Hume Food Organics and Garden Organics Facility

Traffic and Transport Impact Assessment

Transport Canberra and City Services Directorate

01 May 2023

→ **The Power of Commitment**

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Abbreviations and meaning

Abbreviations	Meaning
ACT	Australian Capital Territory
AFP	Australian Federal Police
AGTM	Austroads Guide to Traffic Management
AIMSUN	Advanced Interactive Microscopic Simulator for Urban and Non-Urban Networks
AMC	Alexander Maconochie Centre
CEMP	Construction Environmental Management Plan
CSTM	Canberra Strategic Traffic Model
CTMP	Construction Traffic Management Plan
DoS	Degree of Saturation
EIS	Environmental Impact Statement
EPSDD	Environment, Planning and Sustainable Development Directorate
FOGO	Food Organics and Garden Organics
GHD	GHD Pty Ltd
HV	Heavy Vehicles
km	Kilometre
LoS	Level of service
LV	Light Vehicles
m	Metre
MRF	Materials Recovery Facility
NSW	New South Wales
PBS	Performance Based Standards
PCE	Passenger Car Equivalent
Pcu	Passenger car units
SCATS	Sydney Coordinated Adaptive Traffic System
TCCS	Transport Canberra and City Services
TMP	Traffic Management Plan
tpa	tonnes per annum
TTIA	Traffic and Transport Impact Assessment
VCR	Volume to Capacity Ratio
vph	Vehicles per hour

1. Introduction

1.1 Overview

The Australian Capital Territory (ACT) Government is working to reduce waste to landfill and increase resource recovery. The strategic direction for the management of waste in the Territory is set out in the 'ACT Waste Management Strategy 2011-25' (ACT Government, 2011). The strategy commits the ACT Government to minimise organic waste going to landfill and recovering organic waste resources. It also sets a target of increasing the rate of resource recovery to over 90 percent by 2025, with no recoverable waste sent to landfill.

The Federal Government also has a target of halving the amount of organic waste sent to landfill for disposal by 2030, as set out in the 'National Waste Policy Action Plan' (DCCEEW, 2019).

A waste feasibility study was established in mid-2015 to identify a pathway towards achieving the ACTs waste management targets and examine options to drive better resource recovery. In 2018, the ACT Government released the final recommendations from the study as the 'Waste Feasibility Study: Roadmap and Recommendations Discussion Paper' (ACT NOWaste, 2018). Key recommendations from this were to identify a site and establish an organics progressing facility to process food organics and garden organics (FOGO) and the implementation of a kerbside FOGO collection.

The 'ACT Climate Change Strategy 2019 to 2025' (ACT Government, 2019) also identifies FOGO collection for all households and the investigation of organic waste processing as key priorities. An opt-in FOGO collection pilot is currently underway in the ACT (Belconnen), which has so far diverted more than 480 tonnes of material from landfill (ACT Government, 2022).

There is currently no processing facility within the ACT that can accept and process FOGO material. ACT NOWaste is therefore proposing to develop a new FOGO facility (the 'proposal') in Hume to strengthen the Territory's circular economy and help meet Territory and Federal Government landfill diversion and resource recovery targets.

The proposal is defined as the construction and operation of a new FOGO facility with the capacity to receive up to 70,000 tonnes per year of FOGO for in-vessel composting.

1.1.1 Approval and assessment requirements

This report has been prepared by GHD Pty Ltd (GHD) as part of the environmental impact statement (EIS) for the proposal. The EIS supports the application for approval of the proposal and to address the requirements provided by the ACT Department of Environment, Planning and Sustainable Development Directorate dated 7 June 2022.

The proposal is subject to approval by the planning and land authority within the Environment, Planning and Sustainability Development Directorate.

1.1 Proposal location

The proposal is situated on Block 5, Section 26 Hume, off John Corey Road on Territory Land in the ACT (Figure 1.2 and Figure 1.3). The proposal site is located in proximity to a number of industrial facilities. ACT Skip Hire is on the adjacent block to the south. Further south on John Cory Road the Soft Landing Mattress Recycling facility is located. The Mugga Lane Landfill is located approximately 200 metres northwest of the proposal site.

Figure 1.1 shows the site proposed for the FOGO facility, including a preliminary site boundary configuration to accommodate these operations (subject to detailed design and final vendor process selection). In total, this area comprises approximately 4.3 hectares (ha) of land.

Legend

- Proposal site
- Cadastre
- Watercourses

Paper Size ISO A4

0 25 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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GHD

Transport Canberra and City Services
Hume Food Organics and Garden Organics Facility
Traffic and Transport Impact Assessment

Project No. **12540460**
Revision No. **0**
Date **30/08/2023**

Proposal location

FIGURE 1.1

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Paper Size ISO A4

0 0.5 1

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Project No. **12540464**
Revision No. **0**
Date **30/08/2023**

FOGO regional context

FIGURE 1.2

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Print date: 30 Aug 2023 - 11:30

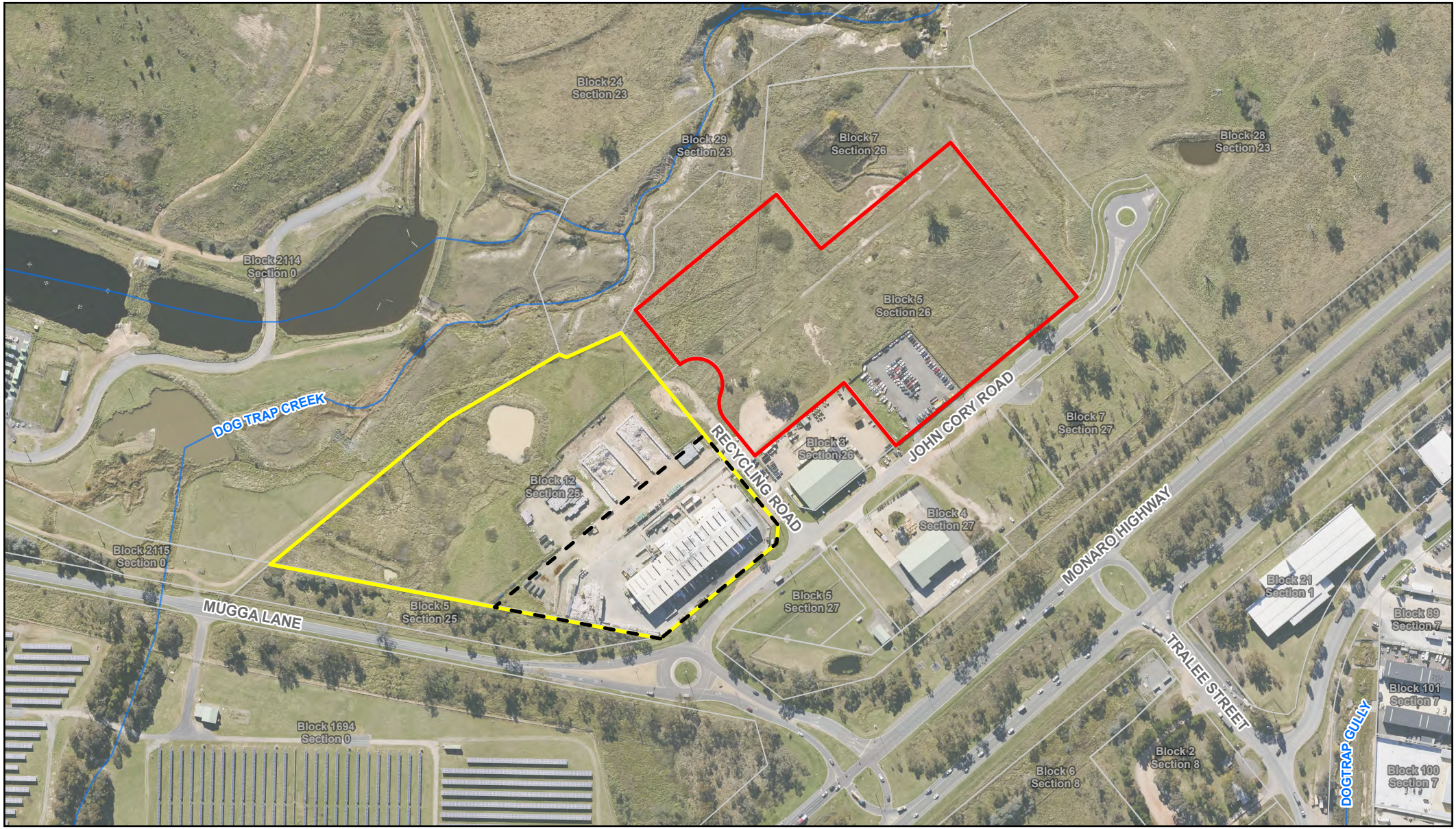
Data source: Metromap Tile Service: ,Light Gray Base: Vicmap, Esri, HERE, Garmin, FAO, NOAA, USGS,Light Gray Reference: Vicmap, Esri, HERE, Garmin, FAO, NOAA, USGS extracted 30/08/2023; DEM - ACT Government, 2015; Roads, Cadastre - ACTmapi, 2022; Watercourses - NSWSS, 2022. Created by: pfernandes

1.2 Other developments

As shown in Figure 1.3, the proposal site is located adjacent to the north-east of the Material Recovery Facility (MRF) on John Cory Drive.

A MRF was operating on the site until December 2022, when the facility was destroyed in a fire. It is proposed to construct a new MRF on the site with technological improvements to facilitate greater resource recovery by increasing the quality of recycled materials and reducing the amount of non-recyclable residual waste generated that is currently sent to landfill. The upgraded MRF facility is intended to have 115,000 tonnes annual capacity to improve the quality and marketability of 23,000 tonnes of paper and mixed cardboard, 1,800 tonnes of mixed plastics and 14,000 tonnes of glass from the ACT and five regional New South Wales (NSW) councils.

To identify the cumulative impacts of the land uses in proximity to the proposal, vehicle activity associated with the MRF have been accounted for in this TTIA.



Legend

- Proposal site
- MRF
- Current MRF facility
- Cadastre
- Watercourses

Paper Size ISO A4

0 25 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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FOGO facility and MRF local context

FIGURE 1.3

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Print date: 30 Aug 2023 - 11:32

Data source: Metromap Tile Service: extracted 30/08/2023; DEM - ACT Government, 2015; Roads, Cadastre - ACTmapi, 2022; Watercourses - NSWSS, 2022.
Created by: pfernandes

1.3 Purpose of this report

This report documents the results of the TTIA and covers the following scope of work that addresses the ACT Government Environment, Planning and Sustainable Development Directorate's (EPSDD) scoping document requirements, including:

– A description of the existing traffic and transport environment in the study area.
– A review of the existing road and transport conditions, traffic volumes, access arrangements, parking, and crash data.
– An assessment of the potential impacts of the proposal and the performance of key intersections during construction and operation. Specifically, the traffic impacts of the construction and operation of the facility:
  - On Mugga Lane and the Monaro Highway.
  - On the safe and efficient flow of vehicles within the study area (e.g., existing road users accessing the Mugga Landfill or the MRF adjacent to the proposal site).
– Recommendations on suitable mitigation measures to minimise the impacts of the proposed FOGO facility on the adjoining road network.

The TTIA responds to scoping requirements, as detailed in Table 1.1.

Table 1.1 Scoping requirements

Requirement	Section address in
Investigate the traffic impacts of the construction and operation of the facility on Mugga Lane and the Monaro Highway including consideration of whether continued safe and efficient movement of vehicles accessing the facility, relating to other activities such as the Mugga Landfill or the materials recycling facility, is not impeded by road network arrangements.	Section 4
Undertake a Traffic and Transport Assessment in accordance with Transport Canberra and City Services (TCCS) Transport Impact Assessment Guidelines which is available at: https://www.cityservices.act.gov.au/__data/assets/pdf_file/0009/991989/TCCSTransport-Impact-Assessment-Guidelines.pdf.	Section 1 to 6
The Traffic and Transport Assessment must include intersection analysis of the nearby roads.	Section 4.4
Describe how hazardous materials will be transported to and from the proposal site.	Appendix C

1.4 Assumptions and limitations

The preparation of this assessment has relied on the following data sources:

– Peak hour intersection traffic counts commissioned by GHD on 09 November 2022 (Wednesday). Intersection counts at the following locations were used for this study:
  - Mugga Lane / John Cory Road (Roundabout)
  - Mugga Lane / Monaro Highway (Intersection)
– SCATS data (traffic counts and signal phasing) provided by TCCS for the intersection of Mugga Lane and Monaro Highway (TCCS 147).
– The conditions of the surrounding network are based on information obtained from desktop checks using ACTmapi, Google Maps and Google Street View. No site inspection was undertaken for this study.

The following study limitations and key assumptions are applicable to this study:

– Estimates of the expected construction and operational traffic volumes of the proposal have been provided by the Client.
– Traffic distribution estimates have been based on high level assumptions on existing travel patterns and information provided by the ACT Government.
– The construction activity of the MRF and FOGO would overlap and both projects would be completed by 2027.
– A traffic growth rate of 1.4 per cent per annum has been adopted for Mugga Lane and Monaro Highway in accordance with the ACT Government population projections.
– The upgrades to Monaro Highway would occur subsequent to 2027.
– The volumes of construction and operational vehicles (cars and trucks) associated with the MRF have been provided by the ACT Government.
– Peak worker vehicle activity coincides with the adjoining road network peak periods.
– All construction workers and operation staff would drive, with a car occupancy of one, i.e., no carpooling.

1.5 Relevant legislation, policies and guidelines

The assessment was undertaken with reference to the following:

– ACT Government Guidelines for Transport Impact Assessment (ACT Government, 2020)
– ACT Government Guidelines for SIDRA Analysis Draft V1.0 (ACT Government, 2016)
– ACT Territory Plan's Parking and Vehicular Access General Code (ACT Government, 2014)
– Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development (Austroads, Guide to Traffic Management Part 12: Traffic Impacts of Development, 2016)
– Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (Austroads, 2021)

1.6 Report structure

This Traffic and Transport Assessment report is structured as follows:

Table 1.2 Report structure

Section No.	Title	Content
1	Introduction	Provides background to, and an overview of, the proposal. This section also establishes the purpose of the document, the assumptions and limitations used in the assessment, and the structure in which information is presented.
2	Existing environment	Provides a description of the existing road network, traffic, and transport conditions within the study area.
3	Project description	Provides a detailed description of the proposal.

Section No.	Title	Content
4	Impact assessment	Provides details on the additional traffic associated with the construction and operation of the proposal and an assessment of the associated traffic and transport impacts that would potentially result from the proposal.
5	Mitigation and management measures	Provides recommendations of proposed mitigation options for the construction and operational impacts of the proposal.
6	Summary and conclusions	Presents a summary of the traffic and transport assessment findings and sets out the principal conclusions for the study.

1.7 Disclaimer

This report: has been prepared by GHD for Transport Canberra and City Services Directorate and may only be used and relied on by Transport Canberra and City Services Directorate for the purpose agreed between GHD and Transport Canberra and City Services Directorate as set out in Section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than Transport Canberra and City Services Directorate arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer Sections 1.4 and 4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

1.7.1 Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

2. Existing environment

2.1 Existing road network

2.1.1 Road hierarchy

Roads in the ACT, based on the Trunk Road Infrastructure Standard, are classified based on their predominant function and to the extent they serve the following two basic purposes of the road network:

– Movement of traffic.
– Access to property.

The road classifications used in the ACT are as follows:

– **Arterial Roads** – predominantly serve longer distance travel within a district and through traffic from one district to another and form the principal avenues of communication for metropolitan scale traffic movements. Design traffic volumes are typically greater than 6,000 vehicles per day.
– **Major Collector Roads** – collect and distribute traffic within residential, industrial, and commercial areas and form the link between the primary network and the roads within local areas and should carry only traffic originating or terminating in the area. Design traffic volumes are typically between 3,001 and 6,000 vehicles per day.
– **Minor Collector Roads** – collect and distribute traffic from access streets, linking to the major collector roads within the neighbourhood; and provide secondary connections direct to the external arterial road network. Design traffic volumes are typically between 1,001 and 3,000 vehicles per day.
– **Local Access Streets** – provide access but do not accommodate traffic generated by sites in other streets, excluding rear lanes. Design traffic volumes are typically less than 1,000 vehicles per day.

A map of the road classifications in proximity to the proposal site is shown in Figure 2.1. Primary access to the proposal site would be provided via John Cory Road, Mugga Lane and Monaro Highway. To the southeast of Monaro Highway, Tralee Street and Sheppard Street provide access to an industrial estate.

Figure 2.1 Road classification of key roads in proximity to the proposal site

Source: Active Travel Infrastructure Practitioner's Tool; modified by GHD

2.1.2 Road characteristics

The following subsections describe the key roads which would likely be impacted by the construction and operation of the FOGO facility.

2.1.2.1 Monaro Highway

Monaro Highway (pictured in Figure 2.2) is an arterial road that traverses Victoria, NSW, and ACT. It runs a north-south alignment and has a length of approximately 285 kilometres, with its northern terminus at Pialligo in ACT, west of the Canberra Airport, and its southern terminus at the intersection with Princes Highway in Cann River, Victoria.

In proximity to the proposal site, Monaro Highway serves as the primary connector from Canberra Central to ACT's eastern suburbs and provides access to various light industrial areas surrounding the proposal site via Tralee Street and Sheppard Street. The section of Monaro Highway located in Hume also forms part of ACT's Tourist Drive 5, an 83-kilometre tourist loop around northern ACT, and is the primary road used to access a number of national parks in southern ACT.

The key features of Monaro Highway in proximity to the proposal site are summarised in Table 2.1.

Table 2.1 Monaro Highway key features

Feature	Description	Key Map
Carriageway	Sealed, divided carriageway with two lanes in each direction. Carriageway width per direction is approximately 7 metres (3.5 metres per lane), with a wide 45 metre median. Slip lanes and turning lanes provide additional travel widths near the intersection of Monaro Highway and Mugga Lane. Travel lanes are delineated by road markings. Shoulders are provided on the outermost lane, which also doubles as on-road cycling lanes. Provides a 170 metre left turn lane and 270 metre right turn lane into Mugga Lane.	
Parking	On-street parking is not permitted.	
Speed limit	80 km/h	
Pedestrian Facilities	No pedestrian facilities such as sidewalks or crossings.	
Bicycle Facilities	On-road cycling lanes on road shoulders, delineated by lane markings.	
Public Transport	Bus Route 182 plies along Monaro Highway, but no public transport stops are located along the highway within 800m from the proposal site.	

Figure 2.2 Monaro Highway looking towards Mugga Lane

Image Source: Google Street View (2022 imagery)

2.1.2.2 Mugga Lane

Mugga Lane (pictured in Figure 2.3) is a rural road that provides an alternate link from Canberra Central to the districts of Jerrabomberra and Tuggeranong. It runs approximately 7.4 kilometres across Jerrabomberra, beginning at the intersection with Hindmarsh Drive in the north and terminating at the intersection with Monaro Highway in the south. Mugga Lane also connects the southern suburbs of Jerrabomberra to Woden Valley via Long Gully Road.

The section of Mugga Lane in proximity to the proposal site serves as the southern boundary of Jerrabomberra and the suburb of Hume. The key features of Mugga Lane in proximity to the proposal site are summarised in Table 2.2.

Table 2.2 Mugga Lane key features

Feature	Description	Key Map
Carriageway	Typically provides sealed, divided carriageway with one lane in each direction. Carriageway widths of approximately 7 metres (3.5 metres per lane). Additional turning lanes are provided in proximity to Monaro Highway.	
Parking	On-street parking is not permitted.	
Speed limit	80 km/h	
Pedestrian Facilities	No pedestrian facilities such as sidewalks or crossings.	
Bicycle Facilities	No cycling facilities.	
Public Transport	No access to public transport.	

Figure 2.3 (L) Mugga Lane looking west towards John Cory Road (R) look east towards Monaro Highway

Image Source: Google Street View (2022 imagery)

2.1.2.3 John Cory Road

John Cory Road (pictured in Figure 2.4) is a local access (cul-de-sac) street to the west of Monaro Highway. It has a length of approximately 500 m, with its southern end connected to Mugga Lane at a roundabout. John Cory Road provides access to the light industrial areas to the northwest of Monaro Highway.

The key features of John Cory Road in proximity to the proposal site are summarised in Table 2.3.

Table 2.3 John Cory Road key features

Feature	Description	Key Map
Carriageway	Sealed carriageway with travel widths of approximately 8 metres (4 metres per lane). No lane markings and shoulders.	
Parking	On-street parking is not permitted.	
Pedestrian Facilities	No pedestrian facilities such as sidewalks or crossings.	
Bicycle Facilities	No cycling facilities.	
Public Transport	No access to public transport.	

Figure 2.4 John Cory Road looking northeast of Mugga Lane

Image Source: Google Street View (2019 imagery)

2.2 Public and active transport

A map of the public transport services around the proposal is shown in Figure 2.5. At the time of writing, the following bus routes traverse Monaro Highway in proximity to the proposal site. However, these routes do not have any stops within 800 m from the proposal site and hence cannot be considered as accessible for the FOGO facility.

– **Route 182 Peak Service.** One of the peak bus services that travel to and from the City and Parliamentary Triangle during weekday peak periods. Route 182 serves the following areas: City West, City Interchange, Reid, Russell, Barton, Kingston, Chisholm, Calwell, Conder, and Lanyon Market Place.
– **Route 902 AMC Shuttle** serving Woden Interchange, Canberra Hospital, Narrabundah College, Narrabundah Shops, AMC, Hume Industrial Area. Route 902 operates Monday to Sunday between Woden and AMC via Narrabundah. The route only extends to the Hume Industrial Area (shown in Figure 2.5) on weekdays.

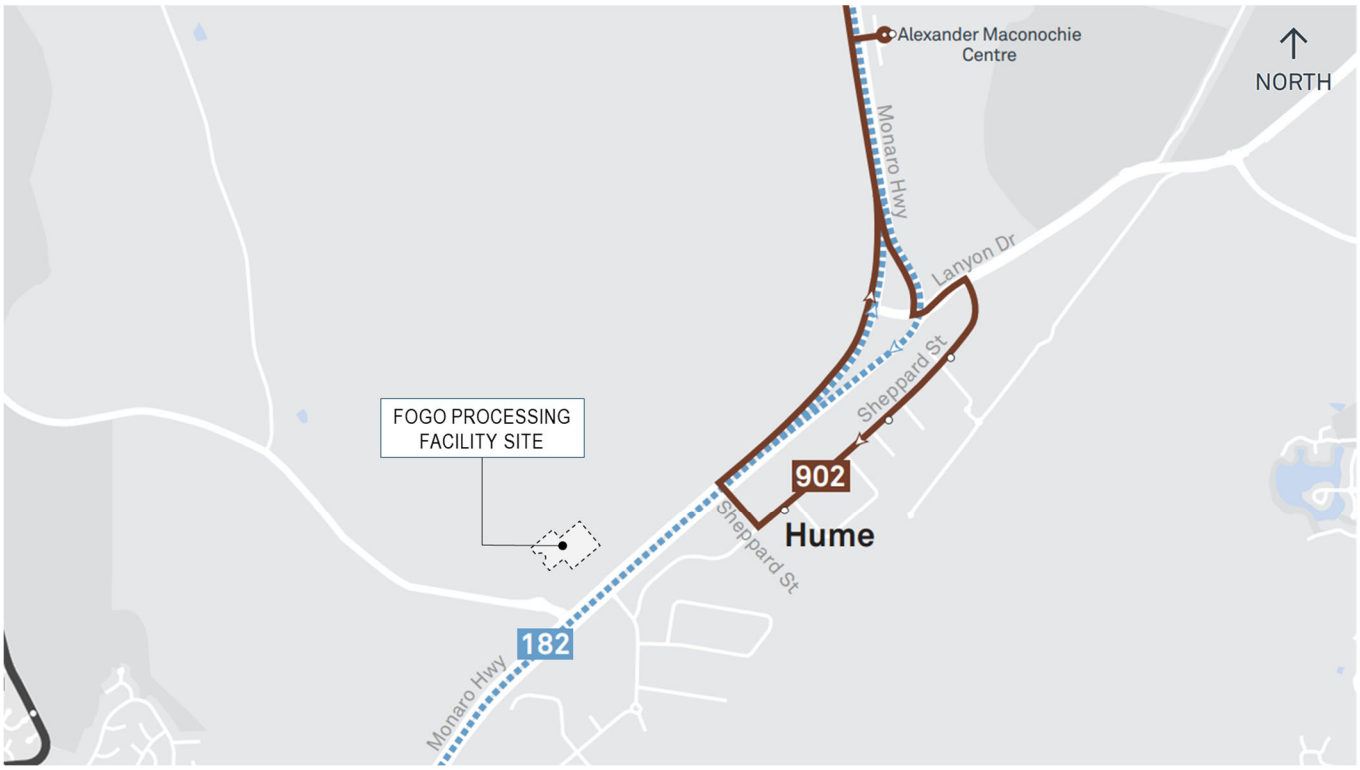


Figure 2.5 Bus network map
Source: Transport Canberra Network Map (effective 31st January 2022), modified by GHD

There are no dedicated footpaths and cycling lanes that provide access to or within the proposal site.

2.3 Freight routes

The ACT Government identifies the Monaro Highway and Mugga Lane as being part of key freight routes (Performance Based Standards [PBS] Level 1) and B-double networks, as displayed in Figure 2.6.

A PBS L1 heavy vehicle is designated as a truck and dog trailer combination that is not longer than 20 metres and is not a B-double or road train.

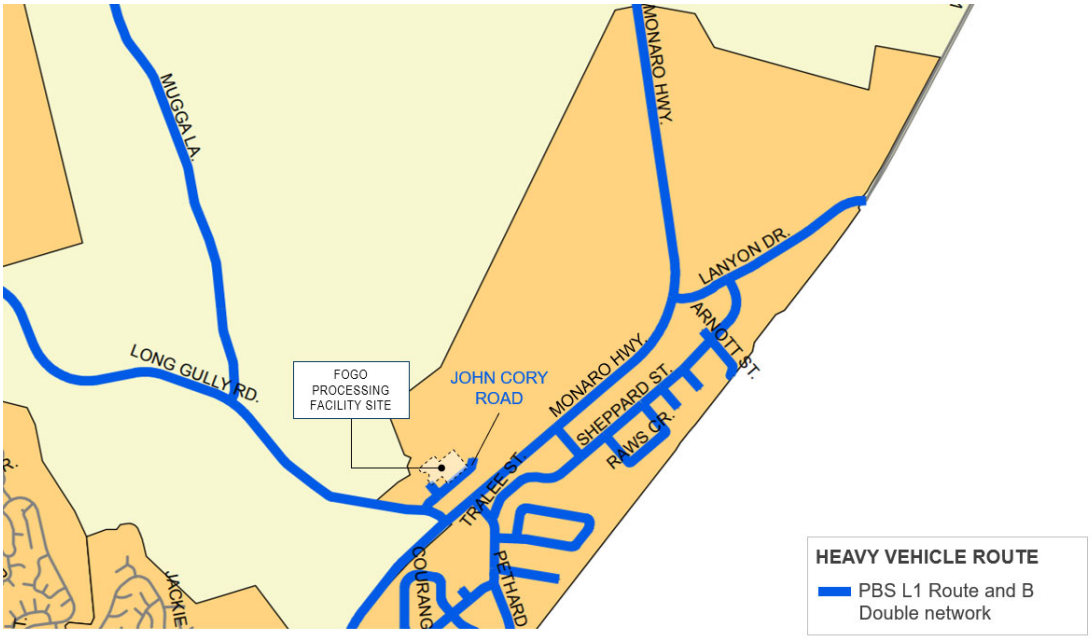


Figure 2.6 Freight route

Source: Approved ACT Routes for Performance Based Standards (PBS) Level 1 Vehicles, ACT Territory and Municipal Services

2.4 Crash review

Road crashes and their locations within ACT are recorded based on the reports of the police and the public through the Australian Federal Police (AFP) Crash Report Form. Since January 2016, 445 crashes were reported within a two-kilometre radius of the proposal site, as summarised in Table 2.4. The five-year data indicates that approximately nine per cent of the reported crashes resulted in injuries and fatalities.

Table 2.4 Reported road crashes within 2-km radius

Year [a]	Total number of crashes reported	of which resulted in Fatality	of which resulted in Injury	of which resulted in Property Damage Only
2016	77	-	4	73
2017	92	-	8	84
2018	87	1	10	76
2019	79	-	9	70
2020	72	-	6	66
2021 [b]	38	1	2	35
Total	**445**	**2**	**39**	**404**

[a] *From 01st January to 31st December of each year, except for 2021*
[b] *As of end of July 2021*

The data indicates that the crashes were predominantly:

– Rear-end collisions (200 incidents, 45 percent of the total number of incidents).
– Same direction side swipe (65 incidents, 15 percent).
– Right-angle collisions (56 incidents, 13 percent).

A heatmap of these reported crashes (refer to Figure 2.7) shows clusters of high-incident areas at intersections (represented by orange). A significant number of crashes are also noted to occur along Monaro Highway.

Source: ACT Government Open Data Portal; modified by GHD

Figure 2.7 Road crash incidents within 2-km radius of proposal site

A closer look at crash data at the intersections near the proposal access (refer to Figure 2.8) show that the majority of the recorded crashes along Mugga Lane and Monaro Highway are property damage crashes, and a further four crashes resulted in injuries and fatalities.

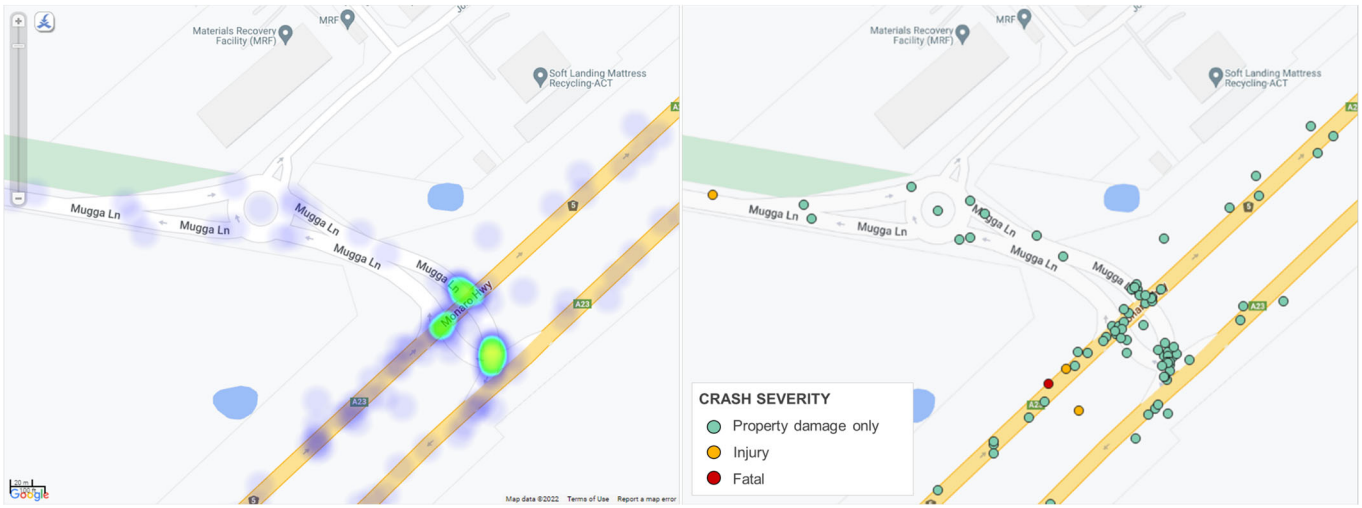


Figure 2.8 Road crash incidents near proposal access
Source (heatmap and data): ACT Government Open Data Portal; modified by GHD

Details of these crashes are summarised in Table 2.5.

Table 2.5 Reported road crashes near proposal access (injuries and fatalities)

Crash ID	Date of Crash	Time of Crash	Crash Direction	Crash Severity	Lighting Condition	Road Condition	Weather Condition
1224732	05-Mar-20	00:30	Westbound	Injury	Dark - poor street lighting	Wet surface	Light rain
1208606	15-May-19	09:00	Northbound	Injury	Daylight	Good dry surface	Fine
1193198	29-Aug-18	18:20	Southbound	Injury	Dark - good street lighting	Good dry surface	Fine
1191325	28-Jul-18	09:26	Northbound	Fatal	Daylight	Good dry surface	Fine

Source: ACT Road Crash Data, ACT Government Open Data Portal

2.5 Traffic performance

2.5.1 Traffic volumes

Existing traffic volumes at key intersections were determined based on peak hour intersection traffic counts conducted on 09 November 2022 (Wednesday), at the following locations:

– Mugga Lane / John Cory Road (Roundabout)
– Mugga Lane / Monaro Highway (Intersection)

The traffic surveys were undertaken for three-hour periods between 06:30 am – 09:30 am and 4:00 pm – 7:00 pm.

The data indicates that:

– The morning traffic peak hour occurs between 08:00 am to 09:00 am.
– The afternoon traffic peak hour occurs between 04:15 pm to 05:15pm.

It is noted that the MRF was operational during the traffic surveys prior to its destruction in a fire in December 2022.

A summary of the weekday AM and PM peak hour traffic movements are shown in Figure 2.9, while a summary of the midblock traffic volume counts is provided in Table 2.6. The traffic count data is provided in Appendix A.

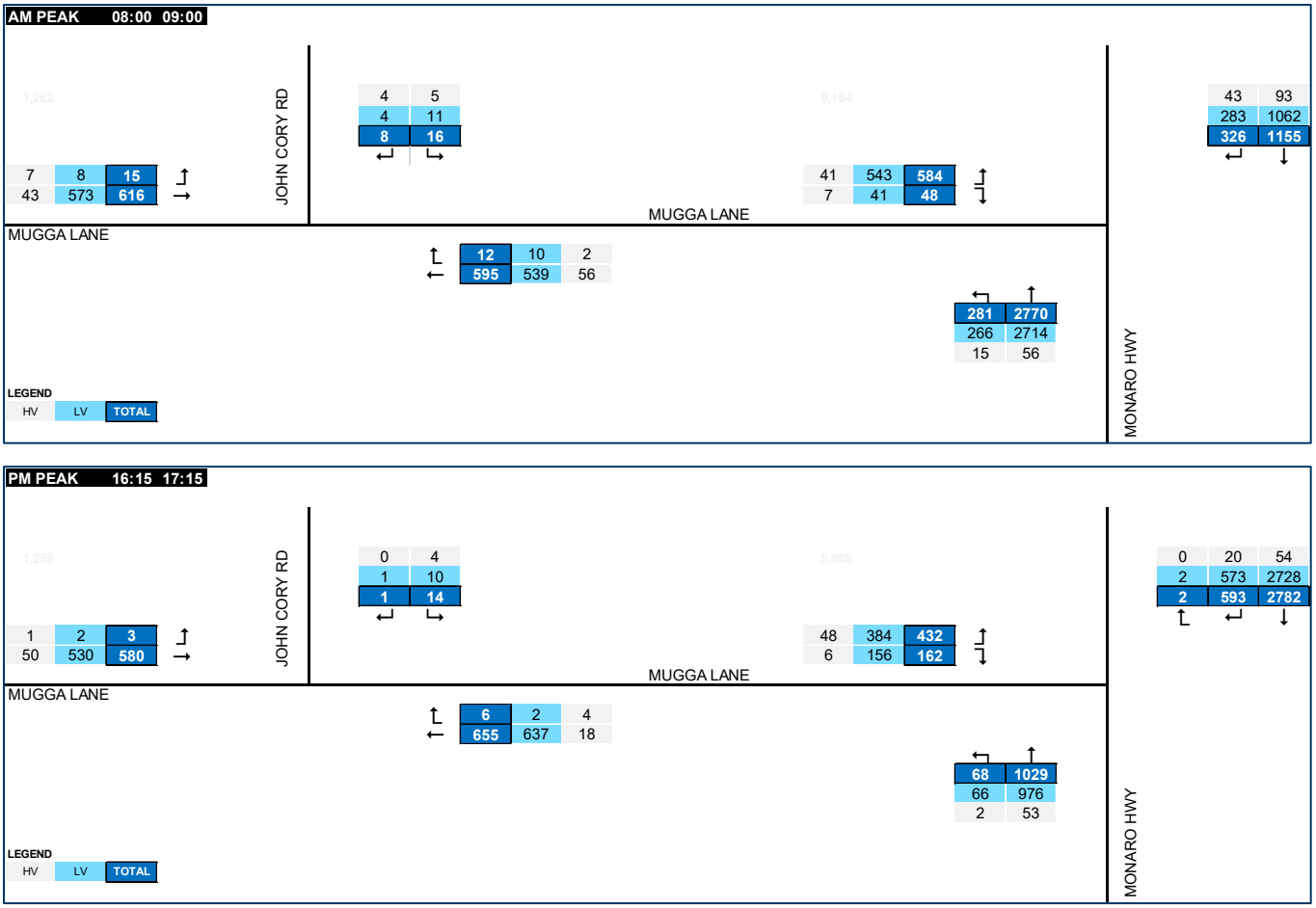


Figure 2.9 Peak hour traffic data (2022)

Table 2.6 Midblock traffic volume count summary (2022)

Road Name	Direction	AM Peak (vph)			PM Peak (vph)		
		LV	HV	Total	LV	HV	Total
Monaro Highway *(north of intersection with Mugga Lane)*	Northbound	3,257	97	3,354	1,362	101	1,463
	Southbound	1,345	136	1,481	3,303	74	3,377
Monaro Highway *(south of intersection with Mugga Lane)*	Northbound	2,980	71	3,051	1,042	55	1,097
	Southbound	1,103	100	1,203	2,884	60	2,944
Mugga Lane *(west of roundabout)*	Eastbound	582	50	632	532	51	583
	Westbound	544	60	604	638	18	656
Mugga Lane *(east of roundabout)*	Eastbound	584	48	632	540	54	594
	Westbound	549	58	607	639	22	661

Note: LV = light vehicles HV = heavy vehicles vph = vehicles per hour

2.5.2 Mid-block analysis

A midblock assessment is an approach for assessing the road network operations between intersections based on hourly traffic volumes along a road and lane capacity limits.

The capacity of the road network to accommodate additional traffic generated by the construction and operation of the proposal was determined based on mid-block volume to capacity ratio (VCR) of the impacted roads *before* (i.e., existing / baseline conditions) and *after* the construction and operation of the proposed modifications.

Volume to capacity ratio (VCR)

VCR is the ratio of the volume of vehicles (demand) and the capacity of the road. The ratio gives an indication of the road's degree of saturation and its ability to accommodate additional traffic. A lower VCR signifies low traffic volumes and typically translates to a better quality of service for road users. A ratio greater than one (1) suggests that the road is oversaturated and cannot handle the influx of volume, leading to delays and queue build-up.

The *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis Methods (AGTM Part 3)* indicates a practical degree of saturation of 0.90 (Austroads, 2017). For a conservative assessment of the traffic impacts associated with the proposal, a desirable outcome for the volume to capacity ratio of 0.85 or lower has been adopted.

Demand

Demand has been estimated to be equivalent to the traffic volumes plying along the assessed corridors. To account for the different impacts of light and heavy vehicles in the traffic mix, traffic volumes are converted from 'vehicle units' to 'passenger car units' (pcu) using multipliers called passenger car equivalent (PCE) factors. This allows for the assessment of traffic volume using one homogenised unit for all vehicles. A PCE factor of 2.0 has been adopted for heavy vehicles to obtain a highly conservative assessment of the impacts of the proposal.

Lane capacity

A road in which fixed elements influence traffic flow conditions (e.g. traffic signals, stop signs, give-way signs, roundabouts or other controls) that cause traffic to stop periodically is referred to as an interrupted flow facility. The capacity of an urban road with interrupted flow varies depending on the type of lane (Section 6.2.1 of AGTM Part 3). The typical mid-block capacity, as stipulated in AGTM Part 3, is replicated in Table 2.7.

Table 2.7 Typical mid-block capacity for urban roads with interrupted flow

Type of lane	One-way mid-block capacity (pc/h)
Median or inner lane	
Divided road	1,000
Undivided road	900
Middle lane (of a 3 lane carriageway)	
Divided road	900
Undivided road	1,000
Kerb lane	
Adjacent to parking lane	900
Occasional parked vehicles	600
Clearway conditions	900

Source: Austroads Guide to Traffic Management Part 3 – Traffic Studies and Analysis Methods - Table 6.1

Note: AGTM Part 3 further states that "peak period mid-block traffic volumes may increase to 1,200 to 1,400 pc/h/lane on any approach road when the following conditions exist or can be implemented:

- *adequate flaring at major upstream intersections.*
- *uninterrupted flow from a wider carriageway upstream of an intersection approach and flowing at capacity.*
- *control or absence of crossing or entering traffic at minor intersections by major road priority controls.*
- *control or absence of parking.*
- *control or absence of right turns by banning turning at difficult intersections high volume flows of traffic from upstream intersections during more than one phase of a signal cycle.*
- *good co-ordination of traffic signals along the route.*

For the purposes of this assessment, a conservative approach has been adopted, and the following lane capacities were used to calculate the VCR:

- Undivided roads: 900 pc/h/lane

– Divided roads: 1,200 pc/h/lane

Table 2.8 presents the VCR of the key roads in the study area.

Table 2.8 Existing mid-block VCR – key roads (2022)

Road Name	Direction	Number of Lanes	Capacity per lane	Existing traffic (2022) (pcu)		VCR (2022)	
				AM Peak	PM Peak	AM Peak	PM Peak
Monaro Highway *(north of intersection with Mugga Lane)*	Northbound	3	1200	3451	1564	0.959	0.434
	Southbound	3	1200	1617	3451	0.449	0.959
Monaro Highway *(south of intersection with Mugga Lane)*	Northbound	2	1200	3122	1152	1.301	0.480
	Southbound	2	1200	1303	3004	0.543	1.252
Mugga Lane *(west of roundabout)*	Eastbound	1	900	682	634	0.758	0.704
	Westbound	1	900	664	674	0.738	0.749
Mugga Lane *(east of roundabout)*	Eastbound	1	900	680	648	0.756	0.720
	Westbound	1	900	665	683	0.739	0.759

Note: pcu = passenger car units (1 LV = 1 pcu , 1 HV = 2 pcu)
VCR = volume to capacity ratio

This analysis indicates that presently:

– Mugga Lane is operating within its mid-block capacity during peak periods of road network activity.
– Monaro Highway is operating with volumes that exceed its capacity during peak periods of road network activity.

2.5.3 Intersection assessment

The performance of the existing road network is largely dependent on the operating performance of key intersections, which are critical capacity control points on the road network. SIDRA 9 Intersection modelling software was used to assess the proposed peak hour operating performance of intersections on the surrounding road network. Intersection performance is represented through the following key parameters:

– Average Delay (given in seconds per vehicle)
– Level of Service (LoS, conversion of the average delay)
– Queue Length (95th percentile in metres)
– Degree of Saturation (DoS, ratio of traffic demand to capacity).

The criteria for evaluating the operational performance of intersections based on the qualitative measure are provided in Table 2.9 and Table 2.10. The TCCS Draft Guidelines for SIDRA Analysis indicate LoS better than “E” as the acceptable level of service.

Table 2.9 LoS criteria for intersections

LoS	Average Delay per Vehicle (seconds/veh)	Traffic Signals, Roundabouts
A	<14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity, at signals, incidents will cause excessive delays, roundabouts require other control modes
F	>70	Over capacity, unstable operation

Source: Roads and Maritime Services Traffic Modelling Guidelines

Table 2.10 Maximum practical degree of saturation by intersection control

Intersection Control	Maximum Practical Degree of Saturation
Traffic Signals	0.90
Roundabouts	0.85
Priority-Controlled	0.80

Source: Roads and Maritime Traffic Modelling Guidelines

The base 2022 traffic models were developed using the weekday AM and PM peak hour SCATS data. Existing traffic flows at key intersections were analysed using SIDRA 9 to obtain the current operation of the key intersections.

The SIDRA intersection layout adopted for this assessment, shown in Figure 2.10 was developed using desktop measurements of satellite imagery on ACTmapi and SIX Maps.

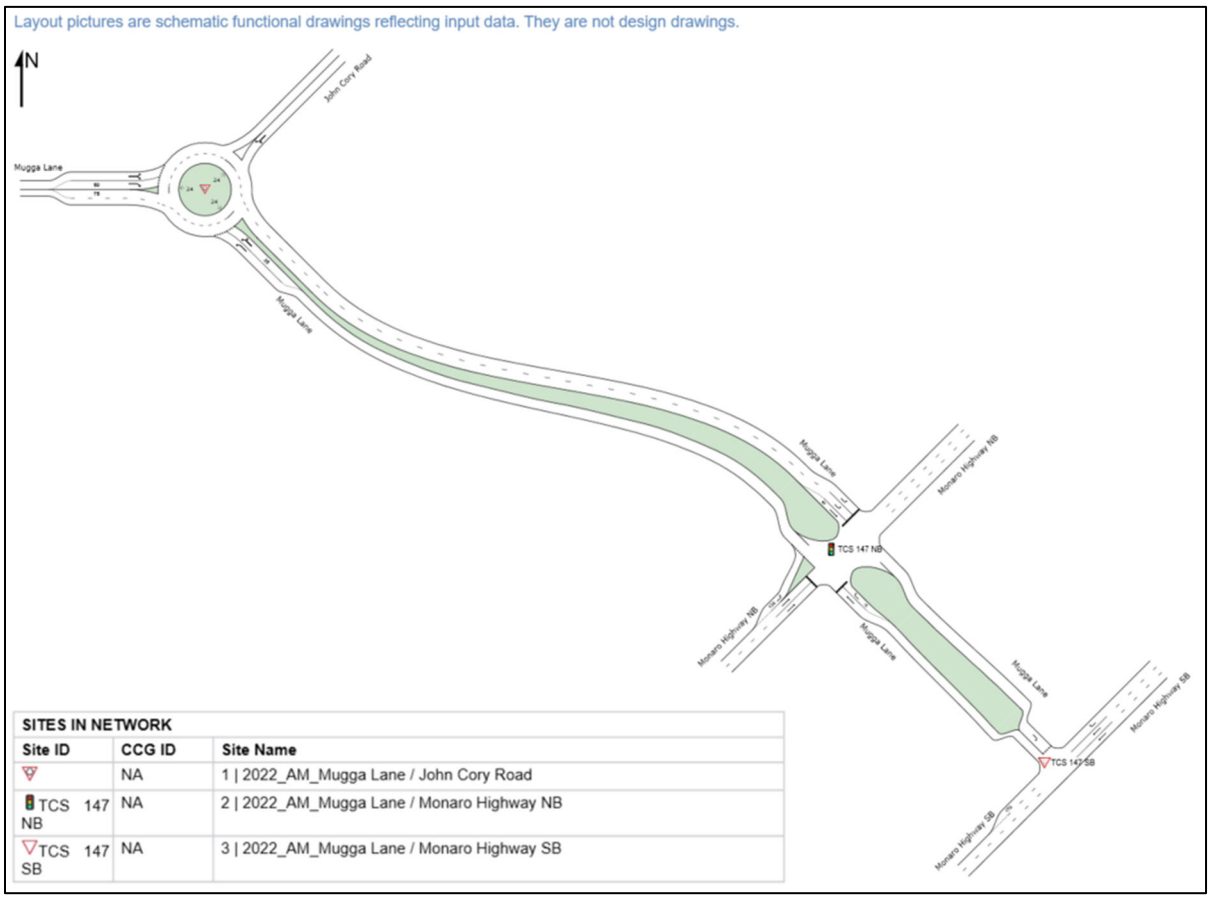


Figure 2.10 Network layout – Base Case (2022)

The signal phasing for the intersection of Mugga Lane and Monaro Highway was determined using SCATS data provided by the ACT Government (refer to Figure 2.11).

Figure 2.11 SCATS signal data – Monaro Highway and Mugga Lane

Source: ACT Government

As displayed in Figure 2.11, the intersection operates with three phases, with the majority of green time allocated to the northbound movement on the Monaro Highway.

The SIDRA model outputs for the intersections of interest based on their current road geometry, traffic volumes and signal phasing are presented in Table 2.11.

Table 2.11 Existing operating conditions – Base Case (2022)

ID	Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:15 – 17:15)			
		DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)
1	Mugga Lane / John Cory Road	0.125	11	B	2	0.201	11	B	3
2	Mugga Lane / Monaro Highway NB	1.109	125	F	832	0.787	21	C	73
3	Mugga Lane / Monaro Highway SB	0.195	7	A	95	0.392	26	D	5

Notes:
- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The degree of saturation (DoS) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

Table 2.11 indicates that:

- The roundabout of Mugga Lane and John Cory Road, which is the primary access to the proposal site, is operating at LoS B with minimal delays and queueing for both AM and PM peak periods.
- During the AM peak, the signalised intersection of Mugga Lane and the northbound carriageway of Monaro Highway is operating over capacity at LoS F, with delays of up to two minutes and queue lengths greater than 800 metres. These outputs are aligned with findings of previous traffic studies in the area, particularly the Canberra Travel Modelling Report (Veitch Lister Consulting Pty Ltd, 2014), which showed that as early as 2011, this section of the corridor has been operating near-capacity in the AM peak. The area is one of the pinch points along Monaro Highway and is one of the intersections subject to upgrade in the Monaro Highway upgrade project jointly funded by the ACT and Australian Governments (refer to Section 4.1).
- During the PM peak, the signalised intersection operates at LoS C with delays of up to 21 seconds and queues up to 73 metres.
- The intersection of Mugga Lane and the southbound carriageway of Monaro Highway operates at acceptable levels of service, with the proposal site operating at LoS A during the AM peak and LoS D in the PM Peak.

SIDRA outputs for the existing situation are presented in Appendix B.

3. FOGO facility project description

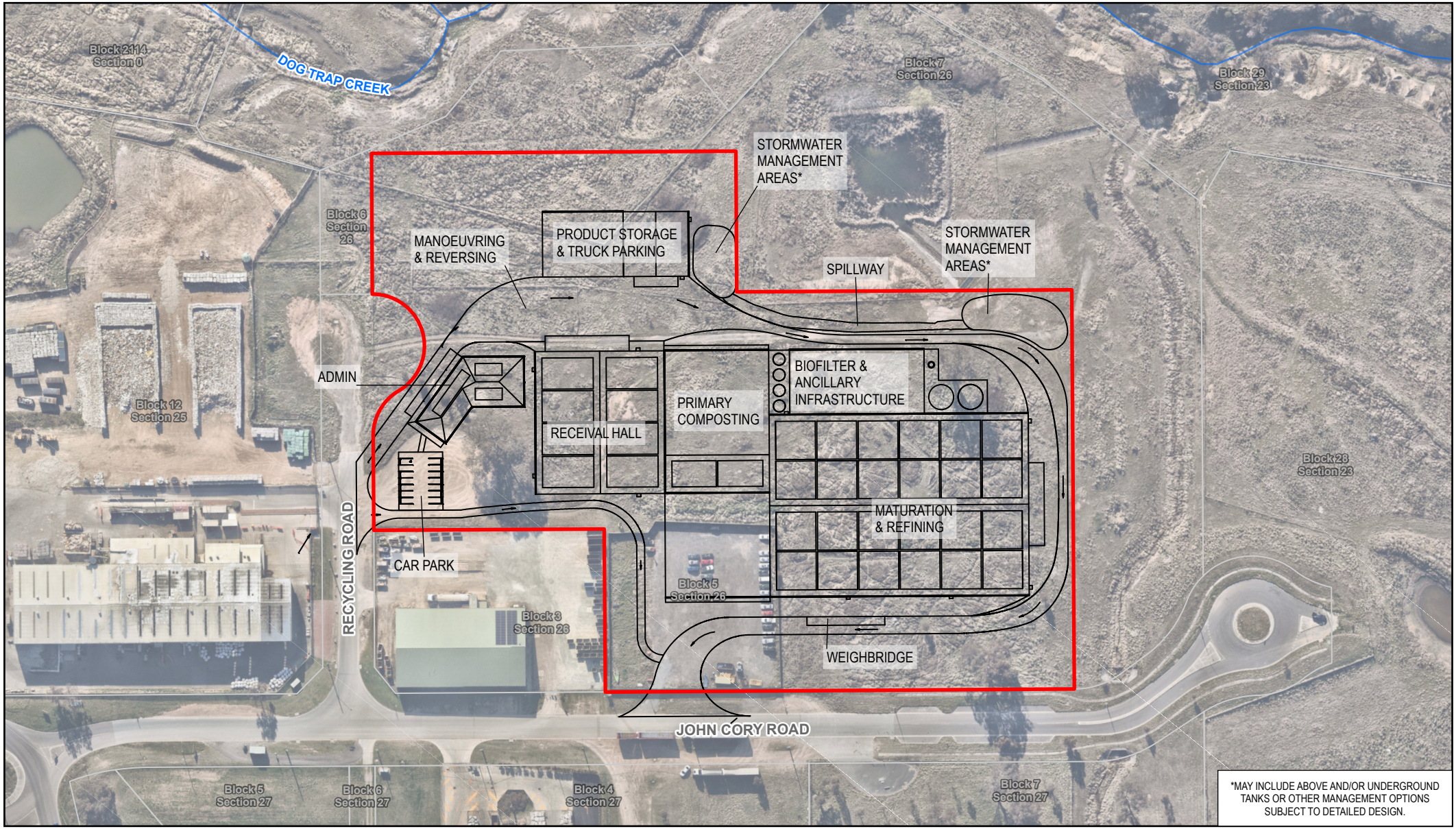
3.1 Layout and operation

3.1.1 Layout

The proposal would involve the following key features, subject to detailed design:

– Receival hall
– Primary composting tunnels and tunnel hallway
– Maturation and refining hall
– Product storage shed
– Odour management system
– Ancillary supporting infrastructure including:
    - Administration building
    - Machinery shed/workshop
    - Weighbridges
    - Access roads and pavements
    - Hardstand parking
    - Stormwater and leachate management

An indicative concept layout of the proposal is displayed in Figure 3.1.



Legend

- Proposal site
- Cadastre
- Proposal site layout
- Watercourses

Paper Size ISO A4

0 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Transport Canberra and City Services
Hume Food Organics and Garden Organics Facility
Traffic and Transport Impact Assessment

Project No. **12540460**
Revision No. **0**
Date **17/10/2023**

Indicative concept layout

FIGURE 3.1

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Print date: 17 Oct 2023 - 15:29

Data source: Imagery - Nearmap: extracted 17/10/2023; DEM - ACT Government, 2015; Roads, Cadastre - ACTmapi, 2022; Watercourses - NSWSS, 2022. Created by: pfernandes

3.1.2 Operation

It is intended that the proposal would operate on a single shift basis with waste acceptance (opening hours) from Monday to Friday to coincide with and accommodate deliveries from municipal kerbside collection trucks, as well as bulk product load-out to wholesale offtake. Weekends are therefore available for carrying out planned (and unplanned) repairs and maintenance, thereby providing a high level of processing continuity assurance.

With respect to waste receival:

– All incoming loads would be received via a dedicated weighbridge located at the site access road within the proposal site boundary. Vehicle identification, load description (material type), source and mass details would be recorded.
– Kerbside collection trucks and articulated waste transfer vehicles would deliver the organic waste into the receival hall through automated roller/shutter doors and unload in the designated delivery area.
– Provision would also be made in design for acceptance of organic waste deliveries via articulated transfer vehicles, such as 19-metre-long semi-trailer vehicles and short combinations.
– The facility would only accept waste delivered in large commercial heavy vehicles (trucks). It would not accommodate public or domestic drop-off of waste.

The FOGO facility would operate, subject to detailed design:

– 52 weeks per year
– Six days per week (excluding Christmas and Good Friday)
– Between 6:00 am – 6:00 pm (12 hours per day)

3.1.3 Access

In terms of the proposed access arrangements:

– An effort has been made separate the movement of heavy vehicles and light vehicles.
– All vehicles would manoeuvre through the FOGO facility in a one-way direction to support the safe and efficient operation of the facility.
– All vehicles would enter the FOGO facility via Recycling Road.
– Light vehicles would travel eastbound to access the car parking area.
– Heavy vehicles would travel north, drive over the entry weighbridge and travel through the FOGO facility in a clockwise direction drop off/collect organic waste and then drive over the exit weighbridge.
– All vehicles would egress the FOGO facility onto John Cory Road.
– The FOGO has been designed to accommodate vehicles up the size of a large B-double truck.

Peak truck traffic times would typically be between 9:30 am and midday, and 1:30 pm to 5:00 pm Monday to Friday.

Employees at the facility would enter via the main entrance off Recycling Road and park small vehicles in a dedicated small vehicle car park adjacent to the administration building. Small vehicles exiting the car park would leave the proposal site via the dedicated exit point onto John Cory Road.

3.1.4 Staffing and equipment

The staffing requirements are expected to be relatively low, given the high degree of automation of the tunnel composting process and entry doors to the main process building. Selection and use of reliable equipment and remote monitoring and control ability via the SCADA system further reduce supervision requirements and effort required for repairs and maintenance. Proactive maintenance schedules would assist with the efficient operation and management of the plant.

Indicative staffing for 70,000 tonnes per annum (tpa) tunnel composting facility is expected to be in the order of 20 direct employees (operations and maintenance, management and supervision), subject to detailed design and final vendor process selection.

3.1.5 Parking

It is proposed to provide a car park within the proposal site. The car park would be sufficiently sized to accommodate the parking demand associated with the proposal.

3.2 Construction

3.2.1 Methodology

Subject to final vendor tender submission, construction activities are expected to include:

- Proposal site preparation and establishment of temporary ancillary construction infrastructure, including:
  - site offices and amenities.
  - fencing.
  - a temporary main switchboard and electrical riser to provide power during construction.
- Bulk earthworks for site shaping and surface water drainage and detention ponds.
- Detailed excavation for lift and stair raft pads.
- Pouring concrete foundation slab, footings, hardstand and suspended slabs for the main buildings.
- Construction of pavement areas for a car park, hardstand and access roads.
- Construction of weighbridges and weighbridge office.
- Installation of steel truss frameworks for structures.
- Erection of pre-cast concrete panels for external and internal partition walls and metal roof for site buildings.
- Installation of tunnels, processing and odour control equipment.
- Installation of firewater tanks.
- Installation of fencing and signage.
- Commissioning.

The construction timing will be confirmed after the completion of the procurement process and onboarding of the contractor. At this stage the indicative contract commencement date is in 2025 and is expected to take approximately 24 months.

3.2.2 Staffing and equipment

Up to 60 workers are expected onsite during the construction of the FOGO facility.

Typical plant and equipment required for construction of the proposal is expected to include:

- 5 tonne excavator
- 20 tonne excavator
- Dozers
- Trucks
- Compaction equipment
- Graders
- Asphalt mixers
- Paver machine
- Bobcats
- Mobile concrete pump
- Concrete vibrators
- Concrete saw
- Welders
- Boom lifts
- Mobile crane
- Elevated working platform
- Mini loader
- Forklifts

During construction of the proposal, it is expected that up to approximately fifty trucks would access/egress the proposal site per day.

3.2.3 Program and hours

Construction working hours would be undertaken during the periods specified in the *Environment Protection Regulation 2005* and abide by noise zones outlined in the *Territory Plan*. This may include hours up to:

– 7:00 am to 6:00 pm Monday to Friday
– 8:00 am to 6:00 pm Saturdays
– 8:00 am to 6:00 pm on Sundays or Public Holidays.

4. Impact assessment

4.1 Road upgrades

4.1.1 Background

The ACT Government has committed funding to upgrade the Monaro Highway to reduce travel times and improve safety. Under this funding, design will be progressed for works in proximity to the proposal site (referred to as the Hume Interchange) are displayed in Figure 4.1.

Figure 4.1 Proposed Monaro Highway intersection upgrade

Source: ACT Government

The available information indicates that $230 million has been allocated for the upgrade to the Monaro Highway.

In proximity to the proposal site, the proposed upgrades that would impact how vehicles access/egress the MRF and FOGO facility include:

– Right turns into and out of Mugga Lane from Monaro Highway would be banned.
– A flyover would be provided on Monaro Highway over Isabella Drive.
– A flyover would be constructed over the Monaro Highway connecting Mugga Lane and Tralee Street.
– A grade separated left turn lane would be provided on Mugga Lane that would connect to the flyover and merge onto northbound traffic lanes on the Monaro Highway.
– Tralee Street would be extended to the southeast, where it would merge onto southbound traffic lanes on the Monaro Highway.
– Sheppard Street (to the north of Tralee Street) of Tralee Street would be left in/left out only.

Under this arrangement:

– Left turns into and out of Mugga Lane from the Monaro Highway would be maintained.
– Vehicles seeking to turn right from Mugga Lane onto Monaro Highway would:
  - Undertake a left turn on the grade separated left turn lane from Mugga Lane.

- Turn right onto the Tralee Street flyover.
- Travel southbound on the Tralee Street extension and merge onto the Monaro Highway.

– Vehicles seeking to turn right from Monaro Highway onto Mugga Lane would:
  - Turn left onto Sheppard Street from the Monaro Highway.
  - Turn right onto Tralee Street.
  - Turn right onto the Tralee Street flyover.
  - Use the flyover to access Mugga Lane.

4.1.2 Literature review

The Monaro Highway Upgrade program has developed intersection models for the proposed road upgrades on Monaro Highway and provide recommendations on the upgrades based on the modelling results. The infrastructure upgrades that were considered on the Monaro Highway in proximity to the FOGO proposal site are displayed in Figure 4.2, which includes:

– A flyover between Mugga Lane and Tralee Street
– A northbound on-ramp between Mugga Lane and the proposed flyover
– Removal of right turns into and out of Mugga Lane from Monaro Highway
– Removal of the traffic signals at the intersection of Monaro Highway and Mugga Lane.

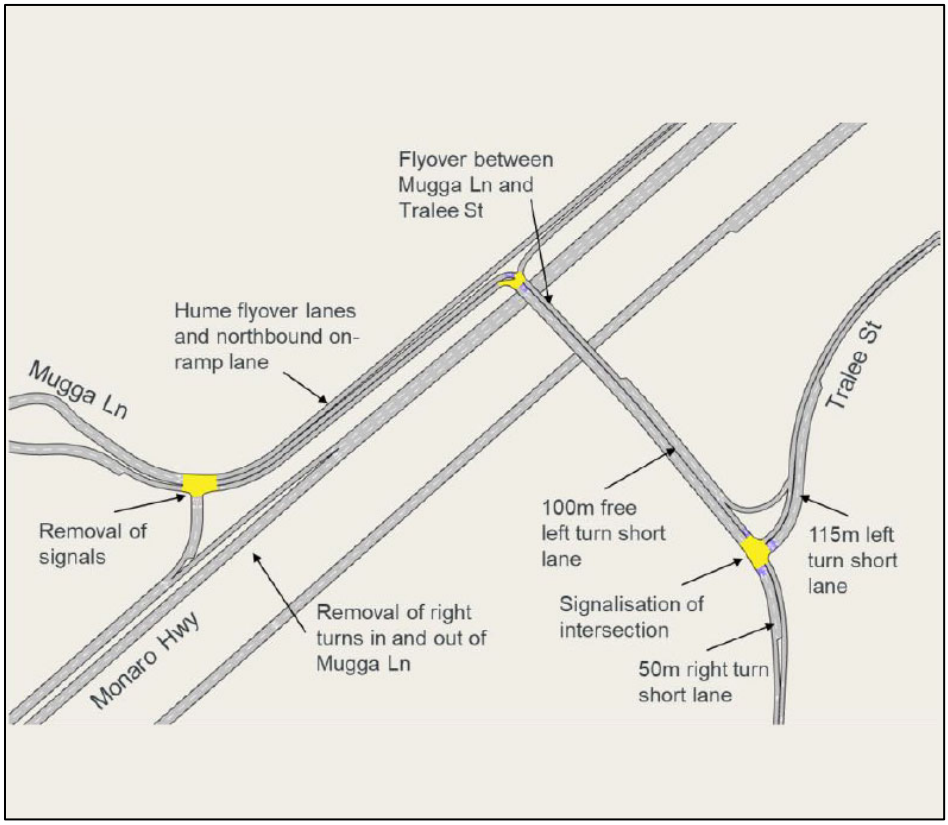

Figure 4.2 ***Proposed Monaro Highway upgrades***

Information from the Monaro Highway Upgrade program indicates that:

– Future year traffic demands were determined from the Canberra Strategic Traffic Model (CSTM) for 2021, 2026, 2031 and 2041.
– An AIMSUN mesoscopic model was prepared for the proposed Monaro Highway upgrades.
– Existing intersection modelling indicates that the intersection of Monaro Highway and Mugga Lane operates with a LoS E in the AM peak hour and a LoS B in the PM peak hour.
– A “do-nothing” scenario indicates that:

- In the 2031 horizon year, the intersection of Monaro Highway/Mugga Lane would operate at a LoS F in the AM peak hour and a LOS E in the PM peak hour.
- In the 2041 horizon year, the intersection of Monaro Highway/Mugga Lane would operate at a LoS F in the AM peak hour and PM peak hour.

– In the 2031 and 2041 horizon years, using the road geometry displayed in Figure 4.2, the intersection of interest would operate with a LoS A in the AM and PM peak hours in 2031 and 2041.

Construction of the Monaro Highway upgrade at the Hume Interchange has not commenced. For the purposes of analysis, it has been assumed that the interchange would commence operation subsequent to 2027.

4.2 Traffic generation

4.2.1 Construction

The peak hour construction vehicle activity has been undertaken on first principles basis in accordance with the expected volumes of workers and heavy vehicles.

It is expected that up to 60 full-time equivalent people would be employed during the construction of the proposal. Most of the construction workforce is likely to be based in Canberra and Queanbeyan.

It is expected that workers would typically access the proposal site in the morning and depart the site in the afternoon. It has been assumed that peak worker vehicle activity coincides with the adjoining road network peak periods as a conservative assumption.

To be conservative, it has been assumed that all construction workers would drive, with a car occupancy of one, i.e. no carpooling.

During the construction of the proposal, it is expected that up to approximately fifty trucks would access/egress the proposal site per day. Assuming a typical (weekday) workday occurs between 7:00 am and 6:00 pm, on average, this equates to approximately five trucks an hour.

To be conservative, it would be assumed that ten construction trucks would access/egress the proposal site in a single hour.

For the purposes of this assessment, the highest hourly traffic generation for the proposal under the peak construction scenario is assumed to be up to 80 vehicle trips in total for the FOGO facility, which would consist of the following:

– AM peak hour:
  - Ten inbound heavy vehicle movements
  - Ten outbound heavy vehicle movements
  - Sixty inbound light vehicle trips.
– PM peak hour:
  - Ten inbound heavy vehicle movements
  - Ten outbound heavy vehicle movements
  - Sixty outbound workers.

For the purposes of analysis, it has additionally been assumed that:

– The proposal and MRF would be constructed at the same time.
– The construction of both facilities would be finalised by 2027.
– The MRF would generate the same amount of construction vehicle activity as the proposal.

4.2.2 Operation

4.2.2.1 FOGO

The trip generation for the proposal has been determined on a first principles basis in accordance with the information provided by the Client, as follows:

– The proposal is expected to process 46,000 m^3 (70,000 tpa) of compost annually.
– Assuming the proposal operates five days a week/52 week a year, this corresponds to 180 m^3 per day.
– Assuming a rigid heavy vehicle is used, with a capacity of 10 m^3, this equates to 18 inbound and 18 outbound heavy vehicles per day. Assuming a dog and truck trailer is used, with a capacity of 30 m^3 this equates to six inbound and six outbound heavy vehicles per day.
– There would also be an additional output of residual material that would typically amount to approximately 20 percent of input tonnage (oversize, stones, lights etc.), which would go to Mugga Lane Landfill (located adjacent to the north of the subject site).
– The proposal is expected to generate approximately 23,300 m^3 residual materials per year, corresponding to 90 m^3 per day. A dog and truck trailer is expected to transport residual materials, corresponding to three inbound and three outbound movements per day.

Based on the processing of 70,000 tpa of compost material, and assuming each truck has a capacity of 10 tonnes, this equates to:

– 7,000 heavy vehicle movements per year – inbound and outbound.
– 583 heavy vehicles movements per month – inbound and outbound.
– 27 heavy vehicle movements per day (assuming 22 working days per month) – inbound and outbound.

To support a robust assessment, it has been assumed that rigid vehicles would be used to transport the organics materials.

In summary, the proposal would generate up to 96 heavy vehicle movements per day as follows:

– 18 inbound and 18 outbound heavy vehicle movements per day (compost material).
– Three inbound and three out dog and truck trailer movements per day (residual materials).
– 27 inbound and 27 outbound heavy vehicle movements per day (FOGO material).

Assuming the FOGO facility operates 12 hours per day, on average, this equates to approximately four inbound and four outbound heavy vehicle movement per hour.

To be conservative, it was assumed that ten trucks would access/egress the proposal site in a single hour.

The proposal would employ up to 20 staff (subject to detail design), who would typically access the proposal site in the morning and depart the site in the afternoon.

For the purposes of this assessment, it was assumed that the proposal would generate up to 40 vehicle trips in peak periods of activity, as follows:

– AM peak hour:
  - Ten inbound heavy vehicle movements
  - Ten outbound heavy vehicle movements
  - Twenty inbound light vehicle trips.
– PM peak hour:
  - Ten inbound heavy vehicle movements
  - Ten outbound heavy vehicle movements
  - Twenty outbound workers.

4.2.2.2 MRF

Prior to the fire, the MRF was processing approximately 65,000 tpa of materials. The upgraded facility is intended to have a capacity of 115,000 tpa. Therefore, it has been assumed that there would be a 77 percent increase in heavy vehicle activity.

Prior to the fire the MRF generated approximately:

– 1,623 inbound and 1,623 outbound heavy vehicle movements per month.
– 74 inbound and 74 outbound heavy vehicle movements per day.

Accordingly, based on a capacity of 115,000 tpa, the MRF would generate an additional 60 inbound and 60 outbound heavy vehicle movement per day, compared to the current situation (prior to the fire).

The MRF would operate:

– 52 weeks per year
– Six days per week (excluding Christmas and Good Friday)
– Between 4:00 am – 10:00 pm (18 hours per day)

Assuming the MRF operates 18 hours per day, on average, this equates to approximately three inbound and three outbound heavy vehicle movement per hour. To be conservative, it would be assumed that eight trucks would access/egress the proposal site in a single hour.

It is assumed that vehicle activity associated with the operational staff at the MRF (prior to the fire) was captured in the traffic surveys commissioned by GHD on the 09 November 2022.

It is assumed that the MRF would employ up to 15 additional staff (subject to detailed design), who would typically access the MRF in the morning and depart the proposal site in the afternoon.

For the purposes of this assessment, it was assumed that the MRF would generate up to 31 vehicle trips in peak periods of activity, as follows:

– AM peak hour:
  - Eight inbound heavy vehicle movements
  - Eight outbound heavy vehicle movements
  - 15 inbound light vehicle trips.
– PM peak hour:
  - Eight inbound heavy vehicle movements
  - Eight outbound heavy vehicle movements
  - 15 outbound workers.

4.3 Trip distribution

The trip distribution has been undertaken in accordance with the information provided by the ACT Government.

4.3.1 Heavy vehicles

For construction heavy vehicles, in the AM and PM peak hours:

– 70 percent of heavy would access/egress the proposal site to and from the north via Monaro Highway.
– 30 percent of heavy would access/egress the proposal site to and from the south via Monaro Highway.

For operational heavy vehicles:

– AM peak hour:
  - 60 percent of heavy vehicles would access the proposal site from the west via Mugga Lane.
  - 40 percent of heavy vehicles would access the proposal site from the east via Mugga Lane.
  - Of the heavy vehicles accessing the proposal site from the east:

    - 50 percent would access the proposal site from the south via the Monaro Highway.
    - 50 percent would access the proposal site from the north via the Monaro Highway.
  - All heavy vehicles would exit the proposal site from the direction they arrived:
- PM peak hour:
  - 60 percent of heavy vehicles would access the proposal site from the west via Mugga Lane.
  - 40 percent of heavy vehicles would access the proposal site from the east via Mugga Lane.
  - Of the heavy vehicles accessing the proposal site from the east:
    - 50 percent would access the proposal site from the south via the Monaro Highway.
    - 50 percent would access the proposal site from the north via the Monaro Highway.
  - All heavy vehicles would exit the proposal site towards the depot that is accessed from Tralee Street and would:
    - Egress the proposal site westbound towards Monaro Highway.
    - Undertake a left turn onto the Monaro Highway towards Tralee Street.

4.3.2 Light vehicles

The residential location of construction workforce and the operational staff of the proposal and MRF is not currently known. However, it is expected they would be predominantly drawn from Canberra and Queanbeyan. In accordance with the patterns of activity identified in the peak hour traffic surveys (for construction and operation):

- AM peak hour:
  - 50 percent of light vehicles would access the proposal site from the west via Mugga Lane.
  - 50 percent of light vehicles would access the proposal site from the east via Mugga Lane.
  - Of the light vehicles accessing the proposal site from the east:
    - 50 percent would access the proposal site from the south via the Monaro Highway.
    - 50 percent would access the proposal site from the north via the Monaro Highway.
- PM peak hour:
  - 55 percent of light vehicles would egress the proposal site to the west via Mugga Lane.
  - 45 percent of light vehicles would egress the proposal site to the east via Mugga Lane.
  - Of the light vehicles egressing the proposal site to the east:
    - 70 percent would travel northbound on the Monaro Highway.
    - 30 percent would travel southbound on the Monaro Highway.

Based on the trip generation data detailed in Section 4.2 and the trip generation assumptions for light vehicles and heavy vehicles described above:

- The AM and PM peak hour construction trips associated with the proposal and MRF are displayed in Figure 4.3.
- The AM and PM peak hour operational trips associated with the proposal and MRF are displayed in Figure 4.4.

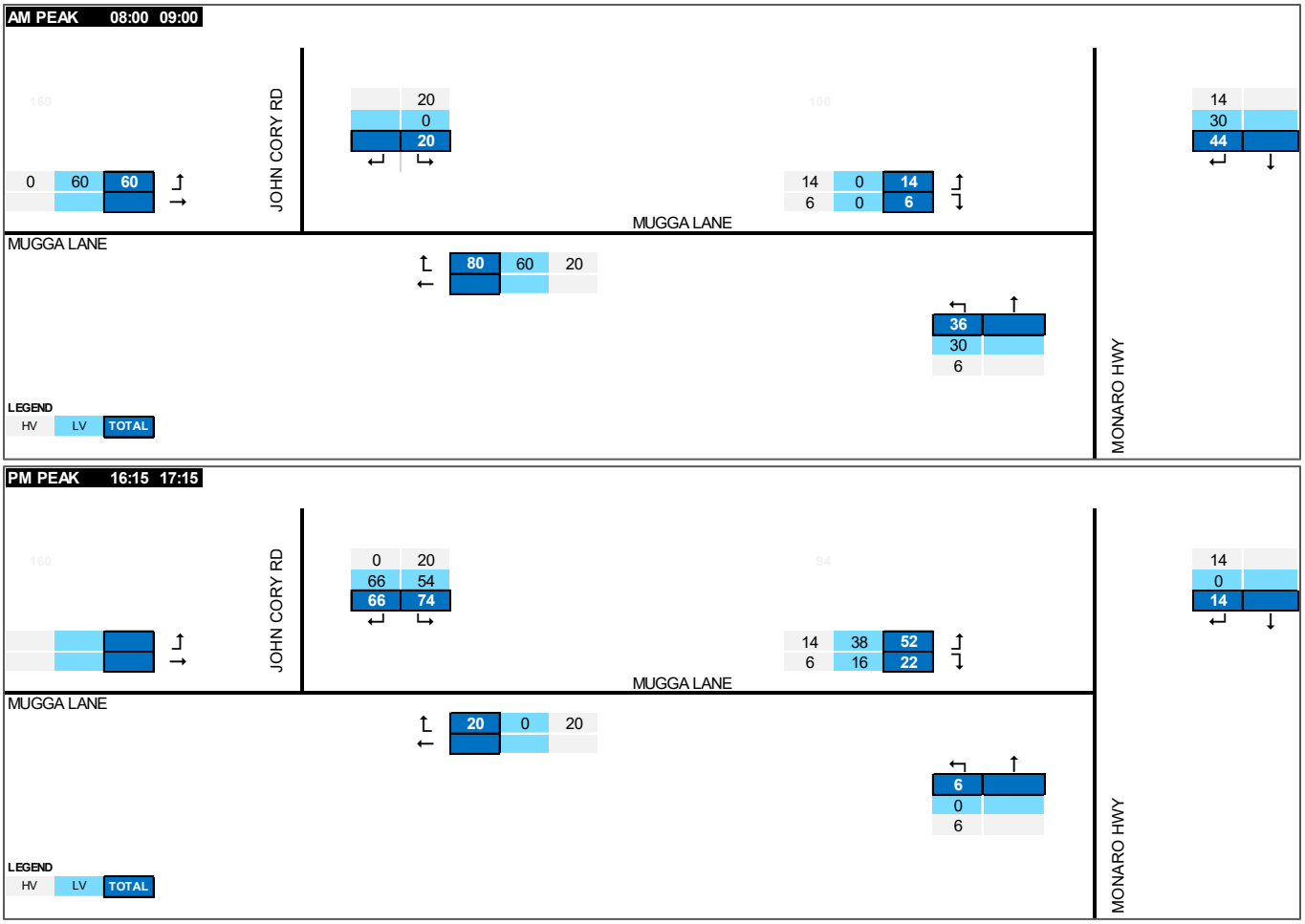

Figure 4.3 ***Proposal and MRF construction trips (2027)***

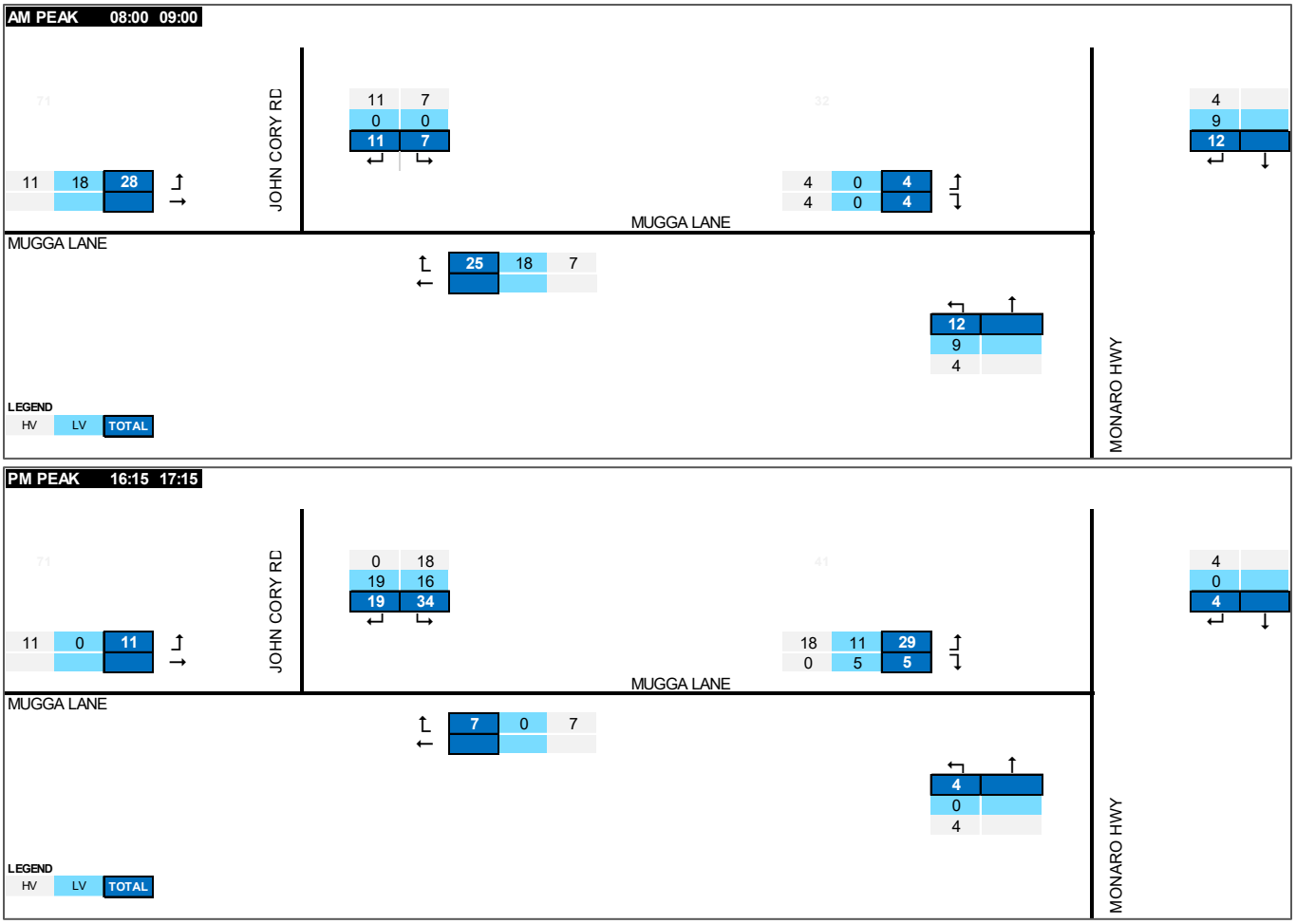

Figure 4.4 Proposal and MRF operational trips (2033)

4.4 Impacts to roads

SIDRA analysis has been undertaken for 2027 to account for construction traffic and 2033 (ten-year horizon) to account for operational traffic.

The ACT Population Projections 2022 to 2060 projects an annual population growth of 1.4 percent. This annual rate has been applied to the current volumes on the Mugga Lane and Monaro Highway to determine the 2027 (refer to Figure 4.5) and 2033 background traffic volumes (refer to Figure 4.6).

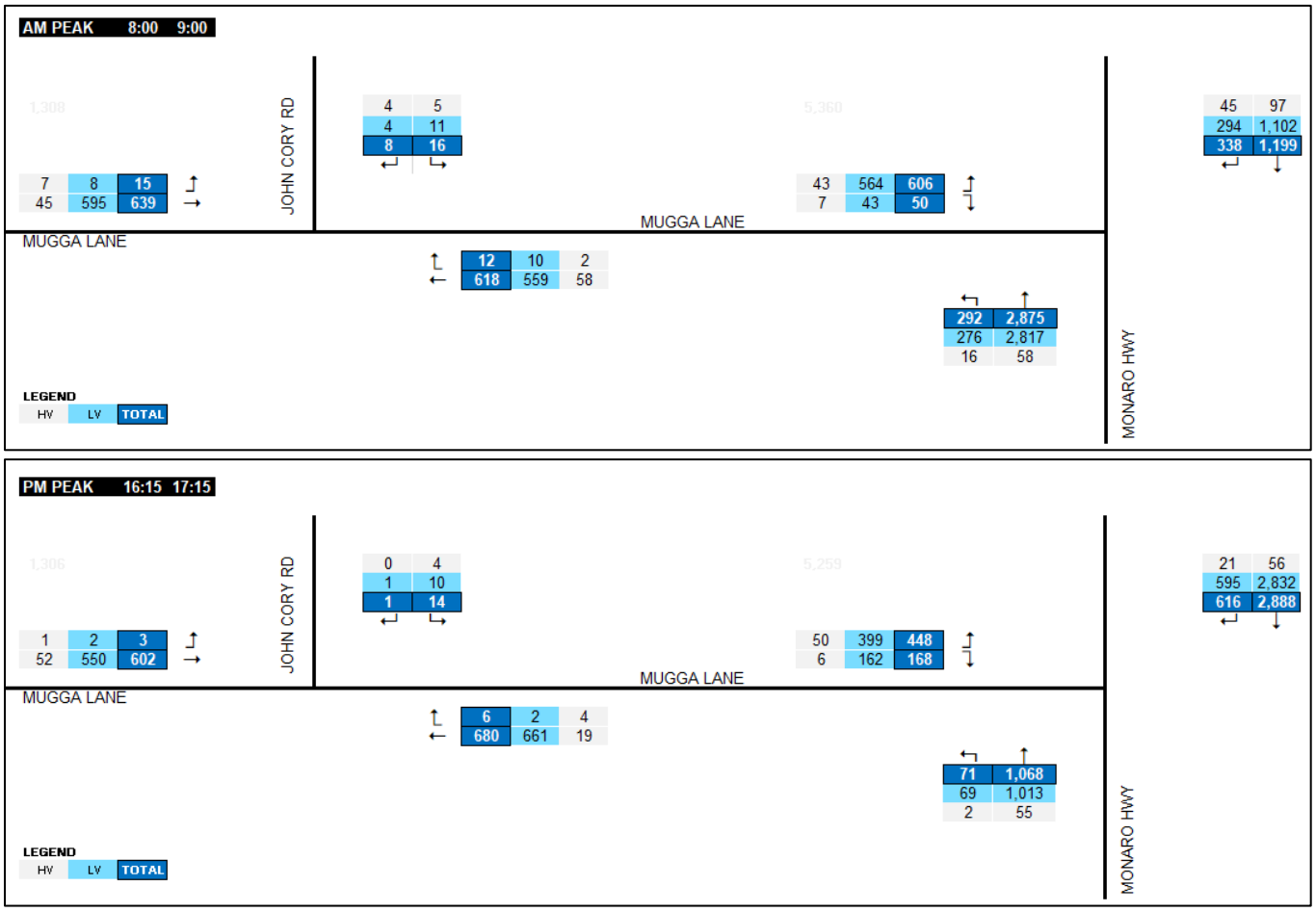

Figure 4.5 2027 background traffic volumes

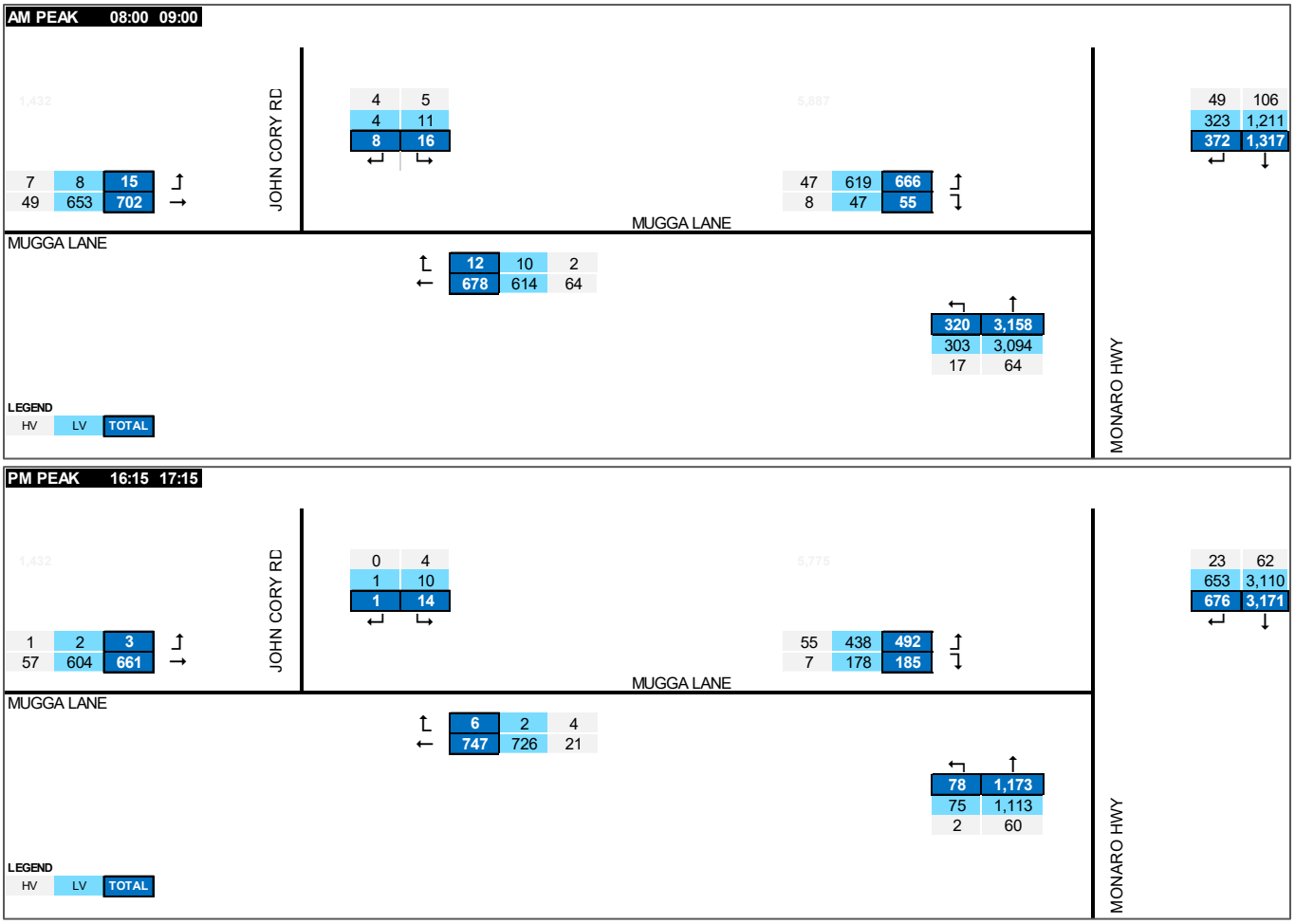

Figure 4.6 2033 background traffic volumes

4.4.1 Construction impacts (2027)

The 2027 horizon year traffic volumes accounting for the proposal and MRF construction vehicle trips (refer to Figure 4.3) and background traffic volumes (refer to Figure 4.5) are displayed in Figure 4.7.

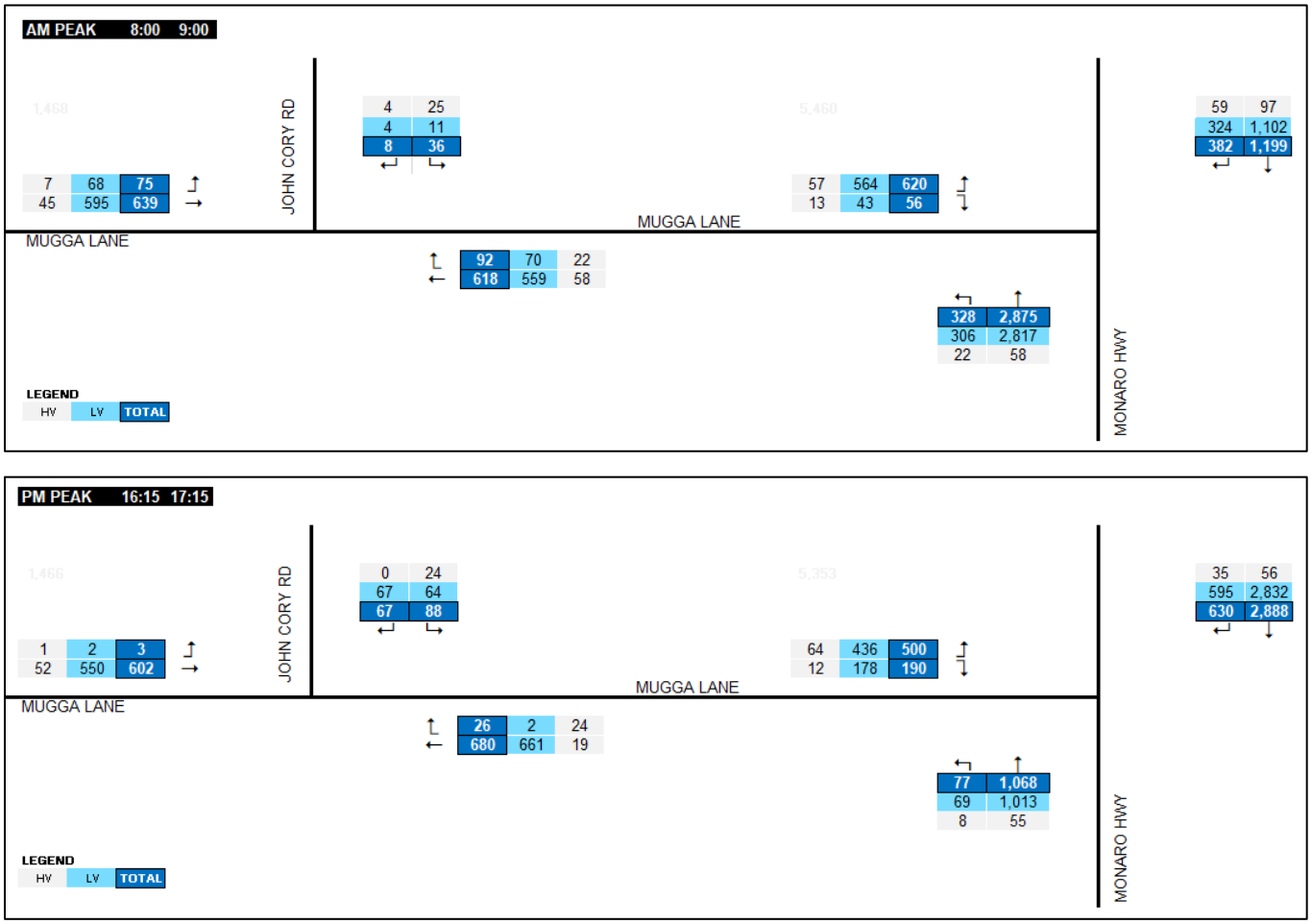

Figure 4.7 Total 2027 traffic volumes (construction scenario)

The traffic impact of the proposal was determined by comparing the future intersection performance of the key intersections *"without"* and *"with"* the proposal activities.

A summary of the SIDRA results for 2027 future scenarios are provided in Table 4.1 and Table 4.2. Detailed SIDRA results are provided in Appendix B.

Table 4.1 Future intersection performance – 2027 without construction (background growth only)

ID	Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:15 – 17:15)			
		DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)
1	Mugga Lane / John Cory Road	0.128	11	B	2	0.207	11	B	3
2	Mugga Lane / Monaro Highway NB	1.145	147	F	929	0.808	22	C	76
3	Mugga Lane / Monaro Highway SB	0.200	7	A	105	0.417	31	D	5

Notes:

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The degree of saturation (DoS) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

Table 4.2 Future intersection performance – 2027 with construction (proposal and MRF)

ID	Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:15 – 17:15)			
		DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)
1	Mugga Lane / John Cory Road	0.142	11	B	2	0.154	11	B	2
2	Mugga Lane / Monaro Highway NB	1.180	197	F	918	0.867	26	C	74
3	Mugga Lane / Monaro Highway SB	0.337	9	A	183	0.781	75	F	52

Notes:
- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The degree of saturation (DoS) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

Results of the SIDRA modelling in Table 4.1 and Table 4.2 indicate that by 2027:

- With construction activities, the roundabout of Mugga Lane and John Cory Road (proposal site access) is expected to continue operating at LoS B with minimal delays.
- Intersections with Monaro Highway are expected to experience levels of service between A to F:
  - During the AM peak, the northbound lane of Monaro Highway (Site 2) experiences poor levels of service, with delays up to 197 seconds and queues approximately a kilometre long. Meanwhile, the southbound lane of Monaro Highway (Site 3) experiences virtually unimpeded flow.
  - During the PM peak, both directions experience poor levels of service from D to E, with delays between 37 to 75 seconds.
- The LoS of the key intersections are generally expected to remain the same with or without the proposal construction activities, except for Site 3, which would experience an LoS increase from D to F during the PM peak.

It is worth noting that, even without the construction, access routes to and from Monaro Highway are expected to already be operating over capacity during the AM and PM peak periods. This means that the performance of these roads could decrease significantly even with a minimal increase in traffic, as there is no longer enough capacity to accommodate demand.

Traffic generated by the construction activities are not expected to have a significant impact on the operation of the road network, which is already operating near or over capacity. Additional heavy vehicles generated by the construction activities are not expected to change the composition of the existing traffic already on the road network.

4.4.2 Operational impacts (2033)

The 2033 horizon year traffic volumes accounting for the proposal and MRF operational vehicle trips (refer to Figure 4.4) and background traffic volumes (refer to Figure 4.6) are displayed in Figure 4.8.

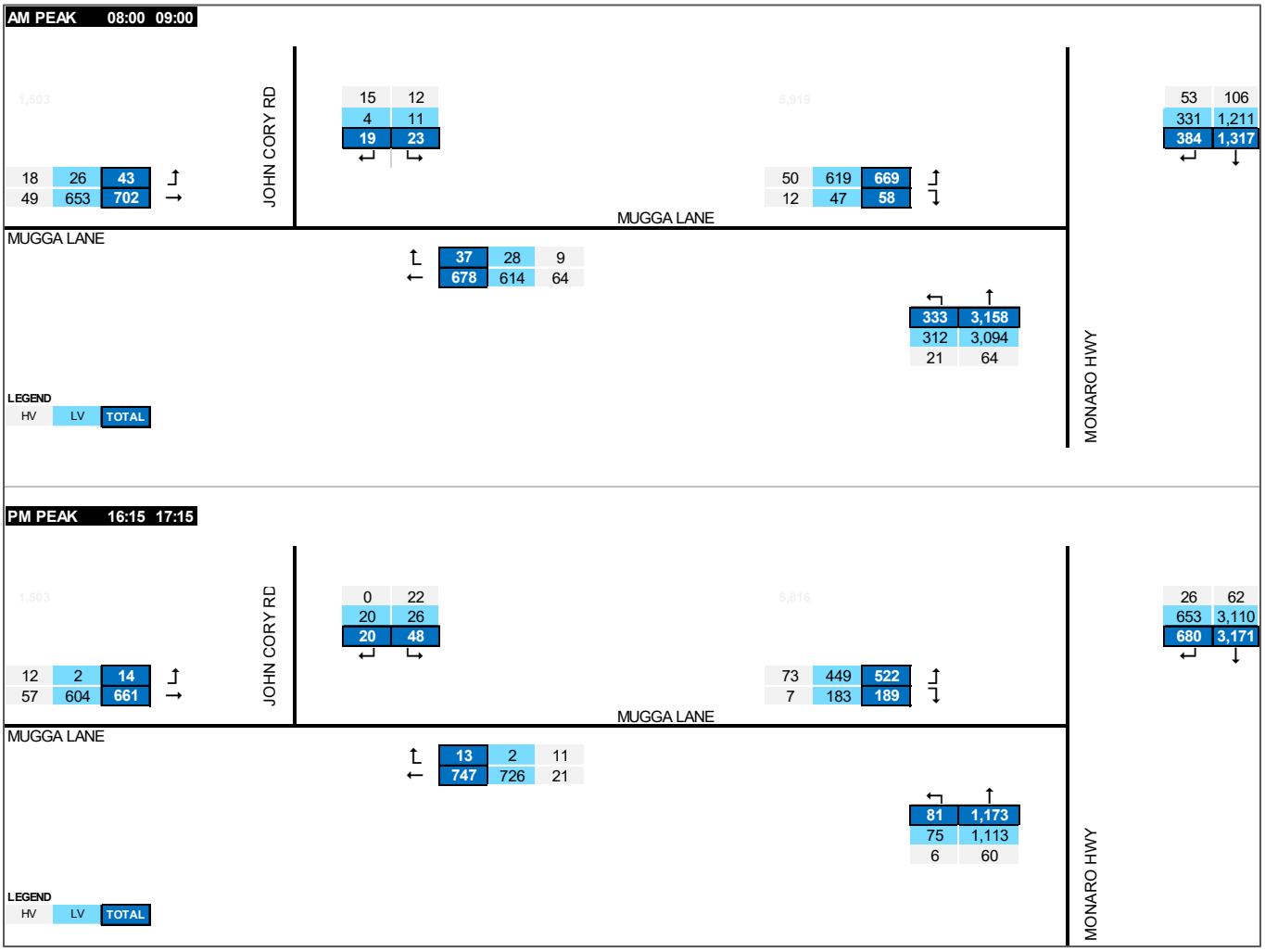

Figure 4.8 Total 2033 traffic volumes (operational scenario)

A summary of the SIDRA results for 2033 future scenarios are provided in Table 4.3 and Table 4.4. Detailed SIDRA results are provided in Appendix B.

Table 4.3 Future intersection performance – 2033 without operation (background growth only)

ID	Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:15 – 17:15)			
		DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)
1	Mugga Lane / John Cory Road	0.142	11	B	2	0.229	11	B	3
2	Mugga Lane / Monaro Highway NB	1.327	295	F	1,463	0.883	28	C	98
3	Mugga Lane / Monaro Highway SB	0.223	7	A	123	0.543	480	F	7

Notes:

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The degree of saturation (DoS) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

Table 4.4 Future intersection performance – 2033 with operation

ID	Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:15 – 17:15)			
		DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)
1	Mugga Lane / John Cory Road	0.151	11	B	2	0.246	11	B	4
2	Mugga Lane / Monaro Highway NB	1.309	285	F	1412	0.883	29	C	98
3	Mugga Lane / Monaro Highway SB	0.231	7	A	139	0.858	519	F	77

Notes:

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The degree of saturation (DoS) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

Results of the SIDRA modelling in Table 4.3 and Table 4.4 indicate that by 2033:

- With the operation of the proposal and MRF facilities, the roundabout of Mugga Lane and John Cory Road (site access) is expected to continue operating at LoS B with minimal delays.
- Similar to conditions in 2027, the intersections of Monaro Highway are expected to operate between LoS A to F, with the southbound lane of Monaro Highway (Site 3) having good flow in the AM Peak. However, during the PM peak, the southbound direction is also expected to experience high delays and long queues, with a LoS F.
- The LoS of the key intersections are expected to remain the same with or without the operation of the MRF and FOGO facilities.
- Access to and from Monaro Highway is already operating over capacity even without the operation of the proposal, with LoS F for northbound traffic in the AM peak and LoS F for southbound traffic in the PM peak. The existing road network is no longer able to accommodate background traffic growth, and capacity upgrades would be necessary to allow the intersections to operate at acceptable levels of service.
- Additional traffic generated by the operation of the proposed FOGO facility and MRF are not expected to have a significant impact on the operation of the road network, which is already operating near or over capacity.

The analysis indicates that the road upgrades detailed in Section 4.1 would be required to support an acceptable LoS at the intersection of Monaro Highway and Mugga Lane.

The Monaro Highway Upgrade program has undertaken traffic modelling that identified that the proposed upgrades to the Monaro Highway at Mugga Lane would support a good LoS in the 2031 and 2041 horizon years.

All SIDRA outputs are included in Appendix B.

4.5 Impacts to public transport and active transport

Impacts of the construction and operation of the proposal on public transport facilities and services is expected to be minimal, as the proposal site and its access point is not located near any public transport facilities and are not expected to interfere with existing public transport routes.

There is no formal active transport infrastructure in proximity to the proposal site. Therefore, the expected vehicle activity associated with the construction and operation of the proposal is expected to have a negligible impact on the active transport network.

4.6 Impacts to parking

Parking for all vehicles associated with the proposal would be contained on site within the FOGO facility boundaries. As such, vehicle parking demand generated by the proposal would have no impact on parking spaces or roads surrounding the sites.

4.7 Impacts to road safety

The proposed construction and operation of the proposal are expected to generate a minimal increase in vehicle traffic when compared to the existing traffic already in the road network. Additional traffic generated by the proposal is not expected significantly change the vehicle composition in the road network and is not anticipated to cause changes to road safety risks in the study area.

Notwithstanding, a Construction Traffic Management Plan (CTMP) shall be prepared to maintain road safety and mitigate any potential impacts of the traffic generated by the proposal. Details of the proposed measures are outlined in Section 5.

5. Mitigation and management measures

5.1 Traffic management measures

5.1.1 Site access and parking

– The following measures are proposed to minimise the number of traffic movements to/from the proposal site:
  - Logistics management shall be controlled by the site supervisor to ensure the efficient delivery of equipment and construction materials, and to minimise the number of trips that would need to be taken for all vehicle types.
  - Carpooling opportunities for personnel living in close proximity to one another shall be explored where feasible. Opportunities for coach services to shuttle workers from the CBD or nearby public transport stations to the proposal site shall also be explored.
– All vehicles shall comply with road traffic rules, particularly for any local traffic rules.
– All parking shall be contained within the proposal site premises. Under no circumstance are personnel, company vehicles or heavy vehicles allowed to use any public road for long-term parking, including leaving parked or unattended vehicles.

5.1.2 Safety

– All staff and subcontractors engaged on the proposal site shall be required to undergo site induction. The induction shall outline the requirements on the TMP, including site access routes, environmental and occupational health and safety responsibilities, emergency procedures, potential carpooling/shuttle service opportunities, and vehicle height and mass restrictions, among others. Additionally, the Site Manager would discuss TMP requirements regularly as a part of regular “toolbox talks.”
– Separation of internal haulage routes for light and heavy vehicle movements within the proposal site shall be maintained as far as practicable.
– All vehicles shall move through the proposal site in a clockwise direction to maintain the predictability of vehicle movements and to minimise conflict points.
– Separate entrances and exits for vehicles and pedestrians shall be provided. Pedestrians on site shall be directed to utilise clearly-defined designated pedestrian paths.
– Access for emergency vehicles shall be maintained at the proposal site during the construction works, in accordance with emergency vehicle requirements. The emergency services, including fire, ambulance, and police, shall be advised of all planned changes to traffic arrangements prior to the commencement of works.

5.1.3 Heavy vehicle access

– Truck drivers shall be directed to follow the predetermined haulage routes. Additionally, all drivers must observe posted speed limits on adjoining road networks to comply with Australian Road Rules. Drivers are to adjust speeds to suit the road environment and weather conditions appropriately to ensure the safe movement of the vehicles based on the individual vehicle configurations.
– Any oversized or overweight load shall be transported in accordance with the requirements of the relevant road authority.

5.2 Construction traffic management plan (CEMP)

In accordance with a review of the existing traffic facilities and the assessment of the impacts associated with the construction traffic, no road upgrades or other traffic control is required to support the construction of the proposal.

Traffic and transport of the proposal are listed in Table 5.1. These measures would be included in the issue-specific environmental management sub-plans for the FOGO facility.

Table 5.1 Mitigation measures – traffic and transport

No.	Outcome	Mitigation measure	Timing
T1	Minimise impacts to traffic and transport networks.	Develop a construction traffic management sub-plan, prior to construction. Include, at a minimum, the following management measures: – Preparation of a Traffic Guidance Scheme, detailing adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised. – Maintain accessibility for pedestrians and cyclists. – Indicate routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses. – Implement measures to manage traffic flows around the area affected by the construction of the proposal, including, as required, regulatory and direction signposting, line marking, and variable message signs and all other traffic control devices necessary for the implementation of the construction traffic management sub-plan. – Undertake consultation with the relevant road authorities during preparation of the sub-plan. Ensure the performance of the proposal traffic arrangements is monitored during construction.	Pre-construction
T2	Minimise impacts to the operation of the current land uses on John Cory Road	Ensure trucks used for the delivery for the developments on John Cory Road are unimpeded.	Construction
T3	Minimise environmental impacts associated with the movement of vehicles.	Monitor the roads leading to and from the proposal site and take necessary steps to rectify any road deposits caused by site vehicles, to maintain the safety of road users. Where possible, offset the construction vehicle activity from peak periods of road network activity.	Construction
T4	Minimise environmental impacts associated with the movement of vehicles.	Induct employees and contractors to raise awareness and understanding of traffic and transport mitigation measures to be implemented during construction via the CEMP.	Construction

6. Summary and conclusions

6.1 Overview

The TTIA has been prepared to support the EIS required to obtain approval for the construction and operation of the proposed FOGO facility.

The TTIA provides an overview of the existing road network and traffic conditions, a review of proposal site access arrangements, an assessment of the potential traffic implications arising from the proposal, and recommendations on measures to minimise any adverse effects of the proposal to road users.

6.2 Key Findings

The key findings of the TTIA are summarised as follows:

- Traffic surveys were undertaken on 09 November 2022 (Wednesday) to determine the existing traffic conditions in the study area. Data from the survey indicate the following peak periods:
  - AM Peak hour occurs between 08:00 am to 09:00 am.
  - PM Peak hour occurs between 04:15 pm to 05:15 pm.
- SIDRA analysis of existing intersection performance showed that:
  - The roundabout of Mugga Lane and John Cory Road, which is the primary access to the proposal site, operates at LoS B with minimal delays and queueing for both AM and PM peak periods.
  - During the AM peak, the signalised intersection of Mugga Lane and the northbound carriageway of Monaro Highway operates over capacity at LoS F. Better operations are observed during the PM peak, with an LoS of C.
- The proposal is expected to generate the following vehicles movements during the peak hour:
  - Construction:
    - Heavy vehicles 20 vehicle movements (10 inbound, 10 outbound).
    - Light vehicles 120 vehicle movements (60 inbound in the AM, 60 outbound in the PM).
  - Operation:
    - Heavy vehicles 16 vehicle movements (8 inbound, 8 outbound).
    - Light vehicles 30 vehicle movements (15 inbound in the AM, 15 outbound in the PM).
- The adjacent MRF facility, which is expected to be constructed and operated during the same period as the proposal, has been assumed to generate the same amount of vehicle activities. Traffic generation of the MRF has been included in the assessment.
- Analysis of traffic performance using SIDRA indicate the following:
  - Construction traffic performance by 2027:
    - With construction activities, the roundabout of Mugga Lane and John Cory Road (site access) is expected to continue operating at LoS B with minimal delays.
    - Intersections with Monaro Highway are expected to operate between LoS A to F in the AM peak, with high delays and long queues in the northbound lane. In the PM peak, both northbound and southbound lanes experience poor levels of service from LoS D to F, with delays ranging from 37 to 75 seconds.
    - The LoS of the key intersections are generally expected to remain the same with or without the construction activities associated with the MRF, except for Monaro Highway at Mugga Lane (southbound), which would experience an LoS increase from D to F during the PM peak.
  - Operation traffic performance by 2033:
    - With the operation of the proposal and MRF, the roundabout of Mugga Lane and John Cory Road (site access) is expected to continue operating at LoS B with minimal delays.

    - The LoS of the key intersections are expected to remain the same with or without the operation of the proposal and MRF facilities. Intersections with Monaro Highway.
- Even without the construction and operation of the proposed facilities, Monaro Highway at Mugga Lane is expected to be already operating over capacity during the AM and PM peak periods. This means that the performance of these roads could decrease significantly even with a minimal increase in traffic as there is no longer enough capacity to accommodate demand. Capacity upgrades would be necessary to allow the intersections to operate at acceptable levels of service.
- The analysis indicates that the road upgrades detailed in Section 4.1 would be required to support an acceptable LoS at the intersection of Monaro Highway and Mugga Lane.
- As detailed in the Monaro Highway Upgrade program, the proposed upgrades to the Monaro Highway at Mugga Lane would support a good LoS in the 2031 and 2041 horizon years.
- There are no public transport facilities in proximity to the proposal site. Proposal activities are not expected to impact public transport operations.

6.3 Conclusions

Based on the assumptions and findings outlined in this report, it is considered that the proposal satisfies the planning requirements on traffic engineering grounds and is not anticipated to have adverse traffic impacts on the surrounding road network.

7. References

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Appendices

Appendix A

Traffic Data

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Mugga Ln and John Cory Rd, Hume

GPS *-35.397122, 149.151335*

Date:	Wed 09/11/22
Weather:	Fine
Suburban:	Hume
Customer:	GHD

North:	John Cory Rd
East:	Mugga Ln
South:	N/A
West:	Mugga Ln

Survey Period	AM:	6:30 AM-9:30 AM
	PM:	4:00 PM-7:00 PM
Traffic Peak	AM:	8:15 AM-9:15 AM
	PM:	4:00 PM-5:00 PM

All Vehicles

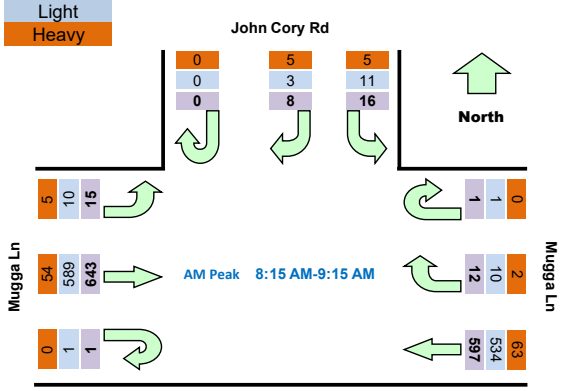
Time		North Approach John Cory R			East Approach Mugga Ln			West Approach Mugga Ln			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
6:30	6:45	0	2	9	0	5	78	0	124	4	945	
6:45	7:00	0	0	10	0	10	91	0	146	3	992	
7:00	7:15	0	2	6	0	7	86	0	97	2	1024	
7:15	7:30	0	1	8	1	5	104	0	139	5	1095	
7:30	7:45	0	3	5	1	5	116	0	134	5	1152	
7:45	8:00	0	3	3	0	3	124	1	158	0	1208	
8:00	8:15	0	2	3	0	4	128	0	130	4	1263	
8:15	8:30	0	1	5	0	2	152	1	158	1	1293	Peak
8:30	8:45	0	2	3	0	4	155	0	158	3	1236	
8:45	9:00	0	3	5	0	2	160	0	170	7		
9:00	9:15	0	2	3	1	4	130	0	157	4		
9:15	9:30	0	3	3	0	4	117	0	134	2		
16:00	16:15	0	0	4	0	2	180	0	162	1	1300	Peak
16:15	16:30	0	0	5	0	2	182	0	140	1	1259	
16:30	16:45	0	1	3	0	0	164	0	145	2	1219	
16:45	17:00	0	0	3	0	2	153	0	148	0	1200	
17:00	17:15	0	0	3	0	2	156	0	147	0	1137	
17:15	17:30	0	0	0	0	0	144	0	145	1	1015	
17:30	17:45	0	0	2	0	0	158	0	136	0	888	
17:45	18:00	0	0	1	1	1	125	0	115	0	717	
18:00	18:15	0	0	0	1	1	88	0	96	0	582	
18:15	18:30	0	0	0	0	0	79	0	82	2		
18:30	18:45	0	0	0	0	1	77	0	47	0		
18:45	19:00	0	0	1	0	0	60	0	47	0		

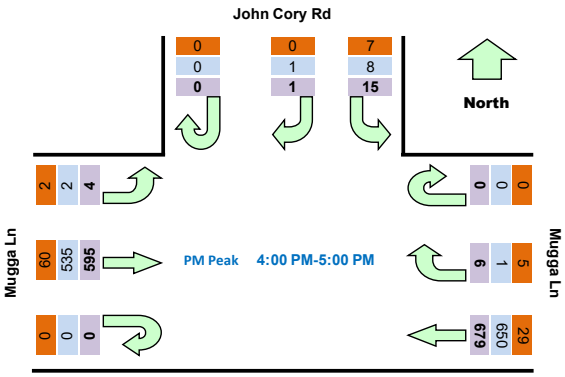
Peak Time		North Approach John Cory R			East Approach Mugga Ln			West Approach Mugga Ln			Peak
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
8:15	9:15	0	8	16	1	12	597	1	643	15	1293
16:00	17:00	0	1	15	0	6	679	0	595	4	1300

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy





TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Mugga Ln and Monaro Hwy, Hume

GPS -35.397823, 149.152851

Date:	Wed 09/11/22
Weather:	Fine
Suburban:	Hume
Customer:	GHD

North:	Monaro Hwy
East:	N/A
South:	Monaro Hwy
West:	Mugga Ln

Survey Period	AM:	6:30 AM-9:30 AM
	PM:	4:00 PM-7:00 PM
Traffic Peak	AM:	8:00 AM-9:00 AM
	PM:	4:30 PM-5:30 PM

All Vehicles

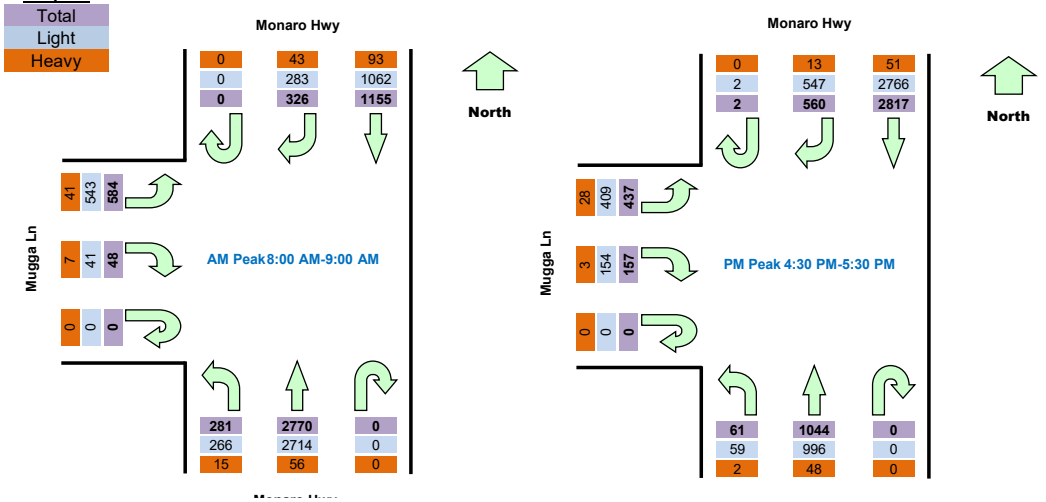
Time		North Approach Monaro Hwy			South Approach Monaro Hwy			West Approach Mugga Ln			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
6:30	6:45	0	52	99	0	614	31	0	4	129	3929	
6:45	7:00	0	57	131	0	606	44	0	7	149	4214	
7:00	7:15	0	67	152	0	524	26	0	5	98	4337	
7:15	7:30	3	65	193	0	680	45	0	9	139	4718	
7:30	7:45	0	68	219	0	733	54	0	14	126	4951	
7:45	8:00	0	94	238	0	591	33	0	10	151	5077	
8:00	8:15	0	74	248	0	740	58	0	9	124	5164	Peak
8:15	8:30	0	78	319	0	731	76	0	7	156	4866	
8:30	8:45	0	72	308	0	712	87	0	12	149	4285	
8:45	9:00	0	102	280	0	587	60	0	20	155		
9:00	9:15	0	94	219	0	440	41	0	12	149		
9:15	9:30	0	85	187	0	341	36	0	16	121		
16:00	16:15	0	160	556	0	233	22	0	44	122	4948	
16:15	16:30	0	167	721	0	266	17	0	38	107	5068	
16:30	16:45	0	139	654	0	239	25	0	40	108	5078	Peak
16:45	17:00	2	141	711	0	271	14	0	41	110	5071	
17:00	17:15	0	146	696	0	253	12	0	43	107	4858	
17:15	17:30	0	134	756	0	281	10	0	33	112	4488	
17:30	17:45	0	139	614	0	288	19	0	42	96	3931	
17:45	18:00	0	114	563	0	270	13	0	31	86	3339	
18:00	18:15	1	77	438	0	261	13	0	23	74	2768	
18:15	18:30	0	69	395	0	213	10	0	20	62		
18:30	18:45	2	66	309	0	170	12	0	14	33		
18:45	19:00	1	47	229	0	168	13	0	10	38		

Peak Time		North Approach Monaro Hwy			South Approach Monaro Hwy			West Approach Mugga Ln			Peak
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	total
8:00	9:00	0	326	1155	0	2770	281	0	48	584	5164
16:30	17:30	2	560	2817	0	1044	61	0	157	437	5078

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



Appendix B

SIDRA Results Summary

MOVEMENT SUMMARY

Site: [1 | 2022_AM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2022)]

Network: N101 [2022_AM (Network Folder: Hume FOGO and MRF)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	626	9.4	626	9.4	0.257	5.1	LOS A	0.5	3.8	0.05	0.49	0.05	63.7
23	R2	13	16.7	13	16.7	0.125	10.6	LOS B	0.2	1.6	0.05	0.50	0.05	51.7
Approach		639	9.6	639	9.6	0.257	5.2	LOS A	0.5	3.8	0.05	0.49	0.05	63.6
NorthEast: John Cory Road														
24	L2	17	31.3	17	31.3	0.022	2.8	LOS A	0.0	0.0	0.00	0.44	0.00	37.0
26a	R1	8	50.0	8	50.0	0.022	7.9	LOS A	0.0	0.0	0.00	0.44	0.00	47.7
Approach		25	37.5	25	37.5	0.022	4.5	LOS A	0.0	0.0	0.00	0.44	0.00	44.3
West: Mugga Lane														
10a	L1	16	46.7	16	46.7	0.291	6.3	LOS A	0.5	3.7	0.08	0.64	0.08	57.2
12a	R1	648	7.0	648	7.0	0.291	10.1	LOS B	0.5	3.8	0.08	0.64	0.08	60.4
Approach		664	7.9	664	7.9	0.291	10.0	LOS A	0.5	3.8	0.08	0.64	0.08	60.3
All Vehicles		1328	9.3	1328	9.3	0.291	7.6	LOS A	0.5	3.8	0.06	0.56	0.06	61.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2022_AM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2022)]

Network: N101 [2022_AM (Network Folder: Hume FOGO and MRF)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 134 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	343	13.2	343	13.2	0.917	73.9	LOS E	3.9	30.0	1.00	1.04	1.31	2.1
23	R2	1	0.0	1	0.0	* 0.077	86.5	LOS F	0.0	0.3	1.00	0.57	1.00	9.3
Approach		344	13.1	344	13.1	0.917	73.9	LOS E	3.9	30.0	1.00	1.04	1.31	2.1
NorthWest: Mugga Lane														
27	L2	615	7.0	615	7.0	* 0.919	81.9	LOS F	14.8	109.7	1.00	0.96	1.34	12.9
28	T1	51	14.6	51	14.6	0.154	49.3	LOS D	1.7	13.4	0.87	0.67	0.87	9.3
Approach		665	7.6	665	7.6	0.919	79.4	LOS E	14.8	109.7	0.99	0.94	1.30	12.7
SouthWest: Monaro Highway NB														
30	L2	296	5.3	296	5.3	0.222	12.7	LOS B	3.4	24.7	0.33	0.69	0.33	64.1
31	T1	2916	2.0	2916	2.0	* 1.109	152.2	LOS F	116.8	831.8	1.00	1.63	1.85	22.5
Approach		3212	2.3	3212	2.3	1.109	139.3	LOS F	116.8	831.8	0.94	1.54	1.71	23.7
All Vehicles		4221	4.0	4221	4.0	1.109	124.5	LOS F	116.8	831.8	0.95	1.41	1.61	21.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2022_AM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2022)]

Network: N101 [2022_AM (Network Folder: Hume FOGO and MRF)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	1216	8.1	1216	8.1	0.325	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
26	R2	343	13.2	343	13.2	0.195	6.9	LOS A	12.2	95.0	0.00	0.65	0.00	48.8
Approach		1559	9.2	1559	9.2	0.325	1.5	NA	12.2	95.0	0.00	0.14	0.00	77.5
NorthWest: Mugga Lane														
29	R2	51	14.6	51	14.6	0.078	7.2	LOS A	0.1	0.8	0.42	0.67	0.42	65.2
Approach		51	14.6	51	14.6	0.078	7.2	LOS A	0.1	0.8	0.42	0.67	0.42	65.2
All Vehicles		1609	9.4	1609	9.4	0.325	1.7	NA	12.2	95.0	0.01	0.16	0.01	77.0

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

MOVEMENT SUMMARY

Site: [1 | 2022_PM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2022)]

Network: N101 [2022_PM (Network Folder: Hume FOGO and MRF)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	689	2.7	689	2.7	0.201	4.8	LOS A	0.4	2.6	0.01	0.50	0.01	67.1
23	R2	6	66.7	6	66.7	0.201	10.5	LOS B	0.4	2.7	0.01	0.50	0.01	45.2
Approach		696	3.3	696	3.3	0.201	4.8	LOS A	0.4	2.7	0.01	0.50	0.01	67.0
NorthEast: John Cory Road														
24	L2	15	28.6	15	28.6	0.010	2.8	LOS A	0.0	0.0	0.00	0.40	0.00	38.5
26a	R1	1	0.0	1	0.0	0.010	6.4	LOS A	0.0	0.0	0.00	0.40	0.00	49.0
Approach		16	26.7	16	26.7	0.010	3.0	LOS A	0.0	0.0	0.00	0.40	0.00	41.1
West: Mugga Lane														
10a	L1	3	33.3	3	33.3	0.184	6.1	LOS A	0.5	3.7	0.06	0.65	0.06	58.2
12a	R1	611	8.6	611	8.6	0.184	10.1	LOS B	0.5	3.7	0.06	0.65	0.06	60.5
Approach		614	8.7	614	8.7	0.184	10.0	LOS B	0.5	3.7	0.06	0.65	0.06	60.5
All Vehicles		1325	6.1	1325	6.1	0.201	7.2	LOS A	0.5	3.7	0.03	0.56	0.03	63.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2022_PM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2022)]

Network: N101 [2022_PM (Network Folder: Hume FOGO and MRF)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 77 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	624	3.4	624	3.4	* 0.787	24.3	LOS C	4.2	30.0	0.94	0.88	1.01	6.0
23	R2	2	0.0	2	0.0	0.089	51.1	LOS D	0.1	0.4	1.00	0.59	1.00	14.2
Approach		626	3.4	626	3.4	0.787	24.4	LOS C	4.2	30.0	0.94	0.88	1.01	6.1
NorthWest: Mugga Lane														
27	L2	455	11.1	455	11.1	0.327	24.2	LOS C	3.7	28.3	0.74	0.78	0.74	29.1
28	T1	171	3.7	171	3.7	0.233	17.0	LOS B	2.6	19.1	0.71	0.58	0.71	22.0
Approach		625	9.1	625	9.1	0.327	22.2	LOS C	3.7	28.3	0.73	0.73	0.73	28.0
SouthWest: Monaro Highway NB														
30	L2	72	2.9	72	2.9	0.074	13.8	LOS B	0.7	4.8	0.49	0.69	0.49	62.8
31	T1	1083	5.2	1083	5.2	* 0.663	19.0	LOS B	10.0	73.3	0.86	0.76	0.86	60.8
Approach		1155	5.0	1155	5.0	0.663	18.7	LOS B	10.0	73.3	0.83	0.75	0.83	60.9
All Vehicles		2406	5.6	2406	5.6	0.787	21.1	LOS C	10.0	73.3	0.83	0.78	0.85	47.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2022_PM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2022)]

Network: N101 [2022_PM (Network Folder: Hume FOGO and MRF)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	2928	1.9	2928	1.9	0.753	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	78.6
26	R2	624	3.4	624	3.4	0.332	6.7	LOS A	9.3	67.2	0.00	0.65	0.00	48.8
Approach		3553	2.2	3553	2.2	0.753	1.3	NA	9.3	67.2	0.00	0.11	0.00	76.9
NorthWest: Mugga Lane														
29	R2	171	3.7	171	3.7	0.392	25.5	LOS D	0.6	4.5	0.73	0.92	0.91	61.0
Approach		171	3.7	171	3.7	0.392	25.5	LOS D	0.6	4.5	0.73	0.92	0.91	61.0
All Vehicles		3723	2.3	3723	2.3	0.753	2.4	NA	9.3	67.2	0.03	0.15	0.04	76.0

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

MOVEMENT SUMMARY

Site: [1 | 2025_AM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2025_without construction)]

Network: N101 [2025_AM_without construction (Network Folder: Hume FOGO and MRF - 2025 without construction)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	644	9.5	644	9.5	0.264	5.1	LOS A	0.5	4.0	0.05	0.49	0.05	63.7
23	R2	13	16.7	13	16.7	0.128	10.6	LOS B	0.2	1.6	0.05	0.50	0.05	51.7
Approach		657	9.6	657	9.6	0.264	5.2	LOS A	0.5	4.0	0.05	0.49	0.05	63.6
NorthEast: John Cory Road														
24	L2	17	31.3	17	31.3	0.024	2.8	LOS A	0.0	0.0	0.00	0.44	0.00	37.0
26a	R1	8	50.0	8	50.0	0.024	7.9	LOS A	0.0	0.0	0.00	0.44	0.00	47.7
Approach		25	37.5	25	37.5	0.024	4.5	LOS A	0.0	0.0	0.00	0.44	0.00	44.3
West: Mugga Lane														
10a	L1	16	46.7	16	46.7	0.334	6.3	LOS A	0.5	3.8	0.08	0.64	0.08	57.2
12a	R1	666	7.0	666	7.0	0.334	10.1	LOS B	0.5	4.0	0.08	0.64	0.08	60.4
Approach		682	7.9	682	7.9	0.334	10.0	LOS A	0.5	4.0	0.08	0.64	0.08	60.3
All Vehicles		1364	9.3	1364	9.3	0.334	7.6	LOS A	0.5	4.0	0.06	0.56	0.06	61.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2025_AM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2025_without construction)]

Network: N101 [2025_AM_without construction (Network Folder: Hume FOGO and MRF - 2025 without construction)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 134 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	353	13.1	353	13.1	* 0.942	80.6	LOS F	3.9	30.0	1.00	1.08	1.38	1.9
23	R2	1	0.0	1	0.0	0.077	86.5	LOS F	0.0	0.3	1.00	0.57	1.00	9.3
Approach		354	13.1	354	13.1	0.942	80.6	LOS F	3.9	30.0	1.00	1.08	1.38	1.9
NorthWest: Mugga Lane														
27	L2	632	7.0	632	7.0	0.946	89.1	LOS F	16.0	118.9	1.00	0.99	1.41	12.0
28	T1	52	14.3	52	14.3	0.157	49.3	LOS D	1.7	13.7	0.88	0.67	0.88	9.3
Approach		683	7.6	683	7.6	0.946	86.1	LOS F	16.0	118.9	0.99	0.96	1.37	11.9
SouthWest: Monaro Highway NB														
30	L2	303	5.2	303	5.2	0.228	13.0	LOS B	3.5	25.5	0.34	0.70	0.34	63.7
31	T1	2998	2.0	2998	2.0	* 1.145	182.2	LOS F	130.5	929.3	1.00	1.77	2.02	19.7
Approach		3301	2.3	3301	2.3	1.145	166.7	LOS F	130.5	929.3	0.94	1.67	1.86	20.8
All Vehicles		4338	4.0	4338	4.0	1.145	147.0	LOS F	130.5	929.3	0.95	1.51	1.75	19.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2025_AM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2025_without construction)]

Network: N101 [2025_AM_without construction (Network Folder: Hume FOGO and MRF - 2025 without construction)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	1251	8.1	1251	8.1	0.334	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
26	R2	353	13.1	353	13.1	0.200	6.9	LOS A	13.5	104.9	0.00	0.65	0.00	48.8
Approach		1603	9.2	1603	9.2	0.334	1.5	NA	13.5	104.9	0.00	0.14	0.00	77.5
NorthWest: Mugga Lane														
29	R2	52	14.3	52	14.3	0.080	7.3	LOS A	0.1	0.8	0.43	0.67	0.43	65.1
Approach		52	14.3	52	14.3	0.080	7.3	LOS A	0.1	0.8	0.43	0.67	0.43	65.1
All Vehicles		1655	9.4	1655	9.4	0.334	1.7	NA	13.5	104.9	0.01	0.16	0.01	77.0

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

MOVEMENT SUMMARY

Site: [1 | 2025_PM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2025_without construction)]

Network: N102 [2025_PM_without construction (Network Folder: Hume FOGO and MRF - 2025 without construction)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	709	2.8	709	2.8	0.207	4.8	LOS A	0.4	2.7	0.01	0.50	0.01	67.1
23	R2	6	66.7	6	66.7	0.207	10.5	LOS B	0.4	2.8	0.01	0.50	0.01	45.2
Approach		716	3.4	716	3.4	0.207	4.8	LOS A	0.4	2.8	0.01	0.50	0.01	67.0
NorthEast: John Cory Road														
24	L2	15	28.6	15	28.6	0.010	2.8	LOS A	0.0	0.0	0.00	0.40	0.00	38.5
26a	R1	1	0.0	1	0.0	0.010	6.4	LOS A	0.0	0.0	0.00	0.40	0.00	49.0
Approach		16	26.7	16	26.7	0.010	3.0	LOS A	0.0	0.0	0.00	0.40	0.00	41.1
West: Mugga Lane														
10a	L1	3	33.3	3	33.3	0.189	6.1	LOS A	0.5	3.8	0.06	0.65	0.06	58.2
12a	R1	627	8.6	627	8.6	0.189	10.1	LOS B	0.5	3.8	0.06	0.65	0.06	60.5
Approach		631	8.7	631	8.7	0.189	10.0	LOS B	0.5	3.8	0.06	0.65	0.06	60.5
All Vehicles		1362	6.1	1362	6.1	0.207	7.2	LOS A	0.5	3.8	0.03	0.56	0.03	63.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2025_PM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2025_without construction)]

Network: N102 [2025_PM_without construction (Network Folder: Hume FOGO and MRF - 2025 without construction)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 77 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	642	3.4	642	3.4	* 0.808	25.7	LOS C	4.2	30.0	0.95	0.91	1.05	5.7
23	R2	1	0.0	1	0.0	0.044	50.4	LOS D	0.0	0.2	1.00	0.57	1.00	14.4
Approach		643	3.4	643	3.4	0.808	25.7	LOS C	4.2	30.0	0.95	0.91	1.05	5.7
NorthWest: Mugga Lane														
27	L2	467	11.0	467	11.0	0.336	24.2	LOS C	3.8	29.2	0.75	0.78	0.75	29.1
28	T1	176	4.2	176	4.2	0.241	17.1	LOS B	2.7	19.8	0.71	0.59	0.71	22.0
Approach		643	9.2	643	9.2	0.336	22.3	LOS C	3.8	29.2	0.74	0.73	0.74	27.9
SouthWest: Monaro Highway NB														
30	L2	74	2.9	74	2.9	0.077	14.2	LOS B	0.7	5.2	0.50	0.69	0.50	62.3
31	T1	1113	5.1	1113	5.1	* 0.681	19.3	LOS B	10.4	76.1	0.87	0.77	0.87	60.6
Approach		1186	5.0	1186	5.0	0.681	18.9	LOS B	10.4	76.1	0.84	0.76	0.84	60.7
All Vehicles		2473	5.7	2473	5.7	0.808	21.6	LOS C	10.4	76.1	0.84	0.79	0.87	47.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2025_PM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2025_without construction)]

Network: N102 [2025_PM_without construction (Network Folder: Hume FOGO and MRF - 2025 without construction)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	3011	2.0	3011	2.0	0.774	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	78.4
26	R2	642	3.4	642	3.4	0.342	6.7	LOS A	10.2	73.8	0.00	0.65	0.00	48.8
Approach		3653	2.2	3653	2.2	0.774	1.4	NA	10.2	73.8	0.00	0.11	0.00	76.7
NorthWest: Mugga Lane														
29	R2	175	3.6	175	3.6	0.417	30.5	LOS D	0.7	4.8	0.75	0.94	0.96	60.4
Approach		175	3.6	175	3.6	0.417	30.5	LOS D	0.7	4.8	0.75	0.94	0.96	60.4
All Vehicles		3827	2.3	3827	2.3	0.774	2.7	NA	10.2	73.8	0.03	0.15	0.04	75.8

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

MOVEMENT SUMMARY

Site: [1 | 2025_AM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2025_with construction)]

Network: N101 [2025_AM_with construction (Network Folder: Hume FOGO and MRF - 2025 with construction)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	644	9.5	644	9.5	0.301	5.0	LOS A	0.6	4.7	0.05	0.50	0.05	63.3
23	R2	97	23.9	97	23.9	0.146	10.6	LOS B	0.3	2.0	0.05	0.60	0.05	46.4
Approach		741	11.4	741	11.4	0.301	5.7	LOS A	0.6	4.7	0.05	0.51	0.05	62.1
NorthEast: John Cory Road														
24	L2	38	69.4	38	69.4	0.035	3.0	LOS A	1.4	15.3	0.00	0.41	0.00	37.0
26a	R1	8	50.0	8	50.0	0.035	8.1	LOS A	1.4	15.3	0.00	0.41	0.00	47.7
Approach		46	65.9	46	65.9	0.035	3.9	LOS A	1.4	15.3	0.00	0.41	0.00	42.2
West: Mugga Lane														
10a	L1	79	9.3	79	9.3	0.462	6.2	LOS A	13.1	97.3	0.27	0.60	0.27	59.7
12a	R1	666	7.0	666	7.0	0.462	10.5	LOS B	13.1	97.3	0.28	0.61	0.28	59.6
Approach		745	7.2	745	7.2	0.462	10.0	LOS B	13.1	97.3	0.28	0.61	0.28	59.6
All Vehicles		1533	11.0	1533	11.0	0.462	7.8	LOS A	13.1	97.3	0.16	0.56	0.16	60.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2025_AM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2025_with construction)]

Network: N101 [2025_AM_with construction (Network Folder: Hume FOGO and MRF - 2025 with construction)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	399	15.3	399	15.3	0.932	82.0	LOS F	3.8	30.0	1.00	1.06	1.29	1.9
23	R2	1	0.0	1	0.0	* 0.014	79.5	LOS E	0.0	0.3	0.98	0.59	0.98	10.0
Approach		400	15.3	400	15.3	0.932	82.0	LOS F	3.8	30.0	1.00	1.06	1.29	1.9
NorthWest: Mugga Lane														
27	L2	646	9.1	646	9.1	* 1.197	262.6	LOS F	17.2	130.0	1.00	1.27	2.28	4.5
28	T1	58	23.6	58	23.6	0.227	60.6	LOS E	2.3	19.4	0.92	0.71	0.92	7.7
Approach		704	10.3	704	10.3	1.197	246.0	LOS F	17.2	130.0	0.99	1.22	2.17	4.5
SouthWest: Monaro Highway NB														
30	L2	341	6.5	341	6.5	0.267	15.3	LOS B	4.8	35.6	0.38	0.73	0.38	61.5
31	T1	2998	2.0	2998	2.0	* 1.198	232.9	LOS F	154.6	1100.8	1.00	1.86	2.13	16.2
Approach		3339	2.5	3339	2.5	1.198	210.6	LOS F	154.6	1100.8	0.94	1.75	1.95	17.3
All Vehicles		4443	4.9	4443	4.9	1.198	204.7	LOS F	154.6	1100.8	0.95	1.60	1.93	14.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2025_AM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2025_with construction)]

Network: N101 [2025_AM_with construction (Network Folder: Hume FOGO and MRF - 2025 with construction)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	1251	8.1	1251	8.1	0.334	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
26	R2	399	15.3	399	15.3	0.230	6.9	LOS A	17.3	137.2	0.00	0.65	0.00	48.8
Approach		1649	9.8	1649	9.8	0.334	1.7	NA	17.3	137.2	0.00	0.16	0.00	77.2
NorthWest: Mugga Lane														
29	R2	58	23.6	58	23.6	0.106	8.5	LOS A	0.1	1.1	0.50	0.73	0.50	62.5
Approach		58	23.6	58	23.6	0.106	8.5	LOS A	0.1	1.1	0.50	0.73	0.50	62.5
All Vehicles		1707	10.3	1707	10.3	0.334	1.9	NA	17.3	137.2	0.02	0.18	0.02	76.5

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

MOVEMENT SUMMARY

Site: [1 | 2025_PM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2025_with construction)]

Network: N101 [2025_PM_with construction (Network Folder: Hume FOGO and MRF - 2025 with construction)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	709	2.8	709	2.8	0.314	5.4	LOS A	0.7	4.8	0.15	0.49	0.15	66.1
23	R2	27	92.3	27	92.3	0.153	11.2	LOS B	0.3	2.1	0.15	0.51	0.15	40.8
Approach		737	6.1	737	6.1	0.314	5.6	LOS A	0.7	4.8	0.15	0.49	0.15	65.6
NorthEast: John Cory Road														
24	L2	93	27.3	93	27.3	0.093	2.8	LOS A	0.0	0.0	0.00	0.48	0.00	35.2
26a	R1	71	0.0	71	0.0	0.093	7.7	LOS A	0.0	0.0	0.00	0.48	0.00	47.7
Approach		163	15.5	163	15.5	0.093	4.9	LOS A	0.0	0.0	0.00	0.48	0.00	44.6
West: Mugga Lane														
10a	L1	3	33.3	3	33.3	0.196	6.2	LOS A	0.5	4.1	0.15	0.62	0.15	57.7
12a	R1	627	8.6	627	8.6	0.196	10.2	LOS B	0.5	4.1	0.16	0.62	0.16	59.8
Approach		631	8.7	631	8.7	0.196	10.2	LOS B	0.5	4.1	0.16	0.62	0.16	59.8
All Vehicles		1531	8.2	1531	8.2	0.314	7.4	LOS A	0.7	4.8	0.14	0.54	0.14	61.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2025_PM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2025_with construction)]

Network: N101 [2025_PM_with construction (Network Folder: Hume FOGO and MRF - 2025 with construction)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	657	5.6	657	5.6	0.803	17.9	LOS B	4.1	30.0	0.94	0.92	1.11	7.9
23	R2	1	0.0	1	0.0	* 0.005	24.3	LOS C	0.0	0.1	0.90	0.58	0.90	23.8
Approach		658	5.6	658	5.6	0.803	17.9	LOS B	4.1	30.0	0.94	0.92	1.11	8.0
NorthWest: Mugga Lane														
27	L2	522	12.7	522	12.7	* 0.822	33.5	LOS C	4.5	35.0	1.00	0.96	1.40	24.0
28	T1	199	6.3	199	6.3	0.600	21.9	LOS C	3.0	21.8	0.97	0.80	1.02	18.2
Approach		721	10.9	721	10.9	0.822	30.3	LOS C	4.5	35.0	0.99	0.91	1.29	23.1
SouthWest: Monaro Highway NB														
30	L2	80	10.5	80	10.5	0.103	13.3	LOS B	0.6	4.4	0.59	0.71	0.59	63.3
31	T1	1113	5.1	1113	5.1	* 0.912	31.9	LOS C	11.3	82.9	1.00	1.13	1.56	52.3
Approach		1193	5.5	1193	5.5	0.912	30.6	LOS C	11.3	82.9	0.97	1.10	1.49	52.9
All Vehicles		2572	7.0	2572	7.0	0.912	27.3	LOS C	11.3	82.9	0.97	1.00	1.34	42.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2025_PM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2025_with construction)]

Network: N101 [2025_PM_with construction (Network Folder: Hume FOGO and MRF - 2025 with construction)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	3011	2.0	3011	2.0	0.774	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	78.4
26	R2	657	5.6	657	5.6	0.355	6.8	LOS A	6.0	43.9	0.00	0.65	0.00	48.7
Approach		3667	2.6	3667	2.6	0.774	1.4	NA	6.0	43.9	0.00	0.12	0.00	76.7
NorthWest: Mugga Lane														
29	R2	199	6.3	199	6.3	0.512	41.5	LOS E	0.9	6.4	0.80	0.98	1.08	58.4
Approach		199	6.3	199	6.3	0.512	41.5	LOS E	0.9	6.4	0.80	0.98	1.08	58.4
All Vehicles		3866	2.8	3866	2.8	0.774	3.5	NA	6.0	43.9	0.04	0.16	0.06	75.5

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

MOVEMENT SUMMARY

Site: [1 | 2033_AM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2033_without operation)]

Network: N101 [2033_AM_without operation (Network Folder: Hume FOGO and MRF - 2033 without operation)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	714	9.4	714	9.4	0.292	5.1	LOS A	0.6	4.6	0.05	0.49	0.05	63.7
23	R2	13	16.7	13	16.7	0.142	10.6	LOS B	0.2	1.8	0.05	0.50	0.05	51.8
Approach		726	9.6	726	9.6	0.292	5.2	LOS A	0.6	4.6	0.05	0.49	0.05	63.6
NorthEast: John Cory Road														
24	L2	17	31.3	17	31.3	0.016	2.8	LOS A	0.9	8.1	0.00	0.44	0.00	37.0
26a	R1	8	50.0	8	50.0	0.016	8.1	LOS A	0.9	8.1	0.00	0.44	0.00	47.7
Approach		25	37.5	25	37.5	0.016	4.6	LOS A	0.9	8.1	0.00	0.44	0.00	44.3
West: Mugga Lane														
10a	L1	16	46.7	16	46.7	0.448	6.3	LOS A	19.9	149.8	0.08	0.64	0.08	57.2
12a	R1	739	7.0	739	7.0	0.448	10.1	LOS B	19.9	149.8	0.08	0.64	0.08	60.4
Approach		755	7.8	755	7.8	0.448	10.0	LOS A	19.9	149.8	0.08	0.64	0.08	60.3
All Vehicles		1506	9.2	1506	9.2	0.448	7.6	LOS A	19.9	149.8	0.07	0.56	0.07	61.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2033_AM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2033_without operation)]

Network: N101 [2033_AM_without operation (Network Folder: Hume FOGO and MRF - 2033 without operation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	392	13.2	392	13.2	0.904	74.6	LOS E	3.9	30.0	1.00	1.01	1.22	2.1
23	R2	1	0.0	1	0.0	* 0.014	79.5	LOS E	0.0	0.3	0.98	0.59	0.98	10.0
Approach		393	13.1	393	13.1	0.904	74.6	LOS E	3.9	30.0	1.00	1.01	1.22	2.1
NorthWest: Mugga Lane														
27	L2	701	7.1	701	7.1	* 1.277	328.8	LOS F	17.5	130.0	1.00	1.36	2.55	3.6
28	T1	58	14.5	58	14.5	0.215	60.3	LOS E	2.3	18.0	0.92	0.70	0.92	7.8
Approach		759	7.6	759	7.6	1.277	308.3	LOS F	17.5	130.0	0.99	1.31	2.42	3.7
SouthWest: Monaro Highway NB														
30	L2	337	5.3	337	5.3	0.260	14.7	LOS B	4.7	34.5	0.37	0.72	0.37	62.0
31	T1	3324	2.0	3324	2.0	* 1.327	346.8	LOS F	205.4	1462.6	1.00	2.24	2.59	11.7
Approach		3661	2.3	3661	2.3	1.327	316.3	LOS F	205.4	1462.6	0.94	2.10	2.39	12.5
All Vehicles		4813	4.0	4813	4.0	1.327	295.3	LOS F	205.4	1462.6	0.95	1.88	2.30	10.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2033_AM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2033_without operation)]

Network: N101 [2033_AM_without operation (Network Folder: Hume FOGO and MRF - 2033 without operation)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	1386	8.0	1386	8.0	0.370	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
26	R2	392	13.2	392	13.2	0.223	6.9	LOS A	15.8	122.8	0.00	0.65	0.00	48.8
Approach		1778	9.2	1778	9.2	0.370	1.6	NA	15.8	122.8	0.00	0.14	0.00	77.4
NorthWest: Mugga Lane														
29	R2	58	14.5	58	14.5	0.097	8.2	LOS A	0.1	1.0	0.47	0.71	0.47	64.4
Approach		58	14.5	58	14.5	0.097	8.2	LOS A	0.1	1.0	0.47	0.71	0.47	64.4
All Vehicles		1836	9.3	1836	9.3	0.370	1.8	NA	15.8	122.8	0.01	0.16	0.01	76.9

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

MOVEMENT SUMMARY

Site: [1 | 2033_PM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2033_without operation)]

Network: N102 [2033_PM_without operation (Network Folder: Hume FOGO and MRF - 2033 without operation)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	786	2.8	786	2.8	0.229	4.8	LOS A	0.4	3.1	0.01	0.50	0.01	67.1
23	R2	6	66.7	6	66.7	0.229	10.5	LOS B	0.4	3.1	0.01	0.50	0.01	45.2
Approach		793	3.3	793	3.3	0.229	4.8	LOS A	0.4	3.1	0.01	0.50	0.01	67.0
NorthEast: John Cory Road														
24	L2	15	28.6	15	28.6	0.010	2.8	LOS A	0.0	0.0	0.00	0.40	0.00	38.5
26a	R1	1	0.0	1	0.0	0.010	6.4	LOS A	0.0	0.0	0.00	0.40	0.00	49.0
Approach		16	26.7	16	26.7	0.010	3.0	LOS A	0.0	0.0	0.00	0.40	0.00	41.1
West: Mugga Lane														
10a	L1	3	33.3	3	33.3	0.209	6.1	LOS A	0.6	4.4	0.06	0.65	0.06	58.2
12a	R1	696	8.6	696	8.6	0.209	10.1	LOS B	0.6	4.4	0.06	0.64	0.06	60.5
Approach		699	8.7	699	8.7	0.209	10.0	LOS B	0.6	4.4	0.06	0.64	0.06	60.4
All Vehicles		1507	6.1	1507	6.1	0.229	7.2	LOS A	0.6	4.4	0.03	0.56	0.03	63.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2033_PM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2033_without operation)]

Network: N102 [2033_PM_without operation (Network Folder: Hume FOGO and MRF - 2033 without operation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	712	3.4	712	3.4	* 0.865	25.6	LOS C	4.2	30.0	0.98	1.01	1.23	5.7
23	R2	1	0.0	1	0.0	0.006	29.8	LOS C	0.0	0.1	0.92	0.59	0.92	20.9
Approach		713	3.4	713	3.4	0.865	25.6	LOS C	4.2	30.0	0.98	1.01	1.23	5.7
NorthWest: Mugga Lane														
27	L2	519	11.2	519	11.2	0.672	31.5	LOS C	4.6	35.3	0.97	0.85	1.05	25.0
28	T1	195	3.8	195	3.8	0.480	23.1	LOS C	3.2	23.0	0.92	0.75	0.92	17.5
Approach		714	9.1	714	9.1	0.672	29.2	LOS C	4.6	35.3	0.96	0.82	1.01	23.7
SouthWest: Monaro Highway NB														
30	L2	81	2.6	81	2.6	0.095	14.6	LOS B	0.7	5.2	0.58	0.70	0.58	61.9
31	T1	1235	5.1	1235	5.1	* 0.883	30.0	LOS C	13.4	98.2	1.00	1.06	1.34	53.4
Approach		1316	5.0	1316	5.0	0.883	29.0	LOS C	13.4	98.2	0.97	1.04	1.29	53.8
All Vehicles		2742	5.6	2742	5.6	0.883	28.2	LOS C	13.4	98.2	0.97	0.98	1.20	42.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2033_PM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2033_without operation)]

Network: N102 [2033_PM_without operation (Network Folder: Hume FOGO and MRF - 2033 without operation)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	3339	2.0	3339	2.0	0.858	0.4	LOS A	0.0	0.0	0.00	0.00	0.00	77.2
26	R2	712	3.4	712	3.4	0.379	6.7	LOS A	10.4	74.7	0.00	0.65	0.00	48.7
Approach		4051	2.2	4051	2.2	0.858	1.5	NA	10.4	74.7	0.00	0.11	0.00	75.6
NorthWest: Mugga Lane														
29	R2	195	3.8	195	3.8	0.543	481.0	LOS F	0.9	6.6	0.83	1.00	1.16	57.4
Approach		195	3.8	195	3.8	0.543	481.0	LOS F	0.9	6.6	0.83	1.00	1.16	57.4
All Vehicles		4245	2.3	4245	2.3	0.858	23.5	NA	10.4	74.7	0.04	0.15	0.05	74.6

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

MOVEMENT SUMMARY

Site: [1 | 2033_AM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2033_with operation)]

Network: N101 [2033_AM_with operation (Network Folder: Hume FOGO and MRF - 2033 with operation)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	714	9.4	714	9.4	0.312	5.2	LOS A	0.7	5.0	0.10	0.49	0.10	63.2
23	R2	39	24.3	39	24.3	0.151	10.7	LOS B	0.3	2.0	0.10	0.53	0.10	48.8
Approach		753	10.2	753	10.2	0.312	5.5	LOS A	0.7	5.0	0.10	0.49	0.10	62.9
NorthEast: John Cory Road														
24	L2	24	52.2	24	52.2	0.033	2.9	LOS A	1.3	14.0	0.00	0.45	0.00	37.0
26a	R1	20	78.9	20	78.9	0.033	8.4	LOS A	1.3	14.0	0.00	0.45	0.00	47.2
Approach		44	64.3	44	64.3	0.033	5.4	LOS A	1.3	14.0	0.00	0.45	0.00	45.0
West: Mugga Lane														
10a	L1	46	40.9	46	40.9	0.476	6.3	LOS A	20.7	157.8	0.16	0.61	0.16	57.4
12a	R1	739	7.0	739	7.0	0.476	10.2	LOS B	20.7	157.8	0.17	0.62	0.17	60.0
Approach		785	9.0	785	9.0	0.476	10.0	LOS A	20.7	157.8	0.17	0.62	0.17	59.8
All Vehicles		1582	11.1	1582	11.1	0.476	7.7	LOS A	20.7	157.8	0.13	0.55	0.13	61.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2033_AM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2033_with operation)]

Network: N101 [2033_AM_with operation (Network Folder: Hume FOGO and MRF - 2033 with operation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	404	13.8	404	13.8	0.936	83.1	LOS F	3.8	30.0	1.00	1.06	1.30	1.9
23	R2	1	0.0	1	0.0	* 0.014	79.5	LOS E	0.0	0.3	0.98	0.59	0.98	10.0
Approach		405	13.8	405	13.8	0.936	83.1	LOS F	3.8	30.0	1.00	1.06	1.30	1.9
NorthWest: Mugga Lane														
27	L2	704	7.5	704	7.5	* 1.289	339.0	LOS F	17.5	130.0	1.00	1.37	2.58	3.5
28	T1	62	20.3	62	20.3	0.239	60.7	LOS E	2.5	20.3	0.92	0.71	0.92	7.7
Approach		766	8.5	766	8.5	1.289	316.4	LOS F	17.5	130.0	0.99	1.32	2.45	3.6
SouthWest: Monaro Highway NB														
30	L2	351	6.3	351	6.3	0.274	15.5	LOS B	4.9	36.4	0.38	0.73	0.38	61.3
31	T1	3324	2.0	3324	2.0	* 1.309	330.4	LOS F	198.2	1411.6	1.00	2.19	2.53	12.2
Approach		3675	2.4	3675	2.4	1.309	300.4	LOS F	198.2	1411.6	0.94	2.05	2.33	13.0
All Vehicles		4846	4.3	4846	4.3	1.309	284.8	LOS F	198.2	1411.6	0.95	1.85	2.26	11.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2033_AM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2033_with operation)]

Network: N101 [2033_AM_with operation (Network Folder: Hume FOGO and MRF - 2033 with operation)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	1386	8.0	1386	8.0	0.370	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
26	R2	404	13.8	404	13.8	0.231	6.9	LOS A	17.7	138.6	0.00	0.65	0.00	48.8
Approach		1791	9.3	1791	9.3	0.370	1.6	NA	17.7	138.6	0.00	0.15	0.00	77.3
NorthWest: Mugga Lane														
29	R2	62	20.3	62	20.3	0.112	8.7	LOS A	0.1	1.2	0.50	0.73	0.50	63.1
Approach		62	20.3	62	20.3	0.112	8.7	LOS A	0.1	1.2	0.50	0.73	0.50	63.1
All Vehicles		1853	9.7	1853	9.7	0.370	1.8	NA	17.7	138.6	0.02	0.17	0.02	76.7

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

MOVEMENT SUMMARY

Site: [1 | 2033_PM_Mugga Lane / John Cory Road (Site Folder: Hume FOGO and MRF_2033_with operation)]

Network: N102 [2033_PM_with operation (Network Folder: Hume FOGO and MRF - 2033 with operation)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
21a	L1	808	2.7	808	2.7	0.246	4.9	LOS A	0.5	3.4	0.07	0.49	0.07	66.7
23	R2	14	84.6	14	84.6	0.246	10.6	LOS B	0.5	3.5	0.08	0.49	0.08	42.4
Approach		822	4.1	822	4.1	0.246	5.0	LOS A	0.5	3.5	0.07	0.49	0.07	66.5
NorthEast: John Cory Road														
24	L2	51	45.8	51	45.8	0.045	2.9	LOS A	0.0	0.0	0.00	0.45	0.00	35.8
26a	R1	21	0.0	21	0.0	0.045	6.4	LOS A	0.0	0.0	0.00	0.45	0.00	48.0
Approach		72	32.4	72	32.4	0.045	3.9	LOS A	0.0	0.0	0.00	0.45	0.00	43.4
West: Mugga Lane														
10a	L1	15	85.7	15	85.7	0.217	6.8	LOS A	0.6	4.7	0.10	0.63	0.10	54.4
12a	R1	696	8.6	696	8.6	0.217	10.1	LOS B	0.6	4.7	0.10	0.63	0.10	60.2
Approach		711	10.2	711	10.2	0.217	10.0	LOS B	0.6	4.7	0.10	0.63	0.10	60.0
All Vehicles		1604	8.1	1604	8.1	0.246	7.2	LOS A	0.6	4.7	0.08	0.55	0.08	62.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: TCS 147 NB [2 | 2033_PM_Mugga Lane / Monaro Highway NB (Site Folder: Hume FOGO and MRF_2033_with operation)]

Network: N102 [2033_PM_with operation (Network Folder: Hume FOGO and MRF - 2033 with operation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Mugga Lane														
22	T1	715	3.8	715	3.8	* 0.871	26.4	LOS C	4.1	30.0	0.98	1.03	1.25	5.6
23	R2	1	0.0	1	0.0	0.006	29.8	LOS C	0.0	0.1	0.92	0.59	0.92	20.9
Approach		716	3.8	716	3.8	0.871	26.4	LOS C	4.1	30.0	0.98	1.03	1.25	5.6
NorthWest: Mugga Lane														
27	L2	549	14.0	549	14.0	0.724	32.8	LOS C	5.1	39.6	0.98	0.88	1.12	24.3
28	T1	200	3.7	200	3.7	0.492	23.1	LOS C	3.3	23.7	0.92	0.76	0.92	17.5
Approach		749	11.2	749	11.2	0.724	30.2	LOS C	5.1	39.6	0.97	0.85	1.07	23.2
SouthWest: Monaro Highway NB														
30	L2	85	7.4	85	7.4	0.104	14.8	LOS B	0.8	5.7	0.59	0.71	0.59	61.9
31	T1	1235	5.1	1235	5.1	* 0.883	30.0	LOS C	13.4	98.2	1.00	1.06	1.34	53.4
Approach		1320	5.3	1320	5.3	0.883	29.0	LOS C	13.4	98.2	0.97	1.04	1.29	53.8
All Vehicles		2785	6.5	2785	6.5	0.883	28.6	LOS C	13.4	98.2	0.97	0.98	1.22	41.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: TCS 147 SB [3 | 2033_PM_Mugga Lane / Monaro Highway SB (Site Folder: Hume FOGO and MRF_2033_with operation)]

Network: N102 [2033_PM_with operation (Network Folder: Hume FOGO and MRF - 2033 with operation)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthEast: Monaro Highway SB														
25	T1	3339	2.0	3339	2.0	0.858	0.4	LOS A	0.0	0.0	0.00	0.00	0.00	77.2
26	R2	715	3.8	715	3.8	0.381	6.7	LOS A	10.7	77.4	0.00	0.65	0.00	48.7
Approach		4054	2.3	4054	2.3	0.858	1.5	NA	10.7	77.4	0.00	0.11	0.00	75.6
NorthWest: Mugga Lane														
29	R2	200	3.7	200	3.7	0.563	519.0	LOS F	1.0	7.0	0.83	1.01	1.19	57.0
Approach		200	3.7	200	3.7	0.563	519.0	LOS F	1.0	7.0	0.83	1.01	1.19	57.0
All Vehicles		4254	2.4	4254	2.4	0.858	25.8	NA	10.7	77.4	0.04	0.16	0.06	74.5

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

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

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

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

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

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

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

Appendix C

Hazardous materials transport

The following is an excerpt from the FOGO Preliminary Hazard Analysis Report:

"*The expectation is that any hazardous chemical will be transported to site following the ADG code requirements. Whilst diesel is likely to be trucked in via a bulk tanker and transferred to a fixed storage vessel, the other chemicals are expected to be transported in package form, for example a 1,000 litre iso-container and used as required*."

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