Station Street Road Closure Carlton North Transport Impact Assessment

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

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Carlton North

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
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Table of Contents

Tables

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:

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

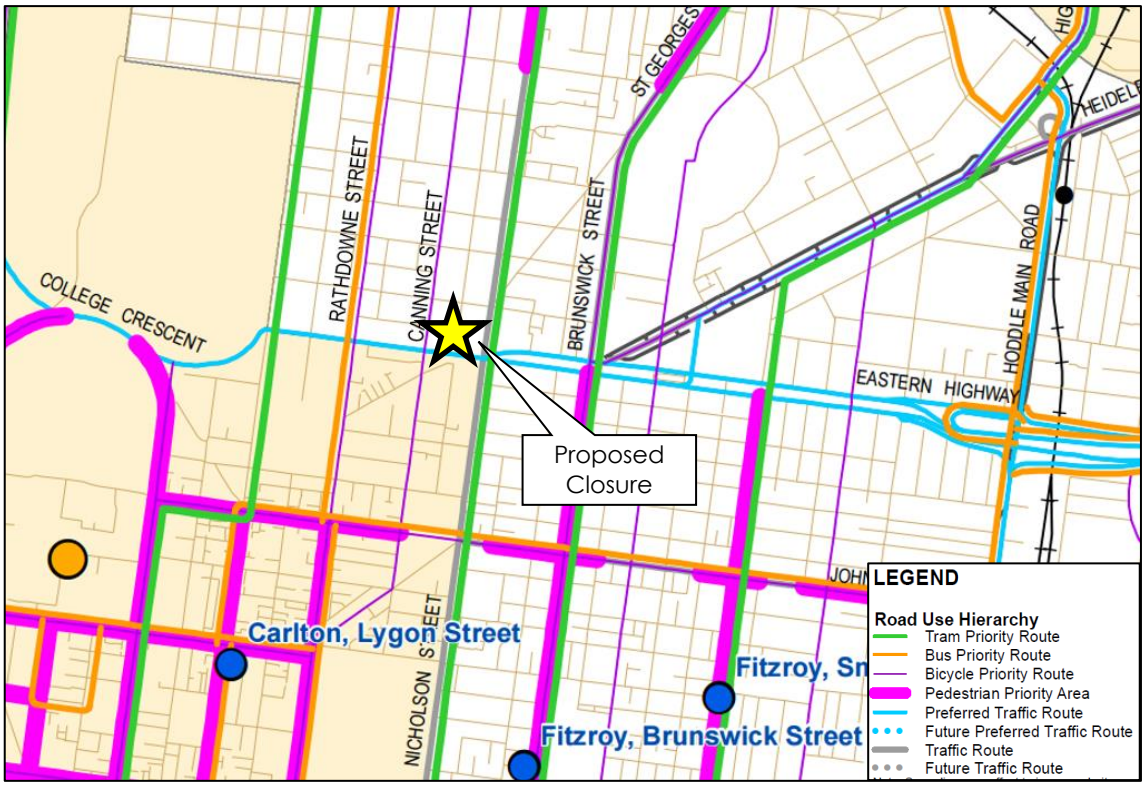
SmartRoads is a VicRoads policy which sets strategic 'modal' priorities on the road network and underpins many of the strategies significant to the operational directions that support broader strategies around land use and transport.

"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

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

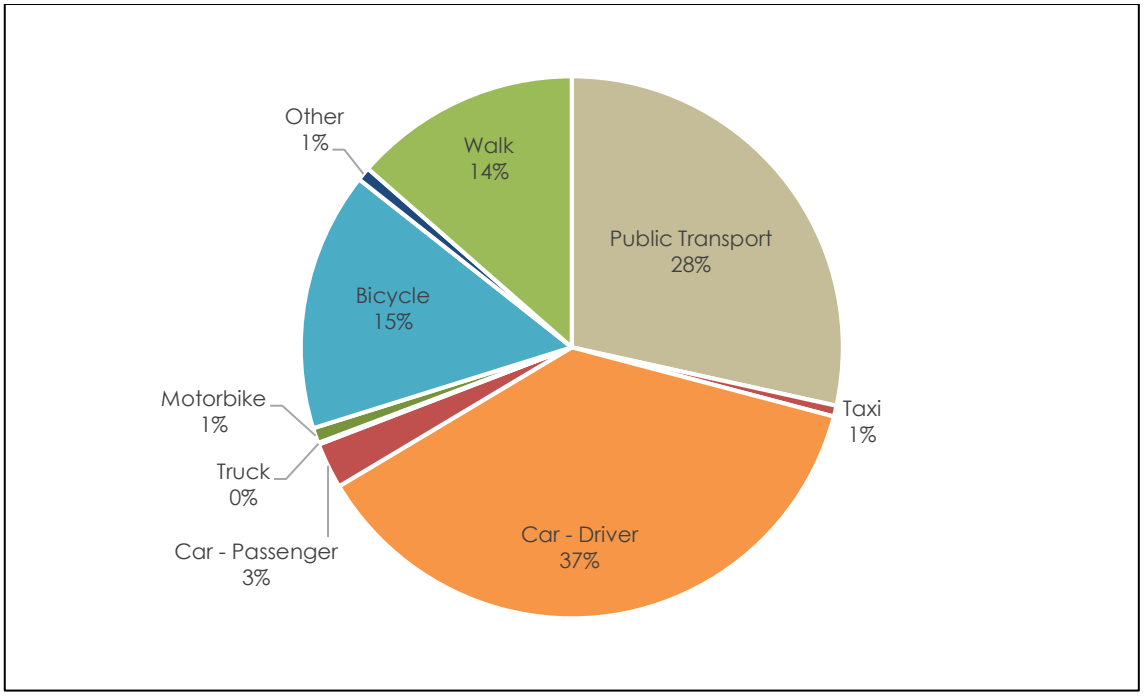
The area is predominantly residential; however, the following major non-residential land uses exist:

- 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 day[1].

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.

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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:

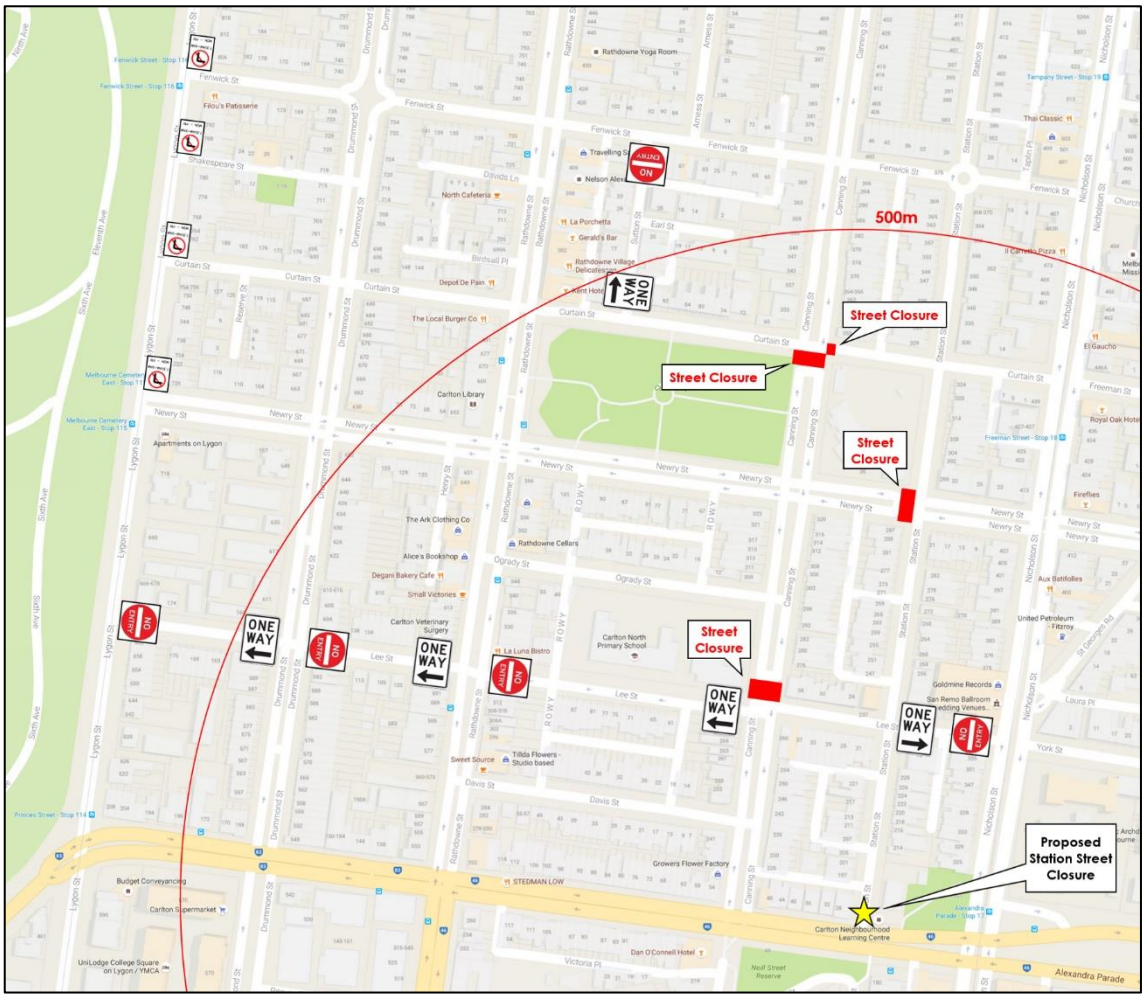
- Station Street / Princes Street (unsignalised T-intersection)
- Station Street / Lee Street (unsignalised X-intersection)
- Station Street / Newry Street (unsignalised X-intersection)
- Canning Street / Princes Street (signalised X-intersection)
- Canning Street / Davis Street (unsignalised T-intersection)
- 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

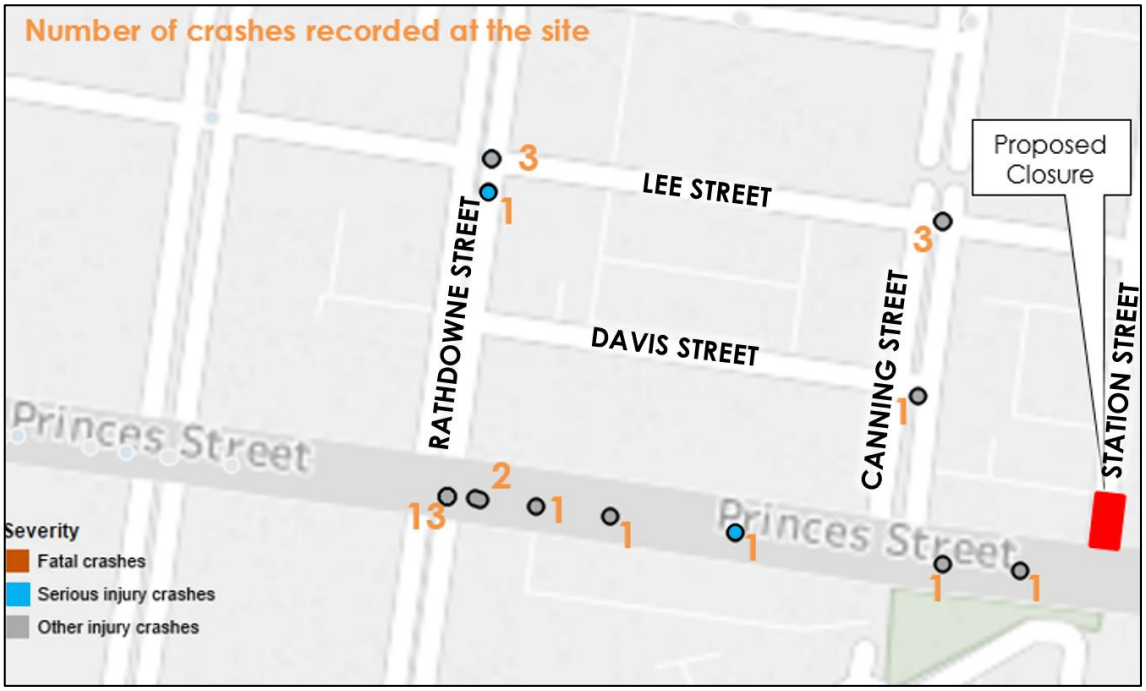
3.3 Crash Stats

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:

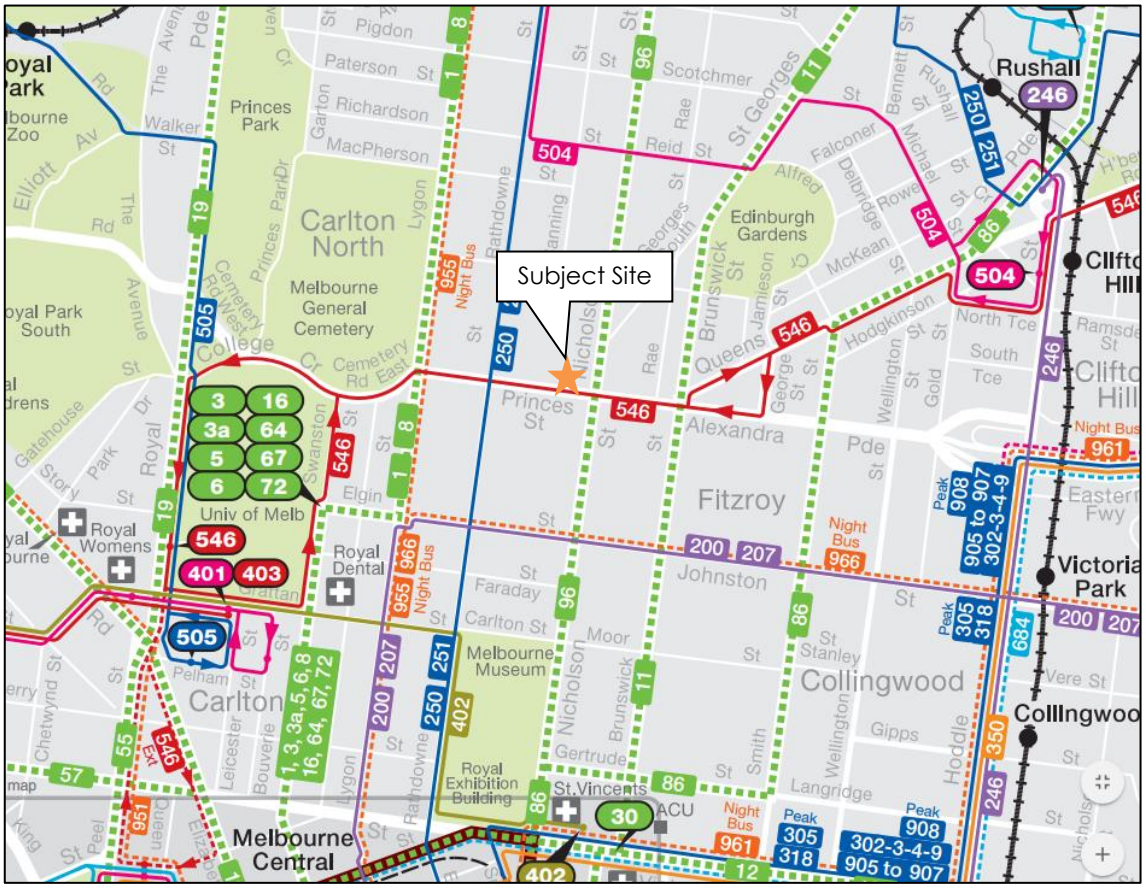
- There has been a total of 15 crashes at the Princes Street/Rathdowne Street, and one at the Princes Street/Canning Street intersection
- Along Rathdowne Street there have been a total four crashes recorded
- Along Canning Street there have been a total of four crashes, noting that the three at the 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.

3.4 Public Transport

Figure 3.4 shows the subject site in relation to existing public transport routes within its vicinity.

Figure 3.4: Public Transport Map



As indicated in Figure 3.4, the area surrounding Station Street is well serviced by public transport, with bus and tram routes operating frequently within the vicinity of the proposed closure. It is noted that the closure of Station Street would have no direct impact on existing public transport routes or stops. However, consideration of any traffic impacts from the re-routing of vehicles is considered further in Section 5.

3.5 Pedestrian Infrastructure

Pedestrian paths are located on all footpaths in the vicinity of the site, with signalised pedestrian crossings on Princes Street at the intersections with Rathdowne Street, Canning Street and Nicholson Street.

3.6 Cycle Infrastructure

The Principal Bicycle Network (PBN) is a network of on and off-road cycling corridors that have been identified to support cycling for transport and access major destinations in metropolitan Melbourne. The PBN was reviewed and updated in 2012 by VicRoads and all local Councils.

The PBN is also a 'bicycle infrastructure planning tool' to guide State investment in the planning and development of the future metropolitan Melbourne bicycle network. In this regard, a subset

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).

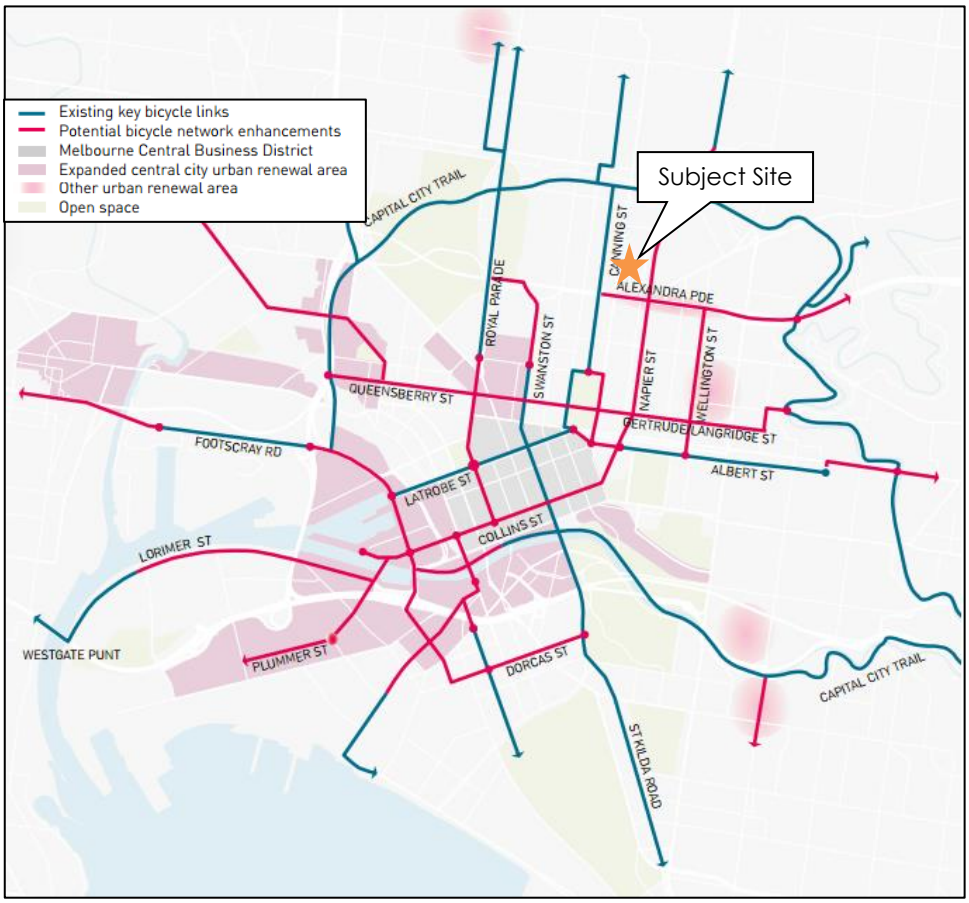
Proximate to Station Street, the following BPR's are indicated in Figure 2.1:

- 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 3.5[3].

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 SCATS[4] 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)

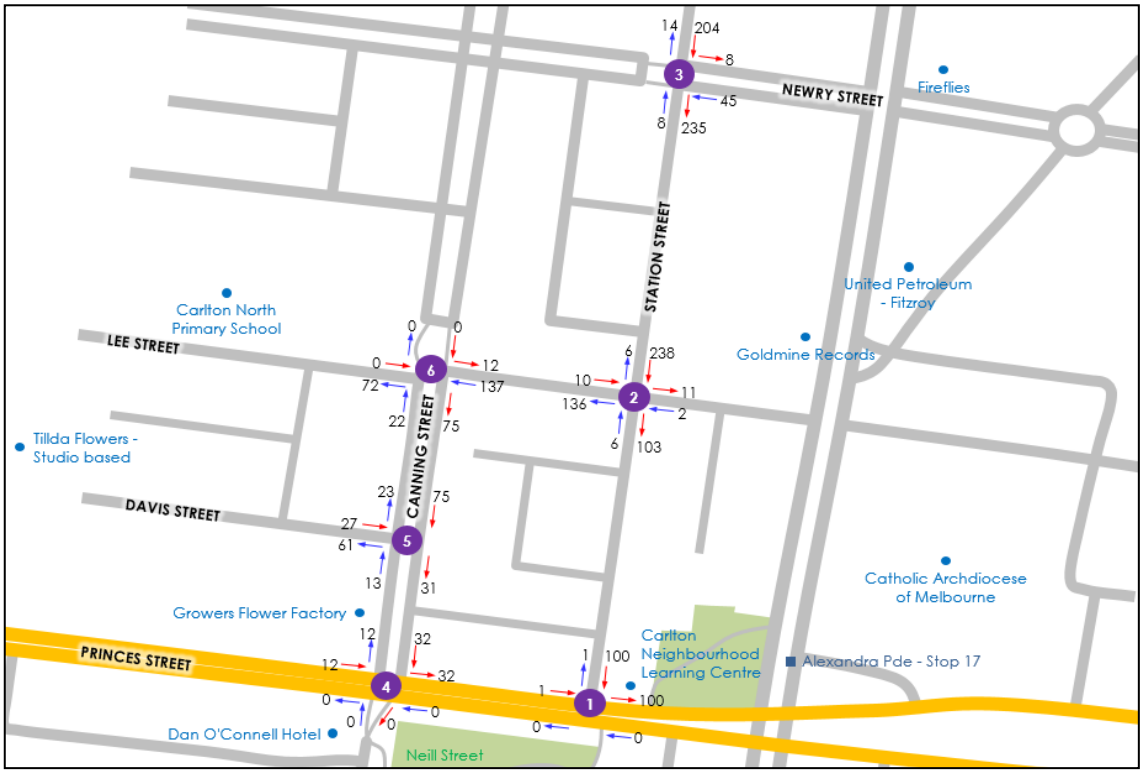


Figure 4.2: Existing PM Peak Hour Traffic Volumes (5:00pm-6:00pm)

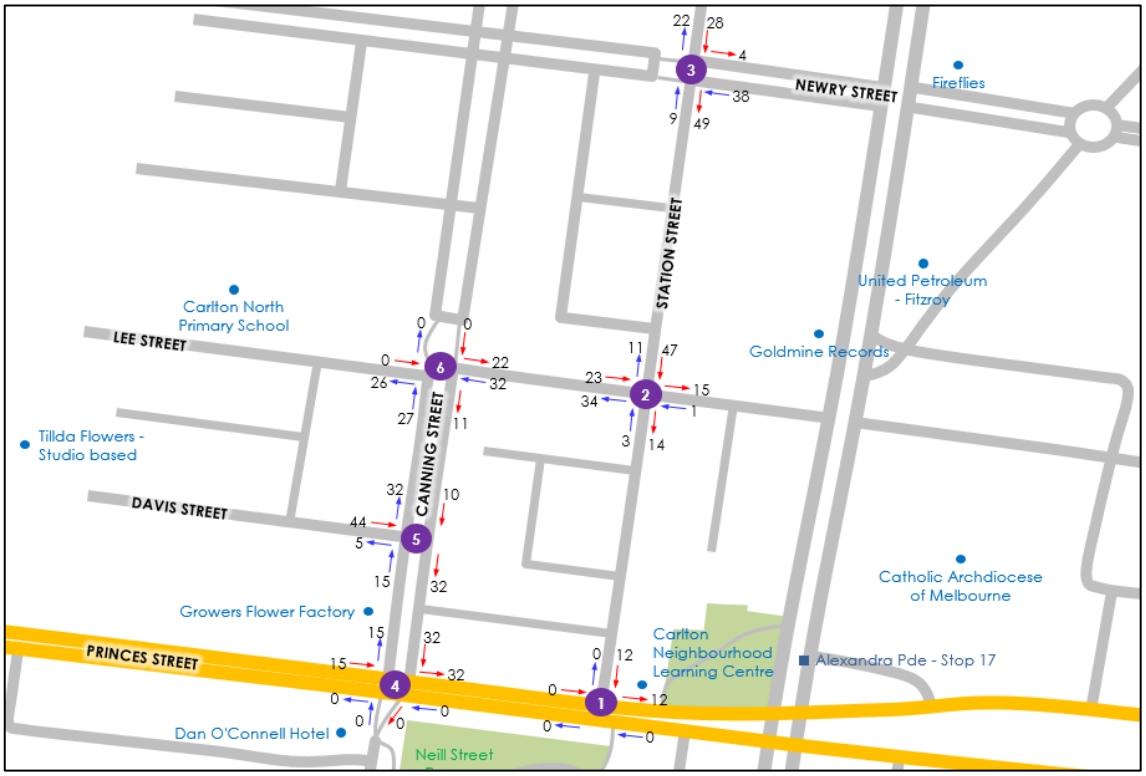


Figure 4.1 and Figure 4.2 indicates that along and proximate to Station Street the following key movements currently occur:

- 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.

Figure 4.3: Morning Peak, Tuesday 13 September – 8:00am-9:00am

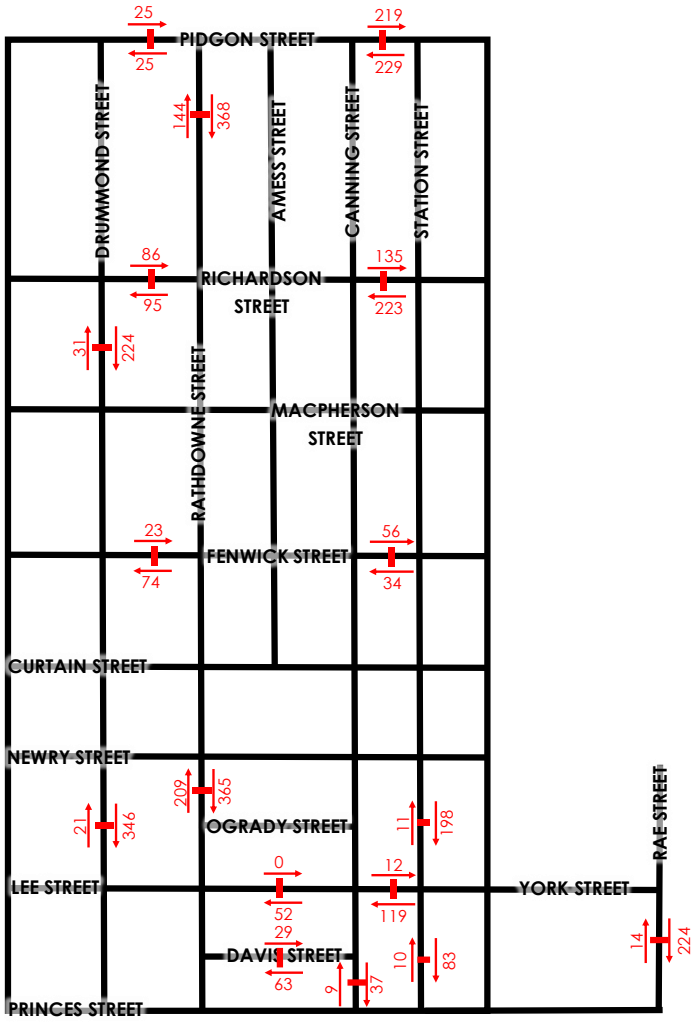


Figure 4.3 indicates that:

- 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.

Afternoon Peak

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:

- School peak between 3:00pm and 4:00pm, as shown in Figure 4.4
- Commuter peak between 5:00pm and 6:00pm, as shown in Figure 4.5.

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

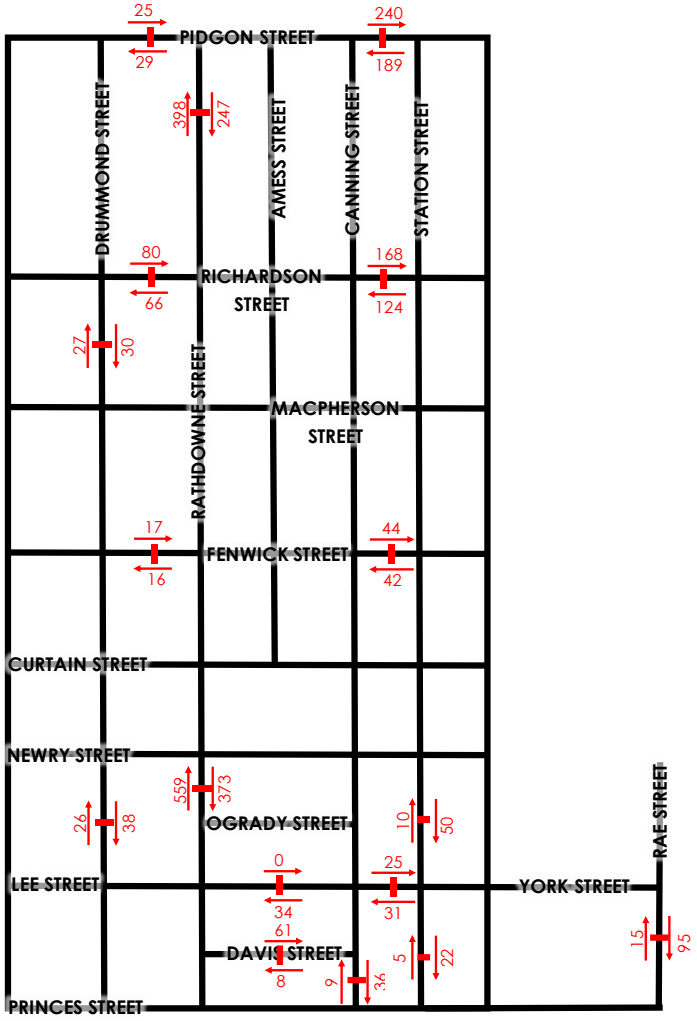


Figure 4.4 indicates the school PM peak occurs from 3:00pm to 4:00pm. During this time, the following has been identified from the recorded traffic:

- 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

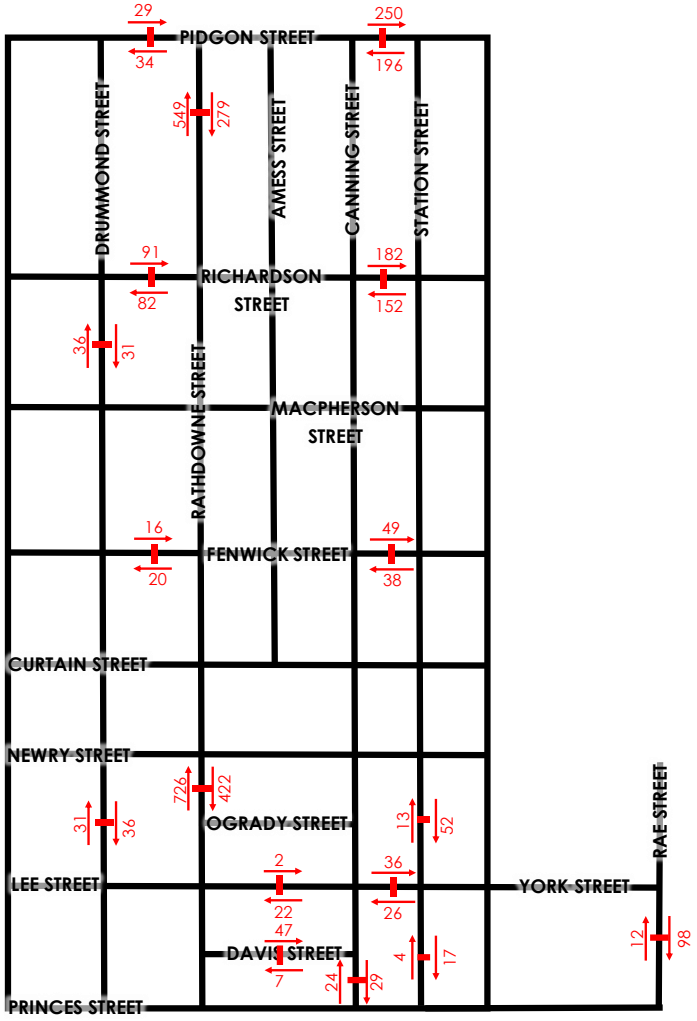


Figure 4.5 indicates the commuter PM peak occurs from 5:00pm to 6:00pm. During this time, the following has been identified from the recorded traffic:

- 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 7[5], 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' limit[6], 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)	95th 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)	95th 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%
	between Station and Canning Street	Eastbound	9	-	9	-
		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	-
	between Station and Canning Street	Eastbound	9	-	9	-
		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)	95th 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 pass 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 Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue 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	Average Back of Queue 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 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: 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 Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back 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 Back of Queue Pedestrian ped	Average 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	95% Back of Queue 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	Average Back of Queue 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	95% Back of Queue 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	Average Back of Queue 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.

Organisation: GTA CONSULTANTS | Processed: Tuesday, 25 October 2016 9:57:21 AM
Project: P:\V10500-10599\V105900 - Station Street Road Closure, North Carlton\Modelling\2100 Princes Nicholson\161019sidra-V105900-Nicholson Princes Alexandra.sip7

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	95% Back of Queue 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	Average 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.

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