Marshall Precinct Structure Plan

Preliminary Transport Infrastructure Assessment

V190014



Prepared for
City of Greater Geelong

9 July 2019

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Shaping the Future

Document Information

Prepared for	City of Greater Geelong
Project Name	Preliminary Transport Infrastructure Assessment
File Reference	V190014REP001D01 - Marshall PSP Transport Assessment TL1.docx
Job Reference	V190014
Date	9 July 2019

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Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
D01	08/07/2019	[redacted]	TL & TM	[redacted]	BCS

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1 Introduction

1.1 Background

The Armstrong Creek growth area covers approximately 2,600 hectares south of the existing Geelong urban fringe between Ghazeepore Road and the Barwon River / Lake Connewarre. The growth area will include residential, employment and activity precincts and will ultimately accommodate a projected 22,000 homes and 22,000 jobs.

Cardno has been engaged by the City of Greater Geelong to provide traffic and transport advice as part of the Marshall Precinct master planning process and to develop and review the transport issues relevant to the Marshall Precinct Structure Plan (Marshall PSP).

This report provides a background review and assessment of existing and proposed road, public transport bicycle and pedestrian provisions relevant to the PSP area and adjacent area and outlines relevant considerations and recommendations to inform the development of the Marshall PSP.

1.2 Referenced Documents

In preparing this report the following documents have been reviewed and considered:

> Greater Geelong Planning Scheme
> Armstrong Creek Urban Growth Plan (13 May 2010)
> Armstrong Creek CIIDP (City of Greater Geelong, February 2010)
> Armstrong Creek Movement and Access Infrastructure Feasibility Draft Phase 1 Traffic Modelling Report (Veitch Lister, July 2008)
> Armstrong Creek North East Industrial Precinct Structure Plan (May 2010)
> Armstrong Creek Horseshoe Bend Precinct Structure Plan (September 2014)
> Keystone Business Park – Precinct Structure Plan Traffic Impact Assessment (GTA Consultants, August 2009)
> Armstrong Creek Horseshoe Bend Precinct Traffic Impact Assessment (Cardno, October 2013)
> Amendment C240 – Greater Geelong Planning Scheme Transport Infrastructure Assessment (Stephen Hunt, Cardno, February 2012)
> Greater Geelong Cycling Strategy – Volume 1 (City of Greater Geelong, March 2008)
> Marshall Precinct Structure Plan – Access Management Plan (DRAFT)
> Geelong Ring Road Extension (Bellarine Link) and Barwon Heads Road Duplication – Stage 2 Future Year Modelling (Jacobs, 14 August 2018)
> Barwon Heads Road Project – Traffic Forecasting Report (WSP, February 2019)

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2 Existing Conditions

2.1 Location

The Marshall Precinct is located in the northern part of the Armstrong Creek Urban Growth Area (ACUGA), to the west of the North East Industrial Precinct (NEIP), the north of the Horseshoe Bend Precinct (HBP) and east of the existing suburb of Grovedale.

Barwon Heads Road runs along the eastern edge of the Precinct with the exception of the north-east corner which is located on the other side (east) of the Barwon Heads Road road reserve, crossing the Geelong-Warrnambool Rail Corridor that extends along the western boundary of the Precinct to the northern tip of the Precinct.

Marshalltown Road runs east-west through the northern half of the Precinct connecting Barwon Heads Road to Surf Coast Highway including a level crossing over the Geelong-Warrnambool rail corridor. East of Barwon Heads Road, Tannery Road is the continuation of Marshalltown Road. Reserve Road extends along the southern boundary of the Precinct, providing a second east-west connection between Barwon Heads Road and Surf Coast Highway as well as a third level crossing of the Geelong-Warrnambool rail corridor.

The northern portion of the Precinct (between Barwon Heads Road and the Geelong-Warrnambool rail corridor, either side of Marshalltown Road) is largely developed as a mix of standard residential lots and includes the Rice Village Retirement Village on the south-west corner of the Barwon Heads Road / Marshalltown Road / Horseshoe Bend Road / Tannery Road intersection and the Marshall Train Station along the western edge of the precinct immediately to the south of Marshalltown Road. The balance of the Precinct is rural and rural residential landholdings.

The Marshall Precinct and surrounding environs is shown in Figure 2-1 with Figure 2-2 showing the precinct in context with the Armstrong Creek Urban Growth Area.

Figure 2-1 Marshall PSP Area

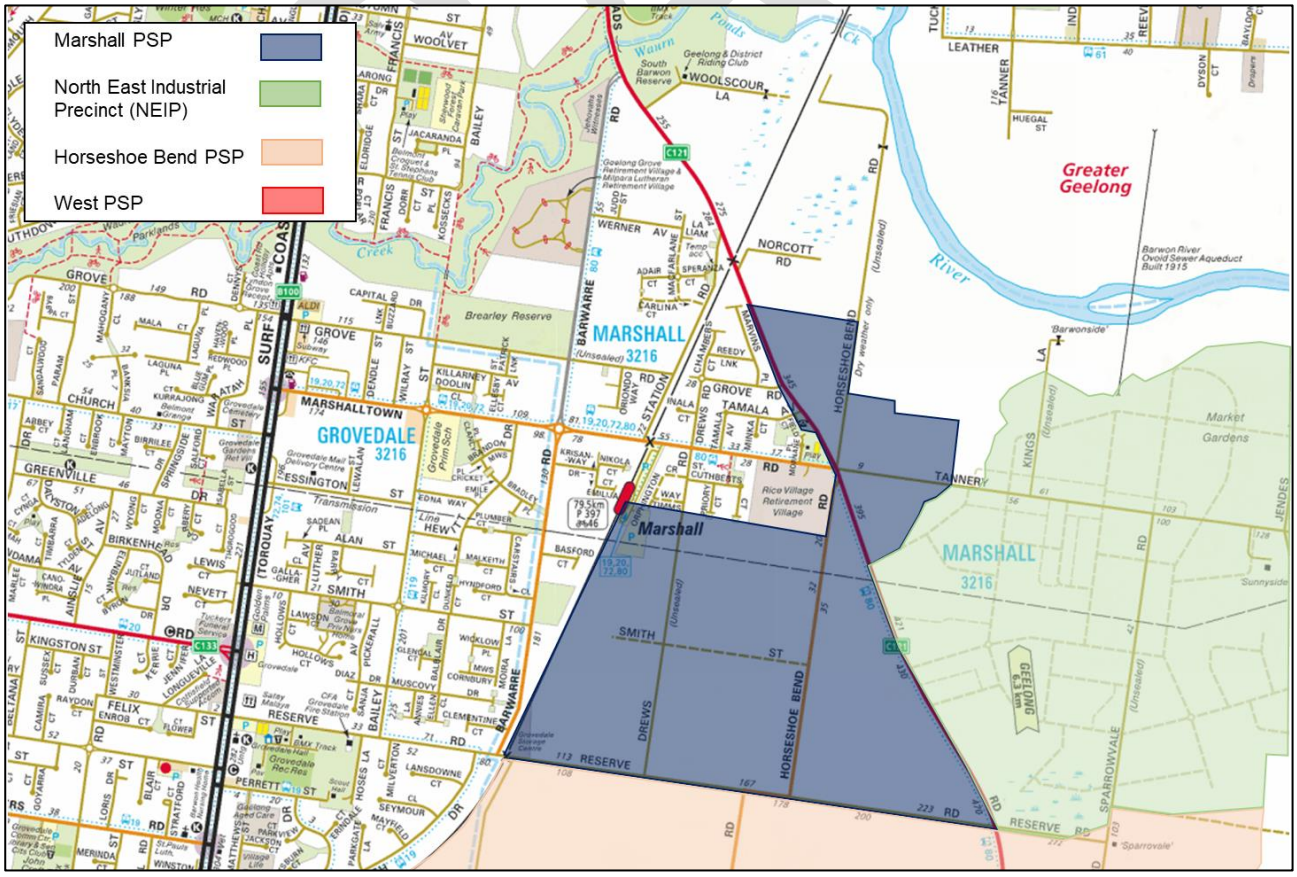
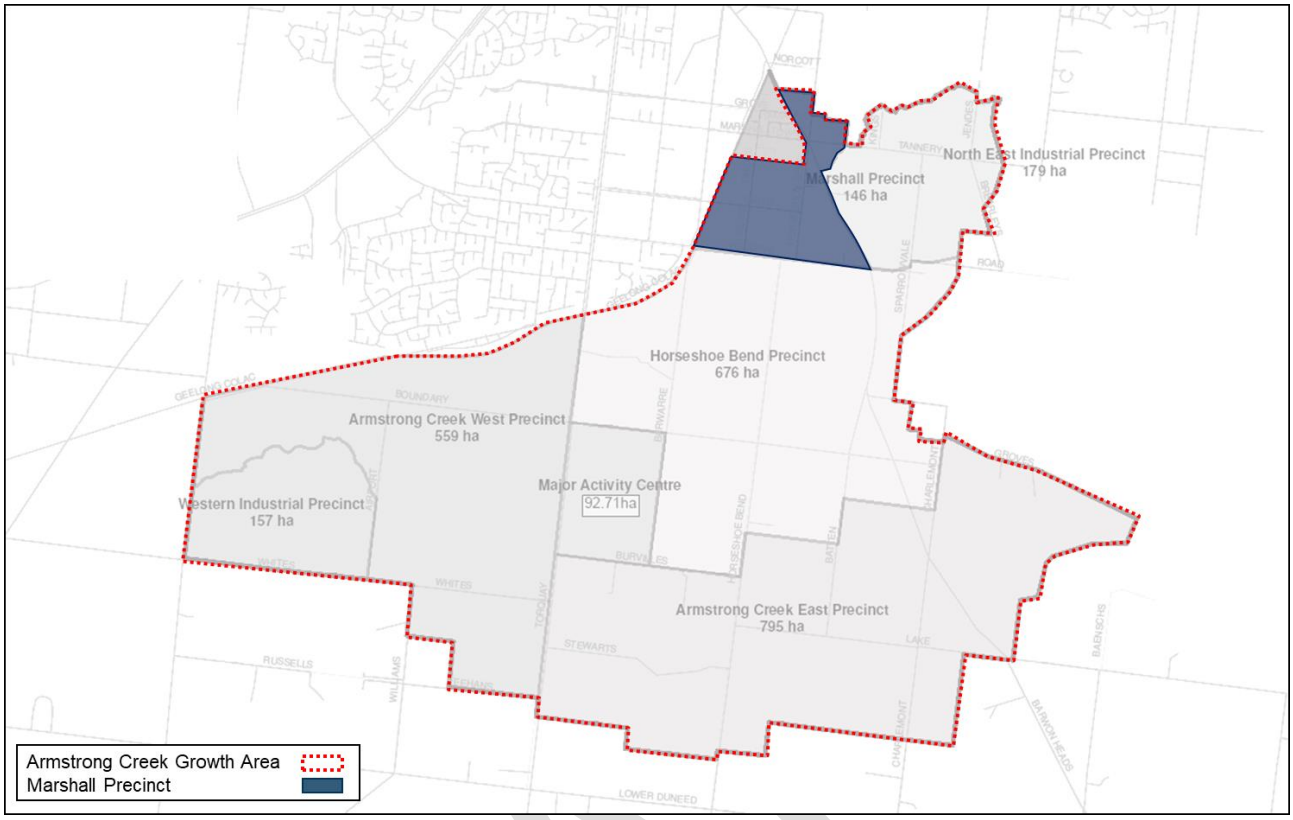


Figure 2-2 Marshall PSP within ACUGA



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2.2 Existing Road Network

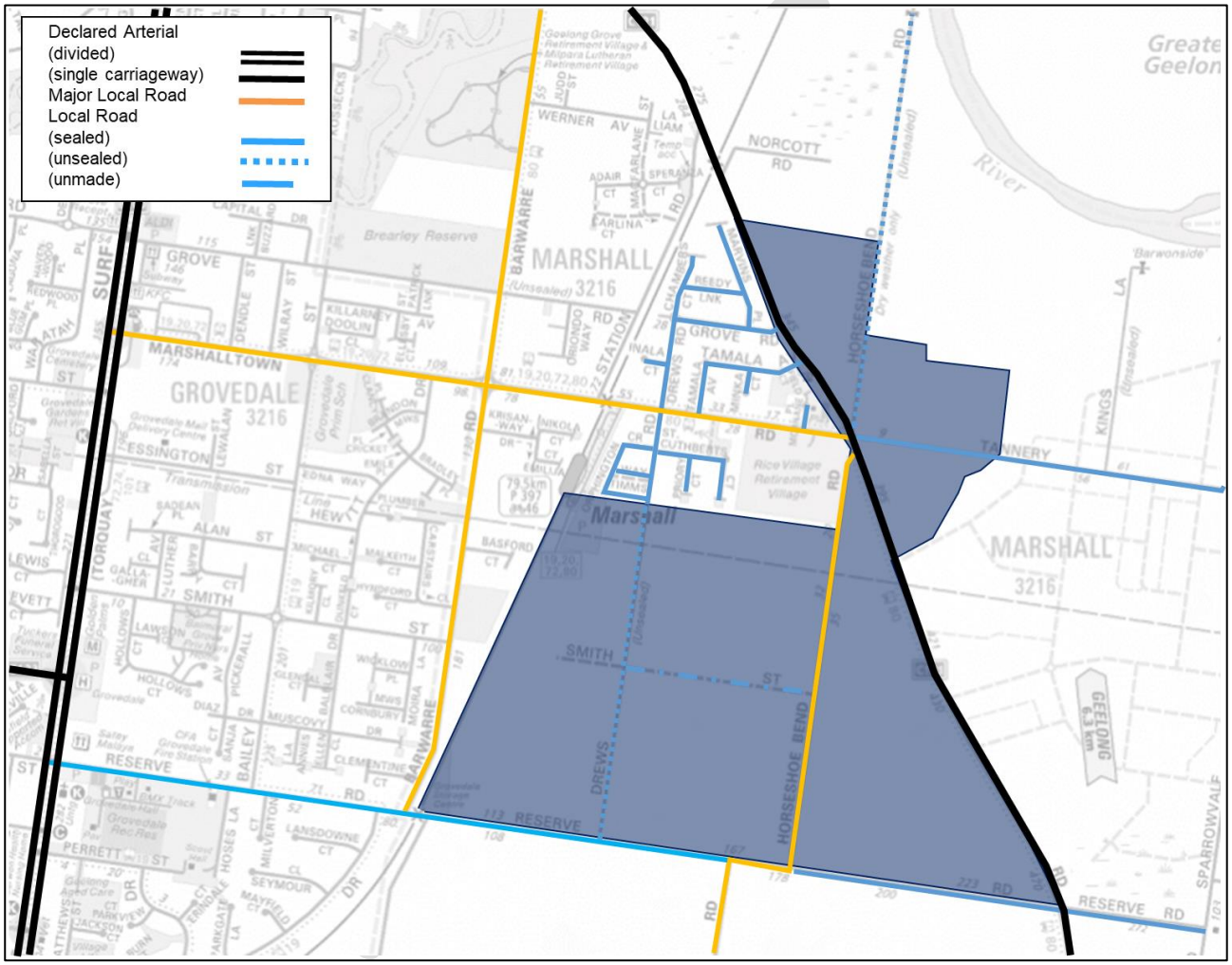
2.2.1 Road Hierarchy

The key existing road network within the Marshall PSP area consists of Barwon Heads Road, Marshalltown Road, Horseshoe Bend Road with Reserve Road extending along the southern interface of the PSP area.

A series of local streets service the existing residential development in the north of the PSP area west of Barwon Heads Road, which includes Drews Road that extends through to Reserve Road to the south as an unsealed rural road. The unmade Smith Street also extends east-west across the southern half of the precinct.

This existing road network is shown in Figure 2-3.

Figure 2-3 Marshall PSP Area – Existing Road Network



2.2.1.2 Barwon Heads Road

Barwon Heads Road is a Declared Main Road and extends across the eastern portion of the precinct and connects Geelong to Barwon Heads and Ocean Grove.

Through the precinct Barwon Heads Road consists of a single carriageway with 3.6 metre traffic lanes in each direction plus sealed shoulders of approximately 1.5 metres shared with cyclists (varies and approximate). In the vicinity of the site Barwon Heads Road currently has a posted speed limit of 80 kilometres per hour.

It is noted that a roundabout was installed in early 2019 at the Barwon Heads Road / Marshalltown Road / Tannery Road / Horseshoe Bend Road intersection, with a new posted speed limit of 60 kilometres per hour on the Barwon Heads Road approaches to the intersection.

It is understood that Barwon Heads Road will be duplicated by Major Road Projects Victoria (MRPV) between 2021-2024 which is further discussed in Section 5.

Barwon Heads Road is shown in Figure 2-4, with the new roundabout intersection shown in Figure 2-4.

Figure 2-4 Barwon Heads Rd, looking South



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Figure 2-5 Barwon Heads Rd / Marshalltown Rd / Tannery Rd / Horseshoe Bend Rd



2.2.1.3 Marshalltown Road / Tannery Road

Marshalltown Road is a connector road that extends between Surf Coast Highway to Barwon Heads Road. Through the Marshall PSP area, Marshalltown Road is constructed with a 12 metre carriageway within a 20 metre road reserve nominally line marked as two, 3.7 metre traffic lanes with 2.3 metre kerbside parking lanes (varies and approximate).

A posted speed limit of 60 kilometres per hour applies. A pedestrian footpath is provided along the southern side of the road only.

Towards the Geelong-Warrnambool rail line level crossing parking lanes are removed and a painted central median is introduced to provide a short right turn lane treatment to the primary Marshall Station vehicle access.

Tannery Road is the continuation of Marshalltown Road east from Barwon Heads Road. The road continues with a 20 metre road reserve but provides a rural standard two-way sealed carriageway of 6 metres with gravel shoulders and grassed verges (varies and approximate).

No footpaths are provided and a posted speed limit of 80 kilometres per hour applies.

Marshalltown Road within the Marshall PSP area is shown in Figure 2-6 .

Figure 2-6 Marshalltown Rd, west from Barwon Heads Rd



2.2.1.4 Reserve Road

Reserve Road extends in an east-west direction from Sparrowvale Road to Surf Coast Highway, along the southern boundary of the Precinct. Between Barwarre Road and Sparrowvale Road, Reserve Road operates as a two-way road and has a sealed carriageway of approximately 6.0 metres and a posted speed limit of 80 kilometres per hour.

West of Barwarre Road and the Geelong-Warrnambool rail line level crossing, Reserve Road has a traditional local street cross section, with kerb and channel and footpaths and parallel parking available on both sides.

A view of Reserve Road as constructed between Barwarre Road and Sparrowvale Road is shown in Figure 2-7.

Figure 2-7 Reserve Rd, looking west from Horseshoe Bend Rd



2.2.1.5 Horseshoe Bend Road

Horseshoe Bend Road functions as a sub-regional connection providing an alternate north-south route between Geelong, at the intersection of Barwon Heads Road and Marshalltown Road, and Torquay to the east of Surf Coast Highway.

Through the Marshall Precinct and south of Barwon Heads Road, Horseshoe Bend Road has a posted speed limit of 80 kilometres per hour and includes a rural standard sealed carriageway approximately 6.5

metres wide with a single traffic lane in each direction within a road reserve of approximately 20 metres. North of Barwon Heads Road, Horseshoe Bend Road continues with an unsealed single lane carriageway of approximately 4.0 metres wide that meanders within the road reserve responding to roadside vegetation and hazards.

A view of Horseshoe Bend Road south from Barwon Heads Road is shown in Figure 2-8.

Figure 2-8 Horseshoe Bend Rd, looking south from Barwon Heads Rd



2.2.1.6 Drews Road

Drews Road extends north from Reserve Road across Marshalltown Road to Grove Road. A road reserve of 20 metres is provided but varying carriageway cross sections apply (varies and approximate).

North of Marshalltown Road a 7.3 metre standard local access street carriageway is provided. Footpaths are not provided and a default 50 kilometre per hour speed limit applies. Immediately south of Marshalltown Road, through existing residential development areas, Drews Road has been constructed with a 9.8 metre wide carriageway that allows for kerbside parking clear of two traffic lanes, with footpaths along both sides.

Further south beyond the existing limit of development and through to Reserve Road, the carriageway reverts to an unsealed 6.5 metre wide rural cross section, with a significant table drain along the eastern side of the road reserve between Reserve Road and Smith Street. The applicable speed limit along this section of Drews Road is nominally 50 kilometres per hour noting an absence of speed limit signage.

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Figure 2-9 Drews Rd, south from Marshalltown Rd



Figure 2-10 Drews Rd, north from Reserve Rd



2.2.1.7 Smith Street

Smith Street is an unmade road that extends across the southern portion of the PSP area east from the Geelong-Warrnambool rail corridor to Horseshoe Bend Road.

The Smith Street road reserve includes areas of significant vegetation as well as a major open table drain that, prior to Horseshoe Bend Road, extends to the north-east across Barwon Heads Road towards Barwon River.

2.2.2 Existing Traffic Volumes

Traffic volume data for roads within the Marshall PSP area and surrounds has been obtained from multiple sources, with data provided by VicRoads, City of Greater Geelong and from a series of turning movement vehicle counts commissioned by Cardno in November 2015.

From the turning movement counts, daily traffic volumes along Barwon Heads Road through and adjacent the PSP area are as follows:

Barwon Heads Road

- North of Marshalltown Road — 10,000 vehicles per day
- South of Marshalltown Road — 9,000 vehicles per day
- South of Reserve Road — 9,700 vehicles per day

These volumes compare with available data from VicRoads near Lower Duneed Road to the south which indicates a daily traffic volume of 10,800 vehicles per day. Additionally, VicRoads data indicates that Barwon Heads Road carries in the order of 20,800 vehicles per day near Breakwater Road to the north.

Historical advice for Barwon Heads Road provided by Vic Roads indicates that traffic volumes on Barwon Heads Road experience seasonal variations, with the peak holiday volumes up to 30 percent higher than non-peak volumes.

Recorded traffic volumes on other roads within and serving the Marshall PSP area are summarised as follows and presented in Figure 2-11.

Marshalltown Road

- West of Barwon Heads Road — 1,950 vehicles per day
- East of Barwarre Road — 3,600 vehicles per day
- West of Barwarre Road — 7,600 vehicles per day

Tannery Road

- East of Barwon Heads Road — 225 vehicles per day

Horseshoe Bend Road

- North of Barwon Heads Road — 15 vehicles per day
- South of Barwon Heads Road — 1,850 vehicles per day

Drews Road

- South of Marshalltown Road — 150 vehicles per day

Reserve Road

- West of Barwon Heads Road — 1,000 vehicles per day
- Between Horseshoe Bend Road and Horseshoe Bend Road — 2,500 vehicles per day
- East of Barwarre Road — 1,800 vehicles per day
- West of Barwarre Road — 4,300 vehicles per day

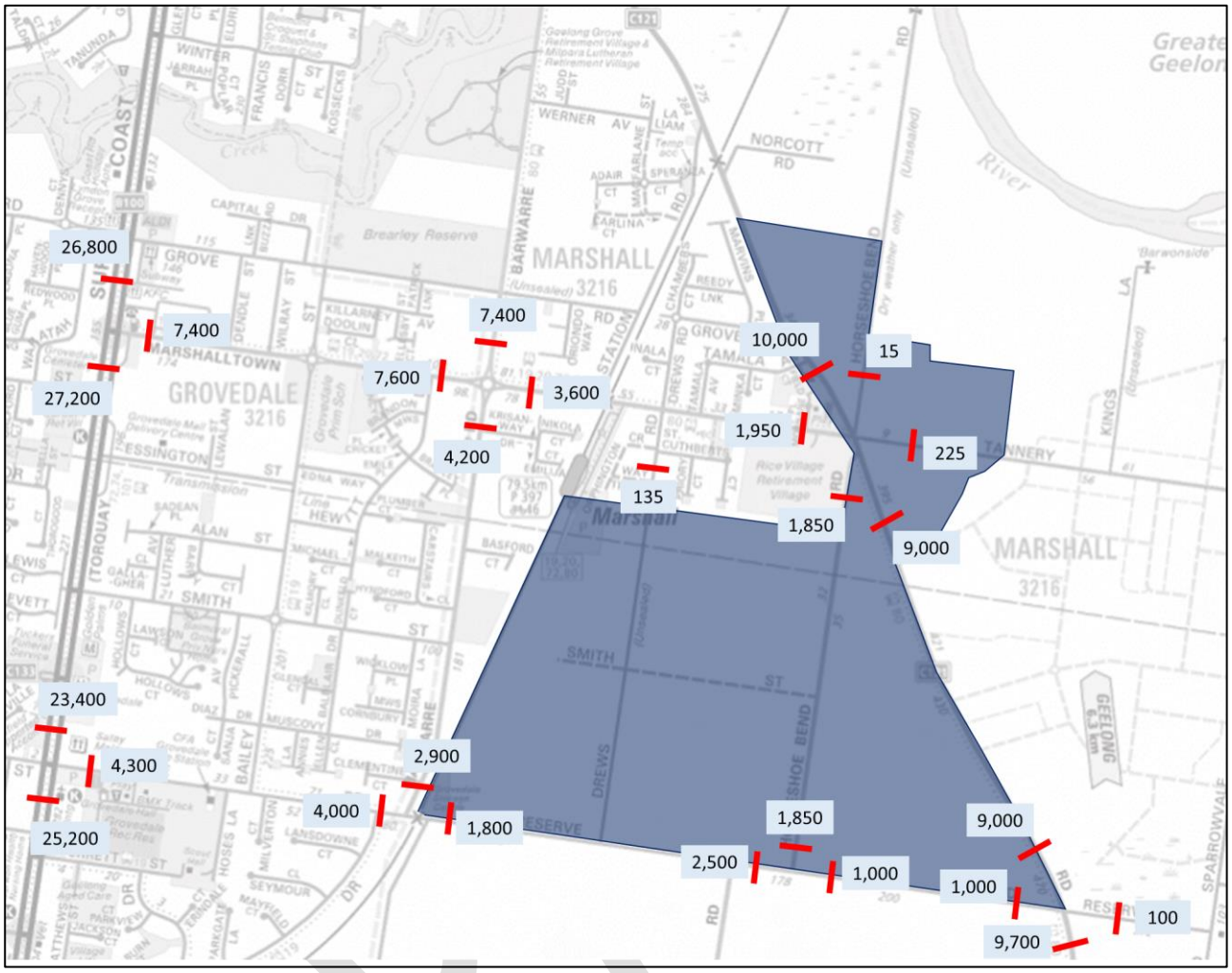
The November 2015 turning movement counts also captured vehicle movements along Barwarre Road to the east of the Marshall PSP, with current daily volumes based on these counts as follows:

Barwarre Road

- North of Marshalltown Road — 7,400 vehicles per day
- South of Marshalltown Road — 4,200 vehicles per day
- North of Reserve Road — 2,900 vehicles per day

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Figure 2-11 Existing Road Network Daily Traffic Volumes (Two-way, November 2015)



On the basis of the above, excluding Barwon Heads Road, traffic volumes on streets within the Marshall PSP area are higher than would be expected if catering for precinct traffic only but are generally within target amenity based thresholds for the applicable road classifications and reflect the known use of local precinct roads as sub-regional routes for traffic moving between Barwon Heads Road and Surf Coast Highway and sub-regional and regional traffic moving between Breakwater Road and areas further east to Surf Coast Highway, the Geelong Ring Road and areas further south and west.

Noting the current limited level of development along Horseshoe Bend Road within the Precinct, the bulk of traffic observed along Horseshoe Bend Road south of Barwon Heads Road appears to primarily comprise through vehicle trips and trips continuing to Horseshoe Bend Road south of Reserve Road or to Reserve Road to Surf Coast Highway.

Outside of the Precinct, a similar traffic pattern is evident across Barwarre Road, Marshalltown Road and Reserve Road, with significant volumes moving north-east to south-west, with the extent of this most evident by the left turn movements from, and right turn movements to, Reserve Road at Surf Coast Highway.

Figure 2-12 Existing Road Network Intersection Peak Hour Turning Movement Volumes (AM (PM), November 2015)



2.2.2.2 Key External Intersection Operation

Whilst external to the PSP area, Marshalltown Road and Reserve Road to the west will act as key access roads to the Precinct. As discussed in Section 2.2.2, significant levels of traffic currently use these roads, along with Barwarre Road, as a sub-regional route between Breakwater Road and areas further east to Surf Coast Highway, the Geelong Ring Road and areas further south and west.

Based on peak hour turning movement counts undertaken and presented in Figure 2-12, this existing traffic is choosing to use both the Surf Coast Highway / Marshalltown Road and Surf Coast Highway / Reserve Road intersections.

To understand current operating conditions, analysis of the existing peak hour operation of these intersections has been undertaken using SIDRA Intersection. SIDRA Intersection is a computer program, originally developed by the Australian Road Research Board that provides information about the capacity of an intersection in terms of a range of parameters, as described below:

The *Degree of Saturation (DOS)*[1] is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement.

The *95th Percentile (95%ile) Queue* represents the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour.

The *Average Delay* represents the average time, in seconds, taken for each vehicle passing through the intersection to approach and enter the intersection.

Based on the recorded volumes presented in Figure 2-12 and existing intersection configurations, the current modelled operating conditions are presented in Table 2-1, Table 2-2 and Table 2-3.

Whilst operating within theoretical capacity, from this analysis it is evident that the Surf Coast Highway / Marshalltown Road intersection is approaching its practical operational limit, with long vehicle queues and significant delays on all approaches during each peak hour. This is no unexpected given existing traffic volumes at this location and given Marshalltown Road provides the only currently signalised intersection access with Surf Coast Highway in the local area.

Table 2-1 Surf Coast Hwy / Marshalltown Rd SIDRA Analysis – Existing Conditions

Peak	Approach	D.O.S	Average Delay (sec)	95th Percentile Queue (m)
AM	Surf Coast Hwy (S)	#0.79	20 sec	287 m
	Marshalltown Rd (E)	0.79	55 sec	107 m
	Surf Coast Hwy (N)	0.79	45 sec	153 m
PM	Surf Coast Hwy (S)	#0.91	60 sec	236 m
	Marshalltown Rd (E)	0.91	63 sec	136 m
	Surf Coast Hwy (N)	0.90	38 sec	344 m

 # - Intersection D.O.S.

Given the limited capacity at the Marshalltown Road / Surf Coast Highway intersection (especially in the PM peak hour), a significant level of traffic is observed using the unsignalised Reserve Road / Surf Coast Highway intersection. Analysis of the operation of this intersection is presented in Table 2-2.

[1] DOS ratings and the corresponding LOS are shown in the table below

LOS		Signals	Roundabouts	Sign control
Excellent	A	x ≤ 0.60	x ≤ 0.60	x ≤ 0.60
Very Good	B	0.60 < x ≤ 0.70	0.60 < x ≤ 0.70	0.60 < x ≤ 0.70
Good	C	0.70 < x ≤ 0.90	0.70 < x ≤ 0.85	0.70 < x ≤ 0.80
Fair	D	0.90 < x ≤ 0.95	0.85 < x ≤ 0.95	0.80 < x ≤ 0.90
Poor	E	0.95 < x ≤ 1.00	0.95 < x ≤ 1.00	0.90 < x ≤ 1.00
Very Poor	F	1.00 < x	1.00 < x	1.00 < x

Table 2-2 Surf Coast Hwy / Reserve Rd SIDRA Analysis - Existing Conditions

Peak	Approach	D.O.S	Average Delay (sec)	95th Percentile Queue (m)
AM	Surf Coast Hwy (S)	#0.41	1 sec	5 m
	Reserve Rd (E)	0.31	46 sec	12 m
	Surf Coast Hwy (N)	0.21	1 sec	1 m
	Felix St (W)	0.21	49 sec	5 m
PM	Surf Coast Hwy (S)	0.41	3 sec	2 m
	Reserve Rd (E)	#0.97	100 sec	12 m
	Surf Coast Hwy (N)	0.41	1 sec	2 m
	Felix St (W)	0.04	38 sec	1 m

 # - Intersection D.O.S.

The above analysis indicates that the operation of the Reserve Road / Surf Coast Highway is critical in the PM peak hour with a DOS at or above its theoretical practical limit of capacity which is due to the significant left turn movement (to the south) and corresponding limited gaps in southbound traffic on Surf Coast Highway at this time.

Acknowledging the significant north to west movements through the Barwarre Road / Marshalltown Road roundabout, analysis of the existing peak hour operation of has also been undertaken, with the results summarised in Table 2-3.

Table 2-3 Barwarre Rd / Marshalltown Rd SIDRA Analysis - Existing Conditions

Peak	Approach	D.O.S	Average Delay (sec)	95th Percentile Queue (m)
AM	Barwarre Road (S)	0.31	7 sec	14 m
	Marshalltown Road (E)	0.21	7 sec	9 m
	Barwarre Road (N)	0.24	8 sec	10 m
	Marshalltown Road (W)	#0.33	7 sec	15 m
PM	Barwarre Road (S)	0.17	8 sec	7 m
	Marshalltown Road (E)	0.24	8 sec	11 m
	Barwarre Road (N)	#0.47	8 sec	25 m
	Marshalltown Road (W)	0.37	6 sec	19 m

 # - Intersection D.O.S.

The above indicates that despite the heavily biased movements north to west, the existing roundabout operates well with significant spare capacity.

2.3 Sustainable Transport

2.3.1 Public Transport

The existing Marshall Station and bus interchange are located in the west of the precinct and noting the route 55 Geelong to Barwon Heads / Ocean Grove bus service extends through the area via Marshalltown Road and Barwon Heads Road, the Marshall PSP area has good access to existing public transport, especially when considered against the balance of the ACUGA.

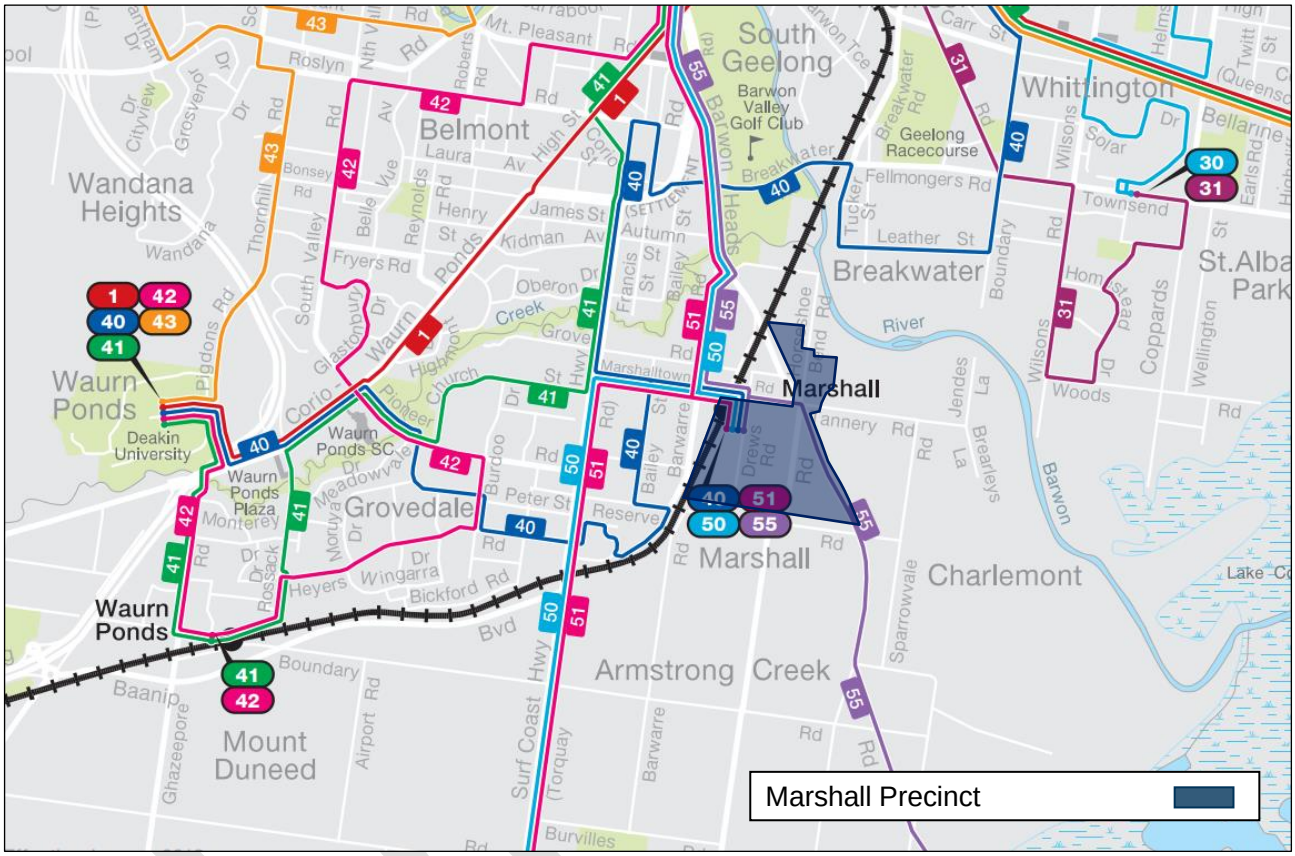
The Marshall Station is serviced by the Waurn Ponds-Southern Cross and Warrnambool V-Line services and provides significant on-site parking primarily used by commuters. In addition to the route 55 service, a further three bus services frequent the Marshall Station interchange, with a taxi rank also provided at the Station.

Existing public transport routes are summarised in Table 2-4 and shown in Figure 2-14 on the following page.

Table 2-4 Public Transport

Service	Route	Route	Stop Locations
Bus	40	Geelong City – Breakwater – Deakin Uni.	Marshall Station
	50	Geelong City – Wombah Park – Jan Juc	Marshall Station
	51	Geelong City – Torquay – Jan Juc	Marshall Station
	55	Geelong City – Barwon Heads – Ocean Grove	Marshall Station / Marshalltown Rd
Train (V/Line)	Geelong - Warrnambool Line		Marshall Station

Figure 2-13 Public Transport Map



source: www.ptv.vic.gov.au

2.3.2 Pedestrian and Bicycle Network

Formal pedestrian paths and facilities are generally provided within all roads serving existing residential development at the northern end of the PSP area only. Notably Drews Road north of Marshalltown Road and south of Grove Road does not include footpaths within the road reserve and a footpath is only provided along the south side of Marshalltown Road.

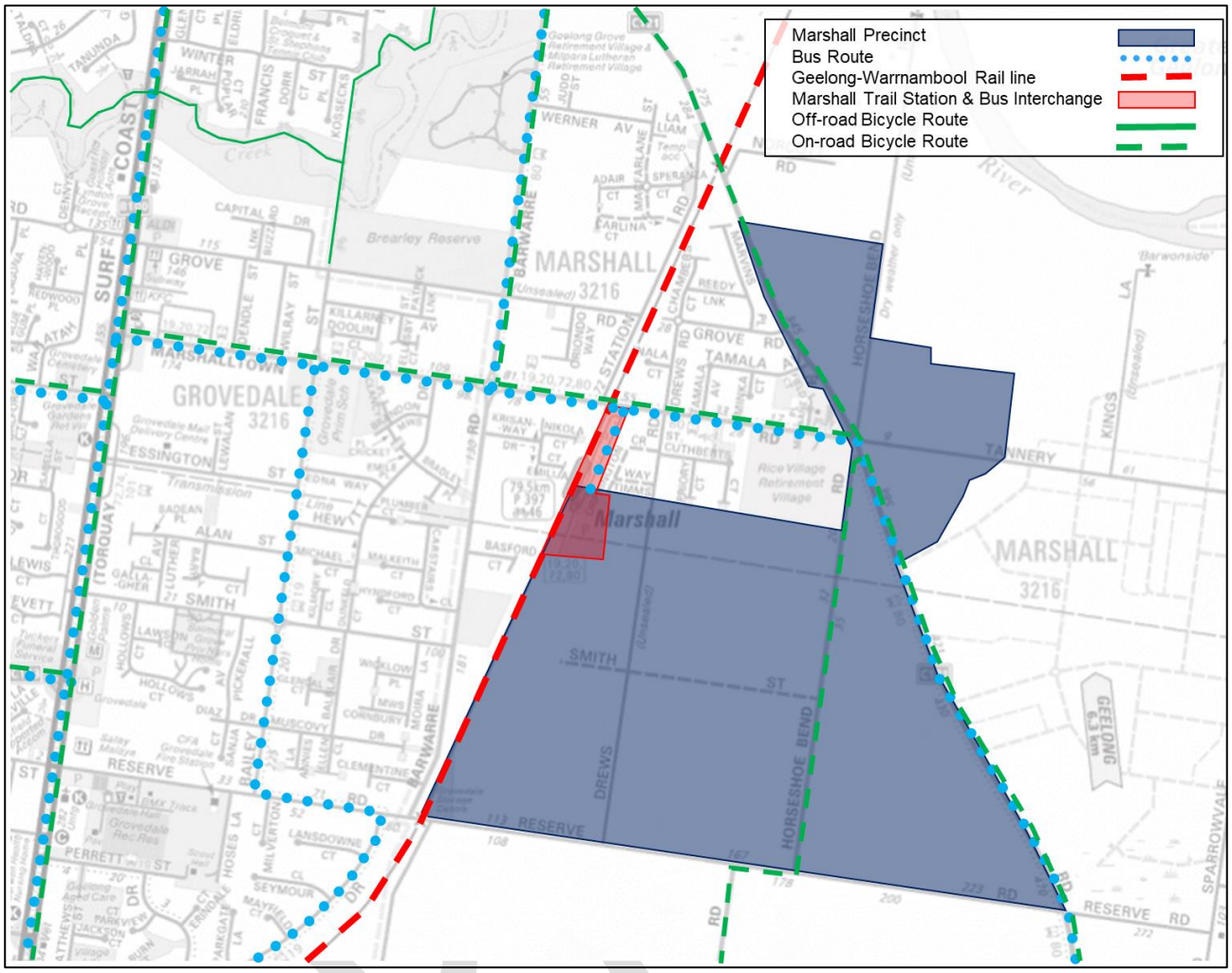
Barwon Heads Road is identified as part of the existing Greater Geelong on road cycle network within the Greater Geelong Cycle Strategy with cyclists catered for via sealed 1.5m shoulders (approximate).

Horseshoe Bend Road south of Barwon Heads Road, and Marshalltown Road are also identified as part of the on road cycle network within the Greater Geelong Cycle Strategy, however it is noted that neither currently provide any formal provision (such as sealed shoulders or separate cycle lanes) with cyclists sharing traffic lanes with vehicle traffic.

The Marshall PSP is in close proximity to the Waurn Ponds shared user trail bicycle route, which provides connectivity to Waurn Ponds to the west and central Geelong to the north via the Barwon River shared user trail.

Existing bicycle routes are shown in Figure 2-14 on the following page.

Figure 2-14 Existing Public Transport and Bicycle Routes



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3 Armstrong Creek Urban Growth Plan

The Armstrong Creek Urban Growth Plan (ACUGP) adopted by the City of Greater Geelong in May 2008 outlines Council's vision for the development of the growth area and provides planning and design principles, and key concepts to guide development in the growth area.

3.1 ACUGP Transport Objectives

With regard to transport, the Armstrong Creek Urban Growth Plan seeks to encourage a more sustainable outcome than traditional greenfield residential subdivision development by;

> Providing high-quality public transport services and ensuring dwellings are within a short walk of public transport services; and

> Designing the internal road network to provide good vehicle access throughout the growth area as well as providing for a comprehensive network of safe, direct and attractive cycle paths and footpaths for commuter and recreational purposes.

It is hoped that by adopting the above and the other planning and design principles outlined within the Urban Growth Plan future residents will be encouraged to use alternate modes of transport, reducing the reliance on private care use, and will have a more active and healthy lifestyle.

Traffic and transport planning/design principles and key concepts detailed within the Armstrong Creek Urban Growth Plan that relate to the Eastern Precinct are summarised below.

3.1.1 Road Network

Local road networks within each precinct should be based around appropriately spaced connectors that distribute traffic to lower order streets providing access to individual properties. Arterial roads should be duplicated if more than four lanes wide.

Provision should be maintained for Barwon Heads Road to be widened to two lanes in each direction.

Higher order (level 2) connector streets should be provided across the growth area spaced approximately 800 metres apart and aligned to provide convenient access to the activity centres. These streets should be designed in accordance with Clause 56 of the Greater Geelong Planning Scheme and have a single traffic lane in each direction, on-road bicycle provisions and allow for kerbside parking on both sides.

The local street network should be highly inter-connected, in accordance with Clause 56 of the Greater Geelong Planning Scheme, with most local streets connected at both ends.

3.1.2 Public Transport

The scale of the growth area offers the opportunity to plan a comprehensive tiered local public transport system from the outset of development. This system should incorporate or be integrated with key routes into central and North Geelong.

This public transport system should:

> Ultimately travel on routes that link all activity nodes and pass within 600 metres of 90 percent of dwellings;

> Be frequent enough that passengers are willing to just turn up without consulting a timetable;

> Incorporate stops with a high level of passenger amenity at appropriate spacings to minimise walking distances; and

> For services sharing road space and where practical/necessary, be given priority over private vehicles.

Public transport services should be provided at the outset of the development to encourage patterns of public transport use. Additional local specialised bus services should be provided to cater for special needs, such as "night rider" and community buses.

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3.1.3 Pedestrian and Bicycle Connectivity

A comprehensive pedestrian and bicycle path network should be provided, integrated with existing and proposed external municipal bicycle network links along Surf Coast Highway, Mt Duneed Road, Barwon Heads Road, Horseshoe Bend Road and Boundary Road and off road trails through the linear parks.

Shared pedestrian/cycle paths will also connect to the ACTC and Neighbourhood Activity Centres with safe crossing facilities to be provided at arterial and connector road crossings.

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4 Adjacent PSP Areas

4.1 Horseshoe Bend Precinct (HBP)

The HBP is to the south of the Marshall PSP area and was completed in September 2014. When development within the HBP is complete it include in the order of 7,060 dwellings, approximately 3.5 hectares allocated to retail/commercial uses across a Neighbourhood Activity Centre (NAC) and two Local Activity Centres (LAC) sites, as well as a number of schools sites and recreational precincts.

Reserve Road forms the interface between the Marshall and HBP PSP areas with future road cross sections and alignments acknowledging the extension of the Geelong Ring Road (GRRE / Baanip Boulevard) to Barwon Heads Road (but not beyond). As noted previously, a public acquisition overlay exists for the delivery of this section of the GRRE / Baanip Boulevard.

4.2 North East Industrial Precinct (NEIP)

The NEIP is located directly east of the Marshall PSP area with Barwon Heads Road forming much of the interface between the two precincts with the exception of the areas either side of Tannery Road and east of Barwon Heads Road.

As identified within the NEIP PSP, proposed land uses extend across commercial, industrial and retail uses with a total net developable area of approximately 140 hectares with an estimated total building footprint of 715,200 square metres.

Primary vehicle access to the NEIP is proposed via a major signalised access intersection approximately mid-way along the precinct's Barwon Heads Road frontage, with a second signalised access intersection to the future GRRE (discussed further in Section 5) just east of Barwon Heads Road. Secondary access is to be provided from a left in / left out at the northern edge of the Barwon Heads Road interface as well as via Tannery Road.

The NEIP PSP was adopted in May 2010, but little development activity has occurred within this precinct to date.

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5 Future Transport Infrastructure

5.1 Barwon Heads Road Duplication

Major Road Projects Victoria (MRPV) are currently working on the tender design of the Barwon Heads Duplication project which is understood to be implemented between 2021 and 2024. The first stage of the project is to duplicate Barwon Heads Road between Settlement Road and Reserve Road.

To allow for the duplication of Barwon Heads Road south of Marshalltown Road and through the ACUGA, land adjacent to the existing Barwon Heads Road road reserve has been secured by way of a public acquisition overlay (PAO) in conjunction with the NEIP, HB and East Precinct Structure Plans. Between Reserve Road and Marshalltown Road this PAO is to the east of the existing road reserve (see Figure 5-1). North of Marshalltown Road, through to the intersection with Breakwater Road, at 41.0 metres typically, the existing road reserve is sufficient to provide for the duplication.

VicRoads has advised that the future Barwon Heads Road duplicated cross section will be generally consistent with that identified within the HB PSP.

The configuration of the Barwon Heads Road / Marshalltown Road / Tannery Road / Horseshoe Bend Road intersection is proposed to be modified to a four-leg signalised intersection with Horseshoe Bend Road being truncated to the north and south of Marshalltown Road.

It is noted that as an interim measure this intersection was upgraded to a five-leg roundabout in early 2019, with the southern leg of Horseshoe Bend Road providing left-out / right-in / left-in access in close proximity to the south of the roundabout.

The following proposed intersection upgrades are also considered to be relatively set:

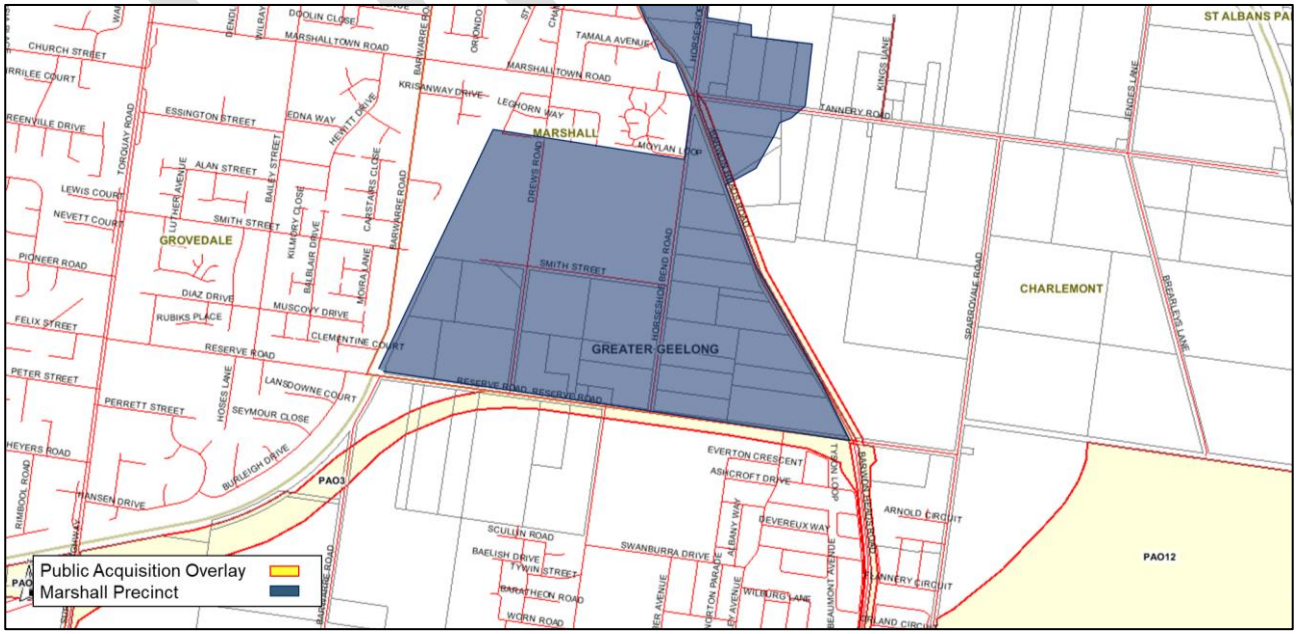
> Barwarre Road will remain connected to Barwon Heads Road via an all-movements signalised intersection;

> Station Road will remain connected to Barwon Heads Road via grade separation and two separate left-in / left-out intersections;

> Grove Road will no longer have direct access to Barwon Heads Road, which will create a local loop back to Marshalltown Road via Tamala Avenue; and

> A new four-leg signalised intersection will be constructed approximately 700m south of Marshalltown Road providing access to the Marshall PSP to the west and NEIP to the east.

Figure 5-1 Barwon Heads Road Public Acquisition Overlay



source: www.land.vic.gov.au

5.2 Geelong Ring Road Extension (GRRE / Bellarine Link)

Resolved in conjunction with the HB PSP, a public acquisition overlay (PAO) also extends west from Barwon Heads Road along Reserve Road before turning to the south-west prior to the Geelong-Warrnambool rail corridor to facilitate the future extension of the Geelong Ring Road (Bellarine Link) to Barwon Heads Road by VicRoads (see Figure 5-1).

As depicted in Figure 5-2, a further extension of the GRRE, also known as Bellarine Link, is proposed to continue further north east beyond Barwon Heads Road including major intersections at Drews Road and Barwon Heads Road (along the section previously proposed to Barwon Heads Road). It is noted that the proposed major intersection with Drews Road is to include an additional fourth-leg with Horseshoe Bend Road realigned to the south as a signalised intersection access, as proposed within the HB PSP.

Additional proposed intersection treatments include:

> Horseshoe Bend Road (north of Reserve Road) will connect to Bellarine Link as a left-in / left-out intersection;

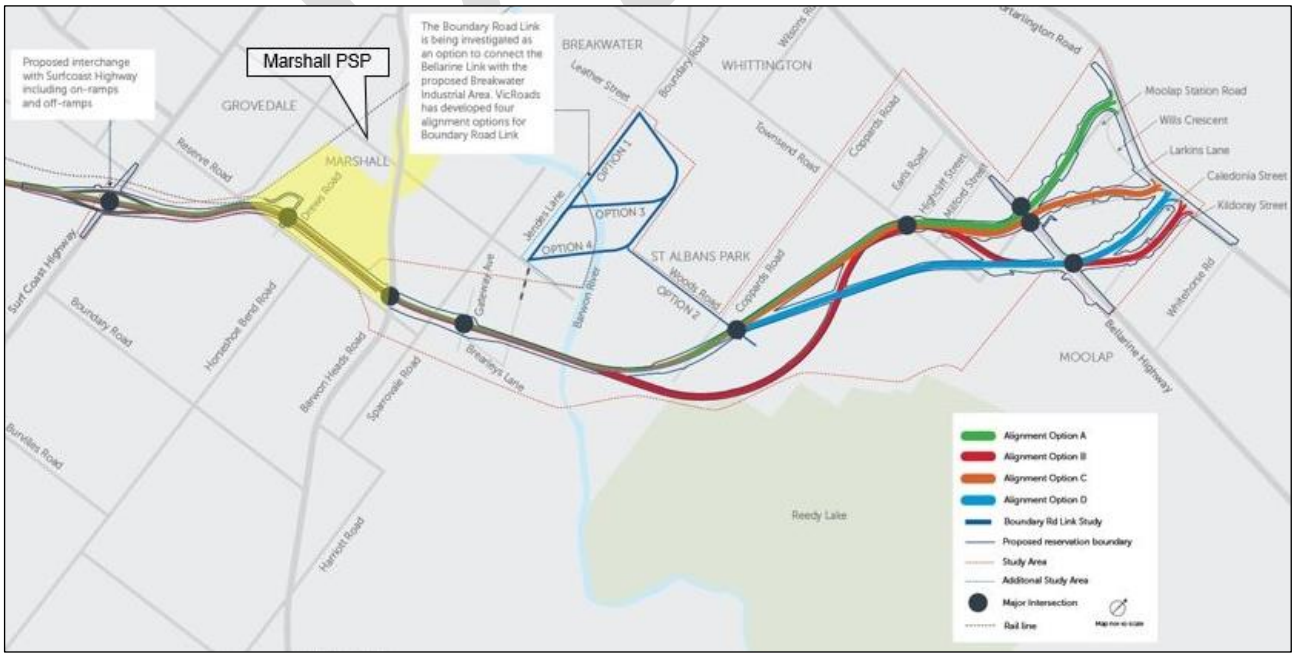
> Barwon Heads Road will connect to Bellarine Link at an all movements signalised intersection under the ultimate configuration;

> Reserve Road will not have direct connection to Bellarine Link, so Reserve Road will need to be realigned to an appropriate internal road network alignment.

The GRRE is currently in the planning phase, with detailed technical investigations and community consultation having been undertaken and a preferred route identified. The project is in the process of being referred to the Planning Minister for Environment Effects Statement (EES) consideration. Following this, a Planning Scheme Amendment process will be required in order to establish a new PAO extending to the east from the existing PAO located along the southern boundary of the Marshall PSP.

Accordingly, the timing of delivery of the GRRE is currently unknown, with the road network developed as part of the HB PSP reflecting this and considering interim and ultimate network scenarios, including the interim function of Reserve Road.

Figure 5-2 Geelong Ring Road Extension



source:www.regionalroads.vic.gov.au

It is further noted that where the GRRE is proposed to form a connection with Portarlington Road, the land to the northeast of the potential intersections is subject to the draft Moolap coastal strategic framework plan (April 2017).

The draft framework plan is a long-term vision for this area known as Point Henry, proposing a vision and principles to guide the future of the area over the next 20 to 30 years and identifies a mix of future land uses potentially abutting Portarlington Road, including residential, industrial and environmental/tourism uses.

5.3 Adjacent PSP Transport Networks

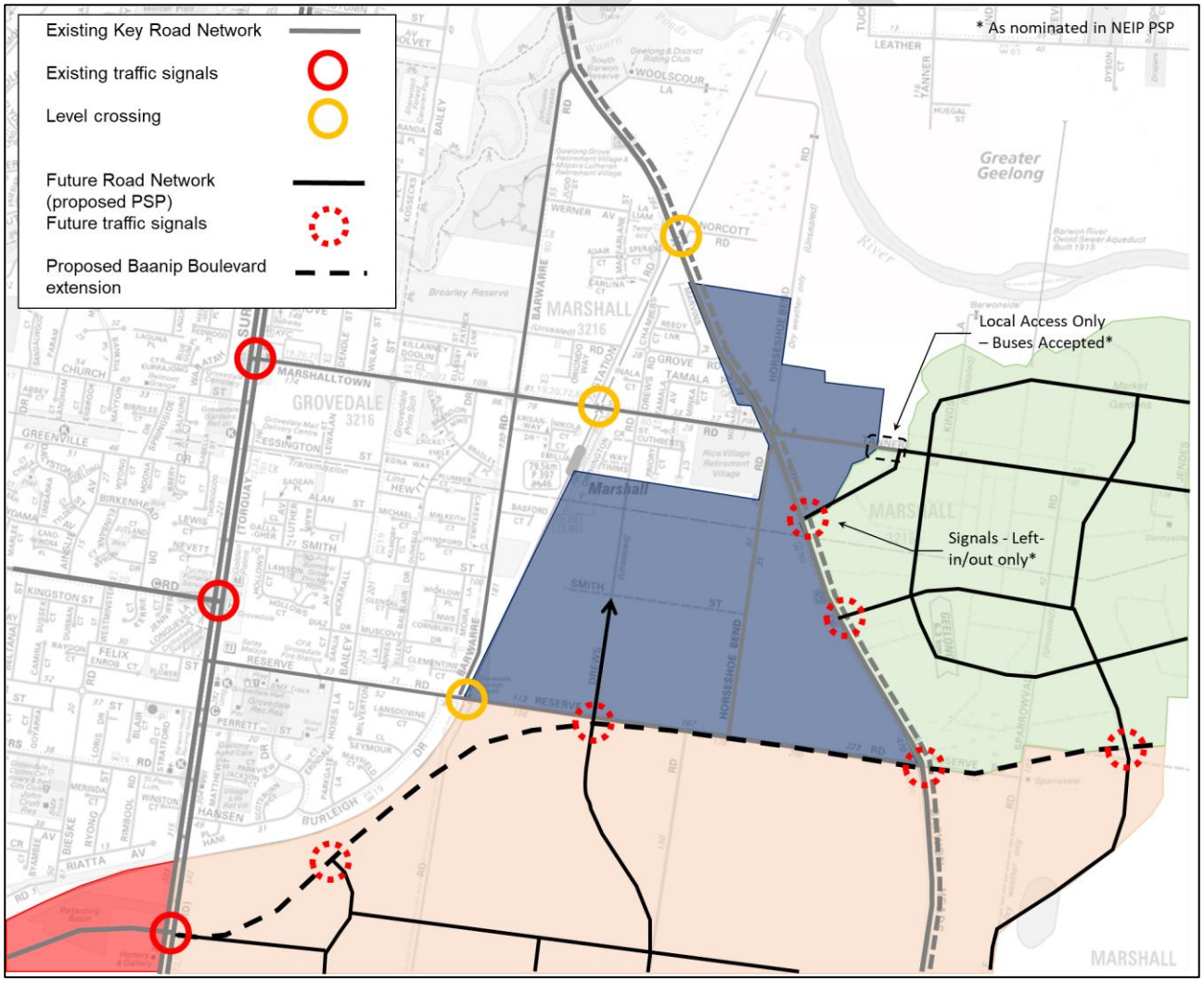
5.3.1 Future Road Network Connections

The future road network, including interface road and intersections, to be delivered as part of the adjacent PSP area are shown in Figure 5-3.

Key to the Marshall PSP area are the NEIP Barwon Heads Road access points, notably the southern fully directional signalised intersection, and the realigned Horseshoe Bend Road and Horseshoe Bend Road / Reserve Road / Drews Road intersection as part of the HBPSP.

As identified within the HBPSP, this intersection will be delivered as a standard signalised cross with Reserve Road as the east and west approaches. As part of the delivery of the GRRE, the western approach will continue to the south-west, with the alignment of Reserve Road west to be resolved as part of the Marshall PSP.

Figure 5-3 Adjacent PSP Areas – Road Networks



5.3.2 Public Transport, Bicycle and Path Networks

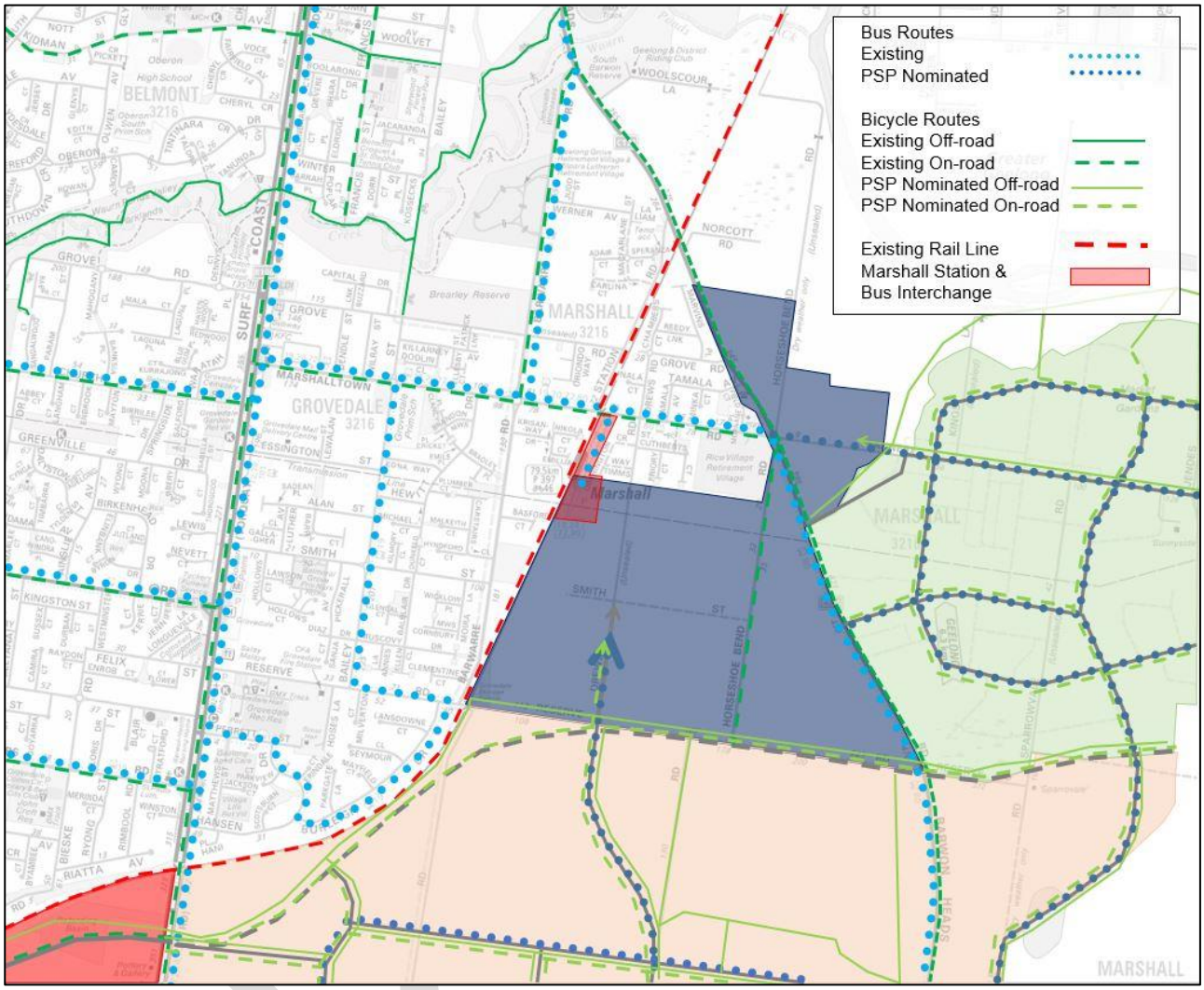
Similarly, both adjacent PSP areas allow for significant public transport routes and include extensive on-road bicycle and off-road bicycle / shared path networks.

Of specific relevance to the Marshall PSP area, bus routes are contemplated along the realigned Horseshoe Bend Road within the HB PSP and along the major access streets to Barwon Heads Road within the NEIP.

On and off-road bicycle routes will also extend along the southern Reserve Road interface, with on-road and off road routes extending to the Marshall PSP area from within both abutting precincts.

Existing and proposed abutting PSP public transport and bicycle networks are summarised in Figure 5-4.

Figure 5-4 Adjacent PSP Areas – Public Transport and Bicycle Networks



6 Marshall PSP

6.1 Land Use and Development Yield

The Marshall Precinct will include a range of residential lots, with bulky goods retail to the north-east, and a neighbourhood activity centre (NAC) within the train station precinct.

A development schedule is set out in Table 6-1 below with location of uses identified on the draft Marshall PSP development plan as summarised in Figure 6-1 on the following page.

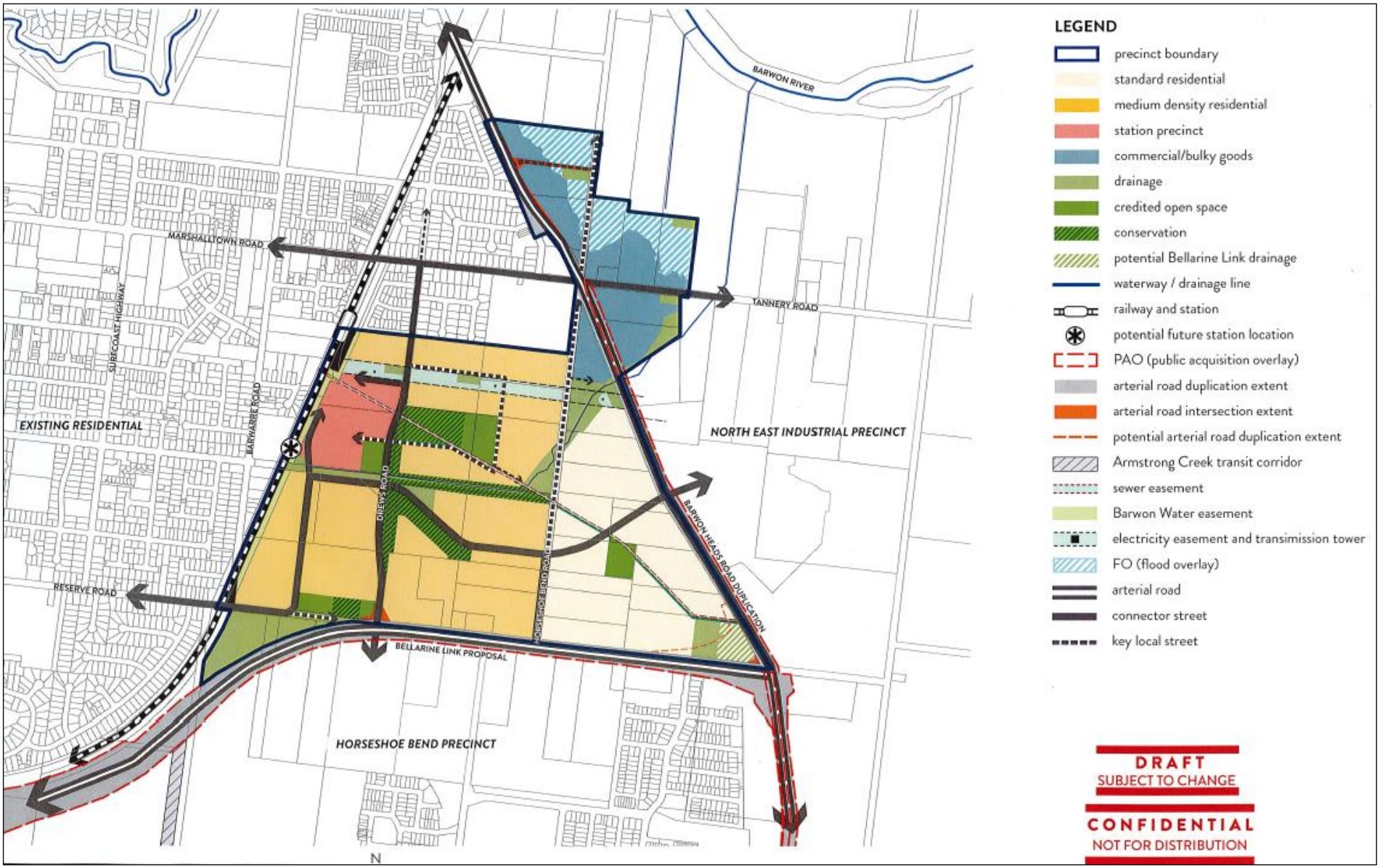
Table 6-1 Development Summary

Use	Description [1]	Total
Residential	Standard Lots (15-25 dwellings / ha)	442 dwellings
	Medium Density (25-40 dwellings / ha)	1,250 dwellings
	High Density (40-60 dwellings / ha)	291 dwellings
	Total	**1,983 dwellings**
Commercial / Bulky Goods	-	10.15 ha [2]
Retail / Shop	Neighbourhood Activity Centre	2,500 sqm (max)

[1] As described in the Marshall PSP Future Urban Structure Plan Draft
[2] Gross Area; for the purpose of this assessment it is assumed that the maximum floor area of Bulky Goods retail in the PSP area will be equivalent to 50% of the gross area (approximately 50,0000 sqm gross floor space)
ha denotes hectare, sqm denotes square metres

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Figure 6-1 Marshall Precinct – Future Urban Structure



6.2 Road Network and Hierarchy

The Marshall PSP area includes an well-defined road network within the northern area of the precinct, with access to the west dictated by the existing level crossings of the Geelong-Warrnambool rail corridor and existing and proposed road connections to the east and south informed as nominated within the HB PSP and NEIP areas, as identified in Figure 5-3.

Notwithstanding items nominated in the HB PSP and NEIP PSP, the following items are proposed in the Marshall PSP road network:

> As the northern continuation of the realigned Horseshoe Bend Road within the HBPSP, Drews Road is provided as a connector street between Reserve Road and Marshalltown Road, with the intersection of Drews Road and Marshalltown Road signalised (or a suitable alternate treatment provided).

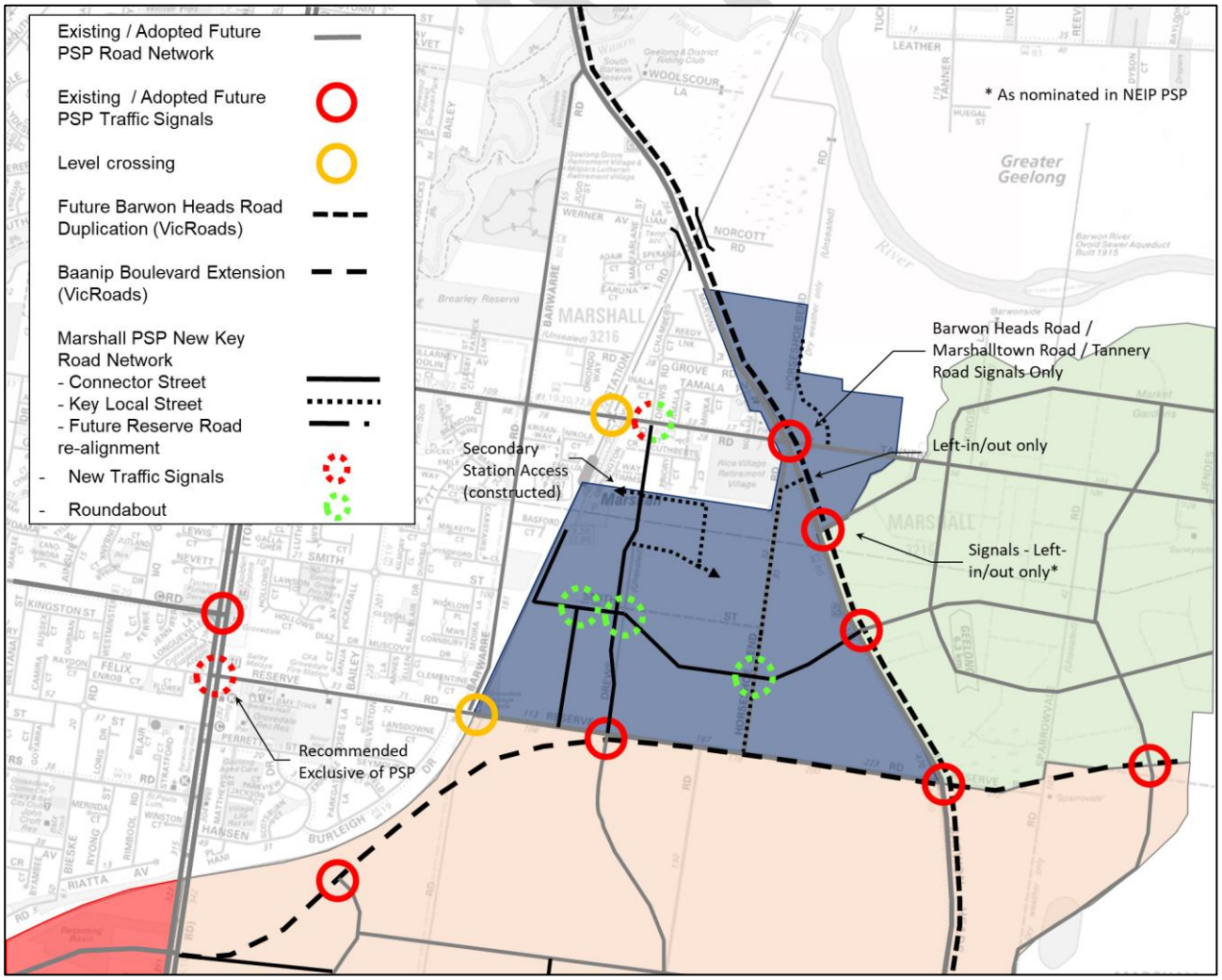
> An east-west connector level street is provided to the south of the Smith Street road reserve (allowing vegetation to be retained) east from Drews Road to Barwon Heads Road as the fourth leg of the NEIP primary access road;

> As an outcome of the GRRE, provision is made to truncate Reserve Road east of the rail corridor and west of Drews Road to form a new north-south connector road, clear of the future Drews Road / Horseshoe Bend Road / GRRE intersection; and

> The intersection of Reserve Road and Surf Coast Highway is signalised. Acknowledging current operating conditions in the PM peak hour, signalisation of this intersection is also expected to be warranted in the short to medium term.

The future Marshall PSP road network is shown in Figure 6-2.

Figure 6-2 Future Marshall PSP Area Recommended Road Network



6.3 Public Transport and Bicycle Routes

Considering existing and proposed public transport routes and bicycle and path infrastructure as shown in Figure 5-4, additional public transport routes and bicycle and path infrastructure within the Marshall PSP area is summarised in Figure 6-3. Principles and key considerations include:

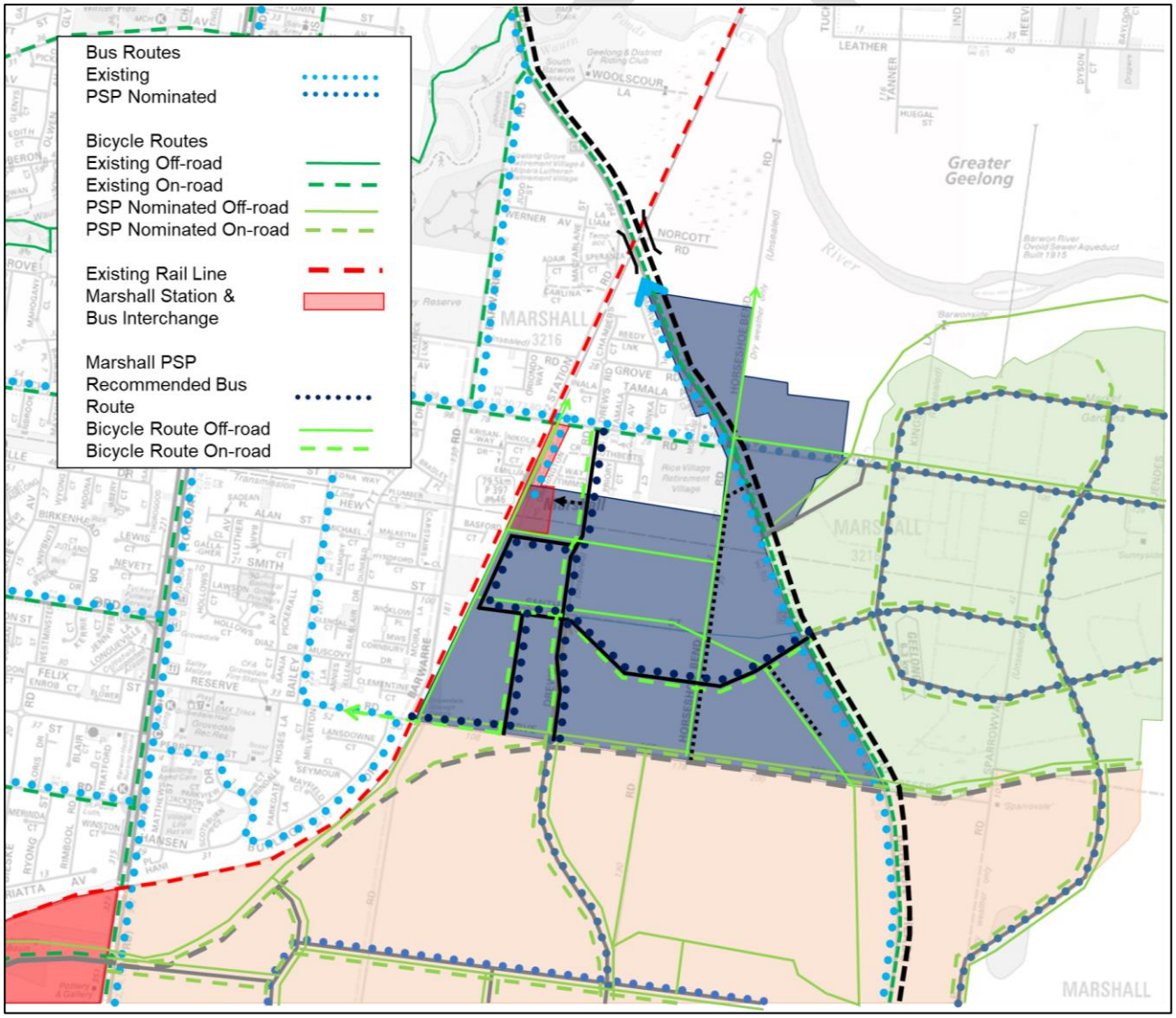
> That connector streets are bus capable and include on-road bicycle lanes, consistent with the typical connector street cross section adopted across the ACUGA;

> The designation of Horseshoe Bend Road as a key local street would allow the provision of an off-road shared path within the existing wider road reserve, connecting with a similar path along the Tannery Road reservation back to the NEIP path network;

> The east-west drainage easement and the existing Smith Street road reserve (including significant vegetation) allows for east-west shared path connections across the Precinct between the rail corridor and Horseshoe Bend Road with connectivity to Barwon Heads Road and shared paths identified within the NEIP; and

> The logical provision of a shared path connection along the rail corridor to Marshall Station as the continuation of the Reserve Road / GRRE shared path to provide convenient and direct Station access.

Figure 6-3 Marshall PSP Recommended Public Transport and Bicycle Network



6.4 Road Cross Sections

Where practical, proposed road cross sections are consistent with those adopted within the Horseshoe Bend Precinct.

Adopted internal road cross sections are shown on the following page in Table 6-2, with road cross section diagrams also provided in appendix G.

Table 6-2 Marshall PSP Road Cross Sections

Road	Road Reserve	Carriageway	Bicycles	Parking	Pedestrians
Reserve Road (Connector Street)	25m	1 x 3.5m lane in each direction	2 x 1.7m on road lanes	2.3m parking lanes each side	1.5m footpath each side
Drews Road (Connector Street)	31.5m	1 x 3.5m lane in each direction (separated)	2 x 1.7m on road lanes	2.3m parking lanes each side	1.5m footpath each side
Key Local Access Streets	20m	2 x 3.0m lane in each direction	On-road	2.3m parking lanes each side	1.5m footpath each side
Local Access Streets	16m	7.3mm carriageway	On-road	On-road	1.5m footpath each side

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7 Marshall PSP Traffic Model

Traffic on roads within the Marshall PSP area will consist of:

> Existing road network traffic,

> Through traffic generated by adjacent areas (notably the HBP and NEIP),

> Internal Marshall PSP generated traffic (largely limited to LAC and Railway Station trips),

> Internal Marshall PSP generated traffic to/from other destinations within the ACUGA (most notably to/from the Armstrong Creek Town Centre (ACTC)), and

> Traffic generated internally within the Marshall PSP area to locations outside of the ACUGA.

Cardno has previously undertaken traffic modelling for the adopted HBPSP Structure Plan area to the immediate south that included a nominal allowance for Marshall PSP traffic and considered previous modelling for the NEIP undertaken by GTA Consultants. The Marshall PSP traffic modelling builds on and refines this this previous work.

7.1 Road Network Scenarios

Two scenarios have been considered for the purpose of this assessment, an 'Interim (2031) scenario' and an 'Ultimate' (2046) scenario. Barwon Heads Road duplication is included in the interim scenario and the GRRE is included in the ultimate scenario.

A description of each scenario is provided in Table 7-1.

Table 7-1 Scenario Descriptions

Scenario	Includes:
Interim (2031) scenario *Based on WSP Barwon Heads Road Duplication Modelling*	▪ Full development of the Marshall PSP area ▪ Duplication of Barwon Heads Road ▪ Signalisation of Surf Coast Highway / Reserve Road and associated traffic redistribution from Surf Coast Highway / Marshalltown Road ▪ Rail link to Torquay ▪ Traffic growth calculated comparing 2021 base year - 2031 project year of Barwon Heads Road project traffic modelling (WSP) and applied to observed volumes
Ultimate (2046) scenario *Based on Jacobs Geelong Ring Road Extension Modelling*	▪ Full development of Marshall PSP area ▪ Duplication of Barwon Heads Road ▪ Signalisation of Surf Coast Highway / Reserve Road and associated traffic redistribution from Surf Coast Highway / Marshalltown Road ▪ Rail link to Torquay ▪ Extension of Geelong Ring Road (Bellarine Link) to Portarlington Road ▪ Traffic growth calculated comparing 2021 base year – 2046 project year of Geelong Ring Road Extension modelling (Jacobs) and applied to observed volumes

7.2 Marshall PSP Traffic Generation

Adopted residential traffic generation rates are summarised in Table 7-2 on the following page and are consistent with rates adopted within previous PSP area models (as agreed with Council), reflecting the aspirations of the Armstrong Creek Urban Growth Plan with regard to the provision and promotion of alternate sustainable transport modes, reduction in the reliance on private vehicles and of private vehicle trips.

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Table 7-2 Adopted Traffic Generation Rates

Use [1]	Daily Generation Rate	Peak Hour Generation Rate
Residential Lots	8 vpd / dwelling	0.8 vph / dwelling
Medium Density Housing	6 vpd/ dwelling	0.6 vph / dwelling
High Density Housing	4 vpd / dwellings	0.4 vph / dwelling
Bulky Goods retail	17 vpd /100 sqm GFA	2.7 vph / 100 sqm GFA [2][3]

[1] It is anticipated that the relatively small retail function won't generate a significant amount of external trips
[2] Bulky Goods retail is not expected to generate significant traffic during the A road network peak
[3] An undiverted drop-in rate of 19% has been applied to the peak hour generation rate in accordance with AGTM part 12.
vpd denotes vehicles per day, vph denotes vehicles per hour, GFA denotes gross floor area

It is expected that Marshall Train Station will continue to generate traffic similar to existing levels, with the exception of traffic from the HSP area which was considered in Cardno's previous traffic assessment of the HSPSP.

On the basis of the above, the Marshall PSP area is expected to generate in the order of 19,000 vehicle movements per day.

7.3 Marshall PSP Traffic Distribution

Marshall PSP generated traffic has been broadly distributed throughout the precinct and externally based on expected trip purposes and considering local and regional destinations.

Vehicle trip purpose has been sourced from the Department of Transport VISTA 2012-2016 (Victorian Integrated Survey of Travel and Activity), with the following broad trip purposes adopted for the purposes of this assessment.

Table 7-3 VISTA 2012-2016 Trip Purpose Data

Trip Purpose	AM Peak (8-9am)	PM Peak (5-6pm)	Daily
Work Related	43%	38%	29%
Retail	12%	27%	29%
Recreational [1]	10%	33%	31%
Education	31%	1%	6%
Other	3%	1%	5%

[1] Recreational Trips include 'social' and 'recreational' trips

Vehicle trips have then been distributed considering internal and external destinations (such as employment centres, local and major shopping destinations, recreational destinations and schools and other education centres), and with consideration of the proposed and external road network with the resultant distribution matrix for the Marshall PSP area summarised in Table 7-4 and Table 7-5 on the following page.

Similar to previous PSP modelling undertaken by Cardno for the ACUGA, this distribution matrix has then been used to assign Marshall PSP generated traffic across the internal road network and key external road connections using a logical route choice(s) model between the internal trip origin point and internal / external destination.

Table 7-4 Marshall PSP – Activity Based Traffic Distribution Matrix AM Peak

Activity	External								Internal		
	South-West (GRR)	North (BHR)	West	South	South-East	ACTC	North-East Employment	West Employment	LAC	Other Local	TOTAL
Work	7%	11%	4%	2%	2%	7%	6%	4%	-	-	43%
Retail	-	3%	2%	2%	-	5%	-	-	1%	-	13%
Recreation	1%	3%	2%	1%	1%	1%	-	-	1%	-	10%
Education	1%	10%	7%	11%	-	2%	-	-	-	-	31%
Other	-	1%	1%	-	-	-	-	-	-	1%	3%
TOTAL	9%	28%	16%	16%	3%	15%	6%	4%	2%	1%	100%

Table 7-5 Marshall PSP – Activity Based Traffic Distribution Matrix PM Peak

Activity	External								Internal		
	South-West (GRR)	North (BHR)	West	South	South-East	ACTC	North-East Employment	West Employment	LAC	Other Local	TOTAL
Work	6%	10%	3%	2%	2%	6%	6%	4%	-	-	38%
Retail	-	5%	4%	4%	-	11%	-	-	3%	-	27%
Recreational	2%	11%	7%	3%	2%	7%	-	-	2%	-	33%
Education	-	-	-	-	-	-	-	-	-	-	1%
Other	-	-	-	-	-	-	-	-	-	-	1%
TOTAL	8%	27%	15%	10%	4%	23%	6%	4%	5%	0%	100%

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7.4 Daily Traffic Volumes

Based on the above traffic generation and distribution matrix, and the proposed road network presented in Figure 6-2, preliminary analysis of the future daily traffic volumes on the key road network has been undertaken. This analysis assumes an even distribution of the expected 1,983 additional dwellings and commercial developments across the undeveloped areas of the Marshall PSP. The additional Marshall PSP traffic is summarised in Figure 7-1 with the ultimate post development road network volumes (considering the Barwon Heads Road duplication and future GRRE) is summarised in Figure 7-2 on the following page.

For the purposes of this assessment, in determining the peak traffic volumes on key roads, the ultimate development scenario has been adopted.

From this preliminary analysis it is expected that volumes on streets within the PSP area will remain within their amenity based thresholds for local and connector roads, and theoretical capacity for arterial roads.

An exception is noted for Marshalltown Road, west of Bawarre Road, which is expected to carry approximately 8,600 vehicles per day and Reserve Road east of Surf Coast Highway which is expected to carry approximately 7,800 vehicles under the ultimate development scenario.

A comparison of the existing, and ultimate traffic volumes is shown in Table 7-6.

Figure 7-1 Marshall PSP Additional Road Network Traffic Generation

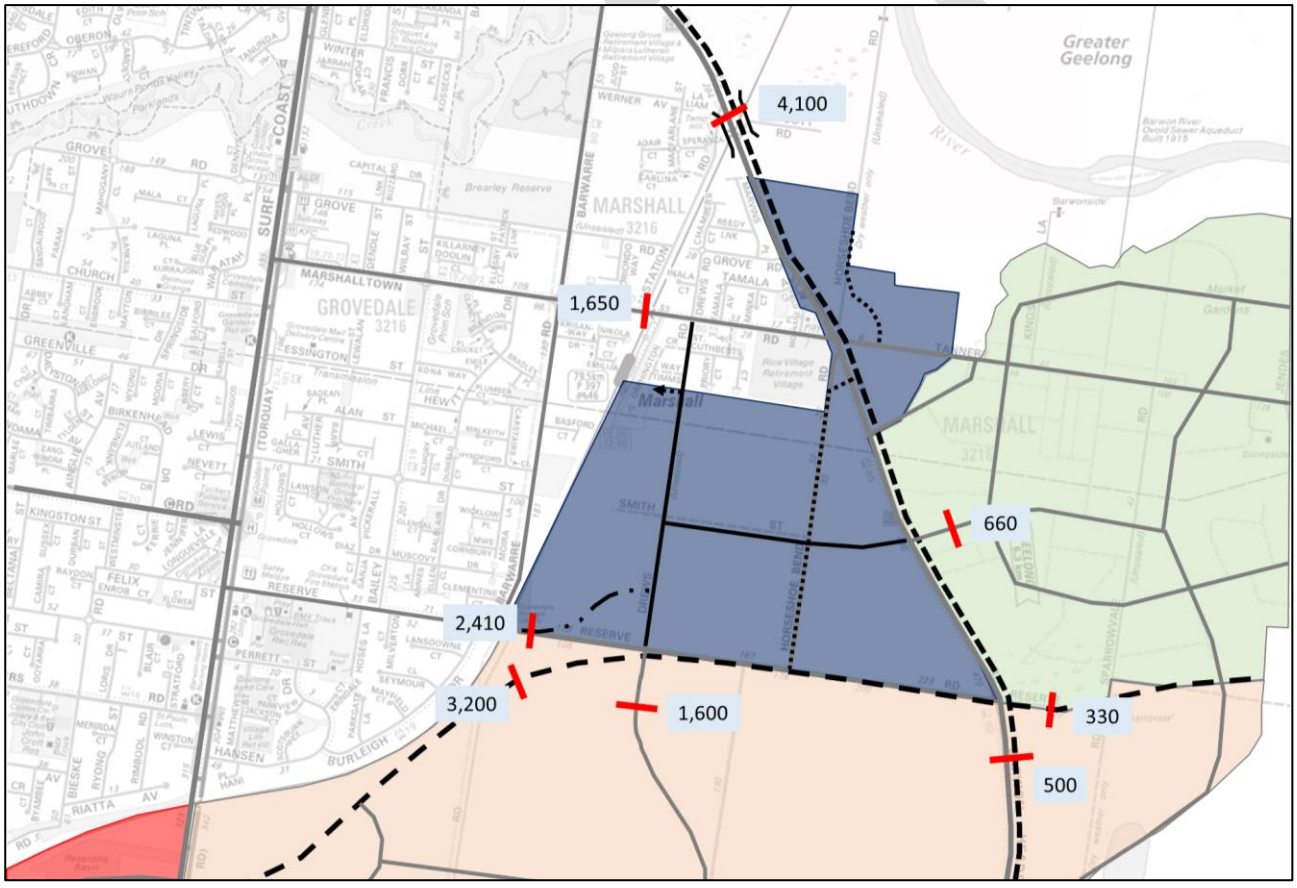


Figure 7-2 Marshall PSP Ultimate Road Network Traffic Volumes

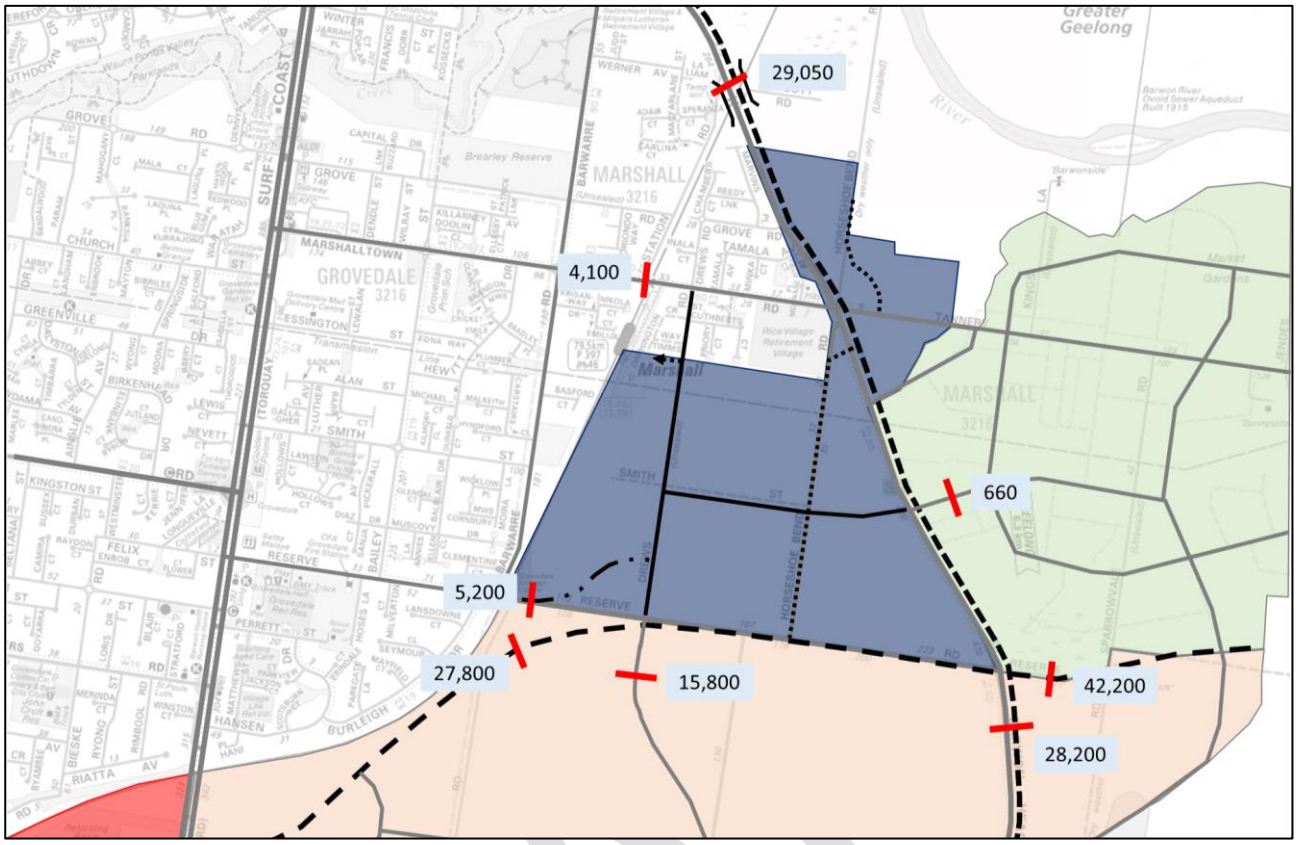


Table 7-6 2-Way Daily Traffic Volumes

Road	Existing	Ultimate Traffic Volumes	Target Volume (ultimate layout)
Marshalltown Rd (west of Bawarre Rd)	7,550 vpd	8,550 vpd	7,000 vpd
Marshalltown Rd (east of Bawarre Rd)	3,550 vpd	7,200 vpd	7,000 vpd
Reserve Rd (east of Surf Coast Hwy)	4,015 vpd	7,780 vpd	7,000 vpd
Reserve Rd (east of Drews Rd)	2,470 vpd	6,410 vpd	7,000 vpd
Drews Rd (north of Reserve Rd)	-	3,490 vpd	7,000 vpd
Barwon Heads Rd (south of GRRE)	9,672 vpd	29,470 vpd	20,250-42,750 vpd
GRRE (east of Drews Rd)	-	24,400 vpd	20,250-42,750 vpd
Surf Coast Hwy (South of Bawarre Rd)	26,175 vpd	27,900 vpd	20,250-42,750 vpd

7.5 Peak Hour Turning Movement Volumes

In addition to the trip purpose matrices discussed earlier, Interim and Ultimate peak hour turning movement volumes have been prepared based on the following assumptions.

> 20% ‘in’ / 80% ‘out’ in the AM peak for residential traffic;
> 60% ‘in’ / 40% ‘out’ in the PM peak for residential traffic;
> 50% in’ & ‘out’ for non-residential traffic in both peak hours.

The Interim and Ultimate turning movement volumes are included in Appendix A and B respectively.

8 Intersection Assessment

In the first instance, where available, intersection layouts have been based on existing conditions, plans for the Barwon Heads Road duplication and/or information provided by Council and VicRoads. Key intersection layout requirements have then been determined using SIRA Intersection analysis and adoption of the Interim and Ultimate traffic volume estimates (based on the methodology outlined in 2.2.2).

All signalised intersections have been modelled with a consistent cycle time of 120 seconds. Adopted turn lane lengths are the greater of storage requirements based on 95th percentile queues or minimum Austroads deceleration design requirements for the relevant road's posted speed (existing or proposed (assumed where necessary).

The SIDRA results for the interim intersection are included in Appendix C.

8.1 Surf Coast Highway / Marshalltown Road

The adopted ultimate configuration for the Surf Coast Highway / Marshalltown Road intersection is shown in Figure 8-1 with anticipated interim and ultimate intersection operation summarised in Table 8-1 on the following page.

The adopted intersection layout is based on the existing intersection layout *plus* the extension of the eastern approach left turn lane to 110m in the interim and 115 m in the ultimate scenario.

Figure 8-1 Surf Coast Hwy / Marshalltown Rd Layout (Interim Layout left / Ultimate Layout right)

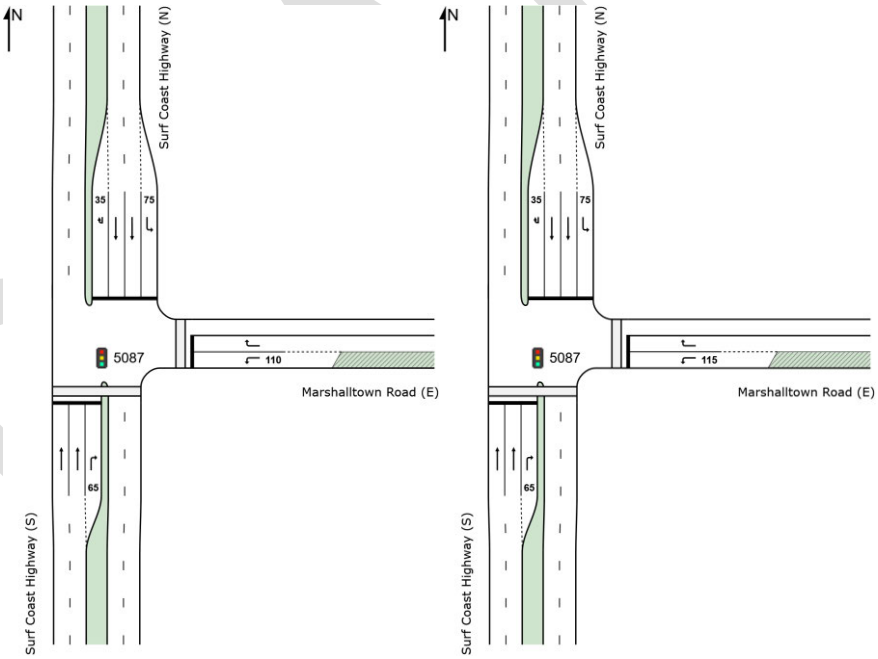


Table 8-1 Surf Coast Hwy / Marshalltown Rd Intersection – Interim & Ultimate Operation

Scenario	Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue (m)
Interim AM Peak	Surf Coast Hwy (S)	#0.67	14 sec	214 m
	Marshalltown Rd (E)	0.66	46 sec	96 m
	Surf Coast Hwy (S)	0.55	20 sec	157 m
Interim PM Peak	Surf Coast Hwy (S)	0.78	14 sec	68 m
	Marshalltown Rd (E)	0.76	50 sec	108 m
	Surf Coast Hwy (S)	#0.79	19 sec	286 m
Ultimate AM Peak	Surf Coast Hwy (S)	#0.87	15 sec	379 m
	Marshalltown Rd (E)	0.84	55 sec	114 m
	Surf Coast Hwy (S)	0.48	18 sec	128 m
Ultimate PM Peak	Surf Coast Hwy (S)	0.78	15 sec	70 m
	Marshalltown Rd (E)	0.78	50 sec	111 m
	Surf Coast Hwy (S)	#0.80	20 sec	289 m

 # Intersection DOS

On the basis of Table 8-1, the Surf Coast Highway / Marshalltown Road intersection is expected to operate with very good and good service levels in the Interim and Ultimate development conditions. This is partially due to the expected redistribution of traffic to the Surfcoast Highway / Reserve Road intersection post signalisation.

It is noted however that under ultimate development scenario, significant queues may be expected on Surf Coast Highway in the AM and PM peak hours. Notwithstanding, it is considered that there is limited scope to implement mitigation works at this intersection due to the existing narrow road reserve width on Surf Coast Highway.

8.2 Surf Coast Highway / Reserve Road / Felix Street

The adopted configuration for the Surf Coast Highway / Reserve Road / Felix Street intersection is shown in Figure 8-1 with the intersection operating conditions shown in Table 8-1.

The adopted interim and ultimate intersection layout is a signalisation of the existing intersection layout including:

> dedicated right turn lane on the east and west approaches (85m and 55m in length respectively).
> Extension of the existing right turn lane on the southern approach to 110m.
> Extension of the existing right turn lane length on the northern approach to 55m.

Due to the Geelong Ring Road extension diverting traffic from Surf Coast Highway, the Interim scenario is considered to be the critical assessment scenario.

DRAFT

Figure 8-2 Surf Coast Hwy / Reserve Rd / Felix St (interim/ultimate layout)

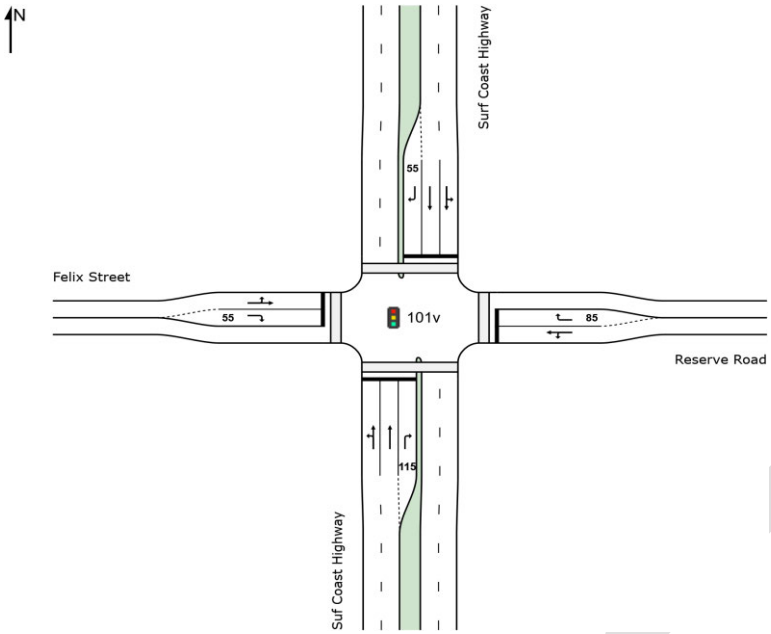


Table 8-2 Surf Coast Hwy / Reserve Rd / Felix St Intersection – Interim & Ultimate Operation

Scenario	Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue (m)
Interim AM Peak	Surf Coast Hwy (S)	#0.89	42 sec	359 m
	Reserve Road (E)	0.87	51 sec	222 m
	Surf Coast Hwy (N)	0.63	25 sec	182 m
	Felix St (W)	0.04	32 sec	8 m
Interim PM Peak	Surf Coast Hwy (S)	0.64	30 sec	111 m
	Reserve Road (E)	0.59	39 sec	82 m
	Surf Coast Hwy (N)	#0.95	58 sec	447 m
	Felix St (W)	0.03	39 sec	10 m
Ultimate PM Peak	Surf Coast Hwy (S)	#0.81	29 sec	285 m
	Reserve Road (E)	0.78	49 sec	71 m
	Surf Coast Hwy (N)	0.47	20 sec	123 m
	Felix St (W)	0.07	34 sec	13 m
Ultimate PM Peak	Surf Coast Hwy (S)	0.64	30 sec	120 m
	Reserve Road (E)	0.62	40 sec	76 m
	Surf Coast Hwy (N)	#0.93	51 sec	408 m
	Felix St (W)	0.06	32 sec	10 m

 # - Intersection DOS

On the basis of Table 8-2, the Surf Coast Highway / Reserve Road / Felix Street intersection is expected to operate with Fair service levels in the Interim and Ultimate development conditions.

Under interim and ultimate development scenarios, significant queues may be expected on Surf Coast Highway in the AM and PM peak hours.

8.3 Marshalltown Road / Drews Road

The adopted (existing) configuration for the Marshalltown Road / Drews Road intersection is shown in Figure 8-1 with the ultimate intersection operating conditions shown in Table 8-1.

Figure 8-3 Marshalltown Rd / Drews Road

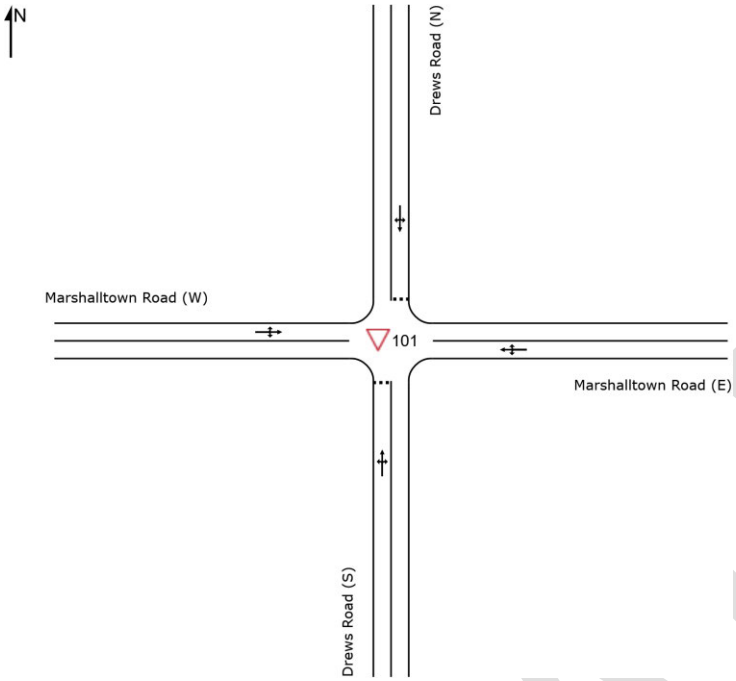


Table 8-3 Drews Road / Marshalltown Road Intersection Operation

Scenario	Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue (m)
Interim AM Peak	Surf Coast Hwy (S)	#0.43	8 sec	18 m
	Reserve Road (E)	0.15	<1 sec	1 m
	Surf Coast Hwy (N)	0.14	9 sec	4 m
	Felix St (W)	0.10	1 sec	2 m
Interim PM Peak	Surf Coast Hwy (S)	#0.31	8 sec	10 m
	Reserve Road (E)	0.15	1 sec	1 m
	Surf Coast Hwy (N)	0.09	9 sec	2 m
	Felix St (W)	0.20	2 sec	5 m
Ultimate PM Peak	Surf Coast Hwy (S)	#0.48	10 sec	21 m
	Reserve Road (E)	0.19	<1 sec	1 m
	Surf Coast Hwy (N)	0.16	10 sec	4 m
	Felix St (W)	0.12	1 sec	2 m
Ultimate PM Peak	Surf Coast Hwy (S)	#0.31	8 sec	10 m
	Reserve Road (E)	0.15	1 sec	1 m
	Surf Coast Hwy (N)	0.09	10 sec	2 m
	Felix St (W)	0.21	2 sec	5 m

 # - Intersection DOS

Table 8-3 indicates that under both interim and ultimate development scenarios the Drews Road / Marshalltown Road intersection is expected to operate with an Excellent service levels.

8.4 Barwon Heads Road / Realigned Reserve Road

The adopted configuration for the Surf Coast Highway / Realigned Reserve Road intersection is shown in Figure 8-1 with the ultimate intersection operating conditions shown in Table 8-1.

The adopted intersection layout is consistent with the Barwon Heads Road cross-section provided by MRPV, and the north east industrial precinct DCP design.

Due to the Geelong Ring Road Extension diverting traffic from Barwon Head Road, the interim scenario is the critical scenario.

Figure 8-4 Barwon Heads Road / Realigned Reserve Road (Interim / Ultimate layout)

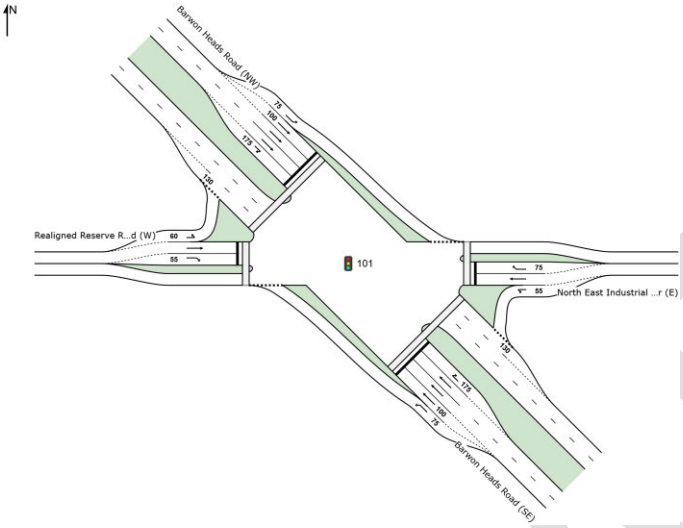


Table 8-4 Barwon Heads Road / Realigned Reserve Road Intersection Operation

Scenario	Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue (m)
Interim AM Peak	Barwon Heads Rd (SE)	#0.68	23 sec	168 m
	N-E Industrial precinct connector (E)	0.53	32 sec	25 m
	Barwon Heads Road (NW)	0.63	38 sec	78 m
	Reserve Road (W)	0.61	27 sec	34 m
Interim PM Peak	Barwon Heads Rd (SE)	0.80	33 sec	115 m
	N-E Industrial precinct connector (E)	0.87	41 sec	46 m
	Barwon Heads Road (NW)	#0.89	29 sec	320 m
	Reserve Road (W)	0.76	37 sec	38 m
Ultimate PM Peak	Barwon Heads Rd (SE)	0.60	22 sec	139 m
	N-E Industrial precinct connector (E)	0.39	25 sec	23 m
	Barwon Heads Road (NW)	0.55	46 sec	48 m
	Reserve Road (W)	#0.61	26 sec	30 m
Ultimate PM Peak	Barwon Heads Rd (SE)	0.75	34 sec	175 m
	N-E Industrial precinct connector (E)	0.72	34 sec	64 m
	Barwon Heads Road (NW)	#0.75	26 sec	221 m
	Reserve Road (W)	0.59	40 sec	36 m

 # - Intersection DOS

On the basis of Table 8-4, the Barwon Heads Road / Realigned Reserve Road intersection is expected operate with Good level of service in the interim scenario and the ultimate scenarios. In both scenarios expected queues are fully accommodated within the turning lanes provided.

8.5 Barwon Heads Road / Bellarine Highway

The adopted configuration for the Surf Coast Highway / Realigned Reserve Road intersection is shown in Figure 8-4 with the ultimate intersection operating conditions shown in Table 8-5.

The interim configuration has been adopted from the WSP draft SIDRA report with the following modifications:

> Extension of the western approach left turn lane to 170m in length.

The ultimate configuration has been adopted from the Jacobs modelling report on the Bellarine Link, noting a slight discrepancy in the Jacobs and WSP designs.

Figure 8-5 Surf Coast Highway / Reserve Road (Interim Layout Left / Ultimate Layout Right)

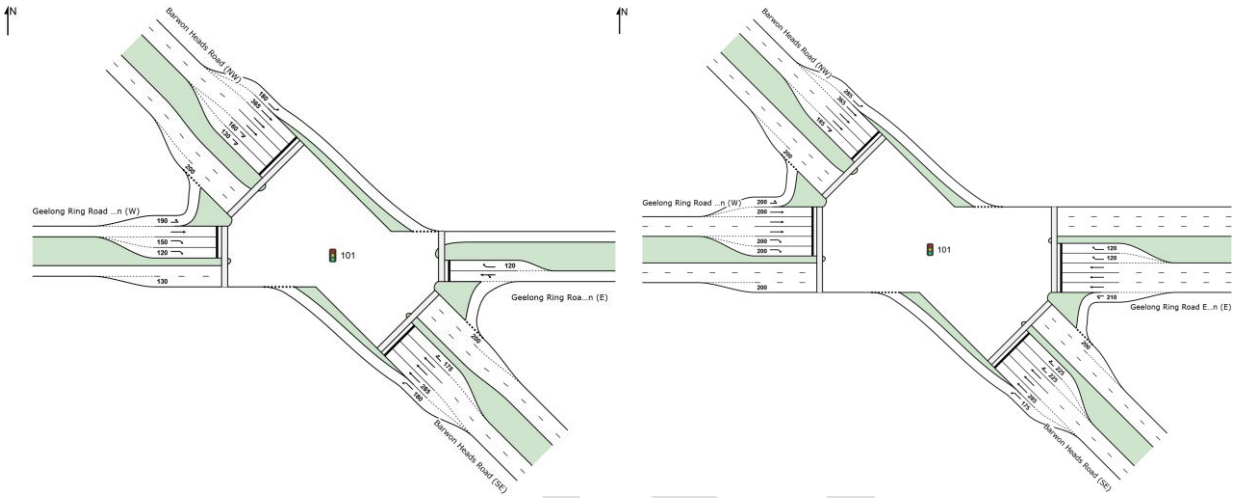


Table 8-5 Barwon Heads Road / GRRE Intersection Operation

Scenario	Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue (m)
Interim AM Peak	Barwon Heads Rd (SE)	0.65	36 sec	144 m
	GRRE (E)	0.43	47 sec	51 m
	Barwon Heads Road (NW)	0.36	34 sec	71 m
	GRRE (W)	#0.70	29 sec	153 m
Interim PM Peak	Barwon Heads Rd (SE)	0.68	44 sec	97 m
	GRRE (E)	0.64	48 sec	97 m
	Barwon Heads Road (NW)	#0.69	29 sec	164 m
	GRRE (W)	0.37	21 sec	55 m
Ultimate PM Peak	Barwon Heads Rd (SE)	#0.60	30 sec	114 m
	GRRE (E)	0.58	34 sec	84 m
	Barwon Heads Road (NW)	0.47	37 sec	35 m
	GRRE (W)	0.61	34 sec	96 m
Ultimate PM Peak	Barwon Heads Rd (SE)	0.58	46 sec	79 m
	GRRE (E)	0.78	32 sec	144 m
	Barwon Heads Road (NW)	#0.82	39 sec	140 m
	GRRE (W)	0.76	38 sec	129 m

#- Intersection DOS

On the basis of Table 8-5, the Barwon Heads Road / GRRE intersection is expected to operate with good service levels in the Interim and Ultimate development conditions. In both scenarios' expected queues are accommodated within the provided turning lanes.

8.6 Barwon Heads Road / Horseshow Bend Road / Drews Road

The adopted configuration for the Surf Coast Highway / Realigned Reserve Road intersection is shown in Figure 8-1 with the ultimate intersection operating conditions shown in Table 8-1.

The interim layout is based on the Horseshoe Bend precinct DCP design, with the ultimate design incorporating the ultimate GRRE link cross-section.

Figure 8-6 Surf Coast Highway / Reserve Road (Interim)

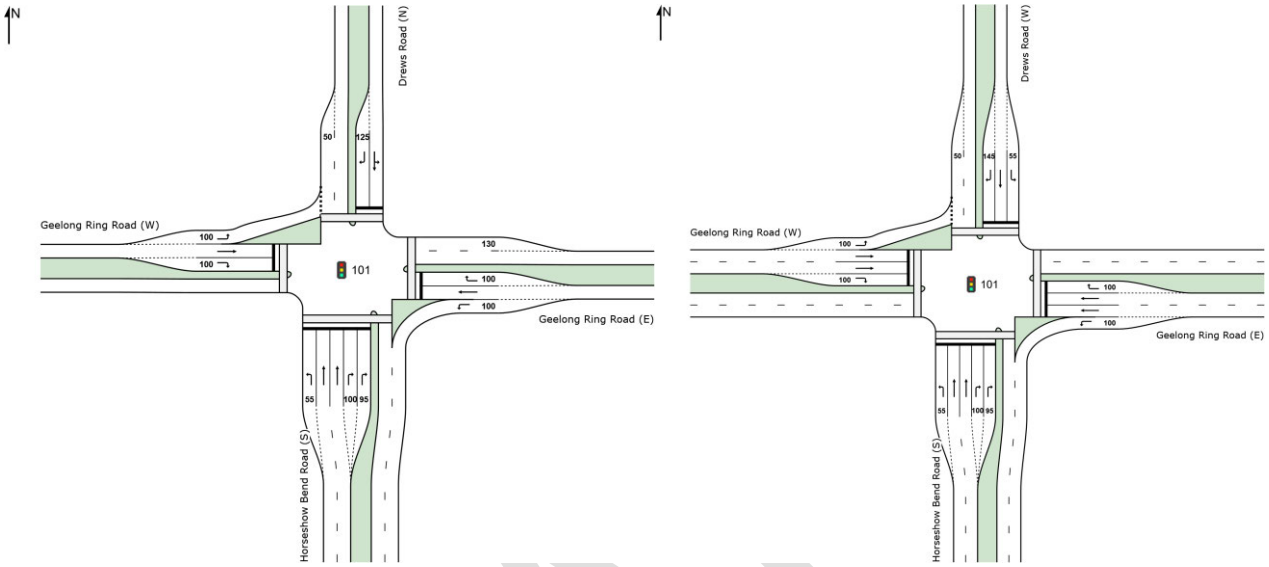


Table 8-6 GRRE / Horseshoe Bend Road / Drews Road Intersection Operation

Scenario	Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue (m)
Interim AM Peak	Horseshow Bend Rd (S)	0.64	42 sec	117 m
	GRRE (E)	0.42	24 sec	32 m
	Drews Road (N)	#0.74	54 sec	111 m
	GRRE (W)	0.72	29 sec	151 m
Interim PM Peak	Horseshow Bend Rd (S)	#0.80	58 sec	90 m
	GRRE (E)	0.70	21 sec	170 m
	Drews Road (N)	0.78	57 sec	113 m
	GRRE (W)	0.77	27 sec	66 m
Ultimate PM Peak	Horseshow Bend Rd (S)	0.48	42 sec	97 m
	GRRE (E)	0.84	37 sec	187 m
	Drews Road (N)	#0.86	55 sec	114 m
	GRRE (W)	0.67	31 sec	142 m
Ultimate PM Peak	Horseshow Bend Rd (S)	0.80	59 sec	91 m
	GRRE (E)	#0.95	40 sec	388 m
	Drews Road (N)	0.93	65 sec	150 m
	GRRE (W)	0.95	24 sec	173 m

 # - Intersection DOS

On the basis of Table 8-6, the GRRE / Horseshoe Bend Road / Drews Road intersection is expected to operate with Good service levels in the Interim and Fair level of service Ultimate development conditions.

In both scenarios expected queues are accommodated within the turning lanes lengths provided.

8.7 Reserve Road / Drews Road

The adopted configuration for the Surf Coast Highway / Realigned Reserve Road intersection is shown in Figure 8-1 with the ultimate intersection operating conditions shown in Table 8-1.

The adopted intersection layout is consistent with the Bellarine Highway cross-section.

Figure 8-7 Surf Coast Highway / Bellarine Highway

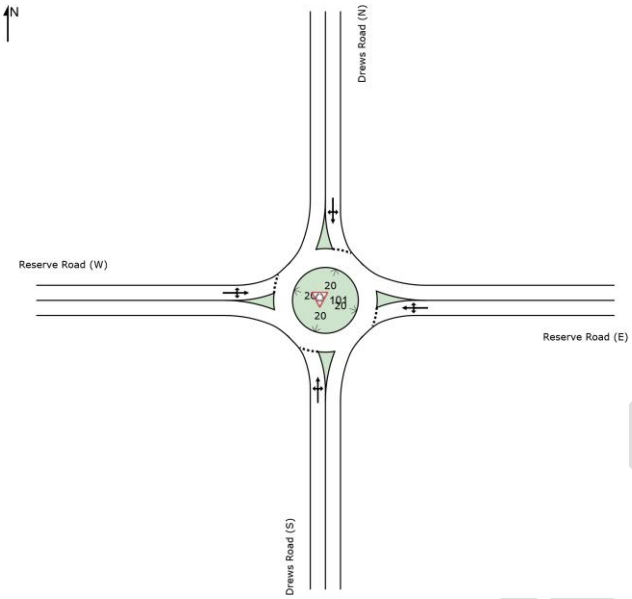


Table 8-7 Reserve Road / Drews Road Intersection Operation

Scenario	Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue (m)
Interim AM Peak	Drews Road (S)	#0.52	6 sec	32 m
	Reserve Road (E)	0.30	6 sec	15 m
	Drews Road (N)	0.13	6 sec	5 m
	Reserve Road (W)	0.26	7 sec	12 m
Interim PM Peak	Drews Road (S)	0.33	7 sec	18 m
	Reserve Road (E)	0.28	7 sec	14 m
	Drews Road (N)	0.13	8 sec	6 m
	Reserve Road (W)	#0.55	11 sec	36 m
Ultimate PM Peak	Drews Road (S)	#0.70	13 sec	64 m
	Reserve Road (E)	0.50	6 sec	32 m
	Drews Road (N)	0.12	6 sec	5 m
	Reserve Road (W)	0.28	7 sec	15 m
Ultimate PM Peak	Drews Road (S)	0.34	7 sec	19 m
	Reserve Road (E)	0.32	7 sec	16 m
	Drews Road (N)	0.13	8 sec	6 m
	Reserve Road (W)	#0.58	11 sec	41 m

 # - Intersection DOS

On the basis of Table 8-7 it is expected that the Reserve Road / Drews Road intersection will operate with an excellent level of service in the interim scenario and a good level of service in the ultimate scenario.

9 Conclusions

Based on the preceding analysis, it is concluded that:

> At full development the Marshall Precinct will include in the order of 1,983 residential dwellings, and approximately 50,000 sqm of Bulky Goods retail floor area as well as a small retail component centred around the Marshall Train Station.

> The Marshall PSP area is expected to develop approximately 19,200 vehicle movements per day, with approximately 17,650 vehicle movements per day external to the site.

> The proposed Marshall PSP provides a well-connected, connected and permeable road network.

> All intersections assessed have sufficient capacity to cater for expected volumes in the interim and ultimate scenarios.

> An extensive and well-connected bicycle and pedestrian network is provided across the precinct that connects and integrates with the pedestrian and bicycle networks within the adjacent PSP area.

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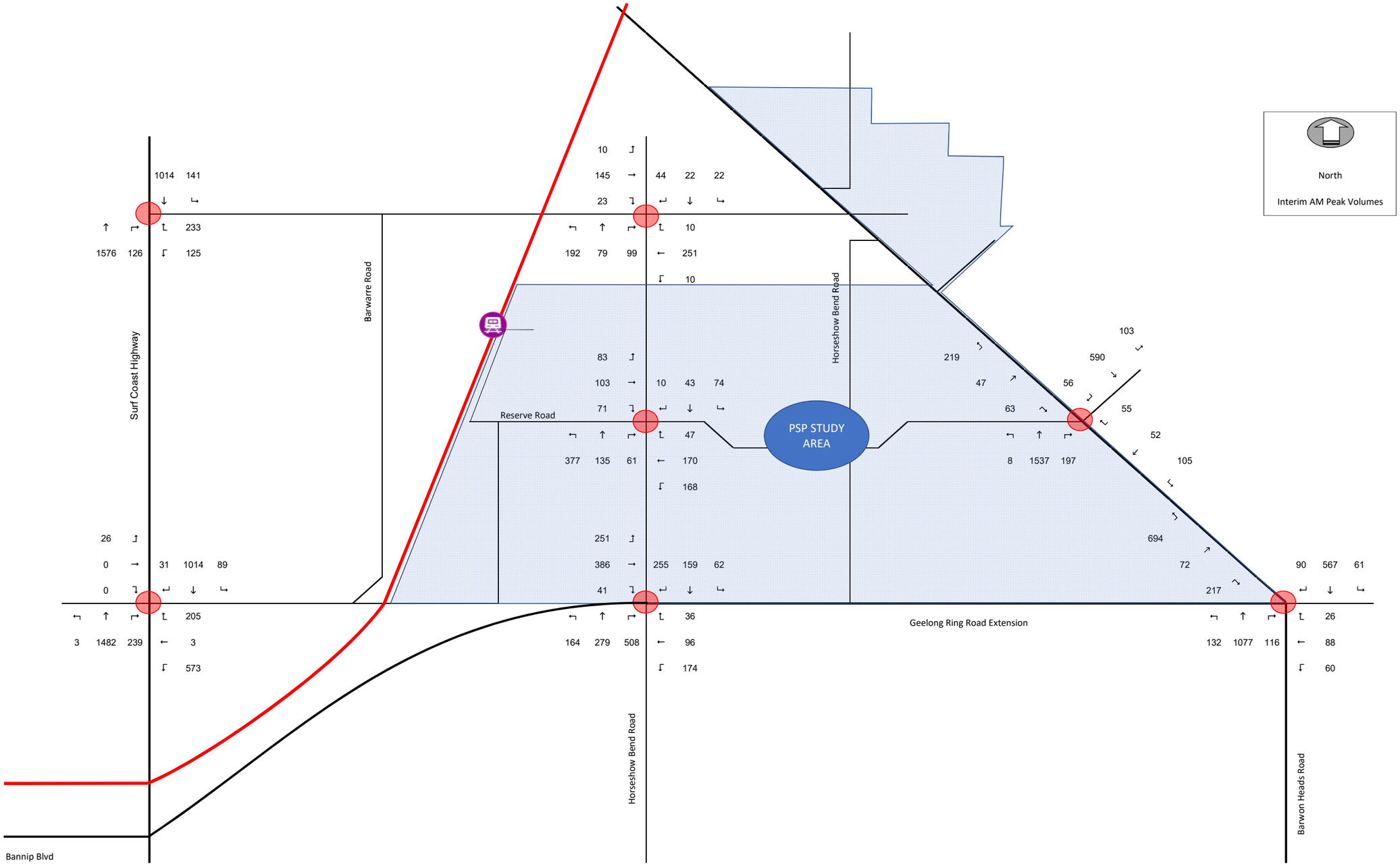
Preliminary Transport Infrastructure Assessment

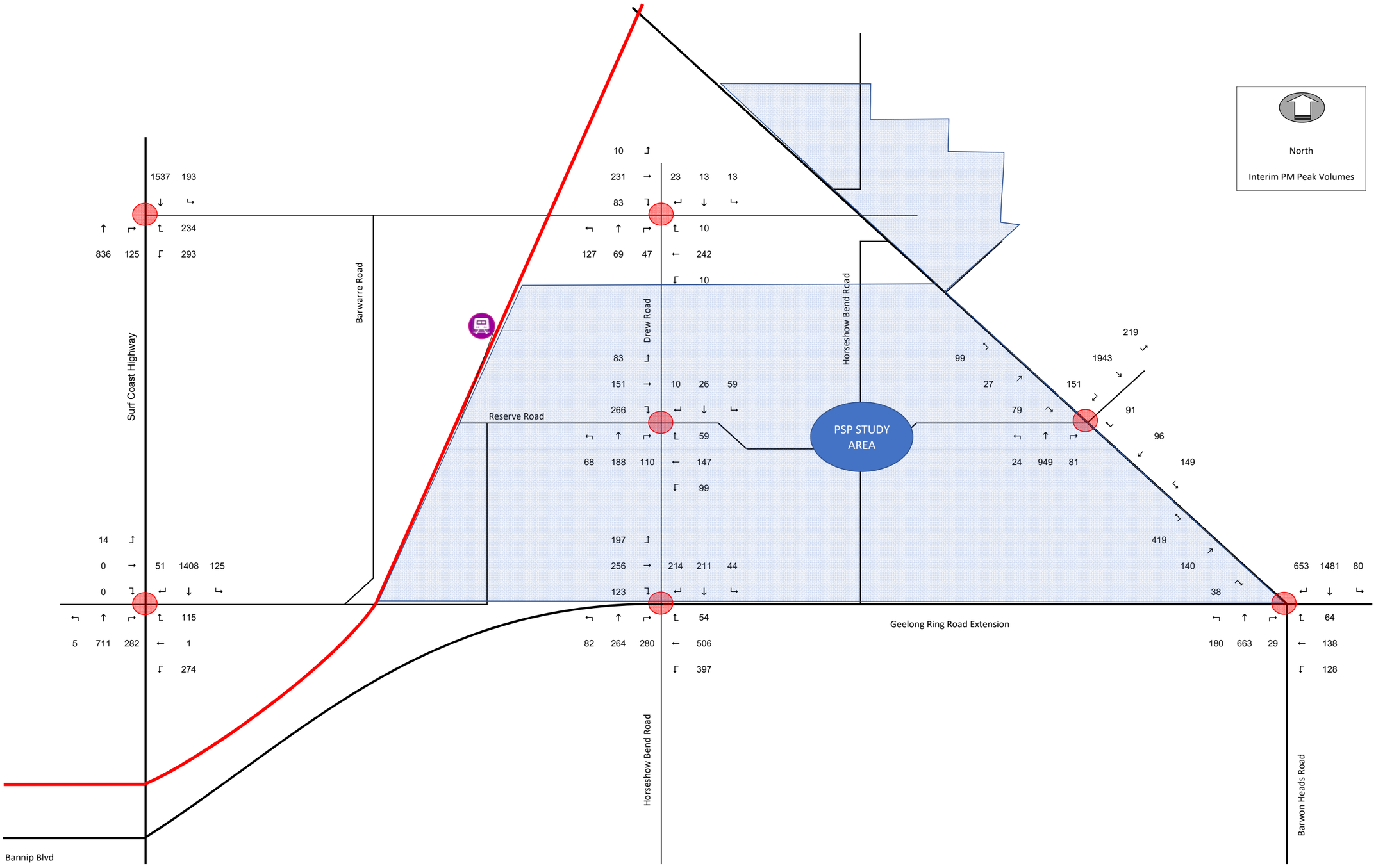
APPENDIX A

INTERIM TRAFFIC VOLUMES



Cardno
Shaping the Future


North
Interim AM Peak Volumes
PSP STUDY AREA
Surf Coast Highway
Barwarre Road
Reserve Road
Horseshow Bend Road
Geelong Ring Road Extension
Bannip Blvd
Barwon Heads Road
1014 141
233
1576 126
125
10
145 44 22 22
23
10
192 79 99 251
10
83
103 10 43 74
71
47
377 135 61 170
168
219
47
63
8 1537 197
103
590
56
55
52
105
694
72
217
90 567 61
26
0 31 1014 89
0
205
3 1482 239 3
573
251
386 255 159 62
41
36
164 279 508 96
174
132 1077 116
26
88
60


North
Interim PM Peak Volumes
PSP STUDY AREA
Surf Coast Highway
Barwarre Road
Drew Road
Horseshow Bend Road
Reserve Road
Geelong Ring Road Extension
Bannip Blvd
Barwon Heads Road
1537 193
234
836 125 293
10
231 23 13 13
83
10
127 69 47 242
10
83
151 10 26 59
266
59
68 188 110 147
99
14
0 51 1408 125
0
115
5 711 282 1
274
197
256 214 211 44
123
54
82 264 280 506
397
99
27 79
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1943
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96
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64
180 663 29 138
128

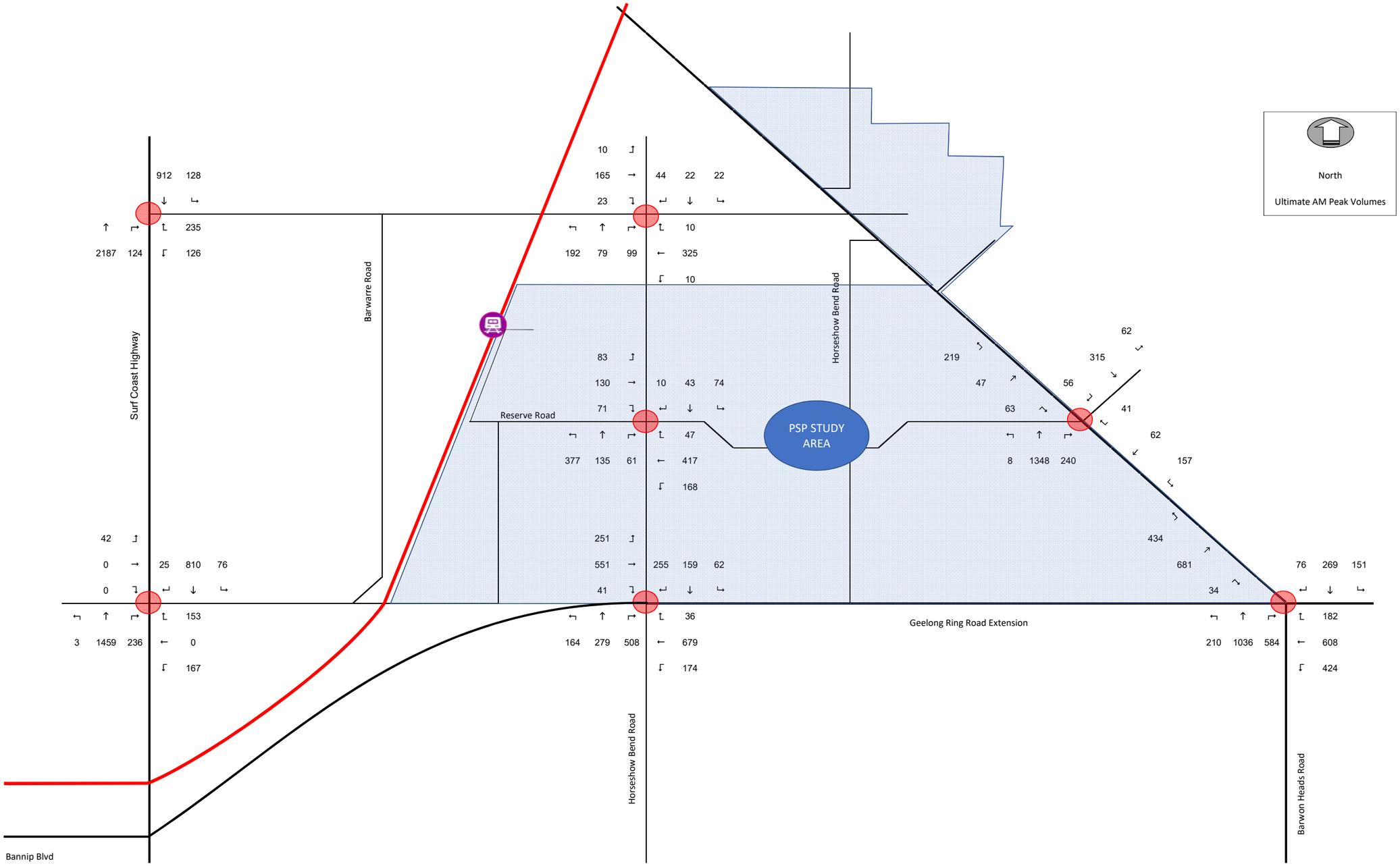
Preliminary Transport Infrastructure Assessment

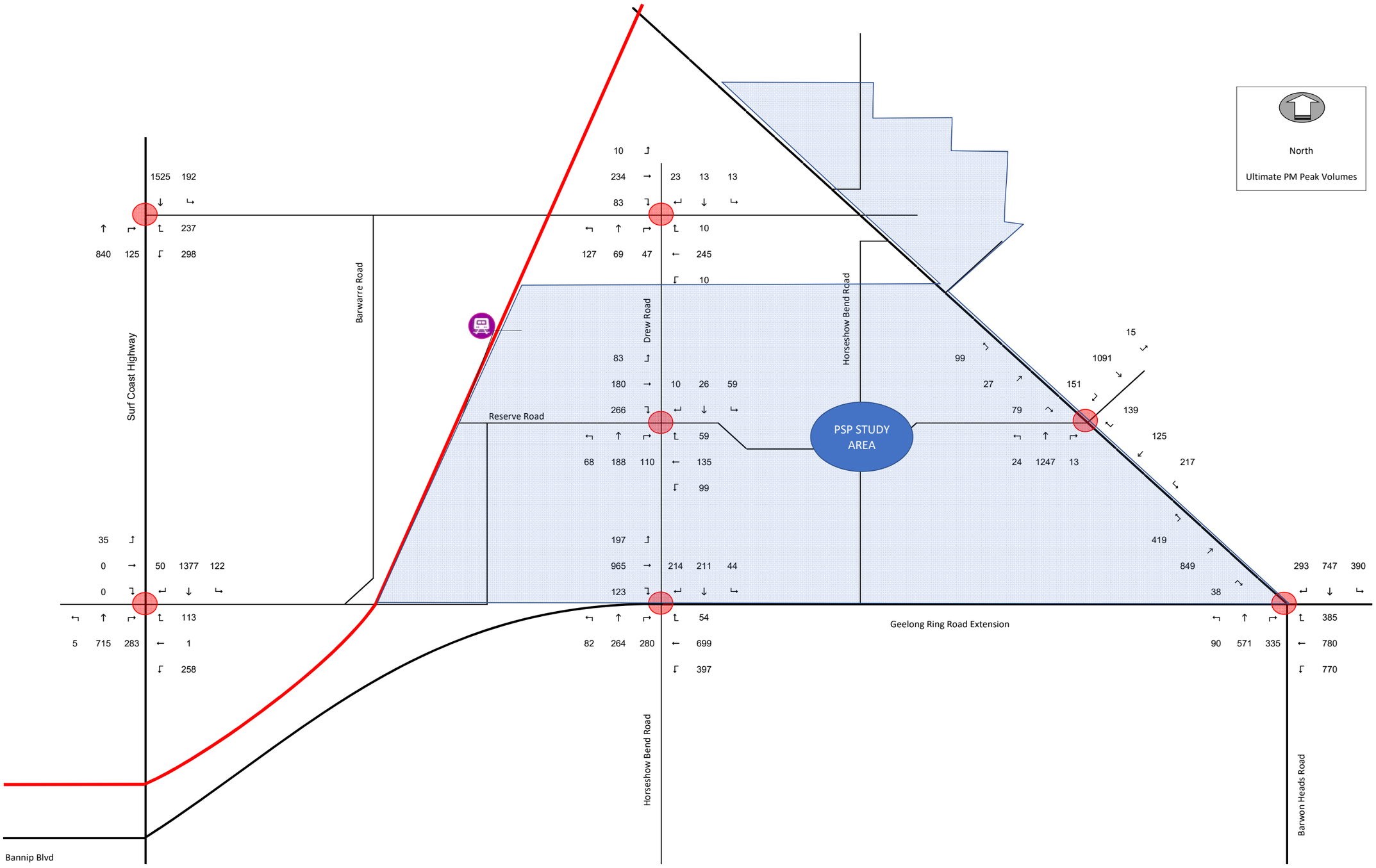
APPENDIX B

ULTIMATE TRAFFIC VOLUMES



Cardno
Shaping the Future


North
Ultimate AM Peak Volumes
PSP STUDY AREA
Surf Coast Highway
Barwarre Road
Horseshow Bend Road
Reserve Road
Geelong Ring Road Extension
Bannip Blvd
Horseshow Bend Road
Barwon Heads Road
912 128
235
2187 124
126
10
165 44 22 22
23
10
192 79 99 325
10
83
130 10 43 74
71
47
377 135 61 417
168
219
47
62
315
56
41
63
62
8 1348 240
157
434
681
34
76 269 151
42
0 25 810 76
0
153
3 1459 236 0
167
251
551 255 159 62
41
36
164 279 508 679
174
210 1036 584 608
182
424


North
Ultimate PM Peak Volumes
Surf Coast Highway
Barwarre Road
Drew Road
Horseshow Bend Road
Reserve Road
PSP STUDY AREA
Geelong Ring Road Extension
Bannip Blvd
Horseshow Bend Road
Barwon Heads Road
1525 192
237
840 125 298
10
234 23 13 13
83
10
127 69 47 245
10
83
180 10 26 59
266
59
68 188 110 135
99
35
0 50 1377 122
0
113
5 715 283 1
258
197
965 214 211 44
123
54
82 264 280 699
397
99
27
15
1091
151
139
79
125
24 1247 13
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849
38
293 747 390
385
90 571 335 780
770

Preliminary Transport Infrastructure Assessment

APPENDIX C

INTERIM SIDRA RESULTS

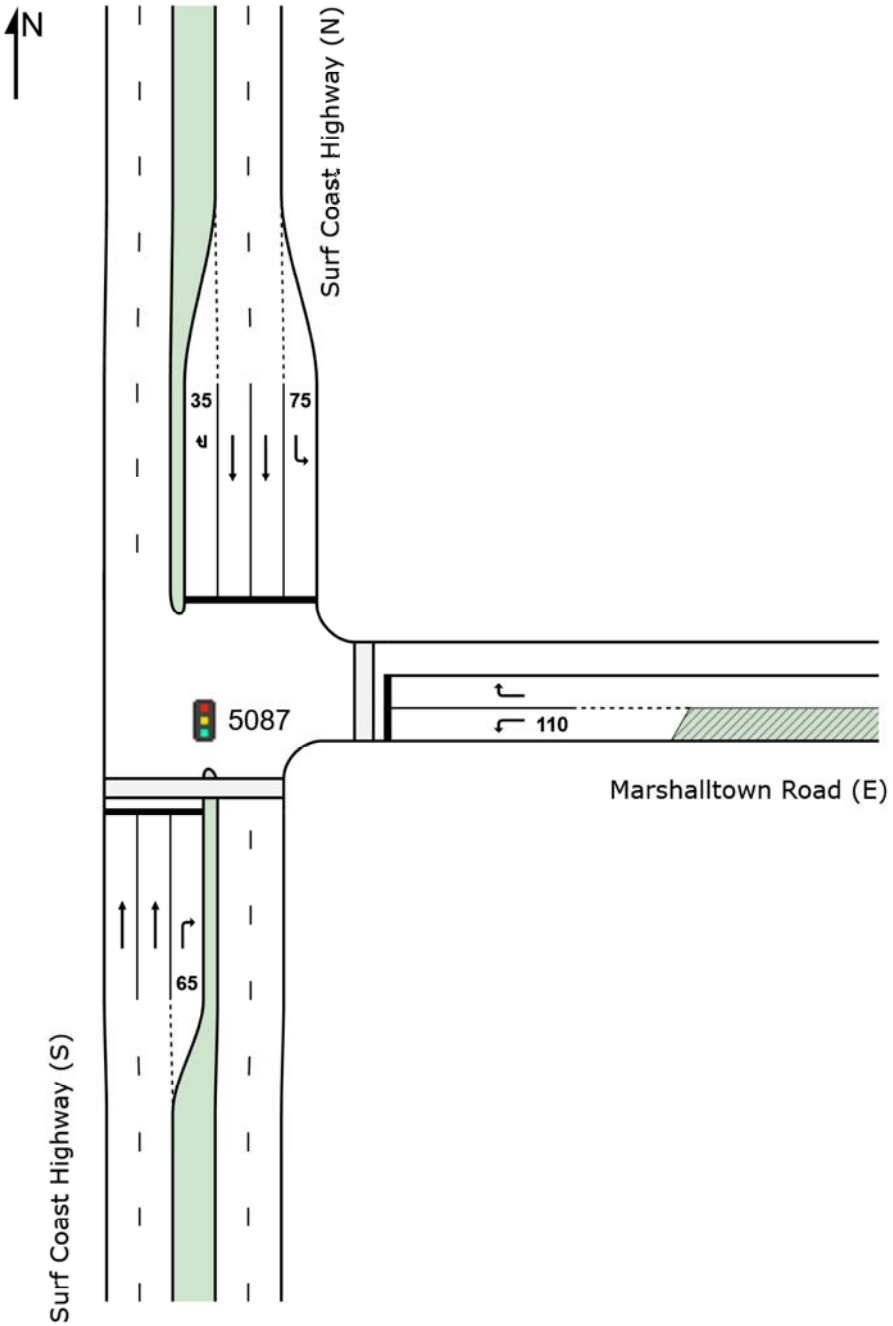


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Shaping the Future

SITE LAYOUT

Site: 5087 [Surf Coast Highway / Marshalltown Road | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 5087 [Surf Coast Highway / Marshalltown Road | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Surf Coast Highway (S)												
2	T1	1655	8.0	0.671	10.3	LOS B	28.6	213.7	0.59	0.54	0.59	51.3
3	R2	133	2.0	0.574	60.5	LOS E	7.6	53.8	0.99	0.80	0.99	29.7
Approach		1787	7.6	0.671	14.0	LOS B	28.6	213.7	0.62	0.56	0.62	48.7
East: Marshalltown Road (E)												
4	L2	132	2.0	0.190	32.4	LOS C	5.1	36.5	0.71	0.75	0.71	38.4
6	R2	245	2.0	0.663	54.0	LOS D	13.5	95.8	0.98	0.83	0.98	31.6
Approach		377	2.0	0.663	46.5	LOS D	13.5	95.8	0.88	0.80	0.89	33.7
North: Surf Coast Highway (N)												
7	L2	148	2.0	0.153	21.1	LOS C	4.4	31.3	0.55	0.71	0.55	43.6
8	T1	1067	8.0	0.555	20.1	LOS C	21.0	157.0	0.72	0.64	0.72	45.1
9u	U	1	2.0	0.014	58.9	LOS E	0.1	0.4	0.90	0.63	0.90	29.9
Approach		1217	7.3	0.555	20.3	LOS C	21.0	157.0	0.70	0.65	0.70	44.9
All Vehicles		3381	6.8	0.671	19.9	LOS B	28.6	213.7	0.68	0.62	0.68	45.1

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 5087 [Surf Coast Highway / Marshalltown Road | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

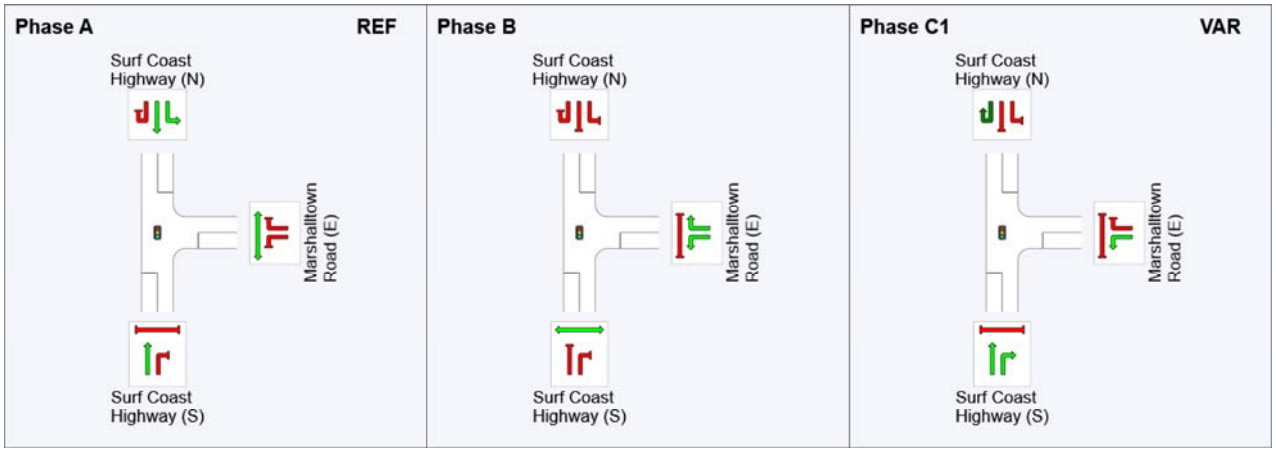
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: 3-W - Copy
Reference Phase: Phase A
Input Phase Sequence: A, B, C1*
Output Phase Sequence: A, B, C1*
(* Variable Phase)

Phase Timing Summary

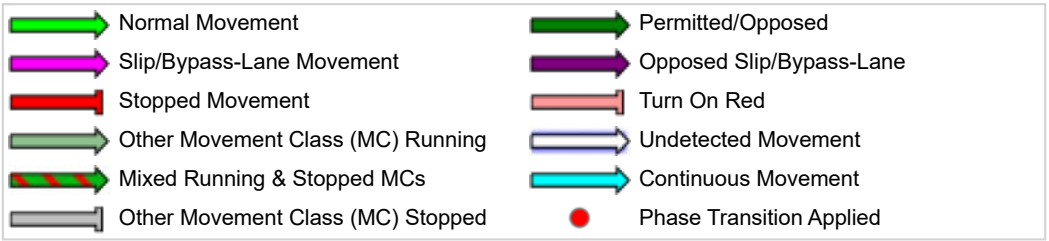
Phase	A	B	C1
Phase Change Time (sec)	0	69	99
Green Time (sec)	63	24	15
Phase Time (sec)	69	30	21
Phase Split	58%	25%	18%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



MOVEMENT SUMMARY

Site: 5087 [Surf Coast Highway / Marshalltown Road | Interim | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Surf Coast Highway (S)												
2	T1	880	8.0	0.324	6.2	LOS A	9.0	67.7	0.39	0.34	0.39	54.4
3	R2	132	2.0	0.776	68.6	LOS E	8.2	58.3	1.00	0.88	1.20	27.9
Approach		1012	7.2	0.776	14.3	LOS B	9.0	67.7	0.47	0.41	0.49	48.4
East: Marshalltown Road (E)												
4	L2	314	2.0	0.535	41.9	LOS D	15.1	107.6	0.88	0.82	0.88	35.0
6	R2	246	2.0	0.761	59.8	LOS E	14.5	103.3	1.00	0.88	1.10	30.1
Approach		560	2.0	0.761	49.7	LOS D	15.1	107.6	0.93	0.85	0.97	32.6
North: Surf Coast Highway (N)												
7	L2	204	2.0	0.189	17.9	LOS B	5.5	39.0	0.50	0.71	0.50	45.4
8	T1	1618	8.0	0.787	19.6	LOS B	38.2	285.4	0.80	0.73	0.80	45.4
9u	U	1	2.0	0.016	70.9	LOS E	0.1	0.4	0.99	0.57	0.99	27.3
Approach		1823	7.3	0.787	19.4	LOS B	38.2	285.4	0.77	0.73	0.77	45.4
All Vehicles		3395	6.4	0.787	22.9	LOS C	38.2	285.4	0.70	0.66	0.72	43.4

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 5087 [Surf Coast Highway / Marshalltown Road | Interim | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

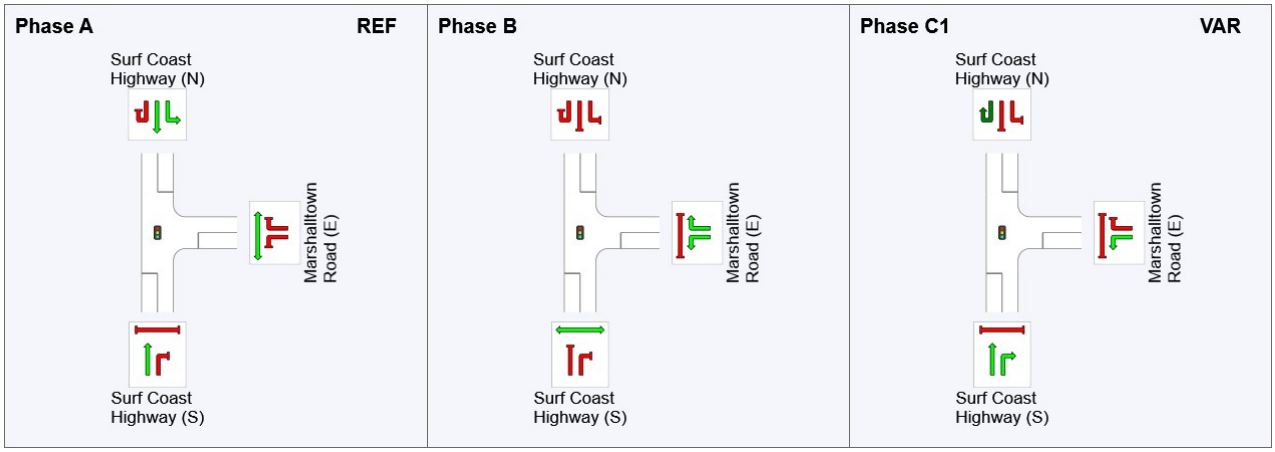
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: 3-W - Copy
Reference Phase: Phase A
Input Phase Sequence: A, B, C1*
Output Phase Sequence: A, B, C1*
(* Variable Phase)

Phase Timing Summary

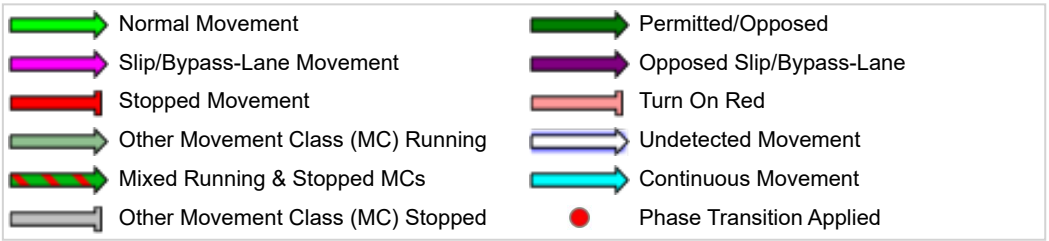
Phase	A	B	C1
Phase Change Time (sec)	0	76	103
Green Time (sec)	70	21	11
Phase Time (sec)	76	27	17
Phase Split	63%	23%	14%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



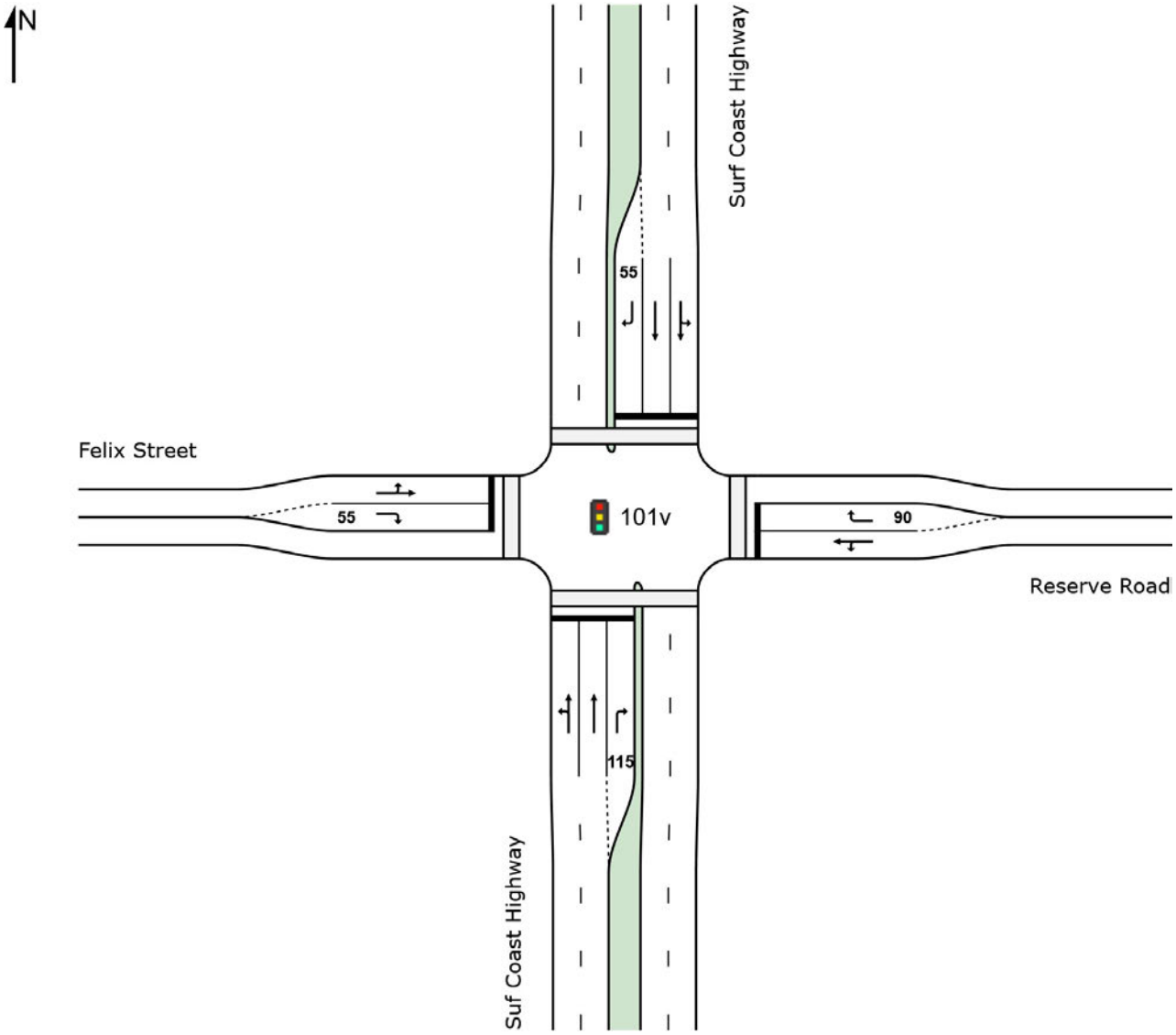
REF: Reference Phase
VAR: Variable Phase



SITE LAYOUT

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Interim | AM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Interim | AM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Suf Coast Highway												
1	L2	3	2.0	0.886	43.5	LOS D	49.6	359.1	0.98	0.98	1.08	36.3
2	T1	1560	4.0	0.886	37.8	LOS D	49.6	359.1	0.93	0.94	1.05	37.0
3	R2	252	2.0	0.859	67.7	LOS E	16.1	114.9	1.00	0.94	1.25	28.1
Approach		1815	3.7	0.886	41.9	LOS D	49.6	359.1	0.94	0.94	1.08	35.4
East: Reserve Road												
4	L2	542	2.0	0.870	48.1	LOS D	31.2	222.3	0.91	0.92	1.06	33.0
5	T1	2	4.0	0.870	42.5	LOS D	31.2	222.3	0.91	0.92	1.06	33.6
6	R2	216	2.0	0.755	59.1	LOS E	12.8	91.0	1.00	0.88	1.11	30.1
Approach		760	2.0	0.870	51.2	LOS D	31.2	222.3	0.93	0.91	1.07	32.1
North: Surf Coast Highway												
7	L2	94	2.0	0.630	29.5	LOS C	25.2	182.0	0.79	0.73	0.79	41.8
8	T1	1067	4.0	0.630	23.6	LOS C	25.2	182.0	0.79	0.71	0.79	43.0
9	R2	33	2.0	0.111	52.5	LOS D	1.7	11.8	0.89	0.72	0.89	31.8
Approach		1194	3.8	0.630	24.9	LOS C	25.2	182.0	0.79	0.72	0.79	42.5
West: Felix Street												
10	L2	27	2.0	0.042	31.4	LOS C	1.1	7.5	0.67	0.68	0.67	38.9
11	T1	1	2.0	0.042	25.8	LOS C	1.1	7.5	0.67	0.68	0.67	39.7
12	R2	1	2.0	0.005	47.1	LOS D	0.0	0.4	0.82	0.61	0.82	33.4
Approach		29	2.0	0.042	31.7	LOS C	1.1	7.5	0.68	0.68	0.68	38.7
All Vehicles		3798	3.4	0.886	38.3	LOS D	49.6	359.1	0.89	0.86	0.98	36.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Interim | AM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

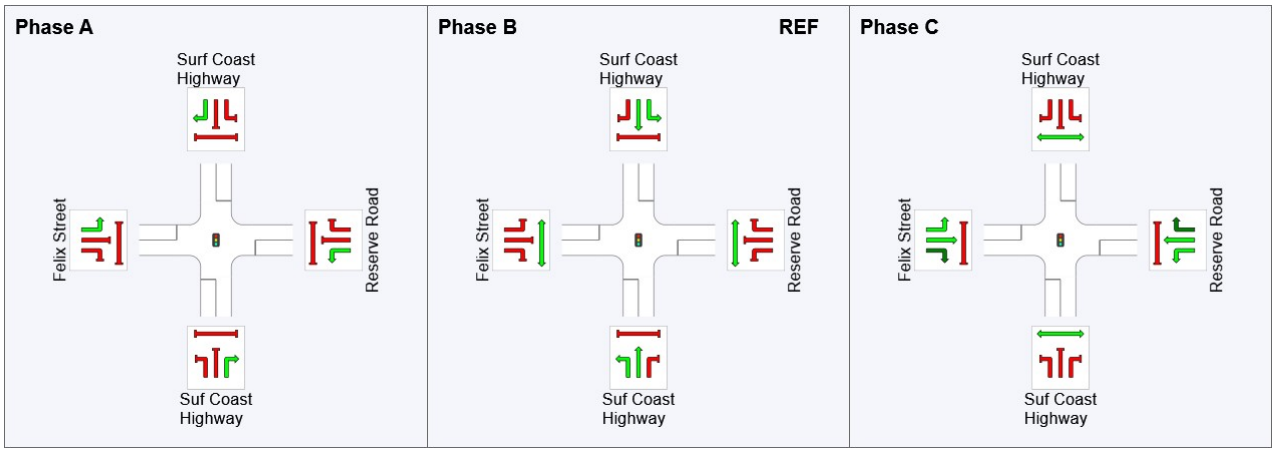
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	95	0	65
Green Time (sec)	19	59	24
Phase Time (sec)	25	65	30
Phase Split	21%	54%	25%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

MOVEMENT SUMMARY

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Interim | PM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Suf Coast Highway												
1	L2	5	2.0	0.431	28.3	LOS C	14.6	108.8	0.72	0.63	0.72	42.7
2	T1	748	8.0	0.431	22.7	LOS C	14.6	108.9	0.72	0.63	0.72	43.7
3	R2	297	2.0	0.642	49.2	LOS D	15.6	111.4	0.95	0.84	0.95	32.7
Approach		1051	6.3	0.642	30.2	LOS C	15.6	111.4	0.78	0.69	0.78	39.9
East: Reserve Road												
4	L2	288	2.0	0.370	30.6	LOS C	11.4	81.5	0.73	0.78	0.73	39.2
5	T1	1	4.0	0.370	25.1	LOS C	11.4	81.5	0.73	0.78	0.73	39.9
6	R2	121	2.0	0.594	60.4	LOS E	6.9	49.4	0.99	0.80	0.99	29.8
Approach		411	2.0	0.594	39.4	LOS D	11.4	81.5	0.81	0.79	0.81	35.8
North: Surf Coast Highway												
7	L2	132	2.0	0.947	63.4	LOS E	60.2	446.7	1.00	1.11	1.26	30.1
8	T1	1482	8.0	0.947	57.7	LOS E	60.2	446.7	1.00	1.12	1.27	30.7
9	R2	54	2.0	0.116	42.8	LOS D	2.4	17.2	0.81	0.73	0.81	34.7
Approach		1667	7.3	0.947	57.7	LOS E	60.2	446.7	0.99	1.11	1.25	30.7
West: Felix Street												
10	L2	15	2.0	0.029	36.9	LOS D	0.6	4.6	0.73	0.67	0.73	36.8
11	T1	1	2.0	0.029	31.4	LOS C	0.6	4.6	0.73	0.67	0.73	37.5
12	R2	1	2.0	0.016	68.8	LOS E	0.1	0.4	0.98	0.58	0.98	27.9
Approach		17	2.0	0.029	38.6	LOS D	0.6	4.6	0.75	0.66	0.75	36.1
All Vehicles		3145	6.3	0.947	46.0	LOS D	60.2	446.7	0.90	0.92	1.03	34.0

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Interim | PM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

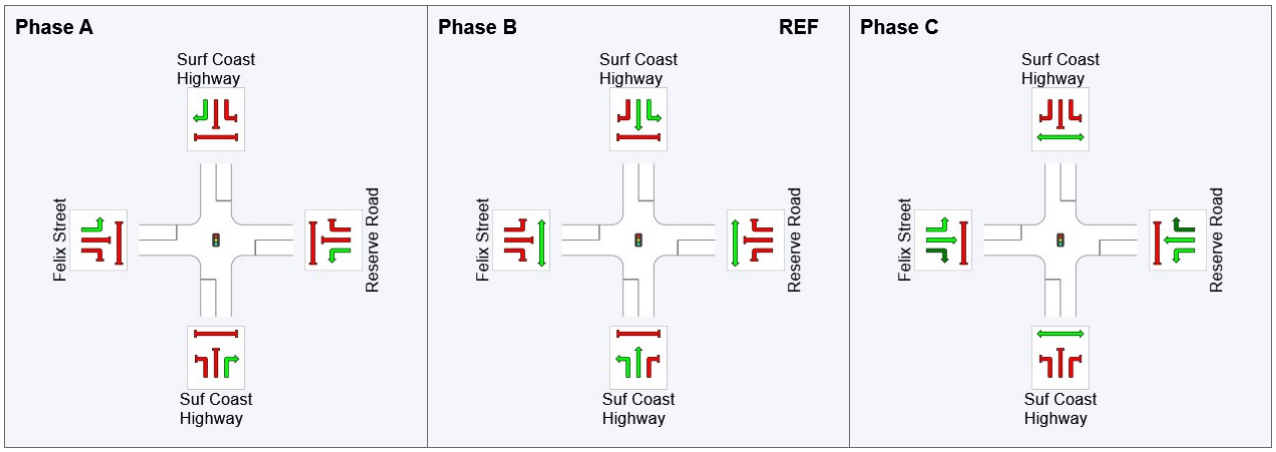
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	84	0	62
Green Time (sec)	30	56	16
Phase Time (sec)	36	62	22
Phase Split	30%	52%	18%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



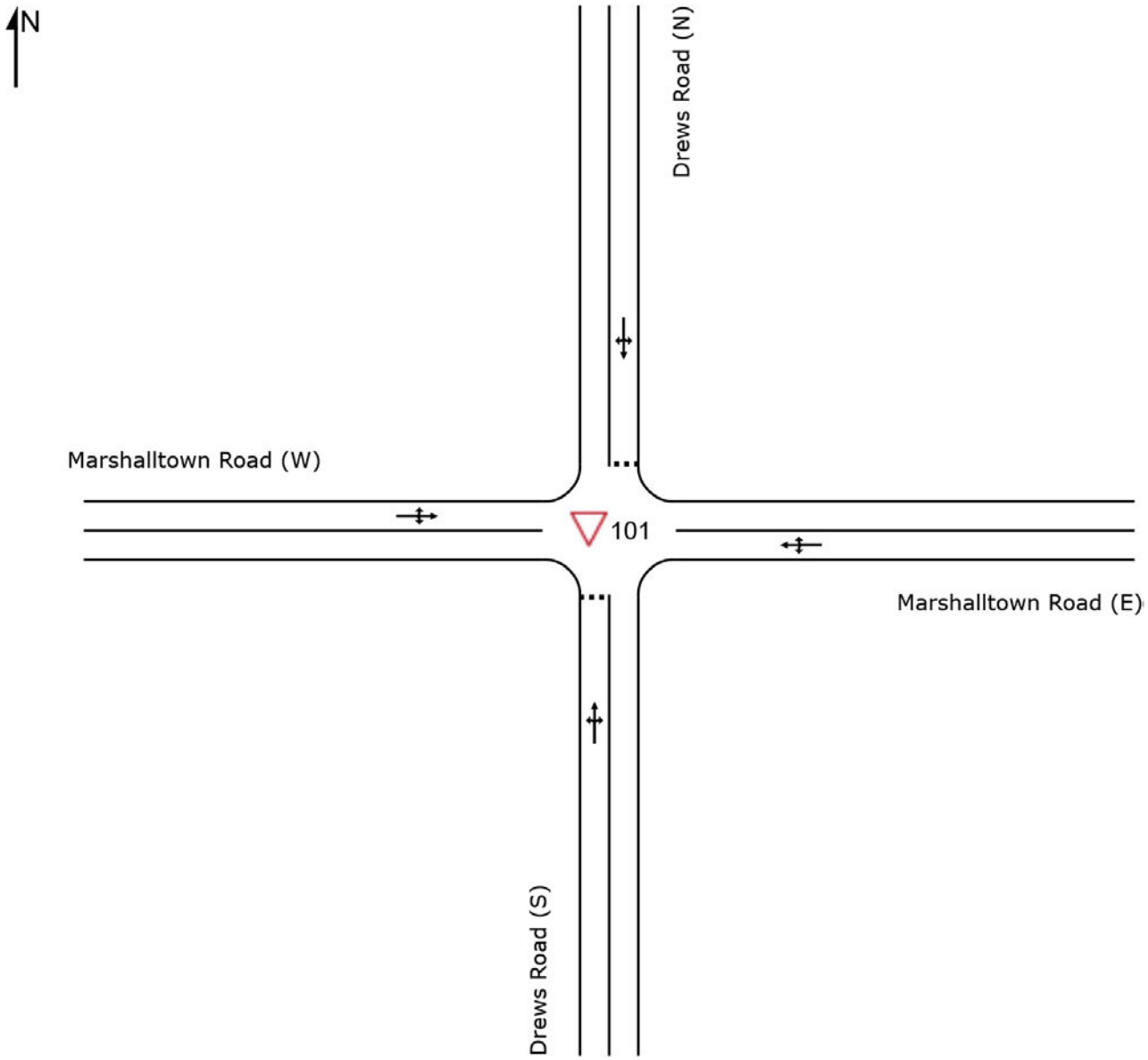
REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

SITE LAYOUT

Site: 101 [Marshalltown Road / Drews Road | Interim | AM PEAK]

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



MOVEMENT SUMMARY

Site: 101 [Marshalltown Road / Drews Road | Interim | AM PEAK]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drews Road (S)												
1	L2	202	2.0	0.425	7.4	LOS A	2.5	17.9	0.51	0.77	0.63	51.4
2	T1	83	2.0	0.425	8.0	LOS A	2.5	17.9	0.51	0.77	0.63	51.6
3	R2	104	2.0	0.425	10.6	LOS B	2.5	17.9	0.51	0.77	0.63	51.0
Approach		389	2.0	0.425	8.4	LOS A	2.5	17.9	0.51	0.77	0.63	51.3
East: Marshalltown Road (E)												
4	L2	11	2.0	0.150	5.9	LOS A	0.1	0.7	0.03	0.04	0.03	57.7
5	T1	264	4.0	0.150	0.0	LOS A	0.1	0.7	0.03	0.04	0.03	59.5
6	R2	11	2.0	0.150	6.1	LOS A	0.1	0.7	0.03	0.04	0.03	57.2
Approach		285	3.9	0.150	0.5	NA	0.1	0.7	0.03	0.04	0.03	59.3
North: Drews Road (N)												
7	L2	23	2.0	0.142	6.1	LOS A	0.5	3.5	0.43	0.69	0.43	51.1
8	T1	23	2.0	0.142	6.6	LOS A	0.5	3.5	0.43	0.69	0.43	51.3
9	R2	46	2.0	0.142	11.2	LOS B	0.5	3.5	0.43	0.69	0.43	50.7
Approach		93	2.0	0.142	8.8	LOS A	0.5	3.5	0.43	0.69	0.43	50.9
West: Marshalltown Road (W)												
10	L2	11	2.0	0.103	6.4	LOS A	0.2	1.6	0.13	0.11	0.13	56.8
11	T1	153	4.0	0.103	0.2	LOS A	0.2	1.6	0.13	0.11	0.13	58.4
12	R2	24	2.0	0.103	6.5	LOS A	0.2	1.6	0.13	0.11	0.13	56.3
Approach		187	3.6	0.103	1.4	NA	0.2	1.6	0.13	0.11	0.13	58.1
All Vehicles		955	2.9	0.425	4.7	NA	2.5	17.9	0.28	0.42	0.34	54.7

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

MOVEMENT SUMMARY

Site: 101 [Marshalltown Road / Drews Road | Interim | PM PEAK]

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

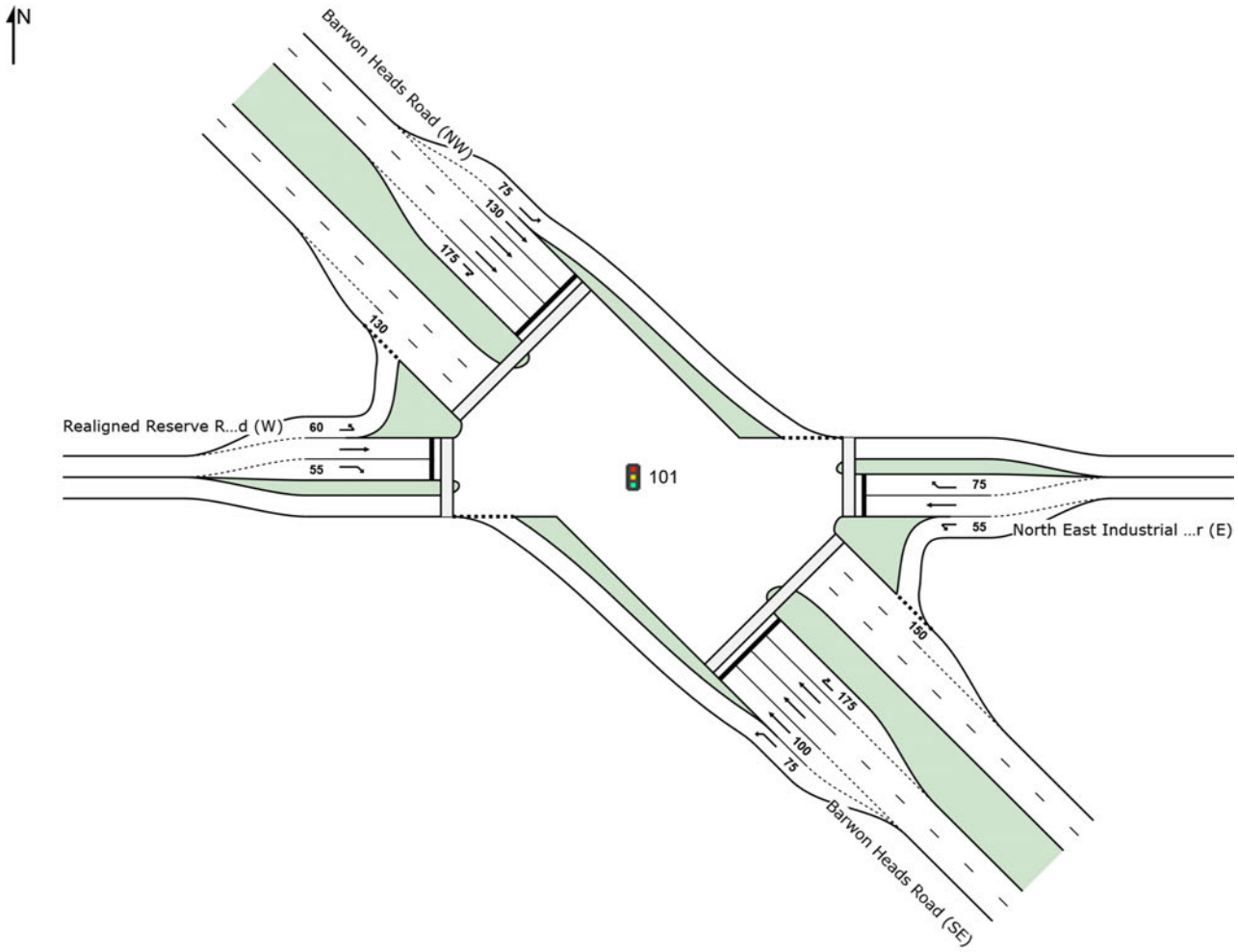
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drews Road (S)												
1	L2	134	4.0	0.311	6.9	LOS A	1.4	10.1	0.48	0.72	0.53	51.4
2	T1	73	4.0	0.311	8.8	LOS A	1.4	10.1	0.48	0.72	0.53	51.6
3	R2	49	4.0	0.311	11.4	LOS B	1.4	10.1	0.48	0.72	0.53	51.0
Approach		256	4.0	0.311	8.3	LOS A	1.4	10.1	0.48	0.72	0.53	51.4
East: Marshalltown Road (E)												
4	L2	11	4.0	0.152	6.2	LOS A	0.1	0.8	0.04	0.04	0.04	57.6
5	T1	265	4.0	0.152	0.1	LOS A	0.1	0.8	0.04	0.04	0.04	59.4
6	R2	11	4.0	0.152	6.5	LOS A	0.1	0.8	0.04	0.04	0.04	57.1
Approach		286	4.0	0.152	0.5	NA	0.1	0.8	0.04	0.04	0.04	59.3
North: Drews Road (N)												
7	L2	14	2.0	0.088	6.4	LOS A	0.3	2.1	0.49	0.72	0.49	50.7
8	T1	14	2.0	0.088	7.6	LOS A	0.3	2.1	0.49	0.72	0.49	50.9
9	R2	24	2.0	0.088	12.0	LOS B	0.3	2.1	0.49	0.72	0.49	50.3
Approach		52	2.0	0.088	9.3	LOS A	0.3	2.1	0.49	0.72	0.49	50.6
West: Marshalltown Road (W)												
10	L2	11	4.0	0.199	6.7	LOS A	0.7	5.3	0.25	0.17	0.25	55.8
11	T1	243	4.0	0.199	0.5	LOS A	0.7	5.3	0.25	0.17	0.25	57.5
12	R2	87	4.0	0.199	6.7	LOS A	0.7	5.3	0.25	0.17	0.25	55.3
Approach		341	4.0	0.199	2.3	NA	0.7	5.3	0.25	0.17	0.25	56.9
All Vehicles		935	3.9	0.311	3.8	NA	1.4	10.1	0.26	0.32	0.28	55.5

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

SITE LAYOUT

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated



MOVEMENT SUMMARY

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Barwon Heads Road (SE)												
21a	L1	8	4.0	0.006	4.7	LOS A	0.0	0.0	0.02	0.56	0.02	54.7
22	T1	1618	8.0	0.677	20.2	LOS C	22.4	167.5	0.66	0.59	0.66	47.8
23b	R3	207	4.0	0.457	44.9	LOS D	9.2	66.6	0.80	0.79	0.80	36.3
Approach		1834	7.5	0.677	22.9	LOS C	22.4	167.5	0.67	0.61	0.67	46.3
East: North East Industrial Connector (E)												
4b	L3	111	4.0	0.091	8.3	LOS A	1.0	7.3	0.22	0.64	0.22	53.4
5	T1	55	4.0	0.137	41.7	LOS D	2.6	18.9	0.85	0.65	0.85	35.7
6a	R1	58	4.0	0.528	67.1	LOS E	3.5	25.4	1.00	0.75	1.01	30.9
Approach		223	4.0	0.528	31.8	LOS C	3.5	25.4	0.58	0.67	0.58	41.0
NorthWest: Barwon Heads Road (NW)												
27a	L1	108	4.0	0.086	4.8	LOS A	0.1	0.8	0.02	0.56	0.02	54.6
28	T1	621	8.0	0.475	41.1	LOS D	10.4	77.5	0.83	0.69	0.83	39.4
29b	R3	59	4.0	0.631	71.3	LOS E	3.6	26.4	1.00	0.79	1.08	29.6
Approach		788	7.2	0.631	38.4	LOS D	10.4	77.5	0.73	0.68	0.74	39.9
West: Realigned Reserve Road (W)												
10b	L3	231	4.0	0.275	12.6	LOS B	4.7	34.2	0.43	0.71	0.43	50.7
11	T1	49	4.0	0.124	41.5	LOS D	2.4	17.0	0.85	0.65	0.85	35.8
12a	R1	66	4.0	0.605	67.8	LOS E	4.1	29.5	1.00	0.78	1.07	30.7
Approach		346	4.0	0.605	27.3	LOS C	4.7	34.2	0.60	0.71	0.61	43.0
All Vehicles		3192	6.8	0.677	27.8	LOS C	22.4	167.5	0.67	0.64	0.67	43.8

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, E1*, F
(* Variable Phase)

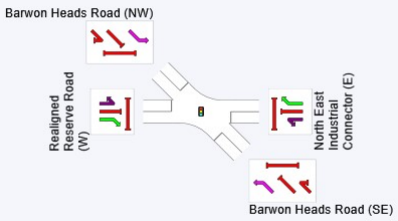
Phase Timing Summary

Phase	A	C	D	E1	F
Phase Change Time (sec)	0	13	44	57	84
Green Time (sec)	7	25	7	21	30
Phase Time (sec)	13	31	13	27	36
Phase Split	11%	26%	11%	23%	30%

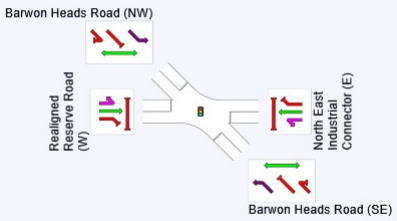
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

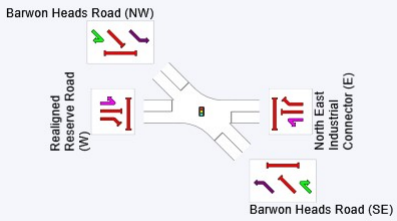
Phase A REF



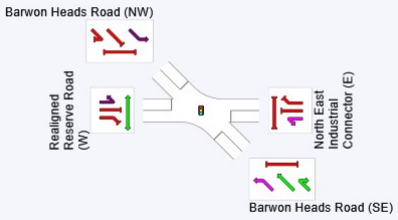
Phase C



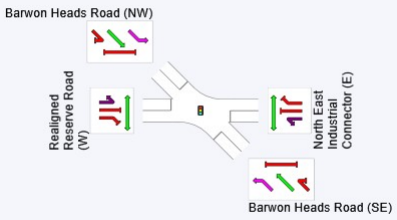
Phase D



Phase E1 VAR

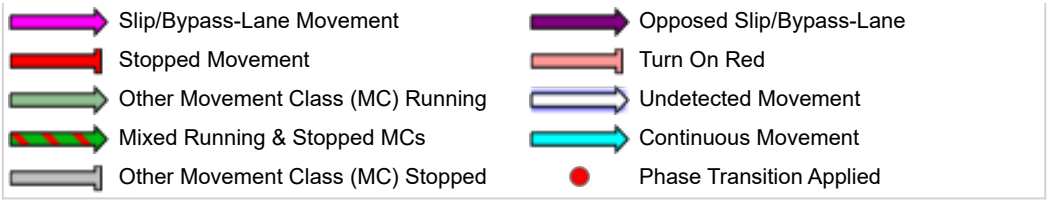


Phase F



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed


Slip/Bypass-Lane Movement
Opposed Slip/Bypass-Lane
Stopped Movement
Turn On Red
Other Movement Class (MC) Running
Undetected Movement
Mixed Running & Stopped MCs
Continuous Movement
Other Movement Class (MC) Stopped
Phase Transition Applied

MOVEMENT SUMMARY

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Interim | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Barwon Heads Road (SE)												
21a	L1	25	4.0	0.019	4.8	LOS A	0.0	0.2	0.02	0.56	0.02	54.6
22	T1	999	8.0	0.554	30.3	LOS C	15.4	115.2	0.74	0.64	0.74	43.3
23b	R3	85	4.0	0.799	73.2	LOS E	5.4	39.3	1.00	0.87	1.24	29.2
Approach		1109	7.6	0.799	33.1	LOS C	15.4	115.2	0.74	0.65	0.76	42.1
East: North East Industrial Connector (E)												
4b	L3	157	4.0	0.207	19.5	LOS B	4.5	32.5	0.56	0.73	0.56	46.9
5	T1	101	4.0	0.253	42.9	LOS D	5.0	36.0	0.88	0.70	0.88	35.3
6a	R1	96	4.0	0.874	75.3	LOS E	6.4	46.1	1.00	0.95	1.45	29.1
Approach		354	4.0	0.874	41.3	LOS D	6.4	46.1	0.77	0.78	0.89	37.3
NorthWest: Barwon Heads Road (NW)												
27a	L1	231	4.0	0.154	4.8	LOS A	0.2	1.6	0.03	0.56	0.03	54.7
28	T1	2045	8.0	0.887	29.5	LOS C	42.7	319.6	0.81	0.79	0.88	43.7
29b	R3	159	4.0	0.568	56.6	LOS E	8.4	61.1	0.93	0.81	0.93	33.0
Approach		2435	7.4	0.887	28.9	LOS C	42.7	319.6	0.74	0.77	0.80	43.6
West: Realigned Reserve Road (W)												
10b	L3	104	4.0	0.098	9.3	LOS A	1.3	9.1	0.27	0.65	0.27	52.8
11	T1	28	4.0	0.071	40.9	LOS D	1.3	9.6	0.83	0.61	0.83	36.0
12a	R1	83	4.0	0.759	70.3	LOS E	5.3	38.1	1.00	0.86	1.23	30.2
Approach		216	4.0	0.759	37.0	LOS D	5.3	38.1	0.63	0.73	0.71	39.2
All Vehicles		4114	7.0	0.887	31.5	LOS C	42.7	319.6	0.74	0.74	0.79	42.4

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Interim | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, E2*, F
(* Variable Phase)

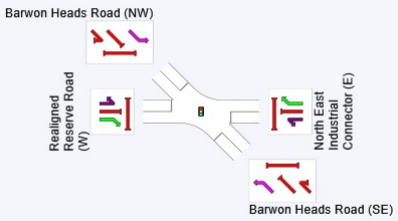
Phase Timing Summary

Phase	A	C	D	E2	F
Phase Change Time (sec)	0	13	44	58	71
Green Time (sec)	7	25	8	7	43
Phase Time (sec)	13	31	14	13	49
Phase Split	11%	26%	12%	11%	41%

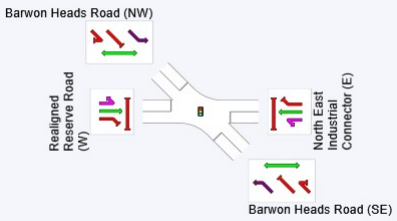
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

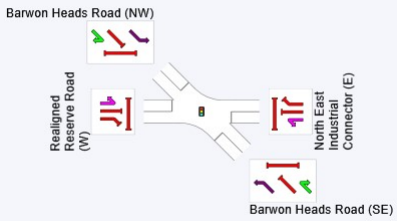
Phase A REF



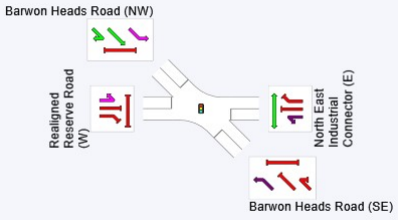
Phase C



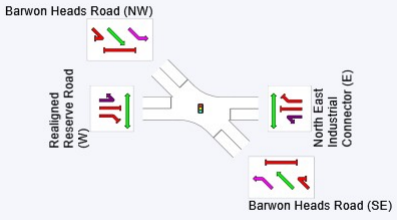
Phase D



Phase E2 VAR

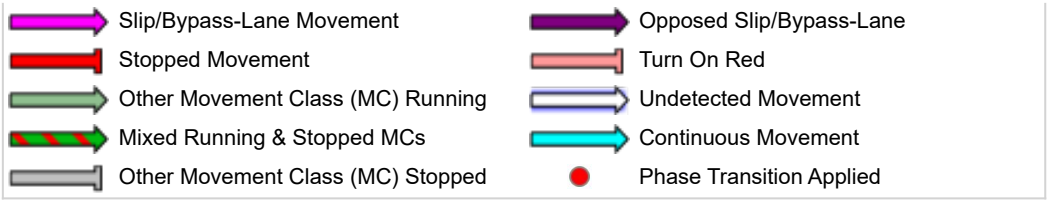


Phase F



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed

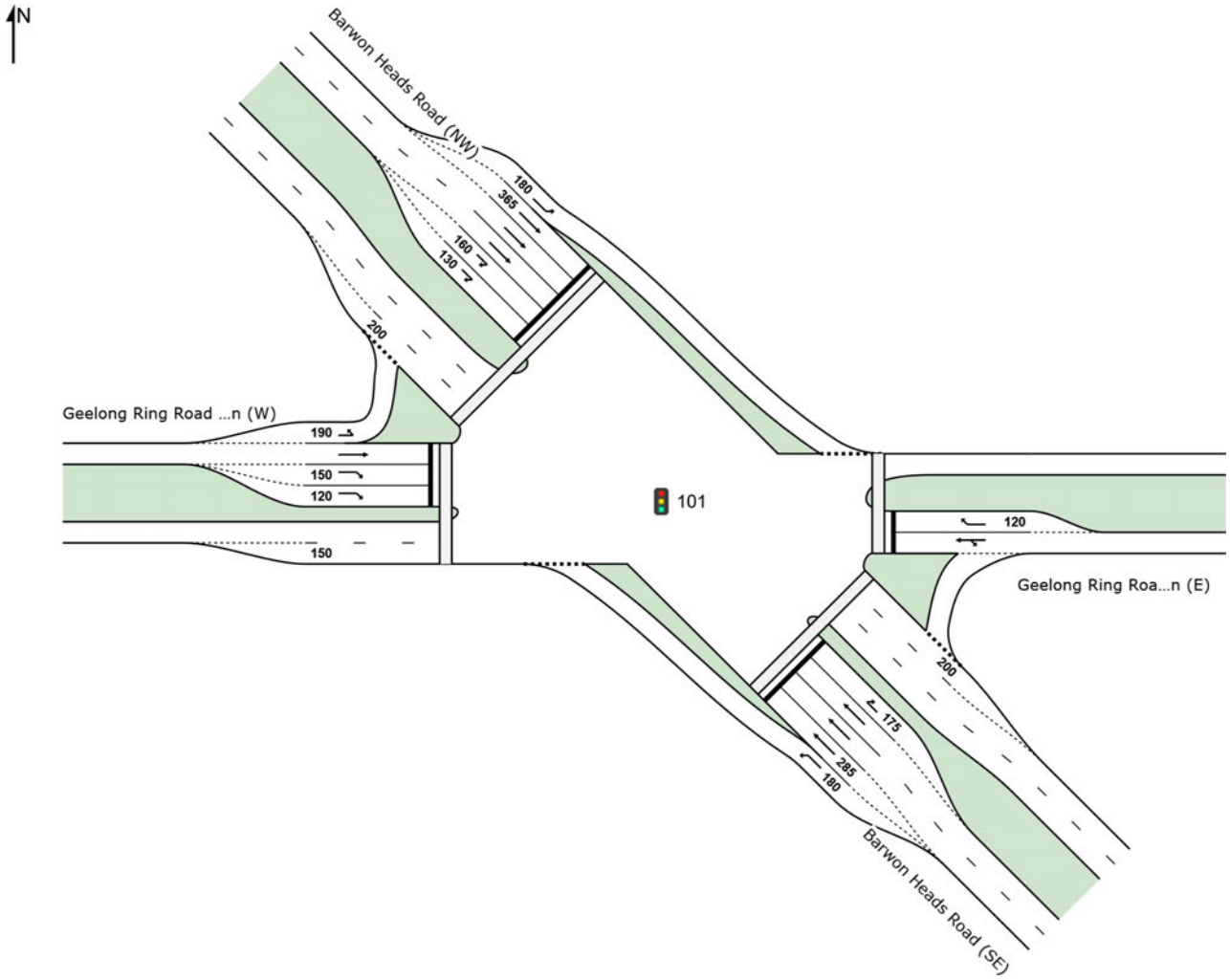


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SITE LAYOUT

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Inteirm | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated



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Organisation: CARDNO (QLD) PTY LTD | Created: Monday, 1 July 2019 5:09:17 PM
Project: M:\2019\0001_0500\V190014_Marshall_PSP_Traffic_Assessment\Traffic\Engineering\SIDRA\V190014-SID001-Interim Year SidraTL.sip8

MOVEMENT SUMMARY

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Inteirm | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Barwon Heads Road (SE)												
21a	L1	139	8.0	0.099	5.5	LOS A	1.0	7.2	0.18	0.56	0.18	53.8
22	T1	1134	8.0	0.654	38.8	LOS D	19.2	143.6	0.93	0.80	0.93	36.7
23b	R3	122	8.0	0.361	50.2	LOS D	6.2	46.1	0.90	0.79	0.90	32.5
Approach		1395	8.0	0.654	36.4	LOS D	19.2	143.6	0.85	0.78	0.85	37.5
East: Geelong Ring Road Extension (E)												
4b	L3	63	8.0	0.435	47.9	LOS D	6.8	51.1	0.92	0.82	1.19	34.9
5	T1	93	8.0	0.435	41.1	LOS D	6.8	51.1	0.92	0.82	1.19	35.1
6a	R1	27	8.0	0.299	67.1	LOS E	1.7	12.4	1.00	0.71	1.00	29.0
Approach		183	8.0	0.435	47.3	LOS D	6.8	51.1	0.93	0.81	1.16	34.0
NorthWest: Barwon Heads Road (NW)												
27a	L1	64	8.0	0.049	6.5	LOS A	0.6	4.1	0.21	0.61	0.21	52.3
28	T1	628	8.0	0.363	34.7	LOS C	9.5	71.2	0.83	0.69	0.83	38.3
29b	R3	95	8.0	0.149	47.8	LOS D	2.4	18.0	0.84	0.74	0.84	33.5
Approach		787	8.0	0.363	34.0	LOS C	9.5	71.2	0.78	0.69	0.78	38.4
West: Geelong Ring Road Extension (W)												
10b	L3	731	8.0	0.699	16.4	LOS B	20.5	153.4	0.67	0.85	0.75	47.2
11	T1	76	8.0	0.180	40.5	LOS D	3.6	26.8	0.85	0.66	0.85	36.2
12a	R1	228	8.0	0.681	64.7	LOS E	6.9	51.5	1.00	0.83	1.09	29.2
Approach		1035	8.0	0.699	28.8	LOS C	20.5	153.4	0.76	0.83	0.83	40.8
All Vehicles		3400	8.0	0.699	34.1	LOS C	20.5	153.4	0.81	0.78	0.84	38.4

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Inteirm | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, B1*, C, D, E1*, F
(* Variable Phase)

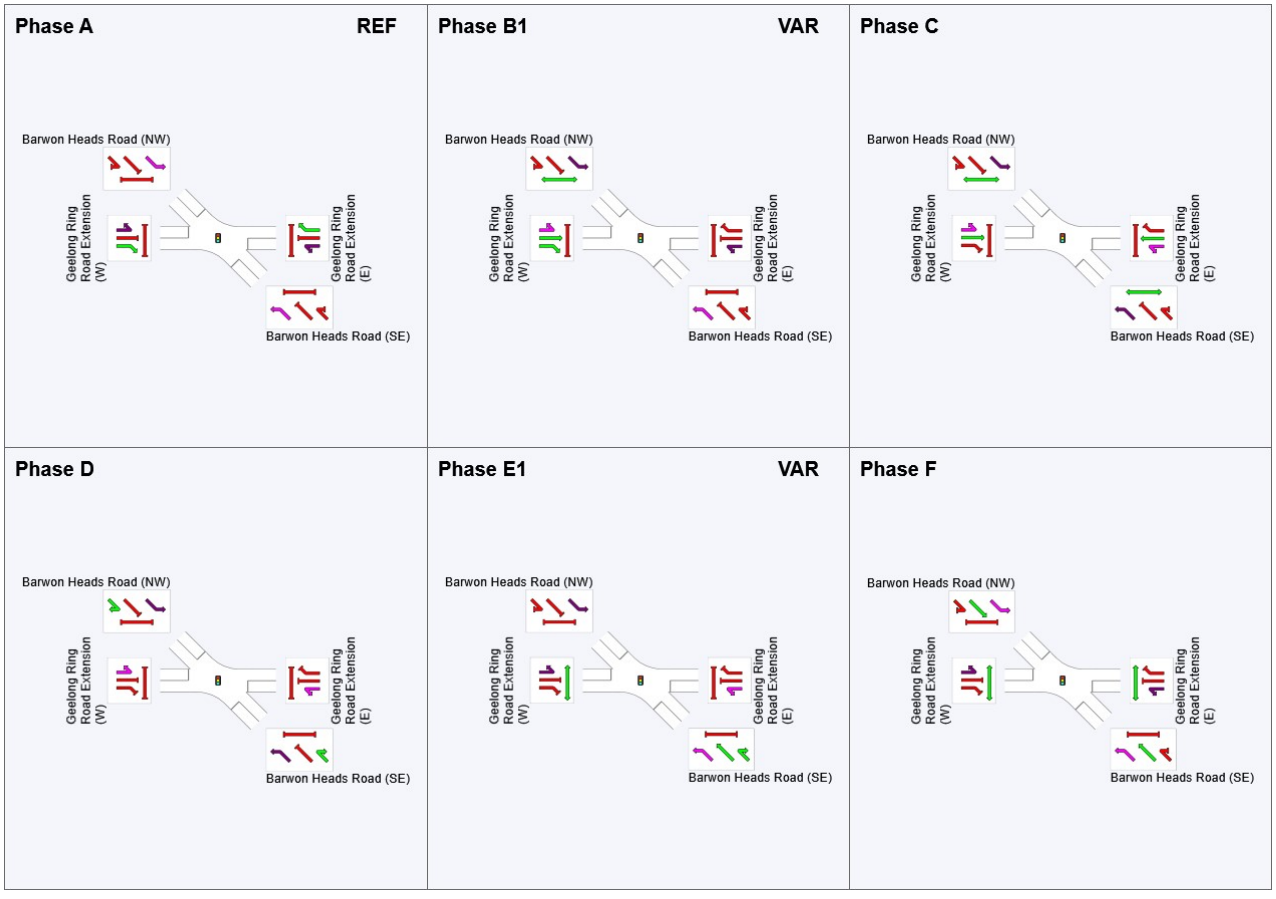
Phase Timing Summary

Phase	A	B1	C	D	E1	F
Phase Change Time (sec)	0	12	17	45	77	77
Green Time (sec)	6	***	22	26	***	37
Phase Time (sec)	12	5	28	32	0	43
Phase Split	10%	4%	23%	27%	0%	36%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

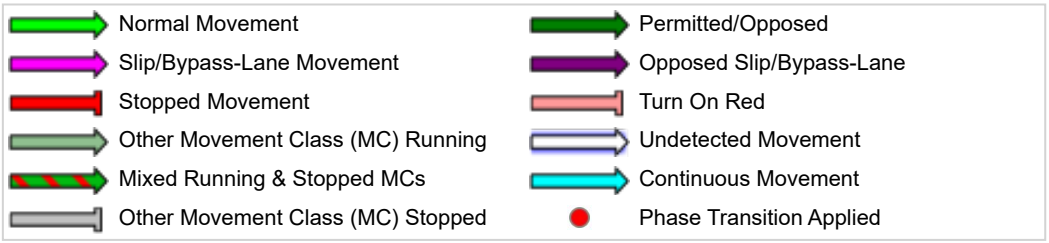
*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Interim | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Barwon Heads Road (SE)												
21a	L1	189	8.0	0.211	17.2	LOS B	5.3	39.4	0.56	0.69	0.56	45.9
22	T1	698	8.0	0.678	50.4	LOS D	13.0	97.3	0.99	0.84	1.01	32.9
23b	R3	31	8.0	0.391	71.0	LOS E	1.9	14.0	1.00	0.72	1.00	27.5
Approach		918	8.0	0.678	44.3	LOS D	13.0	97.3	0.90	0.80	0.91	34.7
East: Geelong Ring Road Extension (E)												
4b	L3	135	8.0	0.637	46.1	LOS D	13.0	97.4	0.94	0.88	1.20	35.4
5	T1	145	8.0	0.637	39.3	LOS D	13.0	97.4	0.94	0.88	1.20	35.5
6a	R1	67	8.0	0.631	68.1	LOS E	4.2	31.1	1.00	0.79	1.09	28.8
Approach		347	8.0	0.637	47.5	LOS D	13.0	97.4	0.95	0.86	1.18	33.9
NorthWest: Barwon Heads Road (NW)												
27a	L1	84	8.0	0.059	6.3	LOS A	0.7	5.3	0.20	0.61	0.20	52.4
28	T1	1559	8.0	0.584	24.4	LOS C	21.9	163.6	0.78	0.70	0.78	42.9
29b	R3	687	8.0	0.685	42.8	LOS D	18.5	138.3	0.90	0.84	0.90	35.1
Approach		2331	8.0	0.685	29.2	LOS C	21.9	163.6	0.80	0.74	0.80	40.5
West: Geelong Ring Road Extension (W)												
10b	L3	441	8.0	0.367	9.5	LOS A	6.3	46.9	0.32	0.68	0.32	51.6
11	T1	147	8.0	0.363	43.3	LOS D	7.4	55.3	0.90	0.73	0.90	35.2
12a	R1	40	8.0	0.219	66.9	LOS E	1.2	9.0	0.99	0.70	0.99	28.7
Approach		628	8.0	0.367	21.1	LOS C	7.4	55.3	0.50	0.69	0.50	44.5
All Vehicles		4224	8.0	0.685	32.7	LOS C	21.9	163.6	0.79	0.75	0.81	39.0

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Interim | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, B2*, C, D, E2*, F
(* Variable Phase)

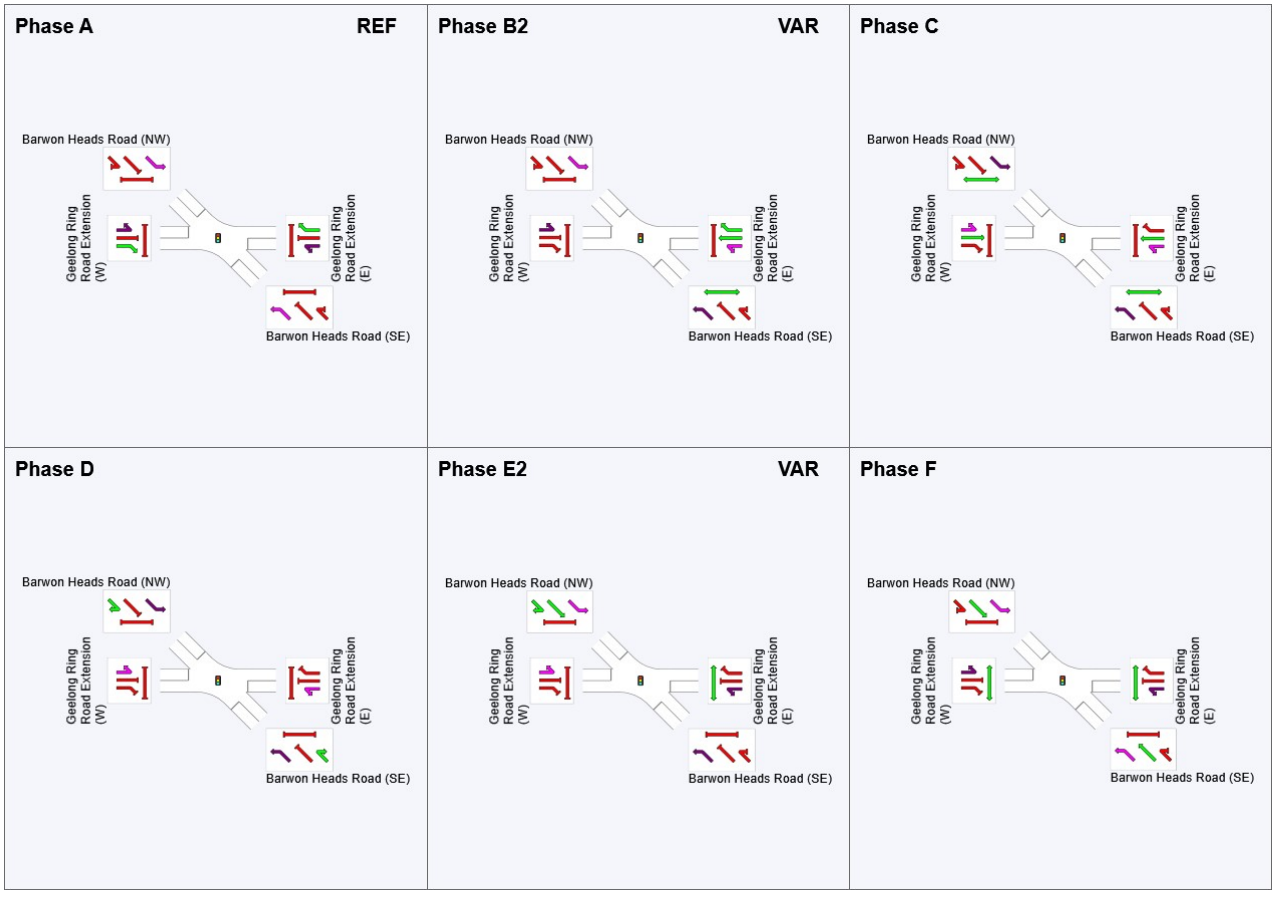
Phase Timing Summary

Phase	A	B2	C	D	E2	F
Phase Change Time (sec)	0	12	13	45	57	92
Green Time (sec)	6	***	26	6	29	22
Phase Time (sec)	12	1	32	12	35	28
Phase Split	10%	1%	27%	10%	29%	23%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

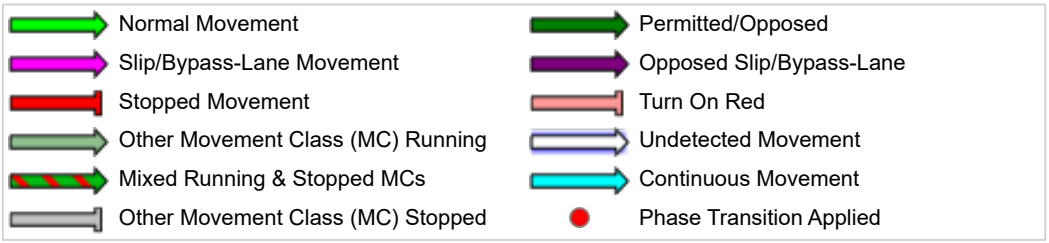
*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

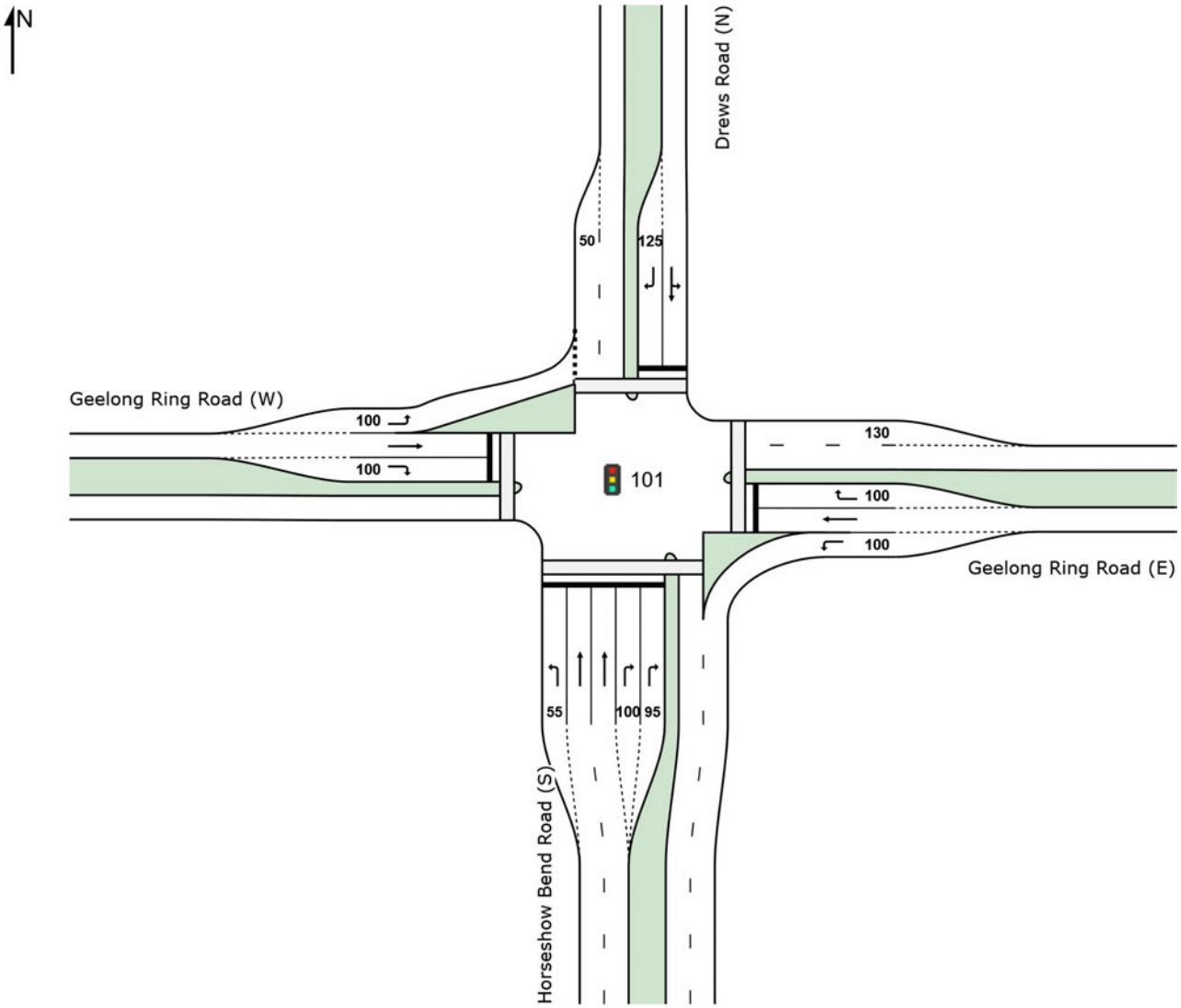


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SITE LAYOUT

Site: 101 [Geelong Ring Road Extension / Drews Road | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated



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MOVEMENT SUMMARY

Site: 101 [Geelong Ring Road Extension / Drews Road | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Horseshow Bend Road (S)												
1	L2	173	4.0	0.232	30.3	LOS C	6.5	47.2	0.69	0.75	0.69	39.3
2	T1	294	4.0	0.455	40.3	LOS D	10.9	78.7	0.88	0.72	0.88	36.2
3	R2	535	4.0	0.638	46.7	LOS D	16.2	116.9	0.92	0.83	0.92	33.6
Approach		1001	4.0	0.638	42.0	LOS D	16.2	116.9	0.87	0.78	0.87	35.2
East: Geelong Ring Road (E)												
4	L2	183	4.0	0.100	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
5	T1	101	8.0	0.223	39.3	LOS D	4.3	32.3	0.77	0.61	0.77	36.7
6	R2	38	4.0	0.415	69.5	LOS E	2.3	16.6	0.99	0.73	0.99	27.7
Approach		322	5.3	0.415	23.7	LOS C	4.3	32.3	0.36	0.58	0.36	43.2
North: Drews Road (N)												
7	L2	65	4.0	0.649	54.6	LOS D	12.8	92.5	0.98	0.82	0.98	32.3
8	T1	167	4.0	0.649	49.0	LOS D	12.8	92.5	0.98	0.82	0.98	32.9
9	R2	268	4.0	0.736	56.4	LOS E	15.4	111.1	1.00	0.87	1.05	30.8
Approach		501	4.0	0.736	53.7	LOS D	15.4	111.1	0.99	0.85	1.02	31.7
West: Geelong Ring Road (W)												
10	L2	264	4.0	0.189	5.9	LOS A	0.3	2.1	0.03	0.56	0.03	54.0
11	T1	406	8.0	0.723	40.0	LOS D	20.2	150.9	0.90	0.79	0.90	36.4
12	R2	43	4.0	0.218	59.7	LOS E	2.3	16.6	0.92	0.73	0.92	30.2
Approach		714	6.3	0.723	28.6	LOS C	20.2	150.9	0.58	0.70	0.58	40.8
All Vehicles		2538	4.8	0.736	38.2	LOS D	20.2	150.9	0.75	0.75	0.75	36.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Geelong Ring Road Extension / Drews Road | Interim | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

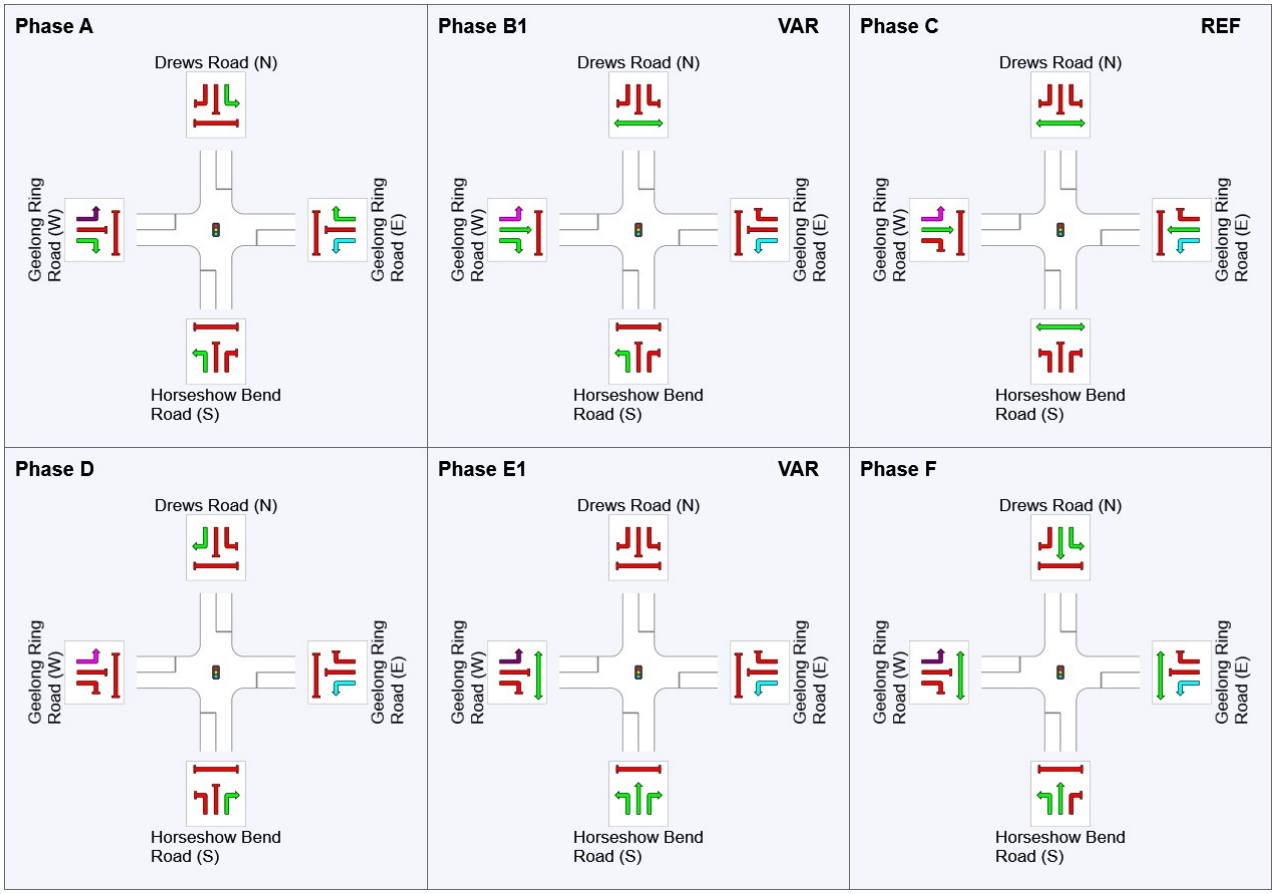
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, B1*, C, D, E1*, F
(* Variable Phase)

Phase Timing Summary

Phase	A	B1	C	D	E1	F
Phase Change Time (sec)	101	113	0	35	65	73
Green Time (sec)	6	1	29	24	2	22
Phase Time (sec)	12	7	35	30	8	28
Phase Split	10%	6%	29%	25%	7%	23%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase





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MOVEMENT SUMMARY

Site: 101 [Geelong Ring Road Extension / Drews Road | Interim | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Horseshow Bend Road (S)												
1	L2	86	4.0	0.167	40.2	LOS D	3.8	27.4	0.79	0.75	0.79	35.5
2	T1	278	4.0	0.760	55.4	LOS E	12.4	89.5	0.98	0.85	1.07	31.5
3	R2	295	4.0	0.803	65.0	LOS E	10.7	77.1	1.00	0.86	1.12	28.8
Approach		659	4.0	0.803	57.7	LOS E	12.4	89.5	0.96	0.84	1.05	30.7
East: Geelong Ring Road (E)												
4	L2	418	4.0	0.229	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
5	T1	533	8.0	0.696	27.8	LOS C	22.8	170.2	0.79	0.70	0.79	41.4
6	R2	57	4.0	0.340	62.8	LOS E	3.2	23.0	0.95	0.75	0.95	29.1
Approach		1007	6.1	0.696	20.6	LOS C	22.8	170.2	0.47	0.63	0.47	44.9
North: Drews Road (W)												
7	L2	46	4.0	0.756	57.9	LOS E	15.6	113.0	1.00	0.89	1.08	31.5
8	T1	222	4.0	0.756	52.3	LOS D	15.6	113.0	1.00	0.89	1.08	32.1
9	R2	225	4.0	0.780	62.3	LOS E	13.6	98.2	1.00	0.89	1.13	29.4
Approach		494	4.0	0.780	57.4	LOS E	15.6	113.0	1.00	0.89	1.10	30.7
West: Geelong Ring Road (W)												
10	L2	207	4.0	0.146	5.9	LOS A	0.2	1.6	0.03	0.56	0.03	54.0
11	T1	269	8.0	0.352	23.1	LOS C	8.8	65.9	0.60	0.51	0.60	43.6
12	R2	129	4.0	0.774	68.0	LOS E	7.9	57.4	1.00	0.87	1.15	28.3
Approach		606	5.8	0.774	26.8	LOS C	8.8	65.9	0.49	0.60	0.52	41.5
All Vehicles		2766	5.2	0.803	37.4	LOS D	22.8	170.2	0.69	0.72	0.73	37.1

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Geelong Ring Road Extension / Drews Road | Interim | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, E2*, F
(* Variable Phase)

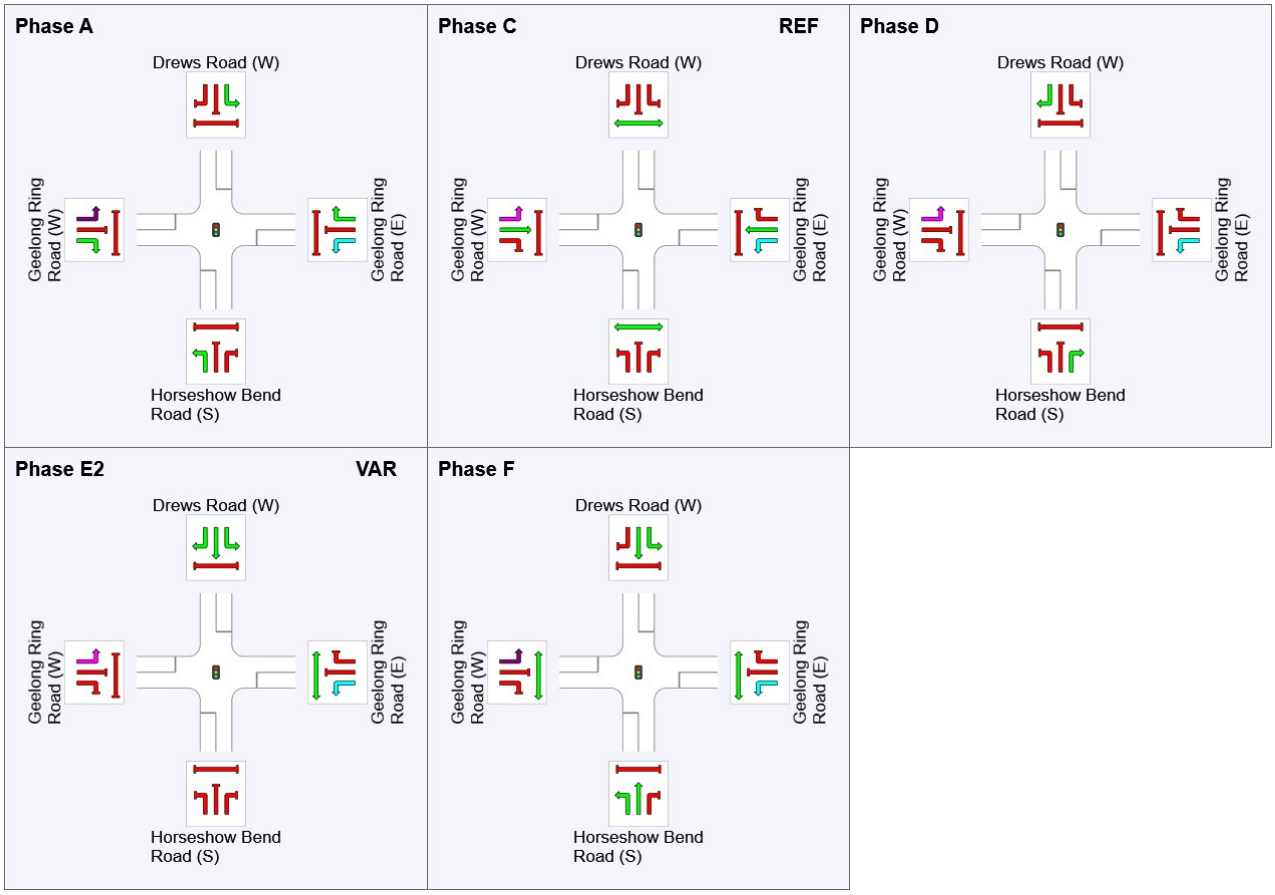
Phase Timing Summary

Phase	A	C	D	E2	F
Phase Change Time (sec)	103	0	55	75	80
Green Time (sec)	11	49	14	***	17
Phase Time (sec)	17	55	20	5	23
Phase Split	14%	46%	17%	4%	19%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

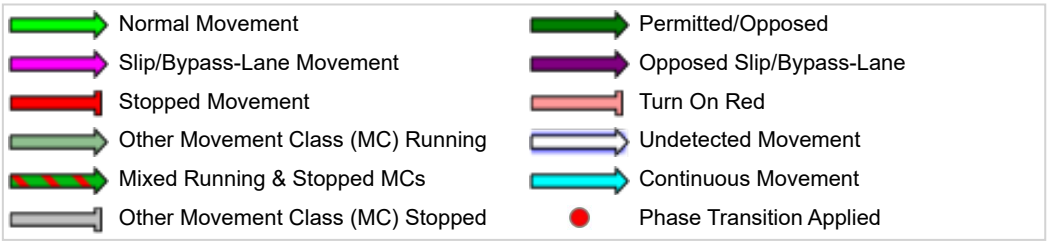
*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

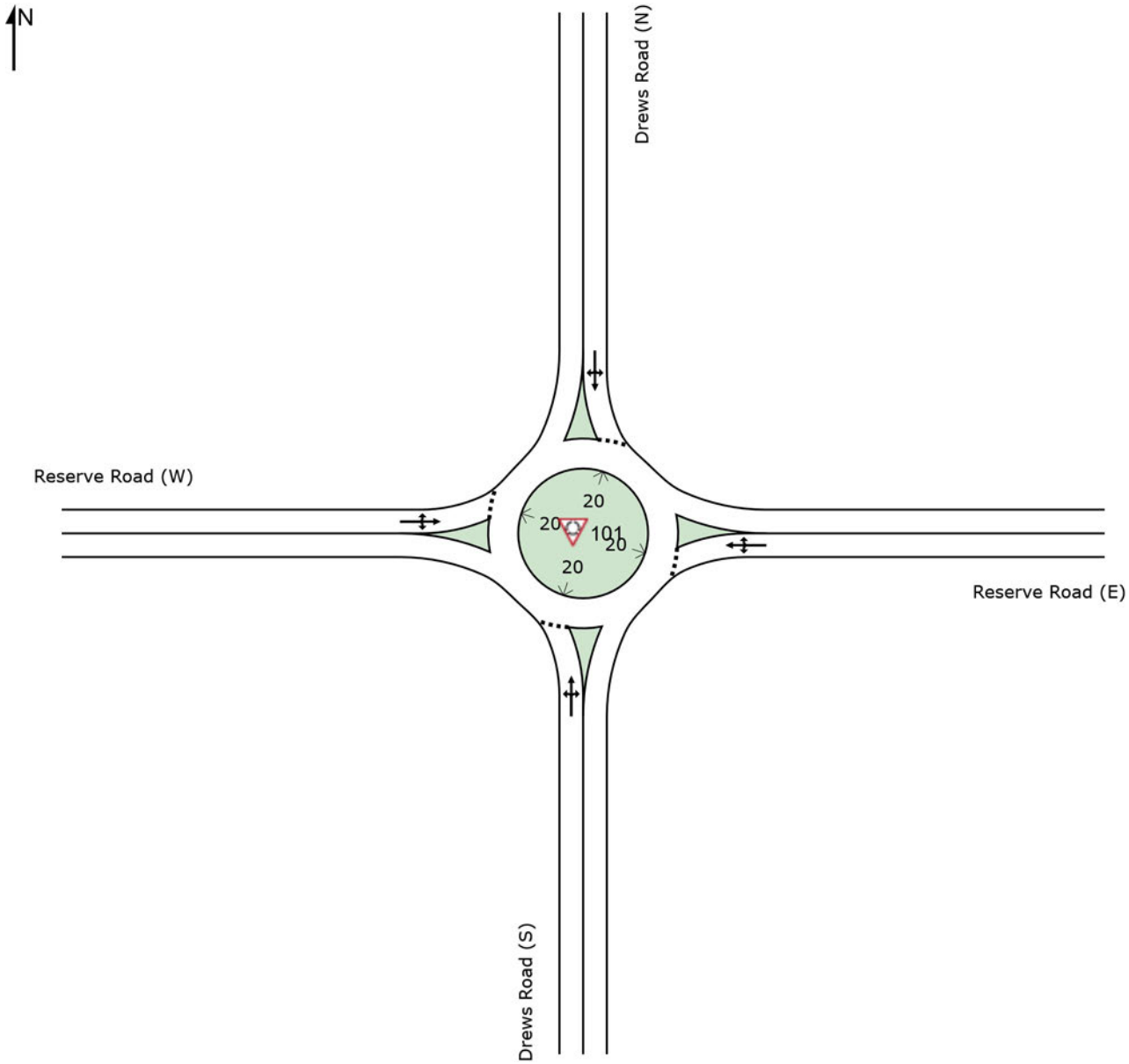


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SITE LAYOUT

Site: 101 [Drews Road / Reserve Road | Interim | AM PEAK]

New Site
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [Drews Road / Reserve Road | Interim | AM PEAK]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drews Road (S)												
1	L2	397	4.0	0.520	5.8	LOS A	4.5	32.3	0.62	0.62	0.62	52.9
2	T1	142	4.0	0.520	6.0	LOS A	4.5	32.3	0.62	0.62	0.62	54.2
3	R2	64	4.0	0.520	10.7	LOS B	4.5	32.3	0.62	0.62	0.62	54.1
Approach		603	4.0	0.520	6.4	LOS A	4.5	32.3	0.62	0.62	0.62	53.4
East: Reserve Road (E)												
4	L2	177	4.0	0.302	4.8	LOS A	2.1	15.1	0.39	0.51	0.39	53.5
5	T1	155	4.0	0.302	5.0	LOS A	2.1	15.1	0.39	0.51	0.39	54.8
6	R2	49	4.0	0.302	9.7	LOS A	2.1	15.1	0.39	0.51	0.39	54.7
Approach		381	4.0	0.302	5.5	LOS A	2.1	15.1	0.39	0.51	0.39	54.2
North: Drews Road (N)												
7	L2	78	4.0	0.125	5.3	LOS A	0.7	5.3	0.47	0.55	0.47	53.5
8	T1	45	4.0	0.125	5.6	LOS A	0.7	5.3	0.47	0.55	0.47	54.8
9	R2	11	4.0	0.125	10.2	LOS B	0.7	5.3	0.47	0.55	0.47	54.7
Approach		134	4.0	0.125	5.8	LOS A	0.7	5.3	0.47	0.55	0.47	54.0
West: Reserve Road (W)												
10	L2	87	4.0	0.256	5.6	LOS A	1.7	12.3	0.54	0.61	0.54	52.5
11	T1	108	4.0	0.256	5.9	LOS A	1.7	12.3	0.54	0.61	0.54	53.8
12	R2	75	4.0	0.256	10.5	LOS B	1.7	12.3	0.54	0.61	0.54	53.7
Approach		271	4.0	0.256	7.1	LOS A	1.7	12.3	0.54	0.61	0.54	53.4
All Vehicles		1388	4.0	0.520	6.2	LOS A	4.5	32.3	0.53	0.58	0.53	53.7

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

MOVEMENT SUMMARY

Site: 101 [Drews Road / Reserve Road | Interim | PM PEAK]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drews Road (S)												
1	L2	72	4.0	0.333	5.2	LOS A	2.4	17.7	0.50	0.58	0.50	52.5
2	T1	198	4.0	0.333	5.4	LOS A	2.4	17.7	0.50	0.58	0.50	53.8
3	R2	116	4.0	0.333	10.1	LOS B	2.4	17.7	0.50	0.58	0.50	53.7
Approach		385	4.0	0.333	6.8	LOS A	2.4	17.7	0.50	0.58	0.50	53.5
East: Reserve Road (E)												
4	L2	104	4.0	0.284	6.1	LOS A	2.0	14.2	0.62	0.65	0.62	52.4
5	T1	112	4.0	0.284	6.3	LOS A	2.0	14.2	0.62	0.65	0.62	53.6
6	R2	62	4.0	0.284	11.0	LOS B	2.0	14.2	0.62	0.65	0.62	53.5
Approach		278	4.0	0.284	7.3	LOS A	2.0	14.2	0.62	0.65	0.62	53.1
North: Drews Road (N)												
7	L2	62	4.0	0.128	7.5	LOS A	0.8	5.9	0.71	0.70	0.71	52.2
8	T1	27	4.0	0.128	7.7	LOS A	0.8	5.9	0.71	0.70	0.71	53.5
9	R2	11	4.0	0.128	12.3	LOS B	0.8	5.9	0.71	0.70	0.71	53.3
Approach		100	4.0	0.128	8.0	LOS A	0.8	5.9	0.71	0.70	0.71	52.7
West: Reserve Road (W)												
10	L2	87	4.0	0.550	7.9	LOS A	4.9	35.5	0.77	0.80	0.83	50.5
11	T1	159	4.0	0.550	8.1	LOS A	4.9	35.5	0.77	0.80	0.83	51.7
12	R2	280	4.0	0.550	12.8	LOS B	4.9	35.5	0.77	0.80	0.83	51.6
Approach		526	4.0	0.550	10.5	LOS B	4.9	35.5	0.77	0.80	0.83	51.4
All Vehicles		1289	4.0	0.550	8.5	LOS A	4.9	35.5	0.65	0.70	0.68	52.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Preliminary Transport Infrastructure Assessment

APPENDIX D

ULTIMATE SIDRA RESULTS

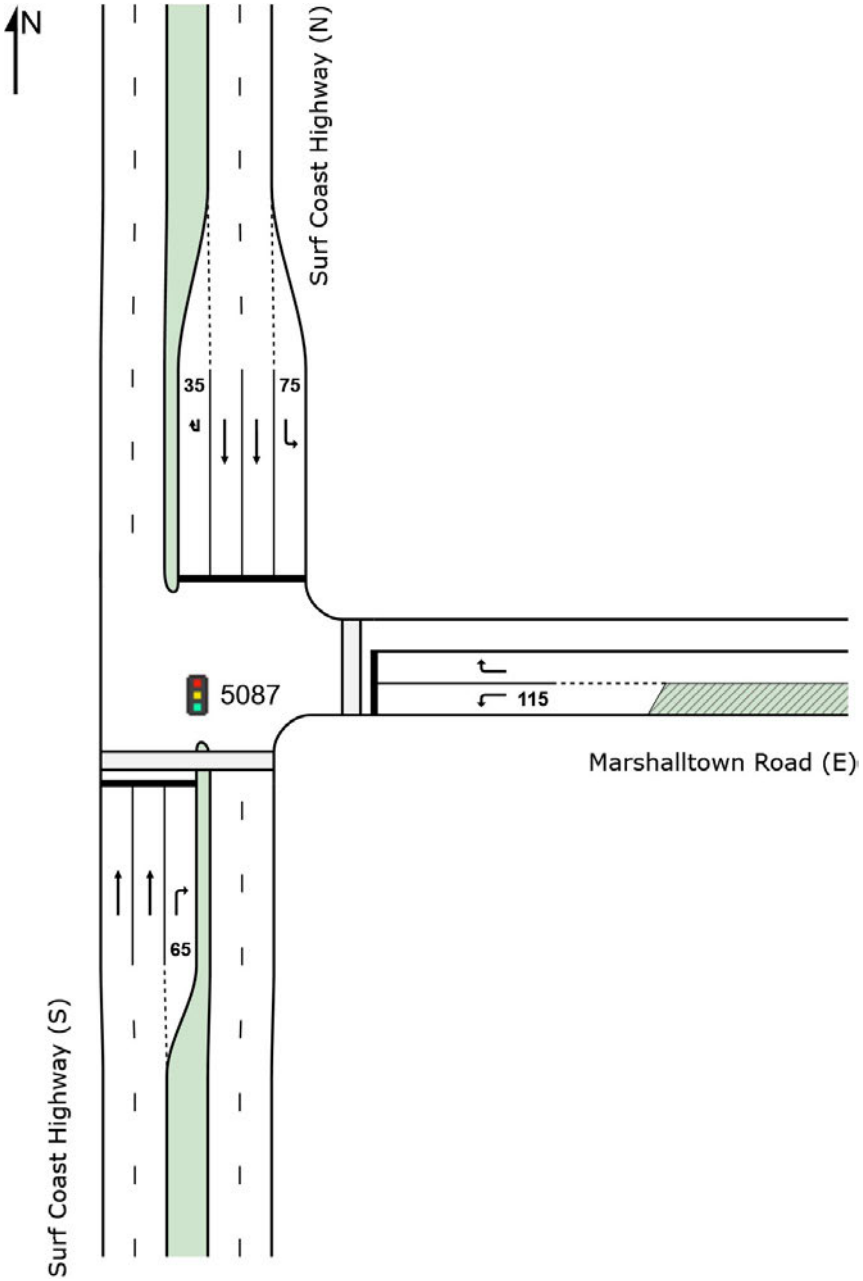


Cardno
Shaping the Future

SITE LAYOUT

Site: 5087 [Surf Coast Highway / Marshalltown Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 5087 [Surf Coast Highway / Marshalltown Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Surf Coast Highway (S)												
2	T1	2302	8.0	0.866	12.6	LOS B	50.7	379.0	0.74	0.71	0.75	49.7
3	R2	131	2.0	0.470	56.9	LOS E	7.1	50.9	0.96	0.79	0.96	30.6
Approach		2433	7.7	0.866	15.0	LOS B	50.7	379.0	0.75	0.71	0.76	48.1
East: Marshalltown Road (E)												
4	L2	133	2.0	0.200	33.9	LOS C	5.3	37.8	0.73	0.75	0.73	37.8
6	R2	247	2.0	0.844	66.4	LOS E	15.6	111.4	1.00	0.94	1.23	28.5
Approach		380	2.0	0.844	55.0	LOS E	15.6	111.4	0.91	0.87	1.05	31.2
North: Surf Coast Highway (N)												
7	L2	135	2.0	0.134	19.9	LOS B	3.8	27.2	0.52	0.71	0.52	44.3
8	T1	960	8.0	0.475	18.0	LOS B	17.1	128.3	0.66	0.59	0.66	46.3
9u	U	1	2.0	0.016	56.6	LOS E	0.1	0.4	0.87	0.64	0.87	30.5
Approach		1096	7.3	0.475	18.2	LOS B	17.1	128.3	0.65	0.60	0.65	46.0
All Vehicles		3908	7.0	0.866	19.8	LOS B	50.7	379.0	0.74	0.70	0.76	45.1

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 5087 [Surf Coast Highway / Marshalltown Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

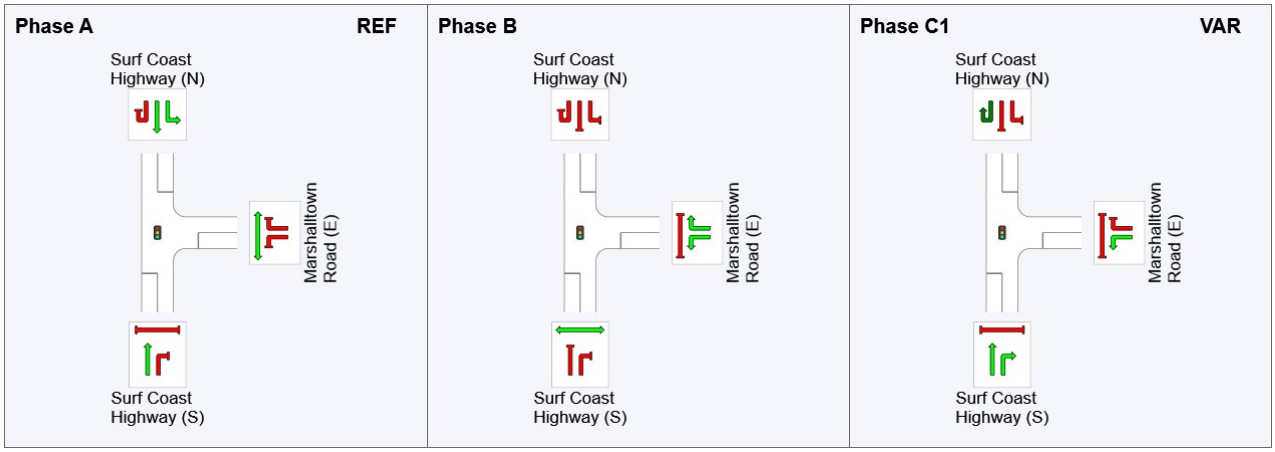
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: 3-W - Copy
Reference Phase: Phase A
Input Phase Sequence: A, B, C1*
Output Phase Sequence: A, B, C1*
(* Variable Phase)

Phase Timing Summary

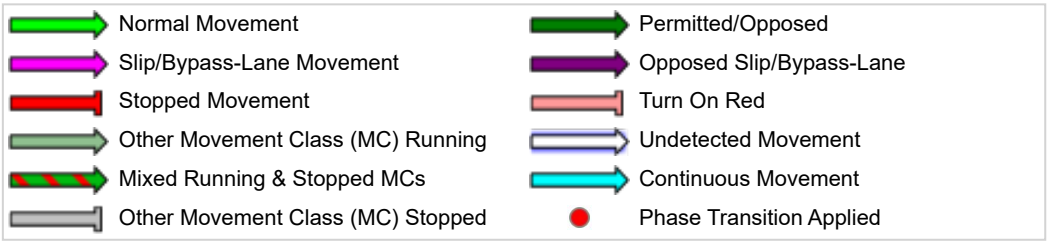
Phase	A	B	C1
Phase Change Time (sec)	0	71	96
Green Time (sec)	65	19	18
Phase Time (sec)	71	25	24
Phase Split	59%	21%	20%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



MOVEMENT SUMMARY

Site: 5087 [Surf Coast Highway / Marshalltown Road | Ultimate | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Surf Coast Highway (S)												
2	T1	884	8.0	0.329	6.6	LOS A	9.4	70.2	0.40	0.36	0.40	54.1
3	R2	132	2.0	0.776	68.6	LOS E	8.2	58.3	1.00	0.88	1.20	27.9
Approach		1016	7.2	0.776	14.7	LOS B	9.4	70.2	0.48	0.42	0.50	48.2
East: Marshalltown Road (E)												
4	L2	314	2.0	0.522	40.9	LOS D	14.9	106.1	0.87	0.82	0.87	35.3
6	R2	263	2.0	0.776	59.7	LOS E	15.6	111.0	1.00	0.89	1.11	30.1
Approach		577	2.0	0.776	49.5	LOS D	15.6	111.0	0.93	0.85	0.98	32.7
North: Surf Coast Highway (N)												
7	L2	216	2.0	0.203	18.5	LOS B	6.0	42.4	0.51	0.72	0.51	45.0
8	T1	1605	8.0	0.795	20.2	LOS C	38.7	289.2	0.81	0.74	0.81	45.0
9u	U	1	2.0	0.016	70.9	LOS E	0.1	0.4	0.99	0.57	0.99	27.3
Approach		1822	7.3	0.795	20.1	LOS C	38.7	289.2	0.78	0.74	0.78	45.0
All Vehicles		3415	6.4	0.795	23.4	LOS C	38.7	289.2	0.71	0.67	0.73	43.1

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 5087 [Surf Coast Highway / Marshalltown Road | Ultimate | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

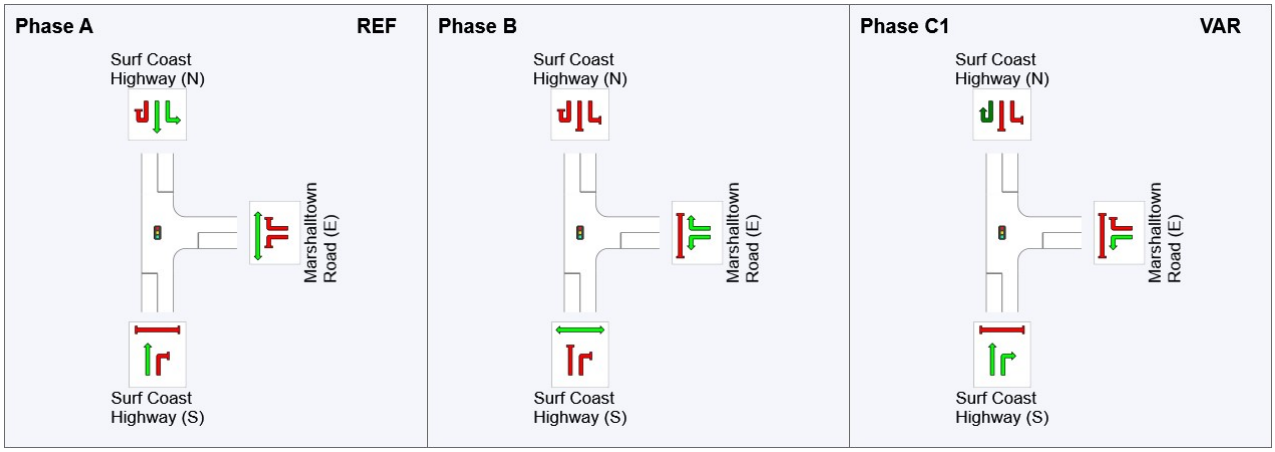
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: 3-W - Copy
Reference Phase: Phase A
Input Phase Sequence: A, B, C1*
Output Phase Sequence: A, B, C1*
(* Variable Phase)

Phase Timing Summary

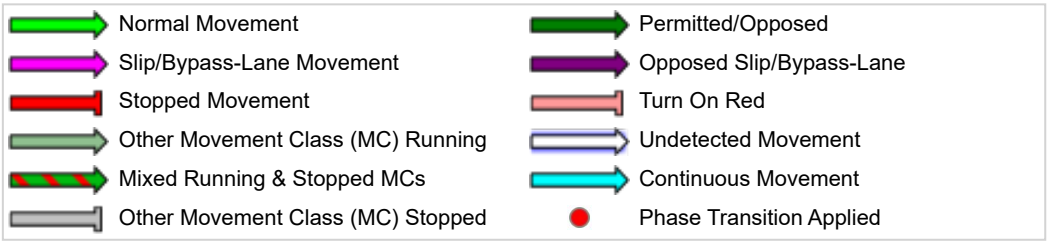
Phase	A	B	C1
Phase Change Time (sec)	0	75	103
Green Time (sec)	69	22	11
Phase Time (sec)	75	28	17
Phase Split	63%	23%	14%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



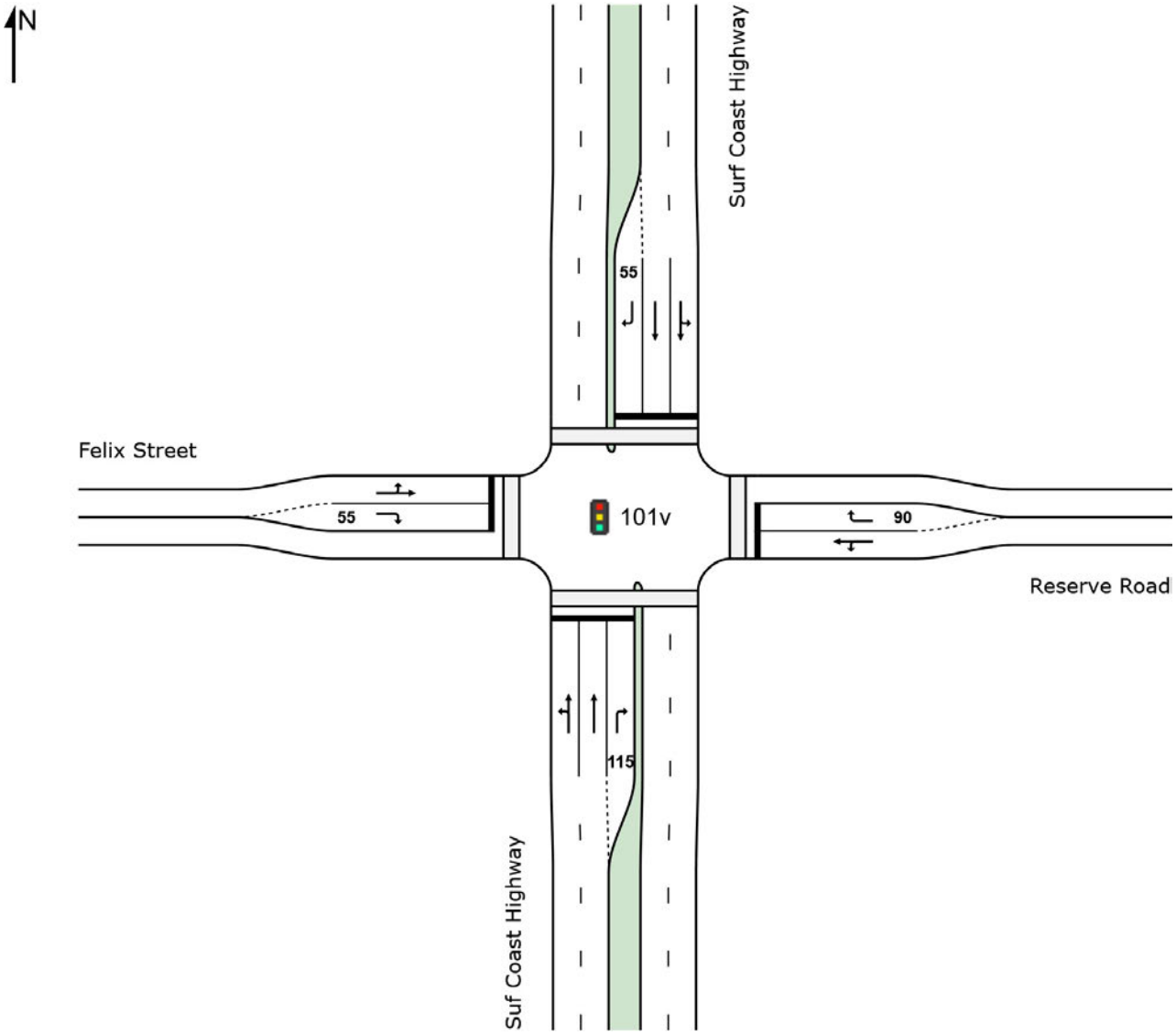
REF: Reference Phase
VAR: Variable Phase



SITE LAYOUT

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Ultimate | AM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated



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Organisation: CARDNO (QLD) PTY LTD | Created: Monday, 1 July 2019 5:18:44 PM
Project: M:\2019\0001_0500\V190014_Marshall_PSP_Traffic_Assessment\Traffic\Engineering\SIDRA\V190014-SID002-Ultimate Year SidraTL.sip8

MOVEMENT SUMMARY

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Ultimate | AM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Suf Coast Highway												
1	L2	3	2.0	0.809	30.0	LOS C	39.3	284.6	0.89	0.82	0.89	41.9
2	T1	1536	4.0	0.809	24.0	LOS C	39.3	284.6	0.85	0.78	0.86	43.0
3	R2	248	2.0	0.806	62.8	LOS E	15.2	107.9	1.00	0.90	1.16	29.2
Approach		1787	3.7	0.809	29.4	LOS C	39.3	284.6	0.87	0.80	0.90	40.3
East: Reserve Road												
4	L2	176	2.0	0.267	34.7	LOS C	7.3	51.9	0.75	0.77	0.75	37.5
5	T1	1	4.0	0.267	29.2	LOS C	7.3	51.9	0.75	0.77	0.75	38.2
6	R2	161	2.0	0.776	65.4	LOS E	9.9	70.7	1.00	0.89	1.17	28.6
Approach		338	2.0	0.776	49.3	LOS D	9.9	70.7	0.87	0.83	0.95	32.7
North: Surf Coast Highway												
7	L2	80	2.0	0.466	24.0	LOS C	17.0	122.7	0.67	0.63	0.67	44.5
8	T1	853	4.0	0.466	18.3	LOS B	17.0	122.7	0.66	0.60	0.66	45.9
9	R2	26	2.0	0.085	51.3	LOS D	1.3	9.3	0.88	0.71	0.88	32.1
Approach		959	3.8	0.466	19.7	LOS B	17.0	122.7	0.67	0.61	0.67	45.2
West: Felix Street												
10	L2	44	2.0	0.073	33.9	LOS C	1.8	12.6	0.71	0.71	0.71	37.9
11	T1	1	2.0	0.073	28.3	LOS C	1.8	12.6	0.71	0.71	0.71	38.6
12	R2	1	2.0	0.008	60.7	LOS E	0.1	0.4	0.93	0.60	0.93	29.7
Approach		46	2.0	0.073	34.3	LOS C	1.8	12.6	0.71	0.70	0.71	37.7
All Vehicles		3131	3.5	0.809	28.6	LOS C	39.3	284.6	0.81	0.74	0.83	40.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Ultimate | AM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

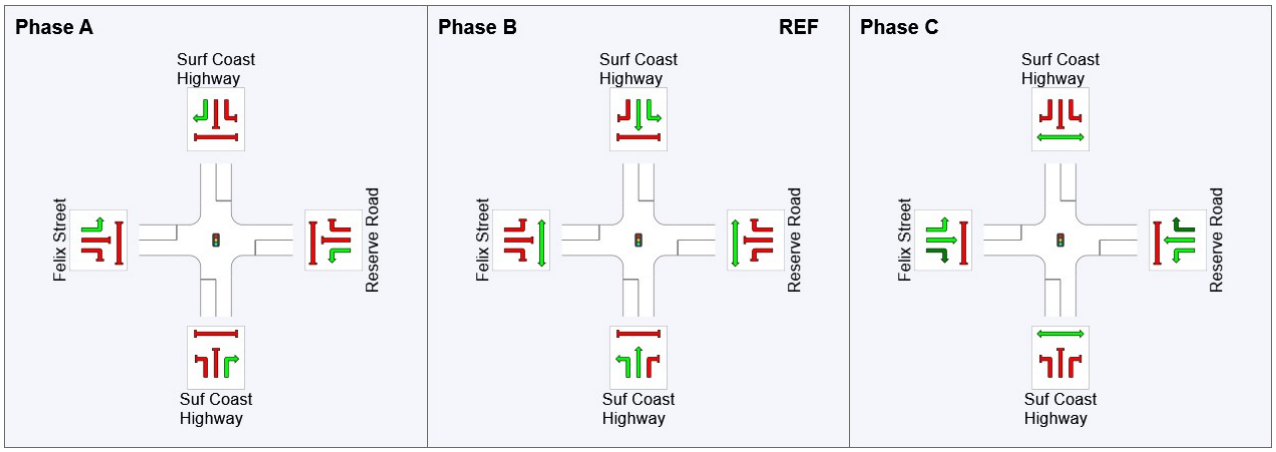
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	94	0	70
Green Time (sec)	20	64	18
Phase Time (sec)	26	70	24
Phase Split	22%	58%	20%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

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MOVEMENT SUMMARY

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Ultimate | PM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Suf Coast Highway												
1	L2	5	2.0	0.434	28.3	LOS C	14.7	109.5	0.72	0.63	0.72	42.7
2	T1	753	8.0	0.434	22.7	LOS C	14.7	109.6	0.72	0.63	0.72	43.6
3	R2	298	2.0	0.644	49.2	LOS D	15.7	111.9	0.95	0.84	0.95	32.7
Approach		1056	6.3	0.644	30.2	LOS C	15.7	111.9	0.78	0.69	0.78	39.9
East: Reserve Road												
4	L2	272	2.0	0.349	30.4	LOS C	10.7	75.9	0.72	0.78	0.72	39.3
5	T1	1	4.0	0.349	24.8	LOS C	10.7	75.9	0.72	0.78	0.72	40.1
6	R2	119	2.0	0.622	61.9	LOS E	6.9	49.4	1.00	0.81	1.03	29.4
Approach		392	2.0	0.622	39.9	LOS D	10.7	75.9	0.80	0.79	0.81	35.7
North: Surf Coast Highway												
7	L2	128	2.0	0.926	56.0	LOS E	54.9	407.9	1.00	1.06	1.20	32.0
8	T1	1449	8.0	0.926	50.4	LOS D	54.9	407.9	0.99	1.06	1.20	32.7
9	R2	53	2.0	0.114	42.8	LOS D	2.4	16.9	0.81	0.73	0.81	34.7
Approach		1631	7.3	0.926	50.6	LOS D	54.9	407.9	0.98	1.05	1.19	32.7
West: Felix Street												
10	L2	37	2.0	0.056	31.5	LOS C	1.4	10.0	0.68	0.69	0.68	38.9
11	T1	1	2.0	0.056	26.0	LOS C	1.4	10.0	0.68	0.69	0.68	39.6
12	R2	1	2.0	0.014	68.3	LOS E	0.1	0.4	0.98	0.58	0.98	28.0
Approach		39	2.0	0.056	32.4	LOS C	1.4	10.0	0.68	0.69	0.68	38.5
All Vehicles		3117	6.2	0.926	42.1	LOS D	54.9	407.9	0.89	0.89	1.00	35.3

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101v [Surf Coast Highway / Reserve Road / Felix Street | Ultimate | PM PEAK - Conversion]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

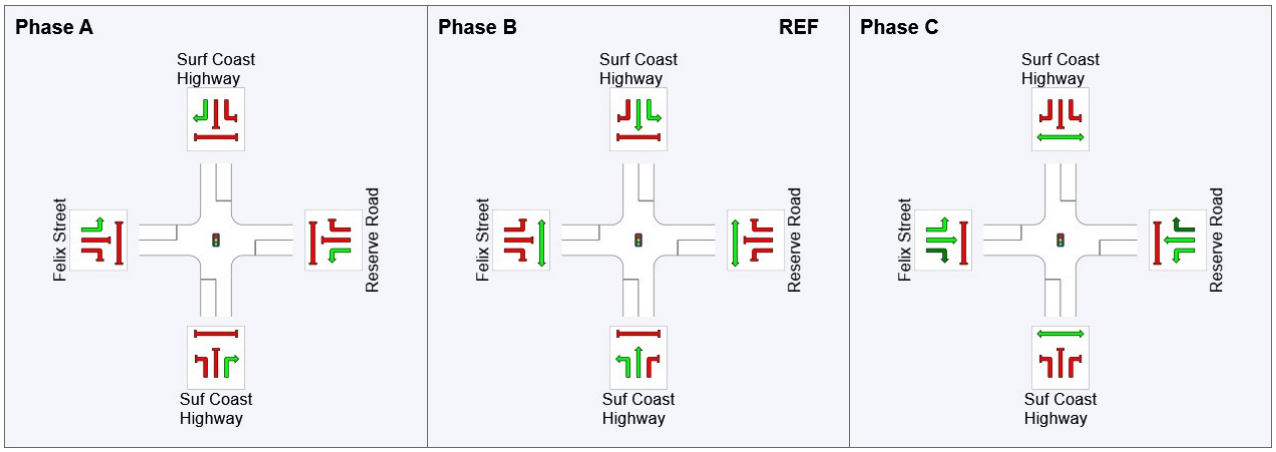
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	84	0	62
Green Time (sec)	30	56	16
Phase Time (sec)	36	62	22
Phase Split	30%	52%	18%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

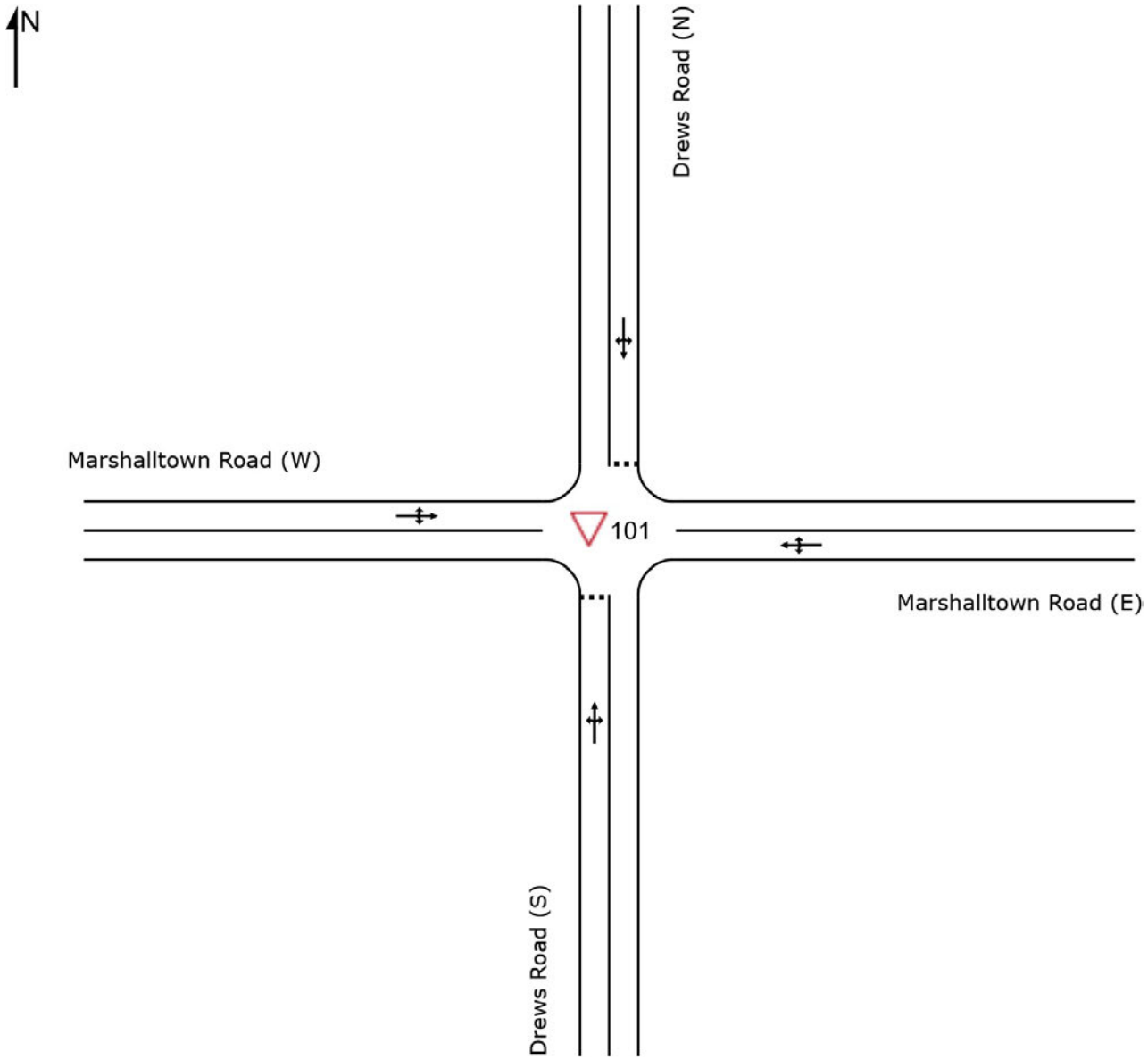
Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

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SITE LAYOUT

Site: 101 [Marshalltown Road / Drews Road | Ultimate | AM PEAK]

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



MOVEMENT SUMMARY

Site: 101 [Marshalltown Road / Drews Road | Ultimate | AM PEAK]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drews Road (S)												
1	L2	202	2.0	0.476	8.4	LOS A	3.0	21.2	0.58	0.86	0.82	50.5
2	T1	83	2.0	0.476	9.6	LOS A	3.0	21.2	0.58	0.86	0.82	50.6
3	R2	104	2.0	0.476	12.4	LOS B	3.0	21.2	0.58	0.86	0.82	50.0
Approach		389	2.0	0.476	9.7	LOS A	3.0	21.2	0.58	0.86	0.82	50.4
East: Marshalltown Road (E)												
4	L2	11	2.0	0.191	6.0	LOS A	0.1	0.8	0.03	0.03	0.03	57.8
5	T1	342	4.0	0.191	0.0	LOS A	0.1	0.8	0.03	0.03	0.03	59.6
6	R2	11	2.0	0.191	6.2	LOS A	0.1	0.8	0.03	0.03	0.03	57.3
Approach		363	3.9	0.191	0.4	NA	0.1	0.8	0.03	0.03	0.03	59.4
North: Drews Road (N)												
7	L2	23	2.0	0.161	6.1	LOS A	0.6	4.0	0.47	0.72	0.47	50.4
8	T1	23	2.0	0.161	7.4	LOS A	0.6	4.0	0.47	0.72	0.47	50.6
9	R2	46	2.0	0.161	12.7	LOS B	0.6	4.0	0.47	0.72	0.47	50.0
Approach		93	2.0	0.161	9.7	LOS A	0.6	4.0	0.47	0.72	0.47	50.3
West: Marshalltown Road (W)												
10	L2	11	2.0	0.116	6.7	LOS A	0.2	1.8	0.14	0.10	0.14	56.8
11	T1	174	4.0	0.116	0.3	LOS A	0.2	1.8	0.14	0.10	0.14	58.5
12	R2	24	2.0	0.116	6.9	LOS A	0.2	1.8	0.14	0.10	0.14	56.3
Approach		208	3.7	0.116	1.4	NA	0.2	1.8	0.14	0.10	0.14	58.2
All Vehicles		1054	3.0	0.476	4.8	NA	3.0	21.2	0.29	0.41	0.38	54.7

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

MOVEMENT SUMMARY

Site: 101 [Marshalltown Road / Drews Road | Ultimate | PM PEAK]

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

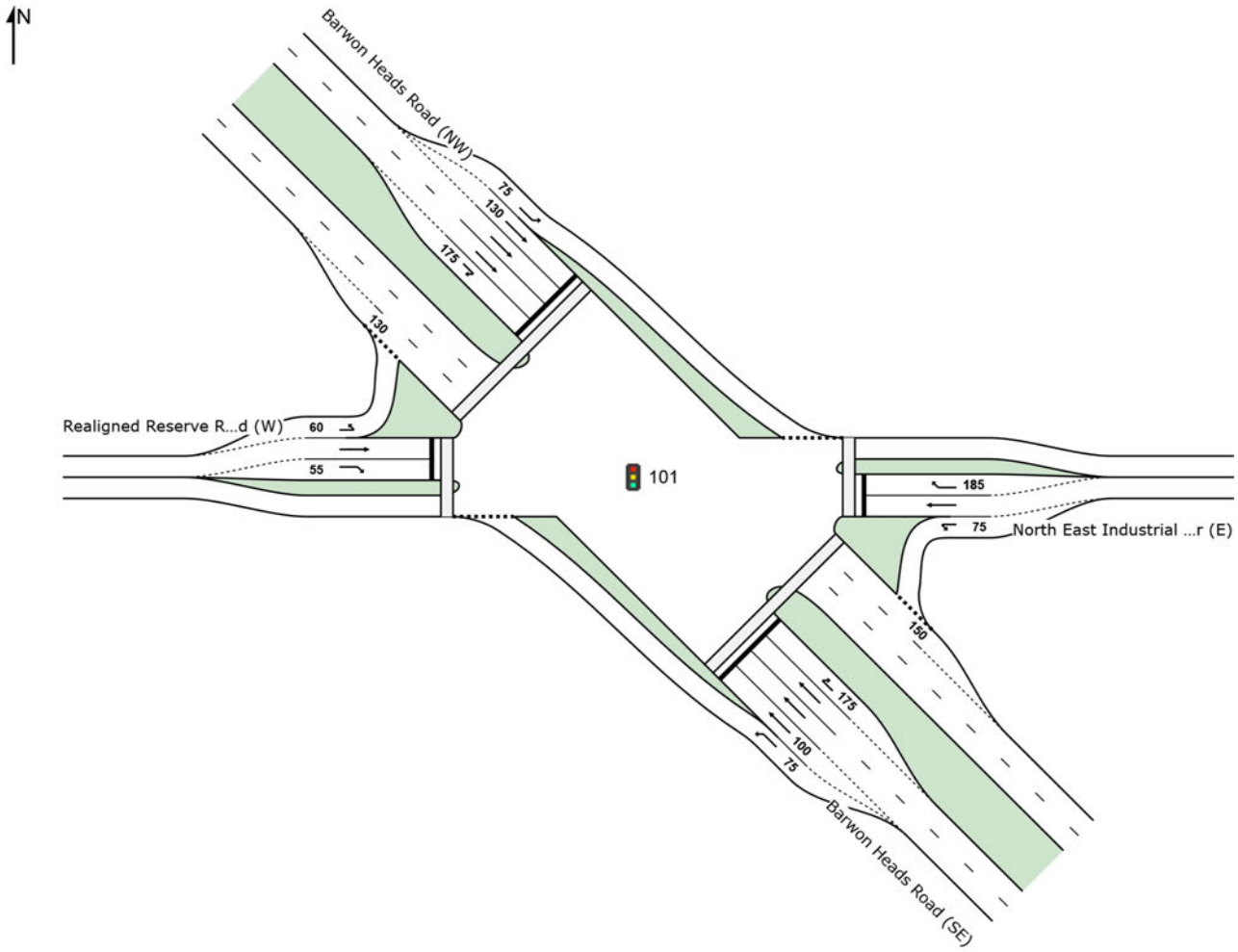
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drews Road (S)												
1	L2	134	4.0	0.314	6.9	LOS A	1.4	10.2	0.48	0.72	0.53	51.3
2	T1	73	4.0	0.314	8.9	LOS A	1.4	10.2	0.48	0.72	0.53	51.5
3	R2	49	4.0	0.314	11.6	LOS B	1.4	10.2	0.48	0.72	0.53	50.9
Approach		256	4.0	0.314	8.4	LOS A	1.4	10.2	0.48	0.72	0.53	51.3
East: Marshalltown Road (E)												
4	L2	11	4.0	0.148	6.2	LOS A	0.1	0.8	0.05	0.04	0.05	57.6
5	T1	258	4.0	0.148	0.1	LOS A	0.1	0.8	0.05	0.04	0.05	59.4
6	R2	11	4.0	0.148	6.6	LOS A	0.1	0.8	0.05	0.04	0.05	57.0
Approach		279	4.0	0.148	0.5	NA	0.1	0.8	0.05	0.04	0.05	59.2
North: Drews Road (N)												
7	L2	14	2.0	0.089	6.4	LOS A	0.3	2.1	0.50	0.73	0.50	50.6
8	T1	14	2.0	0.089	7.7	LOS A	0.3	2.1	0.50	0.73	0.50	50.8
9	R2	24	2.0	0.089	12.2	LOS B	0.3	2.1	0.50	0.73	0.50	50.2
Approach		52	2.0	0.089	9.5	LOS A	0.3	2.1	0.50	0.73	0.50	50.5
West: Marshalltown Road (W)												
10	L2	11	4.0	0.208	6.7	LOS A	0.7	5.4	0.24	0.17	0.24	55.9
11	T1	261	4.0	0.208	0.5	LOS A	0.7	5.4	0.24	0.17	0.24	57.6
12	R2	87	4.0	0.208	6.7	LOS A	0.7	5.4	0.24	0.17	0.24	55.4
Approach		359	4.0	0.208	2.2	NA	0.7	5.4	0.24	0.17	0.24	57.0
All Vehicles		945	3.9	0.314	3.8	NA	1.4	10.2	0.26	0.31	0.27	55.6

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

SITE LAYOUT

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated



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Organisation: CARDNO (QLD) PTY LTD | Created: Monday, 1 July 2019 5:20:30 PM
Project: M:\2019\0001_0500\V190014_Marshall_PSP_Traffic_Assessment\Traffic\Engineering\SIDRA\V190014-SID002-Ultimate Year SidraTL.sip8

MOVEMENT SUMMARY

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Barwon Heads Road (SE)												
21a	L1	8	4.0	0.006	4.7	LOS A	0.0	0.0	0.02	0.56	0.02	54.7
22	T1	1419	8.0	0.604	20.0	LOS C	18.5	138.6	0.62	0.55	0.62	47.8
23b	R3	253	4.0	0.412	33.1	LOS C	9.1	66.2	0.66	0.77	0.66	40.4
Approach		1680	7.4	0.604	21.9	LOS C	18.5	138.6	0.63	0.59	0.63	46.7
East: North East Industrial Connector (E)												
4b	L3	165	4.0	0.124	7.7	LOS A	1.1	8.1	0.18	0.63	0.18	53.9
5	T1	65	4.0	0.163	42.0	LOS D	3.1	22.7	0.86	0.66	0.86	35.6
6a	R1	43	4.0	0.394	66.3	LOS E	2.6	18.7	1.00	0.74	1.00	31.0
Approach		274	4.0	0.394	25.1	LOS C	3.1	22.7	0.47	0.66	0.47	43.9
NorthWest: Barwon Heads Road (NW)												
27a	L1	65	4.0	0.056	4.8	LOS A	0.1	0.4	0.02	0.56	0.02	54.6
28	T1	332	8.0	0.423	50.6	LOS D	6.2	46.4	0.91	0.73	0.91	36.5
29b	R3	59	4.0	0.553	69.2	LOS E	3.5	25.7	1.00	0.77	1.02	30.0
Approach		456	6.9	0.553	46.5	LOS D	6.2	46.4	0.80	0.71	0.80	37.2
West: Realigned Reserve Road (W)												
10b	L3	231	4.0	0.258	11.1	LOS B	4.0	28.9	0.37	0.69	0.37	51.7
11	T1	49	4.0	0.124	41.5	LOS D	2.4	17.0	0.85	0.65	0.85	35.8
12a	R1	66	4.0	0.605	67.8	LOS E	4.1	29.5	1.00	0.78	1.07	30.7
Approach		346	4.0	0.605	26.3	LOS C	4.1	29.5	0.56	0.70	0.57	43.5
All Vehicles		2756	6.5	0.605	26.9	LOS C	18.5	138.6	0.63	0.63	0.63	44.1

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, E1*, F
(* Variable Phase)

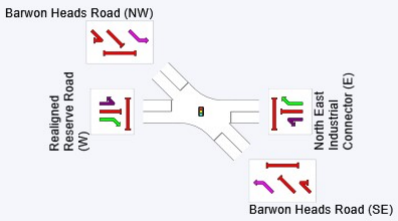
Phase Timing Summary

Phase	A	C	D	E1	F
Phase Change Time (sec)	0	13	44	58	96
Green Time (sec)	7	25	8	32	18
Phase Time (sec)	13	31	14	38	24
Phase Split	11%	26%	12%	32%	20%

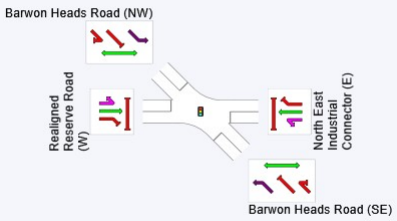
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

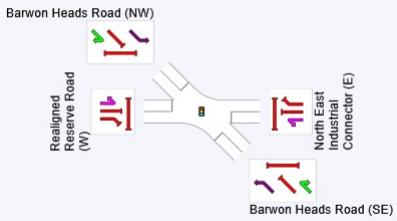
Phase A REF



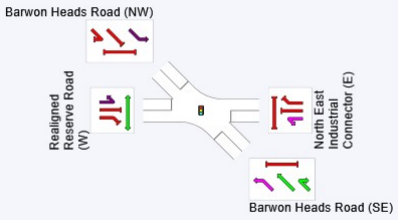
Phase C



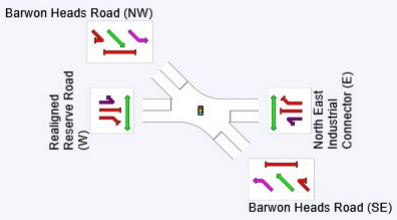
Phase D



Phase E1 VAR

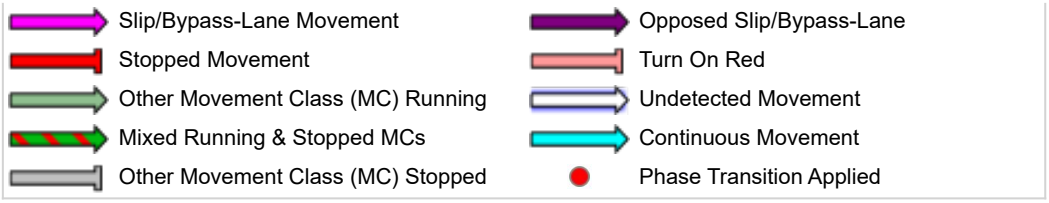


Phase F



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed



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MOVEMENT SUMMARY

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Ultimate | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Barwon Heads Road (SE)												
21a	L1	25	4.0	0.019	4.9	LOS A	0.0	0.2	0.02	0.56	0.02	54.6
22	T1	1313	8.0	0.745	34.0	LOS C	23.4	175.0	0.84	0.74	0.85	41.9
23b	R3	14	4.0	0.171	69.5	LOS E	0.8	5.9	0.97	0.69	0.97	30.0
Approach		1352	7.9	0.745	33.8	LOS C	23.4	175.0	0.83	0.74	0.83	41.9
East: North East Industrial Connector (E)												
4b	L3	228	4.0	0.235	9.5	LOS A	3.0	22.0	0.30	0.67	0.30	52.7
5	T1	132	4.0	0.329	43.8	LOS D	6.6	47.7	0.89	0.72	0.89	35.0
6a	R1	146	4.0	0.719	63.4	LOS E	8.8	63.7	1.00	0.86	1.11	31.7
Approach		506	4.0	0.719	34.0	LOS C	8.8	63.7	0.66	0.74	0.69	40.1
NorthWest: Barwon Heads Road (NW)												
27a	L1	16	4.0	0.010	4.7	LOS A	0.0	0.1	0.02	0.56	0.02	54.7
28	T1	1148	8.0	0.507	22.2	LOS C	14.2	106.5	0.63	0.55	0.63	46.8
29b	R3	159	4.0	0.745	64.3	LOS E	9.4	68.1	1.00	0.86	1.10	31.1
Approach		1323	7.5	0.745	27.1	LOS C	14.2	106.5	0.66	0.58	0.67	44.4
West: Realigned Reserve Road (W)												
10b	L3	104	4.0	0.108	11.7	LOS B	1.8	12.8	0.36	0.67	0.36	51.3
11	T1	28	4.0	0.071	40.9	LOS D	1.3	9.6	0.83	0.61	0.83	36.0
12a	R1	83	4.0	0.408	59.6	LOS E	4.7	34.0	0.98	0.77	0.98	32.7
Approach		216	4.0	0.408	34.0	LOS C	4.7	34.0	0.66	0.70	0.66	40.3
All Vehicles		3397	6.9	0.745	31.2	LOS C	23.4	175.0	0.73	0.68	0.74	42.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Barwon Heads Road / Realigned Reserve Road / North East Industrial Connector | Ultimate | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, E2*, F
(* Variable Phase)

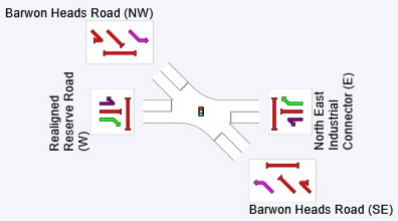
Phase Timing Summary

Phase	A	C	D	E2	F
Phase Change Time (sec)	0	19	50	62	72
Green Time (sec)	13	25	6	4	42
Phase Time (sec)	19	31	12	10	48
Phase Split	16%	26%	10%	8%	40%

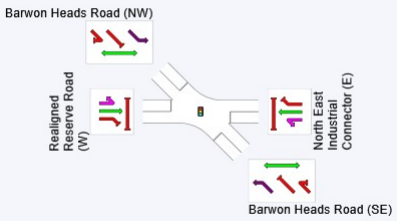
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

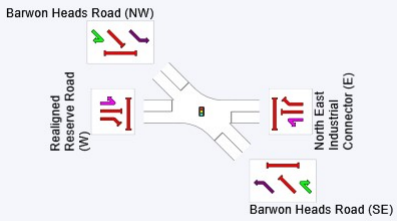
Phase A REF



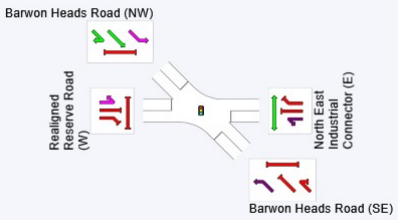
Phase C



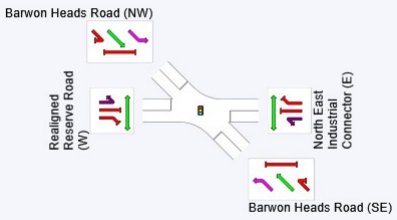
Phase D



Phase E2 VAR

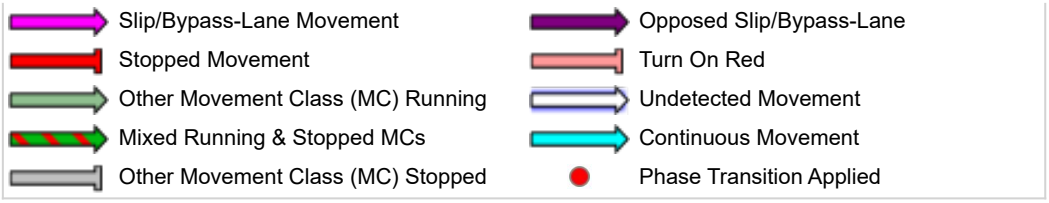


Phase F



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed

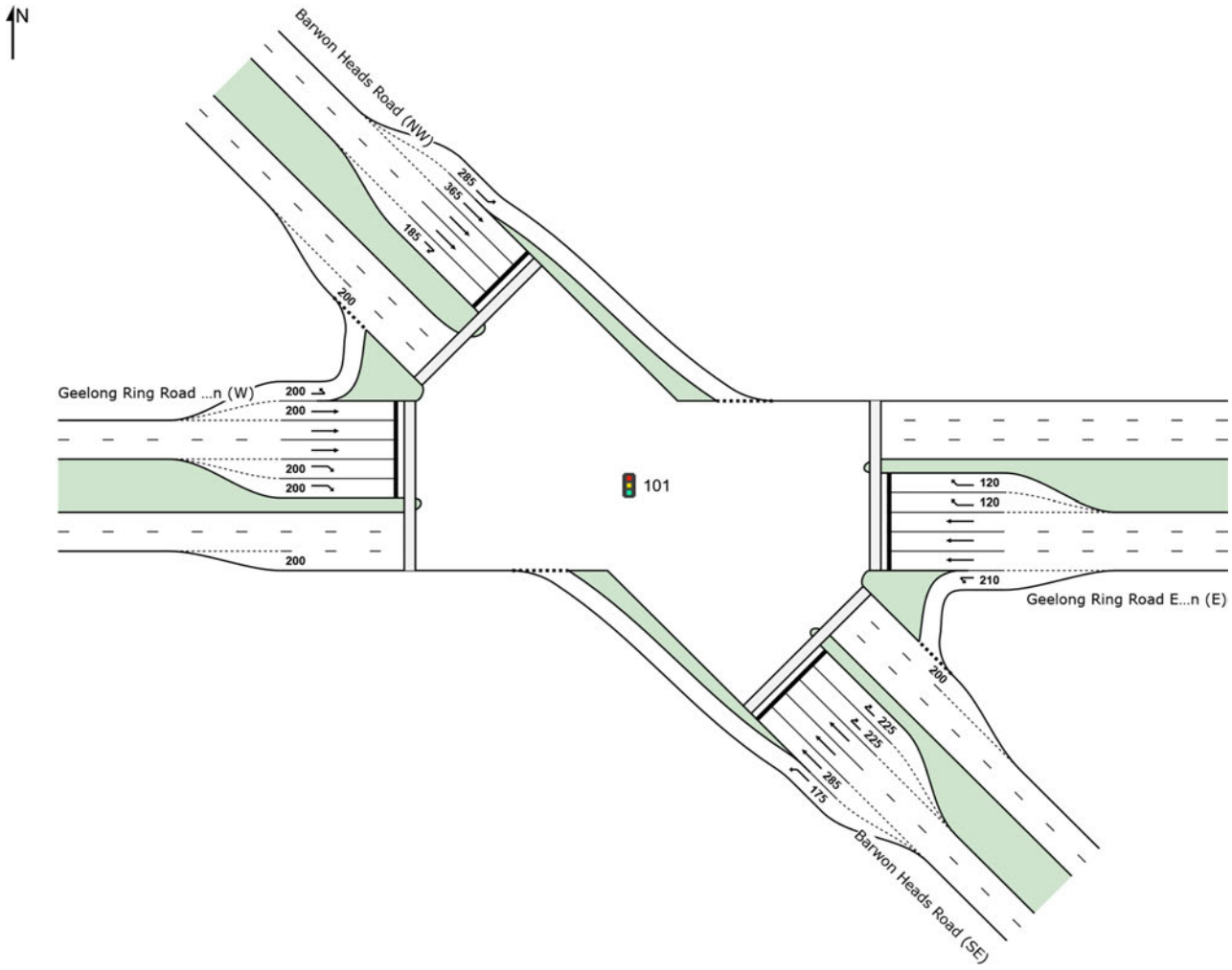


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SITE LAYOUT

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Barwon Heads Road (SE)												
21a	L1	221	8.0	0.172	7.3	LOS A	3.0	22.5	0.30	0.57	0.30	53.1
22	T1	1091	8.0	0.457	26.2	LOS C	15.0	112.5	0.76	0.66	0.76	42.1
23b	R3	615	8.0	0.606	43.7	LOS D	15.2	113.8	0.90	0.84	0.90	35.1
Approach		1926	8.0	0.606	29.6	LOS C	15.2	113.8	0.75	0.71	0.75	40.4
East: Geelong Ring Road Extension (E)												
4b	L3	446	8.0	0.337	7.8	LOS A	3.5	26.0	0.22	0.65	0.22	52.9
5	T1	640	8.0	0.526	45.2	LOS D	11.2	83.5	0.94	0.78	0.94	34.6
6a	R1	124	8.0	0.582	67.4	LOS E	3.8	28.5	1.00	0.77	1.05	29.1
Approach		1211	8.0	0.582	33.7	LOS C	11.2	83.5	0.68	0.73	0.68	38.8
NorthWest: Barwon Heads Road (NW)												
27a	L1	159	8.0	0.181	12.8	LOS B	3.7	27.8	0.47	0.64	0.47	49.2
28	T1	283	8.0	0.242	42.9	LOS D	4.6	34.7	0.88	0.69	0.88	35.4
29b	R3	80	8.0	0.473	63.4	LOS E	4.6	34.4	0.98	0.78	0.98	29.6
Approach		522	8.0	0.473	36.9	LOS D	4.6	34.7	0.77	0.69	0.77	37.4
West: Geelong Ring Road Extension (W)												
10b	L3	449	8.0	0.429	10.6	LOS B	7.9	58.9	0.39	0.71	0.39	50.9
11	T1	717	8.0	0.612	47.0	LOS D	12.9	96.2	0.96	0.81	0.96	34.0
12a	R1	36	8.0	0.196	66.2	LOS E	1.1	8.0	0.99	0.69	0.99	29.5
Approach		1202	8.0	0.612	33.9	LOS C	12.9	96.2	0.75	0.76	0.75	38.7
All Vehicles		4861	8.0	0.612	32.5	LOS C	15.2	113.8	0.73	0.73	0.74	39.2

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, B2*, C, D, E1*, F
(* Variable Phase)

Phase Timing Summary

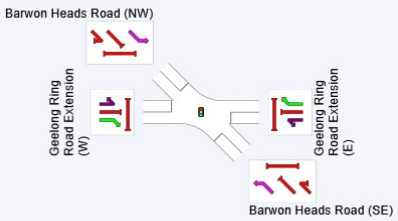
Phase	A	B2	C	D	E1	F
Phase Change Time (sec)	0	12	13	44	63	89
Green Time (sec)	6	***	25	13	20	25
Phase Time (sec)	12	1	31	19	26	31
Phase Split	10%	1%	26%	16%	22%	26%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

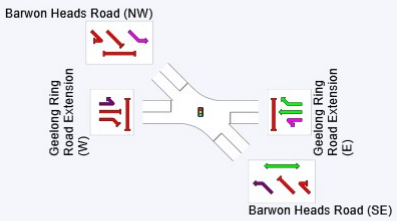
*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified. If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence

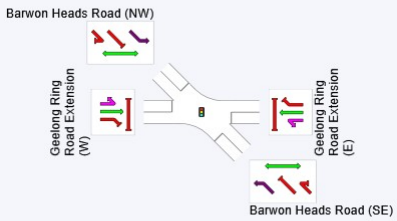
Phase A REF



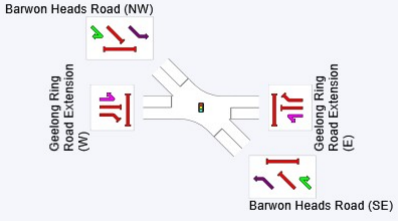
Phase B2 VAR



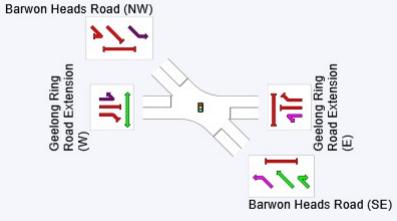
Phase C



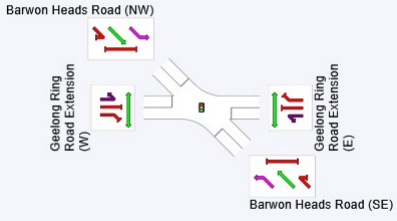
Phase D



Phase E1 VAR

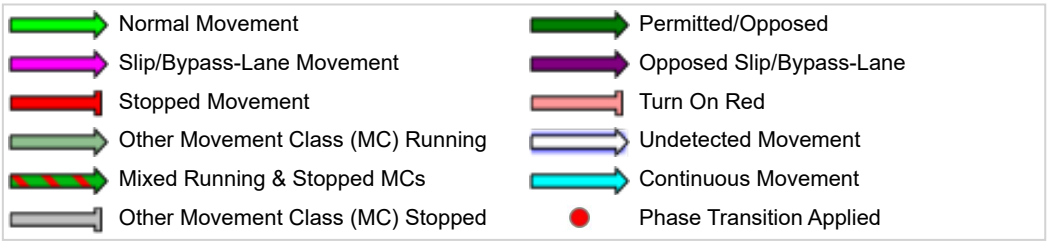


Phase F



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Ultimate | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Barwon Heads Road (SE)												
21a	L1	95	8.0	0.104	13.2	LOS B	2.1	16.0	0.46	0.62	0.46	49.0
22	T1	601	8.0	0.513	45.8	LOS D	10.5	78.7	0.94	0.78	0.94	34.4
23b	R3	374	8.0	0.575	53.7	LOS D	10.0	75.1	0.95	0.82	0.95	32.1
Approach		1069	8.0	0.575	45.7	LOS D	10.5	78.7	0.90	0.78	0.90	34.4
East: Geelong Ring Road Extension (E)												
4b	L3	811	8.0	0.684	11.6	LOS B	19.3	144.3	0.54	0.76	0.54	50.1
5	T1	821	8.0	0.487	37.1	LOS D	13.1	98.3	0.87	0.74	0.87	37.4
6a	R1	405	8.0	0.782	62.1	LOS E	12.3	92.1	1.00	0.91	1.15	30.4
Approach		2037	8.0	0.782	31.9	LOS C	19.3	144.3	0.77	0.78	0.80	39.6
NorthWest: Barwon Heads Road (NW)												
27a	L1	411	8.0	0.389	13.6	LOS B	11.3	84.8	0.55	0.68	0.55	48.7
28	T1	786	8.0	0.579	43.5	LOS D	13.6	102.0	0.94	0.79	0.94	35.1
29b	R3	308	8.0	0.818	59.6	LOS E	18.8	140.4	1.00	0.93	1.15	30.5
Approach		1505	8.0	0.818	38.7	LOS D	18.8	140.4	0.85	0.79	0.88	36.8
West: Geelong Ring Road Extension (W)												
10b	L3	441	8.0	0.383	9.1	LOS A	5.9	44.2	0.31	0.68	0.31	51.9
11	T1	894	8.0	0.763	51.0	LOS D	17.2	128.9	1.00	0.90	1.08	32.8
12a	R1	40	8.0	0.219	66.4	LOS E	1.2	9.0	0.99	0.70	0.99	29.4
Approach		1375	8.0	0.763	38.0	LOS D	17.2	128.9	0.78	0.82	0.83	37.1
All Vehicles		5986	8.0	0.818	37.5	LOS D	19.3	144.3	0.81	0.79	0.84	37.3

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P7	NorthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Geelong Ring Road Extension / Barwon Heads Road | Ultimate | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, B2*, C, D, E2*, F
(* Variable Phase)

Phase Timing Summary

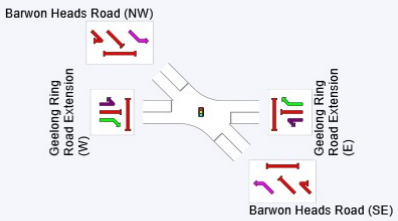
Phase	A	B2	C	D	E2	F
Phase Change Time (sec)	0	12	23	54	85	89
Green Time (sec)	6	5	25	25	***	25
Phase Time (sec)	12	11	31	31	4	31
Phase Split	10%	9%	26%	26%	3%	26%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

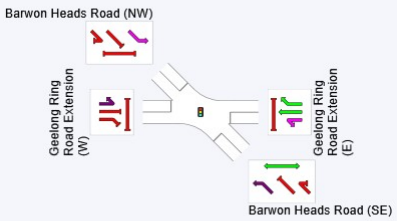
*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence

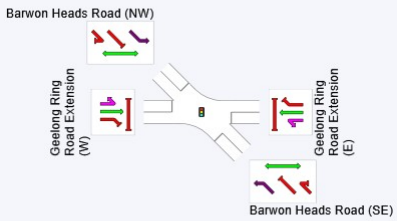
Phase A REF



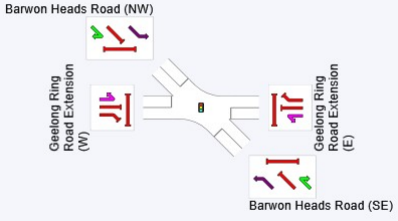
Phase B2 VAR



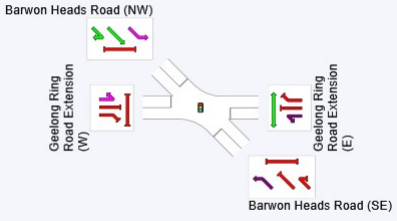
Phase C



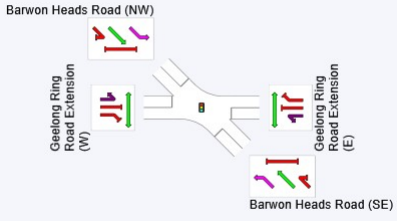
Phase D



Phase E2 VAR

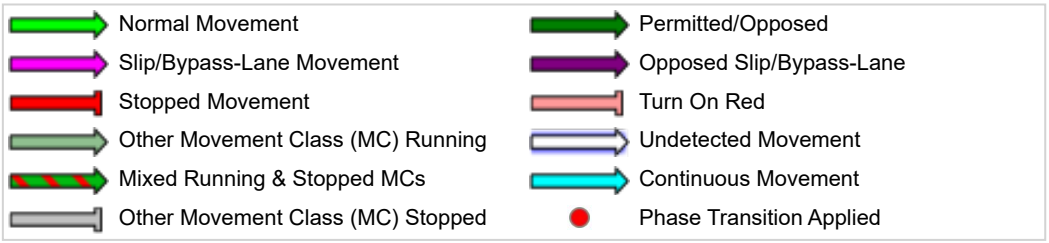


Phase F



REF: Reference Phase

VAR: Variable Phase

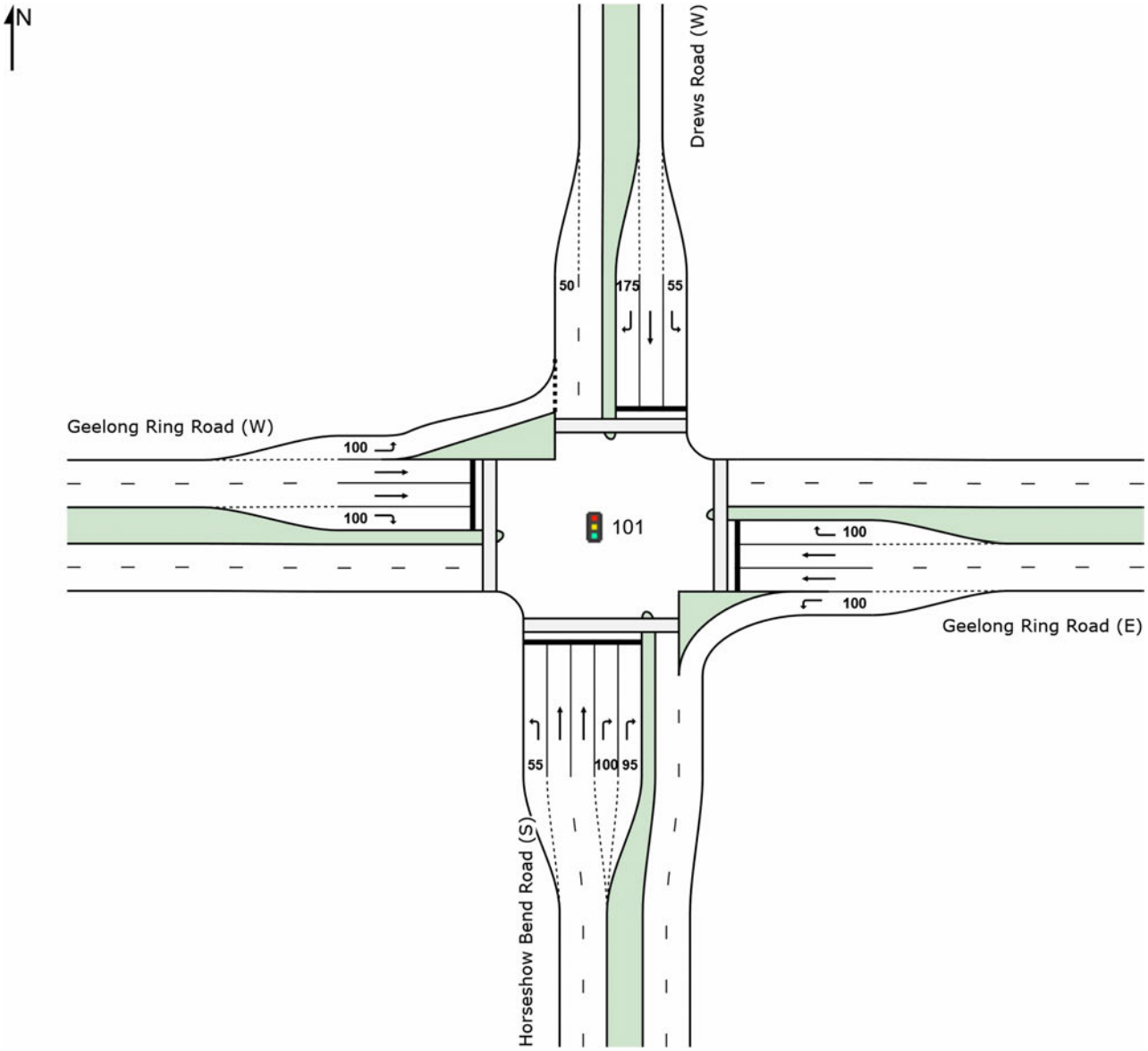


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SITE LAYOUT

Site: 101 [Geelong Ring Road Extension / Drews Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated



MOVEMENT SUMMARY

Site: 101 [Geelong Ring Road Extension / Drews Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Horseshow Bend Road (S)												
1	L2	173	4.0	0.270	35.5	LOS D	7.2	52.2	0.76	0.77	0.76	37.2
2	T1	294	4.0	0.450	40.2	LOS D	10.7	77.7	0.88	0.72	0.88	36.3
3	R2	535	4.0	0.502	43.7	LOS D	13.0	94.2	0.88	0.81	0.88	34.7
Approach		1001	4.0	0.502	41.3	LOS D	13.0	94.2	0.86	0.78	0.86	35.6
East: Geelong Ring Road (E)												
4	L2	183	4.0	0.100	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
5	T1	715	8.0	0.673	41.1	LOS D	17.5	131.1	0.89	0.77	0.89	36.0
6	R2	38	4.0	0.415	69.5	LOS E	2.3	16.6	0.99	0.73	0.99	27.8
Approach		936	7.1	0.673	35.3	LOS D	17.5	131.1	0.72	0.72	0.72	38.1
North: Drews Road (W)												
7	L2	65	4.0	0.130	40.6	LOS D	2.9	20.7	0.79	0.74	0.79	35.4
8	T1	167	4.0	0.498	48.9	LOS D	9.0	65.2	0.95	0.78	0.95	33.4
9	R2	268	4.0	0.679	52.9	LOS D	14.7	106.2	0.98	0.84	0.98	31.9
Approach		501	4.0	0.679	50.0	LOS D	14.7	106.2	0.94	0.81	0.95	32.8
West: Geelong Ring Road (W)												
10	L2	264	4.0	0.189	5.9	LOS A	0.3	2.1	0.03	0.56	0.03	54.0
11	T1	580	8.0	0.546	39.3	LOS D	13.3	99.8	0.83	0.71	0.83	36.7
12	R2	43	4.0	0.473	69.9	LOS E	2.6	19.0	1.00	0.73	1.00	27.9
Approach		887	6.6	0.546	30.8	LOS C	13.3	99.8	0.60	0.67	0.60	39.8
All Vehicles		3325	5.6	0.679	38.1	LOS D	17.5	131.1	0.76	0.74	0.76	36.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Geelong Ring Road Extension / Drews Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

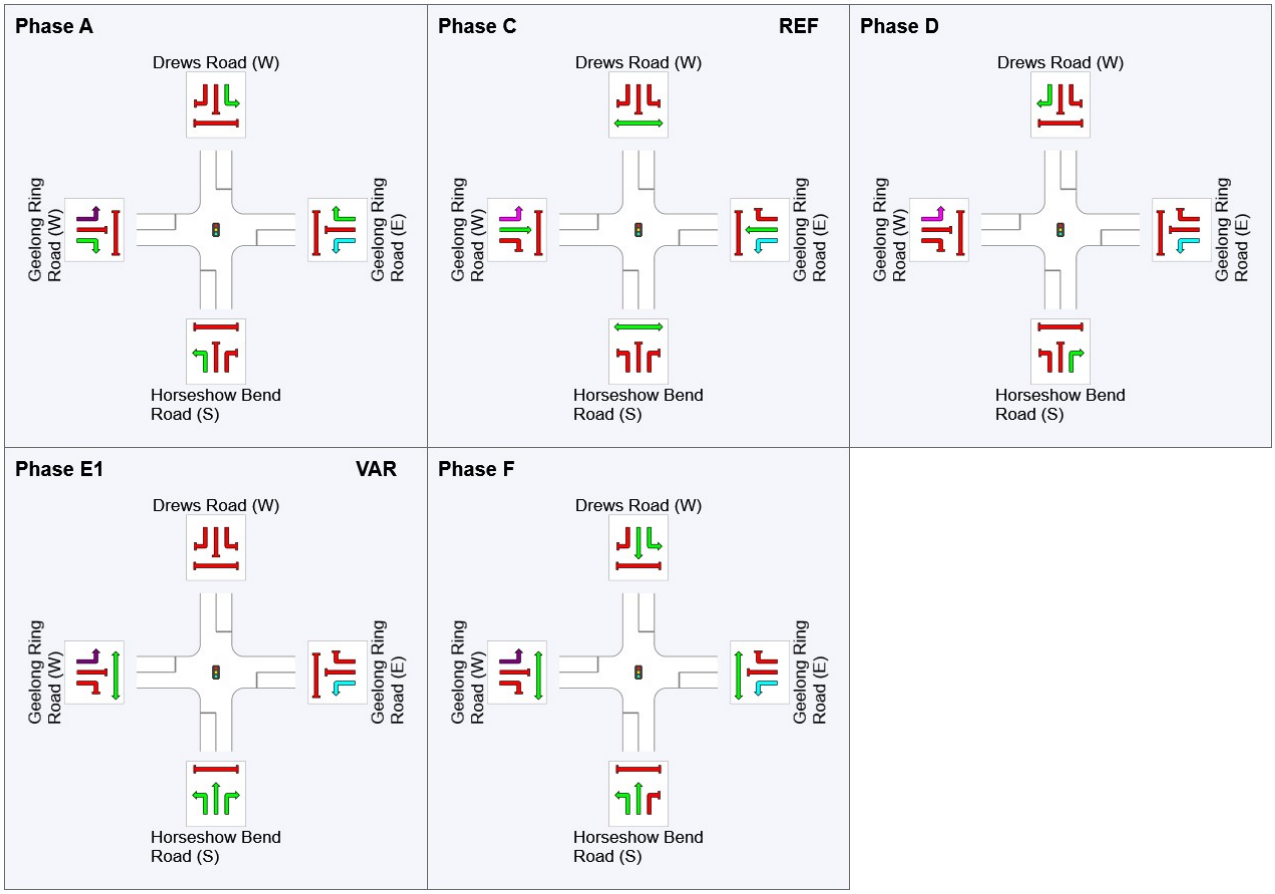
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, E1*, F
(* Variable Phase)

Phase Timing Summary

Phase	A	C	D	E1	F
Phase Change Time (sec)	108	0	40	72	81
Green Time (sec)	6	34	26	3	21
Phase Time (sec)	12	40	32	9	27
Phase Split	10%	33%	27%	8%	23%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase





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MOVEMENT SUMMARY

Site: 101 [Geelong Ring Road Extension / Drews Road | Ultimate | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Horseshow Bend Road (S)												
1	L2	86	4.0	0.146	36.2	LOS D	3.5	25.7	0.74	0.74	0.74	36.9
2	T1	278	4.0	0.710	53.2	LOS D	11.9	86.0	0.98	0.82	1.02	32.2
3	R2	295	4.0	0.606	60.0	LOS E	8.4	60.7	0.99	0.80	0.99	30.1
Approach		659	4.0	0.710	54.0	LOS D	11.9	86.0	0.95	0.80	0.97	31.7
East: Geelong Ring Road (E)												
4	L2	418	4.0	0.229	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
5	T1	736	8.0	0.561	31.9	LOS C	15.5	116.0	0.77	0.67	0.77	39.5
6	R2	57	4.0	0.623	71.0	LOS E	3.5	25.5	1.00	0.78	1.07	27.5
Approach		1211	6.4	0.623	24.7	LOS C	15.5	116.0	0.52	0.63	0.52	42.8
North: Drews Road (W)												
7	L2	46	4.0	0.087	38.5	LOS D	2.0	14.1	0.76	0.72	0.76	36.1
8	T1	222	4.0	0.603	48.4	LOS D	12.1	87.3	0.97	0.80	0.97	33.6
9	R2	225	4.0	0.706	57.8	LOS E	12.9	93.3	1.00	0.85	1.04	30.6
Approach		494	4.0	0.706	51.8	LOS D	12.9	93.3	0.96	0.82	0.98	32.3
West: Geelong Ring Road (W)												
10	L2	207	4.0	0.145	5.9	LOS A	0.2	1.6	0.02	0.55	0.02	54.0
11	T1	1083	8.0	0.680	25.9	LOS C	22.2	166.1	0.76	0.68	0.76	42.3
12	R2	129	4.0	0.568	60.6	LOS E	7.2	52.2	0.97	0.79	0.97	30.1
Approach		1420	7.1	0.680	26.1	LOS C	22.2	166.1	0.67	0.67	0.67	42.0
All Vehicles		3783	5.9	0.710	33.9	LOS C	22.2	166.1	0.71	0.70	0.72	38.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Geelong Ring Road Extension / Drews Road | Ultimate | PM PEAK]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, B1*, C, D, E2*, F
(* Variable Phase)

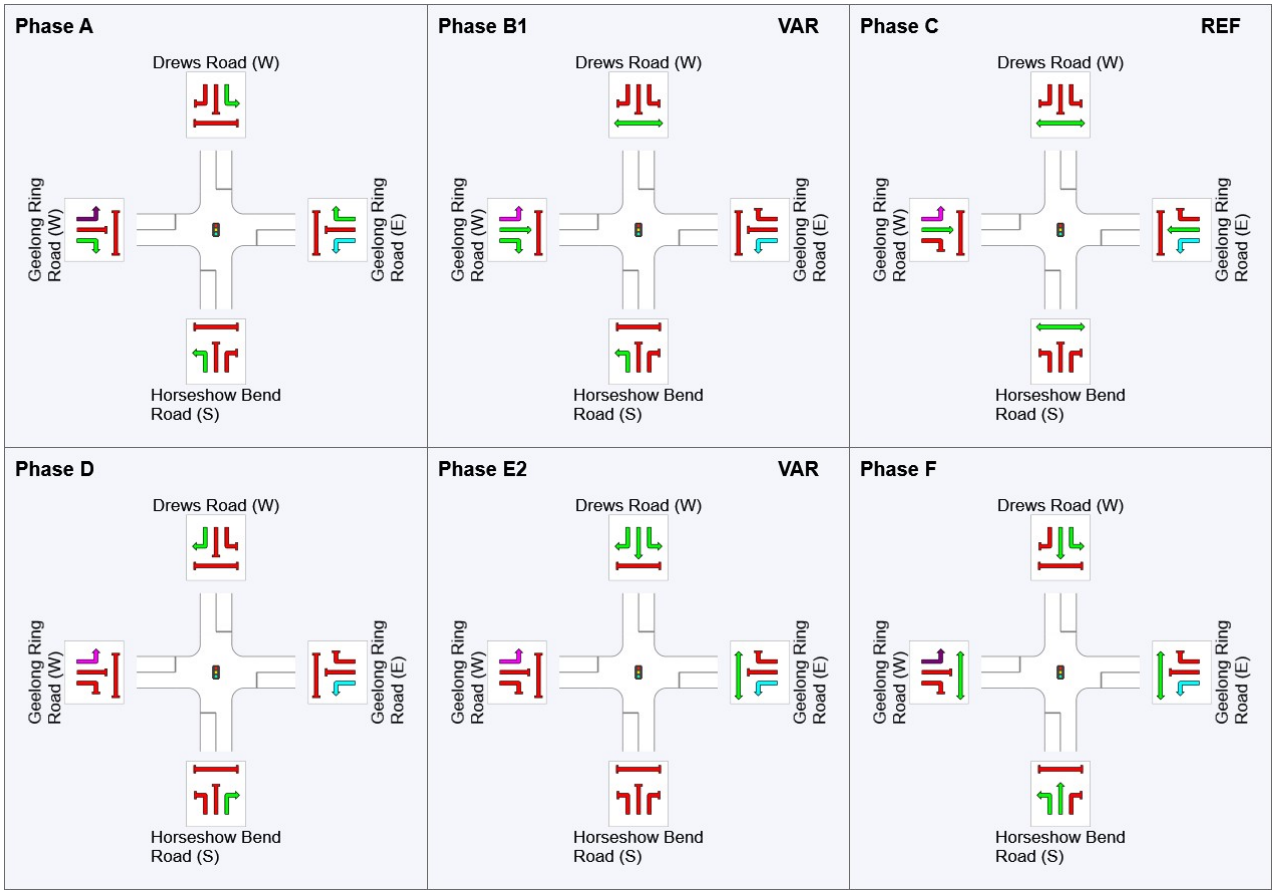
Phase Timing Summary

Phase	A	B1	C	D	E2	F
Phase Change Time (sec)	99	111	0	48	70	75
Green Time (sec)	6	3	42	16	***	18
Phase Time (sec)	12	9	48	22	5	24
Phase Split	10%	8%	40%	18%	4%	20%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

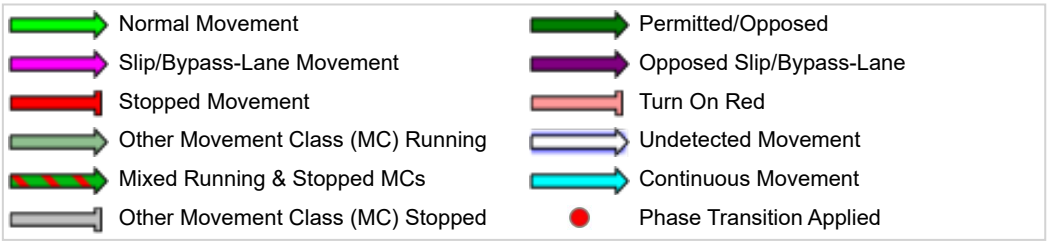
*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

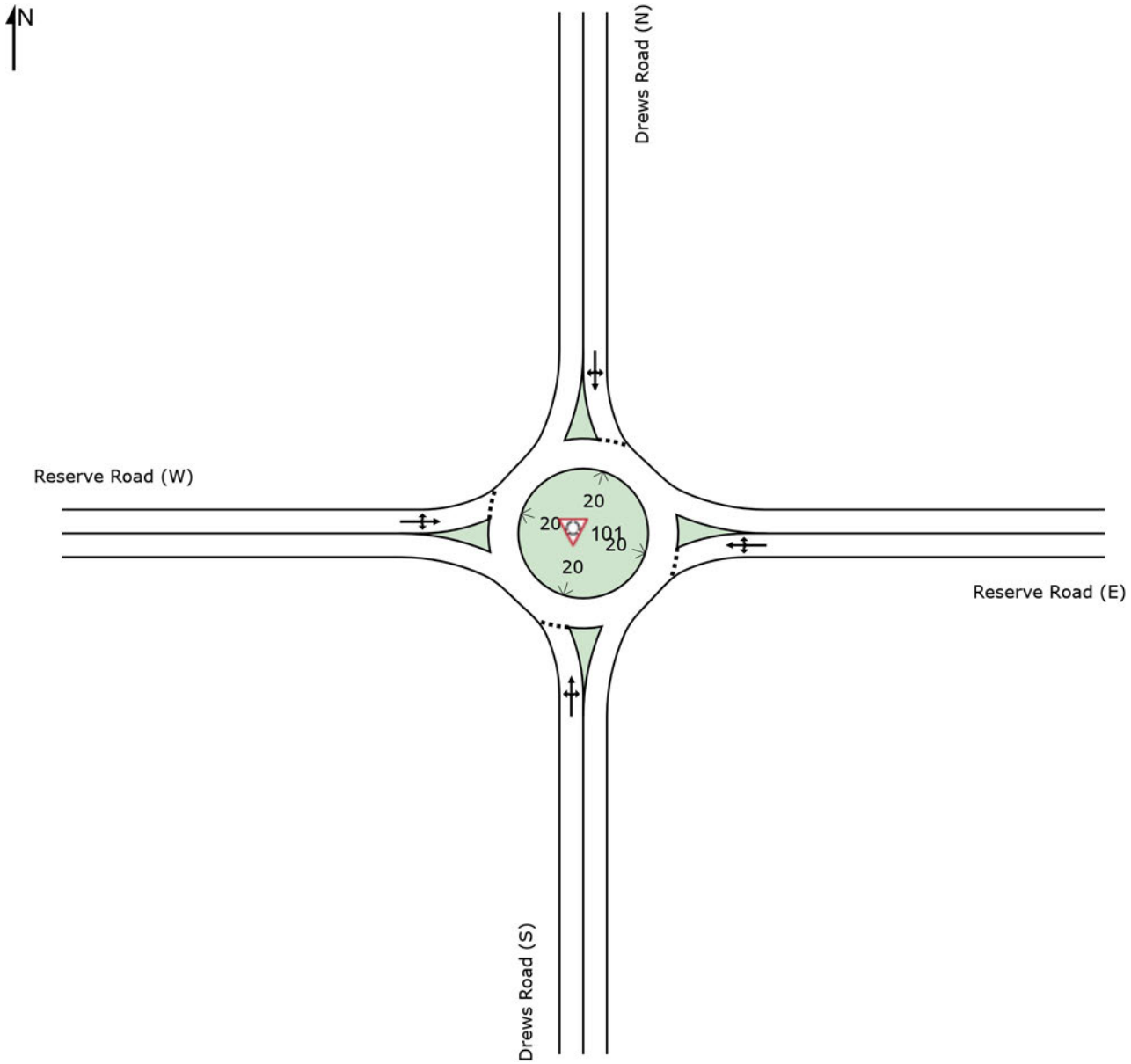


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SITE LAYOUT

Site: 101 [Drews Road / Reserve Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [Drews Road / Reserve Road | Ultimate | AM PEAK]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drews Road (S)												
1	L2	397	4.0	0.713	13.3	LOS B	9.3	67.3	0.95	1.05	1.30	48.3
2	T1	142	4.0	0.713	13.6	LOS B	9.3	67.3	0.95	1.05	1.30	49.4
3	R2	64	4.0	0.713	18.2	LOS B	9.3	67.3	0.95	1.05	1.30	49.3
Approach		603	4.0	0.713	13.9	LOS B	9.3	67.3	0.95	1.05	1.30	48.6
East: Reserve Road (E)												
4	L2	177	4.0	0.514	5.0	LOS A	4.6	33.1	0.49	0.52	0.49	53.1
5	T1	439	4.0	0.514	5.3	LOS A	4.6	33.1	0.49	0.52	0.49	54.4
6	R2	49	4.0	0.514	9.9	LOS A	4.6	33.1	0.49	0.52	0.49	54.3
Approach		665	4.0	0.514	5.6	LOS A	4.6	33.1	0.49	0.52	0.49	54.1
North: Drews Road (N)												
7	L2	78	4.0	0.129	5.5	LOS A	0.8	5.6	0.50	0.57	0.50	53.3
8	T1	45	4.0	0.129	5.8	LOS A	0.8	5.6	0.50	0.57	0.50	54.6
9	R2	11	4.0	0.129	10.4	LOS B	0.8	5.6	0.50	0.57	0.50	54.5
Approach		134	4.0	0.129	6.0	LOS A	0.8	5.6	0.50	0.57	0.50	53.9
West: Reserve Road (W)												
10	L2	87	4.0	0.288	5.7	LOS A	2.1	14.9	0.58	0.62	0.58	52.5
11	T1	137	4.0	0.288	5.9	LOS A	2.1	14.9	0.58	0.62	0.58	53.7
12	R2	75	4.0	0.288	10.6	LOS B	2.1	14.9	0.58	0.62	0.58	53.6
Approach		299	4.0	0.288	7.0	LOS A	2.1	14.9	0.58	0.62	0.58	53.3
All Vehicles		1701	4.0	0.713	8.8	LOS A	9.3	67.3	0.67	0.73	0.80	51.9

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

MOVEMENT SUMMARY

Site: 101 [Drews Road / Reserve Road | Ultimate | PM PEAK]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Drews Road (S)												
1	L2	72	4.0	0.346	5.4	LOS A	2.6	18.5	0.55	0.60	0.55	52.4
2	T1	198	4.0	0.346	5.7	LOS A	2.6	18.5	0.55	0.60	0.55	53.6
3	R2	116	4.0	0.346	10.3	LOS B	2.6	18.5	0.55	0.60	0.55	53.5
Approach		385	4.0	0.346	7.0	LOS A	2.6	18.5	0.55	0.60	0.55	53.4
East: Reserve Road (E)												
4	L2	104	4.0	0.316	6.2	LOS A	2.2	16.3	0.63	0.66	0.63	52.3
5	T1	142	4.0	0.316	6.4	LOS A	2.2	16.3	0.63	0.66	0.63	53.6
6	R2	62	4.0	0.316	11.0	LOS B	2.2	16.3	0.63	0.66	0.63	53.5
Approach		308	4.0	0.316	7.3	LOS A	2.2	16.3	0.63	0.66	0.63	53.1
North: Drews Road (N)												
7	L2	62	4.0	0.133	7.7	LOS A	0.9	6.3	0.73	0.72	0.73	52.0
8	T1	27	4.0	0.133	8.0	LOS A	0.9	6.3	0.73	0.72	0.73	53.3
9	R2	11	4.0	0.133	12.6	LOS B	0.9	6.3	0.73	0.72	0.73	53.2
Approach		100	4.0	0.133	8.3	LOS A	0.9	6.3	0.73	0.72	0.73	52.5
West: Reserve Road (W)												
10	L2	87	4.0	0.583	8.3	LOS A	5.6	40.5	0.80	0.82	0.88	50.4
11	T1	189	4.0	0.583	8.6	LOS A	5.6	40.5	0.80	0.82	0.88	51.5
12	R2	280	4.0	0.583	13.2	LOS B	5.6	40.5	0.80	0.82	0.88	51.4
Approach		557	4.0	0.583	10.9	LOS B	5.6	40.5	0.80	0.82	0.88	51.3
All Vehicles		1351	4.0	0.583	8.8	LOS A	5.6	40.5	0.68	0.72	0.72	52.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

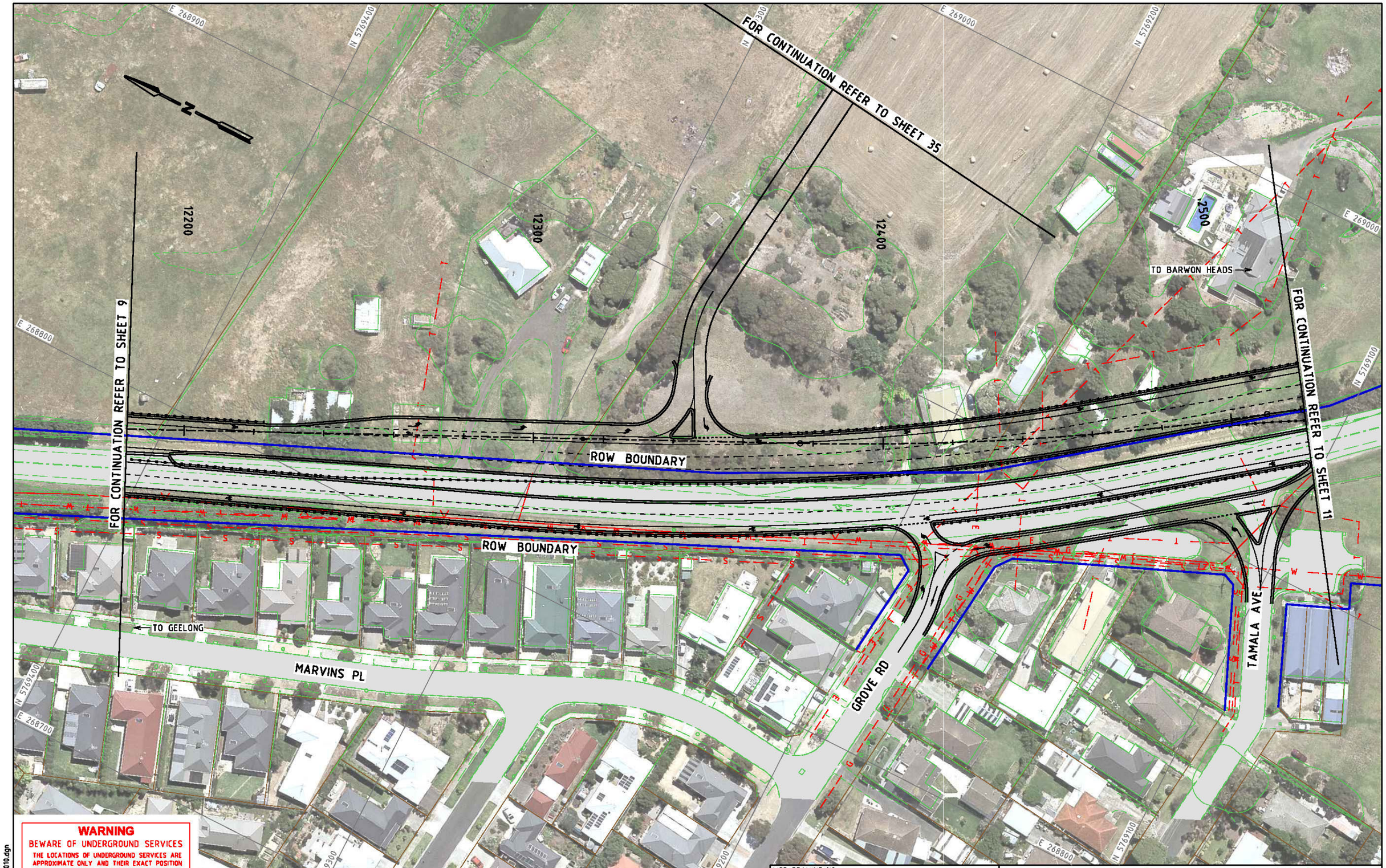
Preliminary Transport Infrastructure Assessment

APPENDIX E

BARWON HEADS RD DUPLICATION DESIGN (WSP)



Cardno
Shaping the Future



WARNING

BEWARE OF UNDERGROUND SERVICES

THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

ISSUE	APP'D	DATE	AMENDMENT
E			
D			
C			
B	SB	03.04.19	PRELIMINARY ISSUE
A	SB	27.07.18	PRELIMINARY ISSUE

GENERAL NOTES

wsp
Level 15, 28 Freshwater Place, Southbank
Melbourne, VIC 3006, Australia
Tel: +61 3 9861 1111 Fax: +61 3 9861 1144
wsp.com

WSP DRAWING NO. 2135645A-49-CIV-2010

FOR INFORMATION ONLY

DESIGNER [redacted] 03.04.19

APPROVED [redacted] 03.04.19

CAT: PS101340_2135645A
PROJ: BARWON HEADS ROAD
FILE: 2135645A-49-CIV-2010.dgn

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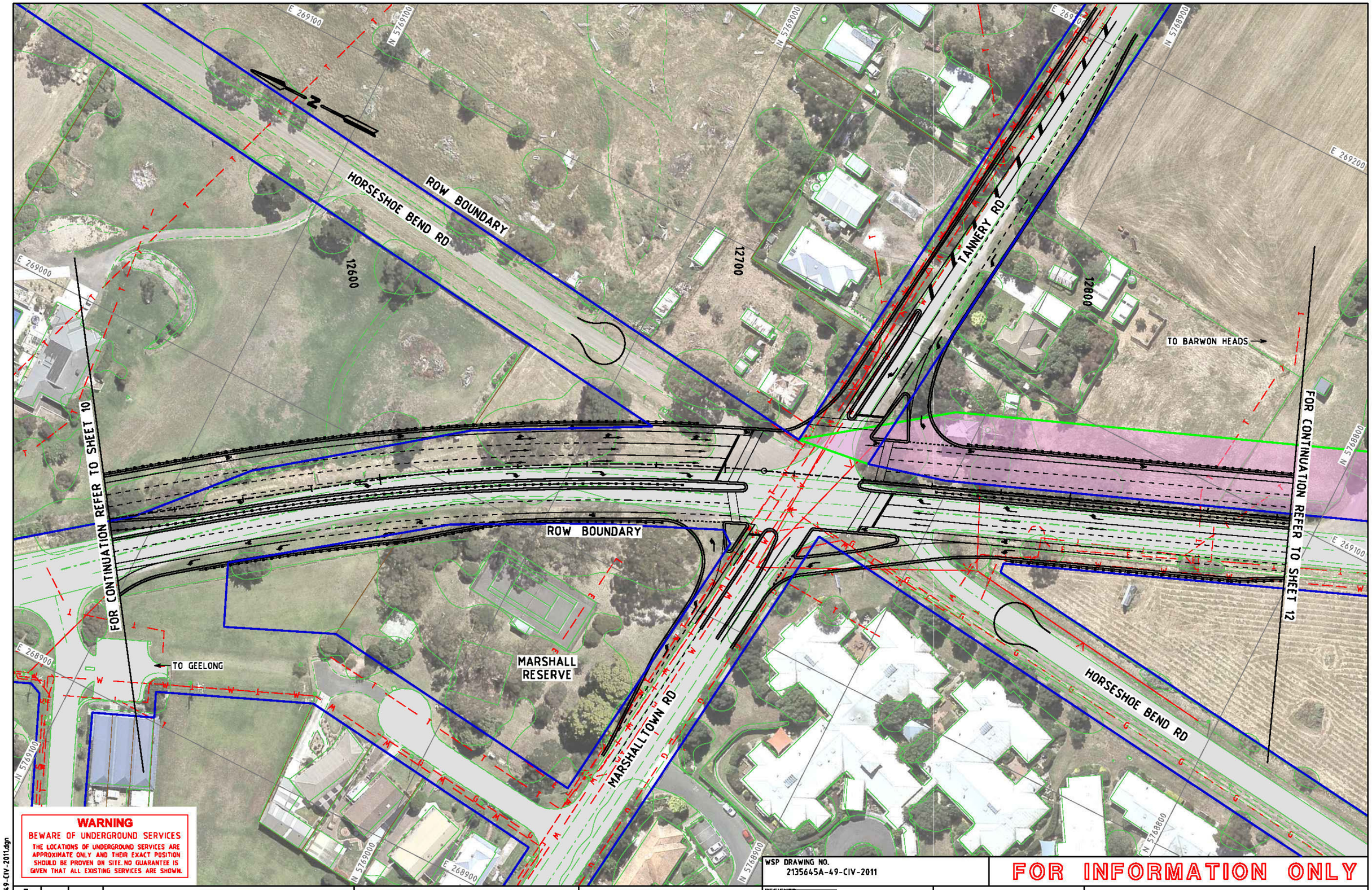
SCALE OF METRES
HOR 0 10 20
VER 0 10 20

BARWON HEADS ROAD
SETTLEMENT RD TO LOWER DUNEED RD

ALIGNMENT PLAN

FILE NO.	CONTRACT NO.	SHEET NO.	DRAWING NO.	ISSUE
		10	CIV-2010	B

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3/04/2019 11:33:05 AM



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ISSUE	APP'D	DATE	AMENDMENT
E			
D			
C			
B	SB	03.04.19	PRELIMINARY ISSUE
A	SB	27.07.18	PRELIMINARY ISSUE

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wsp.com

WSP DRAWING NO.
2135645A-49-CIV-2011

FOR INFORMATION ONLY

DESIGNED [redacted] 03.04.19
APPROVED [redacted] 03.04.19

MAJOR ROAD PROJECTS AUTHORITY

CAT: PS101340_2135645A
PROJ: BARWON HEADS ROAD
FILE: 2135645A-49-CIV-2011.dgn

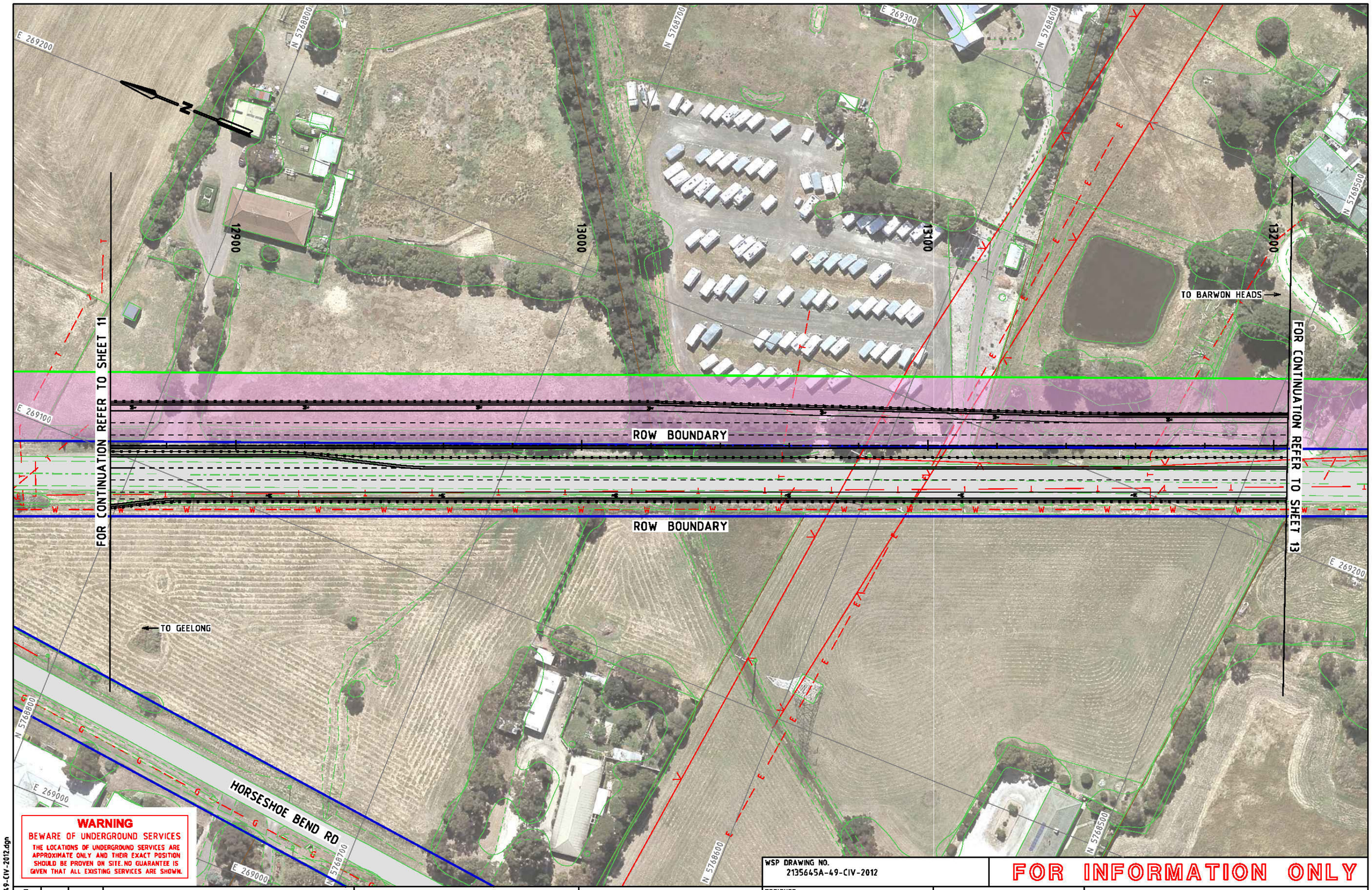
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VER 0 10 20

BARWON HEADS ROAD
SETTLEMENT RD TO LOWER DUNEED RD

ALIGNMENT PLAN

FILE NO.	CONTRACT NO.	SHEET NO.	DRAWING NO.	ISSUE
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3/04/2019 11:33:36 AM



WARNING

BEWARE OF UNDERGROUND SERVICES

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ISSUE	APP'D	DATE	AMENDMENT
E			
D			
C			
B	SB	03.04.19	PRELIMINARY ISSUE
A	SB	27.07.18	PRELIMINARY ISSUE

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WSP DRAWING NO.
2135645A-49-CIV-2012

DESIGNED [redacted] 03.04.19

APPROVED [redacted] 03.04.19

CAT: PS101340_2135645A
PROJ: BARWON HEADS ROAD
FILE: 2135645A-49-CIV-2012.dgn

MAJOR ROAD PROJECTS AUTHORITY

SCALE OF METRES
HOR 0 10 20
VER 0 10 20

FOR INFORMATION ONLY

BARWON HEADS ROAD

SETTLEMENT RD TO LOWER DUNEED RD

ALIGNMENT PLAN

FILE NO.	CONTRACT NO.	SHEET NO.	DRAWING NO.	ISSUE
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3/04/2019 11:34:06 AM



WARNING

BEWARE OF UNDERGROUND SERVICES

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ISSUE	APP'D	DATE	AMENDMENT
E			
D			
C			
B	SB	03.04.19	PRELIMINARY ISSUE
A	SB	27.07.18	PRELIMINARY ISSUE

GENERAL NOTES

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WSP DRAWING NO. 2135645A-49-CIV-2013

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DESIGNED [redacted] 03.04.19

APPROVED [redacted] 03.04.19

CAT: PS101340_2135645A
PROJ: BARWON HEADS ROAD
FILE: 2135645A-49-CIV-2013.dgn

MAJOR ROAD PROJECTS AUTHORITY

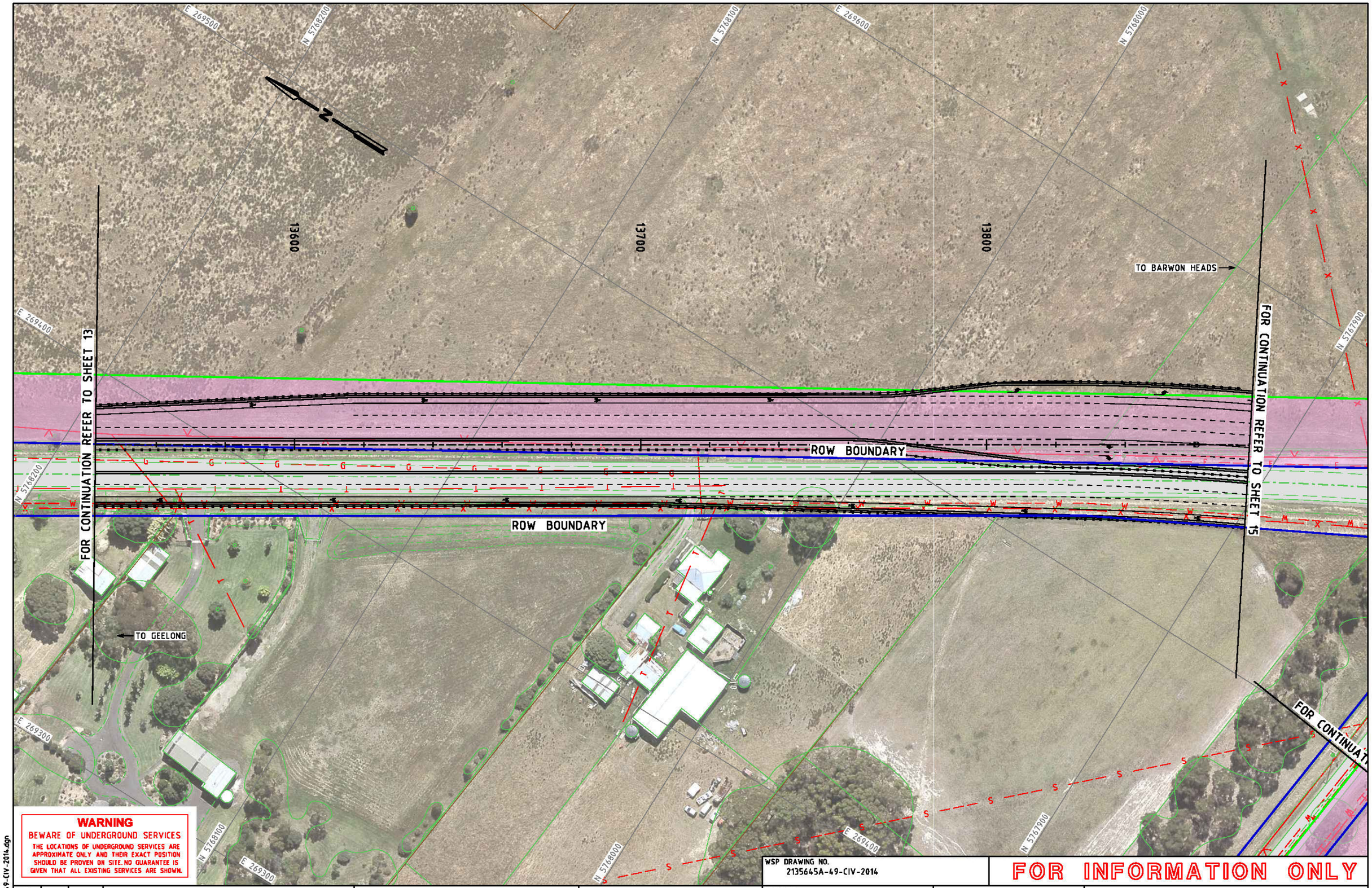
SCALE OF METRES
HOR 0 10 20
VER 0 10 20

BARWON HEADS ROAD
SETTLEMENT RD TO LOWER DUNEED RD

ALIGNMENT PLAN

FILE NO.	CONTRACT NO.	SHEET NO.	DRAWING NO.	ISSUE
		13	CIV-2013	B

3/04/2019 11:34:31 AM Default 2135645A-49-CIV-2013.dgn



WARNING

BEWARE OF UNDERGROUND SERVICES

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ISSUE	APP'D	DATE	AMENDMENT
E			
D			
C			
B	SB	03.04.19	PRELIMINARY ISSUE
A	SB	27.07.18	PRELIMINARY ISSUE

GENERAL NOTES

wsp
Level 15, 28 Freshwater Place, Southbank
Melbourne, VIC 3006, Australia
Tel: +61 3 9861 1111 Fax: +61 3 9861 1144
wsp.com

WSP DRAWING NO. 2135645A-49-CIV-2014

FOR INFORMATION ONLY

DESIGNED [redacted] 03.04.19

APPROVED [redacted] 03.04.19

MAJOR ROAD PROJECTS AUTHORITY

CAT: PS101340_2135645A
PROJ: BARWON HEADS ROAD
FILE: 2135645A-49-CIV-2014.dgn

SCALE OF METRES
HOR 0 10 20
VER 0 10 20

BARWON HEADS ROAD
SETTLEMENT RD TO LOWER DUNEED RD

ALIGNMENT PLAN

FILE NO.	CONTRACT NO.	SHEET NO.	DRAWING NO.	ISSUE
		14	CIV-2014	B

3/04/2019 11:34:58 AM Default 2135645A-49-CIV-2014.dgn

FOR CONTINUATION REFER TO SHEET 37

RESERVE RD

ROW BOUNDARY

14000

14100

14200

13900

TO BARWON HEADS

FOR CONTINUATION REFER TO SHEET 14

FOR CONTINUATION REFER TO SHEET 16

TO GEELONG

RESERVE RD

ROW BOUNDARY

FOR CONTINUATION REFER TO SHEET 36

E 269700 N 5767900 E 269600 E 269500 N 5767800 N 5767700 N 5767600

WARNING

BEWARE OF UNDERGROUND SERVICES

THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

ISSUE	APP'D	DATE	AMENDMENT
E			
D			
C			
B	SB	03.04.19	PRELIMINARY ISSUE
A	SB	27.07.18	PRELIMINARY ISSUE

GENERAL NOTES

wsp
Level 15, 28 Freshwater Place, Southbank
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wsp.com

WSP DRAWING NO. 2135645A-49-CIV-2015

FOR INFORMATION ONLY

DESIGNED [redacted] 03.04.19

APPROVED [redacted] 03.04.19

CAT: PS101340_2135645A
PROJ: BARWON HEADS ROAD
FILE: 2135645A-49-CIV-2015.dgn

MAJOR ROAD PROJECTS AUTHORITY

SCALE OF METRES
HOR 0 10 20
VER 0 10 20

BARWON HEADS ROAD
SETTLEMENT RD TO LOWER DUNEED RD

ALIGNMENT PLAN

FILE NO.	CONTRACT NO.	SHEET NO.	DRAWING NO.	ISSUE
		15	CIV-2015	B

Default 2135645A-49-CIV-2015.dgn
3/04/2019 11:35:22 AM

Preliminary Transport Infrastructure Assessment

APPENDIX F

GRRE INTERSECTION LAYOUTS (JACOBS)



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Shaping the Future

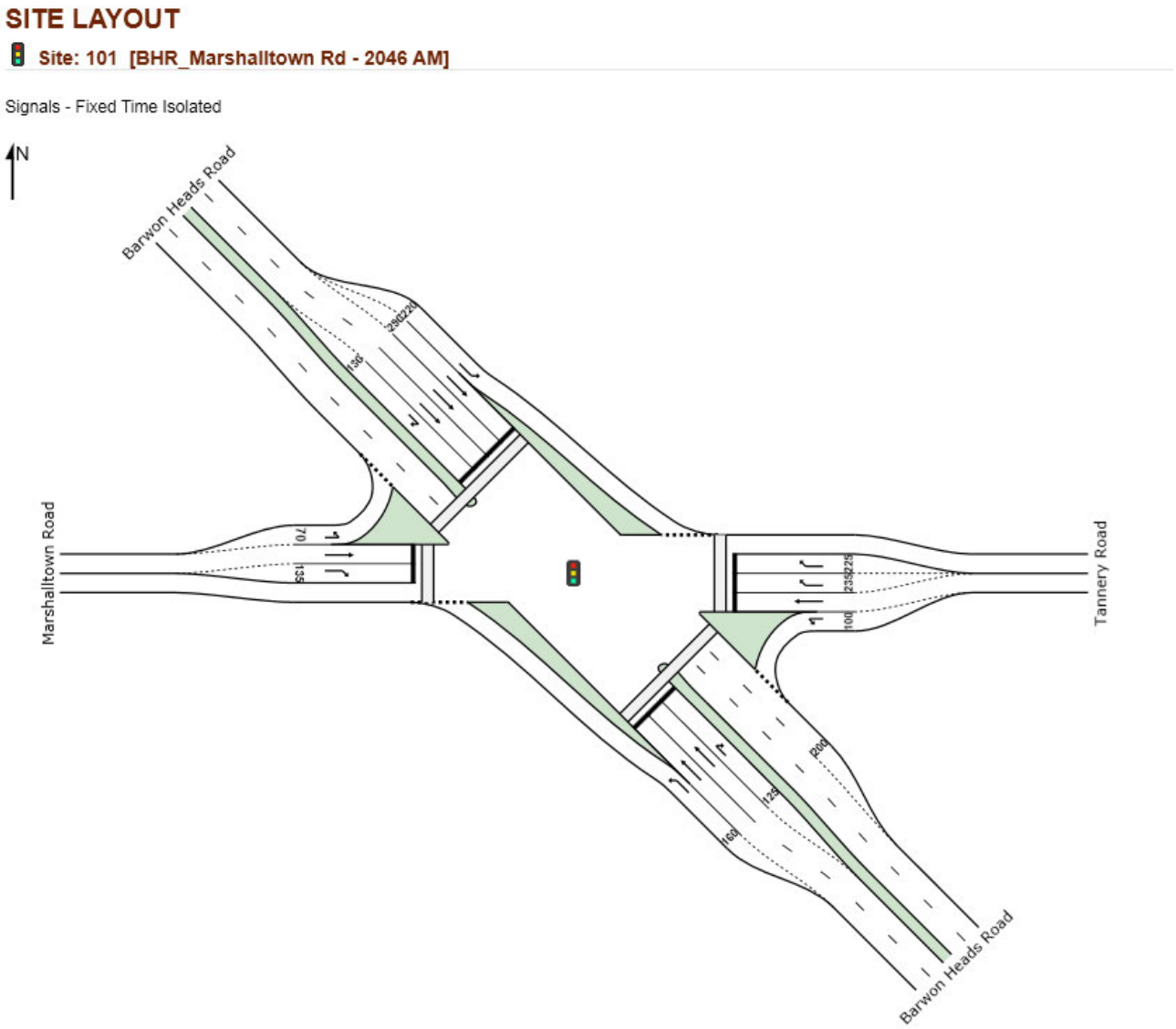


Figure D.5 : Recommended ultimate intersection layout - Barwon Heads Road / Marshalltown Road

SITE LAYOUT

Site: 101 [BHR_GRRE - 2046 PM]

Signals - Fixed Time Isolated

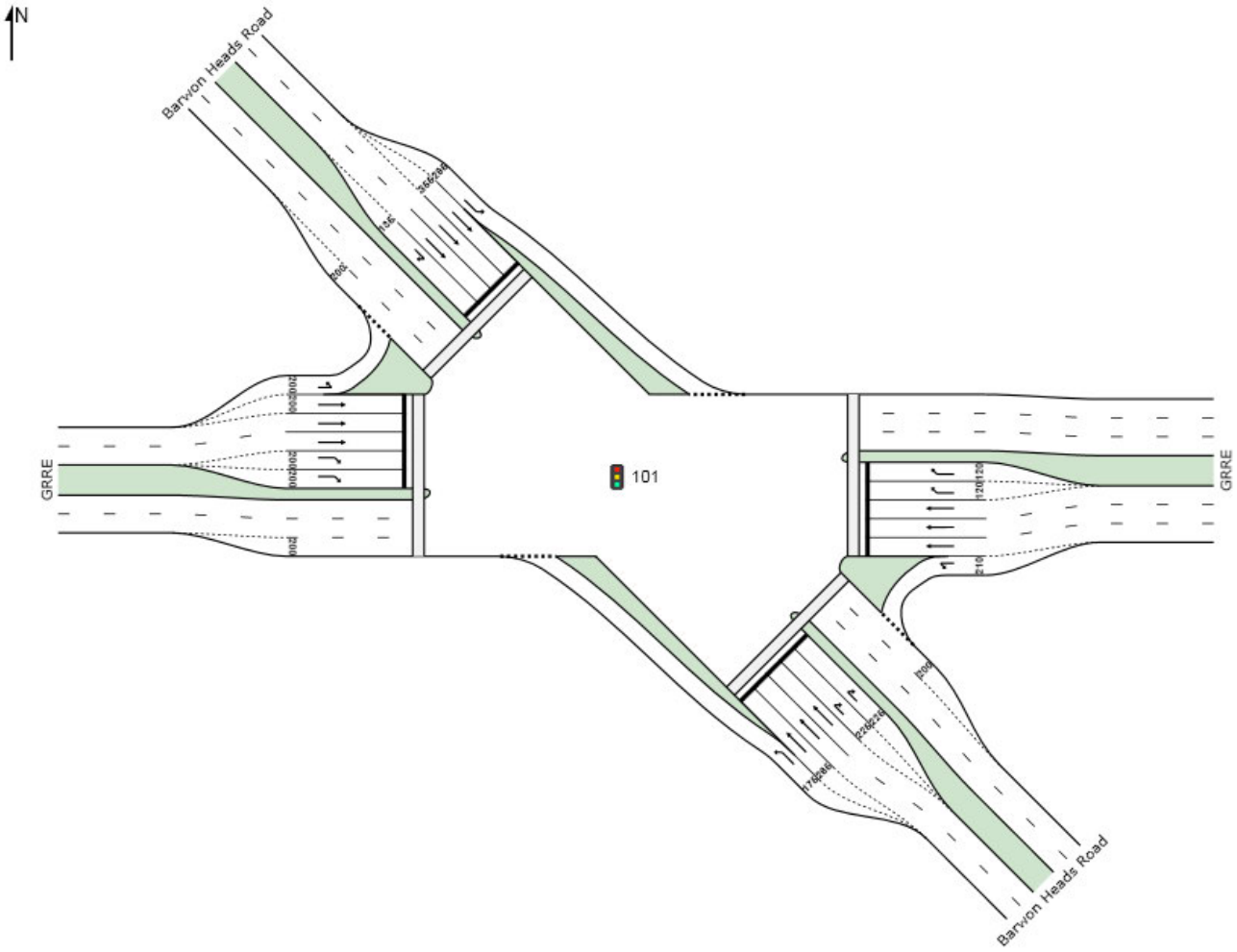


Figure D.6 : Recommended ultimate intersection layout - Barwon Heads Road / Geelong Ring Road Extension

Preliminary Transport Infrastructure Assessment

APPENDIX G

PROPOSED CROSS SECTIONS



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