

# **MONCRIEFF WEST**

## **Traffic Report**

February 2014  
Job No: C11075

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## 1 CURRENT STUDY

As part of the Moncrieff EDP, the September 2011 EMME model was requested from the Territory and Municipal Services (TAMS) to confirm the previously adopted traffic estimate. The following was agreed to be adopted for the Moncrieff West EDP, Mirrabei Drive design and redesign of Horse Park Drive Extension (HPDE):

- Adopt the traffic volumes shown in the September 2011 EMME model as a base to estimate the traffic volume on HPDE in the year 2021 and 2031. The estimated traffic volume shown in the 2011 EMME model is assumed to consider the following suburb developments as determined:

**Table 1 Forecast Suburb Population**

| Suburb    | 2021 Population | 2031 Population |
|-----------|-----------------|-----------------|
| Jacka     | 3,810           | 3,810           |
| Taylor    | 7,976           | 7,976           |
| Moncrieff | 4,572           | 4,800           |
| Ngunnawal | 10,000          | 10,000          |
| Casey     | 5,800           | 6,400           |

- TAMS also confirmed that a Jacka Suburb link was not shown in the right location and this link was moved to the approximate position of Jacka Access 2. The following volume, in vehicles per day (vpd) and directional split was used for the study:

**Table 2 Adopted Suburb Generated Volume Split**

|      | Jacka Suburb<br>Link Volume<br>(vpd) | 50% to HPDE (Mirrabei<br>Dr – Katherine Ave)<br>(vpd) | 50% to HPDE (Mirrabei Dr<br>– Burrumarra Ave) (vpd) |
|------|--------------------------------------|---|---|
| 2021 | 4,590                                | 2,295   | 2,295   |
| 2031 | 4,620                                | 2,310   | 2,300   |

The following figures were provided by Land Development Agency (LDA) on the Group Centre locators and the number of dwellings in fully developed Moncrieff, Jacka and Taylor:

**Table 3 Group Centre Developments and Nearby Suburb Dwelling numbers**

|              |                         | Total area in m2 | Percentage |
|--------------|-------------------------|------------------|------------|
| Group Centre | Supermarket             | 2,500            | 28%        |
|              | Retail                  | 4,170            | 47%        |
|              | Commercial              | 1,550            | 18%        |
|              | Community Facility      | 600              | 7%         |
|              | Residential             | 278 (dwellings)  |            |
|              |                         | Dwellings        |            |
| Suburb       | Moncrieff East and West | 2,200            |            |
|              | Jacka                   | 1,500            |            |
|              | Taylor                  | 3,140            |            |

## 2 MID-BLOCK ANALYSIS

LDA advised that full development figures in Moncrieff, Jacka and Taylor are to be adopted in estimating the traffic volume on Mirrabai Drive Extension and Horse Park Drive Extension in the year 2021 Traffic Analysis. Table 4 shows the computed values on Mirrabai Drive Extension of the daily vehicles derived from the assumptions outlined in the previous section.

**Table 4 Mid-Block two-way Traffic Volumes**

| Mid-block                | Period | Volume (vpd) |
|--------------------------|--------|--------------|
| Mirrabai Drive Extension | 2021   | 11,340       |
| Mirrabai Drive Extension | 2031   | 11,860       |

| Section   | September 2011 EMME Model (vpd) |        |
|---|---------------------------------|--------|
|   | 2021                            | 2031   |
| Mirrabai Drive Extension between Horse Park Drive and Len Waters Street | 11,340                          | 11,860 |

Based on Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis Part 3 (2009), the mid-block capacity of one lane in each direction carriageway would be in the order of 1,500 vehicles/ hour. No duplication is foreseen for Mirrabai Drive Extension.

### 3 INTERSECTION ANALYSIS

Traffic generation for the proposed Group Centre and suburb developments was calculated using the ACT Residential Subdivision Code and the RTA Guide to Traffic Generating Developments (2002).

The adopted traffic generation rates were:

|                     |   |
|---------------------|---|
| Supermarket         | 155 peak hour trips per 1000 m2 GLFA (10% daily rate) |
| Retail              | 121 daily trips per 100 m2 GLFA                       |
| Commercial          | 10 daily trips per 100m2 GFA                          |
| Community facility  | 4 daily trips per 100m2 GFA                           |
| Multi-unit dwelling | 6 daily trips per dwelling                            |
| Single dwellings    | 8 daily trips per dwelling                            |

SIDRA analysis was performed on the following intersections:

- Mirrabai Drive Extension / Moncrieff Group Centre
- Mirrabai Drive Extension / Moncrieff East West Access Road
- Road 4 / Road 3
- Road 13 / Road 3
- Road 2 / Road 3

Figure 1 shows a schematic of the Group Centre, traffic generation and anticipated movements. Table 5 shows the level of service criteria for intersection with the summarised results in Table 3-2 and Table 3-3.

Based on the SIDRA outputs, the proposed intersection arrangements for both AM and PM peak scenarios for the Mirrabai Drive Intersections and Moncrieff West Internal intersections would provide acceptable levels of service.

**Figure 1 Moncrieff Group Centre Traffic Flows**



**Table 5 Level of Service Criteria for Intersections**

| Level of Service | Average Delay per Vehicle (seconds) | Description for traffic signals and Roundabouts  | Description for give way and stop signs   |
|------------------|-------------------------------------|--|---|
| A                | <14                                 | Good operation   | Good operation                            |
| B                | 15 to 28                            | Good with acceptable delays and spare capacity   | Acceptable delays and spare capacity      |
| C                | 29 to 42                            | Satisfactory   | Satisfactory, but accident study required |
| D                | 43 to 56                            | Operating near capacity  | Near capacity and accident study required |
| E                | 57 to 70                            | At capacity, at signals, incidents will cause excessive delays, roundabouts require other control mode | At capacity, requires other control mode  |

Source: RTA Guide to Traffic Generating Developments 2002

**Table 6 Summary of SIDRA outputs for year 2031 – Mirrabei Drive Extension Intersections**

| Intersection                                      | Year    | Average Level of Service (LOS) | Average Delay | Queue   |
|---|---------|--------------------------------|---------------|---|
| Mirrabei Drive Extension / Moncrieff Group Centre | AM Peak | B                              | 24.1 seconds  | 80.0 m<br>Moncrieff East Left/Right Movement              |
|   | PM Peak | C                              | 28.9 seconds  | 58.7 m<br>Mirrabei Drive Extension South Through Movement |
| Mirrabei Drive Extension / East West Access Road  | AM Peak | C                              | 34.3 seconds  | 99.4 m<br>Mirrabei Drive Extension North Through movement |
|   | PM Peak | C                              | 36.2 seconds  | 87.8 m<br>Mirrabei Drive Extension South Through movement |

**Table 7 Summary of SIDRA outputs 2031 AM Peak – Unsignalised Internal Intersections**

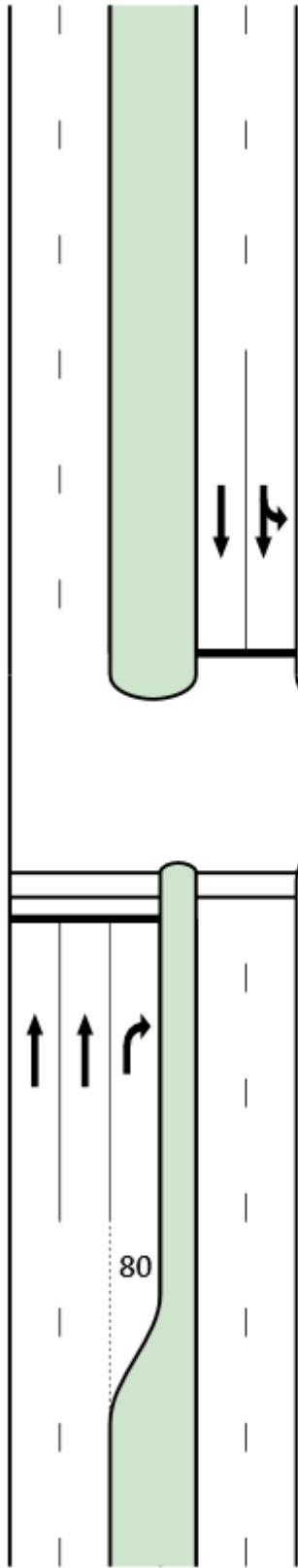
| Intersection                    | Worst LOS | Average Delay (seconds) | Queue                           |
|---------------------------------|-----------|-------------------------|---------------------------------|
| T Intersection Road 4 / Road 3  | A         | 7.2                     | 5.8 m<br>Road 3 Right Movement  |
| T Intersection Road 13 / Road 3 | A         | 6.8                     | 5.0 m<br>Road 13 Movement       |
| T Intersection Road 1 / Road 3  | A         | 6.9                     | 2.2 m<br>Road 3 South Movement  |
| T Intersection Road 5 / Road 15 | A         | 8.6                     | 1.1 m<br>Road 15 south Movement |
| Road 01 / Road 15               | B         | 20.6                    | 37.2<br>Road 15 north Movement  |
| Road 05 / Road 03               | A         | 5.4                     | 1.3<br>Road 3 west Movement     |
| Road 10 / Road 03               | A         | 5.5                     | 2.2<br>Road 10 approach         |



## Appendix A      Final Sidra Results



Mirrabei Drive North



Moncrieff East

Mirrabei Drive South

# MOVEMENT SUMMARY

Site: \*2031 Updated Moncrieff  
Group Centre Access AM Peak -  
dual lane

Updated 2031  
Mirrabai Drive Moncrieff Group Centre  
AM peak  
Signals - Fixed Time Cycle Time = 60 seconds (Practical Cycle Time)

| Movement Performance - Vehicles |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
|---------------------------------|------|----------------------|---------|------------------|----------------------|------------------|--------------------------------------|--------------------------------|--------------|--------------------------------|-----------------------|
| Mov ID                          | Turn | Demand Flow<br>veh/h | HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Back of Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>km/h |
| South: Mirrabai Drive South     |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 2                               | T    | 319                  | 3.0     | 0.354            | 21.4                 | LOS B            | 4.0                                  | 29.0                           | 0.88         | 0.71                           | 35.8                  |
| 3                               | R    | 20                   | 3.0     | 0.109            | 35.5                 | LOS C            | 0.6                                  | 4.1                            | 0.94         | 0.70                           | 29.4                  |
| Approach                        |      | 339                  | 3.0     | 0.354            | 22.2                 | LOS B            | 4.0                                  | 29.0                           | 0.88         | 0.71                           | 35.4                  |
| East: Moncrieff East            |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 4                               | L    | 222                  | 3.0     | 0.658            | 25.9                 | LOS B            | 11.1                                 | 80.0                           | 0.89         | 0.85                           | 35.1                  |
| 6                               | R    | 221                  | 3.0     | 0.658            | 24.0                 | LOS B            | 11.1                                 | 80.0                           | 0.89         | 0.84                           | 31.7                  |
| Approach                        |      | 443                  | 3.0     | 0.658            | 24.9                 | LOS B            | 11.1                                 | 80.0                           | 0.89         | 0.84                           | 33.4                  |
| North: Mirrabai Drive North     |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 7                               | L    | 21                   | 3.0     | 0.678            | 31.8                 | LOS C            | 8.7                                  | 62.3                           | 0.96         | 0.89                           | 33.1                  |
| 8                               | T    | 589                  | 3.0     | 0.678            | 24.3                 | LOS B            | 8.7                                  | 62.5                           | 0.96         | 0.85                           | 34.0                  |
| Approach                        |      | 610                  | 3.0     | 0.678            | 24.5                 | LOS B            | 8.7                                  | 62.5                           | 0.96         | 0.85                           | 34.0                  |
| All Vehicles                    |      | 1392                 | 3.0     | 0.678            | 24.1                 | LOS B            | 11.1                                 | 80.0                           | 0.92         | 0.81                           | 34.1                  |

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

| Movement Performance - Pedestrians |                   |                      |                      |                  |  |                                |              |                                |
|------------------------------------|-------------------|----------------------|----------------------|------------------|--|--------------------------------|--------------|--------------------------------|
| Mov ID                             | Description       | Demand Flow<br>ped/h | Average Delay<br>sec | Level of Service | Average Back of Queue<br>Pedestrian<br>ped | Back of Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per ped |
| P1                                 | Across S approach | 21                   | 24.3                 | LOS C            | 0.0  | 0.0                            | 0.90         | 0.90                           |
| P3                                 | Across E approach | 21                   | 23.4                 | LOS C            | 0.0  | 0.0                            | 0.88         | 0.88                           |
| All Pedestrians                    |                   | 42                   | 23.9                 | LOS C            |  |                                | 0.89         | 0.89                           |

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

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

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

# MOVEMENT SUMMARY

Site: \*2031 Updated Moncrieff  
Group Centre Access PM peak -  
dual lane

Updated 2031  
Mirrabai Drive Moncrieff Group Centre  
PM peak  
Signals - Fixed Time Cycle Time = 70 seconds (Practical Cycle Time)

| Movement Performance - Vehicles |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
|---------------------------------|------|----------------------|---------|------------------|----------------------|------------------|--------------------------------------|--------------------------------|--------------|--------------------------------|-----------------------|
| Mov ID                          | Turn | Demand Flow<br>veh/h | HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Back of Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>km/h |
| South: Mirrabai Drive South     |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 2                               | T    | 530                  | 3.0     | 0.565            | 25.8                 | LOS B            | 8.2                                  | 58.7                           | 0.93         | 0.78                           | 33.4                  |
| 3                               | R    | 200                  | 3.0     | 0.586            | 37.5                 | LOS C            | 6.5                                  | 46.8                           | 0.96         | 0.81                           | 29.6                  |
| Approach                        |      | 730                  | 3.0     | 0.586            | 29.0                 | LOS C            | 8.2                                  | 58.7                           | 0.94         | 0.79                           | 32.2                  |
| East: Moncrieff East            |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 4                               | L    | 18                   | 3.0     | 0.062            | 26.4                 | LOS B            | 0.9                                  | 6.2                            | 0.73         | 0.73                           | 34.8                  |
| 6                               | R    | 18                   | 3.0     | 0.062            | 26.3                 | LOS B            | 0.9                                  | 6.2                            | 0.73         | 0.72                           | 34.8                  |
| Approach                        |      | 36                   | 3.0     | 0.062            | 26.4                 | LOS B            | 0.9                                  | 6.2                            | 0.73         | 0.72                           | 34.8                  |
| North: Mirrabai Drive North     |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 7                               | L    | 199                  | 3.0     | 0.529            | 33.8                 | LOS C            | 7.3                                  | 52.3                           | 0.92         | 0.82                           | 31.3                  |
| 8                               | T    | 287                  | 3.0     | 0.529            | 25.5                 | LOS B            | 7.6                                  | 54.4                           | 0.92         | 0.76                           | 33.3                  |
| Approach                        |      | 486                  | 3.0     | 0.529            | 28.9                 | LOS C            | 7.6                                  | 54.4                           | 0.92         | 0.79                           | 32.5                  |
| All Vehicles                    |      | 1252                 | 3.0     | 0.586            | 28.9                 | LOS C            | 8.2                                  | 58.7                           | 0.92         | 0.78                           | 32.4                  |

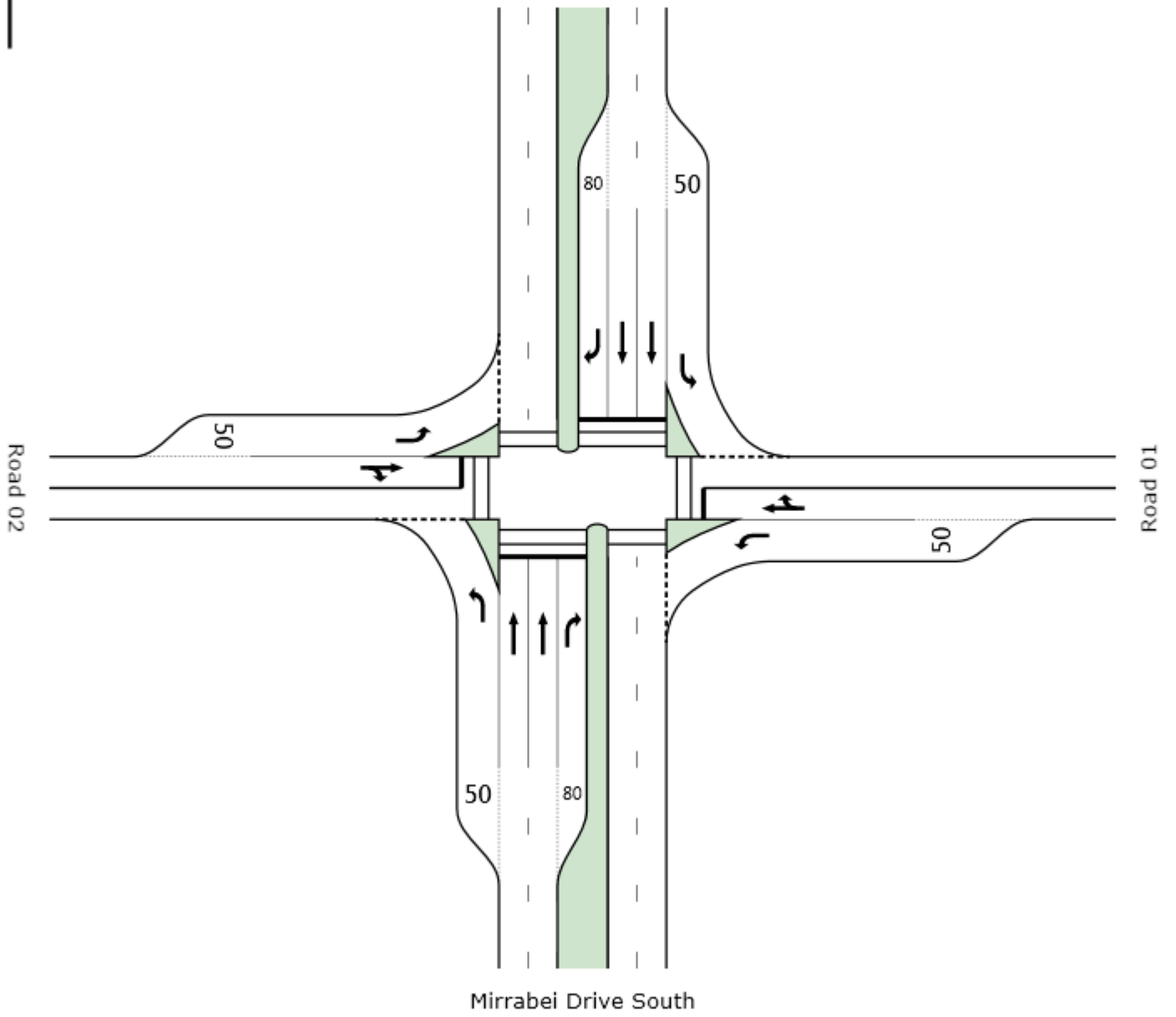
Level of Service (LOS) Method: Delay (RTA NSW).  
Vehicle movement LOS values are based on average delay per movement  
Intersection and Approach LOS values are based on average delay for all vehicle movements.  
SIDRA Standard Delay Model used.

| Movement Performance - Pedestrians |                   |                      |                      |                  |  |                                |              |                                |
|------------------------------------|-------------------|----------------------|----------------------|------------------|--|--------------------------------|--------------|--------------------------------|
| Mov ID                             | Description       | Demand Flow<br>ped/h | Average Delay<br>sec | Level of Service | Average Back of Queue<br>Pedestrian<br>ped | Back of Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per ped |
| P1                                 | Across S approach | 53                   | 29.3                 | LOS C            | 0.1  | 0.1                            | 0.91         | 0.91                           |
| P3                                 | Across E approach | 53                   | 25.7                 | LOS C            | 0.1  | 0.1                            | 0.86         | 0.86                           |
| All Pedestrians                    |                   | 106                  | 27.5                 | LOS C            |  |                                | 0.89         | 0.89                           |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)  
Pedestrian movement LOS values are based on average delay per pedestrian movement.  
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



Mirrabei Drive North



# MOVEMENT SUMMARY

Site: \*2031 Mirrabai / Road 01 /  
Road 02 AM Peak - dual lane

2031

Mirrabai Drive / Road 01 / Road 02

AM peak

Signals - Fixed Time Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
|---------------------------------|------|----------------------|---------|------------------|----------------------|------------------|--------------------------------------|--------------------------------|--------------|--------------------------------|-----------------------|
| Mov ID                          | Turn | Demand Flow<br>veh/h | HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Back of Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>km/h |
| South: Mirrabai Drive South     |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 1                               | L    | 21                   | 0.0     | 0.020            | 8.1                  | LOS A            | 0.1                                  | 0.6                            | 0.14         | 0.62                           | 49.0                  |
| 2                               | T    | 215                  | 3.0     | 0.531            | 50.0                 | LOS D            | 5.4                                  | 39.1                           | 0.99         | 0.78                           | 24.3                  |
| 3                               | R    | 50                   | 3.0     | 0.260            | 55.6                 | LOS D            | 2.4                                  | 17.6                           | 0.96         | 0.74                           | 22.9                  |
| Approach                        |      | 286                  | 2.8     | 0.531            | 47.9                 | LOS D            | 5.4                                  | 39.1                           | 0.92         | 0.76                           | 25.0                  |
| East: Road 01                   |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 4                               | L    | 195                  | 3.0     | 0.312            | 10.9                 | LOS A            | 2.5                                  | 17.7                           | 0.33         | 0.68                           | 46.3                  |
| 5                               | T    | 33                   | 0.0     | 0.412            | 39.2                 | LOS C            | 7.3                                  | 52.3                           | 0.91         | 0.74                           | 26.7                  |
| 6                               | R    | 130                  | 3.0     | 0.412            | 45.2                 | LOS D            | 7.3                                  | 52.3                           | 0.91         | 0.80                           | 24.3                  |
| Approach                        |      | 358                  | 2.7     | 0.412            | 25.9                 | LOS B            | 7.3                                  | 52.3                           | 0.60         | 0.73                           | 33.4                  |
| North: Mirrabai Drive North     |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 7                               | L    | 83                   | 3.0     | 0.082            | 7.5                  | LOS A            | 0.4                                  | 3.0                            | 0.17         | 0.61                           | 48.5                  |
| 8                               | T    | 600                  | 3.0     | 0.627            | 38.3                 | LOS C            | 13.8                                 | 99.4                           | 0.95         | 0.80                           | 28.0                  |
| 9                               | R    | 34                   | 0.0     | 0.087            | 40.5                 | LOS C            | 1.3                                  | 9.2                            | 0.80         | 0.72                           | 28.4                  |
| Approach                        |      | 717                  | 2.9     | 0.627            | 34.8                 | LOS C            | 13.8                                 | 99.4                           | 0.85         | 0.78                           | 29.4                  |
| West: Road 02                   |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 10                              | L    | 95                   | 0.0     | 0.118            | 9.3                  | LOS A            | 0.8                                  | 5.7                            | 0.24         | 0.65                           | 47.8                  |
| 11                              | T    | 42                   | 0.0     | 0.286            | 38.0                 | LOS C            | 5.0                                  | 35.3                           | 0.88         | 0.71                           | 27.4                  |
| 12                              | R    | 74                   | 0.0     | 0.286            | 45.8                 | LOS D            | 5.0                                  | 35.3                           | 0.88         | 0.79                           | 27.1                  |
| Approach                        |      | 211                  | 0.0     | 0.286            | 27.8                 | LOS B            | 5.0                                  | 35.3                           | 0.60         | 0.71                           | 33.8                  |
| All Vehicles                    |      | 1571                 | 2.4     | 0.627            | 34.3                 | LOS C            | 13.8                                 | 99.4                           | 0.77         | 0.75                           | 29.8                  |

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

| Movement Performance - Pedestrians |                   |                      |                      |                  |  |                                |              |                                |
|------------------------------------|-------------------|----------------------|----------------------|------------------|--|--------------------------------|--------------|--------------------------------|
| Mov ID                             | Description       | Demand Flow<br>ped/h | Average Delay<br>sec | Level of Service | Average Back of Queue<br>Pedestrian<br>ped | Back of Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per ped |
| P1                                 | Across S approach | 21                   | 46.7                 | LOS E            | 0.1  | 0.1                            | 0.94         | 0.94                           |
| P3                                 | Across E approach | 21                   | 33.6                 | LOS D            | 0.1  | 0.1                            | 0.80         | 0.80                           |
| P5                                 | Across N approach | 53                   | 46.7                 | LOS E            | 0.1  | 0.1                            | 0.94         | 0.94                           |
| P7                                 | Across W approach | 53                   | 46.7                 | LOS E            | 0.1  | 0.1                            | 0.94         | 0.94                           |
| All Pedestrians                    |                   | 148                  | 44.8                 | LOS E            |  |                                | 0.92         | 0.92                           |

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

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

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

# MOVEMENT SUMMARY

Site: \*2031 Mirrabai / Road 01 /  
Road 02 PM Peak - dual lane

2031

Mirrabai Drive / Road 01 / Road 02

PM peak

Signals - Fixed Time Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

| Movement Performance - Vehicles |      |                   |      |               |                   |                  |                                |                          |              |                             |                    |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|--------------------------|--------------|-----------------------------|--------------------|
| Mov ID                          | Turn | Demand Flow veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Back of Queue Distance m | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| South: Mirrabai Drive South     |      |                   |      |               |                   |                  |                                |                          |              |                             |                    |
| 1                               | L    | 66                | 0.0  | 0.071         | 8.4               | LOS A            | 0.4                            | 2.6                      | 0.18         | 0.63                        | 48.7               |
| 2                               | T    | 540               | 3.0  | 0.564         | 37.6              | LOS C            | 12.2                           | 87.8                     | 0.93         | 0.78                        | 28.3               |
| 3                               | R    | 176               | 3.0  | 0.473         | 43.0              | LOS D            | 7.6                            | 54.4                     | 0.88         | 0.80                        | 26.6               |
| Approach                        |      | 782               | 2.7  | 0.564         | 36.3              | LOS C            | 12.2                           | 87.8                     | 0.85         | 0.77                        | 28.9               |
| East: Road 01                   |      |                   |      |               |                   |                  |                                |                          |              |                             |                    |
| 4                               | L    | 45                | 3.0  | 0.044         | 8.3               | LOS A            | 0.2                            | 1.6                      | 0.16         | 0.63                        | 48.9               |
| 5                               | T    | 38                | 0.0  | 0.283         | 38.0              | LOS C            | 4.9                            | 35.0                     | 0.88         | 0.70                        | 27.4               |
| 6                               | R    | 75                | 3.0  | 0.283         | 43.9              | LOS D            | 4.9                            | 35.0                     | 0.88         | 0.78                        | 24.8               |
| Approach                        |      | 158               | 2.3  | 0.283         | 32.3              | LOS C            | 4.9                            | 35.0                     | 0.68         | 0.72                        | 29.8               |
| North: Mirrabai Drive North     |      |                   |      |               |                   |                  |                                |                          |              |                             |                    |
| 7                               | L    | 117               | 3.0  | 0.143         | 8.2               | LOS A            | 0.9                            | 6.5                      | 0.23         | 0.62                        | 47.8               |
| 8                               | T    | 194               | 3.0  | 0.479         | 49.7              | LOS D            | 4.9                            | 35.1                     | 0.99         | 0.77                        | 24.4               |
| 9                               | R    | 85                | 0.0  | 0.434         | 57.5              | LOS E            | 4.3                            | 29.9                     | 0.98         | 0.77                        | 23.3               |
| Approach                        |      | 396               | 2.4  | 0.479         | 39.1              | LOS C            | 4.9                            | 35.1                     | 0.76         | 0.73                        | 28.0               |
| West: Road 02                   |      |                   |      |               |                   |                  |                                |                          |              |                             |                    |
| 10                              | L    | 31                | 0.0  | 0.045         | 10.0              | LOS A            | 0.3                            | 2.2                      | 0.27         | 0.64                        | 47.1               |
| 11                              | T    | 29                | 0.0  | 0.118         | 36.3              | LOS C            | 2.0                            | 14.1                     | 0.85         | 0.64                        | 28.3               |
| 12                              | R    | 19                | 0.0  | 0.118         | 44.1              | LOS D            | 2.0                            | 14.1                     | 0.85         | 0.76                        | 27.9               |
| Approach                        |      | 79                | 0.0  | 0.118         | 28.0              | LOS B            | 2.0                            | 14.1                     | 0.62         | 0.67                        | 33.4               |
| All Vehicles                    |      | 1415              | 2.4  | 0.564         | 36.2              | LOS C            | 12.2                           | 87.8                     | 0.80         | 0.75                        | 29.0               |

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

| Movement Performance - Pedestrians |                   |                   |                   |                  |                                      |                          |              |                             |
|------------------------------------|-------------------|-------------------|-------------------|------------------|--------------------------------------|--------------------------|--------------|-----------------------------|
| Mov ID                             | Description       | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Back of Queue Distance m | Prop. Queued | Effective Stop Rate per ped |
| P1                                 | Across S approach | 21                | 46.7              | LOS E            | 0.1                                  | 0.1                      | 0.94         | 0.94                        |
| P3                                 | Across E approach | 21                | 46.7              | LOS E            | 0.1                                  | 0.1                      | 0.94         | 0.94                        |
| P5                                 | Across N approach | 53                | 46.7              | LOS E            | 0.1                                  | 0.1                      | 0.94         | 0.94                        |
| P7                                 | Across W approach | 53                | 33.6              | LOS D            | 0.1                                  | 0.1                      | 0.80         | 0.80                        |
| All Pedestrians                    |                   | 148               | 42.0              | LOS E            |                                      |                          | 0.89         | 0.89                        |

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

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

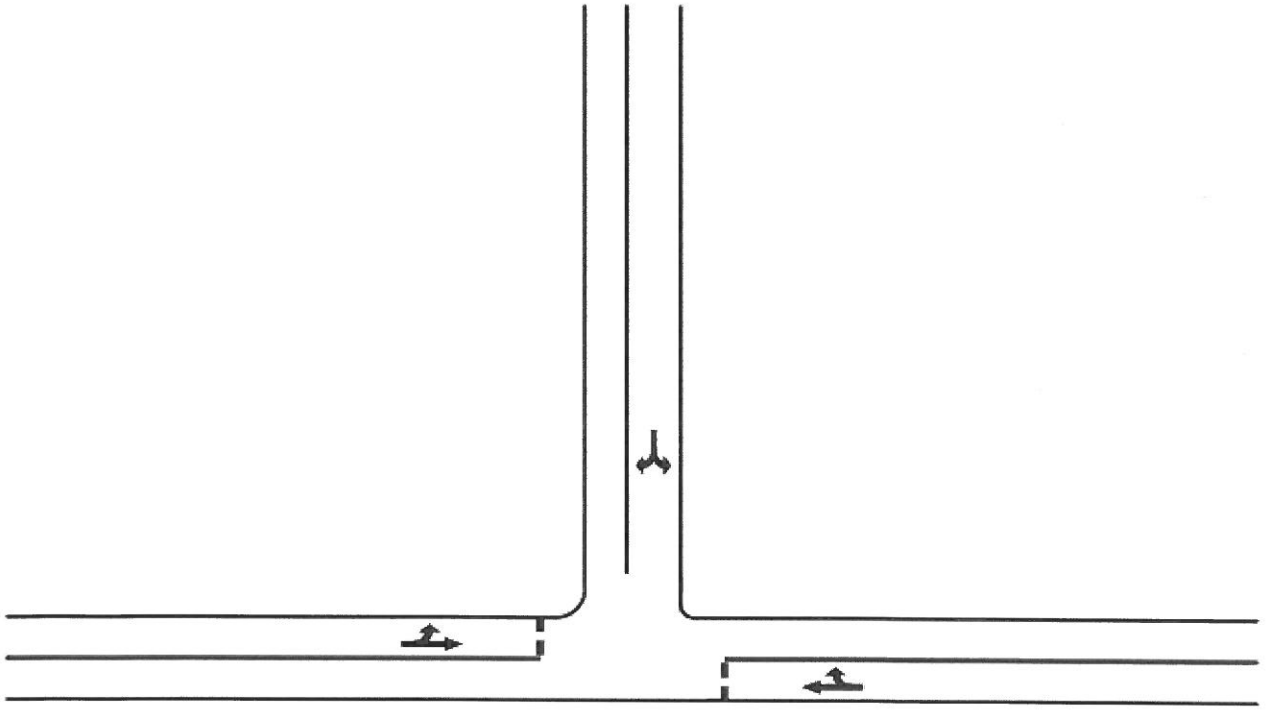
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



Road 4

Road 3 West

Road 3 East





# MOVEMENT SUMMARY

Site: 2031 AM Peak Road 4 and Road 3

2031  
 Moncreiff Internal - Road 4 and Road 3  
 AM peak  
 Giveway / Yield (Two-Way)

| Movement Performance - Vehicles |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
|---------------------------------|------|----------------------|---------|------------------|----------------------|------------------|--------------------------------------|--------------------------------|--------------|--------------------------------|-----------------------|
| Mov ID                          | Turn | Demand Flow<br>veh/h | HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Back of Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>km/h |
| East: Road 3 East               |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 5                               | T    | 11                   | 3.0     | 0.133            | 6.8                  | LOS A            | 0.5                                  | 3.9                            | 0.24         | 0.42                           | 42.8                  |
| 6                               | R    | 86                   | 3.0     | 0.133            | 8.3                  | LOS A            | 0.5                                  | 3.9                            | 0.24         | 0.65                           | 41.7                  |
| Approach                        |      | 97                   | 3.0     | 0.133            | 8.2                  | LOS A            | 0.5                                  | 3.9                            | 0.24         | 0.63                           | 41.8                  |
| North: Road 4                   |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 7                               | L    | 11                   | 3.0     | 0.015            | 6.5                  | LOS A            | 0.0                                  | 0.0                            | 0.00         | 0.59                           | 43.3                  |
| 9                               | R    | 17                   | 3.0     | 0.015            | 6.8                  | LOS A            | 0.0                                  | 0.0                            | 0.00         | 0.66                           | 43.0                  |
| Approach                        |      | 27                   | 3.0     | 0.015            | 6.7                  | NA               | 0.0                                  | 0.0                            | 0.00         | 0.63                           | 43.1                  |
| West: Road 3 West               |      |                      |         |                  |                      |                  |                                      |                                |              |                                |                       |
| 10                              | L    | 137                  | 3.0     | 0.085            | 6.7                  | LOS A            | 0.6                                  | 4.6                            | 0.15         | 0.52                           | 42.8                  |
| 11                              | T    | 10                   | 3.0     | 0.085            | 5.4                  | LOS A            | 0.6                                  | 4.6                            | 0.15         | 0.45                           | 43.7                  |
| Approach                        |      | 147                  | 3.0     | 0.085            | 6.6                  | LOS A            | 0.6                                  | 4.6                            | 0.15         | 0.52                           | 42.8                  |
| All Vehicles                    |      | 271                  | 3.0     | 0.133            | 7.2                  | NA               | 0.6                                  | 4.6                            | 0.17         | 0.57                           | 42.5                  |

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.

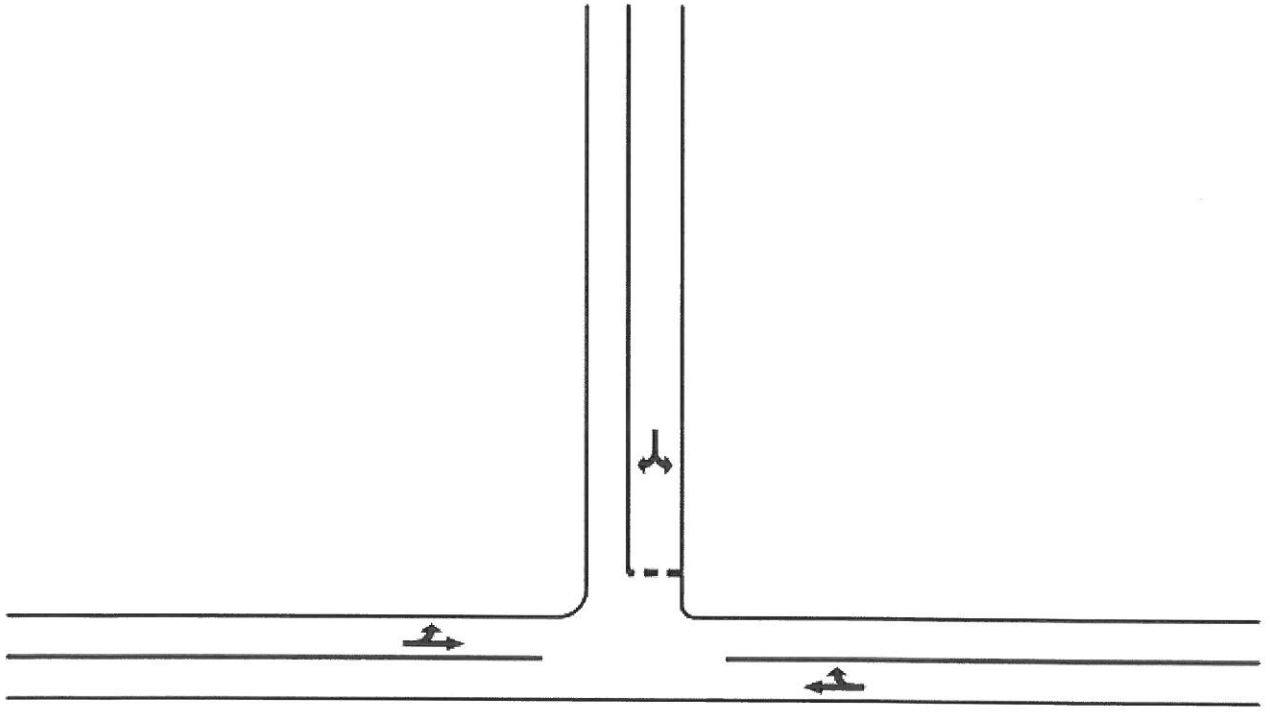
SIDRA Standard Delay Model used.



Road 13

Road 3 North

Road 3 South



# MOVEMENT SUMMARY

Site: 2031 AM Peak Road 13 and  
Road 3

2031  
Moncreiff Internal - Road 13 and Road 3  
AM peak  
Giveaway / Yield (Two-Way)

| Movement Performance - Vehicles |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |  |
|---------------------------------|------|----------------------|---------|------------------|----------------------|------------------|--------------------------------------|------------------------|--------------|--------------------------------|-----------------------|--|
| Mov ID                          | Turn | Demand Flow<br>veh/h | HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>km/h |  |
| East: Road 3 South              |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |  |
| 5                               | T    | 11                   | 1.0     | 0.018            | 0.6                  | LOS A            | 0.1                                  | 0.7                    | 0.21         | 0.00                           | 46.9                  |  |
| 6                               | R    | 11                   | 1.0     | 0.018            | 7.3                  | LOS A            | 0.1                                  | 0.7                    | 0.21         | 0.70                           | 42.7                  |  |
| Approach                        |      | 21                   | 1.0     | 0.018            | 3.9                  | NA               | 0.1                                  | 0.7                    | 0.21         | 0.35                           | 44.7                  |  |
| North: Road 13                  |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |  |
| 7                               | L    | 112                  | 1.0     | 0.158            | 6.5                  | LOS A            | 0.7                                  | 5.0                    | 0.07         | 0.57                           | 43.1                  |  |
| 9                               | R    | 112                  | 1.0     | 0.158            | 6.8                  | LOS A            | 0.7                                  | 5.0                    | 0.07         | 0.64                           | 42.8                  |  |
| Approach                        |      | 223                  | 1.0     | 0.158            | 6.7                  | LOS A            | 0.7                                  | 5.0                    | 0.07         | 0.60                           | 42.9                  |  |
| West: Road 3 North              |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |  |
| 10                              | L    | 5                    | 1.0     | 0.008            | 6.4                  | LOS A            | 0.0                                  | 0.0                    | 0.00         | 0.78                           | 43.3                  |  |
| 11                              | T    | 10                   | 1.0     | 0.008            | 0.0                  | LOS A            | 0.0                                  | 0.0                    | 0.00         | 0.00                           | 50.0                  |  |
| Approach                        |      | 15                   | 1.0     | 0.008            | 2.2                  | NA               | 0.0                                  | 0.0                    | 0.00         | 0.27                           | 47.5                  |  |
| All Vehicles                    |      | 259                  | 1.0     | 0.158            | 6.2                  | NA               | 0.7                                  | 5.0                    | 0.07         | 0.56                           | 43.3                  |  |

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

Vehicle movement LOS values are based on average delay per movement

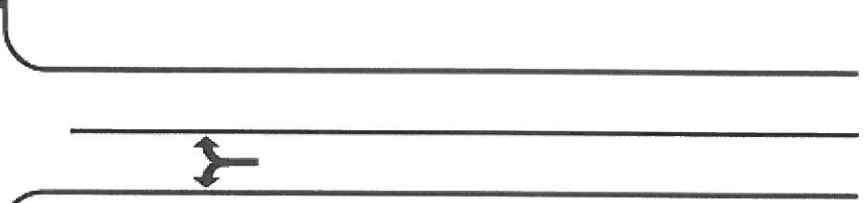
Minor Road Approach LOS values are based on average delay for all vehicle movements.

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 used.



Road 3 North



Road 2

Road 3 South

# MOVEMENT SUMMARY

Site: 2031 AM Peak Road 2 and Road 3

2031  
Moncreiff Internal - Road 2 and Road 3  
AM peak  
Giveaway / Yield (Two-Way)

| Movement Performance - Vehicles |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |
|---------------------------------|------|----------------------|---------|------------------|----------------------|------------------|--------------------------------------|------------------------|--------------|--------------------------------|-----------------------|
| Mov ID                          | Turn | Demand Flow<br>veh/h | HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>km/h |
| South: Road 3 South             |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |
| 2                               | T    | 33                   | 1.0     | 0.059            | 7.9                  | LOS A            | 0.2                                  | 1.7                    | 0.09         | 0.54                           | 49.3                  |
| 3                               | R    | 17                   | 1.0     | 0.059            | 9.4                  | LOS A            | 0.2                                  | 1.7                    | 0.09         | 0.75                           | 47.7                  |
| Approach                        |      | 49                   | 1.0     | 0.059            | 8.4                  | LOS A            | 0.2                                  | 1.7                    | 0.09         | 0.61                           | 48.7                  |
| East: Road 2                    |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |
| 4                               | L    | 21                   | 1.0     | 0.017            | 8.2                  | LOS A            | 0.0                                  | 0.0                    | 0.00         | 0.66                           | 49.0                  |
| 6                               | R    | 11                   | 1.0     | 0.017            | 6.7                  | LOS A            | 0.0                                  | 0.0                    | 0.00         | 0.67                           | 43.0                  |
| Approach                        |      | 32                   | 1.0     | 0.017            | 7.7                  | NA               | 0.0                                  | 0.0                    | 0.00         | 0.66                           | 46.9                  |
| North: Road 3 North             |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |
| 7                               | L    | 209                  | 1.0     | 0.116            | 6.4                  | LOS A            | 0.0                                  | 0.0                    | 0.00         | 0.62                           | 43.3                  |
| 8                               | T    | 5                    | 1.0     | 0.116            | 0.0                  | LOS A            | 0.0                                  | 0.0                    | 0.00         | 0.00                           | 60.0                  |
| Approach                        |      | 215                  | 1.0     | 0.116            | 6.3                  | NA               | 0.0                                  | 0.0                    | 0.00         | 0.61                           | 43.6                  |
| All Vehicles                    |      | 296                  | 1.0     | 0.116            | 6.8                  | NA               | 0.2                                  | 1.7                    | 0.02         | 0.61                           | 44.8                  |

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

Vehicle movement LOS values are based on average delay per movement

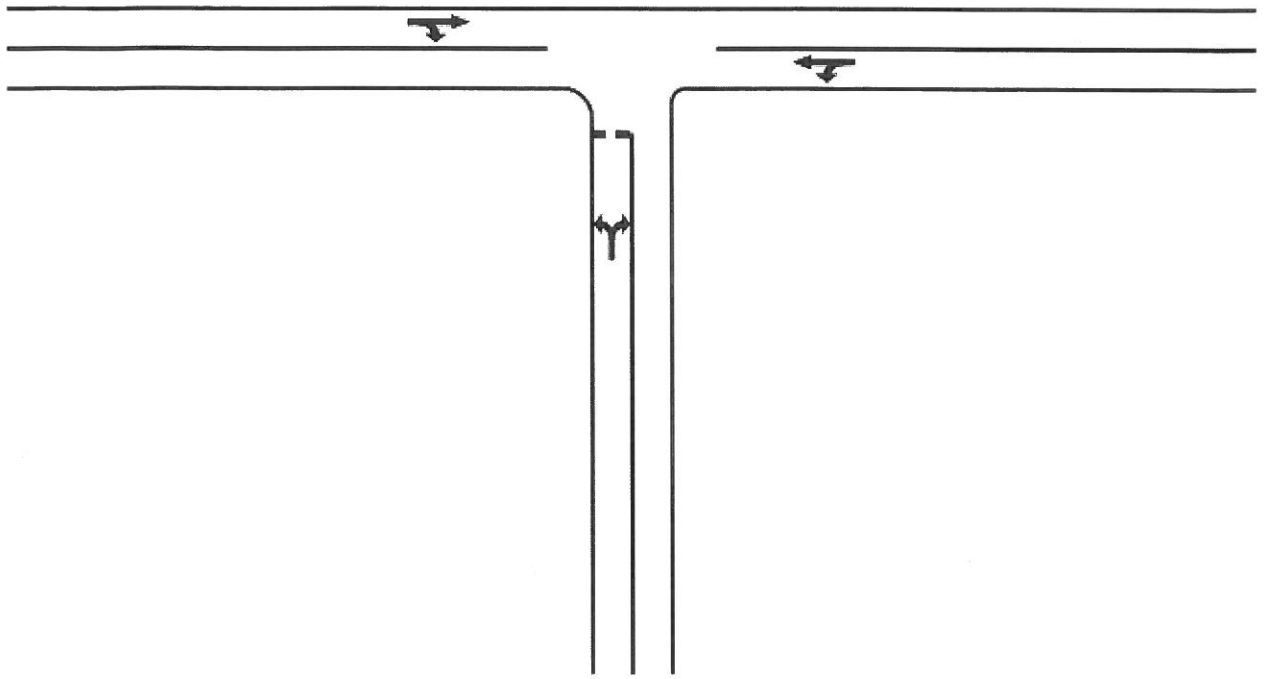
Minor Road Approach LOS values are based on average delay for all vehicle movements.

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 used.



Road 05 east



Road 15

Road 05 west

# MOVEMENT SUMMARY

Site: 2031 -Road 05 / Road 15

Road 05 / Road 15  
 AM Peak  
 2031  
 Giveway / Yield (Two-Way)

| Movement Performance - Vehicles |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |
|---------------------------------|------|----------------------|---------|------------------|----------------------|------------------|--------------------------------------|------------------------|--------------|--------------------------------|-----------------------|
| Mov ID                          | Turn | Demand Flow<br>veh/h | HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>m | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>km/h |
| South: Road 15                  |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |
| 1                               | L    | 15                   | 1.0     | 0.041            | 8.3                  | LOS A            | 0.2                                  | 1.1                    | 0.37         | 0.60                           | 41.6                  |
| 3                               | R    | 16                   | 1.0     | 0.041            | 8.6                  | LOS A            | 0.2                                  | 1.1                    | 0.37         | 0.68                           | 41.5                  |
| Approach                        |      | 31                   | 1.0     | 0.041            | 8.4                  | LOS A            | 0.2                                  | 1.1                    | 0.37         | 0.64                           | 41.6                  |
| East: Road 05 west              |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |
| 4                               | L    | 144                  | 1.0     | 0.152            | 6.4                  | LOS A            | 0.0                                  | 0.0                    | 0.00         | 0.73                           | 43.3                  |
| 5                               | T    | 143                  | 1.0     | 0.152            | 0.0                  | LOS A            | 0.0                                  | 0.0                    | 0.00         | 0.00                           | 50.0                  |
| Approach                        |      | 287                  | 1.0     | 0.152            | 3.2                  | NA               | 0.0                                  | 0.0                    | 0.00         | 0.37                           | 46.4                  |
| West: Road 05 east              |      |                      |         |                  |                      |                  |                                      |                        |              |                                |                       |
| 11                              | T    | 16                   | 1.0     | 0.026            | 1.2                  | LOS A            | 0.1                                  | 0.9                    | 0.36         | 0.00                           | 44.9                  |
| 12                              | R    | 19                   | 1.0     | 0.026            | 8.0                  | LOS A            | 0.1                                  | 0.9                    | 0.36         | 0.72                           | 42.4                  |
| Approach                        |      | 35                   | 1.0     | 0.026            | 4.9                  | NA               | 0.1                                  | 0.9                    | 0.36         | 0.39                           | 43.5                  |
| All Vehicles                    |      | 353                  | 1.0     | 0.152            | 3.8                  | NA               | 0.2                                  | 1.1                    | 0.07         | 0.39                           | 45.6                  |

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 used.

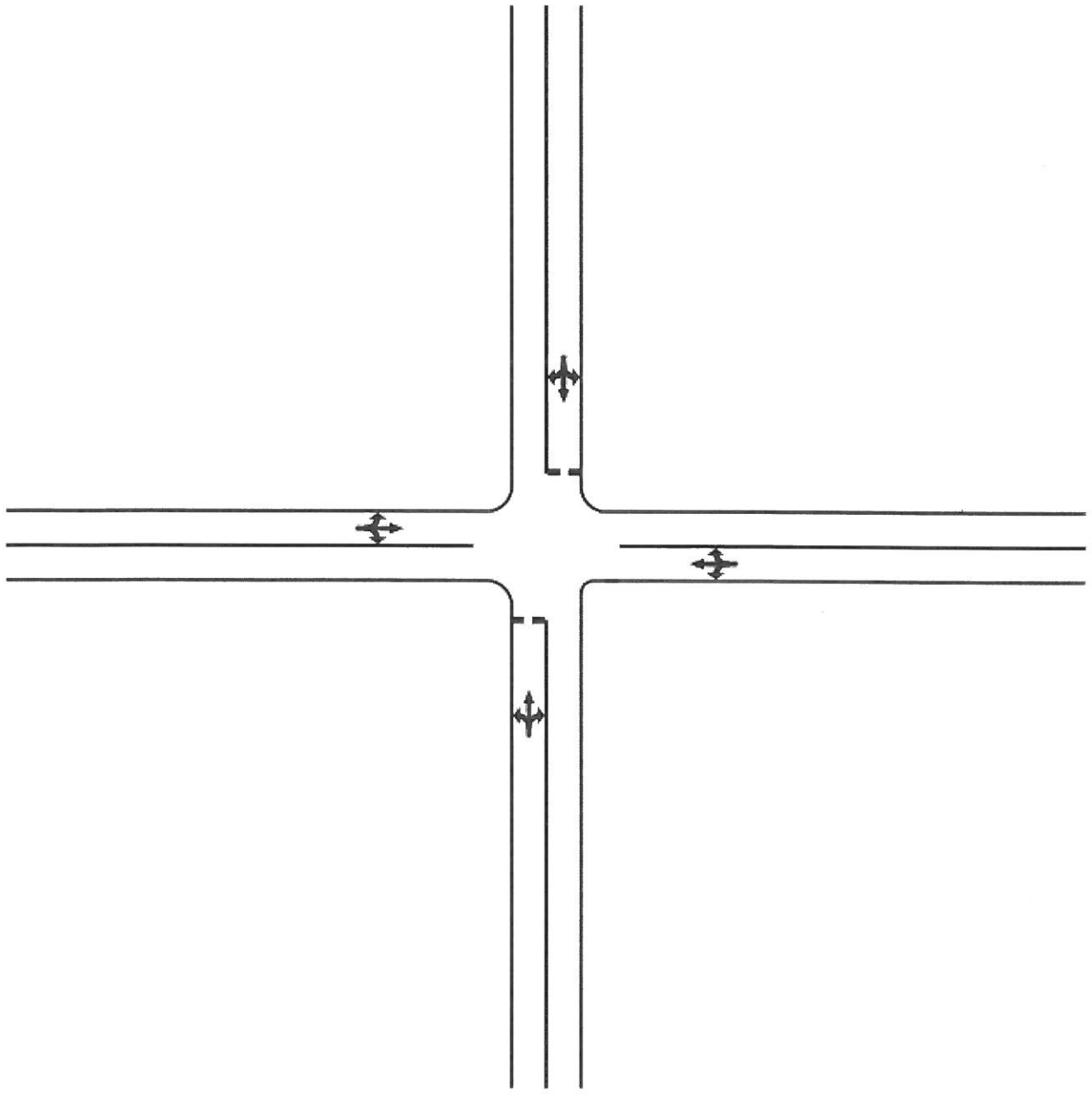


Road 15 north

Road 15 south

Road 01 east

Road 01 west





# MOVEMENT SUMMARY

Site: 2031 -Road 01 / Road 15

Road 01 / Road 15  
AM Peak  
2031  
Giveway / Yield (Two-Way)

| Movement Performance - Vehicles |      |                   |      |               |                   |                  |                                |            |              |                             |                    |
|---------------------------------|------|-------------------|------|---------------|-------------------|------------------|--------------------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID                          | Turn | Demand Flow 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: Road 15 south            |      |                   |      |               |                   |                  |                                |            |              |                             |                    |
| 1                               | L    | 11                | 1.0  | 0.065         | 11.6              | LOS A            | 0.2                            | 1.7        | 0.55         | 0.72                        | 39.1               |
| 2                               | T    | 11                | 1.0  | 0.065         | 12.1              | LOS A            | 0.2                            | 1.7        | 0.55         | 0.73                        | 44.6               |
| 3                               | R    | 11                | 1.0  | 0.065         | 11.9              | LOS A            | 0.2                            | 1.7        | 0.55         | 0.85                        | 39.0               |
| Approach                        |      | 32                | 1.0  | 0.065         | 11.9              | LOS A            | 0.2                            | 1.7        | 0.55         | 0.77                        | 40.8               |
| East: Road 01 west              |      |                   |      |               |                   |                  |                                |            |              |                             |                    |
| 4                               | L    | 11                | 1.0  | 0.212         | 6.7               | LOS A            | 1.4                            | 9.9        | 0.18         | 0.74                        | 43.2               |
| 5                               | T    | 396               | 1.0  | 0.212         | 0.2               | LOS A            | 1.4                            | 9.9        | 0.18         | 0.00                        | 47.7               |
| 6                               | R    | 2                 | 1.0  | 0.212         | 8.7               | LOS A            | 1.4                            | 9.9        | 0.18         | 0.88                        | 48.6               |
| Approach                        |      | 408               | 1.0  | 0.212         | 0.4               | NA               | 1.4                            | 9.9        | 0.18         | 0.02                        | 47.6               |
| North: Road 15 north            |      |                   |      |               |                   |                  |                                |            |              |                             |                    |
| 7                               | L    | 11                | 1.0  | 0.634         | 20.4              | LOS B            | 5.3                            | 37.2       | 0.67         | 0.74                        | 38.5               |
| 8                               | T    | 142               | 1.0  | 0.634         | 19.1              | LOS B            | 5.3                            | 37.2       | 0.67         | 1.05                        | 39.0               |
| 9                               | R    | 153               | 1.0  | 0.634         | 20.6              | LOS B            | 5.3                            | 37.2       | 0.67         | 1.10                        | 38.4               |
| Approach                        |      | 305               | 1.0  | 0.634         | 19.9              | LOS B            | 5.3                            | 37.2       | 0.67         | 1.06                        | 38.7               |
| West: Road 01 east              |      |                   |      |               |                   |                  |                                |            |              |                             |                    |
| 10                              | L    | 21                | 1.0  | 0.038         | 10.1              | LOS A            | 0.3                            | 1.8        | 0.55         | 0.34                        | 47.4               |
| 11                              | T    | 31                | 1.0  | 0.038         | 1.9               | LOS A            | 0.3                            | 1.8        | 0.55         | 0.00                        | 42.9               |
| 12                              | R    | 11                | 1.0  | 0.038         | 8.7               | LOS A            | 0.3                            | 1.8        | 0.55         | 0.76                        | 42.2               |
| Approach                        |      | 62                | 1.0  | 0.038         | 5.9               | NA               | 0.3                            | 1.8        | 0.55         | 0.25                        | 44.2               |
| All Vehicles                    |      | 807               | 1.0  | 0.634         | 8.7               | NA               | 5.3                            | 37.2       | 0.41         | 0.46                        | 43.2               |

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 used.