# Appendix 1

# Dowes Quarry Transport Route Intersection Analysis prepared by Constructive Solutions

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# R.W. Corkery & Co Pty Ltd

# Darryl McCarthy Constructions Pty Ltd Dowe's Quarry Transport Route Intersection Analysis

**December 2014**

Constructive Solutions

Realising potential

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# 1. Introduction

This additional information report has been prepared for R.W. Corkery & Co. Pty Ltd on behalf of Darryl McCarthy Constructions Pty Ltd to consider the traffic impacts of the proposed continuation (and extension) of Dowe's Quarry (the Proposal). This document provides details of a SIDRA intersection traffic analysis for the following four way intersections located on the transport routes associated with Dowe's Quarry:-

- New England Highway (Rouse Street) and Naas Street intersection;
- Naas Street, Logan Street and Robert Brush Drive intersection;
- Mount Lindesay Road, Old Ballandeen Road and Boundary Road intersection; and
- New England Highway, Bruxner Highway and Old Ballandeen Road intersection.

## 2. Development Traffic

Information from the Transport Assessment, included in the Environmental Impact Statement (EIS) for the Proposal, stated that at maximum quarry production rates (100,000 tonne per annum) truck movements (HV) are anticipated to be 20 laden trips or 40 movements per day (two way) with light vehicle movements (LV) anticipated to be 8 per day (two way).

It was further established that these vehicle movements would be split 50:50 as provided in Table 1.

**Table 1 – Development Traffic (Daily)**

| | Maximum Quarry Traffic Levels (per day) | |
|---|---|---|
| **Road** | **LV** | **HV** |
| Mount Lindesay Road from the quarry to Old Ballendeen Road and through to the New England Highway. | 4 | 20 |
| Mount Lindesay from the quarry to Naas Street and through to the New England Highway. | 4 | 20 |
| **Total** | **8** | **40** |

*Source: Dowe's Quarry EIS - Transport Assessment (July 2014)*

For the purposes of the SIDRA analyses, it was assumed that the peak hour volumes for the traffic generated would be 20% of the total daily traffic volumes as provided in Table 2.

**Table 2 – Development Traffic (Peak Hour)**

| | Maximum Quarry Traffic Levels Peak Hour Volumes | |
|---|---|---|
| **Road** | **LV** | **HV** |
| Mount Lindesay Road from the quarry to Old Ballandeen Road and through to the New England Highway. | 1 | 4 |
| Mount Lindesay from the quarry to Naas Street and through to the New England Highway. | 1 | 4 |
| **Total** | **2** | **8** |

# 3. Traffic Data

Traffic data for the analysis was provided by Darryl McCarthy Constructions Pty Ltd and consisted of traffic counts taken at 15 minute intervals at each of the intersections. The traffic counts were undertaken as follows to establish morning and afternoon peak flows and included a breakdown of light vehicles (LV) and heavy vehicles (HV):-

- 18 November 2014 – 7:00am to 10:00am and 3:00pm to 6:00pm
- 24 November 2014 – 7:00am to 10:00am and 3:00pm to 6:00pm.

Traffic data used for the analysis is provided in **Appendix A**.

# 4. SIDRA Intersection Software

## 4.1 Performance Parameters

The ability for the intersections to cater for future traffic forecasts was investigated using the SIDRA intersection software package. This package provides several indicators in order to determine the level of intersection performance. This report has used three typical performance parameters as listed and described below:-

- Level of service (LoS);
- Degree of saturation (DoS); and
- Average intersection delay.

### 4.1.1 Level of Service (LoS)

LoS is a basic performance parameter used to describe the operation of an intersection. Levels of Service range from A (indicating good intersection operation) to F (indicating over saturated conditions with long delays and queues). At priority controlled (give-way and stop controlled) intersections, the LoS is based on the modelled delay (seconds per vehicle) for the most delayed movement as shown in Table 3.

**Table 3 – RMS Level of Service Criteria for Intersections**

| Level of Service | Average Delay per Vehicle (secs/veh) | Give Way & Stop Signs |
|---|---|---|
| A | < 14 | Good operation |
| B | 15 to 28 | Acceptable delays & spare capacity |
| C | 29 to 42 | Satisfactory, but accident study required |
| D | 43 to 56 | Near capacity & accident study required |
| E | 57 to 70 | At capacity, requires other control mode |

*Source: RTA Guide to Traffic Generating Developments (2002)*

### 4.1.2 Degree of Saturation (DoS)

DoS is the ratio of demand flow to capacity. As it approaches 1.0, extensive queues and delays can be experienced at an intersection. It is desirable for the DoS to be less than the nominated practical degree of saturation. The intersection DoS is based on the movement with the highest value.

For SIDRA analyses, a DoS of 0.9 represents an intersection at capacity.

### 4.1.3 Average Delay

Delay is the difference between interrupted and uninterrupted travel times through the intersection and is measured in seconds per vehicle. At priority controlled intersections, the average delay for the most delayed movement is reported.

## 4.2 Software Input Parameters

SIDRA relies on numerous input parameters to enable an accurate assessment to be undertaken. The parameters used for this analysis included:-

- Peak hour traffic data for each leg of the intersection including LV and HV volumes;
- Movement definitions;
- Lane geometry;
- Lane traffic data;
- Road Priority;
- Gap acceptance data;
- Vehicle movement data;

To cater for future traffic demands and to assess the traffic impacts of the additional traffic at each intersection for the for the life of the Proposal, an average annual growth estimate of 1.5% over a 30 year period has been used.

# 5. Intersection Performance

Intersection performance analysed in SIDRA based on the performance parameters discussed in Section 4.1 are provided in Table 4 including demand flows consisting of total vehicles per hour and percentage of heavy vehicles.

Analysis for each intersection included the following scenarios:-

- Background traffic (existing traffic);
- Background traffic plus development traffic; and
- 30 year traffic @ 1.5% annual growth plus development traffic.

**Table 4 – Intersection Performance**

| Traffic | Peak Hour | | | | |
|---|---|---|---|---|---|
| | Demand Flows | | LOS | Degree of Saturation | Average Delay (sec/veh) |
| | Total vph | % HV | | | |
| **New England Hwy (Rouse St) and Naas St intersection** | | | | | |
| Background | 448 | 12.3 | LOS A | 0.114 | 4.4 |
| Background + Development | 458 | 13.8 | LOS A | 0.115 | 4.6 |
| 30 year @ 1.5% + Development | 742 | 13.9 | LOS A | 0.267 | 6.1 |
| **Naas St, Logan St and Robert Brush Drive intersection** | | | | | |
| Background | 134 | 11 | LOS A | 0.038 | 3.3 |
| Background + Development | 144 | 16.1 | LOS A | 0.047 | 3.4 |
| 30 year @ 1.5% + Development | 231 | 16.1 | LOS A | 0.08 | 3.6 |
| **Mount Lindesay Rd, Old Ballandeen Rd and Boundary Rd intersection** | | | | | |
| Background | 74 | 17.1 | LOS A | 0.02 | 3.2 |
| Background + Development | 95 | 31.1 | LOS A | 0.029 | 3.4 |
| 30 year @ 1.5% + Development | 137 | 31.1 | LOS A | 0.042 | 3.4 |
| **New England Hwy, Bruxner Hwy and Old Ballandeen Rd intersection** | | | | | |
| Background | 256 | 16.9 | LOS A | 0.06 | 2.1 |
| Background + Development | 266 | 19.4 | LOS A | 0.06 | 2.5 |
| 30 year @ 1.5% + Development | 386 | 19.4 | LOS A | 0.088 | 2.9 |

SIDRA reports for each of the intersections and scenarios are provided in **Appendix B, C, D & E**.

A sensitivity analysis was also undertaken using the maximum daily quarry traffic volumes as detailed in Section 3. These figures were substituted for the peak hour volumes. In all cases, acceptable levels of delay and LoS A were achieved for all scenarios.

## 6. Conclusion

Based on the results of the SIDRA analysis, all four intersections operate with acceptable delays and good LoS for existing conditions and with the addition of maximum daily development traffic for the 30 year life of quarry operation.

As a result, intersection performance is not considered an issue and the need for intersection upgrades is not warranted from a traffic volume perspective however, minor improvements may be desirable for safety reasons.

# APPENDIX A

## Traffic Data

**New England Highway (NEH) and Naas Street Intersection**

**Morning**

| Date: | NEH from the north | | | | | | | | | | | | Naas Street from NEH | | | | | | | | | | | | NEH from the South | | | | | | | | | | | | Naas Street from Logan Street | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEH - heading south | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into NEH | | | | Left turn into NEH | | | | NEH - heading north | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into NEH | | | | Left turn into NEH | | | |
| 18/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DMcC | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 7:00am to7:15am | 15 | | | | | | | | | | | | 1 | | | | 4 | | | | 1 | | | | 11 | | | 1 | 2 | | | | 5 | | | | 2 | | | | 1 | | | | 5 | | | 1 |
| 7:15am to 7:30am | 17 | 4 | | 2 | | | | | | | | | 1 | | | | 5 | | | | | | | | 12 | 1 | | 1 | 4 | | | | 7 | | | | 2 | | | | 1 | | | | 3 | | | |
| 7:30am to 7:45am | 12 | 1 | | 1 | | | | | 1 | | | | | | | | 7 | | | | | | | | 18 | 1 | | 1 | 3 | | | | 9 | | | | 1 | 1 | | | 3 | | | | 5 | | | |
| 7:45am to 8:00am | 24 | | | 2 | | | | | | | | | 1 | | | | 5 | 2 | | | 1 | | | | 16 | 2 | | 3 | 9 | 1 | | | 3 | | | | 3 | | | | 1 | | | | 9 | 1 | | |
| 8:00am to 8:15am | 30 | 5 | | 2 | | | | | | | | | 2 | | | | 11 | | | | 2 | | | | 16 | 2 | | 3 | 3 | | | | 4 | | | | 1 | | | | | 1 | 1 | | 8 | | | |
| 8:15am to 8:30am | 27 | 4 | | 6 | 1 | | | | 2 | | | | | | | | 6 | | | | 1 | | | | 27 | 1 | | 1 | 3 | | | | 7 | | | | 1 | | | | 1 | 1 | 1 | | 14 | | | |
| 8:30am to 8:45am | 30 | 1 | 1 | | | | | | 1 | | | | 4 | | | | 19 | 1 | | | | | | | 26 | 5 | | 1 | 4 | 1 | | | 5 | | | | 1 | | | | 1 | | | | 7 | | | |
| 8:45am to 9:00am | 37 | 4 | | | 1 | | | | 1 | | | | 1 | | | | 15 | | | | | | | | 20 | 2 | | 1 | 3 | | | | 6 | 1 | | | 4 | | | | 1 | | | | 3 | | | |
| 9:00am to 9:15am | 30 | | | | | | | | | | | | 3 | | | | 4 | | | | | | | | 20 | 1 | | 2 | 5 | 1 | | | 6 | | | | | | | | 4 | | | | 5 | | | |
| 9:15am to 9:30am | 22 | 2 | | 1 | 2 | | | | 2 | | | | 2 | | | | 6 | | | | 1 | | | | 21 | 2 | | | 3 | | | | 7 | | | | | | | | 3 | | | | 4 | | | |
| 9:30am to 9:45am | 30 | | | 2 | | | | | | | | | 2 | | | | 12 | | | | | | | | 38 | | | | 3 | | | | 4 | | | | 2 | | | | 2 | | 1 | | 11 | | | |
| 9:45am to 10:00am | 31 | | | | | | | | | | | | | | | | 12 | | | | 2 | | | | 27 | | | | 6 | 1 | | | 5 | 1 | | | 1 | | | | 2 | | 1 | | 4 | | | |
| Peak Hour: 8am to 9am | 124 | 14 | 1 | 8 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 51 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 89 | 10 | 0 | 6 | 13 | 1 | 0 | 0 | 22 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 3 | 2 | 2 | 0 | 32 | 0 | 0 | 0 |

| Date: | NEH from the north | | | | | | | | | | | | Naas Street from NEH | | | | | | | | | | | | NEH from the South | | | | | | | | | | | | Naas Street from Logan Street | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEH - heading south | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into NEH | | | | Left turn into NEH | | | | NEH - heading north | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into NEH | | | | Left turn into NEH | | | |
| 24/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DMcC | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 7:00am to7:15am | 8 | | | 3 | | | | | | | | | | | | | 3 | | | | 1 | | | | 13 | 1 | | | 2 | | | | 11 | | | | 1 | | | | 3 | | | | 6 | | | |
| 7:15am to 7:30am | 10 | | | 4 | | | | | 1 | | | | 2 | | | | 8 | | | | | | | | 10 | 1 | | 1 | 2 | 1 | | | 6 | | | | 5 | | | | | | | | 6 | | | |
| 7:30am to 7:45am | 13 | 2 | | 3 | | | | | 1 | | | | 1 | | | | 4 | | | | 1 | | 1 | | 15 | | | | 1 | | | | 4 | | | | 2 | | | | 1 | | | | 7 | | | |
| 7:45am to 8:00am | 12 | 1 | | 1 | | | | | | | | | | | | | 5 | | | | | | | | 12 | | | 1 | 2 | 1 | | | 4 | | | | 3 | | | | 1 | | | | 4 | | | |
| 8:00am to 8:15am | 23 | 3 | | | | | | | 2 | | | | 2 | | | | 8 | | | | | | | | 21 | 1 | | 1 | 5 | | | | 2 | | | | 1 | | | | 1 | 1 | 1 | | 11 | | | |
| 8:15am to 8:30am | 37 | 4 | | 2 | | | | | 1 | | | | 3 | | | | 10 | 1 | | | | | | | 22 | | | | 5 | 1 | | | 4 | 1 | | | 3 | | | | 3 | | 1 | | 15 | | | |
| 8:30am to 8:45am | 34 | 5 | | | 1 | | | | | 1 | | | 1 | | | | 12 | 2 | | | | | | | 20 | 6 | | | 8 | | | | 7 | | | | 1 | | | | | | | | 18 | 1 | | |
| 8:45am to 9:00am | 28 | 2 | | 1 | | | | | 2 | | | | | | | | 12 | | | | | | | | 23 | 3 | | 2 | 3 | 1 | | | 13 | | | | 3 | | | | 1 | | 1 | | 7 | | | |
| 9:00am to 9:15am | 23 | | | 2 | 1 | | | | 1 | | | | 3 | | | | 8 | 1 | | | | | | | 21 | 1 | | 3 | 2 | | | | 6 | | | | 3 | | | | 1 | | | | 3 | | | |
| 9:15am to 9:30am | 22 | | | 3 | 1 | | | | | | | | 3 | | | | 4 | | | | | | | | 20 | 1 | | 1 | 5 | | | | 5 | | | | 2 | | | | | | 1 | | 7 | | | |
| 9:30am to 9:45am | 38 | 1 | | | 1 | | | | 2 | | | | 1 | | | | 9 | | | | 1 | | | | 26 | 1 | | 3 | 5 | 1 | | | 12 | 1 | | | 1 | 1 | | | 3 | | | | 8 | | | |
| 9:45am to 10:00am | 31 | 2 | | | | | | | | | | | 1 | 1 | | | 8 | 2 | | | | | | | 25 | 1 | | | 3 | | | | 7 | | | | 2 | | | | | | 1 | | 6 | | | |
| Peak Hour: 8am to 9am | 122 | 14 | 0 | 3 | 1 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 42 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 86 | 10 | 0 | 3 | 21 | 2 | 0 | 0 | 26 | 1 | 0 | 0 | 8 | 0 | 0 | 0 | 5 | 1 | 3 | 0 | 51 | 1 | 0 | 0 |
| Average Morning Peak Hour: 8am to 9am | 123 | 14 | 1 | 6 | 2 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 47 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 88 | 10 | 0 | 5 | 17 | 2 | 0 | 0 | 24 | 1 | 0 | 0 | 8 | 0 | 0 | 0 | 4 | 2 | 3 | 0 | 42 | 1 | 0 | 0 |
| | 123 | 21 | | | 2 | 0 | | | 5 | 1 | | | 7 | 0 | | | 47 | 2 | | | 2 | 0 | | | 88 | 15 | | | 17 | 2 | | | 24 | 1 | | | 8 | 0 | | | 4 | 5 | | | 42 | 1 | | |

**New England Highway (NEH) and Naas Street Intersection**

**Afternoon**

| Date: | NEH from the north | | | | | | | | | | | | Naas Street from NEH | | | | | | | | | | | | NEH from the South | | | | | | | | | | | | Naas Street from Logan Street | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEH - heading south | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into NEH | | | | Left turn into NEH | | | | NEH - heading north | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into NEH | | | | Left turn into NEH | | | |
| 18/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DMcC | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 3:00pm to 3:15pm | 27 | 5 | | 5 | 1 | | | | 4 | | | | 1 | | | | 5 | | | | | | | | 35 | 3 | | 4 | 6 | | | | 13 | | | | 3 | 1 | | | 2 | | 1 | | 4 | 2 | | |
| 3:15pm to 3:30pm | 31 | 1 | | 3 | | | | | 5 | | | | 1 | | | | 10 | | | | | | | | 29 | 4 | | 4 | 11 | | | | 9 | | | | 4 | | | | 1 | | | | 1 | | | |
| 3:30pm to 3:45pm | 19 | 4 | | 5 | | | | | | | | | 4 | | | | 11 | | | | | | | | 26 | 2 | | | 8 | | | | 9 | | | | | 1 | | | 2 | | 1 | | 6 | | | |
| 3:45pm to 4:00pm | 24 | 2 | | 1 | | | | | 2 | | | | 2 | | | | 14 | | | | | | | | 21 | | | 1 | 7 | | | | 3 | | | | 3 | | | | 5 | 2 | | | 7 | | | |
| 4:00pm to 4:15pm | 24 | 2 | | | 2 | | | | | | | | 7 | | | | 12 | | | | | | | | 25 | 3 | | 3 | 7 | | | | 4 | | | | 2 | | | | 3 | | | | 7 | | | |
| 4:15pm to 4:30pm | 22 | | | 1 | | | | | | | | | 4 | | | | 7 | | | | 2 | | | | 25 | 1 | 1 | 1 | 3 | 1 | | | 9 | | | | 3 | | | | | | | | 11 | | | |
| 4:30pm to 4:45pm | 30 | | | 4 | 1 | | | | 3 | | | | 7 | | | | 10 | | | | 1 | | | | 22 | 4 | 1 | 1 | 14 | | | | 9 | | | | | | | | 4 | | 3 | | 11 | | | |
| 4:45pm to 5:00pm | 26 | | | 11 | | | | | 1 | | | | | | | | 5 | | | | | | | | 22 | | | | 10 | | | | 6 | 1 | | | 2 | | | | 4 | | | | 7 | | | |
| 5:00pm to 5:15pm | 24 | 1 | | 4 | 1 | | | | 3 | | | | 3 | | | | 10 | | | | | | | | 33 | 1 | | 3 | 10 | | | | 12 | | | | 4 | | | | 5 | | | | 6 | | | |
| 5:15pm to 5:30pm | 14 | | | 5 | | | | | 1 | | | | 3 | | | | 10 | | | | 1 | | | | 36 | | | 1 | 12 | | | | 14 | | | | 4 | | | | 1 | | | | 3 | | | |
| 5:30pm to 5:45pm | 14 | | | 4 | | | | | 1 | | | | 2 | | | | 4 | | | | | | | | 16 | | | 3 | 9 | | | | 9 | | | | 3 | | | | 1 | | | | 1 | | | |
| 5:45pm to 6:00pm | 28 | 1 | | 1 | | | | | 2 | | | | 1 | | | | 9 | | | | | | | | 22 | | | 3 | 11 | | | | 5 | | | | 3 | | | | 2 | | | | 3 | | | |
| Peak Hour: 3pm to 4pm | 101 | 12 | 0 | 14 | 1 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 111 | 9 | 0 | 9 | 32 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 10 | 2 | 0 | 0 | 10 | 2 | 2 | 0 | 18 | 2 | 0 | 0 |

| Date: | NEH from the north | | | | | | | | | | | | Naas Street from NEH | | | | | | | | | | | | NEH from the South | | | | | | | | | | | | Naas Street from Logan Street | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEH - heading south | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into NEH | | | | Left turn into NEH | | | | NEH - heading north | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into NEH | | | | Left turn into NEH | | | |
| 24/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DMcC | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 3:00pm to 3:15pm | 39 | 4 | | 4 | | | | | | | | | 3 | | | | 6 | | | | 1 | | | | 33 | 6 | | | 8 | 1 | | 1 | 7 | | | | 3 | 1 | | | 5 | | 1 | | 10 | 1 | | |
| 3:15pm to 3:30pm | 30 | 1 | | 2 | 1 | | | | 3 | 1 | | 1 | 7 | | | | 13 | | | | | | | | 28 | 2 | | | 12 | 2 | | | 7 | 2 | | | 2 | | | | 1 | | | | 5 | 1 | | |
| 3:30pm to 3:45pm | 33 | 2 | | 1 | 2 | | | | 3 | 1 | | | 3 | | | | 10 | | | | 1 | | | | 33 | 3 | | 1 | 11 | | | | 7 | | | | 2 | | | | 4 | | 1 | | 4 | | | 1 |
| 3:45pm to 4:00pm | 24 | 1 | | 2 | 2 | | | | | | | | 3 | | | | 3 | 1 | | | 2 | | | | 17 | 1 | | | 5 | | | | 4 | | | | 4 | | | | 2 | 1 | | | 3 | 1 | | |
| 4:00pm to 4:15pm | 27 | 3 | | | 1 | | | | 1 | | | | 3 | | | | 12 | | | | | | | | 27 | 2 | | 3 | 5 | | | | 6 | | | | 2 | | | | | | | | 4 | | | |
| 4:15pm to 4:30pm | 17 | | | 1 | 1 | | | | 3 | | | | 3 | | | | 11 | | | | 1 | | | | 16 | 2 | | 1 | 7 | 2 | | 2 | 8 | | | | 3 | | | | 1 | | 1 | 1 | 4 | 1 | | 1 |
| 4:30pm to 4:45pm | 30 | 1 | | | | | | | 1 | | | | 2 | | | | 14 | | | | 2 | | | | 18 | 1 | | | 13 | | | | 19 | | | | 7 | | | | 4 | | 1 | | 6 | | | |
| 4:45pm to 5:00pm | 27 | | | 4 | | | | | 1 | | | | 1 | | | | 7 | | | | | | | | 24 | 2 | | 1 | 9 | 1 | | | 9 | | | | | | | | 2 | | | | 4 | | | |
| 5:00pm to 5:15pm | 21 | | | 6 | | | | | | | | | 2 | | | | 6 | | | | | | | | 32 | | | 1 | 6 | | | | 15 | | | | 2 | | | | 3 | | | | 7 | | | |
| 5:15pm to 5:30pm | 31 | 1 | | 2 | | | | | 1 | 1 | | | 2 | | | | 5 | | | | | | | | 24 | 1 | | 3 | 8 | | | | 7 | | | | | | | | 2 | | | | 7 | | | |
| 5:30pm to 5:45pm | 19 | 1 | | 9 | | | | | 1 | | | | 5 | | | | 17 | | | | | | | | 19 | 2 | | 3 | 12 | | | 1 | 9 | | | | 4 | | | | 2 | | | | 5 | | | 1 |
| 5:45pm to 6:00pm | 21 | | | 5 | 2 | | | | 5 | | | | 2 | | | | 12 | | | | | | | | 17 | | | 2 | 6 | | | | 13 | | | | 6 | | | | 1 | | | | 7 | | | 1 |
| Peak Hour: 3pm to 4pm | 126 | 8 | 0 | 9 | 5 | 0 | 0 | 0 | 6 | 2 | 0 | 1 | 16 | 0 | 0 | 0 | 32 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 111 | 12 | 0 | 1 | 36 | 3 | 0 | 1 | 25 | 2 | 0 | 0 | 11 | 1 | 0 | 0 | 12 | 1 | 2 | 0 | 22 | 3 | 0 | 1 |
| Average Afternoon Peak Hour: 3pm to 4pm | 114 | 10 | 0 | 12 | 3 | 0 | 0 | 0 | 9 | 1 | 0 | 1 | 12 | 0 | 0 | 0 | 36 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 111 | 11 | 0 | 5 | 34 | 2 | 0 | 1 | 30 | 1 | 0 | 0 | 11 | 2 | 0 | 0 | 11 | 2 | 2 | 0 | 20 | 3 | 0 | 1 |
| | 114 | 22 | | | 3 | 0 | | | 9 | 2 | | | 12 | 0 | | | 36 | 1 | | | 2 | 0 | | | 111 | 16 | | | 34 | 3 | | | 30 | 1 | | | 11 | 2 | | | 11 | 4 | | | 20 | 4 | | |

Use Peak Afternoon for SIDRA

**Mount Lindesay Rd (MLR) & Old Ballandeen Rd (OBR) Intersection**
**Morning**

| Date: | OBR from NEH | | | | | | | | | | | | MLR from Naas Street | | | | | | | | | | | | Boundary Road from Saleyards | | | | | | | | | | | | MLR from Quarry | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OBR across to Boundary Rd | | | | Right turn into MLR | | | | Left turn into MLR (Quarry) | | | | MLR Straight to Quarry | | | | Right turn into Boundary Rd | | | | Left turn into OBR | | | | Boundary Rd across to OBR | | | | Right turn into MLR (Quarry) | | | | Left turn into MLR (to Naas St) | | | | MLR to Naas Street | | | | Right turn into OBR | | | | Left turn into Boundary Road | | | |
| 18/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 7:00am to7:15am | | | | | 2 | | | | 1 | | | | 3 | | | | | | | | 1 | | | | | | | | 2 | | | | | | | | 2 | | | 1 | 1 | | | | 1 | | | |
| 7:15am to 7:30am | | | | | | | | | | | 2 | | 2 | | | | | | | | | | | | 1 | | | | | | | | | | | | 1 | | | | | | | | | | | |
| 7:30am to 7:45am | | | | | | | | | | | | | 3 | 1 | | | | | | | 1 | | | | 2 | 1 | | | | | | | 3 | | | | 1 | | | | | | | | | | | |
| 7:45am to 8:00am | 1 | | | | 1 | | | | | | | | 1 | 1 | | | 3 | | | | | | | | 2 | | | | 1 | | | | 4 | | | | 3 | 3 | | | | | | | | | | |
| 8:00am to 8:15am | | | | | 2 | | | | 1 | | | | 2 | | | | | | | | | | | | 1 | | | | | | | | | | | | 5 | 1 | 1 | | 1 | | | | | | | |
| 8:15am to 8:30am | | | | 1 | | | | | | | 1 | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | 8 | | 1 | | 2 | | | | | | | |
| 8:30am to 8:45am | | | | | | | | | 1 | | 1 | | 2 | | | | | | | | | | | | | | | | | | | | | | | | 7 | | | | 3 | | | | | | | |
| 8:45am to 9:00am | 1 | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | 1 | | | |
| 9:00am to 9:15am | | | | | 1 | | | | | | | | 2 | 1 | | | | | | | | | | | 2 | | | | | 1 | | | 1 | 1 | | | | | | | 1 | | | | | | |
| 9:15am to 9:30am | 1 | | | | 1 | | | | | | | | 2 | | | | | | | | | | | | 1 | | | 1 | | | | | | | | 2 | | | | | | | | | | | |
| 9:30am to 9:45am | | | | | | | | | 1 | | | | 3 | | | | 1 | | | | | | | | | 1 | | | 1 | | | | 1 | | | | 2 | | 1 | | | | | | | | | |
| 9:45am to 10:00am | | | | | 1 | | | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | |
| Peak Hour: 7:45am to 8:45am | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 6 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 23 | 4 | 2 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Date: | OBR from NEH | | | | | | | | | | | | MLR from Naas Street | | | | | | | | | | | | Boundary Road from Saleyards | | | | | | | | | | | | MLR from Quarry | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OBR across to Boundary Rd | | | | Right turn into MLR | | | | Left turn into MLR (Quarry) | | | | MLR Straight to Quarry | | | | Right turn into Boundary Rd | | | | Left turn into OBR | | | | Boundary Rd across to OBR | | | | Right turn into MLR (Quarry) | | | | Left turn into MLR (to Naas St) | | | | MLR to Naas Street | | | | Right turn into OBR | | | | Left turn into Boundary Road | | | |
| 24/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 7:00am to7:15am | | | | | | | | | | | | | 1 | | | | | | | | 1 | | | | | 1 | | | | | | | 1 | | | | 1 | | | | 1 | | | | | | | |
| 7:15am to 7:30am | 1 | 1 | | | | | | | | | 2 | | 3 | | | | 3 | 1 | | | 1 | | | | | | | | 1 | | | | | | | | 2 | | | | | | | | | | | |
| 7:30am to 7:45am | 1 | | | | | | | | 1 | | | | | | | | 1 | | | | | | | | | | | | | | | | 2 | | | | 4 | 1 | | | | | | | | | | |
| 7:45am to 8:00am | | | | | | | | | 1 | | | | 1 | 1 | | | | | | | 1 | | | | 1 | | | | | | | | | | | | | | 1 | | | 1 | | | | | | | |
| 8:00am to 8:15am | | | | | | | | | | 1 | | | 2 | | | | 2 | | | | | 1 | | | 2 | | | | | | | | 2 | | | | 4 | 1 | 1 | | 1 | | | | | | | |
| 8:15am to 8:30am | | | | 1 | 1 | | | | | | 1 | | 2 | | | | 1 | | | | 1 | | | | 1 | | | | | | | | 2 | | | | 9 | | | | 1 | | | | | | | |
| 8:30am to 8:45am | | | | | 2 | | | | | | 1 | | 2 | | | | 2 | | | | | | | | | | | | | | | | 4 | | | | 7 | | | | 1 | | | | | | | |
| 8:45am to 9:00am | 1 | | | | 2 | | | | 1 | | | | 4 | 1 | | | 3 | | | | | | | | 1 | | | | | | | | 5 | | | | 3 | | 1 | | | | 1 | | | | | |
| 9:00am to 9:15am | 2 | | | | | | | | 1 | | | | | | | | | | | | | | | | 4 | | | | | | | | 2 | | | | | | | | | | | | | | | |
| 9:15am to 9:30am | | | | | | | | | | | 1 | | 1 | | | | 4 | | | | 3 | | | | | | | | 1 | | | | 2 | | | | 3 | | 1 | | | | | | | | | |
| 9:30am to 9:45am | 1 | | | | | | | | | | | | 4 | 1 | | | 1 | | | | | | | | | | | | | | | | 2 | | | | 3 | | | | 1 | | | | 2 | | | |
| 9:45am to 10:00am | | | | | | | | | 1 | | 1 | | 1 | 1 | | | 1 | | | | 1 | | | | | | | | | | | | 3 | | | | 3 | | 1 | | | | | | 1 | | | |
| Peak Hour: 7:45am to 8:45am | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 7 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 20 | 1 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average Morning Peak Hour: 7:45am to 8:45am | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 7 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 22 | 3 | 2 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 1 | | 1 | | 3 | | 0 | | 2 | | 3 | | 7 | | 1 | | 5 | | 0 | | 1 | | 1 | | 4 | | 3 | | 1 | | 0 | | 6 | | 1 | | 22 | | 5 | | 5 | | 0 | | 0 | | 0 | |

**Mount Lindesay Rd (MLR) & Old Ballandeen Rd (OBR) Intersection**
**Afternoon**

| Date: | OBR from NEH | | | | | | | | | | | | MLR from Naas Street | | | | | | | | | | | | Boundary Road from Saleyards | | | | | | | | | | | | MLR from Quarry | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OBR across to Boundary Rd | | | | Right turn into MLR | | | | Left turn into MLR (Quarry) | | | | MLR Straight to Quarry | | | | Right turn into Boundary Rd | | | | Left turn into OBR | | | | Boundary Rd across to OBR | | | | Right turn into MLR (Quarry) | | | | Left turn into MLR (to Naas St) | | | | MLR to Naas Street | | | | Right turn into OBR | | | | Left turn into Boundary Road | | | |
| 18/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 3:00pm to 3:15pm | | | | | 2 | | | | 1 | | 1 | | 3 | | | | 1 | | | | | | | | | | | | | | | | | | | | 4 | 2 | 1 | | | | | | | | | |
| 3:15pm to 3:30pm | 1 | | | | 2 | | | | | | | | 5 | | | | 2 | | | | 1 | | | | 1 | | | | | | | | | | | | 1 | | | | | | | | | | | |
| 3:30pm to 3:45pm | | | | | | | | | 1 | | 1 | 1 | 4 | | | | | | | | | | | | | | | | | | | | 1 | | | | 2 | 1 | 1 | | | | | | | | | |
| 3:45pm to 4:00pm | 1 | | | | 1 | | | | | | 1 | | 2 | | | | 1 | | | | 1 | | | | 1 | | | | | | | | 1 | | | | 7 | | | | | | | | | | | |
| 4:00pm to 4:15pm | | | | | 1 | | | | | | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | |
| 4:15pm to 4:30pm | 2 | | | | 1 | | | | 1 | | | | 2 | 1 | | | | | | | | | | | | | | | | | | | 1 | | | | 3 | | 1 | | | | | | | | | |
| 4:30pm to 4:45pm | | | | | | | | | | | | | 6 | 1 | | | 3 | | | | 1 | | | | 1 | 1 | | | | | | | 1 | | | | 5 | | 1 | | | | | | | | | |
| 4:45pm to 5:00pm | | | | 1 | 1 | | | | 2 | | | | 3 | | | | 3 | | | | 2 | | | | | | | | | | | | | | | | 1 | | | 2 | | | | | | | | | |
| 5:00pm to 5:15pm | 2 | | | | | | | | | | | | 3 | | | | 2 | | | | 3 | | | | | | | | | | | | | | | | 2 | | | 1 | | | | | | | | | |
| 5:15pm to 5:30pm | | 1 | | | | | | | | | | | 4 | | | | | | | | | | | | 2 | 1 | | | 1 | | | | | | | | 2 | | | 1 | | | | | | | | | |
| 5:30pm to 5:45pm | 3 | | | | | | | | | | | | 6 | | | | 1 | | | | 2 | | | | | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | |
| 5:45pm to 6:00pm | | | | | | | | | 1 | | | | 2 | | | | | | | | | | | | | | | 1 | | | | | | | | 1 | | | | | | | | | | | | |
| Peak Hour: 4pm to 5pm | 2 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 15 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 13 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Date: | OBR from NEH | | | | | | | | | | | | MLR from Naas Street | | | | | | | | | | | | Boundary Road from Saleyards | | | | | | | | | | | | MLR from Quarry | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OBR across to Boundary Rd | | | | Right turn into MLR | | | | Left turn into MLR (Quarry) | | | | MLR Straight to Quarry | | | | Right turn into Boundary Rd | | | | Left turn into OBR | | | | Boundary Rd across to OBR | | | | Right turn into MLR (Quarry) | | | | Left turn into MLR (to Naas St) | | | | MLR to Naas Street | | | | Right turn into OBR | | | | Left turn into Boundary Road | | | |
| 24/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 3:00pm to 3:15pm | 1 | 1 | | | 1 | | | | 1 | | | | 4 | | | | 1 | | | 1 | | | | | | | | | | | | | | | | 5 | | | | 4 | 1 | 1 | | 1 | | | | | | | |
| 3:15pm to 3:30pm | 1 | 1 | | | | | | | | | | | 3 | | | | 1 | 1 | | 1 | | 1 | | | 1 | 1 | | | | | | | | | | | 2 | | | | | 1 | | | 1 | | | | | | | |
| 3:30pm to 3:45pm | 2 | | | | 1 | | | | | | 1 | | 4 | 1 | | | 3 | | | | 1 | | | | | 1 | | | | | | | | | | | | 3 | | 1 | 1 | 1 | | | | | | | | | |
| 3:45pm to 4:00pm | | 1 | | | | | | | | | | | 3 | | | | 2 | | | | | | | | 3 | 1 | | | | | | | | | | | 2 | 1 | | | 2 | 1 | | | | | | | | |
| 4:00pm to 4:15pm | | | | | | | | | 1 | | 1 | | 2 | | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | |
| 4:15pm to 4:30pm | | 1 | | | | | | | 1 | | | | 2 | 3 | | | 2 | | | 3 | | | | | 2 | | | | | | | | | | | | 2 | | | 2 | 3 | 1 | 1 | | | 1 | | | | | |
| 4:30pm to 4:45pm | 2 | 1 | | | | | | | | | | | 9 | | | | 5 | | | | | | | 1 | | | | | | | | | | | | 1 | | | | 1 | 1 | 1 | | | | | | | | | |
| 4:45pm to 5:00pm | | | | | 1 | | | | 1 | | | | 5 | | | | 1 | 1 | | | | | | | 1 | 1 | | | | | | | | | | | 3 | | | | 1 | | | | | | | | 2 | | | |
| 5:00pm to 5:15pm | 1 | | | | | | | | 1 | | | | 3 | | | | | | | | 1 | | | | | 1 | | | | | | | | | | | 2 | | | | 2 | | | | | | | | 1 | | | |
| 5:15pm to 5:30pm | 1 | | | | 1 | | | | | | | | 4 | | | | | | | | 1 | | | | | | | | | | | | | | | | 3 | 1 | | 1 | | | | | | | | 1 | | | |
| 5:30pm to 5:45pm | 2 | | | | | | | | | | | | 4 | | | | 1 | | | | 1 | | | | 4 | | | | | | | | | | | | 5 | | | | 2 | | | | | | | | | | | |
| 5:45pm to 6:00pm | | | | | | | | | | | | | 2 | 1 | | | 2 | | | 1 | | | | | | | | | | | | | | | | | | | | 1 | 5 | | | | | | | | | | | |
| Peak Hour: 4pm to 5pm | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 18 | 3 | 0 | 0 | 9 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 2 | 6 | 3 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| Average Afternoon Peak Hour: 4pm to5pm | 2 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 17 | 3 | 0 | 0 | 8 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 10 | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| | 2 | | 2 | | 2 | | 0 | | 3 | | 1 | | 17 | | 3 | | 8 | | 3 | | 2 | | 0 | | 2 | | 3 | | 0 | | 0 | | 4 | | 1 | | 10 | | 5 | | 0 | | 1 | | 1 | | 0 | |

Use Peak Morning for SIDRA

**New England Highway (NEH) & Old Ballandeen Rd (OBR) Intersection**
**Morning**

| Date: | NEH from Tenterfield | | | | | | | | | | | | NEH from Brisbane | | | | | | | | Bruxner Highway to Quarry | | | | | | | | | | | | OBR from Quarry | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEH to Brisbane | | | | Right turn into OBR | | | | Left turn into Bruxner | | | | NEH to Tenterfield | | | | Right turn into Bruxner | | | | Left turn into OBR | | | | Bruxner across to OBR | | | | Right turn into NEH | | | | Left turn into NEH | | | | OBR across to Bruxner | | | | Right turn into NEH | | | | Left turn into NEH | | | |
| 18/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 7:00am to 7:15am | 8 | | | 1 | | | | | 1 | | | | 5 | | | 1 | | | | | 1 | | | | | | | | 2 | | | | | | | | | | | | 2 | | | | | | | |
| 7:15am to 7:30am | 9 | | | 1 | | 1 | | | 4 | | | | 10 | | | 1 | | | | | 1 | | 2 | | | | | | | | | | | | | | | | 4 | | | | | 1 | | |
| 7:30am to 7:45am | 9 | | | 1 | | | | | 1 | | | | 9 | | | 2 | | | | | | | | | | | | 1 | | | | | | | | 1 | | | | 1 | 1 | | | | | | |
| 7:45am to 8:00am | 16 | 3 | | 2 | | | | | 1 | | | 1 | 14 | 1 | | 1 | | | | | 1 | | | | 1 | | | | 3 | 1 | | | | | | | | | | 1 | | | | | | | |
| 8:00am to 8:15am | 9 | 1 | 1 | 1 | | | | | 1 | 1 | | | 14 | 5 | | 5 | | | | | 1 | | | | 3 | | | 1 | 2 | | | | | | | | 1 | | | | 1 | | | | | | | |
| 8:15am to 8:30am | 15 | 3 | 1 | 1 | | | | | 3 | 1 | | | 17 | 1 | | 4 | | | | | | | 2 | | 1 | | | | 3 | 1 | | 1 | | | | | | | | | 1 | | | | | | | |
| 8:30am to 8:45am | 16 | 4 | | 1 | | | | | 1 | | | 1 | 18 | | | | | | | | | | | | 1 | | | | 2 | | | | | | | | | | | | 2 | | | | | | | |
| 8:45am to 9:00am | 19 | | | 1 | | | | | | | | | 12 | 3 | | | | | | | 1 | | | | | | | | 5 | | | | | | | | 1 | | | 1 | | | | | | | |
| 9:00am to 9:15am | 12 | 1 | | 1 | | | | | 1 | | | | 18 | | | | | | | | 1 | | | | | | | | 3 | 1 | | | | | | | | | | | | | | | | | | |
| 9:15am to 9:30am | 22 | 1 | | 1 | | | | | 1 | | | | 18 | 1 | | 1 | | | | | | | | | | | | | 1 | 1 | | | | 1 | | | | | | | 2 | | | | | | | |
| 9:30am to 9:45am | 29 | 1 | 1 | 2 | | | | | 3 | | | | 19 | | | 2 | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | |
| 9:45am to 10:00am | 12 | 1 | 1 | 2 | | | | | 2 | | | | 21 | | | 1 | | | | | | | 1 | | | | | | 2 | | | 1 | | | | | | | | | | | | | 1 | | | |
| Peak Hour: 9am to 10am | 75 | 4 | 2 | 6 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 76 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

| Date: | NEH from Tenterfield | | | | | | | | | | | | NEH from Brisbane | | | | | | | | Bruxner Highway to Quarry | | | | | | | | | | | | OBR from Quarry | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEH to Brisbane | | | | Right turn into OBR | | | | Left turn into Bruxner | | | | NEH to Tenterfield | | | | Right turn into Bruxner | | | | Left turn into OBR | | | | Bruxner across to OBR | | | | Right turn into NEH | | | | Left turn into NEH | | | | OBR across to Bruxner | | | | Right turn into NEH | | | | Left turn into NEH | | | |
| 24/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 7:00am to 7:15am | 21 | | | | | | | | 4 | | | | 5 | | | 5 | | | | | | | | | | | | | 3 | | | | | | | | 1 | | | | | | | | | | | |
| 7:15am to 7:30am | 6 | | | | | | | | 3 | 2 | | 1 | 6 | | | 4 | | | | | 1 | | 2 | | | | | 2 | | | | | | | | | | | | | | | | | | | |
| 7:30am to 7:45am | 8 | | | 1 | | | | | | | | | 8 | 1 | | 2 | | | | | 1 | | | | 1 | | | | | | | | | | | | 2 | | | | | | 1 | | | | | |
| 7:45am to 8:00am | 11 | 1 | | 1 | | | | | 4 | | | | 10 | | | 1 | | | | | 1 | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | |
| 8:00am to 8:15am | 10 | | 1 | | | | | | 2 | | | | 12 | 2 | | | | | | | 1 | | | | 1 | | | | 2 | | | | | | | | 2 | | | | 1 | | | | | 1 | | |
| 8:15am to 8:30am | 12 | | 1 | 1 | | | | | 2 | | | | 28 | 2 | | 1 | 1 | | | | | | 1 | | | | | 1 | 4 | 1 | | 1 | | | | | 1 | | | | 1 | | | | | | | |
| 8:30am to 8:45am | 13 | 3 | | | | | | | 1 | | | 1 | 17 | 2 | | | | | | | | | 1 | | | | | | 4 | | | | | | | | | | | | | | | | | | | |
| 8:45am to 9:00am | 13 | 3 | | 2 | | | | | 2 | | | | 15 | 1 | | | | | | | | | | | 2 | | | | 3 | | | 1 | | | | | | | | | | | | | | | |
| 9:00am to 9:15am | 14 | 1 | 1 | 3 | | | | | 4 | | | 1 | 13 | | | 1 | | | | | 2 | | | | | | | | 4 | | | 1 | | | | | | | | | 2 | | | | | | | |
| 9:15am to 9:30am | 13 | 2 | 1 | | | | | | 1 | | | | 16 | 3 | | 1 | | | | | | | 1 | | | | | | 3 | | | 2 | | | | | 1 | | | | | | | | | | | |
| 9:30am to 9:45am | 12 | 1 | | 3 | | | | | 4 | | | | 24 | 1 | | | | | | | 3 | | | | 1 | | | | 2 | | | | | | | | | | | | 1 | | | | | | | |
| 9:45am to 10:00am | 20 | 2 | | | | | | | | | | | 27 | 1 | | | | | | | | | 1 | | 2 | | | | 4 | 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour: 9am to 10am | 59 | 6 | 2 | 6 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 1 | 80 | 5 | 0 | 2 | 0 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 13 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average Morning Peak Hour: 9am to 10am | 67 | 5 | 2 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 1 | 78 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 10 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| | 67 | 13 | | | 0 | 0 | | | 8 | 1 | | | 78 | 6 | | | 0 | 0 | | | 3 | 2 | | | 2 | 0 | | | 10 | 4 | | | 0 | 1 | | | 1 | 0 | | | 3 | 1 | | | 0 | 0 | | |

**New England Highway (NEH) & Old Ballandeen Rd (OBR) Intersection**
**Afternoon**

| Date: | NEH from Tenterfield | | | | | | | | | | | | NEH from Brisbane | | | | | | | | | | | | Bruxner Highway to Quarry | | | | | | | | | | | | OBR from Quarry | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEH to Brisbane | | | | Right turn into OBR | | | | Left turn into Bruxner | | | | NEH to Tenterfield | | | | Right turn into Bruxner | | | | Left turn into OBR | | | | Bruxner across to OBR | | | | Right turn into NEH | | | | Left turn into NEH | | | | OBR across to Bruxner | | | | Right turn into NEH | | | | Left turn into NEH | | | |
| 18/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 3:00pm to 3:15pm | 19 | | 1 | 3 | | | | | 1 | | | | 23 | 2 | | 4 | | | | | 1 | | 1 | | 1 | | | | 1 | 2 | | 1 | | | | | | | | | 1 | 1 | | | | | | |
| 3:15pm to 3:30pm | 27 | 3 | | 4 | | | | | 3 | 1 | | | 18 | | | 3 | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3:30pm to 3:45pm | 16 | 1 | 1 | 1 | | | | | 2 | | | | 12 | 2 | | 4 | | | | | 1 | | 2 | | | | | | 2 | 1 | | | | | | | | | | | 3 | | | | | | | |
| 3:45pm to 4:00pm | 16 | | | 1 | 1 | | | | 2 | | | | 19 | | | 1 | 1 | | | | 2 | | 1 | | 1 | | | | 2 | | | | | | | | | | | | | | | | | | |
| 4:00pm to 4:15pm | 21 | 1 | | 4 | 1 | | | | 1 | | | | 11 | 2 | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | |
| 4:15pm to 4:30pm | 18 | 1 | 1 | 1 | | | | | | | | | 18 | 1 | | 3 | | | | | 5 | | | | 1 | | | | 1 | | | | 1 | | | | | | | | | | 2 | | | | | |
| 4:30pm to 4:45pm | 20 | | 2 | 3 | | | | | 2 | | | | 16 | | | 2 | | | | | 1 | | | | 1 | | | | | 2 | | 1 | | | | | 2 | | | | 1 | 2 | | | | | | |
| 4:45pm to 5:00pm | 12 | 1 | 1 | 1 | | | | | 3 | 1 | | | 24 | 1 | | 12 | | | | | | | | | 2 | | | 1 | 1 | | | | | | | | | | | | | 1 | | | | | | |
| 5:00pm to 5:15pm | 17 | 1 | | 3 | | | | | 3 | | | | 15 | 1 | | 4 | | | | | 1 | 1 | | | 1 | | | | 5 | 1 | | 1 | | | | | | | | | 1 | | | | | | | |
| 5:15pm to 5:30pm | 18 | 3 | | | 1 | | | | 3 | | | | 11 | | | 4 | | | | | 1 | | | | | | | | | 1 | | | | | | | | | | | | 3 | | | | | | |
| 5:30pm to 5:45pm | 18 | 1 | | 4 | | | | | 1 | 1 | | | 16 | 1 | | 3 | | | | | 1 | | | | | | | | 1 | | | | | | | | | | | | | 3 | 1 | | | | | |
| 5:45pm to 6:00pm | 16 | | | 1 | | | | | | | | | 25 | | | 2 | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 1 | | | | |
| Peak Hour: 3pm to 4pm | 78 | 4 | 2 | 9 | 1 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 72 | 4 | 0 | 12 | 1 | 0 | 0 | 0 | 7 | 0 | 4 | 0 | 2 | 0 | 0 | 0 | 5 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

| Date: | NEH from Tenterfield | | | | | | | | | | | | NEH from Brisbane | | | | | | | | | | | | Bruxner Highway to Quarry | | | | | | | | | | | | OBR from Quarry | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NEH to Brisbane | | | | Right turn into OBR | | | | Left turn into Bruxner | | | | NEH to Tenterfield | | | | Right turn into Bruxner | | | | Left turn into OBR | | | | Bruxner across to OBR | | | | Right turn into NEH | | | | Left turn into NEH | | | | OBR across to Bruxner | | | | Right turn into NEH | | | | Left turn into NEH | | | |
| 24/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 3:00pm to 3:15pm | 28 | | | 2 | 1 | | | | 4 | | | | 29 | 1 | | 4 | | | | | 3 | 1 | | | | | | | 2 | 1 | | | 1 | | | | 2 | | | | | | | | | | | |
| 3:15pm to 3:30pm | 21 | 2 | 1 | | | | | | 6 | 1 | | | 27 | 2 | | 6 | | | | | 1 | 1 | | | | | | | 1 | | | | | | | | | 1 | | | | | | | 1 | | | | |
| 3:30pm to 3:45pm | 22 | 1 | | 1 | 1 | | | | 1 | | | 1 | 19 | 1 | | | | | | | | | 1 | | | 1 | | | 4 | | | | | | | | | | | | | 1 | | | | | | |
| 3:45pm to 4:00pm | 16 | 3 | 1 | | 1 | | | | 3 | | | | 22 | | | 2 | | | | | 3 | | 1 | | | | | | 1 | | | | | | | | | | | | | | | | | | |
| 4:00pm to 4:15pm | 17 | | | 2 | | | | | | | | | 21 | 2 | | | | | | | 1 | | | | | | 1 | | 1 | | | | | | | | | | 1 | | | 2 | | | | | | |
| 4:15pm to 4:30pm | 19 | 3 | | 2 | | | | | 1 | | | | 22 | 1 | | 1 | | | | | 1 | 1 | | | 1 | 1 | | | | | | | | | | | 1 | 1 | | | 2 | | | | | | |
| 4:30pm to 4:45pm | 12 | | 2 | 2 | 1 | | | | 2 | | | | 30 | 1 | | 1 | | | | | | | | | | | | | 4 | 1 | | 1 | | | | | 1 | | | | 1 | | | 1 | | | |
| 4:45pm to 5:00pm | 13 | | | 3 | | | | | 4 | | | | 19 | | | 2 | | | | | 1 | | | | 1 | | | | 2 | 1 | | | | | | | | | | | | | | | | | |
| 5:00pm to 5:15pm | 17 | | | | | | | | 1 | | | | 13 | 1 | | 4 | | | | | 1 | | | | 1 | | | | 2 | | | 2 | | | | | | 1 | | | 2 | | | | | | |
| 5:15pm to 5:30pm | 19 | | | 3 | | | | | 2 | | | | 11 | | | 2 | | | | | | | | | | | | | 2 | 1 | | 1 | | | | | | | | | 1 | | | | | | |
| 5:30pm to 5:45pm | 15 | 2 | | 3 | | | | | 4 | 1 | | | 20 | | | 9 | | | | | 1 | | | | | | | | 2 | | | 1 | | | | | | | | | 1 | | | | | | |
| 5:45pm to 6:00pm | 14 | | | | | | | | 2 | | | 1 | 19 | 1 | | 4 | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | |
| Peak Hour: 3pm to 4pm | 87 | 6 | 2 | 3 | 3 | 0 | 0 | 0 | 14 | 1 | 0 | 1 | 97 | 4 | 0 | 12 | 0 | 0 | 0 | 0 | 7 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 8 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| Average Afternoon Peak Hour: 3pm to 4pm | 83 | 5 | 2 | 6 | 2 | 0 | 0 | 0 | 11 | 1 | 0 | 1 | 85 | 4 | 0 | 12 | 1 | 0 | 0 | 0 | 7 | 1 | 3 | 0 | 1 | 1 | 0 | 0 | 7 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| | 83 | 13 | | | 2 | 0 | | | 11 | 2 | | | 85 | 16 | | | 1 | 0 | | | 7 | 4 | | | 1 | 1 | | | 7 | 3 | | | 1 | 0 | | | 1 | 1 | | | 2 | 1 | | | 1 | 0 | | |

Use Peak Afternoon for SIDRA

**Logan St & Naas St Intersection**
**Morning**

| Date: | Logan Street from Quarry | | | | | | | | | | | | Naast Street from NEH | | | | | | | | | | | | Robert Brush Drive (RB Drive) | | | | | | | | | | | | Naas Street | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Straight across to RB Drive | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into RB Drive | | | | Left turn into Logan Street | | | | Straight across to Logan St | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight across to NEH | | | | Right turn into Logan Street | | | | Left turn into RB Drive | | | |
| 18/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 7:00am to 7:15am | | | | | 6 | | | 1 | | | | | 1 | | | | | | | | 1 | | | | | | | | 2 | | | | 1 | | | | 1 | | | | | | | | | | | |
| 7:15am to 7:30am | 1 | | | | | | | | | | | | 1 | | | | 1 | | | | 1 | | | | | | | | 1 | | | | 3 | | | | | | | | | | | |
| 7:30am to 7:45am | | | | | 5 | 1 | | | | | | | | | | | | | | | 3 | | | | | | | | 1 | | | | 3 | | | | 1 | | | | | | | |
| 7:45am to 8:00am | | | | | 10 | 1 | | | | | | | 2 | | | | 1 | | | | 5 | 1 | | | | | | | 1 | | | | 2 | | | | | | | | | | | |
| 8:00am to 8:15am | | | | | 8 | 1 | | | | | | | 1 | | | | 1 | | | | 2 | | | | 1 | 1 | | | | | | | | | | | | | | | | | | |
| 8:15am to 8:30am | 2 | | | | 15 | | 1 | | | | | | 1 | | | | 1 | | | | 2 | | | | 2 | | | | | | | | 2 | 1 | | | | | 1 | | | | | |
| 8:30am to 8:45am | 1 | | | | 7 | | 1 | | | | | | 1 | | | | | | | | 2 | | | | 1 | | | | | | | | 4 | | | | | | | | | | | |
| 8:45am to 9:00am | 3 | | | | | | | | | | | | 2 | | | | 1 | | | | 1 | | | | 1 | | | | 2 | | | | 1 | | | | 7 | | | | | | | |
| 9:00am to 9:15am | 1 | | | | 2 | | | | | | | | 6 | | | | | | | | 4 | | | | 3 | | | | | | | | 1 | | | | 5 | | | | | | | |
| 9:15am to 9:30am | | | | | 4 | | | | | | | | 1 | | | | | | | | 2 | | | | | | | | | | | | | | | | 3 | | | | | | | |
| 9:30am to 9:45am | 1 | | | | 6 | | 1 | | | | | | 3 | | | | 1 | | | | 2 | | | | 1 | | | | 1 | | | | | | | | 10 | | | | | | | |
| 9:45am to 10:00am | | | | | 2 | | 1 | | | | | | 4 | | | | | | | | 2 | 1 | | | | | | | 1 | | | | 4 | | | | | | | | | | | |
| Peak Hour: 7:45am to 8:45am | 3 | 0 | 0 | 0 | 40 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 11 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| Date: | Logan Street from Quarry | | | | | | | | | | | | Naast Street from NEH | | | | | | | | | | | | Robert Brush Drive (RB Drive) | | | | | | | | | | | | Naas Street | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Straight across to RB Drive | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into RB Drive | | | | Left turn into Logan Street | | | | Straight across to Logan St | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight across to NEH | | | | Right turn into Logan Street | | | | Left turn into RB Drive | | | |
| 24/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 7:00am to 7:15am | | | | | 5 | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | | | | | |
| 7:15am to 7:30am | | | | | 6 | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | |
| 7:30am to 7:45am | 3 | | | | 7 | 1 | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | |
| 7:45am to 8:00am | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | |
| 8:00am to 8:15am | 1 | | | | 10 | | 1 | | | | | | 2 | | | | | | | | | | | | 1 | | | | 1 | | | | 1 | | | | 3 | | | | | | | | 1 | | | |
| 8:15am to 8:30am | 1 | 1 | | | 12 | | 1 | | | | | | 4 | | | | 1 | | | | | | | | 1 | | | | 1 | | | | | | | | 8 | | | | | | | | 1 | | | |
| 8:30am to 8:45am | 4 | 1 | | | 12 | | | | | | | | 3 | | | | | | | | | | | | 4 | | | | | | | | 1 | | | | 9 | | | | | | | | | | | |
| 8:45am to 9:00am | 1 | | | | 6 | | 1 | | | | | | 3 | | | | | | | | | | | | 3 | | | | 1 | | | | 2 | | | | 4 | | | | | | | | | | | |
| 9:00am to 9:15am | 1 | | | | 4 | | | | | | | | 3 | | | | 1 | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | | | | | |
| 9:15am to 9:30am | 2 | | | | 8 | | 1 | | | | | | 4 | | | | | | | | | | | | 1 | | | | 2 | | | | | | | | | | | | | | | | | | | |
| 9:30am to 9:45am | | | | | 9 | 1 | | | | | | | 3 | | | | | | | | | | | | 1 | 1 | | | 1 | | | | 3 | | | | | | | | | | | |
| 9:45am to 10:00am | 1 | | | | 4 | | 1 | | | | | | | | | | | | | | | | | | 1 | | | | 2 | | | | 2 | | | | | | | | | | | |
| Peak Hour: 7:45am to 8:45am | 6 | 2 | 0 | 0 | 37 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Average Morning Peak Hour: 7:45am to 8:45am | 5 | 1 | 0 | 0 | 39 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| | 5 | | 1 | | 39 | | 3 | | 0 | | 0 | | 7 | | 0 | | 2 | | 0 | | 6 | | 1 | | 5 | | 0 | | 2 | | 1 | | 2 | | 0 | | 16 | | 1 | | 0 | | 0 | | 1 | | 1 | |

**Logan St & Naas St Intersection**

**Afternoon**

| Date: | Logan Street from Quarry | | | | | | | | | | | | Naast Street from NEH | | | | | | | | | | | | Robert Brush Drive (RB Drive) | | | | | | | | | | | | Naas Street | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Straight across to RB Drive | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into RB Drive | | | | Left turn into Logan Street | | | | Straight across to Logan St | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight across to NEH | | | | Right turn into Logan Street | | | | Left turn into RB Drive | | | |
| 18/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 3:00pm to 3:15pm | 3 | | | | 4 | 3 | 1 | | | | | | 2 | | | | 1 | | | | 4 | | | | 2 | | | | 1 | | | | 3 | | | | 4 | | | | | | | | | | | |
| 3:15pm to 3:30pm | 1 | | | | 1 | | | | | | | | 6 | | | | | | | | 8 | | | | 2 | | | | | | | | 1 | | | | 3 | | | | 1 | | | | | | | |
| 3:30pm to 3:45pm | 2 | | | | 7 | | 1 | | | | | | 1 | | | | 2 | | | | 7 | | | | 1 | | | | | | | | | | | | 2 | | | | | | | | | | | |
| 3:45pm to 4:00pm | 5 | | | | 7 | 2 | | | | 1 | | | 7 | | | | | | | | 3 | | | | | | | | 1 | | | | 3 | 1 | | | 4 | | | | | | | | | | | |
| 4:00pm to 4:15pm | 3 | | | | 5 | | | | | 1 | | | 5 | | | | 1 | | | | 8 | | | | 1 | 1 | | | | | | | 2 | | | | 5 | | | | 1 | | | | | | | |
| 4:15pm to 4:30pm | | | | | 7 | | | | | | | | 3 | | | | | | | | 6 | | | | 2 | | | | | | | | | | | | 8 | | | | | | | | | | | |
| 4:30pm to 4:45pm | | | | | 3 | | 2 | | | | | | 7 | | | | 3 | | | | 8 | | | | 5 | | | | | | | | 3 | | | | 8 | | 1 | | | | | | | | | |
| 4:45pm to 5:00pm | | | | | 6 | | | | | | | | 1 | | | | 1 | | | | 9 | | | | 3 | | | | 1 | | | | 3 | | | | 4 | | | | | | | | | | | |
| 5:00pm to 5:15pm | | | | | 6 | | | | | | | | 9 | | | | 1 | | | | 5 | | | | 3 | | | | | | | | 4 | | | | 6 | | | | | | | | | | | |
| 5:15pm to 5:30pm | | | | | 3 | | | | | | | | 9 | | | | | | | | 6 | | | | 2 | | | | 1 | | | | 1 | | | | 3 | | | | | | | | | | | |
| 5:30pm to 5:45pm | 2 | | | | 3 | | | | | 1 | | | 6 | | | | 2 | | | | 6 | | | | 1 | | | | | | | | 2 | | | | 2 | | | | | | | | 1 | | | |
| 5:45pm to 6:00pm | 1 | | | | 4 | | | | | | | | 4 | | | | | | | | 9 | | | | | | | | | | | | | | | | 3 | | | | | | | | | | | |
| Peak Hour: 3:45pm to 4:45pm | 8 | 0 | 0 | 0 | 22 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 22 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 25 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |

| Date: | Logan Street from Quarry | | | | | | | | | | | | Naast Street from NEH | | | | | | | | | | | | Robert Brush Drive (RB Drive) | | | | | | | | | | | | Naas Street | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Straight across to RB Drive | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight Across | | | | Right turn into RB Drive | | | | Left turn into Logan Street | | | | Straight across to Logan St | | | | Right turn into Naas Street | | | | Left turn into Naas Street | | | | Straight across to NEH | | | | Right turn into Logan Street | | | | Left turn into RB Drive | | | |
| 24/11/2014 | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) | LV | HV | DM HV | HV (Art) |
| 3:00pm to 3:15pm | 3 | | | | 7 | 2 | 1 | | | | | | 3 | | | | 3 | | | | 5 | 1 | | 1 | 1 | | | | 2 | | | | 5 | | | | 3 | | | | | | | | | | | |
| 3:15pm to 3:30pm | 1 | 1 | | | | 1 | | | | | | | 5 | | | | 2 | 1 | | | 11 | | | | 2 | | | | 1 | | | | 3 | | | | 5 | | | | | | | | | | | |
| 3:30pm to 3:45pm | | | | | 10 | | 1 | 1 | | | | | 10 | | | | 1 | | | | 8 | | | | 1 | | | | | | | | 1 | | | | 2 | | | | 1 | 1 | | | | 1 | | |
| 3:45pm to 4:00pm | 1 | | | | 3 | 1 | | | | | | | 1 | | | | | | | | 7 | | | | 1 | | | | | | | | 2 | | | | 3 | 1 | | | | 1 | | | | | | |
| 4:00pm to 4:15pm | | | | | 2 | | | | | | | | 3 | | | | | | | | 3 | | | | 1 | | | | | | | | 4 | | | | 4 | | | 1 | | | | | | | |
| 4:15pm to 4:30pm | | | | | 4 | 1 | 1 | 1 | | | | | 2 | | | | 2 | | | | 7 | 2 | | 2 | 2 | | | | | | | | 2 | | | | 1 | | | | | | | | | | | |
| 4:30pm to 4:45pm | 1 | | | | 12 | | 1 | | | | | | 4 | | | | 1 | | | | 9 | | | | 2 | | | | | | | | 1 | | | | 8 | | | | 1 | | | | | | | |
| 4:45pm to 5:00pm | | | | | 5 | | | | | | | | 3 | | | | | | | | 8 | 1 | | | 1 | | | | 2 | | | | 4 | | | | | | | | | | | | | | | |
| 5:00pm to 5:15pm | | | | | 7 | | | | | | | | 4 | | | | 1 | | | | 3 | | | | | | | | | | | | 1 | | | | 2 | | | | 1 | | | | | | | |
| 5:15pm to 5:30pm | 1 | | | | 6 | | | 1 | | | | | 1 | | | | 1 | | | | 8 | | | | 1 | | | | | | | | | | | | 1 | | | | | | | | | | | |
| 5:30pm to 5:45pm | | | | | 10 | | | | | | | | 6 | | | | 1 | | | | 10 | | | | 2 | | | | | | | | | | | | 2 | | | | | | | | | | | |
| 5:45pm to 6:00pm | 2 | | | | 14 | | | 1 | | | | | 5 | | | | | | | | 8 | | | | 1 | 1 | | | | | | | | | | | 1 | | | | 1 | | | | | | | |
| Peak Hour: 3:45pm to 4:45pm | 2 | 0 | 0 | 0 | 21 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 26 | 2 | 0 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 16 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Average Afternoon Peak Hour: 3:45pm to 4:45pm | 5 | 0 | 0 | 0 | 22 | 2 | 2 | 1 | 0 | 1 | 0 | 0 | 16 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 26 | 1 | 0 | 1 | 7 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 1 | 0 | 0 | 21 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| | 5 | | 0 | | 22 | | 5 | | 0 | | 1 | | 16 | | 0 | | 4 | | 0 | | 26 | | 2 | | 7 | | 1 | | 1 | | 0 | | 9 | | 1 | | 21 | | 3 | | 0 | | 0 | | 1 | | 1 | |

Use Peak Afternoon for SIDRA

# APPENDIX B

# New England Hwy & Naas St - SIDRA Results

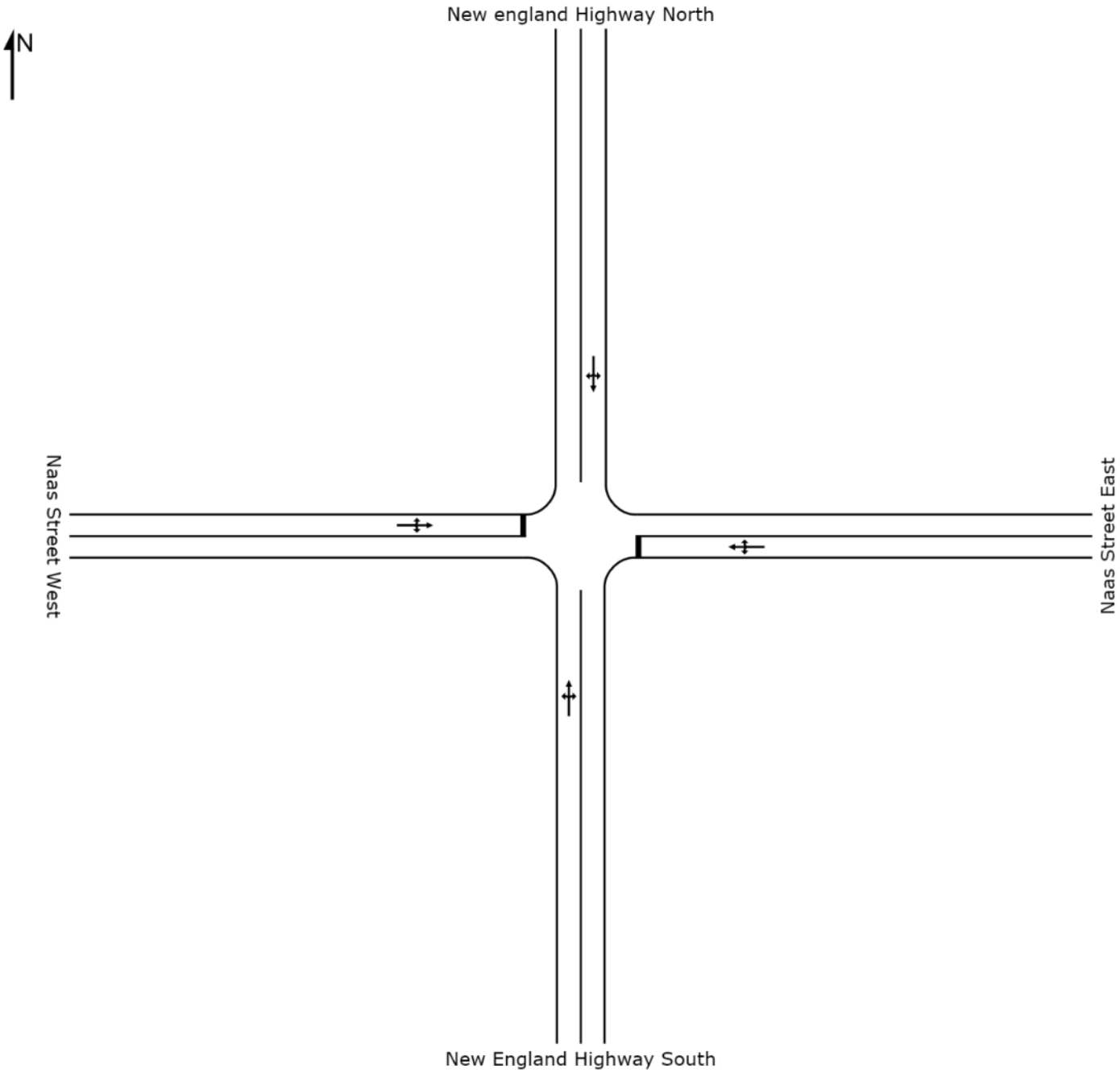
# APPENDIX B1

## Background

# SITE LAYOUT

## Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site
Stop (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site
Stop (Two-Way)

**Volume Display Method: Separate**

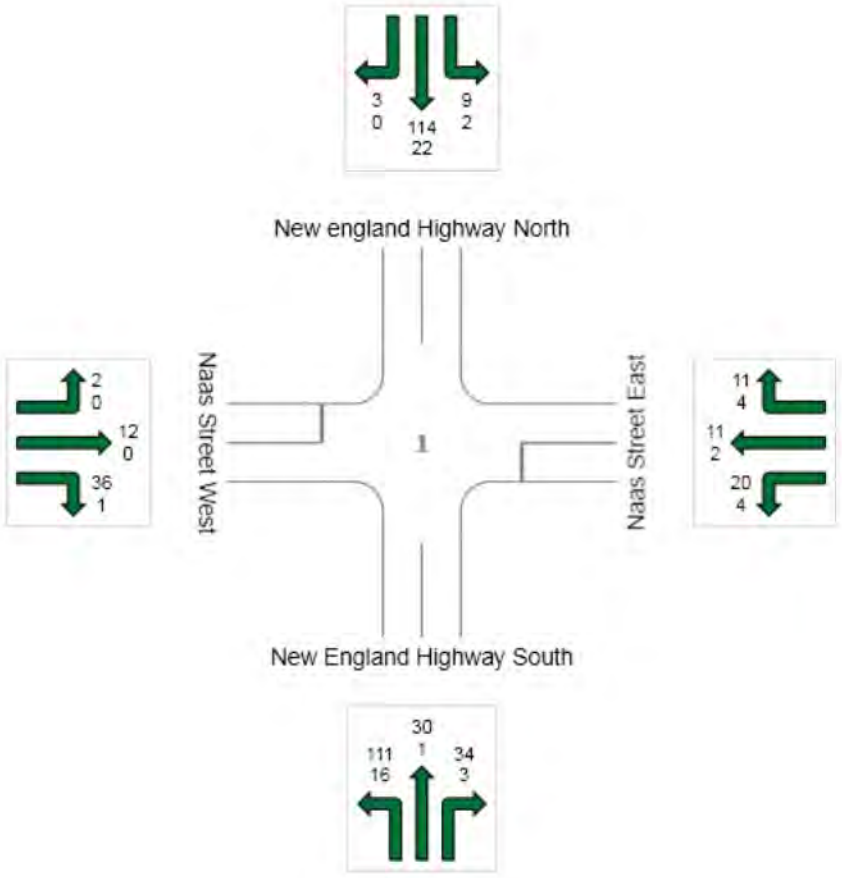
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 448**

**Light Vehicles (LV): 393**

**Heavy Vehicles (HV): 55**



# MOVEMENT SUMMARY

## Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site
Stop (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: New England Highway South | | | | | | | | | | | |
| 1 | L2 | 127 | 12.6 | 0.114 | 5.3 | LOS A | 0.6 | 4.8 | 0.29 | 0.35 | 46.2 |
| 2 | T1 | 31 | 3.2 | 0.114 | 0.6 | LOS A | 0.6 | 4.8 | 0.29 | 0.35 | 46.8 |
| 3 | R2 | 37 | 8.1 | 0.114 | 5.3 | LOS A | 0.6 | 4.8 | 0.29 | 0.35 | 45.9 |
| Approach | | 195 | 10.3 | 0.114 | 4.6 | NA | 0.6 | 4.8 | 0.29 | 0.35 | 46.3 |
| East: Naas Street East | | | | | | | | | | | |
| 4 | L2 | 24 | 16.7 | 0.063 | 9.6 | LOS A | 0.2 | 2.0 | 0.34 | 0.92 | 44.2 |
| 5 | T1 | 13 | 15.4 | 0.063 | 9.4 | LOS A | 0.2 | 2.0 | 0.34 | 0.92 | 44.2 |
| 6 | R2 | 15 | 26.7 | 0.063 | 9.4 | LOS A | 0.2 | 2.0 | 0.34 | 0.92 | 43.8 |
| Approach | | 52 | 19.2 | 0.063 | 9.5 | LOS A | 0.2 | 2.0 | 0.34 | 0.92 | 44.0 |
| North: New england Highway North | | | | | | | | | | | |
| 7 | L2 | 11 | 18.2 | 0.085 | 5.3 | LOS A | 0.5 | 3.6 | 0.28 | 0.04 | 48.3 |
| 8 | T1 | 136 | 16.2 | 0.085 | 0.5 | LOS A | 0.5 | 3.6 | 0.28 | 0.04 | 48.9 |
| 9 | R2 | 3 | 0.0 | 0.085 | 5.1 | LOS A | 0.5 | 3.6 | 0.28 | 0.04 | 48.0 |
| Approach | | 150 | 16.0 | 0.085 | 1.0 | NA | 0.5 | 3.6 | 0.28 | 0.04 | 48.8 |
| West: Naas Street West | | | | | | | | | | | |
| 10 | L2 | 2 | 0.0 | 0.068 | 9.4 | LOS A | 0.2 | 1.7 | 0.33 | 0.93 | 44.5 |
| 11 | T1 | 12 | 0.0 | 0.068 | 9.1 | LOS A | 0.2 | 1.7 | 0.33 | 0.93 | 44.3 |
| 12 | R2 | 37 | 2.7 | 0.068 | 9.0 | LOS A | 0.2 | 1.7 | 0.33 | 0.93 | 44.0 |
| Approach | | 51 | 2.0 | 0.068 | 9.0 | LOS A | 0.2 | 1.7 | 0.33 | 0.93 | 44.1 |
| All Vehicles | | 448 | 12.3 | 0.114 | 4.4 | NA | 0.6 | 4.8 | 0.30 | 0.38 | 46.5 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

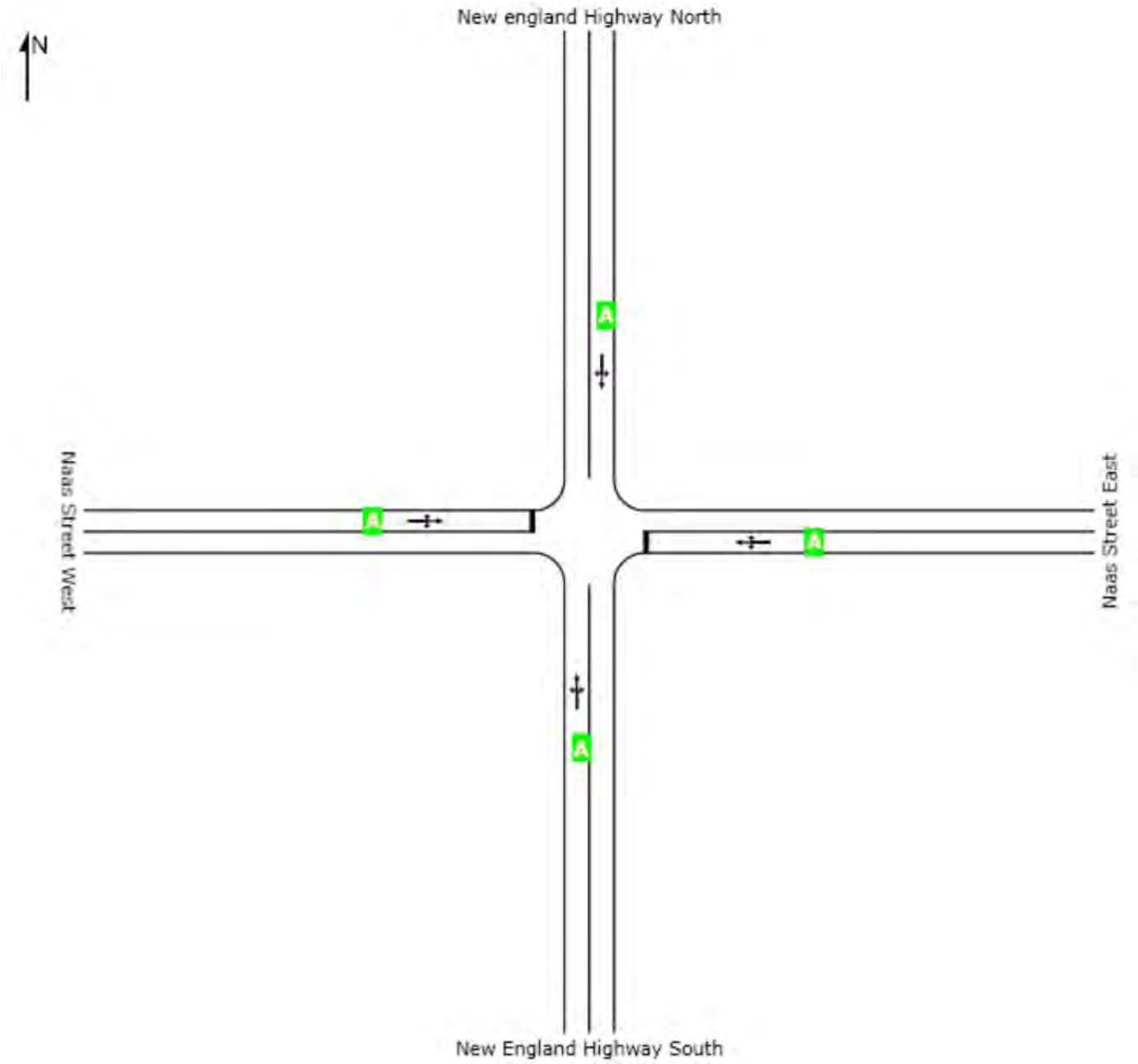
# LEVEL OF SERVICE

## Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site
Stop (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | NA | A | NA | A | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

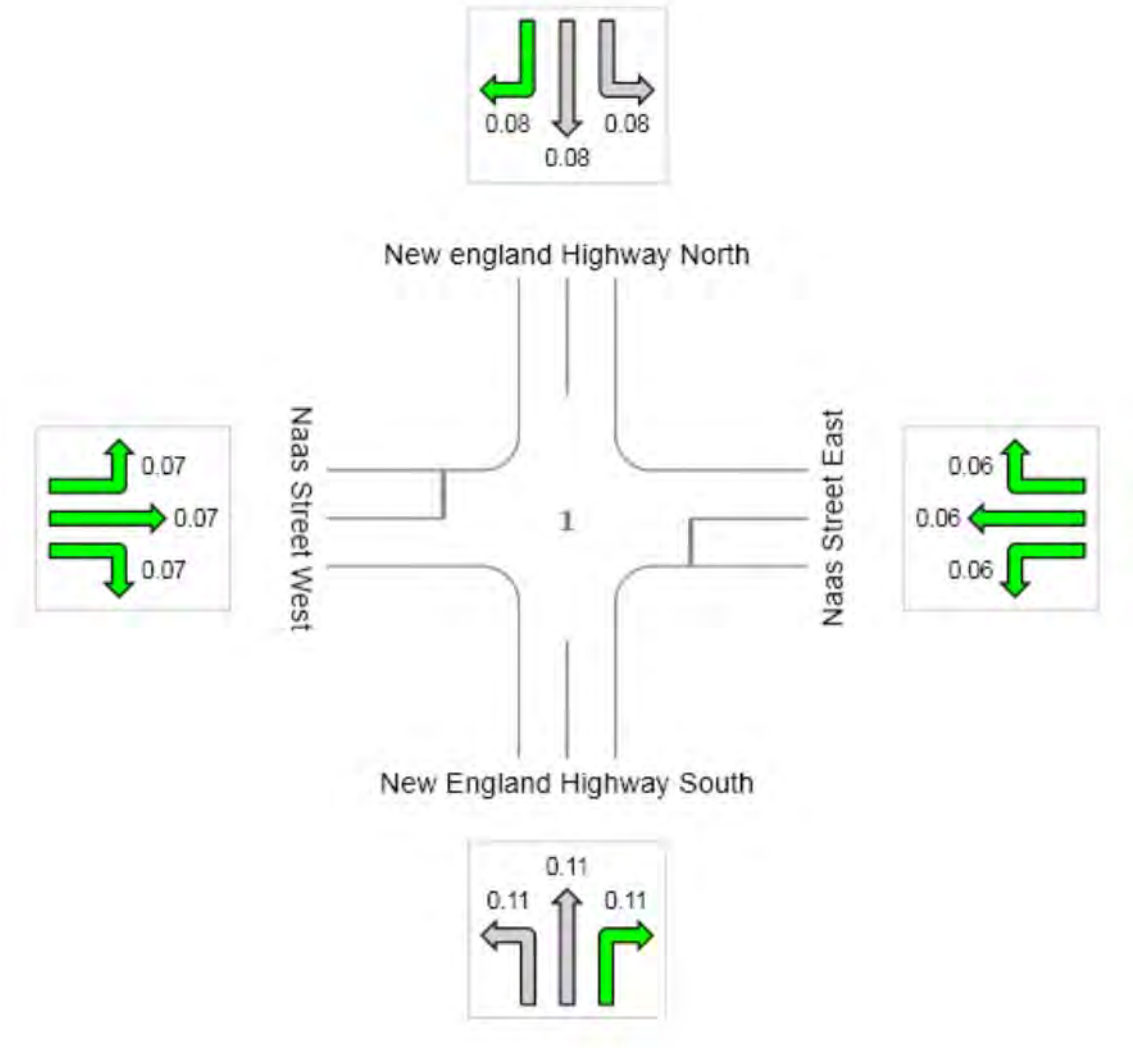
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site
Stop (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.11 | 0.06 | 0.08 | 0.07 | 0.11 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

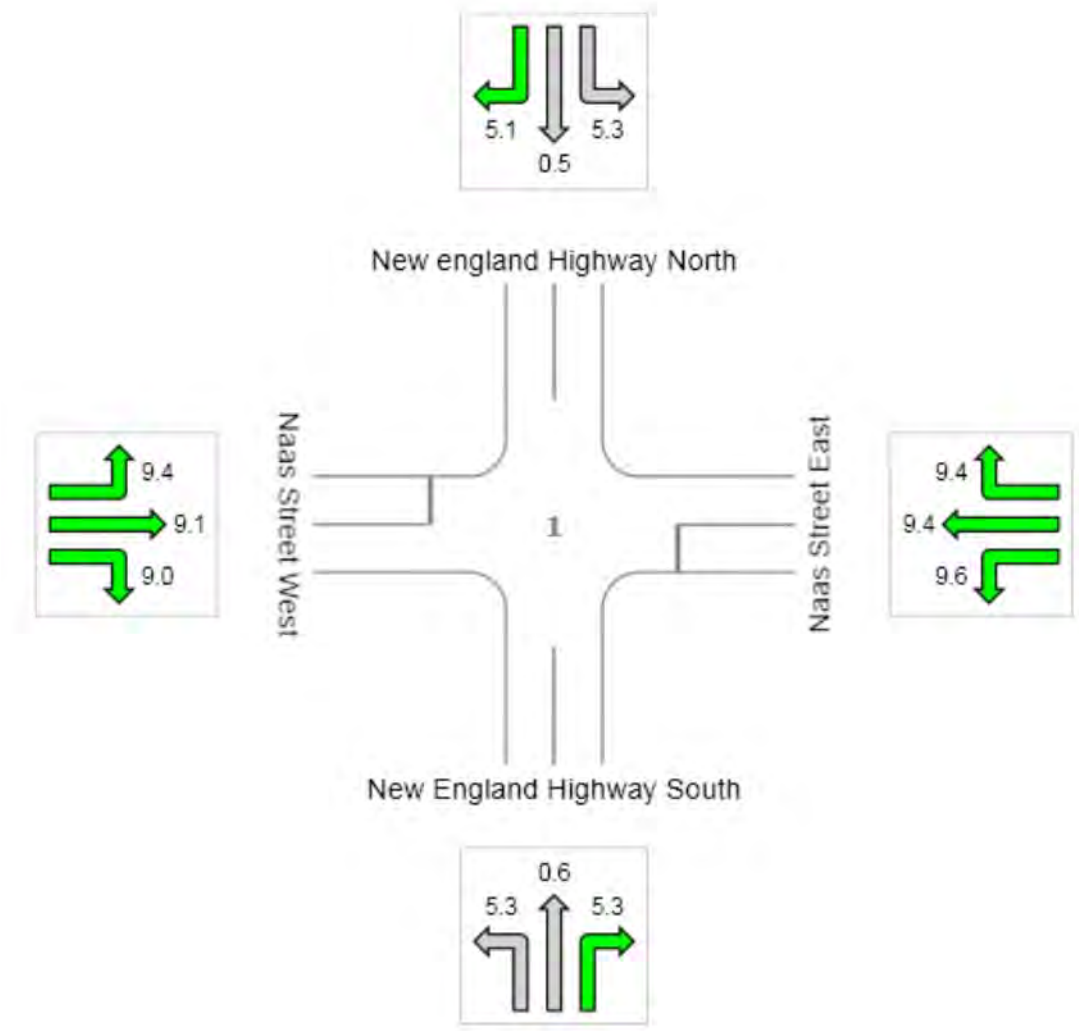
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site
Stop (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 4.6 | 9.5 | 1.0 | 9.0 | 4.4 |
| LOS | NA | A | NA | A | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site
Stop (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | New England Highway & Naas Street - No Development 8am - 9am Peak |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Stop (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 1:48:21 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 2/12/2014 2:19:50 PM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| East | Naas Street East | Two-way | 1 | 1 | 500.0 | 0 | Stop | – |
| North | New england Highway North | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| West | Naas Street West | Two-way | 1 | 1 | 500.0 | 0 | Stop | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | | New England Highway South | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | | Naas Street East | | |
| South | L2 | L | 4 | 4 |
| West | T1 | T | 5 | 5 |
| North | R2 | R | 6 | 6 |

| | | | | |
|---|---|---|---|---|
| From: North | | New england Highway North | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Naas Street West | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/ Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 3 | | | – | – | – | – |
| East | | Naas Street East | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Stop | – | 500 | 3 | 3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | -3 | | | – | – | – | – |
| North | | New england Highway North | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 0 | | | – | – | – | – |
| West | | Naas Street West | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Stop | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |
| South | T1 | 0 | LV, HV |
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach | Lane | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |
| East | Naas Street East | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |
| North | New england Highway North | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |

| | | | | | | |
|---|---|---|---|---|---|---|
| West | Naas Street West | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | |
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |
| **Heavy Vehicles (HV)** | | | | |
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg South | East | North | West |
|---|---|---|---|---|
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | Yes | Yes | Yes |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 60 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 60 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| Total (veh) | – | 37 | 31 | 127 |
| LV (veh) | – | 34 | 30 | 111 |
| HV (veh) | – | 3 | 1 | 16 |
| From: East | Naas Street East | | | |
| Total (veh) | 24 | – | 15 | 13 |
| LV (veh) | 20 | – | 11 | 11 |
| HV (veh) | 4 | – | 4 | 2 |
| From: North | New england Highway North | | | |
| Total (veh) | 136 | 11 | – | 3 |
| LV (veh) | 114 | 9 | – | 3 |
| HV (veh) | 22 | 2 | – | 0 |
| From: West | Naas Street West | | | |
| Total (veh) | 37 | 12 | 2 | – |
| LV (veh) | 36 | 12 | 2 | – |
| HV (veh) | 1 | 0 | 0 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: South | New England Highway South | | |
| West | – | 100.00 | 1.50 |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| From: East | Naas Street East | | |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 21.50 |
| North | – | 100.00 | 1.50 |
| From: North | New england Highway North | | |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 1.50 |
| From: West | Naas Street West | | |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| Heavy Vehicles (HV) | | | |
| From: South | New England Highway South | | |
| West | – | 100.00 | 1.50 |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| From: East | Naas Street East | | |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 21.50 |
| North | – | 100.00 | 1.50 |
| From: North | New england Highway North | | |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 1.50 |
| From: West | Naas Street West | | |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |

## Priorities

| Opposed Movement | Opposing Movements South | East | North | West |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| South | New England Highway South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | T1,L2 | – |
| East | Naas Street East | | | |
| L2 | – | – | T1 | – |
| T1 | R2,T1,L2 | – | T1,R2 | – |
| R2 | R2,T1 | – | T1,R2 | T1,L2 |
| North | New england Highway North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | T1,L2 | – | – | – |
| West | Naas Street West | | | |
| L2 | T1 | – | – | – |
| T1 | R2,T1 | – | T1,L2,R2 | – |
| R2 | R2,T1 | L2,T1 | T1,R2 | – |

**Gap Acceptance - Gap Acceptance Data**

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| East | Naas Street East | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| North | New england Highway North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| West | Naas Street West | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

**Gap Acceptance - Two-Way Sign Control Calibration**

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes**

| | Critical Gap Adjustment | | | | Follow-up Headway Adjustment | | | |
|---|---|---|---|---|---|---|---|---|
| Major Road Number of Lanes: | 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control**

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |

| | | |
|---|---|---|
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | New england Highway North | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Naas Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| **Heavy Vehicles (HV)** | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | New england Highway North | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Naas Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | New england Highway North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Naas Street West | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |

| Heavy Vehicles (HV) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| From: South | New England Highway South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | New england Highway North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Naas Street West | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** None

## Model Settings - Options

| General Options | |
|---|---|
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS C |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| Passenger Car Equivalents | |
|---|---|
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| **Queue Blockage** | |
| Minimum Probability of Blockage | 0 |
| **Delay and Queue** | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| **Downstream Short Lane** | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| Cost Options | |
|---|---|
| Cost Unit | $ |

| Vehicle Cost Parameters | | | | | | |
|---|---|---|---|---|---|---|
| | | Veh Operating Cost | | | Veh Time Cost | |
| Movement Class | Veh Cost Method | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

**Model Settings - Fuel Consumption**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

**Model Settings - CO Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

**Model Settings - HC Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

**Model Settings - NOx Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

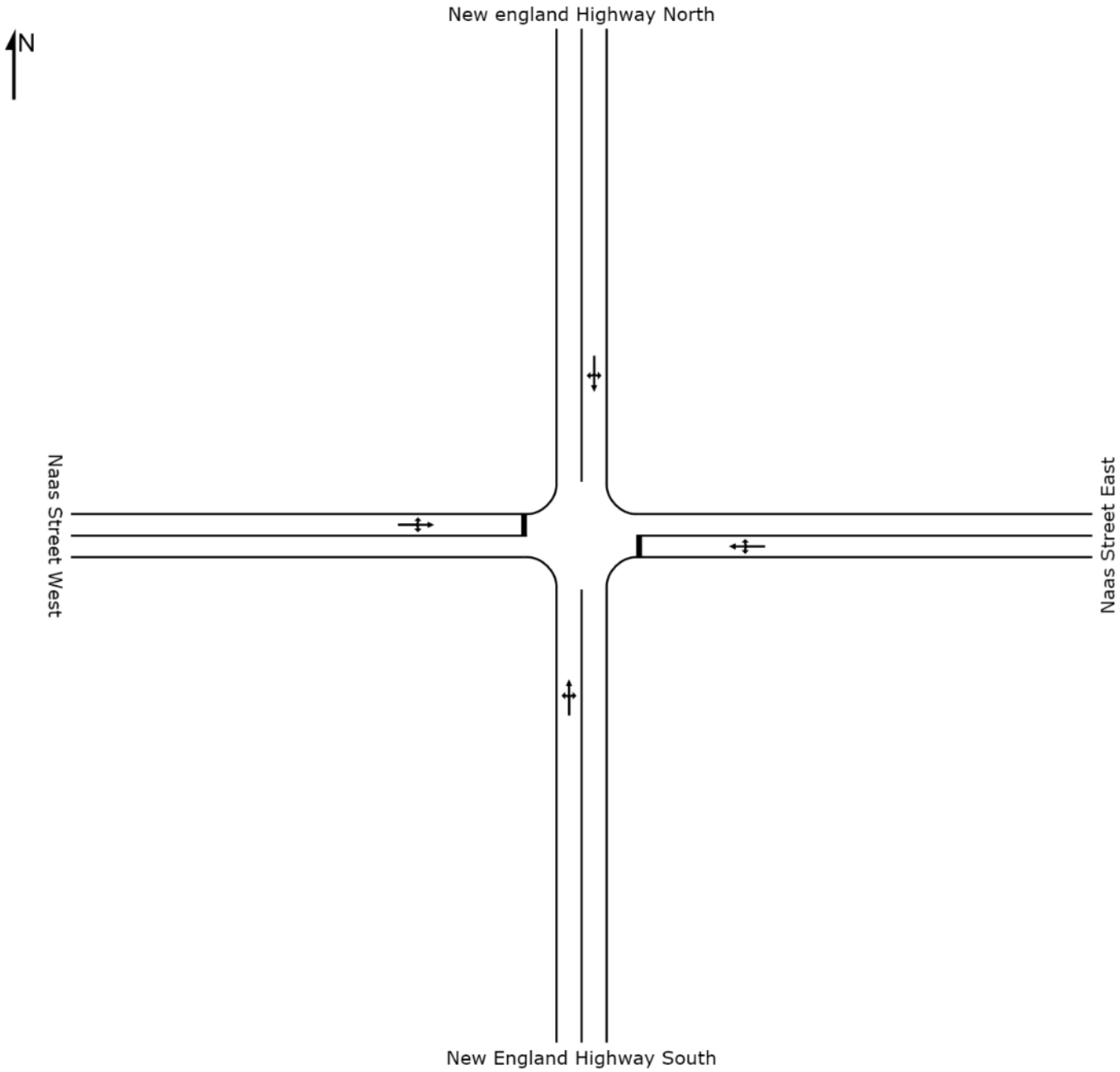
# APPENDIX B2

## Background + Development

# SITE LAYOUT

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)

**Volume Display Method: Separate**

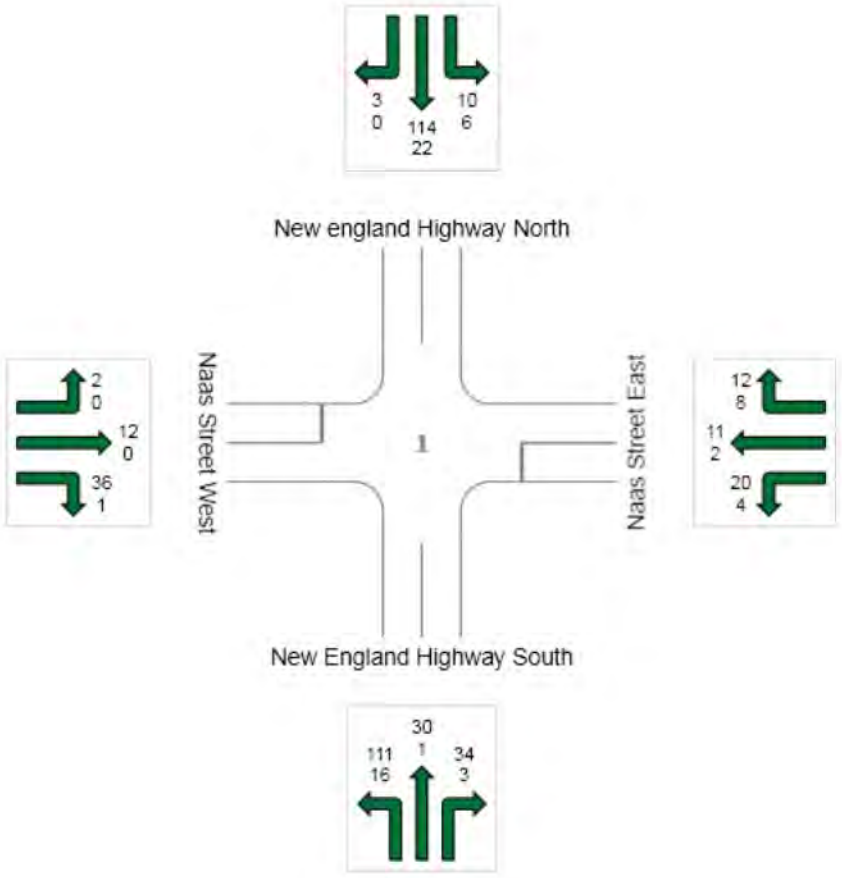
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 458**

**Light Vehicles (LV): 395**

**Heavy Vehicles (HV): 63**



# MOVEMENT SUMMARY

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: New England Highway South | | | | | | | | | | | |
| 1 | L2 | 127 | 12.6 | 0.115 | 5.3 | LOS A | 0.6 | 4.8 | 0.30 | 0.35 | 46.2 |
| 2 | T1 | 31 | 3.2 | 0.115 | 0.6 | LOS A | 0.6 | 4.8 | 0.30 | 0.35 | 46.8 |
| 3 | R2 | 37 | 8.1 | 0.115 | 5.3 | LOS A | 0.6 | 4.8 | 0.30 | 0.35 | 45.9 |
| Approach | | 195 | 10.3 | 0.115 | 4.6 | NA | 0.6 | 4.8 | 0.30 | 0.35 | 46.2 |
| East: Naas Street East | | | | | | | | | | | |
| 4 | L2 | 24 | 16.7 | 0.073 | 9.8 | LOS A | 0.3 | 2.4 | 0.35 | 0.93 | 44.1 |
| 5 | T1 | 13 | 15.4 | 0.073 | 9.6 | LOS A | 0.3 | 2.4 | 0.35 | 0.93 | 44.1 |
| 6 | R2 | 20 | 40.0 | 0.073 | 10.0 | LOS A | 0.3 | 2.4 | 0.35 | 0.93 | 43.5 |
| Approach | | 57 | 24.6 | 0.073 | 9.8 | LOS A | 0.3 | 2.4 | 0.35 | 0.93 | 43.9 |
| North: New england Highway North | | | | | | | | | | | |
| 7 | L2 | 16 | 37.5 | 0.089 | 5.4 | LOS A | 0.5 | 3.8 | 0.29 | 0.05 | 48.1 |
| 8 | T1 | 136 | 16.2 | 0.089 | 0.5 | LOS A | 0.5 | 3.8 | 0.29 | 0.05 | 48.9 |
| 9 | R2 | 3 | 0.0 | 0.089 | 5.1 | LOS A | 0.5 | 3.8 | 0.29 | 0.05 | 47.9 |
| Approach | | 155 | 18.1 | 0.089 | 1.1 | NA | 0.5 | 3.8 | 0.29 | 0.05 | 48.8 |
| West: Naas Street West | | | | | | | | | | | |
| 10 | L2 | 2 | 0.0 | 0.068 | 9.4 | LOS A | 0.2 | 1.7 | 0.33 | 0.93 | 44.5 |
| 11 | T1 | 12 | 0.0 | 0.068 | 9.1 | LOS A | 0.2 | 1.7 | 0.33 | 0.93 | 44.3 |
| 12 | R2 | 37 | 2.7 | 0.068 | 9.0 | LOS A | 0.2 | 1.7 | 0.33 | 0.93 | 44.0 |
| Approach | | 51 | 2.0 | 0.068 | 9.0 | LOS A | 0.2 | 1.7 | 0.33 | 0.93 | 44.1 |
| All Vehicles | | 458 | 13.8 | 0.115 | 4.6 | NA | 0.6 | 4.8 | 0.30 | 0.38 | 46.5 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

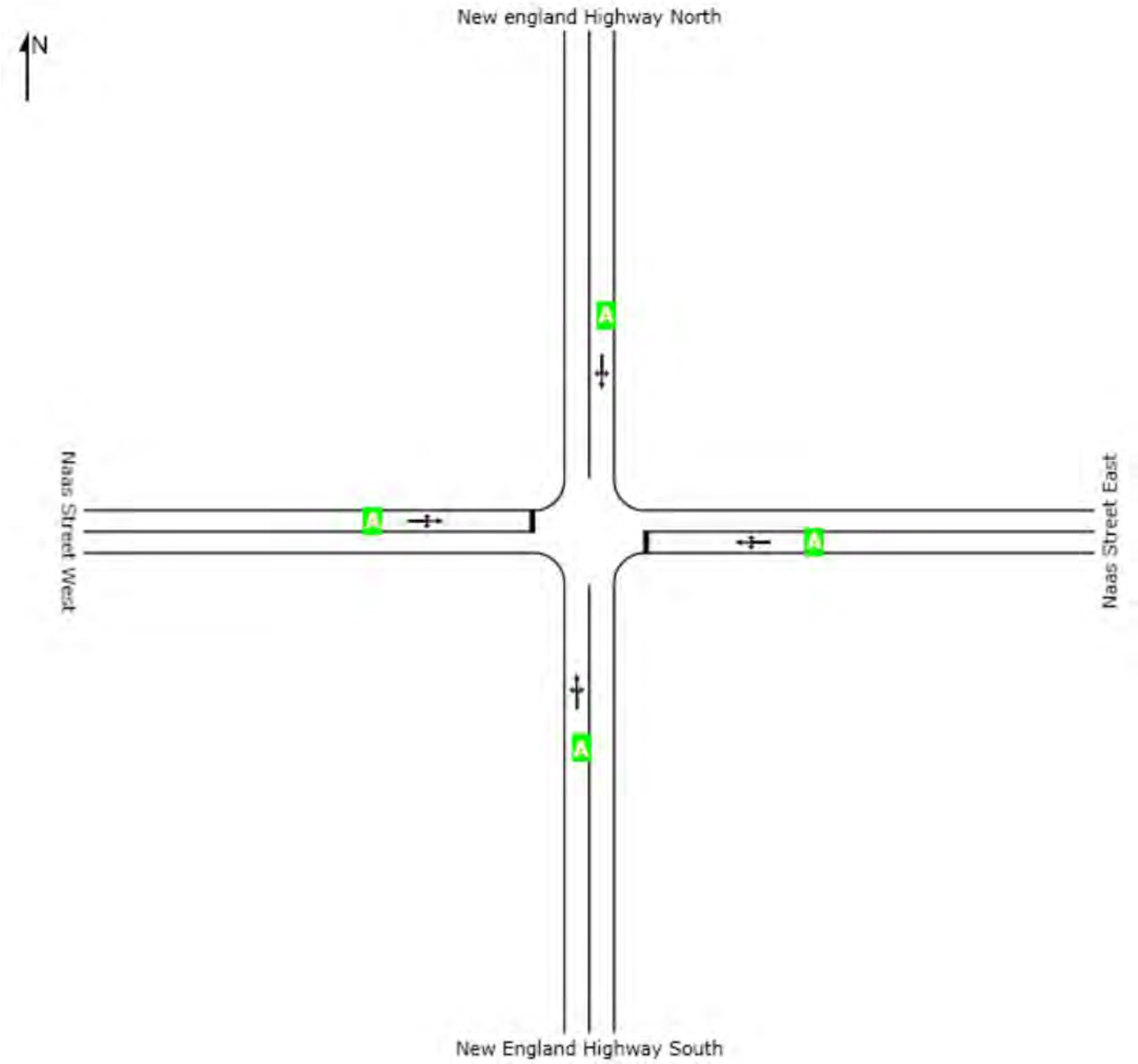
# LEVEL OF SERVICE

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | NA | A | NA | A | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

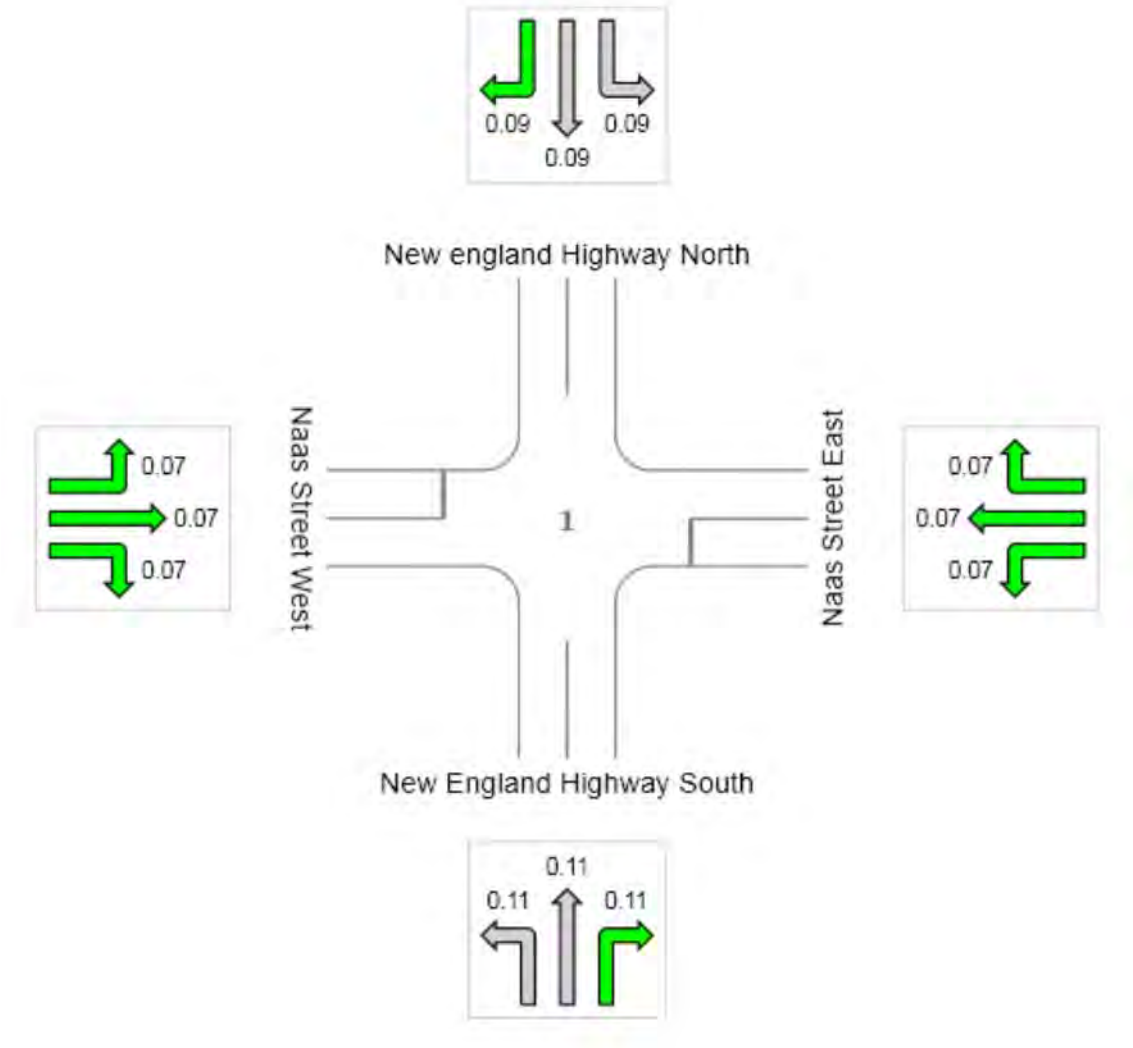
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.11 | 0.07 | 0.09 | 0.07 | 0.11 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

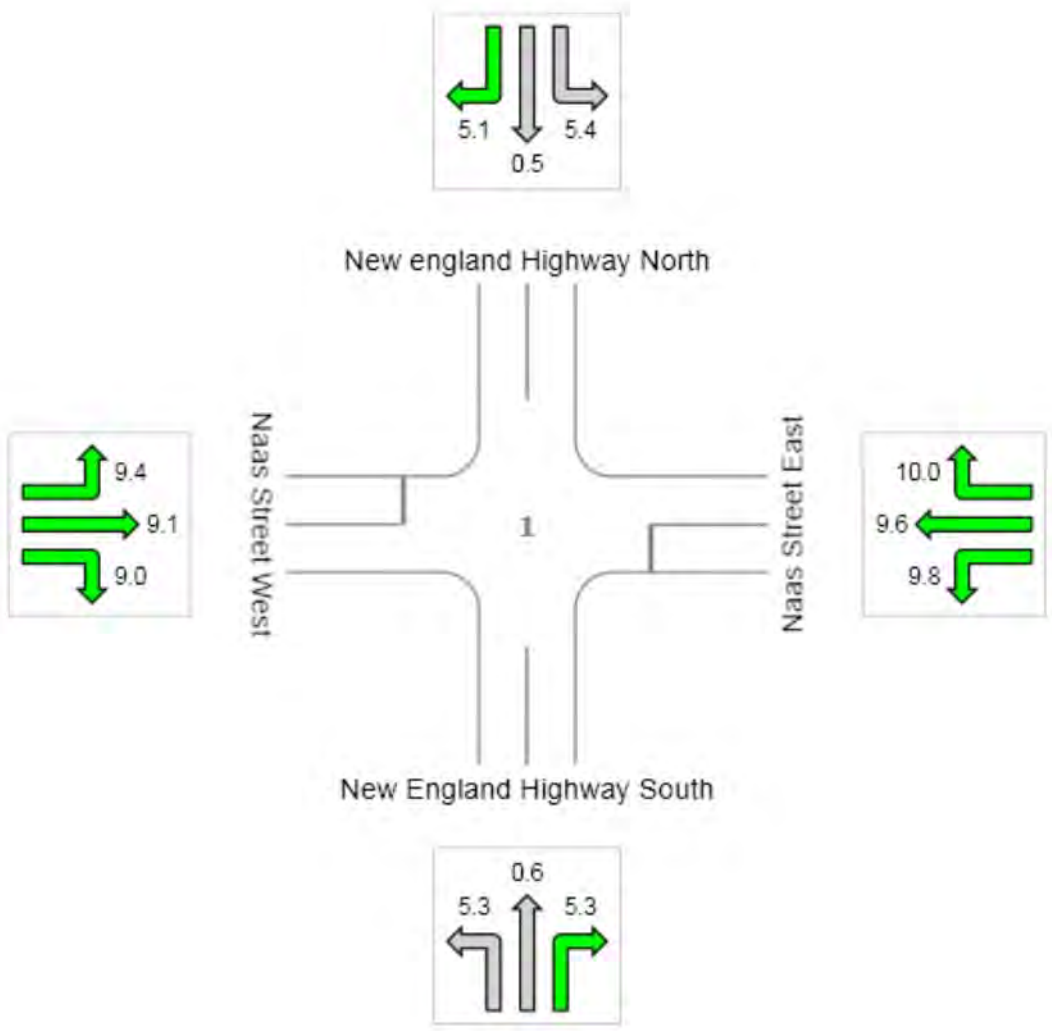
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 4.6 | 9.8 | 1.1 | 9.0 | 4.6 |
| LOS | NA | A | NA | A | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | New England Highway & Naas Street - With Development 8am - 9am Peak |
| Site ID | 1 |
| Site Title | 20% of Quarry Traffic Assumed within am Peak |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Stop (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 1:48:21 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 2/12/2014 3:36:00 PM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| East | Naas Street East | Two-way | 1 | 1 | 500.0 | 0 | Stop | – |
| North | New england Highway North | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| West | Naas Street West | Two-way | 1 | 1 | 500.0 | 0 | Stop | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | Naas Street East | | | |
| South | L2 | L | 4 | 4 |
| West | T1 | T | 5 | 5 |

| | | | | |
|---|---|---|---|---|
| North | R2 | R | 6 | 6 |
| From: North | | New england Highway North | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Naas Street West | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/ Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 3 | | | – | – | – | – |
| East | | Naas Street East | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Stop | – | 500 | 3 | 3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | -3 | | | – | – | – | – |
| North | | New england Highway North | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 0 | | | – | – | – | – |
| West | | Naas Street West | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Stop | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |
| South | T1 | 0 | LV, HV |
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach | Lane | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |
| East | Naas Street East | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |
| North | New england Highway North | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |

| | | | | | | |
|---|---|---|---|---|---|---|
| West | Naas Street West | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | |
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |
| **Heavy Vehicles (HV)** | | | | |
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg South | East | North | West |
|---|---|---|---|---|
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | Yes | Yes | Yes |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 60 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 60 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| Total (veh) | – | 37 | 31 | 127 |
| LV (veh) | – | 34 | 30 | 111 |
| HV (veh) | – | 3 | 1 | 16 |
| From: East | Naas Street East | | | |
| Total (veh) | 24 | – | 20 | 13 |
| LV (veh) | 20 | – | 12 | 11 |
| HV (veh) | 4 | – | 8 | 2 |
| From: North | New england Highway North | | | |
| Total (veh) | 136 | 16 | – | 3 |
| LV (veh) | 114 | 10 | – | 3 |
| HV (veh) | 22 | 6 | – | 0 |
| From: West | Naas Street West | | | |
| Total (veh) | 37 | 12 | 2 | – |
| LV (veh) | 36 | 12 | 2 | – |
| HV (veh) | 1 | 0 | 0 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: South | New England Highway South | | |
| West | – | 100.00 | 1.50 |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| From: East | Naas Street East | | |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 21.50 |
| North | – | 100.00 | 1.50 |
| From: North | New england Highway North | | |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 1.50 |
| From: West | Naas Street West | | |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| Heavy Vehicles (HV) | | | |
| From: South | New England Highway South | | |
| West | – | 100.00 | 1.50 |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| From: East | Naas Street East | | |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 21.50 |
| North | – | 100.00 | 1.50 |
| From: North | New england Highway North | | |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 1.50 |
| From: West | Naas Street West | | |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |

## Priorities

| Opposed Movement | Opposing Movements South | East | North | West |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| South | New England Highway South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | T1,L2 | – |
| East | Naas Street East | | | |
| L2 | – | – | T1 | – |
| T1 | R2,T1,L2 | – | T1,R2 | – |
| R2 | R2,T1 | – | T1,R2 | T1,L2 |
| North | New england Highway North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | T1,L2 | – | – | – |
| West | Naas Street West | | | |
| L2 | T1 | – | – | – |
| T1 | R2,T1 | – | T1,L2,R2 | – |
| R2 | R2,T1 | L2,T1 | T1,R2 | – |

**Gap Acceptance - Gap Acceptance Data**

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| East | Naas Street East | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| North | New england Highway North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| West | Naas Street West | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

**Gap Acceptance - Two-Way Sign Control Calibration**

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes**

| | Critical Gap Adjustment | | | | Follow-up Headway Adjustment | | | |
|---|---|---|---|---|---|---|---|---|
| Major Road Number of Lanes: | 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control**

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |

| | | |
|---|---|---|
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | New england Highway North | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Naas Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| **Heavy Vehicles (HV)** | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | New england Highway North | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Naas Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | New england Highway North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Naas Street West | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |

| Heavy Vehicles (HV) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| From: South | New England Highway South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | New england Highway North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Naas Street West | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** None

## Model Settings - Options

| General Options | |
|---|---|
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS C |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| Passenger Car Equivalents | |
|---|---|
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| **Queue Blockage** | |
| Minimum Probability of Blockage | 0 |
| **Delay and Queue** | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| **Downstream Short Lane** | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| Cost Options | |
|---|---|
| Cost Unit | $ |

| Vehicle Cost Parameters | | | | | | |
|---|---|---|---|---|---|---|
| | | Veh Operating Cost | | | Veh Time Cost | |
| Movement Class | Veh Cost Method | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

**Model Settings - Fuel Consumption**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

**Model Settings - CO Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

**Model Settings - HC Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

**Model Settings - NOx Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

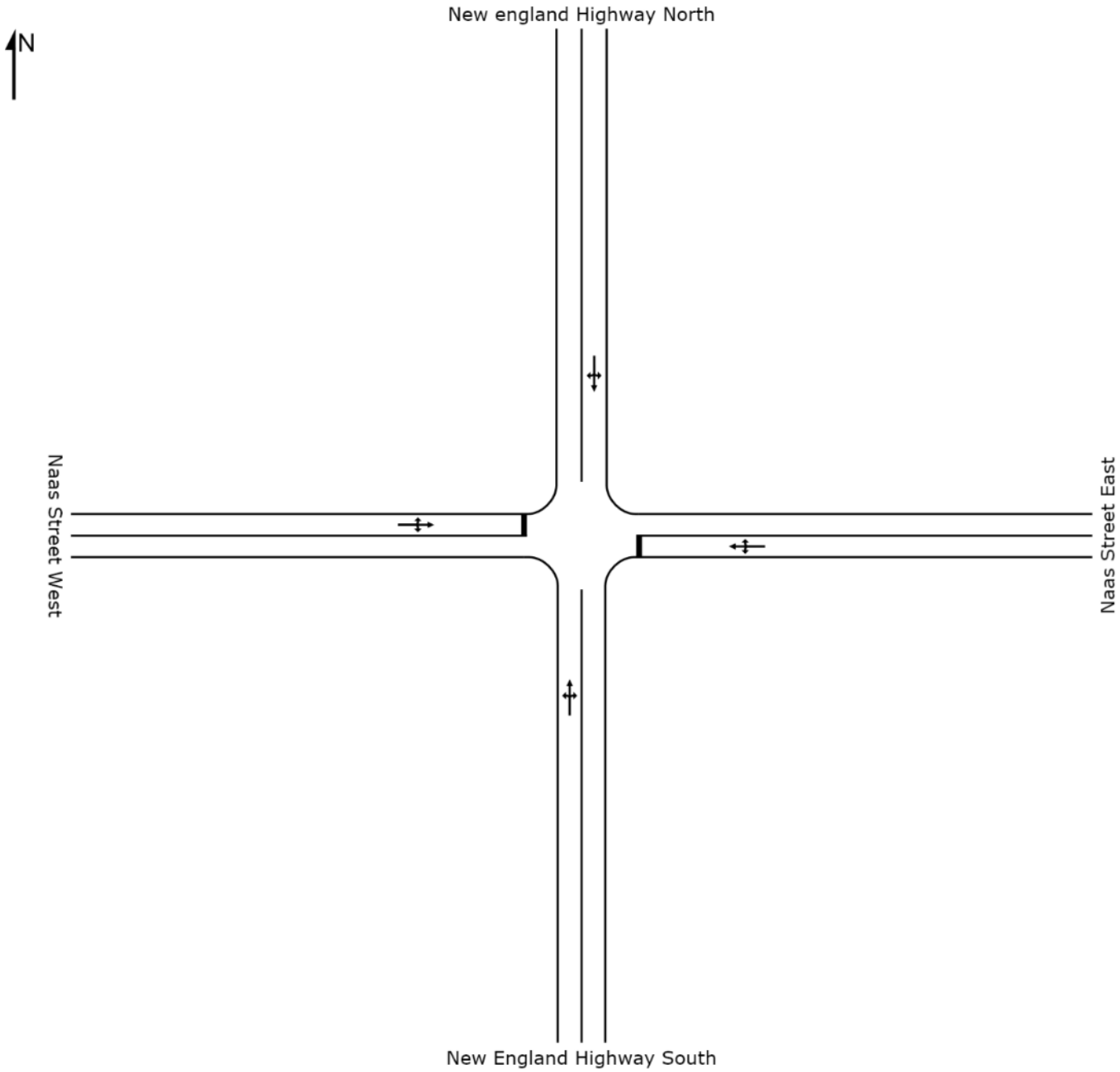
# APPENDIX B3

## 30yr + Development

# SITE LAYOUT

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)

**Volume Display Method: Separate**

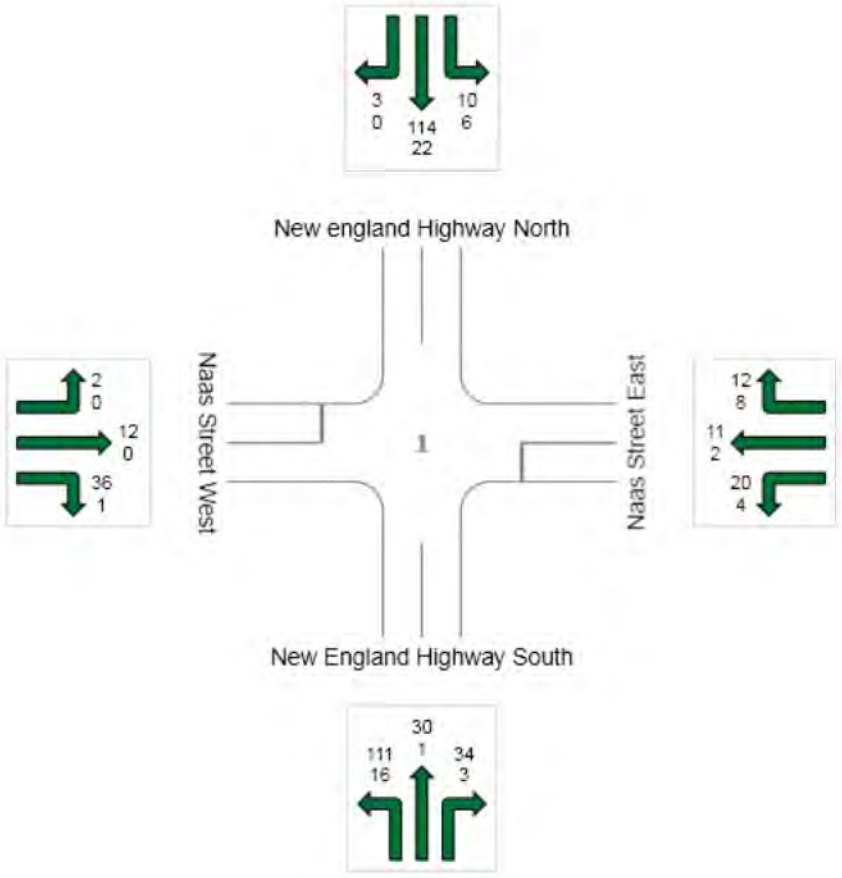
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 458**

**Light Vehicles (LV): 395**

**Heavy Vehicles (HV): 63**



# MOVEMENT SUMMARY

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: New England Highway South | | | | | | | | | | | |
| 1 | L2 | 184 | 12.6 | 0.170 | 5.7 | LOS A | 1.0 | 7.8 | 0.39 | 0.32 | 46.0 |
| 2 | T1 | 45 | 3.2 | 0.170 | 1.0 | LOS A | 1.0 | 7.8 | 0.39 | 0.32 | 46.6 |
| 3 | R2 | 54 | 8.1 | 0.170 | 5.7 | LOS A | 1.0 | 7.8 | 0.39 | 0.32 | 45.6 |
| Approach | | 283 | 10.3 | 0.170 | 5.0 | NA | 1.0 | 7.8 | 0.39 | 0.32 | 46.0 |
| East: Naas Street East | | | | | | | | | | | |
| 4 | L2 | 35 | 16.7 | 0.267 | 12.4 | LOS A | 1.1 | 9.4 | 0.54 | 1.02 | 43.0 |
| 5 | T1 | 97 | 15.4 | 0.267 | 12.2 | LOS A | 1.1 | 9.4 | 0.54 | 1.02 | 43.0 |
| 6 | R2 | 29 | 40.0 | 0.267 | 12.6 | LOS A | 1.1 | 9.4 | 0.54 | 1.02 | 42.4 |
| Approach | | 161 | 20.1 | 0.267 | 12.3 | LOS A | 1.1 | 9.4 | 0.54 | 1.02 | 42.9 |
| North: New england Highway North | | | | | | | | | | | |
| 7 | L2 | 23 | 37.5 | 0.129 | 5.8 | LOS A | 0.7 | 6.0 | 0.37 | 0.05 | 47.8 |
| 8 | T1 | 197 | 16.2 | 0.129 | 0.9 | LOS A | 0.7 | 6.0 | 0.37 | 0.05 | 48.7 |
| 9 | R2 | 4 | 0.0 | 0.129 | 5.4 | LOS A | 0.7 | 6.0 | 0.37 | 0.05 | 47.7 |
| Approach | | 225 | 18.1 | 0.129 | 1.5 | NA | 0.7 | 6.0 | 0.37 | 0.05 | 48.6 |
| West: Naas Street West | | | | | | | | | | | |
| 10 | L2 | 3 | 0.0 | 0.129 | 11.4 | LOS A | 0.4 | 3.2 | 0.44 | 0.98 | 43.5 |
| 11 | T1 | 17 | 0.0 | 0.129 | 11.1 | LOS A | 0.4 | 3.2 | 0.44 | 0.98 | 43.3 |
| 12 | R2 | 54 | 2.7 | 0.129 | 11.0 | LOS A | 0.4 | 3.2 | 0.44 | 0.98 | 43.1 |
| Approach | | 74 | 2.0 | 0.129 | 11.0 | LOS A | 0.4 | 3.2 | 0.44 | 0.98 | 43.1 |
| All Vehicles | | 742 | 13.9 | 0.267 | 6.1 | NA | 1.1 | 9.4 | 0.42 | 0.46 | 45.7 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

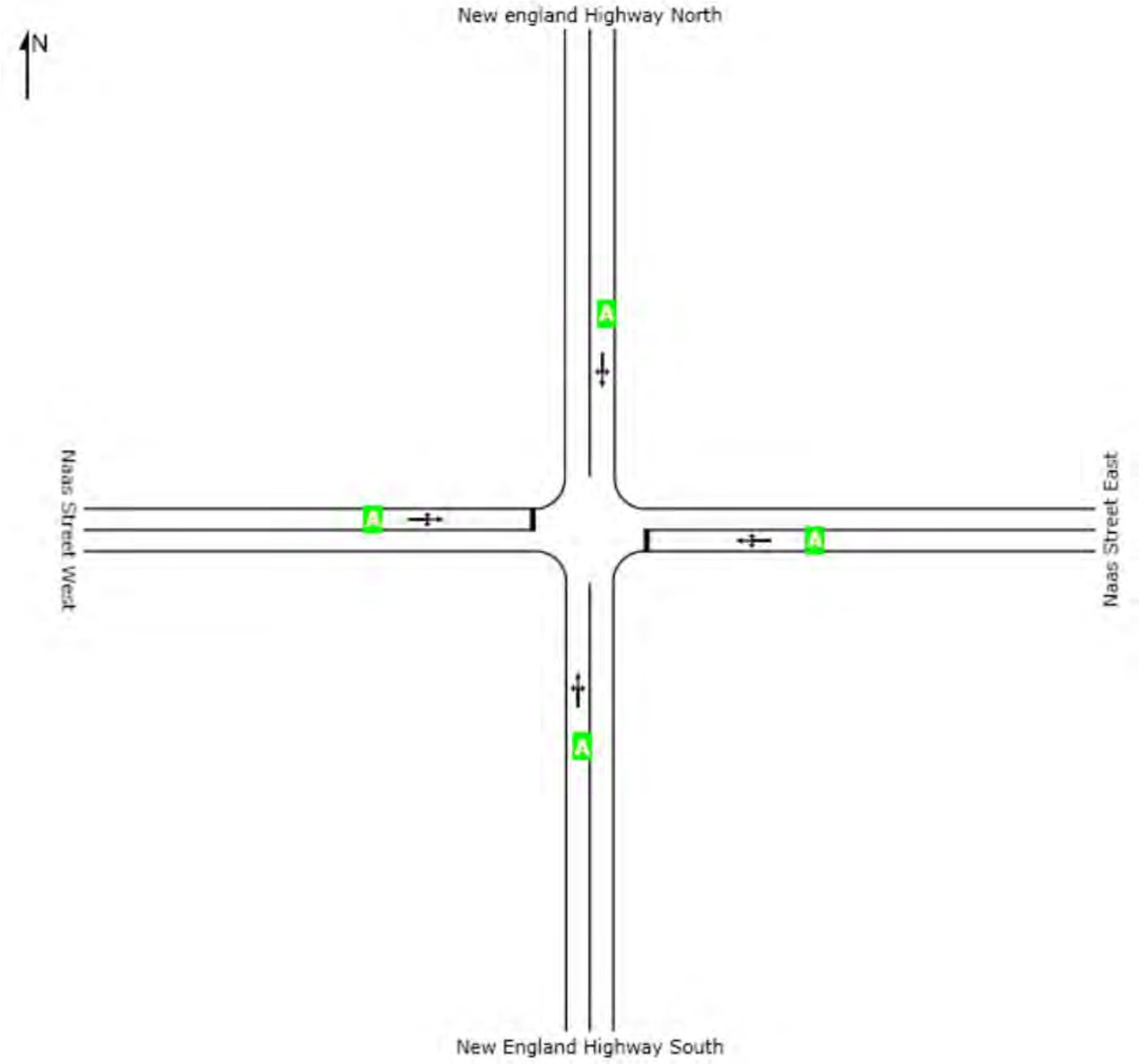
# LEVEL OF SERVICE

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | NA | A | NA | A | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

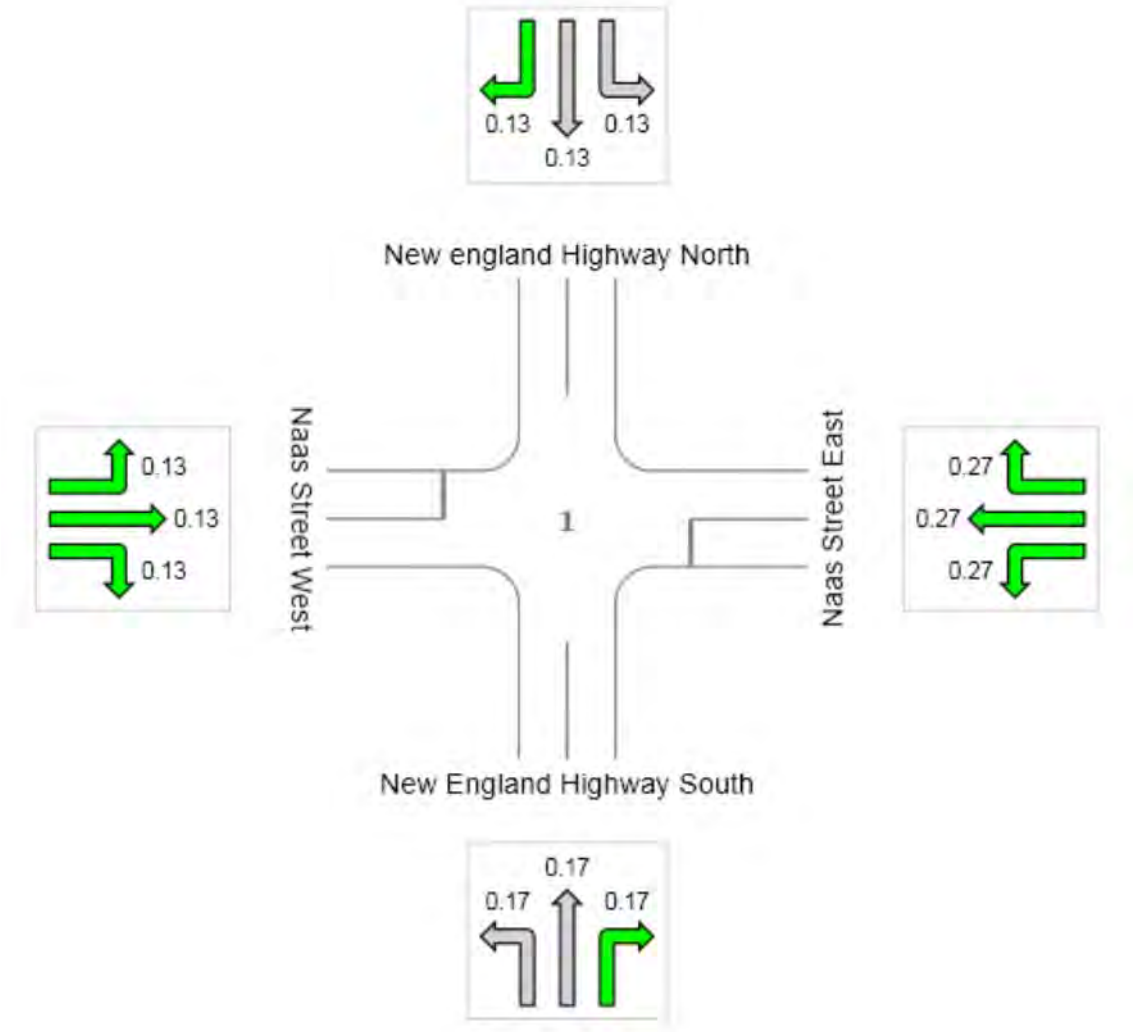
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.17 | 0.27 | 0.13 | 0.13 | 0.27 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

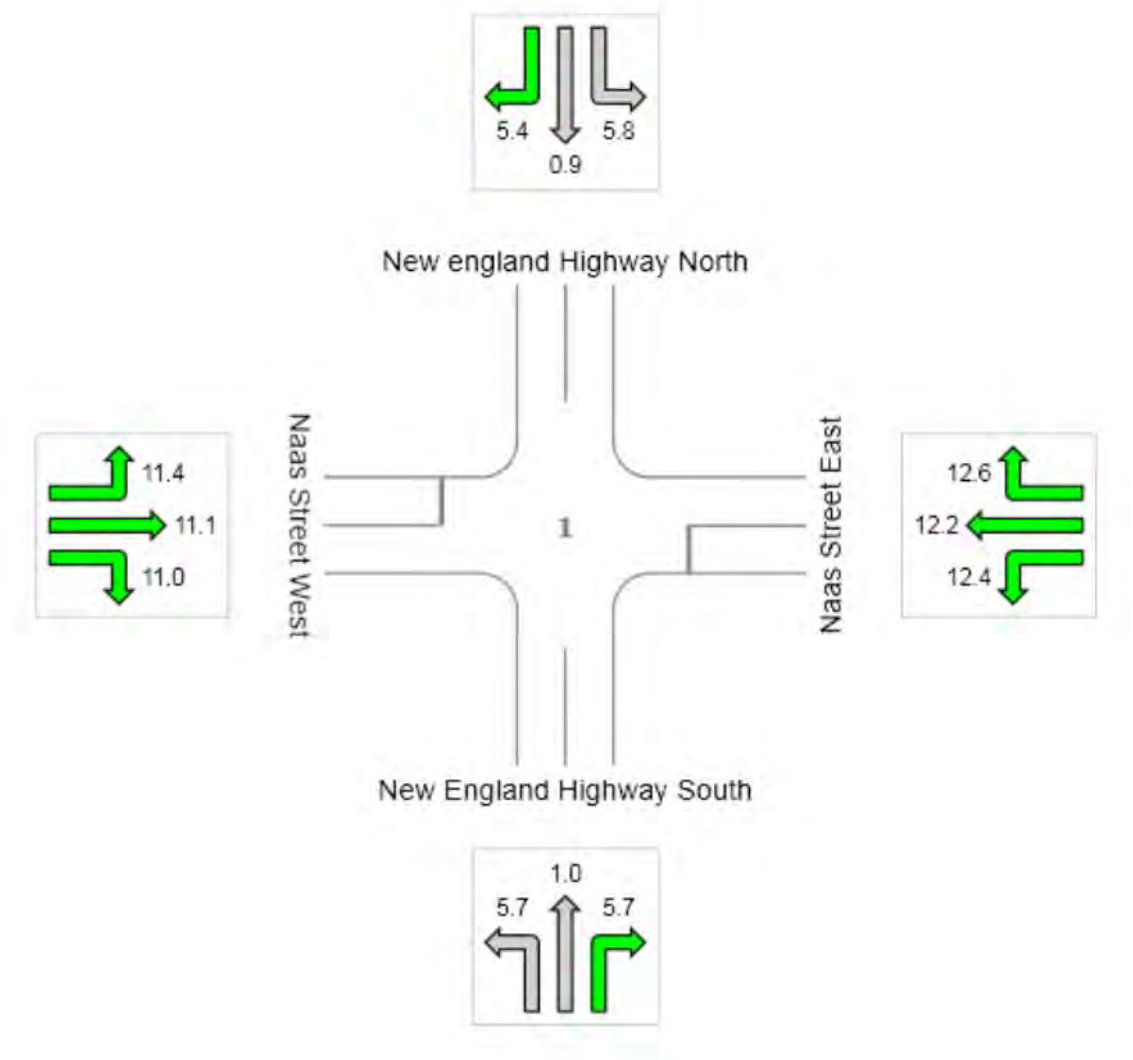
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 5.0 | 12.3 | 1.5 | 11.0 | 6.1 |
| LOS | NA | A | NA | A | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak
Stop (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | New England Highway & Naas Street - With Development 8am - 9am Peak |
| Site ID | 1 |
| Site Title | 20% of Quarry Traffic Assumed within am Peak |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Stop (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 1:48:21 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 2/12/2014 3:15:26 PM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| East | Naas Street East | Two-way | 1 | 1 | 500.0 | 0 | Stop | – |
| North | New england Highway North | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| West | Naas Street West | Two-way | 1 | 1 | 500.0 | 0 | Stop | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | Naas Street East | | | |
| South | L2 | L | 4 | 4 |
| West | T1 | T | 5 | 5 |

| | | | | |
|---|---|---|---|---|
| North | R2 | R | 6 | 6 |
| From: North | | New england Highway North | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Naas Street West | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/ Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 3 | | | – | – | – | – |
| East | | Naas Street East | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Stop | – | 500 | 3 | 3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | -3 | | | – | – | – | – |
| North | | New england Highway North | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 0 | | | – | – | – | – |
| West | | Naas Street West | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Stop | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |
| South | T1 | 0 | LV, HV |
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach | Lane | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |
| East | Naas Street East | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |
| North | New england Highway North | | | | | |
| | App. Lane 1 | 1950 | – | – | 0.0 | No |

| | | | | | | |
|---|---|---|---|---|---|---|
| West | Naas Street West | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | |
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |
| **Heavy Vehicles (HV)** | | | | |
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg South | East | North | West |
|---|---|---|---|---|
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | Yes | Yes | Yes |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 60 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 60 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| Total (veh) | – | 37 | 31 | 127 |
| LV (veh) | – | 34 | 30 | 111 |
| HV (veh) | – | 3 | 1 | 16 |
| From: East | Naas Street East | | | |
| Total (veh) | 24 | – | 20 | 13 |
| LV (veh) | 20 | – | 12 | 11 |
| HV (veh) | 4 | – | 8 | 2 |
| From: North | New england Highway North | | | |
| Total (veh) | 136 | 16 | – | 3 |
| LV (veh) | 114 | 10 | – | 3 |
| HV (veh) | 22 | 6 | – | 0 |
| From: West | Naas Street West | | | |
| Total (veh) | 37 | 12 | 2 | – |
| LV (veh) | 36 | 12 | 2 | – |
| HV (veh) | 1 | 0 | 0 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: South | New England Highway South | | |
| West | – | 100.00 | 1.50 |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| From: East | Naas Street East | | |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 21.50 |
| North | – | 100.00 | 1.50 |
| From: North | New england Highway North | | |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 1.50 |
| From: West | Naas Street West | | |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| Heavy Vehicles (HV) | | | |
| From: South | New England Highway South | | |
| West | – | 100.00 | 1.50 |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| From: East | Naas Street East | | |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 21.50 |
| North | – | 100.00 | 1.50 |
| From: North | New england Highway North | | |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |
| West | – | 100.00 | 1.50 |
| From: West | Naas Street West | | |
| North | – | 100.00 | 1.50 |
| East | – | 100.00 | 1.50 |
| South | – | 100.00 | 1.50 |

## Priorities

| Opposed Movement | Opposing Movements South | East | North | West |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| South | New England Highway South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | T1,L2 | – |
| East | Naas Street East | | | |
| L2 | – | – | T1 | – |
| T1 | R2,T1,L2 | – | T1,R2 | – |
| R2 | R2,T1 | – | T1,R2 | T1,L2 |
| North | New england Highway North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | T1,L2 | – | – | – |
| West | Naas Street West | | | |
| L2 | T1 | – | – | – |
| T1 | R2,T1 | – | T1,L2,R2 | – |
| R2 | R2,T1 | L2,T1 | T1,R2 | – |

**Gap Acceptance - Gap Acceptance Data**

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| East | Naas Street East | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| North | New england Highway North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| West | Naas Street West | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

**Gap Acceptance - Two-Way Sign Control Calibration**

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes**

| | Critical Gap Adjustment | | | | Follow-up Headway Adjustment | | | |
|---|---|---|---|---|---|---|---|---|
| Major Road Number of Lanes: | 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control**

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |

| | | |
|---|---|---|
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | New england Highway North | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Naas Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| **Heavy Vehicles (HV)** | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | New england Highway North | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Naas Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | New england Highway North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Naas Street West | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |

| Heavy Vehicles (HV) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| From: South | New England Highway South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | New england Highway North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Naas Street West | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** Design Life

| | |
|---|---|
| Design Life Analysis Objective | Practical Capacity (v/c ratio = xp) |
| Growth Model | Uniform |
| Number of Years | 30 |
| Const. No. of Years | – |
| Result For | Intersection - Vehicles |

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS C |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| Passenger Car Equivalents | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| Queue Blockage | |
| Minimum Probability of Blockage | 0 |
| Delay and Queue | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| Downstream Short Lane | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| | |
|---|---|
| Cost Options | |
| Cost Unit | $ |

| Vehicle Cost Parameters | | | | | | |
|---|---|---|---|---|---|---|
| | | Veh Operating Cost | | | Veh Time Cost | |
| Movement Class | Veh Cost Method | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

**Model Settings - Vehicle Parameters**

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

**Model Settings - Fuel Consumption**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

**Model Settings - CO Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

**Model Settings - HC Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

**Model Settings - NOx Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

# APPENDIX C

# Logan St & Naas St -SIDRA Results

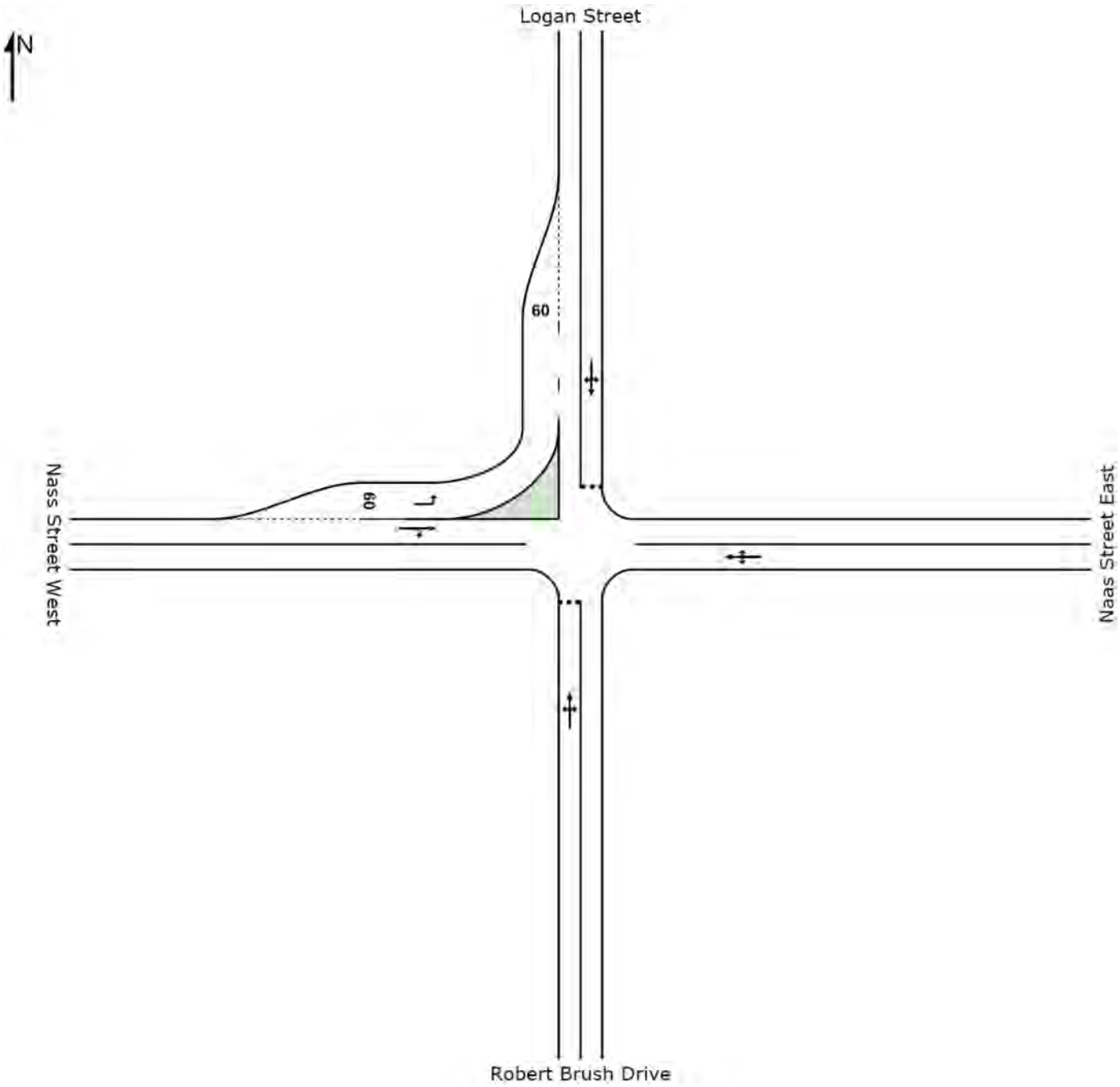
# APPENDIX C1

## Background

# SITE LAYOUT

## Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

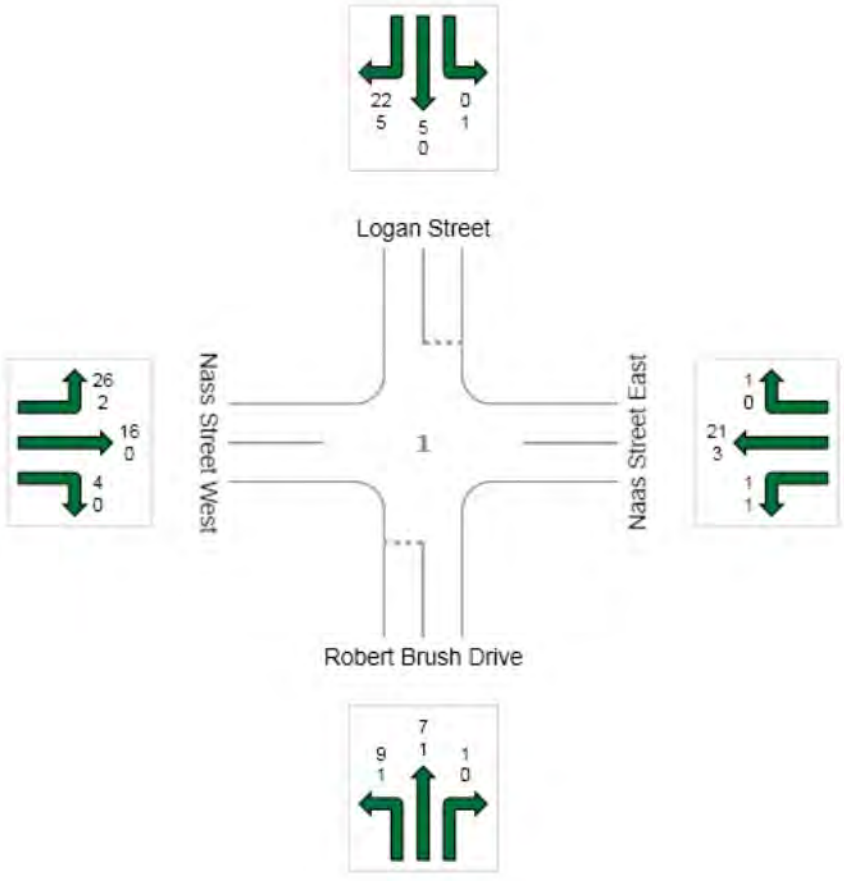
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 127**

**Light Vehicles (LV): 113**

**Heavy Vehicles (HV): 14**



# MOVEMENT SUMMARY

## Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Robert Brush Drive | | | | | | | | | | | |
| 1 | L2 | 11 | 10.0 | 0.016 | 4.9 | LOS A | 0.1 | 0.5 | 0.11 | 0.47 | 46.5 |
| 2 | T1 | 8 | 12.5 | 0.016 | 3.9 | LOS A | 0.1 | 0.5 | 0.11 | 0.47 | 46.8 |
| 3 | R2 | 1 | 0.0 | 0.016 | 4.8 | LOS A | 0.1 | 0.5 | 0.11 | 0.47 | 46.2 |
| Approach | | 20 | 10.5 | 0.016 | 4.5 | LOS A | 0.1 | 0.5 | 0.11 | 0.47 | 46.6 |
| East: Naas Street East | | | | | | | | | | | |
| 4 | L2 | 2 | 50.0 | 0.016 | 5.3 | LOS A | 0.1 | 0.6 | 0.07 | 0.06 | 48.2 |
| 5 | T1 | 25 | 12.5 | 0.016 | 0.0 | LOS A | 0.1 | 0.6 | 0.07 | 0.06 | 49.5 |
| 6 | R2 | 1 | 0.0 | 0.016 | 4.6 | LOS A | 0.1 | 0.6 | 0.07 | 0.06 | 48.7 |
| Approach | | 28 | 14.8 | 0.016 | 0.6 | NA | 0.1 | 0.6 | 0.07 | 0.06 | 49.4 |
| North: Logan Street | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.038 | 5.6 | LOS A | 0.2 | 1.2 | 0.20 | 0.48 | 44.9 |
| 8 | T1 | 5 | 0.0 | 0.038 | 4.1 | LOS A | 0.2 | 1.2 | 0.20 | 0.48 | 46.5 |
| 9 | R2 | 28 | 18.5 | 0.038 | 5.3 | LOS A | 0.2 | 1.2 | 0.20 | 0.48 | 46.4 |
| Approach | | 35 | 18.2 | 0.038 | 5.1 | LOS A | 0.2 | 1.2 | 0.20 | 0.48 | 46.4 |
| West: Nass Street West | | | | | | | | | | | |
| 10 | L2 | 29 | 7.1 | 0.016 | 4.4 | LOS A | 0.0 | 0.0 | 0.00 | 0.46 | 47.8 |
| 11 | T1 | 17 | 0.0 | 0.011 | 0.1 | LOS A | 0.1 | 0.4 | 0.10 | 0.11 | 49.1 |
| 12 | R2 | 4 | 0.0 | 0.011 | 4.6 | LOS A | 0.1 | 0.4 | 0.10 | 0.11 | 48.2 |
| Approach | | 51 | 4.2 | 0.016 | 3.0 | NA | 0.1 | 0.4 | 0.04 | 0.31 | 48.2 |
| All Vehicles | | 134 | 11.0 | 0.038 | 3.3 | NA | 0.2 | 1.2 | 0.10 | 0.33 | 47.7 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

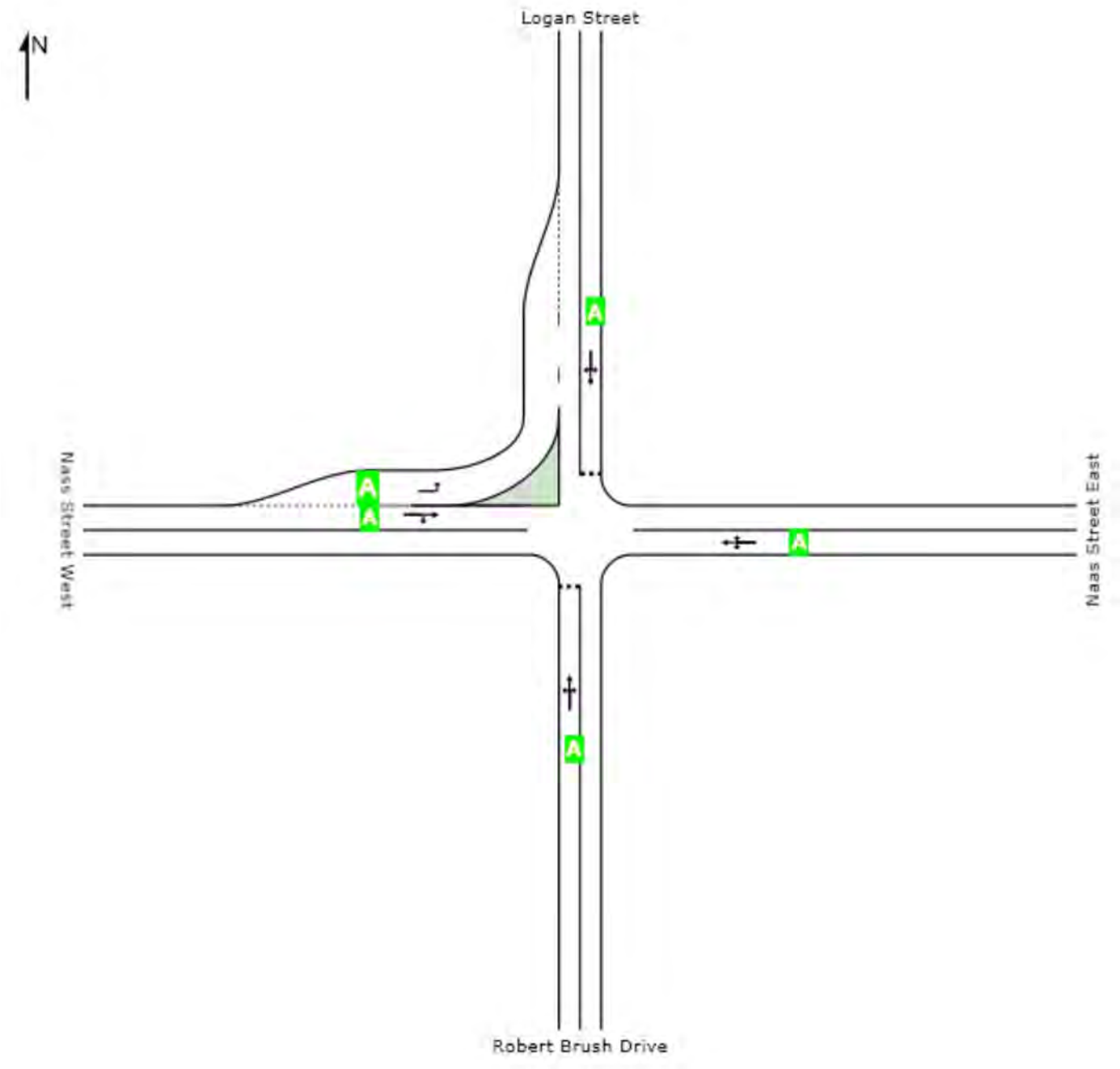
# LEVEL OF SERVICE

## Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | A | NA | A | NA | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

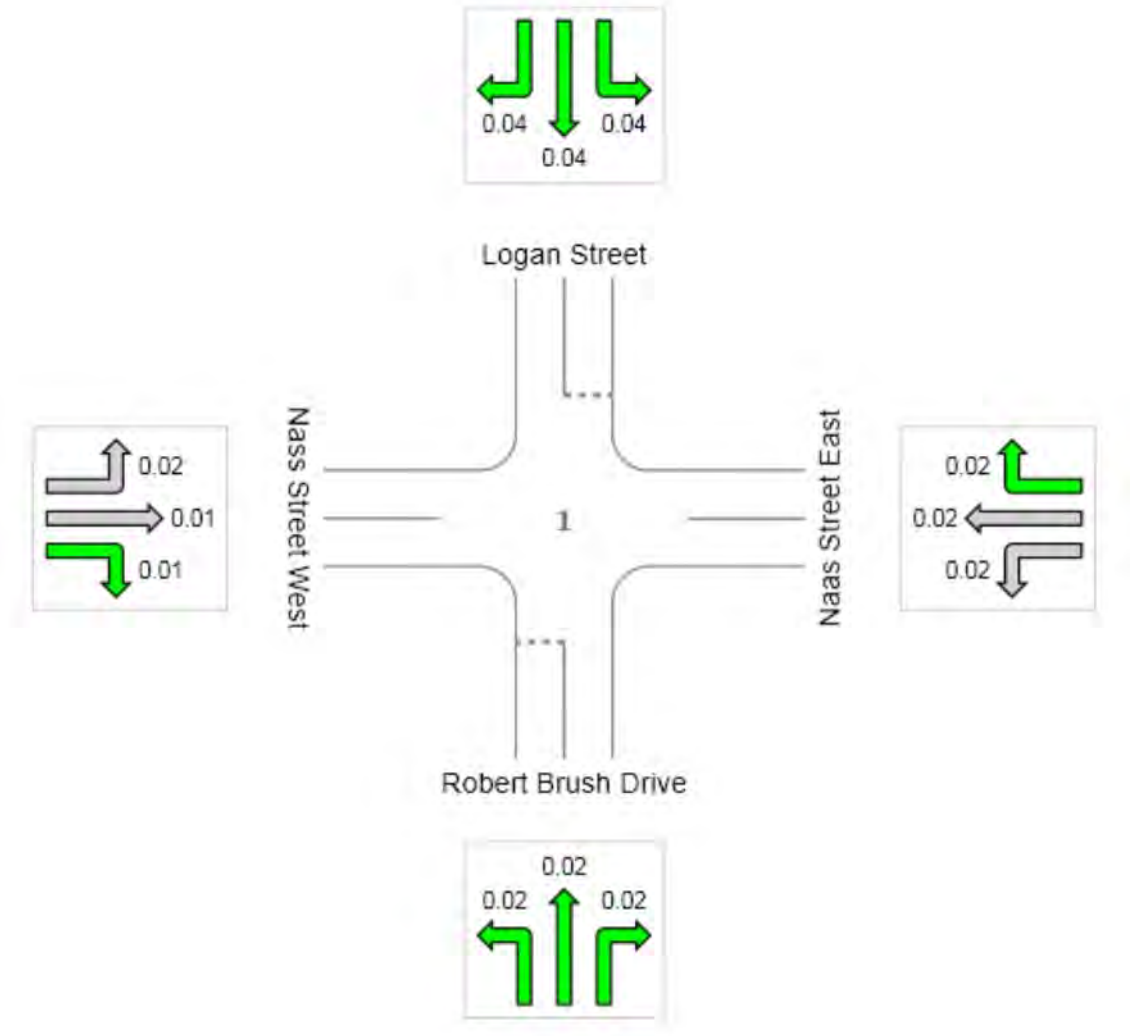
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.02 | 0.02 | 0.04 | 0.02 | 0.04 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

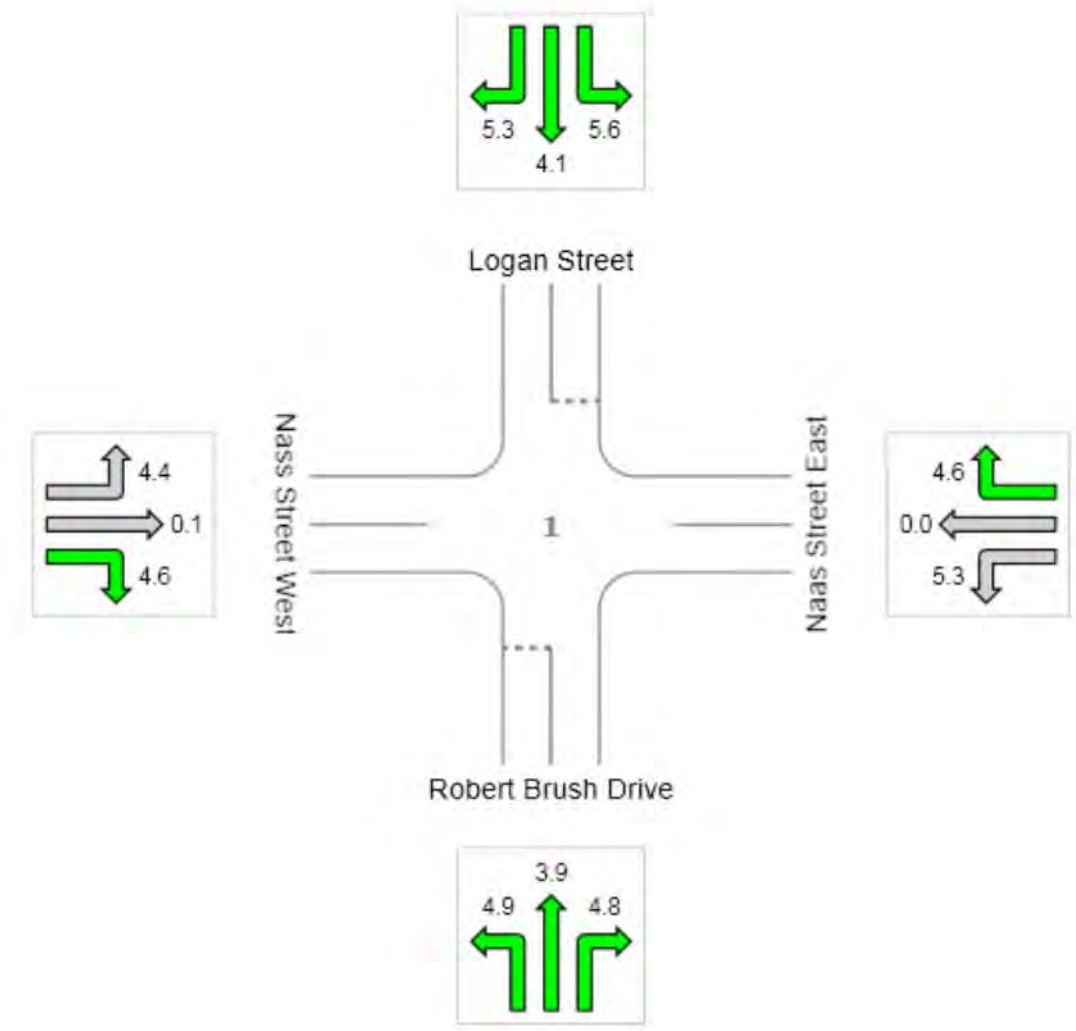
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 4.5 | 0.6 | 5.1 | 3.0 | 3.3 |
| LOS | A | NA | A | NA | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | Logan Street & Naas Street No Development 8am - 9am Peak |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 6:22:47 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 2/12/2014 6:38:24 PM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | Robert Brush Drive | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| East | Naas Street East | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| North | Logan Street | Two-way | 1 | 2 | 500.0 | 0 | Give-way Yield | – |
| West | Nass Street West | Two-way | 2 | 1 | 500.0 | 0 | Major Road | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | | Robert Brush Drive | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | | Naas Street East | | |
| South | L2 | L | 4 | 4 |

| | | | | |
|---|---|---|---|---|
| West | T1 | T | 5 | 5 |
| North | R2 | R | 6 | 6 |
| From: North | | Logan Street | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Nass Street West | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | Robert Brush Drive | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |
| East | | Naas Street East | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 3 | | | – | – | – | – |
| North | | Logan Street | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 5 | 0 | – | – | – | – | – | – |
| West | | Nass Street West | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Slip/Bypass (Low Angle) | Continuous | Continuous | – | 5 | 3 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | -3 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes

| Leg | Item | Configuration | [ Length m | Short Lane / Segment 1 Overflow/ Merge Dir | ID | Colour ] | [ Length m | Segment 2 ID | Colour ] |
|---|---|---|---|---|---|---|---|---|---|
| North | | Logan Street | | | | | | | |
| | Exit Lane 1 | Short Lane | 60 | Right | | | – | – | – |
| West | | Nass Street West | | | | | | | |
| | App. Lane 1 | Short Lane | 60 | Right | | | – | – | – |

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |
| South | T1 | 0 | LV, HV |

| | | | |
|---|---|---|---|
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| From: West | App. Lane 2 | | |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | Robert Brush Drive | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| East | Naas Street East | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| North | Logan Street | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| West | Nass Street West | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: West | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | 100 | – | – |
| Heavy Vehicles (HV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: West | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | 100 | – | – |

## Lane Data - Lane Blockage

| Exit Lane | | To Exit Leg South | East | North | West |
|---|---|---|---|---|---|
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | Yes | Yes | Yes |
| Exit Lane 2 | | – | – | Yes | – |

| | | | | |
|---|---|---|---|---|
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| Exit Lane 2 | – | – | Yes | – |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | – | – | Yes | – |
| Exit Lane 2 | – | – | Yes | – |
| From: West | App. Lane 2 | | | |
| Exit Lane 1 | Yes | Yes | – | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | Robert Brush Drive | | | |
| Total (veh) | – | 1 | 8 | 10 |
| LV (veh) | – | 1 | 7 | 9 |
| HV (veh) | – | 0 | 1 | 1 |
| From: East | Naas Street East | | | |
| Total (veh) | 2 | – | 1 | 24 |
| LV (veh) | 1 | – | 1 | 21 |
| HV (veh) | 1 | – | 0 | 3 |
| From: North | Logan Street | | | |
| Total (veh) | 5 | 1 | – | 27 |
| LV (veh) | 5 | 0 | – | 22 |
| HV (veh) | 0 | 1 | – | 5 |
| From: West | Nass Street West | | | |
| Total (veh) | 4 | 16 | 28 | – |
| LV (veh) | 4 | 16 | 26 | – |
| HV (veh) | 0 | 0 | 2 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: South | Robert Brush Drive | | |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |

| | | | |
|---|---|---|---|
| From: East | Naas Street East | | |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| From: North | Logan Street | | |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| From: West | Nass Street West | | |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| Heavy Vehicles (HV) | | | |
| From: South | Robert Brush Drive | | |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| From: East | Naas Street East | | |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| From: North | Logan Street | | |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| From: West | Nass Street West | | |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |

## Priorities

| Opposed Movement | Opposing Movements South | East | North | West |
|---|---|---|---|---|
| South | Robert Brush Drive | | | |
| L2 | – | T1 | – | – |
| T1 | – | R2,T1 | – | R2,T1,L2 |
| R2 | – | R2,T1 | T1,L2 | R2,T1 |
| East | Naas Street East | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | – | T1 |
| North | Logan Street | | | |
| L2 | – | – | – | T1 |
| T1 | – | L2,R2,T1 | – | R2,T1 |
| R2 | T1,L2 | R2,T1 | – | R2,T1 |
| West | Nass Street West | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | L2,T1 | – | – |

## Gap Acceptance - Gap Acceptance Data

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | Robert Brush Drive | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| East | Naas Street East | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| North | Logan Street | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| West | Nass Street West | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |

## Gap Acceptance - Two-Way Sign Control Calibration

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes

| Major Road Number of Lanes: | Critical Gap Adjustment | | | | Follow-up Headway Adjustment | | | |
|---|---|---|---|---|---|---|---|---|
| | 2-lane | 3-lane | 5-lane | 6-lane or more | 2-lane | 3-lane | 5-lane | 6-lane or more |
| | sec | sec | sec | sec | sec | sec | sec | sec |
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

| | Critical Gap Adjustment | Follow-up Headway Adjustment |
|---|---|---|
| | sec | sec |
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | |
| From: South | Robert Brush Drive | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | Logan Street | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Nass Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| Heavy Vehicles (HV) | | | | | | |
| From: South | Robert Brush Drive | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |

| | | | | | | |
|---|---|---|---|---|---|---|
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | Logan Street | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Nass Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | | | |
| From: South | Robert Brush Drive | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | Logan Street | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Nass Street West | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: South | Robert Brush Drive | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | Logan Street | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Nass Street West | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** None

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| **Passenger Car Equivalents** | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| **Queue Blockage** | |
| Minimum Probability of Blockage | 0 |
| **Delay and Queue** | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| **Downstream Short Lane** | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| | |
|---|---|
| **Cost Options** | |
| Cost Unit | $ |

**Vehicle Cost Parameters**

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

## Model Settings - Fuel Consumption

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

## Model Settings - CO Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

## Model Settings - HC Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

## Model Settings - NOx Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

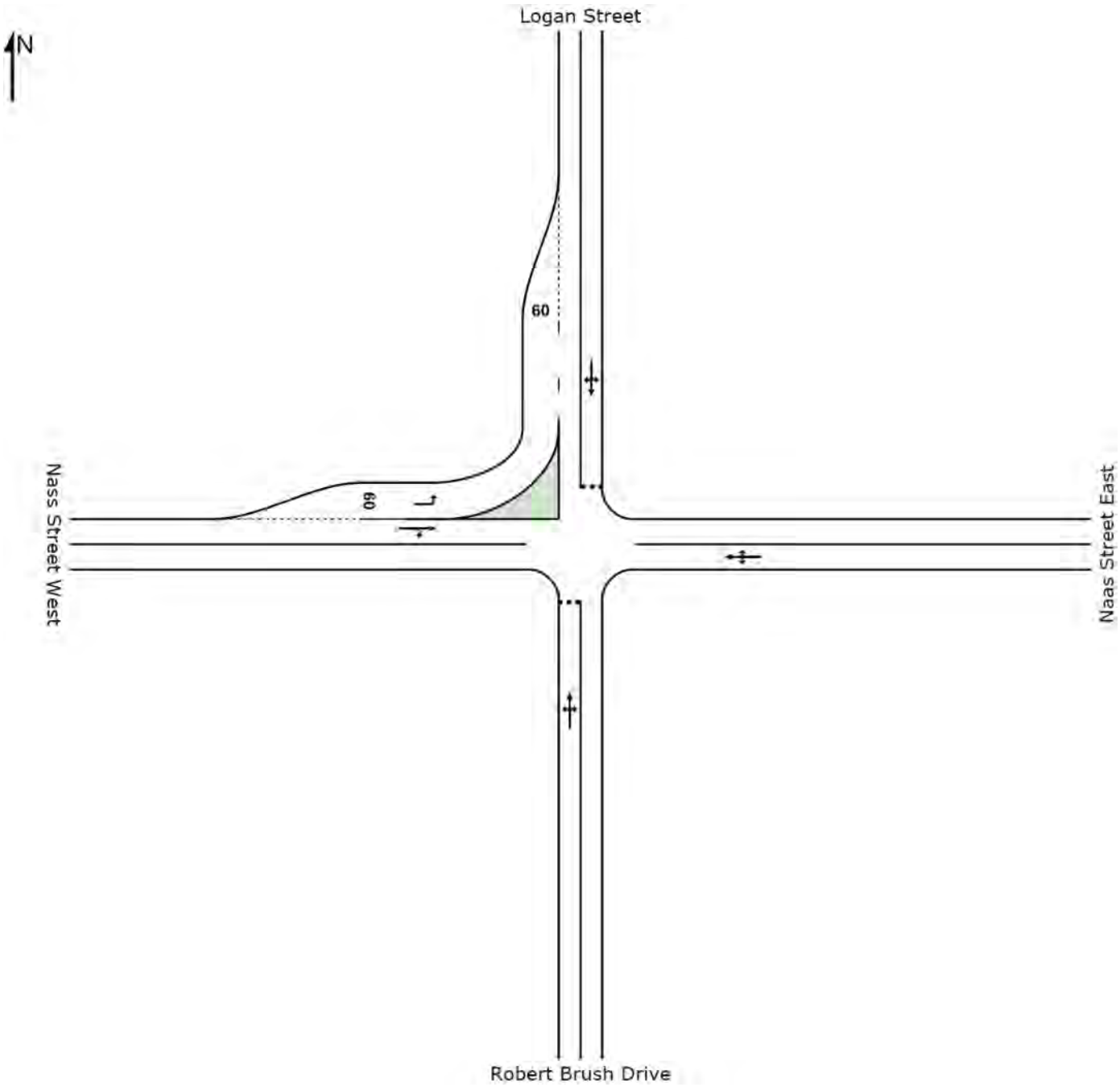
# APPENDIX C2

## Background + Development

# SITE LAYOUT

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

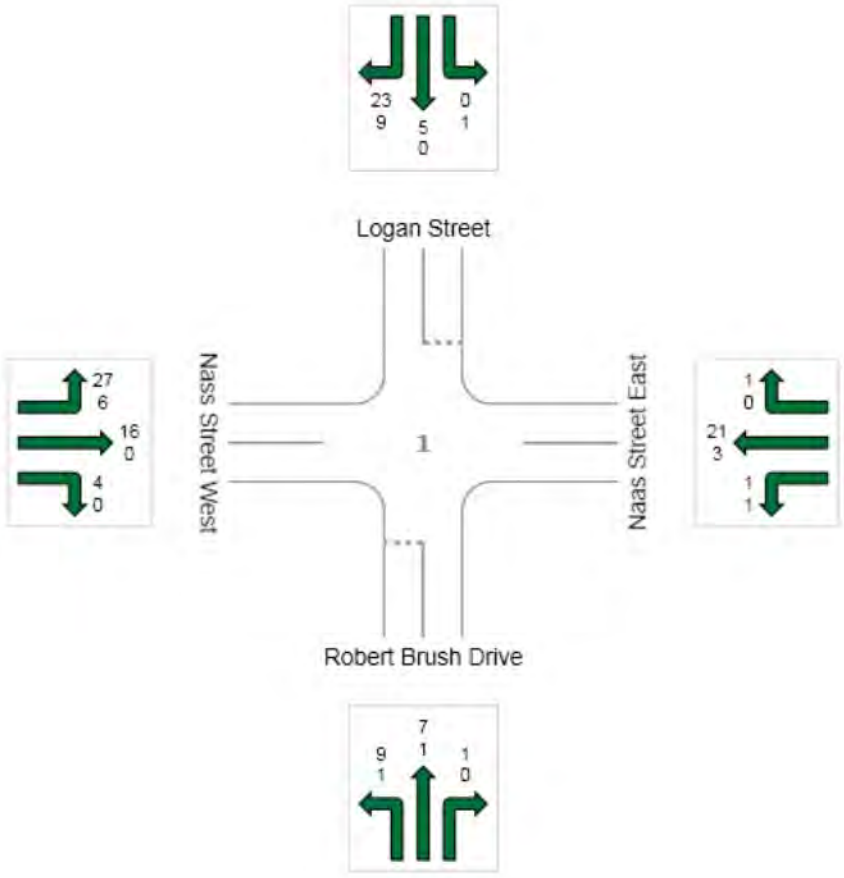
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 137**

**Light Vehicles (LV): 115**

**Heavy Vehicles (HV): 22**



# MOVEMENT SUMMARY

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Robert Brush Drive | | | | | | | | | | | |
| 1 | L2 | 11 | 10.0 | 0.016 | 4.9 | LOS A | 0.1 | 0.5 | 0.11 | 0.47 | 46.5 |
| 2 | T1 | 8 | 12.5 | 0.016 | 3.9 | LOS A | 0.1 | 0.5 | 0.11 | 0.47 | 46.8 |
| 3 | R2 | 1 | 0.0 | 0.016 | 4.8 | LOS A | 0.1 | 0.5 | 0.11 | 0.47 | 46.2 |
| Approach | | 20 | 10.5 | 0.016 | 4.5 | LOS A | 0.1 | 0.5 | 0.11 | 0.47 | 46.6 |
| East: Naas Street East | | | | | | | | | | | |
| 4 | L2 | 2 | 50.0 | 0.016 | 5.3 | LOS A | 0.1 | 0.6 | 0.07 | 0.06 | 48.2 |
| 5 | T1 | 25 | 12.5 | 0.016 | 0.0 | LOS A | 0.1 | 0.6 | 0.07 | 0.06 | 49.5 |
| 6 | R2 | 1 | 0.0 | 0.016 | 4.6 | LOS A | 0.1 | 0.6 | 0.07 | 0.06 | 48.7 |
| Approach | | 28 | 14.8 | 0.016 | 0.6 | NA | 0.1 | 0.6 | 0.07 | 0.06 | 49.4 |
| North: Logan Street | | | | | | | | | | | |
| 7 | L2 | 1 | 100.0 | 0.047 | 5.7 | LOS A | 0.2 | 1.6 | 0.21 | 0.48 | 44.9 |
| 8 | T1 | 5 | 0.0 | 0.047 | 4.2 | LOS A | 0.2 | 1.6 | 0.21 | 0.48 | 46.5 |
| 9 | R2 | 34 | 28.1 | 0.047 | 5.5 | LOS A | 0.2 | 1.6 | 0.21 | 0.48 | 46.3 |
| Approach | | 40 | 26.3 | 0.047 | 5.3 | LOS A | 0.2 | 1.6 | 0.21 | 0.48 | 46.3 |
| West: Nass Street West | | | | | | | | | | | |
| 10 | L2 | 35 | 18.2 | 0.020 | 4.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.46 | 47.7 |
| 11 | T1 | 17 | 0.0 | 0.011 | 0.1 | LOS A | 0.1 | 0.4 | 0.10 | 0.11 | 49.1 |
| 12 | R2 | 4 | 0.0 | 0.011 | 4.6 | LOS A | 0.1 | 0.4 | 0.10 | 0.11 | 48.2 |
| Approach | | 56 | 11.3 | 0.020 | 3.1 | NA | 0.1 | 0.4 | 0.04 | 0.32 | 48.1 |
| All Vehicles | | 144 | 16.1 | 0.047 | 3.4 | NA | 0.2 | 1.6 | 0.10 | 0.34 | 47.6 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

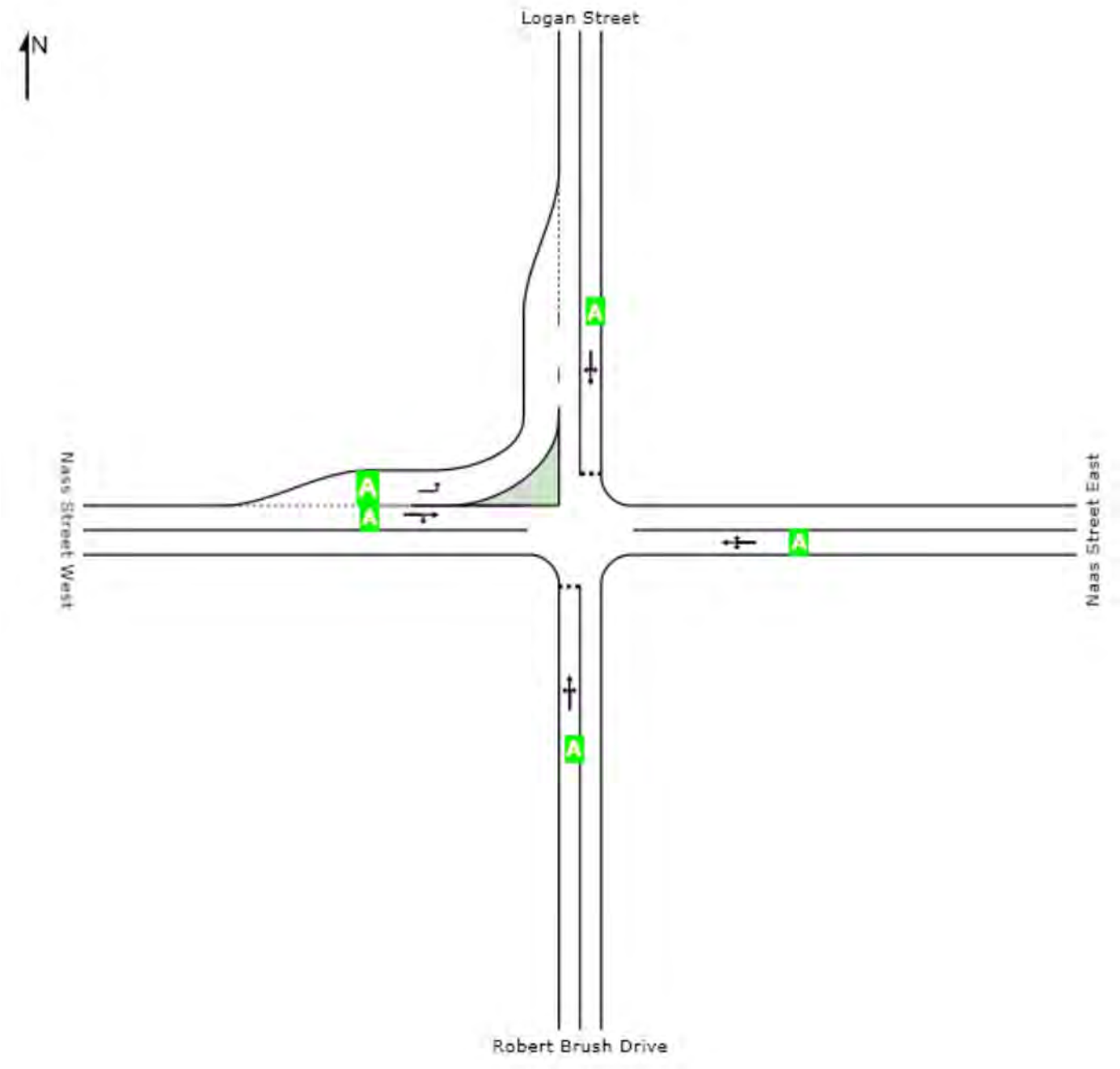
# LEVEL OF SERVICE

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | A | NA | A | NA | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

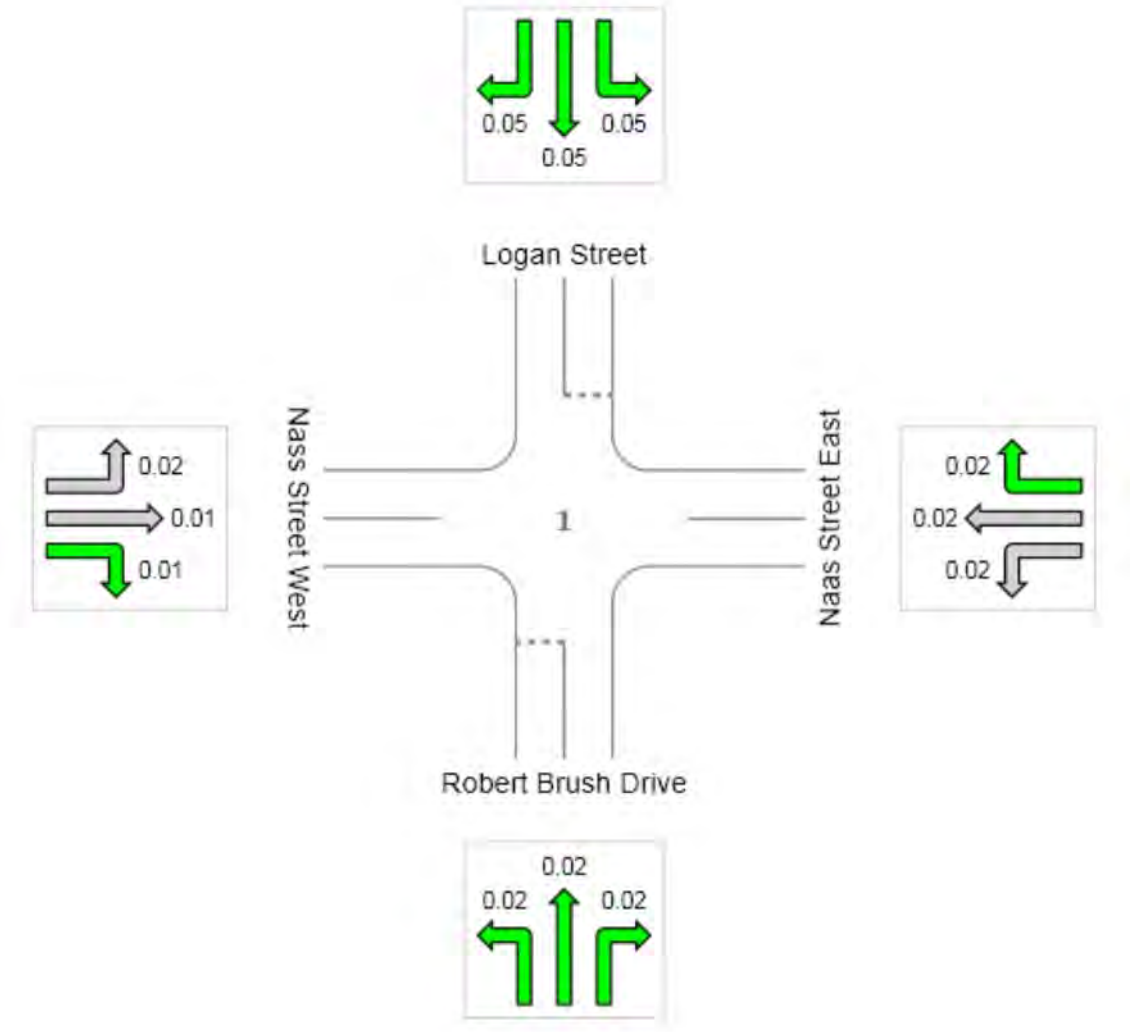
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.02 | 0.02 | 0.05 | 0.02 | 0.05 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

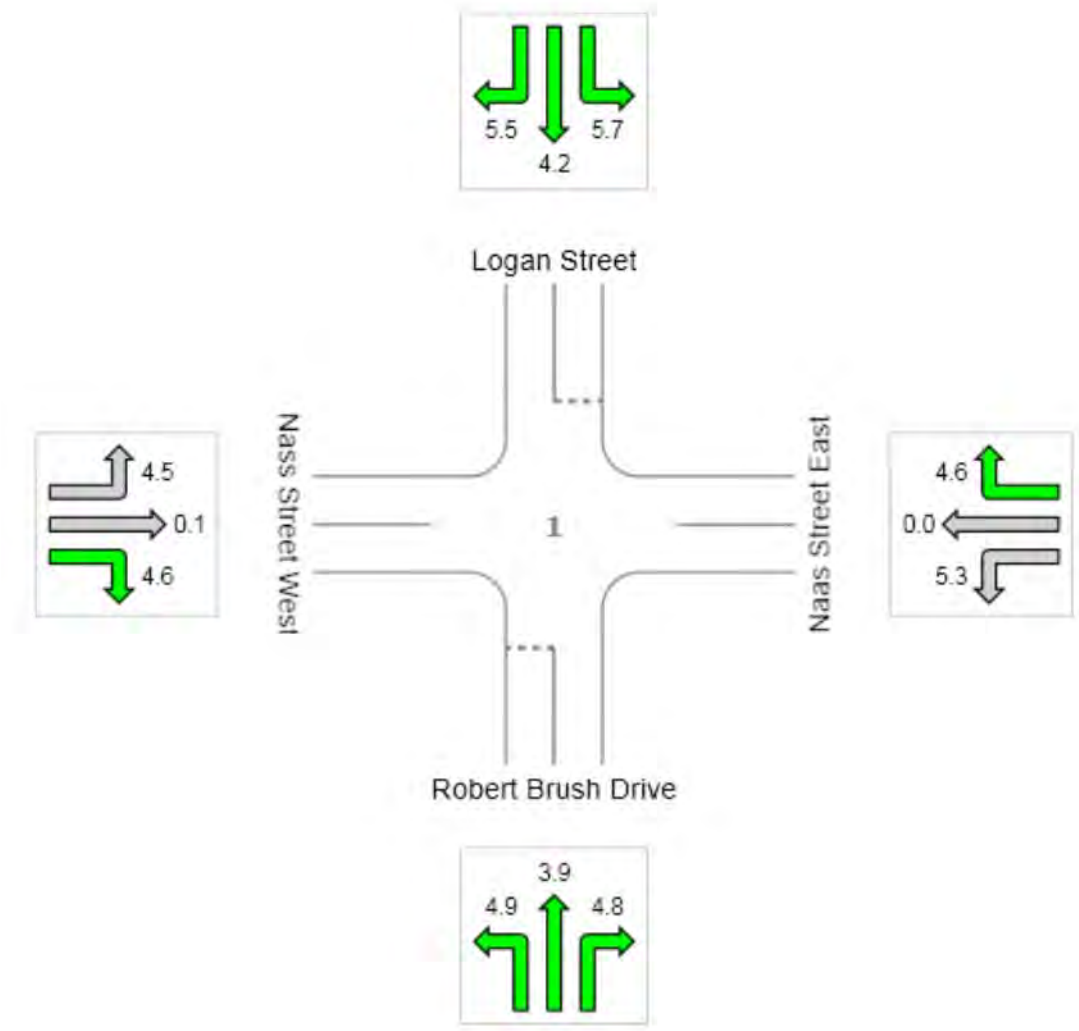
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 4.5 | 0.6 | 5.3 | 3.1 | 3.4 |
| LOS | A | NA | A | NA | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | Logan Street & Naas Street No Development 8am - 9am Peak + Quarry |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 6:22:47 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 3/12/2014 9:11:46 AM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | Robert Brush Drive | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| East | Naas Street East | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| North | Logan Street | Two-way | 1 | 2 | 500.0 | 0 | Give-way Yield | – |
| West | Nass Street West | Two-way | 2 | 1 | 500.0 | 0 | Major Road | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | | Robert Brush Drive | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | | Naas Street East | | |

| | | | | |
|---|---|---|---|---|
| South | L2 | L | 4 | 4 |
| West | T1 | T | 5 | 5 |
| North | R2 | R | 6 | 6 |
| From: North | | Logan Street | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Nass Street West | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | Robert Brush Drive | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |
| East | | Naas Street East | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 3 | | | – | – | – | – |
| North | | Logan Street | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 5 | 0 | – | – | – | – | – | – |
| West | | Nass Street West | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Slip/Bypass (Low Angle) | Continuous | Continuous | – | 5 | 3 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | -3 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes

| Leg | Item | Configuration | [ Length m | Short Lane / Segment 1 Overflow/ Merge Dir | ID | Colour ] | [ Length m | Segment 2 ID | Colour ] |
|---|---|---|---|---|---|---|---|---|---|
| North | | Logan Street | | | | | | | |
| | Exit Lane 1 | Short Lane | 60 | Right | | | – | – | – |
| West | | Nass Street West | | | | | | | |
| | App. Lane 1 | Short Lane | 60 | Right | | | – | – | – |

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |

| | | | |
|---|---|---|---|
| South | T1 | 0 | LV, HV |
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| From: West | App. Lane 2 | | |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | Robert Brush Drive | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| East | Naas Street East | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| North | Logan Street | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| West | Nass Street West | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: West | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | 100 | – | – |
| Heavy Vehicles (HV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: West | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | 100 | – | – |

## Lane Data - Lane Blockage

| Exit Lane | | To Exit Leg South | East | North | West |
|---|---|---|---|---|---|
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | Yes | Yes | Yes |

| | | | | |
|---|---|---|---|---|
| Exit Lane 2 | – | – | Yes | – |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| Exit Lane 2 | – | – | Yes | – |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | – | – | Yes | – |
| Exit Lane 2 | – | – | Yes | – |
| From: West | App. Lane 2 | | | |
| Exit Lane 1 | Yes | Yes | – | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | Robert Brush Drive | | | |
| Total (veh) | – | 1 | 8 | 10 |
| LV (veh) | – | 1 | 7 | 9 |
| HV (veh) | – | 0 | 1 | 1 |
| From: East | Naas Street East | | | |
| Total (veh) | 2 | – | 1 | 24 |
| LV (veh) | 1 | – | 1 | 21 |
| HV (veh) | 1 | – | 0 | 3 |
| From: North | Logan Street | | | |
| Total (veh) | 5 | 1 | – | 32 |
| LV (veh) | 5 | 0 | – | 23 |
| HV (veh) | 0 | 1 | – | 9 |
| From: West | Nass Street West | | | |
| Total (veh) | 4 | 16 | 33 | – |
| LV (veh) | 4 | 16 | 27 | – |
| HV (veh) | 0 | 0 | 6 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: South | Robert Brush Drive | | |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |

| | | | |
|---|---|---|---|
| East | 95.0 | 100.00 | 2.00 |
| From: East | Naas Street East | | |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| From: North | Logan Street | | |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| From: West | Nass Street West | | |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| Heavy Vehicles (HV) | | | |
| From: South | Robert Brush Drive | | |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| From: East | Naas Street East | | |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| From: North | Logan Street | | |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| From: West | Nass Street West | | |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |

## Priorities

| Opposed Movement | South | Opposing Movements East | North | West |
|---|---|---|---|---|
| South | Robert Brush Drive | | | |
| L2 | – | T1 | – | – |
| T1 | – | R2,T1 | – | R2,T1,L2 |
| R2 | – | R2,T1 | T1,L2 | R2,T1 |
| East | Naas Street East | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | – | T1 |
| North | Logan Street | | | |
| L2 | – | – | – | T1 |
| T1 | – | L2,R2,T1 | – | R2,T1 |
| R2 | T1,L2 | R2,T1 | – | R2,T1 |
| West | Nass Street West | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | L2,T1 | – | – |

## Gap Acceptance - Gap Acceptance Data

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | Robert Brush Drive | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| East | Naas Street East | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| North | Logan Street | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| West | Nass Street West | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |

## Gap Acceptance - Two-Way Sign Control Calibration

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes

| Major Road Number of Lanes: | Critical Gap Adjustment | | | | Follow-up Headway Adjustment | | | |
|---|---|---|---|---|---|---|---|---|
| | 2-lane | 3-lane | 5-lane | 6-lane or more | 2-lane | 3-lane | 5-lane | 6-lane or more |
| | sec | sec | sec | sec | sec | sec | sec | sec |
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

| | Critical Gap Adjustment | Follow-up Headway Adjustment |
|---|---|---|
| | sec | sec |
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | |
| From: South | Robert Brush Drive | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | Logan Street | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Nass Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| Heavy Vehicles (HV) | | | | | | |
| From: South | Robert Brush Drive | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |

| | | | | | | |
|---|---|---|---|---|---|---|
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | Logan Street | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Nass Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | | | |
| From: South | Robert Brush Drive | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | Logan Street | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Nass Street West | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: South | Robert Brush Drive | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | Logan Street | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Nass Street West | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** None

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| **Passenger Car Equivalents** | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| **Queue Blockage** | |
| Minimum Probability of Blockage | 0 |
| **Delay and Queue** | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| **Downstream Short Lane** | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| | |
|---|---|
| **Cost Options** | |
| Cost Unit | $ |

**Vehicle Cost Parameters**

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

## Model Settings - Fuel Consumption

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

## Model Settings - CO Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

## Model Settings - HC Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

## Model Settings - NOx Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

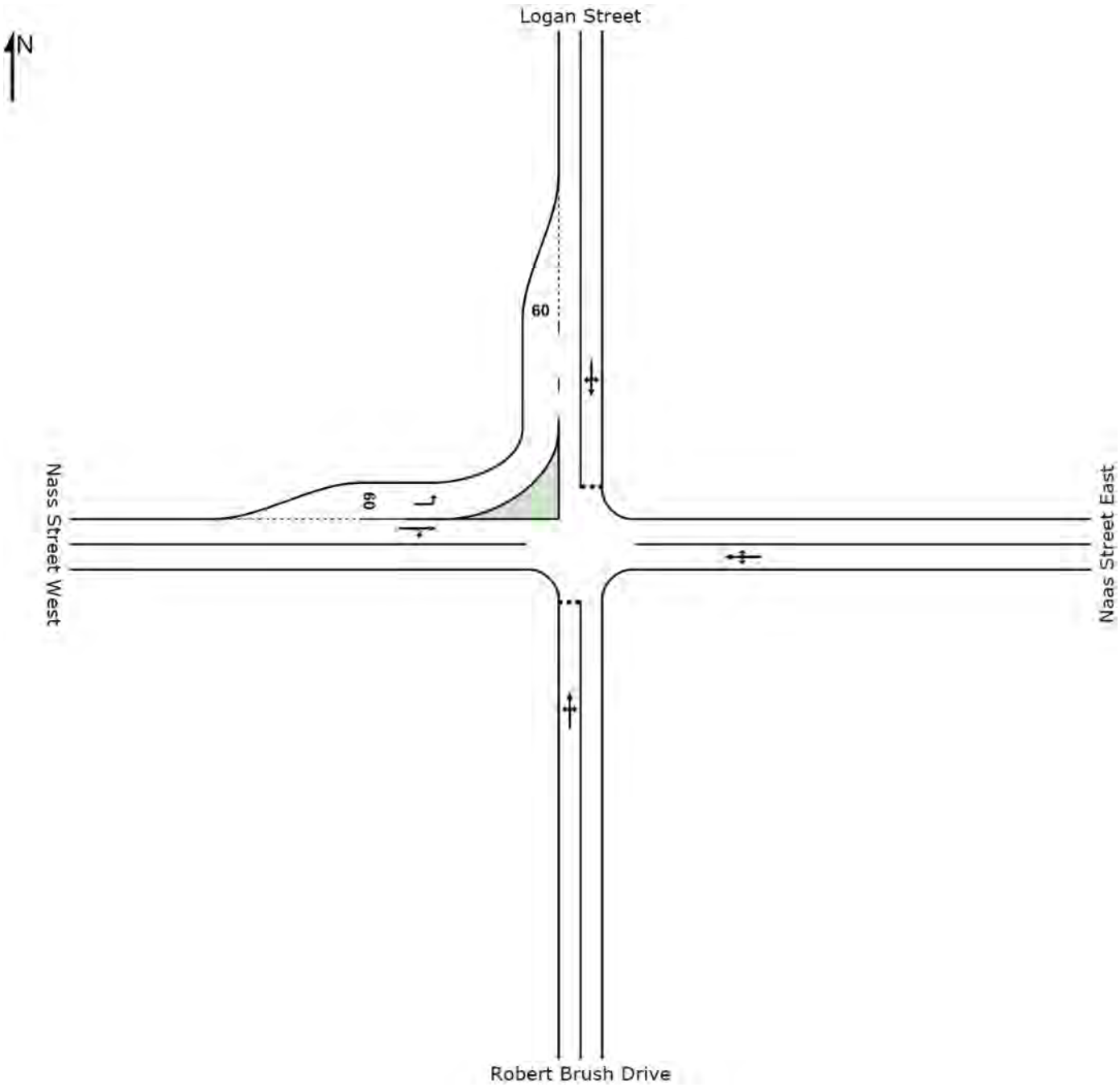
# APPENDIX C3

## 30yr + Development

# SITE LAYOUT

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

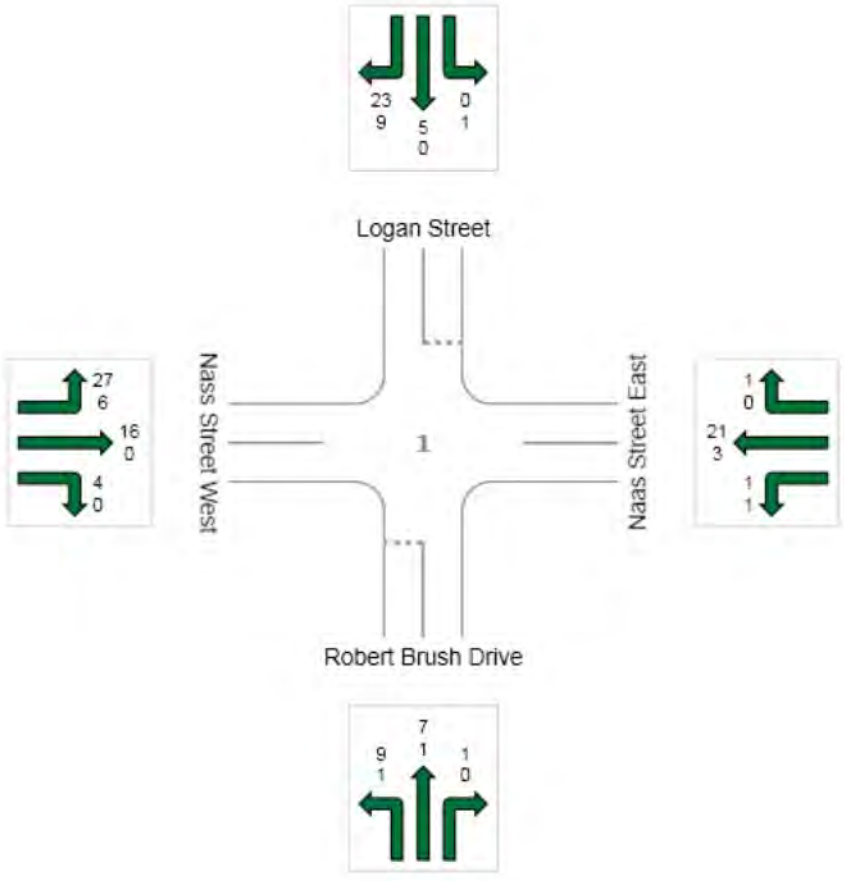
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 137**

**Light Vehicles (LV): 115**

**Heavy Vehicles (HV): 22**



# MOVEMENT SUMMARY

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Robert Brush Drive | | | | | | | | | | | |
| 1 | L2 | 17 | 10.0 | 0.027 | 5.1 | LOS A | 0.1 | 0.8 | 0.15 | 0.48 | 46.4 |
| 2 | T1 | 13 | 12.5 | 0.027 | 4.1 | LOS A | 0.1 | 0.8 | 0.15 | 0.48 | 46.7 |
| 3 | R2 | 2 | 0.0 | 0.027 | 5.0 | LOS A | 0.1 | 0.8 | 0.15 | 0.48 | 46.1 |
| Approach | | 32 | 10.5 | 0.027 | 4.7 | LOS A | 0.1 | 0.8 | 0.15 | 0.48 | 46.5 |
| East: Naas Street East | | | | | | | | | | | |
| 4 | L2 | 3 | 50.0 | 0.026 | 5.3 | LOS A | 0.1 | 0.9 | 0.09 | 0.06 | 48.2 |
| 5 | T1 | 40 | 12.5 | 0.026 | 0.1 | LOS A | 0.1 | 0.9 | 0.09 | 0.06 | 49.5 |
| 6 | R2 | 2 | 0.0 | 0.026 | 4.6 | LOS A | 0.1 | 0.9 | 0.09 | 0.06 | 48.6 |
| Approach | | 45 | 14.8 | 0.026 | 0.6 | NA | 0.1 | 0.9 | 0.09 | 0.06 | 49.3 |
| North: Logan Street | | | | | | | | | | | |
| 7 | L2 | 2 | 100.0 | 0.080 | 6.2 | LOS A | 0.3 | 2.8 | 0.28 | 0.51 | 44.7 |
| 8 | T1 | 8 | 0.0 | 0.080 | 4.7 | LOS A | 0.3 | 2.8 | 0.28 | 0.51 | 46.3 |
| 9 | R2 | 54 | 28.1 | 0.080 | 5.9 | LOS A | 0.3 | 2.8 | 0.28 | 0.51 | 46.1 |
| Approach | | 64 | 26.3 | 0.080 | 5.8 | LOS A | 0.3 | 2.8 | 0.28 | 0.51 | 46.1 |
| West: Nass Street West | | | | | | | | | | | |
| 10 | L2 | 56 | 18.2 | 0.032 | 4.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.46 | 47.7 |
| 11 | T1 | 27 | 0.0 | 0.018 | 0.1 | LOS A | 0.1 | 0.6 | 0.13 | 0.11 | 49.0 |
| 12 | R2 | 7 | 0.0 | 0.018 | 4.7 | LOS A | 0.1 | 0.6 | 0.13 | 0.11 | 48.1 |
| Approach | | 89 | 11.3 | 0.032 | 3.2 | NA | 0.1 | 0.6 | 0.05 | 0.32 | 48.1 |
| All Vehicles | | 231 | 16.1 | 0.080 | 3.6 | NA | 0.3 | 2.8 | 0.14 | 0.34 | 47.5 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

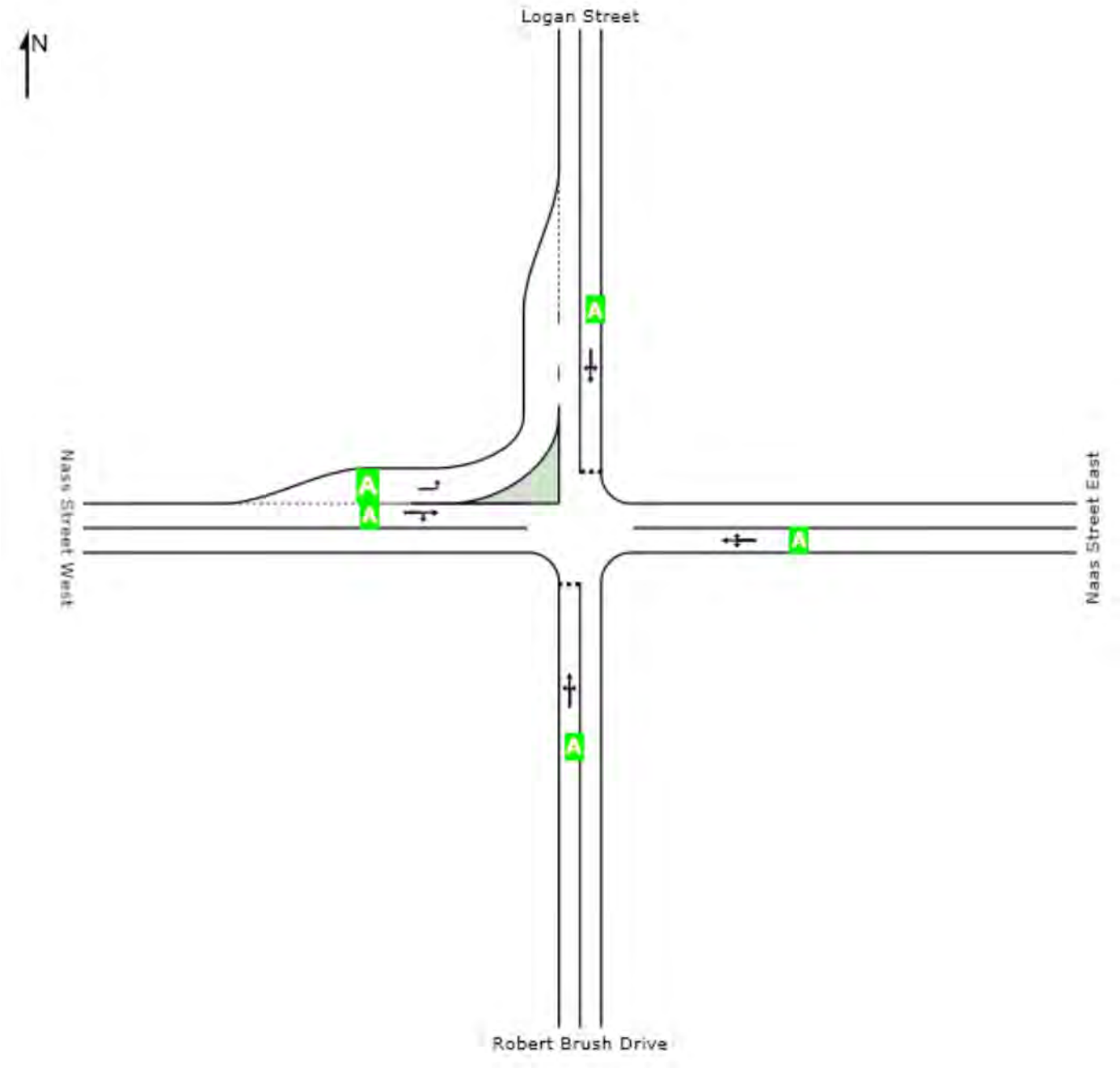
# LEVEL OF SERVICE

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | A | NA | A | NA | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

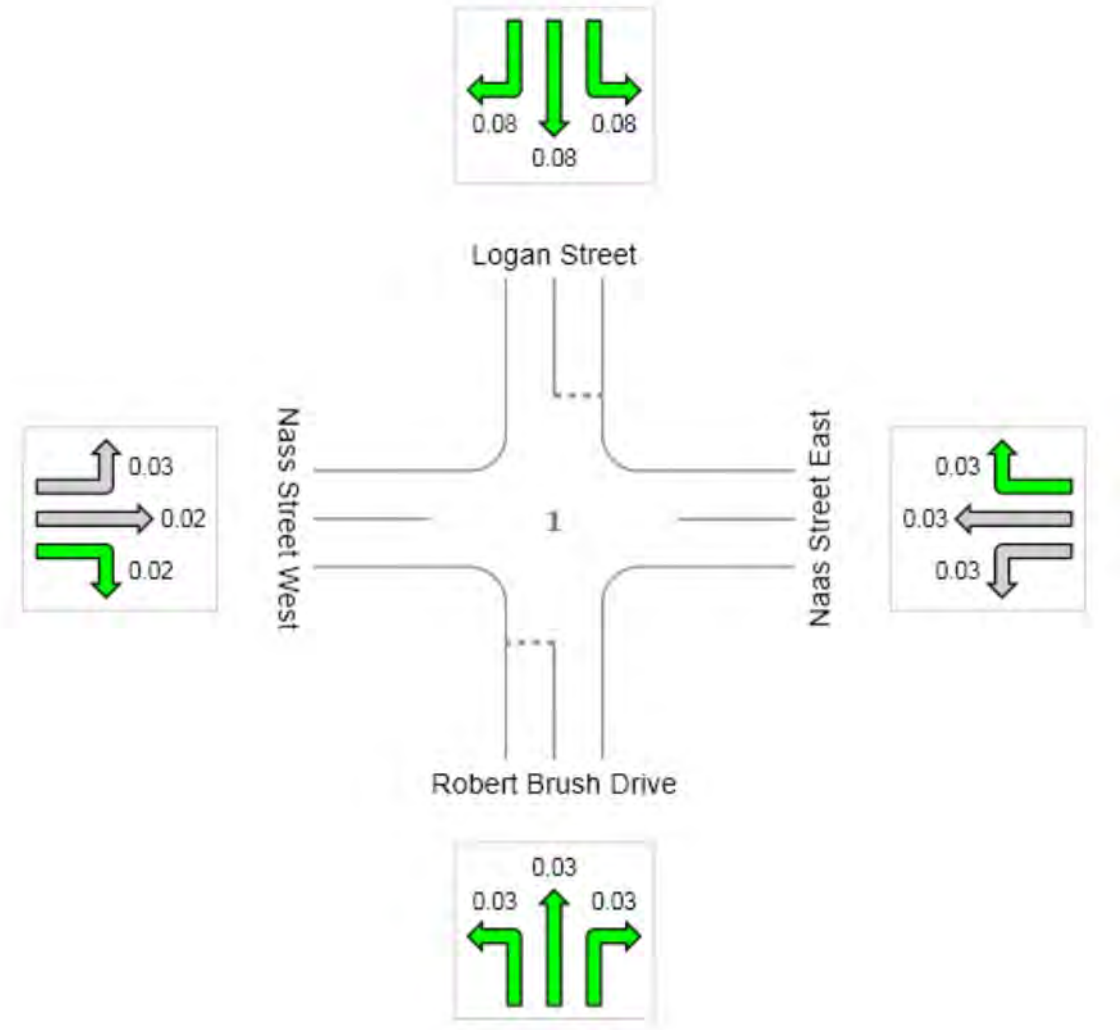
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.03 | 0.03 | 0.08 | 0.03 | 0.08 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

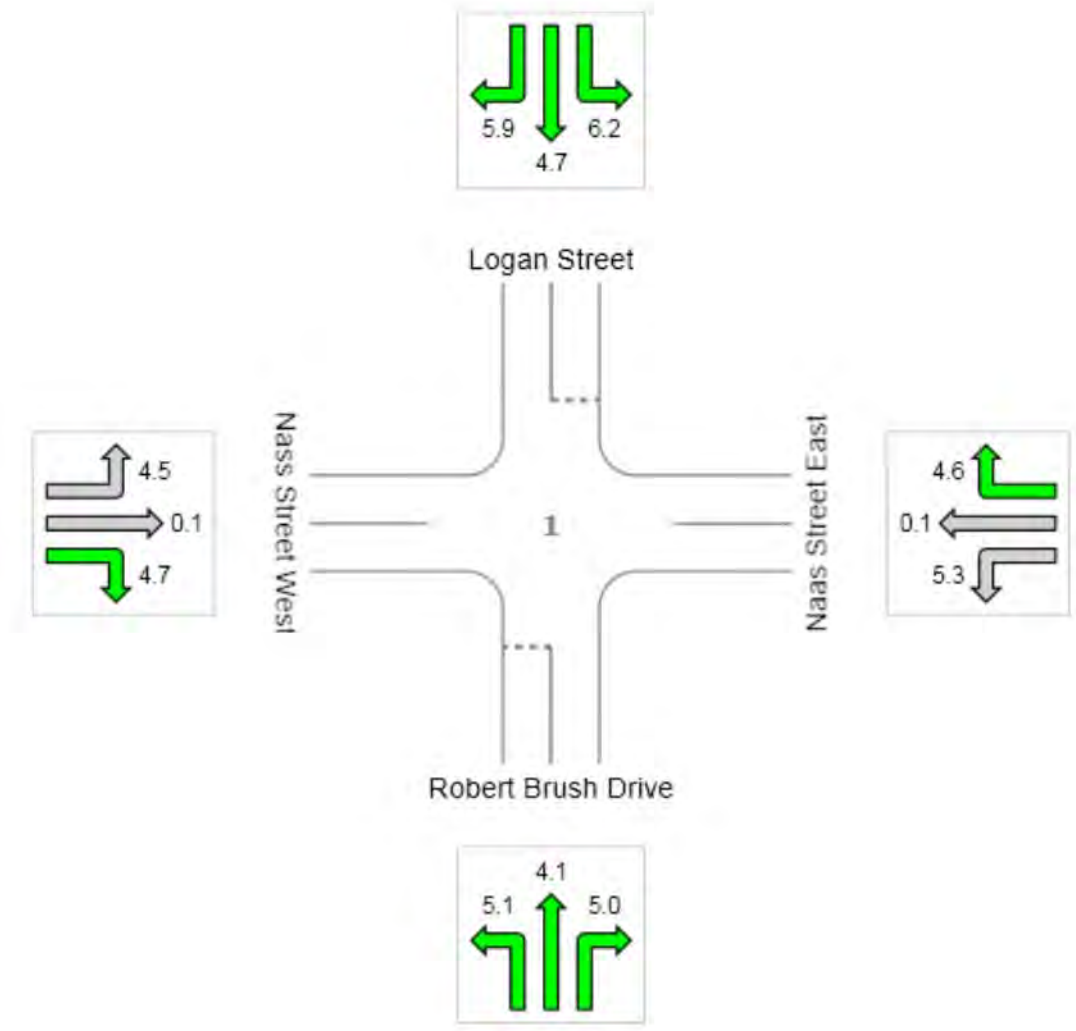
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 4.7 | 0.6 | 5.8 | 3.2 | 3.6 |
| LOS | A | NA | A | NA | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 6:22:47 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 3/12/2014 9:11:46 AM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | Robert Brush Drive | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| East | Naas Street East | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| North | Logan Street | Two-way | 1 | 2 | 500.0 | 0 | Give-way Yield | – |
| West | Nass Street West | Two-way | 2 | 1 | 500.0 | 0 | Major Road | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | | Robert Brush Drive | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | | Naas Street East | | |

| | | | | |
|---|---|---|---|---|
| South | L2 | L | 4 | 4 |
| West | T1 | T | 5 | 5 |
| North | R2 | R | 6 | 6 |
| From: North | | Logan Street | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Nass Street West | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | Robert Brush Drive | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |
| East | | Naas Street East | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 3 | | | – | – | – | – |
| North | | Logan Street | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 5 | 0 | – | – | – | – | – | – |
| West | | Nass Street West | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Slip/Bypass (Low Angle) | Continuous | Continuous | – | 5 | 3 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 3 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | -3 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes

| Leg | Item | Configuration | [ Length m | Short Lane / Segment 1 Overflow/ Merge Dir | ID | Colour ] | [ Length m | Segment 2 ID | Colour ] |
|---|---|---|---|---|---|---|---|---|---|
| North | | Logan Street | | | | | | | |
| | Exit Lane 1 | Short Lane | 60 | Right | | | – | – | – |
| West | | Nass Street West | | | | | | | |
| | App. Lane 1 | Short Lane | 60 | Right | | | – | – | – |

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |

| | | | |
|---|---|---|---|
| South | T1 | 0 | LV, HV |
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| From: West | App. Lane 2 | | |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | Robert Brush Drive | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| East | Naas Street East | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| North | Logan Street | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| West | Nass Street West | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: West | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | 100 | – | – |
| Heavy Vehicles (HV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | – | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | 100 | – | 100 |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: West | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | 100 | – | – |

## Lane Data - Lane Blockage

| Exit Lane | | To Exit Leg South | East | North | West |
|---|---|---|---|---|---|
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | Yes | Yes | Yes |

| | | | | |
|---|---|---|---|---|
| Exit Lane 2 | – | – | Yes | – |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| Exit Lane 2 | – | – | Yes | – |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | – | – | Yes | – |
| Exit Lane 2 | – | – | Yes | – |
| From: West | App. Lane 2 | | | |
| Exit Lane 1 | Yes | Yes | – | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | Robert Brush Drive | | | |
| Total (veh) | – | 1 | 8 | 10 |
| LV (veh) | – | 1 | 7 | 9 |
| HV (veh) | – | 0 | 1 | 1 |
| From: East | Naas Street East | | | |
| Total (veh) | 2 | – | 1 | 24 |
| LV (veh) | 1 | – | 1 | 21 |
| HV (veh) | 1 | – | 0 | 3 |
| From: North | Logan Street | | | |
| Total (veh) | 5 | 1 | – | 32 |
| LV (veh) | 5 | 0 | – | 23 |
| HV (veh) | 0 | 1 | – | 9 |
| From: West | Nass Street West | | | |
| Total (veh) | 4 | 16 | 33 | – |
| LV (veh) | 4 | 16 | 27 | – |
| HV (veh) | 0 | 0 | 6 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: South | Robert Brush Drive | | |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |

| | | | |
|---|---|---|---|
| East | 95.0 | 100.00 | 2.00 |
| From: East | Naas Street East | | |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| From: North | Logan Street | | |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| From: West | Nass Street West | | |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| Heavy Vehicles (HV) | | | |
| From: South | Robert Brush Drive | | |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| From: East | Naas Street East | | |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| North | 95.0 | 100.00 | 2.00 |
| From: North | Logan Street | | |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |
| West | 95.0 | 100.00 | 2.00 |
| From: West | Nass Street West | | |
| North | 95.0 | 100.00 | 2.00 |
| East | 95.0 | 100.00 | 2.00 |
| South | 95.0 | 100.00 | 2.00 |

## Priorities

| Opposed Movement | South | Opposing Movements East | North | West |
|---|---|---|---|---|
| South | Robert Brush Drive | | | |
| L2 | – | T1 | – | – |
| T1 | – | R2,T1 | – | R2,T1,L2 |
| R2 | – | R2,T1 | T1,L2 | R2,T1 |
| East | Naas Street East | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | – | T1 |
| North | Logan Street | | | |
| L2 | – | – | – | T1 |
| T1 | – | L2,R2,T1 | – | R2,T1 |
| R2 | T1,L2 | R2,T1 | – | R2,T1 |
| West | Nass Street West | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | L2,T1 | – | – |

## Gap Acceptance - Gap Acceptance Data

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | Robert Brush Drive | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| East | Naas Street East | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| North | Logan Street | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| West | Nass Street West | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |

## Gap Acceptance - Two-Way Sign Control Calibration

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes

| Major Road Number of Lanes: | Critical Gap Adjustment | | | | Follow-up Headway Adjustment | | | |
|---|---|---|---|---|---|---|---|---|
| | 2-lane | 3-lane | 5-lane | 6-lane or more | 2-lane | 3-lane | 5-lane | 6-lane or more |
| | sec | sec | sec | sec | sec | sec | sec | sec |
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

| | Critical Gap Adjustment | Follow-up Headway Adjustment |
|---|---|---|
| | sec | sec |
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | |
| From: South | Robert Brush Drive | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | Logan Street | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Nass Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| Heavy Vehicles (HV) | | | | | | |
| From: South | Robert Brush Drive | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |

| | | | | | | |
|---|---|---|---|---|---|---|
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: East | Naas Street East | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: North | Logan Street | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |
| From: West | Nass Street West | | | | | |
| L2 | 50.0 | 50.0 | – | – | – | – |
| T1 | 50.0 | 50.0 | – | – | – | – |
| R2 | 50.0 | 50.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | | | |
| From: South | Robert Brush Drive | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | Logan Street | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Nass Street West | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: South | Robert Brush Drive | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Naas Street East | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | Logan Street | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Nass Street West | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** Design Life

| | |
|---|---|
| Design Life Analysis Objective | Practical Capacity (v/c ratio = xp) |
| Growth Model | Uniform |
| Number of Years | 30 |
| Const. No. of Years | – |
| Result For | Intersection - Vehicles |

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |

| | |
|---|---|
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

| Model Settings - Model Parameters | |
|---|---|
| **Passenger Car Equivalents** | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| **Queue Blockage** | |
| Minimum Probability of Blockage | 0 |
| **Delay and Queue** | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| **Downstream Short Lane** | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

**Model Settings - Cost**

| Cost Options | |
|---|---|
| Cost Unit | $ |

**Vehicle Cost Parameters**

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

**Model Settings - Vehicle Parameters**

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

**Model Settings - Fuel Consumption**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

**Model Settings - CO Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

**Model Settings - HC Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

**Model Settings - NOx Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |

| | | | | |
|---|---|---|---|---|
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

# APPENDIX D

# Mount Lindesay Rd & Old Ballandeen Rd - SIDRA Results

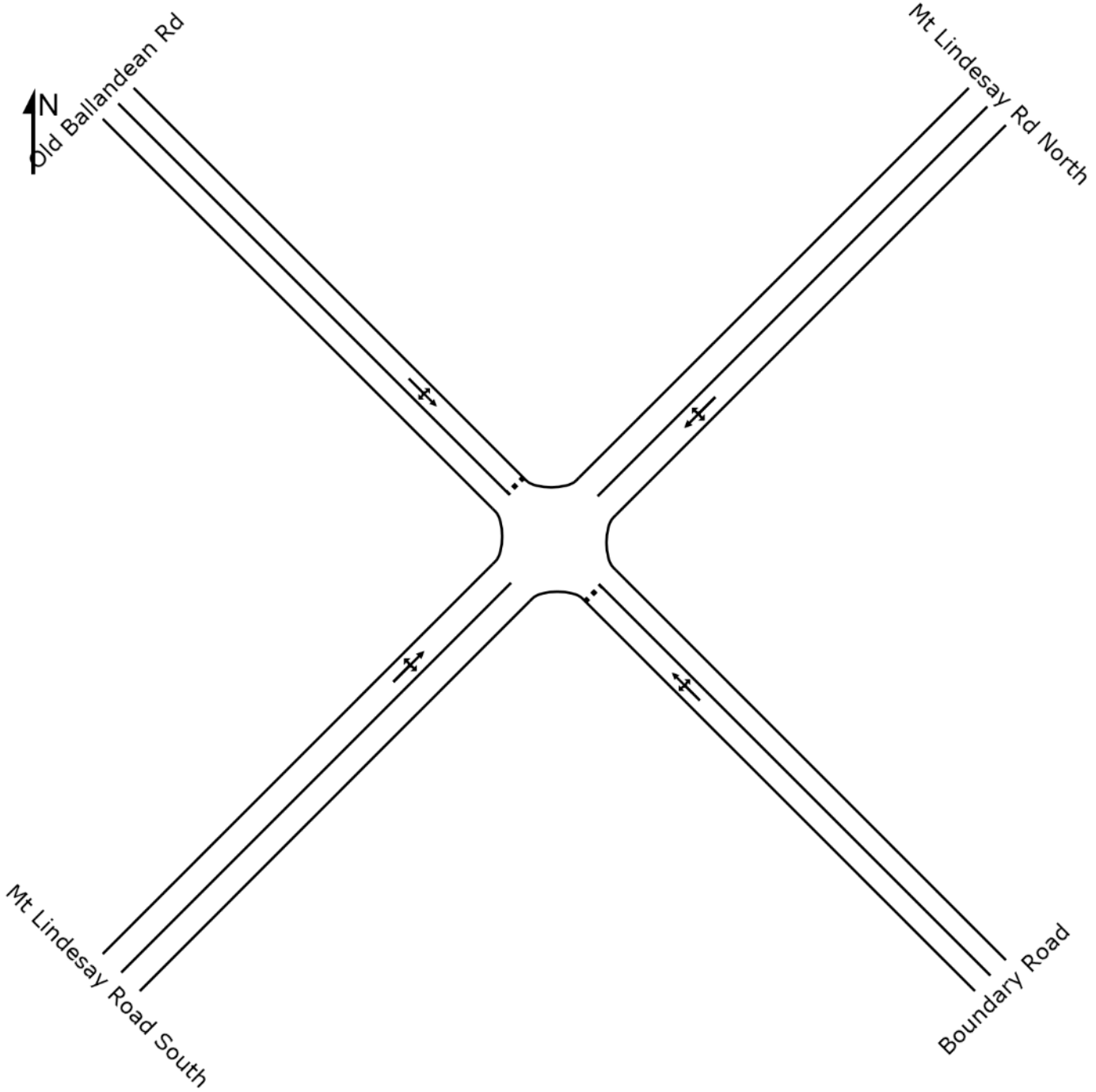
# APPENDIX D1

## Background

# SITE LAYOUT

## Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

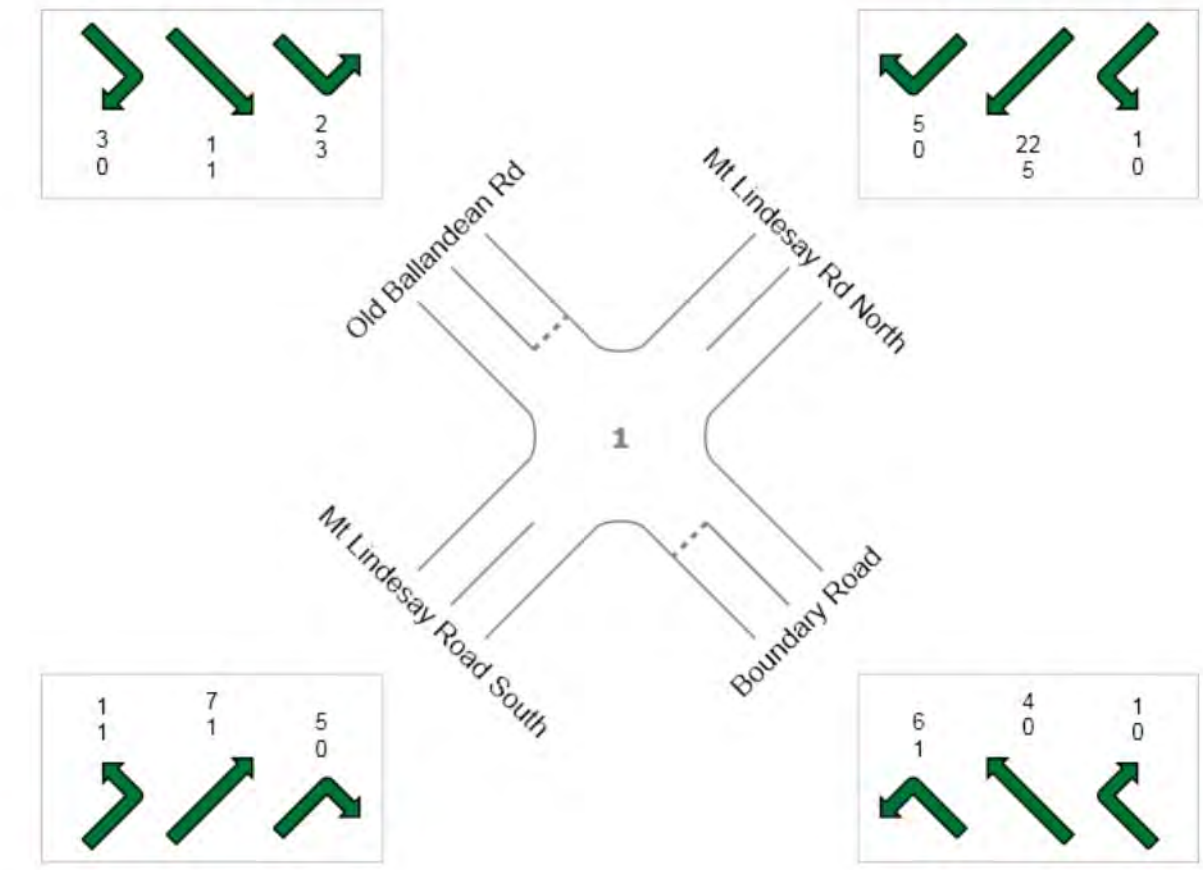
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 70**

**Light Vehicles (LV): 58**

**Heavy Vehicles (HV): 12**



# MOVEMENT SUMMARY

## Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Boundary Road | | | | | | | | | | | |
| 4 | L2 | 7 | 14.3 | 0.009 | 6.9 | LOS A | 0.0 | 0.2 | 0.08 | 0.57 | 55.9 |
| 5 | T1 | 4 | 0.0 | 0.009 | 5.1 | LOS A | 0.0 | 0.2 | 0.08 | 0.57 | 60.2 |
| 6 | R2 | 1 | 0.0 | 0.009 | 6.3 | LOS A | 0.0 | 0.2 | 0.08 | 0.57 | 59.3 |
| Approach | | 13 | 8.3 | 0.009 | 6.3 | LOS A | 0.0 | 0.2 | 0.08 | 0.57 | 57.5 |
| NorthEast: Mt Lindesay Rd North | | | | | | | | | | | |
| 7 | L2 | 1 | 0.0 | 0.020 | 6.4 | LOS A | 0.1 | 0.7 | 0.06 | 0.12 | 64.8 |
| 8 | T1 | 28 | 18.5 | 0.020 | 0.0 | LOS A | 0.1 | 0.7 | 0.06 | 0.12 | 67.9 |
| 9 | R2 | 5 | 0.0 | 0.020 | 6.2 | LOS A | 0.1 | 0.7 | 0.06 | 0.12 | 64.1 |
| Approach | | 35 | 15.2 | 0.020 | 1.2 | NA | 0.1 | 0.7 | 0.06 | 0.12 | 67.2 |
| NorthWest: Old Ballandean Rd | | | | | | | | | | | |
| 10 | L2 | 5 | 60.0 | 0.009 | 6.9 | LOS A | 0.0 | 0.4 | 0.06 | 0.59 | 45.8 |
| 11 | T1 | 2 | 50.0 | 0.009 | 5.4 | LOS A | 0.0 | 0.4 | 0.06 | 0.59 | 48.4 |
| 12 | R2 | 3 | 0.0 | 0.009 | 6.4 | LOS A | 0.0 | 0.4 | 0.06 | 0.59 | 59.2 |
| Approach | | 11 | 40.0 | 0.009 | 6.5 | LOS A | 0.0 | 0.4 | 0.06 | 0.59 | 49.7 |
| SouthWest: Mt Lindesay Road South | | | | | | | | | | | |
| 1 | L2 | 2 | 50.0 | 0.009 | 7.2 | LOS A | 0.0 | 0.3 | 0.10 | 0.28 | 60.5 |
| 2 | T1 | 8 | 12.5 | 0.009 | 0.1 | LOS A | 0.0 | 0.3 | 0.10 | 0.28 | 65.8 |
| 3 | R2 | 5 | 0.0 | 0.009 | 6.3 | LOS A | 0.0 | 0.3 | 0.10 | 0.28 | 62.2 |
| Approach | | 16 | 13.3 | 0.009 | 3.1 | NA | 0.0 | 0.3 | 0.10 | 0.28 | 63.8 |
| All Vehicles | | 74 | 17.1 | 0.020 | 3.2 | NA | 0.1 | 0.7 | 0.07 | 0.30 | 61.6 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

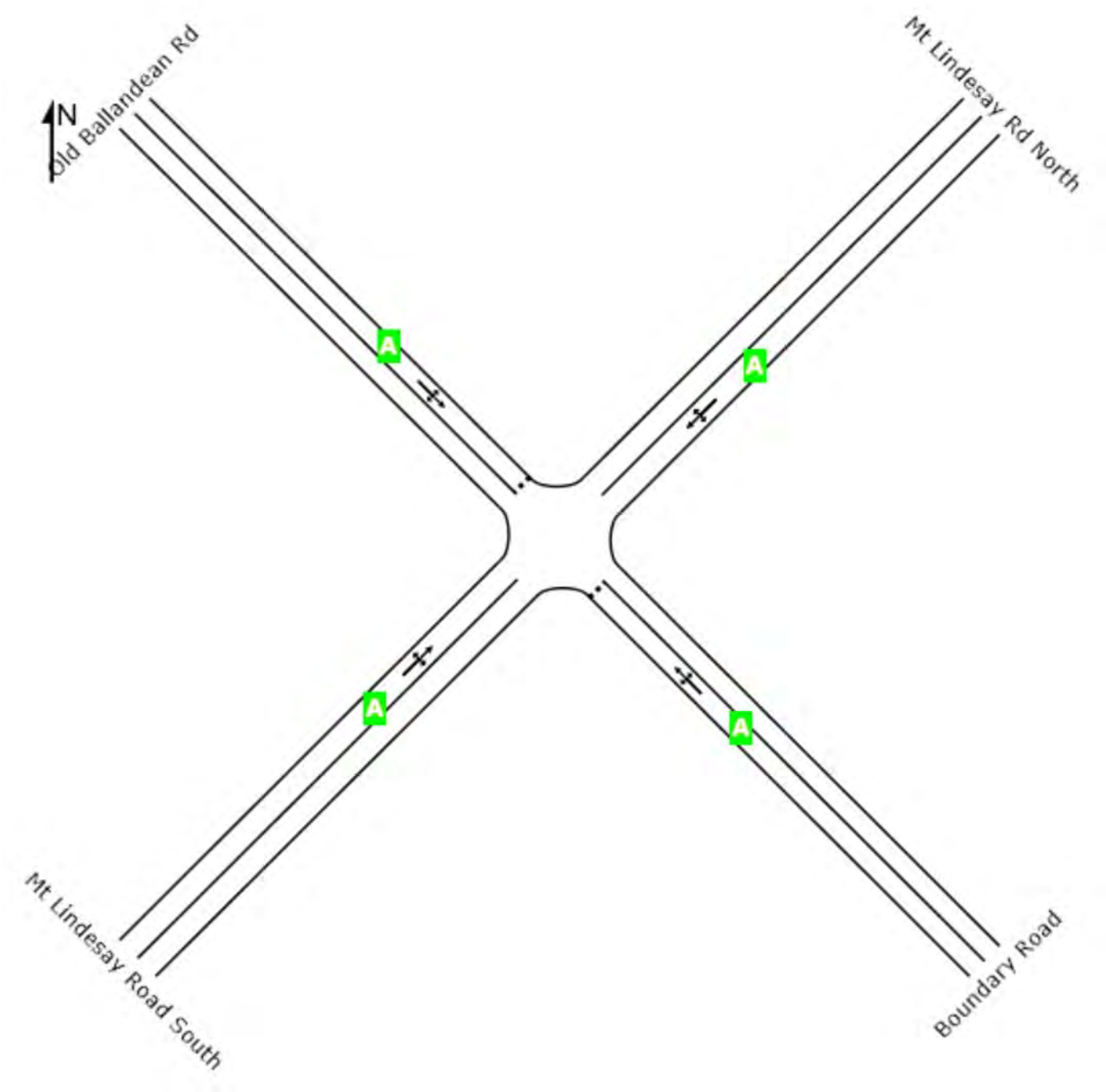
# LEVEL OF SERVICE

## Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| LOS | A | NA | A | NA | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

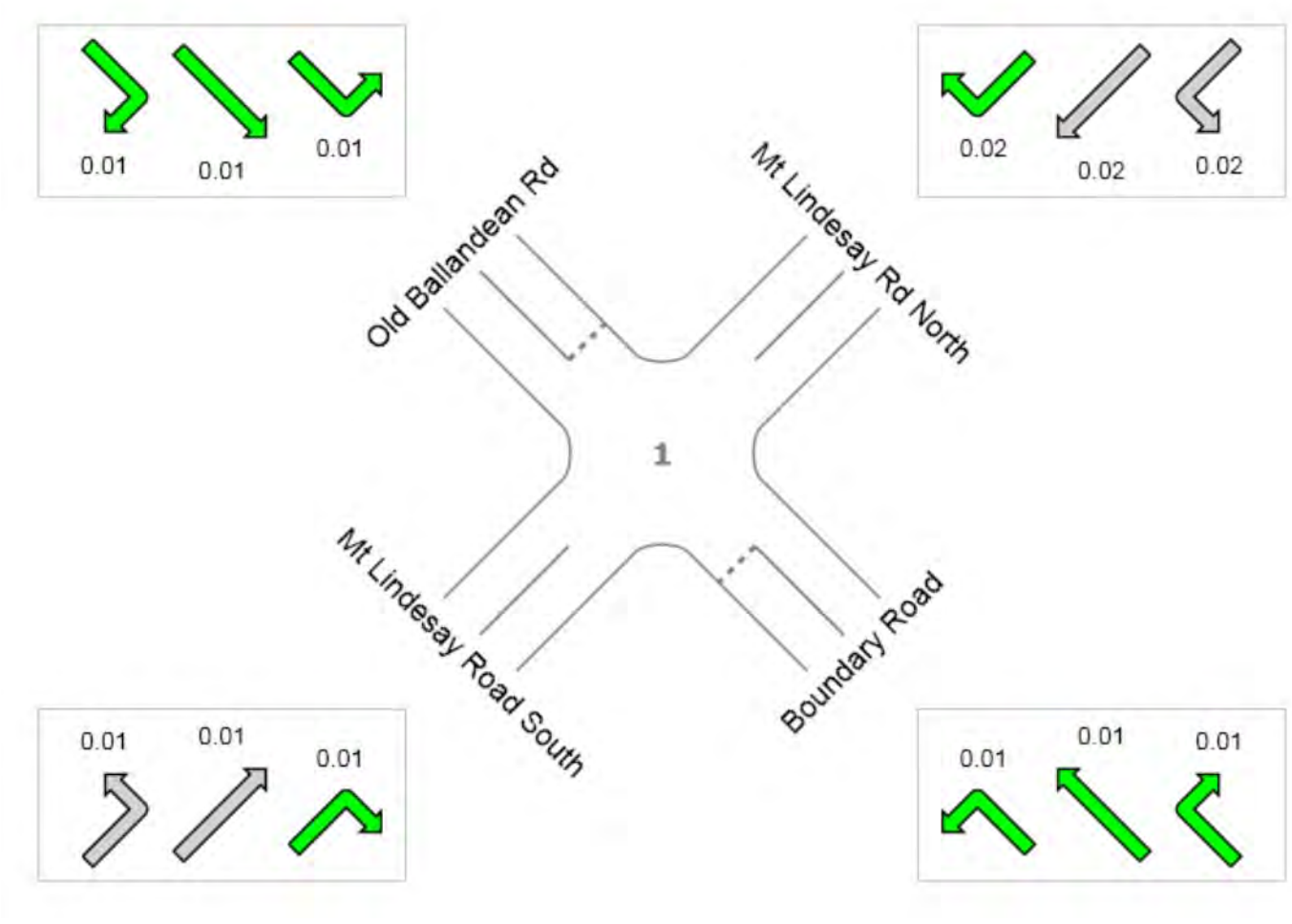
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.01 | 0.02 | 0.01 | 0.01 | 0.02 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

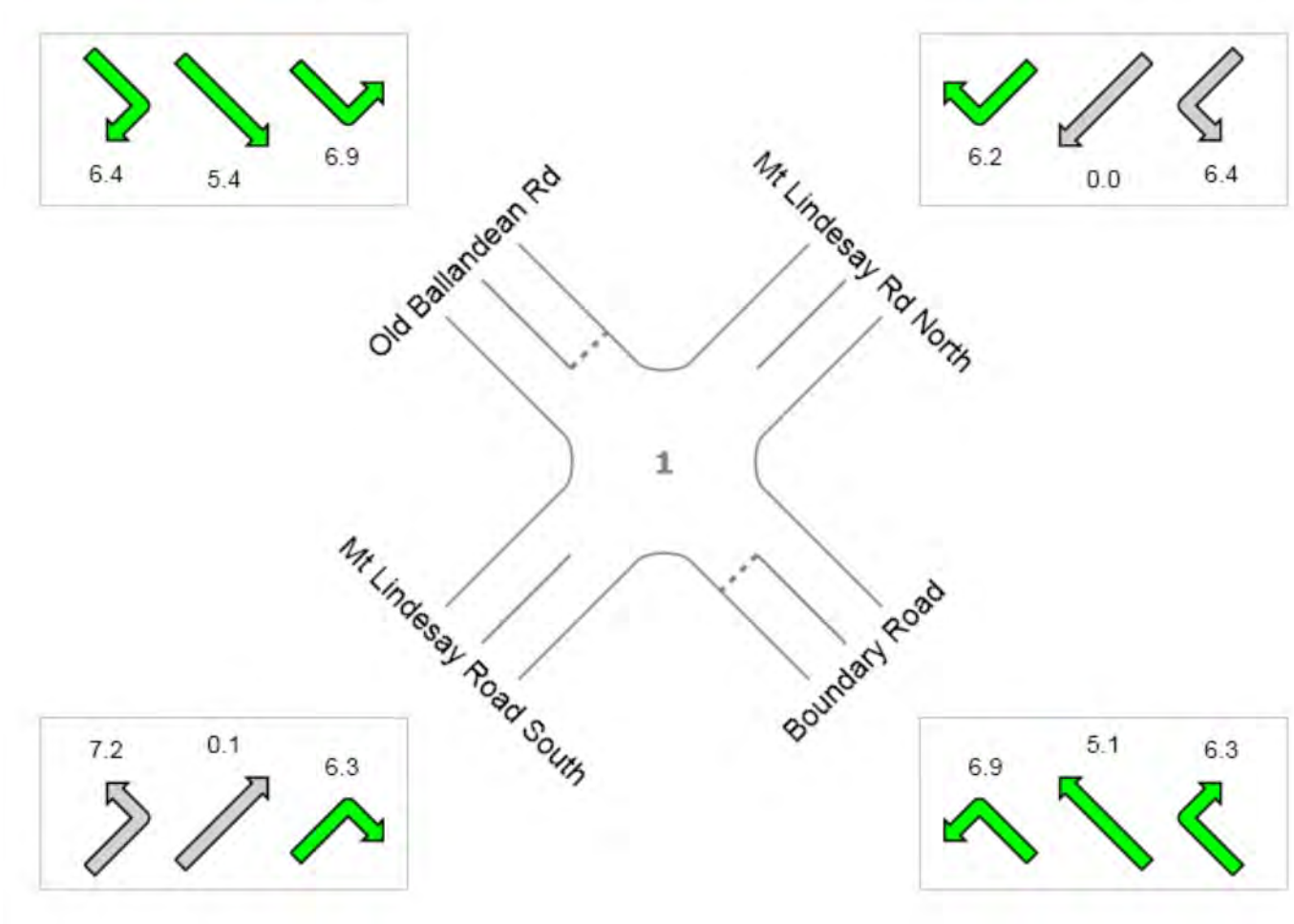
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 6.3 | 1.2 | 6.5 | 3.1 | 3.2 |
| LOS | A | NA | A | NA | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 3:52:40 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 2/12/2014 4:16:42 PM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| NorthEast | Mt Lindesay Rd North | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| NorthWest | Old Ballandean Rd | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| SouthWest | Mt Lindesay Road South | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: SouthEast | Boundary Road | | | |
| SouthWest | L2 | L | 4 | 4 |
| NorthWest | T1 | T | 5 | 5 |
| NorthEast | R2 | R | 6 | 6 |
| From: NorthEast | Mt Lindesay Rd North | | | |
| SouthEast | L2 | L | 7 | 7 |

| | | | | |
|---|---|---|---|---|
| SouthWest | T1 | T | 8 | 8 |
| NorthWest | R2 | R | 9 | 9 |
| From: NorthWest | Old Ballandean Rd | | | |
| NorthEast | L2 | L | 10 | 10 |
| SouthEast | T1 | T | 11 | 11 |
| SouthWest | R2 | R | 12 | 12 |
| From: SouthWest | Mt Lindesay Road South | | | |
| NorthWest | L2 | L | 1 | 1 |
| NorthEast | T1 | T | 2 | 2 |
| SouthEast | R2 | R | 3 | 3 |

## Lane Geometry - Lane Configuration

| Leg Item | Configuration | Type | Control | Slip/ Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 2.5 | -6 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 2.5 | 6 | | | – | – | – | – |
| NorthEast | Mt Lindesay Rd North | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Continu ous | – | 500 | 3 | -2 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 2 | | | – | – | – | – |
| NorthWest | Old Ballandean Rd | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 2.5 | 4 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 2.5 | -4 | | | – | – | – | – |
| SouthWest | Mt Lindesay Road South | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Continu ous | – | 500 | 3 | 0 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: SouthEast | App. Lane 1 | | |
| SouthWest | L2 | 0 | LV, HV |
| NorthWest | T1 | 0 | LV, HV |
| NorthEast | R2 | 0 | LV, HV |
| From: NorthEast | App. Lane 1 | | |
| SouthEast | L2 | 0 | LV, HV |
| SouthWest | T1 | 0 | LV, HV |
| NorthWest | R2 | 0 | LV, HV |
| From: NorthWest | App. Lane 1 | | |
| NorthEast | L2 | 0 | LV, HV |
| SouthEast | T1 | 0 | LV, HV |
| SouthWest | R2 | 0 | LV, HV |
| From: SouthWest | App. Lane 1 | | |
| NorthWest | L2 | 0 | LV, HV |
| NorthEast | T1 | 0 | LV, HV |
| SouthEast | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| NorthEast | Mt Lindesay Rd North | | | | |

| | | | | | |
|---|---|---|---|---|---|
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| NorthWest Old Ballandean Rd | | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| SouthWest Mt Lindesay Road South | | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | To Exit Leg SouthEast % | NorthEast % | NorthWest % | SouthWest % |
|---|---|---|---|---|
| Light Vehicles (LV) | | | | |
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |
| Heavy Vehicles (HV) | | | | |
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg SouthEast | NorthEast | NorthWest | SouthWest |
|---|---|---|---|---|
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | Yes | Yes | Yes |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg SouthEast veh | NorthEast veh | NorthWest veh | SouthWest veh |
|---|---|---|---|---|
| From: SouthEast | Boundary Road | | | |
| Total (veh) | – | 1 | 4 | 7 |
| LV (veh) | – | 1 | 4 | 6 |
| HV (veh) | – | 0 | 0 | 1 |
| From: NorthEast | Mt Lindesay Rd North | | | |
| Total (veh) | 1 | – | 5 | 27 |
| LV (veh) | 1 | – | 5 | 22 |
| HV (veh) | 0 | – | 0 | 5 |
| From: NorthWest | Old Ballandean Rd | | | |
| Total (veh) | 2 | 5 | – | 3 |
| LV (veh) | 1 | 2 | – | 3 |
| HV (veh) | 1 | 3 | – | 0 |
| From: SouthWest | Mt Lindesay Road South | | | |
| Total (veh) | 5 | 8 | 2 | – |
| LV (veh) | 5 | 7 | 1 | – |
| HV (veh) | 0 | 1 | 1 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: SouthEast | Boundary Road | | |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| From: NorthEast | Mt Lindesay Rd North | | |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| From: NorthWest | Old Ballandean Rd | | |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| From: SouthWest | Mt Lindesay Road South | | |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| Heavy Vehicles (HV) | | | |
| From: SouthEast | Boundary Road | | |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| From: NorthEast | Mt Lindesay Rd North | | |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| From: NorthWest | Old Ballandean Rd | | |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| From: SouthWest | Mt Lindesay Road South | | |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |

## Priorities

| Opposed | Opposing Movements |
|---|---|

| Movement | SouthEast | NorthEast | NorthWest | SouthWest |
|---|---|---|---|---|
| SouthEast | Boundary Road | | | |
| L2 | – | T1 | – | – |
| T1 | – | T1,R2 | – | R2,T1,L2 |
| R2 | – | T1,R2 | T1,L2 | R2,T1 |
| NorthEast | Mt Lindesay Rd North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | – | T1,L2 |
| NorthWest | Old Ballandean Rd | | | |
| L2 | – | – | – | T1 |
| T1 | – | T1,L2,R2 | – | R2,T1 |
| R2 | L2,T1 | T1,R2 | – | R2,T1 |
| SouthWest | Mt Lindesay Road South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | T1,L2 | – | – |

**Gap Acceptance - Gap Acceptance Data**

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| NorthEast | Mt Lindesay Rd North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| SouthWest | Mt Lindesay Road South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |

**Gap Acceptance - Two-Way Sign Control Calibration**

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes**

| Major Road Number of Lanes: | Critical Gap Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | Follow-up Headway Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
|---|---|---|---|---|---|---|---|---|
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control**

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |

| | | |
|---|---|---|
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | |
| From: SouthEast | Boundary Road | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthWest | Old Ballandean Rd | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: SouthWest | Mt Lindesay Road South | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| **Heavy Vehicles (HV)** | | | | | | |
| From: SouthEast | Boundary Road | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthWest | Old Ballandean Rd | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: SouthWest | Mt Lindesay Road South | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | | | |
| From: SouthEast | Boundary Road | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: SouthWest | Mt Lindesay Road South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: SouthEast | Boundary Road | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: SouthWest | Mt Lindesay Road South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** None

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| Passenger Car Equivalents | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| Queue Blockage | |
| Minimum Probability of Blockage | 0 |
| Delay and Queue | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| Downstream Short Lane | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| | |
|---|---|
| Cost Options | |
| Cost Unit | $ |

Vehicle Cost Parameters

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

## Model Settings - Fuel Consumption

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

## Model Settings - CO Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

## Model Settings - HC Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

## Model Settings - NOx Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

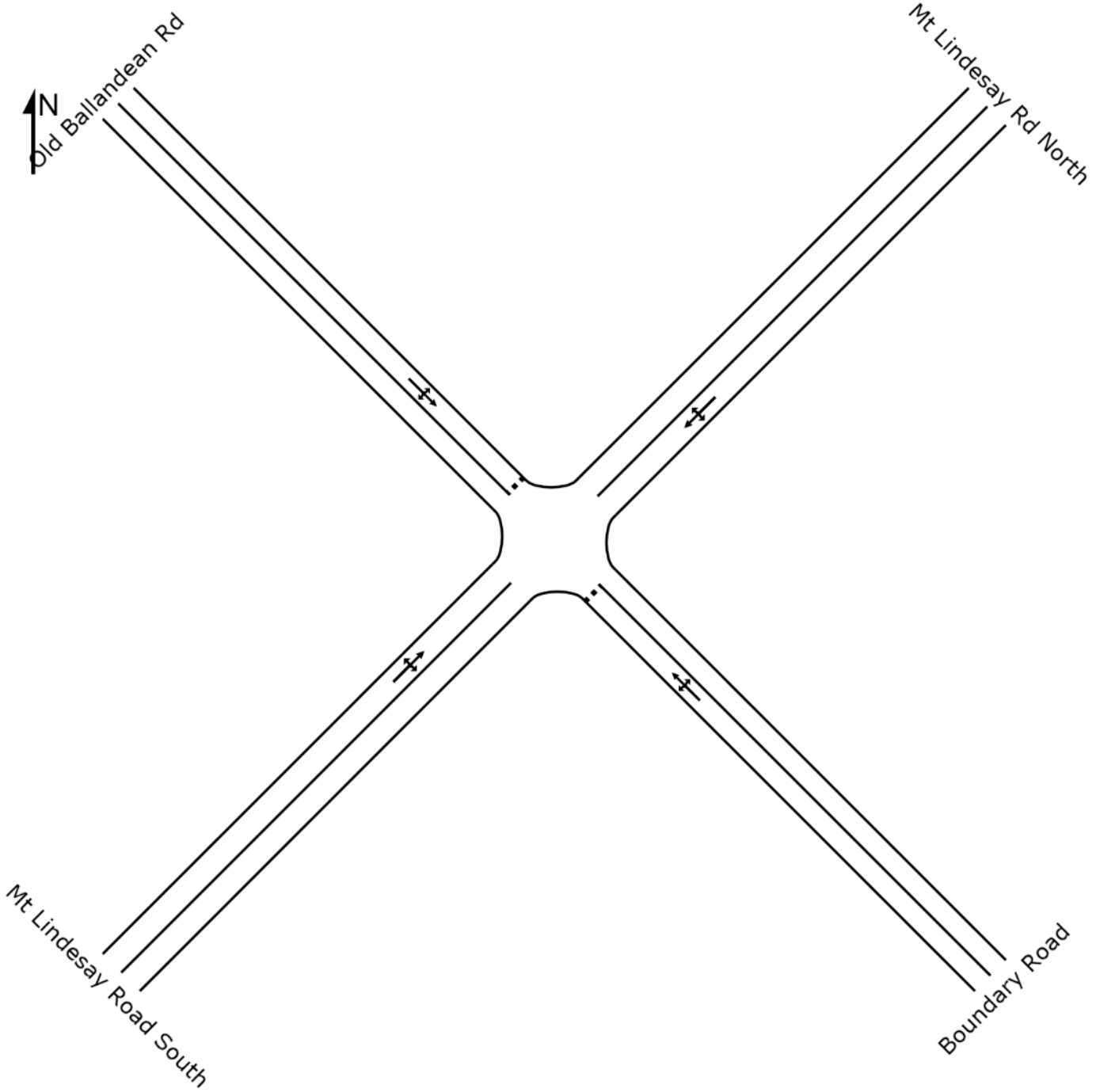
# APPENDIX D2

## Background + Development

# SITE LAYOUT

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

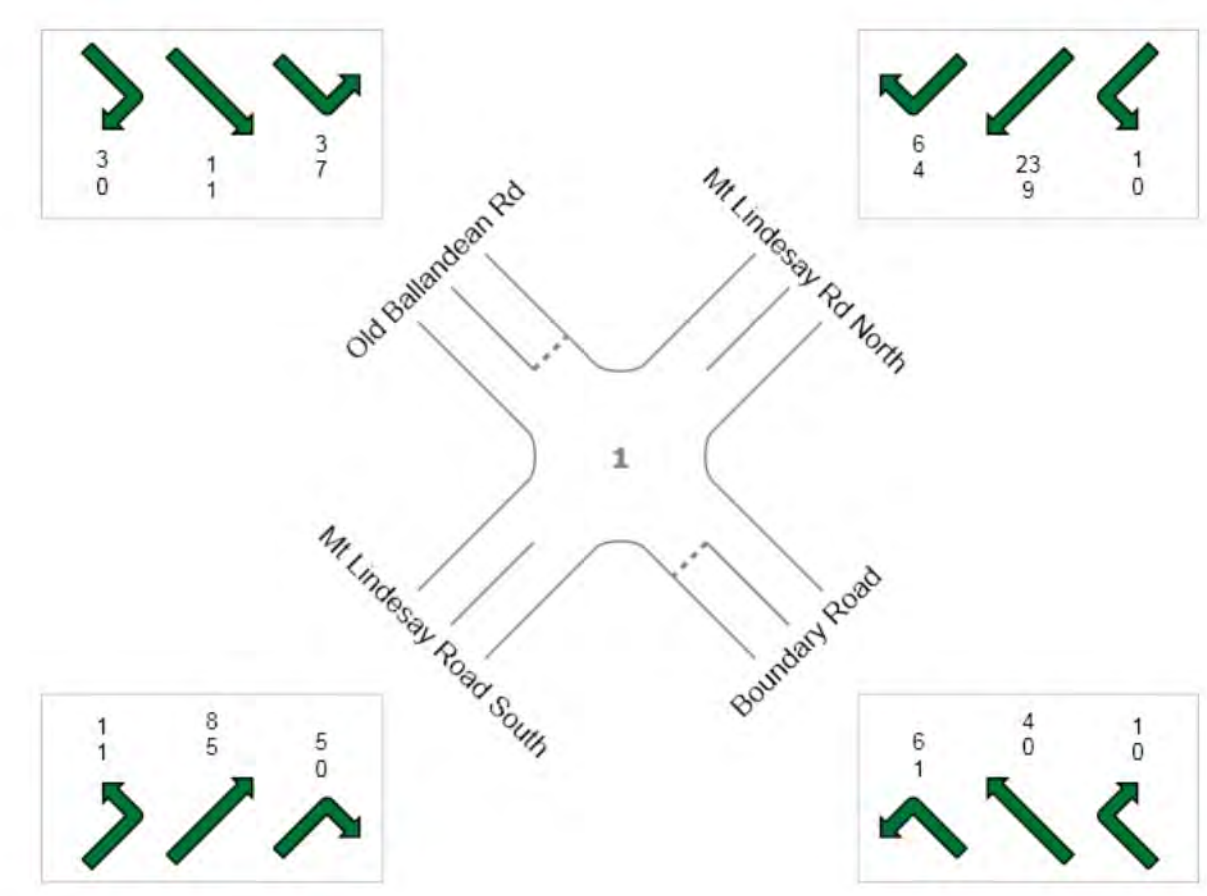
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 90**

**Light Vehicles (LV): 62**

**Heavy Vehicles (HV): 28**



# MOVEMENT SUMMARY

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Boundary Road | | | | | | | | | | | |
| 4 | L2 | 7 | 14.3 | 0.009 | 7.0 | LOS A | 0.0 | 0.2 | 0.09 | 0.57 | 55.8 |
| 5 | T1 | 4 | 0.0 | 0.009 | 5.1 | LOS A | 0.0 | 0.2 | 0.09 | 0.57 | 60.1 |
| 6 | R2 | 1 | 0.0 | 0.009 | 6.4 | LOS A | 0.0 | 0.2 | 0.09 | 0.57 | 59.3 |
| Approach | | 13 | 8.3 | 0.009 | 6.3 | LOS A | 0.0 | 0.2 | 0.09 | 0.57 | 57.5 |
| NorthEast: Mt Lindesay Rd North | | | | | | | | | | | |
| 7 | L2 | 1 | 0.0 | 0.029 | 6.4 | LOS A | 0.1 | 1.2 | 0.08 | 0.16 | 64.5 |
| 8 | T1 | 34 | 28.1 | 0.029 | 0.1 | LOS A | 0.1 | 1.2 | 0.08 | 0.16 | 67.6 |
| 9 | R2 | 11 | 40.0 | 0.029 | 7.2 | LOS A | 0.1 | 1.2 | 0.08 | 0.16 | 61.6 |
| Approach | | 45 | 30.2 | 0.029 | 1.9 | NA | 0.1 | 1.2 | 0.08 | 0.16 | 66.1 |
| NorthWest: Old Ballandean Rd | | | | | | | | | | | |
| 10 | L2 | 11 | 70.0 | 0.014 | 7.0 | LOS A | 0.1 | 0.6 | 0.08 | 0.58 | 44.0 |
| 11 | T1 | 2 | 50.0 | 0.014 | 5.5 | LOS A | 0.1 | 0.6 | 0.08 | 0.58 | 48.3 |
| 12 | R2 | 3 | 0.0 | 0.014 | 6.4 | LOS A | 0.1 | 0.6 | 0.08 | 0.58 | 59.1 |
| Approach | | 16 | 53.3 | 0.014 | 6.7 | LOS A | 0.1 | 0.6 | 0.08 | 0.58 | 47.0 |
| SouthWest: Mt Lindesay Road South | | | | | | | | | | | |
| 1 | L2 | 2 | 50.0 | 0.013 | 7.2 | LOS A | 0.1 | 0.5 | 0.11 | 0.21 | 60.7 |
| 2 | T1 | 14 | 38.5 | 0.013 | 0.1 | LOS A | 0.1 | 0.5 | 0.11 | 0.21 | 66.0 |
| 3 | R2 | 5 | 0.0 | 0.013 | 6.3 | LOS A | 0.1 | 0.5 | 0.11 | 0.21 | 62.3 |
| Approach | | 21 | 30.0 | 0.013 | 2.4 | NA | 0.1 | 0.5 | 0.11 | 0.21 | 64.5 |
| All Vehicles | | 95 | 31.1 | 0.029 | 3.4 | NA | 0.1 | 1.2 | 0.09 | 0.30 | 60.4 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

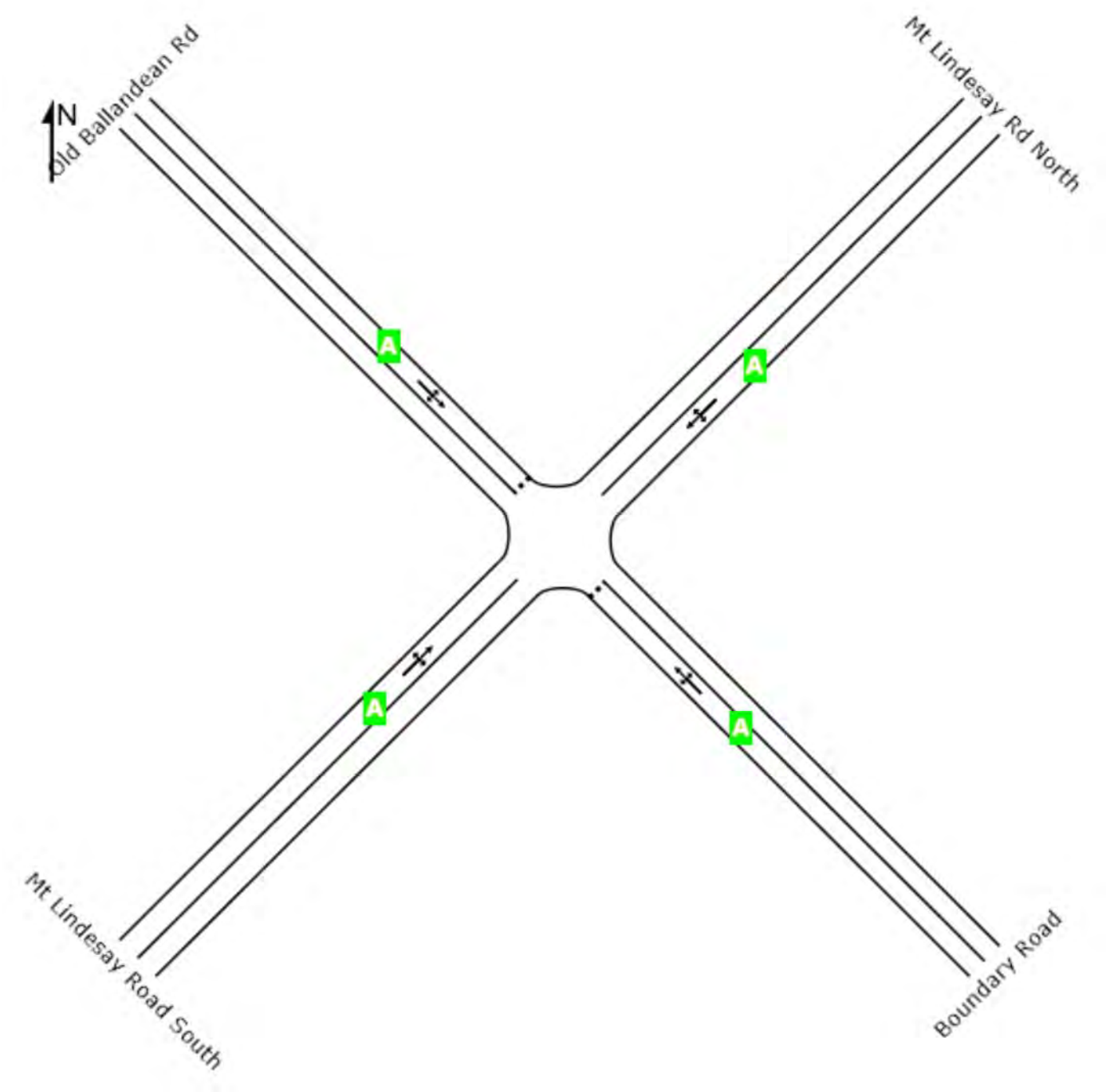
# LEVEL OF SERVICE

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| LOS | A | NA | A | NA | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

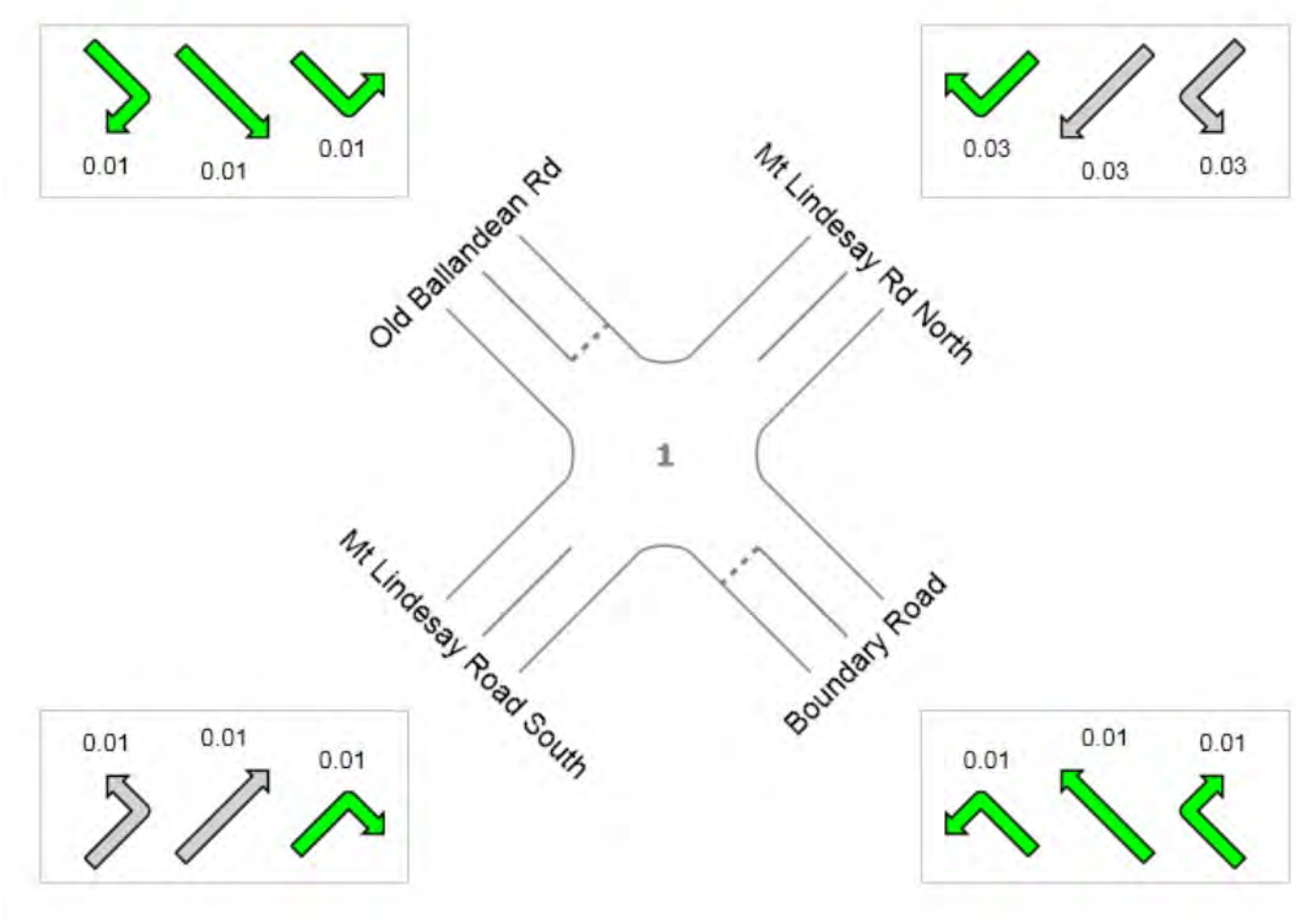
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.01 | 0.03 | 0.01 | 0.01 | 0.03 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

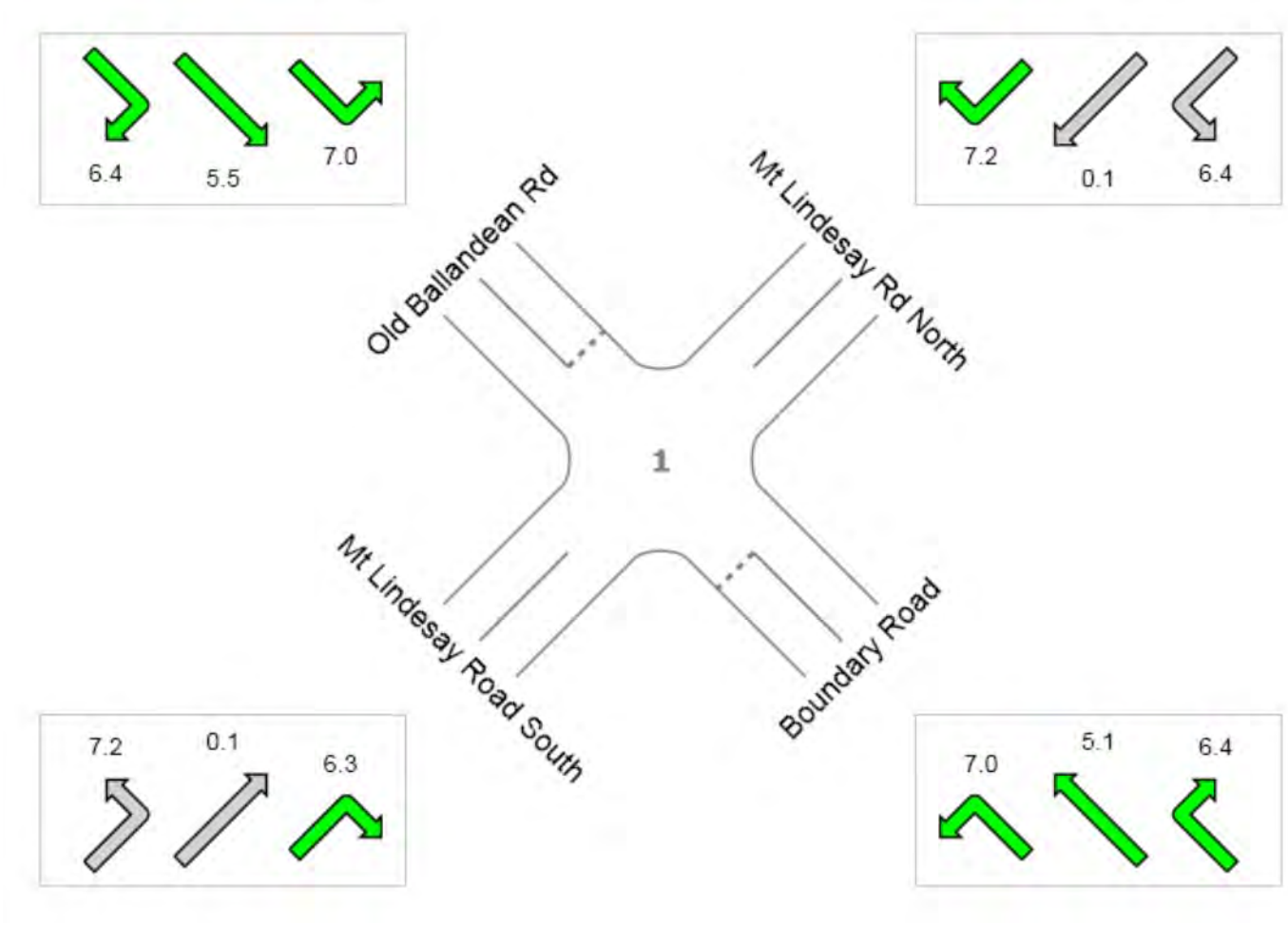
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 6.3 | 1.9 | 6.7 | 2.4 | 3.4 |
| LOS | A | NA | A | NA | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 3:52:40 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 3/12/2014 9:11:46 AM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| NorthEast | Mt Lindesay Rd North | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| NorthWest | Old Ballandean Rd | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| SouthWest | Mt Lindesay Road South | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: SouthEast | Boundary Road | | | |
| SouthWest | L2 | L | 4 | 4 |
| NorthWest | T1 | T | 5 | 5 |
| NorthEast | R2 | R | 6 | 6 |
| From: NorthEast | Mt Lindesay Rd North | | | |
| SouthEast | L2 | L | 7 | 7 |

| | | | | |
|---|---|---|---|---|
| SouthWest | T1 | T | 8 | 8 |
| NorthWest | R2 | R | 9 | 9 |
| From: NorthWest | Old Ballandean Rd | | | |
| NorthEast | L2 | L | 10 | 10 |
| SouthEast | T1 | T | 11 | 11 |
| SouthWest | R2 | R | 12 | 12 |
| From: SouthWest | Mt Lindesay Road South | | | |
| NorthWest | L2 | L | 1 | 1 |
| NorthEast | T1 | T | 2 | 2 |
| SouthEast | R2 | R | 3 | 3 |

## Lane Geometry - Lane Configuration

| Leg Item | Configuration | Type | Control | Slip/ Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 2.5 | -6 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 2.5 | 6 | | | – | – | – | – |
| NorthEast | Mt Lindesay Rd North | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Continu ous | – | 500 | 3 | -2 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 2 | | | – | – | – | – |
| NorthWest | Old Ballandean Rd | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 2.5 | 4 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 2.5 | -4 | | | – | – | – | – |
| SouthWest | Mt Lindesay Road South | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Continu ous | – | 500 | 3 | 0 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: SouthEast | App. Lane 1 | | |
| SouthWest | L2 | 0 | LV, HV |
| NorthWest | T1 | 0 | LV, HV |
| NorthEast | R2 | 0 | LV, HV |
| From: NorthEast | App. Lane 1 | | |
| SouthEast | L2 | 0 | LV, HV |
| SouthWest | T1 | 0 | LV, HV |
| NorthWest | R2 | 0 | LV, HV |
| From: NorthWest | App. Lane 1 | | |
| NorthEast | L2 | 0 | LV, HV |
| SouthEast | T1 | 0 | LV, HV |
| SouthWest | R2 | 0 | LV, HV |
| From: SouthWest | App. Lane 1 | | |
| NorthWest | L2 | 0 | LV, HV |
| NorthEast | T1 | 0 | LV, HV |
| SouthEast | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| NorthEast | Mt Lindesay Rd North | | | | |

| | | | | | |
|---|---|---|---|---|---|
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| NorthWest Old Ballandean Rd | | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| SouthWest Mt Lindesay Road South | | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | To Exit Leg SouthEast % | NorthEast % | NorthWest % | SouthWest % |
|---|---|---|---|---|
| Light Vehicles (LV) | | | | |
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |
| Heavy Vehicles (HV) | | | | |
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg SouthEast | NorthEast | NorthWest | SouthWest |
|---|---|---|---|---|
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | Yes | Yes | Yes |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg SouthEast veh | NorthEast veh | NorthWest veh | SouthWest veh |
|---|---|---|---|---|
| From: SouthEast | Boundary Road | | | |
| Total (veh) | – | 1 | 4 | 7 |
| LV (veh) | – | 1 | 4 | 6 |
| HV (veh) | – | 0 | 0 | 1 |
| From: NorthEast | Mt Lindesay Rd North | | | |
| Total (veh) | 1 | – | 10 | 32 |
| LV (veh) | 1 | – | 6 | 23 |
| HV (veh) | 0 | – | 4 | 9 |
| From: NorthWest | Old Ballandean Rd | | | |
| Total (veh) | 2 | 10 | – | 3 |
| LV (veh) | 1 | 3 | – | 3 |
| HV (veh) | 1 | 7 | – | 0 |
| From: SouthWest | Mt Lindesay Road South | | | |
| Total (veh) | 5 | 13 | 2 | – |
| LV (veh) | 5 | 8 | 1 | – |
| HV (veh) | 0 | 5 | 1 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: SouthEast | Boundary Road | | |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| From: NorthEast | Mt Lindesay Rd North | | |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| From: NorthWest | Old Ballandean Rd | | |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| From: SouthWest | Mt Lindesay Road South | | |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| Heavy Vehicles (HV) | | | |
| From: SouthEast | Boundary Road | | |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| From: NorthEast | Mt Lindesay Rd North | | |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| From: NorthWest | Old Ballandean Rd | | |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| From: SouthWest | Mt Lindesay Road South | | |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |

## Priorities

| Opposed | Opposing Movements |
|---|---|

| Movement | SouthEast | NorthEast | NorthWest | SouthWest |
|---|---|---|---|---|
| SouthEast | Boundary Road | | | |
| L2 | – | T1 | – | – |
| T1 | – | T1,R2 | – | R2,T1,L2 |
| R2 | – | T1,R2 | T1,L2 | R2,T1 |
| NorthEast | Mt Lindesay Rd North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | – | T1,L2 |
| NorthWest | Old Ballandean Rd | | | |
| L2 | – | – | – | T1 |
| T1 | – | T1,L2,R2 | – | R2,T1 |
| R2 | L2,T1 | T1,R2 | – | R2,T1 |
| SouthWest | Mt Lindesay Road South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | T1,L2 | – | – |

**Gap Acceptance - Gap Acceptance Data**

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| NorthEast | Mt Lindesay Rd North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| SouthWest | Mt Lindesay Road South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |

**Gap Acceptance - Two-Way Sign Control Calibration**

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes**

| Major Road Number of Lanes: | Critical Gap Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | Follow-up Headway Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
|---|---|---|---|---|---|---|---|---|
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control**

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |

| | | |
|---|---|---|
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | |
| From: SouthEast | Boundary Road | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthWest | Old Ballandean Rd | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: SouthWest | Mt Lindesay Road South | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| **Heavy Vehicles (HV)** | | | | | | |
| From: SouthEast | Boundary Road | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthWest | Old Ballandean Rd | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: SouthWest | Mt Lindesay Road South | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | | | |
| From: SouthEast | Boundary Road | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: SouthWest | Mt Lindesay Road South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: SouthEast | Boundary Road | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: SouthWest | Mt Lindesay Road South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** None

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| Passenger Car Equivalents | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| Queue Blockage | |
| Minimum Probability of Blockage | 0 |
| Delay and Queue | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| Downstream Short Lane | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| | |
|---|---|
| Cost Options | |
| Cost Unit | $ |

Vehicle Cost Parameters

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

## Model Settings - Fuel Consumption

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

## Model Settings - CO Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

## Model Settings - HC Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

## Model Settings - NOx Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

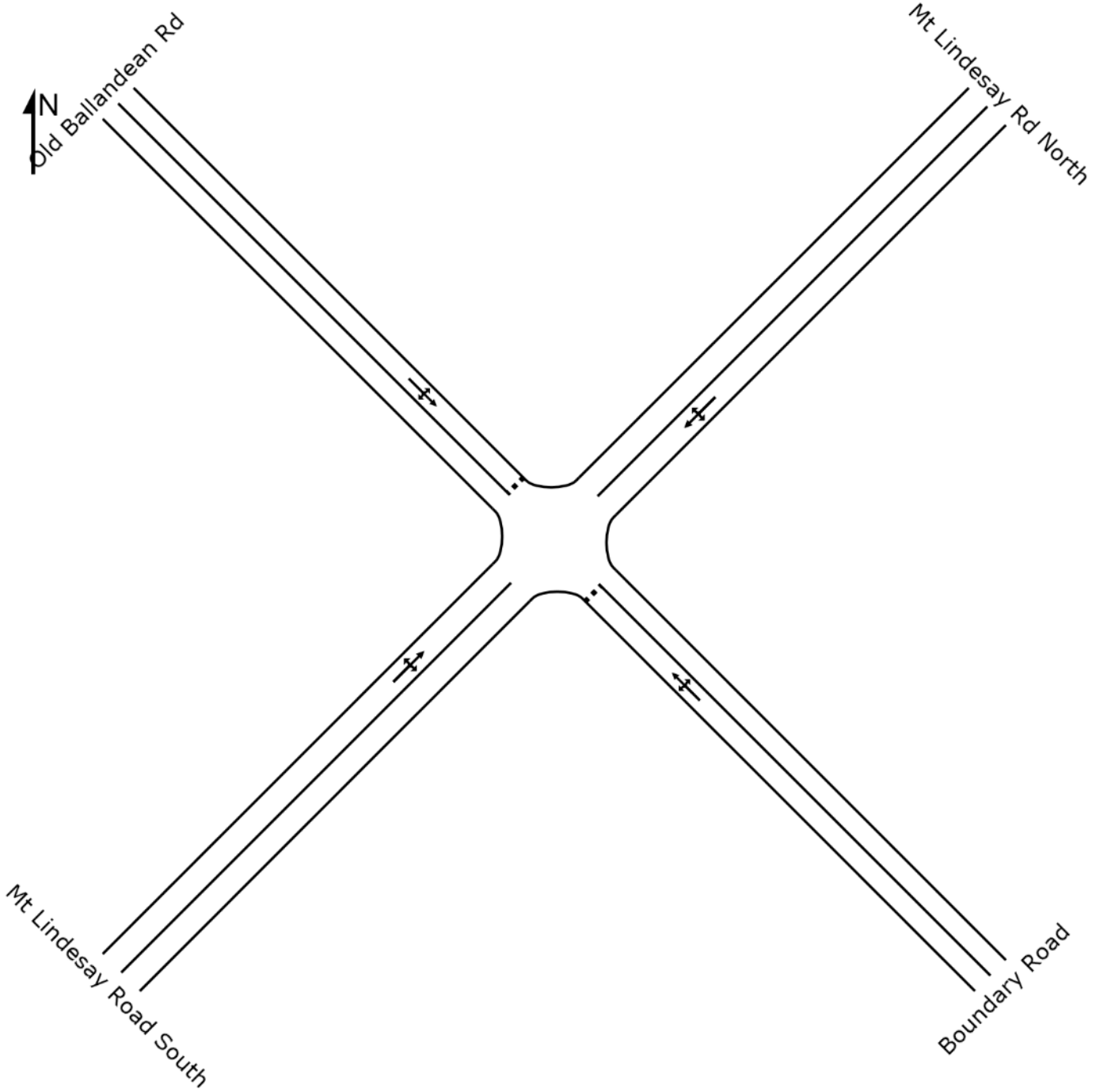
# APPENDIX D3

## 30yr + Development

# SITE LAYOUT

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

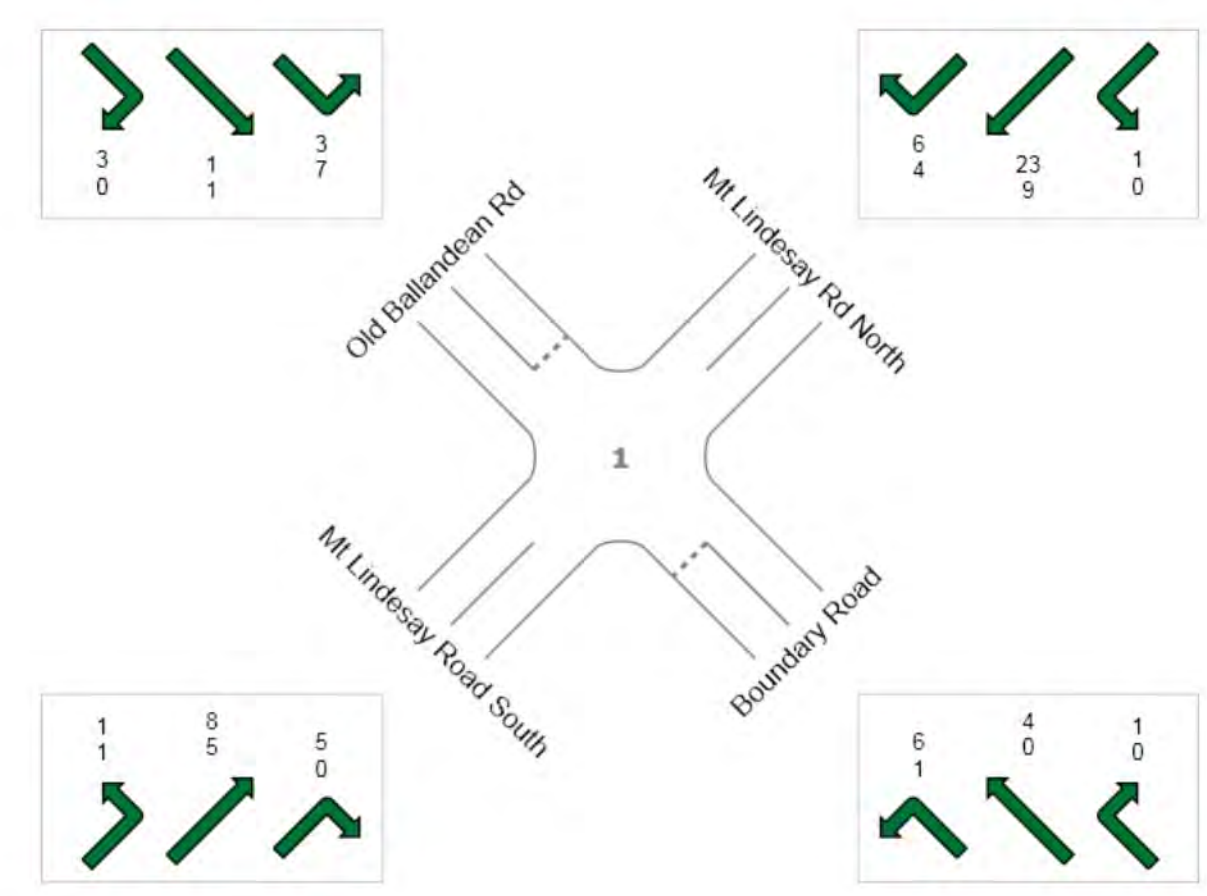
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 90**

**Light Vehicles (LV): 62**

**Heavy Vehicles (HV): 28**



# MOVEMENT SUMMARY

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast: Boundary Road | | | | | | | | | | | |
| 4 | L2 | 11 | 14.3 | 0.014 | 7.0 | LOS A | 0.0 | 0.3 | 0.12 | 0.57 | 55.7 |
| 5 | T1 | 6 | 0.0 | 0.014 | 5.2 | LOS A | 0.0 | 0.3 | 0.12 | 0.57 | 60.0 |
| 6 | R2 | 2 | 0.0 | 0.014 | 6.4 | LOS A | 0.0 | 0.3 | 0.12 | 0.57 | 59.2 |
| Approach | | 18 | 8.3 | 0.014 | 6.4 | LOS A | 0.0 | 0.3 | 0.12 | 0.57 | 57.4 |
| NorthEast: Mt Lindesay Rd North | | | | | | | | | | | |
| 7 | L2 | 2 | 0.0 | 0.042 | 6.5 | LOS A | 0.2 | 1.8 | 0.11 | 0.16 | 64.4 |
| 8 | T1 | 49 | 28.1 | 0.042 | 0.1 | LOS A | 0.2 | 1.8 | 0.11 | 0.16 | 67.5 |
| 9 | R2 | 15 | 40.0 | 0.042 | 7.2 | LOS A | 0.2 | 1.8 | 0.11 | 0.16 | 61.5 |
| Approach | | 66 | 30.2 | 0.042 | 1.9 | NA | 0.2 | 1.8 | 0.11 | 0.16 | 65.9 |
| NorthWest: Old Ballandean Rd | | | | | | | | | | | |
| 10 | L2 | 15 | 70.0 | 0.021 | 7.1 | LOS A | 0.1 | 0.9 | 0.10 | 0.58 | 44.0 |
| 11 | T1 | 3 | 50.0 | 0.021 | 5.6 | LOS A | 0.1 | 0.9 | 0.10 | 0.58 | 48.3 |
| 12 | R2 | 5 | 0.0 | 0.021 | 6.5 | LOS A | 0.1 | 0.9 | 0.10 | 0.58 | 59.0 |
| Approach | | 23 | 53.3 | 0.021 | 6.8 | LOS A | 0.1 | 0.9 | 0.10 | 0.58 | 46.9 |
| SouthWest: Mt Lindesay Road South | | | | | | | | | | | |
| 1 | L2 | 3 | 50.0 | 0.019 | 7.2 | LOS A | 0.1 | 0.7 | 0.14 | 0.21 | 60.5 |
| 2 | T1 | 20 | 38.5 | 0.019 | 0.2 | LOS A | 0.1 | 0.7 | 0.14 | 0.21 | 65.9 |
| 3 | R2 | 8 | 0.0 | 0.019 | 6.4 | LOS A | 0.1 | 0.7 | 0.14 | 0.21 | 62.2 |
| Approach | | 31 | 30.0 | 0.019 | 2.4 | NA | 0.1 | 0.7 | 0.14 | 0.21 | 64.4 |
| All Vehicles | | 137 | 31.1 | 0.042 | 3.4 | NA | 0.2 | 1.8 | 0.11 | 0.29 | 60.3 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

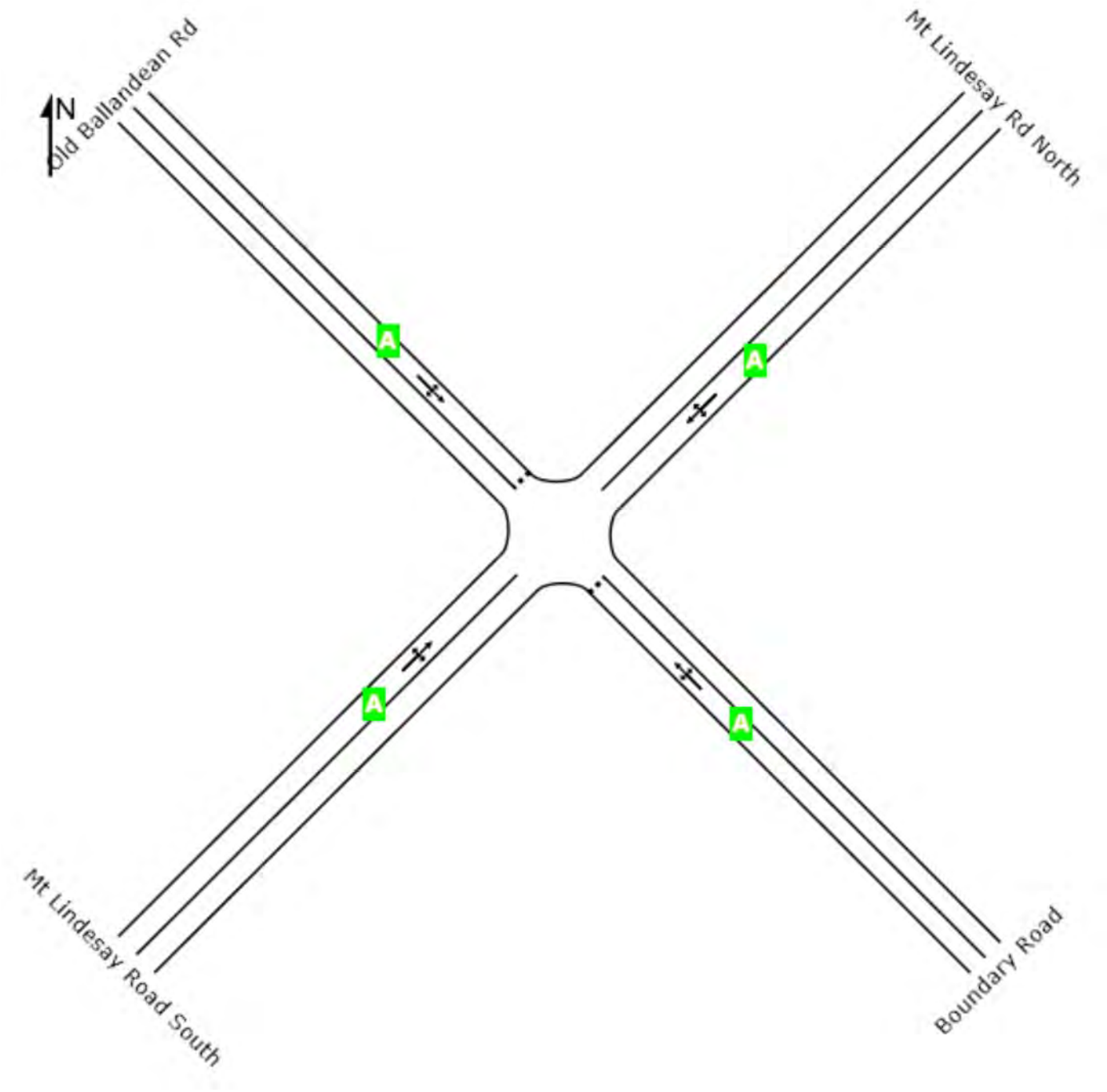
# LEVEL OF SERVICE

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| LOS | A | NA | A | NA | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

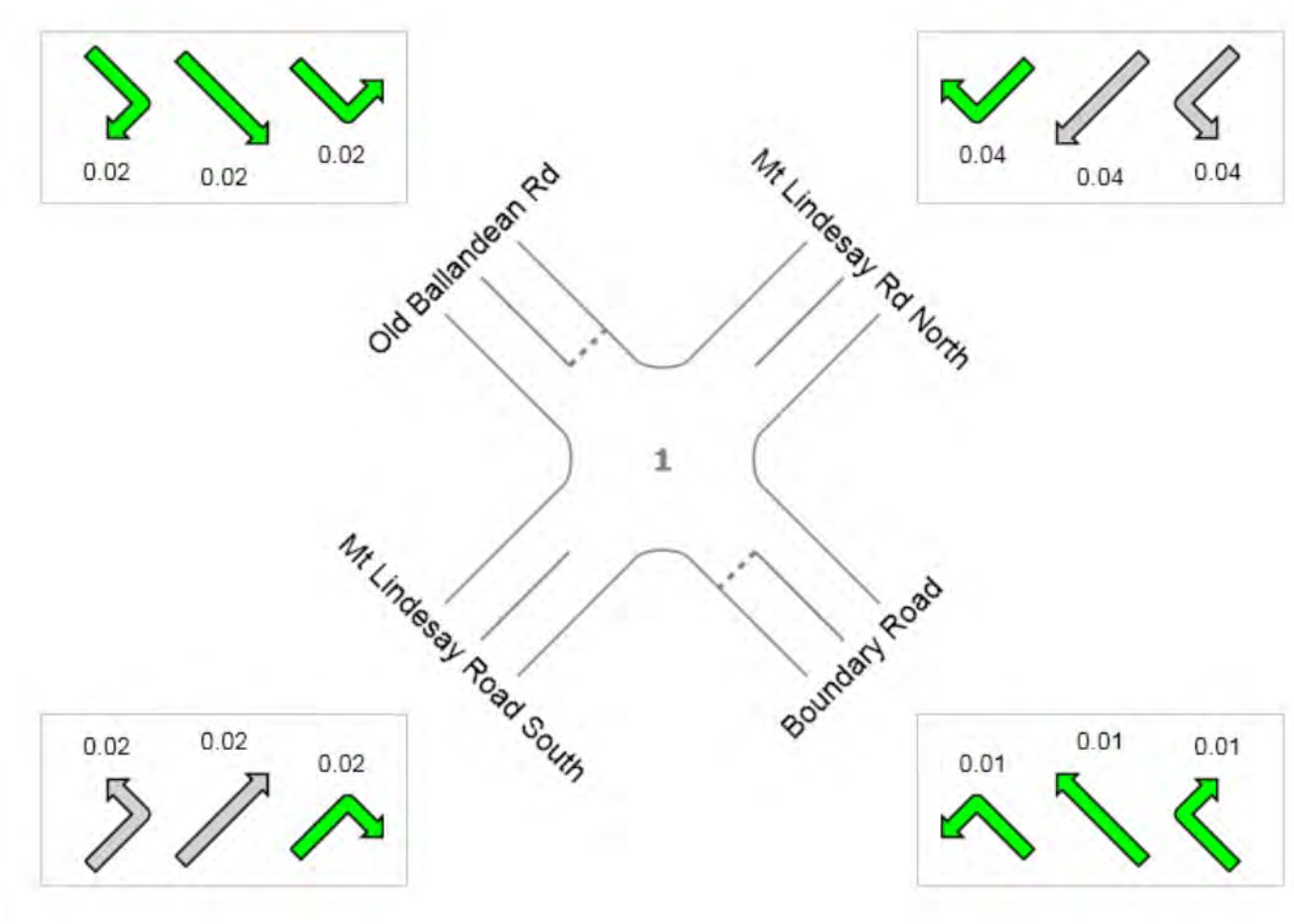
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.01 | 0.04 | 0.02 | 0.02 | 0.04 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

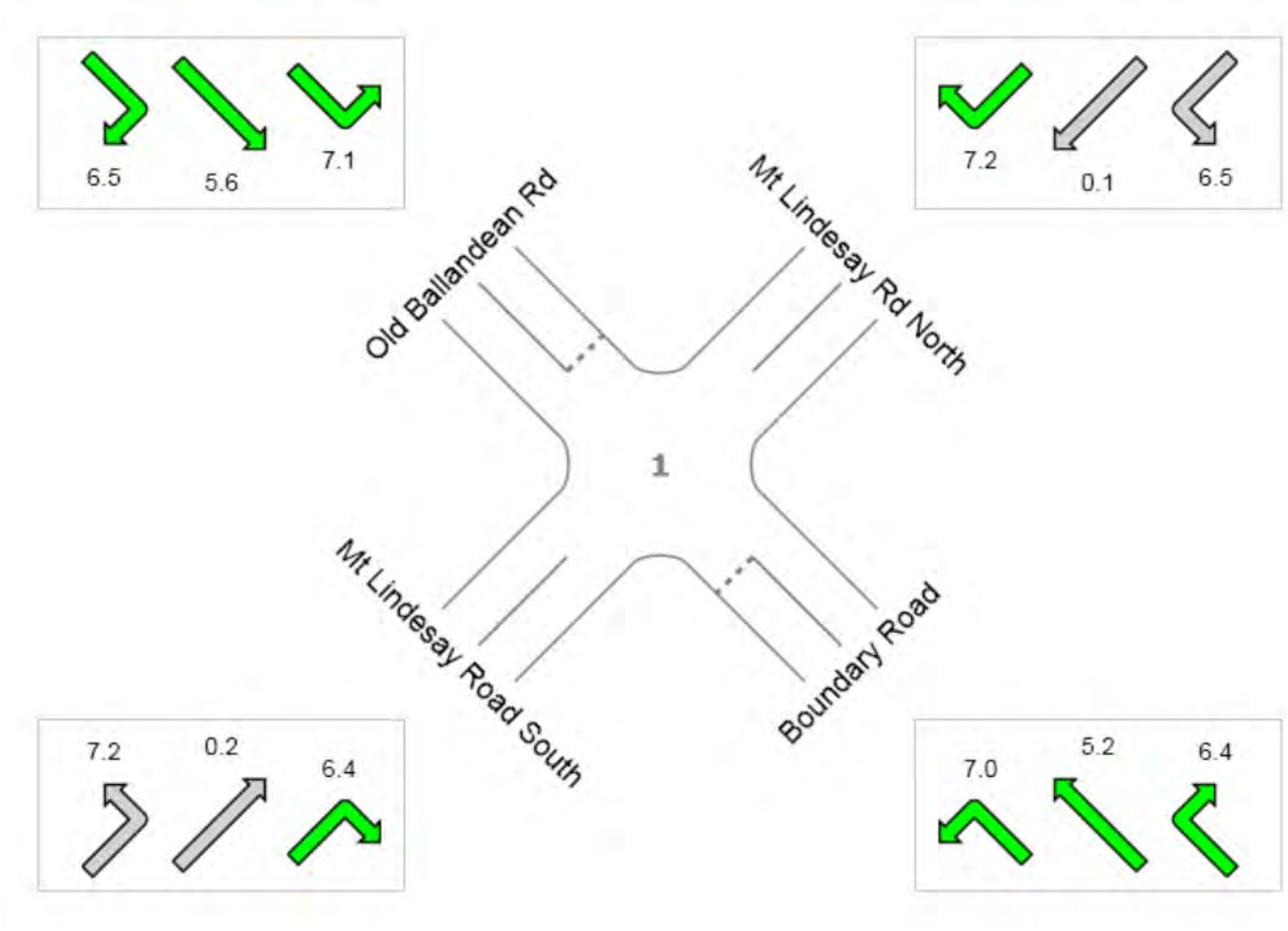
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | Southeast | Northeast | Northwest | Southwest | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 6.4 | 1.9 | 6.8 | 2.4 | 3.4 |
| LOS | A | NA | A | NA | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 3:52:40 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 3/12/2014 9:11:46 AM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| NorthEast | Mt Lindesay Rd North | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |
| NorthWest | Old Ballandean Rd | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| SouthWest | Mt Lindesay Road South | Two-way | 1 | 1 | 500.0 | 0 | Major Road | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: SouthEast | Boundary Road | | | |
| SouthWest | L2 | L | 4 | 4 |
| NorthWest | T1 | T | 5 | 5 |
| NorthEast | R2 | R | 6 | 6 |
| From: NorthEast | Mt Lindesay Rd North | | | |
| SouthEast | L2 | L | 7 | 7 |

| | | | | |
|---|---|---|---|---|
| SouthWest | T1 | T | 8 | 8 |
| NorthWest | R2 | R | 9 | 9 |
| From: NorthWest | Old Ballandean Rd | | | |
| NorthEast | L2 | L | 10 | 10 |
| SouthEast | T1 | T | 11 | 11 |
| SouthWest | R2 | R | 12 | 12 |
| From: SouthWest | Mt Lindesay Road South | | | |
| NorthWest | L2 | L | 1 | 1 |
| NorthEast | T1 | T | 2 | 2 |
| SouthEast | R2 | R | 3 | 3 |

## Lane Geometry - Lane Configuration

| Leg Item | Configuration | Type | Control | Slip/ Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 2.5 | -6 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 2.5 | 6 | | | – | – | – | – |
| NorthEast | Mt Lindesay Rd North | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Continu ous | – | 500 | 3 | -2 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 2 | | | – | – | – | – |
| NorthWest | Old Ballandean Rd | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Giveway /Yield | – | 500 | 2.5 | 4 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 2.5 | -4 | | | – | – | – | – |
| SouthWest | Mt Lindesay Road South | | | | | | | | | | | | |
| App. Lane 1 | Full-Length | Normal | Continu ous | – | 500 | 3 | 0 | | | – | – | – | – |
| Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: SouthEast | App. Lane 1 | | |
| SouthWest | L2 | 0 | LV, HV |
| NorthWest | T1 | 0 | LV, HV |
| NorthEast | R2 | 0 | LV, HV |
| From: NorthEast | App. Lane 1 | | |
| SouthEast | L2 | 0 | LV, HV |
| SouthWest | T1 | 0 | LV, HV |
| NorthWest | R2 | 0 | LV, HV |
| From: NorthWest | App. Lane 1 | | |
| NorthEast | L2 | 0 | LV, HV |
| SouthEast | T1 | 0 | LV, HV |
| SouthWest | R2 | 0 | LV, HV |
| From: SouthWest | App. Lane 1 | | |
| NorthWest | L2 | 0 | LV, HV |
| NorthEast | T1 | 0 | LV, HV |
| SouthEast | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| NorthEast | Mt Lindesay Rd North | | | | |

| | | | | | |
|---|---|---|---|---|---|
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| NorthWest Old Ballandean Rd | | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |
| SouthWest Mt Lindesay Road South | | | | | |
| App. Lane 1 | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | To Exit Leg SouthEast % | NorthEast % | NorthWest % | SouthWest % |
|---|---|---|---|---|
| Light Vehicles (LV) | | | | |
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |
| Heavy Vehicles (HV) | | | | |
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | 100 | 100 | 100 |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | 100 | – | 100 | 100 |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | – | 100 |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | 100 | 100 | 100 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg SouthEast | NorthEast | NorthWest | SouthWest |
|---|---|---|---|---|
| From: SouthEast App. Lane 1 | | | | |
| Exit Lane 1 | – | Yes | Yes | Yes |
| From: NorthEast App. Lane 1 | | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| From: NorthWest App. Lane 1 | | | | |
| Exit Lane 1 | Yes | Yes | – | Yes |
| From: SouthWest App. Lane 1 | | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg SouthEast veh | NorthEast veh | NorthWest veh | SouthWest veh |
|---|---|---|---|---|
| From: SouthEast | Boundary Road | | | |
| Total (veh) | – | 1 | 4 | 7 |
| LV (veh) | – | 1 | 4 | 6 |
| HV (veh) | – | 0 | 0 | 1 |
| From: NorthEast | Mt Lindesay Rd North | | | |
| Total (veh) | 1 | – | 10 | 32 |
| LV (veh) | 1 | – | 6 | 23 |
| HV (veh) | 0 | – | 4 | 9 |
| From: NorthWest | Old Ballandean Rd | | | |
| Total (veh) | 2 | 10 | – | 3 |
| LV (veh) | 1 | 3 | – | 3 |
| HV (veh) | 1 | 7 | – | 0 |
| From: SouthWest | Mt Lindesay Road South | | | |
| Total (veh) | 5 | 13 | 2 | – |
| LV (veh) | 5 | 8 | 1 | – |
| HV (veh) | 0 | 5 | 1 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| Light Vehicles (LV) | | | |
| From: SouthEast | Boundary Road | | |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| From: NorthEast | Mt Lindesay Rd North | | |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| From: NorthWest | Old Ballandean Rd | | |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| From: SouthWest | Mt Lindesay Road South | | |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| Heavy Vehicles (HV) | | | |
| From: SouthEast | Boundary Road | | |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| From: NorthEast | Mt Lindesay Rd North | | |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| NorthWest | 95.0 | 100.00 | 1.50 |
| From: NorthWest | Old Ballandean Rd | | |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |
| SouthWest | 95.0 | 100.00 | 1.50 |
| From: SouthWest | Mt Lindesay Road South | | |
| NorthWest | 95.0 | 100.00 | 1.50 |
| NorthEast | 95.0 | 100.00 | 1.50 |
| SouthEast | 95.0 | 100.00 | 1.50 |

## Priorities

| Opposed | Opposing Movements |
|---|---|

| Movement | SouthEast | NorthEast | NorthWest | SouthWest |
|---|---|---|---|---|
| SouthEast | Boundary Road | | | |
| L2 | – | T1 | – | – |
| T1 | – | T1,R2 | – | R2,T1,L2 |
| R2 | – | T1,R2 | T1,L2 | R2,T1 |
| NorthEast | Mt Lindesay Rd North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | – | T1,L2 |
| NorthWest | Old Ballandean Rd | | | |
| L2 | – | – | – | T1 |
| T1 | – | T1,L2,R2 | – | R2,T1 |
| R2 | L2,T1 | T1,R2 | – | R2,T1 |
| SouthWest | Mt Lindesay Road South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | T1,L2 | – | – |

**Gap Acceptance - Gap Acceptance Data**

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| SouthEast | Boundary Road | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| NorthEast | Mt Lindesay Rd North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| SouthWest | Mt Lindesay Road South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |

**Gap Acceptance - Two-Way Sign Control Calibration**

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes**

| Major Road Number of Lanes: | Critical Gap Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | Follow-up Headway Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
|---|---|---|---|---|---|---|---|---|
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

**Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control**

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |

| | | |
|---|---|---|
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | |
| From: SouthEast | Boundary Road | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthWest | Old Ballandean Rd | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: SouthWest | Mt Lindesay Road South | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| **Heavy Vehicles (HV)** | | | | | | |
| From: SouthEast | Boundary Road | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: NorthWest | Old Ballandean Rd | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |
| From: SouthWest | Mt Lindesay Road South | | | | | |
| L2 | 70.0 | 70.0 | – | – | – | – |
| T1 | 70.0 | 70.0 | – | – | – | – |
| R2 | 70.0 | 70.0 | – | – | – | – |

## Vehicle Movement Data - Calibration

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| **Light Vehicles (LV)** | | | | | | | | |
| From: SouthEast | Boundary Road | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: SouthWest | Mt Lindesay Road South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: SouthEast | Boundary Road | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: NorthEast | Mt Lindesay Rd North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: NorthWest | Old Ballandean Rd | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: SouthWest | Mt Lindesay Road South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** Design Life

| | |
|---|---|
| Design Life Analysis Objective | Practical Capacity (v/c ratio = xp) |
| Growth Model | Uniform |
| Number of Years | 30 |
| Const. No. of Years | – |
| Result For | Intersection - Vehicles |

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| Passenger Car Equivalents | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| Queue Blockage | |
| Minimum Probability of Blockage | 0 |
| Delay and Queue | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| Downstream Short Lane | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| | |
|---|---|
| Cost Options | |
| Cost Unit | $ |

Vehicle Cost Parameters

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Heavy Vehicles (HV) | Cost Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

**Model Settings - Vehicle Parameters**

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

**Model Settings - Fuel Consumption**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

**Model Settings - CO Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

**Model Settings - HC Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

**Model Settings - NOx Emission**

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

# APPENDIX E

# New England Hwy, Bruxner Hwy & Old Ballandeen Rd - SIDRA Results

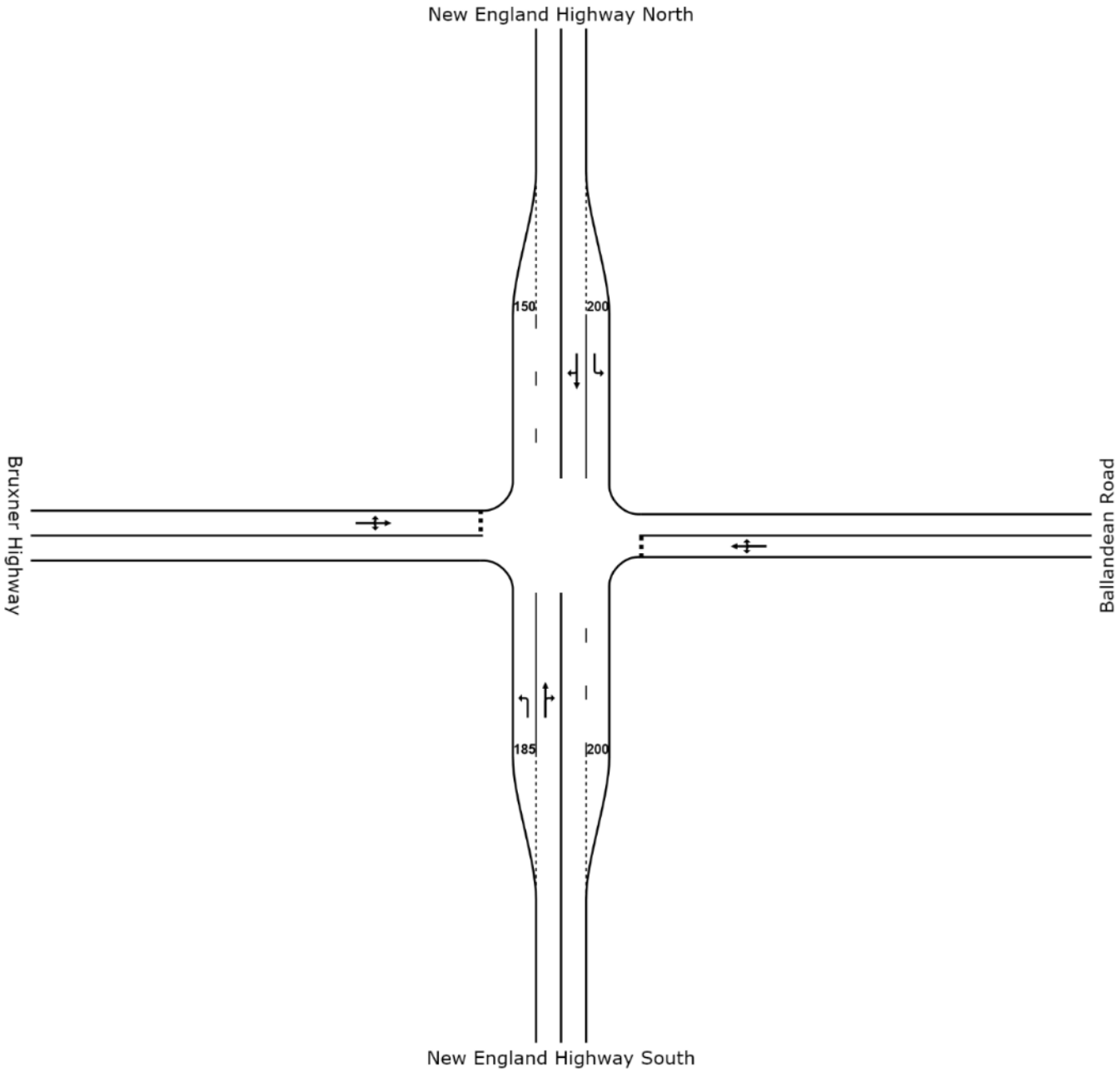
# APPENDIX E1

## Background

# SITE LAYOUT

## Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

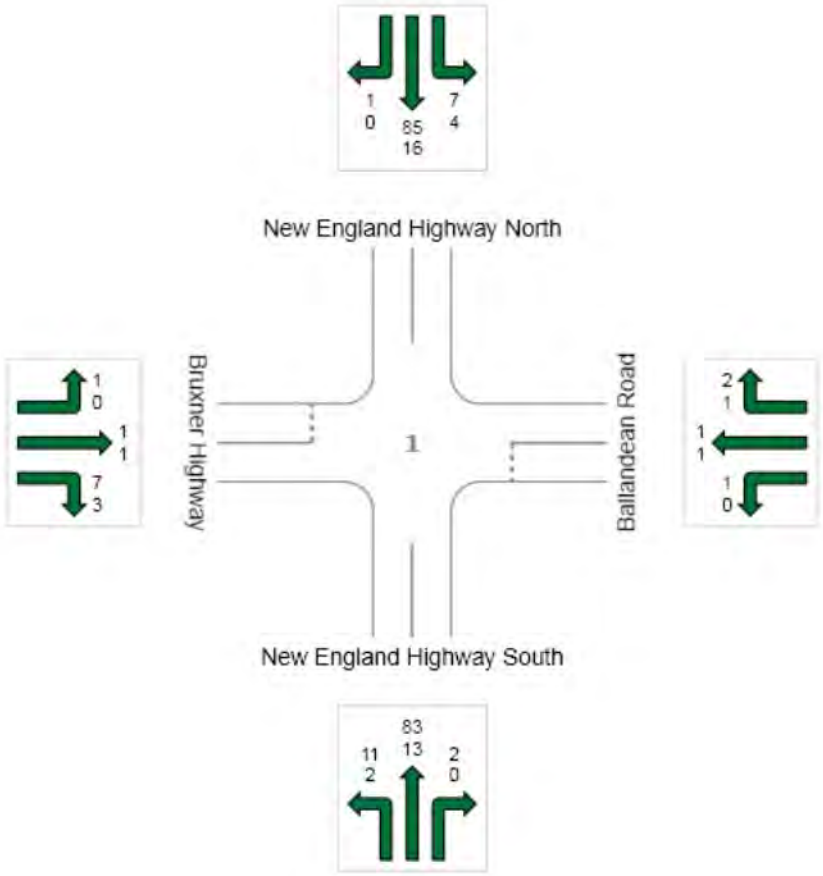
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 243**

**Light Vehicles (LV): 202**

**Heavy Vehicles (HV): 41**



# MOVEMENT SUMMARY

## Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: New England Highway South | | | | | | | | | | | |
| 1 | L2 | 14 | 15.4 | 0.008 | 8.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.66 | 69.1 |
| 2 | T1 | 101 | 13.5 | 0.059 | 0.5 | LOS A | 0.3 | 2.5 | 0.24 | 0.01 | 96.2 |
| 3 | R2 | 2 | 0.0 | 0.059 | 8.1 | LOS A | 0.3 | 2.5 | 0.24 | 0.01 | 83.1 |
| Approach | | 117 | 13.5 | 0.059 | 1.5 | NA | 0.3 | 2.5 | 0.21 | 0.09 | 91.7 |
| East: Ballandean Road | | | | | | | | | | | |
| 4 | L2 | 1 | 0.0 | 0.010 | 8.9 | LOS A | 0.0 | 0.3 | 0.34 | 0.60 | 63.4 |
| 5 | T1 | 2 | 50.0 | 0.010 | 9.7 | LOS A | 0.0 | 0.3 | 0.34 | 0.60 | 51.4 |
| 6 | R2 | 3 | 33.3 | 0.010 | 9.8 | LOS A | 0.0 | 0.3 | 0.34 | 0.60 | 53.8 |
| Approach | | 6 | 33.3 | 0.010 | 9.6 | LOS A | 0.0 | 0.3 | 0.34 | 0.60 | 54.3 |
| North: New England Highway North | | | | | | | | | | | |
| 7 | L2 | 12 | 36.4 | 0.008 | 9.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.67 | 63.0 |
| 8 | T1 | 106 | 15.8 | 0.060 | 0.5 | LOS A | 0.3 | 2.7 | 0.23 | 0.01 | 96.5 |
| 9 | R2 | 1 | 0.0 | 0.060 | 8.1 | LOS A | 0.3 | 2.7 | 0.23 | 0.01 | 85.7 |
| Approach | | 119 | 17.7 | 0.060 | 1.4 | NA | 0.3 | 2.7 | 0.21 | 0.07 | 91.6 |
| West: Bruxner Highway | | | | | | | | | | | |
| 10 | L2 | 1 | 0.0 | 0.022 | 9.4 | LOS A | 0.1 | 0.7 | 0.39 | 0.63 | 62.8 |
| 11 | T1 | 2 | 50.0 | 0.022 | 9.6 | LOS A | 0.1 | 0.7 | 0.39 | 0.63 | 51.0 |
| 12 | R2 | 11 | 30.0 | 0.022 | 9.9 | LOS A | 0.1 | 0.7 | 0.39 | 0.63 | 60.9 |
| Approach | | 14 | 30.8 | 0.022 | 9.8 | LOS A | 0.1 | 0.7 | 0.39 | 0.63 | 59.3 |
| All Vehicles | | 256 | 16.9 | 0.060 | 2.1 | NA | 0.3 | 2.7 | 0.22 | 0.12 | 87.6 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

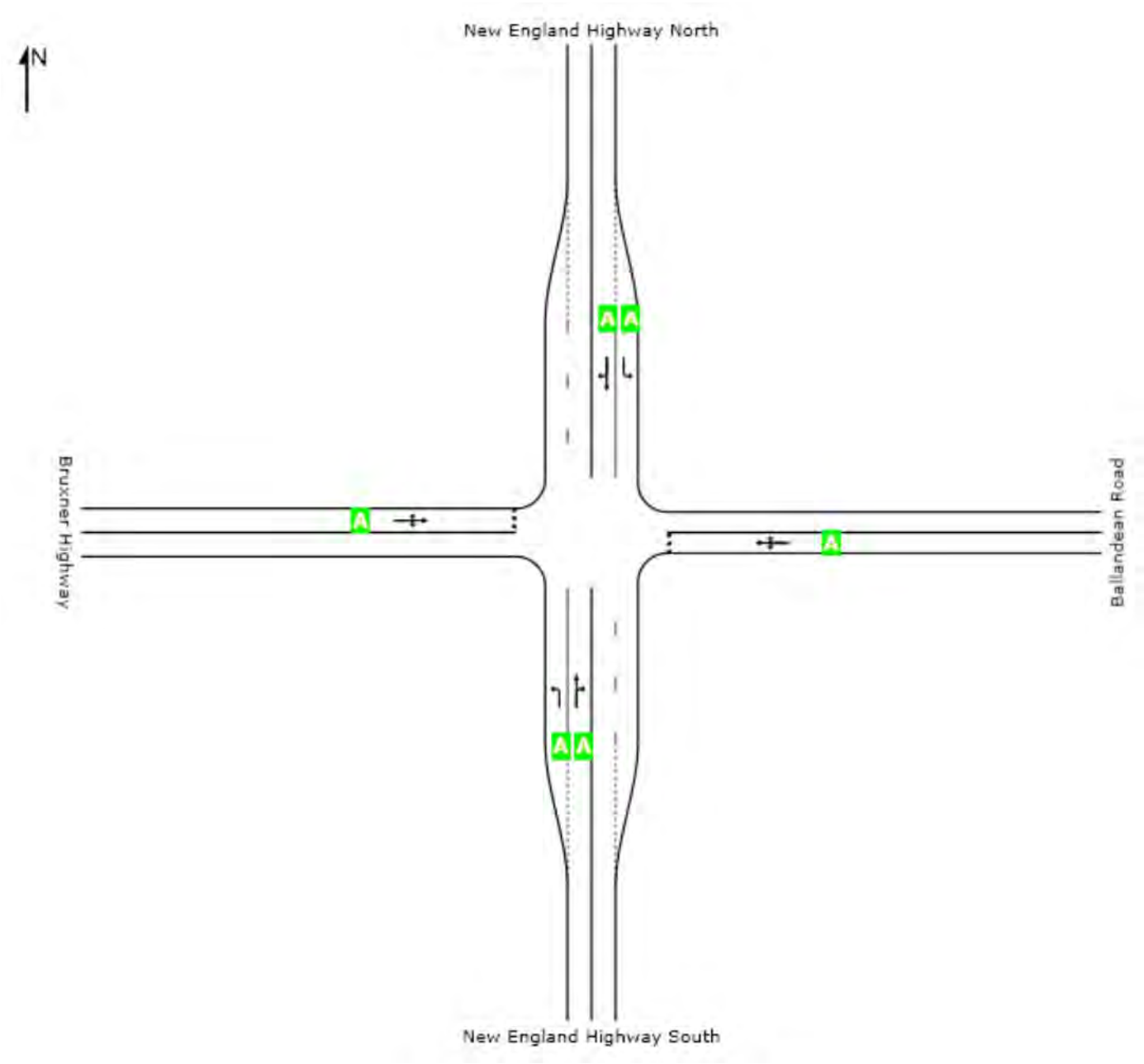
# LEVEL OF SERVICE

## Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | NA | A | NA | A | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

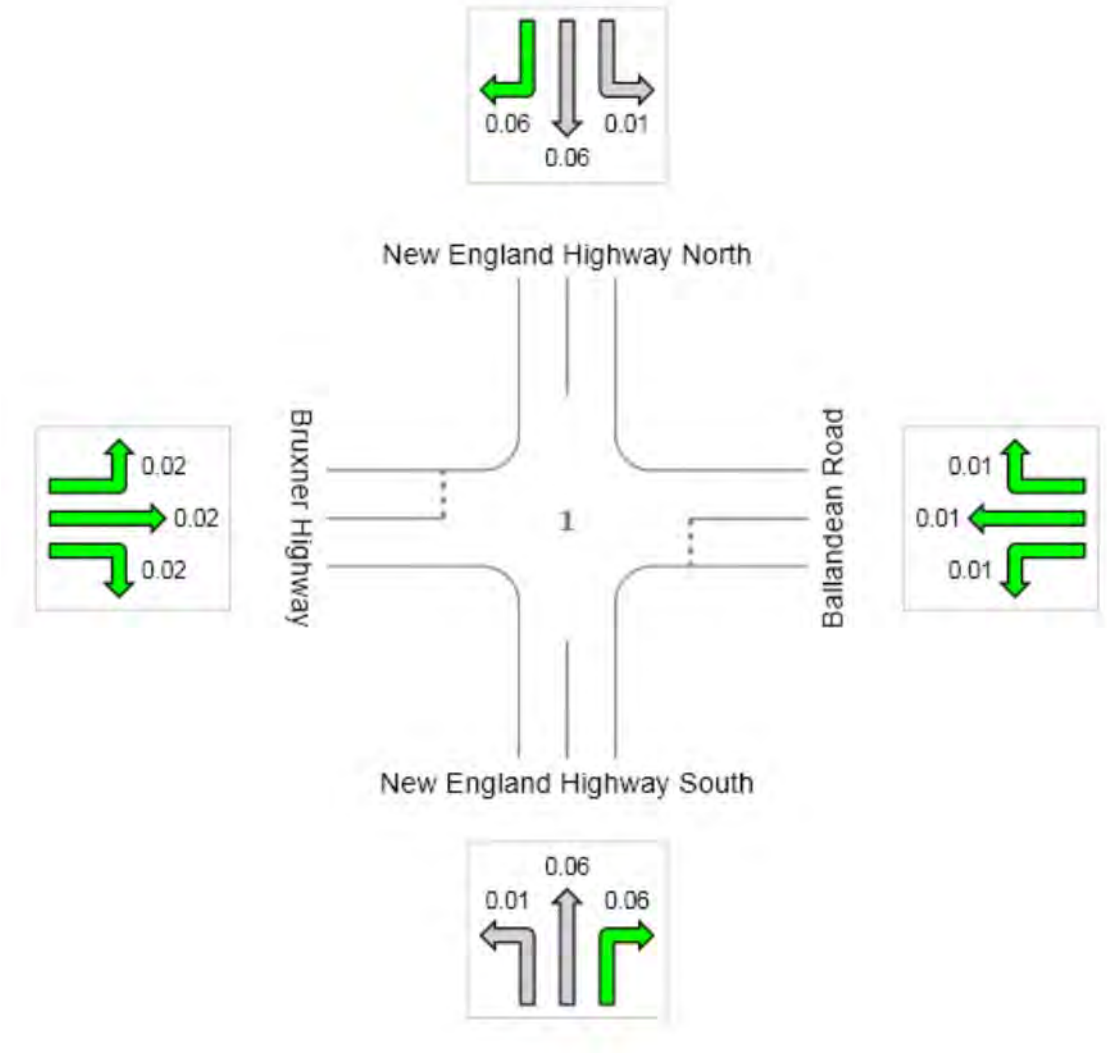
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.06 | 0.01 | 0.06 | 0.02 | 0.06 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

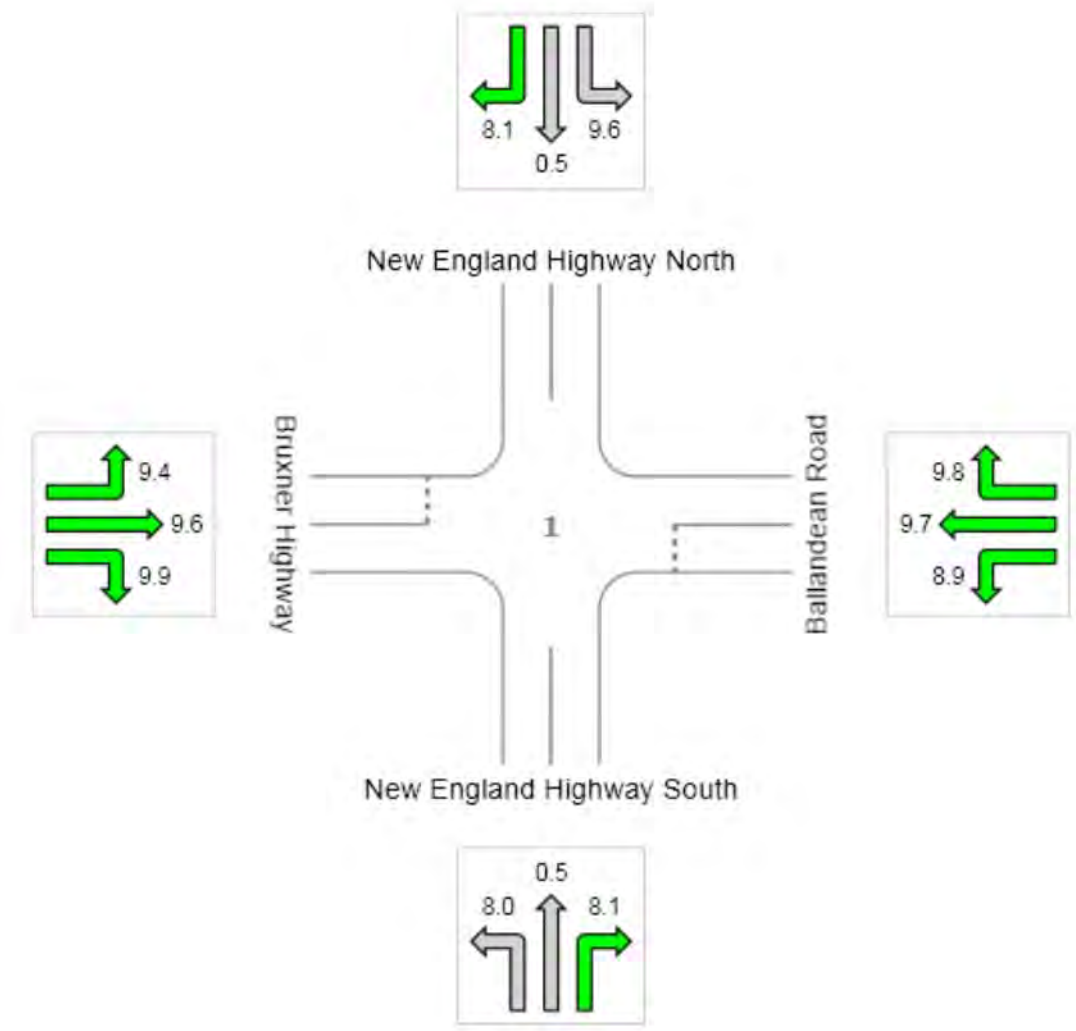
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 1.5 | 9.6 | 1.4 | 9.8 | 2.1 |
| LOS | NA | A | NA | A | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | New England Highway & Old Ballandean Rd No Development 8am - 9am Peak |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 5:05:46 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 2/12/2014 5:56:42 PM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | Two-way | 2 | 2 | 500.0 | 0 | Major Road | – |
| East | Ballandean Road | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| North | New England Highway North | Two-way | 2 | 2 | 500.0 | 0 | Major Road | – |
| West | Bruxner Highway | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | Ballandean Road | | | |

| | | | | |
|---|---|---|---|---|
| South | L2 | L | 4 | 4 |
| West | T1 | T | 5 | 5 |
| North | R2 | R | 6 | 6 |
| From: North | | New England Highway North | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Bruxner Highway | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Normal | Continuous | – | – | 3.25 | 6 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 6 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3.5 | -6 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 3.25 | -6 | – | – | – | – | – | – |
| East | | Ballandean Road | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Give/Yield | – | 500 | 3 | -4 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 4 | | | – | – | – | – |
| North | | New England Highway North | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Normal | Continuous | – | – | 3.25 | -6 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -6 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3.5 | 6 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 3.25 | 6 | – | – | – | – | – | – |
| West | | Bruxner Highway | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Give/Yield | – | 500 | 3.5 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes

| Leg | Item | Configuration | Short Lane / Segment 1 [ Length m | Overflow/Merge Dir | ID | Colour ] | Segment 2 [ Length m | ID | Colour ] |
|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | |
| | App. Lane 1 | Short Lane | 185 | Right | | | – | – | – |
| | Exit Lane 1 | Short Lane | 200 | Right | | | – | – | – |
| North | | New England Highway North | | | | | | | |
| | App. Lane 1 | Short Lane | 200 | Right | | | – | – | – |
| | Exit Lane 1 | Short Lane | 150 | Right | | | – | – | – |

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| From: South | App. Lane 2 | | |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |

| | | | |
|---|---|---|---|
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |
| From: North | App. Lane 2 | | |
| South | T1 | 0 | LV, HV |
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |
| East | Ballandean Road | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| North | New England Highway North | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |
| West | Bruxner Highway | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | – | 100 |
| From: South | App. Lane 2 | | | | |
| Exit Lane 1 | | – | 100 | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | 0 | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | – | – |
| From: North | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | – | – | 100 |
| Exit Lane 2 | | 0 | – | – | – |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | 0 | 100 | 100 | – |
| Exit Lane 2 | | 100 | – | 0 | – |
| Heavy Vehicles (HV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | – | 100 |
| From: South | App. Lane 2 | | | | |
| Exit Lane 1 | | – | 100 | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | 0 | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | – | – |
| From: North | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | – | – | 100 |
| Exit Lane 2 | | 0 | – | – | – |

| From: West | App. Lane 1 | | | |
|---|---|---|---|---|
| Exit Lane 1 | 0 | 100 | 100 | – |
| Exit Lane 2 | 100 | – | 0 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg South | East | North | West |
|---|---|---|---|---|
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | – | – | Yes |
| From: South | App. Lane 2 | | | |
| Exit Lane 1 | – | Yes | Yes | – |
| Exit Lane 2 | – | – | Yes | – |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| Exit Lane 2 | Yes | – | Yes | – |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | – | Yes | – | – |
| From: North | App. Lane 2 | | | |
| Exit Lane 1 | Yes | – | – | Yes |
| Exit Lane 2 | Yes | – | – | – |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |
| Exit Lane 2 | Yes | – | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| Total (veh) | – | 2 | 96 | 13 |
| LV (veh) | – | 2 | 83 | 11 |
| HV (veh) | – | 0 | 13 | 2 |
| From: East | Ballandean Road | | | |
| Total (veh) | 1 | – | 3 | 2 |
| LV (veh) | 1 | – | 2 | 1 |
| HV (veh) | 0 | – | 1 | 1 |
| From: North | New England Highway North | | | |
| Total (veh) | 101 | 11 | – | 1 |
| LV (veh) | 85 | 7 | – | 1 |
| HV (veh) | 16 | 4 | – | 0 |
| From: West | Bruxner Highway | | | |

| | | | | |
|---|---|---|---|---|
| Total (veh) | 10 | 2 | 1 | – |
| LV (veh) | 7 | 1 | 1 | – |
| HV (veh) | 3 | 1 | 0 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| **Light Vehicles (LV)** | | | |
| From: South | New England Highway South | | |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| From: East | Ballandean Road | | |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| From: North | New England Highway North | | |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| From: West | Bruxner Highway | | |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| **Heavy Vehicles (HV)** | | | |
| From: South | New England Highway South | | |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| From: East | Ballandean Road | | |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| From: North | New England Highway North | | |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| From: West | Bruxner Highway | | |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |

## Priorities

| Opposed Movement | Opposing Movements South | East | North | West |
|---|---|---|---|---|
| South | New England Highway South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | T1,L2 | – |
| East | Ballandean Road | | | |
| L2 | – | – | T1 | – |
| T1 | R2,T1,L2 | – | T1,R2 | – |
| R2 | R2,T1 | – | T1,R2 | T1,L2 |
| North | New England Highway North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | T1,L2 | – | – | – |
| West | Bruxner Highway | | | |
| L2 | T1 | – | – | – |
| T1 | R2,T1 | – | T1,L2,R2 | – |
| R2 | R2,T1 | L2,T1 | T1,R2 | – |

## Gap Acceptance - Gap Acceptance Data

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| East | Ballandean Road | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| North | New England Highway North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| West | Bruxner Highway | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

## Gap Acceptance - Two-Way Sign Control Calibration

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes

| Major Road Number of Lanes: | Critical Gap Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | Follow-up Headway Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
|---|---|---|---|---|---|---|---|---|
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |

| | | | | | | |
|---|---|---|---|---|---|---|
| From: East | Ballandean Road | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| From: North | New England Highway North | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: West | Bruxner Highway | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| Heavy Vehicles (HV) | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: East | Ballandean Road | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| From: North | New England Highway North | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: West | Bruxner Highway | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |

**Vehicle Movement Data - Calibration**

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Ballandean Road | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | New England Highway North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Bruxner Highway | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Ballandean Road | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | New England Highway North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Bruxner Highway | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** None

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| Passenger Car Equivalents | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| Queue Blockage | |
| Minimum Probability of Blockage | 0 |
| Delay and Queue | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| Downstream Short Lane | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| | |
|---|---|
| Cost Options | |
| Cost Unit | $ |

Vehicle Cost Parameters

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

## Model Settings - Fuel Consumption

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

## Model Settings - CO Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

| Model Settings - HC Emission | | | | |
|---|---|---|---|---|
| Movement Class | fi | A | B | Beta |
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

| Model Settings - NOx Emission | | | | |
|---|---|---|---|---|
| Movement Class | fi | A | B | Beta |
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

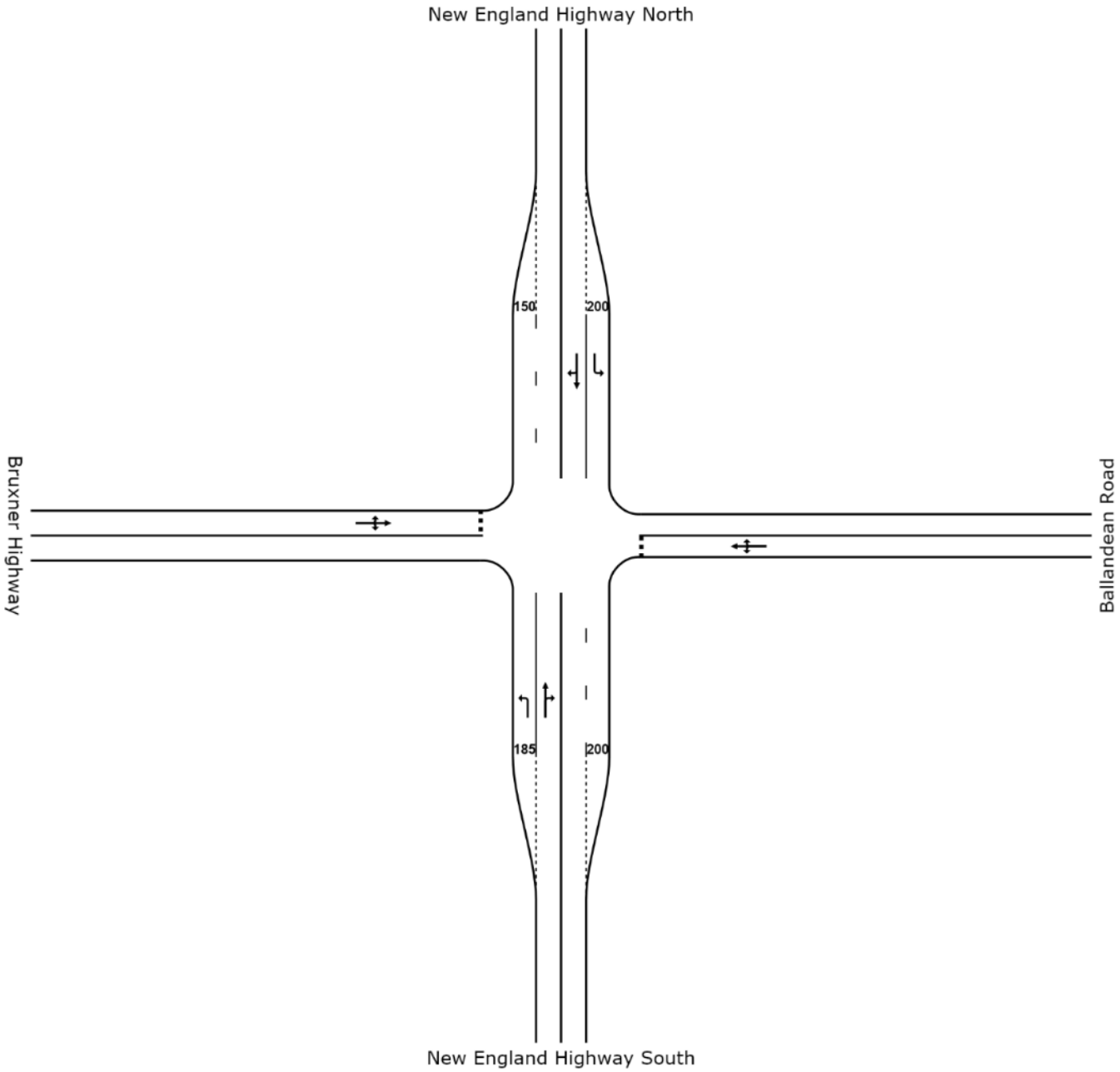
# APPENDIX E2

## Background + Development

# SITE LAYOUT

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

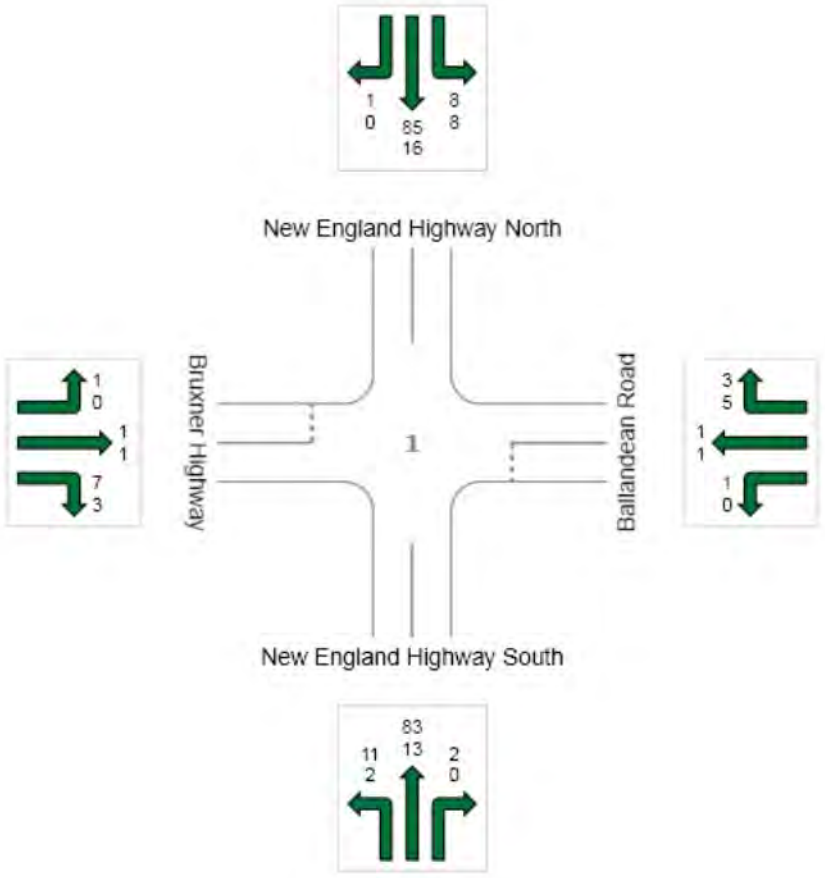
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 253**

**Light Vehicles (LV): 204**

**Heavy Vehicles (HV): 49**



# MOVEMENT SUMMARY

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site
Giveway / Yield (Two-Way)

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: New England Highway South | | | | | | | | | | | |
| 1 | L2 | 14 | 15.4 | 0.008 | 8.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.66 | 69.1 |
| 2 | T1 | 101 | 13.5 | 0.059 | 0.5 | LOS A | 0.3 | 2.6 | 0.24 | 0.01 | 96.1 |
| 3 | R2 | 2 | 0.0 | 0.059 | 8.1 | LOS A | 0.3 | 2.6 | 0.24 | 0.01 | 83.0 |
| Approach | | 117 | 13.5 | 0.059 | 1.5 | NA | 0.3 | 2.6 | 0.22 | 0.09 | 91.6 |
| East: Ballandean Road | | | | | | | | | | | |
| 4 | L2 | 1 | 0.0 | 0.021 | 9.7 | LOS A | 0.1 | 0.8 | 0.38 | 0.63 | 62.6 |
| 5 | T1 | 2 | 50.0 | 0.021 | 10.5 | LOS A | 0.1 | 0.8 | 0.38 | 0.63 | 50.9 |
| 6 | R2 | 8 | 62.5 | 0.021 | 11.5 | LOS A | 0.1 | 0.8 | 0.38 | 0.63 | 47.2 |
| Approach | | 12 | 54.5 | 0.021 | 11.1 | LOS A | 0.1 | 0.8 | 0.38 | 0.63 | 48.9 |
| North: New England Highway North | | | | | | | | | | | |
| 7 | L2 | 17 | 50.0 | 0.012 | 10.3 | LOS A | 0.0 | 0.0 | 0.00 | 0.67 | 59.9 |
| 8 | T1 | 106 | 15.8 | 0.060 | 0.5 | LOS A | 0.3 | 2.7 | 0.23 | 0.01 | 96.5 |
| 9 | R2 | 1 | 0.0 | 0.060 | 8.1 | LOS A | 0.3 | 2.7 | 0.23 | 0.01 | 85.7 |
| Approach | | 124 | 20.3 | 0.060 | 1.9 | NA | 0.3 | 2.7 | 0.20 | 0.10 | 89.0 |
| West: Bruxner Highway | | | | | | | | | | | |
| 10 | L2 | 1 | 0.0 | 0.023 | 9.4 | LOS A | 0.1 | 0.7 | 0.39 | 0.63 | 62.8 |
| 11 | T1 | 2 | 50.0 | 0.023 | 9.6 | LOS A | 0.1 | 0.7 | 0.39 | 0.63 | 51.0 |
| 12 | R2 | 11 | 30.0 | 0.023 | 9.9 | LOS A | 0.1 | 0.7 | 0.39 | 0.63 | 60.9 |
| Approach | | 14 | 30.8 | 0.023 | 9.8 | LOS A | 0.1 | 0.7 | 0.39 | 0.63 | 59.3 |
| All Vehicles | | 266 | 19.4 | 0.060 | 2.5 | NA | 0.3 | 2.7 | 0.22 | 0.14 | 84.8 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

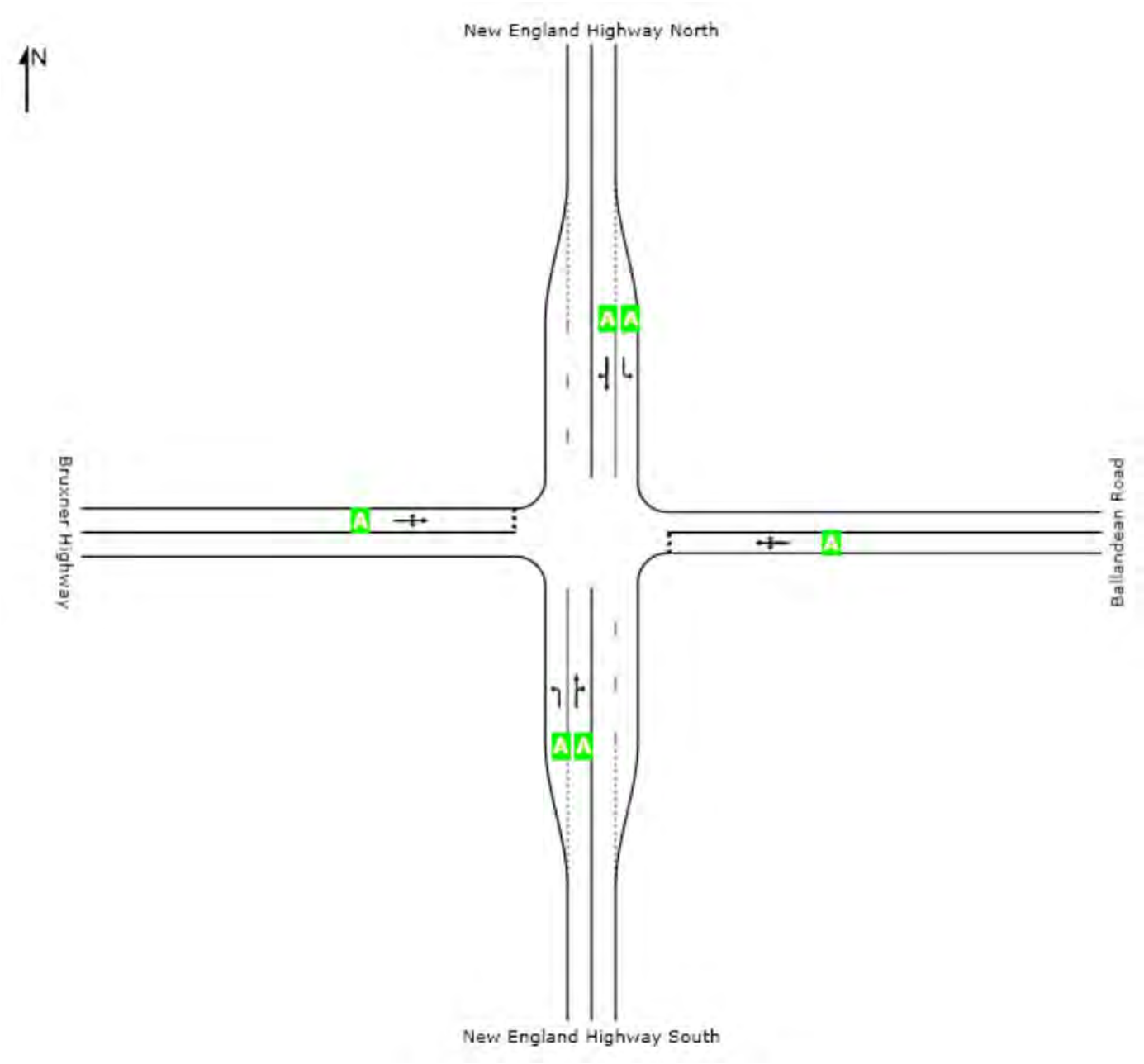
# LEVEL OF SERVICE

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | NA | A | NA | A | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

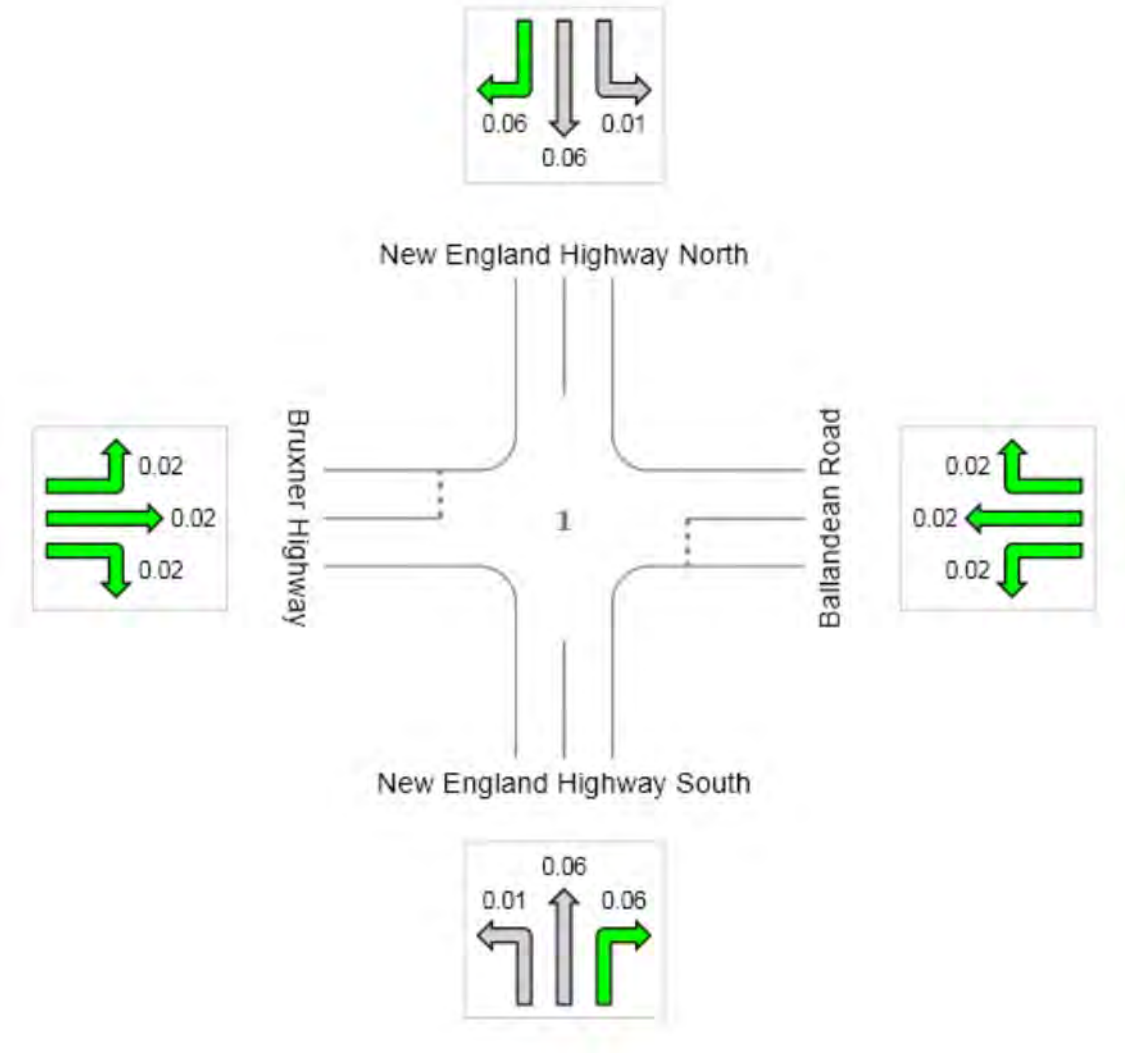
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.06 | 0.02 | 0.06 | 0.02 | 0.06 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

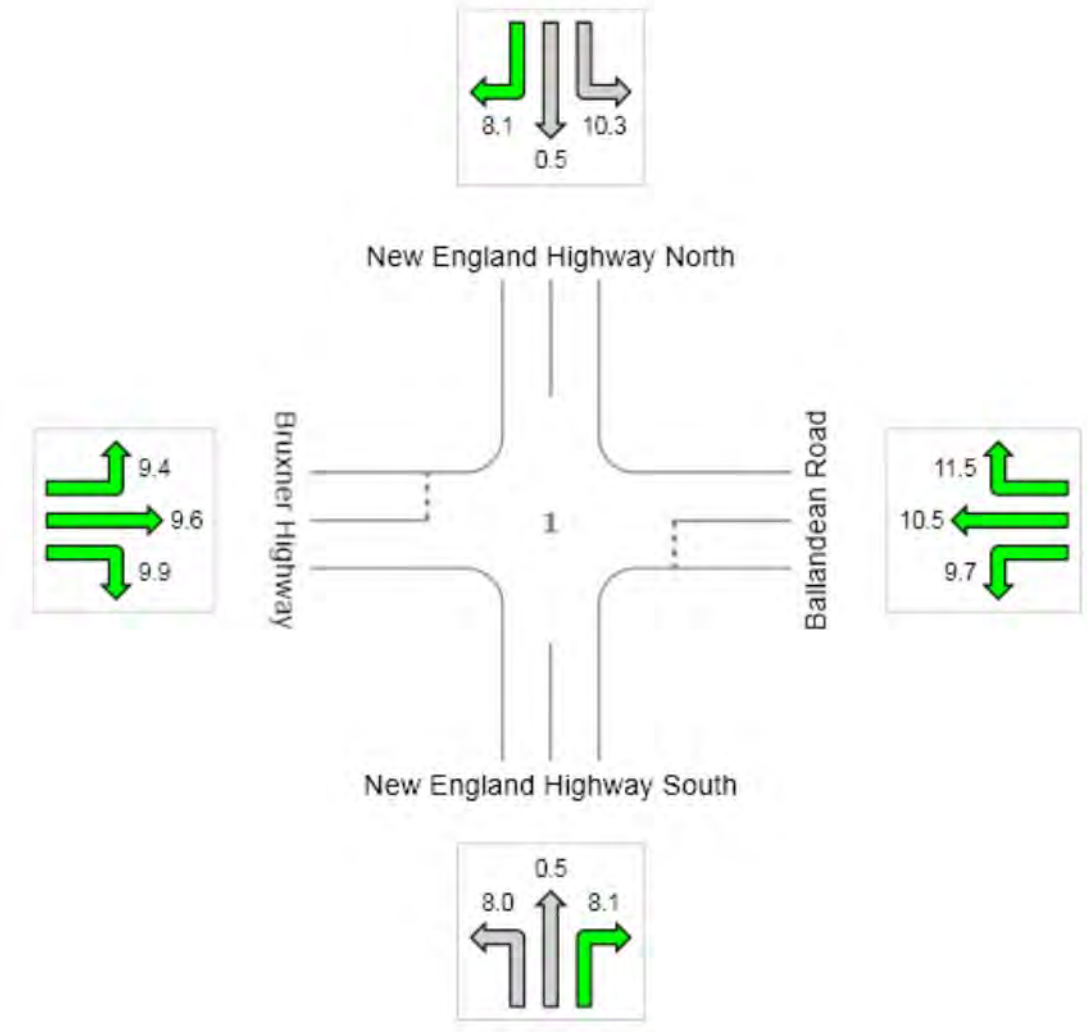
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site
Giveway / Yield (Two-Way)

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 1.5 | 11.1 | 1.9 | 9.8 | 2.5 |
| LOS | NA | A | NA | A | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 5:05:46 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 3/12/2014 9:11:46 AM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | Two-way | 2 | 2 | 500.0 | 0 | Major Road | – |
| East | Ballandean Road | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| North | New England Highway North | Two-way | 2 | 2 | 500.0 | 0 | Major Road | – |
| West | Bruxner Highway | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | Ballandean Road | | | |

| | | | | |
|---|---|---|---|---|
| South | L2 | L | 4 | 4 |
| West | T1 | T | 5 | 5 |
| North | R2 | R | 6 | 6 |
| From: North | | New England Highway North | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Bruxner Highway | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Normal | Continuous | – | – | 3.25 | 6 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 6 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3.5 | -6 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 3.25 | -6 | – | – | – | – | – | – |
| East | | Ballandean Road | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Give/Yield | – | 500 | 3 | -4 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 4 | | | – | – | – | – |
| North | | New England Highway North | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Normal | Continuous | – | – | 3.25 | -6 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -6 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3.5 | 6 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 3.25 | 6 | – | – | – | – | – | – |
| West | | Bruxner Highway | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Give/Yield | – | 500 | 3.5 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes

| Leg | Item | Configuration | Short Lane / Segment 1 [ Length m | Overflow/Merge Dir | ID | Colour ] | Segment 2 [ Length m | ID | Colour ] |
|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | |
| | App. Lane 1 | Short Lane | 185 | Right | | | – | – | – |
| | Exit Lane 1 | Short Lane | 200 | Right | | | – | – | – |
| North | | New England Highway North | | | | | | | |
| | App. Lane 1 | Short Lane | 200 | Right | | | – | – | – |
| | Exit Lane 1 | Short Lane | 150 | Right | | | – | – | – |

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| From: South | App. Lane 2 | | |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |

| | | | |
|---|---|---|---|
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |
| From: North | App. Lane 2 | | |
| South | T1 | 0 | LV, HV |
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |
| East | Ballandean Road | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| North | New England Highway North | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |
| West | Bruxner Highway | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | – | 100 |
| From: South | App. Lane 2 | | | | |
| Exit Lane 1 | | – | 100 | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | 0 | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | – | – |
| From: North | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | – | – | 100 |
| Exit Lane 2 | | 0 | – | – | – |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | 0 | 100 | 100 | – |
| Exit Lane 2 | | 100 | – | 0 | – |
| Heavy Vehicles (HV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | – | 100 |
| From: South | App. Lane 2 | | | | |
| Exit Lane 1 | | – | 100 | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | 0 | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | – | – |
| From: North | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | – | – | 100 |
| Exit Lane 2 | | 0 | – | – | – |

| | | | | |
|---|---|---|---|---|
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | 0 | 100 | 100 | – |
| Exit Lane 2 | 100 | – | 0 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg South | East | North | West |
|---|---|---|---|---|
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | – | – | Yes |
| From: South | App. Lane 2 | | | |
| Exit Lane 1 | – | Yes | Yes | – |
| Exit Lane 2 | – | – | Yes | – |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| Exit Lane 2 | Yes | – | Yes | – |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | – | Yes | – | – |
| From: North | App. Lane 2 | | | |
| Exit Lane 1 | Yes | – | – | Yes |
| Exit Lane 2 | Yes | – | – | – |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |
| Exit Lane 2 | Yes | – | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| Total (veh) | – | 2 | 96 | 13 |
| LV (veh) | – | 2 | 83 | 11 |
| HV (veh) | – | 0 | 13 | 2 |
| From: East | Ballandean Road | | | |
| Total (veh) | 1 | – | 8 | 2 |
| LV (veh) | 1 | – | 3 | 1 |
| HV (veh) | 0 | – | 5 | 1 |
| From: North | New England Highway North | | | |
| Total (veh) | 101 | 16 | – | 1 |
| LV (veh) | 85 | 8 | – | 1 |
| HV (veh) | 16 | 8 | – | 0 |
| From: West | Bruxner Highway | | | |

| | | | | |
|---|---|---|---|---|
| Total (veh) | 10 | 2 | 1 | – |
| LV (veh) | 7 | 1 | 1 | – |
| HV (veh) | 3 | 1 | 0 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| **Light Vehicles (LV)** | | | |
| From: South | New England Highway South | | |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| From: East | Ballandean Road | | |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| From: North | New England Highway North | | |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| From: West | Bruxner Highway | | |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| **Heavy Vehicles (HV)** | | | |
| From: South | New England Highway South | | |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| From: East | Ballandean Road | | |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| From: North | New England Highway North | | |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| From: West | Bruxner Highway | | |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |

## Priorities

| Opposed Movement | Opposing Movements South | East | North | West |
|---|---|---|---|---|
| South | New England Highway South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | T1,L2 | – |
| East | Ballandean Road | | | |
| L2 | – | – | T1 | – |
| T1 | R2,T1,L2 | – | T1,R2 | – |
| R2 | R2,T1 | – | T1,R2 | T1,L2 |
| North | New England Highway North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | T1,L2 | – | – | – |
| West | Bruxner Highway | | | |
| L2 | T1 | – | – | – |
| T1 | R2,T1 | – | T1,L2,R2 | – |
| R2 | R2,T1 | L2,T1 | T1,R2 | – |

## Gap Acceptance - Gap Acceptance Data

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| East | Ballandean Road | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| North | New England Highway North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| West | Bruxner Highway | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

## Gap Acceptance - Two-Way Sign Control Calibration

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes

| Major Road Number of Lanes: | Critical Gap Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | Follow-up Headway Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
|---|---|---|---|---|---|---|---|---|
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |

| | | | | | | |
|---|---|---|---|---|---|---|
| From: East | Ballandean Road | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| From: North | New England Highway North | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: West | Bruxner Highway | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| Heavy Vehicles (HV) | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: East | Ballandean Road | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| From: North | New England Highway North | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: West | Bruxner Highway | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |

**Vehicle Movement Data - Calibration**

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Ballandean Road | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | New England Highway North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Bruxner Highway | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Ballandean Road | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | New England Highway North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Bruxner Highway | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** None

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| Passenger Car Equivalents | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| Queue Blockage | |
| Minimum Probability of Blockage | 0 |
| Delay and Queue | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| Downstream Short Lane | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

| | |
|---|---|
| Cost Options | |
| Cost Unit | $ |

Vehicle Cost Parameters

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

## Model Settings - Fuel Consumption

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

## Model Settings - CO Emission

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

| Model Settings - HC Emission | | | | |
|---|---|---|---|---|
| Movement Class | fi | A | B | Beta |
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

| Model Settings - NOx Emission | | | | |
|---|---|---|---|---|
| Movement Class | fi | A | B | Beta |
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |

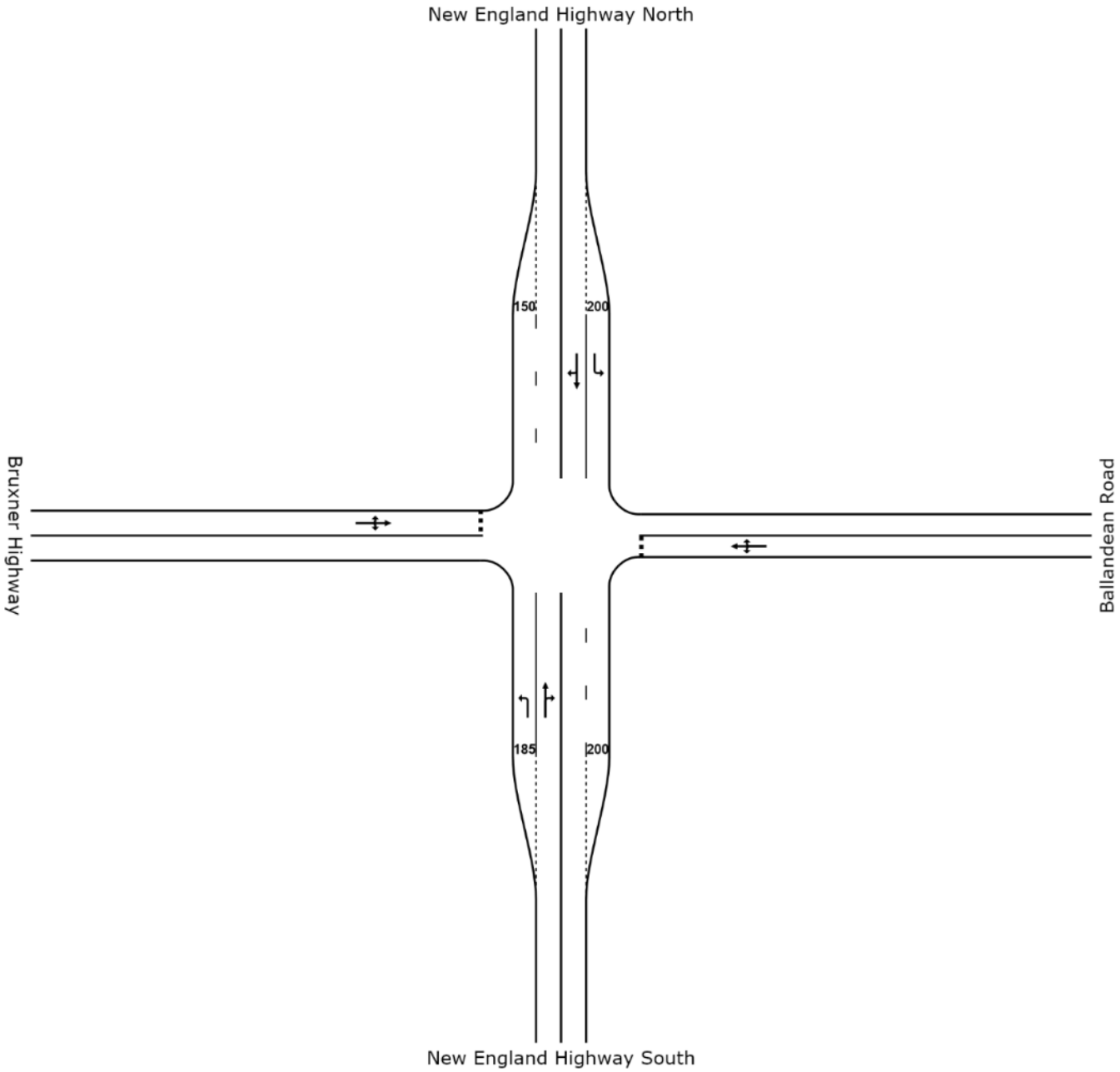
# APPENDIX E3

## 30yr + Development

# SITE LAYOUT

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site
Giveway / Yield (Two-Way)



# INPUT VOLUMES

## Vehicles and pedestrians per 60 minutes

### Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site
Giveway / Yield (Two-Way)

**Volume Display Method: Separate**

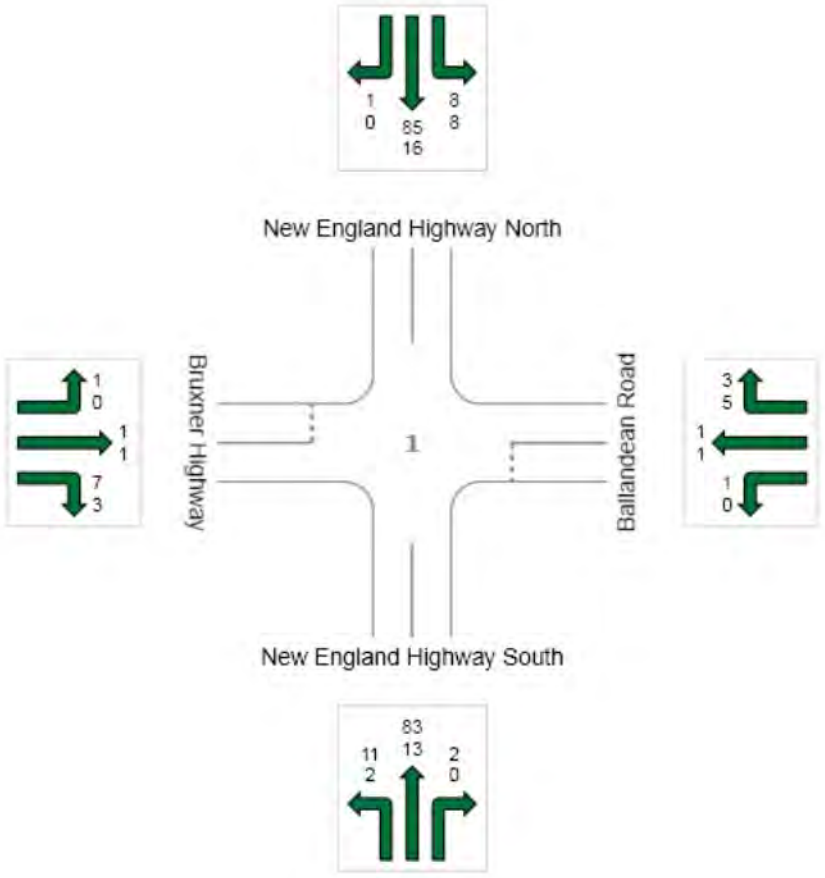
**Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles**

**Total Intersection Volumes (veh)**

**All Movement Classes: 253**

**Light Vehicles (LV): 204**

**Heavy Vehicles (HV): 49**



# MOVEMENT SUMMARY

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**Movement Performance - Vehicles**

| Mov ID | OD Mov | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| South: New England Highway South | | | | | | | | | | | |
| 1 | L2 | 20 | 15.4 | 0.012 | 8.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.66 | 69.1 |
| 2 | T1 | 147 | 13.5 | 0.086 | 0.8 | LOS A | 0.5 | 4.0 | 0.31 | 0.01 | 95.2 |
| 3 | R2 | 3 | 0.0 | 0.086 | 8.4 | LOS A | 0.5 | 4.0 | 0.31 | 0.01 | 82.3 |
| Approach | | 169 | 13.5 | 0.086 | 1.8 | NA | 0.5 | 4.0 | 0.27 | 0.09 | 90.9 |
| East: Ballandean Road | | | | | | | | | | | |
| 4 | L2 | 2 | 0.0 | 0.037 | 11.4 | LOS A | 0.1 | 1.3 | 0.47 | 0.69 | 60.7 |
| 5 | T1 | 3 | 50.0 | 0.037 | 12.2 | LOS A | 0.1 | 1.3 | 0.47 | 0.69 | 49.6 |
| 6 | R2 | 12 | 62.5 | 0.037 | 13.2 | LOS A | 0.1 | 1.3 | 0.47 | 0.69 | 46.1 |
| Approach | | 17 | 54.5 | 0.037 | 12.9 | LOS A | 0.1 | 1.3 | 0.47 | 0.69 | 47.8 |
| North: New England Highway North | | | | | | | | | | | |
| 7 | L2 | 24 | 50.0 | 0.018 | 10.3 | LOS A | 0.0 | 0.0 | 0.00 | 0.67 | 59.9 |
| 8 | T1 | 154 | 15.8 | 0.088 | 0.7 | LOS A | 0.5 | 4.2 | 0.29 | 0.01 | 95.6 |
| 9 | R2 | 2 | 0.0 | 0.088 | 8.4 | LOS A | 0.5 | 4.2 | 0.29 | 0.01 | 85.0 |
| Approach | | 180 | 20.3 | 0.088 | 2.1 | NA | 0.5 | 4.2 | 0.25 | 0.10 | 88.4 |
| West: Bruxner Highway | | | | | | | | | | | |
| 10 | L2 | 2 | 0.0 | 0.039 | 11.0 | LOS A | 0.1 | 1.3 | 0.48 | 0.69 | 61.1 |
| 11 | T1 | 3 | 50.0 | 0.039 | 11.2 | LOS A | 0.1 | 1.3 | 0.48 | 0.69 | 49.9 |
| 12 | R2 | 15 | 30.0 | 0.039 | 11.5 | LOS A | 0.1 | 1.3 | 0.48 | 0.69 | 59.3 |
| Approach | | 20 | 30.8 | 0.039 | 11.4 | LOS A | 0.1 | 1.3 | 0.48 | 0.69 | 57.8 |
| All Vehicles | | 386 | 19.4 | 0.088 | 2.9 | NA | 0.5 | 4.2 | 0.28 | 0.15 | 84.0 |

Level of Service (LOS) Method: Delay (RTA NSW).
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.

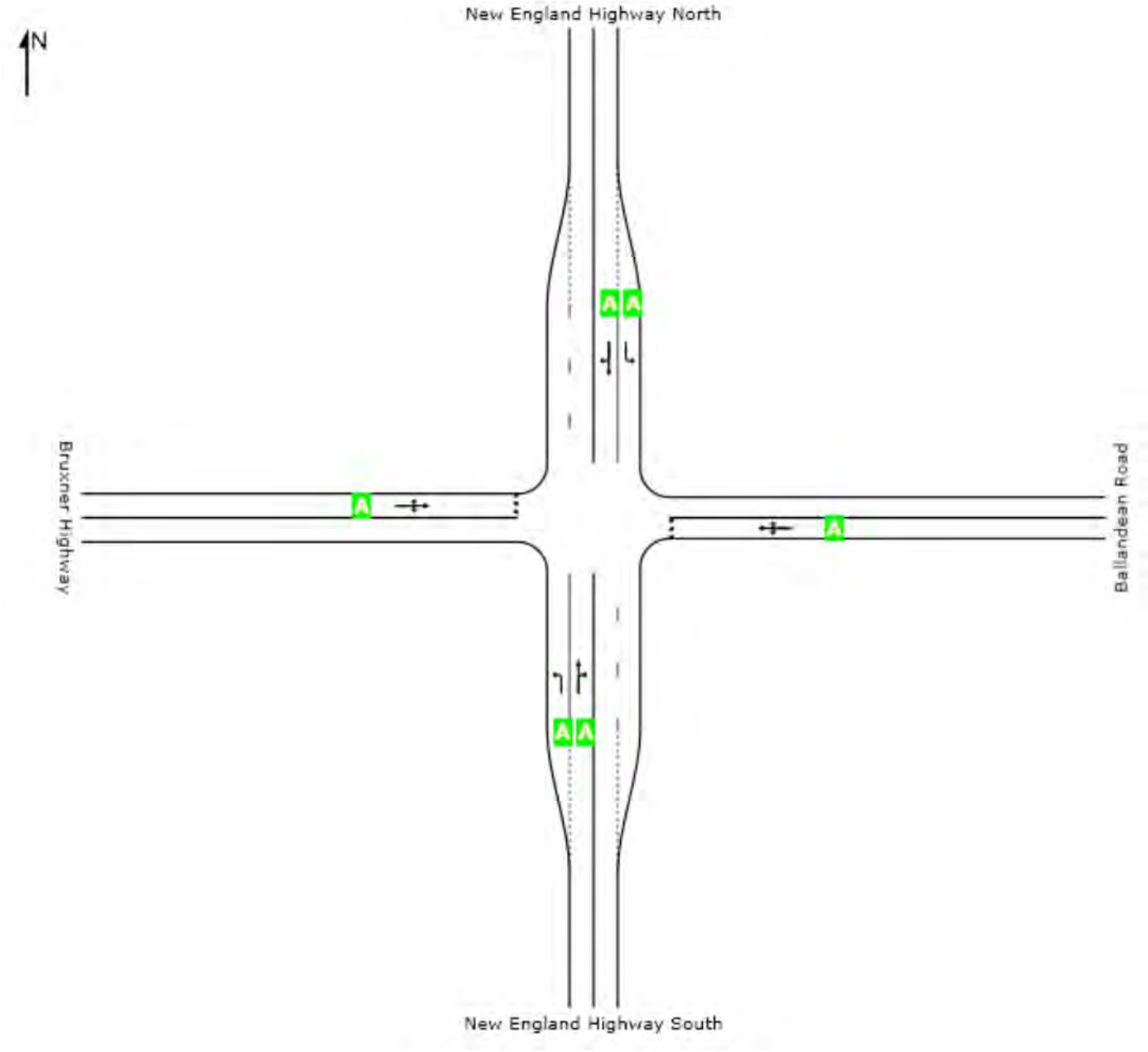
# LEVEL OF SERVICE

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| LOS | NA | A | NA | A | NA |




Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# DEGREE OF SATURATION

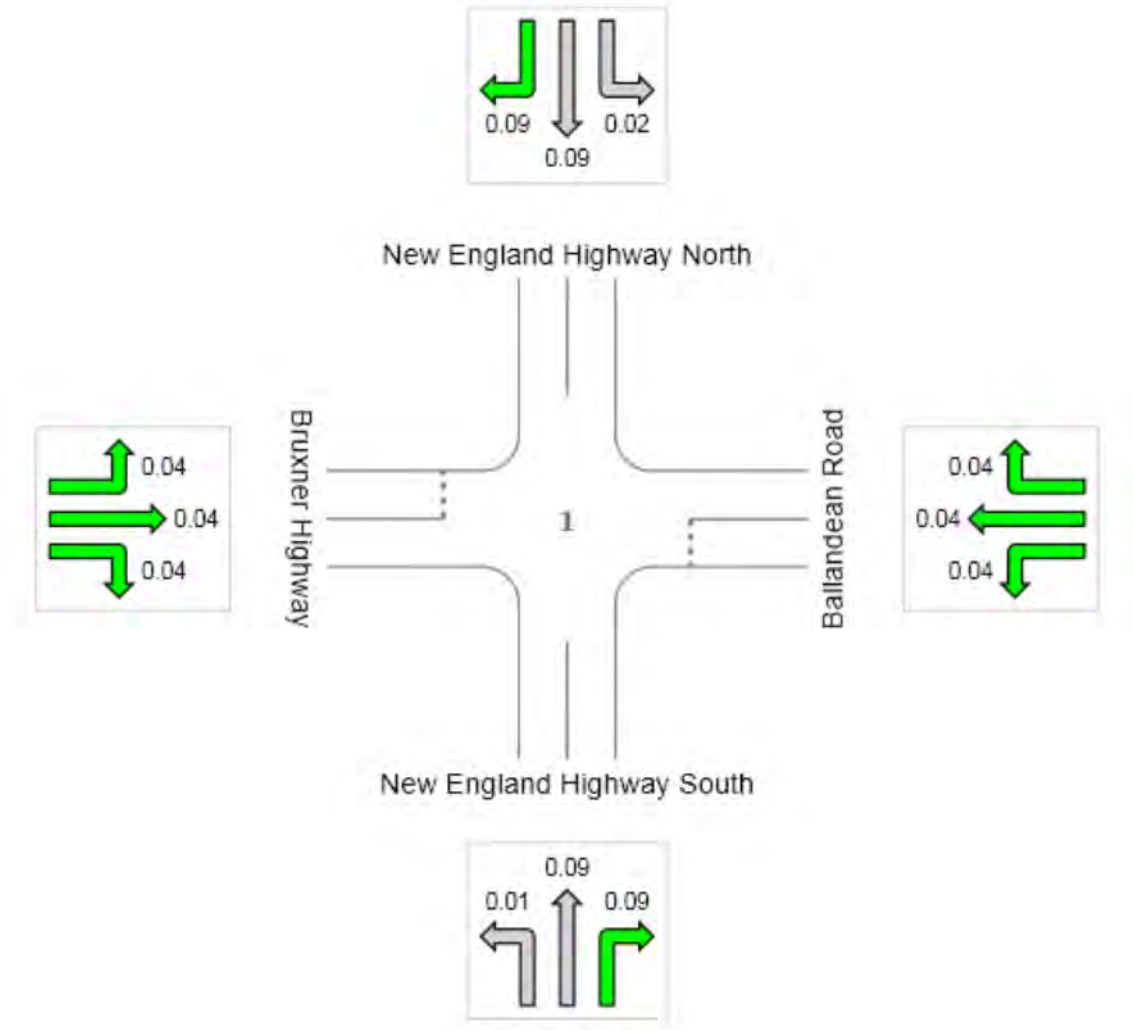
**Ratio of Demand Volume to Capacity (v/c ratio)**

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Degree of Saturation | 0.09 | 0.04 | 0.09 | 0.04 | 0.09 |




Colour code based on Degree of Saturation

[ < 0.6 ] [ 0.6 – 0.7 ] [ 0.7 – 0.8 ] [ 0.8 – 0.9 ] [ 0.9 – 1.0 ] [ > 1.0] Continuous

# DELAY (CONTROL)

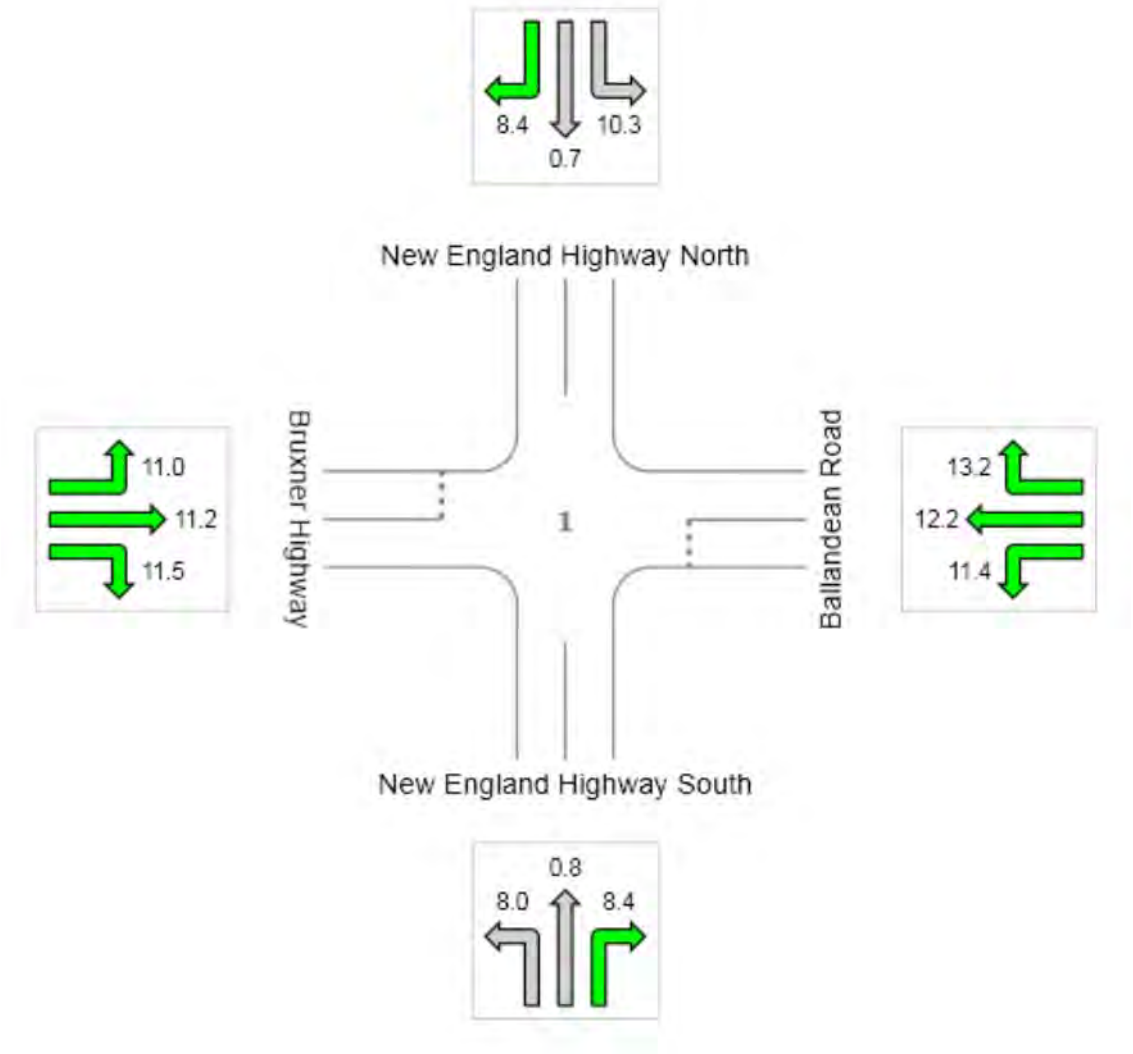
**Average control delay per vehicle, or average pedestrian delay (seconds)**

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 30 years

**All Movement Classes**

| | South | East | North | West | Intersection |
|---|---|---|---|---|---|
| Delay (Control) | 1.8 | 12.9 | 2.1 | 11.4 | 2.9 |
| LOS | NA | A | NA | A | NA |




Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F | Continuous

Level of Service Method: Delay (RTA NSW)
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# INPUT REPORT

## Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site
Giveway / Yield (Two-Way)

| Intersection - Site Data | |
|---|---|
| Site Name | New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr |
| Site ID | 1 |
| Site Title | New Site |

| Intersection - Site Properties | |
|---|---|
| Site (Intersection) Type | Giveway / Yield (Two-Way) |
| Model Name | New South Wales |
| Base Model | NA |
| Drive Rule | Left-hand side of the road |
| HCM Version | No |
| Units | Metric |
| **First Created** | ---------- |
| Date | 2/12/2014 5:05:46 PM |
| Created By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |
| **Last Modified** | ---------- |
| Date | 3/12/2014 9:11:46 AM |
| Modified By | Dave |
| Organisation | CONSTRUCTIVE SOLUTIONS PTY LTD |
| Version | 6.0.22.4722 |

**Intersection - Approach Data**

| Location | Name | Type | No. of App. Lanes | No. of Exit Lanes | Approach Distance m | Extra Bunching % | Approach Control | Area Type Factor |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | Two-way | 2 | 2 | 500.0 | 0 | Major Road | – |
| East | Ballandean Road | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |
| North | New England Highway North | Two-way | 2 | 2 | 500.0 | 0 | Major Road | – |
| West | Bruxner Highway | Two-way | 1 | 1 | 500.0 | 0 | Give-way Yield | – |

**Movement Definitions - Included Movement Classes**

| Name | ID | Model Designation | Type |
|---|---|---|---|
| Light Vehicles | LV | Light Vehicle | Standard |
| Heavy Vehicles | HV | Heavy Vehicle | Standard |

**Movement Definitions - Origin-Destination Movements**

| To Approach | OD Movement | Turn Designation | OD Mov ID | LTR Mov ID |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| West | L2 | L | 1 | 1 |
| North | T1 | T | 2 | 2 |
| East | R2 | R | 3 | 3 |
| From: East | Ballandean Road | | | |

| | | | | |
|---|---|---|---|---|
| South | L2 | L | 4 | 4 |
| West | T1 | T | 5 | 5 |
| North | R2 | R | 6 | 6 |
| From: North | | New England Highway North | | |
| East | L2 | L | 7 | 7 |
| South | T1 | T | 8 | 8 |
| West | R2 | R | 9 | 9 |
| From: West | | Bruxner Highway | | |
| North | L2 | L | 10 | 10 |
| East | T1 | T | 11 | 11 |
| South | R2 | R | 12 | 12 |

## Lane Geometry - Lane Configuration

| Leg | Item | Configuration | Type | Control | Slip/Bypass Control | Length m | Width m | Grade % | Full Lane [ ID | Colour ] | [ Front Width m | Island Back Width m | Fill Style | For Ped Staging ] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Normal | Continuous | – | – | 3.25 | 6 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | 6 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3.5 | -6 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 3.25 | -6 | – | – | – | – | – | – |
| East | | Ballandean Road | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Give/Yield | – | 500 | 3 | -4 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3 | 4 | | | – | – | – | – |
| North | | New England Highway North | | | | | | | | | | | | |
| | App. Lane 1 | Short Lane | Normal | Continuous | – | – | 3.25 | -6 | – | – | – | – | – | – |
| | App. Lane 2 | Full-Length | Normal | Continuous | – | 500 | 3.5 | -6 | | | – | – | – | – |
| | Exit Lane 2 | Full-Length | – | – | – | 500 | 3.5 | 6 | | | – | – | – | – |
| | Exit Lane 1 | Short Lane | – | – | – | – | 3.25 | 6 | – | – | – | – | – | – |
| West | | Bruxner Highway | | | | | | | | | | | | |
| | App. Lane 1 | Full-Length | Normal | Give/Yield | – | 500 | 3.5 | 0 | | | – | – | – | – |
| | Exit Lane 1 | Full-Length | – | – | – | 500 | 3.5 | 0 | | | – | – | – | – |

Lanes are numbered from left to right in the direction of travel.

## Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes

| Leg | Item | Configuration | Short Lane / Segment 1 [ Length m | Overflow/Merge Dir | ID | Colour ] | Segment 2 [ Length m | ID | Colour ] |
|---|---|---|---|---|---|---|---|---|---|
| South | | New England Highway South | | | | | | | |
| | App. Lane 1 | Short Lane | 185 | Right | | | – | – | – |
| | Exit Lane 1 | Short Lane | 200 | Right | | | – | – | – |
| North | | New England Highway North | | | | | | | |
| | App. Lane 1 | Short Lane | 200 | Right | | | – | – | – |
| | Exit Lane 1 | Short Lane | 150 | Right | | | – | – | – |

## Lane Geometry - Lane Disciplines

| To Approach | OD Movement | Free Queue Distance m | Movement Class(es) |
|---|---|---|---|
| From: South | App. Lane 1 | | |
| West | L2 | 0 | LV, HV |
| From: South | App. Lane 2 | | |
| North | T1 | 0 | LV, HV |
| East | R2 | 0 | LV, HV |
| From: East | App. Lane 1 | | |
| South | L2 | 0 | LV, HV |

| | | | |
|---|---|---|---|
| West | T1 | 0 | LV, HV |
| North | R2 | 0 | LV, HV |
| From: North | App. Lane 1 | | |
| East | L2 | 0 | LV, HV |
| From: North | App. Lane 2 | | |
| South | T1 | 0 | LV, HV |
| West | R2 | 0 | LV, HV |
| From: West | App. Lane 1 | | |
| North | L2 | 0 | LV, HV |
| East | T1 | 0 | LV, HV |
| South | R2 | 0 | LV, HV |

## Lane Data - Lane Data

| Approach Lane | | Basic Satn Flow tcu/h | Utilisation Ratio % | Saturation Speed km/h | Capacity Adjustment % | Use Given Cap Adj in Network Analysis |
|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |
| East | Ballandean Road | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| North | New England Highway North | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |
| App. Lane 2 | | 1950 | – | – | 0.0 | No |
| West | Bruxner Highway | | | | | |
| App. Lane 1 | | 1950 | – | – | 0.0 | No |

## Lane Data - Flow Proportions

| Exit Lane | | To Exit Leg South % | East % | North % | West % |
|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | – | 100 |
| From: South | App. Lane 2 | | | | |
| Exit Lane 1 | | – | 100 | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | 0 | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | – | – |
| From: North | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | – | – | 100 |
| Exit Lane 2 | | 0 | – | – | – |
| From: West | App. Lane 1 | | | | |
| Exit Lane 1 | | 0 | 100 | 100 | – |
| Exit Lane 2 | | 100 | – | 0 | – |
| Heavy Vehicles (HV) | | | | | |
| From: South | App. Lane 1 | | | | |
| Exit Lane 1 | | – | – | – | 100 |
| From: South | App. Lane 2 | | | | |
| Exit Lane 1 | | – | 100 | 100 | – |
| Exit Lane 2 | | – | – | 0 | – |
| From: East | App. Lane 1 | | | | |
| Exit Lane 1 | | 100 | – | 0 | 100 |
| Exit Lane 2 | | 0 | – | 100 | – |
| From: North | App. Lane 1 | | | | |
| Exit Lane 1 | | – | 100 | – | – |
| From: North | App. Lane 2 | | | | |
| Exit Lane 1 | | 100 | – | – | 100 |
| Exit Lane 2 | | 0 | – | – | – |

| | | | | |
|---|---|---|---|---|
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | 0 | 100 | 100 | – |
| Exit Lane 2 | 100 | – | 0 | – |

## Lane Data - Lane Blockage

| Exit Lane | To Exit Leg South | East | North | West |
|---|---|---|---|---|
| From: South | App. Lane 1 | | | |
| Exit Lane 1 | – | – | – | Yes |
| From: South | App. Lane 2 | | | |
| Exit Lane 1 | – | Yes | Yes | – |
| Exit Lane 2 | – | – | Yes | – |
| From: East | App. Lane 1 | | | |
| Exit Lane 1 | Yes | – | Yes | Yes |
| Exit Lane 2 | Yes | – | Yes | – |
| From: North | App. Lane 1 | | | |
| Exit Lane 1 | – | Yes | – | – |
| From: North | App. Lane 2 | | | |
| Exit Lane 1 | Yes | – | – | Yes |
| Exit Lane 2 | Yes | – | – | – |
| From: West | App. Lane 1 | | | |
| Exit Lane 1 | Yes | Yes | Yes | – |
| Exit Lane 2 | Yes | – | Yes | – |

## Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

| Main Crossing/ Slip/Bypass Lane Crossing | Volume ped | Peak Flow % | Flow Scale % | Growth Rate % |
|---|---|---|---|---|
| No Ped Movements | | | | |

## Pedestrians - Pedestrian Movement Data

| Main Crossing/ Slip/Bypass Lane Crossing | Mov. ID | Crossing Distance m | Oppng Ped.Fac. | P.Deg. Satn | Walking Speed m/sec | App. Trav. Distance m | Downst. Distance m | Queue Space m |
|---|---|---|---|---|---|---|---|---|
| No Ped Movements | | | | | | | | |

## Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Separate

| Movement Class | To Exit Leg South veh | East veh | North veh | West veh |
|---|---|---|---|---|
| From: South | New England Highway South | | | |
| Total (veh) | – | 2 | 96 | 13 |
| LV (veh) | – | 2 | 83 | 11 |
| HV (veh) | – | 0 | 13 | 2 |
| From: East | Ballandean Road | | | |
| Total (veh) | 1 | – | 8 | 2 |
| LV (veh) | 1 | – | 3 | 1 |
| HV (veh) | 0 | – | 5 | 1 |
| From: North | New England Highway North | | | |
| Total (veh) | 101 | 16 | – | 1 |
| LV (veh) | 85 | 8 | – | 1 |
| HV (veh) | 16 | 8 | – | 0 |
| From: West | Bruxner Highway | | | |

| | | | | |
|---|---|---|---|---|
| Total (veh) | 10 | 2 | 1 | – |
| LV (veh) | 7 | 1 | 1 | – |
| HV (veh) | 3 | 1 | 0 | – |

## Volumes - Volume Factors

| To Approach | Peak Flow Factor % | Flow Scale % | Growth Rate %/year |
|---|---|---|---|
| **Light Vehicles (LV)** | | | |
| From: South | New England Highway South | | |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| From: East | Ballandean Road | | |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| From: North | New England Highway North | | |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| From: West | Bruxner Highway | | |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| **Heavy Vehicles (HV)** | | | |
| From: South | New England Highway South | | |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| From: East | Ballandean Road | | |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| North | 95.0 | 100.00 | 1.50 |
| From: North | New England Highway North | | |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |
| West | 95.0 | 100.00 | 1.50 |
| From: West | Bruxner Highway | | |
| North | 95.0 | 100.00 | 1.50 |
| East | 95.0 | 100.00 | 1.50 |
| South | 95.0 | 100.00 | 1.50 |

## Priorities

| Opposed Movement | Opposing Movements South | East | North | West |
|---|---|---|---|---|
| South | New England Highway South | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | – | – | T1,L2 | – |
| East | Ballandean Road | | | |
| L2 | – | – | T1 | – |
| T1 | R2,T1,L2 | – | T1,R2 | – |
| R2 | R2,T1 | – | T1,R2 | T1,L2 |
| North | New England Highway North | | | |
| L2 | – | – | – | – |
| T1 | – | – | – | – |
| R2 | T1,L2 | – | – | – |
| West | Bruxner Highway | | | |
| L2 | T1 | – | – | – |
| T1 | R2,T1 | – | T1,L2,R2 | – |
| R2 | R2,T1 | L2,T1 | T1,R2 | – |

## Gap Acceptance - Gap Acceptance Data

| Opposed Movement | Apply TWSC Calibration | Critical Gap sec | Follow-up Headway sec | Minimum Departures veh/min | Exiting Flow Effect % | % Opp. By Nearest Lane % | Opng. Peds (UnSig) | Staged Crossing |
|---|---|---|---|---|---|---|---|---|
| South | New England Highway South | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| East | Ballandean Road | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| North | New England Highway North | | | | | | | |
| R2 | Yes | 4.500 | 2.500 | 0.10 | 0 | 0.00 | Pr (Flow) | None |
| West | Bruxner Highway | | | | | | | |
| L2 | Yes | 5.000 | 3.000 | 0.10 | 50 | 100.00 | Pr (Flow) | None |
| T1 | Yes | 6.500 | 3.500 | 0.10 | 50 | 0.00 | Pr (Flow) | None |
| R2 | Yes | 7.000 | 4.000 | 0.10 | 50 | 0.00 | Pr (Flow) | None |

## Gap Acceptance - Two-Way Sign Control Calibration

| | |
|---|---|
| Level of Reduction with Opposing Flow Rate | None |
| Major Road Turning Flow Factor | 1 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes

| Major Road Number of Lanes: | Critical Gap Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec | Follow-up Headway Adjustment 2-lane sec | 3-lane sec | 5-lane sec | 6-lane or more sec |
|---|---|---|---|---|---|---|---|---|
| Minor Road Left Turn | -0.5 | -0.5 | 0.0 | 0.0 | -0.5 | -0.5 | 0.0 | 0.0 |
| Minor Road Through | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Minor Road Right Turn | -1.5 | -0.5 | 0.5 | 1.0 | -0.5 | -0.3 | 0.5 | 1.0 |
| Major Road Turn (Right or Left) | -0.5 | -0.5 | 0.0 | 1.0 | -0.5 | -0.5 | 0.0 | 1.0 |

## Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

| | Critical Gap Adjustment sec | Follow-up Headway Adjustment sec |
|---|---|---|
| Give-Way / Yield Sign Control | -0.5 | -0.3 |
| One-Way Major Road | -0.5 | -0.3 |
| T Intersection (Minor Road Turn) | -0.7 | -0.4 |
| Entry Road Grade (for each per cent grade) | 0.1 | 0.0 |
| Staged Crossing - Stage 1 | -1.0 | -0.6 |
| Staged Crossing - Stage 2 | -1.0 | -0.6 |
| U Turn (Major Road) | 1.5 | 0.9 |
| User Adjustment | 0.0 | 0.0 |

## Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

## Vehicle Movement Data - Path Data

| OD Movement | Approach Cruise Speed km/h | Exit Cruise Speed km/h | Negotiation Speed km/h | Negotiation Distance m | Downstream Distance m | Negotiation Radius m |
|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |

| | | | | | | |
|---|---|---|---|---|---|---|
| From: East | Ballandean Road | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| From: North | New England Highway North | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: West | Bruxner Highway | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| Heavy Vehicles (HV) | | | | | | |
| From: South | New England Highway South | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: East | Ballandean Road | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |
| From: North | New England Highway North | | | | | |
| L2 | 100.0 | 100.0 | – | – | – | – |
| T1 | 100.0 | 100.0 | – | – | – | – |
| R2 | 100.0 | 100.0 | – | – | – | – |
| From: West | Bruxner Highway | | | | | |
| L2 | 80.0 | 80.0 | – | – | – | – |
| T1 | 80.0 | 80.0 | – | – | – | – |
| R2 | 80.0 | 80.0 | – | – | – | – |

**Vehicle Movement Data - Calibration**

| OD Movement | Queue Space m | Vehicle Length m | Vehicle Occupancy pers/veh | Turn Veh Effect [ Factor | Radius ] m | Gap Accp Factor | Opng. Veh Factor | Prac. Deg. Of Satn. |
|---|---|---|---|---|---|---|---|---|
| Light Vehicles (LV) | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: East | Ballandean Road | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: North | New England Highway North | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| From: West | Bruxner Highway | | | | | | | |
| L2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| T1 | 7.00 | 4.50 | 1.20 | 1 | – | 1 | 1 | – |
| R2 | 7.00 | 4.50 | 1.20 | 1.05 | – | 1 | 1 | – |
| Heavy Vehicles (HV) | | | | | | | | |
| From: South | New England Highway South | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: East | Ballandean Road | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: North | New England Highway North | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| From: West | Bruxner Highway | | | | | | | |
| L2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |
| T1 | 13.00 | 10.00 | 1.20 | 1 | – | 1.5 | 1.5 | – |
| R2 | 13.00 | 10.00 | 1.20 | 1.09 | – | 1.5 | 1.5 | – |

## Demand & Sensitivity

**Analysis Method:** Design Life

| | |
|---|---|
| Design Life Analysis Objective | Practical Capacity (v/c ratio = xp) |
| Growth Model | Uniform |
| Number of Years | 30 |
| Const. No. of Years | – |
| Result For | Intersection - Vehicles |

## Model Settings - Options

| | |
|---|---|
| General Options | |
| Level of Service Method | Delay (RTA NSW) |
| Level of Service Target | LOS D |
| Performance Measure | Delay |
| Percentile Queue | 95 % |
| Hours per Year | 480 h |
| Include Short Lanes in determining Approach Queue Storage Ratio | No |

## Model Settings - Model Parameters

| | |
|---|---|
| Passenger Car Equivalents | |
| Light Vehicles (LV) | 1.00 pcu/veh |
| Heavy Vehicles (HV) | 1.65 pcu/veh |
| Queue Blockage | |
| Minimum Probability of Blockage | 0 |
| Delay and Queue | |
| Exclude Geometry Delay | No |
| HCM Delay Formula | No |
| HCM Queue Formula | No |
| Downstream Short Lane | |
| Minimum Downstream Utilisation Ratio | 20 % |
| Minimum Downstream Distance | 30 m |
| Distance for Full Lane Utilisation | 200 m |
| Calibration Parameter | 1.2 |

## Model Settings - Cost

Cost Options

Cost Unit: $

Vehicle Cost Parameters

| Movement Class | Veh Cost Method | Veh Operating Cost | | | Veh Time Cost | |
|---|---|---|---|---|---|---|
| | | Pump Price of Fuel | Fuel Res. Cost Factor | Ratio of Running Cost to Fuel Cost | Avg. Income | Time Value Factor |
| | | $/L | | | $/h | |
| Light Vehicles (LV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |
| Heavy Vehicles (HV) | Operating Cost | 1.450 | 0.500 | 3.00 | 38.00 | 0.600 |

## Model Settings - Vehicle Parameters

| Movement Class | Mass kg | Max Power kW | CO2 to Fuel Rate |
|---|---|---|---|
| Light Vehicles (LV) | 1600.0 | 120 | 2.35 |
| Heavy Vehicles (HV) | 15000.0 | 170 | 2.633 |

## Model Settings - Fuel Consumption

| Movement Class | fi | A | B | Beta |
|---|---|---|---|---|
| Light Vehicles (LV) | 1200 | 16 | 0.004 | 0.1 |
| Heavy Vehicles (HV) | 2300 | 200 | 0.009 | 0.075 |

| Model Settings - CO Emission | | | | |
|---|---|---|---|---|
| Movement Class | fi | A | B | Beta |
| Light Vehicles (LV) | 1620 | -138 | 0.0743 | 0.294 |
| Heavy Vehicles (HV) | 25000 | 320 | -0.06 | 0.04 |

| Model Settings - HC Emission | | | | |
|---|---|---|---|---|
| Movement Class | fi | A | B | Beta |
| Light Vehicles (LV) | 340 | -9 | 0.0031 | 0.029 |
| Heavy Vehicles (HV) | 3000 | 1 | -0.0016 | 0.0013 |

| Model Settings - NOx Emission | | | | |
|---|---|---|---|---|
| Movement Class | fi | A | B | Beta |
| Light Vehicles (LV) | 300 | -14 | 0.0068 | 0.166 |
| Heavy Vehicles (HV) | 44000 | 2820 | 0.21 | 1.9 |