

## How to Read This Document

The following document is a Background Document that was prepared to inform the preparation of the draft Manuka Road Development Plan (the Plan). The document was prepared at a particular point in time prior to the community consultation and may include information that is not represented in the Plan or may conflict with the Plan. Noting this, the background documents have still been deemed suitable to be placed on consultation to support the Plan.

Some general inconsistencies with the Traffic Impact Assessment March 2022 (the Assessment) when compared to the Plan, include that the Assessment:

- Shows the Clover Cottage heritage place as Future Residential but the Plan discourages residential development in this heritage location.
- Excludes the rear of the Clover Cottage allotment for future residential development but the rear of the allotment outside of the heritage place is to be used for residential purposes in the Plan. This may have a minor impact on future traffic.
- Shows early draft road hierarchy and general Plan details represented in Figure 9, Table 2 and Figure 17 that do not match the Plan put out for consultation. Where this occurs, the Figures and Tables should be considered as early draft concepts.

It is intended that all Background Documents are to be updated post community consultation and prior to Council Adoption of the Plan. These updated documents will be made available for public access once completed.

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# Traffix Group

## Traffic Impact Assessment

Proposed Development Plan  
42-80 Manuka Road, Berwick

Prepared for  
Veris

March 2022

G27725R-01C

## Document Control

**Our Reference: G27725R-01C**

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A	Draft	30/07/21	C Blair	W de Waard
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C	Amended Development Plan	31/03/22	S Nguyen	W de Waard

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# 1. Introduction

Traffix Group has been engaged by Veris to prepare a traffic impact assessment report for the Development Plan at 42-80 Manuka Road, Berwick.

This report (G27725R-01C) responds to the requirements under DPO24 of the Casey Planning Scheme for the preparation of a traffic impact assessment and is based on the Development Plan DPO24, Version B (23.03.2022) which is attached at Appendix A of this report.

# 2. DPO24

DPO24 of the Casey Planning Scheme covers land to the east side of Manuka Road, north of Allan Street. It requires a development plan to be prepared that includes a number of requirements, including a traffic impact assessment which must include the following items:

- *A detailed assessment of the expected traffic generation and traffic impacts associated with the development on the internal and external road network and any recommended works or measures within and external to the site,*
- *An internal road layout and external road access,*
- *Any recommendations of an independent traffic safety audit,*
- *Details of road widths to ensure that all streets are designed to allow for service and emergency vehicles to appropriately manoeuvre,*
- *Typical cross sections of internal roads indicating provision for pedestrians, tree planting and car parking,*
- *An internal perimeter road along the northern and eastern boundaries, and an internal loop along the western boundary with appropriate reserves for landscaping,*
- *A cross section of the perimeter road to allow for appropriate parallel or indented parking adjacent to the public open space,*
- *The intersection treatment at Manuka Road, having regard to access to the school and community facilities on the western side of Manuka Road,*
- *The intersection treatment at Allan Street/Manuka Road,*
- *The upgrade of Allan Street to urban standards, to the satisfaction of the responsible authority,*
- *The location of all pedestrian crossings on Manuka Road and Allan Street,*
- *The proposed internal cycle and pedestrian path network and connection to the Casey Trail Network (shared user path and equestrian trails), including public access through the site, and*
- *Identification of visitor car parking within the proposed street network.*

### 3. Existing Conditions

#### 3.1. Development Plan Area

The development plan area is located on the east side of Manuka Road, north of Allan Street. The development plan area consists of four (4) parcels of land that are largely used for farming with the exception of 'Clover Cottage' (former restaurant). The eastern boundary of the development plan area abuts the Melbourne Water Pipe Track.

A locality plan and aerial photograph of the development plan area are provided at Figure 1 and Figure 2 below.

Key uses surrounding the development plan area include Berwick Secondary College and Edwin Flack Reserve with the remaining land uses primarily consisting of residential.

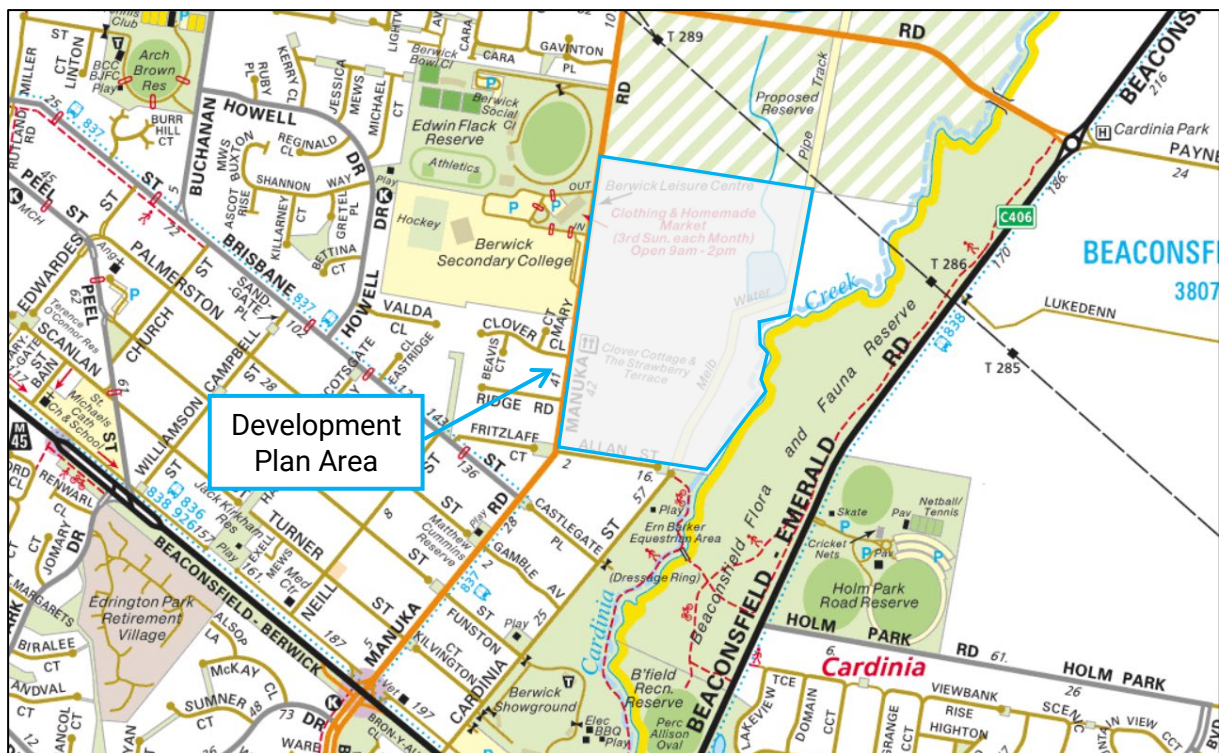


Figure 1: Locality Plan

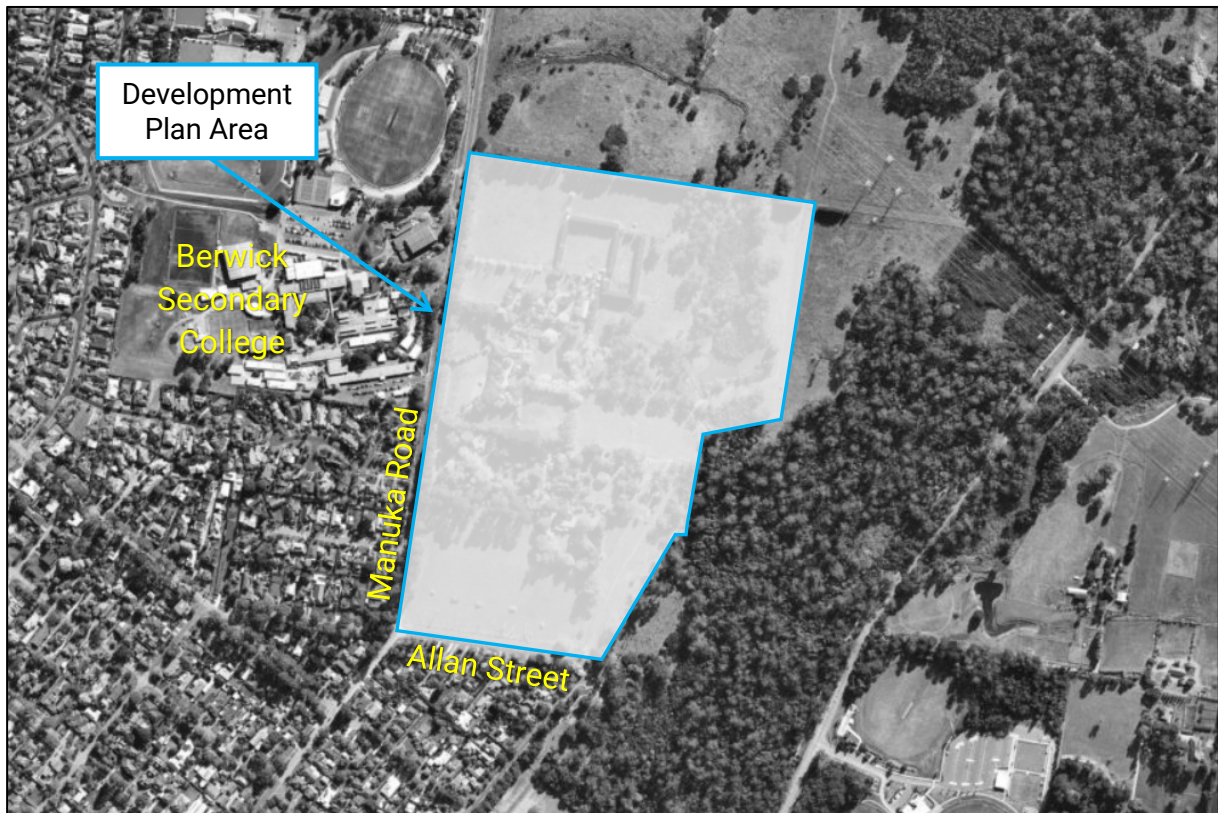


Figure 2: Aerial Photograph

### 3.2. Road Network

**Manuka Road** is classified as a 'Trunk Collector' road under the Casey Public Road Register and generally extends north-south from Princes Highway in the south to Inglis Road in the north. In the vicinity of the development plan area Manuka Road provides for a lane of traffic in each direction with a carriageway width of approximately 10m in the vicinity of Allan Street (kerb and channel both sides of the road) and approximately 6m in the vicinity of the Berwick Secondary College (plus gravel verges).

The road reserve width in the vicinity of the development plan area is approximately 20m wide. Manuka Road has a 60km/h speed limit in the vicinity of the development plan area with a reduction to 40km/h during school periods adjacent to the northern boundary of the development plan area.

**Allan Street** is classified as a 'Local' road under the Casey Public Roads Register and extends east-west from Manuka Road to a dead end in the east. In the vicinity of the development plan area Allan Street provides an unconstructed road (gravel) with a carriageway width of approximately 6m. The road reserve width in the vicinity of the development plan area is approximately 30m wide. Allan Street is subject to the default urban speed limit of 50km/h.



Photographs of the road network surrounding the development plan area are provide in Figure 3 to Figure 6.



*Figure 3: Manuka Road - View North*



*Figure 4: Manuka Road - View South*



*Figure 5: Allan Street - View West*



*Figure 6: Allan Street - View East*

### 3.3. Traffic Volumes

#### 3.3.1. Peak Hour Traffic Volumes

Turning movement counts were undertaken at the intersection of Manuka Road and Allan Street and the intersections of Manuka Road and the school entrance and exit. These counts were conducted on Thursday, 24<sup>th</sup> June 2021 from 7:00am-9:00am and 3:00pm-6:00pm.

The results of the turning movement counts are detailed at Figure 7 below.

The AM peak hour occurred from 8:00am-9:00am and the PM peak hour occurred from 3:00pm-4:00pm.

A full copy of the turning movement count results is provided at Appendix B.

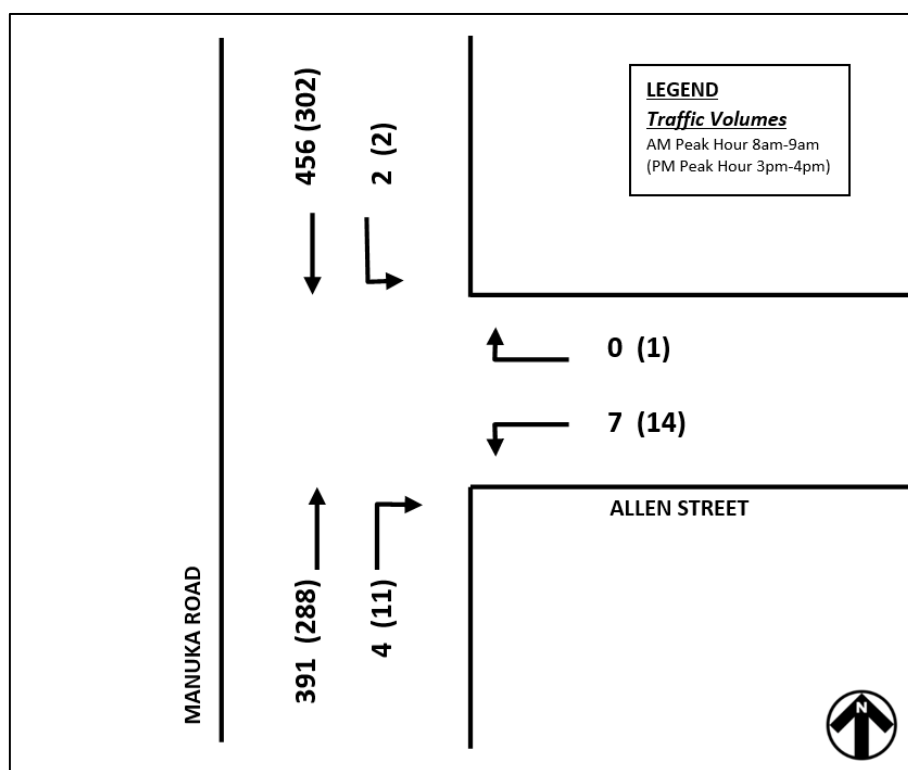


Figure 7: Manuka Road / Allen Street - Existing

### 3.3.2. Daily Traffic Volumes

Seven-day automatic traffic count were undertaken on Manuka Road and Allen Street in the vicinity of the development plan area.

The counts were conducted between 19<sup>th</sup> June and 26<sup>th</sup> June 2021. Table 1 below summarises the key traffic volumes recorded from the automatic tube count, while a full summary of the results is provided in Appendix C.

Table 1: Automatic Tube Counts (June 2021)

Location	24 Hour Weekday Average Volumes			AM Peak Hour Weekday Average			PM Peak Hour Weekday Average		
	N/E	S/W	Total	N/E	S/W	Total	N/E	S/W	Total
<b>Manuka Road</b> North of Clover Lane	1,583	1,464	3,047	369	316	685	224	247	472
<b>Allan Street</b> East of Manuka Road	55	52	107	4	4	8	7	6	13

The development plan area is serviced by a public bus route which operates in close proximity to the site (as shown in the public transport map at Figure 8) as follows:

- 
- A detailed map of the Berwick and Beaconsfield area. The map shows various bus routes represented by colored lines and numbers in colored circles. A blue star marks a specific location on the map, and a blue arrow points from a box labeled "Development Plan Area" to this star. The map includes labels for roads, parks, and other landmarks.
- Development Plan Area**
- Bus Routes:**
- 834, 835, 841, 926 (top left)
  - 39, 981, 838, 839 (middle left)
  - 837, 836, 831 (middle)
  - 847, 846, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899 (bottom right)
- Landmarks and Roads:**
- Berwick Montuna Golf Course
  - Guys Hill
  - Ernst Rd
  - Wanke Rd
  - Wilson Botanic Pk
  - Old Coach Rd
  - Casey Dr
  - Buchanan Rd
  - Inglis Rd
  - Manuka Rd
  - Cardinia Rd
  - Beaconsfield Rd
  - Holm Park Rd
  - Payne Rd
  - Dickie Rd
  - Telegraph Rd
  - Whiteside Rd
  - Officer Rd
  - Princes Rd
  - Bayview Rd
  - Wendland Rd
  - Arling Rd
  - ullen Rd
- Other Labels:**
- Berwick
  - Beaconsfield
  - Federation University Berwick Campus
  - Chisholm TAFE Casey Campus
  - Casey Hospital
  - 846
  - 831
  - 926
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# Traffix Group



## 4. Development Plan

The development plan area is shown in Figure 9.

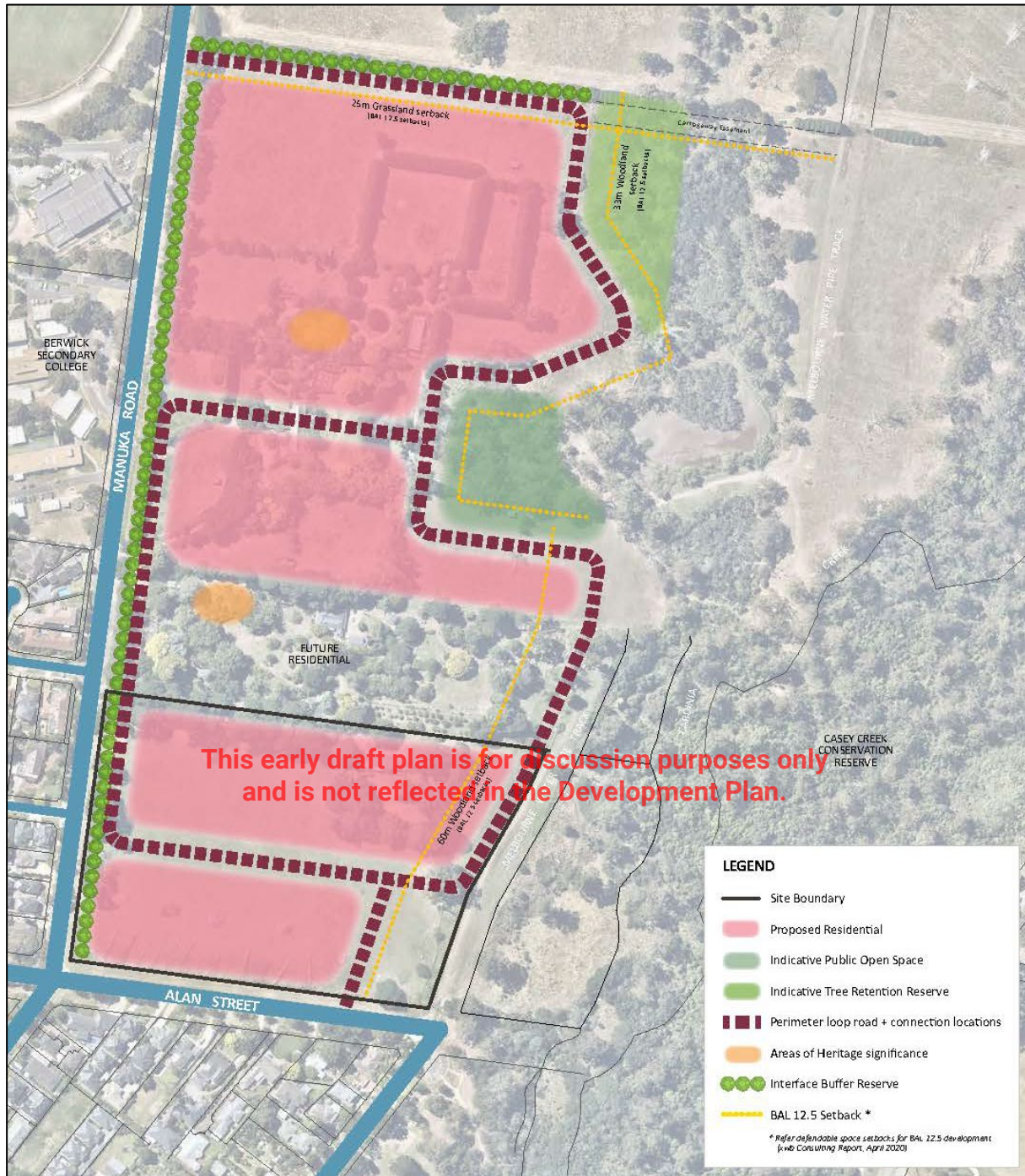


Figure 9: Early Draft Development Plan

DP024 will comprise of residential uses and future residential uses over four (4) separate parcels of land within the development area.



The Development Plan includes the following key traffic engineering features:

- Access point to Allan Street,
- Access point to Manuka Road, and
- Internal loop road around the site.

## 5. External Traffic Considerations

### 5.1. Traffic Generation

The following traffic generation rates have been adopted for the purposes of this assessment based on recent growth area planning of residential subdivisions:

- Conventional residential lots: 8 vte/day  
0.8 vte/h during commuter peak hours

Based on the proposal to provide a total of 155 standard lots representing 108 for the northern parcels, 46 for the southern parcel and one (1) for the existing 'Clover Cottage' site (which is unlikely to be redeveloped due to a heritage overlay), this represents a daily traffic generation of 1,240 trips with approximately 124 trips in each of the AM and PM peak hour periods. The breakdown between each parcel is shown in Table 2 below.

*Table 2: Traffic Generation*

Section	Number of Lots	Daily Trip Generation	Peak Hour Volumes
North Precinct	108 lots	864 vte/day	86 vte/h
South Precinct	46 lots	368 vte/day	37 vte/h
'Clover Cottage'	1 lot	8 vte/day	1 vte/h
<b>Total</b>	<b>155 lots</b>	<b>1,240 vte/day</b>	<b>124 vte/h</b>

### 5.2. Traffic Distribution

Based on the location of the development plan area as well as access to the surrounding suburbs and external road network, the distribution of generated traffic to and from the site has been assumed as follows:

- Northbound – 25% of trips, and
- Southbound – 75% of trips.

Directional splits of 20% in / 80% out during the AM peak and 70% in / 30% out in the PM peak have been adopted.

It should be noted that ultimately there will be connector roads joining together all four (4) parcels of land. The complete traffic generation and distribution is presented at Appendix D.

It is acknowledged that the peak hour for the proposed development is likely to occur between 5pm-6pm (commuter peak periods). However, the dominant peak hour for the local intersection generally occurs between 3pm-4pm. Therefore, in order to be conservative, the vehicle volumes generated by the site have been added to the existing peak hours for the existing peak hours along the network.

## 5.3. Design Traffic Volumes

### 5.3.1. Background Traffic

For the purposes of this assessment, a growth rate of 2% per annum has been adopted for Manuka Road and applied for a period of 10 years to calculate the design background traffic volumes (equal to a growth of 1.22 times existing traffic volumes conservatively assuming compound growth). No growth has been assumed on Allan Street.

Application of this growth rate and the relevant traffic generation and distribution assumptions results in the design background traffic volumes for the Manuka Road intersection with Allan Street as shown below.

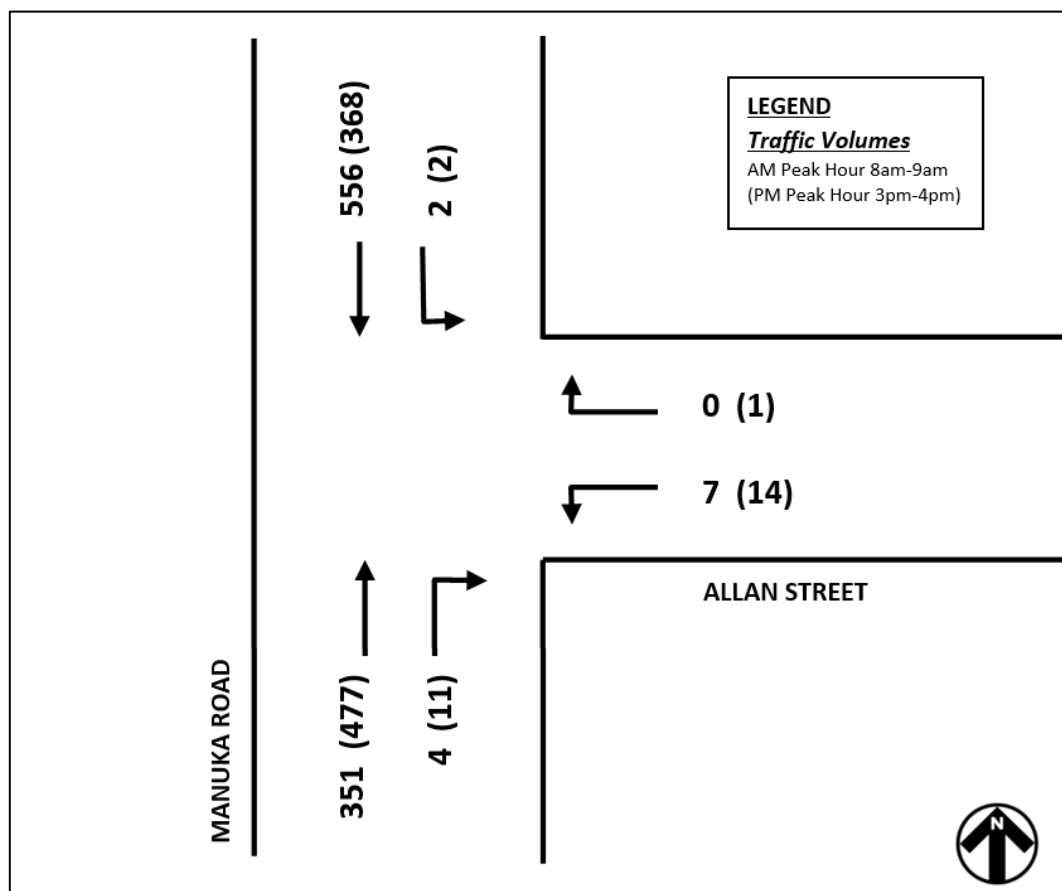


Figure 10: Manuka Road / Allan Street - Background Traffic

## 5.3.2. Development Traffic

Application of the assumptions detailed previously produces the anticipated development traffic volumes shown in the figures below.

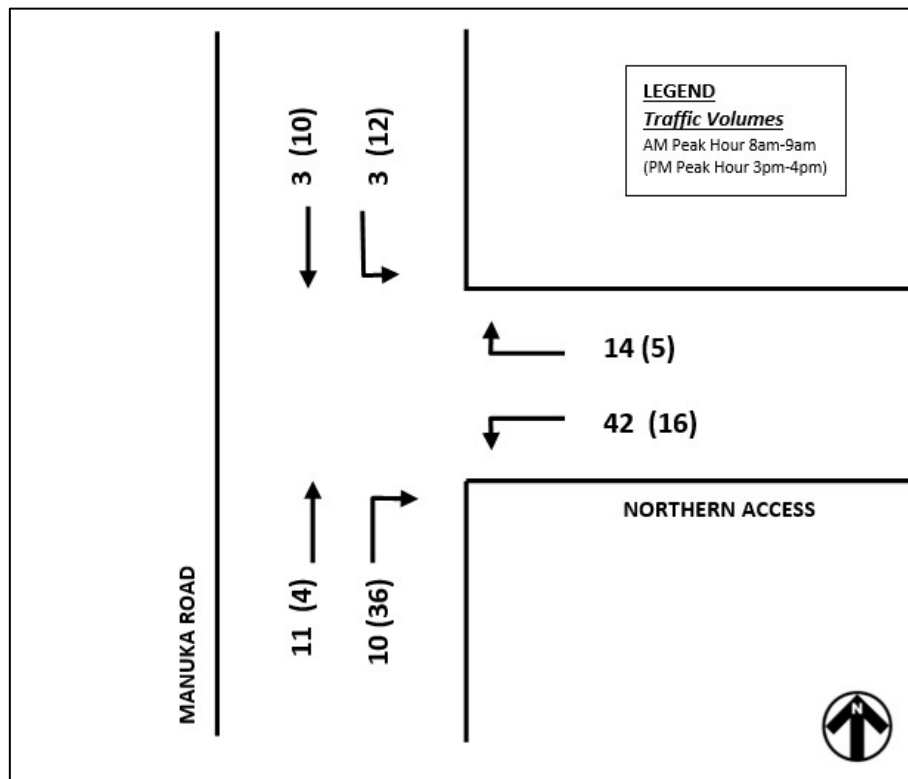


Figure 11: Development Volumes - Manuka Road / Northern Access

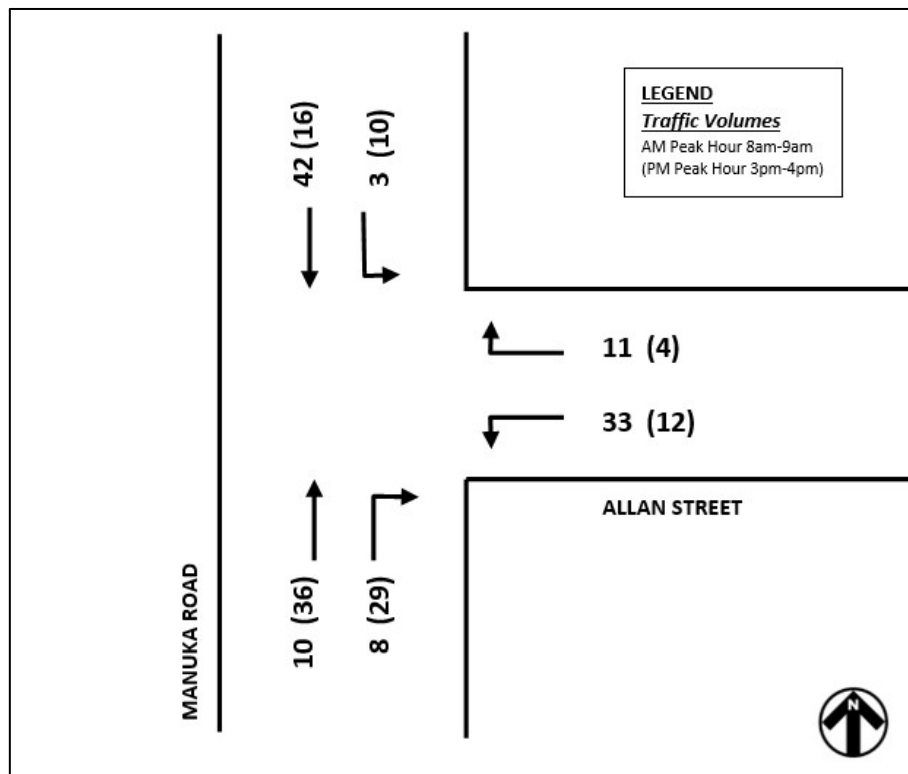


Figure 12: Development Volumes - Manuka Road / Allan Street

### 5.3.3. Design Traffic Volumes

The design traffic volumes are produced by adding the background traffic volumes to the development traffic volumes, as shown in the figures below.

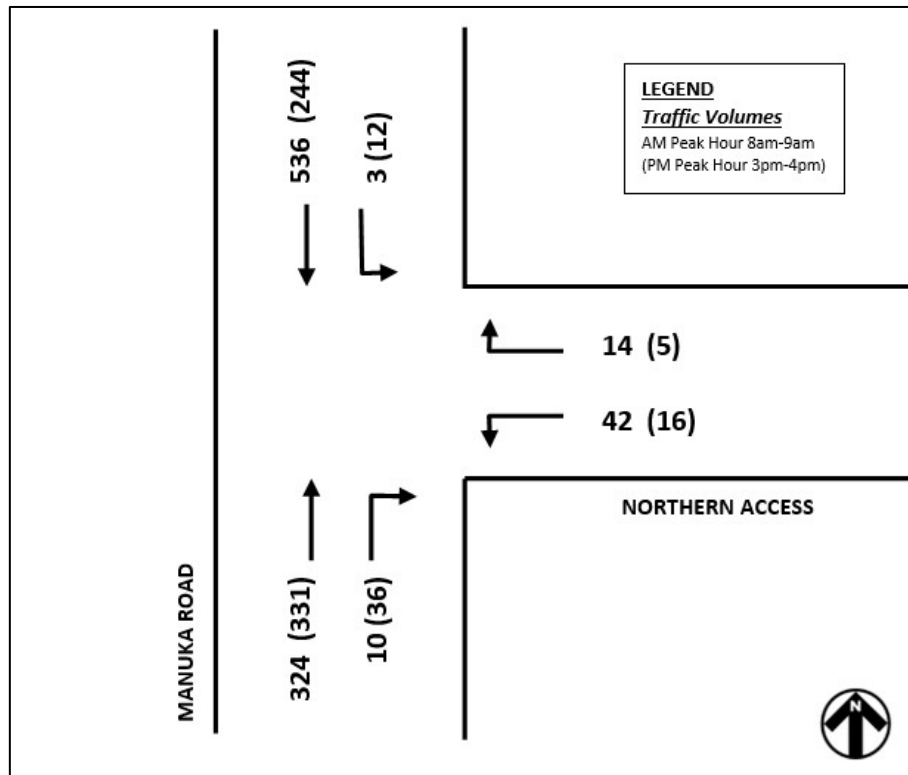


Figure 13: Design Volumes - Manuka Road / Northern Access

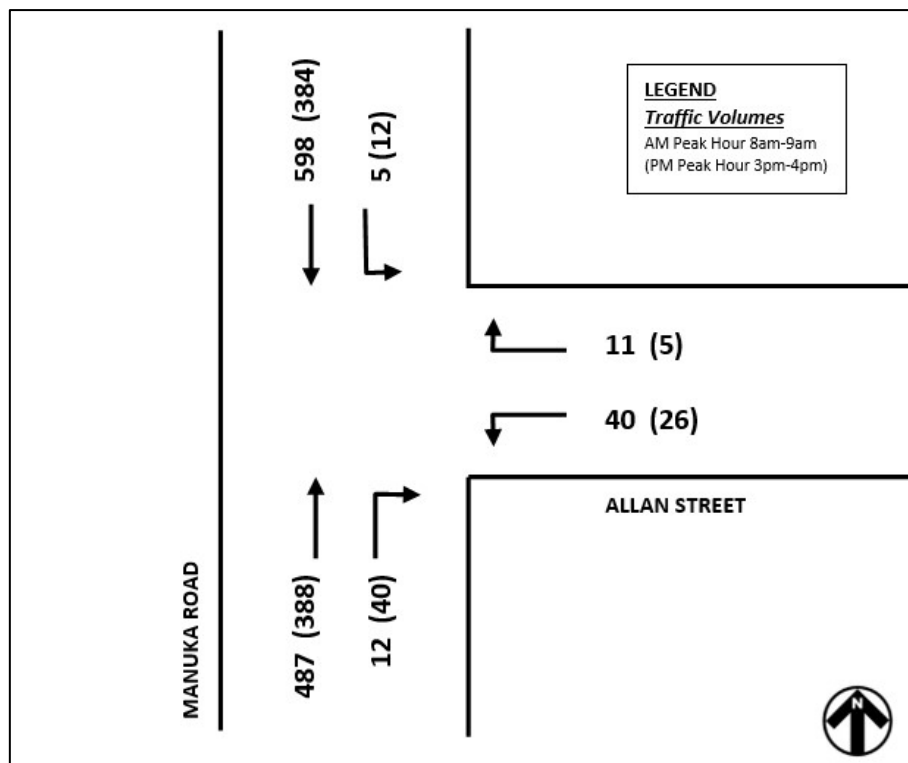


Figure 14: Design Volumes - Manuka Road / Allan Street

## 5.4. Intersection Type

*Guide to Traffic Management Part 6 Intersections, Interchanges and Crossings* (Austroads, 2020) ("GTM Part 6") provides guidance as to the selection of intersection types. Of relevance, Figure 3.25(c) in GTM Part 6 provides a graph for selecting turn treatments on roads with a design speed of less than 70km/h. Figure 3.25(c) is shown below in Figure 15.

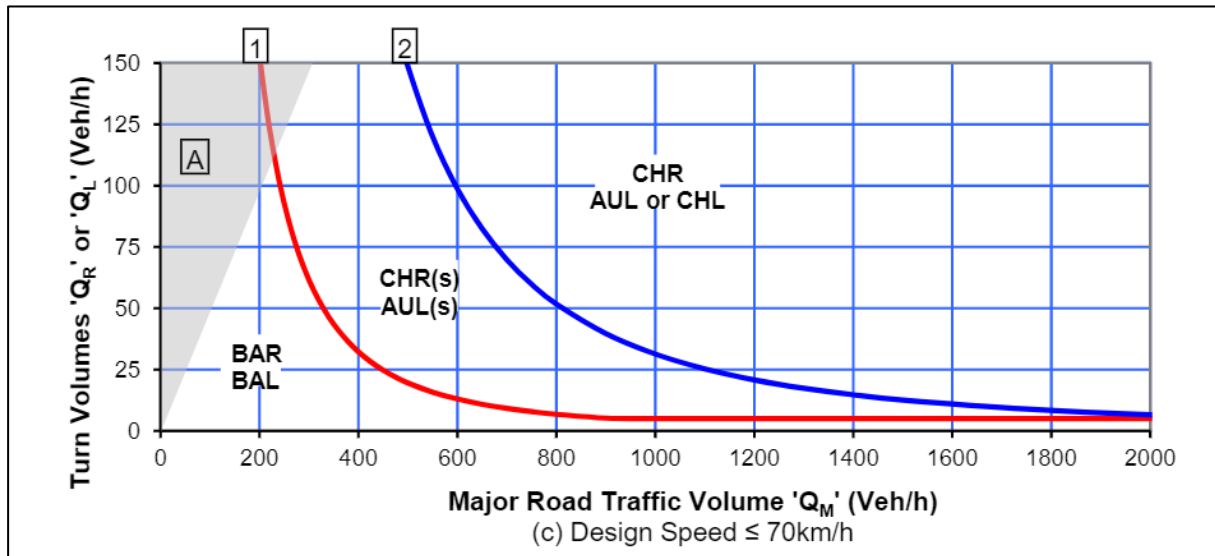


Figure 15: Warrants for Turn Lane Treatments on Major Roads at Unsignalised Intersections

The types of intersections are described as follows:

- BAL: Basic left turn
- AUL(S): Auxiliary left turn (short)
- AUL or CHL: Auxiliary left turn or channelised left turn
- BAR: Basic right turn
- CHR(S): Channelised right turn (short)
- CHR: Channelised right turn

It is noted that Commentary C9.2 states:

*The warrants are based on the construction of intersections on new roads (i.e., Greenfield sites). Therefore, their most appropriate application is to the selection of turn types for intersections on new roads. However, the warrants may also be used:*

- *as a reference for the construction of new intersections on existing roads*
- *as a reference for intervention levels when upgrading existing intersection turn treatments*
- *although not intended for direct application to accesses and driveways, they may be used as a reference for such.*

On this basis, Figure 3.25(c) is therefore to be used as a reference for intervention levels when upgrading existing intersection turn treatments.

To determine the type of intersection required in the future and responsibility for its upgrade, an assessment is first made of the type of intersection required as a result of existing traffic volumes, followed by an assessment of the type of intersection required for the assumed growth in traffic volumes and thirdly an assessment of the type of intersection required for the design traffic volumes (i.e., following completion of the development). The proposed development is then responsible for any upgrading of the intersection type compared to the background intersection type.

It should be noted that the intersection of Manuka Road and the Northern Access Road will only occur as a result of the development of the site, and as such will only be shown on the Design Traffic Volumes assessments.

## 5.4.1. Existing Traffic Volumes

Table 3 below shows the results of applying the existing traffic volumes to Figure 3.25 in GTM Part 6.

Table 3: Existing Traffic Volumes – Intersection Types

Time Period	Allan Street		Northern Access	
	Left Turn	Right Turn	Left Turn	Right Turn
AM Peak	BAL	BAR	N/A	N/A
PM Peak	BAL	BAR	N/A	N/A

## 5.4.2. Background Traffic Volumes

Table 4 below shows the results of applying the background traffic volumes to Figure 3.25 in GTM Part 6.

Table 4: Background Traffic Volumes – Intersection Types

Time Period	Allan Street		Northern Access	
	Left Turn	Right Turn	Left Turn	Right Turn
AM Peak	BAL	BAR	N/A	N/A
PM Peak	BAL	CHR(S)	N/A	N/A

### 5.4.3. Design Traffic Volumes

Table 5 below shows the results of applying the design traffic volumes to Figure 3.25(c) in GTM Part 6.

Table 5: Design Traffic Volumes – Intersection Types

Time Period	Allan Street		Northern Access	
	Left Turn	Right Turn	Left Turn	Right Turn
AM Peak	BAL	CHR (S)	BAL	CHR(S)
PM Peak	BAL	CHR(S)	BAL	CHR(S)

### 5.4.4. Upgrades Required Due to Proposed Development

A comparison of Table 3, Table 4 and Table 5 shows the turning lane treatments required as a result of the development are as follows:

- Allan Street      Left Turn:      No Change  
                             Right Turn:      CHR (S)
- Northern Access   Left Turn:      BAL  
                             Right Turn      CHR(S)

## 5.5. Intersection Capacity Analysis

SIDRA 9 has been used to assess the intersection capacities of the two (2) intersections with Manuka Road for the design traffic volumes. SIDRA provides information about the capacity of an intersection (or access connections in this case) in terms of a range of parameters, described as follows:

**Degree of Saturation (DoS)** is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement.

The **95<sup>th</sup> Percentile Queue** represents the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour.

**Average Delay (seconds)** is the average delay time that can be expected for all vehicles making a particular movement in the peak hour.

The results of the SIDRA assessment on the intersections of Manuka Road with Allan Street and the Northern Access Street are provided below. It should be noted that CHR(S) right turns have been provided on the south approach of each of the intersections as per the previous sections.



Table 6: SIDRA Result Summary - Design Volumes

Approach	AM Peak			PM Peak		
	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
<b>Manuka Road / Allan Street</b>						
South	0.26	0.1	0.4	0.21	0.7	1
East	0.11	10.9	2.6	0.04	8	1
North	0.33	0.7	0	0.21	0.2	0
<b>Total</b>	<b>0.32</b>	<b>1</b>	<b>2</b>	<b>0.21</b>	<b>1</b>	<b>1</b>
<b>Manuka Road / Northern Access Street</b>						
South	0.18	0.3	0.3	0.18	0.7	0.8
East	0.09	9.7	2.3	0.02	7.3	0.6
North	0.29	0.1	0	0.14	0.3	0
<b>Total</b>	<b>0.29</b>	<b>1</b>	<b>2</b>	<b>0.18</b>	<b>1</b>	<b>1</b>

This analysis shows that all intersections will operate at a low degree of saturation with minimal delays and queues, based on the conservative assumption that up to 155 lots could be ultimately provided on the site. Storage for one car is required in the proposed right turn lanes in at Allan Street and the Northern Access Street.

Detailed SIDRA outputs are provided at Appendix E.

## 5.6. Intersection Designs

Proposed intersection layouts have been developed to incorporate the recommended channelised right turn (CHR(S)) and BAL turning lane treatments specified in Section 5.4 at Manuka Road / Allan Street and Manuka Road / Northern Access.

A basic diagram of a channelised right turn is provide below in Figure 16.

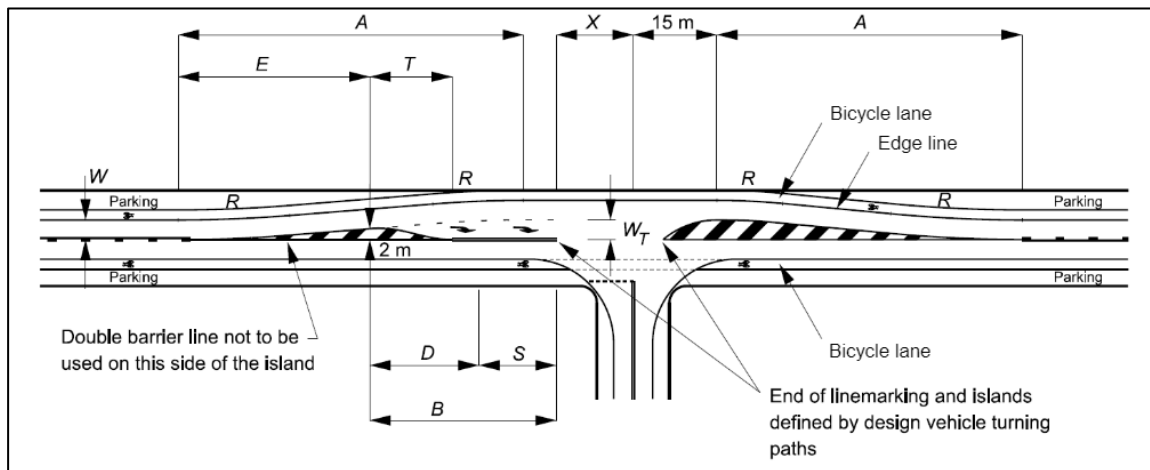


Figure 16: Urban Channelised Right Turn Example

Based on the site constraints, we note that the widening of Manuka Road is most likely required to accommodate the turn lanes.

The dimension of the channelised right turn was assessed against the requirements outlined in Figure 7.7 of Austroads Guide to Road Design Part 4A for a 60km/h speed zone and a turn lane width of 3.0m.

Concept layouts for the proposed intersection layouts are attached at Appendix F.

## 6. Internal Road Network

### 6.1. Road Hierarchy

The internal road network of a residential subdivision on the development plan area is subject to Clause 56 of the Casey Planning Scheme. Typically, the internal roads of a subdivision are broadly defined under the 'Collector', 'Access Street' or 'Access Place' provision in the Planning Scheme.

Given the total daily traffic generated within the proposed development area, all roads are anticipated to carry less than 2,000 vehicles per day, a concept road hierarchy has been established as shown in Figure 17 below with cross sections detailed in the next section.

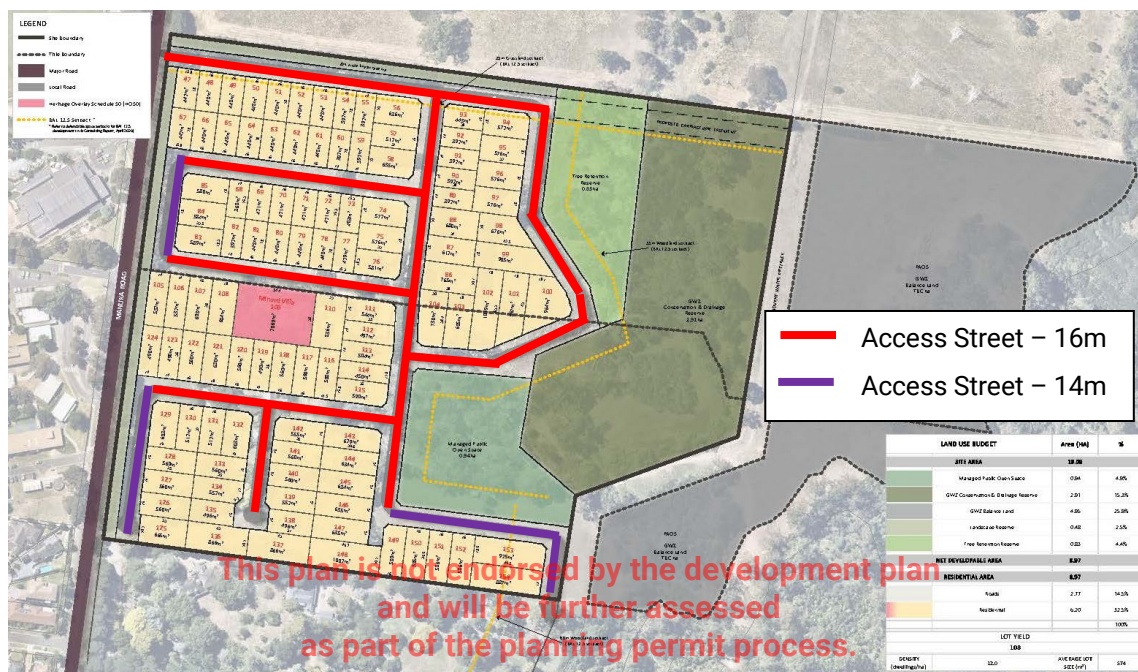


Figure 17: Early Concept Road Hierarchy Plan

Allan Street (to the west of the site access up to Manuka Road) is being proposed to be upgraded as an 'Access Street' which is considered appropriate given the low vehicle volumes.

Other lower order access streets would likely be provided as part of the future establishment of a detailed subdivision layout.

### 6.2. Road Cross-Sections

All roads within the development plan area would be subject to the provision of Clause 56 of the Planning Scheme and the guidelines presented in the MPA Engineering Design and Construction Manual.

The majority of the streets within a residential subdivision will be 'Access Streets' and 'Access Places' which are recommended to have dimensions as follows:

- Access Street
  - 16m wide road reservation (14m wide if adjacent to reserve)
  - 7.3m wide carriageway (parking both sides)
  - 1.5m footpaths on both sides of the road
- Access Place
  - 13m road reservation
  - 5.5m wide carriageway (parking one side only)
  - 1.5m footpath(s) based on lots serviced.

The roads that are adjacent to parks/reserves do not need to provide a footpath provision on the park/reserve side of the road, resulting in a reduced verge requirement (and a total carriageway width of 14m). This approach is commonplace throughout the vast majority of residential subdivisions within Melbourne.

### 6.2.1. Allan Street

As part of the proposed development, the section of Allan Street from Manuka Road to the site access is proposed to be upgraded to a more formalised cross section. Given that the overall road reservation along Allan Street is approximately 30m, a 7.3m wide carriageway and 1.5m footpaths can comfortably be accommodated within the existing carriageway.

Turnaround provision in the form of 'side turning' bays or court bowls should be provided for any discontinuous street with facilities that meet the requirements of the VPA *'Engineering Design and Construction Manual for Subdivision in Growth Areas'*.

## 6.3. Waste Collection and Service Vehicles

The 'Access Street' roads outlined above provide a 7.3m wide carriageway width which will allow for Council waste collection vehicles as well as other service vehicles to manoeuvre past vehicles parked on both sides of the road.

The 'Access Place' as outlined above provides a 5.5m wide carriageway which only permits parking on one side of the road and hence waste collection vehicles will also be able to manoeuvre through.

## 6.4. Walking and Cycling

The City of Casey 'Paths and Trails Strategy' outlines a number of proposed shared paths in the vicinity of the development area that connect to existing paths to the south, as shown on the map below.

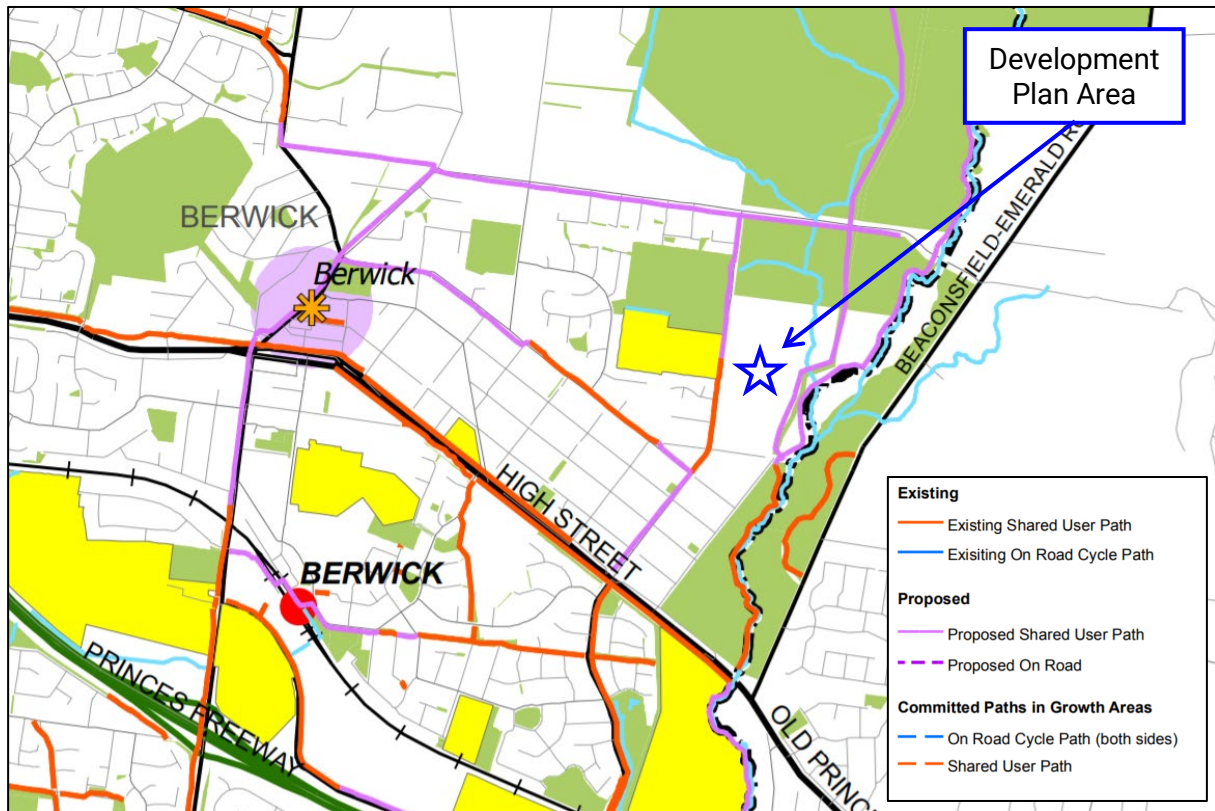


Figure 18: City of Casey 'Parks and Trails Strategy' - Trail Network North

Based on the extract from the Strategy, it is recommended that shared user paths be installed along the Manuka Road frontage of the development plan area and along the pipe track to the east of the area. This will connect the subject site to the existing external network as well as provide key linkages through the area to any future development to the north.

The Development Plan does not identify any dead ends or court bowls. All roads are interconnected with footpaths to be provided on the dwelling side of all of the streets within the development area.

This provides the proposed estate with a high level of connectivity for walking and cycling. No specific treatments are proposed for cyclists within the proposed estate, with cyclists sharing the road carriageway in a manner that is typical with such roads.

## 7. Other DPO24 Requirements

The following matters are required by DPO24 have so far not been addressed in this report:

- Pedestrian crossings on Manuka Road and Allan Street
- Identification of visitor parking

These are addressed in the following sections.

### 7.1. Pedestrian Crossings on Manuka Road and Allan Street

It is not proposed to construct any pedestrian crossings on Manuka Road or Allan Street as the pedestrian demands are unlikely to satisfy any relevant warrants however the intersection layouts at Manuka Road / Allan Street and Manuka Road / Northern Access Street incorporate pedestrian refuges to facilitate pedestrian access across Manuka Road and are demonstrated in the concept plans attached at Appendix F.

### 7.2. Identification of Visitor Parking

It is expected that parking will be provided in line with Clause 52.06 so that adequate resident provision is provided off-street (typically in a garage space and/or driveway space) with the visitor parking being provided on-street.

As discussed above, the adopted road cross sections permit on-street parking and as such it is not considered necessary to specifically identify visitor parking.



## 8. DPO24 Response Summary

The following table provides a response to the specific traffic engineering requirements outlined in DPO24.

DPO24	Response	Location
<i>A detailed assessment of the expected traffic generation and traffic impacts associated with the development on the internal and external road network and any recommended works or measures within and external to the site.</i>	Detailed traffic generation and distribution has been undertaken on the entirety of the development plan area and intersection treatments have been recommended.	Section 5.1- Section 5.5 & Appendix D.
<i>An internal road layout and external road access.</i>	The internal road layout and external road access have been reviewed against the requirements of the Planning Scheme and the VPA Engineering Design and Construction Manual for Subdivision in Growth Areas.	Section 6.1
<i>Any recommendations of an independent traffic safety audit.</i>	To be undertaken following further detailed design of the intersections.	
<i>Details of road widths to ensure that all streets are designed to allow for service and emergency vehicles to appropriately manoeuvre.</i>	Appropriate road widths have been detailed and reviewed against the requirements of service and emergency vehicles.	Section 6.2 & Section 6.3
<i>Typical cross sections of internal roads indicating provision for pedestrians, tree planting and car parking.</i>	Cross sections have been specified for each of the relevant road types within the development plan area.	Section 6.2
<i>An internal perimeter road along the northern and eastern boundaries, and an internal loop along the western boundary with appropriate reserves for landscaping.</i>	Has been shown on the Development Plan and reviewed within this traffic impact assessment report.	Section 6.1 & Section 6.2
<i>A cross section of the perimeter road to allow for appropriate parallel or indented parking adjacent to the public open space.</i>	Cross sections have been specified for each of the relevant road types within the development plan area.	Section 6.2

DPO24	Response	Location
<i>The intersection treatment at Manuka Road, having regard to access to the school and community facilities on the western side of Manuka Road.</i>	An assessment has been undertaken on the required intersection treatments based on the ultimate site build out with Concept Plan developed showing these treatments.	Section 5.6 & Appendix E
<i>The intersection treatment at Allan Street/Manuka Road.</i>		Section 5.6 & Appendix E
<i>The upgrade of Allan Street to urban standards, to the satisfaction of the responsible authority.</i>	The proposed Allan Street cross section has been detailed and reviewed in this report.	Section 6.1 and 6.2
<i>The location of all pedestrian crossings on Manuka Road and Allan Street.</i>	No pedestrian crossings are proposed however the intersection treatments can cater for the provision of pedestrian refuges on the northern side of the intersection.	Section 7.2
<i>The proposed internal cycle and pedestrian path network and connection to the Casey Trail Network (shared user path and equestrian trails), including public access through the site.</i>	Has been discussed and reviewed.	Section 6.4
<i>Identification of visitor car parking within the proposed street network.</i>	Has been discussed and reviewed.	Section 7.3

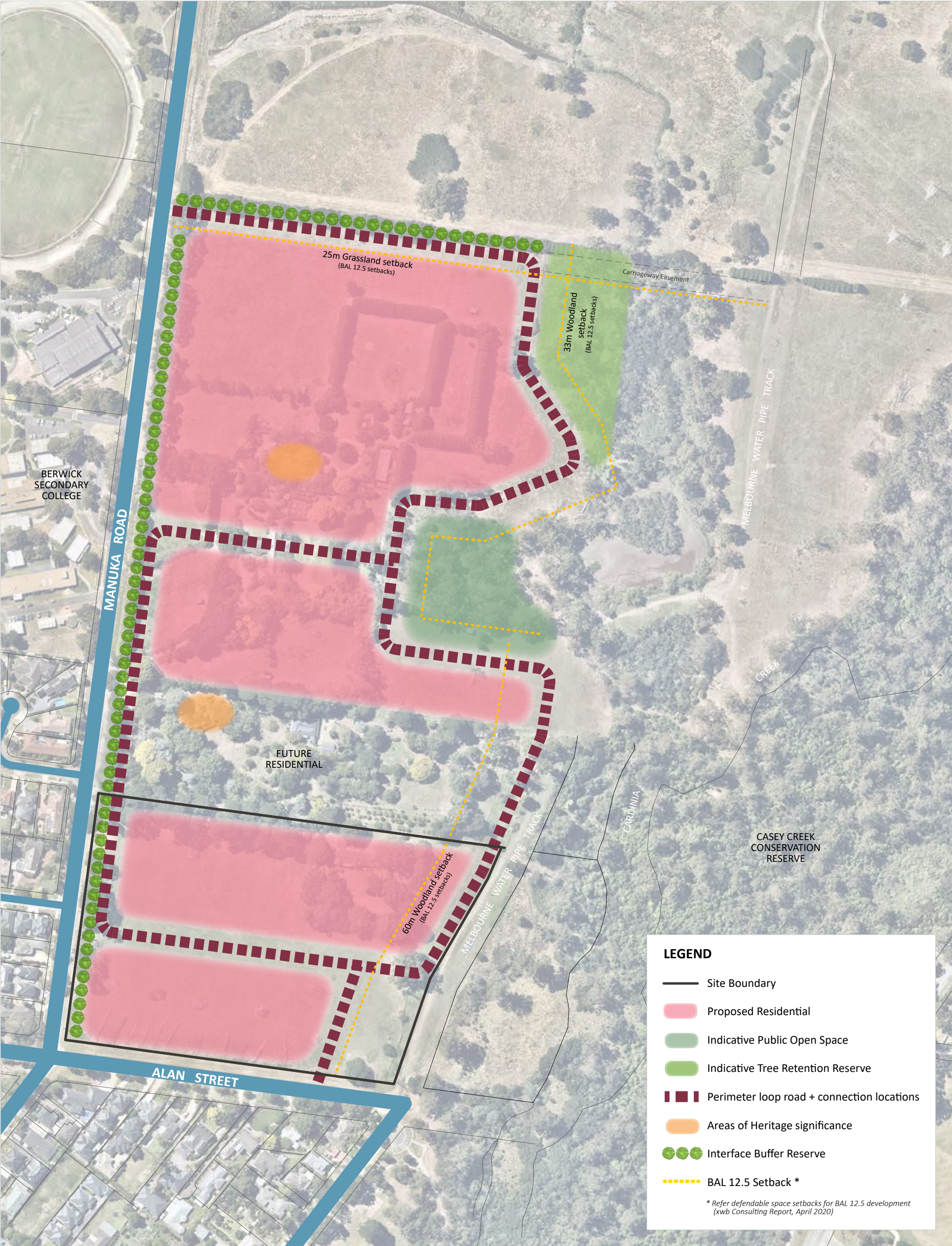




# Appendix A

## Development Plan





Development Plan

62-80 Manuka Road | Berwick  
328131 | 328131UDIB | Version B | 23.03.22

1:2,500@ A3  
Note: This is an indicative plan only based on the Planning Zones/Overlays and the PSP Guidelines (VPA). This plan and areas shown are subject to survey.





# Appendix B

## Turning Movement Counts

# TRANS TRAFFIC SURVEY

## TURNING MOVEMENT SURVEY

trafficsurvey.com.au



### Intersection of School Entrance and Manuka Rd, Beaconsfield

GPS -38.030761, 145.365847

<b>Date:</b>	Thu 24/06/21
<b>Weather:</b>	Fine
<b>Suburban:</b>	Beaconsfield
<b>Customer:</b>	Traffix

<b>North:</b>	Manuka Rd
<b>East:</b>	N/A
<b>South:</b>	Manuka Rd
<b>West:</b>	School Entrance

<b>Survey</b>	AM:	7:00 AM-9:00 AM
<b>Period</b>	PM:	3:00 PM-6:00 PM
<b>Traffic</b>	AM:	8:00 AM-9:00 AM
<b>Peak</b>	PM:	3:00 PM-4:00 PM

#### All Vehicles

Time		North Approach Manuka Rd			South Approach Manuka Rd			West Approach School Entrance			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
7:00	7:15	0	1	8	0	5	3	0	0	0	175	
7:15	7:30	0	2	7	0	9	2	0	0	0	368	
7:30	7:45	0	2	21	0	9	8	0	0	0	571	
7:45	8:00	0	12	51	0	17	18	0	0	0	784	
8:00	8:15	0	47	110	0	16	37	0	0	0	933	Peak
8:15	8:30	0	45	112	0	19	47	0	0	0		
8:30	8:45	0	66	133	0	11	43	0	0	0		
8:45	9:00	0	47	125	0	22	53	0	0	0		
15:00	15:15	0	19	33	0	26	30	0	0	0	574	Peak
15:15	15:30	0	31	127	0	23	29	0	0	0	561	
15:30	15:45	0	17	74	0	30	23	0	0	0	435	
15:45	16:00	0	13	37	0	38	24	0	0	0	381	
16:00	16:15	0	7	33	0	45	10	0	0	0	355	
16:15	16:30	0	9	31	0	30	14	0	0	0	354	
16:30	16:45	0	3	45	0	33	9	0	0	0	340	
16:45	17:00	0	6	38	0	30	12	0	0	0	354	
17:00	17:15	0	6	49	0	31	8	0	0	0	350	
17:15	17:30	0	4	30	0	28	8	0	0	0		
17:30	17:45	0	2	66	0	29	7	0	0	0		
17:45	18:00	0	5	27	0	35	15	0	0	0		

Peak Time		North Approach Manuka Rd			South Approach Manuka Rd			West Approach School Entrance			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
8:00	9:00	0	205	480	0	68	180	0	0	0	933
15:00	16:00	0	80	271	0	117	106	0	0	0	574

# TRANS TRAFFIC SURVEY

## TURNING MOVEMENT SURVEY

trafficsurvey.com.au



### Intersection of School Exit and Manuka Rd, Beaconsfield

GPS -38.029828, 145.366034

Date:	Thu 24/06/21
Weather:	Fine
Suburban:	Beaconsfield
Customer:	Traffix

North:	Manuka Rd
East:	N/A
South:	Manuka Rd
West:	School Exit

Survey	AM:	7:00 AM-9:00 AM
Period	PM:	3:00 PM-6:00 PM
Traffic	AM:	8:00 AM-9:00 AM
Peak	PM:	3:15 PM-4:15 PM

#### All Vehicles

Time		North Approach Manuka Rd			South Approach Manuka Rd			West Approach School Exit			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
7:00	7:15	0	0	8	0	4	1	0	1	0	153	
7:15	7:30	0	1	8	0	9	0	0	1	0	349	
7:30	7:45	0	0	20	0	9	0	0	3	1	547	
7:45	8:00	0	2	52	0	16	1	0	11	5	788	
8:00	8:15	0	4	115	0	16	0	0	42	33	957	Peak
8:15	8:30	0	5	108	0	19	0	0	49	36		
8:30	8:45	0	4	124	0	11	0	0	75	60		
8:45	9:00	0	2	90	0	22	0	0	82	60		
15:00	15:15	0	5	43	0	22	4	0	9	8	607	
15:15	15:30	0	3	83	0	21	2	0	75	65	621	Peak
15:30	15:45	0	3	53	0	29	1	0	38	31	456	
15:45	16:00	0	2	34	0	37	1	0	16	22	407	
16:00	16:15	0	1	22	0	44	1	0	18	19	390	
16:15	16:30	0	0	27	0	30	0	0	13	14	404	
16:30	16:45	0	0	27	0	33	0	0	21	25	389	
16:45	17:00	0	1	31	0	27	3	0	13	20	387	
17:00	17:15	0	0	25	0	31	0	0	30	33	361	
17:15	17:30	0	0	26	0	28	0	0	8	7		
17:30	17:45	0	0	53	0	29	0	0	15	7		
17:45	18:00	0	0	29	0	35	0	0	3	2		

Peak Time		North Approach Manuka Rd			South Approach Manuka Rd			West Approach School Exit			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
8:00	9:00	0	15	437	0	68	0	0	248	189	957
15:15	16:15	0	9	192	0	131	5	0	147	137	621

# TRANS TRAFFIC SURVEY

## TURNING MOVEMENT SURVEY

trafficsurvey.com.au



### Intersection of Manuka Rd and Allan St, Beaconsfield

GPS -38.034871, 145.365047

Date:	Thu 24/06/21
Weather:	Fine
Suburban:	Beaconsfield
Customer:	Traffix

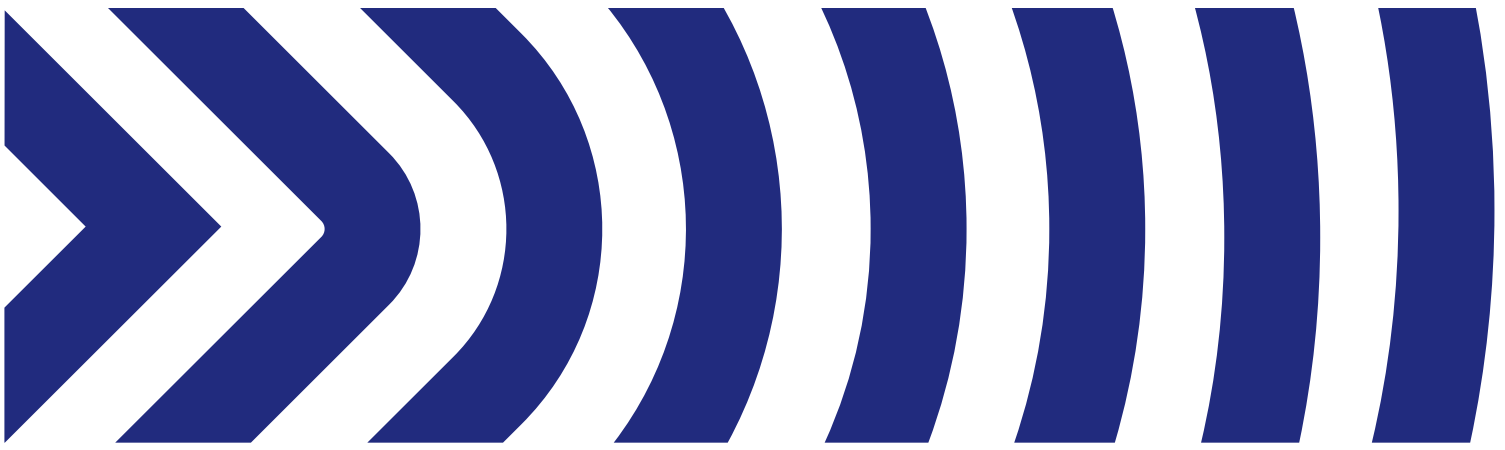
North:	Manuka Rd
East:	Allan St
South:	Manuka Rd
West:	N/A

Survey	AM:	7:00 AM-9:00 AM
Period	PM:	3:00 PM-6:00 PM
Traffic	AM:	8:00 AM-9:00 AM
Peak	PM:	3:00 PM-4:00 PM

#### All Vehicles

Time		North Approach Manuka Rd			East Approach Allan St			South Approach Manuka Rd			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
7:00	7:15	0	11	0	0	0	1	0	0	13	180	
7:15	7:30	0	12	0	0	0	1	0	0	13	336	
7:30	7:45	0	20	0	0	0	0	0	0	20	501	
7:45	8:00	0	46	0	0	0	0	0	0	43	684	
8:00	8:15	0	93	0	0	0	0	0	2	86	861	Peak
8:15	8:30	0	109	0	0	0	4	0	2	76		
8:30	8:45	0	112	1	0	0	2	0	0	108		
8:45	9:00	0	142	1	0	0	1	1	0	121		
15:00	15:15	0	27	0	0	0	2	1	1	69	623	Peak
15:15	15:30	0	141	2	0	0	9	2	7	70	620	
15:30	15:45	0	95	0	0	0	2	2	3	68	472	
15:45	16:00	0	39	0	0	1	1	0	0	81	397	
16:00	16:15	0	33	0	0	0	1	0	2	61	357	
16:15	16:30	0	33	0	0	0	0	0	0	50	358	
16:30	16:45	0	49	0	0	0	0	0	1	45	360	
16:45	17:00	0	34	0	0	0	1	0	1	46	379	
17:00	17:15	0	50	0	0	0	1	0	1	46	381	
17:15	17:30	0	39	0	0	0	0	0	3	43		
17:30	17:45	0	66	0	0	0	1	0	4	43		
17:45	18:00	0	28	1	0	0	2	0	1	52		


Peak Time		North Approach Manuka Rd			East Approach Allan St			South Approach Manuka Rd			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	
8:00	9:00	0	456	2	0	0	7	1	4	391	861
15:00	16:00	0	302	2	0	1	14	5	11	288	623



# Appendix C

## Automatic Traffic Counts

# TRANS TRAFFIC SURVEY

 trafficsurvey.com.au

T. 1300 82 88 82 - F. 1300 83 88 83 - E. [traffic@trafficsurvey.com.au](mailto:traffic@trafficsurvey.com.au) - W. [www.trafficsurvey.com.au](http://www.trafficsurvey.com.au)

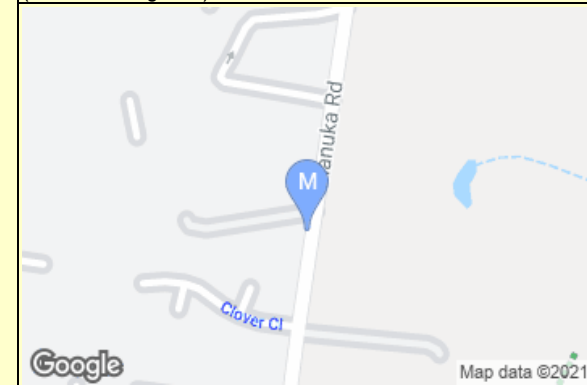
## AUTOMATIC COUNT SUMMARY

Street Name :	Manuka Rd	Location :	North of Clover Cl
Suburb :	Berwick	Start Date :	00:00 Sat 19/June/2021
Metrocount ID	MD722R32/P	Finish Date :	00:00 Sat 26/June/2021
Site ID Number :	11174	Speed Zone :	60 km/h
Prepared By :	Vo Son Binh	Email:	<a href="mailto:binh@trafficsurvey.com.au">binh@trafficsurvey.com.au</a>

GPS information		Lat 38° 1' 55.54 South	Direction of Travel		
			Both directions	Northbound	Southbound
		Long 145° 21' 55.74 East			
Traffic Volume : (Vehicles/Day)		Weekdays Average	3,047	1,583	1,464
		7 Day Average	2,983	1,567	1,416
Weekday	AM	08:00	685	369	316
Peak hour starts	PM	15:00	472	224	247
Speeds : (Km/Hr)		85th Percentile	56.5	54.4	58.7
		Average	51.0	48.9	53.1
Classification % :		Light Vehicles up to 5.5m	97.2%	97.1%	97.2%

## Location

GPS Information [Load Google Map \(internet required\)](#)  
(Latitude, Longitude) -38.032095, 145.365483



[Speed Data](#) [Speed Graph](#) [Speed Bin](#)  
[Volume Data](#) [Volume Graph](#) [Classification](#)



QUALITY ASSURED COMPANY BY ISO 9001:2015

OH&S SYSTEM CERTIFIED TO ISO 4801:2001

ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

### Status of movement – Covid 19

"Traffic behaviour is not the same as pre-pandemic (traditional morning/afternoon peak is much less pronounced and school start/finish times are much more pronounced), the current patterns are close enough to what probably is going to be a 'COVID normal' situation for at least the next year or two. Workplaces are currently not all yet open. These results should be used for indicative assessment only."



# TRANS TRAFFIC SURVEY

trafficsurvey.com.au

T. 1300 82 88 82 - F. 1300 83 88 83 - E. [traffic@trafficsurvey.com.au](mailto:traffic@trafficsurvey.com.au) - W. [www.trafficsurvey.com.au](http://www.trafficsurvey.com.au)

## AUTOMATIC COUNT SUMMARY

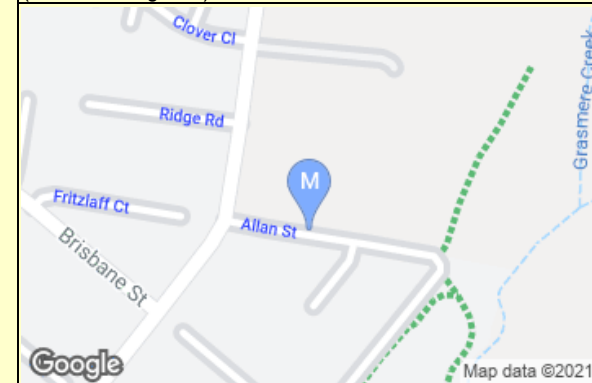
Street Name :	Allan St	Location :	East of Manuka Rd
Suburb :	Berwick	Start Date :	00:00 Sat 19/June/2021
Metrocount ID	ME65AZR9	Finish Date :	00:00 Sat 26/June/2021
Site ID Number :	11175	Speed Zone :	50 km/h
Prepared By :	Vo Son Binh	Email:	<a href="mailto:binh@trafficsurvey.com.au">binh@trafficsurvey.com.au</a>

GPS information		Direction of Travel		
Lat	38° 2' 5.93 South	Both directions	Westbound	Eastbound
Long	145° 21' 58.06 East			
Traffic Volume : (Vehicles/Day)	Weekdays Average	107	52	55
	7 Day Average	104	51	53
Weekday AM	10:00	9	4	4
Peak hour start PM	15:00	13	6	7
Speeds : (Km/Hr)	85th Percentile	30.3	29.8	31.4
	Average	26.7	26.7	27.0
Classification % :	Light Vehicles up to 5.5m	90.3%	90.2%	90.4%

## Location

GPS Information [Load Google Map \(internet required\)](#)

(Latitude, Longitude) -38.03498,145.366127



[Speed Data](#)

[Speed Graph](#)

[Speed Bin](#)

[Volume Data](#)

[Volume Graph](#)

[Classification](#)



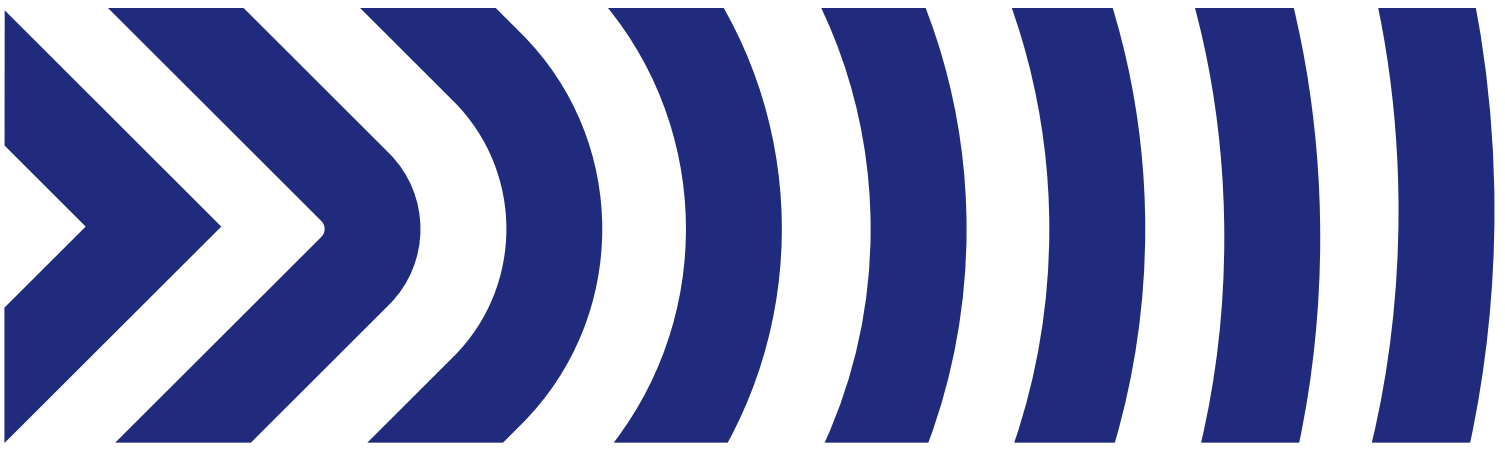
QUALITY ASSURED COMPANY BY ISO 9001:2015

OH&S SYSTEM CERTIFIED TO ISO 4801:2001

ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

### Status of movement – Covid 19

"Traffic behaviour is not the same as pre-pandemic (traditional morning/afternoon peak is much less pronounced and school start/finish times are much more pronounced), the current patterns are close enough to what probably is going to be a 'COVID normal' situation for at least the next year or two. Workplaces are currently not all yet open. These results should be used for indicative assessment only."



# Appendix D

## Traffic Generation and Distribution

42-80 Manuka Road, Berwick  
Proposed Residential Subdivision  
Traffic Generation and Distribution  
Our Ref: GRP27725



Parcel	No. of Lots	Trip Generation (veh/day)	Peak Hour %	Peak Hour Volumes (v/h)	Daily Trip Generation (v/d)
Tulloch (North)	108	8	10%	86	864
Brown (South)	46	8	10%	37	368
'Clover Cottage'	1	8	10%	1	8

Site Access	Peak Hour	Daily
Northern Access	69	692.8
Allan Access	55	547.2

Parcel	North	South
Tulloch	80%	20%
Brown	0%	100%
Clover	20%	80%

Peak Period Splits	AM	PM
In	20%	70%
Out	80%	30%

General Traffic Direction	Percentage
To/From North	25%
To/From South	75%

Manuka Road / Northern Access	AM Peak	PM Peak
Left in	3	12
Right in	10	36
Left Out	42	16
Right out	14	5
<b>TOTAL:</b>	<b>69</b>	<b>69</b>

Manuka Road / Allan Street	AM Peak	PM Peak
Left in	3	10
Right in	8	29
Left Out	33	12
Right out	11	4
<b>TOTAL:</b>	<b>55</b>	<b>55</b>



# Appendix E

## Detailed SIDRA Outputs

## SITE LAYOUT

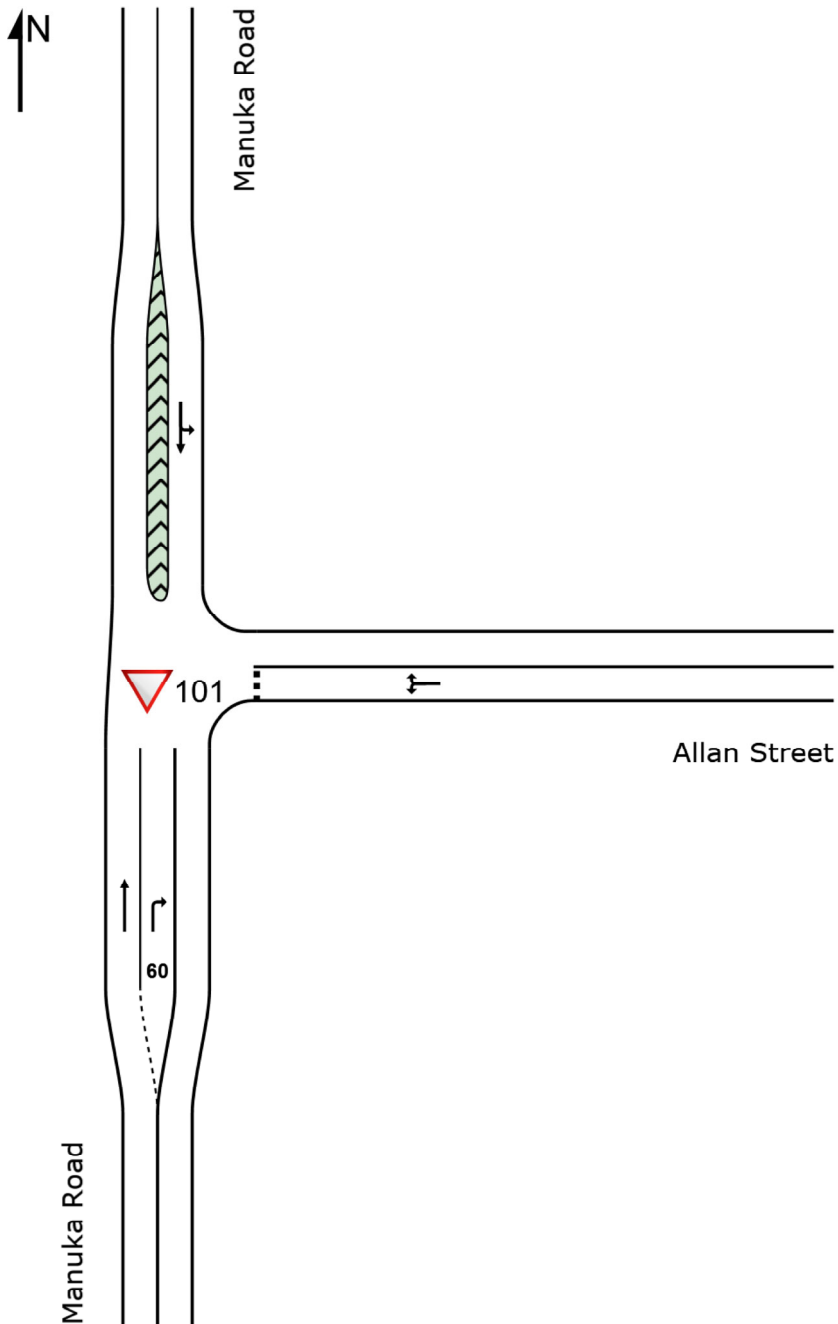
▽ Site: 101 [Manuka Road / Allan Street - AM Peak (Site Folder: General)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

▽ Site: 101 [Manuka Road / Allan Street - AM Peak (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV %	[ Total veh/h	HV %				[ Veh. veh	Dist ] m				
South: Manuka Road														
2	T1	487	0.0	513	0.0	0.263	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	12	0.0	13	0.0	0.014	8.1	LOS A	0.1	0.4	0.55	0.67	0.55	51.2
Approach		499	0.0	525	0.0	0.263	0.3	NA	0.1	0.4	0.01	0.02	0.01	59.6
East: Allan Street														
4	L2	44	0.0	46	0.0	0.106	8.3	LOS A	0.4	2.6	0.62	0.80	0.62	49.7
6	R2	11	0.0	12	0.0	0.106	21.3	LOS C	0.4	2.6	0.62	0.80	0.62	49.2
Approach		55	0.0	58	0.0	0.106	10.9	LOS B	0.4	2.6	0.62	0.80	0.62	49.6
North: Manuka Road														
7	L2	5	0.0	5	0.0	0.326	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.2
8	T1	598	0.0	629	0.0	0.326	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		603	0.0	635	0.0	0.326	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		1157	0.0	1218	0.0	0.326	0.7	NA	0.4	2.6	0.04	0.05	0.04	59.1

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.  
Delay Model: SIDRA Standard (Geometric Delay is included).  
Queue Model: SIDRA Standard.  
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 [Manuka Road / Allan Street - PM Peak (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV % ]	[ Total veh/h	HV % ]				[ Veh. veh	Dist ] m				
South: Manuka Road														
2	T1	388	0.0	408	0.0	0.211	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	40	0.0	42	0.0	0.035	6.9	LOS A	0.1	1.0	0.45	0.63	0.45	51.9
Approach		428	0.0	451	0.0	0.211	0.7	NA	0.1	1.0	0.04	0.06	0.04	59.0
East: Allan Street														
4	L2	26	0.0	27	0.0	0.038	6.9	LOS A	0.1	1.0	0.47	0.65	0.47	51.8
6	R2	5	0.0	5	0.0	0.038	13.2	LOS B	0.1	1.0	0.47	0.65	0.47	51.3
Approach		31	0.0	33	0.0	0.038	8.0	LOS A	0.1	1.0	0.47	0.65	0.47	51.7
North: Manuka Road														
7	L2	12	0.0	13	0.0	0.214	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.1
8	T1	384	0.0	404	0.0	0.214	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		396	0.0	417	0.0	0.214	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		855	0.0	900	0.0	0.214	0.7	NA	0.1	1.0	0.04	0.06	0.04	59.0

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.  
Delay Model: SIDRA Standard (Geometric Delay is included).  
Queue Model: SIDRA Standard.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

## SITE LAYOUT

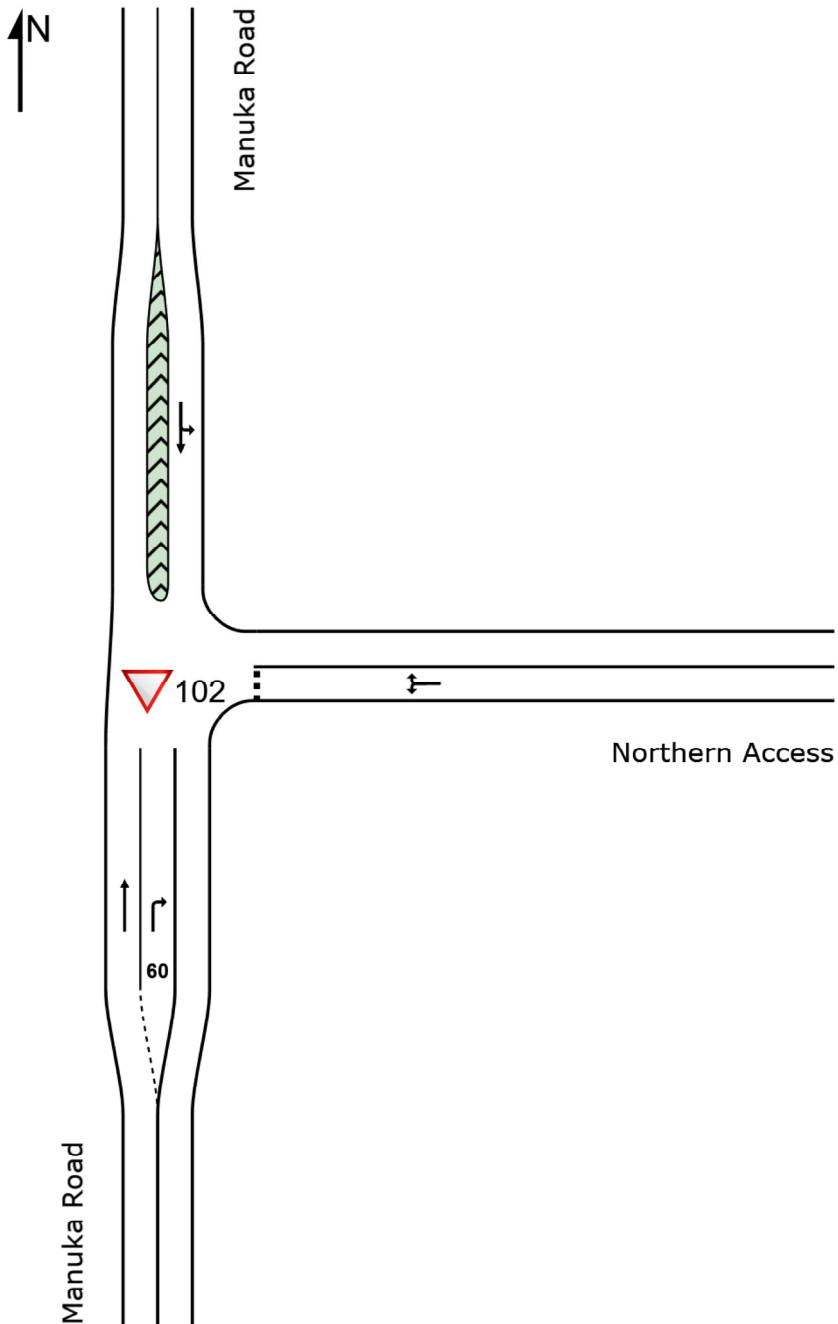
▽ Site: 102 [Manuka Road / Northern Access - AM Peak (Site Folder: General)]

New Site

Site Category: (None)

Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.





## MOVEMENT SUMMARY

▽ Site: 102 [Manuka Road / Northern Access - AM Peak (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV %	[ Total veh/h	HV %				[ Veh. veh	Dist ] m				
South: Manuka Road														
2	T1	324	0.0	341	0.0	0.175	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	10	0.0	11	0.0	0.011	7.6	LOS A	0.0	0.3	0.52	0.64	0.52	51.5
Approach		334	0.0	352	0.0	0.175	0.3	NA	0.0	0.3	0.02	0.02	0.02	59.6
East: Northern Access														
4	L2	42	0.0	44	0.0	0.091	7.9	LOS A	0.3	2.3	0.58	0.77	0.58	50.5
6	R2	14	0.0	15	0.0	0.091	15.1	LOS C	0.3	2.3	0.58	0.77	0.58	50.1
Approach		56	0.0	59	0.0	0.091	9.7	LOS A	0.3	2.3	0.58	0.77	0.58	50.4
North: Manuka Road														
7	L2	3	0.0	3	0.0	0.291	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.2
8	T1	536	0.0	564	0.0	0.291	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		539	0.0	567	0.0	0.291	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
All Vehicles		929	0.0	978	0.0	0.291	0.7	NA	0.3	2.3	0.04	0.05	0.04	59.1

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.

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

Queue Model: SIDRA Standard.

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

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

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Project: P:\Synergy\Projects\GRP2\GRP27725\07-Analysis\SIDRA\Combined\2022-03-24\SIDRA Assessment (Combined) - 2022-03.sip9

# MOVEMENT SUMMARY

▼ Site: 102 [Manuka Road / Northern Access - PM Peak (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV %	[ Total veh/h	HV %				[ Veh. veh	Dist ] m				
South: Manuka Road														
2	T1	331	0.0	348	0.0	0.180	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	36	0.0	38	0.0	0.027	6.3	LOS A	0.1	0.8	0.35	0.58	0.35	52.2
Approach		367	0.0	386	0.0	0.180	0.7	NA	0.1	0.8	0.03	0.06	0.03	59.1
East: Northern Access														
4	L2	16	0.0	17	0.0	0.023	6.3	LOS A	0.1	0.6	0.38	0.59	0.38	52.3
6	R2	5	0.0	5	0.0	0.023	10.2	LOS B	0.1	0.6	0.38	0.59	0.38	51.8
Approach		21	0.0	22	0.0	0.023	7.3	LOS A	0.1	0.6	0.38	0.59	0.38	52.2
North: Manuka Road														
7	L2	12	0.0	13	0.0	0.139	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	58.1
8	T1	244	0.0	257	0.0	0.139	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		256	0.0	269	0.0	0.139	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.6
All Vehicles		644	0.0	678	0.0	0.180	0.7	NA	0.1	0.8	0.03	0.06	0.03	59.0

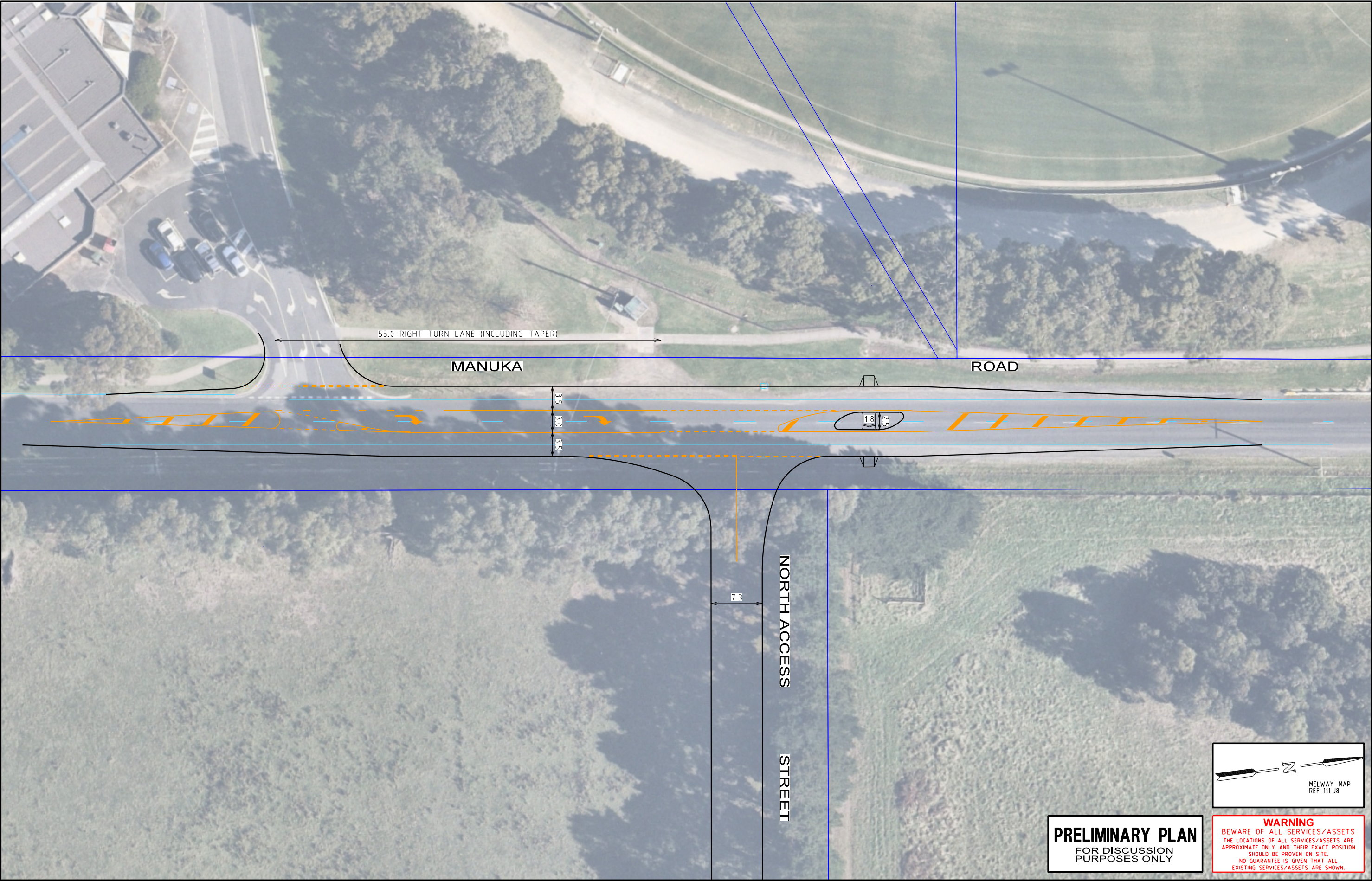
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



# Appendix F

## Concept Design Intersection Layouts





ISSUE	ISSUE DESCRIPTION	ISSUE DATE
A	INITIAL ISSUE	30 JUL 2021
B	UPDATED DEVELOPMENT PLAN	24 MAR 2022

GENERAL NOTES
1. BASE INFORMATION FROM AERIAL PHOTOGRAPH (SOURCE: NEARMAP APR 2021)
2. ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3. MANUKA ROAD - MAIN 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 14284:2009

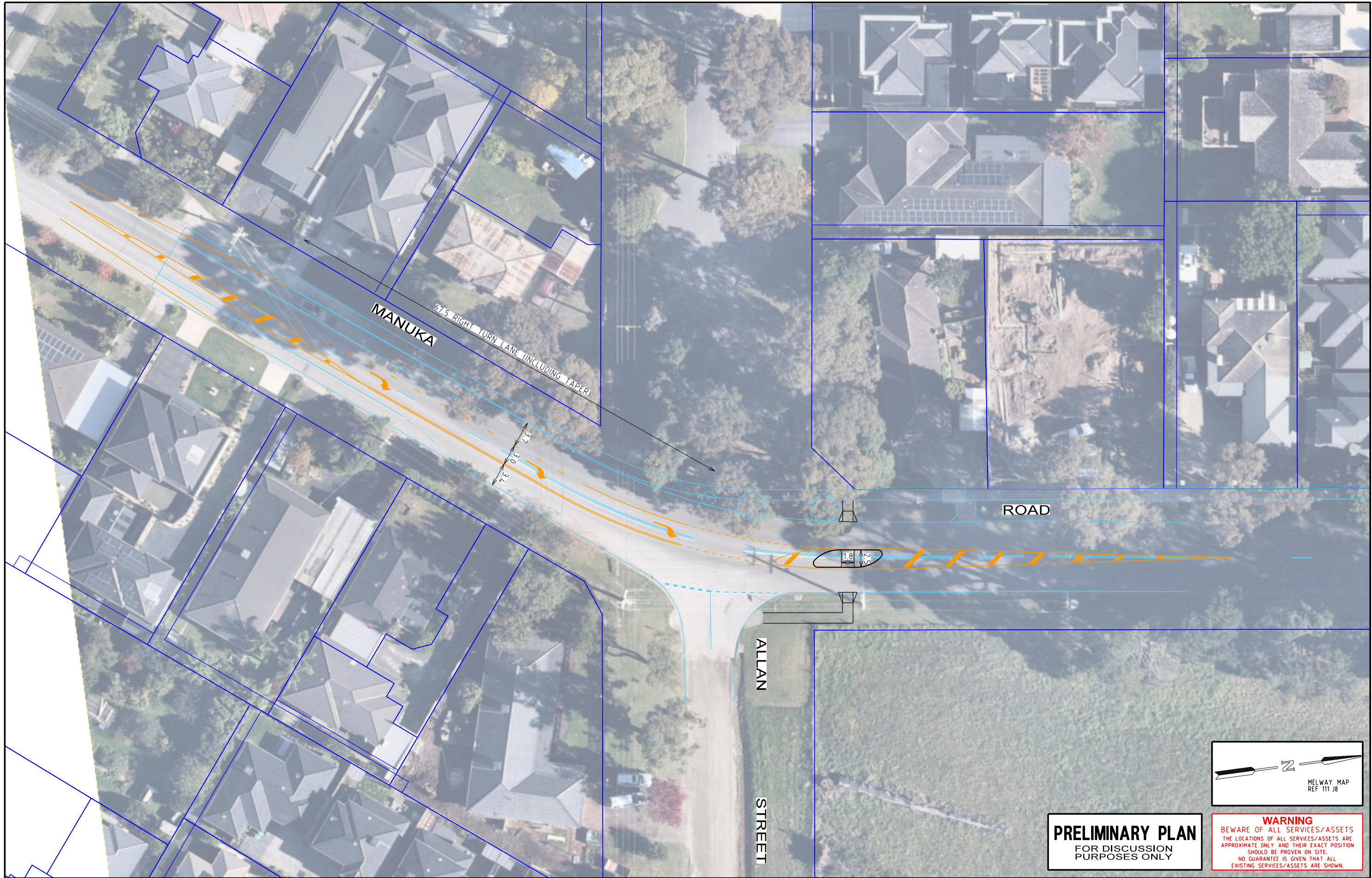
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CHECKED/APPROVED	W DE WAARD 30 JUL 2021
FILE NAME	G27725-01-00.dgn

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**MANUKA ROAD, BERWICK**  
**RIGHT TURN LANE TREATMENT**  
CASEY CITY COUNCIL  
**CONCEPT LAYOUT PLAN**

SCALE 1:500 (A3) 0 2.5 5 7.5 10 SHEET No. 1 OF 2 DWG No. G27725-01-01





ISSUE	ISSUE DESCRIPTION	ISSUE DATE
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CHECKED/APPROVED	W DE WAARD 30 JUL 2021
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**MANUKA ROAD / ALLAN STREET, BERWICK**  
**RIGHT TURN LANE TREATMENT**  
CASEY CITY COUNCIL  
**CONCEPT LAYOUT PLAN**

SCALE 1:500 (A3) 0 2.5 5 7.5 10 SHEET No. 2 OF 2 DWG No. G27725-01-02