

Traffix Group

Traffic Engineering Assessment

Proposed Residential Subdivision
Clarkefield

Prepared for
APD Projects

November 2022

G28661R-01F

Document Control

Our Reference: G28661R-01F

Issue No.	Type	Date	Prepared By	Approved By
A	Draft	04/07/22	D. Trotter	N. Woolcock
B	Revised Draft	24/08/22	D. Trotter	N. Woolcock
C	Final	12/10/22	D. Trotter	N. Woolcock
D	Revised Final	17/10/22	D. Trotter	N. Woolcock
E	Revised Final	21/10/22	N. Woolcock	K. Bullock
F	Revised Final	24/11/22	D.Trotter	D.Trotter

COPYRIGHT: The ideas and material contained in this document are the property of Traffix Group (Traffix Group Pty Ltd – ABN 32 100 481 570). 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.....	5
2.	Existing Conditions.....	5
2.1.	Subject Site.....	5
2.2.	Road Network.....	6
2.3.	Public Transport.....	7
3.	Clarkefield Development Plan.....	8
4.	Proposal.....	8
5.	Internal Traffic Matters	9
5.1.	Road Cross-Sections	9
5.2.	Parking Provision.....	11
5.3.	Access for Service and Emergency Vehicles	11
5.4.	Pedestrian and Cyclist Access	11
5.5.	Public Transport Considerations.....	13
5.6.	Traffic Control.....	13
6.	External Traffic Matters.....	13
6.1.	Introduction	13
6.2.	Traffic Generation.....	14
6.3.	Traffic Distribution.....	14
6.4.	Existing Conditions.....	15
6.5.	Base Case.....	16
6.6.	Site Generated	18
6.7.	Post Development Traffic Volumes	19
6.8.	Traffic Assessment	20
6.9.	Comparison to Development Plan.....	22
7.	Clause 56.06 Assessment	23
8.	Conclusions	25

List of Figures

Figure 1: Locality Plan	5
Figure 2: Land Use Zoning Map	6
Figure 3: Melbourne-Lancefield Road – View North	7
Figure 4: Melbourne-Lancefield Road – View South	7
Figure 5: Station Street – View East	7
Figure 6: Station Street – View West	7
Figure 7: Internal Road Network Plan	9
Figure 8: Cycling Network Plan	12
Figure 9: Existing Traffic Volumes – AM Peak Period (2022)	15
Figure 10: Existing Traffic Volumes - PM Peak Period (2022)	16
Figure 11: Base Case Traffic Volumes - AM Peak Period (2032)	17
Figure 12: Base Case Traffic Volumes - PM Peak Period (2032)	17
Figure 13: Site Generated Traffic Volumes - AM Peak Period	18
Figure 14: Site Generated Traffic Volumes - PM Peak Period	18
Figure 15: Post Development Traffic Volumes - AM Peak Period (2032)	19
Figure 16: Post Development Traffic Volumes - PM Peak Period (2032)	19
Figure 17: Intersection Layout	20

List of Tables

Table 1: Road Cross-Sections.....	10
Table 2: Traffic Generation Summary	14
Table 3: SIDRA Movement Summary – Year 2032.....	21
Table 4: Clause 56.06 Assessment.....	23

List of Appendices

Appendix A	Proposed Design Drawings
Appendix B	Road Cross Sections
Appendix C	SIDRA Intersection Results

1. Introduction

Traffic Group has been engaged by APD Projects to undertake a Traffic Engineering Assessment for the proposed residential subdivision and for the development of lots under 300sq.m for a dwelling; at Clarkefield.

This report provides a detailed traffic engineering assessment of the internal road layout, access arrangements and the likely impacts on the surrounding road network of the proposed development. The report also considers the relevant provisions of Clause 54 and 56 of the Planning Scheme as they relate to the traffic and movement network.

2. Existing Conditions

2.1. Subject Site

The subject site is located both the north and south of Station Street, and to the west of Melbourne Lancefield Road, as shown within Figure 1.

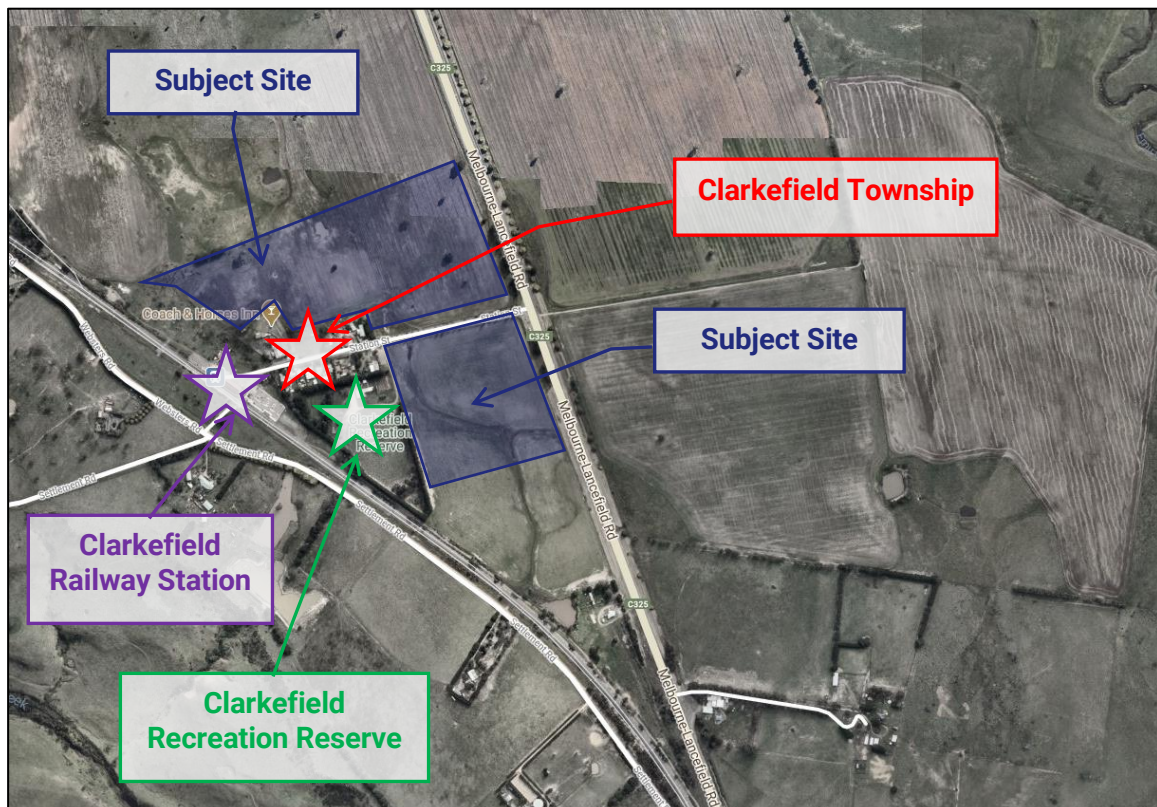


Figure 1: Locality Plan

Source: NearMap

The subject site currently comprises vacant land holdings (farmland) and of note has abuttal to the existing Clarkefield township, Clarkefield Railway Station, Clarkefield Recreation Reserve and Melbourne Lancefield Road.

The subject site is currently zoned 'Township Zone (TZ)' under the Macedon Ranges Planning Scheme, as indicated in the land use zoning map at Figure 2. Land uses within the vicinity of the subject site are generally retail, residential and rural land.

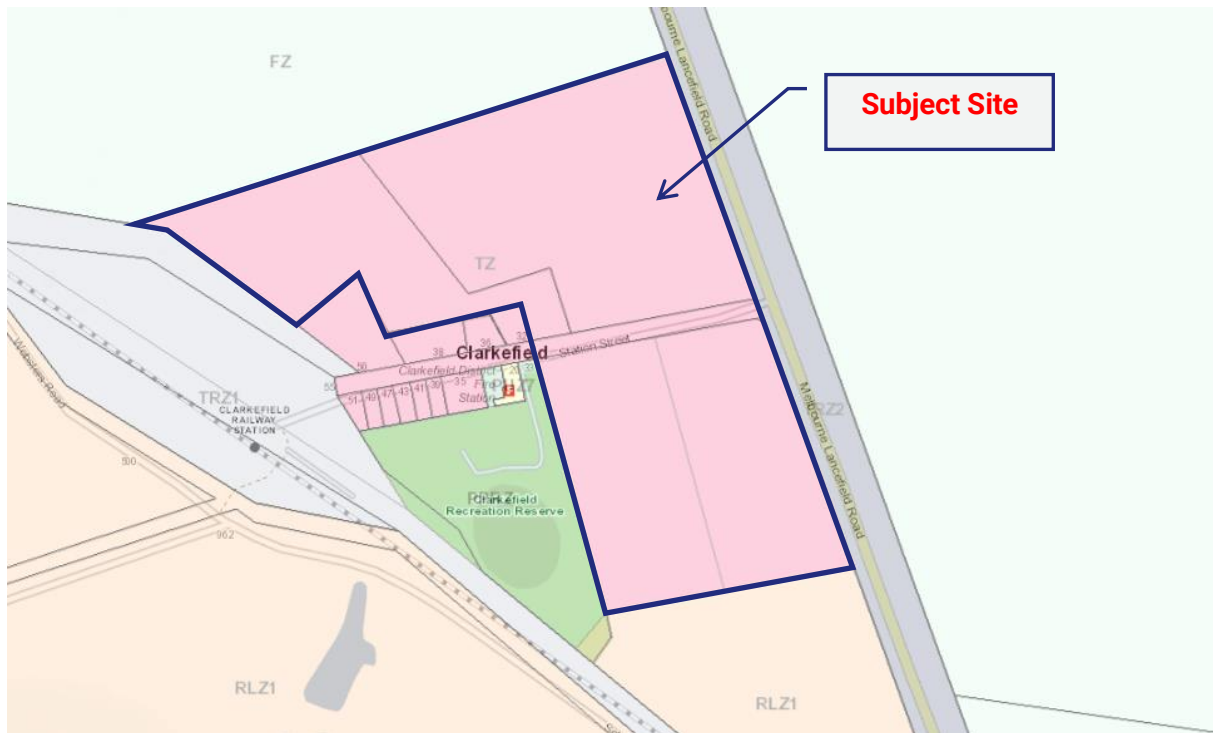


Figure 2: Land Use Zoning Map

Source: VicPlan

2.2. Road Network

Melbourne-Lancefield Road is a VicRoads controlled road and is located within a Transport Zone 2 (TRZ2). The road provides a link between Sunbury Road (Sunbury) to the south and Lancefield, Romsey and other smaller townships to the north.

Adjacent to the subject site, Melbourne-Lancefield Road comprises a single lane in each direction (other than the provision of overtaking lanes) and is undivided to the south and divided (central median with wire rope barriers) to the north of Station Street. Adjacent to the subject site Melbourne-Lancefield Road is within a 100km/h speed limit area.

Photographs of Melbourne-Lancefield Road in the vicinity of the subject site are provided at Figure 3 and Figure 4.



Figure 3: Melbourne-Lancefield Road – View North



Figure 4: Melbourne-Lancefield Road – View South

Station Street is a local Council road orientated in an east-west direction between Melbourne-Lancefield Road and the Clarkefield Railway Station. Station Street comprises a single traffic lane in each direction and is within a 60 km/h speed limit area.

Photographs of Station Street in the vicinity of the subject site are provided at Figure 5 and Figure 6.



Figure 5: Station Street – View East



Figure 6: Station Street – View West

2.3. Public Transport

The edge of the subject site is located approximately 120m east of the Clarkefield Railway Station, which is located on the Bendigo Line. Railway services operate at approximately one-hour intervals, during interpeak periods, on weekdays. More frequent services are provided during the typical commuter peak periods.

There is also a single bus service which services the site, providing a connection between Lancefield and Sunbury. The bus service stops at the Clarkefield Railway Station, and has two services per weekday.

3. Clarkefield Development Plan

Traffic Group previously prepared a traffic report (latest report iteration dated 18 November 2022, ref: G29661L-01D) which accompanied the Clarkefield Development Plan application. We understand that the Development Plan is yet to be endorsed by the Responsible Authority.

The Development Plan included the following indicative development mix and yield:

- Residential – 350 dwellings
- Supermarket – 1,500sq.m
- Retail – 554sq.m
- Hotel – 100 patrons¹
- Child Care Centre – 120 Children²

For reference, it is noted that the road network specified within the Development Plan is generally consistent with that of this subdivision and development application, noting that in both cases a single vehicle connection to the surrounding road network is proposed via the Station Street / Melbourne-Lancefield Road intersection.

The traffic assessment of the Development Plan formed the following conclusion:

“Having undertaken a detailed traffic engineering assessment of the Clarkefield Development Plan, we are of the opinion that the existing Melbourne-Lancefield Road/Station Street intersection will adequately accommodate the traffic predicted to be generated at peak times following full development of the Development Plan area, up to and including the year 2032.”

4. Proposal

The proposal is to subdivide the land to ultimately provide 353 residential allotments, with roads in the subdivision to be provided in accordance with typical practice for greenfield development areas. There are also 111 lots proposed under 300sq.m for which a permit is also being sought for a dwelling on each lot.

The development proposal essentially mirrors the residential component of the aforementioned Development Plan application, albeit an increase from 350 to 353 dwellings.

Vehicle access between the subject site and the broader external road network is proposed via the Station Street / Melbourne-Lancefield Road intersection.

A plan of the proposed subdivision, including the location of the 111 lots less than 300sq.m, is attached at Appendix A.

¹ The Hotel is existing, however, it is considered that the broader Development Plan proposal would result in increased patronage to the existing Hotel.

² Based on our experience with like facilities.

5. Internal Traffic Matters

5.1. Road Cross-Sections

The road reservations and cross-sections within the subject site are generally proposed in accordance with relevant standards, guidelines and best practice for greenfield developments.

Each of the proposed road/street types are outlined within Appendix B with Figure 7 and Table 1 prepared to summarise the nominated road typologies throughout the site.



Figure 7: Internal Road Network Plan

Table 1: Road Cross-Sections

Road Type	Road Reservation	Proposed Carriageway Width	Parking Provision	Pedestrian and Cyclist Provisions
Connector Street	25m	14.5m (2 x 3.5m traffic lanes)	90 degree angled parking (west) Parallel parking (east)	Footpath (east) Shared path (west)
Green Street (Residential)	23m	11.2m (2 x 3.5m traffic lanes)	Parallel parking both sides	Footpath (east) Shared path (west)
Green Street (Urban)	23m	11.2m (2 x 3.5m traffic lanes)	Parallel parking both sides	Footpath both sides
Local Access Street Type A	22m	7.6m (5.5m traffic lane, clear of parking)	Parallel parking on development side	Footpath (development side) Shared path (non-development side)
Local Access Street Type B	22m	11.2m (2 x 3.5m traffic lanes)	Parallel parking both sides	Footpath (south) Shared path (north)
Local Access Street	20m	10.6m (2 x 3.0m traffic lanes)	Parallel parking both sides	Footpath both sides
Station Street (East)	20m	13.0m (2 x 4.2m traffic lanes)	Parallel parking both sides	Footpath both sides, wide traffic lanes
Station Street (West)	20m	13.0m (2 x 4.2m traffic lanes)	Parallel parking both sides	Footpath both sides, wide traffic lanes
Local Access Street	18m	7.3m (includes on-street parking)	On-street parking both sides	Footpath both sides
Local Access Street	14m	5.5m (includes on-street parking)	On-street parking on one-side only	Footpath both sides
Local Frontage Road	12m	5.5m (includes on-street parking)	On-street parking on one-side only	Footpath development side. Shared use path (western side) of Melbourne-Lancefield Road.

Road Type	Road Reservation	Proposed Carriageway Width	Parking Provision	Pedestrian and Cyclist Provisions
Laneway Type A	8m	5.5m	None	Shared zone
Laneway Type B	7m	5.5m	None	Shared zone

[1] Based upon Clause 56.06 of the Planning Scheme. vpd denotes vehicles per day.

5.2. Parking Provision

We note that the 7.3m wide carriageway for the local access streets, set within a 18m reservation, throughout the site will be sufficient for parking to readily occur on both sides of the road whilst maintaining a through lane for traffic. Alternatively, simultaneous two-way traffic is possible if parking occurred on only one side of the road.

Overall, we are satisfied with the parking provision that is identified within the subdivision, regardless of whether parking occurs on one or both sides of the road.

5.3. Access for Service and Emergency Vehicles

The carriageway widths nominated above will adequately facilitate relevant service and emergency vehicles and are consistent with typical CFA requirements.

No 'dead-end' roads are proposed within the subdivision layout, other than the laneway at the north-eastern corner of the site (46m long). It is noted that the CFA requires turning provisions at the end of dead-ends for roads which are longer than 60m, which is not applicable for any roads within the development.

It is expected that occupiers of the three lots within the north-western corner of the site would be required to simply walk their bins a short distance to the east and place them in the access street for collection. This sort of arrangement is consistent with typical practice, and we are of the opinion that it is satisfactory. The balance of lots would be able to place bins directly outside of their property for collection.

5.4. Pedestrian and Cyclist Access

Footpaths, or a shared path, are proposed on both sides of all internal roads, other than laneways.

Where dedicated shared paths are not provided cyclists will utilise the proposed local access street carriageways in a shared fashion on the internal road network consistent with typical practice for the classification of streets that are identified. Indeed, a number of key roads

within the site are proposed to be 'slow vehicle zones'³ which will create a more conducive environment for on-street cycling⁴.

The paths discussed above and shown below will provide connections with adjacent land (including for any future developments) and the wider network at a level that is consistent with good current practice and will be appropriate to serve the proposed development.

A plan illustrating cycling provisions throughout the site is shown at Figure 8.



Figure 8: Cycling Network Plan

³ The measures to ensure slow vehicle speeds through these areas would be subject to both detailed design and agreement with Council.

⁴ Within most slow vehicle zones there are also off-road paths also available. The choice to cycle on-street vs off-street will depend on the individual cyclist's preference. We note that an off-road path is not provided within the green street (urban) road section, which has regard to the level of pedestrian activity/movements and street furniture adjacent to this area.

5.5. Public Transport Considerations

As discussed previously, a bus route currently operates along Station Street. Over and above this, a number of roads within the site are bus 'capable', having 3.5m wide traffic lanes, which could accommodate potential extensions of existing or new bus routes.

The provision of these bus capable roads ensures that residents within the subject site are located within a reasonable walking distance of a bus route(s) at a level that is consistent with current best practice objectives.

Furthermore, all dwellings are located within approximately 700m of the Clarkefield Railway Station.

5.6. Traffic Control

T-Intersections identified within the site are appropriately staggered in our opinion; staggered at least 20m intervals (centre to centre). No cross intersections are identified within the subdivision.

Internal street blocks and straight sections of road are measured to be less than 240m. Accordingly, traffic management control(s) are not required internal to the site to control vehicle speeds.

Any specific details of traffic management controls that Council may consider to be necessary can be determined at the detailed functional design approval stage.

6. External Traffic Matters

6.1. Introduction

The Development Plan traffic report considered a more intensive development that included non-residential uses within land parcels that are specified as superlots as part of this application.

As outlined within Section 3 of this report the Development Plan traffic analysis indicated that the traffic impact of the proposal would be acceptable, up to and including the year 2032.

The methodology of the proceeding assessment is generally consistent with that presented within the Development Plan, however, it is noted that a much greater proportion of external vs internal trips are assumed, given that non-residential uses are not proposed as part of this application⁵.

⁵ Whilst not proposed as part of this application we are of the understanding that future application(s) may seek development of these non-residential uses, prior to the full development and occupation of the 353 dwellings proposed as part of this application.

6.2. Traffic Generation

Guidance on traffic generation rates has been sourced from relevant empirical data, the 'RTA (now RMS) Guide to Traffic Generating Developments' as well as a first principles assessment.

It is important to consider not only the trip generation of specific uses but the percentage of internal vs external trips. Specifically, it is only external trips associated with the development which will utilise the Station Street/Melbourne-Lancefield Road intersection. For example, a motorist who may drive from their home within the subject site to the hotel, sporting reserve, train station, neighbours house, etc. is considered to be an internal trip. A trip discount has been applied to account for this internal/external trip split.

On the above basis, a summary of the anticipated traffic generation associated with the subject site is shown within Table 2.

Table 2: Traffic Generation Summary

Peak Period	Size	Rate [1]	IN/OUT %	External Trips (%)	Vehicle Movements per Hour		
					IN	OUT	TOTAL [5]
Weekday AM Peak Hour	353 dwellings	1.0 vph/dwelling	20/80	95%	67	268	335
Weekday PM Peak Hour			70/30		218	117	335

[1] vph denotes vehicles per hour

6.3. Traffic Distribution

The distribution of traffic to/from the proposed subject site, via the Station Street/Melbourne-Lancefield intersection, will be a function of a variety of factors. Such factors include the external road network orientation, passer-by traffic flows, location of employment opportunities for residents as well as the retail/education and associated customer/student catchments.

Based on detailed consideration of these, and other relevant factors, a 20% North/80% South directional distribution has been adopted for both the weekday AM and PM peak hours.

In forming the above view, we note that the majority of external trips, associated with residential uses, are anticipated to occur to/from the south (i.e. towards Sunbury and broader metropolitan Melbourne).

6.4. Existing Conditions

Traffix Group commissioned traffic movement counts at the Melbourne-Lancefield Road / Station Street intersection on Thursday 20 October 2022 between 7am-9am and 4pm-6pm.

Recorded peak hour traffic volumes⁶ for the weekday AM (7am-8am) and PM (4:30pm-5:30pm) peak periods are shown at Figure 9 and Figure 10 respectively.

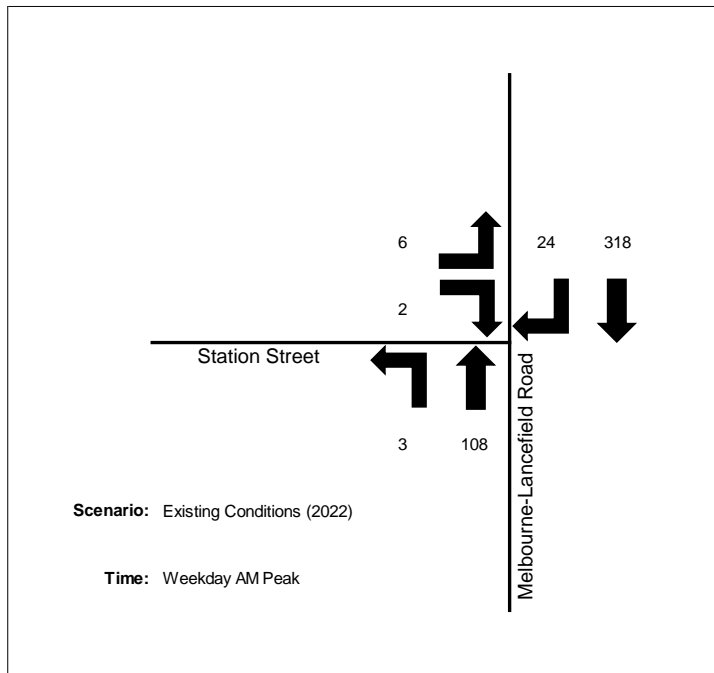


Figure 9: Existing Traffic Volumes – AM Peak Period (2022)

⁶ The existing conditions traffic volumes are consistent with those of the Development Plan traffic assessment.

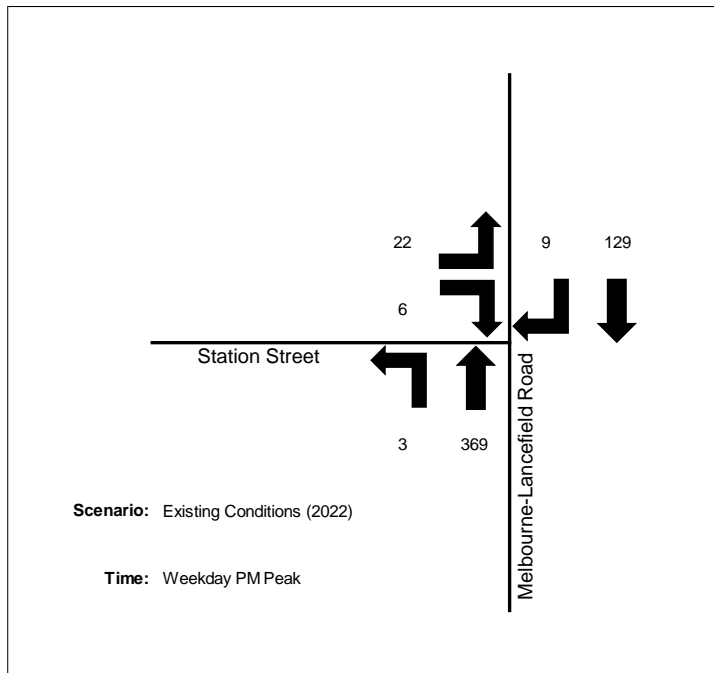


Figure 10: Existing Traffic Volumes - PM Peak Period (2022)

6.5. Base Case

To thoroughly assess the intersection performance it is important to have consideration to a relevant 'Base Case' against which to test the development impact.

A base case examines the performance of the road network without the proposed development at a key point in time. For the purposes of our assessment, we have adopted the year 2032, being a 10 year future scenario, as the base year for assessment.

Traffic Group were provided with traffic surveys of Melbourne-Lancefield Road, at or in the immediate vicinity of Station Street, completed in both 2012 and 2018. By comparing these data sources, a linear traffic growth rate of 3.99% per year was derived across this period.

In order to 'factor up' intersection movements, a linear growth rate of 3.99% per year has been applied to all existing 2022 traffic volumes, for 10 years, in order to reflect a 2032 base case scenario.

Based on this, base case⁷ weekday AM and PM traffic volumes, for the year 2032, are summarised within Figure 11 and Figure 12, respectively.

⁷ The base case traffic volumes are consistent with those of the Development Plan traffic assessment.

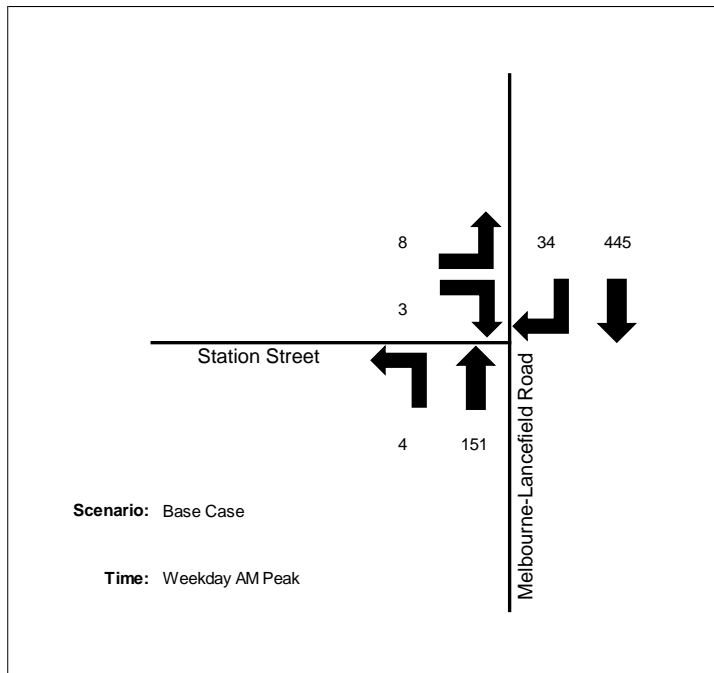


Figure 11: Base Case Traffic Volumes - AM Peak Period (2032)

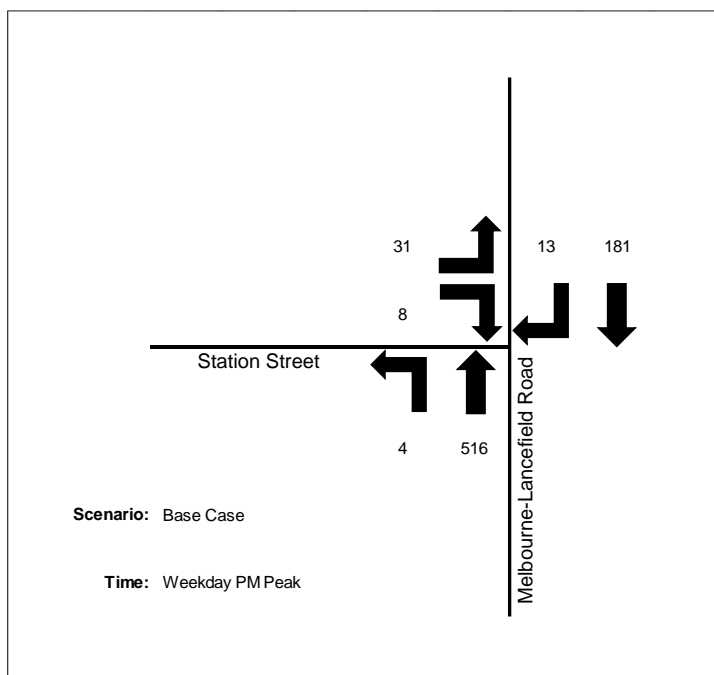


Figure 12: Base Case Traffic Volumes - PM Peak Period (2032)

6.6. Site Generated

Based on the previously outlined assumptions, traffic generation rates and distribution, Figure 13 and Figure 14 have been prepared to illustrate the anticipated site generated traffic volumes during the weekday AM and PM peak periods.

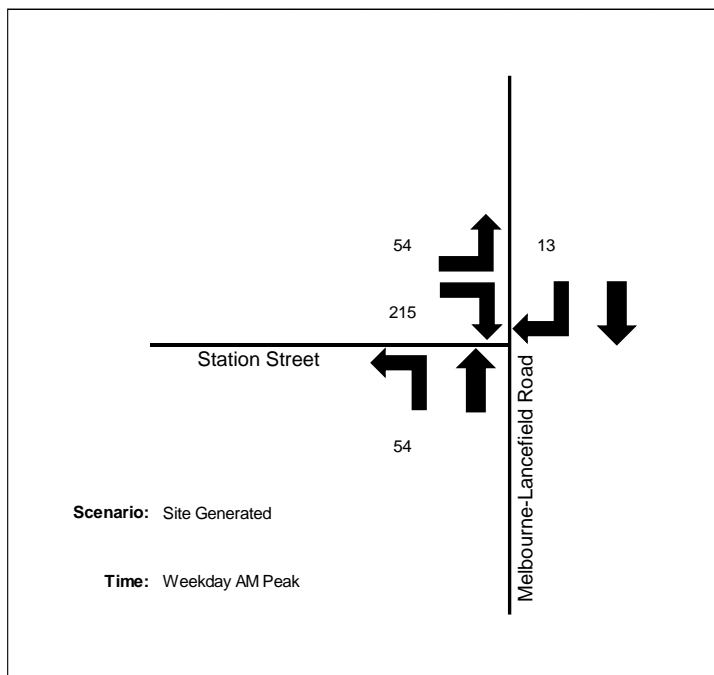


Figure 13: Site Generated Traffic Volumes - AM Peak Period

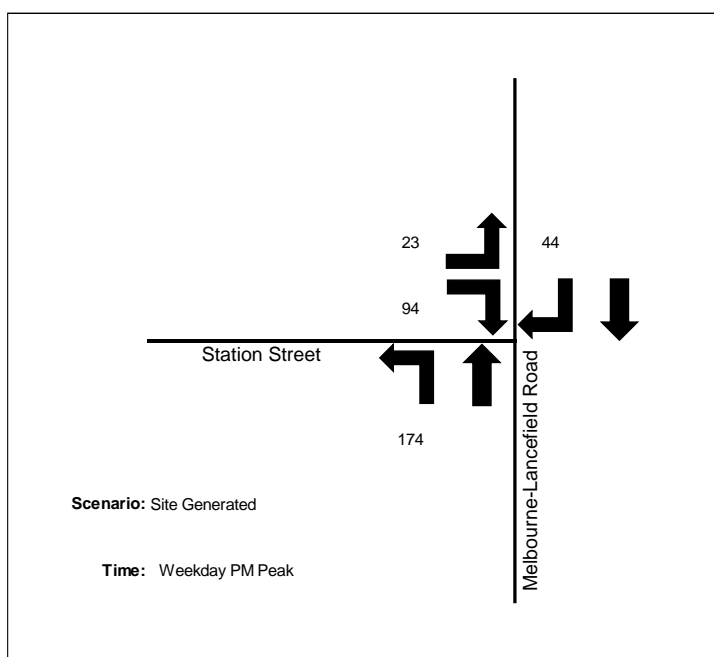


Figure 14: Site Generated Traffic Volumes - PM Peak Period

6.7. Post Development Traffic Volumes

By adding the anticipated site generated traffic volumes to the base case (year 2032) traffic volumes, we can predict the post development traffic volumes (year 2032).

The predicted post development traffic volumes, assuming full development, are presented at Figure 15 and Figure 16.

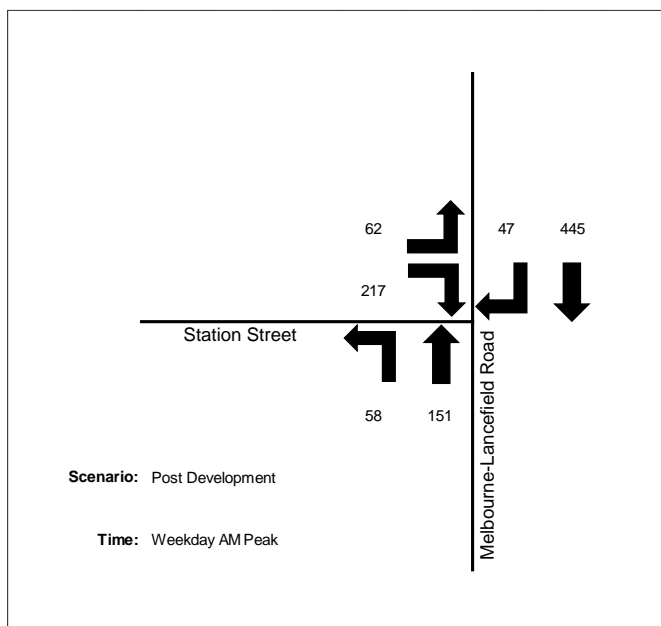


Figure 15: Post Development Traffic Volumes - AM Peak Period (2032)

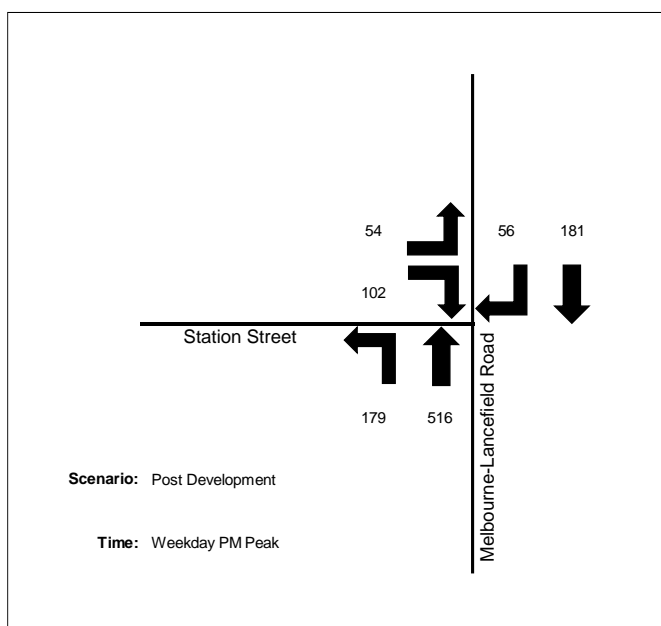


Figure 16: Post Development Traffic Volumes - PM Peak Period (2032)

6.8. Traffic Assessment

We have utilised SIDRA Intersection 8 to undertake an assessment of the Station Street/Melbourne-Lancefield Road intersection.

SIDRA is a computer simulation package which assesses the operating performance of proposed intersections.

A summary of key outputs is as follows:

- **Degree of Saturation (DoS)** – The ratio of traffic volume to maximum capacity for a particular turning movement.
- **Average Delay (Avg. Delay)** – The average delay in seconds for a vehicle making a particular turning movement.
- **95th Percentile Queue (95% Queue)** – The 95th percentile queue length is the length in metres which 95 per cent of all observed cycle queues fall below (or 5% exceed) during the peak analysis period.

The layout of the intersection, as configured in SIDRA, is shown at Figure 17.

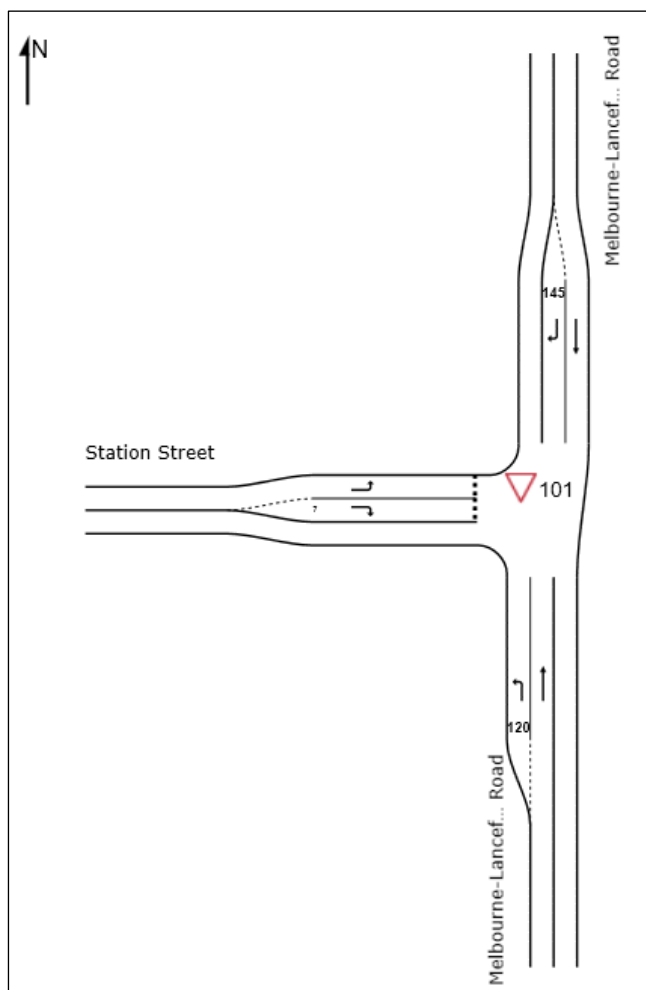


Figure 17: Intersection Layout

Following development of the site it is understood that the existing intersection configuration would be retained until such time as the intersection meets its theoretical capacity.

The theoretical capacity of an intersection is based upon a combination of factors, with the degree of saturation (volume to capacity ratio) commonly used as a measure of this capacity. For un-signalised intersections a DoS of 0.90 is typically considered the theoretical limit with intersection performance disproportionately deteriorating, relative to the addition of traffic volumes, following exceedance of that DoS metric.

The key findings of our SIDRA assessment, based upon both a base case (year 2032) and full development (post development, year 2032) scenario, are summarised in Table 3, with full results provided at Appendix C.

Table 3: SIDRA Movement Summary – Year 2032

Intersection Leg	Base Case			Post Development		
	DoS	Avg. Delay (s)	95% Queue (m)	DoS	Avg. Delay (s)	95% Queue (m)
AM Peak Hour						
Melbourne Lancefield Road (South)	0.09	0	0	0.09	2	0
Melbourne Lancefield Road (North)	0.26	1	1	0.26	1	1
Station Street (West)	0.01	8	0	0.60	16	23
PM Peak Hour						
Melbourne Lancefield Road (South)	0.30	0	0	0.30	2	0
Melbourne Lancefield Road (North)	0.10	1	0	0.11	3	2
Station Street (West)	0.05	10	1	0.38	17	11

As shown within Table 3, the intersection is anticipated to operate within acceptable limits in the year 2032, with minimal queues and delays on approaches, following full development as per the development proposal.

6.9. Comparison to Development Plan

As outlined previously, the Development Plan concluded the following:

"Having undertaken a detailed traffic engineering assessment of the Clarkefield Development Plan, we are of the opinion that the existing Melbourne-Lancefield Road/Station Street intersection will adequately accommodate the traffic predicted to be generated at peak times following full development of the Development Plan area, up to and including the year 2032."

The findings of the development proposal, as outlined within this report, are consistent with the abovementioned findings of the Development Plan traffic assessment. That is, the traffic impact of the proposed residential subdivision and for the development of lots under 300sq.m for a dwelling, is consistent with the Development Plan.

7. Clause 56.06 Assessment

An assessment of the development proposal against Clause 56.06 of the Macedon Ranges Planning Scheme is presented within Table 4.

Table 4: Clause 56.06 Assessment

Standards	Response
Standard C14 (Integrated Mobility)	Our report provides satisfactory details and layout plans regarding the walking, cycling, public transport and neighbourhood street network.
Standard C15 (Walking and Cycling Network)	<p>The walking and cycling network has been designed in accordance with relevant guidelines, standards and best practice. The network seeks to connect to the existing surrounding network (where applicable). Of note the site provides a new shared use path along the site's frontage to Melbourne-Lancefield Road.</p> <p>Footpaths or shared paths are provided on both sides of all internal roads (excluding laneways) and the development of the site allows for walkable distances to the Clarkefield town centre, community facilities, public transport stops and public open spaces.</p>
Standard C16 (Public Transport)	<p>As discussed previously, a bus route currently operates along Station Street. Over and above this, a number of roads within the site are bus 'capable', having 3.5m wide traffic lanes, which could accommodate potential extensions of existing or new bus routes.</p> <p>The provision of these bus capable roads ensures that residents within the subject site are located within a reasonable walking distance of an existing/potential future bus route(s) at a level that is consistent with current best practice objectives.</p> <p>Furthermore, all dwellings are located within approximately 700m of the Clarkefield Railway Station.</p>
Standard C17 (Neighbourhood Street Network)	<p>In our view the neighbourhood street network has been designed in accordance with the Standard and best practice noting the following:</p> <ul style="list-style-type: none"> - The arterial road intersection performance (Station Street / Melbourne-Lancefield Road) has been assessed. - All dead-end roads are less than 60m in length, in accordance with CFA requirements.

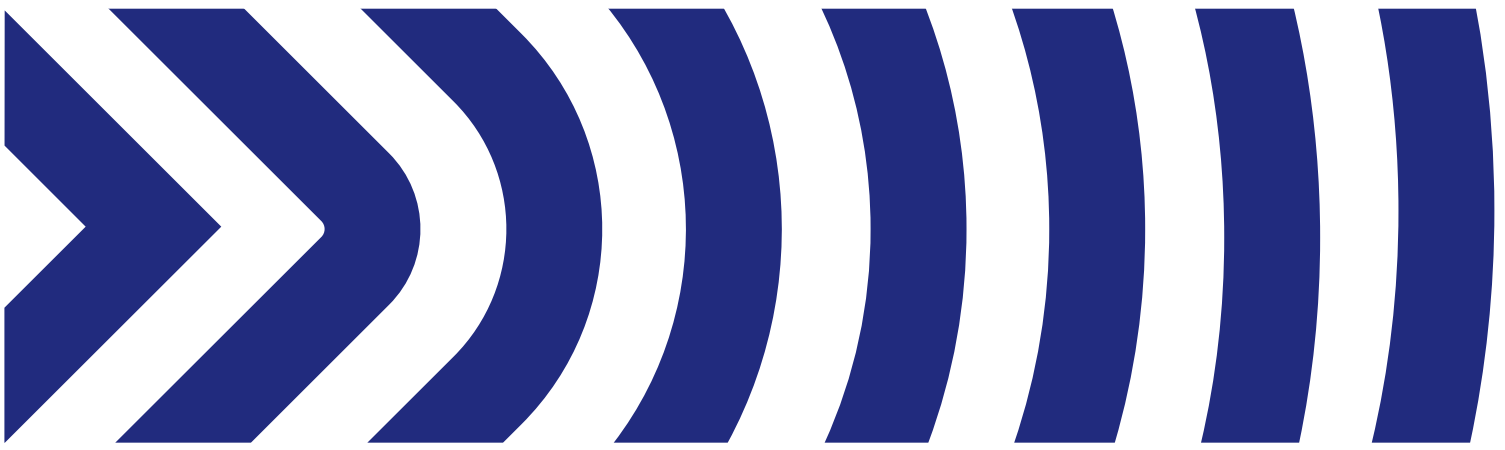
Standards	Response
	<ul style="list-style-type: none"> - Internal street blocks and straight sections of road are measured to be less than 240m. Accordingly, traffic management control(s) are not required internal to the site, in our view, to control vehicle speeds. - The internal connector street (north-south alignment) is roughly situated at the midpoint of Melbourne-Lancefield Road and the railway line.
Standard C18 (Walking and Cycling Network Detail)	The requirements of Table C1 of Clause 56.06 of the Planning Scheme are met. The quality and durability of the road and path network can be mandated by way of appropriately worded permit conditions.
Standard C19 (Public Transport Network Detail)	The detailed design requirements of the Standard can be mandated by way of appropriately worded permit conditions.
Standard C20 (Neighbourhood Street Network Detail)	The requirements of Table C1 of Clause 56.06 of the Planning Scheme are met. The street block lengths/widths are in accordance with Standard C20. Minimum intersection splays, other than at laneway intersections, are provided in accordance with Standard C20. The detailed design requirements of the Standard can be mandated by way of appropriately worded permit conditions.
Standard C21 (Lot Access)	No property/lot access is sought via Melbourne-Lancefield Road. All lots with a frontage less than 7.5m, other than three lots, have vehicle access via laneways. We note that these three lots derive access from a 'side' Local Access Street (14m); consistent with Standard C21 requirements.

On the basis of the assessment presented within Table 4 we are satisfied that the development complies with the relevant traffic engineering requirements of Clause 56.06 of the Macedon Ranges Planning Scheme, noting that detailed design matters (e.g. road construction details) can be mandated by way of appropriately worded permit conditions.

8. Conclusions

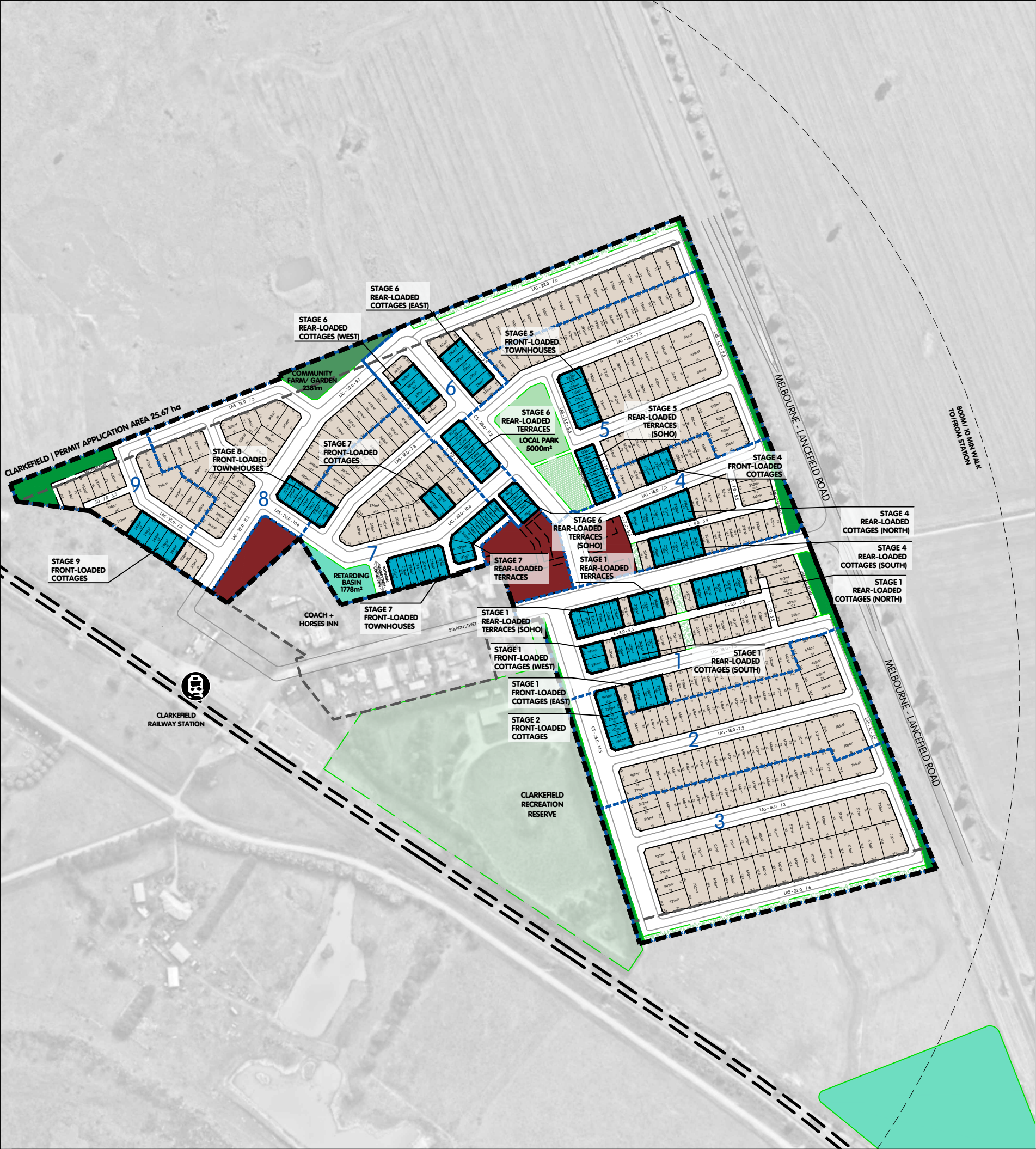
Having visited the site, perused relevant documents and plans, and undertaken other investigations and assessments, we are of the opinion that:

- a) The proposed road reservations are consistent with what is required to accommodate appropriate carriageways, paths, services, etc., in accordance with relevant standards and current practice,
- b) Public transport, on-street parking, pedestrian and cycle provisions are identified in a manner that is consistent with relevant standards and current practice,
- c) All relevant vehicles will be able to adequately access the site including service and emergency vehicles,
- d) Any traffic control measures that may be considered necessary by Council can be determined as part of the future detailed design stage of the development,
- e) The existing Melbourne-Lancefield Road/Station Street intersection will adequately accommodate the traffic predicted to be generated at peak times following full development of the development proposal, up to and including the year 2032,
- f) The traffic impact of the development proposal is consistent with the Development Plan assessment,
- g) Appropriate access connections with the external road network are to be provided,
- h) Development complies with the relevant traffic engineering requirements of Clause 56.06 of the Macedon Ranges Planning Scheme, noting that detailed design matters (e.g. road construction details) can be mandated by way of appropriately worded permit conditions, and
- i) There are no traffic engineering reasons why a permit should not be granted for the proposed residential subdivision and for the development of lots under 300sq.m for a dwelling; at Clarkefield.



Appendix A

Proposed Design Drawings



LEGEND

- PERMIT APPLICATION AREA
- DEVELOPMENT PLAN OVERLAY 10 BOUNDARY
- STAGE BOUNDARY
- PUBLIC OPEN SPACE LOCAL PARK
- PEDESTRIAN RESERVE/LINKS
- PUBLIC OPEN SPACE COMMUNITY FARM/ GARDEN
- PUBLIC OPEN SPACE WETLAND/ RETARDING BASIN
- PUBLIC OPEN SPACE LANDSCAPE RESERVE
- NET SUBDIVISIBLE AREA - RESIDENTIAL (LOT SIZE 300M² AND GREATER)
- NET SUBDIVISIBLE AREA - RESIDENTIAL (LOT SIZE LESS THAN 300M²)
- NET SUBDIVISIBLE AREA - MIXED USE

YIELD SUMMARY
RESIDENTIAL (LOT SIZE 300M² AND GREATER): 242
RESIDENTIAL (LOT SIZE LESS THAN 300M²): 111
TOTAL: 353

REFERENCE PLAN - LOTS LESS THAN 300M²
Clarkefield
Macedon Ranges Shire

HATCH | RobertsDay



REF NO. **APD CLA** DRAW NO. **RD1411** REV. **B**

NOTES:
Kerb and path details are indicative only, subject to detailed engineering design/ Functional Layout Plan approval.
Street Typology Key: Reserve Width (m) - Pavement Width (m).

AERIAL PHOTOGRAPHY
SOURCE: Nearmap
YYMMDD: 200807
SURVEY INFORMATION
SOURCE: Spire
YYMMDD: 200416
DWG REF: 304782FS00-ACAD

N

1:4000 SIZE A3

B	PER RD1403G	220616	MG	EP
A	FIRST ISSUE	220420	MG	EP
REV	DESCRIPTION	YYMMDD	DRAWN	APPRD

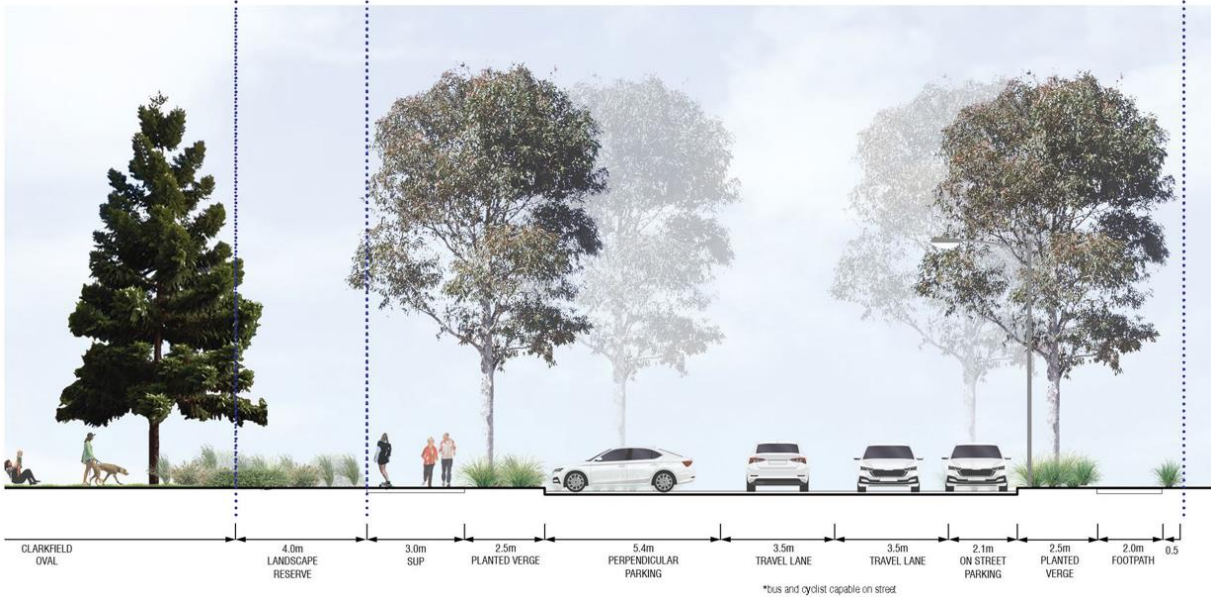


Appendix B

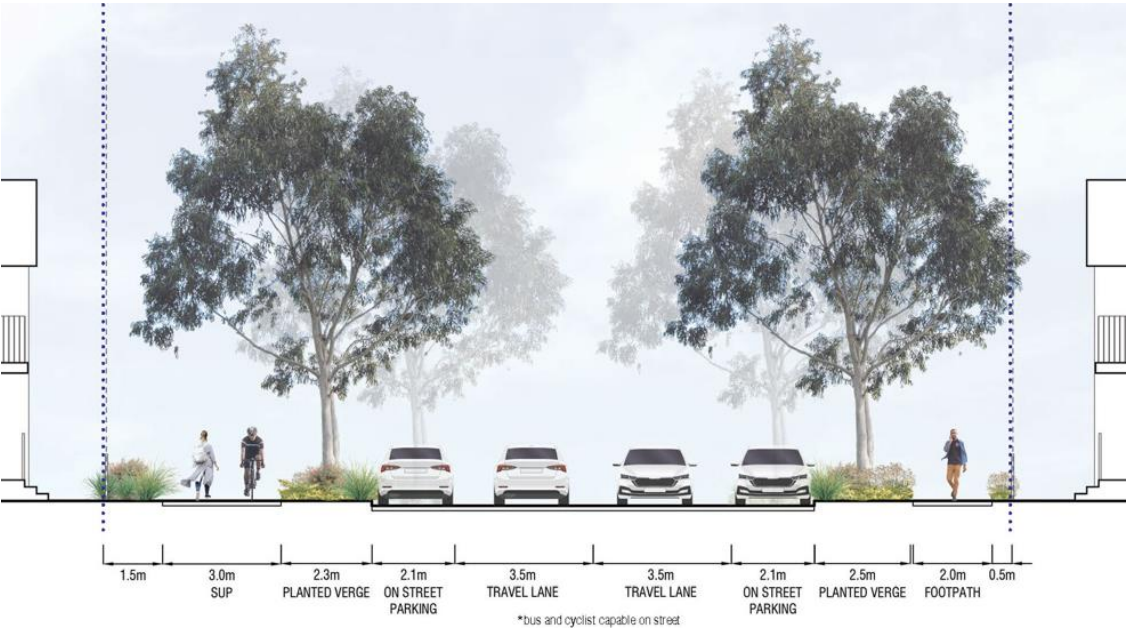
Road Cross Sections



Connector Steet (25m)

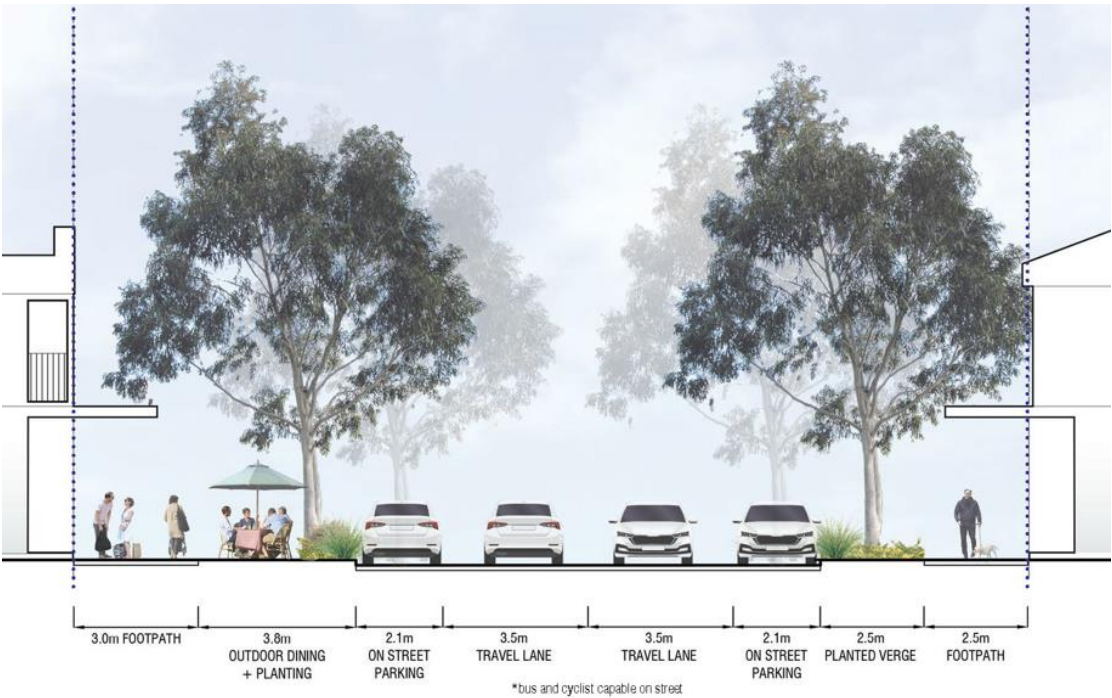


Green Street (Residential) (23m)

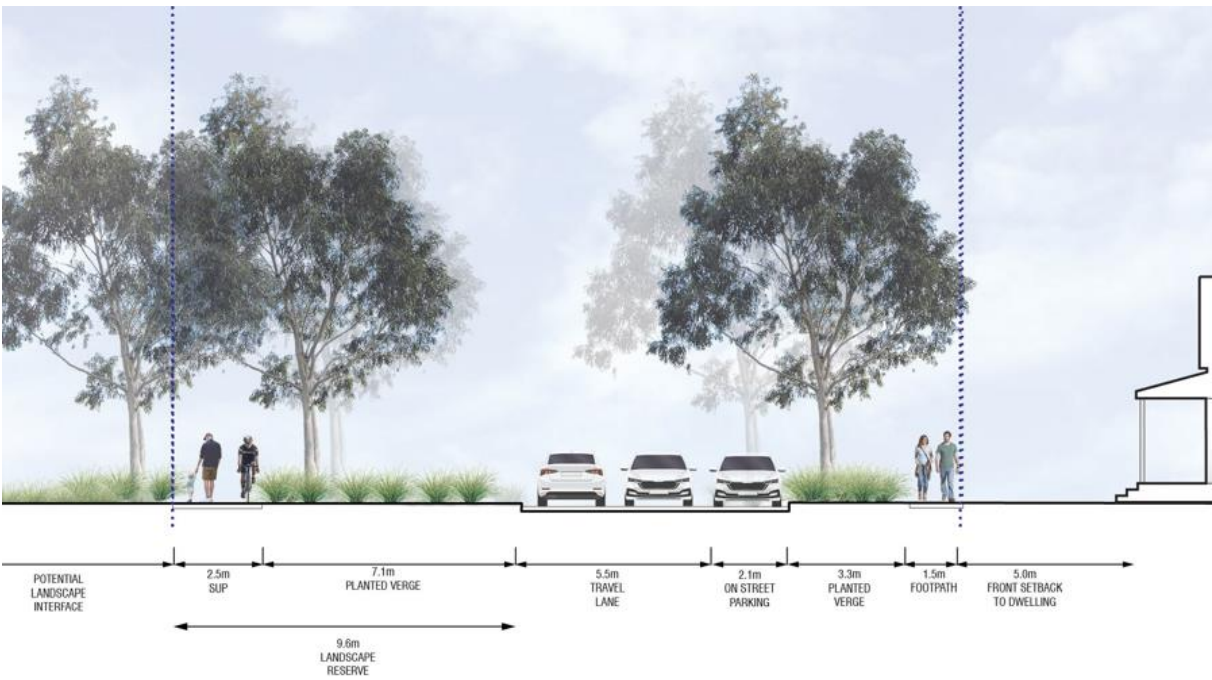




Green Street (Urban) (23m)

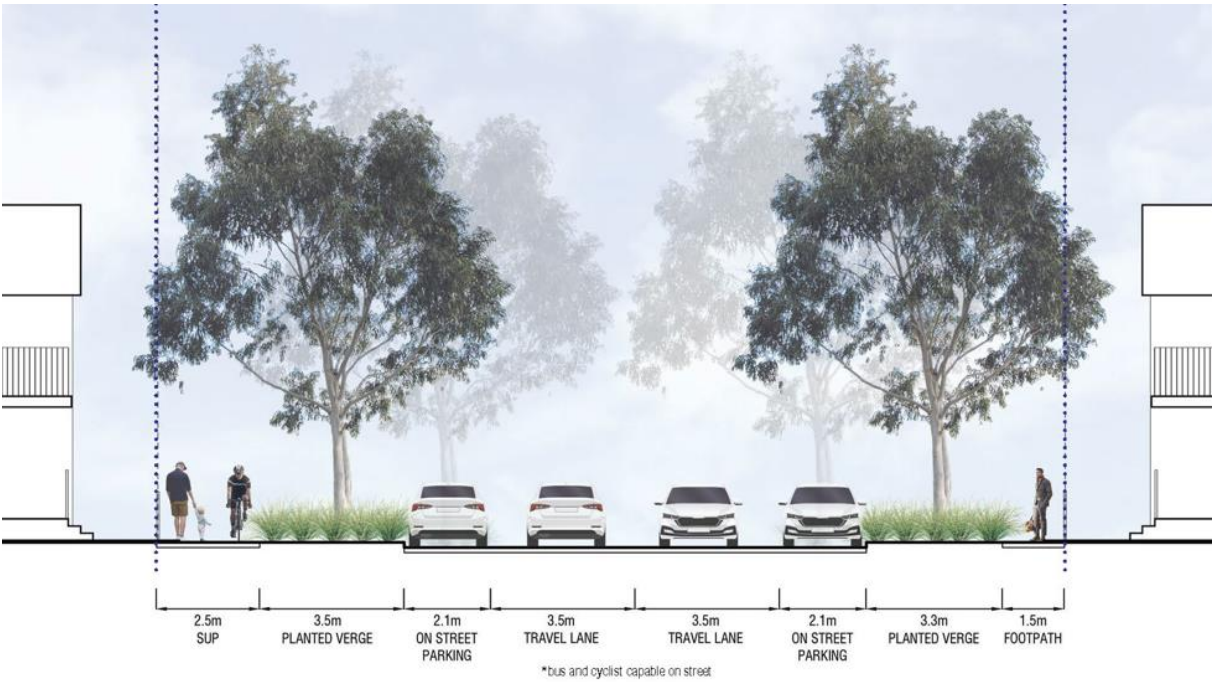


Local Access Street Type A (22m)

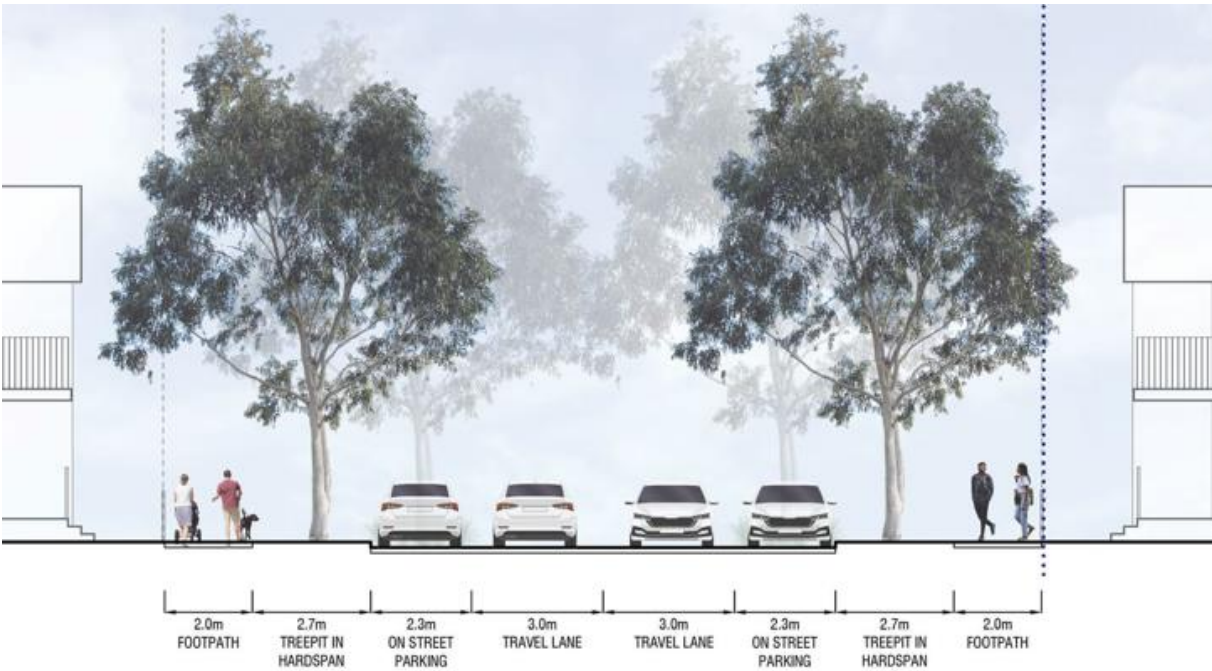




Local Access Street Type B (22m)

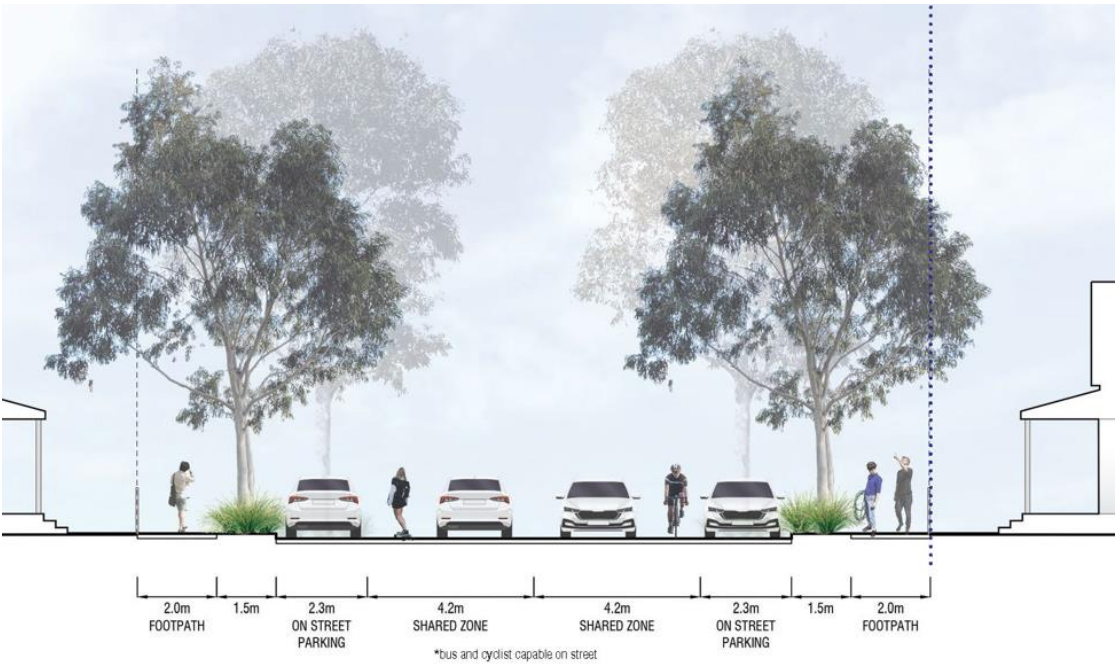


Local Access Street (20m)

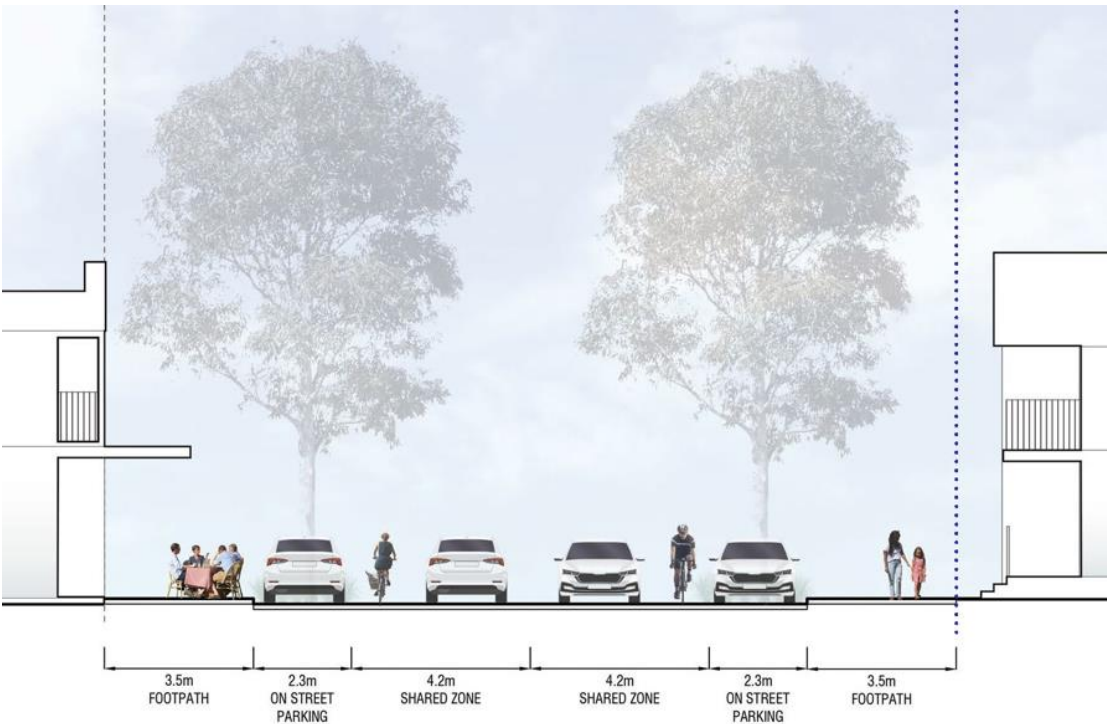




Station Street (East) (20m)

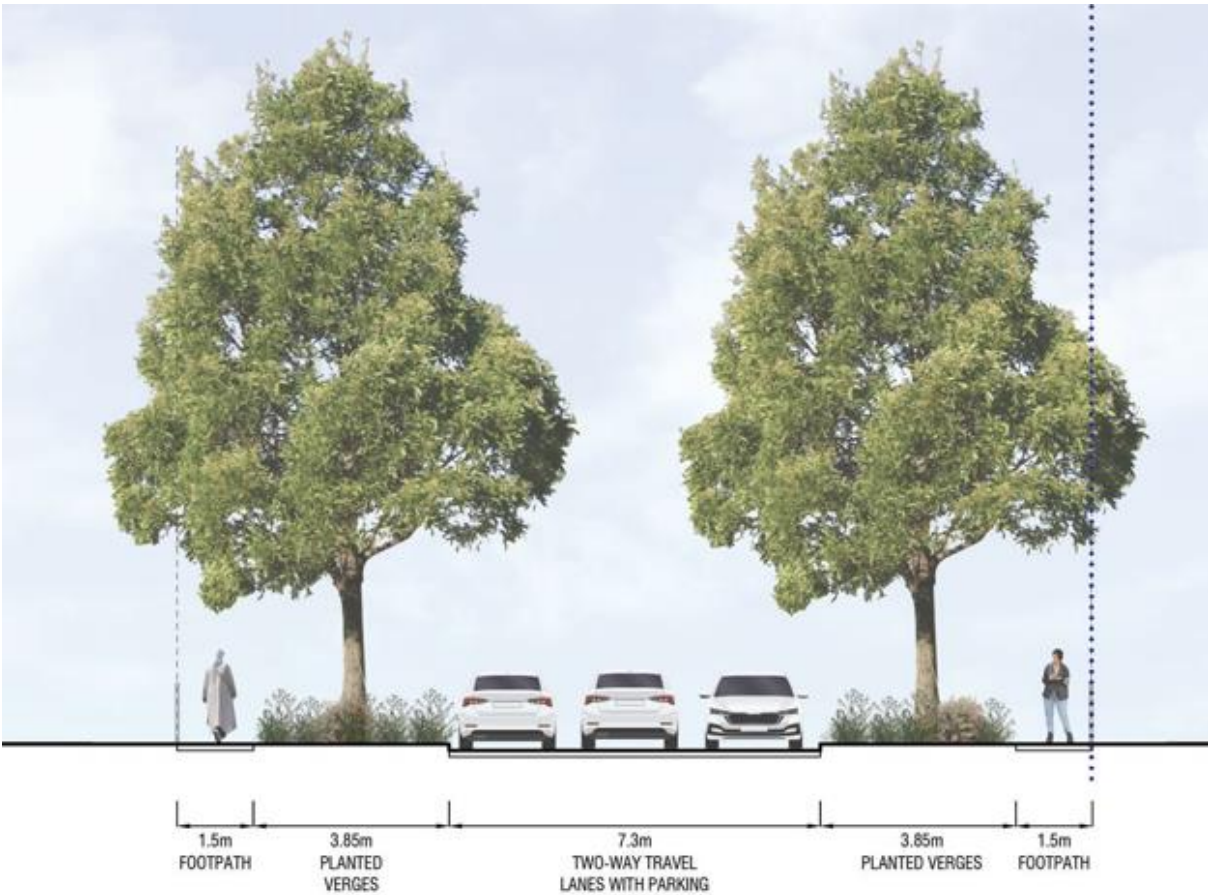


Station Street (West) (20m)

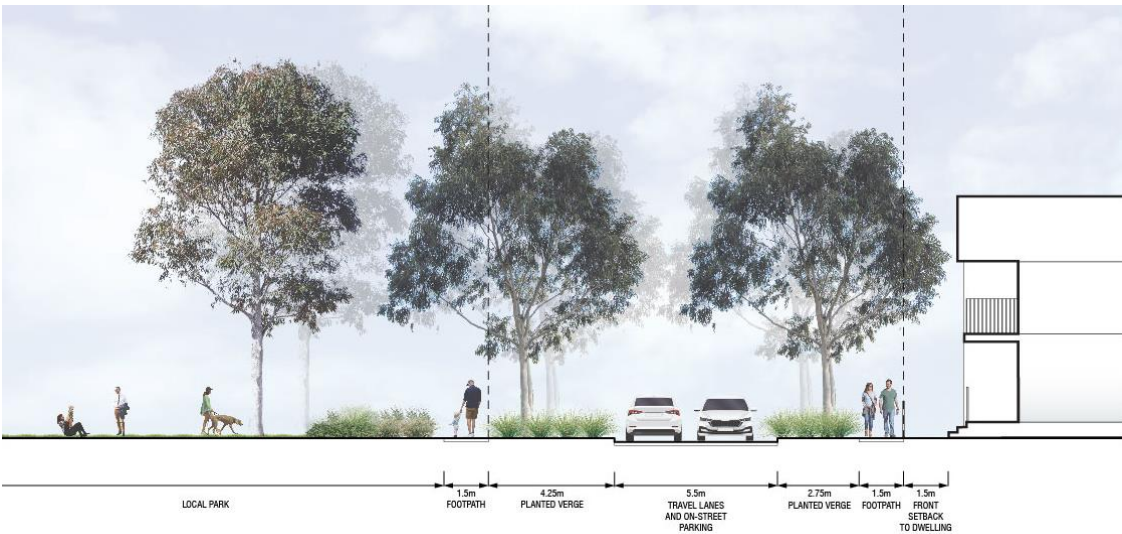




Local Access Street (18m)

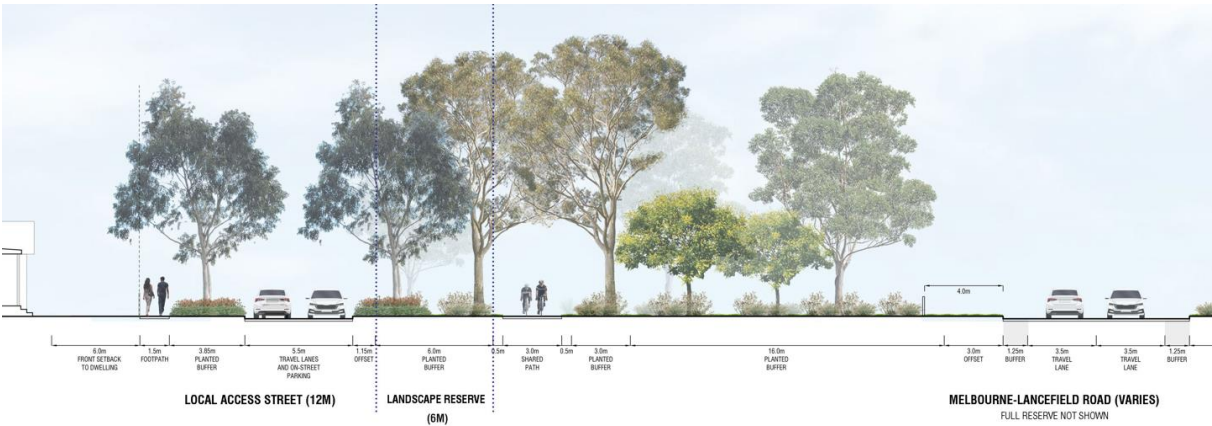


Local Access Street (14m)

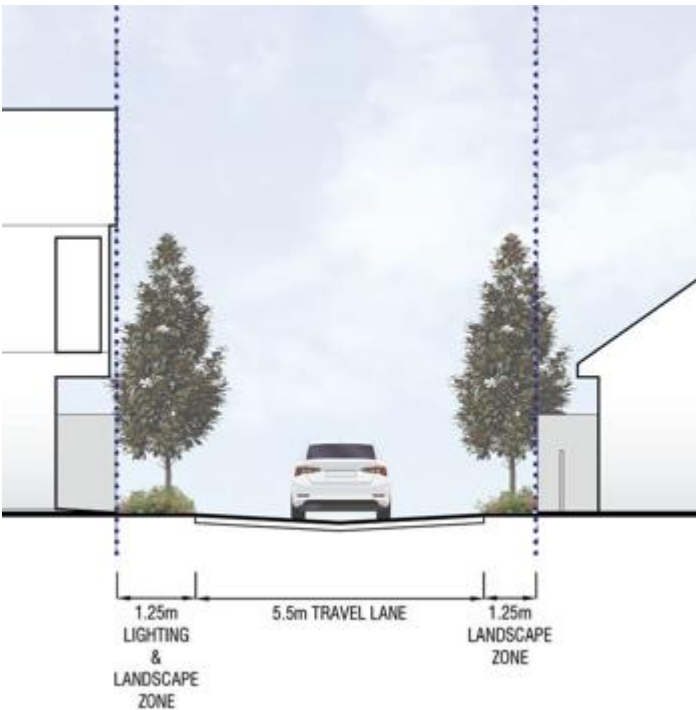




Local Frontage Road (12m)

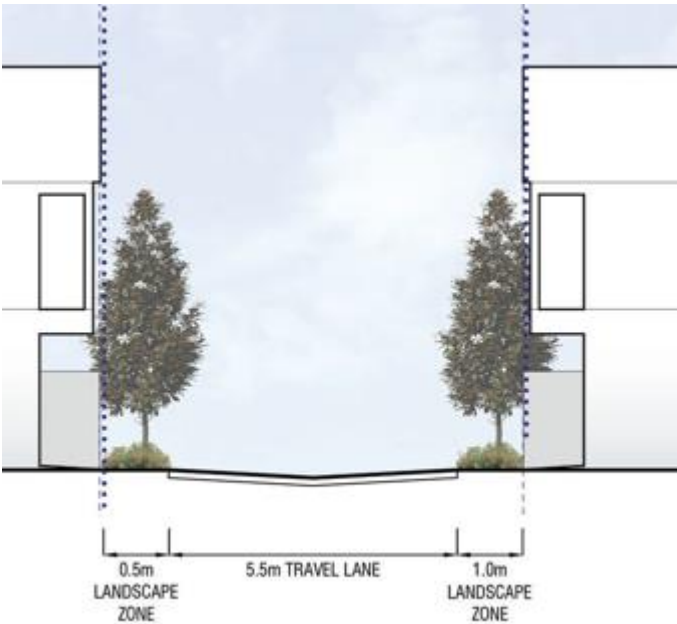


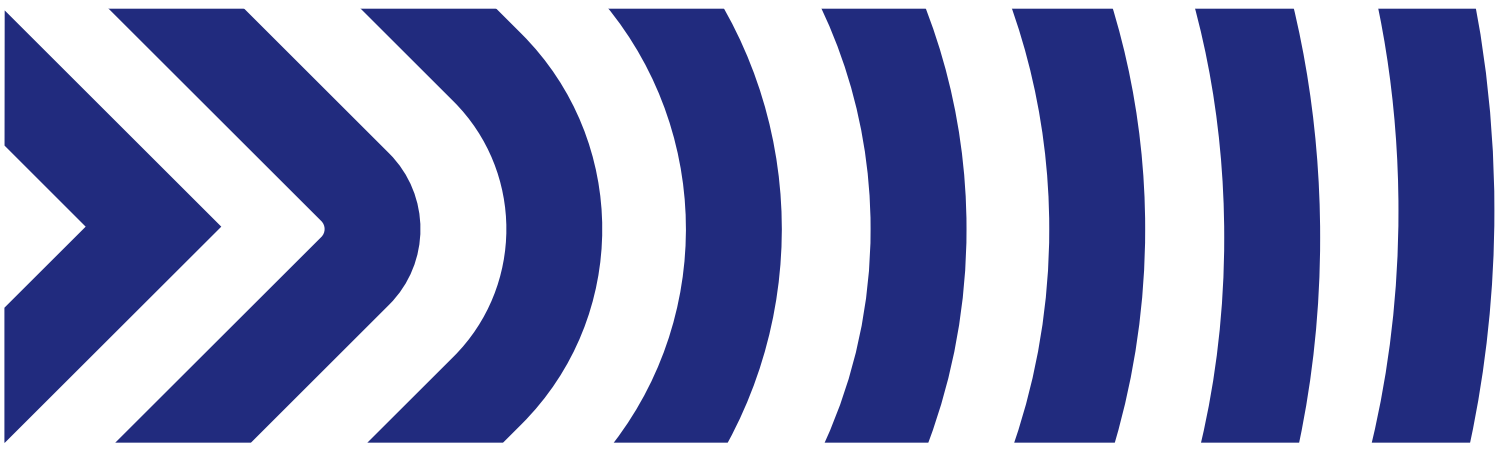
Laneway Type A (8m)





Laneway Type B (7m)





Appendix C

SIDRA Intersection Results

MOVEMENT SUMMARY

Site: 101 [Base Case (2032) - AM Peak]

New Site
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Melbourne-Lancefield Road												
1	L2	4	2.0	0.002	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	73.8
2	T1	159	10.0	0.087	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		163	9.8	0.087	0.2	NA	0.0	0.0	0.00	0.02	0.00	99.0
North: Melbourne-Lancefield Road												
8	T1	468	10.0	0.258	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
9	R2	36	2.0	0.023	8.2	LOS A	0.1	0.7	0.27	0.60	0.27	61.5
Approach		504	9.4	0.258	0.6	NA	0.1	0.7	0.02	0.04	0.02	95.6
West: Station Street												
10	L2	8	2.0	0.007	6.3	LOS A	0.0	0.2	0.30	0.53	0.30	60.0
12	R2	3	2.0	0.008	11.6	LOS B	0.0	0.2	0.60	0.72	0.60	55.6
Approach		12	2.0	0.008	7.8	LOS A	0.0	0.2	0.38	0.58	0.38	58.8
All Vehicles		679	9.4	0.258	0.6	NA	0.1	0.7	0.02	0.05	0.02	95.4

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Wednesday, 23 November 2022 11:58:16 AM

Project: P:\Synergy\Projects\GRP2\GRP28661\07-Analysis\SIDRA\221110sid-Residential Subdivision.sip8

MOVEMENT SUMMARY

Site: 101 [Base Case (2032) - PM Peak]

New Site
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Melbourne-Lancefield Road												
1	L2	4	2.0	0.002	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	73.8
2	T1	543	10.0	0.297	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
Approach		547	9.9	0.297	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.5
North: Melbourne-Lancefield Road												
8	T1	191	10.0	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
9	R2	14	2.0	0.014	10.0	LOS A	0.1	0.4	0.53	0.68	0.53	60.3
Approach		204	9.5	0.104	0.7	NA	0.1	0.4	0.04	0.05	0.04	95.7
West: Station Street												
10	L2	33	2.0	0.050	9.7	LOS A	0.2	1.4	0.59	0.74	0.59	57.3
12	R2	8	2.0	0.024	13.3	LOS B	0.1	0.5	0.66	0.83	0.66	54.1
Approach		41	2.0	0.050	10.4	LOS B	0.2	1.4	0.60	0.76	0.60	56.7
All Vehicles		793	9.4	0.297	0.8	NA	0.2	1.4	0.04	0.05	0.04	94.8

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Wednesday, 23 November 2022 11:58:16 AM

Project: P:\Synergy\Projects\GRP2\GRP28661\07-Analysis\SIDRA\221110sid-Residential Subdivision.sip8

MOVEMENT SUMMARY

 **Site: 101 [Post Development - AM Peak - 2032]**

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Melbourne-Lancefield Road												
1	L2	61	2.0	0.033	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	73.8
2	T1	159	10.0	0.087	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		220	7.8	0.087	2.2	NA	0.0	0.0	0.00	0.18	0.00	91.0
North: Melbourne-Lancefield Road												
8	T1	468	10.0	0.257	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
9	R2	49	2.0	0.034	8.4	LOS A	0.2	1.1	0.32	0.62	0.32	61.3
Approach		518	9.2	0.257	0.8	NA	0.2	1.1	0.03	0.06	0.03	94.2
West: Station Street												
10	L2	65	2.0	0.055	6.4	LOS A	0.2	1.8	0.31	0.56	0.31	60.0
12	R2	228	2.0	0.600	18.9	LOS C	3.3	23.4	0.81	1.09	1.39	50.0
Approach		294	2.0	0.600	16.2	LOS C	3.3	23.4	0.70	0.97	1.15	51.9
All Vehicles		1032	6.9	0.600	5.5	NA	3.3	23.4	0.21	0.34	0.34	76.0

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 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Wednesday, 23 November 2022 12:04:04 PM

Project: P:\Synergy\Projects\GRP2\GRP28661\07-Analysis\SIDRA\221110sid-Residential Subdivision.sip8

MOVEMENT SUMMARY

▽ Site: 101 [Post Development - PM Peak - 2032]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Melbourne-Lancefield Road												
1	L2	188	2.0	0.103	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	73.7
2	T1	543	10.0	0.297	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
Approach		732	7.9	0.297	2.1	NA	0.0	0.0	0.00	0.17	0.00	91.5
North: Melbourne-Lancefield Road												
8	T1	191	10.0	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
9	R2	59	2.0	0.074	11.3	LOS B	0.3	2.1	0.60	0.81	0.60	59.0
Approach		249	8.1	0.105	2.7	NA	0.3	2.1	0.14	0.19	0.14	85.9
West: Station Street												
10	L2	57	2.0	0.086	9.8	LOS A	0.3	2.5	0.60	0.77	0.60	57.2
12	R2	107	2.0	0.384	20.1	LOS C	1.5	10.6	0.81	0.99	1.05	49.2
Approach		164	2.0	0.384	16.5	LOS C	1.5	10.6	0.74	0.91	0.89	51.7
All Vehicles		1145	7.1	0.384	4.3	NA	1.5	10.6	0.14	0.28	0.16	81.3

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 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TRAFFIX GROUP PTY LTD | Processed: Wednesday, 23 November 2022 12:04:04 PM

Project: P:\Synergy\Projects\GRP2\GRP28661\07-Analysis\SIDRA\221110sid-Residential Subdivision.sip8