



## Technical Report - Transport & Parking Upper Gully Strategic Plan - January 2015



movendo

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## 1. EXECUTIVE SUMMARY

This Technical Study has been prepared as a supporting document to inform the City of Knox's preparation of the Upper Gully Strategic Plan. The study focuses on the town centre, train station, Primary School and hospital precincts of Upper Ferntree Gully.

The study includes parking occupancy and traffic survey results, and reviews the provision of sustainable transport options, such as walking, cycling and public transport (bus and train). Recommendations were developed for all modes with the objective of promoting non-motorised travel and enhance the safety and efficiency of the transport network, while also increasing the attractiveness and vibrancy of the area's streets.

The parking occupancy results reveal that the Train Station Car Park exhibits virtually 100% occupancy throughout the day on weekdays. Mount View Road and Rose Street, which provide unrestricted parking in proximity to the town centre and the train station, also exhibit 100% occupancy. However, most other on-street and off-street spaces within the town centre exhibit modest occupancy rates and provide ample parking opportunities.

The on-street and off-street parking areas in the immediate vicinity of the Angliss Hospital exhibited high occupancy rates. Visitors of the hospital park in the paid public car park, which had a peak occupancy rate of 90% during the middle of the day. However, parking demand is significantly reduced (to minimal usage rates) for parking spaces located as close as 250 metres from the hospital. Thus, hospital parking demand does not result in impacts for parents dropping off or picking up children at the nearby Upper Ferntree Gully Primary School. Observations also revealed that the before- and after-school departure phases were extremely well managed and children always crossed Talaskia Road with the assistance of the school crossing supervisor.

Pedestrian footpaths are generally well provided on both sides of most streets. The major exception was the lack of a footpath on the north side of Burwood Highway adjacent to the train station. Other pedestrian safety improvements in the vicinity of the train station and along the south side service road of Burwood Highway are also recommended by this study.

With respect to bicycle infrastructure, off-road trail facilities exist on both sides of Burwood Highway, namely the Belgrave-Ringwood Rail Trail and the Ferny Creek Trail. It is recommended that line marking and directional signage to, and along, these trails be improved in order to promote the use of these trails and direct cyclists from these trails to the train station, the town centre, the hospital and Talaskia Reserve oval and tennis courts. The installation of on-road bike lanes on Burwood Highway are unlikely to be supported by VicRoads given the potential impact to traffic capacity and safety considerations.

Bus stops are currently provided in each direction on the internal road of the train station directly adjacent to the main pedestrian entrance to the station. However, informal (and non-compliant) pedestrian crossing facilities are currently provided in order to encourage passengers to access the westbound bus stop. It is recommended that a formally signed and line marked raised zebra pedestrian crossing be installed to formalise priority for pedestrians over motorists, reduce the speed of motorists at this location, and make pedestrians crossing the road more conspicuous to motorists.

## 1.1. REPORT STRUCTURE

**Section 2** of this report provides an introduction to the project area, background information, methodology and objectives of the study.

**Section 3** summarises extensive parking surveys which were undertaken throughout Upper Ferntree Gully in proximity to the Train Station, the Hospital Precinct and the Town Centre. The surveys included on-street and off-street parking locations. Turnover surveys were undertaken in some locations to gain an understanding of duration of stay and whether motorists were parking beyond posted parking time limits.

**Section 4** summarises manual traffic movement surveys which were undertaken in the vicinity of the Train Station and also at the intersections of Burwood Highway/Dawson Street and Burwood Highway/Rollings Road. These surveys aim to inform the direction of origin for motorists parking at the station and also guide potential intersection modifications which may improve vehicle and pedestrian safety.

**Section 5** provides results of automatic traffic counts undertaken at various locations within the study area to inform patterns of traffic volumes and speeds.

**Section 6** provides a review and analysis of 'Active and Public Transport' options, including pedestrian movements, cycling and public transport (bus and train).

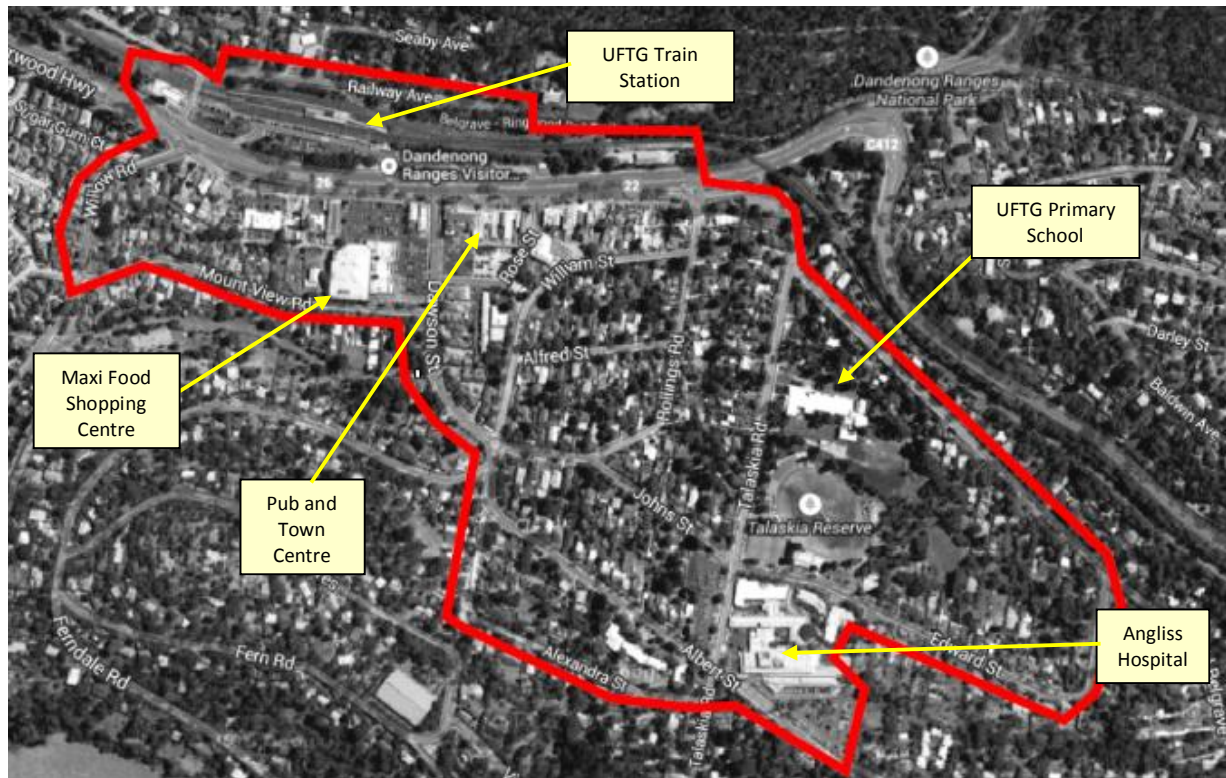
**Section 7** provides potential improvement recommendations.

## 2. INTRODUCTION

### 2.1. PROJECT AREA

The study area is shown in Figure 1 – it includes the Upper Ferntree Gully Train Station, Town Centre, surrounding residential streets and the Primary School and Angliss Hospital precincts.

Figure 1: Study Area



### 2.2. BACKGROUND AND EXISTING INFORMATION

The *'Knox Liveable Street Plan 2012-2022'* describes the many demands on Knox's road and streets network, as well as the opportunities for them to be further improved to better meet the needs and aspirations of the community while considering social, economic and environmental sustainability. The plan includes a key strategic direction to promote 'streets as places', and subsequently make people (on foot) the priority in street design and operation. Other relevant aspirations of this report include:

- More use of streets and an increase in health and well-being of residents;
- Less reliance on car travel for short and medium length trips;
- More nature in our streets;
- More attractive streets to promote business opportunities and local street use;
- Safer streets;
- More pedestrian use in activity and retail hubs, and subsequent rise in retail activity; and
- Streets for services and infrastructure.

In summary, the *'Knox Liveable Street Plan 2012-2022'* provides a direction to promote pedestrian safety and activity by providing safe, attractive, and walkable streets which also promote nature and ecology.

'Plan Melbourne – Metropolitan Planning Strategy 2050' outlines a desire for the suburbs of Melbourne to provide "20 Minute Neighbourhoods". This aims to ensure that people have access to shops, schools, parks, jobs and a range of community services within 20 minutes from their front door. 'Plan Melbourne' provides additional actions to assist in promoting "20 Minute Neighbourhoods", such as making neighbourhoods pedestrian-friendly, supporting local governments to plan and manage their neighbourhoods and accommodating the majority of new dwellings within walking distance of the public transport network.

Upper Ferntree Gully is unlikely to see significant increases in resident population and commercial activity in the foreseeable future. Subsequently, improving existing linkages and providing better connections for residents to access their destinations is of critical importance. In order to achieve "20 Minute Neighbourhoods" for residents and workers of Upper Ferntree Gully, it is imperative that pedestrian links be improved to the train station, to bus stops, to schools, to attractions such as the 1,000 Steps and to the town centre, so that they are safer, more direct and more convenient. Improving links to public transport will assist residents as they travel to jobs at other regional centres and the Melbourne central city. Bike links to and along the existing trails which lead to other regional centres should also be prioritised.

The *'Knox Bicycle Plan Review, 2008'* provides a vision that the City of Knox will, through well planned bicycle networks and programs, increase the use of bicycles for commuting and recreation in a safe, convenient and sustainable manner for residents and visitors. The main aims of the plan are summarised below and align with the vision of the *'Knox Liveable Street Plan 2012-2022'* in regards to prioritising the safety of vulnerable road users and reducing the reliance on private car usage. The plan includes a goal of doubling the number of bike trips to work and increasing the number of children riding to school to 30%. The main aims of the plan are summarised below:

- Reduce the reliance on and use of cars for transport to work, school, shopping and recreation;
- Provide well designed shared paths and on-road lanes that link the Knox communities to public transport, activity centres and recreation areas as well as regional destinations;
- Plan to further reduce casualty crashes through well designed infrastructure and increase driver awareness of cyclists through pavement markings and signs;
- Advocate that VicRoads provide on-road lanes as part of the Principal Bike Network and ensure that all new road works and or the introduction of bus lanes incorporate provision for bicycles;
- Promote and support the use of bicycles as a healthy, environmentally friendly means of transport as well as being safe and cost effective; and
- Measure bicycle use and the effectiveness of programs developed as part of this bicycle review.

VicRoads SmartRoads plans were reviewed as they provide a hierarchy of priorities for each mode of transport along each road, including Priority Bike Routes. Unfortunately, VicRoads Updated Principle Bike Network (PBN) has not yet been finalised. However, an existing map of bike routes in Upper Ferntree Gully was accessed from the City of Knox website.

This study undertook new automatic tube counts in August 2014 to understand existing traffic volumes and speeds in a number of residential and collector streets. Recent automatic tube counts undertaken from 2008 to 2013 were also utilised as they can be expected to be reasonably representative of existing traffic volumes.

### 2.3. KEY CONSIDERATIONS

The Upper Gully Strategic Plan outlines that the residential population of Upper Ferntree Gully is expected to remain stable between 2011 and 2036 (forecast to change from 2,567 to 2,563). This would suggest that parking demands for key attractions, such as the Train Station, are unlikely to change significantly in the future, with potential variations influenced by the demographic profile of the population over time and other factors influencing car usage such as roadway congestion and petrol prices. This assumption aligns with Year 2021 and 2046 passenger projections for Upper Ferntree Gully Station obtained from a recent PTV report which suggests that passenger volumes are unlikely to change significantly in the future.

Extensive parking occupancy and turnover surveys were undertaken to ascertain parking patterns throughout the study area and understand which on-street and off-street parking areas are experiencing high levels of demand. Traffic volume and speed surveys were undertaken to understand the origins of motorists travelling to the train station and traffic patterns at key locations. On-site observations were undertaken of existing walking, cycling, public transport and vehicle conditions.

The above information was used to develop a number of potential infrastructure, signage and line marking improvements.

### 2.4. METHODOLOGY

Parking surveys were initially undertaken in the vicinity of the Train Station and the Town Centre in the week of 25-29 August 2014. The surveys recorded occupancy levels for on-street and off-street parking areas at various periods throughout the day between 6am and 6pm. Turnover surveys were undertaken at strategically selected locations to determine duration of stay and whether motorists were overstaying posted time limits.

Additional surveys were undertaken in the Primary School and Hospital precinct in the week of 13-17 October 2014 to record occupancy levels for on-street and off-street parking areas at various periods throughout the day between 6am and 6pm. As with the original surveys in the train station and town centre areas, turnover surveys were undertaken at all on-street locations and most off-street car parks to determine duration of stay and whether motorists were overstaying posted time limits.

The parking surveys were undertaken by qualified traffic engineers who also undertook an extensive audit of existing roadway conditions, with an aim to developing recommended improvements for all road users.

### 2.5. OBJECTIVES OF THE STUDY

The primary objective of this study is to develop and understanding of current transport conditions in the study area and propose a set of recommendations that can improve the roadway environment for pedestrians, cyclists, public transport users and motorists in Upper Ferntree Gully.

In line with the *'Knox Liveable Street Plan 2012-2022'*, the accessibility and safety of vulnerable road users, such as pedestrians and cyclists, has been prioritised.

The study is also aligned with the overarching objectives of the *'Knox Planning Scheme'*. In particular, Clause 21.08-2 (Objective 3 – Integrated Transport), which includes the following key strategies in order to provide a safe integrated movement system that increases levels of accessibility, use and transport choice for all members of the community:



- Improve connectivity between new and existing residential areas to existing transport networks.
- Enhance walking and bicycle routes between activity centres and surrounding neighbourhoods.
- Develop the pedestrian network in a manner that makes walking a viable transport choice.
- Reduce car parking requirements as appropriate in activity centres and along the Principle Public Transport Network where public transport services provide a real alternative to car use.
- Integrate walking and cycle paths with local street systems.
- Develop spaces and facilities that support use of the walking network and create interest and points of interaction through landscaping, links to shops, park benches, views and public art.
- Integrate public transport facilities in the redevelopment of shopping centres.
- Encourage shared pedestrian and bike path networks.
- Ensure that new development improves the safety, connectivity and accessibility of pedestrian, shared path and bicycle networks.

In summary, the recommendations provided in this report also aim to improve the comfort and convenience of transport by all modes and for road users of all ages and abilities.

The study also provides extensive data of parking and traffic surveys which can act as a baseline for any future surveys that may be undertaken before or after the recommendations are implemented.

## 3. PARKING SURVEYS

### 3.1. OVERVIEW

Parking surveys were initially undertaken in the vicinity of the Train Station and the Town Centre in the week of 25-29 August 2014.

The surveys recorded occupancy levels for on-street and off-street parking areas at various periods throughout the day between 6am and 6pm. Some turnover surveys were undertaken to determine duration of stay and whether motorists were overstaying posted time limits.

The off-street car parks surveyed included:

- The Train Station Car Park (288 unrestricted spaces and 8 other spaces)
- Maxi Foods Shopping Centre Car Park (217 '2 hour limit' spaces and 5 disabled spaces)
- Royal Hotel Pub Car Park (75 patron spaces and 4 disabled spaces)
- 2-4 Rose Street Car Park (35 Permit Zone spaces)
- 6-8 Rose Street Car Park (24 unsigned spaces immediately adjacent to the pub car park)
- Caesars Restaurant Car Park (30 customer spaces)
- Church Car Park – accessed from Mount View Road (approximately 15 spaces in gravel parking area).

The surveys also included observation in the vicinity of Upper Ferntree Gully Primary School during the afternoon peak in order to evaluate traffic and parking operations, and the subsequent impact on pedestrian safety. Observations were not undertaken during the peak morning drop-off period, as parking occupancies are generally higher in the afternoon when parents park for longer periods, making this time the representative of peak conditions around the school. Observations of parking occupancies in the precinct surrounding the primary school and the hospital district were also provided. Based on the initial observations of parking occupancy in the vicinity of the hospital, extensive surveys were approved as an addition to the original study area. These additional surveys were undertaken in this precinct in the week of 13-17 October 2014.

The additional surveys recorded occupancy levels for on-street and off-street parking areas at various periods throughout the day between 6am and 6pm. Turnover surveys were undertaken at all on-street locations and most off-street car parks to determine duration of stay and whether motorists were overstaying posted time limits. The turnover surveys were not undertaken within the large hospital car parking areas.

The off-street car parks surveyed included:

- All Hospital Car Parks for Staff and Visitors (389 spaces total)
- Main Talaskia Reserve Car Park (65 total spaces: 2P, 3P and Unrestricted)
- Small Talaskia Reserve Car Park near Tennis Club (34 total spaces: 1P, 2P and Permit)
- Childcare Car Park (approximately 20 spaces in gravel parking area)
- Informal parking areas on the side of William Street (14 spaces for volunteers and 6 spaces for Norm Reynolds Service Centre).

A visual summary of all the on-street spaces surveyed during both survey periods and the corresponding parking restrictions is provided as Figure 2. A visual summary of all off-street car parking areas surveyed during both survey periods is provided as Figure 3.

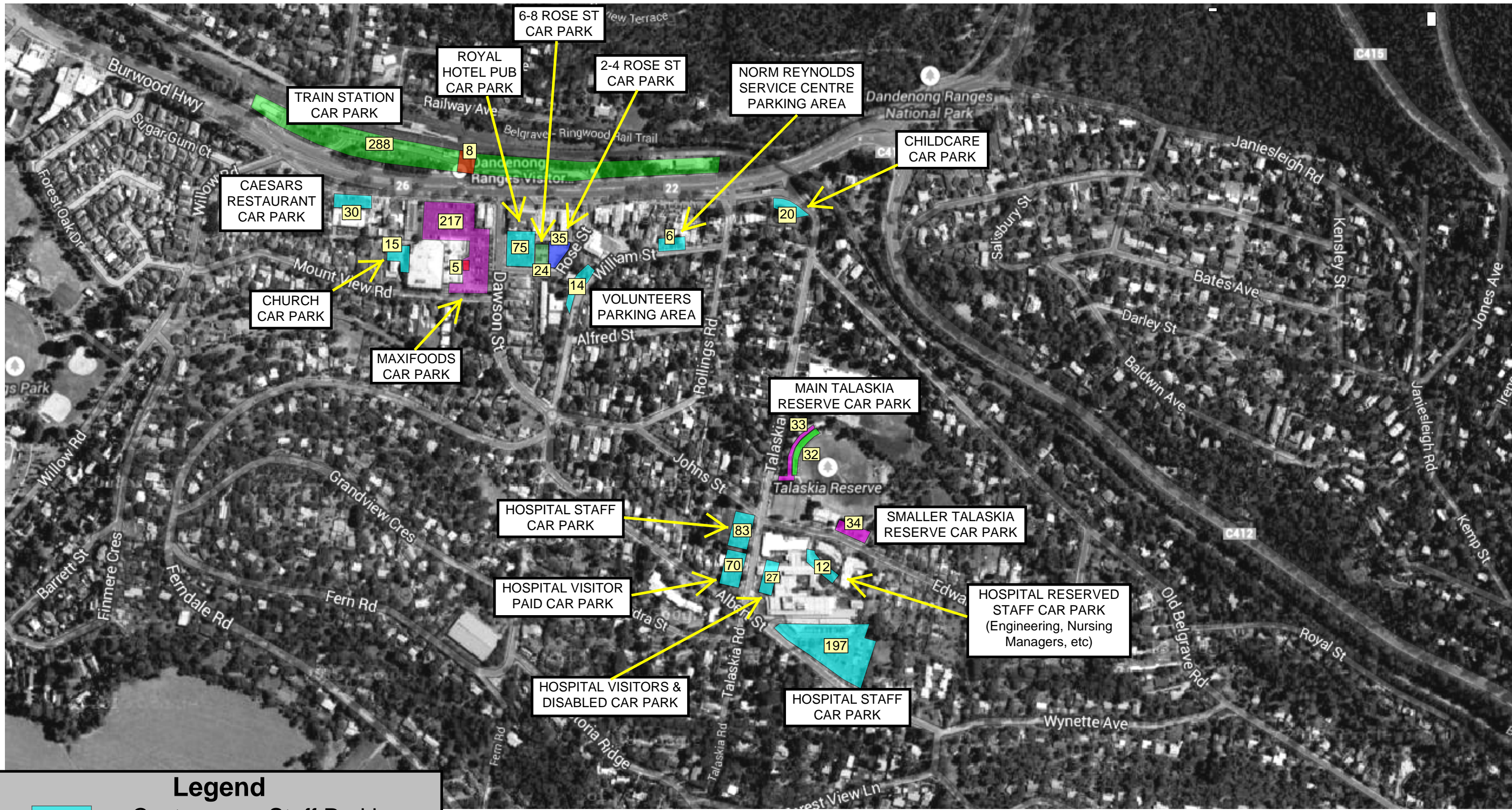
**Figure 2**  
Summary of On-Street Parking Restrictions



**Legend**

- Unrestricted
- 1/2P, 1P, 2P or 3P
- Loading Zone, Disabled or Short Term
- Customer / Visitor Parking
- 25 Number of On-Street Spaces

**Figure 3**  
Summary of Off-Street Car Parks



**Legend**

- Customer or Staff Parking
- Permit Zone Car Park
- Unrestricted Parking
- 1, 2 or 3 hour limit parking
- 20 Number of Off-Street Spaces

### 3.2. PARKING OCCUPANCY RESULTS

A tabulated summary of the number of available parking spaces is provided in Table 1.

Map-based colour coded summaries of the parking occupancies throughout the day are provided in Figure 4 to Figure 9.

Graphs summarising key results of the car parking occupancy surveys are provided in Figure 10 to Figure 12.

Full tabulated results of the parking occupancies are also provided as **Attachment A**.

In summary:

1. The majority of on-street spaces throughout the Town Centre precinct exhibited very modest parking occupancies throughout the day, with the exception of unrestricted parking spaces in Rose Street and Mount View Road, which were fully occupied during the middle of the day.
2. The Train Station car park was essentially fully occupied from early in the morning and throughout the day.
3. The Maxi Foods car park was modestly occupied throughout the day (58% maximum occupancy) and therefore provides substantial spare parking availability.
4. The Royal Hotel pub car park peaked at 79% occupancy at 2pm and is therefore operating reasonably effectively. Occupancies at other times of the day ranged from 5% to 59%.
5. The on-street parking in proximity to the hospital exhibits reasonably high parking occupancies and peaked at 75% at 2pm. On-street parking occupancy is extremely low throughout the day in areas beyond the immediate vicinity of the hospital.
6. The main and smaller Talaskia Reserve off-street car parks exhibited reasonably high occupancy levels. In particular, the unrestricted spaces in the main car park were fully occupied from 9am to 2pm (observations of users indicate that the occupancy is likely to be related to hospital staff and visitors). Occupancy levels throughout this car park reduced significantly between 2pm and 4pm which assists in accommodating parents picking up children from the adjacent Primary School.
7. The Angliss Hospital off-street car parks are well occupied. The paid visitor car park peaked at 90% occupancy at midday and 2pm, indicating the willingness of visitors to pay in order to park for longer than 2 hours and in proximity to the hospital. The staff car parking areas (two different car parks with total capacity of 280 spaces) peaked at 80% occupancy at 2pm.

Table 1: Spare Parking Availability - Summary

OVERALL PARKING SURVEY RESULTS							
PARKING AREA	PARKING CAPACITY	SPACES AVAILABLE AT TIME PERIOD SURVEYED					
		6.00am	9.00am	Midday	2.00pm	4.00pm	6.00pm
Railway Station Car Park (Unrestricted)	288	256	15	8	5	16	109
Maxi Foods Car Park (2P)	217	205	139	111	114	91	139
Royal Hotel Car Park (Customer Parking)	75	71	62	41	16	31	45
Private Car Park - 6-8 Rose Stret (unsigned)	24	24	0	0	2	6	21
Permit Zone Car Park - 2-4 Rose Street (PZ)	35	35	27	21	20	24	31
Caesars Restaurant Car Park (Customer Parking)	30	30	12	6	11	9	20
Hospital Car Parks	389	332	139	90	77	138	232
Main Talaskia Reserve Car Park	65	46	20	16	19	44	53
Smaller Talaskia Reserve Car Park	34	33	13	5	3	8	14
Other Off-Street Car Parks	55	55	29	37	30	44	54
<b>Total off-street spaces available</b>	<b>1212</b>	<b>1087</b>	<b>456</b>	<b>335</b>	<b>297</b>	<b>411</b>	<b>718</b>
<b>Proportion of Off-Street Spaces Available</b>		<b>90%</b>	<b>38%</b>	<b>28%</b>	<b>25%</b>	<b>34%</b>	<b>59%</b>
On-Street (1/2P to 4P: Time Limited)	482	447	370	338	336	347	380
On-Street (Unrestricted)	125	103	64	62	64	85	107
On-Street (LZ, Disabled, Short Term, other)	37	37	26	23	15	15	28
<b>Total on-street spaces available</b>	<b>644</b>	<b>587</b>	<b>460</b>	<b>423</b>	<b>415</b>	<b>447</b>	<b>515</b>
<b>Proportion of On-Street Spaces Available</b>		<b>91%</b>	<b>71%</b>	<b>66%</b>	<b>64%</b>	<b>69%</b>	<b>80%</b>
<b>All Total Spaces Available</b>	<b>1856</b>	<b>1674</b>	<b>916</b>	<b>758</b>	<b>712</b>	<b>858</b>	<b>1233</b>
<b>Proportion of All Spaces Available</b>		<b>90%</b>	<b>49%</b>	<b>41%</b>	<b>38%</b>	<b>46%</b>	<b>66%</b>

**Figure 4**  
 Parking Occupancies: 6.00am



**Legend**

- 0-30%
- 31-50%
- 51-70%
- 71-85%
- 86-100%
- 20  
Number of spare spaces available
- 54  
Number of spare off-street spaces available

**Figure 5**  
 Parking Occupancies: 9.00am



**Legend**

- 0-30%
- 31-50%
- 51-70%
- 71-85%
- 86-100%
- 20 Number of spare spaces available
- 54 Number of spare off-street spaces available



**Figure 6**  
 Parking Occupancies: Midday



**Legend**

- 0-30%
- 31-50%
- 51-70%
- 71-85%
- 86-100%
- 20 Number of spare spaces available
- 54 Number of spare off-street spaces available

**Figure 7**  
 Parking Occupancies: 2.00pm



**Legend**

- 0-30%
- 31-50%
- 51-70%
- 71-85%
- 86-100%
- 20 Number of spare spaces available
- 54 Number of spare off-street spaces available

**Figure 8**  
 Parking Occupancies: 4.00pm



**Legend**

- 0-30%
- 31-50%
- 51-70%
- 71-85%
- 86-100%
- 20 Number of spare spaces available
- 54 Number of spare off-street spaces available

**Figure 9**  
 Parking Occupancies: 6.00pm



**Legend**

- 0-30%
- 31-50%
- 51-70%
- 71-85%
- 86-100%
- 20 Number of spare spaces available
- 54 Number of spare off-street spaces available

Figure 10: Parking Occupancy Graph – All Spaces

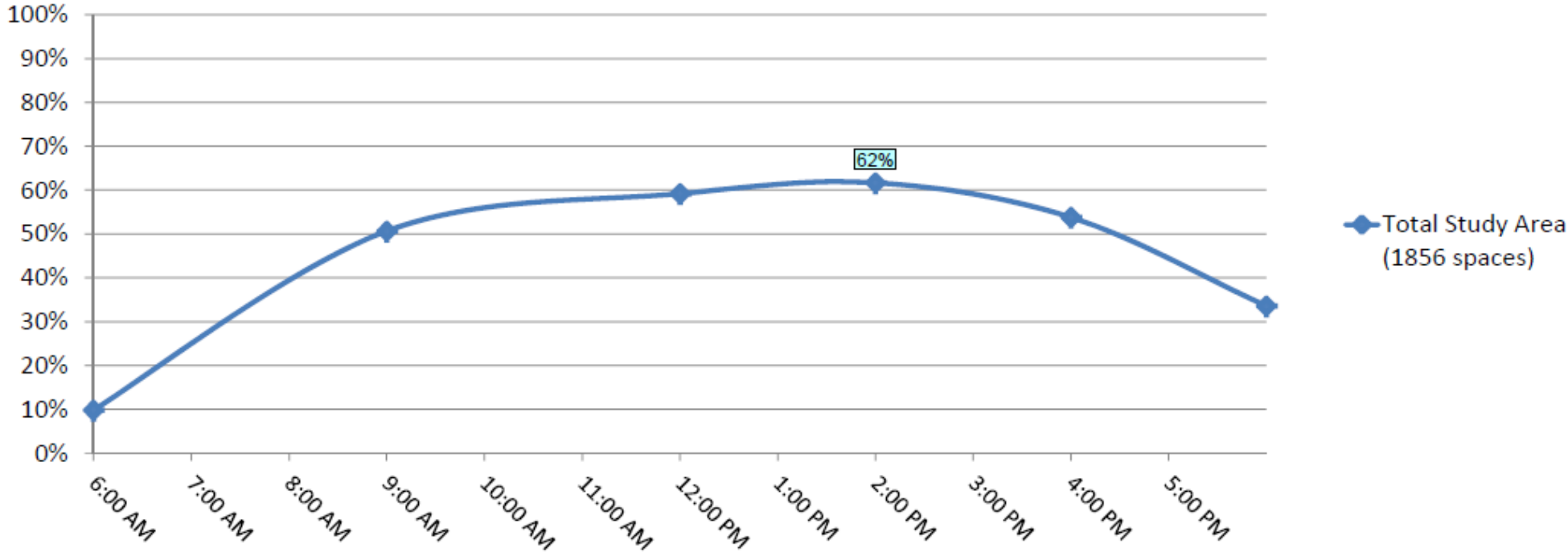


Figure 11: Parking Occupancy Graph – Main Off-Street Car Parks

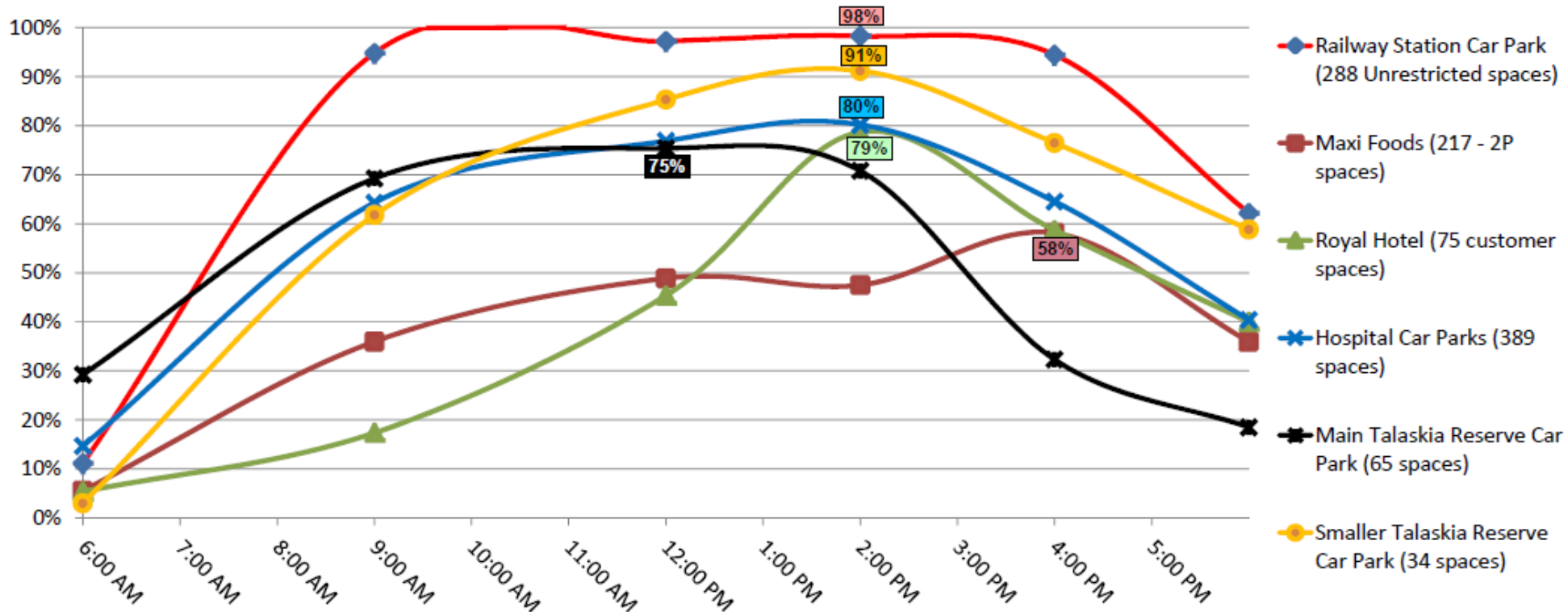
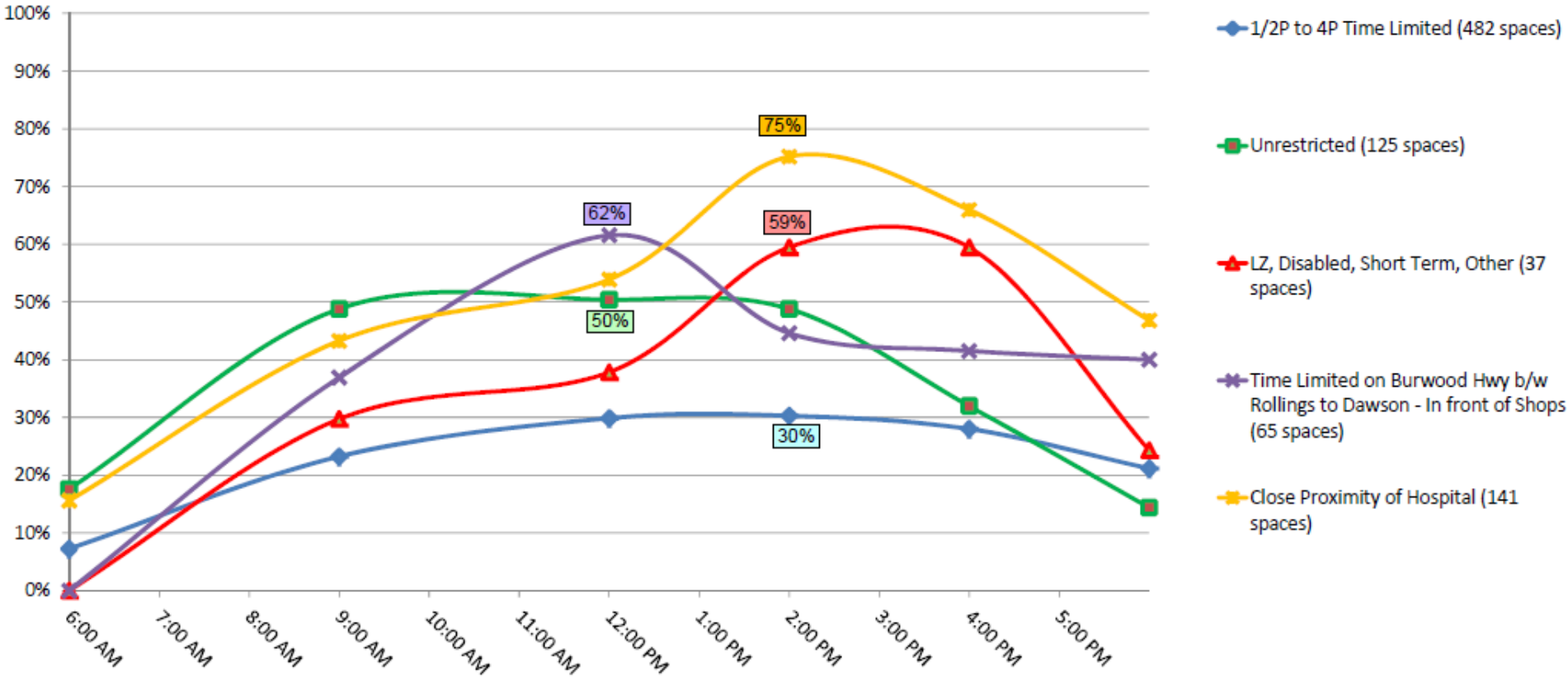


Figure 12: Parking Occupancy Graph – On-Street Parking



### 3.3. CAR PARK MONITORING AND ENFORCEMENT

Observations during the parking occupancy surveys indicated that several vehicles had been issued infringement notices for overstaying the posted time limits, particularly in the vicinity of the Hospital. This suggests that Council officers are monitoring and enforcing the on-street parking restrictions. The parking turnover surveys (summarised below) also suggest that the majority of motorists are adhering to posted time limits which suggests that regular enforcement is occurring and having its desired results.

### 3.4. PARKING TURNOVER SURVEYS

A summary of the parking turnover surveys undertaken in each of the off-street and on-street parking areas is presented below. This provides a description of the parking patterns, which includes determining the number of motorists illegally overstaying the posted time limits.

In general, motorists were extremely compliant with posted time limits. Low proportions of motorists overstayed posted '2 hour limit' in either the Maxi Foods Shopping Centre Car Park or in on-street and off-street parking areas in the hospital precinct.

The Small Talaskia Reserve car park (adjacent to the Tennis Club) exhibited the highest rate of motorists illegally overstaying the posted time limit.

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#### TRAIN STATION AND TOWN CENTRE PRECINCT

##### Royal Hotel Pub Car Park (75 spaces)

The maximum occupancy of the Pub car park was recorded at 2pm when 59 of the 75 spaces were occupied (79% occupancy).

The majority of vehicles stayed for a short period of time. Only five vehicles which were parked at 9.00am stayed past 3pm. These five vehicles may represent staff members and hence it can safely be assumed that train commuters are not using this car park.

A total of 102 different vehicles parked at the pub car park during the five survey periods which were undertaken between 5.40am and 3.40pm. A final survey was undertaken at 5.15pm to ascertain which vehicles remained.

- 71 vehicles were only recorded during one time period (less than 2-3 hours)
- 11 additional vehicles stayed only two time periods (2-4 hours)
- 20 vehicles stayed three or more time periods (4+ hours)

A summary of the results is provided below:

- 3 vehicles parked at 5.40am
  - 2 of these 3 vehicles stayed past midday. None stayed past 5pm
- 11 vehicles parked at 9.00am
  - 5 of these 11 vehicles stayed for 6+ hours
- 40 vehicles parked at Midday
  - 19 vehicles stayed for 4+ hours



- 7 vehicles stayed til at least 5.15pm (perhaps representing staff)
- 59 vehicles parked at 2.00pm
  - The same seven vehicles stayed til at least 5.15pm
  - No other vehicles which arrived between midday and 2.00pm stayed until 5.15pm.

#### 6-8 Rose Street Car Park - located immediately adjacent to the Pub Car Park (24 spaces)

The car park was fully occupied by 9.30am.

- 22 vehicles stayed at least 4 hours
- 16 vehicles stayed at least 6 hours
- 2 vehicles stayed throughout the day past 5.15pm

#### Maxi Foods Shopping Centre Car Park (217 spaces: 2P Restriction)

The maximum occupancy occurred at 4pm. At this time, there were still 91 available spaces, indicating that the car park was never more than 58% occupied.

Turnover surveys were conducted at 9.30am, 1.30pm and 4.00pm.

176 different vehicles were observed parked at either 9.30am or 1.30pm

- 20 vehicles overstayed the 2 hour time limit.
- 8 of these 20 vehicles stayed the entire time from 9.30am to 4.00pm. These vehicles may represent staff members.
- The overwhelming majority (156 vehicles) were only recorded during one time period, indicating that they most likely adhered to the posted time limit.

#### Caesars Restaurant Car Park (30 spaces – Patrons Only)

This car park is accessed from the Burwood Highway Service Lane between Dawson and Willow Streets.

The occupancy was 18 parked vehicles at 9.30am and the maximum occupancy of 24 parked vehicles occurred at 1.30pm.

9 of the vehicles parked at 9.30am stayed til at least 4.00pm. This would indicate that these motorists are either staff of adjacent businesses or motorists illegally using the car park as either rail commuters or nearby workers.

#### On-Street – Surrounding Main Town Centre and Train Station Precinct

223 total on-street parking spaces were surveyed in the area within the precinct surrounding the town centre, which is in reasonably close proximity to the Train Station.

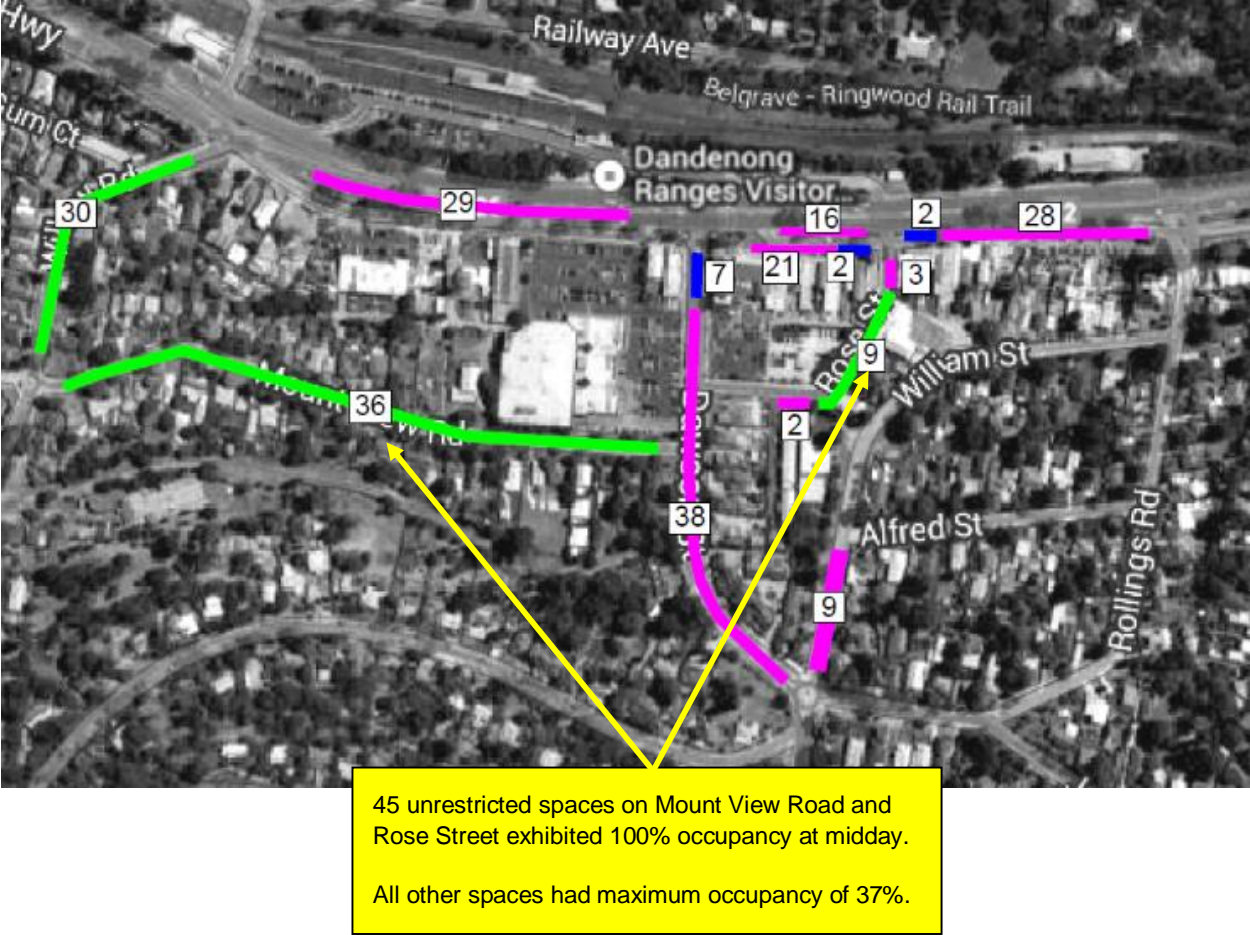
The maximum occupancy of these on-street spaces was 49% at midday.

Almost half of the parked vehicles (45 of the 110) at midday were parked in a total of 45 unrestricted parking spaces in either Mount View Road or Rose Street.

The remaining 178 spaces surveyed throughout this precinct exhibited a maximum occupancy of 37% at midday. Given this low occupancy rate and the ample availability of parking spaces, turnover surveys were not undertaken as they would provide no additional meaningful information in the context of the objectives of this study.

The location of these on-street spaces surveyed in the town centre precinct are summarised in Figure 13.

**Figure 13: Town Centre Precinct: 223 Total On-Street Parking Spaces Surveyed**



While turnover surveys were not conducted in Mount View Road (36 unrestricted spaces), the occupancy was 17 parked vehicles at 6.00am, which likely represents local residents who are unable to park all their vehicles within their own properties and hence seek unrestricted parking. The occupancy increased to 37 parked vehicles at midday and reduced again to 7 parked vehicles by 6.00pm. This would indicate that 20 to 30 motorists parking during the day are either local workers or rail commuters. Council could consider implementing some form of parking restrictions in this area, but this may also impact the residents who are currently seeking on-street parking.

Turnover surveys were undertaken in Rose Street. The nine unrestricted parking spaces had eight parked vehicles at 9.30am. All of these vehicles stayed at least four hours and six of these vehicles stayed at least six hours. It is assumed that these motorists represent local workers or rail commuters. As there are minimal abutting active land uses, it is not recommended that Council increase parking restrictions in this area.

### On-Street – Railway Avenue

This street is located on the northern side of the railway station (opposite side to the main station car park) and provides unrestricted parking. It is a quiet dead-end street with residential homes on one side of the street and a shared bike/pedestrian trail adjacent to the rail line on the other side of the street. The parking throughout the street is unrestricted.

It is estimated that the capacity for parking in the street may be approximately 40 vehicles, but this is unclear given the potential inability to park on both sides of the street.

Four vehicles were parked in the street at 5.30am. It is assumed that these represent residential vehicles. Two of these vehicles stayed all day long and the other two departed in the morning.

The maximum occupancy of 13 parked vehicles occurred at 2pm. The majority of vehicles parked for at least 6 hours and it is subsequently assumed that this represented 11 rail commuters.

It is unclear whether these motorists are parking in Railway Avenue because the station car park is fully occupied or because they live to the north of the railway line and it is therefore more convenient and a shorter travel time to park in this location. Even though the minimal number of parked vehicles currently does not represent a significant problem, conditions should be monitored.

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### HOSPITAL AND SCHOOL PRECINCT

#### Main Talaskia Reserve – Off-Street Car Park (65 spaces)

This car park is accessed from Talaskia Road between the school and the hospital precinct. Observations suggest this car park is primarily used throughout the day by staff/visitors of the hospital, but is also used in the afternoon by some parents as a safe meeting place when picking up their children from the Primary School.

The car park provides a total of 65 spaces, as summarised below:

- 26 spaces – 2 hour limit
- 7 spaces – 3 hour limit
- 32 spaces – unrestricted

The 32 unrestricted spaces were fully occupied at 9am, Midday and 2pm, and the overwhelming majority of motorists were observed to park for at least five hours. However, the occupancy of the 32 unrestricted spaces reduced to 10 parked vehicles by 4pm. By this time, there were 44 total available spaces (of the 65) in this car park. While the school pick-up time is 3.00 to 3.30pm, the surveys and observations suggest that there are sufficient parking opportunities both within the reserve car park and on-street on Talaskia Road in the afternoon for parents picking up their children. It is recommended that the school promote the reserve car park as a pick-up area which would allow children (and parents) to cross no streets while providing a safe and comfortable gathering place.

The seven “3 hour limit” spaces were fully occupied throughout the 9am, Midday, 2pm and 4pm surveys, which is expected as these are the spaces located closest to the hospital. Seventeen different vehicles were recorded parking in this area between 6am and 4pm. Three of these vehicles were observed to overstay the “3 hour limit”.

The 26 “2 hour limit” spaces are provided furthest away from the hospital. The maximum occupancy was 38% at midday. Only one vehicle was observed to overstay the 2 hour limit.

#### Smaller Talaskia Reserve – Off-Street Car Park (34 spaces)

This car park is accessed from Edward Street and is located immediately adjacent to the tennis club. The car park is located within very close proximity of the hospital.

The car park provides a total of 34 spaces, which comprise a variety of “1 hour limit”, “2 hour limit” and “1 hour limit – Permit Holders Excepted” parking spaces.

The maximum occupancy for this car park was 91% and occurred at 2pm.

Seventy two different vehicles were observed to have parked in this car park between 6am and 4pm. Thirteen vehicles were observed to stay longer than 2 hours; however, two of these vehicles were parked in the Permit area. A further 14 vehicles were observed to overstay in the 1 hour limit areas.

These results indicate that vehicles in this car park exhibited the worst compliance to the posted time limit in the entire study area.

It is recommended that Council either consider increasing the time limit to accommodate motorists wishing to park for longer durations or increase enforcement to reduce illegal overstaying in this car park.

#### On-Street – Angliss Hospital and Upper Ferntree Gully Primary School Precinct

Three hundred and eighty one (381) total on-street parking spaces were surveyed in the area surrounding the Hospital and School precinct.

The occupancy of the parking at 6.00am was 9%. This suggests that very few residents elect to park their vehicle on-street over-night. The 35 parked vehicles at this time may include some residents and some visitors/staff of the hospital.

The maximum occupancy of this precinct was 32% and occurred at 2.00pm, indicating that there are ample available parking opportunities in this precinct overall.

In the closer vicinity of the hospital (a precinct which includes 141 on-street spaces), the maximum occupancy was 75% at 2.00pm. This indicates that demand for parking in very close proximity to the hospital is reasonably high. However, beyond this relatively short distance, staff and visitors are more likely to occupy off-street parking spaces (paid or free) rather than walking the additional distance.

Figure 14 illustrates the location of all 381 on-street spaces surveyed in the Hospital and School Precinct and highlights in ‘green’ the locations of the 141 spaces considered in close proximity of the hospital.

Figure 14: Hospital and School Precinct: 381 Total On-Street Parking Spaces Surveyed



The compliance of the posted on-street parking time limits was very good. The majority of the on-street parking restrictions in the precinct are “2 hour limit: 8am-6pm”. The results of the turnover surveys which were undertaken at six times throughout the day between 6am and 6pm are summarised below.

- 335 different vehicles were recorded parking throughout the first five surveys of the day (6am to 4pm).
- Only 19 vehicles (6%) were observed to stay longer than 2 hours in the same on-street location.

## 4. MANUAL TRAFFIC VOLUME SURVEYS

Manual traffic volume surveys were undertaken during the AM (8-9am) and PM (5-6pm) peak hours at the following intersections and are summarised as Figure 15 and Figure 16.

- Burwood Highway and Rollings Road
- Burwood Highway and Dawson Street

Surveys of traffic volumes entering the Train Station car park at all entrance points were also undertaken during the morning peak period from 6.30 to 8.30am in order to determine origin locations of motorists and is summarised as Figure 17.

The results reveal that:

- The majority of traffic entering the Train Station car park during the morning (77%) is originating from the east. This is presumably because people living to the west of the station are more likely to travel to the Ferntree Gully Station located one stop closer to the city.
- Vehicles accessing the train station car park from Dawson Street represent 14% of the overall vehicles entering during the survey period.
- Minimal traffic (9%) enters at the western end of the station car park via either Hilltop Road or the left turn slip lane from Burwood Highway. Site observations revealed that motorists braking to enter the slip lane could potentially cause a traffic hazard and those motorists entering at very high speeds compromise the safety of any pedestrians currently using an informal 'goat track' footpath along the north side of Burwood Highway. Subsequently, opportunities may exist to require all traffic from this direction (approximately only 15 vehicles per hour) to enter the station via Hilltop Road.  
**Recommendation:** The removal of the slip lane would give opportunities to improve pedestrian connectivity, increase green space and increase car parking capacity.
- The current configuration of the intersection of Burwood Highway and Rollings Road is extremely complex and is confusing for motorists and represents a potential safety hazard for pedestrians and motorists. The majority of traffic at this complex intersection connects between Burwood Highway (west leg) and the Burwood Highway Service Road which loops around to Talaskia Avenue.  
**Recommendation:** The minimal traffic volumes performing other movements provide opportunities to simplify and remodel the intersection.

Figure 15: Traffic Volume Summary: Intersection of Burwood Highway and Rollings Road (AM & PM)

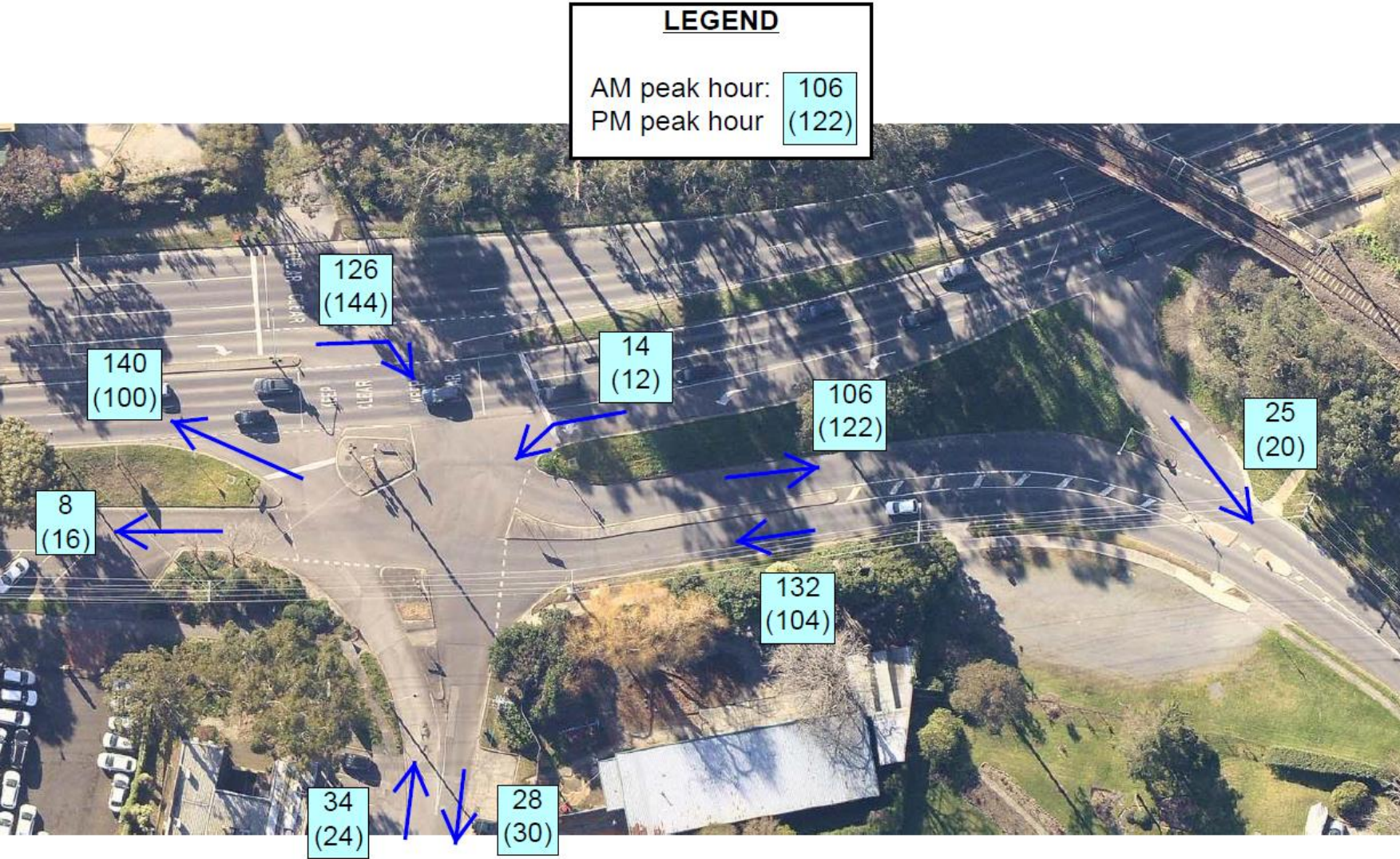


Figure 16: Traffic Volume Summary: Intersection of Burwood Highway and Dawson Street (AM & PM)

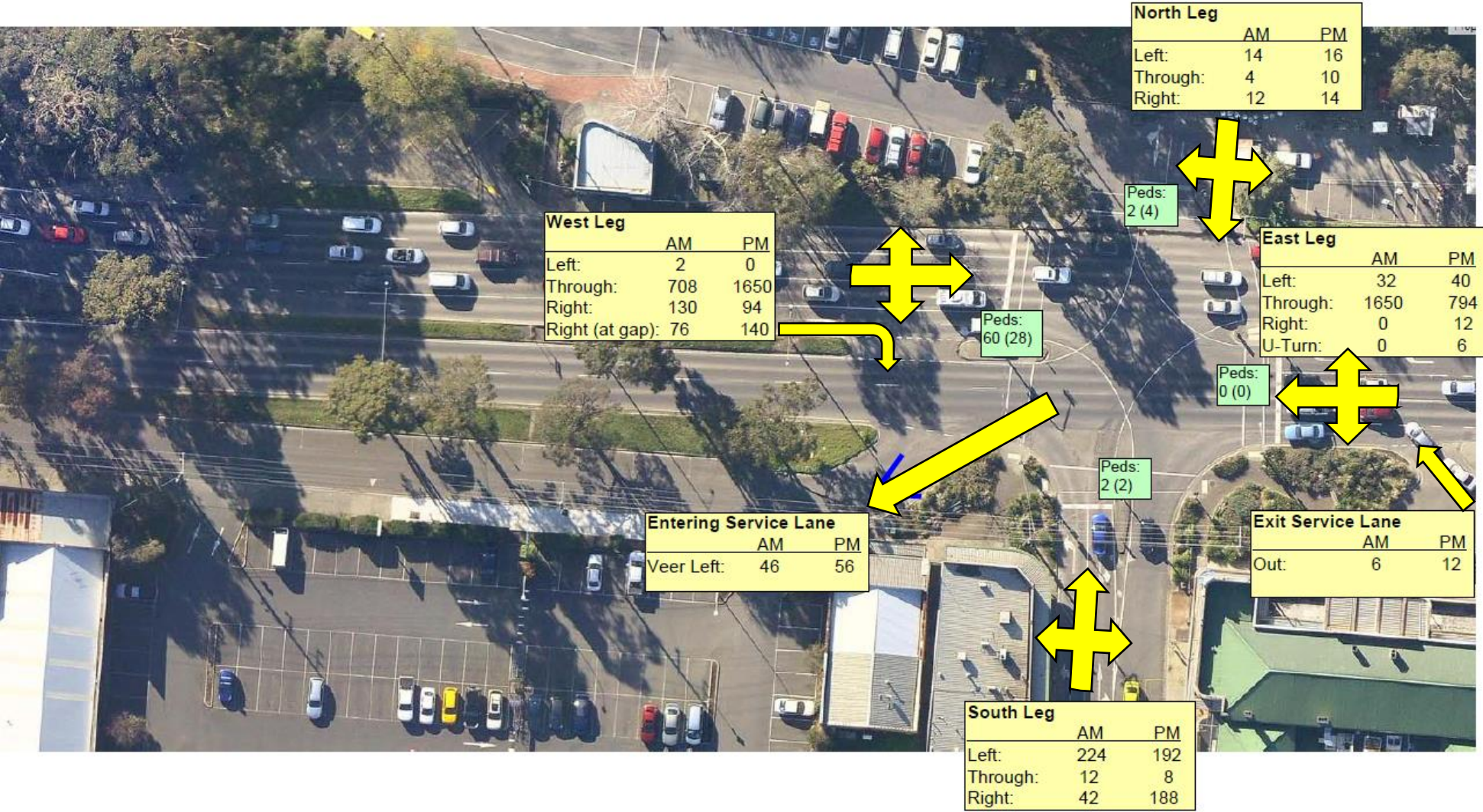




Figure 17: Traffic Volume Summary: Vehicles Entering Train Station Car Park (AM peak)

(Survey conducted from 6.30am to 8.30am)



## 5. AUTOMATIC TRAFFIC COUNTS

Historical and new automatic traffic count data at mid-block locations were collected to ascertain vehicle volumes and speeds using the street network in the project area.

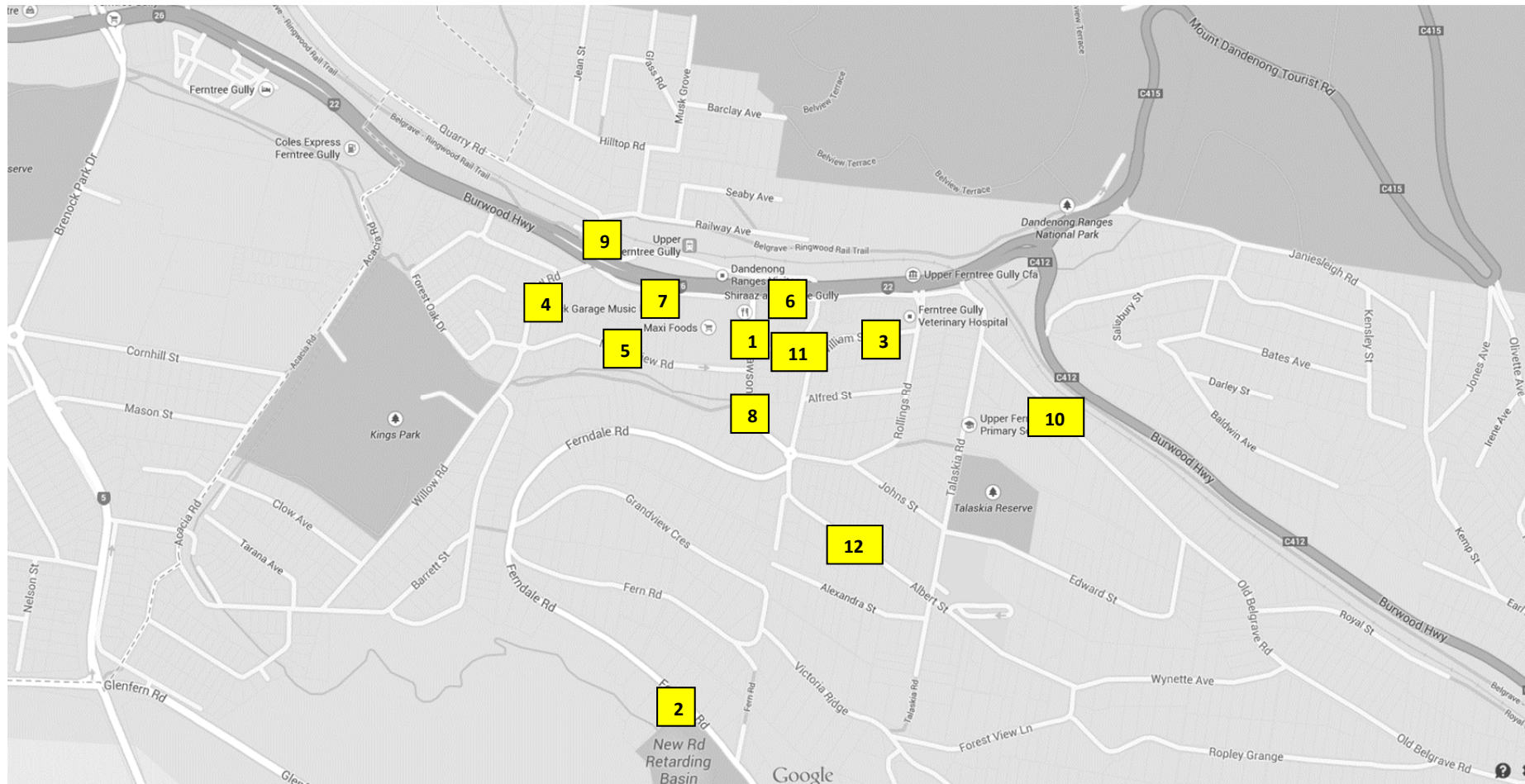
The main results are presented in Table 2 and illustrate that the 85<sup>th</sup> percentile speeds are above 50km/h in several residential streets, including Talaskia Road in the immediate vicinity of the Primary School.

**Recommendation:** Council to investigate reduced speed limits and traffic calming measures with an aim of reducing 85<sup>th</sup> percentile speeds to 40km/h. The location of the surveys is summarised in Figure 18.

**Table 2: Automatic Traffic Count – Survey Results**

Automatic Count Location	Date	Weekday Traffic Volumes			Speeds (7-Day Average)	
		24 Hour	AM 8-9am	PM 5-6pm	Mean	85 <sup>th</sup> %ile
<b>1. Dawson St</b> (Burwood Hwy to Rose St)	July 2009	4972	397	416	44	54
	Aug 2014	3107	235	275	39	46
<b>2. Ferndale Rd</b> (near Retarding Basin)	Feb 2008	176	13	20	34	40
<b>3. William St</b> (Rollings Rd to Alfred St)	May 2009	243	28	22	34	40
<b>4. Willow Rd</b> (Burwood Hwy to Mount View Rd)	May 2009	1735	172	186	39	45
<b>5. Mount View Rd</b> (Willow Rd to Dawson St)	Aug 2014	1121	106	115	44	51
<b>6. Burwood Hwy Service Road</b> (Rose St to Dawson St)	Aug 2014	693	35	42	17	22
<b>7. Burwood Hwy Service Road</b> (Dawson St to Willow Rd)	Aug 2014	542	30	40	29	34
<b>8. Dawson St</b> (South of Mount View Rd)	Aug 2014	2412	198	196	48	54
<b>9. Hilltop Rd</b> (Burwood Highway to Rail Line)	Aug 2014	466	37	46	21	27
<b>10. Old Belgrave Rd</b> (Talaskia Rd to Edward St)	Aug 2014	599	63	40	43	49
<b>11. Rose St</b> (Adjacent to Pub Car Park)	Aug 2014	270	15	12	26	34
<b>12. Albert St</b> (Towney Pl to Talaskia Rd)	Aug 2012	2472	169	192	46	55
<b>13. Talaskia Rd</b> (Old Belgrave Rd to Primary School)	Mar 2012	1970	188	137	51	60

Figure 18: Automatic Traffic Counts – Summary of Results



## 6. ACTIVE AND PUBLIC TRANSPORT

This section evaluates the safety and attractiveness of the existing walking, cycling and public transport (bus and train) provisions provided.

### 6.1. WALKING

Upper Ferntree Gully provides safe and attractive footpaths on both sides of most streets, many of which are often separated from the roadway by a nature strip or landscaped green space. Intersections generally provide tight kerb radii to reduce vehicle turning speeds and reduce pedestrian crossing distances. A school crossing supervisor controls crossings of Talaskia Road from the Primary School and on-site observations revealed no children cross informally at locations away from the controlled crossing point.

Photos illustrating positive examples of the provision of footpaths and crossing facilities are provided below (Figure 19).

Nevertheless, the main locations where improvements to the existing walking conditions are recommended to be investigated are summarised below. Actual recommended improvements will be discussed in **Section 7**.

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#### BURWOOD HIGHWAY SERVICE ROAD – EAST OF DAWSON STREET

The south side of the Burwood Highway service road between Rollings Road and Dawson Street provides some attractive street front shops, cafes and restaurants. As shown in Figure 20, a number of kerbside cafes are already in operation. Kerbside cafes are recommended wherever feasible in order to assist the economic profitability of abutting businesses, improve the vibrancy of the street and increase the passive security of the area by the provision of active street frontages.

However, Figure 20 also illustrates that the kerbside cafe significantly reduces the effective walkable width of the footpath. Subsequently, any opportunities to increase the width of the footpath should be explored to ensure that the kerbside cafes can be maintained in this location while also providing around 2.0 metre width of 'usable' pedestrian clearance space to cater for accessibility along the footpath by pedestrians, wheelchairs and prams. This may require a reconfiguration of existing outdoor seating and tables if the footpath is ultimately not widened.

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#### BURWOOD HIGHWAY SERVICE ROAD – WEST OF DAWSON STREET

The Maxi Foods Shopping Centre is provided on the south side of the Burwood Highway service road, immediately west of the intersection with Dawson Street. This south side of Burwood Highway provides a continuous footpath and accommodates any east/west pedestrian movements along Burwood Highway (given the current lack of footpath facilities on the north side of Burwood Highway adjacent to the train station and beyond the station to the east).

The south side footpath is generally well provided and attractive for pedestrians. However, a vehicle entrance point to the Maxi Foods Shopping Centre car park is provided immediately west of the Dawson Street intersection and the location and alignment of the entrance encourages motorists to cross the footpath and enter the car park at relatively high speeds, as illustrated in Figure 21. Subsequently, opportunities to improve pedestrian safety at this location should be explored.

**Figure 19: Examples of well provided footpaths and crossing facilities**



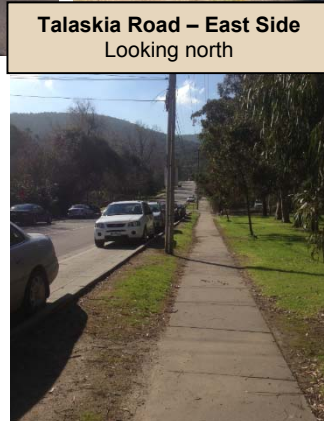
**Intersection of Dawson St & Burwood Highway**  
Looking west across south leg



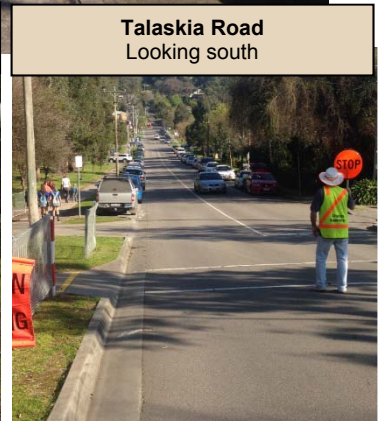
**Burwood Highway – south side service road**  
Looking west towards Rose Street



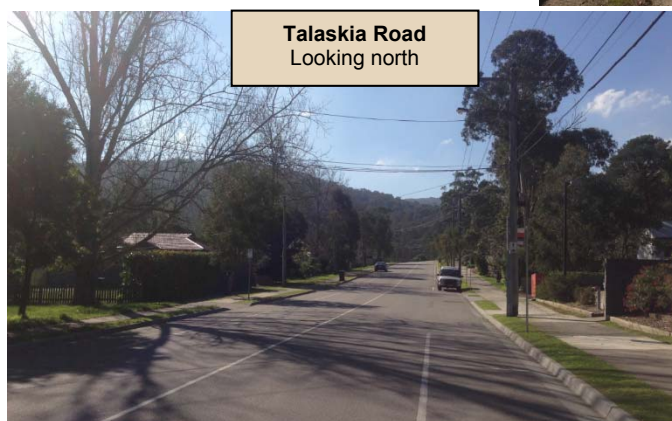
**Burwood Highway – south side service road**  
Looking west towards Dawson Street



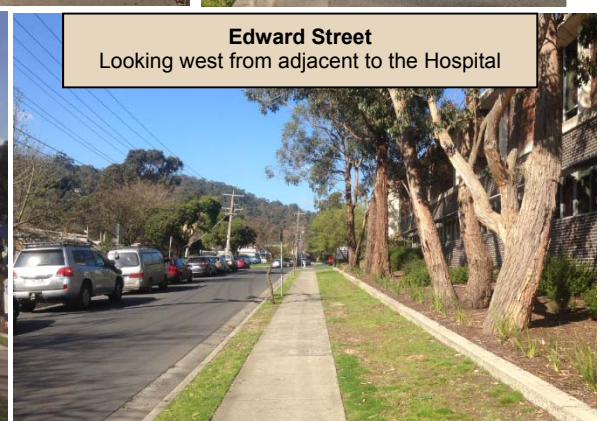
**Talaskia Road – East Side**  
Looking north



**Talaskia Road**  
Looking south



**Talaskia Road**  
Looking north



**Edward Street**  
Looking west from adjacent to the Hospital



**Burwood Highway – south side**  
Looking west across Willow Road



**Dawson St and Alfred St Roundabout**  
Looking across west leg

Figure 20: Example of a kerbside café on the Burwood Highway Service Road footpath

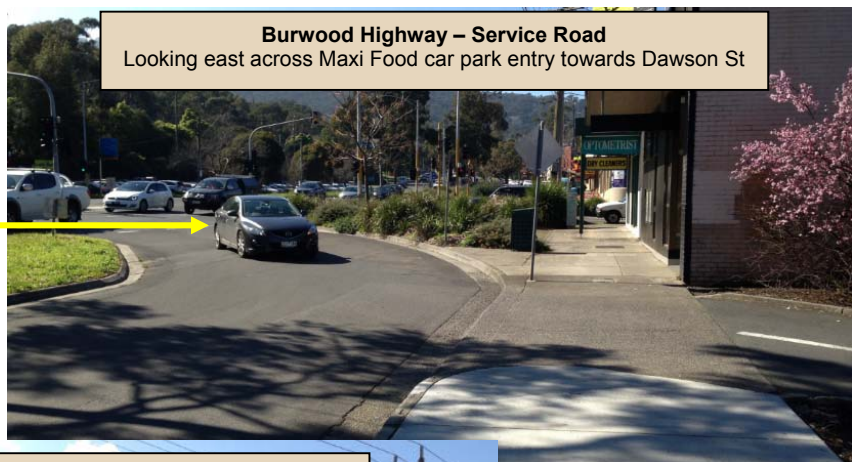


**Figure 21: Vehicle entrance point to Maxi Foods Shopping Centre – from Burwood Highway Service Road**



**Burwood Highway – Main Carriageway**  
Looking across towards Dawson Street

Potentially confusing arrangement as motorists wishing to access service road often utilise left turn lane on Burwood Highway on approach to intersection of Dawson Street



**Burwood Highway – Service Road**  
Looking east across Maxi Food car park entry towards Dawson St

Motorists can enter shopping centre car park at high speed without having to reduce speed and perform a tight left turn



**Within Maxi Food Car Park**  
Looking north-east towards Service Road and Dawson St intersection

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## NORTH SIDE OF BURWOOD HIGHWAY SERVICE ROAD – ADJACENT TO THE TRAIN STATION

The north side of Burwood Highway provides a formal footpath to the west of the train station car park, as shown in Figure 22. An informal gravel footpath is provided to the east of the train station car park, as shown in Figure 23 which leads to the Thousand Steps National Park.

**Figure 22: Footpath on north side of Burwood Highway – west of the Train Station Car Park**



**Figure 23: Gravel Footpath on north side of Burwood Highway – east of the Train Station Car Park**



However, adjacent to the train station, the footpath disappears completely and leaves pedestrians vulnerable, with the only options to walk circuitously through the station car park, cross Burwood Highway at an uncontrolled location or to walk informally along the non-footpath area, which is illustrated in Figure 24.

Opportunities to provide a continuous footpath facility along the north side of Burwood Highway should be explored. This should include a footpath facility adjacent to the eastern end of the station car park to assist train passengers walk from their parked car to the station platforms.



**Figure 24: Lack of Footpath Facility on north side of Burwood Highway – adjacent to Train Station Car Park**



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#### INTERSECTION OF BURWOOD HIGHWAY AND DAWSON STREET

The intersection of Burwood Highway and Dawson Street provides reasonably safe walking facilities. Signalised pedestrian crossings are provided on all four legs of the intersection and the south leg provides landscaped kerb extensions to assist pedestrians walking along the south side footpath of Burwood Highway.

Nevertheless, site observations revealed that some motorists turning right from either Dawson Street or the Train Station Car Park into Burwood Highway often fail to adequately give way to pedestrians crossing the west and east legs of the intersection. The current signal phasing allows permissive right turns in these directions where right turning motorists must give way to opposing traffic flows and crossing pedestrians before performing their turn.

Given the desire to maintain traffic capacity on Burwood Highway, the pedestrian crossings on the west and east legs of this intersection are 25 metres in length and leave pedestrians exposed to motorists performing the right turn at high speed. It is therefore recommended that any opportunities to improve pedestrian safety at this intersection be explored, particularly relating to potential conflicts with right turning motorists.

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#### INTERSECTION OF BURWOOD HIGHWAY AND ROLLINGS ROAD

The intersection of Burwood Highway and Rollings Road is complex and permits numerous vehicle turning movements. Observations revealed that motorists are often confused as to where to turn from and which movements are permitted.

Pedestrians crossing the south leg of the intersection are also relatively exposed despite the presence of a physical pedestrian refuge island. Pedestrians must be aware of motorists approaching this crossing from many angles and approaches and are also confronted with large kerb radii which increase vehicle turning speeds and pedestrian crossing distances. See Figure 25 for photo examples.

**Figure 25: Intersection of Burwood Highway and Rollings Road – Existing Conditions**



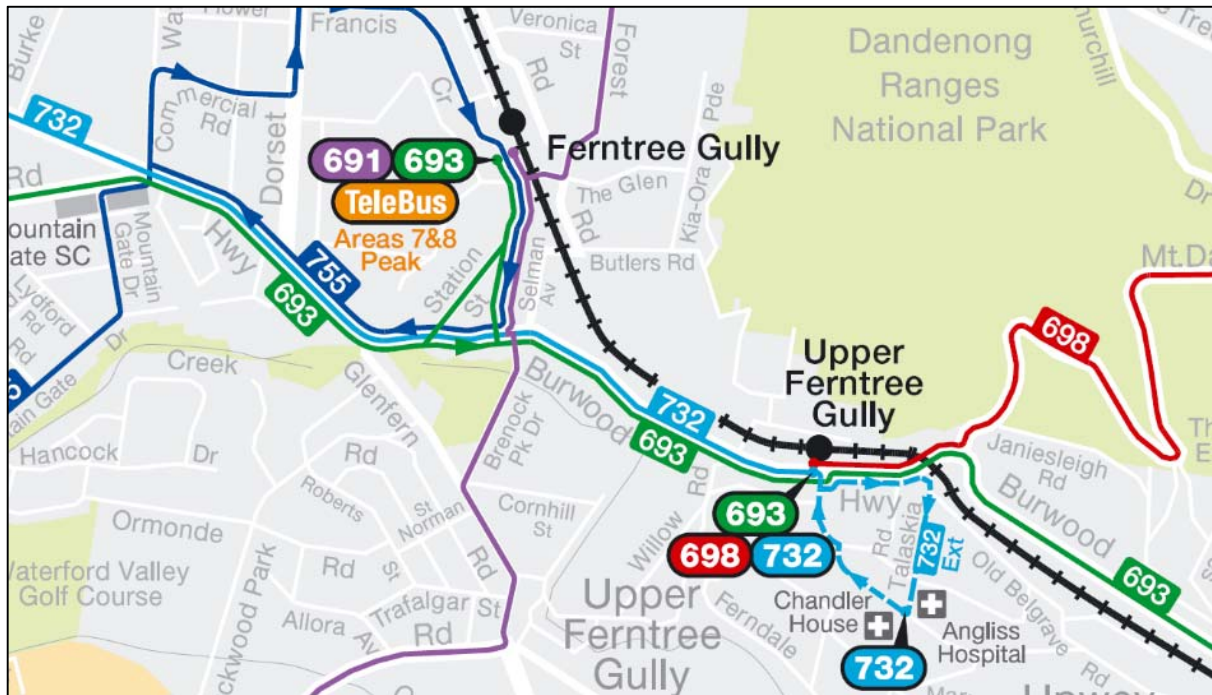
As illustrated in the photos above, observations revealed that parents and children use this crossing. This is presumably due to the presence of a childcare centre which is located immediately east of the intersection. This crossing may also be used as part of the walking route for school children walking to the nearby Primary School on Talaskia Road.

## 6.2. BUSES

Public transport bus routes 688, 693 and 732 service the Upper Ferntree Gully Rail Station. All bus routes operate regionally along Burwood Highway. Some Route 732 services also includes a route deviation extension which operates locally along Dawson Street, Albert Street, Talaskia Road and Burwood Highway. This 732 extension route services the Angliss Hospital, the Primary School and the town centre.

These routes are shown in Figure 26 below.

**Figure 26: Upper Ferntree Gully Bus Routes**



The late-night “Night Rider” bus service also operates along Burwood Highway to and from the city. This “Night Rider” service shares the westbound bus stop located on the main carriageway of Burwood Highway between Rose and Dawson Streets with the 693 bus route service. A private airport shuttle bus also provides a signed stop at this location.

Route 693 in the westbound direction does not enter the internal roadway of the train station and therefore this stop is the primary stop for passengers destined for the town centre and/or the train station. Passengers using this bus stop, as illustrated in Figure 27, must stand on a narrow (1.5 to 2.0m wide) strip of footpath provided between the main and service carriageways of Burwood Highway.

This bus stop can be improved to address:

- The insufficient width of this storage section prohibits the installation of a formal shelter structure;
- Pedestrian accessibility to/from the bus stop is difficult. Signs/posts and light poles prohibit pedestrians accessing this stop from the intersection of Dawson Street / Burwood Highway, as well as the landscaping at exit lane near the intersection. Subsequently, pedestrians must cross the Burwood Highway service road at an uncontrolled location in order to access the stop. Pedestrians may also be confronted by motorists turning into the service road from the break in the median provided at Rose Street.
- There are no disabled access ramps which provide wheelchair or DDA access to this bus stop.

Figure 27: Route 693 / Night Rider Bus Stop – Westbound Carriageway of Burwood Highway – near Rose St



It is recommended that the location and provision of this existing bus stop be reviewed and that pedestrian accessibility improvements for this bus stop be prioritised. Consideration could include relocating the bus stop to a safer and more accessible location.

With the exception of the westbound Route 693 service, the public transport bus services enter and exit the train station car park in both directions. Subsequently, bus stops are provided on both sides of the internal roadway, immediately outside the main station pedestrian access point, which are illustrated in Figure 28.

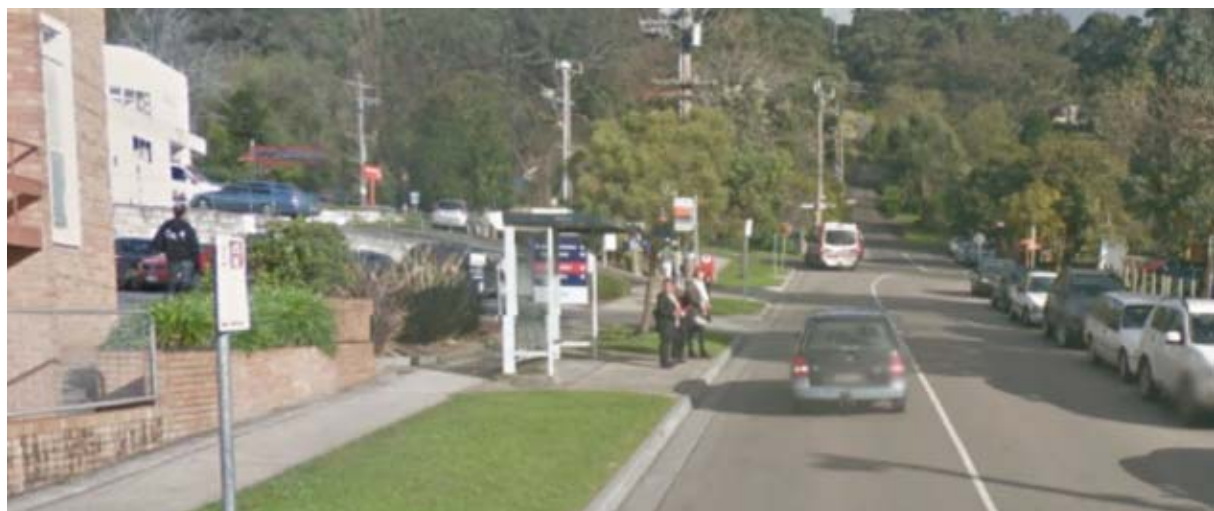
**Figure 28: Bus Stops at Upper Ferntree Gully Train Station**



Two white lines are provided at the eastern end of the bus stops, which seem to have been installed to imply a pedestrian crossing location to enable pedestrians to cross the internal roadway to and from the westbound bus stop location (on the south side of the internal roadway). This informal crossing may also be used by pedestrians walking to and from Dawson Street and a small pick-up and set-down car parking area accessed from the north side of Burwood Highway. The existing crossing facility may be confusing for pedestrians, motorists and bus drivers. It is recommended that consideration be given to improving the pedestrian priority at this location.

The bus stop on Talaskia Road outside the Angliss Hospital is illustrated in Figure 29. This bus stop is serviced by the Route 732 extension diversion. This stop provides a shelter structure and safe, direct and convenient pedestrian access to the hospital.

**Figure 29: Route 732 Extension Bus Stop on Talaskia Road – outside Angliss Hospital**



A Route 732 extension diversion bus stop is also provided on Talaskia Road outside the Primary School, as illustrated in Figure 30. This bus stop does not provide a shelter structure, but does provide safe, direct and convenient pedestrian access to the school. Observations indicated that a relatively small numbers of students used the bus and therefore the installation of a shelter structure is not considered a priority.

**Figure 30: Route 732 Extension Bus Stop on Talaskia Road – outside Primary School**



Finally, a Route 732 extension diversion bus stop is provided on Dawson Street on the immediate approach to the intersection of Burwood Highway, as illustrated in Figure 31. This bus stop provides overhead gantries to shelter bus passengers, but no seating. This stop provides relatively convenient and safe pedestrian access to the train station, Maxi Foods Shopping Centre and the pub located on the opposite side of Dawson Street

**Figure 31: Route 732 Extension Bus Stop on Dawson Street – outside Maxi Foods Shopping Centre**



### 6.3. CYCLING

#### BIKE LANES AND PATHS

VicRoads is currently finalising plans for the Principle Bicycle Network (PBN) for each municipality. VicRoads Priority Bike Routes (PBR's) are a priority set of the PBN and are shown on VicRoads SmartRoads maps for each municipality. The SmartRoads map in the vicinity of the Upper Ferntree Gully study area is shown as Figure 32 and the PBR is indicated by purple lines. This map shows that only the Ferny Creek Trail is included as a Bike Priority Route within the vicinity of the study area.

**Figure 32: VicRoads SmartRoads Map (Bike Priority Routes shown as Purple Lines)**

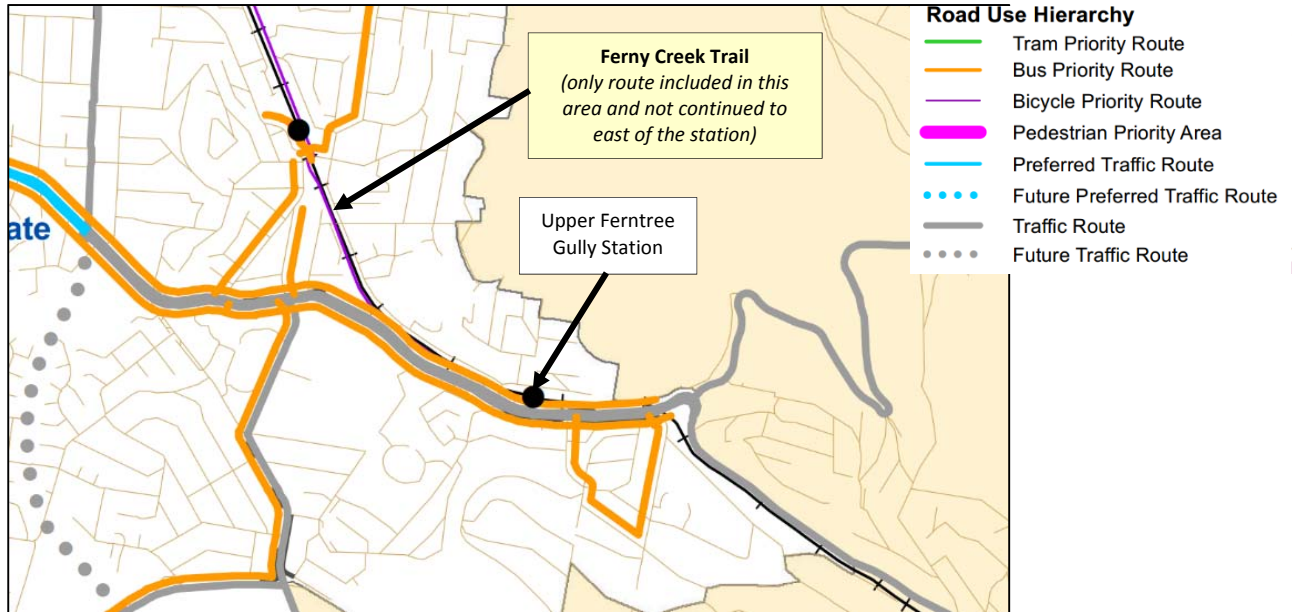
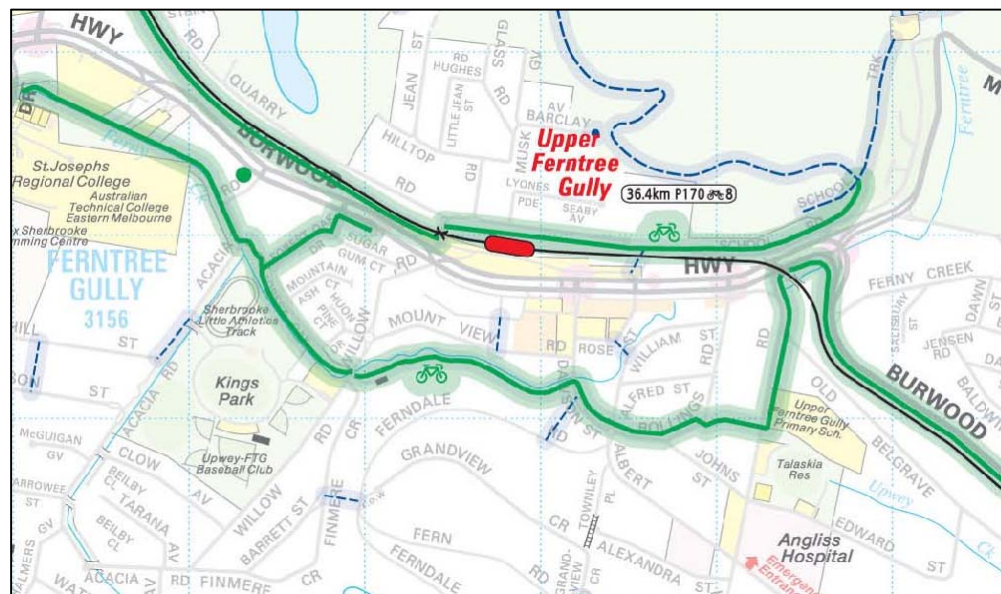


Figure 33 summarises the existing bike routes in the vicinity of the study area.

**Figure 33: City of Knox – Existing Bike Routes in Vicinity of Study Area**



The existing bike route plan indicates that the majority of bike routes in the area are provided in the form of off-road trails on either side of Burwood Highway, which have the potential to provide excellent and safe long distance connections. However, many of these trails are in a poor state of repair or do not meet current standards due to insufficient width. Upgrading the trails and directing cyclists to these trails should be promoted and prioritised.

There is currently no connection across Burwood Highway between the trails provided on either side of Burwood Highway, to the east of the station. The plan also shows no continuous connection to the town centre or the station from the south. It is recommended that consideration be given to improving connections to the town centre, the train station and between the trails on either side of Burwood Highway.

The plan also indicates that sections of Dawson Street and Rollings Road are included as part of a bike route which connects off-road trails and the shared path on the east side of Talaskia Road. These streets currently do not provide any bike lane facilities and no directional signage is present to direct cyclists along this route. It is recommended that improvements to this bike route be investigated.

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## BIKE PARKING

The town centre and train station currently provides minimal levels of bike parking.

The train station provides some secure bike parking which accommodates a small number of bicycles.

It is recommended that the installation of bike parking hoops in the town centre and within the train station be considered to attract new cyclists.

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## UPPER FERNTREE GULLY PRIMARY SCHOOL

The primary school provides bike parking within the school. Observations revealed that many children do cycle to school, as illustrated in Figure 34. It is recommended that consideration be given to providing shelter for the bike parking.

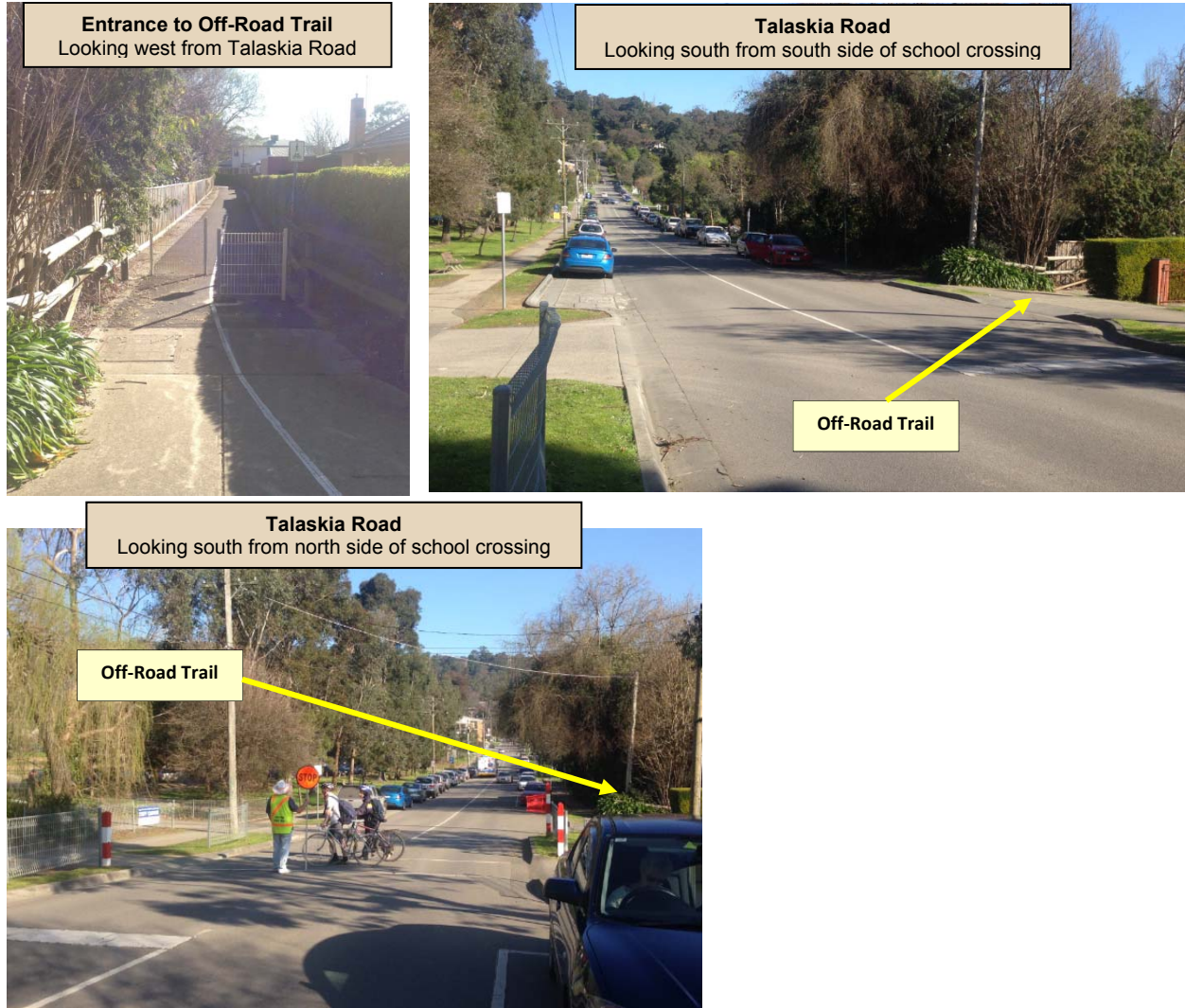
**Figure 34: Bike Parking at Upper Ferntree Gully Primary School**





It is also recommended that bike route improvements be made in the vicinity of the Primary School. This should include improved on-road bike lane facilities and improved directional signage. This should include upgrades to the Rollings Road and Dawson Street route discussed previously which connect to Talaskia Road via the short off-road trail illustrated in Figure 35. This off-road trail currently includes no directional signage.

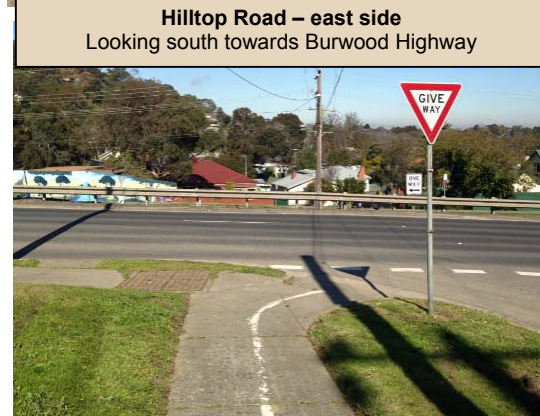
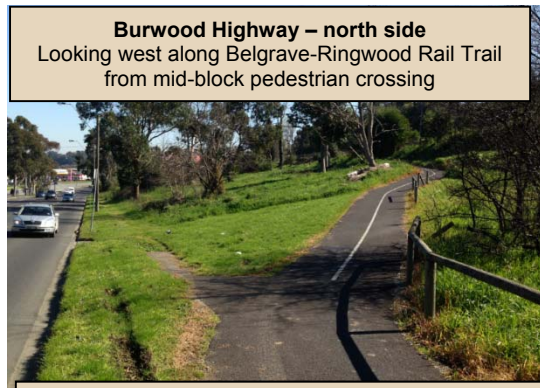
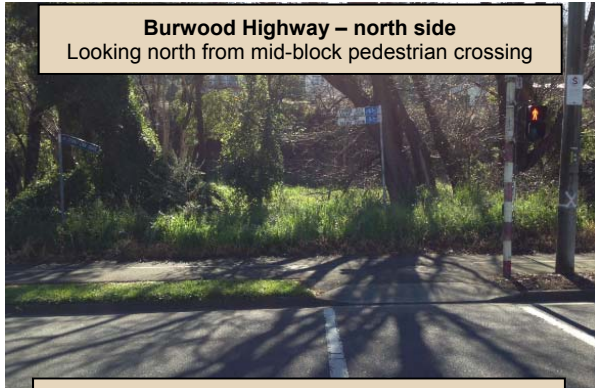
**Figure 35: Existing Off-Road Trail between Talaskia Road and Rollings Road**



#### BIKE DIRECTIONAL SIGNAGE AND PAVEMENT MARKINGS

On-site observations revealed that bike directional signage is currently poorly provided throughout the study area. Signage is either not provided at all, or needs maintenance. Also, shared path pavement markings are rarely provided. Examples of poor or no bike directional signage or pavement markings is provided in Figure 36.

**Figure 36: Examples of Bike Directional Signage needing Improvement**



## 7. RECOMMENDATIONS

The following improvement measures are recommended for consideration in order to improve vehicle and parking operations, pedestrian safety, bike routes, public transport connections and vehicle safety. In line with the *'Knox Liveable Street Plan 2012-2022'*, the recommendations prioritise the desire to promote 'streets as places' and make pedestrians the highest priority in street design and operation. Subsequently, the recommendations generally aim to reduce car dependency and encourage more sustainable transport modes, as well as to improve safety for vulnerable road users, such as pedestrians and cyclists. **Appendix B** summarises all recommended improvements in tabular form.

Stakeholders, including business owners, residents and other agencies will need to be consulted in regards to the recommendations. This aims to ensure that the community support and 'buy-in' to any strategies aimed at improving accessibility. Some recommendations may ultimately require formal approvals from external agencies, such as Metro or VicTrack and subsequently it is important that these agencies be consulted prior to further progressing their development.

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### BURWOOD HIGHWAY CORRIDOR – IN VICINITY OF TRAIN STATION

#### 7.1. BIKE DIRECTIONAL SIGNAGE

##### Findings

The existing bike directional signage and shared path pavement markings and signage are inconsistent, infrequent and potentially confusing for cyclists. The directional signage is particularly lacking in proximity of Hilltop Road where the Belgrave-Ringwood Rail Trail crosses the rail line and cyclists are required to perform several turning manoeuvres. There is also a lack of directional signage to direct cyclists where and how to cross Burwood Highway in order to travel towards the town centre of Upper Ferntree Gully, Talaskia Reserve or the Angliss Hospital.

##### Recommendations

**7.1.1:** A complete review of existing signage should be undertaken in order to develop a strategy for installing new bike directional signage, particularly along the off-road trails in Upper Ferntree Gully. The review should also recommend the installation of standard shared path pavement symbols and signage to inform cyclists and pedestrians of the conditions and the ability for cyclists to share the path. Figure 37 provides examples of modifications required to be made to existing bike directional signage.

**7.1.2:** New bike directional signage is recommended to be installed on both sides of the railway line (in the vicinity of Hilltop Road) to direct cyclists across the railway line and to continue along the existing off-road trails.

**7.1.3:** Bike directional signage should also be provided to key locations including the town centre, 1000 Steps National Park and the Angliss Hospital. The signage should be in accordance with new Melbourne wide standards.

**7.1.4:** The south side of Burwood Highway, between Willow Road and Dawson Street, is not designated as a Shared Path. This is presumably due to the presence of numerous vehicle crossovers, especially at the Maxi Food car park and the presence of pedestrians. Therefore, it is recommended that directional signage be installed to direct cyclists on the Belgrave-Ringwood Rail-Trail and destined for the town centre to cross Burwood Highway at the signalised mid-block pedestrian crossing and then travel via Forest Oak Drive and Ferny Creek Trail towards Dawson Street. This particular route and the route across Hilltop Road are shown in Figure 38.

**Figure 37: Existing Bike Directional Signage (Examples)**

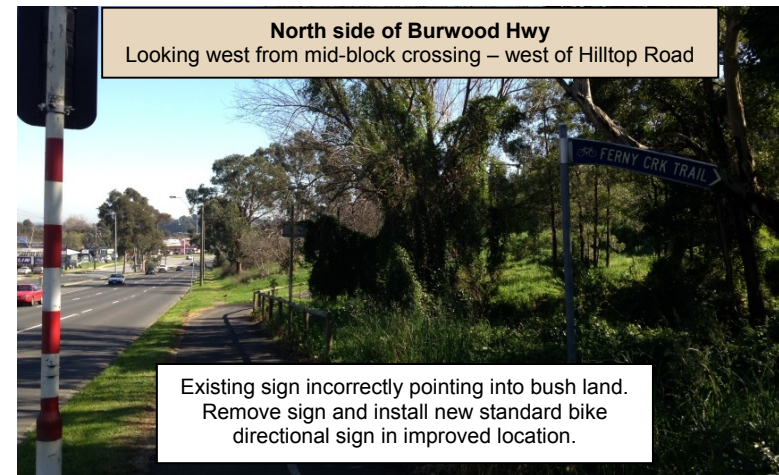
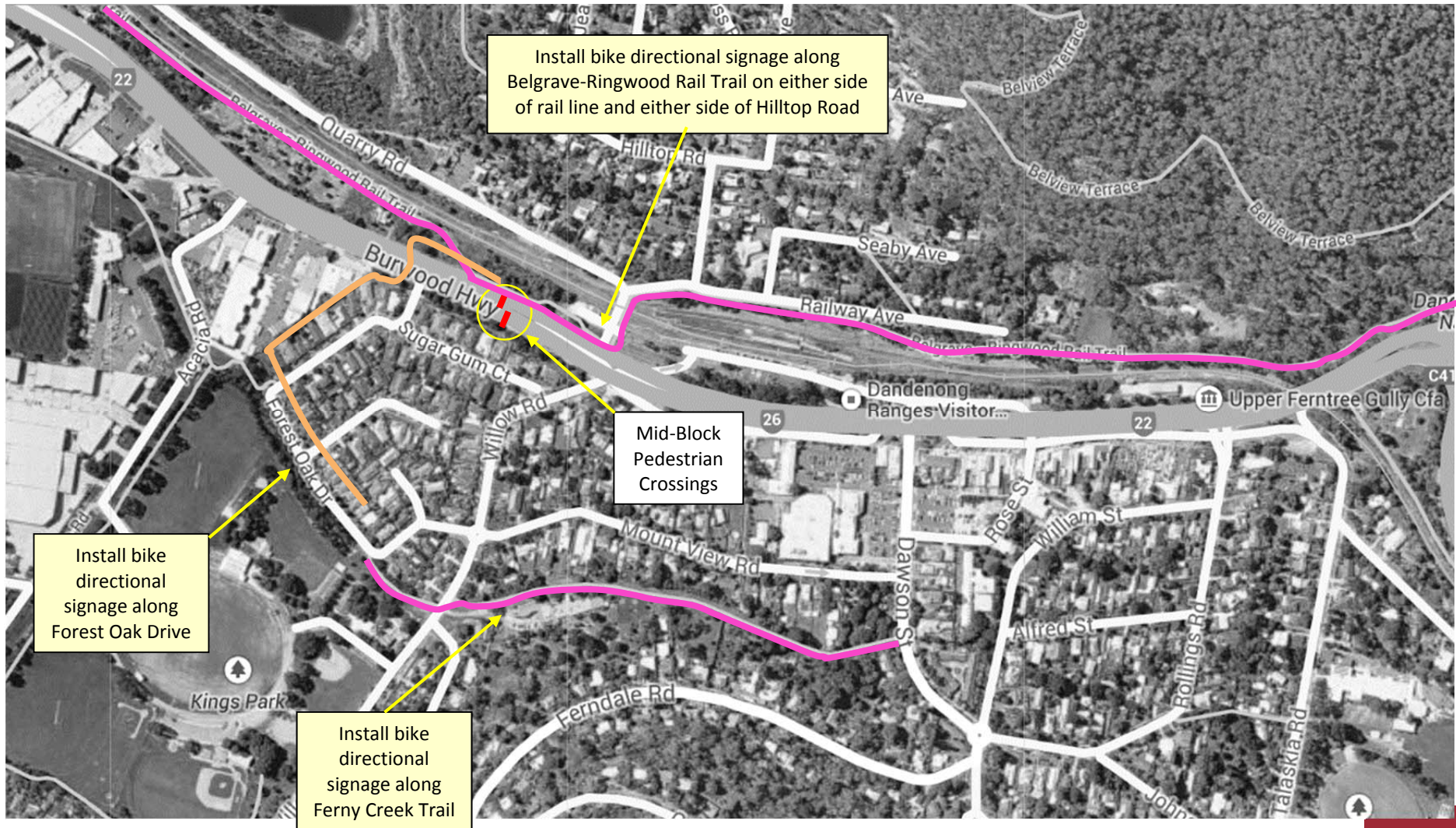


Figure 38: Improved Directional Signage along Route from Belgrave-Ringwood Rail Trail to City Centre



## 7.2. INTERSECTON OF HILLTOP ROAD AND BURWOOD HIGHWAY

### Findings

The intersection of Hilltop Road and Burwood Highway provides a connection between two sections of the existing off-road Belgrave-Ringwood Rail Trail, which are provided on both sides of the railway line.

### Recommendations

**7.2.1:** A physical refuge island be constructed to assist pedestrians and cyclists crossing Hilltop Road. Figure 39 provides photo example.

**7.2.2:** In accordance with **Section 7.1**, new bike directional signage and shared path signage and pavement symbols are recommended to be installed in the vicinity of this intersection to reduce confusion for cyclists and pedestrians.

**7.2.3:** Investigate options to improve and provide a cycle pathway connection from this intersection to Dawson Street (see **Section 7.4** below). This will improve bike connections from Upper Ferntree Gully to Ferntree Gully. This measure would reduce the need to improve directional signage along Forest Oak Drive and the Ferny Creek Trail which was summarised in **Recommendation 7.1.4**.

Figure 39: Intersection of Hilltop Rd and Burwood Highway – Proposed Refuge Island



Install new physical refuge island to assist pedestrians and cyclists crossing Hilltop Road to continue along Off-Road Trails. Also, install bike directional signage and Shared Path pavement markings

### 7.3. REMOVAL OF SLIP LANE FROM BURWOOD HIGHWAY TO TRAIN STATION CAR PARK

#### Findings

Observations revealed that motorists currently turn at high speed from Burwood Highway into the left turn slip lane which provides access to the western end of the Train Station car park. This provides a significant hazard for any pedestrian who may be walking along the existing footpath and informal goat track which are provided either side of the slip lane. Approximately 10 vehicles per hour enter the Train Station car park from this slip lane during the morning peak period. Therefore, this small volume of traffic could be re-directed to use the two-way access point provided from Hilltop Road.

#### Recommendations

**7.3.1:** The slip lane from Burwood Highway to the west end of the Train Station car park should be removed. The removal of the slip lane entry would enable the installation of approximately 11 additional parking spaces and new green space. Figure 40 provides a concept plan and a photo example for the proposed improvement measure.

### 7.4. BURWOOD HIGHWAY – NORTH SIDE: CONSTRUCT PATHWAY WEST OF DAWSON ST

#### Findings

A formal footpath is currently provided on the north side of the Burwood Highway to the west of the slip lane entry (discussed above) into the Train Station Car Park. The footpath terminates at the slip lane and is therefore not continued to the east of the slip lane. Consequently, an informal 'goat track' pathway has been developed. Overhanging tree branches also obstruct this informal pathway at various locations.

#### Recommendations

**7.4.1:** A formal pathway be constructed along the north side of Burwood Highway between the existing slip lane (which is recommended to be removed) and the intersection of Dawson Street. Further investigation into vegetation removal is required. Nevertheless, this footpath will enhance and encourage pedestrian access into the Town Centre. Consideration should be given to designating this new pathway as a shared pedestrian and bicycle pathway to improve bike connections between the town centre and the Ferny Creek Trail. Figure 41 provides photo examples of the existing informal 'goat track' pathway. Consideration may also be given to promoting a footpath through the train station if it is ultimately deemed infeasible or unsafe to provide a footpath along the north side of Burwood Highway.



Figure 40: Proposed Removal of Slip Lane Entry to Train Station Car Park

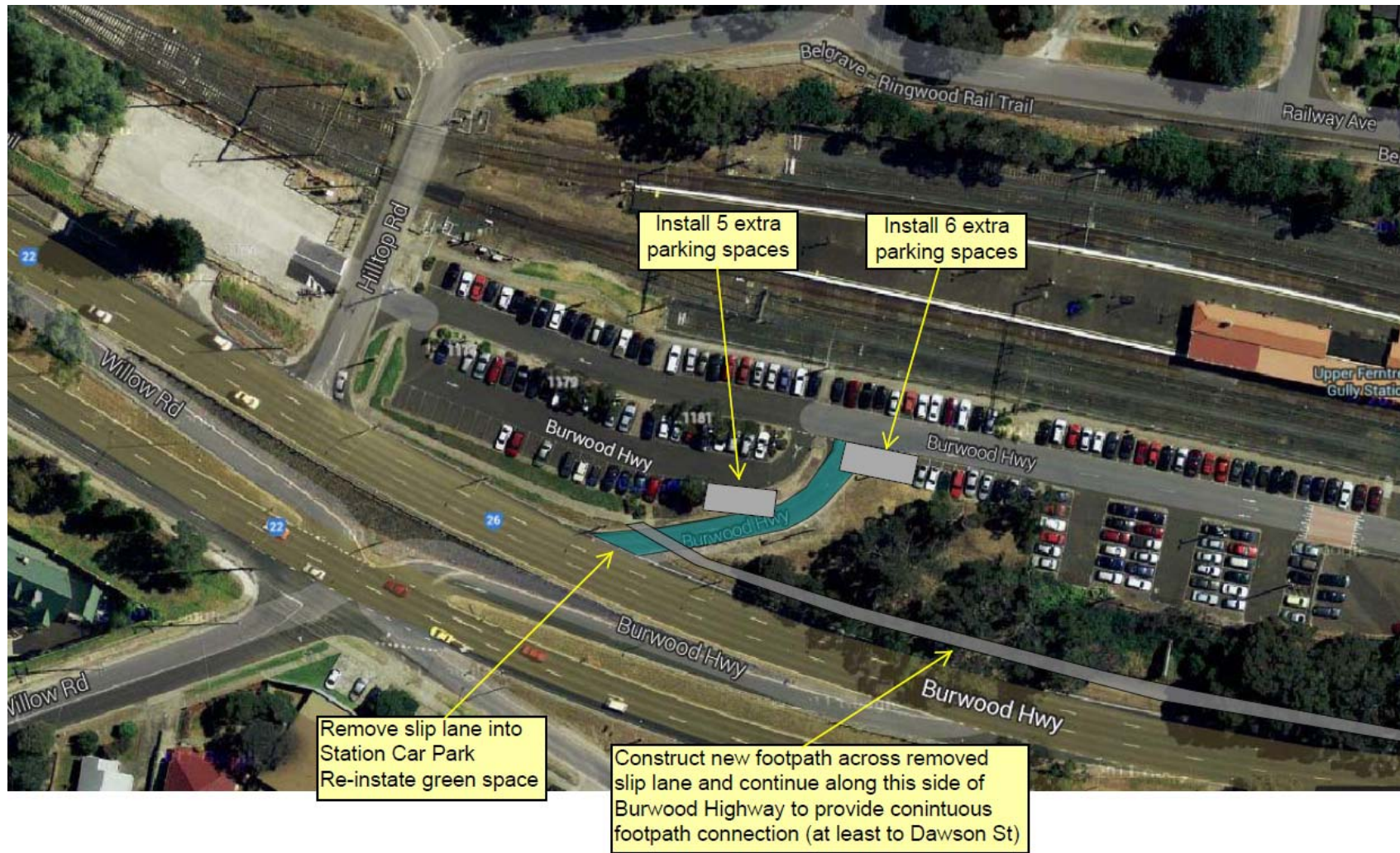
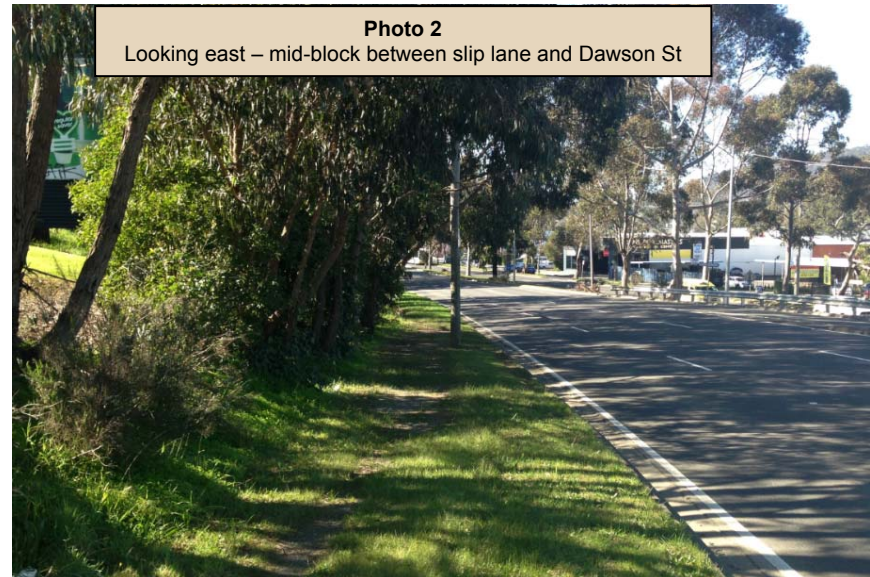


Figure 41: Burwood Highway – North Side: Slip Lane to Dawson Street - Construction of new footpath (examples of informal pathway)



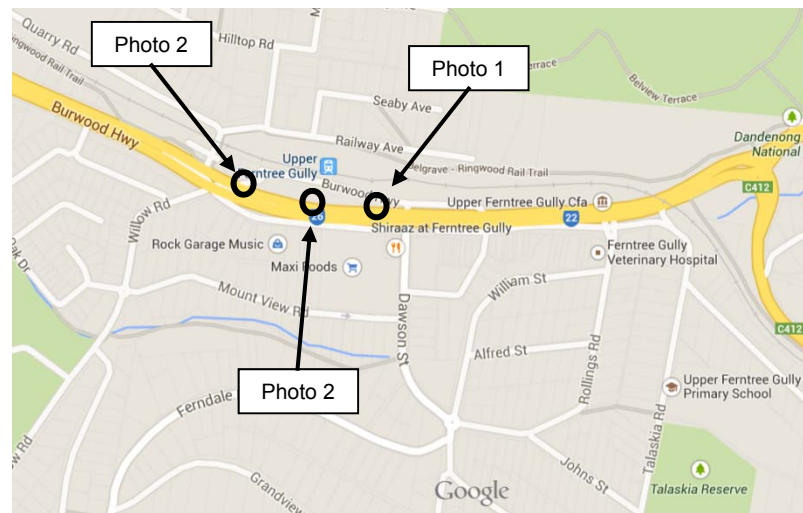
**Photo 1**  
Looking east towards Dawson St intersection



**Photo 2**  
Looking east – mid-block between slip lane and Dawson St



**Photo 3**  
Looking west across slip lane to station car park



## 7.5. TRAIN STATION CAR PARK – CONSTRUCT PATHWAY AT EASTERN END OF CAR PARK

### Findings

An informal gravel pathway is currently provided on the north side of Burwood Highway to the east of the Train Station Car Park. This pathway leads to the 1000 Steps National Park. This informal pathway ends at the eastern end of the Train Station Car Park. Subsequently, there is no form of pedestrian pathway through the eastern portion of the car park. This results in pedestrians being required to walk within the roadway of the car park.

### Recommendations

**7.5.1:** A formal footpath (or shared path) be constructed along the north side of Burwood Highway adjacent to the eastern section of the Train Station car park. This will assist in providing a continuous pedestrian (and bicycle) pathway along the north side of Burwood Highway.

**7.5.2:** To achieve the recommendation summarised above, the internal train station roadway will need to be narrowed. The roadway within the eastern portion of the car park is currently 8.0 metres wide. An opportunity exists to narrow the roadway to 6.4 metres and maintain two-way traffic. Figure 42 provides photo examples. Note that PTV, VicTrack and Metro will need to be consulted in regards to this proposal.

## 7.6. BURWOOD HIGHWAY – NORTH SIDE: CONSTRUCT FOOTPATH EAST OF TRAIN STATION CAR PARK

### Findings

As discussed above, an informal gravel pathway is currently provided on the north side of Burwood Highway to the east of the Train Station Car Park. This gravel pathway leads to the 1000 Steps National Park.

### Recommendations

**7.6.1:** The construction of a formal footpath in place of the existing gravel footpath provided on the north side of Burwood Highway between the train station and the 1000 Steps National Park should be investigated. However, this improvement measure should be allocated a lower level of priority in comparison to the other proposed footpath sections along the north side of Burwood Highway. This is because the existing informal gravel path provides a better facility than the other sections which provide no pedestrian accessibility. Figure 43 provides a photo example.

Figure 42: East end of Train Station Car Park – Construction of Footpath



Investigate construction of new footpath along north side of Burwood Highway (adjacent to east end of Train Station Car Park)

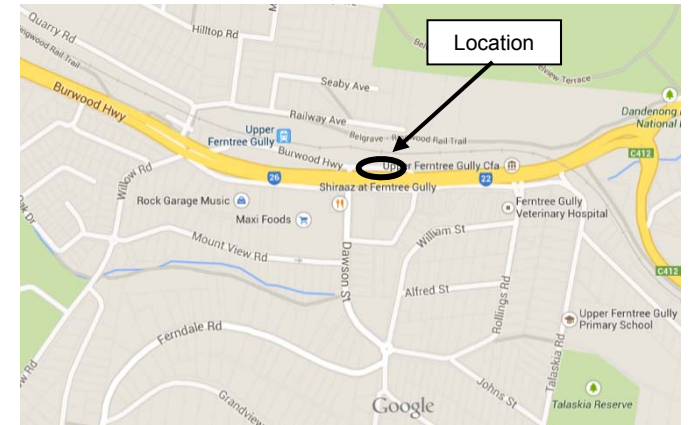


Figure 43: Burwood Highway – North Side: Between Station Car Park and 1000 Steps National Park - Construction of footpath



## 7.7. MAXI FOOD CAR PARK – CLOSE ENTRY LANE FROM BURWOOD HWY SERVICE LANE

### Findings

Four vehicle access points to the Maxi Food Shopping Centre are currently provided, as summarised below:

- Burwood Highway Service Lane – Entry Only lane located immediately west of the intersection with Dawson Street
- Burwood Highway Service Lane – Two-Way Entry & Exit located at west end of the shopping centre car park – approximately 50 metres west of the Entry Only Lane
- Dawson Street – Two-Way Entry & Exit located at north end of car park
- Dawson Street – Two-Way Entry & Exit located at south end of car park

### Recommendations

**7.7.1:** That the existing 'Entry Only' lane from Burwood Highway Service Lane be closed to vehicular traffic. Motorists currently enter the car park at high speed from this access point having immediately exited the main carriageway of Burwood Highway, which is subject to a 70km/h speed limit. The roadway alignment encourages motorists to directly enter the Maxi Food car park without having to slow down or perform a true 90 degree left turn. This represents a significant safety hazard for pedestrians walking along the footpath across the entry lane. Closing this access point would require motorists to continue along the service road and then turn left into the two-way access located at the west end of the car park, thereby increasing their travel distance by 70 metres. It is likely that this would significantly reduce the entering speed of motorists. Figure 44 provides a concept photo plan. Note that management of Maxi Food Shopping Centre will need to be consulted in regards to this recommendation.

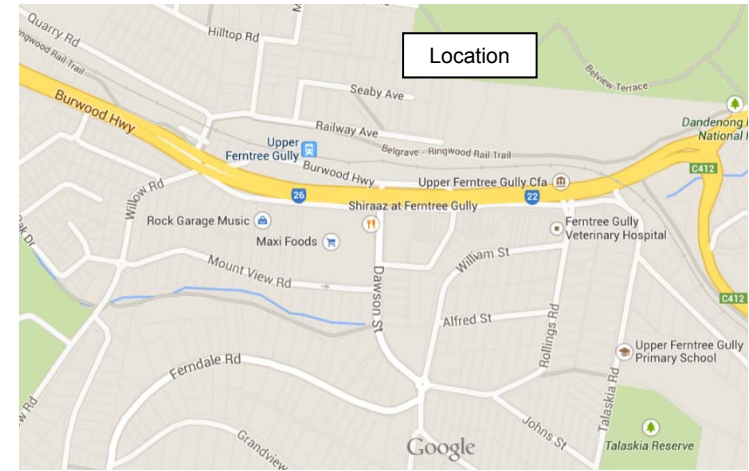
**7.7.2:** Investigate the positives and negatives of relocating the on-street car parking currently provided within the Burwood Highway service road (west of Dawson Street) to the more conventional left hand side of the vehicle traffic lane.

**7.7.3:** Investigate the installation of a formal on-road bike lane within the Burwood Highway service road (west of Dawson Street). The width of this service road (at a location just west of Dawson St) is approximately 6.6 metres wide. This would enable the provision of a 1.5m bike lane, 3.0m traffic lane and 2.1m parking lane, as illustrated below. To reduce the likelihood of 'car dooring' collisions and any potential obstructions to sight lines for motorists exiting driveways, it may be preferable to maintain the on-street parking to the non-conventional right-hand side of the vehicle traffic lane. In this regard, the investigation recommended by 7.7.2 would conclude that parking be maintained on the right-hand side. Some on-street parking may need to be removed at west end of service road due to insufficient road width.

**7.7.4:** Install a new bus stop on the south side of the Burwood Highway service road, immediately west of Dawson Street, to service the westbound Route 693 service. This will serve as a relocation of the existing bus stop located on the main carriageway of Burwood Highway, near Rose Street, which has been deemed sub-standard due to poor pedestrian accessibility to/from this bus stop. This proposal will require buses to travel along this service road (rather than the main carriageway) for a distance of approximately 250 metres which may result in a negligible increase in travel time. This new bus stop, coupled with the closure of the entry lane to Maxi Foods Car Park, will provide excellent pedestrian access to the train station and to the Maxi Foods Shopping Centre. Approximately 3-4 on-street '2 hour limit' spaces within the service lane may need to be removed to facilitate this proposal. This should have marginal impact as the service lane exhibits modest occupancy and motorists could easily relocate to within the Maxi Foods Car Park.

**7.7.5:** If PTV do not support the operation of the Route 693 bus service along the Burwood Highway service lane (see 7.7.4), it is recommended that significant upgrades be made to improve pedestrian accessibility to the existing bus stop on Burwood Highway, near Rose Street. This could include; a raised 'zebra' pedestrian crossing of the Burwood Highway service lane to connect the footpath to the bus stop areas with DDA accessible ramps, the removal/conversion of the existing angled parking to provide a wider storage bus stop area with shelter and seating, and the creation of a more direct pedestrian route to the intersection of Burwood Highway Dawson Street.

**Figure 44: Proposed Closure of Entry Lane into Maxi Foods Car Park from Burwood Highway Service Lane**





## 7.8. INTERSECTION OF BURWOOD HIGHWAY AND DAWSON STREET

### Findings

Observations revealed that some motorists turning right from either Dawson Street or the Train Station car park into Burwood Highway fail to adequately give way to pedestrians crossing on the west and east legs of this intersection. This may be a result of the large size of this intersection and the fact that some motorists are concentrating on giving way to opposing traffic flows more so than pedestrians. While Crashstats do not have any recorded collisions of this nature in the past five years, many near-misses may have occurred which could discourage pedestrian movements, particularly by less able bodied pedestrians.

The observations revealed that traffic movements at this intersection are generally not currently at capacity. Therefore, opportunities may exist to improve pedestrian priority at this intersection.

### Recommendations

**7.8.1:** Investigate the feasibility of providing protected right turn phases in the northbound and southbound directions for the intersection of Burwood Highway and Dawson Street.

**7.8.2:** Install a kerb extension on the south-west corner of the intersection of Burwood Highway and Dawson Street to reduce the pedestrian crossing distance on the west leg of this intersection. This will reduce the phase time required to be allocated to each pedestrian phase and will also prevent westbound motorists using the left turn lane on the approach to Dawson Street when wishing to veer into the service lane on the departure side of the intersection. This will improve pedestrian awareness of motorists' intentions. Figure 45 provides a concept plan of proposed improvements and includes the removal of the vehicle entry to the Maxi Foods Shopping Centre car park which was discussed in **Section 7.7**.

## 7.9. TRAIN STATION CAR PARK – CONSTRUCT RAISED PEDESTRIAN CROSSING

### Findings

Bus Stops are currently located on both sides of the internal car park roadway directly outside the main pedestrian access into the station underpass.

An informal pedestrian crossing (two painted white lines) is currently provided at this location, which may cause confusion for pedestrians, motorists and bus drivers as there are no formal signs or zebra crossing pavement markings. Subsequently, this crossing is not consistent or compliant with Australian Standards.

### Recommendations

**7.9.1:** A formal pedestrian crossing (signs and line marking) should be installed to facilitate pedestrians crossing the internal train station roadway immediately outside the main pedestrian entrance to the train station underpass. A raised pedestrian crossing is recommended in order to reduce vehicle speeds and increase the prominence of pedestrians.

This crossing assists pedestrians crossing to the bus stop on the opposite side of the internal roadway within the station car park and also assists pedestrians crossing to access the pick-up and set-down car park. The formalisation of a continuous footpath along the north side of Burwood Highway will also increase the demand for pedestrians to cross at this location. Figure 46 provides a photo example.

Figure 45: Intersection of Dawson Street and Burwood Highway – Proposed Pedestrian Improvements



Figure 46: Train Station Car Park – Install Raised Pedestrian Crossing outside main entrance to connect Bus Stops



## 7.10. TRAIN STATION CAR PARK: PICK-UP & SET-DOWN AREA

### Findings

A small off-street car park is accessed directly from Burwood Highway to the south of the main entrance and bus stop area. It is unclear what the intention of this car park area is given that there is no signage to indicate the purpose of this car park area. However, it is assumed it is intended as a pick-up and drop-off area.

### Recommendations

**7.10.1:** Directional signage should be installed on Burwood Highway to direct motorists to this car park area. Pedestrian directional signage should also be installed within the station car park to direct pedestrians from the station entrance to this car parking area. Figure 47 provides photo examples.

## 7.11. BIKE PARKING HOOPS AT TRAIN STATION AND TOWN CENTRE

### Findings

A small number of secure bike parking lockers are currently provided in close proximity of the station entrance. The lockers provide excellent security for the small number of cyclists who own access to these lockers. However, these lockers do not necessarily encourage first time cyclists to ride to the station and do not allow for long-term growth in cycling as a legitimate mode of transport to the train station.

Negligible levels of bike hoop parking were observed to be provided in the town centre, either along the Burwood Highway service lane or near Maxi Foods Shopping Centre.

### Recommendations

**7.11.1:** Several bike parking hoops should be installed in the immediate vicinity of the main train station entrance. These bike hoops should be provided in a prominent location that provide passive security, street lighting and shelter. Figure 48 provides photo examples of the existing bike lockers and the area which could be utilised to install new bike parking hoops.

**7.11.2:** Install bike hoops in prominent locations within the town centre.

Figure 47: Train Station Car Park – Install Directional Signage to/from Pick-Up and Set-Down Car Park

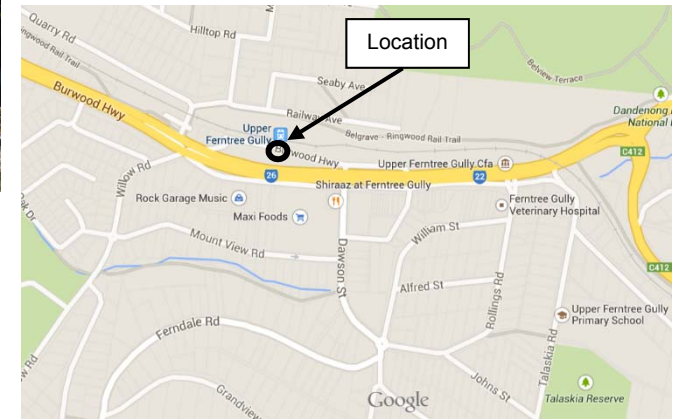
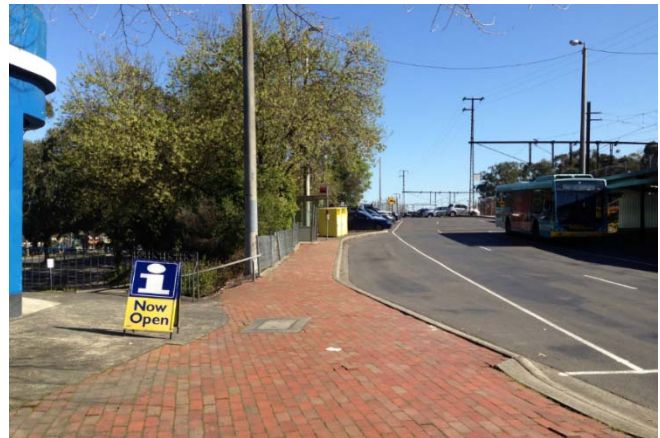
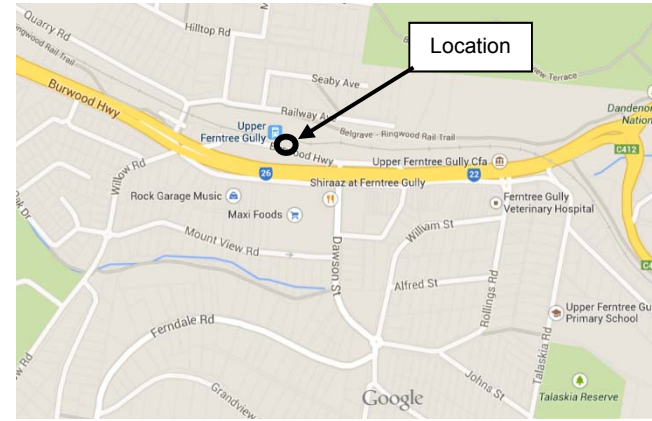


Figure 48: Train Station Car Park – Install Bike Parking Hoops in close proximity of Station Entrance



## 7.12. BURWOOD HIGHWAY SERVICE ROAD FOOTPATH – EAST OF DAWSON STREET

### Findings

The south side of Burwood Highway, to the east of Dawson Street, provides shops, cafes and restaurants. Several restaurants / cafes already provide kerbside cafes. This assists in increasing the attractiveness, vibrancy and economic profitability of this shopping strip. This is directly in line with several of the main aspirations of the *'Knox Liveable Street Plan 2012-2022'*. However, the kerbside cafes also reduce the effective width of the footpath for pedestrians.

Parking surveys revealed that the maximum occupancy of the 39 on-street parking spaces between Rose Street and Dawson Street is 23 parked vehicles. The maximum occupancy of the 30 on-street spaces between Rollings Road and Rose Street is 18 parked vehicles. Subsequently, opportunities exist to reduce the parking supply in order to increase the width of the footpath.

### Recommendations

**7.12.1:** Convert existing angled parking on the south side of the service road to parallel parking in order to increase the width of the footpath. See Figure 49 to Figure 51. These plans also illustrate the following three recommendation provided below. The widened footpath will enable Council to consider a combination of tree planting or landscaping, seating, additional kerbside café provision and increased effective width for pedestrians. These options all increase the attractiveness of the street in regards to making the street a “place for people” and therefore this recommendation strongly aligns with the *'Knox Liveable Street Plan 2012-2022'*.

**7.12.2:** Install a raised pedestrian ‘zebra’ crossing at the intersection with Rose Street to designate priority to pedestrians over motorists exiting Rose Street.

**7.12.3:** Tighten the existing vehicle access between the main carriageway and service road of Burwood Highway, opposite Rose Street. This will reduce vehicle turning speeds and improve pedestrian and vehicle safety.

**7.12.4:** Consider installation of traffic calming devices, such as road humps, to reduce vehicle speeds. This measure in conjunction with the removal of angled parking should improve bike safety and enable this route to be promoted as a bike connection to the town centre and the train station. Bike directional signage should be installed.

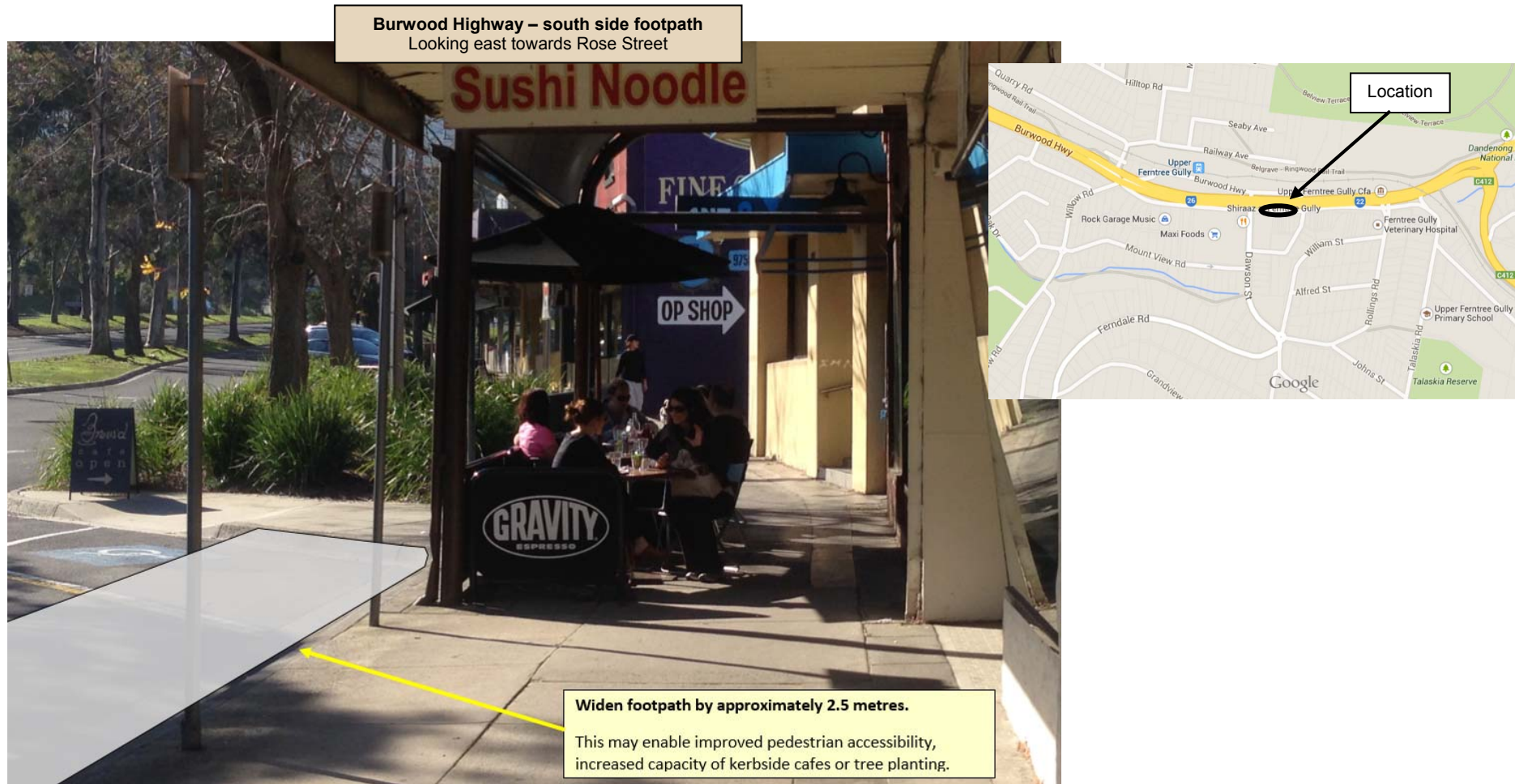
**7.12.5:** Remove the existing bus stop located on the main westbound carriageway of Burwood Highway, near Rose Street, which services the westbound Route 693 service. This will serve as a relocation of the existing. This bus stop is considered sub-standard due to poor pedestrian accessibility to/from this bus stop. Recommendation 7.7.4 recommends relocating this bus stop to the south side of the Burwood Highway service road, immediately west of Dawson Street. The removed bus stop could be landscaped. Alternatively, Recommendation 7.7.5 recommends upgrading the existing bus stop to provide improved pedestrian accessibility.

**Figure 49: Burwood Highway Service Road – Rollings Road to Dawson Street**

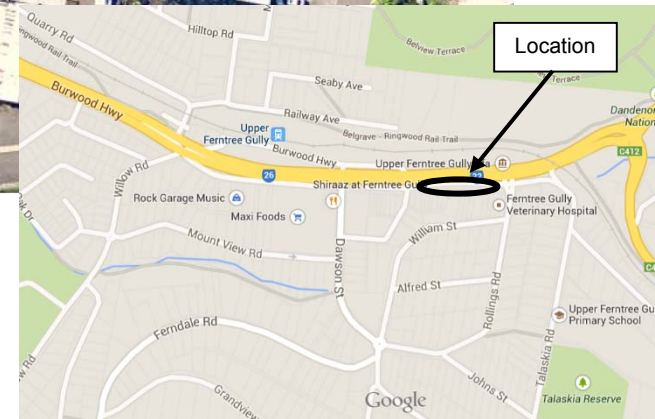




Figure 50: Burwood Highway Service Road – Rollings Road to Dawson Street



**Figure 51: Burwood Highway Service Road – Rollings Road to Dawson Street**



## 7.13. INTERSECTION OF BURWOOD HIGHWAY AND ROLLINGS ROAD

### Findings

The intersection of Burwood Highway and Rollings Road is currently extremely complex and allows numerous movements between the main and service carriageways of Burwood Highway and Rollings Road.

On-site observations noticed that several motorists were confused and undertook potentially hazardous turning movements from incorrect roadway positions.

Large kerb radii are provided throughout the intersection. This allows high vehicle turning speeds and increases pedestrian crossing distances.

A childcare centre is located immediately adjacent to this intersection resulting in several parents and children crossing Rollings Road at this location. Children walking to the Upper Ferntree Gully Primary School may also cross Rollings Road at this location to walk towards Talaskia Road.

Modest traffic volumes were recorded using Rollings Road (approximately 60 vehicles two-way per hour) and the west leg of the service road (approximately 10-20 vehicles per hour) during the peak periods.

### Recommendations

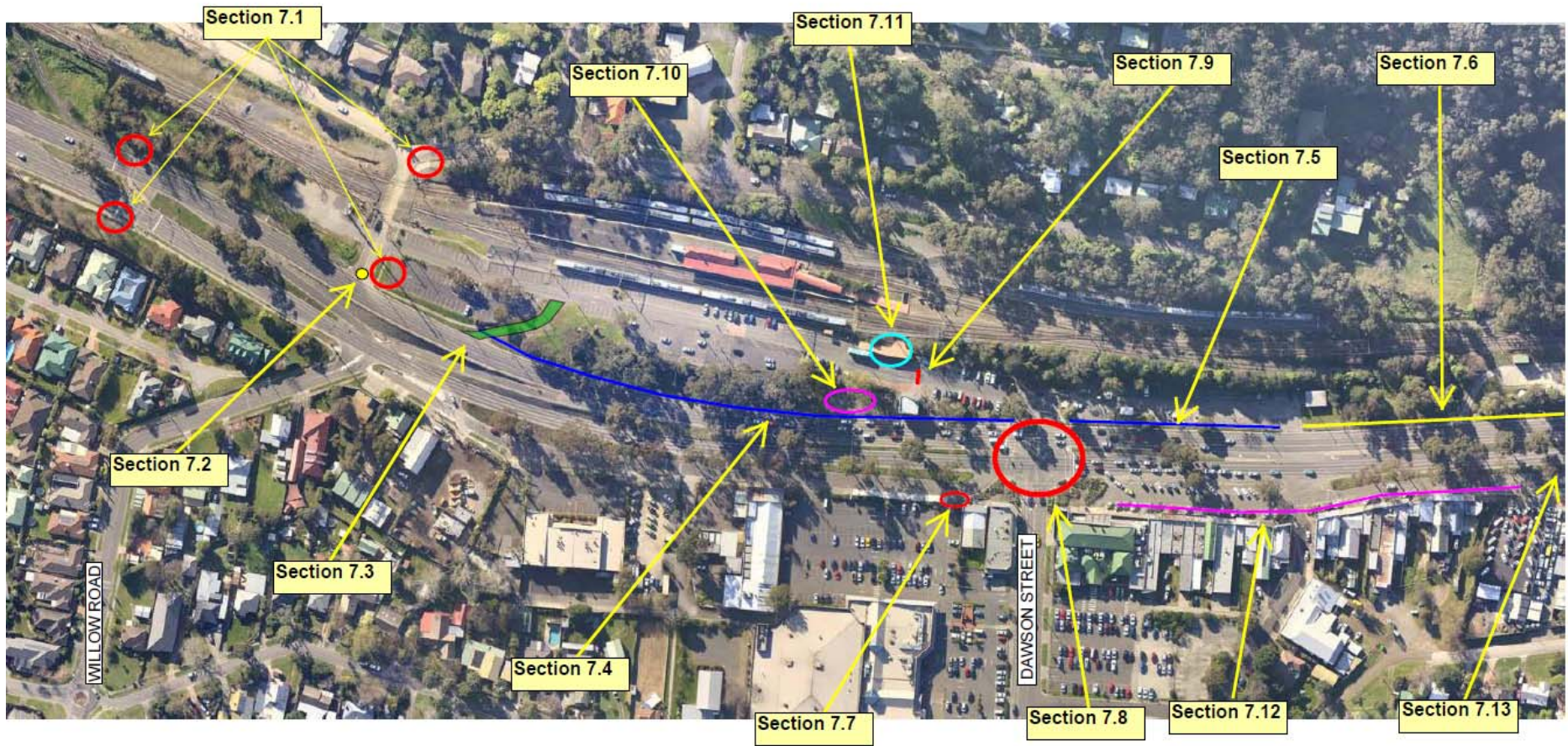
**7.13.1:** Opportunities exist to remodel the intersection of Burwood Highway and Rollings Road to simplify traffic movements and provide improved safety for pedestrians walking across Rollings Road. A raised pedestrian crossing could also be considered across Rollings Road. Figure 52 provides a concept plan and photo example of a proposed intersection remodel.

Refer to Figure 53 for a diagrammatic summary of all proposed improvement measures along the Burwood Highway Corridor, which have been discussed above. Please note that further consultation and investigation into these recommendations is required and therefore these recommendation should be considered as a “work in progress”. The recommendations may not ultimately be feasible following stakeholder comments.

Figure 52: Intersection of Burwood Highway and Rollings Road – Proposed Intersection Remodel



Figure 53: Burwood Highway Corridor - Summary of Proposed Improvements



#### 7.14. OVERFLOW OF TRAIN STATION PARKING DEMAND

##### Findings

The Train Station car park is essentially 100% occupied by 8.30am. Parking demands currently overflow into a gravel car park area provided at the west end of the station car park, which is also approaching capacity. The unrestricted parking spaces provided in Mount View Road and Rose Street are also fully occupied during the day, presumably by train commuters and local workers.

Subsequently, there is currently minimal spare parking capacity to accommodate future increases in demand for vehicle parking for train commuters. This could lead to a combination of the following potentially undesirable outcomes:

- Parking demands spreading into residential streets
- Train commuters encouraged to drive a further distance to an alternative train station
- Potential train commuters encouraged to drive for the entire journey to their final destination

However, the Upper Gully Strategic Plan outlines that the residential population of Upper Ferntree Gully is expected to remain almost precisely stable between 2011 and 2036 (forecast to change from 2,567 to 2,563). This would suggest that parking demands for key attractions, such as the Train Station are unlikely to increase significantly in the future. Therefore, the consideration of constructing new parking facilities in the vicinity of the train station is not recommended as a priority, particularly given the high cost of such projects and the uncertainty of where a potential site would even be feasible.

Nevertheless, the train station car park is currently at capacity and even a marginal increase in future demand could lead to the associated negative outcomes outlined above.

To mitigate these potential negative outcomes, the following options are recommended for consideration by Council and PTV.

- Implement walking and cycling improvements in the vicinity of the train station and the town centre to encourage a mode shift of existing motorists parking at the train station to these more sustainable options.
- Encourage bus travel to/from the station. This includes improvements to pedestrian facilities connecting to the bus services.
- Encourage increased pick-up and set-down activity at the train station. This should include encouraging the use of the existing off-street car park accessed from Burwood Highway to the south of the station entrance (discussed earlier).
- Consider provision of additional parking spaces for rail commuters by utilising currently low occupancy off-street car parks in the vicinity of the train station. Rather than constructing new car parking facilities, it is recommended that alternative strategies to providing increased commuter parking be explored. Parking surveys revealed that the Maxi Food car park has at a minimum 90 spare available parking spaces at all times throughout the day. The spaces located closest to the train station (and farthest to the shopping mall entrance) exhibit the lowest occupancy rates and therefore any use of these spaces by rail commuter would likely result in negligible adverse impacts for motorists wishing to access the Maxi Food car park.

## **Recommendations**

**7.14.1:** Public Transport Victoria (PTV) and Council should investigate opportunities for train commuters to park in under-utilised off-street car parking areas. This could include pursuing an agreement with management of the Maxi Food Shopping Centre to designate some proportion of the car parking as All Day Free parking. It is considered that up to 60 unrestricted spaces could be provided without adversely impacting on the shopping centre. While this recommendation may be counter-intuitive to the aspiration to discourage increased private vehicle usage, it is considered that the negatives associated with potential rail commuters deciding to drive to their ultimate destination are so significant, that additional parking supplies should be investigated in conjunction with other measures aimed at encouraging a mode shift to walking, cycling and bus trips to and from the train station.

**7.14.2:** If an agreement with management of the Maxi Food Shopping Centre is unable to be reached, Council and PTV should prioritise walking, cycling and bus improvements to promote mode shift rather than consider the construction of new off-street parking facilities in the vicinity of the train station.

As discussed in **Section 2**, the majority of the Town Centre exhibits modest parking occupancy rates. However, Mount View Road is occupied 100% during the day. The surveys suggest the on-street parking is utilised by a combination of residents who are unwilling or unable to park the vehicle in a private off-street location and all day commuters who either work locally or travel by train.

**7.14.3:** A resident priority parking scheme and associated signage may need to be investigated for Mount View Road subject to support from residents.

## **7.15. BIKE LANES AND PATHS WITHIN THE TOWN CENTRE**

### **Findings**

The existing City of Knox bike route plan (sourced from the City of Knox website) indicates that sections of Dawson Street and Rollings Road are included as part of a bike route which connects Talaskia Road to the off-road Ferny Creek Trail. These bike route connections are provided as relatively narrow Shared Paths and may be confused as 'pedestrian only' footpaths due to insufficient signage and pavement markings. These streets currently provide minimal directional signage to direct cyclists along this route.

The north/south section of Dawson Street currently does not provide any bike facilities. This prohibits a continuous bike connection between where the off-road shared path on Dawson Street ends (it continues only in an east/west direction along an off-road trail) and Burwood Highway. Therefore, there is no continuous bike connection from the existing off-road paths and the train station. It is not entirely desirable to extend the off-road path along the footpaths on either the east/west side of Dawson Street as these are the areas with the highest level of pedestrian activity and therefore on-road bike lanes should be investigated.

The existing bike route plan with the suggested improvement measures from 7.15.1 to 7.15.5 are shown in Figure 54.

### **Recommendations**

**7.15.1:** Investigate mechanisms that provide a continuous link from where the off-road shared path currently ends on Dawson Street and the train station. This should involve the installation of on-road bike lanes on this section of Dawson Street and bike boxes at the intersection of Burwood Highway. Parking demands on this

section of Dawson Street are negligible and therefore 'No Stopping' restrictions could be installed to allow the installation of formal bike lane facilities.

Upgrade the existing off-road shared path on the sections of Dawson Street and Rollings Road (further east) with improved signage, pavement markings and potentially a widened path.

**7.15.2:** Install formal shared path signage and pavement markings along the east side of Talaskia Road to connect the short section of trail which leads to Rollings Road to the Belgrave-Ringwood Trail which runs along railway line. Warning signage should be installed to direct cyclists to slow down and be mindful of school children when riding past the Primary School.

### **Findings**

There is a lack of pedestrian refuges along the most heavily pedestrian trafficked section of Dawson Street to assist pedestrians crossing the street to connect between the Maxi Foods Shopping Centre and the Pub or the shops located along the Burwood Highway service road to the east of Dawson Street.

### **Recommendations**

**7.15.3:** The safety of informal pedestrian crossings on this section of Dawson Street should also be improved. It is recommended that the construction of physical pedestrian refuge islands be investigated, as illustrated in Figure 55.

### **Findings**

The existing route for cyclists travelling from the east (on the Belgrave-Ringwood Trail) to the train station or the town centre is relatively circuitous. Opportunities may exist to encourage cyclists to use the Burwood Highway service road to cycle between Old Belgrave Road and the town centre.

### **Recommendations**

**7.15.4:** Install a raised pedestrian 'zebra' crossing or priority crossing (for bikes and pedestrians) at the intersection of Old Belgrave Road and Burwood Highway Service Road. An informal crossing is currently promoted at this location via a pedestrian refuge island treatment.

**7.15.5:** Investigate installation of on-road bike lanes on Burwood Highway Service Road between the proposed raised pedestrian crossing (discussed above) and Rollings Road. This may require the removal or modification to the existing centre median island in this section of roadway.



Figure 54: Existing and Proposed Bike Paths – Near Town Centre

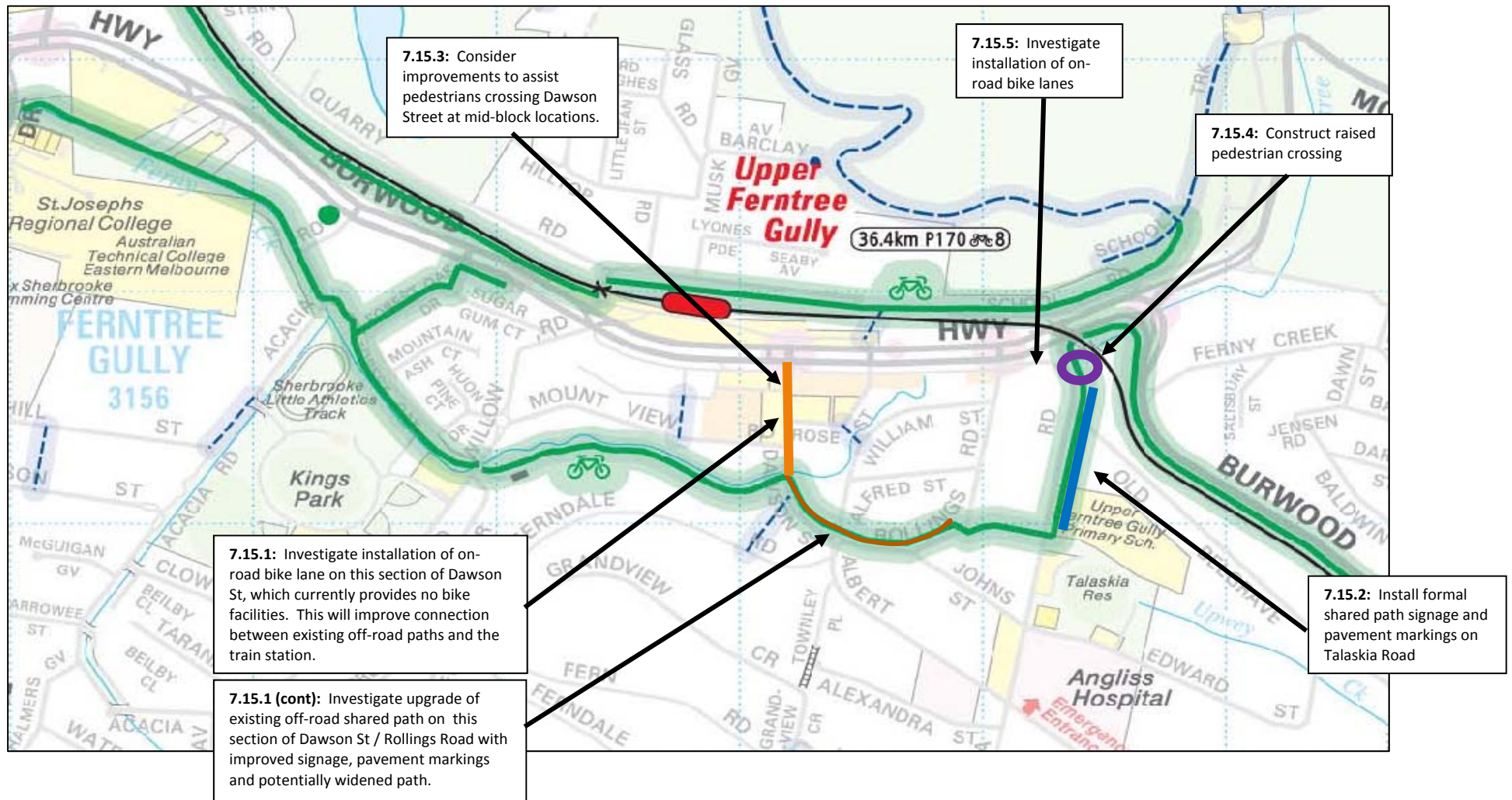


Figure 55: Dawson Street – Proposed Pedestrian Refuge Islands



## 7.16. HOSPITAL PRECINCT

### Findings

As discussed in **Section 3**, the Angliss Hospital generates reasonably high parking occupancies in the streets in the immediate vicinity of the hospital. However, the high parking demands are concentrated only in the immediate vicinity of the hospital and do not extend along Talaskia Road all the way to the Primary School. Consequently, there is negligible overlap of parking demands generated by the hospital and the primary school.

The occupancy of the Main Talaskia Reserve car park peaks at midday at 75%. The occupancy has reduced significantly by 3.30pm and provides significant spare capacity at this time. Therefore, parents who are picking up school children are able to obtain parking in the vicinity of the school either on Talaskia Road or within the Main Talaskia Reserve car park.

Turnover surveys revealed that very few motorists overstay the posted on-street time limits (generally 1 or 2 hour limit) surrounding the hospital. Visitors and staff are utilising the off-street car parks for longer duration stays.

### Recommendations

**7.16.1:** Observations reveal parking restrictions are currently working effectively. Therefore, no on-street parking changes are recommended at this stage in the vicinity of the hospital.

## 7.17. PRIMARY SCHOOL PRECINCT

### Findings

The operation of the school departure phase was extremely well organised and provides a safe environment for children. No children were observed crossing Talaskia Road at an uncontrolled location. In this regard, every child who crossed Talaskia Road used the designated and patrolled school crossing. This assists children and parents who wish to cross the street to walk to parents parked on the opposite (west) side of Talaskia Road or those wishing to walk or cycle along the short section of off-road trail which connects through to Dawson Street.

The fact that all children use the patrolled crossing is extremely important, as children running between parked cars represent a potential safety hazard due to insufficient sight lines for motorists.

Nevertheless, the current 40km/h speed limit signage for the school is provided for only a short distance on Talaskia Road and motorists can observe 50km/h signs while driving past the school. This encourages motorists to accelerate to 50km/h prior to departing the school precinct.

Discussions with the school crossing supervisor indicated that his main concern is vehicle speed on Talaskia Road. This concern is endorsed by the automatic traffic count, which recorded an 85<sup>th</sup> percentile speed of approximately 60km/h on Talaskia Road in the vicinity of the school.

### Recommendations

**7.17.1:** 40km/h speed limit be extended along the entire length of Talaskia Road. This will improve safety in the vicinity of the Primary School and the Hospital.

**7.17.2:** Consider installing road humps along Talaskia Road to reinforce the proposed 40km/h speed limit. It is noted that any road humps (or other traffic calming devices) must be designed to provide no inconvenience for ambulances or the extension of the Route # 732 public transportation bus which uses Talaskia Road. Management of the Hospital and Ambulance Victoria should be consulted prior to any consideration of physical speed reduction devices. Police enforcement of the 40km/h speed limit should also be encouraged.

**7.17.3:** 40km/h speed limits and complementary traffic calming devices should also be considered in other residential streets within the Town Centre or Hospital Precinct, particularly those streets which exhibit 85<sup>th</sup> percentile speeds greater than 45km/h (refer to **Table 2** for summary of automatic count results).

**7.17.4:** A shelter structure should be provided above the existing bike rail parking which is provided within the confines of the primary school. The need for additional bike parking supplies should be monitored.

**Hospital and School Precinct**

Surveys Conducted: Week of 13-17 October 2014

					Occupied Spaces					
<b>OFF-STREET CAR PARKS</b>					6.00am	9.00am	Midday	2.00pm	4.00pm	6.00pm
	Section		Restriction	Spaces						
Main Talaskia Reserve Car Park	Entrance from Talaskia Rd		3P and 2P	33	0	13	17	14	11	7
			Unrestricted	32	19	32	32	32	10	5
Smaller Talaskia Reserve Car Park	Entrance from Edward St		1P, 2P and 1P-Permit Holders	34	1	21	29	31	26	20
Hospital Car Parks	Staff Car Park - West side of Talaskia Rd		Staff Only	83	16	49	57	67	50	34
	Public Paid Car Park - West side of Talaskia Rd		Paid Car Park	70	3	43	63	63	55	36
	2 Car Parks - Disabled / Visiting Doctors / Emergency - East side of Talaskia Rd		Visiting Doctors and Disabled	27	3	21	26	17	16	13
	Supplies and Deliveries - South side of Johns St		Allied Health, Engineering and Nursing Managers	12	6	9	8	7	8	9
	Staff Car Park - North side of Albert St		Staff Only	197	29	128	145	158	122	65
William Street - Gravel Parking Area - Volunteer Parking	At Bend in roadway		Volunteer Parking	14	0	12	11	11	9	0
William Street - Norm Reynolds Service Centre	North side of roadway			6	0	5	4	4	1	0
ChildCare Car Park (Gravel)	south side of Burwood Highway service lane		Visitors	20	0	8	3	10	1	1
<b>ON-STREET PARKING AREAS</b>					6.00am	9.00am	Midday	2.00pm	4.00pm	6.00pm
Railway Avenue	Hilltop Rd and Dead End	Both	Unrestricted	40	4	10	12	13	10	8
Rollings Road	Albert/Dawson Roundabout to Johns St	North	2P: 8am-6pm	10	0	0	0	0	0	0
Johns Street	Rollins Rd to Talaskia Rd	South	2P: 8am-6pm	20	1	1	8	12	10	6
Edward Street	Talaskia Rd to bend in roadway	North	2P: 8am-6pm	15	3	14	13	13	13	9
		South	2P: 8am-6pm	38	5	5	4	8	6	2
	Bend in roadway to Old Belgrave Rd	East	2P: 8am-6pm	15	1	0	0	1	0	0
Old Belgrave Road	Edward St to Talaskia Rd	South	2P	50	3	2	4	0	1	3
Talaskia Road	Old Belgrave Road to School	East	2P: 9am-5pm & 2 min limit: 8-9am	6	0	3	1	0	0	0
		West	2P: 8am-6pm	19	0	7	5	3	1	1
	In front of Reserve (School to Johns St)	Both	2P: 8am-6pm	39	3	13	22	29	24	23
	John St to Albert St	East	1/4P	4	0	0	0	3	1	0
		West	1P: 8am-8pm	12	8	10	8	11	12	8
Albert St to Alexandra St	Both	2P: 8am-6pm	9	5	9	8	8	9	8	
Alexandra Street	Talaskia Rd to Dead End	Both	2P: 8am-6pm	25	1	5	6	13	8	5
Albert Street	Talaskia Rd to Townley Pl	South	2P: 8am-6pm	4	1	2	3	4	3	2
		South	Patient Parking (angled)	13	0	7	8	13	13	5
		South	2P: 8am-6pm	14	2	2	0	1	2	2
Townley Place	Albert Street to Dead End	Both	Unrestricted	10	1	1	0	0	0	0
Alfred Street / William Street	Roundabout to Alfred	East	2P: 8am-6pm	9	0	0	0	0	0	0
William Street	Alfred to Rollings St	South	2P: 8am-6pm	17	0	0	1	0	1	0
Rollings Road	Burwood Hwy to William St	West	Vet Customer Parking (angled)	9	0	4	5	3	7	3
		East	2P: 9am-4.30pm (angled adjacent to childcare)	4	0	1	0	0	1	0
	William St to Alfred St	West	2P: 8am-6pm	10	0	0	1	0	0	0
	Alfred to Roundabout	West	2P: 8am-6pm	8	0	0	0	0	0	0
Alfred Street	Rollings Rd to William St	North	2P: 8am-6pm	21	1	1	2	1	2	2

# Appendix A

## Full Parking Survey Results

Town Centre and Train Station Precinct  
 Surveys Conducted: Week of 25-29 August 2014

OFF-STREET CAR PARKS				Occupied Spaces						
				6.00am	9.00am	Midday	2.00pm	4.00pm	6.00pm	
	Section		Restriction	Spaces						
Upper Ferntree Gully Train Station	Entire Parking Area		Unrestricted	288	32	273	280	283	272	179
			Other	8	0	0	2	2	2	2
Royal Hotel Precinct	Main Royal Hotel Car Park		Customer Parking Only	75	4	13	34	59	44	30
			Disabled	4	0	0	0	2	4	4
			Car Park - immediately adjacent to Royal Hotel	24	0	24	24	22	18	3
			Permit Zone Car Park - East of Royal Hotel	35	0	8	14	15	11	4
Maxi Foods Car Park - Summary	Entire Parking Area		2P	217	12	78	106	103	126	78
			P-Disabled	5	0	4	3	3	2	0
Church Car Park	Accessed from Mount View Road		Unsigned	15	0	1	0	0	0	0
Caesars Restaurant Car Park (1174 & 18821 Burwood Highway)	Accessed from Burwood Hwy Service Rd		Patrons Only	30	0	18	24	19	21	10
			P-Disabled	1	0	0	0	0	0	1
ON-STREET PARKING AREAS					6.00am	9.00am	Midday	2.00pm	4.00pm	6.00pm
	Between	Side	Restriction	Spaces						
Burwood Highway Service Road (south side)	Rollings to Rose	South	2P	28	0	11	17	10	14	12
		South	Loading Zone or Disabled	2	0	0	1	2	1	1
	Rose to Dawson	North	1P (9-5 M-Sat) & 2P (9-5 Sun)	16	0	7	12	9	6	4
		South	Loading Zone or Disabled	2	0	0	0	1	0	0
	Dawson to Willow	South	1/2P (9-5)	21	0	6	11	10	7	10
		North	2P	29	0	9	11	10	7	1
Rose Street	Dawson St to Burwood Hwy	East	1P (9-6 M-F & Sat Morning)	2	0	0	2	0	0	0
		West	Unrestricted	9	0	8	8	8	6	0
		West	1P (9-6 M-F & Sat Morning)	3	0	1	3	1	1	2
Dawson Street	Burwood Hwy to Rollings Roundabout	East	Loading Zone	4	0	0	0	0	0	0
		East	2P	20	0	2	1	2	0	0
		West	2P (8-6 M-F)	18	1	1	1	0	7	2
		West	Loading Zone & Bus Zone (shared)	3	0	0	0	0	0	0
Mount View Road	Willow Rd to Dawson St	North	Unrestricted	36	17	37	37	33	22	7
Willow Road	Burwood Hwy to Mount View Rd	Both	Unrestricted	30	0	5	6	7	2	3

## Appendix B

### Preliminary Transport and Parking Recommendations Summary Table

A complete list of the recommendations which were presented in **Section 7** are summarised in the table below.

Projects which can be achieved easily and cost effectively without significant impact to other transport modes have been listed as 'High Priority'. Furthermore, any projects which are considered critical for pedestrian safety or accessibility have been listed as 'High Priority'.

Projects which are estimated as high-cost and may have limited benefits are listed as 'Low Priority'.

For example, the construction of a formal, paved footpath along the north side of Burwood Highway between the train station and the 1,000 steps is considered a low priority project because it is estimated as high cost and an informal gravel pathway already exists to cater for the existing low volume of pedestrians wishing to walk this route.

By comparison, the construction of a formal footpath along the north side of Burwood Highway between Hilltop Road and Dawson Street is also high cost, but is listed as a medium priority project because there is currently no provision of any form of pathway in this location.

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.1.1	Bikes	A complete review of existing signage should be undertaken in order to develop a strategy for installing new bike directional signage, particularly along the off-road trails in Upper Ferntree Gully. The review should also recommend the installation of standard shared path pavement symbols and signage to inform cyclists and pedestrians of the conditions and the ability for cyclists to share the path.	Review Installation of signage	Bicycle Network Victoria	Medium	Low
7.1.2	Bikes	New bike directional signage is recommended to be installed on both sides of the railway line (in the vicinity of Hilltop Road) to direct cyclists across the railway line and to continue along the existing off-road trails.	Review Installation of signage	Bicycle Network Victoria	Medium	Low
7.1.3	Bikes	Provide bike directional signage to key locations including the town centre, 1000 Steps National Park and the Angliss Hospital.	Review Installation of signage	Bicycle Network Victoria	Medium	Low

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.1.4	Bikes	Install directional signage to direct cyclists on the Belgrave-Ringwood Rail-Trail and destined for the town centre to cross Burwood Highway at the signalised mid-block pedestrian crossing and then travel via Forest Oak Drive and Ferny Creek Trail towards Dawson Street.	Review Installation of signage	Bicycle Network Victoria	Medium	Low
7.2.1	Pedestrians Bikes	A physical refuge island be constructed to assist pedestrians and cyclists crossing Hilltop Road.	Design & Construct	VicRoads	Medium	Low / Medium
7.2.2	Bike	Install new bike directional signage and shared path signage and pavement symbols in the vicinity of the intersection of Burwood Highway and Hilltop Road to reduce confusion for cyclists and pedestrians.	Review Installation of signage	Bicycle Network Victoria	Medium	Low
7.2.3	Pedestrian Bike	Investigate options to provide a cycle pathway connection on north side of Burwood Highway from the intersection of Hilltop Road to Dawson Street. This will improve bike connections from Upper Ferntree Gully to Ferntree Gully. (refer to 7.4.1)	Lead Partner Advocate Design & Construct	VicRoads PTV Victrack & Metro	Medium	Investigate: Low Construct: High
7.3.1	Vehicle Pedestrian	Remove slip lane entry from Burwood Highway to west end of Train Station Car Park. The removal of the slip lane entry would enable the installation of approximately 11 additional parking spaces and new green space.	Lead Partner Advocate	VicRoads PTV Victrack & Metro	High	Medium



Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.4.1	Pedestrian  Bike	Construct a formal pathway along the north side of Burwood Highway between the existing slip lane (which is recommended to be removed) and the intersection of Dawson Street. Further investigation into vegetation removal is required. Nevertheless, this footpath will enhance and encourage pedestrian access into the Town Centre. Consideration should be given to designating this new pathway as a shared pedestrian and bicycle pathway to improve bike connections between the town centre and the Ferny Creek Trail. Consideration may also be given to promoting a footpath through the train station if it is ultimately deemed infeasible or unsafe to provide a footpath along the north side of Burwood Highway.	Lead Partner Advocate  Design & Construct	VicRoads  PTV  Victrack & Metro	Medium	High
7.5.1	Pedestrian  Bike	A formal footpath (or shared path) be constructed along the north side of Burwood Highway adjacent to the eastern section of the Train Station car park. This will assist in providing a continuous pedestrian (and bicycle) pathway along the north side of Burwood Highway.	Lead Partner Advocate	VicRoads  PTV  Victrack & Metro	Low	High
7.5.2	Pedestrian	Reduce the width of the carriageway of the internal train station roadway (in order to achieve 7.5.1). The roadway within the eastern portion of the car park is currently 8.0 metres wide. An opportunity exists to narrow the roadway to 6.4 metres and maintain two-way traffic.	Lead Partner Advocate	VicRoads  PTV  Victrack & Metro	Low	Medium

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.6.1	Pedestrian	Construct a formal footpath along the north side of Burwood Highway between the train station car park and the 1000 Steps National Park. This would replace the existing informal gravel footpath	Design & Construct	VicRoads	Low	High
7.7.1	Pedestrians	Close the existing 'Entry Only' lane from Burwood Highway Service Lane to Maxi Food car park. Closing this access point would require motorists to continue along the service road and then turn left into the two-way access located at the west end of the car park.	Design & Construct	Maxi Food Management	Medium	Low / Medium
7.7.2	Vehicles Pedestrians	Investigate the positives and negatives of relocating the on-street car parking currently provided within the Burwood Highway service road (west of Dawson Street) to the more conventional left hand side of the vehicle traffic lane.	Design Line Marking	Abutting Businesses	Low	Low
7.7.3	Bikes	Investigate the installation of a formal on-road bike lane within the Burwood Highway service road (west of Dawson Street). The width of this service road (at a location just west of Dawson St) is approximately 6.6 metres wide. This would enable the provision of a 1.5m bike lane, 3.0m traffic lane and 2.1m parking lane. To reduce the likelihood of 'car dooring' collisions and any potential obstructions to sight lines for motorists exiting driveways, it may be preferable to maintain the on-street parking to the non-conventional right-hand side of the vehicle traffic lane. In this regard, the investigation recommended by 7.7.2 would conclude that parking be maintained on the right-hand side. Some on-street parking may need to be removed at west end of service road due to insufficient road width.	Design Line Marking	Abutting Businesses	Medium	Low

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.7.4	Bus Pedestrians	Install a new bus stop on the south side of the Burwood Highway service road, immediately west of Dawson Street, to service the westbound Route 693 service. This will serve as a relocation of the existing bus stop located on the main carriageway of Burwood Highway, near Rose Street, which has been deemed sub-standard due to poor pedestrian accessibility to/from this bus stop. This proposal will require buses to travel along this service road (rather than the main carriageway) for a distance of approximately 250 metres which may result in a negligible increase in travel time.	Lead Partner Advocate  Design and line marking	PTV and Bus Company  VicRoads	High	Low
7.7.5	Bus Pedestrians	If PTV do not support the operation of the Route 693 bus service along the Burwood Highway service lane (see 7.7.4), it is recommended that significant upgrades be made to improve pedestrian accessibility to the existing bus stop on Burwood Highway, near Rose Street. This could include; a raised 'zebra' pedestrian crossing of the Burwood Highway service lane to connect the footpath to the bus stop areas with DDA accessible ramps, the removal/conversion of the existing angled parking to provide a wider storage bus stop area with shelter and seating, and the creation of a more direct pedestrian route to the intersection of Burwood Highway Dawson Street.	Lead Partner Advocate  Design and Construction	PTV and Bus Company  VicRoads	High	Medium / High
7.8.1	Pedestrians	Investigate the feasibility of providing protected right turn phases in the northbound and southbound directions for the intersection of Dawson Street and Burwood Highway.	Lead Partner Advocate	VicRoads	High	Low

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.8.2	Pedestrians	Install a kerb extension on the south-west corner of the intersection of Dawson Street and Burwood Highway to reduce the pedestrian crossing distance on the west leg of this intersection.	Design & Construct	VicRoads	High	Medium
7.9.1	Pedestrians Bus	A formal pedestrian crossing (signs and line marking) be installed to improve access to and from the main bus stops located outside the train station entrance. A raised pedestrian crossing is recommended in order to reduce vehicle speeds and increase the prominence of pedestrians.	Lead Partner Advocate	PTV Victrack & Metro	High	Low / Medium
7.10.1	Pedestrians Vehicles	Directional signage be installed on Burwood Highway to direct motorists to the pick-up and set-down car park area. Pedestrian directional signage should also be installed within the station car park to direct pedestrians from the station entrance to this car parking area.	Lead Partner Advocate	VicRoads PTV Victrack & Metro	Low	Low
7.11.1	Bikes	Several bike parking hoops should be installed in the immediate vicinity of the main train station entrance. These bike hoops should be provided in a prominent location that provide passive security, street lighting and shelter.	Lead Partner Advocate	VicRoads PTV Victrack & Metro	High	Low
7.11.2	Bikes	Install bike hoops in prominent locations within the town centre.	Design Installation	Abutting Businesses	High	Low
7.12.1	Pedestrians	Convert existing angled parking on the south side of the Burwood Highway service road (east of Dawson Street) to parallel parking in order to increase the width of the footpath.	Design & Construct	Abutting Businesses	High	Medium / High
7.12.2	Pedestrians	Install raised pedestrian 'zebra' crossing at intersection with Rose Street to designate priority to pedestrians over motorists exiting Rose Street.	Design & Construct	Surrounding Businesses	Medium	Low / Medium

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.12.3	Vehicles Pedestrians	Tighten the existing vehicle access provision between the main carriageway and service road of Burwood Highway, opposite Rose Street. This will reduce vehicle turning speeds and improve pedestrian and vehicle safety.	Design & Construct	VicRoads Surrounding Businesses	Low	Low / Medium
7.12.4	Bike	Consider installation of traffic calming devices, such as road humps, to reduce vehicle speeds in the Burwood Highway service road between Rollings Road and Dawson Street. This measure in conjunction with the removal of angled parking should improve bike safety and enable this route to be promoted as a bike connection to the town centre and the train station. Bike directional signage should be installed.	Design & Construct	Surrounding Businesses	Low	Low / Medium
7.12.5	Bus Pedestrian	Remove the existing bus stop located on the main westbound carriageway of Burwood Highway, near Rose Street, which services the westbound Route 693 service. This will serve as a relocation of the existing. This bus stop is considered sub-standard due to poor pedestrian accessibility to/from this bus stop. Recommendation 7.7.4 recommends relocating this bus stop to the south side of the Burwood Highway service road, immediately west of Dawson Street. The removed bus stop could be landscaped. Alternatively, Recommendation 7.7.5 recommends upgrading the existing bus stop to provide improved pedestrian accessibility.	Lead Partner Advocate	PTV and bus company  VicRoads	High	Low

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.13.1	Pedestrians Vehicles	Opportunities exist to remodel the intersection of Rollings Road and Burwood Highway to simplify traffic movements and provide improved pedestrian safety. A raised pedestrian crossing could also be considered across Rollings Road.	Design & Construct	VicRoads Surrounding Businesses and Residents	High	Medium
7.14.1	Vehicles Train	That Public Transport Victoria (PTV) and Council explore an agreement with management of the Maxi Foods Shopping Centre to designate some proportion of the car parking as All Day Free parking. It is considered that up to 60 unrestricted spaces could be provided without adversely impacting on the shopping centre.	Liaise	PTV Maxi Food Management	High	Low
7.14.2	Vehicles Train	If an agreement with management of the Maxi Food Shopping Centre is unable to be reached (see 7.14.1), Council and PTV should prioritise walking, cycling and bus improvements to promote mode shift rather than consider the construction of new off-street parking facilities in the vicinity of the train station.	Lead Partner Advocate	PTV	Low	N/A
7.14.3	Vehicles	A resident priority parking scheme and associated signage may need to be investigated for Mount View Road subject to support from residents.	Consult Install signs	Abutting Residents	Low	Low

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.15.1	Bike	<p>Investigate the installation of a formal on-road bike facility on the north/south section of Dawson Street to connect the existing off-road paths to Burwood Highway/Train Station. The Parking demands on this section of Dawson Street were identified as negligible and therefore could be removed to facilitate installation of on-road bike lanes.</p> <p>Also investigate upgrade of existing off-road shared path provided on the north side footpath of Dawson St / Rollings Rd (to the east of the north/south section). Upgrade should include improved signage, pavement markings and consideration of path widening.</p>	Design Installation	Abutting Residents	High	Low
7.15.2	Bikes Pedestrians	<p>Install formal shared path signage and pavement markings along the east side of Talaskia Road to connect the short section of trail which leads to Rollings Road to the Belgrave-Ringwood Trail which runs along railway line. Warning signage should be installed to direct cyclists to slow down and be mindful of school children when riding past the Primary School.</p>	Design Installation	Abutting Residents  Upper Ferntree Gully Primary School	Medium	Low
7.15.3	Pedestrians	<p>The safety of informal pedestrian crossings on Dawson Street (south of Burwood Highway) should also be improved. It is recommended that the construction of physical pedestrian refuge islands be investigated.</p>	Design Installation	Abutting Residents and Businesses	Low	Medium

Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.15.4	Bikes Pedestrians	Install a raised pedestrian 'zebra' crossing or priority crossing (for bikes and pedestrians) at the intersection of Old Belgrave Road and Burwood Highway Service Road. An informal crossing is currently promoted at this location via a pedestrian refuge island treatment.	Design Installation	VicRoads	Medium	Low / Medium
7.15.5	Bike	Investigate installation of on-road bike lanes on Burwood Highway Service Road between the proposed raised pedestrian crossing (discussed in 7.15.4) and Rollings Road. This may require the removal or modification to the existing centre median island in this section of roadway.	Design Installation	Abutting Businesses	Low	Low
7.16.1	No change	<b>General Parking Restrictions</b> Observations reveal parking restrictions are currently working effectively. Therefore, no on-street parking changes are recommended at this stage in the vicinity of the hospital.	-	-	-	-
7.17.1	Pedestrians	The existing 40km/h speed limit should be extended along the entire length of Talaskia Road. This will improve safety in the vicinity of the Primary School and the Hospital.	Design Installation	Abutting Residents  Upper Ferntree Gully Primary School  PTV  Angliss Hospital  VicRoads	Medium	Low



Ref #	Mode of Transport Improved	Recommendation	Council Role	Stakeholders	Priority	Indicative Cost
7.17.2	Pedestrians	Consider installing road humps along Talaskia Road to reinforce the proposed 40km/h speed limit. It is noted that any road humps (or other traffic calming devices) must be designed to provide no inconvenience for ambulances and public transportation buses using Talaskia Road.	Design Installation	Abutting Residents  Upper Ferntree Gully Primary School  PTV  Angliss Hospital  VicRoads	Medium	Low / Medium
7.17.3	Pedestrians	40km/h speed limits and complementary traffic calming devices should also be considered in other residential streets within the Town Centre or Hospital Precinct, particularly those streets which exhibit 85 <sup>th</sup> percentile speeds greater than 45km/h.	Design Installation	Abutting Residents  VicRoads	High	Low
7.17.4	Bikes	A shelter structure should be provided above the existing bike rail parking which is provided within the confines of the primary school. The need for additional bike parking supplies should be monitored.	Lead Partner Advocate	UFTG Primary School	Medium	Low



**Addendum to the Technical Report - Transport & Parking  
Upper Gully Strategic Plan - 7 November 2016**



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## 1. EXECUTIVE SUMMARY

This “Addendum Report” has been prepared to complement the report titled “Technical Report – Transport and Parking Upper Gully Strategic Plan January 2015”. Thus, the Addendum Report should be read in conjunction with the January 2015 Technical Report. The 2015 Technical Report was prepared to inform the preparation of the Upper Gully Strategic Plan for Knox City Council. In turn, the Upper Gully Strategic Plan is the subject of Amendment C141 to the Knox Planning Scheme.

A Directions Hearing for Amendment C141 was held on 14 October 2016, where the Panel directed Council through its Part B Submission to address:

- the extent of additional traffic and parking to be generated by anticipated future development in the activity centre; and
- any road network and parking capacity upgrades needed in response to additional traffic and parking needs.

This Addendum Report addresses the Panel’s information requirements by presenting traffic and parking forecasts based on future development scenarios presented in the report prepared by Urban Enterprise for the City of Knox, titled ‘Upper Ferntree Gully Capacity Assessment Addendum to Upper Gully Technical Report – Land Use and Economics – 4 November 2016’.

It is important to reflect on the differences between a ‘static’ requirement to accommodate parked vehicles (which can be addressed entirely on private property within development sites) and a ‘dynamic’ requirement to manage moving vehicles (which can only be accommodated on a public road system). In this context, changes to the Planning Scheme (as envisaged under Amendment C141) should not result in adverse parking consequences. The reason is that the Planning Scheme explicitly places requirements on developments to provide parking on-site and at supply-levels that are set to contain all parking demand off surrounding public roads. Only Council (or VCAT on review) can provide an exception to the requirement to provide on-site parking. These exceptions normally only arise where developers can satisfy Council that lower (or no) levels of on-site parking are required (in accordance with a justification process set out in the Planning Scheme) – and the Council grants a planning permit to allow that on-site parking exemption to take place. In other words, increased development should not translate to increases in on-street parking demand unless Council deliberately allows that to occur by dispensing with statutory parking requirements for a development. In contrast, there is no explicit mechanism in the Planning Scheme that requires developers to ‘provide roads’ to manage traffic impacts or manage traffic within the development site. By its very nature, traffic travels to and from an area using existing public roads. Hence, traffic is typically the ‘unknown quantity’ that needs careful consideration when examining Planning Scheme Amendments. The adequacy of road networks servicing a precinct is typically resolved in the very early subdivisional stages of planning communities – a process normally conducted as a precinct structure plan (PSP) in Victoria. The PSP process ‘sets’ the transport network that will service communities in future years.

Based on the future development scenarios and traffic and parking analysis which is presented in the Addendum Report, it has been concluded that there will be comparatively modest increases in traffic and parking demand under the likely development growth in the activity centre. As such, there is no need to pursue road network and parking capacity upgrades in response to the forecast additional traffic and parking demands.

## 2. INTRODUCTION

### 2.1. STUDY AREA

The area covered by Amendment C141 is the Upper Gully area shown in the figure below as the Activity Centre – it includes the Upper Ferntree Gully Railway Station and the commercial area of the Activity Centre.

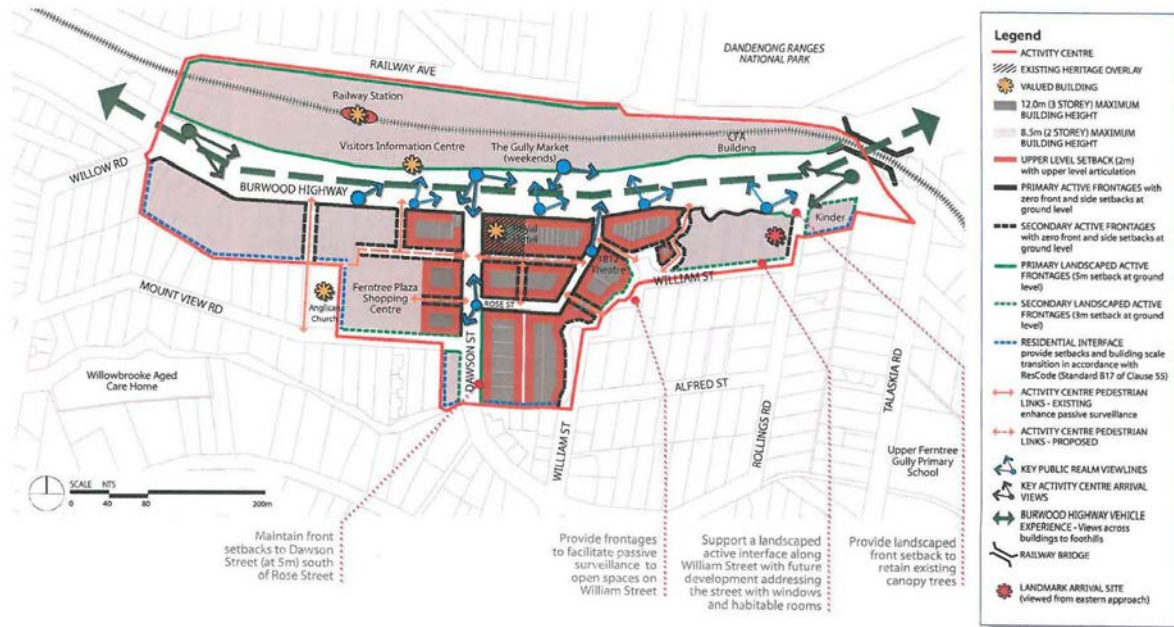


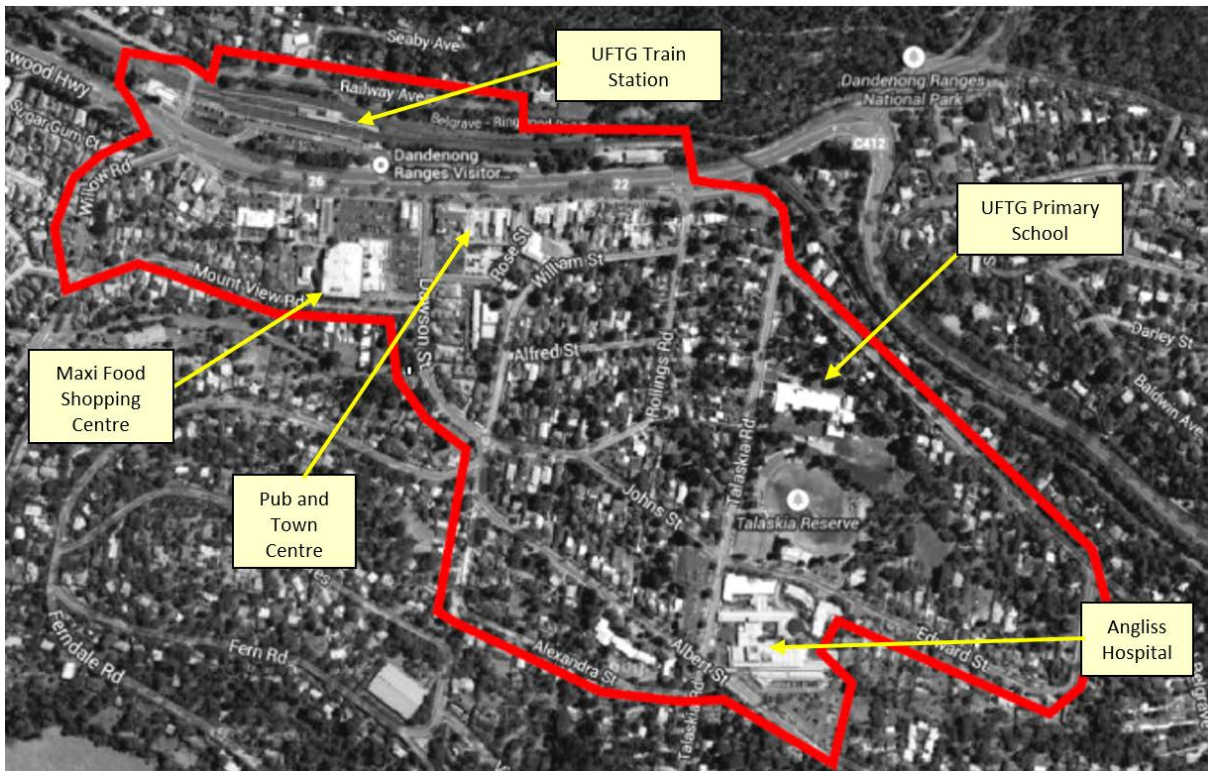
Figure 1: Upper Gully Strategic Plan – Building Height and Setbacks Map

### 2.2. KEY FINDINGS FROM TECHNICAL REPORT – JANUARY 2015

Parking surveys were initially undertaken in a broader area that included the area near the Railway Station and the Activity Centre in the week of 25-29 August 2014, and the Angliss Hospital precinct the week of 13-17 October 2014 (see Figure 2). For the purposes of this Addendum Report, only the parking and traffic data that is relevant to Amendment C141 are discussed. Within the area covered by Amendment C141, there are a total of 241 on-street parking spaces and 436 off-street parking spaces, for a total of 677 publicly available parking spaces.

The surveys recorded occupancy levels for on-street and off-street parking areas at various periods throughout the day between 6am and 6pm. Some turnover surveys were undertaken to determine duration of stay and whether motorists were overstaying posted time limits. The off-street carparks (not under Council control) surveyed within the area covered by Amendment C141 included:

- The Railway Station Car Park (288 unrestricted spaces and 8 other spaces)
- Maxi Foods Shopping Centre Car Park (217 '2-hour limit' spaces and 5 disabled spaces)
- Royal Hotel Car Park (75 patron spaces and 4 disabled spaces)
- 2-4 Rose Street Car Park (35 Permit Zone spaces)
- 6-8 Rose Street Car Park (24 unsigned spaces immediately adjacent to the pub car park)
- Caesars Restaurant Car Park (30 customer spaces)
- Church Car Park – accessed from Mount View Road (approximately 15 spaces in gravel parking area).



**Figure 2: Technical Report Study Area**

The parking occupancy results reveal that the Railway Station carpark exhibits virtually 100% occupancy throughout the day on weekdays. Mount View Road and Rose Street, which provide unrestricted parking in proximity to the Activity Centre and the railway station, also exhibit 100% occupancy. However, most other on-street and off-street spaces within the Activity Centre exhibit modest occupancy rates and provide ample parking opportunities for short and medium term parking.

In summary, the January 2015 Technical Report concluded that:

1. Most on-street spaces throughout the Activity Centre precinct exhibited very modest parking occupancies throughout the day, except for the unrestricted parking spaces in Rose Street and Mount View Road, which were fully occupied during the middle of the day.
2. The Railway Station carpark was essentially fully occupied from early in the morning and throughout the day.
3. Long term (unrestricted) on-street parking is generally highly utilised in the Activity Centre.
4. The Maxi Foods carpark was modestly occupied throughout the day (58% maximum occupancy).
5. The Royal Hotel carpark peaked at 79% occupancy at 2pm and is therefore operating reasonably effectively. Occupancies at other times of the day ranged from 5% to 59%.

Parking turnover surveys were also undertaken in each of the off-street and on-street parking areas in the study area. This provides a description of the parking patterns, which includes determining the number of motorists illegally overstaying the posted time limits. Motorists were extremely compliant with posted time limits within the area relevant to Amendment C141. Most of the on-street parking restrictions in the precinct are '2-hour limit: 8am-6pm'. The results of the turnover surveys which were undertaken at six times throughout the day between 6am and 6pm showed that only between 5% and 10% of the vehicles were observed staying longer than 2 hours in the same on-street location. In addition, low proportions of motorists overstayed the posted '2-hour limit' in the Maxi Foods Shopping Centre carpark.

### 3. URBAN ENTERPRISE DEVELOPMENT FORECASTS

#### 3.1. CONTEXT

Population projections prepared for Council by Forecast ID indicate that the population of Upper Gully will increase only marginally by 13 persons over the next 20 years, as shown in Table 1.

**Table 1: Population and Household Projections, 2016-2036**

Summary	2016	2026	2036	Change (2016-2036)	Annual Increase
Population	2,550	2,554	2,563	+13	+0.65
Households	897	930	942	+45	+2.25
Average Household Size	2.70	2.61	2.59	-0.11	-0.0055
Dwellings	953	979	979	+26	+1.3

Source: Forecast ID. May 2014 in Urban Enterprise, 2016.

A decreasing average household size across the suburb will result in existing dwellings housing fewer people, which is expected to be offset by a minor increase in the number of dwellings in the suburb, including:

- Development of 1172 Burwood Highway for 18 dwellings (apartments) in 2018;
- Low level of vacant lot development (1 dwelling per annum); and
- Low level of infill development (1-2 dwellings per annum).

Urban Enterprise (2016) have concluded that the Forecast ID *“projections are based on the current planning controls, which are very restrictive for housing in the residential zones of Upper Ferntree Gully, and likely developments within the NAC (there is only one permitted development in the NAC at present)”*. It should be noted that the NAC, as defined by Urban Enterprise (2016) is equivalent to the Activity Centre described in Amendment C141. Urban Enterprise (2016) have also determined that if *“changes to planning controls through Amendment C141 result in additional development within the NAC, or if demand increases over time for apartments in Upper Ferntree Gully over and above the rate evident through recent development, population growth could exceed the Forecast ID projections over the period to 2036”*.

In summary, Urban Enterprise (2016) consider that Upper Gully may experience an increase in demand for apartments over time due to the overall trends identified in the Knox Housing Strategy 2015. However, this is unlikely to occur in the short to medium term given the significant capacity and policy support for such development to occur elsewhere in the municipality, particularly in Boronia and Bayswater.

#### 3.2. SCENARIOS

Table 2 provides a summary of potential dwelling, population and floorspace scenarios developed by Urban Enterprise (2016). It should be noted that these scenarios are indicative only. Given the lack of evidence regarding the scale and rate of demand for mixed use development in the Activity Centre, the extent to which the market responds to development opportunities in Upper Gully could vary widely over the next 20 years. Urban Enterprise (2016) expects that the upper scenario could only be realised if demand increases significantly over the next 20 years.

**Table 2: Dwelling and Floorspace Growth Scenarios**

Dwelling and Floorspace Growth Scenarios	Low Scenario	Mid Scenario	Upper Scenario
Potential Dwellings	60	100	376
Potential Additional Residential Population in the NAC (2 persons/household)	120	200	752
Potential Additional Retail and Commercial Floorspace in NAC (sqm)	750	1,500	4,500

Source: Urban Enterprise, 2016

Application of these scenarios is associated with increases in parking and traffic generation. Any identified increase in parking is normally accommodated through on-site parking provision in accordance with Planning Scheme requirements (unless Council is satisfied that a lower on-site parking supply is warranted). Any increase in traffic needs to be accommodated on the surrounding street network.

The forecast increase in parking and traffic under each of the three scenarios (low, mid and upper) is presented in Chapter 4.



## 4. ANALYSIS

### 4.1. FORECASTING ASSUMPTIONS

It is not possible to simply take the number of dwellings and the aggregated area of commercial and retail provided by Urban Enterprise (2016) to derive parking and traffic generation rates appropriate for Upper Gully. Parking and traffic generation rates vary depending on the type of land use and the characteristics within the land use categories (e.g., number of bedrooms in dwellings). In view of the above, and taking into consideration the characteristics of Upper Gully, the following assumptions have been made:

- Dwellings will be of a maximum of two bedrooms, reflective of the location and the medium density residential typology that would be constructed in the Activity Centre. This assumption is also consistent with the falling family size and aging population characteristics in the immediate area and broader municipality.
- In the absence of detailed information about the likely composition of future development, for the purposes of this traffic and parking assessment, it was assumed that the future mix of land uses would broadly mirror the current apportionment in Upper Gully. Today, in the Activity Centre, the retail component is the predominant one, with commercial uses being less prevalent. As such, it will be assumed that future development follows a predominantly retail-oriented pattern. More specifically, it will be assumed that 2/3 of the future retail and commercial floorspace will be retail and 1/3 will be commercial.

### 4.2. PARKING GENERATION

The dwelling and floorspace growth scenarios prepared by Urban Enterprise (2016) generate the parking requirements shown in Tables 3 and 4 below.

**Table 3: Residential Parking Requirements by Development Growth Scenario**

Residential	Low Scenario	Mid Scenario	Upper Scenario
<b>Number of dwellings</b>	60	100	376
<b>Parking requirement (spaces)</b>	60	100	376

Note: The parking rate was assumed at 1 parking space per dwelling (as discussed previously).

**Table 4: Retail and Commercial Parking Requirements by Development Growth Scenario**

Retail and Commercial Development	Low Scenario	Mid Scenario	Upper Scenario
<b>Future Additional Development (sqm)</b>	750	1500	4500
<b>Retail (sqm)</b>	500	1000	3000
<b>Commercial (sqm)</b>	250	500	1500
<b>Parking rates</b>			
<b>Retail (4 spaces/100 sqm)</b>	20	40	120
<b>Commercial (3.5 spaces/100sqm)</b>	8	17	52
<b>Total parking requirement</b>	28	57	172

Notes: 1) It was assumed that 2/3 of the future retail and commercial floorspace would be retail and 1/3 would be commercial; and 2) for retail, the Planning Scheme requirement for uses such as food and drink premises, postal agency and "generic" shops was used, as it is considered to be representative of what would be expected to be developed in Upper Gully.

Importantly, it should be noted that the Planning Scheme places no reliance or expectation on the use of any on-street parking unless the Council deems it is appropriate to do so (on a case-by-case basis). The dispensation mechanisms (that would enable Council to approve the provision of lower levels of parking) are explicitly linked to the nature of the land use proposed (e.g., food outlet, office and retail). Accordingly, as part of this strategic review of Amendment C141, where the nature of individual future land uses cannot be established, it is impossible to provide a meaningful interpretation of the Planning Scheme's dispensation mechanisms.

The administration and enforcement of the Knox Planning Scheme is the duty of the City of Knox. "Clause 52.06 – car parking" of the Knox Planning Scheme, states that its "Purpose" is to:

- ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework;
- ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality;
- support sustainable transport alternatives to the motor car;
- promote the efficient use of car parking spaces through the consolidation of car parking facilities;
- ensure that car parking does not adversely affect the amenity of the locality; and
- ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

The actual number of car parking spaces required for a range of residential, commercial and retail land uses is set out under Clause 52.06-5 of the Knox Planning Scheme. Moreover, the Planning Scheme stipulates that the number of car parking spaces required under Clause 52.06-5 must be provided to the satisfaction of the responsible authority in one or more of the following ways:

- **on the land;** or
- in accordance with a permit issued under Clause 52.06-3 (discussed below); or
- in accordance with a financial contribution requirement specified in a schedule to the Parking Overlay (this does not apply in Upper Gully – as there is no Parking Overlay).

In other words, the Planning Scheme requires that **all development must provide the required car parking on site** – the only situation where this would not occur is when/if the Council resolves to relax that on-site parking requirement by issuing a planning permit, as envisaged by Clause 52.06-3. Clause 52.06-3 states that a permit is required to:

- Reduce (including reduce to zero) the number of car parking spaces required under Clause 52.06-5 or in a schedule to the Parking Overlay;
- Provide some or all the car parking spaces required under Clause 52.06-5 or in a schedule to the Parking Overlay on another site; and
- Provide more than the maximum parking provision specified in a schedule to the Parking Overlay (this does not apply in Upper Gully – as there is no Parking Overlay).

In addition, the Planning Scheme requires that an application to reduce (including reduce to zero) the number of car parking spaces required under Clause 52.06-5 or in a schedule to the Parking Overlay must be accompanied by a Car Parking Demand Assessment. The Application requirements and decision guidelines for permit applications are provided under Clause 52.06-6. This clause describes that the Car Parking Demand Assessment must assess the car parking demand likely to be generated by the proposed:

- new use; or
- increase in the floor areas or site area of the existing use; or
- increase to the existing use by the measure specified in Column C of Table 1 in Clause 52.06-5 for that use.

In other words, any future development application in Upper Gully that would seek to reduce (including reduce to zero) the number of car parking spaces required under the Planning Scheme would need to prepare a Car Parking Demand Assessment that must address the following matters, **to the satisfaction of the responsible authority** (the City of Knox):

- The likelihood of multi-purpose trips within the locality which are likely to be combined with a trip to the land in connection with the proposed use.
- The variation of car parking demand likely to be generated by the proposed use over time.
- The short-stay and long-stay car parking demand likely to be generated by the proposed use.
- The availability of public transport in the locality of the land.
- The convenience of pedestrian and cyclist access to the land.
- The provision of bicycle parking and end of trip facilities for cyclists in the locality of the land.
- The anticipated car ownership rates of likely or proposed visitors to or occupants (residents or employees) of the land.
- Any empirical assessment or case study.

Before granting a permit to reduce the number of spaces, the responsible authority must consider the following, as appropriate:

- The Car Parking Demand Assessment.
- Any relevant local planning policy or incorporated plan.
- The availability of alternative car parking in the locality of the land, including:
- Efficiencies gained from the consolidation of shared car parking spaces.
- Public car parks intended to serve the land.
- On street parking in non-residential zones.
- Streets in residential zones specifically managed for non-residential parking.
- On street parking in residential zones in the locality of the land that is intended to be for residential use.
- The practicality of providing car parking on the site, particularly for lots of less than 300 square metres.
- Any adverse economic impact a shortfall of parking may have on the economic viability of any nearby activity centre.
- The future growth and development of any nearby activity centre.
- Any car parking deficiency associated with the existing use of the land.
- Any credit that should be allowed for car parking spaces provided on common land or by a Special Charge Scheme or cash-in-lieu payment.
- Local traffic management in the locality of the land.
- The impact of fewer car parking spaces on local amenity, including pedestrian amenity and the amenity of nearby residential areas.
- The need to create safe, functional and attractive parking areas.
- Access to or provision of alternative transport modes to and from the land.
- The equity of reducing the car parking requirement having regard to any historic contributions by existing businesses.
- The character of the surrounding area and whether reducing the car parking provision would result in a quality/positive urban design outcome.
- Any other matter specified in a schedule to the Parking Overlay.
- Any other relevant consideration.

Within this context (where formal mandatory processes of thorough examination/justification/review are embedded in the Planning Scheme), it is unlikely that parking-supply issues would arise in association with any new development, as the Council (and the Tribunal on review) controls the statutory mechanism to govern the level of parking associated with such future development. The only manner in which new demands may arise over on-street parking is if Council (after consideration of the requirements and decision guidelines for permit applications as provided under Clause 52.06-6) is satisfied that the impact can be satisfactorily managed and resolves to issue a planning permit that grants a full or part reduction of parking requirements to an individual development application (as envisaged under Clause 52.06-3, and described above).

### **4.3. CONTEXT FOR TRAFFIC GENERATION**

The analysis presented in this section focuses on the traditional commuter peak hours that characterise this part of metropolitan Melbourne – namely 8am to 9am (AM peak) and 5pm to 6pm (PM peak). These peak hours are also consistent with much of the busiest ‘activity’ expected in association with the existing and future land uses in the activity centre (retail, commercial, residential) – for example employees arriving to work and residents departing in the morning.

Those activities whose peak periods do not coincide with the ‘traditional’ weekday AM and PM peak hours (such as ‘shopping’) will attract the greatest number of trips at times when there is abundant spare capacity on the road network (the ‘shops’ are likely to attract the highest patronage in the middle of a typical weekday – consistent with the survey findings in the January 2015 Technical Report which identified the maximum parking demand occurring at 12 noon).

Accordingly, adoption of the traditional AM and PM peak hours (for the purposes of traffic impact analysis) will provide the ‘worst case’ combination of site-generated trips plus background trips on the adjacent road network. To reliably estimate the traffic generation potential of a given development, the well-established industry practice across Australia is to utilise the New South Wales Roads and Traffic Authority (now known as Roads and Maritime Services) ‘Guide to Traffic Generating Developments’ (the RTA Guide) together with local surveys/data, if available and as appropriate.

Within this context, the trip generation rates adopted for the purposes of this assessment, are discussed in Section 4.4.

### **4.4. EXISTING AND NEW TRIPS**

The proposed amendment covers the Activity Centre and it is therefore reasonable to expect that many of the trips that will be attracted to new development will be made by individuals already passing by or visiting the broader Activity Centre. It is also worth noting that certain development types (irrespective of their location within or outside of activity centres) generate relatively few totally new trips; such developments include petrol stations and some fast food outlets. Most of their customers are drawn from cars directly passing, or passing very close to, the Activity Centre.

In summary, not all trips attracted to Upper Gully will be new to the surrounding road network. Accordingly, the analysis of vehicle trips associated with Amendment C141 requires detailed consideration of the ‘composition’ of future trips to the Activity Centre – specifically the identification of which trips are completely ‘new’ versus those trips that are ‘already present’ on the network (those that will already be on the network passing directly in front of or nearby the Activity Centre and will simply ‘divert in’).

Agencies in Australia and worldwide – AustRoads, the NSW Road and Maritime Services and the Institution of Transport Engineers (ITE) – have undertaken in depth research into the nature of trips that may be attracted to certain land use types. Of particular interest in this *traffic impact assessment* analysis are the characteristics of trips associated with ‘shopping centre’ environments – as Amendment C141 deals with such an environment. Much of the aforementioned research has examined this matter in some detail – and the main conclusions are outlined below.

Key findings from ITE’s research are reported in the publication ‘Trip Generation Handbook’ (ITE March 2001). The publication suggests that the incidence of ‘pass-by’ type trips, in shopping centre scenarios, would be in the range of 50-70%. In other words, the ITE’s findings would suggest that a significant proportion of the retail trips attracted to Upper Gully will be from vehicles already within the general area.

Complementing the ITE research, AustRoads’ *Guide to Traffic Management Part 12 – Traffic Impacts of Development (2009)* draws conclusions on linked trips (Commentary 8). Table C8.1 (reproduced in Table 5) sets out ... ‘a typical example of the segmentation of traffic generation for shopping centres’.

**Table 5: Segmentation of Traffic Generation for Shopping Centres**

Development Type	Trip Segmentation		
	New (%)	Diverted drop-in (%)	Undiverted drop-in (%)
Shopping centres > 20,000 m <sup>2</sup>	63	18	19
Shopping centres 3,000 m <sup>2</sup> - 20,000 m <sup>2</sup>	50	22	28
Shopping centres < 3,000 m <sup>2</sup>	50	32	18
Fast food outlets	40	25	35

Table 5 highlights the three trip types defined in the AustRoads Guide. They are as follows:

**New** (unlinked) trips: these are trips attracted to the development and without the development would not have been made.

**Diverted** (drop-in) trips: a linked trip from an origin to a destination that has made a significant network diversion to use the new development.

**Undiverted** (drop-in) trips: a linked trip from an origin to a destination that previously passed the development site. It is also referred to as a **pass-by trip** and the new development is an intermediate stop on a trip that is made from an origin to a destination.

The proportion of each trip type depends upon the specific characteristics and location of any given development.

Thus, when considering future development as part of Amendment C141, the following initial assumptions can be made with respect to trips attracted to Upper Gully:

1. Employee Trips – it will be assumed that these are **entirely new trips** (as they represent workers that are not working in the Activity Centre at present)
2. Visitor / Shopper Trips – it will be assumed that these are **partly undiverted trips** in accordance with guidance from the ITE and AustRoads research

The determination of “*Undiverted drop-in*” trips for the future visitors and shoppers to the subject site is based on three alternate scenarios – linked to shopping centre size. In this instance, Upper Gully currently offers around 7,500m<sup>2</sup> of retail and commercial floorspace and Urban Enterprise (2016) forecast growth of 3,700m<sup>2</sup> for the ‘Upper’ scenario. It is therefore considered appropriate to adopt the *Shopping Centre range* of between 3,000 m<sup>2</sup> – 20,000 m<sup>2</sup> for the purposes of using *Trip Segmentation* characteristics from Table 5. Based on the discussion presented, it would therefore be appropriate to adopt the following *Trip Segmentation* characteristics for the Activity Centre (see Table 6):

**Table 6: Trip Segmentation Characteristics for the Activity Centre**

Land use Component in the Activity Centre	Initial Assumption – Visitor / Shopper Trip Segmentation		
	New	Diverted drop-in	Undiverted drop-in
Retail	50%	22%	28%

#### 4.5. LINKED TRIPS

In addition to identifying the likely proportion of ‘new’ and ‘pass-by’ trips (as discussed in Section 4.4) allowance also must be made for a phenomenon known as ‘trip linking’ – where a person arrives at a centre for one purpose and uses the opportunity to visit one or more other establishments in that centre. This occurrence is typical in activity centres such as Upper Gully. Linked trips thus have the potential to further reduce the overall traffic generation rates adopted for the proposed Amendment C141.

When examining trip linking manifestations, the RTA Guide and ITE (2001) have both found that where additional retail activities are built within existing centres or areas of existing commercial development (such as Upper Gully) the total number of trips to the centre can be further reduced due to ‘trip linking’ – by as much as 24%.

More specifically, the RTA Guide provides trip rates for a range of shopping centre sizes which incorporate the ‘trip linking’ allowance – generally the larger the area, the lower the trip rate. Shopping centres the size of the Activity Centre can exhibit trip rates as low as 2 to 3 trips/100m<sup>2</sup> during the weekday PM peak period and 1 to 2 trips/100m<sup>2</sup> during the weekday AM peak period.

#### 4.6. TRIP GENERATION - COMMERCIAL

The RTA Guide advises that office (commercial) trip rates are as follows:

- Morning peak hour vehicle trips = 1.6 per 100 m<sup>2</sup> gross floor area.
- Evening peak hour vehicle trips = 1.2 per 100 m<sup>2</sup> gross floor area.

#### 4.7. TRIP GENERATION – RETAIL

As already discussed, by virtue of its context, the future retail development in the Activity Centre can be expected to capture a significant level of customers from adjacent land uses – these are the linked trips. The RTA Guide, as previously indicated, provides trip rates for shopping centres the size of Upper Gully as low as 2 to 3 trips/100m<sup>2</sup> during the weekday PM peak period and 1 to 2 trips per 100m<sup>2</sup> during the weekday AM peak period. In the interests of a ‘conservative’ analysis, the trip generation rates adopted for retail uses in the Activity Centre will be:

- Morning peak hour vehicle trips = 2 per 100 m<sup>2</sup> gross floor area
- Evening peak hour vehicle trips = 3 per 100 m<sup>2</sup> gross floor area

#### 4.8. TRIP GENERATION – RESIDENTIAL

Future dwellings in the Activity Centre are assumed to generate traffic at the rate of 0.5 trips per dwelling per hour. This is entirely consistent with the RTA Guide and empirical evidence collected for similar development types around metropolitan Melbourne.

#### 4.9. TRAFFIC FORECAST

Tables 7 and 8 show the traffic generation forecasts under the three development scenarios defined by Urban Enterprise (2016).

**Table 7: Traffic Generation by Growth Scenario – Residential Development**

Residential	Low Scenario	Mid Scenario	Upper Scenario
<b>Number of dwellings</b>	60	100	376
<b>Traffic generation</b>	30	50	188

Note: Traffic generation rate of 0.5 vehicles per dwelling per hour

**Table 8: Traffic Generation by Growth Scenario – Retail and Commercial Development**

Retail and Commercial Development	Low Scenario	Mid Scenario	Upper Scenario
<b>Future Additional Development (sqm)</b>	750	1500	4500
<b>Combined retail/commercial traffic generation</b>			
<b>AM Peak (1.9 vehicle trips/100m<sup>2</sup>)</b>	14	28	84
<b>PM Peak (2.4 vehicle trips/100m<sup>2</sup>)</b>	18	36	108

Notes: 1) AM peak traffic generation rates – retail (2 vehicle trips/100m<sup>2</sup>) and commercial (1.6 vehicle trips/100m<sup>2</sup>); 2) PM peak traffic generation rates – retail (3 vehicle trips/100m<sup>2</sup>) and commercial (1.2 vehicle trips/100m<sup>2</sup>); and 3) combined traffic generation rates calculated by applying the assumed 2/3 retail and 1/3 commercial distribution of future retail and commercial development.

Tables 9 and 10 show the total forecast traffic in the AM and PM peak hours.

**Table 9: Traffic Forecast by Growth Scenario – AM Peak Hour**

AM Peak	Low Scenario	Mid Scenario	Upper Scenario
<b>Residential</b>	30	50	188
<b>Retail/commercial</b>	14	28	84
<b>Total</b>	44	78	272

**Table 10: Traffic Forecast by Growth Scenario – PM Peak Hour**

PM Peak	Low Scenario	Mid Scenario	Upper Scenario
<b>Residential</b>	30	50	188
<b>Retail/commercial</b>	18	36	108
<b>Total</b>	48	86	296

In the core of the Activity Centre, the Dawson Street and Burwood Highway intersection is the most important one from a traffic perspective (as it is the busiest and it provides the main connection between the Activity Centre, the highway, the railway station and areas to the south). Despite being the busiest intersection, it is operating well under capacity in both the AM and PM peak periods. The intersection load (or total traffic entering the intersection from all directions – south, east and west) at this location is 2,876 vehicles in the AM peak hour (8-9am) and 3,124 vehicles in the PM peak hour (5-6pm) (see Figure 3). In a practical sense, this intersection load is manifested in generally free flowing traffic conditions, with rare occasions of congestion and queueing.

In the upper growth scenario (the worst-case situation from a traffic perspective), which Urban Enterprise (2016) identified as only being potentially realised if demand increases significantly, there would be 272 additional vehicles in the AM peak hour and 296 additional vehicles in the PM peak hour in 20 years. Importantly, given the generous permeability and presence of multiple access routes and options (which facilitate dispersal of both arrivals and departures), this additional traffic will be divided into several locations in the Activity Centre. More specifically, there is no single point or intersection in the road network in the Activity Centre where all the additional traffic will be manifested.

In the absence of detailed understanding with respect to the precise location where future development will occur, it is thus appropriate to consider a worst-case scenario where all traffic is loaded onto the critical intersection in the core of the Activity Centre. Even in this extremely unlikely scenario, where every vehicle generated by the growth in the study area travels through the Dawson Street and Burwood Highway, intersection, the proportional impact at this location (in terms of traffic growth) is around 9.5% in both the AM and PM peak hours. In reality, many visitors to the centre will not need to travel through this intersection (e.g., residents from areas south of the Activity Centre will drive north along Dawson Street and turn into their shopping/commercial destination prior to arriving at Burwood Highway – they will also depart in a reverse pattern; and motorists arriving from the east are deliberately encouraged to turn off the highway before it reaches Dawson Street, by entering the Activity Centre via the existing sliplane arrangement just west of Rollings Road).



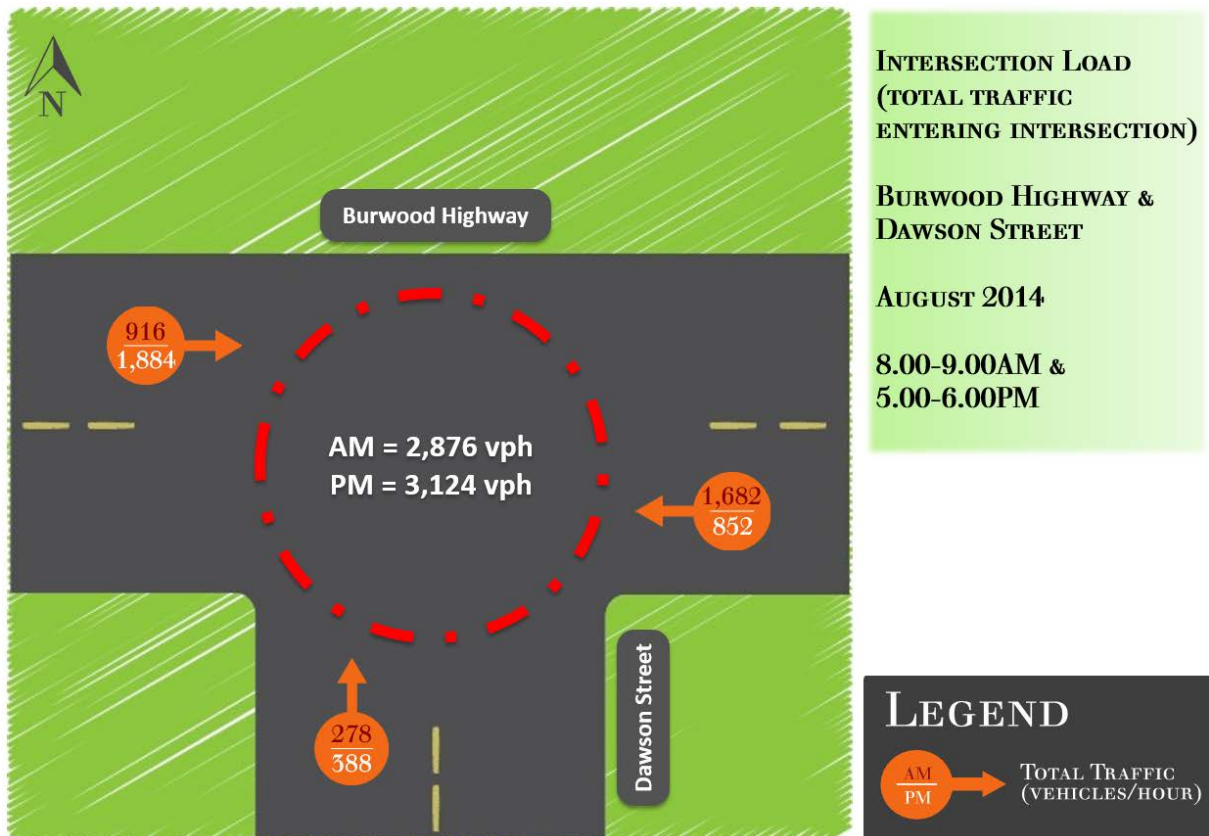


Figure 3: Intersection Load – Burwood Highway and Dawson Street (August 2014)

Accepted industry-practice in Victoria is that traffic volume increases below 10% are generally considered to be insignificant given that daily variations in background traffic flow may fluctuate by this amount – and even much greater. Therefore, any changes in traffic flows below this 10% level are commonly assumed to result in no discernible impact. In this regard, it is relevant to note that the Traffic Monitor 2012-13 report published by VicRoads in September 2014 recognises that traffic volumes vary based on the day of the week and time of the year. More specifically, the report determined that “there is as much as a 10% variation in weekday traffic volumes depending on the day of the week”. In fact, site-specific studies by VicRoads and other agencies have identified that daily traffic volumes can vary by more than 10% from Monday to Friday. Within this context VicRoads has concluded that variations in traffic that fall under 10% can be considered insignificant as they are within the range of normal daily fluctuations identified by for roads within the metropolitan Melbourne area. Since the ‘forecast’ change in traffic volume associated with the residential and retail/commercial development under the upper scenario is within the 10% range identified by VicRoads as ‘insignificant’, it is considered that the traffic impact will be inconsequential.

The projected increase of 9.5% in 20 years of the traffic load at the Burwood Highway and Dawson Street intersection was calculated with the following assumptions:

- The upper growth scenario is realised – as identified by Urban Enterprise (2016), this will only happen if demand increases significantly
- All the additional traffic generated by new development in the Activity Centre will travel through the Burwood Highway and Dawson Street intersection – as discussed previously, this is extremely unlikely to be the case

- The traffic generation calculations for future development in the Activity Centre do not include application of the legitimate 'discounts' associated with pass-by and linked trips (as discussed in Sections 4.4 and 4.5). The traffic generated from future development would thus be significantly lower than the estimated 272 additional vehicles in the AM peak hour and 296 additional vehicles in the PM peak hour in 20 years.

In other words, even when considering an unlikely upper growth scenario, the unlikely situation where all traffic generated by new development travels through the intersection of Burwood Highway and Dawson Street irrespective of the origin and destination of motorists, and the unlikely situation where every additional trip to the Activity Centre is to a single destination and not related to motorists passing by to/from other destinations, the estimated increase in traffic is still under 10% - the threshold for the presence of a material traffic impact. Therefore, it is concluded that any additional traffic generated by new development in the Activity Centre can be easily absorbed onto the surrounding road network with no overall adverse operational impact expected.

## 5. CONCLUSIONS

Based on the matters discussed in this report, it is concluded that:

### 1. Traffic

- a. The number of additional vehicle trips generated by the unlikely worst case “upper scenario” (376 dwellings and 4,500m<sup>2</sup> of additional potential retail and commercial development) is forecast to be very low and will have no material impact on the operation of surrounding roads. Specifically, the additional number of traffic movements has been forecast at 272 and 296 vehicles in the AM and PM peak hours, respectively (without consideration of the legitimate traffic generation discounts associated with pass-by and linked trips).
- b. In the absence of detailed understanding of the precise location where future development will occur, it is appropriate to consider a worst-case scenario where all traffic is loaded onto the most important intersection in the core of the Activity Centre. Even in this extremely unlikely scenario, where every vehicle generated by the growth in the study area travels through the Dawson Street and Burwood Highway, intersection, the proportional impact at this location (in terms of traffic growth) is around 9.5% in the AM and PM peak hours. However, many visitors to the Activity Centre will not need to travel through this intersection.
- c. Even when considering an unlikely upper growth scenario, the unlikely situation where all traffic generated by new development travels through the intersection of Burwood Highway and Dawson Street, and the unlikely situation where every additional trip to the Activity Centre is to a single destination and not related to motorists passing by to/from other destinations, the estimated increase in traffic is still under 10% - the threshold that would trigger a consequential traffic impact.
- d. It is concluded that any additional traffic generated by new development in the Activity Centre will have a negligible impact in the operation of the road network.

### 2. Parking

- a. No evidence exists across metropolitan Melbourne where municipalities have provided dispensation to on-site parking requirements on a large scale – even within busy activity centres.
- b. The dispensation mechanisms are explicitly linked to the nature of the land use proposed. Accordingly, as part of this strategic review of Amendment C141, it is impossible to provide a meaningful interpretation of the Planning Scheme’s dispensation mechanisms.
- c. Council has a responsibility to ensure that the Knox Planning Scheme parking requirements, stipulated under Clause 52.06, are fully met for all future development.
- d. The expectation will thus be that, unless demonstrated otherwise, parking for future development will be entirely catered for off-street (through provision of on-site parking in accordance with the Planning Scheme requirements).
- e. The Planning Scheme places no reliance or expectation on the use of any on-street parking unless the Council deems it is appropriate to do so (on a case-by-case basis).