BHP

MT ARTHUR COAL MINE
MODIFICATION 2

Modification Report

Appendix I
Road Transport Assessment

Resource Strategies

Mt Arthur Coal Modification 2
Road Transport Assessment

Prepared for:

Hunter Valley Energy Coal Pty Ltd

13 September 2023

The Transport Planning Partnership

Mt Arthur Coal Modification 2
Road Transport Assessment

Client: Hunter Valley Energy Coal Pty Ltd

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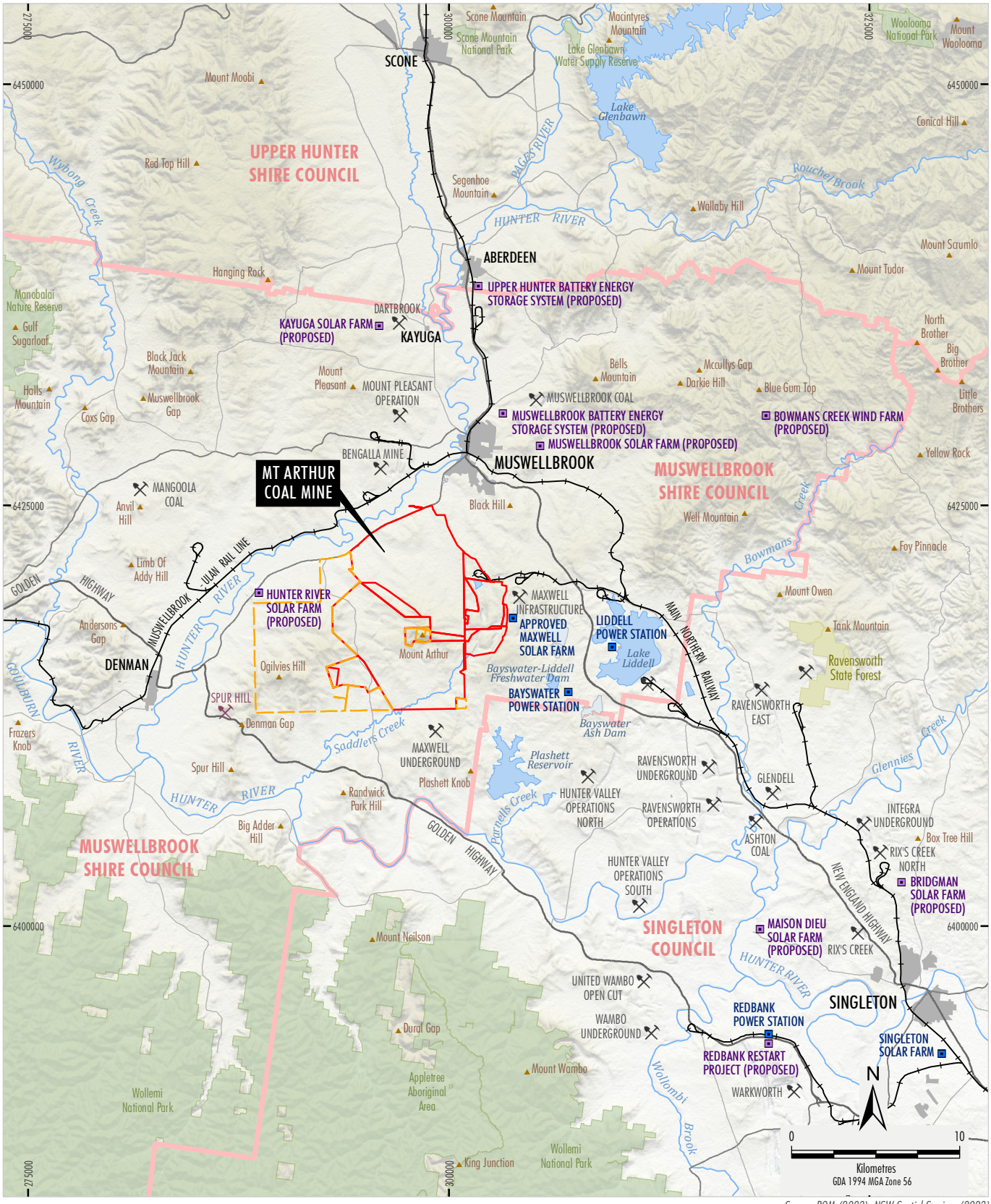
1 Introduction

The Mt Arthur Coal Mine (MAC) is an open cut thermal coal mine situated approximately 5 kilometres (km) south-west of Muswellbrook in the Muswellbrook Local Government Area in the Upper Hunter Valley of New South Wales (NSW) (Figure 1.1). The MAC is owned and operated by Hunter Valley Energy Coal Pty Ltd (HVEC), a wholly owned subsidiary of BHP.

MAC is currently approved to operate until 30 June 2026, in accordance with Project Approval 09_0062. In June 2022, HVEC announced a decision to cease mining at the MAC in 2030, as part of a responsible plan to provide a pathway to closure of the operation. Accordingly, HVEC is seeking a modification of the MAC Project Approval 09_0062 for a four-year extension of the MAC to 30 June 2030 (the Modification).

This Road Transport Assessment forms part of a Modification Report which has been prepared to support an application to modify Project Approval 09_0062 based on the four-year extension of mining activities and on the conceptual general arrangement of the Modification shown on Figure 1.2.



Source: BOM (2023); NSW Spatial Services (2023)

LEGEND

- State Forest
- National Parks and Wildlife Estate
- Local Government Area
- Exploration Licence Boundary (EL, AUTH)
- Mining and Coal Lease Boundary (ML, MPL, CL, CCL)
- Mining Operation
- Proposed Mining Operations (Application Lodged)
- Existing/Approved Energy Generation Site
- Proposed Energy Generation Site

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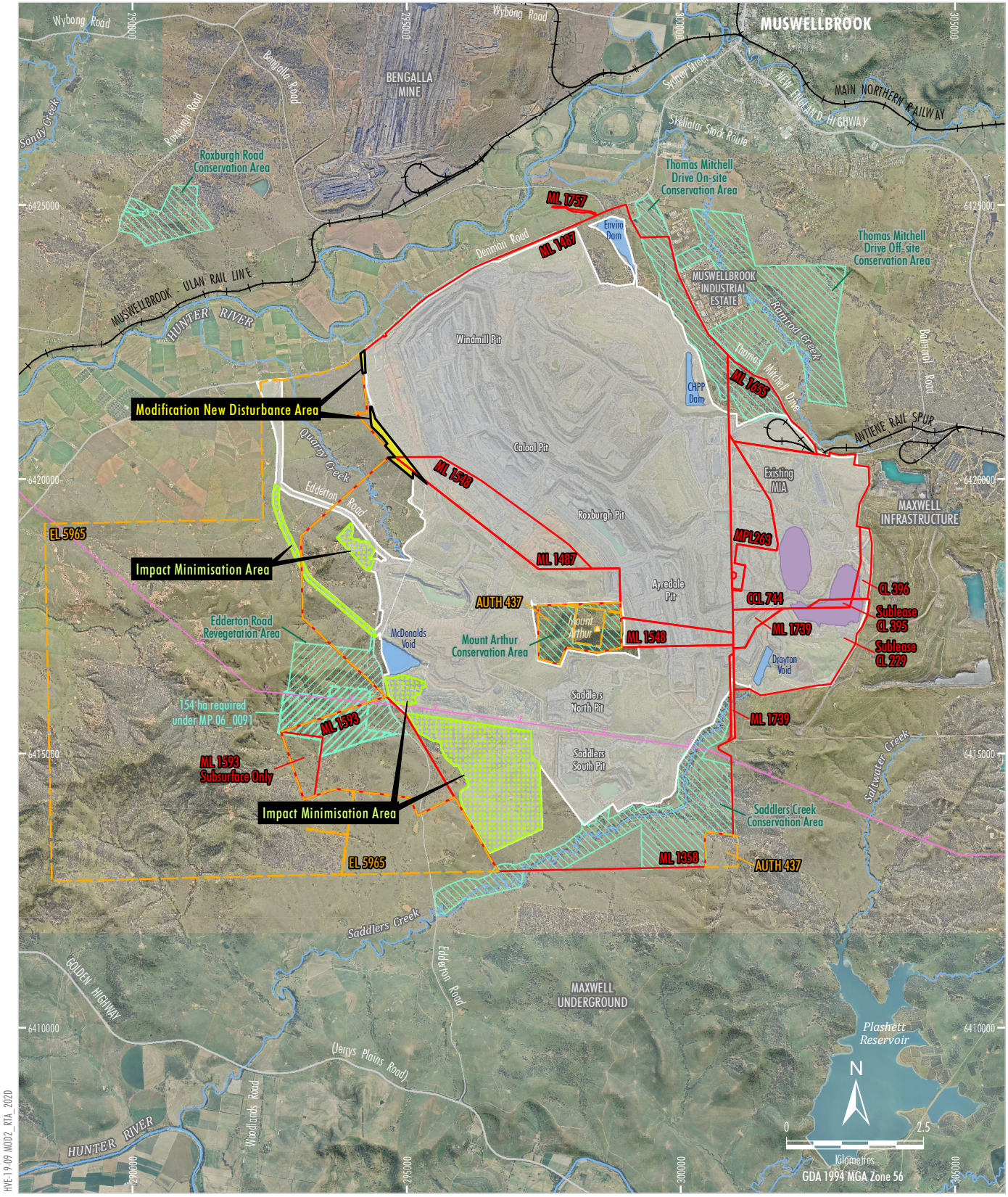
Regional Location

Figure 1.1

HVE-19-09 MOD2_RTA_201C



HVE-19-09 MOD2_RTA_2020

Source: BHP (2023); NSW Spatial Services (2023)
Orthophoto Mosaic: BHP (2022-2020)

LEGEND

- Exploration Licence Boundary (EL, AUTH)
- Mining and Coal Lease Boundary (ML, MPL, CL, CCL)
- Existing 500kV Electricity Transmission Line
- Existing Conservation/Offset Area
- Edderton Road Revegetation Area
- Approximate Extent of Existing/Approved Surface Development
- Tailings Storage Facility
- Water Storage
- Modification New Disturbance Area
- Impact Minimisation Area

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Modification General Arrangement

Figure 1.2

2 MAC Operations

2.1 Approved Operations

The MAC complex includes approved open cut and underground operations, and operates under Project Approval 09_0062 (Mt Arthur Coal Mine Open Cut Consolidation Project) and Project Approval 06_0091 (Mt Arthur Underground Project). The underground mine is approved but not operational.

Project Approval 09_0062 permits the extraction of up to 32 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal from the open cut, and up to 36 Mtpa from the combined open cut and underground operations. Under Project Approval 06_0091, up to 8 Mtpa of ROM coal may be extracted per year from Mt Arthur Underground. The open cut mining operations are permitted until 30 June 2026, and the underground mining operations are permitted until 31 December 2030. Product coal is transported from the MAC complex on the Antiene rail spur, with a maximum of 27 Mtpa of product coal permitted, and maximum of 30 train movements per day.

Project Approval 09_0062 requires a number of road upgrades to be undertaken, including the realignment of the northern section of Edderton Road and its intersection with Denman Road, which was completed in 2020. The intersection of Denman Road and Thomas Mitchell Drive is also required to be upgraded, with the upgrading works recently completed. Required upgrading of the intersection of Thomas Mitchell Drive with New England Highway has been completed, and MAC contributes to the upgrade and maintenance of Thomas Mitchell Drive.

Vehicular access for MAC is available at five locations:

- MAC Main Access Road, off Thomas Mitchell Drive approximately 5 km from Denman Road;
- Bayswater No.2 Access Road off Thomas Mitchell Drive approximately 4.5 km from New England Highway;
- Stage 2 Access Road off Edderton Road south of the former Edderton Road;
- Heavy Vehicle Access Road off Thomas Mitchell Drive approximately 2 km from Denman Road; and
- Minor Service Road off Edderton Road approximately 3 km south of the Stage 2 Access Road.

BHP (2021) indicates that over the period 1 July 2020 to 30 June 2021, 21.0 million tonnes (Mt) of ROM coal was extracted and processed at the CHPP, and 14.9 Mt of product coal was transported by rail to the port at Newcastle. Over that period, product coal transport generated 3,326 train movements (1,663 laden train departures), and a maximum of 20 train

movements (10 laden train departures) in a single day, which is below the maximum of 30 train movements per day permitted by Project Approval 09_0062.

Previous road transport assessments assumed that MAC employed approximately 2,600 full-time equivalent (FTE) employees at peak production, and 240 FTE employees during peak construction phases. BHP (2021) indicates that as at 30 June 2020, MAC employed approximately 2,200 FTE employees, made up of 971 permanent and fixed term contract employees, and approximately 1,225 contractors on a FTE basis.

2.2 The Modification

HVEC is seeking to modify Project Approval 09_0062 under section 4.55(2) of the *Environmental Planning & Assessment Act 1979,* and will include the following activities:

- four-year extension of mining activities to 30 June 2030;
- reduction in the approved open cut mining rate from 32 Mtpa of ROM coal to a maximum of 25 Mtpa ROM coal (similar to current actual ROM coal production);
- reduction in the cumulative open cut and underground ROM coal handling rate from 36 Mtpa to 29 Mtpa;
- reduction in maximum total (open cut and underground) coal rail transportation from 27 Mtpa of product coal to 20 Mtpa, and a reduction in train movements from 30 to 20 movements per day;
- minor extension of the approved disturbance area in the north-west corner of the operation predominantly to allow for access and ancillary infrastructure (refer to Modification New Disturbance Area within Figure 1.2);
- an overall reduction (387 ha) in approved disturbance, as some previously approved disturbance areas are no longer intended to be disturbed (refer to Impact Minimisation Area within Figure 1.2);
- revised final landform and final void configuration, including an overall reduction in the approved height of the northern overburden emplacement areas and the final landform (to reflect the current actual height).

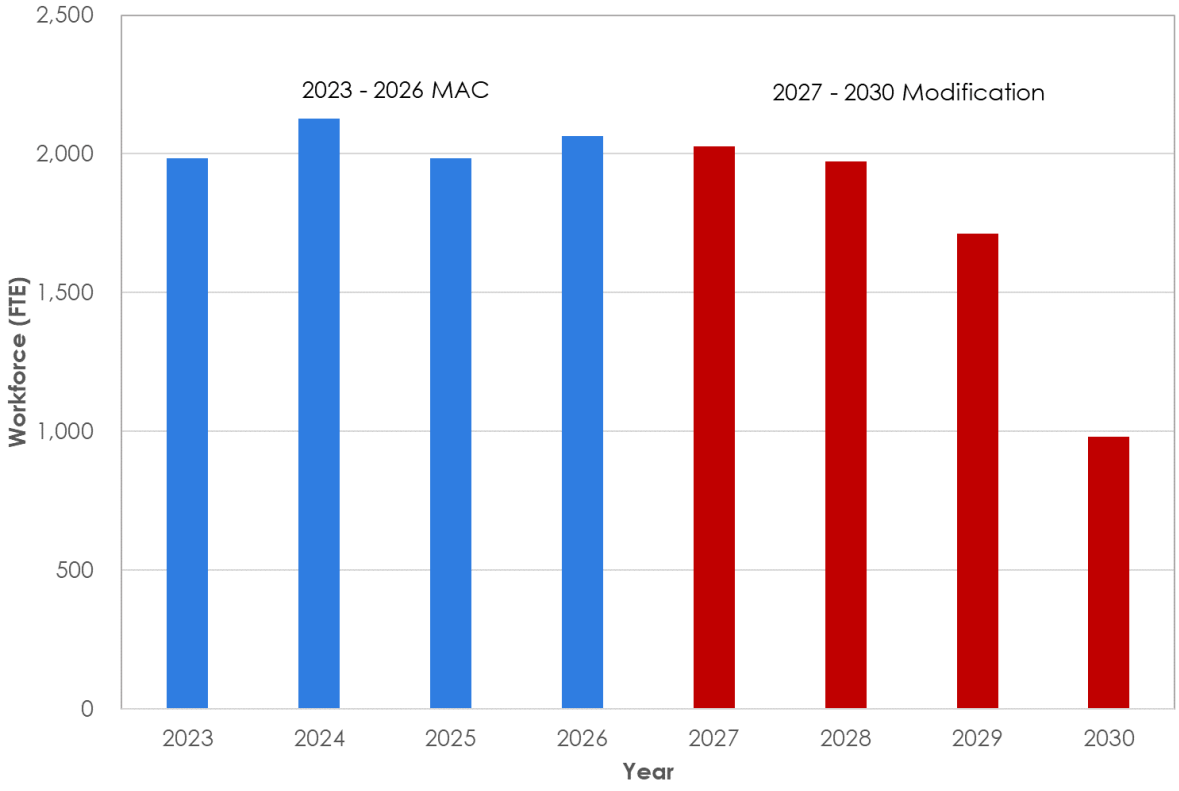
As described in Section 1 of the Modification Report, the Modification would involve no change to:

- existing mining tenements;
- existing coarse rejects and tailings management;
- existing workforce;
- the existing explosives facility;
- existing site accesses;
- existing electricity supply and distribution;

- existing offset and rehabilitation objectives;
- existing services, plant and equipment; and
- the existing hours of operation and associated activities (undertaken 24 hours per day, seven days a week).

The operational workforce is expected to vary over the life of the MAC and Modification, as shown in Figure 2.1.

Figure 2.1: MAC and Modification FTE Workforce



2.3 Modification Impact Assessment Scenario

With respect to potential impacts on the road transport environment, the key aspects of the Modification are:

- continuation of open cut mining for four years from 30 June 2026 to 30 June 2030;

- continuation of employment of a total workforce of approximately 2,200 full-time equivalent employees, reduced from the previously assessed peaks of approximately 2,600 FTE employees at peak production and 240 FTE employees during peak construction phases;
- reduction in the overall approved ROM coal handling from 36 Mtpa to 29 Mtpa (including the Mt Arthur Underground);
- reduction in transport of product coal from 27 Mtpa to 20 Mtpa, with a reduction in the maximum number of rail movements from 30 to 20 movements per day (i.e., 15 laden train departures to 10 laden train departures); and
- continued use of the existing site access roads on Thomas Mitchell Drive and Edderton Road.

To assess the potential road transport impacts of the Modification on the road network, this study considers future road network conditions during the proposed final year of operations at MAC. A conservative approach has been selected to cover both maximum employment and maximum production, notwithstanding that there is a forecast reduction in both in the final year (Section 2.2).

The assessment scenario has adopted the maximum operating characteristics of the Modification, i.e., it assumes that in 2030, MAC would:

- employ a workforce of 2,200 FTE personnel (which exceeds the forecast peak FTE workforce over the life of the MAC and Modification as shown in Figure 2.1);
- extract and process 25 Mt of open cut ROM coal; and
- transport 20 Mt of product coal by rail.

3 Road Transport Environment

3.1 Existing Road Network

The existing road network in the vicinity of Mt Arthur Mine is shown in Figure 3.1, and the key roads in the road network surrounding the site are described below, as observed by TTPP during fine and dry conditions in January 2023.

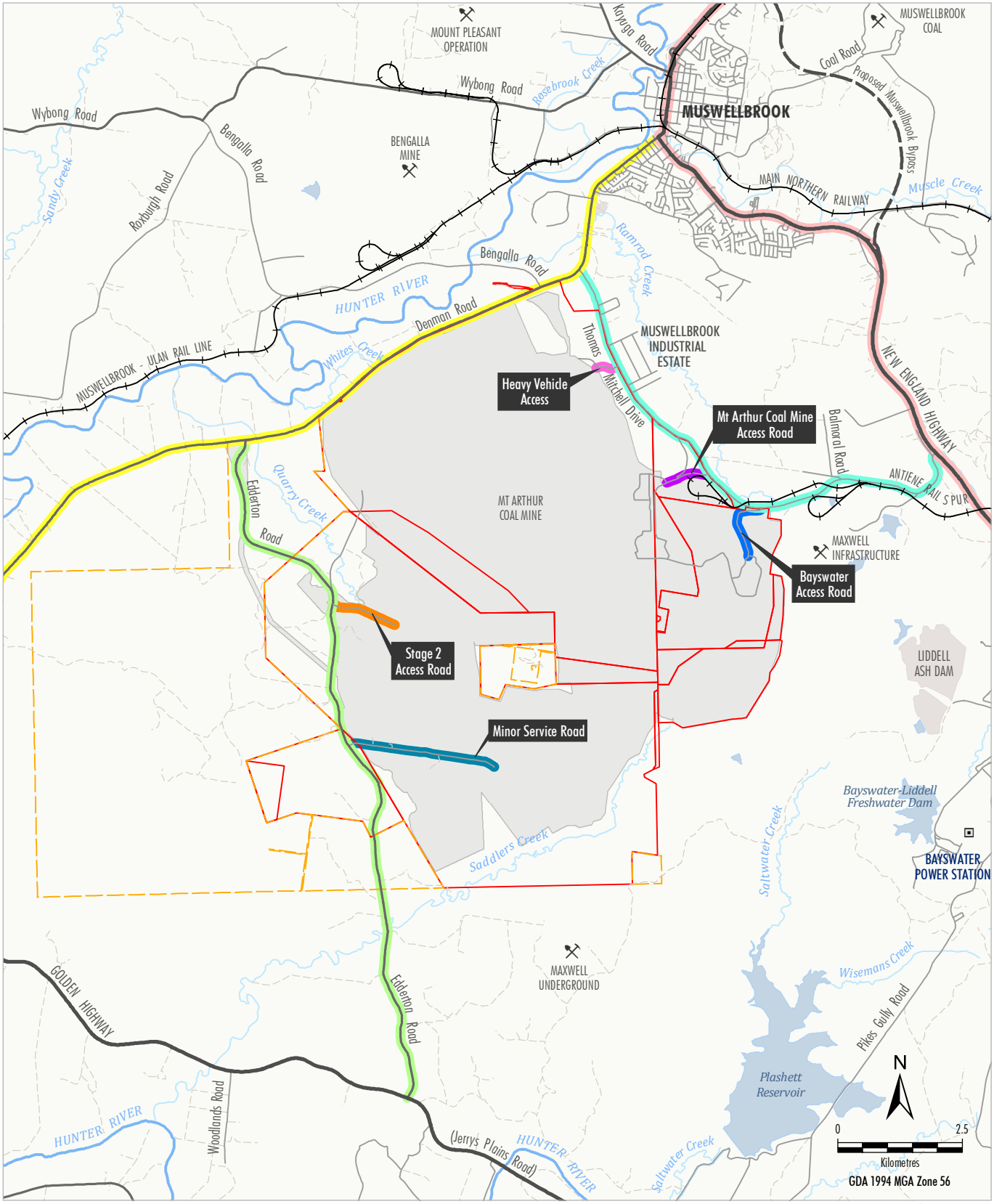
New England Highway (Highway 9, Route A15) is a major State road and forms part of the National Land Transport Network, a defined national network of road and rail infrastructure links for which Commonwealth funding is provided to assist national and regional economic and social development. New England 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 an approved B-double route. To the north of MAC, New England Highway passes through Muswellbrook where it is known as Maitland Street, Sydney Street, Bridge Street and Aberdeen Street. Bridge Street passes under a railway bridge. An alternative route for over-height vehicles is signposted via Bell Street, Victoria Street and Market Street.

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 Transport for New South Wales (TfNSW). 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 (Main Road 209) is a State road which is funded by TfNSW but maintained by Muswellbrook Shire Council. Denman Road forms the primary connection between the townships 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 an approved B-double route.

Denman Road provides access to a number of existing mining operations via local roads such as Bengalla 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.



HVE-19-09 MOD2_RTA_2040

Source: BHP (2023); TTPP (2023); NSW Spatial Services (2023); Transport for NSW (2020)

LEGEND

- Mining Operation
- Exploration Licence Boundary (EL, AUTH)
- Mining and Coal Lease Boundary (ML, MPL, CL, CCL)
- Approximate Extent of Existing/Approved Surface Development
- Railway
- Highway
- Arterial Road
- Sub-arterial Road
- Local Road
- Track

Key Roads

- New England Highway
- Denman Road
- Thomas Mitchell Drive
- Edderton Road
- MAC Main Access Road
- MAC Bayswater Access Road
- MAC Stage 2 Access Road
- MAC Heavy Vehicle Access
- MAC Minor Service Road

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Existing Road Network

Figure 3.1

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 MAC, the Muswellbrook Industrial Area, and the Maxwell Underground Project. Thomas Mitchell Drive crosses the Antiene Rail Spur at rail over road crossings at two locations approximately 3 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 and the local roads in the Industrial Area are approved for use by B-doubles.

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.

The northern part of Edderton Road was realigned as part of the Mt Arthur Open Cut Consolidation Project, resulting in the relocation of the intersection of Edderton Road with Denman Road approximately 2.5 km to the west of its former location. The northern realignment of Edderton Road is constructed with a sealed carriageway approximately 11 m wide, comprising two 3.5 m wide travel lanes and two 2.0 m wide shoulders. Unsealed shoulders approximately 1.5 m wide are provided on each side of the seal. This part of Edderton Road is linemarked with centre and edge lines and is signposted with a 100 km/h speed limit, which reduces to 80 km/h in proximity to the MAC Stage 2 Access Road (described below).

Edderton Road has been upgraded to a point approximately 3.8 km south of the MAC Stage 2 Access Road, with the remaining 6.8 km of Edderton Road to Golden Highway having a sealed carriageway approximately 5.0 m to 6.0 m wide with narrow unsealed shoulders. It has no centre or edgelines and a posted speed limit of 100 km/h. Development of the Maxwell Infrastructure may also realign approximately 3 km of Edderton Road at its southern end, with a new intersection with Golden Highway to be located approximately 1 km west of the existing intersection.

The section of road which was formerly Edderton Road north of its intersection with the realigned Edderton Road (the **former Edderton Road**) was previously in use for access to MAC's Explosives facility. Mining has since extended over this road, and it is therefore not considered further in this assessment.

MAC Main Access Road is a sealed private road that provides the main vehicular access for MAC to and from Thomas Mitchell Drive. It has a single travel lane in each direction, with overtaking not permitted in both travel directions, and a posted speed limit of 70 km/h that reduces to 40 km/h approaching the administration area.

MAC Bayswater Access Road is a sealed private road that provides access to MAC facilities located near the Rail Loading Facility and limited access for some heavy vehicles accessing the Mt Arthur site. It has a single travel lane in each direction, with overtaking not permitted in both travel directions, and a signposted speed limit of 40 km/h immediately south of Thomas Mitchell Drive, and 60 km/h farther within the site.

MAC Stage 2 Access Road is a sealed private road that provides access to MAC from Edderton Road. It has a single travel lane in each direction with wide sealed shoulders and a signposted 60 km/h speed limit. Heavy vehicles exiting the MAC Stage 2 Access Road are required to turn right (only) on to Edderton Road.

MAC Heavy Vehicle Access Road is an unsealed private road that provides access to MAC from Thomas Mitchell Drive near the Muswellbrook Industrial Estate approximately 400 m north of Carramere Road. It is an unsealed road with a single travel lane in each direction, and access is controlled by a gate approximately 45 m from the western side of Thomas Mitchell Drive. It provides access for maintenance of heavy vehicles at a service facility in the Muswellbrook Industrial Area, which has its access on the northern side of Thomas Mitchell Drive approximately 300 m south of the MAC Heavy Vehicle Access Road. Approximately twice per month, haul trucks travel on Thomas Mitchell Drive between the maintenance facility and the MAC Heavy Vehicle Access Road, for which the maintenance provider holds the relevant approvals for temporary road closures. Approximately five light vehicles per day use the MAC Heavy Vehicle Access Road for the maintenance of pumps and monitoring equipment. As the level of use of the MAC Heavy Vehicle Access Road is very low on a day-to-day basis, it has not been considered further in this assessment.

MAC Minor Service Road is an unsealed road located off Edderton Road approximately 3 km south of the Stage 2 Access Road, and is also known as McDonalds Road. It allows access to the summit of Mount Arthur, in accordance with Schedule 3, Condition 47 of Project Approval 09_0062, which requires BHP to:

(f) maintain reasonable access to the summit of Mt Arthur for emergency services and legitimate users on a 24 hour per day basis, except for temporary closures as required for blasting.

The access is only used sporadically by third party utility companies, so is not considered further in this assessment.

3.2 Existing Intersections

The key intersections in the road network of relevance to MAC road traffic are described below.

Thomas Mitchell Drive and MAC Main Access Road

The intersection of Thomas Mitchell Drive with the MAC Main Access Road (Figure 3.2) is constructed as a T-intersection, with an auxiliary left turn lane and channelised right turn lane in Thomas Mitchell Drive for vehicles slowing to enter the access road. The MAC Main Access Road is flared on its approach to Thomas Mitchell Drive, with a double barrier centreline and no auxiliary lanes. The eastbound departure lane of Thomas Mitchell Drive is widened to approximately 7 m over a length of approximately 40 m, forming a de facto acceleration lane for vehicles turning left from the MAC Main Access Road.

Figure 3.2: Intersection of Thomas Mitchell Drive and MAC Main Access Road

Source: nearmap, image 6 May 2022

Thomas Mitchell Drive and MAC Bayswater Access Road

The intersection of Thomas Mitchell Drive with the MAC Bayswater Access Road (Figure 3.3) is a constructed as a seagull intersection, with an auxiliary left turn lane and channelised right turn lane in Thomas Mitchell Drive for vehicles slowing to enter the access road. A dedicated acceleration lane is provided for vehicles exiting the access road via a right turn into Thomas Mitchell Drive, which allows those vehicles to conduct a staged exit manoeuvre. The Bayswater access road is flared on its approach to Thomas Mitchell Drive, with a painted double barrier centreline and no auxiliary lanes.

Figure 3.3: Intersection of Thomas Mitchell Drive and MAC Bayswater Access Road

Source: nearmap, image 6 May 2022

Edderton Road and MAC Stage 2 Access Road

The intersection of Edderton Road with the MAC Stage 2 Access Road (Figure 3.4) is a constructed as a T-intersection, with an auxiliary left turn lane in Edderton Road for vehicles slowing to turn left into the Stage 2 Access Road, and a widened shoulder on the western side of Edderton Road to assist through vehicles to pass around a vehicle which has slowed to turn right into the MAC Stage 2 Access Road. The MAC Stage 2 Access Road is flared on its approach to the intersection, with no auxiliary lanes.

Figure 3.4: Intersection of Edderton Road and MAC Stage 2 Access Road

Source: nearmap, image 6 May 2022

Thomas Mitchell Drive and Denman Road

Upgrading of the intersection of Denman Road and Thomas Mitchell Drive (Figure 3.5) was required by Condition 47(c) of Project Approval 09_0062 for the Mt Arthur Open Cut Consolidation Project. Muswellbrook Shire Council's initial preference for a seagull design was not supported by TfNSW, due to road safety issues associated with seagull treatments (Muswellbrook Shire Council, 2022). Upgrading of the intersection was completed during in 2022, with the intersection constructed with channelised left and right turn lanes in Thomas Mitchell Drive, a wide painted median on the northern approach, and separate left and right turn lanes in Thomas Mitchell Drive. Vehicles turning right into Thomas Mitchell Drive have priority over those turning left into Thomas Mitchell Drive.

Figure 3.5: Intersection of Denman Road and Thomas Mitchell Drive

Source: nearmap, image 12 February 2023

Thomas Mitchell Drive and New England Highway

The intersection of Thomas Mitchell Drive with New England Highway (Figure 3.6) 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.

Figure 3.6: Intersection of New England Highway and Thomas Mitchell Drive

Source: nearmap, image 6 May 2022

Edderton Road and Denman Road

With the realignment of the northern part of Edderton Road, a new intersection between Edderton Road and Denman Road was completed in 2020. The intersection (Figure 3.7) has a channelised right turn lane and auxiliary left turn lane in Denman Road for vehicles to decelerate clear of through vehicles before entering Edderton Road.

Figure 3.7: Intersection of Denman Road and Edderton Road

Source: nearmap, image 6 May 2022

Edderton Road and Golden Highway

The existing intersection of Edderton Road with Golden Highway (Figure 3.8) is constructed with a channelised right turn in Golden Highway for vehicles slowing to turn right into Edderton Road. Golden Highway has two westbound through lanes and one eastbound through lane at the intersection. Edderton Road is flared at the intersection, with no auxiliary or channelised lanes. Development of the Maxwell Underground Project (State Significant Development [SSD] 9526) may realign the southern part of Edderton Road, with the existing intersection at Golden Highway to be replaced with a new intersection approximately 1 km west of the existing intersection.

Figure 3.8: Intersection of Golden Highway and Edderton Road

Source: nearmap, image 9 February 2022

3.3 Road Safety History

Road crash records published by the NSW Centre for Road Safety have been reviewed for the five-year period from 1 January 2017 to 31 December 2021. The data include those crashes which conform to the national guidelines for reporting and classifying road vehicle 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; and
- the crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

3.3.1 Thomas Mitchell Drive

The data for the five-year period have been reviewed with respect to Thomas Mitchell Drive, being the principal access route for MAC-generated traffic travelling to and from the MAC Main Access Road and the MAC Bayswater Access Road. The review included its intersections with Denman Road and New England Highway. That review identified that nine crashes occurred along Thomas Mitchell Drive (inclusive of the intersections with Denman Road and New England Highway), which are discussed below.

Thomas Mitchell Drive and Denman Road Intersection

- One single-vehicle non-casualty crash occurred during rain on a wet road surface in daylight, involving a westbound light vehicle that was turning right and left the carriageway, striking a roadside barrier. Speeding was nominated as a contributing factor. The crash occurred in February 2020, prior to the upgrading of the intersection.

Thomas Mitchell Drive and New England Highway Intersection

- Two crashes involved a southbound light vehicle turning right conflicting with a northbound through light vehicle.
- One crash involved an eastbound light vehicle turning right conflicting with a northbound through light vehicle.
- One crash was a single northbound light vehicle which left the carriageway and struck a guardrail.

Thomas Mitchell Drive between Denman Road and MAC Main Access

- One single vehicle crash occurred in darkness near the intersection of Denman Road with the MAC Main Access, involving a northbound light vehicle that left the carriageway on a bend and struck an object. Speeding and fatigue were nominated as contributing factors.
- One serious injury single-vehicle crash occurred at the intersection of Thomas Mitchell Drive and Glen Munro Road, involving a westbound light vehicle which left the carriageway and struck a parked vehicle. Speeding was nominated as a contributing factor.
- One moderate injury rear end crash occurred between northbound light vehicles at the intersection of Thomas Mitchell Drive and Blakefield Road.
- One fatal head-on crash occurred on Thomas Mitchell Drive 4 km from Denman Road, involving an eastbound vehicle travelling on the incorrect side of the road. Speeding was nominated as a contributing factor.

Thomas Mitchell Drive between MAC Main Access and New England Highway

- No crashes occurred on Thomas Mitchell Drive to the east of MAC (with the exception of those described above at the intersection with New England Highway).

There was no clustering of crashes at any location on Thomas Mitchell Drive that might suggest there is an inherent concern with the design of the road or intersection at any specific location. All of the reported crashes involved light vehicles (only).

3.3.2 Edderton Road

The data for the five-year period have been reviewed with respect to Edderton Road, being the principal access route for MAC-generated traffic travelling to and from the MAC Stage 2 Access Road. The review included its key intersections with Denman Road and Golden Highway, noting that the northern realignment of Edderton Road was opened in 2020, during

the period for which the crash data is available. That review identified that three crashes occurred along Edderton Road with no crashes occurring at its intersections with Denman Road or Golden Highway. The reported crashes are discussed below.

- One minor injury single-vehicle crash occurred 1 km north of McDonalds Road (which is now a minor access road for MAC), involving a northbound light vehicle which left the carriageway on a straight section of road and struck a fence in fine weather and daylight.
- One serious injury single-vehicle crash occurred 9 km south of Denman Road (approximately 5 km south of the MAC Stage 2 Access Road intersection), involving a northbound motorcycle which left the carriageway on a curve and struck a fence, in wet weather conditions at dawn.
- One serious injury single-vehicle crash occurred 3 km north of Golden Highway, involving a northbound light vehicle which struck a kangaroo on the carriageway then struck a fence, in fine weather and darkness.

There was no clustering of crashes at any location on Edderton Road that might suggest there is an inherent concern with the design of the road or intersection at any specific location. All of the reported crashes involved light vehicles (only), and neither speeding nor fatigue were nominated as contributing factors in any of the crashes on Edderton Road.

3.4 Railway Crossings

The Main Northern Railway is located to the east of New England Highway, and provides the main railway connection between Sydney and Armidale, via Werris Creek, Tamworth, Muswellbrook, Newcastle and the Central Coast.

The Australian Rail Track Corporation (ARTC) leases the Hunter Valley Coal Rail network, including the Main Northern Railway which links the coalfields to the north and the Port of Newcastle to the south. The Main Northern Railway lies to the east of MAC, extending through Singleton to the south-east and Muswellbrook to the north. 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 is owned by Antiene Joint Venture, which is currently managed by BHP and Malabar Ventures (Management) Pty Ltd). It provides rail access to MAC and the Maxwell Infrastructure, 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 (refer to photographs in Appendix A).

Figure 3.9: Railway Level Crossing on Antiene Railway Station Road

Source: nearmap, image 12 April 2021

It is a passively controlled crossing, with signage assemblies on each road approach comprising a "RAILWAY CROSSING" sign (R6-25), above a "STOP" sign (R1-1), above a "LOOK FOR TRAINS" sign (G9-48). Guideposts with reflective markers are provided on the side of Antiene Railway Station Road between Hebden Road and the level crossing, with a single guidepost on each side of the road on the northern side of the level crossing.

The northbound approach from Hebden Road has "RAIL X" pavement marking on Antiene Railway Station Road, double solid centre lines and a stop line. The pavement markings are observed to be somewhat faded (January 2023). 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 (W7-7, followed by W7-12 and W8-3 assemblies). 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.

3.5 Historic Traffic Volumes

TfNSW collects and publishes Annual Average Daily Traffic (AADT) volume data at selected locations on its roads. Available AADT data on roads in the vicinity of Muswellbrook since 2015 were reviewed and collated, and are summarised in Table 3.1.

Table 3.1: Historic Annual Average Daily Traffic Volumes (vehicles per day)

Road	TfNSW Station	2015	2017	2018	2019	2020	2021
New England Highway South of Macqueen Street, Aberdeen	06158	10,179	10,355	10,311	10,431	9,620	9,547
New England Highway North of Burtons Lane (north of Muswellbrook)	06157	10,161	10,336	10,324	10,299	9,594	9,510
New England Highway South of Muscle Creek Road (south of Muswellbrook)	06154	9,359	9,349	9,393	9,569	8,660	8,624
New England Highway North of Rixs Creek Lane (north of Singleton)	06153	13,254	13,796	14,284	14,671	13,888	13,747
Merriwa Road (Golden Highway) West of Giants Creek Road, Sandy Hollow	06164	2,023	2,203	2,221	2,164	2,083	2,395
Palace Street (Golden Highway) North of Kenilworth Street, Denman	05223	2,741	2,908	-	-	-	-

Historic daily traffic volume data for the key roads of relevance to MAC have been collated, from other available sources, and are summarised in Table 3.2, noting that as mining activity levels have changed over time, current volumes may be significantly different from the historic volumes, particularly on those roads used for access to and from mines in the region.

Table 3.2: Historic Daily Traffic Volumes (vehicles per day)

Road	Survey Date	Average Weekday	Average Daily	Data Source
Bengalla Road south-east of Wybong Road	February 2020	2,010	1,700	TTPP, 2020
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	October 2013	2,371	2,094	TTPP, 2019
Denman Road north of Thomas Mitchell Drive	October 2013	8,675	7,184	TTPP, 2019
Denman Road between Golden Highway and Edderton Road	November 2013	2,446	2,219	Cardno, 2013
Edderton Road 200m south of Denman Road	April 2012	1,011	896	GTA Consultants, 2012
Golden Highway west of Denman Road	October 2013	4,231	3,898	TTPP, 2019
Golden Highway at Ogilvies Pass	November 2014	2,166	2,141	TTPP, 2019
MAC Main Access Road	April 2021	2,973	2,436	GTA Consultants, 2012
Mount Pleasant Operation Road west of Wybong Road	February 2020	888	737	TTPP, 2020
Thomas Mitchell Drive east of Industrial Area	February 2013	3,993	3,191	Hyder, 2013
Thomas Mitchell Drive Denman Road to Industrial Area Industrial Area to MAC Mine MAC Mine to Maxwell Underground Project Maxwell Underground Project to New England Highway	November 2013	8,801 4,702 3,789 4,146	- - - -	Cardno, 2015[A]
Thomas Mitchell Drive near Denman Road	November 2016	-	5,006	GHD, 2017
Thomas Mitchell Drive east of Denman Road west of New England Highway	June 2018	6,125 3,350	4,902 2,817	TTPP, 2019
Wybong Road north of Bengalla Road	February 2020	1,349	1,149	TTPP, 2020

[A] *Volumes are modelled, not surveyed.*

3.6 Traffic Surveys

To quantify existing traffic conditions on roads of relevance to the Modification, a program of traffic surveys was conducted during June 2021, prior to the introduction of Covid-19 related travel restrictions in NSW and outside of school holidays. The surveys are therefore considered to have captured typical conditions at that time. Travel behaviour at the time of the traffic surveys is considered to be consistent with current behaviour, as employment conditions at the mining developments in the region are no longer constrained, and travel restrictions (e.g., travel distance limits and car occupancy limits) have been lifted. This assessment considers cumulative changes to the road traffic environment relative to the surveyed conditions in 2021, including the impacts of changes to other developments in the region (Section 3.10), changes to the road network (Section 3.11) and non-specific growth in traffic (Section 3.12).

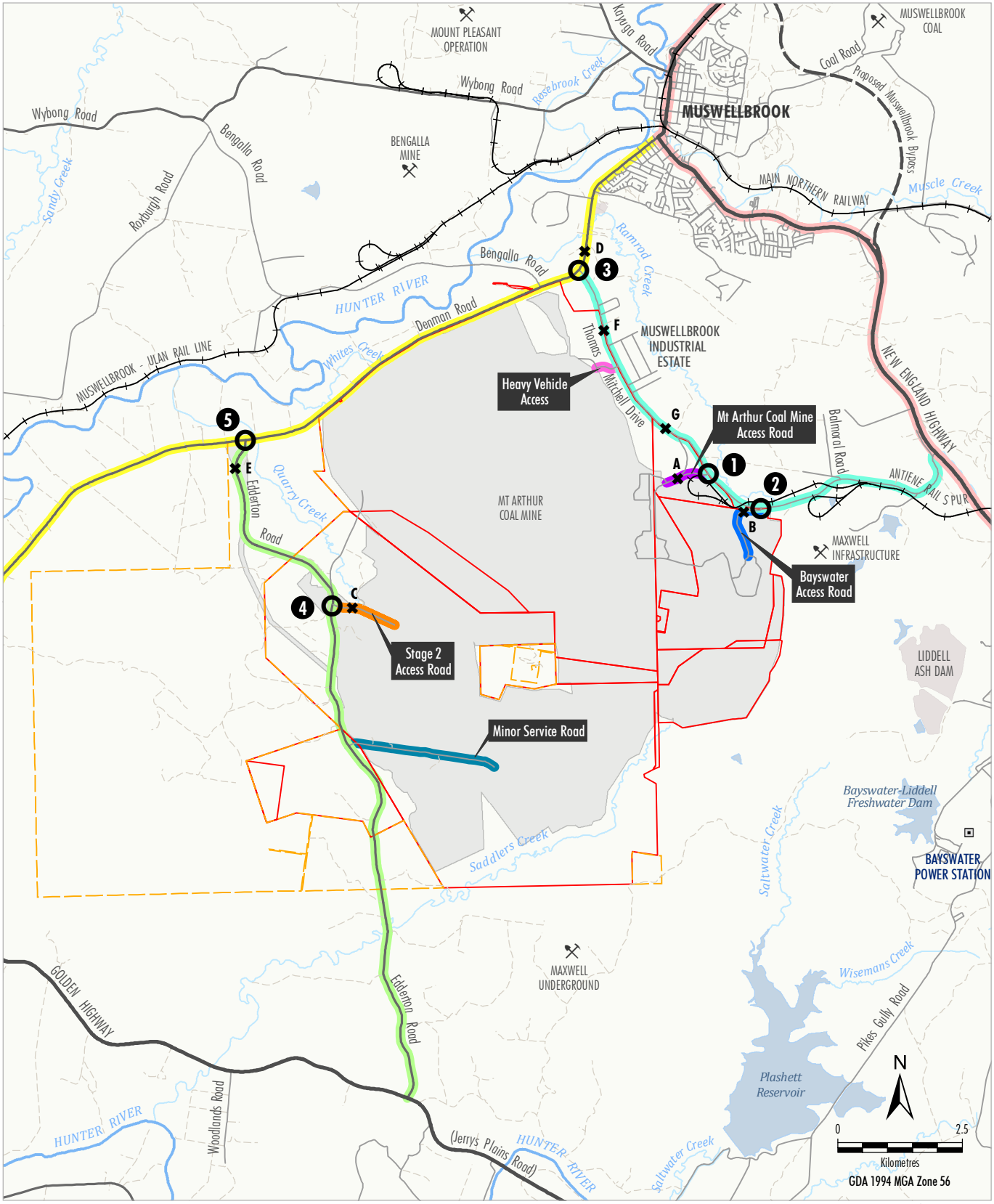
The survey program included automatic tube counts over seven days at:

- MAC Main Access Road;
- MAC Bayswater Access Road;
- MAC Stage 2 Access Road;
- Denman Road north of Thomas Mitchell Drive;
- Edderton Road south of Denman Road;
- Thomas Mitchell Drive near Industrial Area; and
- Thomas Mitchell Drive west of Mt Arthur Access.

Surveys of intersection turning movements were undertaken on Tuesday 22 June 2021 between 5:00 am and 7:00 pm at the intersections of:

- MAC Main Access Road and Thomas Mitchell Drive;
- MAC Bayswater Access Road and Thomas Mitchell Drive;
- Thomas Mitchell Drive and Denman Road;
- Edderton Road and MAC Stage 2 Access Road; and
- Denman Road and Edderton Road.

The survey locations are presented on Figure 3.10, and results of the midblock and intersection surveys are presented in Appendix B.



HVE-19-09 MOD2_RTA_2030

Source: BHP (2023); TTPP (2023); NSW Spatial Services (2023); Transport for NSW (2020)

LEGEND

- Mining Operation
- Exploration Licence Boundary (EL, AUTH)
- Mining and Coal Lease Boundary (ML, MPL, CL, CCL)
- Approximate Extent of Existing/Approved Surface Development
- Railway
- Highway
- Arterial Road
- Sub-arterial Road
- Local Road
- Track

Key Roads

- New England Highway
- Denman Road
- Thomas Mitchell Drive
- Edderton Road
- MAC Main Access Road
- MAC Bayswater Access Road
- MAC Stage 2 Access Road
- MAC Heavy Vehicle Access
- MAC Minor Service Road

Proposed Traffic Survey Locations

- Intersection Survey Location
- Midblock Tube Count

BHP

MT ARTHUR COAL MINE MODIFICATION 2

Traffic Survey Locations

Figure 3.10

3.7 Traffic Volumes

Table 3.3 presents a summary of the surveyed daily traffic volumes at the midblock locations.

Table 3.3: Surveyed Daily Traffic Volumes 2021 (vehicles per day)

Site[A]	Road	Mon	Tue	Wed	Thu	Fri	Sat	Sun
A	MAC Main Access	2,059	2,128	2,052	2,165	1,942	1,131	1,135
B	MAC Bayswater Access	1,039	1,037	1,105	1,137	984	507	495
C	MAC Stage 2 Access	156	144	191	170	108	34	36
D	Denman Road North of Thomas Mitchell Drive	8,741	9,308	9,162	9,415	9,073	5,250	4,249
E	Edderton Road South of Denman Road	635	708	733	696	662	388	324
F	Thomas Mitchell Drive North of Industrial Area	6,141	6,630	6,425	6,536	6,118	2,316	1,861
G	Thomas Mitchell Drive West of MAC Main Access Road	3,995	4,097	3,945	4,058	3,794	1,693	1,552

[A] *Refer to Figure 3.10.*

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 utilities (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 3.4.

Table 3.4: Surveyed Average Weekday Daily Traffic Classification 2021 (vehicles per day)

Site[A]	Road	Light	Rigid	Articulated	Total	Percent Heavy
A	MAC Main Access	1,641	384	44	2,069	20.7%
B	MAC Bayswater Access	936	102	22	1,060	11.7%
C	MAC Stage 2 Access	95	37	22	154	38.3%
D	Denman Road North of Thomas Mitchell Drive	8,429	562	149	9,140	7.8%
E	Edderton Road South of Denman Road	501	153	33	687	27.1%
F	Thomas Mitchell Drive North of Industrial Area	4,957	1,057	356	6,370	22.2%
G	Thomas Mitchell Drive West of MAC Main Access Road	3,113	494	370	3,977	21.7%

[A] *Refer to Figure 3.10.*

The survey results allow the distribution of traffic through the day on each road to be quantified, as presented in Figure 3.11.

Figure 3.11: Surveyed Average Weekday Traffic by Time of Day (vehicles per 15 minutes)

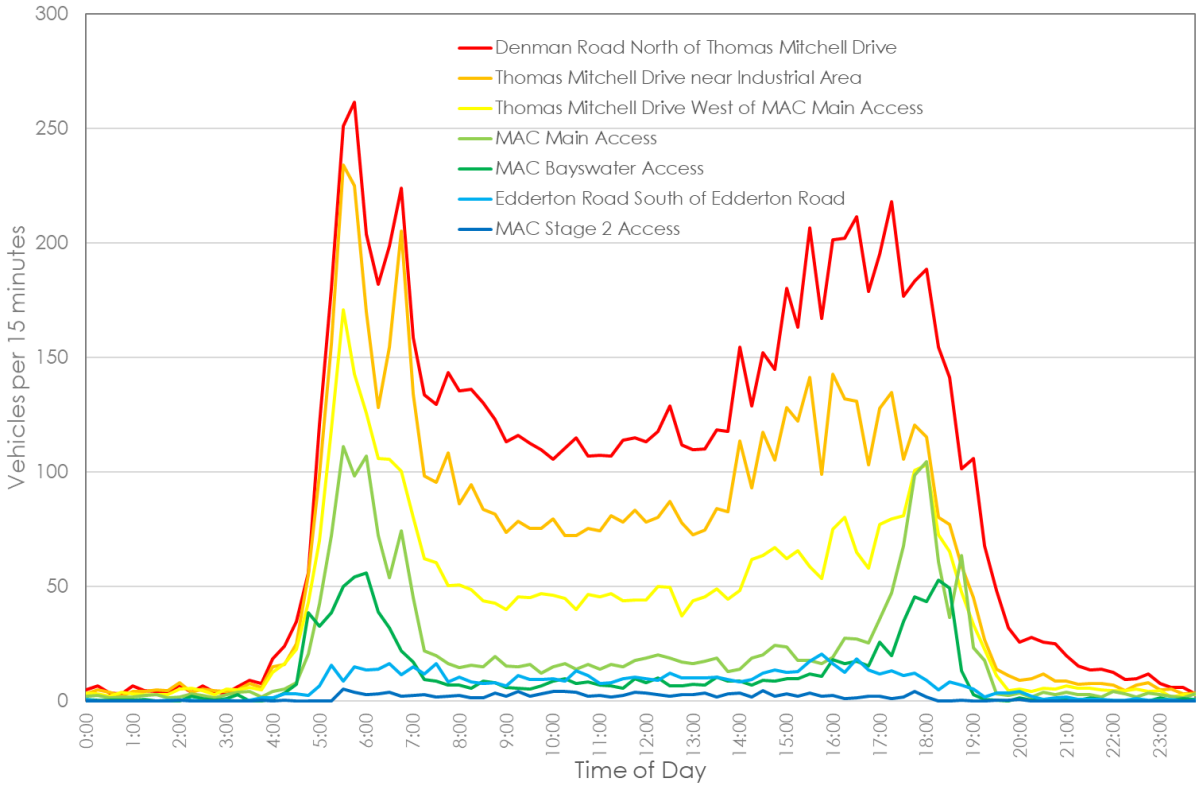


Figure 3.11 indicates that most of the roads display reasonably distinct morning and afternoon peaks, with reduced volumes through the middle of the day and very low volumes overnight.

3.8 MAC Traffic Generation

The traffic surveys described in Section 3.6 enable the traffic generation of MAC at the time of the traffic surveys to be quantified. Based on the average weekday ATC results, the morning and evening peak hours for total traffic generated by MAC were identified as occurring between 5:30 am and 6:30 am, and between 5:30 pm and 6:30 pm respectively. Table 3.5 presents the vehicle trips generated by MAC during those peak hours, and the total trips generated throughout the day. This includes all trips generated to and from the MAC Main Access, MAC Bayswater Access and the MAC Stage 2 Access, being the principal accesses for MAC.

Table 3.5: Surveyed Average Weekday MAC Traffic Generation in 2021

	Light Vehicles	Rigid Heavy Vehicles	Articulated Heavy Vehicles	Total Vehicles
MAC AM Peak Hour 5:30 am to 6:30 am (vehicles per hour)				
MAC Main Access	321	66	2	389
MAC Bayswater Access	189	9	1	199
MAC Stage 2 Access	14	2	0	16
Total	524	77	3	604
MAC PM Peak Hour 5:30 pm to 6:30 pm (vehicles per hour)				
MAC Main Access	270	61	2	333
MAC Bayswater Access	164	13	0	177
MAC Stage 2 Access	7	1	0	8
Total	441	75	2	518
Daily Total (vehicles per day)				
MAC Main Access	1,641	384	44	2,069
MAC Bayswater Access	936	102	22	1,060
MAC Stage 2 Access	95	37	22	154
Total	2,672	523	88	3,283

Classifications using Austroads Vehicle Classification System.

TTPP's experience with mining and quarrying projects has found that ATCs tend to overcount heavy vehicles in these circumstances due to a relatively high proportion of "Class 3" vehicles, which are two-axle small trucks/buses with a wheelbase greater than 3.2 m. Under the Austroads Vehicle Classification System, the longer wheelbase of some larger utilities, vans and 4WDs commonly used by the workforce result in these vehicles being classified as heavy vehicles, while those vehicles have a Gross Vehicle Mass (GVM) below 4.5 t, and so are considered as light vehicles under NSW's vehicle registration definition. The survey results indicate that 82 percent of the average weekday rigid heavy vehicles generated by MAC

are "Class 3" vehicles. To the extent that some of those Class 3 vehicles are likely to be light vehicles used for day-to-day trips by the workforce travelling to and from the site, the ATC results are considered to overestimate the number of heavy vehicle trips associated with mining activity at MAC based on GVM.

To gauge the extent to which the ATC results may have overestimated MAC's heavy vehicle trip generation, Table 3.6 compares the results of the 14-hours of the intersection surveys at the MAC accesses with the ATC results over the same 14-hour period on the average weekday. The intersection survey classification is based on a visual assessment of each vehicle, with 4WDs and utilities with single wheels on each side of the rear axle being identified as light vehicles. Small trucks with dual wheels on each side of the rear axle are identified as heavy vehicles.

Table 3.6: MAC Traffic Composition Comparison

	Light Vehicles	Heavy Vehicles	Total Vehicles	Percent Heavy Vehicles
ATC 14-hour Average Weekday – Austroads Vehicle Classification System				
MAC Main Access	1,504	393	1,897	20.7%
MAC Bayswater Access	870	113	983	11.5%
MAC Stage 2 Access	93	55	148	37.2%
Total	2,467	561	3,028	18.5%
14-hour Intersection Survey 22 June 2021 – Visual Identification				
MAC Main Access	1,783	131	1,914	6.8%
MAC Bayswater Access	894	75	969	7.7%
MAC Stage 2 Access	96	43	139	30.9%
Total	2,773	249	3,022	8.2%

The results in Table 3.6 suggest that over 14 hours across all MAC access roads, approximately 300 vehicles identified as heavy vehicles by the ATC survey were identified as light vehicles by the intersection survey. It suggests that the ATC heavy vehicle trip generation is more than double that suggested by the intersection surveys. When considering the heavy vehicle generation of MAC, this assessment has considered the higher proportion of heavy vehicles suggested by the ATC surveys.

Table 3.7 presents the surveyed average weekday two-way traffic flows during the morning and afternoon peak hours for MAC-generated traffic.

Table 3.7: Average Weekday Traffic Volumes During MAC Peak Hours (vehicles per hour)

Site[A]	Road	Light Vehicles	Rigid Heavy Vehicles	Articulated Heavy Vehicles	Total Vehicles
MAC AM Peak Hour 5:30 am to 6:30 am					
A	MAC Main Access	321	66	2	389
B	MAC Bayswater Access	189	9	1	199
C	MAC Stage 2 Access	14	2	0	16
D	Denman Road North of Thomas Mitchell Drive	858	37	4	899
E	Edderton Road South of Denman Road	39	12	1	52
F	Thomas Mitchell Drive North of Industrial Area	635	114	9	758
G	Thomas Mitchell Drive West of MAC Main Access Road	489	45	12	546
MAC PM Peak Hour 5:30 pm to 6:30 pm					
A	MAC Main Access	270	61	2	333
B	MAC Bayswater Access	164	13	0	177
C	MAC Stage 2 Access	7	1	0	8
D	Denman Road North of Thomas Mitchell Drive	684	17	3	704
E	Edderton Road South of Denman Road	32	6	0	38
F	Thomas Mitchell Drive North of Industrial Area	362	54	6	422
G	Thomas Mitchell Drive West of MAC Main Access Road	328	25	5	358

[A] *Refer to Figure 3.10.*

The survey results indicate that the morning peak is typically the busier of the peak hours on the surrounding public roads.

3.9 MAC Traffic Distribution

The results of the intersection surveys allow the distribution of MAC's traffic approaching and departing the site to be quantified. As a check of how closely the single day intersection survey represents the average weekday conditions, Table 3.8 compares the total inbound and outbound vehicle numbers from the ATC and intersection survey results over the 14-hour period covered by the intersection surveys.

Table 3.8: Surveyed MAC Traffic Generation Comparison 5:00 am to 7:00 pm

	Average Weekday			14-Hour Intersection Survey		
	Inbound	Outbound	Two Way	Inbound	Outbound	Two Way
MAC Main Access	970	927	1,897	976	938	1,914
MAC Bayswater Access	509	474	983	497	472	969
MAC Stage 2 Access	75	73	148	70	69	139
Total	1,554	1,474	3,028	1,543	1,479	3,022

The comparison in Table 3.8 indicates that with regard to the traffic generated by MAC, the average weekday ATC results and the intersection survey results are reasonably consistent. Overall, TTPP considers that the comparison confirms that the single day intersection survey results are representative of the average weekday conditions, and the vehicle turning movement distribution surveyed on 22 June 2021 can therefore be reasonably applied to the average weekday conditions.

Table 3.9 summarises the surveyed directional distribution of traffic to and from each of the MAC accesses over the 14-hour intersection survey period.

Table 3.9: Surveyed Directional Distribution of Average Weekday MAC Traffic (percent)

Access	Light Vehicles				Heavy Vehicles			
	Inbound Traffic		Outbound Traffic		Inbound Traffic		Outbound Traffic	
	West or North	East or South	West or North	East or South	West or North	East or South	West or North	East or South
MAC Main Access	55	45	55	45	58	42	62	38
MAC Bayswater Access	46	54	45	55	51	49	45	55
MAC Stage 2 Access	71	29	71	29	100	0	95	5

Classification of vehicles in Table 3.9 is based on visual classification, not the Austroads Vehicle Classification System.

Table 3.9 demonstrates that over the day, the inbound and outbound directions travelled by MAC traffic are similar, i.e., the majority of vehicles depart in the same direction that they arrived from. The distributions of light and heavy vehicles are somewhat different, notably at the MAC Stage 2 Access, where the significant difference between the distribution of light and heavy vehicles is likely due to the load limit on Edderton Road, with all heavy vehicles travelling to and from the MAC Stage 2 Access along Edderton Road north of the access. During the intersection survey period, one heavy vehicle departed the MAC Stage 2 Access towards the south. It is expected that this vehicle was accessing the minor MAC access road that is located at McDonalds Road, approximately 3 km to the south of the MAC Stage 2 Access Road intersection.

3.10 Developments in the Region

Other projects in the region may impact on future traffic conditions on those roads serving the Modification. Key proposed or approved projects that may potentially interact with, or have potential cumulative impacts with, the traffic generated by the Modification have

been identified with reference to the NSW Planning Portal, are listed in Table 3.10. The projects are identified as being relevant in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Projects* (NSW Government, 2021).

Table 3.10: Relevant Future Projects for Cumulative Impact Assessment

Project	Overview	Status Summary	Report Section
Changes to Existing Projects (intensity of operations may change)			
Maxwell Underground Project	SSD 9526 – underground mining to produce high quality coals primarily for the steel industry using existing and proposed new infrastructure. Extract and process up to 8 Mtpa ROM coal, mine life to 30 June 2047.	Approved 2020, construction commenced May 2022, operations not fully commenced	3.10.1
Mangoola Coal Continued Operations Project	SSD 8642 – extension of open cut mining at Mangoola Coal Mine to a new mining area immediately north of the existing operation. Mine life to 31 December 2030.	Approved 2021, construction commenced December 2021, operations not commenced	3.10.2
Bengalla Continuation Project	SSD 5170 – extract and process up to 15 Mtpa of ROM coal, mine life to 28 February 2039.	Approved 2015, operational	3.10.3
Dartbrook Mine	DA 231-7-200 Mod 7 – underground mining, extract and process up to 6 Mtpa ROM coal, mine life to 5 December 2027.	In care and maintenance, mining activity may recommence	3.10.4
Liddell Power Station	Former coal field power station.	Operational, closure occurred in April 2023	3.10.5
Bayswater Power Station	Existing coal field power station.	Operational, planned closure 2030 to 2033	3.10.5
Approved Projects (approved under EP&A Act but not yet started)			
Maxwell Solar Farm	SSD 9820 – development of a 25 MW solar farm and associated infrastructure.	Approved 2020, not commenced	3.10.6
Mount Pleasant Optimisation Project	SSD 10418 – extend the life of the open cut operation by mining deeper coal seams, using existing and proposed new infrastructure. Extend mine life to 22 December 2048.	Approved 2022, not commenced	3.10.7
Liddell Battery and Bayswater Ancillary Works	SSD 8889679 – construct and operate a Battery Energy Storage System, decouple Liddell and Bayswater power stations, facilitate improved performance of Bayswater Power Station.	Approved, not commenced	3.10.9
Projects Under Assessment (exhibited and currently under assessment)			
Bowmans Creek Wind Farm	SSD 10315 – construction and operation of a wind farm with up to 60 wind turbines and associated infrastructure	EIS exhibited, under assessment	3.10.8
Emerging Development Proposals (potentially relevant)			
Spur Hill Underground	SSD 6509 – development of a new underground coal mine and associated infrastructure to extract up to 8 Mtpa of ROM coal for up to 25 years.	SEARs Issued 2014	3.10.10

Each of the relevant projects considered in this assessment (Table 3.10) are discussed below with respect to their potential for interaction with the traffic generated by MAC and the Modification.

3.10.1 Maxwell Underground Project

Development Consent for the Maxwell Underground Project (SSD 9526), at the site of the former Drayton Mine, was granted by the NSW Independent Planning Commission in December 2020 and two modifications were subsequently approved in November 2021 (Modification 1 – Mine Entry Area Modification) and October 2022 (Modification 2 – Mining Optimisation Modification). The Maxwell Underground Project will use existing Maxwell Infrastructure to extract up to 8 Mtpa of ROM coal until 30 June 2047. Vehicular access for the Maxwell Underground Project is via an access road to and from Thomas Mitchell Drive, approximately 4.5 km east of the Mt Arthur Mine Access Road.

TTPP (2019) assessed the road traffic generation of the Maxwell Underground Project during its initial construction phase (Project Year 0, notionally assumed to represent 2020), its operational phase with the peak operational workforce (Project Year 6, 2026) and its longer-term operational stage (Project Year 13, 2033).

The construction phase of the Maxwell Underground Project commenced in May 2022 with the construction of the initial access road and mine entry area. For the purpose of this study, it has been assumed that the traffic forecast to be generated during the short-term peak operational stage of the Maxwell Underground Project (Project Year 6, now indicatively 2028) may coincide with the Modification assessment year 2030. This is expected to overestimate the cumulative traffic generation, as the final year of the Modification would occur later than the Maxwell Underground Project's peak operational stage.

Shift times at the Maxwell Underground Project are planned to be staggered from those of other mining operations, particularly MAC, to minimise traffic impacts during shift change times. Table 3.11 summarises the anticipated operational workforce shift times and attendance at the Maxwell Underground Project in Project Year 6.

Table 3.11: Maxwell Underground Project Anticipated Operational Workforce Shifts

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

Source: TTPP (2019)

Applying the same travel characteristics as assumed in TTPP (2019) and assuming that the workforce arrive in the 30 minutes prior to the start of their shift and depart in the 30 minutes following the end of their shift, and allowing for visitors and deliveries, the traffic generated by

the Maxwell Underground Project during the peak hours for MAC traffic has been estimated as presented in Table 3.12.

Table 3.12: Maxwell Underground Project Traffic Generation

Time of Day	Inbound Vehicles to Maxwell Project		Outbound Vehicles from Maxwell Project		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
5:30 am to 6:30 am (vehicles per hour)	65	4	2	2	67	6	73
5:30 pm to 6:30 pm (vehicles per hour)	6	2	3	4	9	6	15
Daily Total (vehicles per day)	207	40	207	40	414	80	494

Table 3.13 summarises the resulting forecasts of traffic that may be generated by the Maxwell Underground Project in the Modification assessment year 2030 during the peak hours for MAC's traffic and over the average weekday.

Table 3.13: Average Weekday Maxwell Underground Project Operational Traffic 2030

Road and Location	5:30 am to 6:30 am (vehicles per hour)		5:30 pm to 6:30 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Site Access Road South of Thomas Mitchell Drive	67	6	9	6	414	80
Denman Road South of Thomas Mitchell Drive	5	0	0	0	28	2
Denman Road North of Thomas Mitchell Drive	1	0	1	0	12	14
New England Highway North of Thomas Mitchell Drive	30	3	4	3	184	32
New England Highway South of Thomas Mitchell Drive	31	3	4	3	190	32
Thomas Mitchell Drive East of Maxwell Access Road	61	6	8	6	374	64
Thomas Mitchell Drive West of Maxwell Access Road	6	0	1	0	40	16

At the time of the traffic surveys in 2021, it is expected that care and maintenance activity relating to the former Drayton Mine would have been underway, and would have ceased when the Maxwell Underground Project construction activity was commenced. TTPP (2019) conducted a survey of traffic generated by care and maintenance activity during June 2018, which recorded the following trip generation during the morning and evening hours that overlap with the MAC peak hours (Table 3.14).

Table 3.14: Former Drayton Mine Care and Maintenance Traffic Generation 2018

Time of Day	Inbound Vehicles to Maxwell Project		Outbound Vehicles from Maxwell Project		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
5:00 am to 6:00 am (vehicles per hour)	7	1	1	0	8	1	9
6:00 am to 7:00 am (vehicles per hour)	6	1	1	0	7	1	8
5:00 pm to 6:00 pm (vehicles per hour)	0	0	1	0	1	0	1
6:00 pm to 7:00 pm (vehicles per hour)	0	0	1	0	1	0	1
Daily Total (vehicles per day)	40	9	42	7	82	16	98

Source: TTPP (2019)

For the purpose of this assessment, it is assumed that a similar level of traffic was generated during the 2021 traffic surveys, and would have ceased at commencement of Maxwell Underground Project construction. That traffic would therefore no longer travel on the road network during the 2030 Modification assessment scenario. Table 3.15 summarises the forecasts of care and maintenance traffic that was occurring during the 2021 traffic surveys that would not occur during the Modification assessment year 2030.

Table 3.15: Average Weekday Former Drayton Mine Care and Maintenance Traffic 2021

Road and Location	5:30 am to 6:30 am (vehicles per hour)		5:30 pm to 6:30 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Site Access Road South of Thomas Mitchell Drive	7	1	1	0	82	16
Denman Road South of Thomas Mitchell Drive	0	0	0	0	6	0
Denman Road North of Thomas Mitchell Drive	0	0	0	0	0	3
New England Highway North of Thomas Mitchell Drive	3	1	0	0	37	7
New England Highway South of Thomas Mitchell Drive	4	0	1	0	39	7
Thomas Mitchell Drive East of Site Access Road	7	1	1	0	76	14
Thomas Mitchell Drive West of Site Access Road	0	0	0	0	6	3

3.10.2 Mangoola Coal Continued Operations Project

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). Product coal is transported by rail, and the Mangoola Mine operates 24 hours per day, seven days per week.

The Mangoola Coal Continued Operations Project (MCCOP) was approved in 2021, and 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 to 31 December 2030, construction of a haul road overpass over Wybong Road and Big Flat Creek, and realignment of a section of Wybong Post Office Road (Umwelt, 2019). Mining activity within the MCCOP area is expected to commence in 2023 (Glencore, 2022).

GHD (2019) indicates that the MCCOP proposes a 16-month construction phase. The construction workforce of approximately 145 people and heavy vehicles associated with construction activity would increase the traffic generation of the mine during the construction stage only. Construction activity commenced on 6 December 2021[1], and is expected to continue into the first quarter of 2023[2].

The operation of the MCCOP anticipates no change to the hours of operation, the number of operational employees or the coal transport methods at Mangoola Mine once the construction stage is completed. When operational, the MCCOP would not impact the ongoing traffic conditions on the wider road network in the region compared with Mangoola Coal operations, beyond the localised impact of the realignment of Wybong Post Office Road (GHD, 2019).

The traffic generated by Mangoola Mine captured in the 2021 traffic surveys is therefore expected to continue at the same level until 31 December 2030. Mangoola Coal is therefore not expected to result in any changes to traffic conditions during the Modification assessment year compared with the surveyed conditions in 2021, and has not been considered further.

3.10.3 Bengalla Mine

The Bengalla Mine is an open cut coal mine located 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. Bengalla Mining Company commenced operating under SSD-5170 from October 2015. Modifications 1 to 5 to that Consent have been approved, which do not impact the traffic generation potential of the operational mine.

Hansen Bailey (2013) anticipated that the Bengalla Continuation Project would employ up to 900 full time equivalent (FTE) personnel at peak production, plus up to 315 additional contractors during the construction period between Year 1 to Year 4 of the project. The indicative production schedule anticipated suggested that coal production would reach its

[1] Mangoola Open Cut Community Newsletter 30, June 2022.
[2] Minutes of the Combined Mangoola Open Cut and Mangoola Coal Continued Operations Project Community Consultative Committee 9 August 2022.

maximum of 15 Mtpa ROM coal (12.3 Mtpa product coal and 2.7 Mt reject material) in Year 4 of the project, and continue at that level throughout the life of the mine.

The Bengalla Mine Annual Review reports (2015 to 2021) indicate that annual ROM coal production at Bengalla Mine was 12.87 Mt during 2021, with production forecast to be 13.42 Mt during 2022. During 2021, construction of a new explosives magazine was completed, and construction of a new reload facility commenced. The Bengalla Mine Annual Review 2021 (Bengalla Mining Company, 2022) indicates that as at 31 December 2021, Bengalla Mining Company employed 683 people (490 permanent employees and 193 contractors). Production therefore remains below the anticipated peak of 15 Mtpa ROM coal permitted under SSD-5170, and the workforce is below the maximum 900 FTE anticipated at peak production.

For the purpose of this assessment, it is assumed that at the time of the traffic surveys in 2021, the workforce at Bengalla Mine was approximately 683 people, thus there is the potential for the workforce to increase by approximately 217 people in the future to reach the anticipated peak workforce of 900 FTE people. These workers would generate additional light vehicle trips to and from the Bengalla Mine. Similarly, the increase in production from 12.87 Mt in 2021 to the permitted maximum of 15 Mt would be expected to increase heavy vehicle (delivery) trips to and from Bengalla Mine.

Based on the shift assumptions and travel characteristics presented by DC Engineering (2013), the potential additional workforce of 217 people and the increase in production from 12.87 Mt in 2021 to the permitted maximum of 15.0 Mt would generate the additional vehicle trips presented in Table 3.16.

Table 3.16: Additional Trip Generation at Peak Production at Bengalla Coal Mine

Time of Day	Inbound Vehicles to Bengalla Mine		Outbound Vehicles from Bengalla Mine		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
6:00 am to 7:00 am	76	1	33	1	109	2	111
4:00 pm to 5:00 pm	33	1	76	1	109	2	111
Daily Total	109	3	109	3	218	6	224

The travel characteristics presented by DC Engineering (2013) assumed that all inbound and outbound workforce travel would occur between 6:00 am and 7:00 am, and between 4:00 pm and 5:00 pm, which do not align with the peak hours for traffic generated by MAC. The DC Engineering assessment effectively assumes that shift changes take place at 6:30 am and 4:30 pm, with workers arriving in the 30 minutes prior to their shift start time, and departing in the 30 minutes after the end of their shift time. The DC Engineering report notes that the afternoon peak may be more spread out due to greater variability in end-of work times.

For the purpose of this assessment, it has therefore been assumed that during the MAC peak hours (5:30 am to 6:30 am, and 5:30 pm to 6:30 pm), the additional traffic that may potentially be generated by the Bengalla Mine would include:

- 5:30 am to 6:30 am – the inbound component of the 6:00 am to 7:00 am workforce travel trip generation, i.e., workers commencing work at 6:30 am; and
- 5:30 pm to 6:30 pm – one quarter of the outbound component of the 4:00 pm to 5:00 pm workforce travel forecast, i.e., an allowance for the spread of the outbound trips as described in DC Engineering (2013).

Table 3.17 summarises the resulting forecasts of additional traffic that may be generated by Bengalla Mine should it be operating with its anticipated peak workforce and at peak production in the Modification assessment year 2030.

Table 3.17: Bengalla Mine Potential Additional Traffic on the Road Network in 2030

Road and Location	AM Peak Hour (vehicles per hour)		PM Peak Hour (vehicles per hour)		Daily Total (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Bengalla Mine Access	76	2	19	2	218	6
Bengalla Road Bengalla Mine Access to Wybong Road	21	0	5	0	62	0
Bengalla Road Bengalla Mine Access to Denman Road	55	2	14	2	156	6
Denman Road Bengalla Road to Golden Highway	4	0	1	0	10	0
Denman Road Bengalla Road to Thomas Mitchell Drive	51	2	13	2	146	6
Denman Road Thomas Mitchell Drive to Muswellbrook	30	0	8	0	88	0
New England Highway Thomas Mitchell Drive to Singleton	21	2	5	2	58	6
Thomas Mitchell Drive Denman Road to New England Highway	21	2	5	2	58	6
Wybong Road Bengalla Road to Kayuga Road	21	0	5	0	62	0

Forecast traffic is additional to levels surveyed in 2021 during MAC peak hours.

3.10.4 Dartbrook Mine

The Dartbrook Mine is an underground coal mine located immediately north of the Mount Pleasant Operation, which was placed in care and maintenance in 2007. Approval to extend the life of the Dartbrook Mine for an additional five years to 5 December 2027 was granted on 11 March 2022. Dartbrook Mine could therefore recommence operations and continue until 5 December 2027, however, should mining recommence, it would cease prior to the Modification assessment year of 2030.

During care and maintenance, Dartbrook Mine employed 11 full-time personnel, and traffic generated by those workers is assumed to have been captured by the traffic surveys and may continue to occur as a result of ongoing rehabilitation activity after the cessation of the approved period for mining operations.

During the Modification assessment year, it has been assumed that no changes to the traffic as surveyed in 2021 are expected to occur as a result of changed activity at Dartbrook Mine. Dartbrook Mine has therefore not been considered further in this assessment.

3.10.5 Liddell and Bayswater Power Stations and Future Land Use

The Liddell and Bayswater power stations are located on the western side and south-west of Lake Liddell approximately 15 km south-east of Muswellbrook. Liddell commenced the first stage of closure works in April 2022, with full closure occuring in April 2023, and closure of Bayswater is planned for 2030 to 2033. In its assessment of the implications of the Liddell Battery and Bayswater Ancillary Works (Section 3.10.9), Jacobs (2021) included consideration of the traffic generated during closure activities at the Liddell power station. The Liddell closure works are expected to generate 100 to 200 heavy vehicle trips per day for approximately two years, and rehabilitation works are expected to generate 70 heavy vehicle trips per day for approximately two years following completion of closure works. Heavy vehicles associated with the Liddell closure and rehabilitation works are expected to be to and from Ravensworth, south of the site. Taken together with the other developments in the region of the Liddell and Bayswater power stations, Jacobs (2021) identifies that the cumulative traffic generation (inclusive of the closure activity at the Liddell Power Station and construction, operational and decommissioning activities at the Bayswater Water and Other Associated Operational Works Project) in 2030 is expected to be less than was occurring during the traffic surveys in 2021. Should closure activities at Bayswater commence in 2030, the cumulative traffic generation is expected to remain below that captured in the traffic surveys in 2021.

GHD prepared a Scoping Report for the Liddell Future Land Use and Enabling Works (GHD, 2021). That project seeks to rehabilitate the operational areas of the site in preparation for the proposed future establishment of an Energy Hub or other beneficial uses of the land. The project includes (but is not limited to) demolition of the Liddell Power Station and redundant associated structures. The Scoping Report indicates that a demolition and rehabilitation workforce of approximately 75 to 100 FTE personnel would be utilised, with the demolition and rehabilitation activity anticipated to take up to approximately four years. With closure of the Liddell Power Station planned for early 2023, it is therefore expected that the demolition and rehabilitation activities would be completed prior to the Modification assessment year 2030.

As a robust assessment, this study has not applied any discount to traffic volumes during the Modification assessment year to reflect the reduced cumulative traffic generation impacts of the Liddell and Bayswater power station closures together with the other projects described in Section 3.10.9.

3.10.6 Maxwell Solar Project

The Maxwell Solar Project (SSD 9820) was approved by the Minister for Planning and Public Spaces on 19 August 2020. The Maxwell Solar Project will comprise the installation of a solar plant with a capacity of 25 megawatts (MW) at the Maxwell Infrastructure, which will supply electricity to the Maxwell Underground Project and/or the National Energy Market.

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.

TTPP (2019) and Amber Organisation (2019) assessed the traffic impacts of the Maxwell Solar Project, which found that during peak construction periods, the Maxwell Solar Project will generate 100 to 110 light vehicle trips per day, and 20 heavy vehicle trips per day. Once operational, the Maxwell Solar Project would operate with a very small workforce of three operational staff attending the Maxwell Solar Project each day via the site access road, and delivery and visitor trips would be negligible.

It is anticipated that the Maxwell Solar Project construction activity would commence in 2024, and so during the traffic survey period in 2021, the Maxwell Solar Project was not under construction. During the Modification assessment year 2030, it is anticipated that the Maxwell Solar Project would be operational. As its operational traffic generation would be very low, it has not been considered further in this assessment.

3.10.7 Mount Pleasant Operation

The Mount Pleasant Operation is an open cut coal mine and associated infrastructure located approximately 3 km north-west of Muswellbrook. MACH Mount Pleasant Operations Pty Ltd (MACH) manages the Mount Pleasant Operation, which includes a Coal Handling and Preparation Plan (CHPP) and a rail loop and spur, and a conveyor and load-out facility connecting the mine to the Muswellbrook Ulan Railway. Thermal coal product from the Mount Pleasant Operation is transported by rail via the Muswellbrook Ulan Railway 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.

Mining operations commenced in October 2017, in accordance with Development Consent DA 92/97 and Commonwealth Approval EPBC 2011/5795. During 2021, a total of 10.07 Mt of ROM coal was produced at the Mount Pleasant Operation, which is consistent with the approved extraction of up to 10.5 Mtpa of ROM coal permitted by Development Consent DA 92/97. During that year, construction activities occurred on site, including continuation of the new Rail Loop, Train Load-Out and Hunter River Pump Station relocation; completion and commissioning of a permanent secondary flocculant plant at the discharge point into the Fines Emplacement Area (FEA); commencement of the FEA Stage 1 Lift Project to increase

the capacity for fines deposition; and ongoing progressive rehabilitation of temporary construction areas and mining areas (MACH Energy, 2022).

For the purpose of this assessment, it is assumed that at that time of the traffic surveys in 2021, the Mount Pleasant Operation was operating under typical conditions, therefore its typical vehicle trip generation would have been captured by the traffic surveys.

The Mount Pleasant Optimisation Project (SSD 10418) was approved by the Independent Planning Commission of NSW on 6 September 2022. The Mount Pleasant Optimisation Project permits extraction of up to 21 Mtpa of ROM coal, and transport of up to 17 Mtpa product coal by rail, with an extension of mining operations to 22 December 2048. The additional vehicle trips expected to be generated by the Mount Pleasant Optimisation Project would not have been captured by the traffic surveys conducted during 2021, and so are expected to result in changes to the road transport environment compared with surveyed conditions.

TTPP (2020) assessed the road transport implications of the Mount Pleasant Optimisation Project for two scenarios, being in 2026 with the peak construction workforce, and in 2036 with the longer-term operational workforce and a small construction workforce. The provisional project production and workforce schedule presented in that assessment indicates that during 2030 (the Modification assessment year), the Mount Pleasant Mine would have an operational workforce of approximately 560 FTE people, which is similar to the operational workforce of 555 people assessed for 2026. The schedule indicates that no construction workforce would be present in 2030.

The traffic generated by the Mount Pleasant Optimisation Project during 2030 (the Modification assessment scenario) is therefore estimated to be consistent with that forecast for 2026 in TTPP (2020) for the operational activity (only) of the Mount Pleasant Optimisation Project. Those forecasts are summarised in Table 3.18 over key hours during the morning and afternoon periods as well as the daily total.

Table 3.18: Mount Pleasant Optimisation Project Operational Traffic in 2030

Time of Day	Inbound Vehicles to Mount Pleasant		Outbound Vehicles from Mount Pleasant		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
5:00 am to 6:00 am	69	2	1	0	70	2	72
6:00 am to 7:00 am	59	1	2	0	61	1	62
4:00 pm to 5:00 pm	5	0	92	1	97	1	98
5:00 pm to 6:00 pm	10	0	22	1	32	1	33
6:00 pm to 7:00 pm	0	0	9	1	9	1	10
Daily Total	164	6	164	6	328	12	340

Source: TTPP (2020)

Table 3.18 indicates that the peak hours for Mount Pleasant Optimisation operational traffic are forecast to occur between 5:00 am and 6:00 am, and between 4:00 pm and 5:00 pm. Considering the peak hours for MAC's traffic generation do not coincide with those of the

Mount Pleasant Optimisation Project, this assessment assumes that during the MAC peak hours in 2030 (5:30 am to 6:30 pm and 5:30 pm to 6:30 pm), the Mount Pleasant Optimisation Project would generate additional traffic consistent with the forecasts for 5:00am to 6:00 am, and 5:00 pm to 6:00 pm.

The forecast additional contribution of the Mount Pleasant Optimisation Project to future traffic on the road network is summarised in Table 3.19 for 2030.

Table 3.19: Mount Pleasant Optimisation Project Traffic on the Road Network 2030

Road and Location	AM Peak Hour (vehicles per hour)		PM Peak Hour (vehicles per hour)		Daily Total (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Mount Pleasant Operation Road	70	2	32	1	328	12
Bengalla Road Wybong Road to Denman Road	54	2	25	1	256	12
Denman Road Golden Highway to Bengalla Road	4	0	2	0	20	2
Denman Road Bengalla Road to Thomas Mitchell Drive	50	2	23	1	236	10
Denman Road Thomas Mitchell Drive to Muswellbrook	29	1	13	1	134	6
New England Highway Thomas Mitchell Drive to Singleton	21	1	10	0	102	4
Thomas Mitchell Drive Denman Road to New England Highway	21	1	10	0	102	4
Wybong Road Bengalla Road to Mount Pleasant Operation	57	2	26	1	270	12
Wybong Road Mount Pleasant Operation to Kayuga Road	13	0	6	0	58	0
Wybong Road Bengalla Road to Golden Highway	3	0	1	0	14	0

Forecast traffic is additional to levels surveyed in 2021 during MAC peak hours.

3.10.8 Bowmans Creek Wind Farm

Bowmans Creek Wind Farm is a proposed wind farm located at Bowmans Creek, approximately 10 km east of Muswellbrook. The traffic and transport impact assessment of the Bowmans Creek Wind Farm (Cardno, 2021) indicates that the wind farm would include up to 60 wind turbine sites across the Muswellbrook, Singleton and Upper Hunter Shire LGAs.

Traffic impacts from the Bowmans Creek Wind Farm are anticipated to be related to oversize overmass (OSOM), heavy and light vehicles delivering construction materials and personnel during the construction phase, and light vehicles used by onsite personnel and visitors during the operational phase. OSOM deliveries of turbines would originate from the Port of Newcastle. The haulage route for OSOM vehicles is proposed via Hebden Road (south) from New England Highway at Ravensworth and Scrumlo Road. General vehicle access including heavy vehicles would be via Hebden Road (north and south) from New England Highway at

Ravensworth and at Muswellbrook. A schedule of road upgrade commitments is proposed, which typically relates to addressing the requirements for OSOM vehicle access during construction of the wind farm.

Cardno (2021) indicates that the Bowmans Creek Wind Farm is expected to generate 150 light vehicle and 282 heavy vehicle trips per day during the peak construction period. Once operational, Cardno (2021) anticipates that the wind farm would have a negligible impact on traffic on the local road network, with up to 15 people accessing the site compound off Hebden Road generating up to 30 vehicle trips per day. Half the trips would be to and from Muswellbrook and half would be to and from Singleton.

It is anticipated that should the Bowmans Creek Wind Farm proceed, it would be operational during the Modification assessment year of 2030, generating 30 vehicle trips per day on Hebden Road to and from New England Highway. The additional trips would be well within the day-to day variations in trips on New England Highway, and have not been considered further in this assessment.

3.10.9 Liddell Battery and Bayswater Ancillary Works

Liddell and Bayswater are located approximately 15 km south-east of Muswellbrook. Liddell Power Station is located on the eastern side of New England Highway, and Bayswater Power Station is located on the west side of New England Highway. Vehicular access to and from the highway is provided by a dedicated road interchange for Liddell and Bayswater. Full closure of the Liddell Power Station is planned to take place in April 2023, and closure of the Bayswater Power Station is planned to occur between 2030 and 2033.

The Liddell Battery and Bayswater Ancillary Works project (SSD 8889679) was approved on 8 March 2022, and will consist of a grid-connected battery energy storage system with capacity of up to 500 megawatt and 2 gigawatt hours, decoupling works required for alternative connection arrangements for the Liddell switching station, and upgrades to ancillary infrastructure at Bayswater.

Jacobs (2021) assessed the traffic and transport implications of the Liddell Battery and Bayswater Ancillary Works project. That assessment indicates that the development of the battery may be staged to respond to market demands, with an indicative construction schedule suggesting three stages starting in 2021, 2023 and 2025, with each stage taking approximately 12 months. The third stage may be further divided into smaller staged subject to market demand and be delivered on a progressive basis. The decoupling works are anticipated to take up to 12 months and be undertaken prior to 2024, while the Bayswater ancillary works would be undertaken at any time up to the retirement of Bayswater.

With regard to the potential for construction activity to occur during the Modification assessment year 2030, the indicative schedule suggests that it is likely that the battery development works and decoupling works would be completed prior to 2030, while there is potential for the Bayswater ancillary works to occur during 2030.

Jacobs (2021) indicates that during the staged construction periods, the Bayswater ancillary works would include an additional 100 workers travelling to Bayswater, generating 200 light vehicle trips and 100 heavy vehicle trips per day. The additional traffic is estimated to be distributed with approximately 60% of the workforce travelling to and from Singleton and 40% travelling to and from Muswellbrook, with all traffic travelling via New England Highway and the Bayswater interchange.

In considering cumulative traffic generation, Jacobs (2021) demonstrates that the highest levels of traffic generated by the Liddell Battery and Bayswater Ancillary Works project with other concurrent developments in the local area would occur during the period up to and including 2026. From 2027 to 2040, the total cumulative traffic generation would be less than that forecast during any year from 2020 to 2026. The concurrent developments considered included the construction, operation and decommissioning of the Bayswater Water and Other Associated Operational Works Project; the Bayswater Turbine Efficiency Upgrade; the Ravensworth Composting Facility; Liddell Power Station closure and rehabilitation; and Liddell minor shutdowns.

During the Modification assessment year 2030, the cumulative traffic generation of the activity associated with the Liddell Battery and Bayswater Ancillary Works project and the aforementioned other developments is therefore expected to be less than that which was occurring on the road network during the traffic surveys in 2021. In proximity to the Modification, this reduction is likely to be primarily experienced along New England Highway to and from Muswellbrook. As a robust assessment, this study has not applied any reduction to traffic on New England Highway during the Modification assessment year to reflect the cumulative impacts of the aforementioned projects.

3.10.10 Spur Hill Underground Coking Coal Project

Spur Hill Underground Coking Coal Project is located in EL 7429, adjacent to the Maxwell Underground Project and if developed, may involve integration with the Maxwell Underground Project. It is owned and operated by Malabar, and SEARs for the Spur Hill Underground Coking Coal Project were issued in 2014.

TTPP understands that at this stage, it is not anticipated that the Spur Hill Underground Coking Coal Project would proceed as proposed in previous documentation. Development of 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 considered further in this assessment.

3.10.11 Total Cumulative Impacts Summary

Table 3.20 summarises how the activity and traffic generation of the various developments described above has been assumed to contribute to the surveyed traffic in 2021, and to future traffic during the Modification assessment scenario in 2030.

Table 3.20: Summary of Cumulative Traffic Contributions

Development	During Traffic Surveys 2021	Modification Assessment 2030
Maxwell Underground Project	Not operational. Former Drayton Mine care and maintenance activity accounted for in surveyed traffic volumes.	Operational, addition of operational traffic (Table 3.13). Former Drayton Mine care and maintenance activity no longer occurring (Table 3.15).
Mangoola Mine and Mangoola Coal Continued Operations Project	Operational traffic accounted for in surveyed traffic volumes	No change in operational traffic
Bengalla Mine	Operational traffic accounted for in surveyed traffic volumes	Operational plus additional workforce at peak production (Table 3.16)
Dartbrook Mine	Care and maintenance traffic accounted for in surveyed traffic volumes	Care and maintenance or rehabilitation activity, no change in traffic accounted for in this assessment
Liddell Power Station	Operational traffic accounted for in surveyed traffic volumes	Closed
Bayswater Power Station	Operational traffic accounted for in surveyed traffic volumes	Operational
Maxwell Solar Project	Not operational	Operational, negligible traffic generated, not accounted for in this assessment
Mount Pleasant Operation and Mount Pleasant Optimisation Project	Operational traffic accounted for in surveyed traffic volumes	Operational with addition of Mount Pleasant Optimisation Project operational traffic (Table 3.18 and Table 3.19)
Bowmans Creek Wind Farm	Not operational	Operational, negligible traffic generation, not accounted for in this assessment
Liddell Battery and Bayswater Ancillary Works	Staged construction assumed to be occurring	Reduction in cumulative traffic generation not accounted for in this assessment
Spur Hill Underground Coking Coal Project	Not operational	Subject to future assessment and approval, not accounted for in this assessment

Table 3.21 summarises the combined effects of the various developments described above on average weekday traffic volumes at locations on the road network which are relevant to MAC and the Modification routes.

Table 3.21: Average Weekday Cumulative Impacts of Developments Traffic

Road and Location	5:30 am to 6:30 am (vehicles per hour)		5:30 pm to 6:30 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Denman Road South of Edderton Road	13	0	3	0	52	2
Denman Road South of Bengalla Road	13	0	3	0	52	2
Denman Road South of Thomas Mitchell Drive	106	4	36	3	404	16
Denman Road North of Thomas Mitchell Drive	60	1	22	1	234	19
Edderton Road South of Denman Road	0	0	0	0	0	0
Edderton Road South of MAC Stage 2 Access	0	0	0	0	0	0
New England Highway North of Thomas Mitchell Drive	27	2	4	3	147	25
New England Highway South of Thomas Mitchell Drive	69	6	18	5	311	35
Thomas Mitchell Drive East of Denman Road	48	3	16	2	194	23
Thomas Mitchell Drive West of MAC Main Access	48	3	16	2	194	23
Thomas Mitchell Drive West of MAC Bayswater Access	48	3	16	2	194	23
Thomas Mitchell Drive West of Maxwell Project	96	8	22	8	458	60

3.11 Road Network Changes

3.11.1 Muswellbrook Bypass

The NSW government has committed full funding for the provision of a bypass of Muswellbrook. The preferred route lies to the east of Muswellbrook and includes full northern and southern interchanges with New England Highway. Early enabling works commenced in early 2023, and TfNSW expects to open the bypass to traffic by the end of 2027. On opening, the bypass is expected to remove up to 4,800 vehicles per day (including about 1,900 heavy vehicles) from New England Highway through Muswellbrook.

The Muswellbrook Bypass would connect to New England Highway at full grade separated interchanges north of Thomas Mitchell Drive, north of Sandy Creek Road, and mid-length at Coal Road to the east of Muswellbrook. It would be constructed with a single lane in each direction and a wide centreline treatment. Bridges would be provided over the bypass at the southern connection; over Muscle Creek Road and the Main North railway line; over Muscle

Creek; over Coal Road; and over Sandy Creek Road, Sandy Creek, the Main North railway line and the southbound exit ramp. At the southern connection, a relocated entry/exit is proposed for Milpera Drive, and at the northern connection, a relocated entry/exit for Koolbury Flats Row and a new entry/exit for Burtons Lane are proposed (TfNSW, 2021).

Arcadis (2018) confirms that south of Muscle Creek Road, the average weekday traffic on New England Highway is forecast to increase from 10,400 vehicles per day (including 2,610 heavy vehicles) in 2024 to 11,600 vehicles per day (including 3,150 heavy vehicles) in 2034. These volumes would be unaffected by the Muswellbrook bypass.

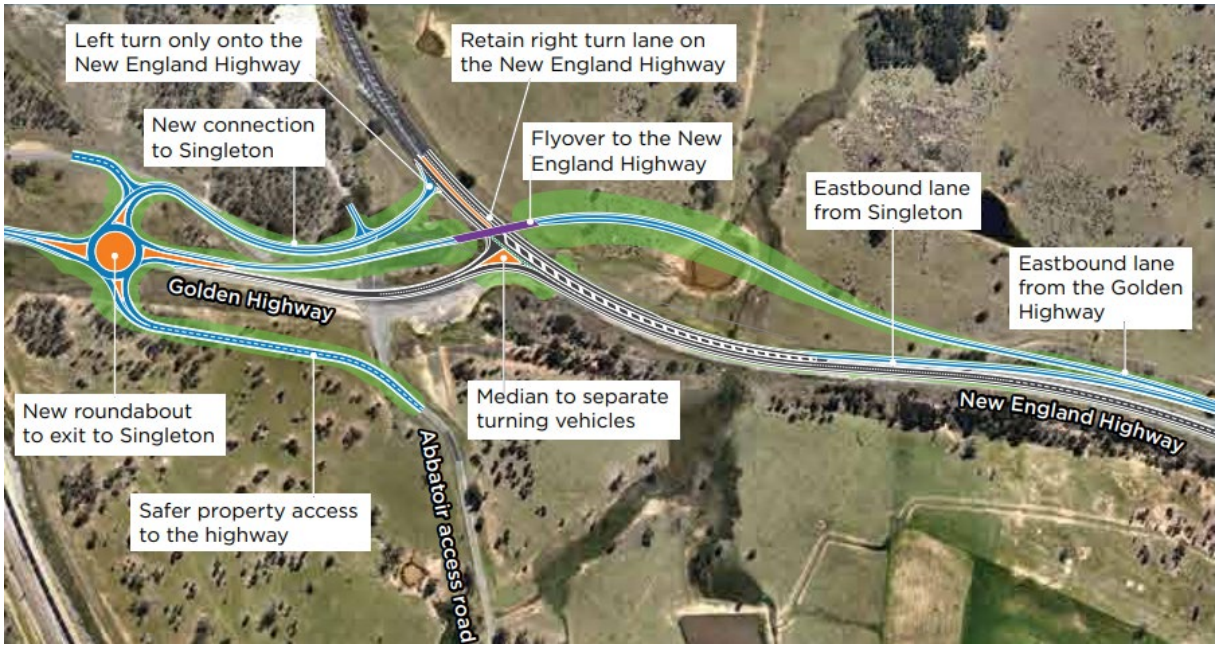
As the Muswellbrook bypass would connect to New England Highway north of Thomas Mitchell Drive, it would not impact the routes used by vehicles travelling to and from MAC to and from the south or the local Muswellbrook region. Vehicles travelling to or from locations to the north of Muswellbrook (e.g. Scone and Aberdeen) would likely use the Muswellbrook bypass, and that part of New England Highway between Thomas Mitchell Drive and the bypass southern interchange.

The Muswellbrook bypass would therefore not impact on traffic conditions on New England Highway in proximity to Thomas Mitchell Drive, and is not considered further in this assessment.

3.11.2 New England Highway Upgrade – Belford to Golden Highway

Construction work on an upgrade of New England Highway between Belford and Golden Highway (Mitchell Line of Road) started in August 2021 and it expected to be completed by late 2024. The upgrade includes widening of New England Highway to provide a divided road with two lanes in each direction, a flyover for vehicles turning right from Golden Highway to New England Highway, and a new roundabout on Golden Highway with a connection to New England Highway to improve safety for drivers turning left on to New England Highway towards Singleton, and for safer access to local properties (Roads and Maritime Services, 2019). The former Whittingham rest area adjacent to that intersection was permanently closed in February 2020 (refer to Figure 3.12).

Figure 3.12: Upgrade of New England Highway and Golden Highway Intersection



The upgrading of New England Highway between Belford and Golden Highway is not anticipated to impact traffic conditions on New England Highway in proximity to MAC. Construction activity had not commenced at the time of the traffic surveys, and is expected to be completed prior to the Modification assessment year 2030. This assessment gives no further consideration to the impacts of the upgrade.

3.11.3 Singleton Bypass

TfNSW is planning a New England Highway bypass of Singleton, to improve traffic flow, travel times and safety through Singleton town centre. The project was approved in August 2020, and involves building a new section of highway west of Singleton across the floodplain, starting near Newington Lane and rejoining New England Highway north of McDougalls Hill, with a full interchange at Putty Road. Early work commenced in late 2022, with major work expected to commence in late 2023. The bypass is expected to be open to traffic by the end of 2026.

The Singleton bypass is not anticipated to impact traffic conditions on New England Highway in proximity to MAC. Construction activity had not commenced at the time of the traffic surveys, and is expected to be completed prior to the Modification assessment year 2030. This assessment gives no further consideration to the impacts of the bypass.

3.11.4 Muswellbrook Mine Affected Roads Network Plan Review

Muswellbrook Shire Council's *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios Consulting and Northrop [Bitzios], 2020) reviews and updates the original *Mine Affected Road Network Plan* (Cardno, 2015) and was adopted by Muswellbrook Shire Council on 19 May

2020. The assessment of options for the road network recommended key strategies to provide a road network that accommodates existing and future demands, including (option names are as presented in Bitzios [2020]):

- a Western Corridor connecting Golden Highway near Edderton Road with New England Highway south of Aberdeen, formed via:
    - upgrades to Edderton Road and retaining the northern deviation of Edderton Road to Denman Road (rather than reinstating the original alignment following completion of mining at MAC Mine);
    - a new link between Denman Road at the Edderton Road northern deviation and Bengalla Road, crossing the Hunter River and the railway line;
    - connecting Wybong Road near Overton Road to Kayuga Road then east via a new bridge over the Hunter River and upgraded Burtons Lane to New England Highway north of Sandy Creek Road;
    - connecting Castlerock Road to Dorset Road to offset the closure of Dorset Road (i.e. Mount Pleasant Operation's Northern Link Road);
- an Inner West Link created by connecting Bengalla Road to Wybong Road west of the rail line via Overton Road, which would then connect with the Option W7 link to New England Highway described above;
- upgrading the Wybong network including closure of Wybong Post Office Road west of the Wybong Community Hall and upgrading of Yarraman Road between Wybong Post Office Road and Wybong Road (Option W5), upgrading of Wybong Road between Sandy Hollow and Reedy Creek Road to collector standard (Option W6), manage Wybong Road between Sandy Hollow and Bengalla Road as an over-size over-mass route, and widen sections of Wybong Road to a consistent and acceptable standard; and
- improving other infrastructure including upgrading of the Hunter River bridge at Denman and Denman bypass, and reclassification of Thomas Mitchell Drive as a State road.

The Western Corridor envisaged by the *Muswellbrook Mine Affected Roads Network Plan Review* would form a western bypass route around Muswellbrook for traffic between Golden Highway and Denman Road south of Muswellbrook, and New England Highway north of Muswellbrook. The Inner West Link is intended to improve travel efficiency between Thomas Mitchell Drive and the mines, and provide a western local bypass of Muswellbrook town.

Even considering the high-level nature of the *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios, 2020) strategies, it is evident that the principal potential implications of the plan for MAC's traffic would be limited to:

- closure of the northern section of Edderton Road and construction of the northern deviation of Edderton Road, which was completed in 2020, noting that following cessation of mining activity at MAC, the plan proposes retention of the northern deviation of Edderton Road (i.e. the former Edderton Road alignment would remain closed);

- closure of the southern section of Edderton Road and construction of the southern deviation of Edderton Road (related to the Maxwell Project);
- reclassification of Thomas Mitchell Drive from local to State road.

These changes would not directly impact MAC's traffic, with no changes to the routes available for access to and from MAC's accesses, and only a minor impact on the length of trips to and from the south on Edderton Road. This assessment therefore gives no further consideration to the impacts of implementation of the plan.

3.12 Background Traffic 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. In its assessment of the Muswellbrook bypass, in consultation with TfNSW, Arcadis (2018) applied a future growth rate for all vehicles (including light and heavy vehicles) of 1.1 % per annum between 2024 and 2034.

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 the 20 year period from 2015 to 2035; and
- All other local roads 1.0% per annum for the 20 year period from 2015 to 2035.

On balance, and considering that the higher growth rate on Thomas Mitchell Drive is inclusive of changes to mine-generated traffic that has been separately considered (refer to Section 3.10) an overall growth rate from surveyed conditions in 2021 to the Modification assessment year 2030 of 1.0 % per annum has been adopted on all roads for the purpose of this assessment. This growth has been applied to total traffic, i.e., including traffic currently generated by the various mines discussed in Section 3.10, for which development-specific changes have also been applied. This will tend to overestimate total future traffic volumes.

4 Impacts of the Modification

4.1 MAC Traffic Generation

The traffic surveys undertaken during June 2021 (Section 3.6) captured MAC's traffic generation characteristics under the following operating conditions:

- workforce of approximately 2,200 FTE personnel;
- extraction and processing of 21 Mt of ROM coal; and
- transport by rail of 14.9 Mt of product coal.

Comparing the surveyed conditions with those proposed with the Modification, it can be seen that:

- the workforce of approximately 2,200 FTE personnel during the traffic surveys in 2021 is greater than that proposed at the MAC over the remaining life of the MAC and the additional four years of mining operations (Figure 2.1), and consistent with the future workforce assumed for the purpose of this assessment of the Modification (Section 2.3);
- the extraction and processing of 21 Mt of ROM coal in FY21 is below the 25 Mtpa (open cut) maximum proposed with the Modification; and
- the transport by rail of 14.9 Mt of product coal in FY21 is approximately 75 percent of the maximum 20 Mtpa proposed with the Modification.

On this basis, the following has been assumed in order to quantify the vehicle trip generation of MAC in 2030 with the Modification:

- the workforce travel to and from MAC in light vehicles only, and all MAC-generated light vehicle trips are made by the workforce;
- as the workforce-generated trips in 2021 reflect a FTE workforce consistent with the peak workforce being assessed with the Modification (Section 2.3), the number of light vehicle trips generated by the Modification would be consistent with the number surveyed at MAC in 2021;
- the heavy vehicle trip generation is related to the ROM coal extraction and processing rate so the number of heavy vehicle trips has been increased above that surveyed in 2021 for assessment purposes to reflect open cut ROM coal production at peak of 25 Mtpa (Section 2.3); and
- with the Modification, activities at MAC would continue with the same shift and operational arrangements as were occurring during the traffic surveys in 2021, so the distribution of both light and heavy vehicle trips throughout the day and relative use of each MAC access would be consistent with those captured during the traffic surveys in 2021.

On this basis, all light vehicle trips generated by MAC during the 2021 traffic surveys were generated by the workforce of approximately 2,200 people (FTE) travelling to and from MAC each day. The Modification scenario assumes that this workforce level would continue through the life of the Modification, therefore no change to the light vehicle trip generation of MAC would occur compared with that surveyed in 2021 (Table 3.5).

Similarly, the heavy vehicle trips generated by MAC during the 2021 traffic surveys are anticipated to vary as the level of mining activity at MAC varies. As the ROM coal production is expected to increase from 21 Mtpa at the time of the traffic surveys to a peak of 25 Mtpa (open cut) with the Modification (i.e. by 19 percent), the surveyed heavy vehicle trip generation (Table 3.5) is assumed to also increase by 19 percent. As a robust assessment, this assessment has assumed that the existing MAC-generated heavy vehicles includes all Austroads Vehicle Classification System Class 3 vehicles identified in the ATC survey results. As described in Section 3.8 (Table 3.6) this is considered to result in a conservatively high forecast of future heavy vehicle trip generation.

It should be noted that should mining of the approved Mt Arthur Underground Mine commence, the total ROM coal production at the MAC complex could potentially increase to 29 Mtpa. BHP has indicated that should that occur, the number of heavy vehicle trips generated by the MAC complex on the public roads is unlikely to increase above that allowed for herein for a peak production of 25 Mtpa. However, based on an analysis in this assessment and checks of the sensitivity of the road transport environment to increased traffic demands, even if processing of the underground coal up to 29 Mtpa resulted in a further linear increase in heavy vehicles, the findings of this report would be unchanged.

Table 4.1 summarises the forecast vehicle trip generation of MAC with the Modification in 2030 and Table 4.2 presents the increase in MAC-generated traffic in 2030 above the surveyed generation in 2021.

Table 4.1: Modification Average Weekday MAC Traffic Generation in 2030

	Light Vehicles	Rigid Heavy Vehicles	Articulated Heavy Vehicles	Total Vehicles
AM Peak Hour 5:30 am to 6:30 am (vehicles per hour)				
MAC Main Access	321	80	4	405
MAC Bayswater Access	189	13	2	204
MAC Stage 2 Access	14	3	0	17
Total	524	96	6	626
PM Peak Hour 5:30 pm to 6:30 pm (vehicles per hour)				
MAC Main Access	270	74	4	348
MAC Bayswater Access	164	17	0	181
MAC Stage 2 Access	7	2	0	9
Total	441	93	4	538
Daily Total (vehicles per day)				
MAC Main Access	1,641	460	54	2,155
MAC Bayswater Access	936	124	27	1,087
MAC Stage 2 Access	95	46	27	168
Total	2,672	630	108	3,410

Table 4.2: Increase in Average Weekday MAC Traffic Generation from 2021 to 2030

	Light Vehicles	Rigid Heavy Vehicles	Articulated Heavy Vehicles	Total Vehicles
AM Peak Hour 5:30 am to 6:30 am (vehicles per hour)				
MAC Main Access	0	14	2	16
MAC Bayswater Access	0	4	1	5
MAC Stage 2 Access	0	1	0	1
Total	0	19	3	22
PM Peak Hour 5:30 pm to 6:30 pm (vehicles per hour)				
MAC Main Access	0	13	2	15
MAC Bayswater Access	0	4	0	4
MAC Stage 2 Access	0	1	0	1
Total	0	18	2	20
Daily Total (vehicles per day)				
MAC Main Access	0	76	10	86
MAC Bayswater Access	0	22	5	27
MAC Stage 2 Access	0	9	5	14
Total	0	107	20	127

4.2 MAC Traffic Distribution

As the Modification would not result in any change to the residential locations of the workforce, nor the source of deliveries, the distribution of traffic generated by the Modification would be consistent with that of the existing MAC operations, as surveyed during June 2021 (refer to Section 3.9).

Table 4.3 presents the forecast distribution of the additional heavy vehicle trips expected to be generated by MAC with the Modification at peak production, based on the surveyed distribution (Table 3.9) and the increased trip generation (Table 4.2).

Table 4.3: Distribution of Additional Average Weekday MAC Traffic

Access	Rigid Heavy Vehicles				Articulated Heavy Vehicles			
	Inbound Traffic		Outbound Traffic		Inbound Traffic		Outbound Traffic	
	West or North	East or South	West or North	East or South	West or North	East or South	West or North	East or South
AM Peak Hour 5:30 am to 6:30 am (vehicles per hour)								
MAC Main Access	5	4	3	2	1	0	0	1
MAC Bayswater Access	2	1	0	1	0	1	0	0
MAC Stage 2 Access	1	0	0	0	0	0	0	0
MAC Total	8	5	3	3	1	1	0	1
PM Peak Hour 5:30 pm to 6:30 pm (vehicles per hour)								
MAC Main Access	2	2	6	3	1	0	0	1
MAC Bayswater Access	1	1	1	1	0	0	0	0
MAC Stage 2 Access	0	0	1	0	0	0	0	0
MAC Total	3	3	8	4	1	0	0	1
Daily Total (vehicles per day)								
MAC Main Access	20	14	26	16	2	2	4	2
MAC Bayswater Access	6	5	5	6	1	1	1	2
MAC Stage 2 Access	5	0	4	0	2	0	3	0
MAC Total	31	19	35	22	5	3	8	4

4.3 Future Traffic Volumes

The impacts of the traffic changes associated with the various developments described in Section 3.10, background traffic growth described in Section 3.12, and the Modification as described in Section 4.1 have been added to the surveyed traffic conditions during the MAC peak hours and average weekday daily conditions. The resulting hourly and daily traffic volumes are presented in Table 4.4 (MAC AM peak hour), Table 4.5 (MAC PM peak hour) and Table 4.6 (average weekday daily). These tables present the breakdown of the various changes anticipated from the surveyed conditions.

Table 4.4: Average Weekday 5:30 am to 6:30 am Traffic Volumes with Modification (vehicles per hour)

Site[A]	Road and Location	Surveyed 2021		Growth to 2030[B]		Maxwell Project[C]		Drayton Care[C]		Bengalla[D]		Mount Pleasant[E]		Modification[F]		Total		
		Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
A	MAC Main Access	321	68	31	6	0	0	0	0	0	0	0	0	0	16	352	90	442
B	MAC Bayswater Access	189	10	18	1	0	0	0	0	0	0	0	0	0	5	207	16	223
C	MAC Stage 2 Access	14	2	1	0	0	0	0	0	0	0	0	0	0	1	15	3	18
D	Denman Road North of Thomas Mitchell Drive	858	41	80	4	1	0	0	0	30	0	29	1	0	12	998	58	1,056
E	Edderton Road South of Denman Road	39	13	4	1	0	0	0	0	0	0	0	0	0	1	43	15	58
F	Thomas Mitchell Drive North of Industrial Area	635	123	60	11	6	0	0	0	21	2	21	1	0	11	743	148	891
G	Thomas Mitchell Drive West of MAC Main Access Road	489	57	46	6	6	0	0	0	21	2	21	1	0	11	583	77	660

[A] *Refer to Figure 3.10.*
[B] *Refer to Section 3.12.*
[C] *Refer to Section 3.10.1.*
[D] *Refer to Section 3.10.3.*
[E] *Refer to Section 3.10.7.*
[F] *Refer to Section 4.1.*

Table 4.5: Average Weekday 5:30 pm to 6:30 pm Traffic Volumes with Modification (vehicles per hour)

Site[A]	Road and Location	Surveyed 2021		Growth to 2030[B]		Maxwell Project[C]		Drayton Care[C]		Bengalla[D]		Mount Pleasant[E]		Modification[F]		Total		
		Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
A	MAC Main Access	270	63	26	6	0	0	0	0	0	0	0	0	0	15	296	84	380
B	MAC Bayswater Access	164	13	15	2	0	0	0	0	0	0	0	0	0	4	179	19	198
C	MAC Stage 2 Access	7	1	1	0	0	0	0	0	0	0	0	0	0	1	8	2	10
D	Denman Road North of Thomas Mitchell Drive	684	20	64	2	1	0	0	0	8	0	13	1	0	12	770	35	805
E	Edderton Road South of Denman Road	32	6	2	0	0	0	0	0	0	0	0	0	0	1	34	7	41
F	Thomas Mitchell Drive North of Industrial Area	362	60	34	6	1	0	0	0	5	2	10	0	0	11	412	79	491
G	Thomas Mitchell Drive West of MAC Main Access Road	328	30	31	3	1	0	0	0	5	2	10	0	0	11	375	46	421

[A] *Refer to Figure 3.10.*
[B] *Refer to Section 3.12.*
[C] *Refer to Section 3.10.1.*
[D] *Refer to Section 3.10.3.*
[E] *Refer to Section 3.10.7.*
[F] *Refer to Section 4.1.*

Table 4.6: Average Weekday Daily Traffic Volumes with Modification (vehicles per day)

Site[A]	Road and Location	Surveyed 2021		Growth to 2030[B]		Maxwell Project[C]		Drayton Care[C]		Bengalla[D]		Mount Pleasant[E]		Modification[F]		Total		
		Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
A	MAC Main Access	1,641	428	154	40	0	0	0	0	0	0	0	0	0	86	1,795	554	2,349
B	MAC Bayswater Access	936	124	88	12	0	0	0	0	0	0	0	0	0	27	1,024	163	1,187
C	MAC Stage 2 Access	95	59	8	6	0	0	0	0	0	0	0	0	0	14	103	79	182
D	Denman Road North of Thomas Mitchell Drive	8,429	711	789	66	12	16	0	-3	88	0	134	6	0	79	9,452	876	10,328
E	Edderton Road South of Denman Road	500	187	47	18	0	0	0	0	0	0	0	0	0	14	547	219	766
F	Thomas Mitchell Drive North of Industrial Area	4,957	1,413	464	133	40	16	-6	-3	58	6	102	4	0	65	5,615	1,635	7,250
G	Thomas Mitchell Drive West of MAC Main Access Road	3,113	864	292	81	40	16	-6	-3	58	6	102	4	0	65	3,599	1,034	4,633

[A] *Refer to Figure 3.10.*
[B] *Refer to Section 3.12.*
[C] *Refer to Section 3.10.1.*
[D] *Refer to Section 3.10.3.*
[E] *Refer to Section 3.10.7.*
[F] *Refer to Section 4.1.*

4.4 Midblock Level of Service on the Road Network

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.

Austroads (2020a) 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 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.

The assessment considers Thomas Mitchell Drive, Edderton Road and Denman Road as Class II roads, on which drivers do not necessarily expect to travel at relatively high speeds. On Class II roads, LOS is defined only in terms of Percent Time Spent Following (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. The LOS criteria for Class II two-lane two-way roads are as shown in Table 4.7.

Table 4.7: LOS Criteria for Class II Two-Lane Two-Way Roads

Level of Service	Percent Time Spent Following
A	≤ 40
B	> 40 – 55
C	> 55 – 70
D	> 70 – 85
E	≥ 85

Source: Austroads (2020a)

The resulting PTSF and LOS at the surveyed locations on Thomas Mitchell Drive, Edderton Road and Denman Road are summarised in Table 4.8 for the surveyed 2021 conditions, and the forecast 2030 conditions with the cumulative impacts of the other developments, growth and the Modification.

Table 4.8: Midblock Levels of Service

Road and Location	5:30 am to 6:30 am				5:30 pm to 6:30 pm			
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
Surveyed 2021								
Direction of Travel	*Northbound*		*Southbound*		*Northbound*		*Southbound*	
Denman Road North of Thomas Mitchell Drive	27.9	A	74.5	D	62.1	C	60.5	C
Edderton Road South of Denman Road	6.5	A	11.5	A	6.9	A	8.7	A
Direction of Travel	*Eastbound*		*Westbound*		*Eastbound*		*Westbound*	
Thomas Mitchell Drive North of Industrial Area	71.9	D	42.8	B	46.8	B	54.4	B
Thomas Mitchell Drive West of MAC Main Access Road	64.9	C	57.9	C	54.9	B	54.8	B
2030 with Other Developments, Growth and Modification								
Direction of Travel	*Northbound*		*Southbound*		*Northbound*		*Southbound*	
Denman Road North of Thomas Mitchell Drive	31.0	A	79.0	D	66.9	C	63.4	C
Edderton Road South of Denman Road	6.7	A	12.1	A	7.4	A	8.6	A
Direction of Travel	*Eastbound*		*Westbound*		*Eastbound*		*Westbound*	
Thomas Mitchell Drive North of Industrial Area	76.6	D	51.7	B	51.1	B	57.8	C
Thomas Mitchell Drive West of MAC Main Access Road	66.1	C	64.1	C	58.4	C	57.1	C

The results indicate that during the peak hours for MAC-generated traffic, with the cumulative impacts of background growth, other developments in the region and the Modification, the LOS experienced by drivers at the surveyed locations would generally remain consistent with that occurring during the 2021 traffic surveys. The exceptions are on Thomas Mitchell Drive during the afternoon peak hour, at which the LOS is forecast to change from B during the

2021 traffic surveys to LOS C in 2030 with the cumulative traffic impacts. It is noted that the relevant PTSF values during 2021 are greater than 54, which is at the uppermost end of the range relevant to LOS B, thus a very minor increase in PTSF would result in a change to the LOS under those conditions. The forecast LOS C on Thomas Mitchell Drive is consistent with the morning peak hour LOS during the 2021 traffic surveys, and represents acceptable conditions.

4.5 Operation of Intersections

The operating characteristics of the key intersections have been assessed using SIDRA INTERSECTION 9.1, an analysis program that determines characteristics of intersection operating conditions including the degree of saturation, average delays and intersection level 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 measure of intersection performance defined by TfNSW. Table 4.9 presents the criteria adopted by TfNSW for assessing the level of service of intersections.

Table 4.9: Intersection Level of Service Criteria

Level of Service	Average Delay per Vehicle (seconds per vehicle)	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

Table 4.10 presents a summary of the operating characteristics of the key intersections during the MAC peak hours as surveyed in 2021, and with the cumulative impacts of background growth, other developments and the Modification as described in this report. Detailed results, including 95th percentile vehicle queues are presented in Appendix C.

Table 4.10: Intersection Operating Conditions During MAC Peak Hours

Intersection	5:30 am to 6:30 am			5:30 pm to 6:30 pm		
	X-Value	Average Delay[A]	Level of Service	X-Value	Average Delay[A]	Level of Service
2021 Surveyed Demands						
MAC Main Access Road and Thomas Mitchell Drive	0.20	15.0	B	0.26	10.1	A
MAC Bayswater Access Road and Thomas Mitchell Drive	0.21	9.4	A	0.11	6.8	A
MAC Stage 2 Access Road and Edderton Road	0.02	8.1	A	0.01	8.1	A
Denman Road and Thomas Mitchell Drive[B]	0.33	14.5	B	0.33	12.0	A
Denman Road and Edderton Road	0.07	11.4	A	0.08	12.5	A
2030 with Other Developments, Growth and Modification						
MAC Main Access Road and Thomas Mitchell Drive	0.24	19.4	B	0.30	11.4	A
MAC Bayswater Access Road and Thomas Mitchell Drive	0.26	13.0	A	0.14	8.6	A
MAC Stage 2 Access Road and Edderton Road	0.02	8.1	A	0.01	8.8	A
Denman Road and Thomas Mitchell Drive	0.38	19.0	B	0.43	14.5	B
Denman Road and Edderton Road	0.08	11.5	A	0.09	13.2	A

[A] *Seconds per vehicle for movement with the highest average delay per vehicle.*
[B] *Surveyed 2021 demands and upgraded intersection configuration.*

The future intersection operating conditions are satisfactory and do not raise any concerns regarding the capacity, future performance and safety of the intersections with the cumulative future traffic demands, including the Modification.

4.6 Intersection Treatments

The assessment of intersection operating conditions (Section 4.5) demonstrates that the existing intersections have adequate capacity to accommodate the forecast traffic demands, with delays to drivers being short.

Nevertheless, the forecast demands during the Modification assessment scenario in 2030 have been compared against the Austroads warrants for major road treatments at rural road intersections. The current Austroads (2021) rural intersection design treatments are briefly described below.

The general minimum preferred treatments at rural road intersections are BAL and BAR treatments. The rural BAL treatment on the major road has a widened shoulder, which assists turning vehicles to move further off the through carriageway, making it easier for through

vehicles to pass. The rural BAR treatment features a widened shoulder on the major road that allows through vehicles, having slowed, to pass to the left of turning vehicles.

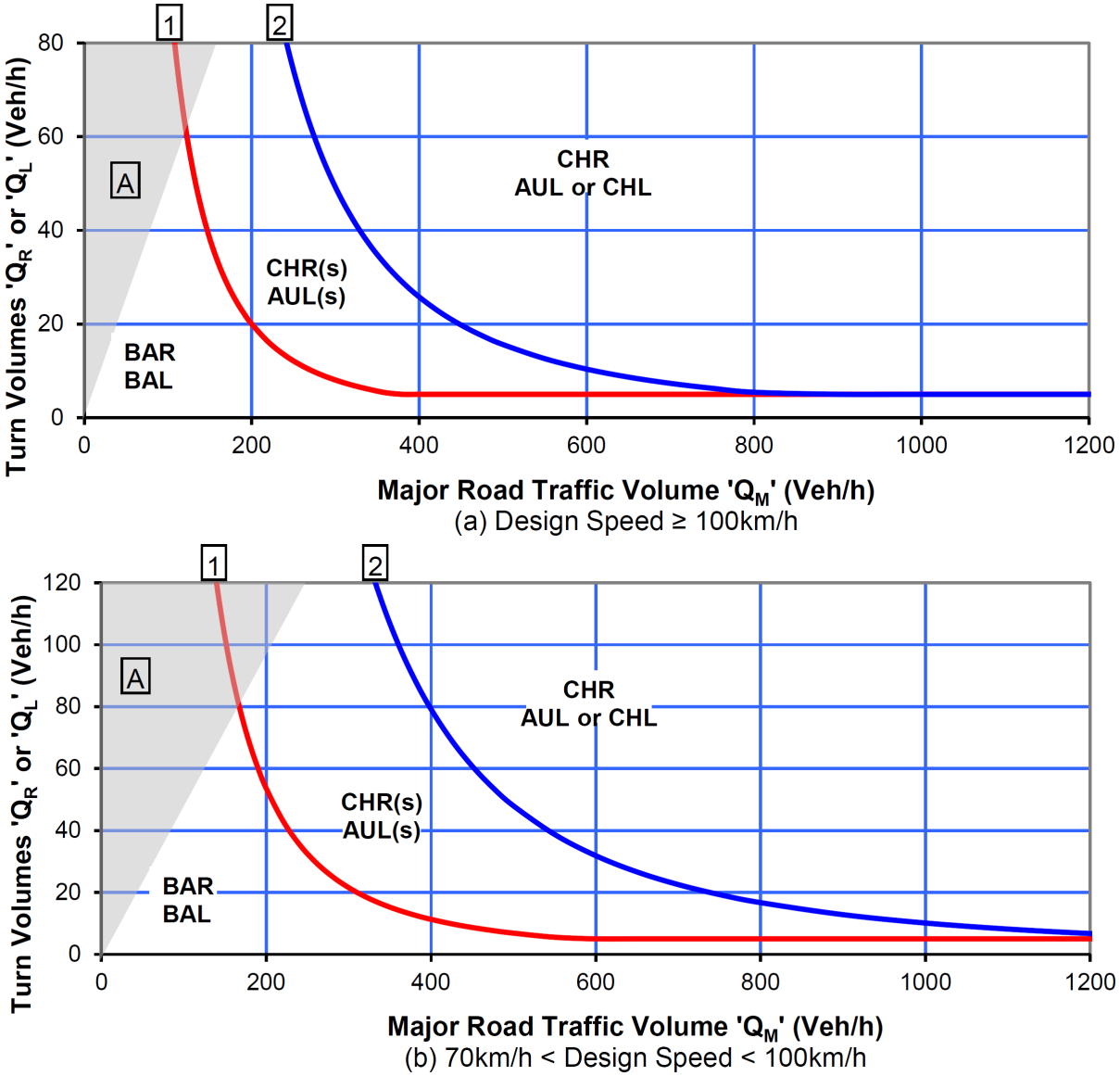
Auxiliary lane turn treatments have short lengths of auxiliary lane provided to improve safety, especially on high speed roads. The Auxiliary Right-turn treatment (AUR) on the major road is not used in NSW, rather a channelised right-turn (CHR) treatment with a short turn bay known as a CHR(S) treatment is used. This is a modification of the channelised treatment described below. Auxiliary Left-turn (AUL) treatments on the major road are normal indented turn lanes, used only by vehicles turning left.

Channelised "CH" treatments separate conflicting vehicle paths by raised or painted medians and/or islands, and often use auxiliary lanes in conjunction with channelisation. The CHR treatment on the major road provides a continuous lane for through vehicles only, and an auxiliary turn lane for right-turning vehicles only. Channelised left-turn (CHL) treatments on the major road provide a separate left-turn "slip" lane, separated from the adjacent lane by a painted or raised island. Channelised treatments are preferred over auxiliary lane treatments where practicable, as the risk of collisions is lower.

The guidelines for the level of treatment in the major road at an intersection are given in Austroads (2020b), which contains details of the warrants for rural road turn treatments for high-speed and intermediate speed rural roads that would apply to the roads along the MAC access routes. The warranted treatment is based on an assessment of the combination of through and turning movements at the intersection, with higher turning volumes generally requiring higher levels of treatment above the minimum. The warrants are applicable to greenfields intersections, however may also be appropriate to consider when determining upgrade requirements for existing intersections.

The high-speed and intermediate-speed graphs relevant to the surveyed intersections are presented in Figure 4.1. In those graphs, Q_L and Q_R are the number of vehicles turning left and right respectively from the major road, and Q_M is the major road flow, which calculated depending on whether the left or right-turn treatment is being considered.

Figure 4.1: Warrants for Turn Treatments on Major Roads at Unsignalised Intersections



BAL = Basic Left-turn; BAR = Basic Right-turn, AUL = Auxiliary Left-turn, CHL = Channelised Left-turn, CHR = Channelised Right-turn, (s) = short
Curve 1 is the boundary between a BAR and CHR(S) treatment and between a BAL and an AUL(S) treatment.
Curve 2 is the boundary between a CHR(S) and a CHR treatment and between an AUL(S) and AUL or CHL treatment.
In Area A, more than 50% of approaching traffic turns left or right, and realignment may be considered to suit the major movement.
Source: Austroads (2020b)

The comparison of forecast peak hour turning movements in 2030 against the warrants is summarised in Table 4.11.

Table 4.11: Intersection Major Road Treatment Warrants in 2030

Intersection	5:30 am to 6:30 am			5:30 pm to 6:30 pm			Existing Treatment	Warrant Met
	Q_L or Q_R	Q_M	Warrant	Q_L or Q_R	Q_M	Warrant		
Left Turn Treatment in Major Road								
MAC Main Access Road and Thomas Mitchell Drive[A]	155	282	AUL or CHL	69	108	BAL	AUL	Yes
MAC Bayswater Access Road and Thomas Mitchell Drive[A]	97	413	AUL or CHL	56	137	AUL(S)	AUL	Yes
MAC Stage 2 Access Road and Edderton Road[B]	9	30	BAL	0	18	BAL	AUL	Yes
Denman Road and Thomas Mitchell Drive[B]	461	465	AUL or CHL	151	259	AUL or CHL	CHL	Yes
Denman Road and Edderton Road[A]	37	48	BAL	17	149	BAL	AUL	Yes
Right Turn Treatment in Major Road								
MAC Main Access Road and Thomas Mitchell Drive[A]	168	595	CHR	80	308	CHR	CHR	Yes
MAC Bayswater Access Road and Thomas Mitchell Drive[A]	80	626	CHR	33	391	CHR	CHR	Yes
MAC Stage 2 Access Road and Edderton Road[B]	8	57	BAR	0	33	BAR	BAR	Yes
Denman Road and Thomas Mitchell Drive[B]	143	1,001	CHR	82	639	CHR	CHR	Yes
Denman Road and Edderton Road[A]	0	239	BAR	0	235	BAR	BAR	Yes

[A] *High-speed warrant.*
[B] *Intermediate-speed warrant.*

The comparison indicates that at the surveyed intersections in 2030 with the cumulative impacts of the other developments, traffic growth and the Modification, the existing major road treatments meet or exceed the Austroads warrants for major road treatments for greenfields intersections. No additional major road treatments are required.

4.7 Road Safety

The review of the road safety history (Section 3.3) found that there was no significant clustering of crashes on Thomas Mitchell Drive or Edderton Road that might suggest there is an inherent safety concern with the design of the principal access roads and intersections used by MAC-generated traffic. The reported crashes on both Thomas Mitchell Drive and Edderton Road involved light vehicles only, suggesting that there is no inherent safety concerns regarding use of those roads by heavy vehicles. The addition of heavy vehicles

associated with the Modification is therefore not expected to result in adverse impacts on road safety along the principal access roads.

4.8 Railway Level Crossings

The Modification would result in a reduction to the existing limits on train movements associated with MAC, from a maximum of 30 train movements per day to a maximum of 20 train movements per day. The Modification would therefore reduce the number of train movements at the level crossing on Antiene Station Road considered in Section 3.4. The additional road traffic generated by the Modification would not use Antiene Station Road, and so would not contribute to any changes to road traffic at the level crossing. The Modification would therefore result in an overall decrease in the combined road and rail demands at the level crossing.

The review of the existing signage and linemarking associated with the level crossing on Antiene Station Road found that the signage and linemarking across the level crossing is generally consistent with AS 1742.7, with some minor non-conformances. Those minor matters may be appropriately addressed through regular maintenance programs, e.g., to upgrade outdated signage and refresh faded pavement markings.

5 Conclusions

This study has investigated the future road transport environment associated with MAC and the proposed Modification to the approved operations. The study has found that the future operating conditions of the surrounding road network would be acceptable, with no significant impacts identified on the performance, capacity, efficiency and safety of the road network.

No specific management or mitigation measures are considered to be warranted by the future operations of MAC with the Modification and other mining operations in the region.

Based on the analysis and discussions presented in this report, it is concluded that the existing road network would satisfactorily accommodate the future traffic demands of the MAC with the Modification.

Appendix A

Photographs

Looking South Along Denman Road towards Thomas Mitchell Drive Intersection

Looking North Along Thomas Mitchell Drive towards Denman Road Intersection

Looking North at the Level Crossing on Antiene Railway Station Road

Looking South at the Level Crossing on Antiene Railway Station Road

Looking West from the Level Crossing on Antiene Railway Station Road

Looking East from the Level Crossing on Antiene Railway Station Road

Looking East from Edderton Road along McDonalds Road – MAC Minor Service Access

Looking West from Thomas Mitchell Drive to MAC Heavy Vehicle Access Road

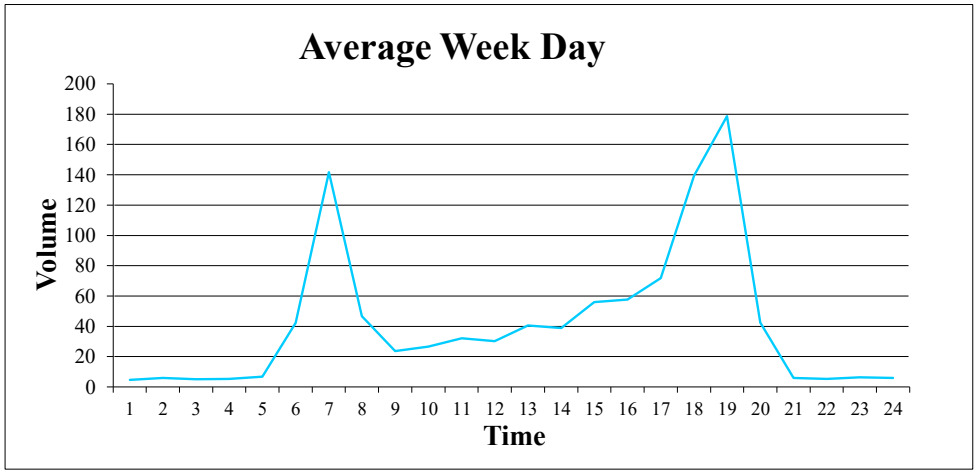
Looking North from Edderton Road along former Edderton Road

Appendix B

Traffic Surveys

Site 1 Mt Arthur Main Access Rd off Thomas Mitchell Dve [70] — Eastbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	4	5	4	6	4	2	2	5	2	4
1:00	3	6	7	5	8	1	0	6	1	4
2:00	3	9	3	5	5	7	5	5	6	5
3:00	1	6	5	8	6	2	1	5	2	4
4:00	4	4	7	10	8	3	8	7	6	6
5:00	40	36	36	52	48	31	29	42	30	39
6:00	123	152	146	141	147	119	124	142	122	136
7:00	54	60	30	53	37	46	43	47	45	46
8:00	24	23	28	23	21	6	6	24	6	19
9:00	24	23	16	34	37	5	4	27	5	20
10:00	27	29	26	38	41	10	13	32	12	26
11:00	39	32	24	32	24	7	4	30	6	23
12:00	28	43	37	47	48	8	14	41	11	32
13:00	45	30	44	42	34	8	15	39	12	31
14:00	60	50	47	56	67	15	11	56	13	44
15:00	46	62	73	53	55	7	8	58	8	43
16:00	82	81	78	83	35	5	13	72	9	54
17:00	154	140	147	154	102	80	91	139	86	124
18:00	183	171	189	176	174	162	139	179	151	171
19:00	35	81	25	30	42	30	27	43	29	39
20:00	7	4	8	6	4	1	1	6	1	4
21:00	5	6	4	6	5	1	2	5	2	4
22:00	5	6	7	8	5	4	3	6	4	5
23:00	3	8	6	7	5	2	3	6	3	5
Total	**999**	**1067**	**997**	**1075**	**962**	**562**	**566**	**1020**	**564**	**890**

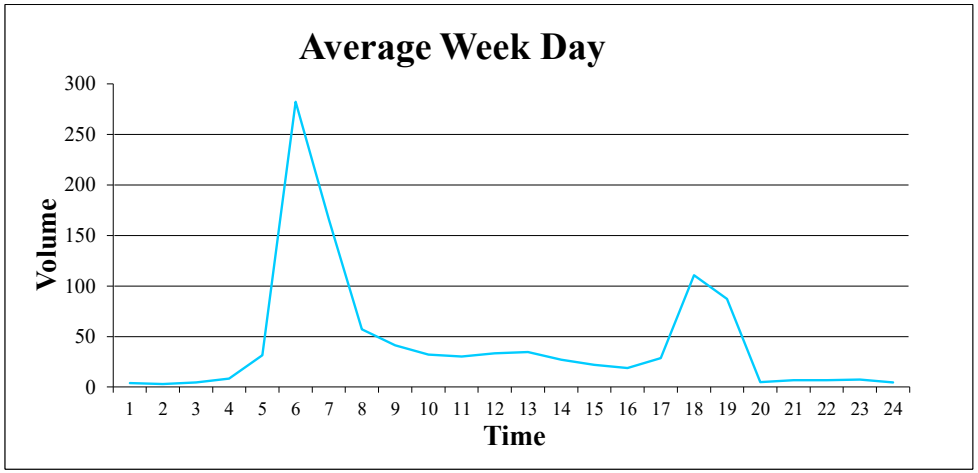


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**152**
PM Peak	6:00 PM	7:00 PM	**189**
		Week Day Average	**1020**
		Weekend Day Average	**564**
		7 Day Average	**890**

Site 1 Mt Arthur Main Access Rd off Thomas Mitchell Dve [70] Westbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	2	3	5	5	3	0	0	4	0	3
1:00	1	2	1	3	7	1	0	3	1	2
2:00	2	5	3	6	5	1	1	4	1	3
3:00	5	7	10	11	8	5	5	8	5	7
4:00	33	27	34	31	33	16	26	32	21	29
5:00	294	300	283	273	261	170	160	282	165	249
6:00	159	171	176	173	150	95	83	166	89	144
7:00	62	52	50	66	55	8	4	57	6	42
8:00	38	50	41	45	33	3	6	41	5	31
9:00	34	33	22	39	33	10	6	32	8	25
10:00	40	36	29	22	22	2	12	30	7	23
11:00	31	29	32	39	36	13	8	33	11	27
12:00	36	37	31	41	29	12	12	35	12	28
13:00	26	26	27	34	21	5	12	27	9	22
14:00	26	25	17	20	20	7	6	22	7	17
15:00	19	15	21	22	16	10	12	19	11	16
16:00	27	34	30	25	25	20	17	28	19	25
17:00	105	105	114	120	110	96	96	111	96	107
18:00	94	74	97	85	86	80	76	87	78	85
19:00	1	4	3	7	8	1	6	5	4	4
20:00	4	6	11	7	5	5	3	7	4	6
21:00	6	9	5	10	3	2	2	7	2	5
22:00	10	7	8	3	7	1	11	7	6	7
23:00	5	4	5	3	4	6	5	4	6	5
Total	**1060**	**1061**	**1055**	**1090**	**980**	**569**	**569**	**1049**	**569**	**912**

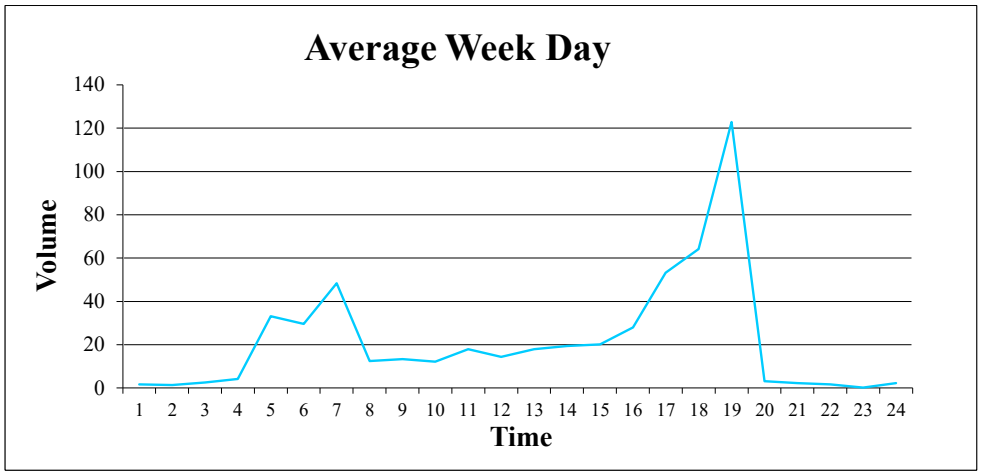


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**300**
PM Peak	5:00 PM	6:00 PM	**120**
		Week Day Average	**1049**
		Weekend Day Average	**569**
		7 Day Average	**912**

Site 2 Mt Arthur Bayswater Access No.2 Access Rd off Thomas Mitchell Dve [50] Eastbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	3	1	1	3	0	5	2	2	4	2
1:00	0	1	4	0	1	1	0	1	1	1
2:00	0	4	3	4	1	0	1	2	1	2
3:00	2	2	3	4	9	3	0	4	2	3
4:00	20	26	49	35	36	24	23	33	24	30
5:00	44	34	16	20	34	24	20	30	22	27
6:00	40	54	48	58	42	41	36	48	39	46
7:00	12	11	11	14	14	3	3	12	3	10
8:00	16	7	15	18	10	1	2	13	2	10
9:00	8	17	15	10	10	2	1	12	2	9
10:00	16	13	27	21	13	3	4	18	4	14
11:00	14	13	12	14	18	5	6	14	6	12
12:00	21	11	15	23	20	1	3	18	2	13
13:00	21	17	14	27	18	4	3	19	4	15
14:00	15	13	19	27	27	5	1	20	3	15
15:00	23	23	24	30	40	3	9	28	6	22
16:00	61	60	52	60	33	11	7	53	9	41
17:00	59	71	84	58	49	19	21	64	20	52
18:00	122	129	127	126	110	94	90	123	92	114
19:00	3	2	3	4	3	7	4	3	6	4
20:00	2	2	1	3	3	0	1	2	1	2
21:00	2	1	2	2	1	0	0	2	0	1
22:00	0	0	0	1	0	2	0	0	1	0
23:00	2	3	3	1	2	1	3	2	2	2
Total	**506**	**515**	**548**	**563**	**494**	**259**	**240**	**525**	**250**	**446**

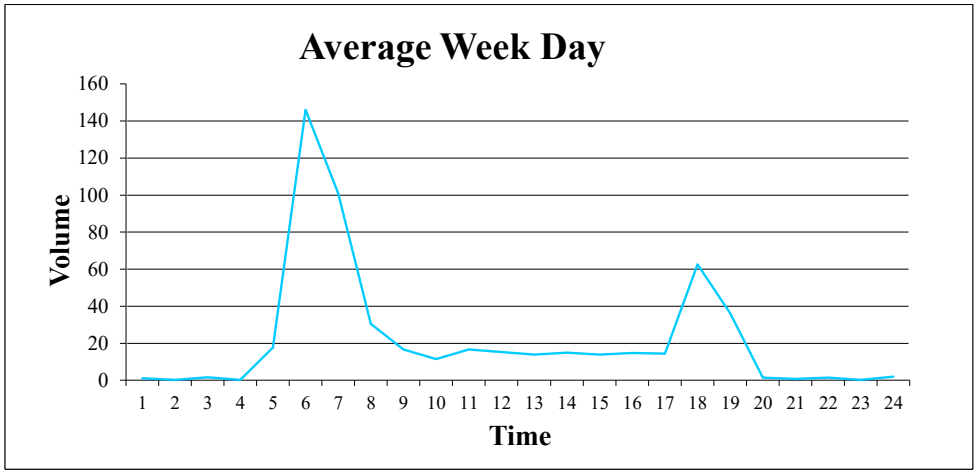


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**58**
PM Peak	6:00 PM	7:00 PM	**129**
		Week Day Average	**525**
		Weekend Day Average	**250**
		7 Day Average	**446**

Site 2 Mt Arthur Bayswater Access No.2 Access Rd off Thomas Mitchell Dve [50] Westbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	2	0	1	2	0	1	0	1	1	1
1:00	0	0	0	0	1	0	0	0	0	0
2:00	2	1	1	2	2	0	0	2	0	1
3:00	1	0	0	0	0	0	1	0	1	0
4:00	15	18	18	18	20	19	20	18	20	18
5:00	143	143	167	150	127	59	55	146	57	121
6:00	91	104	110	99	101	47	58	101	53	87
7:00	34	31	27	33	28	6	1	31	4	23
8:00	14	12	17	27	14	2	4	17	3	13
9:00	11	11	9	16	10	1	6	11	4	9
10:00	18	10	24	21	11	3	4	17	4	13
11:00	23	16	10	15	13	5	3	15	4	12
12:00	11	12	12	19	16	3	3	14	3	11
13:00	14	18	11	17	15	0	2	15	1	11
14:00	13	8	14	25	10	3	2	14	3	11
15:00	19	12	12	13	18	7	3	15	5	12
16:00	21	15	15	13	8	8	9	14	9	13
17:00	67	63	65	64	54	43	45	63	44	57
18:00	29	42	35	36	39	37	37	36	37	36
19:00	3	2	1	1	0	2	0	1	1	1
20:00	0	0	1	2	0	1	1	1	1	1
21:00	2	2	2	1	0	0	0	1	0	1
22:00	0	0	1	0	0	1	0	0	1	0
23:00	0	2	4	0	3	0	1	2	1	1
Total	**533**	**522**	**557**	**574**	**490**	**248**	**255**	**535**	**252**	**454**

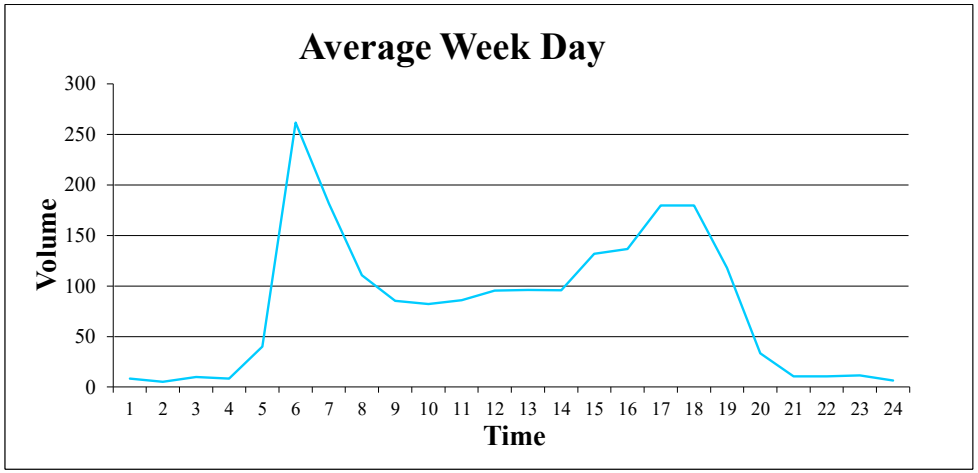


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**167**
PM Peak	5:00 PM	6:00 PM	**67**
		Week Day Average	**535**
		Weekend Day Average	**252**
		7 Day Average	**454**

Site 3 Thomas Mitchell Dve 1km W of Mt Arthur Access [100] Eastbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	3	8	7	11	12	4	3	8	4	7
1:00	2	7	6	3	8	3	3	5	3	5
2:00	7	9	9	11	13	11	3	10	7	9
3:00	8	9	4	14	5	3	5	8	4	7
4:00	41	43	42	38	37	19	24	40	22	35
5:00	247	270	277	271	243	128	123	262	126	223
6:00	179	183	204	181	160	91	89	181	90	155
7:00	113	100	110	121	110	43	31	111	37	90
8:00	77	90	89	87	84	30	12	85	21	67
9:00	72	82	68	101	87	16	24	82	20	64
10:00	100	94	78	74	84	29	25	86	27	69
11:00	92	108	91	92	94	40	24	95	32	77
12:00	82	95	105	104	95	29	49	96	39	80
13:00	91	81	98	92	117	54	30	96	42	80
14:00	133	124	111	134	157	40	33	132	37	105
15:00	133	127	132	140	151	31	32	137	32	107
16:00	210	199	183	180	127	41	30	180	36	139
17:00	170	183	186	210	150	98	106	180	102	158
18:00	119	129	119	123	99	83	91	118	87	109
19:00	29	45	28	30	35	20	26	33	23	30
20:00	8	8	10	12	14	11	7	10	9	10
21:00	9	13	12	9	8	7	5	10	6	9
22:00	15	8	10	11	12	4	5	11	5	9
23:00	5	4	11	5	6	4	5	6	5	6
Total	**1945**	**2019**	**1990**	**2054**	**1908**	**839**	**785**	**1983**	**812**	**1649**

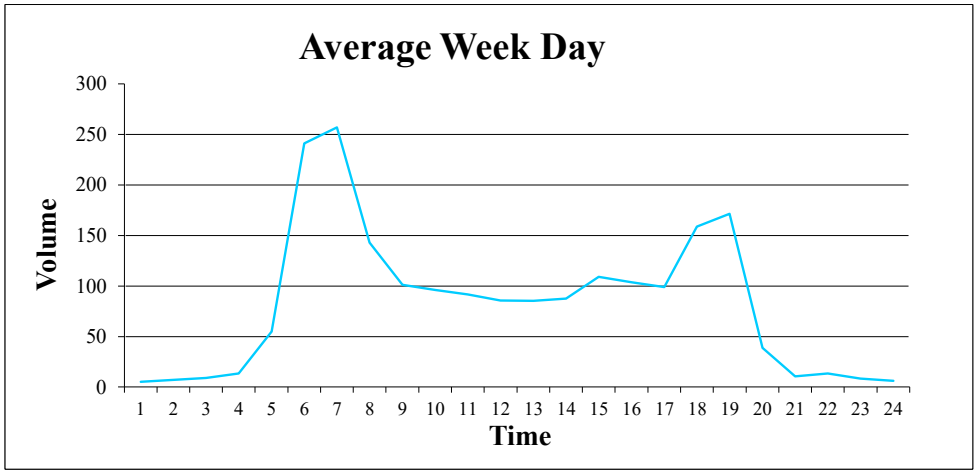


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**277**
PM Peak	4:00 PM	5:00 PM	**210**
		Week Day Average	**1983**
		Weekend Day Average	**812**
		7 Day Average	**1649**

Site 3 Thomas Mitchell Dve 1km W of Mt Arthur Access [100] Westbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	8	3	1	5	8	9	5	5	7	6
1:00	7	6	5	7	9	7	2	7	5	6
2:00	2	16	13	8	4	5	9	9	7	8
3:00	10	11	10	17	18	4	1	13	3	10
4:00	39	58	69	53	55	11	9	55	10	42
5:00	265	248	215	239	239	112	79	241	96	200
6:00	238	279	269	270	228	126	132	257	129	220
7:00	163	164	121	129	137	50	38	143	44	115
8:00	111	99	94	105	96	16	16	101	16	77
9:00	98	96	98	103	86	21	16	96	19	74
10:00	104	104	83	77	91	39	24	92	32	75
11:00	103	81	80	89	75	37	23	86	30	70
12:00	92	82	73	82	97	21	25	85	23	67
13:00	87	89	88	83	91	24	29	88	27	70
14:00	121	103	94	116	112	28	30	109	29	86
15:00	92	113	113	107	94	29	20	104	25	81
16:00	111	99	103	108	73	23	23	99	23	77
17:00	162	170	176	157	129	83	88	159	86	138
18:00	173	156	187	176	165	155	135	171	145	164
19:00	33	52	27	41	41	30	31	39	31	36
20:00	8	13	8	10	12	3	3	10	3	8
21:00	12	13	12	11	17	10	11	13	11	12
22:00	5	12	9	9	5	6	10	8	8	8
23:00	6	11	7	2	4	5	8	6	7	6
Total	**2050**	**2078**	**1955**	**2004**	**1886**	**854**	**767**	**1995**	**811**	**1656**

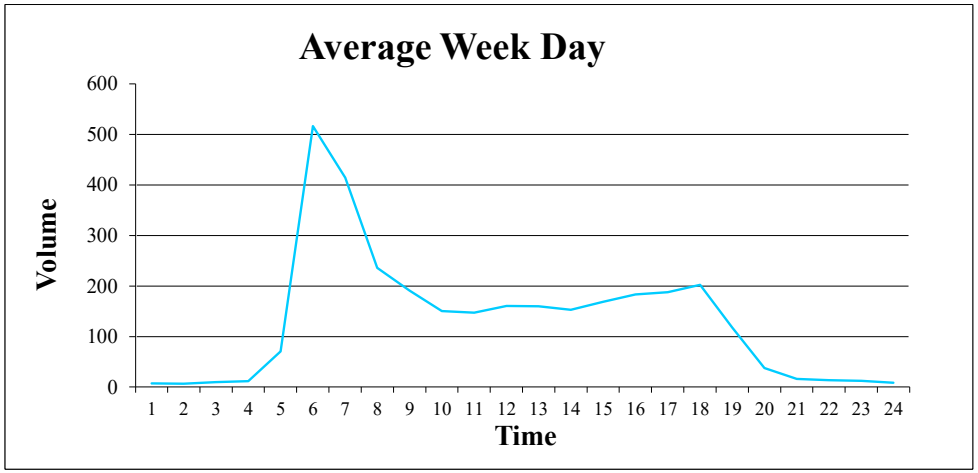


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**279**
PM Peak	6:00 PM	7:00 PM	**187**
		Week Day Average	**1995**
		Weekend Day Average	**810**
		7 Day Average	**1656**

Site 4 Thomas Mitchell Dve 500m E of Denman Rd [70] Eastbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	5	9	5	7	8	9	5	7	7	7
1:00	2	8	6	8	8	3	3	6	3	5
2:00	8	4	11	9	13	5	6	9	6	8
3:00	11	17	5	15	9	8	11	11	10	11
4:00	71	73	77	61	72	37	28	71	33	60
5:00	490	537	543	521	490	176	143	516	160	414
6:00	394	418	422	427	410	112	87	414	100	324
7:00	235	228	244	251	220	57	41	236	49	182
8:00	194	214	193	193	162	47	24	191	36	147
9:00	132	161	142	172	145	43	28	150	36	118
10:00	155	151	129	132	168	68	40	147	54	120
11:00	145	187	168	149	153	79	36	160	58	131
12:00	138	158	165	175	164	45	53	160	49	128
13:00	145	137	156	156	171	63	46	153	55	125
14:00	157	161	148	181	197	44	44	169	44	133
15:00	156	195	195	196	174	47	39	183	43	143
16:00	226	212	183	190	129	55	43	188	49	148
17:00	186	199	225	231	171	114	130	202	122	179
18:00	115	128	109	126	114	78	78	118	78	107
19:00	31	45	40	35	35	22	29	37	26	34
20:00	11	16	15	22	13	11	9	15	10	14
21:00	12	14	12	13	13	16	7	13	12	12
22:00	11	8	15	13	13	5	3	12	4	10
23:00	6	7	16	5	7	5	5	8	5	7
Total	**3036**	**3287**	**3224**	**3288**	**3059**	**1149**	**938**	**3179**	**1044**	**2569**

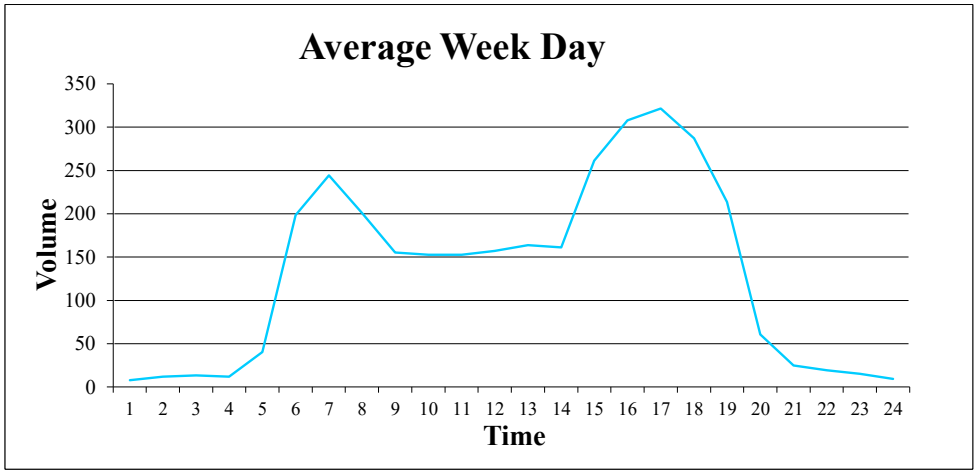


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**543**
PM Peak	5:00 PM	6:00 PM	**231**
		Week Day Average	**3179**
		Weekend Day Average	**1044**
		7 Day Average	**2569**

Site 4 Thomas Mitchell Dve 500m E of Denman Rd [70] Westbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	5	11	5	8	9	12	10	8	11	9
1:00	8	11	10	16	14	8	6	12	7	10
2:00	1	16	23	15	10	11	13	13	12	13
3:00	8	12	11	12	16	6	3	12	5	10
4:00	29	39	53	46	36	13	13	41	13	33
5:00	203	198	176	210	205	106	77	198	92	168
6:00	223	247	270	258	223	122	120	244	121	209
7:00	195	236	171	211	193	68	49	201	59	160
8:00	162	163	160	149	142	35	20	155	28	119
9:00	146	156	151	146	165	45	31	153	38	120
10:00	164	163	141	138	157	78	35	153	57	125
11:00	157	164	146	157	161	78	35	157	57	128
12:00	155	172	152	156	184	51	43	164	47	130
13:00	152	161	146	178	170	53	47	161	50	130
14:00	248	234	246	252	326	54	40	261	47	200
15:00	287	348	334	299	272	49	22	308	36	230
16:00	321	346	362	352	226	46	40	321	43	242
17:00	313	308	299	292	224	95	103	287	99	233
18:00	211	210	225	225	198	167	139	214	153	196
19:00	57	68	53	66	60	37	42	61	40	55
20:00	23	29	23	22	25	8	7	24	8	20
21:00	17	19	18	18	24	11	13	19	12	17
22:00	12	15	16	21	10	8	10	15	9	13
23:00	8	17	10	1	9	6	5	9	6	8
Total	**3105**	**3343**	**3201**	**3248**	**3059**	**1167**	**923**	**3191**	**1045**	**2578**

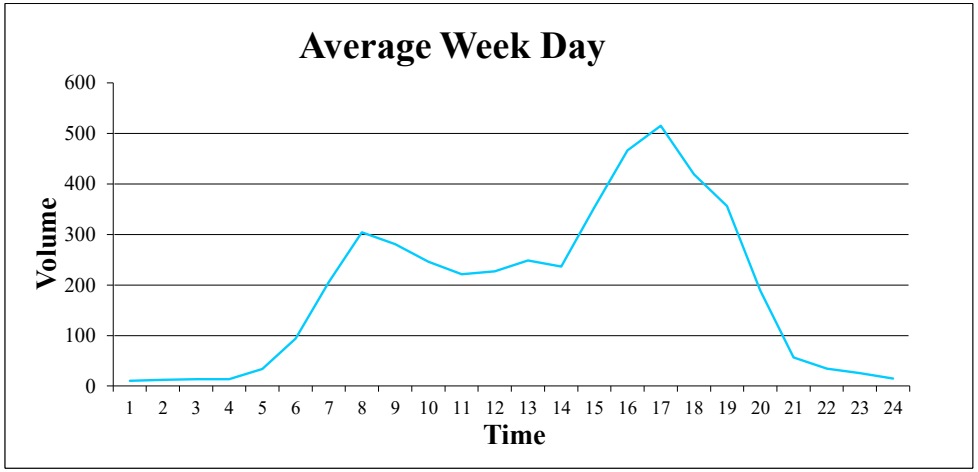


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**270**
PM Peak	4:00 PM	5:00 PM	**362**
		Week Day Average	**3191**
		Weekend Day Average	**1045**
		7 Day Average	**2578**

Site 5 Denman Rd 500m N of Thomas Mitchell Dve [100] — Northbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	5	20	10	10	7	15	12	10	14	11
1:00	7	12	11	13	15	9	11	12	10	11
2:00	4	11	24	14	13	12	14	13	13	13
3:00	11	12	11	15	15	4	8	13	6	11
4:00	25	30	41	40	31	13	14	33	14	28
5:00	88	98	81	98	104	49	51	94	50	81
6:00	178	223	225	205	199	143	133	206	138	187
7:00	310	331	268	313	299	200	157	304	179	268
8:00	279	279	292	293	262	127	75	281	101	230
9:00	237	242	205	270	277	160	103	246	132	213
10:00	234	242	177	214	240	204	130	221	167	206
11:00	218	236	206	227	247	177	136	227	157	207
12:00	233	225	259	241	285	172	134	249	153	221
13:00	210	214	245	245	270	157	136	237	147	211
14:00	331	308	317	358	451	152	147	353	150	295
15:00	415	494	505	470	447	143	134	466	139	373
16:00	535	568	553	561	356	158	133	515	146	409
17:00	450	440	450	453	301	169	175	419	172	348
18:00	338	363	362	359	359	279	219	356	249	326
19:00	176	200	186	204	179	154	143	189	149	177
20:00	39	56	61	41	82	37	24	56	31	49
21:00	31	28	33	34	43	27	28	34	28	32
22:00	20	21	24	31	28	18	17	25	18	23
23:00	10	20	13	7	21	18	14	14	16	15
Total	**4384**	**4673**	**4559**	**4716**	**4531**	**2597**	**2148**	**4573**	**2373**	**3944**

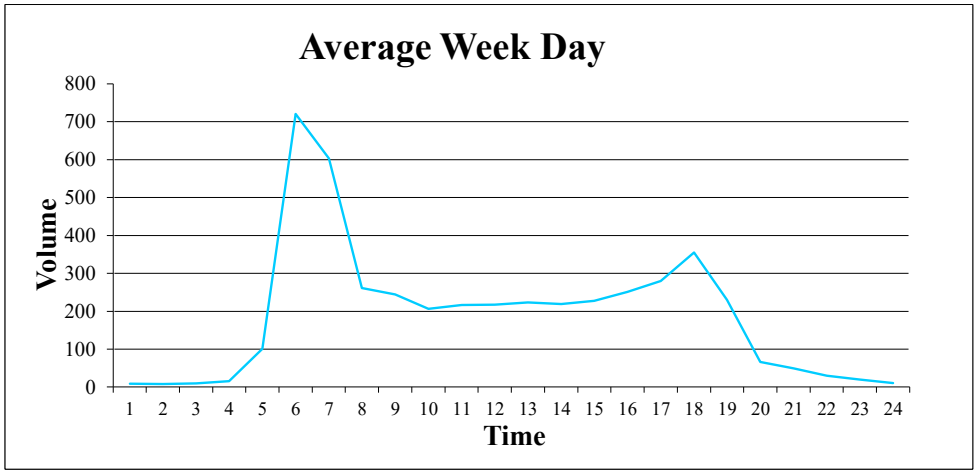


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	**331**
PM Peak	4:00 PM	5:00 PM	**568**
		Week Day Average	**4573**
		Weekend Day Average	**2373**
		7 Day Average	**3944**

Site 5 Denman Rd 500m N of Thomas Mitchell Dve [100] — Southbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	6	9	8	6	13	15	9	8	12	9
1:00	9	7	7	11	5	6	14	8	10	8
2:00	7	7	13	8	8	5	5	9	5	8
3:00	12	17	12	17	14	9	11	14	10	13
4:00	101	100	98	105	99	49	40	101	45	85
5:00	654	763	747	758	679	300	243	720	272	592
6:00	569	585	635	638	587	217	161	603	189	485
7:00	247	262	278	279	241	91	67	261	79	209
8:00	236	278	257	242	209	102	59	244	81	198
9:00	205	208	214	202	202	156	116	206	136	186
10:00	229	230	185	201	239	170	134	217	152	198
11:00	198	228	200	218	241	203	132	217	168	203
12:00	215	230	231	221	220	186	136	223	161	206
13:00	211	216	197	215	258	159	118	219	139	196
14:00	232	195	231	239	240	124	126	227	125	198
15:00	242	271	224	258	262	142	118	251	130	217
16:00	296	263	261	279	299	142	114	280	128	236
17:00	328	378	364	368	338	243	242	355	243	323
18:00	221	215	260	229	225	168	149	230	159	210
19:00	49	64	67	91	56	61	40	65	51	61
20:00	41	51	49	59	44	43	28	49	36	45
21:00	23	27	38	28	31	30	19	29	25	28
22:00	20	17	18	19	22	17	13	19	15	18
23:00	6	14	9	8	10	15	7	9	11	10
Total	**4357**	**4635**	**4603**	**4699**	**4542**	**2653**	**2101**	**4567**	**2377**	**3941**

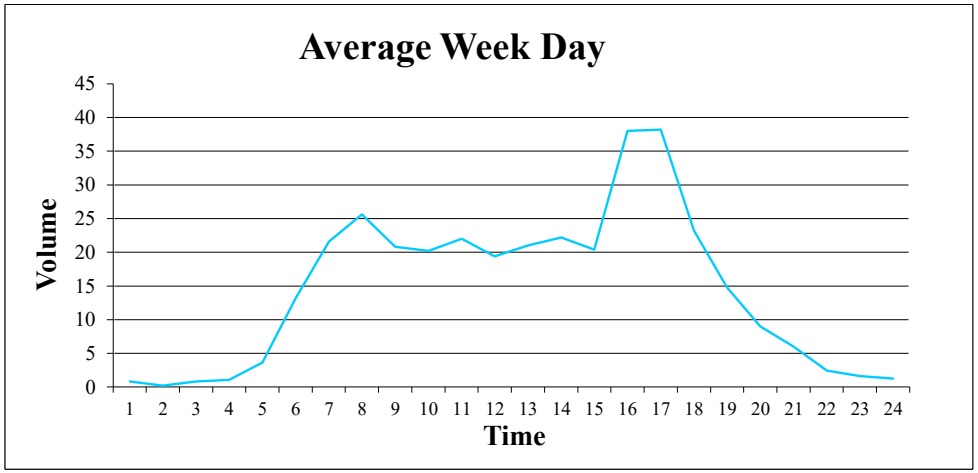


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**763**
PM Peak	5:00 PM	6:00 PM	**378**
		Week Day Average	**4567**
		Weekend Day Average	**2377**
		7 Day Average	**3941**

Site 6 Edderton Rd 500m S of Denman Rd [100] — Northbound

Day / Time	Mon 21/06/2021	Tue 22/06/2021	Wed 23/06/2021	Thu 24/06/2021	Fri 25/06/2021	Sat 26/06/2021	Sun 27/06/2021	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	0	2	1	1	0	1	0	1	1	1
1:00	1	0	0	0	0	1	0	0	1	0
2:00	0	0	1	1	2	0	0	1	0	1
3:00	4	1	0	0	0	1	2	1	2	1
4:00	2	5	4	3	4	2	2	4	2	3
5:00	14	11	13	15	13	8	5	13	7	11
6:00	24	25	20	20	19	11	6	22	9	18
7:00	32	18	27	24	27	17	9	26	13	22
8:00	17	21	17	31	18	11	7	21	9	17
9:00	17	27	10	20	27	10	11	20	11	17
10:00	18	25	24	24	19	17	6	22	12	19
11:00	15	23	20	19	20	12	11	19	12	17
12:00	17	17	22	30	19	7	13	21	10	18
13:00	18	18	30	24	21	5	10	22	8	18
14:00	19	33	18	17	15	13	14	20	14	18
15:00	33	40	49	37	31	12	13	38	13	31
16:00	31	35	48	39	38	21	14	38	18	32
17:00	32	21	23	23	17	14	18	23	16	21
18:00	19	16	11	15	13	13	7	15	10	13
19:00	10	9	9	11	6	10	9	9	10	9
20:00	5	5	6	5	9	4	1	6	3	5
21:00	1	4	2	2	3	1	0	2	1	2
22:00	1	1	2	1	3	3	1	2	2	2
23:00	1	1	1	1	2	0	0	1	0	1
Total	**331**	**358**	**358**	**363**	**326**	**194**	**159**	**347**	**177**	**298**

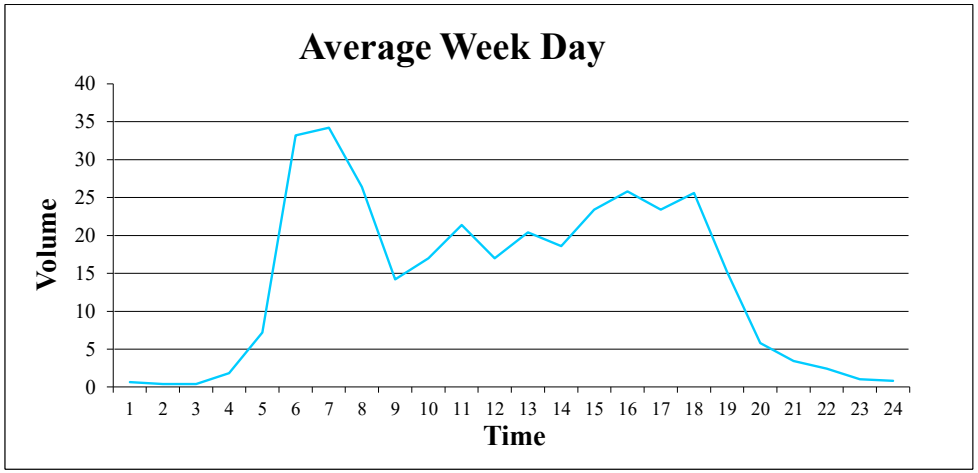


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	**32**
PM Peak	3:00 PM	4:00 PM	**49**
		Week Day Average	**347**
		Weekend Day Average	**177**
		7 Day Average	**298**

Site 6 Edderton Rd 500m S of Denman Rd [100] — Southbound

Day / Time	Mon 21/06/2021	Tue 22/06/2021	Wed 23/06/2021	Thu 24/06/2021	Fri 25/06/2021	Sat 26/06/2021	Sun 27/06/2021	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	0	0	1	1	1	1	0	1	1	1
1:00	1	0	0	0	1	0	0	0	0	0
2:00	0	0	1	0	1	0	0	0	0	0
3:00	2	2	1	3	1	1	1	2	1	2
4:00	9	6	6	9	6	5	3	7	4	6
5:00	31	38	38	32	27	12	12	33	12	27
6:00	29	33	41	29	39	1	7	34	4	26
7:00	26	37	22	30	17	4	3	26	4	20
8:00	10	15	14	19	13	8	4	14	6	12
9:00	17	24	19	14	11	16	12	17	14	16
10:00	19	26	28	21	13	9	9	21	9	18
11:00	17	15	17	19	17	29	13	17	21	18
12:00	19	19	27	18	19	11	20	20	16	19
13:00	15	27	16	16	19	11	12	19	12	17
14:00	20	18	30	17	32	11	13	23	12	20
15:00	29	26	29	20	25	12	10	26	11	22
16:00	21	18	25	25	28	13	16	23	15	21
17:00	19	21	24	33	31	21	18	26	20	24
18:00	12	12	23	12	17	10	7	15	9	13
19:00	2	6	7	6	8	8	3	6	6	6
20:00	5	6	2	2	2	7	1	3	4	4
21:00	1	1	2	2	6	3	1	2	2	2
22:00	0	0	1	3	1	1	0	1	1	1
23:00	0	0	1	2	1	0	0	1	0	1
Total	**304**	**350**	**375**	**333**	**336**	**194**	**165**	**340**	**180**	**294**

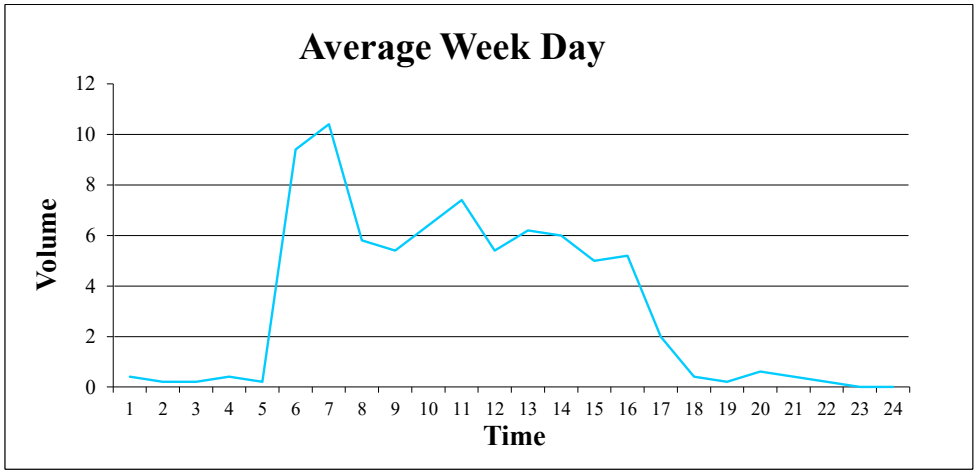


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**41**
PM Peak	5:00 PM	6:00 PM	**33**
		Week Day Average	**340**
		Weekend Day Average	**180**
		7 Day Average	**294**

Site 8 Mt Arthur Stage 2 Access off Edderton Rd [70] — Eastbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	Ave.	Ave.	Ave
0:00	0	0	0	1	1	0	0	0	0	0
1:00	1	0	0	0	0	0	0	0	0	0
2:00	0	0	1	0	0	0	0	0	0	0
3:00	0	1	0	1	0	0	0	0	0	0
4:00	0	0	1	0	0	1	0	0	1	0
5:00	9	9	10	9	10	6	5	9	6	8
6:00	10	10	15	8	9	0	0	10	0	7
7:00	5	7	5	8	4	0	1	6	1	4
8:00	2	5	9	8	3	0	1	5	1	4
9:00	8	7	5	7	5	1	0	6	1	5
10:00	7	8	9	9	4	0	2	7	1	6
11:00	5	4	8	6	4	0	1	5	1	4
12:00	7	7	8	7	2	2	1	6	2	5
13:00	5	8	8	7	2	3	2	6	3	5
14:00	7	4	8	2	4	2	3	5	3	4
15:00	8	4	7	4	3	1	1	5	1	4
16:00	3	0	2	2	3	0	0	2	0	1
17:00	0	0	0	2	0	0	0	0	0	0
18:00	0	0	0	1	0	1	0	0	1	0
19:00	1	1	1	0	0	0	0	1	0	0
20:00	1	0	0	1	0	0	0	0	0	0
21:00	0	0	1	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	**79**	**75**	**98**	**83**	**54**	**17**	**17**	**78**	**17**	**60**

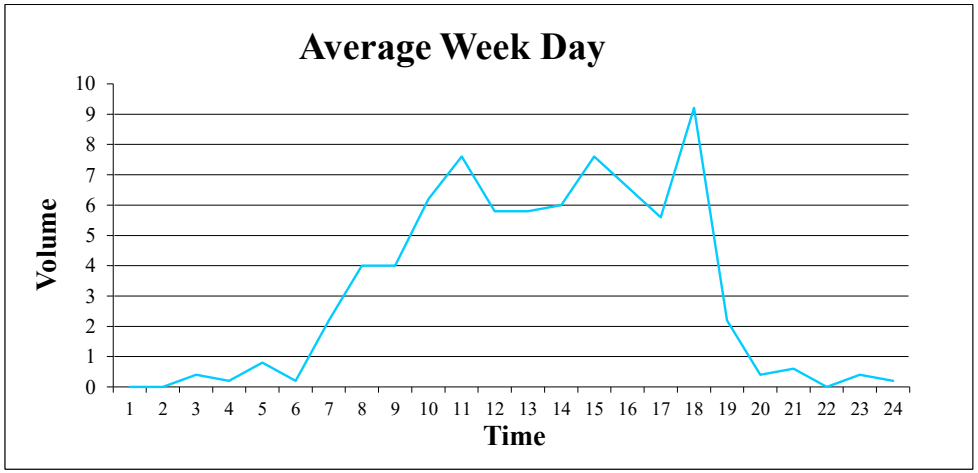


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**15**
PM Peak	12:00 PM	1:00 PM	**8**
		Week Day Average	**78**
		Weekend Day Average	**17**
		7 Day Average	**60**

Site 8 Mt Arthur Stage 2 Access off Edderton Rd [70] — Westbound

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W/Day	W/End	7 Day
Time	21/06/2021	22/06/2021	23/06/2021	24/06/2021	25/06/2021	26/06/2021	27/06/2021	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	1	1	0	0	0	0	0
3:00	1	0	0	0	0	0	0	0	0	0
4:00	0	1	2	1	0	0	0	1	0	1
5:00	0	0	0	0	1	0	0	0	0	0
6:00	1	1	5	1	3	1	0	2	1	2
7:00	5	5	6	3	1	0	0	4	0	3
8:00	5	2	3	6	4	0	0	4	0	3
9:00	5	9	5	5	7	0	1	6	1	5
10:00	6	4	13	9	6	0	2	8	1	6
11:00	3	7	3	12	4	3	0	6	2	5
12:00	5	8	9	5	2	1	2	6	2	5
13:00	5	1	8	13	3	0	2	6	1	5
14:00	10	8	10	3	7	1	3	8	2	6
15:00	7	5	12	7	2	3	2	7	3	5
16:00	6	6	3	6	7	2	2	6	2	5
17:00	15	10	12	5	4	5	5	9	5	8
18:00	1	1	0	9	0	0	0	2	0	2
19:00	1	0	1	0	0	0	0	0	0	0
20:00	1	1	0	1	0	1	0	1	1	1
21:00	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	2	0	0	0	0	0
23:00	0	0	1	0	0	0	0	0	0	0
Total	**77**	**69**	**93**	**87**	**54**	**17**	**19**	**76**	**18**	**59**



Summary

	from	to	
AM Peak	10:00 AM	11:00 AM	**13**
PM Peak	5:00 PM	6:00 PM	**15**
		Week Day Average	**76**
		Weekend Day Average	**18**
		7 Day Average	**59**

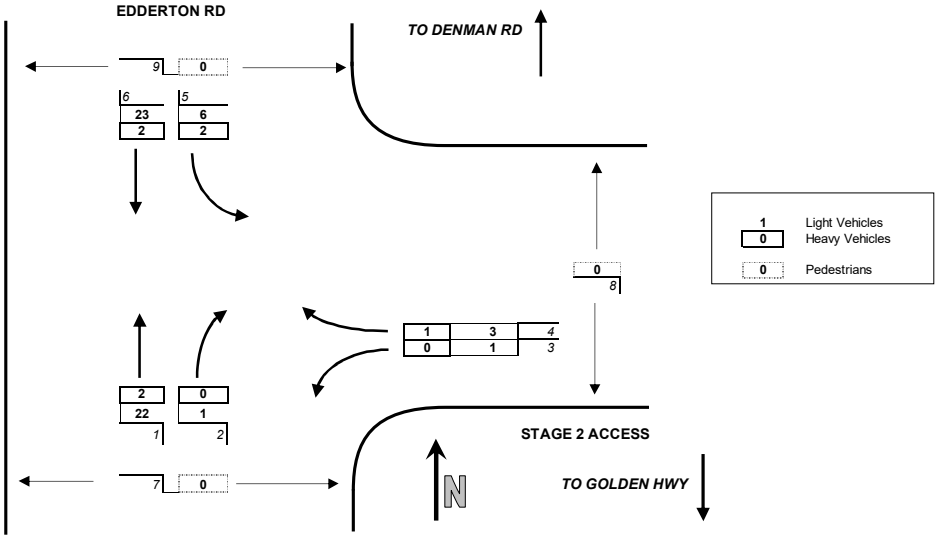
22/6/2021 - EDDERTON RD / STAGE 2 ACCESS, MUSWELLBROOK

8:15 <<< HOUR ENDING Tuesday

Summary:

EDDERTON RD / STAGE 2 ACCESS	
56	Total Light Vehicles
7	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307



22/6/2021 - EDDERTON RD / STAGE 2 ACCESS, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
05:15	1	0	0	0	0	5	6		0	0	0
05:30	4	0	0	0	0	11	15		0	0	0
05:45	3	5	0	0	2	4	14		0	0	0
06:00	1	0	0	0	3	6	10	45	0	0	0
06:15	3	1	0	1	2	5	12	51	0	0	0
06:30	8	2 <	0	0	1 <	5	16	52	0	0	0
06:45	7	0	0	0	2 <	6	15	53	0	0	0
07:00	5 <	0	0	0	2	3	10	53	0	0	0
07:15	3 <	0	0	1	1	8	13	54	0	0	0
07:30	7	0	0	0	2	7	16	54	0	0	0
07:45	3	0	0	1	0	9	13	52	0	0	0
08:00	2	1	0	1	2	4 <	10	52	0	0	0
08:15	10	0	1 <	1	2	3	17	56 <	0	0	0
08:30	3	0	0 <	1 <	0	3	7	47	0	0	0
08:45	4	0	0 <	0	0	0	4	38	0	0	0
09:00	0	0	0 <	0	2	0	2	30	0	0	0
09:15	2	0	0	1	1	4	8	21	0	0	0
09:30	5	0	0	1	1	3	10	24	0	0	0
09:45	3	0	0	1	0	1	5	25	0	0	0
10:00	7	1	0	1 <	0	4	13	36	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	0	0	0	0	0	1	1	
05:30	1	0	0	0	0	5	6	
05:45	0	0	0	0	0	0	0	
06:00	0	0	0	0	0	0	0	7
06:15	1 <	0	0	0	0	3 <	4	10
06:30	1 <	0	0	0	0	4	5	9
06:45	0 <	0	0	0	1	0	1	10
07:00	0 <	0	0	0	0	0	0	10
07:15	0	0	0	0	1	1	2	8
07:30	0	0	0	0	1	0	1	4
07:45	1	0	0	0	0	2	3	6
08:00	0	0	0	1	1	0	2	8
08:15	1 <	0	0	0	0	0	1	7
08:30	0 <	0	0	0	0	0	0	6
08:45	0	0	0	1	0	3	4	7
09:00	1 <	0	0	0	1	0	2	7
09:15	0	0	0	0	0	0	0	6
09:30	0	0	0	1	1	3	5	11
09:45	0	0	0	1	2 <	1	4	11
10:00	1	0	0	2 <	0	2	5	14 <

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	1	0	0	0	0	6	7	
05:30	5	0	0	0	0	16	21	
05:45	3	5	0	0	2	4	14	
06:00	1	0	0	0	3	6	10	52
06:15	4	1	0	1	2	8 <	16	61
06:30	9	2 <	0	0	1	9	21	61
06:45	7	0	0	0	3	6	16	63 <
07:00	5 <	0	0	0	2	3	10	63 <
07:15	3	0	0	1	2	9	15	62
07:30	7	0	0	0	3 <	7	17	58
07:45	4	0	0	1	0	11	16	58
08:00	2	1	0	2	3	4	12	60
08:15	11	0	1 <	1	2	3	18	63 <
08:30	3	0	0 <	1	0	3	7	53
08:45	4	0	0 <	1	0	3	8	45
09:00	1	0	0 <	0	3	0	4	37
09:15	2	0	0	1	1	4	8	27
09:30	5	0	0	2	2	6	15	35
09:45	3	0	0	2	2	2	9	36
10:00	8	1	0	3 <	0	6	18	50

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

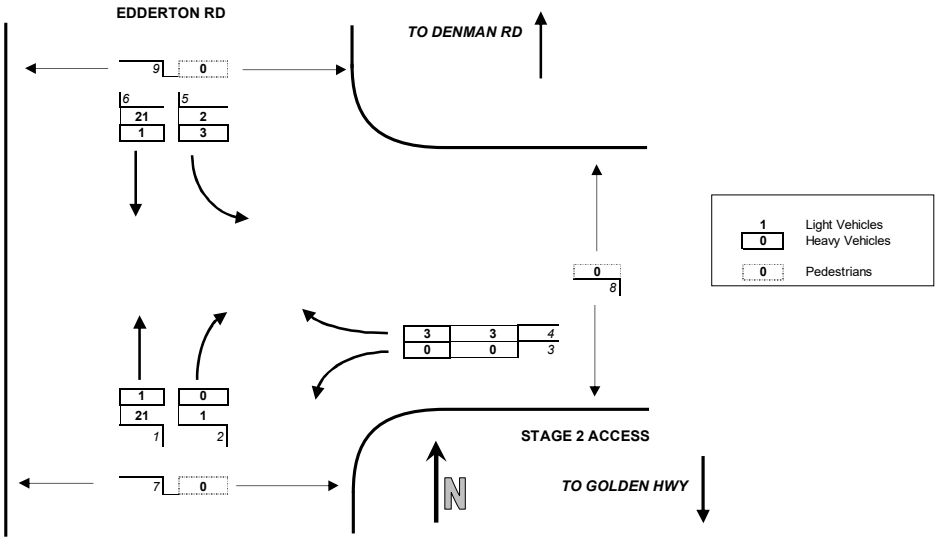
22/6/2021 - EDDERTON RD / STAGE 2 ACCESS, MUSWELLBROOK

11:15 <<< HOUR ENDING **Tuesday**

Summary:

EDDERTON RD / STAGE 2 ACCESS	
48	Total Light Vehicles
8	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307



22/6/2021 - EDDERTON RD / STAGE 2 ACCESS, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
10:15	6	1	0	1	0	1	9		0	0	0
10:30	6	0	0	0	0	4	10		0	0	0
10:45	3	0	0	0	1	5	9		0	0	0
11:00	9 <	0	0	1	1	5	16	44	0	0	0
11:15	3	1	0	2	0	7	13	48 <	0	0	0
11:30	2	0	1	0	0	1	4	42	0	0	0
11:45	1	0	0	3 <	0	0	4	37	0	0	0
12:00	1	0	0	0	0	3	4	25	0	0	0
12:15	1	0	0	1	1	4	7	19	0	0	0
12:30	1	0	0	0	1	1	3	18	0	0	0
12:45	4	0	0	0	0	5	9	23	0	0	0
13:00	5	0	0	1	1	4	11	30	0	0	0
13:15	3	0	0	0	1	7	11	34	0	0	0
13:30	8	0	0	0	1	5	14	45	0	0	0
13:45	2	0	0	1	1 <	6 <	10	46	0	0	0
14:00	4	1	2	0	1 <	3	11	46	0	0	0
14:15	3	0	1	0	0	2	6	41	0	0	0
14:30	4	1 <	0	0	0	3	8	35	0	0	0
14:45	7	0 <	1 <	1	0	3	12	37	0	0	0
15:00	7	0	0	2	0	5	14	40	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
10:15	1	0	0	0	1	1	3	
10:30	0	0	0	0	1	0	1	
10:45	0	0	0	1	1	0	2	
11:00	0	0	0	1	0	0	1	7
11:15	1	0	0	1	1	1	4	8
11:30	0	0	1 <	0	0	1 <	2	9
11:45	1	0	0 <	0	1	0 <	2	9
12:00	1	0	0 <	0	2 <	0 <	3	11 <
12:15	1	0	0 <	1	0	0	2	9
12:30	0	0	0	3 <	0	0	3	10
12:45	1	0	0	0 <	0	0	1	9
13:00	1	0	0	0 <	0	1	2	8
13:15	0	0	0	0	0	0	0	6
13:30	0	0	0	0	2	0	2	5
13:45	0	0	0	0	2 <	0	2	6
14:00	1	0	0	1	0 <	0	2	6
14:15	0	0	0	2	0 <	0	2	8
14:30	1	0	0	0	0	0	1	7
14:45	1	0	0	0	1	1	3	8
15:00	3 <	0	0	0	0	1 <	4	10

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
10:15	7	1	0	1	1	2	12	
10:30	6	0	0	0	1	4	11	
10:45	3	0	0	1	2	5	11	
11:00	9	0	0	2	1	5	17	51
11:15	4	1	0	3	1	8	17	56 <
11:30	2	0	2	0	0	2	6	51
11:45	2	0	0	3 <	1	0	6	46
12:00	2	0	0	0	2	3	7	36
12:15	2	0	0	2	1	4	9	28
12:30	1	0	0	3 <	1	1	6	28
12:45	5	0	0	0	0	5	10	32
13:00	6	0	0	1	1	5	13	38
13:15	3	0	0	0	1	7	11	40
13:30	8	0	0	0	3	5	16	50
13:45	2	0	0	1	3 <	6 <	12	52
14:00	5	1	2	1	1 <	3	13	52
14:15	3	0	1	2	0	2	8	49
14:30	5	1 <	0	0	0	3	9	42
14:45	8	0 <	1 <	1	1	4	15	45
15:00	10 <	0	0	2	0	6	18	50

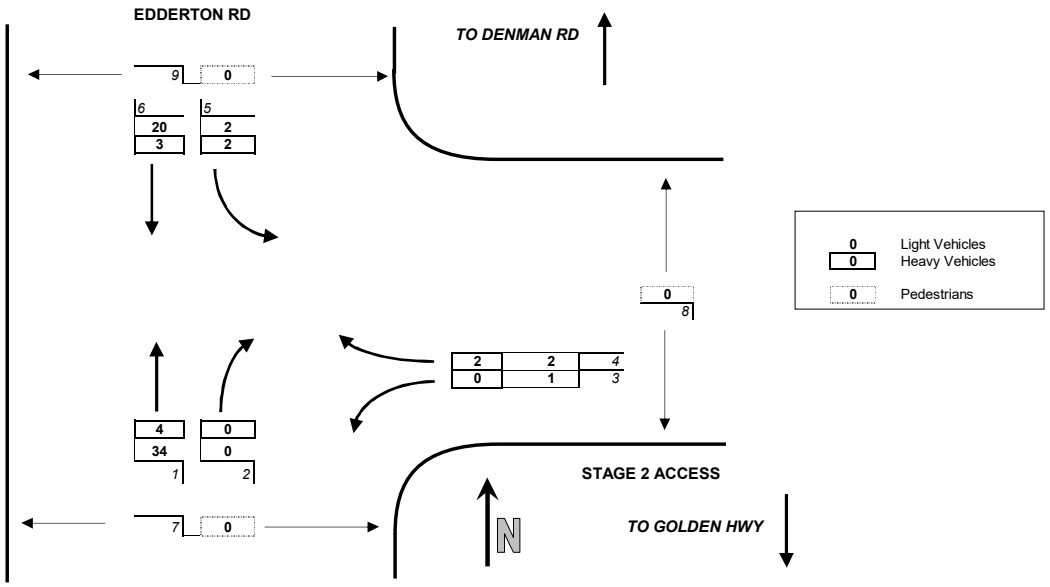
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

22/6/2021 - EDDERTON RD / STAGE 2 ACCESS, MUSWELLBROOK

16:00 <<< HOUR ENDING **Tuesday**

Summary:	EDDERTON RD / STAGE 2 ACCESS
59	Total Light Vehicles
11	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307



22/6/2021 - EDDERTON RD / STAGE 2 ACCESS, MUSWELLBROOK

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
15:15	7	0	0	1	0	4	12		0	0	0
15:30	7	0	0	0	0	5	12		0	0	0
15:45	9	0	1	1	1	5	17		0	0	0
16:00	11 <	0	0	0	1 <	6 <	18	59 <	0	0	0
16:15	4	0	0	2	0 <	3	9	56	0	0	0
16:30	7	0	0	0	0 <	5	12	56	0	0	0
16:45	11	0	0	2 <	0	5	18	57	0	0	0
17:00	7	0	1	0 <	0	6	14	53	0	0	0
17:15	1	0	0	0	0	3	4	48	0	0	0
17:30	2	0	0	1	0	5	8	44	0	0	0
17:45	4	0	0	0	0	4	8	34	0	0	0
18:00	4	0	6 <	3 <	0	6	19	39	0	0	0
18:15	3	0	0 <	0 <	0	2	5	40	0	0	0
18:30	3	0	0 <	1 <	0	4	8	40	0	0	0
18:45	7	0	0 <	0 <	0	3	10	42	0	0	0
19:00	2	0	0	0	0	1	3	26	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	1	0	0	2	1	0	4	
15:30	0	0	0	0	0	0	0	
15:45	0	0	0	0	1	1	2	
16:00	3	0	0	0 <	0 <	2	5	11 <
16:15	2 <	0	0	0	0	1 <	3	10
16:30	0 <	0	0	0	0	0 <	0	10
16:45	0 <	0	0	0	0	0	0	8
17:00	0	0	0	1	0	0	1	4
17:15	0	0	0	1 <	0	1	2	3
17:30	2	0	0	0 <	0	1	3	6
17:45	0	0	0	0 <	0	1	1	7
18:00	0	0	0	0	0	0	0	6
18:15	0	0	0	0	0	0	0	4
18:30	0	0	0	0	0	0	0	1
18:45	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	1	1	1

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	8	0	0	3	1	4	16	
15:30	7	0	0	0	0	5	12	
15:45	9	0	1	1	2	6	19	
16:00	14 <	0	0	0	1 <	8 <	23	70 <
16:15	6	0	0	2	0	4 <	12	66
16:30	7	0	0	0	0	5 <	12	66
16:45	11 <	0	0	2	0	5	18	65
17:00	7	0	1	1 <	0	6	15	57
17:15	1	0	0	1	0	4	6	51
17:30	4	0	0	1 <	0	6	11	50
17:45	4	0	0	0	0	5	9	41
18:00	4	0	6 <	3 <	0	6	19	45
18:15	3	0	0 <	0	0	2	5	44
18:30	3	0	0 <	1	0	4	8	41
18:45	7	0	0 <	0	0	3	10	42
19:00	2	0	0	0	0	2	4	27

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

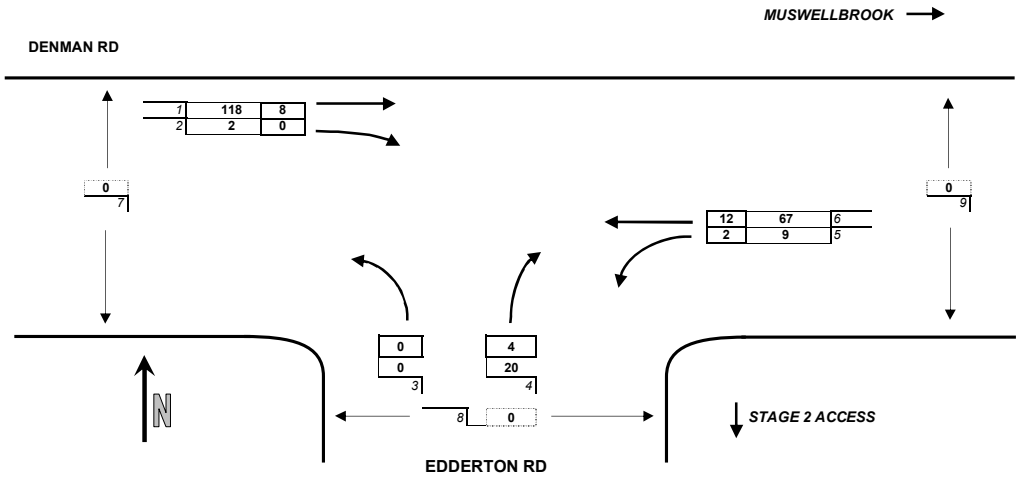
22/6/2021 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

8:45 <<< HOUR ENDING **Tuesday**

Summary:	DENMAN RD / EDDERTON RD
216	Total Light Vehicles
26	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307

118 Light Vehicles
8 Heavy Vehicles
0 Pedestrians



22/6/2021 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
05:15	18	0	0	1	8	6	33		0	0	0
05:30	21	0	0	3	16	3	43		0	0	0
05:45	43	0	0	6	7	5	61		0	0	0
06:00	32	0	0	2	7 <	8	49	186	0	0	0
06:15	31	0	0	5	8 <	11	55	208	0	0	0
06:30	22 <	0	0	7	7	16	52	217 <	0	0	0
06:45	22	0	0	7	7	10	46	202	0	0	0
07:00	21	2	0	6 <	5	12	46	199	0	0	0
07:15	22	1 <	0	4	8	17	52	196	0	0	0
07:30	26	0 <	0	6	8	16	56	200	0	0	0
07:45	23	0 <	0	3	11	9	46	200	0	0	0
08:00	25	2 <	0	1	1	17	46	200	0	0	0
08:15	28	0	0	10	4	19	61	209	0	0	0
08:30	31	0	0	4	2	15	52	205	0	0	0
08:45	34	0	0	5	2	16 <	57	216	0	0	0
09:00	25	0	0	1	4	10	40	210	0	0	0
09:15	22	0	0	3	3	16	44	193	0	0	0
09:30	28	0	0	3	5	15	51	192	0	0	0
09:45	18	0	0	5	2	10	35	170	0	0	0
10:00	19	0	0	7	4	12	42	172	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
05:15	0	0	0	0	0	1	1	
05:30	0	0	0	0	0	3	3	
05:45	0	0	0	0	0	0	0	
06:00	1	0	0	0	1	2	4	8
06:15	0	0	0	0	0	1	1	8
06:30	0	0	0	1	3	1	5	10
06:45	6	0	0	0	1	6	13	23
07:00	3	0	0	1	0	2	6	25
07:15	2	0	0	0	3	2	7	31
07:30	1	0	0	0	1	2	4	30
07:45	3	0	0	0	2	5	10	27
08:00	1	0	0	2	0	4	7	28
08:15	6	0	0	1	0	2	9	30
08:30	0	0	0	0	0	3 <	3	29
08:45	1	0	0	1	2	3	7	26
09:00	2	0	0	1	2	3	8	27
09:15	2	0	0	0	0	1	3	21
09:30	5	0	0	3	6 <	2	16	34
09:45	0	0	0	2	2 <	1	5	32
10:00	6 <	0	0	4 <	2 <	7	19	43 <

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
05:15	18	0	0	1	8	7	34	
05:30	21	0	0	3	16	6	46	
05:45	43	0	0	6	7	5	61	
06:00	33	0	0	2	8 <	10	53	194
06:15	31	0	0	5	8 <	12	56	216
06:30	22 <	0	0	8	10	17	57	227
06:45	28	0	0	7	8	16	59	225
07:00	24	2	0	7 <	5	14	52	224
07:15	24	1 <	0	4	11	19	59	227
07:30	27	0 <	0	6	9	18	60	230
07:45	26	0 <	0	3	13	14	56	227
08:00	26	2 <	0	3	1	21	53	228
08:15	34	0	0	11	4	21	70	239
08:30	31	0	0	4	2	18	55	234
08:45	35	0	0	6	4	19 <	64	242 <
09:00	27	0	0	2	6	13	48	237
09:15	24	0	0	3	3	17	47	214
09:30	33	0	0	6	11	17	67	226
09:45	18	0	0	7	4	11	40	202
10:00	25	0	0	11 <	6	19	61	215

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

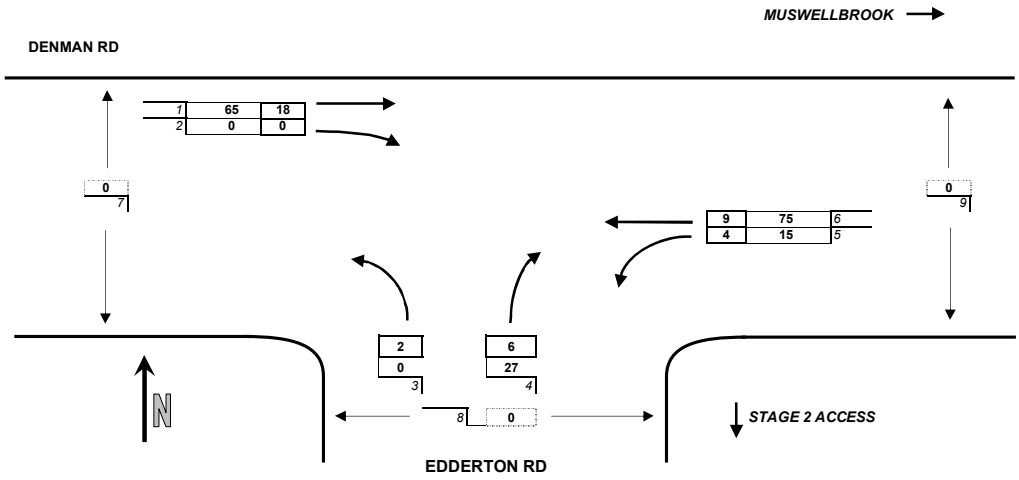
22/6/2021 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

15:00 <<< HOUR ENDING **Tuesday**

Summary: DENMAN RD / EDDERTON RD	
182	Total Light Vehicles
39	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307

65 Light Vehicles
18 Heavy Vehicles
0 Pedestrians



22/6/2021 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
10:15	21	0	0	5	3	13	42		0	0	0
10:30	14	0	0	6	3	23	46		0	0	0
10:45	19	0	0	5	6	20	50		0	0	0
11:00	19 <	0	1	8	7	13	48	186 <	0	0	0
11:15	18	1 <	1	4	4	12	40	184	0	0	0
11:30	8	0 <	0	4	2	23	37	175	0	0	0
11:45	13	0 <	1 <	5	1	21	41	166	0	0	0
12:00	18	0 <	0	3	3	10	34	152	0	0	0
12:15	17	0	0	1	5	18	41	153	0	0	0
12:30	15	0	0	1	1	19	36	152	0	0	0
12:45	12	0	0	6	7	20	45	156	0	0	0
13:00	20	0	0	2	5	22	49	171	0	0	0
13:15	9	0	0	5	6	18	38	168	0	0	0
13:30	11	0	0	7	6 <	20 <	44	176	0	0	0
13:45	22	0	0	2	6	18	48	179	0	0	0
14:00	15	0	0	2	5	18	40	170	0	0	0
14:15	13	0	0	6	1	18	38	170	0	0	0
14:30	7	0	0	5	3	19	34	160	0	0	0
14:45	24	0	0	5	4	23	56	168	0	0	0
15:00	21	0	0	11 <	7	15	54	182	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
10:15	1	0	0	1	2	0	4	
10:30	4	0	0	0	1	0	5	
10:45	3	0	0	0	4	4	11	
11:00	1	0	0	1	2 <	3	7	27
11:15	2	0	0	2	0	4	8	31
11:30	2	0	0	1	1	5	9	35
11:45	3	0	0	2	1	1	7	31
12:00	1	0	0	0	2	3	6	30
12:15	2	0	0	3	0	7	12	34
12:30	6	0	0	2 <	0	3	11	36
12:45	5	0	0	1	0	3	9	38
13:00	5	0	0	1 <	1	4 <	11	43 <
13:15	3 <	0	0	0	0	2	5	36
13:30	1	0	0	0	3	2	6	31
13:45	4	0	0	1	1	3	9	31
14:00	0	0	0	2	0	2	4	24
14:15	3	0	2 <	0	1	2	8	27
14:30	7	0	0 <	1	0	4	12	33
14:45	5	0	0 <	2	2	2	11	35
15:00	3	0	0 <	3	1	1	8	39

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
10:15	22	0	0	6	5	13	46	
10:30	18	0	0	6	4	23	51	
10:45	22	0	0	5	10	24	61	
11:00	20	0	1	9	9 <	16	55	213
11:15	20	1 <	1	6	4	16	48	215
11:30	10	0 <	0	5	3	28	46	210
11:45	16	0 <	1 <	7	2	22	48	197
12:00	19	0 <	0	3	5	13	40	182
12:15	19	0	0	4	5	25	53	187
12:30	21	0	0	3	1	22	47	188
12:45	17	0	0	7	7	23	54	194
13:00	25	0	0	3	6	26 <	60	214
13:15	12	0	0	5	6	20	43	204
13:30	12	0	0	7	9 <	22	50	207
13:45	26	0	0	3	7 <	21	57	210
14:00	15	0	0	4	5	20	44	194
14:15	16	0	2	6	2	20	46	197
14:30	14	0	0	6	3	23	46	193
14:45	29	0	0	7	6	25	67	203
15:00	24 <	0	0	14 <	8	16	62	221 <

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

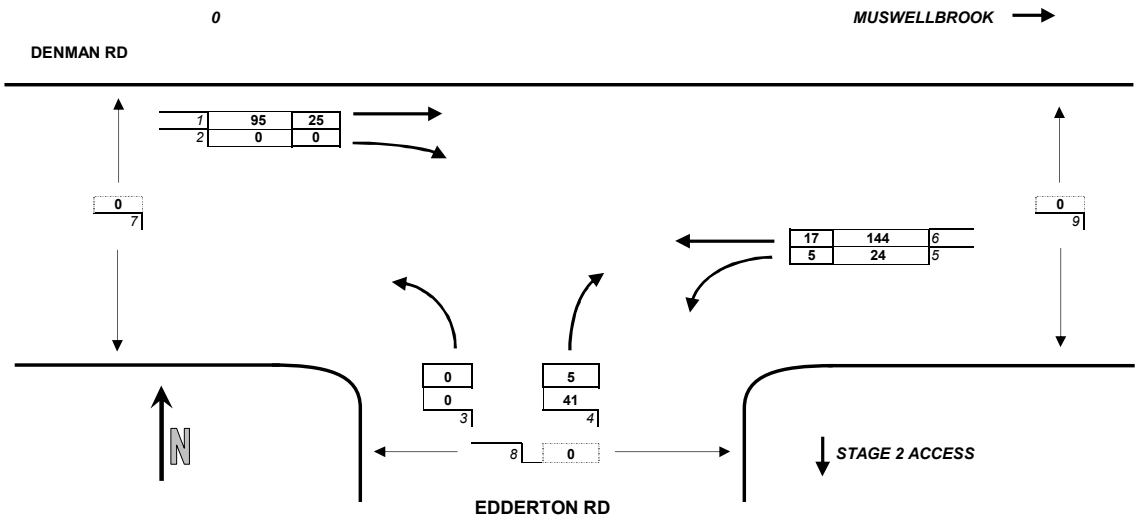
22/6/2021 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

16:15 <<< HOUR ENDING **Tuesday**

Summary:	DENMAN RD / EDDERTON RD
304	Total Light Vehicles
52	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307

95 Light Vehicles
25 Heavy Vehicles
0 Pedestrians



22/6/2021 - DENMAN RD / EDDERTON RD, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
15:15	25	0	0	7	4	13	49		0	0	0
15:30	34	0	0	13	11	53	111		0	0	0
15:45	21	0	0	14	6	31	72		0	0	0
16:00	20 <	0	0	9 <	6 <	28	63	295	0	0	0
16:15	20	0	0	5	1	32	58	304 <	0	0	0
16:30	7	0	1	2	2	6	18	211	0	0	0
16:45	14	0	0	11	6	34	65	204	0	0	0
17:00	21	0	1 <	6	4	29	61	202	0	0	0
17:15	19	0	0 <	4	2	45	70	214	0	0	0
17:30	28	0	0	3	6	42	79	275	0	0	0
17:45	13	0	0	3	7	42	65	275	0	0	0
18:00	19	0	0	8	4	37 <	68	282	0	0	0
18:15	14	0	0	2	2	27	45	257	0	0	0
18:30	9	0	0	4	4	27	44	222	0	0	0
18:45	7	0	0	6	5	27	45	202	0	0	0
19:00	7	0	0	4	1	11	23	157	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	3	0	1	0	1	1	6	
15:30	10	0	0	1	2	10	23	
15:45	8	0	0	1	2	3	14	
16:00	6 <	0	0 <	3 <	1 <	2	12	55 <
16:15	1	0	0	0 <	0	2 <	3	52
16:30	1	0	0	0	0	0	1	30
16:45	4	0	0	1	0	2	7	23
17:00	1	0	0	1	0	1	3	14
17:15	2	0	0	0	1	2	5	16
17:30	0	0	0	1	1	2	4	19
17:45	0	0	0	2	0	0	2	14
18:00	4	0	0	0	0	2	6	17
18:15	1	0	0	0	0	0	1	13
18:30	2	0	0	0	0	0	2	11
18:45	0	0	0	0	0	0	0	9
19:00	0	0	0	0	0	0	0	3

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	28	0	1	7	5	14	55	
15:30	44	0	0	14	13	63	134	
15:45	29	0	0	15	8	34	86	
16:00	26 <	0	0	12 <	7 <	30	75	350
16:15	21	0	0	5	1	34	61	356 <
16:30	8	0	1	2	2	6	19	241
16:45	18	0	0	12	6	36	72	227
17:00	22	0	1 <	7	4	30	64	216
17:15	21	0	0 <	4	3	47	75	230
17:30	28	0	0	4	7	44	83	294
17:45	13	0	0	5	7	42	67	289
18:00	23	0	0	8	4	39 <	74	299
18:15	15	0	0	2	2	27	46	270
18:30	11	0	0	4	4	27	46	233
18:45	7	0	0	6	5	27	45	211
19:00	7	0	0	4	1	11	23	160

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

22/6/2021 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

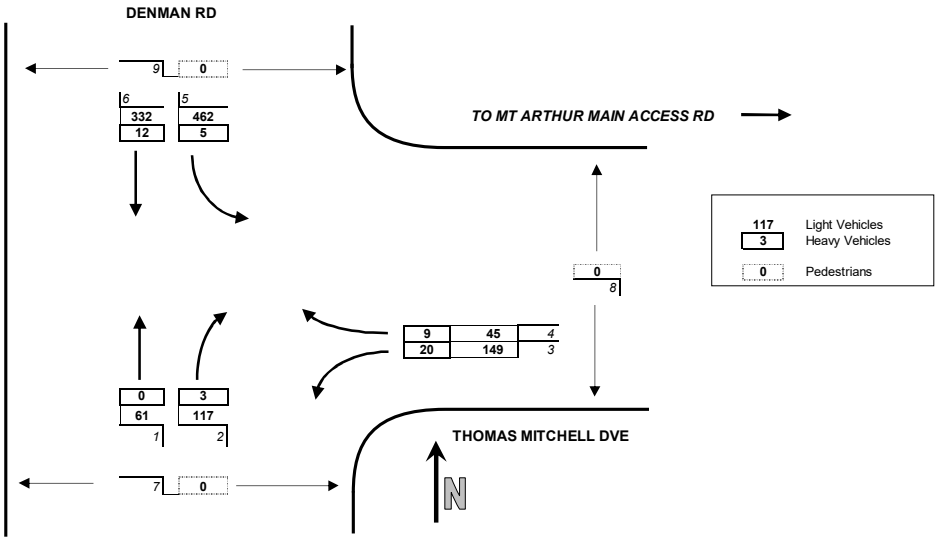
6:15 <<< HOUR ENDING **Tuesday**

Summary:

DENMAN RD / THOMAS MITCHELL DVE

1166	Total Light Vehicles
49	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307



22/6/2021 - 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	10	7	18	15	52	45	147		0	0	0
05:30	13	17	43	10	104	70	257		0	0	0
05:45	13	33	45	4	142	98	335		0	0	0
06:00	16	34	24	12	143	95	324	1063	0	0	0
06:15	19	33	37 <	19	73 <	69	250	1166 <	0	0	0
06:30	20	22 <	35	11	51	97 <	236	1145	0	0	0
06:45	32	27	25	31	66	67	248	1058	0	0	0
07:00	50	30	24	29	107	32	272	1006	0	0	0
07:15	57	22	32	42	41	24	218	974	0	0	0
07:30	57	14	16	23 <	29	29	168	906	0	0	0
07:45	42 <	14	21	15	20	31	143	801	0	0	0
08:00	40	20	13	21	50	23	167	696	0	0	0
08:15	41	11	9	19	37	37	154	632	0	0	0
08:30	48	14	12	16	36	29	155	619	0	0	0
08:45	46	10	13	22	25	26	142	618	0	0	0
09:00	39	7	9	16	33	19	123	574	0	0	0
09:15	30	7	7	22	20	33	119	539	0	0	0
09:30	30	5	6	19	28	24	112	496	0	0	0
09:45	41	11	10	15	23	20	120	474	0	0	0
10:00	33	6	9	24	20	17	109	460	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	0	0	3	0	0	2	5	
05:30	0	0	4	0	1	4	9	
05:45	0	2	4	1	2	0	9	
06:00	0	0	3	5	1	5	14	37
06:15	0	1	9	3	1	3	17	49
06:30	0	1	7	2	1	3	14	54
06:45	1	1	5	1	1	5	14	59
07:00	1	4	7	3	1	3	19	64
07:15	1	4	5	7	1	3	21	68
07:30	1	2	3	8	2	4	20	74
07:45	1	3	12	6	3	1	26	86
08:00	3	1	7	8 <	3	1	23	90
08:15	6	10	5	4	4	7	36	105
08:30	3	3	8 <	2	3	2	21	106
08:45	2	6	9	5	5	3	30	110
09:00	2	6	3	8	3	6 <	28	115 <
09:15	2	8	4	3	2	2	21	100
09:30	5	9	8	2	7 <	1	32	111
09:45	4	6	11	6	4	1	32	113
10:00	4 <	7 <	6	3	2	3	25	110

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	10	7	21	15	52	47	152	
05:30	13	17	47	10	105	74	266	
05:45	13	35	49	5	144	98	344	
06:00	16	34	27	17	144	100	338	1100
06:15	19	34	46 <	22	74 <	72	267	1215 <
06:30	20	23 <	42	13	52	100 <	250	1199
06:45	33	28	30	32	67	72	262	1117
07:00	51	34	31	32	108	35	291	1070
07:15	58	26	37	49	42	27	239	1042
07:30	58	16	19	31 <	31	33	188	980
07:45	43 <	17	33	21	23	32	169	887
08:00	43	21	20	29	53	24	190	786
08:15	47	21	14	23	41	44	190	737
08:30	51	17	20	18	39	31	176	725
08:45	48	16	22	27	30	29	172	728
09:00	41	13	12	24	36	25	151	689
09:15	32	15	11	25	22	35	140	639
09:30	35	14	14	21	35	25	144	607
09:45	45	17	21	21	27	21	152	587
10:00	37	13	15	27	22	20	134	570

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

22/6/2021 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

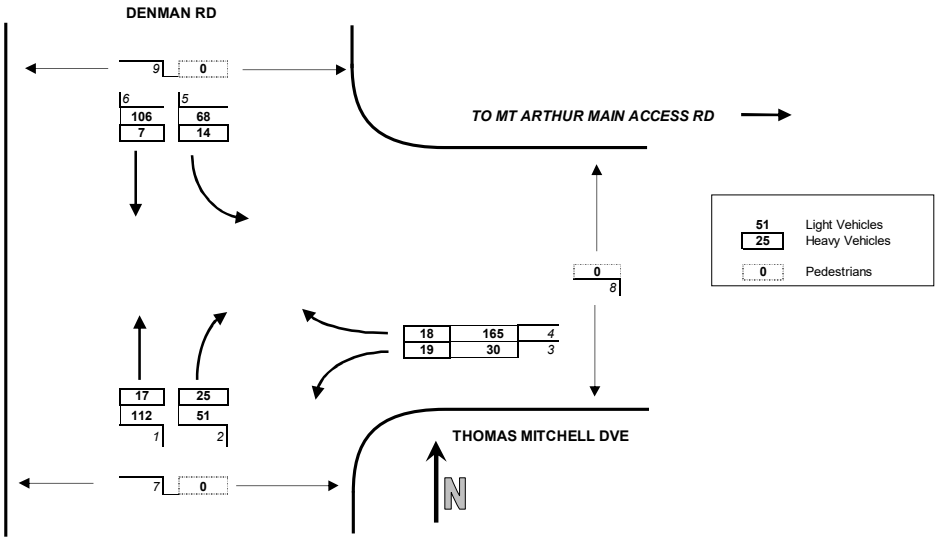
15:00 <<< HOUR ENDING **Tuesday**

Summary:

DENMAN RD / THOMAS MITCHELL DVE

532	Total Light Vehicles
100	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307



22/6/2021 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
10:15	30	7	7	19	23	35	121		0	0	0
10:30	34	5	9	23	23	27	121		0	0	0
10:45	25	7	6	23	17	36	114		0	0	0
11:00	34	9	2	31	19	19	114	470	0	0	0
11:15	34 <	10	8	23	26	29	130	479	0	0	0
11:30	21	16	7	24	21	20	109	467	0	0	0
11:45	23	4	5	23	18	33	106	459	0	0	0
12:00	32	13	9	24	28 <	20	126	471	0	0	0
12:15	25	6	7	20	24	35	117	458	0	0	0
12:30	25	13	14	19	23 <	22	116	465	0	0	0
12:45	19	8	10 <	27	18 <	41	123	482	0	0	0
13:00	32	5	7	25	17	26 <	112	468	0	0	0
13:15	14	4	6	19	21	28	92	443	0	0	0
13:30	29	7	12	23	23	27	121	448	0	0	0
13:45	29	2	11	28	23	25	118	443	0	0	0
14:00	30	12	4	19	16	27	108	439	0	0	0
14:15	23	14	3	52	26	33	151	498	0	0	0
14:30	25	12	4	37	10	24	112	489	0	0	0
14:45	26	15 <	10	39	19	27	136	507	0	0	0
15:00	38	10	13	37 <	13	22	133	532 <	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
10:15	4	2	9	5	4	0	24	
10:30	2	3	8	4	8	1	26	
10:45	3	3	8	6	7	5	32	
11:00	1	9	4	2	3	4	23	105
11:15	4	12	4	2	9 <	6 <	37	118 <
11:30	2	7	6	4	1	0	20	112
11:45	4	5 <	9	4	7	2	31	111
12:00	3	6	3	7	2	3	24	112
12:15	2	5	5	2	6	4	24	99
12:30	7	9	10	7	3	0	36	115
12:45	3	6	5	5 <	3	4	26	110
13:00	4	7	10 <	3	6	2	32	118 <
13:15	0	3	2	5	8	2	20	114
13:30	0	5	8	4	2	1	20	98
13:45	3	3	5	2	4	2	19	91
14:00	2	2	3	7	3	1	18	77
14:15	5	3	4	4	4	2	22	79
14:30	3	10	4	5	4	3	29	88
14:45	4	8	6	4	3	0	25	94
15:00	5 <	4	5	5	3	2	24	100

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
10:15	34	9	16	24	27	35	145	
10:30	36	8	17	27	31	28	147	
10:45	28	10	14	29	24	41	146	
11:00	35	18	6	33	22	23	137	575
11:15	38 <	22	12	25	35 <	35	167	597
11:30	23	23	13	28	22	20	129	579
11:45	27	9	14	27	25	35	137	570
12:00	35	19	12	31	30 <	23	150	583
12:15	27	11	12	22	30	39	141	557
12:30	32	22	24	26	26	22	152	580
12:45	22	14	15	32	21	45	149	592
13:00	36	12	17 <	28	23	28 <	144	586
13:15	14	7	8	24	29	30	112	557
13:30	29	12	20	27	25	28	141	546
13:45	32	5	16	30	27	27	137	534
14:00	32	14	7	26	19	28	126	516
14:15	28	17	7	56	30	35	173	577
14:30	28	22	8	42	14	27	141	577
14:45	30	23 <	16	43	22	27	161	601
15:00	43	14 <	18	42 <	16	24	157	632 <

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

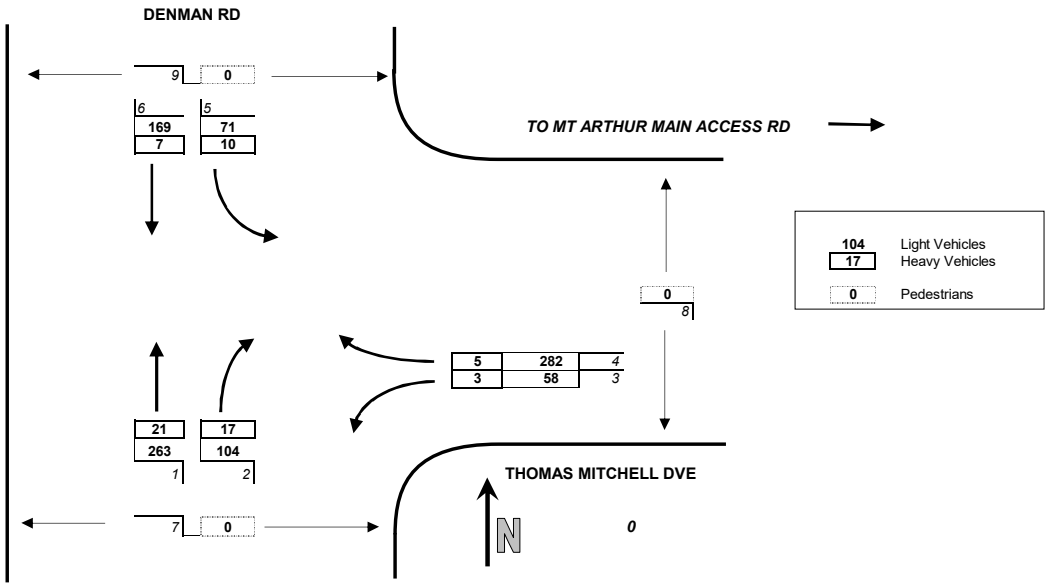
22/6/2021 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

17:00 <<< HOUR ENDING **Tuesday**

Summary:

	DENMAN RD / THOMAS MITCHELL DVE
947	Total Light Vehicles
63	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307



22/6/2021 - DENMAN RD / THOMAS MITCHELL DVE, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	HOUR	Pedestrians 7	8	9
15:15	64	24	6	72	17	27	210		0	0	0
15:30	43	20	16	64	19	30	192		0	0	0
15:45	41	12	18	95	19	33	218		0	0	0
16:00	46	11	8	40	27	52	184	804	0	0	0
16:15	67	21	20	82	13	39	242	836	0	0	0
16:30	53	34	17	87 <	15	35	241	885	0	0	0
16:45	80	26	11	69	27	44	257	924	0	0	0
17:00	63 <	23 <	10	44	16	51	207	947	0	0	0
17:15	48	20	19	81	20	51	239	944	0	0	0
17:30	62	23	18	64	18	70	255	958 <	0	0	0
17:45	39	17	22	40	27	59	204	905	0	0	0
18:00	37	17	11 <	50	39	77 <	231	929	0	0	0
18:15	50	20	6	50	52 <	42	220	910	0	0	0
18:30	57	5	18	54	9	52	195	850	0	0	0
18:45	37	16	10	32	3	45	143	789	0	0	0
19:00	41	15	7	30	3	11	107	665	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	HOUR
15:15	5	9	3	2	6	1	26	
15:30	3	4	5	3	11	4	30	
15:45	5	5	3	6	5	6	30	
16:00	1	10 <	2 <	5 <	3 <	6	27	113 <
16:15	5	4	0	1	1	2 <	13	100
16:30	7	6	3	0	4	2	22	92
16:45	5	2	0	3	4	2	16	78
17:00	4 <	5	0	1	1	1	12	63
17:15	4	2	1	1	0	1	9	59
17:30	4	7	0	1	2	0	14	51
17:45	3	1	2	0	2	2	10	45
18:00	0	2	2	1	5	1	11	44
18:15	5	0	0	0	0	0	5	40
18:30	1	1	0	0	0	0	2	28
18:45	0	2	0	1	0	0	3	21
19:00	0	0	0	0	1	1	2	12

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	HOUR
15:15	69	33	9	74	23	28	236	
15:30	46	24	21	67	30	34	222	
15:45	46	17	21	101	24	39	248	
16:00	47	21	10	45	30	58	211	917
16:15	72	25	20	83	14	41	255	936
16:30	60	40	20	87 <	19	37	263	977
16:45	85	28	11	72	31	46	273	1002
17:00	67 <	28 <	10	45	17	52	219	1010 <
17:15	52	22	20	82	20	52	248	1003
17:30	66	30	18	65	20	70	269	1009
17:45	42	18	24	40	29	61	214	950
18:00	37	19	13 <	51	44	78 <	242	973
18:15	55	20	6	50	52 <	42	225	950
18:30	58	6	18	54	9	52	197	878
18:45	37	18	10	33	3	45	146	810
19:00	41	15	7	30	4	12	109	677

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

22/6/2021 - THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS,

6:15 <<< HOUR ENDING **Tuesday**

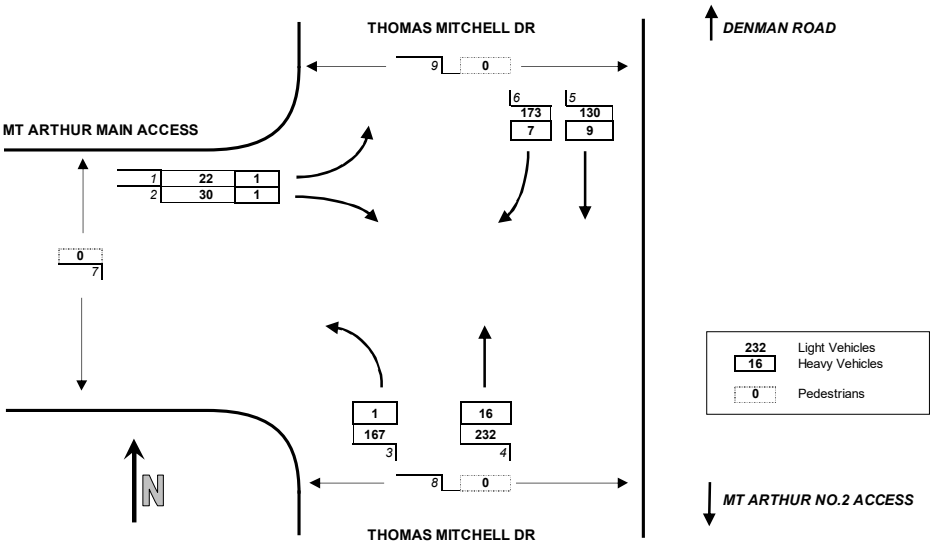
Summary:

THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS

754	**Total Light Vehicles**
35	**Total Heavy Vehicles**
0	**Total Pedestrians**

Quality Surveys

213307



22/6/2021 - THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS,

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
05:15	1	1	31	35	8	14	90		0	0	0
05:30	2	5	31	67	28	35	168		0	0	0
05:45	4	8	45	67	34	53	211		0	0	0
06:00	7	6	44	49	35	41	182	651	0	0	0
06:15	9	11	47 <	49 <	33 <	44 <	193	754 <	0	0	0
06:30	16	8	13	31	27	16	111	697	0	0	0
06:45	20	19	4	51	19	11	124	610	0	0	0
07:00	36	24	13	38	19	11	141	569	0	0	0
07:15	22 <	15 <	5	27	16	7	92	468	0	0	0
07:30	11	3	6	12	20	5	57	414	0	0	0
07:45	6	2	5	20	8	6	47	337	0	0	0
08:00	5	0	4	17	14	5	45	241	0	0	0
08:15	5	1	4	13	7	5	35	184	0	0	0
08:30	0	1	6	15	11	7	40	167	0	0	0
08:45	2	1	5	17	7	5	37	157	0	0	0
09:00	3	2	8	11	5	7	36	148	0	0	0
09:15	3	1	4	12	3	2	25	138	0	0	0
09:30	5	2	2	17	8	5	39	137	0	0	0
09:45	3	1	3	12	8	3	30	130	0	0	0
10:00	2	1	3	12	10	3	31	125	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	0	0	0	2	0	0	2	
05:30	0	0	0	5	4	1	10	
05:45	0	1	0	2	3	4	10	
06:00	1	0	1	4	1	1	8	30
06:15	0	0	0	5	1	1	7	35
06:30	0	3 <	1	11	2	2	19	44
06:45	1	0	2	7	1	1	12	46
07:00	1	0	0	6	1	0	8	46
07:15	0	0	1	7	3	1	12	51
07:30	0	0	1	7	6	0	14	46
07:45	0	0	2	16	4	0	22	56
08:00	0	1	2 <	7	3	1	14	62
08:15	1	1	0	9 <	11	1	23	73
08:30	1	2 <	2 <	6	11	0	22	81 <
08:45	1	0 <	0	8	7	0	16	75
09:00	2 <	0	0	5	5 <	0	12	73
09:15	0	0	0	7	7	2	16	66
09:30	2 <	1	0	6	7	3	19	63
09:45	0	1	0	13	8	2	24	71
10:00	1	0	0	3	9	2 <	15	74

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
05:15	1	1	31	37	8	14	92	
05:30	2	5	31	72	32	36	178	
05:45	4	9	45	69	37	57	221	
06:00	8	6	45	53	36	42	190	681
06:15	9	11	47 <	54 <	34 <	45 <	200	789 <
06:30	16	11	14	42	29	18	130	741
06:45	21	19	6	58	20	12	136	656
07:00	37	24	13	44	20	11	149	615
07:15	22 <	15 <	6	34	19	8	104	519
07:30	11	3	7	19	26	5	71	460
07:45	6	2	7	36	12	6	69	393
08:00	5	1	6	24	17	6	59	303
08:15	6	2	4	22	18	6	58	257
08:30	1	3	8	21	22	7	62	248
08:45	3	1	5	25	14	5	53	232
09:00	5	2	8	16	10	7	48	221
09:15	3	1	4	19	10	4	41	204
09:30	7	3	2	23	15	8	58	200
09:45	3	2	3	25	16	5	54	201
10:00	3	1	3	15	19	5	46	199

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

22/6/2021 - THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS,

15:00 <<< HOUR ENDING **Tuesday**

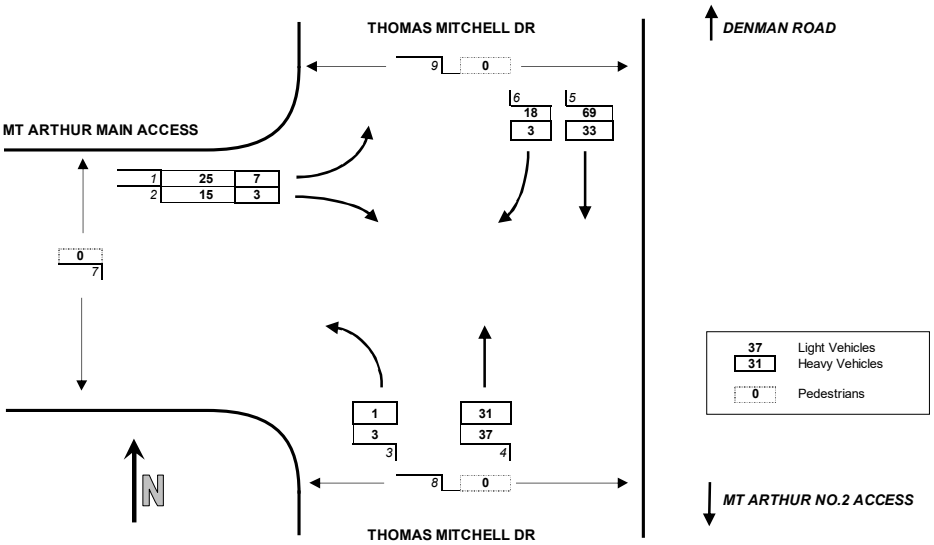
Summary:

THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS

167	**Total Light Vehicles**
78	**Total Heavy Vehicles**
0	**Total Pedestrians**

Quality Surveys

213307



22/6/2021 - THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS,

Light Vehicles

	1	2	3	4	5	6	15 MIN HOUR	Total Vehicles	Pedestrians 7	8	9
10:15	4	3	2	18	9	9	45		0	0	0
10:30	6	2	1	13	12	5	39		0	0	0
10:45	4	3	1	9	6	6	29		0	0	0
11:00	4	2	3	11 <	12	5 <	37	150	0	0	0
11:15	4	2	3	4	15	4	32	137	0	0	0
11:30	4	5	4 <	10	14	5	42	140	0	0	0
11:45	3	3	1 <	8	9	3	27	138	0	0	0
12:00	4	2	0	6	17	3	32	133	0	0	0
12:15	2	4	2	4	7	8	27	128	0	0	0
12:30	6	6	3	15	19	4	53	139	0	0	0
12:45	7	3	2	8	8	3	31	143	0	0	0
13:00	3	3 <	3	5	7	4	25	136	0	0	0
13:15	5	2	2	11	9	6	35	144	0	0	0
13:30	4	0	2	12	11	1	30	121	0	0	0
13:45	5	1	2	8	8	1	25	115	0	0	0
14:00	3	4	2	7	10	2	28	118	0	0	0
14:15	5	0	0	2	16	3	26	109	0	0	0
14:30	11	6	1	4	20	4	46	125	0	0	0
14:45	3	2	1	18	20	3	47	147	0	0	0
15:00	6 <	7	1	13	13 <	8	48	167 <	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	15 MIN HOUR	Total Vehicles
10:15	1	0	1	8	7	0	17	
10:30	0	0	1	11	6	0	18	
10:45	0	0	0	10	6	1	17	
11:00	2	0	0	5 <	12	0	19	71
11:15	0	0	0	8 <	11	1	20	74
11:30	2	1	0	6	8	2 <	19	75
11:45	2	0	0	11	7 <	0	20	78
12:00	0	0	2	6	8	0	16	75
12:15	1	1	0	10	9	0	21	76
12:30	1	2	0	7 <	7	2	19	76
12:45	1	0	1	4	11	1	18	74
13:00	0	0	1	7	5	1 <	14	72
13:15	1	0	1	10	8	0 <	20	71
13:30	4	0	0	12	7	1	24	76
13:45	1	0	2 <	4	12	1	20	78
14:00	0	2	1 <	5	3	0	11	75
14:15	2 <	0	0	10	3	2 <	17	72
14:30	3	2 <	0	11	15	0	31	79 <
14:45	1	0 <	1	3	8	1	14	73
15:00	1 <	1	0	7	7	0	16	78

All Vehicles

	1	2	3	4	5	6	15 MIN HOUR	Total Vehicles
10:15	5	3	3	26	16	9	62	
10:30	6	2	2	24	18	5	57	
10:45	4	3	1	19	12	7	46	
11:00	6	2	3	16 <	24	5 <	56	221
11:15	4	2	3	12	26	5	52	211
11:30	6	6	4	16	22	7	61	215
11:45	5	3	1	19	16	3	47	216
12:00	4	2	2	12	25	3	48	208
12:15	3	5	2	14	16	8	48	204
12:30	7	8	3	22	26	6	72	215
12:45	8	3	3	12	19	4	49	217
13:00	3	3 <	4	12	12	5	39	208
13:15	6	2	3 <	21	17	6	55	215
13:30	8	0	2	24	18	2	54	197
13:45	6	1	4 <	12	20	2	45	193
14:00	3	6	3	12	13	2	39	193
14:15	7	0	0	12	19	5	43	181
14:30	14	8	1	15	35	4	77	204
14:45	4	2	2	21	28	4	61	220
15:00	7 <	8	1	20	20 <	8	64	245 <

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

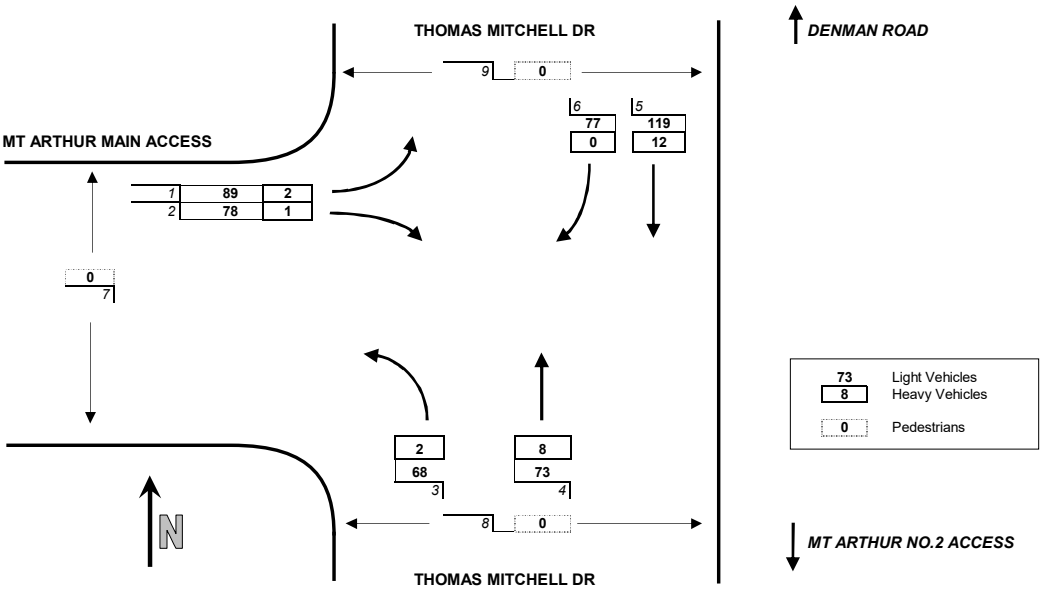
22/6/2021 - THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS,

18:15 <<< HOUR ENDING **Tuesday**

Summary:

THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS	
504	Total Light Vehicles
25	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307



22/6/2021 - THOMAS MITCHELL DR / MT ARTHUR MAIN ACCESS,

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
15:15	15	9	2	4	26	2	58		0	0	0
15:30	6	5	2	18	25	0	56		0	0	0
15:45	7	3	1	13	21	2	47		0	0	0
16:00	6	4	1	8	22	4	45	206	0	0	0
16:15	13	8	0	15	38	4	78	226	0	0	0
16:30	9	12	2	14	47	3	87	257	0	0	0
16:45	10	11	4	11	40	4	80	290	0	0	0
17:00	5	13	4	11	31 <	9	73	318	0	0	0
17:15	14	13	6	32	28	9	102	342	0	0	0
17:30	16	11	5	17	29	10	88	343	0	0	0
17:45	14	13	15	23	29	9	103	366	0	0	0
18:00	30	27	27	15 <	26	23	148	441	0	0	0
18:15	29	27	21 <	18	35	35 <	165	504	0	0	0
18:30	19 <	22	3	31 <	12	10 <	97	513 <	0	0	0
18:45	14 <	11	1	15	20	1	62	472	0	0	0
19:00	19	30 <	1	10	15	0	75	399	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
15:15	0	1	0	9	6	1	17	
15:30	1	1	0	11	6	0	19	
15:45	1	1	0	9	5	1	17	
16:00	0	1 <	0	4 <	6 <	0 <	11	64 <
16:15	1 <	0	1	3	4	1 <	10	57
16:30	1 <	0	1 <	4	7	0 <	13	51
16:45	1 <	0	0 <	1	4	0	6	40
17:00	0 <	0	0 <	2	4	0	6	35
17:15	0	0	0	1	4	0	5	30
17:30	2 <	0	1	2	8	0	13	30
17:45	0	1	0	4	0	0	5	29
18:00	0	0	0	2	3	0	5	28
18:15	0	0	1 <	0	1	0	2	25
18:30	0	0	0	0	1	0	1	13
18:45	0	1	0	0	3	0	4	12
19:00	0	0	0	0	1	0	1	8

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
15:15	15	10	2	13	32	3	75	
15:30	7	6	2	29	31	0	75	
15:45	8	4	1	22	26	3	64	
16:00	6	5	1	12	28	4	56	270
16:15	14	8	1	18	42	5	88	283
16:30	10	12	3	18	54	3	100	308
16:45	11	11	4	12	44	4	86	330
17:00	5	13	4	13	35 <	9	79	353
17:15	14	13	6	33	32	9	107	372
17:30	18	11	6	19	37	10	101	373
17:45	14	14	15	27	29	9	108	395
18:00	30	27	27	17 <	29	23	153	469
18:15	29	27	22 <	18	36	35 <	167	529 <
18:30	19 <	22	3	31	13	10 <	98	526
18:45	14 <	12	1	15	23	1	66	484
19:00	19	30 <	1	10	16	0	76	407

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

22/6/2021 - THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR, MUSWELLBROOK

6:15 <<< HOUR ENDING **Tuesday**

Summary:

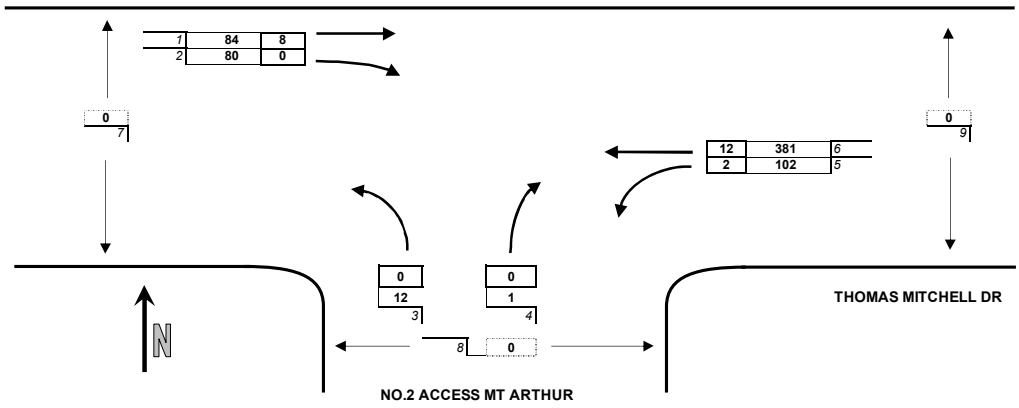
THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR

660	Total Light Vehicles
22	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307

84 Light Vehicles
8 Heavy Vehicles
0 Pedestrians

← *TO MT ARTHUR MAIN ACCESS*



22/6/2021 - THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR, MUSWELLBROOK

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
05:15	5	3	6	21	8	64	107		0	0	0
05:30	22	15	2	1	21	107	168		0	0	0
05:45	22	21	0	0	23	93	159		0	0	0
06:00	20	28	2	0	31	108	189	623	0	0	0
06:15	20	16 <	8	0	27 <	73 <	144	660 <	0	0	0
06:30	26	12	3	7	13	38	99	591	0	0	0
06:45	35	2	11	17	12	44	121	553	0	0	0
07:00	35	6	4 <	3	4	48	100	464	0	0	0
07:15	27 <	6	3	2 <	8	29	75	395	0	0	0
07:30	22	2	2	1	6	18	51	347	0	0	0
07:45	9	2	2	0	1	23	37	263	0	0	0
08:00	10	4	1	0	3	19	37	200	0	0	0
08:15	6	3	3	0	1	15	28	153	0	0	0
08:30	9	0	1	1	0	20	31	133	0	0	0
08:45	8	1	2	0	2	22	35	131	0	0	0
09:00	7	0	0	0	0	15	22	116	0	0	0
09:15	4	0	2	0	2	14	22	110	0	0	0
09:30	5	2	2	0	0	18	27	106	0	0	0
09:45	9	1	1	0	1	15	27	98	0	0	0
10:00	10	0	4	1	0	7	22	98	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
05:15	0	0	0	0	0	2	2	
05:30	3	0	0	0	1	2	6	
05:45	3	0	0	0	0	1	4	
06:00	1	0	0	0	1	6	8	20
06:15	1	0	0	0	0	3	4	22
06:30	4	1	0	0	0	12	17	33
06:45	1	1	1	0	0	8	11	40
07:00	0	0	0	0	0	6	6	38
07:15	2	1	0	0	0	10	13	47
07:30	7	0	0	0	0	7	14	44
07:45	2	0	1	0	0	16	19	52
08:00	4	0	0	0	0	9 <	13	59
08:15	10	0	1	0	1	7	19	65
08:30	13	1	0	0	3 <	9	26	77 <
08:45	7	0	0	0	0 <	7	14	72
09:00	5 <	0	1	0	0 <	5	11	70
09:15	6	0	3	1	1 <	4	15	66
09:30	7	1	0	0	1	6	15	55
09:45	8	0	1 <	0	0	12	21	62
10:00	9	3 <	0	2 <	1	2	17	68

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
05:15	5	3	6	21	8	66	109	
05:30	25	15	2	1	22	109	174	
05:45	25	21	0	0	23	94	163	
06:00	21	28	2	0	32	114	197	643
06:15	21	16 <	8	0	27 <	76 <	148	682 <
06:30	30	13	3	7	13	50	116	624
06:45	36	3	12	17	12	52	132	593
07:00	35	6	4 <	3	4	54	106	502
07:15	29 <	7	3	2 <	8	39	88	442
07:30	29	2	2	1	6	25	65	391
07:45	11	2	3	0	1	39	56	315
08:00	14	4	1	0	3	28	50	259
08:15	16	3	4	0	2	22	47	218
08:30	22	1	1	1	3	29	57	210
08:45	15	1	2	0	2	29	49	203
09:00	12	0	1	0	0	20	33	186
09:15	10	0	5	1	3	18	37	176
09:30	12	3	2	0	1	24	42	161
09:45	17	1	2	0	1	27	48	160
10:00	19	3	4	3	1	9	39	166

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

22/6/2021 - THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR, MUSWELLBROOK

15:00 <<< HOUR ENDING **Tuesday**

Summary:

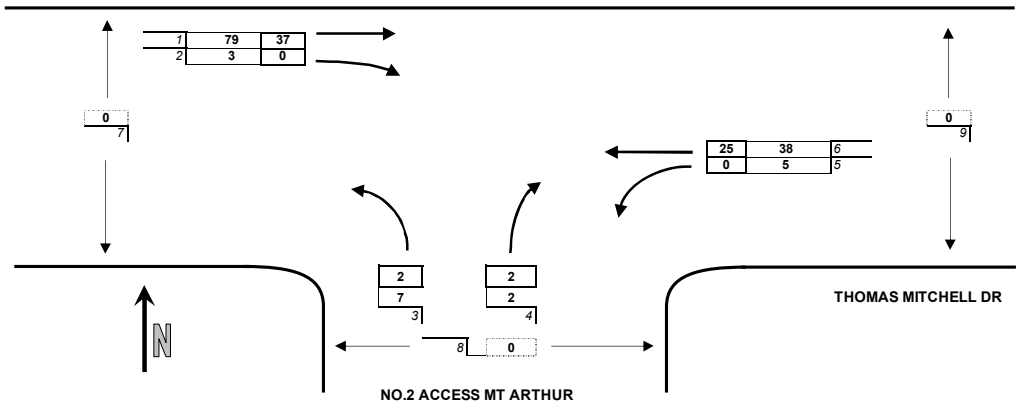
THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR

134	Total Light Vehicles
66	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307

79 Light Vehicles
37 Heavy Vehicles
0 Pedestrians

← *TO MT ARTHUR MAIN ACCESS*



22/6/2021 - THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR, MUSWELLBROOK

Light Vehicles

	1	2	3	4	5	6	15 MIN	HOUR	Total Vehicles
10:15	8	2	1	0	1	18	30		
10:30	11	2	2	0	0	11	26		
10:45	5	3	3	0	0	5	16		
11:00	13	0	2	1	0	10 <	26	98	
11:15	12	2	1	0	1	4	20	88	
11:30	17	1	2	2	1	12	35	97	
11:45	12	1	1	0	1	9	24	105	
12:00	15	3	1	1	0	5	25	104	
12:15	10	2	0	2	0	6	20	104	
12:30	26	0	3	0	3	14	46	115	
12:45	6	1	0	2	0	11	20	111	
13:00	11	1	0	0	0	6	18	104	
13:15	10	1	2	0	0	13 <	26	110	
13:30	8	3	1	2	1	9	24	88	
13:45	7	1	5	0	1	6	20	88	
14:00	12	4 <	1 <	2	2	8	29	99	
14:15	14	1 <	0	2 <	1	4	22	95	
14:30	26	1	2	0	0	3	32	103	
14:45	21	1	4	0	4 <	16	46	129	
15:00	18 <	0	1	0	0	15	34	134 <	

Pedestrians

	7	8	9
10:15	0	0	0
10:30	0	0	0
10:45	0	0	0
11:00	0	0	0
11:15	0	0	0
11:30	0	0	0
11:45	0	0	0
12:00	0	0	0
12:15	0	0	0
12:30	0	0	0
12:45	0	0	0
13:00	0	0	0
13:15	0	0	0
13:30	0	0	0
13:45	0	0	0
14:00	0	0	0
14:15	0	0	0
14:30	0	0	0
14:45	0	0	0
15:00	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	15 MIN	HOUR	Total Vehicles
10:15	7	0	0	0	0	9	16		
10:30	6	0	1	2	0	12	21		
10:45	6	0	1	0	0	8	15		
11:00	10	1	0	0	0	5	16	68	
11:15	11	0	0	0	0	7	18	70	
11:30	7	1	0	0	2	7	17	66	
11:45	7	0	0	1	0	11	19	70	
12:00	7	1	0	1	0	7	16	70	
12:15	6	2 <	0	2	0	10 <	20	72	
12:30	8	1 <	0	2 <	1	7 <	19	74 <	
12:45	12	0 <	0	0	0	5	17	72	
13:00	3	1 <	1	0	1	7	13	69	
13:15	7	0	1	1	0	12	21	70	
13:30	6	0	0	0	2 <	10	18	69	
13:45	12	1	1	0	0 <	4	18	70	
14:00	5	0	1	0	0	7	13	70	
14:15	4	0	1	2	0	6	13	62	
14:30	18 <	0	1 <	0	0	8	27	71	
14:45	6	0	0	0	0	5	11	64	
15:00	9	0	0	0	0	6	15	66	

All Vehicles

	1	2	3	4	5	6	15 MIN	HOUR	Total Vehicles
10:15	15	2	1	0	1	27	46		
10:30	17	2	3	2	0	23	47		
10:45	11	3	4	0	0	13	31		
11:00	23	1	2	1	0	15 <	42	166	
11:15	23	2	1	0	1	11	38	158	
11:30	24	2	2	2	3	19	52	163	
11:45	19	1	1	1	1	20	43	175	
12:00	22	4	1	2	0	12	41	174	
12:15	16	4 <	0	4	0	16	40	176	
12:30	34	1	3	2	4	21	65	189	
12:45	18	1	0	2 <	0	16	37	183	
13:00	14	2	1	0	1	13	31	173	
13:15	17	1	3	1	0	25	47	180	
13:30	14	3	1	2	3	19	42	157	
13:45	19	2	6	0	1	10	38	158	
14:00	17	4	2 <	2	2	15	42	169	
14:15	18	1	1	4	1 <	10	35	157	
14:30	44	1	3 <	0	0	11	59	174	
14:45	27	1	4	0	4 <	21	57	193	
15:00	27 <	0	1	0	0	21	49	200 <	

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

22/6/2021 - THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR, MUSWELLBROOK

18:30 <<< HOUR ENDING **Tuesday**

Summary:

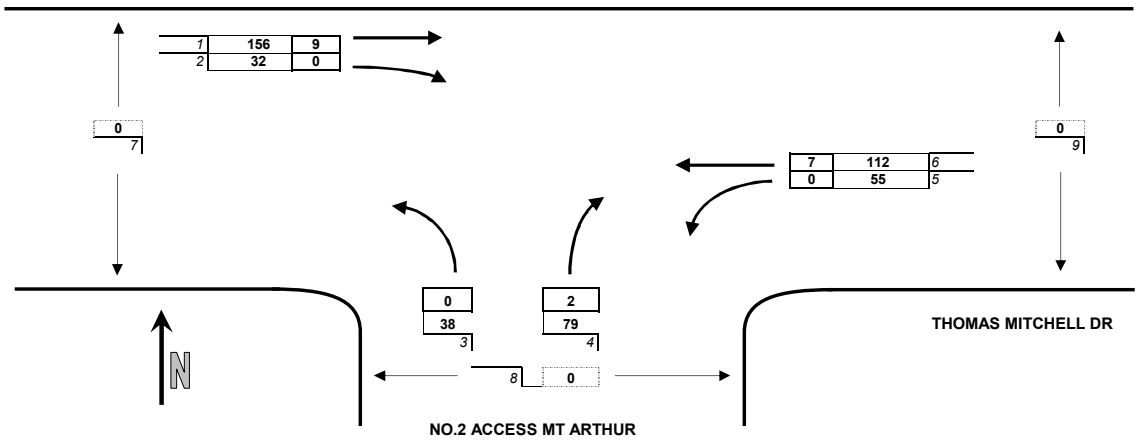
THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR

472	Total Light Vehicles
18	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
213307

156 Light Vehicles
9 Heavy Vehicles
0 Pedestrians

TO MT ARTHUR MAIN ACCESS



22/6/2021 - THOMAS MITCHELL DR / NO.2 ACCESS MT ARTHUR, MUSWELLBROOK

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
15:15	34	0	1	6	0	3	44		0	0	0
15:30	27	1	5	3	2	14	52		0	0	0
15:45	24	0	3	1	2	12	42		0	0	0
16:00	25	3	1	2	0	8	39	177	0	0	0
16:15	42	4	8	6	0	10	70	203	0	0	0
16:30	51	4	4	5	2	10	76	227	0	0	0
16:45	49	1	4	13	1	10	78	263	0	0	0
17:00	48 <	2	4	11	0	12	77	301	0	0	0
17:15	33	6	15	12	1	22	89	320	0	0	0
17:30	36	5	4	9	5	23	82	326	0	0	0
17:45	32	6	4	10	17	31	100	348	0	0	0
18:00	46	10	6	9	13	38	122	393	0	0	0
18:15	45	14 <	5	12	20 <	31 <	127	431	0	0	0
18:30	33	2	23	48	5 <	12	123	472 <	0	0	0
18:45	29	0	12 <	17 <	0	5	63	435	0	0	0
19:00	40	1	6 <	6	0	3	56	369	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
15:15	6	1	0	0	0	9	16	
15:30	6	0	0	0	2	11	19	
15:45	5	0	0	0	0	6	11	
16:00	6 <	0	0	0	0	4 <	10	56 <
16:15	5	0	0	2	1 <	3	11	51
16:30	6	0	0	1 <	0	5	12	44
16:45	4	0	0	0 <	0	1	5	38
17:00	4	0	1 <	0 <	0	1	6	34
17:15	3	0	0 <	0	0	0	3	26
17:30	6	2 <	0 <	1	0	3	12	26
17:45	2	0 <	0 <	1	0	4	7	28
18:00	3	0 <	0	1 <	0	2	6	28
18:15	3	0 <	0	0 <	0	1	4	29
18:30	1	0	0	0	0	0	1	18
18:45	8	0	0	1	0	0	9	20
19:00	2	0	0	0	0	0	2	16

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
15:15	40	1	1	6	0	12	60	
15:30	33	1	5	3	4	25	71	
15:45	29	0	3	1	2	18	53	
16:00	31	3	1	2	0	12	49	233
16:15	47	4	8	8	1	13	81	254
16:30	57	4	4	6	2	15	88	271
16:45	53	1	4	13	1	11	83	301
17:00	52 <	2	5	11	0	13	83	335
17:15	36	6	15	12	1	22	92	346
17:30	42	7	4	10	5	26	94	352
17:45	34	6	4	11	17	35	107	376
18:00	49	10	6	10	13	40	128	421
18:15	48	14 <	5	12	20 <	32 <	131	460
18:30	34	2	23	48	5 <	12	124	490 <
18:45	37	0	12 <	18 <	0	5	72	455
19:00	42	1	6 <	6	0	3	58	385

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

Appendix C

SIDRA Intersection Outputs

MOVEMENT SUMMARY

Site: 101 [2021AM MAC Main Access (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

MAC Main Access and Thomas Mitchell Dr
Surveyed 2021 AM MAC Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Thomas Mitchell Dr E															
4	L2	All MCs	168	1.3	168	1.3	0.091	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	73.2
5	T1	All MCs	242	10.1	242	10.1	0.132	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			410	6.5	410	6.5	0.132	3.2	NA	0.0	0.0	0.00	0.27	0.00	86.9
NorthWest: Thomas Mitchell Dr W															
11	T1	All MCs	151	5.1	151	5.1	0.080	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
12	R2	All MCs	180	4.9	180	4.9	0.201	9.9	LOS A	0.8	6.1	0.50	0.75	0.50	61.6
Approach			331	5.0	331	5.0	0.201	5.4	NA	0.8	6.1	0.27	0.41	0.27	74.7
SouthWest: MAC Main Access															
1	L2	All MCs	41	2.7	41	2.7	0.148	7.6	LOS A	0.5	4.0	0.54	0.73	0.54	59.4
3	R2	All MCs	41	10.8	41	10.8	0.148	15.0	LOS B	0.5	4.0	0.54	0.73	0.54	57.5
Approach			82	6.8	82	6.8	0.148	11.3	LOS A	0.5	4.0	0.54	0.73	0.54	58.4
All Vehicles			823	5.9	823	5.9	0.201	4.9	NA	0.8	6.1	0.16	0.37	0.16	77.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2021PM MAC Main Access (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

MAC Main Access and Thomas Mitchell Dr
Surveyed 2021 MAC PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Thomas Mitchell Dr E															
4	L2	All MCs	82	1.5	82	1.5	0.044	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	73.1
5	T1	All MCs	113	6.5	113	6.5	0.061	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			195	4.4	195	4.4	0.061	3.3	NA	0.0	0.0	0.00	0.28	0.00	86.6
NorthWest: Thomas Mitchell Dr W															
11	T1	All MCs	130	4.7	130	4.7	0.069	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
12	R2	All MCs	94	0.0	94	0.0	0.079	8.2	LOS A	0.3	2.2	0.31	0.64	0.31	64.7
Approach			224	2.7	224	2.7	0.079	3.4	NA	0.3	2.2	0.13	0.27	0.13	81.4
SouthWest: MAC Main Access															
1	L2	All MCs	112	0.0	112	0.0	0.258	6.9	LOS A	1.1	8.0	0.39	0.62	0.39	62.8
3	R2	All MCs	110	1.1	110	1.1	0.258	10.1	LOS A	1.1	8.0	0.39	0.62	0.39	62.5
Approach			222	0.5	222	0.5	0.258	8.5	LOS A	1.1	8.0	0.39	0.62	0.39	62.6
All Vehicles			641	2.5	641	2.5	0.258	5.1	NA	1.1	8.0	0.18	0.39	0.18	75.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 202 [2021AM Bayswater Access (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Bayswater Access and Thomas Mitchell Drive
Surveyed 2021 AM MAC Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bayswater Access															
1	L2	All MCs	15	0.0	15	0.0	0.028	7.3	LOS A	0.1	0.7	0.46	0.65	0.46	51.2
2	R2	All MCs	8	0.0	8	0.0	0.028	8.9	LOS A	0.1	0.7	0.46	0.65	0.46	51.1
Approach			23	0.0	23	0.0	0.028	7.9	LOS A	0.1	0.7	0.46	0.65	0.46	51.2
East: Thomas Mitchell Dr E															
3	L2	All MCs	109	1.1	109	1.1	0.059	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
4	T1	All MCs	384	6.6	384	6.6	0.205	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			493	5.4	493	5.4	0.205	1.3	NA	0.0	0.0	0.00	0.13	0.00	58.2
West: Thomas Mitchell Dr W															
5	T1	All MCs	111	9.3	111	9.3	0.061	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	All MCs	114	22.2	114	22.2	0.166	9.4	LOS A	0.6	5.3	0.55	0.77	0.55	49.1
Approach			225	15.8	225	15.8	0.166	4.8	NA	0.6	5.3	0.28	0.39	0.28	53.9
All Vehicles			741	8.4	741	8.4	0.205	2.5	NA	0.6	5.3	0.10	0.22	0.10	56.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 202 [2021PM Bayswater Access (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Bayswater Access and Thomas Mitchell Drive
Surveyed 2021 PM MAC Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bayswater Access															
1	L2	All MCs	40	0.0	40	0.0	0.114	6.1	LOS A	0.5	3.2	0.29	0.58	0.29	52.0
2	R2	All MCs	85	2.5	85	2.5	0.114	6.8	LOS A	0.5	3.2	0.29	0.58	0.29	51.8
Approach			125	1.7	125	1.7	0.114	6.6	LOS A	0.5	3.2	0.29	0.58	0.29	51.9
East: Thomas Mitchell Dr E															
3	L2	All MCs	58	0.0	58	0.0	0.031	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.9
4	T1	All MCs	125	5.9	125	5.9	0.067	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach			183	4.0	183	4.0	0.067	1.8	NA	0.0	0.0	0.00	0.18	0.00	57.5
West: Thomas Mitchell Dr W															
5	T1	All MCs	174	5.5	174	5.5	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	All MCs	41	17.9	41	17.9	0.038	6.5	LOS A	0.1	1.2	0.30	0.58	0.30	51.1
Approach			215	7.8	215	7.8	0.092	1.3	NA	0.1	1.2	0.06	0.11	0.06	58.0
All Vehicles			523	5.0	523	5.0	0.114	2.7	NA	0.5	3.2	0.09	0.25	0.09	56.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 303 [2021AM Stage2 Access (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Stage 2 Access and Edderton Road
Surveyed 2021 AM MAC Peak
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Edderton Rd S															
5	T1	All MCs	21	11.8	21	11.8	0.018	0.0	LOS A	0.1	0.4	0.09	0.21	0.09	75.5
6	R2	All MCs	10	0.0	10	0.0	0.018	6.9	LOS A	0.1	0.4	0.09	0.21	0.09	62.0
Approach			30	8.0	30	8.0	0.018	2.2	NA	0.1	0.4	0.09	0.21	0.09	70.6
East: Stage 2 Access															
1	L2	All MCs	1	0.0	1	0.0	0.002	8.1	LOS A	0.0	0.0	0.12	0.91	0.12	56.0
2	R2	All MCs	1	0.0	1	0.0	0.002	8.0	LOS A	0.0	0.0	0.12	0.91	0.12	55.9
Approach			2	0.0	2	0.0	0.002	8.0	LOS A	0.0	0.0	0.12	0.91	0.12	56.0
North: Edderton Road N															
3	L2	All MCs	10	0.0	10	0.0	0.005	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
4	T1	All MCs	33	25.9	33	25.9	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			43	20.0	43	20.0	0.020	1.6	NA	0.0	0.0	0.00	0.14	0.00	75.8
All Vehicles			76	14.5	76	14.5	0.020	2.1	NA	0.1	0.4	0.04	0.20	0.04	72.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 303 [2021PM Stage2 Access (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Stage 2 Access and Edderton Road
Surveyed 2021 PM MAC Peak
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Edderton Rd S															
5	T1	All MCs	19	0.0	19	0.0	0.011	0.0	LOS A	0.0	0.1	0.02	0.04	0.02	79.1
6	R2	All MCs	1	0.0	1	0.0	0.011	6.6	LOS A	0.0	0.1	0.02	0.04	0.02	64.4
Approach			21	0.0	21	0.0	0.011	0.4	NA	0.0	0.1	0.02	0.04	0.02	77.9
East: Stage 2 Access															
1	L2	All MCs	8	0.0	8	0.0	0.010	8.1	LOS A	0.0	0.3	0.09	0.93	0.09	56.0
2	R2	All MCs	5	0.0	5	0.0	0.010	7.9	LOS A	0.0	0.3	0.09	0.93	0.09	55.9
Approach			14	0.0	14	0.0	0.010	8.0	LOS A	0.0	0.3	0.09	0.93	0.09	55.9
North: Edderton Road N															
3	L2	All MCs	1	0.0	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
4	T1	All MCs	23	5.9	23	5.9	0.012	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			25	5.6	25	5.6	0.012	0.4	NA	0.0	0.0	0.00	0.03	0.00	78.9
All Vehicles			59	2.3	59	2.3	0.012	2.2	NA	0.0	0.3	0.03	0.25	0.03	71.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 404 [2021AM Thomas Mitchell and Denman (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Thomas Mitchell Dr and Denman Rd
Surveyed 2021 AM MAC Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	75	0.0	75	0.0	0.038	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	All MCs	143	3.2	143	3.2	0.125	8.6	LOS A	0.5	3.9	0.48	0.70	0.48	61.5
Approach			218	2.1	218	2.1	0.125	5.7	NA	0.5	3.9	0.32	0.46	0.32	66.8
East: Thomas Mitchell Dr E															
1	L2	All MCs	186	14.0	186	14.0	0.192	9.4	LOS A	0.8	6.1	0.49	0.73	0.49	58.1
3	R2	All MCs	65	19.3	65	19.3	0.153	14.5	LOS B	0.5	4.4	0.63	0.86	0.63	52.6
Approach			251	15.4	251	15.4	0.192	10.7	LOS A	0.8	6.1	0.53	0.76	0.53	56.6
North: Denman Rd N															
4	L2	All MCs	470	1.2	470	1.2	0.328	8.0	LOS A	1.7	12.0	0.30	0.59	0.30	62.6
5	T1	All MCs	420	3.0	420	3.0	0.220	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			891	2.0	891	2.0	0.328	4.2	LOS A	1.7	12.0	0.16	0.31	0.16	69.7
All Vehicles			1360	4.5	1360	4.5	0.328	5.6	NA	1.7	12.0	0.25	0.42	0.25	66.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 404 [2021PM Thomas Mitchell and Denman (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Thomas Mitchell Dr and Denman Rd
Surveyed 2021 PM MAC Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	204	4.7	204	4.7	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	67	6.3	67	6.3	0.049	7.8	LOS A	0.2	1.6	0.35	0.61	0.35	61.1
Approach			271	5.1	271	5.1	0.108	1.9	NA	0.2	1.6	0.09	0.15	0.09	74.3
East: Thomas Mitchell Dr E															
1	L2	All MCs	65	6.6	65	6.6	0.052	7.9	LOS A	0.2	1.5	0.33	0.62	0.33	61.0
3	R2	All MCs	207	0.5	207	0.5	0.326	12.0	LOS A	1.6	11.2	0.61	0.84	0.71	59.2
Approach			272	2.0	272	2.0	0.326	11.0	LOS A	1.6	11.2	0.54	0.79	0.62	59.6
North: Denman Rd N															
4	L2	All MCs	143	5.2	143	5.2	0.095	7.6	LOS A	0.4	2.9	0.16	0.57	0.16	62.1
5	T1	All MCs	248	1.3	248	1.3	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			390	2.7	390	2.7	0.128	2.8	LOS A	0.4	2.9	0.06	0.21	0.06	72.3
All Vehicles			934	3.2	934	3.2	0.326	4.9	NA	1.6	11.2	0.21	0.36	0.23	68.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 505 [2021AM Denman and Edderton (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Denman Road and Edderton Road
Surveyed 2021 AM MAC Peak
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Edderton Road															
1	L2	All MCs	1	0.0	1	0.0	0.029	9.7	LOS A	0.1	0.8	0.32	0.86	0.32	70.1
3	R2	All MCs	21	4.8	21	4.8	0.029	11.4	LOS A	0.1	0.8	0.32	0.86	0.32	68.5
Approach			22	4.5	22	4.5	0.029	11.3	LOS A	0.1	0.8	0.32	0.86	0.32	68.6
East: Denman Road E															
4	L2	All MCs	33	12.1	33	12.1	0.019	8.2	LOS A	0.0	0.0	0.00	0.66	0.00	69.4
5	T1	All MCs	44	9.1	44	9.1	0.024	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			77	10.4	77	10.4	0.024	3.5	NA	0.0	0.0	0.00	0.28	0.00	84.1
West: Denman Road W															
11	T1	All MCs	128	0.0	128	0.0	0.066	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
12	R2	All MCs	1	0.0	1	0.0	0.001	7.7	LOS A	0.0	0.0	0.17	0.60	0.17	73.9
Approach			129	0.0	129	0.0	0.066	0.1	NA	0.0	0.0	0.00	0.00	0.00	99.7
All Vehicles			228	3.9	228	3.9	0.066	2.3	NA	0.1	0.8	0.03	0.18	0.03	90.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 505 [2021PM Denman and Edderton (Site Folder: Surveyed 2021)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Denman Road and Edderton Road
Surveyed 2021 PM MAC Peak
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Edderton Road															
1	L2	All MCs	1	0.0	1	0.0	0.036	10.3	LOS A	0.1	1.0	0.40	0.88	0.40	69.2
3	R2	All MCs	23	10.5	23	10.5	0.036	12.5	LOS A	0.1	1.0	0.40	0.88	0.40	66.0
Approach			24	10.0	24	10.0	0.036	12.4	LOS A	0.1	1.0	0.40	0.88	0.40	66.1
East: Denman Road E															
4	L2	All MCs	20	0.0	20	0.0	0.011	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
5	T1	All MCs	163	1.5	163	1.5	0.084	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			183	1.3	183	1.3	0.084	0.9	NA	0.0	0.0	0.00	0.07	0.00	96.3
West: Denman Road W															
11	T1	All MCs	75	11.3	75	11.3	0.041	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
12	R2	All MCs	1	0.0	1	0.0	0.001	8.0	LOS A	0.0	0.0	0.28	0.59	0.28	73.3
Approach			76	11.1	76	11.1	0.041	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.4
All Vehicles			283	4.7	283	4.7	0.084	1.7	NA	0.1	1.0	0.04	0.12	0.04	93.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2030AM MAC Main Access (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

MAC Main Access and Thomas Mitchell Dr
2030 AM MAC Peak
With Cumulative Traffic Changes inc Modification
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Thomas Mitchell Dr E															
4	L2	All MCs	172	3.9	172	3.9	0.095	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	71.8
5	T1	All MCs	313	9.2	313	9.2	0.170	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	86.8
Approach			486	7.3	486	7.3	0.170	2.8	NA	0.0	0.0	0.00	0.23	0.00	80.8
NorthWest: Thomas Mitchell Dr W															
11	T1	All MCs	176	7.0	176	7.0	0.094	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	91.4
12	R2	All MCs	187	8.3	187	8.3	0.238	10.8	LOS A	1.0	7.3	0.55	0.79	0.55	61.2
Approach			362	7.7	362	7.7	0.238	5.6	NA	1.0	7.3	0.28	0.41	0.28	72.9
SouthWest: MAC Main Access															
1	L2	All MCs	44	10.0	44	10.0	0.208	8.2	LOS A	0.7	5.7	0.63	0.80	0.63	55.3
3	R2	All MCs	44	17.5	44	17.5	0.208	19.4	LOS B	0.7	5.7	0.63	0.80	0.63	53.8
Approach			89	13.8	89	13.8	0.208	13.8	LOS A	0.7	5.7	0.63	0.80	0.63	54.5
All Vehicles			937	8.1	937	8.1	0.238	4.9	NA	1.0	7.3	0.17	0.36	0.17	74.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2030PM MAC Main Access (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

MAC Main Access and Thomas Mitchell Dr
2030 MAC PM Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Thomas Mitchell Dr E															
4	L2	All MCs	84	4.3	84	4.3	0.047	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	71.6
5	T1	All MCs	132	8.3	132	8.3	0.071	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	91.5
Approach			216	6.8	216	6.8	0.071	3.1	NA	0.0	0.0	0.00	0.26	0.00	82.5
NorthWest: Thomas Mitchell Dr W															
11	T1	All MCs	160	5.3	160	5.3	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	89.1
12	R2	All MCs	98	3.8	98	3.8	0.086	8.4	LOS A	0.3	2.5	0.33	0.65	0.33	63.9
Approach			257	4.7	257	4.7	0.086	3.2	NA	0.3	2.5	0.13	0.25	0.13	77.5
SouthWest: MAC Main Access															
1	L2	All MCs	120	6.1	120	6.1	0.300	7.1	LOS A	1.3	9.9	0.45	0.64	0.45	60.9
3	R2	All MCs	115	5.3	115	5.3	0.300	11.4	LOS A	1.3	9.9	0.45	0.64	0.45	61.0
Approach			234	5.7	234	5.7	0.300	9.2	LOS A	1.3	9.9	0.45	0.64	0.45	61.0
All Vehicles			707	5.7	707	5.7	0.300	5.2	NA	1.3	9.9	0.19	0.38	0.19	72.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 202 [2030AM Bayswater Access (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Bayswater Access and Thomas Mitchell Drive
2030 AM MAC Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bayswater Access															
1	L2	All MCs	15	0.0	15	0.0	0.041	8.0	LOS A	0.1	1.0	0.55	0.73	0.55	49.9
2	R2	All MCs	9	12.5	9	12.5	0.041	13.0	LOS A	0.1	1.0	0.55	0.73	0.55	49.3
Approach			24	4.8	24	4.8	0.041	9.9	LOS A	0.1	1.0	0.55	0.73	0.55	49.6
East: Thomas Mitchell Dr E															
3	L2	All MCs	111	3.1	111	3.1	0.061	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
4	T1	All MCs	475	7.3	475	7.3	0.255	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			586	6.5	586	6.5	0.255	1.1	NA	0.0	0.0	0.00	0.11	0.00	58.4
West: Thomas Mitchell Dr W															
5	T1	All MCs	133	12.1	133	12.1	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	All MCs	116	23.8	116	23.8	0.201	10.8	LOS A	0.8	6.3	0.60	0.83	0.60	48.2
Approach			249	17.5	249	17.5	0.201	5.0	NA	0.8	6.3	0.28	0.38	0.28	53.8
All Vehicles			860	9.6	860	9.6	0.255	2.5	NA	0.8	6.3	0.10	0.21	0.10	56.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 202 [2030PM Bayswater Access (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Bayswater Access and Thomas Mitchell Drive
2030 PM MAC Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bayswater Access															
1	L2	All MCs	41	2.6	41	2.6	0.143	6.2	LOS A	0.6	4.1	0.41	0.64	0.41	51.3
2	R2	All MCs	86	3.7	86	3.7	0.143	8.6	LOS A	0.6	4.1	0.41	0.64	0.41	51.1
Approach			127	3.3	127	3.3	0.143	7.8	LOS A	0.6	4.1	0.41	0.64	0.41	51.2
East: Thomas Mitchell Dr E															
3	L2	All MCs	59	1.8	59	1.8	0.032	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
4	T1	All MCs	144	8.0	144	8.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach			203	6.2	203	6.2	0.078	1.6	NA	0.0	0.0	0.00	0.17	0.00	57.7
West: Thomas Mitchell Dr W															
5	T1	All MCs	208	7.6	208	7.6	0.112	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	All MCs	42	20.0	42	20.0	0.041	6.7	LOS A	0.2	1.3	0.32	0.59	0.32	50.9
Approach			251	9.7	251	9.7	0.112	1.2	NA	0.2	1.3	0.05	0.10	0.05	58.2
All Vehicles			581	7.1	581	7.1	0.143	2.8	NA	0.6	4.1	0.11	0.24	0.11	56.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 303 [2030AM Stage2 Access (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Stage 2 Access and Edderton Road
2030 AM MAC Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Edderton Rd S															
5	T1	All MCs	22	11.1	22	11.1	0.019	0.1	LOS A	0.1	0.4	0.09	0.22	0.09	74.8
6	R2	All MCs	10	0.0	10	0.0	0.019	7.0	LOS A	0.1	0.4	0.09	0.22	0.09	61.9
Approach			32	7.7	32	7.7	0.019	2.2	NA	0.1	0.4	0.09	0.22	0.09	70.3
East: Stage 2 Access															
1	L2	All MCs	1	0.0	1	0.0	0.002	8.1	LOS A	0.0	0.1	0.14	0.89	0.14	56.0
2	R2	All MCs	1	0.0	1	0.0	0.002	8.1	LOS A	0.0	0.1	0.14	0.89	0.14	55.9
Approach			2	0.0	2	0.0	0.002	8.1	LOS A	0.0	0.1	0.14	0.89	0.14	56.0
North: Edderton Road N															
3	L2	All MCs	11	11.1	11	11.1	0.006	7.0	LOS A	0.0	0.0	0.00	0.62	0.00	59.6
4	T1	All MCs	37	26.7	37	26.7	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	77.4
Approach			48	23.1	48	23.1	0.022	1.6	NA	0.0	0.0	0.00	0.14	0.00	72.4
All Vehicles			82	16.4	82	16.4	0.022	2.0	NA	0.1	0.4	0.04	0.20	0.04	70.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 303 [2030PM Stage2 Access (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Stage 2 Access and Edderton Road
2030 PM MAC Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Edderton Rd S															
5	T1	All MCs	21	0.0	21	0.0	0.012	0.0	LOS A	0.0	0.1	0.01	0.04	0.01	77.9
6	R2	All MCs	1	0.0	1	0.0	0.012	6.6	LOS A	0.0	0.1	0.01	0.04	0.01	64.0
Approach			22	0.0	22	0.0	0.012	0.4	NA	0.0	0.1	0.01	0.04	0.01	76.9
East: Stage 2 Access															
1	L2	All MCs	8	0.0	8	0.0	0.012	8.1	LOS A	0.0	0.3	0.11	0.93	0.11	56.0
2	R2	All MCs	7	20.0	7	20.0	0.012	8.8	LOS A	0.0	0.3	0.11	0.93	0.11	53.9
Approach			15	9.1	15	9.1	0.012	8.4	LOS A	0.0	0.3	0.11	0.93	0.11	55.0
North: Edderton Road N															
3	L2	All MCs	1	0.0	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
4	T1	All MCs	25	5.6	25	5.6	0.013	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	78.5
Approach			26	5.3	26	5.3	0.013	0.4	NA	0.0	0.0	0.00	0.03	0.00	77.7
All Vehicles			63	4.3	63	4.3	0.013	2.3	NA	0.0	0.3	0.03	0.25	0.03	70.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 404 [2030AM Thomas Mitchell and Denman (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Thomas Mitchell Dr and Denman Rd
2030 AM MAC Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	83	0.0	83	0.0	0.043	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	77.5
12	R2	All MCs	163	3.5	163	3.5	0.163	9.2	LOS A	0.7	5.1	0.55	0.76	0.55	59.6
Approach			245	2.3	245	2.3	0.163	6.1	NA	0.7	5.1	0.37	0.50	0.37	64.7
East: Thomas Mitchell Dr E															
1	L2	All MCs	253	12.1	253	12.1	0.299	10.2	LOS A	1.4	10.5	0.58	0.81	0.64	55.0
3	R2	All MCs	74	23.1	74	23.1	0.239	19.0	LOS B	0.8	7.1	0.74	0.92	0.82	48.0
Approach			327	14.6	327	14.6	0.299	12.2	LOS A	1.4	10.5	0.61	0.84	0.68	53.2
North: Denman Rd N															
4	L2	All MCs	524	2.8	524	2.8	0.375	8.0	LOS A	2.0	14.5	0.34	0.60	0.34	61.5
5	T1	All MCs	528	3.0	528	3.0	0.276	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	74.7
Approach			1052	2.9	1052	2.9	0.375	4.0	LOS A	2.0	14.5	0.17	0.30	0.17	67.5
All Vehicles			1625	5.2	1625	5.2	0.375	6.0	NA	2.0	14.5	0.29	0.44	0.30	63.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 404 [2030PM Thomas Mitchell and Denman (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Thomas Mitchell Dr and Denman Rd
2030 PM MAC Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	244	5.2	244	5.2	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	75.8
12	R2	All MCs	87	6.1	87	6.1	0.065	7.7	LOS A	0.3	2.1	0.38	0.62	0.38	58.7
Approach			331	5.5	331	5.5	0.129	2.0	NA	0.3	2.1	0.10	0.16	0.10	70.4
East: Thomas Mitchell Dr E															
1	L2	All MCs	74	7.1	74	7.1	0.061	7.9	LOS A	0.2	1.8	0.35	0.63	0.35	59.5
3	R2	All MCs	235	3.6	235	3.6	0.433	14.5	LOS A	2.4	17.1	0.67	0.95	0.95	55.7
Approach			310	4.5	310	4.5	0.433	12.9	LOS A	2.4	17.1	0.60	0.87	0.81	56.6
North: Denman Rd N															
4	L2	All MCs	161	7.9	161	7.9	0.110	7.6	LOS A	0.5	3.5	0.19	0.57	0.19	60.2
5	T1	All MCs	276	1.2	276	1.2	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	77.3
Approach			436	3.7	436	3.7	0.142	2.8	LOS A	0.5	3.5	0.07	0.21	0.07	70.0
All Vehicles			1077	4.4	1077	4.4	0.433	5.5	NA	2.4	17.1	0.23	0.39	0.29	65.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 505 [2030AM Denman and Edderton (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Denman Road and Edderton Road
2030 AM MAC Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Edderton Road															
1	L2	All MCs	1	0.0	1	0.0	0.033	9.7	LOS A	0.1	0.9	0.35	0.86	0.35	69.1
3	R2	All MCs	23	4.3	23	4.3	0.033	11.5	LOS A	0.1	0.9	0.35	0.86	0.35	67.6
Approach			24	4.2	24	4.2	0.033	11.5	LOS A	0.1	0.9	0.35	0.86	0.35	67.6
East: Denman Road E															
4	L2	All MCs	37	13.5	37	13.5	0.022	7.9	LOS A	0.0	0.0	0.00	0.65	0.00	66.5
5	T1	All MCs	48	8.3	48	8.3	0.026	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	94.7
Approach			85	10.6	85	10.6	0.026	3.4	NA	0.0	0.0	0.00	0.28	0.00	79.9
West: Denman Road W															
11	T1	All MCs	153	0.0	153	0.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	90.1
12	R2	All MCs	1	0.0	1	0.0	0.001	7.7	LOS A	0.0	0.0	0.18	0.60	0.18	73.8
Approach			154	0.0	154	0.0	0.078	0.1	NA	0.0	0.0	0.00	0.00	0.00	90.0
All Vehicles			263	3.8	263	3.8	0.078	2.2	NA	0.1	0.9	0.03	0.17	0.03	84.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 505 [2030PM Denman and Edderton (Site Folder: Forecast 2030)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Denman Road and Edderton Road
2030 PM MAC Peak
Cumulative Traffic Changes inc Modification
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Edderton Road															
1	L2	All MCs	1	0.0	1	0.0	0.041	10.4	LOS A	0.1	1.2	0.43	0.89	0.43	68.4
3	R2	All MCs	24	15.0	24	15.0	0.041	13.2	LOS A	0.1	1.2	0.43	0.89	0.43	63.9
Approach			25	14.3	25	14.3	0.041	13.0	LOS A	0.1	1.2	0.43	0.89	0.43	64.1
East: Denman Road E															
4	L2	All MCs	20	0.0	20	0.0	0.011	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
5	T1	All MCs	180	1.3	180	1.3	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	94.1
Approach			200	1.2	200	1.2	0.093	0.8	NA	0.0	0.0	0.00	0.07	0.00	91.6
West: Denman Road W															
11	T1	All MCs	83	11.6	83	11.6	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	93.6
12	R2	All MCs	1	0.0	1	0.0	0.001	8.1	LOS A	0.0	0.0	0.29	0.59	0.29	73.2
Approach			84	11.4	84	11.4	0.046	0.1	NA	0.0	0.0	0.00	0.01	0.00	93.3
All Vehicles			310	5.1	310	5.1	0.093	1.6	NA	0.1	1.2	0.04	0.12	0.04	88.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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The Transport Planning Partnership
Suite 402 Level 4, 22 Atchison Street
St Leonards NSW 2065

P.O. Box 237
St Leonards NSW 1590

02 8437 7800

info@ttpp.net.au

www.ttpp.net.au