ACN: 164611652
Ground Floor, 161 Scott Street
Newcastle NSW 2300
Ph: (02) 4032 7979
admin@secasolution.com.au

4 August 2020

P1704 Mavid Lot 1 Muir Street Medowie

Mavid Group
81 Mustang Drive
Rutherford NSW 2320

Attn: Peter Childs

Dear Peter,

Re: Traffic Impact Assessment for the proposed Family Tavern, Lot 1, Muir Street, Medowie, NSW

Further to our recent correspondence and a review of the provided documentation for the proposed Family Tavern located at Lot 1, Muir Street in Medowie, we provide the following traffic impact assessment. This assessment has been prepared in accordance with the Austroads Guidelines and Section 2.3 of the Guide to Traffic Generating Developments (GtTGD), which provides the structure for the reporting of key issues to be addressed when determining the impacts of traffic associated with a development. This guide indicates that the use of this format and checklist ensures that the most significant matters are considered by the relevant road authority.

The report has also taken into consideration the planning requirements outlined in the Port Stephens Council Development Control Plan 2014 and the relevant requirements of the Australian Standard for off-street parking, AS2890.1.Reference has also been made to the Medowie Traffic and Transport Study (URaP 2017), as well as the Medowie Planning Strategy (2016). The location of the proposed development is shown in Figure 1 below.

Figure 1 – Subject site in the context of the local road network

A summary of the key issues and their comments are provided below:

Item	Comment
Existing Situation	
2.1 Site Location and Access	The proposed development relates to vacant land in Medowie, NSW, with frontage to Muir Street (southern boundary) and Peppertree Road (western boundary). There is no existing formed driveway crossing for the site. Peppertree Road does not extend the whole length of the western site frontage. The site is located within the Medowie town centre, which currently consists of the Woolworths Medowie supermarket, with further retail and commercial uses to the west of the site including Coles Medowie supermarket.
2.2.1 Road Hierarchy	The main road through the locality is **Medowie Road**, which is a regional road (MR518) that runs in a north / south orientation to the east of the subject site. It provides the primary connection between Medowie and the external road network including the Pacific Highway (to the north), Richardson Road (to the south), and Nelson Bay Road (to the south) for connection to Newcastle Airport. In the vicinity of the subject site it provides one lane of travel in each direction, with kerb and guttering along the western roadside and guttering only present along the eastern roadside. It has a pavement width in the order of 11 metres, allowing vehicles to pull over on both sides of the road with a 2.5 metre shoulder marked on the eastern side of the road. There is a footpath along the western roadside from Ferodale Road to Silver Wattle Drive, which ends prior to Silver Wattle Drive with a new footpath continuing north along the opposite (eastern) roadside. The posted speed limit in the locality of the subject site is 50km/hr. Street lighting is provided at the roundabout intersection of Medowie Road and Ferodale Road, with further lighting along the western side of Medowie Road to the north. There is one lane of travel in each direction, on both the northbound and southbound approaches to the roundabout intersection with Ferodale Road. **Ferodale Road** is a major collector road through Medowie, providing connection to the town centre, as well as two primary schools. There is a footpath provided along its length on the northern roadside, with street lighting in the proximity of the Medowie Town Centre. At the intersection with Medowie Road it provides one lane of travel in each direction on both the eastbound and westbound approaches to the roundabout. To the west of this roundabout, Ferodale Road provides access to a number of commercial/retail developments and has a pavement width in the order of 11 metres, with no stopping permitted along both sides of the road. There is a sheltered right turn lane into the Medowie Community Centre (eastbound), as well as a sheltered right turn lane at the connection with Peppertree Road (westbound). This intersection operates as a priority-controlled T-intersection, with Ferodale Road having priority. **Peppertree Road** is a local road which provides a sealed surface with kerb and guttering and a pavement width in the order of 12 metres. There are footpaths along both sides of the road, with street lighting also provided. The road was upgraded as part of the recent development along this road and

Item	Comment
	extended to provide access to land earmarked for future development to the north. This includes a connection to Muir Street. **Muir Street** has an east-west orientation, linking Peppertree Road to Medowie Road. This road was constructed in 2016 and allows vehicles travelling from areas in the north to enter the commercial/retail area off Peppertree Road, bypassing the intersection of Medowie Road and Ferodale Road. It provides a single lane of travel in each direction with a sealed pavement in the order of 12 meters wide allowing sufficient space for kerbside parking, with kerb and guttering on both sides of the road. Street lighting is provided, as well as a pedestrian path along the southern side of the road. Muir Street connects with Medowie Road via a priority-controlled T-intersection allowing all turning movements, with Medowie Road the priority road. There are two lanes provided at this intersection, with one designated for left turns and the other for right turns onto Medowie Road. There are no turn lanes provided on Medowie Road.
2.2.2 Current and Proposed Roadworks, Traffic Management Works and Bikeways	Apart from regular maintenance no roadworks is anticipated in the immediate vicinity of the site. There are future works proposed in response to ongoing development as identified on the Master Plan for the Medowie Town Centre (**Attachment D**), this includes the future road extension of Peppertree Road, as well as a new road running parallel to the west with access off Ferodale Road. Council's Contributions Plan includes funding to upgrade the intersection of Ferodale Road and Peppertree Road to a roundabout. A map of the existing shared paths has been provided in **Attachment C**. Proposed bike paths have also been identified in the Medowie Traffic and Transport Study, with an excerpt from this report shown in Figure 2 below.  *Figure 2 – Proposed bike paths in Medowie surrounding the subject site★ (Source: URaP 2017 Figure 4.3)*
2.3 Traffic Flows	Seca Solution collected traffic data at the following intersections to determine the current road operation and peak flows along these roads:

Item	Comment
	• Medowie Road and Ferodale Road • Ferodale Road and Peppertree Road These surveys were completed during the morning and afternoon on Tuesday 26th March 2019. The AM peak hour was determined as 8:15am to 9:15am, whilst the PM peak was 4:30pm to 5:30pm. The survey data is provided in **Attachment E**. A summary of the current distribution of traffic during the peak hour is provided below in Table 1. *Table 1 –Peak traffic flows in the vicinity of the subject site*

Location	Distribution	AM Peak	PM Peak
Medowie Road (North of Ferodale Road)	Northbound	179	419
	Southbound	301	234
Medowie Road (South of Ferodale Road)	Northbound	352	720
	Southbound	500	395
Ferodale Road (West of Medowie Road)[1]	Eastbound	337	482
	Westbound	403	513
Ferodale Road (West of Peppertree Road)	Eastbound	347	391
	Westbound	340	370
Peppertree Road	Northbound	197	366
	Southbound	71	150

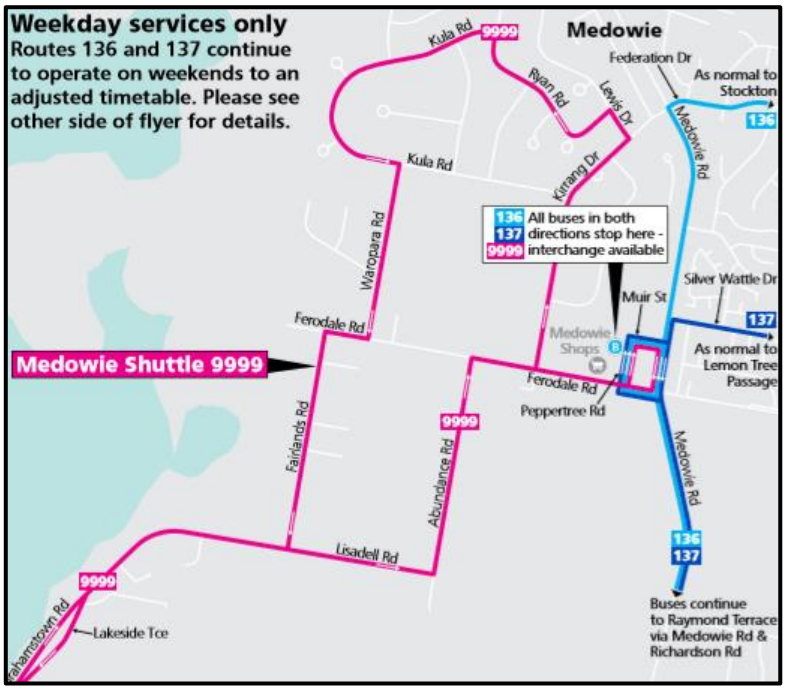
Notes: [1] Flows taken as higher value recorded from the two surveys, with flow differences relating to driveways between Peppertree Road and Medowie Road.

Medowie Road operates as a sub-arterial road through Medowie. The GtTGD provides typical mid-block capacities for urban roads, with a capacity of 900 vehicles per hour per direction. The traffic flows along Medowie Road to the north of Ferodale Road are well within this capacity with critical flows of 419 vehicles northbound and 301 vehicles southbound. These flows represent a Level of Service C for urban road peak hour flows per direction (GtTGD).

Ferodale Road is a major collector road for the area, providing the main access to Medowie Town Centre. Given this classification Ferodale Road has been assessed per GtTGD rate for urban roads above. Traffic flows on Ferodale Road to the west of Medowie Road, toward Peppertree Road, are within the mid-block capacity for Level of Service C with 482 vehicles eastbound and 513 vehicles westbound in the critical PM peak.

Item	Comment
	Traffic flows along Peppertree Road to the north of Ferodale Road are 366 vehicles northbound and 150 vehicles southbound, giving Level of Service B (northbound in the PM) per GtTGD.
2.3.1 Daily Traffic Flows	Peak hour flows typically represent around 10% of the daily traffic flows. This would indicate daily traffic flows in the locality in the order of: • 5,650 vehicles per day (vpd) along Medowie Road (north of Ferodale Road). • 9,850 vpd along Medowie Road (south of Ferodale Road) • 8,700 vpd along Ferodale Road (west of Medowie Road) • 7,250 vpd along Ferodale Road (west of Peppertree Road) • 3,900 vpd along Peppertree Road
2.3.2 AADT	There is no AADT data available in the locality.
2.3.3 Daily Traffic Flow Distribution	It can be seen from Section 2.3.1 above that there is a high demand for travel to the south along Medowie Road in the AM, representing commuters travelling to employment opportunities including Williamtown RAAF base, airport and the City of Newcastle. These flows are tidal with the reverse occurring during the PM. There is also significant demand for vehicles to the west of the roundabout along Ferodale Road, with Medowie Public School, as well as the various retail outlets in this location generating local demands. The demand for such trips would continue throughout the day given the range of commercial and retail developments.
2.3.4 Vehicle Speeds	No speed surveys were completed as part of the study work, however the volume of traffic in the peak periods along Ferodale Road and Medowie Road, to the south of the roundabout does not encourage drivers to speed. The interaction between driveways and accesses to developments in the locality also sees drivers lowering their speed.
2.3.5 Existing Site Flows	The site is currently vacant land and as such generates no traffic demands.
2.3.6 Heavy Vehicle Flows	Data recorded during the traffic survey found higher proportion of heavy vehicles in the AM peak, with 28 heavy vehicle movements at the intersection of Medowie Road and Ferodale Road representing 2.3% of the total traffic flows. At the intersection of Ferodale Road and Peppertree Road there were 15 heavy vehicles recorded representing 1.8% of the total traffic. From observation a number of these related to public and school buses in the locality.
2.3.7 Current Road Network Operation	Observations on site during the peak periods found that the roundabout intersection of Medowie Road and Ferodale Road operates well with minimal delays and congestion. The intersection of Ferodale Road and Peppertree Road currently operates to an acceptable standard during the morning and afternoon peak periods, however some delays and congestion were noted on Peppertree Road

Item	Comment
	associated with demands for vehicles turning right onto Ferodale Road. Outside of the peak periods this intersection operates well with minimal delays or queueing.
2.4 Traffic Safety and Accident History	A review of accident data provided by the RMS **(Attachment B)** during the period October 2013 to September 2018 indicates that 6 accidents have been recorded within the vicinity of the subject site. Of these: • Two accidents were recorded at the intersection of Muir Street and Medowie Road since its opening in 2016. • Two accidents were recorded at the intersection of Medowie Road and Ferodale Road. • One accident was recorded at the intersection of Ferodale Road and Peppertree Road. • One accident occurred along Medowie Road There are no repeat causes for accidents in the area, with a low number of accidents recorded relative to the traffic volumes. Given the good road alignment it is considered that Medowie Road in the vicinity of the subject site operates in a safe and appropriate manner. The two accidents recorded at Muir Street were indicative of driver error, rather than a poor intersection layout. One of these accidents related to a vehicle travelling eastbound in Muir Street colliding with a signpost near the intersection with Medowie Road. The other accident involved a vehicle in Muir Street holding at the intersection with Medowie Road, being struck by a southbound vehicle on Medowie Road, travelling along the footpath.
2.5 Parking Supply and Demand	
2.5.1 On-street Parking Provision	Kerbside parking is available along Muir Street, with No Stopping restrictions in the proximity of intersections. The southern end of Peppertree Road, near the intersection with Ferodale Road, has No Stopping, to provide capacity for turning movements. Further north kerbside parking is available, with the exception of the designated bus zone on the western side prior to the intersection with Muir Street.
2.5.2 Off-street Parking Provision	There is off-street parking available in the commercial/retail precinct, to the immediate south of the subject site.
2.5.3 Current Parking Demand and Utilisation	There was no demand observed for on-street parking along Muir Street, given the existing lack of development in this area. On-street parking at the southern end of Peppertree Road was heavily utilised, associated with the commercial developments in this location. At its northern end passing the subject site there was no demand for parking observed.
2.5.4 Short term set down or pick up areas	There are no set down or pick up areas in the vicinity of the site.
2.6 Modal Split	Given the proximity of the subject site to residential developments in the area, it is considered there is good walkability for local residents to access

Item	Comment
	the site. Given the semi-rural nature of the area it is considered the majority of trips in Medowie are undertaken by private vehicle.
2.7 Public Transport	
2.7.1 Rail Station Locations	There are no train services in the locality, with the nearest rail station located in Hexham, 20 kilometres to the south of the site.
2.7.2 Bus Stops and Associated Facilities	There is a bus stop located on the western side of Peppertree Road opposite the subject site. There are no seating nor shelter facilities provided at this bus stop. There is a bus stop with seating and shelter located on Ferodale Road less than 200 metres south of the subject site.
2.7.3 Transport Services	Bus services in the locality are provided by Hunter Valley Buses. There are three routes that run through Medowie Road in the vicinity of the subject site. • 136 – Raymond Terrace to Stockton: Operates 7 days a week with frequent trips throughout the day. • 137 – Raymond Terrace to Lemon Tree Passage: Operates daily, with frequent trips Monday-Friday and limited trips on weekends and public holidays. • 9999 – Medowie Shuttle: Operates Monday to Friday at regular intervals. These bus routes are shown to follow in Figure 3.  *Figure 3 – Bus services through Medowie* The Medowie Traffic and Transport Study (2017) states there were 5 school buses servicing the area at that point in time.
2.8 Pedestrian Network	There is a pedestrian path along Medowie Road, as well as Muir Street and Peppertree Road providing connection through the Medowie Town Centre and to bus stops. These paths connect with footpaths extending along Ferodale Road in both directions, as well as the footpath extending along

Item	Comment
	Medowie Road to the north of Muir Street allowing for connection to residential areas.
2.9 Other Proposed Developments	A review of the Port Stephens Council DA Tracker has determined the following developments currently approved/proposed in the vicinity of the subject site: • Approved multi-dwelling housing (eight dwellings) at 791 Medowie Rd, (LOT: 2 DP: 260883) • Approved 38 lot residential subdivision located to the north of the Medowie Town Centre at 799 Medowie Rd (LOT: A DP: 404939) and 813 Medowie Rd (LOT: 32 DP: 1045148). • Approved torrens title subdivision (213 lots) at Lots 7-9 DP: 855814 and Lots 1-2 DP: 567481 • Approved multi-dwelling housing (comprising 238 moveable dwellings) at 717 Medowie Rd (LOT: 200 DP: 19739) and 733 Medowie Rd (LOT: 199 DP: 17437). • Approved Service station and food and drink premises – including; vehicle workshop, ancillary signage, car parking, landscaping, demolition of existing structures and associated site works at 787 Medowie Road. • Approved Office premises and signage – construction of two storey office premises, signage, car parking, landscaping, fencing, and associated site works at 795 Medowie Rd, Medowie 2318 NSW. • Approved Commercial premises (multiple-tenancies), medical centre, retail premises (pharmacy), childcare centre (126 place), site works, civil works, signage, landscaping and one into four lot Torrens title subdivision of proposed Lot 4 (on proposed Lots 2, 3 and 4 under DA 16-2018-879-1) at 795 Medowie Rd, Medowie 2318 NSW. • Approved Food and drink premises - McDonalds restaurant at 795 Medowie Rd, Medowie 2318 NSW.
The Development	
3.1.1 Nature of Development	The subject site forms part of the Medowie Town Centre with surrounding commercial and retail elements. It has frontage along Peppertree Road at its western boundary, and Muir Street along its southern boundary. Peppertree Road is incomplete, however is proposed to be extended north in accordance with the Medowie Town Centre masterplan. The project site will allow for commercial premises being a Family Tavern which includes: • Food and Drink Areas • Sports Bar and Gaming • External terrace and children's playground Parking is to be provided on site, with an at-grade parking area accessed via Muir Street providing 12 spaces and a basement car park accessed via Peppertree Road providing 54 parking spaces and 6 motorcycle spaces.

Item	Comment
3.1.2 Access and Circulation Requirements	The layout of the development will require circulation in accordance with the requirements of Council and AS2890. All vehicles shall be able to enter and exit the site in a forward direction.
3.2 Access	
3.2.1 Driveway Location	There are two driveway access points proposed for the subject site, with an access on Muir Street approximately 60 metres west of Medowie Road and a further access off Peppertree Road, to the north of Muir Street. These driveways will allow for all turning movements into and out of the site.
3.2.2 Sight Distances	Sight distance for the proposed driveways is to be provided in accordance with AS2890. For the speed limit of 50km/hr along Peppertree Road and Muir Street AS2890 states a desirable sight distance of 69 metres, with a minimum of 45 metres. Both Peppertree Road and Muir Street provide straight horizontal alignment along their lengths. Sight distance at the Muir Street site access allows for clear visibility along the length of this road, with 60 metres to the left (east) to Medowie Road and 100 metres to the right (west) to Peppertree Road, thereby satisfying AS2890. Sight distance at the Peppertree Road site access allows for in excess of 69 metres to the left (south), including passing Muir Street, whilst there is no existing road to the right (north) with Peppertree Road being a dead end. As such, the requirements of AS2890 are satisfied in relation to sight distance.
3.2.3 Service Vehicle Access	Demands for delivery vehicles within the site as well as waste collection. The detailed design of the parking layout will be in accordance with AS2890 and the Council DCP which will cater for the swept path requirements for the largest design vehicle. All vehicles will access and exit the site in a forward direction.
3.2.4 Queuing at entrance to site	Given the low flows passing the site access points there are minimal vehicle queues expected for vehicles entering the site, with these driveways to operate in the same manner as the Woolworths and Coles access driveways off Peppertree Road.
3.2.5 Comparison with existing site access	There is no formed access to the subject site.
3.2.6 Access to Public Transport	The development is well located in regard to public bus services through the locality, with a bus stop to the south along Peppertree Road.
3.3 Circulation	
3.3.1 Pattern of circulation	All vehicles will be able to enter and exit the site in a forward direction and travel through the parking areas, with the layout allowing for two-way movements.
3.3.2 Internal Road width	All internal roads will be designed in accordance with the requirements of AS2890.1, which nominates a minimum width of 5.5 metres to allow for two-way movements. Additional width is required for parking aisles, as discussed further below.

Item	Comment
3.3.3 Internal Bus Movements	There are no internal bus movements anticipated for the development.
3.3.4 Service Area Layout	The detailed design of the site will provide for servicing to allow for the management of deliveries and removal of waste. A designated loading area has been provided within the at-grade parking off Muir Street.
3.4 Parking	
3.4.1 Proposed Supply	The subject site will include a parking supply of 66 car spaces (including 4 accessible spaces) and 6 motorcycle spaces to cater for the whole of development.
3.4.2 Authority Parking	Port Stephens Council DCP provides the following parking rates for commercial premises relevant to the development: • Food and drink premises = 1 car space per 25m^2 floor area *within commercial premises, or* 15 car spaces per 100m^2 floor area or 1 car space per 3 seats outside of *commercial premises* (1 space per 30 to be accessible). 1 bike space per 200m^2. • Pub or Registered Club = 1 car space per 7m^2 of floor area within commercial centres For all of the above 1 per 30 parking spaces are to be accessible.
3.4.3 Parking Layout	Parking will be designed in accordance with AS2890.1 for a User Class 2 facility (medium term parking). For 90^o angle parking this requires the following: • Minimum 2.5 x 5.4 metre parking spaces. • Minimum 5.8 metre aisle widths (for both one-way and two-way movements). Where parking is on one side of an aisle only and the other side is confined by a wall or high vertical obstruction, the aisle width shall be increased by 300mm. • At blind aisles (dead end), the aisle shall be extended a minimum of 1 metre beyond the last parking space. • In car parks open to the public, the maximum length of a blind aisle shall be equal to the width of 6 spaces (plus 1 metre), unless provision is made for cars to turn around at the end and drive out forwards.
3.4.4 Parking Demand	The GFA for the premises is: Public Internal: 579m^2 Public External (terrace): 164m^2 Public Amenities: 43m^2 B.O.H.: 252m^2 Of this 225m^2 is the sports bar and gaming area whilst the balance of 649m^2 is internal food and drink premises and back of house.

Item	Comment
	The parking rates *within commercial premises* recognise the opportunity for workers and patrons of surrounding businesses to be able to visit the tavern having parked elsewhere within the precinct. This provides for complimentary use of the parking recognising the hours of operation of a tavern over surrounding offices and retail premises. The parking demand is therefore: Food and Drink Premises 649m^2 - 1 car space per 25m^2 floor area the parking demand is **26 spaces.** External Terrace 164m^2 – 1 space per 25 m^2 floor area the parking demand is **7 spaces.** Sports Bar and Gaming 225m^2 - 1 car space per 7m^2 floor area the parking demand is **32 spaces.** Whilst a large part of the tavern has been set aside for family dining including an outside terrace and children's play area the site has been assessed with no discount for the outdoor dining even though this may be unavailable for large parts of the year due to unsuitable weather. This gives a **total demand for 65 spaces.** The proposed **supply of 66 spaces** (4 accessible) therefore meets this requirement. There are also 6 motorcycle spaces to be provided within the site as well as bicycle parking.
3.4.5 Service Vehicle Parking	Servicing by light commercial / utility vehicle e.g. Toyota HiAce can be accommodated within the standard parking spaces provided on site although a loading dock has been incorporated into the site design. A holding area has been nominated to cater for servicing by larger vehicles, including waste collection and deliveries.
3.4.6 Pedestrian and Bicycle Facilities	Internal footpaths and shared zones are provided allowing connectivity between the on site parking and the building access. Bicycle parking shall be provided within the designated area on the basement level.
Traffic Assessment	
4.1 Traffic Generation	Traffic generation for the proposed uses has been determined using rates provided in the GtTGD. The GtTGD however does not provide trip rates for hotels/pubs and notes that these vary from site to site and that driver behaviour to hotels and licensed premises has changed since the RTA undertook surveys in 1978 prior to the introduction of breath testing etc. . The traffic generation rates for restaurants are: • Peak hour vehicle trips = 5 vehicles per hour per 100m^2 GFA • Daily vehicle trips = 60 per 100m^2 GFA

<table>
<tr><th>Item</th><th>Comment</th></tr>
<tr><td></td><td>The above rate applies to the midweek evening peak hour, with no vehicle movements applied to the AM peak for this use.

Allowing for an 80/20 split inbound/outbound in the PM gives the following split of traffic for the restaurant component based on a floor area of 397m^2:

• PM peak = 20 trips (16 inbound / 8 outbound)

For daily trips the RMS Guide rate gives 238 trips per day. In addition there are staff movements which have not been included in this calculation as they are likely to arrive outside the road peaks. Allowing for 10 staff on site this would increase daily movements by 20 trips.

The traffic generation rates for the bar/gaming area is unlikely to be as high as that of the restaurant given the use of shared trips, taxis etc. As a worst case scenario however applying the same rate as the dining component to the 225m^2 will generate:

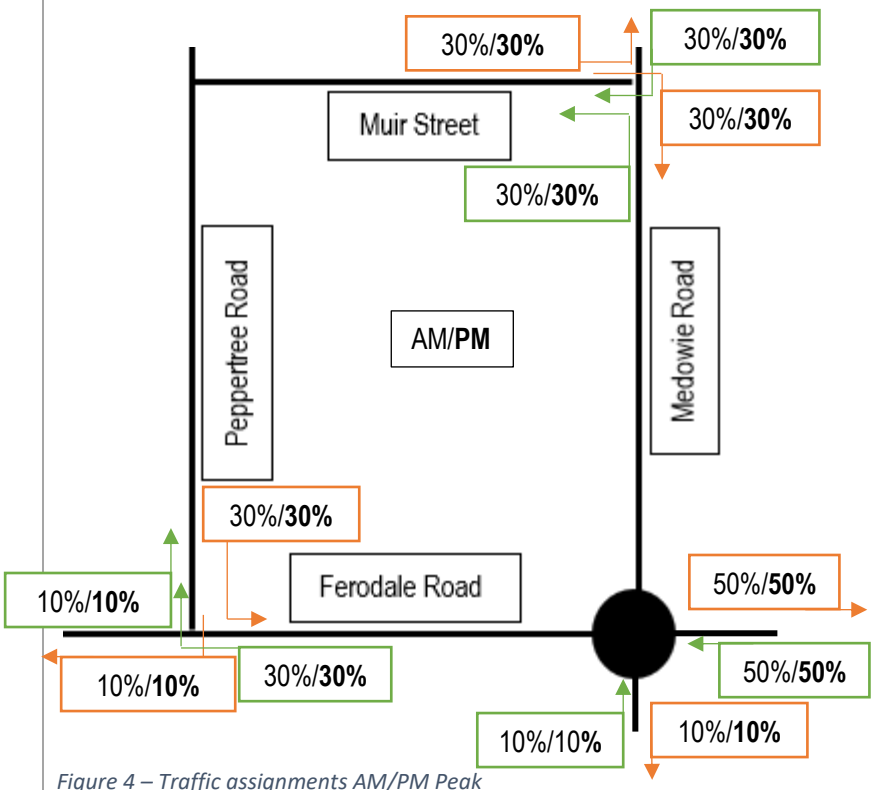
• PM peak = 12 trips (10inbound / 2 outbound)
• Daily trips 134trips per day (67 inbound/67 outbound).

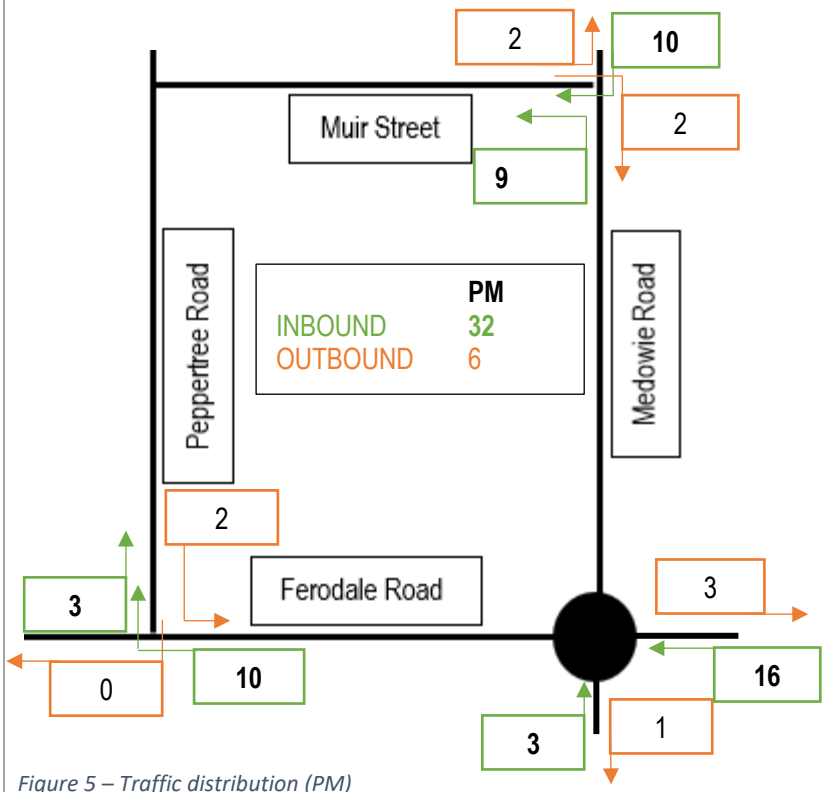
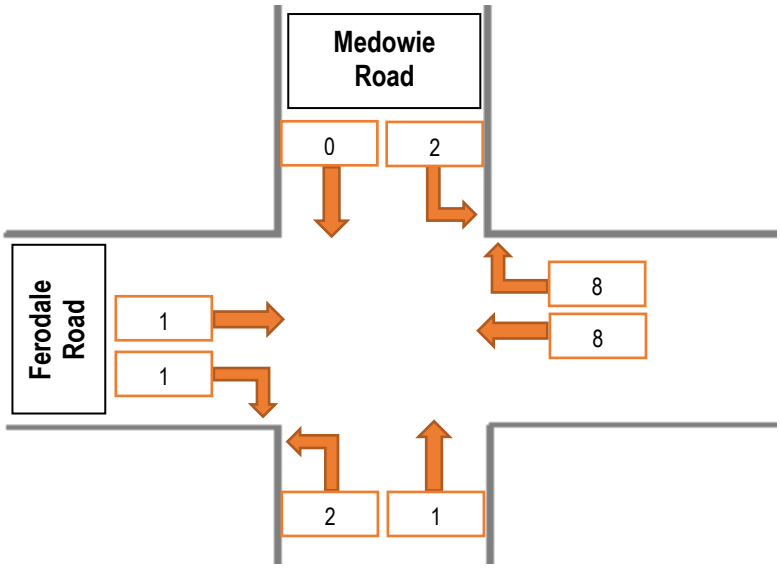
The total traffic generation for the development is outlined in the table below.

<table>
<tr><th>Use</th><th>PM Peak (Inbound/Outbound)</th><th>Daily</th></tr>
<tr><td>Food & Drink</td><td>20 trips (16 / 4)</td><td>258</td></tr>
<tr><td>Sports Bar/Gaming</td><td>12 trips (10 / 2)</td><td>134</td></tr>
<tr><td></td><td>32 trips (26 / 6)</td><td>392</td></tr>
</table>
</td></tr>
<tr><td>4.1.1 Daily and Seasonal Factors</td><td>Limited daily and seasonal variation in traffic movements associated with the development.</td></tr>
<tr><td>4.1.2 Pedestrian Movements</td><td>The site is located within easy walking distance of the Medowie Town Centre, as such it is considered there will be demand for pedestrian movements to the south of the subject site.</td></tr>
<tr><td>4.2 Hourly distribution of trips</td><td></td></tr>
<tr><td>4.2.1 Origin / destinations assignment</td><td>The provision of a Family Tavern will service demands within the local community, contributing to the existing commercial and retail developments within the surrounding Medowie Town Centre and supporting containment of trips within Medowie.

For the purpose of this assessment inbound vehicle movements have been assigned based on the surrounding residential development, with:

• 50% to/from the east along Ferodale Road
• 30% to/from the north along Medowie Road</td></tr>
</table>

Item	Comment
	• 10% to/from the west along Ferodale Road • 10% to/from the south along Medowie Road Outbound movements have been assigned to return in the same direction as approach. Based on the site location the following local road distribution has been allowed for: • All movements to/from the west have been assigned to access the site via Peppertree Road/Ferodale Road. • All movements to/from the north have been assigned to access the site via Muir Street/Medowie Road. • For movements to/from the south and east 50% have been assigned to the Muir Street access, with the remaining 50% assigned to the Peppertree Road access. Allowing for the above distribution of these vehicles on the local road network during the peak periods sees the following vehicle movements.  *Figure 4 – Traffic assignments AM/PM Peak* Applying the assignments in Figure 4 to the traffic generation outlined in Section 4.1 gives the distribution of traffic shown in Figure 5 for the development.

Item	Comment
	 *Figure 5 – Traffic distribution (PM)* Allowing for the trips through the Medowie Road / Ferodale Road roundabout to be distributed evenly to/from each access gives the below demands at this intersection.  *Figure 6 – Traffic distribution at Medowie Road / Ferodale Road (PM)*
4.3 Impact on Road Safety	Sight distances at the access driveways are consistent with the requirements of AS2890 allowing good visibility for drivers entering and exiting the site. The local roads operate in a safe and appropriate manner with good visibility and road alignment at the key intersections of Peppertree Road/Muir Street, Ferodale Road/Peppertree Road, Medowie Road/Muir Street and Medowie Road/Ferodale Road.

Item	Comment
	A review of the accident data provided by the RMS found no repeating cause for crash types at the key intersections, indicating there are no identifiable safety concerns. The intersection of Ferodale Road and Peppertree Road has been identified in the Medowie Traffic and Transport Study for upgrade to a roundabout, to improve the efficiency and safety of turning movements at this intersection. The development will result in increased traffic flows along Muir Street to access the Medowie Town Centre, however the Medowie Traffic and Transport Study identifies that most traffic to the town centre uses Ferodale Road. Muir Street was recently constructed by Council with consideration to the future traffic volumes and has been designed to cater for all turning movements at the intersection with Medowie Road. The intersection of Medowie Road and Ferodale Road has been identified for potential future upgrade to a 2-lane roundabout or traffic signals to cater for overall growth in Medowie and resulting increases in vehicle and pedestrian volumes. Observations indicate the existing roundabout operates in a safe and efficient manner, with the traffic flows associated with the development to have minimal impact upon the existing operation as shown in the Sidra Assessment to follow.
4.4 Impact of Generated Traffic	
4.4.1 Impact on Daily Traffic Flows	The development could generate an additional 395 trips per day with vehicles split across the two main access points and the surrounding local roads. These trips would however have an origin/destination primarily from Medowie and provide for the local containment of trips. There has also been no discount for the number of patrons who attend the tavern as part of their already being within the Medowie Town Centre for work or shopping. The Medowie Traffic and Transport Study classified these roads as collector identifying their role in the distribution of significant future traffic flows within the town centre. Medowie Road and Ferodale Road are major collector roads in the area, with spare capacity (as outlined in Section 2.3.1) to cater for the movements generated by this development. Peppertree Road and Muir Street are collector roads that provide access to commercial and retail land in the Medowie Town Centre. The impact of this traffic can therefore be accommodated within the local road network.
4.4.2 Peak Hour Impacts on Intersections	The key intersection of Ferodale Road and Peppertree Road has been identified by Council for upgrade and included in the Contributions Plan. The Medowie Traffic and Transport Study states a one lane circulating roundabout would be appropriate at this intersection, with the modelling allowing for future development in Medowie, including the proposed development site. As such, further assessment of this intersection is not required.

Item	Comment
	The Transport Study also nominates the intersection of Medowie Road and Ferodale Road for potential future upgrade to a 2-lane roundabout or signals. Sidra Intersection 8 has been used to analyse the impact of the development on this intersection to assess the capacity of the existing layout. The results for this assessment detailed following this table, with the outputs provided in **Attachment F**. The scenarios modelled included: • 2019 Existing Situation • 2019 Existing + Development • 2029 Future Design Year with background growth • 2029 Future Design Year with background growth + Other Development As discussed previously the intersection of Muir Street and Medowie Road was recently designed and constructed by Council with this being identified as an alternative route for vehicles to access the Medowie Town Centre. Upgrades to this intersection in association with other developments within the precinct will see a dedicated right turn lane provided. This will allow through traffic to pass vehicles waiting to turn right into Muir Street and as such improve the operation of this intersection. A Sidra assessment has been completed for this intersection, as per the above scenarios, with this confirming it has capacity to accommodate the proposed development. The results for this assessment are detailed following this table, with the outputs provided in **Attachment F**.
4.4.3 Impact of Construction Traffic	There will be a requirement for construction vehicles (light and heavy) to access the site with the majority of the construction work located on the site. Construction of the new site access shall require a Construction Traffic Management Plan outlining appropriate controls which shall be prepared by the contractor in conjunction with the CC for the project. The construction traffic will be less than the traffic associated with the completed development and as such is considered to have an acceptable impact upon the local road network.
4.4.4 Other Developments	There is a range of developments proposed within the Medowie Town Centre, with the area surrounding the subject site identified as part of the Master planning to accommodate the urban growth of Medowie. Such developments were noted in Section 2.9.
4.5 Public Transport	
4.5.1 Options for improving services	No requirement to improve services.
4.5.2 Pedestrian Access to Bus Stops	There is a bus stop located in close proximity to the site on Peppertree Road.
4.6 Recommended Works	
4.6.1 Improvements to Access and Circulation	Ensure access and internal roads / driveways are designed and constructed in accordance with Council requirements.

Item	Comment
4.6.2 Improvements to External Road Network	None required. The extension of Peppertree Road has been allowed for in the masterplan for the Medowie Town Centre and the intersection of Medowie Road and Muir Street has been identified for upgrades.
4.6.3 Improvements to Pedestrian Facilities	The site shall connect to pedestrian facilities in the area. The existing pedestrian facilities to the south of the site have recently been upgraded, with no further improvements required.
4.6.4 Effect of Recommended Works on Adjacent Developments	Nil.
4.6.5 Effect of Recommended Works on Public Transport Services	None.
4.6.6 Provision of LATM Measures	None Required.
4.6.7 Funding	All internal site work will be funded by the developer.

Sidra Modelling

Sidra modelling has been completed for the intersections of Medowie Road / Ferodale Road and Medowie Road / Muir Street to determine their capacity to support the additional traffic demands associated with the proposed development. The following scenarios were considered in the modelling:

- 2019 Existing Situation based on 2019 surveyed traffic flows,
- 2019 Existing + Allowance for the additional traffic associated with the proposed development,
- 2029 without development allowing for 2.4% growth per annum over 10 years (Consistent with the high growth rate URaP 2017),
- 2029 Future Design Year with development.

The results of this modelling are provided to follow.

Medowie Road / Ferodale Road

Table 2 - Sidra Results - Existing Situation 2019 (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	Approach	A / A	5.0 / 5.8	13.9 / 39.0
Ferodale Road (Westbound)	Approach	A / A	6.1 / 5.6	11.2 / 8.2
Medowie Road (Southbound)	Approach	A / A	6.0 / 6.8	12.7 / 11.5
Ferodale Road (Eastbound)	Approach	A / A	6.4 / 8.4	11.9 / 30.8
Overall	Approach	A / A	5.9 / 6.7	13.9 / 39.0

The results in Table 2 indicate that the roundabout intersection currently operates well with very minimal delays and queuing on all approaches during the peak hours, consistent with observations on site. Each approach operates well within its capacity providing an overall level of service A.

Table 3 - Sidra Results - Existing Situation 2019 with full development (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	Approach	A / A	5.0 / 5.9	13.9 / 39.7
Ferodale Road (Westbound)	Approach	A / A	6.2 / 5.7	11.2 / 8.7
Medowie Road (Southbound)	Approach	A / A	6.0 / 6.8	12.7 / 11.6
Ferodale Road (Eastbound)	Approach	A / A	6.4 / 8.5	11.9 / 31.0
Overall	Approach	A / A	5.9 / 6.7	13.9 / 49.7

Allowing for the increase in traffic demands associated with the proposed development (Section 4.2.1), the roundabout intersection will continue to operate to its current standard with no change to the current level of service on any approach and very minor increases in the average delays and queuing.

Table 4 - Sidra Results – 2029 design year with 24% growth (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	Approach	A / A	5.5 / 10.0	20.4 / 94.4
Ferodale Road (Westbound)	Approach	A / A	7.3 / 6.3	17.4 / 12.5
Medowie Road (Southbound)	Approach	A / A	6.7 / 8.0	18.9 / 19.7
Ferodale Road (Eastbound)	Approach	A / B	6.8 / 14.7	17.1 / 74.5
Overall	Approach	A / A	6.5 / 10.6	20.4 / 94.4

For the future design year, allowing for 24% growth over 10 years, the intersection is able to operate within its capacity providing an overall level of service A. Background growth will see some approaches experience increases in the average delays and additional queuing however these remain within acceptable limits, with the Ferodale Road (Eastbound) approach seeing operation at LoS B.

Table 5 - Sidra Results 2029 design year with 24% growth + development (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	Approach	A / A	5.5 / 10.3	20.4 / 96.9
Ferodale Road (Westbound)	Approach	A / A	7.3 / 6.5	17.4 / 13.2
Medowie Road (Southbound)	Approach	A / A	6.7 / 8.0	18.9 / 19.6
Ferodale Road (Eastbound)	Approach	A / B	6.8 / 14.8	17.1 / 75.0
Overall	Approach	A / A	6.5 / 10.8	20.4 / 96.9

For the future design year including the development, allowing for 24% growth over 10 years, the intersection will operate in a similar manner to the scenario for background growth only given the low development flows.

Overall, the intersection of Medowie Road and Ferodale Road provides sufficient spare capacity to support the proposed development, with increased delays at the intersection associated with the high background growth applied. The high background growth rate allows for future development, including within the Medowie Town Centre.

Medowie Road / Muir Street

The recorded flows along Medowie Road to the north of Ferodale Road provide an accurate reflection of two-way flows passing Muir Street. Observations on site indicate that the turning movements in/out of Muir Street are low at this intersection. To be conservative an allowance for 100 vehicles per hour has been made in the peak periods, with this considered to overestimate the existing traffic at this intersection. This traffic has been applied with an 80/20 inbound/outbound split in the PM, with vehicles split 50/50 to the north and south along Medowie Road. The Sidra results are provided below.

Table 6 - Sidra Results - Existing Situation 2019 (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	Left turn	A / A	4.6 / 4.6	0.0 / 0.0
Medowie Road (Southbound)	Right turn	A / A	5.5 / 6.5	2.5 / 0.8
Muir Street	Left turn	A / A	5.1 / 6.2	0.2 / 1.0
	Right turn	A / A	7.1 / 8.2	0.3 / 1.5

The results above indicate that the intersection operates at the highest LoS, with very minimal delays and queuing for critical movements during the peak hours.

Allowing for the traffic generated by the proposed development (Section 4.2.1) gives the following Sidra results.

Table 7 - Sidra Results - Existing Situation 2019 with full development (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	Left turn	A / A	4.6 / 4.6	0.0 / 0.0
Medowie Road (Southbound)	Right turn	A / A	5.5 / 7.1	2.5 / 0.8
Muir Street	Left turn	A / A	5.2 / 6.3	0.2 / 1.2
	Right turn	A / A	7.2 / 8.5	0.3 / 1.4

Allowing for the increase in traffic demands associated with the proposed development, the intersection will continue to operate to its current standard with no change to the current level of service on any approach and very minor increases in the average delays and queuing.

Allowing for background growth of 2.4% per annum along each leg gives the following Sidra results.

Table 8 - Sidra Results – 2029 design year with development + 24% growth (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	Left turn	A / A	4.6 / 4.6	0.0 / 0.0
Medowie Road (Southbound)	Right turn	A / A	5.9 / 7.9	3.5 / 1.0
Muir Street	Left turn	A / A	5.4 / 6.9	0.3 / 1.6
	Right turn	A / A	8.2 / 9.9	0.4 / 2.1

For the future design year, allowing for 24% growth over 10 years, the intersection will continue to operate within its capacity providing an overall level of service A. Increased traffic demands will see approaches experience minor increases in the average delays and additional queuing however these remain well within acceptable limits.

Site Photos

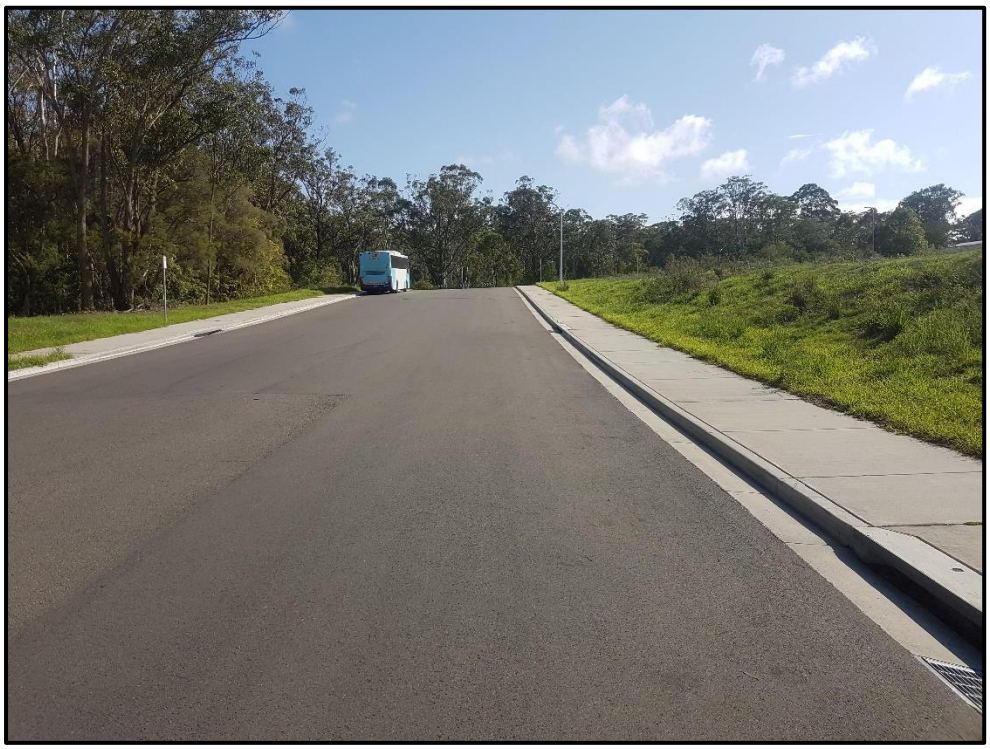


Photo 1 – Cross section of Peppertree Road looking north, subject site to the right

Photo 2 - Cross section of Peppertree Road looking south, with Muir Street to the left

Conclusion

From the above assessment and the review of the proposal and associated plans against the requirements of the Guide to Traffic Generating Developments and Austroads Guide to Traffic Management, it is considered that the proposed development should have no objections raised on traffic and access grounds.

The potential for additional traffic movements generated by the development will have an acceptable impact on the surrounding road network. The SIDRA results show that the key intersection of Medowie Road and Ferodale Road will continue to operate at an acceptable Level of Service for the 2029 design horizon allowing for background growth and development traffic flows.

The intersection of Medowie Road and Muir Street has been earmarked for upgrade in conjunction with development in the area and shall provide a dedicated right turn lane into Muir Street. It has sufficient capacity to accommodate the proposed development and background growth.

The intersection of Ferodale Road and Peppertree Road has been identified as part of Council's Contributions Plan for upgrade to a roundabout in order to accommodate future development in Medowie, including the subject site. The layout of this intersection was determined as part of modelling completed as part of the Medowie Traffic and Transport Study, with this upgrade sufficient to cater for the proposed development and allowing for other development in the surrounding area.

Similarly, the extension of Peppertree Road north past the site has been allowed for in the planning for the Medowie Town Centre.

Parking is provided in accordance with the DCP allowing for the mix of pub and dining uses. No discounts have been applied for shared use of the bar and dining room by patrons nor for the external terrace which may see reduced use during the winter and during hot or wet weather. The parking is therefore suitable for the proposed development.

It is considered the proposal therefore can meet the requirements of the Development Control Plan in relation to traffic, parking and access as well as the overall planning for the subject site.

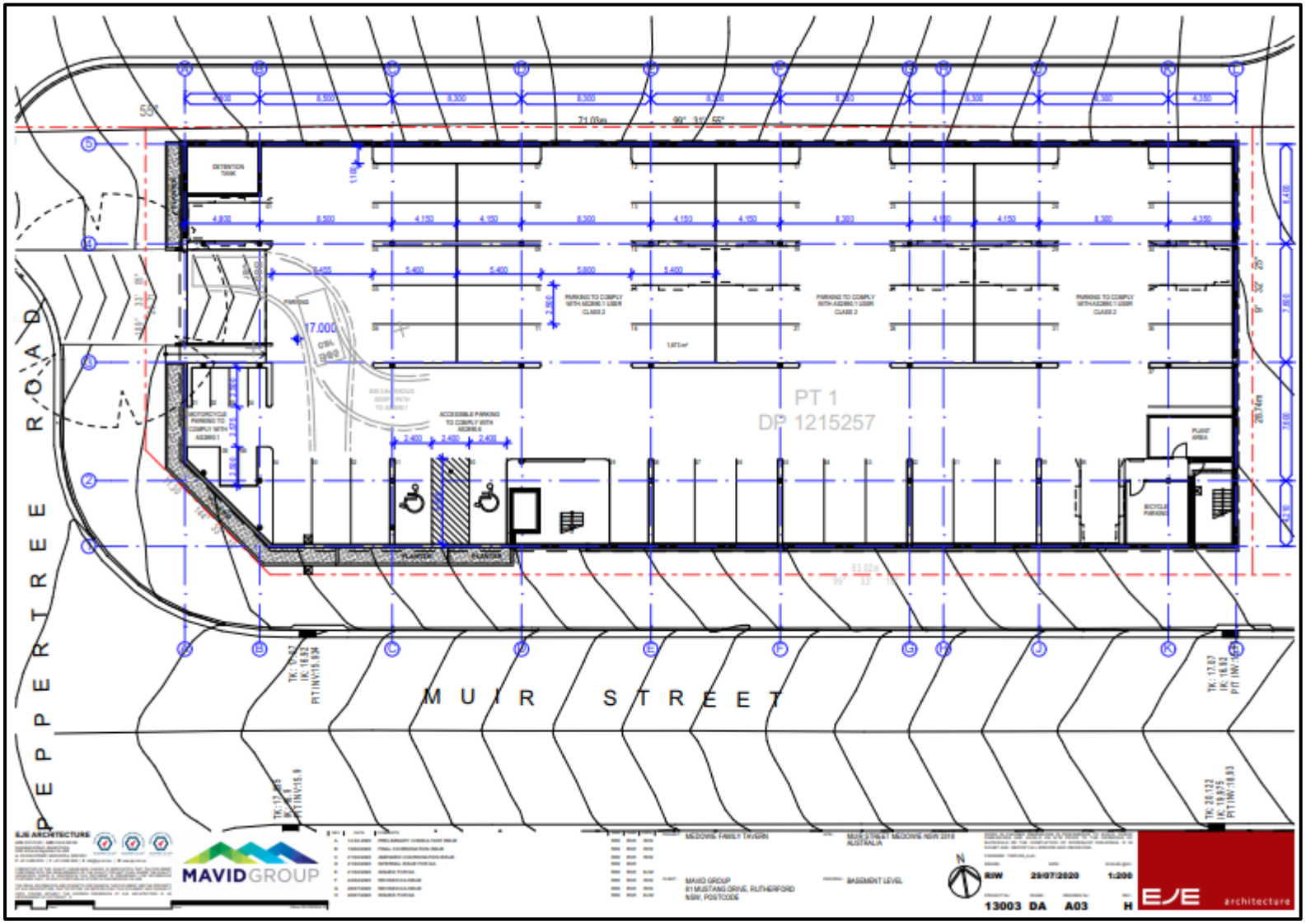
Please feel free to contact our office on 4032 7979, should you have any queries.

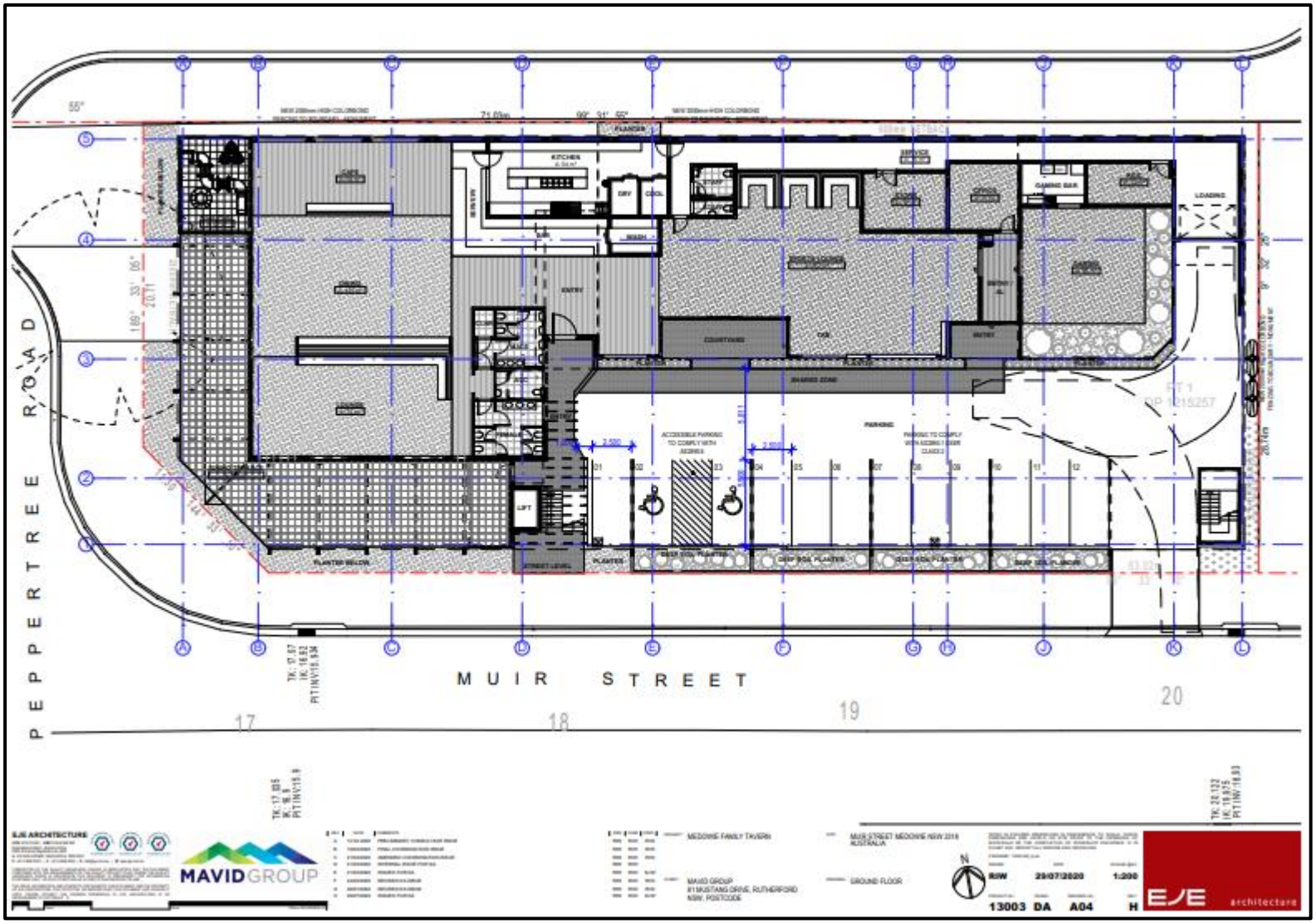
Yours sincerely

Tyler Neve
Traffic Engineer

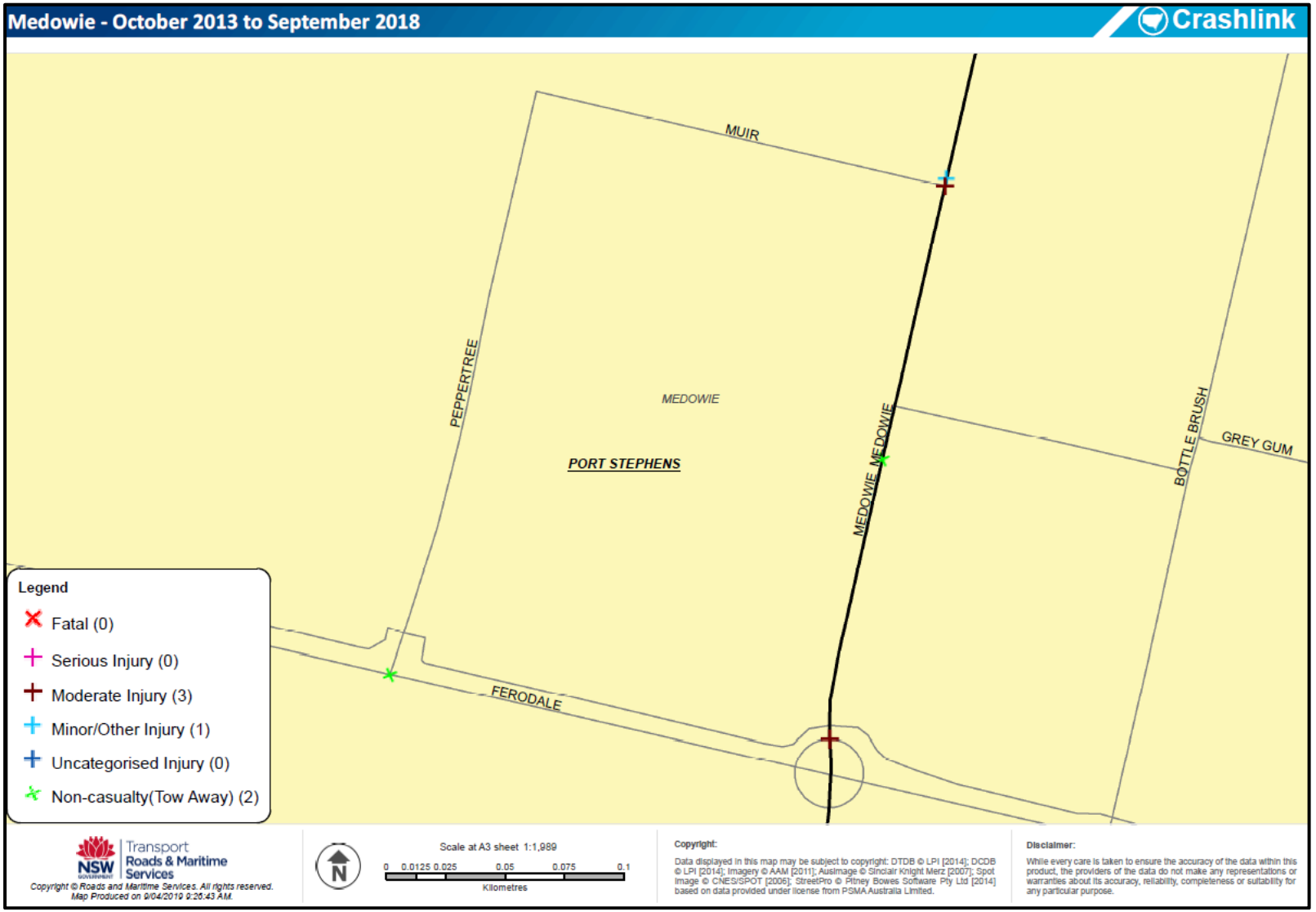
Attached:
A – Site Plan
B – Accident Data
C – Shared Paths
D – Medowie Town Centre Master plan
E – Survey Data
F – Sidra Analysis

Attachment A Site Plan





Attachment B RMS Accident Data



Detailed Crash Report

Transport for NSW — Centre for Road Safety

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors
						Natural Lighting																		S F
Hunter Region																								
Port Stephens LGA																								
Medowie																								
Ferodale Rd																								
1108346	S	16/07/2016	Sat	12:50	at	PEPPERTREE RD	TJN	STR	Fine	Dry	50	2	CAR	F46	S in PEPPERTREE RD	Unk	Turning right	NC	0	0	0	0	0	
E62766178						Daylight	RUM	13	Right near				4WD	F22	E in FERODALE RD	Unk	Proceeding in lane							
Medowie Rd																								
1083690	S	31/10/2015	Sat	15:05	at	NUMBER 785 HN	2WY	STR	Fine	Dry	50	2	CAR	M48	N in MEDOWIE RD	Unk	Proceeding in lane	NC	0	0	0	0	0	
E59470756						Daylight	RUM	30	Rear end				CAR	M69	N in MEDOWIE RD	Unk	Proceeding in lane							
1114461	P	28/07/2016	Thu	05:00	at	FERODALE RD	RDB	CRV	Fine	Dry	50	2	LOR	M38	S in MEDOWIE RD	30	Proceeding in lane	MC	0	0	1	0	0	
E62511229						Darkness	RUM	10	Cross traffic				CAR	M22	E in FERODALE RD	Unk	Proceeding in lane							
1119062	P	18/09/2016	Sun	10:40	at	FERODALE RD	RDB	STR	Overcast	Wet	50	1	M/C	M18	E in FERODALE RD	10	Proceeding in lane	MC	0	0	1	0	0	
E62674631						Daylight	RUM	74	On road-out of cont.															
1116547	S	25/09/2016	Sun	18:00	at	MUIR ST	TJN	STR	Fine	Wet	50	2	4WD	M26	S in MEDOWIE RD	Unk	Along footpath	OC	0	0	0	1	0	
E63215141						Dusk	RUM	49	Other manoeuvring				CAR	M U	E in MUIR ST	0	Stationary							
1154355	P	22/09/2017	Fri	14:00	at	MUIR ST	TJN	STR	Fine	Dry	50	1	CAR	F16	E in MUIR ST	5	Turning left	MC	0	0	1	0	0	S
E66034643						Daylight	RUM	87	Off lft/lft bnd=>obj				Signpost											

Report Totals: Crashes: 6 Fatal Crashes(FC): 0 Serious Injury Crashes(SC):0 Moderate Injury Crashes(MC): 3 Minor/Other Injury Crashes(OC): 1 Uncategorised Injury Crashes(UC): 0 Non-Casualty Crashes(NC): 2

Killed(K): 0 Seriously Injured(S): 0 Moderately Injured(M): 3 Minor/Other Injured(O): 1 Uncategorised Injured(U): 0

Crashid dataset Medowie - October 2013 to September 2018

Note: Ordered by: Crash Date.

Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data.
Reporting yrs 1996-2004 & 2018 Q4 onwards contain uncategorised inj crashes.

Summary Crash Report

Transport for NSW — Centre for Road Safety

# Crash Type		
Car Crash	5	83.3%
Light Truck Crash	0	0.0%
Rigid Truck Crash	1	16.7%
Articulated Truck Crash	0	0.0%
'Heavy Truck Crash	*(1)*	*(16.7%)*
Bus Crash	0	0.0%
"Heavy Vehicle Crash	*(1)*	*(16.7%)*
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	1	16.7%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	5	83.3%
Non intersection	1	16.7%

* Up to 10 metres from an intersection

Collision Type		
Single Vehicle	2	33.3%
Multi Vehicle	4	66.7%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	0	0.0%
Other Classified Road	5	83.3%
Unclassified Road	1	16.7%

Contributing Factors		
Speeding	1	16.7%
Fatigue	0	0.0%

Weather		
Fine	5	83.3%
Rain	0	0.0%
Overcast	1	16.7%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	2	33.3%
Dry	4	66.7%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	0	0.0%
Daylight	4	66.7%
Dusk	1	16.7%
Darkness	1	16.7%

Crash Movement		
Intersection, adjacent approaches	2	33.3%
Head-on (not overtaking)	0	0.0%
Opposing vehicles; turning	0	0.0%
U-turn	0	0.0%
Rear-end	1	16.7%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	0	0.0%
Out of control on straight	1	16.7%
Off road, on curve	0	0.0%
Off road on curve, hit object	0	0.0%
Out of control on curve	0	0.0%
Other crash type	2	33.3%

Speed Limit				
40 km/h or less	0	0.0%	80 km/h zone	0	0.0%
50 km/h zone	6	100.0%	90 km/h zone	0	0.0%
60 km/h zone	0	0.0%	100 km/h zone	0	0.0%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

~ 07:30-09:30 or 14:30-17:00 on school days | ~ 40km/h or less 0 0.0% | ~ School Travel Time Involvement 0 0.0%

Day of the Week												
Monday	0	0.0%	Wednesday	0	0.0%	Friday	1	16.7%	Sunday	2	33.3%	WEEKEND	4	66.7%
Tuesday	0	0.0%	Thursday	1	16.7%	Saturday	2	33.3%	WEEKDAY	2	33.3%			

CRASHES	6	
Fatal	0	0.0%
Serious inj.	0	0.0%
Moderate inj.	3	50.0%
Minor/Other inj.	1	16.7%
Uncategorised inj.	0	0.0%
Non-casualty	2	33.3%

Self Reported Crash	3	50%

Time Group		% of Day	
00:01 - 02:59	0	0.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	1	16.7%	4.2%
06:00 - 06:59	0	0.0%	4.2%
07:00 - 07:59	0	0.0%	4.2%
08:00 - 08:59	0	0.0%	4.2%
09:00 - 09:59	0	0.0%	4.2%
10:00 - 10:59	1	16.7%	4.2%
11:00 - 11:59	0	0.0%	4.2%
12:00 - 12:59	1	16.7%	4.2%
13:00 - 13:59	0	0.0%	4.2%
14:00 - 14:59	1	16.7%	4.2%
15:00 - 15:59	1	16.7%	4.2%
16:00 - 16:59	0	0.0%	4.2%
17:00 - 17:59	0	0.0%	4.2%
18:00 - 18:59	1	16.7%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	0	0.0%	8.3%

Street Lighting Off/Nil		% of Dark
0	of 1	in Dark 0.0%

CASUALTIES	4	
Killed	0	0.0%
Seriously inj.	0	0.0%
Moderately inj.	3	75.0%
Minor/Other inj.	1	25.0%
Uncategorised inj.	0	0.0%
^ Unrestrained	0	0.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Crashes		Casualties
1	2017	1
4	2016	3
1	2015	0

McLean Periods		% Week
A	1	16.7%	17.9%
B	0	0.0%	7.1%
C	1	16.7%	17.9%
D	1	16.7%	3.5%
E	1	16.7%	3.6%
F	0	0.0%	10.7%
G	0	0.0%	7.1%
H	2	33.3%	7.1%
I	0	0.0%	12.5%
J	0	0.0%	10.7%

#Holiday Periods

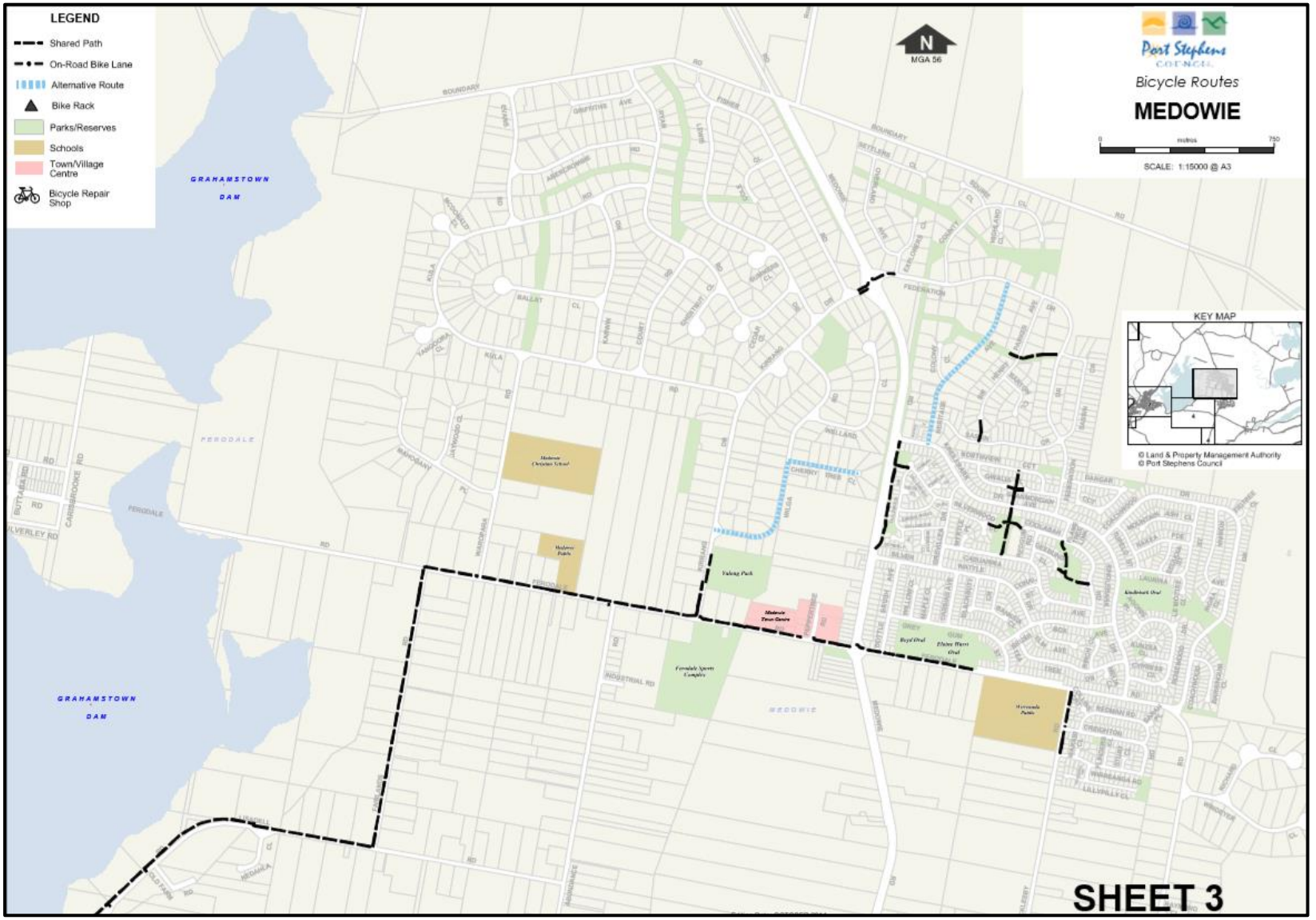
New Year	0	0.0%	Easter	0	0.0%	Queen's BD	0	0.0%	Christmas	0	0.0%	Easter SH	0	0.0%	Sept./Oct. SH	1	16.7%
Aust. Day	0	0.0%	Anzac Day	0	0.0%	Labour Day	0	0.0%	January SH	0	0.0%	June/July SH	1	16.7%	December SH	0	0.0%

Crashid dataset Medowie - October 2013 to September 2018

Note: Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data. Reporting yrs 1996-2004 & 2018 Q4 onwards contain uncategorised inj crashes.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Attachment C Shared Paths

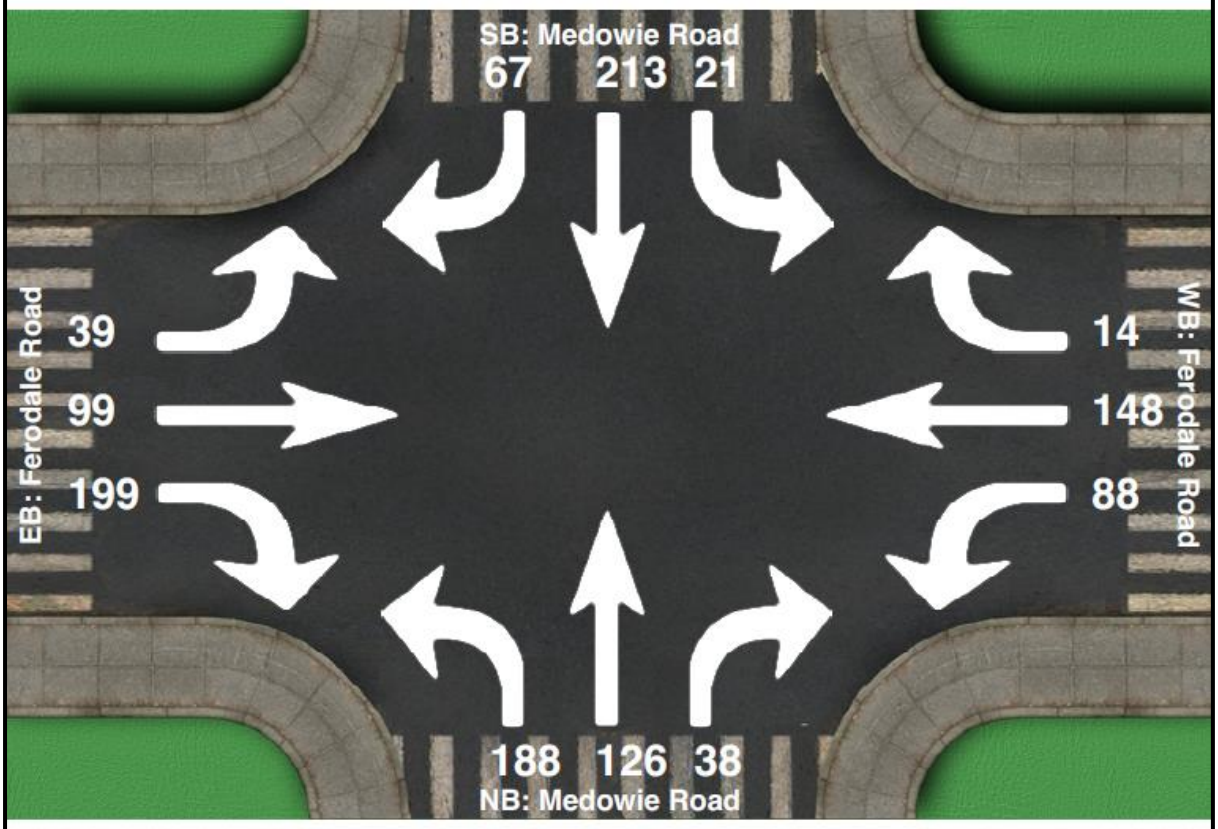


Attachment D Medowie Town Centre Masterplan

Attachment E Survey Data

Medowie Road / Ferodale Road

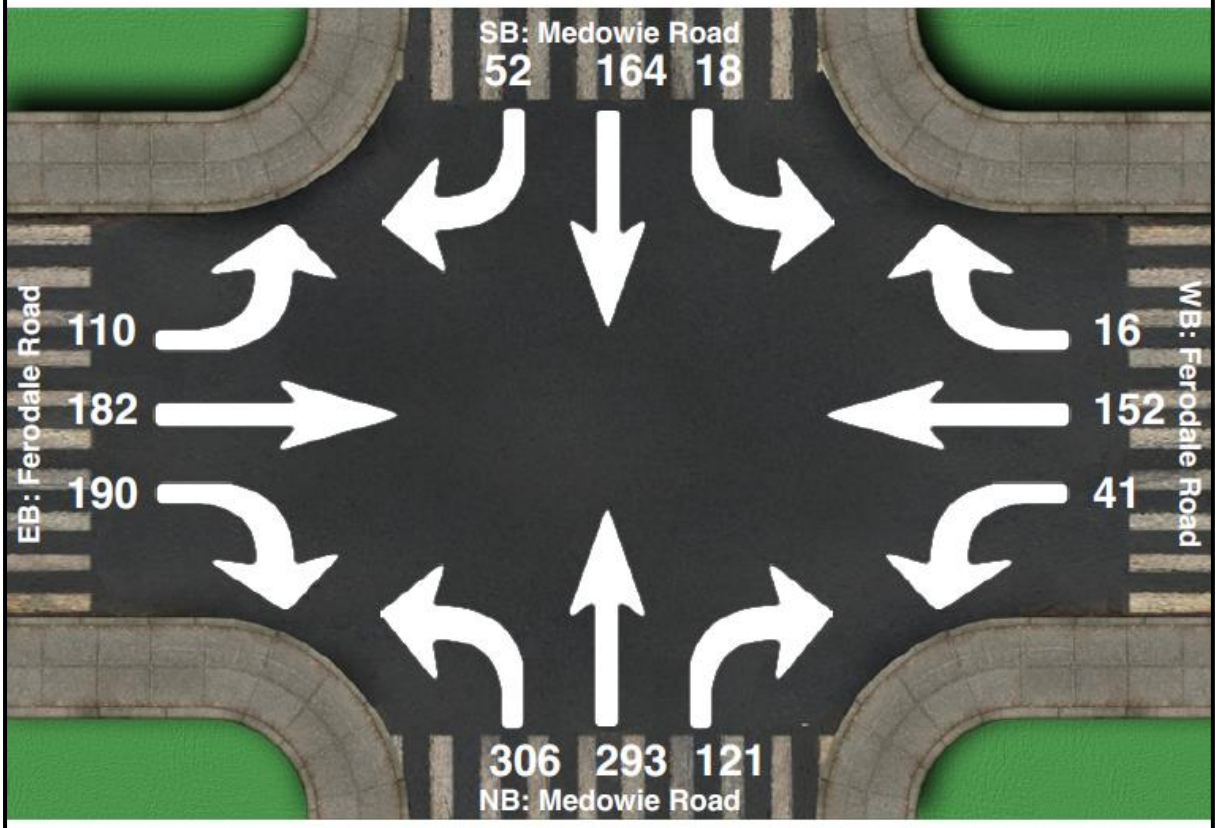
Location: Medowie Road at Ferodale Road, Medowie
GPS Coordinates:
Date: 2019-03-26
Day of week: Tuesday
Weather: Cloudy
Analyst: TN



Intersection Peak Hour

08:15 - 09:15

Location:	Medowie Road at Ferodale Road, Medowie
GPS Coordinates:	
Date:	2019-03-26
Day of week:	Tuesday
Weather:	Cloudy
Analyst:	TN

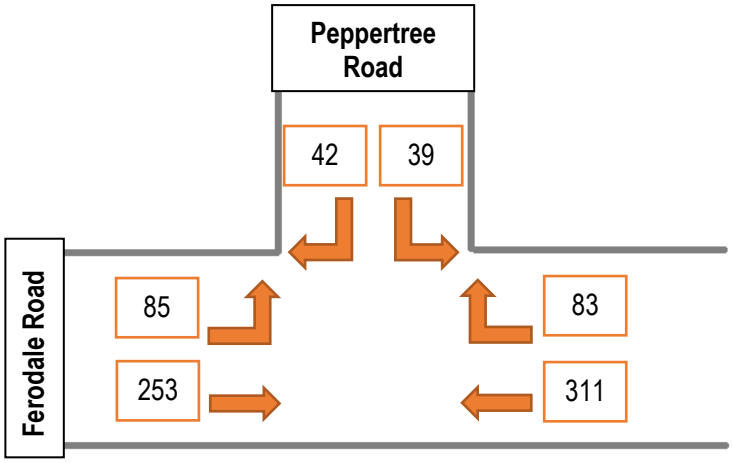


Intersection Peak Hour

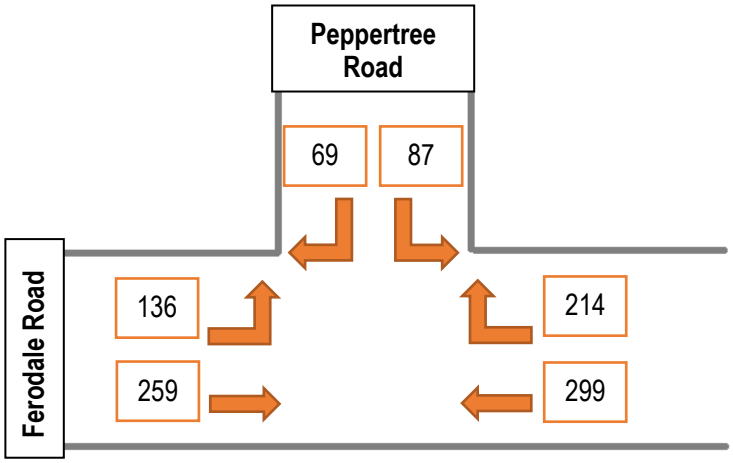
16:30 - 17:30

Ferodale Road / Peppertree Road

Intersection Peak Hour
8:15 – 9:15



Intersection Peak Hour
16:30 – 17:30



Attachment F Sidra Analysis

Criteria for Interpreting Results of Sidra

1-Level of Service (LoS)

LoS	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Good	Good
B	Good, with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but requires accident study
D	Operating near capacity	Near capacity and requires accident study
E	At capacity, excessive delay: roundabout requires other control method	At capacity, requires other control mode
F	Unsatisfactory, requires other control mode or additional capacity	Unsatisfactory, requires other control mode

2-Average Vehicle Delay (AVD)

The AVD is a measure of operational performance of an intersection relating to its LoS. The average delay should be taken as a guide only for an average intersection. Longer delays may be tolerated at some intersections where delays are expected by motorists (e.g. those in inner city areas or major arterial roads).

LoS	Average Delay / Vehicle (secs)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays: roundabout requires other control mode	At capacity; requires other control mode
F	Exceeding 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode

3-Degree of Saturation (D/S)

The D/S of an intersection is usually taken as the highest ratio of traffic volumes on an approach to an intersection compared with the theoretical capacity, and is a measure of the utilisation of available green time. For intersections controlled by traffic signals, both queues and delays increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its D/S is kept below 0.75. When D/S exceeds 0.9, queues are expected.

MOVEMENT SUMMARY

Site: 101 [2019 AM Medowie Road / Ferodale Road]

Medowie Road / Ferodale Road
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	198	3.7	0.338	4.6	LOS A	1.9	13.9	0.45	0.57	0.45	46.0
2	T1	133	8.7	0.338	4.6	LOS A	1.9	13.9	0.45	0.57	0.45	46.9
3	R2	40	0.0	0.338	8.3	LOS A	1.9	13.9	0.45	0.57	0.45	47.0
Approach		371	5.1	0.338	5.0	LOS A	1.9	13.9	0.45	0.57	0.45	46.5
East: Ferodale Road												
4	L2	93	1.1	0.286	5.9	LOS A	1.6	11.2	0.60	0.68	0.60	45.6
5	T1	156	1.4	0.286	5.9	LOS A	1.6	11.2	0.60	0.68	0.60	46.5
6	R2	15	7.1	0.286	9.9	LOS A	1.6	11.2	0.60	0.68	0.60	46.4
Approach		263	1.6	0.286	6.1	LOS A	1.6	11.2	0.60	0.68	0.60	46.2
North: Medowie Road												
7	L2	22	0.0	0.317	5.1	LOS A	1.7	12.7	0.52	0.63	0.52	45.5
8	T1	224	7.0	0.317	5.2	LOS A	1.7	12.7	0.52	0.63	0.52	46.4
9	R2	71	3.0	0.317	8.9	LOS A	1.7	12.7	0.52	0.63	0.52	46.3
Approach		317	5.6	0.317	6.0	LOS A	1.7	12.7	0.52	0.63	0.52	46.3
West: Ferodale Road												
10	L2	41	10.3	0.303	4.4	LOS A	1.7	11.9	0.39	0.59	0.39	45.2
11	T1	104	0.0	0.303	4.2	LOS A	1.7	11.9	0.39	0.59	0.39	46.2
12	R2	209	1.5	0.303	8.0	LOS A	1.7	11.9	0.39	0.59	0.39	46.1
Approach		355	2.1	0.303	6.4	LOS A	1.7	11.9	0.39	0.59	0.39	46.0
All Vehicles		1305	3.7	0.338	5.9	LOS A	1.9	13.9	0.48	0.61	0.48	46.2

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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2019 PM Medowie Road / Ferodale Road]

Medowie Road / Ferodale Road
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	322	0.7	0.643	5.2	LOS A	5.5	39.0	0.62	0.63	0.63	45.5
2	T1	308	2.4	0.643	5.2	LOS A	5.5	39.0	0.62	0.63	0.63	46.4
3	R2	127	2.5	0.643	9.0	LOS A	5.5	39.0	0.62	0.63	0.63	46.4
Approach		758	1.7	0.643	5.8	LOS A	5.5	39.0	0.62	0.63	0.63	46.0
East: Ferodale Road												
4	L2	43	0.0	0.225	5.3	LOS A	1.2	8.2	0.53	0.62	0.53	45.8
5	T1	160	0.0	0.225	5.3	LOS A	1.2	8.2	0.53	0.62	0.53	46.7
6	R2	17	0.0	0.225	9.1	LOS A	1.2	8.2	0.53	0.62	0.53	46.6
Approach		220	0.0	0.225	5.6	LOS A	1.2	8.2	0.53	0.62	0.53	46.5
North: Medowie Road												
7	L2	19	0.0	0.280	5.9	LOS A	1.6	11.5	0.63	0.71	0.63	45.2
8	T1	173	1.8	0.280	5.9	LOS A	1.6	11.5	0.63	0.71	0.63	46.0
9	R2	55	1.9	0.280	9.7	LOS A	1.6	11.5	0.63	0.71	0.63	46.0
Approach		246	1.7	0.280	6.8	LOS A	1.6	11.5	0.63	0.71	0.63	45.9
West: Ferodale Road												
10	L2	116	2.7	0.548	7.0	LOS A	4.3	30.8	0.73	0.82	0.81	44.5
11	T1	192	0.0	0.548	6.9	LOS A	4.3	30.8	0.73	0.82	0.81	45.4
12	R2	200	1.6	0.548	10.7	LOS A	4.3	30.8	0.73	0.82	0.81	45.3
Approach		507	1.2	0.548	8.4	LOS A	4.3	30.8	0.73	0.82	0.81	45.1
All Vehicles		1732	1.3	0.643	6.7	LOS A	5.5	39.0	0.64	0.70	0.67	45.8

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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2019 AM Medowie Road / Ferodale Road + Development]

Medowie Road / Ferodale Road
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	198	3.7	0.338	4.6	LOS A	1.9	13.9	0.45	0.57	0.45	46.0
2	T1	133	8.7	0.338	4.6	LOS A	1.9	13.9	0.45	0.57	0.45	46.9
3	R2	40	0.0	0.338	8.3	LOS A	1.9	13.9	0.45	0.57	0.45	47.0
Approach		371	5.1	0.338	5.0	LOS A	1.9	13.9	0.45	0.57	0.45	46.5
East: Ferodale Road												
4	L2	93	1.1	0.286	5.9	LOS A	1.6	11.2	0.60	0.68	0.60	45.6
5	T1	156	1.4	0.286	5.9	LOS A	1.6	11.2	0.60	0.68	0.60	46.5
6	R2	15	7.1	0.286	10.0	LOS A	1.6	11.2	0.60	0.68	0.60	46.6
Approach		263	1.6	0.286	6.2	LOS A	1.6	11.2	0.60	0.68	0.60	46.2
North: Medowie Road												
7	L2	22	0.0	0.317	5.1	LOS A	1.7	12.7	0.52	0.63	0.52	45.7
8	T1	224	7.0	0.317	5.2	LOS A	1.7	12.7	0.52	0.63	0.52	46.4
9	R2	71	3.0	0.317	8.9	LOS A	1.7	12.7	0.52	0.63	0.52	46.3
Approach		317	5.6	0.317	6.0	LOS A	1.7	12.7	0.52	0.63	0.52	46.3
West: Ferodale Road												
10	L2	41	10.3	0.303	4.4	LOS A	1.7	11.9	0.39	0.59	0.39	45.2
11	T1	104	0.0	0.303	4.2	LOS A	1.7	11.9	0.39	0.59	0.39	46.2
12	R2	209	1.5	0.303	8.0	LOS A	1.7	11.9	0.39	0.59	0.39	46.1
Approach		355	2.1	0.303	6.4	LOS A	1.7	11.9	0.39	0.59	0.39	46.0
All Vehicles		1305	3.7	0.338	5.9	LOS A	1.9	13.9	0.48	0.61	0.48	46.3

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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2019 PM Medowie Road / Ferodale Road + Development]

Medowie Road / Ferodale Road
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	322	0.7	0.646	5.3	LOS A	5.6	39.7	0.62	0.64	0.64	45.5
2	T1	308	2.4	0.646	5.3	LOS A	5.6	39.7	0.62	0.64	0.64	46.4
3	R2	127	2.5	0.646	9.1	LOS A	5.6	39.7	0.62	0.64	0.64	46.4
Approach		758	1.7	0.646	5.9	LOS A	5.6	39.7	0.62	0.64	0.64	46.0
East: Ferodale Road												
4	L2	43	0.0	0.231	5.3	LOS A	1.2	8.7	0.53	0.62	0.53	45.8
5	T1	160	3.3	0.231	5.3	LOS A	1.2	8.7	0.53	0.62	0.53	46.7
6	R2	17	25.0	0.231	9.7	LOS A	1.2	8.7	0.53	0.62	0.53	46.3
Approach		220	4.3	0.231	5.7	LOS A	1.2	8.7	0.53	0.62	0.53	46.5
North: Medowie Road												
7	L2	19	0.0	0.280	6.1	LOS A	1.6	11.6	0.63	0.71	0.63	45.8
8	T1	173	1.8	0.280	5.9	LOS A	1.6	11.6	0.63	0.71	0.63	46.1
9	R2	55	1.9	0.280	9.7	LOS A	1.6	11.6	0.63	0.71	0.63	46.0
Approach		246	1.7	0.280	6.8	LOS A	1.6	11.6	0.63	0.71	0.63	46.0
West: Ferodale Road												
10	L2	116	2.7	0.549	7.0	LOS A	4.4	31.0	0.74	0.83	0.81	44.5
11	T1	192	0.0	0.549	6.9	LOS A	4.4	31.0	0.74	0.83	0.81	45.4
12	R2	200	1.6	0.549	10.8	LOS A	4.4	31.0	0.74	0.83	0.81	45.3
Approach		507	1.2	0.549	8.5	LOS A	4.4	31.0	0.74	0.83	0.81	45.2
All Vehicles		1732	1.9	0.646	6.7	LOS A	5.6	39.7	0.65	0.70	0.68	45.8

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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2029 AM Medowie Road / Ferodale Road]

Medowie Road / Ferodale Road with 2.4% growth all movements
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	245	3.7	0.440	5.1	LOS A	2.8	20.4	0.56	0.63	0.56	45.8
2	T1	164	8.7	0.440	5.1	LOS A	2.8	20.4	0.56	0.63	0.56	46.7
3	R2	50	0.0	0.440	8.7	LOS A	2.8	20.4	0.56	0.63	0.56	46.7
Approach		459	5.1	0.440	5.5	LOS A	2.8	20.4	0.56	0.63	0.56	46.2
East: Ferodale Road												
4	L2	115	1.1	0.396	7.1	LOS A	2.5	17.4	0.72	0.78	0.72	45.1
5	T1	193	1.4	0.396	7.1	LOS A	2.5	17.4	0.72	0.78	0.72	46.0
6	R2	18	7.1	0.396	11.1	LOS A	2.5	17.4	0.72	0.78	0.72	45.9
Approach		326	1.6	0.396	7.3	LOS A	2.5	17.4	0.72	0.78	0.72	45.7
North: Medowie Road												
7	L2	27	0.0	0.422	5.8	LOS A	2.6	18.9	0.63	0.70	0.63	45.2
8	T1	278	7.0	0.422	5.9	LOS A	2.6	18.9	0.63	0.70	0.63	46.0
9	R2	87	3.0	0.422	9.6	LOS A	2.6	18.9	0.63	0.70	0.63	46.0
Approach		393	5.6	0.422	6.7	LOS A	2.6	18.9	0.63	0.70	0.63	45.9
West: Ferodale Road												
10	L2	51	10.3	0.391	4.7	LOS A	2.4	17.1	0.48	0.63	0.48	45.0
11	T1	129	0.0	0.391	4.5	LOS A	2.4	17.1	0.48	0.63	0.48	46.0
12	R2	260	1.5	0.391	8.3	LOS A	2.4	17.1	0.48	0.63	0.48	45.9
Approach		440	2.1	0.391	6.8	LOS A	2.4	17.1	0.48	0.63	0.48	45.8
All Vehicles		1619	3.7	0.440	6.5	LOS A	2.8	20.4	0.59	0.68	0.59	45.9

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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2029 PM Medowie Road / Ferodale Road]

Medowie Road / Ferodale Road with 2.4% growth all movements
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	399	0.7	0.835	9.4	LOS A	13.3	94.4	0.90	0.90	1.13	43.7
2	T1	382	2.4	0.835	9.4	LOS A	13.3	94.4	0.90	0.90	1.13	44.5
3	R2	158	2.5	0.835	13.2	LOS A	13.3	94.4	0.90	0.90	1.13	44.5
Approach		940	1.7	0.835	10.0	LOS A	13.3	94.4	0.90	0.90	1.13	44.2
East: Ferodale Road												
4	L2	54	0.0	0.307	6.1	LOS A	1.8	12.5	0.64	0.70	0.64	45.4
5	T1	198	0.0	0.307	6.0	LOS A	1.8	12.5	0.64	0.70	0.64	46.3
6	R2	21	0.0	0.307	9.8	LOS A	1.8	12.5	0.64	0.70	0.64	46.3
Approach		273	0.0	0.307	6.3	LOS A	1.8	12.5	0.64	0.70	0.64	46.1
North: Medowie Road												
7	L2	23	0.0	0.407	7.1	LOS A	2.8	19.7	0.79	0.83	0.80	44.6
8	T1	214	1.8	0.407	7.2	LOS A	2.8	19.7	0.79	0.83	0.80	45.5
9	R2	68	1.9	0.407	11.0	LOS A	2.8	19.7	0.79	0.83	0.80	45.4
Approach		305	1.7	0.407	8.0	LOS A	2.8	19.7	0.79	0.83	0.80	45.4
West: Ferodale Road												
10	L2	144	2.7	0.787	13.3	LOS A	10.5	74.5	0.99	1.17	1.43	41.4
11	T1	238	0.0	0.787	13.1	LOS A	10.5	74.5	0.99	1.17	1.43	42.2
12	R2	248	1.6	0.787	17.0	LOS B	10.5	74.5	0.99	1.17	1.43	42.1
Approach		629	1.2	0.787	14.7	LOS B	10.5	74.5	0.99	1.17	1.43	42.0
All Vehicles		2147	1.3	0.835	10.6	LOS A	13.3	94.4	0.88	0.94	1.11	43.9

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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2029 AM Medowie Road / Ferodale Road + Development]

Medowie Road / Ferodale Road
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	245	3.7	0.440	5.1	LOS A	2.8	20.4	0.56	0.63	0.56	45.8
2	T1	164	8.7	0.440	5.1	LOS A	2.8	20.4	0.56	0.63	0.56	46.7
3	R2	50	0.0	0.440	8.7	LOS A	2.8	20.4	0.56	0.63	0.56	46.7
Approach		459	5.1	0.440	5.5	LOS A	2.8	20.4	0.56	0.63	0.56	46.2
East: Ferodale Road												
4	L2	115	1.1	0.396	7.1	LOS A	2.4	17.4	0.72	0.78	0.72	45.1
5	T1	193	1.4	0.396	7.1	LOS A	2.4	17.4	0.72	0.78	0.72	46.0
6	R2	18	7.2	0.396	11.1	LOS A	2.4	17.4	0.72	0.78	0.72	46.1
Approach		326	1.6	0.396	7.3	LOS A	2.4	17.4	0.72	0.78	0.72	45.7
North: Medowie Road												
7	L2	27	0.0	0.422	5.8	LOS A	2.6	18.9	0.63	0.70	0.63	45.3
8	T1	278	7.0	0.422	5.9	LOS A	2.6	18.9	0.63	0.70	0.63	46.0
9	R2	87	3.0	0.422	9.6	LOS A	2.6	18.9	0.63	0.70	0.63	46.0
Approach		393	5.7	0.422	6.7	LOS A	2.6	18.9	0.63	0.70	0.63	45.9
West: Ferodale Road												
10	L2	51	10.3	0.391	4.7	LOS A	2.4	17.1	0.48	0.63	0.48	45.0
11	T1	129	0.0	0.391	4.5	LOS A	2.4	17.1	0.48	0.63	0.48	46.0
12	R2	260	1.5	0.391	8.3	LOS A	2.4	17.1	0.48	0.63	0.48	45.9
Approach		440	2.1	0.391	6.8	LOS A	2.4	17.1	0.48	0.63	0.48	45.8
All Vehicles		1618	3.7	0.440	6.5	LOS A	2.8	20.4	0.59	0.68	0.59	45.9

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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2029 PM Medowie Road / Ferodale Road + Development]

Medowie Road / Ferodale Road
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	399	0.7	0.840	9.6	LOS A	13.6	96.6	0.91	0.92	1.16	43.6
2	T1	382	2.4	0.840	9.6	LOS A	13.6	96.6	0.91	0.92	1.16	44.4
3	R2	158	2.5	0.840	13.4	LOS A	13.6	96.6	0.91	0.92	1.16	44.3
Approach		939	1.7	0.840	10.3	LOS A	13.6	96.6	0.91	0.92	1.16	44.0
East: Ferodale Road												
4	L2	54	0.0	0.315	6.1	LOS A	1.8	13.2	0.64	0.71	0.64	45.4
5	T1	198	3.3	0.315	6.1	LOS A	1.8	13.2	0.64	0.71	0.64	46.3
6	R2	21	25.0	0.315	10.6	LOS A	1.8	13.2	0.64	0.71	0.64	45.9
Approach		273	4.3	0.315	6.5	LOS A	1.8	13.2	0.64	0.71	0.64	46.1
North: Medowie Road												
7	L2	23	0.0	0.405	7.3	LOS A	2.8	19.6	0.79	0.83	0.80	45.1
8	T1	214	1.8	0.405	7.1	LOS A	2.8	19.6	0.79	0.83	0.80	45.5
9	R2	68	1.9	0.405	10.9	LOS A	2.8	19.6	0.79	0.83	0.80	45.5
Approach		305	1.7	0.405	8.0	LOS A	2.8	19.6	0.79	0.83	0.80	45.5
West: Ferodale Road												
10	L2	144	2.7	0.789	13.4	LOS A	10.6	75.0	1.00	1.18	1.44	41.4
11	T1	237	0.0	0.789	13.2	LOS A	10.6	75.0	1.00	1.18	1.44	42.2
12	R2	248	1.6	0.789	17.1	LOS B	10.6	75.0	1.00	1.18	1.44	42.1
Approach		628	1.2	0.789	14.8	LOS B	10.6	75.0	1.00	1.18	1.44	42.0
All Vehicles		2145	1.9	0.840	10.8	LOS A	13.6	96.6	0.89	0.95	1.12	43.9

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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2019 AM Medowie Road / Muir Street + Development]

Medowie Road / Muir Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	42	0.0	0.125	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	47.4
2	T1	188	8.9	0.125	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.2
Approach		231	7.3	0.125	0.8	NA	0.0	0.0	0.00	0.10	0.00	49.0
North: Medowie Road												
8	T1	317	5.6	0.198	0.2	LOS A	0.3	2.5	0.10	0.07	0.10	49.1
9	R2	42	0.0	0.198	5.5	LOS A	0.3	2.5	0.10	0.07	0.10	48.0
Approach		359	5.0	0.198	0.8	NA	0.3	2.5	0.10	0.07	0.10	49.0
West: Muir Street												
10	L2	11	0.0	0.009	5.2	LOS A	0.0	0.2	0.28	0.52	0.28	44.9
12	R2	11	0.0	0.013	7.2	LOS A	0.0	0.3	0.44	0.64	0.44	38.9
Approach		21	0.0	0.013	6.2	LOS A	0.0	0.3	0.36	0.58	0.36	42.4
All Vehicles		611	5.7	0.198	1.0	NA	0.3	2.5	0.07	0.10	0.07	48.8

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

MOVEMENT SUMMARY

Site: 101 [2019 PM Medowie Road / Muir Street + Development]

Medowie Road / Muir Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	11	0.0	0.234	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	48.7
2	T1	441	1.7	0.234	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	50.9
Approach		452	1.6	0.234	0.1	NA	0.0	0.0	0.00	0.02	0.00	50.9
North: Medowie Road												
8	T1	246	1.3	0.137	0.1	LOS A	0.1	0.8	0.06	0.02	0.06	49.7
9	R2	11	0.0	0.137	7.1	LOS A	0.1	0.8	0.06	0.02	0.06	49.3
Approach		257	1.2	0.137	0.4	NA	0.1	0.8	0.06	0.02	0.06	49.7
West: Muir Street												
10	L2	42	0.0	0.045	6.3	LOS A	0.2	1.2	0.45	0.63	0.45	44.1
12	R2	42	0.0	0.062	8.2	LOS A	0.2	1.4	0.52	0.75	0.52	37.8
Approach		84	0.0	0.062	7.2	LOS A	0.2	1.4	0.48	0.69	0.48	41.5
All Vehicles		793	1.3	0.234	1.0	NA	0.2	1.4	0.07	0.09	0.07	49.6

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2029 AM Medowie Road / Muir Street + Development + Growth]

Medowie Road / Muir Street
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	52	0.0	0.155	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	47.4
2	T1	234	8.9	0.155	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.2
Approach		286	7.3	0.155	0.8	NA	0.0	0.0	0.00	0.10	0.00	49.0
North: Medowie Road												
8	T1	393	5.6	0.247	0.2	LOS A	0.5	3.5	0.13	0.07	0.13	49.0
9	R2	52	0.0	0.247	5.9	LOS A	0.5	3.5	0.13	0.07	0.13	47.9
Approach		445	5.0	0.247	0.9	NA	0.5	3.5	0.13	0.07	0.13	48.9
West: Muir Street												
10	L2	13	0.0	0.011	5.4	LOS A	0.0	0.3	0.32	0.53	0.32	44.6
12	R2	13	0.0	0.019	8.2	LOS A	0.1	0.4	0.51	0.70	0.51	37.9
Approach		26	0.0	0.019	6.8	LOS A	0.1	0.4	0.41	0.61	0.41	41.8
All Vehicles		756	5.7	0.247	1.1	NA	0.5	3.5	0.09	0.10	0.09	48.7

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2029 PM Medowie Road / Muir Street + Development + Growth]

Medowie Road / Muir Street
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Medowie Road												
1	L2	12	0.0	0.290	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	48.7
2	T1	547	1.7	0.290	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	50.0
Approach		558	1.6	0.290	0.1	NA	0.0	0.0	0.00	0.01	0.00	50.0
North: Medowie Road												
8	T1	305	1.3	0.170	0.2	LOS A	0.1	1.0	0.06	0.02	0.06	49.7
9	R2	12	0.0	0.170	7.9	LOS A	0.1	1.0	0.06	0.02	0.06	49.2
Approach		317	1.2	0.170	0.5	NA	0.1	1.0	0.06	0.02	0.06	49.7
West: Muir Street												
10	L2	51	0.0	0.061	6.9	LOS A	0.2	1.6	0.51	0.69	0.51	43.6
12	R2	51	0.0	0.096	9.9	LOS A	0.3	2.1	0.62	0.83	0.62	36.2
Approach		103	0.0	0.096	8.4	LOS A	0.3	2.1	0.57	0.76	0.57	40.5
All Vehicles		978	1.3	0.290	1.1	NA	0.3	2.1	0.08	0.09	0.08	49.0

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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