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14 November 2016

Ms Nicole Askew

Camden Council
PO Box 183
CAMDEN NSW 2570

Dear Nicole,

# AMENDMENT TO DEVELOPMENT APPLICATION (DA/2016/925): PROPOSED CAR PARK OPERATION AND MANAGEMENT

On the 12 of August 2016 a Development Application was lodged to Camden Council for alterations and additions to a commercial building to be used as a medical centre incorporating a pharmacy together with the reconfiguration of an existing car park at 19 Queen Street Narellan (DA/2016/925).

In response to the concerns of Council and the members of the public, the applicant seeks to amend the proposed operation and management of the medical centre car park.

Consistent with the proposed and notified development, the medical centre includes 81 off-street car parks. Patients and staff of the medical centre will be able to access the car parks from Queen Street, via an existing shared access road. Access to the car park area will be controlled by a boom gate between the existing shared access road and the new medical centre car park.

The applicant seeks to modify the operation, by allowing patient and visitors of the medical centre to have a two (2) or three (3) hour free parking period. The aim of the proposal is to introduce two Paid Parking Schedules (A and B) that can be alternated at the site by the operator.

- Paid Parking Schedule A permits a free parking period of 2 hours for customers of the Medical Centre.
- Paid parking Schedule B proposes to increase the free parking period by 1 hour, to allow a total of 3 hours free parking for customers.

Flexibility is required to ensure the Medical Centre operator is able to effectively respond to the potential future car parking demand. Allowing the operator to alternate the minimum free parking period will increase efficiency of the medical Centre to benefit patients. The minimum 2 hours free parking will be maintained at all times. After the free parking period has expired the paid parking scheme will apply.

The proposed amendment to the management and operation of the car park is reflected in the amended Operational Management Plan prepared by Shellshear Young and Traffic Impact Assessment prepared by Cardno enclosed.

If you have any questions please don't hesitate to contact me on (02) 8233 7657.

Yours sincerely,

Jocelyn McDowall
Consultant - Planning

CC Simon Smith (ssmith@sjb.com.au)

Enc Operational Management Plan
Traffic Impact Assessment

SHELLSHEAR YOUNG

ARCHITECTS

# OPERATIONAL MANAGEMENT PLAN

# NARELLAN MEDICAL CENTRE

19 Queen Street, Narellan, NSW 2567

LOT 2. DP10854322.


## PRIMARY HEALTH CARE LTD

Applicant: Urbis Pty Ltd, L23, Tower 2, Darling Park, 202 Sussex Street, Sydney, NSW 2000.

31th October 2016

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## VERSION CONTROL

| Version | Author | Role | Date | Reviewed |
|---|---|---|---|---|
| v1.6 | Colin Davidson | Project Architect | 31/10/2016 | |
| v1.6 | | Director | 31/10/2016 | Matthew Young |

## CONTENTS

## 1. INTRODUCTION

This Operational Management Plan accompanies a Development Application (DA) to Camden Council for the development of a medical centre at 19 Queen Street, Narellan.

### Summary of Proposed Development

The development proposes the alterations, additions and fit out of an existing two storey office building and associated external works for provision of a new medical centre to be operated by Primary Health Care Limited.

## 2. FIT OUT AND OPERATION

The fit out and operation of the medical centre will comply with the Medical Board of Australia, Australia Health Practitioner Regulatory Agency and the NSW Department of Health Regulations.

The fit out of any rooms used for medical procedures will comply with the Australian Health Infrastructure Alliance 'Australian Health facilities guidelines'.

The private medical practice operating from the proposed medical centre will be satisfy the licensing requirements of the Private Health Facilities Act and Private Health facilities regulations 2010 (as revised).

The fit out of any rooms containing radiation equipment will comply with the Radiation Control Act, Radiation Control Amendment Act and the Radiation Control Regulations.

## 3. HOURS OF OPERATION

The proposed medical centre comprises a range of component activities that are operated and managed by Primary Health Care.

The proposed hours of operation are Monday – Sunday 7.00am – 10.00pm.

## 4. STAFFING AND MEDICAL SERVICES

During construction approximately 80 persons will be employed during the peak activity period.

Upon completion the centre will be operated by approximately 36 staff. The extended hours of the medical centre mean that some staff may undertake shift work. For example: morning shift; afternoon shift.

### Medical Services

The proposed medical services comprise:

- General Practitioners — 17 consultation rooms
- Specialists — 7 consultation rooms
- Treatment room — 4 bed and 1 bed treatment rooms attended by up to 3 nurses
- Radiology clinic — 1 radiologists supported by up to 3 staff
- Physiotherapy — 1 physiotherapist supported by 1 staff
- Dental clinic — 3 surgeries operated by 2 dentists supported by 2 nurses or hygienists
- Pathology collection — 1 collection room attended by up to 2 staff
- Reception and Admin. — 3 receptions and administration areas attended by up to 8 staff
- Pharmacy — 1 pharmacist supported by 2 staff

## 5. CAR PARKING

### Car Park Description

The proposal includes off-street parking for 81 cars. Patients and staff will access the medical centre car park from Queen Street via an existing shared access road, access to the parking will be controlled by a boom gate between the existing shared access road and the new medical centre car park. Patients will exit the medical centre car park via existing access point to Queen Street, also controlled by a boom gate.

Site servicing uses Queen Street entry and exits points as described above order for a semi-rigid waste collection vehicle to enter and leave the site in a forward direction.

### Staff Car Park Access

Staff will access a designate parking area using an automated access system. This system is activated by an electronic security FOB device that opens an automatic gate to access the staff car park. Exit activation is via a ground induction loop that opens the gate upon approach.

### Patient and Visitor Car Park Access

During business hours access to patient and visitor parking is controlled by boom gates.

### Parking Controls

The patient and visitor car park will operate as paid parking with a 2 or 3 hour free parking period.

Patients accessing the site will enter via Queen Street and take a ticket prior to entering the centre. Upon exit a patient will enter a validated ticket into a ticket acceptance unit to raise the boom gate and depart the site.

A freestanding traffic control sign (nominally 0.5sqm) is proposed to be located adjacent to the entry. It will display information on car parking payment rates and free waiver period.

### Visitor Parking Equipment

- **Entry Gate**

A ticket spitter will be located at the entry to the patient car park. This is connected to the boom gate that will open to allow access once a ticket is taken. A pressure sensor detects when a vehicle is at the machine and only then can a ticket be taken from the machine. The boom arm is not activated by the loop so if a car tailgates the boom gate will come down. There is also an intercom button which visitors can push for assistance.

- **Exit Gate**

A ticket reader will be located at the exit of the patient car park. This is connected to the boom gate that will open to allow exit once a paid ticket is inserted. A pressure sensor detects when a vehicle is at the machine and only then can a ticket be inserted into the machine. The boom arm is not activated by the loop so if a car tailgates the boom gate will come down. There is an intercom button they can push for assistance.

- **Automatic Pay Machine**

An APM will be located near the medical centre entrance, this is where users pay for their parking ticket if they stay longer than the advertised free parking period. They do this by inserting their ticket into the pay machine and then paying the fee that is be displayed on the monitor. There is also an intercom button they can push for assistance and a lost ticket button. The APM has the option of paying by cash or credit card.

## 6. LANDSCAPE MAINTENANCE

A landscape maintenance schedule is included as part of Primary Health Care Landscape Guidelines as prepared by Taylor Brammer Landscape Architects.

Please refer to the relevant extract from the Landscape Guidelines which has been included as part of this submission.

## 7. EXTERNAL LIGHTING

Carpark and perimeter security lighting will be installed on the eastern, western and northern boundaries mounted at approx. 6m poles. The external lighting shall be controlled by a light sensitive photo electric cell (dusk to dawn) sensor with the ability to be switched off automatically at a predetermined time.

Refer to the lighting calculation plan prepared by Inlite, July 2016 and included as part of this development application.

## 8. WASTE MANAGEMENT PLAN

Refer to Waste Management Plan prepared by Shellshear Young, May 2016 and included as part of this development application submission.

# Traffic Impact Assessment

## Narellan Medical Centre

80816368

Prepared for
Shellshear Young Pty Ltd

04 November 2016

Cardno
Shaping the Future

# Contact Information

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# Document Information

| | |
|---|---|
| **Prepared for** | **Shellshear Young Pty Ltd** |
| **Project Name** | **Narellan Medical Centre** |
| **File Reference** | **808_16_368 Narellan Medical Centre TIA.docx** |
| **Job Reference** | **80816368** |
| **Date** | **4 November 2016** |
| **Version Number** | **7** |

# Document History

| Version | Effective Date | Description of Revision | Prepared by: | Reviewed by: |
|---|---|---|---|---|
| R007 | 04/11/2016 | Revised Final Report | Kathy Lee | Aaron Tran |
| R006 | 09/08/2016 | Revised Final Report | Kathy Lee | Aaron Tran |
| R005 | 04/08/2016 | Final Report (Post pre-DA meeting) | Kathy Lee | Aaron Tran |
| R004 | 28/07/2016 | Revised v2 Final Report (Post pre-DA meeting) | Kathy Lee | Aaron Tran |
| R003 | 20/06/2016 | Revised v1 Final Report | Kathy Lee | Tim Sullivan |
| R002 | 16/05/2016 | Final Report | Kathy Lee | Tim Sullivan |
| R001 | 29/04/2016 | Draft Report | Kathy Lee | Tim Sullivan |

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# 1 Introduction

## 1.1 Overview

Cardno has been engaged by Shellshear Young Pty Ltd to undertake a Traffic Impact Assessment (TIA) for the Development Application (DA) associated with the proposed Narellan Medical Centre (NMC) located at 19 Queen St, Narellan. The development shown in **Figure 1-1** is located within the Camden Council local government area and will include a medical centre with a Gross Floor Area (GFA) of 1552m$^2$ and a reconfiguration of the existing carpark to include 81 parking spaces.

This TIA report is the result of collaboration between Cardno and Shellshear Young Pty Ltd and discussions with Council and their independent planner from JBL Consulting.

The location of the proposed site is generally bounded by:

> Elyard Street to the north;

> Queen Street to the East; and

> Hume Street to the south.


Background: Nearmap (accessed April 2016)

**Figure 1-1 Narellan Medical Centre Location**

## 1.2 Scope of Works

This report documents the traffic impacts of the proposed NMC including the following scope of works:

> Undertake traffic surveys during the AM and PM for the following intersections:
  - Queen Street/ Elyard Street (Roundabout)
  - Queen Street/ Hume St (Priority)
> Assess existing and proposed traffic volumes during peak hour periods using collected survey data and RMS guidelines.
> Undertake capacity analysis of the aforementioned intersections plus the site access using SIDRA INTERSECTION 6.1 (SIDRA) modelling software for the scenarios below:
  - Baseline Scenario
  - Future Baseline Scenario (anticipated opening year of 2017) plus Development
  - Future Baseline Scenario plus 10 years plus Development
> Assess on-site statutory car parking requirements of the proposed development based on parking rates stipulated in the Camden Council's DCP Chapter E3 and the RMS Guide to Traffic Generation Developments (2002) document and provide justification on the number of parking spaces proposed
> Propose site access / egress arrangements with commentary on suitability and visibility requirements in line with Australian Standards
> Provide advice to the design team (including swept path analysis) on the parking supply, site access and general layout
> Review and acknowledge existing DA conditions for the Camden Council Library (No. 1467/2003)
> Detail car park boom gate operation and justify the use
> Assessment of the latest car park layout design including swept path analysis.

## 1.3 Reference Documents

The following documents have been reviewed and referenced in this report:

> Development Application No. 1467/2003 – 19 Queen Street Narellan
> Camden Council Development Control Plan (2011)
> Guide to Traffic Generating Developments (RTA, 2002)
> Guide to Traffic Generating Developments – Updated traffic surveys (RMS, TDT 2013/04a)
> Australian Standards 2890.1:2004, AS 2890.2:2002 and 2890.6:2009
> Campbelltown Camden Integrated Transport Strategy (2006).

# 2 Existing Situation

## 2.1 Site Location

The proposed Narellan Medical Centre (NMC) is located at 19 Queen St, Narellan as shown in **Figure 1-1**. The subject site measures 5,700 $m^2$ in area and lies within the Camden Council local government area.

A two-storey office building is currently situated on the development site bound by Elyard Street to the north, Queen Street to the west and Hume Street on the western and eastern boundary.

Other existing developments in close proximity to the site include:

> To the north, approximately 100m from the NMC is the Narellan Library, which is situated adjacent to the site at the intersection of Queen Street and Elyard Street.

> Further North is Narellan Town Centre along Elyard Street between Queen St and Somerset Avenue.

> On the western and southern boundary are one and two storey residential properties situated along Queen Street and Hume Street respectively.

## 2.2 Existing Road Network

The existing road network can be described using the Roads and Maritime Services (RMS) Functional Classification of Roads and the Schedule of Classified Roads and Unclassified Regional Roads outlined in **Table 2-1** and **Table 2-2** respectively. The existing road network surrounding the NMC are as follows:

> Camden Valley Way

> Queen Street

> Elyard Street

> Hume Street

**Table 2-1 Functional Road Classifications**

| Road Classification | Description |
|---|---|
| **Arterial Road** | This is typically a main road carrying in excess of 15,000 vehicles per day and over 1,500 vehicles per hour in the peak period. They predominantly carry traffic from one region to another, forming principal avenues of communication for metropolitan traffic movements. |
| **Sub-Arterial Road** | This is typically a secondary road carrying between 5,000 and 20,000 vehicles per day, and over 500 to 2,000 vehicles per hour in the peak period. They predominantly carry traffic from one sub-region to another forming secondary inter-regional transport links. |
| **Collector Road** | This is typically a minor road carrying between 2,000 and 10,000 vehicles per day, and over 250 to 10,000 vehicles per hour in the peak period. They provide a link between local areas and regional roads, carrying low traffic volumes. At volumes greater than 5,000 vehicles per day, residential amenity begins to decline noticeably. |
| **Local Road** | This is typically a local street carrying less than 2,000 vehicles per day and 250 vehicles per hour in the peak period. They provide immediate access to individual houses and carry low volumes of traffic. |

**Table 2-2 Administrative Road Classifications**

| | |
|---|---|
| State Classified Road | Major roads which are managed and financed by RMS |
| Regional Road | Locally roads managed and financed by local councils. |

### 2.2.2 Camden Valley Way

According to the Road and Maritime Schedule of Classified Roads, Camden Valley way is a State Arterial Road from Appin Road at Campbelltown via Narellan Road to the Northern Road intersection. From the Northern Road intersection to Murray Street at Camden, Camden Valley Way is classified as a Regional Road. The ownership of Camden Valley Way in the vicinity of the proposed site is outlined in **Figure 2-1**. It is a divided two lane, two way road with a sign posted speed limit of 60km/h and a school zone between Queen Street and Wilson Crescent.


**Figure 2-1 Camden Valley Way Ownership**

### 2.2.3 Queen Street

Queen Street is Local Road under the authority of Camden Council. It provides access between Camden Valley Way and the Camden Bypass via Narellan Town Centre. Queen Street is an undivided two way, two lane road with a speed limit of 50km/h. Queen Street provides an access and egress to the Narellan Town Centre carpark.

### 2.2.4 Elyard Street

Elyard Street is a Local Road under the authority of Camden Council. It is a two way, two lane Local Road which connects to Camden Valley Way via Richardson Road and Somerset Avenue towards Camden in the West and Campbelltown to the south. A speed limit of 50km/h applies to Elyard Road including a school zone between Richardson Road and Queen Street. Elyard Street also provides pedestrian access to the Narellan Town Centre.

### 2.2.5 Hume Street

Hume Street is Local Road under the authority of Camden Council. It is a two way, two lane Local Road which merges into Rudd Street providing access to residential allotments. The eastern leg of Hume Street is one way exit lane limited to private access.

## 2.3 Existing Public Transport Services

Currently there is no railway network within the vicinity of the proposed site, Macarthur Station in the Campbelltown area is the closest train station. However, there are a number of bus routes which service the area.

### 2.3.1 Bus Services

The subject site is situated in close proximity to the Narellan Town Centre and Narellan Library. As such, there are a number of bus routes that operate along Queen Street, Elyard Street and Somerset Avenue and Camden Valley Way. These buses are operated by Busabout and Picton Buslines. There is a bus stop at the front of the development site on Queen Street.

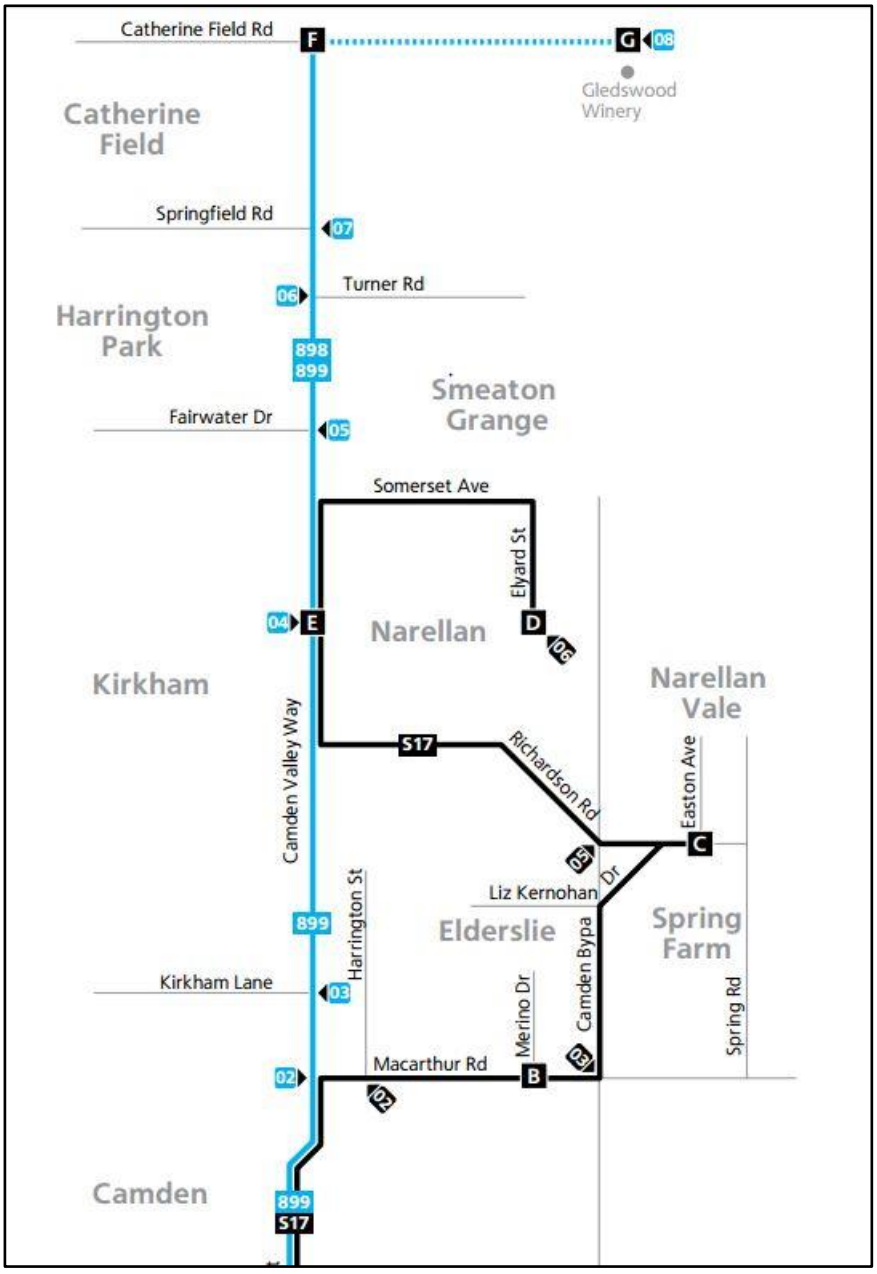
The bus stop locations surrounding the site are displayed in **Figure 2-2** and bus frequencies of buses that operate within the local area are outlined in **Table 2-3**. Corresponding bus network maps are displayed in **Figure 2-3, Figure 2-4** and **Figure 2-5**.


Background: Nearmap (accessed April 2016)

**Figure 2-2 Existing Bus Stop Locations**

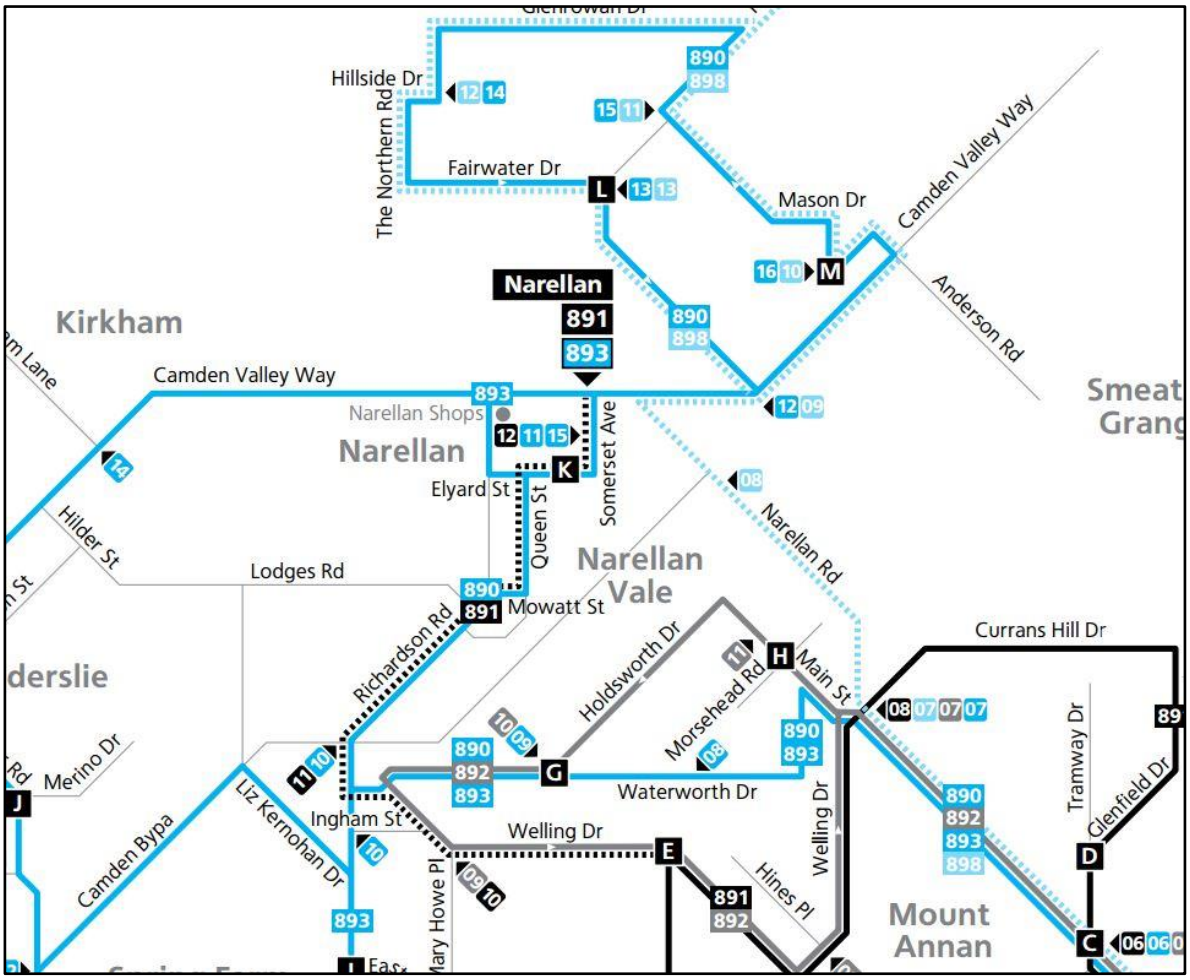
**Table 2-3 Typical Bus Service Frequencies**

| Bus Route | Route Description | Weekday Peak | Weekday Off-Peak | Weekend Peak | Weekend Off-peak |
|---|---|---|---|---|---|
| **899** | Camden to Catherine Field | n/a | 3 services | n/a | Saturday only – 2 services |
| **899** | Catherine Field to Camden | 3 services | 3 services | n/a | Saturday only - 2 services |
| **891** | Curran Hills and Mt Anna Loop | 1 service | 5 services | n/a | 2 services |
| **893** | Narellan to Campbelltown | 6 services | 22 services | Saturday -5 services Sunday 3 services | Saturday – 16 services Sunday – 7 services |
| **893** | Campbelltown to Narellan | 8 services | 21 services | Saturday -3 services Sunday - 3 services | Saturday -19 services Sunday - 8 services |
| **890C** | Camden to Campbelltown | 4 services | 6 services | Saturday -3 services | Saturday -6 services |
| **890C** | Campbelltown to Camden | 1 service | 7 services | Saturday -3 services | Saturday -7 services |
| **894** | Bridgewater to Campbelltown | 5 services | 5 services | n/a | n/a |
| **894** | Campbelltown to Bridgewater | 6 services | 8 services | n/a | n/a |
| **S17** | Narellan & Campbelltown to Picton | n/a | 1 service | Saturday – 1 service | Saturday – 1 services |
| **S17** | Picton to Narellan & Campbelltown | n/a | 1 service | Saturday – 1 services | Saturday – 1 services |
| **900** | Narellan & Campbelltown to Picton | n/a | 1 service | Saturday – 1 services | Saturday – 1 services |
| **900** | Picton to Narellan & Campbelltown | n/a | 1 service | Saturday – 1 services | Saturday – 1 services |



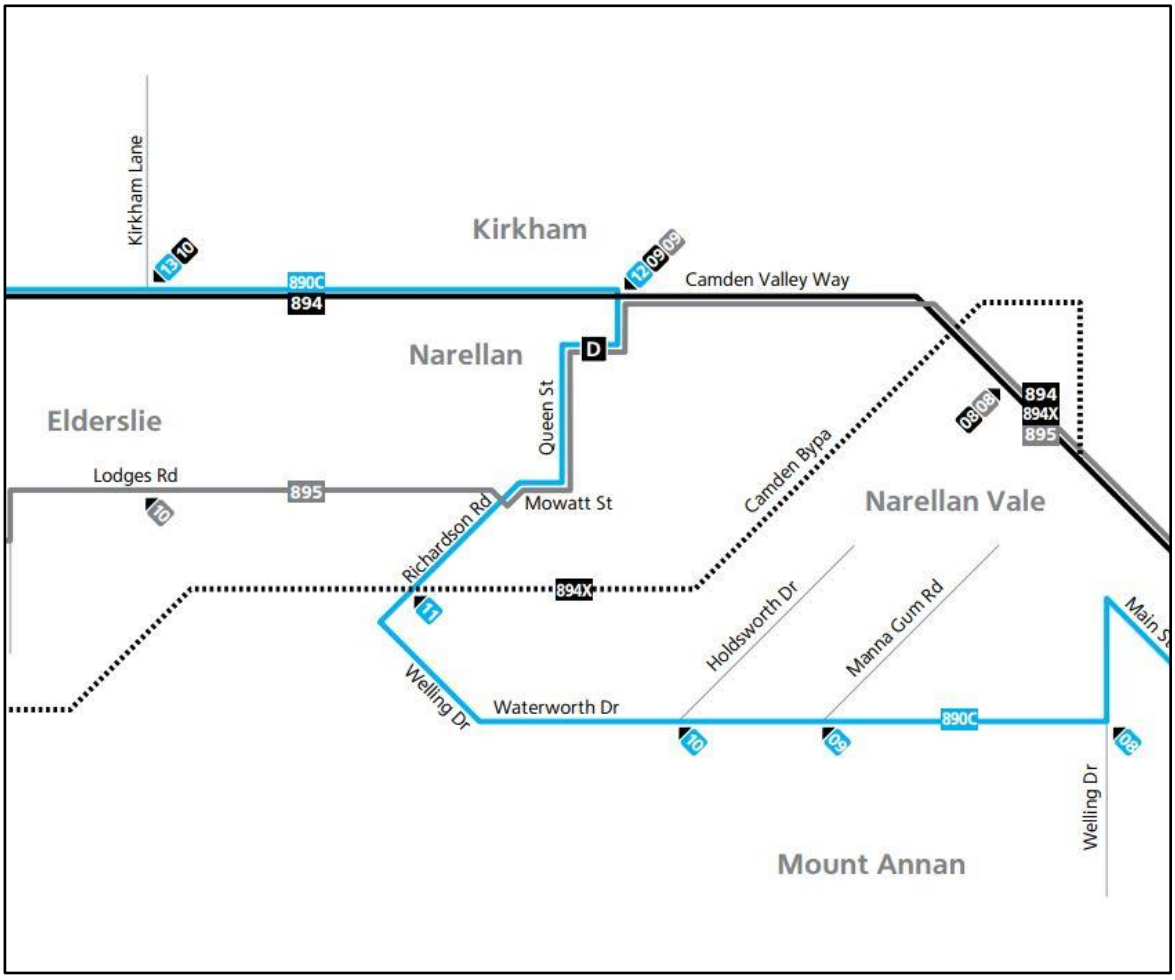

(Source: Busabout)

**Figure 2-3 Bus Route S17, 899 Network Map**




(Source: Busabout)

**Figure 2-4 Bus Route 891, 893 Network Map**




(Source: Busabout)

**Figure 2-5 Bus Route 890C, 894 Network Map**

Based on the availability of local bus services and proximity of bus stops to the proposed development, it is reasonable to expect that some staff and customers of the NMC would arrive by bus. In particular, the site is well connected to the suburbs of Campbelltown and Camden. This will help to reduce the traffic generation and relieve parking pressure of the site.

## 2.4 Pedestrian Infrastructure

As shown in **Figure 2-6**, there are existing pedestrian footpath provisions which facilitate pedestrian movement towards the Narellan Town Centre. Designated concrete footpaths are generally provided on one side of the surrounding road network and footpaths on both sides closer to the Narellan Town Centre.


Background: Nearmap (accessed April 2016)

**Figure 2-6 Designated Pedestrian Footpath Network**

It is reasonable to expect some staff and customers to walk to the proposed NMC. Based on the assessment of the existing pedestrian footpath network, there will be adequate pedestrian footpaths to accommodate for pedestrian access to the proposed development site.

## 2.5 Existing Car Parking Context

### 2.5.1 On-street Parking Provision

On-street car parking provisions surround the subject site are displayed in **Figure 2-7**.

#### *2.5.1.1 Queen Street*

Queen Street generally does not provide on-street parking. Residential side streets that intersect Queen Street, Lord Street and Hume Street provide unrestricted parking.

#### *2.5.1.2 Elyard Street*

Elyard Street generally consists of unrestricted parking with No Stopping zones located near intersections and Bus Zones.

#### *2.5.1.3 Hume Street*

Hume Street consists of unrestricted parking on both sides of the road on the western leg. The eastern leg of Hume Street is restricted to private access only.


Background: Nearmap (accessed April 2016)

**Figure 2-7 On Street Parking Restrictions**

## 2.6 Key intersections

The following two intersections outlined in **Figure 2-8** were included in this traffic assessment due to their proximity to the site, and are considered to be the two intersections most likely to be affected by traffic generated by the proposed development.

> Queen Street / Elyard Street (roundabout)

> Queen Street / Hume Street (priority)


Background: Nearmap (accessed April 2016)

**Figure 2-8 Assessed Intersection Locations**

### 2.6.2 Queen Street/ Elyard Street

This is a roundabout intersection where Queen Street forms the northern and southern leg and Elyard Street forms the eastern and western leg. All approaches have one lane in each direction. Refer to intersection layout in **Figure 2-9**.

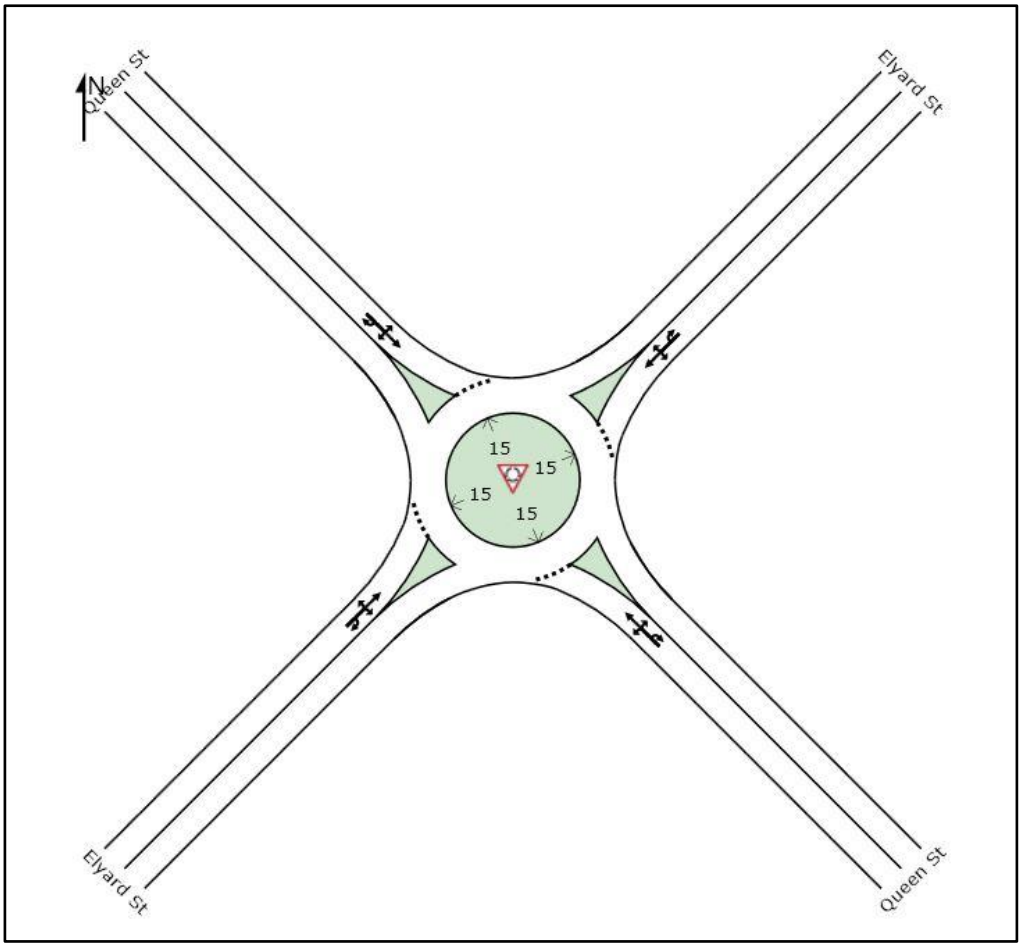



**Figure 2-9 Queen Street / Elyard Street Intersection Layout**

### 2.6.3 Queen Street/ Hume Street

This intersection is a four-way priority-controlled intersection, with Queen Street given priority. All approaches have one lane in each direction with the exception of Hume Street on the eastern side with only one lane westbound. Refer to intersection layout in **Figure 2-10**.

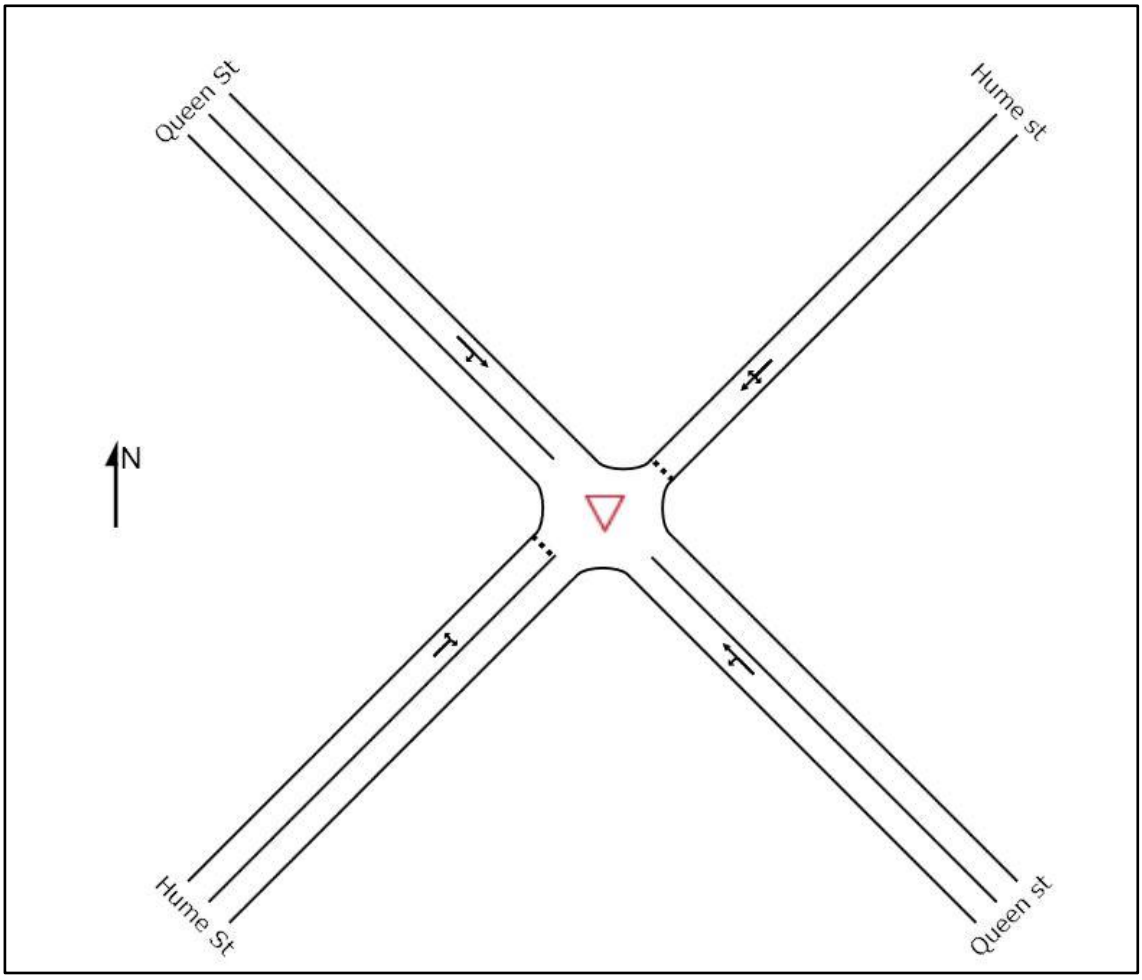



**Figure 2-10 Queen Street / Hume St Intersection Layout**

## 2.7 Baseline Traffic Assessment

Vehicle intersection counts were conducted on Saturday 2 April 2016 and Thursday 7 April 2016 at the intersections listed in Section 2.6. Refer to **Appendix A** for survey outputs.

The traffic surveys identified that the AM peak hour is 8:30am to 9:30am at both intersections. The PM peak hour is 4:30pm to 5:30pm at the Queen Street/ Elyard Street intersection and 4:00pm to 5:00pm at the Queen Street / Hume Street intersection.

Capacity analysis of the two intersections was performed using SIDRA 6.1 to determine the traffic efficiency namely the level of service (LOS), Degree of Saturation (DOS) and Average Vehicle Delay (AVD) for the existing traffic conditions.

The LOS is a quantitative measure of traffic efficiency based on a number of traffic factors such as speed, time, manoeuvrability, traffic volumes, driver experience and operating costs. As per the RMS Guide to Traffic Generating Developments, the LOS can be categorised from A to F as outlined in **Table 2-4**. Generally, a LOS C is acceptable whereby the driver experience limited manoeuvrability, however operating speeds and delays are still reasonable.

The AVD provides a measure of the operational performance of an intersection as indicated in **Table 2-4** which relates AVD to LOS. The AVDs should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route). For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (sign control) the critical movement for level of service assessment should be that movement with the highest average delay.

The DOS is another measure of the operational performance of individual intersections. For intersections controlled by traffic signals both queue length and delay increase rapidly as DOS approaches 1. DOS in the order of 0.7 generally represents satisfactory intersection operation and a DOS above 0.9 may have a significant impact on queue lengths.

**Table 2-4 Intersection Traffic Efficiency**

| LoS | Traffic Signal/Roundabout | Giveway / Stop Sign / T-Junction | AVD (seconds/ vehicle) |
|---|---|---|---|
| A | Good Operation | Good Operation | < 14 |
| B | Good with acceptable delays and spare capacity | Acceptable delays and spare capacity | 15 to 28 |
| C | Satisfactory | Satisfactory, but accident study required | 29 to 42 |
| D | Operating near capacity | Near Capacity & accident study required | 43 to 56 |
| E | At Capacity, at signals incidents will cause excessive delays | At capacity, requires other control mode | 57 to 70 |
| F | Unsatisfactory and requires additional capacity. Roundabouts require other control mode | Unsatisfactory and requires additional capacity. | >70 |

### 2.7.2 Base Scenario Intersection Performance

Input of survey results into SIDRA 6.1 produced the intersection assessment summarised in **Table 2-5**. The key measure of intersection operating performance is LOS. The intersection performance of existing base scenario indicates LOS A in both the AM and PM peak periods for both intersections.

**Table 2-5 Intersection Summary for Peak Hour of Service for Base Scenario**

| Location | Control type | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | DOS | AVD (seconds) | LOS | DOS | AVD (seconds) | LOS |
| Queen Street/ Elyard Street | Roundabout | 0.457 | 1.6 | A | 0.435 | 2.1 | A |
| Queen Street/ Hume Street | Priority Controlled | 0.101 | 0.2 | A | 0.122 | 0.4 | A |

### 2.7.3 Base Scenario Mid-block Capacity

The SIDRA 6.1 results for mid-block capacity of existing conditions based on survey data are summarised in **Table 2-6** and **Table 2-7**. Results indicate the all mid-block capacities operate at a 'Good' LOS A during the peak hour periods which indicates no current issues with road network capacity.

**Table 2-6 Mid-block AM Peak Hour of Service for Base Scenario**

| Location | Direction | Volume (vehicles/hour) | DOS | AVD (seconds) | LOS |
|---|---|---|---|---|---|
| Queen Street/ Elyard Street | Northbound | 213 | 0.193 | 6.0 | A |
| | Westbound | 206 | 0.182 | 5.4 | A |
| | Southbound | 191 | 0.207 | 6.3 | A |
| | Eastbound | 493 | 0.457 | 5.4 | A |
| Queen Street/ Hume Street | Northbound | 193 | 0.101 | 0 | A |
| | Westbound | 30 | 0.033 | 5.8 | A |
| | Southbound | 94 | 0.050 | 0.1 | A |
| | Eastbound | 12 | 0.009 | 5.2 | A |

**Table 2-7 Mid-block PM Peak Hour of Service for Base Scenario**

| Location | Direction | Volume (vehicles/hour) | DOS | AVD (seconds) | LOS |
|---|---|---|---|---|---|
| Queen Street/ Elyard Street | Northbound | 172 | 0.202 | 8.0 | A |
| | Westbound | 339 | 0.383 | 7.1 | A |
| | Southbound | 478 | 0.435 | 7.0 | A |
| | Eastbound | 320 | 0.296 | 5.0 | A |
| Queen Street/ Hume Street | Northbound | 109 | 0.058 | 0.1 | A |
| | Westbound | 98 | 0.110 | 6.3 | A |
| | Southbound | 230 | 0.122 | 0.3 | A |
| | Eastbound | 7 | 0.005 | 5.1 | A |

# 3 Traffic Assessment

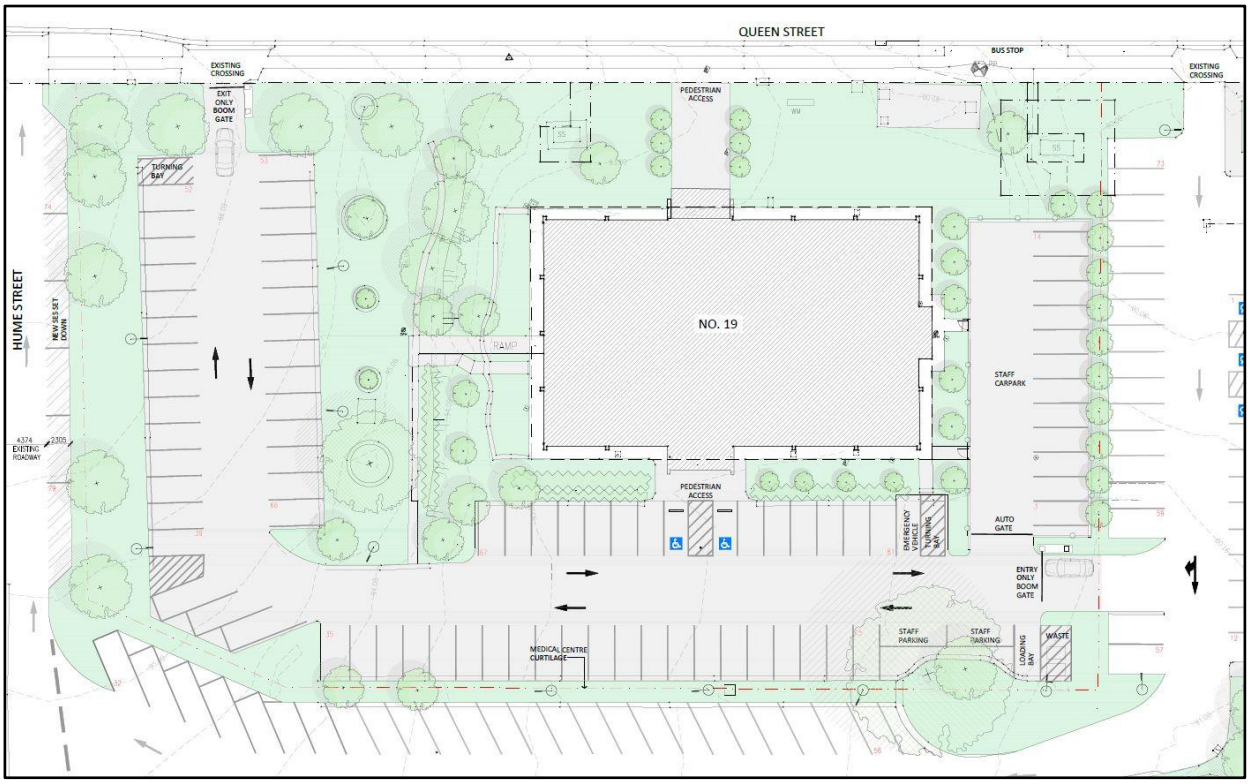
## 3.1 Development Overview

The proposed development is a two-storey medical centre with access and egress to the facility via existing entrance and exits on Queen Street. As shown in Figure 3-1, the NMC is located within the Camden Council area and a reconfiguration of the existing car park to separate the medical facility parking and Camden Council parking is proposed. The GFA of the development is 1686m$^2$.

Details of the proposed NMC is outlined in **Table 3-1** and **Figure 3-1**.

**Table 3-1 Narellan Medical Centre Proposed Details**

| Facility | Consulting Rooms |
|---|---|
| Chemist | n/a |
| General Practitioner | 17 |
| Specialist Practitioner | 7 |
| Radiologist | 1 |
| Dental Surgery | 3 |
| Physiotherapist | 1 |




(Source: Shellshear Young Pty Ltd)

**Figure 3-1 Proposed Narellan Medical Centre Site Plan**

## 3.2 Development Traffic Generation

Development traffic generation was derived from RMS's Guide to Traffic Generating Developments Version 2.2 (2002) based on traffic generation rates for extended hours medical centres. Using an AM peak hour

generation rate of 10.4 vehicle/hour/100m$^2$ and a PM peak hour generation rate of 8.8 vehicle/hour/100m$^2$, the following development trip generation were estimated based on a GFA of 1686m$^2$:

> PM peak hour generation – 149 Vehicles/Hour

> AM peak hour generation – 176 Vehicles/ Hour

Note that during the design process the GFA has been revised from 1686m$^2$ to 1552m$^2$. The following traffic analysis has maintained the use of 1686m$^2$ GFA and subsequently provides a conservative development traffic yield considering the maximum number of development trips generated.

## 3.3 Development Trip Distribution and Assignment

The distribution of traffic generated by the proposed NMC has been determined by using the Australian Bureau of Transport Statistics' Journey to Work 2011 (BTS 2011 JTW) data. The data captures the employment distribution and commute patterns of workers and residents based on locality. By considering the geographical location of vehicles that travel to and from Narellan the following traffic distribution assumptions have been made:

> All vehicles will access and egress the site via Queen Street.

> Directional distribution of the traffic accessing the subject site:

- Based on traffic entering and exiting the development within the peak period. This assumption excludes staff and thus a 60 IN, 40 OUT (AM) and 40 IN, 60 OUT (PM) assumption has been made whereby vehicles will enter the car park in the AM and exit in the PM peak hours.
- Camden, Campbelltown, Wollondilly and Bringelly were the main origins and destinations of vehicle trips.
- For travel towards/ from Camden, Bringelly and Campbelltown, it was considered that residents and workers use Camden Valley Way via Elyard Street to the north of the subject site.
- For travel towards/ from Wollondilly, residents and workers use Camden Bypass to the south of the subject site.
- A 89% northbound split towards Queen Street/ Elyard Street intersection and 11% southbound split towards the Queen Street/ Hume Street intersection was used based on the above considerations.

From the trip generation and distribution assumptions discussed, the overall development trip assignments for AM and PM peak hours are shown in **Figure 3-2** and **Figure 3-3**.

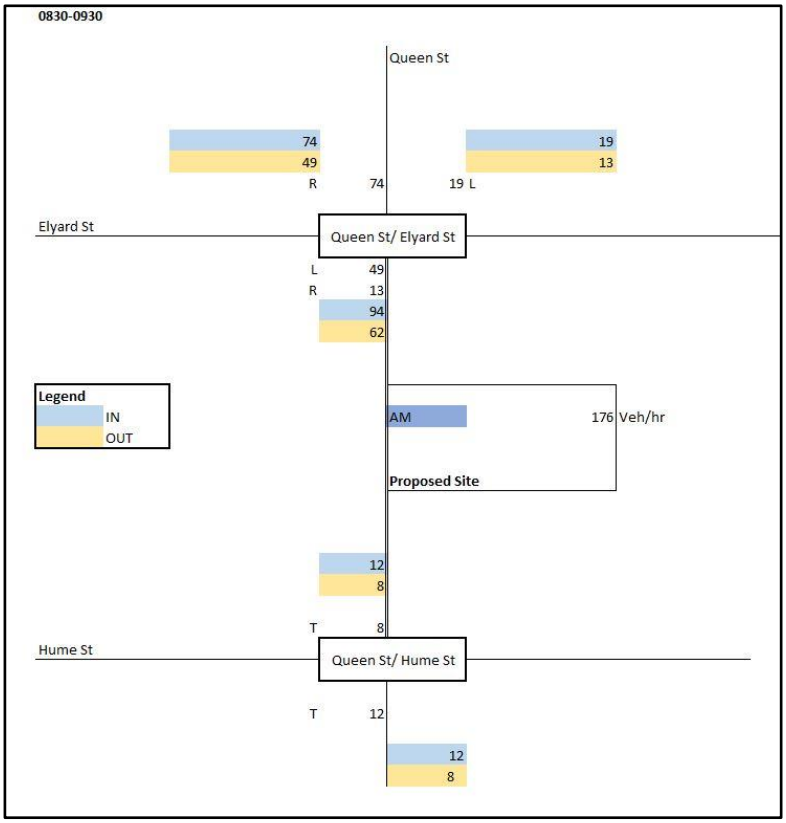



**Figure 3-2 Development Trip Assignment – AM Peak**

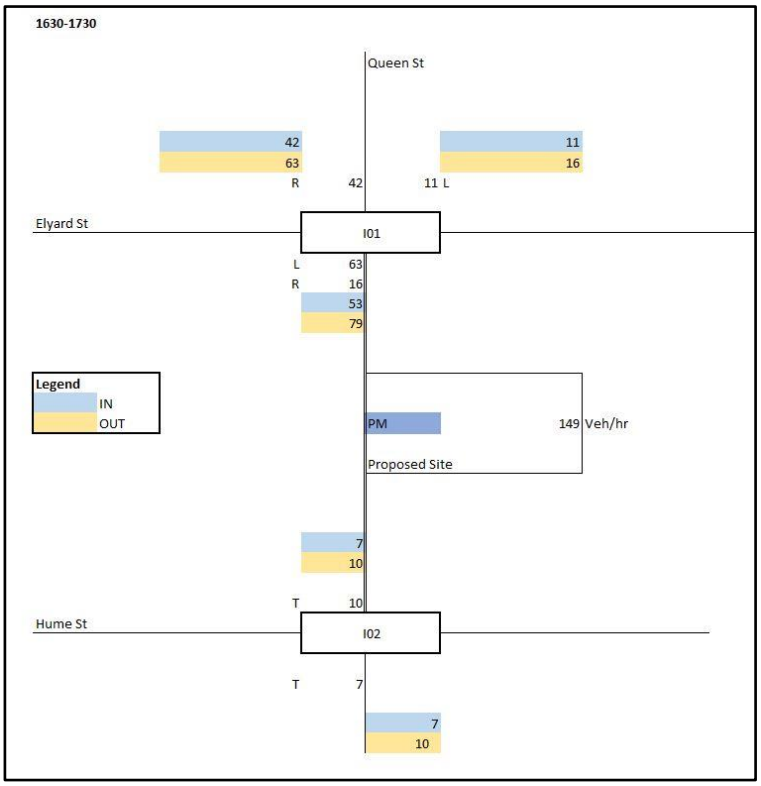



**Figure 3-3 Development Trip Assignment – PM Peak**

## 3.4 Committed Developments

After consultation with Camden Council, it was noted that a child care centre for 88 children on 25 Somerset Avenue has been approved and potential day spa with 19 treatment rooms on 37 Elyard Street is in the final stages of development approvals. However, the trips generated from these committed developments are anticipated to have only a minor impact on the intersections being assessed, therefore the trip generation of the committed development has not been included in this report.

## 3.5 Impact of Development

### 3.5.1 Intersection Performance

The intersection performance with development traffic is summarised in **Table 3-2**. The SIDRA results indicate that although there is an increase in DOS and AVD, the intersections of interest all remain at a LOS A (Good Operation) in both the AM and PM peak period after the application of development trips.

**Table 3-2 Intersection Summary for Peak Hour - Base + Development Scenario**

| Location | Control type | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | DOS | AVD (seconds) | LOS | DOS | AVD (seconds) | LOS |
| Queen Street/ Elyard Street | Roundabout | 0.519 | 1.8 | A | 0.464 | 2.5 | A |
| Queen Street/ Hume Street | Priority Controlled | 0.109 | 0.2 | A | 0.127 | 0.4 | A |

**Table 3-3 Intersection Summary for Peak Hour of Service for Base Scenario**

| Location | Control type | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | DOS | AVD (seconds) | LOS | DOS | AVD (seconds) | LOS |
| Queen Street/ Elyard Street | Roundabout | 0.457 | 1.6 | A | 0.435 | 2.1 | A |
| Queen Street/ Hume Street | Priority Controlled | 0.101 | 0.2 | A | 0.122 | 0.4 | A |

### 3.5.2 Mid-block Capacity

The existing mid-block road capacity plus development is summarised in **Table 3-4** and **Table 3-5**. The application of development trips resulted in the same LOS as the base scenario in **Table 2-6** and **Table 2-7**

**Table 3-4 Mid-block AM Peak Hour of Service for Base + Development Scenario**

| Location | Direction | Volume (vehicles/hour) | DOS | AVD (seconds) | LOS |
|---|---|---|---|---|---|
| Queen Street/ Elyard Street | Northbound | 276 | 0.242 | 5.8 | A |
| | Westbound | 226 | 0.209 | 5.7 | A |
| | Southbound | 191 | 0.219 | 6.8 | A |
| | Eastbound | 568 | 0.519 | 6.1 | A |
| Queen Street/ Hume Street | Northbound | 209 | 0.109 | 0.1 | A |
| | Westbound | 30 | 0.033 | 5.9 | A |
| | Southbound | 102 | 0.054 | 0.1 | A |
| | Eastbound | 12 | 0.009 | 5.2 | A |

**Table 3-5 Mid-block PM Peak Hour of Service for Base + Development Scenario**

| Location | Direction | Volume (vehicles/hour) | DOS | AVD (seconds) | LOS |
|---|---|---|---|---|---|
| Queen Street/ Elyard Street | Northbound | 172 | 0.202 | 8 | A |
| | Westbound | 339 | 0.383 | 7.1 | A |
| | Southbound | 478 | 0.435 | 7.0 | A |
| | Eastbound | 320 | 0.296 | 5.0 | A |
| Queen Street/ Hume Street | Northbound | 109 | 0.058 | 0.1 | A |
| | Westbound | 98 | 0.110 | 6.3 | A |
| | Southbound | 230 | 0.122 | 0.3 | A |
| | Eastbound | 7 | 0.005 | 5.1 | A |

### 3.5.3 Background Traffic Growth

The background traffic growth rate was determined based on the RMS Annual Average Daily Traffic data. RMS collects traffic data at key count stations within the New South Wales (NSW) road network. Historical volumes on Camden Valley Way at Elderslie were obtained. The north bound volume produced the highest percentage growth rate of 0.6% p.a on Camden Valley Way. However, as a conservative assessment a 2% per annum (p.a) average annual growth rate has been applied to the survey data to account for background growth of the Future Opening Year and Future Opening Year plus 10 Years Scenarios.

### 3.5.4 Opening Year 2017 Scenario – Future Base + Development

A 2% linear growth rate per year has been applied to background traffic for the Opening Year + Development Scenario. It estimates the traffic volumes and intersection performance on the road network including development at the anticipated opening year of 2017.

#### *3.5.4.1 Intersection Performance*

Intersection performance of the Opening year 2017 Scenario are summarised in **Table 3-6.** The application of development traffic and background growth indicates an increase in the DOS and AVD in both intersections. However, the LOS remains unchanged at a 'Good' LoS A at both intersections during peak AM and PM periods.

**Table 3-6 Intersection Summary for Peak Hour of Service for Opening Year (2017) Future Base + Development**

| Location | Control type | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | DOS | AVD (seconds) | LOS | DOS | AVD (seconds) | LOS |
| Queen Street/ Elyard Street | Roundabout | 0.553 | 2.1 | A | 0.485 | 2.7 | A |
| Queen Street/ Hume Street | Priority Controlled | 0.110 | 0.2 | A | 0.132 | 0.4 | A |

**Table 3-7 Intersection Summary for Peak Hour of Service for Base Scenario**

| Location | Control type | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | DOS | AVD (seconds) | LOS | DOS | AVD (seconds) | LOS |
| Queen Street/ Elyard Street | Roundabout | 0.457 | 1.6 | A | 0.435 | 2.1 | A |
| Queen Street/ Hume Street | Priority Controlled | 0.101 | 0.2 | A | 0.122 | 0.4 | A |

#### *3.5.4.2 Mid-block Capacity*

The SIDRA intersection analysis results are displayed in **Table 3-8** and **Table 3-9**. Both mid-block capacity and intersection performance results indicate LOS remains at a 'Good' level with minimal impact on the AVD with the application of a one year growth rate.

**Table 3-8 Mid-block AM Peak Hour of Service for Future Base (2017) + Development Scenario**

| Location | Direction | Volume (vehicles/hour) | DOS | AVD (seconds) | LOS |
|---|---|---|---|---|---|
| Queen Street/ Elyard Street | Northbound | 281 | 0.257 | 5.9 | A |
| | Westbound | 236 | 0.227 | 5.9 | A |
| | Southbound | 202 | 0.243 | 7.2 | A |
| | Eastbound | 583 | 0.553 | 6.4 | A |
| Queen Street/ Hume Street | Northbound | 211 | 0.110 | 0.1 | A |
| | Westbound | 29 | 0.032 | 6.1 | A |
| | Southbound | 106 | 0.057 | 0.2 | A |
| | Eastbound | 14 | 0.011 | 5.3 | A |

**Table 3-9 Mid-block PM Peak Hour of Service for Future Base (2017) + Development Scenario**

| Location | Direction | Volume (vehicles/hour) | DOS | AVD (seconds) | LOS |
|---|---|---|---|---|---|
| Queen Street/ Elyard Street | Northbound | 258 | 0.308 | 8.1 | A |
| | Westbound | 365 | 0.439 | 7.8 | A |
| | Southbound | 491 | 0.485 | 7.7 | A |
| | Eastbound | 373 | 0.355 | 5.7 | A |
| Queen Street/ Hume Street | Northbound | 120 | 0.064 | 0.2 | A |
| | Westbound | 98 | 0.114 | 6.6 | A |
| | Southbound | 248 | 0.132 | 0.3 | A |
| | Eastbound | 9 | 0.007 | 5.3 | A |

### 3.5.5 Opening Year + 10 Years Scenario – Base + Development (2027)

A 2% growth rate has been applied to background traffic over a 10 year period for the Opening Year + 10 Years Scenario. It estimates the traffic volume on the road network including development 10 years after the opening year 2017.

#### *3.5.5.1 Intersection Performance*

The intersection performance of the Opening Year plus 10 Years Scenario SIDRA results are displayed in **Table 3-10**. Results indicate the intersections are anticipated to operate at 'Good' LOS in both AM and PM peak periods. As expected, the overall traffic flow increases, resulting in higher AVD. The Queen Street/ Elyard Street intersection continues to sustain the highest peak hour traffic volumes, with the highest AVD in the PM peak hour on Elyard Street westbound direction.

**Table 3-10 Intersection Summary for Peak Hour of Service for Opening Year + 10 Years (2027)**

| Location | Control type | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | DOS | AVD (seconds) | LOS | DOS | AVD (seconds) | LOS |
| Queen Street/ Elyard Street | Roundabout | 0.703 | 3.8 | A | 0.637 | 4.9 | A |
| Queen Street/ Hume Street | Priority Controlled | 0.134 | 0.2 | A | 0.134 | 0.2 | A |

**Table 3-11 Intersection Summary for Peak Hour of Service for Base Scenario**

| Location | Control type | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | DOS | AVD (seconds) | LOS | DOS | AVD (seconds) | LOS |
| Queen Street/ Elyard Street | Roundabout | 0.457 | 1.6 | A | 0.435 | 2.1 | A |
| Queen Street/ Hume Street | Priority Controlled | 0.101 | 0.2 | A | 0.122 | 0.4 | A |

#### *3.5.5.2 Mid-block Capacity*

The mid –block capacity of the Opening Year plus 10 Years Scenario results are presented in **Table 3-12** and **0**. Results indicate an overall traffic volume increase in the road network. In comparison with the Opening Year Base Scenario DOS and AVD increase, however the LOS remains unchanged at a 'Good' LOS A.

**Table 3-12 Mid-block PM Peak Hour of Service for Future + 10 Years (2027) Scenario**

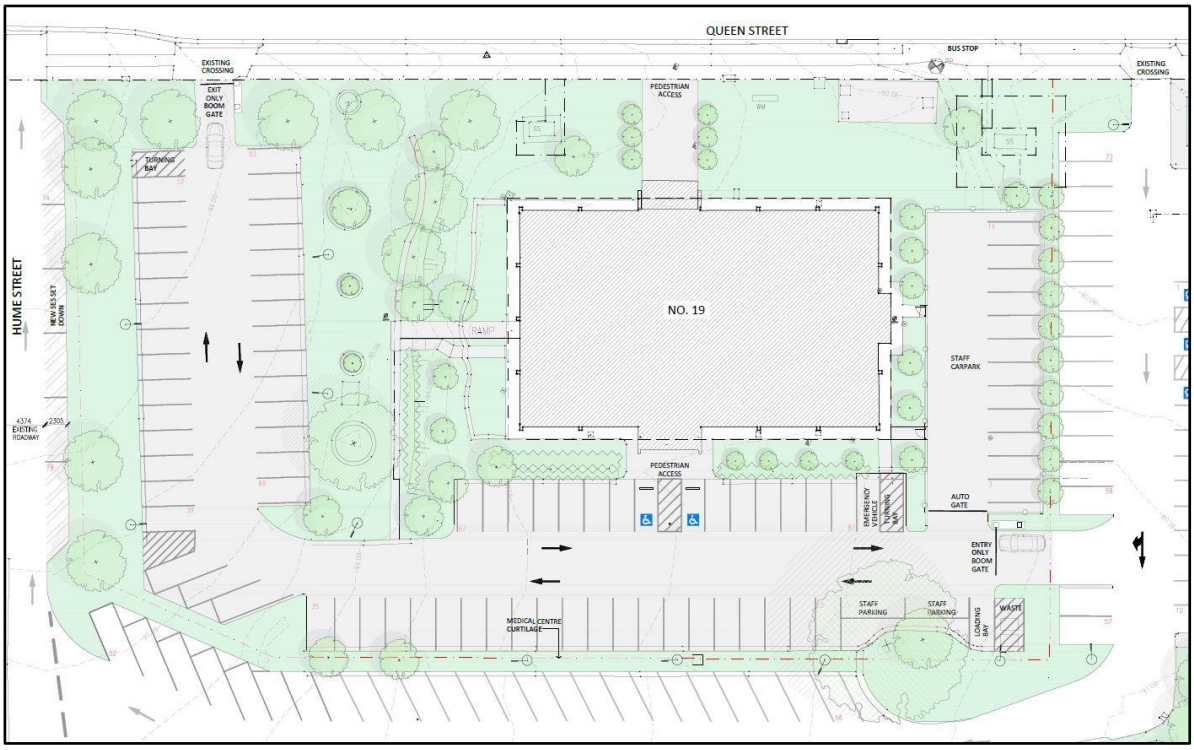
| Location | Direction | Volume (vehicles/hour) | DOS | AVD (seconds) | LOS |
|---|---|---|---|---|---|
| Queen Street/ Elyard Street | Northbound | 332 | 0.319 | 6.4 | A |
| | Westbound | 287 | 0.287 | 6.3 | A |
| | Southbound | 249 | 0.333 | 8.1 | A |
| | Eastbound | 697 | 0.703 | 9.5 | A |
| Queen Street/ Hume Street | Northbound | 256 | 0.134 | 0.1 | A |
| | Westbound | 37 | 0.044 | 6.5 | A |
| | Southbound | 129 | 0.069 | 0.2 | A |
| | Eastbound | 18 | 0.016 | 5.6 | A |

**Table 3-13 Mid-block AM Peak Hour of Service for Future + 10 Years (2027) Scenario**

| Location | Direction | Volume (vehicles/hour) | DOS | AVD (seconds) | LOS |
|---|---|---|---|---|---|
| Queen Street/ Elyard Street | Northbound | 298 | 0.403 | 9.5 | A |
| | Westbound | 448 | 0.612 | 11.8 | A |
| | Southbound | 608 | 0.637 | 10.1 | A |
| | Eastbound | 449 | 0.452 | 6.3 | A |
| Queen Street/ Hume Street | Northbound | 153 | 0.081 | 0.2 | A |
| | Westbound | 121 | 0.154 | 7.2 | A |
| | Southbound | 302 | 0.161 | 0.3 | A |
| | Eastbound | 12 | 0.011 | 5.6 | A |

# 4 Site Access

Access to the proposed development will be via an existing driveway on Queen Street. Staff and patients will enter through the northern entrance and exit via the southern driveway. As shown in **Figure 4-1,** access and egress for the proposed NMC will be controlled by a boom gate.




(Source: Shellshear Young Pty Ltd)

**Figure 4-1 Proposed Narellan Medical Centre Site Plan**

## 4.2 Swept Path Analysis for Narellan Medical Centre

Swept path analysis was conducted to test the vehicle access into the proposed development. In accordance with AS 2890.1:2004 and 2890.2:2002, the standard design vehicles below have been used for the analysis:

> B99 Vehicle (99$^{th}$ percentile passenger vehicle)

> Small Rigid Vehicle (SRV)

> Medium Rigid Vehicle (MRV)

The manoeuvres assessed include:

> B99 Vehicle enter via patron boom gates,

> B899 Vehicle enter via staff boom gates; reverse direction manoeuvre into Car Space 3; forward manoeuvre exit out of staff boom gates.

> SRV enter via patron boom gates, forward direction manoeuvre into Emergency Vehicle car space; reserve direction manoeuvre out of car space; forward direction exit out of patron boom gates.

> MRV enter via patron boom gates

Assumptions for the analysis include:

> Existing Queen Street entry and exit driveways provide satisfactory entry and exit manoeuvres for the vehicle types listed above.

> Vehicles are parked directly opposite the patron boom gate entrance in the Camden Council area.

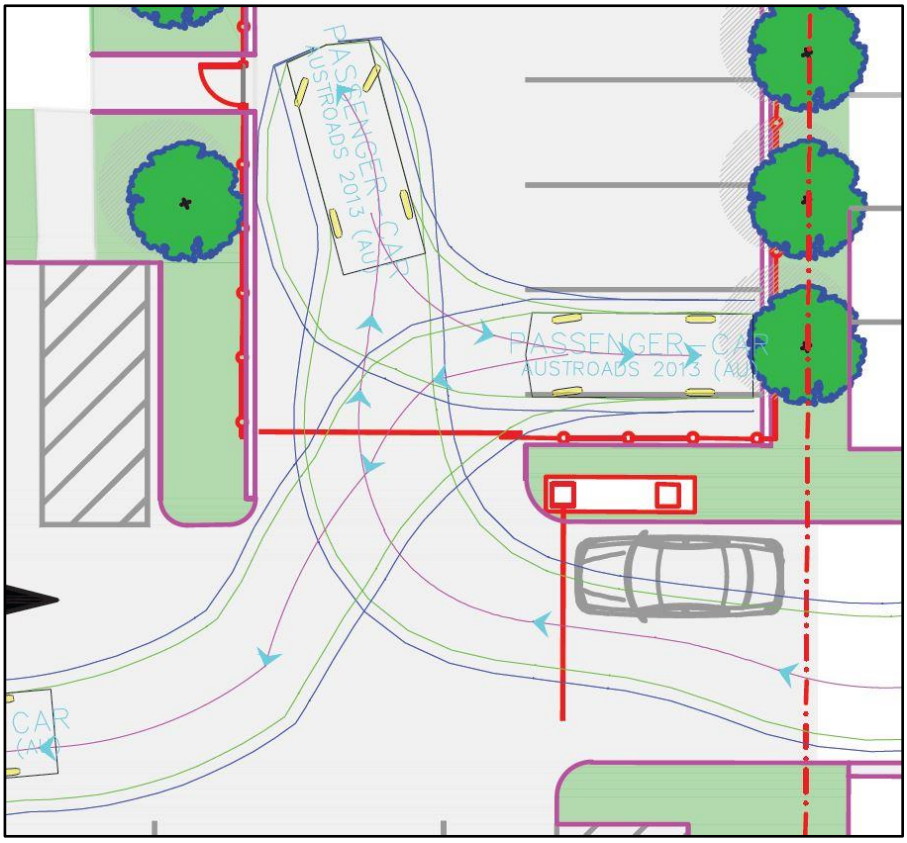
> B99 Vehicle can cross over the eastern car space line marking as it exits the staff car park.

> B99 Vehicle can use the entire extent of the boom gate entrance.

Assuming the B99 Vehicle can cross over line-markings and the entire extent of the boom gate can be accessed in the staff car park, results shown in **Appendix C** and **Figure 4-2** indicate Car Space 3 can accommodate a B99 vehicle parking into Car Space 3 and exit via staff boom gates through to the Queen Street exit. However, due to the limited manoeuvrability into Car Space 3, it is recommended that this space be left unattended and to be used as additional space for other staff vehicles to manoeuvre in and out of the car park.

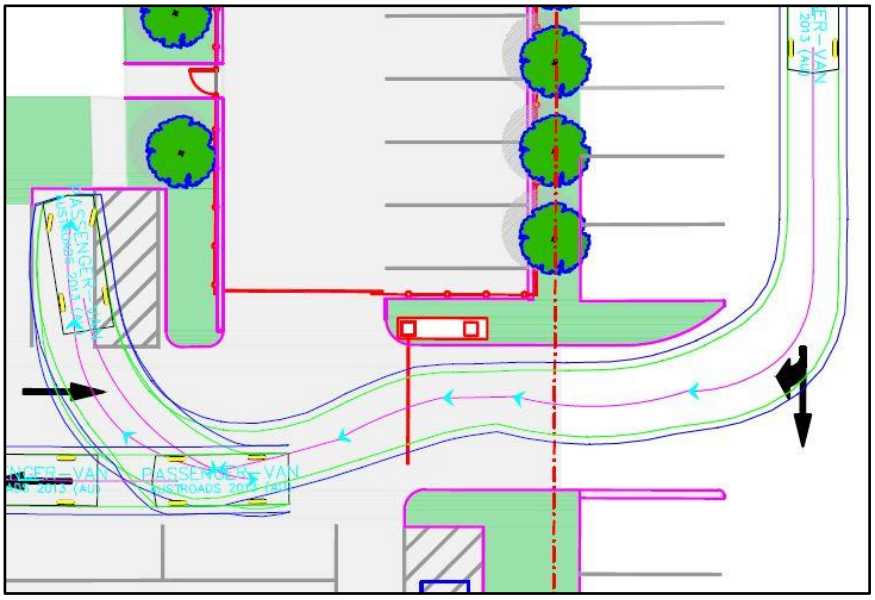
From **Figure 4-3, Figure 4-3** and **Figure 4-4,** the patrons' boom gate can accommodate the SRV and the MRV. Both the SRV and the MRV can manoeuvre though the car park and exit through the Queen Street exit.

The full swept path assessments are attached in **Appendix C.**



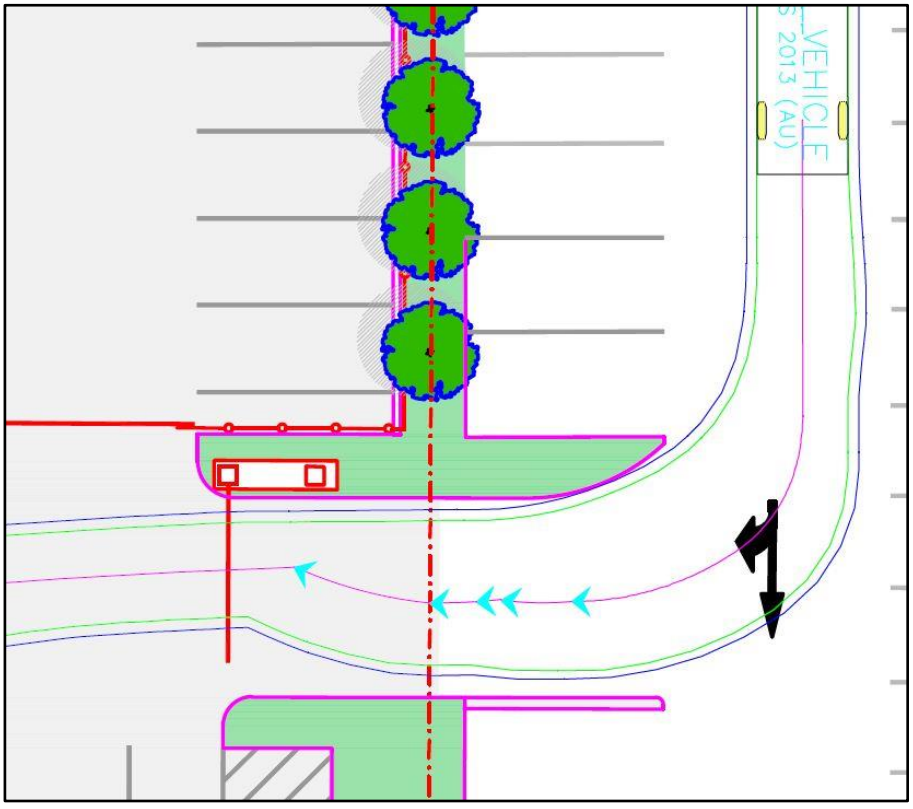

(Layout: Shellshear Young Pty Ltd)

**Figure 4-2 B99 Vehicle Swept Path**



(Layout: Shellshear Young Pty Ltd)

**Figure 4-3 SRV Swept Path – Forward Park**



(Layout: Shellshear Young Pty Ltd)

**Figure 4-4 MRV Swept Path**

## 4.3 Swept Path Analysis for 12m Truck Vehicle

Swept path analysis was conducted to test a 12m vehicle access along the perimeter of proposed development via the State Emergency Services (SES) facility. A preliminary assessment using a custom 12m truck with the following dimensions was analysed:

> Length: 12ms

> Width: 2.55ms

> Wheelbase: 6.8ms

The manoeuvres assessed include:

> 12m truck forward direction entry via Camden Council parking entrance (adjacent to NMC patron entry boom gates),

> 12m truck forward direction exit out of Camden Council parking exit via Hume Street

> 12m truck exit out of Hume Street onto Queen Street

Assumptions for the analysis include:

> Existing Queen Street entry and exit driveways provide satisfactory entry and exit manoeuvres for the vehicle type listed above.

> Vehicles are parked directly opposite the patron boom gate entrance in the Camden Council area.

Results in **Appendix C** show the entry and exits of the Camden Council car park (on the perimeter of the proposed development) can accommodate a 12 meter vehicle travelling in one forward direction through parking aisle.

As shown in **Figure 4-5**, swept path assessment of the 12m vehicle exiting on to Queen Street indicated the vehicle could encroach on to the adjacent property upon a left turn exit. The adjacent property is part of the existing conditions and Council trucks are currently exiting on to Queen Street from this driveway. Based on these existing conditions, the 12m truck exit manoeuvre was considered acceptable, given the truck is currently exiting the driveway and the adjacent land is under the same title as the proposed site.

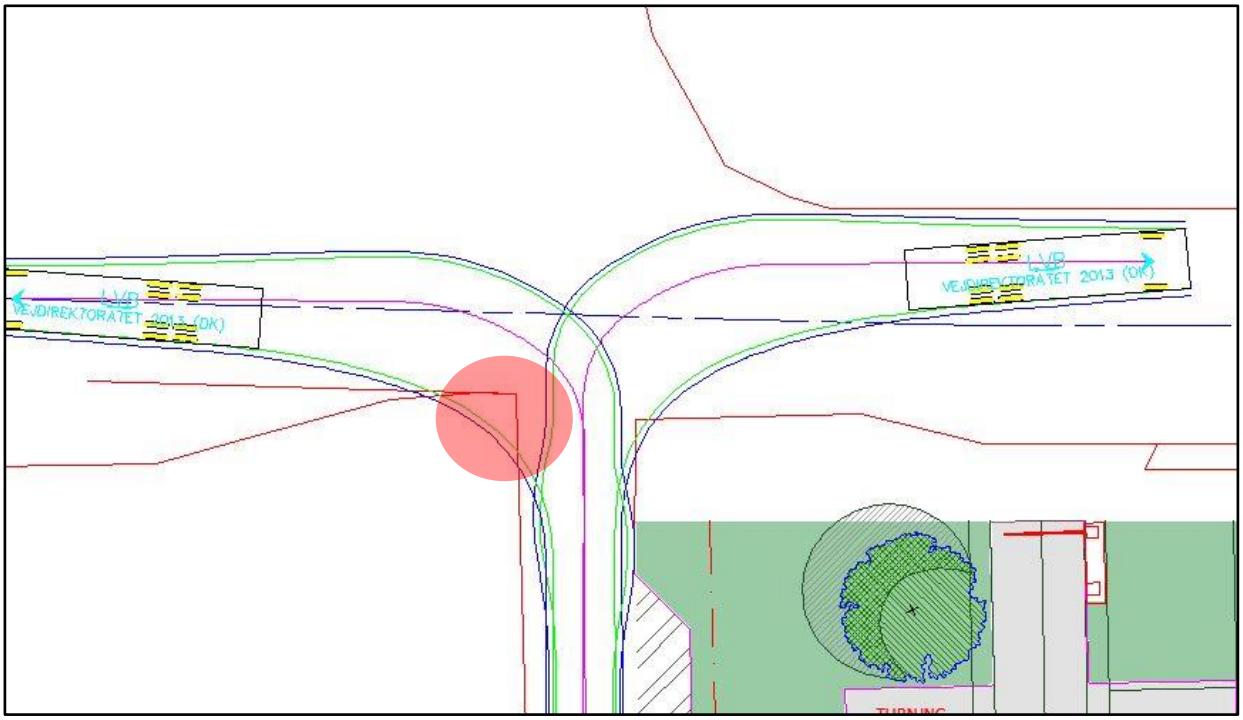


**Figure 4-5 12m Truck Swept Path – Exiting on to Queen Street**

The full swept path assessment is attached in **Appendix C.**

# 5 Car Park Design

## 5.1 Car Parking Minimum Requirements

The development proposes to reconfigure the existing car park. The existing car park is primarily utilised by Camden Council Library patrons. This section of the report assesses the proposed car parking design against the minimum requirements identified in the Camden Development Control Plan 2011 and Camden Council Library DA conditions stipulated in DA No. 1467/2003.

### 5.1.1 Narellan Medical Centre

The Camden Development Control Plan 2011 (Camden DCP) Part B stipulates a minimum requirement for the number of parking spaces required for a medical centre. As outlined in **Figure 4-6**, the Camden DCP outlines four parking spaces per 100m$^2$ Gross Floor Area (GFA). The proposed medical centre is 1686m2 therefore requires 68 car parking spaces to be provided. The proposed development complies with Camden Council's requirement by providing 81 parking spaces including two accessible parking spaces, 14 staff parking spaces, one loading bay and one emergency vehicle car space.

| Health Care | |
|---|---|
| Health Service Facility / Medical Centre | 4 car parking spaces per 100m$^2$ GFA |
| Hospital / Veterinary hospital | Assessment to be based on merit taking into consideration the proposed uses and equivalent rates for similar uses as prescribed in this DCP. |

*(Source: Camden Council Development Control Plan 2011)*

**Figure 5-1 Camden Council Parking Rates for Health Service Facility/ Medical Centres**

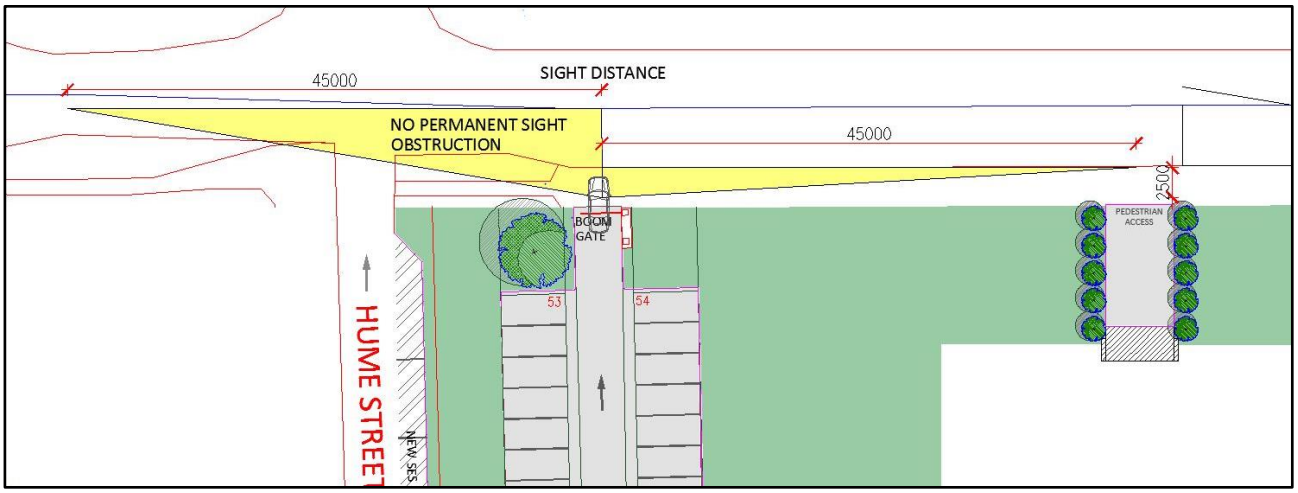
### 5.1.2 Camden Council Library

Provision for 73 car spaces of minimum width 2.6m are stipulated in Condition 17 of the Camden Council Library DA No. 1467/2003. The proposed development retains 73 car spaces of minimum width 2.6m for Camden Library Council patrons. Therefore, the proposed development complies with the Camden Council Library DA No. 1467/2003.

## 5.2 Sight Distance and Pedestrian Sight Lines

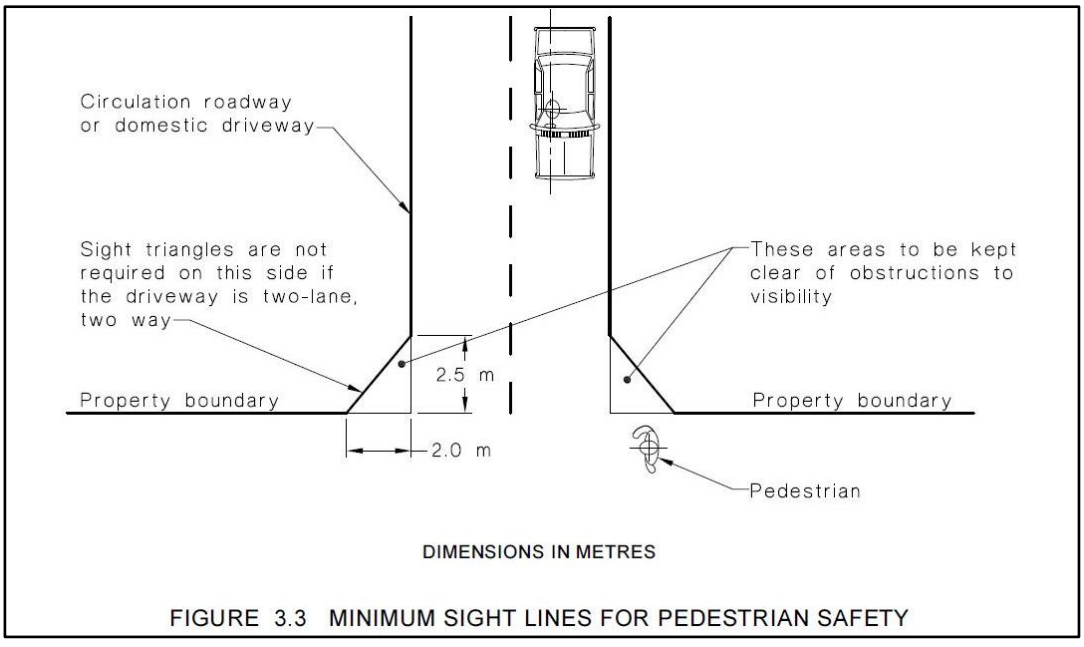
The minimum sight distance requirements are as per AS2890.1:2004. The sight distance requirements sets out the minimum sight distance for a driver to exit a car park or driveway on to a frontage road. For a 50km/hr frontage on Queen Street, a minimum sight distance of 45ms and a desirable sight distance of 69ms is required. An assessment of these requirements shows there are no vegetation or permanent obstruction impeding on the sight distance. As shown in **Figure 4-7, t**he development car park layout meets the minimum requirements for sight distance.

Minimum sight lines for pedestrian requirements are displayed in **Figure 4-8**. Sight distance to pedestrians sets out the minimum requirements from the property line to allow pedestrian and vehicle visibility when vehicles leave a car park or driveway. These sight distance triangles are applied in context in **Figure 4-9**.



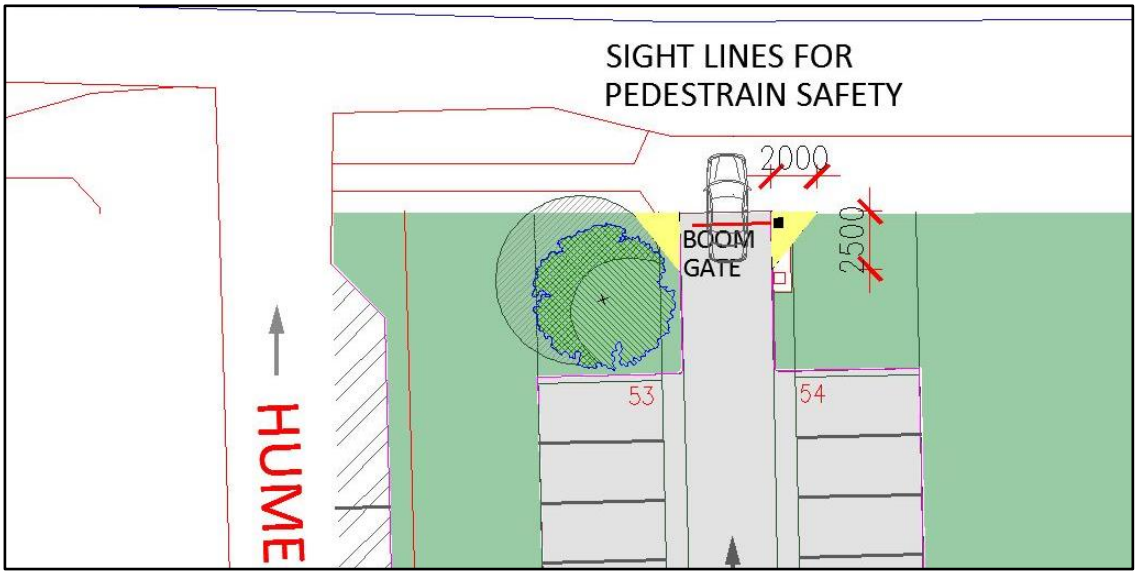

(Layout: Shellshear Young Pty Ltd)

**Figure 5-2 Minimum Sight Distances**




(Source: AS 2890.1:2004)

**Figure 5-3 Minimum Sight Lines for Pedestrian**




(Background: Shellshear Young Pty Ltd)

**Figure 5-4 Minimum Sight Lines for Proposed Exit**

As can be seen in **Figure 4-9,** the sight distance assessment reveals that the boom gates are located within the sight triangles for pedestrians. This is considered to be acceptable, given that the obstruction is highly unlikely to impede on visibility of a large object such as a moving vehicle. An example of the proposed boom gate is shown in **Figure 4-10**.

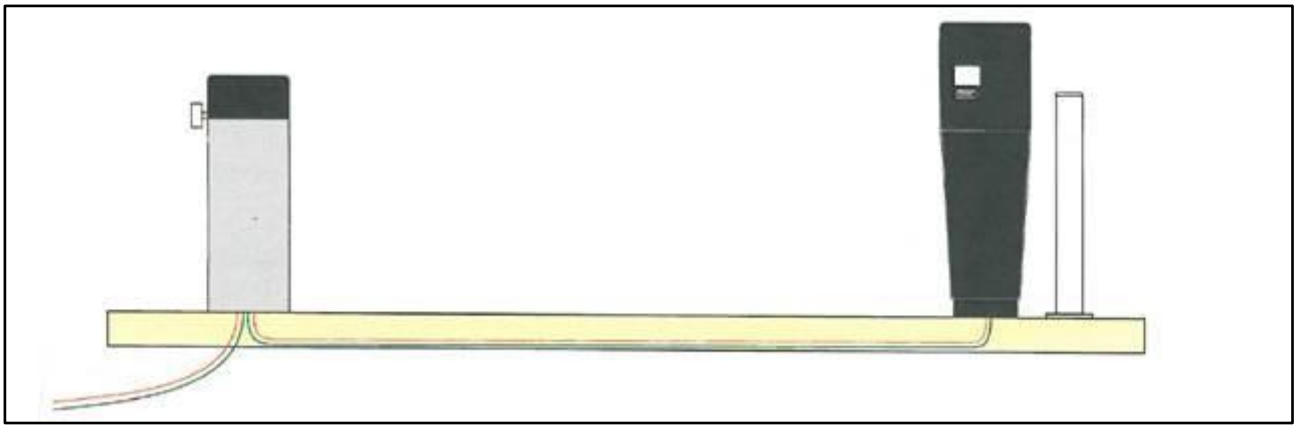


**Figure 5-5 Typical Boom Gate Configuration**

## 5.3 Car Park Operation

This section of the report outlines the car park operation of the proposed development. NMC patrons and staff access the car park via the existing driveways to and from Queen Street. Entry to the NMC car park is controlled by boom gates. NCM patrons and staff will have access to on-site parking at all operational times. The key purpose of the boom gate operation is to prevent non-NMC patron and staff vehicles from occupying the car spaces dedicated for NMC patrons and staff.

This car park operation has been approved for use in other Primary Health Care Medical Centres in Australia including Warringah (NSW), Wyong (NSW), Ringwood (VIC) and Phillip (ACT).

### 5.3.1 Patron Car Park Access

The patron and visitor car park will operate as a paid parking area (after a two or three hour free period) to deter patrons and non-patrons alike from utilising the car park for long term periods. This encourages car park spaces to turn-over and decreases the chance that an arriving NMC patron cannot find a car space. It is noted that the application of the parking fee is not intended as a means of raising revenue for the medical centre.

Patrons will enter the access road via the Queen Street driveway with access granted upon ticket retrieval at the entry boom gate. Exit out of the car park on to Queen Street is granted once a paid ticket is validated at the exit boom gate.

### 5.3.2 Staff Car Park Access

Designated car parking spaces are provided within the proposed NMC car park for NMC staff members only. An automated access system is implemented for this entry and exit. Car park entry is activated by an electronic security device that opens an automatic gate. Exit activation is induced via a ground induction loop that opens the gate upon approach.

### 5.3.3 Boom Gate Operation

#### *5.3.3.1 Entry Gate*

The car park design has allowed for two vehicles to queue at the boom gate entrance to the NMC car park without impacting external circulating car park traffic as presented in **Figure 5-6**. Entry to the car park will be implemented with a ticket spitter. Upon ticket retrieval, the boom gate opens and entry to the car park is granted. A pressure sensor detects when a vehicle is at the machine and only then can a ticket be taken from the machine. The boom arm is not activated by the loop so if a car tailgates the boom gate will come down. There is also an intercom button visitors can push for assistance if the boom gate should ever malfunction.

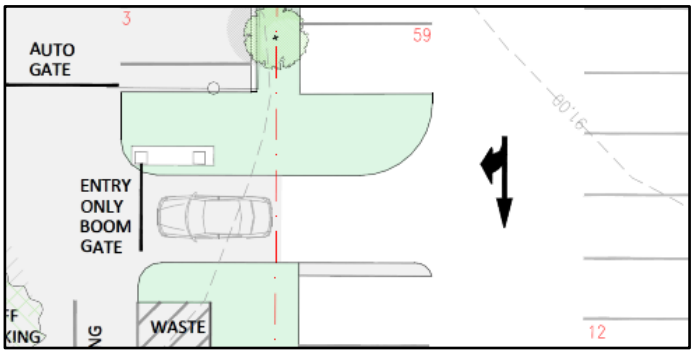



**Figure 5-6 Car Park Entry Boom Gate**

#### *5.3.3.2 Exit Gate*

A ticket reader connected to a boom gate is installed at the car park exit. The boom gate opens once a paid ticket is inserted and the patron can exit the car par. A pressure sensor detects when a vehicle is at the machine and only then can a ticket be inserted into the machine. The boom arm is not activated by the loop so if a car tailgates the boom gate will come down. There is an intercom button they can push for assistance if the boom gate should ever malfunction.

# 6 Conclusion

This report has been prepared to assess the traffic and transport impacts of the proposed Narellan Medical Centre on 19 Queen Street, Narellan. The assessment has considered the following scenarios:

> Existing 2016 Scenario without development;

> Opening Year 2017 including development; and

> Opening Year plus 10 Years (2027) including development.

The assessment of the above scenarios results in the following findings:

> The proposed medical centre is expected to generate approximately 176 vehicle trips in the AM peak hour and 149 vehicle trips in the PM peak hour periods.

> Existing 2016 Scenario and the Opening Year plus 10 Years (2027) Scenario have a good Level of Service (LOS) A at both Queen Street / Elyard and Queen Street / Hume Street intersections.

> Based on the assessment of the existing public transport network, it is reasonable to expect some staff and customers of the proposed site to arrive by bus. Access to the proposed site is supported by an adequate number of public bus routes well connected to the suburbs of Campbelltown and Camden.

> It is reasonable to expect some staff and customers to walk to the proposed NMC. Based on the assessment of the existing pedestrian footpath network, there will be adequate infrastructure to accommodate pedestrian access to the proposed development site.

> The Camden Council DCP (2011) stipulates a minimum number of car parking spaces for a medical centre development. The proposed development complies with the minimum parking requirements. A total of 81 parking spaces have been proposed including two accessible car spaces, 14 staff parking spaces, one loading bay and one emergency vehicle car space have been proposed.

> The Camden Council Library DA Conditions indicate 73 car spaces of minimum width 2.6m be provided for the library. The proposed development maintains this provision and therefore complies with the Camden Council Library DA Conditions.

> The proposed operation of the car park is effective in deterring non-NMC patrons occupying car spaces and in preventing long term stays. This operation has been approved for use in other Primary Health Care Medical Centres in Australia including Warringah (NSW), Wyoming (NSW), Ringwood (VIC) and Phillip (ACT).

> An investigation into vehicle site access using swept paths of relevant vehicles was performed. The vehicles include a standard B99, Small Rigid Vehicle (SRV) and Medium Rigid Vehicle (MRV) to assess the swept paths of cars, emergency vehicles such as ambulances and large waste trucks. Results indicate that the proposed car park layout can accommodate the B99, SRV and MRV vehicles.

> An investigation into vehicle access through the Camden Council car park on the perimeter of the development site was performed. Assessment of a 12m vehicle swept path shows that the perimeter car park entrance and exit can accommodate the 12m vehicle.

> Swept path assessment of the 12m vehicle exiting on to Queen Street indicated the vehicle could encroach on to the adjacent property upon a left turn exit. The adjacent property is part of the existing conditions and Council trucks are currently exiting on to Queen Street from this driveway. Based on these existing conditions, the 12m truck exit manoeuvre was considered acceptable, given the truck is currently exiting the driveway and the adjacent land is under the same title as the proposed site.

> A review of the minimum sight distance and sight lines for pedestrian safety was undertaken for the proposed car park exit. Results show that the car park exit satisfies the minimum driver sight distances. The sight line for pedestrian safety assessment reveals that the boom gates are located within safe sight triangles for pedestrians.

Narellan Medical Centre

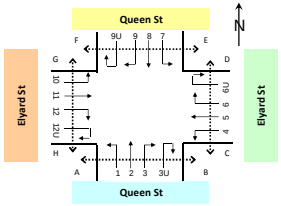
# APPENDIX A

## SURVEY RESULTS

Cardno
Shaping the Future

| | |
|---|---|
| **Job No.** | : N2294 |
| **Client** | : Cardno |
| **Suburb** | : Narellan |
| **Location** | : 1. Queen St / Elyard St |
| **Day/Date** | : Thu, 7th April 2016 |
| **Weather** | : Fine |
| **Description** | : Classified Intersection Count |
| | : 15 mins Data |

| | Class 1 | Class 2 | Class 3 | Class 4 |
|---|---|---|---|---|
| **Classifications** | Cars | Trucks | Buses | Cyclists |



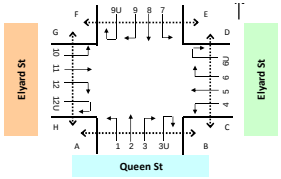

MATRIX Traffic and Transport Data

| Approach | Queen St | | | | | | | | | | | | | | | Elyard St | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Direction** | Direction 1 (Left Turn) | | | | | Direction 2 (Through) | | | | | Direction 3 (Right Turn) | | | | | Direction 3U (U Turn) | | | | | Direction 4 (Left Turn) | | | | | Direction 5 (Through) | | | | | Direction 6 (Right Turn) | | | | | Direction 6U (U Turn) | | | | |
| **Time Period** | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total |
| 8:00 to 8:15 | 4 | 0 | 0 | 0 | 4 | 8 | 1 | 0 | 0 | 9 | 14 | 0 | 1 | 0 | 15 | 1 | 0 | 0 | 0 | 1 | 16 | 0 | 2 | 0 | 18 | 14 | 0 | 0 | 0 | 14 | 4 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 1 |
| 8:15 to 8:30 | 2 | 0 | 0 | 0 | 2 | 14 | 0 | 0 | 0 | 14 | 18 | 0 | 3 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 2 | 0 | 19 | 18 | 1 | 0 | 0 | 19 | 6 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 |
| 8:30 to 8:45 | 7 | 0 | 0 | 0 | 7 | 20 | 0 | 0 | 0 | 20 | 37 | 0 | 2 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 1 | 0 | 19 | 17 | 0 | 0 | 0 | 17 | 14 | 0 | 0 | 0 | 14 | 2 | 0 | 0 | 0 | 2 |
| 8:45 to 9:00 | 14 | 0 | 0 | 0 | 14 | 29 | 0 | 0 | 0 | 29 | 22 | 0 | 1 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 1 | 0 | 16 | 21 | 0 | 0 | 0 | 21 | 15 | 0 | 0 | 0 | 15 | 5 | 0 | 0 | 0 | 5 |
| 9:00 to 9:15 | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 35 | 7 | 0 | 1 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 1 | 0 | 10 | 19 | 0 | 0 | 0 | 19 | 13 | 1 | 0 | 0 | 14 | 2 | 0 | 0 | 0 | 2 |
| 9:15 to 9:30 | 2 | 0 | 0 | 0 | 2 | 18 | 0 | 0 | 0 | 18 | 16 | 0 | 1 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 1 | 0 | 15 | 24 | 3 | 0 | 0 | 27 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 1 | 0 | 1 |
| 9:30 to 9:45 | 4 | 0 | 0 | 0 | 4 | 16 | 0 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 8 | 18 | 0 | 0 | 0 | 18 | 13 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 1 |
| 9:45 to 10:00 | 12 | 0 | 0 | 0 | 12 | 9 | 0 | 0 | 0 | 9 | 10 | 0 | 1 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 2 | 0 | 15 | 23 | 2 | 0 | 0 | 25 | 13 | 1 | 0 | 0 | 14 | 1 | 0 | 0 | 0 | 1 |
| **AM Totals** | **45** | **0** | **0** | **0** | **45** | **149** | **1** | **0** | **0** | **150** | **140** | **0** | **10** | **0** | **150** | **1** | **0** | **0** | **0** | **1** | **110** | **0** | **10** | **0** | **120** | **154** | **6** | **0** | **0** | **160** | **87** | **3** | **0** | **0** | **90** | **12** | **0** | **1** | **0** | **13** |
| 16:00 to 16:15 | 15 | 0 | 0 | 0 | 15 | 14 | 0 | 0 | 0 | 14 | 22 | 0 | 1 | 0 | 23 | 1 | 0 | 0 | 0 | 1 | 24 | 0 | 3 | 0 | 27 | 35 | 2 | 0 | 0 | 37 | 7 | 0 | 0 | 0 | 7 | 4 | 1 | 0 | 0 | 5 |
| 16:15 to 16:30 | 9 | 0 | 0 | 0 | 9 | 14 | 0 | 0 | 0 | 14 | 16 | 0 | 2 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 1 | 0 | 13 | 30 | 0 | 0 | 0 | 30 | 12 | 0 | 0 | 0 | 12 | 4 | 0 | 0 | 0 | 4 |
| 16:30 to 16:45 | 13 | 0 | 0 | 0 | 13 | 11 | 0 | 0 | 0 | 11 | 15 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 18 | 1 | 2 | 0 | 21 | 44 | 0 | 0 | 0 | 44 | 10 | 0 | 0 | 0 | 10 | 2 | 0 | 1 | 0 | 3 |
| 16:45 to 17:00 | 4 | 0 | 0 | 0 | 4 | 18 | 0 | 0 | 0 | 18 | 19 | 0 | 2 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 1 | 0 | 18 | 32 | 1 | 0 | 0 | 33 | 12 | 1 | 0 | 0 | 13 | 3 | 1 | 0 | 0 | 4 |
| 17:00 to 17:15 | 11 | 0 | 0 | 0 | 11 | 23 | 0 | 0 | 0 | 23 | 21 | 0 | 1 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 22 | 53 | 1 | 0 | 0 | 54 | 13 | 0 | 0 | 0 | 13 | 6 | 0 | 0 | 0 | 6 |
| 17:15 to 17:30 | 3 | 0 | 0 | 0 | 3 | 14 | 0 | 0 | 0 | 14 | 14 | 0 | 2 | 0 | 16 | 1 | 0 | 0 | 0 | 1 | 30 | 0 | 2 | 0 | 32 | 46 | 1 | 0 | 0 | 47 | 16 | 0 | 0 | 0 | 16 | 3 | 0 | 0 | 0 | 3 |
| 17:30 to 17:45 | 4 | 0 | 0 | 0 | 4 | 6 | 0 | 0 | 0 | 6 | 9 | 0 | 1 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 20 | 1 | 2 | 0 | 23 | 49 | 0 | 0 | 0 | 49 | 13 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 1 |
| 17:45 to 18:00 | 4 | 0 | 0 | 0 | 4 | 9 | 0 | 0 | 0 | 9 | 17 | 0 | 2 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 1 | 0 | 18 | 46 | 0 | 0 | 0 | 46 | 9 | 0 | 1 | 0 | 10 | 2 | 0 | 0 | 0 | 2 |
| **PM Totals** | **63** | **0** | **0** | **0** | **63** | **109** | **0** | **0** | **0** | **109** | **133** | **0** | **11** | **0** | **144** | **2** | **0** | **0** | **0** | **2** | **160** | **2** | **12** | **0** | **174** | **335** | **5** | **0** | **0** | **340** | **92** | **1** | **1** | **0** | **94** | **25** | **2** | **1** | **0** | **28** |

| Approach | Queen St | | | | | | | | | | | | | | | Elyard St | | | | | | | | | | | | | | | Crossing Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Direction** | Direction 7 (Left Turn) | | | | | Direction 8 (Through) | | | | | Direction 9 (Right Turn) | | | | | Direction 9U (U Turn) | | | | | Direction 10 (Left Turn) | | | | | Direction 11 (Through) | | | | | Direction 12 (Right Turn) | | | | | Direction 12U (U Turn) | | | | | | | | | | | | | |
| **Time Period** | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | A | B | C | D | E | F | G | H | Total |
| 8:00 to 8:15 | 11 | 2 | 1 | 0 | 14 | 7 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 20 | 34 | 0 | 0 | 0 | 34 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 1 | 1 | 0 | 9 |
| 8:15 to 8:30 | 24 | 1 | 0 | 0 | 25 | 10 | 0 | 0 | 0 | 10 | 8 | 0 | 0 | 0 | 8 | 3 | 1 | 0 | 0 | 4 | 29 | 0 | 0 | 0 | 29 | 53 | 0 | 1 | 0 | 54 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 9 |
| 8:30 to 8:45 | 20 | 2 | 1 | 0 | 23 | 9 | 0 | 0 | 0 | 9 | 10 | 0 | 0 | 0 | 10 | 1 | 0 | 0 | 0 | 1 | 37 | 0 | 0 | 0 | 37 | 65 | 0 | 2 | 0 | 67 | 10 | 0 | 0 | 0 | 10 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 5 | 7 | 3 | 0 | 16 |
| 8:45 to 9:00 | 14 | 1 | 1 | 0 | 16 | 15 | 0 | 0 | 0 | 15 | 9 | 1 | 0 | 0 | 10 | 2 | 0 | 0 | 0 | 2 | 44 | 0 | 0 | 0 | 44 | 76 | 1 | 4 | 0 | 81 | 4 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 4 | 1 | 2 | 0 | 8 |
| 9:00 to 9:15 | 13 | 1 | 0 | 0 | 14 | 24 | 0 | 0 | 0 | 24 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 86 | 1 | 1 | 0 | 88 | 46 | 0 | 1 | 0 | 47 | 14 | 0 | 0 | 0 | 14 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 5 |
| 9:15 to 9:30 | 21 | 4 | 1 | 0 | 26 | 24 | 0 | 0 | 0 | 24 | 12 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 64 | 0 | 0 | 0 | 64 | 22 | 1 | 1 | 0 | 24 | 7 | 0 | 0 | 0 | 7 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 6 |
| 9:30 to 9:45 | 16 | 2 | 2 | 0 | 20 | 20 | 0 | 0 | 0 | 20 | 16 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 53 | 19 | 1 | 2 | 0 | 22 | 7 | 0 | 0 | 0 | 7 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 9 | 1 | 2 | 1 | 13 |
| 9:45 to 10:00 | 25 | 3 | 1 | 0 | 29 | 25 | 0 | 0 | 0 | 25 | 25 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 62 | 1 | 0 | 0 | 63 | 21 | 1 | 0 | 0 | 22 | 10 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 5 | 0 | 2 | 13 |
| **AM Totals** | **144** | **16** | **7** | **0** | **167** | **134** | **1** | **0** | **0** | **135** | **95** | **1** | **0** | **0** | **96** | **6** | **1** | **0** | **0** | **7** | **395** | **2** | **1** | **0** | **398** | **336** | **4** | **11** | **0** | **351** | **69** | **0** | **0** | **0** | **69** | **8** | **0** | **0** | **0** | **8** | **1** | **0** | **2** | **7** | **37** | **21** | **8** | **3** | **79** |
| 16:00 to 16:15 | 24 | 2 | 0 | 0 | 26 | 28 | 0 | 0 | 0 | 28 | 45 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 57 | 1 | 0 | 0 | 58 | 21 | 0 | 1 | 0 | 22 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 4 | 4 | 1 | 0 | 1 | 12 |
| 16:15 to 16:30 | 21 | 0 | 0 | 0 | 21 | 46 | 0 | 0 | 0 | 46 | 57 | 0 | 0 | 0 | 57 | 1 | 0 | 0 | 0 | 1 | 50 | 0 | 0 | 0 | 50 | 30 | 1 | 1 | 0 | 32 | 7 | 0 | 0 | 0 | 7 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 9 | 0 | 0 | 11 |
| 16:30 to 16:45 | 25 | 0 | 1 | 0 | 26 | 33 | 0 | 0 | 0 | 33 | 55 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 39 | 25 | 0 | 2 | 0 | 27 | 6 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 3 | 4 | 5 | 2 | 2 | 18 |
| 16:45 to 17:00 | 16 | 0 | 2 | 0 | 18 | 39 | 0 | 0 | 0 | 39 | 52 | 0 | 0 | 0 | 52 | 3 | 0 | 0 | 0 | 3 | 44 | 0 | 0 | 0 | 44 | 24 | 1 | 1 | 0 | 26 | 5 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 6 | 0 | 1 | 12 |
| 17:00 to 17:15 | 22 | 0 | 1 | 0 | 23 | 40 | 0 | 0 | 0 | 40 | 57 | 0 | 0 | 0 | 57 | 2 | 0 | 0 | 0 | 2 | 42 | 0 | 0 | 0 | 42 | 35 | 1 | 2 | 0 | 38 | 5 | 1 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 3 | 2 | 0 | 2 | 10 |
| 17:15 to 17:30 | 19 | 0 | 0 | 0 | 19 | 39 | 0 | 0 | 0 | 39 | 70 | 1 | 0 | 0 | 71 | 1 | 0 | 0 | 0 | 1 | 49 | 0 | 0 | 0 | 49 | 24 | 1 | 2 | 0 | 27 | 7 | 0 | 0 | 0 | 7 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 0 | 6 |
| 17:30 to 17:45 | 19 | 0 | 1 | 0 | 20 | 37 | 0 | 0 | 0 | 37 | 36 | 1 | 0 | 0 | 37 | 1 | 0 | 0 | 0 | 1 | 46 | 0 | 0 | 0 | 46 | 31 | 0 | 0 | 0 | 31 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 4 | 2 | 0 | 1 | 13 |
| 17:45 to 18:00 | 16 | 0 | 1 | 0 | 17 | 33 | 0 | 0 | 0 | 33 | 41 | 0 | 0 | 0 | 41 | 3 | 0 | 0 | 0 | 3 | 46 | 0 | 0 | 0 | 46 | 39 | 0 | 2 | 0 | 41 | 3 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 2 | 0 | 2 | 2 | 2 | 2 | 8 | 0 | 1 | 17 |
| **PM Totals** | **162** | **2** | **6** | **0** | **170** | **295** | **0** | **0** | **0** | **295** | **413** | **2** | **0** | **0** | **415** | **11** | **0** | **0** | **0** | **11** | **373** | **1** | **0** | **0** | **374** | **229** | **4** | **11** | **0** | **244** | **43** | **1** | **0** | **0** | **44** | **7** | **0** | **0** | **0** | **7** | **1** | **4** | **12** | **13** | **22** | **36** | **3** | **8** | **99** |

**Job No.** #REF!
**Client** #REF!
**Suburb** #REF!
**Location** #REF!

**Day/Date** : Thu, 7th April 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Hourly Summary



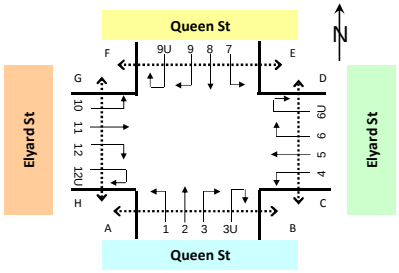

MATRIX Traffic and Transport Data

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | Elyard St | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Direction 1 (Left Turn) | | | | | Direction 2 (Through) | | | | | Direction 3 (Right Turn) | | | | | Direction 3U (U Turn) | | | | | Direction 4 (Left Turn) | | | | | Direction 5 (Through) | | | | | Direction 6 (Right Turn) | | | | | Direction 6U (U Turn) | | | | |
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total |
| 8:00 to 9:00 | 27 | 0 | 0 | 0 | 27 | 71 | 1 | 0 | 0 | 72 | 91 | 0 | 7 | 0 | 98 | 1 | 0 | 0 | 0 | 1 | 66 | 0 | 6 | 0 | 72 | 70 | 1 | 0 | 0 | 71 | 39 | 1 | 0 | 0 | 40 | 8 | 0 | 0 | 0 | 8 |
| 8:15 to 9:15 | 23 | 0 | 0 | 0 | 23 | 98 | 0 | 0 | 0 | 98 | 84 | 0 | 7 | 0 | 91 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 5 | 0 | 64 | 75 | 1 | 0 | 0 | 76 | 48 | 2 | 0 | 0 | 50 | 9 | 0 | 0 | 0 | 9 |
| 8:30 to 9:30 | 23 | 0 | 0 | 0 | 23 | 102 | 0 | 0 | 0 | 102 | 82 | 0 | 5 | 0 | 87 | 0 | 0 | 0 | 0 | 0 | 56 | 0 | 4 | 0 | 60 | 81 | 3 | 0 | 0 | 84 | 51 | 1 | 0 | 0 | 52 | 9 | 0 | 1 | 0 | 10 |
| 8:45 to 9:45 | 20 | 0 | 0 | 0 | 20 | 98 | 0 | 0 | 0 | 98 | 61 | 0 | 3 | 0 | 64 | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 3 | 0 | 49 | 82 | 3 | 0 | 0 | 85 | 50 | 1 | 0 | 0 | 51 | 8 | 0 | 1 | 0 | 9 |
| 9:00 to 10:00 | 18 | 0 | 0 | 0 | 18 | 78 | 0 | 0 | 0 | 78 | 49 | 0 | 3 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 4 | 0 | 48 | 84 | 5 | 0 | 0 | 89 | 48 | 2 | 0 | 0 | 50 | 4 | 0 | 1 | 0 | 5 |
| **AM Totals** | **45** | **0** | **0** | **0** | **45** | **149** | **1** | **0** | **0** | **150** | **140** | **0** | **10** | **0** | **150** | **1** | **0** | **0** | **0** | **1** | **110** | **0** | **10** | **0** | **120** | **154** | **6** | **0** | **0** | **160** | **87** | **3** | **0** | **0** | **90** | **12** | **0** | **1** | **0** | **13** |
| 16:00 to 17:00 | 41 | 0 | 0 | 0 | 41 | 57 | 0 | 0 | 0 | 57 | 72 | 0 | 5 | 0 | 77 | 1 | 0 | 0 | 0 | 1 | 71 | 1 | 7 | 0 | 79 | 141 | 3 | 0 | 0 | 144 | 41 | 1 | 0 | 0 | 42 | 13 | 2 | 1 | 0 | 16 |
| 16:15 to 17:15 | 37 | 0 | 0 | 0 | 37 | 66 | 0 | 0 | 0 | 66 | 71 | 0 | 5 | 0 | 76 | 0 | 0 | 0 | 0 | 0 | 69 | 1 | 4 | 0 | 74 | 159 | 2 | 0 | 0 | 161 | 47 | 1 | 0 | 0 | 48 | 15 | 1 | 1 | 0 | 17 |
| 16:30 to 17:30 | 31 | 0 | 0 | 0 | 31 | 66 | 0 | 0 | 0 | 66 | 69 | 0 | 5 | 0 | 74 | 1 | 0 | 0 | 0 | 1 | 87 | 1 | 5 | 0 | 93 | 175 | 3 | 0 | 0 | 178 | 51 | 1 | 0 | 0 | 52 | 14 | 1 | 1 | 0 | 16 |
| 16:45 to 17:45 | 22 | 0 | 0 | 0 | 22 | 61 | 0 | 0 | 0 | 61 | 63 | 0 | 6 | 0 | 69 | 1 | 0 | 0 | 0 | 1 | 89 | 1 | 5 | 0 | 95 | 180 | 3 | 0 | 0 | 183 | 54 | 1 | 0 | 0 | 55 | 13 | 1 | 0 | 0 | 14 |
| 17:00 to 18:00 | 22 | 0 | 0 | 0 | 22 | 52 | 0 | 0 | 0 | 52 | 61 | 0 | 6 | 0 | 67 | 1 | 0 | 0 | 0 | 1 | 89 | 1 | 5 | 0 | 95 | 194 | 2 | 0 | 0 | 196 | 51 | 0 | 1 | 0 | 52 | 12 | 0 | 0 | 0 | 12 |
| **PM Totals** | **63** | **0** | **0** | **0** | **63** | **109** | **0** | **0** | **0** | **109** | **133** | **0** | **11** | **0** | **144** | **2** | **0** | **0** | **0** | **2** | **160** | **2** | **12** | **0** | **174** | **335** | **5** | **0** | **0** | **340** | **92** | **1** | **1** | **0** | **94** | **25** | **2** | **1** | **0** | **28** |

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | Elyard St | | | | | | | | | | | | | | | | | | | | Crossing Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Direction 7 (Left Turn) | | | | | Direction 8 (Through) | | | | | Direction 9 (Right Turn) | | | | | Direction 9U (U Turn) | | | | | Direction 10 (Left Turn) | | | | | Direction 11 (Through) | | | | | Direction 12 (Right Turn) | | | | | Direction 12U (U Turn) | | | | | | | | | | | | | |
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | A | B | C | D | E | F | G | H | Total |
| 8:00 to 9:00 | 69 | 6 | 3 | 0 | 78 | 41 | 1 | 0 | 0 | 42 | 35 | 1 | 0 | 0 | 36 | 6 | 1 | 0 | 0 | 7 | 130 | 0 | 0 | 0 | 130 | 228 | 1 | 7 | 0 | 236 | 31 | 0 | 0 | 0 | 31 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 5 | 19 | 11 | 6 | 0 | 42 |
| 8:15 to 9:15 | 71 | 5 | 2 | 0 | 78 | 58 | 0 | 0 | 0 | 58 | 34 | 1 | 0 | 0 | 35 | 6 | 1 | 0 | 0 | 7 | 196 | 1 | 1 | 0 | 198 | 240 | 1 | 8 | 0 | 249 | 36 | 0 | 0 | 0 | 36 | 5 | 0 | 0 | 0 | 5 | 1 | 0 | 2 | 3 | 14 | 13 | 5 | 0 | 38 |
| 8:30 to 9:30 | 68 | 8 | 3 | 0 | 79 | 72 | 0 | 0 | 0 | 72 | 38 | 1 | 0 | 0 | 39 | 3 | 0 | 0 | 0 | 3 | 231 | 1 | 1 | 0 | 233 | 209 | 2 | 8 | 0 | 219 | 35 | 0 | 0 | 0 | 35 | 6 | 0 | 0 | 0 | 6 | 1 | 0 | 2 | 1 | 14 | 12 | 5 | 0 | 35 |
| 8:45 to 9:45 | 64 | 8 | 4 | 0 | 76 | 83 | 0 | 0 | 0 | 83 | 44 | 1 | 0 | 0 | 45 | 2 | 0 | 0 | 0 | 2 | 247 | 1 | 1 | 0 | 249 | 163 | 3 | 8 | 0 | 174 | 32 | 0 | 0 | 0 | 32 | 5 | 0 | 0 | 0 | 5 | 1 | 0 | 1 | 1 | 18 | 6 | 4 | 1 | 32 |
| 9:00 to 10:00 | 75 | 10 | 4 | 0 | 89 | 93 | 0 | 0 | 0 | 93 | 60 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 | 0 | 265 | 2 | 1 | 0 | 268 | 108 | 3 | 4 | 0 | 115 | 38 | 0 | 0 | 0 | 38 | 4 | 0 | 0 | 0 | 4 | 1 | 0 | 1 | 2 | 18 | 10 | 2 | 3 | 37 |
| **AM Totals** | **144** | **16** | **7** | **0** | **167** | **134** | **1** | **0** | **0** | **135** | **95** | **1** | **0** | **0** | **96** | **6** | **1** | **0** | **0** | **7** | **395** | **2** | **1** | **0** | **398** | **336** | **4** | **11** | **0** | **351** | **69** | **0** | **0** | **0** | **69** | **8** | **0** | **0** | **0** | **8** | **1** | **0** | **2** | **7** | **37** | **21** | **8** | **3** | **79** |
| 16:00 to 17:00 | 86 | 2 | 3 | 0 | 91 | 146 | 0 | 0 | 0 | 146 | 209 | 0 | 0 | 0 | 209 | 4 | 0 | 0 | 0 | 4 | 190 | 1 | 0 | 0 | 191 | 100 | 2 | 5 | 0 | 107 | 25 | 0 | 0 | 0 | 25 | 3 | 0 | 0 | 0 | 3 | 0 | 2 | 4 | 9 | 11 | 21 | 2 | 4 | 53 |
| 16:15 to 17:15 | 84 | 0 | 4 | 0 | 88 | 158 | 0 | 0 | 0 | 158 | 221 | 0 | 0 | 0 | 221 | 6 | 0 | 0 | 0 | 6 | 175 | 0 | 0 | 0 | 175 | 114 | 3 | 6 | 0 | 123 | 23 | 1 | 0 | 0 | 24 | 4 | 0 | 0 | 0 | 4 | 1 | 0 | 6 | 5 | 10 | 22 | 2 | 5 | 51 |
| 16:30 to 17:30 | 82 | 0 | 4 | 0 | 86 | 151 | 0 | 0 | 0 | 151 | 234 | 1 | 0 | 0 | 235 | 6 | 0 | 0 | 0 | 6 | 174 | 0 | 0 | 0 | 174 | 108 | 3 | 7 | 0 | 118 | 23 | 1 | 0 | 0 | 24 | 4 | 0 | 0 | 0 | 4 | 1 | 0 | 6 | 5 | 10 | 16 | 3 | 5 | 46 |
| 16:45 to 17:45 | 76 | 0 | 4 | 0 | 80 | 155 | 0 | 0 | 0 | 155 | 215 | 2 | 0 | 0 | 217 | 7 | 0 | 0 | 0 | 7 | 181 | 0 | 0 | 0 | 181 | 114 | 3 | 5 | 0 | 122 | 20 | 1 | 0 | 0 | 21 | 3 | 0 | 0 | 0 | 3 | 1 | 0 | 8 | 4 | 10 | 13 | 1 | 4 | 41 |
| 17:00 to 18:00 | 76 | 0 | 3 | 0 | 79 | 149 | 0 | 0 | 0 | 149 | 204 | 2 | 0 | 0 | 206 | 7 | 0 | 0 | 0 | 7 | 183 | 0 | 0 | 0 | 183 | 129 | 2 | 6 | 0 | 137 | 18 | 1 | 0 | 0 | 19 | 4 | 0 | 0 | 0 | 4 | 1 | 2 | 8 | 4 | 11 | 15 | 1 | 4 | 46 |
| **PM Totals** | **162** | **2** | **6** | **0** | **170** | **295** | **0** | **0** | **0** | **295** | **413** | **2** | **0** | **0** | **415** | **11** | **0** | **0** | **0** | **11** | **373** | **1** | **0** | **0** | **374** | **229** | **4** | **11** | **0** | **244** | **43** | **1** | **0** | **0** | **44** | **7** | **0** | **0** | **0** | **7** | **1** | **4** | **12** | **13** | **22** | **36** | **3** | **8** | **99** |

**Job No.** #REF!
**Client** #REF!
**Suburb** #REF!
**Location** #REF!

**Day/Date** : Thu, 7th April 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Peak Hour Summary




MATRIX Traffic and Transport Data

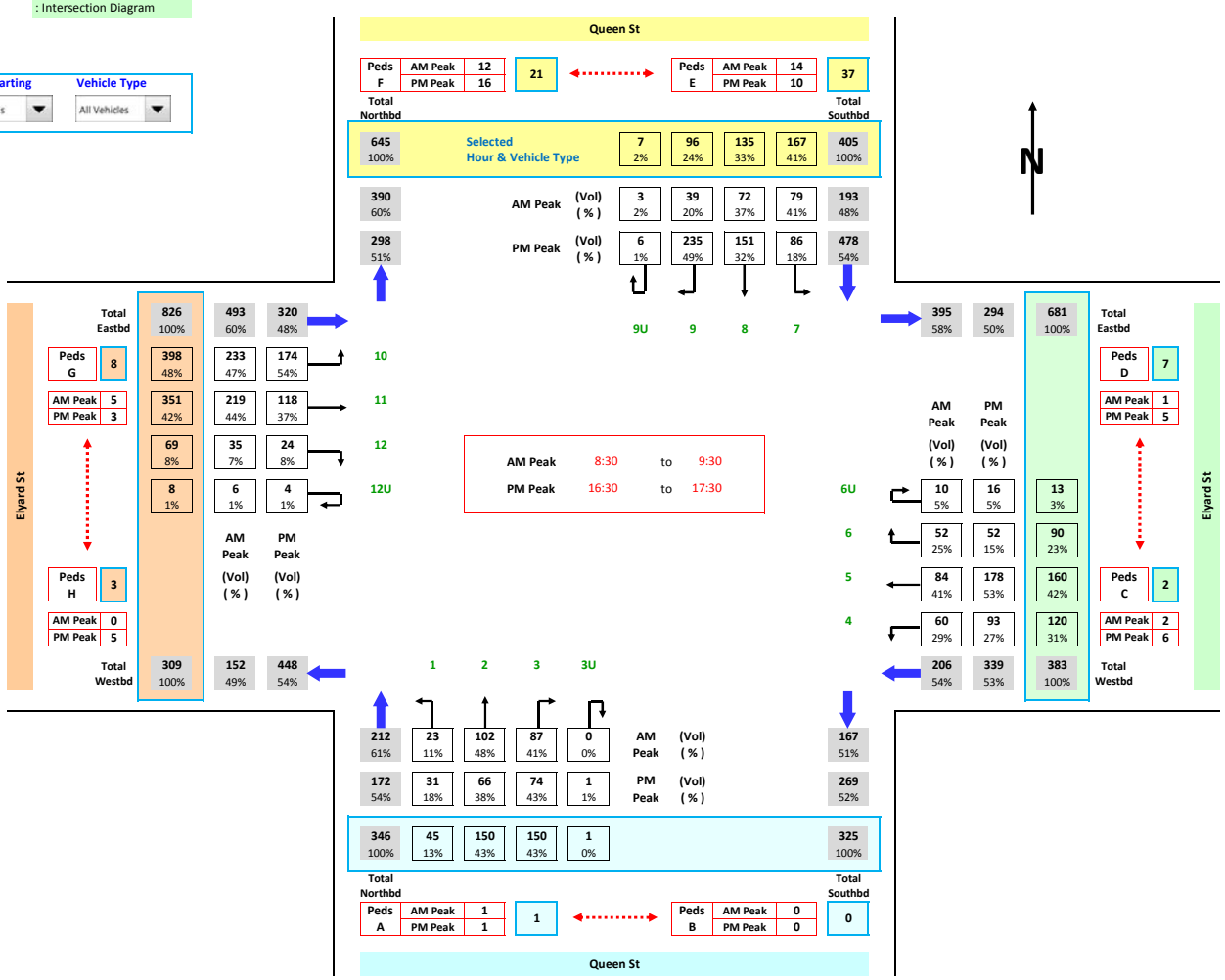
| Approach | | Queen St | | | | | Elyard St | | | | | Queen St | | | | | Elyard St | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | |
| AM | 8:30 to 9:30 | 207 | 0 | 5 | 0 | **212** | 197 | 4 | 5 | 0 | **206** | 181 | 9 | 3 | 0 | **193** | 481 | 3 | 9 | 0 | **493** | **1,104** |
| PM | 16:30 to 17:30 | 167 | 0 | 5 | 0 | **172** | 327 | 6 | 6 | 0 | **339** | 473 | 1 | 4 | 0 | **478** | 309 | 4 | 7 | 0 | **320** | **1,309** |

| Approach | | Queen St | | | | | Elyard St | | | | | Queen St | | | | | Elyard St | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | |
| | 8:00 to 9:00 | 190 | 1 | 7 | 0 | **198** | 183 | 2 | 6 | 0 | **191** | 151 | 9 | 3 | 0 | **163** | 393 | 1 | 7 | 0 | **401** | **953** |
| | 8:15 to 9:15 | 205 | 0 | 7 | 0 | **212** | 191 | 3 | 5 | 0 | **199** | 169 | 7 | 2 | 0 | **178** | 477 | 2 | 9 | 0 | **488** | **1,077** |
| | 8:30 to 9:30 | 207 | 0 | 5 | 0 | **212** | 197 | 4 | 5 | 0 | **206** | 181 | 9 | 3 | 0 | **193** | 481 | 3 | 9 | 0 | **493** | **1,104** |
| | 8:45 to 9:45 | 179 | 0 | 3 | 0 | **182** | 186 | 4 | 4 | 0 | **194** | 193 | 9 | 4 | 0 | **206** | 447 | 4 | 9 | 0 | **460** | **1,042** |
| | 9:00 to 10:00 | 145 | 0 | 3 | 0 | **148** | 180 | 7 | 5 | 0 | **192** | 228 | 10 | 4 | 0 | **242** | 415 | 5 | 5 | 0 | **425** | **1,007** |
| | **AM Totals** | **335** | **1** | **10** | **0** | **346** | **363** | **9** | **11** | **0** | **383** | **379** | **19** | **7** | **0** | **405** | **808** | **6** | **12** | **0** | **826** | **1,960** |
| | 16:00 to 17:00 | 171 | 0 | 5 | 0 | **176** | 266 | 7 | 8 | 0 | **281** | 445 | 2 | 3 | 0 | **450** | 318 | 3 | 5 | 0 | **326** | **1,233** |
| | 16:15 to 17:15 | 174 | 0 | 5 | 0 | **179** | 290 | 5 | 5 | 0 | **300** | 469 | 0 | 4 | 0 | **473** | 316 | 4 | 6 | 0 | **326** | **1,278** |
| | 16:30 to 17:30 | 167 | 0 | 5 | 0 | **172** | 327 | 6 | 6 | 0 | **339** | 473 | 1 | 4 | 0 | **478** | 309 | 4 | 7 | 0 | **320** | **1,309** |
| | 16:45 to 17:45 | 147 | 0 | 6 | 0 | **153** | 336 | 6 | 5 | 0 | **347** | 453 | 2 | 4 | 0 | **459** | 318 | 4 | 5 | 0 | **327** | **1,286** |
| | 17:00 to 18:00 | 136 | 0 | 6 | 0 | **142** | 346 | 3 | 6 | 0 | **355** | 436 | 2 | 3 | 0 | **441** | 334 | 3 | 6 | 0 | **343** | **1,281** |
| | **PM Totals** | **307** | **0** | **11** | **0** | **318** | **612** | **10** | **14** | **0** | **636** | **881** | **4** | **6** | **0** | **891** | **652** | **6** | **11** | **0** | **669** | **2,514** |

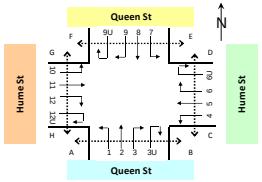
**Job No.** #
**Client** #
**Suburb** #
**Location** #

**Day/Date** : Thu, 7th April 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Intersection Diagram

| Hour Starting | Vehicle Type |
|---|---|
| AM Totals | All Vehicles |



| | |
|---|---|
| **Job No.** | : N2294 |
| **Client** | : Cardno |
| **Suburb** | : Narellan |
| **Location** | : 2. Queen St / Hume St |
| **Day/Date** | : Thu, 7th April 2016 |
| **Weather** | : Fine |
| **Description** | : Classified Intersection Count |
| | : 15 mins Data |




MATRIX
Intelligent Travel Transport Choices

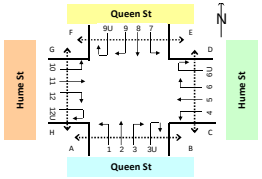
| | Class 1 | Class 2 | Class 3 | Class 4 |
|---|---|---|---|---|
| **Classifications** | Cars | Trucks | Buses | Cyclists |

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | Hume St | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Direction** | Direction 1 (Left Turn) | | | | | Direction 2 (Through) | | | | | Direction 3 (Right Turn) | | | | | Direction 3U (U Turn) | | | | | Direction 4 (Left Turn) | | | | | Direction 5 (Through) | | | | | Direction 6 (Right Turn) | | | | | Direction 6U (U Turn) | | | | |
| **Time Period** | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total |
| 8:00 to 8:15 | 0 | 0 | 0 | 0 | **0** | 31 | 0 | 1 | 0 | **32** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** |
| 8:15 to 8:30 | 0 | 0 | 0 | 0 | **0** | 36 | 0 | 3 | 0 | **39** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** |
| 8:30 to 8:45 | 0 | 0 | 0 | 0 | **0** | 61 | 0 | 2 | 0 | **63** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** |
| 8:45 to 9:00 | 0 | 0 | 0 | 0 | **0** | 53 | 0 | 1 | 0 | **54** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** |
| 9:00 to 9:15 | 0 | 0 | 0 | 0 | **0** | 44 | 0 | 1 | 0 | **45** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** |
| 9:15 to 9:30 | 0 | 0 | 0 | 0 | **0** | 29 | 0 | 1 | 0 | **30** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** |
| 9:30 to 9:45 | 0 | 0 | 0 | 0 | **0** | 35 | 0 | 0 | 0 | **35** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** |
| 9:45 to 10:00 | 1 | 0 | 0 | 0 | **1** | 19 | 1 | 1 | 0 | **21** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 3 | 1 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 11 | 0 | 0 | 0 | **11** | 0 | 0 | 0 | 0 | **0** |
| **AM Totals** | **1** | **0** | **0** | **0** | **1** | **308** | **1** | **10** | **0** | **319** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **12** | **1** | **0** | **0** | **13** | **0** | **0** | **0** | **0** | **0** | **42** | **0** | **0** | **0** | **42** | **0** | **0** | **0** | **0** | **0** |
| 16:00 to 16:15 | 1 | 0 | 0 | 0 | **1** | 30 | 0 | 1 | 0 | **31** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** | 21 | 0 | 0 | 0 | **21** | 0 | 0 | 0 | 0 | **0** |
| 16:15 to 16:30 | 1 | 0 | 0 | 0 | **1** | 24 | 0 | 2 | 0 | **26** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 16 | 0 | 0 | 0 | **16** | 0 | 0 | 0 | 0 | **0** |
| 16:30 to 16:45 | 1 | 0 | 0 | 0 | **1** | 22 | 0 | 0 | 0 | **22** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 9 | 0 | 0 | 0 | **9** | 0 | 0 | 0 | 0 | **0** | 15 | 0 | 0 | 0 | **15** | 0 | 0 | 0 | 0 | **0** |
| 16:45 to 17:00 | 0 | 0 | 0 | 0 | **0** | 25 | 0 | 2 | 0 | **27** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 8 | 0 | 0 | 0 | **8** | 0 | 0 | 0 | 0 | **0** | 14 | 0 | 0 | 0 | **14** | 0 | 0 | 0 | 0 | **0** |
| 17:00 to 17:15 | 1 | 0 | 0 | 0 | **1** | 20 | 0 | 2 | 0 | **22** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 9 | 0 | 0 | 0 | **9** | 0 | 0 | 0 | 0 | **0** | 25 | 0 | 0 | 0 | **25** | 0 | 0 | 0 | 0 | **0** |
| 17:15 to 17:30 | 0 | 0 | 0 | 0 | **0** | 17 | 0 | 1 | 0 | **18** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 10 | 0 | 0 | 0 | **10** | 0 | 0 | 0 | 0 | **0** |
| 17:30 to 17:45 | 0 | 0 | 0 | 0 | **0** | 18 | 0 | 2 | 0 | **20** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** |
| 17:45 to 18:00 | 0 | 0 | 0 | 0 | **0** | 21 | 0 | 1 | 0 | **22** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** |
| **PM Totals** | **4** | **0** | **0** | **0** | **4** | **177** | **0** | **11** | **0** | **188** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **50** | **0** | **0** | **0** | **50** | **0** | **0** | **0** | **0** | **0** | **112** | **0** | **0** | **0** | **112** | **0** | **0** | **0** | **0** | **0** |

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | Hume St | | | | | | | | | | | | | | | | | | Crossing Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Direction** | Direction 7 (Left Turn) | | | | | Direction 8 (Through) | | | | | Direction 9 (Right Turn) | | | | | Direction 9U (U Turn) | | | | | Direction 10 (Left Turn) | | | | | Direction 11 (Through) | | | | | Direction 12 (Right Turn) | | | | | Direction 12U (U Turn) | | | | | | | | | | | | | |
| **Time Period** | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | A | B | C | D | E | F | G | H | Total |
| 8:00 to 8:15 | 0 | 0 | 0 | 0 | **0** | 19 | 0 | 1 | 0 | **20** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **2** |
| 8:15 to 8:30 | 0 | 0 | 0 | 0 | **0** | 11 | 0 | 2 | 0 | **13** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **2** |
| 8:30 to 8:45 | 0 | 0 | 0 | 0 | **0** | 15 | 0 | 1 | 0 | **16** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 8:45 to 9:00 | 0 | 0 | 0 | 0 | **0** | 16 | 0 | 1 | 0 | **17** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | **2** |
| 9:00 to 9:15 | 0 | 0 | 0 | 0 | **0** | 30 | 0 | 1 | 0 | **31** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **2** |
| 9:15 to 9:30 | 0 | 0 | 0 | 0 | **0** | 27 | 0 | 1 | 0 | **28** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | **2** |
| 9:30 to 9:45 | 0 | 0 | 0 | 0 | **0** | 20 | 0 | 1 | 0 | **21** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | **3** |
| 9:45 to 10:00 | 0 | 0 | 0 | 0 | **0** | 29 | 0 | 2 | 0 | **31** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | **2** |
| **AM Totals** | **0** | **0** | **0** | **0** | **0** | **167** | **0** | **10** | **0** | **177** | **9** | **0** | **0** | **0** | **9** | **0** | **0** | **0** | **0** | **0** | **17** | **0** | **0** | **0** | **17** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **4** | **9** | **1** | **0** | **0** | **0** | **15** |
| 16:00 to 16:15 | 0 | 0 | 0 | 0 | **0** | 56 | 0 | 2 | 0 | **58** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 1 | 5 | 2 | 0 | 0 | 0 | **9** |
| 16:15 to 16:30 | 0 | 0 | 0 | 0 | **0** | 52 | 0 | 1 | 0 | **53** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | **3** |
| 16:30 to 16:45 | 0 | 0 | 0 | 0 | **0** | 49 | 1 | 2 | 0 | **52** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 3 | 0 | 6 | 2 | 1 | 0 | 0 | **12** |
| 16:45 to 17:00 | 0 | 0 | 0 | 0 | **0** | 54 | 0 | 1 | 0 | **55** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | **4** |
| 17:00 to 17:15 | 0 | 0 | 0 | 0 | **0** | 54 | 1 | 0 | 0 | **55** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | **4** |
| 17:15 to 17:30 | 0 | 0 | 0 | 0 | **0** | 70 | 0 | 3 | 0 | **73** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 17:30 to 17:45 | 0 | 0 | 0 | 0 | **0** | 54 | 0 | 1 | 0 | **55** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 17:45 to 18:00 | 0 | 0 | 0 | 0 | **0** | 50 | 0 | 1 | 0 | **51** | 1 | 0 | 0 | 0 | **1** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **2** |
| **PM Totals** | **0** | **0** | **0** | **0** | **0** | **439** | **2** | **11** | **0** | **452** | **22** | **0** | **0** | **0** | **22** | **1** | **0** | **0** | **0** | **1** | **10** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **11** | **14** | **4** | **1** | **0** | **0** | **34** |

**Job No.** #REF!
**Client** #REF!
**Suburb** #REF!
**Location** #REF!

**Day/Date** : Thu, 7th April 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Hourly Summary

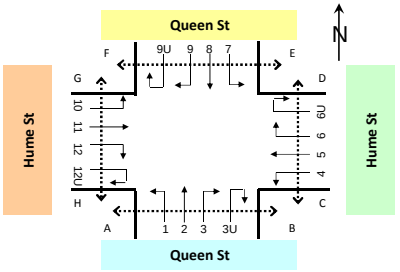



MATRIX
Intelligent Transport Data

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | Hume St | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Direction 1 (Left Turn) | | | | | Direction 2 (Through) | | | | | Direction 3 (Right Turn) | | | | | Direction 3U (U Turn) | | | | | Direction 4 (Left Turn) | | | | | Direction 5 (Through) | | | | | Direction 6 (Right Turn) | | | | | Direction 6U (U Turn) | | | | |
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total |
| 8:00 to 9:00 | 0 | 0 | 0 | 0 | **0** | 181 | 0 | 7 | 0 | **188** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 20 | 0 | 0 | 0 | **20** | 0 | 0 | 0 | 0 | **0** |
| 8:15 to 9:15 | 0 | 0 | 0 | 0 | **0** | 194 | 0 | 7 | 0 | **201** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 6 | 0 | 0 | 0 | **6** | 0 | 0 | 0 | 0 | **0** | 19 | 0 | 0 | 0 | **19** | 0 | 0 | 0 | 0 | **0** |
| 8:30 to 9:30 | 0 | 0 | 0 | 0 | **0** | 187 | 0 | 5 | 0 | **192** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 20 | 0 | 0 | 0 | **20** | 0 | 0 | 0 | 0 | **0** |
| 8:45 to 9:45 | 0 | 0 | 0 | 0 | **0** | 161 | 0 | 3 | 0 | **164** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 18 | 0 | 0 | 0 | **18** | 0 | 0 | 0 | 0 | **0** |
| 9:00 to 10:00 | 1 | 0 | 0 | 0 | **1** | 127 | 1 | 3 | 0 | **131** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 7 | 1 | 0 | 0 | **8** | 0 | 0 | 0 | 0 | **0** | 22 | 0 | 0 | 0 | **22** | 0 | 0 | 0 | 0 | **0** |
| **AM Totals** | **1** | **0** | **0** | **0** | **1** | **308** | **1** | **10** | **0** | **319** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **12** | **1** | **0** | **0** | **13** | **0** | **0** | **0** | **0** | **0** | **42** | **0** | **0** | **0** | **42** | **0** | **0** | **0** | **0** | **0** |
| 16:00 to 17:00 | 3 | 0 | 0 | 0 | **3** | 101 | 0 | 5 | 0 | **106** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 27 | 0 | 0 | 0 | **27** | 0 | 0 | 0 | 0 | **0** | 66 | 0 | 0 | 0 | **66** | 0 | 0 | 0 | 0 | **0** |
| 16:15 to 17:15 | 3 | 0 | 0 | 0 | **3** | 91 | 0 | 6 | 0 | **97** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 29 | 0 | 0 | 0 | **29** | 0 | 0 | 0 | 0 | **0** | 70 | 0 | 0 | 0 | **70** | 0 | 0 | 0 | 0 | **0** |
| 16:30 to 17:30 | 2 | 0 | 0 | 0 | **2** | 84 | 0 | 5 | 0 | **89** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 31 | 0 | 0 | 0 | **31** | 0 | 0 | 0 | 0 | **0** | 64 | 0 | 0 | 0 | **64** | 0 | 0 | 0 | 0 | **0** |
| 16:45 to 17:45 | 1 | 0 | 0 | 0 | **1** | 80 | 0 | 7 | 0 | **87** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 26 | 0 | 0 | 0 | **26** | 0 | 0 | 0 | 0 | **0** | 53 | 0 | 0 | 0 | **53** | 0 | 0 | 0 | 0 | **0** |
| 17:00 to 18:00 | 1 | 0 | 0 | 0 | **1** | 76 | 0 | 6 | 0 | **82** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 23 | 0 | 0 | 0 | **23** | 0 | 0 | 0 | 0 | **0** | 46 | 0 | 0 | 0 | **46** | 0 | 0 | 0 | 0 | **0** |
| **PM Totals** | **4** | **0** | **0** | **0** | **4** | **177** | **0** | **11** | **0** | **188** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **50** | **0** | **0** | **0** | **50** | **0** | **0** | **0** | **0** | **0** | **112** | **0** | **0** | **0** | **112** | **0** | **0** | **0** | **0** | **0** |

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | Hume St | | | | | | | | | | | | | | | | | | | | Crossing Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Direction 7 (Left Turn) | | | | | Direction 8 (Through) | | | | | Direction 9 (Right Turn) | | | | | Direction 9U (U Turn) | | | | | Direction 10 (Left Turn) | | | | | Direction 11 (Through) | | | | | Direction 12 (Right Turn) | | | | | Direction 12U (U Turn) | | | | | | | | | | | | | |
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | A | B | C | D | E | F | G | H | Total |
| 8:00 to 9:00 | 0 | 0 | 0 | 0 | **0** | 61 | 0 | 5 | 0 | **66** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 11 | 0 | 0 | 0 | **11** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | **6** |
| 8:15 to 9:15 | 0 | 0 | 0 | 0 | **0** | 72 | 0 | 5 | 0 | **77** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 11 | 0 | 0 | 0 | **11** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | **6** |
| 8:30 to 9:30 | 0 | 0 | 0 | 0 | **0** | 88 | 0 | 4 | 0 | **92** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 11 | 0 | 0 | 0 | **11** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 0 | **6** |
| 8:45 to 9:45 | 0 | 0 | 0 | 0 | **0** | 93 | 0 | 4 | 0 | **97** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 9 | 0 | 0 | 0 | **9** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 0 | 1 | 1 | 6 | 1 | 0 | 0 | 0 | **9** |
| 9:00 to 10:00 | 0 | 0 | 0 | 0 | **0** | 106 | 0 | 5 | 0 | **111** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 6 | 0 | 0 | 0 | **6** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 0 | 1 | 1 | 6 | 1 | 0 | 0 | 0 | **9** |
| **AM Totals** | **0** | **0** | **0** | **0** | **0** | **167** | **0** | **10** | **0** | **177** | **9** | **0** | **0** | **0** | **9** | **0** | **0** | **0** | **0** | **0** | **17** | **0** | **0** | **0** | **17** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **4** | **9** | **1** | **0** | **0** | **0** | **15** |
| 16:00 to 17:00 | 0 | 0 | 0 | 0 | **0** | 211 | 1 | 6 | 0 | **218** | 12 | 0 | 0 | 0 | **12** | 0 | 0 | 0 | 0 | **0** | 6 | 0 | 0 | 0 | **6** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 1 | 3 | 5 | 14 | 4 | 1 | 0 | 0 | **28** |
| 16:15 to 17:15 | 0 | 0 | 0 | 0 | **0** | 209 | 2 | 4 | 0 | **215** | 12 | 0 | 0 | 0 | **12** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 3 | 8 | 9 | 2 | 1 | 0 | 0 | **23** |
| 16:30 to 17:30 | 0 | 0 | 0 | 0 | **0** | 227 | 2 | 6 | 0 | **235** | 13 | 0 | 0 | 0 | **13** | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 3 | 8 | 6 | 2 | 1 | 0 | 0 | **20** |
| 16:45 to 17:45 | 0 | 0 | 0 | 0 | **0** | 232 | 1 | 5 | 0 | **238** | 11 | 0 | 0 | 0 | **11** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | **8** |
| 17:00 to 18:00 | 0 | 0 | 0 | 0 | **0** | 228 | 1 | 5 | 0 | **234** | 10 | 0 | 0 | 0 | **10** | 1 | 0 | 0 | 0 | **1** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | **6** |
| **PM Totals** | **0** | **0** | **0** | **0** | **0** | **439** | **2** | **11** | **0** | **452** | **22** | **0** | **0** | **0** | **22** | **1** | **0** | **0** | **0** | **1** | **10** | **0** | **0** | **0** | **10** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **11** | **14** | **4** | **1** | **0** | **0** | **34** |

| | |
|---|---|
| **Job No.** | #REF! |
| **Client** | #REF! |
| **Suburb** | #REF! |
| **Location** | #REF! |
| **Day/Date** | : Thu, 7th April 2016 |
| **Weather** | : Fine |
| **Description** | : Classified Intersection Count |
| | : Peak Hour Summary |




MATRIX Traffic and Transport Data

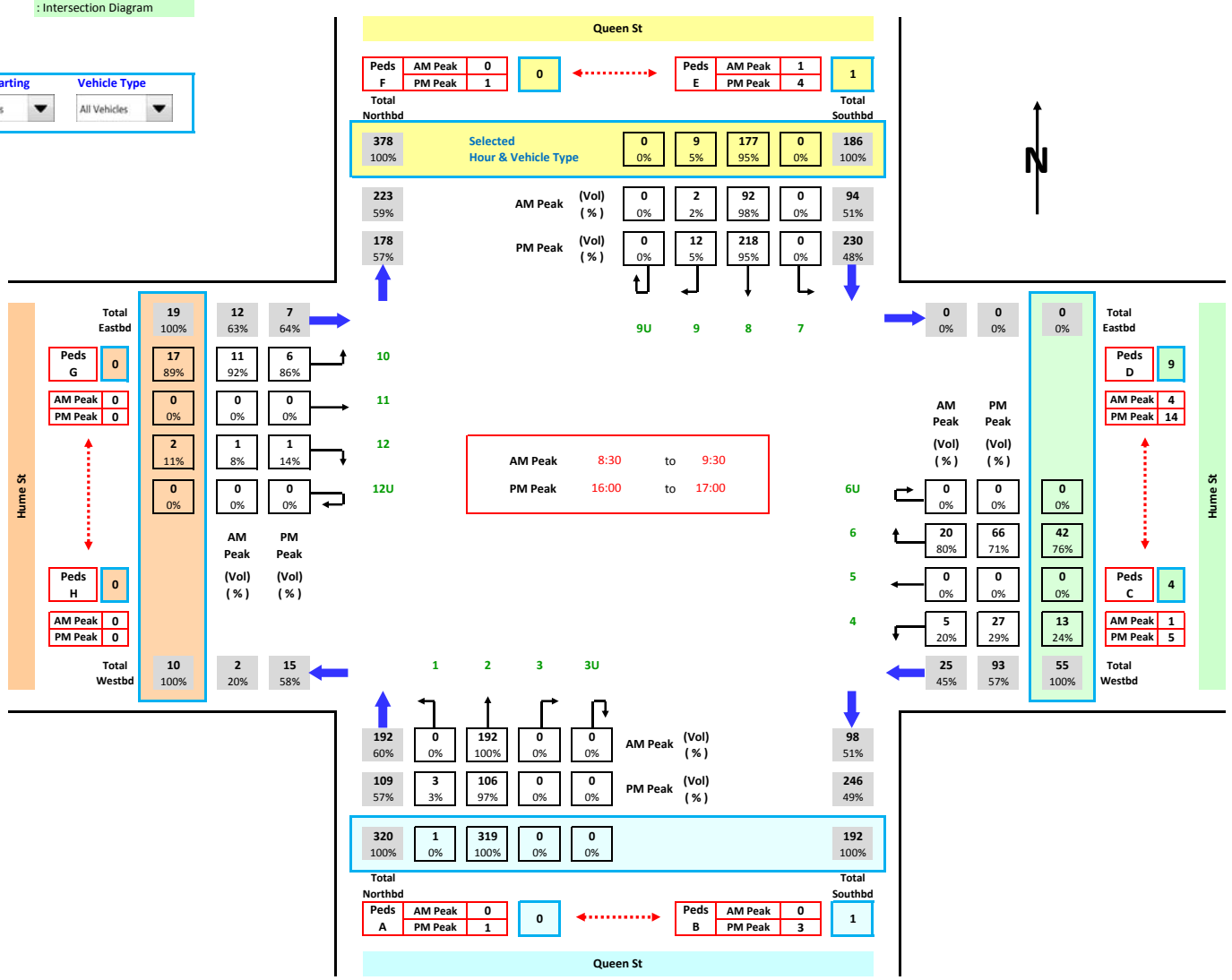
| | Approach | Queen St | | | | | Hume St | | | | | Queen St | | | | | Hume St | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | |
| AM | 8:30 to 9:30 | 187 | 0 | 5 | 0 | **192** | 25 | 0 | 0 | 0 | **25** | 90 | 0 | 4 | 0 | **94** | 12 | 0 | 0 | 0 | **12** | **323** |
| PM | 16:00 to 17:00 | 104 | 0 | 5 | 0 | **109** | 93 | 0 | 0 | 0 | **93** | 223 | 1 | 6 | 0 | **230** | 7 | 0 | 0 | 0 | **7** | **439** |

| Approach | Queen St | | | | | Hume St | | | | | Queen St | | | | | Hume St | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | |
| 8:00 to 9:00 | 181 | 0 | 7 | 0 | **188** | 25 | 0 | 0 | 0 | **25** | 65 | 0 | 5 | 0 | **70** | 11 | 0 | 0 | 0 | **11** | **294** |
| 8:15 to 9:15 | 194 | 0 | 7 | 0 | **201** | 25 | 0 | 0 | 0 | **25** | 74 | 0 | 5 | 0 | **79** | 12 | 0 | 0 | 0 | **12** | **317** |
| 8:30 to 9:30 | 187 | 0 | 5 | 0 | **192** | 25 | 0 | 0 | 0 | **25** | 90 | 0 | 4 | 0 | **94** | 12 | 0 | 0 | 0 | **12** | **323** |
| 8:45 to 9:45 | 161 | 0 | 3 | 0 | **164** | 23 | 0 | 0 | 0 | **23** | 97 | 0 | 4 | 0 | **101** | 11 | 0 | 0 | 0 | **11** | **299** |
| 9:00 to 10:00 | 128 | 1 | 3 | 0 | **132** | 29 | 1 | 0 | 0 | **30** | 111 | 0 | 5 | 0 | **116** | 8 | 0 | 0 | 0 | **8** | **286** |
| **AM Totals** | **309** | **1** | **10** | **0** | 320 | **54** | **1** | **0** | **0** | 55 | **176** | **0** | **10** | **0** | 186 | **19** | **0** | **0** | **0** | 19 | 580 |
| 16:00 to 17:00 | 104 | 0 | 5 | 0 | **109** | 93 | 0 | 0 | 0 | **93** | 223 | 1 | 6 | 0 | **230** | 7 | 0 | 0 | 0 | **7** | **439** |
| 16:15 to 17:15 | 94 | 0 | 6 | 0 | **100** | 99 | 0 | 0 | 0 | **99** | 221 | 2 | 4 | 0 | **227** | 5 | 0 | 0 | 0 | **5** | **431** |
| 16:30 to 17:30 | 86 | 0 | 5 | 0 | **91** | 95 | 0 | 0 | 0 | **95** | 240 | 2 | 6 | 0 | **248** | 4 | 0 | 0 | 0 | **4** | **438** |
| 16:45 to 17:45 | 81 | 0 | 7 | 0 | **88** | 79 | 0 | 0 | 0 | **79** | 243 | 1 | 5 | 0 | **249** | 5 | 0 | 0 | 0 | **5** | **421** |
| 17:00 to 18:00 | 77 | 0 | 6 | 0 | **83** | 69 | 0 | 0 | 0 | **69** | 239 | 1 | 5 | 0 | **245** | 4 | 0 | 0 | 0 | **4** | **401** |
| **PM Totals** | **181** | **0** | **11** | **0** | 192 | **162** | **0** | **0** | **0** | 162 | **462** | **2** | **11** | **0** | 475 | **11** | **0** | **0** | **0** | 11 | 840 |

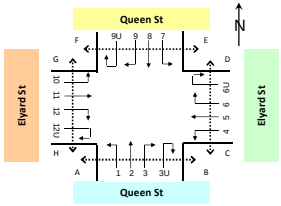
Job No. #
Client #
Suburb #
Location #

Day/Date : Thu, 7th April 2016
Weather : Fine
Description : Classified Intersection Count
: Intersection Diagram

Hour Starting: AM Totals
Vehicle Type: All Vehicles



| | |
|---|---|
| **Job No.** | : N2294 |
| **Client** | : Cardno |
| **Suburb** | : Narellan |
| **Location** | : 1. Queen St / Elyard St |
| **Day/Date** | : Sat, 2nd Apr 2016 |
| **Weather** | : Fine |
| **Description** | : Classified Intersection Count |
| | : 15 mins Data |



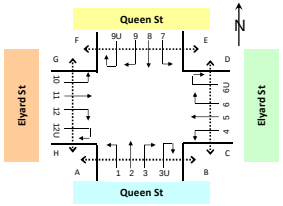

| | Class 1 | Class 2 | Class 3 | Class 4 |
|---|---|---|---|---|
| **Classifications** | Cars | Trucks | Buses | Cyclists |

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | Elyard St | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Direction** | Direction 1 (Left Turn) | | | | | Direction 2 (Through) | | | | | Direction 3 (Right Turn) | | | | | Direction 3U (U Turn) | | | | | Direction 4 (Left Turn) | | | | | Direction 5 (Through) | | | | | Direction 6 (Right Turn) | | | | | Direction 6U (U Turn) | | | | |
| **Time Period** | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total |
| 11:00 to 11:15 | 8 | 0 | 0 | 0 | 8 | 17 | 0 | 0 | 0 | 17 | 17 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 13 | 26 | 0 | 0 | 0 | 26 | 6 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 1 |
| 11:15 to 11:30 | 6 | 1 | 0 | 0 | 7 | 22 | 0 | 0 | 0 | 22 | 15 | 0 | 1 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 1 | 0 | 11 | 19 | 0 | 0 | 0 | 19 | 9 | 0 | 0 | 0 | 9 | 2 | 0 | 0 | 0 | 2 |
| 11:30 to 11:45 | 6 | 0 | 0 | 0 | 6 | 16 | 0 | 0 | 0 | 16 | 14 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 1 | 0 | 18 | 29 | 1 | 0 | 0 | 30 | 11 | 0 | 0 | 0 | 11 | 2 | 0 | 0 | 0 | 2 |
| 11:45 to 12:00 | 6 | 0 | 0 | 0 | 6 | 19 | 0 | 0 | 0 | 19 | 11 | 0 | 2 | 0 | 13 | 1 | 0 | 0 | 0 | 1 | 12 | 0 | 1 | 0 | 13 | 25 | 0 | 0 | 0 | 25 | 10 | 0 | 0 | 0 | 10 | 2 | 0 | 0 | 0 | 2 |
| 12:00 to 12:15 | 7 | 0 | 0 | 0 | 7 | 13 | 0 | 0 | 0 | 13 | 12 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 17 | 42 | 0 | 0 | 0 | 42 | 12 | 0 | 0 | 0 | 12 | 6 | 0 | 0 | 0 | 6 |
| 12:15 to 12:30 | 4 | 0 | 0 | 0 | 4 | 12 | 0 | 0 | 0 | 12 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 14 | 1 | 1 | 0 | 16 | 23 | 1 | 0 | 0 | 24 | 14 | 0 | 0 | 0 | 14 | 1 | 0 | 0 | 0 | 1 |
| 12:30 to 12:45 | 1 | 0 | 0 | 0 | 1 | 12 | 0 | 0 | 0 | 12 | 11 | 1 | 1 | 0 | 13 | 1 | 0 | 0 | 0 | 1 | 17 | 0 | 1 | 0 | 18 | 22 | 0 | 0 | 0 | 22 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 |
| 12:45 to 13:00 | 2 | 1 | 0 | 0 | 3 | 13 | 0 | 0 | 0 | 13 | 11 | 0 | 2 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 17 | 26 | 0 | 0 | 0 | 26 | 7 | 0 | 0 | 0 | 7 | 2 | 0 | 0 | 0 | 2 |
| **Total** | **40** | **2** | **0** | **0** | **42** | **124** | **0** | **0** | **0** | **124** | **97** | **1** | **7** | **0** | **105** | **2** | **0** | **0** | **0** | **2** | **117** | **1** | **5** | **0** | **123** | **212** | **2** | **0** | **0** | **214** | **77** | **0** | **0** | **0** | **77** | **16** | **0** | **0** | **0** | **16** |

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | Elyard St | | | | | | | | | | | | | | | | | | Crossing Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Direction** | Direction 7 (Left Turn) | | | | | Direction 8 (Through) | | | | | Direction 9 (Right Turn) | | | | | Direction 9U (U Turn) | | | | | Direction 10 (Left Turn) | | | | | Direction 11 (Through) | | | | | Direction 12 (Right Turn) | | | | | Direction 12U (U Turn) | | | | | | | | | | | | | |
| **Time Period** | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | A | B | C | D | E | F | G | H | Total |
| 11:00 to 11:15 | 22 | 1 | 1 | 0 | 24 | 39 | 0 | 0 | 0 | 39 | 35 | 1 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 71 | 0 | 0 | 0 | 71 | 27 | 0 | 1 | 0 | 28 | 8 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 5 | 9 | 0 | 0 | 14 |
| 11:15 to 11:30 | 26 | 1 | 0 | 0 | 27 | 35 | 0 | 0 | 0 | 35 | 45 | 0 | 0 | 0 | 45 | 2 | 0 | 0 | 0 | 2 | 81 | 1 | 0 | 0 | 82 | 15 | 1 | 0 | 0 | 16 | 5 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 5 | 5 | 2 | 2 | 15 |
| 11:30 to 11:45 | 28 | 0 | 0 | 0 | 28 | 40 | 0 | 0 | 0 | 40 | 36 | 0 | 0 | 0 | 36 | 1 | 0 | 0 | 0 | 1 | 69 | 0 | 0 | 0 | 69 | 27 | 0 | 1 | 0 | 28 | 10 | 0 | 0 | 0 | 10 | 5 | 0 | 0 | 0 | 5 | 2 | 0 | 1 | 0 | 9 | 9 | 2 | 1 | 24 |
| 11:45 to 12:00 | 25 | 0 | 0 | 0 | 25 | 34 | 0 | 0 | 0 | 34 | 47 | 0 | 0 | 0 | 47 | 1 | 0 | 0 | 0 | 1 | 57 | 1 | 0 | 0 | 58 | 32 | 0 | 0 | 0 | 32 | 9 | 0 | 0 | 0 | 9 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 16 | 4 | 0 | 1 | 25 |
| 12:00 to 12:15 | 28 | 1 | 1 | 0 | 30 | 33 | 0 | 0 | 0 | 33 | 46 | 0 | 0 | 0 | 46 | 1 | 0 | 0 | 0 | 1 | 54 | 0 | 0 | 0 | 54 | 30 | 0 | 2 | 0 | 32 | 7 | 0 | 0 | 0 | 7 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 7 | 6 | 1 | 0 | 15 |
| 12:15 to 12:30 | 23 | 0 | 0 | 0 | 23 | 36 | 0 | 0 | 0 | 36 | 41 | 0 | 0 | 0 | 41 | 1 | 0 | 0 | 0 | 1 | 56 | 1 | 0 | 0 | 57 | 29 | 1 | 0 | 0 | 30 | 5 | 0 | 0 | 0 | 5 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 8 | 7 | 0 | 0 | 16 |
| 12:30 to 12:45 | 24 | 1 | 0 | 0 | 25 | 21 | 0 | 0 | 0 | 21 | 42 | 0 | 0 | 0 | 42 | 1 | 0 | 0 | 0 | 1 | 51 | 0 | 0 | 0 | 51 | 20 | 0 | 0 | 0 | 20 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | 7 | 0 | 0 | 14 |
| 12:45 to 13:00 | 25 | 0 | 0 | 0 | 25 | 30 | 0 | 0 | 0 | 30 | 45 | 1 | 0 | 0 | 46 | 1 | 0 | 0 | 0 | 1 | 39 | 1 | 0 | 0 | 40 | 27 | 0 | 1 | 0 | 28 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 6 | 19 | 0 | 0 | 27 |
| **Total** | **201** | **4** | **2** | **0** | **207** | **268** | **0** | **0** | **0** | **268** | **337** | **2** | **0** | **0** | **339** | **8** | **0** | **0** | **0** | **8** | **478** | **4** | **0** | **0** | **482** | **207** | **2** | **5** | **0** | **214** | **56** | **0** | **0** | **0** | **56** | **14** | **0** | **0** | **0** | **14** | **2** | **1** | **4** | **8** | **60** | **66** | **5** | **4** | **150** |

**Job No.** : N2294
**Client** : Cardno
**Suburb** : Narellan
**Location** : 1. Queen St / Elyard St

**Day/Date** : Sat, 2nd Apr 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Hourly Summary

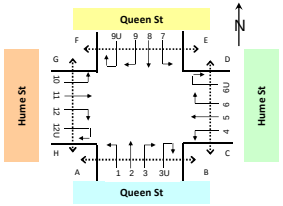



MATRIX Traffic and Transport Data

| Approach | Queen St | | | | | | | | | | | | | | | | Elyard St | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Direction 1 (Left Turn) | | | | | Direction 2 (Through) | | | | | Direction 3 (Right Turn) | | | | | Direction 3U (U Turn) | | | | | Direction 4 (Left Turn) | | | | | Direction 5 (Through) | | | | | Direction 6 (Right Turn) | | | | | Direction 6U (U Turn) | | | | |
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total |
| 11:00 to 12:00 | 26 | 1 | 0 | 0 | 27 | 74 | 0 | 0 | 0 | 74 | 57 | 0 | 3 | 0 | 60 | 1 | 0 | 0 | 0 | 1 | 52 | 0 | 3 | 0 | 55 | 99 | 1 | 0 | 0 | 100 | 36 | 0 | 0 | 0 | 36 | 7 | 0 | 0 | 0 | 7 |
| 11:15 to 12:15 | 25 | 1 | 0 | 0 | 26 | 70 | 0 | 0 | 0 | 70 | 52 | 0 | 4 | 0 | 56 | 1 | 0 | 0 | 0 | 1 | 56 | 0 | 3 | 0 | 59 | 115 | 1 | 0 | 0 | 116 | 42 | 0 | 0 | 0 | 42 | 12 | 0 | 0 | 0 | 12 |
| 11:30 to 12:30 | 23 | 0 | 0 | 0 | 23 | 60 | 0 | 0 | 0 | 60 | 43 | 0 | 3 | 0 | 46 | 1 | 0 | 0 | 0 | 1 | 60 | 1 | 3 | 0 | 64 | 119 | 2 | 0 | 0 | 121 | 47 | 0 | 0 | 0 | 47 | 11 | 0 | 0 | 0 | 11 |
| 11:45 to 12:45 | 18 | 0 | 0 | 0 | 18 | 56 | 0 | 0 | 0 | 56 | 40 | 1 | 4 | 0 | 45 | 2 | 0 | 0 | 0 | 2 | 60 | 1 | 3 | 0 | 64 | 112 | 1 | 0 | 0 | 113 | 44 | 0 | 0 | 0 | 44 | 9 | 0 | 0 | 0 | 9 |
| 12:00 to 13:00 | 14 | 1 | 0 | 0 | 15 | 50 | 0 | 0 | 0 | 50 | 40 | 1 | 4 | 0 | 45 | 1 | 0 | 0 | 0 | 1 | 65 | 1 | 2 | 0 | 68 | 113 | 1 | 0 | 0 | 114 | 41 | 0 | 0 | 0 | 41 | 9 | 0 | 0 | 0 | 9 |
| **Total** | **40** | **2** | **0** | **0** | **42** | **124** | **0** | **0** | **0** | **124** | **97** | **1** | **7** | **0** | **105** | **2** | **0** | **0** | **0** | **2** | **117** | **1** | **5** | **0** | **123** | **212** | **2** | **0** | **0** | **214** | **77** | **0** | **0** | **0** | **77** | **16** | **0** | **0** | **0** | **16** |

| Approach | Queen St | | | | | | | | | | | | | | | | Elyard St | | | | | | | | | | | | | | | | Crossing Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Direction 7 (Left Turn) | | | | | Direction 8 (Through) | | | | | Direction 9 (Right Turn) | | | | | Direction 9U (U Turn) | | | | | Direction 10 (Left Turn) | | | | | Direction 11 (Through) | | | | | Direction 12 (Right Turn) | | | | | Direction 12U (U Turn) | | | | | | | | | | | | | |
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | A | B | C | D | E | F | G | H | Total |
| 11:00 to 12:00 | 101 | 2 | 1 | 0 | 104 | 148 | 0 | 0 | 0 | 148 | 163 | 1 | 0 | 0 | 164 | 4 | 0 | 0 | 0 | 4 | 278 | 2 | 0 | 0 | 280 | 101 | 1 | 2 | 0 | 104 | 32 | 0 | 0 | 0 | 32 | 9 | 0 | 0 | 0 | 9 | 2 | 0 | 1 | 5 | 35 | 27 | 4 | 4 | 78 |
| 11:15 to 12:15 | 107 | 2 | 1 | 0 | 110 | 142 | 0 | 0 | 0 | 142 | 174 | 0 | 0 | 0 | 174 | 5 | 0 | 0 | 0 | 5 | 261 | 2 | 0 | 0 | 263 | 104 | 1 | 3 | 0 | 108 | 31 | 0 | 0 | 0 | 31 | 10 | 0 | 0 | 0 | 10 | 2 | 0 | 2 | 5 | 37 | 24 | 5 | 4 | 79 |
| 11:30 to 12:30 | 104 | 1 | 1 | 0 | 106 | 143 | 0 | 0 | 0 | 143 | 170 | 0 | 0 | 0 | 170 | 4 | 0 | 0 | 0 | 4 | 236 | 2 | 0 | 0 | 238 | 118 | 1 | 3 | 0 | 122 | 31 | 0 | 0 | 0 | 31 | 12 | 0 | 0 | 0 | 12 | 2 | 0 | 2 | 5 | 40 | 26 | 3 | 2 | 80 |
| 11:45 to 12:45 | 100 | 2 | 1 | 0 | 103 | 124 | 0 | 0 | 0 | 124 | 176 | 0 | 0 | 0 | 176 | 4 | 0 | 0 | 0 | 4 | 218 | 2 | 0 | 0 | 220 | 111 | 1 | 2 | 0 | 114 | 27 | 0 | 0 | 0 | 27 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 2 | 7 | 35 | 24 | 1 | 1 | 70 |
| 12:00 to 13:00 | 100 | 2 | 1 | 0 | 103 | 120 | 0 | 0 | 0 | 120 | 174 | 1 | 0 | 0 | 175 | 4 | 0 | 0 | 0 | 4 | 200 | 2 | 0 | 0 | 202 | 106 | 1 | 3 | 0 | 110 | 24 | 0 | 0 | 0 | 24 | 5 | 0 | 0 | 0 | 5 | 0 | 1 | 3 | 3 | 25 | 39 | 1 | 0 | 72 |
| **Total** | **201** | **4** | **2** | **0** | **207** | **268** | **0** | **0** | **0** | **268** | **337** | **2** | **0** | **0** | **339** | **8** | **0** | **0** | **0** | **8** | **478** | **4** | **0** | **0** | **482** | **207** | **2** | **5** | **0** | **214** | **56** | **0** | **0** | **0** | **56** | **14** | **0** | **0** | **0** | **14** | **2** | **1** | **4** | **8** | **60** | **66** | **5** | **4** | **150** |

| | |
|---|---|
| **Job No.** | : N2294 |
| **Client** | : Cardno |
| **Suburb** | : Narellan |
| **Location** | : 2. Queen St / Hume St |
| **Day/Date** | : Sat, 2nd Apr 2016 |
| **Weather** | : Fine |
| **Description** | : Classified Intersection Count |
| | : 15 mins Data |



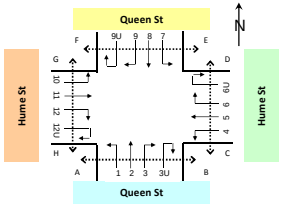

| | Class 1 | Class 2 | Class 3 | Class 4 |
|---|---|---|---|---|
| **Classifications** | Cars | Trucks | Buses | Cyclists |

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | | Hume St | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Direction** | Direction 1 (Left Turn) | | | | | Direction 2 (Through) | | | | | Direction 3 (Right Turn) | | | | | Direction 3U (U Turn) | | | | | Direction 4 (Left Turn) | | | | | Direction 5 (Through) | | | | | Direction 6 (Right Turn) | | | | | Direction 6U (U Turn) | | | | |
| **Time Period** | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total |
| 11:00 to 11:15 | 0 | 0 | 0 | 0 | **0** | 31 | 0 | 0 | 0 | **31** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** |
| 11:15 to 11:30 | 0 | 0 | 0 | 0 | **0** | 31 | 0 | 1 | 0 | **32** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 1 | 0 | 0 | 0 | **1** | 6 | 0 | 0 | 0 | **6** | 0 | 0 | 0 | 0 | **0** |
| 11:30 to 11:45 | 0 | 0 | 0 | 0 | **0** | 31 | 1 | 0 | 0 | **32** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** |
| 11:45 to 12:00 | 1 | 0 | 0 | 0 | **1** | 32 | 0 | 2 | 0 | **34** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** |
| 12:00 to 12:15 | 0 | 0 | 0 | 0 | **0** | 30 | 0 | 0 | 0 | **30** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** |
| 12:15 to 12:30 | 0 | 0 | 0 | 0 | **0** | 21 | 0 | 1 | 0 | **22** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** |
| 12:30 to 12:45 | 0 | 0 | 0 | 0 | **0** | 16 | 0 | 0 | 0 | **16** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** |
| 12:45 to 13:00 | 0 | 0 | 0 | 0 | **0** | 22 | 1 | 3 | 0 | **26** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** |
| **Total** | **1** | **0** | **0** | **0** | **1** | **214** | **2** | **7** | **0** | **223** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **25** | **0** | **0** | **0** | **25** | **1** | **0** | **0** | **0** | **1** | **47** | **0** | **0** | **0** | **47** | **0** | **0** | **0** | **0** | **0** |

| Approach | Queen St | | | | | | | | | | | | | | | | | | | | | Hume St | | | | | | | | | | | | | | | | | | Crossing Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Direction** | Direction 7 (Left Turn) | | | | | Direction 8 (Through) | | | | | Direction 9 (Right Turn) | | | | | Direction 9U (U Turn) | | | | | Direction 10 (Left Turn) | | | | | Direction 11 (Through) | | | | | Direction 12 (Right Turn) | | | | | Direction 12U (U Turn) | | | | | | | | | | | | | |
| **Time Period** | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | A | B | C | D | E | F | G | H | Total |
| 11:00 to 11:15 | 0 | 0 | 0 | 0 | **0** | 42 | 0 | 1 | 0 | **43** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 7 | 0 | 0 | 0 | **7** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | **5** |
| 11:15 to 11:30 | 0 | 0 | 0 | 0 | **0** | 50 | 0 | 1 | 0 | **51** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | **2** |
| 11:30 to 11:45 | 0 | 0 | 0 | 0 | **0** | 44 | 0 | 1 | 0 | **45** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | **2** |
| 11:45 to 12:00 | 0 | 0 | 0 | 0 | **0** | 48 | 0 | 0 | 0 | **48** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 12:00 to 12:15 | 0 | 0 | 0 | 0 | **0** | 49 | 0 | 1 | 0 | **50** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | **2** |
| 12:15 to 12:30 | 0 | 0 | 0 | 0 | **0** | 47 | 1 | 1 | 0 | **49** | 4 | 0 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **2** |
| 12:30 to 12:45 | 0 | 0 | 0 | 0 | **0** | 34 | 0 | 1 | 0 | **35** | 4 | 0 | 0 | 0 | **4** | 1 | 0 | 0 | 0 | **1** | 5 | 0 | 0 | 0 | **5** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **1** |
| 12:45 to 13:00 | 0 | 0 | 0 | 0 | **0** | 37 | 0 | 0 | 0 | **37** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | **1** |
| **Total** | **0** | **0** | **0** | **0** | **0** | **351** | **1** | **6** | **0** | **358** | **22** | **0** | **0** | **0** | **22** | **1** | **0** | **0** | **0** | **1** | **18** | **0** | **0** | **0** | **18** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **4** | **6** | **4** | **1** | **0** | **0** | **16** |

**Job No.** : N2294
**Client** : Cardno
**Suburb** : Narellan
**Location** : 2. Queen St / Hume St

**Day/Date** : Sat, 2nd Apr 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Hourly Summary



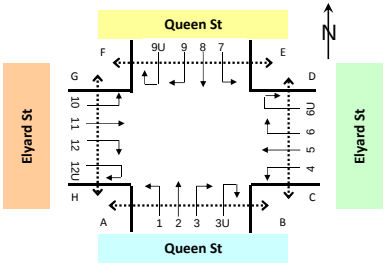

MATRIX Traffic and Transport Data

| Approach | Queen St | | | | | | | | | | | | | | | | Hume St | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Direction 1 (Left Turn) | | | | | Direction 2 (Through) | | | | | Direction 3 (Right Turn) | | | | | Direction 3U (U Turn) | | | | | Direction 4 (Left Turn) | | | | | Direction 5 (Through) | | | | | Direction 6 (Right Turn) | | | | | Direction 6U (U Turn) | | | | |
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total |
| 11:00 to 12:00 | 1 | 0 | 0 | 0 | 1 | 125 | 1 | 3 | 0 | 129 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 |
| 11:15 to 12:15 | 1 | 0 | 0 | 0 | 1 | 124 | 1 | 3 | 0 | 128 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 1 | 27 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 |
| 11:30 to 12:30 | 1 | 0 | 0 | 0 | 1 | 114 | 1 | 3 | 0 | 118 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 |
| 11:45 to 12:45 | 1 | 0 | 0 | 0 | 1 | 99 | 0 | 3 | 0 | 102 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 |
| 12:00 to 13:00 | 0 | 0 | 0 | 0 | 0 | 89 | 1 | 4 | 0 | 94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **1** | **0** | **0** | **0** | **1** | **214** | **2** | **7** | **0** | **223** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **25** | **0** | **0** | **0** | **25** | **1** | **0** | **0** | **0** | **1** | **47** | **0** | **0** | **0** | **47** | **0** | **0** | **0** | **0** | **0** |

| Approach | Queen St | | | | | | | | | | | | | | | | Hume St | | | | | | | | | | | | | | | | Crossing Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Direction 7 (Left Turn) | | | | | Direction 8 (Through) | | | | | Direction 9 (Right Turn) | | | | | Direction 9U (U Turn) | | | | | Direction 10 (Left Turn) | | | | | Direction 11 (Through) | | | | | Direction 12 (Right Turn) | | | | | Direction 12U (U Turn) | | | | | | | | | | | | | | |
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | A | B | C | D | E | F | G | H | Total |
| 11:00 to 12:00 | 0 | 0 | 0 | 0 | 0 | 184 | 0 | 3 | 0 | 187 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 4 | 2 | 0 | 0 | 0 | 10 |
| 11:15 to 12:15 | 0 | 0 | 0 | 0 | 0 | 191 | 0 | 3 | 0 | 194 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 4 | 0 | 0 | 0 | 7 |
| 11:30 to 12:30 | 0 | 0 | 0 | 0 | 0 | 188 | 1 | 3 | 0 | 192 | 12 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 7 |
| 11:45 to 12:45 | 0 | 0 | 0 | 0 | 0 | 178 | 1 | 3 | 0 | 182 | 12 | 0 | 0 | 0 | 12 | 1 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 6 |
| 12:00 to 13:00 | 0 | 0 | 0 | 0 | 0 | 167 | 1 | 3 | 0 | 171 | 14 | 0 | 0 | 0 | 14 | 1 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 6 |
| **Total** | **0** | **0** | **0** | **0** | **0** | **351** | **1** | **6** | **0** | **358** | **22** | **0** | **0** | **0** | **22** | **1** | **0** | **0** | **0** | **1** | **18** | **0** | **0** | **0** | **18** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **4** | **6** | **4** | **1** | **0** | **0** | **16** |

**Job No.** : N2294
**Client** : Cardno
**Suburb** : Narellan
**Location** : 1. Queen St / Elyard St

**Day/Date** : Sat, 2nd Apr 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Peak Hour Summary



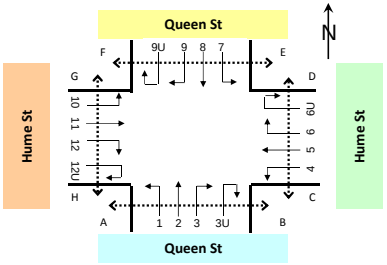

MATRIX Traffic and Transport Data

| Approach | Queen St | | | | | Elyard St | | | | | Queen St | | | | | Elyard St | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | |
| 11:15 to 12:15 | 148 | 1 | 4 | 0 | **153** | 225 | 1 | 3 | 0 | **229** | 428 | 2 | 1 | 0 | **431** | 406 | 3 | 3 | 0 | **412** | **1,225** |

| Approach | Queen St | | | | | Elyard St | | | | | Queen St | | | | | Elyard St | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | |
| 11:00 to 12:00 | 158 | 1 | 3 | 0 | **162** | 194 | 1 | 3 | 0 | **198** | 416 | 3 | 1 | 0 | **420** | 420 | 3 | 2 | 0 | **425** | **1,205** |
| 11:15 to 12:15 | 148 | 1 | 4 | 0 | **153** | 225 | 1 | 3 | 0 | **229** | 428 | 2 | 1 | 0 | **431** | 406 | 3 | 3 | 0 | **412** | **1,225** |
| 11:30 to 12:30 | 127 | 0 | 3 | 0 | **130** | 237 | 3 | 3 | 0 | **243** | 421 | 1 | 1 | 0 | **423** | 397 | 3 | 3 | 0 | **403** | **1,199** |
| 11:45 to 12:45 | 116 | 1 | 4 | 0 | **121** | 225 | 2 | 3 | 0 | **230** | 404 | 2 | 1 | 0 | **407** | 363 | 3 | 2 | 0 | **368** | **1,126** |
| 12:00 to 13:00 | 105 | 2 | 4 | 0 | **111** | 228 | 2 | 2 | 0 | **232** | 398 | 3 | 1 | 0 | **402** | 335 | 3 | 3 | 0 | **341** | **1,086** |
| **Total** | **263** | **3** | **7** | **0** | **273** | **422** | **3** | **5** | **0** | **430** | **814** | **6** | **2** | **0** | **822** | **755** | **6** | **5** | **0** | **766** | **2,291** |

**Job No.** : N2294
**Client** : Cardno
**Suburb** : Narellan
**Location** : 2. Queen St / Hume St

**Day/Date** : Sat, 2nd Apr 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Peak Hour Summary




MATRIX Traffic and Transport Data

| Approach | Queen St | | | | | Hume St | | | | | Queen St | | | | | Hume St | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | |
| 11:15 to 12:15 | 125 | 1 | 3 | 0 | **129** | 41 | 0 | 0 | 0 | **41** | 199 | 0 | 3 | 0 | **202** | 6 | 0 | 0 | 0 | **6** | **378** |

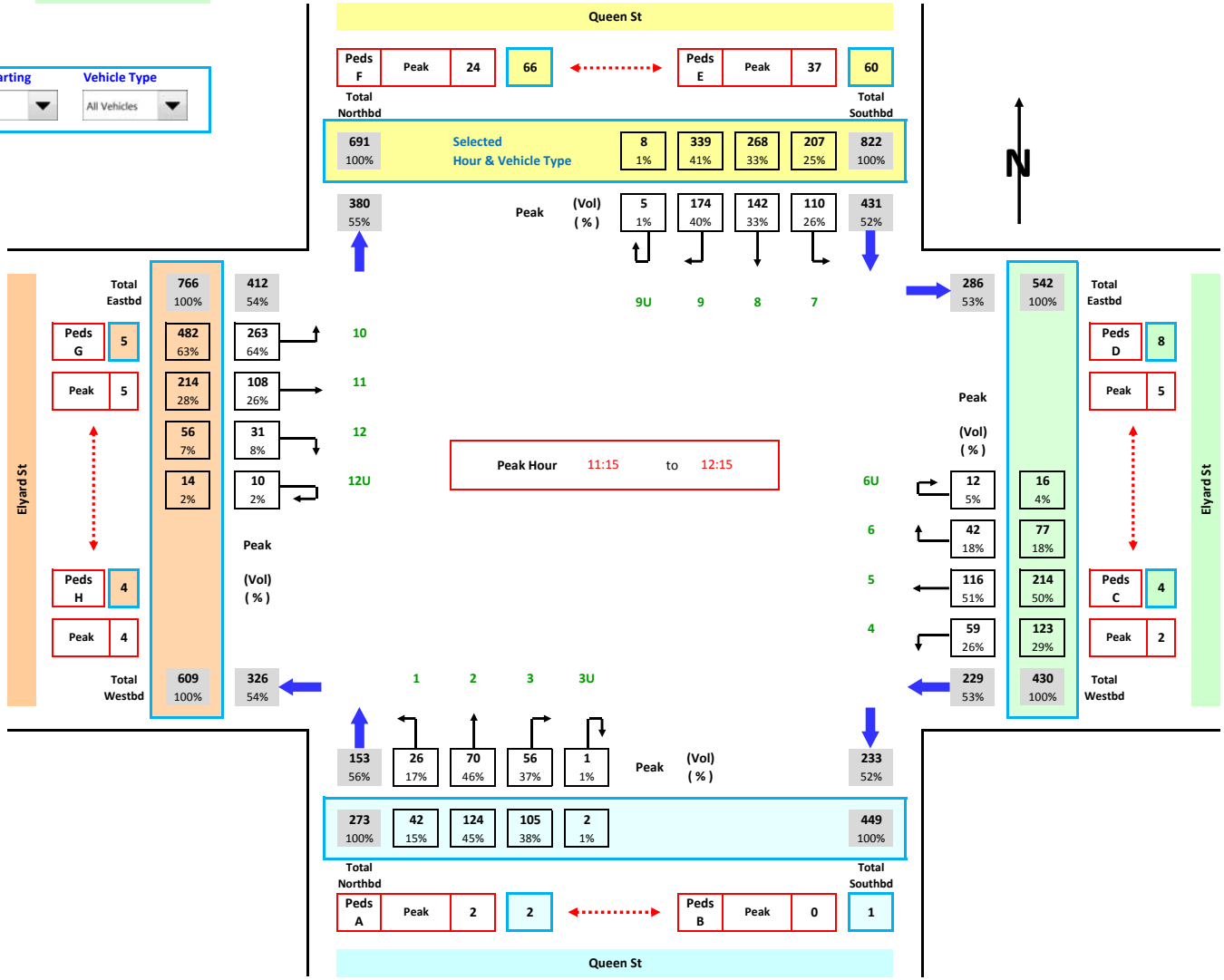
| Approach | Queen St | | | | | Hume St | | | | | Queen St | | | | | Hume St | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | Cars | Trucks | Buses | Cyclists | Total | |
| 11:00 to 12:00 | 126 | 1 | 3 | 0 | **130** | 39 | 0 | 0 | 0 | **39** | 192 | 0 | 3 | 0 | **195** | 11 | 0 | 0 | 0 | **11** | **375** |
| 11:15 to 12:15 | 125 | 1 | 3 | 0 | **129** | 41 | 0 | 0 | 0 | **41** | 199 | 0 | 3 | 0 | **202** | 6 | 0 | 0 | 0 | **6** | **378** |
| 11:30 to 12:30 | 115 | 1 | 3 | 0 | **119** | 38 | 0 | 0 | 0 | **38** | 200 | 1 | 3 | 0 | **204** | 5 | 0 | 0 | 0 | **5** | **366** |
| 11:45 to 12:45 | 100 | 0 | 3 | 0 | **103** | 36 | 0 | 0 | 0 | **36** | 191 | 1 | 3 | 0 | **195** | 8 | 0 | 0 | 0 | **8** | **342** |
| 12:00 to 13:00 | 89 | 1 | 4 | 0 | **94** | 34 | 0 | 0 | 0 | **34** | 182 | 1 | 3 | 0 | **186** | 8 | 0 | 0 | 0 | **8** | **322** |
| **Total** | **215** | **2** | **7** | **0** | **224** | **73** | **0** | **0** | **0** | **73** | **374** | **1** | **6** | **0** | **381** | **19** | **0** | **0** | **0** | **19** | **697** |

**Job No.** : N2294
**Client** : Cardno
**Suburb** : Narellan
**Location** : 1. Queen St / Elyard St

**Day/Date** : Sat, 2nd Apr 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Intersection Diagram

MATRIX Traffic and Transport Data

Hour Starting: Total
Vehicle Type: All Vehicles

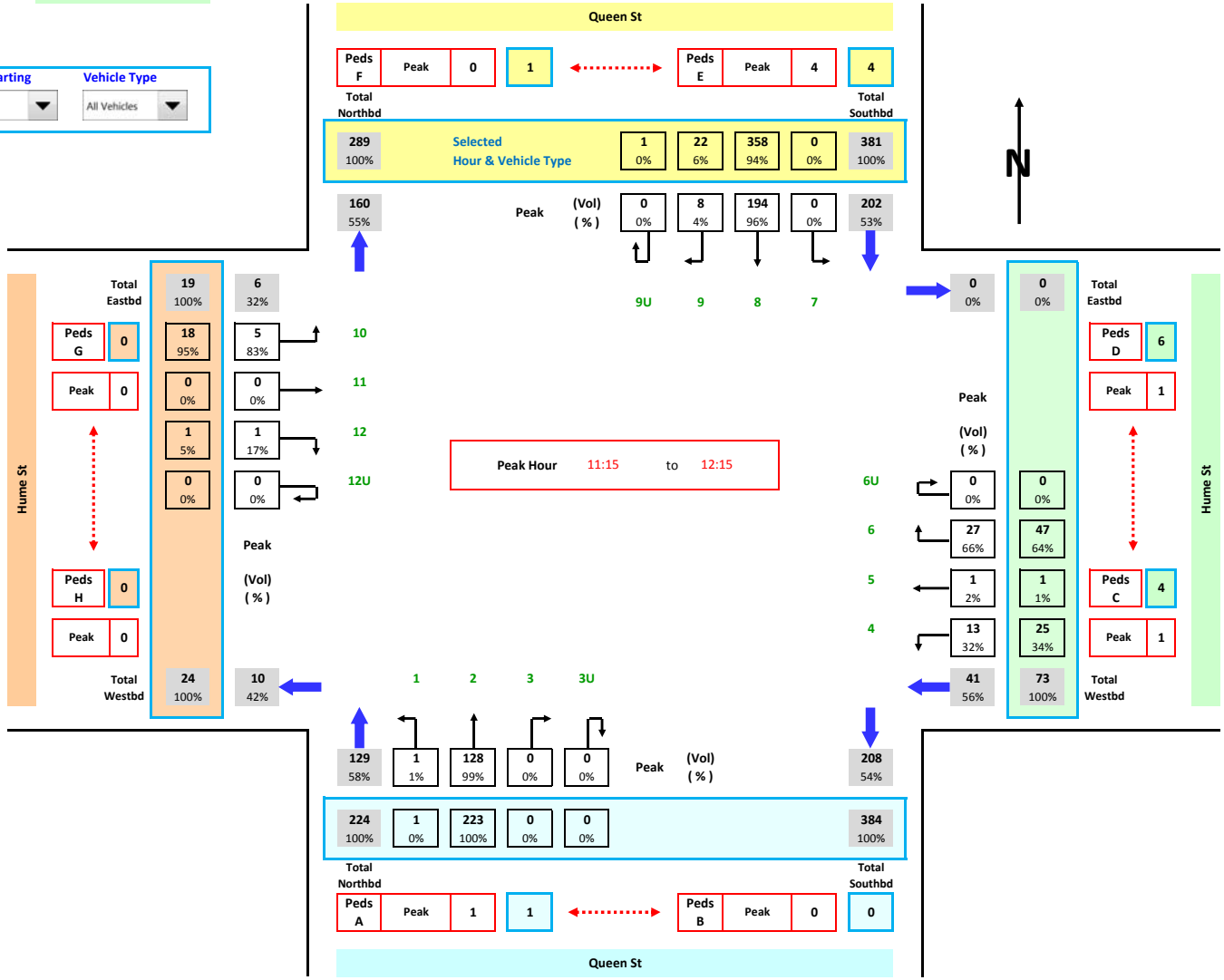


**Job No.** : N2294
**Client** : Cardno
**Suburb** : Narellan
**Location** : 2. Queen St / Hume St

**Day/Date** : Sat, 2nd Apr 2016
**Weather** : Fine
**Description** : Classified Intersection Count
: Intersection Diagram

MATRIX Traffic and Transport Data

Hour Starting: Total
Vehicle Type: All Vehicles



Narellan Medical Centre

# APPENDIX B

## SIDRA MOVEMENT SUMMARIES

Cardno
Shaping the Future

# INTERSECTION SUMMARY

## Site: Base AM Queen St / Elyard St

Base AM Queen St / Elyard St 0830 - 0930
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 45.5 | km/h | 45.7 | km/h |
| Travel Distance (Total) | 1131.5 | veh-km/h | 2008.1 | pers-km/h |
| Travel Time (Total) | 24.9 | veh-h/h | 43.9 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1103 | veh/h | 1957 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.4 | % | | |
| Degree of Saturation | 0.457 | | | |
| Practical Spare Capacity | 85.9 | % | | |
| Effective Intersection Capacity | 2413 | veh/h | | |
| | | | | |
| Control Delay (Total) | 1.74 | veh-h/h | 3.14 | pers-h/h |
| Control Delay (Average) | 5.7 | sec | 5.8 | sec |
| Control Delay (Worst Lane) | 6.3 | sec | | |
| Control Delay (Worst Movement) | 11.0 | sec | 11.0 | sec |
| Geometric Delay (Average) | 4.1 | sec | | |
| Stop-Line Delay (Average) | 1.6 | sec | | |
| Idling Time (Average) | 0.0 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 3.2 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 23.2 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.02 | | | |
| Total Effective Stops | 644 | veh/h | 1139 | pers/h |
| Effective Stop Rate | 0.58 | per veh | 0.58 | per pers |
| Proportion Queued | 0.50 | | 0.49 | |
| Performance Index | 47.2 | | 47.2 | |
| | | | | |
| Cost (Total) | 856.18 | $/h | 856.18 | $/h |
| Fuel Consumption (Total) | 93.6 | L/h | | |
| Carbon Dioxide (Total) | 222.0 | kg/h | | |
| Hydrocarbons (Total) | 0.018 | kg/h | | |
| Carbon Monoxide (Total) | 0.181 | kg/h | | |
| NOx (Total) | 0.233 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base AM Queen St / Hume St

Base AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 49.3 | km/h | 49.6 | km/h |
| Travel Distance (Total) | 332.4 | veh-km/h | 660.7 | pers-km/h |
| Travel Time (Total) | 6.7 | veh-h/h | 13.3 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 329 | veh/h | 654 | pers/h |
| Percent Heavy Vehicles (Demand) | 2.7 | % | | |
| Degree of Saturation | 0.101 | | | |
| Practical Spare Capacity | 873.5 | % | | |
| Effective Intersection Capacity | 3268 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.07 | veh-h/h | 0.09 | pers-h/h |
| Control Delay (Average) | 0.8 | sec | 0.5 | sec |
| Control Delay (Worst Lane) | 5.8 | sec | | |
| Control Delay (Worst Movement) | 6.4 | sec | 6.4 | sec |
| Geometric Delay (Average) | 0.6 | sec | | |
| Stop-Line Delay (Average) | 0.2 | sec | | |
| Idling Time (Average) | 0.0 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.1 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 0.8 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 25 | veh/h | 32 | pers/h |
| Effective Stop Rate | 0.08 | per veh | 0.05 | per pers |
| Proportion Queued | 0.04 | | 0.03 | |
| Performance Index | 7.0 | | 7.0 | |
| | | | | |
| Cost (Total) | 212.14 | $/h | 212.14 | $/h |
| Fuel Consumption (Total) | 21.5 | L/h | | |
| Carbon Dioxide (Total) | 50.8 | kg/h | | |
| Hydrocarbons (Total) | 0.004 | kg/h | | |
| Carbon Monoxide (Total) | 0.040 | kg/h | | |
| NOx (Total) | 0.026 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base PM Queen St / Elyard St

Base PM Queen St / Elyard St 1630-1730
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 45.7 | km/h | 45.9 | km/h |
| Travel Distance (Total) | 1346.0 | veh-km/h | 2266.1 | pers-km/h |
| Travel Time (Total) | 29.5 | veh-h/h | 49.4 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1309 | veh/h | 2204 | pers/h |
| Percent Heavy Vehicles (Demand) | 2.5 | % | | |
| Degree of Saturation | 0.435 | | | |
| Practical Spare Capacity | 95.3 | % | | |
| Effective Intersection Capacity | 3007 | veh/h | | |
| | | | | |
| Control Delay (Total) | 2.42 | veh-h/h | 4.10 | pers-h/h |
| Control Delay (Average) | 6.7 | sec | 6.7 | sec |
| Control Delay (Worst Lane) | 8.0 | sec | | |
| Control Delay (Worst Movement) | 12.2 | sec | 12.2 | sec |
| Geometric Delay (Average) | 4.5 | sec | | |
| Stop-Line Delay (Average) | 2.1 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 3.0 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 21.4 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.02 | | | |
| Total Effective Stops | 846 | veh/h | 1425 | pers/h |
| Effective Stop Rate | 0.65 | per veh | 0.65 | per pers |
| Proportion Queued | 0.57 | | 0.58 | |
| Performance Index | 59.0 | | 59.0 | |
| | | | | |
| Cost (Total) | 999.98 | $/h | 999.98 | $/h |
| Fuel Consumption (Total) | 111.4 | L/h | | |
| Carbon Dioxide (Total) | 263.3 | kg/h | | |
| Hydrocarbons (Total) | 0.022 | kg/h | | |
| Carbon Monoxide (Total) | 0.221 | kg/h | | |
| NOx (Total) | 0.229 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base PM Queen St / Hume St

Base PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 48.6 | km/h | 49.1 | km/h |
| Travel Distance (Total) | 448.7 | veh-km/h | 858.4 | pers-km/h |
| Travel Time (Total) | 9.2 | veh-h/h | 17.5 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 444 | veh/h | 850 | pers/h |
| Percent Heavy Vehicles (Demand) | 2.7 | % | | |
| Degree of Saturation | 0.122 | | | |
| Practical Spare Capacity | 628.6 | % | | |
| Effective Intersection Capacity | 3650 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.20 | veh-h/h | 0.25 | pers-h/h |
| Control Delay (Average) | 1.7 | sec | 1.0 | sec |
| Control Delay (Worst Lane) | 6.3 | sec | | |
| Control Delay (Worst Movement) | 6.9 | sec | 6.9 | sec |
| Geometric Delay (Average) | 1.3 | sec | | |
| Stop-Line Delay (Average) | 0.4 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.4 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 2.7 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 74 | veh/h | 97 | pers/h |
| Effective Stop Rate | 0.17 | per veh | 0.11 | per pers |
| Proportion Queued | 0.10 | | 0.07 | |
| Performance Index | 10.2 | | 10.2 | |
| | | | | |
| Cost (Total) | 287.90 | $/h | 287.90 | $/h |
| Fuel Consumption (Total) | 30.2 | L/h | | |
| Carbon Dioxide (Total) | 71.5 | kg/h | | |
| Hydrocarbons (Total) | 0.006 | kg/h | | |
| Carbon Monoxide (Total) | 0.056 | kg/h | | |
| NOx (Total) | 0.039 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base + Dev AM Queen St / Elyard St

Base + Development AM Queen St / Elyard St  0830 - 0930
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 45.4 | km/h | 45.6 | km/h |
| Travel Distance (Total) | 1294.0 | veh-km/h | 2203.2 | pers-km/h |
| Travel Time (Total) | 28.5 | veh-h/h | 48.3 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1261 | veh/h | 2147 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.0 | % | | |
| Degree of Saturation | 0.519 | | | |
| Practical Spare Capacity | 63.8 | % | | |
| Effective Intersection Capacity | 2430 | veh/h | | |
| | | | | |
| Control Delay (Total) | 2.12 | veh-h/h | 3.64 | pers-h/h |
| Control Delay (Average) | 6.1 | sec | 6.1 | sec |
| Control Delay (Worst Lane) | 6.8 | sec | | |
| Control Delay (Worst Movement) | 11.5 | sec | 11.5 | sec |
| Geometric Delay (Average) | 4.2 | sec | | |
| Stop-Line Delay (Average) | 1.8 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 4.0 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 28.2 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.02 | | | |
| Total Effective Stops | 773 | veh/h | 1314 | pers/h |
| Effective Stop Rate | 0.61 | per veh | 0.61 | per pers |
| Proportion Queued | 0.54 | | 0.54 | |
| Performance Index | 55.4 | | 55.4 | |
| | | | | |
| Cost (Total) | 956.60 | $/h | 956.60 | $/h |
| Fuel Consumption (Total) | 106.7 | L/h | | |
| Carbon Dioxide (Total) | 252.6 | kg/h | | |
| Hydrocarbons (Total) | 0.021 | kg/h | | |
| Carbon Monoxide (Total) | 0.206 | kg/h | | |
| NOx (Total) | 0.242 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base + Dev PM Queen St / Elyard St

Base + Development PM Queen St / Elyard St 1630-1730
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 45.5 | km/h | 45.7 | km/h |
| Travel Distance (Total) | 1482.4 | veh-km/h | 2429.5 | pers-km/h |
| Travel Time (Total) | 32.6 | veh-h/h | 53.2 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1442 | veh/h | 2364 | pers/h |
| Percent Heavy Vehicles (Demand) | 2.3 | % | | |
| Degree of Saturation | 0.464 | | | |
| Practical Spare Capacity | 83.0 | % | | |
| Effective Intersection Capacity | 3105 | veh/h | | |
| | | | | |
| Control Delay (Total) | 2.84 | veh-h/h | 4.65 | pers-h/h |
| Control Delay (Average) | 7.1 | sec | 7.1 | sec |
| Control Delay (Worst Lane) | 7.9 | sec | | |
| Control Delay (Worst Movement) | 12.7 | sec | 12.7 | sec |
| Geometric Delay (Average) | 4.6 | sec | | |
| Stop-Line Delay (Average) | 2.5 | sec | | |
| Idling Time (Average) | 0.2 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 3.3 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 23.2 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.02 | | | |
| Total Effective Stops | 987 | veh/h | 1617 | pers/h |
| Effective Stop Rate | 0.68 | per veh | 0.68 | per pers |
| Proportion Queued | 0.62 | | 0.62 | |
| Performance Index | 66.8 | | 66.8 | |
| | | | | |
| Cost (Total) | 1086.70 | $/h | 1086.70 | $/h |
| Fuel Consumption (Total) | 122.5 | L/h | | |
| Carbon Dioxide (Total) | 289.5 | kg/h | | |
| Hydrocarbons (Total) | 0.023 | kg/h | | |
| Carbon Monoxide (Total) | 0.242 | kg/h | | |
| NOx (Total) | 0.237 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base + Dev AM Queen St / Hume St

Base + Development AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 49.3 | km/h | 49.5 | km/h |
| Travel Distance (Total) | 356.7 | veh-km/h | 689.8 | pers-km/h |
| Travel Time (Total) | 7.2 | veh-h/h | 13.9 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 353 | veh/h | 683 | pers/h |
| Percent Heavy Vehicles (Demand) | 2.5 | % | | |
| Degree of Saturation | 0.109 | | | |
| Practical Spare Capacity | 799.3 | % | | |
| Effective Intersection Capacity | 3239 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.08 | veh-h/h | 0.09 | pers-h/h |
| Control Delay (Average) | 0.8 | sec | 0.5 | sec |
| Control Delay (Worst Lane) | 5.9 | sec | | |
| Control Delay (Worst Movement) | 6.5 | sec | 6.5 | sec |
| Geometric Delay (Average) | 0.6 | sec | | |
| Stop-Line Delay (Average) | 0.2 | sec | | |
| Idling Time (Average) | 0.0 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.1 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 0.8 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 28 | veh/h | 36 | pers/h |
| Effective Stop Rate | 0.08 | per veh | 0.05 | per pers |
| Proportion Queued | 0.04 | | 0.03 | |
| Performance Index | 7.5 | | 7.5 | |
| | | | | |
| Cost (Total) | 222.51 | $/h | 222.51 | $/h |
| Fuel Consumption (Total) | 22.9 | L/h | | |
| Carbon Dioxide (Total) | 54.3 | kg/h | | |
| Hydrocarbons (Total) | 0.004 | kg/h | | |
| Carbon Monoxide (Total) | 0.042 | kg/h | | |
| NOx (Total) | 0.027 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base + Dev PM Queen St / Hume St

Base + Development PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 48.7 | km/h | 49.1 | km/h |
| Travel Distance (Total) | 466.8 | veh-km/h | 880.2 | pers-km/h |
| Travel Time (Total) | 9.6 | veh-h/h | 17.9 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 462 | veh/h | 871 | pers/h |
| Percent Heavy Vehicles (Demand) | 2.6 | % | | |
| Degree of Saturation | 0.127 | | | |
| Practical Spare Capacity | 614.9 | % | | |
| Effective Intersection Capacity | 3628 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.21 | veh-h/h | 0.25 | pers-h/h |
| Control Delay (Average) | 1.6 | sec | 1.0 | sec |
| Control Delay (Worst Lane) | 6.4 | sec | | |
| Control Delay (Worst Movement) | 7.0 | sec | 7.0 | sec |
| Geometric Delay (Average) | 1.2 | sec | | |
| Stop-Line Delay (Average) | 0.4 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.4 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 2.8 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 75 | veh/h | 97 | pers/h |
| Effective Stop Rate | 0.16 | per veh | 0.11 | per pers |
| Proportion Queued | 0.10 | | 0.07 | |
| Performance Index | 10.6 | | 10.6 | |
| | | | | |
| Cost (Total) | 295.22 | $/h | 295.22 | $/h |
| Fuel Consumption (Total) | 31.3 | L/h | | |
| Carbon Dioxide (Total) | 74.0 | kg/h | | |
| Hydrocarbons (Total) | 0.006 | kg/h | | |
| Carbon Monoxide (Total) | 0.058 | kg/h | | |
| NOx (Total) | 0.039 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base + 2% Growth AM Queen St / Elyard St

Base + 2% Growth (2017) AM Queen St / Elyard St 0830 - 0930
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 45.4 | km/h | 45.6 | km/h |
| Travel Distance (Total) | 1176.8 | veh-km/h | 2239.9 | pers-km/h |
| Travel Time (Total) | 25.9 | veh-h/h | 49.1 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1147 | veh/h | 2183 | pers/h |
| Percent Heavy Vehicles (Demand) | 4.4 | % | | |
| Degree of Saturation | 0.481 | | | |
| Practical Spare Capacity | 76.9 | % | | |
| Effective Intersection Capacity | 2387 | veh/h | | |
| | | | | |
| Control Delay (Total) | 1.86 | veh-h/h | 3.63 | pers-h/h |
| Control Delay (Average) | 5.9 | sec | 6.0 | sec |
| Control Delay (Worst Lane) | 6.5 | sec | | |
| Control Delay (Worst Movement) | 11.1 | sec | 11.1 | sec |
| Geometric Delay (Average) | 4.1 | sec | | |
| Stop-Line Delay (Average) | 1.8 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 3.5 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 25.0 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.02 | | | |
| Total Effective Stops | 687 | veh/h | 1302 | pers/h |
| Effective Stop Rate | 0.60 | per veh | 0.60 | per pers |
| Proportion Queued | 0.52 | | 0.52 | |
| Performance Index | 49.9 | | 49.9 | |
| | | | | |
| Cost (Total) | 954.32 | $/h | 954.32 | $/h |
| Fuel Consumption (Total) | 100.6 | L/h | | |
| Carbon Dioxide (Total) | 239.1 | kg/h | | |
| Hydrocarbons (Total) | 0.021 | kg/h | | |
| Carbon Monoxide (Total) | 0.199 | kg/h | | |
| NOx (Total) | 0.298 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base + 2% Growth PM Queen St / Elyard St

Base + 2% Growth (2017) PM Queen St / Elyard St 1630-1730
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 45.6 | km/h | 45.9 | km/h |
| Travel Distance (Total) | 1393.4 | veh-km/h | 2471.1 | pers-km/h |
| Travel Time (Total) | 30.5 | veh-h/h | 53.9 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1355 | veh/h | 2404 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.2 | % | | |
| Degree of Saturation | 0.456 | | | |
| Practical Spare Capacity | 86.5 | % | | |
| Effective Intersection Capacity | 2974 | veh/h | | |
| | | | | |
| Control Delay (Total) | 2.59 | veh-h/h | 4.66 | pers-h/h |
| Control Delay (Average) | 6.9 | sec | 7.0 | sec |
| Control Delay (Worst Lane) | 8.2 | sec | | |
| Control Delay (Worst Movement) | 12.7 | sec | 12.7 | sec |
| Geometric Delay (Average) | 4.6 | sec | | |
| Stop-Line Delay (Average) | 2.3 | sec | | |
| Idling Time (Average) | 0.2 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 3.2 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 22.9 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.02 | | | |
| Total Effective Stops | 899 | veh/h | 1597 | pers/h |
| Effective Stop Rate | 0.66 | per veh | 0.66 | per pers |
| Proportion Queued | 0.60 | | 0.60 | |
| Performance Index | 62.3 | | 62.3 | |
| | | | | |
| Cost (Total) | 1092.83 | $/h | 1092.83 | $/h |
| Fuel Consumption (Total) | 118.9 | L/h | | |
| Carbon Dioxide (Total) | 281.7 | kg/h | | |
| Hydrocarbons (Total) | 0.024 | kg/h | | |
| Carbon Monoxide (Total) | 0.240 | kg/h | | |
| NOx (Total) | 0.300 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base + 2% Growth AM Queen St / Hume St

Base + 2% Growth (2017) AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 49.3 | km/h | 49.6 | km/h |
| Travel Distance (Total) | 343.5 | veh-km/h | 732.2 | pers-km/h |
| Travel Time (Total) | 7.0 | veh-h/h | 14.8 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 340 | veh/h | 725 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.2 | % | | |
| Degree of Saturation | 0.104 | | | |
| Practical Spare Capacity | 841.4 | % | | |
| Effective Intersection Capacity | 3266 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.08 | veh-h/h | 0.09 | pers-h/h |
| Control Delay (Average) | 0.8 | sec | 0.5 | sec |
| Control Delay (Worst Lane) | 6.0 | sec | | |
| Control Delay (Worst Movement) | 6.5 | sec | 6.5 | sec |
| Geometric Delay (Average) | 0.7 | sec | | |
| Stop-Line Delay (Average) | 0.2 | sec | | |
| Idling Time (Average) | 0.0 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.1 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 0.7 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 27 | veh/h | 36 | pers/h |
| Effective Stop Rate | 0.08 | per veh | 0.05 | per pers |
| Proportion Queued | 0.04 | | 0.03 | |
| Performance Index | 7.3 | | 7.3 | |
| | | | | |
| Cost (Total) | 233.82 | $/h | 233.82 | $/h |
| Fuel Consumption (Total) | 22.5 | L/h | | |
| Carbon Dioxide (Total) | 53.4 | kg/h | | |
| Hydrocarbons (Total) | 0.004 | kg/h | | |
| Carbon Monoxide (Total) | 0.042 | kg/h | | |
| NOx (Total) | 0.030 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Base + 2% Growth PM Queen St / Hume St

Base + 2% Growth (2017) PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 48.6 | km/h | 49.1 | km/h |
| Travel Distance (Total) | 462.8 | veh-km/h | 933.6 | pers-km/h |
| Travel Time (Total) | 9.5 | veh-h/h | 19.0 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 458 | veh/h | 924 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.3 | % | | |
| Degree of Saturation | 0.127 | | | |
| Practical Spare Capacity | 617.3 | % | | |
| Effective Intersection Capacity | 3620 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.21 | veh-h/h | 0.26 | pers-h/h |
| Control Delay (Average) | 1.7 | sec | 1.0 | sec |
| Control Delay (Worst Lane) | 6.5 | sec | | |
| Control Delay (Worst Movement) | 7.0 | sec | 7.0 | sec |
| Geometric Delay (Average) | 1.3 | sec | | |
| Stop-Line Delay (Average) | 0.4 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.4 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 2.8 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 77 | veh/h | 102 | pers/h |
| Effective Stop Rate | 0.17 | per veh | 0.11 | per pers |
| Proportion Queued | 0.10 | | 0.07 | |
| Performance Index | 10.5 | | 10.5 | |
| | | | | |
| Cost (Total) | 311.33 | $/h | 311.33 | $/h |
| Fuel Consumption (Total) | 31.7 | L/h | | |
| Carbon Dioxide (Total) | 75.1 | kg/h | | |
| Hydrocarbons (Total) | 0.006 | kg/h | | |
| Carbon Monoxide (Total) | 0.059 | kg/h | | |
| NOx (Total) | 0.047 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Future Baseline Scenario (2017) AM Queen St / Elyard St

Future Baseline + 2% Growth (2017) + Development AM Queen St / Elyard St 0830 - 0930
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 45.3 | km/h | 45.5 | km/h |
| Travel Distance (Total) | 1336.3 | veh-km/h | 2431.3 | pers-km/h |
| Travel Time (Total) | 29.5 | veh-h/h | 53.5 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1302 | veh/h | 2369 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.8 | % | | |
| Degree of Saturation | 0.553 | | | |
| Practical Spare Capacity | 53.7 | % | | |
| Effective Intersection Capacity | 2355 | veh/h | | |
| | | | | |
| Control Delay (Total) | 2.29 | veh-h/h | 4.21 | pers-h/h |
| Control Delay (Average) | 6.3 | sec | 6.4 | sec |
| Control Delay (Worst Lane) | 7.2 | sec | | |
| Control Delay (Worst Movement) | 11.7 | sec | 11.7 | sec |
| Geometric Delay (Average) | 4.2 | sec | | |
| Stop-Line Delay (Average) | 2.1 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 4.3 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 31.2 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.03 | | | |
| Total Effective Stops | 827 | veh/h | 1500 | pers/h |
| Effective Stop Rate | 0.64 | per veh | 0.63 | per pers |
| Proportion Queued | 0.58 | | 0.57 | |
| Performance Index | 59.0 | | 59.0 | |
| | | | | |
| Cost (Total) | 1055.86 | $/h | 1055.86 | $/h |
| Fuel Consumption (Total) | 113.6 | L/h | | |
| Carbon Dioxide (Total) | 269.6 | kg/h | | |
| Hydrocarbons (Total) | 0.023 | kg/h | | |
| Carbon Monoxide (Total) | 0.224 | kg/h | | |
| NOx (Total) | 0.308 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Future Baseline Scenario (2017) AM Queen St / Hume St

Future Baseline + 2% Growth (2017) + Development  AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 49.3 | km/h | 49.6 | km/h |
| Travel Distance (Total) | 363.7 | veh-km/h | 756.4 | pers-km/h |
| Travel Time (Total) | 7.4 | veh-h/h | 15.3 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 360 | veh/h | 749 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.1 | % | | |
| Degree of Saturation | 0.110 | | | |
| Practical Spare Capacity | 788.8 | % | | |
| Effective Intersection Capacity | 3265 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.08 | veh-h/h | 0.10 | pers-h/h |
| Control Delay (Average) | 0.8 | sec | 0.5 | sec |
| Control Delay (Worst Lane) | 6.1 | sec | | |
| Control Delay (Worst Movement) | 6.6 | sec | 6.6 | sec |
| Geometric Delay (Average) | 0.6 | sec | | |
| Stop-Line Delay (Average) | 0.2 | sec | | |
| Idling Time (Average) | 0.0 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.1 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 0.8 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 27 | veh/h | 36 | pers/h |
| Effective Stop Rate | 0.08 | per veh | 0.05 | per pers |
| Proportion Queued | 0.04 | | 0.03 | |
| Performance Index | 7.7 | | 7.7 | |
| | | | | |
| Cost (Total) | 241.85 | $/h | 241.85 | $/h |
| Fuel Consumption (Total) | 23.7 | L/h | | |
| Carbon Dioxide (Total) | 56.1 | kg/h | | |
| Hydrocarbons (Total) | 0.004 | kg/h | | |
| Carbon Monoxide (Total) | 0.044 | kg/h | | |
| NOx (Total) | 0.031 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Future Baseline Scenario (2017) PM Queen St / Elyard St

Future Baseline + 2% Growth (2017) + Development  PM Queen St / Elyard St 1630-1730
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 45.4 | km/h | 45.7 | km/h |
| Travel Distance (Total) | 1528.8 | veh-km/h | 2633.2 | pers-km/h |
| Travel Time (Total) | 33.6 | veh-h/h | 57.7 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1487 | veh/h | 2562 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.0 | % | | |
| Degree of Saturation | 0.485 | | | |
| Practical Spare Capacity | 75.1 | % | | |
| Effective Intersection Capacity | 3064 | veh/h | | |
| | | | | |
| Control Delay (Total) | 3.02 | veh-h/h | 5.24 | pers-h/h |
| Control Delay (Average) | 7.3 | sec | 7.4 | sec |
| Control Delay (Worst Lane) | 8.1 | sec | | |
| Control Delay (Worst Movement) | 13.2 | sec | 13.2 | sec |
| Geometric Delay (Average) | 4.6 | sec | | |
| Stop-Line Delay (Average) | 2.7 | sec | | |
| Idling Time (Average) | 0.3 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 3.5 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 24.8 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.02 | | | |
| Total Effective Stops | 1044 | veh/h | 1799 | pers/h |
| Effective Stop Rate | 0.70 | per veh | 0.70 | per pers |
| Proportion Queued | 0.65 | | 0.65 | |
| Performance Index | 70.4 | | 70.4 | |
| | | | | |
| Cost (Total) | 1180.11 | $/h | 1180.11 | $/h |
| Fuel Consumption (Total) | 130.1 | L/h | | |
| Carbon Dioxide (Total) | 307.9 | kg/h | | |
| Hydrocarbons (Total) | 0.026 | kg/h | | |
| Carbon Monoxide (Total) | 0.261 | kg/h | | |
| NOx (Total) | 0.309 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Future Baseline Scenario (2017) PM Queen St / Hume St

Future Baseline + 2% Growth (2017) + Development PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 48.6 | km/h | 49.1 | km/h |
| Travel Distance (Total) | 480.0 | veh-km/h | 954.2 | pers-km/h |
| Travel Time (Total) | 9.9 | veh-h/h | 19.4 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 475 | veh/h | 944 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.2 | % | | |
| Degree of Saturation | 0.132 | | | |
| Practical Spare Capacity | 604.5 | % | | |
| Effective Intersection Capacity | 3606 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.22 | veh-h/h | 0.26 | pers-h/h |
| Control Delay (Average) | 1.6 | sec | 1.0 | sec |
| Control Delay (Worst Lane) | 6.6 | sec | | |
| Control Delay (Worst Movement) | 7.1 | sec | 7.1 | sec |
| Geometric Delay (Average) | 1.2 | sec | | |
| Stop-Line Delay (Average) | 0.4 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.4 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 2.8 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 78 | veh/h | 103 | pers/h |
| Effective Stop Rate | 0.16 | per veh | 0.11 | per pers |
| Proportion Queued | 0.10 | | 0.07 | |
| Performance Index | 10.9 | | 10.9 | |
| | | | | |
| Cost (Total) | 318.24 | $/h | 318.24 | $/h |
| Fuel Consumption (Total) | 32.7 | L/h | | |
| Carbon Dioxide (Total) | 77.4 | kg/h | | |
| Hydrocarbons (Total) | 0.006 | kg/h | | |
| Carbon Monoxide (Total) | 0.061 | kg/h | | |
| NOx (Total) | 0.048 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Future + 10 years (2027) Scenario  AM Queen St / Elyard St

Future Baseline + 10 Years 2% Growth (2027) + Development Trip AM Queen St / Elyard St 0830 - 0930
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 44.5 | km/h | 44.7 | km/h |
| Travel Distance (Total) | 1606.2 | veh-km/h | 2991.8 | pers-km/h |
| Travel Time (Total) | 36.1 | veh-h/h | 66.9 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1565 | veh/h | 2915 | pers/h |
| Percent Heavy Vehicles (Demand) | 4.2 | % | | |
| Degree of Saturation | 0.703 | | | |
| Practical Spare Capacity | 20.8 | % | | |
| Effective Intersection Capacity | 2225 | veh/h | | |
| | | | | |
| Control Delay (Total) | 3.49 | veh-h/h | 6.56 | pers-h/h |
| Control Delay (Average) | 8.0 | sec | 8.1 | sec |
| Control Delay (Worst Lane) | 9.5 | sec | | |
| Control Delay (Worst Movement) | 14.3 | sec | 14.3 | sec |
| Geometric Delay (Average) | 4.2 | sec | | |
| Stop-Line Delay (Average) | 3.8 | sec | | |
| Idling Time (Average) | 0.6 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 8.3 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 59.7 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.05 | | | |
| Total Effective Stops | 1183 | veh/h | 2186 | pers/h |
| Effective Stop Rate | 0.76 | per veh | 0.75 | per pers |
| Proportion Queued | 0.70 | | 0.69 | |
| Performance Index | 84.7 | | 84.7 | |
| | | | | |
| Cost (Total) | 1336.76 | $/h | 1336.76 | $/h |
| Fuel Consumption (Total) | 140.4 | L/h | | |
| Carbon Dioxide (Total) | 333.3 | kg/h | | |
| Hydrocarbons (Total) | 0.029 | kg/h | | |
| Carbon Monoxide (Total) | 0.280 | kg/h | | |
| NOx (Total) | 0.405 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Future + 10 years (2027) Scenario PM Queen St / Elyard St

Future Baseline + 10 Years 2% Growth (2027) + Development Trip PM Queen St / Elyard St 1630-1730
Roundabout

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 44.4 | km/h | 44.6 | km/h |
| Travel Distance (Total) | 1853.7 | veh-km/h | 3230.3 | pers-km/h |
| Travel Time (Total) | 41.7 | veh-h/h | 72.4 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 1803 | veh/h | 3143 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.2 | % | | |
| Degree of Saturation | 0.637 | | | |
| Practical Spare Capacity | 33.5 | % | | |
| Effective Intersection Capacity | 2831 | veh/h | | |
| | | | | |
| Control Delay (Total) | 4.75 | veh-h/h | 8.32 | pers-h/h |
| Control Delay (Average) | 9.5 | sec | 9.5 | sec |
| Control Delay (Worst Lane) | 11.8 | sec | | |
| Control Delay (Worst Movement) | 17.5 | sec | 17.5 | sec |
| Geometric Delay (Average) | 4.6 | sec | | |
| Stop-Line Delay (Average) | 4.9 | sec | | |
| Idling Time (Average) | 1.1 | sec | | |
| Intersection Level of Service (LOS) | LOS A | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 6.4 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 45.6 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.04 | | | |
| Total Effective Stops | 1522 | veh/h | 2654 | pers/h |
| Effective Stop Rate | 0.84 | per veh | 0.84 | per pers |
| Proportion Queued | 0.78 | | 0.78 | |
| Performance Index | 104.3 | | 104.3 | |
| | | | | |
| Cost (Total) | 1509.13 | $/h | 1509.13 | $/h |
| Fuel Consumption (Total) | 162.8 | L/h | | |
| Carbon Dioxide (Total) | 385.7 | kg/h | | |
| Hydrocarbons (Total) | 0.033 | kg/h | | |
| Carbon Monoxide (Total) | 0.331 | kg/h | | |
| NOx (Total) | 0.419 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Future + 10 years (2027) Scenario AM Queen St / Hume St

Future Baseline + 10 Year 2% Growth (2027) + Development Trip AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 49.3 | km/h | 49.5 | km/h |
| Travel Distance (Total) | 444.6 | veh-km/h | 969.8 | pers-km/h |
| Travel Time (Total) | 9.0 | veh-h/h | 19.6 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 440 | veh/h | 960 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.4 | % | | |
| Degree of Saturation | 0.134 | | | |
| Practical Spare Capacity | 631.2 | % | | |
| Effective Intersection Capacity | 3283 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.11 | veh-h/h | 0.13 | pers-h/h |
| Control Delay (Average) | 0.9 | sec | 0.5 | sec |
| Control Delay (Worst Lane) | 6.5 | sec | | |
| Control Delay (Worst Movement) | 7.1 | sec | 7.1 | sec |
| Geometric Delay (Average) | 0.7 | sec | | |
| Stop-Line Delay (Average) | 0.2 | sec | | |
| Idling Time (Average) | 0.1 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.1 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 1.0 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 36 | veh/h | 49 | pers/h |
| Effective Stop Rate | 0.08 | per veh | 0.05 | per pers |
| Proportion Queued | 0.05 | | 0.03 | |
| Performance Index | 9.5 | | 9.5 | |
| | | | | |
| Cost (Total) | 309.31 | $/h | 309.31 | $/h |
| Fuel Consumption (Total) | 29.3 | L/h | | |
| Carbon Dioxide (Total) | 69.5 | kg/h | | |
| Hydrocarbons (Total) | 0.006 | kg/h | | |
| Carbon Monoxide (Total) | 0.054 | kg/h | | |
| NOx (Total) | 0.041 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INTERSECTION SUMMARY

## Site: Future + 10 years (2027) Scenario PM Queen St / Hume St

Future Base + 10 Years 2% Growth (2027) + Development Trip PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

| Intersection Performance - Hourly Values | | | | |
|---|---|---|---|---|
| Performance Measure | Vehicles | | Persons | |
| Travel Speed (Average) | 48.5 | km/h | 49.0 | km/h |
| Travel Distance (Total) | 594.2 | veh-km/h | 1207.5 | pers-km/h |
| Travel Time (Total) | 12.2 | veh-h/h | 24.6 | pers-h/h |
| | | | | |
| Demand Flows (Total) | 588 | veh/h | 1195 | pers/h |
| Percent Heavy Vehicles (Demand) | 3.4 | % | | |
| Degree of Saturation | 0.161 | | | |
| Practical Spare Capacity | 418.5 | % | | |
| Effective Intersection Capacity | 3651 | veh/h | | |
| | | | | |
| Control Delay (Total) | 0.29 | veh-h/h | 0.36 | pers-h/h |
| Control Delay (Average) | 1.8 | sec | 1.1 | sec |
| Control Delay (Worst Lane) | 7.2 | sec | | |
| Control Delay (Worst Movement) | 7.9 | sec | 7.9 | sec |
| Geometric Delay (Average) | 1.2 | sec | | |
| Stop-Line Delay (Average) | 0.6 | sec | | |
| Idling Time (Average) | 0.2 | sec | | |
| Intersection Level of Service (LOS) | NA | | | |
| | | | | |
| 95% Back of Queue - Vehicles (Worst Lane) | 0.6 | veh | | |
| 95% Back of Queue - Distance (Worst Lane) | 3.9 | m | | |
| Queue Storage Ratio (Worst Lane) | 0.00 | | | |
| Total Effective Stops | 103 | veh/h | 136 | pers/h |
| Effective Stop Rate | 0.18 | per veh | 0.11 | per pers |
| Proportion Queued | 0.12 | | 0.08 | |
| Performance Index | 13.6 | | 13.6 | |
| | | | | |
| Cost (Total) | 402.88 | $/h | 402.88 | $/h |
| Fuel Consumption (Total) | 40.8 | L/h | | |
| Carbon Dioxide (Total) | 96.8 | kg/h | | |
| Hydrocarbons (Total) | 0.008 | kg/h | | |
| Carbon Monoxide (Total) | 0.077 | kg/h | | |
| NOx (Total) | 0.064 | kg/h | | |
| | | | | |

Level of Service (LOS) Method: Delay (HCM 2000).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# MOVEMENT SUMMARY

## Site: Base AM Queen St / Elyard St

Base AM Queen St / Elyard St 0830 - 0930
Roundabout

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 23 | 0.0 | 0.193 | 4.3 | LOS A | 1.1 | 7.6 | 0.40 | 0.55 | 45.8 |
| 5 | T1 | 102 | 0.0 | 0.193 | 4.3 | LOS A | 1.1 | 7.6 | 0.40 | 0.55 | 46.7 |
| 6 | R2 | 87 | 5.7 | 0.193 | 8.3 | LOS A | 1.1 | 7.6 | 0.40 | 0.55 | 46.7 |
| 6u | U | 1 | 0.0 | 0.193 | 9.9 | LOS A | 1.1 | 7.6 | 0.40 | 0.55 | 50.3 |
| Approach | | 213 | 2.3 | 0.193 | 6.0 | LOS A | 1.1 | 7.6 | 0.40 | 0.55 | 46.6 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 60 | 6.7 | 0.182 | 4.1 | LOS A | 1.0 | 7.5 | 0.37 | 0.52 | 46.0 |
| 8 | T1 | 84 | 3.6 | 0.182 | 4.1 | LOS A | 1.0 | 7.5 | 0.37 | 0.52 | 46.9 |
| 9 | R2 | 52 | 1.9 | 0.182 | 8.0 | LOS A | 1.0 | 7.5 | 0.37 | 0.52 | 46.9 |
| 9u | U | 10 | 10.0 | 0.182 | 9.8 | LOS A | 1.0 | 7.5 | 0.37 | 0.52 | 47.6 |
| Approach | | 206 | 4.4 | 0.182 | 5.4 | LOS A | 1.0 | 7.5 | 0.37 | 0.52 | 46.7 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 79 | 13.9 | 0.207 | 5.6 | LOS A | 1.2 | 8.8 | 0.56 | 0.63 | 45.6 |
| 11 | T1 | 72 | 0.0 | 0.207 | 5.3 | LOS A | 1.2 | 8.8 | 0.56 | 0.63 | 46.6 |
| 12 | R2 | 39 | 2.6 | 0.207 | 9.3 | LOS A | 1.2 | 8.8 | 0.56 | 0.63 | 46.6 |
| 12u | U | 1 | 0.0 | 0.207 | 11.0 | LOS A | 1.2 | 8.8 | 0.56 | 0.63 | 47.3 |
| Approach | | 191 | 6.3 | 0.207 | 6.3 | LOS A | 1.2 | 8.8 | 0.56 | 0.63 | 46.2 |
| SouthWest: Elyard St | | | | | | | | | | | |
| 1 | L2 | 233 | 0.9 | 0.457 | 5.0 | LOS A | 3.2 | 23.2 | 0.57 | 0.60 | 41.7 |
| 2 | T1 | 219 | 4.6 | 0.457 | 5.2 | LOS A | 3.2 | 23.2 | 0.57 | 0.60 | 46.8 |
| 3 | R2 | 35 | 0.0 | 0.457 | 9.0 | LOS A | 3.2 | 23.2 | 0.57 | 0.60 | 46.9 |
| 3u | U | 6 | 0.0 | 0.457 | 10.7 | LOS A | 3.2 | 23.2 | 0.57 | 0.60 | 47.6 |
| Approach | | 493 | 2.4 | 0.457 | 5.4 | LOS A | 3.2 | 23.2 | 0.57 | 0.60 | 44.3 |
| All Vehicles | | 1103 | 3.4 | 0.457 | 5.7 | LOS A | 3.2 | 23.2 | 0.50 | 0.58 | 45.5 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Base AM Queen St / Hume St

Base AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 1 | L2 | 1 | 0.0 | 0.101 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 49.5 |
| 2 | T1 | 192 | 2.6 | 0.101 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 50.0 |
| Approach | | 193 | 2.6 | 0.101 | 0.0 | NA | 0.0 | 0.0 | 0.00 | 0.00 | 50.0 |
| NorthEast: Hume St | | | | | | | | | | | |
| 4 | L2 | 5 | 0.0 | 0.033 | 4.8 | LOS A | 0.1 | 0.8 | 0.29 | 0.58 | 45.9 |
| 5 | T1 | 5 | 0.0 | 0.033 | 4.3 | LOS A | 0.1 | 0.8 | 0.29 | 0.58 | 45.9 |
| 6 | R2 | 20 | 0.0 | 0.033 | 6.4 | LOS A | 0.1 | 0.8 | 0.29 | 0.58 | 45.3 |
| Approach | | 30 | 0.0 | 0.033 | 5.8 | LOS A | 0.1 | 0.8 | 0.29 | 0.58 | 45.5 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 92 | 4.3 | 0.050 | 0.0 | LOS A | 0.0 | 0.1 | 0.02 | 0.01 | 49.9 |
| 9 | R2 | 2 | 0.0 | 0.050 | 5.2 | LOS A | 0.0 | 0.1 | 0.02 | 0.01 | 48.9 |
| Approach | | 94 | 4.3 | 0.050 | 0.1 | NA | 0.0 | 0.1 | 0.02 | 0.01 | 49.9 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 11 | 0.0 | 0.009 | 5.1 | LOS A | 0.0 | 0.2 | 0.28 | 0.51 | 46.0 |
| 12 | R2 | 1 | 0.0 | 0.009 | 6.0 | LOS A | 0.0 | 0.2 | 0.28 | 0.51 | 45.6 |
| Approach | | 12 | 0.0 | 0.009 | 5.2 | LOS A | 0.0 | 0.2 | 0.28 | 0.51 | 45.9 |
| All Vehicles | | 329 | 2.7 | 0.101 | 0.8 | NA | 0.1 | 0.8 | 0.04 | 0.08 | 49.3 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

## Site: Base PM Queen St / Elyard St

Base PM Queen St / Elyard St 1630-1730
Roundabout

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 31 | 0.0 | 0.202 | 6.1 | LOS A | 1.2 | 8.3 | 0.62 | 0.71 | 45.0 |
| 5 | T1 | 66 | 0.0 | 0.202 | 6.2 | LOS A | 1.2 | 8.3 | 0.62 | 0.71 | 45.9 |
| 6 | R2 | 74 | 6.8 | 0.202 | 10.3 | LOS A | 1.2 | 8.3 | 0.62 | 0.71 | 46.1 |
| 6u | U | 1 | 0.0 | 0.202 | 11.8 | LOS A | 1.2 | 8.3 | 0.62 | 0.71 | 49.4 |
| Approach | | 172 | 2.9 | 0.202 | 8.0 | LOS A | 1.2 | 8.3 | 0.62 | 0.71 | 45.8 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 93 | 6.5 | 0.383 | 6.3 | LOS A | 2.5 | 18.4 | 0.68 | 0.72 | 45.5 |
| 8 | T1 | 178 | 1.7 | 0.383 | 6.2 | LOS A | 2.5 | 18.4 | 0.68 | 0.72 | 46.3 |
| 9 | R2 | 52 | 1.9 | 0.383 | 10.2 | LOS A | 2.5 | 18.4 | 0.68 | 0.72 | 46.3 |
| 9u | U | 16 | 12.5 | 0.383 | 12.2 | LOS A | 2.5 | 18.4 | 0.68 | 0.72 | 49.7 |
| Approach | | 339 | 3.5 | 0.383 | 7.1 | LOS A | 2.5 | 18.4 | 0.68 | 0.72 | 46.3 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 86 | 4.7 | 0.435 | 5.0 | LOS A | 3.0 | 21.4 | 0.55 | 0.64 | 45.4 |
| 11 | T1 | 151 | 0.0 | 0.435 | 5.0 | LOS A | 3.0 | 21.4 | 0.55 | 0.64 | 46.2 |
| 12 | R2 | 235 | 0.4 | 0.435 | 8.9 | LOS A | 3.0 | 21.4 | 0.55 | 0.64 | 46.2 |
| 12u | U | 6 | 0.0 | 0.435 | 10.6 | LOS A | 3.0 | 21.4 | 0.55 | 0.64 | 49.7 |
| Approach | | 478 | 1.0 | 0.435 | 7.0 | LOS A | 3.0 | 21.4 | 0.55 | 0.64 | 46.1 |
| SouthWest: ElyardSt | | | | | | | | | | | |
| 1 | L2 | 174 | 0.0 | 0.296 | 4.5 | LOS A | 1.8 | 13.3 | 0.47 | 0.55 | 42.0 |
| 2 | T1 | 118 | 8.5 | 0.296 | 4.7 | LOS A | 1.8 | 13.3 | 0.47 | 0.55 | 47.4 |
| 3 | R2 | 24 | 4.2 | 0.296 | 8.6 | LOS A | 1.8 | 13.3 | 0.47 | 0.55 | 47.3 |
| 3u | U | 4 | 0.0 | 0.296 | 10.2 | LOS A | 1.8 | 13.3 | 0.47 | 0.55 | 51.1 |
| Approach | | 320 | 3.4 | 0.296 | 5.0 | LOS A | 1.8 | 13.3 | 0.47 | 0.55 | 44.4 |
| All Vehicles | | 1309 | 2.5 | 0.435 | 6.7 | LOS A | 3.0 | 21.4 | 0.57 | 0.65 | 45.7 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Base PM Queen St / Hume St

Base PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen st | | | | | | | | | | | |
| 1 | L2 | 3 | 0.0 | 0.058 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.02 | 49.4 |
| 2 | T1 | 106 | 4.7 | 0.058 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.02 | 49.9 |
| Approach | | 109 | 4.6 | 0.058 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.02 | 49.9 |
| NorthEast: Hume st | | | | | | | | | | | |
| 4 | L2 | 27 | 0.0 | 0.110 | 5.3 | LOS A | 0.4 | 2.7 | 0.37 | 0.64 | 45.6 |
| 5 | T1 | 5 | 0.0 | 0.110 | 4.7 | LOS A | 0.4 | 2.7 | 0.37 | 0.64 | 45.6 |
| 6 | R2 | 66 | 0.0 | 0.110 | 6.9 | LOS A | 0.4 | 2.7 | 0.37 | 0.64 | 45.0 |
| Approach | | 98 | 0.0 | 0.110 | 6.3 | LOS A | 0.4 | 2.7 | 0.37 | 0.64 | 45.2 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 218 | 3.2 | 0.122 | 0.0 | LOS A | 0.1 | 0.6 | 0.03 | 0.03 | 49.8 |
| 9 | R2 | 12 | 0.0 | 0.122 | 4.9 | LOS A | 0.1 | 0.6 | 0.03 | 0.03 | 48.8 |
| Approach | | 230 | 3.0 | 0.122 | 0.3 | NA | 0.1 | 0.6 | 0.03 | 0.03 | 49.7 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 6 | 0.0 | 0.005 | 4.8 | LOS A | 0.0 | 0.1 | 0.19 | 0.50 | 46.2 |
| 12 | R2 | 1 | 0.0 | 0.005 | 6.4 | LOS A | 0.0 | 0.1 | 0.19 | 0.50 | 45.7 |
| Approach | | 7 | 0.0 | 0.005 | 5.1 | LOS A | 0.0 | 0.1 | 0.19 | 0.50 | 46.1 |
| All Vehicles | | 444 | 2.7 | 0.122 | 1.7 | NA | 0.4 | 2.7 | 0.10 | 0.17 | 48.6 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

## Site: Base + Dev AM Queen St / Elyard St

Base + Development AM Queen St / Elyard St  0830 - 0930
Roundabout

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 73 | 0.0 | 0.242 | 4.3 | LOS A | 1.4 | 10.2 | 0.42 | 0.56 | 45.8 |
| 5 | T1 | 102 | 0.0 | 0.242 | 4.3 | LOS A | 1.4 | 10.2 | 0.42 | 0.56 | 46.8 |
| 6 | R2 | 100 | 5.0 | 0.242 | 8.3 | LOS A | 1.4 | 10.2 | 0.42 | 0.56 | 46.7 |
| 6u | U | 1 | 0.0 | 0.242 | 10.0 | LOS A | 1.4 | 10.2 | 0.42 | 0.56 | 50.4 |
| Approach | | 276 | 1.8 | 0.242 | 5.8 | LOS A | 1.4 | 10.2 | 0.42 | 0.56 | 46.5 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 80 | 5.0 | 0.209 | 4.5 | LOS A | 1.2 | 8.6 | 0.44 | 0.56 | 45.9 |
| 8 | T1 | 84 | 3.6 | 0.209 | 4.5 | LOS A | 1.2 | 8.6 | 0.44 | 0.56 | 46.8 |
| 9 | R2 | 52 | 1.9 | 0.209 | 8.4 | LOS A | 1.2 | 8.6 | 0.44 | 0.56 | 46.8 |
| 9u | U | 10 | 10.0 | 0.209 | 10.3 | LOS A | 1.2 | 8.6 | 0.44 | 0.56 | 47.5 |
| Approach | | 226 | 4.0 | 0.209 | 5.7 | LOS A | 1.2 | 8.6 | 0.44 | 0.56 | 46.5 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 79 | 13.9 | 0.219 | 6.2 | LOS A | 1.3 | 9.6 | 0.62 | 0.68 | 45.3 |
| 11 | T1 | 72 | 0.0 | 0.219 | 5.8 | LOS A | 1.3 | 9.6 | 0.62 | 0.68 | 46.3 |
| 12 | R2 | 39 | 2.6 | 0.219 | 9.8 | LOS A | 1.3 | 9.6 | 0.62 | 0.68 | 46.3 |
| 12u | U | 1 | 0.0 | 0.219 | 11.5 | LOS A | 1.3 | 9.6 | 0.62 | 0.68 | 47.0 |
| Approach | | 191 | 6.3 | 0.219 | 6.8 | LOS A | 1.3 | 9.6 | 0.62 | 0.68 | 45.9 |
| SouthWest:  Elyard St | | | | | | | | | | | |
| 1 | L2 | 233 | 0.9 | 0.519 | 5.2 | LOS A | 4.0 | 28.2 | 0.62 | 0.64 | 41.4 |
| 2 | T1 | 219 | 4.6 | 0.519 | 5.3 | LOS A | 4.0 | 28.2 | 0.62 | 0.64 | 46.5 |
| 3 | R2 | 110 | 0.0 | 0.519 | 9.2 | LOS A | 4.0 | 28.2 | 0.62 | 0.64 | 46.5 |
| 3u | U | 6 | 0.0 | 0.519 | 10.9 | LOS A | 4.0 | 28.2 | 0.62 | 0.64 | 47.2 |
| Approach | | 568 | 2.1 | 0.519 | 6.1 | LOS A | 4.0 | 28.2 | 0.62 | 0.64 | 44.3 |
| All Vehicles | | 1261 | 3.0 | 0.519 | 6.1 | LOS A | 4.0 | 28.2 | 0.54 | 0.61 | 45.4 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Base + Dev PM Queen St / Elyard St

Base + Development PM Queen St / Elyard St 1630-1730
Roundabout

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 94 | 0.0 | 0.294 | 6.4 | LOS A | 1.8 | 12.9 | 0.66 | 0.73 | 45.0 |
| 5 | T1 | 66 | 0.0 | 0.294 | 6.4 | LOS A | 1.8 | 12.9 | 0.66 | 0.73 | 45.9 |
| 6 | R2 | 91 | 5.5 | 0.294 | 10.5 | LOS A | 1.8 | 12.9 | 0.66 | 0.73 | 46.0 |
| 6u | U | 1 | 0.0 | 0.294 | 12.1 | LOS A | 1.8 | 12.9 | 0.66 | 0.73 | 49.4 |
| Approach | | 252 | 2.0 | 0.294 | 7.9 | LOS A | 1.8 | 12.9 | 0.66 | 0.73 | 45.6 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 104 | 5.8 | 0.411 | 6.7 | LOS A | 2.8 | 20.1 | 0.72 | 0.75 | 45.4 |
| 8 | T1 | 178 | 1.7 | 0.411 | 6.6 | LOS A | 2.8 | 20.1 | 0.72 | 0.75 | 46.2 |
| 9 | R2 | 52 | 1.9 | 0.411 | 10.5 | LOS A | 2.8 | 20.1 | 0.72 | 0.75 | 46.2 |
| 9u | U | 16 | 12.5 | 0.411 | 12.7 | LOS A | 2.8 | 20.1 | 0.72 | 0.75 | 49.5 |
| Approach | | 350 | 3.4 | 0.411 | 7.5 | LOS A | 2.8 | 20.1 | 0.72 | 0.75 | 46.1 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 86 | 4.7 | 0.464 | 5.6 | LOS A | 3.3 | 23.2 | 0.62 | 0.69 | 45.2 |
| 11 | T1 | 151 | 0.0 | 0.464 | 5.5 | LOS A | 3.3 | 23.2 | 0.62 | 0.69 | 46.0 |
| 12 | R2 | 235 | 0.4 | 0.464 | 9.4 | LOS A | 3.3 | 23.2 | 0.62 | 0.69 | 46.0 |
| 12u | U | 6 | 0.0 | 0.464 | 11.1 | LOS A | 3.3 | 23.2 | 0.62 | 0.69 | 49.5 |
| Approach | | 478 | 1.0 | 0.464 | 7.5 | LOS A | 3.3 | 23.2 | 0.62 | 0.69 | 45.9 |
| SouthWest: ElyardSt | | | | | | | | | | | |
| 1 | L2 | 174 | 0.0 | 0.339 | 4.7 | LOS A | 2.2 | 15.8 | 0.51 | 0.59 | 41.8 |
| 2 | T1 | 118 | 8.5 | 0.339 | 4.9 | LOS A | 2.2 | 15.8 | 0.51 | 0.59 | 47.1 |
| 3 | R2 | 66 | 1.5 | 0.339 | 8.7 | LOS A | 2.2 | 15.8 | 0.51 | 0.59 | 47.0 |
| 3u | U | 4 | 0.0 | 0.339 | 10.4 | LOS A | 2.2 | 15.8 | 0.51 | 0.59 | 50.7 |
| Approach | | 362 | 3.0 | 0.339 | 5.6 | LOS A | 2.2 | 15.8 | 0.51 | 0.59 | 44.4 |
| All Vehicles | | 1442 | 2.3 | 0.464 | 7.1 | LOS A | 3.3 | 23.2 | 0.62 | 0.68 | 45.5 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Base + Dev AM Queen St / Hume St

Base + Development AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 1 | L2 | 5 | 0.0 | 0.109 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 49.4 |
| 2 | T1 | 204 | 2.5 | 0.109 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 49.9 |
| Approach | | 209 | 2.4 | 0.109 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.01 | 49.9 |
| NorthEast: Hume St | | | | | | | | | | | |
| 4 | L2 | 5 | 0.0 | 0.033 | 4.8 | LOS A | 0.1 | 0.8 | 0.30 | 0.59 | 45.8 |
| 5 | T1 | 5 | 0.0 | 0.033 | 4.5 | LOS A | 0.1 | 0.8 | 0.30 | 0.59 | 45.9 |
| 6 | R2 | 20 | 0.0 | 0.033 | 6.5 | LOS A | 0.1 | 0.8 | 0.30 | 0.59 | 45.3 |
| Approach | | 30 | 0.0 | 0.033 | 5.9 | LOS A | 0.1 | 0.8 | 0.30 | 0.59 | 45.5 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 100 | 4.0 | 0.054 | 0.0 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 49.9 |
| 9 | R2 | 2 | 0.0 | 0.054 | 5.2 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 48.9 |
| Approach | | 102 | 3.9 | 0.054 | 0.1 | NA | 0.0 | 0.1 | 0.01 | 0.01 | 49.9 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 11 | 0.0 | 0.009 | 5.2 | LOS A | 0.0 | 0.2 | 0.29 | 0.51 | 46.0 |
| 12 | R2 | 1 | 0.0 | 0.009 | 6.1 | LOS A | 0.0 | 0.2 | 0.29 | 0.51 | 45.5 |
| Approach | | 12 | 0.0 | 0.009 | 5.2 | LOS A | 0.0 | 0.2 | 0.29 | 0.51 | 45.9 |
| All Vehicles | | 353 | 2.5 | 0.109 | 0.8 | NA | 0.1 | 0.8 | 0.04 | 0.08 | 49.3 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

## Site: Base + Dev PM Queen St / Hume St

Base + Development PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen st | | | | | | | | | | | |
| 1 | L2 | 3 | 0.0 | 0.061 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 49.4 |
| 2 | T1 | 113 | 4.4 | 0.061 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 49.9 |
| Approach | | 116 | 4.3 | 0.061 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.01 | 49.9 |
| NorthEast: Hume st | | | | | | | | | | | |
| 4 | L2 | 27 | 0.0 | 0.112 | 5.3 | LOS A | 0.4 | 2.8 | 0.39 | 0.65 | 45.5 |
| 5 | T1 | 5 | 0.0 | 0.112 | 4.9 | LOS A | 0.4 | 2.8 | 0.39 | 0.65 | 45.6 |
| 6 | R2 | 66 | 0.0 | 0.112 | 7.0 | LOS A | 0.4 | 2.8 | 0.39 | 0.65 | 45.0 |
| Approach | | 98 | 0.0 | 0.112 | 6.4 | LOS A | 0.4 | 2.8 | 0.39 | 0.65 | 45.2 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 229 | 3.1 | 0.127 | 0.0 | LOS A | 0.1 | 0.6 | 0.03 | 0.03 | 49.8 |
| 9 | R2 | 12 | 0.0 | 0.127 | 5.0 | LOS A | 0.1 | 0.6 | 0.03 | 0.03 | 48.8 |
| Approach | | 241 | 2.9 | 0.127 | 0.3 | NA | 0.1 | 0.6 | 0.03 | 0.03 | 49.7 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 6 | 0.0 | 0.005 | 4.9 | LOS A | 0.0 | 0.1 | 0.20 | 0.50 | 46.2 |
| 12 | R2 | 1 | 0.0 | 0.005 | 6.6 | LOS A | 0.0 | 0.1 | 0.20 | 0.50 | 45.7 |
| Approach | | 7 | 0.0 | 0.005 | 5.1 | LOS A | 0.0 | 0.1 | 0.20 | 0.50 | 46.1 |
| All Vehicles | | 462 | 2.6 | 0.127 | 1.6 | NA | 0.4 | 2.8 | 0.10 | 0.16 | 48.7 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

## Site: Base + 2% Growth AM Queen St / Elyard St

Base + 2% Growth (2017) AM Queen St / Elyard St 0830 - 0930
Roundabout

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 24 | 0.0 | 0.202 | 4.4 | LOS A | 1.1 | 8.1 | 0.42 | 0.57 | 45.7 |
| 5 | T1 | 104 | 0.0 | 0.202 | 4.4 | LOS A | 1.1 | 8.1 | 0.42 | 0.57 | 46.6 |
| 6 | R2 | 90 | 6.7 | 0.202 | 8.5 | LOS A | 1.1 | 8.1 | 0.42 | 0.57 | 46.6 |
| 6u | U | 1 | 0.0 | 0.202 | 10.0 | LOS A | 1.1 | 8.1 | 0.42 | 0.57 | 50.2 |
| Approach | | 219 | 2.7 | 0.202 | 6.1 | LOS A | 1.1 | 8.1 | 0.42 | 0.57 | 46.5 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 63 | 7.9 | 0.195 | 4.2 | LOS A | 1.1 | 8.2 | 0.38 | 0.53 | 45.9 |
| 8 | T1 | 87 | 4.6 | 0.195 | 4.2 | LOS A | 1.1 | 8.2 | 0.38 | 0.53 | 46.9 |
| 9 | R2 | 55 | 3.6 | 0.195 | 8.1 | LOS A | 1.1 | 8.2 | 0.38 | 0.53 | 46.9 |
| 9u | U | 12 | 16.7 | 0.195 | 10.0 | LOS A | 1.1 | 8.2 | 0.38 | 0.53 | 47.5 |
| Approach | | 217 | 6.0 | 0.195 | 5.5 | LOS A | 1.1 | 8.2 | 0.38 | 0.53 | 46.6 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 83 | 15.7 | 0.224 | 5.8 | LOS A | 1.3 | 9.7 | 0.58 | 0.65 | 45.4 |
| 11 | T1 | 74 | 0.0 | 0.224 | 5.4 | LOS A | 1.3 | 9.7 | 0.58 | 0.65 | 46.5 |
| 12 | R2 | 41 | 4.9 | 0.224 | 9.5 | LOS A | 1.3 | 9.7 | 0.58 | 0.65 | 46.4 |
| 12u | U | 4 | 0.0 | 0.224 | 11.1 | LOS A | 1.3 | 9.7 | 0.58 | 0.65 | 47.2 |
| Approach | | 202 | 7.4 | 0.224 | 6.5 | LOS A | 1.3 | 9.7 | 0.58 | 0.65 | 46.0 |
| SouthWest: Elyard St | | | | | | | | | | | |
| 1 | L2 | 240 | 1.7 | 0.481 | 5.2 | LOS A | 3.5 | 25.0 | 0.60 | 0.62 | 41.6 |
| 2 | T1 | 226 | 5.3 | 0.481 | 5.3 | LOS A | 3.5 | 25.0 | 0.60 | 0.62 | 46.8 |
| 3 | R2 | 36 | 0.0 | 0.481 | 9.2 | LOS A | 3.5 | 25.0 | 0.60 | 0.62 | 46.8 |
| 3u | U | 7 | 0.0 | 0.481 | 10.9 | LOS A | 3.5 | 25.0 | 0.60 | 0.62 | 47.5 |
| Approach | | 509 | 3.1 | 0.481 | 5.6 | LOS A | 3.5 | 25.0 | 0.60 | 0.62 | 44.2 |
| All Vehicles | | 1147 | 4.4 | 0.481 | 5.9 | LOS A | 3.5 | 25.0 | 0.52 | 0.60 | 45.4 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Base + 2% Growth PM Queen St / Elyard St

Base + 2% Growth (2017) PM Queen St / Elyard St 1630-1730
Roundabout

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 32 | 0.0 | 0.215 | 6.3 | LOS A | 1.3 | 9.0 | 0.64 | 0.72 | 45.0 |
| 5 | T1 | 68 | 0.0 | 0.215 | 6.4 | LOS A | 1.3 | 9.0 | 0.64 | 0.72 | 45.9 |
| 6 | R2 | 77 | 7.8 | 0.215 | 10.6 | LOS A | 1.3 | 9.0 | 0.64 | 0.72 | 46.0 |
| 6u | U | 2 | 0.0 | 0.215 | 12.0 | LOS A | 1.3 | 9.0 | 0.64 | 0.72 | 49.3 |
| Approach | | 179 | 3.4 | 0.215 | 8.2 | LOS A | 1.3 | 9.0 | 0.64 | 0.72 | 45.8 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 97 | 8.2 | 0.410 | 6.5 | LOS A | 2.8 | 20.3 | 0.70 | 0.74 | 45.4 |
| 8 | T1 | 183 | 2.2 | 0.410 | 6.4 | LOS A | 2.8 | 20.3 | 0.70 | 0.74 | 46.3 |
| 9 | R2 | 55 | 3.6 | 0.410 | 10.4 | LOS A | 2.8 | 20.3 | 0.70 | 0.74 | 46.2 |
| 9u | U | 19 | 21.1 | 0.410 | 12.7 | LOS A | 2.8 | 20.3 | 0.70 | 0.74 | 49.4 |
| Approach | | 354 | 5.1 | 0.410 | 7.4 | LOS A | 2.8 | 20.3 | 0.70 | 0.74 | 46.2 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 89 | 5.6 | 0.456 | 5.2 | LOS A | 3.2 | 22.9 | 0.58 | 0.65 | 45.3 |
| 11 | T1 | 154 | 0.0 | 0.456 | 5.1 | LOS A | 3.2 | 22.9 | 0.58 | 0.65 | 46.1 |
| 12 | R2 | 241 | 0.8 | 0.456 | 9.1 | LOS A | 3.2 | 22.9 | 0.58 | 0.65 | 46.1 |
| 12u | U | 7 | 0.0 | 0.456 | 10.8 | LOS A | 3.2 | 22.9 | 0.58 | 0.65 | 49.7 |
| Approach | | 491 | 1.4 | 0.456 | 7.2 | LOS A | 3.2 | 22.9 | 0.58 | 0.65 | 46.0 |
| SouthWest: ElyardSt | | | | | | | | | | | |
| 1 | L2 | 178 | 0.0 | 0.312 | 4.7 | LOS A | 2.0 | 14.2 | 0.50 | 0.57 | 42.0 |
| 2 | T1 | 123 | 9.8 | 0.312 | 4.9 | LOS A | 2.0 | 14.2 | 0.50 | 0.57 | 47.4 |
| 3 | R2 | 25 | 4.0 | 0.312 | 8.7 | LOS A | 2.0 | 14.2 | 0.50 | 0.57 | 47.2 |
| 3u | U | 5 | 0.0 | 0.312 | 10.4 | LOS A | 2.0 | 14.2 | 0.50 | 0.57 | 51.0 |
| Approach | | 331 | 3.9 | 0.312 | 5.1 | LOS A | 2.0 | 14.2 | 0.50 | 0.57 | 44.4 |
| All Vehicles | | 1355 | 3.2 | 0.456 | 6.9 | LOS A | 3.2 | 22.9 | 0.60 | 0.66 | 45.6 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Base + 2% Growth AM Queen St / Hume St

Base + 2% Growth (2017) AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 1 | L2 | 2 | 0.0 | 0.104 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 49.5 |
| 2 | T1 | 197 | 3.0 | 0.104 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 50.0 |
| Approach | | 199 | 3.0 | 0.104 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.01 | 49.9 |
| NorthEast: Hume St | | | | | | | | | | | |
| 4 | L2 | 6 | 0.0 | 0.032 | 4.8 | LOS A | 0.1 | 0.7 | 0.28 | 0.59 | 45.8 |
| 5 | T1 | 2 | 0.0 | 0.032 | 4.4 | LOS A | 0.1 | 0.7 | 0.28 | 0.59 | 45.8 |
| 6 | R2 | 21 | 0.0 | 0.032 | 6.5 | LOS A | 0.1 | 0.7 | 0.28 | 0.59 | 45.2 |
| Approach | | 29 | 0.0 | 0.032 | 6.0 | LOS A | 0.1 | 0.7 | 0.28 | 0.59 | 45.4 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 95 | 5.3 | 0.052 | 0.0 | LOS A | 0.0 | 0.2 | 0.02 | 0.02 | 49.8 |
| 9 | R2 | 3 | 0.0 | 0.052 | 5.2 | LOS A | 0.0 | 0.2 | 0.02 | 0.02 | 48.9 |
| Approach | | 98 | 5.1 | 0.052 | 0.2 | NA | 0.0 | 0.2 | 0.02 | 0.02 | 49.8 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 12 | 0.0 | 0.011 | 5.1 | LOS A | 0.0 | 0.3 | 0.28 | 0.52 | 46.0 |
| 12 | R2 | 2 | 0.0 | 0.011 | 6.1 | LOS A | 0.0 | 0.3 | 0.28 | 0.52 | 45.5 |
| Approach | | 14 | 0.0 | 0.011 | 5.3 | LOS A | 0.0 | 0.3 | 0.28 | 0.52 | 45.9 |
| All Vehicles | | 340 | 3.2 | 0.104 | 0.8 | NA | 0.1 | 0.7 | 0.04 | 0.08 | 49.3 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

## Site: Base + 2% Growth PM Queen St / Hume St

Base + 2% Growth (2017) PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen st | | | | | | | | | | | |
| 1 | L2 | 4 | 0.0 | 0.060 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.02 | 49.4 |
| 2 | T1 | 109 | 5.5 | 0.060 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.02 | 49.9 |
| Approach | | 113 | 5.3 | 0.060 | 0.2 | NA | 0.0 | 0.0 | 0.00 | 0.02 | 49.9 |
| NorthEast: Hume st | | | | | | | | | | | |
| 4 | L2 | 28 | 0.0 | 0.112 | 5.3 | LOS A | 0.4 | 2.8 | 0.38 | 0.64 | 45.5 |
| 5 | T1 | 2 | 0.0 | 0.112 | 4.8 | LOS A | 0.4 | 2.8 | 0.38 | 0.64 | 45.6 |
| 6 | R2 | 68 | 0.0 | 0.112 | 7.0 | LOS A | 0.4 | 2.8 | 0.38 | 0.64 | 45.0 |
| Approach | | 98 | 0.0 | 0.112 | 6.5 | LOS A | 0.4 | 2.8 | 0.38 | 0.64 | 45.1 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 225 | 4.0 | 0.127 | 0.0 | LOS A | 0.1 | 0.7 | 0.03 | 0.03 | 49.7 |
| 9 | R2 | 13 | 0.0 | 0.127 | 4.9 | LOS A | 0.1 | 0.7 | 0.03 | 0.03 | 48.8 |
| Approach | | 238 | 3.8 | 0.127 | 0.3 | NA | 0.1 | 0.7 | 0.03 | 0.03 | 49.7 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 7 | 0.0 | 0.007 | 4.9 | LOS A | 0.0 | 0.2 | 0.20 | 0.51 | 46.2 |
| 12 | R2 | 2 | 0.0 | 0.007 | 6.5 | LOS A | 0.0 | 0.2 | 0.20 | 0.51 | 45.7 |
| Approach | | 9 | 0.0 | 0.007 | 5.2 | LOS A | 0.0 | 0.2 | 0.20 | 0.51 | 46.1 |
| All Vehicles | | 458 | 3.3 | 0.127 | 1.7 | NA | 0.4 | 2.8 | 0.10 | 0.17 | 48.6 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

## Site: Future Baseline Scenario (2017) AM Queen St / Elyard St

Future Baseline + 2% Growth (2017) + Development AM Queen St / Elyard St 0830 - 0930
Roundabout

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 73 | 0.0 | 0.257 | 4.4 | LOS A | 1.5 | 10.9 | 0.45 | 0.57 | 45.8 |
| 5 | T1 | 104 | 0.0 | 0.257 | 4.5 | LOS A | 1.5 | 10.9 | 0.45 | 0.57 | 46.7 |
| 6 | R2 | 103 | 5.8 | 0.257 | 8.5 | LOS A | 1.5 | 10.9 | 0.45 | 0.57 | 46.7 |
| 6u | U | 1 | 0.0 | 0.257 | 10.1 | LOS A | 1.5 | 10.9 | 0.45 | 0.57 | 50.3 |
| Approach | | 281 | 2.1 | 0.257 | 5.9 | LOS A | 1.5 | 10.9 | 0.45 | 0.57 | 46.5 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 82 | 6.1 | 0.227 | 4.7 | LOS A | 1.3 | 9.5 | 0.46 | 0.58 | 45.8 |
| 8 | T1 | 87 | 4.6 | 0.227 | 4.7 | LOS A | 1.3 | 9.5 | 0.46 | 0.58 | 46.7 |
| 9 | R2 | 55 | 3.6 | 0.227 | 8.6 | LOS A | 1.3 | 9.5 | 0.46 | 0.58 | 46.7 |
| 9u | U | 12 | 16.7 | 0.227 | 10.6 | LOS A | 1.3 | 9.5 | 0.46 | 0.58 | 47.4 |
| Approach | | 236 | 5.5 | 0.227 | 5.9 | LOS A | 1.3 | 9.5 | 0.46 | 0.58 | 46.4 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 83 | 15.7 | 0.243 | 6.5 | LOS A | 1.5 | 10.9 | 0.65 | 0.70 | 45.1 |
| 11 | T1 | 74 | 0.0 | 0.243 | 6.0 | LOS A | 1.5 | 10.9 | 0.65 | 0.70 | 46.2 |
| 12 | R2 | 41 | 4.9 | 0.243 | 10.1 | LOS A | 1.5 | 10.9 | 0.65 | 0.70 | 46.1 |
| 12u | U | 4 | 0.0 | 0.243 | 11.7 | LOS A | 1.5 | 10.9 | 0.65 | 0.70 | 46.9 |
| Approach | | 202 | 7.4 | 0.243 | 7.2 | LOS A | 1.5 | 10.9 | 0.65 | 0.70 | 45.7 |
| SouthWest: Elyard St | | | | | | | | | | | |
| 1 | L2 | 240 | 1.7 | 0.553 | 5.5 | LOS A | 4.3 | 31.2 | 0.66 | 0.67 | 41.3 |
| 2 | T1 | 226 | 5.3 | 0.553 | 5.7 | LOS A | 4.3 | 31.2 | 0.66 | 0.67 | 46.4 |
| 3 | R2 | 110 | 0.0 | 0.553 | 9.5 | LOS A | 4.3 | 31.2 | 0.66 | 0.67 | 46.4 |
| 3u | U | 7 | 0.0 | 0.553 | 11.2 | LOS A | 4.3 | 31.2 | 0.66 | 0.67 | 47.1 |
| Approach | | 583 | 2.7 | 0.553 | 6.4 | LOS A | 4.3 | 31.2 | 0.66 | 0.67 | 44.2 |
| All Vehicles | | 1302 | 3.8 | 0.553 | 6.3 | LOS A | 4.3 | 31.2 | 0.58 | 0.64 | 45.3 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Future Baseline Scenario (2017) AM Queen St / Hume St

Future Baseline + 2% Growth (2017) + Development  AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 1 | L2 | 2 | 0.0 | 0.110 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 49.5 |
| 2 | T1 | 209 | 2.9 | 0.110 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 50.0 |
| Approach | | 211 | 2.8 | 0.110 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.01 | 50.0 |
| NorthEast: Hume St | | | | | | | | | | | |
| 4 | L2 | 6 | 0.0 | 0.032 | 4.9 | LOS A | 0.1 | 0.8 | 0.30 | 0.59 | 45.7 |
| 5 | T1 | 2 | 0.0 | 0.032 | 4.5 | LOS A | 0.1 | 0.8 | 0.30 | 0.59 | 45.8 |
| 6 | R2 | 21 | 0.0 | 0.032 | 6.6 | LOS A | 0.1 | 0.8 | 0.30 | 0.59 | 45.2 |
| Approach | | 29 | 0.0 | 0.032 | 6.1 | LOS A | 0.1 | 0.8 | 0.30 | 0.59 | 45.3 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 103 | 4.9 | 0.057 | 0.0 | LOS A | 0.0 | 0.2 | 0.02 | 0.02 | 49.8 |
| 9 | R2 | 3 | 0.0 | 0.057 | 5.2 | LOS A | 0.0 | 0.2 | 0.02 | 0.02 | 48.9 |
| Approach | | 106 | 4.7 | 0.057 | 0.2 | NA | 0.0 | 0.2 | 0.02 | 0.02 | 49.8 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 12 | 0.0 | 0.011 | 5.2 | LOS A | 0.0 | 0.3 | 0.30 | 0.52 | 45.9 |
| 12 | R2 | 2 | 0.0 | 0.011 | 6.2 | LOS A | 0.0 | 0.3 | 0.30 | 0.52 | 45.5 |
| Approach | | 14 | 0.0 | 0.011 | 5.3 | LOS A | 0.0 | 0.3 | 0.30 | 0.52 | 45.9 |
| All Vehicles | | 360 | 3.1 | 0.110 | 0.8 | NA | 0.1 | 0.8 | 0.04 | 0.08 | 49.3 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

## Site: Future Baseline Scenario (2017) PM Queen St / Elyard St

Future Baseline + 2% Growth (2017) + Development  PM Queen St / Elyard St 1630-1730
Roundabout

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 95 | 0.0 | 0.308 | 6.6 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 45.0 |
| 5 | T1 | 68 | 0.0 | 0.308 | 6.6 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 45.8 |
| 6 | R2 | 93 | 6.5 | 0.308 | 10.8 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 46.0 |
| 6u | U | 2 | 0.0 | 0.308 | 12.3 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 49.3 |
| Approach | | 258 | 2.3 | 0.308 | 8.1 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 45.6 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 108 | 7.4 | 0.439 | 7.0 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 45.3 |
| 8 | T1 | 183 | 2.2 | 0.439 | 6.8 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 46.1 |
| 9 | R2 | 55 | 3.6 | 0.439 | 10.8 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 46.1 |
| 9u | U | 19 | 21.1 | 0.439 | 13.2 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 49.2 |
| Approach | | 365 | 4.9 | 0.439 | 7.8 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 46.0 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 89 | 5.6 | 0.485 | 5.8 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 45.1 |
| 11 | T1 | 154 | 0.0 | 0.485 | 5.7 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 45.9 |
| 12 | R2 | 241 | 0.8 | 0.485 | 9.6 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 45.9 |
| 12u | U | 7 | 0.0 | 0.485 | 11.3 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 49.4 |
| Approach | | 491 | 1.4 | 0.485 | 7.7 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 45.8 |
| SouthWest:  ElyardSt | | | | | | | | | | | |
| 1 | L2 | 178 | 0.0 | 0.355 | 4.8 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 41.8 |
| 2 | T1 | 123 | 9.8 | 0.355 | 5.1 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 47.1 |
| 3 | R2 | 67 | 1.5 | 0.355 | 8.9 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 46.9 |
| 3u | U | 5 | 0.0 | 0.355 | 10.5 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 50.6 |
| Approach | | 373 | 3.5 | 0.355 | 5.7 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 44.4 |
| All Vehicles | | 1487 | 3.0 | 0.485 | 7.3 | LOS A | 3.5 | 24.8 | 0.65 | 0.70 | 45.4 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Future Baseline Scenario (2017) PM Queen St / Elyard St

Future Baseline + 2% Growth (2017) + Development PM Queen St / Elyard St 1630-1730
Roundabout

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 95 | 0.0 | 0.308 | 6.6 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 45.0 |
| 5 | T1 | 68 | 0.0 | 0.308 | 6.6 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 45.8 |
| 6 | R2 | 93 | 6.5 | 0.308 | 10.8 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 46.0 |
| 6u | U | 2 | 0.0 | 0.308 | 12.3 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 49.3 |
| Approach | | 258 | 2.3 | 0.308 | 8.1 | LOS A | 1.9 | 13.7 | 0.68 | 0.75 | 45.6 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 108 | 7.4 | 0.439 | 7.0 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 45.3 |
| 8 | T1 | 183 | 2.2 | 0.439 | 6.8 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 46.1 |
| 9 | R2 | 55 | 3.6 | 0.439 | 10.8 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 46.1 |
| 9u | U | 19 | 21.1 | 0.439 | 13.2 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 49.2 |
| Approach | | 365 | 4.9 | 0.439 | 7.8 | LOS A | 3.1 | 22.3 | 0.74 | 0.77 | 46.0 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 89 | 5.6 | 0.485 | 5.8 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 45.1 |
| 11 | T1 | 154 | 0.0 | 0.485 | 5.7 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 45.9 |
| 12 | R2 | 241 | 0.8 | 0.485 | 9.6 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 45.9 |
| 12u | U | 7 | 0.0 | 0.485 | 11.3 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 49.4 |
| Approach | | 491 | 1.4 | 0.485 | 7.7 | LOS A | 3.5 | 24.8 | 0.64 | 0.70 | 45.8 |
| SouthWest: ElyardSt | | | | | | | | | | | |
| 1 | L2 | 178 | 0.0 | 0.355 | 4.8 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 41.8 |
| 2 | T1 | 123 | 9.8 | 0.355 | 5.1 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 47.1 |
| 3 | R2 | 67 | 1.5 | 0.355 | 8.9 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 46.9 |
| 3u | U | 5 | 0.0 | 0.355 | 10.5 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 50.6 |
| Approach | | 373 | 3.5 | 0.355 | 5.7 | LOS A | 2.3 | 16.9 | 0.53 | 0.60 | 44.4 |
| All Vehicles | | 1487 | 3.0 | 0.485 | 7.3 | LOS A | 3.5 | 24.8 | 0.65 | 0.70 | 45.4 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Future + 10 years (2027) Scenario AM Queen St / Elyard St

Future Baseline + 10 Years 2% Growth (2027) + Development Trip AM Queen St / Elyard St 0830 - 0930
Roundabout

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 79 | 0.0 | 0.319 | 4.8 | LOS A | 2.0 | 14.4 | 0.52 | 0.62 | 45.5 |
| 5 | T1 | 127 | 0.0 | 0.319 | 4.9 | LOS A | 2.0 | 14.4 | 0.52 | 0.62 | 46.5 |
| 6 | R2 | 124 | 6.5 | 0.319 | 9.0 | LOS A | 2.0 | 14.4 | 0.52 | 0.62 | 46.4 |
| 6u | U | 2 | 0.0 | 0.319 | 10.5 | LOS A | 2.0 | 14.4 | 0.52 | 0.62 | 50.1 |
| Approach | | 332 | 2.4 | 0.319 | 6.4 | LOS A | 2.0 | 14.4 | 0.52 | 0.62 | 46.3 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 96 | 6.3 | 0.287 | 5.0 | LOS A | 1.7 | 12.9 | 0.52 | 0.61 | 45.6 |
| 8 | T1 | 107 | 4.7 | 0.287 | 5.0 | LOS A | 1.7 | 12.9 | 0.52 | 0.61 | 46.5 |
| 9 | R2 | 68 | 4.4 | 0.287 | 9.0 | LOS A | 1.7 | 12.9 | 0.52 | 0.61 | 46.5 |
| 9u | U | 16 | 18.8 | 0.287 | 11.0 | LOS A | 1.7 | 12.9 | 0.52 | 0.61 | 47.1 |
| Approach | | 287 | 5.9 | 0.287 | 6.3 | LOS A | 1.7 | 12.9 | 0.52 | 0.61 | 46.2 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 102 | 15.7 | 0.333 | 7.5 | LOS A | 2.2 | 16.2 | 0.75 | 0.78 | 44.7 |
| 11 | T1 | 91 | 0.0 | 0.333 | 6.9 | LOS A | 2.2 | 16.2 | 0.75 | 0.78 | 45.7 |
| 12 | R2 | 51 | 5.9 | 0.333 | 11.1 | LOS A | 2.2 | 16.2 | 0.75 | 0.78 | 45.7 |
| 12u | U | 5 | 0.0 | 0.333 | 12.6 | LOS A | 2.2 | 16.2 | 0.75 | 0.78 | 46.4 |
| Approach | | 249 | 7.6 | 0.333 | 8.1 | LOS A | 2.2 | 16.2 | 0.75 | 0.78 | 45.3 |
| SouthWest: Elyard St | | | | | | | | | | | |
| 1 | L2 | 294 | 2.0 | 0.703 | 8.7 | LOS A | 8.3 | 59.7 | 0.83 | 0.87 | 40.2 |
| 2 | T1 | 276 | 5.4 | 0.703 | 8.9 | LOS A | 8.3 | 59.7 | 0.83 | 0.87 | 44.9 |
| 3 | R2 | 118 | 0.0 | 0.703 | 12.6 | LOS A | 8.3 | 59.7 | 0.83 | 0.87 | 45.0 |
| 3u | U | 9 | 0.0 | 0.703 | 14.3 | LOS A | 8.3 | 59.7 | 0.83 | 0.87 | 45.6 |
| Approach | | 697 | 3.0 | 0.703 | 9.5 | LOS A | 8.3 | 59.7 | 0.83 | 0.87 | 42.8 |
| All Vehicles | | 1565 | 4.2 | 0.703 | 8.0 | LOS A | 8.3 | 59.7 | 0.70 | 0.76 | 44.5 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Future + 10 years (2027) Scenario PM Queen St / Elyard St

Future Baseline + 10 Years 2% Growth (2027) + Development Trip PM Queen St / Elyard St 1630-1730
Roundabout

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 4 | L2 | 103 | 0.0 | 0.403 | 7.9 | LOS A | 2.7 | 19.5 | 0.79 | 0.84 | 44.3 |
| 5 | T1 | 83 | 0.0 | 0.403 | 7.9 | LOS A | 2.7 | 19.5 | 0.79 | 0.84 | 45.1 |
| 6 | R2 | 109 | 5.5 | 0.403 | 12.1 | LOS A | 2.7 | 19.5 | 0.79 | 0.84 | 45.3 |
| 6u | U | 3 | 0.0 | 0.403 | 13.6 | LOS A | 2.7 | 19.5 | 0.79 | 0.84 | 48.5 |
| Approach | | 298 | 2.0 | 0.403 | 9.5 | LOS A | 2.7 | 19.5 | 0.79 | 0.84 | 44.9 |
| NorthEast: Elyard St | | | | | | | | | | | |
| 7 | L2 | 131 | 8.4 | 0.612 | 11.0 | LOS A | 6.0 | 43.9 | 0.90 | 1.01 | 43.3 |
| 8 | T1 | 224 | 2.2 | 0.612 | 10.7 | LOS A | 6.0 | 43.9 | 0.90 | 1.01 | 44.1 |
| 9 | R2 | 68 | 4.4 | 0.612 | 14.8 | LOS B | 6.0 | 43.9 | 0.90 | 1.01 | 44.1 |
| 9u | U | 25 | 24.0 | 0.612 | 17.5 | LOS B | 6.0 | 43.9 | 0.90 | 1.01 | 46.9 |
| Approach | | 448 | 5.6 | 0.612 | 11.8 | LOS A | 6.0 | 43.9 | 0.90 | 1.01 | 44.0 |
| NorthWest: Queen St | | | | | | | | | | | |
| 10 | L2 | 116 | 6.0 | 0.637 | 8.3 | LOS A | 6.4 | 45.6 | 0.80 | 0.86 | 44.0 |
| 11 | T1 | 188 | 0.0 | 0.637 | 8.1 | LOS A | 6.4 | 45.6 | 0.80 | 0.86 | 44.8 |
| 12 | R2 | 295 | 1.0 | 0.637 | 12.1 | LOS A | 6.4 | 45.6 | 0.80 | 0.86 | 44.8 |
| 12u | U | 9 | 0.0 | 0.637 | 13.8 | LOS A | 6.4 | 45.6 | 0.80 | 0.86 | 48.1 |
| Approach | | 608 | 1.6 | 0.637 | 10.1 | LOS A | 6.4 | 45.6 | 0.80 | 0.86 | 44.7 |
| SouthWest: ElyardSt | | | | | | | | | | | |
| 1 | L2 | 217 | 0.0 | 0.452 | 5.4 | LOS A | 3.2 | 23.5 | 0.63 | 0.66 | 41.6 |
| 2 | T1 | 151 | 9.9 | 0.452 | 5.7 | LOS A | 3.2 | 23.5 | 0.63 | 0.66 | 46.8 |
| 3 | R2 | 74 | 2.7 | 0.452 | 9.5 | LOS A | 3.2 | 23.5 | 0.63 | 0.66 | 46.7 |
| 3u | U | 7 | 0.0 | 0.452 | 11.1 | LOS A | 3.2 | 23.5 | 0.63 | 0.66 | 50.3 |
| Approach | | 449 | 3.8 | 0.452 | 6.3 | LOS A | 3.2 | 23.5 | 0.63 | 0.66 | 44.1 |
| All Vehicles | | 1803 | 3.2 | 0.637 | 9.5 | LOS A | 6.4 | 45.6 | 0.78 | 0.84 | 44.4 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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 SUMMARY

## Site: Future + 10 years (2027) Scenario AM Queen St / Hume St

Future Baseline + 10 Year 2% Growth (2027) + Development Trip AM Queen St / Hume St 0830 - 0930
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen St | | | | | | | | | | | |
| 1 | L2 | 3 | 0.0 | 0.134 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 49.5 |
| 2 | T1 | 253 | 3.2 | 0.134 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.01 | 49.9 |
| Approach | | 256 | 3.1 | 0.134 | 0.1 | NA | 0.0 | 0.0 | 0.00 | 0.01 | 49.9 |
| NorthEast: Hume St | | | | | | | | | | | |
| 4 | L2 | 8 | 0.0 | 0.044 | 4.9 | LOS A | 0.1 | 1.0 | 0.34 | 0.62 | 45.5 |
| 5 | T1 | 3 | 0.0 | 0.044 | 4.9 | LOS A | 0.1 | 1.0 | 0.34 | 0.62 | 45.6 |
| 6 | R2 | 26 | 0.0 | 0.044 | 7.1 | LOS A | 0.1 | 1.0 | 0.34 | 0.62 | 45.0 |
| Approach | | 37 | 0.0 | 0.044 | 6.5 | LOS A | 0.1 | 1.0 | 0.34 | 0.62 | 45.1 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 125 | 5.6 | 0.069 | 0.0 | LOS A | 0.0 | 0.2 | 0.03 | 0.02 | 49.8 |
| 9 | R2 | 4 | 0.0 | 0.069 | 5.4 | LOS A | 0.0 | 0.2 | 0.03 | 0.02 | 48.9 |
| Approach | | 129 | 5.4 | 0.069 | 0.2 | NA | 0.0 | 0.2 | 0.03 | 0.02 | 49.8 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 15 | 0.0 | 0.016 | 5.3 | LOS A | 0.1 | 0.4 | 0.33 | 0.54 | 45.8 |
| 12 | R2 | 3 | 0.0 | 0.016 | 6.7 | LOS A | 0.1 | 0.4 | 0.33 | 0.54 | 45.4 |
| Approach | | 18 | 0.0 | 0.016 | 5.6 | LOS A | 0.1 | 0.4 | 0.33 | 0.54 | 45.8 |
| All Vehicles | | 440 | 3.4 | 0.134 | 0.9 | NA | 0.1 | 1.0 | 0.05 | 0.08 | 49.3 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

## Site: Future + 10 years (2027) Scenario PM Queen St / Hume St

Future Base + 10 Years 2% Growth (2027) + Development Trip PM Queen St / Hume St 1600 - 1700
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | ODMov | Demand Flows Total | HV | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue Vehicles | Distance | Prop. Queued | Effective Stop Rate | Average Speed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | veh/h | % | v/c | sec | | veh | m | | per veh | km/h |
| SouthEast: Queen st | | | | | | | | | | | |
| 1 | L2 | 5 | 0.0 | 0.081 | 4.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.02 | 49.4 |
| 2 | T1 | 148 | 5.4 | 0.081 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.02 | 49.9 |
| Approach | | 153 | 5.2 | 0.081 | 0.2 | NA | 0.0 | 0.0 | 0.00 | 0.02 | 49.9 |
| NorthEast: Hume st | | | | | | | | | | | |
| 4 | L2 | 35 | 0.0 | 0.154 | 5.6 | LOS A | 0.6 | 3.9 | 0.45 | 0.70 | 45.1 |
| 5 | T1 | 3 | 0.0 | 0.154 | 5.6 | LOS A | 0.6 | 3.9 | 0.45 | 0.70 | 45.2 |
| 6 | R2 | 83 | 0.0 | 0.154 | 7.9 | LOS A | 0.6 | 3.9 | 0.45 | 0.70 | 44.6 |
| Approach | | 121 | 0.0 | 0.154 | 7.2 | LOS A | 0.6 | 3.9 | 0.45 | 0.70 | 44.7 |
| NorthWest: Queen St | | | | | | | | | | | |
| 8 | T1 | 286 | 4.2 | 0.161 | 0.0 | LOS A | 0.1 | 0.9 | 0.04 | 0.03 | 49.7 |
| 9 | R2 | 16 | 0.0 | 0.161 | 5.1 | LOS A | 0.1 | 0.9 | 0.04 | 0.03 | 48.8 |
| Approach | | 302 | 4.0 | 0.161 | 0.3 | NA | 0.1 | 0.9 | 0.04 | 0.03 | 49.7 |
| SouthWest: Hume St | | | | | | | | | | | |
| 10 | L2 | 9 | 0.0 | 0.011 | 5.0 | LOS A | 0.0 | 0.3 | 0.26 | 0.52 | 46.0 |
| 12 | R2 | 3 | 0.0 | 0.011 | 7.4 | LOS A | 0.0 | 0.3 | 0.26 | 0.52 | 45.6 |
| Approach | | 12 | 0.0 | 0.011 | 5.6 | LOS A | 0.0 | 0.3 | 0.26 | 0.52 | 45.9 |
| All Vehicles | | 588 | 3.4 | 0.161 | 1.8 | NA | 0.6 | 3.9 | 0.12 | 0.18 | 48.5 |

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

Narellan Medical Centre

# APPENDIX C

## SWEPT PATH ANALYSIS

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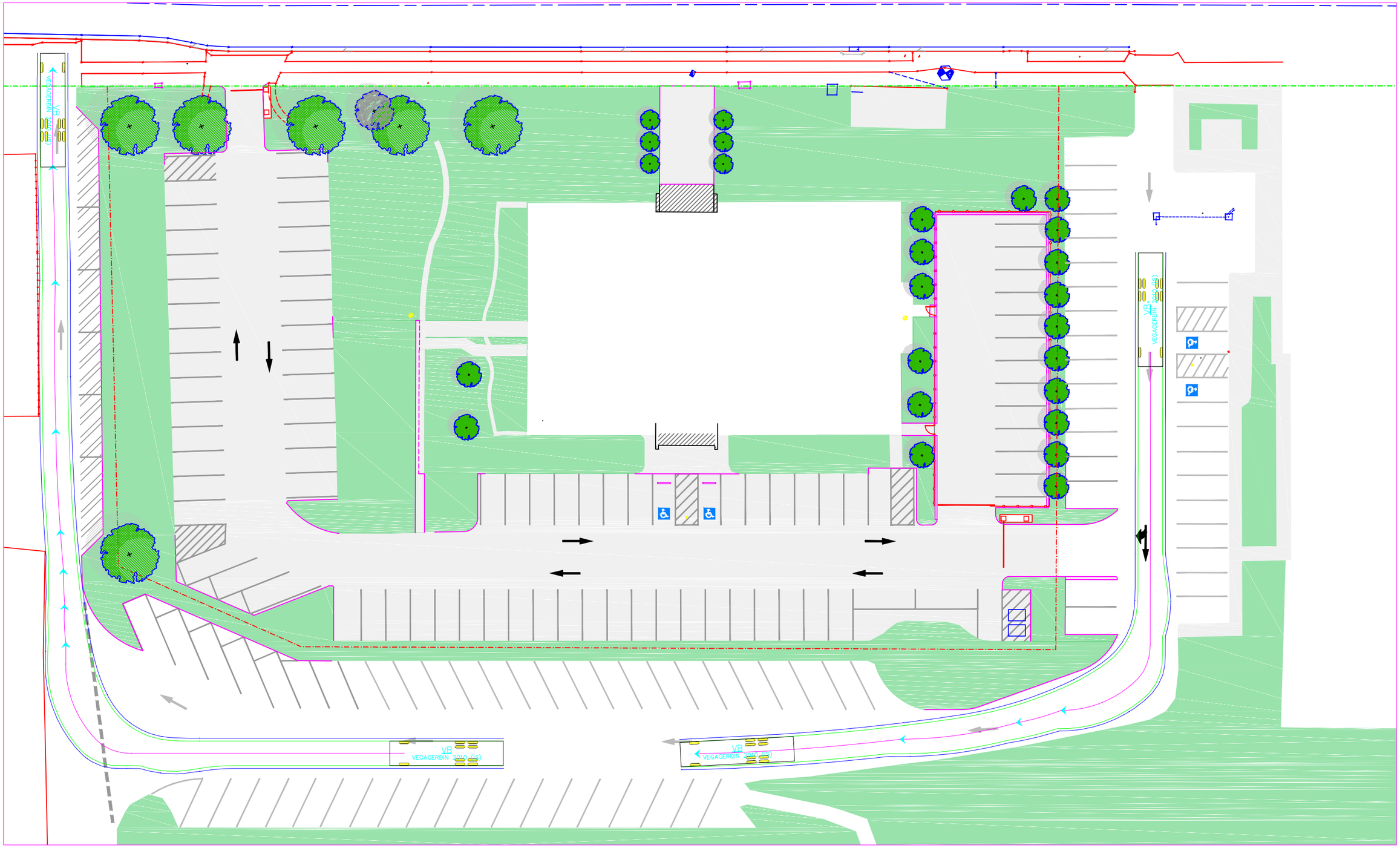



**NOT TO SCALE**

## VEHICLE LEGEND

- VEHICLE BODY PATH
- VEHICLE CENTRELINE
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

## Preliminary Plan

FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE
WITHOUT NOTIFICATION

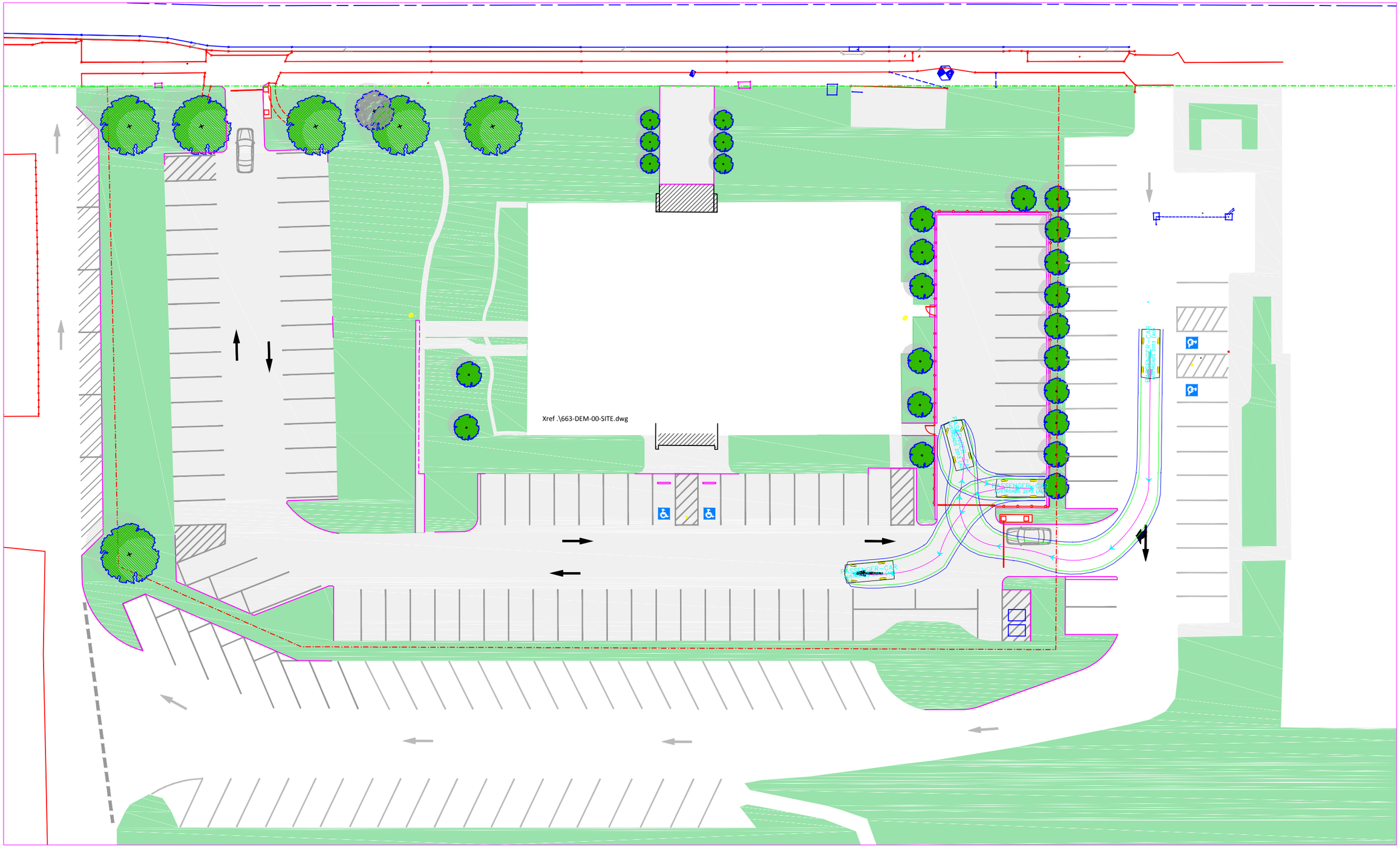


Cardno
Shaping the Future
Cardno (NSW/ACT) Pty Ltd | ABN 95 001 145 035
Level 9, The Forum, 203 Pacific Highway
St. Leonards, NSW 2065
Tel: 02 9496 7700 Fax: 02 9439 5170
Web: www.cardno.com.au

Client: SHELLSHEAR YOUNG PTY LTD

Project: NARELLAN MEDICAL CENTRE
19 QUEEN STREET NARELLAN

Title: SWEPT PATH
12 METER TRUCK SWEPT PATH




**NOT TO SCALE**

## VEHICLE LEGEND

VEHICLE BODY PATH

VEHICLE CENTRELINE

300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

## Preliminary Plan

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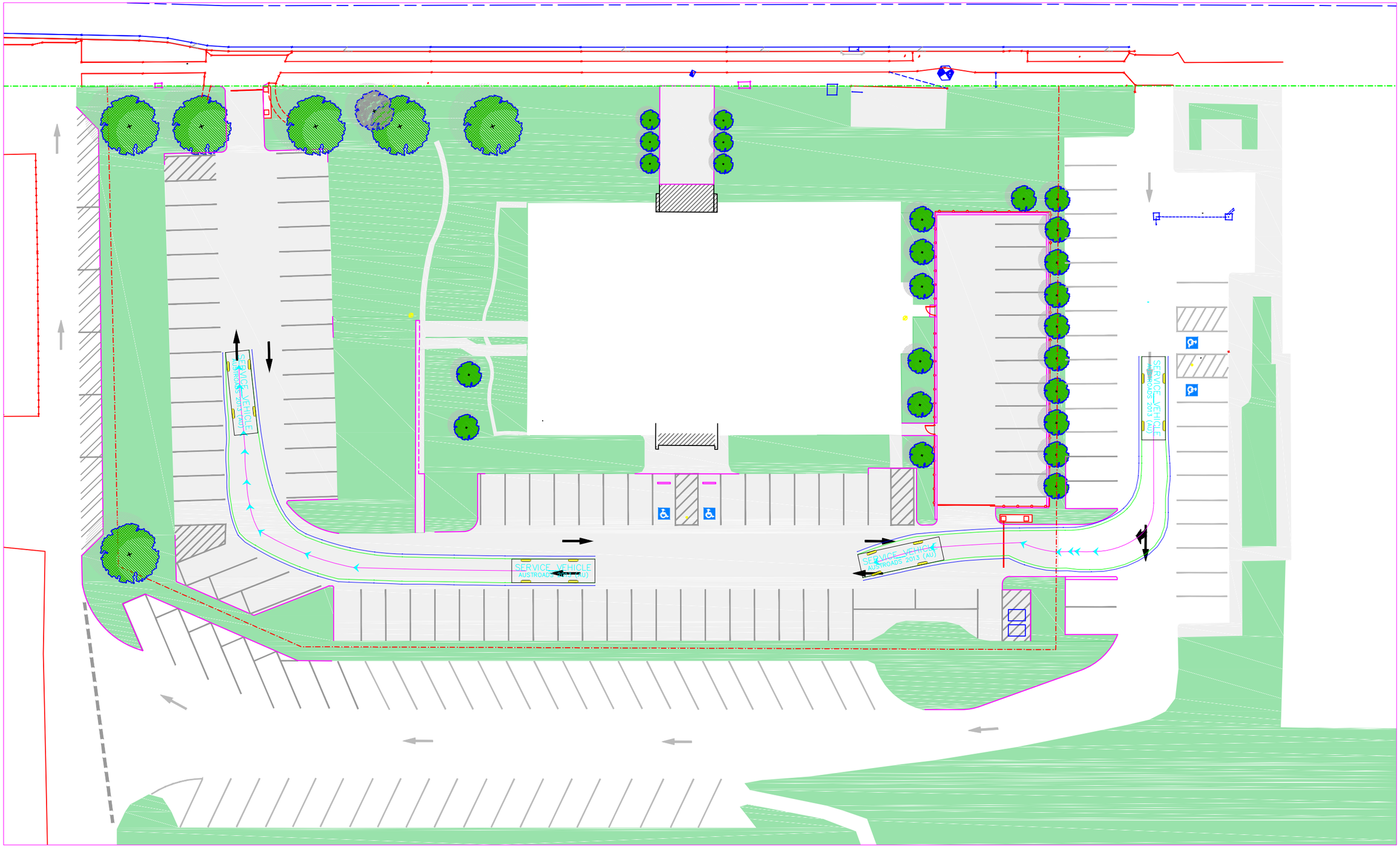
Web: www.cardno.com.au

Client SHELLSHEAR YOUNG PTY LTD

Project NARELLAN MEDICAL CENTRE
19 QUEEN STREET NARELLAN

Title SWEPT PATH
B99 PASSENGER VEHICLE SWEPT PATH




**NOT TO SCALE**

## VEHICLE LEGEND

VEHICLE BODY PATH

VEHICLE CENTRELINE

300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

## Preliminary Plan

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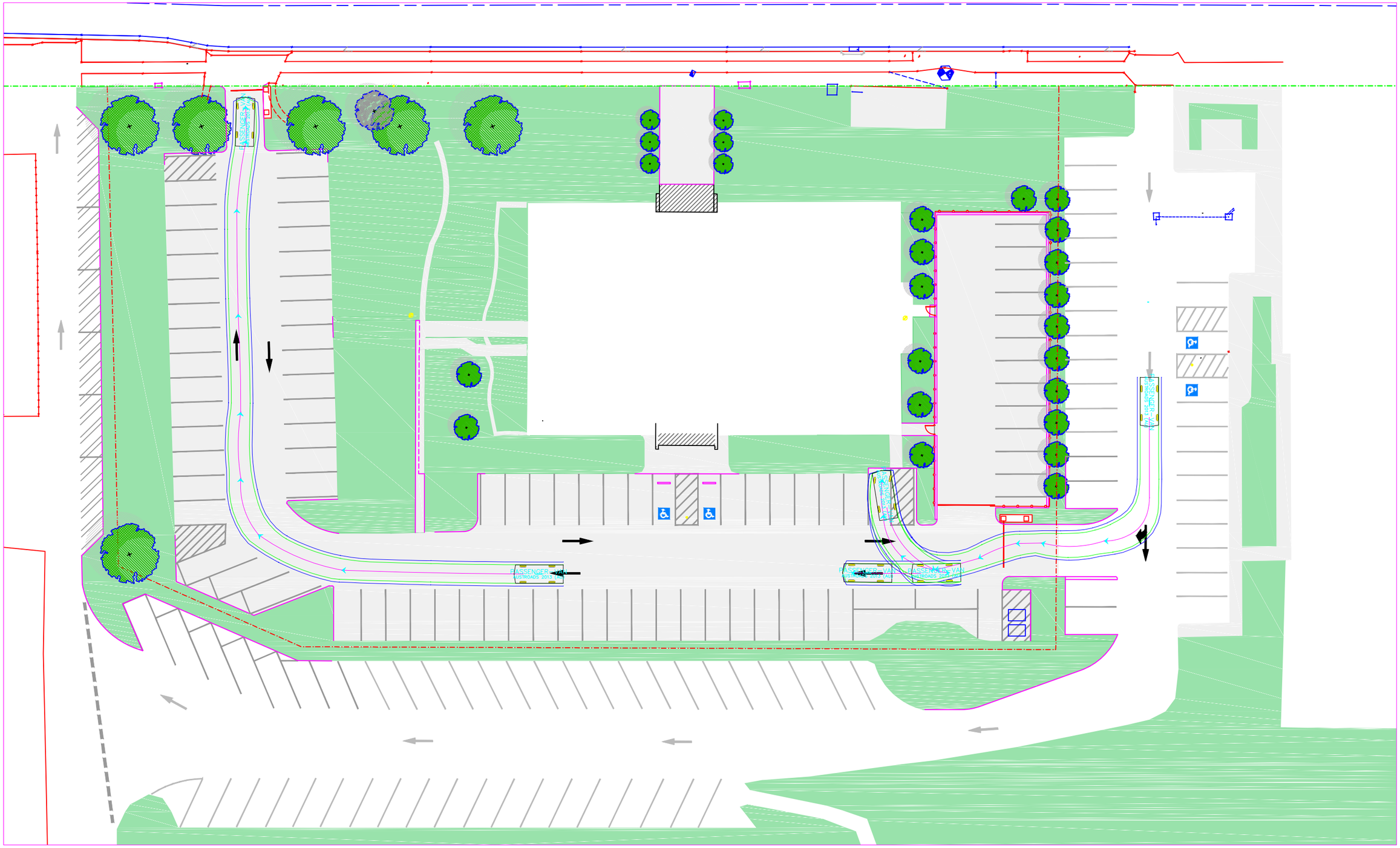
Client SHELLSHEAR YOUNG PTY LTD

Project NARELLAN MEDICAL CENTRE
19 QUEEN STREET NARELLAN

Title SWEPT PATH
MEDIUM RIGID VEHICLE (MRV) SWEPT PATH



**NOT TO SCALE**

## VEHICLE LEGEND

- VEHICLE BODY PATH
- VEHICLE CENTRELINE
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

## Preliminary Plan

FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE
WITHOUT NOTIFICATION



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Client: SHELLSHEAR YOUNG PTY LTD

Project: NARELLAN MEDICAL CENTRE
19 QUEEN STREET NARELLAN

Title: SWEPT PATH
SMALL RIGID VEHICLE (SRV) SWEPT PATH