

# WENTWORTHVILLE TOWN CENTRE

## TRAFFIC AND TRANSPORT STRATEGY

FOR  
**HOLROYD COUNCIL**



**BITZIOS**  
consulting

Gold Coast  
Suite 26, 58 Riverwalk Avenue  
Robina QLD 4226  
P: (07) 5562 5377  
W: [www.bitziosconsulting.com.au](http://www.bitziosconsulting.com.au)

Brisbane  
Level 2, 428 Upper Edward Street  
Spring Hill QLD 4000  
P: (07) 3831 4442  
E: [admin@bitziosconsulting.com.au](mailto:admin@bitziosconsulting.com.au)

Sydney  
Studio 203, 3 Gladstone Street  
Newtown NSW 2042  
P: (02) 9557 6202

## DOCUMENT CONTROL SHEET

### Issue History

| Report File Name   | Prepared by | Reviewed by | Issued by  | Date      | Issued to                            |
|--|-------------|-------------|------------|-----------|--------------------------------------|
| P2123.001R Wentworthville Town Centre Traffic and Transport Strategy | D. Bitzios  | S. Brooke   | D. Bitzios | 22/9/2015 | Natalie Stanowski<br>Holroyd Council |
|  |             |             |            |           |                                      |
|  |             |             |            |           |                                      |
|  |             |             |            |           |                                      |

*Copyright in the information and data in this document is the property of Bitzios Consulting. This document and its information and data is for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or in part for any purpose other than for which it was supplied by Bitzios Consulting. Bitzios Consulting makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or its information and data.*

# CONTENTS

|  | Page      |
|--|-----------|
| <b>1. INTRODUCTION .....</b>                             | <b>1</b>  |
| 1.1 BACKGROUND   | 1         |
| 1.2 STUDY PURPOSE  | 2         |
| <b>2. WENTWORTHVILLE TRANSPORT CHARACTERISTICS .....</b> | <b>3</b>  |
| 2.1 TRANSPORT CONTEXT                                    | 3         |
| 2.2 KEY DEMOGRAPHIC DETAILS AND TRENDS                   | 3         |
| 2.3 TRAVEL PATTERNS AND TRENDS                           | 4         |
| <b>3. DEVELOPMENT OPTIONS AND TRANSPORT DEMANDS.....</b> | <b>5</b>  |
| 3.1 DEVELOPMENT OPTIONS                                  | 5         |
| 3.2 TRIP GENERATION ESTIMATES                            | 5         |
| 3.2.1 Residential Trip Generation                        | 5         |
| 3.2.2 Commercial Traffic Generation                      | 6         |
| 3.2.3 Total Traffic Generation                           | 6         |
| <b>4. TRAFFIC STRATEGY .....</b>                         | <b>7</b>  |
| 4.1 REVIEW OF THE CURRENT SECTION 94 SCHEME              | 7         |
| 4.2 TRAFFIC DATA COLLECTED                               | 7         |
| 4.3 INFERRED ARRIVAL AND DEPARTURE PATTERNS              | 8         |
| 4.4 RECOMMENDED TRAFFIC IMPROVEMENT STRATEGY             | 11        |
| <b>5. PARKING STRATEGY.....</b>                          | <b>13</b> |
| 5.1 OFF STREET PARKING                                   | 13        |
| 5.2 ON STREET PARKING                                    | 13        |
| 5.3 INVESTIGATION OF OFF STREET SUPPLY RATES             | 14        |
| 5.3.1 Residential Development Parking Rates              | 15        |
| 5.3.2 Commercial and Retail Development Parking Rates    | 15        |
| 5.4 RECOMMENDED PARKING STRATEGIES                       | 17        |
| 5.4.1 Off Street Parking Rates                           | 17        |
| 5.4.2 Publically Available Off Street Parking Sites      | 17        |
| 5.4.3 On Street Parking                                  | 18        |
| <b>6. PUBLIC TRANSPORT STRATEGY.....</b>                 | <b>20</b> |
| 6.1 WENTWORTHVILLE STATION UPGRADE                       | 20        |
| 6.2 BUS ROUTES AND STOPS                                 | 20        |
| 6.3 RECOMMENDED STRATEGIES                               | 22        |
| <b>7. ACTIVE TRANSPORT STRATEGY.....</b>                 | <b>23</b> |
| 7.1 STRATEGY DEVELOPMENT                                 | 23        |
| 7.2 RECOMMENDED STRATEGIES                               | 24        |
| <b>8. IMPLEMENTATION TIMING CONSIDERATIONS .....</b>     | <b>25</b> |
| <b>9. INTEGRATED STRATEGY SUMMARY .....</b>              | <b>25</b> |

## Appendices

Appendix A: Stapleton Transportation and Planning Reports - Peer Review

## Tables

Table 2.1: Wentworthville v Greater Sydney 2011 JTW Mode Shares

Table 3.1: Expected Development Levels by Option

Table 3.2: Residential Week Day Peak Traffic Generation (1 hour)

Table 3.3: Additional Commercial Peak Traffic Generation (1 hour)

Table 3.4: Total Additional Development Peak Traffic Generation (1 hour)

Table 5.1: Residential Parking Rates Comparison

Table 5.2: Commercial/Retail Parking Rates Comparison

Table 5.3: Recommended Residential Parking Rates

Table 5.4: Recommended Commercial Parking Rates

## Figures

Figure 1.1: Indicative Building Forms by Option

Figure 2.1: Wentworthville Transport Context

Figure 4.1: AM Peak Traffic Survey Results

Figure 4.2: PM Peak Traffic Survey Results

Figure 4.3: Current Traffic – Arrival Patterns

Figure 4.4: Current Traffic – Departure Patterns

Figure 4.5: Current and Additional Volumes by Option (AM Peak)

Figure 4.6: Current and Additional Volumes by Option (PM Peak)

Figure 4.7: Recommended Traffic Improvement Strategy

Figure 5.1: Current Off Street Parking

Figure 5.2: Current On Street Parking

Figure 5.3: Off Street Parking Strategy

Figure 5.4: On Street Parking Strategy

Figure 6.1: Wentworthville Station Upgrade Plan

Figure 6.2: Current Bus Routes and Stops

Figure 6.3: Current Bus Routes and Stops – Dunmore Street West of Station Street

Figure 6.4: Bus Stop Improvement Strategy

Figure 7.1: Existing Cycle Routes and Active Transport Accessibility Constraints

Figure 7.2: Existing Active Transport Permeability Issues

Figure 7.3: Recommended Active Transport Routes

Figure 9.1: Integrated Traffic, Parking and Active Transport Strategy



## 1. INTRODUCTION

### 1.1 BACKGROUND

During the preparation of its Local Environmental Plan 2013, Holroyd City Council (*Council*) raised the idea of increasing building densities in some centres, including Wentworthville, as one method of accommodating the state government's population targets for the city. The degree of community feedback suggested that a more detailed investigation of the issues and needs associated with increasing building densities in Wentworthville was required. To this end, Council subsequently established the *Wentworthville Town Centre Revitalisation Planning Project* to investigate potential development options for Wentworthville.

Economic, urban design and traffic/transport studies were initiated to provide an "evidence-based" assessment of potential development options in terms of their scale, benefits and impacts.

The objectives of the traffic and transport study were defined as to:

- *analyse existing transport conditions (including parking), determine projected transport issues and model transport outcomes within the study area, including consideration of public transport capacity, parking provision and pedestrian/cycling opportunities;*
- *analyse the major issues, development opportunities and constraints for the study area;*
- *determine the traffic and parking implications for Wentworthville Centre should development occur at three various scales;*
- *provide solutions and recommendations that relate to the traffic generation and parking supply, and identify infrastructure (including transport) upgrades required to accommodate the increased level of development that could eventuate;*
- *understand the impact of any planning changes on the transport network in Wentworthville; and*
- *provide recommendations for a future transport network that responds to the built form and community vision.*

In addition to the current planning controls, two "scales" of development are under by Council (also see Figure 1.1):

- **Current:** The current planning controls (typically an FSR of 2.2:1 and maximum 5 storey buildings);
- **Option 1:** mid-rise built form (generally 8 storey height, 6 storeys along the northern side of Dunmore Street, some 12 storey sites and 4 storey street edge); and
- **Option 2:** mid-rise but with taller heights allowed at key locations (generally 8 storey height, 6 storeys along the northern side of Dunmore Street, some 12 and 18 storey sites and 5 storey street edge).



Source: Architectus

**Figure 1.1: Indicative Building Forms by Option**

Given the above study objectives and options, the outputs required of this study were to define:

- the traffic and transport upgrades needed for each mode of transport for each option including likely costs and priorities;
- defining appropriate development parking rates considering traffic management needs and the economic feasibility of development; and
- Identifying off street and on street parking infrastructure requirements for each option.

## 1.2 STUDY PURPOSE

Bitzios Consulting was initially commissioned to undertake a Peer Review of previous work undertaken by Stapleton Transportation and Planning (ST&P) Pty Ltd. A preliminary scan of the documentation provided suggested that the Peer Review work would need to re-organise and supplement the ST&P work (in addition to reviewing it) in order to provide the types of outputs the Council needed to progress with the broader Wentworthville Town Centre Revitalisation Planning Project.

In view of this, this report provides the Traffic and Transport Strategy for the development options for the Wentworthville Town Centre and makes recommendations that council may carry forward to subsequent deliberations for the project. The review of the ST&P project reports is provided in Appendix A.

This report is structured as follows:

- Chapter 2 outlines the current transport characteristics of the centre and how it sits within the regional context;
- Chapter 3 assesses the likely increases in traffic transport demands associated with the proposed development options;
- Chapter 4 provides a *Traffic Strategy* for Wentworthville and specific requirements for each option;
- Chapter 5 provides the *Parking Strategy* for each option considering site-based off street parking, “communal” off street parking, commuter-specific parking (i.e. Park and Ride) and on street parking supply and management (including loading bays and disabled parking);
- Chapter 6 provides a *Public Transport Strategy* identifying potential bus stop/route improvements (recognising that route planning is primarily a TfNSW consideration);
- Chapter 7 provides an *Active Transport Strategy* to improve accessibility within the centre, to/from the centre and between the centre and the rail station;
- Chapter 8 discussed implementation considerations; and
- Chapter 9 integrates the findings into a coherent “master plan” of traffic and transport improvements.

## 2. WENTWORTHVILLE TRANSPORT CHARACTERISTICS

### 2.1 TRANSPORT CONTEXT

Wentworthville is located approximately 27 km from the Sydney CBD and is located two train stations to the west of Parramatta Station. Its proximity to Westmead and Parramatta means that it is an ideal location for housing employees of these areas, and with good road and rail access to the broader western region of the Western Sydney area.

The town centre is bounded by the Western rail line to the north. The rail line connects to Penrith in the west and to key centres such as Strathfield, Burwood and the CBD in the east.

The Cumberland Highway runs along the western fringe of the centre and the M4 and the Great Western Highway are within 1 km south of the centre. With the implementation of WestConnex, travel to the Airport and surrounding areas will be much faster. Furthermore, Macquarie Park and Macquarie University are within 10km from the centre.

Overall, Wentworthville is in a highly accessible location by car and by train providing an ideal opportunity to capitalise on the benefits of this accessibility. The location of the Wentworthville Town Centre in the context of the broader road and rail system is shown in Figure 2.1.

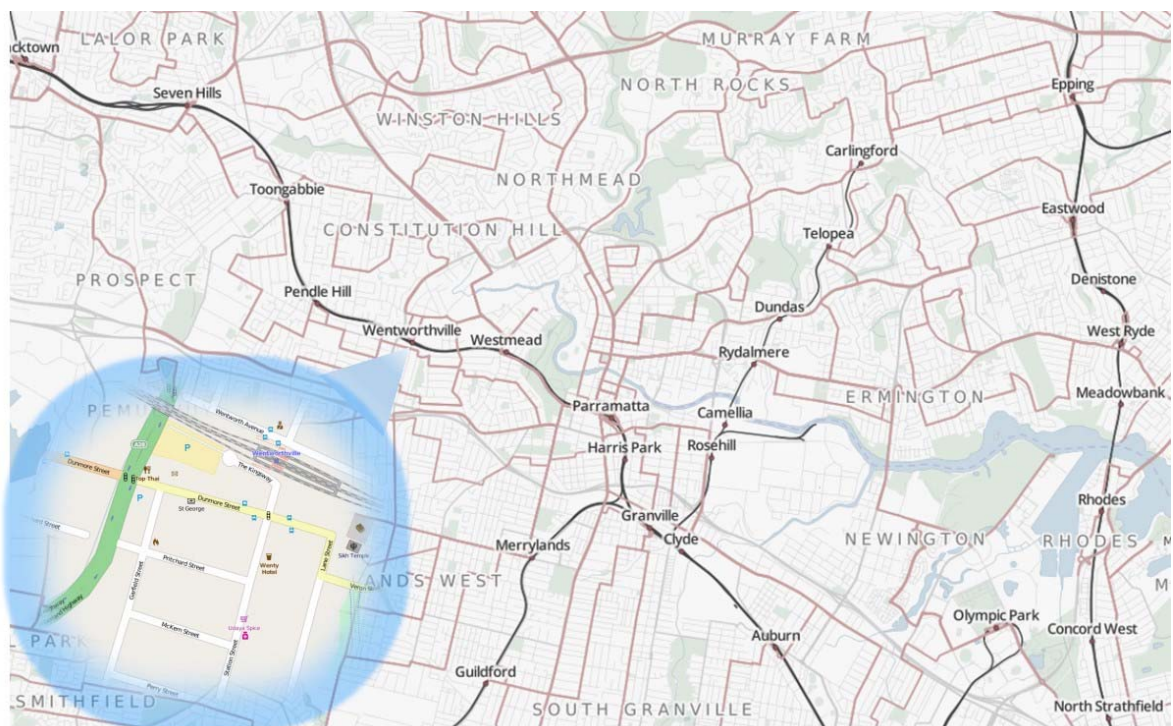


Figure 2.1: Wentworthville Transport Context

### 2.2 KEY DEMOGRAPHIC DETAILS AND TRENDS

In the 2011 Census (<http://www.abs.gov.au/census>) Wentworthville (suburb) has a population of 10,588 persons, had 3993 dwellings and a median age of 34, compared to the Greater Sydney average of 36. Whilst median weekly income was 91% of that of Greater Sydney, monthly mortgage repayments were 94% and median weekly rent at 97% suggesting a lower level of disposable income available for transport. With an average persons per household of 2.8 (slightly higher than the Greater Sydney average), but a car ownership of 1.4 cars per household (compared to 1.8 for Greater Sydney), the data suggests a greater propensity to use non-car modes in Wentworthville than on average in Greater Sydney.



Wentworthville has a greater level of full time employed persons than Greater Sydney (65% compared to 62%) and higher a unemployment proportion (8% compared to 6%) highlighting a lower part time employed proportion of 23% compared to 27% for Greater Sydney.

In terms of car ownership trends, between 2001 and 2011 Wentworthville has been steadily increasing its car ownership per household from 1.19 to 1.23 (2006) to 1.40.

## 2.3 TRAVEL PATTERNS AND TRENDS

In terms of mode shares for the Journey to Work, Table 2.1 provides the data from the 2011 ABS Census.

**Table 2.1: Wentworthville v Greater Sydney 2011 JTW Mode Shares**

| Mode              | Wentworthville | Greater Sydney |
|-------------------|----------------|----------------|
| Car, as driver    | 61%            | 70%            |
| Train             | 26%            | 12%            |
| Car, as passenger | 6%             | 7%             |
| Train, bus        | 4%             | 6%             |
| Walked only       | 3%             | 5%             |

Table 2.1 shows that Wentworthville has a significant outbound rail commuter market. Car modal shares for JTW have stayed fairly constant since 2001 despite increases in car ownership over this period with shares of 66% in 2001, 62% in 2006 and 61% in 2011.

This may be a "bottoming out" of car mode shares with most people who can use train to access workplaces doing so and hence increasing train modal share in the future could be reliant on nearby centres located near rail stations increasing their employment, or, the persons attracted to new residential developments in Wentworthville in part relocating there due to the presence of the rail station.



### 3. DEVELOPMENT OPTIONS AND TRANSPORT DEMANDS

#### 3.1 DEVELOPMENT OPTIONS

The current planning controls for the Wentworthville Town centre are typically a FSR of 2.2:1 and maximum 5 storey buildings. Two alternative development options are being considered by Council, namely:

- **Option 1:** mid-rise built form (generally 8 storey height, 6 storeys along the northern side of Dunmore Street, some 12 storey sites and 4 storey street edge); and
- **Option 2:** mid-rise built form but with taller heights allowed at key locations (generally 8 storey height, 6 storeys along the northern side of Dunmore Street, some 12 and 18 storey sites and 5 storey street edge).

Table 3.1 contains an estimate of the expected commercial floor areas and numbers of units under each option.

**Table 3.1: Expected Development Levels by Option**

| Development Option | Residential Units | Commercial GFA (sqm) |
|--------------------|-------------------|----------------------|
| Current controls   | 1,487             | 41,416               |
| Option 1           | 2,118             | 33,672               |
| Option 2           | 2,266             | 31,183               |

Source: Architectus

Commercial floor area includes both retail and office space

There is very little existing residential development in the areas where the new residential units are proposed and these units can therefore be considered additional to existing supply. In terms of the commercial area, there is approximately 25,000 sqm GFA currently in the centre which would be replaced with the GFA proposed under each option in Table 3.1.

Table 3.1 shows that some of the commercial space contained in the current DCP is reduced under Options 1 and 2 with significant increases in residential units proposed under these options.

#### 3.2 TRIP GENERATION ESTIMATES

##### 3.2.1 Residential Trip Generation

The RMS Technical Direction No. 13\_04 dated May 2013, identifies traffic generation rates and private vehicle modal shares of 10 high density residential developments across NSW. In reviewing this data, Rockdale currently has the closest non-car mode shares to Wentworthville at 43%. It is conceivable that Wentworthville may move from 39% to 47% non-car mode shares with increased high density development. That is, new development (about 50% increase in dwellings in Wentworthville over current dwellings) might relate to a 60% non-car mode share.

On this basis, peak hour traffic generates of the new high density development would approach those of Chatswood and Parramatta residents which show about **0.2 car trips per unit per hour**. Typically in the morning peak 80% of residential trips are "out" and 20% are in whereas in the evening peak, 70% are in and 30% are out. These proportions have been applied to determine the additional residential traffic generation as shown in Table 3.2.

Whilst the peak periods extend for much longer than one hour, peak one hour volumes have been used for ease of intersection analysis and capacity calculations which are typically based on hourly flows.

Table 3.2: Residential Week Day Peak Traffic Generation (1 hour)

| Development Option | Residential Units | Peak Hour Traffic Generated | AM in | AM out | PM in | PM out |
|--------------------|-------------------|-----------------------------|-------|--------|-------|--------|
| Current controls   | 1,487             | 297                         | 59    | 238    | 208   | 89     |
| Option 1           | 2,118             | 424                         | 85    | 339    | 297   | 127    |
| Option 2           | 2,266             | 453                         | 91    | 363    | 317   | 136    |

### 3.2.2 Commercial Traffic Generation

The RMS Technical Direction No. 13\_04 identifies the traffic generation for retail and commercial uses across NSW. Typical daily traffic generation rates considering the scale and function of the Wentworthville Centre in the future are:

- 3 trips per 100sqm GFA for shopping centres; and
- 2 trips per 100sqm GFA for commercial offices.

Applying these rates to the additional commercial area expected under each option and considering peak hour in/out splits, the likely additional traffic generation for the study area is shown in Table 3.3. That is, the traffic generated by the options would be in addition to existing through traffic within the centre.

Table 3.3: Additional Commercial Peak Traffic Generation (1 hour)

| Development Option | Commercial GFA (sqm) | Additional Commercial GFA (sqm) | AM Peak Traffic | PM Peak Traffic | AM in | AM out | PM in | PM out |
|--------------------|----------------------|---------------------------------|-----------------|-----------------|-------|--------|-------|--------|
| Current controls   | 41,416               | 1,035                           | 213             | 410             | 171   | 43     | 205   | 205    |
| Option 1           | 33,672               | 842                             | 113             | 217             | 90    | 23     | 108   | 108    |
| Option 2           | 31,183               | 780                             | 80              | 155             | 64    | 16     | 77    | 77     |

### 3.2.3 Total Traffic Generation

By combining the data in Tables 3.2 and 3.3, the estimated total additional development traffic associated with each option is calculated in Table 3.4.

Table 3.4: Total Additional Development Peak Traffic Generation (1 hour)

| Development Option | AM Peak Traffic | PM Peak Traffic | AM in | AM out | PM in | PM out |
|--------------------|-----------------|-----------------|-------|--------|-------|--------|
| Current controls   | 511             | 708             | 230   | 281    | 414   | 294    |
| Option 1           | 536             | 640             | 175   | 361    | 405   | 235    |
| Option 2           | 534             | 608             | 155   | 379    | 395   | 213    |

Table 3.4 demonstrates that whilst the current controls result in less residential development than the other options, their high level of commercial development means that on balance, the application of the current controls generates slightly more peak traffic than the two options under consideration. This is also the case when comparing Option 1 to Option 2. Overall though, when considering existing levels of traffic, the additional traffic generated by any of the current controls and the two options would have a similar impact on the local road system.

## 4. TRAFFIC STRATEGY

### 4.1 REVIEW OF THE CURRENT SECTION 94 SCHEME

The current Section 94 scheme for Wentworthville is based on the following road network improvements and reasoning, from the Arup Report of 3<sup>rd</sup> April 2013:

- **Cumberland Highway/Dunmore Street** – did not identify any capacity improvements apart from some signal timing offset adjustments along the Cumberland Highway. These changes would be expected to have a minimal benefit to traffic operations in the area as the intersection with Dunmore Street operates at capacity in peak periods;
- **Station Street/Dunmore Street** – recommended to extend the no parking areas back from the intersection to provide more turn lane capacity given the expected growth at this location. This fails to recognise the presence of bus stops in this area on Dunmore Street and the issues with relocating these stops away from this preferred location. Also, on street parking spaces on Station Street are at a premium and removal of any bays would be undesirable;
- **Veron Street/Lane Street** intersection – a roundabout has been proposed; and
- **Garfield Street/Dunmore Street** – proposed widening in Dunmore Street for a right turn lane into Garfield Street, although the right turn has been subsequently banned.

### 4.2 TRAFFIC DATA COLLECTED

The previous ST&P study undertook traffic surveys covering the AM Peak (0700 – 0900) and PM Peak (1600-1800). These traffic counts identified the peak hours at the Station Street/Dunmore Street intersection to be:

- **AM:** 0800-0900; and
- **PM:** 1700-1800.

At the Cumberland Highway/Dunmore Street intersection, Cumberland Highway traffic patterns provided peak periods of:

- **AM:** 0730-0830; and
- **PM:** 1630-1730

The traffic survey results for the individual peak hours at each intersection are shown for the AM peak in Figure 4.1 and for the PM peak in Figure 4.2. ST&P data appeared reasonable and has been used to inform the analysis within this peer review report.

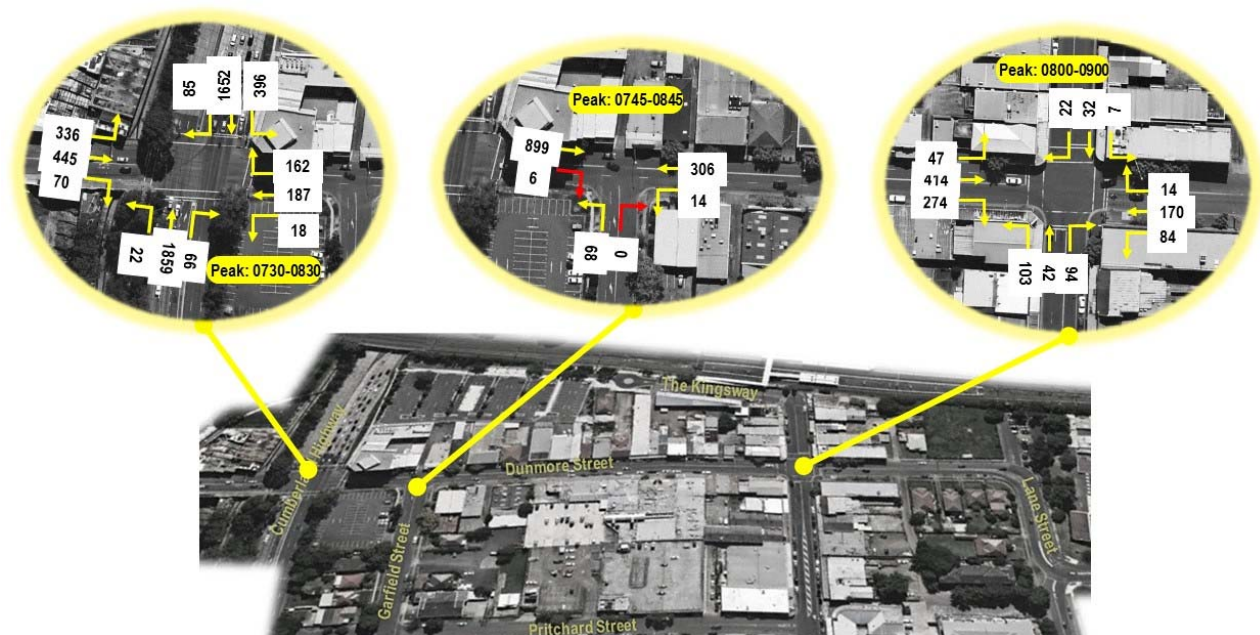


Figure 4.1: AM Peak Traffic Survey Results





Figure 4.2: PM Peak Traffic Survey Results

The traffic survey data suggests:

- most of the traffic entering Dunmore Street from the Cumberland Highway intersection does so from the north and west, with a reasonably small volume from the south;
- traffic flow in Dunmore Street is predominantly eastbound in the morning peak and highlights a reasonable level of “through traffic” to Station Street and Veron Street. This finding is on the basis that there is limited locally generated traffic in the morning peak as many of the shops and eateries are not open;
- in the afternoon peak, with retail activities in Wentworthville more “active” than in the morning peak, traffic flow on Dunmore Street is directionally balanced, with westbound “through” traffic matched by eastbound local traffic accessing and circulating the centre. An estimate of the proportion of through traffic in Dunmore Street (based on limited data) is about 50%, which is still reasonably high for a town centre; and
- With the Cumberland Highway/Dunmore Street intersection catering for over 5,000 vehicle movements in each peak hour s a four-way intersection, it is inevitable that its configuration is over capacity in peak hours.

#### 4.3 INFERRED ARRIVAL AND DEPARTURE PATTERNS

The traffic count data has been used to identify the general arrival and departure distribution for traffic entering and leaving the Wentworthville Town Centre. These patterns are shown in Figure 4.3 and Figure 4.4.



Figure 4.3: Current Traffic – Arrival Patterns





Figure 4.4: Current Traffic – Departure Patterns

Figure 4.3 suggests that about two-thirds of arriving traffic in the morning peak does so via the Cumberland Highway intersection, with this traffic equally split between Dunmore Street west of the Cumberland Highway and the left turn from the Cumberland Highway north. The arrival pattern is largely reversed in the PM peak with only 39% of arrivals to the area coming from the Cumberland Highway intersection. This suggests a reasonable volume of “tidal” through traffic in the area in peak periods.

Figure 4.4 also provides some interesting insights into movement to/from and through the area. In the PM peak, 50% of the departures are to the east and south, whilst in the AM peak this increases to 70%. What this suggests is the mix of local and through traffic in much greater in the PM peak, which is expected due to the low level of retail/commercial activity in the morning peak between 0730 and 0830.

Comparing the in and out proportions suggests that in the AM peak, most of the traffic on Dunmore Street is through traffic, whilst a reasonably high proportion of PM peak traffic on Dunmore Street is through traffic. Numberplate surveys would be required to draw more definitive conclusions on the mix of local and through traffic.

Figure 4.5 and Figure 4.6 show the effects of the additional development-option traffic on the existing traffic at the Cumberland Highway/Dunmore Street and Dunmore Street/Station Street intersections if there was no growth in “through” traffic in the future over current levels and current traffic distributions prevailed.



Figure 4.5: Current and Additional Volumes by Option (AM Peak)



**Figure 4.6: Current and Additional Volumes by Option (PM Peak)**

Dunmore Street is already carrying in the order of 600 vehicles per hour (vph) per direction in the PM peak. The proposed development would add about another 150 vph each way. With on street parking and pedestrian movements, this level of traffic would be expected to reach the capacity of this link with regular queuing occurring.

The intersection of the Cumberland Highway/Dunmore Street is already at capacity in peak periods with long queues resulting. The additional traffic generated by the development option would add in the order of 200-300 vehicle movements to this intersection in each peak (about 5% more) which will inevitably increase queues and delays at this location by at least this amount.

The Station Street/Dunmore Street intersection is also quite busy in peak periods as well, with pedestrian crossing demands affecting traffic capacity. An extra 400 vph in the PM peak equates to about an extra 25% more traffic through this intersection and with even more pedestrians present with development in the area, delays would be expected to increase significantly.

Station Street would also be expected to increase from 400 vph (PM peak southbound) to close to 500 vph (PM peak southbound).

On the basis of these volumes, there appears merit in reducing/removing a proportion of through traffic from the Dunmore Street-Station Street route. As local traffic generation grows and redevelopment occurs, the importance of through traffic on Dunmore Street-Station Street for "pass-by" trade will diminish and the importance of better catering for local pedestrian cross-movements and on-street parking movements will increase. Also, the ease and legibility of access/egress to off street parking areas without having to traverse through long sections of Dunmore Street or Station Street will also become more important as local traffic grows.

The removal of through traffic from the centre is being suggested as a longer term proposal, which requires a certain critical mass of development to occur within the centre so that the removal of pass-by trade due to through traffic is readily replaced by "walk-up" trade from surrounding apartments or car-based visitors making multi-purpose trips within the centre.

#### 4.4 RECOMMENDED TRAFFIC IMPROVEMENT STRATEGY

The recommended traffic improvement strategy is shown in Figure 4.7.

Key elements of the strategy include:

- a “bypass” of Dunmore Street and part of Station Street with a new link connecting Pritchard Street to Veron Street and a new set of traffic signals at Station/Pritchard/New Link. The new link would be located immediately to the north of the hotel, and would incorporate the vacant site to the north and potentially the hotel driveway as well. The orientation and location of any impacted off street parking in this area would also need to be further considered.  
The purpose of this link is to allow traffic not associated with the centre to not have to drive through it, freeing up road space for parking, pedestrians and bus movements. This has been proposed as a potential long term strategy that will require further modelling, design, costing and impact assessment to understand the full extent of its impacts and benefits. It is difficult to estimate at this stage what level of traffic diversion would be achievable on the bypass however current estimates of through traffic of between 50% and 70% of total traffic on Dunmore Street could be relocated (subject to more detailed concept specification and associated modelling).  
The bypass link would connect into Lane Street and could be incorporated into a revised design for the proposed Lane Street/Veron Street roundabout (section 94 scheme recommendation);
- left in/out off the Cumberland Highway at the Commuter Car Park and extending The Kingsway through to this connection as a roadway). This will take pressure off the Cumberland/Dunmore intersection which is already at capacity and improve commuter parking access whilst “activating” the Kingsway frontage. The feasibility of re-introducing these movements and retuning the western end of the Kingsway to a road will require modelling, design and impact assessment, particularly in terms of how the loss of existing commuter parking can be minimised or completely mitigated, and quantifying the benefits to the Cumberland Highway/Dunmore Street intersection due to this proposal. The potential for a larger combined commuter/shopping car park on the existing commuter parking site would also need to be included in these considerations given the additional traffic that such a facility would generate as the centre redevelops and intensifies;
- a streetscaping and LATM strategy for Dunmore Street and Station Street and the eastern end of The Kingsway to allow a 40 kph High Pedestrian Activity Area (HPAA) scheme to be introduced in these streets; and
- lane ways as shared zones to provide local access and, in particular, allow for improved pedestrian movements and better access for servicing of individual development sites. The exact location of these and their configuration would need to be flexible and adapt to the specifics of development site needs in the area, whilst maintaining the overall intent to increase pedestrian permeability whilst increasing activity fronting this laneways.

The re-orientation of Dunmore Street as part of the bypass concept to include the Garfield Street alignment on approach to the Cumberland Highway introduces opportunities to add another approach lane to the eastern approach to this intersection (note – additional lane not shown on Figure 4.7 and requires further assessment before inclusion). This option would not be possible under the current alignment of Dunmore Street. The additional approach lane could extend approximately 60m and would allow the Dunmore Street approach to the Cumberland Highway to include a left-through lane, a through-right lane and a right turn lane. This would facilitate more traffic leaving Dunmore Street for the same “green time” which is a key issue in the afternoon peak.

The potential left in/left out at the Kingsway would also take pressure off the left turns from Dunmore into Cumberland (a particular issue in the AM peak). The feasibility of these improvement would need further design, estimates and impacts assessment, including discussions with the RMS. Local area traffic modelling would also assist in identifying the degree of improvement in traffic operations with these initiatives.

Overall, it is difficult to specify a “target” LOS for the centre in terms of traffic operations as this varies depending on the function of each street/road in the network. In general, the Cumberland Highway intersection should target a LOS D in peak periods, whilst the Garfield-Pritchard “bypass” intersections should target a LOS B to encourage their use. Dunmore Street intersections should not have a target LOS given the intent of this route to primarily cater for local traffic circulation and pedestrians.



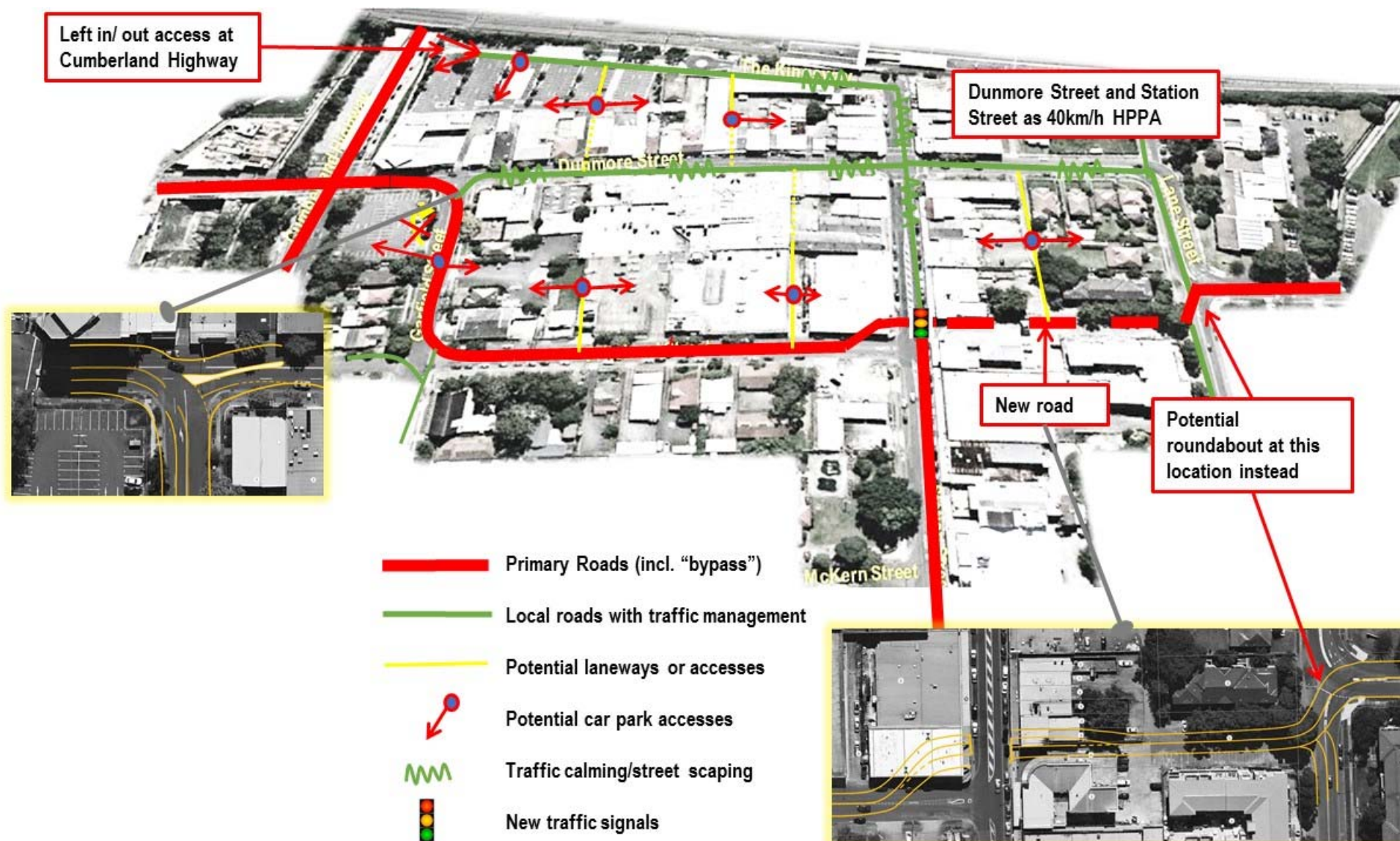


Figure 4.7: Recommended Traffic Improvement Strategy



## 5. PARKING STRATEGY

### 5.1 OFF STREET PARKING

Figure 5.1 shows the locations of current publically-available off street parking supply, by parking duration allowed.



Figure 5.1: Current Off Street Parking

ST&P undertook parking occupancy surveys which identified that off street occupancies reached about 50% of the total off street capacity for <3 hour stay. The longer stay off street parking was at 74% utilisation; although this occupancy is dominated by the rail station commuter parking which is almost full for the entire day. In particular, the data suggests that the "Mall" and the "Supermarket" car parks have a lot of spare capacity which suggests that users of these sites may be parking on street for "drop-in" trips due to the convenience of doing so and the circuitous nature of access to these car parks.

With redevelopment of the area, it is expected that existing parking will be demolished and new parking provided with a mix of retail and resident parking in basements as part of each development. Rather than each development providing its own "incremental" retail/commercial parking, there would be benefits in a single major off street car park south of Dunmore Street and a single car park north of Dunmore Street, presumably tied in with a major development in each area.

For developments along the Station Street "strip" south of Pritchard Street, these would more likely rely on development-specific off street parking.

### 5.2 ON STREET PARKING

The locations of available on street parking are shown in Figure 5.2.

The on street parking needs of the area will evolve as the nature, scale and location of development evolves in the centre. Some principles worth considering include:

- with the "localisation" of Dunmore and Station Street as part of the traffic strategy, maximising on street parking by introducing 90 degree parking along development frontages would have benefit;
- introducing consideration of 30 minute parking in some locations as development occurs; and
- improve signage and access to off street parking areas to reduce the pressure on on-street parking.



Figure 5.2: Current On-Street Parking

### 5.3 INVESTIGATION OF OFF STREET SUPPLY RATES

The land use options investigated were:

- **Current situation:** the current planning controls (typically an FSR of 2.2:1 and maximum 5 storey buildings);
- **Option 1:** mid-rise built form (generally 8 storey height, 6 storeys along the northern side of Dunmore Street, some 12 storey sites and 4 storey street edge); and
- **Option 2:** mid-rise built form but with taller heights allowed at key locations (generally 8 storey height, 6 storeys along the northern side of Dunmore Street, some 12 and 18 storey sites and 5 storey street edge).

### 5.3.1 Residential Development Parking Rates

The current Wentworthville DCP rates are summarised in Table 5.1, along with rates for a selection of other centres in Sydney.

**Table 5.1: Residential Parking Rates Comparison**

| Component           | Current DCP<br>Wentworthville <sup>1</sup> | City of<br>Ryde<br>Draft<br>DCP <sup>2</sup> | Green<br>Square <sup>2</sup>          | North<br>Sydney <sup>2</sup> | RMS<br>(sub-reg.) <sup>2</sup> | Wolli<br>Creek <sup>2</sup> | West<br>Rhodes <sup>2</sup> | Bondi<br>Junction <sup>2</sup> |
|---------------------|--|--|---------------------------------------|------------------------------|--------------------------------|-----------------------------|-----------------------------|--------------------------------|
| Studio/1brm         | 0.8 – 1.0                                  | 0.6  | 0.5                                   | 1                            | 0.6                            | 1                           | 1                           | 0.6                            |
| 2 brm               | 1.0 – 1.5                                  | 0.9  | 1.0                                   | 1                            | 0.9                            | 1                           | 1.5                         | 0.8                            |
| 3 brm               | 1.2 – 2.0                                  | 1.4  | 1.2                                   | 1.5                          | 1.4                            | 2                           | 2                           | 1.2                            |
| 4+ brm              | 1.5 – 2.0                                  | 1.4  | 1.2                                   | 1.5                          | 1.4                            | 2                           | 2                           | 1.2                            |
| Visitors per<br>brm | 0.2 – 0.5                                  | 0.1  | 0.2 < 0<br>0.125, 30-70<br>0.067, >70 | 0.25                         | n.a.                           | n.a.                        | n.a                         | n.a                            |

<sup>1</sup> Minimum and maximum volume currently specified

<sup>2</sup> Minimum rates recommended

n/a = not available

The areas selected for comparison have been chosen to reflect how even the most transit-friendly locations have maintained relatively high parking rates for 2+ bedroom units, most likely due the difficulty in selling these units in these types of areas without a car space.

A review of rates from a variety of other areas suggests a general trend of reducing historical rates for one and two bedroom units that have access to a major public transport system (e.g. a train station). Further discounting appears to be provided for areas that are close to the CBD or have a large volume, wide variety and mix of shopping and entertainment options within walking distance.

The setting of appropriate parking rates requires consideration of a number of inter-related factors, such as:

- encouraging a reduction in car ownership as residential intensification occurs around centres by disproportionately attracting buyers who would or could rely on fewer vehicles;
- ensuring that developments are not required to provide too much parking which makes development costs excessive; and
- ensuring that parking requirements are not forced too low (i.e. using maximum rates) such that these units are not saleable.

There is no “science” to the setting of appropriate parking rates, particularly in an area like Wentworthville where the scale of the proposed changes is significant in terms of the type of development product being introduced. Rather, rates are typically developed using experienced-based judgement considering current transport usage characteristics and the degree to which these will change with the proposed development option, which may in fact influence the demographic profile of the area over time.

Car use for the Journey to Work (JTW) from Wentworthville comprised 67% of all JTW trips from the area in 2011, with 26% for train and only 7% for all other modes. This demonstrates the heavy reliance on train for non-car usage and hence for the difficulty in reducing parking rates significantly for residential uses. Higher densities may however introduce more “train-dependent” commuters into the local resident market and would certainly increase the supporting commercial and retail in the centre which would in turn increase walking and cycling usage.

### 5.3.2 Commercial and Retail Development Parking Rates

In a mixed use “town centre” environment it is often very difficult to distinguish between retail and commercial developments and tenancies may shift between the two types of uses over time. Also, there comes a time where parking rates for commercial and retail uses need to transition from being primarily based on mostly on-site parking to being based on “shared centre” parking and providing contributions to

the provision of these centralised public car parks. The renewal of the Wentworthville centre suggests a more aggregate parking form and encouraging “off-site parking” in most locations, particularly for sites centred on Dunmore Street and Station Street.

Furthermore, the parking surveys suggests a current occupancy of about 50% for the off street car parks when excluding the rail commuter car park. This spare off street capacity coupled with the increasing use of local retail by local residents as multi-level apartments are introduced, suggest are more aggressive approach to reducing commercial/retail parking rates, in line with other comparative centres across Sydney. Parking space is expensive and funding excessive off street parking could be detrimental to the rate of evolution of the centre.

Table 5.2 summaries current DCP rates and rates from a selection of other mixed use commercial centres. Rockdale and Hurstville have been selected as they are rail-based centres and have similar levels of car usage to what Wentworthville is expected to have in the future. Epping has been selected as it is a key town centre next to a major employment node, similar to the way Wentworthville is the next station from Westmead.

**Table 5.2: Commercial/Retail Parking Rates Comparison**

| Component               | Current DCP <sup>1</sup> | Hurstville City Centre Draft DCP <sup>2</sup> | Rockdale | Epping  |
|-------------------------|--------------------------|---|----------|---------|
| Ground floor commercial | 1/20 sqm – 1/15 sqm      | 1/100sqm <sup>4</sup>                         | 1/40 sqm | 1/50sqm |
| Above ground commercial | 1/40 sqm – 1/20 sqm      | 1/100sqm <sup>4</sup>                         | 1/40 sqm | 1/50sqm |
| Food and drink          | 1/10 sqm                 | 1/50sqm                                       | 1/40 sqm | 1/30sqm |

<sup>1</sup> Minimum and maximum shown

<sup>2</sup> Effective total based on staff, business and visitor

<sup>3</sup> Effective total based on customer, operational and staff rates for “retail” shown

<sup>4</sup> B4 Zone

If there is an associated strategy to “shift” some on street capacity to off-street usage, then the potential exists to reduce commercial/retail rates substantially.

Also, in a true “town centre” there is no need to distinguish between commercial and retail uses but rather aggregate “non-residential” parking into “mixed use commercial”. Furthermore, whilst we understand the logic between the residential parking rate varying depending of the level of public transport to/from the centre, the nature of access to local commercial and retail uses in Wentworthville are largely independent of public transport and are more dependent on the level of residential development in the walking catchment.



## 5.4 RECOMMENDED PARKING STRATEGIES

### 5.4.1 Off Street Parking Rates

Considering all of these issues/needs and the benefits in a gradual transition of parking rates over time, the rates in Table 5.3 are recommended for residential parking.

**Table 5.3: Recommended Residential Parking Rates**

| Component Type      | Option      |                      |           |           |
|---------------------|-------------|----------------------|-----------|-----------|
|                     | Current DCP | Current DCP-Modified | Option 1  | Option 2  |
| 1 brm unit/studio   | 0.8 - 1.0   | 0.8 - 1.0            | 0.7 - 0.9 | 0.6 - 0.8 |
| 2 brm               | 1.0 - 1.5   | 1.0 - 1.2            | 1.0 - 1.2 | 0.9 - 1.2 |
| 3 brm               | 1.2 - 2.0   | 1.2 - 2.0            | 1.2 - 1.5 | 1.0 - 1.4 |
| 4+ brm              | 1.5 - 2.0   | 1.5 - 2.0            | 1.2 - 1.5 | 1.0 - 1.4 |
| Visitors (per unit) | 0.2 - 0.5   | 0.2 - 0.5            | 0.1 - 0.3 | 0.1 - 0.2 |

*Acceptable (minimum) to High (maximum rates) is the range shown*

Most other parking rate classifications reviewed did not include a 4+ bedroom category and 3+ was the largest category. Consideration should also be given to limiting the highest category to 3+.

If Council's desire is to provide the market mechanisms to encourage Wentworthville to redevelop and renew, we suggest not including maximum rates in the LEP/DCP at this stage of the centre's evolution but to allow for a residential product mix that caters for more than the primary "rail commuter" market.

The commercial rates that are recommended are provided in Table 5.4 and a single minimum rate has been specified for each option.

**Table 5.4: Recommended Commercial Parking Rates**

| Component Type                | Option      |                      |          |          |
|-------------------------------|-------------|----------------------|----------|----------|
|                               | Current DCP | Current DCP-Modified | Option 1 | Option 2 |
| Ground floor commercial (sqm) | 1/20-1/15   | 1/40                 | 1/50     | 1/50     |
| Above ground commercial (sqm) | 1/40 - 1/20 | 1/40                 | 1/50     | 1/50     |
| Food and drink (sqm)          | 1/10        | 1/40                 | 1/50     | 1/50     |

In essence, the current retail and commercial rates in the centre are far too high when comparing current parking supply and office/shop occupation, leading to an over-provision of off street parking and potentially excessive development costs. The recommended rates in Table 5.4 also recognise the progressive increase in the proportion of "walk-up" catchment over time as the centre redevelops and there is also a greater "commercial" component that evolves.

### 5.4.2 Publically Available Off Street Parking Sites

Figure 5.3 provides an indication of the type of off street parking recommended in each location within the study area.

The intent of the strategy is to provide two large "common" parking areas that could be a mix of short term retail/visitor parking, long term employee parking (e.g. leased out) and resident parking (lower floors). The proposed parking station north of Dunmore Street would need to incorporate commuter parking and it may be more effective to separate this area into two parking stations, as is currently the case.

Fringe development sites away from these two major public parking areas would need site-specific for amalgamated sites or for individual sites, as the case may be.

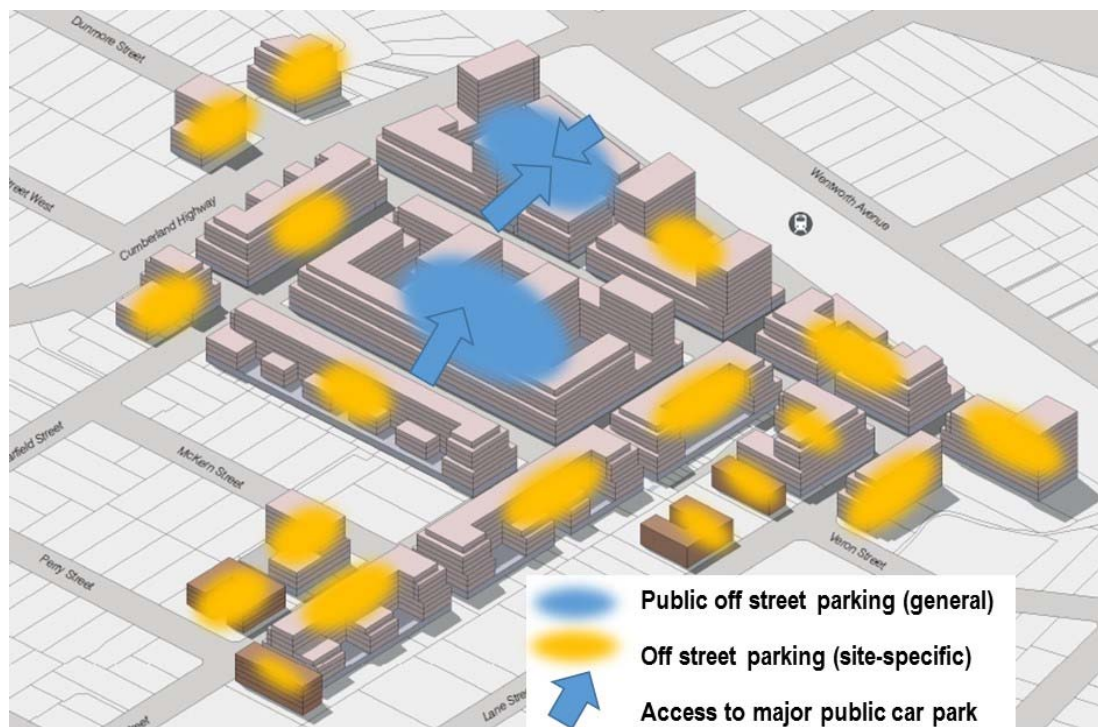


Figure 5.3: Off Street Parking Strategy

#### 5.4.3 On Street Parking

The on street parking strategy is closely aligned to the traffic strategy in Section 4. The strategy is shown in Figure 5.4.



Figure 5.3: On Street Parking Strategy

The strategy aims to maximise the quantity of on street parking for the most active frontages along Dunmore Street and Station Street (north of Pritchard). Architectus has identified a proposal to widen the footpath along the southern side of Dunmore Street to provide a wide pedestrian plaza for a range of purposes, including potentially footpath dining and week-end markets, whilst maintaining the parallel parking along Dunmore Street. An alternative approach to counteract the difficulty in identifying available car parking spaces in long sections of continuous parallel parking, is to provide banks of 90 degree parking separated by paved "platforms" for outdoor dining, landscaping or other uses. This would require a similar strip of land off property on the southern side of Dunmore Street (to the Architectus proposal) but would not achieve the long continuous footpath proposed by Architectus. Rather, the streetscape (including on street parking areas) would be broken up by three raised paved area buildouts spaced every 50m (approx.) and be approximately 20m long.

This strategy also recognises the important traffic carrying function of Pritchard Street in the future and acts to limit on street parking on this street and rather use this road space for cycle lanes and short turning lanes for access to lane ways and car park entrances.

Along Station Street south of Pritchard Street, visitor parking will be required for what is likely to be mostly commercial uses and 2 hour parallel parking would be sufficient in this case.



## 6. PUBLIC TRANSPORT STRATEGY

### 6.1 WENTWORTHVILLE STATION UPGRADE

The state government has committed to the upgrade of Wentworthville Station. The stated purpose of the upgrade project is to: *"improve pedestrian access to and from the station, increase Wentworthville Station's ability to cope with the predicted future customer demands, improve pedestrian flow, passenger information services and wayfinding between transport modes"* (Wentworthville Station Easy Access Upgrade: Determination Report). Figure 6.1 shows what is planned to be constructed.



Figure 6.1: Wentworthville Station Upgrade Plan

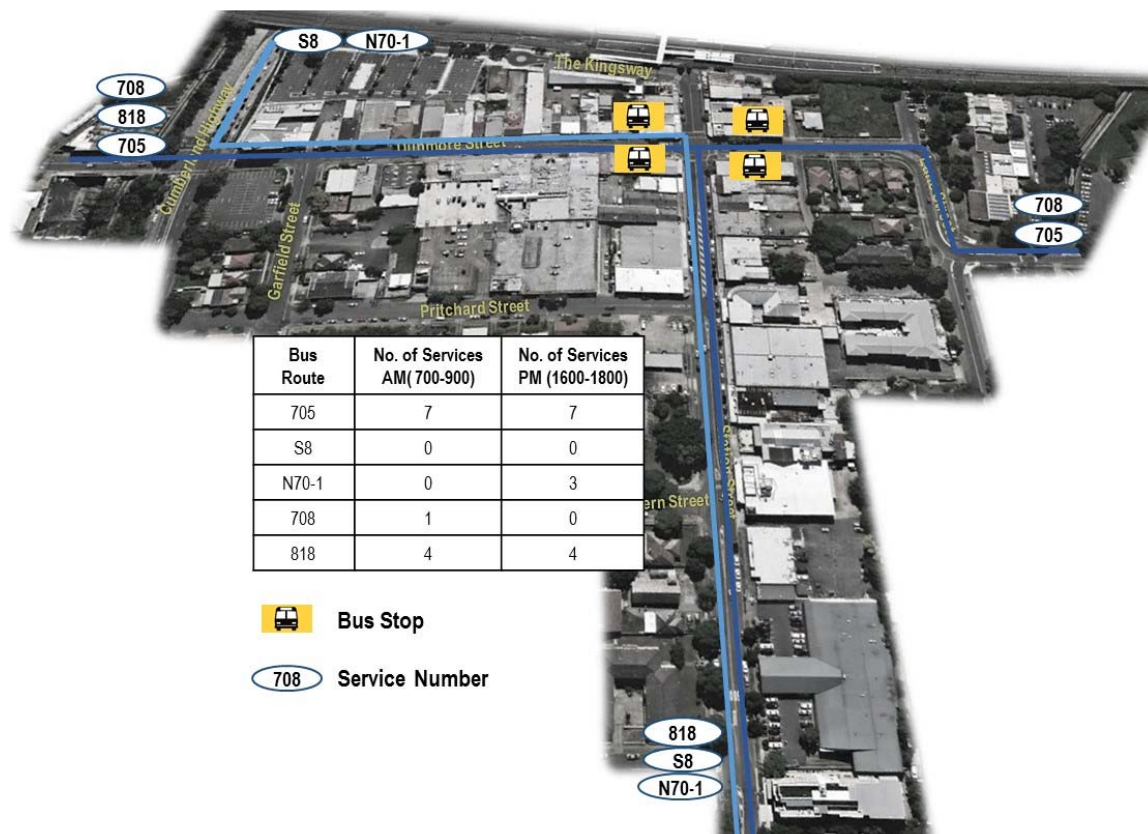
Source: *Wentworthville Station Easy Access Upgrade: Visual Impact Assessment*

The project is essentially improving the appearance and amenity of the station as well as making it easier to find and get to by pedestrians.

### 6.2 BUS ROUTES AND STOPS

The current bus routes and stops are shown in Figure 6.2.





**Figure 6.2: Current Bus Routes and Stops**

The bus stops on Dunmore Street to the west of Station Street are difficult to find with no marked (with line marking) bus zone, as shown in Figure 6.3.



Source: Google Earth

**Figure 6.3: Current Bus Routes and Stops – Dunmore Street West of Station Street**

With redevelopment of the sites fronting these stops opportunities will arise to incorporate improved stop facilities including specific bus bays and seats/shelters and associated landscaping treatment. Maintaining the location of these stops will be important however so that there is relatively close integration with the station, without having to route buses down The Kingsway.

### 6.3 RECOMMENDED STRATEGIES

There are no changes recommended to the locations of the bus stops however redevelopment of sites surrounding the Station Street/Dunmore Street intersection provides an opportunity for improved configurations for these facilities, particularly with the relocation of most through traffic out of Dunmore Street with the Traffic Strategy proposal.

Figure 6.4 shows the indicative bus stop upgrades that are contingent on the Traffic Strategy being implemented.

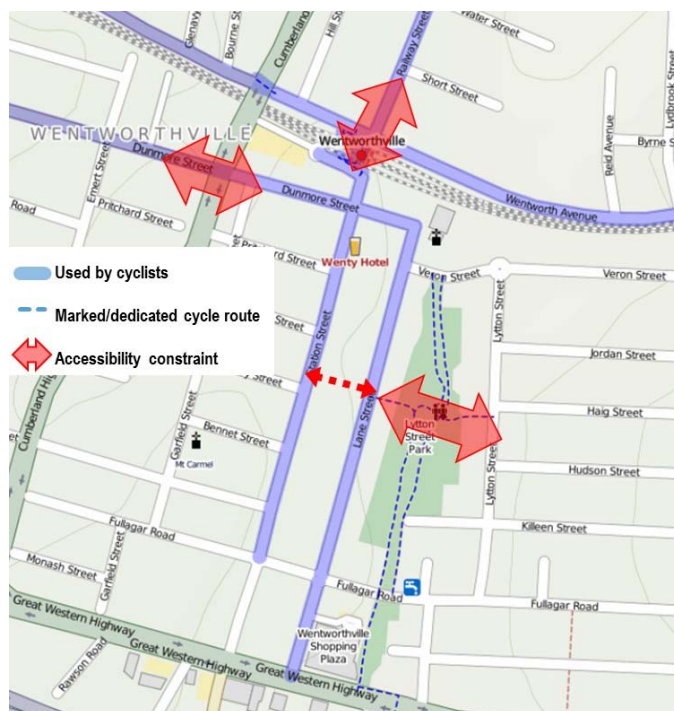


Figure 6.4: Bus Stop Improvement Strategy

## 7. ACTIVE TRANSPORT STRATEGY

### 7.1 STRATEGY DEVELOPMENT

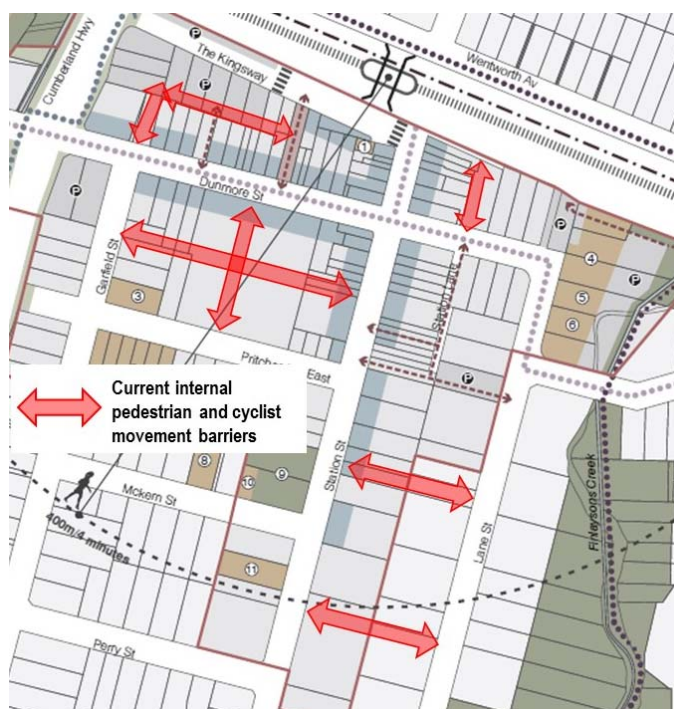
There are pedestrian and cyclist accessibility barriers into the Wentworthville Town Centre from the West (Cumberland Highway), the north (rail line) and the east (Finlayson Creek), as identified in Figure 7.1.



Source of the base map: *OpenStreetmap.org*

**Figure 7.1: Existing Cycle Routes and Active Transport Accessibility Constraints**

Within Wentworthville Town Centre, the movement of pedestrians and cyclists is stifled by relatively poor permeability and large block sizes, as shown in Figure 7.2.



Source of base map: *Architectus*

**Figure 7.2: Existing Active Transport Permeability Issues**



Key principles upon which to base the assessment of new/upgraded pedestrian and cyclist linkages include:

- providing a grid of pedestrian movement opportunities in the core of the Town Centre which ensures connections are available every 50m to 100m (i.e. within observable eye sight);
- activate the pedestrian linkages by creating them as shared zones and promoting some activity fronting them where possible, and as a minimum at their “edges” to the surrounding road system;
- providing a mix of on street and off street cycling opportunities to cater for vulnerable and comfortable users;
- orientate cycling routes with roads, rail lines and creeks for legibility purposes;
- locating cycling routes on roads where there are fewer turning and parking movements to reduce risks to cyclists; and
- understand the needs of different travel markets, such as:
  - Walking from car parks to activities in the centre;
  - Connecting from residences to the rail station;
  - Cycling through the area to access work or education purposes;
  - Cycling through the area for recreational purposes; and
  - Cycling to/from the area.

## 7.2 RECOMMENDED STRATEGIES

The recommended pedestrian and cycling route strategy is provided in Figure 7.3.

Key features include:

- new shared zones linking The Kingsway, Dunmore Street, Pritchard Street, Lane Street, Station Street and Garfield Street for much improved pedestrian permeability;
- key cycle routes on the streets around Dunmore Street as Dunmore Street is expected to have the highest parking turnover and cycling will be safer in the surrounding streets;
- a new connection to/from north of the railway line via the Finlayson Creek underpass;
- pedestrian crossing treatments are likely to be pedestrian refuges, possibly with contrasting paving as volumes would not meet RMS warrants for zebra crossings; and
- cycling could/would also occur in the shared zones but would not be marked/signed specifically as cycle routes.

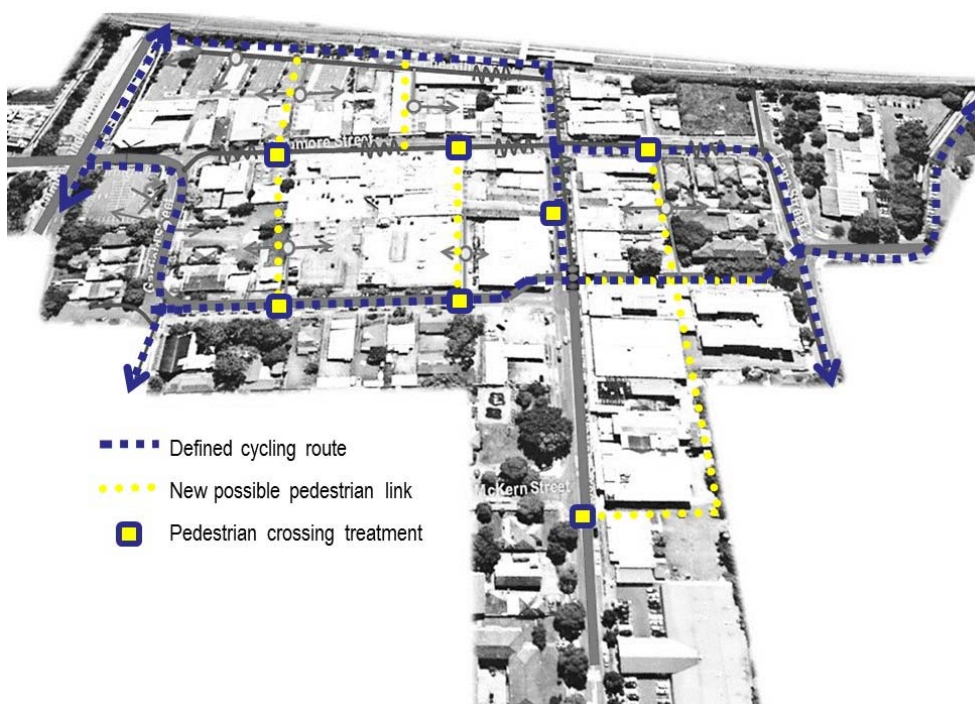


Figure 7.3: Recommended Active Transport Routes

## 8. IMPLEMENTATION TIMING CONSIDERATIONS

The traffic strategy in particular relies upon a number of key sites redeveloping at a similar time, or the construction of “part” facilities such as lane ways for interim parking access until adjoining sites develop and the lane way can be completed through to the next street.

There is little justification for bypassing traffic onto Pritchard Street at this stage and such an improvement would most likely need to tie in with major redevelopment of sites fronting Dunmore Street. Further modelling/analysis would be required to determine the trigger for the level of development in the centre that would justify the need for the bypass, without detrimentally affecting traffic levels on Dunmore Street (for local trade).

The possible conversion of parallel on street parking to 90 degree parking could also be progressively implemented in Dunmore Street (if selected) as amalgamated sites fronting the street redevelop. The proposed bus stop upgrades would similarly be triggered by redevelopment of key sites around the Station Street/Dunmore Street intersection.

The left in/out connection from the Cumberland Highway would need to be negotiated with RMS and further analysis is undertaken to demonstrate its benefits to the RMS intersection of the Cumberland Highway and Dunmore Street and Dunmore Street/Station Street. It may be that the modelling suggests that the left in in particular is not provided until the bypass is in place as it may simply shift some of the through traffic issue from Dunmore Street to the Kingsway.

In essence, the staging of the preferred strategies will require detailed consideration at the time of development of each site, or amalgamated sites, as what elements of the strategy can be constructed where will be highly dependent on the number of sites amalgamated as part of the development.

The off street parking strategy will be particularly challenging to stage-implement. It's timing will rely heavily on the redevelopment of key sites north and south of Dunmore Street as this is where the consolidated public parking is proposed. One advantage is that off street parking is currently over-supplied and hence there is an ability to redevelop parts of the blocks either side of Dunmore Street seeking parking contributions, rather than providing on-site parking, and then using these funds in part to construct the public car parks within the key site areas.

## 9. INTEGRATED STRATEGY SUMMARY

The integrated traffic, parking, public transport and active transport strategy is presented in Figure 9.1.

Key elements are summarised as follows:

- The Wentworthville Centre Bypass with a new signalised intersection at the Pritchard/Station/New Link intersection a new link north of the Hotel on Station Street connecting across to Lane Street (potentially as a roundabout as mooted in the Section 94 scheme, subject to more detailed investigation). The Section 94 funds allocated for the Veron Street/Lane Street roundabout and the Garfield Street/Dunmore Street intersection upgrade could potentially be re-appropriated towards the bypass scheme.
- Speed management treatments, increased pedestrian crossing and streetscaping in Dunmore Street and Station Street (north of Pritchard) to create the environment for a 40 kph High Pedestrian Activity Area (HPAA);
- Major public parking sites limited to the existing commuter car park area and the Mall site as multi-level car parks;
- Increased pedestrian permeability between Pritchard Street, Dunmore Street and the Kingsway and between Station Street and Lane Street;
- Improving the existing four bus stops in Dunmore Street with pavement marking and better definition of stopping areas using landscape treatments; and
- Marked cycle routes on the Kingsway, Pritchard Street, Station Street and Lane Street.

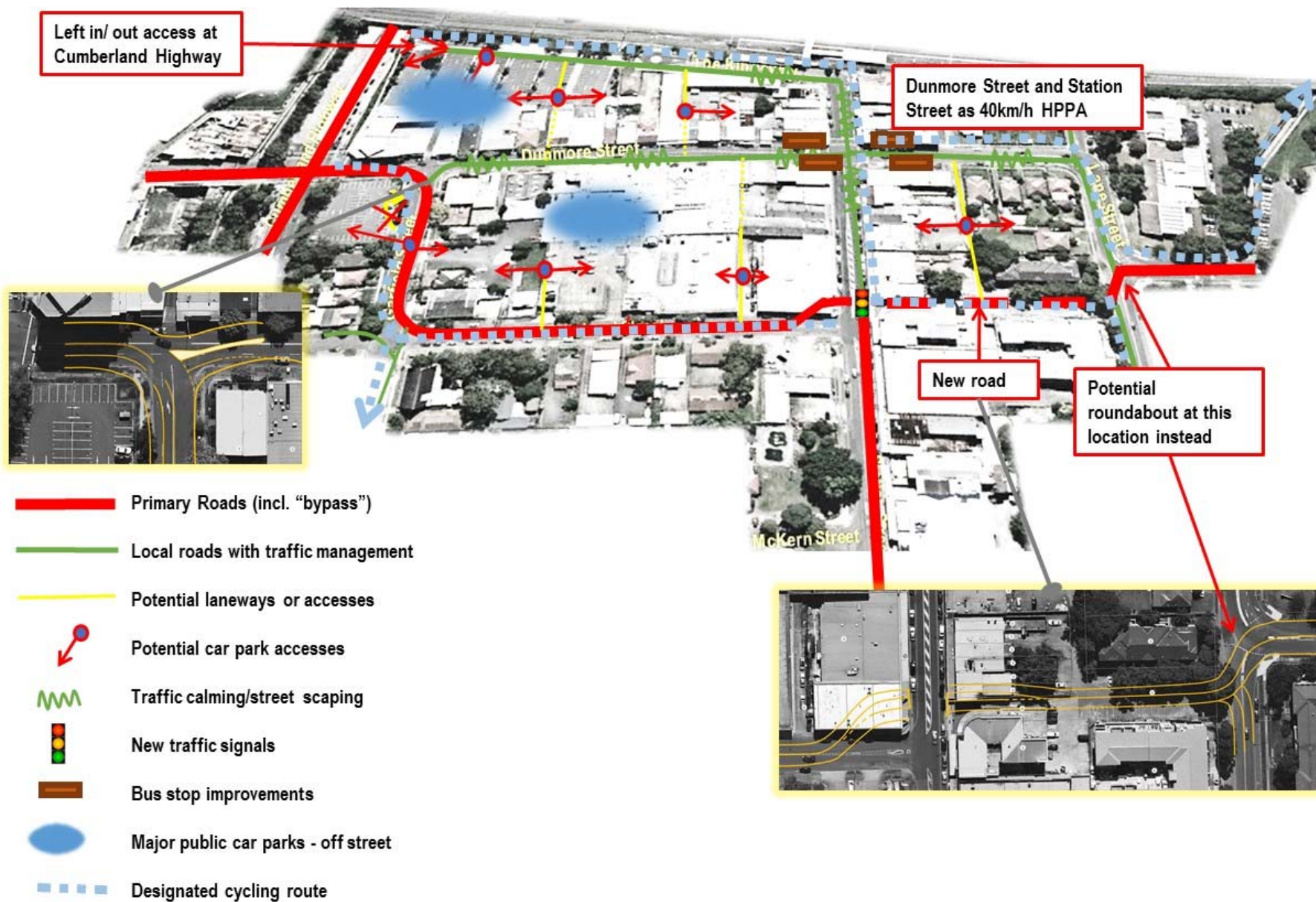


Figure 9.1: Integrated Traffic, Parking and Active Transport Strategy