
# Assessment of Road Closure Proposal

## Elizabeth Street, between Flinders Lane and Flinders Street

**Prepared for City of Melbourne 28 July 2016**

CITY OF MELBOURNE

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# 1. EXECUTIVE SUMMARY

## 1.1. STUDY PURPOSE

This study examines a proposal to close the eastern side (southbound carriageway) of the southern end of Elizabeth Street (between Flinders Lane and Flinders Street).

## 1.2. ANALYSIS UNDERTAKEN & FEASIBILITY

The assessment presented in this report indicates that a closure of the eastern side of the southern-most section of Elizabeth Street is feasible. In drawing this conclusion, a significant amount of data has been reviewed and analysed. This includes historic data, as well as comprehensive new data collected through a package of traffic surveys and monitoring activities undertaken between February and September 2015.

Key findings from the analysis include the following:

- Between 2004 and 2015 there has been a 65% decline in the number of motor vehicles using Elizabeth Street. This decline is particularly significant when compared with the more modest 5% decline of motor vehicles entering the central city in the same period.
- Survey data indicates that the southern end of Elizabeth Street exhibits the highest level of pedestrian activity, by far, of any block along Elizabeth street and at all hours of a typical weekday. On a daily basis, pedestrian numbers on the southernmost block of Elizabeth Street (moving on both the eastern and western footpaths and in both the northbound and southbound directions) are estimated to be around 80-90% of those on the corresponding block of Swanston Street.
- Furthermore, during the AM peak (8am to 9am), pedestrian volumes are estimated to be higher in the southernmost block of Elizabeth Street than on the corresponding block of Swanston Street. Surveys revealed that there are 9,301 pedestrians using footpaths on both sides of this section of Elizabeth Street during the AM peak.
- Pedestrians and tram users make up 96% of the mode share in both the weekday AM and PM peak hours (between 8am to 9am and 5pm and 6pm, respectively).
- In the AM and PM peak weekday period the corresponding number of vehicles is very low. The southbound traffic on Elizabeth Street was recorded as 73 motor vehicles per hour in the morning peak hour and 122 motor vehicles per hour in the PM peak period.

In addition, comprehensive origin–destination data has been collected during the study to help understand Elizabeth Street's traffic function. It is evident that the street is not being used as a through route but is predominantly catering for local needs – as very few vehicles that enter at La Trobe Street travel the full length southbound to reach the southern end of Elizabeth Street.

More specifically, the traffic surveys and origin-destination work undertaken as part of this study have conclusively revealed that the number of motorists using the east side of the southernmost section of Elizabeth Street is very low.

The specific trip origins of these vehicles cover a wide area within the central city grid, and thus motorists have multiple options to change their travel patterns following the proposed road closure. The 'spread' of origins will allow the dispersal of traffic over multiple routes and intersections – ensuring that comparatively low additional traffic volumes are added to any given location. It is relevant to note that:

- In the morning peak hour, only 14 vehicles (3%) of the 450 vehicles that enter Elizabeth Street at La Trobe Street travel southbound, the full length, to exit Elizabeth Street at Flinders Street. Thus, the traffic existing at Flinders Street is largely generated within the central city, south of La Trobe Street.
- The 122 motor vehicles that were recorded exiting Flinders Street in the PM peak period (between 5pm and 6pm) were identified as follows:
  - Almost 50% arrive from either Collins Street or Flinders Lane
  - The remainder either originate from 7 other intersections north of Collins Street or from on-street car parking spaces along the entire length of Elizabeth Street (the latter correspond to 16 vehicles – equivalent to 13% of the 122 vehicles).

In summary, no adverse traffic consequences are expected as part of the proposal to close the eastern side of Elizabeth Street, south of Flinders Lane, given the low volume of displaced southbound traffic, as well as the generous permeability and alternate travel route choices that will remain available for motorists. The altered traffic patterns can be readily managed within existing road operational arrangements. At the busiest time (the PM peak hour) there is a total of 122 vehicles/hour travelling southbound on this section of Elizabeth Street – equivalent to around 2 vehicles per minute. This volume is irrelevant in the context of managing traffic around the central city and thus it is anticipated that no specific new traffic treatments will be required to manage traffic flows (except for the modifications to traffic signals at the intersection of Elizabeth Street and Flinders Lane to account for the need to turn all southbound traffic into Flinders Lane).

With respect to cycling activity, whilst there are sections of Elizabeth Street where significant levels of cycling occur, the overall proportion of cyclists using the southbound carriageway of Elizabeth Street south of Flinders Lane is modest, particularly when compared with north-south movements in the corresponding sections of the other parallel north-south streets between William Street and Exhibition Street. Accordingly, the proposed closure is not expected to have any major adverse impact on cyclists.

Finally, the modest loss of around four loading zone spaces as a result of the proposed road closure can be readily compensated through installation of new loading zone spaces on Elizabeth Street north of Flinders Lane and Flinders Lane west of Elizabeth Street. In fact, in those two areas, it is possible to match the loading zone availability in this general area, since there are short-term metered parking spaces in immediate proximity that can be readily converted to new loading zone spaces.

## 1.3. FUTURE GROWTH

The closure of the eastern side of the southern end of Elizabeth Street will create an appropriate environment to support the provision of improved tram services and assist in catering for the predicted increase in public transport usage in the central city.

In 2015, the State Government's *Trains, Trams and Jobs 2015-2025 Victorian Rolling Stock Strategy* reported an increase of over 42% in annual patronage of both trains and trams, across metropolitan Melbourne over the previous 10 years. The State Government predicts that this strong growth will continue as Victoria's population is expected to increase by around 17% in the next decade, while patronage on metropolitan trains, trams and regional trains is expected to increase by around 47% over the same period.

In the central city, the expected growth in public transport patronage is significant and will be manifested in response to:

- Resident population in the municipality growing from 122,000 in 2014 to 202,000 in 2030
  (*City of Melbourne Daily Population Estimates and Forecasts – 2015 Update*)
- Daily weekday visitors to the municipality growing from 854,000 in 2014 (travel to or were present in the municipality) to 1,180,000 in 2030
  (*City of Melbourne Daily Population Estimates and Forecasts – 2015 Update*)
- On-going expansion of activities from 2002 to 2012 – here has been a 38% growth in the municipality's number of retail establishments – from 1,813 to 2,502; and 10% growth in retail floor-space from 695,172 to 765,069 square metres
  (*Melbourne Retail and Hospitality Strategy 2013 – 2017*)

Within this context (whether the Melbourne Metro Rail Project is built or not) the number of pedestrians entering and exiting Flinders Street Station at Elizabeth Street is expected to increase significantly in the future.

# 2. INTRODUCTION

## 2.1. STUDY OBJECTIVES

The City of Melbourne has resolved to close the eastern side of Elizabeth Street, between Flinders Lane and Flinders Street, in order to achieve an improved urban environment for residents, workers and visitors by creating a place specifically designed for people. The specific objectives of this "*Traffic, Transport, Access and Parking Study"* are to:

1. Document the current use of the road reservation in the southern-most block of Elizabeth Street
2. Review the potential impact (across all travel modes) of the proposed closure

## 2.2. STUDY AREA

The area of most relevance for this study is the section of Elizabeth Street between Flinders Lane and Flinders Street. The study also considers the broader surrounding context within the central city area – in particular the Elizabeth Street corridor.

## 2.3. DATA SOURCES AND STUDIES

This report takes into consideration and uses numerous data sources, including publicly available documents prepared by the City of Melbourne, other government agencies and private developers, as well as transport data collected by the City of Melbourne and other organisations as part of other projects. It has been found that there is limited data that is either specific to Elizabeth Street and areas immediately surrounding, or recent enough to be of direct relevance to this study. In response, extensive new empirical transport survey work was undertaken between February and September 2015.

The primary sources of information used in the preparation of this study include:

- The new empirical survey work undertaken between February and September 2015
- Data being collected in other concurrent and/or recent studies, including *Last Kilometre Freight*, *Vehicle Access Permit Scheme* and studies around the Queen Victoria Market in support of a new master plan for that area
- City of Melbourne's relevant pedestrian sensor and traffic data
- Bicycle Network's Super Tuesday counts
- Relevant data from recent City of Melbourne strategies, plans and studies, including the Transport Strategy 2012: Planning for Future Growth; Walking Plan 2014-2017; Bicycle Plan 2016-2020; Motorcycle Plan 2015-2018; and Road Safety Plan 2013-2017

A full list of the documents reviewed as part of this study is provided in Chapter 3.

## 2.4. TERMINOLOGY

Throughout this document the following terms are used:

- Study – refers to this document
- City – refers to the municipality of the City of Melbourne
- Central City – refers to the area defined in Figure 1 (bounded by Victoria Street, Spring Street, Flinders Street, Russell Street, the Yarra River, Spencer Street, La Trobe Street, William Street and Peel Street)
- Motor vehicles – all motorised vehicles, including private cars, taxis, buses and commercial vehicles


**Figure 1: Central City Area**

## 2.5. STUDY STRUCTURE

Following this introductory chapter, this report is divided into the following sections:

- Chapter 3 provides the strategic context and presents information from City of Melbourne strategies and plans, as well as other relevant studies
- Chapter 4 presents the existing transport conditions and future trends on Elizabeth Street
- Chapter 5 provides information regarding large-scale infrastructure projects that are likely to have an impact on the study area
- Chapter 6 describes the proposed closure of the southern end of Elizabeth Street and summarises the high-level implications
- Chapter 7 analyses the transport implications of the proposed closure of Elizabeth Street, covering traffic impacts and ameliorative measures; parking, servicing and delivery; tram passengers; cyclists and pedestrians
- Chapter 8 provides the overall conclusions and recommendations of this study

# 3. STRATEGIC CONTEXT

In preparation of this study, all relevant and current City of Melbourne policies, strategies and plans, as well as a number of previous studies and data sources, have been reviewed. In terms of transport data, such as traffic counts, information that precedes the installation of tram platform stops along the section of Elizabeth Street between Flinders Street and La Trobe Street was (with a few exceptions) considered of limited relevance given the significant changes in the composition and behaviour of road users on the street.

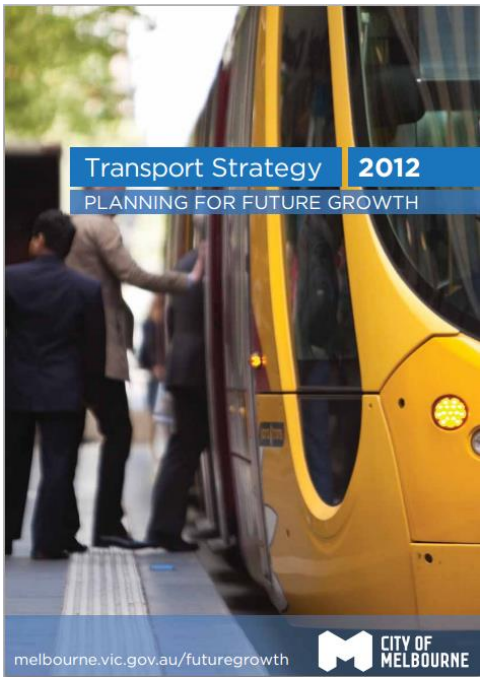
The following sections present a detailed summary of the most relevant transport documents reviewed in preparing this study, namely: Transport Strategy 2012: Planning for Future Growth; Walking Plan 2014-2017; Bicycle Plan 2016-2020; Motorcycle Plan 2015-2018; and Road Safety Plan 2013-2017.

## 3.1. TRANSPORT STRATEGY 2012: PLANNING FOR FUTURE GROWTH

The Transport Strategy 2012 – Planning for Future Growth – sets new key directions and policy targets and plans for strong growth in the City of Melbourne to 2030. It takes into account the significant changes in transport policy and strong growth in public transport use, cycling and walking since the 2006 transport strategy, Moving People and Freight.

The key directions outlined in the Transport Strategy 2012 are:

- Integrate transport and land use planning
- Go anywhere, anytime public transport for inner Melbourne
- Support public transport, walking and cycling as the dominant modes of transport in inner Melbourne
- Develop high-mobility pedestrian and public transport streets in the central city
- Make Melbourne a cycling city
- Foster innovative, low impact freight and delivery in central Melbourne



The relevant priority actions presented in the Transport Strategy 2012 include:

Walking City

- Prepare pedestrian accessibility plans for the precincts around Flinders Street Station and Southern Cross Station
- Design and build high mobility streets *(these have been defined in Figure 2 of this report)*
- Provide excellent quality pedestrian access to all public transport stops, stations and interchanges
- Ensure that the municipality's Road Network Operating Plan provides a high level of priority to pedestrian trips

Cycling City

- Design and build safe cycling along high-mobility streets

Driving

- Work with others to deploy driving speed limits across the municipality that achieve mobility objectives of this strategy

Train

- Work closely with the *(former Department of Transport)* DOT on planning and construction of the Melbourne Metro project.

Tram

- Work with others to improve tram frequency and average running speeds.
- Work with others to … design and construct level-access stops … as part of whole-of-streetscape renewal
- Ensure the design of new level-access tram stops… have excellent pedestrian accessibility with the surrounding footpath network

Taxis

- Develop taxi parking and ranks that will improve late night transport options, especially in the entertainment, restaurant and bar precincts.

Car Share

- Allocating spaces to car sharing in the municipality's existing and emerging high-density mixed-use areas.

Central City Freight

- Plan and implement more efficient and less intrusive freight delivery option in the central city on a street or precinct based approach
- Develop a central city last kilometre freight delivery strategy

With respect to walking, the Transport Strategy 2012 identifies Elizabeth Street as a 'high mobility street' with 'intensive public transport interchanges' at Flinders Street and La Trobe Street (see figure below). High mobility streets are defined as streets with high frequency tram and priority bus services, and excellent pedestrian access to and around stops. These streets will generally have highest density and diversity of destinations along them.

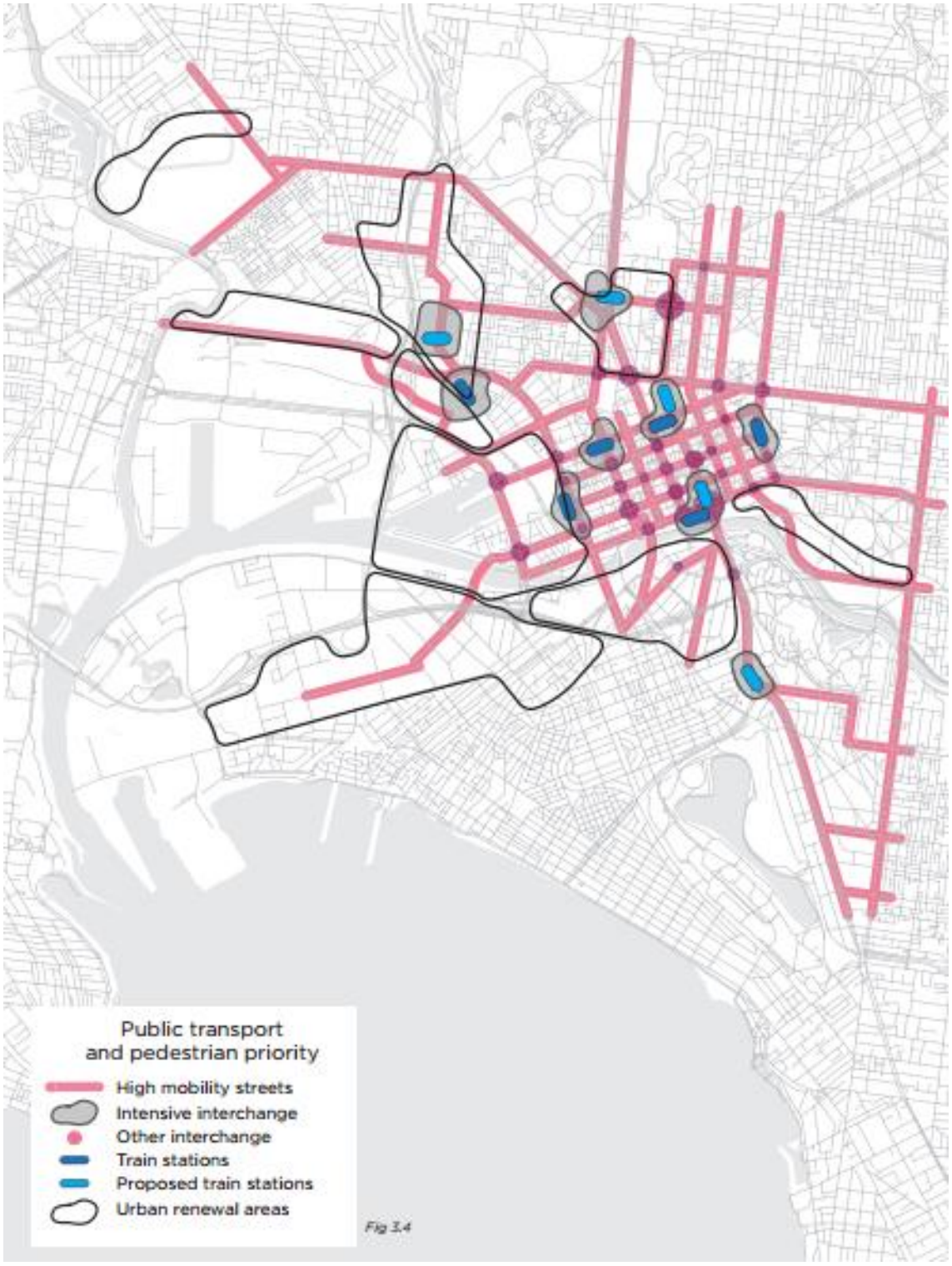



**Figure 2: Public transport and pedestrian priority in the municipality**

With respect to cycling, the Transport Strategy 2012 identified Elizabeth Street as part of the municipality's bicycle network (see figure below).

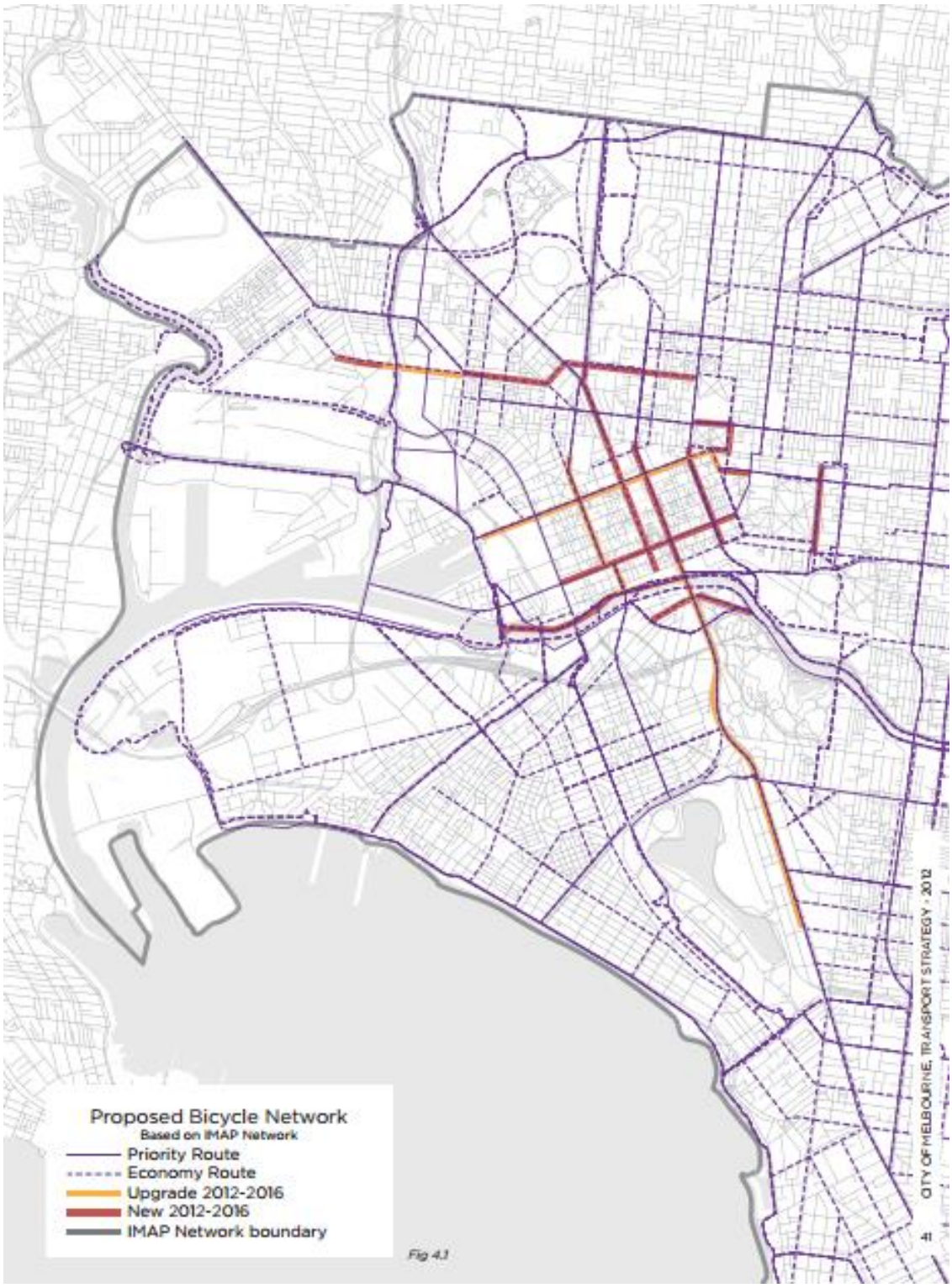



**Figure 3: Proposed bicycle network in the municipality**

For the purposes of this study, the only other specific reference to relevant information about Elizabeth Street is found in Chapter 6 (Train), which states that "the design of the public realm around existing and proposed stations needs to optimise pedestrian priority, safety, amenity and convenience of all rail patrons as they move between the station and their final destination, or the next leg of their journey. This requires specific improvements to facilitate convenient access for people with disabilities to existing and future underground train stations. The Flinders Street precinct, and links to the Federation Square tram stop and the Elizabeth Street tram terminus require specific short term improvements."

## 3.2. WALKING PLAN 2014-2017

As part of the Transport Strategy 2012, City of Melbourne is committed to creating an enjoyable and safe walking environment for residents, workers and visitors. In delivering the walking objectives for the city, the Walking Plan 2014-2017 looks at the many ways walking contributes to the city and how Melbourne's walking network could be improved.

Some of the key actions in the Walking Plan 2014-2017 include:

- Improving the way pedestrians are included in transport planning and management decisions
- Creating an attractive walking environment and connected walking networks
- Addressing pedestrian crowding, including around train stations and bus and tram stops
- Reducing pedestrian delays at signalised crossings

The relevant goals of the Walking Plan 2014-2017 are:

Expand the pedestrian network: "…create an excellent and safe walking environment with seamless high-priority links between the city's public spaces and the public transport system…"

Plan for Future Growth: "…a key goal is to accommodate increasing amounts of walking in Melbourne. Decisions about the transport network and land use that affects pedestrians should take into account the likely future growth in number of people walking in Melbourne and plan accordingly."

Reduce Delay: "This plan will reduce delays to pedestrians through changes to the walking network, footpaths, intersections and traffic signals."

Improve Safety: "The City of Melbourne faces a significant challenge addressing the high numbers of people injured by vehicles while walking."

The Walking Plan 2014-2017 specifically acknowledges the importance of Elizabeth Street and defines it as a street that "bookends the pedestrianised heart of Melbourne centred on the retail core". The Walking Plan recognises that there will be significant growth in pedestrian activity along the Elizabeth Street corridor. It further states that the future volumes of pedestrians accessing Elizabeth Street from two train stations (Flinders Street Station and Melbourne Central) and several tram lines will grow significantly and more footpath space will be needed to accommodate them. Lastly, it highlights that there will be significant growth in tram patronage along this corridor, potentially exacerbating current overcrowding issues at tram stops. The Walking Plan identifies the south end of Elizabeth Street (Flinders Lane to Flinders Street) as a proposed "*walking street*" and the sections to the north as a "*high mobility walking street*".

The Plan defines the characteristics of *Walking Streets* as follows:

- Pedestrians move freely across the street in segments away from intersections
- Key transport link for pedestrians
- Amenity and safety increased by reducing crowding
- Low through-traffic function

Furthermore, City of Melbourne's 'Street Management' principles for *Walking Streets* include streets that:

- Can be used as a walking street permanently or during specific times (such as lunchtime or during the evening)
- Can operate as a shared zone to provide traffic access
- Provide for deliveries, property servicing, cycling and access to off-street car parking

The Plan defines the characteristics of *High Mobility Walking Streets* as follows:

- Streets shared by trams, buses, bikes and pedestrians
- High-frequency public transport corridor
- Low traffic function
- Significant interchange between public transport and walking network

Furthermore, City of Melbourne's 'Street Management' principles for *High Mobility Walking Streets* include streets that provide for deliveries, property servicing, cycling and access to off -street car parking.

The maps below are extracts from City of Melbourne's Walking Plan 2014-2017 and show the Proposed *Walking Streets* and Proposed *High Mobility Walking Streets* in the central city. The images include information about opportunities for improvement of the Elizabeth Street corridor, including enhancement of the tram terminus area on the southernmost section and the importance of maintaining vehicle access to Flinders Lane.

One of the objectives of the Walking Plan 2014-2017 is to define a pedestrian street hierarchy and provide direction for the design and operation of streets based on this hierarchy. This hierarchy allows each street to be assessed as to its position in the hierarchy based on factors such as current and future pedestrian demand or requirements for other modes (such as deliveries, providing access to car parks, etc.). Importantly, streets may operate differently at different times of day depending on demand for different modes.

The Walking Plan recognises that maintaining access for deliveries and service vehicles, as well as to off-street car parks, is important for city commerce; thus, the Walking Plan does not propose to remove motor vehicle access to off-street car parks nor to remove delivery, service or disabled access to properties. Similarly, the Walking Plan recognises that the bicycle network identified in the City of Melbourne Bicycle Plan will also be considered when investigating proposals that change the layout or operation of a street.

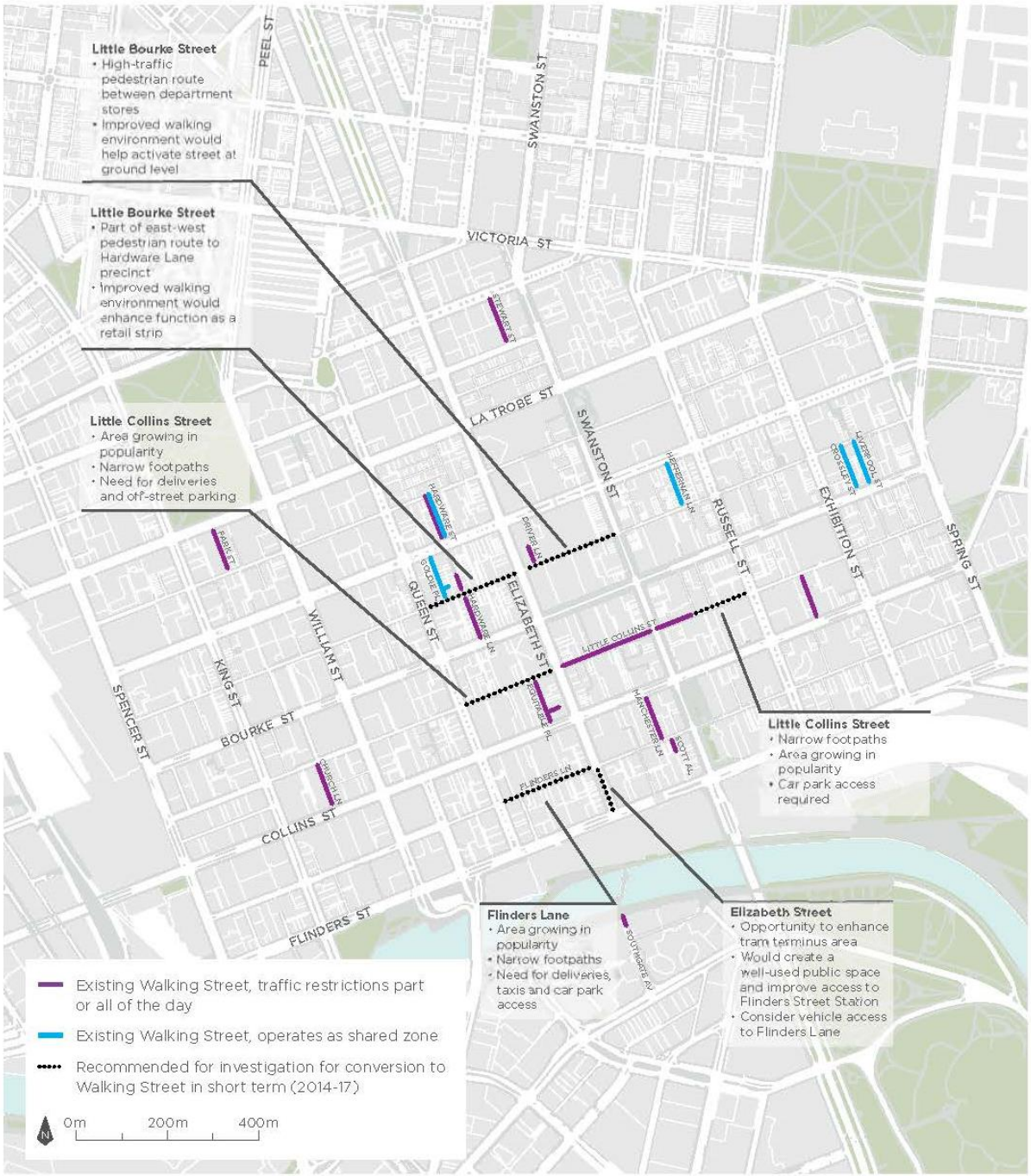



**Figure 4: Proposed Walking Streets (Walking Plan 2014-2017)**

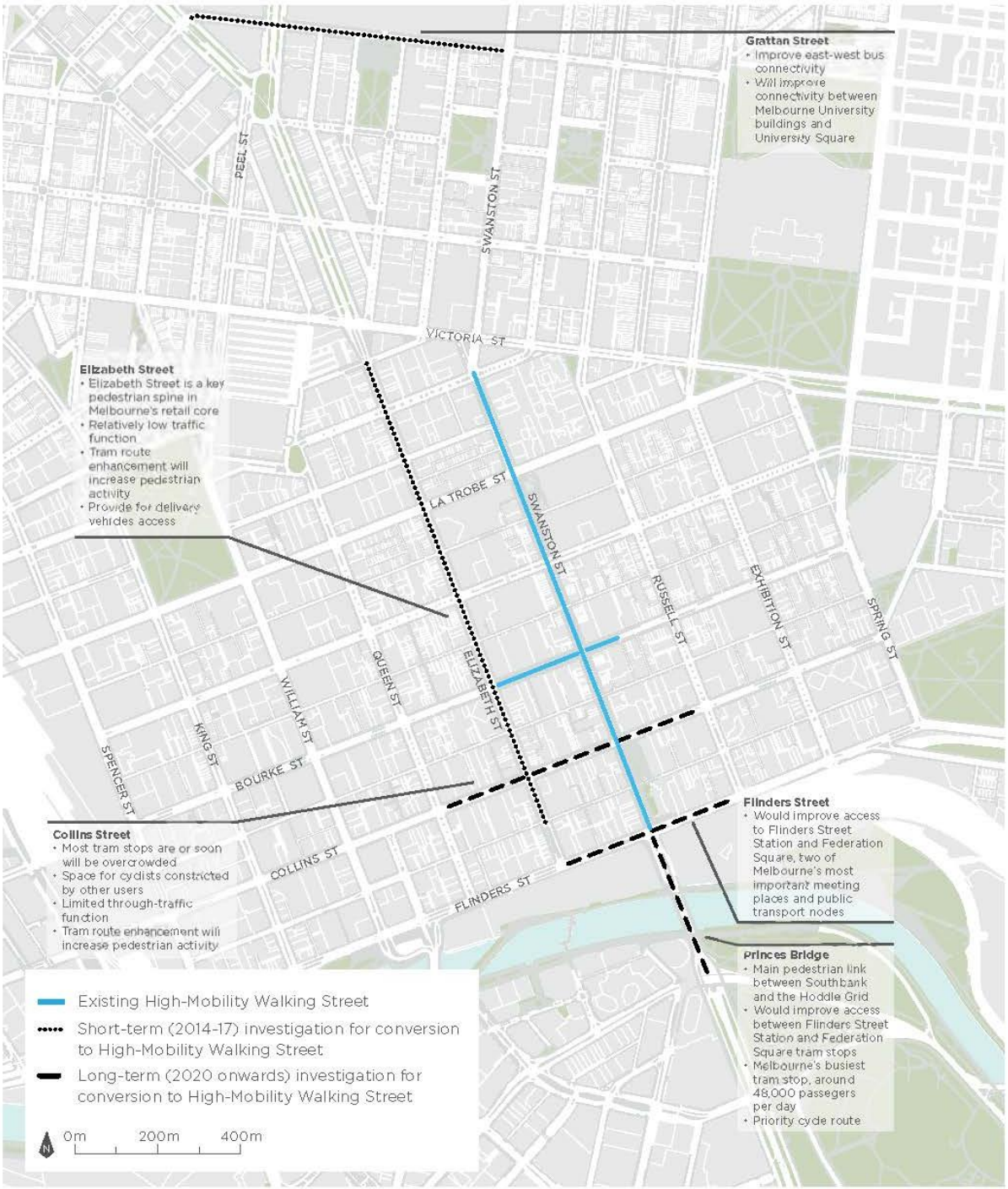



**Figure 5: Proposed High Mobility Walking Streets (Walking Plan 2014-2017)**

## 3.3. BICYCLE PLAN 2016-2020

The City of Melbourne's recently released Bicycle Plan 2016-2020 has multiple actions that focus on:

**Planning for people to ride bikes**

- working with government to incorporate cycling into future growth and transport projects
- advocating for amendments to the Melbourne Planning Scheme to make the municipality more bike-friendly

**A connected bicycle network and facilities**

- supporting the Victorian Government to develop cycling corridors
- making it easier for people to ride in their local communities
- an increasing level of service for each bicycle project

**A safe and encouraging environment**

- increasing separation, lowering speed limits and building safer intersections
- safety and education programs for children, parents, and new residents

**Measuring outcomes**

- sharing evidence with the community to continuously improve the cycling environment.

More specifically, the Bicycle Plan acknowledges the suggestion made by various stakeholders and community members to investigate the creation of a "*bicycle-friendly environment between La Trobe Street and Flinders Street*" and the provision of an "*upgraded bicycle route from Victoria Street to La Trobe Street as part of Queen Victoria Market Precinct Renewal Master Plan development*".

A comprehensive bicycle network has been identified as shown in Figure 6.

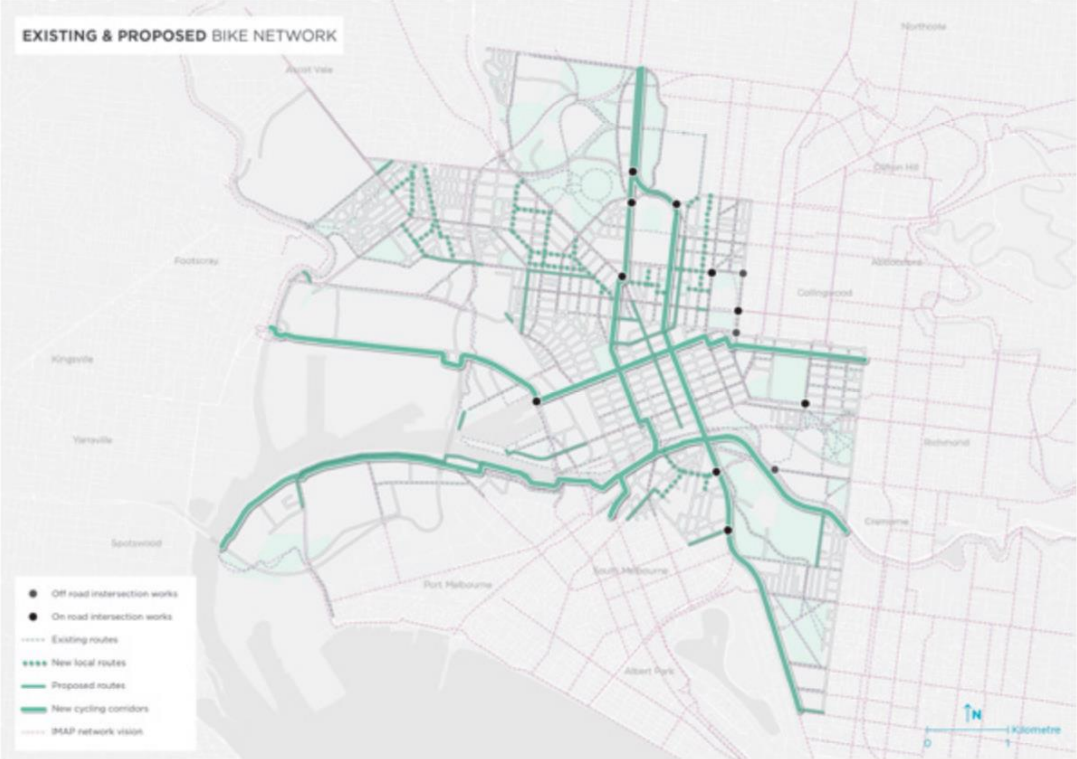



**Figure 6: Bicycle Network (Bicycle Plan 2016-2020)**

Online community engagement undertaken during the preparation of the Bicycle Plan showed strong community interest in Elizabeth Street. Figure 7 presents a 'heat map' of the thousands of inputs received and the locations where the community offered ideas/comments to help build a better cycling city.

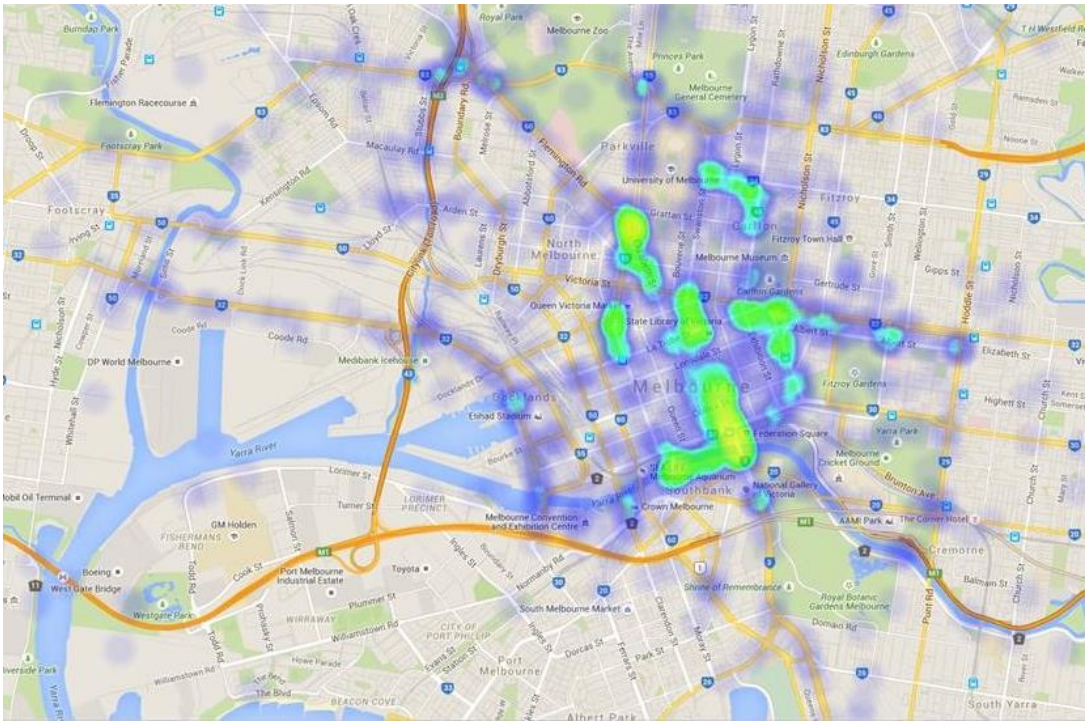


**Figure 7: Bicycle Heat Map – Cycling Issues Raised by Community**

## 3.4. ROAD SAFETY PLAN

The City of Melbourne has developed a new Road Safety Plan which aims to improve safety for all road users, particularly pedestrians, cyclists and motorcyclists.

The City of Melbourne is Victoria's busiest municipality for pedestrian and cycling activity. On an average day, 854,000 people come into the city and our daily population is set to reach 1.18 million by 2030.

The Road Safety Plan's objectives are to:

- Enhance the safety of all road users
- Improve the care and attention of motorists towards pedestrians, cyclists and motorcyclists
- Improve the relationship among pedestrians, cyclists and motorcyclists
- Reduce motor vehicle speeds in areas of high pedestrian movement
- Recognise the needs of pedestrians, cyclists and motorcyclists in street design


The Road Safety Plan recognises that as the level of activity increases in the city, so will the potential for injuries, unless effective prevention measures are adopted that will continue to improve road-user safety. More specifically, while the Road Safety Plan identified increases in crashes for vulnerable road users compared to the previous plan, it highlights the need to consider those changes within the context of changing populations and travel patterns to and within the City. The comparison of crashes against population changes and travel pattern changes present differing pictures of the change in risk for pedestrians, cyclists and motorcyclists.

Overall, the risk is decreasing for all three road users, although at a much slower rate for cyclists. The Road Safety Plan identifies that cyclists require particular attention; however, the key principle of the Safe System Approach, which provides the framework for the development of the Road Safety Plan, is that "all injuries are unacceptable", and therefore the road safety actions in the Road Safety Plan aim to improve the safety of all road users.

The following images from the Road Safety Plan show the location of crashes by type and injury severity for the most vulnerable road users: pedestrians, cyclists and motorcyclists. Along its entire length, Elizabeth Street is a significant pedestrian crash location and action is required to improve pedestrian safety.


## Figure 8: Pedestrian Crashes – Type and Location

**Note:** Near Side and Far Side crashes are those when pedestrians are hit from either their left or right when crossing a road. Emerging crashes are those when pedestrians emerge from in between parked motor vehicles.


**Figure 9: Pedestrian Crashes – Injury Severity**

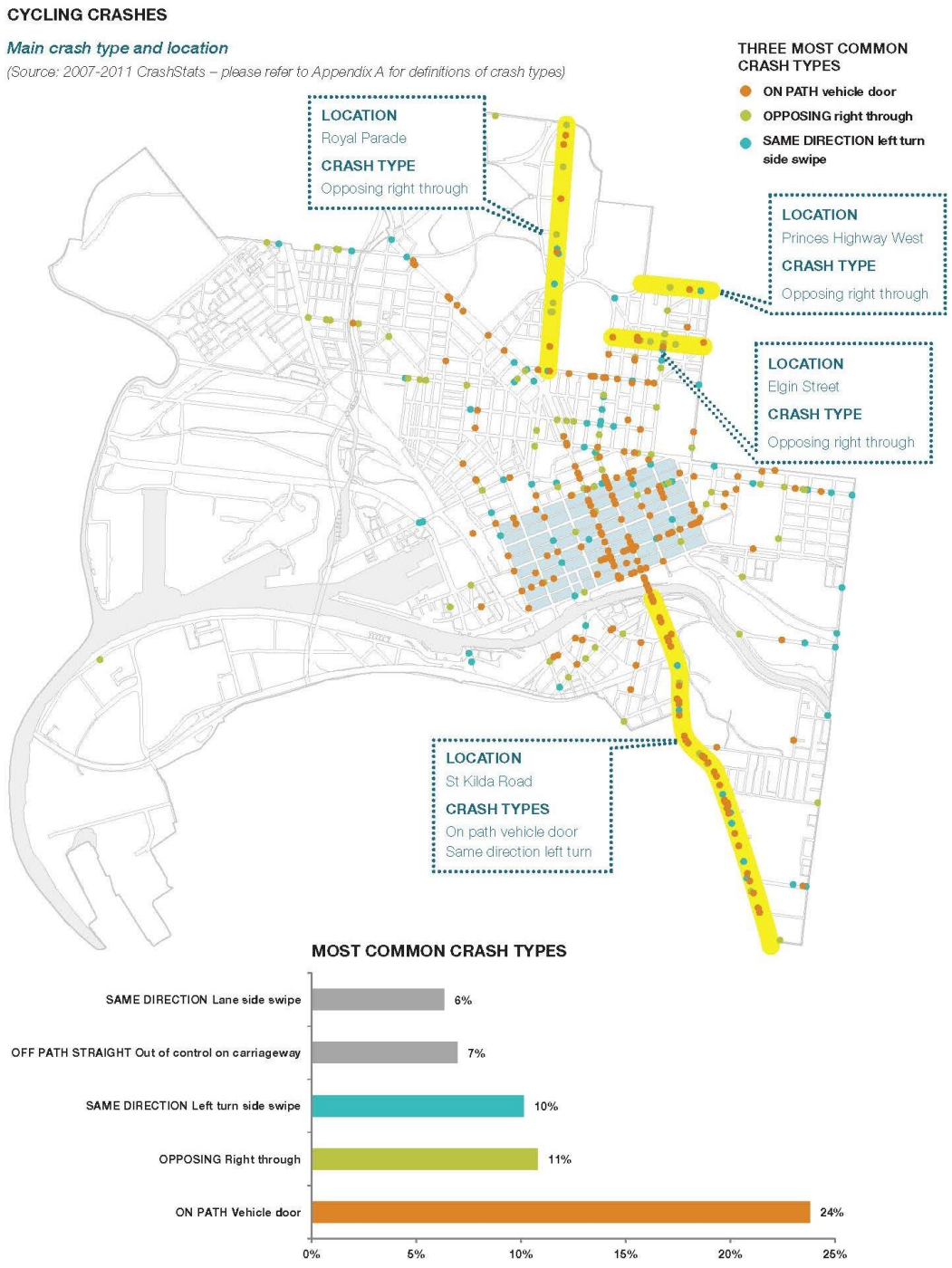



**Figure 10: Cyclist Crashes – Type and Location**

**Note:** On Path vehicle door are those crashes when cyclists hit a vehicle door that is opened in their path. Opposing right through are those crashes when cyclists are hit by a vehicle turning right from the opposite travel direction. Same direction left turn swipe are those crashes when cyclists are hit by a vehicle traveling in the same travel direction turning left.

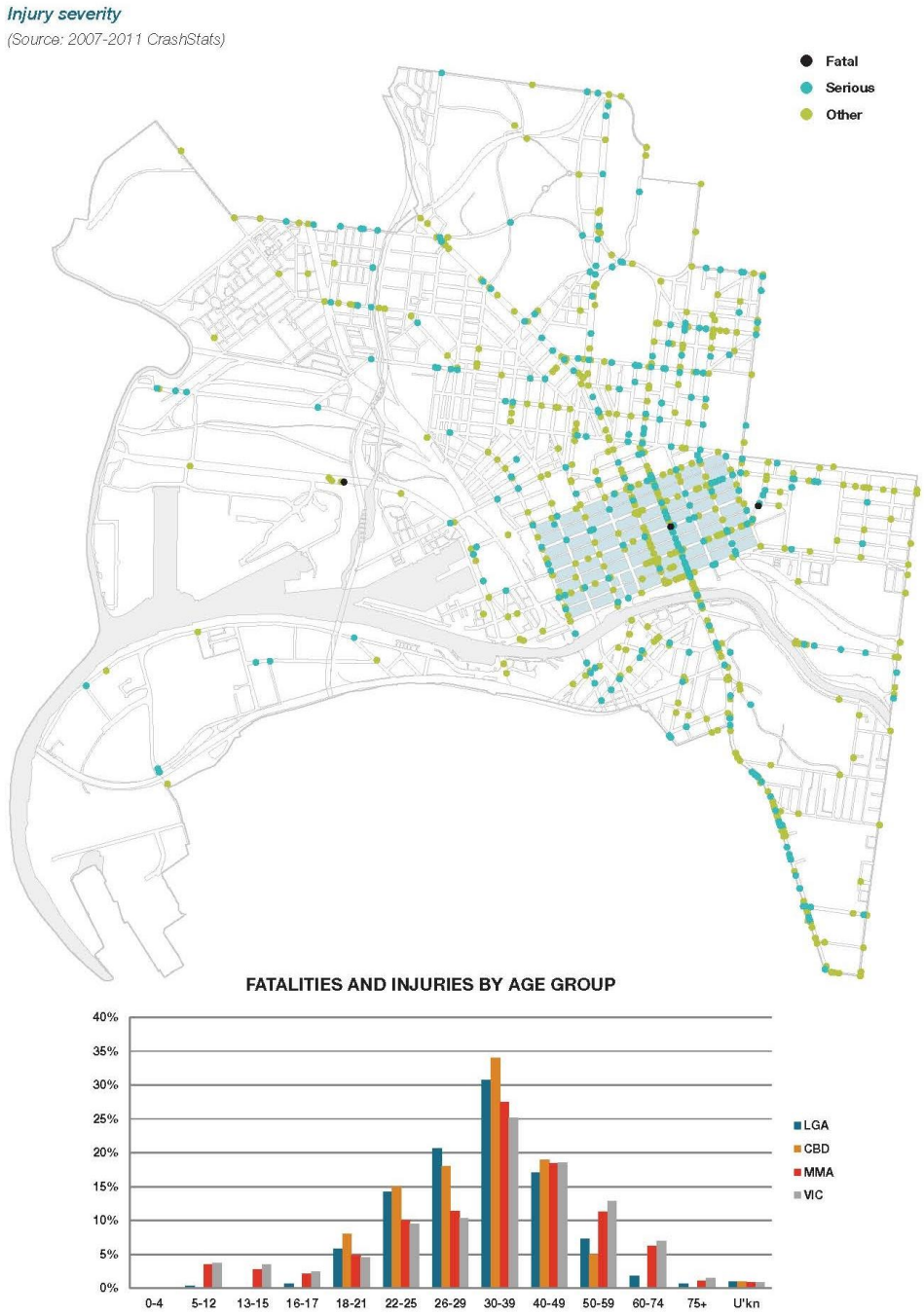
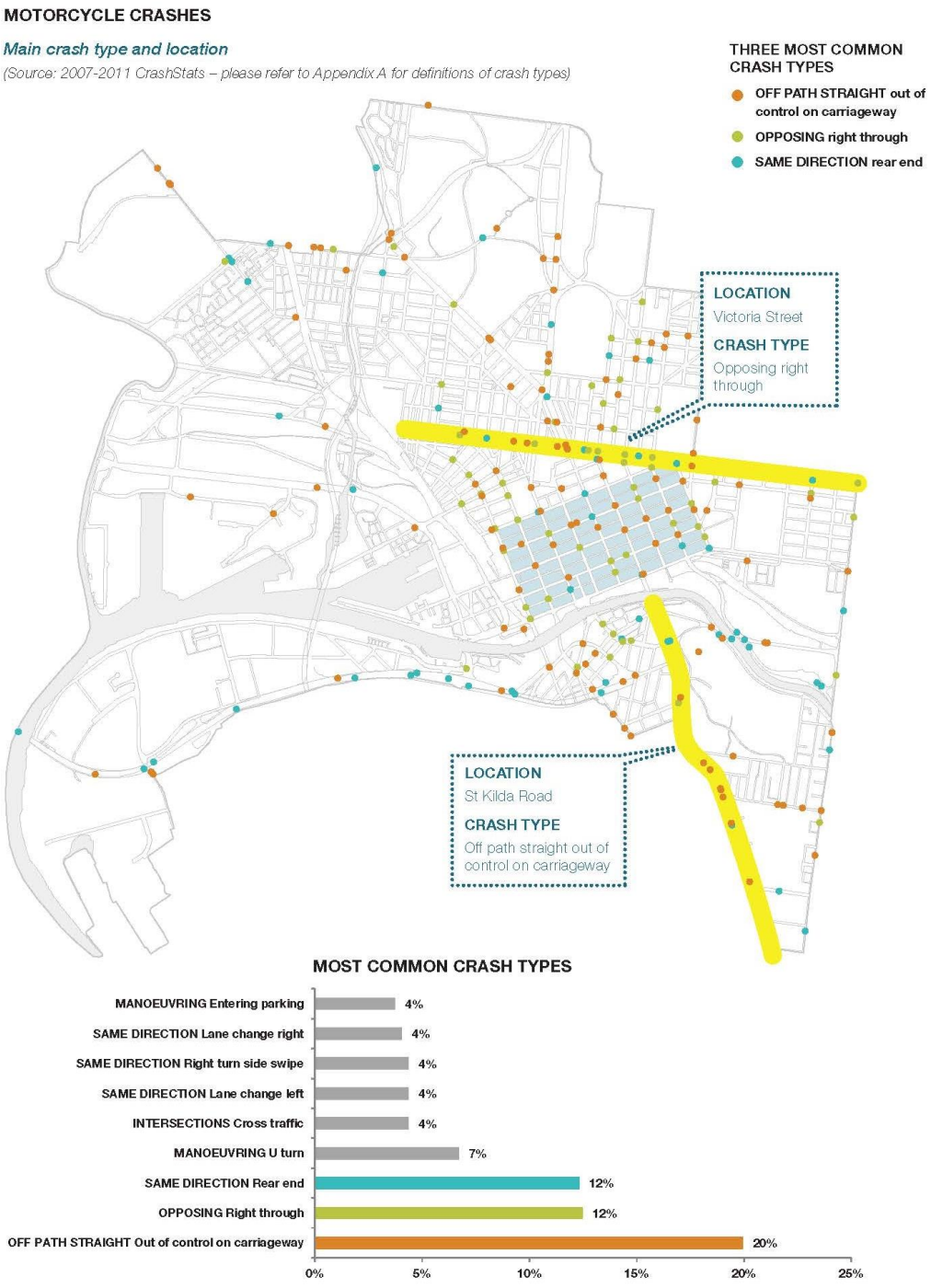



**Figure 11: Cyclist Crashes – Injury Severity**




## Figure 12: Motorcyclist Crashes – Type and Location

**Note:** Off Path straight out of control on carriageway are those crashes when motorcyclists lose control on the road – these are typically single-vehicle crashes, with potential causes including speeding, loss of traction in the wet, on tram tracks or pit covers, and debris on the road; however, they could also include crashes resulting from motorcyclists compensating for the behaviour of other road users (e.g. sudden lane changes by motor vehicles). Right-through crashes involve a right turning motorcycle (or motor vehicle) colliding with a through motor vehicle (or motorcycle) travelling through at an intersection. Same direction rear end crashes refer to those when a motorcyclist is hit from behind by a motor vehicle traveling in the same direction.

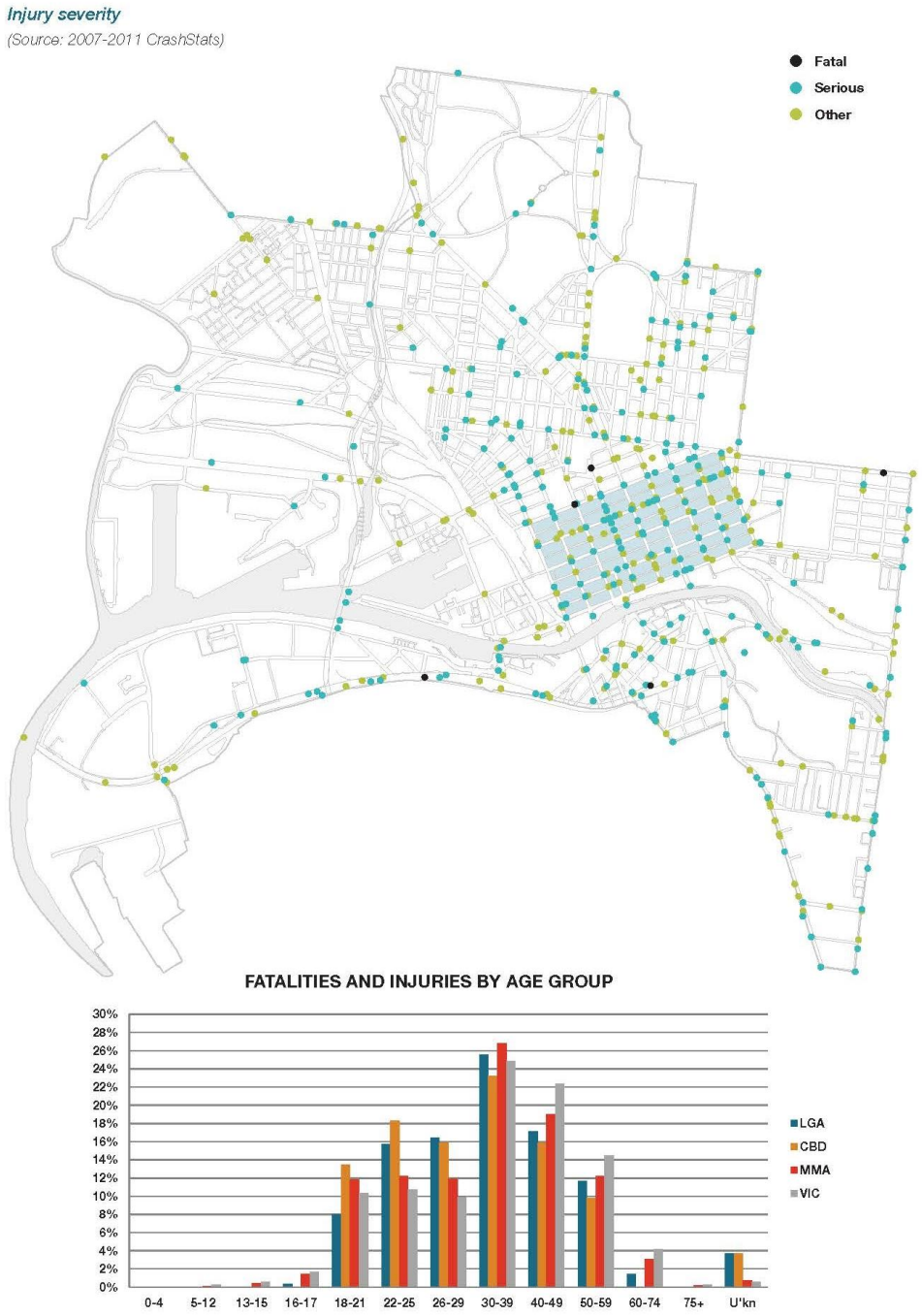



**Figure 13: Motorcyclist Crashes – Injury Severity**

## 3.5. SMARTROADS

SmartRoads is an approach that manages competing interests for limited road space by giving priority use of the road to different transport modes at particular times of the day. By deciding which modes have priority on which roads, Melbourne's road network can work better for everyone.

SmartRoads recognises the increasing importance of public transport, walking and cycling as transport modes. It uses a set of guiding principles to establish the priority use of roads by transport mode, time of day, and place of activity. This approach also ensures that decisions about the operation of the road network support integrated land use and transport planning. Under SmartRoads, all road users continue to have access to all roads, but over time, changes are being made to how roads are operated to:

- Facilitate good pedestrian access into and within activity centres in periods of high demand
- Prioritise trams and buses on key public transport routes that link activity centres during morning and afternoon peak periods
- Encourage cars to use alternative routes around activity centres to reduce the level of 'through' traffic
- Encourage bicycles through further developing the bicycle network
- Prioritise trucks on important transport routes that link freight hubs and at times that reduce conflict with other transport modes.

These priority movements are assigned to arterial roads across the network forming SmartRoads Network Operating Plan. VicRoads has developed SmartRoads network operating plans through extensive consultation with local councils, government agencies and relevant stakeholders over several years. These plans illustrate which transport modes have priority on the road at different times of the day and can even show priority at individual intersections for each of the local government areas. Road Use Hierarchy Maps showing the priority modes on each road have also been developed for each council area; these maps form the foundation for the network operating plan.

The SmartRoads Road Use Hierarchy map for City of Melbourne (see figures over the page) identifies that Elizabeth Street is a:

- Tram Priority Route
- Pedestrian Priority Area
- Bicycle Priority Route

The above is entirely consistent with the vision for Elizabeth Street as outlined in the City of Melbourne plans discussed in the previous sections.

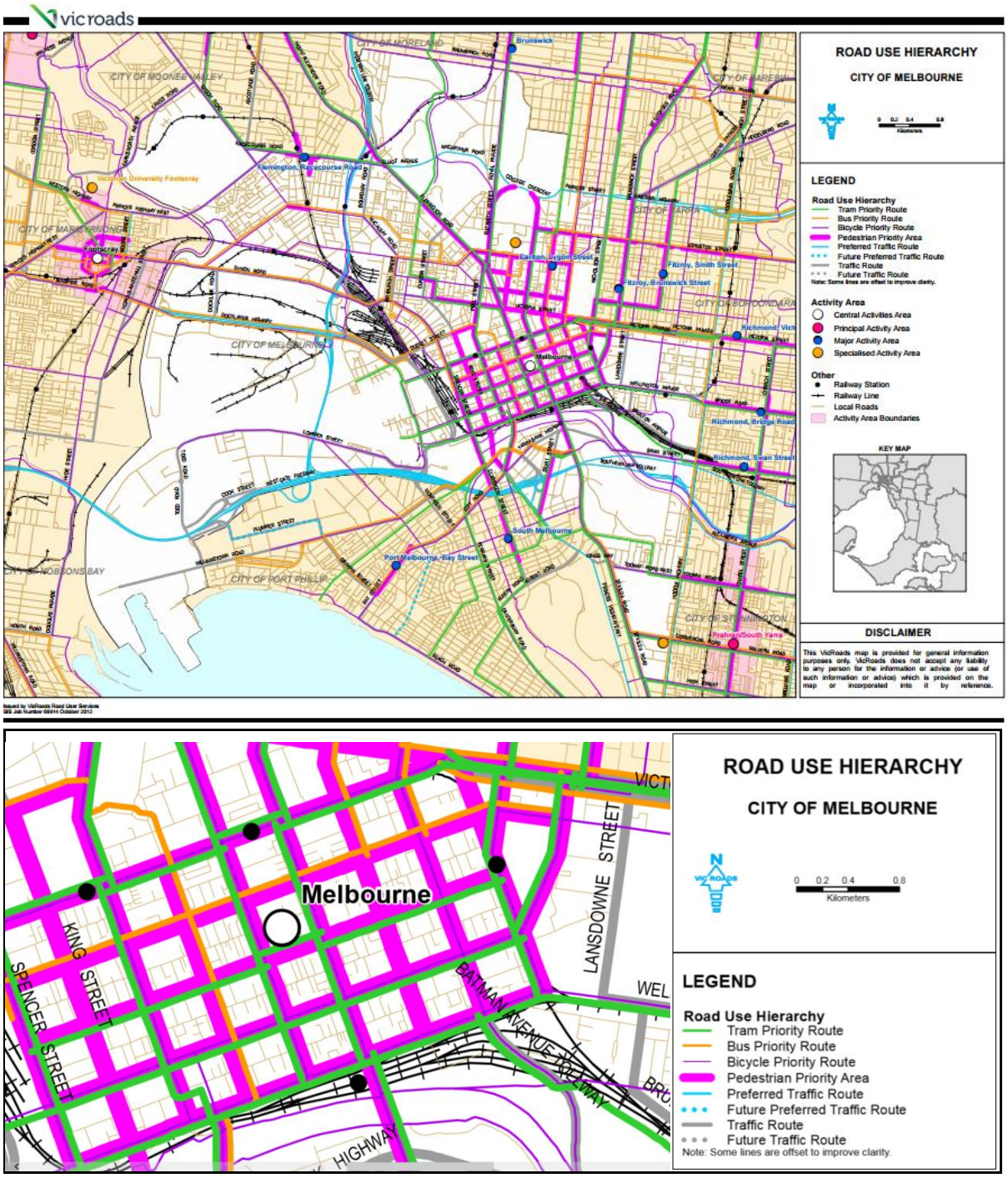



**Figure 14: Road Use Hierarchy Map for the City of Melbourne and the Central City**

## 3.6. CURRENT CITY OF MELBOURNE STUDIES

The City of Melbourne is conducting a study to derive an indicator of the proportion of last kilometre freight delivered to the central city by low impact means. Specific objectives of this freight study are to:

1. Develop and undertake fieldwork to collect data on the amount, composition and impact of freight traffic to the central city.
2. Estimate the total amount of last kilometre freight delivered to the central city.
3. Estimate the proportion of last kilometre freight delivered to the central city by low impact means.

The study includes the following main components:

- Comprehensive traffic surveys to determine the number of 'true' delivery vehicles entering the central city on an average day (through a combination of automatic traffic counts, manual traffic counts, origin-destination surveys and advanced video recognition;
- Detailed analysis of the City of Melbourne's Census of Land Use and Employment (CLUE) database (which provides comprehensive information about land use, employment and economic activity across the entire City of Melbourne) to select a group of business 'clusters' that capture industry sectors that are both representative of the industry composition of the central city and similar in terms of freight generation;
- Interviews with businesses across the 'clusters' allocated according to the relative size of each 'cluster' (in terms of number of employees and establishments) and their freight generation potential (as determined by preliminary surveys);
- Interviews with freight deliverers and loading dock managers;
- Determination of the proportion of 'last kilometre' freight that is delivered by 'low impact' means;
- Review of international freight best practice literature to determine relevant external influences to freight generation and distribution; and
- Development of a high-level theoretical framework for estimation of a low impact freight index and preliminary list of data requirements (and potential sources) for index estimation.

The *last kilometre freight* study responds to the imperatives set out in the City of Melbourne's premier planning document – the Future Melbourne Community Plan – which outlines a plan to grow 'Melbourne' as a global, liveable and sustainable city, including an objective for low impact and efficient central city last-kilometre freight, monitored by an indicator that reports the proportion of last kilometre central city freight delivered by low impact vehicles.

Complementing the Future Melbourne Community Plan, the City of Melbourne also has a Transport Strategy which defines a street or precinct approach to identifying efficient approaches to last kilometre freight delivery. This is intended to leverage the design and consultation opportunities associated with street redevelopment and structure planning projects to influence how freight deliveries are managed.

In setting ambitious objectives with respect to freight, the Transport Strategy also acknowledges that there is:

*"very little information about how the system is operating, if it is efficient, and if and how it may be able to be improved. There is a gap in understanding of the last kilometre task…"*

Within this context, the City of Melbourne commenced a new study in 2015 on the performance and potential expansion of its existing 'vehicle access permit scheme' – which operates in Bourke Street Mall (between Elizabeth and Swanston Streets) and Swanston Street (between Flinders and La Trobe Street). One of the key reasons for capturing data on the vehicle access permit system is that many of the existing users are part of last kilometre freight operations in the central city. Thus, developing a greater understanding of the permit system and its potential broader application, can also help the City of Melbourne achieve its aims of increasing the level of low impact deliveries being made in the central city.

The study is now nearing completion and has concluded that the existing 'vehicle access permit scheme':

- Has operated satisfactorily and largely achieved its intended objectives
- Is widely understood and generally supported by the delivery industry
- Has been effective in providing the requisite delivery and servicing capabilities for properties in the affected streets
- Provides strong support for a range of Council strategies that deal with freight management, lower emissions, sustainable transport and pedestrian priority in the central city
- Offers potential for expansion into other areas

# 4. EXISTING CONDITIONS AND TRENDS

This chapter assesses the existing movement patterns and conditions in the study area and along the full length of Elizabeth Street (to provide a more comprehensive context). Numerous data sources have been used, including publicly available documents prepared by the City of Melbourne, other government agencies and private developers, as well as transport data collected by the City of Melbourne and other organisations as part of separate projects.

The review of available transport information revealed that there is limited data that is either specific to the southern end of Elizabeth Street and areas immediately 'adjacent', or recent enough to be of direct relevance to this study. In this respect, it is relevant to note the changes to road space allocation associated with the installation of tram platform stops along the length of Elizabeth Street at the end of 2013, which influenced traffic volumes along the corridor. In response, extensive new empirical transport survey work was undertaken between February and September 2015.

In summary, the data used in the assessment was obtained from a number of sources, including:

- The new empirical survey work undertaken between February and September 2015
- Data being collected in other concurrent studies, including *Last Kilometre Freight*, *Vehicle Access Permit Scheme* (both of which are in the process of being finalised) and studies around the Queen Victoria Market in support of a new master plan for that area
- City of Melbourne's relevant pedestrian sensor and traffic data
- Bicycle Network's Super Tuesday counts
- Relevant data from previous City of Melbourne strategies, plans and studies, including the Transport Strategy 2012: Planning for Future Growth; Walking Plan 2014-2017; Bicycle Plan 2012-2016; Motorcycle Plan 2015-2018; and Road Safety Plan 2013-2017

## 4.1. EXISTING FEATURES

The main feature that characterises the southern section of Elizabeth Street, between Flinders Lane and Flinders Street, is the centre-of-road tram terminus. There is some limited parking on the east side of the street, including a single car-share space, 4 loading zone spaces and 7 half-hour limit metered parking spaces. On the western side of the street there is a single northbound traffic lane.

## 4.2. ROAD CRASHES

As discussed in the review of the City of Melbourne Road Safety Plan in Chapter 2, Elizabeth Street is a significant pedestrian crash location in the central city. As such, action needs to be taken to improve safety for all vulnerable road users in Elizabeth Street. Recent data from CrashStats confirms that there is still a significant pedestrian safety issue on Elizabeth Street that needs to be addressed.

A review of CrashStats data (for the 5-year period between 2009 and 2013) has revealed that there were 95 reported crashes in the section of Elizabeth Street between Flinders and La Trobe Streets (from the northern building line at Flinders Street to the southern building line at La Trobe Street). Around 45% of crashes involved either a cyclist or a pedestrian (see Figure 15).

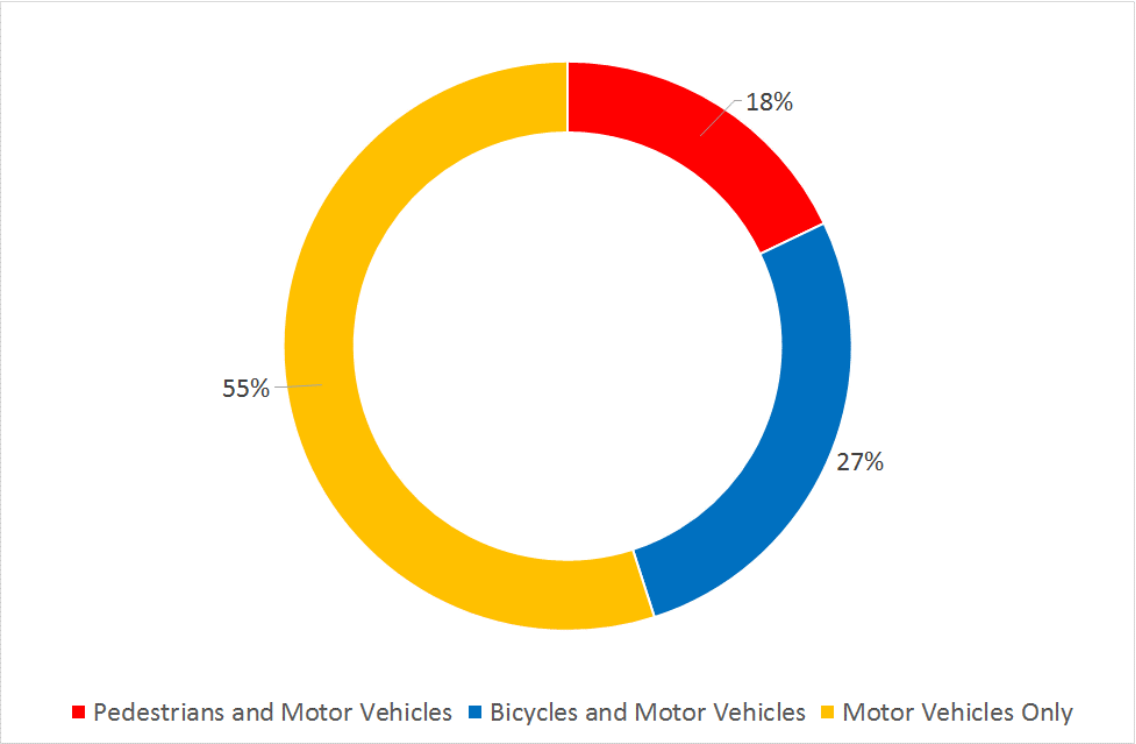



**Figure 15: Proportion of Crashes on Elizabeth St – *CrashStats* Data (2009-2013)**

## 4.3. MOVEMENT & SPACES

### RECENT 2015 DATA

Between March and September 2015 a comprehensive package of surveys and monitoring activities was undertaken. This survey program was designed to measure general traffic, delivery vehicle, taxi, tram passenger, cyclist and pedestrian movements – primarily in the area of direct interest, namely the southern end of Elizabeth Street. Furthermore, in order to better understand the dynamics of traffic flow through Elizabeth Street, a package of origin-destination surveys was arranged.

Morning, midday and afternoon peak period bicycle counts were also undertaken on the six parallel north-south streets between William Street and Exhibition Street to determine the relative 'role' of Elizabeth Street for bicycle movements in the central city at different times of the day.

### TRAVEL MODES ON ELIZABETH STREET

As a result of these survey activities, and a comparison to historic data, powerful insights were obtained into the current role of Elizabeth Street's southern end and the utilisation of the street by the various transport modes.

#### TRAFFIC FUNCTION

Elizabeth Street's traffic function has diminished markedly, over a period of years, to the extent that its role is largely limited to providing for local access and delivery-servicing purposes. This status is characterised by the gradual decline in traffic volume – recorded for at least a decade – and reinforced by a further recent significant reduction in traffic numbers following the installation of tram platforms at three locations along Elizabeth Street in 2013.

#### PEDESTRIAN USAGE

Pedestrians and tram passengers are the most dominant mode on all sections of Elizabeth Street. During the morning peak period, in the section of Elizabeth Street between Flinders Street and Flinders Lane, the number of pedestrians is over four times the combined number of vehicles, bicycles and tram passengers.

#### PUBLIC TRANSPORT PATRONAGE

Tram patronage along Elizabeth Street is well in excess of the number of people in motor vehicles (estimated by multiplying the number of motor vehicles counted during the surveys by an observed average occupancy factor of 1.1 persons per motor vehicle, including the driver). There are eight times as many tram passengers as people in motor vehicles that travel each day during the peak periods (combined morning and afternoon periods) at the southern end of Elizabeth Street.

## BICYCLE USAGE

Cyclist numbers on Elizabeth Street are comparable to those of other north-south routes in the central city, with the exception of Swanston Street. However, cyclists on Elizabeth Street are mostly arriving/departing to a local destination on the street or adjacent east-west streets, which highlights the local access role that the street plays for bicycles. Furthermore, the number of southbound cyclists in the section of Elizabeth Street south of Flinders Lane is modest, compared with the number of cyclists on parallel north-south streets (see Figure 24, Figure 25 and Figure 26 in section 4.6).

## TRAVEL MODE SHARE

The 2015 surveys provided detailed information with respect to people movement in the southern section of Elizabeth Street. The information collected included counting people on all travel modes during the morning (8-9 am) and afternoon (5-6 pm) peak periods between Flinders and Collins Streets. The 'movements' were counted as follows:

- People on foot on the footpaths on both sides of these three sections of Elizabeth Street
- Cyclists on the roadway riding north and south along these three sections
- Tram passengers were counted by physically observing and estimating the number of people on trams by stationary survey staff positioned at the three respective tram stops
- Motor vehicles on the roadway travelling north and south; the number of people was calculated using an observed average vehicle occupancy of 1.1 people per motor vehicle.

Figure 16 shows the travel mode share in the morning and afternoon peak periods, as well as the combined peak periods, at the southern end of Elizabeth Street (estimated by calculating the proportion of people travelling on each mode to the total number of people counted on all modes). Figure 16, shows that pedestrians are clearly dominant in this section of Elizabeth Street, as they represent almost 80% of all people movements in the combined morning and afternoon peak periods.

Further insights into the pedestrian data collected and the analysis undertaken is provided in section 4.4.

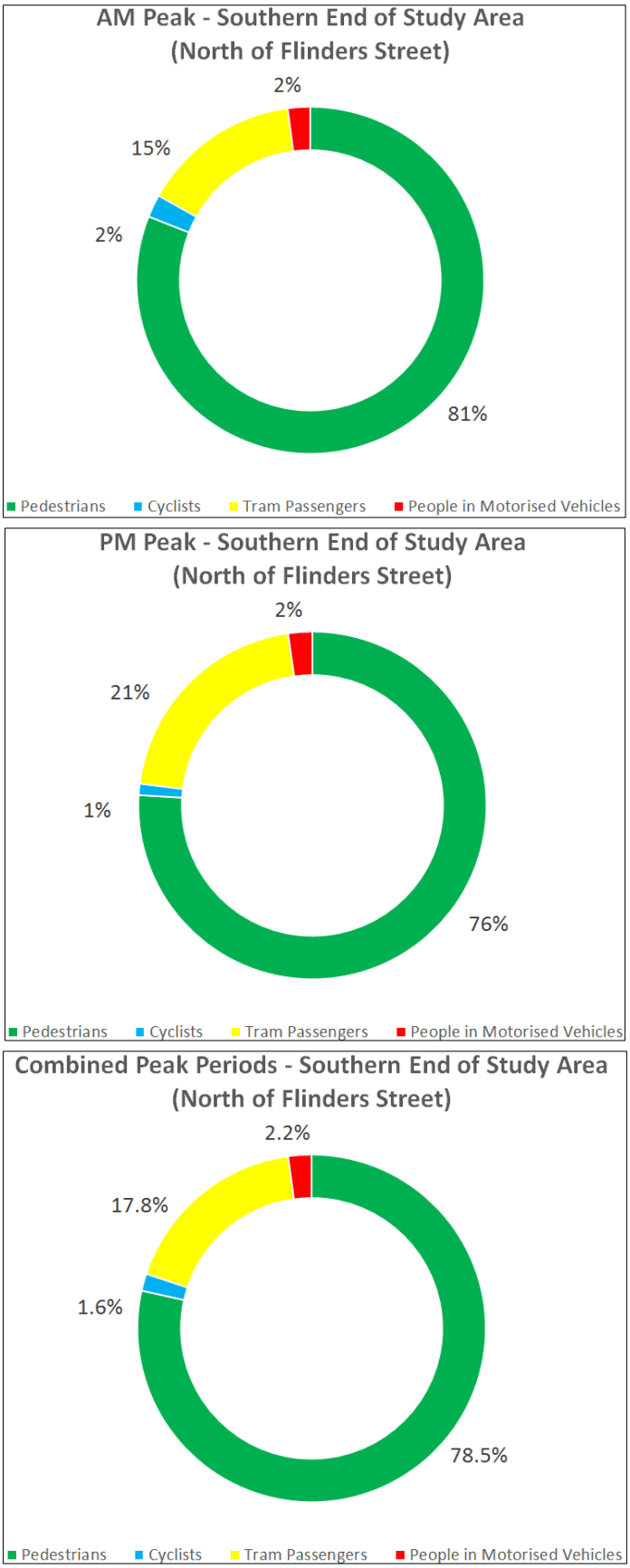



**Figure 16: Travel Mode Share – Southern End of Elizabeth St between Flinders St and Flinders Lane (AM Peak, PM Peak & Combined Peaks)**

## 4.4. PEDESTRIANS

### OVERVIEW

The previous section outlined the current pedestrian dominance at the southern end of Elizabeth Street. This section expands in greater detail the nature and magnitude of pedestrian movements in that part of Elizabeth Street.

### PEDESTRIAN FLOWS ON FOOTPATHS ALONG ELIZABETH STREET

The City of Melbourne has a 24-hour pedestrian counting system that measures pedestrian activity in the city each day. The system counts pedestrian movements to give the City of Melbourne a better understanding of how people use the city to assist with management decisions and planning for future needs. The City of Melbourne has an online visualisation tool, providing an interactive map of the pedestrian sensor locations, and enabling users to see pedestrian counts on particular dates and times and compare data. The image below presents a recent 24-hour profile of pedestrian numbers on the east side of Elizabeth Street between Flinders Street and Flinders Lane – the only pedestrian counter on Elizabeth Street.

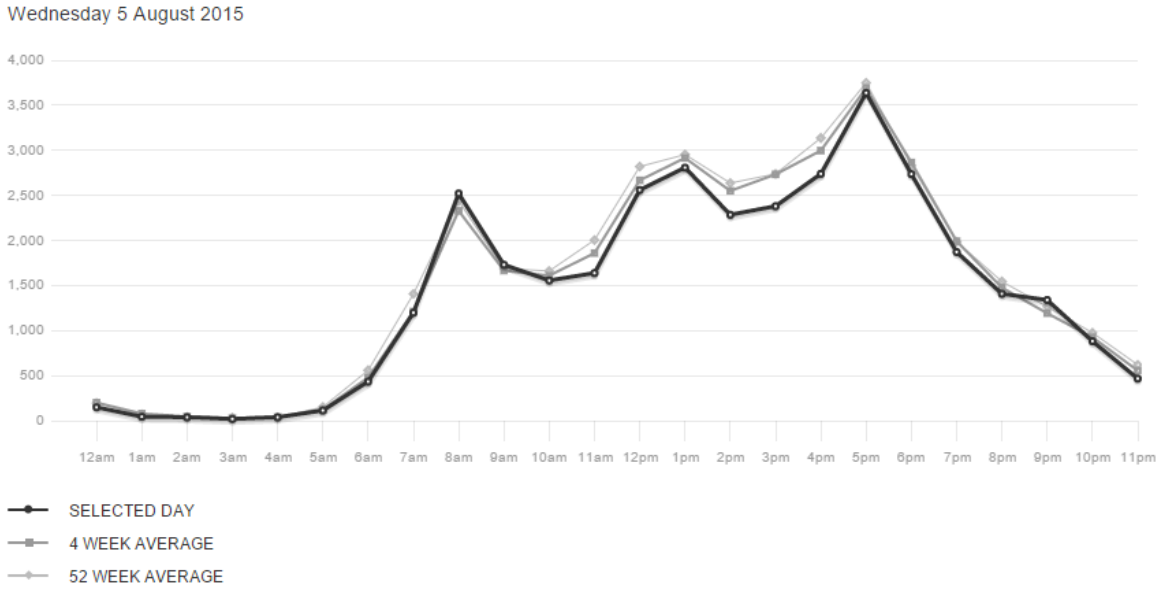



**Figure 17: Average Hourly Pedestrian Count on East Side of Elizabeth St between Flinders St and Flinders Lane – 5 August 2015**

A detailed review of data from the Elizabeth Street pedestrian counter revealed that pedestrian volumes are significant. More specifically, review of all available data for this counter (by looking at the total 24-hour volume for the first Wednesday of each month since September 2013 – the first month for which there is data for this locations) showed that pedestrian numbers were over 30,000 on all 24 months examined, and have averaged between 34,000 and 39,000 over the past 12 months.

The image below shows the 24-hour profile of pedestrian numbers on the west side of Swanston Street between Flinders Street and Flinders Lane – the nearest corresponding block of Swanston Street to the block with the only pedestrian counter on Elizabeth Street.

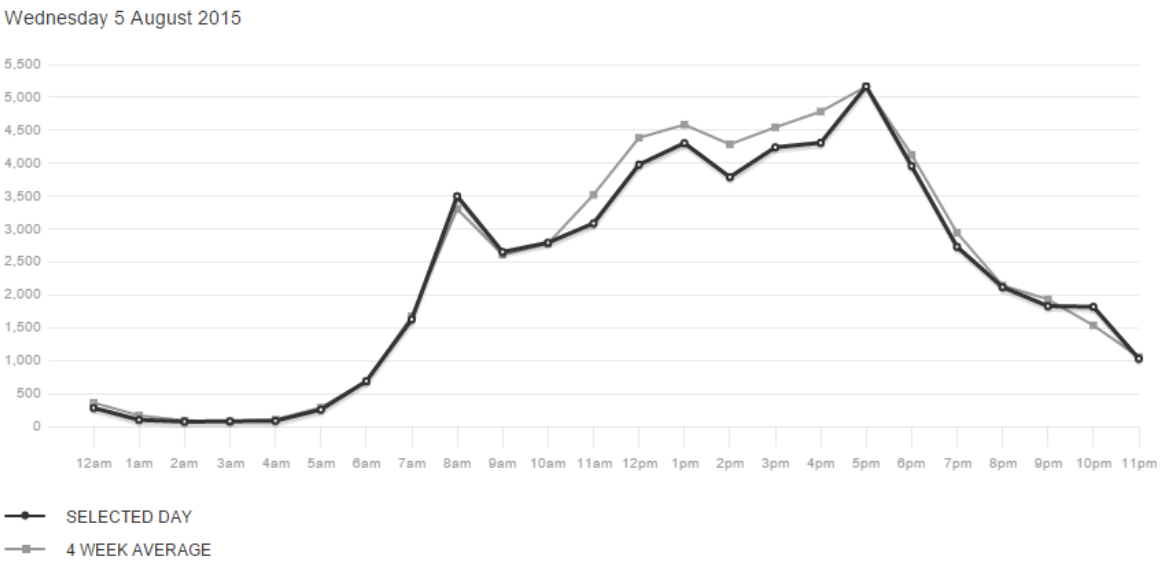



**Figure 18: Average Hourly Pedestrian Count on West Side of Swanston St between Flinders St and Flinders Lane – 5 August 2015**

The counters on the corresponding blocks of Elizabeth and Swanston Street (between Flinders Street and Flinders Lane) are located on the east and west sides of the two streets, respectively, as shown in Figure 19.

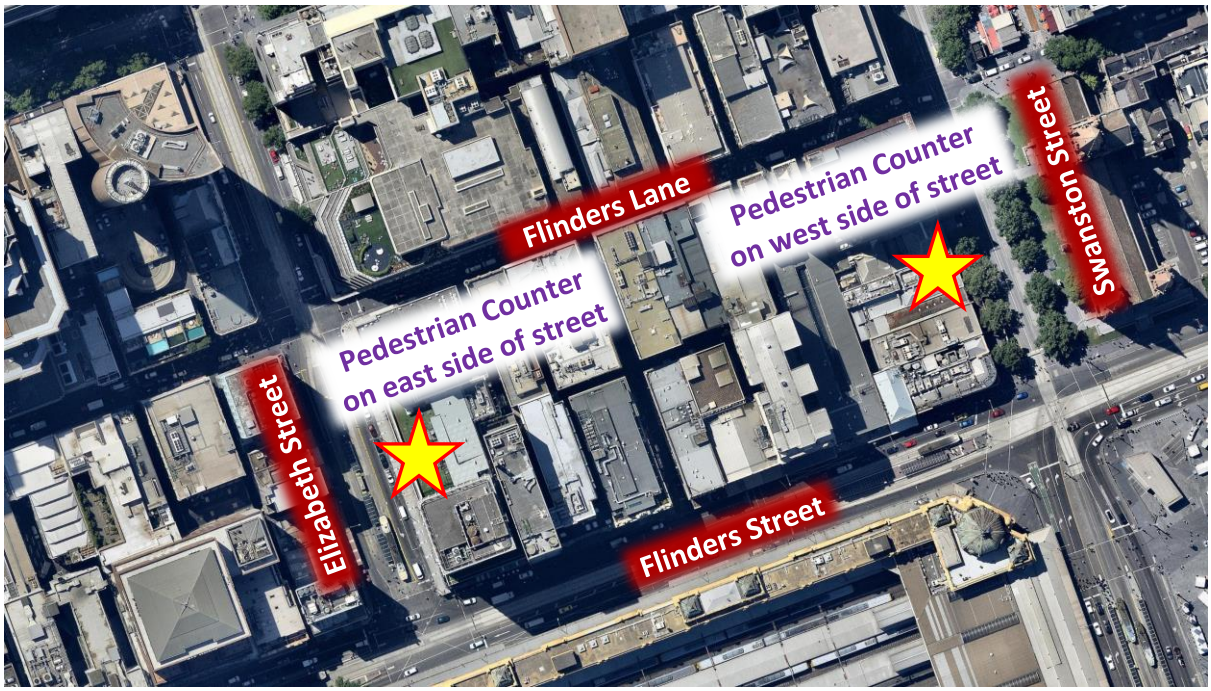



**Figure 19: Location of Pedestrian Counters**

Since the counters at these two locations are on only one side of the street, they do not allow a full determination of the overall number of pedestrians on those two corresponding blocks.

Pedestrian surveys were undertaken on both sides of the two streets to determine the proportion of pedestrians using each side of the street and calculate the overall number of pedestrians on both sides and thereby provide a more comprehensive and meaningful comparison of pedestrian volumes. The surveys consisted of pedestrian counts for a period of 15 minutes on each side of the street during:

- A weekday: morning (8 to 9 am), midday (12-1 pm) and afternoon (5-6 pm) peak periods, as well as an 'evening' count between 8 and 9 pm
- A weekend day: mid-afternoon (between 2 and 3 pm)

On Swanston Street, the number of pedestrians using the west side is much higher than the number using the east side; the proportion is generally uniform – on average, between 65 and 75% of pedestrians walk on the west side of the street. On Elizabeth Street, the distribution is less uniform, with pedestrians preferring the west side in the morning and midday peak periods, and the east side in the afternoon peak period and 'evening' – on average, around 60% of pedestrians walk on the east side of the street. On a daily basis, pedestrians in the southernmost block of Elizabeth Street (moving on both the eastern and western footpaths and in both the northbound and southbound directions) are estimated to be around 80-90% of those on the corresponding block of Swanston Street. Furthermore, during the morning peak (8 to 9 am) pedestrian volumes are estimated to be higher in the southernmost block of Elizabeth Street than on the corresponding block of Swanston Street.

In order to obtain a better understanding of pedestrian patterns on Elizabeth street, a more detailed bi-directional pedestrian survey program was undertaken in February and March 2015 – in response to the evidence of significant pedestrian numbers provided by the Elizabeth Street counter, together with a realisation of the inherent limitations of just relying on the data from this single counter location (and only available for one side of the street). The data collected included pedestrian counts on both sides of Elizabeth Street at three locations during the morning and afternoon peak periods, which significantly expanded understanding of how the existing pedestrian usage patterns are manifested along Elizabeth Street at different times of the day.

The locations for the pedestrian counts were as follows:

- Southern end of Elizabeth Street (the core study area) – between Flinders Street and Flinders Lane
- Middle section of Elizabeth Street – between Little Collins and Bourke Streets
- Northern end of Elizabeth Street – between Little Lonsdale and La Trobe Streets

Figure 20 provides an overall snapshot of pedestrian volumes using footpaths on both sides of Elizabeth Street during the weekday AM peak hour, along the full length of Elizabeth Street.

At the southern end, in the core study area, nearly 58% of pedestrians use the western side of the street. Visual observation during the survey program revealed that pedestrians coming out of Flinders Street Station are headed towards the financial and legal offices west of Elizabeth Street, which explains the 'preference' for the west side footpath, as commuters 'position' themselves on that side of the street while waiting on the south side of Flinders Street for the pedestrian signals to 'turn green'. The City of Melbourne has also undertaken video monitoring of pedestrian conditions on the southern Flinders Street footpath (opposite Elizabeth Street) at the train station entry/exit. This video monitoring has revealed that in a typical weekday morning peak hour the existing footpath is completely full (at capacity) approximately six times per hour.

Moving further north on Elizabeth Street it is evident that by Bourke Street, the 'pattern' observed at the southern end has reversed with nearly 57% of pedestrians using the eastern footpath as it is immediately adjacent to the Bourke Street Mall and the retail core. By the northern end of Elizabeth Street, nearly 77% of pedestrians use the eastern side – reflecting the presence of Melbourne Central Train Station and the retail core on that side of the street.

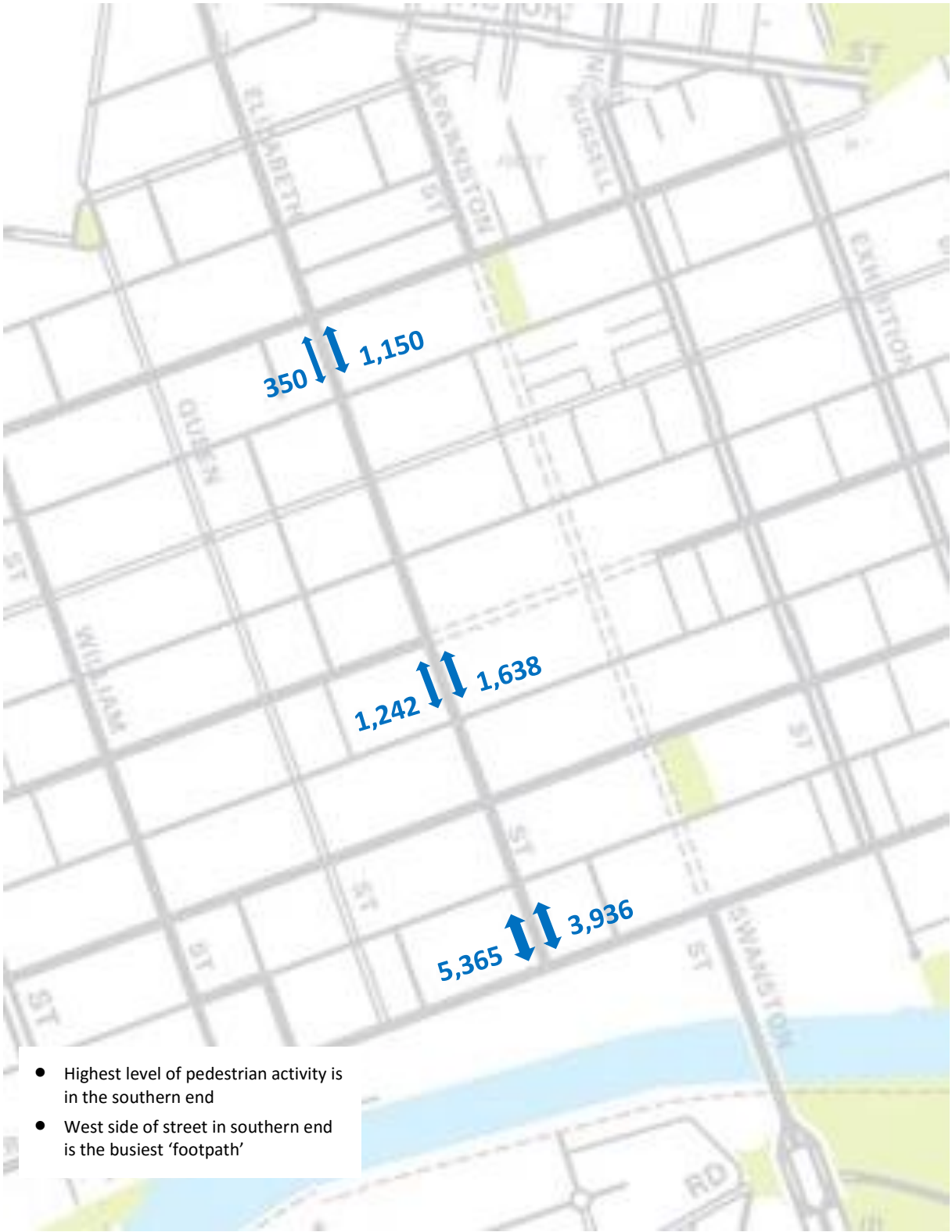



**Figure 20: Elizabeth Street, Pedestrian Flows on Footpaths – Weekday AM Peak Hour**

Figure 21 provides an overall snapshot of pedestrian volumes using footpaths on both sides of Elizabeth Street during the weekday PM peak hour, along the full length which was surveyed. Again, the pedestrian volumes at the southern end illustrate the important pedestrian role that Elizabeth Street plays, as the number of pedestrians on both the east and west sides of the street are at similar levels than those using Swanston Street. The pattern of afternoon pedestrian movements displays some variation to the morning peak patterns. Specifically, the usage of the eastern footpath increases at the southern end with nearly 53% of pedestrians using that side of the street. The preference for the eastern footpath is also reaffirmed at Bourke and La Trobe Streets with nearly 60% and 67% of pedestrians using the east side respectively – a reflection of pedestrians' desire to access the Bourke Street Mall and the Melbourne Central Train Station.

Given the high levels of pedestrian volumes in the southern end of Elizabeth Street, pedestrian counts at this location were also undertaken in the middle of the day to capture pedestrian dynamics during the lunchtime peak period. The surveys revealed that the pattern of higher usage of the west side of the street intensified, with over 65% of pedestrians favouring the west side of the street (up from 58% in the AM peak).

Observations revealed that many of the lunchtime pedestrians in this part of Elizabeth Street originate from the office towers to the west of Elizabeth Street and are bound for the Southbank riverside attractions (crossing the Yarra River via the pedestrian bridge on the southern edge of Flinders Street Station).

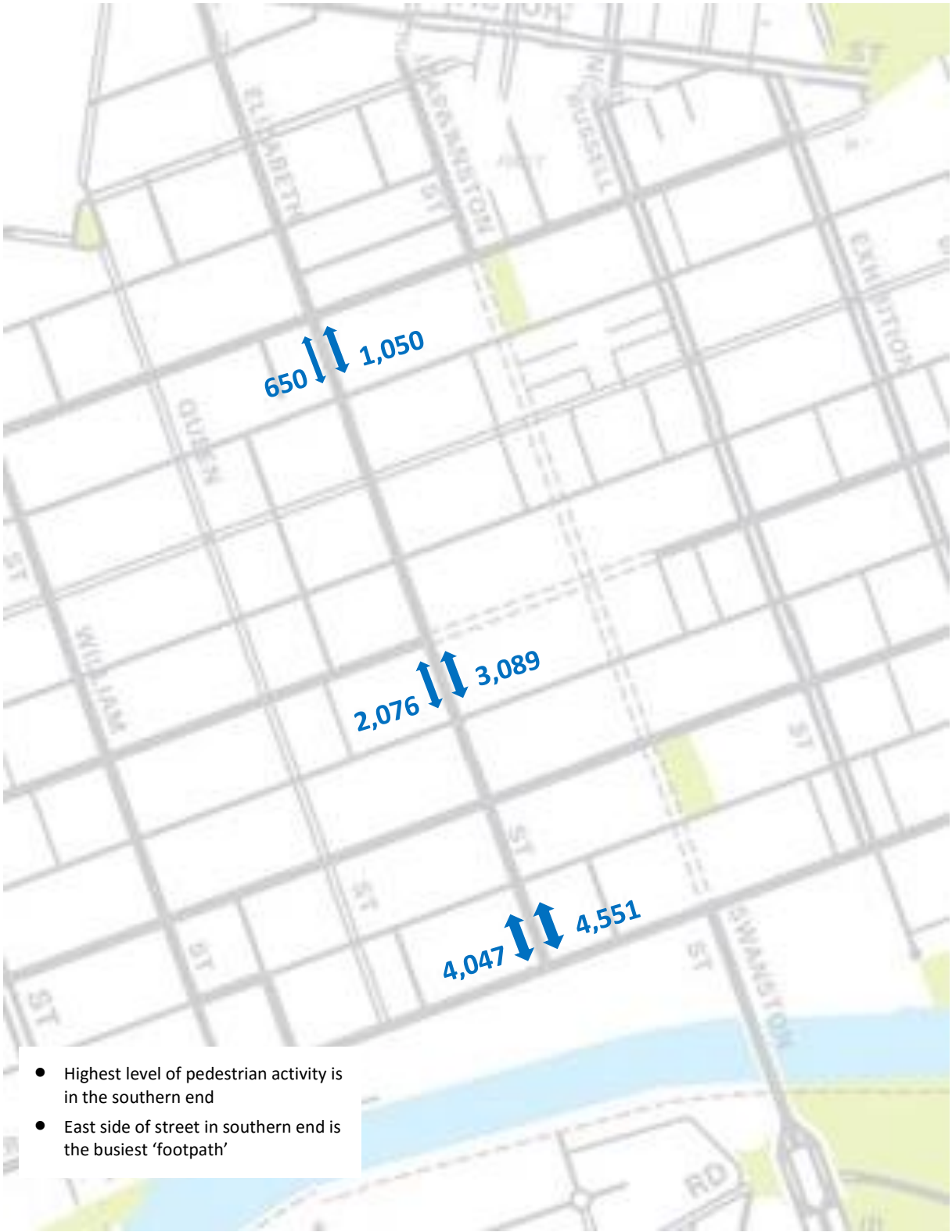



**Figure 21: Elizabeth Street, Pedestrian Flows on Footpaths – Weekday PM Peak Hour**

## 4.5. PUBLIC TRANSPORT

### TRAMS

Trams are the principal form of public transport on Elizabeth Street – which is an important tram corridor servicing the city's retail heart and is serviced by three routes (19, 57 and 59) providing up to 35 trams per hour per direction during the morning and afternoon peaks (8-9 am and 5-6 pm). Currently, all trams terminate at Flinders Street.

In addition to providing an important public transport facility on the busy corridor between Flinders Street and the Queen Victoria Market, routes 19, 57 and 59 also link to the Melbourne University precinct, Royal Children's Hospital, Zoo and on to several northern and western suburbs. Yarra Trams data indicates that more than 210,000 people use the three routes each week.

By the end of 2013 three accessible tram stops (platforms) were installed along Elizabeth Street between Collins and Little Collins Streets, Bourke and Little Bourke Streets and Little Lonsdale and La Trobe Streets.

Surveys undertaken as part of this study have shown that the number of tram passengers (measured 'on trams') in both morning and afternoon peak periods is lowest at the southern end of Elizabeth Street and highest near La Trobe Street.

The tram passenger volumes (passengers per hour) captured in the morning and afternoon peaks are shown in the table below.

| Location | Morning Peak Passengers | Afternoon Peak Passengers |
|---|---|---|
| **Flinders Street Terminus** | 1,700 | 2,350 |
| **Little Collins Street** | 2,100 | 4,000 |
| **Little Lonsdale Street** | 2,600 | 5,100 |

### BUSES

There are no formal bus routes on Elizabeth Street and the extensive traffic survey work undertaken during this study did not capture any movement of tour-buses or other bus activity (at the times surveyed). It is likely that very few buses use Elizabeth Street in the study area between Flinders Lane and Flinders Street.

## 4.6. BICYCLES

Super Tuesday is a visual count of riders in the morning peak between 7am and 9am and is undertaken at more than 800 locations around Australia. Bicycle Network coordinates the collection and analysis of the Super Tuesday Bicycle Count.

In Melbourne, the latest Super Tuesday Bicycle Count data that is available is from 2015. It includes one-way counts of bicycle commuters entering the city at 46 intersections. The latest counts from March 2015 for Melbourne showed a 7% increase in the overall number of cyclists at the same locations counted in 2014.

The average number of cyclists for all 46 intersections was 412 bicycle trips per hour. Even though the Super Tuesday counts provide useful information about the overall dynamics of commuter cycling in the municipality and change over time at specific locations, they only cover the morning peak period and bicycle movements in one direction (entering the city).

The City of Melbourne conducts comprehensive bicycle and motor vehicle traffic, and has extensive time-series counts. The data collected between March 2008 and March 2014 revealed that bicycles entering the central city grew from 6,806 to 10,182 as measured between 7-10 am at 19 sites (see map) – an increase of 50% in a period of 6 years.


**Figure 22: City of Melbourne Biannual Bicycle-Traffic Monitoring Stations (since 2004)**

The City of Melbourne time-series data has also revealed a steady increase in the mode share of bicycles for journeys to work in the central city. Figure 23 shows the bicycle mode share for commuting trips between 2006 and 2015.

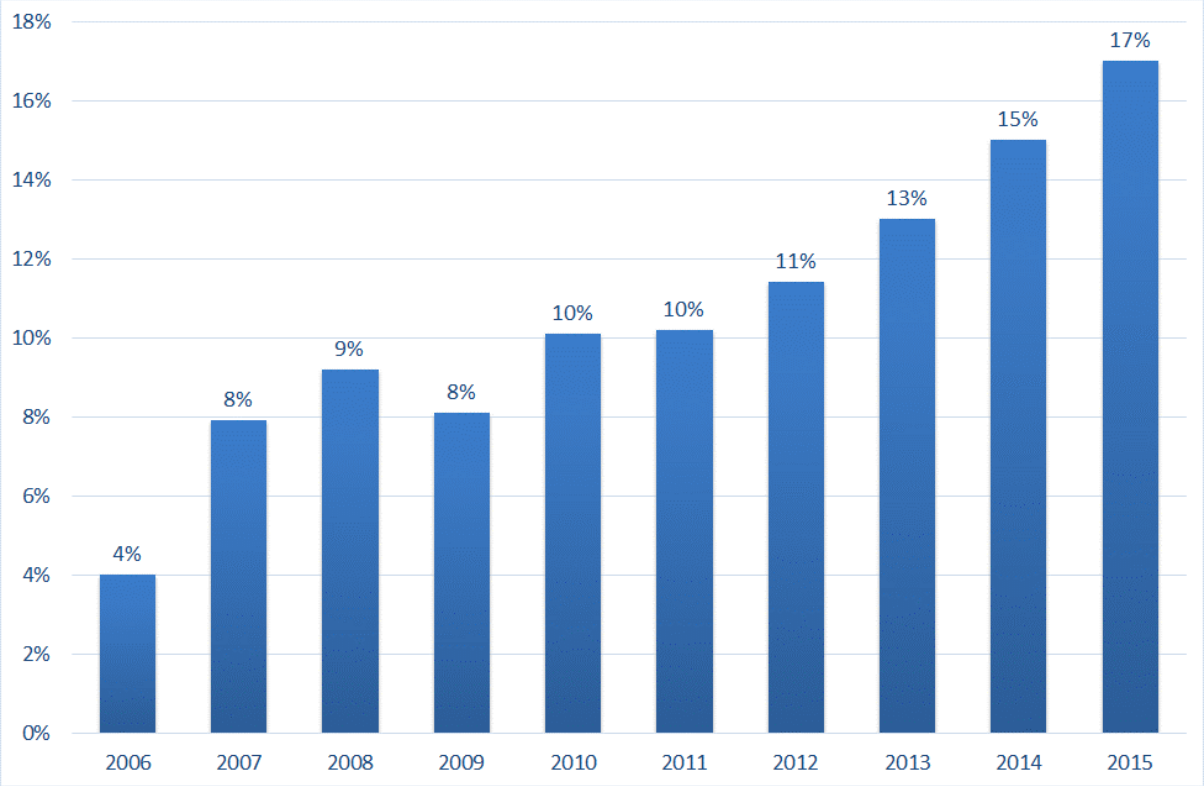



**Figure 23: Bicycle Travel Mode Share for Commuting Trips to the Central City (2006-2015) from Biannual Traffic Counts**

Based on the evidence of significant and growing bicycle numbers in the central city, together with the limitations of data being only available for a single location on Elizabeth Street and for one time period (the morning peak), comprehensive two-way bicycle volumes were collected between February and August 2015.

The data collected included morning, lunchtime and afternoon peak periods not only at the northern and southern ends of Elizabeth Street, but also on five adjoining parallel north-south routes (two to the west and three to the east: Queen/William Streets and Swanston/Russell/Exhibition Streets) (see Figure 24 to Figure 26). This data provides a unique 'perspective' on cycling behaviour in the heart of the Central City, on 6 parallel north-south routes.

Overall, the bicycle movement data highlighted the important local access role that Elizabeth Street plays for bicycles, with a large proportion of cyclists on the street being at or near their origin or destination. The local role of Elizabeth Street is consistent with its proximity to the two priority north-south bicycle routes in the central city: (1) 200 metres west of the highest priority route of St Kilda Road, Swanston Street and Royal Parade; and (2) 400 metres east of the second highest priority route of William Street.

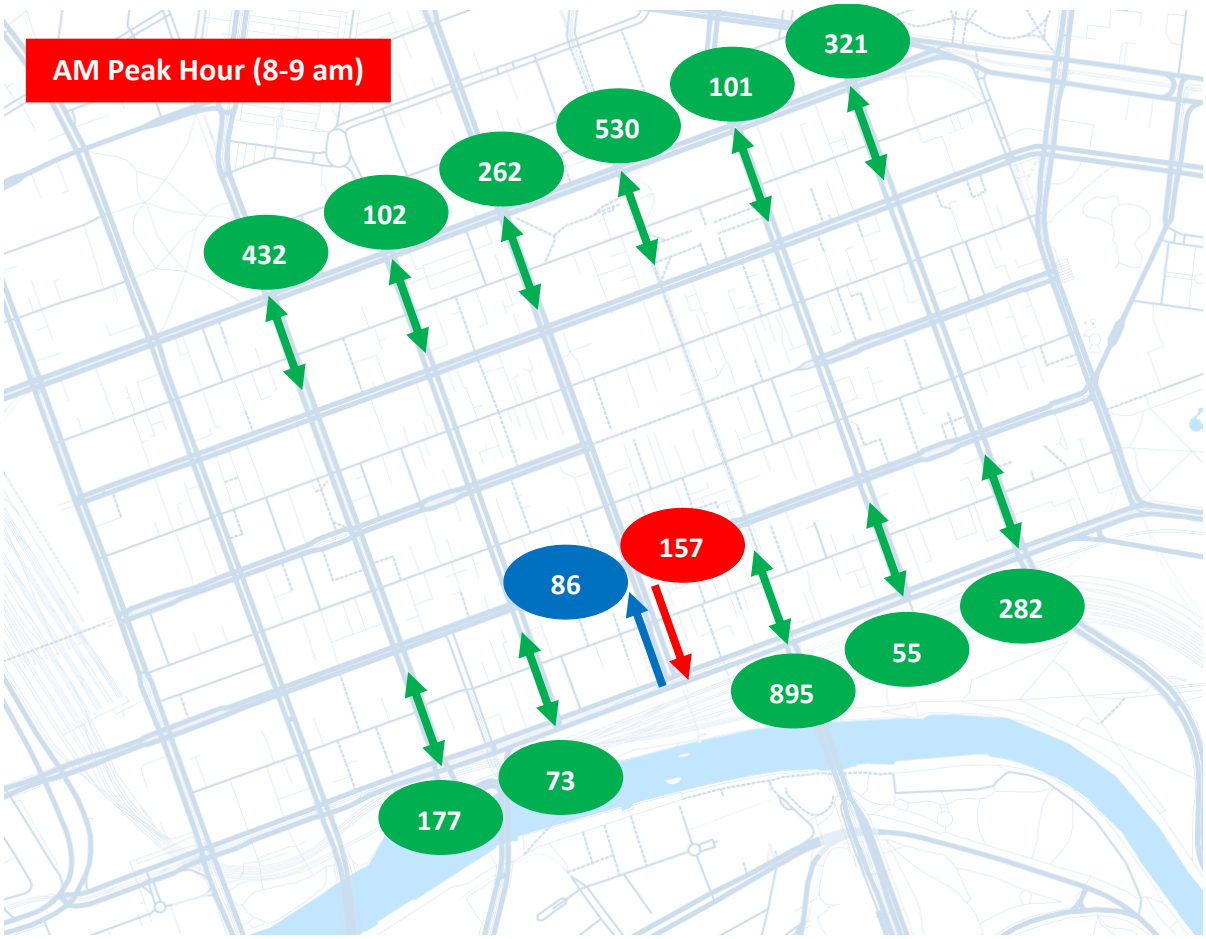



**Figure 24: Morning Peak Bicycle Volumes at Six North-South Routes in the Central City**

During the AM peak hour 157 cyclists were recorded travelling southbound in the study area, on Elizabeth Street south of Flinders Lane. Figure 24 shows those 157 southbound cyclists represent around 9% of all two-way north-south bicycle movements recorded across the cordon defined by the 6 streets at the southern end of the central city (William to Exhibition Streets) – in the AM peak hour.

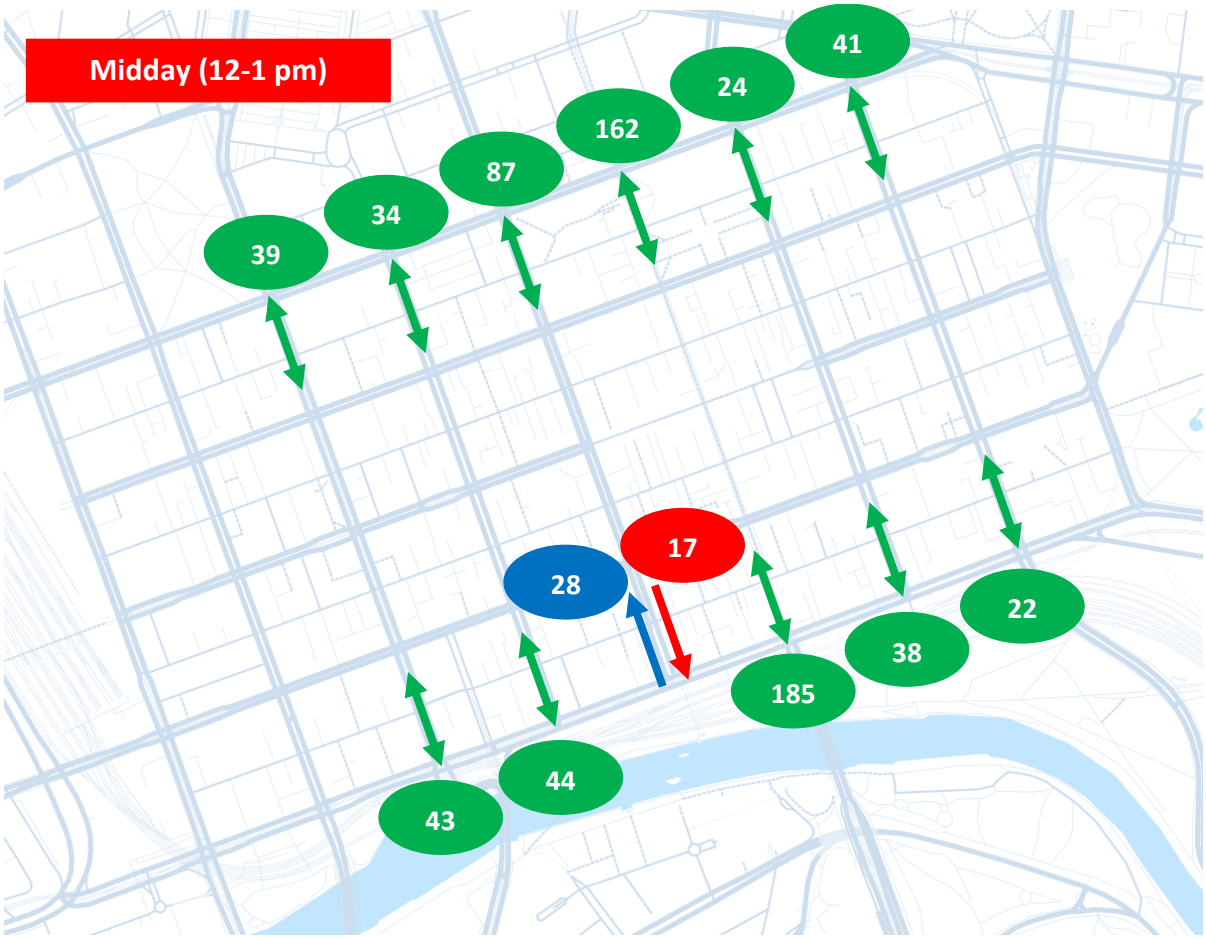



**Figure 25: Midday Bicycle Volumes at Six North-South Routes in the Central City**

During the midday peak hour, 17 cyclists were recorded travelling southbound in the study area, on Elizabeth Street south of Flinders Lane. Figure 25 shows those 17 southbound cyclists represent around 4.5% of all two-way north-south bicycle movements recorded across the cordon defined by the 6 streets at the southern end of the central city (William to Exhibition Streets) – during the midday hour.

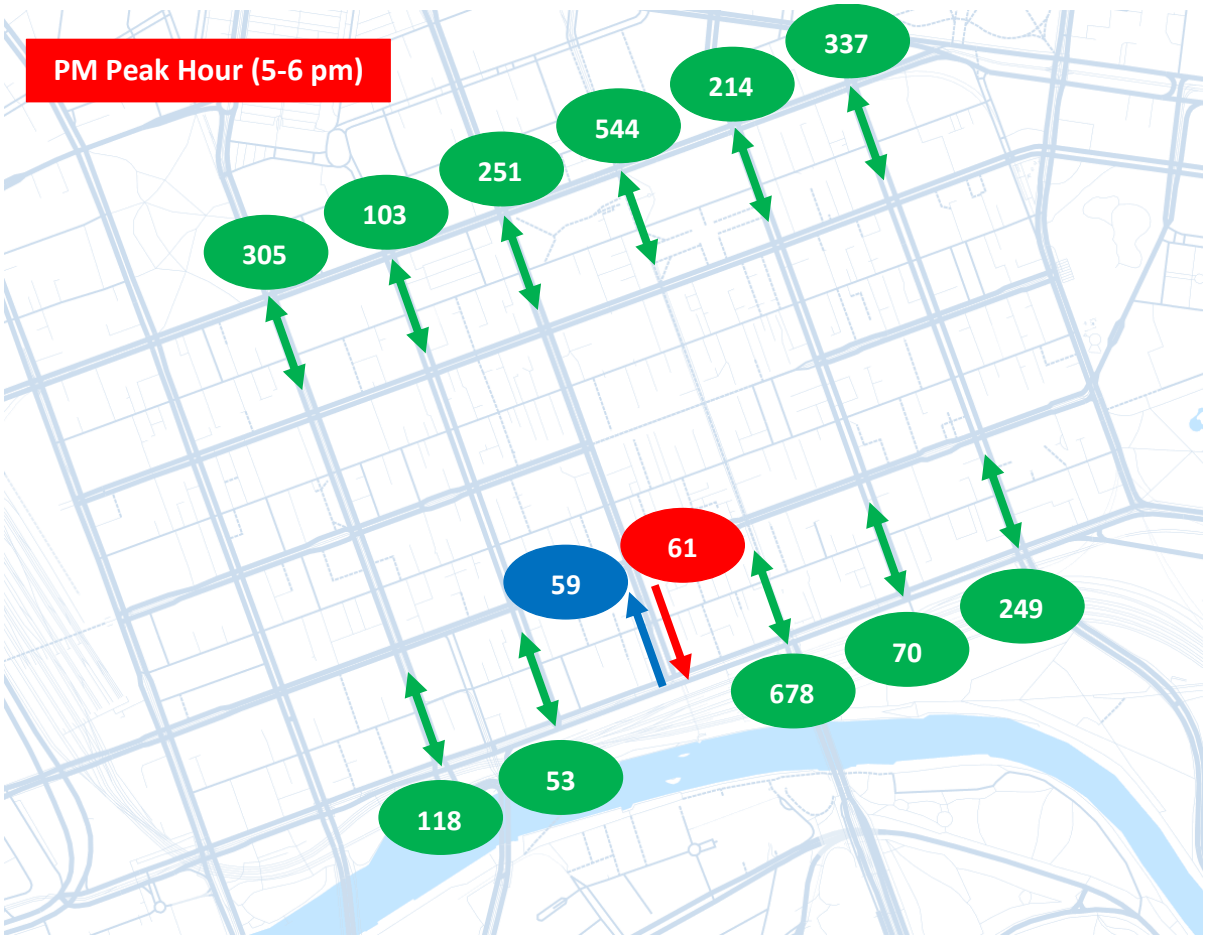



**Figure 26: Evening Peak Bicycle Volumes at Six North-South Routes in the Central City**

During the PM peak hour 61 cyclists were recorded travelling southbound in the study area, on Elizabeth Street south of Flinders Lane. Figure 26 shows those 61 southbound cyclists represent around 4.7% of all two-way north-south bicycle movements recorded across the cordon defined by the 6 streets at the southern end of the central city (William to Exhibition Streets) – in the PM peak hour.

## 4.7. MOTORCYCLES

The number of motorcycles that has been recorded travelling on Elizabeth Street, during the weekday peak hour survey activities undertaken for this study, is low. Most motorcycle volumes in all the surveyed sections of Elizabeth Street were found to lie within the range of 0-5 motorcycles per hour. The areas of Elizabeth Street that exhibited the more regular motorcycling activity were north of Lonsdale Street. In contrast the study area, south of Flinders lane exhibited very little motorcycling activity.

However, whilst the volume of motorcycles 'moving' on Elizabeth Street was found to be comparatively modest, the City of Melbourne motorcycle parking survey (which recorded a total of 777 motorcycles parked on the footpaths of all major 'big' and 'little' streets within the Hoddle grid) revealed that 111 of the 254 motorcycles parked on the footpaths of the north-south main streets were parked in the section of Elizabeth Street between La Trobe and Lonsdale Streets – this is partly related to the 'for sale' motorcycles that are placed on the footpath in front of the motorcycle stores during business hours. This part of Elizabeth street is of historic and current importance for the motorcycling community in Melbourne and Victoria.

## 4.8. MOTOR VEHICLES

### TRAFFIC USING ELIZABETH STREET

An extensive traffic survey program was undertaken on Elizabeth Street between February and September 2015. Figure 27 shows the hourly turning movements measured in 2015 at the intersection of Elizabeth Street with Flinders Lane – the intersection of most relevance for the study area.

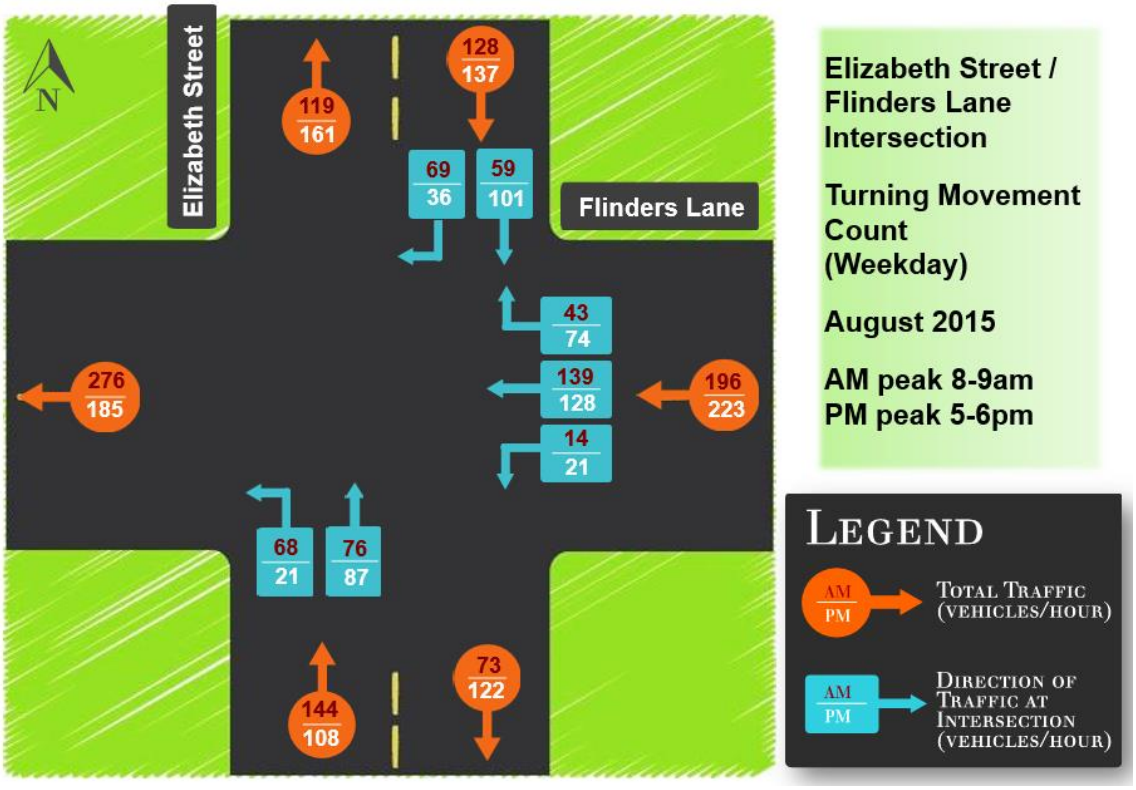



**Figure 27: Full Turning Movements at Elizabeth Street and Flinders Lane (2015)**

The count summarised in Figure 27 highlights that there is a relatively modest southbound traffic volume on Elizabeth Street in both the AM and PM peak hours – south of Flinders Lane.

Figure 28 and Figure 29 compare the northbound and southbound morning and afternoon peak traffic flows on Elizabeth Street at three midblock locations: (1) between Flinders Street and Flinders Lane; (2) between Little Collins and Bourke Streets; and (3) between Little Lonsdale and La Trobe Streets.

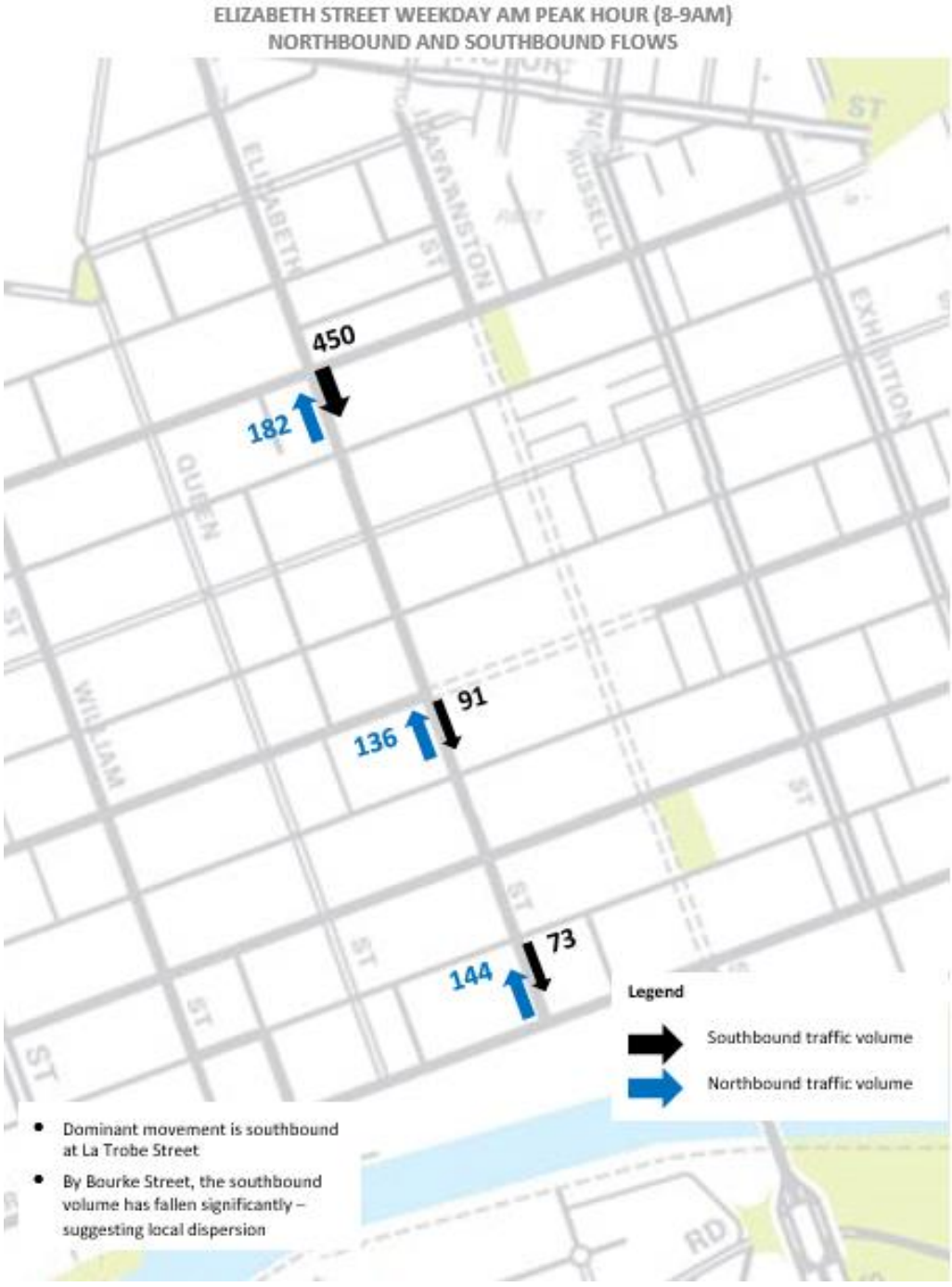



**Figure 28: Northbound and Southbound Motor Vehicles on Elizabeth St during Morning Peak Hour (2015)**

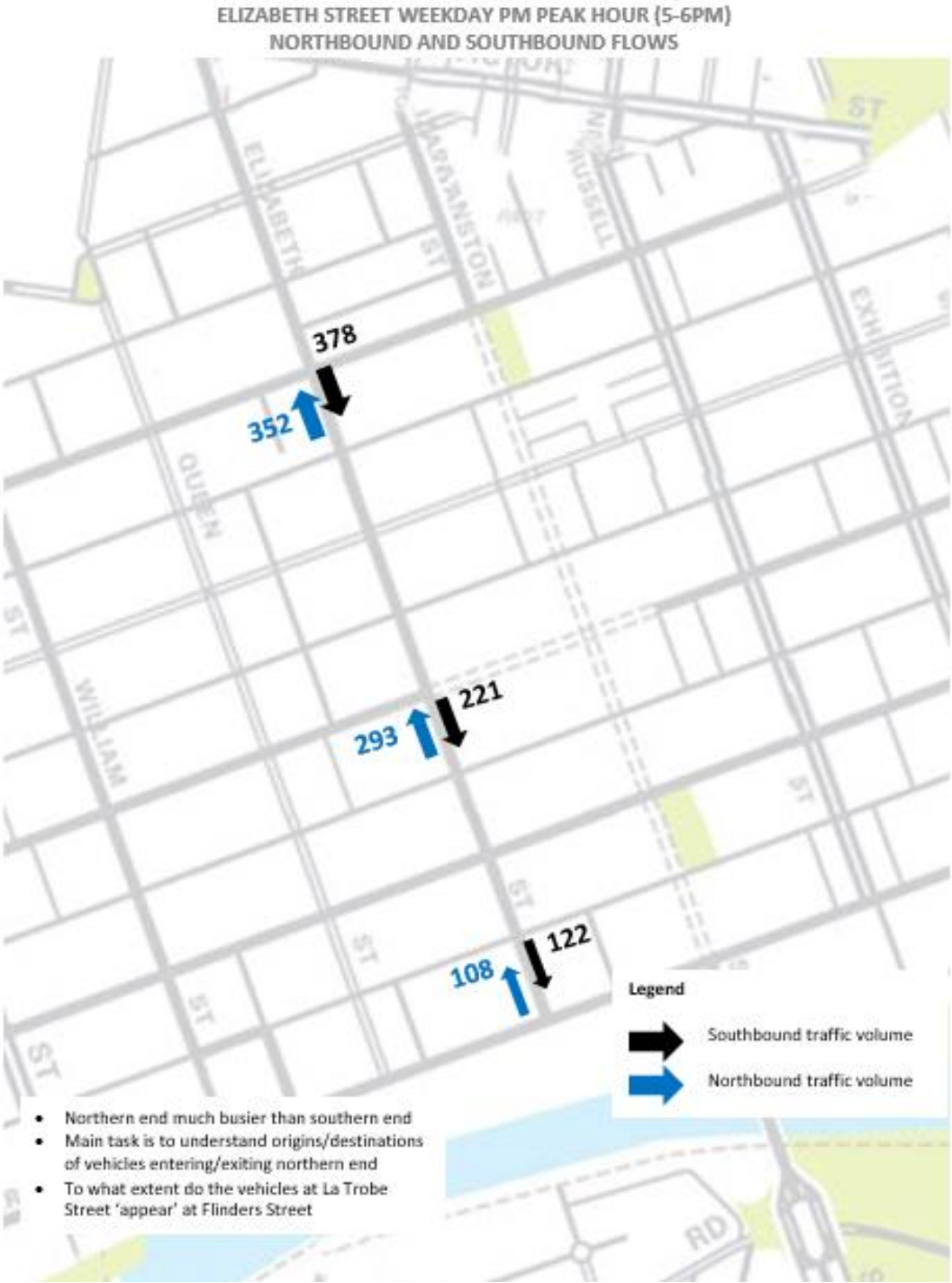



**Figure 29: Northbound and Southbound Motor Vehicles on Elizabeth St during Afternoon Peak Hour (2015)**

Examination of historic traffic records on Elizabeth Street, compared with the new traffic counts undertaken in 2015, has revealed a marked decrease in the volume using Elizabeth Street for the past 25 years. This reduction is manifested along the entire length of the study area and in both directions – Figure 30 and Figure 31 show the reduction in traffic at the northern and southern ends of Elizabeth Street since 2004.

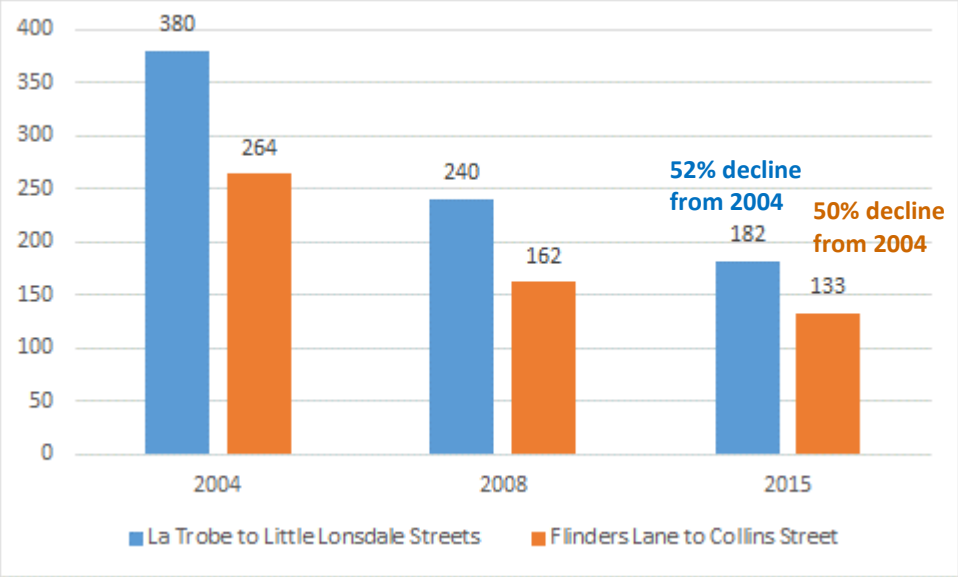



**Figure 30: Change in Number of Northbound Motor Vehicles on Elizabeth St during Morning Peak Hour (2004 – 2015)**

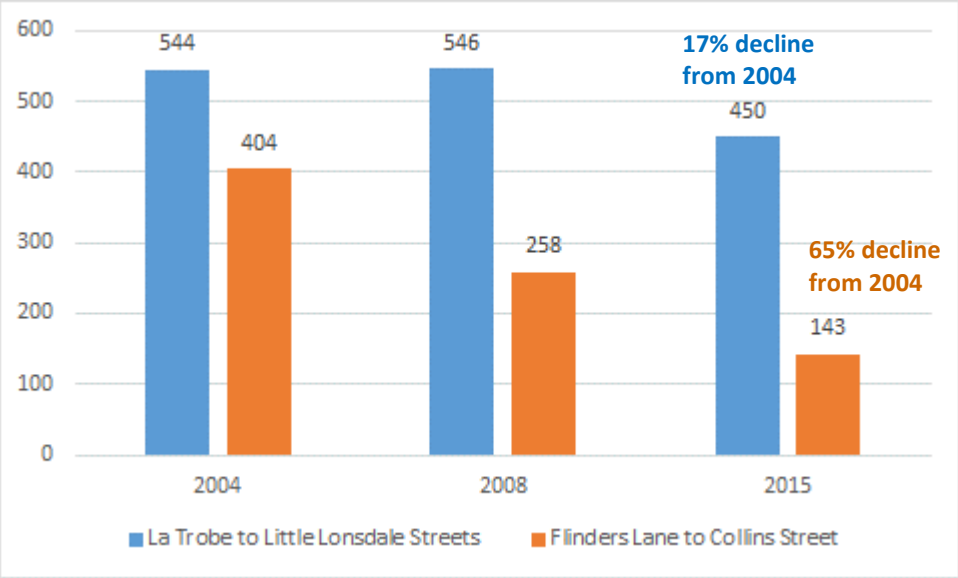



**Figure 31: Change in Number of Southbound Motor Vehicles on Elizabeth St during Morning Peak Hour (2004 – 2015)**

Additional data was available (for Elizabeth Street at La Trobe Street only) from August 1992. This data revealed a southbound traffic volume of 805 vehicles/hour and 400 vehicles/hour northbound in 1992. Thus, compared with 1992, it can be concluded that in 2015 there has been a 44% decrease in the traffic volume on Elizabeth Street southbound and 55% decrease northbound (measured at a point south of La Trobe Street). Even though no data is available to understand the precise source of the reduction in motor vehicle traffic on Elizabeth Street, a spreading of the peak periods in response to the reduced capacity of the road carriageway following the installation of the tram platform stops could be a contributing factor.

However, there is ample evidence from the time-series traffic counts collected by the City of Melbourne that the volume of traffic entering the central city area overall is also diminishing. In particular, between March 2008 and September 2014 the number of 'light' motor vehicles (defined as those under 4.5 tonnes of gross vehicle mass [GVM]) entering the central city dropped from 58,376 to 46,315 as measured between 7-10am at 16 sites – a reduction of 21% in a period of 6.5 years. This pattern of lower traffic volumes entering the central city has now been evident for some time – and has occurred despite the ongoing development in this area and the documented increase in the total number of visitors. It can be concluded that the travel demand associated with much of the increased activity levels in the central city is not being satisfied by the reduced traffic volumes being recorded and is thus likely associated with a mode shift to more sustainable transport options (such as walking, cycling and public transport).

In fact, there is evidence of increased use of 'bypass' routes by motorists travelling to points in areas around the city, as well as reduced reliance on private vehicle access to the central city and greater use of public transport and sustainable transport modes – captured across multiple dimensions, including:

- The total daily traffic volume entering the central city (as measured at a cordon of 22 sites on the perimeter) has reduced by approximately 12,000 vehicles per day (5% decrease) between February 2012 and February 2015.
- Morning peak hour bicycle volumes on La Trobe Street between Swanston and Russell Streets have increased by 118% (more than doubled) since the bicycle lanes were installed in 2013 (an increase of approximately 225 two-way bicycles per hour). Afternoon peak hour bicycle volumes in this same location have more than tripled since the bicycle lanes were installed.
- Total bicycle volumes entering the central city precinct during the morning peak period (7-10 am) have increased by 57% since 2011 (up from 7,335 in 2011 to 11,519 in 2015 – measured at a number of the City of Melbourne's permanent monitoring stations).
- Total metropolitan public transport patronage has increased by 7.4% in the 4-year period between 2008/09 to 2012/13. The increase represents approximately 38 million additional public transport boardings across the metropolitan network per annum.

The data reviewed shows that the number of motor vehicles is decreasing in the central city – a pattern that has been particularly pronounced on Elizabeth Street. The traffic volume reductions reported above are of most interest as they reveal a pattern of diminishing traffic utilisation in the area of consideration directly relevant to this study – namely the section of Elizabeth Street between Flinders Lane and Flinders Street.

## ORIGIN-DESTINATION SURVEYS

A comprehensive origin-destination (OD) survey program was undertaken to examine the traffic movements in the core study area – Elizabeth Street between Flinders Lane and Flinders Street – and beyond. The OD surveys revealed that Elizabeth Street's predominant function, between La Trobe and Flinders Streets, is to provide for local access and servicing. More specifically, Elizabeth Street provides an important access route for many of the carparks located in the three blocks immediately east and west (covering the section between Queen and Russell Streets). This access role is most evident in the peak periods when many motorists turn into Lonsdale Street and Flinders Lane – two of the streets where some of the largest carparks are located.

Typically, the proportion of traffic that stops and parks on-street on Elizabeth Street (for deliveries/servicing) is between 5-10% of the total volume that enters at either the northern or southern ends. This proportion varies depending on the time-of-day under consideration.

Figure 32 and Figure 33 show the main results of the analysis of the origin-destination surveys – relevant to the southern-most section of Elizabeth Street and specifically the southbound direction of flow, including traffic that uses the eastern side of Elizabeth Street (the location of the proposed closure). The analysis of the origin-destination data shows that the majority of the motor vehicle traffic on Elizabeth Street has a local destination in the morning peak and a local origin in the afternoon peak. More specifically, most traffic originates from or has a destination in the blocks immediately east and west of Elizabeth Street (between Queen and Russell Streets). Overall, during both the morning and afternoon peaks, the through role of Elizabeth Street is insignificant. The following is a summary of the main findings relevant to the study area:

### MORNING PEAK

- Southbound traffic entering study area at La Trobe Street – 450 vehicles
  - Around 12% turns at Collins Street, Flinders Lane and Flinders Street, virtually all of which has a destination between Elizabeth and Swanston Streets
  - Around 11% of the traffic entering at La Trobe Street parks on Elizabeth Street
  - Overall, almost 75% of all traffic entering at La Trobe Street has a destination within the area bounded by Little Lonsdale Street in the north, Flinders Lane in the south, Russell Street in the east and Queen Street in the west
- Northbound traffic entering study area at Flinders Street – 144 vehicles
  - Almost 50% turn left at Flinders Lane
  - Around 64% (almost two thirds) turn at Flinders Lane and Collins Streets
  - Around 10% turn on streets north of Bourke Street or exit at La Trobe Street, with only 5% travelling all the way from Flinders Street to La Trobe Street
  - Around 7% of the traffic entering at Flinders Street parks on Elizabeth Street

## AFTERNOON PEAK

- Southbound traffic exiting study area at Flinders Street – 122 vehicles
  - Around 47% originates from Flinders Lane and Collins Street, the majority of which comes from areas west of Russell Street and east of Queen Street
  - Around 32% originates from streets between Little Collins and Lonsdale Streets
  - Around 8% originates from Little Lonsdale Street or comes from areas north of La Trobe Street, with only 3% of those vehicles exiting at Flinders Street having travelled all the way from La Trobe Street
  - Around 13% of the traffic exiting at Flinders Street comes from on-street carpark spaces on Elizabeth Street
- Northbound traffic exiting study area at La Trobe Street – 352 vehicles
  - Around 33% originates from Collins Street, Flinders Lane and Flinders Street, with approximately 10% of those vehicles exiting at La Trobe Street having travelled all the way from Flinders Street
  - Around 8% of the traffic exiting at La Trobe Street comes from on-street carpark spaces on Elizabeth Street
- Northbound traffic entering study area at Flinders Street – 108 vehicles
  - Around 49% turn off Elizabeth Street between Flinders and Bourke Streets
  - Around 15% travel all the way from Flinders Street to areas north of La Trobe Street
  - Around 4% of the traffic entering at Flinders Street parks on Elizabeth Street

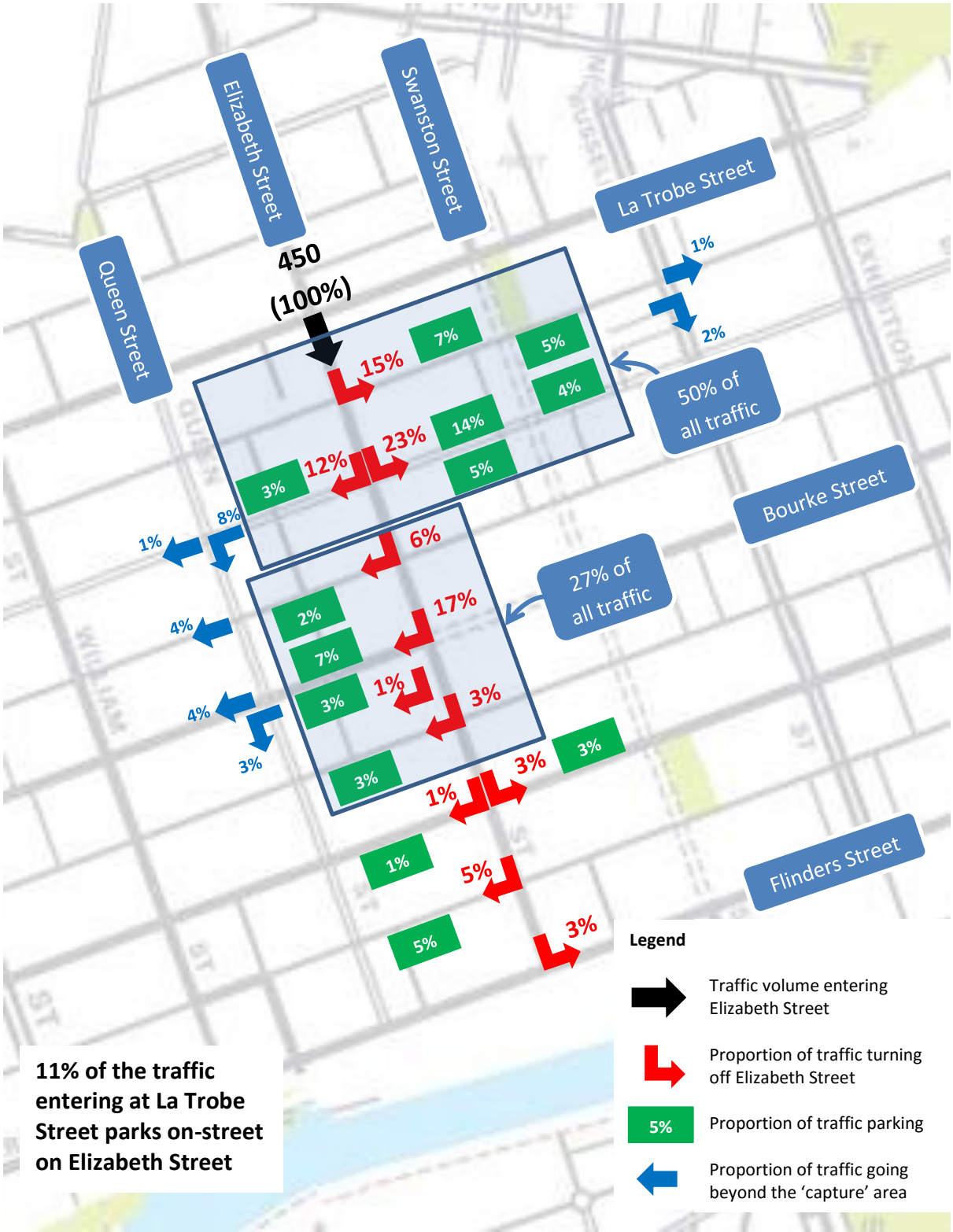



**Figure 32: Distribution of Southbound Traffic Entering at La Trobe St – AM Peak**

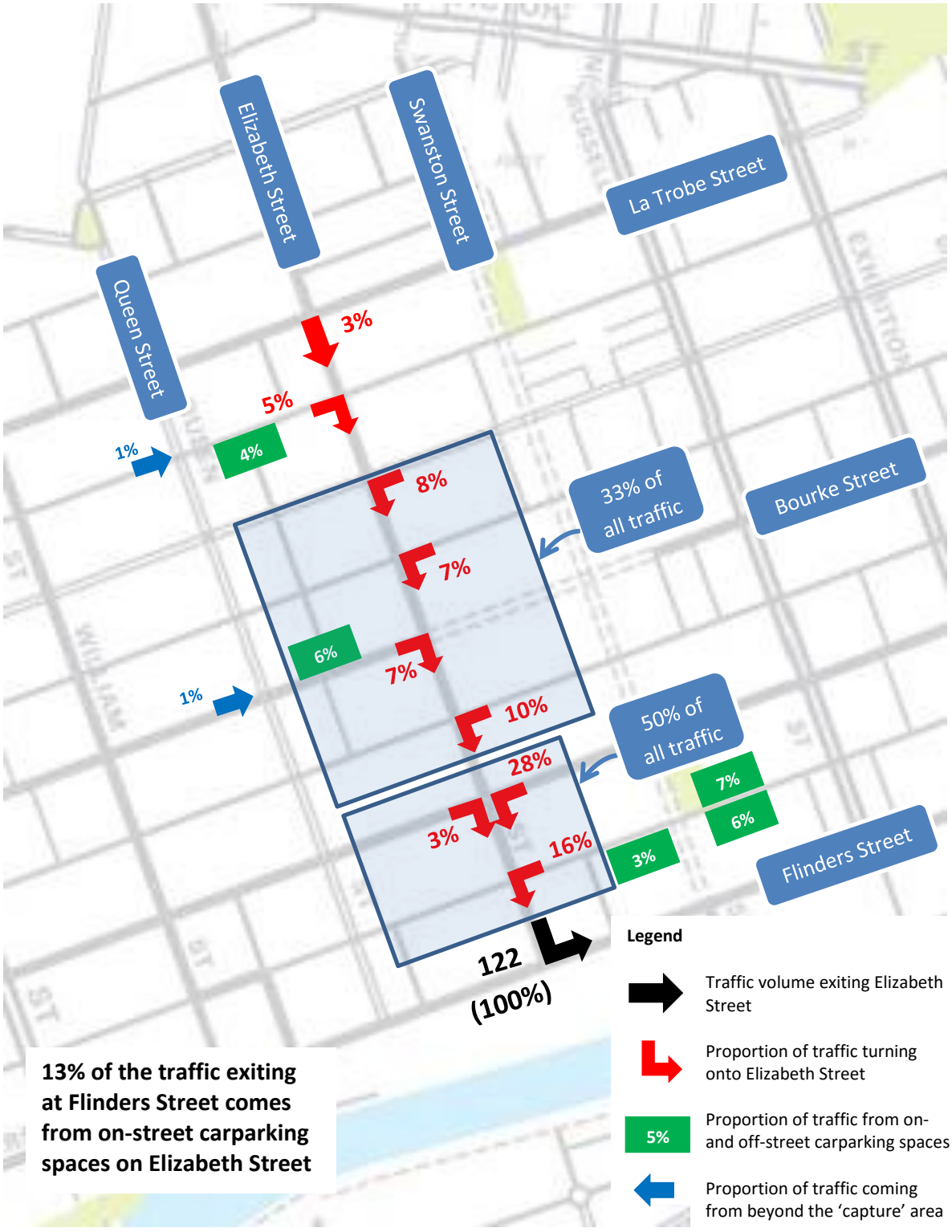



**Figure 33: Origin of Southbound Traffic Exiting at Flinders St – PM Peak**

## 4.9. COMPARISON BETWEEN TRAVEL MODES

As already highlighted, pedestrians outnumber all other modes and, in particular, motor vehicles in the southern end of Elizabeth Street. The extent of pedestrian dominance is best illustrated by a closer examination of volumes of people by mode.

In terms of total number of people moving in a north-south direction at the southern end of Elizabeth Street, the morning peak hour is busiest (out of the three periods surveyed). In the AM peak hour there is a total of almost 11,500 people that travel north-south on all modes in the morning peak, compared with around 11,300 in the afternoon peak. The overall usage in this block of Elizabeth Street in the morning peak is shown in the image below (the 'number of people' inside motor vehicles has been obtained by multiplying the number of vehicles by the 'observed' vehicle occupancy of 1.1 people/vehicle).

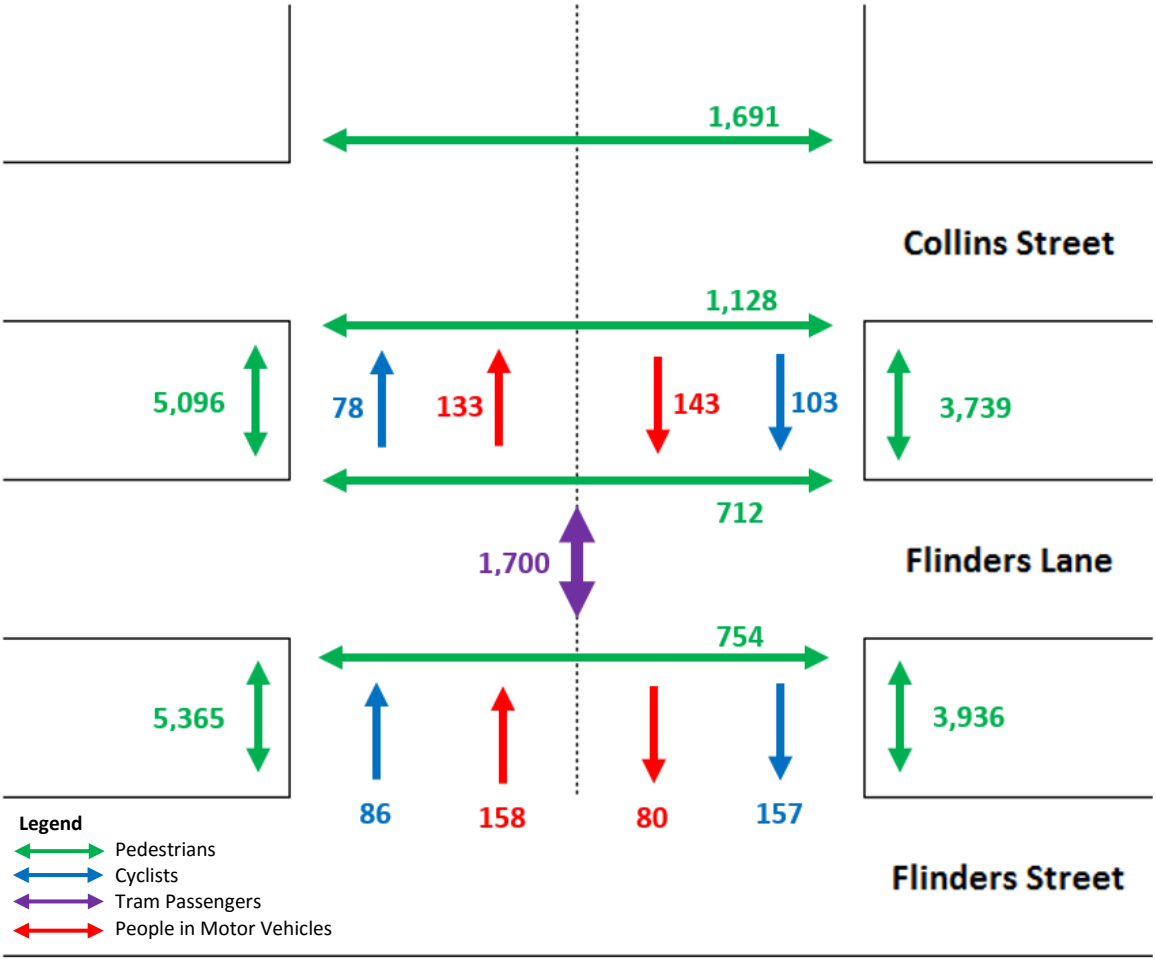



**Figure 34: Elizabeth St – Morning Peak Movement Summary in the Southern End of Study Area**

During the morning peak hour, there are a number of significant transport and movement-related aspects that highlight the dominant pedestrian utilisation of the southern end of Elizabeth Street:

- 9,301 pedestrians travel north-south along the footpaths on both sides of Elizabeth Street between Flinders Street and Flinders Lane, compared to 238 people in motor vehicles. Thus, there are approximately 39 pedestrians for every motor vehicle occupant.
- In the southernmost block of Elizabeth Street (between Flinders Lane and Flinders Street), there are almost twice as many cyclists as motor vehicle drivers and passengers travelling in the southbound direction. In both directions, there are also slightly more cyclists than motor vehicle drivers and passengers.
- The number of cyclists and motor vehicle occupants is similar between Flinders Lane and Collins Street.
- 1,700 passengers on trams and 238 people in motor vehicles move in the southernmost section of Elizabeth Street. Thus, there are more than seven tram passengers for every motor vehicle occupant.
- Around 4,285 pedestrians cross Elizabeth Street between the south side of Flinders Lane and the north side of Collins Street, compared to 276 people travelling north-south in motor vehicles between these two streets. Around 16 pedestrians cross Elizabeth Street for each person moving in a vehicle either north or southbound.
- The number of vehicles traveling south between Collins Street and Flinders Lane (as determined by the 2015 traffic surveys) was 50% lower than the previous most recent data from 2008.
- The number of vehicles traveling north between Flinders Lane and Collins Street (as determined by the 2015 traffic surveys) was 25% lower than the previous most recent data from 2008.

## 4.10. TAXIS

There are no 'taxi zone' spaces in the southern section of Elizabeth Street. It has been estimated (based on field observations) that the proportion of taxis – as a function of the total traffic volume – is between 0-5% at most times on a typical weekday.

## 4.11. ON-STREET PARKING AND SERVICING/DELIVERIES

### INVENTORY

There are approximately 12 on-street parking spaces in the southern end of Elizabeth Street between Flinders Lane and Flinders Street. The parking controls feature a mix of loading zone, car-share and half-hour limit metered parking, apportioned as follows:

- Half-hour limit meters – 7 spaces
- Loading Zone – 4 spaces
- Car-share – 1 space

## UTILISATION

A parking utilisation survey was undertaken between Flinders Lane and Flinders Street, in order to gain some insight into Elizabeth Street's role in supporting delivery/servicing activities in this part of the central city. The principal focus of the survey was to monitor loading use usage. The overall occupancy (the number of loading zone spaces occupied at any given point in time out of the total number of loading zone spaces available) recorded at the four loading zone spaces in this part of Elizabeth Street was typically in the order of 50-60%, which is consistent with the City of Melbourne's occupancy target to maximise access to safe and convenient parking. Thus, around half of the loading zone spaces in this southern section of Elizabeth Street were typically unoccupied and available for use by delivery/service vehicles. During the AM peak hour four vehicles used the loading zones in the southern section of Elizabeth Street. Average 'stay' was around 16.7 minutes per vehicle. During the PM peak hour three vehicles used the loading zones in this southern section of Elizabeth Street. Average 'stay' was around 15 minutes per vehicle.

The existing location of loading zone spaces and potential alternate locations that may be used to compensate for the loss of loading zones at the southern end is shown in Figure 35. These alternate locations are on the east side of Elizabeth Street, north of Flinders Lane and the south side of Flinders Lane, west of Elizabeth Street. A replacement car-share space can also be provided in one of these areas (to compensate for the removal of the car-share space in the closed section of Elizabeth Street).

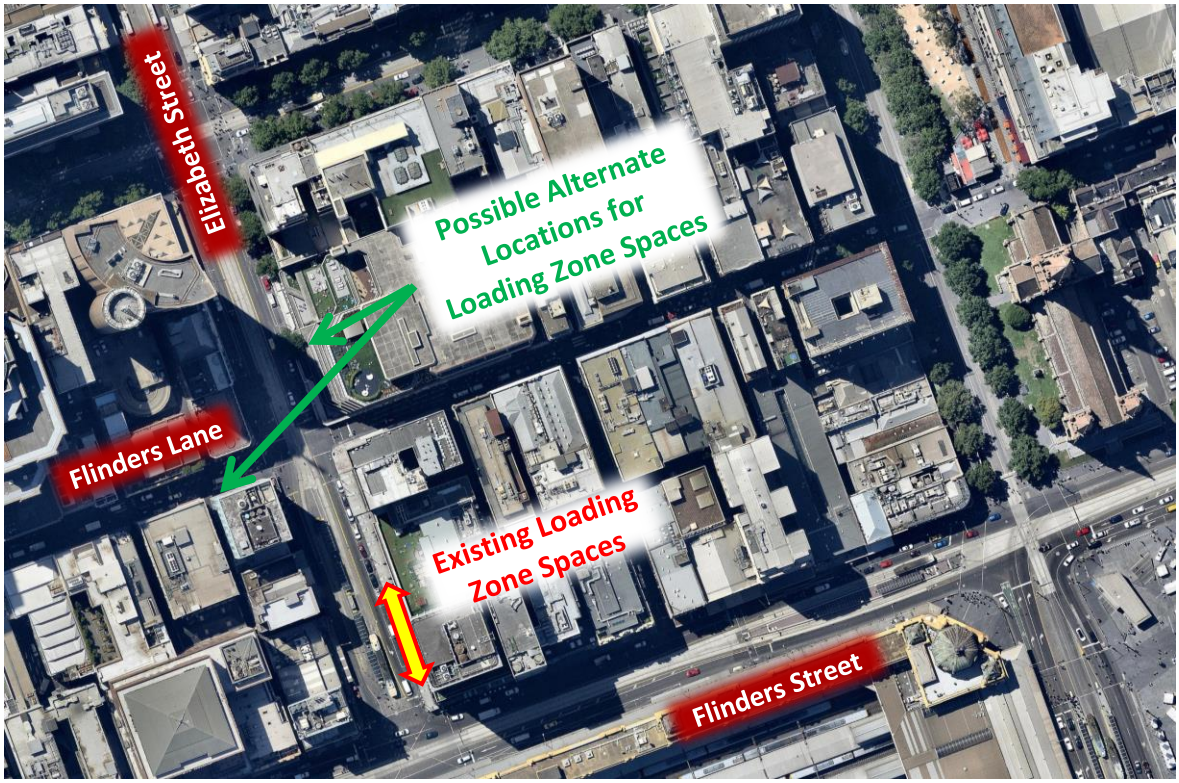



**Figure 35: Existing & Alternate Loading Zone Locations**

# 5. LARGE-SCALE INFRASTRUCTURE PROJECTS

## 5.1. MELBOURNE METRO RAIL PROJECT

The Victorian Government is pursuing planning and implementation work on the Melbourne Metro Rail Project. The new Metro Tunnel will allow more trains to run in and out of the city by giving the Cranbourne, Pakenham and Sunbury lines their own tunnel through the CBD. The Metro Tunnel's scope includes five new underground stations, with two new city stations directly connected to Flinders Street and Melbourne Central. The conceptual alignment is shown in the figure below.

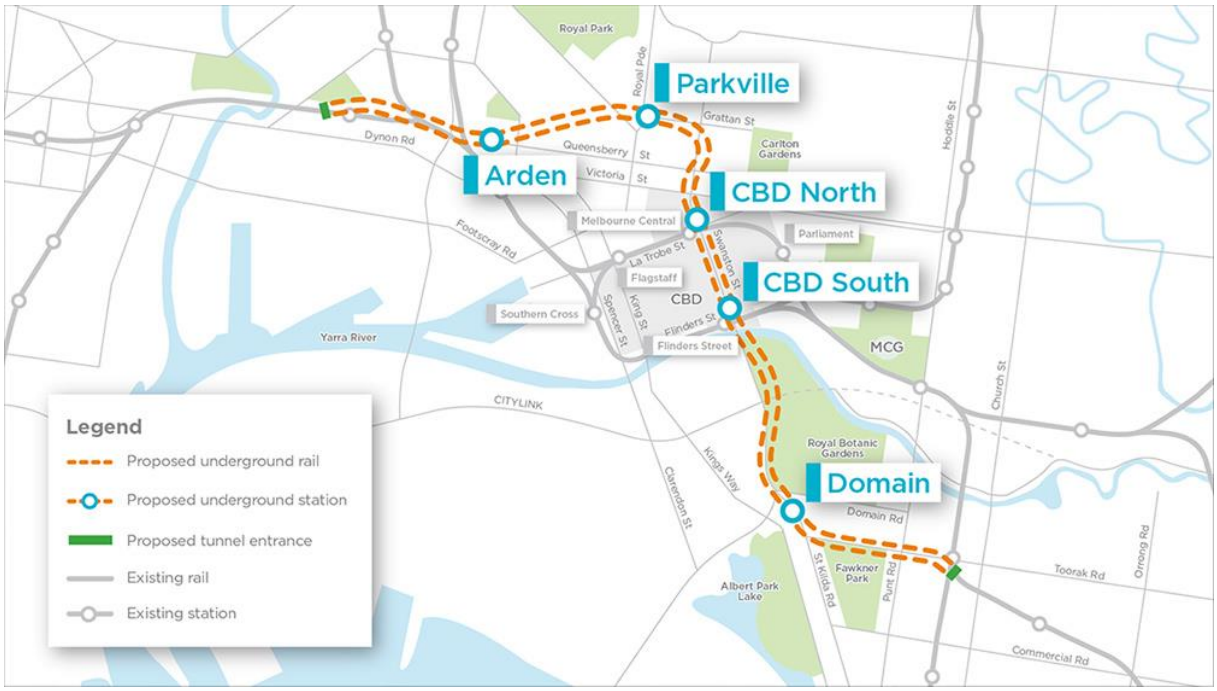



**Figure 36: Melbourne Metro Alignment and Stations**

The proposal to close the east side of the southernmost section of Elizabeth Street is fully compatible with (and supports) the Melbourne Metro Rail Project. The reduction in vehicle movements at the Elizabeth Street and Flinders Street intersection associated with the proposed closure will improve the public transport interchange functions between rail and tram passengers.

## 5.2. FLINDERS STREET STATION DEVELOPMENT

The Victorian Government has approved the development of Flinders Street Station. This $100 million project will involve major restoration works, as well as the upgrade of station platforms, entrances, toilets and information displays. As part of the project, platforms and entrances will be upgraded to ease passenger congestion at peak times and allow people to move through the station faster. The project is expected to commence in 2016 and is estimated to take four years to complete.

It is unclear whether any of the proposed works will have any significant impact on pedestrian movement patterns to/from Elizabeth or other parts of the central city. It is however likely, given the largely 'maintenance / cosmetic' nature of much of the proposed works, that the project will not influence existing passenger numbers through the Station (and hence pedestrian flows to/from). However, in the future it is expected that the Station will have the ability to cater for a growing number of passengers.

## 5.3. TRAM LEVEL ACCESS PLATFORM STOP INSTALLATION

As part of the modernisation of Melbourne's tram network, Yarra Trams and Public Transport Victoria constructed three pairs of level access platform stops on Elizabeth Street at La Trobe Street, Bourke Street and Collins Street (at the end of 2013) to improve access and safety for all passengers, and accommodate future plans to operate more low-floor trams on Route 19. The new level access tram stops provide safer waiting areas and comply with the requirements of the *Disability Discrimination Act (2002)*. The stops were constructed as part of a $7.5 million project completed in two stages that also saw new tram tracks laid that provide a smoother, quieter and more comfortable ride for passengers.

# 6. PROPOSED PROJECT

## 6.1. CLOSURE SCHEME

The proposal involves the closure of the eastern side of Elizabeth Street, south of Flinders Lane, in order to enhance pedestrian safety and provide much needed pedestrian space and amenity improvements, as well as to facilitate an improved tram passenger experience at the existing tram terminus.

Another advantage of the closure scheme is that by keeping the west side of the street open it protects the important local access function in this part of the central city, whereby nearly 50% of morning peak northbound motorists that enter Elizabeth Street at Flinders Street turn left at Flinders Lane to access carparks west of Elizabeth Street. A closure of the western side of the street would force these motorists to travel approximately an additional 900 metres (up to Russell Street to enter Flinders Lane at that location) – having to also travel past the already-congested intersection of Flinders Street with Swanston Street.

## 6.2. SUMMARY OF IMPACTS

### TRAFFIC MOVEMENT

The volume of traffic using the southbound carriageway of Elizabeth Street, south of Flinders Lane, is insignificant. It is around 73 vehicles/hour in the AM peak and 122 vehicles/hour in the PM peak.

These traffic volumes can be readily managed upon implementation of the proposed road closure.

### PARKING & DELIVERIES

There are 12 on-street parking spaces on Elizabeth Street between Flinders Lane and Flinders Street (4 loading zone, 7 short-term parking and 1 car-share space). The modest loss of four loading zone spaces as a result of the proposed road closure can be readily compensated through installation of new loading zone spaces on Elizabeth Street north of Flinders Lane and Flinders Lane west of Elizabeth Street. In fact, in those two areas, it is possible to match the loading zone availability in this general area, since there are some short-term metered parking spaces in immediate proximity that can be readily converted to new loading zone spaces. It is thus concluded that there are unlikely to be any adverse impacts for drivers engaged in delivery/service activities.

## PUBLIC TRANSPORT

The new pedestrian space proposed near the existing tram terminus in Elizabeth Street is expected to improve access and provide enhanced safety for tram passengers.

## BICYCLES

The bike ridership data collected during this study and presented in section 4.6 suggests that Elizabeth Street is not a bicycle route of regional significance. Rather, Elizabeth Street and its environs are often the start/end points of bicycle journeys – whether for commuting, shopping or leisure purposes. Furthermore, it is evident that southbound cyclists at the southern end of Elizabeth Street represent only a small proportion of all two-way north-south bicycle movements recorded across the cordon defined by the 6 streets at the southern end of the central city (William to Exhibition Streets) – at all times.

Thus, the proposed closure of the eastern side of Elizabeth Street, south of Flinders Lane, is expected to affect only a comparatively modest number of cyclists – who have many alternative southbound routes available on parallel streets.

## PEDESTRIANS

The number of pedestrians at the southern end of Elizabeth Street is significant. Data collected through the use of the City of Melbourne's pedestrian-counter sensors and other sources during the course of this study has revealed that the volume of pedestrians on this section of Elizabeth Street is comparable to the pedestrian volume on Swanston Street – the central city's busiest pedestrian spine. However, the useable footpath space available to 'moving' pedestrians on Elizabeth Street is only around half the space found on Swanston Street. The creation of new pedestrian space at the southern end of Elizabeth Street, as envisaged under the proposed closure, will provide major benefits for pedestrians.

# 7. ANALYSIS

## 7.1. TRAFFIC IMPACTS AND AMELIORATIVE MEASURES – OVERVIEW

Traffic volume data has been collected on Elizabeth Street at Flinders Lane (during both the AM and PM peak hours) to help establish the extent of traffic displacement that will take place under the proposed closure of the southbound carriageway. The key considerations in this respect are as follows:

- **AM Peak Hour** – The southbound traffic volume through the study area has been measured at **73 vehicles per hour**.
- **PM Peak Hour** – The southbound traffic volume through the study area has been measured at **122 vehicles per hour**.

Clearly, the PM peak hour traffic volume is higher than the AM peak hour traffic volume and thus the focus of the analysis will be on the likely impacts of displacing those higher 122 vehicles/hour during the PM peak hour.

The lower traffic volumes in the AM peak hour (equivalent to just over one vehicle per minute) will, naturally, cause less of an impact than the PM peak traffic.

The key issue when assessing the PM peak hour traffic conditions is to first consider those 122 vehicle movements in the context of the overall traffic volume in the central city at that time. City of Melbourne traffic modelling data shows that between 5pm and 6pm there are in excess of 40,700 vehicle movements per hour on a typical weekday entering/exiting the central city. Thus the 122 vehicles/hour travelling southbound on Elizabeth street during the PM peak hour represent around 0.3% of total inbound/outbound vehicle movements in the central city at that time.

If such a small proportion of the overall central city traffic volume was forced to divert to different routes as a result of the closure of the eastern side of Elizabeth Street, the impacts are almost certain to be insignificant. A proportion of 0.3% is considered inconsequential in terms of road network performance. The widely-accepted industry-practice in Victoria is that traffic volume increases below 10% are generally considered to be immaterial given that daily variations in background traffic flow may actually fluctuate by this amount – in fact typically by even much greater amounts. Therefore, any changes in traffic flows below 10% are commonly assumed to result in no discernible impact. In this regard, it is relevant to note that the latest Traffic Monitor 2012-13 report published by VicRoads in September 2014 recognises that traffic volumes vary significantly 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 inconsequential as they are within the range of normal daily fluctuations identified for roads within the metropolitan Melbourne area.

Within this context, it is reasonable to conclude that the traffic potentially displaced by the closure of the eastern side of Elizabeth Street south of Flinders Lane is not only very low, in absolute terms, but is also expected to have a negligible impact on the operation of other sections in Elizabeth Street and nearby surrounding streets.

However, traffic signals at the intersection of Elizabeth Street and Flinders Lane will need to be remodelled to account for the need to turn all southbound traffic into Flinders Lane. This will effectively involve a modification of the existing 3-phase traffic signal operation at this location to ensure that all right turn movements into Flinders Lane are fully controlled by 'right-turn signal arrows' to avoid any adverse impact on tram movements.

**Conclusion:**

**The displacement of around 73 southbound vehicles during the AM peak hour and 122 southbound vehicles during the PM peak hour from the southernmost section of Elizabeth Street (between Flinders Lane and Flinders Street) is expected to have an insignificant impact on the traffic operation of Elizabeth Street and other nearby streets.**

**This study has shown that the traffic is primarily locally generated within the central city from multiple streets and will therefore most likely disperse on several alternative routes once the southbound carriageway of Elizabeth Street, south of Flinders Lane, is closed to traffic.**

## 7.2. PARKING AND SERVICING/DELIVERIES IMPACTS

The parking utilisation survey undertaken between Flinders Lane and Flinders Street, has revealed modest loading use usage of the existing four loading zone spaces on the east side of Elizabeth Street. The overall occupancy of these loading zone spaces was in the order of 50-60%, which is consistent with the City of Melbourne's occupancy target to maximise access to safe and convenient parking. The loss of these loading zone spaces can be readily compensated by the conversion of nearby short-term metered parking spaces to new loading zone spaces. This can occur on the east side of Elizabeth Street north of Flinders Lane (there are six metered parking spaces in this area) and Flinders Lane west of Elizabeth Street (there are two metered parking spaces in this area). Therefore, the loss of four loading zone spaces associated with the closure can be immediately compensated by matching the loading zone availability in this general area, since there some parking spaces in immediate proximity that can be readily converted to new loading zone space (and are currently designated for short-term metered parking on Elizabeth Street between Flinders Lane and Collins Street and on Flinders Lane west of Elizabeth Street).

## 7.3. TRAM IMPACTS

Elizabeth Street is one of Melbourne's busiest tram corridors, as discussed in section 4.5, with tram frequencies for the existing three routes (19, 57 and 59) reaching up to 35 trams per hour per direction during peaks. Currently, all trams terminate at Flinders Street, but the usage of the route is expected to increase as the PTV and Yarra Trams continue to pursue a rationalisation of tram services on the parallel Swanston Street route.

The new pedestrian space that would be created at the southern end of Elizabeth Street, through the proposed closure of the eastern side between Flinders Lane and Flinders Street, is expected to significantly improve access for passengers, providing:

- Conditions under which it will be easier and safer to board and alight trams
- Increased protection from road traffic

In summary, the significantly improved environment will complement other public transport improvement initiatives (such as Melbourne Metro) that are currently in the planning and implementation phases.

## 7.4. BICYCLE IMPACTS

As discussed in Chapter 3, cyclist numbers on Elizabeth Street are comparable, at times, to those of other north-south routes in the central city, with the exception of Swanston Street. However, contrary to streets like William and Exhibition that cater predominantly to morning/afternoon commuter cyclists and through movements, cyclists on Elizabeth Street are mainly at the beginning or end of their journey into the central city, as demonstrated by the fact that cyclist numbers in the middle of the day remain relatively significant in comparison to those of other streets.

The local nature of bicycle movements on Elizabeth Street is unsurprising, as Elizabeth Street is not only close to important employment destinations, but also defines the western edge of the central city's retail heart and is close to a large number of food and entertainment venues. The local role of Elizabeth Street is also consistent with its proximity to the two priority north-south bicycle routes in the central city: (1) 200 metres west of the highest priority route of St Kilda Road, Swanston Street and Royal Parade; and (2) 400 metres east of the second highest priority route of William Street.

Importantly, for the purposes of this study, the overall proportion of cyclists using the southbound carriageway of Elizabeth Street south of Flinders Lane is modest, particularly when compared with north-south movements in the corresponding sections of the parallel streets between William Street and Exhibition Street. Thus, a closure of the eastern carriageway in Elizabeth Street, south of Flinders Lane is unlikely to create any significant disruption to cycling patterns and the attractiveness of bike riding in the central city.

## 7.5. PEDESTRIAN IMPACTS

As discussed in section 4.4, limited pedestrian-count data is available for Elizabeth Street.

The City of Melbourne has a 24-hour pedestrian counting system that measures pedestrian activity in the city each day. The system includes a permanent counter on the east side of Elizabeth Street between Flinders Street and Flinders Lane – the only pedestrian counter on Elizabeth Street.

A detailed review of data from the Elizabeth Street pedestrian counter revealed that pedestrian volumes are significant. More specifically, review of all available data for this counter (by looking at the total 24-hour volume for the first Wednesday of each month since September 2013 – the first month for which there is data for this locations) showed that pedestrian numbers were over 30,000 on all 24 months examined, and have averaged between 34,000 and 39,000 over the past 12 months.

In addition to examining data for the eastern footpath of Elizabeth Street, pedestrian data was also analysed from a permanent counter located in the corresponding block of Swanston Street (west side of Swanston Street between Flinders Street and Flinders Lane). Finally, in order to enable a more comprehensive and meaningful comparison of pedestrian volumes between Swanston and Elizabeth Streets (on both sides of the street), a program of detailed bi-directional pedestrian counts was undertaken in February and March 2015. The data collected included pedestrian volume on both sides of Elizabeth Street during various peak periods.

Overall, it was determined that daily pedestrian numbers in the southernmost block of Elizabeth Street are estimated to be around 80-90% of those on the corresponding block of Swanston Street. Furthermore, during the morning peak (8 to 9 am), pedestrian volumes are estimated to be higher in the southernmost block of Elizabeth Street than on the corresponding block of Swanston Street.

Clearly, Elizabeth Street is an important pedestrian spine – a conclusion that can be drawn based on the utilisation statistics available for the southern end of the street, where the pedestrian volumes are just short of those measured on Swanston Street; central Melbourne's busiest pedestrian area.

# 8. CONCLUSIONS

The assessment undertaken as part of this study indicates that the proposal to close the east side of the southernmost section of Elizabeth Street is feasible as it is not expected to have any major traffic impacts. In drawing this conclusion, a significant amount of both existing information relevant to the Elizabeth Street study area, as well as newly-collected transport and traffic data, has been reviewed and analysed. Based on this comprehensive process it has been determined that the needs of all road users can be adequately managed, while at the same time the implementation of the road closure is expected to deliver benefits in terms of safety, amenity and accessibility for pedestrians and tram passengers on the southern end of Elizabeth Street.

The traffic surveys and origin-destination work undertaken as part of this study have conclusively revealed that the number of motorists using the east side of the southernmost section of Elizabeth Street is very low. The specific trip origins of these vehicles cover a wide area within the central city grid, and thus motorists have multiple options to change their travel patterns following the proposed road closure. The 'spread' of origins will allow the dispersal of traffic over multiple routes and intersections – ensuring that comparatively low additional traffic volumes are added to any given intersection.

In summary, no adverse traffic consequences are expected as part of the proposal to close the eastern side of Elizabeth Street, south of Flinders Lane, given the low volume of displaced southbound traffic, as well as the generous permeability and alternate travel route choices that will remain available for motorists. At the busiest time (the PM peak hour) there is a total of 122 vehicles/hour travelling southbound on this section of Elizabeth Street – equivalent to 2 vehicles per minute. This volume is irrelevant in the context of managing traffic around the central city and thus it is anticipated that no specific new traffic management treatments will be required to manage traffic flows (except for the modifications to traffic signals at the intersection of Elizabeth Street and Flinders Lane to account for the need to turn all southbound traffic into Flinders Lane).

Whilst there are sections of Elizabeth Street where significant levels of cycling activity have been measured, the overall proportion of cyclists using the southbound carriageway of Elizabeth Street south of Flinders Lane is modest, particularly when compared with north-south movements in the corresponding sections of the other parallel north-south streets between William Street and Exhibition Street. Accordingly, the proposed closure is not expected to have any major adverse impact on cyclists.

Finally, the modest loss of around four loading zone spaces as a result of the proposed road closure can be readily compensated through installation of new loading zone spaces on Elizabeth Street north of Flinders Lane and Flinders Lane west of Elizabeth Street. In fact, in those two areas, it is possible to match the loss of loading zone space in the closed section of Elizabeth Street.