MALABAR COAL

MAXWELL PROJECT

APPENDIX K

Road Transport Assessment

Maxwell Project
Road Transport Assessment

Prepared for:

Malabar Coal Limited

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The Transport Planning Partnership

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TOC

Maxwell Project

Road Transport Assessment

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1 Introduction

Maxwell Ventures (Management) Pty Ltd, a wholly owned subsidiary of Malabar Coal Limited (Malabar), is seeking consent to develop an underground coal mining operation, referred to as the Maxwell Project (the Project).

The Project is in the Upper Hunter Valley of New South Wales (NSW), east-southeast of Denman and south-southwest of Muswellbrook.

Underground mining is proposed within Exploration Licence (EL) 5460, which was acquired by Malabar in February 2018. Malabar also acquired existing infrastructure within Coal Lease (CL) 229, Mining Lease (ML) 1531 and CL 395, known as the "Maxwell Infrastructure". The Project would include the use of the substantial existing Maxwell Infrastructure, along with the development of some new infrastructure. The Project would facilitate the underground mining, processing and sale of coking coal suitable for steel-making from within EL 5460.

This Road Transport Assessment forms part of an Environmental Impact Statement (EIS) which has been prepared to accompany a Development Application for the Project in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act). This report has been prepared with reference to the road transport components of the Secretary's Environmental Assessment Requirements (SEARs):

Traffic & Transport *– including:*

- *an assessment of the likely transport impacts of the development on the capacity, condition, safety and efficiency of the road and rail networks, including undertaking a road safety audit; and*
- *a traffic analysis of any major/relevant intersections impacted, using SIDRA or a similar traffic model;*

In accordance with the SEARs for the Project, this report has regard for the relevant input from NSW Roads and Maritime Services (RMS), and Muswellbrook Shire Council.

In addition, the SEARs refer to guidelines which are relevant to the assessment, including the RMS (formerly Roads and Traffic Authority [RTA]) *Guide to Traffic Generating Developments* (RTA, 2002) and the RMS's *Road Design Guide* (N.D) and relevant Austroads Standards. It is noted that RMS and other road agencies have adopted the Austroads guides and the Australian Standards as the primary technical references, together with RMS Supplements, rather than the RMS Road Design Guide referred to in the SEARs. This study has therefore been prepared in accordance with RTA (2002) and with reference to the relevant Austroads guides, RMS Supplements to the Austroads guides and Australian Standards.

2 Existing Road Transport Environment

2.1 Road Network

The existing road network in the vicinity of the Project is shown in Figure 2.1, and the key roads in the road network surrounding the site are described below.

New England Highway
New England Highway (Highway 9, Route A15) is a major State road and forms part of the National Land Transport Network, a defined national network of road and rail infrastructure links for which Commonwealth funding is provided to assist national and regional economic and social development. New England Highway is the main north-south link through the Hunter Region and connects Muswellbrook and Newcastle as part of its route between Hexham and the Queensland border. It is an alternative to the Pacific Highway for the north-south vehicular link between Brisbane and Sydney, and as such carries a significant proportion of regional and interstate traffic movements.

Outside of the urban areas, New England Highway is generally a two lane high standard rural highway with regular overtaking lanes, wide sealed shoulders, designated turning lanes and a posted speed limit of 100 kilometres per hour (km/h). New England Highway is a designated B-double route. To the north of the Project, New England Highway passes through Muswellbrook.

A corridor for a future bypass of Muswellbrook is included in Muswellbrook Shire Council's Local Environment Plan, and preserves a route to the east of Muswellbrook from south of Muscle Creek Road to north of Sandy Creek Road. A review of the options for the Muswellbrook Bypass (RMS, 2018) recommended an updated version of this route as the preferred route option, with minor route changes to improve its economic viability. The timing and design of a bypass remains unknown, however it would generally be expected that it would be constructed to a rural highway standard.

RMS is planning to upgrade New England Highway between Belford and Golden Highway (Mitchell Line of Road) to provide two travel lanes in each direction and a flyover for vehicles turning right from Golden Highway (RMS, 2017). The intersection of New England Highway and Golden Highway is currently a seagull intersection with dedicated and protected turning lanes, deceleration lanes and acceleration lanes. Vehicles turning right into Golden Highway have priority over those turning left into Golden Highway. As part of this upgrade project, a road corridor for future development of New England Highway would be established towards Singleton. At the time of writing, work on a detailed design is expected to start by the end of 2018.

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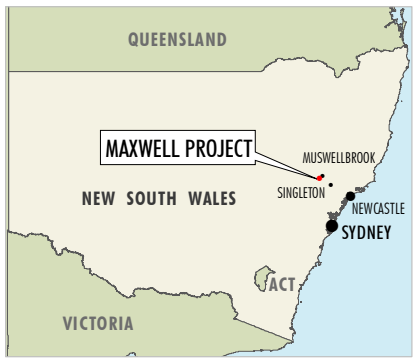

LEGEND

- Mining Operation
- Proposed Mining Operation
- Railway
- Local Government Boundary
- State Forest
- National Parks and Wildlife Service Estate
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Indicative Extent of Underground Development

Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019); Office of Environment and Heritage NSW (2019)

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Existing Road Network

Figure 2.1

RMS is also planning for a future New England Highway bypass of Singleton, to improve traffic flow, travel times and safety through Singleton town centre. The preferred route for the bypass is west of Singleton starting near Newington Lane and rejoining New England Highway north of McDougalls Hill. Investigations to inform the concept design development and environmental assessment are underway, and are expected to be displayed for community feedback in late 2019. Timing for construction of the bypass has not been confirmed and is subject to approval and funding availability.

Golden Highway

Golden Highway (Highway 27, Route B84) is also known as Jerrys Plains Road, Putty Road and Mitchell Line of Road, and is a State road under the control of RMS. Golden Highway provides a road link between New England Highway at Minimbah and Newell Highway at Dubbo. It is generally a two lane rural highway with a posted speed limit of 100 km/h outside of urban areas. Golden Highway is an approved B-double route.

Denman Road

Denman Road (Main Road 209) is a State road which is funded by the RMS but maintained by Muswellbrook Shire Council. Denman Road forms the primary connection between the township of Denman and Muswellbrook and provides a road link between Golden Highway and New England Highway. Outside of the urban areas, Denman Road is a two lane rural road, with a 7 metre (m) wide sealed carriageway, additional sealed shoulders, and a posted speed limit of 100 km/h, reducing to 80 km/h east of Bengalla Road. Denman Road is a designated B-double route.

Denman Road provides access to a number of existing mining operations via local roads such as Edderton Road and Thomas Mitchell Drive. As a result, Denman Road carries a significant proportion of mine-related traffic, particularly employee traffic accessing the mining operations.

Thomas Mitchell Drive

Thomas Mitchell Drive is a local road under the control of Muswellbrook Shire Council. It provides a link between Denman Road and New England Highway to the south of Muswellbrook township, thus providing a bypass of Muswellbrook for some traffic and is signposted as an alternative route to Singleton from Denman Road. It is a 7 m wide sealed road, and provides access to the Mt Arthur Mine, the Muswellbrook Industrial Area, and the Maxwell Infrastructure. Thomas Mitchell Drive crosses the Antiene Rail Spur at rail over road crossings at two locations approximately 3 kilometres (km) and 4.8 km west of New England Highway. The speed limit on Thomas Mitchell Drive is 80 km/h at its western end, increasing to 100 km/h approximately 400 m east of the Industrial Area, and reducing to 80 km/h over approximately 1,350 m at its eastern end from the intersection with the New England Highway.

The eastern end of Thomas Mitchell Drive was upgraded in 2013-2014 between New England Highway and the Mt Arthur Mine access road, including road widening and reconstruction, and the installation of wire rope and w-beam protection barriers.

Thomas Mitchell Drive is an approved B-Double route.

Edderton Road

Edderton Road is a local road under the control of Muswellbrook Shire Council. It runs in a generally north-south alignment and provides a road connection between Golden Highway in the south and Denman Road in the north.

Edderton Road has a load limit restriction of a maximum of 14 tonnes, which relates to a causeway near its southern end. It has a sealed carriageway in the order of 6 to 7 m wide, and a posted speed limit of 100 km/h for approximately 3 km at its northern end, and approximately 5.5 km at its southern end. The speed limit along the remaining 6.2 km of Edderton Road is 80 km/h. The length with the lower speed limit is generally a somewhat lower standard of road, with more curves and poorer road surface on the edges of the carriageway, although some parts of the 100 km/h lengths also have poor surfaces along the edges. Sections of Edderton Road have been locally widened where crests restrict sight distance to approaching traffic, with wider sections typically having double centre linemarking and solid edgelines.

The northern part of Edderton Road is proposed to be realigned as part of the Mt Arthur Coal Mine Open Cut Consolidation Project prior to mining within 200 m of the road. That realignment would result in the relocation of the intersection of Edderton Road with Denman Road approximately 2.5 km to the west of its current location (Hansen Bailey, 2009). Two potential realignment options are discussed in Hansen Bailey (2009), one of which would relocate approximately 5.4 km of Edderton Road and the other would relocate approximately 6.2 km of Edderton Road.

Site Access Road

The road that provides vehicular access to the Maxwell Infrastructure (former Drayton Mine) will be referred to as the "site access road" in this assessment. It is generally a 7 m wide sealed road with a single travel lane in each direction and no centre linemarking and some solid edgelines. It crosses the Antiene Rail Spur at a road over rail crossing 120 m from its intersection with Thomas Mitchell Drive. The speed limit on the site access road is 60 km/h.

2.2 Intersections

The key intersections in the road network of particular relevance to the Project are described below.

Thomas Mitchell Drive and Site Access Road

The intersection of Thomas Mitchell Drive with the site access road has channelised left turn and right turn deceleration lanes in Thomas Mitchell Drive for vehicles entering the site access road. The site access road flares on its approach to the intersection, allowing left turning vehicles to pass around a vehicle waiting to turn right if required.

Thomas Mitchell Drive and Denman Road

The intersection of Thomas Mitchell Drive with Denman Road has a left turn deceleration lane and short left turn acceleration lane in Denman Road, and widening of the northbound carriageway which allows northbound vehicles to pass around vehicles waiting to turn right into Thomas Mitchell Drive. Separate left and right turn lanes are provided in Thomas Mitchell Drive on the approach to the intersection. A single departure lane is provided in Thomas Mitchell Drive, which widens to two eastbound lanes before merging to a single lane over approximately 300 m. Condition 47(c) of the Project Approval for the Mt Arthur Coal Mine Open Cut Consolidation Project requires upgrading of the intersection of Denman Road and Thomas Mitchell Drive by the end of December 2019.

Thomas Mitchell Drive and New England Highway

The intersection of Thomas Mitchell Drive with New England Highway is a seagull intersection with channelised deceleration lanes for vehicles turning into Thomas Mitchell Drive, and acceleration lanes for vehicles turning into New England Highway into both directions. Vehicles turning right into Thomas Mitchell Drive have priority over those turning left into Thomas Mitchell Drive, which approach via a slip lane with "give way" control. Vehicles turning right from Thomas Mitchell Drive have a "stop" control prior to crossing the northbound lane of New England Highway.

Edderton Road and Denman Road

The intersection of Edderton Road and Denman Road is a basic rural T-intersection, with no additional turn lanes on any of the approaches, with some flaring of Edderton Road on its approach to Denman Road. The shoulder of Denman Road has been widened, which allows vehicles turning left into Edderton Road to move clear of through traffic on Denman Road, and for northbound through vehicles to pass around a vehicle slowing to turn right into Edderton Road. Condition 47(d) of the Project Approval for the Mt Arthur Coal Mine Open Cut Consolidation Project requires realignment of Edderton Road and its intersection with Denman Road prior to mining within 200 m of the road. It is understood that the design of the new intersection will be a similar standard to the existing intersection and will be undertaken in accordance with applicable design guidelines and standards in consultation with RMS and Muswellbrook Shire Council (Hansen Bailey, 2009).

Edderton Road and Golden Highway

The intersection of Golden Highway and Edderton Road has no additional turn lanes on any of the approaches, with flaring of Edderton Road on its approach to Golden Highway.

2.3 Historic Traffic Volumes

Historic daily traffic volume data for the key roads of relevance to the Project have been collated, and are summarised in Table 2.1.

Table 2.1: Historic Daily Traffic Volumes (vehicles per day)

Road	Survey Date	Average Weekday	Average Daily	Data Source
Denman Road east of Thomas Mitchell Drive	2012	-	9,392	GHD, 2017
Denman Road west of Bengalla Road	2012	-	2,993	GHD, 2017
Denman Road north of Golden Highway	Oct 2013	2,371	2,094	Malabar[A]
Denman Road north of Thomas Mitchell Drive	Oct 2013	8,675	7,184	Malabar[A]
Denman Road between Golden Highway and Edderton Road	Nov 2013	2,446	2,219	Cardno, 2013
Edderton Road south of Denman Road	Apr 2012 Nov 2013	1,011 1,023	896 -	GTA Consultants, 2012 Cardno, 2015[B]
Edderton Road north of Golden Highway	Nov 2013	819	720	Cardno, 2013
Golden Highway west of Denman Road	Oct 2013	4,231	3,898	Malabar[A]
Golden Highway at Ogilvies Pass	Nov 2014	2,166	2,141	Malabar[A]
Mt Arthur Mine Access Road off Thomas Mitchell Drive	Apr 2012	2,973	2,010	GTA Consultants, 2012
New England Highway East of Grant Miller Street	2012	11,557	-	Average Annual Daily Traffic (AADT) RMS Station 05244
New England Highway South of Muscle Creek Road	2015 2017 2018[C]	9,929 9,775 9,488	9,359 9,349 9,014	AADT RMS Station 06154
New England Highway North of Rixs Creek Lane	2015 2017 2018[C]	14,756 15,166 15,113	13,254 13,796 13,646	AADT RMS Station 06153
Thomas Mitchell Drive east of Industrial Area	Oct 2011 Feb 2013	3,988 3,993	3,190 3,191	Hyder, 2013
Thomas Mitchell Drive Denman Road to Industrial Area Industrial Area to Mt Arthur Mine Mt Arthur Mine to Maxwell Infrastructure Maxwell Infrastructure to New England Highway	Nov 2013	8,801 4,702 3,789 4,146	- - - -	Cardno, 2015[B]
Thomas Mitchell Drive near Denman Road	Nov 2016	-	5,006	GHD, 2017

[A] *Unpublished data provided to TTPP by Malabar.*
[B] *Volumes are modelled, not surveyed.*
[C] *To end of June 2018.*

The data demonstrate the variance in the traffic carried on Thomas Mitchell Drive, which ranged between approximately 3,800 vehicles per weekday east of Mt Arthur Mine to approximately 8,800 vehicles per weekday near Denman Road in 2013, at which time the Drayton Mine was operating. In late 2016, the volume on Thomas Mitchell Drive near Denman Road reduced to approximately 5,000 vehicles per day, estimated to be equivalent to approximately 6,250 vehicles per weekday. The closure of Drayton Mine and reductions in workforce at other mining operations are expected to have contributed to this reduction.

2.4 Existing Traffic Volumes

2.4.1 Traffic Survey Program

A program of traffic surveys was undertaken on roads and intersections of relevance to the Project to quantify existing traffic conditions as a baseline against which future conditions can be assessed. The survey program included mid-block surveys of classified vehicle volumes by direction over one week (from Thursday 14 June to Wednesday 20 June 2018) on:

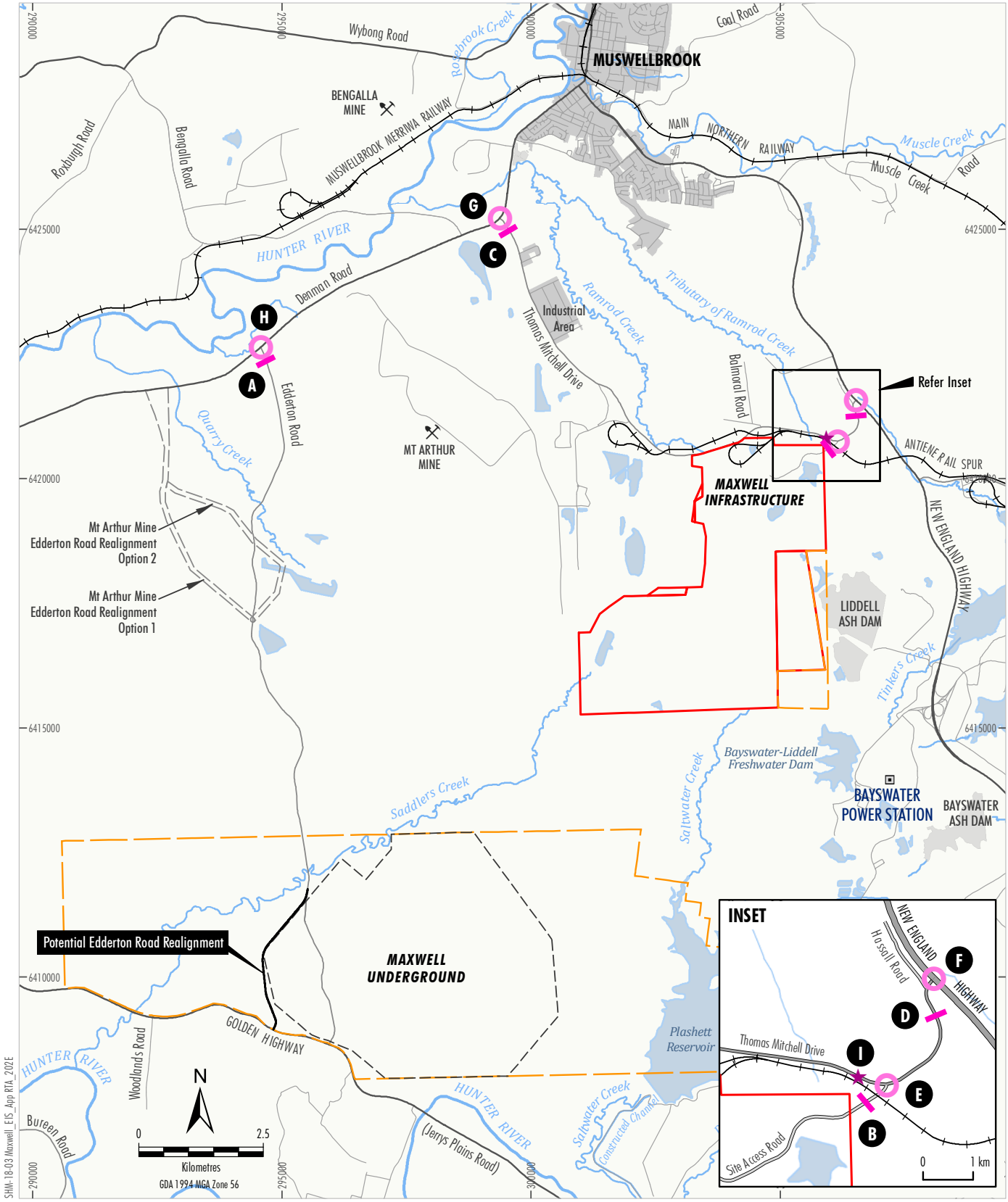
- site access road south of Thomas Mitchell Drive;
- Thomas Mitchell Drive west of New England Highway;
- Thomas Mitchell Drive east of Denman Road; and
- Edderton Road south of Denman Road.

Vehicle turning movement surveys were undertaken during the morning peak period on Thursday 14 June and the evening peak period on Wednesday 13 June 2018 at the intersections of:

- site access road and Thomas Mitchell Drive;
- New England Highway and Thomas Mitchell Drive;
- Denman Road and Thomas Mitchell Drive; and
- Denman Road and Edderton Road.

The survey locations are presented on Figure 2.2, and results of the midblock and intersection surveys are presented in Appendix A.

Surveys of vehicle travel times along Edderton Road were also undertaken on 25 October 2018, recording vehicle travel times in both directions between Denman Road and Golden Highway.



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LEGEND

- Mining Operation
- Railway
- Mt Arthur Mine Edderton Road Realignment
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Indicative Underground Mining Area
- Midblock Tube Count
- Intersection Survey
- Volume Estimated from Survey Results

Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019)

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Traffic Survey Locations

Figure 2.2

2.4.2 Midblock Survey Results

Table 2.2 presents a summary of the surveyed daily traffic volumes at the midblock locations.

Table 2.2: Surveyed Daily Traffic Volumes 2018 (vehicles per day)

Site[A]	Road	Mon	Tue	Wed	Thu	Fri	Sat	Sun
A	Edderton Road south of Denman Road	797	747	768	845	958	504	458
B	Site Access Road south of Thomas Mitchell Drive	123	119	101	68	79	12	8
C	Thomas Mitchell Drive east of Denman Road	5,925	6,257	6,157	6,310	5,794	2,173	1,701
D	Thomas Mitchell Drive west of New England Highway	3,257	3,439	3,401	3,410	3,244	1,586	1,382

[A] *Refer to Figure 2.2.*

The results demonstrate that the weekday volumes are distinctly different from those on weekend days. As weekday traffic volumes are higher, the assessment which follows considers the average weekday (rather than average daily) traffic conditions. The surveys included classification of the vehicles based on the Austroads Vehicle Classification System. Light vehicles include motorcycles, cars, vans, 4-wheel drives (4WDs), and utes (including those towing a trailer or caravan). Heavy vehicles include single unit rigid trucks and buses with two, three or four axles and up to 14.5 m long, as well as articulated vehicles (which include semi-trailers and rigid trucks with trailers, B-Doubles and road trains where permitted). The surveyed average daily classified traffic volumes are summarised in Table 2.3.

Table 2.3: Surveyed Average Weekday Daily Traffic Classification 2018 (vehicles per day)

Site[A]	Road	Light	Rigid	Articulated	Total	Percent Heavy
A	Edderton Road south of Denman Road	736	82	5	823	10.6%
B	Site Access Road south of Thomas Mitchell Drive	82	9	7	98	16.3%
C	Thomas Mitchell Drive east of Denman Road	4,758	1,142	182	6,082	21.8%
D	Thomas Mitchell Drive west of New England Highway	2,517	591	239	3,347	24.8%

[A] *Refer to Figure 2.2.*
Note: excludes a small number of vehicles which were unclassified by the counters on Thomas Mitchell Drive.

The survey results allow the distribution of traffic through the day on each road to be quantified, as presented in Figure 2.3.

Figure 2.3: Surveyed Average Weekday Traffic by Time of Day (vehicles per hour)

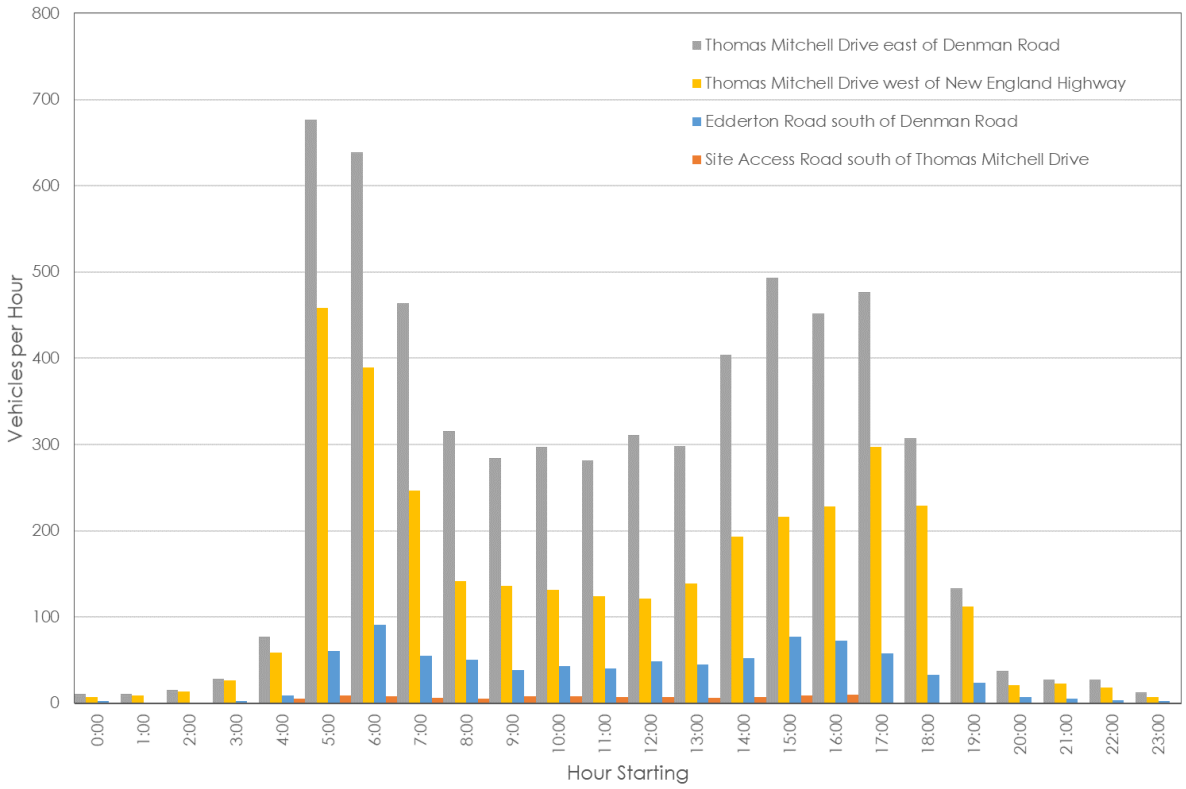


Figure 2.3 indicates that the peak hours for traffic on the surveyed roads do not all coincide, although the three public roads all display a distinct morning and afternoon peak, with reduced volumes through the middle of the day and very low volumes overnight. The morning peak on Thomas Mitchell Drive occurs between 5:00 am and 6:00 am, and is significantly higher than any single hour during the afternoon. The morning peak is dominated by eastbound traffic at the western end of Thomas Mitchell Drive and by westbound traffic at the eastern end of Thomas Mitchell Drive. These peaks are likely as a result of shift changes at mining operations serviced by Thomas Mitchell Drive.

Table 2.4 presents the surveyed average weekday two-way traffic flows during the morning and afternoon peak hours, which represents the busiest hour before and after midday at each survey location, measured over the average weekday.

Table 2.4: Average Weekday Peak Hourly Traffic Volumes (vehicles per hour)

Site[A]	Road	AM Peak				PM Peak			
		Hour	Light	Heavy	Total	Hour	Light	Heavy	Total
A	Edderton Road south of Denman Road	6:00	82	9	91	15:00	68	9	77
B	Site Access Road south of Thomas Mitchell Drive	5:00	8	1	9	16:00	9	1	10
C	Thomas Mitchell Drive east of Denman Road	5:00	559	118	677	15:00	407	86	493
D	Thomas Mitchell Drive west of New England Highway	5:00	365	93	458	17:00	248	49	297

[A] *Refer to Figure 2.2.*

The survey results indicate that the morning peak is the busier of the peak hours on the public roads. The directional distribution of traffic on Thomas Mitchell Drive during the peak hours was surveyed as follows:

Thomas Mitchell Drive – east of Denman Road:

- 78 percent eastbound in the AM peak hour; and
- 71 percent westbound in the PM peak hour.

Thomas Mitchell Drive – west of New England Highway:

- 86 percent westbound in the AM peak hour; and
- 59 percent eastbound in the PM peak hour.

The surveyed distributions reflect the inbound trips of employees to the various employment destinations on Thomas Mitchell Drive in the morning, and their departure from those in the evening. The directional distribution on Edderton Road followed less of a distinct pattern, with 62 percent northbound during the morning peak hour and 57 percent northbound during the evening peak hour. Outside of the peak hours, the northbound and southbound volumes on Edderton Road are similar.

2.4.3 Intersection Turning Movement Results

Vehicle turning movements were recorded at the surveyed intersections between 5:00 am and 8:00 am, and between 4:00 pm and 7:00 pm. The peak hour at each intersection was identified as the hour during which the highest number of vehicles passed through the intersection. The surveyed peak hour approach/turning volumes at each intersection are summarised in Table 2.5 (noting that these results differ from the hourly results described in Section 2.4.2 as the values in Table 2.5 are derived from the specific surveyed hours at the intersections, while the values in Section 2.4.2 are based on the average hourly volumes over one week recorded at the specified midblock location).

Table 2.5: Surveyed Peak Hour Intersection Approach Volumes (vehicles per hour)

Site[A]	Intersection	Peak Hour	Major Road		Major Road		Minor Road	
			Through	Right	Through	Left	Left	Right
E	Site Access Road (Minor) and Thomas Mitchell Drive (Major)	5:15-6:15 am	85	0	466	4	1	0
		5:15-6:15 pm	207	0	132	0	0	0
F	New England Highway (Major) and Thomas Mitchell Drive (Minor)	5:15-6:15 am	356	22	144	450	3	79
		4:45-5:45 pm	348	9	337	82	7	214
G	Denman Road (Major) and Thomas Mitchell Drive (Minor)	5:30-6:30 am	82	155	313	483	209	71
		4:45-5:45 pm	256	116	184	90	52	331
H	Denman Road (Major) and Edderton Road (Minor)	6:00-7:00 am	113	0	70	35	0	68
		4:30-5:30 pm	97	2	150	32	0	27

[A] *Refer to Figure 2.2.*

The following key observations were made from the results of the intersection turning movement surveys:

- The number of vehicles turning into and out of the site access road during the surveyed periods was very low, with a total of 30 vehicles turning in and out of the site access road over the six hours surveyed. This reflects the current level of activity at the Maxwell Infrastructure. One-third of those vehicles approached or departed via Thomas Mitchell Drive west of the site access road and two-thirds approached or departed via Thomas Mitchell Drive east of the site access road.
- The number of vehicles turning between Edderton Road and Denman Road south during the survey periods was very low. During the surveyed morning three hour period, no vehicles made these turns, and during the surveyed evening three hour period, three vehicles turned right into Edderton Road and three vehicles turned left out of Edderton Road. The highest demand in the morning was for the right turn out of Edderton Road, while the highest demand in the evening was the left turn into Edderton Road.
- At the intersection of Thomas Mitchell Drive and New England Highway, the dominant turning movement was the left turn into Thomas Mitchell Drive during the morning, and the right turn out of Thomas Mitchell Drive during the evening.
- At the intersection of Thomas Mitchell Drive and Denman Road, the dominant turning movement during the morning was the left turn from Denman Road into Thomas Mitchell Drive, and in the evening the right turn out of Thomas Mitchell Drive onto Denman Road.

2.5 Existing Road Network Performance

The performance of the road network can be assessed by considering the demands in the context of the capacity of the network. The capacity of the road network is usually governed by the operation of the intersections, due to the need for vehicles travelling in opposing directions to occupy the same road space, resulting in restrictions on the flow of traffic on the lower priority movements. In rural areas, the level of service perceived by drivers along routes is also a consideration, with increasing traffic demands restricting drivers' freedom of movement along the route. These aspects of the existing road network performance are assessed in this section.

2.5.1 Operation of Intersections

The operating characteristics of the surveyed intersections have been assessed using SIDRA INTERSECTION 8, an analysis program which determines characteristics of intersection operating conditions including the degree of saturation, average delays, and levels of service. The degree of saturation, or x-value, is the ratio of the arrival rate of vehicles to the capacity. The average delay, expressed in seconds per vehicle, is measured over all movements at signalised intersections, and over the movement with the highest average delay at roundabout and priority intersections. Average vehicle delay is the commonly used measure of intersection performance defined by RMS. Table 2.6 shows the criteria adopted by RMS for assessing the level of service.

Table 2.6: Intersection Level of Service Criteria

Level of Service (LoS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Note: Average delay per vehicle is measured as seconds per vehicle (secs/veh).

Table 2.7 presents a summary of the existing peak hour operating characteristics of the surveyed intersections. All surveyed intersections are under priority control, thus the reported average delays is for the movement with the highest average delay per vehicle. At the surveyed T-intersections, this is typically the right turn movement from the minor road to the major road. Detailed results, including vehicle queues are presented in Appendix B.

Table 2.7: Existing Intersection Operating Conditions (2018)

Site[A]	Intersection	AM Peak			PM Peak		
		X-Value	Average Delay[B]	LoS	X-Value	Average Delay[B]	LoS
E	Site Access Road and Thomas Mitchell Drive	0.27	11.2	A	0.12	8.2[C]	A
F	New England Highway and Thomas Mitchell Drive	0.36	12.2	A	0.32	13.2	A
G	Denman Road and Thomas Mitchell Drive	0.37	24.2	B	0.91	40.1	C
H	Denman Road and Edderton Road	0.08	8.4	A	0.11	8.5	A

[A] *Refer to Figure 2.2.*
[B] seconds per vehicle for movement with the highest average delay per vehicle.
[C] modelled with one vehicle on each turning movement, surveys showed no turning vehicles.

On the basis of the above assessment results and observations of operating conditions during the peak hour periods, it is evident that the majority of the intersections currently operate at satisfactory levels of service during peak periods, with spare capacity and acceptable delays.

During the evening peak hour, vehicles exiting Thomas Mitchell Drive via a right turn to Denman Road currently experience delays consistent with the upper range of Level of Service C, suggesting that an accident study should be considered. The crash history of the intersection is examined in Section 2.6.2, and it is noted that the intersection is expected to be upgraded in accordance with Condition 47(c) of the Project Approval for the Mt Arthur Coal Mine Open Cut Consolidation Project. There is limited spare capacity available for this movement during the evening peak, with the surveyed demand being over 90 percent of capacity. At high levels of x-value (i.e. degree of saturation), small increases in demand result in significant increases in delay.

2.5.2 Midblock Level of Service

The Austroads (2017a) *Guide to Traffic Management Part 3: Traffic Studies and Analysis* provides guidelines for the capacity and performance of two lane, two-way rural roads, which in turn, refers to the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2016).

The capacity of a road is defined as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions. The capacity of a single traffic lane will be affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Level of Service (LOS) is defined as a qualitative measure describing the operational conditions within a traffic stream as perceived by drivers and/or passengers. A LOS definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. LOS A provides the best traffic conditions, with no restriction on desired travel speed or overtaking. LOS B to D describes progressively worse traffic conditions. LOS E occurs when traffic conditions are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for LOS E is taken as the capacity of a lane or roadway. In rural situations, LOS C is generally considered to be acceptable. At LOS C, most vehicles are travelling in platoons, and travel speeds are curtailed. At LOS D, platooning increases significantly, and the demand for passing is high, but the capacity to do so is low.

The LOS experienced by drivers on two-way rural roads is dependent on the drivers' expectations regarding the road, and three classes of road are defined in the HCM. Class I roads are those on which motorists expect to travel at relatively high speeds. They most often serve long-distance trips or provide connecting links between facilities that serve long-distance trips. Class II roads are those on which motorists do not necessarily expect to travel at high speeds, and may function as access routes to Class I facilities, serve as scenic or recreational routes or pass through rugged terrain. Class III roads serve moderately developed areas, and may be portions of a Class I or Class II highway that pass through small towns or developed recreational areas, where local traffic mixes with through traffic, and the density of unsignalised roadside access points increases.

On Class I roads, LOS is defined in terms of Percent Time Spent Following (PTSF) and Average Travel Speed (ATS). On Class II roads, LOS is defined only in terms of PTSF. The PTSF is a measure of the level of opportunities to overtake, and is estimated from the demand traffic volumes, the directional distribution of that traffic, and the percentage of no-passing zones. On Class III roads, LOS is defined in terms of Percent of Free-Flow Speed (PFFS), which is the ratio of ATS to the free-flow speed, representing the ability of vehicles to travel at or near the posted speed limit. The LOS criteria for two lane roads are as shown in Table 2.8, noting that the HCM defines ATS in miles per hour (mi/h).

Table 2.8: LOS Criteria for Class I and Class II Two Lane Roads

LOS	Class I		Class II	Class III
	PTSF (percent)	ATS (mi/h)[A]	PTSF (percent)	PFFS (percent)
A	≤ 35	≥ 55	≤ 40	> 91.7
B	> 35 – 50	> 50 – 55	> 40 – 55	> 83.3 – 91.7
C	> 50 – 65	> 45 – 50	> 55 – 70	> 75.0 – 83.3
D	> 65 – 80	> 40 – 45	> 70 – 85	> 66.7 – 75.0
E	≥ 80	≤ 40	≥ 85	≤ 66.7
F	Demand exceeds capacity			

[A] *note that 1 mi/h is equivalent to approximately 1.6 km/h.*

The primary determinant of a road's classification for operational analysis is the drivers' expectations, which may not necessarily agree with the functional classification. The surveyed two lane, two way roads would typically be considered as Class II roads under the HCM descriptions, drivers would expect some level of restriction to their freedom of movement along the routes as a result of characteristics of the route such as limits on the opportunities for overtaking (e.g. centre line marking, sight distances, lack of overtaking lanes).

Table 2.9 presents the results of the assessment of midblock conditions at the surveyed locations on the road network during the busiest hours as surveyed.

Table 2.9: Existing Weekday Peak Hour Midblock Road Performance

Site[A]	Road and Location	Hour Start	Inbound to Maxwell Infrastructure		Outbound from Maxwell Infrastructure	
			PTSF	LOS	PTSF	LOS
Morning Peak Hour						
A	Edderton Road south of Denman Road	6:00	26.3	A	15.8	A
B	Site Access Road south of Thomas Mitchell Drive	5:00	5.3	A	0.7	A
C	Thomas Mitchell Drive east of Denman Road	5:00	65.0	C	29.0	A
D	Thomas Mitchell Drive west of New England Highway	5:00	74.0	D	16.9	A
Evening Peak Hour						
A	Edderton Road south of Denman Road	15:00	23.2	A	17.5	A
B	Site Access Road south of Thomas Mitchell Drive	16:00	0.6	A	5.5	A
C	Thomas Mitchell Drive east of Denman Road	15:00	32.2	A	62.1	C
D	Thomas Mitchell Drive west of New England Highway	17:00	38.4	A	54.6	B

[A] *Refer to Figure 2.2.*

The results indicate that the existing midblock levels of service on Thomas Mitchell Drive reach C and D during the morning peak hour in the inbound direction to the site access road. The midblock level of service is C in the evening peak hour in the outbound direction from the site access road at its western end near Denman Road. At these levels, vehicles will tend to travel in platoons, and the ability to overtake is limited. It is noted that overtaking is prohibited by double centre lines in Thomas Mitchell Drive for the full distance between the site access road and New England Highway (approximately 1 km).

2.5.3 Edderton Road Travel Time

The speed limit on Edderton Road varies along its length, with 100 km/h speed limits over the northern 3 km and southern 5.5 km, and 80 km/h speed limit over the central 6.2 km (Table 2.10). Advisory speed signs are provided on curves along Edderton Road, with advisory speeds of between 65 km/h and 95 km/h. "Reduce Speed" signs are posted on each approach to a causeway located within the southern 100 km/h zone.

Table 2.10: Estimated Travel Times on Edderton Road (seconds)

Section of Edderton Road	Travel Time at Speed Limit[A]
Northern 100 km/h zone	108
Central 80 km/h zone	279
Southern 100 km/h zone	198
Total	**585**

[A] *Excluding advisory speeds.*

The posted speed limits suggest that the travel time along Edderton Road is approximately 9 minutes and 45 seconds, excluding travel at advisory speeds which are below the posted speed limit (Table 2.10). It is noted that the speed limit on the central section of Edderton Road was formerly 100 km/h but was reduced in 2012 after a review by RMS, with the aim to reduce the number of crashes and improve road safety (RMS, 2012).

2.6 Road Safety History

Road crash information was obtained from the RMS for the most recent five year period available, being from 1 October 2012 to 30 September 2017. The data include those crashes which conform to the national guidelines for reporting and classifying road vehicles crashes based on the following criteria:

- The crash was reported to the police.
- The crash occurred on a road open to the public.
- The crash involved at least one moving vehicle.
- The crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

Crash data were reviewed for the primary access routes relevant to the Project:

- Thomas Mitchell Drive between Denman Road and New England Highway;
- Denman Road between Golden Highway and New England Highway;
- New England Highway between Denman Road and approximately 10 km south of Thomas Mitchell Drive; and

- Edderton Road between Golden Highway and Denman Road.

Table 2.11 summarises the number and general types of crashes which occurred on the sections of road under consideration.

Table 2.11: General Crash Types on Access Routes (1 October 2012 to 30 September 2017)

Route	Route Length (km)	Pedestrian	Multiple Vehicles					Single Vehicle			Total
			Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	
Thomas Mitchell Drive	10.6	-	-	1	3	1	-	-	1	1	7
Denman Road	21.2	1	2	1	5	2	2	5	9	9	36
New England Highway	19.7	-	6	6	11	5	-	9	9	8	54
Edderton Road	14.7	-	-	-	-	-	1	2	3	-	6
Total Crashes by Type		**1**	**8**	**8**	**19**	**8**	**3**	**16**	**22**	**18**	**103**

Over the investigation period and routes reviewed, a total of 103 crashes occurred, resulting in one fatality, 17 people being seriously injured, and 37 people being moderately injured.

Table 2.11 demonstrates that over all the roads investigated, the most common types of crashes involved single vehicles leaving the carriageway, known as run-off-road (ROR) crashes, which made up approximately 39 percent of the total reported crashes in Table 2.11. This is consistent with Austroads (2015), which found that in rural road environments in Australia, off-path crashes were the most likely. Australian Road Research Board (2011) states that known causes of ROR crashes include:

- driver behaviours such as speed, inattention, avoidance manoeuvres, errant vehicles;
- driver impairment including fatigue, alcohol, drugs, mood state;
- road conditions such as horizontal alignment, shoulder deficiencies, slippery surface, poor delineation, damaged surfaces;
- vehicle failure; and
- environmental conditions such as rain, fog, snow, livestock or native fauna.

The most common multiple vehicle crash type over the period investigated was between vehicles travelling in the same direction, such as rear end or side swipe crashes. A detailed review of the crashes on each route is provided in the following sections, and summary tables of crash characteristics on each route are presented in Appendix C.

2.6.1 Thomas Mitchell Drive

The reported crashes on Thomas Mitchell Drive have been reviewed and key characteristics examined (Table C1 in Appendix C). Over the five year period investigated, seven crashes occurred along Thomas Mitchell Drive between Denman Road and New England Highway, excluding the intersections with Denman Road and New England Highway, which were considered as part of those respective routes.

Three crashes occurred at intersections, two of which occurred at the intersection of Thomas Mitchell Drive with the Mt Arthur Mine access road on the same day in 2014. The majority of crashes occurred in fine weather, on a dry road surface and in daylight. One fatal crash occurred on Thomas Mitchell Drive. This was a head-on crash between two light trucks on a dry road surface in fine weather at dawn. One of the trucks was travelling on the incorrect side of the road, and fatigue was nominated as a contributing factor to the crash.

No crashes occurred at or near the intersection of Thomas Mitchell Drive with the site access road, noting the crash records cover the period to 2016 during which the Drayton Mine was operating, and the site access road was in use by the Drayton Mine traffic.

During the period under investigation, Thomas Mitchell Drive was subject to upgrading between New England Highway and the Mt Arthur Mine access road. That upgrade occurred during 2013-2014. Two crashes have occurred on that length of Thomas Mitchell Drive since the upgrade was completed, both being single vehicle ROR crashes involving a heavy vehicle. Speed was nominated as a contributing factor to one of those crashes.

2.6.2 Denman Road

The reported crashes on Denman Road have been reviewed, and key characteristics examined (Table C2 in Appendix C). Over the five year period investigated, 36 crashes occurred along Denman Road between Golden Highway and New England Highway, excluding the intersection with New England Highway (which is considered as part of New England Highway (Section 2.6.2).

No crashes occurred at or near the intersection of Denman Road with Edderton Road. One crash occurred at the intersection of Denman Road with Thomas Mitchell Drive, at 7:05 am on Wednesday 28 May 2014. A 4WD turning right out of Thomas Mitchell Drive struck a westbound car in Denman Road in fine weather and on a dry road surface.

2.6.3 New England Highway

The reported crashes on New England Highway have been reviewed, and key characteristics examined (Table C3 in Appendix C). Over the five year period investigated, 54 crashes occurred along New England Highway between Denman Road and 10 km south of Thomas Mitchell Drive. This includes crashes which occurred at the intersections of New England Highway with Denman Road and with Thomas Mitchell Drive.

No fatal crashes occurred on New England Highway.

Eight crashes occurred at the intersection of New England Highway with Thomas Mitchell Drive, of which six occurred during 2013. One of those involved a vehicle striking an animal in the dark, while the remaining five involved multiple vehicles at the intersection. The intersection was subject to a major upgrade which commenced in 2012. Since 2013, two crashes have occurred at or near the intersection, one in 2016 and one in 2017, both of which were single vehicle crashes unrelated to the movement of vehicles at the intersection.

Two crashes involved bicycles, with both of these occurring in the urban area of Muswellbrook where the urban speed limit applies. Two crashes involved motorcycles, which were both single vehicle crashes which occurred in areas where the rural speed limit applies.

2.6.4 Edderton Road

The reported crashes on Edderton Road have been reviewed, and key characteristics examined (Table C4 in Appendix C). Over the five year period investigated, six crashes occurred along Edderton Road between Denman Road and Golden Highway.

Five of the crashes were single vehicle ROR crashes, two of which occurred on a wet road surface. One head-on crash occurred as a result of a car driver overtaking, with speed nominated as a contributing factor.

Speed was nominated as a contributing factor in three of the six crashes on Edderton Road, and fatigue in one crash. Three of the crashes occurred where the speed limit is 80 km/h, and three occurred where the speed limit is 100 km/h.

2.7 Road Safety Audit

A Road Safety Audit of existing conditions on Thomas Mitchell Drive between Denman Road and New England Highway was conducted to identify existing issues relating to the road environment which might constitute a road safety risk, and is presented in Appendix E. That report presents specific details of road safety issues identified during the audit and assigns a risk level rating (high, medium or low) to each of those issues. A high risk item is considered very important and needs to be addressed urgently. A medium risk item is important and needs to be addressed as soon as possible, and a low risk item needs to be considered as part of regular maintenance and planning programming.

The road safety audit found one item with a high risk rating (refer to Appendix E for full findings), relating to the shared cycle and turn lane in New England Highway approach to Thomas Mitchell Drive (Item 14). Due to the high-speed environment on New England Highway, the intersection design should ideally consider the NSW best practice for crossing points at off-ramps of motorways (RTA, 2005) which includes a designated bicycle lane to the left of the left turn lane, with a designated point for the bicycle through movements to cross the left turn lane.

The northern side of the intersection has been constructed in a manner consistent with RTA (2005) and it is unknown why the southern approach has not been constructed to a similar standard as part of the intersection upgrade works in 2012. Any improvements to meet best practice are the responsibility of RMS, being the authority responsible for New England Highway.

The following medium risk items were identified in the audit:

- visibility of road markings at the right turn treatment are not easily seen on Denman Road eastbound approach to Thomas Mitchell Drive (Item 2);
- proximity of the culvert structure to the travel lane on Denman Road westbound approach to Thomas Mitchell Drive intersection (Item 3);
- unprotected culvert close to Thomas Mitchell Drive southbound entry from Denman Road (Item 4);
- additional lane on Thomas Mitchell Drive between Denman Road and the Industrial Area (Item 5);
- lack of road marking on Thomas Mitchell Drive and side roads near the Industrial Area (Items 7, 8 and 10);
- road edging on Thomas Mitchell Drive near the Industrial Area (Item 9);
- lack of signage on curve on approach to New England Highway (Item 13); and
- night-time delineation on Thomas Mitchell Drive between Denman Road and the Industrial Area (Item 18).

The majority of the medium risk items are located in the vicinity of the intersection of Thomas Mitchell Drive with Denman Road, and in the vicinity of the Industrial Area. These items typically relate to a lack of road line marking and protection barriers to roadside structures that pose a risk for errant drivers. It is expected that the planned upgrading of the intersection of Denman Road with Thomas Mitchell Drive would be designed and constructed in accordance with current guidelines, with installation of appropriate line marking and barriers where required, thus addressing several of the existing medium risk items identified in the audit.

The other medium and low risk rating issues may be appropriately addressed by Muswellbrook Shire Council, being the authority responsible for Thomas Mitchell Drive, or RMS, being the authority responsible for New England Highway. It is noted that Cardno (2015) recommends that Thomas Mitchell Drive be reclassified as a Main Arterial Road under the care and control of RMS.

The issues raised in the audit do not highlight any particular concerns regarding the basic road alignment or width characteristics of Thomas Mitchell Drive that might adversely impact road safety. In addition, no specific road safety issues were identified at the intersection of Thomas Mitchell Drive and the site access road to the Maxwell Infrastructure.

2.8 Rail Level Crossings

The Main Northern Railway lies to the east of the Project, extending through Singleton to the south-east and Muswellbrook to the north of the Project. The Antiene Rail Spur and the Antiene Coal Unloader are privately owned rail infrastructure which each extend westwards from the Main Northern Railway at the Drayton Junction and Antiene Junction respectively. The majority of rail/road crossings in the region are grade separated, such that the road and rail traffic do not impede each other.

The Antiene Rail Spur provides rail access to the Project and Mt Arthur Mine, and crosses the Antiene Railway Station Road at a level crossing approximately 40 m from its intersection with Hebden Road. This is the only level crossing on the Antiene Rail Spur. Antiene Railway Station Road is a local road providing limited access to local properties only, with no through traffic function. It is sealed for approximately 700 m between Hebden Road and the now closed Antiene Station. At the level crossing, the Antiene Rail Spur has a single track, with a down refuge loop ending approximately 100 m south-west of the level crossing. The road and rail intersection at 90 degrees, and observations on site suggest that sight distance for vehicle drivers at the crossing is adequate to observe an approaching train.

It is a passively controlled crossing, with signage assemblies on each road approach comprising a "RAILWAY CROSSING" sign (R6-24), above a "STOP" sign (R1-1), above a "LOOK FOR TRAINS" sign (G9-48). Some guideposts with reflective markers are provided on the side of Antiene Railway Station Road near the level crossing, although it appears some are missing.

The northbound approach from Hebden Road has "RAIL X" pavement marking on Antiene Railway Station Road, double solid centre lines and a stop line. Advance warning signs are provided for traffic approaching in both directions on Hebden Road, consisting of diagrammatic warning signs advising of the crossing on the side road (W7-12 and W8-3).

The southbound approach on Antiene Railway Station Road has a stop line at the crossing, with no centre linemarking, noting the road pavement is sufficiently narrow that centre linemarking is not warranted. A "RAIL X" pavement marking is provided on the southbound approach, approximately 200 m from the level crossing, together with an advance warning sign of the level crossing. The advance warning sign used is a sign which is no longer in use (W7-3), its current equivalent would be a symbolic train sign (W7-7). Travelling southbound, the advance warning sign is followed by an advance warning sign of "give way sign ahead" (W3-2), which is followed by a T intersection sign (W2-3). These latter two signs refer to the intersection of Antiene Railway Station Road with Hebden Road, which lies some 40 m past the level crossing. Between the warning signs and the intersection, drivers are required to stop at the level crossing, and warning signage for that requirement is missing.

Observations indicate that traffic volumes on Antiene Railway Station Road are low, such that the movement of trains on the Antiene Rail Spur would result in very low likelihood that vehicles on that road would be delayed by a train.

3 The Project

3.1 Description of the Project

The Project would involve an underground mining operation that would produce high quality coals over a period of approximately 26 years.

At least 75 percent of coal produced by the Project would be capable of being used in the making of steel (coking coals). The balance would be export thermal coals suitable for the new generation High Efficiency, Low Emissions power generators.

The Project would involve extraction of run-of-mine (ROM) coal, from four seams within the Wittingham Coal Measures using the following underground mining methods:

- underground bord and pillar mining with partial pillar extraction in the Whynot Seam; and
- underground longwall extraction in the Woodlands Hill Seam, Arrowfield Seam and Bowfield Seam.

The substantial existing Maxwell Infrastructure would be used for handling, processing and transportation of coal for the life of the Project. The Maxwell Infrastructure includes an existing coal handling and preparation plant (CHPP), train load-out facilities and other infrastructure and services (including water management infrastructure, administration buildings, workshops and services).

A mine entry area would be developed for the Project in a natural valley in the north of EL 5460 to support underground mining and coal handling activities and provide for personnel and materials access. Personnel access to the mine entry area would be via an extension of the existing site access road from Thomas Mitchell Drive.

ROM coal brought to the surface at the mine entry area would be transported to the Maxwell Infrastructure area. Early ROM coal would be transported via internal roads during the construction and commissioning of a covered overland conveyor system. Subsequently, ROM coal would be transported to the Maxwell Infrastructure area via the covered overland conveyor system.

The Project would support continued rehabilitation of previously mined areas and overburden emplacements areas within CL 229, ML 1531 and CL 395. The volume of the East Void would be reduced through the emplacement of reject material generated by Project coal processing activities and would be capped and rehabilitated at the completion of mining.

A detailed description of the Project is provided in the main document of the EIS.

3.2 Assessment Scenarios

The main generator of road transport demands by the Project would be the workforce travelling to and from the site each day, with additional demands generated by deliveries such as fuel and consumables, and by visitors. Product from the Project would be transported off-site by train via the Antiene Rail Spur, and so would not directly generate any road-related vehicle trips.

Having regard to the potential road transport implications of the Project and the variation in the Project characteristics throughout the life of the Project (refer to Appendix C), this assessment has adopted the following scenarios in order to assess the short-term impacts of the Project, and its long-term impacts combined with the effects of background traffic growth and other developments in the region:

- Initial Construction Phase – peak construction activity, with a peak workforce of 250 people;[1]
- Project Year 6 – peak short-term operational activity, with the peak workforce forecast for the life of the Project and short-term growth/change in non-Project traffic conditions; and
- Project Year 13 – longer-term operational activity, with peak longer-term workforce combined with longer-term growth/change in non-Project traffic conditions.

The Project scenarios therefore tend to represent busiest conditions, with traffic implications being less at other times through the life of the Project than those assessed herein.

3.3 Project Traffic Generation

3.3.1 Operational Employment

Once operational, the Project workforce would work under various shift arrangements. The anticipated shift start and end times, and workers attending per shift during the nominated future assessment years are summarised in Table 3.1.

[1] Construction and development activities may occur throughout the Project life. Any activities that would occur after the initial construction phase have been accounted for as part of operational traffic movements.

Table 3.1: Anticipated Operational Workforce Shifts and Attendance

Shift	Shift Start	Shift End	Approximate Shift Attendance	
			Project Year 6	Project Year 13
Production Day	6:30 am	5:00 pm	63	55
Production Night	9:00 pm	7:30 am	63	55
Maintenance	1:00 pm	11:00 pm	28	25
Contractors	1:00 pm	11:00 pm	9	8
Management/ Support Staff	6:00 am to 8:00 am	3:00 pm to 5:00 pm	36	36
CHPP Day	6:30 am	6:30 pm	4	4
CHPP Night	6:30 pm	6:30 am	4	4

The operational workforce would typically travel to and from the Project by private vehicle, with some carpooling. Carpooling would be expected to be higher for the shifts with higher numbers of workers attending the site. The daily traffic generation of the Project workforce during the nominated assessment years is presented in Table 3.2.

Table 3.2: Operational Workforce Vehicle Trip Generation

Shift	Estimated People per Vehicle	Project Year 6		Project Year 13	
		Vehicles	Vehicle Trips per Day	Vehicles	Vehicle Trips per Day
Production Day	1.3	49	98	43	86
Production Night	1.3	49	98	43	86
Maintenance	1.1	26	52	23	46
Contractors	1.0	9	18	8	16
Management/ Support Staff	1.0	36	72	36	72
CHPP Day	1.0	4	8	4	8
CHPP Night	1.0	4	8	4	8
Total	**-**	**177**	**354**	**161**	**322**

The start and end times of the different shifts would spread the movement of the workforce to and from the site across a number of periods throughout the day. It would generally be expected that the workforce would arrive within 30 minutes prior to the start of their shift, and depart within 30 minutes of the end of their shift. It is noted that the workforce would start and end their shift at the mine entry area, which is approximately 11 km from Thomas Mitchell Drive. This would impact the time at which inbound workers would enter the site, and outbound workers depart the site, further spreading the arrivals and departures of the workforce vehicles on the public road system.

It is also noted that Management/Support Staff may arrive over a two hour period and depart over a two hour period. As a robust assessment of the potential impacts of the Project workforce on traffic conditions the distribution of the trips generated by the operational workforce has been estimated assuming that all Management/Support Staff arrive during the same hour that the Production Day Shift and CHPP Day Shift arrive, and the CHPP Night Shift depart, and that all Management/Support Staff depart during the same hour as the Production Day Shift workers depart.

The assumed profile of the operational workforce vehicle arrivals and departures is summarised in Table 3.3 for the nominated assessment years.

Table 3.3: Operational Workforce Hourly Traffic Generation (vehicles per hour)

Hour	Project Year 6			Project Year 13		
	Inbound	Outbound	Two Way	Inbound	Outbound	Two Way
6:00 am to 7:00 am	**89**	**4**	**93**	**83**	**4**	**87**
7:00 am to 8:00 am	0	49	49	0	43	43
12:00 pm to 1:00 pm	35	0	35	31	0	31
5:00 pm to 6:00 pm	**0**	**85**	**85**	**0**	**79**	**79**
6:00 pm to 7:00 pm	4	4	8	4	4	8
8:00 pm to 9:00 pm	49	0	49	43	0	43
11:00 pm to 12:00 am	0	35	35	0	31	31
Daily Total (vehicles per day)	**177**	**177**	**354**	**161**	**161**	**322**

Table 3.3 suggests that the busiest hour for the movement of the workforce to and from the Project during the morning would occur between 6:00 am and 7:00 am, and the busiest hour during the afternoon/evening would occur between 5:00 pm and 6:00 pm.

3.3.2 Operational Deliveries and Visitors

Operational activity at the Project would generate non-employee travel (NET) as a result of light and heavy vehicle trips for deliveries of equipment and consumables, and other non-employee visitors.

During Project Year 6, NET is anticipated to generate an average of 120 heavy and 100 light vehicles per week. During Project Year 13, NET is anticipated to generate an average of 100 heavy and 100 light vehicles per week.

Considering the maximum trip generation to assess the impacts of the Project, and assuming that while some deliveries and visitors would occur on weekend days, there would be a tendency for these to occur on weekdays, this assessment assumes that NET would generate:

- Project Year 6 – 40 heavy and 30 light vehicle trips per weekday; and
- Project Year 13 – 30 heavy and 30 light vehicle trips per weekday.

These would tend to be spread throughout the day and night, however the majority would be expected to occur during daylight hours between 6:00 am and 6:00 pm. This assessment assumes that during the peak periods for the movement of the workforce, NET would generate:

- Project Year 6 – 6 heavy and 5 light vehicle trips per hour; and
- Project Year 13 – 5 heavy and 5 light vehicle trips per hour.

3.3.3 Land Management Activities

Consistent with existing practice, agricultural and other land management activities would continue on Malabar-owned property throughout the life of the Project. Edderton Road may be used to access Malabar-owned property to undertake these activities. Such activities would generate a low number of vehicle trips on any one day, it has therefore not been considered in the assessment of average weekday conditions which follows. The potential implications of this traffic are however included in the assessment of the future operation of the intersection of Edderton Road with Denman Road to represent conditions on a busy day.

3.3.4 Construction Workforce

Initial construction activity is expected to generate an average of 90 personnel, and a maximum of 250 personnel. Construction work would typically occur between 6:00 am and 6:00 pm, however some night works would take place for drift and shaft development. At peak construction, it is estimated that night work would employ approximately 40 personnel, and the remaining 210 personnel would work during the day. The start and finish times of the workers would vary depending on their activity, and it is noted that construction activity would take place some distance from the site access off Thomas Mitchell Drive, requiring additional internal travel time for workers before and after their shift.

The construction workforce are assumed to travel to and from the site by private vehicles, with only limited carpooling due to the short-term nature of the construction activity. Conservatively assuming that each worker travels independently by private vehicle, the peak construction workforce would generate 500 vehicle trips per day.

For the purpose of this assessment it is conservatively assumed that the construction workforce would arrive and depart the site as shown in Table 3.4, and that the construction workforce would travel in light vehicles only. Although it is expected that the construction workforce on day shift would arrive earlier and depart later than shown in Table 3.4, the busiest hours for the movement of the construction workforce are assumed to occur between 6:00 am and 7:00 am, and between 5:00 pm and 6:00 pm to align with the operational Project peak hours (Section 3.3.1) and provide a consistent basis for forecasting of future Project traffic implications.

Table 3.4: Construction Workforce Arrivals and Departures (vehicles per hour)

Hour	Day Shift		Night Shift	
	Arrivals	Departures	Arrivals	Departures
5:00 am to 6:00 am	63	-	-	20
6:00 am to 7:00 am	105	-	-	20
7:00 am to 8:00 am	42	-	-	-
4:00 pm to 5:00 pm	-	63	-	-
5:00 pm to 6:00 pm	-	105	20	-
6:00 pm to 7:00 pm	-	42	20	-
Daily Total (vehicles per day)	**210**	**210**	**40**	**40**

3.3.5 Construction Deliveries and Visitors

During peak construction activity, the Project would require an average of 35 heavy vehicle deliveries per day and 15 light vehicle deliveries/visitors per day. At the time of peak construction activity, it is estimated that the Project would require up to 90 heavy vehicle deliveries per day and 25 light vehicle deliveries/visitors per day. This would result in an average of 70 heavy vehicle and 30 light vehicle trips per day over the initial construction phase, and up to 180 heavy vehicle and 50 light vehicle trips per day during the initial construction phase.

Deliveries and visitors to the site during the Project initial construction phase would typically be spread throughout the day, with limited activity at night, consistent with the construction shift and staffing arrangements. On this basis, the delivery and visitor activity at the time of peak construction activity would be expected to generate six light and 12 heavy vehicle trips per hour during the Project peak hours.

3.3.6 Total Project Traffic Generation

Table 3.5 summarises the peak hourly and daily traffic generation of the Project during the nominated assessment years.

Table 3.5: Average Weekday Project Peak Hourly and Daily Traffic Generation

Hour	AM Peak (vehicles per hour)			PM Peak (vehicles per hour)			Daily (vehicles per day)		
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
Initial Construction Phase									
Inbound	111	6	117	20	6	26	275	90	365
Outbound	20	6	26	111	6	117	275	90	365
Two Way	131	12	143	131	12	143	550	180	730
Project Year 6									
Inbound	92	4	96	2	2	4	207	40	247
Outbound	6	2	8	88	4	92	207	40	247
Two Way	98	6	104	90	6	96	414	80	494
Project Year 13									
Inbound	86	3	89	2	2	4	191	30	221
Outbound	6	2	8	82	3	85	191	30	221
Two Way	92	5	97	84	5	89	382	60	442

AM Project Peak 6:00 am to 7:00 am.
PM Project Peak 5:00 pm to 6:00 pm.

3.4 Project Traffic Distribution

3.4.1 Workforce Traffic

The contribution of the workforce to traffic on routes in the region will be dependent on the residential distribution of the workforce. Table 3.6 summarises the expected residential distribution of the construction and operational workforce.

Table 3.6: Workforce Residential Locations (percent)

Residential Location	Construction Workforce	Operational Workforce
Singleton, Lower Hunter and Newcastle	55	45
Muswellbrook	25	35
Scone, Aberdeen and North	10	10
Sandy Hollow, Merriwa and West	5	5
Denman, Jerrys Plains	5	5

Table 3.7 summarises the approach routes expected to be used by the workforce vehicles travelling to the site access road. These generally assume that drivers will use the shortest route available, noting that some alternative routes exist and may be used by some drivers.

Table 3.7: Workforce Approach Routes to Maxwell Infrastructure

Trip Origin	Assumed Approach Route (shortest distance)
Singleton, Lower Hunter and Newcastle	New England Highway South – Thomas Mitchell Drive
Muswellbrook	New England Highway North – Thomas Mitchell Drive
Scone, Aberdeen and North	New England Highway North – Thomas Mitchell Drive
Sandy Hollow, Merriwa and West	Golden Highway West – Denman Road South – Thomas Mitchell Drive
Denman	Denman Road South – Thomas Mitchell Drive
Jerrys Plains	Jerrys Plains Road – Lemington Road – New England Highway – Thomas Mitchell Drive

Note: departure route assumed to be the reverse of the approach route.

With regard to the workforce travelling to and from Jerrys Plains, it is noted that the existing route via Edderton Road is currently the shortest. With the proposed realignments of Edderton Road associated with the Project and Mt Arthur Mine, the travel distances via Edderton Road and via Lemington Road will be similar in the future. The number of trips between Jerrys Plains and the Project would be relatively small, peaking at approximately ten vehicle trips per day during the Initial Construction Phase, and six to seven trips per day during the operational stage. This assessment has assumed use of the Lemington Road route by these workers, however the impacts of the possible use of the Edderton Road route have been considered in the review of the future operation of intersections (Section 5.2).

3.4.2 Delivery and Visitor Traffic

It is expected that approximately 60 percent of the delivery and visitor traffic would be drawn from Muswellbrook and locations to the north; 40 percent from locations to the south such as Singleton and Newcastle; and approximately one heavy vehicle delivery per day would occur from Denman or the Western Coalfield. For the purpose of this assessment, Table 3.8 describes the routes anticipated to be used by delivery and visitor trips to the Project.

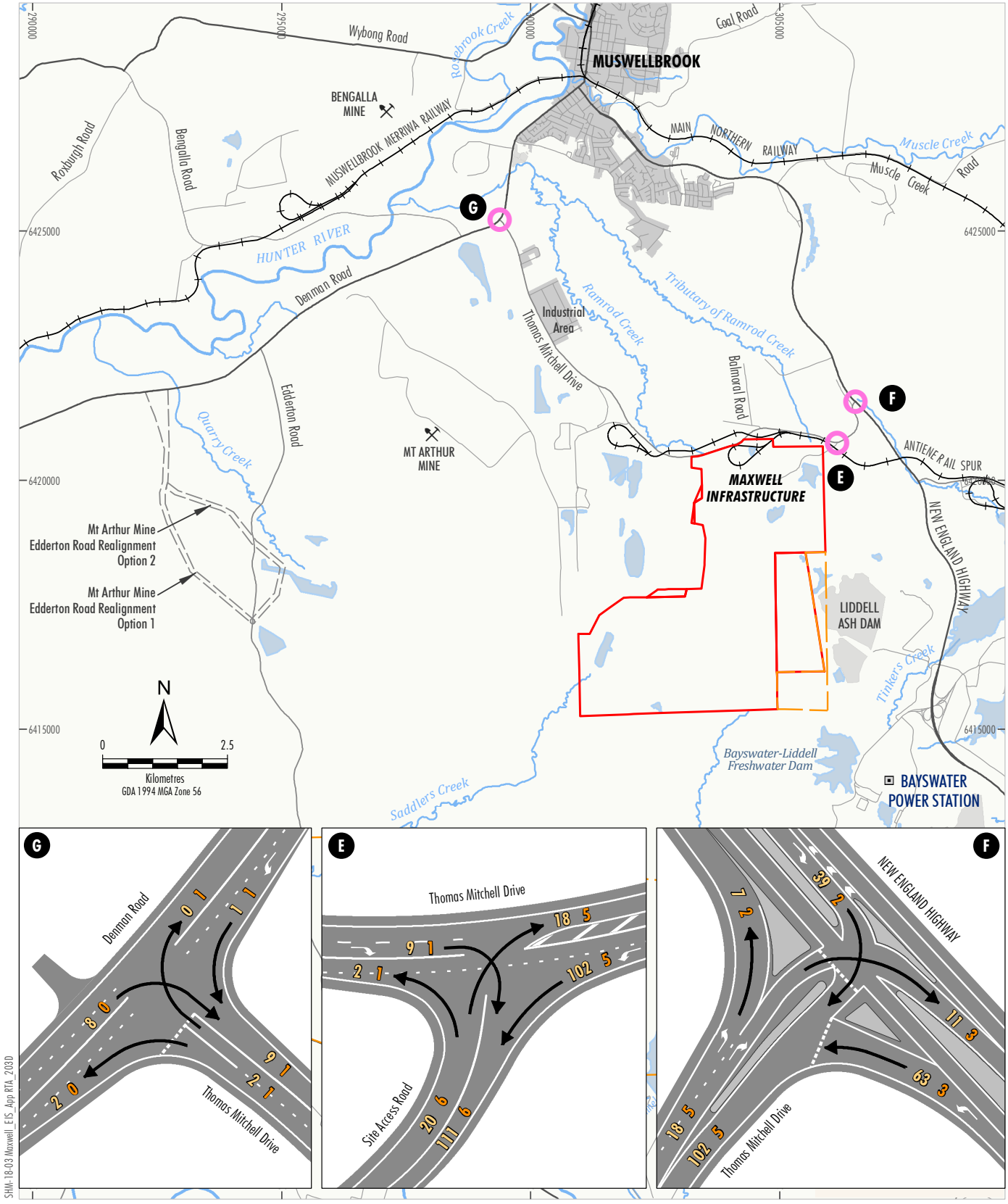
Table 3.8: Delivery and Visitor Approach Routes to Maxwell Infrastructure

Trip Origin	Percent	Approach Route
Singleton, Lower Hunter and Newcastle	40	New England Highway South – Thomas Mitchell Drive
Muswellbrook and North	40 20	New England Highway North – Thomas Mitchell Drive Denman Road North – Thomas Mitchell Drive
Denman/Western Coalfield (1 delivery per day)	-	Denman Road South – Thomas Mitchell Drive

Note: departure route assumed to be the reverse of the approach route.

3.5 Total Project Traffic

Table 3.9 summarises the average weekday traffic expected to be generated by the Project on key locations on the road network. The volume and distribution of peak hourly traffic generated by the Project is also presented diagrammatically in Figure 3.1 to Figure 3.6.



SHM-18-03 Maxwell_EIS_App RTA_2020

LEGEND

- Mining Operation
- Railway
- Mt Arthur Mine Edderton Road Realignment
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Intersection of Interest
- 5 10 Light Vehicle Volume, Heavy Vehicle Volume

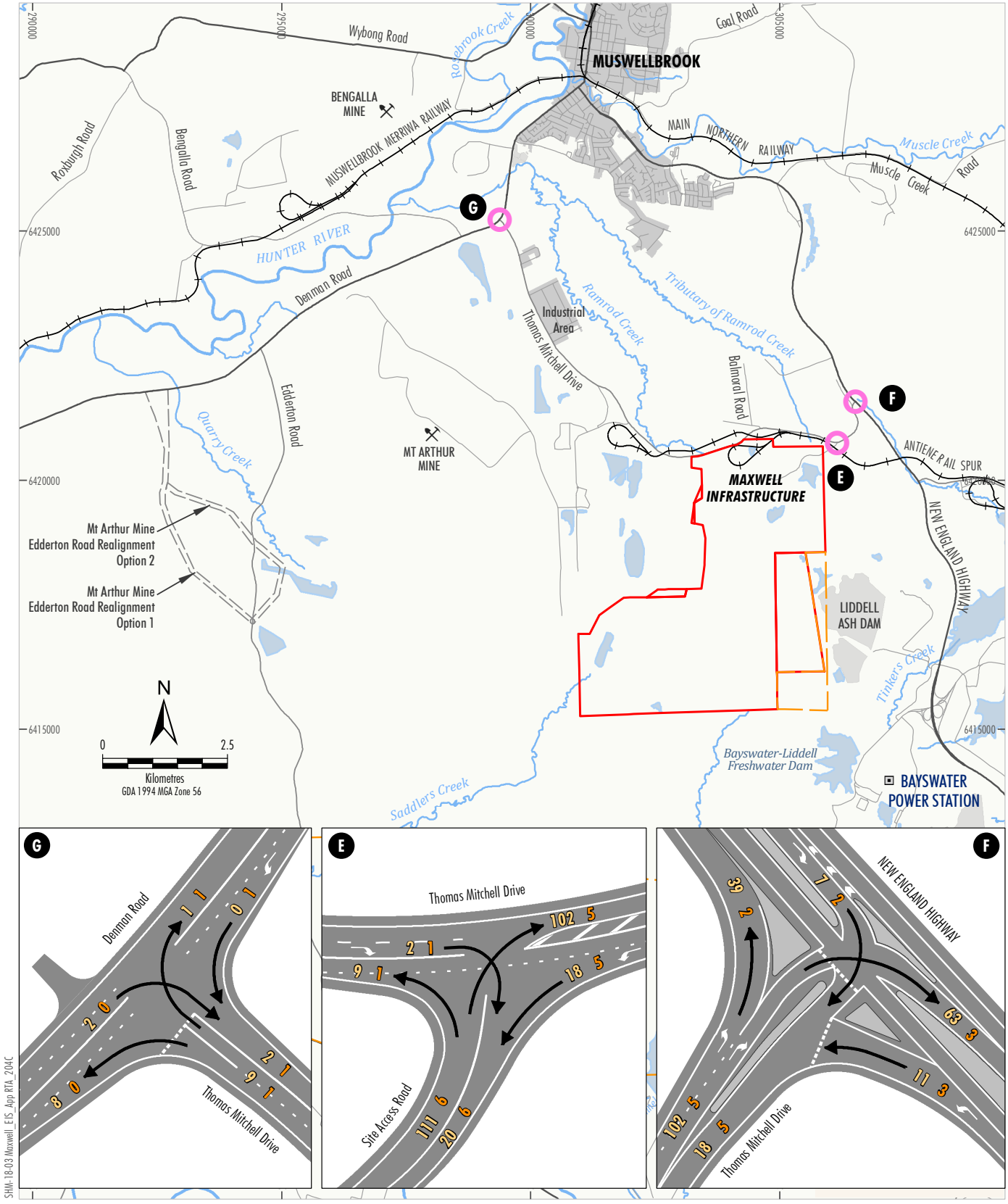
Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019)

MALABAR COAL

MAXWELL PROJECT

Average Weekday AM Peak Project Traffic - Initial Construction Phase

Figure 3.1



SHM-18-03 Maxwell_EIS_App RTA_204C

LEGEND

- Mining Operation
- Railway
- Mt Arthur Mine Edderton Road Realignment
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Intersection of Interest
- 5 10 Light Vehicle Volume, Heavy Vehicle Volume

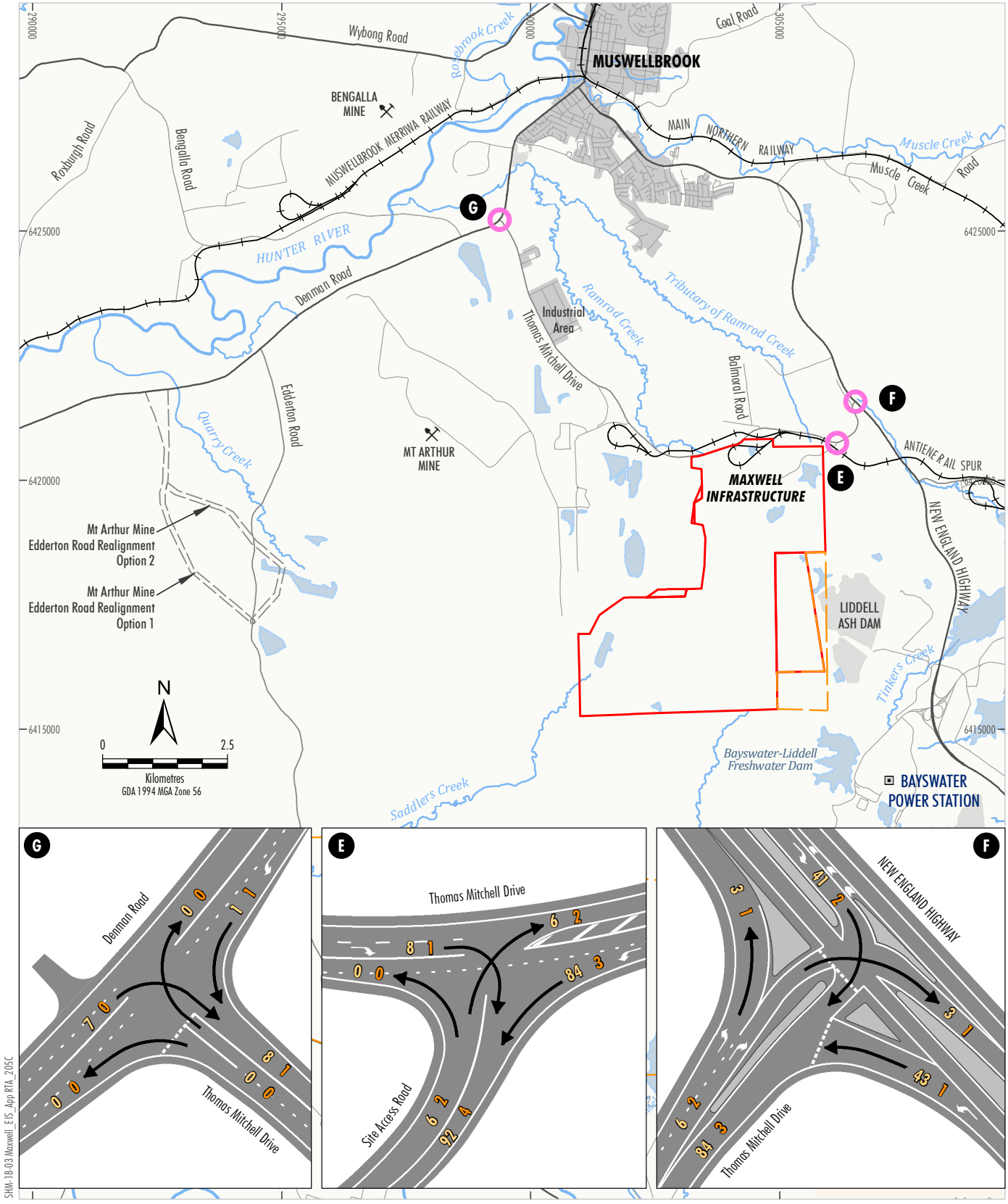
Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019)

MALABAR COAL

MAXWELL PROJECT

Average Weekday PM Peak Project Traffic - Initial Construction Phase

Figure 3.2



SHM-18-03 Maxwell_EIS_App RTA_205C

LEGEND

- Mining Operation
- Railway
- Mt Arthur Mine Edderton Road Realignment
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Intersection of Interest
- 5 10 Light Vehicle Volume, Heavy Vehicle Volume

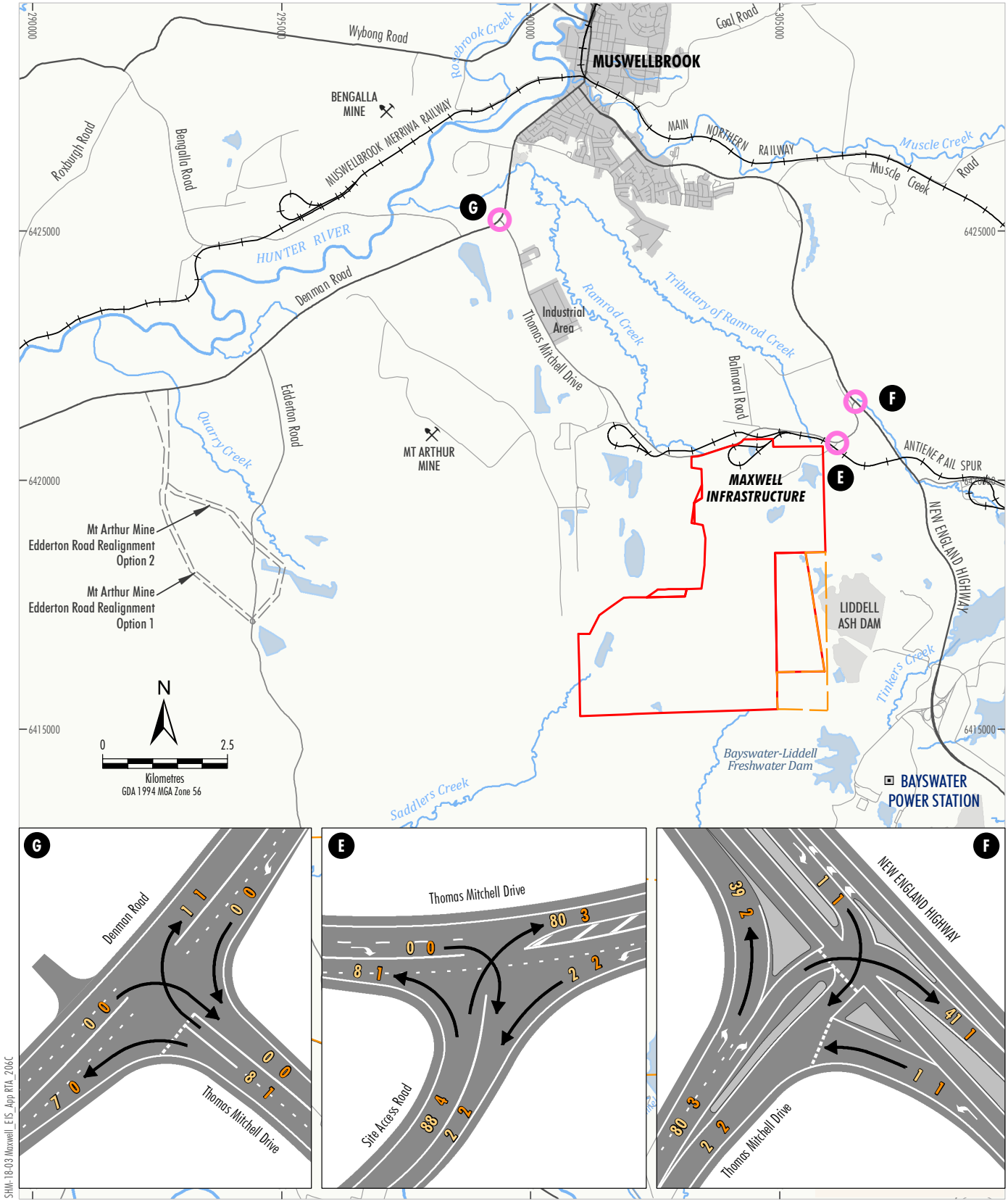
Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019)

MALABAR COAL

MAXWELL PROJECT

Average Weekday AM Peak Project Traffic - Year 6

Figure 3.3



SHM-18-03 Maxwell_EIS_App RTA_206C

LEGEND

- Mining Operation
- Railway
- Mt Arthur Mine Edderton Road Realignment
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Intersection of Interest
- 5 10 Light Vehicle Volume, Heavy Vehicle Volume

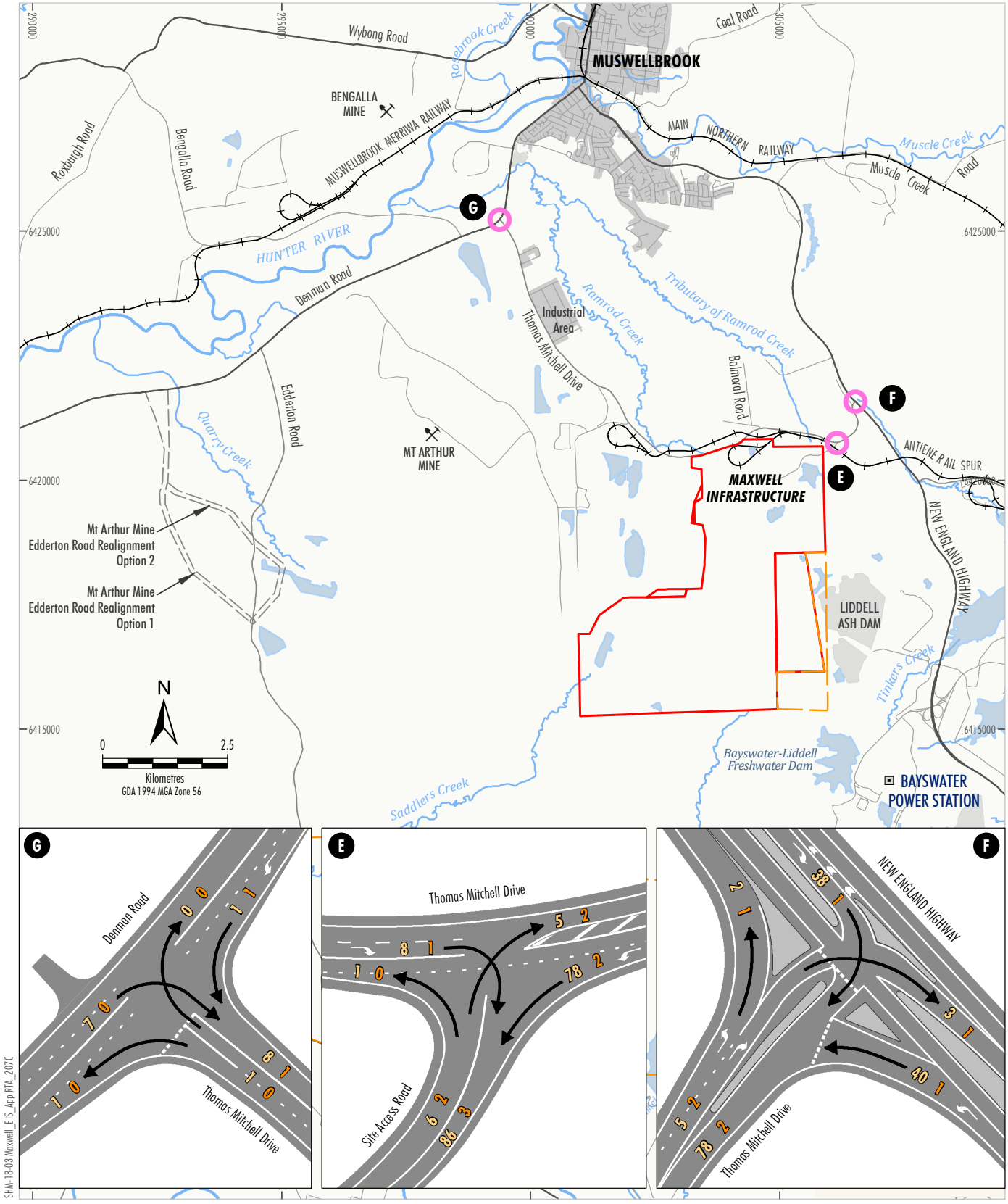
Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019)

MALABAR COAL

MAXWELL PROJECT

Average Weekday PM Peak Project Traffic - Year 6

Figure 3.4



SHM-18-03 Maxwell_EIS_App RTA_207C

LEGEND

- Mining Operation
- Railway
- Mt Arthur Mine Edderton Road Realignment
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Intersection of Interest
- 5 10 Light Vehicle Volume, Heavy Vehicle Volume

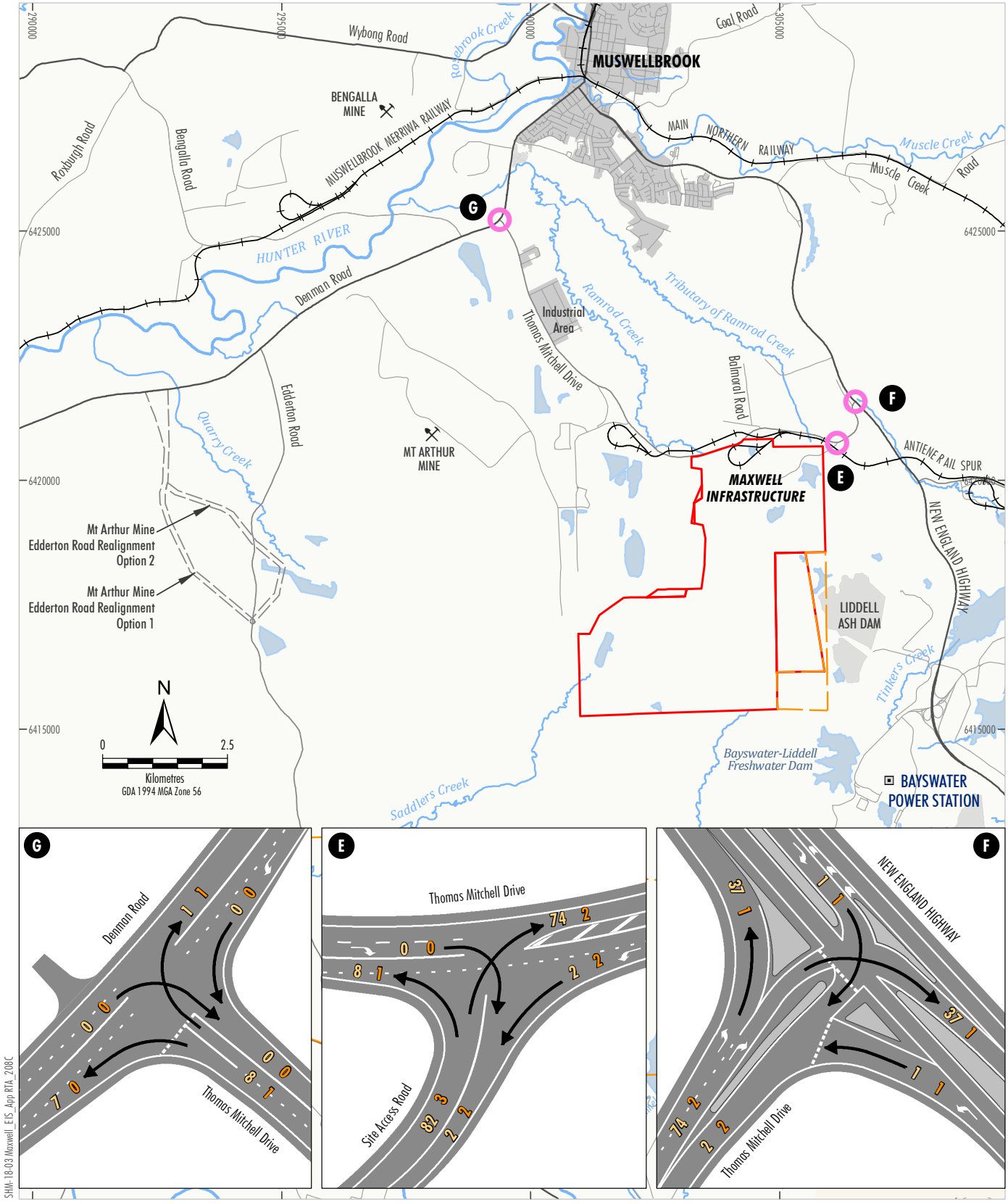
Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019)

MALABAR COAL

MAXWELL PROJECT

Average Weekday AM Peak Project Traffic - Year 13

Figure 3.5



SHM-18-03 Maxwell_EIS_App RTA_200C

LEGEND

- Mining Operation
- Railway
- Mt Arthur Mine Edderton Road Realignment
- Maxwell Project Exploration Licence Boundary
- Maxwell Project Mining and Coal Lease Boundary
- Intersection of Interest
- 5 10 Light Vehicle Volume, Heavy Vehicle Volume

Source: © NSW Department of Planning and Environment (2019); NSW Department of Finance, Services and Innovation (2019)

MALABAR COAL

MAXWELL PROJECT

Average Weekday PM Peak Project Traffic - Year 13

Figure 3.6

Table 3.9: Average Weekday Project Traffic on the Road Network (vehicles per day)

Road and Location	Initial Construction Phase			Project Year 6			Project Year 13		
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
Site Access Road South of Thomas Mitchell Drive	550	180	730	414	80	494	382	60	442
Denman Road South of Thomas Mitchell Drive	40	2	42	28	2	30	26	2	28
Denman Road North of Thomas Mitchell Drive	10	34	44	12	14	26	12	10	22
New England Highway North of Thomas Mitchell Drive	196	72	268	184	32	216	168	24	192
New England Highway South of Thomas Mitchell Drive	306	72	378	190	32	222	176	24	200
Thomas Mitchell Drive East of Site Access Road	500	144	644	374	64	438	344	48	392
Thomas Mitchell Drive West of Site Access Road	50	36	86	40	16	56	38	12	50

Table 3.10 summarises the morning peak hour traffic expected to be generated by the Project on an average weekday at key locations on the road network. The Project morning peak hour is anticipated to occur between 6:00 am and 7:00 am.

Table 3.10: Average Weekday AM Peak Hour Project Traffic (vehicles per hour)

Road and Location	Initial Construction Phase			Project Year 6			Project Year 13		
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
Site Access Road South of Thomas Mitchell Drive	131	12	143	98	6	104	92	5	97
Denman Road South of Thomas Mitchell Drive	10	0	10	7	0	7	8	0	8
Denman Road North of Thomas Mitchell Drive	1	2	3	1	1	2	1	1	2
New England Highway North of Thomas Mitchell Drive	46	4	50	44	3	47	40	2	42
New England Highway South of Thomas Mitchell Drive	74	6	80	46	2	48	43	2	45
Thomas Mitchell Drive East of Site Access Road	120	10	130	90	5	95	83	4	87
Thomas Mitchell Drive West of Site Access Road	11	2	13	8	1	9	9	1	10

Table 3.11 summarises the evening peak hour traffic expected to be generated by the Project on an average weekday at key locations on the road network. The Project evening peak hour is anticipated to occur between 5:00 pm and 6:00 pm.

Table 3.11: Average Weekday PM Peak Hour Project Traffic (vehicles per hour)

Road and Location	Initial Construction Phase			Project Year 6			Project Year 13		
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
Site Access Road South of Thomas Mitchell Drive	131	12	143	90	6	96	84	5	89
Denman Road South of Thomas Mitchell Drive	10	0	10	7	0	7	7	0	7
Denman Road North of Thomas Mitchell Drive	1	2	3	1	1	2	1	1	2
New England Highway North of Thomas Mitchell Drive	46	4	50	40	3	43	38	2	40
New England Highway South of Thomas Mitchell Drive	74	6	80	42	2	44	38	2	40
Thomas Mitchell Drive East of Site Access Road	120	10	130	82	5	87	76	4	80
Thomas Mitchell Drive West of Site Access Road	11	2	13	8	1	9	8	1	9

4 Baseline Future Traffic Conditions

This section describes the expected changes to traffic conditions in the region during the initial construction phase (nominally 2020), Project Year 6 (nominally 2026) and Year 13 (nominally 2033) with approved and planned developments and growth in traffic compared with the surveyed traffic conditions. These are the conditions which are expected to occur without the Project, and thus their cumulative impacts form the baseline conditions against which the Project can be assessed.

4.1 Developments in the Region

4.1.1 Maxwell Infrastructure (Former Drayton Mine)

Mining activity at the Drayton Mine ceased in October 2016. Since then, care and maintenance and rehabilitation activities have occurred at the site, with vehicular access via Thomas Mitchell Drive and the site access road. The traffic surveyed on the site access road in June 2018 was generated by the care and maintenance and rehabilitation activities for the Drayton Mine, now known as Maxwell Infrastructure. Care and maintenance activities would cease as a separate activity upon commencement of the Project.

Based on the findings of the traffic surveys, the existing traffic generation and distribution of traffic generated by the activity at Maxwell Infrastructure during the expected average weekday Project peak hours is estimated in Table 4.1. This relates to conditions during the surveyed week, noting that due to the nature of the activity, the level of traffic generation and its distribution would be expected to vary over time.

Table 4.1: Average Weekday Maxwell Infrastructure Traffic 2018

Road and Location		Inbound			Outbound		
		AM	PM	Daily	AM	PM	Daily
Site Access Road South of Thomas Mitchell Drive	Light Heavy	6 1	0 0	40 9	1 0	1 0	42 7
Thomas Mitchell Drive East of Site Access Road	Light Heavy	4 1	0 0	27 6	1 0	1 0	28 5
Thomas Mitchell Drive West of Site Access Road	Light Heavy	2 0	0 0	13 3	0 0	0 0	14 2
Denman Road North of Thomas Mitchell Drive	Light Heavy	2 0	0 0	12 3	0 0	0 0	13 2
Denman Road South of Thomas Mitchell Drive	Light Heavy	0 0	0 0	1 0	0 0	0 0	1 0
New England Highway North of Thomas Mitchell Drive	Light Heavy	2 1	0 0	14 3	1 0	1 0	14 3
New England Highway South of Thomas Mitchell Drive	Light Heavy	2 0	0 0	13 3	0 0	0 0	14 2

AM Project Peak 6:00 am to 7:00 am (vehicles per hour).
PM Project Peak 5:00 pm to 6:00 pm (vehicles per hour).
Daily (vehicles per day).

If the Project does not proceed, a level of care and maintenance activity would be expected to continue in the future, and decline over time. For the purpose of this assessment, it is assumed that such activity would continue at the same level as surveyed in 2018 (Table 4.1) for up to five years, after which, six employees would work at the site per day. Table 4.2 summarises the estimated longer-term traffic generation of the care and maintenance activity should the Project not proceed.

Table 4.2: Average Weekday Maxwell Infrastructure Traffic After 2023 (No Project)

Road and Location		Inbound			Outbound		
		AM	PM	Daily	AM	PM	Daily
Site Access Road South of Thomas Mitchell Drive	Light Heavy	6 1	0 0	6 1	0 0	6 1	6 1
Thomas Mitchell Drive East of Site Access Road	Light Heavy	4 1	0 0	4 1	0 0	4 1	4 1
Thomas Mitchell Drive West of Site Access Road	Light Heavy	2 0	0 0	2 0	0 0	2 0	2 0
Denman Road North of Thomas Mitchell Drive	Light Heavy	2 0	0 0	2 0	0 0	2 0	2 0
Denman Road South of Thomas Mitchell Drive	Light Heavy	0 0	0 0	0 0	0 0	0 0	0 0
New England Highway North of Thomas Mitchell Drive	Light Heavy	2 1	0 0	2 1	0 0	2 1	2 1
New England Highway South of Thomas Mitchell Drive	Light Heavy	2 0	0 0	2 0	0 0	2 0	2 0

AM Project Peak 6:00 am to 7:00 am (vehicles per hour).
PM Project Peak 5:00 pm to 6:00 pm (vehicles per hour).
Daily (vehicles per day).

4.1.2 Maxwell Solar Project

Maxwell Solar Pty Ltd proposes to develop a solar farm, to be known as the Maxwell Solar Project, at the Maxwell Infrastructure.

The Maxwell Solar Project would comprise the installation of a solar plant with a capacity of 25 megawatts (MW) that would supply electricity to the Project and/or the National Energy Market (NEM).

The proposal would include the following elements:

- flat plate photovoltaic (PV) modules in a fixed or tracking arrangement;
- potential battery storage; and
- overhead line, overhead collection line or underground line from the proposed array to the existing Ausgrid 33 kilovolts (kV) power lines to the east or to the 66 kV power lines to the north.

Construction of the Maxwell Solar Project is expected to take 18 months if constructed in one stage, although construction may be staged and therefore take longer than 18 months. The Maxwell Solar Project is expected to operate for more than 25 years.

This assessment considers the cumulative impacts of the Maxwell Solar Project construction activity in the event that peak construction activity for the Maxwell Solar Project and the Project overlap. The construction workforce would consist of up to 50 personnel, who would arrive between 5:00 am and 7:30 am and depart between 4:30 pm and 7:00 pm, with limited carpooling expected. It is estimated that half of the construction workforce would travel during the Project peak hours. Deliveries and visitors would generate 10 light and 10 heavy vehicle visits per day, which would be spread throughout the day.

The distribution of the Maxwell Solar Project traffic would be expected to be similar to that assumed for the Project construction workforce (Section 3.4.1) and Project deliveries and visitors (Section 3.4.2).

Table 4.3 presents the estimated daily and hourly construction traffic expected to be generated by the Maxwell Solar Project.

Table 4.3: Average Weekday Maxwell Solar Project Construction Traffic

Road and Location		Inbound			Outbound		
		AM	PM	Daily	AM	PM	Daily
Site Access Road South of Thomas Mitchell Drive	Light Heavy	27 2	0 0	60 10	0 0	27 2	60 10
Thomas Mitchell Drive East of Site Access Road	Light Heavy	25 2	0 0	54 8	0 0	25 2	54 8
Thomas Mitchell Drive West of Site Access Road	Light Heavy	2 0	0 0	6 2	0 0	2 0	6 2
Denman Road North of Thomas Mitchell Drive	Light Heavy	0 0	0 0	2 2	0 0	0 0	2 2
Denman Road South of Thomas Mitchell Drive	Light Heavy	2 0	0 0	4 0	0 0	2 0	4 0
New England Highway North of Thomas Mitchell Drive	Light Heavy	10 1	0 0	22 4	0 0	10 1	22 4
New England Highway South of Thomas Mitchell Drive	Light Heavy	15 1	0 0	32 4	0 0	15 1	32 4

AM Project Peak 6:00 am to 7:00 am (vehicles per hour).
PM Project Peak 5:00 pm to 6:00 pm (vehicles per hour).
Daily (vehicles per day).

Once operational, the Maxwell Solar Project would operate with a very small workforce attending the site each day. This assessment assumes three operational staff would attend the Maxwell Solar Project each day via the site access road in Years 6 and 13 of the Project. Delivery and visitor trips to the Maxwell Solar Project when operational would be negligible. Table 4.4 presents the daily and peak hourly operational traffic expected to be generated by the Maxwell Solar Project, assuming that the operational staff arrive and depart during the Project peak hours.

Table 4.4: Average Weekday Maxwell Solar Project Operational Traffic

Road and Location		Inbound			Outbound		
		AM	PM	Daily	AM	PM	Daily
Site Access Road South of Thomas Mitchell Drive	Light Heavy	3 0	0 0	3 0	0 0	3 0	3 0
Thomas Mitchell Drive East of Site Access Road	Light Heavy	3 0	0 0	3 0	0 0	3 0	3 0
Thomas Mitchell Drive West of Site Access Road	Light Heavy	0 0	0 0	0 0	0 0	0 0	0 0
Denman Road North of Thomas Mitchell Drive	Light Heavy	0 0	0 0	0 0	0 0	0 0	0 0
Denman Road South of Thomas Mitchell Drive	Light Heavy	0 0	0 0	0 0	0 0	0 0	0 0
New England Highway North of Thomas Mitchell Drive	Light Heavy	1 0	0 0	1 0	0 0	1 0	1 0
New England Highway South of Thomas Mitchell Drive	Light Heavy	2 0	0 0	2 0	0 0	2 0	2 0

AM Project Peak 6:00 am to 7:00 am (vehicles per hour).
PM Project Peak 5:00 pm to 6:00 pm (vehicles per hour).
Daily (vehicles per day).

4.1.3 Mt Arthur Mine

The Mt Arthur Mine is located approximately 5 km south-west of Muswellbrook, and immediately east of the Project. It is owned by Hunter Valley Energy Coal Pty Ltd, a wholly owned subsidiary of BHP. The open cut mining operation is approved to mine up to 32 million tonnes per annum (Mtpa) of ROM coal until 30 June 2026 under Project Approval 09_0062. The approval includes realignment of the northern section of Edderton Road and its intersection with Denman Road. The Mt Arthur Underground has not yet commenced longwall extraction and is approved until 2030.

GHD (2015) presents traffic data and forecasts to establish use of Thomas Mitchell Drive by several of the mines in the region, including Mt Arthur Mine. That study estimates the average weekday contribution of the Mt Arthur Mine to traffic on Thomas Mitchell Drive in 2018 as:

- east of Mt Arthur Mine access road 809 light and 119 heavy vehicles per day;
- west of Mt Arthur Mine access road and east of Industrial Area 1,620 light and 265 heavy vehicles per day; and
- west of Industrial Area 1,517 light and 251 heavy vehicles per day.

These forecasts include the effects of the approved Modification which included relocation and upgrade of the explosives, storage, magazine and associated facilities, with limited access via Edderton Road. The heavy vehicle trips to and from the Edderton Road access are expected to use Thomas Mitchell Drive.

Considering those trips on the basis of the GTA Consultants (2012) assessment of the Mt Arthur Coal Open Cut Modification, the overall generation of the Mt Arthur Mine in 2018 is estimated at:

- 2,429 light and 370 heavy vehicle trips per day to and from the Mt Arthur Mine access road on Thomas Mitchell Drive; and
- 72 light and 14 heavy vehicle trips per day to and from the Mt Arthur Mine access road on Edderton Road.

The GHD (2015) and GTA Consultants (2012) assessments assume similar distributions of Mt Arthur Mine traffic to the east and west along Thomas Mitchell Drive. Based on those distributions and the above estimates of average weekday traffic generation, the operational traffic generated by the Mt Arthur Mine has been estimated and is presented in Table 4.5. The GTA Consultants (2012) assessment applied a worst case scenario with regard to the vehicles using the Edderton Road access, in which all vehicles arrived in one hour during the morning and departed in one hour in the evening. The estimate in Table 4.5 assumes some spread of that traffic throughout the day, based on the surveyed volumes on Edderton Road.

Table 4.5: Average Weekday Mt Arthur Mine Operational Traffic

Road and Location		Inbound			Outbound		
		AM	PM	Daily	AM	PM	Daily
Mt Arthur Mine Access Road Off Thomas Mitchell Drive	Light Heavy	288 19	48 4	1,212 188	109 6	124 8	1,217 182
Mt Arthur Mine Access Road Off Edderton Road	Light Heavy	18 1	0 0	36 7	0 0	18 1	36 7
Thomas Mitchell Drive Denman Road to Industrial Area	Light Heavy	175 13	29 2	737 121	67 4	76 6	740 118
Thomas Mitchell Drive Industrial Area to Mt Arthur Mine Access Road	Light Heavy	187 13	31 2	788 129	71 4	81 6	791 125
Thomas Mitchell Drive Mt Arthur Mine to New England Highway	Light Heavy	101 8	17 1	424 73	38 2	44 4	426 71
Denman Road North of Thomas Mitchell Drive	Light Heavy	172 11	26 2	692 104	60 3	81 4	694 100
Denman Road Edderton Road to Thomas Mitchell Drive	Light Heavy	27 2	3 0	91 17	7 1	19 2	92 18
Denman Road South of Edderton Road	Light Heavy	15 1	3 0	68 10	7 1	7 1	69 10
New England Highway South of Thomas Mitchell Drive	Light Heavy	101 8	17 1	424 73	38 2	44 4	426 71
Edderton Road South of Denman Road	Light Heavy	12 1	0 0	23 7	0 0	12 1	23 7
Edderton Road South of Mt Arthur Mine Access Road	Light Heavy	6 0	0 0	13 0	0 0	6 0	13 0

AM Project Peak 6:00 am to 7:00 am (vehicles per hour).
PM Project Peak 5:00 pm to 6:00 pm (vehicles per hour).
Daily (vehicles per day).

For the purpose of this assessment, it is assumed that the Mt Arthur Mine will remain operational until the end of 2026. After 2026, it is expected that some traffic would be generated by decommissioning activity at the site. This is not quantified in GTA Consultants (2012) and it is assumed that decommissioning and ongoing care and maintenance activity would generate very low volumes of traffic during the long-term Project assessment scenario period. For the purpose of this assessment, this small volume has not been considered.

4.1.4 Mount Pleasant Operation

The Mount Pleasant Operation is located approximately 4 km north-west of Muswellbrook, and immediately to the north of the Bengalla Mine. The approved Mount Pleasant Operation permits extraction of approximately 197 million tonnes of ROM coal at up to 10.5 Mtpa until December 2026 following approval of a modification to the Mount Pleasant Operation (Modification 3) during August 2018.

MACH Energy recommenced construction of the Mount Pleasant Operation in November 2016, and mining operations commenced in October 2017, in accordance with Development Consent DA 92/97 and Commonwealth Approval EPBC 2011/5795. Thermal coal product from the Mount Pleasant Operation is transported by rail to the port of Newcastle for export, or to domestic customers for use in electricity generation, generating up to nine trains per day. The main vehicular access to the mine site and administration office is from Wybong Road, with a second access road also from Wyong Road for access to the rail corridor and associated infrastructure south of Wybong Road.

Modification 4, which proposed duplication of the approved rail spur, rail loop, conveyor and rail load-out facility; and amendments to water supply infrastructure and redundant approved infrastructure was approved on 16 November 2018. Modification 4 does not result in any material change to the currently approved road transport movements, and the modest construction activity would not coincide with peak operational mining activity at the mine.

GHD (2017) assessed the volume of traffic generated by the Mount Pleasant Operation on an average day, and its distribution on the surrounding road network. At the time of the traffic surveys, the Mount Pleasant Operation was operational, and for the purpose of this assessment, it is assumed that the Mount Pleasant Operation's traffic characteristics were as assessed by GHD (2017). On this basis, the contribution of the Mount Pleasant Operation to traffic volumes on roads of relevance to the Project has been estimated, and is presented in Table 4.6.

Table 4.6: Average Weekday Mount Pleasant Operational Traffic

Road and Location		Inbound			Outbound		
		AM	PM	Daily	AM	PM	Daily
Mount Pleasant Operation Access Combined Accesses off Wybong Road	Light Heavy	89 13	19 3	306 46	16 2	52 8	306 46
Thomas Mitchell Drive Denman Road to New England Highway	Light Heavy	24 5	5 1	81 18	4 1	14 3	81 18
Denman Road North of Thomas Mitchell Drive	Light Heavy	34 7	7 2	120 23	6 1	21 4	120 23
Denman Road Bengalla Road to Thomas Mitchell Drive	Light Heavy	58 12	12 3	201 41	10 2	35 7	201 41
Denman Road South of Bengalla Road	Light Heavy	3 1	1 0	11 5	0 0	4 1	11 5
New England Highway South of Thomas Mitchell Drive	Light Heavy	24 5	5 1	81 18	4 1	14 3	81 18

AM Project Peak 6:00 am to 7:00 am (vehicles per hour).
PM Project Peak 5:00 pm to 6:00 pm (vehicles per hour).
Daily (vehicles per day).

For the purpose of this assessment, it is assumed that the Mount Pleasant Operation will remain operational until the end of 2026, i.e. the volume of traffic forecast in Table 4.6 would occur in addition to the traffic surveyed on the road network in 2018 until the end of Project Year 6.

After 2026, it is expected that some traffic would be generated by decommissioning activity at the Mount Pleasant Operation. This is not quantified in GHD (2017) nor in the original assessment of the Mount Pleasant Project (ERM Mitchell McCotter, 1997). It is assumed that decommissioning and ongoing care and maintenance activity would generate very low volumes of traffic during the long-term Project assessment scenario period. For the purpose of this assessment, this small volume has not been considered.

4.1.5 Bengalla Mine

The Bengalla Mine is an open cut coal mine located immediately to the south of the Mount Pleasant Operation, and 4 km west of Muswellbrook. Development Consent SSD-5170 (as modified) permits open cut coal mining operations and associated activities to 2039, with open cut mining at a rate of up to 15 Mtpa ROM coal, utilising a workforce of approximately 900 full time equivalent personnel (plus contractors) at peak production. Bengalla Mining Company commenced operating under SSD-5170 from October 2015 (Hansen Bailey, 2018). Modifications 1 to 4 to that Consent have been approved, which generally do not impact the traffic generation potential of the operational mine.

An environmental audit of the Bengalla Continuation Project (Horn, 2017) indicates that during 2015, Bengalla Mine employed 705 people, and Hansen Bailey (2016) reports that production in 2015 was 10.5 Mt ROM coal. Hansen Bailey (2018) forecasts that production in 2018 will be 10.75 Mt ROM coal, which remains below the approved peak production of 15 Mtpa ROM coal. For the purpose of this assessment, it is assumed that at the time of the traffic surveys in 2018, the workforce at the Bengalla Continuation Project was approximately 720 people, thus there is the potential for the workforce to increase by approximately 180 people to reach the peak workforce of 900 people.

The production schedule anticipated by the Bengalla Continuation Project EIS (Hansen Bailey, 2013) suggested that coal production would reach its maximum in Year 4, and continue at that level throughout the life of the mine. It is therefore assumed that an additional 180 people may work at the mine at any time throughout the remainder of the life of the mine above those working at the time of the traffic surveys.

Based on the travel characteristics presented by DC Engineering (2013), Table 4.7 summarises the additional traffic that may be expected to be generated by the potential increase in the workforce at Bengalla Mine.

Table 4.7: Average Weekday Bengalla Continuation Project Additional[A] Operational Traffic

Road and Location		Inbound			Outbound		
		AM	PM	Daily	AM	PM	Daily
Bengalla Mine Access	Light Heavy	63 1	27 1	90 2	27 1	63 1	90 2
Thomas Mitchell Drive Denman Road to New England Highway	Light Heavy	17 0	7 0	24 0	7 0	17 0	24 0
Denman Road North of Bengalla Road	Light Heavy	25 1	11 1	36 2	11 1	25 1	36 2
Denman Road South of Bengalla Road	Light Heavy	3 0	1 0	5 0	1 0	3 0	5 0
New England Highway South of Thomas Mitchell Drive	Light Heavy	17 0	7 0	24 0	7 0	17 0	24 0

[A] *Potential additional traffic above 2018 levels.*
AM Project Peak 6:00 am to 7:00 am (vehicles per hour).
PM Project Peak 5:00 pm to 6:00 pm (vehicles per hour).
Daily (vehicles per day).

4.1.6 Mangoola Mine

Mangoola Mine is an open cut coal mine located approximately 20 km west of Muswellbrook and 10 km north of Denman. It is owned by Mangoola Coal Operations Pty Limited (a subsidiary of Glencore plc), and is approved under PA06_0014 (as modified) to produce up to 13.5 Mtpa of ROM coal until November 2029. Product coal is transported by rail, and the Mangoola Mine operates 24 hours per day, seven days per week.

SEARs have been issued for the proposed Mangoola Coal Continued Operations (MCCO), which involves development of a new open cut pit to continue to extract approximately 13.5 Mtpa of ROM coal, extension of the life of the mine by seven years (to 2036), construction of a haul road overpass over Wybong Road and Big Flat Creek, and realignment of a section of Wybong Post Office Road (Umwelt, 2017). The MCCO anticipates no change to the hours of operation, the number of operational employees or the coal transport methods at the Mangoola Mine. If approved, the MCCO when operational would therefore not impact the ongoing traffic conditions on the wider road network in the region, beyond the localised impact of the realignment of Wybong Post Office Road.

The MCCO proposes a construction workforce of up to approximately 120 people, which would increase the traffic generation of the mine during the construction phase. It is assumed that the construction phase of the MCCO (if approved) would not occur during any of the Project assessment scenario years.

4.1.7 Dartbrook Mine

The Dartbrook Mine is an underground coal mine located immediately north of the Mount Pleasant Operation. DA 231-7-200 permits mining of up to 6 Mtpa of ROM coal until 5 December 2022, however the mine was placed in care and maintenance in 2006. AQC Dartbrook Management Pty Limited (a wholly owned subsidiary of Australian Pacific Coal Limited) has lodged an application to modify the consent, which if approved, would extend the life of the mine by an additional five years to 5 December 2027. The modification would employ some 26 full time equivalent (FTE) construction workers and 99 FTE operational workers.

It is therefore assumed that the Dartbrook Mine may recommence operations which would continue until 5 December 2027. For the purpose of this assessment, the potential traffic generation of the Dartbrook Mine and its general distribution on the road network has been estimated based on the characteristics of the proposed Mount Pleasant Mine Optimisation Modification (GHD, 2017), on a pro rata basis to the FTE workforce. On this basis, Table 4.8 presents the forecast contribution of the Dartbrook Mine to traffic volumes on roads of relevance to the Project.

Table 4.8: Average Weekday Dartbrook Mine Operational Traffic

Road and Location		Inbound			Outbound		
		AM	PM	Daily	AM	PM	Daily
Dartbrook Mine Access	Light Heavy	23 3	4 1	80 12	4 1	13 2	80 12
Thomas Mitchell Drive Denman Road to New England Highway	Light Heavy	0 0	0 0	0 0	0 0	0 0	0 0
Denman Road Muswellbrook to Denman	Light Heavy	1 0	0 0	3 1	0 0	0 0	3 1
New England Highway South of Muswellbrook	Light Heavy	6 1	1 0	21 5	6 1	1 0	21 5

AM Project Peak 6:00 am to 7:00 am (vehicles per hour).
PM Project Peak 5:00 pm to 6:00 pm (vehicles per hour).
Daily (vehicles per day).

After mining activity at the Dartbrook Mine ceases, care and maintenance activity is expected to resume. Such activity is expected to generate similar volumes of traffic on the road network as was occurring during the traffic surveys in 2018.

4.1.8 Liddell Power Station

The Liddell Power Station is located on the western side of Lake Liddell approximately 14 km south-east of Muswellbrook. AGL Energy Limited has announced that the Liddell Power Station will be closed in 2022, and is seeking proposals from businesses and organisations regarding the future of the site and resources. Closure of the Liddell Power Station would result in a reduction in traffic generated by the site, however future development of the site has the potential to again generate traffic.

As details of any future development are not known, this assessment makes no allowance for the decrease in traffic expected after 2022, nor for any future increase in traffic which may occur upon redevelopment.

4.1.9 Spur Hill Underground Coking Coal Project

Malabar also owns and operates Spur Hill Underground Coking Coal Project in the adjacent EL 7429. Malabar is continuing to undertake work to enhance the geological understanding of the zone where EL 5460 meets the Spur Hill exploration licence (EL 7429). The improved understanding will be used to optimise the development plans for the Spur Hill Underground Coking Coal Project. At this stage, it is not anticipated that the Spur Hill Underground Coking Coal Project would proceed as proposed in previous documentation.

Any future integration of the Maxwell Project and the Spur Hill Underground Coking Coal Project would be subject to future separate assessments and approvals, including assessment of any potential cumulative impacts. On this basis, potential cumulative impacts from the Spur Hill Underground Coking Coal Project are not being assessed in the Maxwell Project EIS. An assessment of cumulative impacts would occur at the appropriate stage in the future, when more detail is available about development plans in EL 7429.

4.1.10 Total Impacts of Developments

Table 4.9 summarises how the activity and traffic generation of the various developments described above has been assumed to vary during the Project assessment years.

Table 4.9: Consideration of Other Developments in Project Assessment Years

Development	Initial Construction Phase (2020)	Project Year 6 (2026)	Project Year 13 (2033)
Maxwell Infrastructure (No Project)	Existing activity (Table 4.1) accounted for in surveyed traffic volumes	Future traffic reduced (to Table 4.2)	
Maxwell Infrastructure (With Project)	Initial Construction Phase traffic (Table 3.5) and cessation of existing activity (Table 4.1)	Project Year 6 traffic (Table 3.5) and cessation of existing activity (Table 4.1)	Project Year 13 traffic (Table 3.5) and cessation of existing activity (Table 4.1)
Maxwell Solar Project	Construction workforce traffic (Table 4.3)	Operational workforce traffic (Table 4.4)	
Mt Arthur Mine	Operational traffic (Table 4.5) accounted for in surveyed traffic volumes		Cessation of mining, removal of operational traffic (Table 4.5)
Mount Pleasant Operation	Operational traffic (Table 4.6) accounted for in surveyed traffic volumes		Cessation of mining, removal of operational traffic
Bengalla Mine	Operational traffic accounted for in surveyed traffic volumes, plus additional workforce traffic (Table 4.7)		
Mangoola Mine	Operational traffic accounted for in surveyed traffic volumes		
Dartbrook Mine	Operational traffic (Table 4.8)		Cessation of mining, no operational traffic
Liddell Power Station	Accounted for in surveyed traffic volumes	Traffic reductions associated with closure not assessed	
Spur Hill Underground Coking Coal Project	Subject to future assessment and approval, not accounted for in this assessment		

Table 4.10 summarises the combined effects of the various developments described in Section 4.1 on average weekday traffic volumes at locations on the road network which are relevant to the Project. These volumes assume that the Project is not constructed, i.e. that care and maintenance activity would continue at Maxwell Infrastructure.

Table 4.10: Impacts of Developments on Average Weekday Traffic (vehicles per day)

Road and Location	Initial Construction Phase (2020)	Project Year 6 (2026)	Project Year 13 (2033)
Thomas Mitchell Drive New England Highway to Site Access Road	+172	-2	-1,194
Thomas Mitchell Drive Site Access Road to Mt Arthur Mine Access Road	+64	+20	-1,172
Thomas Mitchell Drive Mt Arthur Mine Access Road to Industrial Area	+64	+20	-2,011
Thomas Mitchell Drive Industrial Area to Denman Road	+64	+20	-1,894
Denman Road North of Thomas Mitchell Drive	+92	+58	-1,826
Denman Road Thomas Mitchell Drive to Bengalla Road	+140	+130	-580
Denman Road Edderton Road to Bengalla Road	+26	+16	-242
Denman Road South of Edderton Road	+26	+16	-182
New England Highway North of Thomas Mitchell Drive	+104	+26	-26
New England Highway South of Thomas Mitchell Drive	+172	+76	-1,168
Edderton Road South of Denman Road	0	0	-60
Edderton Road South of Mt Arthur Mine Access Road	0	0	-26

Changes in cumulative daily traffic generation by mines in Table 4.9 from 2018 conditions.

4.2 Background Growth

Regardless of the status of specific developments, other changes in traffic may be expected as a result of general growth or changes in population or travel behaviour. Cardno (2015) considered forecasts of background traffic growth on roads in the Muswellbrook region, taking into consideration advice from RMS Assets Branch and with reference to a study for the Muswellbrook Bypass prepared by Hyder (2008). The resulting background growth rates applied for the purpose of modelling future traffic volumes on the road network for the Muswellbrook Mine Affected Roads Stage 1 Road Network Plan (Cardno, 2015) were:

- Thomas Mitchell Drive 1.45% per annum for 20 years (2015 to 2035), reducing to 1% per annum thereafter; and
- All other local roads 1% per annum for 20 years (2015 to 2035) and 0.9% per annum thereafter.

The recent RMS (2018) study of options for the Muswellbrook Bypass, future growth rates were applied on the basis of vehicle type, determined using consideration of historical growth rates, population growth in urban areas and heavy vehicle through traffic growth. The growth rate applied to all vehicles (not specifically to non-mining traffic) was:

- 1.1 % per annum between 2024 (assumed opening date of the Muswellbrook Bypass) and 2034 and then 1% per annum thereafter to 2044.

On the basis of the above, traffic volumes on the key routes have been forecast by applying a background traffic growth rate of 1.0 % per annum on all roads, with the exception of Thomas Mitchell Drive, to which the higher rate of 1.45 % per annum has been applied.

At the surveyed locations on Thomas Mitchell Drive, the existing estimated contribution of the following major developments has been estimated as described in Section 4.1:

- Maxwell Infrastructure care and maintenance;
- Mt Arthur Mine; and
- Mount Pleasant Operation.

The growth rate has not been applied to that component of the traffic associated with the above developments, as the extent of such traffic has been identified and quantified, and changes to those components are allowed for in the forecasts associated with each development.

It is noted that Thomas Mitchell Drive is also used by other mining developments, including Bengalla Mine and Mangoola Mine (Sections 4.1.5 and 4.1.6), along with the Industrial Area. The contribution of these sources at the time of the surveys could not be accurately quantified. Therefore, the assessment is inherently conservative as it applies background growth to traffic that would be associated with these developments.

Table 4.11 presents the background growth for Thomas Mitchell Drive and Edderton Road from 2018 to the relevant Project years.

Table 4.11: Background Growth in Traffic on Thomas Mitchell Drive and Edderton Road

Road and Location	6:00 am to 7:00 am (vehicles per hour)		5:00 pm to 6:00 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Thomas Mitchell Drive West of New England Highway						
Surveyed 2018	319	70	248	49	2,517	830
Contribution of Known Developments[A]	172	17	81	9	1,067	191
Other Traffic	147	53	167	40	1,450	639
Growth 2018 to 2020	4	2	5	1	32	19
Growth 2018 to 2026	17	6	19	5	168	74
Growth 2018 to 2033	32	12	36	9	315	139
Thomas Mitchell Drive West of Site Access Road						
Estimated 2018[B]	316	69	247	49	2,489	824
Contribution of Known Developments[A]	169	16	80	9	1,039	185
Other Traffic	147	53	167	40	1,450	639
Growth 2018 to 2020	4	2	5	1	42	19
Growth 2018 to 2026	17	6	20	5	168	74
Growth 2018 to 2033	32	12	36	9	315	139
Thomas Mitchell Drive East of Denman Road						
Surveyed 2018	529	111	396	81	4,758	1,324
Contribution of Known Developments[A]	272	23	124	12	1,666	280
Other Traffic	257	88	272	69	3,092	1,044
Growth 2018 to 2020	7	3	8	2	90	30
Growth 2018 to 2026	30	10	32	8	359	121
Growth 2018 to 2033	56	19	59	15	673	227
Edderton Road South of Denman Road						
Surveyed 2018	82	9	52	6	736	87
Contribution of Known Developments[A]	12	1	12	1	46	14
Other Traffic	70	8	40	5	690	73
Growth 2018 to 2020	1	0	1	0	14	1
Growth 2018 to 2026	6	1	3	0	55	7
Growth 2018 to 2033	11	1	7	1	104	13

[A] *Includes Maxwell Infrastructure care and maintenance, Mt Arthur Mine and Mount Pleasant Operation operational traffic.*
[B] *East of Mt Arthur Mine Access Road, existing traffic estimated from surveyed conditions and the site access road traffic generation and distribution.*

4.3 Baseline Future Traffic Volumes

Taking into consideration the combined effects of changes in traffic conditions resulting from other major developments in the region (Section 4.1) and background non-specific growth (Section 4.2), the future traffic volumes have been forecast at the surveyed locations for the average weekday Project peak hours and daily totals. These are summarised in Table 4.12.

Table 4.12: Baseline Future Traffic Volumes (No Project)

Site[A]	Road and Location	6:00 am to 7:00 am (vehicles per hour)		5:00 pm to 6:00 pm (vehicles per hour)		Daily (vehicles per day)	
		Light	Heavy	Light	Heavy	Light	Heavy
Existing 2018							
A	Edderton Road south of Denman Road	82	9	52	6	736	87
B	Site Access Road south of Thomas Mitchell Drive	7	1	1	0	82	16
C	Thomas Mitchell Drive east of Denman Road	529	111	396	81	4,758	1,324
D	Thomas Mitchell Drive west of New England Highway	319	70	248	49	2,517	830
I	Thomas Mitchell Drive west of Site Access Road	316	69	247	49	2,489	824
Year 2020							
A	Edderton Road south of Denman Road	83	9	53	6	750	88
B	Site Access Road south of Thomas Mitchell Drive	34	3	28	2	202	36
C	Thomas Mitchell Drive east of Denman Road	562	114	430	83	4,908	1,356
D	Thomas Mitchell Drive west of New England Highway	372	74	302	53	2,715	865
I	Thomas Mitchell Drive west of Site Access Road	346	71	278	50	2,591	847
Year 2026							
A	Edderton Road south of Denman Road	88	10	55	6	791	93
B	Site Access Road south of Thomas Mitchell Drive	9	1	9	1	18	2
C	Thomas Mitchell Drive east of Denman Road	583	121	454	89	5,142	1,440
D	Thomas Mitchell Drive west of New England Highway	362	76	297	55	2,692	895
I	Thomas Mitchell Drive west of Site Access Road	357	75	293	54	2,682	893
Year 2033							
A	Edderton Road south of Denman Road	81	9	47	6	794	84
B	Site Access Road south of Thomas Mitchell Drive	9	1	9	1	18	2
C	Thomas Mitchell Drive east of Denman Road	339	107	357	84	3,817	1,271
D	Thomas Mitchell Drive west of New England Highway	210	66	234	50	1,827	780
I	Thomas Mitchell Drive west of Site Access Road	205	65	229	49	1,817	778

[A] *Refer to Figure 2.2.*

4.4 Baseline Future Operation of Intersections

The performance of the key intersections under future baseline conditions (without the Project) has been forecast using SIDRA INTERSECTION 8. As they are generally the critical locations which dictate the capacity of the overall road network, the assessments are based on the surveyed peak hourly conditions, regardless of the time at which that peak occurred. The future turning movements have been forecast by considering the changes in mine-generated traffic during the Project peak hours (Section 4.1) and growth in background traffic during the Project peak hours (Section 4.2), and applying those changes to the surveyed peak hour volumes.

The results of the SIDRA analysis are summarised in Table 4.13, and output summaries are presented in Appendix B. For the purpose of this analysis of intersection operating conditions, the intersections are assumed to retain their current geometry and controls throughout the forecast years. The intersection of Thomas Mitchell Drive with Denman Road is however expected to be upgraded prior to the Project initial construction phase in accordance with Condition 47(c) of the Project Approval for the Mt Arthur Coal Mine Open Cut Consolidation Project.

Table 4.13: Baseline Future Intersection Operating Conditions

Site[A]	Intersection	AM Peak			PM Peak		
		X-Value	Average Delay[B]	LoS	X-Value	Average Delay[B]	LoS
Year 2020							
E	Site Access Road and Thomas Mitchell Drive	0.29	12.3	A	0.14	9.2	A
F	New England Highway and Thomas Mitchell Drive	0.40	12.7	A	0.38	13.8	A
G	Denman Road and Thomas Mitchell Drive	0.43	29.2	C	>1.0	>70.0	F
H	Denman Road and Edderton Road	0.10	9.0	A	0.13	9.1	A
Year 2026							
E	Site Access Road and Thomas Mitchell Drive	0.29	12.0	A	0.13	9.3	A
F	New England Highway and Thomas Mitchell Drive	0.38	12.5	A	0.36	13.9	A
G	Denman Road and Thomas Mitchell Drive	0.42	28.6	C	>1.0	>70.0	F
H	Denman Road and Edderton Road	0.10	8.9	A	0.13	9.0	A
Year 2033							
E	Site Access Road and Thomas Mitchell Drive	0.24	10.1	A	0.11	8.7	A
F	New England Highway and Thomas Mitchell Drive	0.32	12.4	A	0.33	13.9	A
G	Denman Road and Thomas Mitchell Drive	0.34	41.8	C	0.93	48.2	D
H	Denman Road and Edderton Road	0.09	8.4	A	0.12	8.6	A

[A] *Refer to Figure 2.2.*
[B] seconds per vehicle for movement with the highest average delay per vehicle.

Table 4.13 indicates that the intersections would remain operating at good levels of service with short delays and spare capacity, with the exception of the intersection of Thomas Mitchell Drive and Denman Road. As noted, this intersection is expected to be upgraded prior to the Project initial construction phase in accordance with Condition 47(c) of the Project Approval for the Mt Arthur Coal Mine Open Cut Consolidation Project. While the details of the intended design are not known, it is expected that a seagull intersection arrangement is likely, given that the right turn exit movement from Thomas Mitchell Drive is already operating close to capacity. As a guide, the forecast baseline evening peak hour traffic volumes for 2026 (Project Year 6) (the worst case conditions reported Table 4.13) have been separately assessed on the assumption that the intersection is upgraded to a similar layout as the existing intersection of Thomas Mitchell Drive and New England Highway. Under this arrangement, the average delay experienced by vehicles turning right out of Denman Road would be consistent with level of service A.

4.5 Baseline Future Road Network Performance

The future midblock operating conditions have been assessed using the HCM method (Section 2.5.2) with the forecast baseline traffic volumes. The results are summarised in Table 4.14.

Table 4.14: Baseline Future Weekday Peak Hour Midblock Road Performance

Site[A]	Road and Location	Project Peak Hour	Inbound to Maxwell Infrastructure		Outbound from Maxwell Infrastructure	
			PTSF	LOS	PTSF	LOS
Year 2020						
A	Edderton Road south of Denman Road	AM PM	26.5 17.7	A A	15.7 20.6	A A
B	Site Access Road south of Thomas Mitchell Drive	AM PM	9.6 0.3	A A	0.3 8.7	A A
C	Thomas Mitchell Drive east of Denman Road	AM PM	58.6 32.1	C A	30.8 50.3	A B
D	Thomas Mitchell Drive west of New England Highway	AM PM	73.2 50.4	D B	48.6 68.8	B C
I	Thomas Mitchell Drive west of Site Access Road	AM PM	36.9 56.0	A C	65.0 39.7	C A
Year 2026						
A	Edderton Road south of Denman Road	AM PM	26.8 17.9	A A	16.0 20.7	A A
B	Site Access Road south of Thomas Mitchell Drive	AM PM	5.7 0.6	A A	0.6 5.7	A A
C	Thomas Mitchell Drive east of Denman Road	AM PM	58.8 35.0	C A	33.1 50.1	A B
D	Thomas Mitchell Drive west of New England Highway	AM PM	73.7 51.1	D B	49.4 69.4	B C
I	Thomas Mitchell Drive west of Site Access Road	AM PM	37.6 56.9	A C	65.8 41.1	C B
Year 2033						
A	Edderton Road south of Denman Road	AM PM	29.3 12.1	A A	10.8 24.8	A A
B	Site Access Road south of Thomas Mitchell Drive	AM PM	5.7 0.6	A A	0.6 5.7	A A
C	Thomas Mitchell Drive east of Denman Road	AM PM	45.4 34.7	B A	28.5 42.8	A B
D	Thomas Mitchell Drive west of New England Highway	AM PM	65.8 47.6	C B	41.6 63.3	B C
I	Thomas Mitchell Drive west of Site Access Road	AM PM	35.1 48.9	A B	52.7 42.2	B B

[A] *Refer to Figure 2.2.*
AM Project Peak 6:00 am to 7:00 am.
PM Project Peak 5:00 pm to 6:00 pm.

The results indicate that with the forecast baseline traffic volumes in 2020 and 2026, the midblock LOS on Thomas Mitchell Drive would be C and D in the inbound directions to the site access road during the morning Project peak hour and C in the outbound direction during the evening Project peak hour. LOS D would be experienced for inbound traffic at the eastern end of Thomas Mitchell Drive, where there are no overtaking opportunities, consistent with the existing conditions during the surveyed morning peak hour (Table 2.9).

In Project Year 13, the poorest level of service on Thomas Mitchell Drive would be C, which would occur on the eastern end of Thomas Mitchell Drive for traffic in the inbound direction during the morning peak hour and outbound traffic during the evening peak hour.

Levels of service on Edderton Road and the site access road would remain good under baseline conditions for all the future scenario years.

4.6 Baseline Edderton Road Travel Time

The northern part of Edderton Road is proposed to be realigned as part of the Mt Arthur Coal Mine Open Cut Consolidation Project prior to mining within 200 m of the road. That realignment would result in the relocation of the intersection of Edderton Road with Denman Road approximately 2.5 km to the west of its current location (Hansen Bailey, 2009). Two potential realignment options are identified.

Hansen Bailey (2009) reports the extent to which travel times would be impacted by the realignment of the northern part of Edderton Road. As the speed limit on Edderton Road has changed since that time, TTPP has reassessed those impacts, assuming that:

- the new intersection of Denman Road with Edderton Road will be 2.5 km southwest of the existing intersection;
- the Edderton Road realignment will replace the northernmost existing 5.5 km of Edderton Road;
- no changes to speed limits on the remaining 9.2 km of Edderton Road will be made; and
- the Edderton Road realignment would have a posted speed limit of 100 km/h.

Table 4.15 summarises the resulting calculated travel times for vehicles using Edderton Road to travel to and from the direction of Denman and of Muswellbrook.

Table 4.15: Impact of Northern Realignment of Edderton Road on Travel Time

Travel Route	to/from Denman Direction			to/from Muswellbrook Direction		
	Distance (km)	Speed Limit (km/h)	Travel Time (seconds)	Distance (km)	Speed Limit (km/h)	Travel Time (seconds)
Existing Road Network						
Denman Road	2.5	100	90	-	-	-
Edderton Road - Northern - Central - Southern	 3.0 6.2 5.5	 100 80 100	 108 279 198	 3.0 6.2 5.5	 100 80 100	 108 279 198
Total	17.2	-	675 (11.3 mins)	14.7	-	585 (9.8 mins)
Baseline with Option 1 Northern Realignment (for Mt Arthur Mine)						
Denman Road	-	-	-	2.5	100	90
Edderton Road - Northern Realignment - Central Existing (part) - Southern Existing	 5.4 3.7 5.5	 100 80 100	 195 167 198	 5.4 3.7 5.5	 100 80 100	 195 167 198
Total	14.6	-	560 (9.3 mins)	17.1	-	650 (10.8 mins)
Baseline with Option 2 Northern Realignment (for Mt Arthur Mine)						
Denman Road	-	-	-	2.5	100	90
Edderton Road - Northern Realignment - Central Existing (part) - Southern Existing	 6.2 3.7 5.5	 100 80 100	 223 167 198	 6.2 3.7 5.5	 100 80 100	 223 167 198
Total	15.4	-	588 (9.8 mins)	17.9	-	678 (11.3 mins)

The assessment suggests that with the realignment of the northern portion of Edderton Road, the travel time would decrease by 87 to 115 seconds for vehicles travelling to and from the direction of Denman, and increase by 65 to 93 seconds for vehicles travelling to and from the direction of Muswellbrook.

5 Impacts of the Project

5.1 Future Traffic Volumes

Taking into consideration the combined effects of changes in traffic conditions resulting from other major developments in the region (Section 4.1), background non-specific growth (Section 4.2), and Project traffic (Section 3.3), the future traffic volumes have been forecast at the surveyed locations for the average weekday Project peak hours and daily totals. These are summarised in Table 5.1.

Table 5.1: Future Traffic Volumes With Project

Site[A]	Road and Location	6:00 am to 7:00 am (vehicles per hour)		5:00 pm to 6:00 pm (vehicles per hour)		Daily (vehicles per day)	
		Light	Heavy	Light	Heavy	Light	Heavy
Initial Construction Phase (2020)							
A	Edderton Road south of Denman Road	83	9	53	6	750	88
B	Site Access Road south of Thomas Mitchell Drive	158	14	158	14	670	200
C	Thomas Mitchell Drive east of Denman Road	571	116	441	85	4,931	1,389
D	Thomas Mitchell Drive west of New England Highway	487	83	421	63	3,160	998
I	Thomas Mitchell Drive west of Site Access Road	355	73	289	52	2,614	878
Project Year 6 (2026)							
A	Edderton Road south of Denman Road	88	10	55	6	791	93
B	Site Access Road south of Thomas Mitchell Drive	101	6	93	6	420	80
C	Thomas Mitchell Drive east of Denman Road	589	122	460	90	5,178	1,456
D	Thomas Mitchell Drive west of New England Highway	448	80	375	59	3,058	957
I	Thomas Mitchell Drive west of Site Access Road	363	76	299	55	2,718	909
Project Year 13 (2033)							
A	Edderton Road south of Denman Road	81	9	47	6	794	84
B	Site Access Road south of Thomas Mitchell Drive	95	5	87	5	388	60
C	Thomas Mitchell Drive east of Denman Road	346	108	363	85	3,851	1,283
D	Thomas Mitchell Drive west of New England Highway	289	69	306	53	2,163	826
I	Thomas Mitchell Drive west of Site Access Road	212	66	235	50	1,851	790

[A] *Refer to Figure 2.2.*

5.2 Future Operation of Intersections

The performance of the key intersections under future conditions with the Project has been forecast using SIDRA INTERSECTION 8. As for the baseline conditions assessment (Section 4.4), the assessments are based on the surveyed peak hourly conditions, regardless of the time at which that peak occurred. The future turning movements have been forecast by considering the changes in mine-generated traffic during the Project peak hours (Section 4.1), growth in background traffic during the Project peak hours (Section 4.2), and Project-generated traffic.

These analyses assume that in addition to the Project-generated traffic expected on an average weekday, the agricultural and other land management activities would continue over the life of the Project (consistent with existing practice). Two vehicle trips have been conservatively included during the peak hours of future average weekday conditions. These trips would be inbound to Edderton Road from Denman Road in the morning peak hour and outbound from Edderton Road to Denman Road in the evening peak hour.

As noted in Section 3.4.1, the workforce travelling to and from Jerrys Plains has generally been assumed to use the route via Lemington Road. In recognition that the alternative route via Edderton Road would have a similar travel time, the intersection analyses include the workforce vehicles travelling to and from Jerrys Plains along both potential routes (i.e. via New England Highway and Thomas Mitchell Drive to the site access road, and also via Edderton Road, Denman Road and Thomas Mitchell Drive to the site access road).

The results of the SIDRA analysis are summarised in Table 5.2, and output summaries are presented in Appendix B. As for the baseline analyses (Section 4.4), the intersections are assumed to retain their current geometry and controls throughout the forecast years with the Project.

Table 5.2: Future Intersection Operating Conditions with the Project

Site[A]	Intersection	AM Peak			PM Peak		
		X-Value	Average Delay[B]	LoS	X-Value	Average Delay[B]	LoS
Initial Construction Phase (2020)							
E	Site Access Road and Thomas Mitchell Drive	0.29	17.4	B	0.27	10.1	A
F	New England Highway and Thomas Mitchell Drive	0.47	13.6	A	0.49	14.8	B
G	Denman Road and Thomas Mitchell Drive	0.46	30.5	C	>1.0	>70.0	F
H	Denman Road and Edderton Road	0.10	8.9	A	0.12	9.0	A
Project Year 6 (2026)							
E	Site Access Road and Thomas Mitchell Drive	0.29	16.2	B	0.17	9.4	A
F	New England Highway and Thomas Mitchell Drive	0.43	13.2	A	0.42	14.0	B
G	Denman Road and Thomas Mitchell Drive	0.44	29.1	C	>1.0	>70.0	F
H	Denman Road and Edderton Road	0.10	8.9	A	0.12	9.0	A
Project Year 13 (2033)							
E	Site Access Road and Thomas Mitchell Drive	0.24	13.4	A	0.14	8.7	A
F	New England Highway and Thomas Mitchell Drive	0.36	13.0	A	0.38	14.3	B
G	Denman Road and Thomas Mitchell Drive	0.36	42.6	D	0.94	49.0	D
H	Denman Road and Edderton Road	0.08	8.3	A	0.12	8.6	A

[A] *Refer to Figure 2.2.*
[B] seconds per vehicle for movement with highest average delay per vehicle.

Table 5.2 indicates that, as for the baseline analyses (Table 4.13), the intersections are expected to operate at good levels of service with short delays and spare capacity, with the exception of the intersection of Thomas Mitchell Drive and Denman Road. As noted, this intersection is expected to be upgraded prior to the Project initial construction phase in accordance with Condition 47(c) of the Project Approval for the Mt Arthur Coal Mine Open Cut Consolidation Project. While the details of the intended design are not known, it is expected that a seagull intersection arrangement is likely, given that the right turn exit movement from Thomas Mitchell Drive is already operating close to capacity. As a guide, the forecast future evening peak hour traffic volumes with the Project during Project Year 6 have been separately assessed on the assumption that the intersection is upgraded to a similar layout as the existing intersection of Thomas Mitchell Drive and New England Highway. Under this arrangement, the level of service would be A.

5.3 Future Road Network Performance

The future midblock operating conditions have been assessed using the HCM method (Section 2.5.2) with the forecast traffic volumes with the cumulative impacts of the changes to other major developments in the region (Section 4.1), background growth (Section 4.2), and Project traffic (Section 3.3). The results of the assessments are presented in Table 5.3.

Table 5.3: Future Weekday Peak Hour Midblock Road Performance with Project

Site[A]	Road and Location	Project Peak Hour	Inbound to Maxwell Infrastructure		Outbound from Maxwell Infrastructure	
			PTSF	LOS	PTSF	LOS
Initial Construction Phase (2020)						
A	Edderton Road south of Denman Road	AM PM	26.5 17.7	A A	15.7 20.6	A A
B	Site Access Road south of Thomas Mitchell Drive	AM PM	24.1 4.8	A A	4.8 24.1	A A
C	Thomas Mitchell Drive east of Denman Road	AM PM	65.8 33.9	C A	33.7 59.6	A C
D	Thomas Mitchell Drive west of New England Highway	AM PM	73.4 50.3	D B	48.8 69.4	B C
I	Thomas Mitchell Drive west of Site Access Road	AM PM	38.4 55.6	A C	64.7 41.7	C B
Project Year 6 (2026)						
A	Edderton Road south of Denman Road	AM PM	26.8 17.9	A A	16.0 20.7	A A
B	Site Access Road south of Thomas Mitchell Drive	AM PM	17.2 0.8	A A	1.6 16.9	A A
C	Thomas Mitchell Drive east of Denman Road	AM PM	64.5 33.3	C A	33.2 58.0	A C
D	Thomas Mitchell Drive west of New England Highway	AM PM	74.1 50.6	D B	49.3 69.9	B C
I	Thomas Mitchell Drive west of Site Access Road	AM PM	38.9 56.2	A C	65.2 42.5	C B
Project Year 13 (2033)						
A	Edderton Road south of Denman Road	AM PM	29.3 12.1	A A	10.8 24.8	A A
B	Site Access Road south of Thomas Mitchell Drive	AM PM	16.4 0.8	A A	1.6 16.1	A A
C	Thomas Mitchell Drive east of Denman Road	AM PM	52.6 31.8	B A	27.0 51.0	A B
D	Thomas Mitchell Drive west of New England Highway	AM PM	66.5 47.4	C B	41.7 64.2	B C
I	Thomas Mitchell Drive west of Site Access Road	AM PM	36.7 48.3	A B	52.1 43.9	B B

[A] *Refer to Figure 2.2.*
AM Project Peak 6:00 am to 7:00 am.
PM Project Peak 5:00 pm to 6:00 pm.

Comparing the results in Table 5.3 with the forecast performance under baseline conditions (Table 4.14), the Project traffic would not impact the peak hour midblock levels of service in the direction of inbound traffic to the Project from those expected under baseline conditions. With regard to traffic travelling in the outbound direction from the Project, the Project traffic would impact midblock levels of service at:

- Thomas Mitchell Drive east of Denman Road outbound from the Maxwell Infrastructure during the evening peak hour in the Project initial construction phase and Project Year 6, from Level of Service B under baseline conditions to Level of Service C with the Project traffic; and
- Thomas Mitchell Drive west of the site access road outbound from the Maxwell Infrastructure during the evening peak hour in the Project initial construction phase, from Level of Service A under baseline conditions to Level of Service to B with the Project traffic.

The Project would therefore have only minor impacts on the midblock levels of service experienced by drivers on Thomas Mitchell Drive in the short to medium term. In the long-term, the Project traffic would not impact levels of service on Thomas Mitchell Drive compared with those conditions expected without the Project.

Future levels of service on Edderton Road and the site access road would be good during both morning and evening Project peak hours under all future scenario years.

It is understood that there are existing concerns regarding congestion in the Singleton town centre during the evening peak period. The potential impact of the Project traffic on conditions through the Singleton town centre has been reviewed with reference to traffic survey data collected by RMS at its permanent count station on New England Highway north of Singleton (Station 06153). That data demonstrates that during the afternoon period, the peak volume towards Singleton occurs between 4:00 pm and 5:00 pm, and the peak volume towards Muswellbrook occurs between 5:00 pm and 6:00 pm. The peaks in the Singleton town centre are expected to occur at a similar time to those at the permanent count station location. Singleton is approximately 25 to 30 minutes from the Project.

At its peak operational phase in 2026, the Project generation through the afternoon peak in Singleton is very low at approximately two vehicles per hour in each direction, as the peak in outbound traffic departing the Project is later (between 5:00 pm and 6:00 pm). Inbound traffic remains low throughout the afternoon with no distinct peak until after 8:00 pm.

On this basis, it is expected that the Project traffic would not coincide with the evening peak hour conditions in the Singleton town centre, and the contribution of the Project to the evening peak hour in Singleton town centre would be negligible.

5.4 Edderton Road Realignment

5.4.1 Project Impact on Travel Times

As the Project may realign the southern portion of Edderton Road, some change in travel time along that route could result. It has been assumed that the potential realignment of Edderton Road would have a posted speed limit of 80 km/h, although in practice a higher speed limit may be adopted. The existing Edderton Road to be replaced by the realignment has a posted speed limit of 100 km/h. Golden Highway has a posted speed limit of 100 km/h.

The realignment of Edderton Road would intersect with Golden Highway at a new intersection, located approximately 1.16 km west along Golden Highway from the existing intersection. The realignment of Edderton Road would cover a travel distance of 3.16 km between Golden Highway and the existing alignment of Edderton Road. The existing portion of Edderton Road which would be replaced by the realignment covers a travel distance of 3.28 km between Golden Highway and the realignment of Edderton Road.

If a realignment is constructed, the intersection with the Golden Highway would be constructed to contemporary design standards. This would enhance the safety of road users and in particular those turning right onto Edderton Road.

Table 5.4 summarises the impact that the realignment of Edderton Road would have on travel distances and times, based on posted speed limits and travel distances. The table does not take into account the delays experienced by drivers slowing and turning at the relevant intersection with Golden Highway and Edderton Road, as these delays would not be materially impacted by the realignment. The table considers the extent of travel routes impacted by the realignment, with travel to and from the direction of Denman and of Jerrys Plains.

Table 5.4: Impact of Project Realignment of Edderton Road on Travel Time

Travel Route	to/from Denman Direction			To/from Jerrys Plains Direction		
	Distance (km)	Speed Limit (km/h)	Travel Time (seconds)	Distance (km)	Speed Limit (km/h)	Travel Time (seconds)
With Existing Edderton Road Alignment						
Golden Highway	1.16	100	42	-	-	-
Edderton Road[A]	3.28	100	118	3.28	100	118
Total	4.44	-	160	3.28	-	118
With Southern Realignment of Edderton Road						
Golden Highway	-	-	-	1.16	100	42
Edderton Road Realignment[A]	3.16	80	142	3.16	80	142
Total	3.16	-	142	4.32	-	184

[A] *between Golden Highway and the northern end of realignment.*

The realignment of the southern portion of Edderton Road would therefore decrease the travel time for Edderton Road drivers travelling to and from Golden Highway west of Edderton Road by 18 seconds, and would increase the travel time for Edderton Road drivers travelling to and from Golden Highway east of Edderton Road by 66 seconds.

Alternatively, subsidence impacts on Edderton Road could be managed along its current alignment with speed reductions from 100 km/h to 40 km/h along up to 2.6 km during active subsidence. This would increase travel time in both directions by up to 140 seconds.

With the Project in 2026, Edderton Road is expected to carry 459 vehicles per day northbound and 425 vehicles per day southbound south of Denman Road. Some of those vehicles would have a trip origin or destination along Edderton Road and so would not all necessarily be impacted by the realignment or speed reductions.

5.4.2 Cumulative Impacts on Travel Times

The cumulative implications of the realignment of the northern part of Edderton Road required for the Mt Arthur Mine, together with that of the Project realignment of the southern part of Edderton Road have been reviewed. The highest impact of the realignments would be for any vehicles travelling between Jerrys Plains and Muswellbrook via Edderton Road. These vehicles would increase their travel distance along both Golden Highway and Denman Road to access Edderton Road.

Table 5.5 compares the travel time along the route between Jerrys Plains and Muswellbrook with the Mt Arthur Mine Option 2 northern realignment of Edderton Road, being the option with the longer travel distance.

Table 5.5: Cumulative Impacts on Edderton Road Travel Time (Jerrys Plains – Muswellbrook)

	Distance (km)	Speed Limit (km/h)	Travel Time (seconds)
Existing Edderton Road Alignment			
Denman Road	-	-	-
Edderton Road - Northern Alignment - Central Alignment - Southern Alignment	 3.0 6.2 5.5	 100 80 100	 108 279 198
Golden Highway	-	-	-
Total	14.7		**585 (9 min 45 sec)**
With Option 2 Northern Realignment of Edderton Road (for Mt Arthur Mine)			
Denman Road	2.5	100	90
Edderton Road - Northern Realignment - Existing Central Alignment (part) - Existing Southern Alignment	 6.2 3.7 5.5	 100 80 100	 223 167 198
Golden Highway	-	-	-
Total	17.9		**678 (11 min 18 sec)**
With Option 2 Northern Realignment and Project Southern Realignment of Edderton Road			
Denman Road	2.5	100	90
Edderton Road - Northern Realignment - Existing Central Alignment (part) - Existing Southern Alignment (part) - Southern Realignment	 6.2 3.7 2.22 3.16	 100 80 100 80	 223 167 80 142
Golden Highway	1.16	100	42
Total	18.94		**744 (12 min 24 sec)**

Table 5.5 demonstrates that the highest cumulative impact of the realignments of the northern and southern sections of Edderton Road would increase the travel distance by approximately 4.2 km and the travel time by 159 seconds (2 minutes and 39 seconds) compared with the existing conditions.

5.4.3 Road Design

The realigned portion of Edderton Road would have a two way sealed carriageway 7.0 m wide, with 1.0 m sealed shoulder and 1.0 m unsealed shoulder on each side. This is consistent with Austroads (2016) requirements for rural roads carrying an AADT of between 1,000 and 3,000 vehicles per day. Historic traffic volumes on Edderton Road (Table 2.1) indicate that Edderton Road has carried over 1,000 vehicles per weekday, thus adoption of the road width consistent with this higher design AADT is considered appropriate.

The new intersection of the realignment of Edderton Road with Golden Highway would include a channelised right turn lane and an auxiliary left turn lane in Golden Highway for vehicles turning into Edderton Road. The historic traffic volume on Golden Highway at Ogilvies Pass west of Edderton Road (Table 2.1) indicates that traffic volumes peak on Golden Highway in the middle of the day, rather than at traditional morning or evening periods. At the time of that survey (November 2014), Golden Highway carried:

- 87 vehicles per hour during the Project AM peak hour;
- 137 vehicles per hour during the Project PM peak hour; and
- 173 vehicles per hour during the midday peak hour.

The historic traffic volume on Edderton Road north of Golden Highway (Table 2.1) suggests that the volume at the southern end of Edderton Road is less than that at its northern end.

Considering these background volumes, the proposed Chanelised Right Turn (CHR) and Auxiliary Left Turn (AUL) turn treatments on Golden Highway at the new intersection with Edderton Road are expected to meet or exceed the warrants set out by Austroads (2017b) and are considered satisfactory. This layout is safer than that of the existing intersection of Edderton Road and Golden Highway, as it allows turning vehicles to slow clear of the through traffic on Golden Highway.

Sight distance at the new intersection is currently estimated at approximately 200 m between vehicles on Golden Highway and a vehicle on the Edderton Road realignment. The sight distance to and from the west is limited by trees along the northern side of Golden Highway, and sight distance to and from the east is limited by the raised verge on the northern side of Golden Highway. The new intersection will be designed to meet the sight distance requirements of Austroads (2017c), noting that this may require trimming of trees and/or localised lowering of the verge.

5.5 Future Performance of Railway Level Crossings

The Project would not contribute additional road traffic at railway level crossings in the local area, however would generate trains on the Antiene Rail Spur and Main Northern Railway south of the Drayton Junction. Rail/road crossings in the area are grade separated with the exception of the level crossing on Antiene Railway Station Road, which is a no through road (Section 2.8). Subject to upgrading some aspects of signage and guideposts at the existing level crossing of the Antiene Rail Spur with Antiene Railway Station Road, the general layout of the crossing is satisfactory. Given the low number of vehicles which use Antiene Railway Station Road, the likelihood of vehicles being delayed by a train would remain very low with the rail traffic anticipated with the Project.

5.6 Future Road Safety Implications

The road crash history of the roads serving the Project (Section 2.6) did not identify any causation factors associated with the existing road network that may be exacerbated by increased traffic demands. The Road Safety Audit of existing conditions on Thomas Mitchell Drive between Denman Road and New England Highway (Appendix E) did not highlight any particular road safety concerns regarding the basic road alignment or width characteristics of Thomas Mitchell Drive. Many of the items identified would be appropriately addressed as part of the planned upgrading of the intersection of Thomas Mitchell Drive with Denman Road, and the others may be appropriately addressed by Muswellbrook Shire Council and/or RMS as relevant. The Project-generated traffic would not alter the severity of the potential crashes identified in the audit, and is not expected to materially alter the likelihood of the potential crashes.

The Road Safety Audit (Appendix E) did not identify any specific road safety issues at or near the intersection of Thomas Mitchell Drive and the site access road that would warrant changes to its design or condition. The channelised left and right turn treatments at the existing intersection of Thomas Mitchell Drive with the site access road meet or exceed the treatment warrants as set out in Austroads (2017b), allowing turning vehicles to slow and shelter clear of through traffic, with a significantly reduced risk of rear end and overtaking crashes. The existing intersection design is therefore considered appropriate for the forecast conditions.

The planned upgrade of the intersection of Thomas Mitchell Drive with Denman Road would be designed in accordance with current guidelines, and is therefore expected to provide a safe environment for all users, but notably for drivers turning right from Thomas Mitchell Drive by reducing delays to those vehicles. The items noted in the Road Safety Audit in the vicinity of the intersection generally relate to line marking and lack of protection for errant vehicles, and are likely to be rectified as part of the planned upgrade of the intersection.

5.7 Mitigation Measures

The foregoing assessment suggests that the existing road network can satisfactorily accommodate the forecast traffic demands resulting from the Project without any specific additional road upgrade requirements.

As highlighted in the SEARs, Malabar should consult with Muswellbrook Shire Council and the NSW Department of Planning and Environment to develop a plan to contribute to the maintenance of local roads under the control of Muswellbrook Shire Council. The Project's contribution to traffic on Thomas Mitchell Drive is expected to vary along the route and also vary with time.

As a preliminary guide, Table 5.6 summarises the Project's contribution to total average weekday traffic on sections of Thomas Mitchell Drive, based on the findings of this study for the key Project years. This excludes consideration of weekend conditions, and generally represents the years during which the Project would make its greatest contributions to traffic conditions. Table 5.6 does not include the section of Thomas Mitchell Drive between Mt Arthur Mine and the Industrial Area. It is expected that total traffic volume on that part of Thomas Mitchell Drive would be less than that between Denman Road and the Industrial Area, while the Project traffic volume would remain the same.

Table 5.6: Project Contribution to Average Weekday Traffic on Thomas Mitchell Drive

	Project Traffic (vehicles per day)		Total Traffic (vehicles per day)		Project Contribution (percent)	
	Light	Heavy	Light	Heavy	Light	Heavy
Initial Construction Phase (2020)						
Denman Road to Industrial Area	50	36	4,931	1,389	1.0	2.6
Mt Arthur Mine to Maxwell Infrastructure	50	36	2,614	878	1.9	4.1
Maxwell Infrastructure to New England Highway	500	144	3,160	998	15.8	14.4
Project Year 6 (2026)						
Denman Road to Industrial Area	40	16	5,178	1,456	0.8	1.1
Mt Arthur Mine to Maxwell Infrastructure	40	16	2,718	909	1.5	1.8
Maxwell Infrastructure to New England Highway	374	64	3,058	957	12.2	6.7
Project Year 13 (2033)						
Denman Road to Industrial Area	38	12	3,851	1,283	1.0	0.9
Mt Arthur Mine to Maxwell Infrastructure	38	12	1,851	790	2.1	1.5
Maxwell Infrastructure to New England Highway	344	48	2,163	826	15.9	5.8

The Project's contribution to traffic volumes on other local roads would be minimal.

6 Conclusions

This study has examined the likely road transport implications of the Maxwell Project. It is concluded that no specific measures or upgrades are required to mitigate the impacts of the development on the capacity, safety and efficiency of the road network as a result of the changed road traffic conditions associated with the Project.

The Project would have minor or no impact on the midblock levels of service experienced by drivers on Thomas Mitchell Drive, and future levels of service on Edderton Road and the site access road would be good. The key intersections which would be used by Project traffic are expected to operate at good levels of service with short delays and spare capacity without requiring upgrading, with the exception of Denman Road and Thomas Mitchell Drive intersection which is planned to be upgraded by others regardless of the Project.

Should Malabar elect to realign the southern portion of Edderton Road and construct a new intersection of Edderton Road with Golden Highway, these would be designed and constructed in accordance with Austroads Guide to Road Design requirements and in consultation with Muswellbrook Shire Council and RMS as relevant.

Malabar should consult with Muswellbrook Shire Council and the NSW Department of Planning and Environment to develop a plan to contribute to the maintenance of local roads under the control of Muswellbrook Shire Council.

Appendix A

Project Traffic Surveys

14/6/2018 - NEW ENGLAND HWY / THOMAS MITCHELL DVE, MUSWELLBROOK

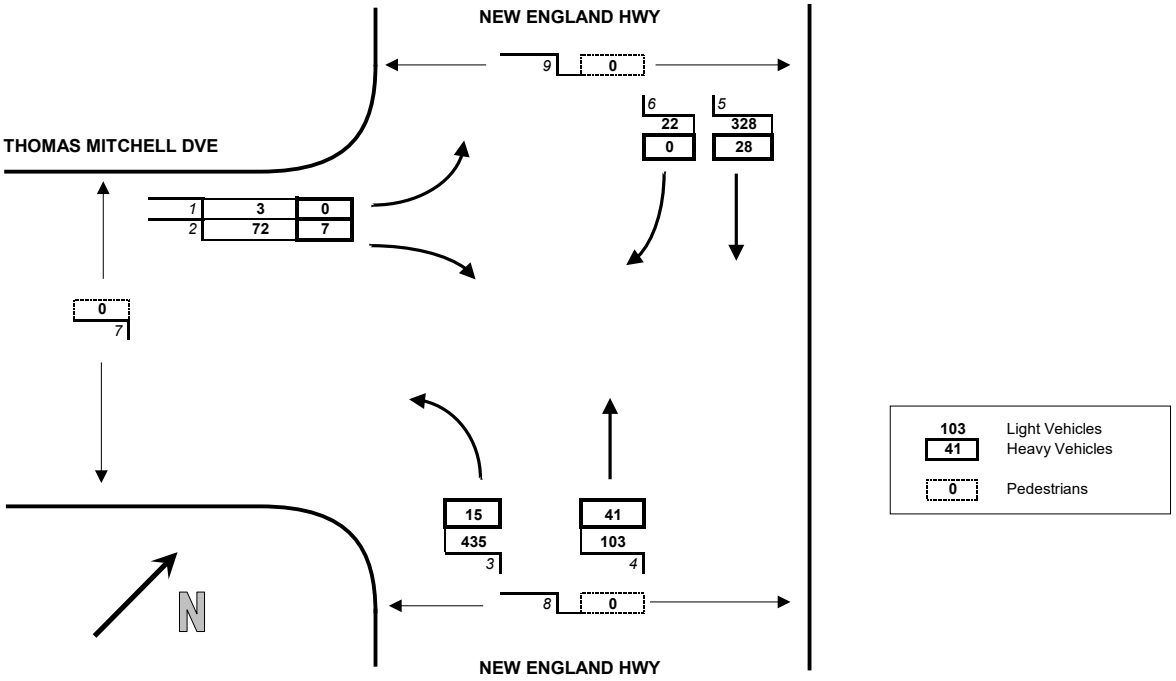
6:15 <<< HOUR ENDING **Thursday**

Summary:

NEW ENGLAND HWY / THOMAS MITCHELL DVE

963	Total Light Vehicles
91	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182812



14/6/2018 - NEW ENGLAND HWY / THOMAS MITCHELL DVE, MUSWELLBROOK

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
05:15	3	9	38	15	30	3	98		0	0	0
05:30	1	11	115	27	56	3	213		0	0	0
05:45	1	17	133	30	77	3	261		0	0	0
06:00	0	14	110	23	82	9	238	810	0	0	0
06:15	1	30	77 <	23	113	7 <	251	963 <	0	0	0
06:30	1	24	46	26	86	3 <	186	936	0	0	0
06:45	2	18	45	43	99 <	3 <	210	885	0	0	0
07:00	1	23	34	58	73	6	195	842	0	0	0
07:15	4	44 <	27	56	49	1	181	772	0	0	0
07:30	3 <	16	28	61	64	0	172	758	0	0	0
07:45	2 <	12	17	83 <	50	1	165	713	0	0	0
08:00	0	5	23	50	40	0	118	636	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	0	3	5	7	9	0	24	
05:30	0	1	3	10	8	0	22	
05:45	0	1	8	15	6	0	30	
06:00	0	1	2	9	5	0	17	93
06:15	0	4	2	7	9	0	22	91
06:30	0	7	4	11	8	0	30	99
06:45	0	1	8	15	11	0	35	104
07:00	0	2	10	14	7	0	33	120
07:15	1	2	5 <	16 <	13	0	37	135 <
07:30	0	4	4 <	8	13 <	0	29	134
07:45	1	7	2	17	8	0	35	134
08:00	2 <	5 <	4	13	10 <	0	34	135 <

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	3	12	43	22	39	3	122	
05:30	1	12	118	37	64	3	235	
05:45	1	18	141	45	83	3	291	
06:00	0	15	112	32	87	9	255	903
06:15	1	34	79 <	30	122	7 <	273	1054 <
06:30	1	31	50	37	94	3 <	216	1035
06:45	2	19	53	58	110 <	3 <	245	989
07:00	1	25	44	72	80	6	228	962
07:15	5	46 <	32	72	62	1	218	907
07:30	3	20	32	69	77	0	201	892
07:45	3	19	19	100 <	58	1	200	847
08:00	2 <	10	27	63	50	0	152	771

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

13/6/2018 - NEW ENGLAND HWY / THOMAS MITCHELL DVE, MUSWELLBROOK

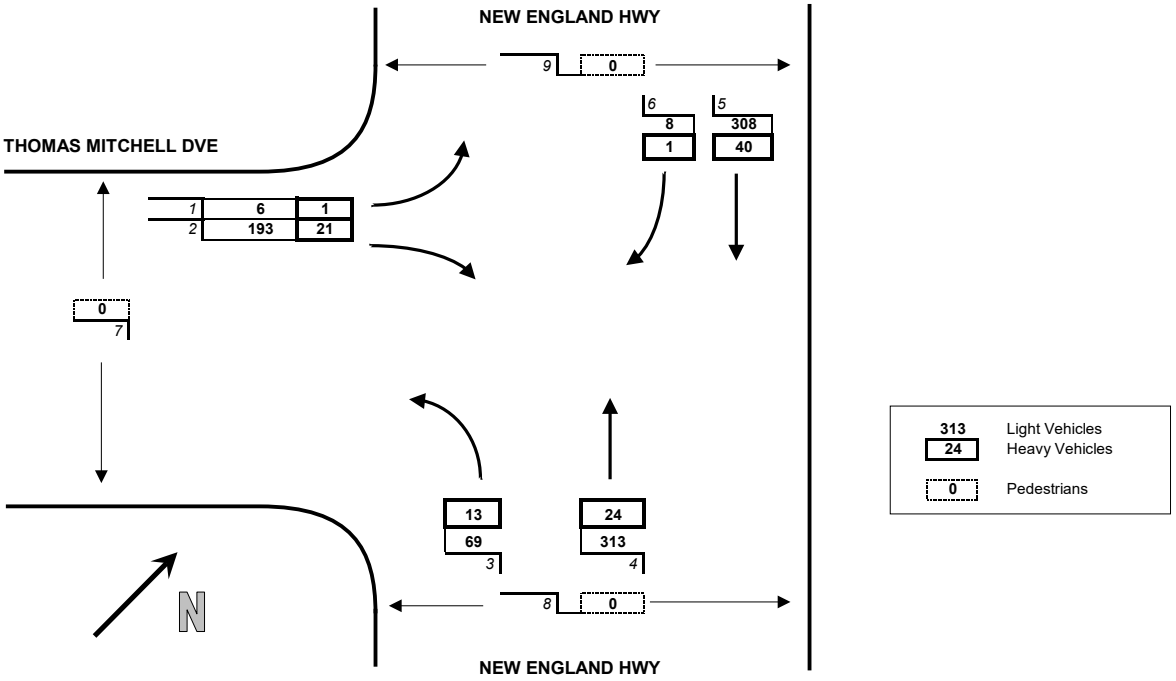
17:45 <<< HOUR ENDING **Wednesday**

Summary:

NEW ENGLAND HWY / THOMAS MITCHELL DVE

897	Total Light Vehicles
100	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182812



13/6/2018 - NEW ENGLAND HWY / THOMAS MITCHELL DVE, MUSWELLBROOK

Light Vehicles — **Total Vehicles** — **Pedestrians**

	1	2	3	4	5	6	15 MIN HOUR	HOUR	7	8	9
16:15	2	40	8	89	59	1	199		0	0	0
16:30	3	41	7	77	99	1	228		0	0	0
16:45	1	42	5	98	80	2	228		0	0	0
17:00	1	56	9	83 <	76	1	226	881	0	0	0
17:15	1	43	12	86	71 <	3	216	898 <	0	0	0
17:30	2	33	23	68	69	1	196	866	0	0	0
17:45	2	61 <	25	76	92	3	259	897	0	0	0
18:00	0	40	33	42	71	1	187	858	0	0	0
18:15	2	51	35 <	58	63	4 <	213	855	0	0	0
18:30	3	34	13	55	30	1 <	136	795	0	0	0
18:45	3	26	8	65	13	0	115	651	0	0	0
19:00	6 <	40	6	34	32	0	118	582	0	0	0

Heavy Vehicles — **Total Vehicles**

	1	2	3	4	5	6	15 MIN HOUR	HOUR
16:15	0	1	6	7	14	0	28	
16:30	0	3	5	5	10	1	24	
16:45	0	3	7	3	7	0	20	
17:00	1 <	4	8 <	7	10 <	1 <	31	103 <
17:15	0 <	7	4	4	9	0 <	24	99
17:30	0 <	7 <	1	5	8	0	21	96
17:45	0 <	3 <	0	8	13	0	24	100
18:00	0	1	3	7	4	0	15	84
18:15	0	2	0	11	6	0	19	79
18:30	0	2	0	8	8	0	18	76
18:45	0	1	1	11 <	11	0	24	76
19:00	0	1	1	5	8	0	15	76

All Vehicles — **Total Vehicles**

	1	2	3	4	5	6	15 MIN HOUR	HOUR
16:15	2	41	14	96	73	1	227	
16:30	3	44	12	82	109	2	252	
16:45	1	45	12	101	87	2	248	
17:00	2	60	17	90 <	86	2	257	984
17:15	1	50	16	90	80 <	3 <	240	997 <
17:30	2	40	24	73	77	1	217	962
17:45	2	64 <	25	84	105	3 <	283	997 <
18:00	0	41	36	49	75	1	202	942
18:15	2	53	35 <	69	69	4 <	232	934
18:30	3	36	13	63	38	1 <	154	871
18:45	3	27	9	76	24	0	139	727
19:00	6 <	41	7	39	40	0	133	658

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

14/6/2018 - THOMAS MITCHELL DR / MAXWELL INFRASTRUCTURE RD, MUSWELLBROOK

6:15 <<< HOUR ENDING **Thursday**

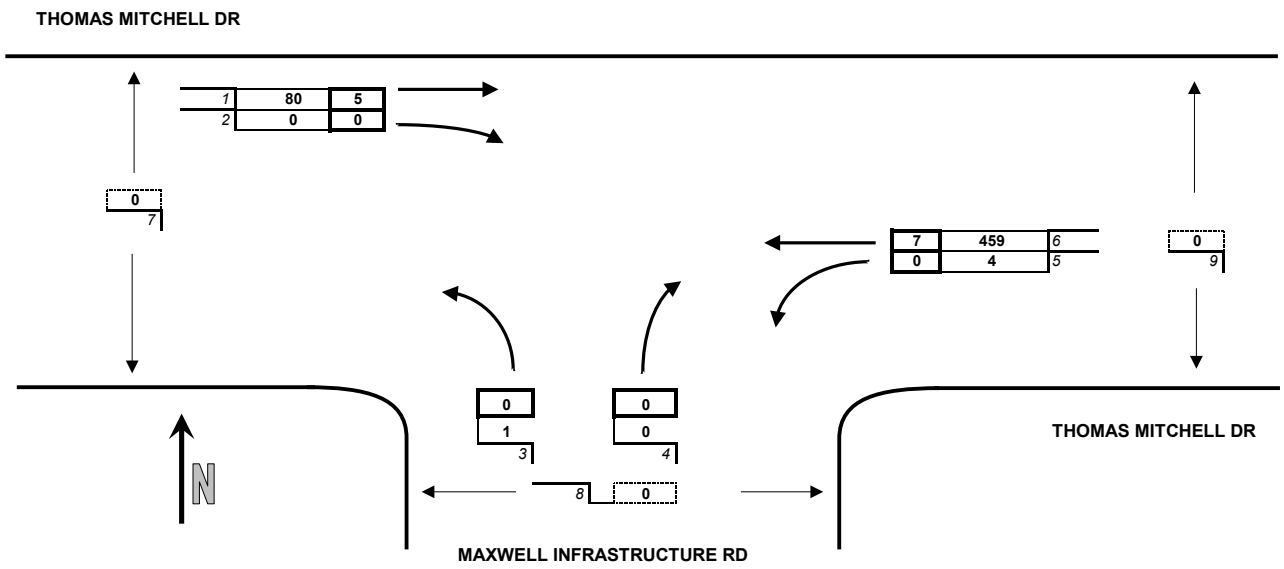
Summary:

THOMAS MITCHELL DR / MAXWELL INFRASTRUCTURE RD

544	Total Light Vehicles
12	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182812

80 Light Vehicles
5 Heavy Vehicles
0 Pedestrians



14/6/2018 - THOMAS MITCHELL DR / MAXWELL INFRASTRUCTURE RD, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
05:15	11	2	0	0	2	43	58		0	0	0
05:30	15	0	1	0	1	121	138		0	0	0
05:45	14	0	0	0	2	138	154		0	0	0
06:00	19	0 <	0 <	0	1 <	120	140	490	0	0	0
06:15	32	0	0 <	0	0	80 <	112	544 <	0	0	0
06:30	22	0	0	1 <	0	51	74	480	0	0	0
06:45	17	0	0	0 <	2	46	65	391	0	0	0
07:00	30	0	1 <	0 <	2	38	71	322	0	0	0
07:15	50 <	1	0 <	0 <	1	28	80	290	0	0	0
07:30	12	0	0 <	0	1 <	26	39	255	0	0	0
07:45	13	0	0 <	0	0	18	31	221	0	0	0
08:00	4	0	0	0	0	22	26	176	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	2	0	0	0	0	4	6	
05:30	1	0	0	0	0	0	1	
05:45	1	0	0	0	0	5	6	
06:00	2	0	0	0	0	1	3	16
06:15	1	0	0	0	0	1	2	12
06:30	6	0	0	0	0	3	9	20
06:45	0	0	0	0	0	8	8	22
07:00	2	0	0	0	0	10	12	31
07:15	5	1 <	0	0	0	5	11	40
07:30	5	0 <	0	0	0	4 <	9	40
07:45	9	0 <	0	0	0	2	11	43 <
08:00	4 <	0 <	0	0	0	5	9	40

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	13	2	0	0	2	47	64	
05:30	16	0	1	0	1	121	139	
05:45	15	0	0	0	2	143	160	
06:00	21	0 <	0 <	0	1 <	121	143	506
06:15	33	0	0 <	0	0	81 <	114	556 <
06:30	28	0	0	1 <	0	54	83	500
06:45	17	0	0	0 <	2	54	73	413
07:00	32	0	1 <	0 <	2	48	83	353
07:15	55 <	2 <	0 <	0 <	1	33	91	330
07:30	17	0 <	0 <	0	1 <	30	48	295
07:45	22	0 <	0 <	0	0	20	42	264
08:00	8	0 <	0	0	0	27	35	216

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

13/6/2018 - THOMAS MITCHELL DR / MAXWELL INFRASTRUCTURE RD, MUSWELLBROOK

18:15 <<< HOUR ENDING **Wednesday**

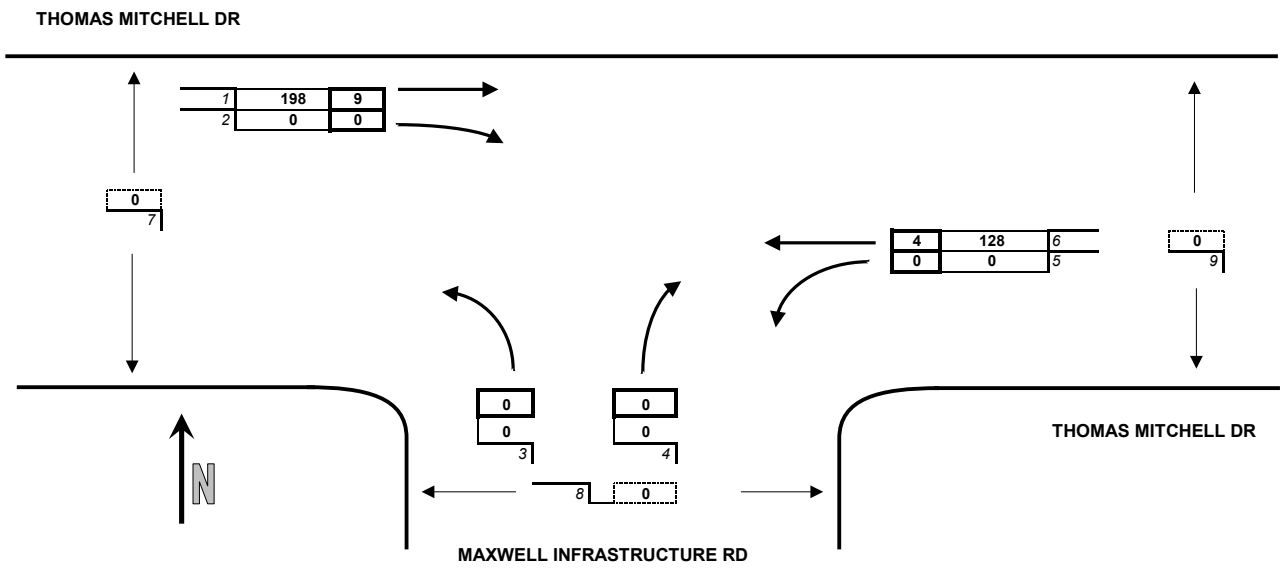
Summary:

THOMAS MITCHELL DR / MAXWELL INFRASTRUCTURE RD

326	Total Light Vehicles
13	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182812

198 Light Vehicles
9 Heavy Vehicles
0 Pedestrians



13/6/2018 - THOMAS MITCHELL DR / MAXWELL INFRASTRUCTURE RD, MUSWELLBROOK

Light Vehicles | **Total Vehicles** | **Pedestrians**

	1	2	3	4	5	6	15 MIN	HOUR	7	8	9
16:15	41	0	1	2	0	11	55		0	0	0
16:30	45	1	0	3	0	8	57		0	0	0
16:45	44	0	0	2	0	7	53		0	0	0
17:00	48	0 <	0 <	0 <	0	10	58	223	0	0	0
17:15	47	0 <	0	0	0	13	60	228	0	0	0
17:30	37	0	0	0	0	24	61	232	0	0	0
17:45	62	0	0	0	0	28	90	269	0	0	0
18:00	47	0	0	0	0	35	82	293	0	0	0
18:15	52 <	0	0	0	0	41 <	93	326 <	0	0	0
18:30	28	0	0	0	0	13	41	306	0	0	0
18:45	36	0	0	0	0	9	45	261	0	0	0
19:00	42	0	0	0	0	6	48	227	0	0	0

Heavy Vehicles | **Total Vehicles**

	1	2	3	4	5	6	15 MIN	HOUR
16:15	2	0	0	0	0	6	8	
16:30	3	0	0	0	0	6	9	
16:45	2	0	0	0	0	7	9	
17:00	5	0	0	0	0	8 <	13	39
17:15	8	1 <	1 <	0	0	4	14	45 <
17:30	7 <	0 <	0 <	0	0	1	8	44
17:45	1	0 <	0 <	0	0	0	1	36
18:00	0	0 <	0 <	0	0	3	3	26
18:15	1	0	0	0	0	0	1	13
18:30	2	0	0	0	0	0	2	7
18:45	2	0	0	0	0	0	2	8
19:00	1	0	0	0	0	1	2	7

All Vehicles | **Total Vehicles**

	1	2	3	4	5	6	15 MIN	HOUR
16:15	43	0	1	2	0	17	63	
16:30	48	1	0	3	0	14	66	
16:45	46	0	0	2	0	14	62	
17:00	53	0	0 <	0 <	0	18	71	262
17:15	55	1 <	1 <	0	0	17	74	273
17:30	44	0	0 <	0	0	25	69	276
17:45	63 <	0	0 <	0	0	28	91	305
18:00	47	0	0 <	0	0	38	85	319
18:15	53	0	0	0	0	41 <	94	339 <
18:30	30	0	0	0	0	13	43	313
18:45	38	0	0	0	0	9	47	269
19:00	43	0	0	0	0	7	50	234

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

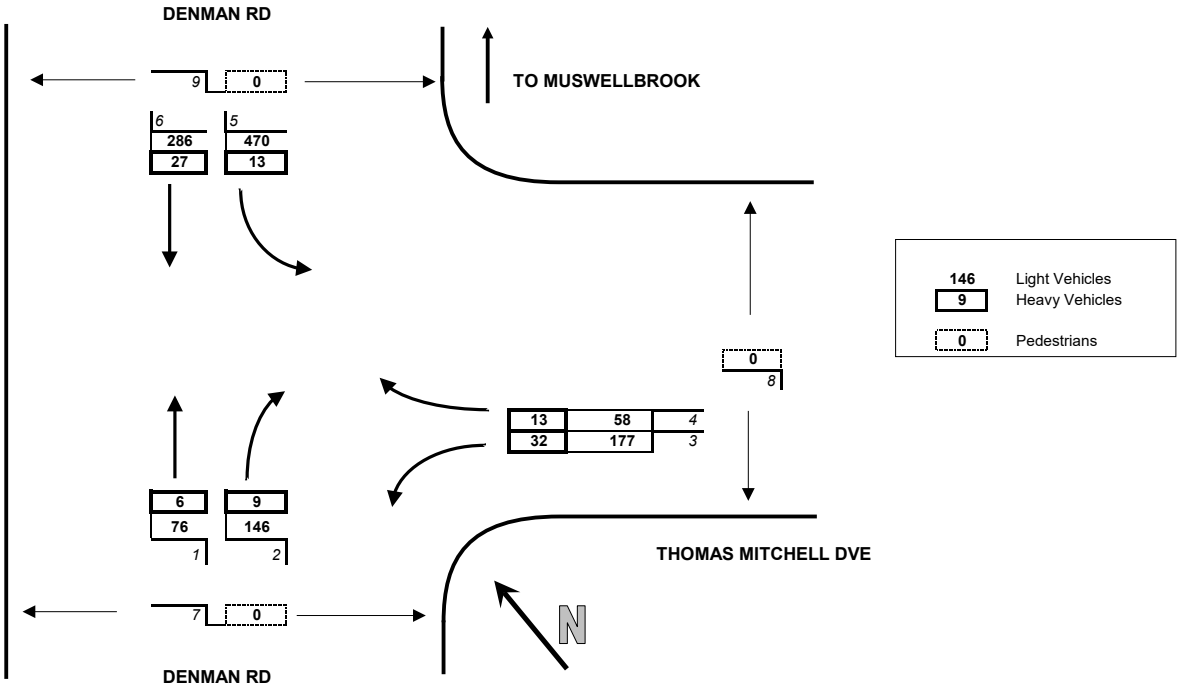
14/6/2018 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

6:30 <<< HOUR ENDING **Thursday**

Summary:

DENMAN RD / THOMAS MITCHELL DVE	
1213	Total Light Vehicles
100	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182812



14/6/2018 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
05:15	6	9	14	11	52	28	120		0	0	0
05:30	6	16	39	7	84	35	187		0	0	0
05:45	14	30	54	6	174	74	352		0	0	0
06:00	13	36	31	8	160	60	308	967	0	0	0
06:15	28	63	68 <	34	88 <	79	360	1207	0	0	0
06:30	21	17 <	24	10	48	73 <	193	1213 <	0	0	0
06:45	17	19	30	16	63	60	205	1066	0	0	0
07:00	30	26	19	30	120	34	259	1017	0	0	0
07:15	33	17	22	60	47	20	199	856	0	0	0
07:30	43	14	16	22	33	22	150	813	0	0	0
07:45	38	7	16	19 <	32	31	143	751	0	0	0
08:00	31 <	11	6	16	39	27	130	622	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	1	0	2	3	0	2	8	
05:30	1	0	2	2	5	3	13	
05:45	0	1	6	2	4	4	17	
06:00	2	3	5	4	3	7	24	62
06:15	3	5	14	6	2 <	9	39	93
06:30	1	0	7 <	1	4	7	20	100 <
06:45	2	1	4	0	1	5 <	13	96
07:00	3 <	4	5	2	2	2	18	90
07:15	2	3	2	3	0	0	10	61
07:30	0	3	3	6	7	5	24	65
07:45	4 <	2 <	4	5	2	3	20	72
08:00	2	2	10	7 <	4	2	27	81

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	7	9	16	14	52	30	128	
05:30	7	16	41	9	89	38	200	
05:45	14	31	60	8	178	78	369	
06:00	15	39	36	12	163	67	332	1029
06:15	31	68	82 <	40	90 <	88	399	1300
06:30	22	17 <	31	11	52	80 <	213	1313 <
06:45	19	20	34	16	64	65	218	1162
07:00	33	30	24	32	122	36	277	1107
07:15	35	20	24	63	47	20	209	917
07:30	43	17	19	28	40	27	174	878
07:45	42 <	9	20	24 <	34	34	163	823
08:00	33 <	13	16	23	43	29	157	703

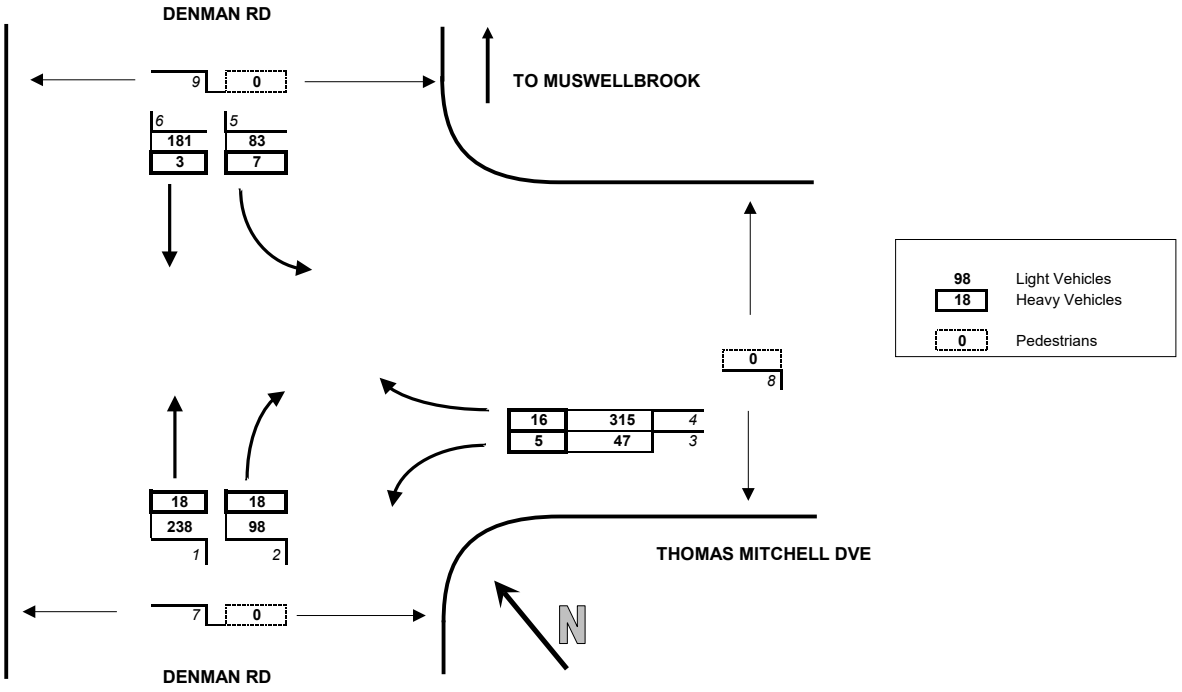
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

13/6/2018 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

17:45 <<< HOUR ENDING **Wednesday**

Summary: DENMAN RD / THOMAS MITCHELL DVE	
962	Total Light Vehicles
67	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182812



13/6/2018 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
16:15	60	12	15	72	25	26	210		0	0	0
16:30	44	21	13	48	11	28	165		0	0	0
16:45	62	31	10	67	5	46	221		0	0	0
17:00	57	18	12	61	16	45	209	805	0	0	0
17:15	52	21	6	74	21	43	217	812	0	0	0
17:30	68 <	29	11	67	25	42	242	889	0	0	0
17:45	61	30	18	113 <	21	51	294	962	0	0	0
18:00	41	22	10	47	33	47	200	953	0	0	0
18:15	34	25 <	13	61	53 <	48 <	234	970 <	0	0	0
18:30	23	7	13 <	18	4	35	100	828	0	0	0
18:45	23	7	9	31	2	28	100	634	0	0	0
19:00	22	7	11	41	2	18	101	535	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
16:15	2	4	1	1	2	2	12	
16:30	7	1	0	4	1	0	13	
16:45	4	4	0	0	5	1	14	
17:00	3	3	2	4	4 <	1 <	17	56
17:15	5 <	4	1	3	1	0	14	58
17:30	6	9 <	1	4	1	1	22	67 <
17:45	4	2	1 <	5 <	1	1	14	67 <
18:00	2	2	1	1	2	1	9	59
18:15	2	1	0	0	1	0	4	49
18:30	1	0	0	2	1	1	5	32
18:45	2	1	2	2	2	0	9	27
19:00	0	0	0	0	2	1	3	21

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
16:15	62	16	16	73	27	28	222	
16:30	51	22	13	52	12	28	178	
16:45	66	35	10	67	10	47	235	
17:00	60	21	14	65	20	46	226	861
17:15	57	25	7	77	22	43	231	870
17:30	74 <	38	12	71	26	43	264	956
17:45	65	32	19	118 <	22	52	308	1029 <
18:00	43	24	11	48	35	48	209	1012
18:15	36	26 <	13	61	54 <	48 <	238	1019
18:30	24	7	13 <	20	5	36	105	860
18:45	25	8	11	33	4	28	109	661
19:00	22	7	11	41	4	19	104	556

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

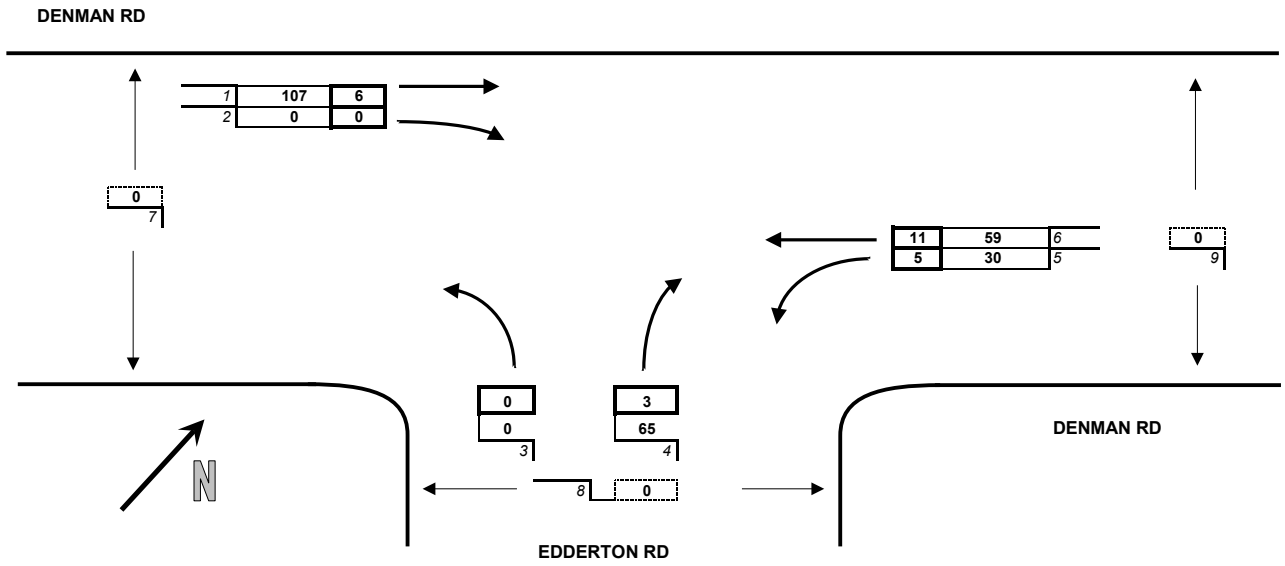
14/6/2018 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

7:00 <<< HOUR ENDING **Thursday**

Summary:	DENMAN RD / EDDERTON RD
261	Total Light Vehicles
25	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182812

107 Light Vehicles
6 Heavy Vehicles
0 Pedestrians



14/6/2018 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
05:15	10	0	0	2	3	4	19		0	0	0
05:30	19	0	0	8	5	5	37		0	0	0
05:45	38	0	0	6	13	5	62		0	0	0
06:00	28	0	0	5	7	5	45	163	0	0	0
06:15	32	0	0	27	10	13	82	226	0	0	0
06:30	26 <	0	0	10	11 <	8	55	244	0	0	0
06:45	31	0	0	11	6	9	57	239	0	0	0
07:00	18	0	0	17 <	3	29	67	261 <	0	0	0
07:15	13	0	0	8	6	11	38	217	0	0	0
07:30	18	0	0	14	3	5	40	202	0	0	0
07:45	16	0	0	6	3	20 <	45	190	0	0	0
08:00	27	0	0	5	3	20	55	178	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
05:15	1	0	0	0	0	0	1	
05:30	1	0	0	0	0	2	3	
05:45	0	0	0	0	0	0	0	
06:00	2	0	0	0	1	1	4	8
06:15	1	0	0	1	3	2	7	14
06:30	1	0	0	0	1	2	4	15
06:45	3	0	0	1	1 <	4	9	24
07:00	1	0	0	1 <	0	3	5	25
07:15	1	0	0	0	0	2	3	21
07:30	3	0	0	0	0	4	7	24
07:45	3	0	0	0	2	4	9	24
08:00	4 <	0	0	0	0	7 <	11	30 <

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
05:15	11	0	0	2	3	4	20	
05:30	20	0	0	8	5	7	40	
05:45	38	0	0	6	13	5	62	
06:00	30	0	0	5	8	6	49	171
06:15	33	0	0	28	13	15	89	240
06:30	27 <	0	0	10	12 <	10	59	259
06:45	34	0	0	12	7	13	66	263
07:00	19	0	0	18 <	3	32	72	286 <
07:15	14	0	0	8	6	13	41	238
07:30	21	0	0	14	3	9	47	226
07:45	19	0	0	6	5	24 <	54	214
08:00	31	0	0	5	3	27	66	208

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

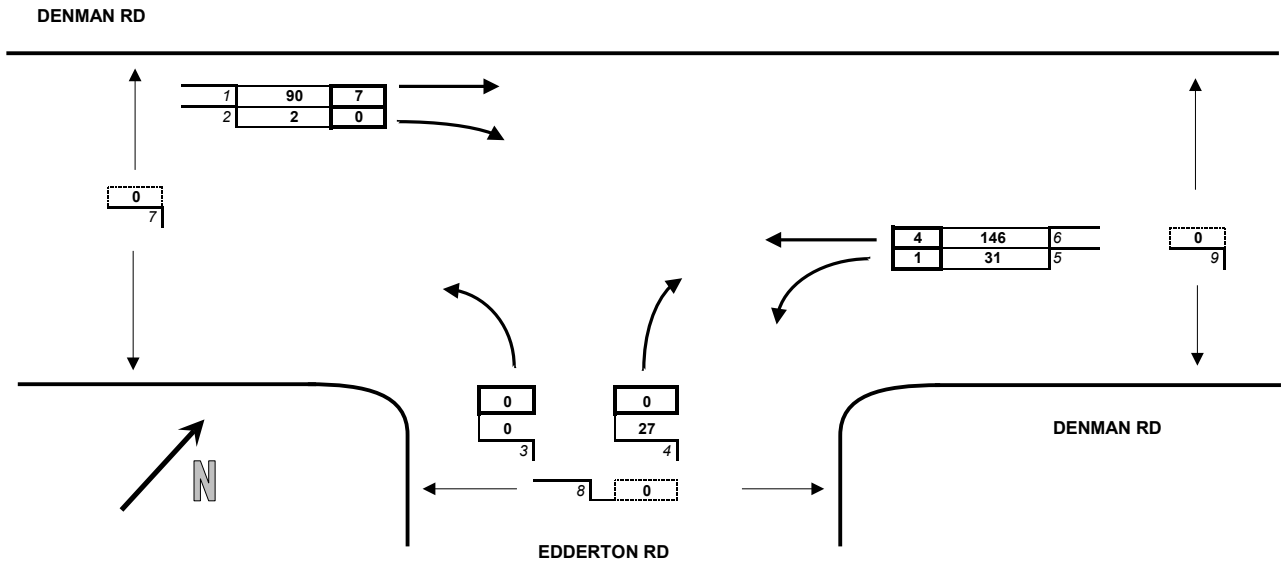
13/6/2018 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

17:30 <<< HOUR ENDING **Wednesday**

Summary:	DENMAN RD / EDDERTON RD
296	Total Light Vehicles
12	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
182812

90 Light Vehicles
7 Heavy Vehicles
0 Pedestrians



13/6/2018 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
16:15	26	1	1	4	10	25	67		0	0	0
16:30	13	0	0	9	4	20	46		0	0	0
16:45	28	2	0	5	6	40	81		0	0	0
17:00	23 <	0 <	0	4	9	36	72	266	0	0	0
17:15	16	0	0	9 <	9	33	67	266	0	0	0
17:30	23 <	0	0	9 <	7	37 <	76	296 <	0	0	0
17:45	11	0	1	4	12 <	38	66	281	0	0	0
18:00	13	0	0	4	7	21	45	254	0	0	0
18:15	14	0	1 <	8	11 <	27	61	248	0	0	0
18:30	5	0	0 <	6	1	26	38	210	0	0	0
18:45	11	0	0	1	5	16	33	177	0	0	0
19:00	5	0	0	3	1	19	28	160	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
16:15	3	0	0	0	0	0	3	
16:30	6	0	0	0	1	3	10	
16:45	4	0	0	0	0	0	4	
17:00	1 <	0	0	0	1 <	2	4	21 <
17:15	0	0	0	0	0 <	2	2	20
17:30	2	0	0	0	0	0	2	12
17:45	2	0	0	0	1 <	1	4	12
18:00	2	0	0	1	1 <	5 <	9	17
18:15	3	0	0	0	0 <	1	4	19
18:30	0	0	0	1 <	0 <	0	1	18
18:45	0	0	0	0 <	1 <	0	1	15
19:00	0	0	0	0	0	1	1	7

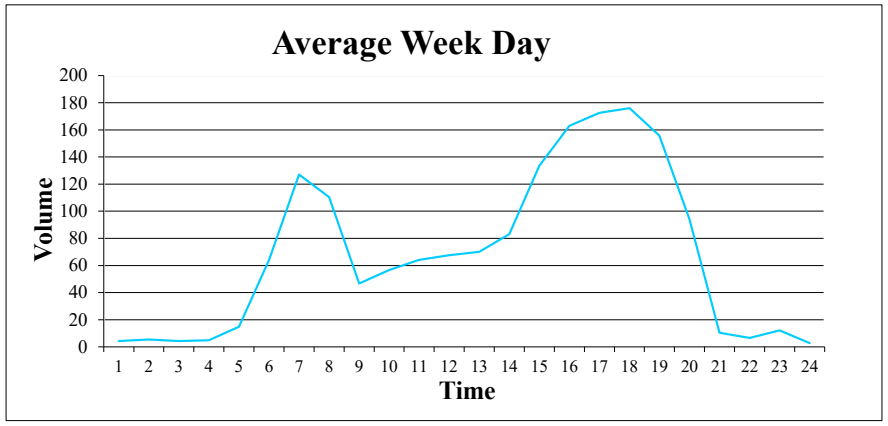
All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
16:15	29	1	1	4	10	25	70	
16:30	19	0	0	9	5	23	56	
16:45	32	2	0	5	6	40	85	
17:00	24 <	0 <	0	4	10	38	76	287
17:15	16	0	0	9 <	9	35	69	286
17:30	25	0	0	9 <	7	37 <	78	308 <
17:45	13	0	1	4	13 <	39	70	293
18:00	15	0	0	5 <	8	26	54	271
18:15	17	0	1 <	8	11 <	28	65	267
18:30	5	0	0 <	7	1	26	39	228
18:45	11	0	0	1	6	16	34	192
19:00	5	0	0	3	1	20	29	167

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

Site 1 Thomas Mitchell DR 300m W of New England HWY [80] Eastbound

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	14/06/18	15/06/2018	16/06/2018	17/06/2018	18/06/2018	19/06/2018	20/06/2018	Ave.	Ave.	Ave
0:00	6	4	5	3	6	4	1	4	4	4
1:00	6	5	3	5	4	5	7	5	4	5
2:00	6	2	2	1	6	3	4	4	2	3
3:00	4	7	5	3	8	3	2	5	4	5
4:00	14	16	16	2	20	18	6	15	9	13
5:00	59	66	50	40	68	64	63	64	45	59
6:00	113	101	83	80	120	156	145	127	82	114
7:00	108	104	79	65	113	102	125	110	72	99
8:00	33	52	22	11	48	54	47	47	17	38
9:00	53	57	28	8	43	71	59	57	18	46
10:00	67	73	24	15	58	77	46	64	20	51
11:00	69	77	30	18	66	62	64	68	24	55
12:00	82	89	20	20	45	73	61	70	20	56
13:00	79	96	34	15	72	81	87	83	25	66
14:00	134	154	20	24	118	141	121	134	22	102
15:00	180	167	27	22	134	176	158	163	25	123
16:00	195	158	31	23	173	167	170	173	27	131
17:00	208	133	76	75	189	168	182	176	76	147
18:00	160	136	114	127	140	176	167	156	121	146
19:00	107	101	102	91	85	71	107	94	97	95
20:00	9	11	6	8	5	14	13	10	7	9
21:00	9	6	4	4	4	6	8	7	4	6
22:00	10	16	8	4	11	12	12	12	6	10
23:00	3	3	8	2	2	4	2	3	5	3
Total	**1714**	**1634**	**797**	**666**	**1538**	**1708**	**1657**	**1650**	**732**	**1388**

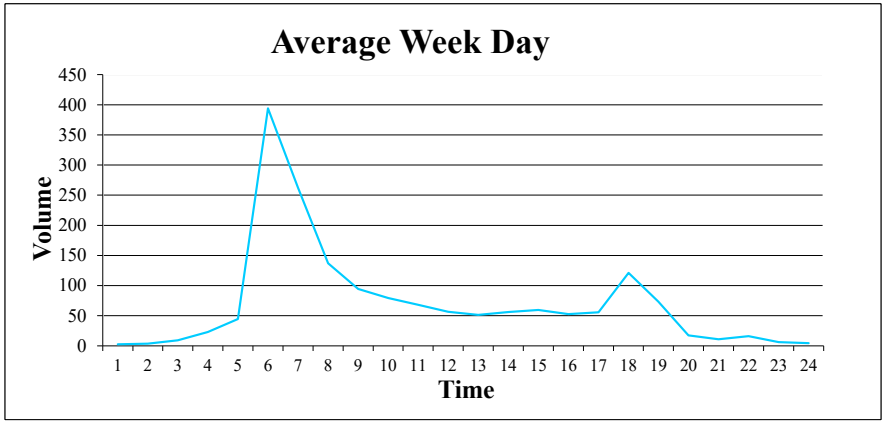


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**156**
PM Peak	5:00 PM	6:00 PM	**208**
		Week Day Average	**1650**
		Weekend Day Average	**731**
		7 Day Average	**1388**

Site 1 Thomas Mitchell DR 300m W of New England HWY [80] Westbound

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	14/06/18	15/06/2018	16/06/2018	17/06/2018	18/06/2018	19/06/2018	20/06/2018	Ave.	Ave.	Ave
0:00	2	2	5	3	3	0	6	3	4	3
1:00	6	3	3	2	1	6	2	4	3	3
2:00	5	13	3	3	10	4	14	9	3	7
3:00	28	20	28	2	17	28	21	23	15	21
4:00	41	48	16	15	46	46	42	45	16	36
5:00	426	367	204	175	356	405	416	394	190	336
6:00	247	245	81	80	285	249	285	262	81	210
7:00	121	129	25	16	154	153	128	137	21	104
8:00	82	96	22	12	90	110	95	95	17	72
9:00	82	57	32	20	99	83	75	79	26	64
10:00	67	59	20	19	68	82	65	68	20	54
11:00	60	61	20	25	50	49	62	56	23	47
12:00	77	47	32	19	41	48	45	52	26	44
13:00	56	56	15	20	53	59	57	56	18	45
14:00	48	60	20	17	69	73	48	60	19	48
15:00	62	40	20	18	54	50	58	53	19	43
16:00	55	50	38	36	67	44	63	56	37	50
17:00	95	104	92	99	149	123	135	121	96	114
18:00	84	88	74	81	55	65	75	73	78	75
19:00	18	22	13	16	17	15	16	18	15	17
20:00	11	9	5	8	9	17	8	11	7	10
21:00	13	22	11	17	12	14	19	16	14	15
22:00	4	7	6	5	9	4	7	6	6	6
23:00	6	5	4	8	5	4	2	4	6	5
Total	**1696**	**1610**	**789**	**716**	**1719**	**1731**	**1744**	**1700**	**753**	**1429**

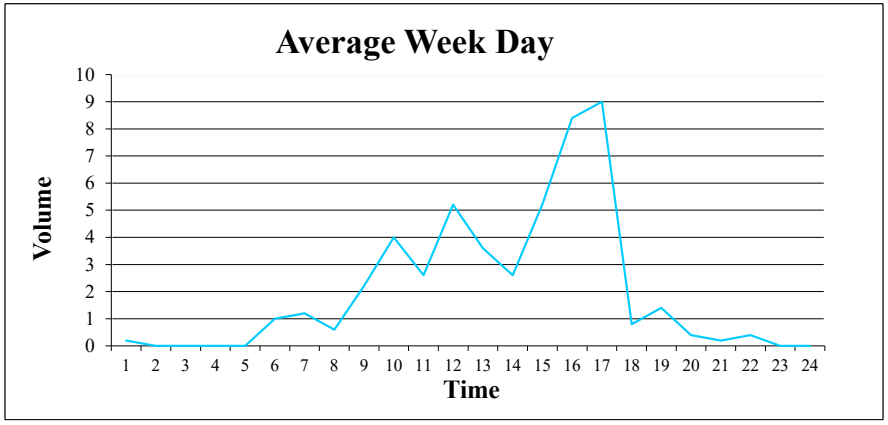


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**426**
PM Peak	5:00 PM	6:00 PM	**149**
		Week Day Average	**1700**
		Weekend Day Average	**753**
		7 Day Average	**1429**

Site 2 Maxwell Infrastructure Access RD [40] Eastbound

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	14/06/18	15/06/2018	16/06/2018	17/06/2018	18/06/2018	19/06/2018	20/06/2018	Ave.	Ave.	Ave
0:00	0	0	1	1	1	0	0	0	1	0
1:00	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0
5:00	1	1	0	0	1	1	1	1	0	1
6:00	1	1	0	1	1	1	2	1	1	1
7:00	1	0	0	0	0	1	1	1	0	0
8:00	0	3	2	0	1	5	2	2	1	2
9:00	2	1	0	0	7	8	2	4	0	3
10:00	0	0	0	0	5	2	6	3	0	2
11:00	2	5	0	0	6	8	5	5	0	4
12:00	4	6	0	0	4	3	1	4	0	3
13:00	2	5	0	0	0	2	4	3	0	2
14:00	2	3	1	0	9	7	5	5	1	4
15:00	9	2	0	0	9	9	13	8	0	6
16:00	9	8	0	0	12	8	8	9	0	6
17:00	0	0	0	0	3	0	1	1	0	1
18:00	0	1	1	1	4	2	0	1	1	1
19:00	0	1	0	1	0	1	0	0	1	0
20:00	0	0	1	0	0	1	0	0	1	0
21:00	1	1	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0
Total	**34**	**38**	**6**	**4**	**63**	**59**	**51**	**49**	**5**	**36**

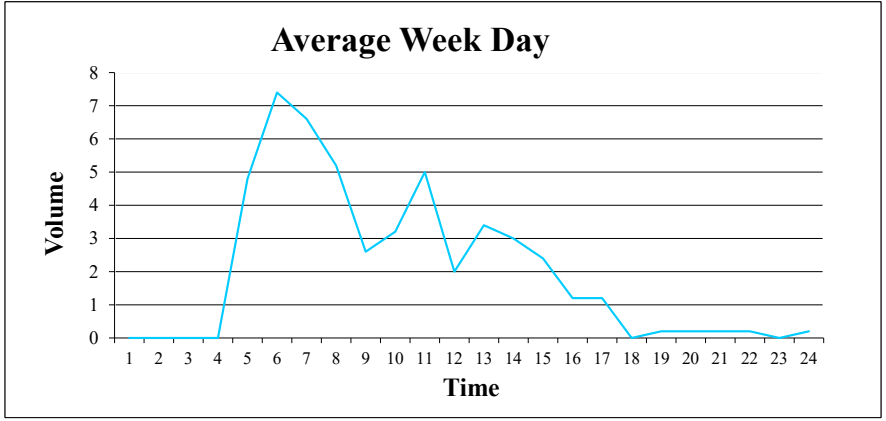


Summary

	from	to	
AM Peak	9:00 AM	10:00 AM	**8**
PM Peak	3:00 PM	4:00 PM	**13**
		Week Day Average	**49**
		Weekend Day Average	**5**
		7 Day Average	**36**

Site 2 Maxwell Infrastructure Access RD [40] — Westbound

Day	*Thu*	*Fri*	*Sat*	*Sun*	*Mon*	*Tue*	*Wed*	*W/Day*	*W/End*	*7 Day*
Time	14/06/18	15/06/2018	16/06/2018	17/06/2018	18/06/2018	19/06/2018	20/06/2018	*Ave.*	*Ave.*	*Ave*
0:00	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0
4:00	4	3	0	0	5	6	6	5	0	3
5:00	8	5	0	0	7	8	9	7	0	5
6:00	4	6	0	1	9	8	6	7	1	5
7:00	2	4	0	0	5	6	9	5	0	4
8:00	1	2	2	0	3	6	1	3	1	2
9:00	1	2	0	0	7	5	1	3	0	2
10:00	3	2	0	0	4	6	10	5	0	4
11:00	1	1	0	0	1	5	2	2	0	1
12:00	3	8	0	0	3	2	1	3	0	2
13:00	1	2	0	0	6	3	3	3	0	2
14:00	3	1	1	0	6	1	1	2	1	2
15:00	1	0	0	0	3	2	0	1	0	1
16:00	1	1	0	0	1	2	1	1	0	1
17:00	0	0	0	0	0	0	0	0	0	0
18:00	0	1	1	1	0	0	0	0	1	0
19:00	0	1	0	0	0	0	0	0	0	0
20:00	1	0	1	1	0	0	0	0	1	0
21:00	0	1	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0
23:00	0	1	1	1	0	0	0	0	1	0
Total	**34**	**41**	**6**	**4**	**60**	**60**	**50**	**49**	**5**	**36**

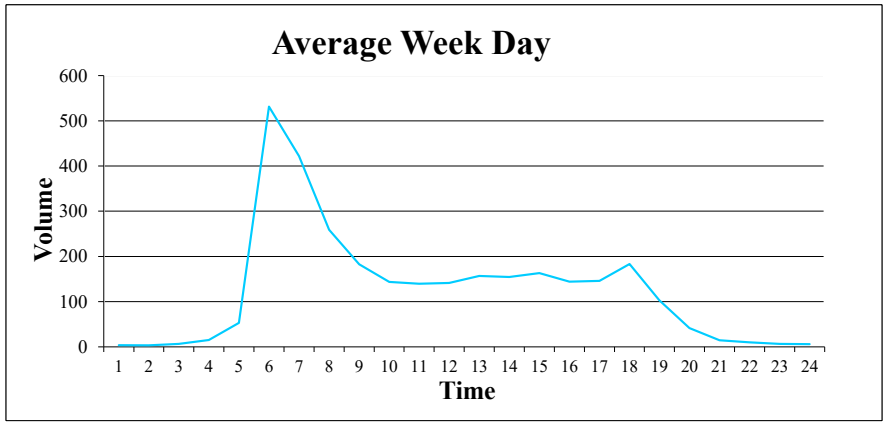


Summary

	from	to	
AM Peak	10:00 AM	11:00 AM	**10**
PM Peak	12:00 PM	1:00 PM	**8**
		Week Day Average	**49**
		Weekend Day Average	**5**
		7 Day Average	**36**

Site 3 Thomas Mitchell DR 300m E of Denman RD [60] Eastbound

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	14/06/18	15/06/2018	16/06/2018	17/06/2018	18/06/2018	19/06/2018	20/06/2018	Ave.	Ave.	Ave
0:00	6	3	4	3	3	6	1	4	4	4
1:00	4	2	3	2	3	2	6	3	3	3
2:00	6	8	5	1	5	5	8	6	3	5
3:00	14	17	14	2	20	19	6	15	8	13
4:00	59	51	30	16	44	55	56	53	23	44
5:00	551	483	203	173	499	592	532	531	188	433
6:00	431	391	133	90	404	425	458	422	112	333
7:00	237	239	67	28	261	282	275	259	48	198
8:00	166	167	53	20	186	202	193	183	37	141
9:00	155	132	65	29	140	151	141	144	47	116
10:00	138	134	53	29	126	161	139	140	41	111
11:00	142	152	51	33	123	146	145	142	42	113
12:00	171	181	36	32	132	151	148	157	34	122
13:00	170	144	43	26	166	148	146	155	35	120
14:00	156	198	34	32	160	151	152	163	33	126
15:00	160	144	30	35	133	132	152	144	33	112
16:00	174	143	48	36	150	131	132	146	42	116
17:00	198	158	93	111	192	164	203	183	102	160
18:00	120	91	66	85	97	111	97	103	76	95
19:00	56	31	40	37	39	34	48	42	39	41
20:00	13	10	8	8	12	17	21	15	8	13
21:00	10	8	4	6	7	13	12	10	5	9
22:00	11	6	7	4	4	7	5	7	6	6
23:00	5	6	7	2	5	8	7	6	5	6
Total	**3153**	**2899**	**1097**	**840**	**2911**	**3113**	**3083**	**3032**	**969**	**2442**

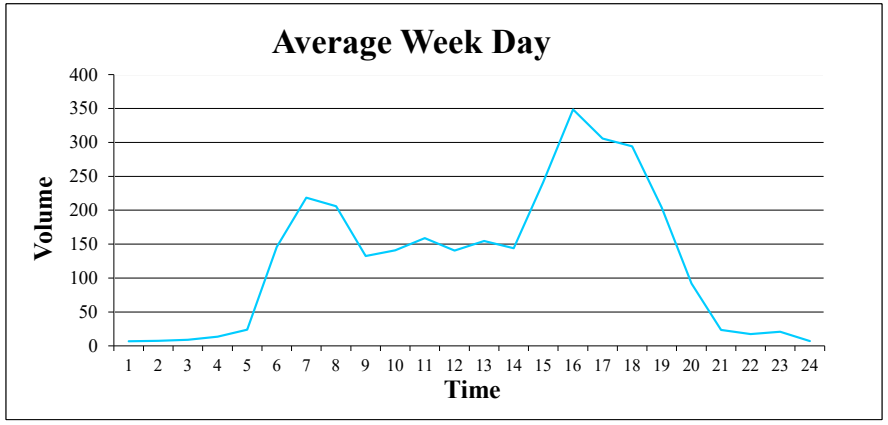


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**592**
PM Peak	5:00 PM	6:00 PM	**203**
		Week Day Average	**3032**
		Weekend Day Average	**969**
		7 Day Average	**2442**

Site 3 Thomas Mitchell DR 300m E of Denman RD [60] Westbound

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	14/06/18	15/06/2018	16/06/2018	17/06/2018	18/06/2018	19/06/2018	20/06/2018	Ave.	Ave.	Ave
0:00	9	7	6	3	1	9	8	7	5	6
1:00	8	8	7	2	0	12	10	8	5	7
2:00	9	9	5	4	8	4	15	9	5	8
3:00	10	27	5	4	6	10	15	14	5	11
4:00	32	23	8	6	27	20	18	24	7	19
5:00	177	131	72	50	126	137	159	146	61	122
6:00	239	195	120	96	199	230	229	218	108	187
7:00	215	184	84	58	239	218	173	206	71	167
8:00	122	122	41	15	131	140	148	133	28	103
9:00	145	126	51	22	145	148	141	141	37	111
10:00	157	129	51	21	168	189	151	159	36	124
11:00	122	154	44	39	129	143	154	140	42	112
12:00	177	162	64	40	134	134	167	155	52	125
13:00	127	161	51	32	151	142	138	144	42	115
14:00	216	268	57	40	232	269	222	241	49	186
15:00	361	355	30	32	335	364	328	349	31	258
16:00	309	233	35	40	306	334	346	306	38	229
17:00	316	272	141	119	345	253	286	294	130	247
18:00	234	160	110	139	186	235	204	204	125	181
19:00	84	106	69	66	88	80	102	92	68	85
20:00	32	22	9	15	19	30	14	23	12	20
21:00	19	22	3	8	13	15	17	17	6	14
22:00	27	13	11	7	20	19	25	21	9	17
23:00	10	6	2	3	6	9	4	7	3	6
Total	**3157**	**2895**	**1076**	**861**	**3014**	**3144**	**3074**	**3057**	**969**	**2460**

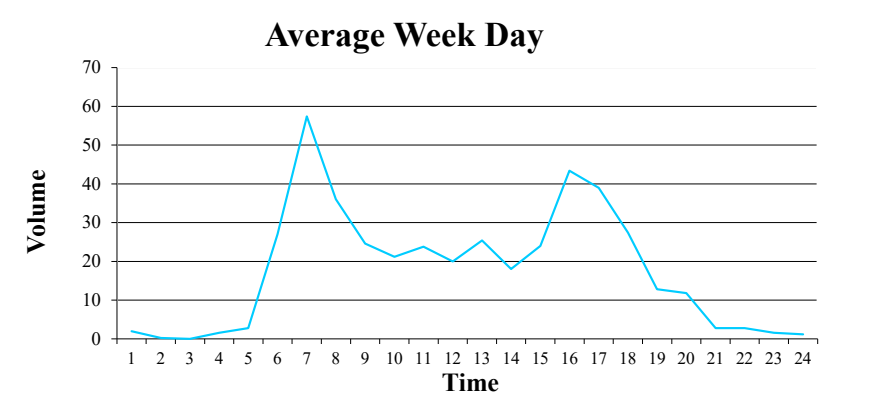


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**239**
PM Peak	3:00 PM	4:00 PM	**364**
		Week Day Average	**3057**
		Weekend Day Average	**968**
		7 Day Average	**2460**

Site 4 Edderton RD 200m S of Denman RD [100] Northbound

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	14/06/18	15/06/2018	16/06/2018	17/06/2018	18/06/2018	19/06/2018	20/06/2018	Ave.	Ave.	Ave
0:00	2	2	1	0	1	3	2	2	1	2
1:00	0	0	4	0	0	0	1	0	2	1
2:00	0	0	4	1	0	0	0	0	3	1
3:00	3	3	2	2	2	0	0	2	2	2
4:00	3	3	1	1	3	2	3	3	1	2
5:00	19	29	11	4	27	32	28	27	8	21
6:00	66	57	11	7	55	55	54	57	9	44
7:00	37	34	17	11	38	38	33	36	14	30
8:00	26	25	16	9	26	16	30	25	13	21
9:00	21	22	15	12	23	26	14	21	14	19
10:00	27	22	14	16	27	27	16	24	15	21
11:00	20	22	21	11	29	15	14	20	16	19
12:00	30	32	19	14	20	23	22	25	17	23
13:00	13	26	23	16	18	17	16	18	20	18
14:00	18	34	15	21	26	25	17	24	18	22
15:00	58	54	21	24	32	36	37	43	23	37
16:00	33	40	12	16	49	38	35	39	14	32
17:00	28	31	11	14	31	21	26	27	13	23
18:00	11	15	9	13	11	12	15	13	11	12
19:00	12	22	12	11	5	9	11	12	12	12
20:00	2	7	6	4	1	2	2	3	5	3
21:00	2	5	2	3	3	1	3	3	3	3
22:00	1	2	1	1	1	2	2	2	1	1
23:00	2	1	0	1	1	1	1	1	1	1
Total	**434**	**488**	**248**	**212**	**429**	**401**	**382**	**427**	**230**	**371**

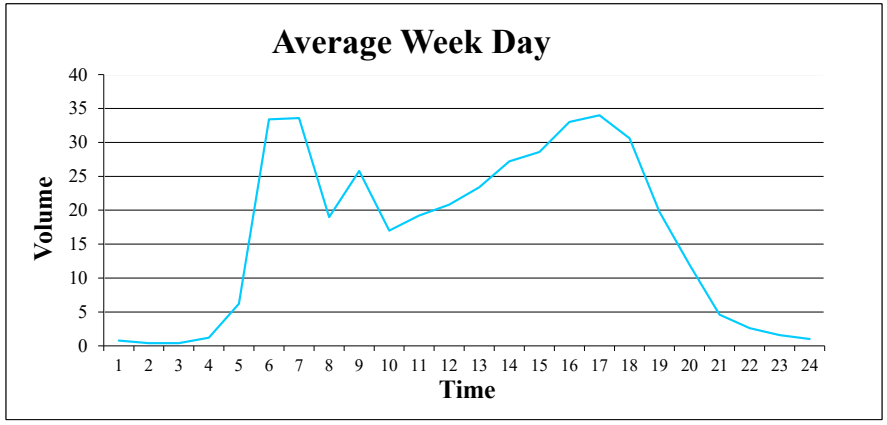


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**66**
PM Peak	3:00 PM	4:00 PM	**58**
		Week Day Average	**427**
		Weekend Day Average	**230**
		7 Day Average	**371**

Site 4 Edderton RD 200m S of Denman RD [100] Southbound

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	14/06/18	15/06/2018	16/06/2018	17/06/2018	18/06/2018	19/06/2018	20/06/2018	Ave.	Ave.	Ave
0:00	1	1	0	1	1	0	1	1	1	1
1:00	0	0	2	2	2	0	0	0	2	1
2:00	1	0	0	0	0	0	1	0	0	0
3:00	1	2	1	0	1	1	1	1	1	1
4:00	5	6	5	4	4	7	9	6	5	6
5:00	29	34	13	15	37	29	38	33	14	28
6:00	36	39	7	9	30	32	31	34	8	26
7:00	17	26	8	5	22	12	18	19	7	15
8:00	22	34	20	6	24	23	26	26	13	22
9:00	17	18	24	6	17	17	16	17	15	16
10:00	16	20	19	26	25	18	17	19	23	20
11:00	22	28	26	26	20	19	15	21	26	22
12:00	29	28	28	14	18	27	15	23	21	23
13:00	34	33	22	25	18	22	29	27	24	26
14:00	30	34	13	27	30	26	23	29	20	26
15:00	35	45	9	12	32	20	33	33	11	27
16:00	36	43	13	10	29	24	38	34	12	28
17:00	38	33	23	29	24	27	31	31	26	29
18:00	25	23	12	13	13	17	21	20	13	18
19:00	6	11	6	5	12	16	15	12	6	10
20:00	5	8	3	6	5	3	2	5	5	5
21:00	2	1	1	4	3	5	2	3	3	3
22:00	1	2	1	0	1	1	3	2	1	1
23:00	3	1	0	1	0	0	1	1	1	1
Total	**411**	**470**	**256**	**246**	**368**	**346**	**386**	**396**	**251**	**355**



Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**39**
PM Peak	3:00 PM	4:00 PM	**45**
		Week Day Average	**396**
		Weekend Day Average	**251**
		7 Day Average	**355**

Appendix B

SIDRA INTERSECTION 8 Outputs

MOVEMENT SUMMARY

Site: 101 [Denman & Edderton Ex AM]

Denman Road and Edderton Road
Surveyed AM Peak 2018
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.075	8.1	LOS A	0.2	1.8	0.29	0.66	0.29	73.5
3	R2	76	4.4	0.075	8.4	LOS A	0.2	1.8	0.29	0.66	0.29	71.5
Approach		77	4.3	0.075	8.4	LOS A	0.2	1.8	0.29	0.66	0.29	71.5
NorthEast: Denman Rd NE												
4	L2	39	14.3	0.067	8.2	LOS A	0.0	0.0	0.00	0.23	0.00	77.0
5	T1	78	15.7	0.067	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	93.2
Approach		117	15.2	0.067	2.7	NA	0.0	0.0	0.00	0.23	0.00	87.1
SouthWest: Denman Rd SW												
11	T1	126	5.3	0.067	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	99.7
12	R2	1	0.0	0.067	7.8	LOS A	0.0	0.1	0.00	0.01	0.00	88.0
Approach		127	5.3	0.067	0.1	NA	0.0	0.1	0.00	0.01	0.00	99.6
All Vehicles		320	8.7	0.075	3.0	NA	0.2	1.8	0.07	0.24	0.07	86.9

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.
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 [Denman & Edderton Ex PM]

Denman Road and Edderton Road
Surveyed PM Peak 2018
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.031	8.3	LOS A	0.1	0.7	0.32	0.66	0.32	74.1
3	R2	30	0.0	0.031	8.5	LOS A	0.1	0.7	0.32	0.66	0.32	73.6
Approach		31	0.0	0.031	8.5	LOS A	0.1	0.7	0.32	0.66	0.32	73.6
NorthEast: Denman Rd NE												
4	L2	36	3.1	0.107	7.9	LOS A	0.0	0.0	0.00	0.12	0.00	84.2
5	T1	167	2.7	0.107	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	96.3
Approach		202	2.7	0.107	1.4	NA	0.0	0.0	0.00	0.12	0.00	93.9
SouthWest: Denman Rd SW												
11	T1	108	7.2	0.059	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	99.3
12	R2	2	0.0	0.059	8.0	LOS A	0.0	0.1	0.02	0.01	0.02	87.6
Approach		110	7.1	0.059	0.2	NA	0.0	0.1	0.02	0.01	0.02	99.1
All Vehicles		343	3.9	0.107	1.7	NA	0.1	0.7	0.03	0.13	0.03	93.2

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.
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 [Denman & Edderton 2020 AM Baseline]

Denman Road and Edderton Road
2020 AM Peak
Baseline without Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.085	8.3	LOS A	0.3	2.1	0.35	0.69	0.35	73.1
3	R2	79	5.6	0.085	8.9	LOS A	0.3	2.1	0.35	0.69	0.35	70.6
Approach		80	5.6	0.085	8.9	LOS A	0.3	2.1	0.35	0.69	0.35	70.7
NorthEast: Denman Rd NE												
4	L2	41	16.2	0.099	8.3	LOS A	0.0	0.0	0.00	0.16	0.00	77.6
5	T1	136	11.5	0.099	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	95.4
Approach		177	12.6	0.099	1.9	NA	0.0	0.0	0.00	0.16	0.00	90.6
SouthWest: Denman Rd SW												
11	T1	152	5.8	0.082	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	99.8
12	R2	1	0.0	0.082	8.0	LOS A	0.0	0.1	0.01	0.00	0.01	88.0
Approach		153	5.8	0.082	0.1	NA	0.0	0.1	0.01	0.00	0.01	99.7
All Vehicles		410	8.7	0.099	2.6	NA	0.3	2.1	0.07	0.21	0.07	88.7

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 [Denman & Edderton 2020 PM Baseline]

Denman Road and Edderton Road
2020 PM Peak
Baseline Without Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.037	8.4	LOS A	0.1	0.9	0.37	0.69	0.37	72.8
3	R2	32	3.4	0.037	9.0	LOS A	0.1	0.9	0.37	0.69	0.37	71.2
Approach		33	3.3	0.037	9.0	LOS A	0.1	0.9	0.37	0.69	0.37	71.3
NorthEast: Denman Rd NE												
4	L2	38	5.9	0.122	8.0	LOS A	0.0	0.0	0.00	0.11	0.00	83.1
5	T1	193	2.9	0.122	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	96.6
Approach		231	3.4	0.122	1.3	NA	0.0	0.0	0.00	0.11	0.00	94.1
SouthWest: Denman Rd SW												
11	T1	158	5.6	0.086	0.0	LOS A	0.0	0.2	0.02	0.01	0.02	99.3
12	R2	3	0.0	0.086	8.2	LOS A	0.0	0.2	0.02	0.01	0.02	87.6
Approach		161	5.5	0.086	0.2	NA	0.0	0.2	0.02	0.01	0.02	99.0
All Vehicles		426	4.2	0.122	1.5	NA	0.1	0.9	0.04	0.12	0.04	93.5

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.
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 [Denman & Edderton 2026 AM Baseline]

Denman Road and Edderton Road
2026 AM Peak
Baseline without Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.084	8.3	LOS A	0.3	2.0	0.35	0.69	0.35	73.1
3	R2	78	5.7	0.084	8.9	LOS A	0.3	2.0	0.35	0.69	0.35	70.6
Approach		79	5.6	0.084	8.9	LOS A	0.3	2.0	0.35	0.69	0.35	70.6
NorthEast: Denman Rd NE												
4	L2	41	16.2	0.099	8.3	LOS A	0.0	0.0	0.00	0.16	0.00	77.6
5	T1	136	11.5	0.099	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	95.4
Approach		177	12.6	0.099	1.9	NA	0.0	0.0	0.00	0.16	0.00	90.6
SouthWest: Denman Rd SW												
11	T1	149	6.0	0.080	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	99.8
12	R2	1	0.0	0.080	8.0	LOS A	0.0	0.1	0.01	0.01	0.01	88.0
Approach		150	5.9	0.080	0.1	NA	0.0	0.1	0.01	0.01	0.01	99.7
All Vehicles		406	8.8	0.099	2.6	NA	0.3	2.0	0.07	0.21	0.07	88.7

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 [Denman & Edderton 2026 PM Baseline]

Denman Road and Edderton Road
2026 PM Peak
Baseline Without Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.037	8.4	LOS A	0.1	0.8	0.37	0.68	0.37	72.9
3	R2	32	3.4	0.037	9.0	LOS A	0.1	0.8	0.37	0.68	0.37	71.2
Approach		33	3.3	0.037	9.0	LOS A	0.1	0.8	0.37	0.68	0.37	71.3
NorthEast: Denman Rd NE												
4	L2	38	5.9	0.120	8.0	LOS A	0.0	0.0	0.00	0.11	0.00	83.1
5	T1	190	2.9	0.120	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	96.6
Approach		228	3.4	0.120	1.3	NA	0.0	0.0	0.00	0.11	0.00	94.0
SouthWest: Denman Rd SW												
11	T1	157	5.7	0.086	0.0	LOS A	0.0	0.2	0.02	0.01	0.02	99.3
12	R2	3	0.0	0.086	8.2	LOS A	0.0	0.2	0.02	0.01	0.02	87.6
Approach		160	5.6	0.086	0.2	NA	0.0	0.2	0.02	0.01	0.02	99.0
All Vehicles		421	4.2	0.120	1.5	NA	0.1	0.8	0.04	0.12	0.04	93.5

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.
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 [Denman & Edderton 2033 AM Baseline]

Denman Road and Edderton Road
2033 AM Peak
Baseline without Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.084	8.0	LOS A	0.3	2.0	0.26	0.66	0.26	73.6
3	R2	88	5.1	0.084	8.3	LOS A	0.3	2.0	0.26	0.66	0.26	71.4
Approach		89	5.0	0.084	8.3	LOS A	0.3	2.0	0.26	0.66	0.26	71.4
NorthEast: Denman Rd NE												
4	L2	29	19.2	0.043	8.3	LOS A	0.0	0.0	0.00	0.26	0.00	75.1
5	T1	48	2.3	0.043	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	93.3
Approach		77	8.7	0.043	3.1	NA	0.0	0.0	0.00	0.26	0.00	85.5
SouthWest: Denman Rd SW												
11	T1	131	4.2	0.070	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	99.8
12	R2	1	0.0	0.070	7.6	LOS A	0.0	0.1	0.00	0.01	0.00	88.0
Approach		132	4.2	0.070	0.1	NA	0.0	0.1	0.00	0.01	0.00	99.7
All Vehicles		298	5.6	0.084	3.3	NA	0.3	2.0	0.08	0.26	0.08	85.8

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 [Denman & Edderton 2033 PM Baseline]

Denman Road and Edderton Road
2033 PM Peak
Baseline Without Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.022	8.4	LOS A	0.1	0.5	0.33	0.66	0.33	74.0
3	R2	20	0.0	0.022	8.6	LOS A	0.1	0.5	0.33	0.66	0.33	73.5
Approach		21	0.0	0.022	8.6	LOS A	0.1	0.5	0.33	0.66	0.33	73.5
NorthEast: Denman Rd NE												
4	L2	42	5.3	0.119	8.0	LOS A	0.0	0.0	0.00	0.13	0.00	83.1
5	T1	184	0.6	0.119	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	96.2
Approach		227	1.5	0.119	1.5	NA	0.0	0.0	0.00	0.13	0.00	93.5
SouthWest: Denman Rd SW												
11	T1	114	1.0	0.061	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	99.1
12	R2	3	0.0	0.061	8.1	LOS A	0.0	0.2	0.02	0.02	0.02	87.4
Approach		118	0.9	0.061	0.3	NA	0.0	0.2	0.02	0.02	0.02	98.7
All Vehicles		366	1.2	0.119	1.5	NA	0.1	0.5	0.03	0.12	0.03	93.6

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 [Denman & Edderton 2020 AM Project]

Denman Road and Edderton Road
2020 AM Peak
With Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.090	8.3	LOS A	0.3	2.2	0.36	0.70	0.36	73.0
3	R2	82	5.4	0.090	9.0	LOS A	0.3	2.2	0.36	0.70	0.36	70.6
Approach		83	5.3	0.090	8.9	LOS A	0.3	2.2	0.36	0.70	0.36	70.7
NorthEast: Denman Rd NE												
4	L2	44	15.0	0.102	8.2	LOS A	0.0	0.0	0.00	0.17	0.00	78.0
5	T1	138	11.3	0.102	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	95.1
Approach		182	12.2	0.102	2.0	NA	0.0	0.0	0.00	0.17	0.00	90.3
SouthWest: Denman Rd SW												
11	T1	159	5.6	0.085	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	99.8
12	R2	1	0.0	0.085	8.0	LOS A	0.0	0.1	0.01	0.00	0.01	88.0
Approach		160	5.6	0.085	0.1	NA	0.0	0.1	0.01	0.00	0.01	99.7
All Vehicles		426	8.4	0.102	2.6	NA	0.3	2.2	0.07	0.21	0.07	88.6

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 [Denman & Edderton 2020 PM Project]

Denman Road and Edderton Road
2020 PM Peak
With Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.041	8.5	LOS A	0.1	0.9	0.38	0.69	0.38	72.7
3	R2	36	3.1	0.041	9.1	LOS A	0.1	0.9	0.38	0.69	0.38	71.2
Approach		37	3.0	0.041	9.1	LOS A	0.1	0.9	0.38	0.69	0.38	71.3
NorthEast: Denman Rd NE												
4	L2	41	5.4	0.129	8.0	LOS A	0.0	0.0	0.00	0.12	0.00	83.2
5	T1	202	2.7	0.129	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	96.5
Approach		243	3.2	0.129	1.4	NA	0.0	0.0	0.00	0.12	0.00	94.0
SouthWest: Denman Rd SW												
11	T1	160	5.6	0.087	0.0	LOS A	0.0	0.2	0.02	0.01	0.02	99.3
12	R2	3	0.0	0.087	8.2	LOS A	0.0	0.2	0.02	0.01	0.02	87.6
Approach		163	5.4	0.087	0.2	NA	0.0	0.2	0.02	0.01	0.02	99.0
All Vehicles		443	4.0	0.129	1.6	NA	0.1	0.9	0.04	0.13	0.04	93.3

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.
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 [Denman & Edderton 2026 AM Project]

Denman Road and Edderton Road
2026 AM Peak
With Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.087	8.3	LOS A	0.3	2.1	0.36	0.70	0.36	73.0
3	R2	80	5.6	0.087	8.9	LOS A	0.3	2.1	0.36	0.70	0.36	70.6
Approach		81	5.5	0.087	8.9	LOS A	0.3	2.1	0.36	0.70	0.36	70.6
NorthEast: Denman Rd NE												
4	L2	44	15.0	0.101	8.2	LOS A	0.0	0.0	0.00	0.17	0.00	77.9
5	T1	136	11.5	0.101	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	95.1
Approach		180	12.3	0.101	2.0	NA	0.0	0.0	0.00	0.17	0.00	90.2
SouthWest: Denman Rd SW												
11	T1	157	5.7	0.084	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	99.8
12	R2	1	0.0	0.084	8.0	LOS A	0.0	0.1	0.01	0.00	0.01	88.0
Approach		158	5.6	0.084	0.1	NA	0.0	0.1	0.01	0.00	0.01	99.7
All Vehicles		419	8.5	0.101	2.6	NA	0.3	2.1	0.07	0.21	0.07	88.6

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 [Denman & Edderton 2026 PM Project]

Denman Road and Edderton Road
2026 PM Peak
With Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.040	8.4	LOS A	0.1	0.9	0.37	0.69	0.37	72.8
3	R2	34	3.2	0.040	9.0	LOS A	0.1	0.9	0.37	0.69	0.37	71.2
Approach		36	3.1	0.040	9.0	LOS A	0.1	0.9	0.37	0.69	0.37	71.3
NorthEast: Denman Rd NE												
4	L2	40	5.6	0.126	8.0	LOS A	0.0	0.0	0.00	0.11	0.00	83.2
5	T1	198	2.8	0.126	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	96.5
Approach		238	3.3	0.126	1.4	NA	0.0	0.0	0.00	0.11	0.00	94.0
SouthWest: Denman Rd SW												
11	T1	157	5.7	0.086	0.0	LOS A	0.0	0.2	0.02	0.01	0.02	99.3
12	R2	3	0.0	0.086	8.2	LOS A	0.0	0.2	0.02	0.01	0.02	87.6
Approach		160	5.6	0.086	0.2	NA	0.0	0.2	0.02	0.01	0.02	99.0
All Vehicles		433	4.1	0.126	1.6	NA	0.1	0.9	0.04	0.12	0.04	93.3

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.
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 [Denman & Edderton 2033 AM Project]

Denman Road and Edderton Road
2033 AM Peak
With Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.087	8.0	LOS A	0.3	2.1	0.27	0.66	0.27	73.6
3	R2	90	4.9	0.087	8.4	LOS A	0.3	2.1	0.27	0.66	0.27	71.4
Approach		91	4.9	0.087	8.4	LOS A	0.3	2.1	0.27	0.66	0.27	71.4
NorthEast: Denman Rd NE												
4	L2	32	17.2	0.045	8.3	LOS A	0.0	0.0	0.00	0.27	0.00	75.5
5	T1	49	2.3	0.045	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	92.8
Approach		81	8.2	0.045	3.3	NA	0.0	0.0	0.00	0.27	0.00	85.1
SouthWest: Denman Rd SW												
11	T1	139	4.0	0.074	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	99.8
12	R2	1	0.0	0.074	7.7	LOS A	0.0	0.1	0.00	0.01	0.00	88.0
Approach		140	4.0	0.074	0.1	NA	0.0	0.1	0.00	0.01	0.00	99.7
All Vehicles		312	5.3	0.087	3.3	NA	0.3	2.1	0.08	0.26	0.08	85.9

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.
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 [Denman & Edderton 2033 PM Project]

Denman Road and Edderton Road
2033 PM Peak
With Maxwell Project
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
SouthEast: Edderton Rd												
1	L2	1	0.0	0.024	8.4	LOS A	0.1	0.5	0.34	0.66	0.34	74.0
3	R2	22	0.0	0.024	8.6	LOS A	0.1	0.5	0.34	0.66	0.34	73.5
Approach		23	0.0	0.024	8.6	LOS A	0.1	0.5	0.34	0.66	0.34	73.5
NorthEast: Denman Rd NE												
4	L2	44	5.0	0.124	8.0	LOS A	0.0	0.0	0.00	0.13	0.00	83.2
5	T1	192	0.6	0.124	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	96.2
Approach		237	1.4	0.124	1.5	NA	0.0	0.0	0.00	0.13	0.00	93.4
SouthWest: Denman Rd SW												
11	T1	114	1.0	0.061	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	99.1
12	R2	3	0.0	0.061	8.2	LOS A	0.0	0.2	0.02	0.02	0.02	87.4
Approach		118	0.9	0.061	0.3	NA	0.0	0.2	0.02	0.02	0.02	98.7
All Vehicles		378	1.2	0.124	1.6	NA	0.1	0.5	0.03	0.13	0.03	93.4

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.
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 [TMD & Denman Ex AM]

Denman Road and Thomas Mitchell Drive
Surveyed AM Peak 2018
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: Denman Rd S												
11	T1	91	7.3	0.049	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	172	5.8	0.368	16.0	LOS B	1.7	12.3	0.76	0.97	0.99	54.7
Approach		263	6.3	0.368	10.4	NA	1.7	12.3	0.50	0.63	0.65	61.5
East: Thomas Mitchell Dr												
1	L2	232	15.3	0.280	9.6	LOS A	1.1	9.1	0.49	0.76	0.49	58.2
3	R2	79	18.3	0.323	24.2	LOS B	1.3	10.4	0.82	0.97	1.00	46.5
Approach		311	16.1	0.323	13.3	LOS A	1.3	10.4	0.57	0.81	0.62	54.7
North: Denman Rd N												
4	L2	537	2.7	0.295	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.4
5	T1	348	8.6	0.188	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		884	5.0	0.295	4.3	NA	0.0	0.0	0.00	0.38	0.00	69.7
All Vehicles		1459	7.6	0.368	7.3	NA	1.7	12.3	0.21	0.52	0.25	64.4

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.
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 [TMD & Denman Ex PM]

Denman Road and Thomas Mitchell Drive
Surveyed PM Peak 2018
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: Denman Rd S												
11	T1	284	7.0	0.220	0.8	LOS A	1.2	8.8	0.22	0.17	0.22	75.7
12	R2	129	15.5	0.220	9.0	LOS A	1.2	8.8	0.39	0.31	0.39	62.4
Approach		413	9.7	0.220	3.3	NA	1.2	8.8	0.27	0.21	0.27	71.0
East: Thomas Mitchell Dr												
1	L2	58	9.6	0.056	8.0	LOS A	0.2	1.5	0.30	0.62	0.30	61.0
3	R2	368	4.8	0.907	40.1	LOS C	12.5	90.9	0.94	1.60	3.51	40.3
Approach		426	5.5	0.907	35.8	LOS C	12.5	90.9	0.86	1.47	3.08	42.2
North: Denman Rd N												
4	L2	100	7.8	0.057	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.8
5	T1	204	1.6	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		304	3.6	0.106	2.3	NA	0.0	0.0	0.00	0.21	0.00	73.4
All Vehicles		1143	6.5	0.907	15.1	NA	12.5	90.9	0.42	0.68	1.24	57.0

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.

MOVEMENT SUMMARY

Site: 101 [TMD & Denman 2020 AM Baseline]

Denman Road and Thomas Mitchell Drive
2020 AM Peak
Baseline Without Maxwell Project
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: Denman Rd S												
11	T1	108	8.2	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	188	5.9	0.432	17.6	LOS B	2.1	15.1	0.80	1.00	1.11	53.4
Approach		296	6.8	0.432	11.2	NA	2.1	15.1	0.51	0.63	0.71	60.8
East: Thomas Mitchell Dr												
1	L2	258	14.2	0.324	10.3	LOS A	1.5	11.7	0.52	0.81	0.59	57.9
3	R2	82	18.9	0.395	29.2	LOS C	1.6	13.0	0.86	1.01	1.12	43.7
Approach		340	15.4	0.395	14.8	LOS B	1.6	13.0	0.60	0.86	0.71	53.7
North: Denman Rd N												
4	L2	548	2.8	0.301	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.4
5	T1	384	8.4	0.208	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		932	5.1	0.301	4.1	NA	0.0	0.0	0.00	0.37	0.00	70.0
All Vehicles		1568	7.7	0.432	7.8	NA	2.1	15.1	0.23	0.53	0.29	63.9

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.
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 [TMD & Denman 2020 PM Baseline]

Denman Road and Thomas Mitchell Drive
2020 PM Peak
Baseline Without Maxwell Project
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: Denman Rd S												
11	T1	319	7.0	0.254	0.9	LOS A	1.4	10.6	0.23	0.18	0.23	75.5
12	R2	152	13.9	0.254	9.2	LOS A	1.4	10.6	0.43	0.33	0.43	62.6
Approach		471	9.2	0.254	3.6	NA	1.4	10.6	0.29	0.23	0.29	70.8
East: Thomas Mitchell Dr												
1	L2	71	9.4	0.070	8.1	LOS A	0.3	1.9	0.32	0.63	0.32	61.0
3	R2	378	5.0	1.069	113.7	LOS F	30.2	220.3	1.00	2.48	7.34	22.1
Approach		449	5.7	1.069	97.0	LOS F	30.2	220.3	0.89	2.19	6.23	24.6
North: Denman Rd N												
4	L2	103	8.6	0.059	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.5
5	T1	223	2.5	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		327	4.4	0.116	2.3	NA	0.0	0.0	0.00	0.20	0.00	73.5
All Vehicles		1247	6.7	1.069	36.8	NA	30.2	220.3	0.43	0.93	2.35	42.5

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.
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 [TMD & Denman 2026 AM Baseline]

Denman Road and Thomas Mitchell Drive
2026 AM Peak
Baseline Without Maxwell Project
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: Denman Rd S												
11	T1	107	8.3	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	183	6.1	0.417	17.3	LOS B	2.0	14.5	0.79	0.99	1.08	53.6
Approach		290	6.9	0.417	10.9	NA	2.0	14.5	0.50	0.63	0.69	61.0
East: Thomas Mitchell Dr												
1	L2	256	14.3	0.321	10.2	LOS A	1.5	11.5	0.52	0.81	0.58	57.9
3	R2	82	18.9	0.388	28.6	LOS C	1.6	12.7	0.86	1.00	1.10	44.0
Approach		338	15.5	0.388	14.7	LOS B	1.6	12.7	0.60	0.85	0.71	53.8
North: Denman Rd N												
4	L2	543	2.9	0.299	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.4
5	T1	382	8.4	0.207	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		926	5.2	0.299	4.1	NA	0.0	0.0	0.00	0.37	0.00	70.0
All Vehicles		1553	7.7	0.417	7.7	NA	2.0	14.5	0.22	0.52	0.28	64.0

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.

MOVEMENT SUMMARY

Site: 101 [TMD & Denman 2026 PM Baseline]

Denman Road and Thomas Mitchell Drive
2026 PM Peak
Baseline Without Maxwell Project
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: Denman Rd S												
11	T1	317	7.0	0.252	0.9	LOS A	1.4	10.5	0.23	0.18	0.23	75.5
12	R2	151	14.0	0.252	9.1	LOS A	1.4	10.5	0.42	0.33	0.42	62.6
Approach		468	9.3	0.252	3.5	NA	1.4	10.5	0.29	0.23	0.29	70.8
East: Thomas Mitchell Dr												
1	L2	68	9.8	0.067	8.1	LOS A	0.2	1.8	0.32	0.63	0.32	60.8
3	R2	376	5.0	1.052	102.3	LOS F	27.6	201.5	1.00	2.37	6.86	23.8
Approach		443	5.8	1.052	87.9	LOS F	27.6	201.5	0.90	2.11	5.86	26.2
North: Denman Rd N												
4	L2	102	8.7	0.058	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.5
5	T1	221	2.5	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		323	4.5	0.115	2.3	NA	0.0	0.0	0.00	0.20	0.00	73.5
All Vehicles		1234	6.8	1.052	33.5	NA	27.6	201.5	0.43	0.89	2.21	44.2

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.
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 [TMD & Denman 2033 AM Baseline]

Denman Road and Thomas Mitchell Drive
2033 AM Peak
Baseline Without Maxwell Project
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: Denman Rd S												
11	T1	103	6.5	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	190	5.3	0.337	13.7	LOS A	1.6	11.5	0.70	0.93	0.87	56.8
Approach		293	5.7	0.337	8.9	NA	1.6	11.5	0.45	0.60	0.56	63.2
East: Thomas Mitchell Dr												
1	L2	251	13.7	0.304	9.8	LOS A	1.3	10.4	0.50	0.78	0.53	58.4
3	R2	14	100.0	0.138	41.8	LOS C	0.4	5.6	0.87	0.95	0.87	34.8
Approach		266	18.4	0.304	11.6	LOS A	1.3	10.4	0.52	0.79	0.55	56.3
North: Denman Rd N												
4	L2	422	0.8	0.229	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	65.1
5	T1	361	7.4	0.194	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		783	3.8	0.229	3.8	NA	0.0	0.0	0.00	0.34	0.00	71.2
All Vehicles		1342	7.1	0.337	6.4	NA	1.6	11.5	0.20	0.49	0.23	65.9

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.
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 [TMD & Denman 2033 PM Baseline]

Denman Road and Thomas Mitchell Drive
2026 PM Peak
Baseline Without Maxwell Project
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: Denman Rd S												
11	T1	288	5.4	0.238	0.8	LOS A	1.3	9.7	0.22	0.18	0.22	75.5
12	R2	149	13.4	0.238	9.1	LOS A	1.3	9.7	0.43	0.35	0.43	62.5
Approach		437	8.1	0.238	3.7	NA	1.3	9.7	0.29	0.24	0.29	70.5
East: Thomas Mitchell Dr												
1	L2	60	7.4	0.059	8.2	LOS A	0.2	1.6	0.33	0.63	0.33	61.5
3	R2	352	4.7	0.934	48.2	LOS D	13.7	100.0	0.96	1.70	3.98	37.0
Approach		412	5.1	0.934	42.3	LOS C	13.7	100.0	0.87	1.55	3.45	39.3
North: Denman Rd N												
4	L2	86	9.1	0.049	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.4
5	T1	239	1.4	0.124	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		324	3.4	0.124	1.9	NA	0.0	0.0	0.00	0.17	0.00	74.4
All Vehicles		1173	5.8	0.934	16.8	NA	13.7	100.0	0.41	0.68	1.32	55.8

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 [TMD & Denman 2020 AM Project]

Denman Road and Thomas Mitchell Drive
2020 AM Peak
With Maxwell Project
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: Denman Rd S												
11	T1	108	8.2	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	200	5.6	0.459	17.9	LOS B	2.3	16.5	0.81	1.01	1.16	53.2
Approach		308	6.5	0.459	11.7	NA	2.3	16.5	0.52	0.66	0.75	60.3
East: Thomas Mitchell Dr												
1	L2	261	14.0	0.328	10.3	LOS A	1.5	11.9	0.52	0.81	0.59	57.9
3	R2	83	20.0	0.414	30.5	LOS C	1.7	13.8	0.87	1.01	1.14	42.8
Approach		344	15.5	0.414	15.2	LOS B	1.7	13.8	0.61	0.86	0.72	53.4
North: Denman Rd N												
4	L2	548	3.0	0.301	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.3
5	T1	384	8.4	0.208	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		932	5.2	0.301	4.1	NA	0.0	0.0	0.00	0.37	0.00	69.9
All Vehicles		1584	7.7	0.459	8.0	NA	2.3	16.5	0.23	0.53	0.30	63.7

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 [TMD & Denman 2020 PM Project]

Denman Road and Thomas Mitchell Drive
2020 PM Peak
Baseline With Maxwell Project
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: Denman Rd S												
11	T1	319	7.0	0.256	0.9	LOS A	1.4	10.7	0.23	0.18	0.23	75.5
12	R2	156	13.6	0.256	9.2	LOS A	1.4	10.7	0.43	0.34	0.43	62.6
Approach		474	9.1	0.256	3.6	NA	1.4	10.7	0.30	0.23	0.30	70.7
East: Thomas Mitchell Dr												
1	L2	83	8.0	0.082	8.1	LOS A	0.3	2.2	0.32	0.63	0.32	61.4
3	R2	380	5.3	1.086	125.9	LOS F	32.9	240.6	1.00	2.60	7.84	20.6
Approach		463	5.8	1.086	104.7	LOS F	32.9	240.6	0.88	2.24	6.49	23.4
North: Denman Rd N												
4	L2	104	9.6	0.060	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.2
5	T1	223	2.5	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		328	4.7	0.116	2.3	NA	0.0	0.0	0.00	0.20	0.00	73.3
All Vehicles		1266	6.8	1.086	40.3	NA	32.9	240.6	0.43	0.96	2.49	40.8

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 [TMD & Denman 2026 AM Project]

Denman Road and Thomas Mitchell Drive
2026 AM Peak
With Maxwell Project
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: Denman Rd S												
11	T1	107	8.3	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	193	5.7	0.439	17.6	LOS B	2.1	15.6	0.80	1.00	1.12	53.5
Approach		300	6.7	0.439	11.3	NA	2.1	15.6	0.51	0.65	0.72	60.6
East: Thomas Mitchell Dr												
1	L2	257	14.3	0.322	10.2	LOS A	1.5	11.6	0.52	0.81	0.58	57.9
3	R2	82	18.9	0.395	29.1	LOS C	1.6	12.9	0.86	1.01	1.11	43.7
Approach		339	15.4	0.395	14.8	LOS B	1.6	12.9	0.60	0.85	0.71	53.7
North: Denman Rd N												
4	L2	543	3.1	0.299	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.3
5	T1	382	8.4	0.207	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		926	5.3	0.299	4.1	NA	0.0	0.0	0.00	0.37	0.00	69.9
All Vehicles		1564	7.7	0.439	7.8	NA	2.1	15.6	0.23	0.53	0.29	63.9

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.
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 [TMD & Denman 2026 PM Project]

Denman Road and Thomas Mitchell Drive
2026 PM Peak
Baseline With Maxwell Project
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: Denman Rd S												
11	T1	317	7.0	0.252	0.9	LOS A	1.4	10.5	0.23	0.18	0.23	75.5
12	R2	151	14.0	0.252	9.1	LOS A	1.4	10.5	0.42	0.33	0.42	62.6
Approach		468	9.3	0.252	3.5	NA	1.4	10.5	0.29	0.23	0.29	70.8
East: Thomas Mitchell Dr												
1	L2	78	8.6	0.076	8.1	LOS A	0.3	2.1	0.32	0.63	0.32	61.2
3	R2	376	5.3	1.055	104.5	LOS F	28.1	205.5	1.00	2.39	6.95	23.4
Approach		453	5.9	1.055	88.0	LOS F	28.1	205.5	0.88	2.09	5.81	26.2
North: Denman Rd N												
4	L2	102	8.7	0.058	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.5
5	T1	221	2.5	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		323	4.5	0.115	2.3	NA	0.0	0.0	0.00	0.20	0.00	73.5
All Vehicles		1244	6.8	1.055	34.0	NA	28.1	205.5	0.43	0.90	2.23	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.
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: 101-1 [TMD & Denman Upgrade 2026 PM Stage 1 Project]

Thomas Mitchell Drive and Denman Rd
2026 PM Peak Stage 1
With Maxwell Project
Site Category: Potential Upgrade Layout
Stop (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: Denman S												
12	R2	151	14.0	0.112	9.1	LOS A	0.5	4.1	0.35	0.64	0.35	63.3
Approach		151	14.0	0.112	9.1	NA	0.5	4.1	0.35	0.64	0.35	63.3
East: Thomas Mitchell Drive												
1	L2	78	8.6	0.044	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	63.6
2	T1	376	5.3	0.476	12.7	LOS A	2.8	20.5	0.56	1.10	0.78	52.2
Approach		453	5.9	0.476	11.8	LOS A	2.8	20.5	0.47	1.01	0.65	54.6
North: Denman N												
4	L2	102	8.7	0.087	9.3	LOS A	0.4	2.7	0.28	0.62	0.28	65.6
5	T1	221	2.5	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		323	4.5	0.115	2.9	LOS A	0.4	2.7	0.09	0.19	0.09	85.7
All Vehicles		928	6.7	0.476	8.3	NA	2.8	20.5	0.32	0.67	0.40	66.0

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.

MOVEMENT SUMMARY

Site: 101-2 [TMD & Denman Upgrade 2026 PM Stage 2 Project]

Thomas Mitchell Dr and New England Hwy
2026 PM Peak Stage 2
With Maxwell Project
Site Category: Potential Upgrade Layout
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: Denman S												
11	T1	317	7.0	0.170	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		317	7.0	0.170	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
SouthEast: Merge Movement												
32a	R1	376	5.3	0.264	0.8	LOS A	0.9	6.9	0.33	0.23	0.33	95.3
Approach		376	5.3	0.264	0.8	LOS A	0.9	6.9	0.33	0.23	0.33	95.3
All Vehicles		692	6.1	0.264	0.4	NA	0.9	6.9	0.18	0.12	0.18	97.8

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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & Denman Upgrade 2026 PM Project]

New Route
Network Category: (None)

Route Travel Performance			
Performance Measure	**Vehicles**	**Per Unit Distance**	**Persons**
Travel Speed (Average)	71.5 km/h		71.5 km/h
Travel Distance (Average)	1170.0 m		1170.0 m
Travel Time (Average)	58.9 sec	50.4 sec/km	58.9 sec
Route Delay (Average)	13.5 sec	11.5 sec/km	13.5 sec
Route Stop Rate	1.32	1.13 per km	1.32
Desired Speed	60.0 km/h		
Route Level of Service (LOS)	LOS A[3]		
Travel Time Index	12.13		
Speed Efficiency	1.19		
Congestion Coefficient	0.84		

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Cycles	Dem. Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & Denman Upgrade 2026 PM Stage 1 Project											
East Approach											
2	T1	510.0	34.0	54.0	12.7	0.56	1.10	0.78	376	376	0.476
Site ID: 101-2 Site Name: TMD & Denman Upgrade 2026 PM Stage 2 Project											
SouthEast Approach											
32a	R1	660.0	24.9	95.3	0.8	0.33	0.23	0.33	376	376	0.264

MOVEMENT SUMMARY

Site: 101 [TMD & Denman 2033 AM Project]

Denman Road and Thomas Mitchell Drive
2033 AM Peak
With Maxwell Project
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: Denman Rd S												
11	T1	103	6.5	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	200	5.0	0.355	13.9	LOS A	1.7	12.3	0.70	0.94	0.89	56.7
Approach		303	5.5	0.355	9.2	NA	1.7	12.3	0.46	0.62	0.59	62.9
East: Thomas Mitchell Dr												
1	L2	253	13.6	0.307	9.9	LOS A	1.3	10.5	0.50	0.78	0.53	58.4
3	R2	14	100.0	0.141	42.6	LOS D	0.4	5.7	0.88	0.96	0.88	34.5
Approach		268	18.3	0.307	11.6	LOS A	1.3	10.5	0.52	0.79	0.55	56.3
North: Denman Rd N												
4	L2	422	1.1	0.229	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	65.0
5	T1	361	7.4	0.194	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		783	4.0	0.229	3.8	NA	0.0	0.0	0.00	0.34	0.00	71.1
All Vehicles		1354	7.1	0.355	6.5	NA	1.7	12.3	0.21	0.49	0.24	65.8

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 [TMD & Denman 2033 PM Project]

Denman Road and Thomas Mitchell Drive
2033 PM Peak
Baseline With Maxwell Project
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: Denman Rd S												
11	T1	288	5.4	0.238	0.8	LOS A	1.3	9.7	0.22	0.18	0.22	75.5
12	R2	149	13.4	0.238	9.1	LOS A	1.3	9.7	0.43	0.35	0.43	62.5
Approach		437	8.1	0.238	3.7	NA	1.3	9.7	0.29	0.24	0.29	70.5
East: Thomas Mitchell Dr												
1	L2	70	6.3	0.069	8.1	LOS A	0.2	1.8	0.33	0.63	0.33	61.8
3	R2	352	5.0	0.937	49.0	LOS D	14.0	101.9	0.97	1.72	4.03	36.7
Approach		422	5.3	0.937	42.3	LOS C	14.0	101.9	0.86	1.54	3.42	39.3
North: Denman Rd N												
4	L2	86	9.1	0.049	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.4
5	T1	239	1.4	0.124	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		324	3.4	0.124	1.9	NA	0.0	0.0	0.00	0.17	0.00	74.4
All Vehicles		1183	5.8	0.937	16.9	NA	14.0	101.9	0.41	0.68	1.33	55.6

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 [TMD & MIR Ex AM]

Thomas Mitchell Drive and Maxwell Infrastructure Road
Surveyed AM Peak 2018
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: Maxwell Infrastructure Rd												
1	L2	1	0.0	0.004	8.0	LOS A	0.0	0.1	0.54	0.64	0.54	55.1
3	R2	1	0.0	0.004	11.2	LOS A	0.0	0.1	0.54	0.64	0.54	55.0
Approach		2	0.0	0.004	9.6	LOS A	0.0	0.1	0.54	0.64	0.54	55.1
East: Thomas Mitchell Dr E												
4	L2	4	0.0	0.002	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
5	T1	518	1.5	0.268	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		522	1.5	0.268	0.1	NA	0.0	0.0	0.00	0.01	0.00	79.7
West: Thomas Mitchell Dr W												
11	T1	94	5.9	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	1	0.0	0.001	9.1	LOS A	0.0	0.0	0.50	0.61	0.50	56.5
Approach		96	5.8	0.050	0.1	NA	0.0	0.0	0.01	0.01	0.01	79.6
All Vehicles		620	2.2	0.268	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.6

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 [TMD & MIR Ex PM]

Thomas Mitchell Dr and Maxwell Infrastructure Road
Surveyed PM Peak 2018
NOTE surveyed zero vehicles in or out during peak hour
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: Maxwell Infrastructure Rd												
1	L2	1	0.0	0.003	6.0	LOS A	0.0	0.1	0.32	0.55	0.32	57.3
3	R2	1	0.0	0.003	8.2	LOS A	0.0	0.1	0.32	0.55	0.32	57.1
Approach		2	0.0	0.003	7.1	LOS A	0.0	0.1	0.32	0.55	0.32	57.2
East: Thomas Mitchell Dr E												
4	L2	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
5	T1	147	3.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		148	3.0	0.077	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.8
West: Thomas Mitchell Dr W												
11	T1	230	4.3	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	1	0.0	0.001	7.1	LOS A	0.0	0.0	0.25	0.57	0.25	57.9
Approach		231	4.3	0.121	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		381	3.8	0.121	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.6

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 [TMD & MIR 2020 AM Baseline]

Thomas Mitchell Drive and Maxwell Infrastructure Road
2020 AM Peak
Baseline without Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	1	0.0	0.004	8.3	LOS A	0.0	0.1	0.57	0.66	0.57	54.5
3	R2	1	0.0	0.004	12.3	LOS A	0.0	0.1	0.57	0.66	0.57	54.4
Approach		2	0.0	0.004	10.3	LOS A	0.0	0.1	0.57	0.66	0.57	54.5
East: Thomas Mitchell Dr E												
4	L2	36	9.4	0.020	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.3
5	T1	554	2.6	0.289	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		590	3.0	0.289	0.5	NA	0.0	0.0	0.00	0.04	0.00	78.5
West: Thomas Mitchell Dr W												
11	T1	106	6.3	0.056	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	4	0.0	0.006	9.6	LOS A	0.0	0.2	0.53	0.67	0.53	56.0
Approach		110	6.1	0.056	0.4	NA	0.0	0.2	0.02	0.03	0.02	78.6
All Vehicles		702	3.5	0.289	0.5	NA	0.0	0.2	0.01	0.04	0.01	78.4

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.
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 [TMD & MIR 2020 PM Baseline]

Thomas Mitchell Dr and Maxwell Infrastructure Road
2020 PM Peak
Baseline without Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	2	0.0	0.054	6.2	LOS A	0.2	1.5	0.48	0.69	0.48	55.7
3	R2	31	7.1	0.054	9.2	LOS A	0.2	1.5	0.48	0.69	0.48	53.8
Approach		33	6.7	0.054	9.0	LOS A	0.2	1.5	0.48	0.69	0.48	53.9
East: Thomas Mitchell Dr E												
4	L2	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
5	T1	160	3.5	0.084	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		161	3.4	0.084	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.8
West: Thomas Mitchell Dr W												
11	T1	256	4.3	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	1	0.0	0.001	7.2	LOS A	0.0	0.0	0.26	0.57	0.26	57.8
Approach		257	4.3	0.135	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		451	4.2	0.135	0.7	NA	0.2	1.5	0.04	0.05	0.04	77.1

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 [TMD & MIR 2026 AM Baseline]

Thomas Mitchell Drive and Maxwell Infrastructure Road
2026 AM Peak
Baseline without Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	1	0.0	0.004	8.3	LOS A	0.0	0.1	0.56	0.65	0.56	54.7
3	R2	1	0.0	0.004	12.0	LOS A	0.0	0.1	0.56	0.65	0.56	54.5
Approach		2	0.0	0.004	10.1	LOS A	0.0	0.1	0.56	0.65	0.56	54.6
East: Thomas Mitchell Dr E												
4	L2	9	12.5	0.005	7.2	LOS A	0.0	0.0	0.00	0.63	0.00	61.4
5	T1	549	2.6	0.286	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		558	2.8	0.286	0.1	NA	0.0	0.0	0.00	0.01	0.00	79.5
West: Thomas Mitchell Dr W												
11	T1	104	6.4	0.056	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	2	0.0	0.003	9.4	LOS A	0.0	0.1	0.52	0.64	0.52	56.2
Approach		107	6.3	0.056	0.2	NA	0.0	0.1	0.01	0.01	0.01	79.3
All Vehicles		667	3.3	0.286	0.2	NA	0.0	0.1	0.00	0.01	0.00	79.3

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.
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 [TMD & MIR 2026 PM Baseline]

Thomas Mitchell Dr and Maxwell Infrastructure Road
2026 PM Peak
Baseline without Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	2	0.0	0.017	6.1	LOS A	0.1	0.5	0.43	0.62	0.43	56.1
3	R2	9	12.5	0.017	9.3	LOS A	0.1	0.5	0.43	0.62	0.43	52.9
Approach		11	10.0	0.017	8.6	LOS A	0.1	0.5	0.43	0.62	0.43	53.5
East: Thomas Mitchell Dr E												
4	L2	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
5	T1	158	3.5	0.083	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		159	3.5	0.083	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.8
West: Thomas Mitchell Dr W												
11	T1	253	4.4	0.134	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	1	0.0	0.001	7.2	LOS A	0.0	0.0	0.26	0.57	0.26	57.8
Approach		254	4.4	0.134	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		424	4.2	0.134	0.3	NA	0.1	0.5	0.01	0.02	0.01	78.8

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 [TMD & MIR 2033 AM Baseline]

Thomas Mitchell Drive and Maxwell Infrastructure Road
2033 AM Peak
Baseline without Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	1	0.0	0.004	7.7	LOS A	0.0	0.1	0.51	0.62	0.51	55.8
3	R2	1	0.0	0.004	10.1	LOS A	0.0	0.1	0.51	0.62	0.51	55.6
Approach		2	0.0	0.004	8.9	LOS A	0.0	0.1	0.51	0.62	0.51	55.7
East: Thomas Mitchell Dr E												
4	L2	9	12.5	0.005	7.2	LOS A	0.0	0.0	0.00	0.63	0.00	61.4
5	T1	471	0.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		480	0.2	0.242	0.2	NA	0.0	0.0	0.00	0.01	0.00	79.5
West: Thomas Mitchell Dr W												
11	T1	63	5.3	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	2	0.0	0.003	8.8	LOS A	0.0	0.1	0.47	0.62	0.47	56.7
Approach		66	5.1	0.034	0.3	NA	0.0	0.1	0.02	0.02	0.02	78.9
All Vehicles		548	0.8	0.242	0.2	NA	0.0	0.1	0.00	0.02	0.00	79.3

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.
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 [TMD & MIR 2033 PM Baseline]

Thomas Mitchell Dr and Maxwell Infrastructure Road
2033 PM Peak
Baseline without Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	2	0.0	0.016	6.1	LOS A	0.1	0.5	0.41	0.61	0.41	56.5
3	R2	9	12.5	0.016	8.7	LOS A	0.1	0.5	0.41	0.61	0.41	53.2
Approach		11	10.0	0.016	8.2	LOS A	0.1	0.5	0.41	0.61	0.41	53.8
East: Thomas Mitchell Dr E												
4	L2	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
5	T1	156	2.1	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		157	2.1	0.081	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.8
West: Thomas Mitchell Dr W												
11	T1	212	1.6	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	1	0.0	0.001	7.1	LOS A	0.0	0.0	0.26	0.57	0.26	57.9
Approach		213	1.6	0.110	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		381	2.0	0.110	0.3	NA	0.1	0.5	0.01	0.02	0.01	78.7

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 [TMD & MIR 2020 AM Project]

Thomas Mitchell Drive and Maxwell Infrastructure Road
2020 AM Peak
With Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	4	25.0	0.099	9.9	LOS A	0.3	2.8	0.72	0.88	0.72	45.6
3	R2	26	21.7	0.099	17.4	LOS B	0.3	2.8	0.72	0.88	0.72	46.0
Approach		30	22.2	0.099	16.3	LOS B	0.3	2.8	0.72	0.88	0.72	46.0
East: Thomas Mitchell Dr E												
4	L2	149	5.2	0.083	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	63.6
5	T1	554	2.6	0.289	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		703	3.2	0.289	1.5	NA	0.0	0.0	0.00	0.13	0.00	75.8
West: Thomas Mitchell Dr W												
11	T1	109	9.2	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	17	6.7	0.028	11.2	LOS A	0.1	0.7	0.58	0.77	0.58	54.5
Approach		126	8.8	0.059	1.5	NA	0.1	0.7	0.08	0.10	0.08	75.3
All Vehicles		859	4.7	0.289	2.0	NA	0.3	2.8	0.04	0.15	0.04	74.0

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.

MOVEMENT SUMMARY

Site: 101 [TMD & MIR 2020 PM Project]

Thomas Mitchell Dr and Maxwell Infrastructure Road
2020 PM Peak
With Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	17	6.7	0.268	6.5	LOS A	1.2	8.5	0.53	0.78	0.55	53.5
3	R2	149	5.2	0.268	10.1	LOS A	1.2	8.5	0.53	0.78	0.55	53.6
Approach		166	5.4	0.268	9.8	LOS A	1.2	8.5	0.53	0.78	0.55	53.6
East: Thomas Mitchell Dr E												
4	L2	26	21.7	0.016	7.3	LOS A	0.0	0.0	0.00	0.63	0.00	58.7
5	T1	160	3.5	0.084	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		186	6.0	0.084	1.0	NA	0.0	0.0	0.00	0.09	0.00	76.1
West: Thomas Mitchell Dr W												
11	T1	256	4.3	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	4	25.0	0.004	8.0	LOS A	0.0	0.1	0.30	0.59	0.30	56.4
Approach		260	4.7	0.135	0.1	NA	0.0	0.1	0.01	0.01	0.01	79.4
All Vehicles		611	5.3	0.268	3.0	NA	1.2	8.5	0.15	0.24	0.15	69.4

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.
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 [TMD & MIR 2026 AM Project]

Thomas Mitchell Drive and Maxwell Infrastructure Road
2026 AM Peak
With Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	1	0.0	0.032	8.4	LOS A	0.1	0.9	0.69	0.83	0.69	50.9
3	R2	9	25.0	0.032	16.2	LOS B	0.1	0.9	0.69	0.83	0.69	46.0
Approach		10	22.2	0.032	15.4	LOS B	0.1	0.9	0.69	0.83	0.69	46.5
East: Thomas Mitchell Dr E												
4	L2	100	3.3	0.055	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.3
5	T1	549	2.6	0.286	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		649	2.7	0.286	1.1	NA	0.0	0.0	0.00	0.10	0.00	77.0
West: Thomas Mitchell Dr W												
11	T1	104	6.4	0.056	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	12	9.1	0.019	10.7	LOS A	0.1	0.5	0.56	0.74	0.56	54.7
Approach		117	6.7	0.056	1.1	NA	0.1	0.5	0.06	0.08	0.06	76.3
All Vehicles		776	3.6	0.286	1.3	NA	0.1	0.9	0.02	0.10	0.02	76.2

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.
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 [TMD & MIR 2026 PM Project]

Thomas Mitchell Dr and Maxwell Infrastructure Road
2026 PM Peak
With Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	12	9.1	0.167	6.4	LOS A	0.7	4.8	0.49	0.73	0.49	53.5
3	R2	96	3.5	0.167	9.4	LOS A	0.7	4.8	0.49	0.73	0.49	54.6
Approach		108	4.1	0.167	9.0	LOS A	0.7	4.8	0.49	0.73	0.49	54.5
East: Thomas Mitchell Dr E												
4	L2	4	50.0	0.003	7.9	LOS A	0.0	0.0	0.00	0.63	0.00	51.7
5	T1	158	3.5	0.083	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		162	4.8	0.083	0.2	NA	0.0	0.0	0.00	0.02	0.00	78.8
West: Thomas Mitchell Dr W												
11	T1	253	4.4	0.134	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	1	0.0	0.001	7.2	LOS A	0.0	0.0	0.26	0.57	0.26	57.8
Approach		254	4.4	0.134	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		524	4.4	0.167	1.9	NA	0.7	4.8	0.10	0.16	0.10	72.6

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 [TMD & MIR 2033 AM Project]

Thomas Mitchell Drive and Maxwell Infrastructure Road
2033 AM Peak
With Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	2	0.0	0.024	7.8	LOS A	0.1	0.7	0.59	0.74	0.59	53.3
3	R2	8	28.6	0.024	13.4	LOS A	0.1	0.7	0.59	0.74	0.59	47.3
Approach		10	22.2	0.024	12.1	LOS A	0.1	0.7	0.59	0.74	0.59	48.5
East: Thomas Mitchell Dr E												
4	L2	92	2.4	0.051	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
5	T1	471	0.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		563	0.4	0.242	1.2	NA	0.0	0.0	0.00	0.10	0.00	76.9
West: Thomas Mitchell Dr W												
11	T1	63	5.3	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	12	9.1	0.017	9.9	LOS A	0.1	0.5	0.52	0.71	0.52	55.5
Approach		76	5.9	0.034	1.6	NA	0.1	0.5	0.08	0.11	0.08	74.7
All Vehicles		649	1.4	0.242	1.4	NA	0.1	0.7	0.02	0.11	0.02	75.9

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.
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 [TMD & MIR 2033 PM Project]

Thomas Mitchell Dr and Maxwell Infrastructure Road
2033 PM Peak
With Maxwell Project
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: Maxwell Infrastructure Rd												
1	L2	12	9.1	0.144	6.4	LOS A	0.6	4.1	0.46	0.69	0.46	54.0
3	R2	88	2.5	0.144	8.7	LOS A	0.6	4.1	0.46	0.69	0.46	55.4
Approach		100	3.3	0.144	8.4	LOS A	0.6	4.1	0.46	0.69	0.46	55.2
East: Thomas Mitchell Dr E												
4	L2	4	50.0	0.003	7.9	LOS A	0.0	0.0	0.00	0.63	0.00	51.7
5	T1	156	2.1	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		160	3.5	0.081	0.2	NA	0.0	0.0	0.00	0.02	0.00	78.8
West: Thomas Mitchell Dr W												
11	T1	212	1.6	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	1	0.0	0.001	7.2	LOS A	0.0	0.0	0.26	0.57	0.26	57.8
Approach		213	1.6	0.110	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		473	2.6	0.144	1.9	NA	0.6	4.1	0.10	0.15	0.10	72.6

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: 101-1 [TMD & NEH Ex AM Stage 1]

Thomas Mitchell Drive and New England Highway
Existing AM Peak
Stage 1
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	500	3.3	0.361	8.6	LOS A	2.0	14.8	0.12	0.60	0.12	68.4
5	T1	160	28.5	0.097	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		660	9.4	0.361	6.5	LOS A	2.0	14.8	0.09	0.46	0.09	74.0
North: New England Hwy N												
12	R2	24	0.0	0.016	8.3	LOS A	0.1	0.5	0.28	0.60	0.28	68.6
Approach		24	0.0	0.016	8.3	NA	0.1	0.5	0.28	0.60	0.28	68.6
West: Thomas Mitchell Drive												
1	L2	3	0.0	0.002	7.6	LOS A	0.0	0.0	0.00	0.60	0.00	66.2
2	T1	88	8.9	0.117	11.4	LOS A	0.4	3.0	0.45	1.00	0.45	53.4
Approach		91	8.5	0.117	11.2	LOS A	0.4	3.0	0.44	0.99	0.44	54.0
All Vehicles		776	9.0	0.361	7.1	NA	2.0	14.8	0.14	0.52	0.14	71.7

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: 101-2 [TMD & NEH Ex AM Stage 2]

Thomas Mitchell Dr and New England Hwy
Existing AM Peak Stage 2 Merge

Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	396	7.9	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		396	7.9	0.213	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	88	8.9	0.067	0.9	LOS A	0.2	1.5	0.33	0.24	0.33	95.3
Approach		88	8.9	0.067	0.9	LOS A	0.2	1.5	0.33	0.24	0.33	95.3
All Vehicles		483	8.0	0.213	0.2	NA	0.2	1.5	0.06	0.04	0.06	99.3

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Minor Road Right - MERGE]

Network: N304B [TMD & NEH Ex AM]

New Route
Network Category: Existing Geometry

Route Travel Performance			
Performance Measure	**Vehicles**	**Per Unit Distance**	**Persons**
Travel Speed (Average)	73.0 km/h		73.0 km/h
Travel Distance (Average)	1170.0 m		1170.0 m
Travel Time (Average)	57.7 sec	49.3 sec/km	57.7 sec
Route Delay (Average)	12.2 sec	10.5 sec/km	12.2 sec
Route Stop Rate	1.24	1.06 per km	1.24
Desired Speed	60.0 km/h		
Route Level of Service (LOS)	LOS A[3]		
Travel Time Index	12.42		
Speed Efficiency	1.22		
Congestion Coefficient	0.82		

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Cycles	Dem. Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH Ex AM Stage 1											
West Approach											
2	T1	510.0	32.7	56.1	11.4	0.45	1.00	0.45	88	88	0.117
Site ID: 101-2 Site Name: TMD & NEH Ex AM Stage 2											
NorthWest Approach											
32a	R1	660.0	24.9	95.3	0.9	0.33	0.24	0.33	88	88	0.067

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH Ex PM Stage 1]

Thomas Mitchell Drive and New England Highway
Existing PM Peak Stage 1
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	91	15.9	0.069	8.8	LOS A	0.3	2.3	0.06	0.62	0.06	64.5
5	T1	374	7.1	0.201	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		466	8.8	0.201	1.7	LOS A	0.3	2.3	0.01	0.12	0.01	90.1
North: New England Hwy N												
12	R2	10	11.1	0.009	9.6	LOS A	0.0	0.3	0.44	0.62	0.44	63.9
Approach		10	11.1	0.009	9.6	NA	0.0	0.3	0.44	0.62	0.44	63.9
West: Thomas Mitchell Drive												
1	L2	8	14.3	0.005	7.8	LOS A	0.0	0.0	0.00	0.59	0.00	61.9
2	T1	238	9.8	0.320	12.2	LOS A	1.4	10.4	0.51	1.06	0.58	52.6
Approach		246	10.0	0.320	12.1	LOS A	1.4	10.4	0.50	1.05	0.57	53.0
All Vehicles		721	9.2	0.320	5.4	NA	1.4	10.4	0.18	0.44	0.21	76.1

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: 101-2 [TMD & NEH Ex PM Stage 2]

Thomas Mitchell Dr and New England Hwy
Existing PM Peak Stage 2 Merge

Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	387	11.5	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		387	11.5	0.213	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	238	9.8	0.183	1.0	LOS A	0.6	4.6	0.36	0.28	0.36	94.9
Approach		238	9.8	0.183	1.0	LOS A	0.6	4.6	0.36	0.28	0.36	94.9
All Vehicles		624	10.9	0.213	0.4	NA	0.6	4.6	0.14	0.11	0.14	98.4

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Minor Road Right - MERGE]

Network: N304B [TMD & NEH Ex PM]

New Route
Network Category: Existing Geometry

Route Travel Performance			
Performance Measure	**Vehicles**	**Per Unit Distance**	**Persons**
Travel Speed (Average)	72.1 km/h		72.1 km/h
Travel Distance (Average)	1170.0 m		1170.0 m
Travel Time (Average)	58.4 sec	49.9 sec/km	58.4 sec
Route Delay (Average)	13.2 sec	11.3 sec/km	13.2 sec
Route Stop Rate	1.34	1.15 per km	1.34
Desired Speed	60.0 km/h		
Route Level of Service (LOS)	LOS A[3]		
Travel Time Index	12.25		
Speed Efficiency	1.20		
Congestion Coefficient	0.83		

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Cycles	Dem. Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH Ex PM Stage 1											
West Approach											
2	T1	510.0	33.4	55.0	12.2	0.51	1.06	0.58	238	238	0.320
Site ID: 101-2 Site Name: TMD & NEH Ex PM Stage 2											
NorthWest Approach											
32a	R1	660.0	25.0	94.9	1.0	0.36	0.28	0.36	238	238	0.183

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2020 AM Stage 1 Baseline]

Thomas Mitchell Drive and New England Highway
2020 AM Peak
Stage 1 Baseline without Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	548	3.4	0.402	8.7	LOS A	2.4	17.2	0.17	0.60	0.17	68.0
5	T1	172	27.7	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		720	9.3	0.402	6.6	LOS A	2.4	17.2	0.13	0.45	0.13	73.6
North: New England Hwy N												
12	R2	39	5.7	0.027	8.6	LOS A	0.1	0.9	0.30	0.61	0.30	66.4
Approach		39	5.7	0.027	8.6	NA	0.1	0.9	0.30	0.61	0.30	66.4
West: Thomas Mitchell Drive												
1	L2	4	0.0	0.002	7.6	LOS A	0.0	0.0	0.00	0.60	0.00	66.2
2	T1	98	9.1	0.139	11.8	LOS A	0.5	3.6	0.48	1.02	0.48	53.0
Approach		102	8.7	0.139	11.6	LOS A	0.5	3.6	0.46	1.00	0.46	53.7
All Vehicles		861	9.0	0.402	7.3	NA	2.4	17.2	0.18	0.52	0.18	71.1

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: 101-2 [TMD & NEH 2020 AM Stage 2 Baseline]

Thomas Mitchell Dr and New England Hwy
2020 AM Peak Stage 2 Merge
Baseline without Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	406	7.9	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		406	7.9	0.219	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	98	9.1	0.076	0.9	LOS A	0.2	1.7	0.34	0.25	0.34	95.2
Approach		98	9.1	0.076	0.9	LOS A	0.2	1.7	0.34	0.25	0.34	95.2
All Vehicles		503	8.2	0.219	0.2	NA	0.2	1.7	0.07	0.05	0.07	99.2

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2020 AM Baseline]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	72.6	km/h			72.6	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	58.0	sec	49.6	sec/km	58.0	sec
Route Delay (Average)	12.7	sec	10.9	sec/km	12.7	sec
Route Stop Rate	1.27		1.09	per km	1.27	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A[3]					
Travel Time Index	12.33					
Speed Efficiency	1.21					
Congestion Coefficient	0.83					

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Cycles	Dem. Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2020 AM Stage 1 Baseline											
West Approach											
2	T1	510.0	33.1	55.5	11.8	0.48	1.02	0.48	98	98	0.139
Site ID: 101-2 Site Name: TMD & NEH 2020 AM Stage 2 Baseline											
NorthWest Approach											
32a	R1	660.0	25.0	95.2	0.9	0.34	0.25	0.34	98	98	0.076

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2020 PM Stage 1 Baseline]

Thomas Mitchell Drive and New England Highway
2020 PM Peak Stage 1
Baseline without Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	102	15.2	0.077	8.8	LOS A	0.3	2.5	0.07	0.61	0.07	64.7
5	T1	384	7.2	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		487	8.9	0.206	1.9	LOS A	0.3	2.5	0.01	0.13	0.01	89.6
North: New England Hwy N												
12	R2	12	18.2	0.011	9.9	LOS A	0.0	0.4	0.45	0.64	0.45	61.6
Approach		12	18.2	0.011	9.9	NA	0.0	0.4	0.45	0.64	0.45	61.6
West: Thomas Mitchell Drive												
1	L2	22	15.0	0.013	7.8	LOS A	0.0	0.0	0.00	0.59	0.00	61.7
2	T1	280	9.1	0.383	12.7	LOS A	1.8	13.9	0.55	1.09	0.69	52.0
Approach		302	9.6	0.383	12.4	LOS A	1.8	13.9	0.51	1.05	0.64	53.0
All Vehicles		801	9.3	0.383	5.9	NA	1.8	13.9	0.21	0.49	0.25	74.1

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: 101-2 [TMD & NEH 2020 PM Stage 2 Baseline]

Thomas Mitchell Dr and New England Hwy
2020 PM Peak Stage 2 Merge
Baseline without Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	400	11.7	0.221	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		400	11.7	0.221	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	280	9.1	0.217	1.1	LOS A	0.7	5.5	0.37	0.30	0.37	94.7
Approach		280	9.1	0.217	1.1	LOS A	0.7	5.5	0.37	0.30	0.37	94.7
All Vehicles		680	10.6	0.221	0.5	NA	0.7	5.5	0.15	0.12	0.15	98.2

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2020 PM Baseline]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	71.4	km/h			71.4	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	59.0	sec	50.4	sec/km	59.0	sec
Route Delay (Average)	13.8	sec	11.8	sec/km	13.8	sec
Route Stop Rate	1.39		1.19	per km	1.39	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A[3]					
Travel Time Index	12.12					
Speed Efficiency	1.19					
Congestion Coefficient	0.84					

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Cycles	Dem. Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2020 PM Stage 1 Baseline											
West Approach											
2	T1	510.0	33.9	54.2	12.7	0.55	1.09	0.69	280	280	0.383
Site ID: 101-2 Site Name: TMD & NEH 2020 PM Stage 2 Baseline											
NorthWest Approach											
32a	R1	660.0	25.1	94.7	1.1	0.37	0.30	0.37	280	280	0.217

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2026 AM Stage 1 Baseline]

Thomas Mitchell Drive and New England Highway
2026 AM Peak
Stage 1 Baseline without Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	528	3.4	0.383	8.6	LOS A	2.2	16.1	0.14	0.60	0.14	68.3
5	T1	171	27.9	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		699	9.4	0.383	6.5	LOS A	2.2	16.1	0.10	0.45	0.10	74.0
North: New England Hwy N												
12	R2	28	4.0	0.019	8.5	LOS A	0.1	0.6	0.30	0.60	0.30	67.0
Approach		28	4.0	0.019	8.5	NA	0.1	0.6	0.30	0.60	0.30	67.0
West: Thomas Mitchell Drive												
1	L2	3	0.0	0.002	7.6	LOS A	0.0	0.0	0.00	0.60	0.00	66.2
2	T1	98	9.1	0.135	11.6	LOS A	0.5	3.5	0.47	1.01	0.47	53.1
Approach		101	8.8	0.135	11.5	LOS A	0.5	3.5	0.46	1.00	0.46	53.7
All Vehicles		828	9.1	0.383	7.2	NA	2.2	16.1	0.15	0.52	0.15	71.4

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.
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: 101-2 [TMD & NEH 2026 AM Stage 2 Baseline]

Thomas Mitchell Dr and New England Hwy
2026 AM Peak Stage 2 Merge
Baseline without Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	402	8.0	0.217	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		402	8.0	0.217	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	98	9.1	0.076	0.9	LOS A	0.2	1.7	0.34	0.25	0.34	95.2
Approach		98	9.1	0.076	0.9	LOS A	0.2	1.7	0.34	0.25	0.34	95.2
All Vehicles		500	8.2	0.217	0.2	NA	0.2	1.7	0.07	0.05	0.07	99.2

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2026 AM Baseline]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	72.7	km/h			72.7	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	57.9	sec	49.5	sec/km	57.9	sec
Route Delay (Average)	12.5	sec	10.7	sec/km	12.5	sec
Route Stop Rate	1.26		1.08	per km	1.26	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A[3]					
Travel Time Index	12.36					
Speed Efficiency	1.21					
Congestion Coefficient	0.82					

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2026 AM Stage 1 Baseline											
West Approach											
2	T1	510.0	32.9	55.7	11.6	0.47	1.01	0.47	98	98	0.135
Site ID: 101-2 Site Name: TMD & NEH 2026 AM Stage 2 Baseline											
NorthWest Approach											
32a	R1	660.0	25.0	95.2	0.9	0.34	0.25	0.34	98	98	0.076

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2026 PM Stage 1 Baseline]

Thomas Mitchell Drive and New England Highway
2026 PM Peak Stage 1
Baseline without Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	101	15.4	0.077	8.8	LOS A	0.3	2.5	0.07	0.61	0.07	64.6
5	T1	381	7.3	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		482	9.0	0.205	1.9	LOS A	0.3	2.5	0.01	0.13	0.01	89.5
North: New England Hwy N												
12	R2	12	18.2	0.011	9.9	LOS A	0.0	0.4	0.45	0.63	0.45	61.6
Approach		12	18.2	0.011	9.9	NA	0.0	0.4	0.45	0.63	0.45	61.6
West: Thomas Mitchell Drive												
1	L2	13	25.0	0.008	7.9	LOS A	0.0	0.0	0.00	0.59	0.00	59.1
2	T1	264	9.2	0.360	12.6	LOS A	1.7	12.6	0.54	1.08	0.65	52.2
Approach		278	10.0	0.360	12.3	LOS A	1.7	12.6	0.51	1.06	0.62	52.7
All Vehicles		772	9.5	0.360	5.8	NA	1.7	12.6	0.20	0.47	0.24	74.7

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: 101-2 [TMD & NEH 2026 PM Stage 2 Baseline]

Thomas Mitchell Dr and New England Hwy
2026 PM Peak Stage 2 Merge
Baseline without Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	397	11.8	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		397	11.8	0.219	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	264	9.2	0.205	1.0	LOS A	0.7	5.2	0.37	0.30	0.37	94.8
Approach		264	9.2	0.205	1.0	LOS A	0.7	5.2	0.37	0.30	0.37	94.8
All Vehicles		661	10.8	0.219	0.4	NA	0.7	5.2	0.15	0.12	0.15	98.3

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2026 PM Baseline]

New Route
Network Category: (None)

Route Travel Performance								
Performance Measure	**Vehicles**			**Per Unit Distance**		**Persons**		
Travel Speed (Average)	71.7	km/h				71.7	km/h	
Travel Distance (Average)	1170.0	m				1170.0	m	
Travel Time (Average)	58.8	sec		50.2	sec/km	58.8	sec	
Route Delay (Average)	13.6	sec		11.6	sec/km	13.6	sec	
Route Stop Rate	1.38			1.18	per km	1.38		
Desired Speed	60.0	km/h						
Route Level of Service (LOS)	LOS A[3]							
Travel Time Index	12.16							
Speed Efficiency	1.19							
Congestion Coefficient	0.84							

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Cycles	Dem. Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2026 PM Stage 1 Baseline											
West Approach											
2	T1	510.0	33.7	54.5	12.6	0.54	1.08	0.65	264	264	0.360
Site ID: 101-2 Site Name: TMD & NEH 2026 PM Stage 2 Baseline											
NorthWest Approach											
32a	R1	660.0	25.1	94.8	1.0	0.37	0.30	0.37	264	264	0.205

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2033 AM Stage 1 Baseline]

Thomas Mitchell Drive and New England Highway
2033 AM Peak
Stage 1 Baseline without Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	443	0.8	0.318	8.5	LOS A	1.7	12.0	0.14	0.60	0.14	69.2
5	T1	186	28.7	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		629	9.0	0.318	6.0	LOS A	1.7	12.0	0.10	0.42	0.10	76.1
North: New England Hwy N												
12	R2	32	3.4	0.022	8.6	LOS A	0.1	0.7	0.31	0.61	0.31	67.2
Approach		32	3.4	0.022	8.6	NA	0.1	0.7	0.31	0.61	0.31	67.2
West: Thomas Mitchell Drive												
1	L2	3	0.0	0.002	7.6	LOS A	0.0	0.0	0.00	0.60	0.00	66.2
2	T1	54	10.2	0.074	11.4	LOS A	0.2	1.8	0.44	0.99	0.44	53.3
Approach		58	9.6	0.074	11.2	LOS A	0.2	1.8	0.42	0.97	0.42	54.3
All Vehicles		719	8.8	0.318	6.5	NA	1.7	12.0	0.13	0.48	0.13	74.0

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.

MOVEMENT SUMMARY

Site: 101-2 [TMD & NEH 2033 AM Stage 2 Baseline]

Thomas Mitchell Dr and New England Hwy
2033 AM Peak Stage 2 Merge
Baseline without Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	457	8.0	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
Approach		457	8.0	0.246	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.8
NorthWest: Merge Movement												
32a	R1	54	10.2	0.044	1.0	LOS A	0.1	1.0	0.36	0.26	0.36	94.9
Approach		54	10.2	0.044	1.0	LOS A	0.1	1.0	0.36	0.26	0.36	94.9
All Vehicles		511	8.3	0.246	0.1	NA	0.1	1.0	0.04	0.03	0.04	99.5

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2033 AM Baseline]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	73.0	km/h			73.0	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	57.7	sec	49.3	sec/km	57.7	sec
Route Delay (Average)	12.4	sec	10.6	sec/km	12.4	sec
Route Stop Rate	1.26		1.07	per km	1.26	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A[3]					
Travel Time Index	12.40					
Speed Efficiency	1.22					
Congestion Coefficient	0.82					

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2033 AM Stage 1 Baseline											
West Approach											
2	T1	510.0	32.7	56.1	11.4	0.44	0.99	0.44	54	54	0.074
Site ID: 101-2 Site Name: TMD & NEH 2033 AM Stage 2 Baseline											
NorthWest Approach											
32a	R1	660.0	25.0	94.9	1.0	0.36	0.26	0.36	54	54	0.044

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2033 PM Stage 1 Baseline]

Thomas Mitchell Drive and New England Highway
2033 PM Peak Stage 1
Baseline without Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	88	17.7	0.067	8.8	LOS A	0.3	2.2	0.07	0.61	0.07	63.9
5	T1	431	7.2	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		519	9.0	0.231	1.5	LOS A	0.3	2.2	0.01	0.10	0.01	91.1
North: New England Hwy N												
12	R2	13	16.7	0.013	10.1	LOS A	0.1	0.4	0.48	0.65	0.48	61.9
Approach		13	16.7	0.013	10.1	NA	0.1	0.4	0.48	0.65	0.48	61.9
West: Thomas Mitchell Drive												
1	L2	14	23.1	0.009	7.9	LOS A	0.0	0.0	0.00	0.59	0.00	59.6
2	T1	227	8.8	0.326	12.7	LOS A	1.4	10.6	0.54	1.08	0.64	52.0
Approach		241	9.7	0.326	12.5	LOS A	1.4	10.6	0.51	1.05	0.60	52.6
All Vehicles		773	9.3	0.326	5.1	NA	1.4	10.6	0.18	0.41	0.20	77.2

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.
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: 101-2 [TMD & NEH 2033 PM Stage 2 Baseline]

Thomas Mitchell Dr and New England Hwy
2033 PM Peak Stage 2 Merge
Baseline without Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	446	11.5	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
Approach		446	11.5	0.246	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.8
NorthWest: Merge Movement												
32a	R1	227	8.8	0.182	1.2	LOS A	0.6	4.5	0.39	0.33	0.39	94.5
Approach		227	8.8	0.182	1.2	LOS A	0.6	4.5	0.39	0.33	0.39	94.5
All Vehicles		672	10.6	0.246	0.4	NA	0.6	4.5	0.13	0.11	0.13	98.5

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2033 PM Baseline]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	71.4	km/h			71.4	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	59.0	sec	50.5	sec/km	59.0	sec
Route Delay (Average)	13.9	sec	11.9	sec/km	13.9	sec
Route Stop Rate	1.40		1.20	per km	1.40	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A[3]					
Travel Time Index	12.10					
Speed Efficiency	1.19					
Congestion Coefficient	0.84					

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Cycles	Dem. Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2033 PM Stage 1 Baseline											
West Approach											
2	T1	510.0	33.9	54.2	12.7	0.54	1.08	0.64	227	227	0.326
Site ID: 101-2 Site Name: TMD & NEH 2033 PM Stage 2 Baseline											
NorthWest Approach											
32a	R1	660.0	25.1	94.5	1.2	0.39	0.33	0.39	227	227	0.182

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2020 AM Stage 1 Project]

Thomas Mitchell Drive and New England Highway
2020 AM Peak
Stage 1 With Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	619	3.6	0.473	9.0	LOS A	3.0	21.7	0.29	0.60	0.29	67.3
5	T1	172	27.7	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		791	8.8	0.473	7.0	LOS A	3.0	21.7	0.22	0.47	0.22	72.4
North: New England Hwy N												
12	R2	81	4.1	0.055	8.6	LOS A	0.2	1.8	0.31	0.62	0.31	66.9
Approach		81	4.1	0.055	8.6	NA	0.2	1.8	0.31	0.62	0.31	66.9
West: Thomas Mitchell Drive												
1	L2	13	16.7	0.008	7.8	LOS A	0.0	0.0	0.00	0.59	0.00	61.3
2	T1	113	10.8	0.179	12.7	LOS A	0.6	4.7	0.53	1.05	0.53	52.0
Approach		127	11.4	0.179	12.2	LOS A	0.6	4.7	0.47	1.01	0.47	53.3
All Vehicles		999	8.8	0.473	7.8	NA	3.0	21.7	0.26	0.55	0.26	69.7

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: 101-2 [TMD & NEH 2020 AM Stage 2 Project]

Thomas Mitchell Dr and New England Hwy
2020 AM Peak Stage 2 Merge
With Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	406	7.9	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		406	7.9	0.219	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	113	10.8	0.089	0.9	LOS A	0.3	2.1	0.34	0.26	0.34	95.1
Approach		113	10.8	0.089	0.9	LOS A	0.3	2.1	0.34	0.26	0.34	95.1
All Vehicles		519	8.6	0.219	0.2	NA	0.3	2.1	0.08	0.06	0.08	99.1

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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2020 AM Project]

New Route
Network Category: (None)

Route Travel Performance			
Performance Measure	**Vehicles**	**Per Unit Distance**	**Persons**
Travel Speed (Average)	71.7 km/h		71.7 km/h
Travel Distance (Average)	1170.0 m		1170.0 m
Travel Time (Average)	58.7 sec	50.2 sec/km	58.7 sec
Route Delay (Average)	13.6 sec	11.6 sec/km	13.6 sec
Route Stop Rate	1.31	1.12 per km	1.31
Desired Speed	60.0 km/h		
Route Level of Service (LOS)	LOS A[3]		
Travel Time Index	12.17		
Speed Efficiency	1.20		
Congestion Coefficient	0.84		

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2020 AM Stage 1 Project											
West Approach											
2	T1	510.0	33.8	54.4	12.7	0.53	1.05	0.53	113	113	0.179
Site ID: 101-2 Site Name: TMD & NEH 2020 AM Stage 2 Project											
NorthWest Approach											
32a	R1	660.0	25.0	95.1	0.9	0.34	0.26	0.34	113	113	0.089

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2020 PM Stage 1 Project]

Thomas Mitchell Drive and New England Highway
2020 PM Peak Stage 1
With Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	118	16.0	0.091	8.8	LOS A	0.4	3.0	0.10	0.61	0.10	64.3
5	T1	384	7.2	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		502	9.3	0.206	2.1	LOS A	0.4	3.0	0.02	0.14	0.02	88.3
North: New England Hwy N												
12	R2	22	20.0	0.021	10.0	LOS A	0.1	0.7	0.46	0.65	0.46	61.0
Approach		22	20.0	0.021	10.0	NA	0.1	0.7	0.46	0.65	0.46	61.0
West: Thomas Mitchell Drive												
1	L2	67	8.3	0.038	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	63.7
2	T1	353	8.2	0.490	13.7	LOS A	2.8	21.3	0.60	1.12	0.87	51.1
Approach		420	8.2	0.490	12.7	LOS A	2.8	21.3	0.50	1.04	0.73	53.5
All Vehicles		944	9.1	0.490	7.0	NA	2.8	21.3	0.25	0.55	0.35	70.8

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: 101-2 [TMD & NEH 2020 PM Stage 2 Project]

Thomas Mitchell Dr and New England Hwy
2020 PM Peak Stage 2 Merge
With Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	400	11.7	0.221	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		400	11.7	0.221	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	353	8.2	0.272	1.1	LOS A	1.0	7.2	0.39	0.32	0.39	94.5
Approach		353	8.2	0.272	1.1	LOS A	1.0	7.2	0.39	0.32	0.39	94.5
All Vehicles		753	10.0	0.272	0.5	NA	1.0	7.2	0.18	0.15	0.18	97.8

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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2020 PM Project]

New Route
Network Category: (None)

Route Travel Performance			
Performance Measure	**Vehicles**	**Per Unit Distance**	**Persons**
Travel Speed (Average)	70.3 km/h		70.3 km/h
Travel Distance (Average)	1170.0 m		1170.0 m
Travel Time (Average)	59.9 sec	51.2 sec/km	59.9 sec
Route Delay (Average)	14.8 sec	12.7 sec/km	14.8 sec
Route Stop Rate	1.44	1.23 per km	1.44
Desired Speed	60.0 km/h		
Route Level of Service (LOS)	LOS A[3]		
Travel Time Index	11.91		
Speed Efficiency	1.17		
Congestion Coefficient	0.85		

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2020 PM Stage 1 Project											
West Approach											
2	T1	510.0	34.7	52.8	13.7	0.60	1.12	0.87	353	353	0.490
Site ID: 101-2 Site Name: TMD & NEH 2020 PM Stage 2 Project											
NorthWest Approach											
32a	R1	660.0	25.1	94.5	1.1	0.39	0.32	0.39	353	353	0.272

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2026 AM Stage 1 Project]

Thomas Mitchell Drive and New England Highway
2026 AM Peak
Stage 1 With Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	574	3.3	0.435	8.9	LOS A	2.6	19.0	0.25	0.60	0.25	67.6
5	T1	171	27.9	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		746	8.9	0.435	6.8	LOS A	2.6	19.0	0.20	0.46	0.20	73.0
North: New England Hwy N												
12	R2	72	3.1	0.049	8.5	LOS A	0.2	1.6	0.30	0.61	0.30	67.3
Approach		72	3.1	0.049	8.5	NA	0.2	1.6	0.30	0.61	0.30	67.3
West: Thomas Mitchell Drive												
1	L2	8	14.3	0.005	7.8	LOS A	0.0	0.0	0.00	0.59	0.00	61.9
2	T1	102	9.8	0.154	12.2	LOS A	0.5	4.0	0.51	1.04	0.51	52.5
Approach		110	10.1	0.154	11.9	LOS A	0.5	4.0	0.47	1.01	0.47	53.4
All Vehicles		928	8.6	0.435	7.6	NA	2.6	19.0	0.24	0.54	0.24	70.4

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.
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: 101-2 [TMD & NEH 2026 AM Stage 2 Project]

Thomas Mitchell Dr and New England Hwy
2026 AM Peak Stage 2 Merge
With Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	402	8.0	0.217	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		402	8.0	0.217	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	102	9.8	0.079	0.9	LOS A	0.2	1.8	0.34	0.25	0.34	95.2
Approach		102	9.8	0.079	0.9	LOS A	0.2	1.8	0.34	0.25	0.34	95.2
All Vehicles		504	8.4	0.217	0.2	NA	0.2	1.8	0.07	0.05	0.07	99.2

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2026 AM Project]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	72.1	km/h			72.1	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	58.4	sec	49.9	sec/km	58.4	sec
Route Delay (Average)	13.2	sec	11.2	sec/km	13.2	sec
Route Stop Rate	1.29		1.10	per km	1.29	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A[3]					
Travel Time Index	12.25					
Speed Efficiency	1.20					
Congestion Coefficient	0.83					

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2026 AM Stage 1 Project											
West Approach											
2	T1	510.0	33.4	54.9	12.2	0.51	1.04	0.51	102	102	0.154
Site ID: 101-2 Site Name: TMD & NEH 2026 AM Stage 2 Project											
NorthWest Approach											
32a	R1	660.0	25.0	95.2	0.9	0.34	0.25	0.34	102	102	0.079

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2026 PM Stage 1 Project]

Thomas Mitchell Drive and New England Highway
2026 PM Peak Stage 1
With Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	103	16.1	0.079	8.8	LOS A	0.3	2.6	0.07	0.61	0.07	64.3
5	T1	381	7.3	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		484	9.2	0.205	1.9	LOS A	0.3	2.6	0.02	0.13	0.02	89.3
North: New England Hwy N												
12	R2	14	23.1	0.014	10.1	LOS A	0.1	0.5	0.46	0.64	0.46	60.1
Approach		14	23.1	0.014	10.1	NA	0.1	0.5	0.46	0.64	0.46	60.1
West: Thomas Mitchell Drive												
1	L2	56	8.0	0.032	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	63.8
2	T1	309	8.3	0.420	12.9	LOS A	2.2	16.2	0.56	1.10	0.74	51.9
Approach		364	8.2	0.420	12.1	LOS A	2.2	16.2	0.47	1.02	0.62	54.1
All Vehicles		863	9.0	0.420	6.4	NA	2.2	16.2	0.22	0.52	0.28	72.5

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.
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: 101-2 [TMD & NEH 2026 PM Stage 2 Project]

Thomas Mitchell Dr and New England Hwy
2026 PM Peak Stage 2 Merge
With Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	397	11.8	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		397	11.8	0.219	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	309	8.3	0.238	1.1	LOS A	0.8	6.1	0.38	0.30	0.38	94.7
Approach		309	8.3	0.238	1.1	LOS A	0.8	6.1	0.38	0.30	0.38	94.7
All Vehicles		706	10.2	0.238	0.5	NA	0.8	6.1	0.17	0.13	0.17	98.0

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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2026 PM Project]

New Route
Network Category: (None)

Route Travel Performance			
Performance Measure	**Vehicles**	**Per Unit Distance**	**Persons**
Travel Speed (Average)	71.2 km/h		71.2 km/h
Travel Distance (Average)	1170.0 m		1170.0 m
Travel Time (Average)	59.2 sec	50.6 sec/km	59.2 sec
Route Delay (Average)	14.0 sec	12.0 sec/km	14.0 sec
Route Stop Rate	1.40	1.20 per km	1.40
Desired Speed	60.0 km/h		
Route Level of Service (LOS)	LOS A[3]		
Travel Time Index	12.07		
Speed Efficiency	1.19		
Congestion Coefficient	0.84		

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2026 PM Stage 1 Project											
West Approach											
2	T1	510.0	34.1	53.9	12.9	0.56	1.10	0.74	309	309	0.420
Site ID: 101-2 Site Name: TMD & NEH 2026 PM Stage 2 Project											
NorthWest Approach											
32a	R1	660.0	25.1	94.7	1.1	0.38	0.30	0.38	309	309	0.238

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2033 AM Stage 1 Project]

Thomas Mitchell Drive and New England Highway
2033 AM Peak
Stage 1 With Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	487	0.9	0.363	8.8	LOS A	2.0	14.2	0.23	0.60	0.23	68.6
5	T1	186	28.7	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		672	8.6	0.363	6.3	LOS A	2.0	14.2	0.17	0.43	0.17	75.1
North: New England Hwy N												
12	R2	72	1.5	0.049	8.5	LOS A	0.2	1.5	0.32	0.62	0.32	67.8
Approach		72	1.5	0.049	8.5	NA	0.2	1.5	0.32	0.62	0.32	67.8
West: Thomas Mitchell Drive												
1	L2	7	16.7	0.004	7.8	LOS A	0.0	0.0	0.00	0.59	0.00	61.3
2	T1	59	11.3	0.086	11.9	LOS A	0.3	2.2	0.47	1.01	0.47	52.8
Approach		66	11.9	0.086	11.5	LOS A	0.3	2.2	0.43	0.97	0.43	53.9
All Vehicles		810	8.2	0.363	7.0	NA	2.0	14.2	0.20	0.49	0.20	72.7

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: 101-2 [TMD & NEH 2033 AM Stage 2 Project]

Thomas Mitchell Dr and New England Hwy
2033 AM Peak Stage 2 Merge
With Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	457	8.0	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
Approach		457	8.0	0.246	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.8
NorthWest: Merge Movement												
32a	R1	59	11.3	0.048	1.1	LOS A	0.1	1.1	0.36	0.27	0.36	94.9
Approach		59	11.3	0.048	1.1	LOS A	0.1	1.1	0.36	0.27	0.36	94.9
All Vehicles		516	8.4	0.246	0.1	NA	0.1	1.1	0.04	0.03	0.04	99.4

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2033 AM Project]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	72.4	km/h			72.4	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	58.1	sec	49.7	sec/km	58.1	sec
Route Delay (Average)	13.0	sec	11.1	sec/km	13.0	sec
Route Stop Rate	1.28		1.09	per km	1.28	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A[3]					
Travel Time Index	12.30					
Speed Efficiency	1.21					
Congestion Coefficient	0.83					

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2033 AM Stage 1 Project											
West Approach											
2	T1	510.0	33.1	55.5	11.9	0.47	1.01	0.47	59	59	0.086
Site ID: 101-2 Site Name: TMD & NEH 2033 AM Stage 2 Project											
NorthWest Approach											
32a	R1	660.0	25.0	94.9	1.1	0.36	0.27	0.36	59	59	0.048

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2033 PM Stage 1 Project]

Thomas Mitchell Drive and New England Highway
2033 PM Peak Stage 1
With Maxwell Project
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	90	18.5	0.069	8.9	LOS A	0.3	2.3	0.08	0.61	0.08	63.6
5	T1	431	7.2	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		521	9.2	0.231	1.6	LOS A	0.3	2.3	0.01	0.11	0.01	90.8
North: New England Hwy N												
12	R2	16	21.4	0.016	10.4	LOS A	0.1	0.5	0.49	0.66	0.49	60.5
Approach		16	21.4	0.016	10.4	NA	0.1	0.5	0.49	0.66	0.49	60.5
West: Thomas Mitchell Drive												
1	L2	53	6.3	0.030	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	64.3
2	T1	267	7.9	0.383	13.1	LOS A	1.8	13.6	0.57	1.09	0.72	51.7
Approach		320	7.6	0.383	12.2	LOS A	1.8	13.6	0.47	1.01	0.60	54.2
All Vehicles		857	8.8	0.383	5.7	NA	1.8	13.6	0.19	0.45	0.24	75.0

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.

MOVEMENT SUMMARY

Site: 101-2 [TMD & NEH 2033 PM Stage 2 Project]

Thomas Mitchell Dr and New England Hwy
2033 PM Peak Stage 2 Merge
With Maxwell Project
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	446	11.5	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
Approach		446	11.5	0.246	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.8
NorthWest: Merge Movement												
32a	R1	267	7.9	0.213	1.2	LOS A	0.7	5.3	0.39	0.34	0.39	94.4
Approach		267	7.9	0.213	1.2	LOS A	0.7	5.3	0.39	0.34	0.39	94.4
All Vehicles		712	10.1	0.246	0.5	NA	0.7	5.3	0.15	0.13	0.15	98.3

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2033 PM Project]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	70.9	km/h			70.9	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	59.4	sec	50.8	sec/km	59.4	sec
Route Delay (Average)	14.3	sec	12.2	sec/km	14.3	sec
Route Stop Rate	1.43		1.22	per km	1.43	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A[3]					
Travel Time Index	12.02					
Speed Efficiency	1.18					
Congestion Coefficient	0.85					

3 Calculated Average Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Cycles	Dem. Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2033 PM Stage 1 Project											
West Approach											
2	T1	510.0	34.3	53.6	13.1	0.57	1.09	0.72	267	267	0.383
Site ID: 101-2 Site Name: TMD & NEH 2033 PM Stage 2 Project											
NorthWest Approach											
32a	R1	660.0	25.2	94.4	1.2	0.39	0.34	0.39	267	267	0.213

Appendix C

Road Crash Data Summaries

Table C1: Thomas Mitchell Drive[A] Crash Summary (1 October 2012 to 30 September 2017)

		Multiple Vehicles					Single Vehicle			
	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Total
Total Crashes	-	-	1	3	1	-	-	1	1	7
Crash Location										
2-way undivided road	-	-	1	1	-	-	-	1	1	4
Intersection	-	-	-	2	1	-	-	-	-	3
Road Surface Condition										
Dry Road	-	-	1	2	1	-	-	1	1	6
Wet Road	-	-	-	1	-	-	-	-	-	1
Weather										
Fine	-	-	1	2	1	-	-	1	1	6
Raining	-	-	-	1	-	-	-	-	-	1
Natural Lighting										
Dawn	-	-	1	-	-	-	-	-	-	1
Daylight	-	-	-	2	1	-	-	1	-	4
Darkness	-	-	-	1	-	-	-	-	1	2
Vehicles Involved										
Car, 4WD, or van	-	-	-	2	1	-	-	-	-	3
Truck or Bus	-	-	2	3	1	-	-	1	-	7
Articulated Vehicle	-	-	-	1	-	-	-	-	1	2
Severity of Crash										
Fatal	-	-	1	-	-	-	-	-	-	1
Moderate Injury	-	-	-	2	-	-	-	-	-	2
Non-injury	-	-	-	1	1	-	-	1	1	4
Factors[B]										
Speed	-	-	-	2	-	-	-	-	1	3
Fatigue	-	-	1	-	-	-	-	-	-	1
None	-	-	-	1	1	-	-	1	-	3

[A] *between Denman Road and New England Highway, excluding intersections with Denman Road and New England Highway.*

[B] *Factors considered to have contributed to the crash. More than one factor can be nominated for a single crash.*

Table C2: Denman Road[A] Crash Summary (1 October 2012 to 30 September 2017)

		Multiple Vehicles					Single Vehicle			
	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Total
Total Crashes	1	2	1	5	2	2	5	9	9	36
Crash Location										
2-way undivided road	-	-	1	2	1	1	5	6	7	23
Intersection	1	2	-	3	1	1	-	3	2	13
Road Surface Condition										
Dry Road	1	1	1	4	2	2	4	8	5	28
Wet Road	-	1	-	1	-	-	1	1	4	8
Weather										
Fine	1	1	1	4	2	2	3	7	5	26
Fog or mist	-	1	-	-	-	-	2	1	1	5
Raining	-	-	-	1	-	-	-	1	3	5
Natural Lighting										
Dawn	-	2	-	-	-	-	1	2	1	6
Daylight	-	-	1	5	1	2	-	3	3	15
Dusk	-	-	-	-	-	-	-	-	1	1
Darkness	1	-	-	-	1	-	4	4	4	14
Vehicles Involved[B]										
Motorcycle	-	-	-	1	3	-	-	1	-	5
Car, 4WD, or van	1	2	1	5	1	3	5	8	4	30
Truck or Bus	-	2	1	4	1	1	-	1	4	14
Articulated Vehicle	-	-	-	-	-	1	-	-	1	2
Severity of Crash										
Serious Injury	-	2	-	1	1	-	-	1	2	7
Moderate Injury	1	-	1	-	1	-	1	5	3	12
Other/Non-injury	-	-	-	4	-	2	4	3	4	17
Factors[C]										
Speed	-	-	-	1	-	1	1	-	9	12
Fatigue	-	-	-	-	-	-	-	1	-	1
None	1	2	1	4	2	1	4	8	-	23

[A] *between Golden Highway and New England Highway, excludes intersection with new England Highway.*
[B] *Some single vehicle crashes involve a collision with a stationary/parked vehicle. These have been included in the vehicles involved.*
[C] *Factors considered to have contributed to the crash. More than one factor can be nominated for a single crash.*

Table C3: New England Highway[A] Crash Summary (1 October 2012 to 30 September 2017)

		Multiple Vehicles					Single Vehicle			
	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Total
Total Crashes	-	6	6	11	5	-	9	9	8	54
Crash Location										
2-way undivided road	-	-	2	2	3	-	6	3	3	19
Divided road	-	-	-	2	-	-	2	4	5	13
Intersection	-	6	4	7	2	-	1	2	-	22
Road Surface Condition										
Dry Road	-	5	5	9	4	-	7	7	5	42
Wet Road	-	1	1	2	1	-	2	2	3	12
Weather										
Fine	-	4	5	10	4	-	6	6	5	40
Fog or mist	-	-	-	-	-	-	2	-	-	2
Overcast	-	1	-	-	-	-	-	1	-	2
Raining	-	1	1	1	1	-	1	2	3	10
Natural Lighting										
Dawn	-	-	1	-	-	-	2	-	-	3
Daylight	-	3	3	9	4	-	1	5	4	29
Dusk	-	3	1	2	-	-	-	-	1	7
Darkness	-	-	1	-	1	-	6	4	3	15
Vehicles Involved[B]										
Bicycle or motorcycle	-	-	-	1	1	-	-	2	-	4
Car, 4WD, van or other	-	9	9	20	7	-	8	8	6	67
Truck or Bus	-	2	2	4	1	-	1	1	2	13
Articulated Vehicle	-	-	1	1	-	-	-	-	-	2
Severity of Crash										
Injury	-	1	4	4	3	-	2	5	-	19
Other/Non-injury	-	5	2	7	2	-	7	4	8	35
Factors[C]										
Speed	-	1	-	-	-	-	1	3	6	11
Fatigue	-	1	2	-	-	-	-	3	2	8
None	-	5	4	11	5	-	8	3	1	37

[A] *between New England Highway and 10km south of Thomas Mitchell Drive 1 October 2012 to 30 September 2017.*
[B] *Some single vehicle crashes involve a collision with a stationary/parked vehicle. These have been included in the vehicles involved.*
[C] *Factors considered to have contributed to the crash. More than one factor can be nominated for a single crash.*

Table C4: Edderton Road[A] Crash Summary (1 October 2012 to 30 September 2017)

		Multiple Vehicles					Single Vehicle			
	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Total
Total Crashes	-	-	-	-	-	1	-	2	3	6
Crash Location										
2-way undivided road	-	-	-	-	-	1	-	2	3	6
Road Surface Condition										
Dry Road	-	-	-	-	-	1	-	2	1	4
Wet Road	-	-	-	-	-	-	-	-	2	2
Weather										
Fine	-	-	-	-	-	1	-	2	1	4
Fog or mist	-	-	-	-	-	-	-	-	1	1
Raining	-	-	-	-	-	-	-	-	1	1
Natural Lighting										
Daylight	-	-	-	-	-	1	-	1	1	3
Darkness	-	-	-	-	-	-	-	1	2	3
Vehicles Involved[B]										
Car, 4WD or van	-	-	-	-	-	1	-	3	1	5
Truck or Bus	-	-	-	-	-	1	-	-	1	2
Articulated Vehicle	-	-	-	-	-	-	-	-	-	-
Severity of Crash										
Injury	-	-	-	-	-	1	-	-	2	3
Other/Non-injury	-	-	-	-	-	-	-	2	1	3
Factors[C]										
Speed	-	-	-	-	-	1	-	-	2	3
Fatigue	-	-	-	-	-	-	-	1	-	1
None	-	-	-	-	-	-	-	1	1	2

[A] *between Denman Road and Golden Highway 1 October 2012 to 30 September 2017.*
[B] *Some single vehicle crashes involve a collision with a stationary/parked vehicle. These have been included in the vehicles involved.*
[B] *Factors considered to have contributed to the crash. More than one factor can be nominated for a single crash.*

Appendix D

Project Production and Workforce Schedule

Project Year	Total ROM (Mt)	Anticipated Approximate Total Workforce
1	0.5	160
2	1.6	297
3	2.0	429
4	8.0	382
5	7.9	382
6	7.2	**429**
7	7.0	338
8	7.4	292
9	7.4	292
10	5.9	248
11	7.8	229
12	7.9	342
13	6.6	**382**
14	6.1	338
15	6.0	252
16	6.7	204
17	5.2	204
18	6.0	248
19	6.4	292
20	6.0	204
21	5.7	185
22	5.0	204
23	4.3	248
24	5.5	248
25	4.8	116
26	3.0	116

Appendix E

Road Safety Audit

TOC

Maxwell Project

Road Safety Audit of Existing Conditions

Prepared for:

Malabar Coal Limited

13 December 2018

The Transport Planning Partnership

Maxwell Project

Road Safety Audit of Existing Conditions

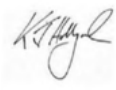
Client: Malabar Coal Limited

Version: 02

Date: 13 December 2018

TTPP Reference: 18136

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
01	30/10/2018	Ken Hollyoak	Wayne Johnson	Ken Hollyoak	
02	13/12/2018	Ken Hollyoak	Wayne Johnson	Ken Hollyoak	

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1 Road Safety Audit Summary

Audited project:	Maxwell Project – Thomas Mitchell Drive. Road Safety Audit of Existing Conditions
Client:	Malabar Coal Limited c/- Resource Strategies Pty Ltd
Project manager:	William Dean
Email address:	info@malabarcoal.com.au
Telephone:	+61 2 6542 0283
Audit Team:	Ken Hollyoak (Level 3 Lead Road Safety Auditor) Wayne Johnson (Level 3 Road Safety Auditor)
Audit type:	Existing Conditions
Commencement meeting:	19 October 2018
Audit date:	25 October 2018
Completion meeting:	Not required

The objective of this audit is to identify and examine road safety concerns on Thomas Mitchell Drive from New England Highway to Denman Road.

2 Introduction

2.1 Background

Thomas Mitchell Drive is a local road under the control of Muswellbrook Shire Council. It provides a link between Denman Road and New England Highway to the south of Muswellbrook township, thus providing a bypass of Muswellbrook for some traffic and is signposted as an alternative route to Singleton from Denman Road. It provides access to the Mt Arthur Mine, the Muswellbrook Industrial Area, and Maxwell Infrastructure (formerly the Drayton mine).

Maxwell Ventures (Management) Pty Ltd, a wholly owned subsidiary of Malabar Coal Limited (Malabar), is seeking consent to develop an underground coal mining operation, referred to as the Maxwell Project (the Project), which would involve the use of the existing Maxwell Infrastructure. The Project would include an underground mining operation that would produce high quality coals over a period of approximately 26 years. Vehicular access to the Project would be via Thomas Mitchell Drive, which is the same primary access road used for the former Drayton Mine. The Project is forecast to generate approximately 500 vehicle trips per day at its peak operational phase in 2026, and 730 vehicle trips per day during its peak construction phase in 2020. The Drayton Mine generated approximately 800 vehicle trips per day in November 2013.

The Secretary's Environmental Assessment Requirements (SEARs) for the Project include a requirement for a road safety audit. This Road Safety Audit has been undertaken in response to the SEARs. The audit encompasses Thomas Mitchell Drive between New England Highway and Denman Road, inclusive of the intersections at each end of the route.

2.2 Audit Objective

The objective of this Audit is to identify existing issues which might constitute a road safety risk.

2.3 Procedures and Reference Material

The procedures used are these described in *Guidelines for Road Safety Audit Practices* (NSW Roads and Traffic Authority, 2011). The checklist contained within the *Guide to Road Safety: Part 6 Road Safety Audit* (Austroads, 2009) was used by the audit team as a reference in this roadwork traffic scheme audit. Key elements examined included:

- general topics;
- design issues;
- intersections;
- lighting, signs and delineation;

- physical objects;
- environmental constraints; and
- other matters.

2.4 Audit Team

The Road Safety Audit was carried out by the following team of road safety auditors, registered with the New South Wales (NSW) Centre for Road Safety:

- Ken Hollyoak (RSA-02-0249) – Level 3 road safety auditor (team leader); and
- Wayne Johnson (RSA-02-0769) – Level 3 road safety auditor (team member).

3 Road Safety Audit Program

3.1 Commencement Meeting

A commencement meeting took place between Penny Dalton (The Transport Planning Partnership on behalf of Resource Strategies and Malabar) and the audit team members on 19 October 2018. The purpose, extent and scope of the audit were discussed.

3.2 Site and Field Audit

Site inspections were carried out on Thursday, 25 October 2018 during day time and night time periods. The weather for the day audit was fine and sunny while the night audit was fine and clear.

The audited road section was driven over to identify possible road safety concerns. Several photographs and video footage were recorded.

3.3 Completion Meeting

Not required.

4 Road Safety Audit Findings

4.1 Introduction

Table 4.2 provides specific details of the audit findings and a risk rating as high, medium or low. The risk ratings have been based on the risk matrix presented in Table 4.1, which has been adopted from the standard Austroads Risk Matrix.

Table 4.1: Risk Matrix

Severity \ Likelihood	Highly probable	Occasional	Improbable
Major	High	High	Medium
Moderate	High	Medium	Low
Minor	Medium	Low	Low

The terms in Table 4.1 are described below.

Likelihood:

- Highly probable: It is likely that more than one crash of this type could occur within a five-year period.
- Occasional: It is likely that less than one crash of this type could occur within a five-year period.
- Improbable: Less than one crash of this type could occur within a 10-year period.

Severity:

- Major: The crash is likely to result in a fatality or serious injuries.

  For example, high/medium speed vehicle collision, high/medium speed collision with a fixed object, pedestrian struck at high speed, and cyclist hit by car.
- Moderate: The crash is likely to result in minor injuries or large scale property damage.

  For example, some slow speed vehicle collisions, cyclist falls, and rear end crashes.
- Minor: The crash is likely to result in minor property damage or many near miss crash events.

  For example, some slow speed collisions, pedestrian walks into object (no head injury), and car reverses into post.

Priority:

- High: Very important, and needs to be addressed urgently.
- Medium: Important, and needs to be addressed as soon as possible.
- Low: Needs to be considered as part of regular maintenance/planning program.

4.2 Responding to the Audit Report

As set out in the road safety audit guidelines, the responsibility for the road rests with the relevant roads authority, not with the auditor. The project manager and relevant roads authority are under no obligation to accept the audit findings. Neither is it the role of the auditor to agree to, or approve the project manager's responses to the audit.

The audit provides the opportunity to highlight potential road safety problems and have them formally considered by the project manager and relevant roads authority in conjunction with all other project considerations.

4.3 Road Safety Audit Findings

A summary of the audit findings is shown in Table 4.2 which provides:

- specific details of the road safety issues identified during the audit; and
- a risk level rating for each of the road safety audit findings.

It should be acknowledged that positive attributes of the audited road section have not been discussed. Deficiencies that do not cause a safety problem are also not listed.

No specific road safety issues were identified at the intersection of Thomas Mitchell Drive and the site access road to the Maxwell Infrastructure.

In line with NSW Roads and Maritime Services best practice, recommendations have not been included in the road safety audit findings.

Table 4.2: Summary of Road Safety Audit Findings

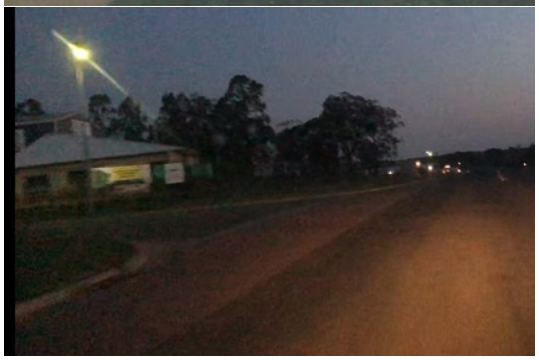
Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
1.	Denman Road intersection	It was noted that signage indicates that the Denman Road intersection with Thomas Mitchell Drive is to be the subject of an upgrade. No timing information was given on the sign as to when this would commence.		Note only		
2.	Denman Road Eastbound approach to intersection of Thomas Mitchell Drive	The road markings at the right turn treatment cannot easily be seen on approach. This may lead to late lane changes and side swipe crashes.		Occasional	Moderate	Medium

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
3.	Denman Road Westbound approach to the intersection	The drop to the culvert structure is sufficiently close to the travel lane such that it could cause errant vehicles to overturn.		Occasional	Moderate	Medium
4.	Southbound entry to Thomas Mitchell Drive	There is an unprotected culvert close to Thomas Mitchell Drive. It is sufficiently close to the travel lane such that it could cause errant vehicles to overturn.		Occasional	Moderate	Medium

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
5.	Thomas Mitchell Drive between Denman Road and the Industrial Area	There is a short length of additional lane but it is not clear from the road markings and signage whether this is an additional traffic lane or a layby. It merges into a traffic lane further south. Consequently, this could cause confusion with some vehicles pulling into what they think is a layby with other drivers thinking it is a traffic lane. This could result in rear-end and/or side swipe crashes.		Occasional	Moderate	Medium

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
6.	Thomas Mitchell Drive close to the Industrial Area	The gravel shoulder extends in to the travel lane in some locations. This could lead to an errant vehicle which subsequently brakes after leaving the travel lane, skidding and losing control. This occurs in both directions.		Improbable	Moderate	Low

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
7.	Thomas Mitchell Drive close to the Industrial Area	The road appears to have been widened but there is no road marking to suggest if the section of road is two through lanes, one through lane with a turning lane, or other arrangement. As a result, drivers are not given clear information around where they should be located in the road. This could result in side swipes when vehicles are turning.		Occasional	Moderate	Medium

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
8.	Thomas Mitchell Drive close to the Industrial Area	Most of the side roads out of the Industrial Area do not have any give way markings and, due to the road widening mentioned earlier (Item no.7), vehicles in the side roads sit a long way back from the travel lane of Thomas Mitchell Drive. The lack of markings might result in overshot crashes.	 	Occasional	Moderate	Medium

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
9.	Thomas Mitchell Drive close to the Industrial Area	The road as shown is in poor condition with a jagged edge and short drop. A cyclist or motorcyclist travelling close to the edge line might be unseated if traversing this poor surfacing. This occurs in both directions.		Occasional	Moderate	Medium

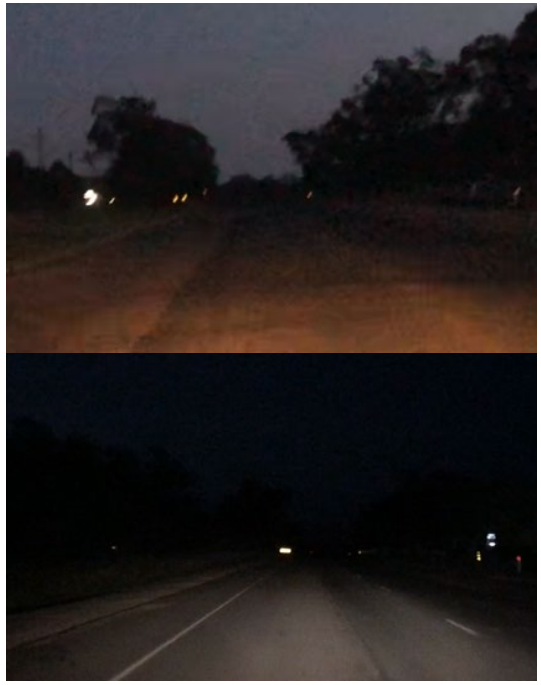
Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
10.	Thomas Mitchell Drive close to the Industrial Area	As described above, the wide road and lack of lane markings mean that cars park adjacent to the kerb. As there are no road markings to define a parking lane, vehicles may not be expecting on-street parked vehicles on a road such as this, which could result in rear-end crashes.		Occasional	Moderate	Medium
11.	Thomas Mitchell Drive East of the Industrial Area	East of the Industrial Area, it was noted that the road has been upgraded and the quality of the road surface, line marking, and raised reflective pavement markers (RRPM) improved significantly. The provision of the line markings, RRPMs, guide posts was generally inconsistently applied throughout the remainder of the audit study area.		Note only		

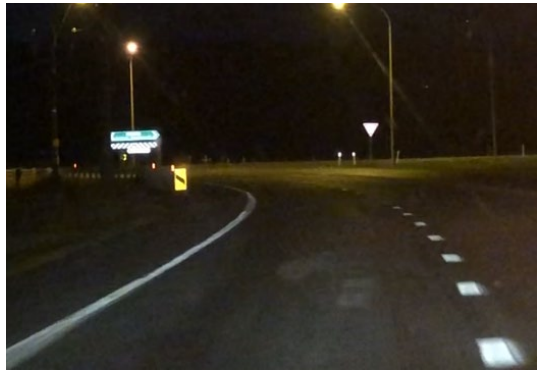
Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
12.	Thomas Mitchell Drive at Balmoral Road	It was noted that some "hooning" appears to have taken place with tyre burns noted on the road surface. This is clearly a dangerous occurrence on a high-speed road.		Note Only		

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
13.	Thomas Mitchell Drive on approach to New England Highway	There is a single Chevron Alignment Marker (CAM) at this bend which is not sufficient to highlight the severity of the curve. This could lead to drivers not appreciating the curvature of the road and losing control. This occurs in both directions.		Occasional	Moderate	Medium

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
14.	New England Highway Northbound approach to intersection of Thomas Mitchell Drive	There are concerns about cyclists travelling uphill toward the intersection, who need to sit within the turning lane to travel straight ahead. This is a high-speed road with a significant number of trucks turning left. This may lead to conflict between cyclists and trucks.		Occasional	Major	High
15.	Thomas Mitchell Drive Northbound west of Maxwell access	The wire rope safety barrier in this location has been impacted. As a result, the wire rope would have diminished strength should it be impacted by errant vehicles.		Improbable	Moderate	Low

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
16.	Thomas Mitchell Drive Northbound near Industrial Area	The quality of the road surface is sufficiently poor that it might unseat a cyclist or motorcyclist.		Improbable	Moderate	Low
17.	Denman Road southbound approach to Thomas Mitchell Drive intersection	At a time when all of the lighting at the intersection was observed to be on, one light appeared to be not working (although it was working an hour or so later) and another was not co-ordinated with the other street lights such that it came on sometime after the others.		Note only		

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
18.	Thomas Mitchell Drive between Denman Road intersection and just south of the Industrial Area	The quality of the night time delineation is variable and at worst poor. The lack of line markings, RRPMs and guide posts makes it difficult for drivers to see where they should sit in the road. This could result in side swipe and/or head-on crashes		Occasional	Moderate	Medium
19.	Thomas Mitchell Drive close to the Industrial Area	Of the few accesses which have give way markings on the minor road, subsequent resurfacing has made them barely visible. This could result in vehicles overshooting the minor road access.		Improbable	Moderate	Low

Item No.	Location	Descriptions of Findings	Photo	Likelihood	Severity	Risk Rating
20.	Thomas Mitchell Drive approach to New England Highway	The left turn line markings are in poor condition and barely visible. This could result in late lane changes and side swipe crashes.		Improbable	Moderate	Low

5 Concluding Statement

The findings and opinions in the report are based on the examination of the specific road and environs, and might not address all concerns existing at the time of the audit.

The auditors have endeavoured to identify features of the road that could be modified in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe.

While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that anyone relying on it does so at their own risk without any liability to the auditors.

Ken Hollyoak
Level 3 Road Safety Auditor – Team Leader
The Transport Planning Partnership

Wayne Johnson
Level 3 Road Safety Auditor
The Transport Planning Partnership

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Our Ref: 18136

31 July 2019

Malabar Coal Limited
PMB 9
MUSWELLBROOK NSW 2333

Attention: Mr Bill Dean

Dear Bill,

RE: MAXWELL PROJECT – ADDENDUM TO ROAD TRANSPORT ASSESSMENT

Please find herein additional information regarding potential cumulative impacts of developments in the region during the initial construction stage of the Maxwell Project (the Project). This addendum has been prepared in response to release of new information regarding the proposed Mangoola Coal Continued Operations Project (MCCOP). This addendum should be read in conjunction with the Road Transport Assessment for the Maxwell Project[1].

Background

The Project Road Transport Assessment considered the cumulative impacts of other developments in the region during the peak initial construction stage of the Project, which was nominally assumed to occur in 2020. At the time of preparation of that assessment, Secretary's Environmental Assessment Requirements had been issued for the MCCOP, and it was anticipated that the MCCOP would not impact the ongoing traffic conditions on the wider road network beyond the localised impact of the proposed realignment of Wybong Post Office Road. It was further assumed that the construction stage of the MCCOP, if approved, would not occur during any of the Project assessment scenario years.

[1] TTPP (2019), *Maxwell Project Road Transport Assessment.*

The MCCOP Environmental Impact Statement has now been placed on public exhibition by the NSW Department of Planning, Industry and Environment. The MCCOP Traffic and Transport Report[2] confirms that the traffic generation of the operational stage of the MCCOP would remain unchanged from existing conditions. The MCCOP construction period is however assumed to take place over a period of approximately 16 months and be completed by 2022, i.e. it would occur during 2021-22.

The timing of the construction stages for both projects would ultimately depend on the timing of the assessment of the respective Development Applications, however there is some potential for the two construction periods to overlap. This addendum assesses the traffic implications of the Project construction phase coinciding with the MCCOP construction phase.

MCCOP Construction Stage Traffic

The peak hourly traffic generation of the MCCOP during the initial construction stage was determined by GHD (2019), which presents forecasts of intersection turning movements for a "no-build" and a "build" scenario at intersections of relevance to the MCCOP. The difference between these two scenarios is MCCOP-generated trips.

GHD (2019) indicates that MCCOP traffic on Thomas Mitchell Drive would be travelling to and from Singleton, so TTPP has assumed that at the eastern end of Thomas Mitchell Drive, the MCCOP-generated vehicles would be turning to and from New England Highway south. The MCCOP would generate the following additional peak hour trips on roads of relevance to the Project:

Morning Peak Hour

- 34 light and 8 heavy vehicles on Denman Road north of Thomas Mitchell Drive;
- 21 light and 2 heavy vehicle trips on Thomas Mitchell Drive and on New England Highway south of Thomas Mitchell Drive; and
- 55 light and 10 heavy vehicles on Denman Road south of Thomas Mitchell Drive.

Evening Peak Hour

- 34 light and 8 heavy vehicle trips on Denman Road north of Thomas Mitchell Drive;
- 20 light and 2 heavy vehicle trips on Thomas Mitchell Drive and on New England Highway south of Thomas Mitchell Drive; and
- 54 light and 10 heavy vehicles on Denman Road south of Thomas Mitchell Drive.

[2] GHD (2019), *Mangoola Coal Continued Operations Project Traffic and Transport Report.*

Future Traffic Volumes

TTPP has added the MCCOP-generated trips to the Project's Road Transport Assessment forecasts (Table 1). This addendum conservatively assumes that the peak hour trip generation of the MCCOP would coincide with the peak hour trip generation of the Project.

Table 1: Future Traffic Volumes with MCCOP Traffic

Site[A]	Road and Location	6:00 am to 7:00 am (vehicles per hour)		5:00 pm to 6:00 pm (vehicles per hour)		Daily (vehicles per day)	
		Light	Heavy	Light	Heavy	Light	Heavy
Baseline Year 2020 with MCCOP Traffic							
A	Edderton Road south of Denman Road	83	9	53	6	750	88
B	Site Access Road south of Thomas Mitchell Drive	34	3	28	2	202	36
C	Thomas Mitchell Drive east of Denman Road	583	116	450	85	4,948	1,386
D	Thomas Mitchell Drive west of New England Highway	393	76	322	55	2,755	893
I	Thomas Mitchell Drive west of Site Access Road	367	73	298	52	2,631	875
Year 2020 with MCCOP and Project Traffic							
A	Edderton Road south of Denman Road	83	9	53	6	750	88
B	Site Access Road south of Thomas Mitchell Drive	158	14	158	14	670	200
C	Thomas Mitchell Drive east of Denman Road	592	118	461	87	4,971	1,417
D	Thomas Mitchell Drive west of New England Highway	508	85	441	65	3,200	1,026
I	Thomas Mitchell Drive west of Site Access Road	376	75	309	54	2,654	906

Future Operation of Intersections

The primary determinant of the operation of the surrounding road network is the operation of the intersections, as these are the locations at which vehicles travelling in opposing directions occupy the same road space. The Project intersections have been reanalysed using SIDRA INTERSECTION 8, and the results are summarised in Table 2.

transport planning

Table 2: Future Intersection Operating Conditions with MCCOP Traffic

Site[A]	Intersection	AM Peak			PM Peak		
		X-Value	Average Delay[A]	LoS	X-Value	Average Delay[A]	LoS
Baseline Year 2020 with MCCOP Traffic							
E	Site Access Road and Thomas Mitchell Drive	0.30	12.8	A	0.15	9.6	A
F	New England Highway and Thomas Mitchell Drive	0.42	12.9	A	0.41	14.0	A
G	Denman Road and Thomas Mitchell Drive	0.46	33.4	C	>1.0	>70.0	F
H	Denman Road and Edderton Road	0.10	8.9	A	0.13	9.0	A
Year 2020 with MCCOP and Project Traffic							
E	Site Access Road and Thomas Mitchell Drive	0.30	18.2	B	0.28	10.6	A
F	New England Highway and Thomas Mitchell Drive	0.49	13.8	A	0.52	15.1	B
G	Denman Road and Thomas Mitchell Drive	0.49	35.1	C	>1.0	>70.0	F
H	Denman Road and Edderton Road	0.10	9.0	A	0.13	9.1	A

[A] Refer to Figure 2.2 of TTPP (2019).
[B] seconds per vehicle for movement with the highest average delay per vehicle.

Comparing these results with those presented in TTPP (2019) (Tables 4.13 and 5.2), the resulting Levels of Service at the intersections would remain unchanged should the construction stage of the MCCOP and the Project coincide, and the peak hour traffic of each project occur in the same hour of the day.

Under these conditions, the intersections are expected to operate at good levels of service with short delays and spare capacity, with the exception of the intersection of Thomas Mitchell Drive and Denman Road. As noted in TTPP (2019), this intersection is expected to be upgraded prior to the Project initial construction phase in accordance with Condition 47(c) of the Project Approval for the Mt Arthur Coal Mine Open Cut Consolidation Project. While the details of the intended design are not known, it is expected that a seagull intersection arrangement is likely, given that the right turn exit movement from Thomas Mitchell Drive is already operating close to capacity.

As a guide, the forecast future evening peak hour traffic volumes with the Project and MCCOP construction stage traffic have been separately assessed on the assumption that the intersection is upgraded to a similar layout as the existing intersection of Thomas Mitchell Drive and New England Highway. Under this arrangement, the level of service would be A.

Summary and Conclusion

This addendum has found that should the initial construction stage of the Project coincide with the construction period of the MCCOP, and the peak hours for traffic generated by those two developments also coincide, the levels of service experienced at the key Project intersections would be unchanged from the levels of service presented in TTPP (2019). The key Project intersections are predicted to operate at good levels of service with short delays and spare capacity without requiring upgrading, with the exception of Denman Road and Thomas Mitchell Drive intersection, which is planned to be upgraded by others regardless of the Project.

Yours sincerely,

Penny Dalton
Associate Director

Attachment One

SIDRA INTERSECTION 8 Output Summaries

MOVEMENT SUMMARY

Site: 101 [TMD & MIR 2020 AM Baseline - MCCOP]

Thomas Mitchell Drive and Maxwell Infrastructure Road
2020 AM Peak
Baseline without Maxwell Project, MCCOP traffic added
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: Maxwell Infrastructure Rd												
1	L2	1	0.0	0.005	8.6	LOS A	0.0	0.1	0.59	0.67	0.59	54.2
3	R2	1	0.0	0.005	12.8	LOS A	0.0	0.1	0.59	0.67	0.59	54.1
Approach		2	0.0	0.005	10.7	LOS A	0.0	0.1	0.59	0.67	0.59	54.2
East: Thomas Mitchell Dr E												
4	L2	36	9.4	0.020	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.3
5	T1	579	2.7	0.302	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		614	3.1	0.302	0.4	NA	0.0	0.0	0.00	0.04	0.00	78.6
West: Thomas Mitchell Dr W												
11	T1	107	7.3	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	4	0.0	0.006	9.9	LOS A	0.0	0.2	0.54	0.68	0.54	55.8
Approach		111	7.0	0.057	0.4	NA	0.0	0.2	0.02	0.03	0.02	78.6
All Vehicles		728	3.7	0.302	0.5	NA	0.0	0.2	0.01	0.04	0.01	78.5

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.
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 [TMD & MIR 2020 PM Baseline - MCCOP]

Thomas Mitchell Dr and Maxwell Infrastructure Road
2020 PM Peak
Baseline without Maxwell Project, MCCOP traffic added
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: Maxwell Infrastructure Rd												
1	L2	2	0.0	0.057	6.2	LOS A	0.2	1.5	0.49	0.70	0.49	55.4
3	R2	31	7.1	0.057	9.6	LOS A	0.2	1.5	0.49	0.70	0.49	53.5
Approach		33	6.7	0.057	9.3	LOS A	0.2	1.5	0.49	0.70	0.49	53.7
East: Thomas Mitchell Dr E												
4	L2	6	0.0	0.003	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
5	T1	161	4.1	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		167	4.0	0.085	0.2	NA	0.0	0.0	0.00	0.02	0.00	79.4
West: Thomas Mitchell Dr W												
11	T1	279	4.4	0.147	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	1	0.0	0.001	7.2	LOS A	0.0	0.0	0.27	0.57	0.27	57.8
Approach		280	4.4	0.147	0.0	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		480	4.4	0.147	0.8	NA	0.2	1.5	0.03	0.06	0.03	77.1

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 [TMD & MIR 2020 AM Project - MCCOP]

Thomas Mitchell Drive and Maxwell Infrastructure Road
2020 AM Peak
With Maxwell Project, MCCOP traffic added
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: Maxwell Infrastructure Rd												
1	L2	4	25.0	0.104	10.2	LOS A	0.4	3.0	0.73	0.89	0.73	45.2
3	R2	26	21.7	0.104	18.2	LOS B	0.4	3.0	0.73	0.89	0.73	45.6
Approach		30	22.2	0.104	17.0	LOS B	0.4	3.0	0.73	0.89	0.73	45.5
East: Thomas Mitchell Dr E												
4	L2	149	5.2	0.083	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	63.6
5	T1	579	2.7	0.302	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		728	3.2	0.302	1.5	NA	0.0	0.0	0.00	0.13	0.00	75.9
West: Thomas Mitchell Dr W												
11	T1	109	9.2	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	17	6.7	0.029	11.4	LOS A	0.1	0.8	0.60	0.79	0.60	54.2
Approach		126	8.8	0.059	1.5	NA	0.1	0.8	0.08	0.10	0.08	75.2
All Vehicles		883	4.7	0.302	2.0	NA	0.4	3.0	0.04	0.15	0.04	74.1

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 [TMD & MIR 2020 PM Project - MCCOP]

Thomas Mitchell Dr and Maxwell Infrastructure Road
2020 PM Peak
With Maxwell Project, MCCOP traffic added
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: Maxwell Infrastructure Rd												
1	L2	17	6.7	0.279	6.6	LOS A	1.2	9.0	0.55	0.81	0.59	53.1
3	R2	149	5.2	0.279	10.6	LOS A	1.2	9.0	0.55	0.81	0.59	53.3
Approach		166	5.4	0.279	10.2	LOS A	1.2	9.0	0.55	0.81	0.59	53.2
East: Thomas Mitchell Dr E												
4	L2	26	21.7	0.016	7.3	LOS A	0.0	0.0	0.00	0.63	0.00	58.7
5	T1	161	4.1	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		187	6.5	0.085	1.0	NA	0.0	0.0	0.00	0.09	0.00	76.2
West: Thomas Mitchell Dr W												
11	T1	279	4.4	0.147	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	4	25.0	0.004	8.0	LOS A	0.0	0.1	0.30	0.59	0.30	56.4
Approach		283	4.7	0.147	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.4
All Vehicles		636	5.4	0.279	3.0	NA	1.2	9.0	0.14	0.24	0.16	69.6

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: 101-1 [TMD & NEH 2020 AM Stage 1 Baseline - MCCOP]

Thomas Mitchell Drive and New England Highway
2020 AM Peak
Stage 1 Baseline without Maxwell Project, MCCOP traffic added
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	572	3.5	0.420	8.7	LOS A	2.6	18.4	0.18	0.59	0.18	68.0
5	T1	172	27.7	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		744	9.1	0.420	6.7	LOS A	2.6	18.4	0.14	0.46	0.14	73.4
North: New England Hwy N												
12	R2	39	5.7	0.027	8.6	LOS A	0.1	0.9	0.30	0.61	0.30	66.4
Approach		39	5.7	0.027	8.6	NA	0.1	0.9	0.30	0.61	0.30	66.4
West: Thomas Mitchell Drive												
1	L2	4	0.0	0.002	7.6	LOS A	0.0	0.0	0.00	0.60	0.00	66.2
2	T1	99	10.1	0.144	12.0	LOS A	0.5	3.7	0.49	1.03	0.49	52.7
Approach		103	9.7	0.144	11.8	LOS A	0.5	3.7	0.47	1.01	0.47	53.4
All Vehicles		887	9.0	0.420	7.3	NA	2.6	18.4	0.18	0.53	0.18	70.9

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.
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: 101-2 [TMD & NEH 2020 AM Stage 2 Baseline - MCCOP]

Thomas Mitchell Dr and New England Hwy
2020 AM Peak Stage 2 Merge
Baseline without Maxwell Project, MCCOP traffic added
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	406	7.9	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		406	7.9	0.219	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	99	10.1	0.077	0.9	LOS A	0.2	1.8	0.34	0.25	0.34	95.2
Approach		99	10.1	0.077	0.9	LOS A	0.2	1.8	0.34	0.25	0.34	95.2
All Vehicles		504	8.4	0.219	0.2	NA	0.2	1.8	0.07	0.05	0.07	99.2

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.
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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2020 AM Baseline - MCCOP]

New Route
Network Category: (None)

Route Travel Performance								
Performance Measure	**Vehicles**			**Per Unit Distance**		**Persons**		
Travel Speed (Average)	72.4	km/h				72.4	km/h	
Travel Distance (Average)	1170.0	m				1170.0	m	
Travel Time (Average)	58.2	sec		49.7	sec/km	58.2	sec	
Route Delay (Average)	12.9	sec		11.1	sec/km	12.9	sec	
Route Stop Rate	1.28			1.09	per km	1.28		
Desired Speed	60.0	km/h						
Route Level of Service (LOS)	LOS A							
Travel Time Index	12.30							
Speed Efficiency	1.21[3]							
Congestion Coefficient	0.83							

3 Calculated Average Travel Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2020 AM Stage 1 Baseline - MCCOP											
West Approach											
2	T1	510.0	33.2	55.3	12.0	0.49	1.03	0.49	99	99	0.144
Site ID: 101-2 Site Name: TMD & NEH 2020 AM Stage 2 Baseline - MCCOP											
NorthWest Approach											
32a	R1	660.0	25.0	95.2	0.9	0.34	0.25	0.34	99	99	0.077

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2020 PM Stage 1 Baseline - MCCOP]

Thomas Mitchell Drive and New England Highway
2020 PM Peak Stage 1
Baseline without Maxwell Project, MCCOP traffic added
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	103	16.1	0.079	8.8	LOS A	0.3	2.6	0.07	0.61	0.07	64.4
5	T1	384	7.2	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		488	9.1	0.206	1.9	LOS A	0.3	2.6	0.01	0.13	0.01	89.4
North: New England Hwy N												
12	R2	12	18.2	0.011	9.9	LOS A	0.0	0.4	0.45	0.64	0.45	61.6
Approach		12	18.2	0.011	9.9	NA	0.0	0.4	0.45	0.64	0.45	61.6
West: Thomas Mitchell Drive												
1	L2	22	15.0	0.013	7.8	LOS A	0.0	0.0	0.00	0.59	0.00	61.7
2	T1	303	8.8	0.414	12.9	LOS A	2.1	15.9	0.56	1.10	0.73	51.9
Approach		326	9.2	0.414	12.6	LOS A	2.1	15.9	0.52	1.06	0.68	52.7
All Vehicles		826	9.3	0.414	6.2	NA	2.1	15.9	0.22	0.51	0.28	73.3

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.
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: 101-2 [TMD & NEH 2020 PM Stage 2 Baseline - MCCOP]

Thomas Mitchell Dr and New England Hwy
2020 PM Peak Stage 2 Merge
Baseline without Maxwell Project, MCCOP traffic added
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	400	11.7	0.221	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		400	11.7	0.221	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	303	8.8	0.235	1.1	LOS A	0.8	6.1	0.38	0.31	0.38	94.6
Approach		303	8.8	0.235	1.1	LOS A	0.8	6.1	0.38	0.31	0.38	94.6
All Vehicles		703	10.4	0.235	0.5	NA	0.8	6.1	0.16	0.13	0.16	98.1

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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2020 PM Baseline - MCCOP]

New Route
Network Category: (None)

Route Travel Performance						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Travel Speed (Average)	71.2	km/h			71.2	km/h
Travel Distance (Average)	1170.0	m			1170.0	m
Travel Time (Average)	59.2	sec	50.6	sec/km	59.2	sec
Route Delay (Average)	14.0	sec	12.0	sec/km	14.0	sec
Route Stop Rate	1.40		1.20	per km	1.40	
Desired Speed	60.0	km/h				
Route Level of Service (LOS)	LOS A					
Travel Time Index	12.07					
Speed Efficiency	1.19[3]					
Congestion Coefficient	0.84					

3 Calculated Average Travel Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2020 PM Stage 1 Baseline - MCCOP											
West Approach											
2	T1	510.0	34.1	53.9	12.9	0.56	1.10	0.73	303	303	0.414
Site ID: 101-2 Site Name: TMD & NEH 2020 PM Stage 2 Baseline - MCCOP											
NorthWest Approach											
32a	R1	660.0	25.1	94.6	1.1	0.38	0.31	0.38	303	303	0.235

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2020 AM Stage 1 Project - MCCOP]

Thomas Mitchell Drive and New England Highway
2020 AM Peak
Stage 1 With Maxwell Project, MCCOP traffic added
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	643	3.6	0.492	9.0	LOS A	3.2	23.3	0.30	0.60	0.30	67.3
5	T1	172	27.7	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		816	8.7	0.492	7.1	LOS A	3.2	23.3	0.23	0.47	0.23	72.2
North: New England Hwy N												
12	R2	81	4.1	0.055	8.6	LOS A	0.2	1.8	0.31	0.62	0.31	66.9
Approach		81	4.1	0.055	8.6	NA	0.2	1.8	0.31	0.62	0.31	66.9
West: Thomas Mitchell Drive												
1	L2	13	16.7	0.008	7.8	LOS A	0.0	0.0	0.00	0.59	0.00	61.3
2	T1	114	11.7	0.185	12.9	LOS A	0.6	4.9	0.53	1.05	0.53	51.8
Approach		128	12.2	0.185	12.4	LOS A	0.6	4.9	0.48	1.01	0.48	53.1
All Vehicles		1024	8.8	0.492	7.9	NA	3.2	23.3	0.27	0.55	0.27	69.5

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.
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: 101-2 [TMD & NEH 2020 AM Stage 2 Project - MCCOP]

Thomas Mitchell Dr and New England Hwy
2020 AM Peak Stage 2 Merge
With Maxwell Project, MCCOP traffic added
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	406	7.9	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		406	7.9	0.219	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	114	11.7	0.090	1.0	LOS A	0.3	2.1	0.34	0.26	0.34	95.1
Approach		114	11.7	0.090	1.0	LOS A	0.3	2.1	0.34	0.26	0.34	95.1
All Vehicles		520	8.8	0.219	0.2	NA	0.3	2.1	0.08	0.06	0.08	99.1

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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2020 AM Project - MCCOP]

New Route
Network Category: (None)

Route Travel Performance			
Performance Measure	**Vehicles**	**Per Unit Distance**	**Persons**
Travel Speed (Average)	71.5 km/h		71.5 km/h
Travel Distance (Average)	1170.0 m		1170.0 m
Travel Time (Average)	58.9 sec	50.3 sec/km	58.9 sec
Route Delay (Average)	13.8 sec	11.8 sec/km	13.8 sec
Route Stop Rate	1.32	1.12 per km	1.32
Desired Speed	60.0 km/h		
Route Level of Service (LOS)	LOS A		
Travel Time Index	12.13		
Speed Efficiency	1.19[3]		
Congestion Coefficient	0.84		

3 Calculated Average Travel Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2020 AM Stage 1 Project - MCCOP											
West Approach											
2	T1	510.0	33.9	54.1	12.9	0.53	1.05	0.53	114	114	0.185
Site ID: 101-2 Site Name: TMD & NEH 2020 AM Stage 2 Project - MCCOP											
NorthWest Approach											
32a	R1	660.0	25.0	95.1	1.0	0.34	0.26	0.34	114	114	0.090

MOVEMENT SUMMARY

Site: 101-1 [TMD & NEH 2020 PM Stage 1 Project - MCCOP]

Thomas Mitchell Drive and New England Highway
2020 PM Peak Stage 1
With Maxwell Project, MCCOP traffic added
Site Category: Existing Geometry
Stop (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: New England Hwy S												
4	L2	119	16.8	0.092	8.8	LOS A	0.4	3.1	0.10	0.61	0.10	64.0
5	T1	384	7.2	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		503	9.5	0.206	2.1	LOS A	0.4	3.1	0.02	0.14	0.02	88.1
North: New England Hwy N												
12	R2	22	20.0	0.021	10.0	LOS A	0.1	0.7	0.46	0.65	0.46	61.0
Approach		22	20.0	0.021	10.0	NA	0.1	0.7	0.46	0.65	0.46	61.0
West: Thomas Mitchell Drive												
1	L2	67	8.3	0.038	7.7	LOS A	0.0	0.0	0.00	0.60	0.00	63.7
2	T1	377	8.0	0.522	14.0	LOS A	3.2	23.9	0.61	1.13	0.92	50.9
Approach		443	8.0	0.522	13.0	LOS A	3.2	23.9	0.52	1.05	0.79	53.2
All Vehicles		969	9.1	0.522	7.3	NA	3.2	23.9	0.26	0.57	0.38	70.1

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: 101-2 [TMD & NEH 2020 PM Stage 2 Project - MCCOP]

Thomas Mitchell Dr and New England Hwy
2020 PM Peak Stage 2 Merge
With Maxwell Project, MCCOP traffic added
Site Category: Existing Geometry
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
North: New England Hwy N												
11	T1	400	11.7	0.221	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		400	11.7	0.221	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.9
NorthWest: Merge Movement												
32a	R1	377	8.0	0.290	1.1	LOS A	1.0	7.8	0.39	0.32	0.39	94.4
Approach		377	8.0	0.290	1.1	LOS A	1.0	7.8	0.39	0.32	0.39	94.4
All Vehicles		777	9.9	0.290	0.6	NA	1.0	7.8	0.19	0.16	0.19	97.7

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.

ROUTE TRAVEL PERFORMANCE

Route: R101 [Route1]

Network: N101 [TMD & NEH 2020 PM Project - MCCOP]

New Route
Network Category: (None)

Route Travel Performance			
Performance Measure	**Vehicles**	**Per Unit Distance**	**Persons**
Travel Speed (Average)	70.0 km/h		70.0 km/h
Travel Distance (Average)	1170.0 m		1170.0 m
Travel Time (Average)	60.2 sec	51.4 sec/km	60.2 sec
Route Delay (Average)	15.1 sec	12.9 sec/km	15.1 sec
Route Stop Rate	1.45	1.24 per km	1.45
Desired Speed	60.0 km/h		
Route Level of Service (LOS)	LOS A		
Travel Time Index	11.85		
Speed Efficiency	1.17[3]		
Congestion Coefficient	0.86		

3 Calculated Average Travel Speed exceeds the specified Desired Speed.

Route Travel Movement Performance											
Mov ID	Turn	Trav Dist m	Trav Time sec	Aver. Speed km/h	Aver. Delay sec	Prop. Queued	Eff. Stop Rate	Aver. No. Dem. Cycles	Flow Rate veh/h	Arv. Flow Rate veh/h	Deg. of Satn
Site ID: 101-1 Site Name: TMD & NEH 2020 PM Stage 1 Project - MCCOP											
West Approach											
2	T1	510.0	35.0	52.5	14.0	0.61	1.13	0.92	377	377	0.522
Site ID: 101-2 Site Name: TMD & NEH 2020 PM Stage 2 Project - MCCOP											
NorthWest Approach											
32a	R1	660.0	25.2	94.4	1.1	0.39	0.32	0.39	377	377	0.290

MOVEMENT SUMMARY

Site: 101 [TMD & Denman 2020 AM Baseline - MMCOP]

Denman Road and Thomas Mitchell Drive
2020 AM Peak
Baseline Without Maxwell Project, MCCOP traffic added
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: Denman Rd S												
11	T1	112	11.9	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	189	6.5	0.464	19.0	LOS B	2.2	16.6	0.82	1.02	1.18	52.2
Approach		301	8.5	0.464	11.9	NA	2.2	16.6	0.52	0.64	0.74	60.0
East: Thomas Mitchell Dr												
1	L2	282	13.4	0.375	11.1	LOS A	1.9	14.7	0.56	0.87	0.70	57.4
3	R2	82	18.9	0.444	33.4	LOS C	1.8	14.6	0.89	1.03	1.19	41.5
Approach		364	14.6	0.444	16.1	LOS B	1.9	14.7	0.64	0.91	0.81	52.8
North: Denman Rd N												
4	L2	548	2.8	0.301	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.4
5	T1	427	8.6	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		974	5.4	0.301	4.0	NA	0.0	0.0	0.00	0.35	0.00	70.3
All Vehicles		1640	8.0	0.464	8.1	NA	2.2	16.6	0.24	0.53	0.32	63.6

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 [TMD & Denman 2020 PM Baseline - MCCOP]

Denman Road and Thomas Mitchell Drive
2020 PM Peak
Baseline Without Maxwell Project, MCCOP traffic added
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: Denman Rd S												
11	T1	361	7.4	0.290	0.9	LOS A	1.6	12.5	0.24	0.18	0.24	75.4
12	R2	176	12.7	0.290	9.3	LOS A	1.6	12.5	0.45	0.34	0.45	62.8
Approach		537	9.1	0.290	3.7	NA	1.6	12.5	0.31	0.24	0.31	70.7
East: Thomas Mitchell Dr												
1	L2	72	10.8	0.072	8.2	LOS A	0.3	2.0	0.33	0.63	0.33	60.5
3	R2	378	5.0	1.220	235.4	LOS F	52.9	386.0	1.00	3.37	11.48	12.6
Approach		450	5.9	1.220	199.0	LOS F	52.9	386.0	0.89	2.93	9.69	14.5
North: Denman Rd N												
4	L2	103	8.6	0.059	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.5
5	T1	228	4.4	0.120	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		331	5.7	0.120	2.2	NA	0.0	0.0	0.00	0.20	0.00	73.6
All Vehicles		1318	7.2	1.220	70.0	NA	52.9	386.0	0.43	1.15	3.43	30.5

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.
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 [TMD & Denman 2020 AM Project - MCCOP]

Denman Road and Thomas Mitchell Drive
2020 AM Peak
With Maxwell Project, MCCOP traffic added
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: Denman Rd S												
11	T1	112	11.9	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	201	6.1	0.493	19.4	LOS B	2.5	18.1	0.83	1.03	1.24	52.0
Approach		313	8.2	0.493	12.4	NA	2.5	18.1	0.53	0.66	0.79	59.5
East: Thomas Mitchell Dr												
1	L2	286	13.2	0.379	11.1	LOS A	1.9	14.9	0.57	0.87	0.70	57.4
3	R2	83	20.0	0.466	35.1	LOS C	1.9	15.6	0.90	1.03	1.22	40.6
Approach		369	14.8	0.466	16.5	LOS B	1.9	15.6	0.64	0.91	0.82	52.5
North: Denman Rd N												
4	L2	548	3.0	0.301	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.3
5	T1	427	8.6	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		974	5.5	0.301	4.0	NA	0.0	0.0	0.00	0.35	0.00	70.3
All Vehicles		1657	8.0	0.493	8.4	NA	2.5	18.1	0.24	0.54	0.33	63.3

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.
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 [TMD & Denman 2020 PM Project - MCCOP]

Denman Road and Thomas Mitchell Drive
2020 PM Peak
Baseline With Maxwell Project, MCCOP traffic added
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: Denman Rd S												
11	T1	361	7.4	0.292	0.9	LOS A	1.7	12.6	0.24	0.18	0.24	75.3
12	R2	179	12.4	0.292	9.3	LOS A	1.7	12.6	0.45	0.35	0.45	62.8
Approach		540	9.1	0.292	3.7	NA	1.7	12.6	0.31	0.24	0.31	70.7
East: Thomas Mitchell Dr												
1	L2	84	9.2	0.084	8.2	LOS A	0.3	2.3	0.33	0.64	0.33	61.0
3	R2	380	5.3	1.240	252.4	LOS F	56.0	410.0	1.00	3.48	11.98	11.9
Approach		464	6.0	1.240	208.0	LOS F	56.0	410.0	0.88	2.96	9.86	14.0
North: Denman Rd N												
4	L2	104	9.6	0.060	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.2
5	T1	228	4.4	0.120	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		332	6.0	0.120	2.2	NA	0.0	0.0	0.00	0.20	0.00	73.4
All Vehicles		1337	7.2	1.240	74.3	NA	56.0	410.0	0.43	1.18	3.55	29.4

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.
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.