TRAFFIC AND PARKING IMPACT ASSESSMENT OF THE PROPOSED REZONING APPLICATION FOR WAREHOUSE UNITS AT 20-24 LOCKYER STREET, GOULBURN

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Development Type: **Warehouse Units**

Site Address: **20-24 Lockyer Street, Goulburn**

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1 INTRODUCTION

M^CLaren Traffic Engineering was commissioned by *NOVO Advisory* to provide a traffic and parking impact assessment of the proposed Warehouse Units at 20-24 Lockyer Street, Goulburn as depicted in **Annexure A**.

1.1 Description and Scale of Development

This traffic and parking impact assessment is provided to assist in the application of a rezoning application for the subject site from RU2 – Rural Landscape to IN1 – General Industrial by assessing the ability of the site to accommodate the below development scale.

The proposed development has the following characteristics relevant to traffic and parking:

- 10 separate Warehouse Units:
  - Including 45,650m^2 GFA Warehouse;
  - Ancillary offices of 3,150m^2 GFA.
- Construction of a public Access Road, facilitating access for vehicles up to 20m long Articulated Vehicles.

1.2 State Environmental Planning Policy (Transport and Infrastructure) 2021

The proposed development does qualify as a traffic generating development with relevant size and/or capacity under *Clause 2.122* of the *SEPP (Transport and Infrastructure) 2021,* as the proposal is larger than 20,000m^2 GFA for an industrial development. Accordingly, formal referral to Transport for NSW (TfNSW) is necessary and the application will be assessed by Goulburn Mulwaree Council officers in conjunction with TfNSW officers.

1.3 Site Description

The subject development is currently zoned *RU2 – Rural Landscape* and *IN1 – General Industrial* under the *Goulburn Mulwaree Council Local Environmental Plan 2009,* whilst the proposal seeks to rezone the land entirely to *IN1 – General Industrial*. The subject site is currently a vacant lot of land and has a singular frontage to Lockyer Street to the west.

The site is generally surrounded by rural developments with Goulburn McDonalds located approximately 600m to the west and Hume Highway located approximately 250m to the south of the site.

1.4 Site Context

The location of the site is shown on an aerial photo and a street map in **Figure 1** and **Figure 2** respectively.

Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO

Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Hierarchy

The road network servicing the site has characteristics as described in the following sub-sections.

2.1.1 Lockyer Street

- Unclassified LOCAL Road;
- Approximately 13m wide carriageway facilitating one (1) traffic flow lane in each direction;
- Signposted 50km/h speed limit;
- Kerbside parking permitted along both sides of the road.

2.1.2 Hume Highway

- TfNSW Classified STATE Highway (No. 2);
- Approximately 44m wide dual carriageway separated by a 20m central median facilitating two (2) traffic flow lanes in each direction;
- Signposted 110km/h speed limit;
- No kerbside parking permitted along both sides of the road.

2.1.3 Hume Street

- TfNSW Classified STATE Road (No. 676);
- Approximately 24m wide carriageway separated by a 2m wide central median facilitating two (2) traffic flow lanes in each direction;
- Signposted 60km/h speed limit.

2.1.4 Finlay Road

- Unclassified LOCAL Road;
- Approximately 11m wide carriageway facilitating one (1) traffic flow lane in each direction and kerbside parking along both sides of the road;
- Signposted 50km/h speed limit;
- Unrestricted kerbside parking permitted along both sides of the road.

2.2 Existing Traffic Management

- 'Give Way' controlled intersection of Sowerby Street / Lockyer Street;
- 'Give Way' controlled intersection of Hume Street / Finlay Road;
- 'Give Way' controlled intersection of Hume Street / Sowerby Street;
- 'Give Way' controlled intersection of Finlay Road / Tait Crescent (Lockyer Street);
- Existing commercial vehicle restrictions greater than 5.5m along Lockyer Street:
    - It should be noted that under the NSW Road Rules, it is legal for a truck to pass the sign if the destination lies beyond the sign and there is no other route by which the driver may take to reach the destination.

2.3 Existing Traffic Environment

Turning movement count traffic surveys were conducted at the intersections of Lockyer Street / Sowerby Street, Hume Street / Sowerby Street, Hume Street / Finlay Road and Finlay Road / Tait Crescent from 7:00am to 9:30am and 3:00pm to 6:00pm on Thursday 10 March 2023 and from 10:00am to 2:00pm on Saturday 18 March 2023 representing a typical operating weekday and weekend respectively. The full survey results are shown in **Annexure B** for reference.

2.3.1 Existing Road Performance

The performance of the surrounding intersections under the existing traffic conditions has been assessed using SIDRA INTERSECTION 9.0, **Table 1** summarises the resultant intersection performance data, with full SIDRA results reproduced in **Annexure C**.

As part of the SIDRA results, a detailed review of the video footage was undertaken for critical movements to ensure a calibrated model, specifically the following:

- Intersection of Hume Street / Sowerby Street:
    - Right turn movement from Hume Street into Sowerby Street;
    - Right turn movement from Sowerby Street into Hume Street.
- Intersection of Hume Street / Finlay Road:
    - Right turn movement from Hume Street into Finlay Road;
    - Right turn movement from Finaly Road into Hume Street.

Table 2 and **Table 3** below provides a summary of the review against the SIDRA output results.

TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement
EXISTING PERFORMANCE						
Lockyer Street / Sowerby Street	AM	0.08	**N/A** (Worst: 6.0)	**NA** (Worst: A)	Give Way	RT from Lockyer Street
	PM	0.08	**N/A** (Worst: 5.6)	**NA** (Worst: A)		RT from Lockyer Street
	SAT	0.12	**N/A** (Worst: 6.2)	**NA** (Worst: A)		RT from Lockyer Street
Hume Street / Sowerby Street	AM	0.25	**N/A** (Worst: 17.5)	**NA** (Worst: B)	Give Way	RT from Sowerby Street
	PM	0.24	**N/A** (Worst: 19.8)	**NA** (Worst: B)		RT from Sowerby Street
	SAT	0.55	**N/A** (Worst: 31.1)	**NA** (Worst: C)		RT from Sowerby Street
Finlay Road / Hume Street	AM	0.22	**N/A** (Worst: 36.4)	**NA** (Worst: C)	Give Way	RT from Finlay Road (west)
	PM	0.34	**N/A** (Worst: 36.1)	**NA** (Worst: C)		RT from Finlay Road (east)
	SAT	0.45	**N/A** (Worst: 66.3)	**NA** (Worst: E)		RT from Finlay Road (west)
Finlay Road / Tait Crescent	AM	0.08	**N/A** (Worst: 6.0)	**NA** (Worst: A)	Give Way	RT from Tait Crescent (S)
	PM	0.10	**N/A** (Worst: 7.1)	**NA** (Worst: A)		RT from Churchill Street
	SAT	0.10	**N/A** (Worst: 7.1)	**NA** (Worst: A)		RT from Churchill Street

Notes:

(1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

(4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown, the intersection of Finlay Road / Tait Crescent and Lockyer Street / Sowerby Street are currently performing at a high level of efficiency, with a worst turn movement of Level of Service (LoS) “A” condition in both the AM & PM peak hour periods. The level of service “A” performance is characterised by low approach delays and spare capacity.

The intersection of Hume Street / Sowerby Street is operating with a worst turn movement of LoS “B” in the AM and PM peak hour periods and LoS “C” in the weekend Saturday peak hour period. The LoS “B” performance is characterised by low approach delays and spare capacity, whilst a LoS “C” condition is a satisfactory operation with some delays and some spare capacity.

The intersection of Finlay Road / Hume Street is operating with worst turning movement of LoS “C” during the AM and PM peak hour periods and LoS “E” during the weekend period. LoS “E” condition indicates that certain movements are operating close to capacity. The worst turning movement of LoS “E” during the weekend periods relates to the right turn movement from Finlay Road (west).

TABLE 2: OBSERVED AVERAGE DELAY AGAINST SIDRA OUTPUT AVERAGE DELAY FOR CRITICAL MOVEMENTS – SOWERBY STREET / HUME STREET

Intersection Movement	Peak Period	Sample Size	Observed Average Delay	95th Percentile Queue	SIDRA Output Average Delay	SIDRA Output 95th percentile Queue	Modification for calibration
Right Turn from Hume Street into Sowerby Street	AM Weekday (7:45am to 8:45am)	125	8.4 seconds	2 vehicles	8.5 seconds	1 vehicle	Bunching Factor 10% applied to the northern leg only.
	PM Weekday (3:45pm to 4:45pm)	120	8.2 seconds	2 vehicles	8.3 seconds	1 vehicle	Bunching Factor 15% applied to the northern leg only. PFF = 1 (1)
	Saturday Peak (12:15pm to 1:15pm)	219	8.8 seconds	3 vehicles	10.1 seconds	2 vehicles	Bunching Factor 15% applied to the northern leg only.
Right turn from Sowerby Street into Hume Street	AM Weekday (7:45am to 8:45am)	62	17.3 seconds	2 vehicles	17.5 seconds	1 vehicle	Bunching Factor 10% applied to the northern leg only.
	PM Weekday (3:45pm to 4:45pm)	55	13.9 seconds	3 vehicles	19.8 seconds	1 vehicle	Bunching Factor 15% applied to the northern leg only. PFF = 1(1)
	Saturday Peak (12:15pm to 1:15pm)	101	28.6 seconds	3 vehicles	31.1 seconds	2.3 vehicles	Bunching Factor 15% applied to the northern leg only.

Note: 1 – PFF = 1 is based upon the traffic volumes surveyed for a total flow period of 60 minutes and peak flow analysis period of 30 minutes.

As shown above, the average delay outputs closely reflect the observed average delays which indicates that the base case models are fit for purpose and can be relied upon for future development scenario modelling.

It is relevant to note that the observed 95th percentile queues are larger than the SIDRA output queues. This is predominantly due to SIDRA considering queues when no vehicles are present at the intersection, which results in lower output 95th percentile queues.

TABLE 3: OBSERVED AVERAGE DELAY AGAINST SIDRA OUTPUT AVERAGE DELAY FOR CRITICAL MOVEMENTS – FINLAY ROAD / HUME STREET

Intersection Movement	Peak Period	Sample Size	Observed Average Delay	95th Percentile Queue	SIDRA Output Average Delay	SIDRA Output 95th percentile Queue	Modification for calibration
Right Turn from Hume Street into Finlay Road	AM Weekday (8:30am to 9:30am)	83	7.3 seconds	2 vehicles	7.5 seconds	1 vehicle	N/A
	PM Weekday (3:30pm to 4:30 pm)	99	7.9 seconds	2 vehicles	8.1 seconds	1 vehicle	N/A
	Saturday Peak (11:30am to 12:30pm)	105	6.2 seconds	1 vehicle	8.1 seconds	1 vehicle	N/A
Right turn from Finlay Road into Hume Street	AM Weekday (8:30am to 9:30am)	25	22.4 seconds	1 vehicle	24.2 seconds	1 vehicle	Gap Acceptance modified to 6.5 and 3.5 seconds
	PM Weekday (3:30pm to 4:30 pm)	33	30.5 seconds	2 vehicles	36.1 seconds	2 vehicles	Gap Acceptance modified to 6.5 and 3.5 seconds
	Saturday Peak (11:30am to 12:30pm)	25	32 seconds	2 vehicles	39.1 seconds	1 vehicle	Gap Acceptance modified to 6.5 and 3.5 seconds

As shown above, the average delay outputs closely reflect the observed average delays which indicates that the base case models are fit for purpose and can be relied upon for future development scenario modelling.

It is relevant to note that the observed 95th percentile queues are larger than the SIDRA output queues. This is predominantly due to SIDRA considering queues when no vehicles are present at the intersection, which results in lower output 95th percentile queues.

2.4 Public Transport

The subject site has access to the existing bus stop (ID: 258086) located approximately 750m walking distance to the north of site on Finlay Road. The bus stop services existing bus route 823 (Goulburn to West Goulburn loop via Clinton Villas and South Goulburn) provided by PBC Goulburn.

The location of the site subject to the surrounding public transport network is shown in **Figure 3**.

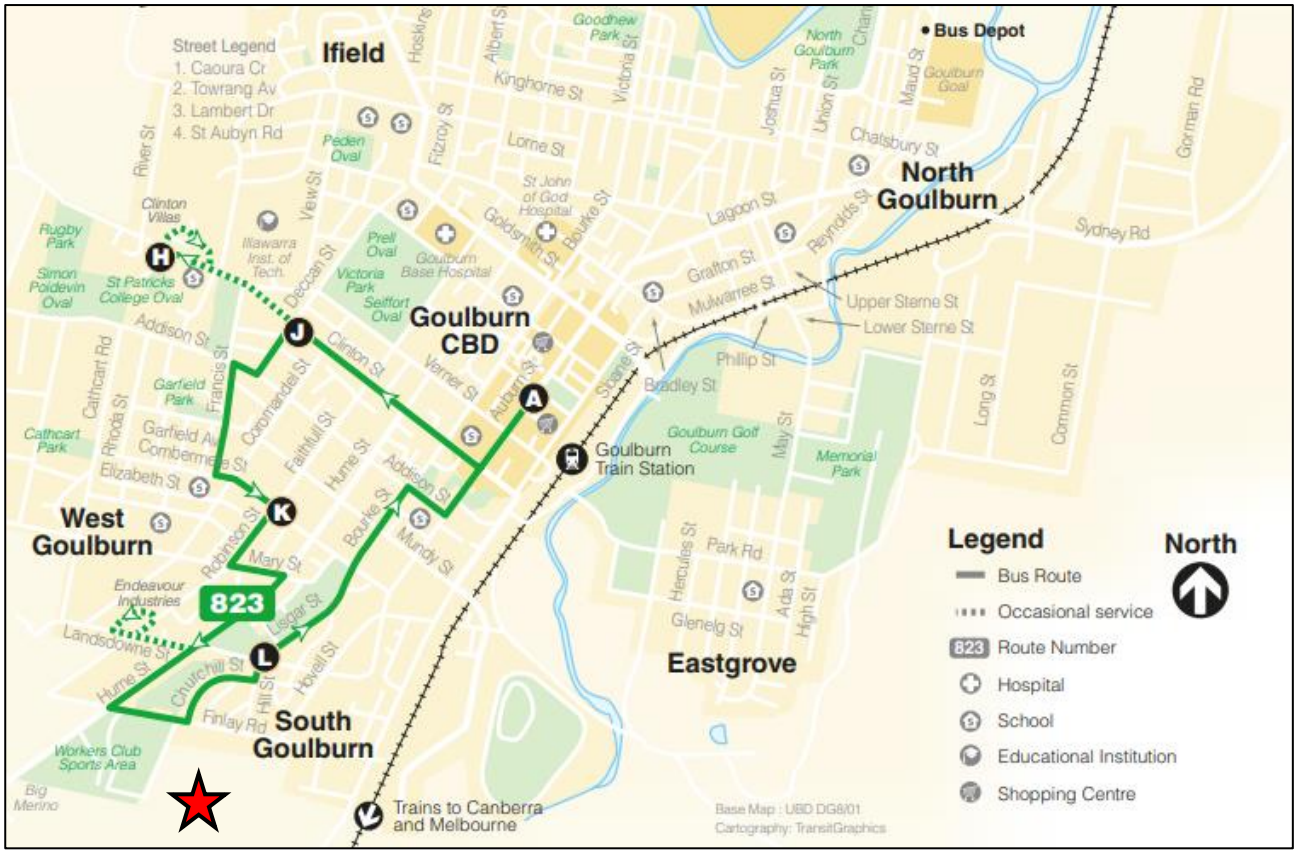

FIGURE 3: PUBLIC TRANSPORT NETWORK MAP

2.5 Future Road and Infrastructure Upgrades

From Goulburn Mulwaree Council Development Application tracker and website, it appears that there are no future planned road or public transport changes that will affect traffic conditions within the immediate vicinity of the subject site.

3 PARKING ASSESSMENT

3.1 Council Parking Requirement

Reference is made to the *Goulburn Mulwaree Development Control Plan 2009 Section 3.6 – Vehicular access and parking* which designates the following parking rates applicable to the proposed development:

Table 3-2: Off-street parking requirements

Warehouse / Bulk Stores

1 space per 300m^2 GFA; plus

1 space per 40m^2 of retail GFA

Table 4 presents the parking requirements of the proposal according to Council's above car parking rates.

TABLE 4: DCP PARKING RATES

Land Use	Scale	Rate	Spaces Required
Warehouse	45,650m^2 GFA	1 space per 300m^2	153

As shown above, the proposed development will be required to provide 153 car parking spaces (rounded up). The concept layout demonstrates the provision of 536 car parking spaces, which greatly exceeds the minimum requirements of Council.

3.2 Parking for People with Disabilities

Section 3.6.2 of Council's DCP outlines that accessible car parking will apply to most land uses at a rate of one (1) space per 50 car parking space or part thereof. It is expected that each building will be required to provide at least one (1) accessible car parking space. The concept layout provides a surplus of car parking which can be modified to accommodate the required accessible car parking.

3.3 Bicycle & Motorcycle Parking Requirements

Section 3.6.2 of Council's DCP outlines that bicycle parking should be considered for shopping and recreational developments. Whilst this is the case, providing bicycle facilities is recommended to promote sustainable modes of transport other than private motor vehicles. The recommended minimum bicycle rate is to provide bicycle spaces for 8-15% of staff employed on-site in accordance with the NSW Planning Guidelines for walking and cycling 2004.

Council's DCP does not outline any provision for motorcycle car parking, and hence no motorcycle spaces are required.

3.4 Road Design Requirements

Reference is made to Table D.1.5.A of the Goulburn Mulwaree Council Standards for Engineering Works D1 which requires Industrial Street to have the following geometric requirements:

- 11m – 13m wide carriageway;
- 20m road reserve;
- Barrier Kerbs;
- Footpaths on both sides of the road;
- Minimum Verge width of 3.5m on each side of the road;
- 12m radius at kerb line.

In addition to the above the proposed design consists of a dead end cul-de-sac road. The Council Goulburn Mulwaree Council Standards for Engineering Works D1 does not outline requirements for cul-de-sac roads for Industrial developments.

The residential requirement for cul-de-sacs is to provide a turning head that facilitates a 3 point turn for a single unit truck (defined as a 12.5m length). This would typically cater for waste collection vehicles which would be of low use within a dead end residential road. Hence, with consideration to the above requirements, the design of the cul-de-sac is recommended to facilitate the turning movements of the largest vehicle without the use of a 3 point turn, i.e. a single movement. Swept path testing has been undertaken for a 20m length Articulated Vehicle to ensure that the proposed design of the access road is appropriate for the design vehicle. Swept paths are reproduced in **Annexure D** for reference.

It should be noted that part of Lockyer Street is an approved 25/26m B-double approved route based upon the TfNSW Combined Higher Mass Limits and Restricted Access Vehicle Map, which is extracted in **Figure 4** below.

FIGURE 4: APPROVED TFNSW B-DOUBLE ROUTES

Hence, based upon the above, it is anticipated that 20m length AV's will be capable of travelling to the site.

3.4.1 Access Arrangements / Sight Line Assessment

The proposed access arrangements into and out of the subdivision consists of the provision of a roundabout intersection with Lockyer Street. The proposed internal road will connect to the roundabout as part of a third leg and the roundabout will operate as both a traffic management device and a traffic calming device to enforce a lower operating speed of Lockyer Street, which will improve the general safety of Lockyer Street.

To ensure a safe operation for the proposed roundabout intersection, reference is made to Section 3 of Austroads Guide to Road Design Part 4B: Roundabouts which outlines the sight distance requirements for roundabouts. The detailed assessment along with sight photos have been provided in **Annexure E**, with a summary provided in **Table 5** below.

TABLE 5: ROUNDABOUT CRITERIA SIGHT LINE ASSESSMENT SUMMARY

Sight Line Criteria	Approach Leg	Required Sight Distance for Trucks[1][6]	Required Sight Distance for Cars [1][4][5]	Sight Distance Achieved for Trucks [4][5]	Sight Distance Achieved for Cars [4][5]
Criteria 1 (Approach Sight Distance)	Lockyer Street (West)[2]	99m	80m	>108m	108m
	Lockyer Street (East)	74m	64m	>74m	>74m
	Access Road	74m	64m	>74m	>74m
Criteria 2 (4 to 5 second gap)[6]	Lockyer Street (West) [2]	67m to 83m	67m to 83m	>83m	>83m
	Lockyer Street (East)	67m to 83m	67m to 83m	>83m	>83m
	Access Road	67m to 83m	67m to 83m	>83m	>83m
Criteria 3 (Sight Triangle for minimum Approach Sight Distance entry curve)[3]	Lockyer Street (West)	N/A	N/A	Criteria 3 is not mandatory, and the design of the roundabout exceeds the minimum sight distance. Refer to **Annexure E** for details.	
	Lockyer Street (East)	N/A	N/A		
	Access Road	N/A	N/A		

Note: 1 - Design Speed adopted is 60km/h, 10km/h above the signposted speed limit, 1.5 second reaction time, deceleration of 0.29 for trucks and downgrade of 10%

2 – Vehicles approaching from the west will adopt a 10% downgrade as measured on-site.

3 – Criteria 3 is desirable but not mandatory

4 – Sight Distance for car is based upon 0.36 coefficient of deceleration

5- Sight distance for cars is taken as 1.1m to a height of 0m, whilst the truck sight distance is taken as 2.4m to 0.0m

6 – Based upon a car driver eye height of 1.1m to a height of 0.65m

Based upon the above assessment, the proposed roundabout is satisfactory with respect to the required sight line requirements for Criteria 1 and 2. In relation to Criteria 3, this is not a mandatory requirement. Whilst this is the case, an assessment has been completed to provide the minimum sight distance based upon a 30km/h design speed for the southern approach. This assessment is shown in **Annexure E** and hence the design of the roundabout exceeds the minimum requirements of Criteria 3 sight line.

The concept plans also detail an additional driveway that connects to the roundabout via a private driveway. A sight line assessment for Criteria 2 has been undertaken for Austroads requirements, demonstrating compliance. This sight line does travel through the subject site and hence it is recommended that there are no obstructions within the property boundary that impacts this sight line.

3.5 Car Park Design & Compliance

An assessment of compliance against the relevant Standards AS2890.1:2004, AS2890.6:2022 and AS2890.2:2018 has not been undertaken and will be completed during the development application stage of each building.

The only relevant assessment that needs to be considered is the location of potential driveways for each lot and the respective sight line requirement which has been completed in previous sub-sections.

Each lot to the south of the proposed roundabout will have a frontage to the internal access road, with the exception of Warehouse 6. All Lots that have access to the internal access road should have their vehicle access from the internal access road and not from Lockyer Street which has been shown on the plans. The one exception to this is the car parking area for Warehouse Unit 3, which would have adequate sight lines to provide a driveway directly onto Lockyer Street as far from the roundabout as physically possible and Warehouse 6 will be required to have vehicle access through the roundabout which has been assessed to be compliant.

Relevant swept paths for the operation of the roundabout are shown in **Annexure D** for reference.

4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Traffic Generation

Traffic generation rates for the relevant land uses are provided in the *RTA Guide to Traffic Generating Developments (2002)* and recent supplements as adopted by *Transport for NSW* (TfNSW) and are as follows:

> ***3.10.2 Warehouses***
>
> *Morning peak hour vehicle trips = 0.5 per 100m^2 gross floor area*

The resulting AM and PM peak hourly traffic generation is summarised in **Table 6**.

TABLE 6: ESTIMATED TRAFFIC GENERATION

Use	Scale	Peak	Generation Rate	Trips[(1)]
Warehouses	45,650m^2 GFA	AM	0.5 per 100m^2 GFA	229 (184 in, 45 out)
		PM		229 (45 in, 184 out)

Notes:
(1) Assumes 80% inbound & 20% outbound during AM peak. Vice versa for PM.

As shown, the expected traffic generation associated with the proposed development is in the order of 229 vehicle trips in the AM peak period (184 in, 45 out) and 229 vehicle trips in the PM peak period (45 in, 184 out).

With consideration to heavy vehicle movements, it will be assumed that 10% of traffic generated by the site during peak periods will be heavy vehicle movements. This relates to 23 heavy vehicle movements in the AM and PM peak hour periods which is included in **Table 6** above.

The *RTA Guide to Traffic Generating Developments (2002)* and recent supplements as adopted by *Transport for NSW* (TfNSW) do not outline any traffic generation rates for warehouse developments during weekend periods. As such, the assessment will adopt 50% of the weekday peak for a highly conservative assessment. As such, it is expected that the weekend peak will generate 120 (60 inbound and 60 outbound) vehicle trips, of which 12 would be associated with heavy vehicles.

4.2 Traffic Assignment

The road network, traffic surveys and locations of residential areas surrounding the site have been assessed, in addition to the following information:

- The catchment of staff to the development will be predominantly from within Goulburn;
- Limited staff will travel to and from the site from Canberra as it is approximately a 1 hour drive;
- Limited staff will travel to and from the site from the north-west as there is not a large catchment of residential lots and the travel time from dense residential areas is approximately a 1 hour drive;
- Heavy vehicles are anticipated to travel to and from the following destinations:
    - Sydney;
    - Canberra;
    - Victoria.

With consideration to the above, the following trip distribution for all vehicles travelling to and from the site are the following:

- All commercial vehicles will access the site via the Hume Highway to the west of the site, with:
    - 60% travelling to / from Sydney
    - 40% travelling to / from Canberra / Victoria;
- All staff vehicles will access the site as per the following:
    - 5 % travelling to / from the west (Canberra);
    - 5% travelling to / from the east (Moss Vale);
    - 90% will travel to the site via Goulburn from Finlay Road & Hume Street as per the existing distribution into and out of Tait Crescent (Lockyer Street) at the intersection of Finlay Road / Tait Crescent (Lockyer Street) as per the following:
        - 25% from Hume Street;
        - 75% from Finlay Road.

4.3 Traffic Impact

The traffic generation outlined in **Section 4.1** & **4.2** above has been added to the existing traffic volumes recorded. SIDRA INTERSECTION 9.0 was used to assess the intersections performance. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of this assessment are shown in **Table 7** and reproduced in **Annexure C**.

TABLE 7: FUTURE INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement
FUTURE PERFORMANCE						
Lockyer Street / Sowerby Street	AM	0.11	**N/A** (Worst: 6.6)	**NA** (Worst: A)	Give Way	RT from Lockyer Street
	PM	0.08	**N/A** (Worst: 7.1)	**NA** (Worst: A)		RT from Lockyer Street
	SAT	0.13	**N/A** (Worst: 7.1)	**NA** (Worst: A)		RT from Sowerby Street
Hume Street / Sowerby Street	AM	0.28	**N/A** (Worst: 19.5)	**NA** (Worst: B)	Give Way	RT from Sowerby Street
	PM	0.24	**N/A** (Worst: 20.2)	**NA** (Worst: B)		RT from Sowerby Street
	SAT	0.56	**N/A** (Worst: 32.8)	**NA** (Worst: C)		RT from Sowerby Street
Finlay Road / Hume Street	AM	0.28	**N/A** (Worst: 36.4)	**NA** (Worst: C)	Give Way	RT from Finlay Road (W)
	PM	0.57	**N/A** (Worst: 41.3)	**NA** (Worst: C)		RT from Finlay Road (E)
	SAT	0.45	**N/A** (Worst: 66.3)	**NA** (Worst: E)		RT from Finlay Road (W)
Finlay Road / Tait Crescent	AM	0.15	**N/A** (Worst: 7.2)	**NA** (Worst: A)	Give Way	RT from Tait Crescent (S)
	PM	0.28	**N/A** (Worst: 7.6)	**NA** (Worst: A)		RT from Churchill Street (N)
	SAT	0.10	**N/A** (Worst: 7.3)	**NA** (Worst: A)		RT from Tait Crescent (S)

Notes:

(1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

(4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown, all assessed intersections retain the same overall level of service under future conditions with minimal increases to average delays and spare capacity maintained, indicating that there will be no adverse impact on the existing road network as a result of the proposed development.

4.3.1 Holiday Traffic

As part of consultation with TfNSW, consideration was required to be made to holiday periods. As gathering of count data within holiday periods was outside the scope of this report, consideration was made to the Traffic Count Station at Marulan (Station ID T0274-PR), which is 650m east of George Street, Marulan.

The relied upon traffic data utilised within this report was gathered in March and based upon the review of the Traffic Count Station at Marulan, the increase in traffic volume during the July to August Months was generally a 10% change. Hence, for the purposes of traffic modelling holiday periods, an increase in 10% to the gathered traffic volumes will be assessed. The assessment will only consider the intersections with Hume Street.

The SIDRA results based upon an increase of 10% to all traffic volumes at the intersection of Hume Street / Sowerby Street and Finaly Road / Hume Street is shown in **Table 8**.

TABLE 8: HOLIDAY INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement
HOLIDAY PERFORMANCE						
Hume Street / Sowerby Street	AM	0.32	**N/A** (Worst: 20.9)	**NA** (Worst: B)	Give Way	RT from Sowerby Street
	PM	0.30	**N/A** (Worst: 24.3)	**NA** (Worst: B)		RT from Sowerby Street
	SAT	0.73	**N/A** (Worst: 46.0)	**NA** (Worst: D)		RT from Sowerby Street
Finlay Road / Hume Street	AM	0.30	**N/A** (Worst: 47.5)	**NA** (Worst: D)	Give Way	RT from Finlay Road (W)
	PM	0.48	**N/A** (Worst: 50.0)	**NA** (Worst: D)		RT from Finlay Road (E)
	SAT	0.68	**N/A** (Worst: 101.8)	**NA** (Worst: F)		RT from Finlay Road (W)
HOLIDAY + DEVELOPMENT PERFORMANCE						
Hume Street / Sowerby Street	AM	0.35	**N/A** (Worst: 23.5)	**NA** (Worst: B)	Give Way	RT from Sowerby Street
	PM	0.31	**N/A** (Worst: 24.8)	**NA** (Worst: B)		RT from Sowerby Street
	SAT	0.76	**N/A** (Worst: 49.9)	**NA** (Worst: D)		RT from Sowerby Street
Finlay Road / Hume Street	AM	0.36	**N/A** (Worst: 47.5)	**NA** (Worst: D)	Give Way	RT from Finlay Road (W)
	PM	0.76	**N/A** (Worst: 65.8)	**NA** (Worst: E)		RT from Finlay Road (E)
	SAT	0.68	**N/A** (Worst: 101.8)	**NA** (Worst: F)		RT from Finlay Road (W)

Notes: Refer to Table 1

As shown above, the intersection of Hume Street / Sowerby Street is relatively unchanged between the base case holiday performance and future scenario with the development at the intersection. This indicates that the development will not have an adverse traffic impact on the intersection of Hume Street / Sowerby Street.

The intersection of Finlay Road / Hume Street is unchanged in the AM and weekend peak periods, with the worst turn movement being unchanged during the weekend peak period. Notwithstanding this, the right turn movement from Finlay Road during the weekend period is operating at LoS “F”. Which indicates this movement is approaching capacity and exhibits large delays. Hence, for this movement to be acceptable, an infrastructure upgrade would be required, or the right turn movement banned.

The banning of any right turn movements is unlikely to be supported by Council or TfNSW, as there is no convenient alternative access onto Hume Street (i.e. no access to a controlled intersection). Considering this, the likely required infrastructure to ensure a safe and efficient operation of the intersection of Finlay Road / Hume Street would either be in the form of a signalised intersection or roundabout.

The forecast operation of the intersection of Finlay Road / Hume Street during the PM peak hour period is shown to deteriorate to a worst turning movement of LoS E condition from LoS D. It is not considered that the proposal is responsible for an infrastructure upgrade to resolve this concern for the following reasons:

- The operation of LoS “E” will be limited to high tourist periods, which are limited throughout the year and are unlikely to occur during peak operational periods of the site;
- The RTA Guide permits a less desirable LoS operation of intersections during recreational peak periods and hence on this basis the LoS E condition is considered acceptable within the context of holiday periods;
- The degree of saturation of the worst turn movement during the PM peak hour period is 0.76, which indicates the intersection is yet to reach capacity.
- The weekend operation of the intersection is operating at LoS “F”, which is a worse outcome compared to the PM peak hour period, of which the proposed development does not have any impact upon. Hence, it is not the sole responsibility of the development to provide an infrastructure upgrade.
- There is spare capacity for right turn movements from the intersection of Sowerby Street / Hume Street that can be utilised as an alternative for turning right onto Hume Street;
- There exists the ability for vehicles to travel left onto Hume Street from Finlay Road and undertaken a U-turn at the roundabout intersection of Hume Street / Ducks Lane.

4.4 Road Safety

A pre-DA meeting was held with TfNSW as part of the preparation of this Traffic & Parking Impact Assessment Report. The following information was requested to be reviewed as part of the TPIA:

- A road safety assessment including details on crash history and a sight distance assessment at the local road connections with Hume Street will be required;
- A weave analysis on the approach to the Sowerby Street / Hume Street intersection needs to be undertaken to confirm that potential traffic can merge across the lanes and into the right turn bay.

4.4.1 Sight Line Assessment & Crash History

Reference is made to the interactive crash statistics from TfNSW Centre for Road Safety Website which holds records of crash data for a 5-year duration. The intersection of Hume Street / Sowerby Street and Finlay Road / Hume Street has been reviewed, with the results shown below:

Hume Street / Sowerby Street:

- One (1) crash recorded as a minor severity outcome in 2019;

Finlay Road / Hume Street:

- Six (6) recorded crashes between 2018 and 2020;
    - Five (5) moderate injury;
    - One (1) serious injury.
- Five (5) out of six (6) crashes were right and through crashes (Rum Code 21);
- One (1) crash was a right rear crash (Rum Code 32).

Based upon the above, there are no existing cluster of accidents at the intersection of Hume Street / Sowerby Street and there would appear to be a history of accidents associated with right turn movements into Finlay Road east (four accidents recorded) and Finlay Road west (one accident recorded).

Considering the trip distribution of the site, the proposal is not intensifying the right turn movement into Finlay Road east or west and therefore any existing deficiency is for other road authorities to consider.

With regards to sight lines, the intersection of Hume Street / Sowerby Street and Finlay Road / Hume Street have signposted speed limits of 60km/h, which would require consideration to an operating speed of 70km/h for sight line assessments.

The safe intersection stopping distance sight line requirement for an operating speed of 70km/h is 141m. This sight line is achieved at the intersection of Hume Street / Finlay Road, which provides for a level and straight alignment with no existing roadside vegetation which restricts sight line visibility.

In relation to the sight line assessment at the intersection of Hume Street / Sowerby Street, adopting a 70km/h operating speed for sight lines to the north is not appropriate in this instance that there is a roundabout located some 70m from the intersection. The roundabout departure speed is estimated to be approximately 40km/h, which would require a Safe Intersection Sight Distance of 67m. Hence, to the north, the intersection of Sowerby Street / Hume Street would comply with the Safe Intersection Sight Distance.

To the south of Sowerby Street, there is a localised blockage of sight lines at the intersection of Sowerby Street / Hume Street as there is an existing tree that slightly obstructs sight lines, as show in **Figure 5** below.

FIGURE 5: EXISTING TREE LOCATED AT INTERSECTION OF HUME STREET / SOWERBY STREET

Based upon the above, it is recommended that as a minimum the lower-level branches be removed to increase visibility for road users.

4.4.2 Weaving Analysis

A weave analysis is typically completed for freeways, rather than for sub-arterial roads within built up areas. Further, the volumes are not significantly large to warrant such an assessment.

Notwithstanding the above, a weaving analysis has been undertaken, with the detailed assessment provided in **Annexure F** for reference. The following assumptions / inputs have been made for the assessment:

- Free flow speed of 80km/h
- Type B Weave
- Peak Flow Factor of 0.95 (determined from volumes surveyed);
- Constrained configuration;
- 190m weave segment;
- Assumed that half of the vehicles turning right into Sowerby Street have to weave (i.e. are travelling eastbound along Hume Highway on the approach to Goulburn).
- Assumed that half the additional vehicle trips travelling to the site from the Hume Highway will weave.
- The following scenarios were considered:
    - Existing volumes;
    - Existing + 10% increase in volumes;
    - Existing + Development volumes
    - Existing + Development + 20% increase in volumes.

The worst-case scenario was the Saturday period, with the results summarised in **Table 9** below.

TABLE 9 – SATURDAY NORTHBOUND WEAVING RESULTS

Weaving Parameters	Existing Volumes (2023)	Existing + 20% Volumes (2023)	Existing + Development Volumes (2023)	Existing + Development Volumes + 20% (2023)
Overall speed of all vehicles in weaving section (km/h)	82.5	81.6	81.7	80.9
Density of weaving section (pc/km/lane)	3.4	4.1	3.7	4.4
Level of Service (LOS)	**A**	**A**	**A**	**A**

As shown above, the weaving analysis results in a reported Level of Service “A” condition. This result is not unexpected considering the lower levels of vehicles travelling along Hume Street in comparison to what you would expect on a freeway.

5 CONCLUSION

In view of the foregoing, the subject Warehouse Units proposal at 20-24 Lockyer Street, Goulburn (as depicted in **Annexure A**) is supportable in terms of its traffic and parking impacts. The following outcomes of this traffic impact assessment are relevant to note:

- The proposed development will be required to provide 153 car parking spaces when considering normal rounding requirements. The provision of parking on the site will be subject to the development application of each lot.
- Council's DCP does not require the provision of bicycle and motorcycle parking facilities. As such nil (**0**) bicycle / motorcycle parking spaces can be been provided. Whilst this is the case, it is recommended that some bicycle space be provided to promote sustainable modes of transport.
- The proposed plans detail a 20m wide road reserve and a cul-de-sac which is capable of complying with Council's Industrial Street design requirements and the minimum recommendation for the cul-de-sac.
- An assessment of compliance against the relevant Standards AS2890.1:2004, AS2890.6:2022 and AS2890.2:2018 has not been undertaken and will be completed during the development application stage.
- The estimated traffic generation associated with the proposed development is in the order of 229 vehicle trips in the AM peak period (184 in, 45 out) and 229 vehicle trips in the PM peak period (45 in, 184 out).
- All assessed intersections retain the same overall Level of Service under future conditions (existing plus development) with minimal increases to average delays and spare capacity maintained, indicating that there will be no adverse impact on the existing road network as a result of the proposed development.
- The intersection of Hume Street / Sowerby Street is relatively unchanged between the base case holiday performance and future scenario with the development at the intersection. This indicates that the development will not have an adverse traffic impact on the intersection of Hume Street / Sowerby Street.
- The forecast operation of the intersection of Finlay Road / Hume Street during the PM peak hour period is shown to deteriorate to a worst turning movement of LoS E condition from LoS D. It is not considered that the proposal is responsible for an infrastructure upgrade to resolve this concern for the following reasons:
    - The operation of LoS "E" will be limited to high tourist periods, which are limited throughout the year and are unlikely to occur during peak operational periods of the site;
    - The RTA Guide permits a less desirable LoS operation of intersections during recreational peak periods and hence on this basis the LoS E condition of considered acceptable within the context of holiday periods;

- The degree of saturation of the worst turn movement during the PM peak hour period is 0.7, which indicates the vehicle movement is yet to reach capacity.
- The weekend operation of the intersection is operating at LoS “F”, which is a worse outcome compared to the PM peak hour period, of which the proposed development does not have any impact upon. Hence, it is not the sole responsibility of the development to provide an infrastructure upgrade.
- There is spare capacity for right turn movements from the intersection of Sowerby Street / Hume Street that can be utilised as an alternative for turning right onto Hume Street.

ANNEXURE A: PROPOSED PLANS
(1 SHEET)

DEVELOPMENT TABLE

TOTAL SITE AREA	**123,566 m²**
ACCESS ROAD CORRIDOR	6,588 m²
OSD BASIN	6,200 m²
NET DEVELOPABLE AREA	110,778 m²
BUILDING AREAS (GFA)	
WAREHOUSE UNITS 1	1,910 m²
OFFICE UNITS 1	160 m²
WAREHOUSE UNITS 2	1,620 m²
OFFICE UNITS 2	150 m²
WAREHOUSE UNITS 3	3,240 m²
OFFICE UNITS 3	300 m²
WAREHOUSE UNITS 4	6,340 m²
OFFICES UNITS 4	900 m²
WAREHOUSE 1	5,850 m²
OFFICE 1	300 m²
WAREHOUSE 2	6,050 m²
OFFICE 2	300 m²
WAREHOUSE 3 / 4	4,780 m²
OFFICE 3	320 m²
WAREHOUSE 5	14,650 m²
OFFICE 5	600 m²
WAREHOUSE 6	1,210 m²
OFFICE 6	120 m²
TOTAL BUILDING AREAS	**48,800 m²**
LAND USE PERCENTAGE	**44%**
TOTAL PARKING PROV.	**536**
(PROVISION PARKING INCL.)	20
TOTAL CAR PARKING REQ. (WAREHOUSE @ 1:100 OFFICE @ 1:40)	536

LEGEND

- WAREHOUSE
- OFFICE
- LANDSCAPE
- LIGHT DUTY PAVEMENT
- HEAVY DUTY PAVEMENT
- PEDESTRIAN PATHWAY
- OSD BASIN
- SITE BOUNDARY
- RETAINING WALL

0m 20m 40m 60m 80m 100m

SCALE BAR 1:1000 @ A1 ; 1: 2000 @ A3

Notes

-This drawing and design is subject to Reid Campbell (NSW) Pty Ltd copyright and may not be reproduced without prior written consent.
-Contractor to verify all dimensions on site before commencing work.
-Report all discrepancies to project manager prior to construction.
-Figured dimensions to be taken in preference to scaled drawings.
-All work is to conform to relevant Australian Standards and other Codes as applicable, together with other Authorities' requirements and regulations.

Michael Morony NSWARB No. 8218

Issue	Description	Date	By	QA
A	For Information	01.06.2023	CL	MF
B	For Information	13.06.2023	CL	MF
C	For Information	10.08.2023	CL	MF
D	For Information	29.08.2023	CL	MF
E	For Information	14.09.2023	CL	AM
F	For Information	09.10.2023	CL	MF

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CONCEPT DEVELOPMENT

CLIENT: FAL GROUP

PROJECT MANAGER: novo ADVISORY

PROJECT: PROPOSED INDUSTRIAL LOT
20-24 LOCKYER ST, GOULBURN

Drawn CL Checked MF PRINT DATE 9/10/2023 3:26:44 PM

NORTH POINT

Drawing Title: CONCEPT SKETCH

SHEET NUMBER: 1210001_ ASK-02

ISSUE: F

Autodesk Docs://1220051_20-24 Lockyer St Goulburn/1220051_LOCKYER ST GOULBURN_SD_R23.rvt

ANNEXURE B: TRAFFIC SURVEY DATA
(8 SHEETS)

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Sowerby and Lockyer, Goulburn

GPS	*-34.773720, 149.691403*						
Date:	Thu 16/03/23		***North:***	Lockyer	***Survey Period***	AM:	7:00 AM-9:30 AM
Weather:	Overcast		***East:***	Sowerby		PM:	3:00 PM-6:00 PM
Suburban:	Goulburn		***South:***	N/A	***Traffic Peak***	AM:	7:45 AM-8:45 AM
Customer:	McLaren		***West:***	Sowerby		PM:	3:15 PM-4:15 PM

All Vehicles

Time		North Approach Lockyer			East Approach Sowerby			West Approach Sowerby			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
7:00	7:15	0	13	5	0	5	25	3	19	3	268	
7:15	7:30	0	7	4	0	1	16	2	16	4	280	
7:30	7:45	0	6	2	0	5	17	1	24	3	306	
7:45	8:00	0	10	4	0	4	26	1	33	9	328	Peak
8:00	8:15	0	9	2	0	4	27	4	35	4	315	
8:15	8:30	0	7	3	0	4	28	1	27	6	306	
8:30	8:45	0	8	4	0	1	28	4	33	2	308	
8:45	9:00	0	2	5	1	0	31	4	27	4		
9:00	9:15	0	6	4	0	1	28	3	28	6		
9:15	9:30	0	4	4	0	1	35	3	27	4		
15:00	15:15	0	3	4	0	3	21	0	19	7	292	
15:15	15:30	0	8	4	0	7	22	1	25	4	295	Peak
15:30	15:45	0	1	7	0	12	27	1	26	8	287	
15:45	16:00	0	6	7	0	7	25	0	31	6	268	
16:00	16:15	0	2	2	0	7	23	0	21	5	254	
16:15	16:30	0	6	1	0	2	23	0	22	9	271	
16:30	16:45	0	7	3	0	2	20	2	20	9	256	
16:45	17:00	1	3	4	0	6	21	1	23	9	243	
17:00	17:15	0	4	3	0	11	23	1	29	6	236	
17:15	17:30	0	3	3	0	4	19	0	13	6		
17:30	17:45	0	3	3	0	5	15	0	21	3		
17:45	18:00	0	2	3	0	2	24	0	18	12		

Peak Time		North Approach Lockyer			East Approach Sowerby			West Approach Sowerby			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
7:45	8:45	0	34	13	0	13	109	10	128	21	328
15:15	16:15	0	17	20	0	33	97	2	103	23	295

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Hume St and Sowerby St, Goulburn

GPS	*-34.772784, 149.690556*					
Date:	Thu 16/03/23	***North:***	Hume St	***Survey Period***	AM:	7:00 AM-9:30 AM
Weather:	Overcast	***East:***	Sowerby St		PM:	3:00 PM-6:00 PM
Suburban:	Goulburn	***South:***	Hume St	***Traffic Peak***	AM:	7:45 AM-8:45 AM
Customer:	McLaren	***West:***	N/A		PM:	3:45 PM-4:45 PM

All Vehicles

Time		North Approach Hume St			East Approach Sowerby St			South Approach Hume St			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
7:00	7:15	0	78	22	0	9	47	0	32	32	867	
7:15	7:30	0	92	19	0	4	41	0	19	37	879	
7:30	7:45	0	83	25	0	10	28	0	24	26	933	
7:45	8:00	0	58	36	0	13	44	0	32	56	956	Peak
8:00	8:15	0	65	25	0	15	35	0	34	58	946	
8:15	8:30	0	59	36	0	13	45	0	33	80	954	
8:30	8:45	0	39	22	0	22	44	0	27	65	946	
8:45	9:00	0	41	27	0	21	35	0	33	72		
9:00	9:15	0	62	27	0	18	28	0	42	63		
9:15	9:30	0	60	31	0	18	52	0	28	69		
15:00	15:15	0	71	19	0	18	33	0	31	75	1010	
15:15	15:30	0	61	16	0	10	35	0	27	92	1008	
15:30	15:45	0	65	25	0	9	33	0	30	82	1042	
15:45	16:00	0	65	21	0	19	35	0	27	111	1045	Peak
16:00	16:15	0	54	25	0	15	22	0	29	100	1036	
16:15	16:30	0	63	24	0	13	43	0	35	97	1037	
16:30	16:45	0	56	27	0	7	37	0	30	90	1001	
16:45	17:00	0	62	29	0	14	24	0	13	127	995	
17:00	17:15	0	66	16	0	14	27	0	36	87	938	
17:15	17:30	0	55	10	0	11	33	0	25	105		
17:30	17:45	0	52	12	0	7	26	1	37	106		
17:45	18:00	0	39	24	0	13	22	0	19	95		

Peak Time		North Approach Hume St			East Approach Sowerby St			South Approach Hume St			Peak
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
7:45	8:45	0	221	119	0	63	168	0	126	259	956
15:45	16:45	0	238	97	0	54	137	0	121	398	1045

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Finlay Rd and Hume St, Goulburn

GPS	*-34.769064, 149.696545*						
Date:	Thu 16/03/23	***North:***	Hume St	***Survey Period***	AM:	7:00 AM-9:30 AM
Weather:	Overcast	***East:***	Finlay Rd		PM:	3:00 PM-6:00 PM
Suburban:	Goulburn	***South:***	Hume St	***Traffic Peak***	AM:	8:30 AM-9:30 AM
Customer:	McLaren	***West:***	Finlay Rd		PM:	3:30 PM-4:30 PM

All Vehicles

Time		North Approach Hume St				East Approach Finlay Rd				South Approach Hume St				West Approach Finlay Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
7:00	7:15	0	3	88	7	0	1	6	16	0	7	36	1	0	3	1	1	811	
7:15	7:30	1	1	103	3	0	3	3	18	0	8	49	3	0	1	4	8	853	
7:30	7:45	1	2	90	9	0	4	3	15	0	8	47	3	0	7	1	1	896	
7:45	8:00	1	8	96	9	0	7	2	10	0	17	70	9	0	5	0	11	920	
8:00	8:15	1	3	74	7	0	7	4	7	0	13	79	2	0	7	0	8	925	
8:15	8:30	3	9	85	4	0	5	2	8	0	16	91	7	0	5	1	12	976	
8:30	8:45	0	6	66	9	0	3	2	10	1	20	83	4	0	2	3	6	990	Peak
8:45	9:00	2	2	70	10	0	7	5	18	0	21	95	3	0	3	4	10		
9:00	9:15	1	3	97	13	0	9	4	18	0	18	81	5	0	4	2	8		
9:15	9:30	2	2	94	6	0	9	2	16	1	22	85	5	0	5	2	11		
15:00	15:15	1	2	93	2	0	6	4	19	0	24	118	6	0	2	2	7	1132	
15:15	15:30	1	4	72	6	0	4	4	20	0	14	102	3	0	2	3	3	1128	
15:30	15:45	0	5	98	9	0	6	5	22	2	22	94	1	0	10	2	11	1193	Peak
15:45	16:00	1	4	92	10	0	9	5	29	1	25	123	6	0	3	2	11	1191	
16:00	16:15	1	3	90	9	0	9	2	17	0	32	104	4	0	3	0	8	1174	
16:15	16:30	0	8	95	5	0	7	2	20	0	22	115	8	0	12	3	6	1192	
16:30	16:45	1	4	92	9	0	6	3	14	0	27	102	8	0	3	3	13	1186	
16:45	17:00	1	4	86	10	0	5	1	30	3	26	113	7	0	7	3	8	1180	
17:00	17:15	0	1	86	7	0	10	2	21	1	24	126	5	0	5	2	10	1133	
17:15	17:30	0	6	87	8	0	5	4	19	0	30	124	3	0	3	0	8		
17:30	17:45	0	8	79	7	0	8	1	12	0	23	121	3	0	6	3	8		
17:45	18:00	2	2	63	16	0	3	4	10	0	23	122	3	0	1	4	4		

Peak Time		North Approach Hume St				East Approach Finlay Rd				South Approach Hume St				West Approach Finlay Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
8:30	9:30	5	13	327	38	0	28	13	62	2	81	344	17	0	14	11	35	990
15:30	16:30	2	20	375	33	0	31	14	88	3	101	436	19	0	28	7	36	1193

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Finlay Rd and Churchill St, Goulburn

GPS	*-34.769756, 149.700647*						
Date:	Thu 16/03/23	**North:**	Churchill St	**Survey Period**	AM:	7:00 AM-9:30 AM
Weather:	Overcast	**East:**	Finlay Rd		PM:	3:00 PM-6:00 PM
Suburban:	Goulburn	**South:**	Tait Cre	**Traffic Peak**	AM:	8:30 AM-9:30 AM
Customer:	McLaren	**West:**	Finlay Rd		PM:	3:45 PM-4:45 PM

All Vehicles

Time		North Approach Churchill St				East Approach Finlay Rd				South Approach Tait Cre				West Approach Finlay Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
7:00	7:15	0	0	0	0	0	1	23	10	0	5	0	0	0	2	14	0	225	
7:15	7:30	0	1	3	0	0	0	19	5	0	2	0	2	0	3	10	0	228	
7:30	7:45	0	0	0	0	0	1	21	6	0	7	2	0	0	3	15	1	234	
7:45	8:00	0	1	0	1	0	0	18	13	0	8	0	1	0	4	23	0	248	
8:00	8:15	0	0	0	0	0	0	17	12	0	8	1	0	0	2	18	0	269	
8:15	8:30	0	1	0	0	0	0	12	7	0	8	0	0	0	2	21	0	296	
8:30	8:45	0	0	0	1	0	0	14	12	0	9	0	0	1	6	26	1	318	Peak
8:45	9:00	0	1	0	1	0	1	26	15	0	6	0	2	1	3	34	0		
9:00	9:15	0	0	0	0	0	0	23	12	0	10	1	5	0	5	28	1		
9:15	9:30	0	0	0	1	0	0	24	13	0	3	0	2	0	3	25	2		
15:00	15:15	0	0	0	1	0	0	24	12	0	19	0	2	0	6	22	0	378	
15:15	15:30	0	1	0	0	0	1	24	11	0	15	3	1	0	0	20	1	386	
15:30	15:45	0	0	0	2	0	0	29	16	1	12	1	4	0	0	25	1	387	
15:45	16:00	0	1	1	0	0	0	41	13	0	19	1	7	0	6	35	0	391	Peak
16:00	16:15	0	1	0	0	0	2	26	7	0	14	3	6	0	1	33	1	365	
16:15	16:30	0	1	0	0	0	1	25	4	0	14	1	3	0	1	28	0	363	
16:30	16:45	0	0	0	1	0	0	29	10	0	12	1	3	0	1	37	1	367	
16:45	17:00	0	0	0	0	0	1	37	7	0	13	0	1	0	0	38	1	337	
17:00	17:15	0	0	0	0	0	0	21	7	0	13	0	5	0	3	42	1	314	
17:15	17:30	0	0	0	0	0	0	29	3	0	12	0	4	0	1	33	0		
17:30	17:45	0	0	0	1	1	0	21	5	0	4	0	6	0	1	23	3		
17:45	18:00	0	1	1	0	1	1	22	8	0	7	0	0	0	0	34	0		

Peak Time		North Approach Churchill St				East Approach Finlay Rd				South Approach Tait Cre				West Approach Finlay Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
8:30	9:30	0	1	0	3	0	1	87	52	0	28	1	9	2	17	113	4	318
15:45	16:45	0	3	1	1	0	3	121	34	0	59	6	19	0	9	133	2	391

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Sowerby St and Lockyer St, Goulburn

GPS	*-34.773720, 149.691403*					
Date:	Sat 18/03/23	***North:***	Lockyer St	***Survey Period***	AM:	10:00 AM-12:00 PM
Weather:	Overcast	***East:***	Sowerby St		PM:	12:00 PM-2:00 PM
Suburban:	Goulburn	***South:***	N/A	***Traffic Peak***	AM:	10:15 AM-11:15 AM
Customer:	McLaren	***West:***	Sowerby St		PM:	12:15 PM-1:15 PM

All Vehicles

Time		North Approach Lockyer St			East Approach Sowerby St			West Approach Sowerby S			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
10:00	10:15	0	5	2	0	7	41	3	48	6	416	
10:15	10:30	0	7	6	0	7	37	1	38	5	420	Peak
10:30	10:45	0	4	6	0	5	50	0	39	4	413	
10:45	11:00	0	5	5	0	4	32	2	43	4	408	
11:00	11:15	0	4	8	0	8	43	1	51	1	414	
11:15	11:30	0	3	3	0	3	39	1	32	13		
11:30	11:45	0	5	3	0	6	34	2	48	5		
11:45	12:00	1	4	0	0	6	37	1	43	9		
12:00	12:15	0	3	3	0	8	37	2	46	4	446	
12:15	12:30	0	9	4	0	4	30	2	48	15	454	Peak
12:30	12:45	0	3	2	0	5	58	5	47	11	444	
12:45	13:00	0	7	2	0	7	35	1	41	7	398	
13:00	13:15	0	3	5	0	4	50	3	39	7	394	
13:15	13:30	0	8	5	0	7	42	0	35	5		
13:30	13:45	0	4	3	1	5	26	0	42	4		
13:45	14:00	0	7	5	0	5	35	1	38	5		

Peak Time		North Approach Lockyer St			East Approach Sowerby St			West Approach Sowerby S			Peak
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
10:15	11:15	0	20	25	0	24	162	4	171	14	420
12:15	13:15	0	22	13	0	20	173	11	175	40	454

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Hume St and Sowerby St, Goulburn

GPS	*-34.772784, 149.690556*					
Date:	Sat 18/03/23	***North:***	Hume St	***Survey Period***	AM:	10:00 AM-12:00 PM
Weather:	Overcast	***East:***	Sowerby St		PM:	12:00 PM-2:00 PM
Suburban:	Goulburn	***South:***	Hume St	***Traffic Peak***	AM:	10:15 AM-11:15 AM
Customer:	McLaren	***West:***	N/A		PM:	12:15 PM-1:15 PM

All Vehicles

Time		North Approach Hume St			East Approach Sowerby St			South Approach Hume St			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
10:00	10:15	0	69	39	0	27	64	0	68	66	1308	
10:15	10:30	0	67	33	0	20	62	0	60	79	1315	Peak
10:30	10:45	0	64	40	0	23	72	0	48	83	1295	
10:45	11:00	0	60	38	0	23	64	0	57	82	1282	
11:00	11:15	0	80	31	0	20	72	0	63	74	1255	
11:15	11:30	0	66	41	0	25	55	0	46	68		
11:30	11:45	0	69	37	0	25	50	0	67	69		
11:45	12:00	0	69	36	0	21	52	0	52	67		
12:00	12:15	0	52	39	0	14	64	0	70	84	1336	
12:15	12:30	0	69	54	0	24	67	0	48	90	1337	Peak
12:30	12:45	0	54	46	0	27	79	0	64	76	1296	
12:45	13:00	0	64	37	0	25	54	0	61	74	1235	
13:00	13:15	0	76	41	0	23	72	1	44	67	1197	
13:15	13:30	0	73	30	0	22	67	0	45	74		
13:30	13:45	0	71	33	0	19	41	0	44	77		
13:45	14:00	0	67	27	0	18	55	0	41	69		

Peak Time		North Approach Hume St			East Approach Sowerby St			South Approach Hume St			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	
10:15	11:15	0	271	142	0	86	270	0	228	318	1315
12:15	13:15	0	263	178	0	99	272	1	217	307	1337

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Finlay Rd and Hume St, Goulburn

GPS	*-34.769064, 149.696545*						
Date:	Thu 16/03/23	***North:***	Hume St	***Survey Period***	AM:	10:00 AM-12:00 PM
Weather:	Overcast	***East:***	Finlay Rd		PM:	12:00 PM-2:00 PM
Suburban:	Goulburn	***South:***	Hume St	***Traffic Peak***	AM:	11:00 AM-12:00 PM
Customer:	McLaren	***West:***	Finlay Rd		PM:	12:00 PM-1:00 PM

All Vehicles

Time		North Approach Hume St				East Approach Finlay Rd				South Approach Hume St				West Approach Finlay Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
10:00	10:15	0	0	109	7	0	3	4	27	0	21	92	1	0	7	3	3	1251	
10:15	10:30	1	4	96	18	0	6	3	31	1	21	106	3	0	3	2	7	1294	
10:30	10:45	2	4	116	9	0	12	3	38	0	26	114	3	0	2	1	7	1314	
10:45	11:00	0	6	116	4	0	8	2	27	2	26	123	4	0	6	1	10	1323	
11:00	11:15	2	4	123	8	0	0	7	18	1	33	108	2	0	3	0	11	1331	Peak
11:15	11:30	2	2	125	4	0	4	3	29	1	21	103	9	0	4	1	14		
11:30	11:45	1	1	109	16	0	6	2	39	2	27	124	7	0	4	2	6		
11:45	12:00	1	4	120	16	0	8	1	31	1	25	115	5	0	6	1	9		
12:00	12:15	2	5	99	4	0	4	5	28	0	26	113	3	0	10	4	11	1237	Peak
12:15	12:30	2	3	125	3	0	5	1	38	0	26	140	10	0	5	2	7	1215	
12:30	12:45	2	2	103	4	0	4	3	25	1	14	113	6	0	2	2	5	1128	
12:45	13:00	3	2	95	8	0	0	0	18	0	25	97	8	0	6	3	5	1102	
13:00	13:15	1	2	107	9	0	5	1	18	3	25	104	4	0	7	2	4	1105	
13:15	13:30	2	0	105	8	0	10	2	28	0	15	95	4	0	5	0	6		
13:30	13:45	1	2	86	3	0	4	1	29	2	27	93	0	0	7	1	4		
13:45	14:00	0	3	104	5	0	8	0	21	1	20	103	0	0	4	0	4		

Peak Time		North Approach Hume St				East Approach Finlay Rd				South Approach Hume St				West Approach Finlay Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
11:00	12:00	6	11	477	44	0	18	13	117	5	106	450	23	0	17	4	40	1331
12:00	13:00	9	12	422	19	0	13	9	109	1	91	463	27	0	23	11	28	1237

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Finlay Rd and Churchill St, Goulburn

GPS	*-34.769756, 149.700647*						
Date:	Sat 18/03/23	***North:***	Churchill St	***Survey Period***	AM:	10:00 AM-12:00 PM
Weather:	Overcast	***East:***	Finlay Rd		PM:	12:00 PM-2:00 PM
Suburban:	Goulburn	***South:***	Tait Cre	***Traffic Peak***	AM:	10:00 AM-11:00 AM
Customer:	McLaren	***West:***	Finlay Rd		PM:	1:00 PM-2:00 PM

All Vehicles

Time		North Approach Churchill St				East Approach Finlay Rd				South Approach Tait Cre				West Approach Finlay Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
10:00	10:15	0	0	0	0	0	1	39	6	0	9	2	3	0	0	31	0	387	Peak
10:15	10:30	0	0	0	1	0	0	52	6	0	5	2	3	1	0	25	0	377	
10:30	10:45	0	0	0	0	0	0	30	7	0	10	3	1	0	7	49	3	363	
10:45	11:00	0	1	0	0	0	0	39	7	0	7	0	0	0	0	35	2	367	
11:00	11:15	0	3	0	0	0	1	21	9	0	10	0	1	1	0	33	2	380	
11:15	11:30	0	1	0	2	0	0	33	7	0	7	0	6	0	2	22	1		
11:30	11:45	0	2	0	0	0	0	34	5	0	7	0	2	1	2	59	2		
11:45	12:00	0	0	0	0	0	0	36	3	0	10	2	3	0	2	47	1		
12:00	12:15	0	1	0	2	0	0	28	8	0	7	0	2	0	1	28	3	307	
12:15	12:30	0	0	0	2	0	0	42	8	0	9	0	4	0	3	26	0	311	
12:30	12:45	0	0	1	1	0	0	30	5	0	8	1	0	0	1	16	2	303	
12:45	13:00	0	0	0	1	0	1	17	4	0	13	0	2	0	1	28	1	320	
13:00	13:15	0	0	0	1	0	0	24	4	0	9	1	3	0	1	40	1	321	Peak
13:15	13:30	0	0	0	0	0	0	28	11	0	9	0	3	0	3	32	0		
13:30	13:45	0	0	0	2	0	0	23	5	0	13	0	4	0	3	31	1		
13:45	14:00	0	3	1	0	0	0	22	7	0	6	0	3	0	3	23	1		

Peak Time		North Approach Churchill St				East Approach Finlay Rd				South Approach Tait Cre				West Approach Finlay Rd				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
10:00	11:00	0	1	0	1	0	1	160	26	0	31	7	7	1	7	140	5	387
13:00	14:00	0	3	1	3	0	0	97	27	0	37	1	13	0	10	126	3	321

ANNEXURE C: SIDRA RESULTS
(36 SHEETS)

MOVEMENT SUMMARY

Site: 01 [EX AM Lockyer St / Sowerby St (Site Folder: Existing)]

Lockyer Street / Sowerby Street
Existing Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sowerby Street (E)														
5	T1	109	4	115	3.7	0.069	0.1	LOS A	0.1	0.7	0.07	0.09	0.07	49.5
6	R2	13	0	14	0.0	0.069	5.1	LOS A	0.1	0.7	0.07	0.09	0.07	48.0
Approach		122	4	128	3.3	0.069	0.6	NA	0.1	0.7	0.07	0.09	0.07	49.3
North: Lockyer Street (N)														
7	L2	13	0	14	0.0	0.049	5.0	LOS A	0.2	1.3	0.30	0.56	0.30	45.3
9	R2	34	6	36	17.6	0.049	6.0	LOS A	0.2	1.3	0.30	0.56	0.30	44.8
Approach		47	6	49	12.8	0.049	5.7	LOS A	0.2	1.3	0.30	0.56	0.30	45.0
West: Sowerby Street (W)														
10	L2	21	4	22	19.0	0.083	4.8	LOS A	0.0	0.0	0.00	0.08	0.00	48.1
11	T1	128	2	135	1.6	0.083	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	49.6
Approach		149	6	157	4.0	0.083	0.7	NA	0.0	0.0	0.00	0.08	0.00	49.4
All Vehicles		318	16	335	5.0	0.083	1.4	NA	0.2	1.3	0.07	0.15	0.07	48.6

MOVEMENT SUMMARY

Site: 01 [EX PM Lockyer St / Sowerby St (Site Folder: Existing)]

Lockyer Street / Sowerby Street
Existing Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sowerby Street (E)														
5	T1	96	1	101	1.0	0.075	0.2	LOS A	0.2	1.5	0.14	0.18	0.14	48.8
6	R2	33	0	35	0.0	0.075	5.0	LOS A	0.2	1.5	0.14	0.18	0.14	47.4
Approach		129	1	136	0.8	0.075	1.4	NA	0.2	1.5	0.14	0.18	0.14	48.5
North: Lockyer Street (N)														
7	L2	20	0	21	0.0	0.032	4.9	LOS A	0.1	0.8	0.24	0.53	0.24	45.4
9	R2	17	1	18	5.9	0.032	5.6	LOS A	0.1	0.8	0.24	0.53	0.24	45.2
Approach		37	1	39	2.7	0.032	5.2	LOS A	0.1	0.8	0.24	0.53	0.24	45.3
West: Sowerby Street (W)														
10	L2	25	4	26	16.0	0.072	4.7	LOS A	0.0	0.0	0.00	0.11	0.00	48.0
11	T1	103	1	108	1.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	49.4
Approach		128	5	135	3.9	0.072	0.9	NA	0.0	0.0	0.00	0.11	0.00	49.2
All Vehicles		294	7	309	2.4	0.075	1.7	NA	0.2	1.5	0.09	0.19	0.09	48.3

MOVEMENT SUMMARY

Site: 01 [EX SAT Lockyer St / Sowerby St (Site Folder: Existing)]

Lockyer Street / Sowerby Street
Existing Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sowerby Street (E)														
5	T1	173	2	182	1.2	0.109	0.1	LOS A	0.2	1.1	0.08	0.06	0.08	49.4
6	R2	20	0	21	0.0	0.109	5.4	LOS A	0.2	1.1	0.08	0.06	0.08	48.5
Approach		193	2	203	1.0	0.109	0.7	NA	0.2	1.1	0.08	0.06	0.08	49.3
North: Lockyer Street (N)														
7	L2	13	0	14	0.0	0.036	5.1	LOS A	0.1	0.9	0.32	0.58	0.32	45.9
9	R2	22	0	23	0.0	0.036	6.2	LOS A	0.1	0.9	0.32	0.58	0.32	45.5
Approach		35	0	37	0.0	0.036	5.8	LOS A	0.1	0.9	0.32	0.58	0.32	45.6
West: Sowerby Street (W)														
10	L2	40	4	42	10.0	0.119	4.7	LOS A	0.0	0.0	0.00	0.10	0.00	48.8
11	T1	175	2	184	1.1	0.119	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.4
Approach		215	6	226	2.8	0.119	0.9	NA	0.0	0.0	0.00	0.10	0.00	49.3
All Vehicles		443	8	466	1.8	0.119	1.2	NA	0.2	1.1	0.06	0.12	0.06	49.0

MOVEMENT SUMMARY

Site: 02 [EX AM Hume St / Sowerby St (Site Folder: Existing)]

Hume Street / Sowerby Street
Existing Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
2	T1	259	23	273	8.9	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	126	11	133	8.7	0.204	8.5	LOS A	0.8	5.7	0.46	0.69	0.46	47.3
Approach		385	34	405	8.8	0.204	2.8	NA	0.8	5.7	0.15	0.23	0.15	55.1
East: Sowerby Street (E)														
4	L2	168	12	177	7.1	0.154	5.2	LOS A	0.6	4.8	0.24	0.52	0.24	48.3
6	R2	63	3	66	4.8	0.251	17.5	LOS B	0.9	6.4	0.73	0.89	0.82	42.0
Approach		231	15	243	6.5	0.251	8.5	LOS A	0.9	6.4	0.37	0.62	0.40	46.4
North: Hume Street (N)														
7	L2	119	11	125	9.2	0.072	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
8	T1	221	24	233	10.9	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		340	35	358	10.3	0.072	2.0	NA	0.0	0.0	0.00	0.20	0.00	57.1
All Vehicles		956	84	1006	8.8	0.251	3.9	NA	0.9	6.4	0.15	0.31	0.16	53.3

MOVEMENT SUMMARY

Site: 02 [EX PM Hume St / Sowerby St (Site Folder: Existing)]

Hume Street / Sowerby Street
Existing Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
South: Hume Street (S)														
2	T1	398	33	398	8.3	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	121	15	121	12.4	0.181	8.3	LOS A	0.7	5.2	0.43	0.67	0.43	47.4
Approach		519	48	519	9.2	0.181	1.9	NA	0.7	5.2	0.10	0.16	0.10	56.5
East: Sowerby Street (E)														
4	L2	137	5	137	3.6	0.117	5.1	LOS A	0.5	3.5	0.23	0.52	0.23	48.4
6	R2	54	1	54	1.9	0.236	19.8	LOS B	0.8	5.7	0.77	0.91	0.85	40.9
Approach		191	6	191	3.1	0.236	9.3	LOS A	0.8	5.7	0.38	0.63	0.41	46.0
North: Hume Street (N)														
7	L2	97	2	97	2.1	0.053	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
8	T1	238	20	238	8.4	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		335	22	335	6.6	0.064	1.6	NA	0.0	0.0	0.00	0.17	0.00	57.7
All Vehicles		1045	76	1045	7.3	0.236	3.2	NA	0.8	5.7	0.12	0.25	0.12	54.6

MOVEMENT SUMMARY

Site: 02 [EX SAT Hume St / Sowerby St (Site Folder: Existing)]

Hume Street / Sowerby Street
Existing Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
2	T1	307	15	323	4.9	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	217	7	228	3.2	0.368	10.1	LOS A	1.8	13.0	0.55	0.80	0.68	46.4
Approach		524	22	552	4.2	0.368	4.2	NA	1.8	13.0	0.23	0.33	0.28	53.5
East: Sowerby Street (E)														
4	L2	272	3	286	1.1	0.244	5.3	LOS A	1.1	8.1	0.28	0.53	0.28	48.4
6	R2	99	2	104	2.0	0.550	31.1	LOS C	2.3	16.7	0.88	1.08	1.34	36.4
Approach		371	5	391	1.3	0.550	12.2	LOS A	2.3	16.7	0.44	0.68	0.56	44.5
North: Hume Street (N)														
7	L2	178	2	187	1.1	0.102	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
8	T1	263	17	277	6.5	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		441	19	464	4.3	0.102	2.3	NA	0.0	0.0	0.00	0.23	0.00	56.9
All Vehicles		1336	46	1406	3.4	0.550	5.8	NA	2.3	16.7	0.21	0.39	0.27	51.6

MOVEMENT SUMMARY

Site: 03 [EX AM Hume St / Finlay Rd (Site Folder: Existing)]

Hume Street / Finlay Road
Existing Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	17	0	18	0.0	0.102	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.0
2	T1	344	22	362	6.4	0.102	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	81	9	85	11.1	0.092	7.5	LOS A	0.4	2.8	0.43	0.64	0.43	47.9
Approach		442	31	465	7.0	0.102	1.6	NA	0.4	2.8	0.08	0.14	0.08	57.0
East: Finlay Road (E)														
4	L2	62	7	65	11.3	0.063	5.5	LOS A	0.2	1.7	0.29	0.54	0.29	48.0
5	T1	13	2	14	15.4	0.224	23.7	LOS B	0.7	5.7	0.81	0.93	0.89	37.1
6	R2	28	3	29	10.7	0.224	24.2	LOS B	0.7	5.7	0.81	0.93	0.89	38.9
Approach		103	12	108	11.7	0.224	12.9	LOS A	0.7	5.7	0.50	0.70	0.53	43.6
North: Hume Street (N)														
7	L2	38	6	40	15.8	0.029	6.1	LOS A	0.1	0.9	0.20	0.51	0.20	48.6
8	T1	327	19	344	5.8	0.099	0.1	LOS A	0.1	1.1	0.05	0.05	0.05	59.6
9	R2	13	0	14	0.0	0.099	7.3	LOS A	0.1	1.1	0.10	0.11	0.10	52.4
Approach		378	25	398	6.6	0.099	1.0	LOS A	0.1	1.1	0.06	0.10	0.06	58.0
West: Finlay Road (W)														
10	L2	35	1	37	2.9	0.208	5.4	LOS A	0.7	5.3	0.67	0.67	0.67	42.6
11	T1	11	2	12	18.2	0.208	23.7	LOS B	0.7	5.3	0.67	0.67	0.67	40.3
12	R2	14	5	15	35.7	0.208	36.4	LOS C	0.7	5.3	0.67	0.67	0.67	41.9
Approach		60	8	63	13.3	0.208	16.0	LOS B	0.7	5.3	0.67	0.67	0.67	42.0
All Vehicles		983	76	1035	7.7	0.224	3.4	NA	0.7	5.7	0.15	0.22	0.16	54.4

MOVEMENT SUMMARY

Site: 03 [EX PM Hume St / Finlay Rd (Site Folder: Existing)]

Hume Street / Finlay Road
Existing Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	19	1	20	5.3	0.126	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	56.8
2	T1	436	18	459	4.1	0.126	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
3	R2	101	15	106	14.9	0.125	8.1	LOS A	0.5	3.9	0.47	0.68	0.47	47.5
Approach		556	34	585	6.1	0.126	1.7	NA	0.5	3.9	0.09	0.14	0.09	57.0
East: Finlay Road (E)														
4	L2	88	4	93	4.5	0.088	5.6	LOS A	0.3	2.4	0.32	0.56	0.32	48.2
5	T1	14	1	15	7.1	0.337	32.4	LOS C	1.1	8.4	0.88	1.00	1.07	33.4
6	R2	31	3	33	9.7	0.337	36.1	LOS C	1.1	8.4	0.88	1.00	1.07	34.9
Approach		133	8	140	6.0	0.337	15.5	LOS B	1.1	8.4	0.51	0.71	0.57	42.4
North: Hume Street (N)														
7	L2	33	3	35	9.1	0.025	6.1	LOS A	0.1	0.7	0.22	0.52	0.22	48.7
8	T1	375	18	395	4.8	0.118	0.3	LOS A	0.3	2.0	0.07	0.08	0.07	59.4
9	R2	20	2	21	10.0	0.118	8.5	LOS A	0.3	2.0	0.17	0.18	0.17	51.9
Approach		428	23	451	5.4	0.118	1.1	LOS A	0.3	2.0	0.09	0.12	0.09	58.0
West: Finlay Road (W)														
10	L2	36	0	38	0.0	0.299	7.0	LOS A	1.2	8.3	0.79	0.83	0.95	40.3
11	T1	7	1	7	14.3	0.299	34.7	LOS C	1.2	8.3	0.79	0.83	0.95	38.2
12	R2	28	1	29	3.6	0.299	35.4	LOS C	1.2	8.3	0.79	0.83	0.95	40.3
Approach		71	2	75	2.8	0.299	20.9	LOS B	1.2	8.3	0.79	0.83	0.95	40.1
All Vehicles		1188	67	1251	5.6	0.337	4.2	NA	1.2	8.4	0.18	0.24	0.19	53.9

MOVEMENT SUMMARY

Site: 03 [EX SAT Hume St / Finlay Rd (Site Folder: Existing)]

Hume Street / Finlay Road
Existing Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	25	0	26	0.0	0.143	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	56.9
2	T1	492	15	518	3.0	0.143	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	104	4	109	3.8	0.129	8.1	LOS A	0.5	3.7	0.50	0.71	0.50	47.6
Approach		621	19	654	3.1	0.143	1.6	NA	0.5	3.7	0.08	0.14	0.08	57.1
East: Finlay Road (E)														
4	L2	136	2	143	1.5	0.138	5.8	LOS A	0.5	3.7	0.35	0.59	0.35	48.2
5	T1	9	0	9	0.0	0.274	33.3	LOS C	0.9	6.3	0.90	0.98	1.01	32.7
6	R2	23	1	24	4.3	0.274	39.1	LOS C	0.9	6.3	0.90	0.98	1.01	34.1
Approach		168	3	177	1.8	0.274	11.8	LOS A	0.9	6.3	0.46	0.66	0.48	44.5
North: Hume Street (N)														
7	L2	39	2	41	5.1	0.029	6.0	LOS A	0.1	0.8	0.21	0.52	0.21	48.7
8	T1	453	8	477	1.8	0.132	0.2	LOS A	0.2	1.3	0.04	0.05	0.04	59.6
9	R2	13	0	14	0.0	0.132	8.5	LOS A	0.2	1.3	0.10	0.11	0.10	52.5
Approach		505	10	532	2.0	0.132	0.8	LOS A	0.2	1.3	0.06	0.09	0.06	58.4
West: Finlay Road (W)														
10	L2	33	0	35	0.0	0.451	10.7	LOS A	1.7	12.3	0.90	1.00	1.29	34.9
11	T1	9	0	9	0.0	0.451	36.8	LOS C	1.7	12.3	0.90	1.00	1.29	33.4
12	R2	25	3	26	12.0	0.451	66.3	LOS E	1.7	12.3	0.90	1.00	1.29	34.8
Approach		67	3	71	4.5	0.451	35.0	LOS C	1.7	12.3	0.90	1.00	1.29	34.7
All Vehicles		1361	35	1433	2.6	0.451	4.2	NA	1.7	12.3	0.16	0.23	0.18	53.9

MOVEMENT SUMMARY

Site: 04 [EX AM Finlay Rd / Tait Cres / Churchill St (Site Folder: Existing)]

Finlay Road / Tait Crescent / Churchill Street
Existing Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tait Crescent (S)														
1	L2	9	0	9	0.0	0.043	4.8	LOS A	0.1	1.0	0.29	0.55	0.29	45.3
2	T1	1	0	1	0.0	0.043	4.3	LOS A	0.1	1.0	0.29	0.55	0.29	45.6
3	R2	28	1	29	3.6	0.043	6.0	LOS A	0.1	1.0	0.29	0.55	0.29	45.1
Approach		38	1	40	2.6	0.043	5.7	LOS A	0.1	1.0	0.29	0.55	0.29	45.1
East: Finlay Road (E)														
4	L2	52	0	55	0.0	0.080	4.6	LOS A	0.0	0.1	0.01	0.21	0.01	47.6
5	T1	87	9	92	10.3	0.080	0.0	LOS A	0.0	0.1	0.01	0.21	0.01	48.8
6	R2	1	0	1	0.0	0.080	4.6	LOS A	0.0	0.1	0.01	0.21	0.01	47.4
Approach		140	9	147	6.4	0.080	1.7	NA	0.0	0.1	0.01	0.21	0.01	48.3
North: Churchill Street (N)														
7	L2	3	0	3	0.0	0.004	4.9	LOS A	0.0	0.1	0.25	0.49	0.25	45.6
8	T1	1	0	1	0.0	0.004	4.3	LOS A	0.0	0.1	0.25	0.49	0.25	45.9
9	R2	1	0	1	0.0	0.004	5.7	LOS A	0.0	0.1	0.25	0.49	0.25	45.4
Approach		5	0	5	0.0	0.004	4.9	LOS A	0.0	0.1	0.25	0.49	0.25	45.6
West: Finlay Road (W)														
10	L2	4	2	4	50.0	0.081	5.4	LOS A	0.1	1.0	0.08	0.12	0.08	47.3
11	T1	113	14	119	12.4	0.081	0.1	LOS A	0.1	1.0	0.08	0.12	0.08	49.3
12	R2	17	1	18	5.9	0.081	5.1	LOS A	0.1	1.0	0.08	0.12	0.08	47.8
Approach		134	17	141	12.7	0.081	0.9	NA	0.1	1.0	0.08	0.12	0.08	49.0
All Vehicles		317	27	334	8.5	0.081	1.9	NA	0.1	1.0	0.08	0.21	0.08	48.2

MOVEMENT SUMMARY

Site: 04 [EX PM Finlay Rd / Tait Cres / Churchill St (Site Folder: Existing)]

Finlay Road / Tait Crescent / Churchill Street
Existing Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tait Crescent (S)														
1	L2	19	0	20	0.0	0.098	5.0	LOS A	0.3	2.5	0.34	0.59	0.34	45.2
2	T1	6	0	6	0.0	0.098	4.5	LOS A	0.3	2.5	0.34	0.59	0.34	45.5
3	R2	59	2	62	3.4	0.098	6.4	LOS A	0.3	2.5	0.34	0.59	0.34	44.9
Approach		84	2	88	2.4	0.098	5.9	LOS A	0.3	2.5	0.34	0.59	0.34	45.0
East: Finlay Road (E)														
4	L2	34	0	36	0.0	0.088	4.6	LOS A	0.0	0.2	0.02	0.13	0.02	48.0
5	T1	121	4	127	3.3	0.088	0.0	LOS A	0.0	0.2	0.02	0.13	0.02	49.2
6	R2	3	0	3	0.0	0.088	4.7	LOS A	0.0	0.2	0.02	0.13	0.02	47.8
Approach		158	4	166	2.5	0.088	1.1	NA	0.0	0.2	0.02	0.13	0.02	48.9
North: Churchill Street (N)														
7	L2	1	0	1	0.0	0.007	5.0	LOS A	0.0	0.2	0.35	0.54	0.35	45.2
8	T1	1	0	1	0.0	0.007	4.4	LOS A	0.0	0.2	0.35	0.54	0.35	45.5
9	R2	3	1	3	33.3	0.007	7.1	LOS A	0.0	0.2	0.35	0.54	0.35	44.5
Approach		5	1	5	20.0	0.007	6.2	LOS A	0.0	0.2	0.35	0.54	0.35	44.8
West: Finlay Road (W)														
10	L2	2	1	2	50.0	0.086	5.4	LOS A	0.1	0.5	0.04	0.06	0.04	47.6
11	T1	133	18	140	13.5	0.086	0.0	LOS A	0.1	0.5	0.04	0.06	0.04	49.6
12	R2	9	0	9	0.0	0.086	5.1	LOS A	0.1	0.5	0.04	0.06	0.04	48.2
Approach		144	19	152	13.2	0.086	0.4	NA	0.1	0.5	0.04	0.06	0.04	49.5
All Vehicles		391	26	412	6.6	0.098	1.9	NA	0.3	2.5	0.10	0.21	0.10	48.2

MOVEMENT SUMMARY

Site: 04 [EX SAT Finlay Rd / Tait Cres / Churchill St (Site Folder: Existing)]

Finlay Road / Tait Crescent / Churchill Street
Existing Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tait Crescent (S)														
1	L2	11	0	12	0.0	0.056	5.0	LOS A	0.2	1.4	0.35	0.59	0.35	45.1
2	T1	2	0	2	0.0	0.056	4.7	LOS A	0.2	1.4	0.35	0.59	0.35	45.4
3	R2	33	1	35	3.0	0.056	6.5	LOS A	0.2	1.4	0.35	0.59	0.35	44.9
Approach		46	1	48	2.2	0.056	6.1	LOS A	0.2	1.4	0.35	0.59	0.35	44.9
East: Finlay Road (E)														
4	L2	24	1	25	4.2	0.091	4.6	LOS A	0.0	0.1	0.01	0.08	0.01	48.2
5	T1	140	3	147	2.1	0.091	0.0	LOS A	0.0	0.1	0.01	0.08	0.01	49.5
6	R2	1	0	1	0.0	0.091	4.6	LOS A	0.0	0.1	0.01	0.08	0.01	48.1
Approach		165	4	174	2.4	0.091	0.7	NA	0.0	0.1	0.01	0.08	0.01	49.3
North: Churchill Street (N)														
7	L2	4	0	4	0.0	0.011	5.0	LOS A	0.0	0.3	0.33	0.53	0.33	45.3
8	T1	1	0	1	0.0	0.011	4.6	LOS A	0.0	0.3	0.33	0.53	0.33	45.5
9	R2	4	1	4	25.0	0.011	7.1	LOS A	0.0	0.3	0.33	0.53	0.33	44.7
Approach		9	1	9	11.1	0.011	5.9	LOS A	0.0	0.3	0.33	0.53	0.33	45.0
West: Finlay Road (W)														
10	L2	6	2	6	33.3	0.098	5.2	LOS A	0.1	0.6	0.04	0.06	0.04	47.9
11	T1	160	3	168	1.9	0.098	0.0	LOS A	0.1	0.6	0.04	0.06	0.04	49.7
12	R2	8	1	8	12.5	0.098	5.3	LOS A	0.1	0.6	0.04	0.06	0.04	48.0
Approach		174	6	183	3.4	0.098	0.5	NA	0.1	0.6	0.04	0.06	0.04	49.5
All Vehicles		394	12	415	3.0	0.098	1.3	NA	0.2	1.4	0.07	0.14	0.07	48.8

MOVEMENT SUMMARY

Site: 01 [FU AM Lockyer St / Sowerby St (Site Folder: Existing + Development)]

Lockyer Street / Sowerby Street
Future Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sowerby Street (E)														
5	T1	109	4	115	3.7	0.070	0.1	LOS A	0.1	0.7	0.08	0.09	0.08	49.4
6	R2	13	0	14	0.0	0.070	5.2	LOS A	0.1	0.7	0.08	0.09	0.08	48.0
Approach		122	4	128	3.3	0.070	0.6	NA	0.1	0.7	0.08	0.09	0.08	49.3
North: Lockyer Street (N)														
7	L2	13	0	14	0.0	0.063	5.0	LOS A	0.2	1.7	0.32	0.58	0.32	45.7
9	R2	42	11	44	26.2	0.063	6.6	LOS A	0.2	1.7	0.32	0.58	0.32	45.5
Approach		55	11	58	20.0	0.063	6.2	LOS A	0.2	1.7	0.32	0.58	0.32	45.6
West: Sowerby Street (W)														
10	L2	53	22	56	41.5	0.109	5.1	LOS A	0.0	0.0	0.00	0.18	0.00	48.6
11	T1	128	2	135	1.6	0.109	0.2	LOS A	0.0	0.0	0.00	0.18	0.00	50.7
Approach		181	24	191	13.3	0.109	1.6	NA	0.0	0.0	0.00	0.18	0.00	50.1
All Vehicles		358	39	377	10.9	0.109	2.0	NA	0.2	1.7	0.08	0.21	0.08	49.1

MOVEMENT SUMMARY

Site: 01 [FU PM Lockyer St / Sowerby St (Site Folder: Existing + Development)]

Lockyer Street / Sowerby Street
Future Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sowerby Street (E)														
5	T1	96	1	101	1.0	0.075	0.2	LOS A	0.2	1.5	0.14	0.19	0.14	48.8
6	R2	33	0	35	0.0	0.075	5.0	LOS A	0.2	1.5	0.14	0.19	0.14	47.4
Approach		129	1	136	0.8	0.075	1.4	NA	0.2	1.5	0.14	0.19	0.14	48.5
North: Lockyer Street (N)														
7	L2	20	0	21	0.0	0.078	4.9	LOS A	0.3	2.3	0.29	0.58	0.29	46.5
9	R2	49	19	52	38.8	0.078	7.1	LOS A	0.3	2.3	0.29	0.58	0.29	47.2
Approach		69	19	73	27.5	0.078	6.5	LOS A	0.3	2.3	0.29	0.58	0.29	47.0
West: Sowerby Street (W)														
10	L2	33	9	35	27.3	0.078	4.9	LOS A	0.0	0.0	0.00	0.14	0.00	48.1
11	T1	103	1	108	1.0	0.078	0.1	LOS A	0.0	0.0	0.00	0.14	0.00	49.8
Approach		136	10	143	7.4	0.078	1.2	NA	0.0	0.0	0.00	0.14	0.00	49.4
All Vehicles		334	30	352	9.0	0.078	2.4	NA	0.3	2.3	0.12	0.25	0.12	48.5

MOVEMENT SUMMARY

Site: 01 [FU SAT Lockyer St / Sowerby St (Site Folder: Existing + Development)]

Lockyer Street / Sowerby Street
Future Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Sowerby Street (E)														
5	T1	173	2	182	1.2	0.109	0.1	LOS A	0.2	1.1	0.09	0.10	0.09	49.4
6	R2	20	0	21	0.0	0.109	5.4	LOS A	0.2	1.1	0.09	0.10	0.09	48.0
Approach		193	2	203	1.0	0.109	0.7	NA	0.2	1.1	0.09	0.10	0.09	49.3
North: Lockyer Street (N)														
7	L2	13	0	14	0.0	0.054	5.1	LOS A	0.2	1.4	0.37	0.61	0.37	45.8
9	R2	33	5	35	15.2	0.054	7.1	LOS A	0.2	1.4	0.37	0.61	0.37	46.2
Approach		46	5	48	10.9	0.054	6.5	LOS A	0.2	1.4	0.37	0.61	0.37	46.1
West: Sowerby Street (W)														
10	L2	51	10	54	19.6	0.128	4.8	LOS A	0.0	0.0	0.00	0.13	0.00	48.2
11	T1	175	2	184	1.1	0.128	0.1	LOS A	0.0	0.0	0.00	0.13	0.00	49.7
Approach		226	12	238	5.3	0.128	1.1	NA	0.0	0.0	0.00	0.13	0.00	49.4
All Vehicles		465	19	489	4.1	0.128	1.5	NA	0.2	1.4	0.07	0.17	0.07	49.0

MOVEMENT SUMMARY

Site: 02 [FU AM Hume St / Sowerby St (Site Folder: Existing + Development)]

Hume Street / Sowerby Street
Future Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
2	T1	259	23	273	8.9	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	158	29	166	18.4	0.275	9.3	LOS A	1.1	8.8	0.49	0.71	0.51	47.3
Approach		417	52	439	12.5	0.275	3.5	NA	1.1	8.8	0.19	0.27	0.19	54.4
East: Sowerby Street (E)														
4	L2	176	17	185	9.7	0.163	5.3	LOS A	0.7	5.2	0.24	0.52	0.24	48.4
6	R2	63	3	66	4.8	0.275	19.5	LOS B	1.0	7.1	0.76	0.92	0.88	41.0
Approach		239	20	252	8.4	0.275	9.0	LOS A	1.0	7.1	0.38	0.63	0.41	46.2
North: Hume Street (N)														
7	L2	119	11	125	9.2	0.072	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
8	T1	221	24	233	10.9	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		340	35	358	10.3	0.072	2.0	NA	0.0	0.0	0.00	0.20	0.00	57.1
All Vehicles		996	107	1048	10.7	0.275	4.3	NA	1.1	8.8	0.17	0.33	0.18	53.0

MOVEMENT SUMMARY

Site: 02 [FU PM Hume St / Sowerby St (Site Folder: Existing + Development)]

Hume Street / Sowerby Street
Future Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
South: Hume Street (S)														
2	T1	398	33	398	8.3	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	129	20	129	15.7	0.198	8.4	LOS A	0.7	5.9	0.44	0.67	0.44	47.5
Approach		527	53	527	10.1	0.198	2.1	NA	0.7	5.9	0.11	0.17	0.11	56.3
East: Sowerby Street (E)														
4	L2	169	23	171	14.0	0.154	5.5	LOS A	0.7	5.2	0.24	0.53	0.24	48.8
6	R2	54	1	54	1.9	0.241	20.2	LOS B	0.8	5.8	0.78	0.92	0.86	40.7
Approach		223	24	225	11.1	0.241	9.0	LOS A	0.8	5.8	0.37	0.62	0.39	46.6
North: Hume Street (N)														
7	L2	97	2	97	2.1	0.053	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
8	T1	238	20	238	8.4	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		335	22	335	6.6	0.064	1.6	NA	0.0	0.0	0.00	0.17	0.00	57.7
All Vehicles		1085	99	1087	9.2	0.241	3.4	NA	0.8	5.9	0.13	0.26	0.13	54.4

MOVEMENT SUMMARY

Site: 02 [FU SAT Hume St / Sowerby St (Site Folder: Existing + Development)]

Hume Street / Sowerby Street
Future Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
2	T1	307	15	323	4.9	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	228	13	240	5.7	0.396	10.6	LOS A	2.0	15.0	0.57	0.81	0.72	46.2
Approach		535	28	563	5.2	0.396	4.5	NA	2.0	15.0	0.24	0.35	0.31	53.2
East: Sowerby Street (E)														
4	L2	283	9	298	3.2	0.257	5.4	LOS A	1.2	8.8	0.29	0.53	0.29	48.5
6	R2	99	2	104	2.0	0.570	32.8	LOS C	2.4	17.4	0.89	1.09	1.38	35.8
Approach		382	11	402	2.9	0.570	12.5	LOS A	2.4	17.4	0.44	0.68	0.57	44.4
North: Hume Street (N)														
7	L2	178	2	187	1.1	0.102	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
8	T1	263	17	277	6.5	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		441	19	464	4.3	0.102	2.3	NA	0.0	0.0	0.00	0.23	0.00	56.9
All Vehicles		1358	58	1429	4.3	0.570	6.0	NA	2.4	17.4	0.22	0.40	0.28	51.4

MOVEMENT SUMMARY

Site: 03 [FU AM Hume St / Finlay Rd (Site Folder: Existing + Development)]

Hume Street / Finlay Road
Future Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	17	0	18	0.0	0.102	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.0
2	T1	344	22	362	6.4	0.102	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	81	9	85	11.1	0.092	7.5	LOS A	0.4	2.8	0.43	0.64	0.43	47.9
Approach		442	31	465	7.0	0.102	1.6	NA	0.4	2.8	0.08	0.14	0.08	57.0
East: Finlay Road (E)														
4	L2	62	7	65	11.3	0.063	5.5	LOS A	0.2	1.7	0.29	0.54	0.29	48.0
5	T1	13	2	14	15.4	0.274	25.8	LOS B	0.9	7.2	0.83	0.95	0.95	37.0
6	R2	37	3	39	8.1	0.274	25.4	LOS B	0.9	7.2	0.83	0.95	0.95	38.9
Approach		112	12	118	10.7	0.274	14.5	LOS A	0.9	7.2	0.53	0.73	0.59	43.2
North: Hume Street (N)														
7	L2	75	6	79	8.0	0.055	6.0	LOS A	0.2	1.7	0.20	0.52	0.20	50.6
8	T1	327	19	344	5.8	0.099	0.1	LOS A	0.1	1.1	0.05	0.05	0.05	59.6
9	R2	13	0	14	0.0	0.099	7.3	LOS A	0.1	1.1	0.10	0.11	0.10	52.4
Approach		415	25	437	6.0	0.099	1.4	LOS A	0.2	1.7	0.08	0.14	0.08	57.5
West: Finlay Road (W)														
10	L2	35	1	37	2.9	0.208	5.4	LOS A	0.7	5.3	0.67	0.67	0.67	42.6
11	T1	11	2	12	18.2	0.208	23.7	LOS B	0.7	5.3	0.67	0.67	0.67	40.3
12	R2	14	5	15	35.7	0.208	36.4	LOS C	0.7	5.3	0.67	0.67	0.67	41.9
Approach		60	8	63	13.3	0.208	16.0	LOS B	0.7	5.3	0.67	0.67	0.67	42.0
All Vehicles		1029	76	1083	7.4	0.274	3.8	NA	0.9	7.2	0.16	0.23	0.17	54.2

MOVEMENT SUMMARY

Site: 03 [FU PM Hume St / Finlay Rd (Site Folder: Existing + Development)]

Hume Street / Finlay Road
Future Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	19	1	20	5.3	0.126	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	56.8
2	T1	436	18	459	4.1	0.126	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
3	R2	101	15	106	14.9	0.125	8.1	LOS A	0.5	3.9	0.47	0.68	0.47	47.5
Approach		556	34	585	6.1	0.126	1.7	NA	0.5	3.9	0.09	0.14	0.09	57.0
East: Finlay Road (E)														
4	L2	88	4	93	4.5	0.088	5.6	LOS A	0.3	2.4	0.32	0.56	0.32	48.2
5	T1	14	1	15	7.1	0.569	40.4	LOS C	2.3	16.9	0.92	1.09	1.39	32.5
6	R2	68	3	72	4.4	0.569	41.3	LOS C	2.3	16.9	0.92	1.09	1.39	33.9
Approach		170	8	179	4.7	0.569	22.8	LOS B	2.3	16.9	0.61	0.82	0.84	39.9
North: Hume Street (N)														
7	L2	42	3	44	7.1	0.031	6.1	LOS A	0.1	0.9	0.22	0.52	0.22	49.6
8	T1	375	18	395	4.8	0.118	0.3	LOS A	0.3	2.0	0.07	0.08	0.07	59.4
9	R2	20	2	21	10.0	0.118	8.5	LOS A	0.3	2.0	0.17	0.18	0.17	51.9
Approach		437	23	460	5.3	0.118	1.2	LOS A	0.3	2.0	0.09	0.13	0.09	57.9
West: Finlay Road (W)														
10	L2	36	0	38	0.0	0.299	7.0	LOS A	1.2	8.3	0.79	0.83	0.95	40.3
11	T1	7	1	7	14.3	0.299	34.7	LOS C	1.2	8.3	0.79	0.83	0.95	38.2
12	R2	28	1	29	3.6	0.299	35.4	LOS C	1.2	8.3	0.79	0.83	0.95	40.3
Approach		71	2	75	2.8	0.299	20.9	LOS B	1.2	8.3	0.79	0.83	0.95	40.1
All Vehicles		1234	67	1299	5.4	0.569	5.5	NA	2.3	16.9	0.20	0.27	0.24	52.8

MOVEMENT SUMMARY

Site: 03 [FU SAT Hume St / Finlay Rd (Site Folder: Existing + Development)]

Hume Street / Finlay Road
Future Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	25	0	26	0.0	0.143	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	56.9
2	T1	492	15	518	3.0	0.143	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	104	4	109	3.8	0.129	8.1	LOS A	0.5	3.7	0.50	0.71	0.50	47.6
Approach		621	19	654	3.1	0.143	1.6	NA	0.5	3.7	0.08	0.14	0.08	57.1
East: Finlay Road (E)														
4	L2	136	2	143	1.5	0.138	5.8	LOS A	0.5	3.7	0.35	0.59	0.35	48.2
5	T1	9	0	9	0.0	0.373	36.9	LOS C	1.3	9.1	0.91	1.01	1.11	32.3
6	R2	35	1	37	2.9	0.373	41.8	LOS C	1.3	9.1	0.91	1.01	1.11	33.7
Approach		180	3	189	1.7	0.373	14.3	LOS A	1.3	9.1	0.49	0.69	0.54	43.5
North: Hume Street (N)														
7	L2	51	2	54	3.9	0.037	6.0	LOS A	0.1	1.1	0.21	0.52	0.21	49.7
8	T1	453	8	477	1.8	0.132	0.2	LOS A	0.2	1.3	0.04	0.05	0.04	59.6
9	R2	13	0	14	0.0	0.132	8.5	LOS A	0.2	1.3	0.10	0.11	0.10	52.5
Approach		517	10	544	1.9	0.132	1.0	LOS A	0.2	1.3	0.06	0.10	0.06	58.2
West: Finlay Road (W)														
10	L2	33	0	35	0.0	0.451	10.7	LOS A	1.7	12.3	0.90	1.00	1.29	34.9
11	T1	9	0	9	0.0	0.451	36.8	LOS C	1.7	12.3	0.90	1.00	1.29	33.4
12	R2	25	3	26	12.0	0.451	66.3	LOS E	1.7	12.3	0.90	1.00	1.29	34.8
Approach		67	3	71	4.5	0.451	35.0	LOS C	1.7	12.3	0.90	1.00	1.29	34.7
All Vehicles		1385	35	1458	2.5	0.451	4.6	NA	1.7	12.3	0.17	0.24	0.19	53.6

MOVEMENT SUMMARY

Site: 04 [FU AM Finlay Rd / Tait Cres / Churchill St (Site Folder: Existing + Development)]

Finlay Road / Tait Crescent / Churchill Street
Future Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tait Crescent (S)														
1	L2	18	0	19	0.0	0.091	5.4	LOS A	0.3	2.3	0.34	0.60	0.34	48.4
2	T1	1	0	1	0.0	0.091	4.9	LOS A	0.3	2.3	0.34	0.60	0.34	46.9
3	R2	55	1	58	1.8	0.091	7.2	LOS A	0.3	2.3	0.34	0.60	0.34	48.1
Approach		74	1	78	1.4	0.091	6.7	LOS A	0.3	2.3	0.34	0.60	0.34	48.2
East: Finlay Road (E)														
4	L2	164	0	173	0.0	0.144	5.2	LOS A	0.0	0.1	0.00	0.37	0.00	51.0
5	T1	87	9	92	10.3	0.144	0.0	LOS A	0.0	0.1	0.00	0.37	0.00	49.6
6	R2	1	0	1	0.0	0.144	4.6	LOS A	0.0	0.1	0.00	0.37	0.00	48.2
Approach		252	9	265	3.6	0.144	3.4	NA	0.0	0.1	0.00	0.37	0.00	50.5
North: Churchill Street (N)														
7	L2	3	0	3	0.0	0.005	4.9	LOS A	0.0	0.1	0.27	0.49	0.27	45.5
8	T1	1	0	1	0.0	0.005	5.1	LOS A	0.0	0.1	0.27	0.49	0.27	45.8
9	R2	1	0	1	0.0	0.005	6.0	LOS A	0.0	0.1	0.27	0.49	0.27	45.3
Approach		5	0	5	0.0	0.005	5.2	LOS A	0.0	0.1	0.27	0.49	0.27	45.5
West: Finlay Road (W)														
10	L2	4	2	4	50.0	0.109	5.9	LOS A	0.4	3.0	0.25	0.30	0.25	47.2
11	T1	113	14	119	12.4	0.109	0.5	LOS A	0.4	3.0	0.25	0.30	0.25	49.1
12	R2	54	1	57	1.9	0.109	6.2	LOS A	0.4	3.0	0.25	0.30	0.25	50.2
Approach		171	17	180	9.9	0.109	2.4	NA	0.4	3.0	0.25	0.30	0.25	49.4
All Vehicles		502	27	528	5.4	0.144	3.6	NA	0.4	3.0	0.14	0.38	0.14	49.7

MOVEMENT SUMMARY

Site: 04 [FU AM Finlay Rd / Tait Cres / Churchill St (Site Folder: Existing + Development)]

Finlay Road / Tait Crescent / Churchill Street
Future Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tait Crescent (S)														
1	L2	18	0	19	0.0	0.091	5.4	LOS A	0.3	2.3	0.34	0.60	0.34	48.4
2	T1	1	0	1	0.0	0.091	4.9	LOS A	0.3	2.3	0.34	0.60	0.34	46.9
3	R2	55	1	58	1.8	0.091	7.2	LOS A	0.3	2.3	0.34	0.60	0.34	48.1
Approach		74	1	78	1.4	0.091	6.7	LOS A	0.3	2.3	0.34	0.60	0.34	48.2
East: Finlay Road (E)														
4	L2	164	0	173	0.0	0.144	5.2	LOS A	0.0	0.1	0.00	0.37	0.00	51.0
5	T1	87	9	92	10.3	0.144	0.0	LOS A	0.0	0.1	0.00	0.37	0.00	49.6
6	R2	1	0	1	0.0	0.144	4.6	LOS A	0.0	0.1	0.00	0.37	0.00	48.2
Approach		252	9	265	3.6	0.144	3.4	NA	0.0	0.1	0.00	0.37	0.00	50.5
North: Churchill Street (N)														
7	L2	3	0	3	0.0	0.005	4.9	LOS A	0.0	0.1	0.27	0.49	0.27	45.5
8	T1	1	0	1	0.0	0.005	5.1	LOS A	0.0	0.1	0.27	0.49	0.27	45.8
9	R2	1	0	1	0.0	0.005	6.0	LOS A	0.0	0.1	0.27	0.49	0.27	45.3
Approach		5	0	5	0.0	0.005	5.2	LOS A	0.0	0.1	0.27	0.49	0.27	45.5
West: Finlay Road (W)														
10	L2	4	2	4	50.0	0.109	5.9	LOS A	0.4	3.0	0.25	0.30	0.25	47.2
11	T1	113	14	119	12.4	0.109	0.5	LOS A	0.4	3.0	0.25	0.30	0.25	49.1
12	R2	54	1	57	1.9	0.109	6.2	LOS A	0.4	3.0	0.25	0.30	0.25	50.2
Approach		171	17	180	9.9	0.109	2.4	NA	0.4	3.0	0.25	0.30	0.25	49.4
All Vehicles		502	27	528	5.4	0.144	3.6	NA	0.4	3.0	0.14	0.38	0.14	49.7

MOVEMENT SUMMARY

Site: 04 [FU SAT Finlay Rd / Tait Cres / Churchill St (Site Folder: Existing + Development)]

Finlay Road / Tait Crescent / Churchill Street
Future Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tait Crescent (S)														
1	L2	23	0	24	0.0	0.115	5.6	LOS A	0.4	2.9	0.38	0.63	0.38	48.5
2	T1	2	0	2	0.0	0.115	4.9	LOS A	0.4	2.9	0.38	0.63	0.38	46.9
3	R2	68	1	72	1.5	0.115	7.3	LOS A	0.4	2.9	0.38	0.63	0.38	48.2
Approach		93	1	98	1.1	0.115	6.8	LOS A	0.4	2.9	0.38	0.63	0.38	48.2
East: Finlay Road (E)														
4	L2	59	1	62	1.7	0.111	5.2	LOS A	0.0	0.1	0.00	0.17	0.00	50.7
5	T1	140	3	147	2.1	0.111	0.0	LOS A	0.0	0.1	0.00	0.17	0.00	49.7
6	R2	1	0	1	0.0	0.111	4.6	LOS A	0.0	0.1	0.00	0.17	0.00	48.3
Approach		200	4	211	2.0	0.111	1.6	NA	0.0	0.1	0.00	0.17	0.00	50.0
North: Churchill Street (N)														
7	L2	4	0	4	0.0	0.011	5.0	LOS A	0.0	0.3	0.34	0.54	0.34	45.2
8	T1	1	0	1	0.0	0.011	4.9	LOS A	0.0	0.3	0.34	0.54	0.34	45.5
9	R2	4	1	4	25.0	0.011	7.4	LOS A	0.0	0.3	0.34	0.54	0.34	44.6
Approach		9	1	9	11.1	0.011	6.0	LOS A	0.0	0.3	0.34	0.54	0.34	45.0
West: Finlay Road (W)														
10	L2	6	2	6	33.3	0.107	5.5	LOS A	0.2	1.3	0.09	0.12	0.09	47.8
11	T1	160	3	168	1.9	0.107	0.1	LOS A	0.2	1.3	0.09	0.12	0.09	49.6
12	R2	20	1	21	5.0	0.107	5.9	LOS A	0.2	1.3	0.09	0.12	0.09	50.3
Approach		186	6	196	3.2	0.107	0.9	NA	0.2	1.3	0.09	0.12	0.09	49.6
All Vehicles		488	12	514	2.5	0.115	2.4	NA	0.4	2.9	0.12	0.25	0.12	49.4

MOVEMENT SUMMARY

Site: 02 [Holiday AM Hume St / Sowerby St (Site Folder: Holiday Modelling Base Case)]

Hume Street / Sowerby Street
Holiday Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
2	T1	259	23	300	8.9	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	126	11	146	8.7	0.235	9.0	LOS A	0.9	6.6	0.49	0.72	0.49	47.0
Approach		385	34	446	8.8	0.235	3.0	NA	0.9	6.6	0.16	0.23	0.16	55.0
East: Sowerby Street (E)														
4	L2	168	12	195	7.1	0.171	5.3	LOS A	0.7	5.4	0.26	0.53	0.26	48.3
6	R2	63	3	73	4.8	0.316	20.9	LOS B	1.1	8.4	0.78	0.94	0.95	40.4
Approach		231	15	267	6.5	0.316	9.5	LOS A	1.1	8.4	0.40	0.64	0.44	45.8
North: Hume Street (N)														
7	L2	119	11	138	9.2	0.079	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
8	T1	221	24	256	10.9	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		340	35	394	10.3	0.079	2.0	NA	0.0	0.0	0.00	0.20	0.00	57.1
All Vehicles		956	84	1107	8.8	0.316	4.2	NA	1.1	8.4	0.16	0.32	0.17	53.1

MOVEMENT SUMMARY

Site: 02 [Holiday PM Hume St / Sowerby St (Site Folder: Holiday Modelling Base Case)]

Hume Street / Sowerby Street
Holiday Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
South: Hume Street (S)														
2	T1	398	33	438	8.3	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	121	15	133	12.4	0.207	8.6	LOS A	0.8	6.0	0.46	0.69	0.46	47.2
Approach		519	48	571	9.2	0.207	2.0	NA	0.8	6.0	0.11	0.16	0.11	56.4
East: Sowerby Street (E)														
4	L2	137	5	151	3.6	0.130	5.2	LOS A	0.5	3.9	0.25	0.52	0.25	48.4
6	R2	54	1	59	1.9	0.304	24.3	LOS B	1.1	7.6	0.82	0.96	0.97	39.0
Approach		191	6	210	3.1	0.304	10.6	LOS A	1.1	7.6	0.41	0.65	0.45	45.3
North: Hume Street (N)														
7	L2	97	2	107	2.1	0.058	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
8	T1	238	20	262	8.4	0.071	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		335	22	369	6.6	0.071	1.6	NA	0.0	0.0	0.00	0.17	0.00	57.7
All Vehicles		1045	76	1150	7.3	0.304	3.5	NA	1.1	7.6	0.13	0.25	0.14	54.3

MOVEMENT SUMMARY

Site: 02 [Holiday SAT Hume St / Sowerby St (Site Folder: Holiday Modelling Base Case)]

Hume Street / Sowerby Street
Holiday Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
2	T1	307	15	355	4.9	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	217	7	251	3.2	0.428	11.2	LOS A	2.3	16.6	0.60	0.86	0.80	45.7
Approach		524	22	607	4.2	0.428	4.7	NA	2.3	16.6	0.25	0.36	0.33	53.1
East: Sowerby Street (E)														
4	L2	272	3	315	1.1	0.272	5.4	LOS A	1.3	9.3	0.30	0.54	0.30	48.3
6	R2	99	2	115	2.0	0.728	46.0	LOS D 11	3.5	25.0	0.94	1.22	1.79	31.7
Approach		371	5	430	1.3	0.728	16.2	LOS B	3.5	25.0	0.47	0.72	0.70	42.4
North: Hume Street (N)														
7	L2	178	2	206	1.1	0.112	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
8	T1	263	17	305	6.5	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		441	19	511	4.3	0.112	2.3	NA	0.0	0.0	0.00	0.23	0.00	56.9
All Vehicles		1336	46	1547	3.4	0.728	7.1	NA	3.5	25.0	0.23	0.42	0.33	50.6

MOVEMENT SUMMARY

Site: 03 [Holiday AM Hume St / Finlay Rd (Site Folder: Holiday Modelling Base Case)]

Hume Street / Finlay Road
Holiday Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	17	0	20	0.0	0.112	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.0
2	T1	344	22	398	6.4	0.112	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	81	9	94	11.1	0.105	7.8	LOS A	0.4	3.2	0.46	0.66	0.46	47.7
Approach		442	31	512	7.0	0.112	1.7	NA	0.4	3.2	0.08	0.14	0.08	57.0
East: Finlay Road (E)														
4	L2	62	7	72	11.3	0.070	5.7	LOS A	0.3	2.0	0.31	0.55	0.31	48.0
5	T1	13	2	15	15.4	0.299	30.1	LOS C	1.0	7.7	0.86	0.97	1.01	34.8
6	R2	28	3	32	10.7	0.299	30.6	LOS C	1.0	7.7	0.86	0.97	1.01	36.4
Approach		103	12	119	11.7	0.299	15.5	LOS B	1.0	7.7	0.53	0.72	0.59	42.3
North: Hume Street (N)														
7	L2	38	6	44	15.8	0.032	6.2	LOS A	0.1	1.0	0.21	0.52	0.21	48.6
8	T1	327	19	379	5.8	0.109	0.1	LOS A	0.2	1.2	0.05	0.06	0.05	59.5
9	R2	13	0	15	0.0	0.109	7.6	LOS A	0.2	1.2	0.11	0.12	0.11	52.4
Approach		378	25	438	6.6	0.109	1.0	LOS A	0.2	1.2	0.07	0.10	0.07	57.9
West: Finlay Road (W)														
10	L2	35	1	41	2.9	0.277	6.5	LOS A	1.0	7.8	0.75	0.77	0.88	40.5
11	T1	11	2	13	18.2	0.277	30.1	LOS C	1.0	7.8	0.75	0.77	0.88	38.5
12	R2	14	5	16	35.7	0.277	47.5	LOS D [11]	1.0	7.8	0.75	0.77	0.88	39.8
Approach		60	8	69	13.3	0.277	20.4	LOS B	1.0	7.8	0.75	0.77	0.88	40.0
All Vehicles		983	76	1138	7.7	0.299	4.0	NA	1.0	7.8	0.16	0.23	0.18	53.9

MOVEMENT SUMMARY

Site: 03 [Holiday PM Hume St / Finlay Rd (Site Folder: Holiday Modelling Base Case)]

Hume Street / Finlay Road
Holiday Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	19	1	22	5.3	0.139	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	56.8
2	T1	436	18	505	4.1	0.139	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
3	R2	101	15	117	14.9	0.145	8.4	LOS A	0.6	4.5	0.50	0.71	0.50	47.3
Approach		556	34	644	6.1	0.145	1.8	NA	0.6	4.5	0.09	0.15	0.09	56.9
East: Finlay Road (E)														
4	L2	88	4	102	4.5	0.100	5.8	LOS A	0.4	2.7	0.34	0.58	0.34	48.1
5	T1	14	1	16	7.1	0.474	44.8	LOS D [11]	1.6	11.8	0.93	1.05	1.23	29.8
6	R2	31	3	36	9.7	0.474	50.0	LOS D [11]	1.6	11.8	0.93	1.05	1.23	30.9
Approach		133	8	154	6.0	0.474	20.2	LOS B	1.6	11.8	0.54	0.74	0.64	40.3
North: Hume Street (N)														
7	L2	33	3	38	9.1	0.028	6.1	LOS A	0.1	0.8	0.23	0.52	0.23	48.6
8	T1	375	18	434	4.8	0.130	0.3	LOS A	0.3	2.4	0.08	0.09	0.08	59.3
9	R2	20	2	23	10.0	0.130	8.9	LOS A	0.3	2.4	0.18	0.20	0.18	51.7
Approach		428	23	496	5.4	0.130	1.2	LOS A	0.3	2.4	0.09	0.12	0.09	57.9
West: Finlay Road (W)														
10	L2	36	0	42	0.0	0.411	9.3	LOS A	1.7	12.1	0.86	0.95	1.20	37.5
11	T1	7	1	8	14.3	0.411	46.2	LOS D [11]	1.7	12.1	0.86	0.95	1.20	35.7
12	R2	28	1	32	3.6	0.411	47.2	LOS D [11]	1.7	12.1	0.86	0.95	1.20	37.4
Approach		71	2	82	2.8	0.411	27.9	LOS B	1.7	12.1	0.86	0.95	1.20	37.3
All Vehicles		1188	67	1376	5.6	0.474	5.2	NA	1.7	12.1	0.19	0.25	0.22	53.1

MOVEMENT SUMMARY

Site: 03 [Holiday SAT Hume St / Finlay Rd (Site Folder: Holiday Modelling Base Case)]

Hume Street / Finlay Road
Holiday Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	25	0	29	0.0	0.157	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	56.9
2	T1	492	15	570	3.0	0.157	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	104	4	120	3.8	0.150	8.5	LOS A	0.6	4.3	0.53	0.74	0.53	47.3
Approach		621	19	719	3.1	0.157	1.7	NA	0.6	4.3	0.09	0.15	0.09	57.1
East: Finlay Road (E)														
4	L2	136	2	157	1.5	0.157	5.9	LOS A	0.6	4.3	0.38	0.60	0.38	48.1
5	T1	9	0	10	0.0	0.393	46.4	LOS D [11]	1.3	9.0	0.93	1.02	1.13	28.9
6	R2	23	1	27	4.3	0.393	54.7	LOS D [11]	1.3	9.0	0.93	1.02	1.13	30.0
Approach		168	3	195	1.8	0.393	14.8	LOS B	1.3	9.0	0.48	0.68	0.52	43.0
North: Hume Street (N)														
7	L2	39	2	45	5.1	0.032	6.1	LOS A	0.1	0.9	0.23	0.52	0.23	48.7
8	T1	453	8	525	1.8	0.146	0.2	LOS A	0.2	1.6	0.05	0.05	0.05	59.6
9	R2	13	0	15	0.0	0.146	8.9	LOS A	0.2	1.6	0.10	0.12	0.10	52.4
Approach		505	10	585	2.0	0.146	0.9	LOS A	0.2	1.6	0.06	0.09	0.06	58.3
West: Finlay Road (W)														
10	L2	33	0	38	0.0	0.676	20.7	LOS B	2.8	20.0	0.98	1.22	1.80	29.2
11	T1	9	0	10	0.0	0.676	55.8	LOS D [11]	2.8	20.0	0.98	1.22	1.80	28.1
12	R2	25	3	29	12.0	0.676	101.8	LOS F [11]	2.8	20.0	0.98	1.22	1.80	29.1
Approach		67	3	78	4.5	0.676	55.7	LOS D [11]	2.8	20.0	0.98	1.22	1.80	29.0
All Vehicles		1361	35	1576	2.6	0.676	5.7	NA	2.8	20.0	0.17	0.25	0.22	52.8

MOVEMENT SUMMARY

Site: 02 [Holiday + Development AM Hume St / Sowerby St (Site Folder: Holiday + Development)]

Hume Street / Sowerby Street
Holiday + Development Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
2	T1	259	23	300	8.9	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	158	29	180	17.6	0.310	10.0	LOS A	1.3	10.7	0.52	0.76	0.59	46.8
Approach		417	52	479	12.2	0.310	3.8	NA	1.3	10.7	0.20	0.28	0.22	54.2
East: Sowerby Street (E)														
4	L2	176	17	203	9.4	0.181	5.4	LOS A	0.8	5.8	0.26	0.53	0.26	48.3
6	R2	63	3	73	4.8	0.348	23.5	LOS B	1.3	9.2	0.81	0.97	1.01	39.3
Approach		239	20	276	8.2	0.348	10.1	LOS A	1.3	9.2	0.41	0.65	0.46	45.5
North: Hume Street (N)														
7	L2	119	11	138	9.2	0.079	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	52.5
8	T1	221	24	256	10.9	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		340	35	394	10.3	0.079	2.0	NA	0.0	0.0	0.00	0.20	0.00	57.1
All Vehicles		996	107	1149	10.6	0.348	4.7	NA	1.3	10.7	0.18	0.34	0.20	52.7

MOVEMENT SUMMARY

Site: 02 [Holiday + Development PM Hume St / Sowerby St (Site Folder: Holiday + Development)]

Hume Street / Sowerby Street
Holiday + Development Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
South: Hume Street (S)														
2	T1	398	33	438	8.3	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	129	20	142	15.4	0.225	8.8	LOS A	0.8	6.7	0.47	0.69	0.47	47.2
Approach		527	53	579	10.0	0.225	2.2	NA	0.8	6.7	0.11	0.17	0.11	56.2
East: Sowerby Street (E)														
4	L2	169	23	184	13.3	0.168	5.6	LOS A	0.7	5.7	0.26	0.53	0.26	48.7
6	R2	54	1	59	1.9	0.310	24.8	LOS B	1.1	7.7	0.83	0.96	0.98	38.8
Approach		223	24	244	10.5	0.310	10.2	LOS A	1.1	7.7	0.40	0.64	0.44	45.9
North: Hume Street (N)														
7	L2	97	2	107	2.1	0.058	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
8	T1	238	20	262	8.4	0.071	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		335	22	369	6.6	0.071	1.6	NA	0.0	0.0	0.00	0.17	0.00	57.7
All Vehicles		1085	99	1192	9.0	0.310	3.7	NA	1.1	7.7	0.14	0.26	0.14	54.1

MOVEMENT SUMMARY

Site: 02 [Holiday + Development SAT Hume St / Sowerby St (Site Folder: Holiday + Development)]

Hume Street / Sowerby Street
Holiday + Development Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
2	T1	307	15	355	4.9	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	228	13	263	5.5	0.457	11.8	LOS A	2.6	18.9	0.61	0.88	0.86	45.5
Approach		535	28	618	5.1	0.457	5.0	NA	2.6	18.9	0.26	0.37	0.36	52.8
East: Sowerby Street (E)														
4	L2	283	9	327	3.0	0.286	5.5	LOS A	1.4	10.0	0.31	0.54	0.31	48.4
6	R2	99	2	115	2.0	0.756	49.9	LOS D 11	3.7	26.7	0.95	1.25	1.89	30.6
Approach		382	11	441	2.7	0.756	17.0	LOS B	3.7	26.7	0.47	0.72	0.72	42.1
North: Hume Street (N)														
7	L2	178	2	206	1.1	0.112	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.8
8	T1	263	17	305	6.5	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		441	19	511	4.3	0.112	2.3	NA	0.0	0.0	0.00	0.23	0.00	56.9
All Vehicles		1358	58	1570	4.2	0.756	7.5	NA	3.7	26.7	0.24	0.43	0.35	50.4

MOVEMENT SUMMARY

Site: 03 [Holiday + Development AM Hume St / Finlay Rd (Site Folder: Holiday + Development)]

Hume Street / Finlay Road
Holiday + Development Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	17	0	20	0.0	0.112	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.0
2	T1	344	22	398	6.4	0.112	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	81	9	94	11.1	0.105	7.8	LOS A	0.4	3.2	0.46	0.66	0.46	47.7
Approach		442	31	512	7.0	0.112	1.7	NA	0.4	3.2	0.08	0.14	0.08	57.0
East: Finlay Road (E)														
4	L2	62	7	72	11.3	0.070	5.7	LOS A	0.3	2.0	0.31	0.55	0.31	48.0
5	T1	13	2	15	15.4	0.361	32.9	LOS C	1.3	9.5	0.87	1.00	1.09	34.6
6	R2	37	3	42	8.3	0.361	32.3	LOS C	1.3	9.5	0.87	1.00	1.09	36.1
Approach		112	12	129	10.8	0.361	17.5	LOS B	1.3	9.5	0.56	0.75	0.65	41.6
North: Hume Street (N)														
7	L2	75	6	83	8.4	0.058	6.1	LOS A	0.2	1.8	0.21	0.52	0.21	50.5
8	T1	327	19	379	5.8	0.109	0.1	LOS A	0.2	1.2	0.05	0.06	0.05	59.5
9	R2	13	0	15	0.0	0.109	7.6	LOS A	0.2	1.2	0.11	0.12	0.11	52.4
Approach		415	25	477	6.1	0.109	1.4	LOS A	0.2	1.8	0.08	0.14	0.08	57.5
West: Finlay Road (W)														
10	L2	35	1	41	2.9	0.277	6.5	LOS A	1.0	7.8	0.75	0.77	0.88	40.5
11	T1	11	2	13	18.2	0.277	30.1	LOS C	1.0	7.8	0.75	0.77	0.88	38.5
12	R2	14	5	16	35.7	0.277	47.5	LOS D [11]	1.0	7.8	0.75	0.77	0.88	39.8
Approach		60	8	69	13.3	0.277	20.4	LOS B	1.0	7.8	0.75	0.77	0.88	40.0
All Vehicles		1029	76	1187	7.4	0.361	4.4	NA	1.3	9.5	0.17	0.24	0.19	53.7

MOVEMENT SUMMARY

Site: 03 [Holiday + Development PM Hume St / Finlay Rd (Site Folder: Holiday + Development)]

Hume Street / Finlay Road
Holiday + Development Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	19	1	22	5.3	0.139	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	56.8
2	T1	436	18	505	4.1	0.139	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
3	R2	101	15	117	14.9	0.145	8.4	LOS A	0.6	4.5	0.50	0.71	0.50	47.3
Approach		556	34	644	6.1	0.145	1.8	NA	0.6	4.5	0.09	0.15	0.09	56.9
East: Finlay Road (E)														
4	L2	88	4	102	4.5	0.100	5.8	LOS A	0.4	2.7	0.34	0.58	0.34	48.1
5	T1	14	1	16	7.1	0.762	64.7	LOS E [11]	3.5	25.2	0.96	1.22	1.85	26.7
6	R2	68	3	75	4.6	0.762	65.8	LOS E [11]	3.5	25.2	0.96	1.22	1.85	27.6
Approach		170	8	193	4.8	0.762	34.0	LOS C	3.5	25.2	0.64	0.88	1.06	35.5
North: Hume Street (N)														
7	L2	42	3	48	7.3	0.034	6.1	LOS A	0.1	1.0	0.23	0.52	0.23	49.5
8	T1	375	18	434	4.8	0.130	0.3	LOS A	0.3	2.4	0.08	0.09	0.08	59.3
9	R2	20	2	23	10.0	0.130	8.9	LOS A	0.3	2.4	0.18	0.20	0.18	51.7
Approach		437	23	505	5.3	0.130	1.3	LOS A	0.3	2.4	0.10	0.13	0.10	57.8
West: Finlay Road (W)														
10	L2	36	0	42	0.0	0.411	9.3	LOS A	1.7	12.1	0.86	0.95	1.20	37.5
11	T1	7	1	8	14.3	0.411	46.2	LOS D [11]	1.7	12.1	0.86	0.95	1.20	35.7
12	R2	28	1	32	3.6	0.411	47.2	LOS D [11]	1.7	12.1	0.86	0.95	1.20	37.4
Approach		71	2	82	2.8	0.411	27.9	LOS B	1.7	12.1	0.86	0.95	1.20	37.3
All Vehicles		1234	67	1424	5.4	0.762	7.5	NA	3.5	25.2	0.21	0.29	0.29	51.4

MOVEMENT SUMMARY

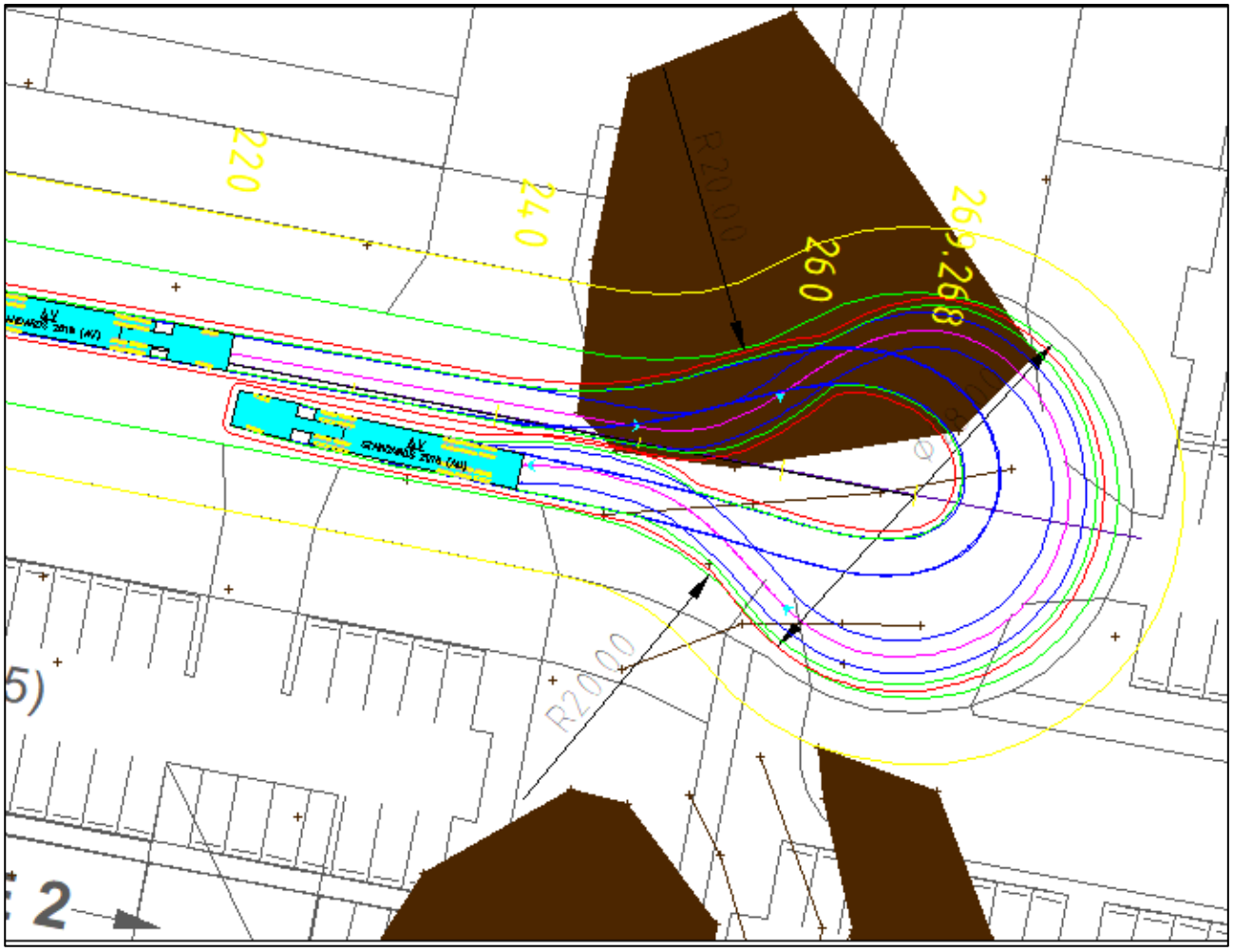
Site: 03 [Holiday + Development SAT Hume St / Finlay Rd (Site Folder: Holiday + Development)]

Hume Street / Finlay Road
Holiday + Development Conditions
SAT Peak Period
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hume Street (S)														
1	L2	25	0	29	0.0	0.157	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	56.9
2	T1	492	15	570	3.0	0.157	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
3	R2	104	4	120	3.8	0.150	8.5	LOS A	0.6	4.3	0.53	0.74	0.53	47.3
Approach		621	19	719	3.1	0.157	1.7	NA	0.6	4.3	0.09	0.15	0.09	57.1
East: Finlay Road (E)														
4	L2	136	2	157	1.5	0.157	5.9	LOS A	0.6	4.3	0.38	0.60	0.38	48.1
5	T1	9	0	10	0.0	0.521	53.2	LOS D [11]	1.8	12.9	0.95	1.06	1.27	27.9
6	R2	35	1	39	2.9	0.521	60.2	LOS E [11]	1.8	12.9	0.95	1.06	1.27	28.9
Approach		180	3	207	1.7	0.521	18.6	LOS B	1.8	12.9	0.52	0.71	0.59	41.4
North: Hume Street (N)														
7	L2	51	2	58	4.0	0.040	6.1	LOS A	0.2	1.2	0.23	0.52	0.23	49.6
8	T1	453	8	525	1.8	0.146	0.2	LOS A	0.2	1.6	0.05	0.05	0.05	59.6
9	R2	13	0	15	0.0	0.146	8.9	LOS A	0.2	1.6	0.10	0.12	0.10	52.4
Approach		517	10	597	1.9	0.146	1.0	LOS A	0.2	1.6	0.07	0.10	0.07	58.2
West: Finlay Road (W)														
10	L2	33	0	38	0.0	0.676	20.7	LOS B	2.8	20.0	0.98	1.22	1.80	29.2
11	T1	9	0	10	0.0	0.676	55.8	LOS D [11]	2.8	20.0	0.98	1.22	1.80	28.1
12	R2	25	3	29	12.0	0.676	101.8	LOS F [11]	2.8	20.0	0.98	1.22	1.80	29.1
Approach		67	3	78	4.5	0.676	55.7	LOS D [11]	2.8	20.0	0.98	1.22	1.80	29.0
All Vehicles		1385	35	1601	2.5	0.676	6.2	NA	2.8	20.0	0.18	0.26	0.23	52.4

ANNEXURE D: SWEPT PATH TESTING
(4 SHEETS)



20m length Articulated Vehicle undertaking a U-turn at the cul-de-sac.

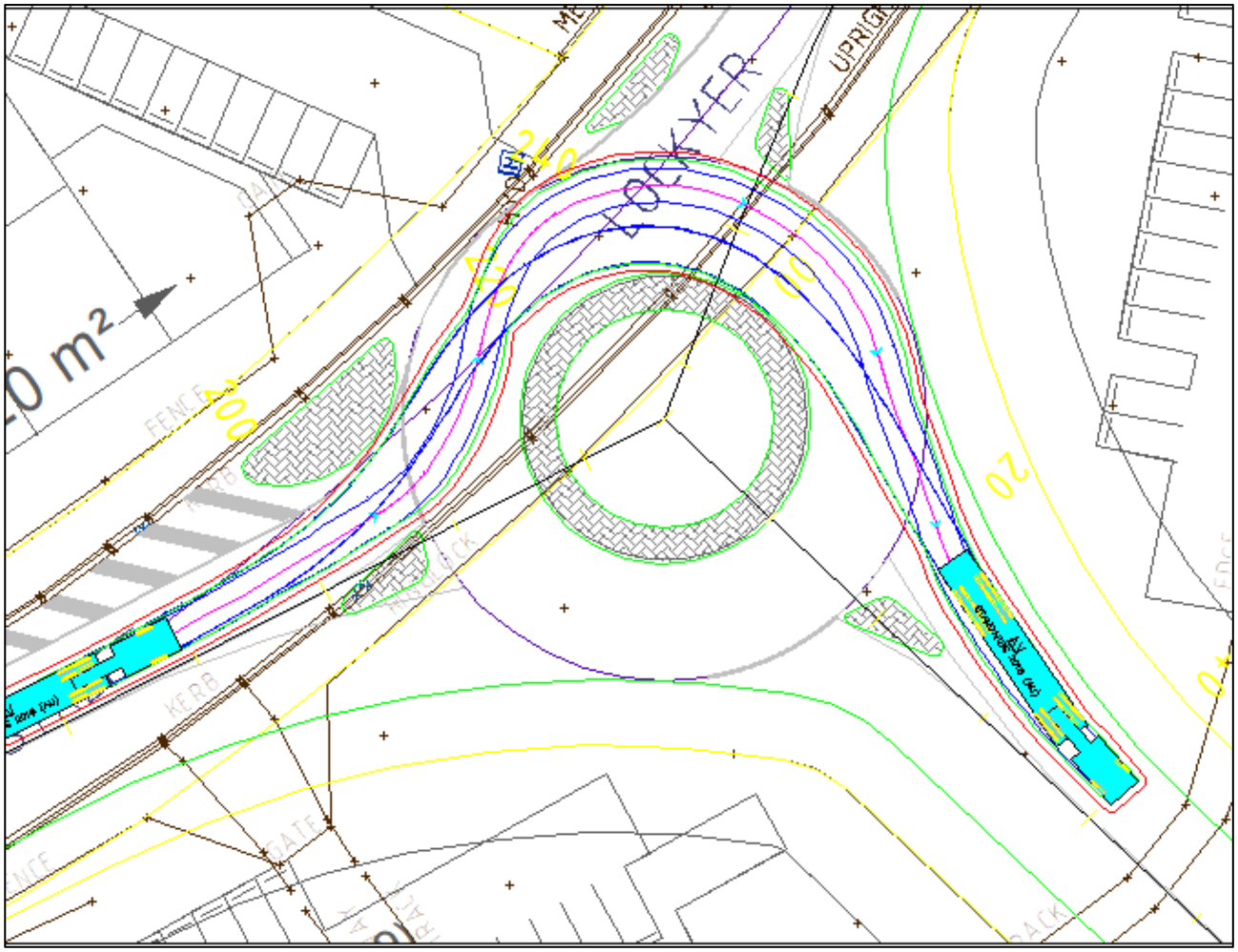
Successful

Tested at 10km/h

Blue – Vehicle Tyres

Green – Vehicle Body

Red – 500mm Clearance



20m length Articulated Vehicle undertaking a right turn at the roundabout.

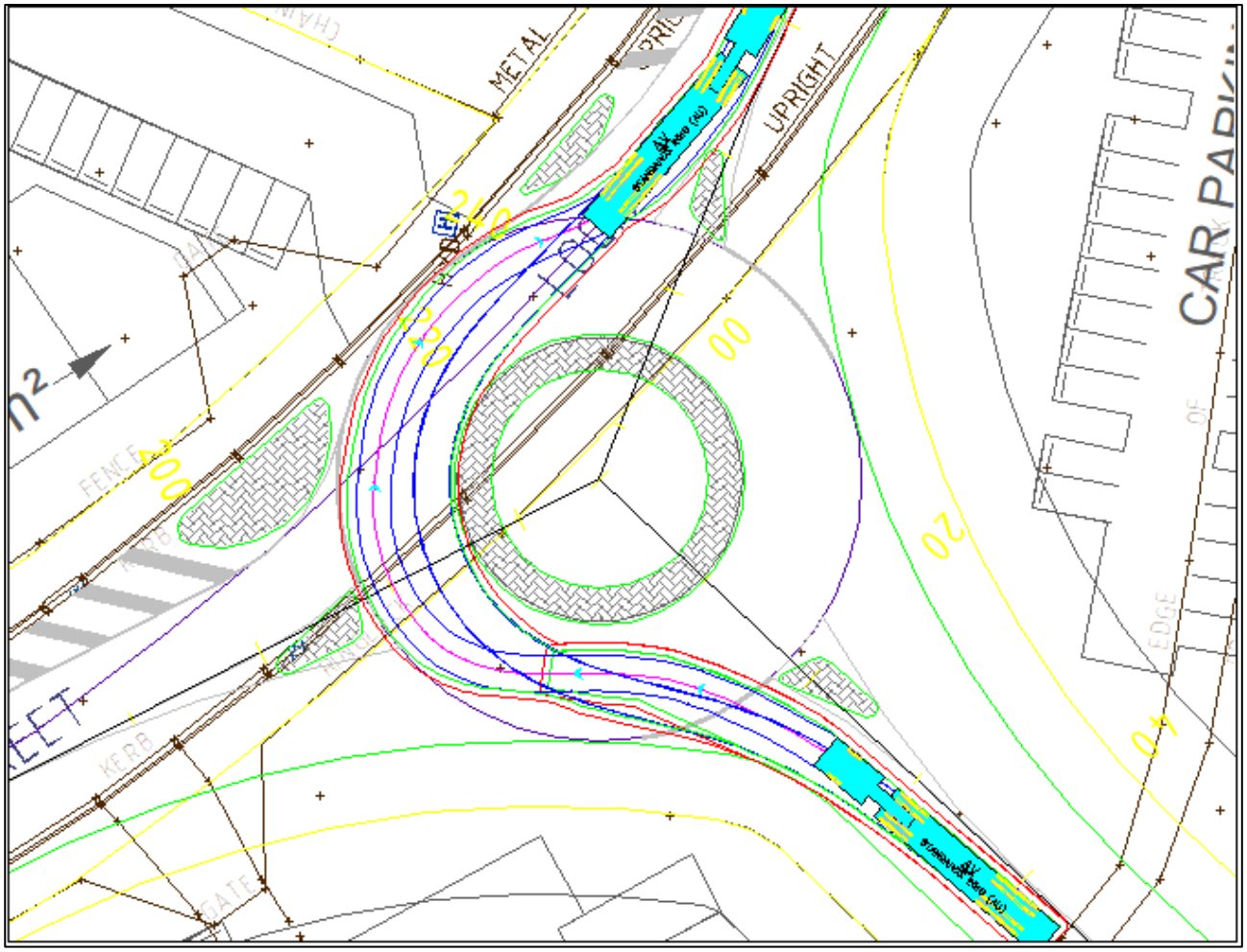
Successful

Tested at 10km/h

Blue – Vehicle Tyres

Green – Vehicle Body

Red – 500mm Clearance



20m length Articulated Vehicle undertaking a right turn at the roundabout.

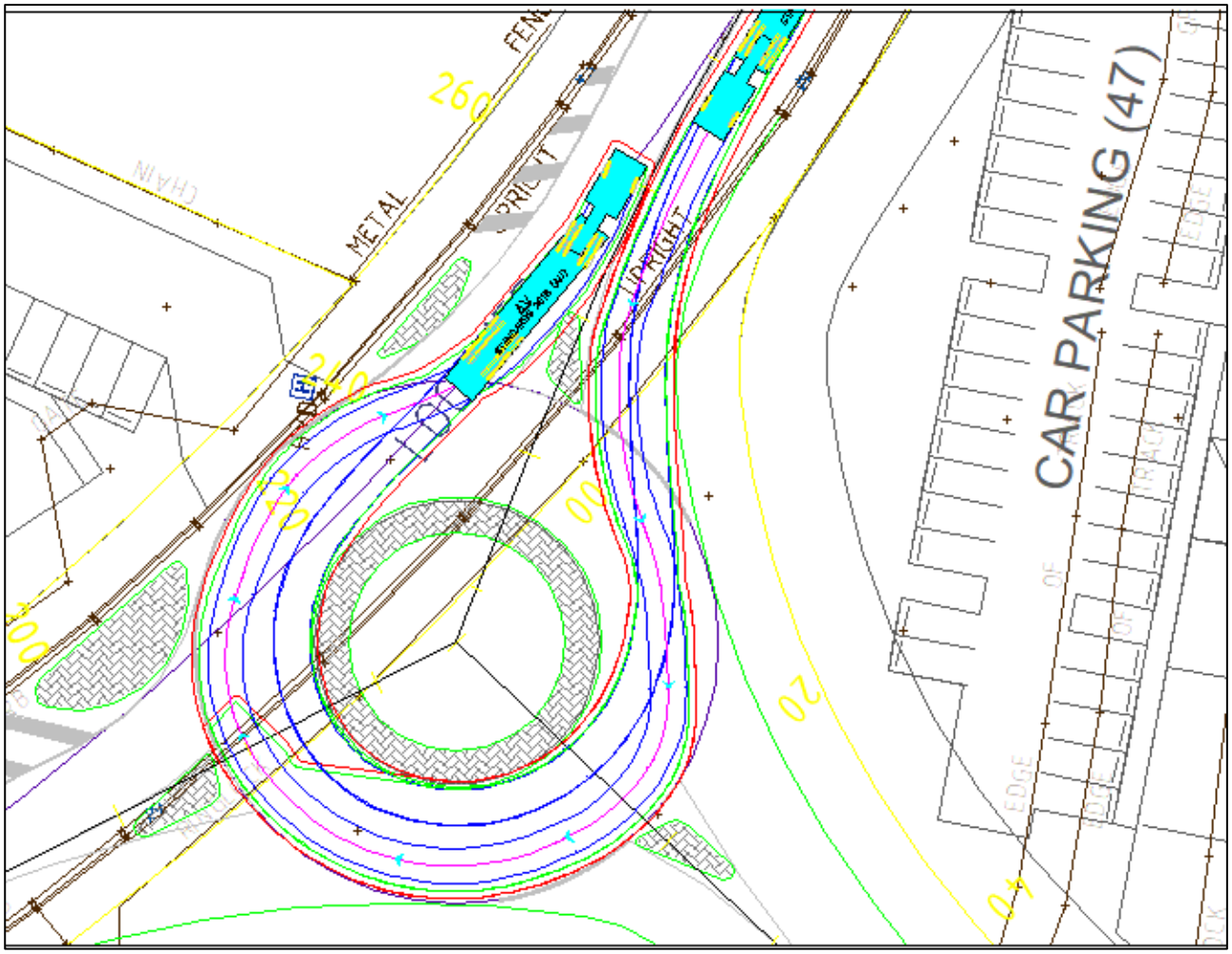
Successful

Tested at 10km/h

Blue – Vehicle Tyres

Green – Vehicle Body

Red – 500mm Clearance



20m length Articulated Vehicle undertaking a U-turn at the roundabout.

Successful

Tested at 10km/h

Blue – Vehicle Tyres

Green – Vehicle Body

Red – 500mm Clearance

ANNEXURE E: SIGHT LINE ASSESSMENT & PHOTOS
(6 SHEETS)

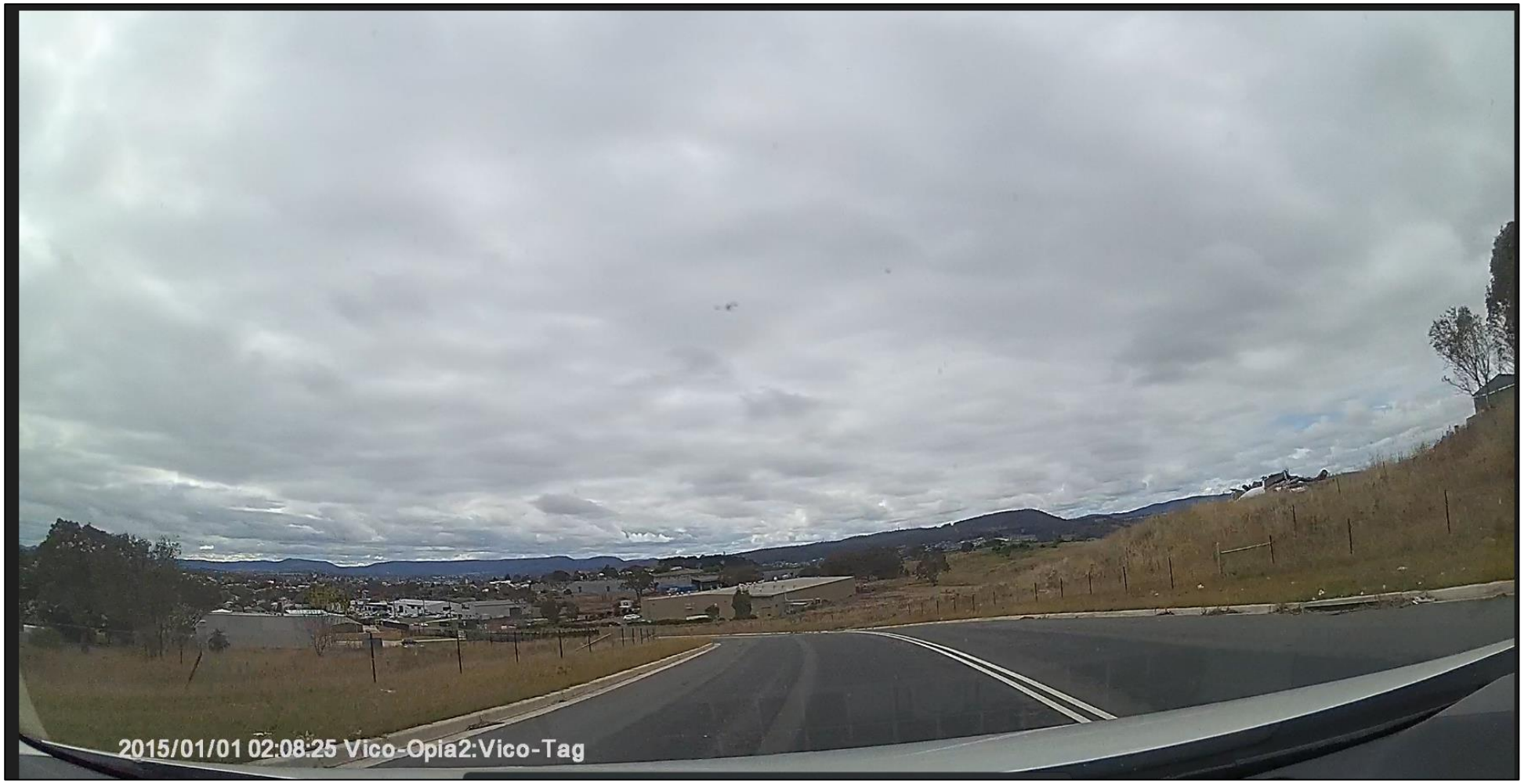
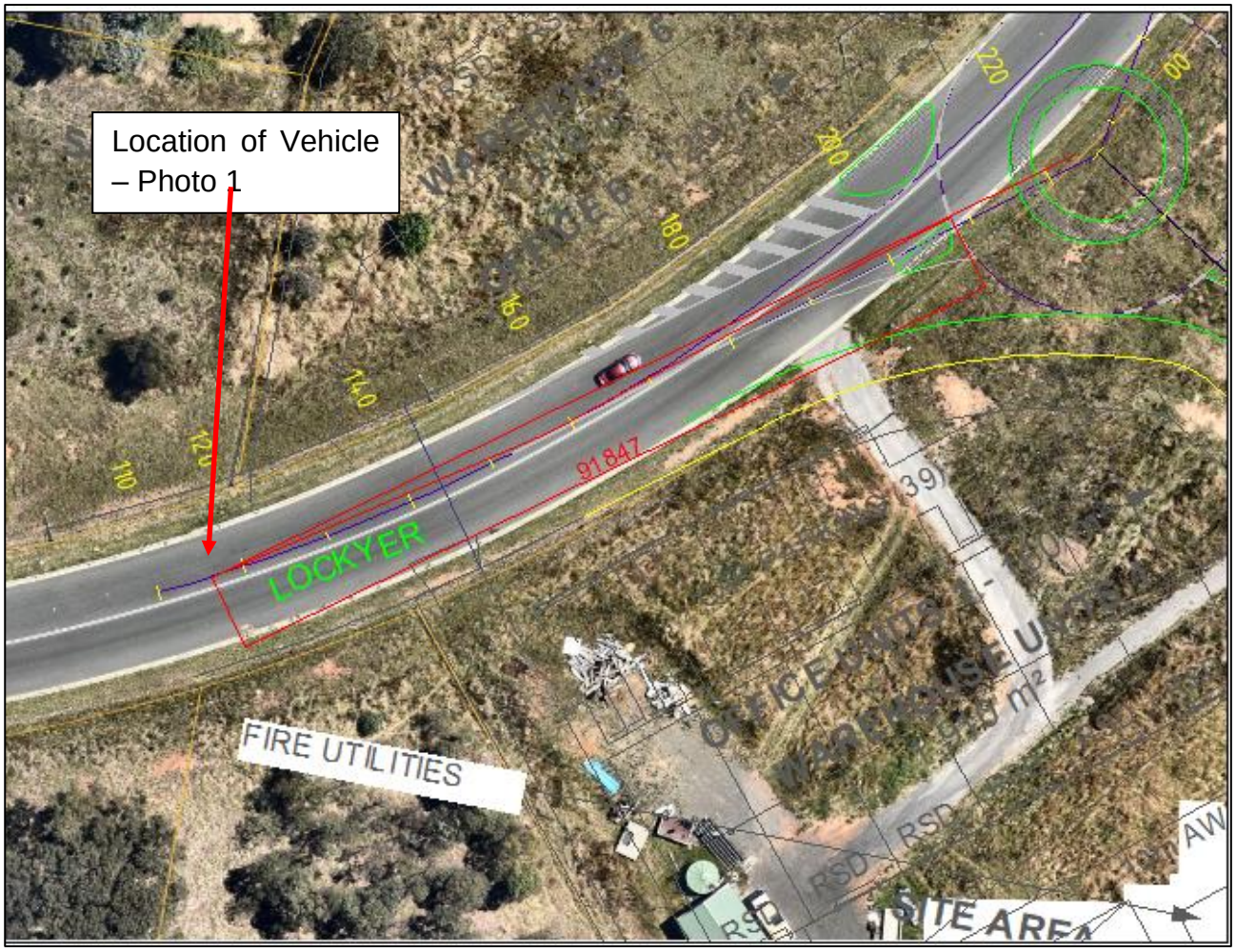


Photo 1 - Site visit photo along Lockyer Street via video recording. Recording height of approximately 1.1m in accordance with passenger vehicle.



Criteria 1 sight line from the west (car). 92m achieved, 80m required

Compliant

Heavy vehicles are capable of seeing further due to heightened view position and would achieve a sight distance greater than 99m.

Photo 2 - Sight line from access road looking west – Approximately 123m is achieved, 67m to 83m required

Compliant

Photo 3 - Clear sight lines are available to / from the east well in excess of the minimum required to be achieved by Criteria 1 or 2

Criteria 3 sight triangle (30km/h) – Compliant subject to no permanent obstructions within sight triangle.

Criteria 2 for driveway approach (5m setback from road) – Sight Distance of 83m is achieved. It is recommended that no obstruction be provided within the boundary that would obstruct sight lines.

ANNEXURE F: WEAVING ANALYSIS
(12 SHEETS)

EXHIBIT 24-2. LOS CRITERIA FOR WEAVING SEGMENTS

LOS	Density (pc/km/ln)	
	Freeway Weaving Segment	Multilane and Collector-Distributor Weaving Segments
A	≤ 6.0	≤ 8.0
B	> 6.0–12.0	> 8.0–15.0
C	> 12.0–17.0	> 15.0–20.0
D	> 17.0–22.0	> 20.0–23.0
E	> 22.0–27.0	> 23.0–25.0
F	> 27.0	> 25.0

In general, these criteria allow for slightly higher densities at any given level-of-service threshold than on a comparable basic freeway segment or multilane highway segment. This follows the philosophy that drivers expect and will accept higher densities on weaving segments than on basic freeway or multilane highway segments. The LOS E/F boundary does not follow this approach. Rather, it reflects densities that are somewhat less than those identified for basic freeway or multilane highway segments. Because of the additional turbulence on weaving segments, it is believed that breakdown occurs at somewhat lower densities than on basic freeway and multilane highway segments.

WEAVING SEGMENT PARAMETERS

Exhibit 24-3 illustrates and defines the variables that are used in the analysis of weaving segments. These variables are used in the algorithms that make up the methodology.

All existing or projected roadway and traffic conditions must be specified when applying the methodology. Roadway conditions include length of the segment, number of lanes, type of configuration under study, and type of terrain or grade conditions. If freeway free-flow speed (FFS) is not known, the characteristics of the basic freeway segment or multilane highway must be specified to allow its determination using the algorithms of Chapter 21 or 23.

DETERMINING FLOW RATES

All of the models and equations in this chapter are based on peak 15-min flow rates in equivalent passenger cars per hour. Thus, hourly volumes must be converted to this basis using Equation 24-1.

If 15-min flow rates are specified initially, set the PHF to 1.00 before applying this conversion

$$v = \frac{V}{PHF * f_{HV} * f_p} \quad (24\text{-}1)$$

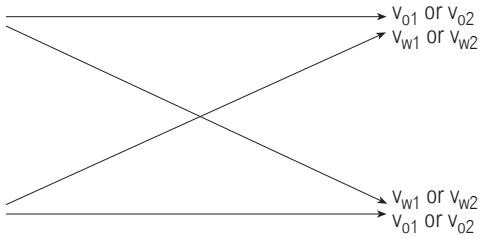
where

v = peak 15-min flow rate in an hour (pc/h),
V = hourly volume (veh/h),
f_{HV} = heavy-vehicle adjustment factor (from basic freeway segment or multilane highway methodology), and
f_p = driver population factor (from basic freeway segment or multilane highway methodology).

WEAVING SEGMENT DIAGRAM

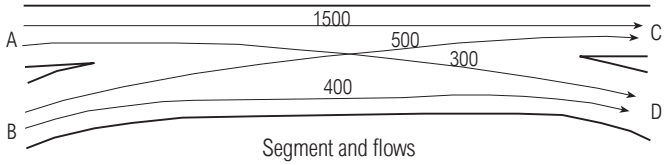
After volumes have been converted to flow rates, it is useful to construct a weaving diagram of the type shown in Exhibit 24-4. All flows are shown as flow rates in equivalent passenger cars per hour, and critical analysis variables are identified and placed on the diagram. The diagram may now be used as a reference for all input information required in applying the methodology.

EXHIBIT 24-3. PARAMETERS AFFECTING WEAVING SEGMENT OPERATION

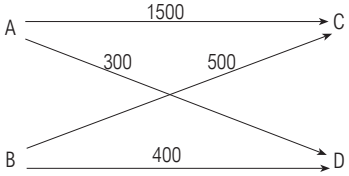


Symbol	Definition
L	Length of weaving segment (m)
N	Total number of lanes in the weaving segment
N_w	Number of lanes to be used by weaving vehicles if unconstrained operation is to be achieved
N_w(max)	Maximum number of lanes that can be used by weaving vehicles for a given configuration
N_{nw}	Number of lanes used by nonweaving vehicles
v	Total flow rate in the weaving segment (pc/h)
v_{o1}	Larger of the two outer, or nonweaving, flow rates in the weaving segment (pc/h)
v_{o2}	Smaller of the two outer, or nonweaving, flow rates in the weaving segment (pc/h)
v_{w1}	Larger of the two weaving flow rates in the weaving segment (pc/h)
v_{w2}	Smaller of the two weaving flow rates in the weaving segment (pc/h)
v_w	Total weaving flow rate in the weaving segment (pc/h) ($v_w = v_{w1} + v_{w2}$)
v_{nw}	Total nonweaving flow rate in the weaving segment (pc/h) ($v_{nw} = v_{o1} + v_{o2}$)
VR	Volume ratio; the ratio of weaving flow rate to total flow rate in the weaving segment ($VR = v_w/v$)
R	Weaving ratio; the ratio of the smaller weaving flow rate to total weaving flow rate ($R = v_{w2}/v_w$)
S_w	Speed of weaving vehicles in the weaving segment (km/h)
S_{nw}	Speed of nonweaving vehicles in the weaving segment (km/h)
S	Speed of all vehicles in the weaving segment (km/h)
D	Density of all vehicles in the weaving segment (pc/km/ln)
W_w	Weaving intensity factor for prediction of weaving speed
W_{nw}	Weaving intensity factor for prediction of nonweaving speed

EXHIBIT 24-4. CONSTRUCTION AND USE OF WEAVING DIAGRAMS



Segment and flows



Weaving diagram

WEAVING SEGMENT CONFIGURATION

Weaving segment configuration is based on the number of lane changes required of each weaving movement. A complete discussion of this concept is found in Chapter 13. Exhibit 24-5 may be used to establish configuration type.

See Chapter 13 for diagrams and concepts of the three weaving segment configurations

EXHIBIT 24-5. DETERMINING CONFIGURATION TYPE

Number of Lane Changes Required by Movement v_{w1}	Number of Lane Changes Required by Movement v_{w2}		
	0	1	≥ 2
0	Type B	Type B	Type C
1	Type B	Type A	N/A
≥ 2	Type C	N/A	N/A

Note:
N/A = not applicable; configuration is not feasible.

The three types of geometric configurations are defined as follows:

- Type A—Weaving vehicles in both directions must make one lane change to successfully complete a weaving maneuver.
- Type B—Weaving vehicles in one direction may complete a weaving maneuver without making a lane change, whereas other vehicles in the weaving segment must make one lane change to successfully complete a weaving maneuver.
- Type C—Weaving vehicles in one direction may complete a weaving maneuver without making a lane change, whereas other vehicles in the weaving segment must make two or more lane changes to successfully complete a weaving maneuver.

DETERMINING WEAVING AND NONWEAVING SPEEDS

The heart of the weaving segment analysis procedure is the prediction of space mean speeds of weaving and nonweaving flows within the weaving segment. They are predicted separately because under some conditions they can be quite dissimilar, and the analyst must be aware of this.

The algorithm for prediction of average weaving and nonweaving speeds may be generally stated by Equation 24-2.

$$S_i = S_{min} + \frac{S_{max} - S_{min}}{1 + W_i} \quad (24\text{-}2)$$

where

S_i = average speed of weaving (i = w) or nonweaving (i = nw) vehicles (km/h),
S_{min} = minimum speed expected in a weaving segment (km/h),
S_{max} = maximum speed expected in a weaving segment (km/h), and
W_i = weaving intensity factor for weaving (i = w) and nonweaving (i = nw) flows.

For the purposes of these procedures, the minimum speed, S_{min}, is set at 24 km/h. The maximum speed, S_{max}, is taken to be the average free-flow speed of the freeway segments entering and leaving the weaving segment plus 8 km/h. The addition of 8 km/h to the free-flow speed adjusts for the tendency of the algorithm to underpredict high speeds. Setting the minimum and maximum speeds in this way constrains the algorithm to a reasonable prediction range. With these assumptions incorporated, the speed prediction is given by Equation 24-3.

$$S_i = 24 + \frac{S_{FF} - 16}{1 + W_i} \quad (24\text{-}3)$$

where S_{FF} is the average free-flow speed of the freeway segments entering and leaving the weaving segment (km/h).

Initial estimates of speed are always based on the assumption of unconstrained operation. This assumption is later tested, and speeds are recomputed if operations turn out to be constrained.

Attributes of weaving segments captured by the model

The combination of Equations 24-2 and 24-3 yields sensitivities that are consistent with observed operations of weaving segments.

- As the length of the weaving segment increases, speeds also increase, and the intensity of lane changing declines.
- As the proportion of weaving vehicles in total flow (VR) increases, speeds decrease, reflecting the increased turbulence caused by higher proportions of weaving vehicles in the traffic stream.
- As average total flow per lane (v/N) increases, speeds decrease, reflecting more intense demand.
- Constrained operations yield lower weaving speeds and higher nonweaving speeds than unconstrained operations. This reflects the fact that weaving vehicles are constrained to less space than equilibrium would require, whereas nonweaving vehicles have correspondingly more than their equilibrium share of space. In Exhibit 24-6, this is reflected by differences in the constant a.

EXHIBIT 24-6. CONSTANTS FOR COMPUTATION OF WEAVING INTENSITY FACTORS

General Form

$$W = \frac{a(1+VR)^b\left(\frac{v}{N}\right)^c}{(3.28L)^d}$$

	Constants for Weaving Speed, S_w				Constants for Nonweaving Speed, S_{nw}			
	a	b	c	d	a	b	c	d
Type A Configuration								
Unconstrained	0.15	2.2	0.97	0.80	0.0035	4.0	1.3	0.75
Constrained	0.35	2.2	0.97	0.80	0.0020	4.0	1.3	0.75
Type B Configuration								
Unconstrained	0.08	2.2	0.70	0.50	0.0020	6.0	1.0	0.50
Constrained	0.15	2.2	0.70	0.50	0.0010	6.0	1.0	0.50
Type C Configuration								
Unconstrained	0.08	2.3	0.80	0.60	0.0020	6.0	1.1	0.60
Constrained	0.14	2.3	0.80	0.60	0.0010	6.0	1.1	0.60

- Type B configurations are the most efficient for handling large weaving flows. Weaving speeds of such flows are higher than for Type A and C configurations of equal length and width.
- The sensitivity of speeds to length is greatest for Type A configurations, because weaving vehicles are often accelerating or decelerating as they traverse the weaving segment.
- The sensitivity of nonweaving speeds to the volume ratio (VR) is greatest for Type B and C configurations. Because these configurations can accommodate higher proportions of weaving vehicles and because each has a through lane for one weaving movement, nonweaving vehicles are more likely to share lanes with weaving vehicles than in Type A configurations, where the opportunity to segregate is greater.

The last point is important and serves to highlight the essential difference between Type A configurations (particularly ramp-weaves) and others (Types B and C). Because all weaving vehicles must cross a crown line in Type A segments, weaving vehicles tend

to concentrate in the two lanes adjacent to the crown line, whereas nonweaving vehicles gravitate to outer lanes. Thus there is substantially more segregation of weaving and nonweaving flows in Type A configurations.

This difference makes Type A segments behave somewhat differently from other configurations. Speeds tend to be higher in Type A segments than in Types B or C given the same length, width, and demand flows. However, this does not suggest that Type A segments always operate better than Types B or C for similar lengths, widths, and flows. Type A segments have more severe restrictions on the amount of weaving traffic that can be accommodated than do other configurations.

Determining Weaving Intensity

The weaving intensity factors (W_w and W_{nw}) are a measure of the influence of weaving activity on the average speeds of both weaving and nonweaving vehicles. These factors are computed by Equation 24-4.

$$W_i = \frac{a(1+VR)^b\left(\frac{v}{N}\right)^c}{(3.28L)^d} \quad (24\text{-}4)$$

where

- W_i = weaving intensity factors for weaving (i = w) and nonweaving (i = nw) flows;
- VR = volume ratio;
- v = total flow rate in the weaving segment (pc/h);
- N = total number of lanes in the weaving segment;
- L = length of the weaving segment (m); and
- a, b, c, d = constants of calibration.

Constants for Computing Weaving Intensity Factors

Constants for computation of weaving intensity factors (a, b, c, d) are given in Exhibit 24-6. Values for these constants vary on the basis of three factors:

- Whether the average speed prediction is for weaving or nonweaving vehicles,
- Configuration type (A, B, or C), and
- Whether the operation is unconstrained or constrained.

DETERMINING TYPE OF OPERATION

The determination of whether a particular weaving segment is operating in an unconstrained or constrained state is based on the comparison of two variables that are defined in Chapter 13:

- N_w = number of lanes that must be used by weaving vehicles to achieve equilibrium or unconstrained operation, and
- $N_w(max)$ = maximum number of lanes that can be used by weaving vehicles for a given configuration.

Definition of constrained weaving segment

Fractional values for lane use requirements of weaving vehicles may occur because weaving and nonweaving vehicles share some lanes. Cases for which $N_w < N_w(max)$ are unconstrained because there are no impediments to weaving vehicles using the number of lanes required for equilibrium. If $N_w \geq N_w(max)$, weaving vehicles are constrained to using $N_w(max)$ lanes and therefore cannot occupy as much of the roadway as would be needed to establish equilibrium operations. Exhibit 24-7 provides algorithms for the computation of N_w and shows the values of $N_w(max)$, which are discussed more fully in Chapter 13.

EXHIBIT 24-7. CRITERIA FOR UNCONSTRAINED VERSUS CONSTRAINED OPERATION OF WEAVING SEGMENTS

Configuration	Number of Lanes Required for Unconstrained Operation, N_w	N_w(max)
Type A	$1.21(N)\ VR^{0.571}L^{0.234}/S_w^{0.438}$	1.4
Type B	$N[0.085 + 0.703VR + (71.57/L) - 0.0112(S_{nw} - S_w)]$	3.5
Type C	$N[0.761 + 0.047VR - 0.00036L - 0.0031(S_{nw} - S_w)]$	3.0[a]

Note:
a. For two-sided weaving segments, all freeway lanes may be used by weaving vehicles.

The equations of Exhibit 24-7 rely on the prediction of unconstrained weaving and nonweaving speeds. The equations take these results and predict the number of lanes weaving vehicles would have to occupy to achieve unconstrained speeds. If the result indicates that constrained operations exist, speeds must be recomputed using constrained equations.

The limit on maximum number of weaving lanes, N_w(max), is most restrictive for Type A segments and reflects the need for weaving vehicles to cluster in the two lanes adjacent to the crown line. The through weaving lane in Type B and C configurations provides for greater occupancy of lanes by weaving vehicles.

Type A segments have another unusual, but understandable, characteristic. As the length of a Type A segment increases, constrained operation is more likely to result. As the length increases, the speed of weaving vehicles is also able to increase. Thus, weaving vehicles use more space as length increases, and the likelihood of requiring more than the maximum of 1.4 lanes to achieve equilibrium also increases.

Types B and C show the opposite trend. Increasing length has less effect on weaving speed than in Type A configurations. First, acceleration and deceleration from low-speed ramps are less of an issue for Types B and C, which are, by definition, major weaving segments. Second, the substantial mixing of weaving and nonweaving vehicles in the same lanes makes the resulting speeds less sensitive to length. In Type B and C segments, the proportion of lanes needed by weaving vehicles to achieve unconstrained operation decreases as length increases.

The analyst should note that under extreme conditions (high VR, short length), the equation for Type B segments can predict values of $N_w > N$. While this is not practical and reflects portions of the research database with sparse field data, it may always be taken to indicate constrained operations.

DETERMINING WEAVING SEGMENT SPEED

Once speeds have been estimated and the type of operation determined (which may cause a recomputation of estimated speeds), the average space mean speed of all vehicles in the segment is computed according to Equation 24-5.

$$S = \frac{v}{\left(\frac{v_w}{S_w}\right) + \left(\frac{v_{nw}}{S_{nw}}\right)} \quad (24\text{-}5)$$

where

S = space mean speed of all vehicles in the weaving segment (km/h),
S_w = space mean speed of weaving vehicles in the weaving segment (km/h),
S_{nw} = space mean speed of nonweaving vehicles in the weaving segment (km/h),
v = total flow rate in the weaving segment (pc/h),
v_w = weaving flow rate in the weaving segment (pc/h), and
v_{nw} = nonweaving flow rate in the weaving segment (pc/h).

DETERMINING DENSITY

The average speed for all vehicles may be used to compute density for all vehicles in the weaving segment as shown in Equation 24-6.

$$D = \frac{\left(\frac{v}{N}\right)}{S} \quad (24\text{-}6)$$

where *D* is the average density for all vehicles in the weaving segment (pc/km/ln).

DETERMINING WEAVING SEGMENT CAPACITY

Capacity of a weaving segment defined

The capacity of a weaving segment is any combination of flows that causes the density to reach the LOS E/F boundary condition of 27.0 pc/km/ln for freeways or 25.0 pc/km/ln for multilane highways. Thus, capacity varies with a number of variables: configuration, number of lanes, free-flow speed of the freeway or multilane highway, length, and volume ratio. Because of the form of predictive algorithms, generation of a simple closed-form solution for capacity given the specification of the other variables is not possible. Rather, a trial-and-error process must be used.

Capacity attributes of weaving segments

Exhibit 24-8 shows tabulated values of weaving segment capacity for a number of situations. As a rough estimate, straight-line interpolation may be used for intermediate values. The tabulated capacities reflect some other limitations on weaving segment operations that reflect field observations:

- The capacity of a weaving segment may never exceed the capacity of a similar basic freeway or multilane highway segment.
- Field studies suggest that weaving flow rates should not exceed the following values: 2,800 pc/h for Type A, 4,000 pc/h for Type B, and 3,500 pc/h for Type C configurations. Even though higher weaving flows have been observed, they are likely to cause failure regardless of the results of analysis using the procedures in this manual.
- Field studies indicate that there are also limitations on the proportion of weaving flow (VR) that can be accommodated by various configurations: 1.00, 0.45, 0.35, or 0.20 for Type A with two, three, four, or five lanes, respectively; 0.80 for Type B; and 0.50 for Type C. At higher volume ratios, stable operations may still occur, but operations will be worse than those anticipated by the methodology, and failure could occur.
- For Type C segments, the weaving ratio, R, should not exceed 0.40, with the larger weaving flow being in the direction of the through weaving lane. At higher weaving ratios or where the dominant weaving flow is not in the direction of the through weaving lane, stable operations may still occur, but operations will be worse than those estimated by the methodology. Breakdown may occur in some cases.
- The maximum length for which weaving analysis is conducted is 750 m for all configuration types. Beyond these lengths, merge and diverge areas are considered separately using the methodology of Chapter 25, "Ramps and Ramp Junctions."

As noted previously, the capacity of a weaving segment is represented by any set of conditions that results in an average density of 27 pc/km/ln (for freeways) or 25 pc/km/ln (for multilane highways). Thus, capacity varies with the configuration, the length and width of the weaving segment, the proportion of total flow that weaves (VR), and the free-flow speed of the freeway. For any given set of conditions, the algorithms described herein must be solved iteratively to find capacity.

EXHIBIT 24-8. CAPACITY FOR VARIOUS WEAVING SEGMENTS

Volume Ratio, VR	Length of Weaving Segment (m) 150	300	450	600	750[a]
(A) Type A Weaving Segments—120-km/h Free-Flow Speed					
Three-Lane Segments					
0.10	6050	6820	7200[b]	7200[b]	7200[b]
0.20	5490	6260	6720	7050	7200[b]
0.30	5040	5780	6240	6570	6830
0.40	4660	5380	5530	5800[c]	6050[c]
0.45[d]	4430	5000[c]	5270[c]	5550[c]	5800[c]
Four-Lane Segments					
0.10	8060	9010	9600[b]	9600[b]	9600[b]
0.20	7320	8340	8960	9400	9600[b]
0.30	6710	7520[c]	8090[c]	8510[c]	8840
0.35[e]	6370[c]	7160[c]	7700[c]	8000[f]	8000[f]
Five-Lane Segments					
0.10	10,080	11,380	12,000[b]	12,000[b]	12,000[b]
0.20[g]	9150	10,540[c]	11,270[c]	11,790[c]	12,000[b]
(B) Type A Weaving Segments—110-km/h Free-Flow Speed					
Volume Ratio, VR	Length of Weaving Segment (m) 150	300	450	600	750[a]
Three-Lane Segments					
0.10	5770	6470	6880	7050[b]	7050[b]
0.20	5250	5960	6280	6680	6900
0.30	4830	5520	5940	6240	6480
0.40	4480	5150	5250[c]	5530[c]	5760[c]
0.45[d]	4190	4790[c]	5020[c]	5310[c]	5530[c]
Four-Lane Segments					
0.10	7690	8630	9180	9400[b]	9400[b]
0.20	7000	7940	8500	8900	9200
0.30	6440	7180[c]	7710[c]	8090[c]	8390[c]
0.35[e]	6080[c]	6830[c]	7360[c]	7730[c]	8030[c]
Five-Lane Segments					
0.10	9610	10,790	11,470	11,750[b]	11,750[b]
0.20[g]	8750	10,030[c]	10,690[c]	11,160[c]	11,520[c]

Notes:
Refer to the last page of Exhibit 24-8.

Units	Equation	Parameter	NORTHBOUND WEAVE							
			Existing (AM Peak)		Existing (PM Peak)		Existing Saturday Peak			
			Weaving	Non Weaving	Weaving	Non Weaving	Weaving	Non Weaving		
		a	0.080	0.002	0.080	0.002	0.080	0.002		
		b	2.200	6.000	2.200	6.000	2.200	6.000		
		c	0.700	1.000	0.700	1.000	0.700	1.000		
		d	0.500	0.500	0.500	0.500	0.500	0.500		
L in m		L	190	190	190	190	190	190		
		VR	0.1671	0.17	0.1184	0.12	0.2079	0.21		
		N	2.00	2.00	2.00	2.00	2.00	2.00		
	Equation 24-4	w	0.20	0.04	0.22	0.04	0.25	0.06		
S free flow in km/h			80.000	80.000	80.000	80.000	80.000	80.000		
S in kph	Equation 24-3		77.5	85.7	76.6	85.5	75.1	84.6		
Light vehicles (1 PCE)			58	293	53	418	105	397		
Heavy Vehicles (2 PCE)			6	28	6	33	3	13		
Total passenger car equivalent		v	70	349	65	484	111	423		
Total Passenger Car equivalent as a peak flow rate (Peak Hour Flow)	Equation 24-1		73.68421	367.3684211	68.42105	509.4736842	116.8421	445.2631579		
s in kph	Equation 24-5		84.2		84.4		82.5			
pc/km/lane	Equation 24-6		2.6		3.4		3.4			
LOS			A		A		A			

NORTHBOUND WEAVE							
Existing + 20% Growth In Volumes AM Peak		Existing + 20% Growth In Volumes PM Peak		Existing + 20% Growth In Volumes Saturday Peak			
Weaving	Non Weaving	Weaving	Non Weaving	Weaving	Non Weaving		
0.080	0.002	0.080	0.002	0.080	0.002		
2.200	6.000	2.200	6.000	2.200	6.000		
0.700	1.000	0.700	1.000	0.700	1.000		
0.500	0.500	0.500	0.500	0.500	0.500		
190	190	190	190	190	190		
0.1667	0.17	0.1182	0.12	0.2084	0.21		
2.00	2.00	2.00	2.00	2.00	2.00		
0.22	0.04	0.25	0.05	0.29	0.07		
80.000	80.000	80.000	80.000	80.000	80.000		
76.3	85.3	75.4	85.1	73.7	84.0		
70	352	64	502	126	477		
7	34	7	40	4	16		
84	420	78	582	134	509		
88.42105	442.1052632	82.10526	612.6315789	141.0526	535.7894737		
83.6		83.8		81.6			
3.2		4.1		4.1			
A		A		A			

Units	Equation	Parameter	NORTHBOUND WEAVE							
			Existing+ Development (AM Peak)		Existing + Development (PM Peak)		Existing + Development Saturday Peak			
			Weaving	Non Weaving	Weaving	Non Weaving	Weaving	Non Weaving		
		a	0.080	0.002	0.080	0.002	0.080	0.002		
		b	2.200	6.000	2.200	6.000	2.200	6.000		
		c	0.700	1.000	0.700	1.000	0.700	1.000		
		d	0.500	0.500	0.500	0.500	0.500	0.500		
L in m		L	190	190	190	190	190	190		
		VR	0.2026	0.20	0.1263	0.13	0.2263	0.23		
		N	2.00	2.00	2.00	2.00	2.00	2.00		
	Equation 24-4	w	0.23	0.05	0.22	0.04	0.27	0.06		
S free flow in km/h			80.000	80.000	80.000	80.000	80.000	80.000		
S in kph	Equation 24-3		76.1	85.1	76.3	85.4	74.3	84.2		
Light vehicles (1 PCE)			65	300	55	419	111	403		
Heavy Vehicles (2 PCE)			15	37	8	36	9	19		
Total passenger car equivalent		v	95	374	71	491	129	441		
Total Passenger Car equivalent as a peak flow rate (Peak Hour Flow)	Equation 24-1		100	393.6842105	74.73684	516.8421053	135.7895	464.2105263		
s in kph	Equation 24-5		83.1		84.1		81.7			
pc/km/lane	Equation 24-6		3.0		3.5		3.7			
LOS			A		A		A			

NORTHBOUND WEAVE												
Existing + 20% Growth + Development Volumes AM Peak			Existing + 20% Growth + Development Volumes PM Peak			Existing + 20% Growth + Development Volumes Saturday Peak					
Weaving	Non Weaving		Weaving	Non Weaving		Weaving	Non Weaving				
0.080	0.002		0.080	0.002		0.080	0.002				
2.200	6.000		2.200	6.000		2.200	6.000				
0.700	1.000		0.700	1.000		0.700	1.000				
0.500	0.500		0.500	0.500		0.500	0.500				
190	190		190	190		190	190				
0.1757	0.18		0.1207	0.12		0.2239	0.22				
2.00	2.00		2.00	2.00		2.00	2.00				
0.23	0.05		0.25	0.05		0.31	0.07				
80.000	80.000		80.000	80.000		80.000	80.000				
76.0	85.1		75.3	85.0		73.0	83.6				
79	361		66	505		132	483				
16	43		9	43		10	22				
91	427		80	583		152	527				
95.78947	449.4736842		84.21053	613.6842105		160	554.7368421				
83.3			83.7			80.9					
3.3			4.2			4.4					
A			A			A					