



221 - 229 Numurkah Road, Shepparton Shopping Centre Development

draft

Client // Greater Shepparton City Council
Office // VIC
Reference // V102560
Date // 15/02/17

221 - 229 Numurkah Road, Shepparton

Shopping Centre Development

Transport Impact Assessment

Issue: A-Dr 15/02/17

Client: Greater Shepparton City Council

Reference: V102560

GTA Consultants Office: VIC

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A-Dr	15/02/17	Draft	Andrew Harmer	Alex Blackett	Chris Coath	

Table of Contents

1. Introduction	1
1.1 Background	1
1.2 Subject Site	1
1.3 Purpose of this Report	2
1.4 References	2
2. Existing Conditions	4
2.1 Road Network	4
2.2 Cycling Infrastructure	6
3. Development Proposal	7
3.1 Development Plan	7
3.2 Land Uses	8
3.3 Car Parking Facilities	8
3.4 Bicycle Parking Facilities	8
3.5 Access Arrangements	8
3.6 Loading Facilities	9
4. Sustainable Transport Considerations	10
4.1 Walking & Cycling Network	10
4.2 Public Transport	10
4.3 Bicycle Parking & Associated Facilities	10
5. Car Parking Provision	12
5.1 Statutory Car Parking Requirements	12
5.2 Site Access Arrangements & Car Parking Layout	13
6. Loading & Waste Collection	14
6.1 Statutory Requirements	14
6.2 Layout	14
6.3 Refuse Collection	14
7. Traffic Impact	15
7.1 Preamble	15
7.2 Traffic Generation	15
7.3 Traffic Distribution and Assignment	16
7.4 Traffic Impact	18
7.5 Mitigating Works	21
8. Conclusion	23

Appendices

- A: Previous Reports & Correspondence
- B: SIDRA Intersection Results
- C: Goulburn Valley Highway Recommended Design – Concept Layout Plan

Figures

Figure 1.1:	Subject Site and its Environs	1
Figure 1.2:	Land Zoning Map	2
Figure 2.1:	Goulburn Valley Highway (looking north)	4
Figure 2.2:	Goulburn Valley Highway (looking south)	4
Figure 2.3:	Doody Street (looking east)	4
Figure 2.4:	Doody Street (looking west)	4
Figure 2.5:	Ford Road (looking east)	5
Figure 2.6:	Ford Road (looking west)	5
Figure 2.7:	Wanganui Road (looking east)	5
Figure 2.8:	Wanganui Road (looking west)	5
Figure 2.9:	Existing PM Peak Hour Traffic Volumes	6
Figure 2.10:	Existing Saturday Peak Hour Traffic Volumes	6
Figure 3.1:	Proposed Development Plan	7
Figure 7.1:	Weekday PM Peak Hour Site Generated Traffic Volumes	17
Figure 7.2:	Saturday Midday Peak Hour Site Generated Traffic Volumes	17
Figure 7.3:	Post-Development AM Peak Hour Traffic Volumes	18
Figure 7.4:	Post-Development PM Peak Hour Traffic Volumes	18
Figure 7.5:	Goulburn Valley Highway / Ford Road / Wanganui Road – Future Traffic Volumes with Surrounding Known Development Traffic – Weekday PM Peak Hour	22

Tables

Table 3.1:	Development Schedule	8
Table 4.1:	Statutory Requirement for Bicycle Facilities	10
Table 5.1:	Statutory Car Parking Requirements	12
Table 7.1:	Traffic Generation Estimates	15
Table 7.2:	Goulburn Valley Highway Site Access – Existing Operating Conditions	19
Table 7.3:	Goulburn Valley Highway Site Access – Post-Development Operating Conditions	19
Table 7.4:	Goulburn Valley Highway / Ford Road / Wanganui Road – Existing Operating Conditions	20
Table 7.5:	Goulburn Valley Highway / Ford Road / Wanganui Road – Post-Development Intersection Operation	20

Table 7.6:	Goulburn Valley Highway / Ford Road / Wanganui Road – Post-Development Intersection Operation	21
Table 7.7:	Goulburn Valley Highway / Ford Road / Wanganui Road – Future Operating Conditions with Completion of Surrounding Major Developments – Weekday PM Peak	22

1. Introduction

1.1 Background

A planning permit is currently being sought for a proposed mixed use development on land located at 221-229 Goulburn Valley Highway and 10 Ford Road in Shepparton.

GTA Consultants was commissioned by Greater Shepparton City Council in July 2016 to undertake a peer review of the transport planning implications of the proposed development. Throughout the review process, advice provided by GTA Consultants to Council has been passed on to the applicant and has resulted in various design changes being made. The various correspondence and changes are set out for information purposes in Section 1.4.

This transport impact assessment report provides a summary of the findings of our independent assessment of the development proposal as it currently stands¹.

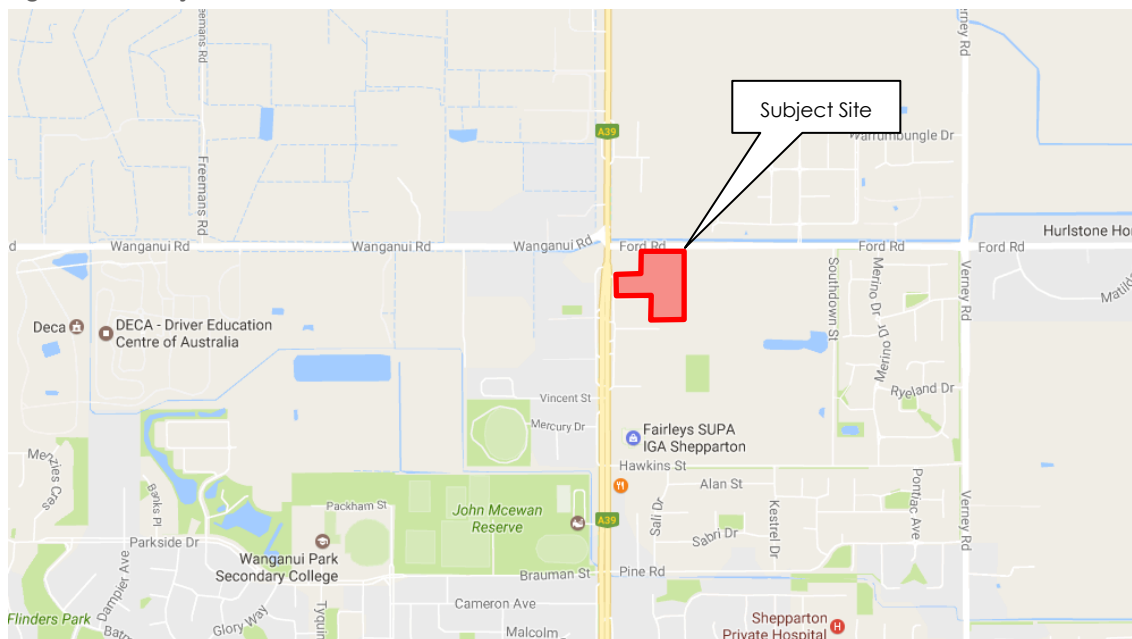
1.2 Subject Site

The subject site is located at 221-229 Goulburn Valley Highway in Shepparton. The site of approximately 933m² has frontages of 100m to the Goulburn Valley Highway service road (Numurkah Road), 100m to Doody Street and 180m to Ford Road.

The site is located within a Commercial 2 Zone and is currently undeveloped. The surrounding properties include a mix of commercial, residential and farming land uses.

The location of the subject site and the surrounding environs is shown in Figure 1.1, and the land zoning is shown in Figure 1.2.

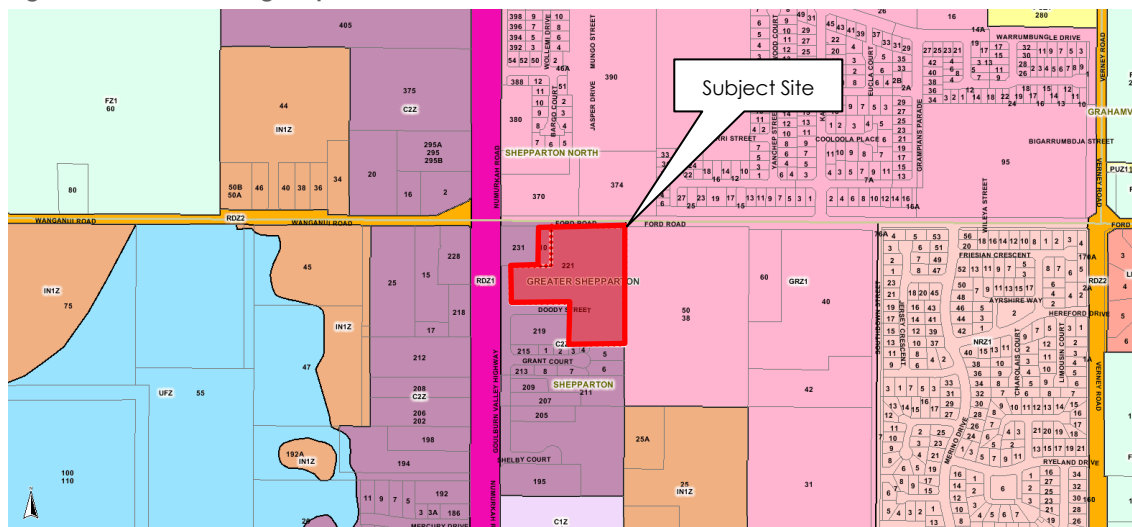
Figure 1.1: Subject Site and its Environs



(Reproduced from Google Maps)

¹ To the best of GTA Consultants understanding.

Figure 1.2: Land Zoning Map



(Reproduced from Land Channel web site)

1.3 Purpose of this Report

This report sets out an assessment of the anticipated parking, traffic and transport implications of the proposed development as we understand it, including consideration of the following:

- i the adequacy of the proposed pedestrian, bicycle and public transport access arrangements to the site
- ii the adequacy of the proposed bicycle parking provision and layout
- iii the adequacy of the proposed car parking provision and layout
- iv the adequacy of the proposed arrangements for loading and waste collection
- v the acceptability of the traffic impacts of the proposed development, including the need for mitigating road works and appropriate vehicular access.

It should be noted that, as the site abuts a Road Zone 1, the application requires referral to VicRoads under Clause 52.29 and Clause 66.03 of the Greater Shepparton Planning Scheme.

1.4 References

In preparing this report, reference has been made to the following:

- o Proposed Site Plan by i2C (dated 21 June 2016, job 2015-050)
- o Greater Shepparton Planning Scheme
- o Australian Standard / New Zealand Standard, Parking Facilities (AS2890)
- o Traffic survey data collected by Traffic Focus as referenced in this report
- o an inspection of the site and its surrounds
- o The following documents prepared by TraffixGroup and included in Appendix A.1:
 - o Traffic Engineering Assessment for the Proposed Shopping Centre at 221 – 229 Goulburn Valley Highway and 10 Ford Road, Shepparton, dated June 2016
 - o 227 – 229 Goulburn Valley Highway, Shepparton – Proposed Shopping Centre, Response to Traffic Engineering Peer Review, dated 22nd August 2016
 - o 221 – 227 Goulburn Valley Highway, Shepparton North, Proposed Mixed-Use Development – Intersection Analysis, dated 30th November 2016
 - o Traffic Engineering Assessment for the Proposed Shopping Centre at 221 – 229 Goulburn Valley Highway and 10 Ford Road, Shepparton, dated January 2017

- The Following documents prepared by GTA Consultants and included in Appendix A.2:
 - 227 – 229 Numurkah Road, Shepparton, Traffic Engineering Assessment Peer Review, dated 29 July 2016
 - 227 – 229 Numurkah Road, Shepparton, Updated Traffic Engineering Assessment Review, dated 2 September 2016
 - 221 – 229 Numurkah Road, Shepparton, Intersection Analysis Review, dated 6 December 2016
- other documents as nominated.

2. Existing Conditions

2.1 Road Network

2.1.1 Adjoining Roads

Goulburn Valley Highway

Goulburn Valley Highway functions as a primary arterial road (under VicRoads control) and is located within a Road Zone (Category 1) in the Greater Shepparton Planning Scheme. South of Doody Street it is a divided two-way road aligned in a north-south direction and configured with two-lane, nine metre wide carriageways in both directions. The road reserve is approximately 80m wide and contains service roads in either direction for the majority of its length, except proximate to intersections. Between Doody Street and Ford Road it transitions to an undivided road.

Goulburn Valley Highway carries approximately 13,900 vehicles per day² and is shown in Figure 2.1 and Figure 2.2.

Figure 2.1: Goulburn Valley Highway (looking north)



Figure 2.2: Goulburn Valley Highway (looking south)



Doody Street

Doody Street functions as a local access road along the southern frontage of the subject site, and is controlled by Council. It is a two-way road aligned in an east-west direction and configured with a two-lane, 12.0 metre wide carriageway set within a 25 metre wide road reserve (approximately). Doody Street is shown in Figure 2.5 and Figure 2.6.

Figure 2.3: Doody Street (looking east)



Figure 2.4: Doody Street (looking west)



² Based on the peak hour traffic counts undertaken by GTA in July 2016 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.

Ford Road

Ford Road functions as a local access road in the section fronting the subject site, controlled by Council. It is a two-way road aligned in an east-west direction and configured with a two-lane, 7.5 metre wide carriageway set within a 40 metre wide road reserve (approximately). Ford Road carries approximately 3,000 vehicles per day² and is shown in Figure 2.5 and Figure 2.6.

Figure 2.5: Ford Road (looking east)



Figure 2.6: Ford Road (looking west)



Wanganui Road

Wanganui Road functions as a secondary arterial road (under VicRoads control) and is located within a Road Zone (Category 2) in the Greater Shepparton Planning Scheme. It is a two-way road aligned in an east-west direction and configured with a two-lane, 7.5 metre wide carriageway set within a 20 metre wide road reserve (approximately). Wanganui Road carries approximately 1,900 vehicles per day² and is shown in Figure 2.7 and Figure 2.8.

Figure 2.7: Wanganui Road (looking east)



Figure 2.8: Wanganui Road (looking west)



2.1.2 Surrounding Intersections

Key intersections in the vicinity of the site include Goulburn Valley Highway / Ford Road / Wanganui Road (unsignalised off-set X-intersection).

2.1.3 Traffic Volumes

GTA Consultants engaged Traffic Focus to undertake traffic movement counts at the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road, as well as Goulburn Valley Highway / Numurkah Road (eastern service road), during the following peak periods:

- 4:00pm - 6:30pm on Monday 18 July 2016
- 11:00am – 2:00pm on Saturday 16 July 2016

The PM and Saturday peak hour traffic volumes are shown in Figure 2.9 and Figure 2.10 respectively.

Figure 2.9: Existing PM Peak Hour Traffic Volumes

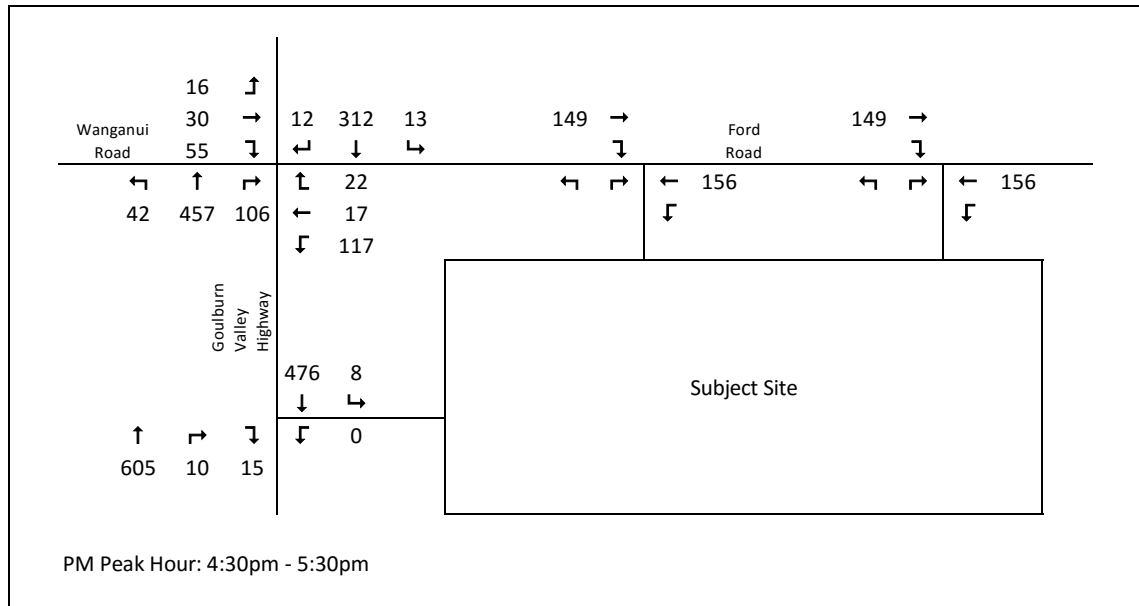
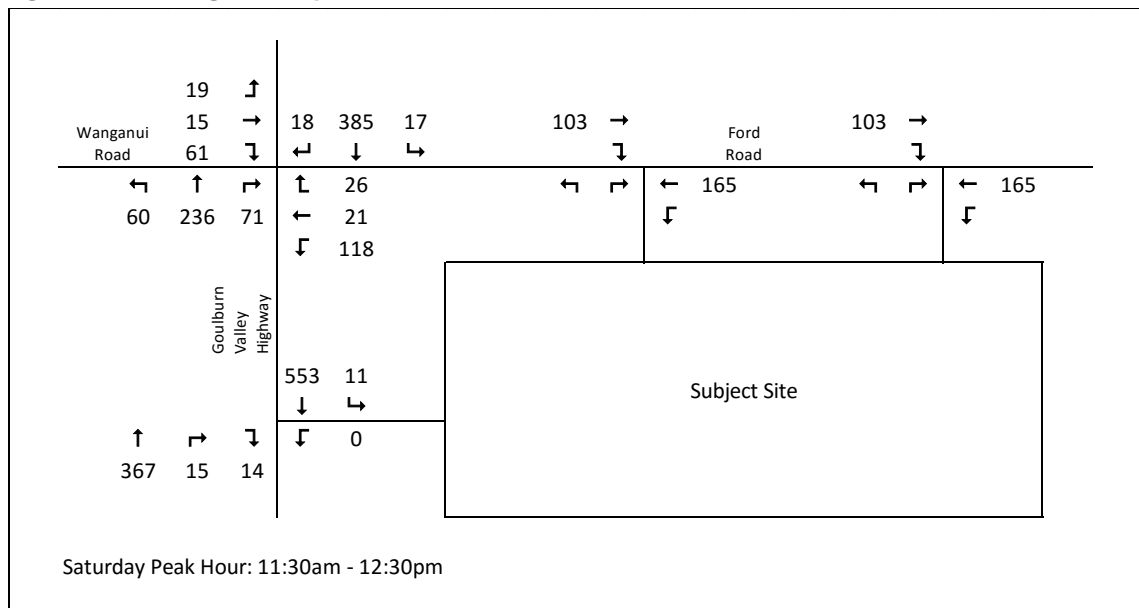


Figure 2.10: Existing Saturday Peak Hour Traffic Volumes



2.2 Cycling Infrastructure

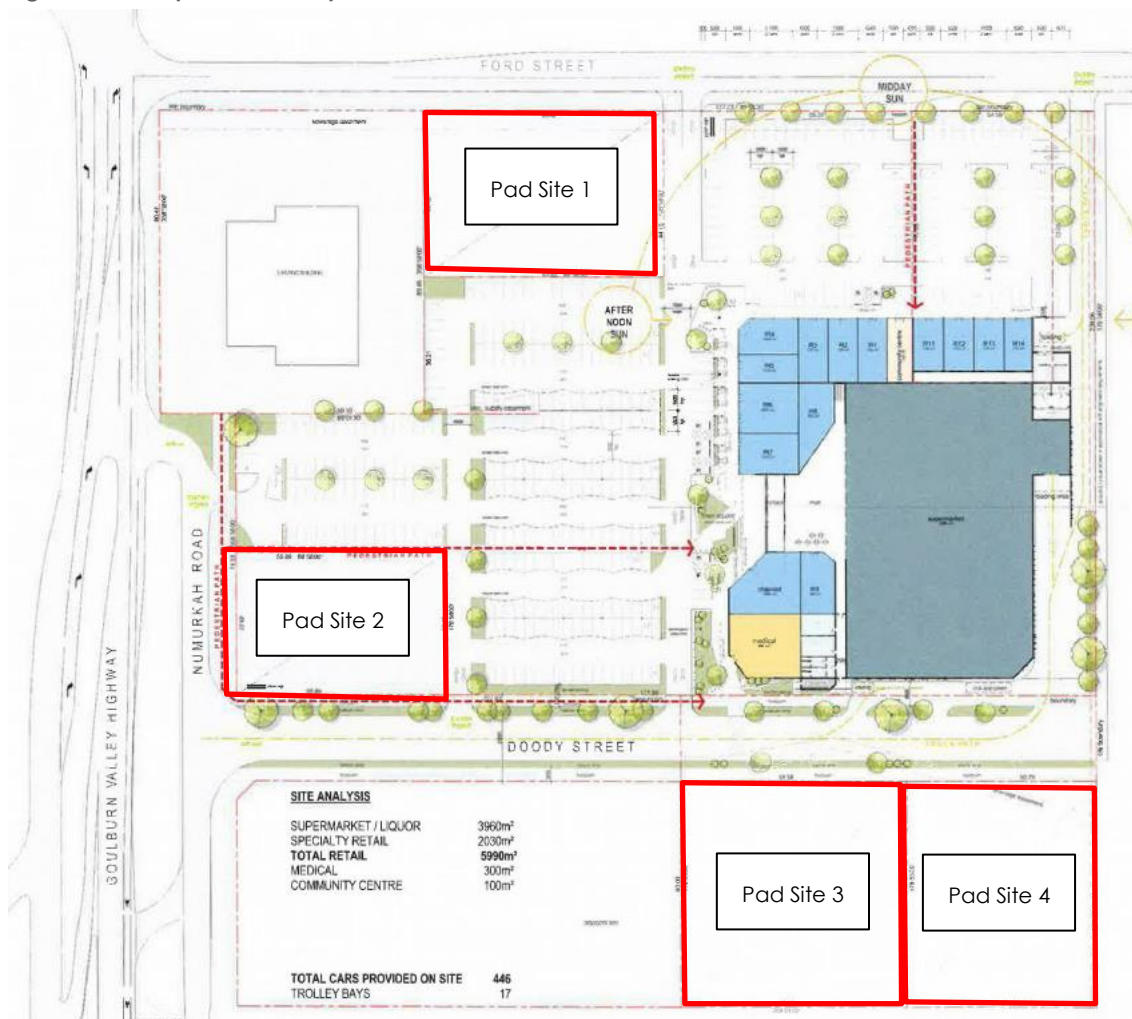
Existing cycling infrastructure in the vicinity of the site includes dedicated bicycle lanes in both directions on Goulburn Valley Highway to the south of Doody Street.

3. Development Proposal

3.1 Development Plan

The development proposal consists of a supermarket, speciality retail, medical centre, community centre and four pad sites, as shown in Figure 3.1.

Figure 3.1: Proposed Development Plan



Source: TraffixGroup Report (dated 25/01/17)

It is noted that that latest Traffic Engineering Assessment, dated January 2017 and completed by TraffixGroup, does not given any consideration to the four pad sites. It is understood that these will form part of future and separate town planning applications. However, in order to accurately assess the traffic impacts of the ultimate development of the entire site, it is considered appropriate for the pad sites to be taken into consideration.

In this regard, assumptions have been made in consultation with the applicant on potential yields and type of develop that could be accommodated within the four pad sites, as set out in this report and in previous assessments of the site.

3.2 Land Uses

The proposal includes the following land uses, as summarised in Table 3.1. It is noted that the development schedule also includes the yields and type of development expected to be accommodated by the four pad sites.

Table 3.1: Development Schedule

Use	Size
Supermarket	3,960 sqm
Specialty Retail	2,030 sqm
Medical Centre	6 practitioners (300 sqm)
Council / Community Centre	100 sqm
Pad Site 1: KFC Restaurant	2,602 sqm
Pad Site 2: Petrol Station	1,904 sqm including a 244 sqm convenience store
Pad Site 3: Childcare Centre	90 children
Pad Site 4: Bulky Goods Retail	2,000 sqm

3.3 Car Parking Facilities

The development plan presented in Figure 3.1 indicates a total of 446 car parking spaces will be provided on-site, including eight disabled spaces. It is noted that no car parking within the pad sites is currently shown, and there is potential to accommodate additional parking within them.

Moreover, it is expected that a suitable level of car parking provision for pad sites 3 and 4 on the southern side of Doody Street will be provided as part of them.

In terms of pad sites 1 and 2, they can be expected to provide some additional car parking but can have some reliance on the 446 car parking spaces to be provided around the supermarket, speciality retail, medical centre and community centre.

3.4 Bicycle Parking Facilities

It is proposed to provide 30 bicycle parking spaces, including 16 employee spaces and 14 visitor spaces. Two end of trip shower/change room facilities are also proposed.

These facilities have been provided to support the proposed supermarket, speciality retail, medical centre and community centre. Additional facilities are expected to be provided for and as part of the pad sites.

3.5 Access Arrangements

There will be vehicle access points to each fronting road, as outlined as follows:

- A left-in and right-in intersection from Goulburn Valley Highway to Numurkah Road (eastern service road) that connects with the following:
 - An entry only site access point on Numurkah Road
 - Left-in and left out intersection with Doody Street
- Two car park access points both offering full turning movements and an egress only loading dock access point to Doody Street.
- Two access points to Ford Road along the northern boundary of the site, both offering full turning movements.

3.6 Loading Facilities

Three loading bays are proposed on-site, including one dedicated to the supermarket tenancy and located at its rear, and two others for shared use by the retail tenancies, located on the north-east and southern sides of the main buildings.

Additional facilities are expected to be provided for and as part of the pad sites, including access by a fuel tanker for the proposed petrol station as part of pad site2.

4. Sustainable Transport Considerations

4.1 Walking & Cycling Network

There is currently limited pedestrian infrastructure in the vicinity of the site. Key pedestrian links are proposed through the site from Ford Road and Numurkah Road. It is also proposed to include pedestrian paths along Doody Street and potential connection through into the proposed residential subdivision to the east.

4.2 Public Transport

There is currently one bus route operating within the vicinity of the site, approximately 550m away on Hawkins Street and Ford Road. However, with the level of development proposed it is recommended that PTV be consulted and at least the ability be made for a bus stop on the sites frontage be provided to help support potential access by public transport to the site in the future.

4.3 Bicycle Parking & Associated Facilities

4.3.1 Overview

Clause 52.34 of the Greater Shepparton Planning Scheme seeks to encourage cycling as a mode of travel through the provision of appropriate bicycle parking and associated facilities. The discussion and analysis presented below examines these requirements.

4.3.2 Statutory Requirements

Bicycle Parking Provision

Statutory requirements for the provision of bicycle parking are set out in Clause 52.34 of the Greater Shepparton Planning Scheme. The statutory requirements for the provision of bicycle facilities for the development proposal are set out in Table 4.1. It is noted that these are only the requirements for the initial proposed development and do not account for the requirements of the future pad site developments.

Table 4.1: Statutory Requirement for Bicycle Facilities

Use	Size	Statutory Rate		Statutory Requirement	
		Employee/ Resident	Visitor/Shopper/ Student	Employee	Visitor / Shopper
Supermarket [1]	3,960 sqm	1 space to each 600sqm leasable floor area if greater than 1,000sqm	1 space to each 500sqm leasable floor area if greater than 1,000sqm	7 spaces	8 spaces
Specialty Retail [2]	2,030 sqm	1 space to each 300sqm leasable floor area	1 space to each 500sqm leasable floor area	7 spaces	4 spaces
Medical Centre	6 practitioners (300 sqm)	1 to each 8 practitioners	1 to each 4 practitioners	1 spaces	2 spaces
Council / Community Centre [3]	100 sqm	1 space to each 300sqm net floor area if greater than 1,000sqm	1 space to each 1,000sqm net floor area if greater than 1,000sqm	0 spaces	0 spaces
Total				15 spaces	14 spaces

[1] Assuming a shop land use

[2] Assuming a retail use

[3] Assuming an office use

Table 4.1 indicates that the proposal has a statutory bicycle parking requirement of 29 bicycle spaces, including 15 employee spaces and 14 spaces for visitors/customers.

In this instance, the proposed on-site bicycle parking provision of 30 bicycle spaces meets the statutory requirement. However, as there is limited ability to share these facilities with the pad sites, additional facilities be required to support these uses.

Associated Facilities

In addition to the requirement for bicycle parking, Clause 52.34-3 of the Greater Shepparton Planning Scheme requires 1 shower for the first 5 employee bicycle parking spaces and 1 shower for each subsequent 10 employee bicycle parking spaces (if 5 or more employee bicycle parking spaces are required).

Application of the above rates to the statutory employee bicycle parking requirement of 15 bicycle spaces indicates that the proposal also generates a statutory requirement of two change rooms/showers, which have been included on the development plans, noting additional facilities may need to be provided as part of the pad sites.

5. Car Parking Provision

5.1 Statutory Car Parking Requirements

Statutory requirements for the provision of car parking are set out in Clause 52.06 of the Greater Shepparton Planning Scheme, with parking rates specified in Table 1 to Clause 52.06-5. An assessment of the statutory parking requirements for the development proposal is set out in Table 5.1. The table specifies only the requirements for the initial proposed development and do not account for the requirements of the pad sites.

Table 5.1: Statutory Car Parking Requirements

Description	Use	Size	Statutory Parking Rate	Statutory Parking Requirement
Supermarket	Supermarket	3,960 sqm	5 spaces per 100sqm leasable floor area	198 spaces
Specialty Retail	Shop	2,030 sqm	4 spaces per 100sqm leasable floor area	81 spaces
Medical Centre	Medical Centre	6 practitioners (300 sqm)	5 spaces for the first practitioner and 3 spaces to every other practitioner	20 spaces
Council / Community Centre	Office	100 sqm	3.5 spaces per 100sqm net floor area	3 spaces
Total				302 spaces

The above assessment anticipates the development proposal has statutory requirement of 302 spaces.

The proposed on-site parking provision of 446 car spaces exceeds the statutory parking requirement and is considered to be appropriate. There is considered to be an opportunity to share these facilities with the pad sites 1 and 2. However, this will be subject to appropriate justification as part of separate town planning applications. Pad sites 3 and 4 will need to provide sufficient parking on their sites to support their own demands as there is limited ability to share the 446 spaces north of Doody Street.

In addition to the statutory car parking requirements in the Planning Scheme, the Building Code of Australia (BCA) outlines requirements for the provision of car parking for people with disabilities. An assessment of the BCA disabled car parking requirements for the development proposal indicates that a total of 10 disabled parking spaces. The development plans only appear to include eight parking spaces for people with disabilities, noting that the provided plans are of a poor quality.

On this basis, an additional two parking spaces for people with disabilities should be accommodated within the plans based on the current proposed car parking provision.

5.2 Site Access Arrangements & Car Parking Layout

Site Access Arrangements

A functional layout plan has been prepared for the proposed access arrangement from Numurkah Road. The following is noted in this regard:

- The proposed intersection layout for the Numurkah Road access point does not include an island north of the right turn from Goulbourn Valley Highway into the Numurkah Road service road to help separate the three right movements between this location and Ford Road. It is recommended that an island is included to help separate these right-turn movements given the expected significant increase in their use as part of this development proposal.
- A left turn deceleration lane on Goulbourn Valley Highway for southbound vehicles has not been included on the proposed plan for this access intersection. It is recommended that this is provided so as to not significantly impact the through traffic volumes on Goulbourn Valley Highway.

In addition, it is considered appropriate for full turning movements to be available at the two access points from Ford Road. The concept layout plans include deceleration lanes for the left turn movement into both access points, as well as a widening of the eastbound carriageway along the frontage of the site to allow vehicles to pass any queued right turning vehicles (no formal right turn lanes provided). At this stage this arrangement is considered to be appropriate, however with further development of the surrounding area, ability to provide full right turn facilities should be considered.

Car Parking Layout

All car parking areas appear to have been designed in accordance with the Planning Scheme and parking spaces for people with disabilities in accordance with the Australian Standard (AS 2890.6:2009), noting that GTA has only been supplied with a low quality PDF copy of the site plans.

6. Loading & Waste Collection

6.1 Statutory Requirements

Clause 52.07 of the Greater Shepparton Planning Scheme is applicable where buildings or works are constructed for the manufacture, servicing, storage or sale of goods or materials.

The Clause anticipates the development proposal has statutory requirement of a loading area of 45.4sqm for the supermarket and 27.4sqm for the retail use.

It is proposed to provide a dedicated loading dock for the supermarket to the rear of the tenancy, which is expected to exceed the area requirement. There are also two separate loading areas proposed for shared use by the retail tenancies, located on the north-east and southern sides of the building.

These loading areas are considered to be adequate to meet the requirements and anticipated demands of the proposal, noting additional facilities as part of the pad sites will likely need to be provided.

6.2 Layout

A swept path assessment has been completed by TraffixGroup for a 19.0m semi-trailer accessing the supermarket loading dock which is considered appropriate.

However, the swept path assessments provided only focus on the internal loading dock layout. As such, it is recommended that additional swept path assessments are undertaken to confirm a 19.0m semi-trailer can enter the site from Ford Road and exit via Doody Street to Numurkah Road.

6.3 Refuse Collection

It is expected that there will be a refuse storage and collection area to the rear of the main building along the rear service road.

7. Traffic Impact

7.1 Preamble

The following traffic assessment includes consideration of the four pad sites once they are developed in the future. While it is appropriate for the car parking, bicycle facilities and loading facilities to be assessed with their individual permit applications, the anticipated traffic that each pad site generates has been considered as part of the overall assessment, to at least indicatively determine whether the surrounding road network can support the full development of the site.

7.2 Traffic Generation

7.2.1 Design Rates

GTA has previously reviewed the appropriateness of the traffic generation rates adopted by TraffixGroup in our memorandum dated 29 July 2016. It was not possible to verify the appropriateness of the traffic generation rates for the supermarket and retail tenancies given the limited information provided around the site that was surveyed.

As such, GTA has utilised the traffic generation rates provided in Table 7.1, including the relevant source we obtained them from.

Table 7.1: Traffic Generation Estimates

Land Use	Size	Traffic Generation Rate (movements/hour)		Source	Vehicle Movements	
		Weekday PM	Saturday Midday		Weekday PM	Saturday Midday
Supermarket	3,960 m ²	13.8/100m ²	14.7/100m ²	RTA Guide	546/hr	582/hr
Speciality Shops	2,030 m ²	5.6/100m ²	10.7/100m ²	RTA Guide	114/hr	217/hr
Medical Centre	6 practitioners	10/practitioner	10/practitioner	TraffixGroup	60/hr	60/hr
Council / Community Centre	100 m ²	0.5/100m ²	0	RTA Guide	1/hr	0/hr
Childcare Centre	90 children	0.7/child	0	RTA Guide	63/hr	0/hr
Petrol Station	1,904 m ² , including a 244 m ² store	0.04 of site 0.30 of shop	0.04 of site 0.30 of shop	RTA Guide	149/hr	149/hr
KFC	2,602 m ²	100 mvts	100 mvts	RTA Guide	100/hr	100/hr
Bulky Goods Retail	2,000 m ²	2.5/100m ²	6.6/100m ²	GTA Generation Database	50/hr	132/hr
Total Movements					1,083/hr	1,241/hr

Table 7.1 indicates that the site could potentially generate up to 1,083 vehicle movements in a weekday PM peak hour and 1,241 vehicle movements in a Saturday midday peak hour.

7.2.2 Characteristic Trip Types

An important characteristic of the traffic generation of the above uses is the different types of trips which may occur. These different trip types correspond to:

'Primary Trips'

'Link-diverted Trips'

'Non-link-diverted Trips'.

Primary trips and *link-diverted trips* involve a vehicle either making a special trip or a modification of the route to an existing trip. *Non-link-diverted trips*, on the other hand, correspond to those trips which do not involve a diversion from the route that would otherwise have been taken, or in other words are trips generated by passing traffic. The important distinction here is that it is only *primary trips* and *link-diverted trips* which impact upon the external road network. *Non-link-diverted trips* are already present on the adjacent road network, and although these trips need to be considered in the design of access driveways, turning lanes and so on, they do not constitute additional traffic per se.

In order to account for these different trip types the following has been adopted in terms of the two pad sites at this time for assessment purposes:

- 100% of the petrol station trips are considered to be *non-link-diverted trips*
- 35% of the KFC trips are considered to be *non-link-diverted trips*.

The above tries to account for the likely high proportion of vehicles accessing the petrol station and KFC being link and non-link diverted trips, and to a lesser extent the interplay with some of the other land uses. As such, all of the trips associated with the petrol station and 35% of the trips associated with the KFC are not considered to be additional to what already exists on the fronting roads of Goulburn Valley Highway and Ford Street. However, they will result in additional turning movements at the intersections used to access the site.

7.3 Traffic Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- i configuration of the arterial road network in the immediate vicinity of the site
- ii existing operation of intersections providing access between the local and arterial road network
- iii distribution of households in the vicinity of the site
- iv surrounding employment centres, retail centres and schools in relation to the site
- v configuration of access points to the site.

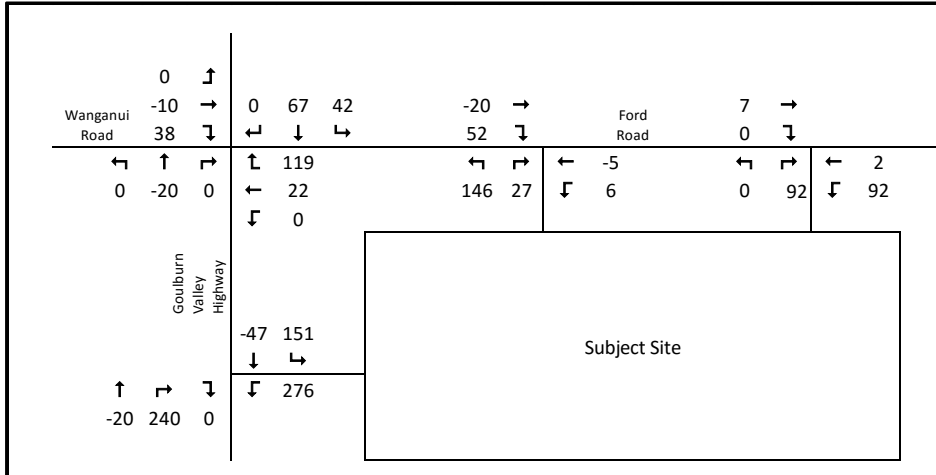
Notwithstanding the above, in this instance the directional distributions have been sourced from the MacroPlan Dimasi economic impact assessment report (dated January 2017). Based on the findings of this report, the following directional distributions have been assumed for the proposal:

- 5% to/from the west
- 22% to/from the east
- 51% to/from the south
- 22% to/from the north

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) will be 50:50 in the peak hours for each proposed land use.

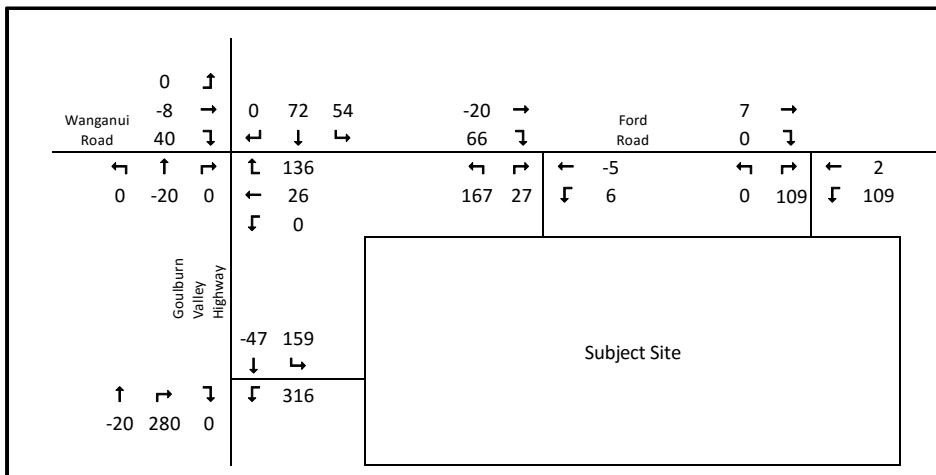
Based on the above, Figure 7.1 and Figure 7.2 have been prepared to show the estimated marginal increase in turning movements in the vicinity of the subject property during a weekday PM and Saturday midday peak hours, following full site development.

Figure 7.1: Weekday PM Peak Hour Site Generated Traffic Volumes



[1] Negative numbers relate to non-link-diverted trips

Figure 7.2: Saturday Midday Peak Hour Site Generated Traffic Volumes



[1] Negative numbers relate to non-link-diverted trips

By adding the development traffic to the existing traffic flows we can obtain the Post-Development traffic volumes. These are outlined in Figure 7.3 and Figure 7.4.

Figure 7.3: Post-Development AM Peak Hour Traffic Volumes

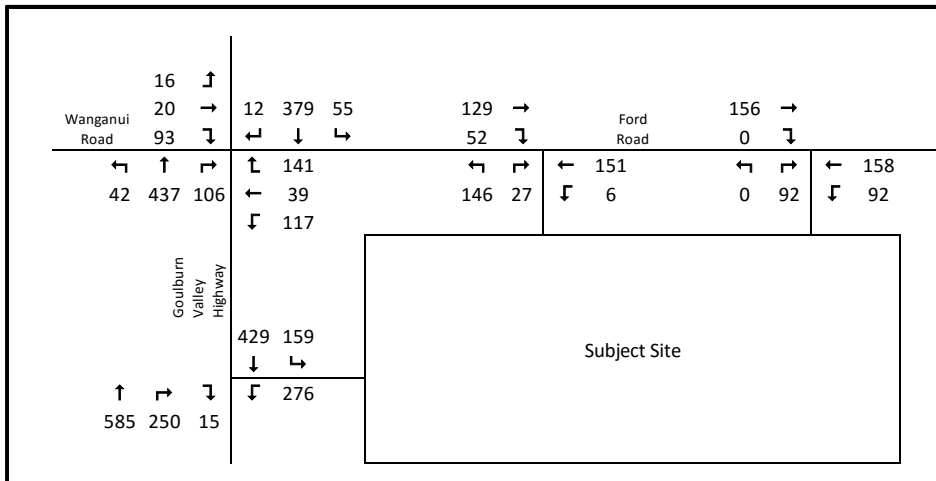
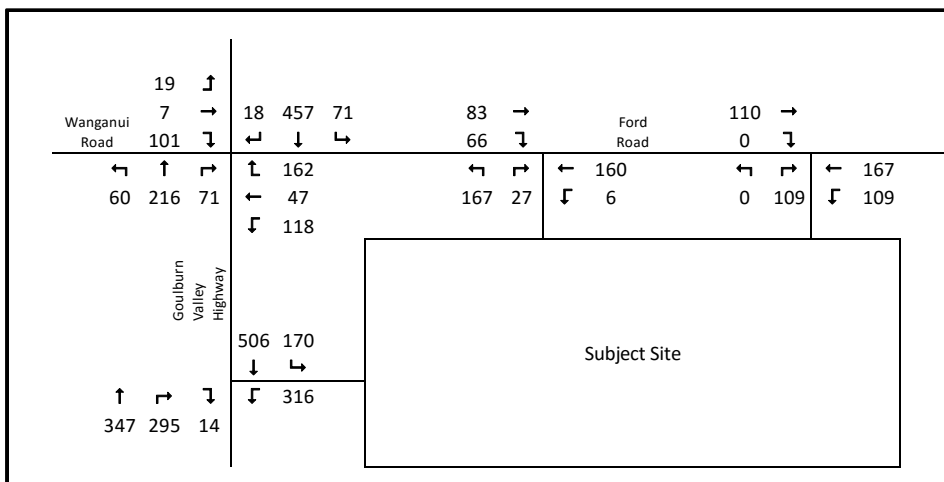


Figure 7.4: Post-Development PM Peak Hour Traffic Volumes



7.4 Traffic Impact

Analysis undertaken by TraffixGroup in their latest Traffic Engineering Assessment, dated January 2017, only assesses the right-turn facility from Goulbourn Valley Highway into the Numurkah Road service road, and did not include consideration of the traffic likely to be generated by the pad sites. As such, no specific review of their analysis has been undertaken. Rather, our own traffic analysis for the key intersections providing access to the site based on what the traffic volumes the entire site once fully developed might generate has been completed.

7.4.1 Goulburn Valley Highway Site Access Intersection

Existing Conditions

The operation of the Goulburn Valley Highway site access intersection has been assessed using *SIDRA INTERSECTION 7.0*³, a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement

³ Program used under license from Akcelik & Associates Pty Ltd.

on each leg of the intersection. For unsignalised intersections, a DOS of around 0.90 has been typically considered the 'ideal' limit, beyond which queues and delays increase disproportionately⁴.

Table 7.2 presents a summary of the existing operation of the intersection, with full results presented in Appendix B of this report.

Table 7.2: Goulburn Valley Highway Site Access – Existing Operating Conditions

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	# 0.34	1 sec	1 m
	Goulburn Valley Hwy (North)	0.27	0 sec	0 m
Saturday Midday	Goulburn Valley Hwy (South)	0.21	1 sec	1 m
	Goulburn Valley Hwy (North)	# 0.31	0 sec	0 m

DOS – Degree of Saturation, # - Intersection DOS

Table 7.2 indicates that the Goulburn Valley Highway site access intersection currently operates well with minimal queues and delays on all approaches.

Post Development Conditions

The impact of the development traffic on the Goulburn Valley Highway site access intersection was assessed using SIDRA INTERSECTION 7.0. Table 7.3 presents a summary of the anticipated future operation of the nominated intersections following the full development of the site. Detailed results of this analysis are provided in Appendix B of this report.

Table 7.3: Goulburn Valley Highway Site Access – Post-Development Operating Conditions

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	# 0.40	4 sec	16 m
	Goulburn Valley Hwy (North)	0.24	2 sec	0 m
Saturday Midday	Goulburn Valley Hwy (South)	# 0.54	7 sec	24 m
	Goulburn Valley Hwy (North)	0.28	2 sec	0 m

DOS – Degree of Saturation, # - Intersection DOS

Note: This model is based on an existing conditions model which has not been calibrated and is only appropriate for comparative purposes to understand the extent of changes that occur in the operation of the intersection.

The calculated DOS suggest that the nominated intersections can be expected to operate satisfactorily following full development of the site.

7.4.2 Goulburn Valley Highway / Ford Road / Wanganui Road

Existing Conditions

The operation of the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road has been assessed using SIDRA INTERSECTION 7.0. It is noted that the intersection has been modelled

⁴ SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

as a network with two T-intersections located in close proximity, which represents how the intersection operates in reality.

Table 7.4 presents a summary of the existing operation of the intersection, with full results presented in Appendix B of this report.

Table 7.4: Goulburn Valley Highway / Ford Road / Wanganui Road – Existing Operating Conditions

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	0.28	2 sec	4 m
	Ford Road (East)	0.28	18 sec	8 m
	Goulburn Valley Hwy (North)	0.21	0 sec	0 m
	Wanganui Road (West)	# 0.37	23 sec	12 m
Saturday Midday	Goulburn Valley Hwy (South)	0.16	2 sec	2 m
	Ford Road (East)	0.21	16 sec	5 m
	Goulburn Valley Hwy (North)	# 0.24	0 sec	0 m
	Wanganui Road (West)	0.23	15 sec	7 m

DOS – Degree of Saturation, # - Intersection DOS

Table 7.4 indicates that the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road currently operates well with minimal queues and delays on all approaches.

Post Development Conditions

The impact of the site generated traffic on the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road has been assessed using SIDRA Intersection 7.0.

Table 7.5 presents a summary of the anticipated future operation of the intersection following the full development of the site. Detailed results of this analysis are provided in Appendix B of this report.

Table 7.5: Goulburn Valley Highway / Ford Road / Wanganui Road – Post-Development Intersection Operation

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	0.29	0 sec	2 m
	Ford Road (East)	# 1.67	411 sec	415 m
	Goulburn Valley Hwy (North)	0.26	0 sec	0 m
	Wanganui Road (West)	0.66	39 sec	25 m
Saturday Midday	Goulburn Valley Hwy (South)	0.19	1 sec	2 m
	Ford Road (East)	# 1.31	223 sec	289 m
	Goulburn Valley Hwy (North)	0.31	0 sec	0 m
	Wanganui Road (West)	0.51	27 sec	17 m

DOS – Degree of Saturation, # - Intersection DOS

Note: This model is based on an existing conditions model which has not been calibrated and is only appropriate for comparative purposes to understand the extent of changes that occur in the operation of the intersection.

Table 7.5 indicates that the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road is expected to fail. The right turn movements on the Ford Road eastern approach exceeds its theoretical capacity with an overall DOS of 1.67 during the weekday PM peak hour, following full development of the site (including the future pad sites). During both peak periods this movements will experience significant queues and delays.

These SIDRA model results indicate that mitigating works will be required to upgrade the intersection to facilitate the anticipated future traffic volumes.

7.5 Mitigating Works

A potential solution could be to signalise the existing layout of the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road. A concept layout plan of our recommended intersection design has been included in Appendix C.

7.5.1 Post Development

Based on the abovementioned proposed intersection design, a SIDRA Intersection assessment has been undertaken to determine the operation of the intersection following full development of the site. It is noted that only the critical weekday PM peak hour has been assessed for the proposed mitigated scenario. The results are summarised in Table 7.6 below, with full results included in Appendix B.

Table 7.6: Goulburn Valley Highway / Ford Road / Wanganui Road – Post-Development Intersection Operation

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	0.61	22 sec	91 m
	Ford Road (East)	# 0.63	30 sec	68 m
	Goulburn Valley Hwy (North)	0.53	19 sec	76 m
	Wanganui Road (West)	0.61	39 sec	33 m

DOS – Degree of Saturation, # - Intersection DOS

Note: This model is based on an existing conditions model which has not been calibrated and is only appropriate for comparative purposes to understand the extent of changes that occur in the operation of the intersection.

For signalised intersections, a DOS of around 0.95 has been typically considered the 'ideal' limit, beyond which queues and delays increase disproportionately. Table 7.6 indicates that the intersection is expected to operate satisfactorily immediately following full development of the subject site (including development of the pad sites).

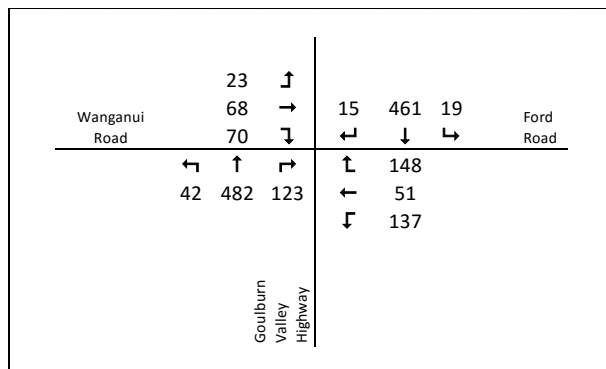
7.5.2 Additional Background Growth

In addition to the post development operation of the recommended intersection upgrade, it is considered appropriate to account for other significant known developments that are expected to occur over the next 10 years. These known future developments in the vicinity of the site include the following:

- Waste Sorting Centre
- Primary School
- Residential development to the east and north

The estimated future traffic volumes through the subject intersection have been presented in Figure 7.5 for the weekday PM peak period, accounting for the anticipated additional traffic that will be generated by these developments.

Figure 7.5: Goulburn Valley Highway / Ford Road / Wanganui Road – Future Traffic Volumes with Surrounding Known Development Traffic – Weekday PM Peak Hour



The traffic volumes presented above through the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road, which include completion of the surrounding known major developments do not take into consideration any potential *non-link-diverted trips* for a conservative (on the high side) assessment. Moreover, the resulting traffic volumes are in excess of the future volumes identified in the Shepparton Strategic Model prepared by AECOM for 2031. Therefore, in this instance no additional traffic growth is considered to be necessary for assessment purposes.

The performance of the recommended signalised intersection with the additional traffic from the surrounding known developments, has been assessed with SIDRA Intersection 7.0. A summary of the results is presented in Table 7.7, with full results presented in Appendix B.

Table 7.7: Goulburn Valley Highway / Ford Road / Wanganui Road – Future Operating Conditions with Completion of Surrounding Major Developments – Weekday PM Peak

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	0.70	25 sec	107 m
	Ford Road (East)	# 0.71	32 sec	82 m
	Goulburn Valley Hwy (North)	0.67	21 sec	100 m
	Wanganui Road (West)	0.67	37 sec	42 m

DOS – Degree of Saturation, # - Intersection DOS

Table 7.7 indicates that the recommended signalised intersection will still operate satisfactorily with the completion of the surrounding known major developments.

8. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- i The proposed development generates a statutory parking requirement of 302 spaces.
- ii The proposed supply of 446 spaces exceeds the statutory requirement, and is considered to be appropriate, noting additional consideration of the pad sites will be required as part of their separate town planning applications.
- iii The proposed car parking layout appears to be generally consistent with the dimensional requirements as set out in the Greater Shepparton Planning Scheme and Australian Standard (AS 2890.6:2009). In terms of the proposed site access arrangements, the following modifications are recommended:
 - o Inclusion of an island on the Goulburn Valley Highway access intersection to the Numurkah Road service road.
 - o Inclusion of a left turn deceleration lane on Goulburn Valley Highway.
- iv It is proposed to provide 30 bicycle parking spaces on-site, which meets the statutory car parking requirements, noting additional consideration of the pad sites will be required as part of their separate town planning applications.
- v Loading areas are proposed for the supermarket as well as two areas for shared use by the retail tenancies, which is considered to be an appropriate provision. A swept path assessment has been completed which confirms access through the site to the supermarket loading dock by a 19m semi-trailer. However, it is recommended that swept paths are also completed demonstrating a 19m semi-trailer manoeuvring from Ford Road and to Doody Street be completed. Additional consideration of the pad sites will be required as part of their separate town planning applications.
- vi It is considered appropriate when completing a traffic assessment to have consideration to the anticipated future developments of the pad sites, to ensure the site access and surrounding intersections perform adequately following full development of the site. On this basis, the site is expected to generate up to 1,083 and 1,241 vehicle movements in a weekday PM and Saturday midday peak hour respectively (including the anticipated traffic generation of the four pad sites).
- vii The site access intersection to Goulburn Valley Highway is expected to operate satisfactorily with full site development. However, the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road is expected to fail with full development of the subject site, with an anticipated Degree of Saturation of 1.67 during the weekday PM peak hour.
- viii Based on the above, and to mitigate the impact of the site generated traffic on the surrounding road network, it is recommended to upgrade the intersection of Goulburn Valley Highway / Ford Road / Wanganui Road to a signalised intersection.
- ix A SIDRA Intersection assessment has been undertaken for the recommended upgraded intersection. The assessment also takes into account the anticipated traffic generation of the surrounding known major future developments in the area. The results of the assessment indicate that the recommended upgraded intersection will perform adequately with full development of the site and all known future developments in the area.

Appendix A

Previous Reports & Correspondence

A.1 TrafixGroup



Traffic Engineers and Transport Planners

Traffic Engineering Assessment

Proposed Shopping Centre

at

**221-229 Goulburn Valley Highway and 10 Ford Road,
Shepparton**

Prepared For

Lascorp Development Group (Aust) Pty Ltd

June, 2016

G19863R-01D

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

Traffic Engineering Assessment

Proposed Shopping Centre

at

**221-229 Goulburn Valley Highway and 10 Ford Road,
Shepparton**

Document Control

Issue No.	Type	Date	Prepared By	Approved By
A	Draft	08/04/2016	D. Milder	H. Turnbull
B	Draft	15/06/2016	D. Milder	H. Turnbull
C	Draft	17/06/2016	D. Milder	H. Turnbull
D	Final	20/06/2016	D. Milder	H. Turnbull

Our Reference: G19863R-01D

COPYRIGHT: The ideas and material contained in this document are the property of Traffix Group (Traffix Group Pty Ltd – ABN 32 100 481 570, Traffix Survey Pty Ltd – ABN 57 120 461 510, Traffix Design Pty Ltd – ABN 41 060 899 443). Use or copying of this document in whole or in part without the written permission of Traffix Group constitutes an infringement of copyright.

LIMITATION: This report has been prepared on behalf of and for the exclusive use of Traffix Group's client, and is subject to and issued in connection with the provisions of the agreement between Traffix Group and its client. Traffix Group accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

Table of Contents

1	Introduction	1
2	Existing Conditions	1
2.1	The Site	1
2.2	Land Use.....	3
2.3	Road Network	4
2.4	Sustainable Modes of Transport	5
2.4.1	Public Transport	5
2.4.2	Bicycle Network	5
3	Proposal	6
4	Car Parking Assessment	7
4.1	Statutory Car Parking Requirements	7
4.2	Car Parking Layout	8
4.3	Goulburn Valley Highway Access	8
5	Bicycle Parking	9
6	Traffic Considerations	11
6.1	Traffic Generation	11
6.2	Traffic Distribution	12
6.3	Traffic Impact	13
7	Loading and Refuelling	14
8	Conclusions	15

List of Appendices

Appendix A: Development Plans

Appendix B: Swept Path Diagrams

Appendix C: Functional Layout Plan of Goulburn Valley Highway Access

Appendix D: SIDRA Output

1 Introduction

Traffix Group has been engaged by Lascorp Development Group (Aust) Pty Ltd to undertake a traffic engineering assessment and prepare a report for the proposed shopping centre located at 221-229 Goulburn Valley Highway and 10 Ford Road in Shepparton.

In preparing this report, the subject site and environs have been inspected, relevant data has been collected and reviewed, plans of the proposed development have been perused and the traffic engineering implications of the proposed development have been assessed.

2 Existing Conditions

2.1 The Site

The subject site is located on the east side of Goulburn Valley Highway and the south side of Ford Road in Shepparton, as shown in the locality plan at Figure 1 below.



Figure 1: Locality Map

The site is currently undeveloped. It is irregular in shape with an area of approximately 4.05 hectares and frontages to Ford Road and Goulburn Valley Highway of approximately 178 metres and 74 metres respectively.

An aerial view (2016) of the subject site photographs of the site and from Ford Road and Goulburn Valley Highway are shown in Figures 2 to 6 below.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre



Figure 2: Aerial View



Figure 3: Subject Site viewed from Ford Road



Figure 4: Subject Site viewed from Ford Road



Figure 5: Subject Site viewed from Goulburn Valley Highway



Figure 6: Subject Site viewed from Goulburn Valley Highway

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

2.2 Land Use

The subject site is within a Commercial Zone – Schedule 2 (C2Z) as shown in the Land Use Zone Map at Figure 7.

Surrounding uses are currently predominantly a residential and farm to the east and north. Land uses along Goulburn Valley Highway are commercial including fast food tenancies, supermarkets, service stations and restaurants/eateries.

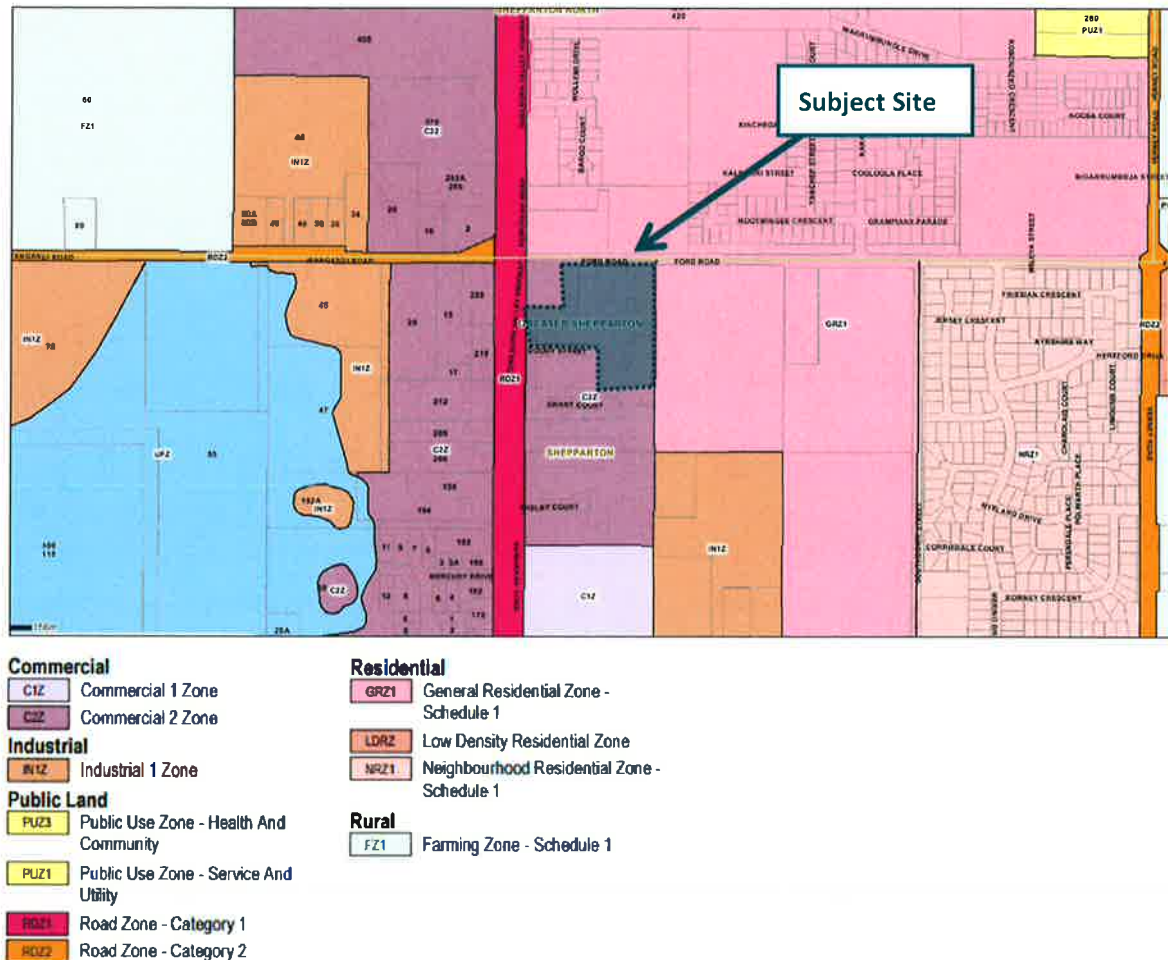


Figure 7: Land Use Zoning Map

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

2.3 Road Network

Goulburn Valley Highway in the vicinity of the subject site is a VicRoads declared road (Road Zone Category 1). Goulburn Valley Highway extends in a north-south direction from Hume Highway to Murray Valley Highway.

In the vicinity of the subject site, Goulburn Valley Highway is constructed with a divided carriageway comprising 2 lanes of through traffic in each direction and bicycle lanes on each side.

A posted speed limit of 60km/h applies to Goulburn Valley Highway.



Figure 8: Goulburn Valley Highway view North



Figure 9: Goulburn Valley Highway view South

Ford Road is a local road which extends approximately 5.4 kilometres in an east-west direction between Lemnos N Road (where it continues as Lemons – Cosgrove Road) and Goulburn Valley Highway.

Ford Road is constructed with a 7.5 metre (approx.) carriageway comprising one traffic lane in each direction.

A posted speed limit of 60km/h applies to Ford Road.

We understand from VicRoads that as part of the Shepparton North Growth Corridor, Ford Road and the intersection of Ford Road/Goulburn Valley Highway are to be upgraded. No plans are yet available detailing the extent of works that VicRoads will be undertaking as part of the upgrade, but we understand that it will include the signalisation of the intersection.



Figure 10: Ford Road view West



Figure 11: Ford Road view East

2.4 Sustainable Modes of Transport

2.4.1 Public Transport

There are currently no public transportation services available within reasonable walking distance of the subject site.

2.4.2 Bicycle Network

There are several on- and off-road bicycle routes provided throughout Shepparton. In addition, several new paths, including priority routes along Wyndham Road and Midland Highway connecting to Mooroopna, have been identified as part of future bicycle route planning. Figure 12 below shows the VicRoads' Bicycle Network Planning map for Shepparton.

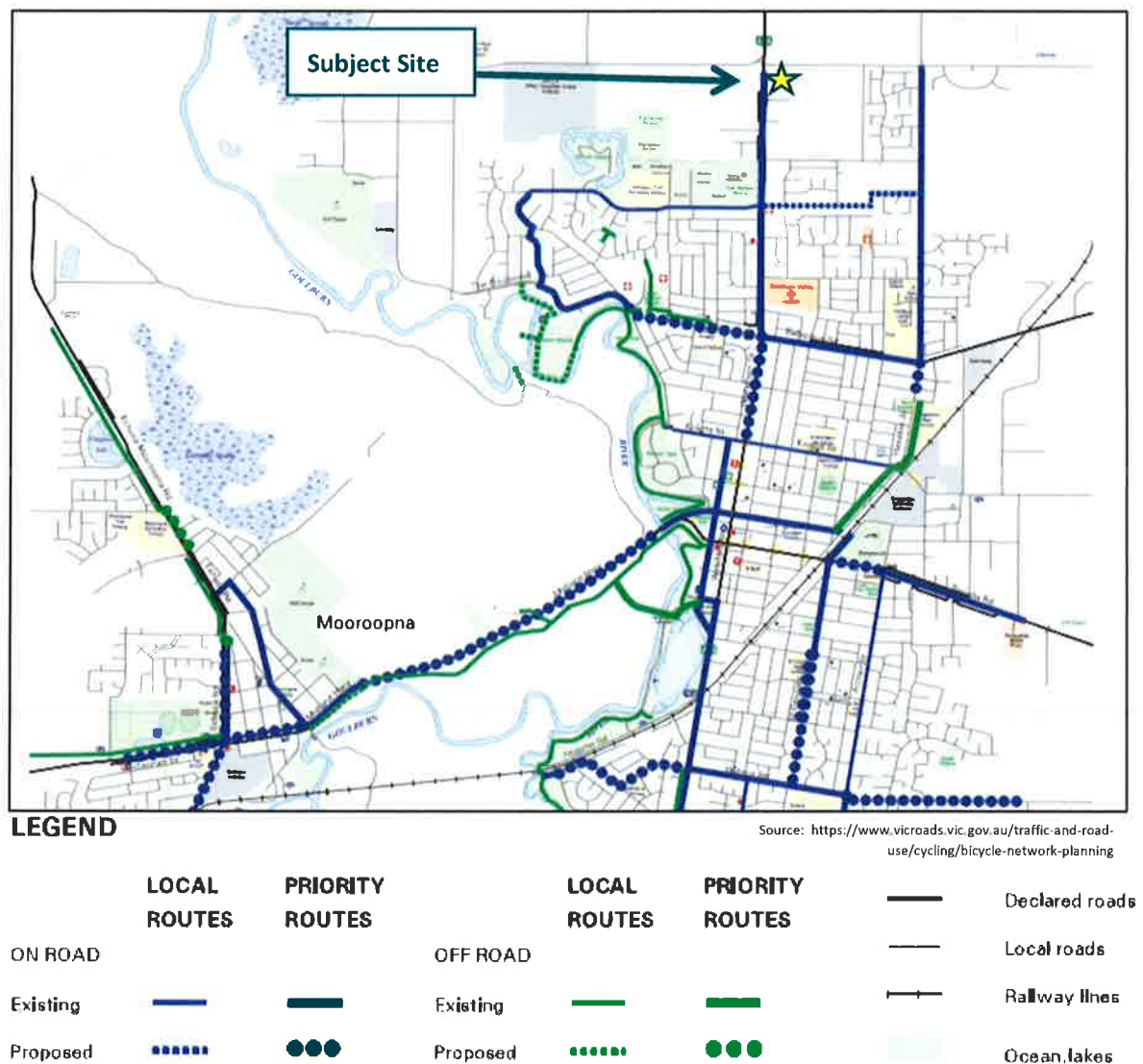


Figure 12: Shepparton Bicycle Network Planning Routes

3 Proposal

The proposal is to develop the subject site for the purposes of a mixed-use development comprising a supermarket, specialty shops, medical centre, community facilities and a childcare centre.

A schedule of uses for the proposed development is provided at Table 1.

Table 1: Schedule of Uses

Use	Quantity / Size
Supermarket	3,960m ²
Speciality Shops	1,779m ²
Medical Centre	10 practitioners (500m ²)
Council/Community Centre	252m ²
Childcare Centre	90 children (3,000m ²)

A total of 366 car parking spaces are to be provided on-site for the proposed development.

Loading for the supermarket is to be taken at the rear of the supermarket and a second loading zone is provided adjacent to the Council/Community space.

Vehicle access to the site is to be taken via new crossovers to Ford Road, Doody Street and a new access directly from Goulburn Valley Highway.

A copy of the proposed development plan is attached at Appendix A.

4 Car Parking Assessment

4.1 Statutory Car Parking Requirements

Clause 52.06 of the Planning Scheme sets out the statutory requirements for car parking as summarised at Table 2. The purpose of Clause 52.06 is:

- To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.
- To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.
- To support sustainable transport alternatives to the motor car.
- To promote the efficient use of car parking spaces through the consolidation of car parking facilities.
- To ensure that car parking does not adversely affect the amenity of the locality.
- To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

Table 2: Statutory Car Parking Requirements

Use	Measure	Rate ¹	Requirement ²
Supermarket	3,960m ²	5 spaces per 100m ² of leasable floor area	198 spaces
Shop	1,779m ²	4 spaces per 100m ² of leasable floor area	71 spaces
Medical Centre	10 Practitioners	5 spaces to the first person providing health services and 3 spaces to each other person providing health services	32 spaces
Council/Community Centre	252m ²	3.5 spaces per 100m ² of net floor area	8 spaces
Childcare Centre	90 children	0.22 spaces to each child	19 spaces
Total			328 spaces

We note that the childcare centre will provide parking at the statutory rate on its site, separate from the rest of the development.

The proposed development has provision for 366 parking spaces comprising 344 within the main carpark and 22 spaces within the car park on the childcare site. This exceeds the statutory

¹ We note that Clause 21.04-6 specifies parking rates for childcare centres and medical centres within residential areas. The site is not located in a residential area and that the update to Clause 52.06 postdates those sections of the Planning Scheme.

² Clause 52.06-5 states ... "If in calculating the number of car spaces the result is not a whole number, the required number of car parking spaces is to be rounded down to the nearest whole number."

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

requirement under Clause 52.06 and accordingly, the application is not seeking a permit to reduce the statutory car parking requirement.

4.2 Car Parking Layout

The proposed car parking layout and access arrangements have been assessed under the relevant sections of the Planning Scheme and the relevant Australian Standards.

Key elements of the design include:

Design Standard 1 – Accessways

- All vehicles can exit the site in a forwards direction in accordance with the requirements of the Planning Scheme.
- Adequate pedestrian sight triangles will be available at all the proposed crossovers.
- Articulated vehicles (i.e. 19.0m semi-trailer) are expected to enter the site via Ford Road and exit via Doody Street for the purposes of deliveries for the supermarket.

A swept path diagram for this vehicle has been prepared in order to check the suitability of this arrangement. This swept path is attached at Appendix B and shows that the design vehicle can enter and egress the site in an appropriate and acceptable manner.

Design Standard 2 – Car Parking Spaces

- All car spaces (with the exception of the parallel spaces adjacent to the car charging station) are measured to be at least 2.6m wide, 5.4m long and accessed from an aisle that is at least 6.4 metres wide, in accordance with the requirements of the Planning Scheme.
- The proposed disabled car spaces are measured to be 2.4m wide and 5.4m long and have an adjacent shared area that is 2.4m wide and 5.4m long. These dimensions satisfy the requirements the Australian Standard for people with disabilities.

Based on the foregoing, we are satisfied that the proposed car parking layout and access arrangements are satisfactory and will provide for safe and efficient movements to and from the site.

4.3 Goulburn Valley Highway Access

Traffix Group has prepared a concept access layout plan for a new access via Goulburn Valley Highway directly into the site. This access will replace the existing U-turn that exists for access to the Goulburn Valley Highway service road.

Based on an operating speed of 80km/h the right turn deceleration lane has been designed at 120 metres (including 25 metres taper) in accordance with the Austroads Guide to Road Design Part 4A.

This access will provide left-IN, left-OUT and right-IN movements only.

A copy of the functional layout plan for the proposed access via Goulburn Valley Highway is attached at Appendix C.

5 Bicycle Parking

Clause 52.34 of the Planning Scheme sets out the statutory requirements for bicycle facilities. The purpose of Clause 52.34 is:

- To encourage cycling as a mode of transport.
- To provide secure, accessible and convenient bicycle parking spaces and associated shower and change facilities.

The number of bicycle spaces required under Clause 52.34 is set out below.

Table 3: Statutory Bicycle Parking Requirement

Use	Measure	Rate	Requirement ⁽¹⁾
Employee			
Retail Tenancy 1	137 m ²	1 space to each 300m ² of leasable floor area	0 space
Retail Tenancy 2	152 m ²	1 space to each 300m ² of leasable floor area	1 space
Retail Tenancy 3	152 m ²	1 space to each 300m ² of leasable floor area	1 space
Retail Tenancy 4	203 m ²	1 space to each 300m ² of leasable floor area	1 space
Retail Tenancy 5	143 m ²	1 space to each 300m ² of leasable floor area	0 space
Retail Tenancy 6	193 m ²	1 space to each 300m ² of leasable floor area	1 space
Retail Tenancy 7	218 m ²	1 space to each 300m ² of leasable floor area	1 space
Retail Tenancy 8	76 m ²	1 space to each 300m ² of leasable floor area	0 space
Retail Tenancy 9	75 m ²	1 space to each 300m ² of leasable floor area	0 space
Chemist	430 m ²	1 space to each 300m ² of leasable floor area	1 space
Supermarket	3,960 m ²	1 space to each 600m ² of leasable floor area if the leasable floor area exceeds 1,000m ²	7 spaces
Medical Centre	10 practitioners	1 space to each eight practitioners	1 space
Council/Community Centre	252 m ²	1 space to each 300m ² of net floor area if the net floor area exceeds 1,000m ²	0 spaces
Childcare Centre	90 children (3,000m ²)	Not applicable	0 spaces
Shopper/Visitor			
Retail Tenancy 1	137 m ²	1 space to each 500m ² of leasable floor area	0 spaces
Retail Tenancy 2	152 m ²	1 space to each 500m ² of leasable floor area	0 spaces

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

Use	Measure	Rate	Requirement ⁽¹⁾
Retail Tenancy 3	152 m ²	1 space to each 500m ² of leasable floor area	0 spaces
Retail Tenancy 4	203 m ²	1 space to each 500m ² of leasable floor area	0 spaces
Retail Tenancy 5	143 m ²	1 space to each 500m ² of leasable floor area	0 spaces
Retail Tenancy 6	193 m ²	1 space to each 500m ² of leasable floor area	0 spaces
Retail Tenancy 7	218 m ²	1 space to each 500m ² of leasable floor area	0 spaces
Retail Tenancy 8	76 m ²	1 space to each 500m ² of leasable floor area	0 space
Retail Tenancy 9	75 m ²	1 space to each 500m ² of leasable floor area	0 space
Chemist	430 m ²	1 space to each 500m ² of leasable floor area	1 space
Supermarket	3,960 m ²	1 space to each 500m ² of leasable floor area if the leasable floor area exceeds 1,000m ²	8 spaces
Medical Centre	10 practitioners	1 space to each four practitioners	3 space
Council/Community Centre	252 m ²	1 space to each 1,000m ² of leasable floor area if the leasable floor area exceeds 1,000m ²	0 spaces
Childcare Centre	90 children (3,000m ²)	Not applicable	0 spaces
TOTAL			27 spaces

(1) Clause 52.34 states... "If in calculating the number of bicycle facilities the result is not a whole number, the required number of bicycle facilities is the nearest whole number. If the requirement is one-half, the requirement is the next whole number."

The proposed development has a statutory requirement for 26 bicycle spaces, comprising 14 employee spaces and 12 visitor spaces.

The above assessment shows that the supermarket requires 7 employee bicycle spaces. This triggers the requirement for shower and change room facilities.

While not currently shown on the plans, we are satisfied that there is opportunity to provide formal bicycle parking on-site.

6 Traffic Considerations

6.1 Traffic Generation

Supermarket and Shops

Traffix Group has undertaken detailed turning movement counts of a similar site on the corner of Archer Street and Benalla Road at the direction of VicRoads. Extensive surveys were carried out from 12:30pm-6:00pm. A peak of 751 vehicle movements were recorded from 4:00pm-5:00pm. An estimate of approximately 6,800m² for the floor area of the shops and supermarket was based on aerial photography of the site.

Accordingly, given the site's location and similar characteristics, a peak afternoon vehicle generation rate of 11 vehicles per 100m² has been adopted. This equates to up to 659 movements in the PM peak hour.

Medical Centre

The likely traffic generation for the proposed medical centre development is estimated from first principles, based on the following assumptions:

- consultations will be by appointment with an average consultation time of 12 minutes, and
- all patients will drive to the site, i.e. up to 10 vehicle trip-ends per practitioner each hour (5 arriving and 5 leaving).

Based on the above assumptions, it is anticipated that a maximum of 100 vehicle trip-ends may be generated by the site during any one hour. Staff would typically arrive prior to the scheduled appointment times, and depart after the last appointment, and accordingly the staff vehicle movements would not coincide with the busiest hour.

Childcare Centre

The RTA Guide to Traffic Generating Developments (2002) (RTA Guide) sets out traffic generation rates based on survey data collected in New South Wales for a range of land uses. This guide is referred to in the Austroads Guide which is used by VicRoads, and is generally regarded as the standard for metropolitan development characteristics.

The RTA Guide sets out the following relevant rates:

Childcare Centre: AM peak hour: 0.8 vehicle trip-ends per child

 PM peak hour: 0.7 vehicle trip-ends per child

Accordingly, the childcare centre is estimated to generate up to 63 movements in the PM peak hour.

Summary

We note that it is highly unlikely that the PM peak traffic generation of each of the above uses will coincide. Nevertheless, for the purposes of a robust assessment, we have assumed that all peak rates will overlap and accordingly, up to 822 vehicle movements will be generated by the proposed development in the PM peak period.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

6.2 Traffic Distribution

The following distribution assumptions have been adopted for the purpose of analysis, based on the site locality and our experience:

- 50% of traffic will enter and 50% will exit in the peak periods,
- 5% of traffic will arrive and depart to the west,
- 10% of traffic will arrive and depart to the north,
 - 20% of traffic to access from Ford Road,
 - 80% of traffic to access from Goulburn Valley Highway,
- 25% of traffic will arrive and depart to the east,
 - $\frac{2}{3}$ of traffic to and from the east will enter/exit via the western access on Ford Road,
 - $\frac{1}{3}$ of traffic to and from the east will enter/exit via the eastern access on Ford Road, and
- 60% of traffic will arrive and depart to the south.

Based on the above assumptions, the anticipated peak hour turning movements generated by the proposed mixed-use development is summarised in Figure 13 below.

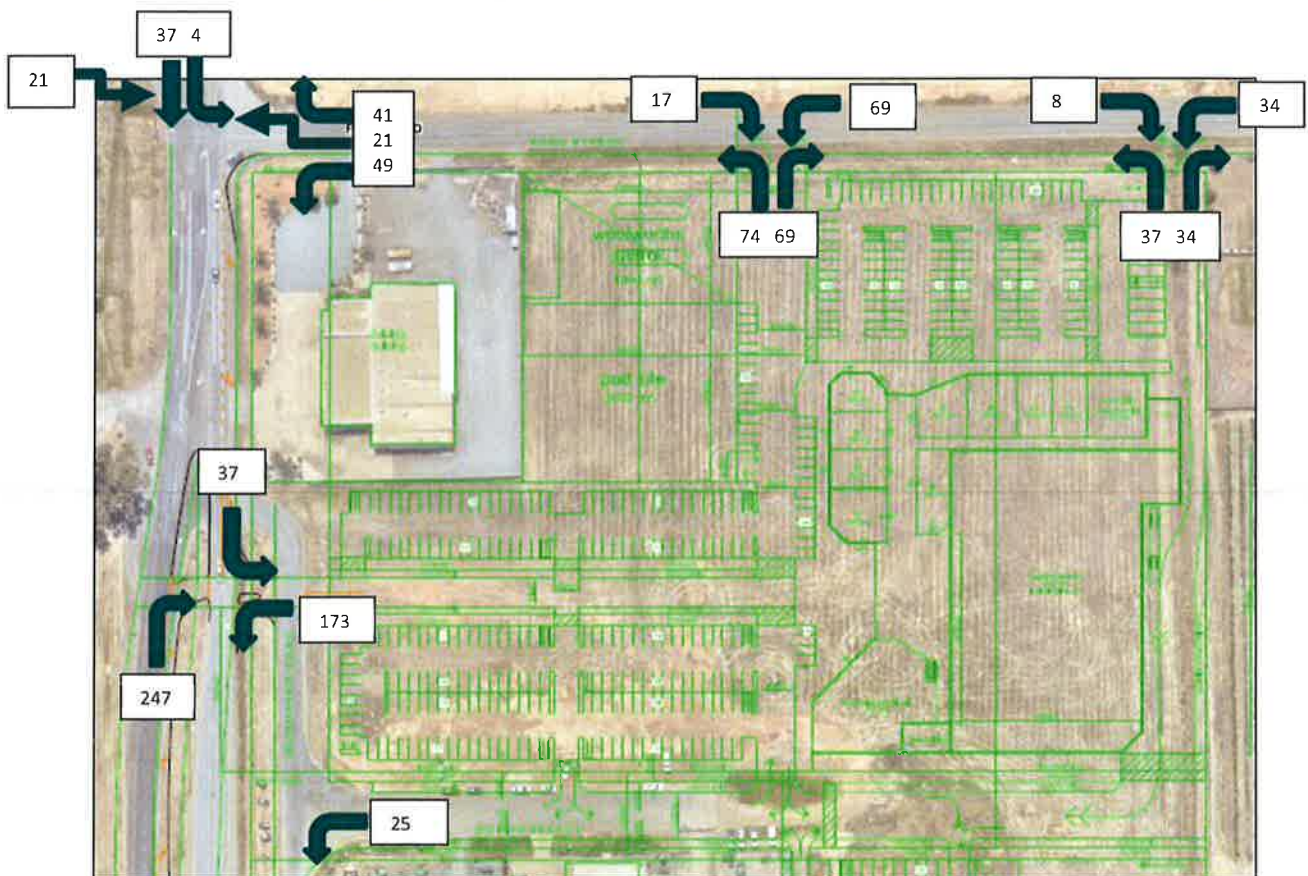


Figure 13: Expected Traffic Generation and Distribution

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

6.3 Traffic Impact

The above traffic generation values represent the conservative estimate of the ultimate traffic volumes once the shopping centre is fully constructed and has had time to build up to peak operational capacity.

The likely timeframe for this in our estimation is 5-10 years.

Within this timeframe, we understand that the intersection of Ford Road, Wanganui Road and Goulburn Valley Highway will be realigned to form a cross-intersection that will be signalised. Furthermore, it is likely that traffic volumes and expansion of the area will result in upgrade works to Goulburn Valley Highway in the vicinity of the subject site, giving additional capacity.

The proposed development will result in up to 247 exit movements onto Goulburn Valley Highway and 25 exit movements on to the service road. Traffic volumes sourced from the signalised intersection of Pine Road/Brauman Street/Goulburn Valley Highway indicates that there are approximately 1,000 movements on the southbound carriageway. At the new access to the site via Goulburn Valley Highway, there are two lanes provided for through traffic.

A SIDRA intersection analysis has been undertaken to determine the performance of the new access via Goulburn Valley Highway to the development site under post development conditions. A peak flow factor of 95% has been adopted.

A comparison of pre and post development intersection saturations is presented Table 4.

Table 4: SIDRA Summary

Approach	DoS	Average Delay (sec)	Queue Length (m)
Goulburn Valley Highway (south)	0.253	1.7	0.0
Site Access (east)	0.288	12.5	8.6
Goulburn Valley Highway (north)	0.290	0.2	0.0

The SIDRA analysis indicates that the proposed access has ample capacity on each approach capacity to accommodate the level of traffic, and there will be only a very minor delay for vehicles turning out of the site.

Significantly, Degrees of Saturation (DOS) less than 0.8 are considered to be good operating conditions for unsignalised intersections. As can be seen each DOS (being the highest DOS of any one approach at that intersection) is significantly lower than 0.8.

Full outputs of the SIDRA analysis for existing and post development conditions are attached at Appendix D.

Based on the above assessment, we are satisfied that the introduction of up to 230 movements will not severely impact on the operation of Goulburn Valley Highway.

7 Loading and Refuelling

Clause 52.07 of the Planning Scheme specifies that:

No building or works may be constructed for the manufacture, servicing, storage or sale of goods or materials unless:

- *Space is provided on the land for loading and unloading vehicles as specified in the table below.*
- *The driveway to the loading bay is at least 3.6 metres wide. If a driveway changes direction or intersects another driveway, the internal radius at the change of direction or intersection must be at least 6 metres.*
- *The road that provides access to the loading bay is at least 3.6 metres wide.*

FLOOR AREA OF BUILDING	MINIMUM LOADING BAY DIMENSIONS	
2,600 m ² or less in single occupation	Area	27.4 m ²
	Length	7.6 m
	Width	3.6 m
	Height Clearance	4.0 m
For every additional 1,800 m ² or part	Additional 18 m ²	

The supermarket is 3,960m² in area requiring a 45.4m² loading area. The supermarket loading bay is significantly larger than this and exceeds the other dimension requirements also.

Swept path analysis of a 19m articulated vehicle accessing the supermarket loading bay has been undertaken and access was shown to be satisfactory. Full results of the swept path analysis are attached at Appendix B.

A second loading area is located to the east of the Council/Community tenancy. Given the nature of the proposed development, the shared loading bay is considered to be appropriate in this instance.

We note that given the small size of many of the retail premises, it would be appropriate for them to share a single loading area.

Accordingly, with regards to the above, we are of the opinion the proposed loading provision is appropriate.

8 Conclusions

Having visited the site, perused relevant documents and plans, provided design advice, conducted a spot parking survey and undertaken traffic engineering assessments, we are of the opinion that:

- a) the proposed car parking provision of 366 spaces, exceeds the statutory parking requirement the application does not seek a permit to reduce the statutory parking requirement,
- b) the proposed car parking layout and access are considered to be in accordance with both the relevant requirements of the Planning Scheme and Australian Standards and will operate in an appropriate and acceptable manner,
- c) the new access via Goulburn Valley Highway has been designed in accordance with VicRoads' specifications and will operate in a safe and effective manner,
- d) bicycle parking is able to be provided in accordance with the statutory requirement under Clause 52.34,
- e) the proposed site may ultimately generate up to 822 movements to the site. This is unlikely to be achieved for 5-10 years at which time proposed upgrade works to the road network and surrounding intersections are likely to have been completed,
- f) the loading bay provided for the supermarket and the second loading bay provided for the specialty shops exceed the statutory requirement. Given the size of many of the shops, it is suitable that they share the second loading bay, and
- g) there are no traffic engineering reasons why a planning permit for the proposed mixed-use development at 221-229 Goulburn Valley Highway, Shepparton, should not be granted.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

Appendix A: Development Plans

SITE ANALYSIS
 SUPERMARKET / FOOD 3600m²
 CHILDREN CENTRE 1500m²
 CHEMIST / MEDICAL 1500m²
 COUNCIL / COMMUNITY 2500m²
 TOTAL 9100m²
 CARSPROVIDED - 341
 CHILDREN CENTRE 10 CHILDREN
 CARSPROVIDED - 22
 TOTAL CAR SPACES PROVIDED ON SITE - 363

FORD STREET

woolworths petrol
1904m²

existing building

pad site
2602m²

NUMURKAH ROAD

SUPERMARKET

MALL

CHEMIST / MEDICAL

COUNCIL / COMMUNITY

AMENITIES

US

DODDY STREET

GOUBURN VALLEY HIGHWAY

ADJACENT SITE

childcare site 3000m²

expansion site 3552m²

external area

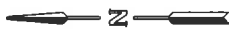
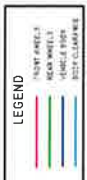
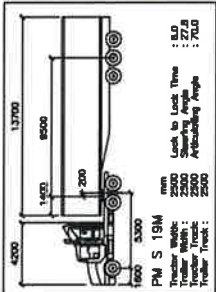
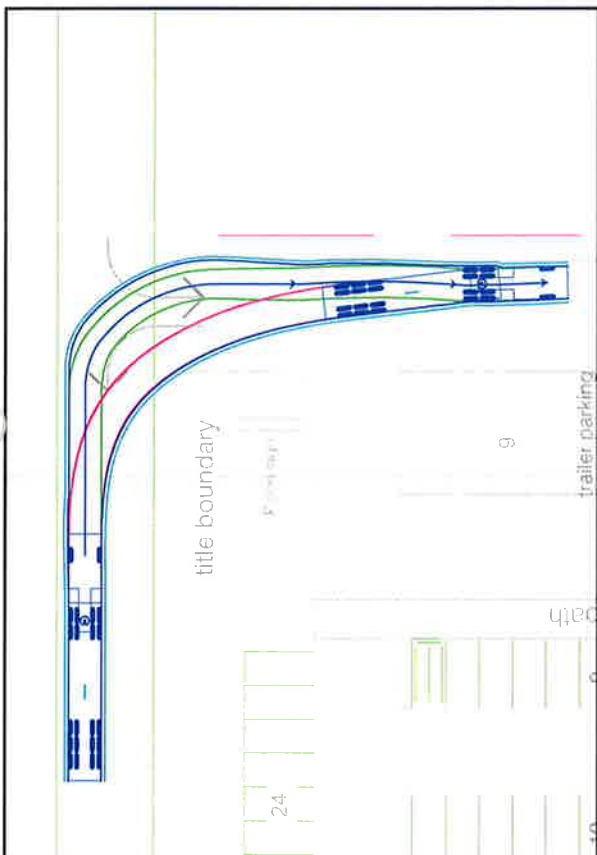
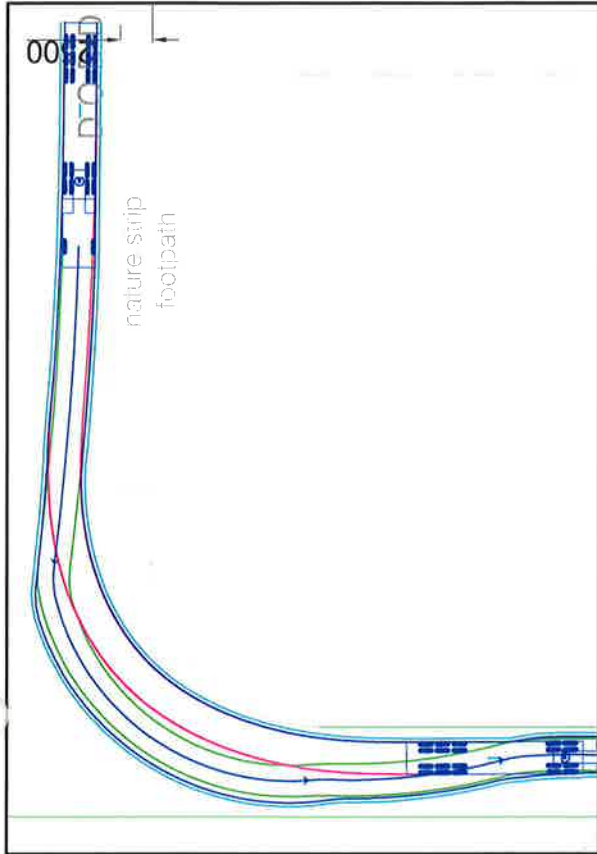
Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

Appendix B: Swept Path Diagrams

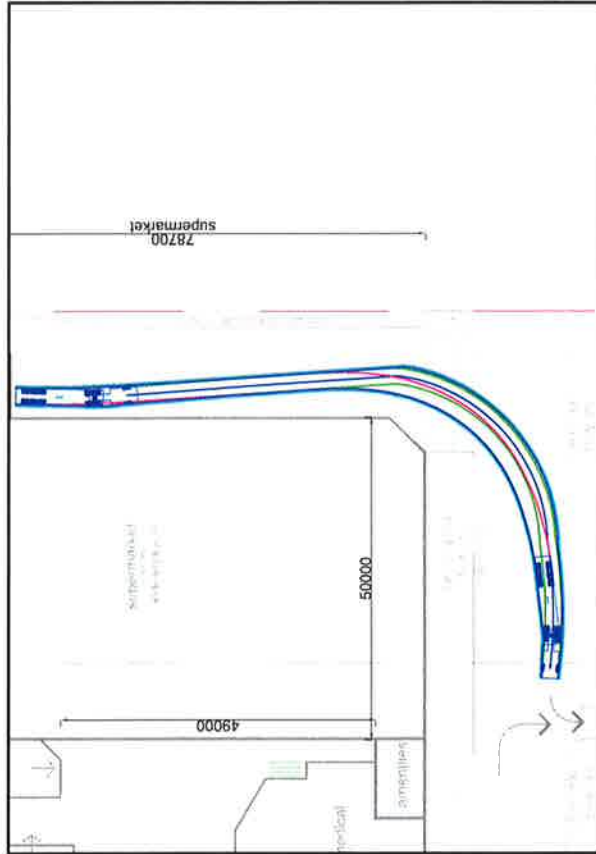
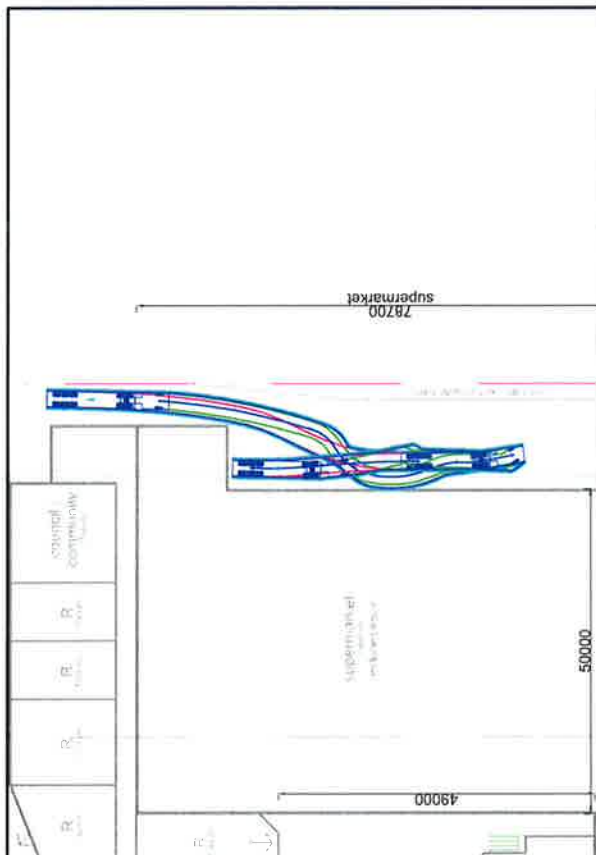
19m Semi Egress

19m Semi Egress



Loading Bay - Autoturn IN

Loading Bay - Autoturn OUT



REV.	REVISION NOTES	REVISION DATE

GENERAL NOTES
 1. BASE INFORMATION FROM: 2015-050_SK-21.1 - Sketch plan.dwg
 PREPARED BY: Gc Architects - received 08-06-2016

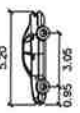
DESIGNED: 10 JUN 2016
 D. MILLER
 CHECKED: 10 JUN 2016
 H. TURNBULL
 FILE NAME: 19863-01.DWG
 ISSUE: A



221-229 GOULBURN VALLEY HIGHWAY, SHEPPARTON NORTH
 19m SEMI DESIGN SWEEP PATHS
 PROPOSED MIXED-USE DEVELOPMENT
 SHEET No. 01/01 19863-01

FORD ROAD - ACCESS AND EGRESS

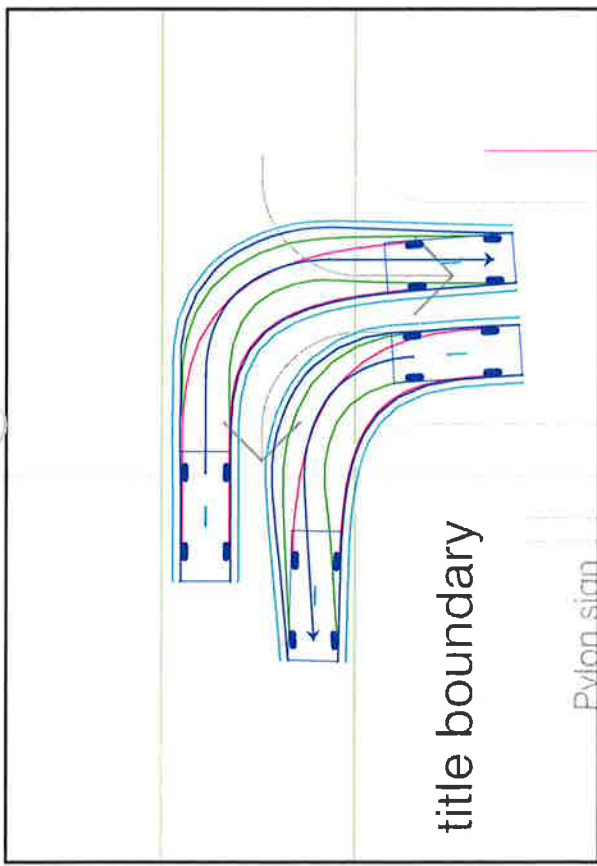
VEHICLE USED IN SIMULATION
(VEHICLE SPEED - 30km/h)



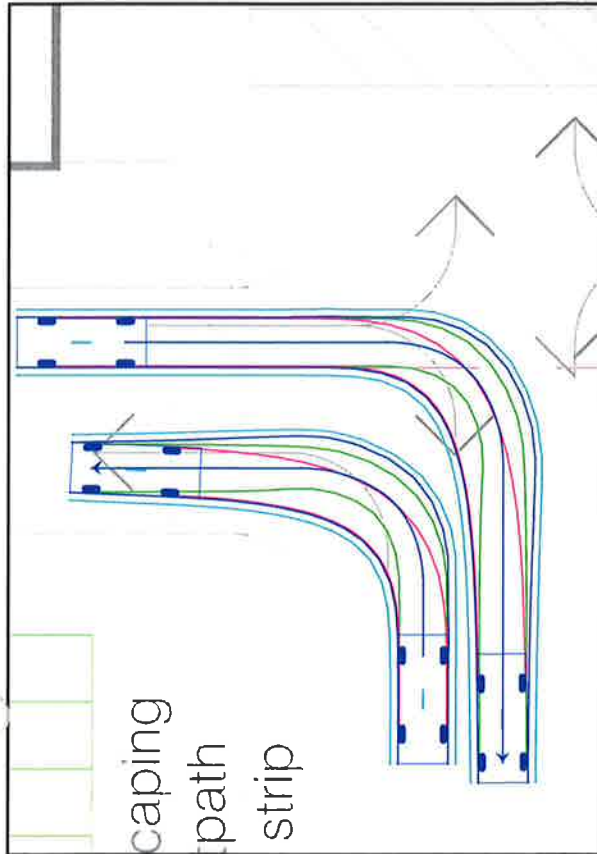
99TH-CAR-AS2890-04
Width : 1.94
Track : 1.84
Lock to Lock Time : 5.00
Steering Angle : 37.50

LEGEND

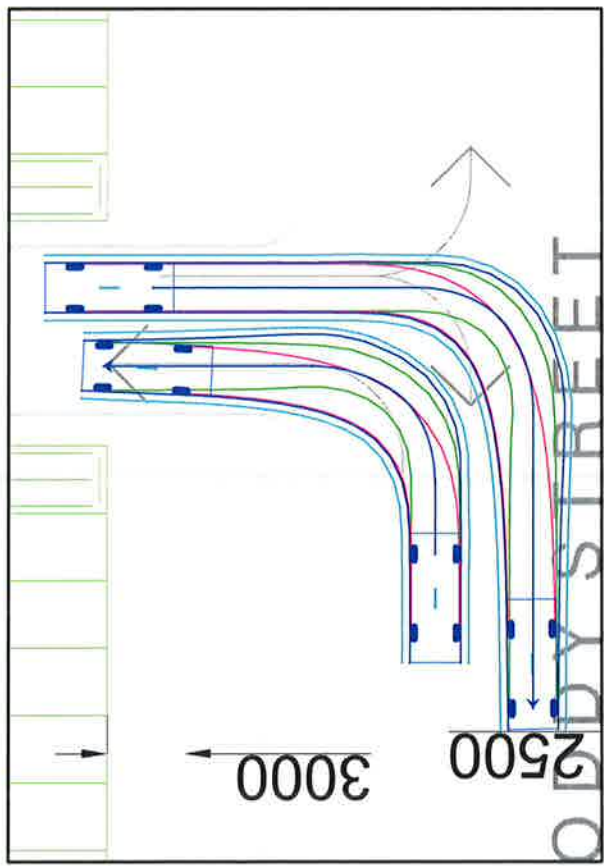
- FRONT WHEELS
- REAR WHEELS
- VEHICLE BODY
- 55% CLEARANCE



DODDY STREET - ACCESS AND EGRESS



DODDY STREET - ACCESS & EGRESS



REV.	REVISION NOTES	REVISION DATE	GENERAL NOTES	DESIGNED:	10 JUN 2016
			BASE INFORMATION FROM: 2015-050_SK-211 - Sketch plan.dwg	D. WILDER	
			PREPARED BY Ec Architects - received 05-06-2016	CHECKED:	
				H. TURBULL	10 JUN 2016
				FILE NAME:	ISSUE:
				19863-01.DWG	A



221-229 GOULBURN VALLEY HIGHWAY, SHEPPARTON NORTH
B99 DESIGN VEHICLE SWEEP PATHS
PROPOSED MIXED-USE DEVELOPMENT

Appendix C: Functional Layout Plan of Goulburn Valley Highway Access

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

Appendix D: SIDRA Output

MOVEMENT SUMMARY

Site: 101 [221-229 Goulburn Valley Highway, Shepparton]

221-229 Goulburn Valley Highway, Shepparton
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Goulburn Valley Highway											
2	T1	578	4.0	0.253	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
3	R2	260	1.0	0.141	5.5	LOS A	0.0	0.0	0.00	0.59	53.3
Approach		838	3.1	0.253	1.7	NA	0.0	0.0	0.00	0.18	57.7
East: Site Access											
4	L2	182	1.0	0.288	12.5	LOS B	1.2	8.6	0.58	1.02	49.4
Approach		182	1.0	0.288	12.5	LOS B	1.2	8.6	0.58	1.02	49.4
North: Goulburn Valley Highway											
7	L2	39	0.0	0.290	5.6	LOS A	0.0	0.0	0.00	0.04	57.9
8	T1	1061	4.0	0.290	0.0	LOS A	0.0	0.0	0.00	0.02	59.7
Approach		1100	3.9	0.290	0.2	NA	0.0	0.0	0.00	0.02	59.7
All Vehicles		2120	3.3	0.290	1.9	NA	1.2	8.6	0.05	0.17	57.9

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

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

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

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

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

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

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

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Monday, 20 June 2016 1:34:26 PM

Project: P:\Synergy\Projects\GRP1\GRP19863\07-Analysis\SIDRA\19863 GVH Access.sip7



Traffic Engineers and Transport Planners

Our Reference: G19863L-02A

22nd August 2016

Debra Butcher Consulting Pty Ltd
PO Box 417
ALBERT PARK VIC 3206
Attention: Debra Butcher

Traffix Group Pty Ltd
ABN 32 100 481 570

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
admin@traffixgroup.com.au
www.traffixgroup.com.au

Dear Debra,

227 – 229 Goulburn Valley Highway, Shepparton – Proposed Shopping Centre Response to Traffic Engineering Peer Review

We refer to your request to review the Traffic Engineering Assessment Peer Review prepared by GTA Consultants (GTA Ref: V102560 dated 29th July 2017), and to provide additional information and undertake additional traffic engineering assessments as required.

Our assessment is set out below.

Proposal

GTA's description of the proposal is consistent with the Traffix Group report Ref: G19863-01D dated June 2016 (the "Traffix Report"), except that it also includes the following:

- Pad Site #1 (Petrol Station) – 1,904m² including a 244m² store
- Pad Site #2 – 2,602m² – GTA comment: *"it is noted at this time that no specific land use has been identified for the southern pad site. Given that it is common practice for a convenience restaurant to be co-located with a shopping centre, a medium traffic generating type has been assumed, i.e. a KFC convenience restaurant. This has only been assumed at this time for assessment purposes. The applicant will need to indicate the likely land use that will be accommodated, as it is considered to have a material impact on the abutting road network"*.
- Expansion site – 3,592m² – GTA comment: *"the future use of the site is not able to be reasonably assumed at this time, so has not been included in the assessment presented in this memorandum. However, again the applicant will need to indicate the likely land use that will be accommodated, as it may well have a material impact on the abutting road network"*.

It is noted that the pad sites and the expansion site will be the subject of separate planning permit applications, and at such time that an application is made for a development on those sites, a traffic engineering report would be required to demonstrate that there is adequate car parking provision and traffic capacity within the surrounding road network.

However, for the purpose of providing a revised analysis which is consistent with GTA's peer review recommendations, we have adopted the same uses for the pad sites (i.e. a petrol station and KFC-type convenience restaurant), and have included the traffic generation for these uses in our revised assessments.

We note that the applicant has not determined a use for the expansion site at this stage, and the timing for potential development of that site is unknown.

Accordingly, we agree with GTA's assessment that the future use of the site is not able to be reasonably assumed at this time and should therefore be excluded from the traffic impact assessment, and we note that the traffic impacts of that development site will be analysed at such time that a permit application is made.

Bicycle Parking & End of Trip Facilities

The Traffix Report set out a bicycle parking assessment which considered the bicycle parking requirements of each tenancy separately.

The GTA peer review states that while the Traffix Report ... *"generally utilises the correct rates to land uses, it is recommended that the nine Specialty Shops be considered based on their total floor area instead of each premise"*.

This calculation would result in a requirement for four (4) staff bicycle spaces and three (3) visitor bicycle spaces for the nine Specialty Shop tenancies, compared with five (5) staff and no visitor spaces based on the individual tenancy calculation.

We note that Clause 52.34 does not specify which method of calculation should be adopted.

However, we note that either scenario could be accommodated on the site, and bicycle parking provision "In accordance with Clause 52.34 to the satisfaction of the Responsible Authority" could be addressed via a permit condition.

Car Parking

The GTA peer review concludes that the proposed level of car parking provided on-site is suitable ... *"as long as the two pad sites don't generate a requirement for more than 38 car spaces or that any requirement over this amount is accommodated within the pad site footprints"*.

As previously noted, the pad sites would be subject to a separate planning application process, and would at that time be required to demonstrate that sufficient car parking is available.

It is our understanding that the pad sites will incorporate additional car parking.

Car Parking Layout

The GTA peer review makes a number of recommendations with regard to the car parking layout, which are addressed in Table 1 below.

Table 1: Car Parking Layout Comments

GTA Recommendation	Comment
<p><i>Provide raised pedestrian crossings, at least along the Doody Street frontage (can be in the form of vehicle crossovers).</i></p>	<p>Current plans show pedestrian crossings across the shopping centre crossovers on the northern side of Doody Street.</p> <p>We recommend that the pedestrian crossing line-marking be removed all together from where the Doody Street footpath crosses vehicle access points, and instead, it would be appropriate to install pram ramps.</p> <p>We note that this detail can be addressed via permit conditions.</p>
<p><i>Set child care car spaces back a suitable distance to provide at least 0.5m clearance to the footpath and property boundary along Doody Street.</i></p>	<p>The child care spaces are currently shown to be 5.4 metres long, which exceeds the statutory Clause 52.06-8 requirements by 0.5m.</p> <p>Accordingly, GTA’s recommendation can easily be achieved within the available space by showing 4.9m long spaces off-set 0.5m from the footpath.</p>
<p><i>Suitable clear footpath width along the Specialty Shop frontages, especially the western side where car parking spaces are proposed and will overhang the kerb.</i></p>	<p>Car spaces adjacent to specialty shop frontages are at least 5.4 metres long which exceeds the statutory requirement by 0.5 metres and accordingly it is not anticipated that cars will overhang the footpath (wheel stops could be installed to ensure this is the case).</p> <p>Specialty shops 1 – 4 are offset approximately 3.5 metres from the car spaces and specialty shops 6 – 9 are offset approximately 2.5 metres from the car spaces.</p> <p>We are satisfied that these offset widths and car space dimensions are suitable.</p>
<p><i>Provide suitable traffic management arrangements associated with the access to the petrol station from the main north-south aisle through the site.</i></p>	<p>This can be addressed either as part of the separate petrol station permit application, or via a permit condition.</p>
<p><i>Provide suitable access arrangements for the pad site and integration with the rest of the site.</i></p>	<p>Access points have been nominated for the pad site. The access, circulation and integration of the pad site will be addressed at such time that a permit application is submitted for that site.</p>

Loading & Refuse Collection Arrangements

Table 2 below addresses the loading and refuse collection arrangements comments set out in the GTA peer review.

Table 2: Loading & Refuse Collection Comments

GTA Recommendation	Comment
<i>A suitable back of house area for loading and refuse collection is considered to be provided on the eastern side of the supermarket and specialty shops.</i>	Noted.
<i>Swept paths assessments for the area have only been provided for within the site and accessing Doody Street. Additional swept paths are recommended to be undertaken to confirm access from and to the surrounding road network.</i>	We understand that the surrounding road network already accommodates larger vehicle movements having regard to the nearby uses which take access from the service lane.
<i>Additional swept paths are also recommended to be undertaken to identify and confirm how the refuelling tankers for the petrol station will access the site.</i>	This swept path has been prepared and demonstrates that adequate provision is made for the refuelling tankers – refer to Appendix A.
<i>Loading vehicle deliveries and refuse collection are also expected for the southern pad site, so suitable swept paths identifying and confirming their access arrangements should be provided as part of the associated planning application.</i>	Noted. (This will be addressed as part of the separate application for the pad site).

Site Access Arrangements

Following discussions at the meeting held on 2nd August 2016, the following access arrangements are proposed:

- Utilise the existing right-in facility from the main carriageway of Goulburn Valley Highway into the eastern service road (i.e. no change to the existing service lane access arrangement).
- Potentially extend the right-turn lane if SIDRA analysis indicates that additional storage capacity is required.
- Build a central raised median island to the north of the existing right turn facility to block existing right turns into the western service road. While this is not required from a capacity perspective, we understand that the road authority seeks to reduce the number of conflict points along this stretch of road. Access to the western service road will remain available from the southern end.
- Retain one-way (southbound) circulation within the eastern service lane abutting the site.
- Left-in access from the service lane, and egress via Doody Street.
- Fully directional access to Ford Street.

A revised plan demonstrating these proposed access arrangements will follow shortly.

Traffic Generation

The GTA peer review states that ... *“we haven’t been provided with sufficient detail in the Traffic Engineering Assessment around the similar-site surveys on the corner of Archer Street and Benalla Road to verify the appropriateness of the resulting rates. As such, alternative traffic generation rates have been adopted at this time for the supermarket and specialty shops”*.

By way of background, we note that early process, VicRoads was consulted and it was agreed that a shopping centre on the periphery of a regional township was unlikely to have the same traffic generation characteristics of a typical metropolitan suburban centre. Accordingly, it was agreed that it would be appropriate to determine empirical rates based on local conditions, and the location and times for the “case study” survey were agreed with VicRoads.

On that basis, we are of the opinion that the resulting surveyed rates at the nearby similar-sized shopping centre located at the corner of Archer Street and Benalla Road are appropriate to adopt for the purpose of the subject site.

The GTA peer review also adopted rates for the Council/Community Centre, petrol station and pad site (as a KFC).

While the petrol station and pad site do not form part of this application, for the purposes of providing a conservative and consistent assessment, we have also included these in our revised assessments.

The GTA peer review calculated an overall weekday PM peak hour traffic generation of 1,059 vehicle movements.

Overall, the difference between our calculations and GTA’s calculations are negligible when including the petrol station and pad site, and accordingly for consistency, we will also adopt 1,059 vehicle movements as the weekday PM peak generation for the site.

The GTA peer review also calculates a traffic generation for the Saturday midday peak hour, being slightly higher at 1,121 vehicle movements per hour. We will also adopt this figure.

The GTA peer review assumes:

- 100% of the petrol station trips are non-link-diverted trips, and
- 35% of the pad site trips are non-link-diverted trips.

The RTA Guide states that for a KFC ... *“the proportion of passing trade is typically at least 50%”*.

Accordingly, the adopted 35% may be on the low side.

Traffic Distribution

The Traffix Report adopted the following distribution assumptions, based on preliminary advice provided by the client in terms of catchment areas:

- 5% of traffic to/from the west,
- 10% of traffic to/from the north (8% from Goulburn Valley Highway, 2% from Ford Road),
- 25% of traffic to/from the east, and
- 60% of traffic to/from the south.

The GTA peer review noted the following:

- more from the north expected, and
- in terms of the proximate residential catchments to the east and west of the subject site, they seem to be of a similar size. So it is not considered appropriate to assume such a significant majority will come from the east over the west.

Subsequently, an economic impact assessment has been prepared by MacroPlan Dimasi (relevant section attached at Appendix B) which sets out the likely origins of sales, as follows:

- *Approximately 30% of centre sales are expected to originate from the south-western quadrant of the defined primary trade area. These customers would enter the site from the south, travelling along Goulburn Valley Highway to access the centre, having accessed the highway via Brannan Street, Branditt Avenue, Grutzner Avenue or Balaclava Road.*
- *An estimated 33% of the centre sales are expected to access the centre generally from the east or south-east. These customers would access the site either off Ford Road, directly into the carpark, or from the south along Goulburn Valley Highway, having previously access the highway via Hawkins Street, Pine Road, Graham Street or Balaclava Road.*
- *Approximately 27% of total centre sales are expected to originate from the north, with those customers accessing the site off Goulburn Valley Highway north of Ford Road.*
- *Approximately 10% of centre sales are expected to be drawn from beyond the trade area, and almost all of these customers would originate from the south, i.e. from the balance of the Shepparton and Mooroopna urban areas.*

Based on the location of the south-western quadrant catchment, we have adopted 5% via Wanganui Road and the remaining 25% from the south (via Brannan Street, Branditt Avenue, Grutzner Avenue or Balaclava Road).

For the east and south-east catchment, we have adopted half (16.5%) via Ford Road and the other half from the south (via Hawkins Street, Pine Road, Graham Street or Balaclava Road).

For the northern catchment, we have adopted 80% entering via Goulburn Valley Highway and 20% turning left into Ford Road to enter the site.

Table 3 below summarises the previous, GTA adopted, and Traffix revised (based on MacroPlan Dimasi economic analysis) traffic distribution assumptions.

Table 3: Traffic Distribution Comparison

	Traffix Report	GTA Peer Review	Revised Rates	Comment
To/From West (Wanganui Road only)	5%	10%	5%	While additional traffic will be generated from the west, most will access Goulburn Valley Highway from Brannan Street, Branditt Avenue, Grutzner Avenue or Balaclava Road and will therefore effectively turn into the site from the south.
To/From East (Ford Road)	25%	15%	16.5%	
To/From South	60%	60%	51.5%	Revised rates include 25% from south-west quadrant, 16.5% from southeast quadrant and 10% from beyond the trade area, as specified in the economic analysis.
To/From North (total)	10%	15%	27%	The economic analysis shows a higher proportion coming to/from the north than originally adopted.
<i>To/From North entering from Ford Road</i>	<i>(2%)</i>	<i>Not specified</i>	<i>(5.4%)</i>	
<i>To/From North entering from Goulburn Valley Highway</i>	<i>(8%)</i>	<i>Not specified</i>	<i>(21.6%)</i>	

Traffic Impact

The GTA peer review shows an increase in the queue length for vehicles turning right into the service lane from the south of 23 metres (from a queue length of 1.0 metre to a queue length of 24 metres).

There is adequate space within the existing median on Goulburn Valley Highway to increase the length of the right-turn lane by 23 metres.

Furthermore, the volume of traffic likely to turn right into the service lane (entering from the south) is anticipated to be less than estimated by GTA, based on the economic analysis which suggests in the order of 51.5% of traffic will enter from the south (compared to 60% adopted by GTA).

A revised access plan demonstrating the proposed mitigating works (including extension of the right-turn lane) will follow shortly.

The GTA peer review shows that the weekday PM peak hour is the critical peak hour in terms of development impacts on the Goulburn Valley Highway/Ford Road/Wanganui Road staggered T-intersections.

We have undertaken a revised SIDRA analysis of this intersection using SIDRA 7. Notably, the intersection has been modelled using a “network” analysis as two closely spaced T-intersections, in accordance with the existing on-site layout.

We have adopted the same “existing conditions” traffic volumes as the GTA peer review report (based on data collected by Traffic Focus), and have also adopted the same critical gap and follow-up headway assumptions as GTA, i.e. 5.5 seconds and 3.0 seconds, as we agree this is appropriate having regard to the gap analysis undertaken by GTA, and generally consistent with our experience.

It is important to note that by default, SIDRA applies a “peak flow factor”.

The traffic generation for the centre already conservatively assumes that all of the proposed uses will generate peak traffic demands at the same time, and that this peak will coincide with the road network peak hour. In practice, the peak hours for the various uses will vary, and by summing all the components of the development, the design “peak” volume likely overestimates the traffic which is likely occur during the existing road network peak hour. Accordingly, we are of the opinion that the application of a further “peak flow factor” in the SIDRA analysis essentially applies a second factor on top of an already conservative analysis, and is not appropriate in this instance.

Our revised SIDRA analysis based on the revised distribution assumptions set out in Table 3 (derived from the economic analysis) identified a peak degree of saturation (DOS) of 0.774 based on today’s traffic, and 0.868 when allowing for traffic growth up until opening (in accordance with VicRoads’ policy for intersections which are not directly providing access to a site), with the right turn out of Ford Road being the critical movement (consistent with GTA’s analysis).

This remains within the “acceptable” DOS range for an unsignalised intersection, and accordingly no mitigating works are required.

A summary of the SIDRA output is attached at Appendix C and a copy of our SIDRA files will be provided to GTA.

Importantly, we note that the above represents a highly conservative analysis, as it assumes the centre (including the petrol station and pad sites which are not part of the current development application) will be running at capacity from day 1. In practice, we understand that it is anticipated that the centre will not open for say 2 – 3 years, and will then trade below capacity for a period as the surrounding area is developing.

We further understand that VicRoads has plans (albeit un-funded) to upgrade the Goulburn Valley Highway/Ford Road/Wanganui Road intersection in the foreseeable future (estimated 5+ years).

Conclusions

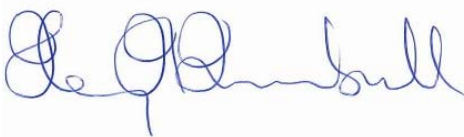
Having reviewed the GTA peer review and undertaken additional traffic engineering assessments, we are of the opinion that:

- a) GTA's assumptions of the uses for the pad sites are appropriate for the purposes of the current analysis,
- b) bicycle parking provision "In accordance with Clause 52.34 to the satisfaction of the Responsible Authority" could be addressed via a permit condition,
- c) we disagree with raised pedestrian crossings at the crossovers to Doody Street and recommend that zebra crossing line-marking be removed and pram ramps be installed,
- d) GTA's recommended 0.5m setback between childcare car spaces and the Doody Street footpath can be achieved by marking the car spaces at 4.9m in accordance with Clause 56.06-8,
- e) based on the economic analysis now available to us, it is agreed that the distribution to/from the north was on the low side and the assumptions have now been revised,
- f) based on the economic analysis the traffic accessing the site from Wanganui Road is appropriate and additional traffic from the west will utilise roads south of the site (and enter via Goulburn Valley Highway from the south),
- g) the gap acceptance assumptions adopted by GTA are appropriate,
- h) a peak flow factor should not be applied in SIDRA having regard to the already conservative nature of the assessments in adopting the peak for all uses and the road network at the same time, and
- i) the revised SIDRA analysis demonstrates that the Goulburn Valley Highway/Ford Road/Wanganui Road intersection will continue to operate within acceptable limits even when conservatively incorporating traffic from the pad sites (which do not form part of this application) and accordingly no mitigating works are required.

Please contact Henry Turnbull or Jodie Place at Traffix Group if you require any further information.

Yours faithfully,

TRAFFIX GROUP PTY LTD

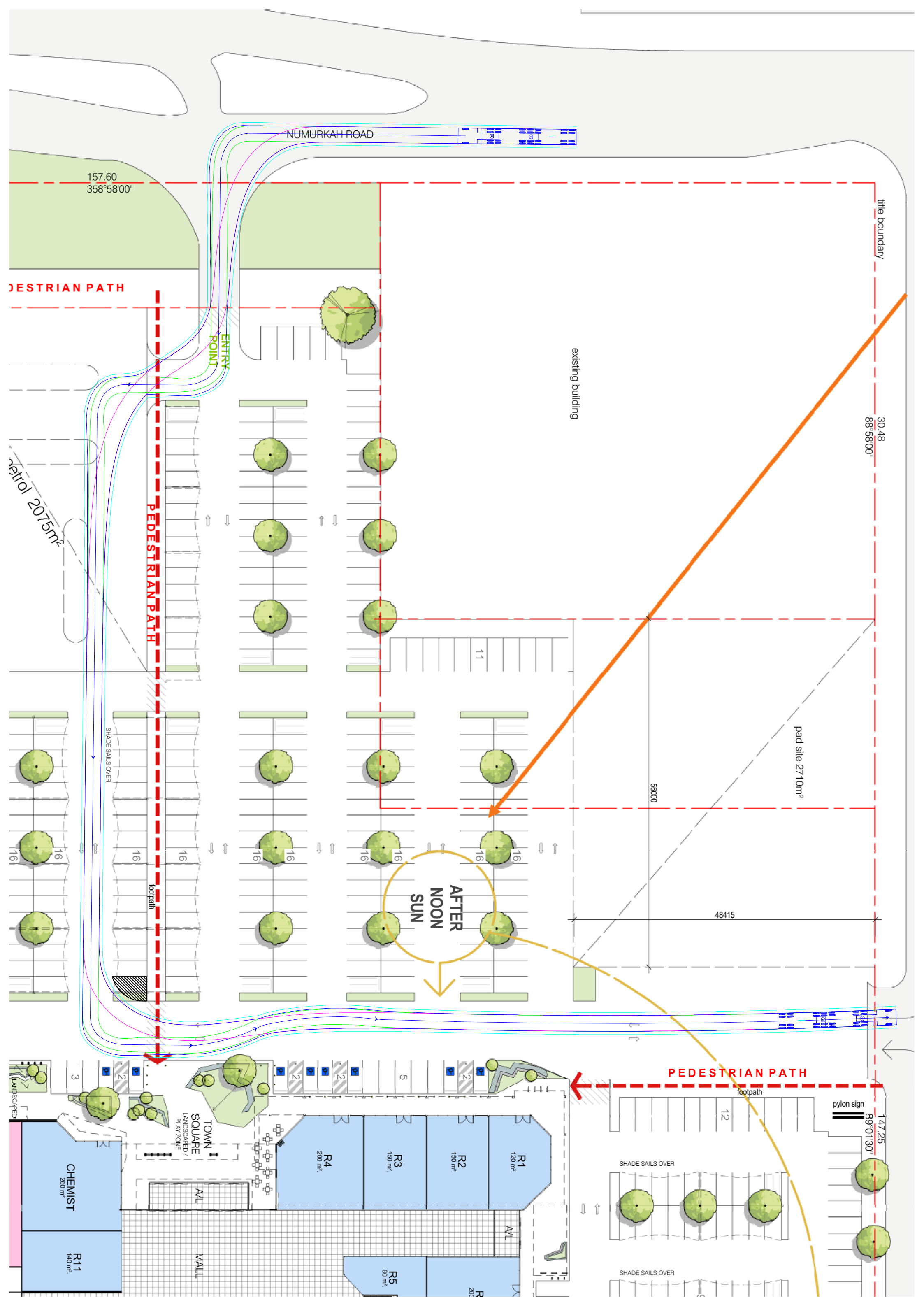


HENRY H TURNBULL



Appendix A

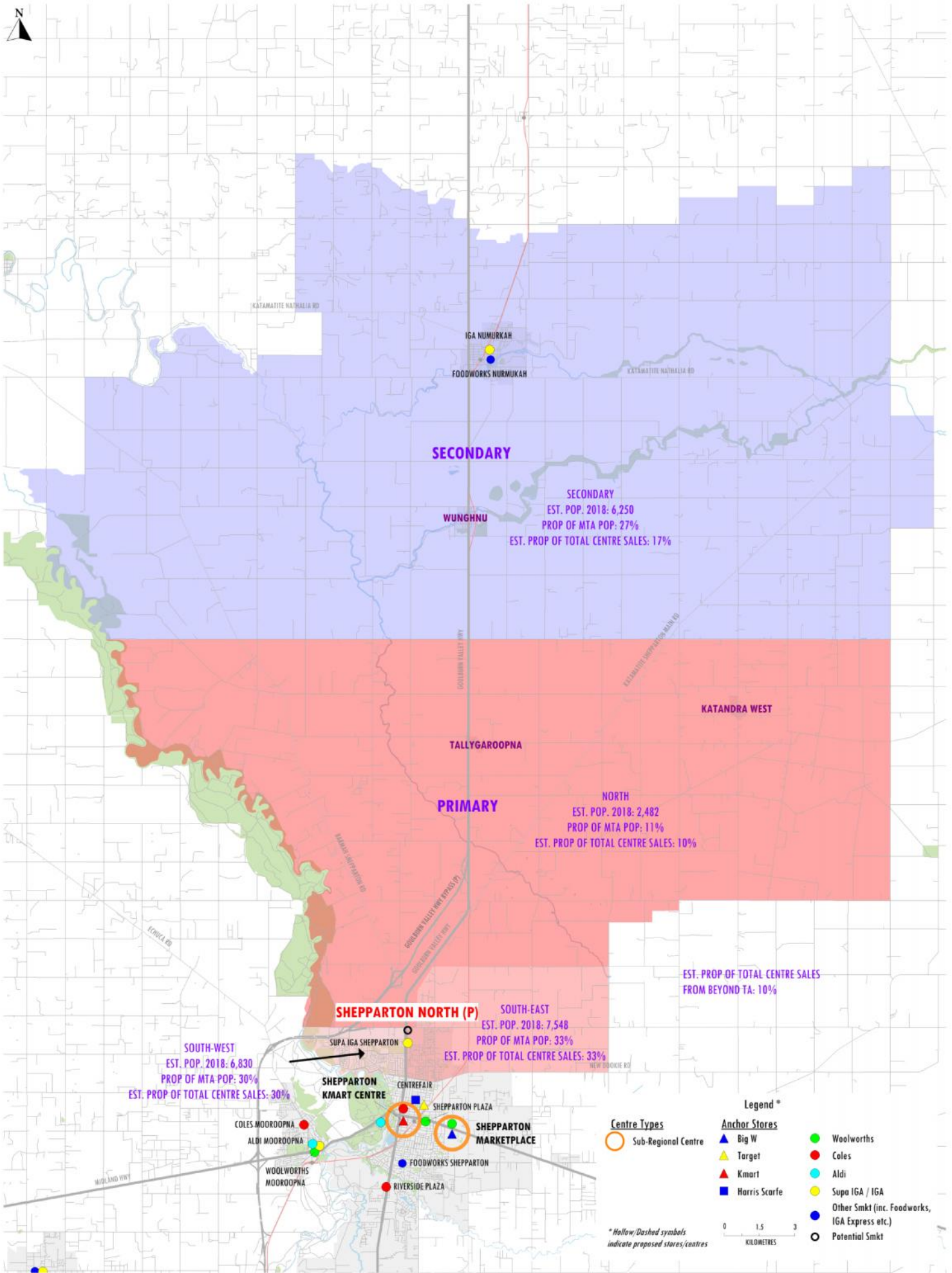
Petrol Tanker Swept Path Diagram





Appendix B

Economic Analysis



Map 4.1: Shepparton North Neighbourhood Centre
 Estimated distribution of centre sales by origin

4.2 Origins of centre sales

Map 4.1 attached shows the expected origins of centre sales, highlighting the proportions of centre sales expected to originate from the east, west, south and north.

As shown on Map 4.1, the anticipated distribution of centre sales by origin is as follows:

- Approximately 30% of centre sales are expected to originate from the south-western quadrant of the defined primary trade area. These customers would enter the site from the south, travelling along Goulburn Valley Highway to access the centre, having accessed the highway via Brannan Street, Branditt Avenue, Grutzner Avenue or Balaclava Road.
- An estimated 33% of the centre sales are expected to access the centre generally from the east or south-east. These customers would access the site either off Ford Road, directly into the carpark, or from the south along Goulburn Valley Highway, having previously accessed the highway via Hawkins Street, Pine Road, Graham Street, or Balaclava Road.
- Approximately 27% of total centre sales are expected to originate from the north, with those customers accessing the site off Goulburn Valley Highway south of Ford Road.
- Approximately 10% of centre sales are expected to be drawn from beyond the trade area, and almost all of these customers would originate from the south, i.e. from the balance of the Shepparton and Mooroopna urban areas.

In summary therefore, slightly more than one-quarter of total centre business (27%) is expected to enter the site from the north via Goulburn Valley Highway.



Appendix C

SIDRA Output

MOVEMENT SUMMARY

STOP Site: 111 [221-227 Goulburn Valley Highway, Shepparton - with Growth]

Network: N102 [Traffix - with Growth]

221-227 Goulburn Valley Highway, Shepparton
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Goulburn Valley Highway													
1	L2	70	0.0	70	0.0	0.043	3.3	LOS A	0.2	1.2	0.06	0.56	53.1
2	T1	639	12.5	639	12.5	0.354	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		709	11.3	709	11.3	0.354	0.3	LOS A	0.2	1.2	0.01	0.05	59.1
North: Goulburn Valley Highway													
8	T1	459	15.0	459	15.0	0.237	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	13	5.0	13	5.0	0.007	5.6	LOS A	0.0	0.0	0.00	0.59	53.2
Approach		472	14.7	472	14.7	0.237	0.2	NA	0.0	0.0	0.00	0.02	59.5
West: Wanganui Road													
10	L2	17	5.0	17	5.0	0.030	10.0	LOS B	0.1	0.7	0.57	0.75	50.8
12	R2	115	5.0	115	5.0	0.634	43.3	LOS E	2.9	21.5	0.94	1.15	25.6
Approach		132	5.0	132	5.0	0.634	39.0	LOS E	2.9	21.5	0.89	1.10	28.9
All Vehicles		1313	11.9	1313	11.9	0.634	4.2	NA	2.9	21.5	0.09	0.15	53.3

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

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

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

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

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

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

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

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Monday, 22 August 2016 5:04:38 PM

Project: P:\Synergy\Projects\GRP\GRP19863\07-Analysis\SIDRA\19863 Ford Road-GVH (1).sip7

MOVEMENT SUMMARY

STOP Site: 112 [221-227 Goulburn Valley Highway, Shepparton (2) - with Growth]

Network: N102 [Traffix - with Growth]

221-227 Goulburn Valley Highway, Shepparton
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Goulburn Valley Highway													
2	T1	504	12.5	504	12.5	0.256	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
3	R2	112	5.0	112	5.0	0.062	5.6	LOS A	0.0	0.0	0.00	0.59	53.2
Approach		616	11.1	616	11.1	0.256	1.0	NA	0.0	0.0	0.00	0.11	57.7
East: Ford Road													
4	L2	150	5.0	150	5.0	0.222	11.7	LOS B	0.8	6.1	0.53	0.99	49.9
6	R2	201	5.0	201	5.0	0.868	56.6	LOS F	6.9	50.5	0.97	1.49	21.7
Approach		351	5.0	351	5.0	0.868	37.4	LOS E	6.9	50.5	0.78	1.28	32.7
North: Goulburn Valley Highway													
7	L2	41	0.0	41	0.0	0.022	3.1	LOS A	0.0	0.0	0.00	0.57	52.3
8	T1	419	15.0	419	15.0	0.236	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		460	13.7	460	13.7	0.236	0.3	NA	0.0	0.0	0.00	0.05	59.2
All Vehicles		1427	10.4	1427	10.4	0.868	9.7	NA	6.9	50.5	0.19	0.38	47.5

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

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

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

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

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

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

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

MOVEMENT SUMMARY

 Site: 111 [221-227 Goulburn Valley Highway, Shepparton]

 Network: N102 [Traffix]

221-227 Goulburn Valley Highway, Shepparton
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows		Arrival Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %	Total veh/h	HV %								
South: Goulburn Valley Highway													
1	L2	67	0.0	67	0.0	0.041	3.3	LOS A	0.2	1.2	0.05	0.56	53.1
2	T1	610	12.5	610	12.5	0.338	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		677	11.3	677	11.3	0.338	0.3	LOS A	0.2	1.2	0.01	0.06	59.2
North: Goulburn Valley Highway													
8	T1	441	15.0	441	15.0	0.228	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	12	5.0	12	5.0	0.007	5.6	LOS A	0.0	0.0	0.00	0.59	53.2
Approach		453	14.7	453	14.7	0.228	0.2	NA	0.0	0.0	0.00	0.02	59.6
West: Wanganui Road													
10	L2	16	5.0	16	5.0	0.027	9.7	LOS A	0.1	0.6	0.55	0.73	51.1
12	R2	110	5.0	110	5.0	0.544	35.9	LOS E	2.4	17.6	0.91	1.12	28.5
Approach		126	5.0	126	5.0	0.544	32.6	LOS D	2.4	17.6	0.87	1.07	31.7
All Vehicles		1256	11.9	1256	11.9	0.544	3.5	NA	2.4	17.6	0.09	0.14	54.2

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

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

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

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

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

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

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

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Monday, 22 August 2016 5:04:23 PM

Project: P:\Synergy\Projects\GRP\GRP19863\07-Analysis\SIDRA\19863 Ford Road-GVH (1).sip7

MOVEMENT SUMMARY

 Site: 112 [221-227 Goulburn Valley Highway, Shepparton (2)]

 Network: N102 [Traffix]

221-227 Goulburn Valley Highway, Shepparton
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Goulburn Valley Highway													
2	T1	475	12.5	475	12.5	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
3	R2	106	5.0	106	5.0	0.059	5.6	LOS A	0.0	0.0	0.00	0.59	53.2
Approach		581	11.1	581	11.1	0.242	1.0	NA	0.0	0.0	0.00	0.11	57.7
East: Ford Road													
4	L2	143	5.0	143	5.0	0.206	11.4	LOS B	0.8	5.6	0.51	0.97	50.1
6	R2	199	5.0	199	5.0	0.774	41.1	LOS E	5.1	37.6	0.94	1.33	26.5
Approach		342	5.0	342	5.0	0.774	28.7	LOS D	5.1	37.6	0.76	1.18	36.6
North: Goulburn Valley Highway													
7	L2	40	0.0	40	0.0	0.022	3.1	LOS A	0.0	0.0	0.00	0.57	52.3
8	T1	401	15.0	401	15.0	0.226	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		441	13.6	441	13.6	0.226	0.3	NA	0.0	0.0	0.00	0.05	59.2
All Vehicles		1364	10.4	1364	10.4	0.774	7.7	NA	5.1	37.6	0.19	0.36	49.6

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

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

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

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

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

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

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

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Monday, 22 August 2016 5:04:23 PM

Project: P:\Synergy\Projects\GRP1\GRP19863\07-Analysis\SIDRA\19863 Ford Road-GVH (1).sip7



Traffic Engineers and Transport Planners

Our Reference: G19863L-06A

30th November, 2016

Traffix Group Pty Ltd
ABN 32 100 481 570

Lascorp Development Group (Aust) Pty Ltd
PO Box 6268
SOUTH YARRA VIC 3141

Attention: Rob Harris

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
admin@traffixgroup.com.au
www.traffixgroup.com.au

Dear Sir,

221-227 Goulburn Valley Highway, Shepparton North Proposed Mixed-Use Development – Intersection Analysis

Traffix Group has undertaken a review of the estimated traffic distribution used by GTA for its proposed signalised intersection.

We have undertaken our own traffic generation and distribution assessments to determine the number of movements from the surrounding developments that we believe will contribute to traffic at the intersection of Goulburn Valley Highway/Ford Road/Wanganui Road.

A comparison of the traffic volumes through the intersection shows a higher number for the Traffix Group model. Table 1 shows a comparison of the total number of movements and the proportion for which each development contributes.

Table 1: Comparison of Traffic Contributions

Use	GTA Consulting	Traffix
Waste Sorting Centre	6.3%	5.4%
Primary School	0%	0%
Northern Residential	14.2%	29.3%
Eastern Residential	11.1%	12.8%
Commercial	67.7%	52.5%
TOTAL DEVELOPMENT TRAFFIC	443 movements	515 movements

While we do not agree with some of the traffic generation or distributions made by GTA, we have adopted their values for the purposes of this assessment.

We note that the critical movement has been found to be right turns from Ford Road heading north onto Goulburn Valley Highway. GTA's model produces a higher number of these movements and is therefore considered conservative despite the fewer number of movements overall.

We note that the model is also highly conservative as it does not account for any passing trade or linked trips.

Alternate Intersection Options

Traffix Group has assessed an alternate intersection option to the signalised intersection proposed by GTA. This arrangement would see the Goulburn Valley Highway/Ford Road/Wanganui Road intersection remain unsignalised and introduce a set of stop signals on Goulburn Valley Highway, approximately 45 metres south of Ford Road. The signals would only face northbound traffic and would be triggered by queues on Ford Road.

A Concept Layout Plan of the proposed arrangement (Drawing Number 19863-07) dated 30th November, is attached at Appendix A.

For the purpose of our analysis, we have assumed that at the time of peak demand for Ford Road right turns, the signals will provide Goulburn Valley Highway with green time for $\frac{2}{3}$ of the peak hour with a cycle time of 60 seconds.

Traffix Group has undertaken a SIDRA intersection analysis of this arrangement using the network feature of the computer software package. The results are based on the GTA model figures.

A summary of the output is provided at Table 2 below.

Table 2: Summary of SIDRA Output for GTA volumes

Approach	Degree of Saturation	Average Delay (sec)	95 th Percentile Queue (m)
Ford Road/GVH T-Intersection			
South	0.260	1.5	4.3
East	0.859	37.1	48.8
North	0.287	0.4	0
Wanganui Road/GVH T-Intersection			
South	0.323	0.4	1.7
North	0.230	0.3	0.5
West	0.629	32.5	21.4
Stop Signals			
North	0.668	9.9	98.3

For signalised and unsignalised intersection degrees of saturation less than 0.95 and 0.9 respectively are considered acceptable operating conditions. As shown above, each of the degrees of saturation is below the acceptable limit and accordingly, we believe the proposed intersection will work well.

The above shows that the intersection will work appropriately based on GTA's traffic generation and distributions however, the Traffix Group figures shows approximately 80 additional movements through the intersection as a result of the five contributing future developments. While the overall traffic is increased, there is a slight reduction in the critical right turn movements from Ford Road.

Intersection Analysis

221-227 Goulburn Valley Highway, Shepparton North: Proposed Mixed-Use Development

A summary of the SIDRA analysis for the same alternate intersection option using the Traffix Group figures is provided at Table 3 below.

Table 3: Summary of SIDRA Output for Traffix Group volumes

Approach	Degree of Saturation	Average Delay (sec)	95 th Percentile Queue (m)
Ford Road/GVH T-Intersection			
South	0.286	1.5	4.8
East	0.829	33.4	42.7
North	0.277	0.6	0
Wanganui Road/GVH T-Intersection			
South	0.344	0.3	1..2
North	0.288	0.3	0.5
West	0.656	35.7	22.3
Stop Signals			
North	0.731	11.1	117.4

The table above shows that the critical movement will operate better than indicated when using the GTA figures. The queues and delays to traffic on Goulburn Valley Highway on the south approach are generally consistent with the GTA fully signalised model and no queue is formed on the north approach.

Significantly, the proposed intersection arrangement will allow the continued use of the unsignalised intersection without the cost of a fully signalised intersection and with minimal works required.

Additionally, at the time the Shepparton bypass is constructed, we understand that Wanganui Road will form a cross intersection with Ford Road and Goulburn Valley Highway. Ford Road will also be duplicated during this process. As a result, any interim treatment that would be installed at this location would be made redundant.

Accordingly, we believe that the stop signals are a suitable alternative arrangement to signalling the intersection of Goulburn Valley Highway/Ford Road/Wanganui Road.

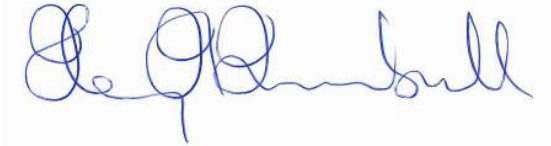
Intersection Analysis

221-227 Goulburn Valley Highway, Shepparton North: Proposed Mixed-Use Development

If you have any queries regarding the above assessments, please contact Daniel Milder or Henry Turnbull at our Glen Iris office.

Yours faithfully,

TRAFFIX GROUP PTY LTD

A handwritten signature in blue ink, appearing to read "Henry H Turnbull". The signature is written in a cursive style with a large initial "H".

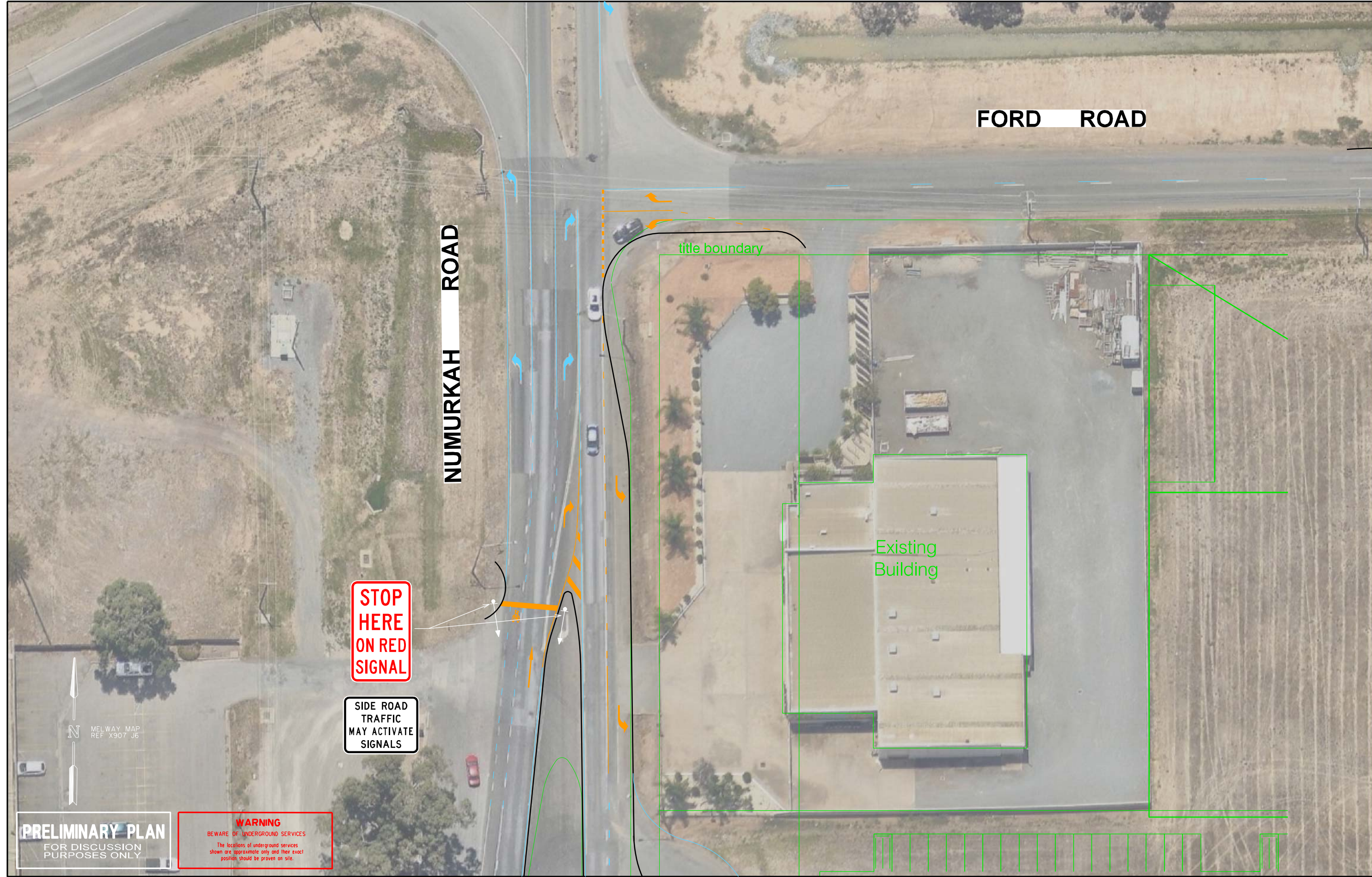
HENRY H TURNBULL



Intersection Analysis

221-227 Goulburn Valley Highway, Shepparton North: Proposed Mixed-Use Development

Appendix A: Concept Layout Diagram



PRELIMINARY PLAN
FOR DISCUSSION
PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE

GENERAL NOTES

1. BASE INFORMATION FROM AERIAL PHOTOGRAPH (SOURCE: NEARMAP JUNE 2016).
2. ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL.
3. MAIN ROAD - NUMURKAH ROAD (SPEED ZONE 60km/h).
4. ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1428.4.2009.

DESIGNED
G. RAKITA 30 NOV 2016

CHECKED/APPROVED
D. MILDER 30 NOV 2016

FILE NAME
G19863-00.dgn

Traffix Engineers and Transport Planners
Suite 8/431 Burke Road TEL: (03) 9822-2888
GLEN IRIS VICTORIA 3146 FAX: (03) 9822-7444
www.traffixgroup.com.au

NUMURKAH ROAD / FORD ROAD SHEPPARTON
GREATER SHEPPARTON CITY
CONCEPT PLAN

SCALE 0 5 10
SHEET No. DWG No. **G19863-07**



Traffic Engineers and Transport Planners

Traffic Engineering Assessment

Proposed Shopping Centre

at

**221-229 Goulburn Valley Highway and 10 Ford Road,
Shepparton**

Prepared For

Lascorp Development Group (Aust) Pty Ltd

January, 2017

G19863R-01E

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

Traffic Engineering Assessment

Proposed Shopping Centre

at

**221-229 Goulburn Valley Highway and 10 Ford Road,
Shepparton****Document Control**

Issue No.	Type	Date	Prepared By	Approved By
A	Draft	08/04/2016	D. Milder	H. Turnbull
B	Draft	15/06/2016	D. Milder	H. Turnbull
C	Draft	17/06/2016	D. Milder	H. Turnbull
D	Draft	20/06/2016	D. Milder	H. Turnbull
E	Final	25/01/2017	D. Milder	H. Turnbull

Our Reference: G19863R-01E

COPYRIGHT: The ideas and material contained in this document are the property of Traffix Group (Traffix Group Pty Ltd – ABN 32 100 481 570, Traffix Survey Pty Ltd – ABN 57 120 461 510, Traffix Design Pty Ltd – ABN 41 060 899 443). Use or copying of this document in whole or in part without the written permission of Traffix Group constitutes an infringement of copyright.

LIMITATION: This report has been prepared on behalf of and for the exclusive use of Traffix Group's client, and is subject to and issued in connection with the provisions of the agreement between Traffix Group and its client. Traffix Group accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

Table of Contents

1	Introduction	1
2	Existing Conditions	1
2.1	The Site	1
2.2	Land Use.....	3
2.3	Road Network	4
2.4	Sustainable Modes of Transport.....	5
2.4.1	Public Transport	5
2.4.2	Bicycle Network	5
3	Proposal	6
4	Car Parking Assessment	7
4.1	Statutory Car Parking Requirements	7
4.2	Car Parking Layout	8
4.3	Site Access.....	9
4.3.1	Goulburn Valley Highway Access	9
4.3.2	Ford Road Access	9
5	Traffic Considerations	10
5.1	Traffic Generation	10
5.1.1	Supermarket and Shops.....	10
5.1.2	Medical Centre.....	10
5.1.3	Nearby Development.....	10
5.1.4	Summary	11
5.2	Traffic Distribution	11
5.3	Traffic Impact	12
6	Bicycle Parking	14
7	Loading	15
8	Conclusions	16

List of Appendices

Appendix A: Development Plans

Appendix B: Functional Layout Plan of Goulburn Valley Highway Access

Appendix C: Functional Layout Plan of Ford Road Access

Appendix D: SIDRA Output Goulburn Valley Highway Access

Appendix E: SIDRA Output Ford Road Access

Appendix F: Swept Path Diagrams

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

1 Introduction

Traffix Group has been engaged by Lascorp Development Group (Aust) Pty Ltd to undertake a traffic engineering assessment and prepare a report for the proposed shopping centre located at 221-229 Goulburn Valley Highway and 10 Ford Road in Shepparton.

In preparing this report, the subject site and environs have been inspected, relevant data has been collected and reviewed, plans of the proposed development have been perused and the traffic engineering implications of the proposed development have been assessed.

2 Existing Conditions

2.1 The Site

The subject site is located on the east side of Goulburn Valley Highway and the south side of Ford Road in Shepparton, as shown in the locality plan at Figure 1 below.

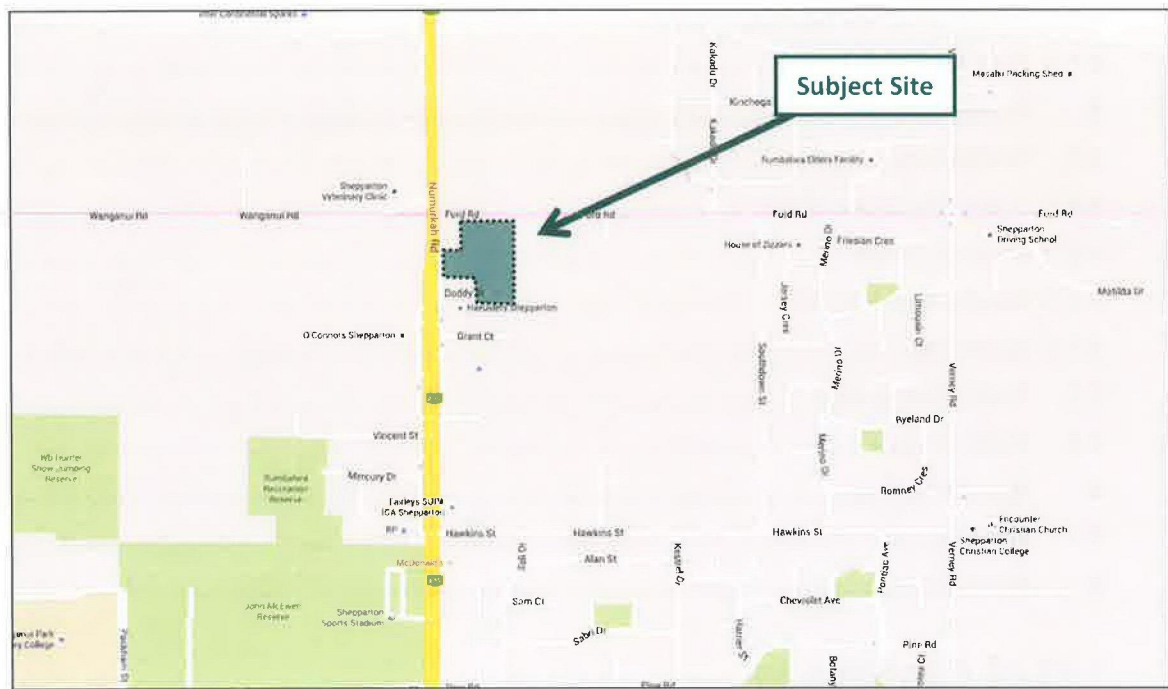


Figure 1: Locality Map

The site is currently undeveloped. It is irregular in shape with an area of approximately 4.05 hectares and frontages to Ford Road and Goulburn Valley Highway of approximately 178 metres and 74 metres respectively.

An aerial view (2016) of the subject site photographs of the site and from Ford Road and Goulburn Valley Highway are shown in Figures 2 to 6 below.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

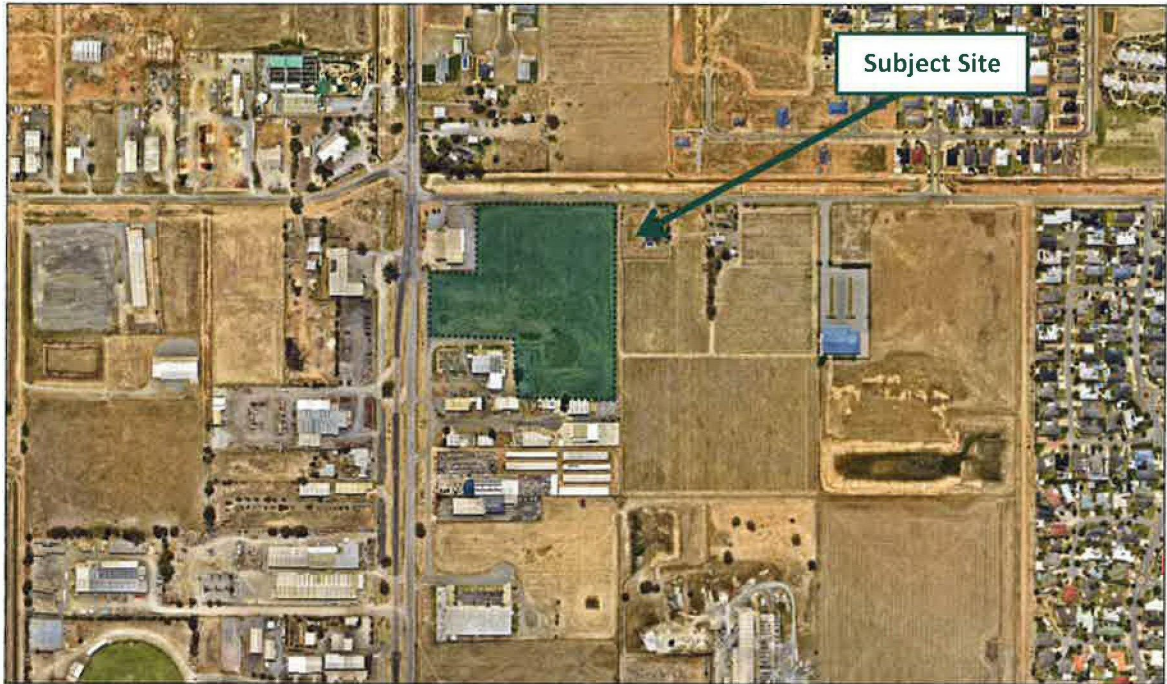


Figure 2: Aerial View



Figure 3: Subject Site viewed from Ford Road



Figure 4: Subject Site viewed from Ford Road



Figure 5: Subject Site viewed from Goulburn Valley Highway



Figure 6: Subject Site viewed from Goulburn Valley Highway

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

2.2 Land Use

The subject site is within a Commercial Zone – Schedule 2 (C2Z) as shown in the Land Use Zone Map at Figure 7.

Surrounding uses are currently predominantly a residential and farm to the east and north. Land uses along Goulburn Valley Highway are commercial including fast food tenancies, supermarkets, service stations and restaurants/eateries.

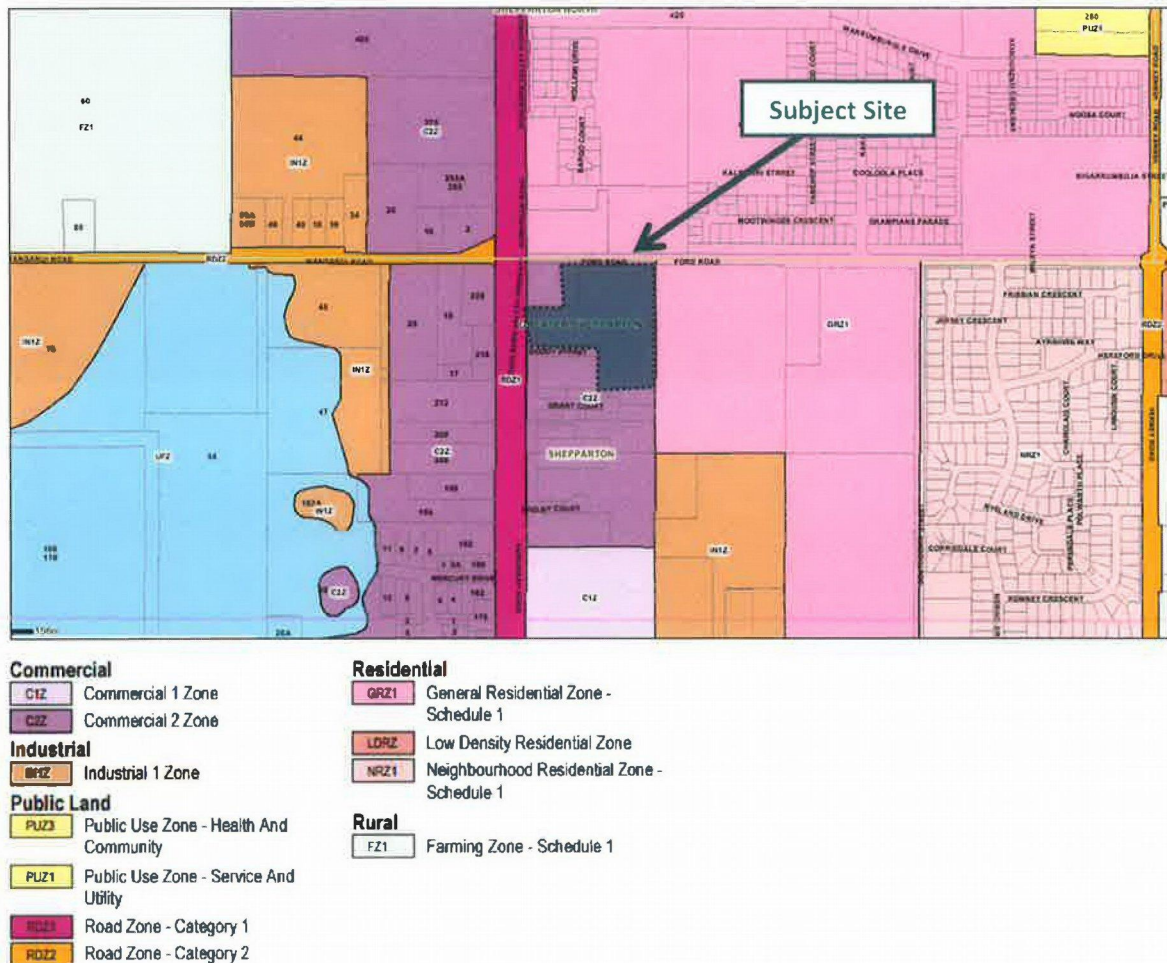


Figure 7: Land Use Zoning Map

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

2.3 Road Network

Goulburn Valley Highway in the vicinity of the subject site is a VicRoads declared road (Road Zone Category 1). Goulburn Valley Highway extends in a north-south direction from Hume Highway to Murray Valley Highway.

In the vicinity of the subject site, Goulburn Valley Highway is constructed with a divided carriageway comprising 2 lanes of through traffic in each direction and bicycle lanes on each side.

A posted speed limit of 60km/h applies to Goulburn Valley Highway.



Figure 8: Goulburn Valley Highway view North



Figure 9: Goulburn Valley Highway view South

Ford Road is a local road which extends approximately 5.4 kilometres in an east-west direction between Lemnos N Road (where it continues as Lemnos – Cosgrove Road) and Goulburn Valley Highway.

Ford Road is constructed with a 7.5 metre (approx.) carriageway comprising one traffic lane in each direction.

A posted speed limit of 60km/h applies to Ford Road.

We understand from VicRoads that as part of the Shepparton North Growth Corridor, Ford Road and the intersection of Goulburn Valley Highway/Wanganui Road/Ford Road are to be upgraded. No plans are yet available detailing the extent of works that VicRoads will be undertaking as part of the upgrade, but we understand that it will include the signalisation of the intersection.



Figure 10: Ford Road view West



Figure 11: Ford Road view East

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

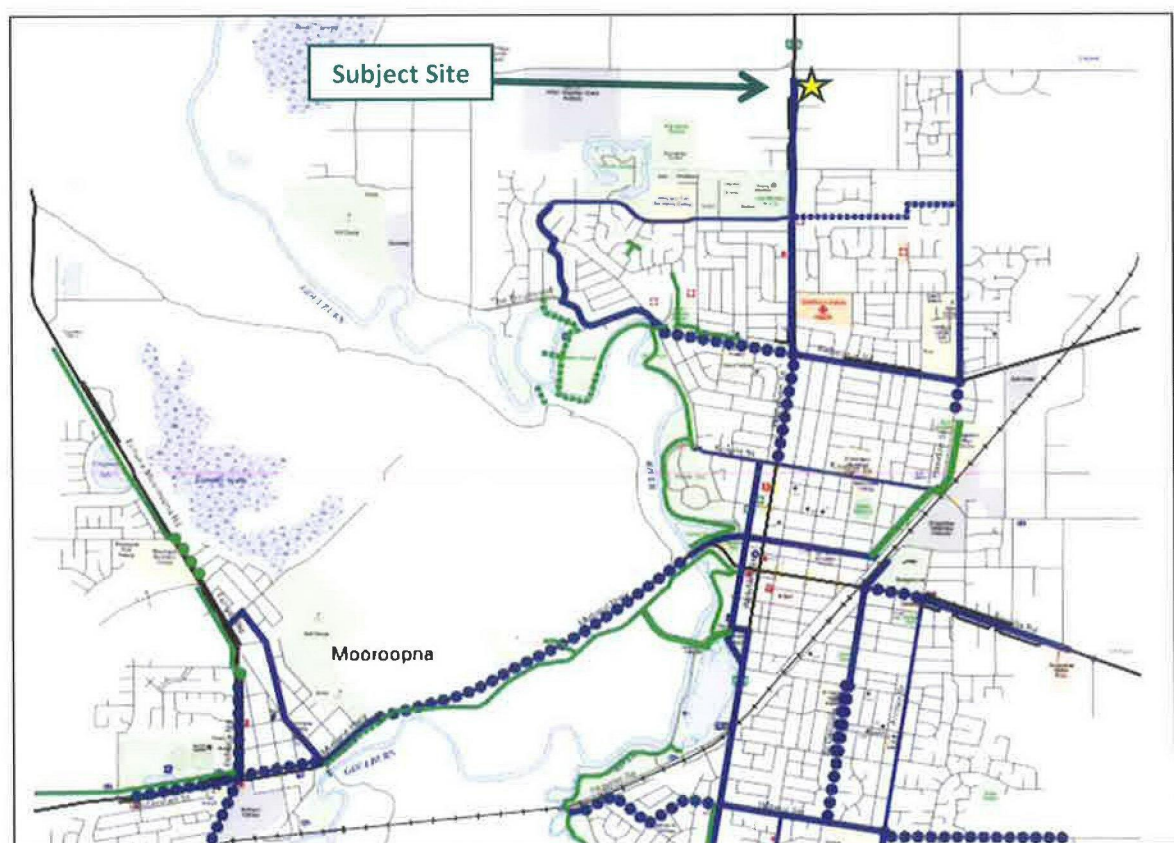
2.4 Sustainable Modes of Transport

2.4.1 Public Transport

There are currently no public transportation services available within reasonable walking distance of the subject site.

2.4.2 Bicycle Network

There are several on- and off-road bicycle routes provided throughout Shepparton. In addition, several new paths, including priority routes along Wyndham Road and Midland Highway connecting to Mooroopna, have been identified as part of future bicycle route planning. Figure 12 below shows the VicRoads' Bicycle Network Planning map for Shepparton.



LEGEND

Source: <https://www.vicroads.vic.gov.au/traffic-and-road-use/cycling/bicycle-network-planning>

	LOCAL ROUTES	PRIORITY ROUTES	LOCAL ROUTES	PRIORITY ROUTES	
ON ROAD					Declared roads
Existing					Local roads
Proposed					Railway lines
OFF ROAD					Ocean, lakes
Existing					
Proposed					

Figure 12: Shepparton Bicycle Network Planning Routes

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

3 Proposal

The proposal is to develop the subject site for the purposes of a mixed-use development comprising a supermarket, specialty shops, medical centre and community facilities.

A schedule of uses for the proposed development is provided at Table 1.

Table 1: Schedule of Uses

Use	Quantity / Size
Supermarket	3,960m ²
Specialty Retail	2,030m ²
Medical Centre	6 practitioners (300m ²)
Community Centre	100m ²

A total of 446 car parking spaces are to be provided on-site for the proposed development.

Three loading bays are provided on-site, a dedicated loading space is provided to the supermarket at the rear of the supermarket and two shared loading areas are provided for the retail uses, one on the south side of the supermarket and one to the east of retail tenancy 14.

Vehicle access to the site is to be taken from new crossovers via Ford Road, Doddy Street and a new access directly via Goulburn Valley Highway.

A copy of the proposed development plan is attached at Appendix A.

4 Car Parking Assessment

4.1 Statutory Car Parking Requirements

Clause 52.06 of the Planning Scheme sets out the statutory requirements for car parking as summarised at Table 2. The purpose of Clause 52.06 is:

- To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.
- To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.
- To support sustainable transport alternatives to the motor car.
- To promote the efficient use of car parking spaces through the consolidation of car parking facilities.
- To ensure that car parking does not adversely affect the amenity of the locality.
- To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

Table 2: Statutory Car Parking Requirements

Use	Measure	Rate ⁽¹⁾	Requirement ⁽²⁾
Supermarket	3,960m ²	5 spaces per 100m ² of leasable floor area	198 spaces
Shop	2,030m ²	4 spaces per 100m ² of leasable floor area	81spaces
Medical Centre	6 Practitioners	5 spaces to the first person providing health services and 3 spaces to each other person providing health services	20 spaces
Community Centre	100m ² (34 patrons)	0.3 per patron permitted	10 spaces
TOTAL			309 spaces

(1) We note that Clause 21.04-6 specifies parking rates for medical centres within residential areas. The site is not located in a residential area and the update to Clause 52.06 postdates those sections of the Planning Scheme.

(2) Clause 52.06-5 states ... "If in calculating the number of car spaces the result is not a whole number, the required number of car parking spaces is to be rounded down to the nearest whole number."

The proposed development has provision for 446 parking spaces which exceeds the statutory requirement under Clause 52.06 and accordingly, the application is not seeking a permit to reduce the statutory car parking requirement.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

4.2 Car Parking Layout

The proposed car parking layout and access arrangements have been assessed under the relevant sections of the Planning Scheme and the relevant Australian Standards.

Key elements of the design include:

Design Standard 1 – Accessways

- All vehicles can exit the site in a forwards direction in accordance with the requirements of the Planning Scheme.
- Adequate pedestrian sight triangles will be available at all the proposed crossovers.
- Articulated vehicles (i.e. 19m semi-trailer) are expected to enter the site via Ford Road and exit via Doddy Street for the purposes of deliveries for the supermarket.

Design Standard 2 – Car Parking Spaces

- All standard car spaces are provided with dimensions in excess of the minimum requirements of the Planning Scheme.
- The proposed disabled car spaces are provided in accordance with AS/NZS 2890.6:2009.

Based on the foregoing, we are satisfied that the proposed car parking layout arrangements are satisfactory and will work well.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

4.3 Site Access

4.3.1 Goulburn Valley Highway Access

Traffix Group has prepared a concept access layout plan for an amended access treatment from Goulburn Valley Highway. This amended access includes a lengthening of the existing channelised right turn deceleration lane on Goulburn Valley Highway turning to the service road.

Based on an operating speed of 60km/h the right turn deceleration lane has been designed at 85 metres (including 25 metres taper and 30 metres of storage). The treatment has been designed in accordance with the specifications in the Austroads Guide to Road Design Part 4A.

This access will provide left-in and right-in movements only.

South of Doddy Street, a new egress will provide left-out only into the southbound lanes on Goulburn Valley Highway.

In addition, at the request of VicRoads, the left-in to the service road, just north of Grant Court is to be removed.

A copy of the functional layout plan for the proposed access via Goulburn Valley Highway is attached at Appendix B.

4.3.2 Ford Road Access

Traffix Group has prepared a concept access layout plan for the proposed access points via Ford Road directly into the site.

Based on an operating speed of 60km/h the left turn deceleration lanes have been designed at 55 metres (including 20 metres taper) in accordance with the Austroads Guide to Road Design Part 4A.

For simplicity of design and construction, Ford Road is to be widened on the north side for majority of the site's frontage. These will allow for AUR type treatments at each access point.

A copy of the functional layout plan for the proposed access points via Ford Road is attached at Appendix C.

5 Traffic Considerations

5.1 Traffic Generation

5.1.1 Supermarket and Shops

Traffix Group has undertaken detailed turning movement counts of a similar site on the corner of Archer Street and Benalla Road at the direction of VicRoads. Extensive surveys were carried out from 12:30pm-6:00pm. The peak hour was from 4:00pm-5:00pm when 751 vehicle movements were recorded. An estimate of approximately 6,800m² for the floor area of the shops and supermarket was based on aerial photography of the site.

Accordingly, given the site's location and similar characteristics, a peak afternoon vehicle generation rate of 11 vehicles per 100m² has been adopted. This equates to up to 659 movements in the PM peak hour.

5.1.2 Medical Centre

The likely traffic generation for the proposed medical centre development is estimated from first principles, based on the following assumptions:

- consultations will be by appointment with an average consultation time of 12 minutes, and
- all patients will drive to the site, i.e. up to 10 vehicle trip-ends per practitioner each hour (5 arriving and 5 leaving).

Based on the above assumptions, it is anticipated that a maximum of 60 vehicle trip-ends may be generated by the site during any one hour. Staff would typically arrive prior to the scheduled appointment times, and depart after the last appointment, and accordingly the staff vehicle movements would not coincide with the busiest hour.

5.1.3 Nearby Development

Childcare Centre

We understand that a childcare centre has recently been approved in the immediate vicinity of the subject site. Accordingly, we believe it is appropriate to include this traffic given that it will form part of the existing traffic on the road network.

The RTA Guide to Traffic Generating Developments (2002) (RTA Guide) sets out traffic generation rates based on survey data collected in New South Wales for a range of land uses. This guide is referred to in the Austroads Guide which is used by VicRoads, and is generally regarded as the standard for metropolitan development characteristics.

The RTA Guide sets out the following relevant rates:

Childcare Centre:	AM peak hour: 0.8 vehicle trip-ends per child
	PM peak hour: 0.7 vehicle trip-ends per child

Accordingly, the childcare centre is estimated to generate up to 74 movements in the PM peak hour.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

5.1.4 Summary

We note that it is highly unlikely that the PM peak traffic generation of each of the above uses will coincide. Nevertheless, for the purposes of a robust assessment, we have assumed that all peak rates will overlap and accordingly, up to 793 vehicle movements will be generated by the proposed development in the PM peak period.

5.2 Traffic Distribution

An economic impact assessment report has been prepared by MacroPlan Dimasi dated January 2017. At section 4.2 to this report are detailed numbers regarding the origin of sales for the proposed development. For traffic distribution purposes, we have adopted the conclusions from the report. Traffic will be distributed to and from the site in the following way:

- 50% of traffic will enter and 50% will exit in the peak periods,
- 5% of traffic will arrive from and depart to the west,
- 27% of traffic will arrive from and depart to the north,
 - 80% will access the site from Goulburn Valley Highway, south of Ford Road, and
 - 20% will access the site via Ford Road.
- 16.5% of traffic will arrive from and depart to the east or southeast via Ford Road
 - 85% of traffic to and from the east will enter/exit via the western access on Ford Road, and
 - 15% of traffic to and from the east will enter/exit via the eastern access on Ford Road,
- 51.5% of traffic will arrive and depart to the south.
 - 25% from the southwest quadrant,
 - 10% from beyond the trade area, and
 - 16.5% from east/southeast
 - 10% of exiting southbound traffic will turn left from Ford Road onto Goulburn Valley Highway,
 - 90% of exiting southbound traffic will turn left from Doddy Street onto Goulburn Valley Highway.

Based on the above assumptions, the anticipated peak hour turning movements generated by the proposed mixed-use development is summarised in Figure 13 below.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

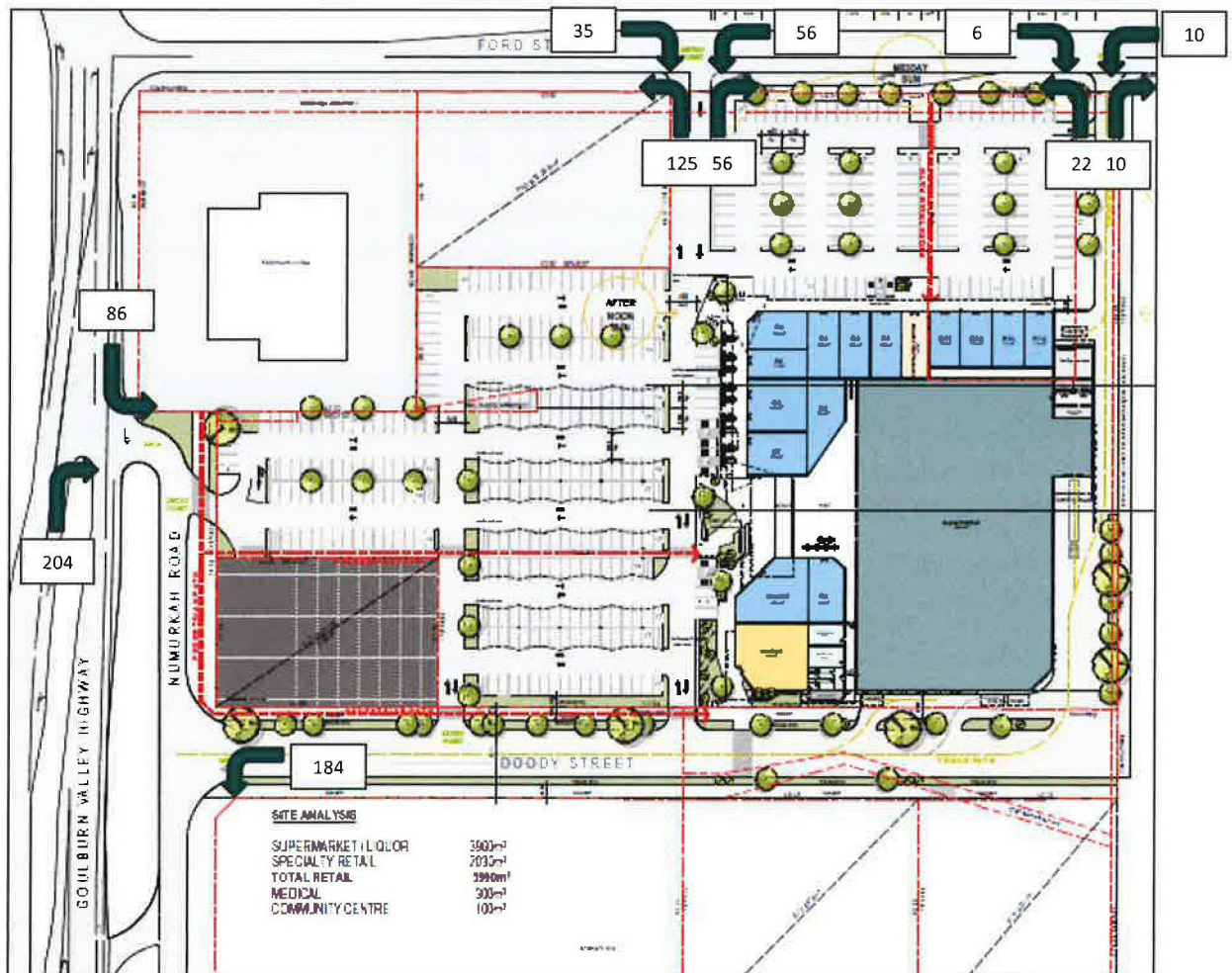


Figure 13: Expected Traffic Generation and Distribution

5.3 Traffic Impact

Goulburn Valley Highway/Wanganui Road/Ford Road Intersection

Traffix Group has discussed the future operation of Goulburn Valley Highway/Wanganui Road/Ford Road intersection with VicRoads' officers.

We understand that the intersection of Ford Road, Wanganui Road and Goulburn Valley Highway will be realigned to form a cross-intersection that will be signalised. Furthermore, it is likely that traffic volumes and expansion of the area will result in upgrade works to Goulburn Valley Highway in the vicinity of the subject site, giving additional capacity.

We have been advised that the applicant will provide a monetary contribution to be used at the discretion of Council/VicRoads for interim works at the intersection of Goulburn Valley Highway/Wanganui Road/Ford Road intersection until the ultimate intersection is constructed as part of the Shepparton Bypass.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

Goulburn Valley Highway Access

The proposed development may result in up to 204 right-turn entry movements and 86 left-turn entry movements from Goulburn Valley Highway. Traffic surveys undertaken by GTA Consulting show that there are in the order of 500 southbound movements in the midweek PM peak hour.

A SIDRA intersection analysis has been undertaken to determine the performance of the new access via Goulburn Valley Highway to the development site in the PM peak hour under post development conditions. A peak flow factor of 95% has been adopted.

Table 3: SIDRA Summary

Approach	Degree of Saturation	Average Delay (sec)	Queue Length (m)
Goulburn Valley Highway (south)	0.339	2.6	9.7
Goulburn Valley Highway (north)	0.271	0.9	0.0

The SIDRA analysis indicates that the proposed access has ample capacity on each approach to accommodate the number of entry movements, and there will be only a very minor delay for vehicles turning right into the site.

Significantly, Degrees of Saturation (DOS) less than 0.8 are considered to be good operating conditions for unsignalised intersections. As can be seen each DOS (being the highest DOS of any one approach at that intersection) is significantly lower than 0.8.

Full outputs of the SIDRA analysis for existing and post development conditions are attached at Appendix D.

Based on the above assessment, we are satisfied that the introduction of up to 204 right-turn movements and 86 left-turn into the site will not severely impact on the operation of Goulburn Valley Highway.

Ford Road Access

The proposed development may result in up to 272 movements in/out of the site via the central access via Ford Road.

Traffix Group has undertaken a SIDRA intersection analysis has been undertaken to determine the performance of the new access via Ford Road under post development conditions. A peak flow factor of 95% has been adopted.

Table 4: SIDRA Summary

Approach	Degree of Saturation	Average Delay (sec)	Queue Length (m)
Site Access (south)	0.205	8.0	6.1
Ford Road (east)	0.103	1.3	0.0
Ford Road (west)	0.121	1.5	2.3

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

The SIDRA analysis indicates that the proposed access has ample capacity on each approach to accommodate the number of movements, and there will be only a very minor delay for vehicles turning out of the site.

Full outputs of the SIDRA analysis for existing and post development conditions are attached at Appendix E.

6 Bicycle Parking

Clause 52.34 of the Planning Scheme sets out the statutory requirements for bicycle facilities. The purpose of Clause 52.34 is:

- To encourage cycling as a mode of transport.
- To provide secure, accessible and convenient bicycle parking spaces and associated shower and change facilities.

The number of bicycle spaces required under Clause 52.34 is set out below.

Table 5: Statutory Bicycle Parking Requirement

Use	Measure	Rate	Requirement ⁽¹⁾
Employee			
Retail	2,030m ²	1 space to each 300m ² of leasable floor area	7 space
Supermarket	3,960m ²	1 space to each 600m ² of leasable floor area if the leasable floor area exceeds 1,000m ²	7 spaces
Medical Centre	6 practitioners	1 space to each eight practitioners	1 space
Community Centre	100m ²	1 space to each 300m ² of net floor area if the net floor area exceeds 1,000m ²	0 spaces
Shopper/Visitor			
Retail	2,030m ²	1 space to each 500m ² of leasable floor area	4 spaces
Supermarket	3,960m ²	1 space to each 500m ² of leasable floor area if the leasable floor area exceeds 1,000m ²	8 spaces
Medical Centre	6 practitioners	1 space to each four practitioners	2 space
Council/Community Centre	100m ²	1 space to each 1,000m ² of leasable floor area if the leasable floor area exceeds 1,000m ²	0 spaces
TOTAL			29 spaces

(1) Clause 52.34 states... "If in calculating the number of bicycle facilities the result is not a whole number, the required number of bicycle facilities is the nearest whole number. If the requirement is one-half, the requirement is the next whole number."

The proposed development has a statutory requirement for 29 bicycle spaces, comprising 15 employee spaces and 14 visitor spaces.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

A total of 30 bicycle parking spaces are provided on-site including 16 within a secure area for employees and 14 spaces provided at horizontal rails near tenancy 4 for visitors.

Two shower/change room facilities are provided adjacent to the secure bicycle parking.

Accordingly, the bicycle and end of trip facility requirements set out at Clause 52.34 of the Planning Scheme are met.

7 Loading

Clause 52.07 of the Planning Scheme specifies that:

No building or works may be constructed for the manufacture, servicing, storage or sale of goods or materials unless:

- *Space is provided on the land for loading and unloading vehicles as specified in the table below.*
- *The driveway to the loading bay is at least 3.6 metres wide. If a driveway changes direction or intersects another driveway, the internal radius at the change of direction or intersection must be at least 6 metres.*
- *The road that provides access to the loading bay is at least 3.6 metres wide.*

FLOOR AREA OF BUILDING	MINIMUM LOADING BAY DIMENSIONS	
2,600 m ² or less in single occupation	Area	27.4 m ²
	Length	7.6 m
	Width	3.6 m
	Height Clearance	4.0 m
For every additional 1,800 m ² or part	Additional 18 m ²	

The supermarket is 3,960m² in area requiring a 45.4m² loading area. The supermarket loading bay is significantly larger than this and exceeds the Planning Scheme requirement.

Swept path analysis of a 19m articulated vehicle accessing the supermarket loading bay has been undertaken and access was shown to be satisfactory. A copy of the swept path analysis is attached at Appendix F.

A further two loading bays are provided for loading of the retail tenancies. Given the small size of many of the retail premises and the nature of the proposed development, it would be appropriate to for the retail tenancies to share the two common loading areas..

In addition, deliveries to the retail tenancies are likely to be via small vans which could make use of the on-site parking to undertake deliveries.

The provision of loading bays meets the statutory requirement set out at Clause 52.07 of the Planning Scheme.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton: Proposed Shopping Centre

8 Conclusions

Having visited the site, perused relevant documents and plans, provided design advice, conducted a spot parking survey and undertaken traffic engineering assessments, we are of the opinion that:

- a) The proposed development has a statutory car parking requirement for 309 spaces,
- b) the provision of 446 spaces, exceeds the statutory parking requirement the application does not seek a permit to reduce the statutory parking requirement,
- c) the proposed car parking layout is considered to be in accordance with both the relevant requirements of the Planning Scheme and Australian Standards and will operate in an appropriate and acceptable manner,
- d) the new access via Goulburn Valley Highway has been designed in accordance with Austroads Guide to Road Design Part 4A and will operate in a safe and effective manner,
- e) the treatments for the proposed access points on Ford Road have been designed in accordance with Austroads Guide to Road Design Part 4A and will work well as an interim treatment until the ultimate duplication of Ford Road,
- f) a contribution has been made by the applicant to be used at the discretion of Council/VicRoads for interim works at the intersection of Goulburn Valley Highway/Wanganui Road/Ford Road prior to the ultimate construction of the intersection as part of the Shepparton bypass,
- g) the provision of bicycle parking and end of trip facilities is in accordance with Clause 52.34 of the Planning Scheme,
- h) the provision of three loading bays meets the statutory loading requirement set out at Clause 52.07, and
- i) there are no traffic engineering reasons why a planning permit for the proposed mixed-use development at 221-229 Goulburn Valley Highway, Shepparton, should not be granted.

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton:
Proposed Shopping Centre

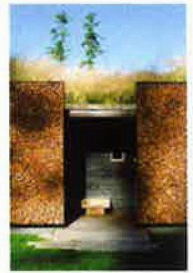
Appendix A: Development Plans



SITE ANALYSIS

SUPERMARKET / LIQUOR	3960m ²
SPECIALTY RETAIL	2030m ²
TOTAL RETAIL	5990m²
MEDICAL	300m ²
COMMUNITY CENTRE	100m ²

TOTAL CARS PROVIDED ON SITE	446
TROLLEY BAYS	17



TOWN PLANNING

2015-050	TP02	A
1:500	JW/TL	



LASCORP

NORTH SHEPPARTON
NUMURKAH ROAD,
SHEPPARTON, VIC 3630

PROPOSED SITE PLAN



Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton:
Proposed Shopping Centre

Appendix B:
Functional Layout Plan of
Goulburn Valley Highway Access



PRELIMINARY PLAN
FOR DISCUSSION
PURPOSES ONLY

WARNING
BE AWARE OF UNDERGROUND SERVICES
The locations of underground services
shown are approximate only and their exact
position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE
A	ISSUED FOR COMMENTS	19 NOV 2016
B	EXISTING NUMURKAH ROAD U-TURN AND SERVICE ROAD ACCESS RETAINED - PLAN UPDATED	20 DEC 2016
C	PEDESTRIAN CROSSING ADDED	22 DEC 2016
D	SERVICE ROAD EXIT RELOCATED FURTHER SOUTH AND MEDIAN ISLAND EXTENDED	09 JAN 2017
E	BASE PLAN UPDATED - PLAN RE-ISSUED	24 JAN 2017

GENERAL NOTES
 1 BASE INFORMATION FROM AERIAL PHOTOGRAPH (SOURCE NEARMAP JUNE 2016)
 2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
 3 MAIN ROAD - NUMURKAH ROAD (SPEED ZONE 60KM/H)
 4 ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1:28 & 2003
 5 EXISTING SIGNAGE NOT SHOWN

DESIGNED
S O'KEEFE 06 JUNE 2016

CHECKED/APPROVED
D MILDER 08 JUNE 2016

FILE NAME
G19863-00.dgn

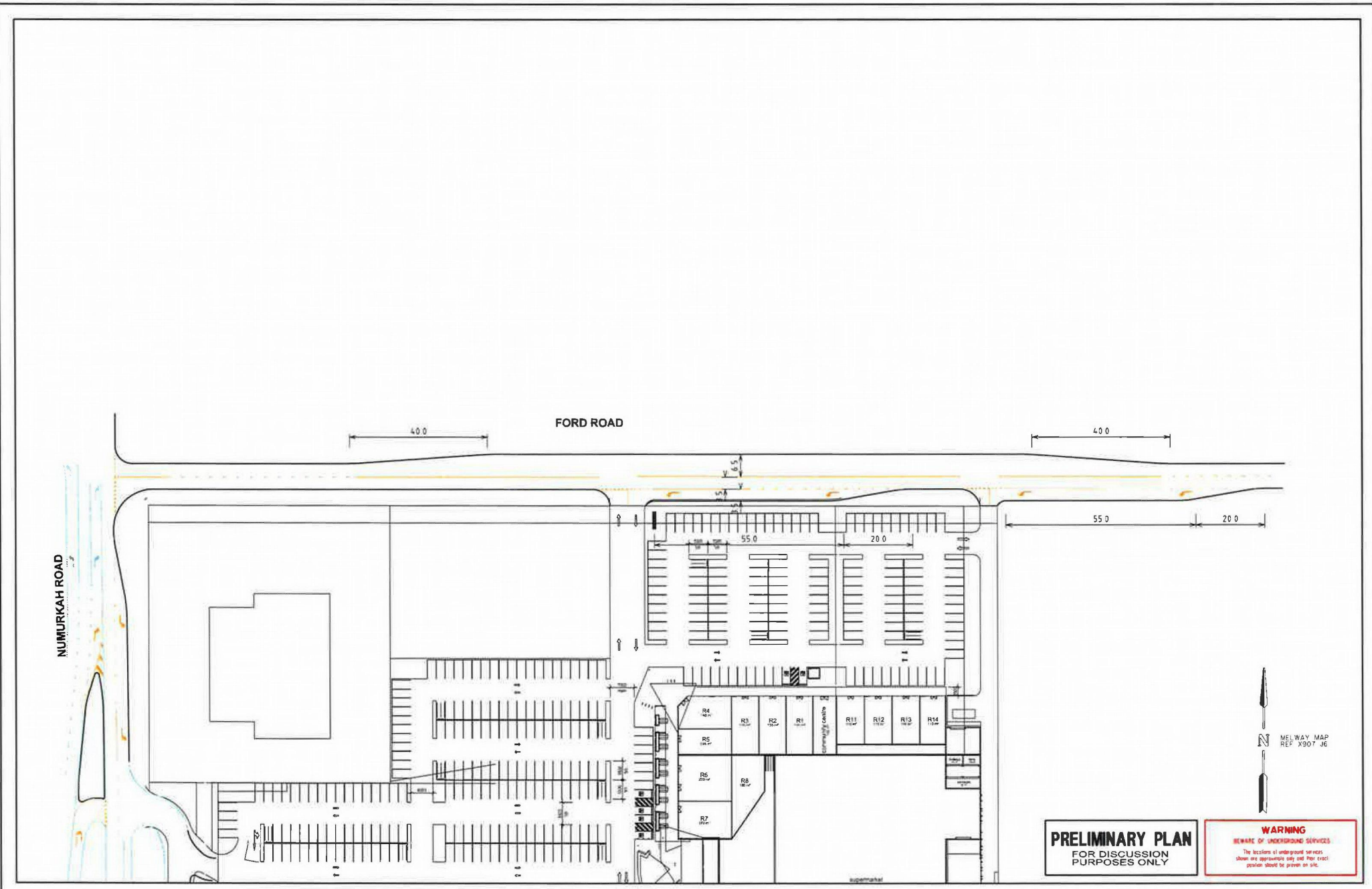


NUMURKAH ROAD - SHEPPARTON
GREATER SHEPPARTON CITY COUNCIL
FUNCTIONAL LAYOUT PLAN - OPTION 4
SCALE 1:500 SHEET No. 1 DWG No. G19863-04E

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton:
Proposed Shopping Centre

Appendix C:
Functional Layout Plan of Ford
Road Access



PRELIMINARY PLAN
FOR DISCUSSION
PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES.
The locations of underground services shown are approximate only and their exact position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE
A	ISSUED FOR COMMENTS	25 JULY 2016
B	BASE PLAN UPDATED - PLAN RE-ISSUED	24 JAN 2017

GENERAL NOTES

1. BASE INFORMATION FROM AERIAL PHOTOGRAPH (SOURCE NEARMAP JUNE 2016)
2. ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3. MAIN ROAD - NUMURKAH ROAD (SPEED ZONE 80KM/H)
4. ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1628.4-2009

DESIGNED
S O'KEEFE 25 JULY 2016

CHECKED/APPROVED
D MILDNER 25 JULY 2016

FILE NAME
G19863-00.dgn



FORD ROAD - SHEPPARTON
GREATER SHEPPARTON CITY COUNCIL
CONCEPT PLAN

SCALE 0 5 10 15 20 SHEET No. DWG No. G19863-06B

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton:
Proposed Shopping Centre

Appendix D:
SIDRA Output Goulburn Valley
Highway Access

MOVEMENT SUMMARY

 Site: 101 [221-229 Goulburn Valley Highway, Shepparton]

221-229 Goulburn Valley Highway, Shepparton
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Goulburn Valley Highway											
2	T1	637	6.0	0.339	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
3	R2	215	1.0	0.300	10.1	LOS B	1.4	9.7	0.61	0.89	49.6
Approach		852	4.7	0.339	2.6	NA	1.4	9.7	0.15	0.22	56.9
North: Goulburn Valley Highway											
7	L2	91	1.0	0.049	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	509	6.0	0.271	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		600	5.2	0.271	0.9	NA	0.0	0.0	0.00	0.09	58.9
All Vehicles		1452	4.9	0.339	1.9	NA	1.4	9.7	0.09	0.17	57.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Tuesday, 10 January 2017 2:40:37 PM

Project: P:\Synergy\Projects\GRP1\GRP19863\07-Analysis\SIDRA\19863 GVH & Ford Access.sip7

Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton:
Proposed Shopping Centre

Appendix E:
SIDRA Output Ford Road Access

MOVEMENT SUMMARY

Site: 1 [Ford Road Access]

Ford Road Access
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: Site Access												
1	L2	132	0.0	0.205	7.2	LOS A	0.9	6.1	0.39	0.90	47.5	
3	R2	59	0.0	0.205	10.0	LOS B	0.9	6.1	0.39	0.90	47.1	
Approach		191	0.0	0.205	8.0	LOS A	0.9	6.1	0.39	0.90	47.4	
East: Ford Road												
4	L2	59	0.0	0.032	5.5	LOS A	0.0	0.0	0.00	0.58	48.7	
5	T1	195	5.0	0.103	0.0	LOS A	0.0	0.0	0.00	0.00	60.0	
Approach		254	3.8	0.103	1.3	NA	0.0	0.0	0.00	0.13	58.0	
West: Ford Road												
11	T1	165	5.0	0.121	0.3	LOS A	0.3	2.3	0.16	0.11	58.4	
12	R2	37	0.0	0.121	6.6	LOS A	0.3	2.3	0.16	0.11	53.1	
Approach		202	4.1	0.121	1.5	NA	0.3	2.3	0.16	0.11	57.7	
All Vehicles		646	2.8	0.205	3.3	NA	0.9	6.1	0.16	0.35	55.4	

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

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

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

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

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

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

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

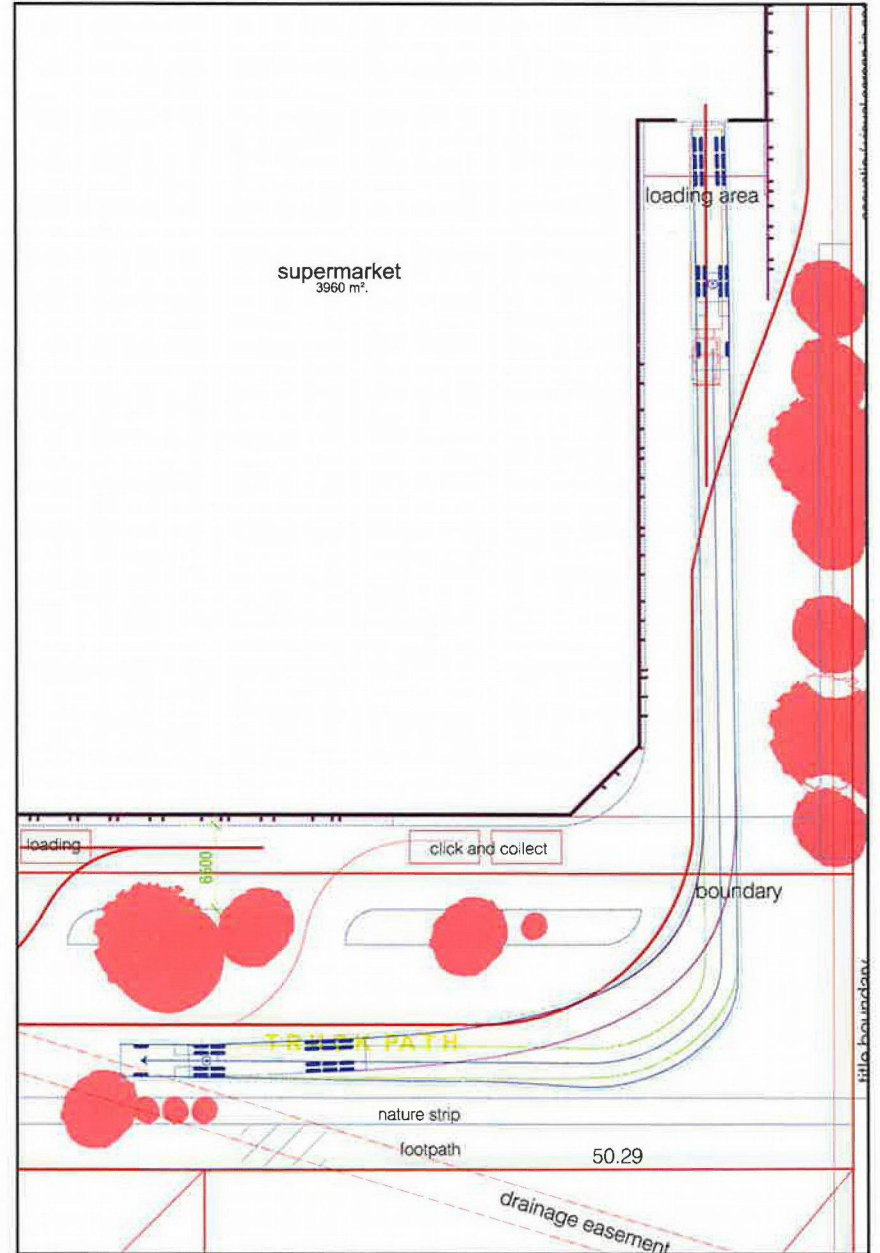
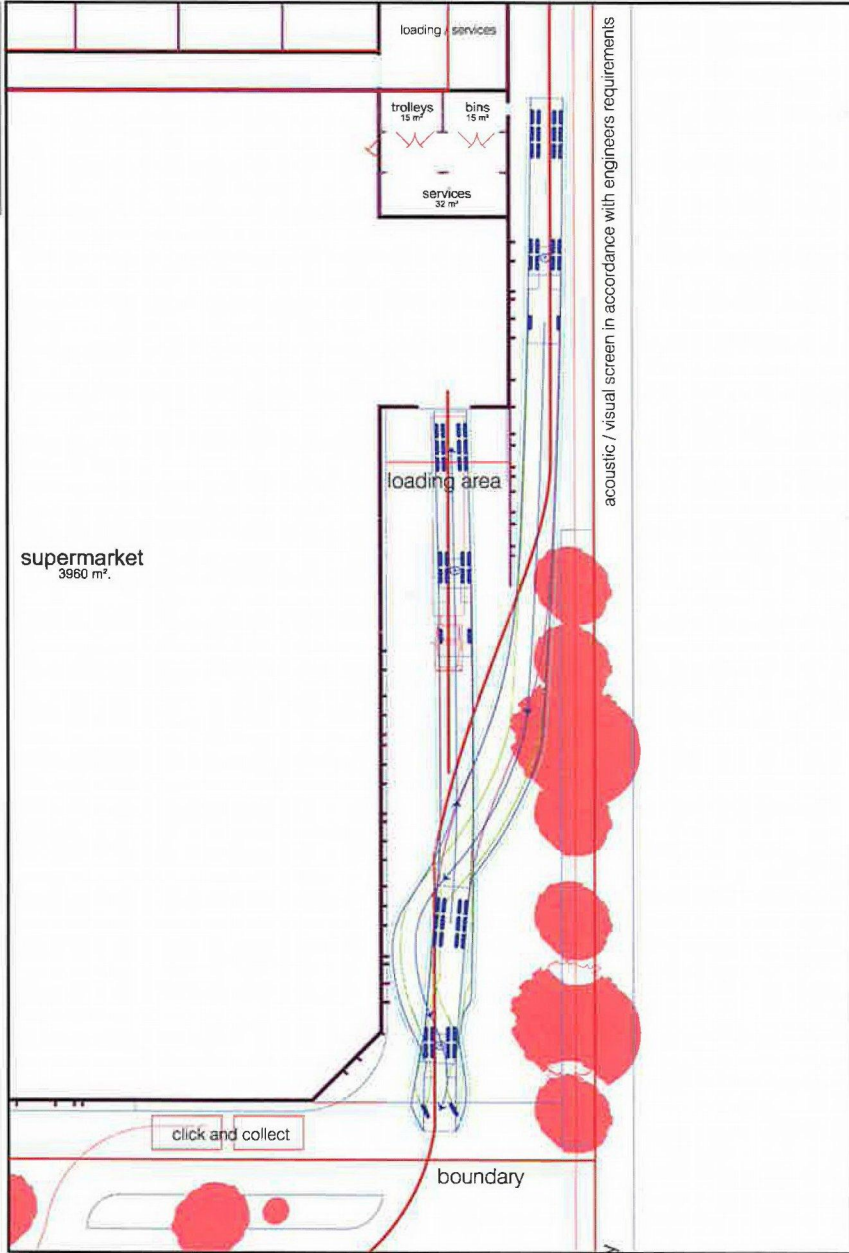
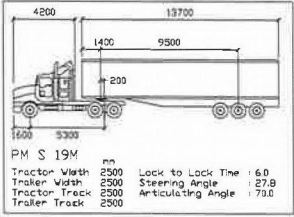
Traffic Engineering Assessment

221-229 Goulburn Valley Highway and 10 Ford Road, Shepparton:
Proposed Shopping Centre


Appendix F: Swept Path Diagrams

Loading Bay - Autoturn IN

Loading Bay - Autoturn OUT



REV.	REVISION NOTES	REVISION DATE	GENERAL NOTES

DESIGNED: D. MILDER 24 JAN 2017	 Traffic Engineers and Transport Planners <small>Suite 14/11 Bynoe Place GLEN RIS VICTORIA 3148 TEL (03) 9552 2295 FAX (03) 9552 7444</small>
CHECKED: H. TURNBULL 24 JAN 2017	
FILE NAME: 19863-01B.DWG	

ISSUE: A	221-229 GOULBURN VALLEY HIGHWAY, SHEPPARTON NORTH 19m SEMI DESIGN SWEEP PATHS PROPOSED MIXED-USE DEVELOPMENT
-------------	--

SCALE: 0 4 8	SHEET No. 01/01	19863-01B
--------------	-----------------	-----------

A.2 GTA Consultants

MEMORANDUM

TO: Elke Cummins (GSCC)
CC: Michael MacDonagh (GSCC)
FROM: Alex Blackett (GTA)
DATE: 29 July 2017
OUR REF: V102560
PAGE 1 OF 13
RE: **227-229 Numurkah Road, Shepparton**
Traffic Engineering Assessment Peer Review

Dear Elke

Background

GTA Consultants has prepared this memorandum to outline our peer review findings and recommendations in regards to the Traffic Engineering Assessment of the proposed shopping centre at 221-229 Goulburn Valley Highway, Shepparton.

In undertaking our peer review, we have generally used the following material:

- Material submitted in support of the associated planning application, including:
 - Proposed Site Plan by i2C (dated 21 June 2016, job 2015-050)
 - Traffic Engineering Assessment prepared by TraffixGroup (dated June 2016, reference G19863R-01D, issue D Final)
- Traffic survey data collected by Traffic Focus as referenced in this memorandum
- an inspection of the site and its surrounds
- other documents as nominated

Where insufficient information has been provided at this time, assumptions or indications for additional information have been made.

Moreover, the findings and recommendations set out in this memorandum are provided in an effort to help Council and the applicant achieve suitable post-development transport arrangements.

Subject Site

The subject site is located at 221-229 Goulburn Valley Highway in Shepparton. The site of approximately 933 m² has frontages of 100m to the Goulburn Valley Highway service road (Numurkah Road) and 180m to Ford Road. Goulburn Valley Highway is located within a Road Zone 1, which is controlled by VicRoads, so the application requires referral to VicRoads under Clause 66.03.

The site is located within a Commercial 2 Zone and is currently undeveloped. The surrounding properties include a mix of commercial, residential and farming land uses.

Proposal

The planning application proposes to accommodate the land uses presented in Table 1.

Table 1: Development Schedule

Use	Size
Supermarket	3,960 m ²
Speciality Shops (9 tenancies)	1,779 m ² (ranging between 75 m ² and 218 m ²)
Medical Centre	10 practitioners (500 m ²)
Council / Community Centre	252 m ²
Childcare Centre	90 children (3,000 m ²)
Pad Site #1 (Petrol Station indicated on plans)	1,904 m ² , including a 244 m ² store
Pad Site #2 (average sized KFC assumed)	2,602 m ²
Expansion Site	3,592 m ²

It is noted at this time that no specific land use has been identified for the southern pad site. Given that it is common practice for a convenience restaurant to be co-located with a shopping centre, a medium traffic generating type has been assumed, i.e. a KFC convenience restaurant.

This has only been assumed at this time for assessment purposes. The applicant will need to indicate the likely land use that will be accommodated, as it is considered to have a material impact on the abutting road network.

It is also noted that there is an 'expansion site' in the southeast corner of the site. The future use of the site is not able to be reasonably assumed at this time, so has not been included in the assessment presented in this memorandum. However, again the applicant will need to indicate the likely land use that will be accommodated, as it may well have a material impact on the abutting road network.

Bicycle Parking & End-of Trip Facilities

Clause 52.34 of the Greater Shepparton Planning Scheme seeks to encourage cycling as a mode of travel through the provision of appropriate bicycle parking and associated facilities.

While the statutory assessment in Section 5 of the Traffic Engineering Assessment generally utilises the correct rates to land uses, it is recommended that the nine Specialty Shops be considered based on their total floor area instead of each premise.

Car Parking

There is proposed to be a total of 366 car parking spaces provided on-site. This currently exceeds the statutory requirements of 328 spaces for the proposed land uses, excluding the two pad sites.

As such, the current level of car parking provided on-site is considered suitable, as long as the two pad sites don't generate a requirement for more than 38 car spaces or that any requirement over this amount is accommodated within the pad site footprints.

It is also recommended that an appropriate amount of car parking be provided adjacent to the buildings proposed to be located on the pad sites.

Car Park Layout

The car parking layout presented in the Proposed Site Plan generally appears appropriate. However, no specific review of dimensions has been undertaken and no swept paths for critical movements have been provided at this time.

Also, the following layout considerations are recommended to be considered as the design develops further:

- Provide raised pedestrian crossings, at least along the Doddy Street frontage (can be in the form of vehicle crossovers)
- Set child care car spaces back a suitable distance to provide at least 0.5m clearance to the footpath and property boundary along Doddy Street
- Suitable clear footpath width along the Speciality Shop frontages, especially the western side where car parking spaces are proposed and will overhang the kerb
- Provide suitable traffic management arrangements associated with the access to the petrol station from the main north-south aisle through the site
- Provide suitable access arrangements for the pad site and integration with the rest of the site.

Loading & Refuse Collection Arrangements

A suitable back of house area for loading and refuse collection is considered to be provided on the eastern side of the supermarket and speciality shops. However, swept path assessments for the area have only been provided for within the site and accessing Doddy Street. Additional swept paths are recommended to be undertaken to confirm access from and to the surrounding road network.

Additional swept paths are also recommended to be undertaken to identify and confirm how the refuelling tankers for the petrol station will access the site.

Loading vehicle deliveries and refuse collection are also expected for the southern pad site, so suitable swept paths identifying and confirming their access arrangements should be provided as part of the associated planning application.

Site Access Arrangements

The proposed site access arrangements indicated in the Proposed Site Plan and Traffic Engineering Assessment differ, in terms of access to Goulburn Valley Highway. Regardless, both look to provide a left-in / right-in / left-out access point to the main carriageway of the Goulburn Valley Highway. Such an arrangement is not considered appropriate across a service road unless at least the southbound traffic are controlled via signals to manage the various conflicting movements.

The preferred access arrangements for the site to Goulburn Valley Highway are the following:

- Utilise the existing right-in facility from the main carriageway of Goulburn Valley Highway into the eastern service road
- It is expected that the right-turn facility from the main carriageway into the eastern service road will be extended to be consistent with relevant design standards and intersection analysis
- Build a central raised median island to the north of the right turn facility into the eastern service road that covers the right-turn facility into the western service road. Those affected by this closure will be able to use the right-turn facility to the south
- Left-in / left-out access to the eastern service road should be locate a suitable distance south of the right-turn facility from the main carriageway so no queuing back out of the service road occurs.

In terms of two access points to Ford Street that are currently proposed, they are considered appropriate. However, consideration of right-turn facility, at least for the westernmost access should be made. This latter consideration will be most likely determined based on the future proposed cross-section of Ford Street as a result of the various developments to the east and its proposed purpose as a heavy vehicle by-pass route.

The following traffic impact assessment adopts the above recommended access arrangements. Moreover, it focuses on what impacts the proposed development will have on Goulburn Valley Highway, namely the right-turn facility into the eastern service road and the staggered intersection with Ford Street and Wanganui Road.

Traffic Generation

We haven't been provided with sufficient detail in the Traffic Engineering Assessment around the similar-site surveys on the corner of Archer Street and Benalla Road to verify the appropriateness of the resulting rates. As such, alternative traffic generation rates have been adopted at this time for the super market and speciality shops. Also, rates have been sourced for the Council / Community Centre, petrol station and KFC. In addition, consideration of what traffic the development proposal will generate during the Saturday Middy peak period has also be undertaken.

The sources, rates and resulting peak hour estimates for the development proposal are set out in Table 1.

Table 1: Traffic Generation Estimates

Land Use	Size	Traffic Generation Rate (movements/hour)		Source	Vehicle Movements	
		Weekday PM	Saturday Midday		Weekday PM	Saturday Midday
Supermarket	3,960 m ²	13.8/100m ²	14.7/100m ²	RTA Guide	546/hr	582/hr
Speciality Shops	1,779 m ²	5.6/100m ²	10.7/100m ²	RTA Guide	100/hr	190/hr
Medical Centre	10 practitioners	10/practitioner	10/practitioner	First Principles	100/hr	100/hr
Council / Community Centre	252 m ²	0.5/100m ²	0	RTA Guide	1/hr	0/hr
Childcare Centre	90 children	0.7/child	0	RTA Guide	63/hr	0/hr
Petrol Station	1,904 m ² , including a 244 m ² store	0.04 of site 0.30 of shop	0.04 of site 0.30 of shop	RTA Guide	149/hr	149/hr
KFC	2,602 m ²	100 mvts	100 mvts	RTA Guide	100/hr	100/hr
Total Movements					1,059/hr	1,121/hr

Table 1 indicates that the site could potentially generate 1,059 vehicle movements in a weekday PM peak hour and 1,121 vehicle movements in a Saturday midday peak hour.

However, an important characteristic of the traffic generation of the above uses is the different types of trips which may occur. These different trip types correspond to:

'Primary Trips'

'Link-diverted Trips'

'Non-link-diverted Trips'.

Primary trips and *link-diverted trips* involve a vehicle either making a special trip or a modification of the route to an existing trip. *Non-link-diverted trips*, on the other hand, correspond to those trips which do not involve a diversion from the route that would otherwise have been taken, or in other words are trips generated by passing traffic. The important distinction here is that it is only *primary trips* and *link-diverted trips* which impact upon the external road network. *Non-link-diverted trips* are already present on the adjacent road network, and although these trips need to be considered in the design of access driveways, turning lanes and so on, they do not constitute additional traffic per se.

In order to account for these different trip types the following has been adopted in terms of the two pad sites at this time for assessment purposes:

- 100% of the petrol station trips are considered to be *non-link-diverted trips*
- 35% of the KFC trips are considered to be *non-link-diverted trips*.

The above tries to account for the likely high proportion of vehicles accessing the petrol station and KFC being link and non-link diverted trips, and to a lesser extend the interplay with some of the other land uses. As such, all of the trips associated with the petrol station and 35% of the trips associated with the KFC are not considered to be additional to what already exists on the fronting roads of Goulburn Valley Highway and Ford Street. However, they will result in additional turning at the intersections used to access the site.

Traffic Distribution

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including but not limited to the:

- i configuration of the arterial road network in the immediate vicinity of the site
- ii existing operation of intersections providing access between the local and arterial road network
- iii distribution of households in the vicinity of the site
- iv configuration of access points to the site.

At this time, it is difficult to provide a sound basis for the directional distribution of traffic that will access the subject site. However, based on the estimates provided in the Traffic Engineering Assessment, the following is noted:

- The site is located towards the northern end of Shepparton, but there are a number of other shopping centres serving customers to the south, so it is generally agreed that the majority of accessing traffic will come from the south a majority of potential visitors from the north will access this centre, so more from the north expected
- In terms of the proximate residential catchments to the east and west of the subject site, they seem to be of a similar size, so it is not considered appropriate to assume such a significant majority will come from the east over the west
- The two pad sites are expected to draw more from the passer-by volumes on Ford Street and Goulburn Valley Highway
- The existing volumes splits during the PM peak period at the Goulburn valley Highway / Ford Road / Wanganui Road intersection are the following:
 - 28% from the north
 - 13% from the east
 - 50% from the south
 - 8% from the east

While it is recommended that a more robust basis be developed to identify the likely directional distribution of traffic for the subject site, such as through the use of customer catchment modelling and/or the strategic transport model for Shepparton, the following have been assumed for assessment purposes:

- 15% from the north (20% for pad sites only)
- 15% from the east (50% for pad sites only)
- 60% from the south (20% for pad sites only)
- 10% from the west (10% for pad sites only).

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) will be 50:50 in the peak hours with each proposed land use.

Based on the above, Figure 1 and Figure 2 have been prepared to show the estimated increase in turning movements in the vicinity of the subject site following full site development.

Figure 3: Post-Development Weekday PM Peak Hour Traffic Volumes

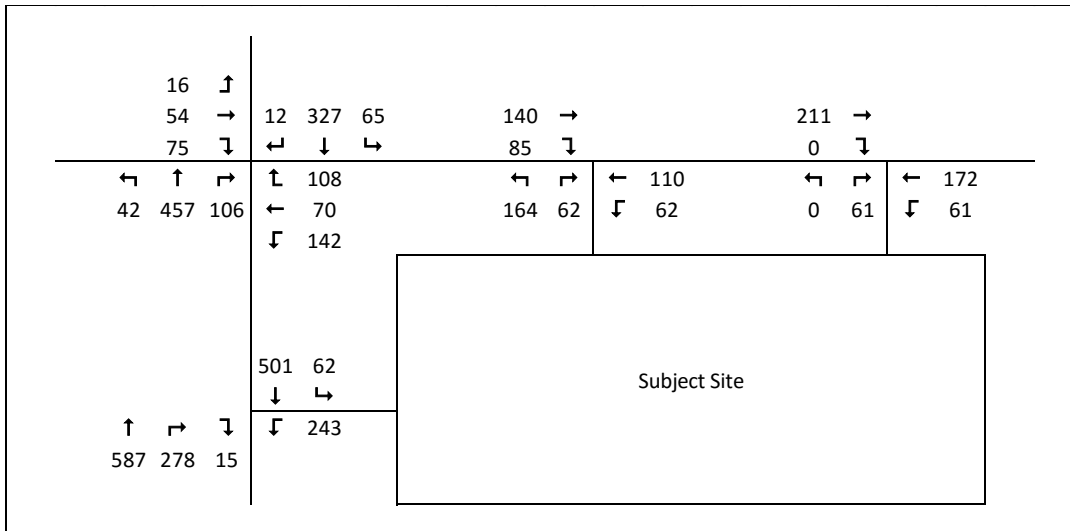
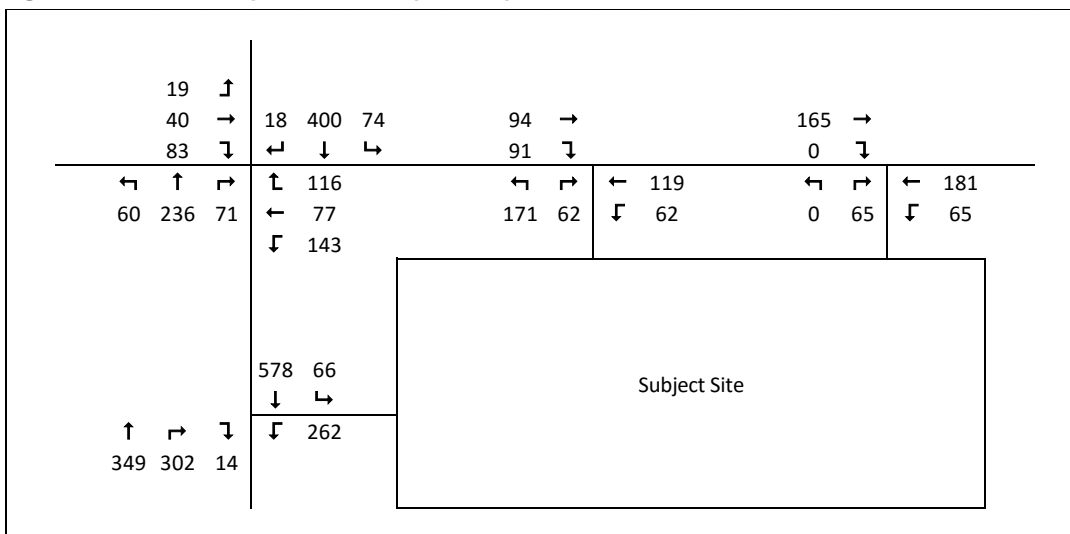


Figure 4: Post-Development Saturday Midday Peak Hour Traffic Volumes



Traffic Impact

As mentioned above, the traffic impact assessment adopts the above recommended access arrangements. Also, it focuses on what impacts the proposed development will have on Goulburn Valley Highway, namely the right-turn facility into the eastern service road and the staggered intersection with Ford Street and Wanganui Road.

As such, each of these locations on Goulburn Valley Highway are considered separately below.

Goulburn Valley Highway Right-Turn Facility

The operation of the right-turn facility from the main carriageway way of Goulburn Valley Highway into the eastern service road has been assessed using *SIDRA INTERSECTION 6¹*, a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For unsignalised intersections, a DOS of around 0.90 has been typically considered the 'ideal' limit, beyond which queues and delays increase disproportionately².

Table 2 presents a summary of the existing operation of the Goulburn Valley Highway Right-Turn Facility.

Table 2: Goulburn Valley Highway Right-Turn Facility – Existing Operating Conditions

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	# 0.34	1 sec	1 m
	Goulburn Valley Hwy (North)	0.27	0 sec	0 m
Saturday Middy	Goulburn Valley Hwy (South)	0.21	1 sec	1 m
	Goulburn Valley Hwy (North)	# 0.31	0 sec	0 m

DOS – Degree of Saturation, # - Intersection DOS

Table 2 indicates that the Goulburn Valley Highway Right-Turn Facility currently operates well with minimal queues and delays on all approaches.

Table 3 presents a summary of the post development operation of the Goulburn Valley Highway Right-Turn Facility.

Table 3: Goulburn Valley Highway Right-Turn Facility – Post Development Operating Conditions

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	# 0.44	4 sec	18 m
	Goulburn Valley Hwy (North)	0.28	1 sec	0 m
Saturday Middy	Goulburn Valley Hwy (South)	# 0.54	7 sec	24 m
	Goulburn Valley Hwy (North)	0.32	1 sec	0 m

DOS – Degree of Saturation, # - Intersection DOS

Table 3 indicates that the Goulburn Valley Highway Right-Turn Facility will operate well under post development conditions with minimal queues and delays on all approaches.

¹ Program used under license from Akcelik & Associates Pty Ltd.

² SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

Goulburn Valley Highway / Ford Road / Wanganui Road Intersection

The operation of the Goulburn Valley Highway / Ford Road / Wanganui Road intersection has been assessed using *SIDRA INTERSECTION 6²*. Given the staggered nature of the intersection, it has been assessed through two T-intersections, noting that Ford Road is under Stop control.

Table 4 presents a summary of the existing operation of the Goulburn Valley Highway / Ford Road / Wanganui Road intersection.

Table 4: Goulburn Valley Hwy / Ford Rd / Wanganui Rd Intersection – Existing Operating Conditions

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	0.28	2 sec	4 m
	Ford Road (East)	0.28	18 sec	8 m
	Goulburn Valley Hwy (North)	0.18	0 sec	0 m
	Wanganui Road (West)	# 0.37	23 sec	12 m
Saturday Midday	Goulburn Valley Hwy (South)	0.16	2 sec	2 m
	Ford Road (East)	0.21	16 sec	5 m
	Goulburn Valley Hwy (North)	0.22	0 sec	1 m
	Wanganui Road (West)	# 0.23	15 sec	7 m

DOS – Degree of Saturation, # - Intersection DOS

Table 4 indicates that the Goulburn Valley Highway / Ford Road / Wanganui Road intersection currently operates well with minimal queues and delays on all approaches.

Table 5 presents a summary of the post development operation of the Goulburn Valley Highway / Ford Road / Wanganui Road intersection.

Table 5: Goulburn Valley Hwy / Ford Rd / Wanganui Rd Intersection – Post Development Operating Conditions

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	0.28	2 sec	4 m
	Ford Road (East)	# 1.59	338 sec	382 m
	Goulburn Valley Hwy (North)	0.22	0 sec	0 m
	Wanganui Road (West)	0.83	57 sec	38 m
Saturday Midday	Goulburn Valley Hwy (South)	0.15	2 sec	3 m
	Ford Road (East)	# 1.06	83 sec	122 m
	Goulburn Valley Hwy (North)	0.26	0 sec	1 m
	Wanganui Road (West)	0.54	27 sec	19 m

DOS – Degree of Saturation, # - Intersection DOS

Table 5 indicates that the Goulburn Valley Highway / Ford Road / Wanganui Road intersection will not operate well under post development conditions, as significant queuing and delays are expected on the Ford Road (west) approach of the intersection. This is mostly due to the increased number of right-turning movements for those accessing the subject site to and from the north and west.

However, it is noted that the SIDRA INTERSECTION model is often limited in its ability to account for site specific traffic conditions, such as platooning, queuing, merging effects and what gaps are created along Goulburn Valley Highway by the adjoining intersections.

In order to determine if the SIDRA INTERSECTION model absorption capacity of the Goulburn Valley Highway intersection with Ford Road is consistent with what the actual traffic conditions are, GTA Consultants has reviewed the video footage from the traffic movement surveys to identify peak period gap numbers at this location and what actual right turn capacities into and out of Ford Road exist.

The gap analysis at this location have shown that in the Weekday PM peak hour, the following gaps exist:

- Right-turn from Ford Street = ability to accommodate up to 226 vehicles
- Right-turn into Ford Street = ability to accommodate up to 774 vehicles.

The SIDRA INTERSECTION model indicates the following Weekday PM peak hour gaps exist:

- Right-turn from Ford Street = capacity for 146 vehicles
- Right-turn into Ford Street = capacity for 883 vehicles.

On this basis, the SIDRA INTERSECTION model is under estimating the ability for vehicles to turn right out of Ford Road onto Goulburn Valley Highway. As such, the critical gap and follow-up headway have been manually changed to 5.5 seconds and 3.0 seconds respectively, to be more reflective of the actual traffic conditions at the intersection.

On the above basis, and assuming that the above gap calibrations follow through to the post-development conditions, Table 6 presents a summary of the calibrated post development operation of the Goulburn Valley Highway / Ford Road / Wanganui Road intersection.

Table 6: Goulburn Valley Hwy / Ford Rd / Wanganui Rd Intersection – Post Development Operating Conditions with Gap Calibration

Peak Hour	Approach	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Weekday PM	Goulburn Valley Hwy (South)	0.28	2 sec	4 m
	Ford Road (East)	# 1.07	91 sec	127 m
	Goulburn Valley Hwy (North)	0.22	0 sec	0 m
	Wanganui Road (West)	0.83	57 sec	38 m
Saturday Middy	Goulburn Valley Hwy (South)	0.15	2 sec	3 m
	Ford Road (East)	# 0.67	24 sec	30 m
	Goulburn Valley Hwy (North)	0.26	0 sec	1 m
	Wanganui Road (West)	0.54	27 sec	19 m

DOS – Degree of Saturation, # - Intersection DOS

Table 5 indicates that the Goulburn Valley Highway / Ford Road / Wanganui Road intersection will still not operate well under post development conditions, at least in the Weekday PM peak period, as significant queuing and delays are still expected on the Ford Road (west) approach of the intersection.

As such, it is expected that the Goulburn Valley Highway / Ford Road / Wanganui Road intersection will need to be upgraded to suitably accommodate the additional traffic generated by the development proposal. The specific upgrade works have not been

determined at this time, but would be most likely determined based on the future proposed cross-section of Ford Street as a result of the various developments to the east and its proposed purpose as a heavy vehicle by-pass route.

Summary of Comments

Given the above discussion and analysis, a summary of the various recommendations are provided as follows:

- The southern pad site has been assumed to be a KFC convenience store at this time for assessment purposes. The applicant will need to indicate the likely land use that will be accommodated, as it is considered to have a material impact on the abutting road network.
- There is an 'expansion site' in the southeast corner of the site. The future use of the site is not able to be reasonably assumed at this time, so has not been included in the assessment presented in this memorandum. However, the applicant will need to indicate the likely land use that will be accommodated, as it may well have a material impact on the abutting road network.
- The bicycle parking and end-of-trip statutory assessment in Section 5 of the Traffic Engineering Assessment is recommended to be based on the total floor area for each land use type instead of each premise.
- The current level of car parking provided on-site is considered suitable, as long as the two pad sites don't generate a requirement for more than 38 car spaces or that any requirement over this amount is accommodated within the pad site footprints.
- Car park layout is generally appropriate, except for some minor recommendations around providing raised pedestrian crossings, set-back of car spaces to footpaths, and more detail around what the traffic management arrangements will be for vehicles accessing the petrol station and pad site to the south.
- Additional swept paths are recommended to be undertaken to identify and confirm how the loading vehicles will access the abutting road network, refuelling tankers for the petrol station and pad site to the south.
- Utilise the existing right-in facility from the main carriageway of Goulburn Valley Highway into the eastern service road, instead of the proposed left-in / left-out access arrangements in the Proposed Site Plan and Traffic Engineering Assessment.
- Build a central raised median island to the north of the right turn facility into the eastern service road that covers the right-turn facility into the western service road. Those affected by this closure will be able to use the right-turn facility to the south.
- Two access points to Ford Street are considered appropriate, however consideration of a right-turn facility, at least for the westernmost access should be made. This latter consideration will be most likely informed based on the future proposed cross-section of Ford Street.
- It is recommended that a more robust basis be developed to identify the likely directional distribution of traffic for the subject site, such as through the use of customer catchment modelling and/or the strategic transport model for Shepparton.

- It is expected that the Goulburn Valley Highway / Ford Road / Wanganui Road intersection will need to be upgraded to suitably accommodate the additional traffic generated by the development proposal. The specific upgrade works have not been determined at this time, but would be most likely informed based on the future proposed cross-section of Ford Street.

Trust that the above provide sufficient information pertaining to our peer review of the proposed shopping centre at 221-229 Goulburn Valley Highway, Shepparton. Naturally, should you have any questions or require any further information, please do not hesitate to contact me in our Melbourne office on (03) 9851 9600.

Yours sincerely

GTA CONSULTANTS

Alex Blackett

Associate

MEMORANDUM

TO: Elke Cummins (GSCC)
CC: Michael MacDonagh (GSCC)
FROM: Alex Blackett (GTA)
DATE: 02 September 2016
OUR REF: V102560
PAGE 1 OF 5
RE: **227-229 Numurkah Road, Shepparton**
Updated Traffic Engineering Assessment Review

Dear Elke

Background

GTA Consultants has prepared this memorandum to outline our review findings and recommendations in regards to the updated traffic engineering assessment of the proposed rezoning and development of a shopping centre at 227-229 Numurkah Road and 10 Ford Road in Shepparton.

In undertaking our review, we have generally used the following material:

- Updated traffic engineering assessment set out in the letter dated 22 August 2016 from TraffixGroup (Ref:G19863L-02A)
- SIDRA Intersection model for the Goulburn Valley Highway / Ford Road / Wanganui Road intersection (Titled: 19863 Ford Road–GVH (1))
- Functional Layout Plan for Numurkah Road prepared by Traffic Group (Drawing No. G19863-01, Rev C)
- Previous material as indicated in our peer review memorandum dated 29 July 2016 (Ref: V102560)
- an inspection of the site and its surrounds
- other documents as nominated.

Where insufficient information has been provided at this time, assumptions or indications for additional information have been made.

Moreover, the findings and recommendations set out in this memorandum are provided in an effort to help Council and the applicant achieve suitable post-development transport arrangements.

melbourne
sydney
brisbane
canberra
adelaide
gold coast
townsville
perth

Level 25, 55 Collins Street
MELBOURNE VIC 3000
PO Box 24055
MELBOURNE VIC 3000
t// +613 9851 9600

In this regard, the following comments and recommendations are made based on the material provided to date:

- The letter indicates that the two pad sites and the expansion site will be formally considered as part of subsequent planning permit applications. While this is agreed in terms of their specific layout and provision of such elements as car and bicycle parking, their potential impact should be considered from at least a traffic generation and access perspective as part of the rezoning. As such, the applicant should advise what level and type of development could reasonably be expected to be accommodated for each.
This has been confirmed for the two pad sites, but no indication has been provided for the expansion site. The applicant is requested to indicate what they would reasonably expect to be accommodated within the expansion site. Otherwise a restricted retail / bulky goods store of 2,000sqm will be assumed to enable Council to understand and be comfortable with the rezoning of the site.
- On the above basis, all relevant sections of the traffic engineering assessment should be updated to include consideration of the expansion site.
- The detail provided about loading and refuse collection arrangements are not considered sufficient to determine if they are appropriate, namely the following at a minimum should also be provided:
 - 19.0m semi swept path in Appendix A of the letter needs to be updated as it utilises the old architectural base and doesn't consider a right-in movement.
 - Swept paths to and from each of the access points to Ford Road are not shown.
 - Swept paths through the Goulburn Valley Highway / Ford Road / Wanganui Road intersection are not shown.
- The Functional Layout Plan outlines proposed access arrangements for Numurkah Road. The following is noted and needs to be considered:
 - It is not believed that the proposed island will block the opposing right-turners accessing the western service road.
 - The resulting right-turn lane length on the south approach to the Goulburn Valley Highway / Ford Road intersection is sub-standard.
 - Consider a design solution that better blocks the opposing right-turners accessing the western service road and maximises the right-turn lane length on the south approach to the Goulburn Valley Highway / Ford Road intersection, as shown in the mark-up in Attachment 1.
 - A left-turn lane from Goulburn Valley Highway should still be provided into Ford Road.
- Functional layout plan for the Ford Road access points should be provided.
- Comment regarding the KFC non-link-diverted trips is noted, but considered to be covered by the 100% non-link-diverted trips assumed for the petrol station.
- The broad traffic distributions informed by MacroPlan Dimasi are recommended to be adopted. In terms of the refinements which relate to the accessing road network, these are considered to be appropriate and generally consistent with the Strategic Transport Model for Shepparton, especially that the majority of those that live in the west will access the site via Brauman Street to the south.

In summary the resulting traffic distributions to be adopted for the site are understood to be:

- 5% to/from the west
 - 22% to/from the east
 - 51% to/from the south
 - 22% to/from the north.
- The peak flow factor is reflective of the fluctuations of the arrival of vehicles on the road network during the analysed peak periods. Removing this to account for any potential conservatism in the traffic generation estimates at this intersection, which is mostly made up of non-development related traffic volumes, is not considered appropriate. If there is believed to be any conservatism in the traffic generation estimates of the development proposal or different peak flow factors for the existing flows in the area, this should be informed through empirical evidence and applied to the associated traffic movements.
 - Please confirm when the development is expected to be opened, what traffic growth was applied and what VicRoads Policy that indicates growth should be applied to 'intersections not directly providing access to a site'.
 - While a detailed review of the SIDRA model has not been completed at this time, it has been used to update the analysis based on the following:
 - Including a 2,000sqm restricted retail / bulky goods store on the expansion site
 - Reintroduction of the 95% peak flow factor on all movements

On this basis, the unsignalised intersection operation results in a DOS value above 0.9, which exceeds the theoretical capacity and would indicate that the intersection needs to be upgraded.

I trust that the above provides sufficient information pertaining to our review of the updated traffic engineering assessment of the proposed shopping centre at 221-229 Goulburn Valley Highway, Shepparton. Naturally, should you have any questions or require any further information, please do not hesitate to contact me in our Melbourne office on (03) 9851 9600.

Yours sincerely

GTA CONSULTANTS

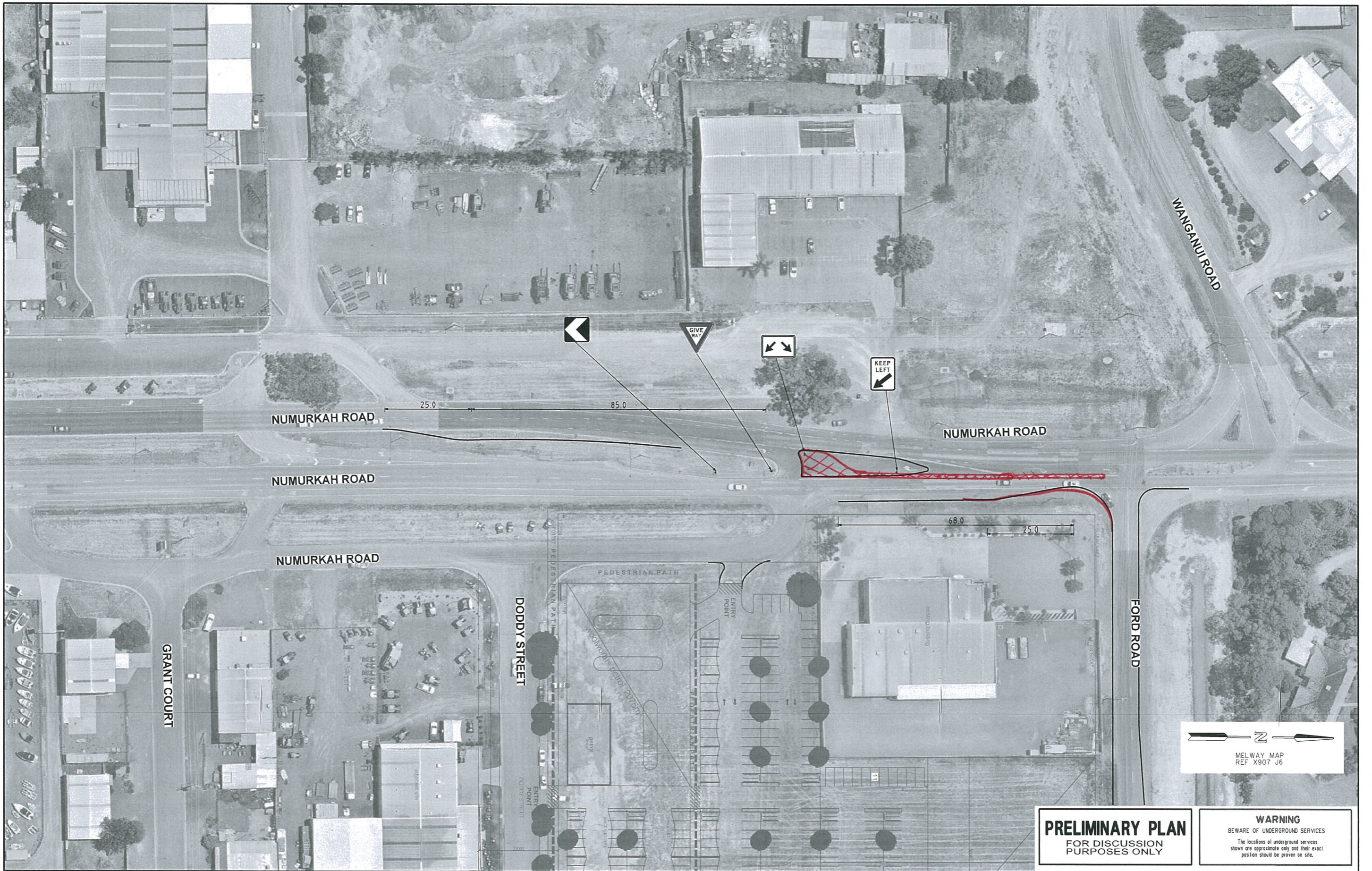


Alex Blackett

Associate

Attachment 1

Functional Layout Plan Mark-Up



PRELIMINARY PLAN
FOR DISCUSSION
PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE
A	ISSUED FOR COMMENTS	08 JUNE 2016
B	ARCHITECTS BASE DRAWING UPDATED - PLAN RE-ISSUED	28 JUNE 2016
C	ARCHITECTS BASE DRAWING UPDATED - PLAN RE-ISSUED	22 AUGUST 2016

GENERAL NOTES

1. BASE INFORMATION FROM AERIAL PHOTOGRAPH (SOURCE: NEARMAP JUNE 2016).
2. ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL.
3. MAIN ROAD - NUMURKAH ROAD (SPEED ZONE 80km/h).
4. ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES. REFER TO AS 1428.4-2009.

DESIGNED
S. O'KEEFE 08 JUNE 2016

CHECKED/APPROVED
D. MILDNER 08 JUNE 2016

FILE NAME
G19863-00.dgn

TraffixGroup
Traffic Engineers and Transport Planners

Suite 6/431 Burke Road TEL: (03) 9522-2855
GLEN IRIS VICTORIA 3146 FAX: (03) 9522-7144
www.traffixgroup.com.au

NUMURKAH ROAD - SHEPPARTON

GREATER SHEPPARTON CITY COUNCIL

FUNCTIONAL LAYOUT PLAN

SCALE 0 5 10 15 20 SHEET No. 1 DWG No. G19863-01

MEMORANDUM

TO: Ronan Murphy (GSCC)
FROM: Alex Blackett (GTA)
DATE: 6 December 2016
OUR REF: V102560
PAGE 1 OF 4
RE: **221-229 Numurkah Road, Shepparton
Intersection Analysis Review**

Dear Ronan

Background

GTA Consultants has prepared this memorandum to outline our review findings and recommendations in regards to the proposed mitigating works and allocation of cost at the Goulburn Highway (Numurkah Road) / Ford Road / Wanganui Road intersection associated with the proposed shopping centre at 221-229 Goulburn Valley Highway, Shepparton.

In undertaking our review, we have generally used the following material:

- Intersection Analysis letter prepared by TraffixGroup (dated 30 August 2016, reference G19863L-06A)
- SIDRA Intersection network model named 19863 – Ford Road – GVH – Alternate Intersection
- Previous documents as nominated.

Where insufficient information has been provided at this time, assumptions or indications for additional information have been made.

Moreover, the findings and recommendations set out in this memorandum are provided in an effort to help Council and the applicant achieve suitable post-development transport arrangements.

Comparison of Traffic Contributions

The TraffixGroup letter outlines on the first page that they have undertaken their own traffic generation and distribution assessment of the various proposed developments in the area to determine what additional traffic will contribute to the Goulburn Valley Highway / Ford Road / Wanganui Road intersection to identify the development contributions set out in Table 1.

melbourne
sydney
brisbane
canberra
adelaide
gold coast
townsville
perth

Level 25, 55 Collins Street
MELBOURNE VIC 3000
PO Box 24055
MELBOURNE VIC 3000
t// +613 9851 9600

While there are, no further details provided on what key inputs and assumptions they have made in this regard, the following comments are made based on the information and commentary provided in the TraffixGroup letter:

- It is assumed that Table 1 sets out the relative proportions of traffic volumes anticipated to be generated by each of the various proposed developments in the area that will travel through the Goulburn Valley Highway / Ford Road / Wanganui Road intersection. Given that the critical movement requiring the mitigating works at the intersection is the right-turn movement out of Ford Road, the relative generation of this movement is recommended to be the main determinant for the allocation of cost.
- It is not clear how the total number of movements for either of the 'GTA Consulting' and 'Traffix' scenarios were arrived at, as the 'GTA Consulting' value of 443 total movements is not consistent with the material we have provided, and no traffic generation rates have been provided to consider if the 'Traffix' value of 515 total movements is appropriate.
- It is noted that the 'Traffix' value is higher than the 'GTA Consulting' value. Given that the traffic generation rates and distribution of the Commercial use has generally been agreed on, it would mean that the traffic generation rates applied to the other uses, namely the residential land uses, must be above the standard rates we have applied of 0.85 movements per dwelling in a peak hour.
- The TraffixGroup letter indicates in the last paragraph that the assessment is "highly conservative as it does not account for any passing trade or linked trips". This is not considered to be the case for the following reasons:
 - As the allocation of cost is based on a percentage of the total traffic generation (i.e. relative impact of each proposed development), then as long as the traffic generation rates are applied in a consistent basis, there is not considered to be any major conservatism in the analysis.
 - If you consider what land use of those proposed in the area that will likely generate passing trade or linked trips, it is the commercial use. While this might help reduce the overall traffic volumes going through the Goulburn Valley Highway / Ford Road / Wanganui Road intersection, it is unlikely to reduce the critical right-turn movement numbers out of Ford Road.
- Our previous advice, which has been provided to TraffixGroup, indicates that purely based on a traffic generation perspective for these various proposed developments, that the commercial use contributes in the order of 75% of the additional right-turn movements out of Ford Road. As this is the movement that is ultimately driving the need for mitigating works at the intersection, then its contribution should be similar. Council has reduced this contribution to 65% of the mitigating works cost given broader considerations.

On the above basis, we do not agree with the traffic contribution analysis provided at this time. A request for further detail, namely what traffic generation rates have been adopted and general basis for the allocation of cost (i.e. on a whole of intersection, or critical movement basis) has been made. Until this is provided and the above comments are addressed, we continue to support the 65% cost allocation to the commercial use associated with the mitigating works at the Goulburn Valley Highway / Ford Road / Wanganui Road intersection.

Alternate Intersection Options

An alternative intersection option has been proposed by TraffixGroup to mitigate the impact of the various proposed developments in the area on the Goulburn Valley Highway / Ford Road / Wanganui Road intersection. The alternative solution aims to meter the northbound traffic on Goulburn Valley Highway through a set of signals approximately 50m south of the Goulburn Valley Highway / Ford Road intersection to support the right turn movements from Ford Road.

In regards to this alternative intersection option, the following comments are provided:

- From an intersection capacity perspective, it is expected that this alternative intersection option would increase the number of gaps in the Goulburn Valley Highway traffic stream for vehicles turning right-out of Ford Road, as identified through the network SIDRA Model that has been provided. However, the following is noted with the use of the network SIDRA Model:
 - The introduction of the Network function in SIDRA Intersection 7.0 is relatively new and not well tested to date.
 - The resulting intersection arrangement is considered to be complex and not sure a Network SIDRA Model is able to suitably reflect the proposed post-development arrangements.
 - Running some sensitively analysis of the Network SIDRA Model, it will exceed a DOS of 0.9 for the west approach through small changes to the various inputs, such as a change in the cycle time or adoption of the 'Traffix' value of 515 total movements at the intersection (future traffic volumes anticipated by GTA Consultants has been adopted in the model).
 - The existing conditions network SIDRA model for the Goulburn Valley Highway / Ford Road / Wanganui Road intersection has not been calibrated.
- If the above modelling concerns can be addressed, then at a minimum, the following additional infrastructure is recommended to ensure the proposed arrangement works at an operational level:
 - Actuated static queuing detector on Ford Road to advise when the lights on Goulburn Valley Highway are required to start generating more gaps to enable right-turn movements out of Ford Road.
 - Advanced warning system on Goulburn Valley Highway to advise approach motorists that the lights are about to turn red.
 - Additional pedestals and lanterns north of the hold line to advise those vehicles at the front of the queue when they can continue.
 - Additional lanterns to advise vehicles coming from the side road when the lights are red.
- Even with the above improvements to the layout, there are the following safety concerns with the proposed alternative layout:
 - The proposed signal hold line is in a non-standard location where people may not know why they have been stopped (especially those queued and can't see the proposed signage), which could result in driver confusion and frustration.
 - For the proposed arrangements to work the signals during the peak period need to operate on a 60 second cycle time, which is very short for an arterial road, so likely

- to increase the potential for rear-ends and red-light running (or increased approaching speeds to beat it).
- Does not resolve the safety concerns that exist with the current off-set cross intersection between Goulburn Valley Highway / Ford Road / Wanganui Road, and there will be significantly increased turning movements at this intersection.
 - It is also questioned whether the proposed works reasonably mitigates the impact of the development. The existing intersection operation has a low DOS (approx. 0.4), yet with the proposed alternative intersection option it has a DOS of 0.86, which is just below the theoretical capacity value of 0.9 for an unsignalised intersection.

Given the above, the proposed alternative intersection option is not supported at this time. It is indicated as a cost saving option that is considered to not suitably mitigate the impact of the development on the Goulburn Valley Highway / Ford Road / Wanganui Road intersection. If the applicant is to proceed with this option, the following activities at a minimum should be completed:

- Develop a calibrated existing conditions network SIDRA model for the Goulburn Valley Highway / Ford Road / Wanganui Road intersection, including identification of what the typical design day for traffic volumes on Goulburn Valley Highway.
- Provide the additional signal infrastructure indicated above.
- Arrange for an independent Road Safety Audit of the proposed alternative arrangement to be undertaken.
- Obtain in-principle support of the proposed alternative intersection option from VicRoads, as Goulburn Valley Highway is under their control the implementation of signals is a major traffic item.

Naturally, should you have any questions or require any further information, please do not hesitate to contact me in our Melbourne office on (03) 9851 9600.

Yours sincerely

GTA CONSULTANTS



Alex Blackett

Associate

Appendix B

SIDRA Intersection Results

B.1 Existing Conditions

MOVEMENT SUMMARY

Site: 101 [Existing (West T-int) - Weekday PM Peak]

Network: N101 [Existing PM Peak]

Numurkah Road / Ford Road / Wanganui Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Numurkah Road (South)													
1	L2	62	10.0	62	10.0	0.040	3.5	LOS A	0.2	1.2	0.06	0.53	58.4
2	T1	504	5.0	504	5.0	0.267	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		566	5.5	566	5.5	0.267	0.4	LOS A	0.2	1.2	0.01	0.06	76.7
North: Numurkah Road (North)													
8	T1	342	5.0	342	5.0	0.181	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
9	R2	13	6.0	13	6.0	0.013	9.0	LOS A	0.1	0.4	0.51	0.65	61.1
Approach		355	5.0	355	5.0	0.181	0.3	NA	0.1	0.4	0.02	0.02	78.3
West: Wanganui Road (West)													
10	L2	17	3.0	17	3.0	0.023	9.7	LOS A	0.1	0.5	0.48	0.70	61.5
12	R2	89	12.0	89	12.0	0.367	25.0	LOS C	1.5	11.5	0.84	0.99	38.6
Approach		106	10.6	106	10.6	0.367	22.6	LOS C	1.5	11.5	0.78	0.94	42.9
All Vehicles		1027	5.9	1027	5.9	0.367	2.7	NA	1.5	11.5	0.09	0.14	70.9

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

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

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

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

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

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

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

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 3:39:32 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Service Road Access.sip7

MOVEMENT SUMMARY

 Site: 101 [Existing (East T-int) - Weekday PM Peak]

 Network: N101 [Existing PM Peak]

Numurkah Road / Ford Road / Wanganui Road
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Numurkah Road (South)													
2	T1	525	5.0	525	5.0	0.278	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	112	3.0	112	3.0	0.126	9.2	LOS A	0.5	3.6	0.49	0.73	61.8
Approach		637	4.6	637	4.6	0.278	1.6	NA	0.5	3.6	0.09	0.13	73.5
East: Ford Road (East)													
4	L2	123	1.0	123	1.0	0.164	11.5	LOS B	0.6	4.3	0.48	0.95	61.2
6	R2	41	11.0	41	11.0	0.282	37.3	LOS E	1.0	7.5	0.88	1.03	31.8
Approach		164	3.5	164	3.5	0.282	18.0	LOS C	1.0	7.5	0.58	0.97	54.0
North: Numurkah Road (North)													
7	L2	45	4.0	45	4.0	0.025	3.1	LOS A	0.0	0.0	0.00	0.55	61.3
8	T1	386	5.0	386	5.0	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		432	4.9	432	4.9	0.205	0.3	NA	0.0	0.0	0.00	0.06	77.4
All Vehicles		1233	4.6	1233	4.6	0.282	3.4	NA	1.0	7.5	0.12	0.22	69.8

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

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

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

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

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

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

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

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akçelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 3:39:32 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Service Road Access.sip7

MOVEMENT SUMMARY

Site: 101 [Service Road Access - Existing - Weekday PM Peak]

Numurkah Road / Service Road Access
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Numurkah Road (South)											
2	T1	637	5.0	0.337	0.0	LOS A	0.0	0.0	0.00	0.00	79.8
3	R2	11	3.0	0.040	8.9	LOS A	0.1	1.1	0.54	0.76	51.8
3u	U	16	0.0	0.040	11.4	LOS B	0.1	1.1	0.54	0.76	52.2
Approach		663	4.8	0.337	0.5	NA	0.1	1.1	0.02	0.03	78.2
North: Numurkah Road (North)											
7	L2	8	8.0	0.005	7.1	LOS A	0.0	0.0	0.00	0.63	62.7
8	T1	501	5.0	0.265	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		509	5.0	0.265	0.1	NA	0.0	0.0	0.00	0.01	79.5
All Vehicles		1173	4.9	0.337	0.3	NA	0.1	1.1	0.01	0.02	78.8

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

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

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Existing (West T-int) - Saturday Peak]

Network: N102 [Existing Saturday Peak]

Numurkah Road / Ford Road / Wanganui Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h		veh/h		v/c	sec		veh	m		per veh	km/h
South: Numurkah Road (South)													
1	L2	85	4.0	85	4.0	0.054	3.6	LOS A	0.2	1.6	0.07	0.53	61.4
2	T1	276	3.0	276	3.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		361	3.2	361	3.2	0.144	0.8	LOS A	0.2	1.6	0.02	0.12	74.6
North: Numurkah Road (North)													
8	T1	423	2.0	423	2.0	0.220	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
9	R2	19	8.0	19	8.0	0.014	7.9	LOS A	0.1	0.5	0.37	0.60	61.1
Approach		442	2.3	442	2.3	0.220	0.4	NA	0.1	0.5	0.02	0.03	78.0
West: Wanganui Road (West)													
10	L2	20	0.0	20	0.0	0.020	8.1	LOS A	0.1	0.5	0.34	0.62	63.8
12	R2	80	6.0	80	6.0	0.233	17.2	LOS C	0.9	6.6	0.73	0.92	46.0
Approach		100	4.8	100	4.8	0.233	15.4	LOS C	0.9	6.6	0.65	0.86	50.7
All Vehicles		903	2.9	903	2.9	0.233	2.2	NA	0.9	6.6	0.09	0.16	71.9

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

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

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

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

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

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

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

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akçelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 3:39:41 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Service Road Access.sip7

MOVEMENT SUMMARY

 Site: 101 [Existing (East T-int) - Saturday Peak]

 Network: N102 [Existing Saturday Peak]

Numurkah Road / Ford Road / Wanganui Road
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Numurkah Road (South)													
2	T1	312	3.0	312	3.0	0.163	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	75	1.0	75	1.0	0.091	9.5	LOS A	0.3	2.4	0.51	0.75	62.0
Approach		386	2.6	386	2.6	0.163	1.8	NA	0.3	2.4	0.10	0.14	73.2
East: Ford Road (East)													
4	L2	124	1.0	124	1.0	0.185	12.3	LOS B	0.7	4.8	0.52	0.98	60.5
6	R2	49	4.0	49	4.0	0.211	24.3	LOS C	0.7	5.4	0.80	1.01	40.5
Approach		174	1.9	174	1.9	0.211	15.7	LOS C	0.7	5.4	0.60	0.99	55.9
North: Numurkah Road (North)													
7	L2	34	2.0	34	2.0	0.018	3.1	LOS A	0.0	0.0	0.00	0.55	62.4
8	T1	469	2.0	469	2.0	0.244	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		503	2.0	503	2.0	0.244	0.2	NA	0.0	0.0	0.00	0.04	78.4
All Vehicles		1063	2.2	1063	2.2	0.244	3.3	NA	0.7	5.4	0.13	0.23	70.1

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

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

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

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

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

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

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

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 3:39:41 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Service Road Access.sip7

MOVEMENT SUMMARY

Site: 101 [Service Road Access - Existing - Saturday Peak]

Numurkah Road / Service Road Access
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Numurkah Road (South)											
2	T1	386	5.0	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	16	3.0	0.052	9.8	LOS A	0.2	1.3	0.58	0.80	51.9
3u	U	15	0.0	0.052	12.9	LOS B	0.2	1.3	0.58	0.80	52.2
Approach		417	4.7	0.205	0.8	NA	0.2	1.3	0.04	0.06	76.9
North: Numurkah Road (North)											
7	L2	12	8.0	0.007	7.1	LOS A	0.0	0.0	0.00	0.63	62.7
8	T1	582	5.0	0.308	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		594	5.1	0.308	0.2	NA	0.0	0.0	0.00	0.01	79.4
All Vehicles		1011	4.9	0.308	0.5	NA	0.2	1.3	0.02	0.03	78.4

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

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

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

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

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

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

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

B.2 Post Development Conditions

MOVEMENT SUMMARY

Site: 101 [Post Dev (West T-int) - Weekday PM Peak]

Network: N101 [Post Dev - Weekday PM]

Numurkah Road / Ford Road / Wanganui Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total	HV	Total	HV							per veh	km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
South: Numurkah Road (South)													
1	L2	85	10.0	76	9.2	0.049	3.5	LOS A	0.2	1.5	0.06	0.53	58.8
2	T1	608	5.0	543	4.6	0.287	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		694	5.6	619 ^{N1}	5.2	0.287	0.4	LOS A	0.2	1.5	0.01	0.06	76.5
North: Numurkah Road (North)													
8	T1	456	5.0	456	5.0	0.241	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
9	R2	13	6.0	13	6.0	0.013	9.2	LOS A	0.1	0.4	0.52	0.67	60.9
Approach		468	5.0	468	5.0	0.241	0.3	NA	0.1	0.4	0.01	0.02	78.6
West: Wanganui Road (West)													
10	L2	17	3.0	17	3.0	0.024	10.0	LOS A	0.1	0.6	0.50	0.72	61.2
12	R2	119	12.0	119	12.0	0.664	43.3	LOS E	3.2	24.7	0.93	1.12	27.9
Approach		136	10.9	136	10.9	0.664	39.2	LOS E	3.2	24.7	0.88	1.07	31.7
All Vehicles		1298	6.0	1223 ^{N1}	6.3	0.664	4.7	NA	3.2	24.7	0.11	0.16	66.1

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

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

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

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

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

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

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

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 3:39:50 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Service Road Access.sip7

MOVEMENT SUMMARY

 Site: 101 [Post Dev (East T-int) - Weekday PM Peak]

 Network: N101 [Post Dev - Weekday PM]

Numurkah Road / Ford Road / Wanganui Road
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Numurkah Road (South)													
2	T1	504	5.0	504	5.0	0.267	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	112	3.0	112	3.0	0.153	10.4	LOS B	0.6	4.2	0.56	0.81	60.5
Approach		616	4.6	616	4.6	0.267	1.9	NA	0.6	4.2	0.10	0.15	72.8
East: Ford Road (East)													
4	L2	123	1.0	123	1.0	0.193	12.7	LOS B	0.7	5.0	0.54	1.00	60.2
6	R2	191	11.0	191	11.0	1.666	667.7	LOS F	54.2	415.1	1.00	3.16	2.7
Approach		314	7.1	314	7.1	1.666	410.6	LOS F	54.2	415.1	0.82	2.31	5.8
North: Numurkah Road (North)													
7	L2	79	4.0	79	4.0	0.044	3.1	LOS A	0.0	0.0	0.00	0.55	61.3
8	T1	496	5.0	496	5.0	0.263	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		575	4.9	575	4.9	0.263	0.4	NA	0.0	0.0	0.00	0.08	76.7
All Vehicles		1504	5.2	1504	5.2	1.666	86.6	NA	54.2	415.1	0.21	0.57	19.0

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

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

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

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

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

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

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

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 3:39:50 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Service Road Access.sip7

MOVEMENT SUMMARY

Site: 101 [Service Road Access - Post Dev - Weekday PM Peak]

Numurkah Road / Service Road Access
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Numurkah Road (South)											
2	T1	616	5.0	0.326	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	263	3.0	0.404	12.3	LOS B	2.2	15.7	0.65	0.94	53.2
3u	U	16	0.0	0.404	13.4	LOS B	2.2	15.7	0.65	0.94	53.6
Approach		895	4.3	0.404	3.9	NA	2.2	15.7	0.20	0.29	69.1
North: Numurkah Road (North)											
7	L2	167	8.0	0.095	7.1	LOS A	0.0	0.0	0.00	0.63	62.7
8	T1	452	5.0	0.239	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		619	5.8	0.239	1.9	NA	0.0	0.0	0.00	0.17	74.4
All Vehicles		1514	4.9	0.404	3.1	NA	2.2	15.7	0.12	0.24	71.1

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

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

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

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

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

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

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

MOVEMENT SUMMARY

Site: 101 [Post Dev (West T-int) - Saturday Peak]

Network: N101 [Post Dev - Saturday Midday Peak]

Numurkah Road / Ford Road / Wanganui Road
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Numurkah Road (South)													
1	L2	113	4.0	101	3.9	0.064	3.6	LOS A	0.3	1.9	0.07	0.53	61.4
2	T1	398	3.0	357	2.9	0.187	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		511	3.2	458 ^{N1}	3.2	0.187	0.8	LOS A	0.3	1.9	0.02	0.12	74.9
North: Numurkah Road (North)													
8	T1	556	2.0	556	2.0	0.289	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
9	R2	19	8.0	19	8.0	0.016	8.2	LOS A	0.1	0.5	0.42	0.62	60.9
Approach		575	2.2	575	2.2	0.289	0.3	NA	0.1	0.5	0.01	0.02	78.3
West: Wanganui Road (West)													
10	L2	20	0.0	20	0.0	0.022	8.5	LOS A	0.1	0.5	0.39	0.65	63.6
12	R2	114	6.0	114	6.0	0.508	30.2	LOS D	2.2	16.5	0.88	1.04	34.8
Approach		134	5.1	134	5.1	0.508	26.9	LOS D	2.2	16.5	0.81	0.98	39.4
All Vehicles		1219	2.9	1167 ^{N1}	3.1	0.508	3.5	NA	2.2	16.5	0.11	0.17	68.6

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

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

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

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

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

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

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

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 3:39:59 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Service Road Access.sip7

MOVEMENT SUMMARY

 Site: 101 [Post Dev (East T-int) - Saturday Peak]

 Network: N101 [Post Dev - Saturday Midday Peak]

Numurkah Road / Ford Road / Wanganui Road
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Numurkah Road (South)													
2	T1	291	3.0	291	3.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	75	1.0	75	1.0	0.114	11.0	LOS B	0.4	3.0	0.58	0.83	60.5
Approach		365	2.6	365	2.6	0.152	2.3	NA	0.4	3.0	0.12	0.17	72.1
East: Ford Road (East)													
4	L2	124	1.0	124	1.0	0.224	13.9	LOS B	0.8	5.8	0.60	1.01	59.1
6	R2	221	4.0	221	4.0	1.312	340.1	LOS F	39.9	288.7	1.00	2.89	5.1
Approach		345	2.9	345	2.9	1.312	222.7	LOS F	39.9	288.7	0.86	2.21	9.9
North: Numurkah Road (North)													
7	L2	82	2.0	82	2.0	0.045	3.1	LOS A	0.0	0.0	0.00	0.55	62.4
8	T1	587	2.0	587	2.0	0.305	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		669	2.0	669	2.0	0.305	0.4	NA	0.0	0.0	0.00	0.07	77.2
All Vehicles		1380	2.4	1380	2.4	1.312	56.5	NA	39.9	288.7	0.25	0.63	25.8

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

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

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

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

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

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

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

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 3:39:59 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Service Road Access.sip7

MOVEMENT SUMMARY

Site: 101 [Service Road Access - Post Dev - Saturday Peak]

Numurkah Road / Service Road Access
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Numurkah Road (South)											
2	T1	365	5.0	0.193	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	311	3.0	0.541	15.1	LOS C	3.4	24.1	0.74	1.03	51.1
3u	U	15	0.0	0.541	16.5	LOS C	3.4	24.1	0.74	1.03	51.5
Approach		691	4.0	0.541	7.2	NA	3.4	24.1	0.35	0.49	63.2
North: Numurkah Road (North)											
7	L2	179	8.0	0.102	7.1	LOS A	0.0	0.0	0.00	0.63	62.7
8	T1	533	5.0	0.282	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		712	5.8	0.282	1.8	NA	0.0	0.0	0.00	0.16	74.7
All Vehicles		1402	4.9	0.541	4.4	NA	3.4	24.1	0.17	0.32	68.6

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

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

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

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

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

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

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

B.3 Mitigated Conditions

MOVEMENT SUMMARY

 Site: 101 [Post Dev - Weekday PM]

New Site

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Goulburn Valley Highway (South)											
1	L2	44	0.0	0.062	20.7	LOS C	1.0	6.8	0.67	0.70	43.9
2	T1	460	0.0	0.613	19.5	LOS B	13.0	90.7	0.87	0.76	45.4
3	R2	112	0.0	0.425	31.8	LOS C	3.4	24.1	0.90	0.79	38.5
Approach		616	0.0	0.613	21.8	LOS C	13.0	90.7	0.86	0.76	43.9
East: Ford Road (East)											
4	L2	123	0.0	0.628	31.0	LOS C	9.7	68.1	0.94	0.82	39.4
5	T1	41	0.0	0.628	25.5	LOS C	9.7	68.1	0.94	0.82	40.1
6	R2	148	0.0	0.628	31.1	LOS C	9.7	68.1	0.94	0.82	39.6
Approach		313	0.0	0.628	30.3	LOS C	9.7	68.1	0.94	0.82	39.6
North: Goulburn Valley Highway (North)											
7	L2	58	0.0	0.081	20.9	LOS C	1.3	9.0	0.68	0.71	43.8
8	T1	399	0.0	0.531	18.8	LOS B	10.8	75.6	0.83	0.72	45.8
9	R2	13	0.0	0.055	30.9	LOS C	0.4	2.5	0.84	0.69	38.9
Approach		469	0.0	0.531	19.4	LOS B	10.8	75.6	0.82	0.72	45.3
West: Wanganui Road (West)											
10	L2	17	0.0	0.613	39.8	LOS D	4.8	33.3	1.00	0.82	36.0
11	T1	21	0.0	0.613	34.3	LOS C	4.8	33.3	1.00	0.82	36.6
12	R2	98	0.0	0.613	39.8	LOS D	4.8	33.3	1.00	0.82	36.2
Approach		136	0.0	0.613	39.0	LOS D	4.8	33.3	1.00	0.82	36.2
All Vehicles		1534	0.0	0.628	24.3	LOS C	13.0	90.7	0.87	0.76	42.5

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 4:15:33 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Signalised Intersection.sip7

MOVEMENT SUMMARY

 **Site: 101 [Post Dev + Surrounding Developments - Weekday PM]**

New Site

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Goulburn Valley Highway (South)											
1	L2	44	0.0	0.064	21.5	LOS C	1.0	6.9	0.69	0.70	43.5
2	T1	507	0.0	0.703	21.5	LOS C	15.3	107.1	0.92	0.81	44.3
3	R2	129	0.0	0.640	38.4	LOS D	4.6	32.0	0.98	0.84	36.0
Approach		681	0.0	0.703	24.7	LOS C	15.3	107.1	0.92	0.81	42.4
East: Ford Road (East)											
4	L2	144	0.0	0.709	32.8	LOS C	11.6	81.5	0.97	0.87	38.7
5	T1	54	0.0	0.709	27.3	LOS C	11.6	81.5	0.97	0.87	39.4
6	R2	156	0.0	0.709	32.9	LOS C	11.6	81.5	0.97	0.87	38.9
Approach		354	0.0	0.709	32.0	LOS C	11.6	81.5	0.97	0.87	38.9
North: Goulburn Valley Highway (North)											
7	L2	20	0.0	0.029	21.2	LOS C	0.4	3.1	0.67	0.67	43.6
8	T1	485	0.0	0.672	20.8	LOS C	14.2	99.6	0.90	0.79	44.7
9	R2	16	0.0	0.084	35.0	LOS D	0.5	3.5	0.90	0.70	37.3
Approach		521	0.0	0.672	21.2	LOS C	14.2	99.6	0.89	0.78	44.4
West: Wanganui Road (West)											
10	L2	24	0.0	0.671	39.6	LOS D	6.0	41.8	1.00	0.85	36.7
11	T1	72	0.0	0.671	34.0	LOS C	6.0	41.8	1.00	0.85	37.3
12	R2	74	0.0	0.671	39.6	LOS D	6.0	41.8	1.00	0.85	36.8
Approach		169	0.0	0.671	37.2	LOS D	6.0	41.8	1.00	0.85	37.0
All Vehicles		1725	0.0	0.709	26.4	LOS C	15.3	107.1	0.93	0.82	41.6

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

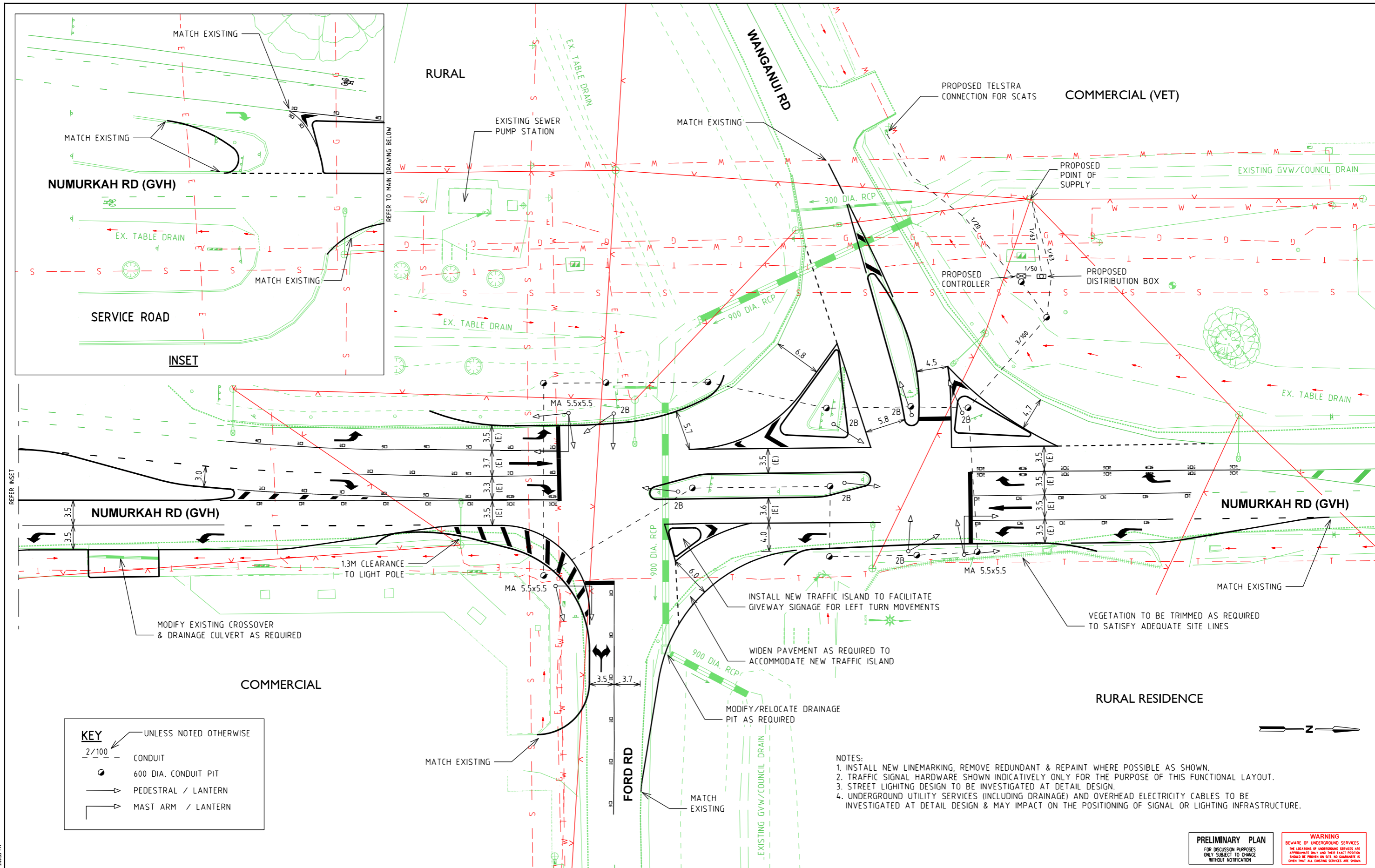
SIDRA INTERSECTION 7.0 | Copyright © 2000-2016 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: GTA CONSULTANTS | Processed: Monday, 13 February 2017 4:15:33 PM

Project: P:\V10200-10299\V102560 - 221-229 Numurkah Road, Shepparton - Peer Review\Modelling\170213sid-V102560-Numurkah&Ford&Wanganui-Signalised Intersection.sip7

Appendix C

Goulburn Valley Highway Recommended Design – Concept Layout Plan



KEY UNLESS NOTED OTHERWISE

	CONDUIT
	600 DIA. CONDUIT PIT
	PEDESTRAL / LANTERN
	MAST ARM / LANTERN

- NOTES:**
1. INSTALL NEW LINEMARKING, REMOVE REDUNDANT & REPAINT WHERE POSSIBLE AS SHOWN.
 2. TRAFFIC SIGNAL HARDWARE SHOWN INDICATIVELY ONLY FOR THE PURPOSE OF THIS FUNCTIONAL LAYOUT.
 3. STREET LIGHTING DESIGN TO BE INVESTIGATED AT DETAIL DESIGN.
 4. UNDERGROUND UTILITY SERVICES (INCLUDING DRAINAGE) AND OVERHEAD ELECTRICITY CABLES TO BE INVESTIGATED AT DETAIL DESIGN & MAY IMPACT ON THE POSITIONING OF SIGNAL OR LIGHTING INFRASTRUCTURE.

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY. SUBJECT TO CHANGE WITHOUT NOTIFICATION.

WARNING
BEWARE OF UNDERGROUND SERVICES. THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

AMENDMENTS		RA	PD	PD	
ISSUE	DATE	DESCRIPTION	BY	CHK.	APP.
P1	09.11.2016	CONCEPT DESIGN REVIEW ISSUE			

GENERAL NOTES

1. ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.
2. BASE INFORMATION OBTAINED FROM FEATURE SURVEY DATED 03 MAY 2016 PREPARED BY RURAL WORKS PTY LTD. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.
3. DECLARED MAIN ROAD - NUMURKAH RD (GVH) - SPEED ZONE 60KM/H - DESIGN SPEED 60KM/H
LOCAL ROAD - FORD ROAD - SPEED ZONE 60KM/H
LOCAL ROAD - WANGANUI ROAD - SPEED ZONE 80KM/H
4. DESIGN VEHICLE - 19M SEMI TRAILER

DESIGNED R.ABRAHAM / P. DELACCA	DESIGN CHECK
DRAWN R.ABRAHAM / P. DELACCA	DRAFTING CHECK
APPROVED BY	DATE APPROVED FOR INITIAL ISSUE 10 NOVEMBER 2016
SCALE A1	CAD FILE NO. V102560-02-P1.dgn

GTA consultants
www.gta.com.au

Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Canberra 02 6243 9400
Adelaide 08 8334 3600
Gold Coast 07 5510 4814
Townsville 07 4722 2765
Perth 08 6169 1000

CLIENT **GREATER SHEPPARTON CITY COUNCIL**

NUMURKAH RD (GVH) / WANGANUI RD / FORD RD INTERSECTION

FUNCTIONAL LAYOUT

DRAWING NO. **V102560-02** ISSUE **P1**

PLOTTED BY: Paul Delacca ON: 10/11/2016 AT: 5:00:31 PM

Melbourne

A Level 25, 55 Collins Street
PO Box 24055
MELBOURNE VIC 3000
P +613 9851 9600
E melbourne@gta.com.au

Sydney

A Level 6, 15 Help Street
CHATSWOOD NSW 2067
PO Box 5254
WEST CHATSWOOD NSW 1515
P +612 8448 1800
E sydney@gta.com.au

Brisbane

A Level 4, 283 Elizabeth Street
BRISBANE QLD 4000
GPO Box 115
BRISBANE QLD 4001
P +617 3113 5000
E brisbane@gta.com.au

Canberra

A Tower A, Level 5,
7 London Circuit
Canberra ACT 2600
P +612 6243 4826
E canberra@gta.com.au

Adelaide

A Suite 4, Level 1, 136 The Parade
PO Box 3421
NORWOOD SA 5067
P +618 8334 3600
E adelaide@gta.com.au

Gold Coast

A Level 9, Corporate Centre 2
Box 37, 1 Corporate Court
BUNDALL QLD 4217
P +617 5510 4800
F +617 5510 4814
E goldcoast@gta.com.au

Townsville

A Level 1, 25 Sturt Street
PO Box 1064
TOWNSVILLE QLD 4810
P +617 4722 2765
E townsville@gta.com.au

Perth

A Level 2, 5 Mill Street
PERTH WA 6000
PO Box 7025, Cloisters Square
PERTH WA 6850
P +618 6169 1000
E perth@gta.com.au