

MCLAREN TRAFFIC ENGINEERING

Address: Shop 7, 720 Old Princes Highway Sutherland NSW 2232
Postal: P.O Box 66 Sutherland NSW 1499

Telephone: (02) 9521 7199
Fax: +61 2 9521 7199
Web: www.mclarentraffic.com.au
Email: admin@mclarentraffic.com.au

Division of RAMTRANS Australia ABN: 45067491678 RPEQ: 19457

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

22 February 2022

Reference: 211056.01FA

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

TRAFFIC ADVICE ON PLANNING PROPOSAL OF PROPOSED INCREASED LOT YIELD AT WATAGAN PARK SUBDIVISION, COORANBONG

Dear Bryan,

Reference is made to your request to provide high-level traffic advice on the proposal to modify the scale of and form of dwellings in the Watagan Park Urban Release Area (URA). McLaren Traffic Engineering contributed to traffic and transport assessment for the URA most recently as part of the Planning Agreement (dated 12 March 2021, executed June 2021) with Lake Macquarie City Council. A summary of the proposed changes is provided in **Table 1** and is illustrated on a plan in **Annexure A**.

TABLE 1: SUMMARY OF CHANGES COMPARED TO PLANNING AGREEMENT

Scenario	Total Traffic Generation (trips)	Low Density Dwellings/Lots	Medium Density Dwellings	High Density Dwellings	
	AM			1 or 2 Bed	3 Bed
Scale Accommodated as part of PA	1,673	1,878	614	0	0
Proposed Modification	1,927	1,995	198	476	318
Change	+254 (+15%)	+117	-416	+476	+318

An assessment of the proposed changes has been undertaken with reference to the traffic generation rates for low-density dwellings utilised as part of the traffic study underpinning the PA, with the proposed medium and high density dwellings assessed using the Peak Vehicle Trip (PVT) rates suggested by Lake Macquarie City Council. This assessment is detailed in **Section 1**.

In addition to the changes in form and scale of the dwellings, some modifications are proposed to the formation and operation of the roads within and surrounding the town centre. A discussion of the proposed design is provided in **Section 2**.

1 Traffic Assessment

1.1 Traffic Study for PA

The traffic study underpinning the most recently agreed PA included a total traffic generation for the subdivision of 1,673 PVT and included a total yield of 1,878 low-density lots with an external traffic generation of 0.71 PVT per lot and approximately 614 medium-density dwellings with an average PVT of 0.55 per lot (a weighted average based on 0.5 trips per 1 or 2 bedroom dwelling and 0.65 trips per 3+ bedroom dwelling).

SIDRA Intersection 8.0 was used to assess the impacts of the subdivision on key intersections along Freemans Drive between Alton Road and the new access point required under VPA item 17. The intersection of Deaves Road / Freemans Drive was assessed using SIDRA 9 at a later date using the same PVT assumptions. The results of these assessments are summarised in **Table 1**.

1.2 Proposed Modifications

The traffic generation of the proposed modifications have been based on both the rates relied upon for the PA negotiations for low-density dwellings (0.71 trips per dwelling) and the PVT rates suggested by Council for medium and high-density residential dwellings and drawing from their adopted Morisset Contributions Plan (0.45 trips per 1 or 2 bedroom dwelling and 0.575 trips per 3 or more bedroom dwelling). It is noted that the traffic generation rates assumed for the high-density dwellings are conservative and exceed those provided in recent research and typical industry standard generation rates.

Based on the above traffic generation rates, the proposed structure plan and changes to planning provisions to accommodate varied housing form and type, including small lot attached and detached product, townhouses and residential flat buildings across varied building heights will have a traffic generation approximately consistent with that shown in **Table 2**. The scale of yield has been advised by AJ+C as an outcome of the urban design review that has informed the planning proposal.

TABLE 2: TRAFFIC GENERATION – PROPOSED MODIFICATION

Land Use	Type	Scale	Trip Generation Rate	Trips
Low Density Residential Dwellings	N/A	1,995	0.71 per dwelling	1,416
Medium Density Residential Dwellings	1 or 2 Bedroom Dwelling	0	0.45 per dwelling	0
	3+ Bedroom Dwelling	198	0.575 per dwelling	114
High Density Residential Units	1 or 2 Bedroom Dwelling	476	0.45 per dwelling	214
	3+ Bedroom Dwelling	318	0.575 per dwelling	183
Total	-	-	-	1,927

The increased traffic volumes have been applied to the network in SIDRA Intersection 9.0 in order to assess the impacts of the additional PVTs on the external road network. The road formation and intersection treatments used in the modelling were consistent with those used for the PA study, though some minor line marking changes have been made to the Alton Road / Central Road / Freemans Drive intersection to optimise the capacity of this intersection. The intersection layouts modelled are provided in **Annexure B** for reference.

The results of this assessment are summarised in **Table 4**, with the SIDRA output reports provided in **Annexure C**.

TABLE 3: INTERSECTION PERFORMANCE – PA SCALE

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/vehicle)	Level of Service ⁽³⁾	Control Type	Worst Movement	95th Percentile Queue
APPROVED YIELD							
Freemans Drive / Alton Road	AM	0.86	13.1	A	Signals	RT from Alton Road (N)	20.2 veh (141.7m) Freeman Drive (W)
	PM	0.83	14.9	B		RT from Alton Road (N)	28.8 veh (201.7m) Freeman Drive (W)
Central Road / Freemans Drive	AM	0.89	18	B	Signals	RT from Central	52.8 veh (369.6m) Freeman Drive (E)
	PM	0.67	9	A		RT from Central	16.5 veh (115.6m) Freeman Drive (E)
Freemans Drive / Patrick Drive	AM	0.89	34.1	C	Signals	RT from Freeman Drive (E)	33.7 veh (235.8m) Patrick Drive (N)
	PM	0.67	7.5	A		RT from Patrick Drive (N)	6.6 veh (46.2m) Freeman Drive (E)
Avondale S / Freemans Drive	AM	0.40	0.6 (Worst: 23.3)	N/A (Worst: B)	Give Way	RT from Avondale South	0.3 veh (2.1m) Freemans Drive (W)
	PM	0.31	0.7 (Worst: 23.7)	N/A (Worst: B)		RT from Avondale South	0.5 veh (3.8m) Freemans Drive (W)
Freemans Drive / Avondale N	AM	0.82	7.2 (Worst: 36.1)	N/A (Worst: C)	Give Way	RT from Avondale North	6.2 veh (43.7m) Avondale North
	PM	0.59	4.8 (Worst: 25.5)	N/A (Worst: B)		RT from Avondale North	3 veh (21m) Avondale North
Newport Road / Freemans Drive	AM	0.30	3.9 (Worst: 15.3)	N/A (Worst: B)	Give Way	RT from Newport Road	1.3 veh (9m) Newport Road
	PM	0.29	4.1 (Worst: 12.5)	N/A (Worst: A)		RT from Newport Road	1.2 veh (8.4m) Newport Road
Freeman Drive / New Access (VPA 17)	AM	0.76	8.7 (Worst: 18.8)	N/A (Worst: B)	Give Way	RT from New Access (N)	10.5 veh (73.8m) New Access (N)
	PM	0.27	4 (Worst: 15.6)	N/A (Worst: B)		RT from New Access (N)	1.3 veh (8.9m) Freeman Drive (E)
Deaves Road / Freemans Drive	AM	0.89	20.6	B	Signals	RT from Deaves Road	30.3 veh (213.6m) Freemans Drive
	PM	0.89	22.5	B		RT from Freemans Drive	46.7 veh (328.9m) Freemans Drive

NOTES:

- (1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
- (2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
- (3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
- (4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

TABLE 4: INTERSECTION PERFORMANCE – PROPOSED SCALE

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/vehicle)	Level of Service ⁽³⁾	Control Type	Worst Movement	95th Percentile Queue
PROPOSED YIELD							
Freemans Drive / Alton Road	AM	0.98	23.3	B	Signals	RT from Alton Road (N)	14.6 veh (102m) Alton Road (N)
	PM	0.78	15.8	B		LT from Alton Road (N)	22.7 veh (158.6m) Freeman Drive (W)
Central Road / Freemans Drive	AM	0.86	23	B	Signals	RT from Central	36.3 veh (253.9m) Freeman Drive (E)
	PM	0.73	9.6	A		LT from Central	8.2 veh (57.4m) Freeman Drive (E)
Freemans Drive / Patrick Drive	AM	0.91	36	C	Signals	RT from Patrick Drive (N)	37.8 veh (264.9m) Freeman Drive (E)
	PM	0.73	12.9	A		RT from Freeman Drive (E)	8.2 veh (57.6m) Freeman Drive (E)
Avondale S / Freemans Drive	AM	0.43	0.7 (Worst: 25.3)	N/A (Worst: B)	Give Way	RT from Avondale South	0.3 veh (2.3m) Freemans Drive (W)
	PM	0.33	0.7 (Worst: 26.1)	N/A (Worst: B)		RT from Avondale South	0.6 veh (4.2m) Freemans Drive (W)
Freemans Drive / Avondale N	AM	0.92	10.1 (Worst: 55.6)	N/A (Worst: D)	Give Way	RT from Avondale North	9.7 veh (67.7m) Avondale North
	PM	0.60	4.8 (Worst: 25.8)	N/A (Worst: B)		RT from Avondale North	3.1 veh (21.7m) Avondale North
Newport / Freemans Drive	AM	0.32	4.1 (Worst: 16.8)	N/A (Worst: B)	Give Way	RT from Newport Road	1.4 veh (10m) Freemans Drive (W)
	PM	0.30	4.2 (Worst: 13)	N/A (Worst: A)		RT from Newport Road	1.3 veh (8.9m) Newport Road
Freemans Drive / New Access (VPA 17)	AM	0.90	14.3 (Worst: 29.8)	N/A (Worst: C)	Give Way	RT from New Access (N)	20.3 veh (141.8m) New Access (N)
	PM	0.33	4.5 (Worst: 19.1)	N/A (Worst: B)		RT from New Access (N)	1.6 veh (11m) Freeman Drive (E)
Deaves Road / Freemans Drive	AM	0.96	29	C (Worst: F)	Signals	RT from Freemans Drive	38.2 veh (268.9m) Freemans Drive
	PM	0.90	26.8	B (Worst: F)		RT from Freemans Drive	64.6 veh (454.7m) Freemans Drive

NOTES:

- (1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
- (2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
- (3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
- (4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

The results of the modelling indicate that the intersection works committed to under the PA and by Council will maintain an acceptable level of service under the proposed scale of development.

It is also noted that the midblock capacity of Freemans Drive will not be exceeded by the proposed additional yield, though this must be a consideration for any further significant development relying on the Freemans Drive road corridor.

2 Internal Road Network

2.1 Traffic Management in Town Centre Precinct

The proposed modifications to the town centre precinct include several roads along which high traffic volumes would be undesirable. The proposed road network layout in the town centre precinct is depicted in **Figure 1**, and includes the following features designed to redirect traffic flows to and from the external road network around the precinct:

- The roadway (MC11) in between the mixed-use centre and the park is proposed to be one-way (southbound) and constructed as a shared zone in accordance with the TfNSW Technical Direction 2016/001 (TDT 2016/001) and will include the following features:
 - Pavement texture to differentiate it from the surrounding roads;
 - Pavement at the same level as the footpaths, with no kerbs;
 - Traffic calming features to reduce vehicle speeds;
 - Line marked car parking bays;
 - Appropriate signage.
- Threshold treatments are proposed at two locations along MC06 as follows:
 - At the intersection of Cessna Avenue and MC06 to limit traffic flows along MC06 to only traffic travelling to and from the mixed-use centre or the public open spaces.
 - At the extension point of the continuous east / west pedestrian link through the retail centre to provide for a safe crossing location. This threshold will also serve as additional traffic calming and reduce the attractiveness of the route for “rat-running”.

These modifications are designed to reduce the incidence of through traffic using the roads in the town centre and to create a safer environment for pedestrians and cyclists.

2.2 Capacity of Collector Roads

The changes discussed in **Section 2.1** will result in a higher concentration of trips on the road along the northern (Cessna Avenue) and western (Grazier Road) perimeters of the town centre precinct. Each of these roads has been designed with sufficient carriageway width to provide the capacity for the additional traffic volumes.

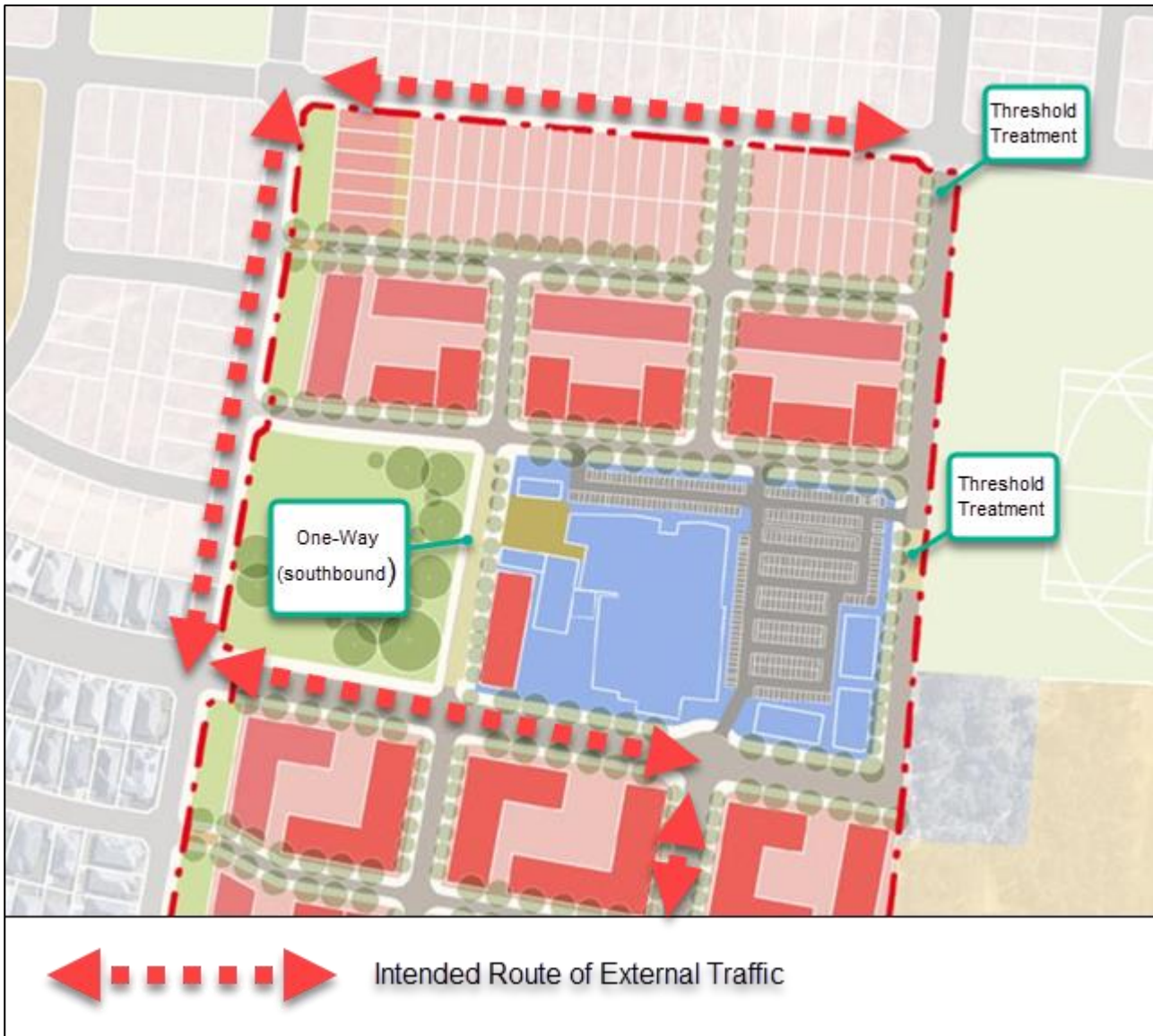


FIGURE 1: TOWN CENTRE PRECINCT

3 Conclusions

The proposed changes to the dwelling yield and composition of the Watagan Park Urban Release Area and its medium density and town centre zoned lands have been considered with regard to the likely impact that the changes might have on the internal and external road network when compared to the yield most recently executed under the PA.

The proposed changes result in a higher total number of dwellings with an increased proportion of medium and high-density forms, which generate less peak hour trips on average than low-density dwellings. As a result, the traffic generation of the subdivision is expected to be 15% greater than that assessed for the recently executed PA.

Modelling of the intersections connecting the urban release area to the external traffic network indicate that the presently planned intersections under the PA and by Council will have sufficient capacity to serve the proposed additional trips.

Changes are proposed to the internal road network within the town centre to provide for a pedestrian and cyclist friendly environment surrounding the town centre and public open spaces. Some trips which previously would have used the roads through the town centre will be added to the roads on the perimeter of the town centre, however these roads will have sufficient midblock capacity to cater to the proposed additional trips.

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: CONCEPT TOWN CENTRE PLANS
(1 SHEET)**

- KEY
- SITE BOUNDARY
 - GREEN SPACE
 - RETAIL PLAZA
 - RETAIL CENTRE
 - RFB INNER RING
 - STRATA TOWNHOUSES
 - TORRENS TOWNHOUSES
 - SMALL LOT DETACHED HOUSING



1:5,000 @ A3





**ANNEXURE B: INTERSECTION LAYOUTS MODELLED
(2 SHEETS)**

SITE LAYOUT

 **Site: 101v [AM Freemans/Deaves - 2500 Lots (14.75 Years Growth) - Import (2) (Site Folder: Deaves - 2% HV - Council Design)]**

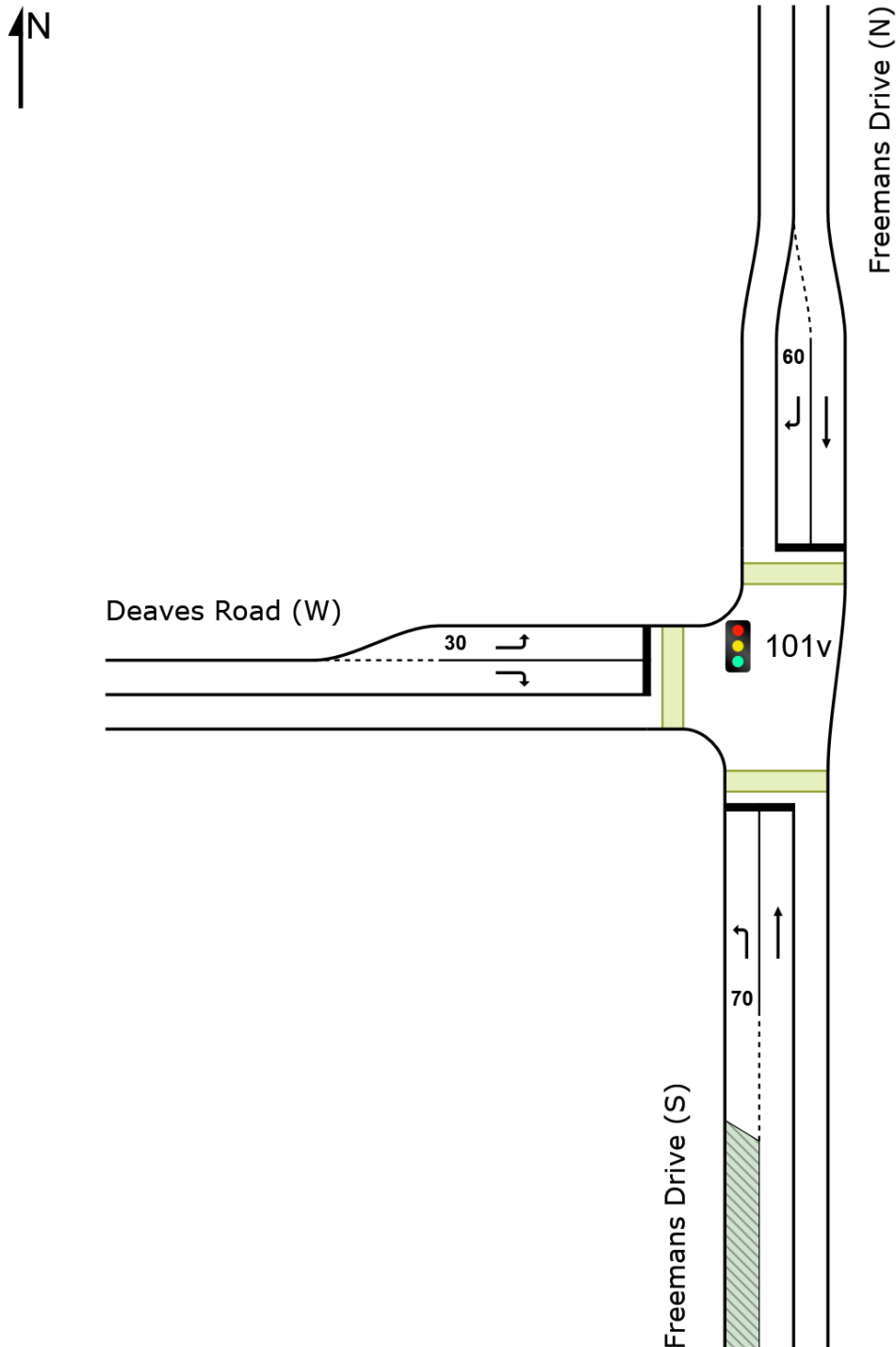
Freemans Drive/Deaves Road

Growth Test - 25 Lots/Year

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

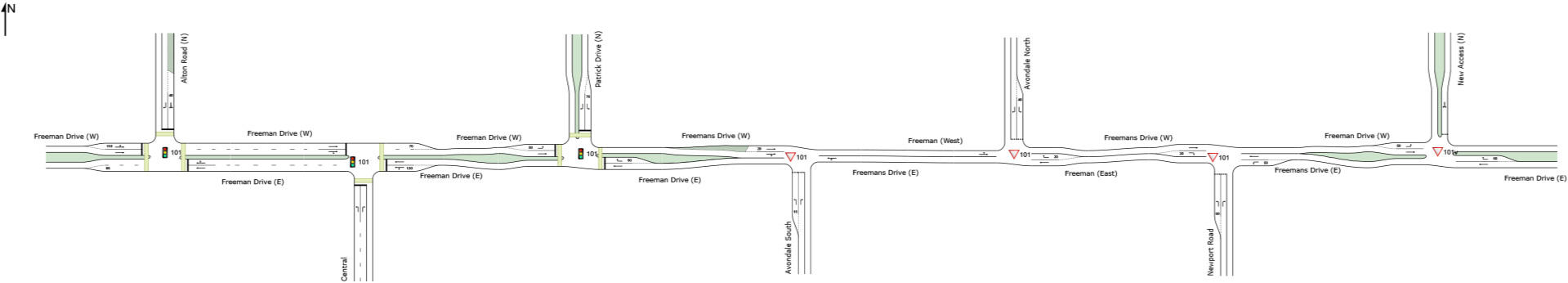


NETWORK LAYOUT

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

Alto / Central
AM Peak Period
Existing + Development
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	CCG ID	Site Name
101	CCG1	Alton / Freeman Existing + Development AM - Copy
101	CCG1	Central / Freeman Existing + Development AM - Copy
101	NA	Patrick Drive / Freeman Drive Existing + Development AM - Copy
101	NA	Avondale South / Freeman Drive Existing + Development AM - Copy
101	NA	Avondale North Existing + Development AM - Copy
101	NA	Newport Road / Freemans Drive AM - Copy
101v	NA	Freemans Drive/New Access (VPA 17) AM - Copy



**ANNEXURE C: SIDRA RESULT REPORTS
(16 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 = 85 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	*0.977	22.1	LOS B	4.7	32.6	0.58	0.69	0.79	37.9
6	R2	79	0.0	79	0.0	0.977	32.5	LOS C	4.7	32.6	0.89	1.09	1.24	30.1
Approach		1308	0.0	1308	0.0	0.977	22.7	LOS B	4.7	32.6	0.59	0.71	0.82	37.3
North: Alton Road (N)														
7	L2	96	0.0	96	0.0	0.381	34.1	LOS C	3.4	23.8	0.86	0.78	0.86	28.6
9	R2	359	0.0	359	0.0	0.785	38.9	LOS C	14.6	102.0	0.95	0.89	1.08	35.9
Approach		455	0.0	455	0.0	0.785	37.9	LOS C	14.6	102.0	0.93	0.87	1.04	34.8
West: Freeman Drive (W)														
10	L2	125	0.0	125	0.0	0.571	19.0	LOS B	10.0	69.7	0.70	0.68	0.70	46.9
11	T1	548	0.0	548	0.0	0.571	13.6	LOS A	10.0	69.7	0.70	0.65	0.70	40.9
Approach		673	0.0	673	0.0	0.571	14.6	LOS B	10.0	69.7	0.70	0.65	0.70	42.6
All Vehicles		2436	0.0	2436	0.0	0.977	23.3	LOS B	14.6	102.0	0.68	0.73	0.83	37.8
Site: 101 [Central / Freeman Existing + Development AM - Copy]														
South: Central														
1	L2	47	0.0	47	0.0	0.083	28.1	LOS B	1.4	9.8	0.74	0.71	0.74	31.4
3	R2	36	0.0	36	0.0	*0.149	42.1	LOS C	1.4	9.5	0.92	0.72	0.92	25.4
Approach		83	0.0	83	0.0	0.149	34.1	LOS C	1.4	9.8	0.82	0.72	0.82	28.5
East: Freeman Drive (E)														
4	L2	99	0.0	99	0.0	0.859	29.3	LOS C	35.9	251.5	0.91	0.92	1.02	41.3
5	T1	1258	0.0	1258	0.0	0.859	26.9	LOS B	36.3	253.9	0.91	0.95	1.08	30.3
Approach		1357	0.0	1357	0.0	0.859	27.1	LOS B	36.3	253.9	0.91	0.95	1.07	31.4
West: Freeman Drive (W)														
11	T1	543	0.0	543	0.0	0.836	9.0	LOS A	4.7	32.6	0.45	0.41	0.49	10.9
12	R2	145	0.0	145	0.0	*0.836	30.5	LOS C	4.7	32.6	1.00	0.93	1.19	30.4
Approach		689	0.0	689	0.0	0.836	13.6	LOS A	4.7	32.6	0.57	0.52	0.63	22.7
All Vehicles		2129	0.0	2129	0.0	0.859	23.0	LOS B	36.3	253.9	0.80	0.80	0.92	29.9

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 ped	Dist] m		Rate		sec	m	m/sec
Site: 101 [Alton / Freeman Existing + Development AM - Copy]											
East: Freeman Drive (E)											
P2 Full	80	36.8	LOS D	0.2	0.2	0.93	0.93	65.4	37.2	0.57	
North: Alton Road (N)											
P3 Full	80	12.0	LOS B	0.1	0.1	0.53	0.53	36.5	31.9	0.87	
West: Freeman Drive (W)											
P4 Full	80	36.8	LOS D	0.2	0.2	0.93	0.93	65.4	37.2	0.57	
All Pedestrians	240	28.5	LOS C	0.2	0.2	0.80	0.80	55.8	35.4	0.64	
Site: 101 [Central / Freeman Existing + Development AM - Copy]											
South: Central											
P1 Full	80	12.0	LOS B	0.1	0.1	0.53	0.53	36.5	31.9	0.87	
East: Freeman Drive (E)											
P2 Full	80	36.8	LOS D	0.2	0.2	0.93	0.93	65.4	37.2	0.57	
All Pedestrians	160	24.4	LOS C	0.2	0.2	0.73	0.73	51.0	34.6	0.68	

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

MOVEMENT SUMMARY

 **Site: 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 = 85 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	* 0.892	32.8	LOS C	37.8	264.9	0.97	1.04	1.17	30.4
6	R2	27	0.0	27	0.0	0.206	48.3	LOS D	1.1	7.9	0.97	0.71	0.97	33.5
Approach		849	0.0	849	0.0	0.892	33.3	LOS C	37.8	264.9	0.97	1.03	1.16	30.6
North: Patrick Drive (N)														
7	L2	42	0.0	42	0.0	0.044	16.2	LOS B	0.8	5.9	0.52	0.67	0.52	39.3
9	R2	568	0.0	568	0.0	* 0.911	50.3	LOS D	28.9	202.6	1.00	1.02	1.34	22.8
Approach		610	0.0	610	0.0	0.911	48.0	LOS D	28.9	202.6	0.97	0.99	1.28	23.5
West: Freeman Drive (W)														
10	L2	118	0.0	118	0.0	0.207	29.2	LOS C	3.8	26.9	0.82	0.76	0.82	39.1
11	T1	427	0.0	427	0.0	0.682	25.8	LOS B	15.6	109.3	0.93	0.81	0.93	31.1
Approach		544	0.0	544	0.0	0.682	26.6	LOS B	15.6	109.3	0.91	0.80	0.91	33.6
All Vehicles		2003	0.0	2003	0.0	0.911	36.0	LOS C	37.8	264.9	0.95	0.95	1.13	28.9

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	22.7	LOS C	0.1	0.1	0.73	0.73	48.8	33.9	0.70
North: Patrick Drive (N)											
P3	Full	80	24.9	LOS C	0.1	0.1	0.77	0.77	51.0	33.9	0.66
West: Freeman Drive (W)											
P4	Full	80	22.7	LOS C	0.1	0.1	0.73	0.73	48.8	33.9	0.70
All Pedestrians		240	23.4	LOS C	0.1	0.1	0.74	0.74	49.5	33.9	0.68

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

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

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

MOVEMENT SUMMARY

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

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

Avondale South / Freeman Drive
AM Peak Period
Existing + Growth + Development
Site Category: (None)
Give-Way (Two-Way)
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				
South: Avondale South														
1	L2	28	0.0	28	0.0	0.045	9.9	LOS A	0.2	1.1	0.62	0.81	0.62	45.5
3	R2	7	0.0	7	0.0	0.043	25.3	LOS B	0.1	0.9	0.86	0.94	0.86	32.8
Approach		36	0.0	36	0.0	0.045	13.1	LOS A	0.2	1.1	0.67	0.84	0.67	42.2
East: Freemans Drive (E)														
4	L2	13	0.0	13	0.0	0.425	2.7	LOS A	0.0	0.0	0.00	0.01	0.00	56.7
5	T1	816	0.0	816	0.0	0.425	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	58.5
Approach		829	0.0	829	0.0	0.425	0.1	NA	0.0	0.0	0.00	0.01	0.00	58.1
West: Freemans Drive (W)														
11	T1	499	0.0	499	0.0	0.235	0.5	LOS A	0.3	2.3	0.08	0.02	0.09	58.6
12	R2	17	0.0	17	0.0	0.235	11.6	LOS A	0.3	2.3	0.10	0.03	0.11	57.3
Approach		516	0.0	516	0.0	0.235	0.8	NA	0.3	2.3	0.08	0.02	0.09	58.5
All Vehicles		1381	0.0	1381	0.0	0.425	0.7	NA	0.3	2.3	0.05	0.03	0.05	57.3

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.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCLAREN TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 18 February 2022 11:08:59 AM

Project: \\192.168.1.107\mte storage\Jobs\2021\211056\MTE SIDRA\22 02 03 PM12.23 - Revis in Sidra 9\22 02 18 Final Yield no Filters + Deaves.sip9

MOVEMENT SUMMARY

Site: 101 [Avondale North Existing + Development AM - Copy
(Site Folder: Alton Layout Testing)]

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

Avondale North / Freeman Drive
AM Peak Period
Existing + Development + 15 Year Growth
Site Category: (None)
Give-Way (Two-Way)
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 HV] veh/h	%				[Veh. veh	Dist] m				
East: Freeman (East)														
5	T1	547	0.0	547	0.0	0.283	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	164	0.0	164	0.0	0.150	5.6	LOS A	0.7	5.0	0.54	0.69	0.54	48.8
Approach		711	0.0	711	0.0	0.283	1.3	NA	0.7	5.0	0.12	0.16	0.12	51.1
North: Avondale North														
7	L2	250	0.0	250	0.0	0.193	6.6	LOS A	0.9	6.4	0.38	0.61	0.38	48.8
9	R2	258	0.0	258	0.0	0.922	55.6	LOS D	9.7	67.7	0.98	1.69	3.61	21.3
Approach		509	0.0	509	0.0	0.922	31.5	LOS C	9.7	67.7	0.68	1.16	2.02	29.5
West: Freeman (West)														
10	L2	243	0.0	243	0.0	0.273	2.7	LOS A	0.0	0.0	0.00	0.25	0.00	54.8
11	T1	277	0.0	277	0.0	0.273	0.0	LOS A	0.0	0.0	0.00	0.25	0.00	37.3
Approach		519	0.0	519	0.0	0.273	1.3	NA	0.0	0.0	0.00	0.25	0.00	53.1
All Vehicles		1739	0.0	1739	0.0	0.922	10.1	NA	9.7	67.7	0.25	0.48	0.64	37.7

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.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCLAREN TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 18 February 2022 11:08:59 AM

Project: \\192.168.1.107\mte storage\Jobs\2021\211056\MTE SIDRA\22 02 03 PM12.23 - Revis in Sidra 9\22 02 18 Final Yield no Filters + Deaves.sip9

MOVEMENT SUMMARY

Site: 101 [Newport Road / Freemans Drive AM - Copy (Site Folder: Alton Layout Testing)]

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

Newport Road / Freemans Drive AM Peak Period 15 Year Growth
AM Peak Period
Existing + 15 Year Growth + Development
Site Category: (None)
Give-Way (Two-Way)
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				
South: Newport Road														
1	L2	273	0.0	273	0.0	0.316	8.2	LOS A	1.4	9.9	0.51	0.77	0.56	47.4
3	R2	43	0.0	43	0.0	0.144	16.8	LOS B	0.5	3.5	0.76	0.90	0.76	38.8
Approach		316	0.0	316	0.0	0.316	9.4	LOS A	1.4	9.9	0.54	0.79	0.59	46.0
East: Freemans Drive (E)														
4	L2	96	0.0	96	0.0	0.052	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	54.4
5	T1	414	0.0	414	0.0	0.212	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		510	0.0	510	0.0	0.212	1.1	NA	0.0	0.0	0.00	0.11	0.00	58.2
West: Freemans Drive (W)														
11	T1	196	0.0	196	0.0	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	252	0.0	252	0.0	0.302	6.7	LOS A	1.4	10.0	0.57	0.80	0.63	47.5
Approach		448	0.0	448	0.0	0.302	3.8	NA	1.4	10.0	0.32	0.45	0.35	48.2
All Vehicles		1274	0.0	1274	0.0	0.316	4.1	NA	1.4	10.0	0.25	0.40	0.27	52.6

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.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCLAREN TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 18 February 2022 11:08:59 AM

Project: \\192.168.1.107\mte storage\Jobs\2021\211056\MTE SIDRA\22 02 03 PM12.23 - Revis in Sidra 9\22 02 18 Final Yield no Filters + Deaves.sip9

MOVEMENT SUMMARY

Site: 101v [Freemans Drive/New Access (VPA 17) 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)
Give-Way (Two-Way)
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	209	0.0	209	0.0	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	88	0.0	88	0.0	0.079	6.6	LOS A	0.3	2.2	0.36	0.62	0.36	52.2
Approach		297	0.0	297	0.0	0.108	2.0	NA	0.3	2.2	0.11	0.18	0.11	56.1
North: New Access (N)														
7	L2	340	0.0	340	0.0	0.902	21.3	LOS B	20.3	141.8	0.81	1.54	2.73	41.5
9	R2	311	0.0	311	0.0	0.902	29.8	LOS C	20.3	141.8	0.81	1.54	2.73	32.9
Approach		651	0.0	651	0.0	0.902	25.4	LOS B	20.3	141.8	0.81	1.54	2.73	38.3
West: Freeman Drive (W)														
10	L2	26	0.0	26	0.0	0.014	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	54.4
11	T1	236	0.0	236	0.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		262	0.0	262	0.0	0.121	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.3
All Vehicles		1209	0.0	1209	0.0	0.902	14.3	NA	20.3	141.8	0.46	0.89	1.50	46.1

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.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCLAREN TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 18 February 2022 11:08:59 AM

Project: \\192.168.1.107\mte storage\Jobs\2021\211056\MTE SIDRA\22 02 03 PM12.23 - Revis in Sidra 9\22 02 18 Final Yield no Filters + Deaves.sip9

MOVEMENT SUMMARY

Site: 101v [AM Freemans/Deaves - 2500 Lots (14.75 Years Growth) - Import (2) (Site Folder: Deaves - 2% HV - Council Design)]

Freemans Drive/Deaves Road

Growth Test - 25 Lots/Year

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)

Design Life Analysis: Constant Number of Years = 26

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND 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] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Freemans Drive (S)														
1	L2	18	0	19	0.0	0.024	28.4	LOS B	0.7	4.8	0.61	0.67	0.61	40.1
2	T1	477	6	527	1.2	0.652	31.6	LOS C	26.2	185.2	0.85	0.76	0.85	39.5
Approach		495	6	546	1.2	0.652	31.5	LOS C	26.2	185.2	0.84	0.76	0.84	39.5
North: Freemans Drive (N)														
8	T1	997	7	1149	0.6	* 0.895	11.8	LOS A	38.2	268.9	0.49	0.50	0.54	50.2
9	R2	268	0	315	0.0	0.962	86.1	LOS F	24.0	168.3	0.84	1.01	1.36	24.5
Approach		1265	7	1464	0.5	0.962	27.8	LOS B	38.2	268.9	0.57	0.61	0.71	41.0
West: Deaves Road (W)														
10	L2	120	0	135	0.0	0.150	25.2	LOS B	4.7	32.6	0.59	0.72	0.59	41.6
12	R2	25	0	26	0.0	* 0.154	65.5	LOS E	1.6	11.0	0.95	0.72	0.95	28.4
Approach		145	0	161	0.0	0.154	31.8	LOS C	4.7	32.6	0.65	0.72	0.65	38.7
All Vehicles		1905	13	2171	0.6	0.962	29.0	LOS C	38.2	268.9	0.64	0.65	0.74	40.4

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

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

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

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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Freemans Drive (S)												
P1	Full	50	80	59.3	LOS E	0.3	0.3	0.96	0.96	83.9	31.9	0.38
North: Freemans Drive (N)												
P3	Full	50	80	59.3	LOS E	0.3	0.3	0.96	0.96	83.9	31.9	0.38
West: Deaves Road (W)												
P4	Full	50	80	59.3	LOS E	0.3	0.3	0.96	0.96	83.9	31.9	0.38
All Pedestrians		0	240	59.3	LOS E	0.3	0.3	0.96	0.96	83.9	31.9	0.38

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.

MOVEMENT SUMMARY

 **Site: 101v [PM Freemans/Deaves - 2500 Lots (14.75 Years Growth) - Import (2) (Site Folder: Deaves - 2% HV - Council Design)]**

Freemans Drive/Deaves Road

Growth Test - 25 Lots/Year

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)

Design Life Analysis: Constant Number of Years = 26

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND 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] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Freemans Drive (S)														
1	L2	13	0	14	0.0	0.011	12.3	LOS A	0.3	1.9	0.33	0.62	0.33	48.8
2	T1	1030	7	1184	0.6	* 0.898	22.5	LOS B	64.6	454.7	0.88	0.86	0.92	43.8
Approach		1043	7	1198	0.6	0.898	22.4	LOS B	64.6	454.7	0.88	0.86	0.92	43.9
North: Freemans Drive (N)														
8	T1	576	8	631	1.3	0.401	3.4	LOS A	10.7	75.7	0.30	0.27	0.30	56.8
9	R2	116	0	130	0.0	* 0.830	76.5	LOS F	9.0	63.0	1.00	0.90	1.28	26.2
Approach		692	8	762	1.1	0.830	16.0	LOS B	10.7	75.7	0.42	0.38	0.46	47.3
West: Deaves Road (W)														
10	L2	289	0	337	0.0	0.847	64.7	LOS E	22.3	156.4	1.00	0.92	1.17	28.7
12	R2	19	0	20	0.0	* 0.117	65.2	LOS E	1.2	8.3	0.95	0.70	0.95	28.5
Approach		308	0	357	0.0	0.847	64.8	LOS E	22.3	156.4	1.00	0.91	1.15	28.7
All Vehicles		2043	15	2316	0.7	0.898	26.8	LOS B	64.6	454.7	0.74	0.71	0.80	41.5

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

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

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

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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
South: Freemans Drive (S)												
P1	Full	50	80	59.3	LOS E	0.3	0.3	0.96	0.96	83.9	31.9	0.38
North: Freemans Drive (N)												
P3	Full	50	80	59.3	LOS E	0.3	0.3	0.96	0.96	83.9	31.9	0.38
West: Deaves Road (W)												
P4	Full	50	80	59.3	LOS E	0.3	0.3	0.96	0.96	83.9	31.9	0.38
All Pedestrians		0	240	59.3	LOS E	0.3	0.3	0.96	0.96	83.9	31.9	0.38

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.

CCG MOVEMENT SUMMARY

Common Control Group: CCG1 [CCGName]

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

EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 75 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 %				[Veh. veh	Dist] m				
Site: 101 [Alton / Freeman Existing + Development PM - Copy]														
East: Freeman Drive (E)														
5	T1	593	0.0	593	0.0	0.713	10.5	LOS A	4.7	32.6	0.48	0.44	0.51	45.4
6	R2	87	0.0	87	0.0	0.713	27.8	LOS B	4.7	32.6	0.92	0.85	1.00	32.1
Approach		680	0.0	680	0.0	0.713	12.7	LOS A	4.7	32.6	0.54	0.49	0.57	43.1
North: Alton Road (N)														
7	L2	83	0.0	83	0.0	0.428	39.9	LOS C	3.0	20.9	0.96	0.77	0.96	26.2
9	R2	110	0.0	110	0.0	0.403	38.2	LOS C	3.8	26.7	0.95	0.78	0.95	36.1
Approach		193	0.0	193	0.0	0.428	38.9	LOS C	3.8	26.7	0.95	0.77	0.95	32.7
West: Freeman Drive (W)														
10	L2	319	0.0	319	0.0	*0.779	17.0	LOS B	22.7	158.6	0.77	0.78	0.80	47.9
11	T1	1016	0.0	1016	0.0	0.779	13.1	LOS A	22.7	158.6	0.76	0.77	0.83	41.1
Approach		1334	0.0	1334	0.0	0.779	14.1	LOS A	22.7	158.6	0.76	0.77	0.82	43.5
All Vehicles		2207	0.0	2207	0.0	0.779	15.8	LOS B	22.7	158.6	0.71	0.68	0.75	41.8
Site: 101 [Central / Freeman Existing + Development PM - Copy]														
South: Central														
1	L2	108	0.0	108	0.0	*0.658	41.0	LOS C	4.2	29.2	0.98	0.86	1.13	24.3
3	R2	78	0.0	78	0.0	0.315	38.7	LOS C	2.7	18.9	0.94	0.76	0.94	25.1
Approach		186	0.0	186	0.0	0.658	40.0	LOS C	4.2	29.2	0.97	0.82	1.05	24.6
East: Freeman Drive (E)														
4	L2	28	0.0	28	0.0	0.527	13.9	LOS A	8.2	57.4	0.65	0.60	0.65	50.4
5	T1	676	0.0	676	0.0	0.527	8.3	LOS A	8.2	57.4	0.65	0.59	0.65	45.9
Approach		704	0.0	704	0.0	0.527	8.6	LOS A	8.2	57.4	0.65	0.59	0.65	46.2
West: Freeman Drive (W)														
11	T1	1059	0.0	1059	0.0	0.730	5.1	LOS A	4.7	32.6	0.35	0.33	0.35	19.1
12	R2	69	0.0	69	0.0	0.730	7.0	LOS A	4.7	32.6	0.38	0.38	0.38	49.3
Approach		1128	0.0	1128	0.0	0.730	5.2	LOS A	4.7	32.6	0.35	0.33	0.35	27.3
All Vehicles		2019	0.0	2019	0.0	0.730	9.6	LOS A	8.2	57.4	0.51	0.47	0.52	37.0

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 ped	Dist] m		Rate		sec	m	m/sec
Site: 101 [Alton / Freeman Existing + Development PM - Copy]											
East: Freeman Drive (E)											
P2 Full	80	31.8	LOS D	0.2	0.2	0.92	0.92	60.5	37.2	0.62	
North: Alton Road (N)											
P3 Full	80	6.8	LOS A	0.1	0.1	0.43	0.43	31.4	31.9	1.02	
West: Freeman Drive (W)											
P4 Full	80	31.8	LOS D	0.2	0.2	0.92	0.92	60.5	37.2	0.62	
All Pedestrians	240	23.5	LOS C	0.2	0.2	0.76	0.76	50.8	35.4	0.70	
Site: 101 [Central / Freeman Existing + Development PM - Copy]											
South: Central											
P1 Full	80	6.8	LOS A	0.1	0.1	0.43	0.43	31.4	31.9	1.02	
East: Freeman Drive (E)											
P2 Full	80	31.8	LOS D	0.2	0.2	0.92	0.92	60.5	37.2	0.62	
All Pedestrians	160	19.3	LOS B	0.2	0.2	0.68	0.68	45.9	34.6	0.75	

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

MOVEMENT SUMMARY

 **Site: 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 = 75 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	0.397	5.2	LOS A	8.2	57.6	0.45	0.41	0.45	52.0
6	R2	108	0.0	108	0.0	* 0.726	46.4	LOS D	4.3	30.2	1.00	0.86	1.23	34.1
Approach		644	0.0	644	0.0	0.726	12.1	LOS A	8.2	57.6	0.55	0.48	0.58	45.5
North: Patrick Drive (N)														
7	L2	11	0.0	11	0.0	0.018	24.9	LOS B	0.3	1.9	0.72	0.66	0.72	33.2
9	R2	142	0.0	142	0.0	* 0.521	38.9	LOS C	5.0	35.3	0.97	0.79	0.97	26.5
Approach		152	0.0	152	0.0	0.521	37.9	LOS C	5.0	35.3	0.95	0.78	0.95	26.9
West: Freeman Drive (W)														
10	L2	470	0.0	470	0.0	0.513	15.2	LOS B	8.2	57.5	0.51	0.73	0.51	46.4
11	T1	589	0.0	589	0.0	* 0.566	5.4	LOS A	7.9	55.1	0.39	0.35	0.39	50.2
Approach		1059	0.0	1059	0.0	0.566	9.8	LOS A	8.2	57.5	0.45	0.52	0.45	47.8
All Vehicles		1855	0.0	1855	0.0	0.726	12.9	LOS A	8.2	57.6	0.52	0.53	0.54	44.8

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 (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	31.8	LOS D	0.2	0.2	0.92	0.92	57.9	33.9	0.59
North: Patrick Drive (N)											
P3	Full	80	12.9	LOS B	0.1	0.1	0.59	0.59	39.0	33.9	0.87
West: Freeman Drive (W)											
P4	Full	80	31.8	LOS D	0.2	0.2	0.92	0.92	57.9	33.9	0.59
All Pedestrians		240	25.5	LOS C	0.2	0.2	0.81	0.81	51.6	33.9	0.66

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

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

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

MOVEMENT SUMMARY

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

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

Avondale South / Freeman Drive
PM Peak Period
Existing + Growth + Development
Site Category: (None)
Give-Way (Two-Way)
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				
South: Avondale South														
1	L2	23	0.0	23	0.0	0.027	8.1	LOS A	0.1	0.7	0.52	0.69	0.52	47.5
3	R2	8	0.0	8	0.0	0.050	26.1	LOS B	0.2	1.1	0.87	0.95	0.87	32.4
Approach		32	0.0	32	0.0	0.050	12.9	LOS A	0.2	1.1	0.61	0.76	0.61	42.3
East: Freemans Drive (E)														
4	L2	14	0.0	14	0.0	0.325	2.7	LOS A	0.0	0.0	0.00	0.01	0.00	56.7
5	T1	619	0.0	619	0.0	0.325	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	58.1
Approach		632	0.0	632	0.0	0.325	0.1	NA	0.0	0.0	0.00	0.01	0.00	57.8
West: Freemans Drive (W)														
11	T1	702	0.0	702	0.0	0.329	0.4	LOS A	0.6	4.2	0.09	0.03	0.11	58.6
12	R2	32	0.0	32	0.0	0.329	9.8	LOS A	0.6	4.2	0.11	0.03	0.13	57.3
Approach		733	0.0	733	0.0	0.329	0.8	NA	0.6	4.2	0.09	0.03	0.11	58.5
All Vehicles		1397	0.0	1397	0.0	0.329	0.7	NA	0.6	4.2	0.06	0.04	0.07	57.7

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.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCLAREN TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 18 February 2022 11:00:20 AM

Project: \\192.168.1.107\mte storage\Jobs\2021\211056\MTE SIDRA\22 02 03 PM12.23 - Revis in Sidra 9\22 02 18 Final Yield no Filters + Deaves.sip9

MOVEMENT SUMMARY

Site: 101 [Avondale North Existing + Development PM - Copy
(Site Folder: Alton Layout Testing)]

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

Avondale North / Freeman Drive
PM Peak Period
Existing + Development + 15 Year Growth
Site Category: (None)
Give-Way (Two-Way)
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 (East)														
5	T1	419	0.0	419	0.0	0.217	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	187	0.0	187	0.0	0.217	7.1	LOS A	1.0	6.9	0.63	0.81	0.63	47.1
Approach		606	0.0	606	0.0	0.217	2.2	NA	1.0	6.9	0.19	0.25	0.19	49.0
North: Avondale North														
7	L2	124	0.0	124	0.0	0.098	6.6	LOS A	0.4	3.0	0.37	0.60	0.37	48.9
9	R2	174	0.0	174	0.0	0.598	25.8	LOS B	3.1	21.7	0.89	1.11	1.48	32.6
Approach		299	0.0	299	0.0	0.598	17.8	LOS B	3.1	21.7	0.67	0.90	1.02	37.9
West: Freeman (West)														
10	L2	409	0.0	409	0.0	0.373	2.7	LOS A	0.0	0.0	0.00	0.31	0.00	54.3
11	T1	298	0.0	298	0.0	0.373	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	34.3
Approach		707	0.0	707	0.0	0.373	1.6	NA	0.0	0.0	0.00	0.31	0.00	52.9
All Vehicles		1612	0.0	1612	0.0	0.598	4.8	NA	3.1	21.7	0.20	0.40	0.26	46.4

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.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCLAREN TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 18 February 2022 11:00:20 AM

Project: \\192.168.1.107\mte storage\Jobs\2021\211056\MTE SIDRA\22 02 03 PM12.23 - Revis in Sidra 9\22 02 18 Final Yield no Filters + Deaves.sip9

MOVEMENT SUMMARY

Site: 101 [Newport Road / Freemans Drive PM - Copy (Site Folder: Alton Layout Testing)]

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

Newport Road / Freemans Drive AM Peak Period 15 Year Growth

PM Peak Period

Existing + 15 Year Growth + Development

Site Category: (None)

Give-Way (Two-Way)

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				
South: Newport Road														
1	L2	298	0.0	298	0.0	0.298	7.2	LOS A	1.3	8.9	0.43	0.67	0.43	48.6
3	R2	90	0.0	90	0.0	0.211	13.0	LOS A	0.8	5.6	0.67	0.87	0.68	42.2
Approach		388	0.0	388	0.0	0.298	8.5	LOS A	1.3	8.9	0.48	0.72	0.49	46.9
East: Freemans Drive (E)														
4	L2	50	0.0	50	0.0	0.027	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	54.4
5	T1	291	0.0	291	0.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		341	0.0	341	0.0	0.149	0.9	NA	0.0	0.0	0.00	0.08	0.00	58.5
West: Freemans Drive (W)														
11	T1	171	0.0	171	0.0	0.088	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	212	0.0	212	0.0	0.208	5.2	LOS A	0.9	6.3	0.45	0.66	0.45	49.3
Approach		383	0.0	383	0.0	0.208	2.9	NA	0.9	6.3	0.25	0.36	0.25	50.0
All Vehicles		1113	0.0	1113	0.0	0.298	4.2	NA	1.3	8.9	0.25	0.40	0.26	52.1

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.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCLAREN TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 18 February 2022 11:00:20 AM

Project: \\192.168.1.107\mte storage\Jobs\2021\211056\MTE SIDRA\22 02 03 PM12.23 - Revis in Sidra 9\22 02 18 Final Yield no Filters + Deaves.sip9

MOVEMENT SUMMARY

Site: 101v [Freemans Drive/New Access (VPA 17) 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)
Give-Way (Two-Way)
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 HV] veh/h	%				[Veh. veh	Dist] m				
East: Freeman Drive (E)														
5	T1	316	0.0	316	0.0	0.163	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	349	0.0	349	0.0	0.326	7.1	LOS A	1.6	11.0	0.46	0.68	0.46	51.9
Approach		665	0.0	665	0.0	0.326	3.8	NA	1.6	11.0	0.24	0.36	0.24	54.2
North: New Access (N)														
7	L2	91	0.0	91	0.0	0.324	7.3	LOS A	1.4	10.1	0.50	0.74	0.60	48.6
9	R2	73	0.0	73	0.0	0.324	19.1	LOS B	1.4	10.1	0.50	0.74	0.60	42.7
Approach		164	0.0	164	0.0	0.324	12.5	LOS A	1.4	10.1	0.50	0.74	0.60	46.7
West: Freeman Drive (W)														
10	L2	102	0.0	102	0.0	0.055	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	54.4
11	T1	199	0.0	199	0.0	0.102	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		301	0.0	301	0.0	0.102	1.9	NA	0.0	0.0	0.00	0.19	0.00	57.9
All Vehicles		1129	0.0	1129	0.0	0.326	4.5	NA	1.6	11.0	0.22	0.37	0.23	54.3

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.

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: MCLAREN TRAFFIC ENGINEERING | Licence: NETWORK / 1PC | Processed: Friday, 18 February 2022 11:00:20 AM

Project: \\192.168.1.107\mte storage\Jobs\2021\211056\MTE SIDRA\22 02 03 PM12.23 - Revis in Sidra 9\22 02 18 Final Yield no Filters + Deaves.sip9