



STATION STREET Temporary Road Closure for Traffic Diversion Experiment

Traffic Report to VicRoads

Yarra City Council

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1. Introduction

In April 2016, Yarra City Council resolved to progress with a proposal to temporarily close Station Street at the intersection of Princes Street, North Carlton, to vehicles for the purposes of undertaking a traffic diversion experiment.

In September 2017, Yarra City Council resolved that the traffic diversion experiment will be evaluated during the next Local Area Place Making (LAPM) study for the North Carlton Precinct. Currently, the next LAPM study for the North Carlton Precinct is planned for 2018/19 financial year (noting that this may be subject to change through Councils annual LAPM priority ranking process or Council's commitment to undertaking LAPM studies beyond 2017/18).

In line with the 5 September 2017 resolution, a copy of the resolution is provided in Appendix 1, with a submission prepared by some residents on the proposed temporary closure provided in Appendix 2. Further community feedback is provided in Section 3 of this document and Appendix 3.

The decision to proceed with the traffic diversion experiment will be made by Council in late 2017 following further consultation with the North Carlton community.

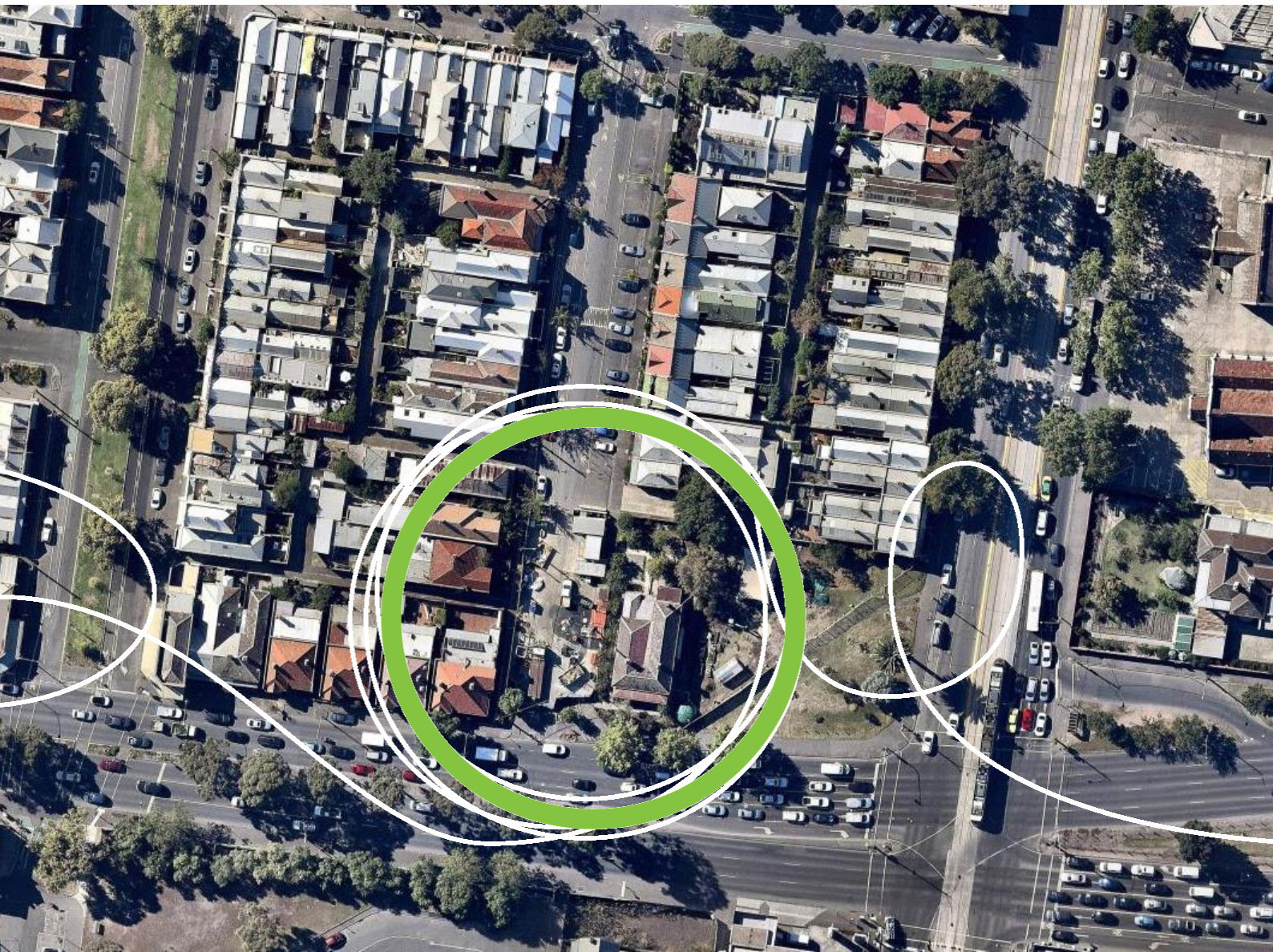
In line with Schedule 11, Section 10, of the Local Government Act 1989, Council is seeking a report from VicRoads on this matter.

This document provides the information required by VicRoads to prepare its report. Specifically, this includes:

- Section 2: An independent Traffic Impact Assessment (TIA) undertaken by GTA Consultants.
- Section 3: In line with the Yarra City Council Resolution of 2 August 2016, resident submissions received prior to the resolution on amenity and safety issues on Station Street between Lee Street and Princes Street have been provided.

A brief summary of the community consultation undertaken during the Place Making Assessment (Section 4) is also provided.
- Section 4: An independent Place Making Assessment undertaken by CoDesign Studios (as per Yarra City Council resolution of 20 December 2016).
- Section 5: An assessment of the proposal against the objectives of the Transport Integration Act (as per Yarra City Council resolution of 20 December 2016).
- Section 6: Additional information required by VicRoads as per Section 13.4.2 and 13.5 of Traffic Engineering Manual (TEM) Volume 1 Chapter 13: Road Closure (VicRoads, August 2014), including Council officer comment.

Section 2: GTA Consultants Traffic Impact Assessment



Station Street Road Closure Carlton North Transport Impact Assessment

Client // Yarra City Council
Office // VIC
Reference // V105900
Date // 25/11/16

Station Street Road Closure

Carlton North

Transport Impact Assessment

Issue: C 25/11/16

Client: Yarra City Council
Reference: V105900
GTA Consultants Office: VIC

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1. Introduction

1.1 Background & Purpose

The City of Yarra is currently considering what the benefits and impacts are of temporarily closing Station Street, at its intersection with Princes Street in North Carlton, for the purposes of undertaking a traffic diversion experiment.

The closure has previously been suggested as part of a Local Area Traffic Management Study of the North Carlton area in 2003. This proposal only restricted egress (southbound) movements from Station Street to Princes Street due to expected redistributed rat-running traffic caused by other traffic management measures being implemented in the precinct.

Moreover, Station Street was temporarily closed at this location between January 2015 and March 2016 by Melbourne Water to enable them to upgrade the sewer network. Consequently, the City of Yarra has consulted with North Carlton residents about formally closing Station Street at Princes Street in February and March 2016. The responses from the community indicated that only half are supportive of the closure, with those not being supportive largely being concerned about traffic redistribution impacts onto surrounding streets.

GTA Consultants was commissioned by the City of Yarra in September 2016 to undertake a transport impact assessment of the proposed closure of Station Street at Princes Street. The assessment aims to provide an understanding of what the potential implications of the closure are, as well as whether the associated benefits and impacts are material.

1.2 Proposed Closure

The proposed road closure is located in North Carlton, at the intersection of Station Street and Princes Street. The location of the closure is shown in Figure 1.1.

Figure 1.1: Subject Site and its Environs



1.3 Methodology

The report is an assessment of the anticipated transport implications of the proposed closure of Station Street and has been completed through the following steps:

- i A **policy review** of relevant transport documents affecting and guiding the development and management of the area
- ii Setting out the **existing transport conditions** in the area to understand the current access arrangements and what impact the proposal will have of current users
- iii The collection and analysis of **traffic data** to understand how motorists currently access and travel through the area
- iv A **traffic assessment** of the proposal to identify how the resulting road network will operate in the future and what impacts there will be on current users
- v Provide a **summary of conclusions** of what the potential implications of the closure are, as well as whether the associated benefits and impacts are material to current users
- vi Provide a **recommendation** about whether the proposed closure of Station Street should be pursued further.

1.4 References

In preparing this report, reference has been made to the following:

- o Documentation provided by the City of Yarra
- o City of Yarra Local Area Traffic Management Plan
- o VicRoads Traffic Engineering Manual Volume 1: Chapter 13
- o traffic and car parking surveys undertaken by GTA Consultants as referenced in the context of this report
- o an inspection of the site and its surrounds
- o other documents as nominated.

2. Background

2.1 Policy & Strategies

There are a number of policies and strategies prepared by national, state and local government bodies that help inform how the North Carlton area should be developed and managed into the future. Those that have the highest relevance in regards to the proposed closure of Station Street is discussed below.

2.1.1 VicRoads SmartRoads Policy

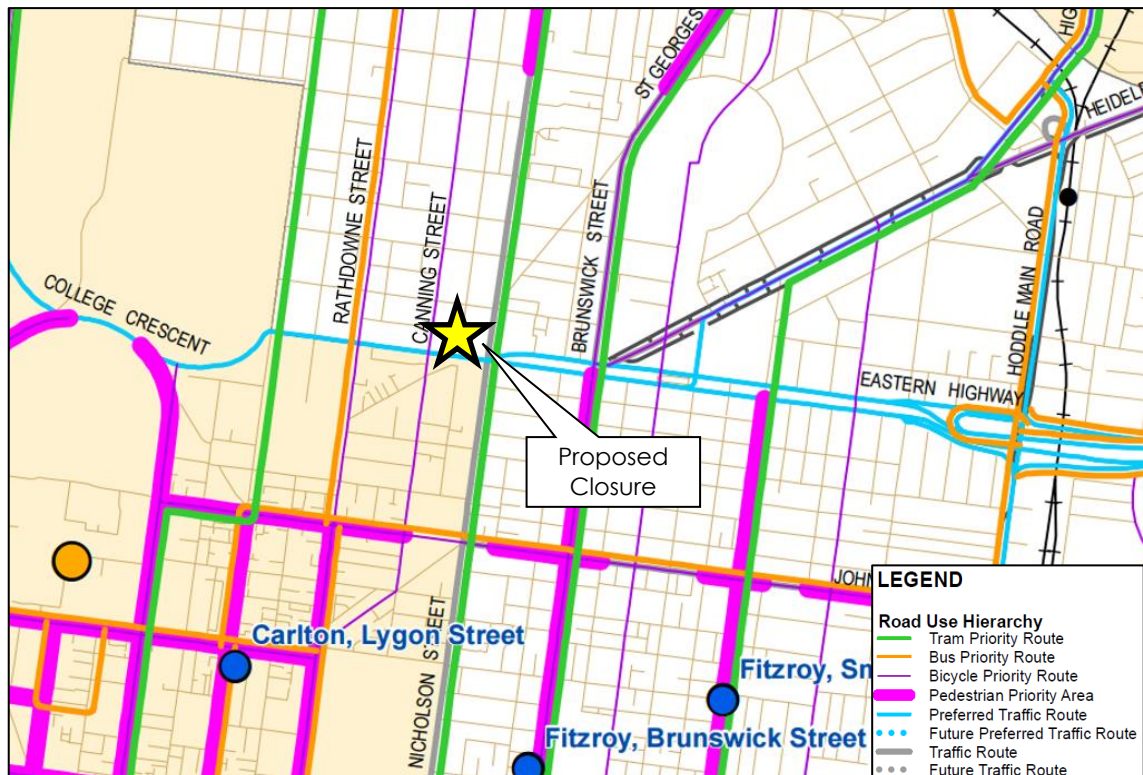
SmartRoads is a VicRoads policy which sets strategic 'modal' priorities on the road network and underpins many of the strategies significant to the operational directions that support broader strategies around land use and transport.

"There is no single solution to managing congestion on our roads. Sustainable management of congestion will require an integrated approach involving better management of the existing network, building new infrastructure, visionary land use planning, encouraging sustainable transport modes, and changes in behaviour by individuals, businesses and government."

All road users will continue to have access to all roads. However, certain routes will be managed to work better for cars while others for public transport, cyclists and pedestrians during the various peak and off-peak periods.

The VicRoads SmartRoads Network Operating Plan for the area surrounding the subject site has been reproduced in Figure 2.1.

Figure 2.1: VicRoads SmartRoads Network Operating Plan – City of Hobsons Bay



Source: VicRoads Website

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Figure 2.1 illustrates the following arterial road network priorities in the area:

- Princes Street is nominated as a Preferred Traffic Route
- Nicholson Street is nominated as a Traffic Route and Tram Priority Route
- Rathdowne Street is a Bus and Bicycle Priority Route
- Canning Street is a Bicycle Priority Route.

On this basis, it can be understood that the proposed closure of Station Street will prevent vehicular access to a Preferred Traffic Route.

2.1.2 Yarra City Council Local Area Traffic Management Plan

The City of Yarra Council adopted its Local Area Traffic Management Policy in May 2014. The policy outlines Council's process for conducting Local Area Traffic Management (LATM) studies. The aim of the policy is to reduce traffic volume and speeds on local roads and provide a safer environment for cyclists and pedestrians. The LATM Policy separates the City of Yarra into 21 precincts, of which North Carlton is the #2 precinct, bound by Park Street to the north, Nicholson Street to the east, Princes Street to the south and Lygon Street to the west.

The LATM Policy sets out the following processes in undertaking studies:

- Upon receipt of requests, Council officers will make a preliminary site visit and review available traffic data to quantify if there is a readily apparent road safety problem.
- If the site is not considered a road safety issue, officers will refer this to the LATM priority ranking list.
- If a safety issue is identified from the analysis of site investigations, evidentiary traffic data and engineering assessment, officers may decide to bypass the LATM process and consider another appropriate course of action to address the issue.

The LATM priority ranking list is based on a warrants system to determine the priorities for competing LATM works. These precincts will be ranked according to the following criteria using available data:

- Casualty crashes – any reported fatalities, serious injuries and other injuries in the last five years on local streets or intersections;
- Traffic speed – any local street with an 85th percentile speed generally greater than 44km/h;
- Traffic volume – any local street with an average weekday traffic volume generally greater than 1,000 vehicles;
- Through traffic – any local street with a peak hour to 24-hour volume ratio generally in excess of 14%;
- Heavy vehicles – any local street with a proportion of commercial vehicles to all traffic generally in excess of 5%;
- Activity land use generators (e.g. hospitals and schools) – considered in terms of likely pedestrian and bicycle generation, especially by vulnerable road users; and
- Resident complaints – expressed by the number of received letters, petitions and notes to file from Council officers.

Each year Council officers review the LATM priority ranking list as part of developing budgets and traffic management programs for the subsequent financial year, and advise councillors accordingly.

It is unclear at this time how the proposed closure of Station Street ranks against other LATM issues within the municipality. However, as part of this study, consideration is being given to each the criteria used to assess such matters.

2.2 Temporary Closure (Water Main Upgrade)

Between January 2015 and March 2016, Melbourne Water closed various streets in North Carlton and North Fitzroy to enable them to replace a 114-year old section of the Carlton main sewer. These closures included Scotchmer Street, Amess Street and Station Street, and resulted in changes to traffic patterns through the wider North Carlton and North Fitzroy areas.

The works on Station Street required that it be closed at its intersection with Princes Street. During this time, pedestrian access was maintained along Station Street to Princes Street, but access by cars and cyclists was prevented, with detours in place.

Councillors and Council Officers met with VicRoads in mid-2016 about the potential of continuing the road closure on Station Street. While VicRoads noted that they had not observed any notable impact on the arterial road network with the closures in place, they did indicate they needed an assessment of the potential impacts in the area once traffic patterns returned to normal following the reopening of Scotchmer Street, Amess Street and Station Street.

3. Baseline Conditions

3.1 Carlton North Demographics

The North Carlton LATM Policy precinct (#2) is bound by Park Street to the north, Nicholson Street to the east, Princes Street to the south and Lygon Street to the west. Within this area, the below key demographics have been identified.

3.1.1 Population

According to data collected in 2015, Carlton North has a population of approximately 9,086 people. The area is highly accessible for tertiary institutions located in central Melbourne, with almost one in five residents studying at a university.

3.1.2 Land Use

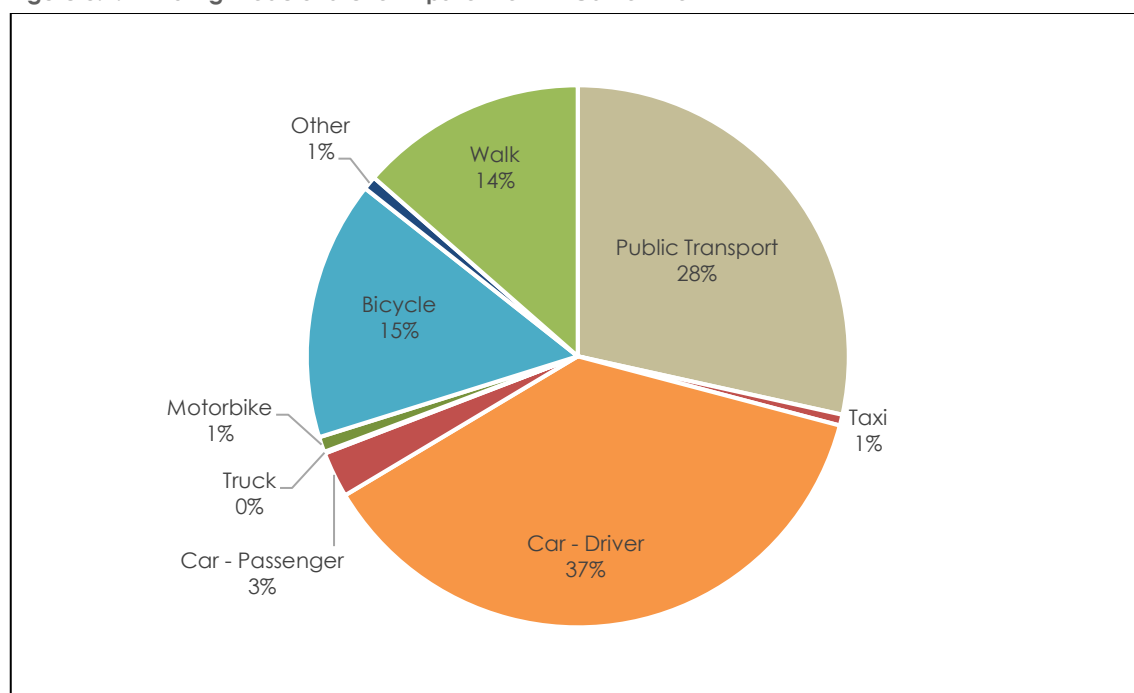
The area is predominantly residential; however, the following major non-residential land uses exist:

- Curtain Square, which is approx. 350m northwest of Station Street
- Carlton North Primary School, which is approx. 200m northwest of Station Street.

3.1.3 Mode Splits

Existing mode split data has been sourced from ABS 2011 Journey to Work Data, for residents of Carlton North. This data represents those who use one mode of transport only. Figure 3.1 shows that approximately 40% of those living in Carlton North drive their own car to get to work, almost 30% utilise public transport and 30% use some form of active travel (i.e. cycle or walk).

Figure 3.1: Existing Mode Share for Trips to Work in Carlton North



3.2 Road Network

3.2.1 Adjoining Roads

Station Street

Station Street functions as a local road in the Yarra Planning Scheme. It is a two-way road aligned in a north-south direction and configured with a two-lane, six-metre-wide carriageway set within a 20-metre-wide road reserve (approx.). Kerbside parking is permitted on both sides of the road, subject to time restrictions. There is an on-road bicycle lane in the northbound direction and a marked mixed traffic bicycle route in the southbound direction along Station Street.

Station Street carries approximately 1,000 vehicles per day¹.

Nicholson Street

Nicholson Street functions as a primary arterial road and is located within a Road Zone (Category 1) in the Yarra Planning Scheme. It is a two-way road aligned in a north-south direction and generally configured with a four-lane, 23-metre-wide carriageway set within a 31-metre-wide road reserve (approx.). Two tram lanes are located in the middle of the road. Some kerbside parking is permitted, subject to time restrictions. There are no bicycle lanes provided along Nicholson Street.

Nicholson Street carries approximately 10,000 vehicles per day.²

Canning Street

Station Street functions as a local road in the Yarra Planning Scheme. It is a two-way road aligned in a north-south direction and configured with a two-lane, 19-metre-wide carriageway set within a 29-metre-wide road reserve (approx.). Included within the carriageway are bicycle lanes in both directions, and an eight-metre-wide central median. Some kerbside parking is permitted, subject to time restrictions. Bicycles are catered for on Canning Street in on-road lanes in both directions.

Canning Street carries approximately 550 vehicles per day.¹

Rathdowne Street

Rathdowne Street functions as a collector road in the Yarra Planning Scheme. It is a two-way road aligned in a north-south direction and is generally configured with a three-lane, 20-metre-wide carriageway set within a 31-metre-wide road reserve (approx.). Included within the carriageway are bicycle lanes in both directions, and a three-meter-wide central median. Some kerbside parking is permitted, subject to time restrictions.

Rathdowne carries approximately 10,500 vehicles per day.¹

Lee Street

Lee Street functions as a local road in the Yarra Planning Scheme. It is a two-way road aligned in an east-west direction and configured with a two-lane, 14-metre-wide carriageway set within a 20-metre-wide road reserve (approx.). Included within the carriageway are bicycle lanes in both directions, and a three-metre-wide central median. Some kerbside parking is permitted, subject to time restrictions.

¹ Based on traffic counts undertaken by GTA between 8 September 2016 and 14 September 2016.

² Source: VicRoads Traffic Profiler

Lee Street carries approximately 800 vehicles per day.¹

Davis Street

Davis Street functions as a local road in the Yarra Planning Scheme. It is a two-way road aligned in an east-west direction and configured with a two-lane, 8-metre-wide carriageway set within a 20-metre-wide road reserve (approx.). Some kerbside parking is permitted, subject to time restrictions.

Davis Street carries approximately 700 vehicles per day.¹

Princes Street

Princes Street functions as a primary arterial road and is located within a Road Zone (Category 1) in the Yarra Planning Scheme. It is a two-way road aligned in an east-west direction and is generally configured with a 6-lane, 22-metre-wide carriageway set within a 30-metre-wide road reserve (approx.), including a central median. Some kerbside parking is permitted, subject to time restrictions.

Princes Street carries approximately 29,000 vehicles per day.²

3.2.2 Surrounding Intersections

Key intersections in the vicinity of the site include:

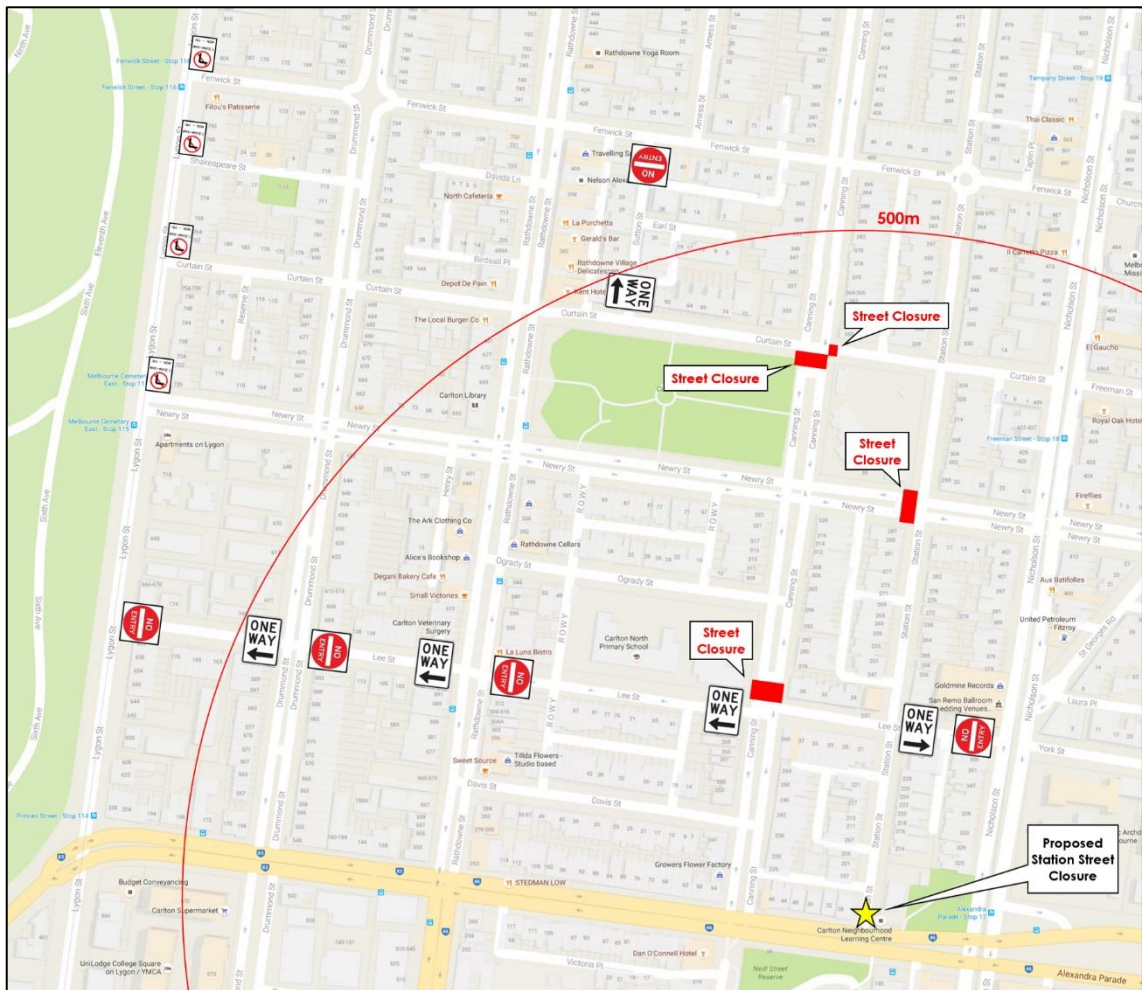
- Station Street / Princes Street (unsignalised T-intersection)
- Station Street / Lee Street (unsignalised X-intersection)
- Station Street / Newry Street (unsignalised X-intersection)
- Canning Street / Princes Street (signalised X-intersection)
- Canning Street / Davis Street (unsignalised T-intersection)
- Princes Street / Nicholson Street / Alexandra Parade (signalised X-intersection)
- Princes Street / Rathdowne Street (signalised X-intersection).

3.2.3 Existing Traffic Controls

A number of existing traffic controls and movement restrictions exist within the North Carlton area, proximate to Station Street. These include no entry, no right turn and various street closures.

These traffic controls within 500m of the proposed closure are shown in Figure 3.2.

Figure 3.2: Existing Traffic Controls



Base Map Source: Google Maps

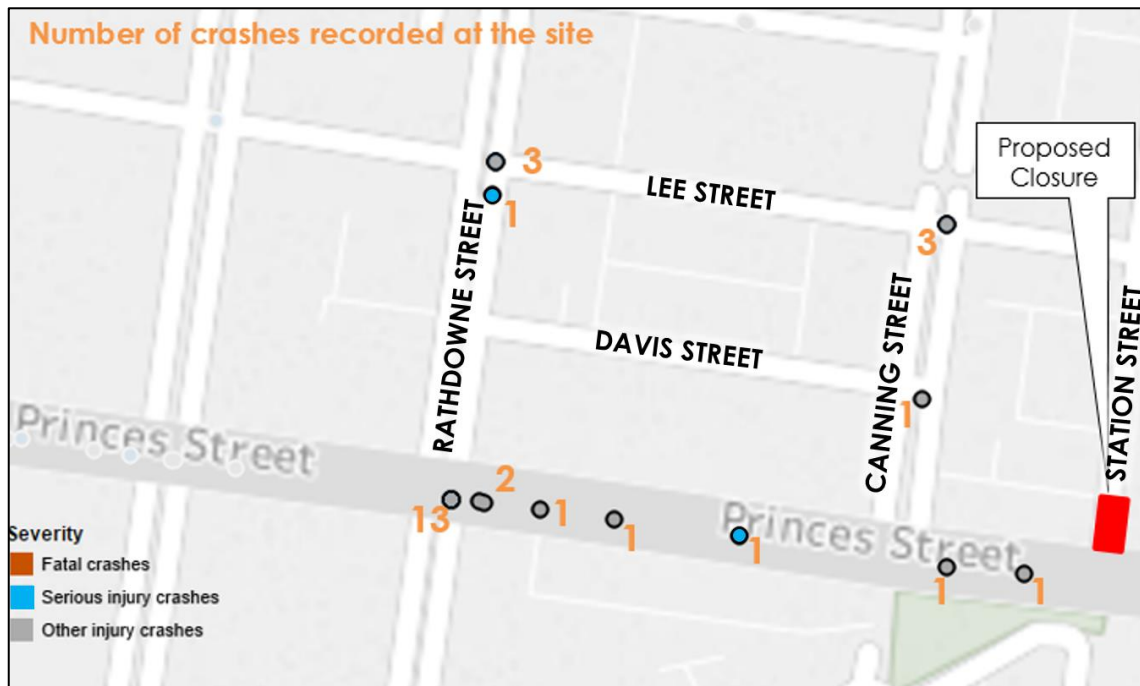
3.3 Crash Stats

A review of the reported casualty accident history for the roads and intersections adjoining the subject site has been sourced from VicRoads CrashStats accident database. This database records all accidents causing injury that have occurred in Victoria since 1987 (as recorded by Victorian Police) and categorises these accidents as follows:

- Fatal injury: at least one person was killed in the accident or died within 30 days as a result of the accident.
- Serious injury: at least one person was sent to hospital as a result of the accident.
- Other injury: at least one person required medical treatment as a result of the accident.

A summary of accidents in the vicinity of the proposed closure is shown in Figure 3.3.

Figure 3.3: Crash Stats in the Vicinity of the Site



A summary of the accidents shown in Figure 3.3 in the vicinity of the site for the last available five-year period is presented in Table 3.1.

Table 3.1: Casualty Accident History

Location	Accident No.		
	Fatality crashes	Serious Injury crashes	Other Injury crashes
Roads in Vicinity of the Site			
Station Street	0	0	0
Canning Street	0	1	3
Rathdowne Street	0	3	1
Nearby Intersections			
Princes Street / Station Street	0	0	0
Princes Street / Canning Street	0	0	1
Princes Street / Rathdowne Street	0	0	13

Source: VicRoads

Figure 3.3 and Table 3.1 indicates that no injuries have been recorded as a result of vehicles travelling along and turning out of Station Street on Princes Street (noting the temporary closure for sewer works).

Moreover, the following accidents have been recorded in the area, which could be further impacted by displaced traffic that currently uses Station Street to access Princes Street:

- There has been a total of 15 crashes at the Princes Street/Rathdowne Street, and one at the Princes Street/Canning Street intersection
- Along Rathdowne Street there have been a total four crashes recorded
- Along Canning Street there have been a total of four crashes, noting that the three at the Lee Street intersection all involving and resulting in injuries to cyclists (one serious).

Given the above there is no historic accident trend that exists with Station Street or its intersection with Princes Street.

of the PBN has been identified and elevated to a higher level of priority, mainly on the basis of potential for separation from motorised traffic, making these routes more attractive to less experienced bike riders. These cycling corridors are referred to as Bicycle Priority Routes (BPRs) and form part of the modal priorities for the road network set out in the VicRoads SmartRoads Network Operating Plans for each municipality (as shown in Figure 2.1 for the study area).

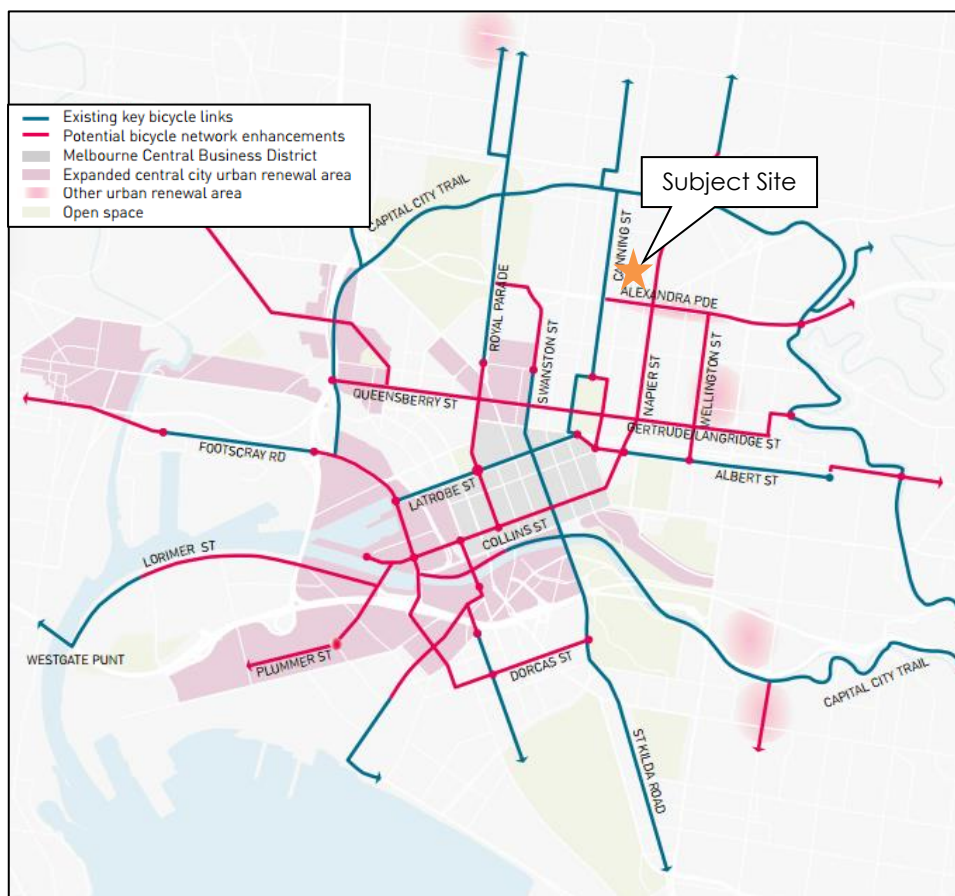
Proximate to Station Street, the following BPR's are indicated in Figure 2.1:

- Canning Street
- Rathdowne Street.

It is noted that the type of bicycle facility (i.e. on or off-road and separated or shared) has not been indicated as part of the PBN and BPRs. Rather, the PBN and BPRs show the proposed cycling network. The associated facilities should be delivered in accordance with the relevant standards and guidelines, such as the Australian Standards, Austroads Guides and VicRoads' Cycle Notes.

In addition, Strategic Cycle Corridors (SCC) form another subset of the PBN, and represent an initiative outlined in Plan Melbourne to support walking and cycling in Central Melbourne. SCCs are intended to be corridors designed to provide high quality bicycle infrastructure to, and around, major activity areas in metropolitan Melbourne. The SCC's are shown in Figure 3.5³.

Figure 3.5: Strategic Cycle Corridors



Source: Plan Melbourne

³ Further information regarding the PBN and BPRs is available at <https://www.vicroads.vic.gov.au/traffic-and-road-use/cycling/bicycle-network-planning>

Figure 3.5 indicates that Canning Street and Princes Street form part of the proposed SCC network.

It is also noted that the southbound bicycle lane on Canning Street between Lee Street and Princes Street has recently been relocated from being between the traffic and parking lanes, to the right-hand side of the traffic lane, up against the central median.

This arrangement has been implemented given the following benefits:

- Better connects with the signalised crossing facilities of Princes Street
- Locates cyclists away from the car door opening area of the kerbside parking lane
- Removes the conflict point between left-turning vehicles from Lee Street into Canning Street, and left-turning vehicles from Station Street into Princes Street.

While the above benefits have been achieved, this arrangement places cyclists on the right-hand side of traffic, which is not where motorists expect cyclists to be. This could potentially result in motorists that are turning right-in and out of Davis Street from Station Street to not be looking where the southbound cyclists are coming from.

However, this potential conflict issue is not considered significant given the signage and linemarking that is in place, especially the green bicycle lane pavement markings across the central medial break. To further improve the level of safety at this location, consideration could be given to raising the bicycle lane, even if only 50mm or similar (i.e. not kerb high) to further raise the awareness and slow down approaching motorists.

4. Data Collection & Analysis

4.1 Overview

A range of targeted site observations, surveys and analysis has been undertaken to understand how users currently access and travel through the area. The associated information has been used to inform what impacts and / or benefits the closure of Station Street will have in the area.

4.2 Site Observations

Site observations were undertaken on Tuesday 13 September 2016, which was at the same time as the majority of the survey data was collected. This was in an effort to verify the survey data, but also provide greater context and understanding of user behaviour in the area.

A summary of the key site observations during the AM and PM peak periods are set out below.

4.2.1 Princes Street / Station Street

On-site surveys of the Princes Street / Station Street intersection were undertaken during the peak periods to understand what proportion of vehicles exiting Station Street cross the adjacent three eastbound traffic lanes to access the right-turn lane and travel south on Nicholson Street. Concerns have been raised about this movement and that the potential closure of Station Street would eliminate this movement from occurring.

It is noted that should Station Street be closed that those currently completing this movement would most likely go to Canning Street instead. While they would still need to cross three traffic lanes to access the right-turn lane, they would be able to do it over a longer distance, so is likely to have some safety improvements.

However, it is noted that there are many other examples in the area where local roads intersect major roads, such as Drummond Street, Rae Street and Gore Street to the east and west along Princes Street and Alexander Parade, and they seem to genially operate satisfactorily.

Also, the intersection of Canning Street and Princes Street is a partially signalised intersection, with a dedicated bicycle lane on the right-hand side of the road. Vehicles making the left-hand turn movement from Canning Street to Princes Street are restricted by a left turn arrow. The arrow is red during the majority of the pedestrian and cyclist crossing phases, to separate vehicle and pedestrian movements, but does drop out before the end of pedestrian and cyclist crossing phases to provide opportunity for vehicles to exit Canning Street before traffic along Princes Street get the green phase.

From these on-site surveys the vehicles turning left out of Station Street did the following:

- In the AM period (7:45-8:15am), 48 vehicles turned left out of Station Street, with three (6%) vehicles moving to the right hand lane to turn right onto Nicholson Street.
- In the PM period (5:00-5:30pm), 6 vehicles turned left out of Station Street, with one (16%) vehicle moving to the right hand lane to turn right onto Nicholson Street.

These observations indicate that a very low proportion of vehicles in both peaks make this movement. However, it was also observed to be very difficult to complete this movement due to there being an almost continuous traffic stream and/or vehicles queued in the lanes they

needed to cross and finally enter. In fact, vehicles trying to complete this manoeuvre generally have to rely on other motorists to let them in.

As such, this movement was observed to occur at low speeds, which means the potential severity of any crash would be minor. However, those making these movements likely cause other motorists to become frustrated with them, such as those waiting to get out of Station Street.

4.2.2 Queuing

From our on-site observations in the peak periods, the following locations was observed.

- Vehicles turning out of Station Street onto Princes Street formed a queue in the morning of up to 35m (up to six cars), due to the limited opportunities to enter the Princes Street traffic lanes.
- Queuing on Rathdowne Street was observed to queue back from Princes Street to Curtain Square (i.e. approx. 350m) during the AM peak period. This queue typically did not clear each cycle, as the amount of green time given to the northern approach was fairly limited, but also due to there only being one approach lane serving the associated traffic volume. This issue was not observed in the PM peak period, including with the southern approach to Princes Street, which accommodates more vehicles.
- Canning Street experienced minimal queuing, with the maximum queue observed containing two vehicles.

4.2.3 Key Trip Attractors

The land uses surrounding the site are largely residential, with some exceptions, including the Carlton Neighbourhood Learning Centre (20 Princes St), local shops, restaurants and gyms.

The most significant nearby attraction is the Carlton North Primary School (60 Lee St). The school has approximately 275 pupils, between the years of Prep and Year 7. This site generates substantial traffic, particularly during morning and afternoon school peak periods when students are being picked-up and dropped-off.

Working with the schools to understand how the pick-off / drop-off arrangements and demands can be better managed is likely something already being undertaken, but if material changes can be achieved, it would likely result in significant congestion and amenity improvements in the area. Such activities are being completed around Australia, with one of the leading school travel plan guides / tool kits being available through the following link:

http://www.darwin.nt.gov.au/sites/default/files/Active_Schools_Toolkit_web.pdf

4.3 Data Collection

The following data was collected by GTA in order to assess the operation of the site and surrounding area:

- i Weekday AM and PM (Tuesday 13 September) peak period movement counts (all modes) at the following intersections:
 - Station Street / Princes Street
 - Station Street / Lee Street
 - Station Street / Newry Street
 - Canning Street / Princes Street
 - Canning Street / Davis Street.

- ii Weekend midday (Saturday 10 September) and weekday AM and PM (Tuesday 13 September) peak period movement counts (all modes) at the Canning Street / Lee Street intersection.
- iii Obtain a typical weeks' worth of SCATS⁴ data (from Friday 9 September until Thursday 15 September) and the operational sheets for the following signalised intersections:
 - Princes Street / Nicholson Street / Alexandra Parade
 - Princes Street / Canning Street
 - Princes Street / Rathdowne Street.
- iv Peak period sample surveys of the above signalised intersections to identify the following:
 - turning splits from lanes that support more than one turning movement
 - queue lengths for each turning movement.
- v Undertake tube counts for a 7-day period (from Friday 9 September until Thursday 15 September) at 17 locations.
- vi Numberplate surveys at 10 locations, to identify the access routes of those currently utilising Station Street during a typical weekday AM period (Tuesday 13 September).

4.4 Data Analysis

4.4.1 Intersection Summaries

GTA Consultants undertook traffic movement counts at the intersections listed above on Tuesday 13 September 2016.

The AM (8:00am-9:00am) and PM (5:00pm-6:00pm) peak hour traffic volumes are shown in Figure 4.1 and Figure 4.2, respectively.

⁴ Sydney Coordinated Adaptive Traffic System (SCATS) is a sophisticated and dynamic intelligent transport system used for day to day monitoring and operation. It provides traffic signal coordination that improves both traffic flow and safety for all road users.

Figure 4.1: Existing AM Peak Hour Traffic Volumes (8:00am-9:00am)

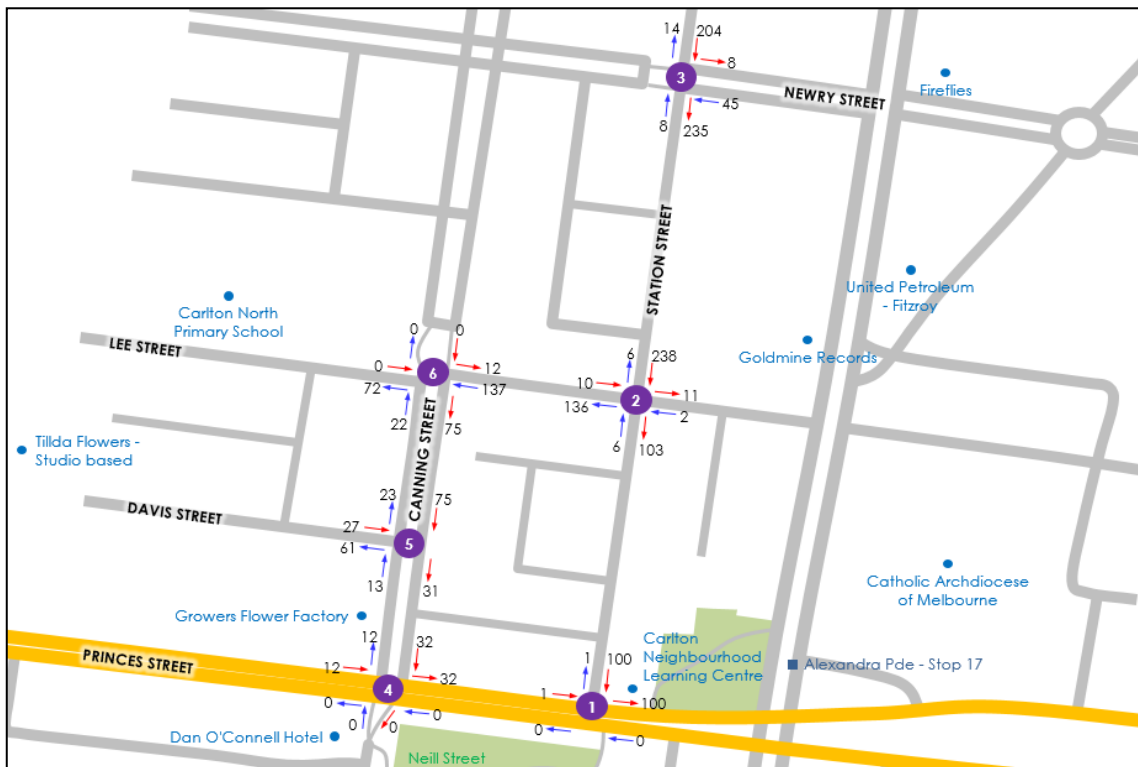


Figure 4.2: Existing PM Peak Hour Traffic Volumes (5:00pm-6:00pm)

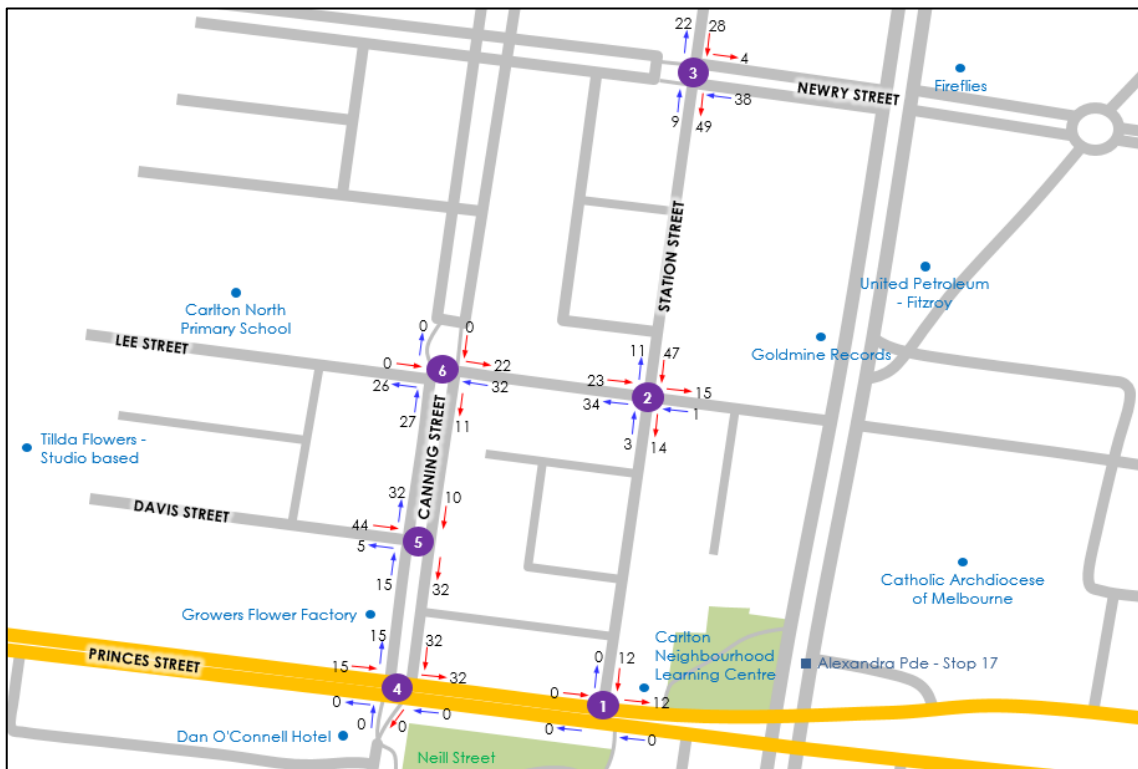


Figure 4.1 and Figure 4.2 indicates that along and proximate to Station Street the following key movements currently occur:

- In the AM peak period the main route through the local road network is via Station Street, Lee Street, Canning Street and Davis Street.
- In the AM peak 100 vehicles access Princes Street via Station Street, and only 32 vehicles access Princes Street via Canning Street.
- In the PM peak period the volumes within the local road network are quite low, with the highest movement being 42 vehicles travelling out of Davis Street onto Canning Street, of which approximately half turn left and the other half right towards Princes Street.
- In the PM peak 12 vehicles access Princes Street via Station Street, and again 32 vehicles access Princes Street via Canning Street.

4.4.2 Canning Street Bicycle Data

Super Tuesday

Data undertaken during the Super Tuesday Cycle Count (undertaken on 1 March 2015 from 7:00am-9:00am and 3 March 2016 from 7:00am-9:00am) indicates that there has been a 15% increase in cyclist traffic at the Canning Street/Princes Street intersection in the last year. Further, these counts have shown that Canning Street has the third highest on-road cyclist volumes travelling into the CBD (after St Kilda Road and Royal Parade).

Table 4.1: Super Tuesday Cycle Count Data (7:00am to 9:00am)

Intersection	2015 Volume	2016 Volume	Change	% Difference
Canning St/Princes Street (all directions)	1,054	1,215	+161	+15%

GTA Cycle Counts

GTA conducted counts of the Canning Street / Princes Street intersection in the AM (8-9) and PM (5-6) peak. A summary of the peak hour results is provided as follows:

- AM Volumes:
 - Southbound - 299 (i.e. toward the city)
 - Northbound - 22 (i.e. away from city)
- PM Volumes:
 - Southbound - 11 (i.e. toward the city)
 - Northbound - 223 (i.e. away from city)

4.4.3 Pneumatic Tube Counts

Pneumatic tubes were installed in a number of locations in the nearby area to determine the existing traffic flows through the road network over the course of the week starting Friday 9 September until Thursday 15 September.

During that week, the day during which the network accommodated the highest traffic demand was on Thursday, and the traffic conditions recorded on this day are summarised in Table 4.2.

Table 4.2: Existing Traffic Flows

Location	AM Peak (8:00-9:00)	PM Peak (3:00-4:00)	PM Peak (5:00-6:00)	Daily Total	85th %ile Speed
Pidgon Street between Drummond Street and Rathdowne Street	509	550	632	6,411	39.7
Rathdowne Street south of Pidgon Street	512	645	829	8,461	41.4
Richardson Street between Drummond Street and Rathdowne Street	181	146	173	1,828	27.6
Drummond Street between Richardson Street and Macpherson Street	255	57	67	1,123	39.9
Fenwick Street between Drummond Street and Rathdowne Street	97	33	36	626	36.1
Drummond Street between Newry Street and Lee Street	368	64	66	1,336	39.1
Rathdowne Street between Newry Street and Ogrady Street	574	931	1,148	12,506	40.7
Davis Street between ROWY and Canning Street	92	69	54	719	45.0
Canning Street between Princess Street and Davis Street	46	45	53	548	35.2
Station Street near #207	93	27	22	452	30.6
Lee Street between Station Street and Canning Street	131	55	52	799	34.8
Station Street near #258	208	60	65	1,028	37.5
Rae Street between Alexandra Parade and York Street	238	110	111	1,649	38.9
Fenwick Street between Station Street and Canning Street	90	80	87	1,115	37.7
Richardson Street between Station Street and Canning Street	358	292	334	3,691	37.7
Pidgon Street between Station Street and Canning Street	449	429	446	5,202	37.0

Table 4.2 indicates that the local roads in the area all generally operate as per their classification within the road network, as indicated through the traffic volume ranges and target speeds for each road type set out in Table C1 of Clause 56.06 of the Yarra Planning Scheme. The only roads that do not strictly comply with Table C1 of Clause 56.06 of the Yarra Planning Scheme are Rathdowne Street and Richardson Street, which exceed the upper daily traffic volume ranges of 7,000 and 3,000 vehicles per day, but significantly and only over specific blocks, which is common within built up areas like Carlton North.

While the Thursday was identified to accommodate the highest traffic volumes, the majority of the survey activities occurred on Tuesday 13 September, which based on the pneumatic tube counts accommodated traffic volumes that were 6% less than what was recorded on the Thursday, which is not considered to be material on the overall operation of the road network.

As such, and for comparison purposes, further detail relating to the AM and PM peak period results from the pneumatic tube counts are discussed based on what was recorded on the Tuesday below.

Morning Peak

Figure 4.3 shows the morning peak for vehicles travelling in the wider North Carlton neighbourhood that may be affected by the proposed closure of Station Street.

The map shows a grid of streets with bus routes and passenger numbers. The streets are labeled as follows:

- Vertical Streets (from left to right):** Drummond Street, Rathdowne Street, Amess Street, Canning Street, Station Street, Rae Street.
- Horizontal Streets (from top to bottom):**
 - Pidgon Street
 - Richardson Street
 - Macpherson Street
 - Fenwick Street
 - Curtain Street
 - Newry Street
 - Ogrady Street
 - Lee Street
 - York Street
 - Princes Street

Bus routes are indicated by red arrows with numbers:

- Drummond Street:**
 - Up: 25
 - Down: 25
 - Between Richardson and Macpherson: 31 (up), 224 (down)
 - Between Fenwick and Newry: 23 (up), 74 (down)
 - Between Newry and Lee: 21 (up), 346 (down)
- Rathdowne Street:**
 - Between Pidgon and Richardson: 144 (up), 368 (down)
 - Between Fenwick and Newry: 209 (up), 365 (down)
 - Between Lee and Princes: 0 (up), 52 (down), 29 (down), 63 (down)
- Amess Street:**
 - Between Richardson and Macpherson: 86 (up), 95 (down)
- Canning Street:**
 - Between Pidgon and Richardson: 219 (up), 229 (down)
 - Between Fenwick and Newry: 56 (up), 34 (down)
 - Between Lee and Princes: 12 (up), 119 (down)
 - Between Princes and York: 10 (up), 83 (down)
- Station Street:**
 - Between Richardson and Macpherson: 135 (up), 223 (down)
- Rae Street:**
 - Between Lee and Princes: 14 (up), 224 (down)

One-way traffic directions are indicated by black arrows:

- Drummond Street:** One-way down.
- Rathdowne Street:** One-way up.
- Amess Street:** One-way down.
- Canning Street:** One-way up.
- Station Street:** One-way up.
- Rae Street:** One-way up.

- Most (58%) vehicles that use Station Street north of Lee Street do not continue along Station Street between Lee Street and Princes Street
- Station Street is more utilised than Canning Street for vehicles wishing to travel eastbound onto Princes Street, with 99 vehicles exiting Station Street and 41 exiting Canning Street
- Station Street carries far fewer vehicles (198) than Rathdowne Street (365) or Drummond Street (346) between Lee Street and Newry Street.
- Vehicles travelling along Station Street north of Lee Street exiting the neighbourhood to the west are using Lee Street or Davis Street.

In order to ensure that the peak traffic was recorded correctly, two afternoon peaks have been reported as follows to enable consideration of both the PM peak associated with the Carlton North Primary School and typical commuter peak period:

- 

Figure 4.4: School PM Peak, Tuesday 13 September – 3:00pm-4:00pm

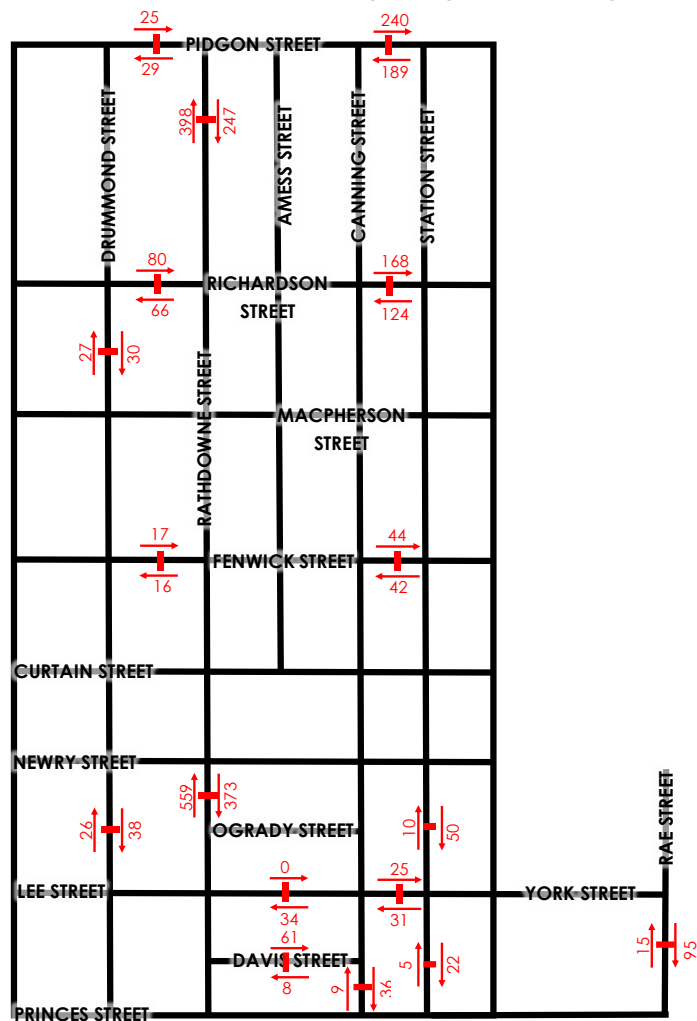


Figure 4.4 indicates the school PM peak occurs from 3:00pm to 4:00pm. During this time, the following has been identified from the recorded traffic:

- Station Street is less utilised than any of the surrounding streets for southbound movements
- Majority of vehicles travelling southbound along Station Street turn right into Lee Street rather than continuing along Station Street to Princes Street.

Figure 4.5: Commuter PM Peak, Tuesday 13 September – 5:00pm-6:00pm

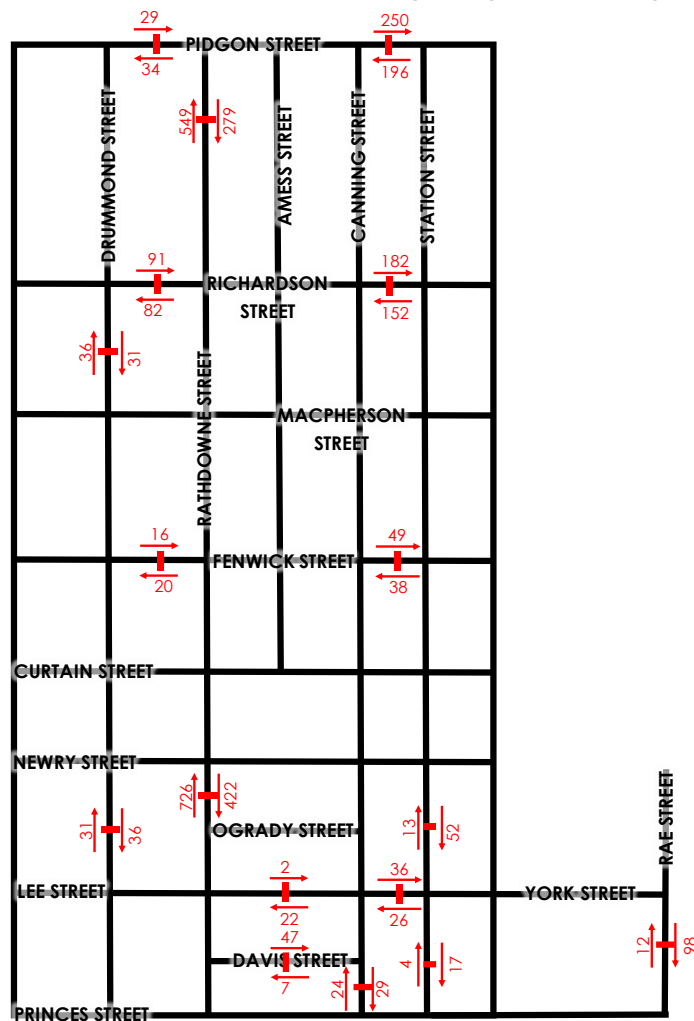


Figure 4.5 indicates the commuter PM peak occurs from 5:00pm to 6:00pm. During this time, the following has been identified from the recorded traffic:

- The commuter PM peak accommodates higher traffic volumes than the PM school peak.
- Local traffic movement patterns are generally the same in the commuter PM peak as the PM school peak.

It is noted that there are some minor discrepancies between the pneumatic tube counts and the intersection turning movement counts. These are largely explained due to the differences in the locations the associated surveys occurred (i.e. the pneumatic tube counts don't occur at the intersections), and that there are traffic activities occurring between them.

4.4.4 Origin – Destination Data

In order to determine the routes motorists utilise in accessing the Station Street / Princes Street intersection, origin destination data was collected for vehicles passing a number of checkpoints in the nearby local road network.

These surveys were completed on Tuesday 13 September 2016, between 7:30 and 9:30am, considered to be the peak time for vehicles to be accessing the network.

Sites that origin destination data has been collected are marked in blue and purple in Figure 4.6. The red numbers adjacent to each site show the number of trips that have originated from the said site and are recorded going through the Station Street / Princes Street intersection (total number is indicated in red next to the Station Street / Princes Street intersection).

Figure 4.6: Origin and Destination of Vehicles using Station Street



Figure 4.6 indicates the following in terms of the origin and destination of vehicles in the AM peak hour that used Station Street to access Princes Street:

- A total of 24 vehicles originated from one of the other nine sites
- No vehicles from Lee Street used Station Street to access Princes Street
- 14 vehicles originated from outside the North Carlton neighbourhood
- The remaining 10 vehicles that were only detected at Site #8 (Station Street / Newry Street intersection) are considered to originate from within the local neighbourhood.

4.4.5 Traffic Volume Comparisons

In order to confirm whether the traffic data collected in September 2016 was representative of typical conditions the following has been identified:

- Surveys occurred on a typical weekday, noting that it was during the school term and no public holidays occurred across the associated week
- SCATS data of the signalised intersections along Princes Street for a number of days throughout the year has found that the volumes recorded along Princes Street on Tuesday 13 September 2016 was around 85% of the peak volumes identified.
- A comparison between traffic volumes recorded in 2009 on a number of the local roads to those in September 2016 are presented in Table 4.3 and show they are generally similar, except along Station Street (between Princes Street and Lee Street), where volumes have decreased significantly.

Table 4.3: Data Comparison 2009 and 2016

Location (2009)	Daily Volume (2009)	Comparative Location (2016)	Daily Volume (2016)
Canning Street between Davis Street and Lee Street	559	Canning Street between Princess Street and Davis Street	620
Davis Street between Rathdowne Street and Canning Street	759	Davis Street between Rathdowne Street and Canning Street	719
Lee Street between Station Street and Canning Street	921	Lee Street between Station Street and Canning Street	854
Lee Street between Rathdowne Street and Canning Street	432	Lee Street between Rathdowne Street and Canning Street	391
Station Street between Lee Street and Newry Street	1,019	Station Street near #258	1,028
Station Street between Princes Street and Lee Street	747	Station Street near #207	473

It is also noted that since 2009 and 2016 there has not been any significant developments accommodated proximate to Station Street, except for general increased residential dwelling densities, which are gradual in this area. This is reflected in the traffic volume comparisons in Table 4.3, where the traffic volumes in 2009 are similar to those in 2016.

4.5 Station Street Traffic Generation

Only 24 of the 100 vehicles that use Station Street to access Princes Street in the AM peak hour come from a location to the north of Newry Street. This occurs even though the traffic volumes at each intersection along Station Street between Newry Street and Princes Street seem to be fairly balanced, i.e. the number of movements at each intersection are generally the same.

However, the other 76 vehicles are believed to be generated from the mostly residential dwellings accessed from the rear laneways that intersect Station Street and the many on-street car spaces along Station Street. In essence, there are vehicles starting and finishing their trips within each block, as well as some turning around, such as those accessing the Carlton Neighbourhood Learning Centre.

This can be seen through Figure 4.7, which shows on an aerial photograph the following being accommodated in the associated area that generates these vehicles movements:

- in the order of 100 kerbside car parking spaces
- in the order of 200 dwellings accessed from connecting rear laneways.

Figure 4.7: Map of Where 76 Vehicles Exiting Station Street is Generated From



Given the level of development and public on-street car parking that exists in the area identified in Figure 4.7, it is considered reasonable that some 76 vehicle movements could be generated along Station Street that want to access Princes Street at its southern end, as well as various other vehicles finishing their trips in this area of turning around after a short stop, such as the Carlton Neighbourhood Learning Centre.

5. Traffic Impact

5.1 Intersection Modelling

Intersection modelling has been undertaken using SIDRA Intersection 7⁵, in order to understand how the following intersections currently operate, and how they might in the future should Station Street be closed.

- Nicholson Street / Princes Street signalised intersection
- Canning Street / Princes Street give-way controlled T-intersection
- Rathdowne Street / Princes Street signalised intersection.

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections, a DOS of around 0.95 has been typically considered the 'ideal' limit, and for non-signalised intersections a DOS of 0.90 has been typically considered the 'ideal' limit⁶, beyond which queues and delays increase disproportionately.

5.1.1 Existing Conditions

Table 5.1 presents a summary of the existing operation of the three intersections, with full results presented in Appendix A of this report.

Table 5.1: Existing Operating Conditions

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Princes Street and Rathdowne Street				
AM	Rathdowne Street (South)	0.764	66 sec	60.2 m
	Princes Street (East)	0.789	25 sec	344.6 m
	Rathdowne Street (North)	0.562	57 sec	107.0 m
	Princes Street (West)	# 0.791	27 sec	180.1 m
PM	Rathdowne Street (South)	0.796	44 sec	259.7 m
	Princes Street (East)	# 0.798	36 sec	309.9 m
	Rathdowne Street (North)	0.527	66 sec	71.3 m
	Princes Street (West)	0.789	37 sec	296.1 m

⁵ SIDRA is used for intersection and network capacity, level of service and performance analysis. Program used under license from Akcelik & Associates Pty Ltd.

⁶ SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Princes Street and Canning Street				
AM	Canning Street (North)	0.023	7 sec	3.6 m
	Princes Street (West)	0.436	6 sec	108.0 m
PM	Canning Street (North)	0.023	7 sec	3.6 m
	Princes Street (West)	# 0.568	7 sec	167.4 m
Princes Street, Nicholson Street and Alexandra Parade				
AM	Nicholson Street (South)	# 0.802	64 sec	73.0 m
	Alexandra Parade (East)	0.754	29 sec	341.1 m
	Nicholson Street (North)	0.792	64 sec	172.7 m
	Princes Street (West)	0.681	27 sec	274.8 m
PM	Nicholson Street (South)	0.872	63 sec	284.0 m
	Alexandra Parade (East)	0.796	36 sec	293.7 m
	Nicholson Street (North)	0.677	60 sec	132.4 m
	Princes Street (West)	# 1.019	130 sec	708.5 m

DOS – Degree of Saturation, # – Intersection DOS

Table 5.1 indicates that the above intersections currently operates well with minimal queues and delays on all approaches, except for the Princes Street / Nicholson Street / Alexandra Parade intersection in the PM peak, whereby the western leg is at capacity during this period.

It is also noted that the existing conditions SIDRA Model in the AM for the Rathdowne Street / Princes Street intersection and Canning Street / Princes Street intersection indicates queue lengths on the north approaches that are less than what was observed on-site. This is due to the SIDRA Models considering the associated intersections in isolation. In reality they are impacted by constraints and queuing that occurs at adjacent intersections.

While these intersections have not been calibrated to try and reflect the queue lengths observed, the following should be noted and applied to the post-development models to better reflect what the actual queuing will be:

- Rathdowne Street / Princes Street intersection: North approach queue was 107m in the SIDRA Model but 350m observed due to congestion along Rathdowne Street to the south.
- Canning Street / Princes Street intersection: North approach queue was 4m in the SIDRA Model but 14m observed due to queuing back from Nicholson Street on Princes Street.

5.1.2 Post Road Closure

With the closure of Station Street, it is not clear exactly how motorists that currently use it to access Princes Street will change their behaviour. However, for assessment purposes the following two scenarios have been tested:

- **Scenario 1:** Closure of Station Street, with traffic redistributed throughout the local road network (i.e. Canning Street, Lee Street and Davis Street) in the same proportions as currently exhibited.
- **Scenario 2:** Closure of Station Street, with all vehicles using the Station Street / Princes Street intersection assumed to now use the Canning Street / Princes Street intersection.

Moreover, it is acknowledged that only in the AM peak period will there be a significant change in traffic patterns in the local road network with the closure of Station Street.

As such, Table 5.2 and Table 5.3 show the additional volumes in the AM peak of the local road network for both Scenario 1 and Scenario 2, respectively.

Table 5.2: Scenario 1 – Additional Volumes

Street	Mid-Block Location	Direction	Existing	Future		% Change
				Additional	Total	
Davis Street	between Canning Street and Rathdowne Street	Eastbound	27	41	68	152%
		Westbound	61	-	61	-
Lee Street	between Canning Street and Rathdowne Street	Westbound	72	47	119	65%
		Eastbound	9	-	9	-
	between Station and Canning Street	Westbound	136	101	237	74%
Canning Street	between Princes Street and Davis Street	Northbound	11	1	12	9%
		Southbound	29	11	40	38%
	between Davis Street and Lee Street	Northbound	10	2	12	20%
		Southbound	75	54	129	72%
Station Street	between Lee Street and Newry Street	Northbound	235	-	235	-
		Southbound	8	-	8	-

Table 5.2 shows that by using the existing distribution throughout the local road network, in the AM peak, 47 vehicles continue westbound along Lee Street, while 54 travel southbound along Canning Street, with only 11 continuing to the Princes Street intersection. These numbers are low, with no more than one additional vehicle movement per minute on each of these roads to what they currently accommodate. As such, is not expected to have a material impact on their current operations.

Table 5.3: Scenario 2 – Additional Volumes

Street	Mid-Block Location	Direction	Existing	Future		% Change
				Additional	Total	
Davis Street	between Canning Street and Rathdowne Street	Eastbound	27	-	27	-
		Westbound	61	-	61	-
Lee Street	between Canning Street and Rathdowne Street	Westbound	72	-	72	-
		Eastbound	9	-	9	-
	between Station and Canning Street	Westbound	136	101	237	74%
Canning Street	between Princes Street and Davis Street	Northbound	11	1	12	9%
		Southbound	29	101	130	348%
	between Davis Street and Lee Street	Northbound	10	-	10	-
		Southbound	75	101	176	135%
Station Street	between Lee Street and Newry Street	Northbound	235	-	235	-
		Southbound	8	-	8	-

Table 5.3 demonstrates that all 101 vehicles currently using Station Street will continue along Lee and Canning Street, to exit at Princes Street.

Furthermore, based on only the Canning Street / Princes Street intersection of those been modelled will experience significant changes to their future operation.

As such, Table 5.4 presents a summary of the future operation of the Canning Street / Princes Street intersection under the above two scenarios, with full results of the intersection modelling provided in Appendix A of this report.

Table 5.4: Canning Street / Princes Street Intersection 8:00am-9:00am

Scenario	Approach	DOS	Average Delay (sec)	95 th Percentile Queue	
				veh	m
Scenario 1	Canning Street (North)	0.031	9 sec	0.7 veh	4.9 m
	Princes Street (West)	0.436	6 sec	15.4 veh	108.1 m
Scenario 2	Canning Street (North)	0.095	10 sec	2.3 veh	15.9 m
	Princes Street (West)	0.436	6 sec	15.4 veh	108.1 m

DOS – Degree of Saturation, # - Intersection DOS

Note: This model is based on an existing conditions model that has not been calibrated and is only appropriate for comparative purposes to understand the extent of changes that occur in the operation of the intersection.

Table 5.4 indicates the following with the future operation of the Canning Street / Princes Street intersection based on the above two scenarios with the closure of Station Street:

- **Scenario 1:** Based on traffic volumes generally changing based on the current distributions in the area, the intersection still operates well, but queuing along Canning Street increases from 3m to 5m. However, calibrating the results to reflect observed conditions indicates that the existing 14m (two vehicle) queue will increase to 21m (3 vehicles).
- **Scenario 2:** Based on all the traffic volumes from Station Street using Canning Street to access Princes Street, the intersection still operates well, but the queuing along Canning Street increases from 3m to 16m. Once these results have been calibrated, the existing 14m (two vehicle) queue will increase to 63m (9 vehicles).

5.2 Network Implications

Based on the access arrangements available with the local road network in this area and the existing traffic volumes that have been recorded, it is considered that the most likely of the two scenarios to occur with the closure of Station Street at Princes Street is Scenario 2. This is considered to be the case as you can only turn-left-out onto Princes Street, so these vehicles will be expected to continue to do this if forced to Canning Street instead of changing the direction they are travelling in a congested network, which is what is required based on Scenario 1.

On this basis, it is expected that queuing along Canning Street back from Princes Street will likely extend to Davis Street at times. This will in turn result in some of the 75 vehicles that turn right into Davis Street to be caught up in this queue, which will increase these users' delays.

In terms of the cyclists that currently use Canning Street, the increased southbound traffic volumes with the closure of Station Street is not considered to have a significant impact on them. However, it is considered to be safer that cars travelling along Canning Road in a southbound direction before turning right into Davis Street do so in free-flow conditions, because if queued they won't have as clear sight-lines of the approaching cyclists as drivers will need to look over their shoulders.

It is also noted that with increased left-turning volumes coming out of Canning Street that there is a potential for increased conflicts with pedestrians crossing Princes Street, as drivers will be looking to the west for a gap in the traffic stream, while the pedestrian crossing facility is on the left-hand side of Canning Street. It is noted that a left-turn red arrow is in place to help with this potential conflict, but is not held for the entire time pedestrians are crossing Princes Street.

Beyond this, there is not expected to be any significant impacts on the rest of the existing transport network (noting 14 vehicles use the local road network in this precinct), whether it is the road based public transport services / reliability, arterial road network or emergency vehicles access arrangements.

6. Conclusions & Recommendations

6.1 Summary of Conclusions

Based on the analysis and discussions presented within this report, the following conclusions have been made regarding the temporary closure of Station Street at Princes Street:

- The closure was previously suggested in a LATM Study in 2003 for Northern Carlton as a potential response to expected changes in local traffic movements.
- Station Street is a local road that, at its southern end, intersects with Princes Street, which is an arterial road managed by VicRoads, and based on their SmartRoads Policy is a Preferred Traffic Route
- Station Street carries approximately 1,000 vehicles per day, with 100 vehicles in the AM peak hour, 22 vehicles in the school PM peak hour and 12 vehicles in the commuter PM peak hour turn left-out and access Princes Street.
- There are no accidents that have been recorded along Station Street between and including Newry Street and Princes Street over the latest available five-year period, noting the Station Street / Princes Street intersection was closed over a 15 month period
- From on-site surveys the vehicles turning left out of Station Street did the following:
 - In the AM period (7:45-8:15am), 48 vehicles turned left out of Station Street, with three (6%) vehicles moving to the right hand lane to turn right onto Nicholson Street.
 - In the PM period (5:00-5:30pm), six vehicles turned left out of Station Street, with one (16%) vehicle moving to the right hand lane to turn right onto Nicholson Street.
- Of the 100 vehicles that turned out of Station Street in the AM peak hour, 24 vehicles were identified to have originated from a location north of Newry Street, with only 14 of these originated from outside the North Carlton neighbourhood, so the majority are considered to be local generated traffic.
- Should those that currently use Station Street to access Princes Street use Canning Street when it is closed, it is expected that queuing along Canning Street will occur, namely as queuing back from Princes Street will extend back past Davis Street at times and also prevent the 75 vehicles wanting to turn right into Davis Street.
- Potential safety impacts with pedestrians and cyclists as follows may occur with the additional traffic using Canning Street:
 - Queued vehicles waiting to turn right into Davis Street may not see the southbound cyclists as clearly as they would do in free flow conditions
 - When vehicles turn left out of Canning Street they are looking to the right, but the signalised crossing facility on Princes Street is on the left-hand side of Canning Street
- Broader impacts on the existing transport network are considered to be minimal with the closure of Station Street.

6.2 Recommendation

The analysis and discussions presented within this report has identified that there is not an existing issue with regard to the level of traffic and speed on Station Street for access to Princes Street. Those that currently use Station Street to access Princes Street have been found to mostly be generated by those that live on and proximate to Station Street (i.e. local trips).

However, there are a relatively small number of vehicles that cross the three through lanes to access the right-turn lane on Princes Street to travel southbound on Nicholson Street. While this is not ideal, and has some potential safety issues, there is no crash history and the manoeuvre occurs in a congested road environment, where vehicle speeds on Princes Street are low, at least in the peak commuter periods.

The analysis and on-site observations indicate that there is no existing significant queuing or delays in accessing Princes Street from Station Street or Canning Street. However, should Station Street be closed the majority of the traffic accessing Princes Street via Station Street will then use Canning Street, which is expected to see queues increase from 14m (two vehicle) to 63m (9 vehicles). With this increased queuing on Canning Street, it will at times extend back past Davis Street and also prevent the 75 vehicles wanting to turn right into Davis Street, which will increase delays for all these vehicles.

The increased queuing on Canning Street following the closure of Station Street could be mitigated through modified signal coordination on Princes Street, but would require VicRoads support and ongoing monitoring.

In summary, there is not considered to be an existing issue with the operation and use of Station Street. It has low speeds, volumes and crash history with the majority of users being local generated trips. However, there is a potential for increased congestion on Canning Street with the closure of Station Street due to the redistributed traffic volumes still wanting to access Princes Street. As such, the closure of Station Street at Princes Street is not considered to achieve any major benefits to the network, and has the potential to result in more congestion on Canning Street.

Appendix A

SIDRA Intersection 7 Outputs

MOVEMENT SUMMARY

 **Site: 4381 [Princes /Rathdowne AM 8-9]**

New Site

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rathdowne Street											
1	L2	63	0.0	0.098	40.5	LOS D	3.1	21.5	0.71	0.72	35.4
2	T1	139	0.0	0.334	53.7	LOS D	8.6	60.2	0.89	0.73	32.1
3	R2	197	0.0	0.764	83.3	LOS F	7.7	53.7	1.00	0.89	20.0
Approach		399	0.0	0.764	66.2	LOS E	8.6	60.2	0.92	0.81	26.2
East: Princes Street											
4	L2	133	0.0	0.789	31.8	LOS C	48.9	342.1	0.85	0.80	35.6
5	T1	2306	0.0	0.789	25.0	LOS C	49.2	344.6	0.81	0.75	37.5
6	R2	40	0.0	0.149	21.5	LOS C	1.1	7.5	0.67	0.71	39.0
Approach		2479	0.0	0.789	25.3	LOS C	49.2	344.6	0.81	0.75	37.4
North: Rathdowne Street											
7	L2	4	0.0	0.562	62.4	LOS E	15.3	107.0	0.95	0.80	25.2
8	T1	447	0.0	0.562	56.6	LOS E	15.3	107.0	0.94	0.79	31.3
9	R2	26	0.0	0.128	65.5	LOS E	1.7	11.8	0.90	0.72	28.7
Approach		478	0.0	0.562	57.1	LOS E	15.3	107.0	0.94	0.79	31.1
West: Princes Street											
10	L2	549	0.0	0.526	26.1	LOS C	24.8	173.4	0.66	0.79	41.3
11	T1	1194	0.0	0.526	20.6	LOS C	25.7	180.1	0.66	0.60	40.3
12	R2	185	0.0	0.791	66.6	LOS E	10.9	76.0	1.00	1.01	28.6
Approach		1928	0.0	0.791	26.6	LOS C	25.7	180.1	0.69	0.69	38.7
All Vehicles		5284	0.0	0.791	31.8	LOS C	49.2	344.6	0.79	0.74	35.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	21.4	LOS C	0.1	0.1	0.53	0.53	
P2	East Full Crossing	53	62.7	LOS F	0.2	0.2	0.92	0.92	
P3	North Full Crossing	53	4.8	LOS A	0.1	0.1	0.25	0.25	
P4	West Full Crossing	53	63.6	LOS F	0.2	0.2	0.92	0.92	
All Pedestrians		211	38.1	LOS D			0.66	0.66	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 4381 [Princes /Rathdowne PM 5-6]**

New Site

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rathdowne Street											
1	L2	156	0.0	0.188	31.9	LOS C	6.7	47.2	0.64	0.74	38.7
2	T1	569	0.0	0.796	45.6	LOS D	37.1	259.7	0.96	0.87	34.5
3	R2	581	0.0	0.686	45.7	LOS D	16.2	113.1	0.94	0.83	28.4
Approach		1306	0.0	0.796	44.0	LOS D	37.1	259.7	0.91	0.84	32.5
East: Princes Street											
4	L2	224	0.0	0.791	40.2	LOS D	43.9	307.5	0.91	0.85	31.5
5	T1	1603	0.0	0.791	34.2	LOS C	44.3	309.9	0.86	0.79	32.9
6	R2	153	0.0	0.798	51.0	LOS D	7.2	50.4	1.00	0.92	26.8
Approach		1980	0.0	0.798	36.2	LOS D	44.3	309.9	0.88	0.81	32.2
North: Rathdowne Street											
7	L2	46	0.0	0.527	70.1	LOS E	10.2	71.3	0.97	0.79	23.0
8	T1	246	0.0	0.527	64.4	LOS E	10.2	71.3	0.97	0.79	29.2
9	R2	29	0.0	0.258	75.0	LOS E	2.1	14.5	0.96	0.74	26.7
Approach		322	0.0	0.527	66.2	LOS E	10.2	71.3	0.97	0.79	28.1
West: Princes Street											
10	L2	25	0.0	0.789	43.1	LOS D	42.2	295.6	0.92	0.84	36.5
11	T1	1885	0.0	0.789	36.6	LOS D	42.3	296.1	0.90	0.81	32.1
12	R2	63	0.0	0.365	35.7	LOS D	2.3	16.2	0.89	0.75	37.6
Approach		1974	0.0	0.789	36.6	LOS D	42.3	296.1	0.90	0.81	32.4
All Vehicles		5582	0.0	0.798	39.9	LOS D	44.3	309.9	0.90	0.81	32.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	30.1	LOS D	0.1	0.1	0.63	0.63	
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
P3	North Full Crossing	53	12.6	LOS B	0.1	0.1	0.57	0.57	
P4	West Full Crossing	53	44.2	LOS E	0.2	0.2	0.77	0.77	
All Pedestrians		211	39.0	LOS D			0.73	0.73	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4415 [Princes Street/Canning Street AM - 8-9 - Existing]

Three-way intersection with "Seagull" treatment (Signals)

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Princes Street											
5	T1	2555	0.0	0.555	6.3	LOS A	22.9	160.6	0.41	0.38	45.8
Approach		2555	0.0	0.555	6.3	LOS A	22.9	160.6	0.41	0.38	45.8
North: Canning Street											
7	L2	34	0.0	0.023	7.0	LOS A	0.5	3.6	0.23	0.53	36.0
Approach		34	0.0	0.023	7.0	LOS A	0.5	3.6	0.23	0.53	36.0
West: Princes Street											
10	L2	13	0.0	0.436	11.0	LOS B	15.4	107.9	0.35	0.33	51.1
11	T1	1993	0.0	0.436	5.4	LOS A	15.4	108.0	0.35	0.33	47.3
Approach		2005	0.0	0.436	5.5	LOS A	15.4	108.0	0.35	0.33	47.4
All Vehicles		4594	0.0	0.555	6.0	LOS A	22.9	160.6	0.39	0.36	46.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
P3	North Full Crossing	53	5.9	LOS A	0.1	0.1	0.28	0.28	
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
All Pedestrians		158	48.1	LOS E			0.73	0.73	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4415 [Princes Street/Canning Street PM - 5-6 - Existing]

Three-way intersection with "Seagull" treatment (Signals)

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Princes Street											
5	T1	2006	0.0	0.436	5.4	LOS A	15.4	108.0	0.35	0.32	47.4
Approach		2006	0.0	0.436	5.4	LOS A	15.4	108.0	0.35	0.32	47.4
North: Canning Street											
7	L2	34	0.0	0.023	7.0	LOS A	0.5	3.6	0.23	0.53	36.0
Approach		34	0.0	0.023	7.0	LOS A	0.5	3.6	0.23	0.53	36.0
West: Princes Street											
10	L2	16	0.0	0.568	12.0	LOS B	23.9	167.2	0.42	0.40	50.0
11	T1	2598	0.0	0.568	6.5	LOS A	23.9	167.4	0.42	0.39	45.5
Approach		2614	0.0	0.568	6.5	LOS A	23.9	167.4	0.42	0.39	45.6
All Vehicles		4654	0.0	0.568	6.0	LOS A	23.9	167.4	0.39	0.36	46.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
P3	North Full Crossing	53	5.9	LOS A	0.1	0.1	0.28	0.28	
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
All Pedestrians		158	48.1	LOS E			0.73	0.73	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Existing AM Peak - Test - Updated Vols]

Alexandra Parade and Nicholson Street

Signals - Fixed Time Isolated Cycle Time = 160 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Nicholson Street (South Approach)											
1	L2	91	0.0	0.438	62.7	LOS E	10.2	72.1	0.90	0.77	29.8
2	T1	217	3.0	0.438	57.1	LOS E	10.2	72.1	0.90	0.75	30.9
3	R2	153	0.0	0.802	74.8	LOS E	10.4	72.5	1.00	0.99	26.9
Approach		460	1.4	0.802	64.1	LOS E	10.4	73.0	0.93	0.83	29.3
East: Alexandra Parade (East Approach)											
4	L2	553	0.0	0.487	22.0	LOS C	22.4	156.8	0.58	0.77	43.2
5	T1	2393	5.0	0.754	28.6	LOS C	46.7	341.1	0.83	0.77	40.9
6	R2	89	0.0	0.723	89.5	LOS F	7.3	51.0	1.00	0.84	24.3
Approach		3035	3.9	0.754	29.2	LOS C	46.7	341.1	0.79	0.77	40.5
North: Nicholson Street (North Approach)											
7	L2	135	0.0	0.792	69.4	LOS E	24.3	172.7	1.00	1.00	28.8
8	T1	461	3.0	0.792	64.3	LOS E	24.3	172.7	0.97	0.93	29.2
9	R2	100	0.0	0.403	57.4	LOS E	6.3	44.2	0.90	0.78	30.8
Approach		696	2.0	0.792	64.3	LOS E	24.3	172.7	0.97	0.92	29.3
West: Alexandra Parade (West Approach)											
10	L2	35	0.0	0.681	30.7	LOS C	22.9	166.4	0.68	0.62	41.5
11	T1	2047	5.0	0.681	26.8	LOS C	37.6	274.8	0.72	0.65	41.7
12	R2	35	0.0	0.281	36.4	LOS D	1.4	9.8	0.87	0.74	37.2
Approach		2117	4.8	0.681	27.0	LOS C	37.6	274.8	0.72	0.65	41.6
All Vehicles		6307	3.8	0.802	34.9	LOS C	46.7	341.1	0.80	0.75	38.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	21.6	LOS C	0.1	0.1	0.52	0.52	
P2	East Full Crossing	53	70.5	LOS F	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	24.8	LOS C	0.1	0.1	0.56	0.56	
P4	West Full Crossing	53	68.6	LOS F	0.2	0.2	0.93	0.93	
All Pedestrians		211	46.4	LOS E			0.74	0.74	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Existing PM Peak - Test - 5-6 - Updated Vols]

Alexandra Parade and Nicholson Street

Signals - Fixed Time Isolated Cycle Time = 160 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Nicholson Street (South Approach)											
1	L2	35	0.0	0.872	70.5	LOS E	39.6	284.0	1.00	0.97	28.8
2	T1	771	3.0	0.872	64.7	LOS E	39.6	284.0	0.96	0.94	29.3
3	R2	252	0.0	0.824	54.9	LOS D	16.0	112.3	0.94	0.89	31.5
Approach		1057	2.2	0.872	62.5	LOS E	39.6	284.0	0.96	0.93	29.8
East: Alexandra Parade (East Approach)											
4	L2	321	0.0	0.297	19.2	LOS B	10.8	75.9	0.52	0.73	44.7
5	T1	1897	5.0	0.736	37.5	LOS D	40.2	293.7	0.88	0.80	37.2
6	R2	120	0.0	0.796	58.6	LOS E	6.0	41.8	1.00	0.87	30.5
Approach		2338	4.1	0.796	36.1	LOS D	40.2	293.7	0.84	0.79	37.6
North: Nicholson Street (North Approach)											
7	L2	205	0.0	0.677	61.0	LOS E	18.7	132.4	0.94	1.00	30.4
8	T1	321	3.0	0.677	60.4	LOS E	18.7	132.4	0.95	0.87	30.0
9	R2	48	0.0	0.355	50.5	LOS D	2.6	18.3	0.97	0.74	32.7
Approach		575	1.7	0.677	59.8	LOS E	18.7	132.4	0.95	0.91	30.4
West: Alexandra Parade (West Approach)											
10	L2	56	0.0	1.019	156.4	LOS F	64.7	470.4	1.00	1.28	17.1
11	T1	2564	5.0	1.019	131.0	LOS F	97.1	708.5	1.00	1.27	19.1
12	R2	40	0.0	0.248	34.6	LOS C	1.5	10.6	0.85	0.74	37.9
Approach		2660	4.8	1.019	130.1	LOS F	97.1	708.5	1.00	1.27	19.2
All Vehicles		6629	3.9	1.019	80.1	LOS F	97.1	708.5	0.93	1.01	26.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	30.7	LOS D	0.1	0.1	0.62	0.62	
P2	East Full Crossing	53	74.3	LOS F	0.2	0.2	0.96	0.96	
P3	North Full Crossing	53	31.3	LOS D	0.1	0.1	0.63	0.63	
P4	West Full Crossing	53	57.1	LOS E	0.2	0.2	0.85	0.85	
All Pedestrians		211	48.3	LOS E			0.76	0.76	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4415 [Princes Street/Canning Street AM - 8-9 - Future - Scenario 1]

Three-way intersection with "Seagull" treatment (Signals)

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Princes Street											
5	T1	2555	0.0	0.555	6.3	LOS A	22.9	160.6	0.41	0.38	45.8
Approach		2555	0.0	0.555	6.3	LOS A	22.9	160.6	0.41	0.38	45.8
North: Canning Street											
7	L2	45	0.0	0.031	7.0	LOS A	0.7	4.9	0.23	0.53	36.0
Approach		45	0.0	0.031	7.0	LOS A	0.7	4.9	0.23	0.53	36.0
West: Princes Street											
10	L2	14	0.0	0.436	11.0	LOS B	15.4	108.0	0.35	0.33	51.1
11	T1	1993	0.0	0.436	5.4	LOS A	15.4	108.1	0.35	0.33	47.3
Approach		2006	0.0	0.436	5.5	LOS A	15.4	108.1	0.35	0.33	47.4
All Vehicles		4606	0.0	0.555	6.0	LOS A	22.9	160.6	0.38	0.36	46.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
P3	North Full Crossing	53	5.9	LOS A	0.1	0.1	0.28	0.28	
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
All Pedestrians		158	48.1	LOS E			0.73	0.73	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4415 [Princes Street/Canning Street AM - 8-9 - Future - Scenario 2]

Three-way intersection with "Seagull" treatment (Signals)

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Princes Street											
5	T1	2555	0.0	0.555	6.3	LOS A	22.9	160.6	0.41	0.38	45.8
Approach		2555	0.0	0.555	6.3	LOS A	22.9	160.6	0.41	0.38	45.8
North: Canning Street											
7	L2	139	0.0	0.095	7.2	LOS A	2.3	15.9	0.25	0.55	35.9
Approach		139	0.0	0.095	7.2	LOS A	2.3	15.9	0.25	0.55	35.9
West: Princes Street											
10	L2	14	0.0	0.436	11.0	LOS B	15.4	108.0	0.35	0.33	51.1
11	T1	1993	0.0	0.436	5.4	LOS A	15.4	108.1	0.35	0.33	47.3
Approach		2006	0.0	0.436	5.5	LOS A	15.4	108.1	0.35	0.33	47.4
All Vehicles		4700	0.0	0.555	6.0	LOS A	22.9	160.6	0.38	0.36	45.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
P3	North Full Crossing	53	5.9	LOS A	0.1	0.1	0.28	0.28	
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96	
All Pedestrians		158	48.1	LOS E			0.73	0.73	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Section 3: Community consultation and resident feedback

3. Community feedback

3.1 Community consultation exercise (February / March 2016)

Initial community consultation was undertaken in February and March 2016 to provide an understanding of the level of support for a temporary closure of Station Street (refer to Figure 1 for consultation area).

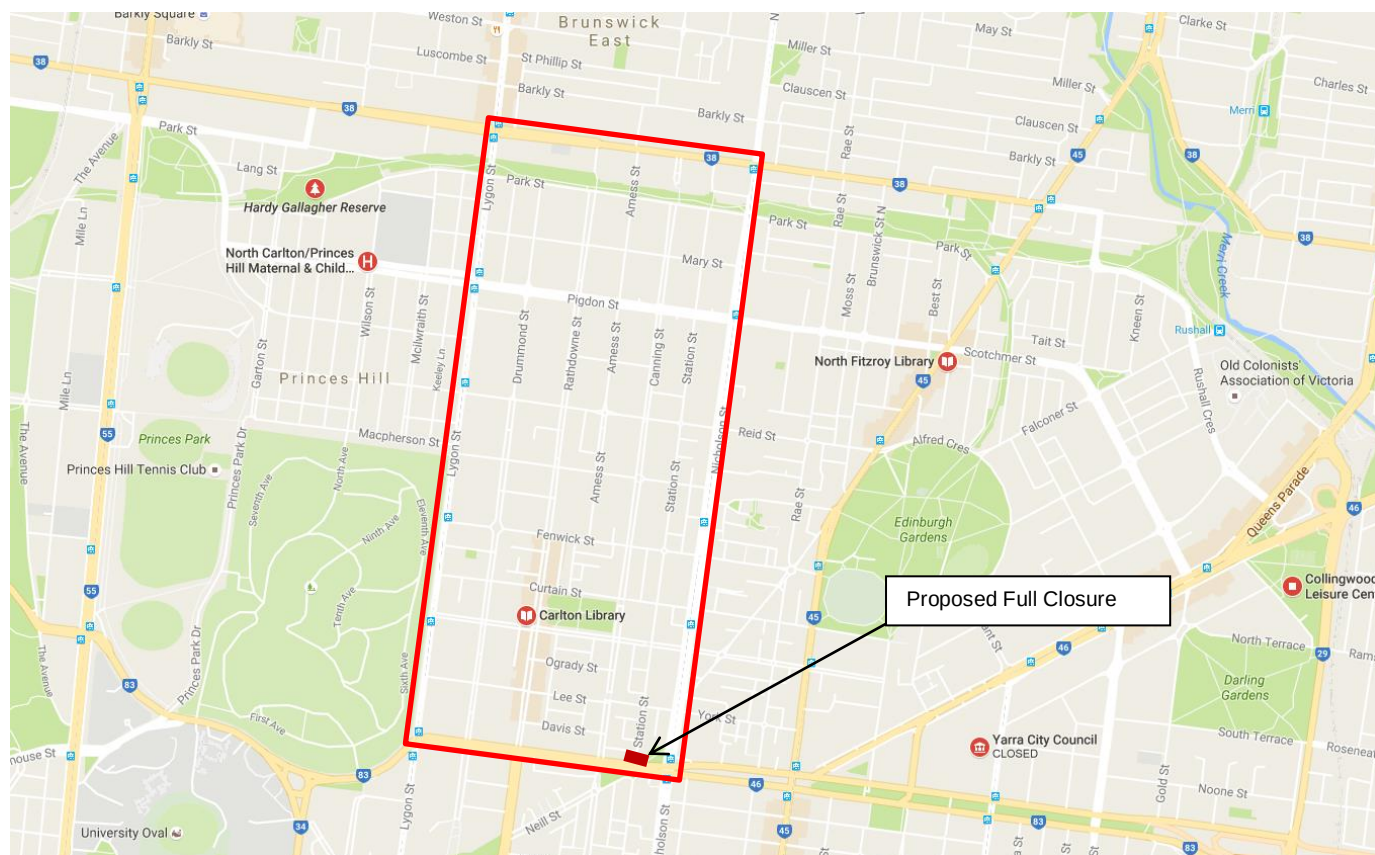


Figure 1. Consultation Area (area bounded by Princes St, Nicholson St, park St, Lygon Street in North Carlton)

A detailed review of the consultation results showed:

- a) the whole Carlton North consultation area - 50% support closure, 50% do not support closure (354 responses total);**
- b) properties on Station Street - 78% support closure, 22% do not support closure (100 responses total, which are included in the total responses of 354); and**
- c) properties that are potentially both collectively and individually affected by the closure and displaced traffic (the area bound by Rathdowne Street, Lee Street, Nicholson Street and Princes Street) see Figure 2 below (51 responses total, which are included in the total responses of 354)**

Street	Description	Support Closure	Do Not Support Closure	Number of Responses
Station Street	between Lee St and Princes St	82%	18%	17
Lee Street	between Rathdowne St and Nicholson St	70%	30%	10
Rathdowne Street	between Lee St and Princes St	33%	66%	6
Davis Street	between Rathdowne St and Canning St	0%	100%	4
Canning Street	between Lee St and Princes St	17%	83%	6
Nicholson Street	between Lee St and Princes St	66%	33%	3
Princes Street	between Rathdowne St and Nicholson St	20%	80%	5

Figure 2. Break down of Survey Results

The top reasons cited for either support or opposition to the temporary closure is shown in Figure 3.

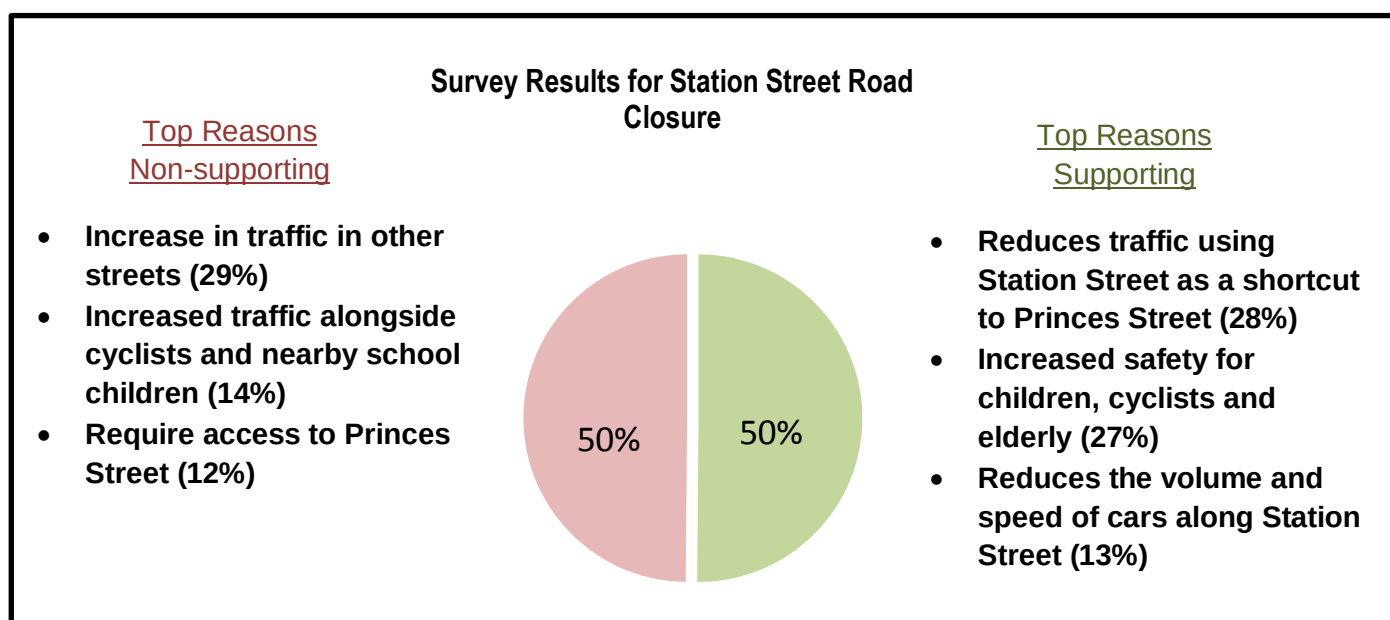


Figure 3. Break down of Survey Results

3.2 Station Street (between Lee Street and Princes Street) resident feedback

Council has received submissions from some residents over a number of years expressing concerns regarding safety and the type and level of traffic using Station Street. Submissions made by residents from 2010 onwards is summarised below, whilst a submission made to Council by a local resident at the 10 November 2015 Council meeting is provided in Appendix 3:

- Bank up of arterial traffic using Station Street seeking to exit into Princes Street as an alternative to the Nicholson Street arterial road. Station Street has been observed by residents as a rat-running route to access Alexandra Parade. Photograph 1 has been submitted by resident to indicate queue lengths.



Photograph 1. Queues on Station Street pre-Melbourne Water works closure

- The worsening nature of traffic in this local residential street over the years. This included:
 - Increase in volume of traffic in Station Street over the years
 - High speeds observed from vehicles on Station Street
- Non-compliance with Stop Signs on Station Street
- Resident concerns with cars exiting Station Street to Princes Street and damaging the traffic treatment
- Safety concerns regarding cars exiting Station Street and crossing four lanes to get to the right turn lane to Nicholson Street. Photograph 2 shows a truck exiting Station Street and encroaching onto Princes Street.



Photograph 2. Truck encroaching onto Princes Street

3.3 Community consultation exercise May / June 2017

Further to Council resolution of 20 December 2016, a place making assessment has been prepared by a consultant commissioned by officers (refer to Section 4 for consultant report).

A community led approach was undertaken by the consultant team to help develop the proposed place making concept designs for Station Street. This has been key to understanding any constraints and how the community would prefer to see this space be used (if at all).

Stage 1 Consultation

The development of place making options was informed by a range of consultation (Stage 1 consultation).

This consultation targeted residents and stakeholders with 200 metres of the southern end of Station Street, although there was opportunity for the wider community to make suggestions via an online survey.

A total of 11 responses were received via the online survey. Four responses provided support for place making in some form, whilst seven responses opposed closing Station Street in any form.

23 additional submissions relating solely to the temporary road closure proposal were received by email during the Stage 1 consultation period. Six submissions were in favour of the proposal and 17 submissions opposed the proposal.

During the Stage 1 consultation period, a member of the community started an online Change.org petition opposing the road closure in any form. This petition has been signed by 262 people, including a mixture of residents and commuters who use Canning Street as a cycle route.

Stage 2 Consultation

A second stage of consultation was undertaken to understand the level of support for three placemaking options developed by the consultant. Again, this consultation targeted residents and stakeholders with 200 metres of the southern end of Station Street, although there was opportunity for the wider community to make suggestions via an online survey.

A total of seven responses in support of placemaking were received.

The majority of feedback (over 80% of responses) during the Stage 2 Consultation was opposition to the road closure.

Section 4: Codesign Studios Place Making Assessment

STATION STREET NORTH CARLTON

SUMMARY REPORT
AUGUST 2017

Revision 3



CO
DESIGN
STUDIO



Prepared for: City of Yarra



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01. OVERVIEW

CONTEXT

City of Yarra is exploring placemaking opportunities that would be made possible by temporarily closing the southern section of Station Street, North Carlton. To understand the longer term implications of this intervention, CoDesign Studio was invited to facilitate a placemaking assessment with local residents and businesses to explore the ideas for re-purposing this road space. This included exploring opportunities and constraints for improved public amenity. From this initial round of community engagement, three concept options were developed with Hansen Partnership and presented to the community for feedback. The concepts were then updated to reflect feedback and form a suite of placemaking recommendations.

This document outlines the project objectives, engagement approach, feedback outcomes, limitations and recommendations for placemaking in Station Street.

WHY IS THIS IMPORTANT?

In 2015, the Southern end of Station Street was closed due to Melbourne Water upgrades. From this, a number of local residents expressed their desire to see the road closed permanently.

Following this, Council resolved to progress with a proposal to temporarily close Station Street for a 12 month period for the purposes of undertaking a traffic diversion experiment. In order to inform this process, Council has commissioned a range of further assessments including this placemaking assessment conducted by CoDesign Studio.

Note: CNLC refers to Carlton Neighbourhood Learning Centre

PROJECT OBJECTIVES

The **overall objective** of the Station Street placemaking assessment, is to offer an opportunity for local businesses and residents to provide feedback and ideas for community led activation in the context of a temporary but full road closure of Station Street. This feedback then formulates a set of placemaking recommendations as outlined in this document.

In undertaking the Placemaking Assessment, CoDesign Studio's objectives were to;

- > Understand possible uses of the site, by inviting placemaking ideas.
- > Improve awareness of the project and provide opportunities for local residents to input placemaking ideas.
- > Provide a forum for local residents to offer their ideas in person, online or via more direct communication lines: (email, telephone)
- > Develop three schematic placemaking concepts for further feedback and review.
- > Provide recommendation for preferred option/s based on feedback.
- > Make recommendations on placemaking aspects of the project.

It was **not** the objective of this project to assess traffic implications of the potential temporary road closure, nor to provide recommendations of whether a full road closure (temporary 12 months, or permanently) should or should not proceed on traffic grounds.

ENGAGEMENT SUMMARY

In April, local residents were door-knocked and invited to attend a drop-in ideas workshop held in May, of which 29 locals attended to put forward ideas and feedback. From this, three placemaking concepts were produced and included in an online survey for further feedback of which there were 29 respondents from Carlton, North Carlton, Thornbury and Northcote.

KEY PROJECT OUTCOMES

- > Key issues and feedback raised at community workshop and via the Your Say Yarra online platform, in relation to a proposed temporary road closure, included: Concern over loss of parking, traffic impacts to neighbouring streets, cyclist safety, child safety, and emergency access.
- > The majority of feedback was not supportive of a road closure (only 6 online responses were in favour of closing the road for placemaking). Some of these responses were not willing to trade off on-street parking which limits the extent of placemaking that can occur. The Carlton Neighbourhood Learning Centre (CNLC) was also not in favour of losing car spaces.

KEY RECOMMENDATIONS

Based on community feedback, CoDesign Studio has provided a placemaking recommendation (See Chapter 7).

02. STATION STREET SITE

KEY PLACE AUDIT OBSERVATIONS

CoDesign Studio conducted a short place audit of the Station Street site to understand pedestrian and driver behaviour as well as site opportunities and constraints. The following key observations were drawn; (see Appendix B for summary sheet)

1. On-street parking outside Carlton Neighbourhood Learning Centre (CNLC) being used by Melbourne Water for storage.
2. Minimal pedestrian and vehicle movements observed on Station Street during site visit.
3. Parking on east of Station Street is 90 degree and west is parallel.
4. CNLC and Brandon Hotel are key public facilities.
5. Proximity of busy Princes Street a potential hazard to encouraging unsupervised active public use of Southern Section of Station Street.



Figure 1 Focus area.

KEY DESIGN PRINCIPLES

From site observations and feedback;

1. **Landscaped closure buffer required**
Proximity of busy Princes Street a potential hazard to encouraging active public use of Southern Section of Station Street.
2. **Focus area for placemaking and street activation** adjacent to CNLC and between 205 Station Street and Princes Street intersection.
3. **Maximise greening opportunities** at closure area and throughout focus area.
4. **Maintain existing footpaths**
5. **Maintain cycle access and pedestrian access.**



Figure 2 Station St and Princes St intersection.

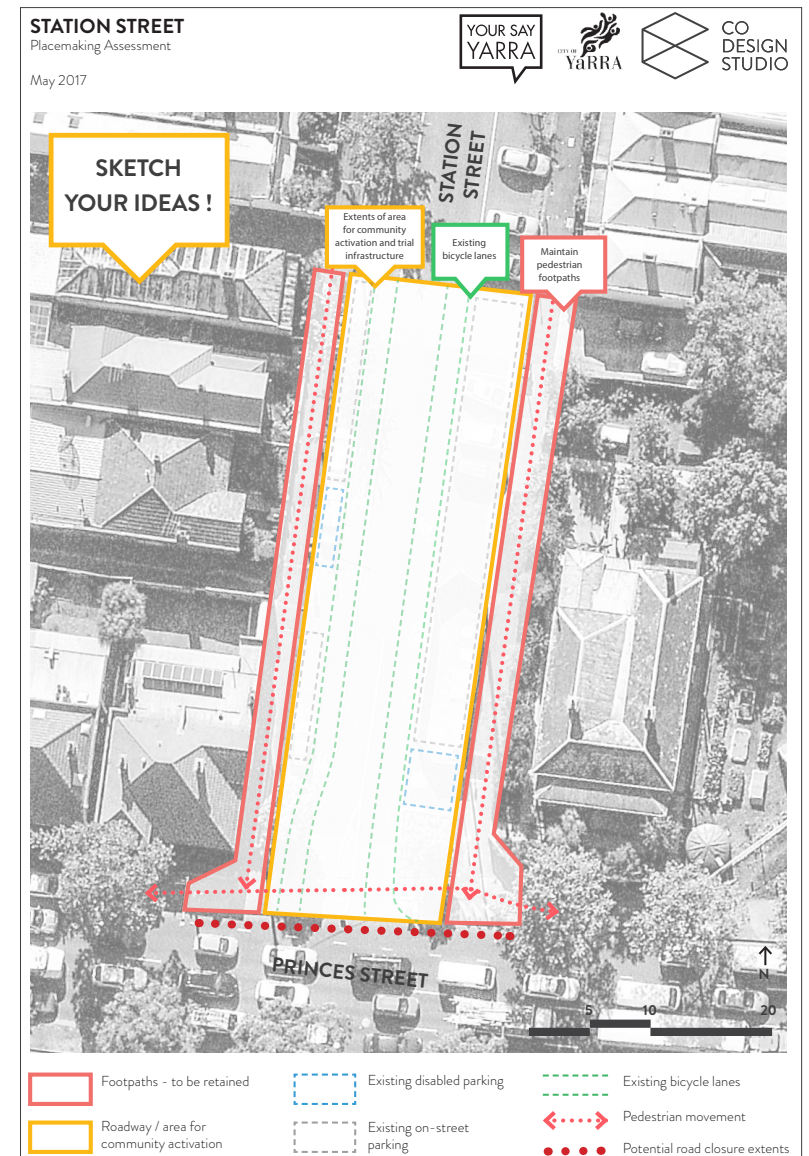


Figure 3 Station St focus area base plan.

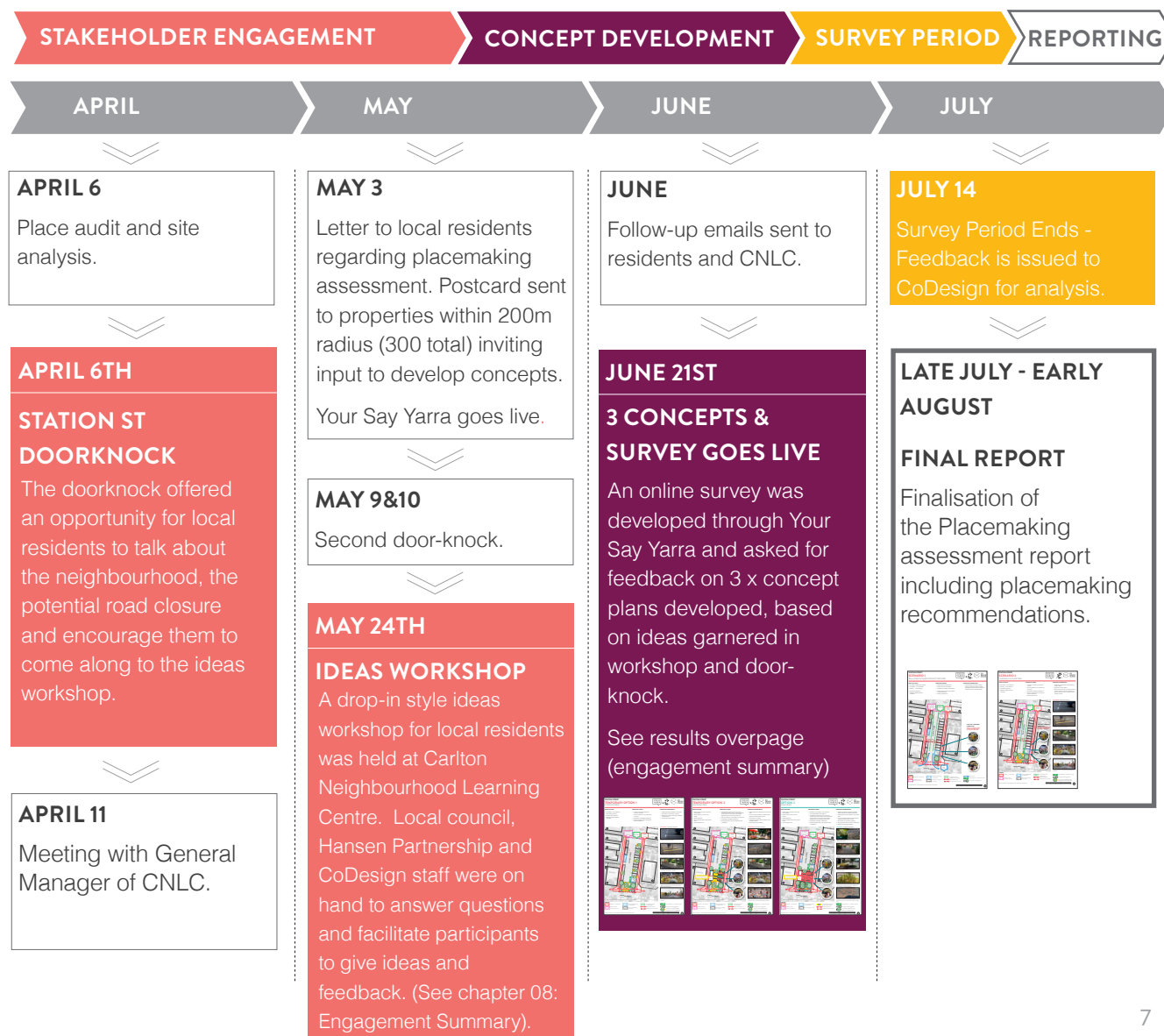
03. ENGAGEMENT APPROACH

CoDesign Studio worked closely with City of Yarra to review the engagement approaches to date to inform the development of a communications strategy and time-line associated with the placemaking master plan (see right). After an inception phase, door-knocking with immediate residents helped get the conversation started. This was followed by a 'drop-in' workshop at the Carlton Neighbourhood Learning Centre (CNLC). Feedback from this workshop was used to inform 3 x placemaking concepts. Finally, a survey was produced offering a chance to galvanise input to date and offer a forum for further comments and feedback on the three developed concepts for a potential Station Street road closure trial.

ENGAGEMENT PRINCIPLES

1. **Have an open and honest discussion** through various engagement approaches: door knocking, online forum, survey, drop-in workshop, email and telephone.
2. **Use simple, cohesive and inclusive messaging** across all materials and engagement forums.
3. **Have face to face conversations** with key stakeholders.
4. **Have clear resources** and access to information.
5. **Collect and evaluate** by capturing input and conversation data through memos, post-its, email response and online survey responses.

ENGAGEMENT PROCESS



04. ENGAGEMENT SUMMARY

DOOR KNOCK, INITIAL STAKEHOLDERS CONVERSATIONS & YOURSAY YARRA PHASE 1

Over two visits (April 6th and May 9), CoDesign Studio door knocked local Station Street residents towards the Princes Street intersection. Your Say Yarra page went live, inviting input to help develop concept designs.

Who did we speak to: 22 residents homes (door knock) and CNLC (separate meeting).

YourSay Yarra: 139 people visited the page and 13 have contributed.

Key feedback points:

1. Most residents spoken to were keen to be involved in the discussion and ideas workshop.
2. Most residents spoken to were noted to be supportive of the closure.
3. Carlton NLC: Supportive of place-making projects that involve centre students and staff. Noted that CNLC can support local community groups to undertake projects.
4. Carlton NLC: Access and parking are very important as visitors, staff and users of the centre are not local and come via vehicle.
5. YourSay Yarra Phase 1: (as of May 25th) Of the 13 responses, nine opposed the closure and only four provided suggestions for placemaking including added greenery and ball play.

DROP-IN IDEAS WORKSHOP

An open ideas workshop was held at the Carlton Neighbourhood Learning Centre on the evening of 6-8pm, May 25th. Local residents in North Carlton within 200 metres of the site were directly invited.

Facilitators:

CoDesign Studio, Hansen Partnership, and City of Yarra.

Who did we speak to: 29 residents homes

Key feedback points:

1. Some (11) residents stated they were clearly against the road closure on grounds of traffic, protection of Canning Street from added traffic.
2. Some residents stated they are conditionally supportive of the road closure, expressing concerns for traffic impact in neighbouring streets.
3. Residents were generally supportive of short term activation eg. Weekends, festivals.
4. There was support for added greenery in the form of planter boxes.

CONCEPTS - YOUR SAY YARRA PHASE 2

An online survey was developed to provide a single and focussed portal for participants to;

1. Vote on preferred concept option and response to particular infrastructure elements for Station Street road closure (temporary and permanent)
2. Gather basic demographics of respondents (age, gender, local suburb, and relationship to Station Street)

Who did we speak to: 27 respondents completed the survey.

Key results and analysis are as follows: Further summary of results in appendix.

- > 15 Female, 12 Male.
- > Majority from Carlton North 74% with others from Carlton, Thornbury, Northcote and Fitzroy.
- > Majority live in Yarra 74% with less than half 37% working in Yarra.
- > Majority say they cycle through the area 48% than drive 33%.
- > 81% percent of respondents preferred none of the proposed concepts and for Station Street to remain open. This strongly suggests that a full road closure is not supported.
- > Minimal support (68% opposed) for removal of on-street carparking for 12 months or more in exchange for public space.

05. ENGAGEMENT OUTCOMES

This evaluation is a summary of feedback from initial door-knocking, meeting with CNLC, Drop-in Ideas Workshop, Your Say Yarra (phase 1 and 2) and direct feedback via phone/email.

KEY THEMES

The following key themes were identified.

Road Space Reallocation

There was low levels of support for road space reallocation to public space in the context of a temporary full road closure.

'48 Hours' - Short Term Activation

There was stronger support for placemaking initiatives that used the roadway for up to 48 hours. Such as street festivals (jazz, food), temporary sports, pop-up spaces, community mural/art.

Better utilise existing green spaces and The Carlton Neighbourhood Learning Centre

Suggestions were made for placemaking opportunities to be explored at existing public spaces (eg. Nicholson Street Reserve) or the CNLC facility instead of the roadway. Reasons given include established communities already meet and the centre is open to the wider community to hire or host community gatherings.

Child Safety

Concerns were raised about increased risk to child safety due to perceived increase in vehicle traffic around Carlton North Primary as a result of the proposed road closure.

Cyclist Safety

Concerns were raised regarding increased risk to cyclist safety due to anticipated increase in vehicle traffic around Carlton North Primary as a result of the proposed road closure.

Increased Traffic Spillage

Concerns were raised over the impact of increased traffic to surrounding streets, namely Lee and Canning Streets. Some residents suggested they would be more supportive of a road closure if these anticipated traffic impacts could be addressed.

Protection of Canning Street

Canning Street serves as a main bicycle corridor connecting the City and Northern Suburbs. Concerns were raised at both the ideas workshop, online survey and via Bicycle Network that an estimated increase in traffic will increase risk to cyclists and pedestrians using Canning Street. A Change.org petition was initiated to seek support for keeping Station Street open. There were 262 supporters for this local resident led petition.

Emergency Access

Concerns were raised about blocking access of emergency access vehicles should a full road closure proceed. While there may be minimal actual delay or imposition to emergency access, the perception is there is a problem and should be noted.

Parking

The Carlton Neighbourhood Learning Centre and some residents expressed strong desire for parking not to be reduced.



Figure 4 Station St 'drop-in' session.

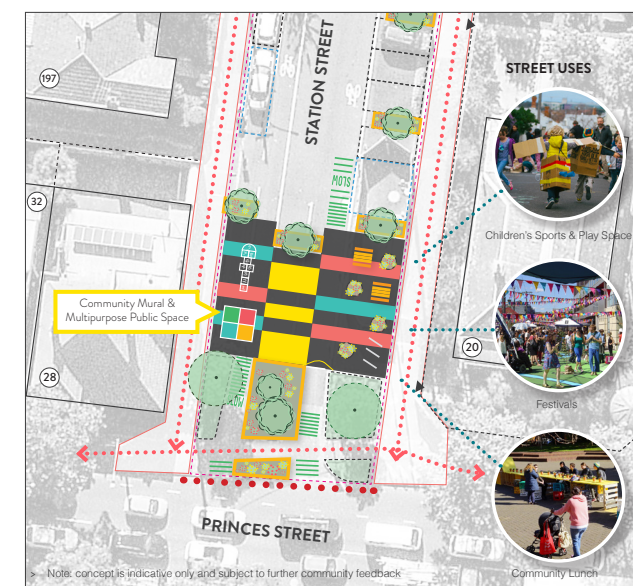


Figure 5 Station St example concept.

06. PLACEMAKING CONCEPT PLANS

KEY PLACE MAKING IDEAS

Following community feedback, 2 x placemaking concept plans were developed to explore options for a 12 month placemaking trial and 1 x concept which formalises trialled interventions as a long term option. All options included maintaining existing footpaths, cycling access and pedestrian access. (See appendix C for estimated costs and larger concept plan images)

TEMPORARY OPTION 1 12 MONTHS TRIAL

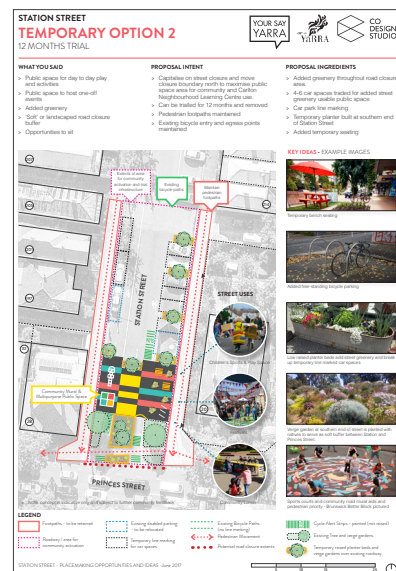
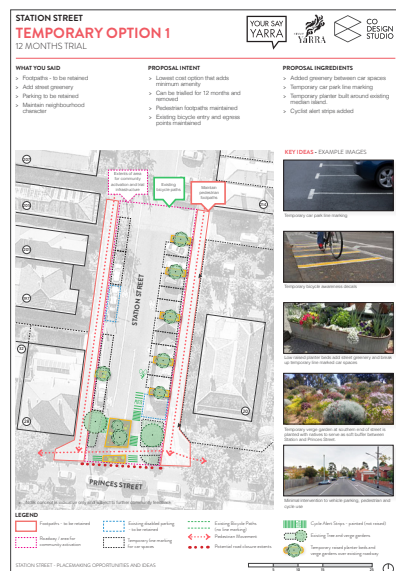
- > Lowest cost option that adds greenery and minimal parking restriction.
- > Can be trialled for 12 months and removed
- > Pedestrian footpaths maintained

TEMPORARY OPTION 2 12 MONTHS TRIAL

- > Capitalise on street closure and move closure boundary north to maximise public space area for community and Carlton Neighbourhood Learning Centre use.
- > Can be trialled for 12 months and removed.

LONG TERM OPTION 3 12 MONTHS TRIAL

- > Evolution of 'Option 2: 12 month trial' which formalise trialled interventions
- > Capitalise on street closure and move closure boundary north to maximise public space area for community and Carlton Neighbourhood Learning Centre use.



See Chapter 07: Recommendations for updated concepts based on potential trial road closure scenarios.

07. RECOMMENDATIONS

PLACEMAKING RECOMMENDATIONS

Should council proceed with the road closure trial, we recommend that a small amount of funding be allocated to support placemaking in this area.

There was some support for one-off placemaking events that would not require a road closure on an ongoing basis, for example a street party or supervised play street event that would require a temporary road closure for only an afternoon of a weekend day.

Recommended placemaking activities include:

- 1. Short term activation** - Allocate funds to support respondents who put forward ideas that would make community-led placemaking events such as events or community lunches simpler and easier to carry out. (See 08 Case Study: The Neighbourhood Project. p13)
- 2. Community road safety initiative** could be explored with partners such as TAC or Vicroads, trialling a community-led, low-cost, high impact road safety intervention. (See case study: South Melbourne Market)
- 3. Greening:** Landscaped buffer to Princes Street is well considered (See diagram right)
- 4. Bicycle awareness:** Bicycle decals are installed to increase awareness (See diagram right)

The diagram to the right represents the road closure proceeding whereby;

- > Small community events (3 hours to 2 days) could be planned subject to traffic management plan and trail closure of southern section of Station Street.
 - > Bicycle access is maintained
 - > Existing footpaths maintained
 - > Existing carparking is maintained
- (See appendix C for larger version)



08. CASE STUDIES

THE NEIGHBOURHOOD PROJECT

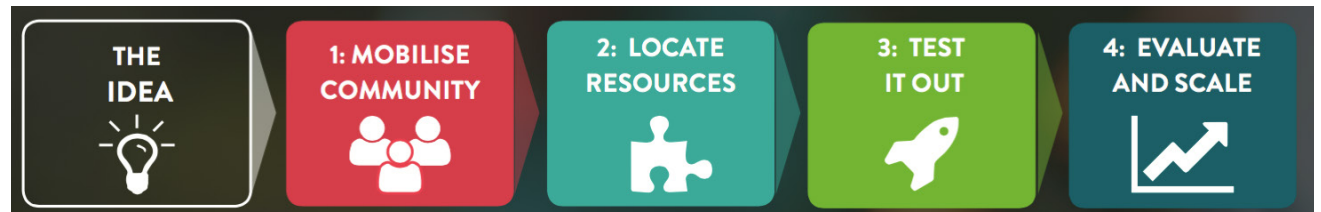
The Neighbourhood project is a CoDesign initiative that invites Councils along with community groups, organisations, residents and local businesses to apply through an Expression Of Interest process to receive funding and training to bring their ideas to life. Selected groups receive mentoring and training across 5 days of time over 3 months to develop and install their project idea.

Community groups from different councils have worked together to achieve projects such as a trial local dog park, community art festival and a laneway greening initiative.

Images - Top: Process Diagram

Left: Community Art Fair, Cardinia Lakes, VIC

Right: Dog Park, Brooklyn, VIC

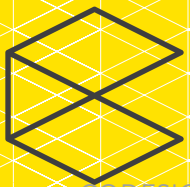


SOUTH MELBOURNE MARKET

In late 2016, Cecil Street South Melbourne, CoDesign Studio worked with local council and market traders to design and install low-cost infrastructure changes including public seating and novel surface decals to increase awareness of pedestrian priority zones to passing drivers. Traders successfully lobbied the council and Mayor to increase the length of the trial

This is a successful outcome showing how consistent, open and engaging consultation and testing can lead to low cost, high impact interventions shaped by the community for the community.





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APPENDICES

- A: SURVEY RESULTS
- B: PLACE AUDIT
- C: CONCEPT DESIGNS
- D: ENGAGEMENT MATERIALS

APPENDIX A: SURVEY RESULTS SUMMARY

SURVEY RESULTS

- > 27 respondents completed the survey.
- > 15 Female, 12 Male.
- > Majority from Carlton North 74% with others from Carlton, Thornbury, Northcote and Fitzroy.
- > Majority live in Yarra 74% with less than half 37% working in Yarra.
- > Majority say they cycle through the area 48% than drive 33%.

Q1: Which concept design do you prefer?

81% percent of respondents preferred none of the proposed concepts and for Station Street to remain open. This strongly suggests that a full road closure is not supported.

Q2: What is your view of the following elements being included in the final concept design?

Q2.1: Do you support additional greenery throughout the road closure area.

54% were strongly opposed, 32% supported or strongly supported, 14% were neutral. This suggests that there is only minor support for additional greening in the street.

Q2.2: Car-park linemarking

50% opposed or strongly opposed, 36% supported, 14% neutral. It is noted that key stakeholder CNLC strongly supports line-marking of the car-parks adjacent to the centre to increase parking efficiency

Q2.3: Tables and Seats

63% opposed or strongly opposed, 18% supported and 19% neutral.

Q2.4: Additional Bike Parking

50% opposed additional bike parking, 40% supported

Q2.5: Space for play, activities and events

62% strongly opposed or opposed, 28% supported

Q2.6: Remove some on-street parking to create additional public space

68% strongly opposed or opposed, only 18% supported.

Common themes from respondent comments; (as per 04: Engagement Outcomes)

- > Road space reallocation
- > Short term activation of road space (ie. weekend event)
- > Look at other local public spaces or CNLC for placemaking initiatives.
- > Child safety due to redistribution of traffic with a temporary road closure in place.
- > Cyclist safety due to redistribution of traffic with a temporary road closure in place.
- > Concern over increased traffic spillage with a road closure in place.
- > Protection of Canning St.
- > Emergency Access
- > Parking

Note: City of Yarra has raw survey results and comments on file, hence only a summary is included here.

APPENDIX B: PLACE AUDIT



CO
DESIGN
STUDIO

1716YAR
STATION ST
ISS: For information
APR 2017

DATE: Thursday 06/04/2017

TIME: 3 - 5pm

PERFORMED BY: Ryan Moroney and Albert Chong

SITE: Station St / Princes St, North Carlton - Sunny 25 degrees

WHO WAS USING THE STREET?

PEDESTRIANS
21

RESIDENTS

CYCLISTS
36

SKATE-
BOARDERS

SCOOTER

DOG
WALKER
7

KEY OBSERVATIONS - PEDESTRIANS

- > KEY RISK BEHAVIOUR: Lack of awareness due to looking down at phone whilst walking.
- > Minimal pedestrian traffic - predominantly street residents walking home.
- > People driving and parking along street and walking to nearby destinations - 9
- > Few dog walkers - 7
- > Families with pram and child - 7
- > Slight increase of pedestrian traffic around 4:30-5pm.
- > Destinations located at either end of audit site - Brandon Hotel and Carlton Neighbourhood Learning Centre.
- > Few people sitting in small groups outside Brandon Hotel.

KEY OBSERVATIONS - CYCLISTS

- > 36 cyclists observed.
- > Minimal cyclist traffic along Station St. Large volume on Lee St. Larger volume of cycling traffic expected along Canning St (parallel to Station St).
- > Bicycle numbers increasing at 4.30 - 5pm. Note: decrease in car traffic at same time.
- > Other modes observed - scooters (2), skateboards (3) and a tandem bike.
- > Very little cycling traffic at Princes St end of street due to high volume of car traffic and lack of dedicated cycle lane.
- > Parking space outside Learning Centre unavailable due to sewage works.

MAP KEY

↓ pedestrian movement

↓ cycle movement - weight represents predominance

□ parking occupied by works

× standing

● sitting

◇ audit position



NORTH

APPENDIX C: CONCEPT DESIGNS

PLACEMAKING RECOMMENDATION

RECOMMENDATION

12 Months Trial

Estimated Cost: \$3,000 - 6,000 (low)

Pros: Trial only, adaptable, low-cost, high impact changes.

Cons: Additional maintenance

Main Works:

- > Temporary planter built around existing median island.
- > Cyclist alert strips added.
- > Small events (3 hours to 2 days) could be planned subject to traffic management plan and trail closure of southern section of Station Street.

PLACEMAKING ASSESSMENT OPTIONS

OPTION 1

12 Months Trial

Estimated Cost: \$3,000 - 6,000 (low)

Pros: Trial only, adaptable, low-cost, minimal intervention on carspace

Cons: Durability risk, ongoing maintenance

Main Works:

- > Added greenery between car spaces
- > Temporary car park line marking
- > Temporary planter built around existing median island.
- > Cyclist alert strips added

OPTION 2

12 Months Trial

Estimated Cost: \$6,000 - 10,000 (low-medium)

Pros: Trial only, adaptable, low-cost, high impact changes.

Cons: Additional maintenance

Main Works:

- > Added greenery throughout road closure area.
- > 4-6 car spaces traded for added street greenery usable public space
- > Car park line marking
- > Temporary planter built at southern end of Station Street
- > Added temporary seating

OPTION 3

Long Term / Permanent

Estimated Cost: \$10,000+

Pros: Permanent, medium-cost, high impact.

Cons: Higher cost than temporary options. Would require additional and ongoing maintenance

Main Works:

- > Raised pedestrian footpath at Station Street and Princes Street intersection.
- > Added greenery throughout road closure area.
- > 4-6 car spaces traded for added street greenery usable public space
- > Permanent car park line-marking
- > Verge garden bed at closure intersection
- > Space for temporary seating

STATION STREET RECOMMENDATION 12 MONTHS CLOSURE TRIAL



WHAT YOU SAID

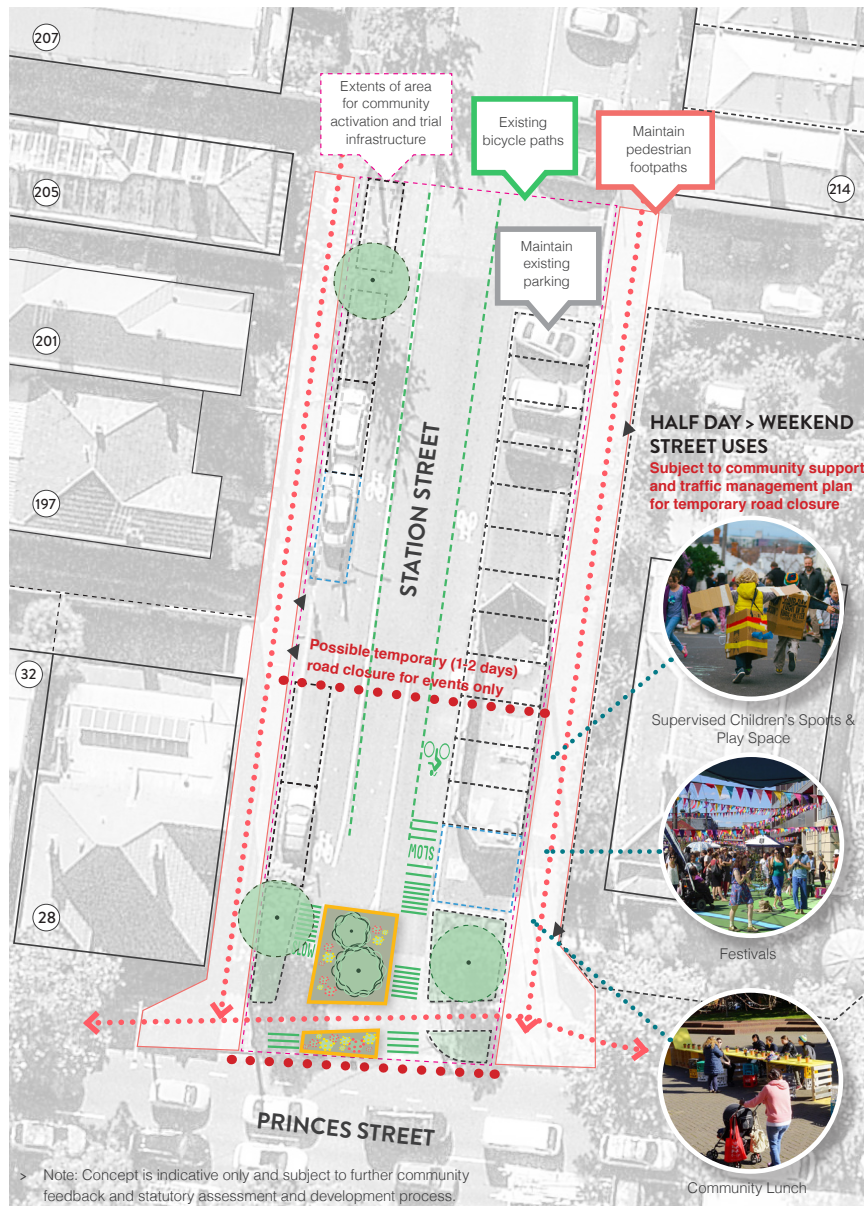
- > Footpaths - to be retained.
- > Parking - to be retained.
- > Add street greenery.
- > Maintain neighbourhood character.

PROPOSAL INTENT

- > Lowest cost option for trial road closure.
- > Can be trialled for 12 months and removed.
- > Pedestrian footpaths maintained
- > Existing bicycle entry and egress points maintained.
- > Parking maintained.

PROPOSAL INGREDIENTS

- > Temporary planter built around existing median island.
- > Cyclist alert strips added.
- > Small events (3 hours to 2 days) could be planned subject to traffic management plan and trail closure of southern section of Station Street.



LEGEND

- | | | | |
|---|--|--|---|
| Footpaths - to be retained | Existing disabled parking - to be retained | Existing Bicycle Paths (no line marking) | Cycle Alert Strips - painted (not raised) |
| Roadway / area for community activation | Temporary line marking for car spaces | Pedestrian Movement | Existing Tree and verge gardens |
| | | Potential road closure extents | Temporary raised planter beds and verge gardens over existing roadway |

STATION STREET - PLACEMAKING OPPORTUNITIES AND IDEAS



KEY IDEAS - EXAMPLE IMAGES



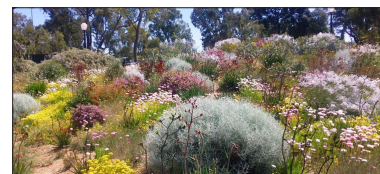
Temporary car park line marking



Temporary bicycle awareness decals



Low raised planter beds add street greenery



Temporary verge garden at southern end of street is planted with natives to serve as soft buffer between Station and Princes Street.



Minimal intervention to vehicle parking, pedestrian and cycle use

STATION STREET

TEMPORARY OPTION 1

12 MONTHS TRIAL



CO
DESIGN
STUDIO

WHAT YOU SAID

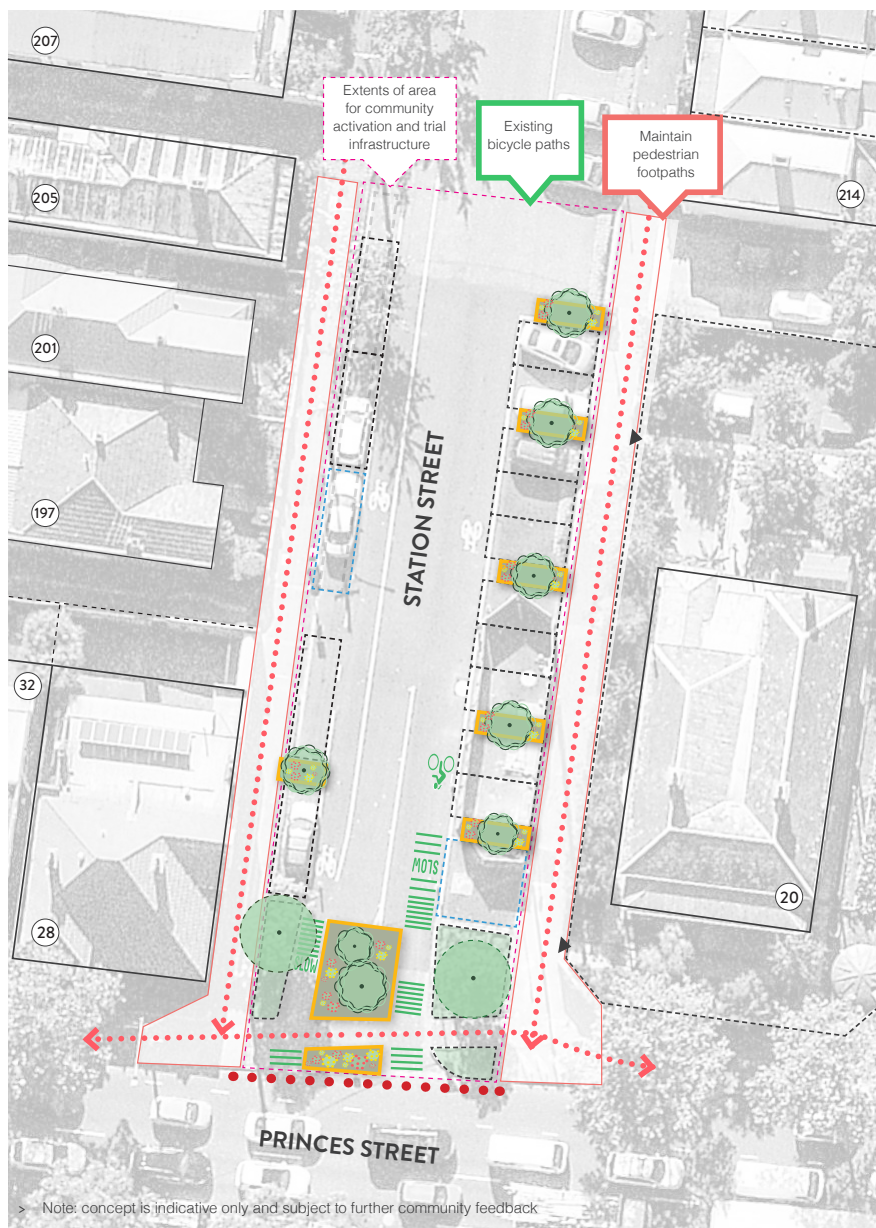
- > Footpaths - to be retained
- > Add street greenery
- > Parking to be retained
- > Maintain neighbourhood character

PROPOSAL INTENT

- > Lowest cost option that adds minimum amenity
- > Can be trialled for 12 months and removed
- > Pedestrian footpaths maintained
- > Existing bicycle entry and egress points maintained

PROPOSAL INGREDIENTS

- > Added greenery between car spaces
- > Temporary car park line marking
- > Temporary planter built around existing median island.
- > Cyclist alert strips added



KEY IDEAS - EXAMPLE IMAGES



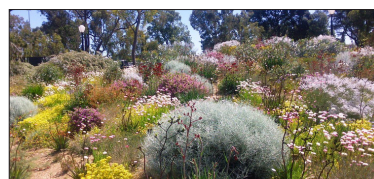
Temporary car park line marking



Temporary bicycle awareness decals



Low raised planter beds add street greenery and break up temporary line marked car spaces



Temporary verge garden at southern end of street is planted with natives to serve as soft buffer between Station and Princes Street.



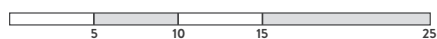
Minimal intervention to vehicle parking, pedestrian and cycle use

LEGEND

	Footpaths - to be retained		Existing disabled parking - to be retained		Existing Bicycle Paths (no line marking)
	Roadway / area for community activation		Temporary line marking for car spaces		Pedestrian Movement
					Potential road closure extents

	Cycle Alert Strips - painted (not raised)
	Existing Tree and verge gardens
	Temporary raised planter beds and verge gardens over existing roadway

STATION STREET - PLACEMAKING OPPORTUNITIES AND IDEAS



STATION STREET

TEMPORARY OPTION 2

12 MONTHS TRIAL



WHAT YOU SAID

- > Public space for day to day play and activities
- > Public space to host one-off events
- > Added greenery
- > 'Soft' or landscaped road closure buffer
- > Opportunities to sit

PROPOSAL INTENT

- > Capitalise on street closure and move closure boundary north to maximise public space area for community and Carlton Neighbourhood Learning Centre use.
- > Can be trialled for 12 months and removed
- > Pedestrian footpaths maintained
- > Existing bicycle entry and egress points maintained

PROPOSAL INGREDIENTS

- > Added greenery throughout road closure area.
- > 4-6 car spaces traded for added street greenery usable public space
- > Car park line marking
- > Temporary planter built at southern end of Station Street
- > Added temporary seating



KEY IDEAS - EXAMPLE IMAGES



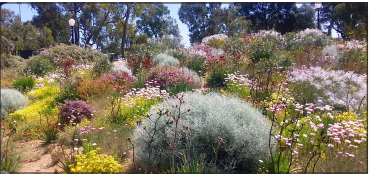
Temporary bench seating



Added free-standing bicycle parking



Low raised planter beds add street greenery and break up temporary line marked car spaces



Verge garden at southern end of street is planted with natives to serve as soft buffer between Station and Princes Street.



Sports courts and community road mural aids and pedestrian priority - Brunswick Better Block pictured

LEGEND

Footpaths - to be retained	Existing disabled parking - to be relocated	Existing Bicycle Paths (no line marking)	Cycle Alert Strips - painted (not raised)
Roadway / area for community activation	Temporary line marking for car spaces	Pedestrian Movement	Existing Tree and verge gardens
		Potential road closure extents	Temporary raised planter beds and verge gardens over existing roadway

STATION STREET OPTION 3 LONG TERM



WHAT YOU SAID

- > Public Space for day to day play and activities
- > Public space to host one-off events
- > Added greenery
- > 'Soft' or landscaped road closure buffer
- > Opportunities to sit

PROPOSAL INTENT

- > Evolution of 'Option 2: 12 month trial'
- > Formalise trialled interventions
- > Capitalise on street closure and move closure boundary north to maximise public space area for community and Carlton Neighbourhood Learning Centre use.
- > Pedestrian footpaths maintained
- > Existing bicycle entry and egress points maintained

PROPOSAL INGREDIENTS

- > Raised pedestrian footpath at Station Street and Princes Street intersection.
- > Added greenery throughout road closure area.
- > 4-6 car spaces traded for added street greenery usable public space
- > Permanent car park line-marking
- > Verge garden bed at closure intersection
- > Space for temporary seating

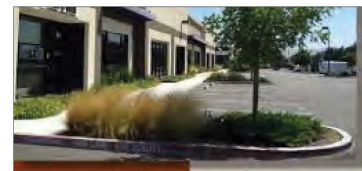
KEY IDEAS - EXAMPLE IMAGES



Maintain planters bicycle parking for long term use and added street greenery.



Raised pedestrian crossing with bluestone square sawn setts, tactile ground surface indicators and directional signage.



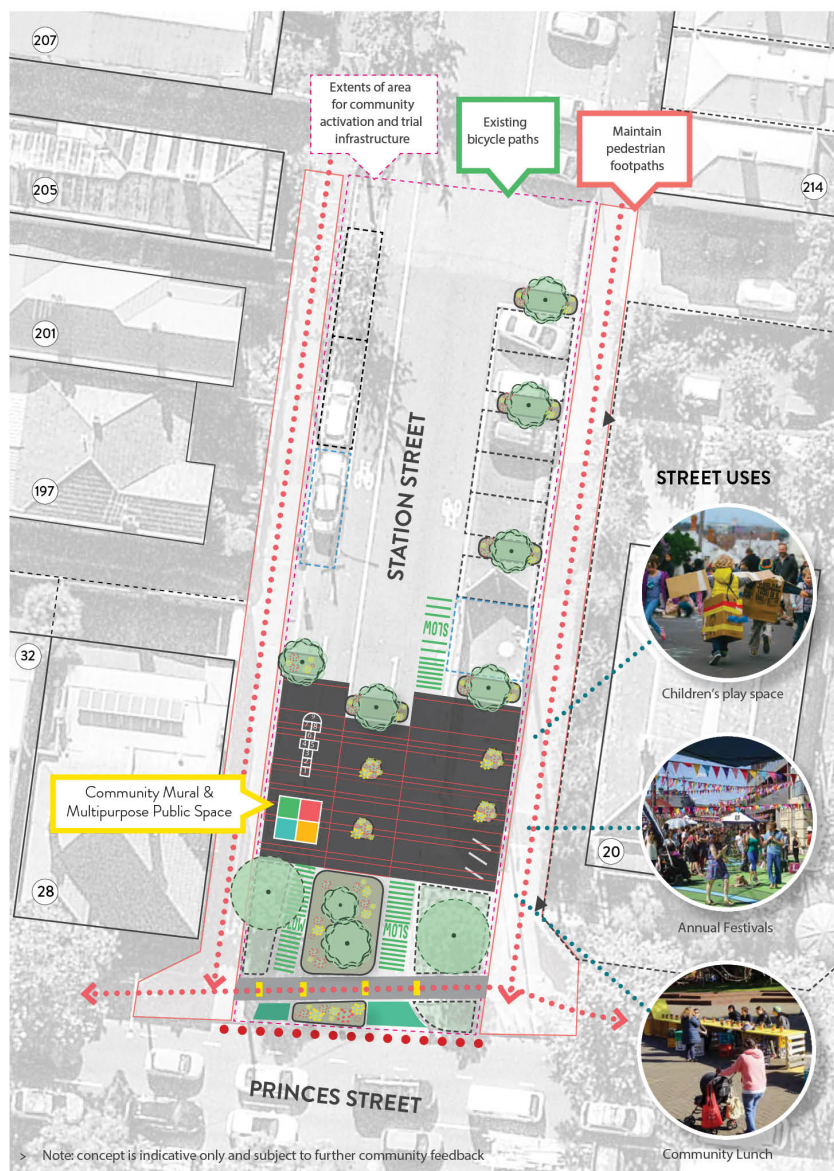
Planter beds add street greenery and break up line-marked car spaces



Verge garden at southern end of street is planted with natives to serve as soft buffer between Station and Princes Street. - image City of Yarra



Long term road mural inlay or asphalt surface treatment for sports, play and sense of place - example only.



> Note: concept is indicative only and subject to further community feedback

LEGEND

- | | | | |
|---|---|--|---|
| Footpaths - to be retained | Existing disabled parking - to be relocated | Raised footpath with tactile ground surface indicators | Cycle Alert Strips - painted (not raised) |
| Roadway / area for community activation | Line marking for car spaces | Pedestrian Movement | Existing Tree and verge gardens |
| | | Potential road closure extents | Permanent planter beds or verge gardens over existing roadway |

STATION STREET - PLACEMAKING OPPORTUNITIES AND IDEAS



APPENDIX D: ENGAGEMENT MATERIALS

DROP-IN IDEAS WORKSHOP

Workshop participants were walked through the follow sequence of panels, and encouraged to contribute ideas and vote on other ideas using the postcards and post in notes;

A1 Board # 1 - Big Framing Question: "How can we make Station Street happier, healthier and safer?"

A1 Board # 2 - Ideas Board - 48 hours: What activation or community ideas could be implemented over 48 hours

A1 Board # 3 - Ideas Board - 48 Days (1-2 months): What activation or community ideas could be implemented over 48 Days.

A1 Board # 4 - Ideas Board - 48 Weeks (10 -12 months): What activation or community ideas could be implemented over 48 Weeks

A1 Board # 5 - Other Comments: Throughout the process, they may have comments on issues such as parking, access, greenery, safety, noise to name a few. These were noted down on post it notes and placed on this board.

A1 Board # 6 - Large Aerial Plan: A large aerial map marked up with non-negotiable design elements (footpaths, cycle access, disabled parking) and extent of important areas ie. closure area, and existing parking.



YOUR IDEA! SHARE YOUR IDEA TO MAKE STATION STREET HAPPIER, HEALTHIER AND SAFER?

WHAT'S THE IDEA?

HOW DOES IT WORK & WHATS NEEDED

HEY! LOVE THIS IDEA? VOTE FOR IT WITH A STICKER BELOW

○ ○ ○ ○ ○ ○ ○ ○

HOW CAN WE MAKE STATION STREET HAPPIER, HEALTHIER & SAFER?

A POTENTIAL TEMPORARY ROAD CLOSURE IS PLANNED FOR THE SOUTHERN END OF STATION STREET, MAINTAINING PEDESTRIAN AND CYCLE ACCESS - HOW MIGHT THIS INSPIRE YOUR IDEAS?

IDEA - 48 HOURS

INSPIRATION

YOUR IDEAS

IDEA - 48 DAYS

INSPIRATION

YOUR IDEAS

IDEA - 48 WEEKS

INSPIRATION

YOUR IDEAS

OTHER COMMENTS & IDEAS GO HERE!

STATION STREET PLAN

Legend:

- Footpaths - to be retained
- Existing disabled parking
- Existing cycle lanes
- Stationery / area for community activation
- Existing on-street parking
- Pedestrian Movement
- Potential road closure extents

Section 5: Assessment of the proposal in line with the objectives of the Transport Integration Act (2010)

5. Transport Integration Act assessment

Division 2—Transport system objectives

8. Social and economic inclusion	
The transport system should provide a means by which persons can access social and economic opportunities to support individual and community wellbeing including by—	
(a) minimising barriers to access so that so far as is possible the transport system is available to as many persons as wish to use it;	The road closure does not minimise or increase any barriers to accessing the transport system, providing there is no associated reduction to parking. On-street parking in the vicinity of the road closure is regularly used by elderly and mobility impaired users to access facilities at the Carlton Neighbourhood Learning Centre.
(b) providing tailored infrastructure, services and support for persons who find it difficult to use the transport system.	The road closure does not minimise or increase any barriers to accessing the transport system, providing there is no associated reduction to parking. On-street parking in the vicinity of the road closure is regularly used by elderly and mobility impaired users to access facilities at the Carlton Neighbourhood Learning Centre.
9. Economic prosperity	
The transport system should facilitate economic prosperity by—	
(a) enabling efficient and effective access for persons and goods to places of employment, markets and services;	There is likely to be an increase in vehicle journey time for some residents and local businesses. Any change is likely to be very minimal and very localised. There will be no change in non-vehicle accessibility.
(b) increasing efficiency through reducing costs and improving timeliness;	There is likely to be an increase in vehicle journey time for some residents and local businesses. Any change is likely to be very minimal and very localised. There will be no change in non-vehicle accessibility.
(c) fostering competition by providing access to markets;	Not Applicable
(d) facilitating investment in Victoria;	Not Applicable
(e) supporting financial sustainability.	Not Applicable

10. Environmental sustainability	
The transport system should actively contribute to environmental sustainability by—	
(a) protecting, conserving and improving the natural environment;	There is likely to be an opportunity to plant a couple of trees. Any change is likely to be minimal and very localised.
(b) avoiding, minimising and offsetting harm to the local and global environment, including through transport-related emissions and pollutants and the loss of biodiversity;	The street carries a low number of vehicles, and there is unlikely to be any material change in the number of vehicles in the neighbourhood. Any change is likely to be very minimal and very localised. There is no expected change in walking, cycling or public transport use.
(c) promoting forms of transport and the use of forms of energy and transport technologies which have the least impact on the natural environment and reduce the overall contribution of transport-related greenhouse gas emissions;	Not Applicable
(d) improving the environmental performance of all forms of transport and the forms of energy used in transport;	The street carries a low number of vehicles, and there is unlikely to be any material change in the number of vehicles in the neighbourhood. Any change is likely to be very minimal and very localised. There is no expected change in walking, cycling or public transport use.
(e) preparing for and adapting to the challenges presented by climate change.	The street carries a low number of vehicles, and there is unlikely to be any material change in the number of vehicles in the neighbourhood. Any change is likely to be very minimal and very localised. There is no expected change in walking, cycling or public transport use.
11. Integration of transport and land use	
1. The transport system should provide for the effective integration of transport and land use and facilitate access to social and economic opportunities.	Likely to be very limited change, if any, to transport system or land use.
2. Without limiting the generality of subsection (1), transport and land use should be effectively integrated so as to improve accessibility and transport efficiency with a focus on—	
(a) maximising access to residences, employment, markets, services and recreation;	There is likely to be an increase in vehicle journey time for some residents and local businesses. Any change is likely to be very minimal and very localised. There will be no change in non-vehicle accessibility.
(b) planning and developing the transport system more effectively;	Not applicable. Proposal has been developed outside of Council's adopted traffic and transport planning mechanism.

(c) reducing the need for private motor vehicle transport and the extent of travel;	Not applicable. There is unlikely to be any change in current transport use.
(d) facilitating better access to, and greater mobility within, local communities.	Not applicable. There is unlikely to be any change in mobility.
3. Without limiting the generality of subsection (1), the transport system and land use should be aligned, complementary and supportive and ensure that—	
(a) transport decisions are made having regard to the current and future impact on land use;	The proposal will likely result in some inconvenience for existing local businesses, although access to properties will be retained. There is unlikely to be any significant change in land use away from predominantly low density residential use.
(b) land use decisions are made having regard for the current and future development and operation of the transport system;	There is unlikely to be any significant change in land use away from predominantly low density residential use.
(c) transport infrastructure and services are provided in a timely manner to support changing land use and associated transport demand.	Not Applicable
4. Without limiting the generality of subsection (1), the transport system should improve the amenity of communities and minimise impacts of the transport system on adjacent land uses.	Not applicable. There is unlikely to be any significant reduction in traffic in the neighbourhood. Any reduction of traffic on Station Street is likely to result in an increase in traffic elsewhere in the neighbourhood.
12. Efficiency, coordination and reliability	
1. The transport system should facilitate network-wide efficient, coordinated and reliable movements of persons and goods at all times.	Any impacts will be local and within local road network. Any change is likely to be very minimal and very localised.

2. Without limiting the generality of subsection (1), the transport system should—	
(a) balance efficiency across the network so as to optimise the network capacity of all modes of transport and reduce journey times;	Any impacts will be local and within local road network. Any change is likely to be very minimal and very localised.
(b) maximise the efficient use of resources including infrastructure, land, services and energy;	Not applicable.
(c) facilitate integrated and seamless travel within and between different modes of transport;	Not applicable. Any change is likely to be very minimal and very localised.
(d) provide predictable and reliable services and journey times and minimise any inconvenience caused by disruptions to the transport system.	Not applicable. Any change is likely to be very minimal and very localised.
13. Safety and health and wellbeing	
1. The transport system should be safe and support health and wellbeing.	The proposal is not expected to result in an increase in walking, cycling or public transport use. There is unlikely to be any significant reduction in traffic in the neighbourhood. Any reduction of traffic on Station Street is likely to result in an increase in traffic elsewhere in the neighbourhood.
2. Without limiting the generality of subsection (1), the transport system should—	
(a) seek to continually improve the safety performance of the transport system through—	
(i) safe transport infrastructure;	Not Applicable
(ii) safe forms of transport;	Not Applicable
(iii) safe transport system user behaviour;	Not Applicable
(b) avoid and minimise the risk of harm to persons arising from the transport system;	Traffic will likely be diverted onto Canning Street as the alternative access to Princes Street. Canning Street is a major bicycle route. Whilst infrastructure is in place on Canning Street to help minimise conflict between vehicles and cyclists, the increase in vehicles using Canning Street is a concern to some cyclists. The current level of vehicles using Station Street is very low.
(c) promote forms of transport and the use of forms of energy which have the greatest benefit for, and least negative impact on, health and wellbeing.	Not Applicable - the closure does not promote alternative forms of transport.

**Section 6: Additional information required by VicRoads as
per Traffic Engineering Manual Volume 1,
Chapter 13: Road Closure**

6. Additional information and Council officer comment

6.1 Closure type

The proposed temporary road closure is located at the intersection of Station Street and Princes Street, North Carlton (refer to Figure 4).



Figure 4. Subject Site and its Environs Proposed Closure

Station Street access to and from Princes Street will be closed to vehicles only. The road closure treatment (i.e. bollards / barriers) will be placed on Station Street and will allow bicycles to pass through the closure. Pedestrian footpaths will remain open.

The required approvals for traffic management and associated signage on the local and arterial road network will be sought from VicRoads prior to the closure.

6.2 Background and objective of closure

A road closure on Station Street has previously been proposed as part of a Local Area Traffic Management Study of the North Carlton area in 2003. This was to only restrict egress (southbound) movements from Station Street to Princes Street due to expected redirected rat-running traffic caused by other measures being implemented in the precinct. It was decided at the time that this was a lower priority measure given the lower level of traffic using Station Street in comparison to other streets and the road closure was not implemented.

As part of works to upgrade the sewer network in North Carlton, Melbourne Water established a work site at the southern end of Station Street at the intersection with Princes Street between January 2015 and March 2016.

The worksite at Station Street extended across the full width of the road carriageway meaning that the movement of vehicular traffic along the street was effectively blocked at this location during the 15 month period.

In December 2015, the decision to progress with the currently proposed temporary closure was made on the basis of the effectiveness of the (Melbourne Water) road blockage in addressing the following concerns expressed by some residents of Station Street:

- the previous lengthy bank up of arterial traffic using Station Street seeking to exit into Princes Street (i.e. before the Melbourne Water works); and
- the risk to cars crossing 4 lanes on Princes Street, to reach the right turn lane on Princes Street at Nicholson Street to turn south towards the CBD.

In February 2016, the City of Yarra undertook a public consultation exercise in the North Carlton LATM 2 Precinct to gain an initial understanding of the level of potential support for a temporary road closure.

The results of the consultation indicated that approximately 50% of residents in the Carlton LATM 2 Precinct supported a temporary closure, whilst half opposed. The key concern for some residents is the potential impacts associated with a redistribution of traffic into other streets in the area.

In April 2016, Yarra City Council resolved to progress with a proposal to temporarily close Station Street at the intersection of Princes Street, North Carlton, to vehicles for the purposes of undertaking a traffic diversion experiment.

6.3 Land use

Station Street is in North Carlton which is a Neighbourhood Residential Zone (NRZ1). North Carlton and the surrounding area is largely residential with a few industrial and commercial properties as shown in Figure 5. North Carlton primary school is located at the intersection of Lee Street and Canning Street.

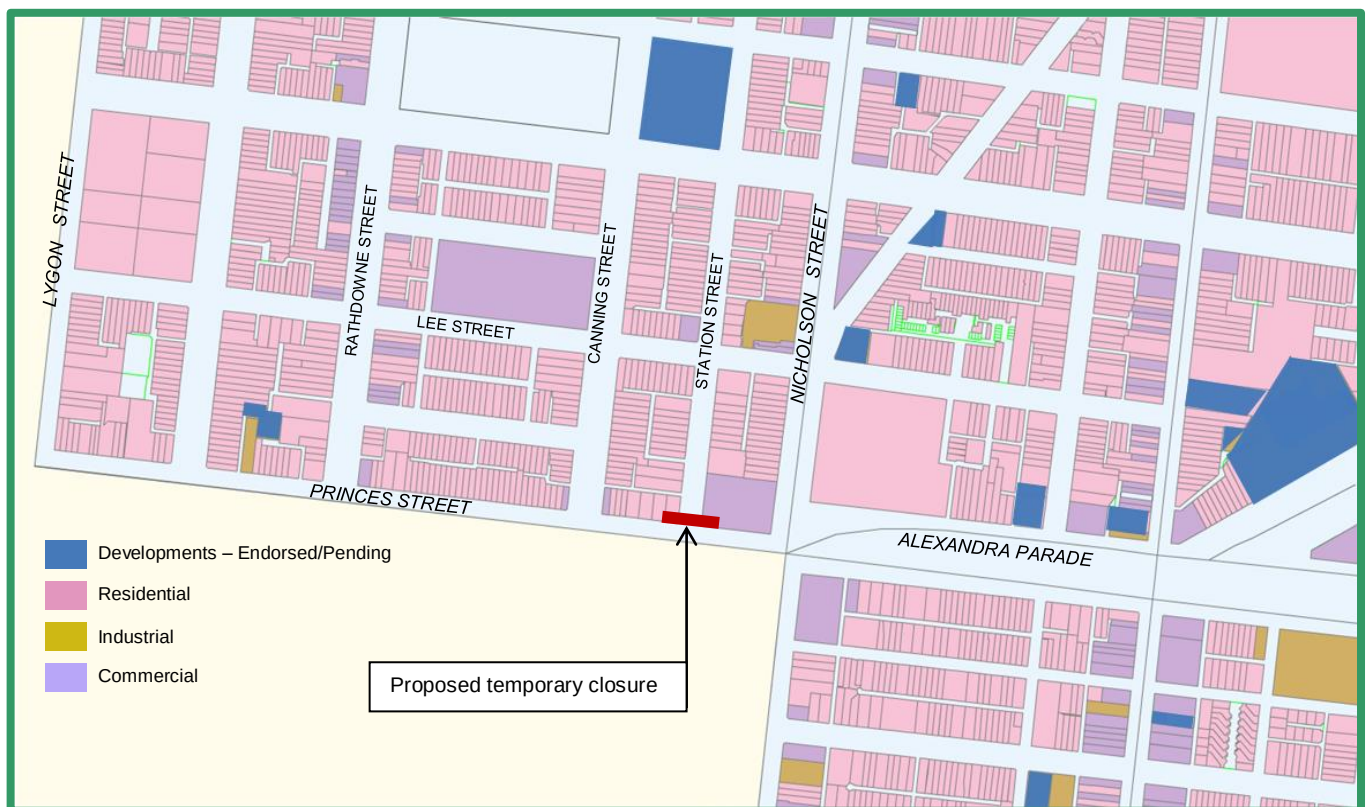


Figure 5. Land use & developments

6.4 Controls within 500m of the closure

Information on traffic controls within 500m of the proposed temporary closure is shown in Section 3.2 of the GTA Traffic Impact Assessment (refer to Section 2 of this document).

6.5 Street and road network hierarchy

Information on the street and road network hierarchy is provided in Section 3.2 of the GTA Traffic Impact Assessment (refer to Section 2 of this document).

6.6 Previous closures and traffic diversion experiments

The proposed temporary road closure has not been subject of a previous traffic diversion experiment.

The Station Street / Princes Street intersection was closed between January 2015 and March 2016 as part of the Melbourne Water North Carlton Sewer Upgrade works.

Councillors and Council officers met with VicRoads in mid-2016 regarding a temporary closure on Station Street. VicRoads officers noted that there were no notable impacts on the arterial road network during this time.

6.7 Consultation with emergency services

Consultation with Victoria Police, Ambulance Victoria and Metropolitan Fire Brigade was conducted in November 2016. All parties have no major concerns regarding the proposed closure.

The Metropolitan Fire Brigade (MFB) noted possible extended response times to the premises in the southern area of Station Street due to the road closure. MFB noted that this will be offset by a communications plan and ongoing familiarisation of the area by those stations responding to “Alarms of Fire”.

6.8 Consultation with public transport operators

Public Transport Victoria and bus operators Dysons and Transdev have expressed no objections towards the proposal.

6.9 Consultation with Bicycle Network

Initial consultation with Bicycle Network has indicated that it strongly opposes the Station Street temporary closure on the basis that the closure is highly likely to result in an increase in traffic using Canning Street to access Princes Street.

Bicycle Network considers that an increase in traffic using Station Street will decrease both the level of service (i.e. amenity) and safety for bike riders on Canning Street. Bicycle Network has noted that Canning Street is the third busiest on-road cycle route in Melbourne and that bike rider traffic on Canning Street increased by 15% in 2016 in comparison to the previous year. As similar increases in bike riders using Canning Street is anticipated in the future, Bicycle Network considers that it would not be appropriate to encourage more motor vehicles along this key bicycle corridor.

6.10 Communication and stakeholder engagement plan

The report provided by VicRoads will be presented to Council for consideration.

If the subsequent decision is to proceed with the temporary closure, Council will present the key findings of the study to the wider North Carlton community and will seek feedback on the proposal in accordance with Section 223 of the Local Government Act 1989. This will allow residents and other stakeholders the

opportunity to make representations to Council in writing or in person before any decision on the installation of the closure is made by the Council.

If Council proceeds with the temporary road closure, the closure will be advertised in line with the requirements of the Local Government Act 1989. Any required traffic management approvals will be sought from VicRoads.

With a temporary closure in place, any impacted residents or stakeholders wishing to make a complaint or communicate with Council will be handled in line with Council's Customer Service Charter.

Utilities or other companies who undertake works within the road reserve will be managed by Council's Construction Management branch in line with current construction traffic management practices and policies.

Should any issues occur with the temporary closure, VicRoads and other key stakeholders will be consulted at an officer level as per current reporting and feedback processes. Any required changes will be communicated to the community.

The temporary closure will be evaluated during the next LAPM study for the North Carlton precinct. As part of this study, key stakeholders such as VicRoads, Bicycle Victoria and important local land uses (i.e. North Carlton Primary School) will be consulted with. Any decision to continue or end the temporary closure will be communicated to the community in accordance with Section 223 of the Local Government Act 1989.

6.11 Extent of traffic impacts and mitigation measures

The extent of the impacts on the road and transport network resulting from the proposal is set out in Section 5 (Traffic Impact) and Section 6 (Conclusions and Recommendations) of the GTA Traffic Impact Assessment (refer to Section 2 of this document).

The scope of works was previously agreed between Council and VicRoads officers.

Council officers have undertaken numerous on-site observations on Station Street (most recently in July 2017) and confirm that the traffic conditions presented in the TIA are representative of current typical traffic conditions on Station Street (i.e. maximum queue lengths of around 6 vehicles during the AM peak hour, with periods of the AM peak hour with no queuing at all, and a limited number of vehicles accessing Nicholson Street from Station Street via the right turn lane on Princes Street).

Council officers note that the scenarios tested by GTA Consultants represent the worst case or high impact outcomes for traffic impact testing purposes only. Applying the assumptions used by GTA over the course of the full day would see daily increases of traffic on Canning Street in the order of 105 to 470 vehicles per day (refer to Table 1).

Table 1 Daily traffic flows on Canning Street (between Davis Street and Princes Street) using GTA assumptions

	Existing daily traffic volume on Canning Street (approx. vehicles per day)	Increased number of vehicles using Canning Street (vehicles per day)	Future Daily Traffic Flow on Canning Street as per GTA scenarios
Scenario 1	550 to 620	105 to 110	655 to 730
Scenario 2	550 to 620	450 to 470	1,000 to 1,090

Council officers also consider that there is unlikely to be any traffic or safety related impact on the broader road network as evident by the limited notable impacts on the road network during the full closure of the Station Street / Princes Street intersection between January 2015 and March 2016 associated with Melbourne Water upgrade works.

As any increased congestion associated with the temporary closure will only be on the local road network, no mitigation measures are proposed at this stage. All required signage and road closure treatments (i.e. bollards / barriers) will be supplied and funded by Council. Council officers will undertake on-going monitoring of the closure as part of the overall evaluation process.

The potential safety impacts for pedestrians and cyclists on Canning Street will need to be given further consideration by Council before a decision is made on the closure particularly given:

- The recent accident history involving cyclists on Canning Street, with one accident occurring after the changes to the lane arrangements on Canning Street.
- The very low levels of traffic and lack of identified traffic and safety issues on Station Street between Lee Street and Princes Street.
- The only changes to amenity on Station Street will be predominantly for those residents between Lee Street and Princes Street whilst any perceived amenity and safety issues and vehicle queuing will be transferred to other local streets in the area.
- The road closure has limited overall benefit for the North Carlton community and does not address potential rat-running between Station Street and Rathdowne Street (via Lee Street or Davis Street, with these vehicles crossing the bicycle lanes on Canning Street). The road closure on Station Street at the intersection with Princes Street may limit future options in addressing this issue.

**Appendix 1: Yarra City Council resolution 5
September 2017**

11.1 – COUNCIL RESOLUTION

Moved: Councillor Fristacky

Seconded: Councillor Coleman

1. That Council:
 - (a) notes:
 - (i) representations by Station Street residents since 2015, including several families with children seeking alleviation from the impacts of traffic accessing the Princes Street/Alexandra Parade major arterial in North Carlton;
 - (ii) Resident Submissions to VicRoads received September 2017, including analysis of traffic and safety, ongoing damage to road infrastructure at Station/Princes Streets from turning vehicles, and comparisons of Council traffic data before (Council surveys 2009, 2013), during (Council survey February 2015), and after (GTA survey September 2016) the previous 14 month temporary closure of Station/Princes Streets January 2015 to March 2016 required for Melbourne Water sewer works; and
 - (iii) the above Resident Submissions identifying that analysis of this comparative traffic data showed an overall reduction in traffic volumes in February 2015, during the period of that temporary closure, by a net 437 vehicles less per day for all streets affected by the temporary closure - Station, Davis, Canning Streets, and on Lee Street past the Carlton North Primary School; and
 - (b) notes Council's four prior resolutions on this matter dated 10 November 2015, 15 December 2015, 19 April 2016, and 20 December 2016, and the further information on these representations;
 - (c) now determines to refer to VicRoads, this Council resolution, the above Resident Submission to VicRoads, and material in Attachments 1 and 2, with a request that VicRoads consider this matter and provide a report in accordance with Schedule 11, Section 10(1)(c) of the *Local Government Act 1989*, on the proposed trial closure of Station Street North Carlton at its intersection with Princes Street, pending completion of a proposed North Carlton Local Area Traffic Management assessment of the area being undertaken; and
 - (d) resolves to receive a further report to Council within a month of receiving the report from VicRoads on this matter together with advice on further proposed consultation with the community on any proposed trial closure.

Appendix 2: Resident Submission to 5 September 2017 Council Meeting

Submission to VicRoads by residents

Proposed trial road closure, Station/Princes Streets, North Carlton

Background

Closure of Station Street at Princes Street was identified during extensive community input in 2002/03 on ways to manage traffic on local roads through the North Carlton precinct. A half closure at Station/Princes Streets was incorporated in priority measures set out in plans dated 25 September 2003 drafted by GTA Traffic & Transport Consultants. Several traffic calming measures from these plans - reduction of speed to 40 km/h, and some intersection kerb outstands were implemented. However, most of the 2002/03 North Carlton LATM proposals were not actioned as LATM assessments shifted to other parts of Yarra.

North Carlton was prioritized for LATM assessment for 2014/15, then 2015/16. Postponed due to Melbourne Water upgrading the main Carlton Sewer which saw closure of Station Street at Princes Street between January 2015 and March 2016, the community was advised the North Carlton LATM would be rescheduled to 2017/18. Officer proposals now suggest further postponement to 2018/19.

This delay is a serious concern for North Carlton given the extensive community input in 2002/03, the plans drafted by GTA for Council in September 2003 and the added traffic impacts on North Carlton with development in the inner north and east.

The 14-month temporary closure of Station/Princes Streets as part of the Melbourne Water sewer works saw substantial alleviation in traffic queuing in Station Street with other benefits including reduced traffic on Lee Street adjacent to the Carlton North Primary School. Reopening of Station Street at Princes Street from March 2016, has seen a return to substantial queuing of vehicles seeking to access the Princes Street arterial from Station Street. This has renewed representations on extending the temporary closure of Station Street.

A summary of issues on the proposed closure follows:

- Traffic queuing on Station Street
- Safer angle parking on Station Street
- Vehicles turning into heavy Princes Street traffic lanes
- Ongoing damage to road infrastructure at Station/Princes Streets
- Amenity improvements on Station Street
- Positive impacts of Melbourne Water closure
- Other examples of local road closures at arterials

Traffic Queuing on Station Street

Station Street residents have over at least 15 years, raised the problems of traffic queueing on Station Street as north-south drivers seek access to Princes Street to avoid traffic on Nicholson Street. This queuing on Station Street is shown below:



11/11/2016 – 12 vehicles queueing



21/12/2016 – 10 vehicles queueing

A GTA assessment based on observations in September 2016, downplayed queuing to a maximum of 6 vehicles at any one time. The above photographs show typical morning peak queuing double that, following reopening of the closure post March 2016.

Safer angle parking on Station Street

Station Street has angled parking along its east side. Egress from angled parking by residents during the morning peak is difficult given the queueing of vehicles along the length of Station Street between Lee and Princes Streets. This is problematic for all angle parked cars, but is more problematic for users of disabled car parking spaces outside the Carlton Neighbourhood Learning Centre on Station Street at Princes Street. Closure would remedy this problem of cars seeking to reverse into a queue of vehicles. The learning centre would be a large beneficiary of the closure as the reduced traffic will make parking easier and safer.



2014 pre the closure from January 2015

Vehicles turning into heavy Princes Street traffic lanes

Residents on Station Street emphasise safety concerns over cars queuing on Station Street exiting into oncoming traffic on Princes Street. Such exiting raises several problems:

1. Cars queuing on Station Street seek to exit rapidly to secure a space in incessant oncoming traffic on Princes Street;
2. Impatient drivers on Princes Street, focused on getting through the traffic lights at Nicholson Street are reluctant to give way to vehicles exiting from Station Street east into Nicholson Street;
3. A proportion of vehicles exiting Station Street seek to turn east across 4 lanes of

traffic to access the right turn lane on Princes Street into Nicholson Street south to the CBD;

4. Residents report accidents in this area of Princes Street due to these manoeuvres. Tow trucks often wait in the area anticipating crashes at Princes/Nicholson Streets.



Truck exiting Station into Princes St, 25 June 2016



Cars exiting Station into Princes St, 4 January 2016



The Station Street resident providing the above 25 June 2016 photo, stated:

"Because there are so many vehicles on Princes st. travelling east, vehicles wanting to turn left at the intersection become impatient and force their way onto the Princes st middle lanes. This is very dangerous for the vehicles already travelling east on Princes street, approaching the Station st intersection.

You can't tell by the photo, but the drivers blocked by the truck, were angry and tooting their horns.

I think it is an accident waiting to happen. This sort of incident at the intersection occurs on a daily basis."

GTA Figure 3.3 reporting a 5-year history to 2015, of injury crashes adjoining the subject site, covered crash data between Rathdowne and Station Streets, but omitted crash data in Princes Street between Station and Nicholson Streets. Given the area of analysis, it is important to consider the impact of left turn vehicles from Station Street into Princes Street and the problems outlined above.

There were 6 reported injury crashes in this section of Princes Street between Station and Nicholson Streets during that 5-year period to 2015. Although a 2016 officer report suggested crashes in this section of Princes Street were unrelated to vehicles exiting from Station Street, the crash stats need proper situational analysis. Apart from injury crashes, residents in Station Street proximate to Princes Street, identify that other crashes involving only vehicle property damage, mostly unreported, are experienced on a regular basis. Residents hear and see these crashes which, while at speeds which may not result in personal injury, cause property damage, noise and other adverse impacts, but are not included in injury crash stats.

It is submitted that the temporary closure of Station Street at Princes Street January 2015 to March 2016, resolved the above problems.

Ongoing damage to road infrastructure at Station/Princes Streets

The impact of traffic seeking to turn quickly out of Station Street into Princes Street is evident in the ongoing damage to kerb outstands at Station/Princes Streets.

The community has worked to achieve water sensitive urban design (WSUD) and amenity improvements in North Carlton with traffic treatments at Station/Princes and Lee/Station Streets. Vehicles turning from Station Street into Princes Street and from Princes Street into Station Street constantly damage the kerb outstands and WSUD garden beds installed at the intersection to manage traffic. This is evident

from the below photos at Station/Princes Streets damage to bluestone edging, asphalt paving and garden beds, which requires regular repair and maintenance.



Closure of Station Street at Princes Street would rectify this constant repair headache which adds to local government maintenance costs and substantially reduces local amenity while the damage is reported, assessed and budgeted for repair, then actioned.

Amenity improvements on Station Street

Residents found that the temporary Melbourne Water road closure at Station/Princes Streets resulted in amenity improvements on Station Street with a safer traffic calmed street. Continued closure is sought to ease the concerns of parents and families on the street and occupants of the residential facility for people with disabilities adjacent to the Carlton Neighbourhood Learning Centre.

The road closure also alleviated the impact of some 30,000+ vehicles per day using Princes Street, forming a barrier to traffic impacts and noise from cars hooting at exiting vehicles. One resident stated that prior to the Melbourne Water closure, she was not supportive of closing Station Street at Princes Street, but having experienced the benefits, was firmly now in support.

Positive Impacts of Melbourne Water Road closure

Overall the impacts of the Melbourne Water temporary road closure between January 2015 and March 2016 were positive. No adverse impacts were reported on the arterial road network and the closure was in general, well received by the local community. Particularly positive impacts were reported in traffic calming the area of Station Street.

A surprising result was that the closure also had a positive impact on reducing vehicle traffic in Lee Street adjoining the Carlton North Primary School.

1. The table below sets out 24-hour two-way traffic flow (VPD – vehicles per day) from traffic data for streets directly affected by the closure of Station/Princes Streets at 3 different periods without and with the closure between January 2015 and March 2016:
 - (a) between August 2009 - November 2013, before the closure in 2015/16;

- (b) February 2016 during the closure, before re-opening in March 2016; and
(c) September 2016, after the road was reopened.

Street	Between	VPD before closure	VPD with closure Feb-16	Increase/ Decrease VPD	VPD Sep-16 when open	Increase/ Decrease VPD when open
Canning St	Davis St - Lee St	Aug-09 559	750	+191	620	-130
Davis St	Rathdowne St - Canning St	Jul-12 759	792	+33	719	- 73
Lee St	Station St - Canning St	Nov-13 921	935	+14	854	- 81
Lee St*	Canning St - Rathdowne St	Aug-09 432	312	-120	391	+79
Station St	Lee St - Newry St	Aug-09 1,019	904	-115	1,028	+124
Station St**	Lee St - Princes St	Aug-09 747	227	-520	473	+246

* Lee St is one way from Canning to Rathdowne St, thus data is one way, not two way traffic flow

** Preponderance of traffic flow on Station St is north-south from Lee to Princes St with limited south-north traffic from Princes St

2. The closure period saw:

Reduction in vehicles on:

- Station Street - Lee to Princes Streets by 520 VPD;
- Station Street - Lee to Newry Streets by 115 VPD;
- Lee Street - Canning to Rathdowne Streets by 120 VPD.

Total reduction in vehicles during closure = 775 VPD

Increase in vehicles on:

- Canning Street (between Davis and Lee Streets by 191 VPD.
- Some of this increase was however due to vehicles from Davis Street rather than from Station Street, as vehicles on Rathdowne Street turn west into Davis Street, then south into Canning Street to access Princes Street, in order to avoid queuing at the intersection of Rathdowne/Princes Streets.

Not a significant difference in traffic flows on:

- Lee Street - Station to Canning Streets – 14 VPD increase;
- Davis Street - Rathdowne to Canning Streets – 33 VPD increase.

Total increase in vehicles on above 3 streets during closure = 238 VPD

3. Closure of Station/Princes Streets saw substantially reduced traffic on Station Street by 635 VPD between Newry and Princes Street, but also reduced traffic using Lee Street adjacent to the Carlton North Primary School by 120 VPD, thus also benefitting the Primary School. With removal of the closure in March 2016, traffic increased on Lee Street past the Primary School – 79 VPD, but was still lower than the recorded 2009 level. Post removal of the closure, traffic on Canning Street between Davis and Lee Streets declined by 130 VPD and to a lesser extent on Davis and Lee Streets (-73 VPD) between Station and Canning Streets.
4. The closure of Station Street at Princes Street evidenced a higher overall reduction in traffic volumes for Station Street, and for Lee Street adjacent to the Primary School (totaling 775 VPD). The benefits of this reduction greatly exceeded increased traffic flow in Davis and Canning Streets, and in Lee Street between Station and Canning Streets (totaling 238 VPD). Re-opening of Station Street at Princes Street saw an increase in traffic volumes for Station Street, and for Lee Street adjacent to the Primary School (by a total of 449) compared with a reduction

on Davis and Canning Streets, and in Lee Street between Station and Canning Streets (totaling 284 VPD).

Overall positive benefit

The above data showed an overall benefit in terms of traffic volumes. Closure saw a positive 775 VPD reduction in 3 affected streets as against an increase of 238 VPD in 3 other affected streets, that is, a net decrease of 437 VPD. The traffic data relating to the Melbourne Water closure of Station/Princes Streets thus showed an overall net local benefit in terms of local traffic volumes.

Impact on Canning Street Cyclists

The below table sets out cycle data at the Canning/Princes Street intersection from Super Tuesday bike counts in March 2015 and 2016 - northbound and southbound in the morning peak 7-9am.

Intersection	2015 Volume	2016 Volume	% difference
Canning to Princes St	1054	1215	+15%

It has been suggested that the temporary closure of Station Street may be adverse for cyclists on Canning Street between Lee and Princes Streets. However, vehicles from Station Street are only 1 of 5 sources of traffic on this part of Canning Street between Princes and Lee Streets:

1. Cars from Station Street turning R into Lee, L into Canning to turn L into Princes: Only this category of the 4– 5, would be an extra source of traffic volume on Canning Street. But these vehicles do not cross the cycle path on Canning Street.
2. Cars from Rathdowne Street, turning L into Davis Street, then R into Canning cross both northbound and southbound bike paths, to turn L into Princes Street.
3. Cars from Station Street turning L into Canning, then turn R into Davis Street cross both northbound and southbound bike paths, to turn into Rathdowne Street.
4. Cars from Station Street, turning R into Lee Street, also cross both northbound and southbound bike paths on Canning to continue on Lee Street past the School to turn into Rathdowne.
5. Cars from Princes Street turning L into Canning, then R into Lee Street, cross both northbound and southbound bike paths on Canning Street.

Of the 5 categories of vehicles, categories 2 to 5 are unrelated to any road closure at Station/Princes Streets and would continue regardless. Only category 1 would contribute to extra vehicles on Canning Street as a result of a closure of Station Street at Princes Street. Even so, as regards cyclists, vehicles in category 1 turn L into Canning Street parallel to the cycle path adjacent to the Canning central median; the bike path is on the R of any vehicles coming from Station Street via Lee Street. Category 1 vehicles using Canning Street do not cross the cycle path or cut across cyclists. Thus there is no adverse impacts for cyclists from these vehicles from Station Street.

The problematic vehicles for Canning Street cyclists are categories 2-5 above; these, unlike category 1, cross over both directions of the Canning Street bicycle path, with impacts for cyclists. This happens with or without the closure and is thus unrelated to any closure at Station/Princes Streets.

Furthermore, it is suggested that overall traffic on Canning Street may be alleviated to the extent that “Road closed Ahead” signs on Station Street, incidentally, serve to deter vehicle volumes in 3-4 above. This is supported by the decline in traffic volumes along Lee Street adjacent to the Carlton North (Lee Street) primary school during the period of the Station/Princes Street road closure due to Melbourne Water sewer works!

While a majority of residents in the affected section of Canning Street between Lee and Princes Streets did not support continuation of the Station Street closure, it is pointed out that it is safer for vehicles to turn into Princes Street from Canning Street as against turning from Station Street. This is because vehicles can turn L into Princes Street when oncoming vehicles on Princes Street stop at the traffic lights at Canning/Princes Street to wait for cyclists and pedestrians to cross Princes Street at Canning Street. There is also greater visibility from Princes Street of vehicles turning out of Canning as against out of Station Street. Traffic exiting Canning onto Princes also has a wider view of vision because of the median on Canning. There is also no added lane on Princes at Canning so you don't have the danger of traffic veering into new lanes like at the moment at Station.

It is concluded from the analysis that there are no significant impact of the Station Street closure on cyclists using Canning Street. This was recognized by GTA in its 2016 report (Page 29).

Examples of local road closures at arterials

There are many other examples of residential streets being closed at or near arterial roads to improve local road safety and amenity and/or to better support arterial traffic flow. Some such examples include:

- Station Street south at Princes St, Carlton (Melbourne City Council side) - full closure
- Drummond Street south at Princes Street, Carlton - full closure
- Napier Street at Victoria Parade, Fitzroy - half closure
- George Street south of Alexandra Parade, Fitzroy - full closure
- Queens Parade north of Alexandra Parade, Clifton Hill - half closure
- Emma Street south of Alexandra Parade, Collingwood - half closure
- Napier Street, Fitzroy, at Fitzroy Primary School - full mid-block closure near Johnston Street.

Conclusions

Residents of Station Street conclude that there are safety benefits in continuation of the closure of Station Street at Princes Street with no significant adverse outcomes for either local traffic, Canning Street cyclists, or on the arterial road network.

Although some additional traffic queuing is likely on Canning Street at Princes Street, the Melbourne Water temporary closure of Station/Princes Streets between January 2015 and March 2016 saw a positive 775 VPD overall reduction in Station Street between Newry and Princes Streets and in Lee Street adjacent to the Carlton North Primary School. This contrasted with an increase of 238 VPD in 3 other affected streets, that is, a net decrease of 437 VPD. The traffic data relating to the Melbourne Water closure of Station/Princes Streets thus showed an overall net benefit in terms of local traffic

volumes. It is safer for cars to enter Princes at Canning rather than Station because

- no added lane on Princes
- the traffic lights create a break in the traffic
- the greater width of the intersection provides better conflicting traffic visibility.

Further benefits are reduction in the costs of regular repair and maintenance required to the traffic treatments at Station/Princes Streets, damaged by exiting traffic and significant enhancements of the amenity of Station Street residents.

VicRoads and Council are thus urged to support the continuation of the closure.

Matt Janson.	211 Station Street
Anthony & Lisa Polglaze.	221 Station Street
Vito Manlio.	215 Station Street
Wendy Hargreaves.	250 Station Street
Sunita.	217 Station Street
Mick & Jeneane.	219 Station Street

Appendix 3: Resident Submission to 10 November 2015 Council Meeting

Why Station St should stay closed at Princes St

- FACT 1: The upgrade of the Carlton Sewer has created a forced closure of Station Street, Carlton North at Princes Street. Noise levels from the drilling and reduced parking have caused headaches for residents, but there's a silver lining. The closure has created an extremely positive impact on local residents and the community – our streets are now safe for pedestrians and cyclists again as we have cleared our residential area of rat runners.
- FACT 2: Councillors may be aware of the extensive North Carlton LATM review in 2002/03, in which GTA consultants recommended the closure of Station/Princes Streets. It was supported by local residents but not actioned. The 2014/15 LATM failed to happen, and is proposed for 2017/18. This means NO action 2019/20 - 18 years after the first recommendation.
- FACT 3: Meanwhile many similar residential streets have been closed at Princes St (such as the Carlton side of Station Street) to improve residential safety and traffic flow of Princes Street.
- FACT 4: Before the sewer works closure, cars exiting Station St would cut directly across four east-bound lanes of Princes St to turn south into Nicholson St. This dangerous practice caused regular accidents and has now ceased with the closure.
- FACT 5: Significantly reduced traffic is now diverted down Canning Street, where traffic lights allow for a safe exit from Canning St into Princes St, with greater time to change lanes for a turn into Nicholson St.
- FACT 6: Princes St traffic flow has improved significantly without cars forcing their way into traffic from Station St. We don't hear any car horns in peak hour any more.
- FACT 7: Carlton Neighbourhood Learning Centre users could not access parking due to the peak hour traffic backed up on Station St. That problem is solved by the closure.
- FACT 8: Pedestrians and cyclists on the north side of Princes St could not cross Station St without putting themselves in danger due to the traffic exiting Station Street. That problem is solved by the closure.
- FACT 9: Cars cutting the corner from Station St into Princes St have destroyed the bluestone curb on the east corner, which has been replaced many times by the council. This won't happen anymore.
- FACT 10: Three east bound lanes on Princes St become four lanes at the intersection of Station St. Before the closure, this encouraged morning rat running which started at Amess St to avoid Nicholson St. The morning rat run on residential streets has been significantly reduced pushing traffic back onto Nicholson St. Installation of 40KPH signs and speed bumps on Station did not help, but the closure helped immediately – meaning fewer cars at children's centres including Gowrie, Carlton North Kindergarten and Carlton North Primary
- FACT 11: Cyclists riding west along Lee Street put their lives in danger in peak times when Station St is open to traffic (as Lee Street is a one-way street and they do not expect to give way). The temporary closure means safer access to Canning St and the Yarra Trail for cyclists.
- FACT 12: Cars travelling south along Princes St avoided the left turning lights at Nicholson Street by turning left at Station Street (speeding along the Station Street bike lane) and accessed Nicholson Street via Lee Street. No longer do we have speeding rat runners using residential streets as a short-cut.
- FACT 13: Closing the street would allow beautification and greenery from Princes St. The Carlton Neighbourhood Learning Centre could use the space for a community garden.

