



## M<sup>C</sup>LAREN TRAFFIC ENGINEERING

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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

25 July 2022

Reference: 220051.02FA

Johnson Property Group  
27 Patrick Drive,  
Cooranbong NSW 2265  
Attention: Bryan Garland

### **SUPPLEMENTARY TRAFFIC ADVICE FOR WATAGAN PARK TOWN CENTRE PLANNING PROPOSAL AT 35 MCCULLOUGH STREET, COORANBONG**

Dear Bryan,

Reference is made to your request to provide supplementary traffic advice for the Watagan Park Town Centre Planning Proposal at 35 McCullough Street, Cooranbong. This supplementary advice is provided in response to Lake Macquarie City Council's comments. The comments made by Council relevant to traffic and parking are reproduced in the following sections (*italicised*) with *M<sup>C</sup>Laren Traffic Engineering's* (MTE) response thereafter.

#### **1 SIDRA Intersection Files**

*Provide a copy of the electronic SIDRA files to enable further interrogation of the modelling. The capacity of the intersections need to be assessed for the ten year design horizon.*

The electronic SIDRA files have been provided for review and reflect development traffic plus growth up to 2032.

#### **2 Capacity of Patrick Drive Intersection for Future Growth**

*The TfNSW advice states 'the modelling used to inform the traffic signal design found that the intersection may reach capacity by about 2025 with regard to the right turn out of Patrick Drive'. This modelling submitted to TfNSW should be submitted with the planning proposal to allow comparison with new modelling for this proposal.*

Growth volumes have been added to the Patrick Drive / Freemans Drive intersection to reflect the proposed development and growth volumes to the year 2032. The results as provided in **Annexure A** reflect that the Patrick Drive / Freemans Drive intersection will perform with a Level of Service of "C" in the AM peak and "A" in the PM peak, which is acceptable and demonstrates additional capacity beyond the 10-year design horizon.

### **3 Alton Road / Central Road / Patrick Drive Intersection Layout**

*The layout of the Alton Road / Central Road / Freemans Drive intersection is different in the model than is being designed, with the merge lane being different lengths. The model is required to be updated to match the design layout.*

The model has been modified to reflect the Council's design layout and the modelling rerun on this basis. There is no change reflected in the capacity of the intersection compared to the previous results, with the results showing a Level of Service of "B" in the AM peak and "A" in the PM peak under the existing plus development plus growth to 2032 volumes. The results are provided in **Annexure B** for reference.

Please contact the undersigned on 9521 7199 should you require further information or assistance.

Yours faithfully,

**McLaren Traffic Engineering**



**Tom Steal**

**Senior Traffic Engineer**

BE Civil AMAITPM MIEAust

RMS Accredited Level 2 Road Safety Auditor



**ANNEXURE A: PATRICK DRIVE SIDRA RESULTS  
(6 SHEETS)**

## LANE SUMMARY

**Site: 101 [Patrick Drive / Freeman Drive Existing + Development PM - Copy (Site Folder: Alton Layout Testing)]**

■ ■ Network: N101 [PM Peak  
(Network Folder: Alton Layout  
Testing)]

Freeman Drive / Patrick Drive

### AM Peak Period

100% Development Scale + Existing

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Optimum Cycle Time - Minimum Delay)

Design Life Analysis: Constant Number of Years = 26

| Lane Use and Performance |                  |           |                  |           |      |           |            |             |                  |                   |             |             |             |           |              |
|--------------------------|------------------|-----------|------------------|-----------|------|-----------|------------|-------------|------------------|-------------------|-------------|-------------|-------------|-----------|--------------|
|                          | DEMAND FLOWS     |           | ARRIVAL FLOWS    |           | Cap. | Deg. Satn | Lane Util. | Aver. Delay | Level of Service | 95% BACK OF QUEUE |             | Lane Config | Lane Length | Cap. Adj. | Prob. Block. |
|                          | [ Total<br>veh/h | HV ]<br>% | [ Total<br>veh/h | HV ]<br>% |      |           |            |             |                  | [ Veh             | Dist ]<br>m |             |             |           |              |
| East: Freeman Drive (E)  |                  |           |                  |           |      |           |            |             |                  |                   |             |             |             |           |              |
| Lane 1                   | 536              | 0.0       | 536              | 0.0       | 1309 | 0.410     | 100        | 5.6         | LOS A            | 8.2               | 57.7        | Full        | 550         | 0.0       | 0.0          |
| Lane 2                   | 108              | 0.0       | 108              | 0.0       | 159  | 0.677     | 100        | 42.8        | LOS D            | 4.0               | 27.8        | Short       | 60          | 0.0       | NA           |
| Approach                 | 644              | 0.0       | 644              | 0.0       |      | 0.677     |            | 11.8        | LOS A            | 8.2               | 57.7        |             |             |           |              |
| North: Patrick Drive (N) |                  |           |                  |           |      |           |            |             |                  |                   |             |             |             |           |              |
| Lane 1                   | 11               | 0.0       | 11               | 0.0       | 610  | 0.017     | 100        | 22.5        | LOS B            | 0.2               | 1.7         | Short       | 70          | 0.0       | NA           |
| Lane 2                   | 142              | 0.0       | 142              | 0.0       | 292  | 0.486     | 100        | 35.9        | LOS C            | 4.6               | 32.5        | Full        | 500         | 0.0       | 0.0          |
| Approach                 | 152              | 0.0       | 152              | 0.0       |      | 0.486     |            | 35.0        | LOS C            | 4.6               | 32.5        |             |             |           |              |
| West: Freeman Drive (W)  |                  |           |                  |           |      |           |            |             |                  |                   |             |             |             |           |              |
| Lane 1                   | 470              | 0.0       | 470              | 0.0       | 849  | 0.554     | 100        | 13.8        | LOS A            | 7.9               | 55.4        | Short       | 50          | 0.0       | NA           |
| Lane 2                   | 589              | 0.0       | 589              | 0.0       | 975  | 0.604     | 100        | 5.2         | LOS A            | 7.6               | 53.1        | Full        | 450         | 0.0       | 0.0          |
| Approach                 | 1059             | 0.0       | 1059             | 0.0       |      | 0.604     |            | 9.0         | LOS A            | 7.9               | 55.4        |             |             |           |              |
| Intersection             | 1855             | 0.0       | 1855             | 0.0       |      | 0.677     |            | 12.1        | LOS A            | 8.2               | 57.7        |             |             |           |              |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

| Approach Lane Flows (veh/h) |             |             |       |     |               |                     |                    |                      |                    |
|-----------------------------|-------------|-------------|-------|-----|---------------|---------------------|--------------------|----------------------|--------------------|
| East: Freeman Drive (E)     |             |             |       |     |               |                     |                    |                      |                    |
| Mov.<br>From E<br>To Exit:  | T1<br><br>W | R2<br><br>N | Total | %HV | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |
| Lane 1                      | 536         | -           | 536   | 0.0 | 1309          | 0.410               | 100                | NA                   | NA                 |
| Lane 2                      | -           | 108         | 108   | 0.0 | 159           | 0.677               | 100                | 0.0                  | 1                  |
| Approach                    | 536         | 108         | 644   | 0.0 | 0.677         |                     |                    |                      |                    |
| North: Patrick Drive (N)    |             |             |       |     |               |                     |                    |                      |                    |
| Mov.<br>From N<br>To Exit:  | L2<br><br>E | R2<br><br>W | Total | %HV | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |
| Lane 1                      | 11          | -           | 11    | 0.0 | 610           | 0.017               | 100                | 0.0                  | 2                  |
| Lane 2                      | -           | 142         | 142   | 0.0 | 292           | 0.486               | 100                | NA                   | NA                 |
| Approach                    | 11          | 142         | 152   | 0.0 | 0.486         |                     |                    |                      |                    |
| West: Freeman Drive (W)     |             |             |       |     |               |                     |                    |                      |                    |


| Mov.<br>From W<br>To Exit: | L2<br>N | T1<br>E | Total | %HV   | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |
|----------------------------|---------|---------|-------|-------|---------------|---------------------|--------------------|----------------------|--------------------|
| Lane 1                     | 470     | -       | 470   | 0.0   | 849           | 0.554               | 100                | 14.3                 | 2                  |
| Lane 2                     | -       | 589     | 589   | 0.0   | 975           | 0.604               | 100                | NA                   | NA                 |
| Approach                   | 470     | 589     | 1059  | 0.0   |               | 0.604               |                    |                      |                    |
| Total %HV Deg.Satn (v/c)   |         |         |       |       |               |                     |                    |                      |                    |
| Intersection               | 1855    | 0.0     |       | 0.677 |               |                     |                    |                      |                    |

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

| Merge Analysis                                                  |                        |                              |                                       |                                |                        |                             |                                     |                        |                     |                      |                       |
|-----------------------------------------------------------------|------------------------|------------------------------|---------------------------------------|--------------------------------|------------------------|-----------------------------|-------------------------------------|------------------------|---------------------|----------------------|-----------------------|
|                                                                 | Exit<br>Lane<br>Number | Short<br>Lane<br>Length<br>m | Percent<br>Opng in<br>Lane<br>% veh/h | Opposing<br>Flow Rate<br>pcu/h | Critical<br>Gap<br>sec | Follow-up<br>Headway<br>sec | Lane Capacity<br>Flow Rate<br>veh/h | Lane Capacity<br>veh/h | Deg.<br>Satn<br>v/c | Min.<br>Delay<br>sec | Merge<br>Delay<br>sec |
| East Exit: Freeman Drive (E)<br>Merge Type: <b>Not Applied</b>  |                        |                              |                                       |                                |                        |                             |                                     |                        |                     |                      |                       |
| Full Length Lane                                                | 1                      | Merge Analysis not applied.  |                                       |                                |                        |                             |                                     |                        |                     |                      |                       |
| North Exit: Patrick Drive (N)<br>Merge Type: <b>Not Applied</b> |                        |                              |                                       |                                |                        |                             |                                     |                        |                     |                      |                       |
| Full Length Lane                                                | 1                      | Merge Analysis not applied.  |                                       |                                |                        |                             |                                     |                        |                     |                      |                       |
| West Exit: Freeman Drive (W)<br>Merge Type: <b>Not Applied</b>  |                        |                              |                                       |                                |                        |                             |                                     |                        |                     |                      |                       |
| Full Length Lane                                                | 1                      | Merge Analysis not applied.  |                                       |                                |                        |                             |                                     |                        |                     |                      |                       |

# MOVEMENT SUMMARY

 **Site: 101 [Patrick Drive / Freeman Drive Existing + Development AM - Copy (Site Folder: Alton Layout Testing)]**

 **Network: N101 [AM Peak (Network Folder: Alton Layout Testing)]**

Freeman Drive / Patrick Drive

AM Peak Period

100% Development Scale + Existing

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 95 seconds (Network Optimum Cycle Time - Minimum Delay)

Design Life Analysis: Constant Number of Years = 26

| Vehicle Movement Performance |      |               |      |               |      |           |             |                  |                   |          |           |                     |                  |             |
|------------------------------|------|---------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|-----------|---------------------|------------------|-------------|
| Mov ID                       | Turn | DEMAND FLOWS  |      | ARRIVAL FLOWS |      | Deg. Satn | Aver. Delay | Level of Service | 95% BACK OF QUEUE |          | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed |
|                              |      | [ Total veh/h | HV % | [ Total veh/h | HV % |           |             |                  | [ Veh. veh        | Dist ] m |           |                     |                  |             |
| East: Freeman Drive (E)      |      |               |      |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 5                            | T1   | 822           | 0.0  | 822           | 0.0  | * 0.890   | 34.4        | LOS C            | 40.9              | 286.1    | 0.96      | 1.01                | 1.13             | 29.7        |
| 6                            | R2   | 27            | 0.0  | 27            | 0.0  | 0.230     | 54.1        | LOS D            | 1.3               | 8.9      | 0.98      | 0.71                | 0.98             | 31.9        |
| Approach                     |      | 849           | 0.0  | 849           | 0.0  | 0.890     | 35.0        | LOS C            | 40.9              | 286.1    | 0.96      | 1.00                | 1.13             | 29.9        |
| North: Patrick Drive (N)     |      |               |      |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 7                            | L2   | 42            | 0.0  | 42            | 0.0  | 0.044     | 17.6        | LOS B            | 0.9               | 6.6      | 0.52      | 0.67                | 0.52             | 38.3        |
| 9                            | R2   | 568           | 0.0  | 568           | 0.0  | * 0.900   | 51.1        | LOS D            | 30.7              | 214.9    | 1.00      | 0.99                | 1.27             | 22.6        |
| Approach                     |      | 610           | 0.0  | 610           | 0.0  | 0.900     | 48.8        | LOS D            | 30.7              | 214.9    | 0.97      | 0.97                | 1.22             | 23.2        |
| West: Freeman Drive (W)      |      |               |      |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 10                           | L2   | 118           | 0.0  | 118           | 0.0  | 0.201     | 32.8        | LOS C            | 4.5               | 31.3     | 0.86      | 0.77                | 0.86             | 37.6        |
| 11                           | T1   | 427           | 0.0  | 427           | 0.0  | 0.665     | 29.0        | LOS C            | 17.5              | 122.2    | 0.94      | 0.82                | 0.94             | 29.4        |
| Approach                     |      | 544           | 0.0  | 544           | 0.0  | 0.665     | 29.8        | LOS C            | 17.5              | 122.2    | 0.92      | 0.81                | 0.92             | 31.9        |
| All Vehicles                 |      | 2003          | 0.0  | 2003          | 0.0  | 0.900     | 37.8        | LOS C            | 40.9              | 286.1    | 0.95      | 0.94                | 1.10             | 28.1        |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

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

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |          |           |             |                  |                       |          |           |                     |             |              |             |
|---------------------------------|----------|-----------|-------------|------------------|-----------------------|----------|-----------|---------------------|-------------|--------------|-------------|
| Mov ID                          | Crossing | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE |          | Prop. Que | Effective Stop Rate | Travel Time | Travel Dist. | Aver. Speed |
|                                 |          | ped/h     | sec         |                  | [ Ped ped             | Dist ] m |           |                     | sec         | m            | m/sec       |
| East: Freeman Drive (E)         |          |           |             |                  |                       |          |           |                     |             |              |             |
| P2                              | Full     | 80        | 23.7        | LOS C            | 0.2                   | 0.2      | 0.71      | 0.71                | 49.8        | 33.9         | 0.68        |
| North: Patrick Drive (N)        |          |           |             |                  |                       |          |           |                     |             |              |             |
| P3                              | Full     | 80        | 25.9        | LOS C            | 0.2                   | 0.2      | 0.74      | 0.74                | 52.0        | 33.9         | 0.65        |
| West: Freeman Drive (W)         |          |           |             |                  |                       |          |           |                     |             |              |             |
| P4                              | Full     | 80        | 23.7        | LOS C            | 0.2                   | 0.2      | 0.71      | 0.71                | 49.8        | 33.9         | 0.68        |
| All Pedestrians                 |          | 240       | 24.4        | LOS C            | 0.2                   | 0.2      | 0.72      | 0.72                | 50.5        | 33.9         | 0.67        |

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.

## LANE SUMMARY

 **Site: 101 [Patrick Drive / Freeman Drive Existing + Development AM - Copy (Site Folder: Alton Layout Testing)]**

 **Network: N101 [AM Peak (Network Folder: Alton Layout Testing)]**

Freeman Drive / Patrick Drive

AM Peak Period

100% Development Scale + Existing

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 95 seconds (Network Optimum Cycle Time - Minimum Delay)

Design Life Analysis: Constant Number of Years = 26

| Lane Use and Performance |              |      |               |      |                  |           |            |             |                  |                   |       |             |             |           |              |   |
|--------------------------|--------------|------|---------------|------|------------------|-----------|------------|-------------|------------------|-------------------|-------|-------------|-------------|-----------|--------------|---|
|                          | DEMAND FLOWS |      | ARRIVAL FLOWS |      | Cap.             | Deg. Satn | Lane Util. | Aver. Delay | Level of Service | 95% BACK OF QUEUE |       | Lane Config | Lane Length | Cap. Adj. | Prob. Block. |   |
|                          | [ Total      | HV ] | [ Total       | HV ] |                  |           |            |             |                  |                   |       |             |             |           |              |   |
|                          | veh/h        | %    | veh/h         | %    | veh/h            | v/c       | %          | sec         |                  |                   | [ Veh | Dist ]      |             | m         | %            | % |
| East: Freeman Drive (E)  |              |      |               |      |                  |           |            |             |                  |                   |       |             |             |           |              |   |
| Lane 1                   | 822          | 0.0  | 822           | 0.0  | 924 <sup>1</sup> | 0.890     | 100        | 34.4        | LOS C            | 40.9              | 286.1 | Full        | 550         | 0.0       | 0.0          |   |
| Lane 2                   | 27           | 0.0  | 27            | 0.0  | 117              | 0.230     | 100        | 54.1        | LOS D            | 1.3               | 8.9   | Short       | 60          | 0.0       | NA           |   |
| Approach                 | 849          | 0.0  | 849           | 0.0  |                  | 0.890     |            | 35.0        | LOS C            | 40.9              | 286.1 |             |             |           |              |   |
| North: Patrick Drive (N) |              |      |               |      |                  |           |            |             |                  |                   |       |             |             |           |              |   |
| Lane 1                   | 42           | 0.0  | 42            | 0.0  | 958              | 0.044     | 100        | 17.6        | LOS B            | 0.9               | 6.6   | Short       | 70          | 0.0       | NA           |   |
| Lane 2                   | 568          | 0.0  | 568           | 0.0  | 631 <sup>1</sup> | 0.900     | 100        | 51.1        | LOS D            | 30.7              | 214.9 | Full        | 500         | 0.0       | 0.0          |   |
| Approach                 | 610          | 0.0  | 610           | 0.0  |                  | 0.900     |            | 48.8        | LOS D            | 30.7              | 214.9 |             |             |           |              |   |
| West: Freeman Drive (W)  |              |      |               |      |                  |           |            |             |                  |                   |       |             |             |           |              |   |
| Lane 1                   | 118          | 0.0  | 118           | 0.0  | 586              | 0.201     | 100        | 32.8        | LOS C            | 4.5               | 31.3  | Short       | 50          | 0.0       | NA           |   |
| Lane 2                   | 427          | 0.0  | 427           | 0.0  | 642 <sup>1</sup> | 0.665     | 100        | 29.0        | LOS C            | 17.5              | 122.2 | Full        | 450         | 0.0       | 0.0          |   |
| Approach                 | 544          | 0.0  | 544           | 0.0  |                  | 0.665     |            | 29.8        | LOS C            | 17.5              | 122.2 |             |             |           |              |   |
| Intersection             | 2003         | 0.0  | 2003          | 0.0  |                  | 0.900     |            | 37.8        | LOS C            | 40.9              | 286.1 |             |             |           |              |   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

<sup>1</sup> Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

| Approach Lane Flows (veh/h) |     |     |       |     |                  |               |              |                |              |  |
|-----------------------------|-----|-----|-------|-----|------------------|---------------|--------------|----------------|--------------|--|
| East: Freeman Drive (E)     |     |     |       |     |                  |               |              |                |              |  |
| Mov. From E To Exit:        | T1  | R2  | Total | %HV |                  | Deg. Satn v/c | Lane Util. % | Prob. SL Ov. % | Ov. Lane No. |  |
|                             | W   | N   |       |     | Cap. veh/h       |               |              |                |              |  |
| Lane 1                      | 822 | -   | 822   | 0.0 | 924 <sup>1</sup> | 0.890         | 100          | NA             | NA           |  |
| Lane 2                      | -   | 27  | 27    | 0.0 | 117              | 0.230         | 100          | 0.0            | 1            |  |
| Approach                    | 822 | 27  | 849   | 0.0 |                  | 0.890         |              |                |              |  |
| North: Patrick Drive (N)    |     |     |       |     |                  |               |              |                |              |  |
| Mov. From N To Exit:        | L2  | R2  | Total | %HV |                  | Deg. Satn v/c | Lane Util. % | Prob. SL Ov. % | Ov. Lane No. |  |
|                             | E   | W   |       |     | Cap. veh/h       |               |              |                |              |  |
| Lane 1                      | 42  | -   | 42    | 0.0 | 958              | 0.044         | 100          | 0.0            | 2            |  |
| Lane 2                      | -   | 568 | 568   | 0.0 | 631 <sup>1</sup> | 0.900         | 100          | NA             | NA           |  |

|                           |      |     |       |       |                  |               |              |                |              |  |
|---------------------------|------|-----|-------|-------|------------------|---------------|--------------|----------------|--------------|--|
| Approach                  | 42   | 568 | 610   | 0.0   |                  | 0.900         |              |                |              |  |
| West: Freeman Drive (W)   |      |     |       |       |                  |               |              |                |              |  |
| Mov. From W To Exit:      | L2   | T1  | Total | %HV   | Cap. veh/h       | Deg. Satn v/c | Lane Util. % | Prob. SL Ov. % | Ov. Lane No. |  |
| Lane 1                    | 118  | -   | 118   | 0.0   | 586              | 0.201         | 100          | 0.0            | 2            |  |
| Lane 2                    | -    | 427 | 427   | 0.0   | 642 <sup>1</sup> | 0.665         | 100          | NA             | NA           |  |
| Approach                  | 118  | 427 | 544   | 0.0   |                  | 0.665         |              |                |              |  |
| Total %HV Deg. Satn (v/c) |      |     |       |       |                  |               |              |                |              |  |
| Intersection              | 2003 | 0.0 |       | 0.900 |                  |               |              |                |              |  |

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.


- <sup>1</sup> Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

| Merge Analysis                 |                  |                     |                        |                          |                  |                       |                      |                     |               |                |                 |                             |
|--------------------------------|------------------|---------------------|------------------------|--------------------------|------------------|-----------------------|----------------------|---------------------|---------------|----------------|-----------------|-----------------------------|
|                                | Exit Lane Number | Short Lane Length m | Percent Opng in Lane % | Opposing Flow Rate veh/h | Critical Gap sec | Follow-up Headway sec | Lane Flow Rate veh/h | Lane Capacity veh/h | Deg. Satn v/c | Min. Delay sec | Merge Delay sec |                             |
| East Exit: Freeman Drive (E)   |                  |                     |                        |                          |                  |                       |                      |                     |               |                |                 |                             |
| Merge Type: <b>Not Applied</b> |                  |                     |                        |                          |                  |                       |                      |                     |               |                |                 |                             |
| Full Length Lane               | 1                |                     |                        |                          |                  |                       |                      |                     |               |                |                 | Merge Analysis not applied. |
| North Exit: Patrick Drive (N)  |                  |                     |                        |                          |                  |                       |                      |                     |               |                |                 |                             |
| Merge Type: <b>Not Applied</b> |                  |                     |                        |                          |                  |                       |                      |                     |               |                |                 |                             |
| Full Length Lane               | 1                |                     |                        |                          |                  |                       |                      |                     |               |                |                 | Merge Analysis not applied. |
| West Exit: Freeman Drive (W)   |                  |                     |                        |                          |                  |                       |                      |                     |               |                |                 |                             |
| Merge Type: <b>Not Applied</b> |                  |                     |                        |                          |                  |                       |                      |                     |               |                |                 |                             |
| Full Length Lane               | 1                |                     |                        |                          |                  |                       |                      |                     |               |                |                 | Merge Analysis not applied. |



# MOVEMENT SUMMARY

 **Site: 101 [Patrick Drive / Freeman Drive Existing + Development PM - Copy (Site Folder: Alton Layout Testing)]**

 **Network: N101 [PM Peak (Network Folder: Alton Layout Testing)]**

Freeman Drive / Patrick Drive

AM Peak Period

100% Development Scale + Existing

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Optimum Cycle Time - Minimum Delay)

Design Life Analysis: Constant Number of Years = 26

| Vehicle Movement Performance |      |               |      |               |      |           |             |                  |                   |          |           |                     |                  |             |
|------------------------------|------|---------------|------|---------------|------|-----------|-------------|------------------|-------------------|----------|-----------|---------------------|------------------|-------------|
| Mov ID                       | Turn | DEMAND FLOWS  |      | ARRIVAL FLOWS |      | Deg. Satn | Aver. Delay | Level of Service | 95% BACK OF QUEUE |          | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed |
|                              |      | [ Total veh/h | HV % | [ Total veh/h | HV % |           |             |                  | [ Veh. veh        | Dist ] m |           |                     |                  |             |
| East: Freeman Drive (E)      |      |               |      |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 5                            | T1   | 536           | 0.0  | 536           | 0.0  | 0.410     | 5.6         | LOS A            | 8.2               | 57.7     | 0.49      | 0.43                | 0.49             | 51.5        |
| 6                            | R2   | 108           | 0.0  | 108           | 0.0  | * 0.677   | 42.8        | LOS D            | 4.0               | 27.8     | 1.00      | 0.84                | 1.17             | 35.2        |
| Approach                     |      | 644           | 0.0  | 644           | 0.0  | 0.677     | 11.8        | LOS A            | 8.2               | 57.7     | 0.57      | 0.50                | 0.60             | 45.7        |
| North: Patrick Drive (N)     |      |               |      |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 7                            | L2   | 11            | 0.0  | 11            | 0.0  | 0.017     | 22.5        | LOS B            | 0.2               | 1.7      | 0.70      | 0.66                | 0.70             | 34.7        |
| 9                            | R2   | 142           | 0.0  | 142           | 0.0  | * 0.486   | 35.9        | LOS C            | 4.6               | 32.5     | 0.96      | 0.79                | 0.96             | 27.7        |
| Approach                     |      | 152           | 0.0  | 152           | 0.0  | 0.486     | 35.0        | LOS C            | 4.6               | 32.5     | 0.94      | 0.78                | 0.94             | 28.1        |
| West: Freeman Drive (W)      |      |               |      |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 10                           | L2   | 470           | 0.0  | 470           | 0.0  | 0.554     | 13.8        | LOS A            | 7.9               | 55.4     | 0.52      | 0.73                | 0.52             | 47.3        |
| 11                           | T1   | 589           | 0.0  | 589           | 0.0  | * 0.604   | 5.2         | LOS A            | 7.6               | 53.1     | 0.40      | 0.36                | 0.40             | 50.5        |
| Approach                     |      | 1059          | 0.0  | 1059          | 0.0  | 0.604     | 9.0         | LOS A            | 7.9               | 55.4     | 0.46      | 0.52                | 0.46             | 48.5        |
| All Vehicles                 |      | 1855          | 0.0  | 1855          | 0.0  | 0.677     | 12.1        | LOS A            | 8.2               | 57.7     | 0.54      | 0.54                | 0.55             | 45.4        |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

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

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |          |           |             |                  |                       |          |           |                     |             |              |             |
|---------------------------------|----------|-----------|-------------|------------------|-----------------------|----------|-----------|---------------------|-------------|--------------|-------------|
| Mov ID                          | Crossing | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE |          | Prop. Que | Effective Stop Rate | Travel Time | Travel Dist. | Aver. Speed |
|                                 |          | ped/h     | sec         |                  | [ Ped ped             | Dist ] m |           |                     | sec         | m            | m/sec       |
| East: Freeman Drive (E)         |          |           |             |                  |                       |          |           |                     |             |              |             |
| P2                              | Full     | 80        | 29.4        | LOS C            | 0.1                   | 0.1      | 0.92      | 0.92                | 55.4        | 33.9         | 0.61        |
| North: Patrick Drive (N)        |          |           |             |                  |                       |          |           |                     |             |              |             |
| P3                              | Full     | 80        | 13.9        | LOS B            | 0.1                   | 0.1      | 0.63      | 0.63                | 40.0        | 33.9         | 0.85        |
| West: Freeman Drive (W)         |          |           |             |                  |                       |          |           |                     |             |              |             |
| P4                              | Full     | 80        | 29.4        | LOS C            | 0.1                   | 0.1      | 0.92      | 0.92                | 55.4        | 33.9         | 0.61        |
| All Pedestrians                 |          | 240       | 24.2        | LOS C            | 0.1                   | 0.1      | 0.82      | 0.82                | 50.3        | 33.9         | 0.67        |

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.



**ANNEXURE B: ALTON/CENTRAL SIDRA RESULTS  
(10 SHEETS)**

## CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [CCGName]

■ ■ Network: N101 [AM Peak  
(Network Folder: Alton Layout  
Testing)]

EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 95 seconds (Network Optimum Cycle Time - Minimum Delay)

Design Life Analysis: Constant Number of Years = 26

| Vehicle Movement Performance (CCG)                             |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
|----------------------------------------------------------------|------|---------------|-------|---------------|------|-----------|-------------|------------------|-------------------|----------|-----------|---------------------|------------------|-------------|
| Mov ID                                                         | Turn | DEMAND        | FLOWs | ARRIVAL FLOWs |      | Deg. Satn | Aver. Delay | Level of Service | 95% BACK OF QUEUE |          | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed |
|                                                                |      | [ Total veh/h | HV %  | [ Total veh/h | HV % | v/c       | sec         |                  | [ Veh. veh        | Dist ] m |           |                     |                  | km/h        |
| Site: 101 [Alton / Freeman Existing + Development AM - Copy]   |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
| East: Freeman Drive (E)                                        |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 5                                                              | T1   | 1230          | 0.0   | 1230          | 0.0  | *0.968    | 22.9        | LOS B            | 4.7               | 32.6     | 0.63      | 0.72                | 0.81             | 37.1        |
| 6                                                              | R2   | 79            | 0.0   | 79            | 0.0  | 0.968     | 31.3        | LOS C            | 4.7               | 32.6     | 0.89      | 1.03                | 1.16             | 30.7        |
| Approach                                                       |      | 1308          | 0.0   | 1308          | 0.0  | 0.968     | 23.4        | LOS B            | 4.7               | 32.6     | 0.65      | 0.74                | 0.83             | 36.6        |
| North: Alton Road (N)                                          |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 7                                                              | L2   | 96            | 0.0   | 96            | 0.0  | 0.408     | 38.9        | LOS C            | 3.9               | 27.1     | 0.88      | 0.79                | 0.88             | 26.6        |
| 9                                                              | R2   | 359           | 0.0   | 359           | 0.0  | 0.920     | 60.6        | LOS E            | 20.2              | 141.2    | 0.99      | 1.02                | 1.43             | 29.6        |
| Approach                                                       |      | 455           | 0.0   | 455           | 0.0  | 0.920     | 56.0        | LOS D            | 20.2              | 141.2    | 0.96      | 0.97                | 1.31             | 29.2        |
| West: Freeman Drive (W)                                        |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 10                                                             | L2   | 125           | 0.0   | 125           | 0.0  | 0.536     | 18.1        | LOS B            | 10.1              | 71.0     | 0.64      | 0.64                | 0.64             | 47.4        |
| 11                                                             | T1   | 548           | 0.0   | 548           | 0.0  | 0.536     | 12.7        | LOS A            | 10.1              | 71.0     | 0.64      | 0.60                | 0.64             | 41.7        |
| Approach                                                       |      | 673           | 0.0   | 673           | 0.0  | 0.536     | 13.7        | LOS A            | 10.1              | 71.0     | 0.64      | 0.61                | 0.64             | 43.3        |
| All Vehicles                                                   |      | 2436          | 0.0   | 2436          | 0.0  | 0.968     | 26.8        | LOS B            | 20.2              | 141.2    | 0.71      | 0.75                | 0.87             | 35.6        |
| Site: 101 [Central / Freeman Existing + Development AM - Copy] |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
| South: Central                                                 |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 1                                                              | L2   | 47            | 0.0   | 47            | 0.0  | 0.090     | 32.4        | LOS C            | 1.6               | 11.3     | 0.77      | 0.72                | 0.77             | 29.3        |
| 3                                                              | R2   | 36            | 0.0   | 36            | 0.0  | *0.153    | 46.5        | LOS D            | 1.5               | 10.7     | 0.92      | 0.73                | 0.92             | 23.9        |
| Approach                                                       |      | 83            | 0.0   | 83            | 0.0  | 0.153     | 38.4        | LOS C            | 1.6               | 11.3     | 0.83      | 0.72                | 0.83             | 26.7        |
| East: Freeman Drive (E)                                        |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 4                                                              | L2   | 99            | 0.0   | 99            | 0.0  | 0.814     | 23.3        | LOS B            | 32.8              | 229.5    | 0.83      | 0.80                | 0.86             | 44.6        |
| 5                                                              | T1   | 1258          | 0.0   | 1258          | 0.0  | 0.814     | 20.4        | LOS B            | 41.8              | 292.3    | 0.84      | 0.82                | 0.91             | 34.3        |
| Approach                                                       |      | 1357          | 0.0   | 1357          | 0.0  | 0.814     | 20.6        | LOS B            | 41.8              | 292.3    | 0.84      | 0.82                | 0.90             | 35.5        |
| West: Freeman Drive (W)                                        |      |               |       |               |      |           |             |                  |                   |          |           |                     |                  |             |
| 11                                                             | T1   | 543           | 0.0   | 543           | 0.0  | 0.830     | 8.7         | LOS A            | 4.7               | 32.6     | 0.43      | 0.39                | 0.46             | 11.2        |
| 12                                                             | R2   | 145           | 0.0   | 145           | 0.0  | *0.830    | 30.9        | LOS C            | 4.7               | 32.6     | 1.00      | 0.93                | 1.18             | 30.2        |
| Approach                                                       |      | 689           | 0.0   | 689           | 0.0  | 0.830     | 13.4        | LOS A            | 4.7               | 32.6     | 0.55      | 0.50                | 0.61             | 22.9        |
| All Vehicles                                                   |      | 2129          | 0.0   | 2129          | 0.0  | 0.830     | 19.0        | LOS B            | 41.8              | 292.3    | 0.75      | 0.72                | 0.81             | 32.8        |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

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

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

- \* Critical Movement (Signal Timing)

| Pedestrian Movement Performance (CCG) |          |           |             |                  |                       |           |                |             |             |             |
|---------------------------------------|----------|-----------|-------------|------------------|-----------------------|-----------|----------------|-------------|-------------|-------------|
| Mov ID                                | Crossing | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE | Prop. Que | Effective Stop | Travel Time | Travel Dist | Aver. Speed |

|                                                                | ped/h | sec  |       | [ Ped<br>ped | Dist ]<br>m |      | Rate |      | sec  | m    | m/sec |
|----------------------------------------------------------------|-------|------|-------|--------------|-------------|------|------|------|------|------|-------|
| Site: 101 [Alton / Freeman Existing + Development AM - Copy]   |       |      |       |              |             |      |      |      |      |      |       |
| East: Freeman Drive (E)                                        |       |      |       |              |             |      |      |      |      |      |       |
| P2 Full                                                        | 80    | 41.8 | LOS E | 0.2          | 0.2         | 0.94 | 0.94 | 70.4 | 37.2 | 0.53 |       |
| North: Alton Road (N)                                          |       |      |       |              |             |      |      |      |      |      |       |
| P3 Full                                                        | 80    | 11.2 | LOS B | 0.1          | 0.1         | 0.49 | 0.49 | 35.7 | 31.9 | 0.89 |       |
| West: Freeman Drive (W)                                        |       |      |       |              |             |      |      |      |      |      |       |
| P4 Full                                                        | 80    | 41.8 | LOS E | 0.2          | 0.2         | 0.94 | 0.94 | 70.4 | 37.2 | 0.53 |       |
| All Pedestrians                                                | 240   | 31.6 | LOS D | 0.2          | 0.2         | 0.79 | 0.79 | 58.9 | 35.4 | 0.60 |       |
| Site: 101 [Central / Freeman Existing + Development AM - Copy] |       |      |       |              |             |      |      |      |      |      |       |
| South: Central                                                 |       |      |       |              |             |      |      |      |      |      |       |
| P1 Full                                                        | 80    | 11.2 | LOS B | 0.1          | 0.1         | 0.49 | 0.49 | 35.7 | 31.9 | 0.89 |       |
| East: Freeman Drive (E)                                        |       |      |       |              |             |      |      |      |      |      |       |
| P2 Full                                                        | 80    | 41.8 | LOS E | 0.2          | 0.2         | 0.94 | 0.94 | 70.4 | 37.2 | 0.53 |       |
| All Pedestrians                                                | 160   | 26.5 | LOS C | 0.2          | 0.2         | 0.71 | 0.71 | 53.1 | 34.6 | 0.65 |       |

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

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Modified to Council Design.sip9

## CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [CCGName]

■ ■ Network: N101 [PM Peak  
(Network Folder: Alton Layout  
Testing)]

EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Optimum Cycle Time - Minimum Delay)

Design Life Analysis: Constant Number of Years = 26

| Vehicle Movement Performance (CCG)                             |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
|----------------------------------------------------------------|------|---------------|------|--------------------|-----|-----------|-------------|------------------|-------------------|----------|-----------|---------------------|------------------|-------------|
| Mov ID                                                         | Turn | DEMAND FLOWS  |      | ARRIVAL FLOWS      |     | Deg. Satn | Aver. Delay | Level of Service | 95% BACK OF QUEUE |          | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed |
|                                                                |      | [ Total veh/h | HV % | [ Total HV ] veh/h | %   |           |             |                  | [ Veh. veh        | Dist ] m |           |                     |                  |             |
| Site: 101 [Alton / Freeman Existing + Development PM - Copy]   |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
| East: Freeman Drive (E)                                        |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
| 5                                                              | T1   | 609           | 0.0  | 609                | 0.0 | *0.778    | 14.3        | LOS A            | 4.7               | 32.6     | 0.64      | 0.59                | 0.70             | 41.6        |
| 6                                                              | R2   | 87            | 0.0  | 87                 | 0.0 | 0.778     | 28.6        | LOS C            | 4.7               | 32.6     | 0.97      | 0.93                | 1.11             | 31.8        |
| Approach                                                       |      | 696           | 0.0  | 696                | 0.0 | 0.778     | 16.1        | LOS B            | 4.7               | 32.6     | 0.68      | 0.63                | 0.75             | 40.1        |
| North: Alton Road (N)                                          |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
| 7                                                              | L2   | 83            | 0.0  | 83                 | 0.0 | 0.345     | 36.3        | LOS C            | 2.7               | 18.9     | 0.94      | 0.76                | 0.94             | 27.6        |
| 9                                                              | R2   | 110           | 0.0  | 110                | 0.0 | 0.414     | 36.5        | LOS C            | 3.6               | 25.2     | 0.95      | 0.78                | 0.95             | 36.7        |
| Approach                                                       |      | 193           | 0.0  | 193                | 0.0 | 0.414     | 36.4        | LOS C            | 3.6               | 25.2     | 0.95      | 0.77                | 0.95             | 33.7        |
| West: Freeman Drive (W)                                        |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
| 10                                                             | L2   | 319           | 0.0  | 319                | 0.0 | 0.769     | 16.7        | LOS B            | 22.1              | 155.0    | 0.78      | 0.78                | 0.80             | 48.2        |
| 11                                                             | T1   | 1028          | 0.0  | 1028               | 0.0 | 0.769     | 12.7        | LOS A            | 22.1              | 155.0    | 0.77      | 0.77                | 0.84             | 41.4        |
| Approach                                                       |      | 1347          | 0.0  | 1347               | 0.0 | 0.769     | 13.7        | LOS A            | 22.1              | 155.0    | 0.77      | 0.77                | 0.83             | 43.8        |
| All Vehicles                                                   |      | 2236          | 0.0  | 2236               | 0.0 | 0.778     | 16.4        | LOS B            | 22.1              | 155.0    | 0.76      | 0.73                | 0.81             | 41.4        |
| Site: 101 [Central / Freeman Existing + Development PM - Copy] |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
| South: Central                                                 |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
| 1                                                              | L2   | 108           | 0.0  | 108                | 0.0 | *0.629    | 37.5        | LOS C            | 3.8               | 26.8     | 0.97      | 0.85                | 1.09             | 25.6        |
| 3                                                              | R2   | 78            | 0.0  | 78                 | 0.0 | 0.294     | 35.8        | LOS C            | 2.5               | 17.5     | 0.93      | 0.76                | 0.93             | 26.2        |
| Approach                                                       |      | 186           | 0.0  | 186                | 0.0 | 0.629     | 36.8        | LOS C            | 3.8               | 26.8     | 0.95      | 0.81                | 1.02             | 25.9        |
| East: Freeman Drive (E)                                        |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
| 4                                                              | L2   | 28            | 0.0  | 28                 | 0.0 | 0.553     | 13.8        | LOS A            | 7.7               | 53.6     | 0.66      | 0.60                | 0.66             | 50.5        |
| 5                                                              | T1   | 676           | 0.0  | 676                | 0.0 | 0.553     | 8.2         | LOS A            | 7.7               | 53.6     | 0.66      | 0.59                | 0.66             | 46.0        |
| Approach                                                       |      | 704           | 0.0  | 704                | 0.0 | 0.553     | 8.5         | LOS A            | 7.7               | 53.6     | 0.66      | 0.59                | 0.66             | 46.3        |
| West: Freeman Drive (W)                                        |      |               |      |                    |     |           |             |                  |                   |          |           |                     |                  |             |
| 11                                                             | T1   | 1059          | 0.0  | 1059               | 0.0 | 0.755     | 5.0         | LOS A            | 4.7               | 32.6     | 0.36      | 0.35                | 0.37             | 19.3        |
| 12                                                             | R2   | 69            | 0.0  | 69                 | 0.0 | 0.755     | 7.1         | LOS A            | 4.7               | 32.6     | 0.42      | 0.42                | 0.44             | 49.2        |
| Approach                                                       |      | 1128          | 0.0  | 1128               | 0.0 | 0.755     | 5.2         | LOS A            | 4.7               | 32.6     | 0.37      | 0.36                | 0.38             | 27.4        |
| All Vehicles                                                   |      | 2019          | 0.0  | 2019               | 0.0 | 0.755     | 9.2         | LOS A            | 7.7               | 53.6     | 0.52      | 0.48                | 0.53             | 37.5        |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

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

Delay Model: SIDRA Standard (Geometric Delay is included).

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

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

- \* Critical Movement (Signal Timing)

| Pedestrian Movement Performance (CCG) |          |           |             |                  |                       |           |                |             |             |             |
|---------------------------------------|----------|-----------|-------------|------------------|-----------------------|-----------|----------------|-------------|-------------|-------------|
| Mov ID                                | Crossing | Dem. Flow | Aver. Delay | Level of Service | AVERAGE BACK OF QUEUE | Prop. Que | Effective Stop | Travel Time | Travel Dist | Aver. Speed |

|                                                                | ped/h | sec  |       | [ Ped<br>ped | Dist ]<br>m |      | Rate |      | sec  | m    | m/sec |
|----------------------------------------------------------------|-------|------|-------|--------------|-------------|------|------|------|------|------|-------|
| Site: 101 [Alton / Freeman Existing + Development PM - Copy]   |       |      |       |              |             |      |      |      |      |      |       |
| East: Freeman Drive (E)                                        |       |      |       |              |             |      |      |      |      |      |       |
| P2 Full                                                        | 80    | 29.4 | LOS C | 0.1          | 0.1         | 0.92 | 0.92 | 58.0 | 37.2 | 0.64 |       |
| North: Alton Road (N)                                          |       |      |       |              |             |      |      |      |      |      |       |
| P3 Full                                                        | 80    | 7.3  | LOS A | 0.1          | 0.1         | 0.46 | 0.46 | 31.9 | 31.9 | 1.00 |       |
| West: Freeman Drive (W)                                        |       |      |       |              |             |      |      |      |      |      |       |
| P4 Full                                                        | 80    | 29.4 | LOS C | 0.1          | 0.1         | 0.92 | 0.92 | 58.0 | 37.2 | 0.64 |       |
| All Pedestrians                                                | 240   | 22.0 | LOS C | 0.1          | 0.1         | 0.76 | 0.76 | 49.3 | 35.4 | 0.72 |       |
| Site: 101 [Central / Freeman Existing + Development PM - Copy] |       |      |       |              |             |      |      |      |      |      |       |
| South: Central                                                 |       |      |       |              |             |      |      |      |      |      |       |
| P1 Full                                                        | 80    | 7.3  | LOS A | 0.1          | 0.1         | 0.46 | 0.46 | 31.9 | 31.9 | 1.00 |       |
| East: Freeman Drive (E)                                        |       |      |       |              |             |      |      |      |      |      |       |
| P2 Full                                                        | 80    | 29.4 | LOS C | 0.1          | 0.1         | 0.92 | 0.92 | 58.0 | 37.2 | 0.64 |       |
| All Pedestrians                                                | 160   | 18.3 | LOS B | 0.1          | 0.1         | 0.69 | 0.69 | 44.9 | 34.6 | 0.77 |       |

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

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Modified to Council Design.sip9

# CCG LANE SUMMARY

Common Control Group: CCG1 [CCGName]

Network: N101 [PM Peak  
(Network Folder: Alton Layout  
Testing)]

EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Optimum Cycle Time - Minimum Delay)

Design Life Analysis: Constant Number of Years = 26

| Lane Use and Performance (CCG)                                 |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
|----------------------------------------------------------------|--------------|------|---------------|------|-------|-----------|-----------------|-------------|------------------|-------------------|--------------------|-------------|-------------|---------------------|--------------|
|                                                                | DEMAND FLOWS |      | ARRIVAL FLOWS |      | Cap.  | Deg. Satn | Lane Util.      | Aver. Delay | Level of Service | 95% BACK OF QUEUE |                    | Lane Config | Lane Length | Cap. Adj.           | Prob. Block. |
|                                                                | [ Total      | HV ] | [ Total       | HV ] |       |           |                 |             |                  | [ Veh             | Dist ]             |             |             |                     |              |
|                                                                | veh/h        | %    | veh/h         | %    | veh/h | v/c       | %               | sec         |                  |                   | m                  |             | m           | %                   | %            |
| Site: 101 [Alton / Freeman Existing + Development PM - Copy]   |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
| East: Freeman Drive (E)                                        |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
| Lane 1                                                         | 367          | 0.0  | 367           | 0.0  | 1254  | 0.293     | 38 <sup>6</sup> | 6.7         | LOS A            | 4.7 <sup>N4</sup> | 32.6 <sup>N4</sup> | Full        | 20          | 0.0                 | 50.0         |
| Lane 2                                                         | 329          | 0.0  | 329           | 0.0  | 423   | 0.778     | 100             | 26.6        | LOS B            | 4.7 <sup>N4</sup> | 32.6 <sup>N4</sup> | Full        | 20          | 0.0                 | 50.0         |
| Approach                                                       | 696          | 0.0  | 696           | 0.0  |       | 0.778     |                 | 16.1        | LOS B            | 4.7               | 32.6               |             |             |                     |              |
| North: Alton Road (N)                                          |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
| Lane 1                                                         | 83           | 0.0  | 83            | 0.0  | 241   | 0.345     | 100             | 36.3        | LOS C            | 2.7               | 18.9               | Short (P)   | 40          | -9.2 <sup>N3</sup>  | NA           |
| Lane 2                                                         | 110          | 0.0  | 110           | 0.0  | 265   | 0.414     | 100             | 36.5        | LOS C            | 3.6               | 25.2               | Full        | 500         | 0.0                 | 0.0          |
| Approach                                                       | 193          | 0.0  | 193           | 0.0  |       | 0.414     |                 | 36.4        | LOS C            | 3.6               | 25.2               |             |             |                     |              |
| West: Freeman Drive (W)                                        |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
| Lane 1                                                         | 864          | 0.0  | 864           | 0.0  | 1123  | 0.769     | 100             | 13.2        | LOS A            | 22.1              | 155.0              | Short       | 110         | -6.0 <sup>N3</sup>  | NA           |
| Lane 2                                                         | 482          | 0.0  | 482           | 0.0  | 627   | 0.769     | 100             | 14.5        | LOS B            | 13.9              | 97.4               | Full        | 500         | -50.0 <sup>N3</sup> | 0.0          |
| Approach                                                       | 1347         | 0.0  | 1347          | 0.0  |       | 0.769     |                 | 13.7        | LOS A            | 22.1              | 155.0              |             |             |                     |              |
| Intersection                                                   | 2236         | 0.0  | 2236          | 0.0  |       | 0.778     |                 | 16.4        | LOS B            | 22.1              | 155.0              |             |             |                     |              |
| Site: 101 [Central / Freeman Existing + Development PM - Copy] |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
| South: Central                                                 |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
| Lane 1                                                         | 108          | 0.0  | 108           | 0.0  | 172   | 0.629     | 100             | 37.5        | LOS C            | 3.8               | 26.8               | Full        | 450         | -50.0 <sup>N3</sup> | 0.0          |
| Lane 2                                                         | 78           | 0.0  | 78            | 0.0  | 265   | 0.294     | 100             | 35.8        | LOS C            | 2.5               | 17.5               | Full        | 450         | 0.0                 | 0.0          |
| Approach                                                       | 186          | 0.0  | 186           | 0.0  |       | 0.629     |                 | 36.8        | LOS C            | 3.8               | 26.8               |             |             |                     |              |
| East: Freeman Drive (E)                                        |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
| Lane 1                                                         | 357          | 0.0  | 357           | 0.0  | 646   | 0.553     | 100             | 8.7         | LOS A            | 7.7               | 53.6               | Short       | 120         | -47.9 <sup>N3</sup> | NA           |
| Lane 2                                                         | 347          | 0.0  | 347           | 0.0  | 627   | 0.553     | 100             | 8.2         | LOS A            | 7.4               | 52.1               | Full        | 450         | -50.0 <sup>N3</sup> | 0.0          |
| Approach                                                       | 704          | 0.0  | 704           | 0.0  |       | 0.553     |                 | 8.5         | LOS A            | 7.7               | 53.6               |             |             |                     |              |
| West: Freeman Drive (W)                                        |              |      |               |      |       |           |                 |             |                  |                   |                    |             |             |                     |              |
| Lane 1                                                         | 377          | 0.0  | 377           | 0.0  | 1254  | 0.301     | 40 <sup>6</sup> | 6.2         | LOS A            | 3.1               | 21.5               | Full        | 20          | 0.0                 | 11.7         |
| Lane 2                                                         | 751          | 0.0  | 751           | 0.0  | 996   | 0.755     | 100             | 4.6         | LOS A            | 4.7 <sup>N4</sup> | 32.6 <sup>N4</sup> | Full        | 20          | 0.0                 | 50.0         |
| Approach                                                       | 1128         | 0.0  | 1128          | 0.0  |       | 0.755     |                 | 5.2         | LOS A            | 4.7               | 32.6               |             |             |                     |              |
| Intersection                                                   | 2019         | 0.0  | 2019          | 0.0  |       | 0.755     |                 | 9.2         | LOS A            | 7.7               | 53.6               |             |             |                     |              |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

<sup>6</sup> Lane under-utilisation due to downstream effects

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

N4 Average back of queue has been restricted to the available queue storage space.

| Approach Lane Flows (CCG) (veh/h)                              |         |         |       |       |               |                     |                    |                      |                    |  |
|----------------------------------------------------------------|---------|---------|-------|-------|---------------|---------------------|--------------------|----------------------|--------------------|--|
| Site: 101 [Alton / Freeman Existing + Development PM - Copy]   |         |         |       |       |               |                     |                    |                      |                    |  |
| East: Freeman Drive (E)                                        |         |         |       |       |               |                     |                    |                      |                    |  |
| Mov.<br>From E<br>To Exit:                                     | T1<br>W | R2<br>N | Total | %HV   | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 367     | -       | 367   | 0.0   | 1254          | 0.293               | 38 <sup>6</sup>    | NA                   | NA                 |  |
| Lane 2                                                         | 242     | 87      | 329   | 0.0   | 423           | 0.778               | 100                | NA                   | NA                 |  |
| Approach                                                       | 609     | 87      | 696   | 0.0   |               | 0.778               |                    |                      |                    |  |
| North: Alton Road (N)                                          |         |         |       |       |               |                     |                    |                      |                    |  |
| Mov.<br>From N<br>To Exit:                                     | L2<br>E | R2<br>W | Total | %HV   | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 83      | -       | 83    | 0.0   | 241           | 0.345               | 100                | 0.0                  | 2                  |  |
| Lane 2                                                         | -       | 110     | 110   | 0.0   | 265           | 0.414               | 100                | NA                   | NA                 |  |
| Approach                                                       | 83      | 110     | 193   | 0.0   |               | 0.414               |                    |                      |                    |  |
| West: Freeman Drive (W)                                        |         |         |       |       |               |                     |                    |                      |                    |  |
| Mov.<br>From W<br>To Exit:                                     | L2<br>N | T1<br>E | Total | %HV   | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 319     | 546     | 864   | 0.0   | 1123          | 0.769               | 100                | 36.3                 | 2                  |  |
| Lane 2                                                         | -       | 482     | 482   | 0.0   | 627           | 0.769               | 100                | NA                   | NA                 |  |
| Approach                                                       | 319     | 1028    | 1347  | 0.0   |               | 0.769               |                    |                      |                    |  |
| Total %HV Deg.Satn (v/c)                                       |         |         |       |       |               |                     |                    |                      |                    |  |
| Intersection                                                   | 2236    | 0.0     |       | 0.778 |               |                     |                    |                      |                    |  |
| Site: 101 [Central / Freeman Existing + Development PM - Copy] |         |         |       |       |               |                     |                    |                      |                    |  |
| South: Central                                                 |         |         |       |       |               |                     |                    |                      |                    |  |
| Mov.<br>From S<br>To Exit:                                     | L2<br>W | R2<br>E | Total | %HV   | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 108     | -       | 108   | 0.0   | 172           | 0.629               | 100                | NA                   | NA                 |  |
| Lane 2                                                         | -       | 78      | 78    | 0.0   | 265           | 0.294               | 100                | NA                   | NA                 |  |
| Approach                                                       | 108     | 78      | 186   | 0.0   |               | 0.629               |                    |                      |                    |  |
| East: Freeman Drive (E)                                        |         |         |       |       |               |                     |                    |                      |                    |  |
| Mov.<br>From E<br>To Exit:                                     | L2<br>S | T1<br>W | Total | %HV   | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 28      | 329     | 357   | 0.0   | 646           | 0.553               | 100                | 0.0                  | 2                  |  |
| Lane 2                                                         | -       | 347     | 347   | 0.0   | 627           | 0.553               | 100                | NA                   | NA                 |  |
| Approach                                                       | 28      | 676     | 704   | 0.0   |               | 0.553               |                    |                      |                    |  |
| West: Freeman Drive (W)                                        |         |         |       |       |               |                     |                    |                      |                    |  |
| Mov.<br>From W<br>To Exit:                                     | T1<br>E | R2<br>S | Total | %HV   | Cap.<br>veh/h | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 377     | -       | 377   | 0.0   | 1254          | 0.301               | 40 <sup>6</sup>    | NA                   | NA                 |  |
| Lane 2                                                         | 682     | 69      | 751   | 0.0   | 996           | 0.755               | 100                | NA                   | NA                 |  |



|                          |      |     |       |     |       |
|--------------------------|------|-----|-------|-----|-------|
| Approach                 | 1059 | 69  | 1128  | 0.0 | 0.755 |
| Total %HV Deg.Satn (v/c) |      |     |       |     |       |
| Intersection             | 2019 | 0.0 | 0.755 |     |       |

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

#### 6 Lane under-utilisation due to downstream effects

| Merge Analysis (CCG)                                           |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
|----------------------------------------------------------------|------------------|-----------------------------|------------------------|---------------------------|--------------------------|------------------|-----------------------|----------------------|----------------|---------------|----------------|-----------------|
|                                                                | Exit Lane Number | Short Lane Length m         | Percent Opng in Lane % | veh/h                     | Opposing Flow Rate pcu/h | Critical Gap sec | Follow-up Headway sec | Lane Flow Rate veh/h | Capacity veh/h | Deg. Satn v/c | Min. Delay sec | Merge Delay sec |
| Site: 101 [Alton / Freeman Existing + Development PM - Copy]   |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| East Exit: Freeman Drive (E)                                   |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Not Applied</b>                                 |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 1                | Merge Analysis not applied. |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 2                | Merge Analysis not applied. |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| North Exit: Alton Road (N)                                     |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Not Applied</b>                                 |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 1                | Merge Analysis not applied. |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| West Exit: Freeman Drive (W)                                   |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Priority</b>                                    |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Exit Short Lane                                                | 1                | 65                          | 0.0                    | 352                       | 352                      | 3.00             | 2.00                  | 367                  | 1442           | 0.255         | 0.5            | 0.8             |
| Merge Lane                                                     | 2                | -                           | 100.0                  | Merge Lane is not Opposed |                          |                  |                       | 352                  | 1800           | 0.195         | 0.0            | 0.0             |
| Site: 101 [Central / Freeman Existing + Development PM - Copy] |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| South Exit: Central                                            |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Not Applied</b>                                 |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 1                | Merge Analysis not applied. |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| East Exit: Freeman Drive (E)                                   |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Priority</b>                                    |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Exit Short Lane                                                | 1                | 70                          | 0.0                    | 760                       | 760                      | 3.00             | 2.00                  | 377                  | 1011           | 0.373         | 1.6            | 2.8             |
| Merge Lane                                                     | 2                | -                           | 100.0                  | Merge Lane is not Opposed |                          |                  |                       | 760                  | 1800           | 0.422         | 0.0            | 0.0             |
| West Exit: Freeman Drive (W)                                   |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Not Applied</b>                                 |                  |                             |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 1                | Merge Analysis not applied. |                        |                           |                          |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 2                | Merge Analysis not applied. |                        |                           |                          |                  |                       |                      |                |               |                |                 |

# CCG LANE SUMMARY

Common Control Group: CCG1 [CCGName]

Network: N101 [AM Peak  
(Network Folder: Alton Layout  
Testing)]

EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 95 seconds (Network Optimum Cycle Time - Minimum Delay)

Design Life Analysis: Constant Number of Years = 26

| Lane Use and Performance (CCG)                                 |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
|----------------------------------------------------------------|--------------|------|---------------|------|------------------|-----------|-----------------|-------------|------------------|--------------------|---------------------|-------------|-------------|---------------------|--------------|
|                                                                | DEMAND FLOWS |      | ARRIVAL FLOWS |      | Cap.             | Deg. Satn | Lane Util.      | Aver. Delay | Level of Service | 95% BACK OF QUEUE  |                     | Lane Config | Lane Length | Cap. Adj.           | Prob. Block. |
|                                                                | [ Total      | HV ] | [ Total       | HV ] |                  |           |                 |             |                  | [ Veh              | Dist ]              |             |             |                     |              |
|                                                                | veh/h        | %    | veh/h         | %    | veh/h            | v/c       | %               | sec         |                  |                    | m                   |             | m           | %                   | %            |
| Site: 101 [Alton / Freeman Existing + Development AM - Copy]   |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
| East: Freeman Drive (E)                                        |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
| Lane 1                                                         | 419          | 0.0  | 419           | 0.0  | 1149             | 0.364     | 38 <sup>6</sup> | 11.9        | LOS A            | 2.5                | 17.6                | Full        | 20          | 0.0                 | 0.0          |
| Lane 2                                                         | 890          | 0.0  | 890           | 0.0  | 919              | 0.968     | 100             | 28.8        | LOS C            | 4.7 <sup>N4</sup>  | 32.6 <sup>N4</sup>  | Full        | 20          | 0.0                 | 50.0         |
| Approach                                                       | 1308         | 0.0  | 1308          | 0.0  |                  | 0.968     |                 | 23.4        | LOS B            | 4.7                | 32.6                |             |             |                     |              |
| North: Alton Road (N)                                          |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
| Lane 1                                                         | 96           | 0.0  | 96            | 0.0  | 235              | 0.408     | 100             | 38.9        | LOS C            | 3.9                | 27.1                | Short (P)   | 40          | -50.0 <sup>N3</sup> | NA           |
| Lane 2                                                         | 359          | 0.0  | 359           | 0.0  | 390 <sup>1</sup> | 0.920     | 100             | 60.6        | LOS E            | 20.2               | 141.2               | Full        | 500         | 0.0                 | 0.0          |
| Approach                                                       | 455          | 0.0  | 455           | 0.0  |                  | 0.920     |                 | 56.0        | LOS D            | 20.2               | 141.2               |             |             |                     |              |
| West: Freeman Drive (W)                                        |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
| Lane 1                                                         | 365          | 0.0  | 365           | 0.0  | 682              | 0.536     | 100             | 14.5        | LOS A            | 10.1               | 71.0                | Short       | 110         | -39.6 <sup>N3</sup> | NA           |
| Lane 2                                                         | 308          | 0.0  | 308           | 0.0  | 575              | 0.536     | 100             | 12.8        | LOS A            | 8.7                | 60.8                | Full        | 500         | -50.0 <sup>N3</sup> | 0.0          |
| Approach                                                       | 673          | 0.0  | 673           | 0.0  |                  | 0.536     |                 | 13.7        | LOS A            | 10.1               | 71.0                |             |             |                     |              |
| Intersection                                                   | 2436         | 0.0  | 2436          | 0.0  |                  | 0.968     |                 | 26.8        | LOS B            | 20.2               | 141.2               |             |             |                     |              |
| Site: 101 [Central / Freeman Existing + Development AM - Copy] |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
| South: Central                                                 |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
| Lane 1                                                         | 47           | 0.0  | 47            | 0.0  | 528              | 0.090     | 100             | 32.4        | LOS C            | 1.6                | 11.3                | Full        | 500         | 0.0                 | 0.0          |
| Lane 2                                                         | 36           | 0.0  | 36            | 0.0  | 235              | 0.153     | 100             | 46.5        | LOS D            | 1.5                | 10.7                | Full        | 500         | 0.0                 | 0.0          |
| Approach                                                       | 83           | 0.0  | 83            | 0.0  |                  | 0.153     |                 | 38.4        | LOS C            | 1.6                | 11.3                |             |             |                     |              |
| East: Freeman Drive (E)                                        |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
| Lane 1                                                         | 889          | 0.0  | 889           | 0.0  | 1093             | 0.814     | 100             | 18.3        | LOS B            | 32.8               | 229.5               | Short       | 120         | 0.0                 | NA           |
| Lane 2                                                         | 468          | 0.0  | 468           | 0.0  | 575              | 0.814     | 100             | 25.0        | LOS B            | 41.8 <sup>N5</sup> | 292.3 <sup>N5</sup> | Full        | 450         | -50.0 <sup>N3</sup> | 0.0          |
| Approach                                                       | 1357         | 0.0  | 1357          | 0.0  |                  | 0.814     |                 | 20.6        | LOS B            | 41.8               | 292.3               |             |             |                     |              |
| West: Freeman Drive (W)                                        |              |      |               |      |                  |           |                 |             |                  |                    |                     |             |             |                     |              |
| Lane 1                                                         | 462          | 0.0  | 462           | 0.0  | 1396             | 0.331     | 40 <sup>6</sup> | 5.2         | LOS A            | 4.7 <sup>N4</sup>  | 32.6 <sup>N4</sup>  | Full        | 20          | 0.0                 | 50.0         |
| Lane 2                                                         | 227          | 0.0  | 227           | 0.0  | 274              | 0.830     | 100             | 29.9        | LOS C            | 4.7 <sup>N4</sup>  | 32.6 <sup>N4</sup>  | Full        | 20          | 0.0                 | 50.0         |
| Approach                                                       | 689          | 0.0  | 689           | 0.0  |                  | 0.830     |                 | 13.4        | LOS A            | 4.7                | 32.6                |             |             |                     |              |
| Intersection                                                   | 2129         | 0.0  | 2129          | 0.0  |                  | 0.830     |                 | 19.0        | LOS B            | 41.8               | 292.3               |             |             |                     |              |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

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

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

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

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

<sup>1</sup> Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at

entry to short lanes are not included.

6 Lane under-utilisation due to downstream effects

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

N4 Average back of queue has been restricted to the available queue storage space.

N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

| Approach Lane Flows (CCG) (veh/h)                              |         |         |       |       |                  |                     |                    |                      |                    |  |
|----------------------------------------------------------------|---------|---------|-------|-------|------------------|---------------------|--------------------|----------------------|--------------------|--|
| Site: 101 [Alton / Freeman Existing + Development AM - Copy]   |         |         |       |       |                  |                     |                    |                      |                    |  |
| East: Freeman Drive (E)                                        |         |         |       |       |                  |                     |                    |                      |                    |  |
| Mov.<br>From E<br>To Exit:                                     | T1<br>W | R2<br>N | Total | %HV   | Cap.<br>veh/h    | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 419     | -       | 419   | 0.0   | 1149             | 0.364               | 38 <sup>6</sup>    | NA                   | NA                 |  |
| Lane 2                                                         | 811     | 79      | 890   | 0.0   | 919              | 0.968               | 100                | NA                   | NA                 |  |
| Approach                                                       | 1230    | 79      | 1308  | 0.0   |                  | 0.968               |                    |                      |                    |  |
| North: Alton Road (N)                                          |         |         |       |       |                  |                     |                    |                      |                    |  |
| Mov.<br>From N<br>To Exit:                                     | L2<br>E | R2<br>W | Total | %HV   | Cap.<br>veh/h    | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 96      | -       | 96    | 0.0   | 235              | 0.408               | 100                | 0.0                  | 2                  |  |
| Lane 2                                                         | -       | 359     | 359   | 0.0   | 390 <sup>1</sup> | 0.920               | 100                | NA                   | NA                 |  |
| Approach                                                       | 96      | 359     | 455   | 0.0   |                  | 0.920               |                    |                      |                    |  |
| West: Freeman Drive (W)                                        |         |         |       |       |                  |                     |                    |                      |                    |  |
| Mov.<br>From W<br>To Exit:                                     | L2<br>N | T1<br>E | Total | %HV   | Cap.<br>veh/h    | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 125     | 240     | 365   | 0.0   | 682              | 0.536               | 100                | 0.0                  | 2                  |  |
| Lane 2                                                         | -       | 308     | 308   | 0.0   | 575              | 0.536               | 100                | NA                   | NA                 |  |
| Approach                                                       | 125     | 548     | 673   | 0.0   |                  | 0.536               |                    |                      |                    |  |
| Total %HV Deg.Satn (v/c)                                       |         |         |       |       |                  |                     |                    |                      |                    |  |
| Intersection                                                   | 2436    | 0.0     |       | 0.968 |                  |                     |                    |                      |                    |  |
| Site: 101 [Central / Freeman Existing + Development AM - Copy] |         |         |       |       |                  |                     |                    |                      |                    |  |
| South: Central                                                 |         |         |       |       |                  |                     |                    |                      |                    |  |
| Mov.<br>From S<br>To Exit:                                     | L2<br>W | R2<br>E | Total | %HV   | Cap.<br>veh/h    | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 47      | -       | 47    | 0.0   | 528              | 0.090               | 100                | NA                   | NA                 |  |
| Lane 2                                                         | -       | 36      | 36    | 0.0   | 235              | 0.153               | 100                | NA                   | NA                 |  |
| Approach                                                       | 47      | 36      | 83    | 0.0   |                  | 0.153               |                    |                      |                    |  |
| East: Freeman Drive (E)                                        |         |         |       |       |                  |                     |                    |                      |                    |  |
| Mov.<br>From E<br>To Exit:                                     | L2<br>S | T1<br>W | Total | %HV   | Cap.<br>veh/h    | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 99      | 791     | 889   | 0.0   | 1093             | 0.814               | 100                | 65.0                 | 2                  |  |
| Lane 2                                                         | -       | 468     | 468   | 0.0   | 575              | 0.814               | 100                | NA                   | NA                 |  |
| Approach                                                       | 99      | 1258    | 1357  | 0.0   |                  | 0.814               |                    |                      |                    |  |
| West: Freeman Drive (W)                                        |         |         |       |       |                  |                     |                    |                      |                    |  |
| Mov.<br>From W<br>To Exit:                                     | T1<br>E | R2<br>S | Total | %HV   | Cap.<br>veh/h    | Deg.<br>Satn<br>v/c | Lane<br>Util.<br>% | Prob.<br>SL Ov.<br>% | Ov.<br>Lane<br>No. |  |
| Lane 1                                                         | 462     | -       | 462   | 0.0   | 1396             | 0.331               | 40 <sup>6</sup>    | NA                   | NA                 |  |

|                          |      |     |       |     |       |       |     |    |    |
|--------------------------|------|-----|-------|-----|-------|-------|-----|----|----|
| Lane 2                   | 82   | 145 | 227   | 0.0 | 274   | 0.830 | 100 | NA | NA |
| Approach                 | 543  | 145 | 689   | 0.0 | 0.830 |       |     |    |    |
| Total %HV Deg.Satn (v/c) |      |     |       |     |       |       |     |    |    |
| Intersection             | 2129 | 0.0 | 0.830 |     |       |       |     |    |    |

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

- 1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
- 6 Lane under-utilisation due to downstream effects

| Merge Analysis (CCG)                                           |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
|----------------------------------------------------------------|------------------|-----------------------------|------------------------|---------------------------|-----------------|------------------|-----------------------|----------------------|----------------|---------------|----------------|-----------------|
|                                                                | Exit Lane Number | Short Lane Length m         | Percent Opng in Lane % | Opposing Flow Rate veh/h  | Flow Rate pcu/h | Critical Gap sec | Follow-up Headway sec | Lane Flow Rate veh/h | Capacity veh/h | Deg. Satn v/c | Min. Delay sec | Merge Delay sec |
| Site: 101 [Alton / Freeman Existing + Development AM - Copy]   |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| East Exit: Freeman Drive (E)                                   |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Not Applied</b>                                 |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 1                | Merge Analysis not applied. |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 2                | Merge Analysis not applied. |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| North Exit: Alton Road (N)                                     |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Not Applied</b>                                 |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 1                | Merge Analysis not applied. |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| West Exit: Freeman Drive (W)                                   |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Priority</b>                                    |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Exit Short Lane                                                | 1                | 65                          | 0.0                    | 1170                      | 1170            | 3.00             | 2.00                  | 419                  | 578            | 0.725         | 3.9            | 9.5             |
| Merge Lane                                                     | 2                | -                           | 100.0                  | Merge Lane is not Opposed |                 |                  |                       | 1170                 | 1800           | 0.650         | 0.0            | 0.0             |
| Site: 101 [Central / Freeman Existing + Development AM - Copy] |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| South Exit: Central                                            |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Not Applied</b>                                 |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 1                | Merge Analysis not applied. |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| East Exit: Freeman Drive (E)                                   |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Priority</b>                                    |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Exit Short Lane                                                | 1                | 70                          | 0.0                    | 118                       | 118             | 3.00             | 2.00                  | 462                  | 1682           | 0.274         | 0.2            | 0.3             |
| Merge Lane                                                     | 2                | -                           | 100.0                  | Merge Lane is not Opposed |                 |                  |                       | 118                  | 1800           | 0.065         | 0.0            | 0.0             |
| West Exit: Freeman Drive (W)                                   |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Merge Type: <b>Not Applied</b>                                 |                  |                             |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 1                | Merge Analysis not applied. |                        |                           |                 |                  |                       |                      |                |               |                |                 |
| Full Length Lane                                               | 2                | Merge Analysis not applied. |                        |                           |                 |                  |                       |                      |                |               |                |                 |