Armstrong Creek West Precinct
Transport Impact Assessment

transportation planning, design and delivery

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GTAconsultants

Armstrong Creek West Precinct

Transport Impact Assessment

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1. Introduction

1.1 Background

The Armstrong Creek Urban Growth Plan aims to concentrate the majority of the urban growth of Geelong into a comprehensive community to the south of the Geelong-Warrnambool Railway Line, between Ghazeepore Road (to the west) and the Barwon River (to the east). The Armstrong Creek urban growth area, comprising of approximately 2600 hectares, is detailed in the Armstrong Creek Urban Growth Plan Framework which is now approved and has been incorporated into the Geelong Planning Scheme to provide guidance on the overall development of this area.

In order to facilitate the delivery of this overall framework plan the Armstrong Creek area has been divided into seven precincts.

Each precinct is individually required to prepare a Precinct Structure Plan to further establish development detail and a vision relevant to the precinct prior to development commencing. The West Precinct forms one of the seven precincts within Armstrong Creek and Villawood Properties are leading the consortium team that is developing the Precinct Structure Plan (PSP) for the precinct.

GTA Consultants (GTA) has been commissioned by Villawood Properties to assess the transport related elements of the Precinct Structure Plan for the Armstrong Creek West Precinct.

1.2 Purpose of This Report

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

- the existing traffic and transport conditions surrounding the site
- the traffic generation characteristics of the proposed development
- the proposed access arrangements for the site
- the existing and future public transport facilities and provisions
- the existing and future bicycle and walking facilities and provisions.

1.3 Referenced Documents

In preparing this report, reference has been made to a number of background documents, including:

- City of Greater Geelong Planning Scheme
- Armstrong Creek Urban Growth Plan, adopted 13 May 2010
- Armstrong Creek Civil Interagency Infrastructure Delivery Plan (prepared by the City of Greater Geelong dated February 2009)
- Sustainable Communities Infrastructure Development Guidelines (prepared by the City of Greater Geelong dated October 2010)
- Armstrong Creek Movement and Access Infrastructure Feasibility draft Phase 1 Traffic Modelling Report (prepared by Veitch Lister Consulting, dated 21 July 2008)
- Geelong Ring Road Sections 4B and 4C Traffic Modelling Report (prepared by Veitch Lister Consulting, dated 16 October 2009)

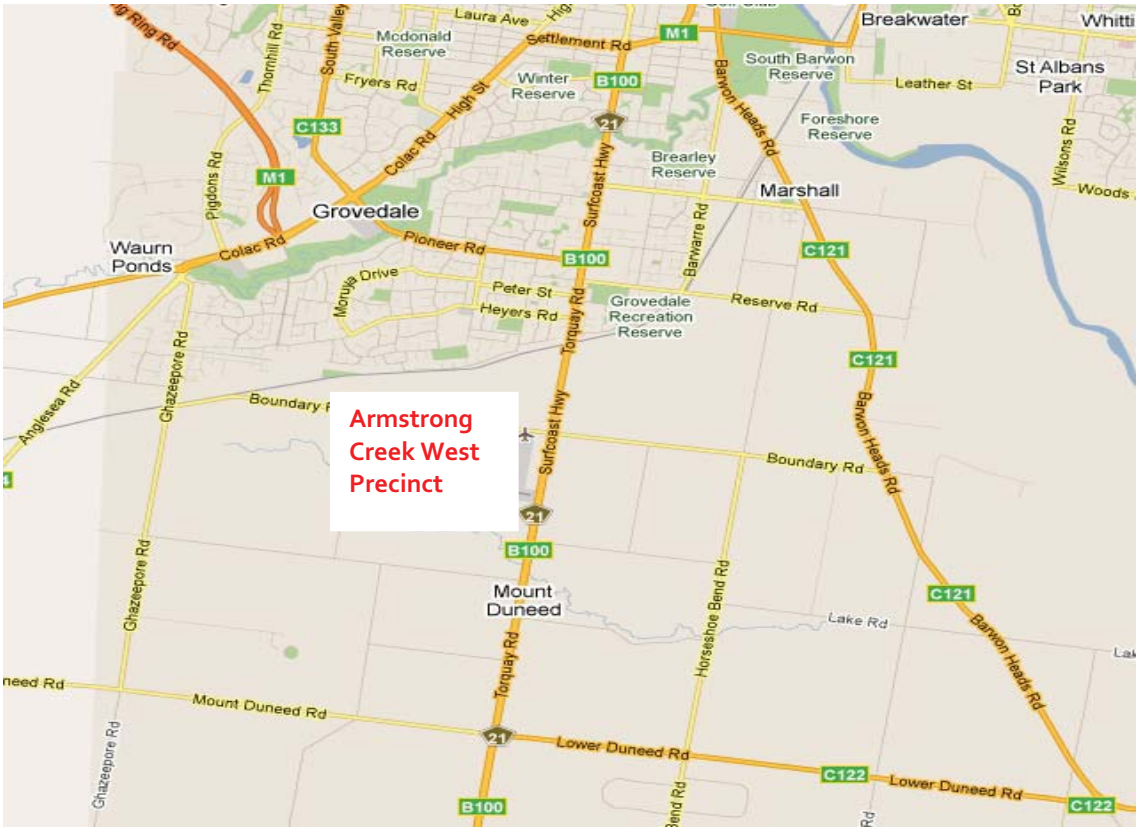
- Armstrong Creek Major Activity Centre Enquiry by Design Report (prepared by the City of Greater Geelong, dated September 2009)
- The Structure Plan for the Armstrong Creek West Precinct prepared by Mesh Pty Ltd
- various technical data as referenced in this report
- the Roads and Traffic Authority New South Wales (RTANSW) Guide to Traffic Generation Development Report (2002)
- other documents as nominated.

2. Existing Conditions

2.1 Subject Site

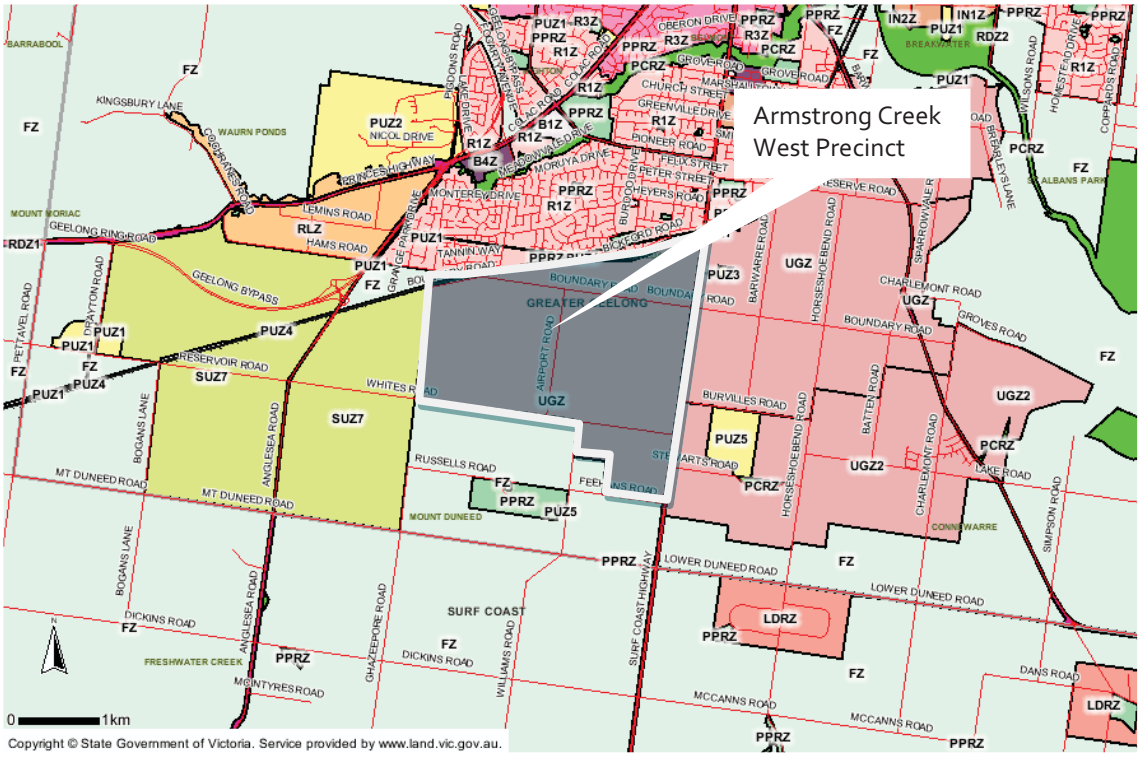
The Armstrong Creek West Precinct site is located within the western side of the Armstrong Creek Urban Growth Plan area. The general location of the site and the surrounding environs is shown in Figure 2.1 and the land zoning is shown Figure 2.2.

Figure 2.1: Subject Site and its Environs



(Map courtesy of Google Maps)

Figure 2.2: Land Zoning Map



(Reproduced from Land Channel web site)

2.2 Road Network

2.2.1 Adjoining Roads

Key Roads

Existing key roads in the vicinity of the Armstrong Creek West Precinct include:

- Surf Coast Highway – Primary State Arterial Road aligned in a north – south direction
- Mt Duneed Road – Major road aligned in an east – west direction
- Ghazeepore Road – Major road aligned in a north – south direction.

Local Roads

Other local roads within the vicinity of the precinct include:

- Feehans Road
- Boundary Road
- Burvilles Road
- Whites Road
- Williams Road
- Airport Road.

2.2.2 Surrounding Intersections

The following intersections currently exist in the vicinity of the site:

- Mount Duneed/Surf Coast Highway (roundabout)
- Whites Road/Surf Coast Highway (unsignalised)
- Boundary Road/Surf Coast Highway (unsignalised)
- Feehans Road/ Surf Coast Highway (unsignalised)
- Boundary Road/Ghazeepore Road (unsignalised)
- Boundary Road/Airport Road (unsignalised)
- Airport Road/ Whites Road (unsignalised)
- Whites Road/Ghazeepore Road (unsignalised)
- Williams Road/Whites Road (unsignalised)
- Williams Road/ Feehans Road (unsignalised).

2.2.3 Traffic Volumes

Existing traffic volumes on Surf Coast Highway are in the order of 19,000[1] vehicles per day. Other local roads within the subject site are rural in nature and carry low daily traffic volumes (generally less than 3,000 vehicles per day).

2.3 Integrated Transport Infrastructure

2.3.1 Active Transport Infrastructure

The Victorian Principal Bike Network plan shows a proposed local bike route on Boundary Road and an existing priority bike route on Surf Coast Highway. Due to the subject site and surrounding areas currently not being developed, no formalised pedestrian paths exist in the immediate vicinity of the subject site.

2.3.2 Public Transport Infrastructure

Public transport facilities and services in the immediate vicinity of the West Precinct are limited to regional bus services operating along Surf Coast Highway.

In addition to road based public transport, the Geelong-Warrnambool rail line extends along the northern boundary of the West Precinct, with the closest existing station located in Marshall, approximated 2km north-east of the subject site.

[1] Volume sourced from the Armstrong Creek Eastern Precinct Traffic Impact Assessment Report prepared by Cardno Grogan Richards (dated 14 October 2009), assuming a 2% annual growth rate.

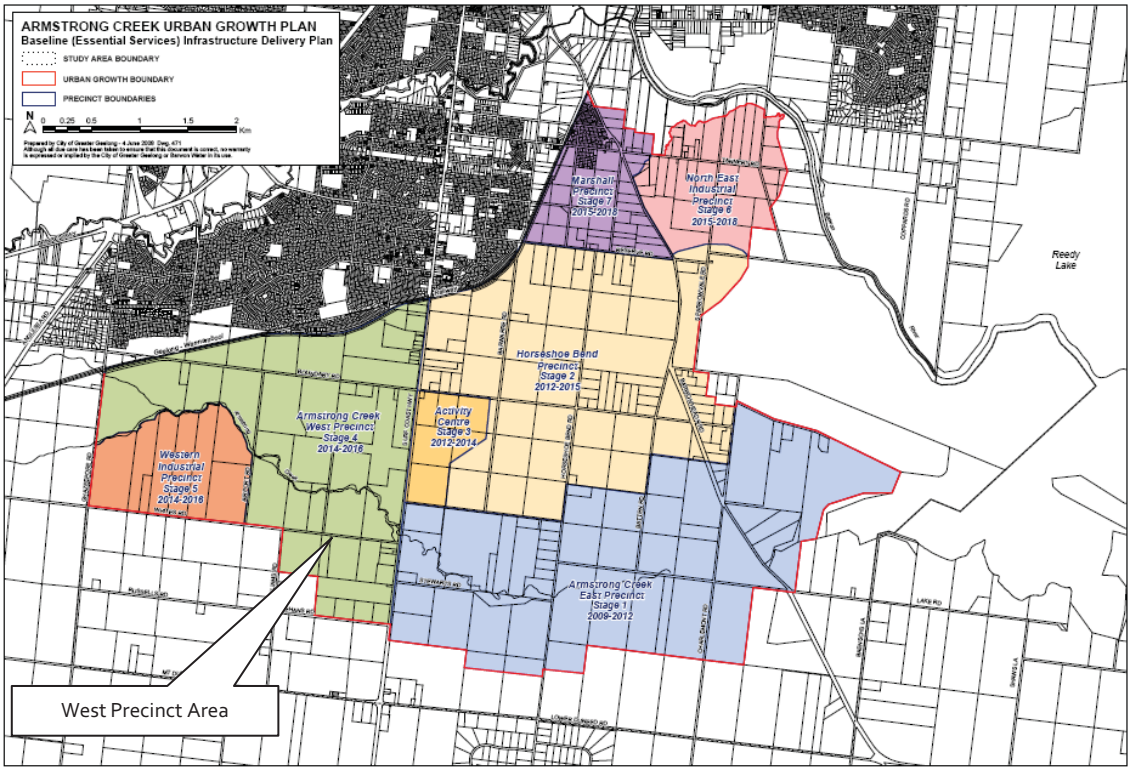
3. Armstrong Creek Urban Growth Plan

3.1 Armstrong Creek Precincts

The Armstrong Creek Urban Growth Plan was developed by the City of Greater Geelong (Council) to set out the vision and direction for the development of the Armstrong Creek area.

The overall Armstrong Creek area and the precincts that it has been divided into are set out in Figure 3.1.

Figure 3.1: Armstrong Creek Urban Growth Plan – Precincts

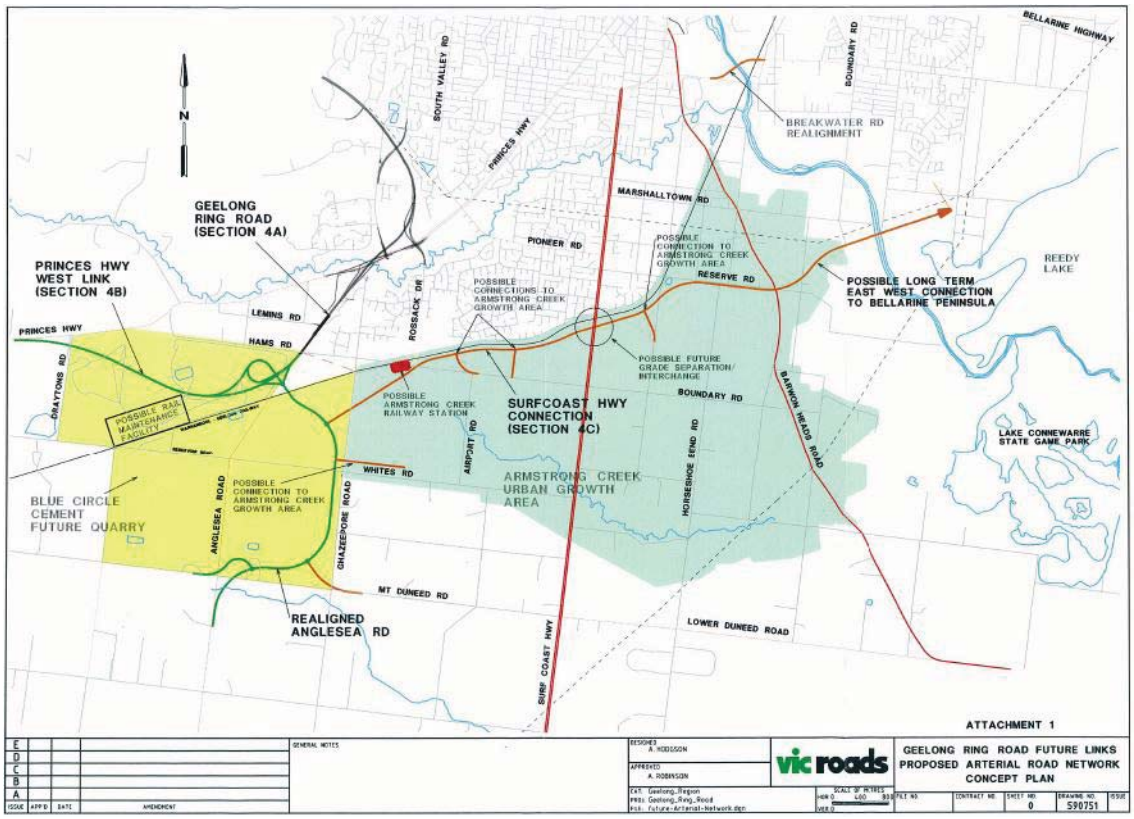


3.2 Arterial Road Network

The Armstrong Creek Urban Growth Plan identifies that there is a need for three arterial roads within the overall area, two of which, Surf Coast Highway and Section 4C of the Geelong Ring Road directly abut the West Precinct.

The proposed arterial road network for the Armstrong Creek, area as defined by VicRoads, is shown in Figure 3.2.

Figure 3.2: Proposed Arterial Road Network



Source: Armstrong Creek Interagency Infrastructure Delivery Plan (IIDP)

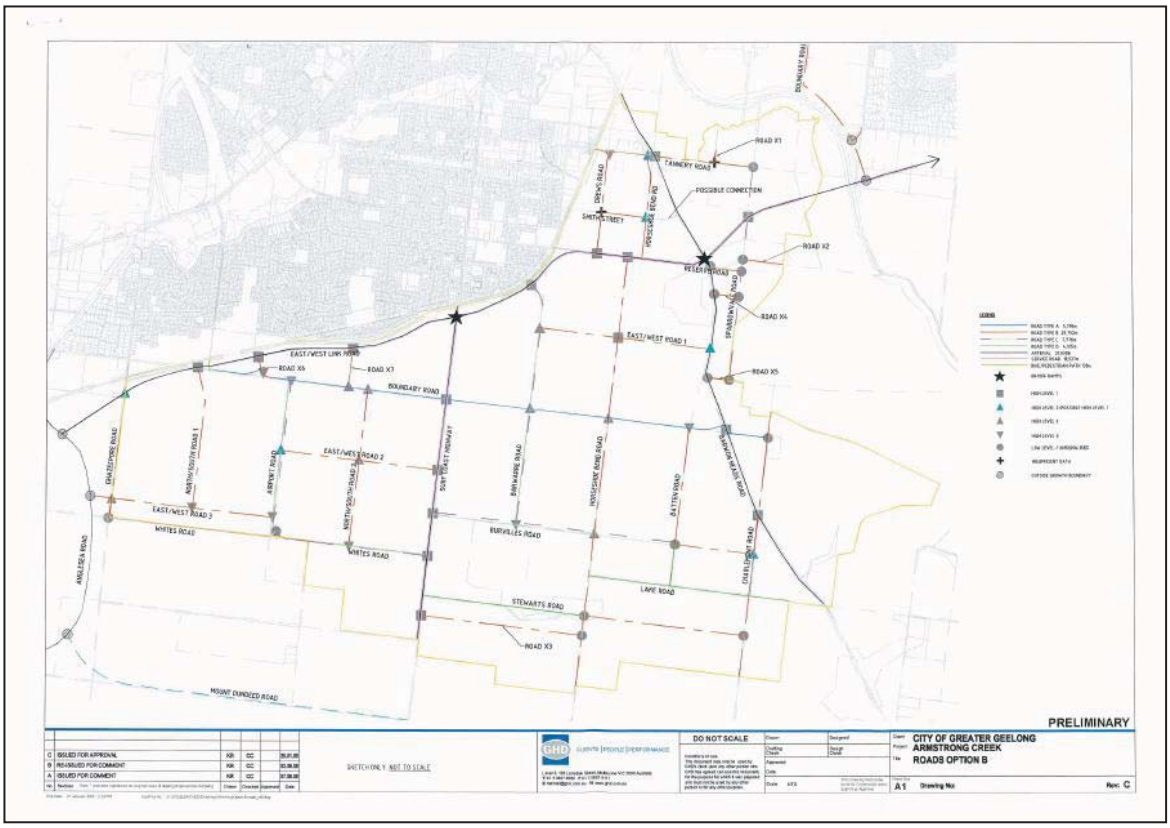
The primary purpose of the Geelong Ring Road in the Armstrong Creek area is to provide a link between the Geelong Bypass and Bellarine Peninsula, reducing traffic in central Geelong. Section 4C of the Geelong Ring Road, adjacent to the subject area, will be a four lane divided roadway with provision for widening to six lanes. Widening to six lanes has the potential to incorporate two on-road bus lanes. Provision has also been made for on road cycle lanes.

Surf Coast Highway currently provides two traffic lanes in each direction separated by a central median. The Armstrong Creek Interagency Infrastructure Delivery Plan (dated February 2009) notes that Surf Coast Highway will be upgraded to three lanes in each direction with service roads in the future. The upgrade will integrate with the retail and commercial uses (through the use of service roads) proposed along the Surf Coast Highway associated with the development of the Armstrong Creek Major Activity Centre Precinct and West Precinct.

3.3 Connector Street Network

The Connector Street network included in the Armstrong Creek Interagency Infrastructure Delivery Plan is shown in Figure 3.3.

Figure 3.3 Connector Street Network



Source: Armstrong Creek Civil Interagency Infrastructure Delivery Plan

A key design principle of the Armstrong Creek Urban Growth Plan and the Armstrong Creek Interagency Infrastructure Delivery Plan (IIDP) is that Connector Streets be spaced at approximately 800m taking traffic to the outer arterial roads. The Connector Streets are generally envisaged to comprise of one traffic lane in each direction, with generous footpaths, shared or dedicated cycle paths, and kerbside parking provided on both sides.

3.4 Pedestrian and Cycle Infrastructure

An objective of the Armstrong Creek Urban Growth Plan is to provide comprehensive pedestrian and bicycle path networks. This is proposed by implementing "greenways" and off road recreational trails that integrate with existing and proposed bicycle and pedestrian network links.

This, in combination with the provision of on-road paths, will enable people to walk or cycle to local destinations such as neighbourhood shops, public transport, workplaces, primary schools and parks which are all located in close proximity to the proposed households.

3.5 Public Transport Infrastructure

An objective of the Armstrong Creek Urban Growth Plan is to provide a high quality comprehensive local public transport system that links activity nodes and passes within a short walk of housing to reduce reliance on private cars.

The public transport system within the Armstrong Creek area will be a bus based system that connects to nearby train stations including the proposed Armstrong Creek Station north of the West Precinct (which will be accessed from the Geelong Ring Road).

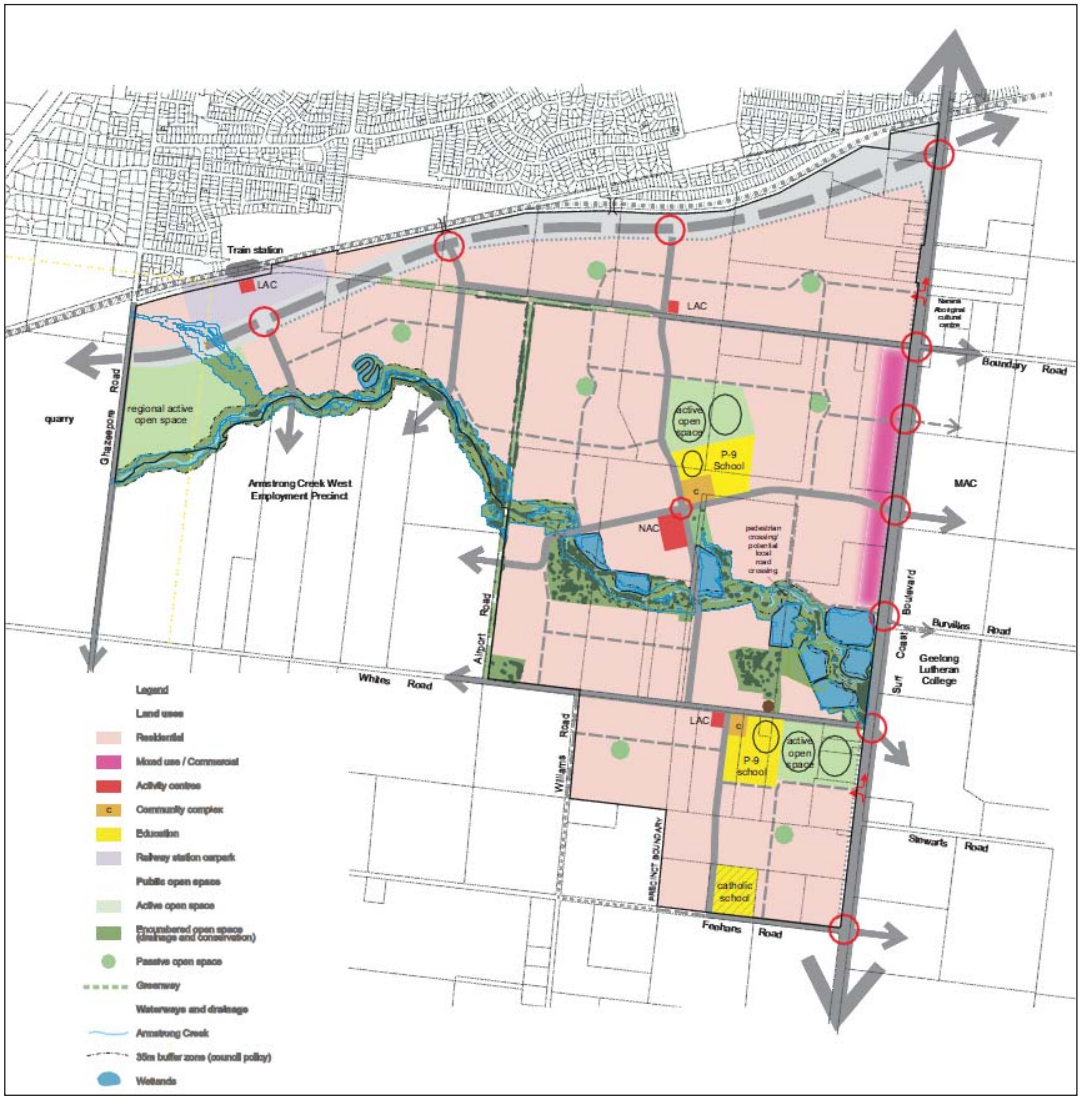
4. West Precinct Structure Plan Area

4.1 Precinct Structure Plan

The West Precinct area is approximately 528 hectares in area and is generally bound the rail line to the north, Whites Road and Feehans Road to the south, Ghazeepore Road and Airport Road to the west and Surf Coast Highway to the east.

The proposed Precinct Structure Plan for the Armstrong Creek West Precinct is shown in Figure 4.1 and an enlarged plan is included in Appendix A.

Figure 4.1: Structure Plan for the Armstrong Creek West Precinct



The Structure Plan features a mixture of conventional, medium and high density residential uses, along with retail, community facilities and schools.

4.2 Anticipated Development Yield

The West Precinct is planned to include a range of uses consisting of residential, educational, and activity centre uses. Table 4.1 summarises the type and size of the various uses envisaged by the Structure Plan.

Table 4.1: West Precinct Land Use Summary

Use	Description	Approximate Quantity/Area
Residential	Conventional Residential	6,300 dwellings
	Medium Density Residential	
	High Density Residential	
Mixed Use/Retail	Neighbourhood Activity Centre and Local Activity Centres	1.35 ha
	Mixed Use (retail/office/residential)	9.38 ha
Community Uses	Community Facilities	1.85 ha
	Schools	11 ha (2,850 enrolments)[1]

[1] Total enrolments based on the following assumptions: 1,100 enrolments per state school (2), and 650 enrolments per private school (1).

4.3 Road Network

The road network shown on the Structure Plan is based on a grid framework that has been modified to respond to the location of existing site features.

The modified grid provides a distributed network that allows traffic to filter through the network rather than focusing it on to a small number of routes. The network responds to the road network proposed for the Armstrong Creek Major Activity Centre Precinct on the east side of the Surf Coast Highway and the fixed connection points on the Highway.

Whilst the modified grid network has been designed to respond to existing site conditions it will also deliberately incorporate points of difference as a placemaking initiative and to create diverse experiences as people move through the network. The grid will also be modified and refined to respond to the allocation of land uses through future planning stages.

Distributing traffic flows via the modified grid network will provide multiple routes for all road users, including pedestrians and cyclist, and is designed to enhance public and active transport amenity.

The modified grid-based network is generally in accordance with the key design principles outlined in the Growth Areas Authority's Precinct Structure Plan Guidelines which are:

- The arterial road network is based on a one mile (1.6km) grid and has been adjusted to reflect local context.
- Connector Streets are spaced at approximately 800m intervals having regard for existing and proposed land uses.

All roads within the subject area are proposed to be connector or lower order roads (with the exception of Section 4C of the Geelong Ring Road).

4.4 External Access

As shown in Figure 4.1 the West Precinct area primarily connects to the external road network by six signalised intersections on the Surf Coast Highway, and three signalised intersections along Section 4C of the Geelong Ring Road. Furthermore an additional two left in/left out priority controlled intersections are proposed on the Surf Coast Highway.

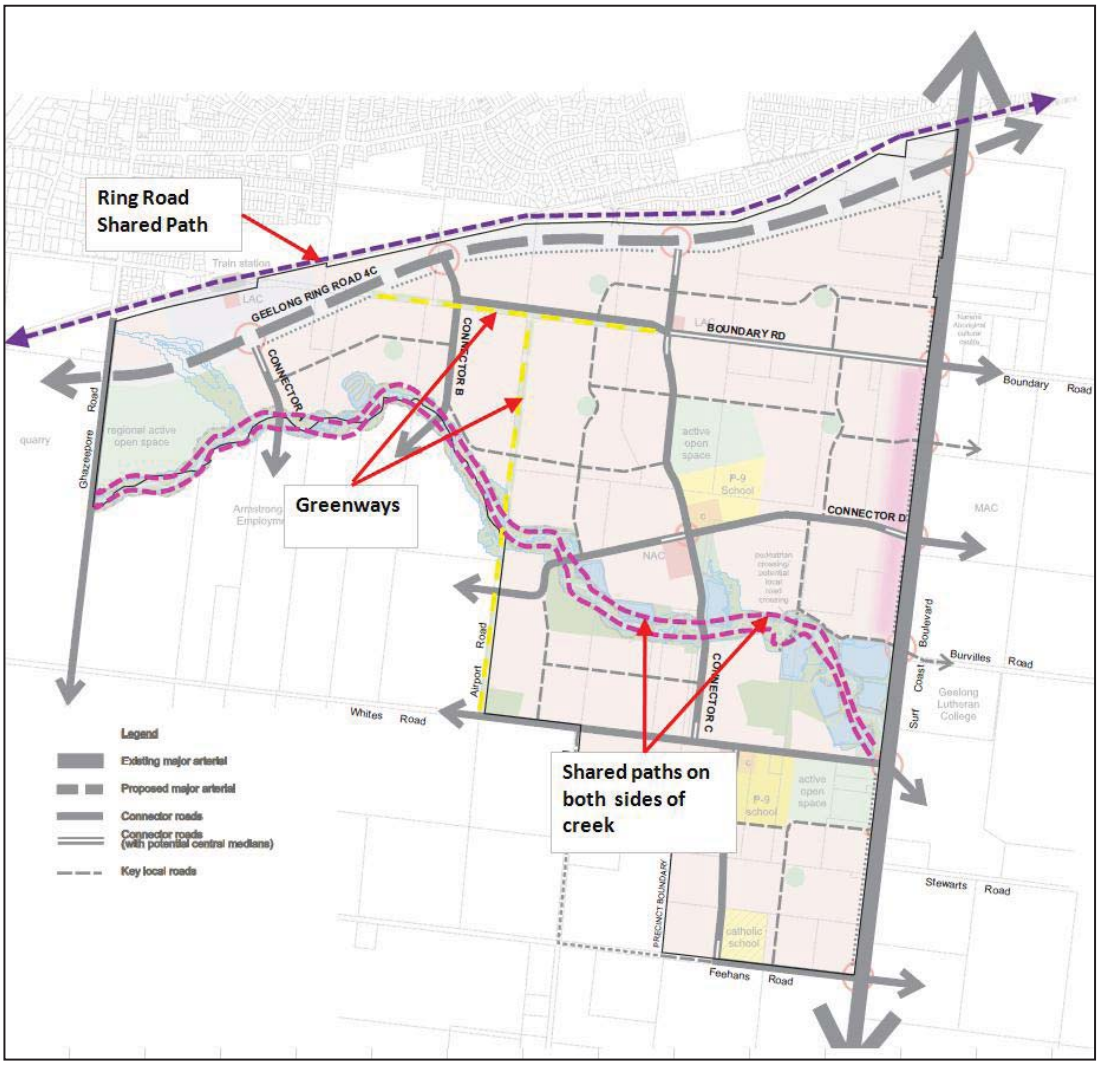
The proposed Connector Street network within the West Precinct will also extend west and south into the adjoining Armstrong Creek Western Industrial Precinct as shown in Figure 4.1.

4.5 Active Transport Infrastructure

In accordance with the Armstrong Creek Urban Growth Plan, the Structure Plan for the West Precinct includes the provision of both on and off road pedestrian and cyclist infrastructure.

In this regard Connector Streets within the Precinct will include pedestrian and cyclist provisions (discussed further in Sections 7 and 8), whilst off-road infrastructure provisions will be provided by "Greenways" which are highlighted below in Figure 4.2.

Figure 4.2: Proposed Off Road Pedestrian and Cyclist Infrastructure



Furthermore shared paths will be provided on both sides of the creek within the West Precinct and a shared path will also be provided on the north side of the Geelong Ring Road as also shown in Figure 4.2.

5. Site Traffic Characteristics

5.1 Overview

In order to confirm the scale and layout of both the internal road network and site access intersections an assessment of the expected traffic volumes and their distribution across the network has been undertaken.

It is noted that traffic modelling has been undertaken by Veitch Lister Consulting (VLC) on behalf of Council/VicRoads for the overall Armstrong Creek growth area. This modelling has been used to assess the background traffic volumes on key arterial roads that bound the site. This modelling is considered sufficient for determining the broader arterial road network requirements; however it does not account for the more specific traffic generating characteristics of the expected land uses in the Western Precincts and other adjoining Armstrong Creek Precincts.

Given the limitations of the VLC modelling, consideration has been given to the traffic generating characteristics of the West Precinct and the adjoining Armstrong Creek Precincts (i.e. the Western Industrial Precinct, the East Precinct and the Major Activity Centre Precinct). Consideration has also been given to the proposed Armstrong Creek Rail Station, given its scale and close proximity to the site.

It is noted that the analysis outlined in this section provides a broad indication of the traffic volumes likely to be generated by the West Precinct and its surrounds, and it is acknowledged that the analysis is not an exact science with likely variations to the land use and scale of development within the West Precinct and the surrounding precincts as development proceeds.

It has been predicted that the West Precinct will cater for approximately 6,300 dwellings; however variations around this number may occur. In this respect GTA has been conservative with traffic generation rates applied to the individual dwellings to allow for slight fluctuations in the total dwelling yield.

5.2 West Precinct Traffic Generation

5.2.1 Overview

The individual land use type components of the site have been assessed and appropriate traffic generation rates for each land use type have been adopted to determine the amount of traffic likely to be generated by the site. The following Section sets out the selected traffic generation rate for each land use type and any assumptions used in adopting this rate.

Traffic generation rates for the various land uses within the site have been sourced from surveys undertaken by GTA and other consultants, and the New South Wales Road Transport Authority (RTA) "Guide to Traffic Generating Developments" (RTANSW) document.

In considering the appropriate traffic generation rates for land uses, consideration must also be given to the possible reductions to these rates which could result from improved public transport, pedestrian and cycle facilities and the promotion of sustainable transport opportunities. As such the analysis detailed in this Section is considered conservative.

Furthermore an aim of the Armstrong Creek Interagency Infrastructure Delivery Plan is to design a high standard network of paths to encourage a walkable / cycling community that does not solely rely on the use of motor vehicles as a primary mode of transport. It therefore follows that increased walking, cycling and public transport movements would result in reduced private motor vehicle trips.

5.2.2 Residential Use

It is assumed that each dwelling will generate 8 vehicle movements per day based on surveys undertaken by GTA of residential subdivisions of conventional residential dwellings. This rate is consistent with the rate used by Cardno Grogan Richards in the assessment of the Armstrong Creek East Precinct. The RTANSW suggests that peak hour rates for residential dwellings are typically 10% of the daily rate and as such a peak rate of 0.8 vehicle movements per dwelling has been adopted.

The resulting traffic generation is considered conservative as all dwellings have been assumed to be conventional dwellings. The site will contain a portion of medium and high density dwellings which are anticipated to generate fewer vehicle movements (in the order of 5-6 daily vehicle movements per dwelling) than conventional residential dwellings. Furthermore recent analysis undertaken by GTA for Precinct Structure Plans in the Growth Area Authority's South-east growth corridor indicate that conventional dwellings are likely to have a lower daily traffic generation rate (in the order of six daily movements) in the future based on the outputs of the Department of Transport's Victorian Integrated Transport Model as a result of a greater public transport/active transport mode split.

5.2.3 School Use

Surveys undertaken by GTA indicate that the daily trip rate for schools is on average 1.3 trips per student. The morning peak hour trip rate is estimated to be half the daily rate, that is 0.65 vehicle movements per student. Given that the school pick-up peak and commuter PM peak are not anticipated to coincide, no school based trips are anticipated during the commuter PM peak period.

5.2.4 Retail Use

In order to determine the likely traffic generation of the Neighbourhood and Local Activity Centres (NAC and LACs) reference is made to the RTANSW rates. It is anticipated that the NAC will operate similar to a small shopping centre in that it will accommodate retail, service and food and drink premises. For shopping centres ranging in size from 0 to 10,000sqm in size the RTANSW suggests a daily vehicle generation rate of 121 movements/100sqm floor area, and an evening commuter peak hour rate of 12.5 movements/100sqm floor area.

In regards to the morning commuter peak hour the RTANSW does not specify a generation rate, as shopping centres are generally not fully operational during the AM peak hour. Similarly, there is limited empirical data available for the AM peak assessment. For the purpose of this analysis it has been assumed that the AM peak hour trips will be 10% of the PM peak trips (i.e. 1.25 movements /100sqm) and will account for staff and servicing activities.

In order to provide for a conservative estimate for the LACs the generation rates applied to the NAC have also been used to assess the LACs. It is anticipated that in reality the LACs will have lower traffic generation rates given that they will primarily serve the surrounding communities and will attract a higher proportion of non-motorised vehicle trips (i.e. walking and cycling), hence the assessment approach is considered conservative.

5.2.5 Community Facilities

In order to determine the likely traffic generation of the community facilities reference is made to the RTANSW rates. The guide suggests traffic generation rates for office and retail uses but does not provide a rate for community centres or places of assembly. Similarly, there is limited empirical data available for similar developments. It is anticipated that the community facilities will generate more vehicles than office (10 daily movements/100sqm, and 2 peak hour movements/100sqm) developments but less than retail developments (described above).

For the purpose of this analysis it has been assumed that the community facilities daily generation rate is within the range of the office and retail uses, and rate of 50.0 daily movements / 100sqm has been adopted, this rate is comparable to surveys undertaken by GTA for minor sports and recreation facilities which could form part of the proposed community facilities.

Furthermore for the purpose of this analysis it has been assumed that 10% of the daily trips will occur in each of the peak hours (i.e. 5.0 movements/100 sqm), a conservative assessment given that the nature of the community facilities is yet to be determined.

The generation rates for the community facilities are considered conservative given that the community facilities have been co-located with schools/activity centres to promote multi-purpose trips and the use of active and public transport modes.

5.2.6 Mixed/Commercial Use

Given that the makeup of the mixed use/ commercial area adjacent to the Surf Coast Highway is yet to confirmed, for the purpose of this analysis it has been assumed that the area will comprise of 50% residential use, 35% office use and 15% retail use.

The office use surveys undertaken by GTA indicate that it will generate in the order of 10 vehicle movements/100sqm floor area per day, and 2.40 vehicle movements/100sqm in each of the commuter peak hours.

Given the location of the proposed retail use, it has been assumed that the area will effectively act as an extension to the Armstrong Creek Major Activity Centre on the eastern side of the Surf Coast Highway and conservatively have the characteristics of a large shopping centre.

For large shopping centres the RTANSW suggests a daily traffic generation rate of 50.0 movements/100sqm and a PM peak hour rates of 4.6 movements /100sqm. The retail use is not anticipated to be fully operational during the morning commuter peak hour, and as such an AM peak hour generation rate of 1.0 movement/100sqm has been assumed to account for staff and servicing for the purpose of this analysis.

5.2.7 Traffic Generation Summary

These generation rates and the resulting traffic generation for the West Precinct are summarised in Table 5.1.

Table 5.1: Traffic Generation Estimates

Use	Size	Traffic Generation Rate			Vehicle Movements		
		AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily
Residential	6,300 dwellings	0.80 movements /dwelling	0.80 movements /dwelling	8.0 movements /dwelling	5,040	5,040	50,400
School	2,850 enrolments	0.65 movements /student	0.00 movements /student	1.3 movements /student	1,853	0	3,705
Retail	6,000sqm [1][2]	1.21 movements /100sqm	12.5 movements /100sqm	121.0 movements /100sqm	75	750	7,260
Community Facilities	4,000sqm [1]	5.00 movements /100sqm	5.00 movements /100sqm	50.0 movements /100sqm	200	200	2,000
Mixed/ Commercial Use -Retail	7,035 sqm [1]	2.30 movements /100sqm	4.60 movements /100sqm	50.0 movements /100sqm	162	324	3518
Mixed/ Commercial Use -Office	16,415 sqm [1]	10.0 movements /100sqm	2.4 movements /100sqm	2.4 movements /100sqm	1642	394	394
				Total	**8,971**	**6,708**	**67,276**

[1] It is assumed that 50% of the gross site area will be developable floor area.
[2] Includes NAC and LAC located in the West Precinct

As shown in Table 5.1 the West Precinct is expected to generate a total of 67,000vehicles movements per day, and 9,000 vehicle movements and 6,700 vehicle movements during the AM and PM commuter peak hours respectively.

It is anticipated that 25% of the residential generated movements (12,600 daily trips) will be internal to the West Precinct involving local shopping/school/community facility/social trips. As such the daily vehicle movements onto the wider external road network is anticipated to be a total of 55,000 movements, and 7,700 vehicle movements and 5,500 vehicle movements during the AM and PM commuter peak hours respectively.

5.2.8 Traffic Distribution

The distribution of the West Precinct generated traffic onto the external road network has been based on the VLC modelling for the Armstrong Creek Growth Area and has been agreed with VicRoads and Council. The adopted directional distribution is as follows:

- 30% to the northeast (using Surf Coast Highway and/or the Geelong Ring Road).
- 25% to the east (towards the eastern precincts in the Armstrong Creek Urban Growth Area).
- 20% to the south.
- 10% to the west (through the Western Industrial Precinct or along the Geelong Ring Road).
- 15% to the northwest (using Geelong Ring Road).

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) is assumed to be 80% outbound/20% inbound for the AM peak, 30% outbound/ 70% inbound for the PM peak.

5.3 External Traffic Considerations

5.3.1 Proposed Armstrong Creek Rail Station

The proposed Armstrong Creek Railway Station is identified as a component of the Geelong Urban Growth Package projected for development beyond 2017 and it is also included in the Victorian Transport Plan. The Geelong Line services that currently terminate at Marshall will be extended to the station to provide high-quality public transport to central Geelong and Melbourne.

The Department of Transport and VicRoads Amendment C232 Summary Report (dated 18 June 2010) notes that *"the railway station is planned to be in place before substantial development in the Armstrong Creek Urban Growth Area and will support a more sustainable community that is accessed easily by public transport."*

Discussions with the Department of Transport (DoT) indicate that the Armstrong Creek Rail Station is envisaged to be a gateway station to high frequency rail services between Geelong and Melbourne. It is anticipated to accommodate some 5,800 passengers per peak hour during which time the station will be serviced by 6-7 services operating broadly at 15 minute intervals. It is anticipated that the peak hour vehicle movements generated by the station will be in the order of 30% of the peak hour passenger total (i.e. 1740 vehicles per hour) given that the use of active transport modes, car sharing and public transport to access the station will be encouraged.

Furthermore, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) is assumed to be 20% outbound/80% inbound for the AM peak, 80% outbound/ 20% inbound for the PM peak.

5.3.2 Armstrong Creek Western Industrial Precinct

The Armstrong Creek Urban Growth Plan anticipates that the Western Industrial Precinct will cater for approximately 139ha of employment land. For the purposes of this assessment it has been assumed that 50% (agreed with VicRoads and Council) of the total area will be developable floor area (i.e. 625,500sqm). The generation rates adopted for the precinct are based on those used by GTA to assess the Armstrong Creek Keystone Business Park Precinct (4.5 daily trips per 100sqm, and 0.45 peak hour trips per 100sqm). Furthermore it has been assumed that 50% of the daily trips will be internal to the Western Industrial Precinct, 35% will be to the northwest of the precinct, and 15% will be to the south of the precinct as agreed with Council and VicRoads.

The directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) is assumed to be 20% outbound/80% inbound for the AM peak, 80% outbound/ 20% inbound for the PM peak.

5.3.3 Armstrong Creek Major Activity Centre

The anticipated traffic generation of the Armstrong Creek Major Activity Centre has been based on the development yields outlined in the Armstrong Creek Major Activity Centre Enquiry by Design Report (dated September 2009). As agreed with Council and VicRoads it has been assumed that 50% of the Major Activity Centre uses will access the site via the Surf Coast Highway.

The development yields that will be accessed via the Surf Coast Highway and the anticipated resulting traffic generation is summarised in Table 5.2.

Table 5.2: Major Activity Centre Development Yields and Traffic Generation

Use	[1] Size (sqm)	Traffic Generation Rate			Vehicle Movements		
		AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily
Retail	17,500	1.0 movements /100sqm [5]	4.60 movements /dwelling	50.0 movements /100sqm [6]	175	805	875
Restricted Retail	12,500		1.97 movements /student		125	246	625
Entertainment	3,500		4.60 movements /100sqm		35	14210	175
Office [2]	17,500	2.40 movements /100sqm	2.40 movements /100sqm	10.0 movements /100sqm	420	420	1,750
Community Facilities [3]	17,500	5.00 movements /100sqm	5.00 movements /100sqm	50.0 movements /100sqm	875	875	8,750
Residential [4]	1,180 dwellings	0.80 movements /dwelling	0.80 movements /dwelling	8.0 movements /dwelling	944	944	9,440
				Total	**2,574**	**17,500**	**21,615**

[1] It is assumed that 50% of the gross site area will be developable floor area.
[2] Rate based on surveys undertaken by GTA of office uses.
[3] See Section 5.2.5
[4] Medium density dwelling yield as per Pg 17 of the Armstrong Creek Urban Growth Plan Volume 2: Precinct Plans (dated 6/10/2006).
[5] Rate accounts for servicing and staff movements given that the Major Activity Centre will not be fully operational in the AM peak hour.
[6] Rate based on RTANSW rate for a large shopping centre.

For the purpose of this analysis it has been assumed that half the total traffic generated by the Major Activity Centre will access the external road network via Surf Coast Highway, and the directional distribution has been assumed to be 65% to the north and 35% to the south given the configuration of the arterial road network in the immediate vicinity of the site and the surrounding land uses (as agreed with Council and VicRoads).

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) is assumed to be 20% outbound/80% inbound for the AM peak, 60% outbound/ 40% inbound for the PM peak.

5.3.4 Armstrong Creek East Precinct

The anticipated traffic generation and distribution for the Armstrong Creek East Precinct has been sourced from the Traffic Impact Assessment Report prepared by Cardno Grogan Richards (dated 14 October 2009) for the East Precinct. Figures 16 to 18 of this report summarise the anticipated daily and commuter peak hour post-development traffic volumes and distributions for the East Precinct, these volumes have been utilised as an input in this assessment.

5.3.5 Background Traffic Volumes on Arterial Roads

The ultimate background traffic volumes of the Surf Coast Highway and the Geelong Ring Road have been sourced from the VLC modelling for the Armstrong Creek Urban Growth Area and the Geelong Ring Road Section 4C and are summarised in Table 5.3.

Table 5.3: Anticipated Background Traffic Volumes

Location	Anticipated Traffic Volume (Two-way)		
	Daily	AM Peak Hour [1]	PM Peak Hour [1]
Surf Coast Highway at Burvilles Road	18,000	2,080	2,840
Geelong Ring Road (near Surf Coast Highway)	10,500	1,410	1,560
Geelong Ring Road (near Ghazeepore Road)	16,500	1,120	1,200

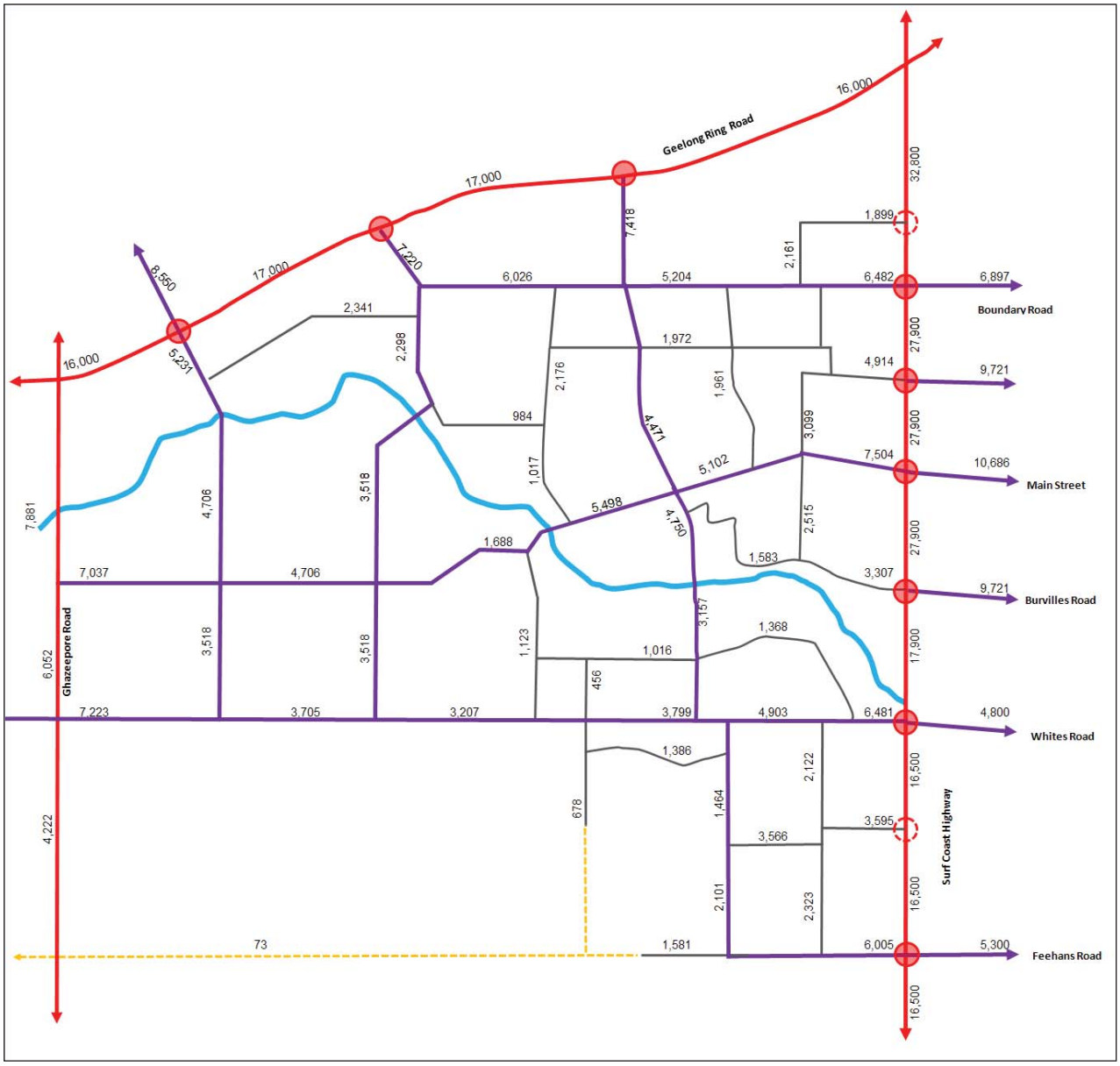
[1] Peak hour volumes assumed to be half the reported 2-hour VLC modelling volumes

5.4 Expected Post Development Traffic Volumes

Based on the assumptions outlined above, GTA prepared a traffic model to determine the anticipated traffic volumes on key roads within the West Precinct.

Based on the outcomes of the spreadsheet modelling, Figure 5.1 shows the anticipated daily traffic volumes for the West Precinct and adjoining road network (with a more detailed analysis included in Appendix B).

Figure 5.1: Anticipated Post-Development Daily Traffic Volumes



5.5 Anticipated Intersection Peak Hour Turning Movement Volumes

Figure 5.2 and Figure 5.3 have been prepared to show the anticipated turning movements at the West Precinct intersections with Surf Coast Highway and the Geelong Ring Road (with a more detailed analysis included in Appendix B).

Figure 5.2: Anticipated Post-Development AM Peak Hour Turning Movements

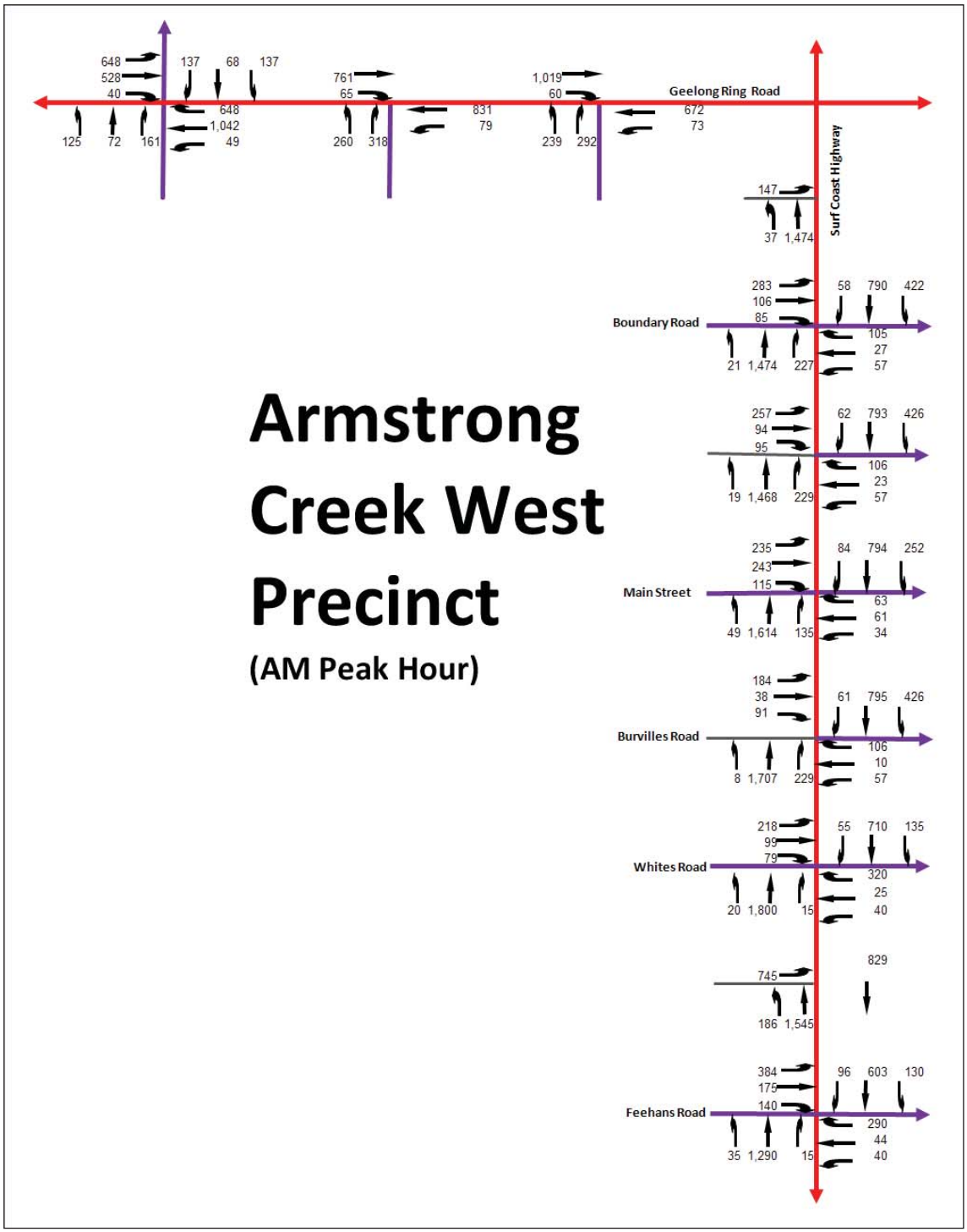
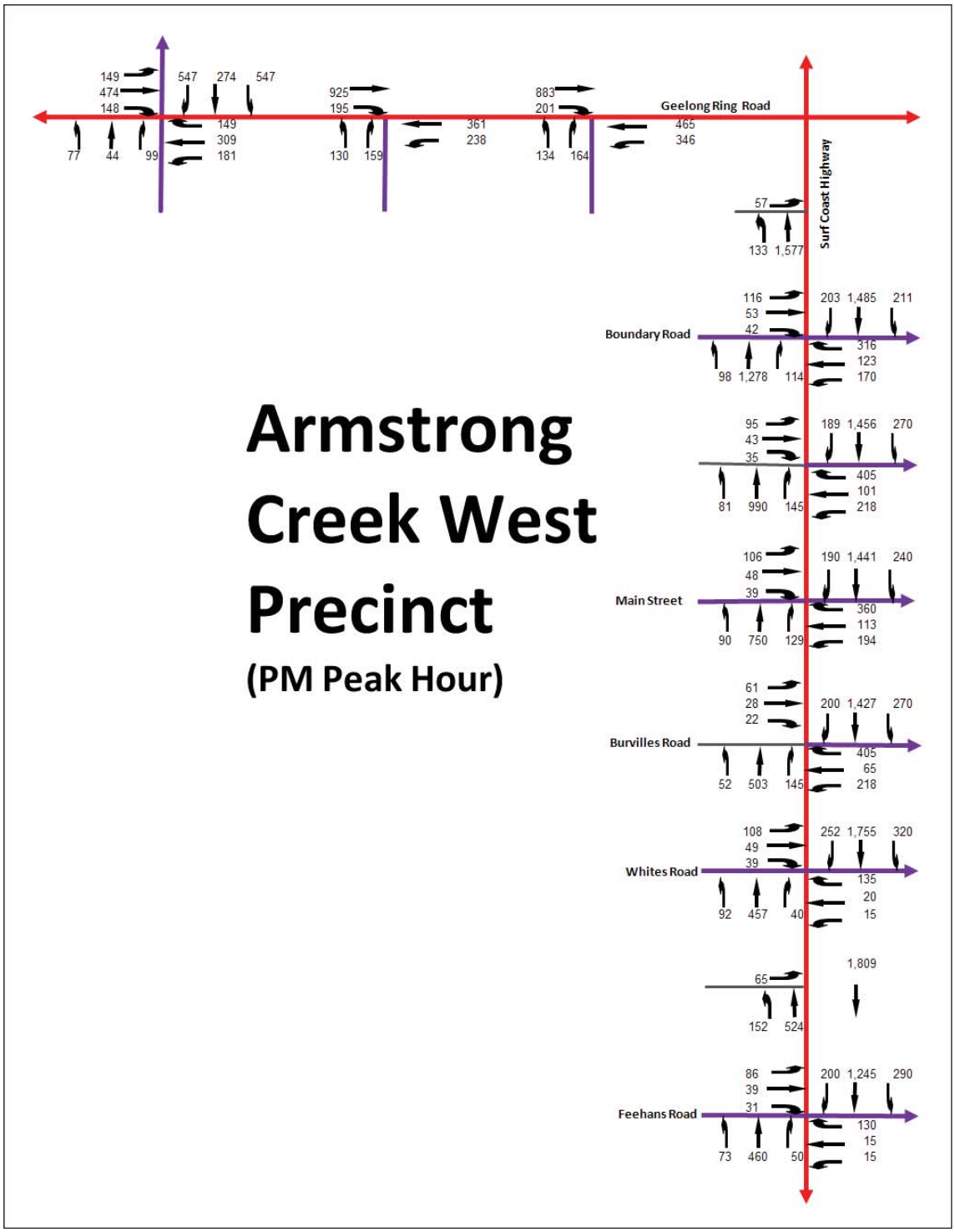


Figure 5.3: Anticipated Post-Development PM Peak Hour Turning Movements



6. External Intersections

6.1 Intersection Modelling

On the basis of the anticipated traffic volumes outlined in Section 5, GTA has assessed the site access intersections on the Geelong Ring Road and Surf Coast Highway using *SIDRA INTERSECTION*[2], a computer based modelling package which calculates intersection performance. The software was used to determine the ultimate and interim intersection layout requirements of the access intersections needed to cater for the anticipated traffic volumes.

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections, a DOS of around 0.95 has been typically considered the 'ideal' limit, beyond which queues and delays increase disproportionately[3].

The details of this Section indicate the design and turn lane requirements, and the operational characteristics of each intersection.

6.2 Surf Coast Highway Intersections Ultimate Design Requirements

6.2.1 Overview

The Surf Coast Highway is currently a dual carriageway road that will be upgraded to three lanes in each direction in the future when traffic volumes warrant the upgrade. The timing and extent of the works is ultimately the responsibility of VicRoads.

Whilst the Armstrong Creek West Precinct will increase traffic volumes on the Surf Coast Highway, the need for the additional through traffic lanes on Surf Coast Highway will be driven by the development of the surrounding Armstrong Creek Precincts and increased growth and development in the Torquay area. As such the third through traffic lane (in each direction) on the Surf Coast Highway will not be required in the interim development case.

Given the ultimate six-lane layout of the Surf Coast Highway, all intersections north of Whites Road have been modelled with the six-lane configuration and additional left and right turn lanes as required. South of Whites Road the intersections have been modelled with a four-lane layout consistent with the approach taking in the assessment of the Armstrong Creek East Precinct. It is anticipated that through traffic volumes on Surf Coast Highway (south of Whites Road) will not warrant the additional through traffic lanes for the purpose of this assessment.

[2] Program used under license from Akcelik & Associates Pty Ltd.

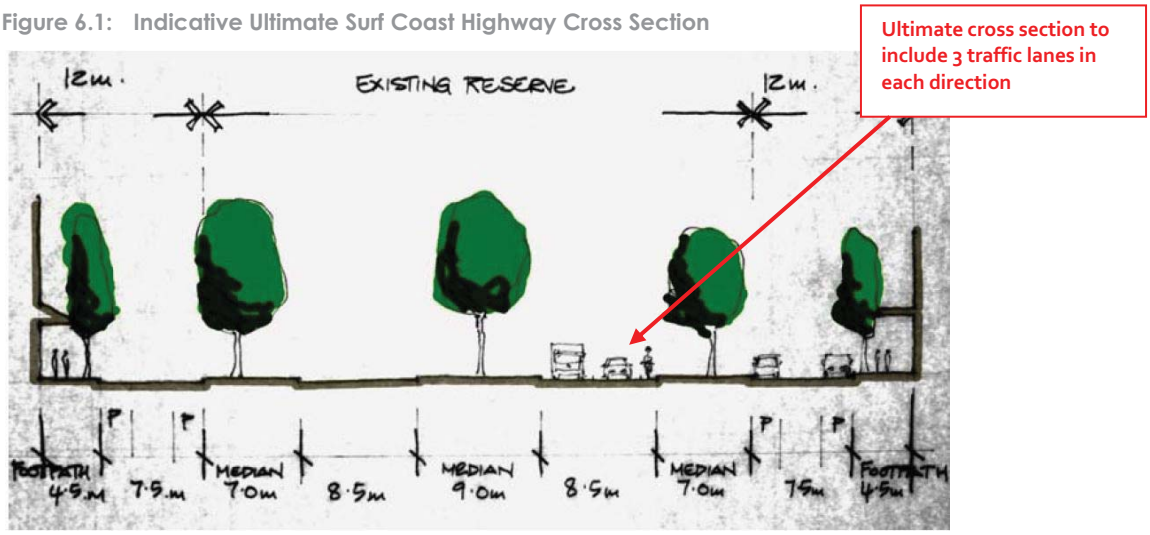
[3] SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

		Intersection Degree of Saturation (X)	
		Unsignalised Intersection	Signalised Intersection
A	Excellent	<=0.50	<=0.60
B	Very Good	0.50-0.70	0.60-0.75
C	Good	0.70-0.80	0.75-0.90
D	Acceptable	0.80-0.90	0.90-0.95
E	Poor	0.90-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0

6.2.2 Surf Coast Highway Cross Section

The ultimate cross section of Surf Coast Highway in the vicinity of the West Precinct and the Armstrong Creek Major Activity Centre is envisaged to be a "Boulevard" style road with service lanes that provide parking and access to local businesses. The Armstrong Creek Major Activity Centre Enquiry by Design Report (dated September 2009) includes an indicative cross section for the Surf Coast Highway which is shown below in Figure 6.1.

Figure 6.1: Indicative Ultimate Surf Coast Highway Cross Section



Source: Armstrong Creek Major Activity Centre Enquiry by Design Report (dated September 2009)

The cross section design intent is to integrate land uses and it incorporates planted medians, pedestrian and cyclist facilities and is envisaged to operate with a reduced limit (60-70km/hr).

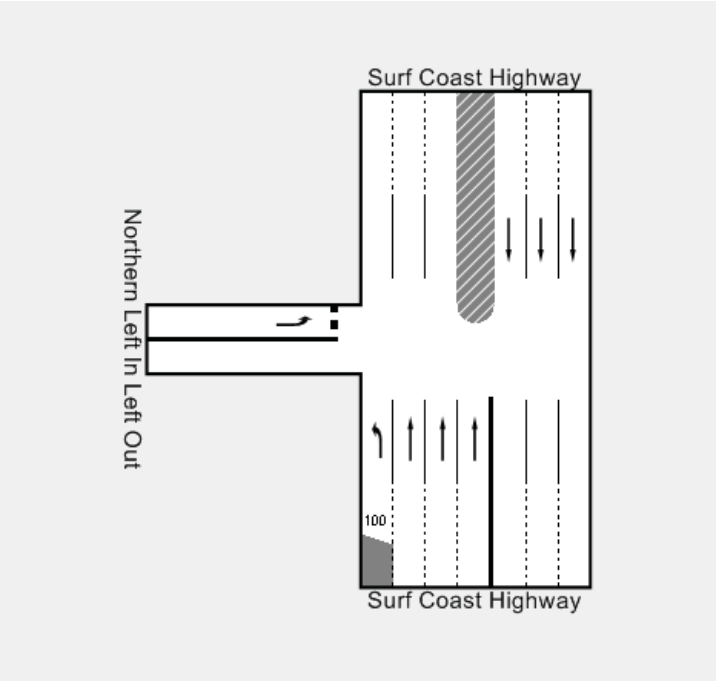
The cross section shown in Figure 6.1 is indicative only and will be finalised during the preparation of the Armstrong Creek Major Activity Centre Precinct Structure Plan.

6.2.3 Surf Coast Highway/Northern Left in-left out Intersection

In order to sufficiently cater for the anticipated traffic volumes, this intersection is required to operate as a priority controlled intersection. This intersection is anticipated to operate as a secondary access to point to the signalised primary access points and provide additional capacity and connectivity to the wider road network.

The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.2.

Figure 6.2: Surf Coast Highway/Northern Left in-left out Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.1 with the full outputs included in Appendix C.

Table 6.1: Surf Coast Highway/Northern Left in-left out Intersection Anticipated Operating Conditions

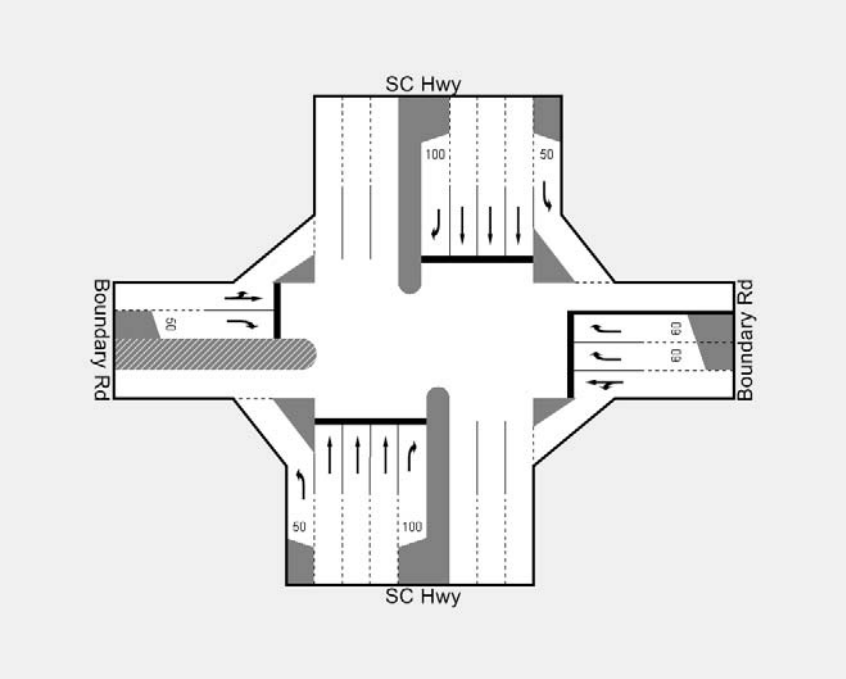
Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Surf Coast Highway – North	0.23	0	0	0.38	0	0
Surf Coast Highway – South	0.27	0	0	0.29	1	0
Western Site Access	0.47	25	19	0.38	1	8

Table 6.1 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and the surrounding Armstrong Creek precincts.

6.2.4 Surf Coast Highway/Boundary Road Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.3.

Figure 6.3: Surf Coast Highway/Boundary Road Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.2 with the full outputs included in Appendix C.

Table 6.2: Surf Coast Highway/Boundary Road Intersection Anticipated Operating Conditions

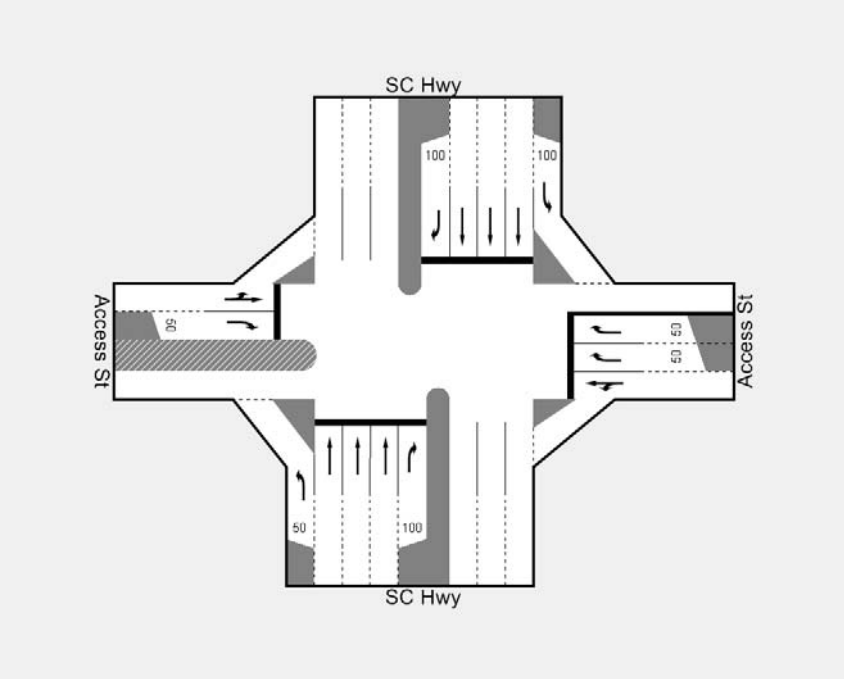
Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Surf Coast Highway – North	0.40	25	85	0.68	28	149
Boundary Road – East	0.44	50	32	0.70	55	107
Surf Coast Highway – South	0.73	38	175	0.70	38	156
Boundary Road – West	0.73	49	124	0.36	40	58

Table 6.2 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and the surrounding Armstrong Creek precincts with acceptable levels of delay and queuing for peak periods.

6.2.5 Surf Coast Highway/Access Street (between Boundary Road and Main Street) Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.4.

Figure 6.4: Surf Coast Highway/Access Street (between Boundary Road and Main Street) Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.3 with the full outputs included in Appendix C.

Table 6.3: Surf Coast Highway/Access Street (between Boundary Road and Main Street) Intersection Anticipated Operating Conditions

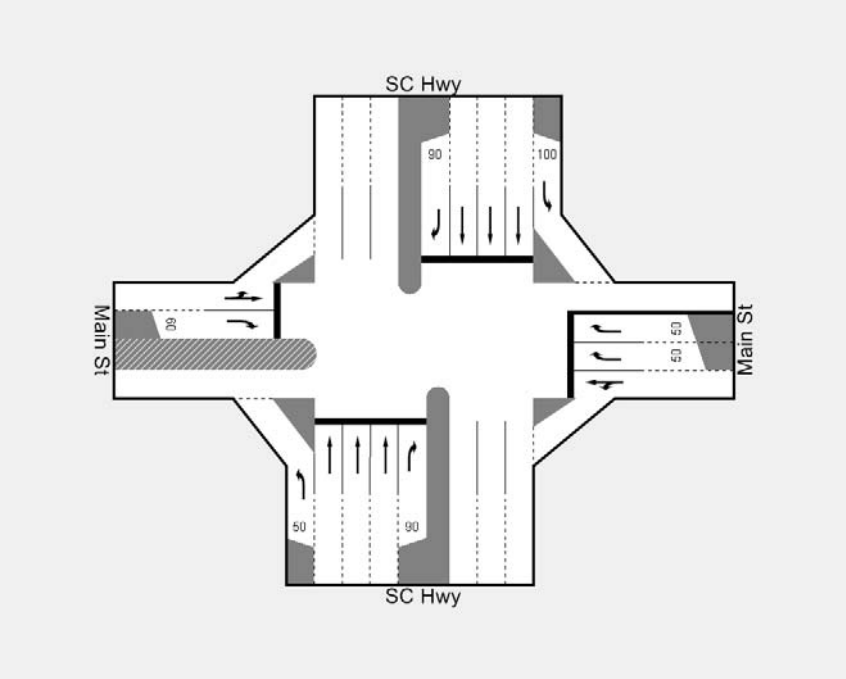
Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Surf Coast Highway – North	0.65	26	80	0.65	44	51
Access Street – East	0.40	38	23	0.70	50	115
Surf Coast Highway – South	0.76	28	130	0.50	32	105
Access Street – West	0.78	30	81	0.65	44	51

Table 6.3 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and the surrounding Armstrong Creek precincts with acceptable levels of delay and queuing for peak periods.

6.2.6 Surf Coast Highway/Main Street Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.5.

Figure 6.5: Surf Coast Highway/Main Street Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.4 with the full outputs included in Appendix C.

Table 6.4: Surf Coast Highway/Main Street Intersection Anticipated Operating Conditions

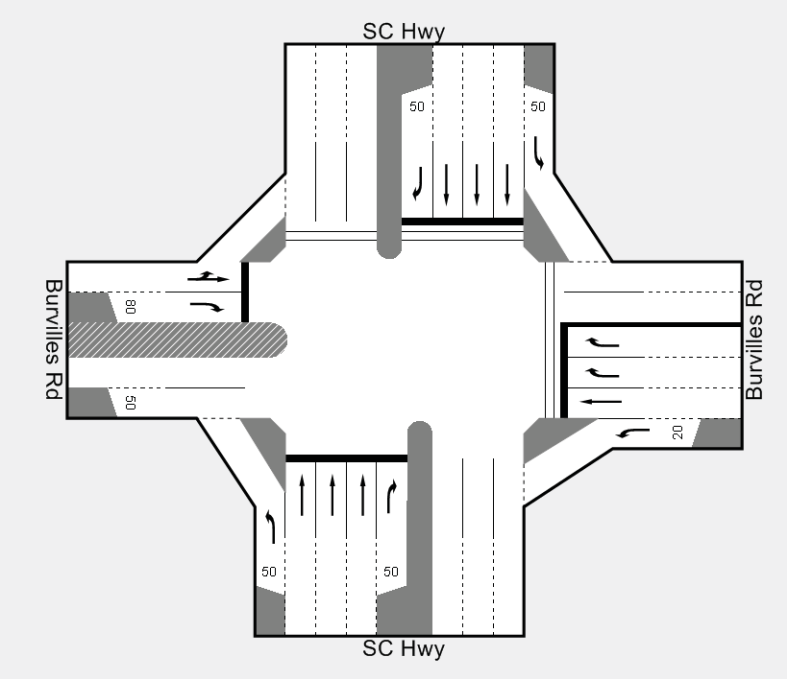
Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Surf Coast Highway – North	0.51	29	87	0.77	37	182
Main Street – East	0.21	45	32	0.77	42	87
Surf Coast Highway – South	0.83	42	216	0.77	45	102
Main Street – West	0.83	56	195	0.68	47	61

Table 6.4 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and the surrounding Armstrong Creek precincts with acceptable levels of delay and queuing for peak periods.

6.2.7 Surf Coast Highway/Burvilles Road Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.6.

Figure 6.6: Surf Coast Highway/Burvilles Road Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.5 with the full outputs included in Appendix C.

Table 6.5: Surf Coast Highway/Burvilles Road Intersection Anticipated Operating Conditions

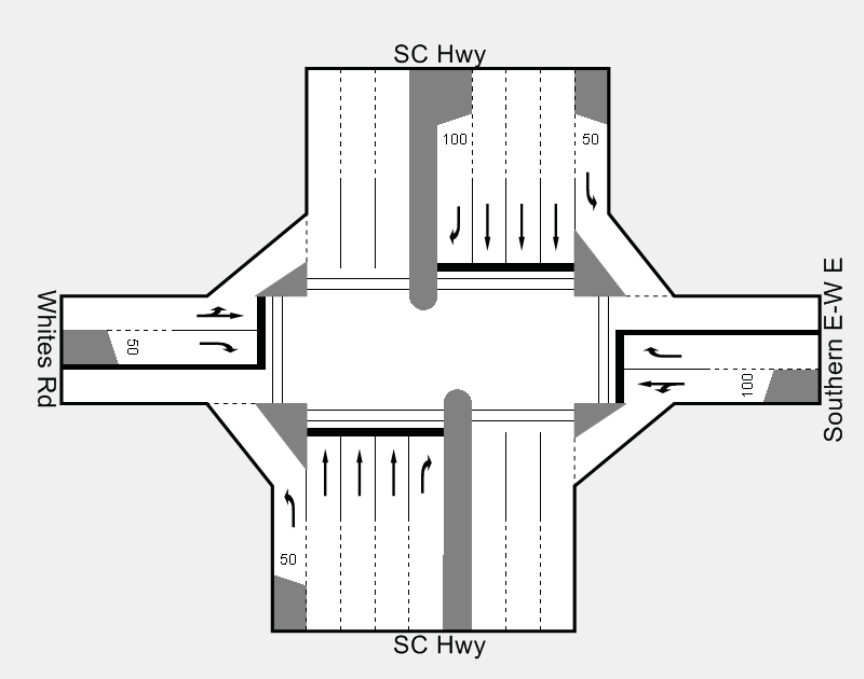
Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Surf Coast Highway – North	0.36	20	76	0.84	41	199
Burvilles Road – East	0.64	57	36	0.80	50	102
Surf Coast Highway – South	0.71	32	192	0.35	35	67
Burvilles Road – West	0.67	41	70	0.57	50	40

Table 6.5 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and the surrounding Armstrong Creek precincts with acceptable levels of delay and queuing for peak periods.

6.2.8 Surf Coast Highway/Whites Road Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.7.

Figure 6.7: Surf Coast Highway/Whites Road Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.6 with the full outputs included in Appendix C.

Table 6.6: Surf Coast Highway/Whites Road Intersection Anticipated Operating Conditions

Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Surf Coast Highway – North	0.67	41	103	0.65	23	191
Whites Road – East	0.90	69	176	0.65	60	70
Surf Coast Highway – South	0.90	62	232	0.65	49	77
Whites Road – West	0.91	60	311	0.58	53	67

Table 6.6 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and the surrounding Armstrong Creek precincts with acceptable levels of delay and queuing for peak periods.

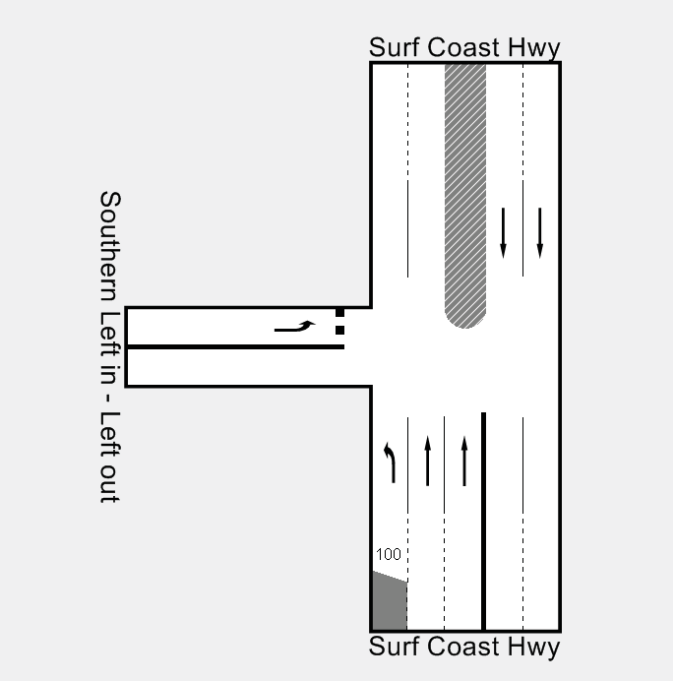
The modelling shows that the 95th percentile queue on Whites Road does exceed 300m during the AM peak. It is noted that this level of queuing is not anticipated to occur every cycle and does not result in the operation of the intersection failing. Queues on the approach are still anticipated to clear regularly and not result in overly excessive delays at the intersection.

6.2.9 Surf Coast Highway/ Access Street (between Whites Road and Feehans Road) Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a priority controlled intersection. This intersection is anticipated to operate as a secondary access to point to signalised primary access points and provide additional capacity and connectivity to the wider road network.

The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.8.

Figure 6.8: Surf Coast Highway/ Access Street (between Whites Road and Feehans Road) Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.7 with the full outputs included in Appendix C.

Table 6.7: Surf Coast Highway/ Access Street (between Whites Road and Feehans Road) Intersection Anticipated Operating Conditions

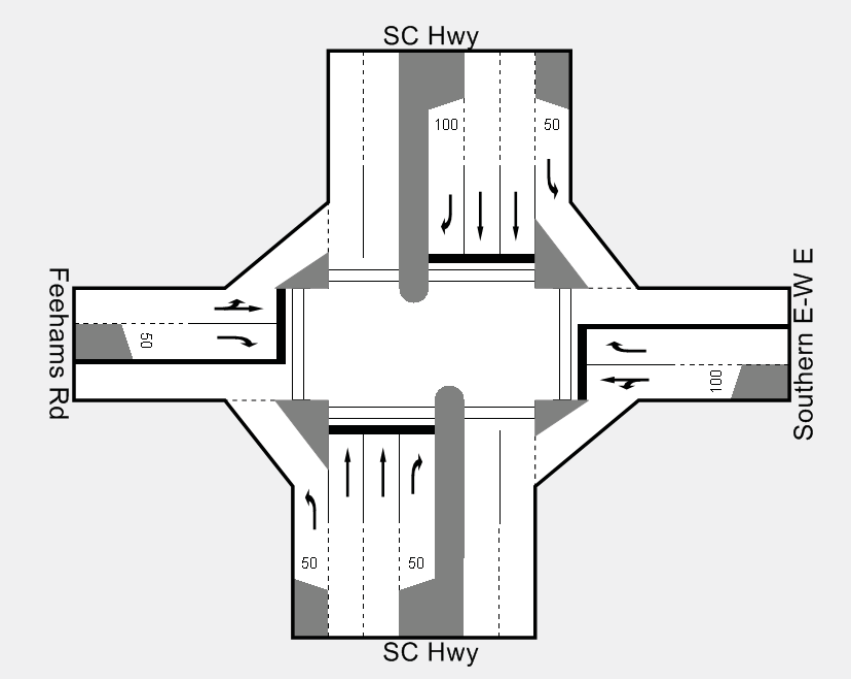
Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Surf Coast Highway – North	0.15	0	0	0.25	0	0
Surf Coast Highway – South	0.21	1	0	0.09	2	0
Access Street – West	0.93	51	100	0.07	11	3

Table 6.7 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and the surrounding Armstrong Creek precincts with acceptable levels of delay and queuing for peak periods.

6.2.10 Surf Coast Highway/Feehans Road Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.9.

Figure 6.9: Surf Coast Highway/Feehans Road Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.8 with the full outputs included in Appendix C.

Table 6.8: Surf Coast Highway/Feehans Road Intersection Anticipated Operating Conditions

Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Surf Coast Highway – North	0.94	43	128	0.69	28	218
Feehans Road – East	0.95	84	190	0.70	65	72
Surf Coast Highway – South	0.93	67	340	0.26	22	72
Feehans Road – West	0.93	79	315	0.57	42	42

Table 6.8 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and the surrounding Armstrong Creek precincts with acceptable levels of delay and queuing for peak periods.

The modelling shows that the 95th percentile queues on Feehans Road and Surf coast Highway (South) do exceed 300m during the AM peak. It is noted that this level of queuing is not anticipated to occur every cycle and does not result in the operation of the intersection failing. Queues on the approaches are still anticipated to clear regularly and not result in overly excessive delays at the intersection.

6.3 Geelong Ring Road Intersection Ultimate Design Requirements

6.3.1 Overview

The yet to be constructed Geelong Ring Road (Section 4C) will provide a four lane divided roadway with on road cycle lanes. The interim four lane configuration will include provision for future widening into the central median for the entire length, to provide an ultimate six-lane cross section.

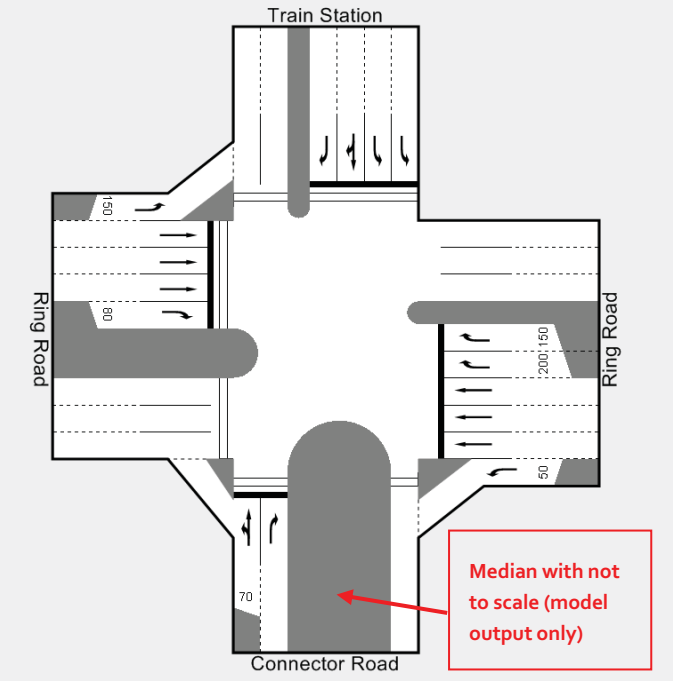
Whilst the Armstrong Creek West Precinct will slightly increase traffic volumes on the Geelong Ring Road the need for the additional through traffic lanes on Geelong Ring Road will be driven by the development of the wider area. As such the third through traffic lane (in each direction) on the Geelong Ring Road will not be required in the interim development case.

Given the ultimate six-lane layout of the Geelong Ring Road, all intersections have been modelled with the six-lane configuration and additional left and right turn lanes as required.

6.3.2 Geelong Ring Road/Armstrong Creek Rail Station/Western Access Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.10.

Figure 6.10: Geelong Ring Road / Armstrong Creek Rail Station/Western Access Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.9 with the full outputs included in Appendix C.

Table 6.9: Geelong Ring Road / Armstrong Creek Rail Station/Western Access Intersection Anticipated Operating Conditions

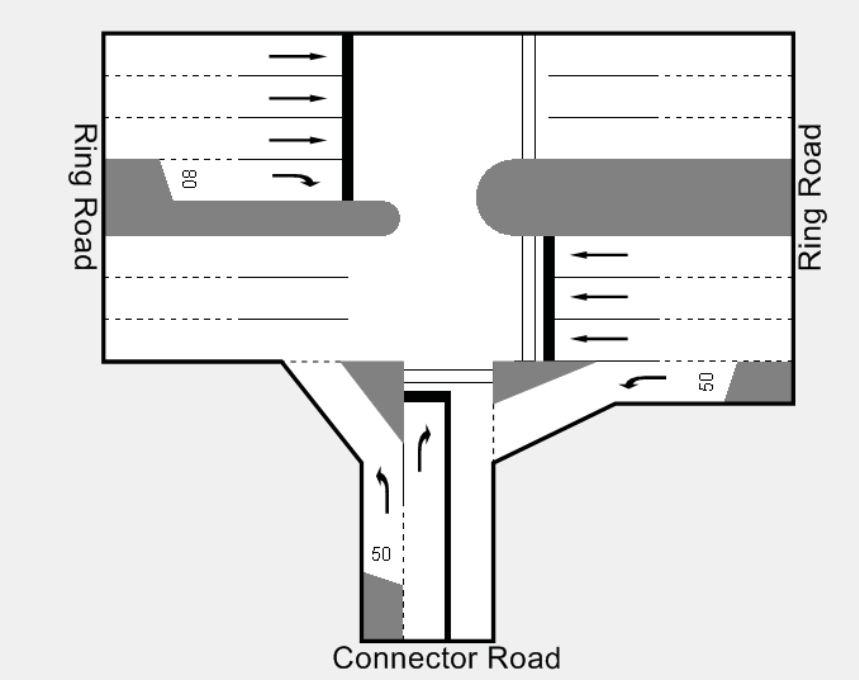
Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Armstrong Creek Station – North	0.67	81	70	0.73	45	169
Geelong Ring Road – East	0.71	46	164	0.36	38	54
Site Access – South	0.68	42	78	0.76	54	58
Geelong Ring Road – West	0.72	38	135	0.48	41	80

Table 6.9 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct and Train Station with acceptable levels of delay and queuing for peak periods.

Geelong Ring Road/ Middle Access Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.11.

Figure 6.11: Geelong Ring Road / Middle Access Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.10 with the full outputs included in Appendix C.

Table 6.10: Geelong Ring Road / Middle Access Intersection Anticipated Operating Conditions

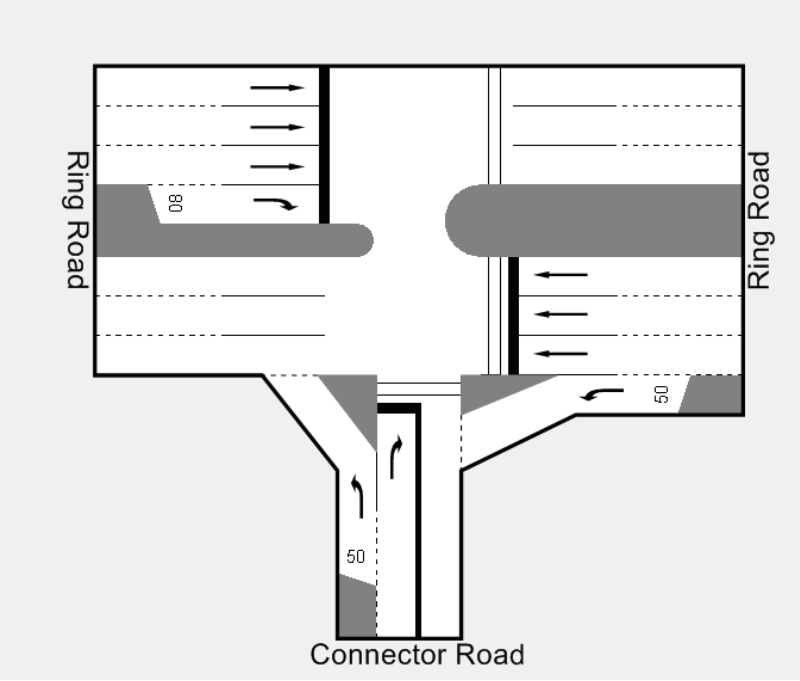
Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Geelong Ring Road – East	0.52	35	117	0.44	35	65
Site Access – South	0.52	29	120	0.44	35	74
Geelong Ring Road – West	0.27	18	74	0.45	11	66

Table 6.10 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct with acceptable levels of delay and queuing for peak periods.

6.3.3 Geelong Ring Road/ Eastern Access Intersection

In order to sufficiently cater for the anticipated traffic volumes this intersection is required to operate as a signalised intersection. The required intersection design to cater for the anticipated traffic volumes is shown in Figure 6.12.

Figure 6.12: Geelong Ring Road / Eastern Access Intersection Design Requirements



Lane configurations only, median and traffic island requirements to be determined through detailed design

The results of the SIDRA modelling are summarised in Table 6.11with the full outputs included in Appendix C.

Table 6.11: Geelong Ring Road/ Eastern Access Intersection Anticipated Operating Conditions

Approach	AM Peak Hour			PM Peak Hour		
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length
Geelong Ring Road – East	0.50	38	101	0.47	35	78
Site Access – South	0.49	27	120	0.47	35	76
Geelong Ring Road – West	0.39	22	109	0.48	11	65

Table 6.11 indicates that this intersection will operate satisfactorily during both peak periods following full development of the Armstrong Creek West Precinct with acceptable levels of delay and queuing for peak periods.

6.4 Interim Design Requirements

The interim volumes are used to inform intersection works up to the interim scenario for inclusion into the Development Contributions Plan (DCP), whilst the ultimate volumes are used to validate the provision of ultimate road reserves including flaring requirements at intersections.

In order to determine the interim volumes on the Surf Coast Highway and Geelong Ring Road the ultimate volumes have been factored by 0.8 (20% reduction), to take into account traffic growth that is likely to occur between interim and ultimate Armstrong Creek Growth Area development cases.

It is highlighted that only the through volumes on the arterial road network have been factored as agreed with Council and VicRoads. The traffic volumes generated by the West Precinct (and surrounding precincts) have not been reduced for the interim scenario in ordered to account for all the West Precinct generated traffic in the DCP analysis.

Table 6.12 summaries the interim operation of the site access intersections (with full results provided in Appendix D), along with the layout differences between the interim and ultimate layout configurations of the intersections.

Table 6.12: Anticipated Interim Intersection Operation

Intersection	AM Peak Hour			PM Peak Hour			Intersection Design Requirements
	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	Degree of Saturation	Average Delay (s)	95th Percentile Queue Length	
Surf Coast Highway/ Northern Left in-left out	0.32	1	12	0.46	1	5	Two through traffic lanes on Surf Coast Highway only
Surf Coast Highway/ Boundary Road	0.80	30	184	0.76	36	186	Two through traffic lanes on Surf Coast Highway only
Surf Coast Highway/ Access Street (between Boundary Road and Main Street)	0.87	37	214	0.87	43	246	Two through traffic lanes on Surf Coast Highway only
Surf Coast Highway/ Main Street	0.90	43	283	0.81	40	214	Two through traffic lanes on Surf Coast Highway only
Surf Coast Highway/ Burvilles Road	0.78	28	217	0.73	35	188	Two through traffic lanes on Surf Coast Highway only
Surf Coast Highway/ Whites Road	0.95	72	405	0.76	32	237	Two through traffic lanes on Surf Coast Highway only
Surf Coast Highway/ Access Street (between Whites Road and Feehans Road)	0.94	7	106	0.25	1	3	Two through traffic lanes on Surf Coast Highway only
Surf Coast Highway/ Feehans Road	0.90	53	244	0.63	31	169	Two through traffic lanes on Surf Coast Highway only
Geelong Ring Road/ Armstrong Creek Rail Station/Western Access	0.72	46	172	0.70	42	162	Two through traffic lanes on Geelong Ring Road only
Geelong Ring Road/ Middle Access	0.62	29	141	0.46	22	78	Two through traffic lanes on Geelong Ring Road only
Geelong Ring Road/ Eastern Access	0.50	27	17	0.49	23	90	Two through traffic lanes on Geelong Ring Road only

Table 6.12 shows that under interim conditions, all intersections are anticipated to operate satisfactorily during both peak periods with acceptable levels of delay and queuing for peak periods.

The only layout difference between the interim and ultimate intersection layouts is the addition of a through traffic lane (in both directions) on the Surf Coast Highway and the Geelong Ring Road in the ultimate case.

The anticipated traffic volumes in the interim case will still require the same left and right turn lane requirements as the ultimate case. Whilst the provision of left turn slips lanes is not required at all the intersections in the interim case (on a capacity grounds) VicRoads has indicated that it will require that slip lanes be provided in the interim case on safety and functionality grounds.

7. Internal Road Network

7.1 Traffic Volumes and Capacities

7.1.1 Connector Roads

As previously shown in Figure 5.1 the proposed connector roads within the West Precinct are generally anticipated to carry less than 7,000 vehicles per day which is defined as the indicative upper limit for connector road in Clause 56.06 of the Planning Scheme. It is noted that at the intersection of Surf Coast Highway and Main Street that volumes at the intersections do exceed 7,000vpd as a result of the mixed use/commercial area adjacent to the Surf Coast Highway. These increased volumes are not anticipated to compromise the connector street status of Main Street within the West Precinct; rather it suggests that appropriate capacity will need to be provided at the intersections to ensure the function of the streets (discussed in Section 6.2.6) is maintained.

7.1.2 Local Access Streets

Figure 5.1 also showed that the proposed local access streets within the West Precinct are all anticipated to carry less than 3,000 vehicles per day which is defined as the indicative upper limit for access streets in Clause 56.06 of the Planning Scheme.

7.2 Road Cross Sections

Road cross sections within the West Precinct have been designed in consultation with Council.

The cross sections have been designed for the anticipated traffic volumes and in accordance with Clause 56 of the Planning Scheme and the Armstrong Creek Urban Growth Plan Documentation. Each of the cross sections are summarised in the following detail of this Section.

7.2.1 Key Local Roads

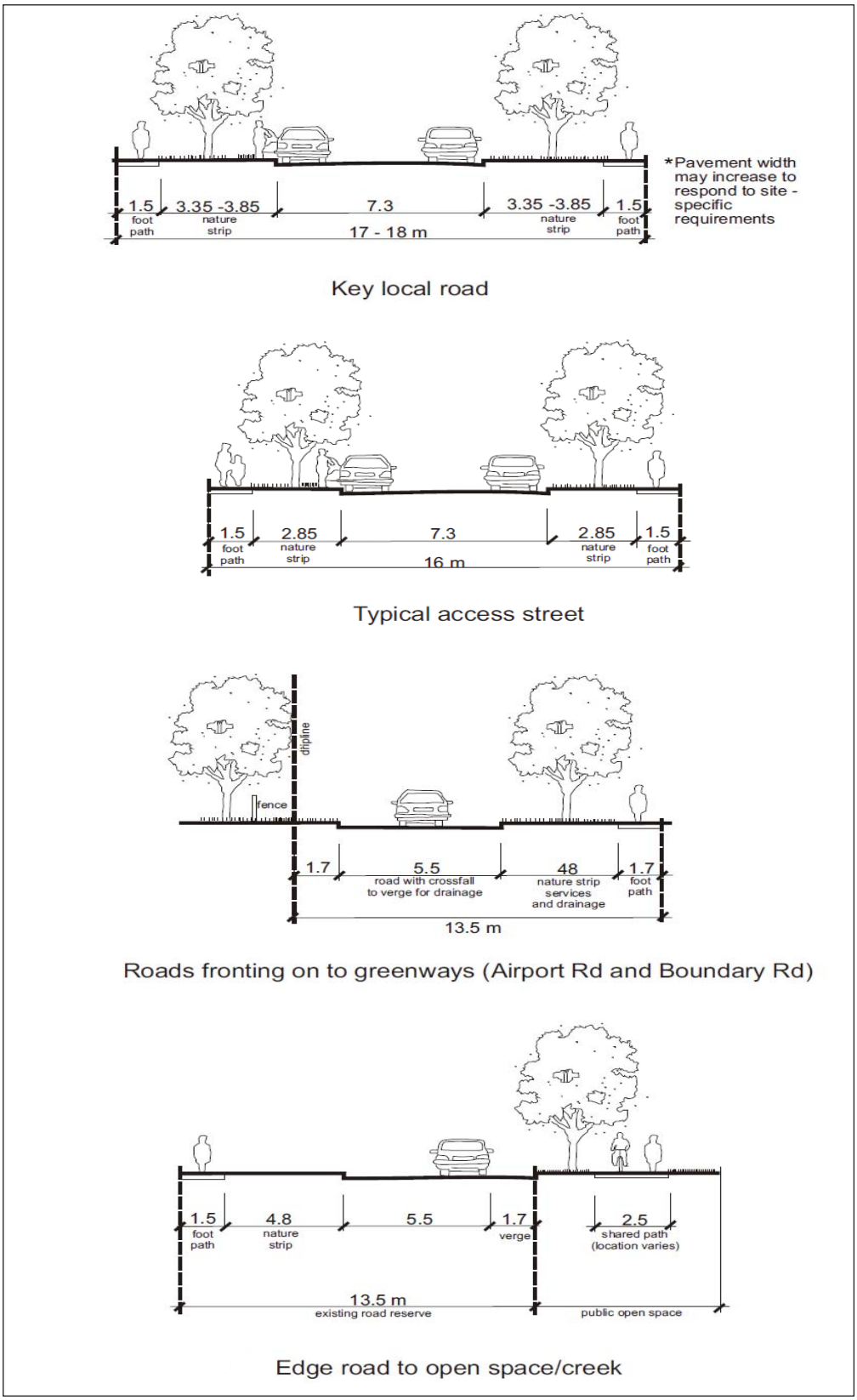
The key local roads within the West Precinct are anticipated to function as Access Street –Level 2 streets as Clause 56.06 of the Planning Scheme. The Planning Scheme design requirements for proposed Key Local Roads are summarised in Table 7.1.

Table 7.1: Key Local Road Planning Scheme Requirements

Road Characteristic	Planning Scheme Requirement
Traffic Volume	Up to 3,000 vehicles per day
Carriageway Width and parking provisions within street reservation	7-7.5m width with parking on both sides of the carriageway
Verge Width	4.5 minimum on each side
Cycle Path provision	Carriageway designed as a shared zone and appropriately signed

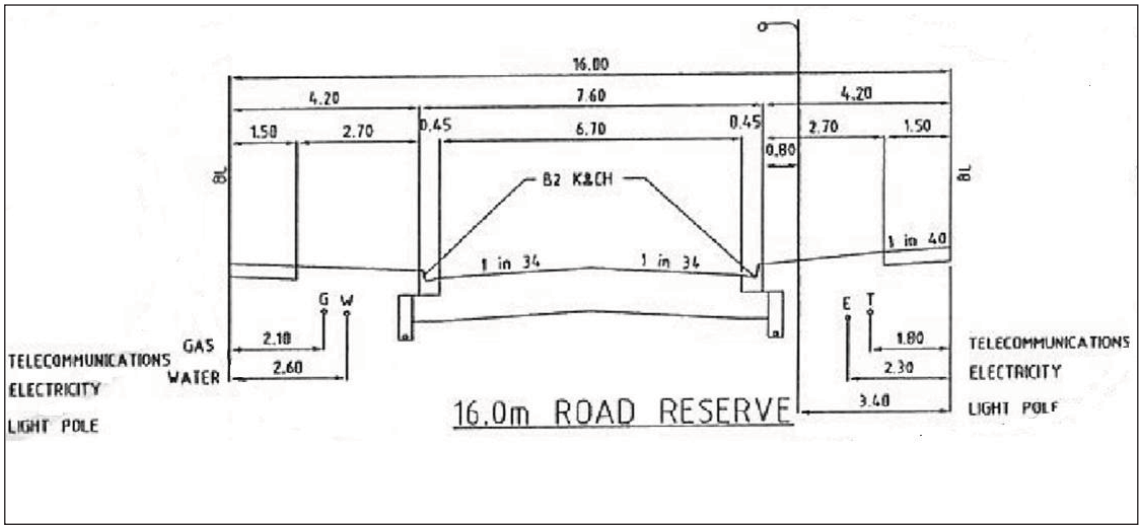
The proposed cross sections for the key local roads is shown in Figure 7.1.

Figure 7.1: Proposed Key Local Road and Typical Access Street Cross Sections



As shown in Figure 7.1, the proposed cross sections are generally in accordance with the Planning Scheme requirements, with the exception of the verge width. The Planning Scheme requires that a minimum verge width of 4.5m. It is understood that this minimum requirement relates to sufficient width being provided with the verge to allow for underground services, it is however anticipated that the services can be accommodated in reduced verge widths as shown below in Figure 7.2.

Figure 7.2: Underground Services Locations – Key Local Road[1]



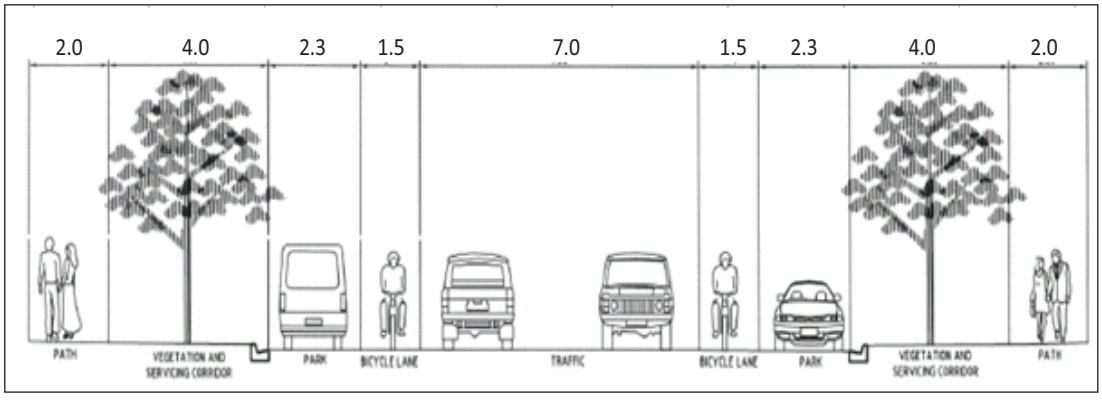
[1] Plan provided by Villawood Properties

7.2.2 Connector Roads

General

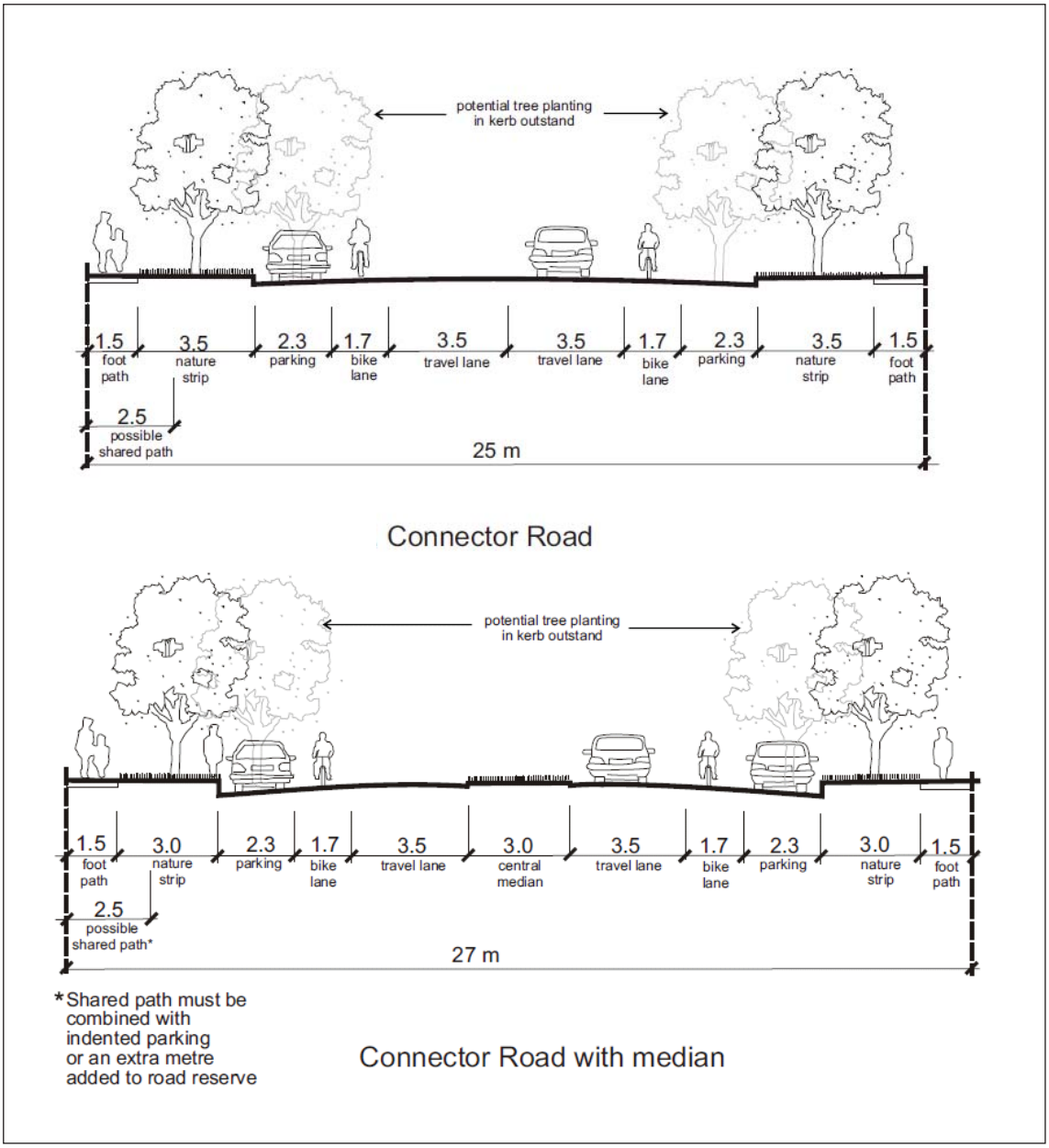
The Armstrong Creek Urban Growth Plan Civil Interagency Infrastructure Delivery Plan (IIDP) includes a typical cross section for a Connector Road which is shown in Figure 7.3.

Figure 7.3: Armstrong Creek Interagency Infrastructure Delivery Plan Typical Road Cross Section Type B



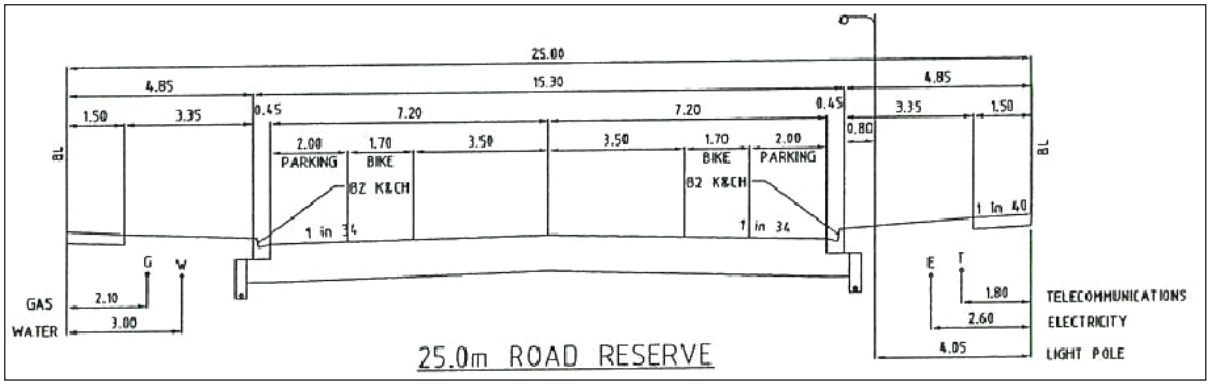
The proposed cross sections for connector roads in the West Precinct are shown in Figure 7.4.

Figure 7.4: Proposed Connector Road Cross Sections



As shown in Figure 7.4 the proposed cross sections are generally in accordance with the IIDP, with the exception of the verge width. Again it is understood that this minimum requirement relates to sufficient width being provided with the verge to allow for underground services, it is however anticipated that the services can be accommodated in a reduced verge width as shown below in Figure 7.5.

Figure 7.5: Underground Services Locations –Connector Road [1]

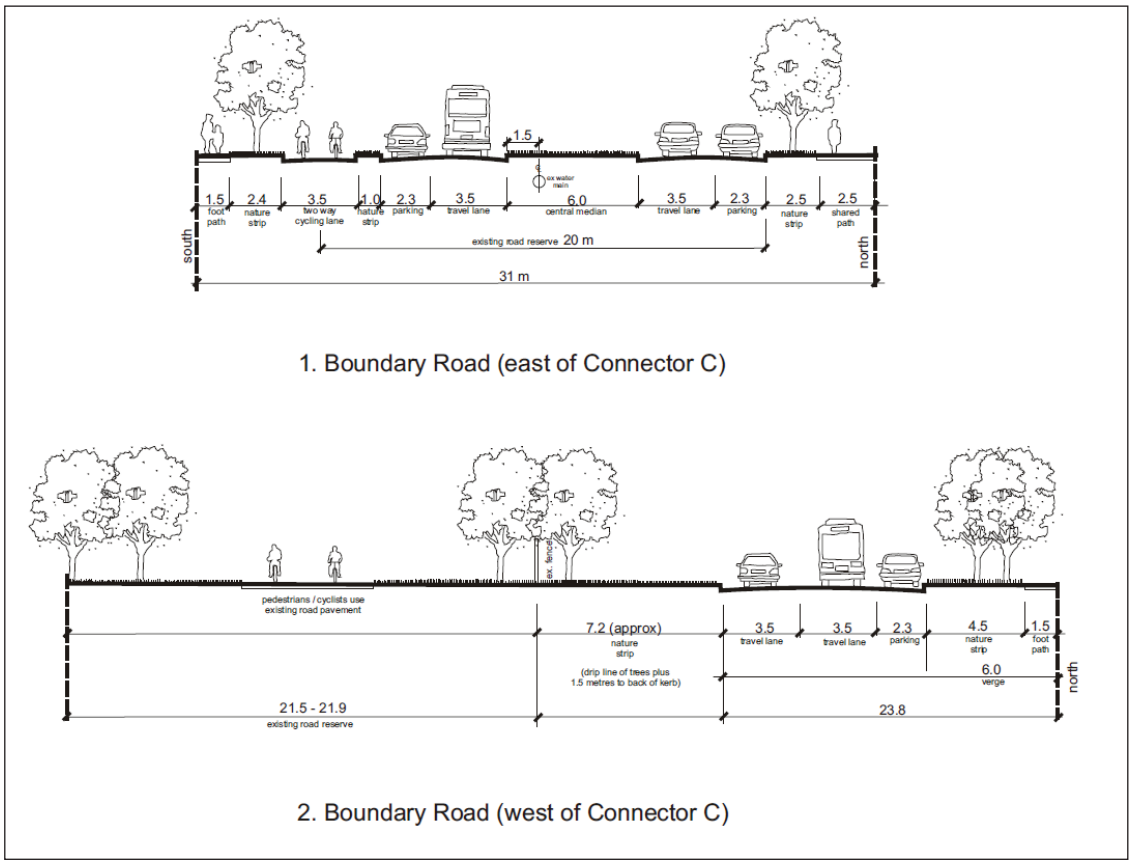


[1] Plan provided by Villawood Properties

Boundary Road

The proposed cross sections for Boundary Road east and west of Airport Road are shown in Figure 7.6.

Figure 7.6: Proposed Boundary Road Cross Sections



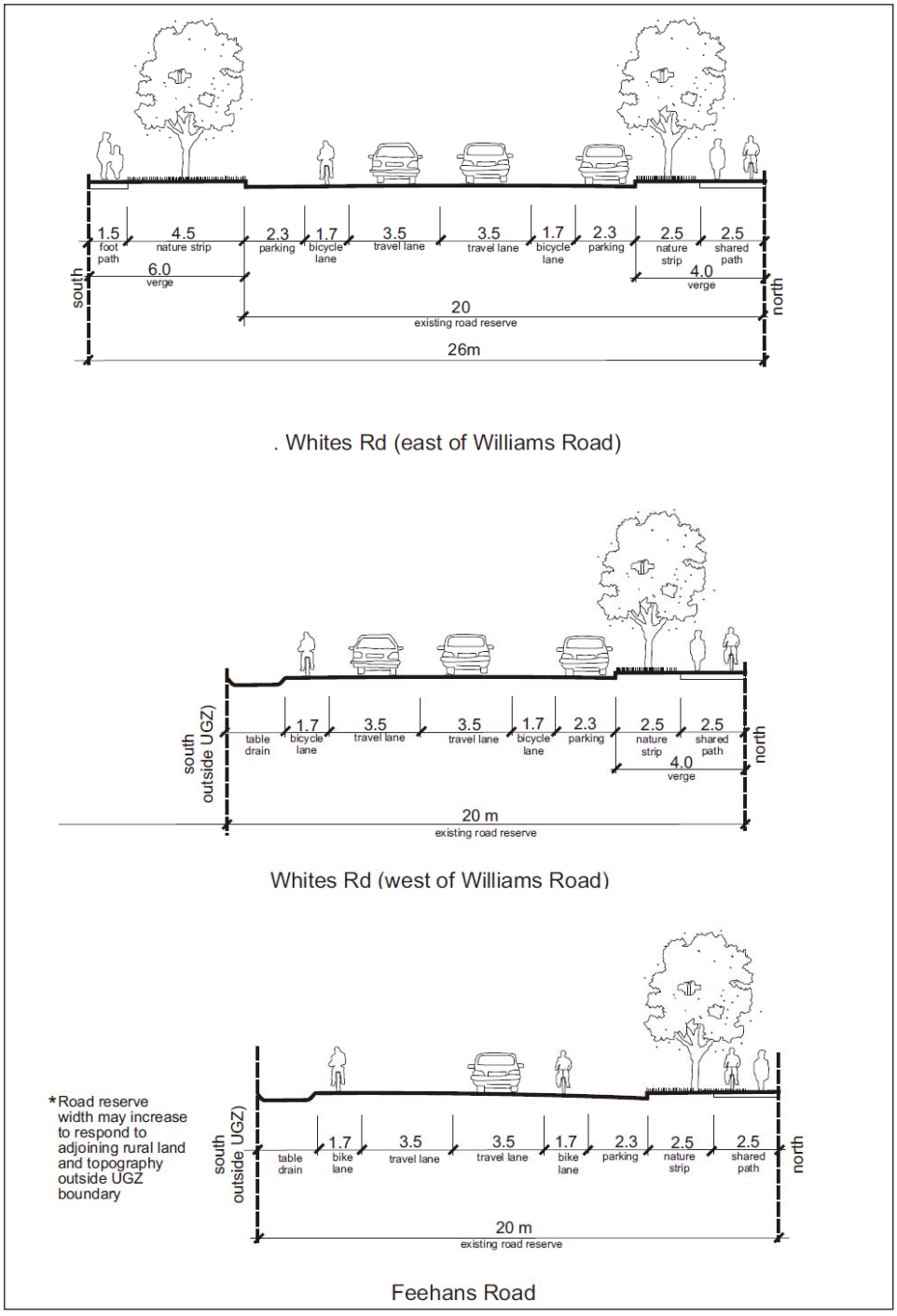
The cross sections respond to the location of the existing water main pipeline (between the Surf Coast Highway and Airport Road) whilst still providing the requirements of a connector road for all road users.

The proposed cross section for Boundary Road includes the provision of a 21.5-21.9m (approx) Greenway for pedestrians and cyclists west of Airport Road. To the east of Airport Road, the cross section includes a 3.5m two-way cycle lane on the south side of the rood along with footpaths on both sides of the road.

Whites Road and Feehans Road

The proposed cross sections for Whites Road and Feehans Road in the vicinity of the West Precinct are shown in Figure 7.7

Figure 7.7: Proposed Whites Road and Feehans Road Cross Sections



The proposed cross sections for Whites Road and Feehans Road are consistent with the IIDP Connector Road requirements.

NAC Connector Street

The NAC is envisaged to be a focus of the community, providing residents with convenient access to jobs. The NAC needs to be designed with a particular focus on pedestrian and cyclist movement as well as private motor vehicles.

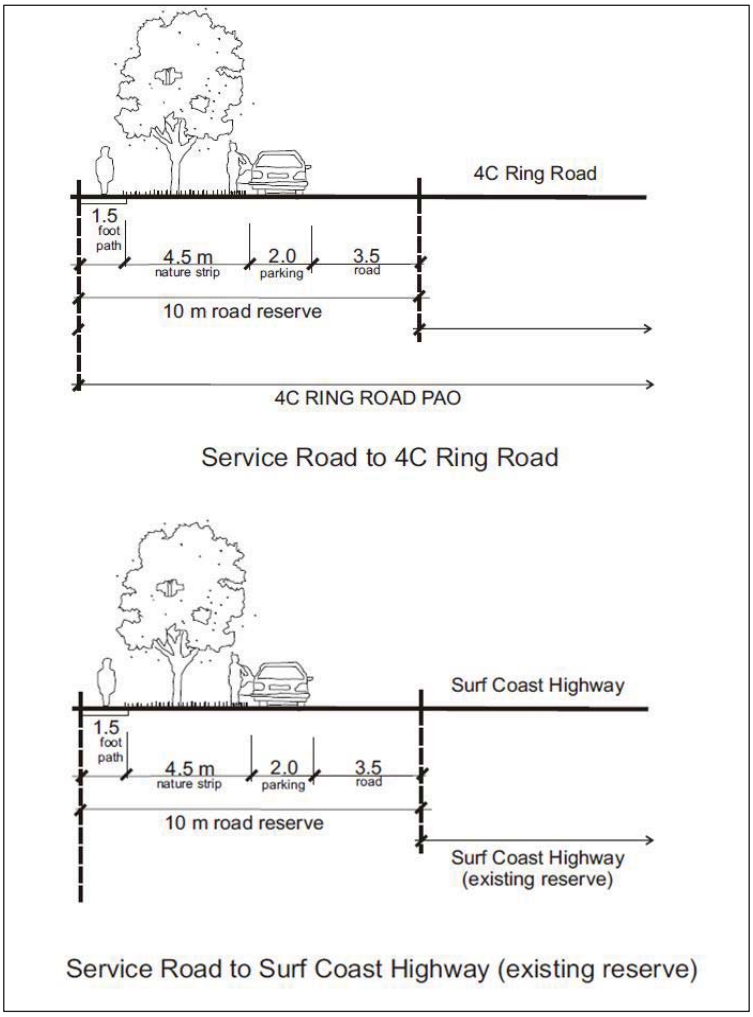
The NAC main street cross section should include wide footpaths (suitable for pedestrian movement and outdoor seating areas), kerbside parking facilities, and a single combined cyclist/motor vehicle lane in each direction (to reduce pedestrian crossing distances). The speed limit in the area should be reduced (generally to 30-40 km/hr) to promote pedestrian and cyclist amenity.

The NAC main street cross section will be determined as part of the NAC urban design framework plan.

7.2.3 Service Roads to the Surf Coast Highway and 4C Ring Road

The indicative layout of the service roads abutting the West Precinct is shown in Figure 7.8.

Figure 7.8: Proposed Service Road Cross Sections (Abutting West Precinct)

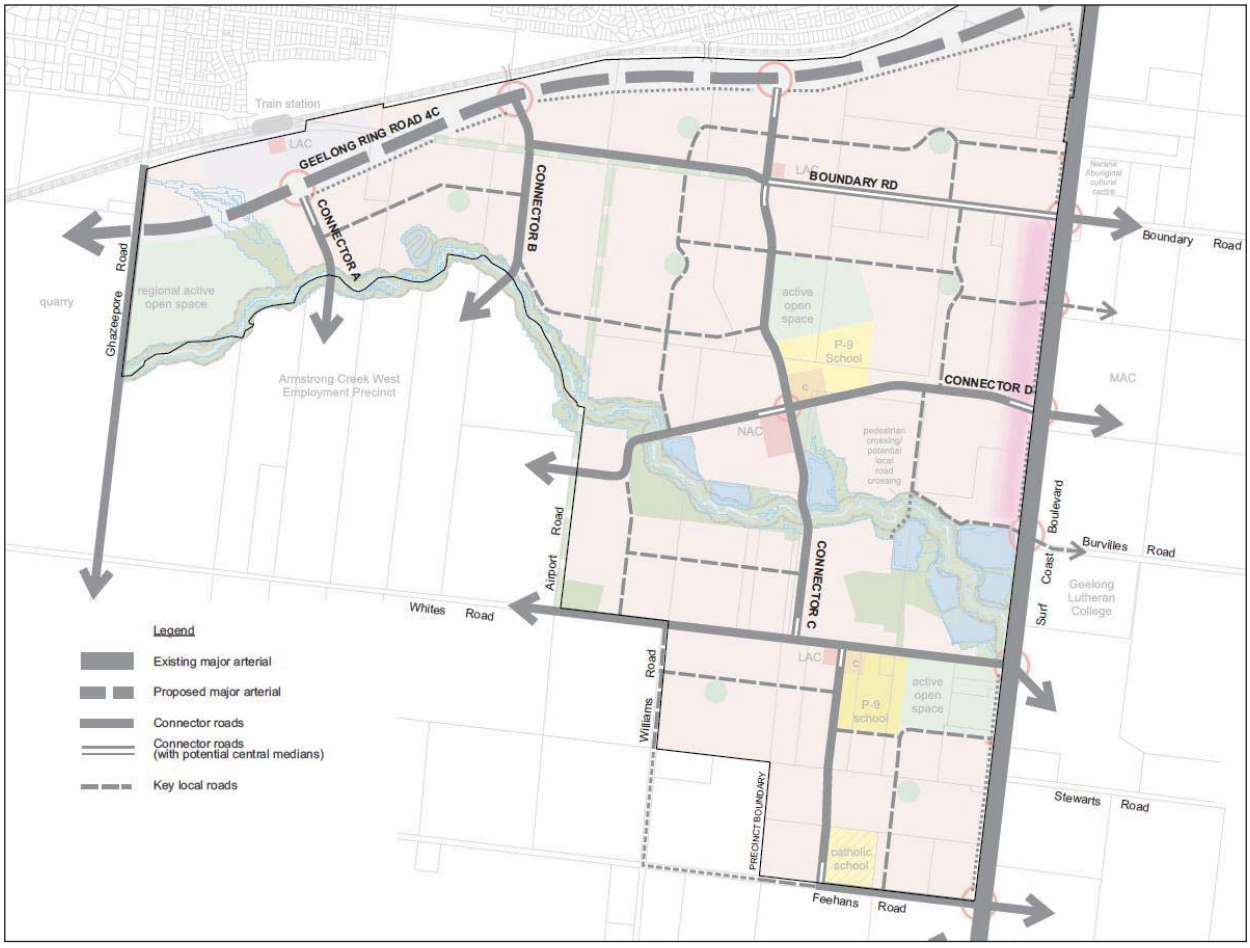


As shown in Figure 7.8, the service roads will include a footpath, parking lane and wide verge in addition to a one-way traffic lane. The layout of the Surf Coast Road service road is consistent with the "boulevard" style road envisaged for the Surf Coast Highway (discussed previously in Section 6.2.2).

7.2.4 Proposed Median Treatments

In order to enhance the amenity of the West Precinct and provide "gateway" entry points central medians are proposed on some Connector Roads. The indicative location of the proposed median treatments is shown in Figure 7.9.

Figure 7.9: Indicative Locations of Proposed Median Treatment



The median width is anticipated to be 2-3m and in addition to the proposed Connector Road cross section shown in Figure 7.4.

7.3 Internal Intersection Controls

In is anticipated that all the internal intersections within the West Precinct will be unsignalised with the exception of the Main Street/Middle North-South Connector Street near the NAC, central community facilities area and school.

At this intersection daily traffic volumes on Main Street and the Middle North-South Connector Road are in the order of 5,500 and 4,750 vehicles per day respectively. Whilst a roundabout could cater for the anticipated traffic volumes, a signalised intersection is recommended on safety grounds for pedestrian and cyclists. Pedestrian and cyclist activity in the area is anticipated to be notable given the surrounding land uses (NAC, school and community facilities). Traffic signals at the intersection would

provide a controlled pedestrian crossing facility and could be more safely navigated by cyclists then a roundabout.

The signals will also enhance the urban amenity of the activity area through promoting pedestrian and cycling activity in an area when such activity will be a key focus.

8. Active and Public Transport Infrastructure

8.1 Active Transport Infrastructure

8.1.1 Armstrong Creek Civil Interagency Infrastructure Delivery Plan

The Armstrong Creek Civil Interagency Infrastructure Delivery Plan (IIDP) was prepared by Council and is the baseline (conceptual) delivery plan for the Armstrong Creek Growth Area.

With regard to sustainable transport infrastructure, a key objective of the IIDP is to design a high standard network of paths to encourage a walkable / cycling community that does not solely rely on the use of motor vehicles as a primary mode of transport.

It aims to provide a comprehensive network of pedestrian and bicycle paths, achieved through the implementation of 'greenways' and off-road recreational trails as well as on-road facilities that integrate with the existing infrastructure.

8.1.2 Pedestrian and Cyclist Infrastructure

Within the West Precinct pedestrian will be catered by footpaths on Access and Connector Streets. Cyclists will be catered for by suitable width carriageways on the Access Streets and dedicated cycle lanes on Connector Streets.

Furthermore as previously discussed in Section 4.5 the on-road network will be complemented by off-road infrastructure which was previously shown in Figure 4.2.

The pedestrian and cycle networks through the West Precinct are highly interconnected and provided suitable connections to key internal and external land uses (e.g. NAC, LACs and schools). Furthermore the recommended signalised intersection at the Main Street/Middle North-South Connector Road intersection will enhance both pedestrian and cyclist amenity and safety in the key activity area.

The proposed active transport infrastructure meets the objectives of the IIDP given the highly interconnected nature and extent of the on and off road networks.

8.2 Public Transport Infrastructure

8.2.1 Design Guidelines

The Department of Transport (DoT) Public Transport Land Use Guidelines specifies a number of requirements for developments accommodating new or revised bus routes and their supporting infrastructure, these include:

- The trafficked road width of any carriageway, including one way roads needs to be sufficient for two buses to pass at normal speed.
- For undivided roads – (two lane, two way) require a clear trafficable road width of 7.0 meters, with separate designated space for cyclists and/or parking.
- For divided roads – a clear trafficable road width of 5.2 metres when a dedicated bicycle lane and separate traffic lane are provided.

- For divided roads – the median surface if required to provide part of the clear zone must be trafficable by low floor buses in all weather conditions and the kerbing must be mountable or semi-mountable in accordance with road authority guidelines.
- Road design and any traffic management features must be able to accommodate the turning templates for the standard 12.5 metre ultra low floor bus.
- Where bus movements will involve turns, to ensure pedestrian safety, sufficient road pavement must be provided within intersections to accommodate the swept path of the bus without the front or the rear overhand of a bus sweeping over any splitter islands or kerbs.

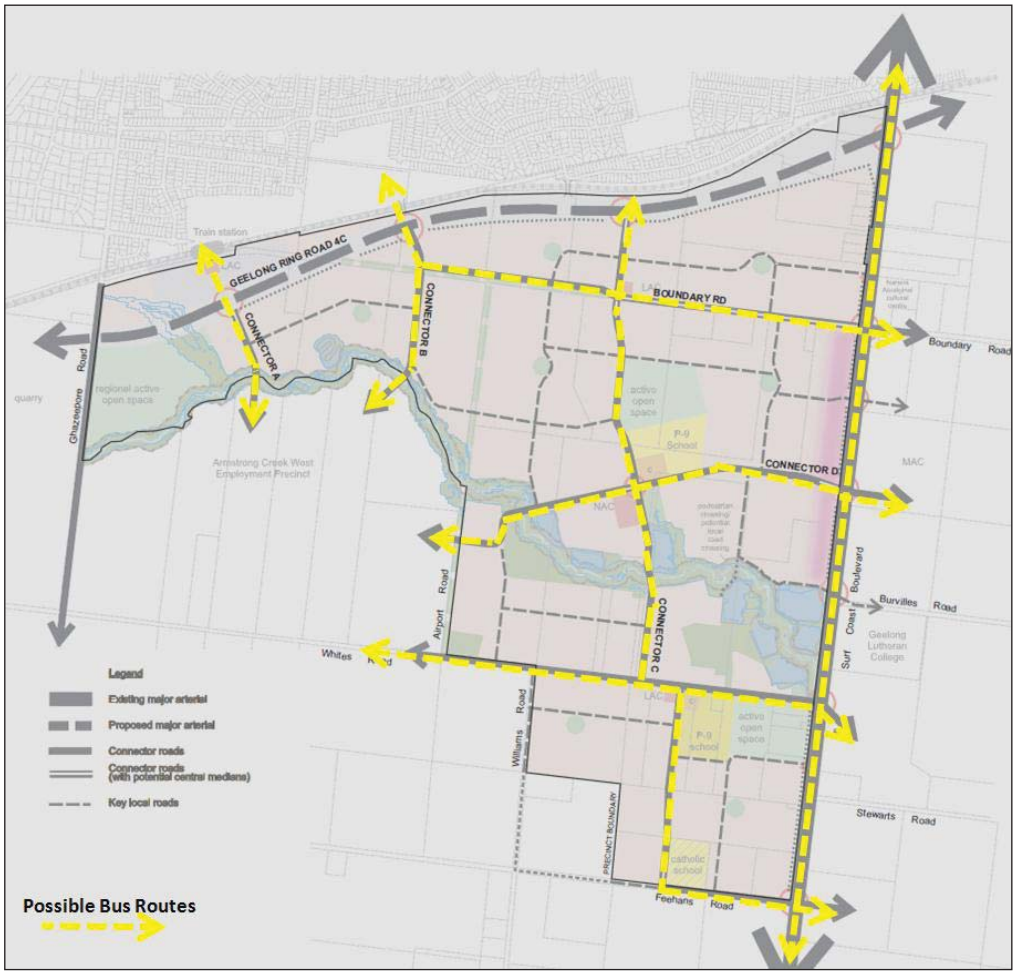
The anticipated Connector Road cross sections discussed in Section 7.2 meet the above requirements.

8.2.2 Bus Routes

Having regard for the above, bus routes within the West Precinct must be carefully planned to ensure that they maximise the potential for public transport access, and subsequently the promotion of sustainable travel methods such as public transport.

Having reviewed the Structure Plan and having regard to the relevant DoT Guidelines, indicative bus routes within the subject area have been identified and are shown in Figure 8.1.

Figure 8.1: Possible Bus Routes



The indicative bus routes have been derived based on the location of the activity centre and schools in the West Precinct area, with consideration given to key external destinations such as the proposed Armstrong Creek Rail Station and Major Activity Centre proposed on the eastern side of Surf Coast Highway.

It is highlighted that the routes shown in Figure 8.1: are indicative only, the DoT will be ultimately responsible for determining the location of bus routes and stops which best serve the proposed development, public transport operators and the overall public transport networks of the Armstrong Creek area.

8.2.3 Bus Stops

The Department of Transport Public Transport Land Use Guidelines identify that "*bus stop siting is critical to maintaining passenger safety and convenience, as well as ensuring ease of bus vehicle access and operation*". In this respect a number of key considerations, relevant to the West Precinct are further reproduced below:

- Stops should be located as close as possible to demand generating land uses.
- The desirable average stop spacing is 300m.
- Bus stops should be located to maximise walking accessibility from the surrounding area.
- Stops on roads with indented parking, bus stops should be designed and located at kerb outstand areas.
- Departure side stops at local street intersections are preferred.

It would be expected that generally bus stops will be identified by a bus stop post and flag. A central bus stop within the activity centre and bus stops near schools could possibly also provide a bus shelters to improve patron amenity.

9. Conclusion

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

i The West Precinct is expected to generate in the order of 67,000 vehicle movements per day, and some 9,000 and 6,700 movements respectively during the AM and PM commuter peak hours.

ii The proposed access points to the surrounding road network are appropriately located to serve the West Precinct and surrounding adjacent precincts.

iii The external access intersections will operate satisfactorily and provide sufficient capacity to cater for the anticipated traffic generated by the West Precinct.

iv The internal road network design is in accordance with the Armstrong Creek Civil Interagency Infrastructure Delivery Plan (IIDP).

v Comprehensive pedestrian and cyclist facilities are provided throughout the precinct and connecting to the surrounding networks.

vi The internal road network has been designed to allow for future bus routes to access the Precinct.

Appendix A

Structure Plan

Legend

Land uses

- Residential
- Mixed use / Commercial
- Activity centres
- c — Community complex
- Education
- Railway station carpark

Public open space

- Active open space
- Encumbered open space (drainage and conservation)
- Passive open space
- Greenway

Waterways and drainage

- Armstrong Creek
- 35m buffer zone (council policy)
- Wetlands
- 1:100 year floodline

Movement Network

- Proposed 4C Ring Road and reservation (includes service roads within reservation)
- Surf Coast Highway / Boulevard
- Connector roads
- Key local roads
- Service roads
- Gravel roads
- Intersection (signalised)
- Intersection (left in - left out)
- Railway line and proposed station
- Pedestrian overpass

Other

- Retained vegetation (refer to NVPP for details)
- Heritage sites
- Quarry buffer (300m from boundary)

Plan 3

Armstrong Creek West Precinct Urban Structure

September 2011

1:7500 @ A1

0 500 1000 m

Plan 12

Armstrong Creek West Precinct Urban Structure

September 2011

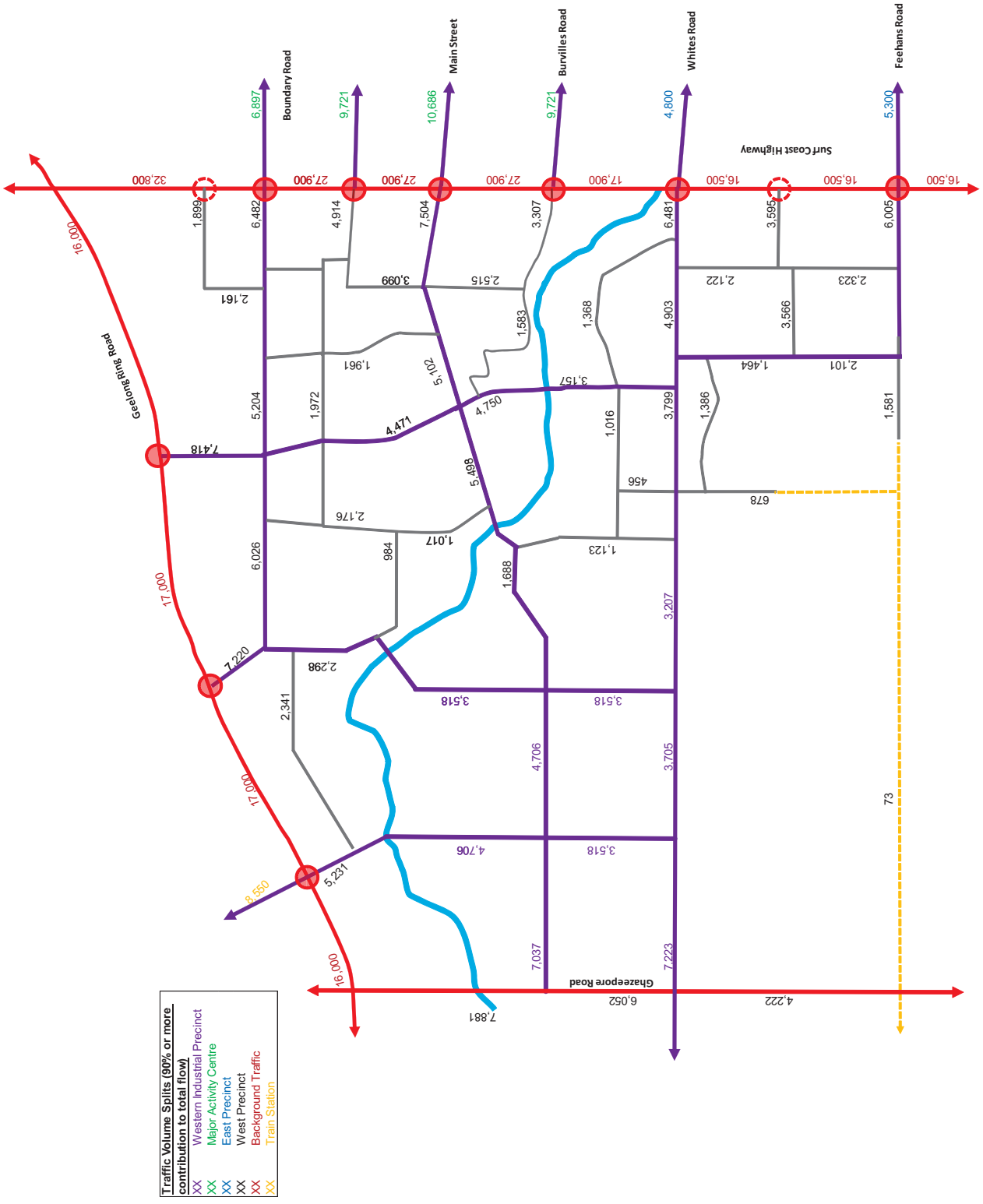
1:7500 @ A1

0 500 1000 m

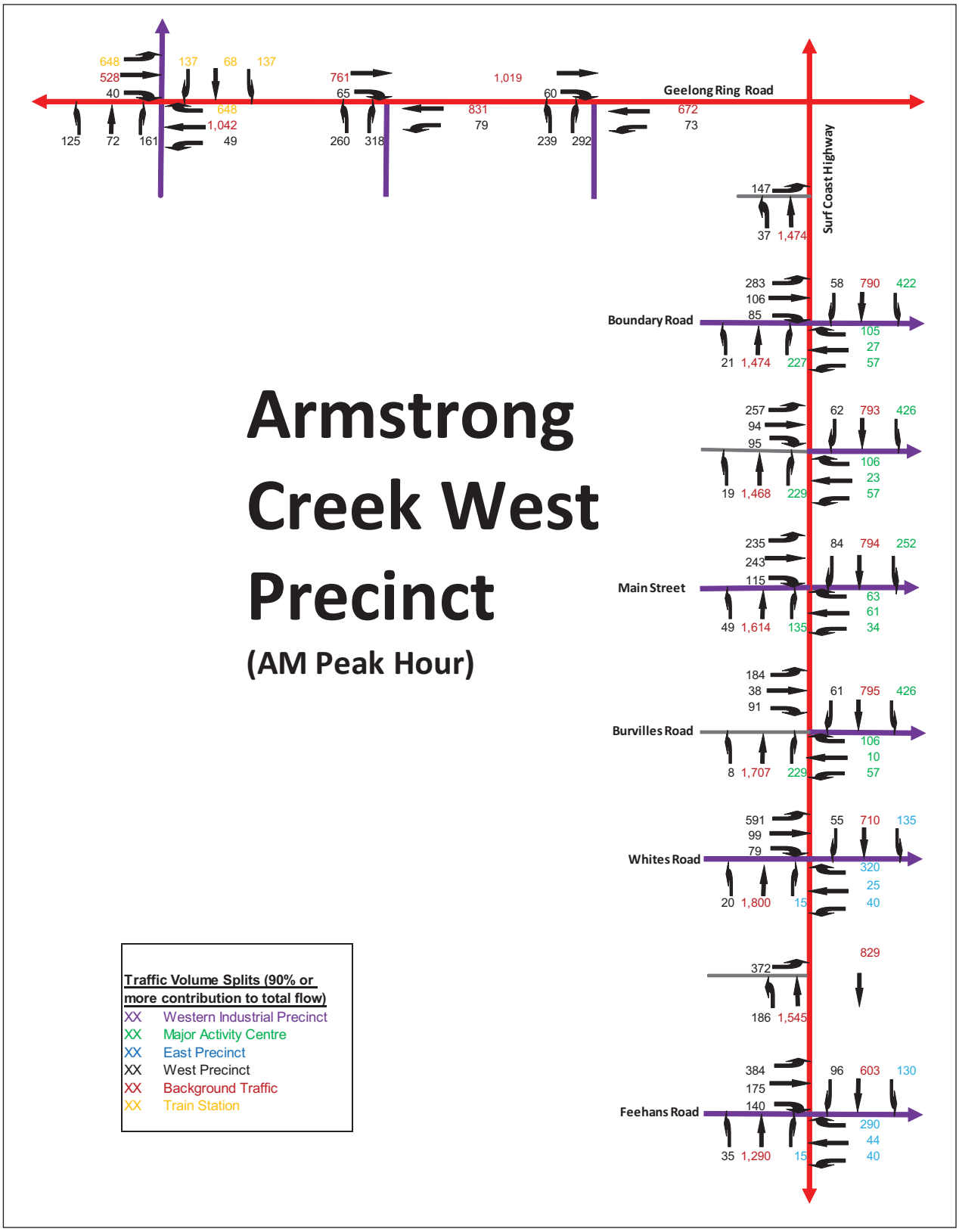
Appendix B

Anticipated Post-Development Traffic Volumes

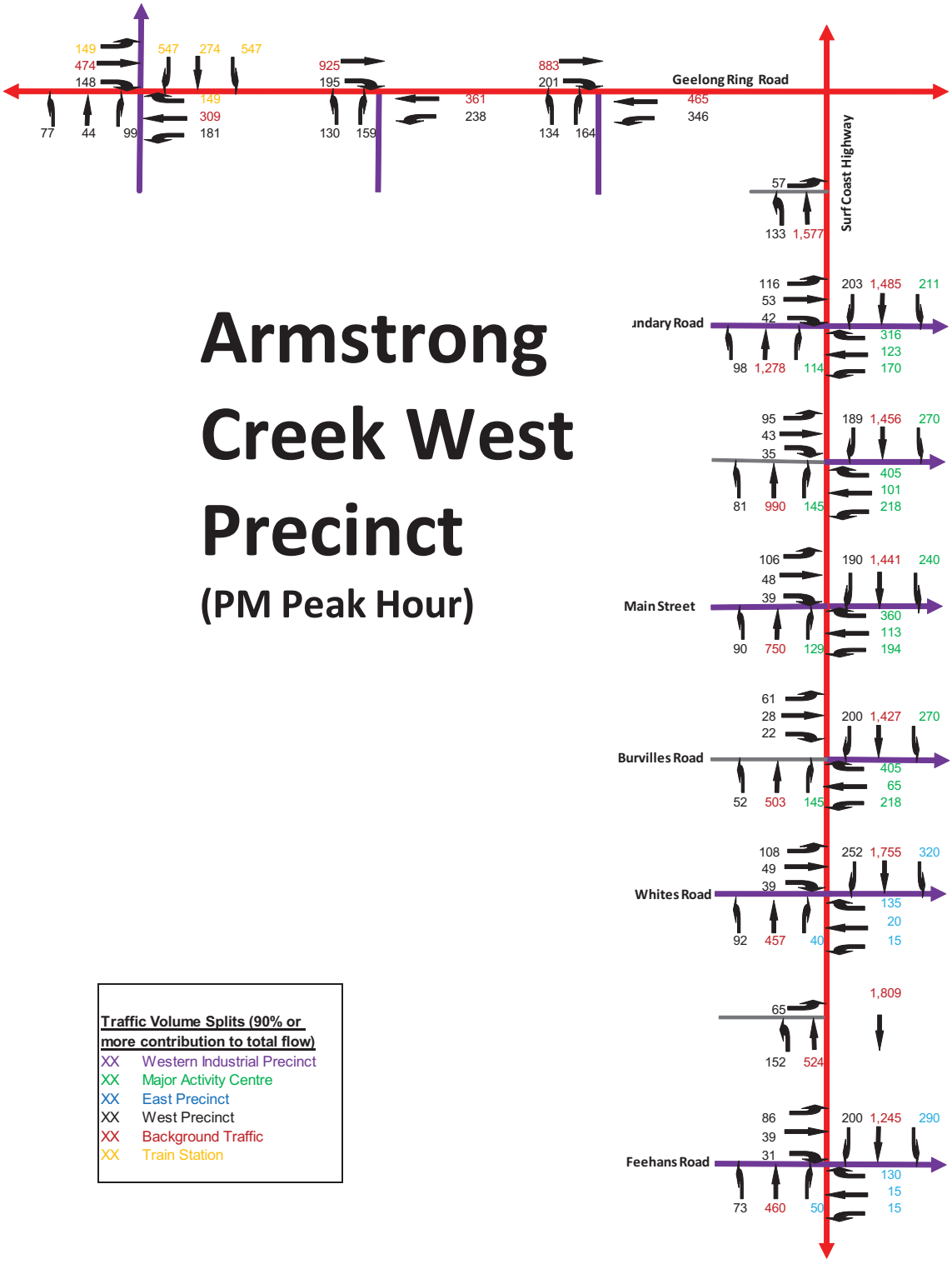
Daily Volumes



AM Peak Hour Volumes



PM Peak Hour Volumes



Armstrong Creek West Precinct

(PM Peak Hour)

Traffic Volume Splits (90% or more contribution to total flow)

XX Western Industrial Precinct
XX Major Activity Centre
XX East Precinct
XX West Precinct
XX Background Traffic
XX Train Station

Appendix C

SIDRA Modelling Results (Ultimate Scenario)

Ring Road – East Intersection - Ultimate

MOVEMENT SUMMARY

Site: Ring Road-East Intersection-AM

Ring Road-East Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	252	2.0	0.368	11.5	LOS B	4.5	31.7	0.28	0.70	48.9
3	R	360	2.0	0.492	36.0	LOS D	16.9	120.1	0.80	0.83	31.9
Approach		612	2.0	0.492	27.1	LOS C	16.9	120.1	0.58	0.78	37.3
East: Ring Road											
4	L	77	2.0	0.077	10.4	LOS B	0.6	4.1	0.14	0.68	56.6
5	T	707	10.0	0.498	41.0	LOS D	13.3	101.4	0.90	0.76	32.6
Approach		784	9.2	0.498	38.0	LOS D	13.3	101.4	0.83	0.75	33.9
West: Ring Road											
11	T	1073	10.0	0.391	19.6	LOS B	14.3	108.6	0.67	0.58	46.1
12	R	63	2.0	0.199	54.1	LOS D	4.4	31.1	0.88	0.76	26.6
Approach		1136	9.6	0.391	21.7	LOS C	14.3	108.6	0.68	0.59	44.5
All Vehicles		2532	7.6	0.498	28.0	LOS C	16.9	120.1	0.70	0.69	38.9

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	36.8	LOS D	0.1	0.1	0.78	0.78
P3	Across E approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		106	45.5				0.87	0.87

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

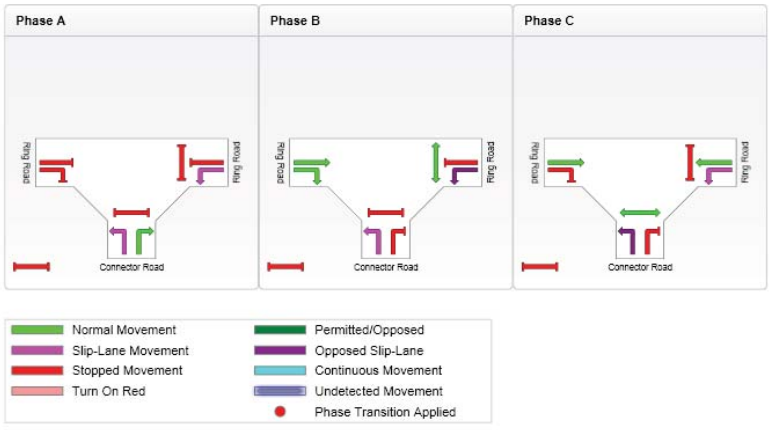
Site: Ring Road-East Intersection-AM

Ring Road-East Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	48	23	31
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	54	29	37
Phase Split	45 %	24 %	31 %



MOVEMENT SUMMARY

Site: Ring Road-East Intersection-PM

Ring Road-East Intersection-PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	141	2.0	0.162	10.4	LOS B	1.8	13.1	0.20	0.68	49.9
3	R	173	2.0	0.471	55.5	LOS E	10.7	76.4	0.93	0.81	26.0
Approach		314	2.0	0.471	35.2	LOS D	10.7	76.4	0.61	0.75	33.2
East: Ring Road											
4	L	259	2.0	0.346	11.1	LOS B	3.2	22.7	0.22	0.70	55.5
5	T	489	10.0	0.465	47.0	LOS D	10.3	78.2	0.94	0.77	30.2
Approach		748	7.2	0.465	34.6	LOS C	10.3	78.2	0.69	0.74	35.3
West: RoadNameRing Road											
11	T	929	10.0	0.242	6.8	LOS A	8.1	61.4	0.39	0.34	62.6
12	R	212	2.0	0.476	31.2	LOS C	9.2	65.4	0.65	0.79	36.9
Approach		1141	8.5	0.476	11.4	LOS B	9.2	65.4	0.44	0.42	56.1
All Vehicles		2203	7.2	0.476	22.6	LOS C	10.7	78.2	0.55	0.58	43.3

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	43.4	LOS E	0.2	0.2	0.85	0.85
P3	Across E approach	53	28.0	LOS C	0.1	0.1	0.68	0.68
All Pedestrians		106	35.7				0.77	0.77

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

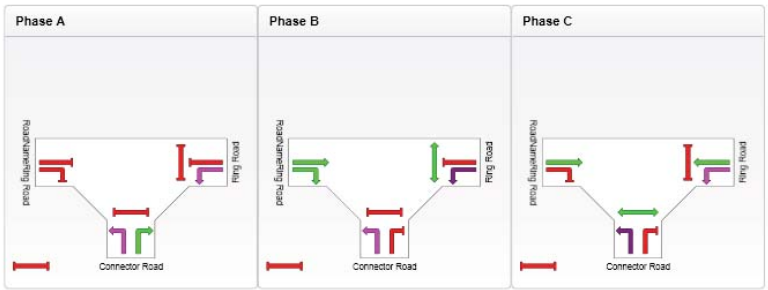
Site: Ring Road-East Intersection-PM

Ring Road-East Intersection-PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	24	55	23
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	30	61	29
Phase Split	25 %	51 %	24 %



Ring Road – Middle Intersection – Ultimate

MOVEMENT SUMMARY

Site: Ring Road-Middle Inter-section-AM

Ring Road-Middle Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	274	2.0	0.465	12.2	LOS B	5.7	40.4	0.33	0.71	48.2
3	R	335	2.0	0.522	42.5	LOS D	16.8	119.5	0.85	0.83	30.1
Approach		608	2.0	0.522	28.9	LOS C	16.8	119.5	0.61	0.78	36.3
East: Ring Road											
4	L	83	2.0	0.084	10.4	LOS B	0.6	4.4	0.14	0.68	56.6
5	T	875	10.0	0.516	36.6	LOS D	15.4	117.1	0.88	0.75	34.6
Approach		958	9.3	0.516	34.5	LOS C	15.4	117.1	0.81	0.74	35.7
West: Ring Road											
11	T	801	10.0	0.265	15.0	LOS B	9.8	74.4	0.56	0.48	51.0
12	R	68	2.0	0.215	54.2	LOS D	4.7	33.5	0.88	0.76	26.5
Approach		869	9.4	0.265	18.1	LOS B	9.8	74.4	0.59	0.51	47.9
All Vehicles		2436	7.5	0.522	27.2	LOS C	16.8	119.5	0.68	0.67	39.4

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	32.3	LOS D	0.1	0.1	0.73	0.73
P3	Across E approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		106	43.2				0.84	0.84

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

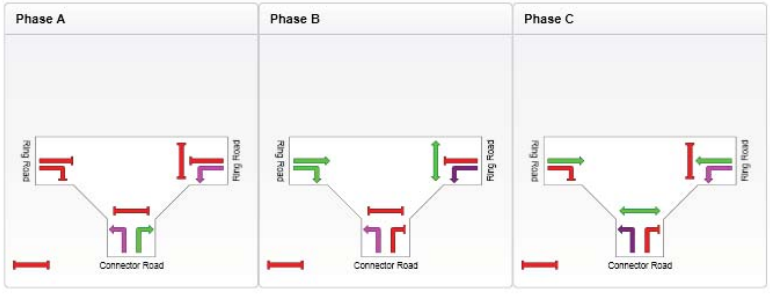
Site: Ring Road-Middle Inter-section-AM

Ring Road-Middle Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	42	23	37
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	48	29	43
Phase Split	40 %	24 %	36 %



MOVEMENT SUMMARY

Site: Ring Road-Middle Intersection-PM

Ring Road-Middle Intersection-PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	137	2.0	0.143	10.1	LOS B	1.5	11.0	0.18	0.67	50.2
3	R	167	2.0	0.439	54.3	LOS D	10.3	73.5	0.92	0.81	26.3
Approach		304	2.0	0.439	34.4	LOS C	10.3	73.5	0.59	0.75	33.5
East: Ring Road											
4	L	251	2.0	0.325	11.0	LOS B	2.9	20.5	0.20	0.70	55.8
5	T	380	10.0	0.437	50.2	LOS D	8.5	64.9	0.95	0.76	29.0
Approach		631	6.8	0.437	34.6	LOS C	8.5	64.9	0.65	0.74	35.3
West: Ring Road											
11	T	974	10.0	0.256	7.3	LOS A	8.7	65.8	0.40	0.35	61.8
12	R	205	2.0	0.445	29.2	LOS C	8.6	61.1	0.62	0.78	38.1
Approach		1179	8.6	0.445	11.1	LOS B	8.7	65.8	0.44	0.43	56.3
All Vehicles		2114	7.1	0.445	21.5	LOS C	10.3	73.5	0.52	0.57	44.2

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	46.8	LOS E	0.2	0.2	0.86	0.88
P3	Across E approach	53	26.0	LOS C	0.1	0.1	0.66	0.66
All Pedestrians		106	36.4				0.77	0.77

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

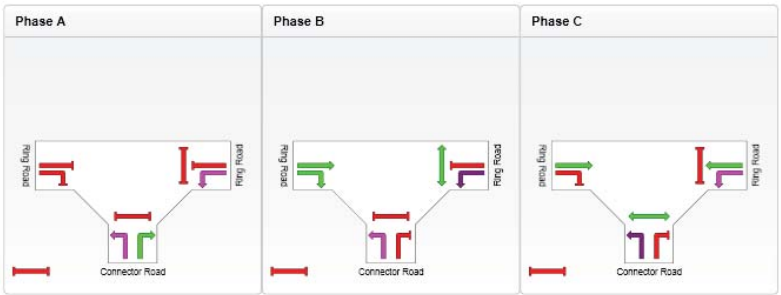
Site: Ring Road-Middle Intersection-PM

Ring Road-Middle Intersection-PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	25	58	19
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	31	64	25
Phase Split	26 %	53 %	21 %



Ring Road – West Intersection – Ultimate

MOVEMENT SUMMARY

Site: Ring Road-West Inter-section-AM

Ring Road-West Intersection-AM
Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	132	2.0	0.673	38.3	LOS D	10.5	74.3	0.82	0.85	32.2
2	T	76	0.0	0.676	29.0	LOS C	10.5	74.3	0.82	0.72	31.0
3	R	169	2.0	0.295	50.6	LOS D	11.0	78.0	0.80	0.79	27.5
Approach		377	1.6	0.675	42.0	LOS D	11.0	78.0	0.81	0.80	29.7
East: Ring Road											
4	L	52	2.0	0.061	10.7	LOS B	0.6	4.1	0.14	0.68	56.2
5	T	1097	10.0	0.495	36.4	LOS D	20.8	157.9	0.81	0.70	34.9
6	R	682	0.0	0.707	64.6	LOS E	23.4	163.7	0.97	0.86	23.7
Approach		1831	6.0	0.707	46.2	LOS D	23.4	163.7	0.85	0.76	30.3
North: Train Station											
7	L	144	2.0	0.454	81.7	LOS F	6.8	48.3	0.99	0.77	20.3
8	T	72	2.0	0.669	74.8	LOS E	9.8	70.0	1.00	0.82	18.8
9	R	144	2.0	0.669	84.1	LOS F	9.8	70.0	1.00	0.82	20.1
Approach		360	2.0	0.669	81.3	LOS F	9.8	70.0	1.00	0.80	19.9
West: Ring Road											
10	L	682	0.0	0.717	16.5	LOS B	19.3	134.9	0.47	0.76	48.9
11	T	556	10.0	0.528	59.6	LOS E	13.8	104.9	0.95	0.79	26.2
12	R	42	2.0	0.493	90.0	LOS F	4.5	31.9	1.00	0.74	18.5
Approach		1280	4.4	0.717	37.6	LOS D	19.3	134.9	0.70	0.78	33.6
All Vehicles		3847	4.7	0.717	46.2	LOS D	23.4	163.7	0.81	0.77	29.7

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	57.2	LOS E	0.2	0.2	0.87	0.87
P5	Across N approach	53	64.4	LOS F	0.2	0.2	0.93	0.93
P7	Across W approach	53	50.4	LOS E	0.2	0.2	0.82	0.82
All Pedestrians		159	57.3				0.87	0.87

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

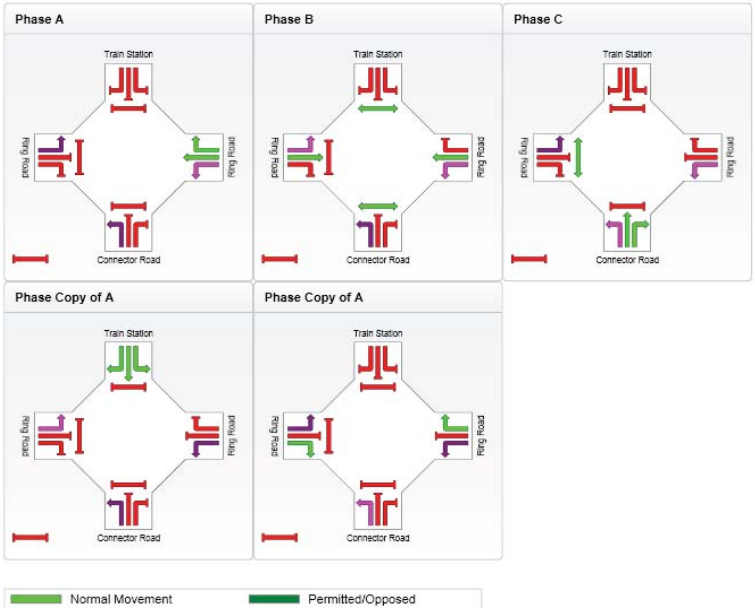
Site: Ring Road-West Intersection-AM

Ring Road-West Intersection-AM
Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C, Copy of A, Copy of A
Output Sequence: A, B, C, Copy of A, Copy of A

Phase Timing Results

Phase	A	B	C	Copy of A	Copy of A
Green Time (sec)	25	28	47	13	7
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	31	34	53	19	13
Phase Split	21 %	23 %	35 %	13 %	9 %



MOVEMENT SUMMARY

Site: Ring Road-West Inter-section-PM

Ring Road-West Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	81	2.0	0.618	41.9	LOS D	6.6	46.9	1.00	0.80	30.8
2	T	46	0.0	0.619	32.7	LOS C	6.6	46.9	1.00	0.80	29.0
3	R	104	2.0	0.759	73.5	LOS E	8.2	58.4	1.00	0.87	21.9
Approach		232	1.6	0.759	54.3	LOS D	8.2	58.4	1.00	0.83	25.7
East: Ring Road											
4	L	191	2.0	0.380	14.7	LOS B	4.5	32.1	0.37	0.72	51.0
5	T	325	10.0	0.301	45.2	LOS D	7.1	54.1	0.90	0.72	30.9
6	R	157	0.0	0.190	51.3	LOS D	5.2	36.1	0.86	0.77	27.6
Approach		673	5.4	0.380	36.0	LOS D	7.1	54.1	0.74	0.73	33.6
North: Train Station											
7	L	576	2.0	0.497	45.0	LOS D	15.1	107.2	0.86	0.83	29.2
8	T	288	2.0	0.733	39.4	LOS D	23.7	168.5	0.95	0.84	27.1
9	R	576	2.0	0.733	48.7	LOS D	23.7	168.5	0.95	0.87	26.2
Approach		1440	2.0	0.733	45.4	LOS D	23.7	168.5	0.92	0.85	28.4
West: Ring Road											
10	L	157	0.0	0.118	10.6	LOS B	1.5	10.6	0.17	0.69	56.1
11	T	499	10.0	0.474	47.1	LOS D	10.5	79.6	0.94	0.77	30.1
12	R	156	2.0	0.478	53.8	LOS D	9.6	68.3	0.90	0.80	26.7
Approach		812	6.5	0.478	41.3	LOS D	10.5	79.6	0.78	0.76	32.1
All Vehicles		3156	3.9	0.759	43.4	LOS D	23.7	168.5	0.85	0.80	30.0

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	46.8	LOS E	0.2	0.2	0.88	0.88
P5	Across N approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		159	51.7				0.93	0.93

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

Site: Ring Road-West Inter-section-PM

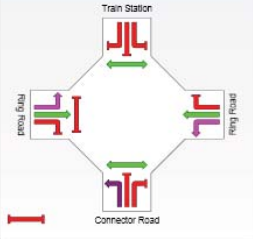
Ring Road-West Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing (phase reduction applied)
Input Sequence: A, B, C, Copy of A, Copy of A
Output Sequence: B, C, Copy of A, Copy of A

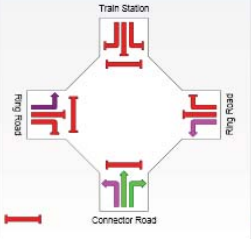
Phase Timing Results

Phase	B	C	Copy of A	Copy of A
Green Time (sec)	23	9	38	26
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	29	15	44	32
Phase Split	24 %	13 %	37 %	27 %

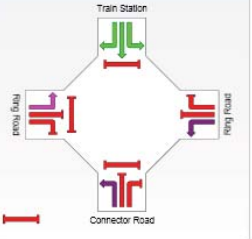
Phase B



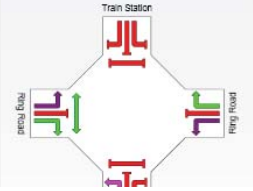
Phase C



Phase Copy of A



Phase Copy of A



SC Hwy and Feehans Road

MOVEMENT SUMMARY

Site: Feehams Rd/SC Hwy AM

Feehams Rd/SC Hwy
Signals - Fixed Time Cycle Time = 140 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	37	0.0	0.039	10.5	LOS B	0.3	2.4	0.14	0.67	56.4
2	T	1200	0.0	0.927	69.0	LOS E	48.5	339.5	1.00	1.07	23.8
3	R	16	0.0	0.147	80.4	LOS F	1.6	11.4	0.98	0.70	20.1
Approach		1253	0.0	0.927	67.4	LOS E	48.5	339.5	0.97	1.06	24.1
East: Southern E-W E											
4	L	42	0.0	0.212	32.0	LOS C	3.6	25.5	0.77	0.79	35.2
5	T	46	0.0	0.212	22.9	LOS C	3.6	25.5	0.77	0.61	34.4
6	R	305	0.0	0.949	100.5	LOS F	27.1	189.7	1.00	1.09	17.6
Approach		394	0.0	0.949	84.0	LOS F	27.1	189.7	0.95	1.00	19.7
North: SC Hwy											
7	L	137	0.0	0.185	11.3	LOS B	2.0	13.8	0.20	0.69	55.3
8	T	635	0.0	0.490	40.1	LOS D	18.3	128.1	0.85	0.73	33.1
9	R	101	0.0	0.943	103.1	LOS F	10.1	70.4	1.00	1.03	16.6
Approach		873	0.0	0.943	42.9	LOS D	18.3	128.1	0.77	0.76	31.6
West: Feehams Rd											
10	L	404	0.0	0.933	83.7	LOS F	44.9	314.5	1.00	1.21	20.1
11	T	184	0.0	0.934	74.5	LOS E	44.9	314.5	1.00	1.21	18.6
12	R	147	0.0	0.802	72.6	LOS E	11.5	80.8	0.95	0.90	22.0
Approach		736	0.0	0.933	79.2	LOS E	44.9	314.5	0.99	1.14	20.1
All Vehicles		3255	0.0	0.949	65.5	LOS E	48.5	339.5	0.92	0.99	23.9

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

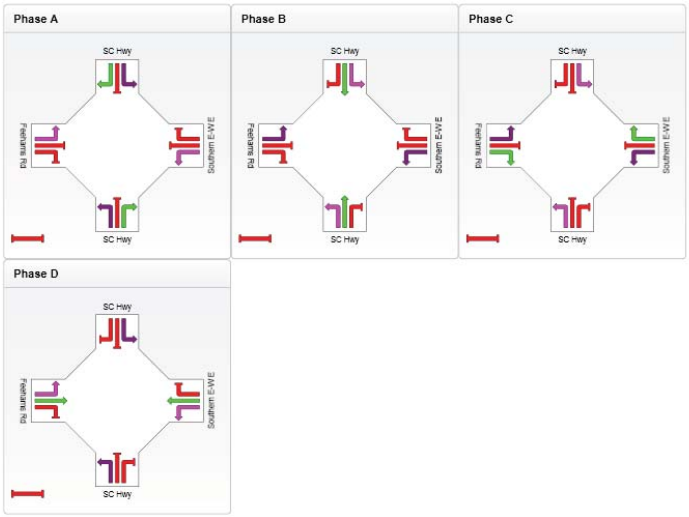
Site: Feehams Rd/SC Hwy AM

Feehams Rd/SC Hwy
Signals - Fixed Time Cycle Time = 140 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	8	46	24	38
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	14	52	30	44
Phase Split	10 %	37 %	21 %	31 %



C- right and thru, D right and through

MOVEMENT SUMMARY

Site: Feehams Rd/SC Hwy PM

Feehams Rd/SC Hwy
Signals - Fixed Time Cycle Time = 125 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	77	0.0	0.103	11.6	LOS B	1.2	8.1	0.22	0.69	54.9
2	T	484	0.0	0.256	20.4	LOS C	10.3	72.0	0.63	0.54	45.7
3	R	53	0.0	0.256	57.3	LOS E	3.9	27.3	0.88	0.75	25.5
Approach		614	0.0	0.256	22.4	LOS C	10.3	72.0	0.60	0.57	43.9
East: Southern E-W E											
4	L	16	0.0	0.203	41.6	LOS D	1.8	12.8	0.96	0.73	31.0
5	T	16	0.0	0.203	32.5	LOS C	1.8	12.8	0.96	0.70	29.4
6	R	137	0.0	0.701	70.9	LOS E	10.2	71.5	1.00	0.84	22.3
Approach		168	0.0	0.701	64.5	LOS E	10.2	71.5	0.99	0.82	23.4
North: SC Hwy											
7	L	305	0.0	0.287	10.4	LOS B	2.4	17.0	0.15	0.69	56.4
8	T	1311	0.0	0.693	26.9	LOS C	31.1	217.5	0.84	0.76	40.2
9	R	211	0.0	0.638	62.4	LOS E	13.6	95.4	0.96	0.83	24.1
Approach		1826	0.0	0.693	28.2	LOS C	31.1	217.5	0.74	0.76	39.2
West: Feehams Rd											
10	L	91	0.0	0.567	38.5	LOS D	6.0	41.8	0.98	0.80	32.1
11	T	41	0.0	0.568	29.4	LOS C	6.0	41.8	0.98	0.78	30.3
12	R	33	0.0	0.167	65.4	LOS E	2.7	19.2	0.95	0.73	23.5
Approach		164	0.0	0.568	41.6	LOS D	6.0	41.8	0.97	0.78	29.5
All Vehicles		2773	0.0	0.701	29.9	LOS C	31.1	217.5	0.74	0.72	37.8

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

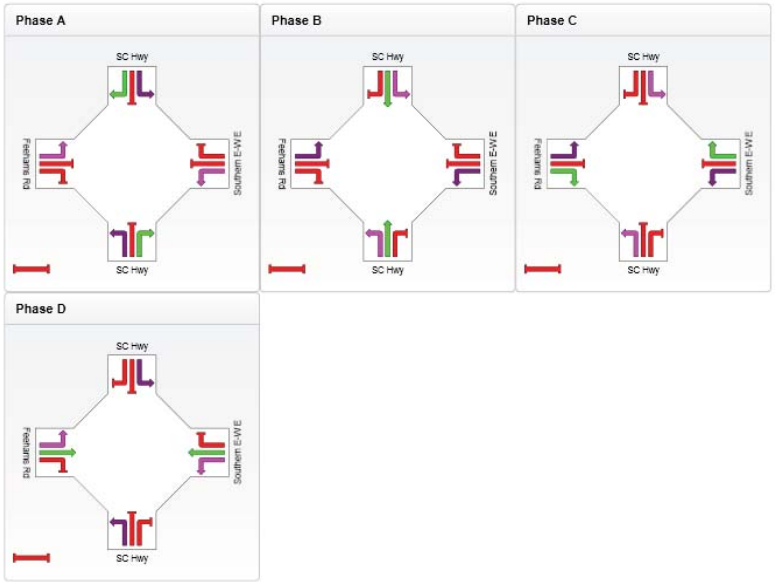
Site: Feehams Rd/SC Hwy PM

Feehams Rd/SC Hwy
Signals - Fixed Time Cycle Time = 125 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	22	60	13	6
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	28	66	19	12
Phase Split	22 %	53 %	15 %	10 %



SC Hwy and Whites Rd

MOVEMENT SUMMARY

Site: Whites Rd/SC Hwy AM

Whites Rd/SC Hwy
Signals - Fixed Time Cycle Time = 130 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	21	0.0	0.019	10.3	LOS B	0.1	1.0	0.12	0.67	56.7
2	T	1385	0.0	0.896	63.0	LOS E	33.2	232.2	1.00	1.02	25.2
3	R	16	0.0	0.182	76.0	LOS E	1.6	10.9	0.99	0.69	20.6
Approach		1422	0.0	0.896	62.4	LOS E	33.2	232.2	0.99	1.01	25.3
East: Southern E-W E											
4	L	42	0.0	0.138	24.7	LOS C	2.5	17.7	0.69	0.76	39.1
5	T	26	0.0	0.138	15.6	LOS B	2.5	17.7	0.69	0.53	38.9
6	R	337	0.0	0.898	78.1	LOS E	25.1	175.5	1.00	1.00	21.0
Approach		405	0.0	0.898	68.5	LOS E	25.1	175.5	0.95	0.95	22.7
North: SC Hwy											
7	L	142	0.0	0.147	10.5	LOS B	1.3	8.9	0.15	0.69	56.4
8	T	747	0.0	0.484	43.6	LOS D	14.8	103.4	0.90	0.76	31.5
9	R	58	0.0	0.669	81.6	LOS F	5.4	37.5	1.00	0.79	19.9
Approach		947	0.0	0.669	41.0	LOS D	14.8	103.4	0.79	0.75	32.5
West: Whites Rd											
10	L	621	0.0	0.907	61.5	LOS E	44.4	310.7	1.00	1.15	24.5
11	T	104	0.0	0.908	52.3	LOS D	44.4	310.7	1.00	1.15	22.8
12	R	83	0.0	0.407	56.1	LOS E	5.9	41.5	0.88	0.76	25.8
Approach		808	0.0	0.907	59.7	LOS E	44.4	310.7	0.99	1.11	24.4
All Vehicles		3583	0.0	0.907	56.8	LOS E	44.4	310.7	0.93	0.96	26.3

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

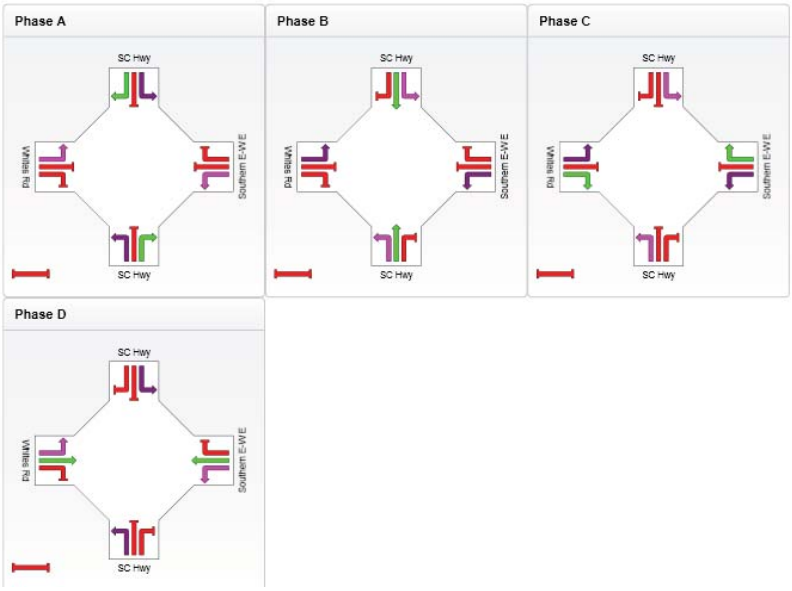
Site: Whites Rd/SC Hwy AM

Whites Rd/SC Hwy
Signals - Fixed Time Cycle Time = 130 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	6	34	26	40
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	12	40	32	46
Phase Split	9 %	31 %	25 %	35 %



MOVEMENT SUMMARY

Site: Whites Rd/SC Hwy PM

Whites Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	97	0.0	0.129	11.3	LOS B	1.3	9.1	0.21	0.69	55.2
2	T	481	0.0	0.651	55.8	LOS E	10.9	76.6	1.00	0.82	27.2
3	R	42	0.0	0.180	61.6	LOS E	3.3	22.9	0.93	0.74	24.4
Approach		620	0.0	0.651	49.3	LOS D	10.9	76.6	0.87	0.80	29.1
East: Southern E-W E											
4	L	16	0.0	0.218	41.2	LOS D	2.1	14.5	0.96	0.74	31.3
5	T	21	0.0	0.217	32.1	LOS C	2.1	14.5	0.96	0.70	29.7
6	R	142	0.0	0.649	66.0	LOS E	10.0	70.0	1.00	0.82	23.4
Approach		179	0.0	0.649	59.8	LOS E	10.0	70.0	0.99	0.80	24.5
North: SC Hwy											
7	L	337	0.0	0.324	10.5	LOS B	2.9	20.5	0.17	0.70	56.3
8	T	1847	0.0	0.647	24.8	LOS C	27.3	190.8	0.81	0.73	41.7
9	R	265	0.0	0.460	29.7	LOS C	10.9	76.2	0.64	0.79	37.7
Approach		2449	0.0	0.647	23.3	LOS C	27.3	190.8	0.70	0.73	42.7
West: Whites Rd											
10	L	114	0.0	0.580	54.0	LOS D	9.5	66.6	0.97	0.89	26.6
11	T	52	0.0	0.579	44.9	LOS D	9.5	66.6	0.97	0.87	25.0
12	R	41	0.0	0.208	61.8	LOS E	3.2	22.6	0.94	0.74	24.4
Approach		206	0.0	0.579	53.3	LOS D	9.5	66.6	0.97	0.85	25.8
All Vehicles		3455	0.0	0.651	31.7	LOS C	27.3	190.8	0.77	0.75	36.7

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

Site: Whites Rd/SC Hwy PM

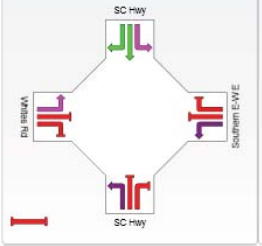
Whites Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

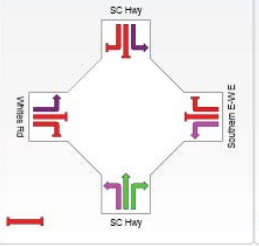
Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	58	15	14	9
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	64	21	20	15
Phase Split	53 %	18 %	17 %	13 %

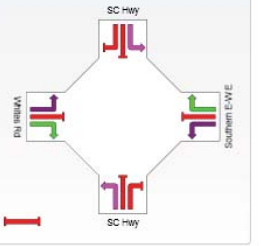
Phase A



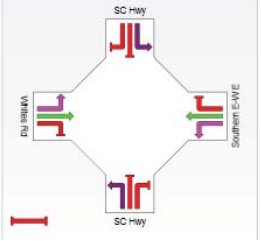
Phase B



Phase C



Phase D



Burvilles Road and SC Hwy

MOVEMENT SUMMARY

Site: Burvilles Rd/SC Hwy AM

Burvilles Rd/SC Hwy
Signals - Fixed Time Cycle Time = 130 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	8	0.0	0.006	10.0	LOS B	0.0	0.2	0.05	0.66	57.2
2	T	1797	0.0	0.706	27.7	LOS C	27.4	191.7	0.77	0.69	39.9
3	R	241	0.0	0.696	64.4	LOS E	15.6	108.9	0.96	0.84	23.7
Approach		2046	0.0	0.706	32.0	LOS C	27.4	191.7	0.79	0.71	37.2
East: Burvilles Rd											
4	L	60	0.0	0.109	10.9	LOS B	1.0	6.7	0.22	0.66	49.4
5	T	11	0.0	0.116	67.2	LOS E	1.0	7.3	0.99	0.66	20.4
6	R	112	0.0	0.644	80.3	LOS F	5.2	36.2	1.00	0.79	20.6
Approach		182	0.0	0.644	56.7	LOS E	5.2	36.2	0.74	0.74	25.5
North: SC Hwy											
7	L	448	0.0	0.364	10.6	LOS B	2.4	16.7	0.09	0.66	56.2
8	T	837	0.0	0.329	22.4	LOS C	10.8	75.7	0.56	0.46	44.4
9	R	64	0.0	0.302	58.3	LOS E	4.5	31.6	0.83	0.75	25.3
Approach		1349	0.0	0.364	20.2	LOS C	10.8	75.7	0.42	0.56	45.9
West: Burvilles Rd											
10	L	194	0.0	0.665	34.1	LOS C	9.9	69.5	0.94	0.83	33.8
11	T	40	0.0	0.665	25.0	LOS C	9.9	69.5	0.94	0.80	32.2
12	R	96	0.0	0.332	62.6	LOS E	7.1	49.9	0.94	0.78	24.2
Approach		329	0.0	0.665	41.3	LOS D	9.9	69.5	0.94	0.81	30.1
All Vehicles		3907	0.0	0.706	29.8	LOS C	27.4	191.7	0.67	0.67	38.1

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

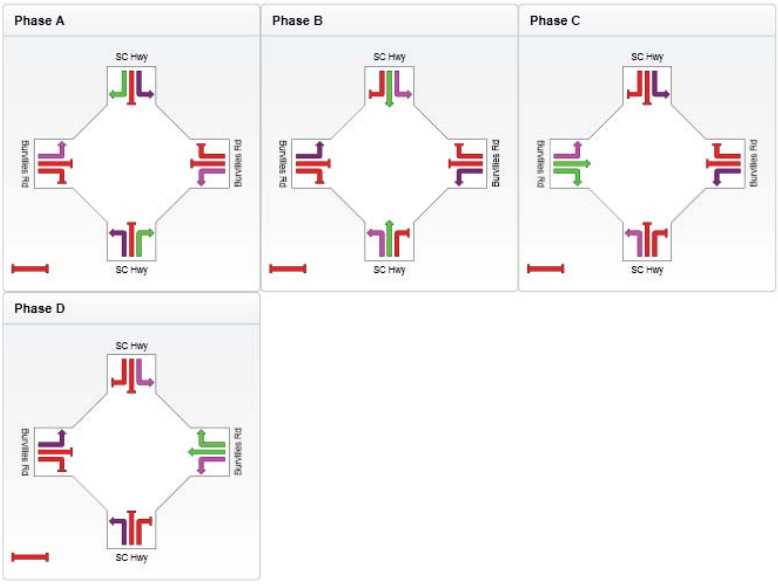
Site: Burvilles Rd/SC Hwy AM

Burvilles Rd/SC Hwy
Signals - Fixed Time Cycle Time = 130 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	24	56	20	6
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	30	62	26	12
Phase Split	23 %	48 %	20 %	9 %



MOVEMENT SUMMARY

Site: Burvilles Rd/SC Hwy PM

Burvilles Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	55	0.0	0.045	10.3	LOS B	0.2	1.4	0.05	0.67	56.8
2	T	529	0.0	0.291	34.5	LOS C	9.6	67.1	0.81	0.67	35.9
3	R	153	0.0	0.345	43.3	LOS D	8.4	58.7	0.80	0.79	30.7
Approach		737	0.0	0.345	34.5	LOS C	9.6	67.1	0.75	0.69	35.6
East: Burvilles Rd											
4	L	229	0.0	0.482	15.5	LOS B	6.3	44.4	0.42	0.73	45.2
5	T	68	0.0	0.245	50.1	LOS D	5.0	34.9	0.93	0.71	24.3
6	R	426	0.0	0.802	68.3	LOS E	14.5	101.8	1.00	0.91	22.9
Approach		724	0.0	0.802	49.8	LOS D	14.5	101.8	0.81	0.84	27.4
North: SC Hwy											
7	L	284	0.0	0.325	11.0	LOS B	3.3	23.1	0.21	0.70	55.6
8	T	1502	0.0	0.826	44.7	LOS D	28.1	196.8	0.96	0.89	31.0
9	R	211	0.0	0.842	58.2	LOS E	13.2	92.4	0.83	0.91	25.3
Approach		1997	0.0	0.841	41.3	LOS D	28.1	196.8	0.84	0.86	32.2
West: Burvilles Rd											
10	L	64	0.0	0.566	47.2	LOS D	5.7	40.0	1.00	0.77	28.8
11	T	29	0.0	0.566	36.0	LOS D	5.7	40.0	1.00	0.77	27.1
12	R	23	0.0	0.247	71.9	LOS E	2.1	14.6	0.99	0.71	22.2
Approach		117	0.0	0.566	49.8	LOS D	5.7	40.0	1.00	0.76	26.8
All Vehicles		3575	0.0	0.841	41.9	LOS D	28.1	196.8	0.82	0.82	31.5

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

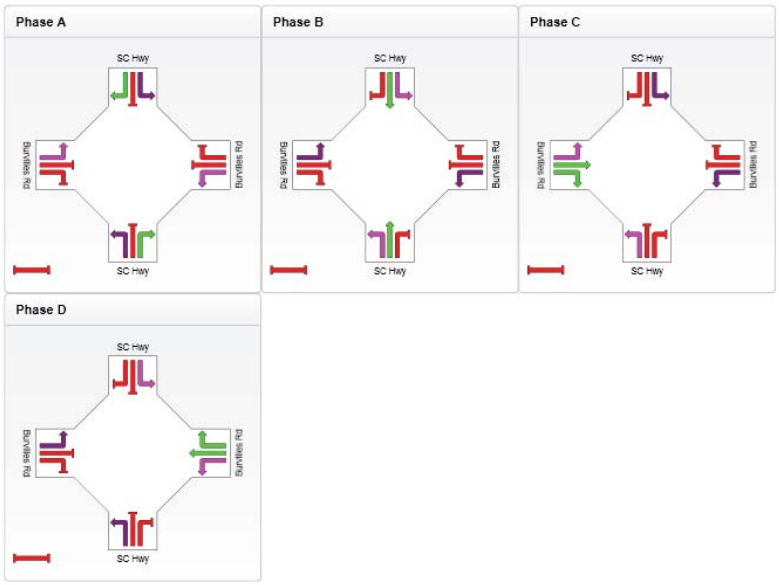
Site: Burvilles Rd/SC Hwy PM

Burvilles Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	37	36	6	17
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	43	42	12	23
Phase Split	36 %	35 %	10 %	19 %



Main St and SC Hwy

MOVEMENT SUMMARY

Site: Main St/SC Hwy AM

Main St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	52	0.0	0.038	10.1	LOS B	0.2	1.2	0.05	0.67	57.0
2	T	1699	0.0	0.827	39.9	LOS D	30.9	216.4	0.94	0.87	30.5
3	R	142	0.0	0.806	73.0	LOS E	10.5	73.3	1.00	0.87	21.7
Approach		1893	0.0	0.827	41.6	LOS D	30.9	216.4	0.92	0.87	29.9
East	Main St										
4	L	36	0.0	0.172	38.3	LOS D	4.6	31.9	0.77	0.85	32.9
5	T	64	0.0	0.172	27.3	LOS C	4.6	31.9	0.77	0.64	30.6
6	R	66	0.0	0.212	66.4	LOS E	2.8	19.4	0.97	0.73	23.3
Approach		166	0.0	0.212	45.3	LOS D	4.6	31.9	0.85	0.72	27.4
North	SC Hwy										
7	L	265	0.0	0.294	10.6	LOS B	1.3	8.8	0.07	0.67	56.3
8	T	836	0.0	0.404	30.7	LOS C	12.4	86.8	0.71	0.60	35.6
9	R	88	0.0	0.514	68.3	LOS E	6.6	46.5	0.96	0.77	22.7
Approach		1189	0.0	0.514	29.0	LOS C	12.4	86.8	0.59	0.63	37.1
West	Main St										
10	L	247	0.0	0.827	57.2	LOS E	27.9	195.2	0.99	1.03	26.2
11	T	256	0.0	0.827	46.9	LOS D	27.9	195.2	0.99	1.02	22.8
12	R	121	0.0	0.774	72.9	LOS E	9.3	64.9	1.00	0.89	22.0
Approach		624	0.0	0.828	56.0	LOS E	27.9	195.2	0.99	1.00	24.0
All Vehicles		3873	0.0	0.827	40.2	LOS D	30.9	216.4	0.83	0.81	30.4

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

SIDRA INTERSECTION

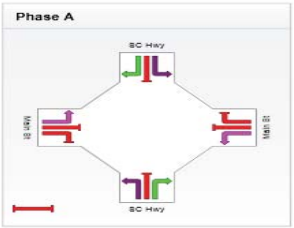
PHASING SUMMARY

Site: Main St/SC Hwy AM

Main St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

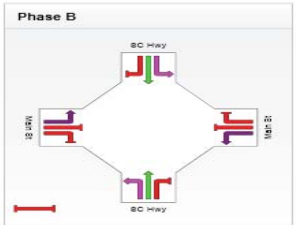
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: original (phase reduction applied)
Input Sequence: A, New Phase - 5, B, C, D
Output Sequence: A, B, C, D

Phase A



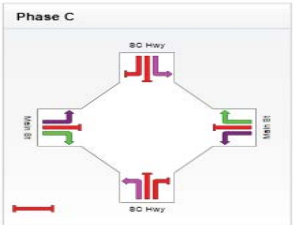
Green Time = 11 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 17 sec
Phase Split = 14 %

Phase B



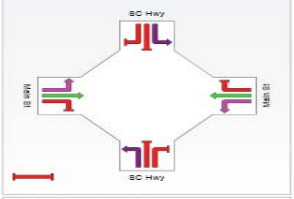
Green Time = 41 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 47 sec
Phase Split = 39 %

Phase C



Green Time = 10 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 16 sec
Phase Split = 13 %

Phase D



Green Time = 34 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 40 sec
Phase Split = 33 %

MOVEMENT SUMMARY

Site: Main St/SC Hwy PM

Main St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	95	0.0	0.078	10.3	LOS B	0.4	2.5	0.06	0.67	56.7
2	T	789	0.0	0.579	44.9	LOS D	14.6	102.0	0.90	0.76	28.6
3	R	136	0.0	0.770	71.9	LOS E	10.0	69.8	1.00	0.85	21.9
Approach		1020	0.0	0.770	45.3	LOS D	14.6	102.0	0.83	0.76	28.7
East	Main St										
4	L	204	0.0	0.472	37.1	LOS D	12.5	87.2	0.82	0.92	32.8
5	T	119	0.0	0.472	27.4	LOS C	12.5	87.2	0.82	0.78	29.8
6	R	379	0.0	0.766	50.0	LOS D	11.2	78.2	0.82	0.87	27.6
Approach		702	0.0	0.765	42.4	LOS D	12.5	87.2	0.82	0.87	29.3
North	SC Hwy										
7	L	253	0.0	0.166	10.2	LOS B	1.0	6.8	0.06	0.67	56.8
8	T	1517	0.0	0.770	38.5	LOS D	26.0	182.2	0.91	0.81	31.1
9	R	200	0.0	0.556	57.9	LOS E	11.9	83.6	0.92	0.82	25.4
Approach		1969	0.0	0.770	36.9	LOS D	26.0	182.2	0.80	0.80	32.3
West	Main St										
10	L	112	0.0	0.678	44.5	LOS D	8.8	61.3	1.00	0.82	29.8
11	T	51	0.0	0.678	35.0	LOS D	8.8	61.3	1.00	0.82	26.2
12	R	41	0.0	0.263	66.8	LOS E	3.4	23.7	0.97	0.74	23.2
Approach		203	0.0	0.678	46.6	LOS D	8.8	61.3	0.99	0.81	27.4
All Vehicles		3895	0.0	0.770	40.6	LOS D	26.0	182.2	0.82	0.80	30.4

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Processed: Thursday, 29 September 2011 4:46:43 PM
SIDRA INTERSECTION 4.0.12.1029
Project: P:\IM20000-20990\IM20761\Sidra Scats\110927-IM20761 Double RHT Lanes.sip
8000056, GTA CONSULTANTS, FLOATING

SIDRA INTERSECTION

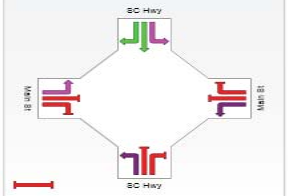
PHASING SUMMARY

Site: Main St/SC Hwy PM

Main St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

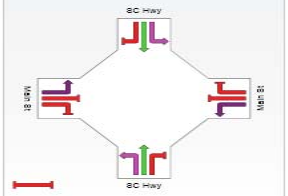
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D, Copy of A
Output Sequence: A, B, C, D, Copy of A

Phase A



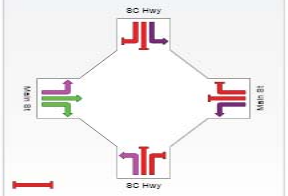
Green Time = 6 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 12 sec
Phase Split = 10 %

Phase B



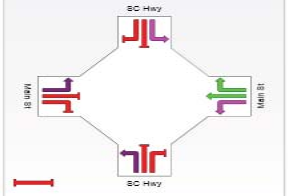
Green Time = 27 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 33 sec
Phase Split = 27 %

Phase C



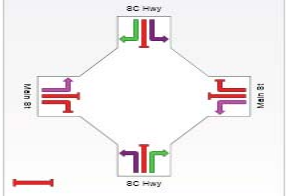
Green Time = 10 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 16 sec
Phase Split = 13 %

Phase D



Green Time = 36 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 42 sec
Phase Split = 35 %

Phase Copy of A



Green Time = 11 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 17 sec
Phase Split = 14 %

Access St and SC Hwy

MOVEMENT SUMMARY

Site: Access St/SC Hwy AM

Access St/SC Hwy
Signals - Fixed Time Cycle Time = 80 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	20	0.0	0.013	10.0	LOS A	0.0	0.3	0.05	0.67	57.2
2	T	1545	0.0	0.755	25.7	LOS C	18.6	130.0	0.89	0.80	38.2
3	R	241	0.0	0.626	42.5	LOS D	10.3	71.9	0.93	0.82	31.0
Approach		1806	0.0	0.755	27.7	LOS C	18.6	130.0	0.89	0.80	37.2
East	Access St										
4	L	60	0.0	0.220	24.3	LOS C	2.5	17.3	0.85	0.77	39.4
5	T	24	0.0	0.220	14.9	LOS B	2.5	17.3	0.85	0.66	36.7
6	R	112	0.0	0.396	50.0	LOS D	3.2	22.7	0.99	0.74	27.6
Approach		196	0.0	0.396	37.8	LOS D	3.2	22.7	0.93	0.74	31.3
North	SC Hwy										
7	L	448	0.0	0.406	12.4	LOS B	6.2	43.7	0.39	0.74	53.6
8	T	835	0.0	0.648	32.0	LOS C	11.5	80.4	0.93	0.78	34.3
9	R	65	0.0	0.464	51.2	LOS D	3.7	26.0	0.96	0.75	27.6
Approach		1348	0.0	0.648	26.4	LOS C	11.5	80.4	0.75	0.77	36.5
West	Access St										
10	L	271	0.0	0.778	30.8	LOS C	11.6	81.4	0.96	0.94	35.6
11	T	99	0.0	0.779	21.5	LOS C	11.6	81.4	0.96	0.92	32.1
12	R	100	0.0	0.323	37.9	LOS D	4.6	32.4	0.87	0.77	32.0
Approach		469	0.0	0.779	30.4	LOS C	11.6	81.4	0.95	0.90	34.1
All Vehicles		3820	0.0	0.779	28.1	LOS C	18.6	130.0	0.85	0.80	36.8

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

SIDRA INTERSECTION

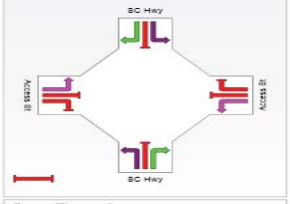
PHASING SUMMARY

Site: Access St/SC Hwy AM

Access St/SC Hwy
Signals - Fixed Time Cycle Time = 80 seconds

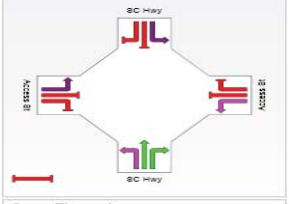
Cycle Time Option: **Practical Cycle Time**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, New Phase - 5, B, C, D
Output Sequence: A, New Phase - 5, B, C, D

Phase A



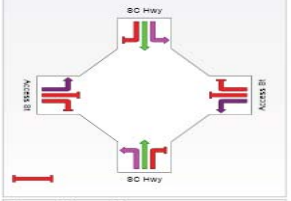
Green Time = 6 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 12 sec
Phase Split = 15 %

Phase New Phase - 5



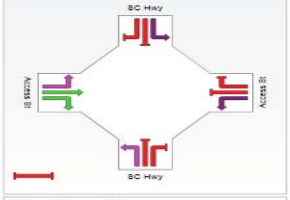
Green Time = 4 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 10 sec
Phase Split = 12 %

Phase B



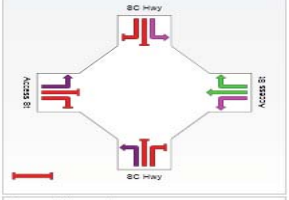
Green Time = 17 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 23 sec
Phase Split = 28 %

Phase C



Green Time = 17 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 23 sec
Phase Split = 28 %

Phase D



Green Time = 6 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 12 sec
Phase Split = 15 %

MOVEMENT SUMMARY

Site: Access St/SC Hwy PM

Access St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	85	0.0	0.073	10.3	LOS B	0.3	2.3	0.06	0.67	56.7
2	T	1042	0.0	0.480	29.8	LOS C	15.1	105.5	0.72	0.62	36.1
3	R	153	0.0	0.501	60.6	LOS E	9.7	68.2	0.93	0.80	24.7
Approach		1280	0.0	0.501	32.2	LOS C	15.1	105.5	0.70	0.65	35.0
East	Access St										
4	L	229	0.0	0.626	43.7	LOS D	14.2	99.6	0.92	0.94	30.1
5	T	106	0.0	0.626	34.2	LOS C	14.2	99.6	0.92	0.89	26.6
6	R	426	0.0	0.698	56.9	LOS E	16.4	114.8	0.96	0.84	25.6
Approach		762	0.0	0.698	49.8	LOS D	16.4	114.8	0.94	0.88	27.0
North	SC Hwy										
7	L	284	0.0	0.249	11.3	LOS B	3.7	26.0	0.23	0.71	55.2
8	T	1533	0.0	0.706	33.1	LOS C	24.1	168.8	0.85	0.75	33.9
9	R	199	0.0	0.670	62.7	LOS E	12.6	88.2	0.97	0.83	24.1
Approach		2016	0.0	0.706	33.0	LOS C	24.1	168.8	0.77	0.75	34.4
West	Access St										
10	L	100	0.0	0.652	41.4	LOS D	7.3	51.3	1.00	0.81	31.0
11	T	45	0.0	0.651	31.9	LOS C	7.3	51.3	1.00	0.81	27.4
12	R	37	0.0	0.262	68.0	LOS E	3.1	21.7	0.98	0.73	23.0
Approach		182	0.0	0.651	44.4	LOS D	7.3	51.3	0.99	0.80	28.1
All Vehicles		4240	0.0	0.706	36.3	LOS D	24.1	168.8	0.79	0.74	32.5

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

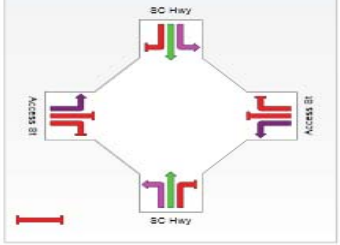
PHASING SUMMARY

Site: Access St/SC Hwy PM

Access St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

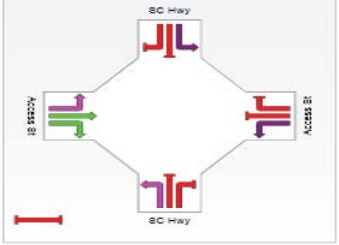
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn (phase reduction applied)
Input Sequence: A, B, C, D, Copy of A
Output Sequence: B, C, D, Copy of A

Phase B



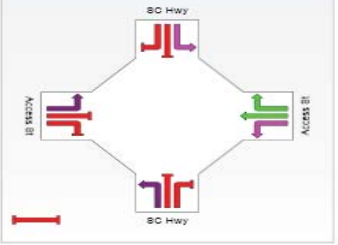
Green Time = 43 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 49 sec
Phase Split = 40 %

Phase C



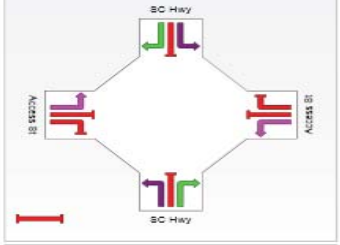
Green Time = 9 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 15 sec
Phase Split = 12 %

Phase D



Green Time = 25 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 31 sec
Phase Split = 25 %

Phase Copy of A



Green Time = 19 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 25 sec
Phase Split = 20 %

Boundary Road and SC Hwy

MOVEMENT SUMMARY

Site: Boundary Rd/SC Hwy AM

Boundary Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	22	0.0	0.016	10.0	LOS B	0.1	0.4	0.05	0.67	57.2
2	T	1552	0.0	0.731	34.5	LOS C	25.0	175.2	0.87	0.77	33.1
3	R	239	0.0	0.710	61.8	LOS E	14.7	102.8	0.97	0.84	24.4
Approach		1813	0.0	0.731	37.8	LOS D	25.0	175.2	0.87	0.78	31.8
East	Boundary Rd										
4	L	60	0.0	0.165	26.4	LOS C	3.3	23.0	0.76	0.78	38.1
5	T	28	0.0	0.165	16.9	LOS B	3.3	23.0	0.76	0.60	35.8
6	R	111	0.0	0.442	70.4	LOS E	4.6	32.1	1.00	0.75	22.5
Approach		199	0.0	0.442	49.5	LOS D	4.6	32.1	0.89	0.74	27.1
North	SC Hwy										
7	L	444	0.0	0.401	10.6	LOS B	2.3	16.3	0.08	0.68	56.3
8	T	832	0.0	0.392	29.6	LOS C	12.1	84.9	0.69	0.59	36.3
9	R	61	0.0	0.186	55.8	LOS E	4.1	28.6	0.84	0.76	26.0
Approach		1337	0.0	0.401	24.5	LOS C	12.1	84.9	0.50	0.63	40.4
West	Boundary Rd										
10	L	296	0.0	0.729	46.0	LOS D	17.8	124.3	0.95	0.99	29.2
11	T	112	0.0	0.729	36.7	LOS D	17.8	124.3	0.95	0.95	25.6
12	R	89	0.0	0.715	73.3	LOS E	7.2	50.3	1.00	0.84	21.9
Approach		499	0.0	0.729	48.9	LOS D	17.8	124.3	0.96	0.95	26.8
All Vehicles		3847	0.0	0.731	35.2	LOS D	25.0	175.2	0.76	0.75	33.0

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

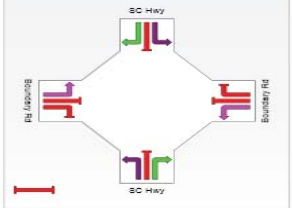
PHASING SUMMARY

Site: Boundary Rd/SC Hwy AM

Boundary Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

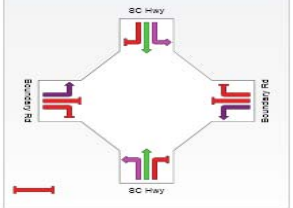
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase A



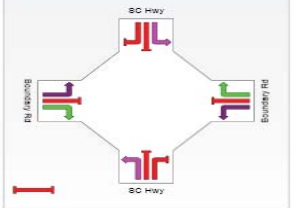
Green Time = 21 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 27 sec
Phase Split = 22 %

Phase B



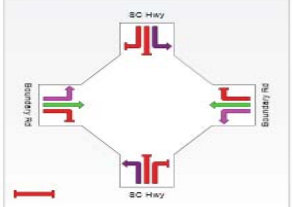
Green Time = 42 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 48 sec
Phase Split = 40 %

Phase C



Green Time = 8 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 14 sec
Phase Split = 11 %

Phase D



Green Time = 25 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 31 sec
Phase Split = 25 %

MOVEMENT SUMMARY

Site: Boundary Rd/SC Hwy PM

Boundary Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	103	0.0	0.093	10.4	LOS B	0.4	2.9	0.06	0.67	56.6
2	T	1345	0.0	0.701	37.6	LOS D	22.3	156.1	0.88	0.77	31.6
3	R	120	0.0	0.618	61.5	LOS E	8.3	57.9	1.00	0.79	24.4
Approach		1568	0.0	0.701	37.7	LOS D	22.3	156.1	0.83	0.76	31.8
East	Boundary Rd										
4	L	179	0.0	0.697	48.5	LOS D	15.2	106.5	0.97	0.92	28.7
5	T	129	0.0	0.697	38.5	LOS D	15.2	106.5	0.97	0.89	25.2
6	R	333	0.0	0.665	64.5	LOS E	11.3	79.0	1.00	0.83	23.7
Approach		641	0.0	0.697	54.8	LOS D	15.2	106.5	0.99	0.87	25.3
North	SC Hwy										
7	L	222	0.0	0.163	10.1	LOS B	0.8	5.5	0.06	0.67	57.0
8	T	1563	0.0	0.619	25.7	LOS C	21.3	149.3	0.73	0.65	38.7
9	R	214	0.0	0.683	62.1	LOS E	13.3	93.4	0.97	0.83	24.2
Approach		1999	0.0	0.683	27.9	LOS C	21.3	149.3	0.68	0.67	37.6
West	Boundary Rd										
10	L	122	0.0	0.364	37.7	LOS D	8.2	57.7	0.86	0.86	32.4
11	T	56	0.0	0.364	28.3	LOS C	8.2	57.7	0.86	0.76	29.2
12	R	44	0.0	0.219	59.6	LOS E	3.4	23.7	0.92	0.74	24.9
Approach		222	0.0	0.364	39.7	LOS D	8.2	57.7	0.87	0.81	29.9
All Vehicles		4431	0.0	0.701	35.8	LOS D	22.3	156.1	0.79	0.74	32.7

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

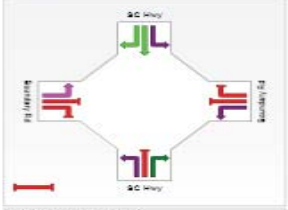
PHASING SUMMARY

Site: Boundary Rd/SC Hwy PM

Boundary Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

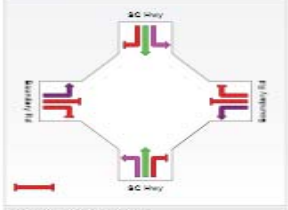
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D, Copy of A
Output Sequence: A, B, C, D, Copy of A

Phase A



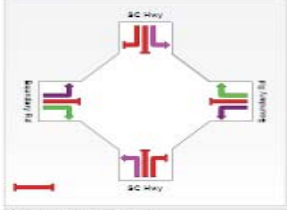
Green Time = 6 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 12 sec
Phase Split = 10 %

Phase B



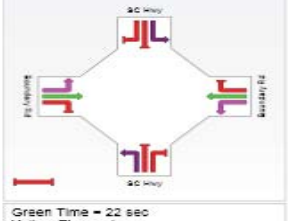
Green Time = 38 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 44 sec
Phase Split = 36 %

Phase C



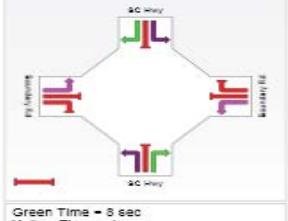
Green Time = 16 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 22 sec
Phase Split = 18 %

Phase D



Green Time = 22 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 28 sec
Phase Split = 23 %

Phase Copy of A



Green Time = 8 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 14 sec
Phase Split = 11 %

Left In Left Out (South)

MOVEMENT SUMMARY

Site: Left in Left Out South AM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RoadName											
1	L	196	0.0	0.105	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	1293	0.0	0.221	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1488	0.0	0.221	1.1	LOS A	0.0	0.0	0.00	0.09	58.3
North: RoadName											
8	T	873	0.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		873	0.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: RoadName											
10	L	393	0.0	0.933	50.5	LOS F	14.3	99.9	0.98	1.88	25.1
Approach		393	0.0	0.932	50.5	LOS F	14.3	99.9	0.98	1.88	25.1
All Vehicles		2754	0.0	0.932	7.6	NA	14.3	99.9	0.14	0.31	49.4

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

re assign % traffic to whites

MOVEMENT SUMMARY

Site: Left in Left Out South PM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RoadName											
1	L	160	0.0	0.086	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	552	0.0	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		712	0.0	0.094	1.8	LOS A	0.0	0.0	0.00	0.15	57.1
North: RoadName											
8	T	1463	0.0	0.250	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1463	0.0	0.250	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: RoadName											
10	L	68	0.0	0.068	10.5	LOS B	0.4	2.6	0.54	0.74	46.5
Approach		68	0.0	0.068	10.5	LOS B	0.4	2.6	0.54	0.74	46.5
All Vehicles		2243	0.0	0.250	0.9	NA	0.4	2.6	0.02	0.07	58.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

Left In Left Out (North)

MOVEMENT SUMMARY

Site: Left in Left Out North AM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RoadName											
1	L	39	0.0	0.021	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	1552	0.0	0.265	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1591	0.0	0.265	0.2	LOS A	0.0	0.0	0.00	0.02	59.7
North: RoadName											
8	T	1355	0.0	0.232	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1355	0.0	0.232	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: RoadName											
10	L	155	0.0	0.467	24.8	LOS C	2.6	18.5	0.89	1.06	35.6
Approach		155	0.0	0.467	24.8	LOS C	2.6	18.5	0.89	1.06	35.6
All Vehicles		3100	0.0	0.467	1.3	NA	2.6	18.5	0.04	0.06	57.9

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: Left in Left Out North PM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RoadName											
1	L	140	0.0	0.075	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	1698	0.0	0.290	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1838	0.0	0.290	0.6	LOS A	0.0	0.0	0.00	0.05	59.0
North: RoadName											
8	T	2216	0.0	0.379	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		2216	0.0	0.379	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: RoadName											
10	L	60	0.0	0.239	25.2	LOS D	1.1	7.6	0.89	0.98	35.4
Approach		60	0.0	0.239	25.2	LOS D	1.1	7.6	0.89	0.98	35.4
All Vehicles		4114	0.0	0.379	0.6	NA	1.1	7.6	0.01	0.04	59.0

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

Appendix D

SIDRA Modelling Results (Interim Scenario)

Ring Road and East intersection (Interim)

MOVEMENT SUMMARY

Site: Ring Road-East Intersection-AM - Interim

Ring Road-East Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	252	2.0	0.452	11.9	LOS B	4.8	34.1	0.30	0.70	48.5
3	R	360	2.0	0.502	38.8	LOS D	17.1	121.6	0.81	0.83	31.6
Approach		612	2.0	0.502	27.8	LOS C	17.1	121.6	0.60	0.76	36.9
East: Ring Road											
4	L	77	2.0	0.073	10.4	LOS B	0.6	4.1	0.14	0.68	56.6
5	T	565	10.0	0.501	36.5	LOS D	14.9	113.5	0.87	0.74	34.7
Approach		642	9.0	0.501	33.4	LOS C	14.9	113.5	0.78	0.74	36.2
West: Ring Road											
11	T	858	10.0	0.461	20.1	LOS C	17.1	130.1	0.69	0.61	45.7
12	R	63	2.0	0.230	59.3	LOS E	4.6	32.8	0.92	0.76	25.0
Approach		921	9.5	0.461	22.8	LOS C	17.1	130.1	0.71	0.62	43.5
All Vehicles		2175	7.2	0.502	27.3	LOS C	17.1	130.1	0.70	0.70	39.2

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	32.3	LOS D	0.1	0.1	0.73	0.73
P3	Across E approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		106	43.2				0.84	0.84

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

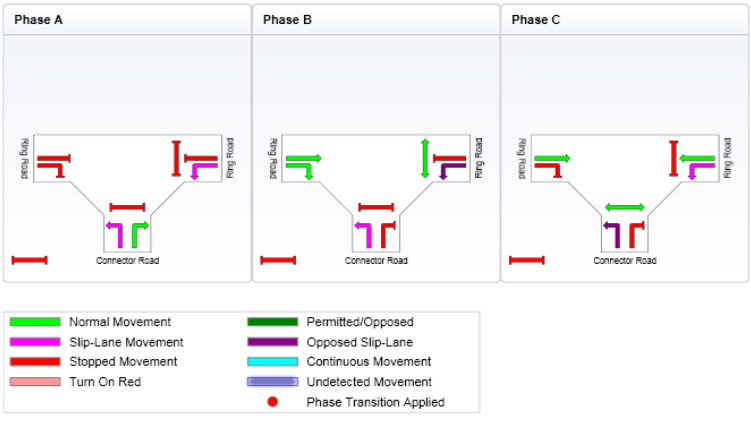
Site: Ring Road-East Intersection-AM - Interim

Ring Road-East Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	47	18	37
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	53	24	43
Phase Split	44 %	20 %	36 %



MOVEMENT SUMMARY

Site: Ring Road-East Intersection-PM - Interim

Ring Road-East Intersection-PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	141	2.0	0.179	10.8	LOS B	2.1	14.6	0.22	0.68	49.6
3	R	173	2.0	0.492	56.6	LOS E	10.8	77.1	0.94	0.81	25.7
Approach		314	2.0	0.492	36.0	LOS D	10.8	77.1	0.62	0.75	32.8
East: Ring Road											
4	L	259	2.0	0.347	11.1	LOS B	3.2	22.8	0.22	0.70	55.5
5	T	392	10.0	0.494	44.9	LOS D	11.8	89.7	0.93	0.77	31.0
Approach		651	6.8	0.494	31.4	LOS C	11.8	89.7	0.64	0.74	37.1
West: RoadNameRing Road											
11	T	743	10.0	0.267	6.7	LOS A	9.5	72.1	0.39	0.35	62.7
12	R	212	2.0	0.488	32.6	LOS C	9.4	67.1	0.67	0.79	36.0
Approach		955	8.2	0.488	12.5	LOS B	9.5	72.1	0.45	0.45	54.6
All Vehicles		1919	6.7	0.494	22.7	LOS C	11.8	89.7	0.55	0.60	43.1

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	40.8	LOS E	0.1	0.1	0.83	0.83
P3	Across E approach	53	26.0	LOS C	0.1	0.1	0.66	0.66
All Pedestrians		106	33.4				0.74	0.74

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

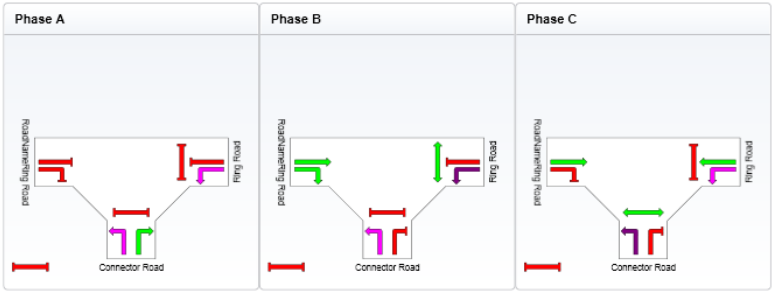
Site: Ring Road-East Intersection-PM - Interim

Ring Road-East Intersection-PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	23	53	26
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	29	59	32
Phase Split	24 %	49 %	27 %



Ring Road and Middle Intersection (Interim)

MOVEMENT SUMMARY

Site: Ring Road-Middle Intersection-AM -Interim

Ring Road-Middle Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	274	2.0	0.466	13.2	LOS B	6.3	44.8	0.36	0.72	47.2
3	R	335	2.0	0.467	38.3	LOS D	15.8	112.6	0.80	0.83	31.8
Approach		608	2.0	0.467	27.0	LOS C	15.8	112.6	0.60	0.78	37.3
East: Ring Road											
4	L	83	2.0	0.079	10.4	LOS B	0.6	4.5	0.14	0.66	56.6
5	T	699	10.0	0.619	36.2	LOS D	18.6	141.4	0.91	0.79	33.8
Approach		782	9.1	0.619	35.3	LOS D	18.6	141.4	0.83	0.78	35.2
West: Ring Road											
11	T	641	10.0	0.344	18.6	LOS B	12.6	95.8	0.64	0.55	47.2
12	R	68	2.0	0.249	59.5	LOS E	5.0	35.3	0.92	0.77	24.9
Approach		709	9.2	0.344	22.6	LOS C	12.6	95.8	0.67	0.57	43.9
All Vehicles		2100	7.1	0.619	28.6	LOS C	18.6	141.4	0.71	0.71	38.4

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	32.3	LOS D	0.1	0.1	0.73	0.73
P3	Across E approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		106	43.2				0.84	0.84

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

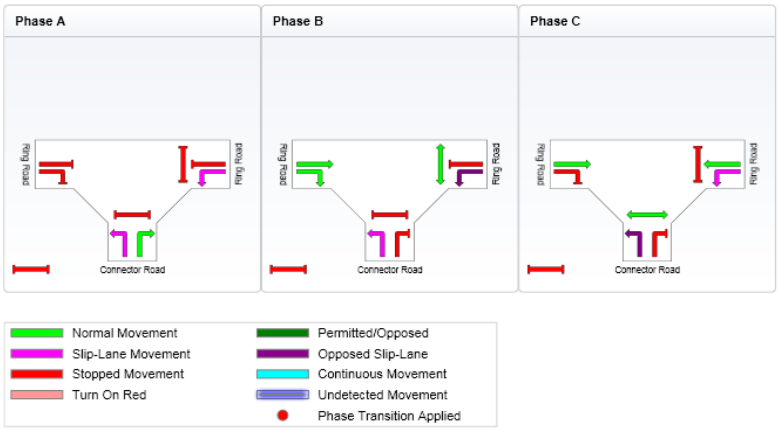
Site: Ring Road-Middle Intersection-AM -Interim

Ring Road-Middle Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	47	18	37
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	53	24	43
Phase Split	44 %	20 %	36 %



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8000056, GTA CONSULTANTS, FLOATING
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SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Ring Road-Middle Intersection-PM - Interim

Ring Road-Middle Intersection-PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	137	2.0	0.152	10.3	LOS B	1.7	11.8	0.19	0.67	50.1
3	R	167	2.0	0.457	55.3	LOS E	10.4	74.3	0.93	0.81	26.0
Approach		304	2.0	0.457	35.1	LOS D	10.4	74.3	0.60	0.75	33.2
East: Ring Road											
4	L	251	2.0	0.333	11.1	LOS B	3.1	21.8	0.21	0.70	55.6
5	T	304	10.0	0.453	47.7	LOS D	9.8	74.2	0.94	0.76	29.9
Approach		555	6.4	0.453	31.2	LOS C	9.8	74.2	0.61	0.74	37.2
West: Ring Road											
11	T	779	10.0	0.304	7.2	LOS A	10.2	77.5	0.41	0.36	61.8
12	R	205	2.0	0.456	30.5	LOS C	8.8	62.8	0.64	0.79	37.2
Approach		984	8.3	0.456	12.1	LOS B	10.2	77.5	0.46	0.45	55.0
All Vehicles		1843	6.7	0.457	21.6	LOS C	10.4	77.5	0.53	0.59	44.0

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	44.2	LOS E	0.2	0.2	0.86	0.86
P3	Across E approach	53	24.1	LOS C	0.1	0.1	0.63	0.63
All Pedestrians		106	34.1				0.75	0.75

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

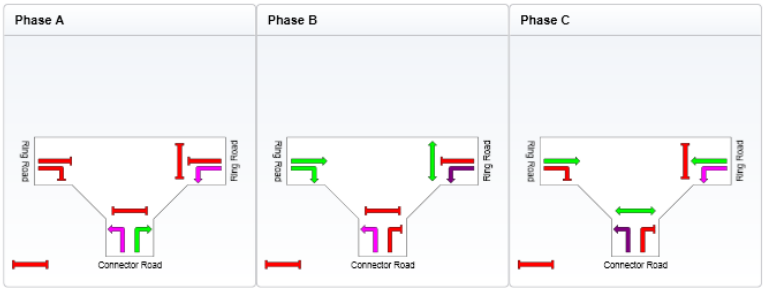
Site: Ring Road-Middle Intersection-PM - Interim

Ring Road-Middle Intersection-PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	24	56	22
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	30	62	28
Phase Split	25 %	52 %	23 %



Ring Road and Western Intersection (Interim)

MOVEMENT SUMMARY

Site: Ring Road-West Inter-section-AM - Interim

Ring Road-West Intersection-AM
Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	132	2.0	0.670	39.0	LOS D	10.5	74.1	0.82	0.85	31.9
2	T	76	0.0	0.672	29.7	LOS C	10.5	74.1	0.82	0.72	30.7
3	R	169	2.0	0.302	51.4	LOS D	11.1	78.7	0.81	0.80	27.3
Approach		377	1.6	0.671	42.7	LOS D	11.1	78.7	0.82	0.80	29.4
East: Ring Road											
4	L	52	2.0	0.061	10.7	LOS B	0.6	4.1	0.14	0.66	56.2
5	T	877	10.0	0.531	35.8	LOS D	22.7	172.3	0.80	0.70	35.3
6	R	682	0.0	0.707	64.6	LOS E	23.4	163.7	0.97	0.86	23.7
Approach		1611	5.5	0.707	47.2	LOS D	23.4	172.3	0.85	0.77	29.8
North: Train Station											
7	L	144	2.0	0.454	81.7	LOS F	6.8	48.3	0.99	0.77	20.3
8	T	72	2.0	0.669	74.8	LOS E	9.8	70.0	1.00	0.82	18.8
9	R	144	2.0	0.669	84.2	LOS F	9.8	70.0	1.00	0.82	20.0
Approach		360	2.0	0.669	81.3	LOS F	9.8	70.0	1.00	0.80	19.9
West: Ring Road											
10	L	682	0.0	0.717	16.5	LOS B	19.3	135.0	0.47	0.76	48.9
11	T	444	10.0	0.612	59.9	LOS E	16.3	123.5	0.97	0.81	26.1
12	R	42	2.0	0.493	90.0	LOS F	4.5	31.9	1.00	0.74	18.5
Approach		1168	3.9	0.717	35.7	LOS D	19.3	135.0	0.68	0.79	34.6
All Vehicles		3516	4.2	0.717	46.4	LOS D	23.4	172.3	0.81	0.78	29.6

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	56.3	LOS E	0.2	0.2	0.87	0.87
P5	Across N approach	53	63.5	LOS F	0.2	0.2	0.92	0.92
P7	Across W approach	53	47.2	LOS E	0.2	0.2	0.79	0.79
All Pedestrians		159	55.7				0.86	0.86

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

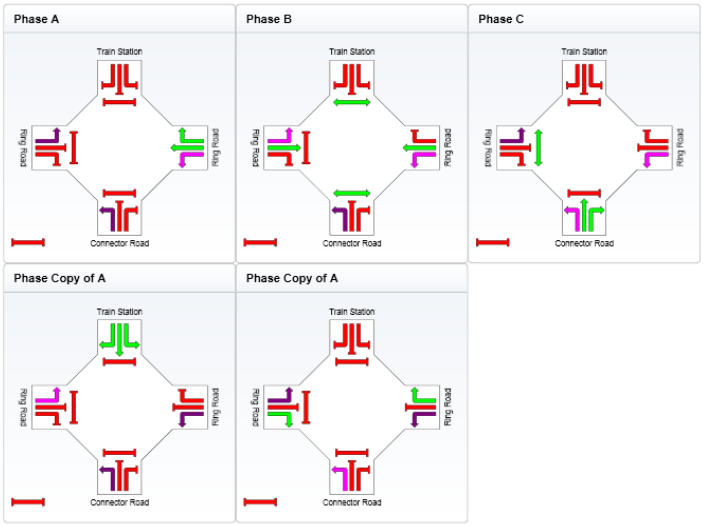
Site: Ring Road-West Inter-section-AM - Interim

Ring Road-West Intersection-AM
Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C, Copy of A, Copy of A
Output Sequence: A, B, C, Copy of A, Copy of A

Phase Timing Results

Phase	A	B	C	Copy of A	Copy of A
Green Time (sec)	25	29	46	13	7
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	31	35	52	19	13
Phase Split	21 %	23 %	35 %	13 %	9 %



MOVEMENT SUMMARY

Site: Ring Road-West Inter-section-PM - Interim

Ring Road-West Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connector Road											
1	L	81	2.0	0.536	39.7	LOS D	6.3	44.6	0.98	0.79	31.7
2	T	46	0.0	0.536	30.4	LOS C	6.3	44.6	0.98	0.77	30.0
3	R	104	2.0	0.621	68.7	LOS E	7.9	56.0	1.00	0.80	22.8
Approach		232	1.6	0.621	50.9	LOS D	7.9	56.0	0.99	0.79	26.6
East: Ring Road											
4	L	191	2.0	0.360	14.7	LOS B	4.5	32.2	0.37	0.72	51.0
5	T	260	10.0	0.361	45.8	LOS D	8.4	63.7	0.91	0.74	30.7
6	R	157	0.0	0.235	56.2	LOS E	5.4	38.0	0.90	0.77	26.0
Approach		607	4.9	0.361	38.8	LOS D	8.4	63.7	0.74	0.74	33.1
North: Train Station											
7	L	576	2.0	0.460	42.4	LOS D	14.6	103.7	0.83	0.83	30.2
8	T	288	2.0	0.680	36.4	LOS D	22.8	162.1	0.92	0.81	28.2
9	R	576	2.0	0.680	45.7	LOS D	22.8	162.1	0.92	0.86	29.2
Approach		1440	2.0	0.679	42.5	LOS D	22.8	162.1	0.88	0.84	29.4
West: Ring Road											
10	L	157	0.0	0.117	10.6	LOS B	1.5	10.6	0.17	0.69	56.1
11	T	399	10.0	0.568	48.1	LOS D	12.4	94.0	0.96	0.79	29.7
12	R	156	2.0	0.486	59.0	LOS E	10.1	71.7	0.95	0.81	25.1
Approach		712	6.0	0.568	42.2	LOS D	12.4	94.0	0.78	0.77	31.6
All Vehicles		2991	3.5	0.679	42.3	LOS D	22.8	162.1	0.84	0.80	30.3

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	46.8	LOS E	0.2	0.2	0.88	0.88
P5	Across N approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		159	51.7				0.93	0.93

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

PHASING SUMMARY

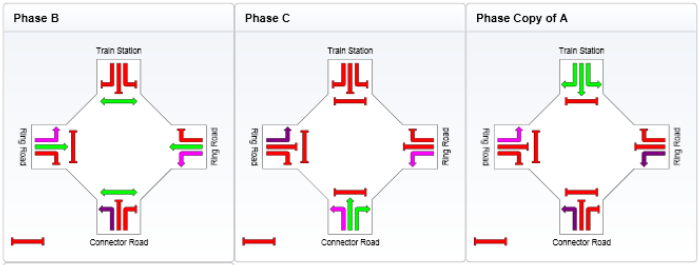
Site: Ring Road-West Inter-section-PM - Interim

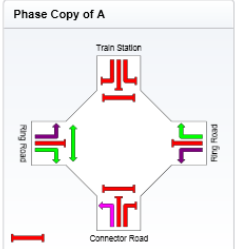
Ring Road-West Intersection-AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing (phase reduction applied)
Input Sequence: A, B, C, Copy of A, Copy of A
Output Sequence: B, C, Copy of A, Copy of A

Phase Timing Results

Phase	B	C	Copy of A	Copy of A
Green Time (sec)	23	11	41	21
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	29	17	47	27
Phase Split	24 %	14 %	39 %	23 %





SC Hwy and Feehams Rd (Interim)

MOVEMENT SUMMARY

Site: Feehams Rd/SC Hwy AM Interim

Feehams Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	37	0.0	0.036	10.6	LOS B	0.3	2.4	0.16	0.68	56.2
2	T	960	0.0	0.886	56.3	LOS E	31.5	220.7	1.00	1.01	27.0
3	R	16	0.0	0.126	69.1	LOS E	1.4	9.8	0.97	0.70	22.4
Approach		1013	0.0	0.886	54.8	LOS D	31.5	220.7	0.97	0.99	27.4
East: Southern E-W E											
4	L	42	0.0	0.188	26.6	LOS C	3.1	21.7	0.76	0.78	38.2
5	T	46	0.0	0.188	17.4	LOS B	3.1	21.7	0.76	0.59	37.6
6	R	305	0.0	0.888	73.2	LOS E	21.2	148.4	1.00	0.99	21.8
Approach		394	0.0	0.887	61.7	LOS E	21.2	148.4	0.95	0.92	24.0
North: SC Hwy											
7	L	137	0.0	0.169	11.0	LOS B	1.7	11.7	0.20	0.69	55.6
8	T	507	0.0	0.468	39.0	LOS D	13.9	97.0	0.88	0.75	33.5
9	R	101	0.0	0.808	76.9	LOS E	8.1	57.0	1.00	0.88	20.8
Approach		745	0.0	0.808	39.0	LOS D	13.9	97.0	0.77	0.75	33.3
West: Feehams Rd											
10	L	404	0.0	0.895	63.3	LOS E	34.8	243.6	1.00	1.14	24.2
11	T	184	0.0	0.896	54.2	LOS D	34.8	243.6	1.00	1.14	22.5
12	R	147	0.0	0.692	58.2	LOS E	9.7	67.7	0.93	0.83	25.2
Approach		736	0.0	0.895	60.0	LOS E	34.8	243.6	0.99	1.08	24.0
All Vehicles		2887	0.0	0.895	53.0	LOS D	34.8	243.6	0.92	0.94	27.2

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

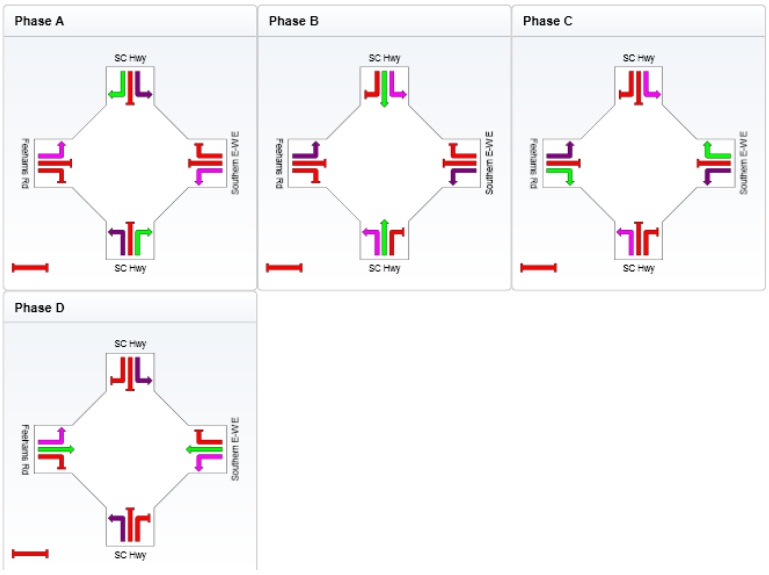
Site: Feehams Rd/SC Hwy AM Interim

Feehams Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	8	33	22	33
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	14	39	28	39
Phase Split	12 %	33 %	23 %	33 %



MOVEMENT SUMMARY

Site: Feehams Rd/SC Hwy PM - Interim

Feehams Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	77	0.0	0.101	11.5	LOS B	1.1	7.7	0.22	0.69	55.0
2	T	387	0.0	0.227	22.6	LOS C	8.7	61.0	0.67	0.56	43.8
3	R	53	0.0	0.240	52.7	LOS D	3.6	25.5	0.86	0.75	27.0
Approach		517	0.0	0.240	24.0	LOS C	8.7	61.0	0.62	0.60	42.5
East: Southern E-W E											
4	L	16	0.0	0.195	39.4	LOS D	1.7	11.7	0.95	0.73	31.9
5	T	16	0.0	0.195	30.3	LOS C	1.7	11.7	0.95	0.70	30.3
6	R	137	0.0	0.625	65.6	LOS E	9.6	67.5	1.00	0.81	23.4
Approach		168	0.0	0.625	59.9	LOS E	9.6	67.5	0.99	0.79	24.5
North: SC Hwy											
7	L	305	0.0	0.286	10.4	LOS B	2.4	16.9	0.16	0.69	56.4
8	T	1048	0.0	0.614	28.0	LOS C	24.1	168.9	0.83	0.74	39.5
9	R	211	0.0	0.561	57.2	LOS E	12.8	89.8	0.95	0.82	25.6
Approach		1564	0.0	0.614	28.5	LOS C	24.1	168.9	0.72	0.74	39.0
West: Feehams Rd											
10	L	91	0.0	0.546	37.2	LOS D	5.6	39.4	0.98	0.79	32.6
11	T	41	0.0	0.545	28.0	LOS C	5.6	39.4	0.98	0.77	30.9
12	R	33	0.0	0.165	61.5	LOS E	2.6	18.2	0.93	0.73	24.4
Approach		164	0.0	0.545	39.7	LOS D	5.6	39.4	0.97	0.76	30.2
All Vehicles		2414	0.0	0.625	30.5	LOS C	24.1	168.9	0.73	0.72	37.4

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

Site: Feehams Rd/SC Hwy PM - Interim

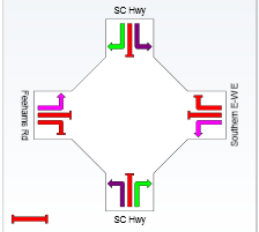
Feehams Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

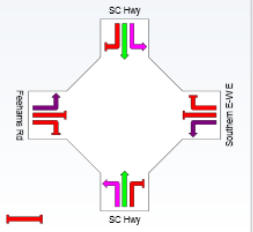
Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	24	52	14	6
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	30	58	20	12
Phase Split	25 %	48 %	17 %	10 %

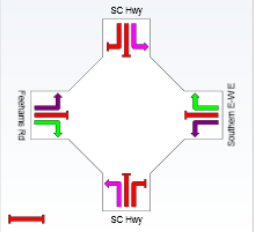
Phase A



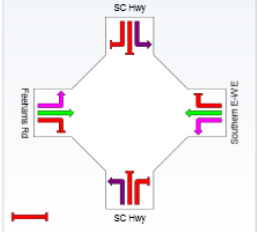
Phase B



Phase C



Phase D



SC Hwy and Whites Rd (Interim)

MOVEMENT SUMMARY

Site: Whites Rd/SC Hwy AM - Interim

Whites Rd/SC Hwy
Signals - Fixed Time Cycle Time = 145 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	21	0.0	0.019	10.2	LOS B	0.1	1.0	0.11	0.67	56.8
2	T	1108	0.0	0.949	83.0	LOS F	49.6	347.3	1.00	1.13	21.0
3	R	16	0.0	0.203	86.6	LOS F	1.7	12.2	1.00	0.69	19.0
Approach		1145	0.0	0.949	81.8	LOS F	49.6	347.3	0.98	1.11	21.2
East: Southern E-W E											
4	L	42	0.0	0.152	26.9	LOS C	2.8	19.3	0.70	0.76	37.8
5	T	26	0.0	0.152	17.8	LOS B	2.8	19.3	0.70	0.54	37.4
6	R	337	0.0	0.930	93.6	LOS F	29.2	204.2	1.00	1.04	18.5
Approach		405	0.0	0.930	81.7	LOS F	29.2	204.2	0.95	0.98	20.1
North: SC Hwy											
7	L	142	0.0	0.153	10.5	LOS B	1.4	9.7	0.14	0.68	56.4
8	T	598	0.0	0.512	45.2	LOS D	18.5	129.5	0.88	0.76	31.0
9	R	58	0.0	0.746	91.5	LOS F	5.9	41.6	1.00	0.82	16.2
Approach		798	0.0	0.746	42.4	LOS D	18.5	129.5	0.76	0.75	31.8
West: Whites Rd											
10	L	621	0.0	0.948	84.3	LOS F	57.8	404.7	1.00	1.23	19.9
11	T	104	0.0	0.949	75.2	LOS E	57.8	404.7	1.00	1.23	18.4
12	R	83	0.0	0.452	62.3	LOS E	6.5	45.8	0.89	0.76	24.2
Approach		808	0.0	0.948	80.9	LOS F	57.8	404.7	0.99	1.18	20.1
All Vehicles		3157	0.0	0.949	71.6	LOS E	57.8	404.7	0.92	1.02	22.6

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

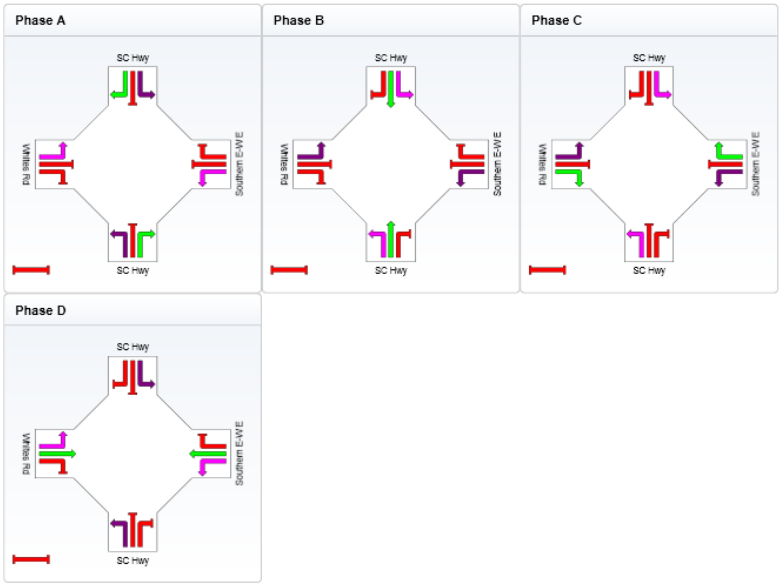
Site: Whites Rd/SC Hwy AM - Interim

Whites Rd/SC Hwy
Signals - Fixed Time Cycle Time = 145 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	6	43	28	44
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	12	49	34	50
Phase Split	8 %	34 %	23 %	34 %



MOVEMENT SUMMARY

Site: Whites Rd/SC Hwy PM - Interim

Whites Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	97	0.0	0.127	11.1	LOS B	1.2	8.6	0.21	0.69	55.4
2	T	385	0.0	0.733	56.9	LOS E	13.0	90.8	1.00	0.86	26.9
3	R	42	0.0	0.168	60.5	LOS E	3.2	22.6	0.92	0.74	24.6
Approach		524	0.0	0.733	48.8	LOS D	13.0	90.8	0.85	0.82	29.2
East: Southern E-W E											
4	L	16	0.0	0.267	41.4	LOS D	2.0	13.7	0.98	0.73	31.2
5	T	21	0.0	0.268	32.2	LOS C	2.0	13.7	0.96	0.71	29.6
6	R	142	0.0	0.757	70.6	LOS E	10.4	72.9	1.00	0.87	22.4
Approach		179	0.0	0.757	63.5	LOS E	10.4	72.9	0.99	0.84	23.6
North: SC Hwy											
7	L	337	0.0	0.325	10.5	LOS B	2.9	20.6	0.17	0.70	56.3
8	T	1478	0.0	0.736	24.7	LOS C	33.9	237.1	0.85	0.77	41.7
9	R	265	0.0	0.463	27.9	LOS C	10.4	73.1	0.61	0.79	38.9
Approach		2080	0.0	0.736	22.8	LOS C	33.9	237.1	0.71	0.76	43.0
West: Whites Rd											
10	L	114	0.0	0.658	59.0	LOS E	10.1	70.4	0.99	0.92	25.3
11	T	52	0.0	0.657	49.8	LOS D	10.1	70.4	0.99	0.92	23.6
12	R	41	0.0	0.219	64.2	LOS E	3.3	23.1	0.96	0.74	23.7
Approach		206	0.0	0.657	57.7	LOS E	10.1	70.4	0.99	0.88	24.6
All Vehicles		2989	0.0	0.757	32.2	LOS C	33.9	237.1	0.77	0.79	36.3

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

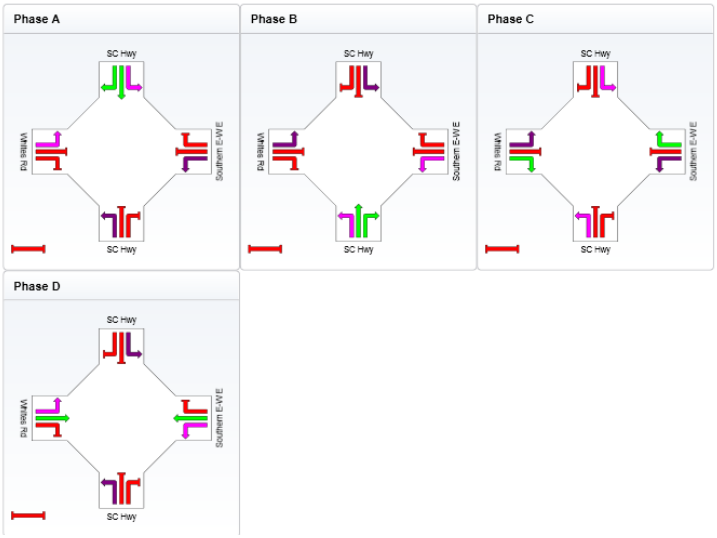
Site: Whites Rd/SC Hwy PM - Interim

Whites Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	61	16	12	7
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	67	22	18	13
Phase Split	56 %	18 %	15 %	11 %



Burvilles Road and SC Hwy (Interim)

MOVEMENT SUMMARY

Site: Burvilles Rd/SC Hwy AM - Interim

Burvilles Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	8	0.0	0.006	10.0	LOS B	0.0	0.2	0.05	0.66	57.2
2	T	1438	0.0	0.782	23.3	LOS C	31.0	217.0	0.80	0.72	42.8
3	R	241	0.0	0.771	64.6	LOS E	15.3	107.3	0.99	0.86	23.6
Approach		1687	0.0	0.782	29.2	LOS C	31.0	217.0	0.82	0.74	38.8
East: Burvilles Rd											
4	L	60	0.0	0.108	11.0	LOS B	1.0	6.7	0.24	0.68	49.2
5	T	11	0.0	0.107	61.6	LOS E	1.0	6.7	0.98	0.66	21.5
6	R	112	0.0	0.595	74.2	LOS E	4.8	33.6	1.00	0.77	21.7
Approach		182	0.0	0.595	52.6	LOS D	4.8	33.6	0.75	0.73	26.6
North: SC Hwy											
7	L	448	0.0	0.357	10.5	LOS B	2.2	15.3	0.08	0.68	56.4
8	T	669	0.0	0.364	17.8	LOS B	11.1	77.7	0.52	0.45	48.5
9	R	64	0.0	0.291	57.0	LOS E	4.4	30.5	0.85	0.76	25.6
Approach		1182	0.0	0.364	17.2	LOS B	11.1	77.7	0.37	0.56	48.7
West: Burvilles Rd											
10	L	194	0.0	0.733	35.9	LOS D	9.4	65.9	0.96	0.87	33.0
11	T	40	0.0	0.734	26.7	LOS C	9.4	65.9	0.96	0.85	31.3
12	R	96	0.0	0.436	63.9	LOS E	7.0	49.0	0.97	0.76	23.8
Approach		329	0.0	0.734	42.9	LOS D	9.4	65.9	0.96	0.84	29.5
All Vehicles		3381	0.0	0.782	27.6	LOS C	31.0	217.0	0.67	0.69	39.4

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Processed: Tuesday, 30 August 2011 4:21:23 PM
SIDRA INTERSECTION 5.0.5.1510
Project: P:\IM20000-20990\IM20761\Sidra Scats\110830-IM20761.sip
8000056, GTA CONSULTANTS, FLOATING

SIDRA INTERSECTION

PHASING SUMMARY

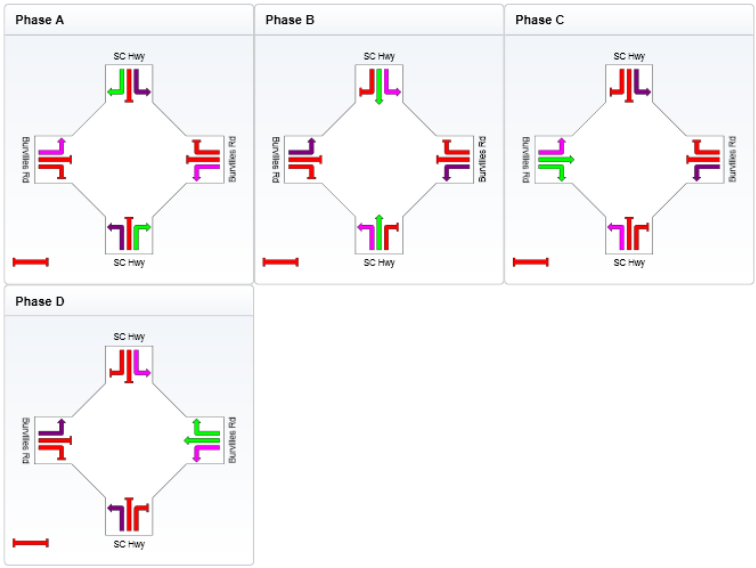
Site: Burvilles Rd/SC Hwy AM - Interim

Burvilles Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	20	56	14	6
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	26	62	20	12
Phase Split	22 %	52 %	17 %	10 %



MOVEMENT SUMMARY

Site: Burvilles Rd/SC Hwy PM - Interim

Burvilles Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: SC Hwy											
1	L	55	0.0	0.046	10.3	LOS B	0.2	1.4	0.05	0.67	56.7
2	T	423	0.0	0.256	24.9	LOS C	9.8	68.4	0.70	0.59	42.0
3	R	153	0.0	0.724	61.0	LOS E	10.2	71.2	0.95	0.84	24.6
Approach		631	0.0	0.724	32.4	LOS C	10.2	71.2	0.70	0.66	36.9
East: Burvilles Rd											
4	L	229	0.0	0.597	16.1	LOS B	6.9	48.0	0.46	0.74	44.7
5	T	68	0.0	0.208	46.9	LOS D	4.8	33.8	0.90	0.70	25.2
6	R	426	0.0	0.682	61.4	LOS E	13.6	95.3	0.99	0.84	24.4
Approach		724	0.0	0.682	45.7	LOS D	13.6	95.3	0.82	0.80	28.7
North: SC Hwy											
7	L	284	0.0	0.334	11.1	LOS B	3.5	24.6	0.22	0.70	55.4
8	T	1202	0.0	0.729	28.3	LOS C	26.9	188.1	0.81	0.73	39.4
9	R	211	0.0	0.641	60.5	LOS E	13.2	92.5	0.98	0.83	24.6
Approach		1697	0.0	0.728	29.4	LOS C	26.9	188.1	0.73	0.74	36.5
West: Burvilles Rd											
10	L	64	0.0	0.580	47.3	LOS D	5.8	40.3	0.99	0.78	28.8
11	T	29	0.0	0.581	36.1	LOS D	5.8	40.3	0.99	0.77	27.0
12	R	23	0.0	0.247	72.0	LOS E	2.1	14.6	0.99	0.71	22.1
Approach		117	0.0	0.581	49.8	LOS D	5.8	40.3	0.99	0.76	26.7
All Vehicles		3168	0.0	0.728	34.5	LOS C	26.9	188.1	0.76	0.73	34.9

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

PHASING SUMMARY

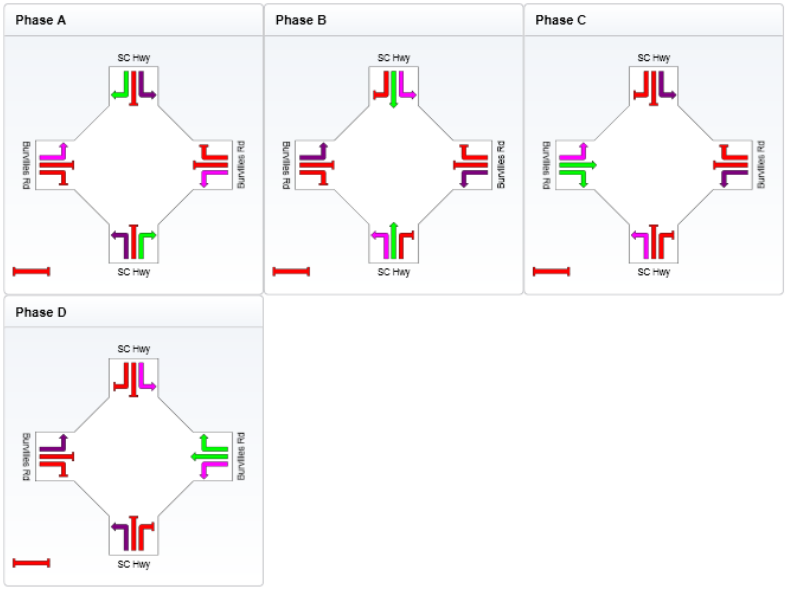
Site: Burvilles Rd/SC Hwy PM - Interim

Burvilles Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	21	49	6	20
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	27	55	12	26
Phase Split	23 %	46 %	10 %	22 %



Main Street and SC Hwy (Interim)

MOVEMENT SUMMARY

Site: Main St/SC Hwy AM - Interim

Main St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	52	0.0	0.038	10.1	LOS B	0.2	1.2	0.05	0.67	57.0
2	T	1359	0.0	0.888	41.8	LOS D	40.4	282.9	0.97	0.95	29.6
3	R	142	0.0	0.886	78.3	LOS E	10.9	76.5	1.00	0.93	20.5
Approach		1553	0.0	0.888	44.1	LOS D	40.4	282.9	0.94	0.94	28.9
East	Main St										
4	L	36	0.0	0.187	39.9	LOS D	4.8	33.3	0.79	0.85	32.2
5	T	64	0.0	0.187	28.9	LOS C	4.8	33.3	0.79	0.66	29.8
6	R	66	0.0	0.236	67.8	LOS E	2.8	19.7	0.98	0.73	22.9
Approach		166	0.0	0.236	46.8	LOS D	4.8	33.3	0.87	0.73	26.8
North	SC Hwy										
7	L	265	0.0	0.273	10.6	LOS B	1.3	8.8	0.07	0.67	56.3
8	T	668	0.0	0.432	26.6	LOS C	13.7	95.6	0.67	0.58	38.3
9	R	88	0.0	0.566	69.8	LOS E	6.7	47.2	0.99	0.78	22.3
Approach		1022	0.0	0.566	26.2	LOS C	13.7	95.6	0.54	0.62	39.1
West	Main St										
10	L	247	0.0	0.896	71.2	LOS E	32.3	226.1	1.00	1.14	22.9
11	T	256	0.0	0.899	60.8	LOS E	32.3	226.1	1.00	1.14	19.5
12	R	121	0.0	0.860	78.1	LOS E	9.6	67.5	1.00	0.97	20.9
Approach		624	0.0	0.899	68.3	LOS E	32.3	226.1	1.00	1.10	21.2
All Vehicles		3365	0.0	0.899	43.3	LOS D	40.4	282.9	0.83	0.86	29.1

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

SIDRA INTERSECTION

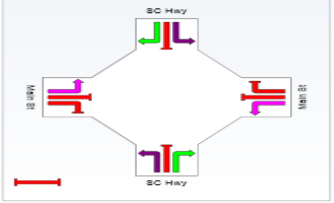
PHASING SUMMARY

Site: Main St/SC Hwy AM - Interim

Main St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

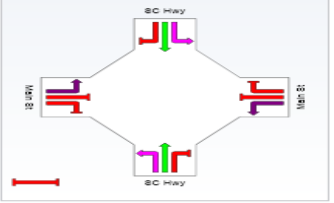
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase A



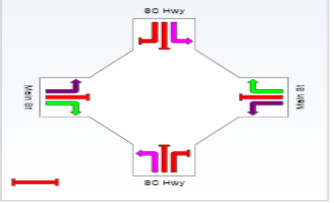
Green Time = 10 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 16 sec
Phase Split = 13 %

Phase B



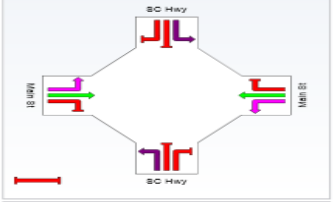
Green Time = 46 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 52 sec
Phase Split = 43 %

Phase C



Green Time = 9 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 15 sec
Phase Split = 12 %

Phase D



Green Time = 31 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 37 sec
Phase Split = 30 %

MOVEMENT SUMMARY

Site: Main St/SC Hwy PM - Interim

Main St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	95	0.0	0.080	10.3	LOS B	0.4	2.6	0.06	0.67	56.7
2	T	632	0.0	0.568	40.3	LOS D	16.1	112.7	0.85	0.73	30.5
3	R	136	0.0	0.770	71.9	LOS E	10.0	69.8	1.00	0.85	21.8
Approach		862	0.0	0.770	42.0	LOS D	16.1	112.7	0.79	0.74	30.2
East	Main St										
4	L	204	0.0	0.534	41.9	LOS D	13.4	94.0	0.87	0.94	30.9
5	T	119	0.0	0.534	32.2	LOS C	13.4	94.0	0.87	0.84	27.5
6	R	379	0.0	0.809	57.4	LOS E	12.0	84.2	0.87	0.91	25.4
Approach		702	0.0	0.809	48.6	LOS D	13.4	94.0	0.87	0.90	27.2
North	SC Hwy										
7	L	253	0.0	0.166	10.2	LOS B	1.0	6.9	0.06	0.67	56.8
8	T	1214	0.0	0.801	34.3	LOS C	30.5	213.7	0.90	0.82	33.2
9	R	200	0.0	0.556	58.0	LOS E	11.9	83.6	0.92	0.82	25.3
Approach		1666	0.0	0.801	33.5	LOS C	30.5	213.7	0.77	0.80	34.1
West	Main St										
10	L	112	0.0	0.728	45.5	LOS D	8.8	61.8	1.00	0.84	29.5
11	T	51	0.0	0.727	36.0	LOS D	8.8	61.8	1.00	0.84	25.7
12	R	41	0.0	0.292	68.2	LOS E	3.4	24.0	0.98	0.74	22.9
Approach		203	0.0	0.726	47.7	LOS D	8.8	61.8	1.00	0.82	27.0
All Vehicles		3434	0.0	0.809	39.5	LOS D	30.5	213.7	0.81	0.81	30.9

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Processed: Thursday, 29 September 2011 4:52:30 PM
SIDRA INTERSECTION 4.0.12.1029
Project: P:\IM20000-20990\IM20761\Sidra_Scats\110927-IM20761 Double RHT Lanes.sip
8000056, GTA CONSULTANTS, FLOATING

SIDRA INTERSECTION

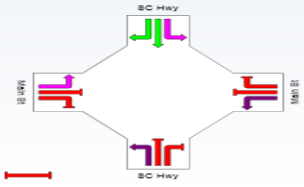
PHASING SUMMARY

Site: Main St/SC Hwy PM - Interim

Main St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

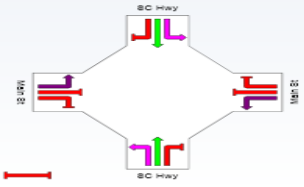
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D, Copy of A
Output Sequence: A, B, C, D, Copy of A

Phase A



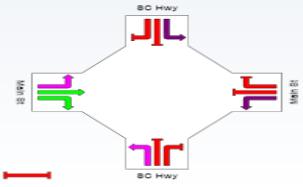
Green Time = 6 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 12 sec
Phase Split = 10 %

Phase B



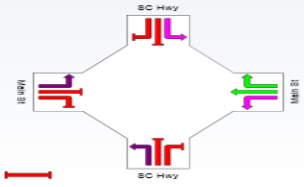
Green Time = 33 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 39 sec
Phase Split = 32 %

Phase C



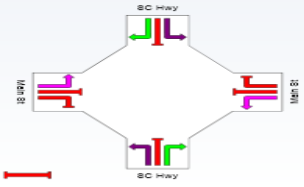
Green Time = 9 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 15 sec
Phase Split = 12 %

Phase D



Green Time = 31 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 37 sec
Phase Split = 30 %

Phase Copy of A



Green Time = 11 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 17 sec
Phase Split = 14 %

Access Street and SC Hwy

MOVEMENT SUMMARY

Site: Access St/SC Hwy AM - Interim

Access St/SC Hwy
Signals - Fixed Time Cycle Time = 125 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	20	0.0	0.015	10.0	LOS B	0.1	0.4	0.05	0.67	57.2
2	T	1236	0.0	0.780	32.2	LOS C	30.6	213.9	0.87	0.78	36.9
3	R	241	0.0	0.870	74.4	LOS E	17.0	119.1	1.00	0.91	21.3
Approach		1497	0.0	0.870	38.7	LOS D	30.6	213.9	0.88	0.80	33.5
East	Access St										
4	L	60	0.0	0.340	37.3	LOS D	4.1	28.5	0.94	0.77	32.5
5	T	24	0.0	0.340	28.2	LOS C	4.1	28.5	0.94	0.73	31.0
6	R	112	0.0	0.619	77.3	LOS E	5.0	34.9	1.00	0.78	21.1
Approach		196	0.0	0.619	59.0	LOS E	5.0	34.9	0.97	0.77	24.7
North	SC Hwy										
7	L	448	0.0	0.482	13.5	LOS B	9.0	62.7	0.35	0.74	52.3
8	T	667	0.0	0.421	26.6	LOS C	13.8	96.7	0.65	0.56	41.0
9	R	65	0.0	0.242	61.9	LOS E	4.8	33.3	0.89	0.76	24.2
Approach		1181	0.0	0.482	23.6	LOS C	13.8	96.7	0.55	0.64	42.7
West	Access St										
10	L	271	0.0	0.873	58.2	LOS E	21.4	150.1	1.00	1.04	25.4
11	T	99	0.0	0.873	49.1	LOS D	21.4	150.1	1.00	1.04	23.7
12	R	100	0.0	0.460	52.0	LOS D	6.6	46.1	0.86	0.77	27.0
Approach		469	0.0	0.874	55.0	LOS D	21.4	150.1	0.97	0.99	25.4
All Vehicles		3343	0.0	0.874	36.8	LOS D	30.6	213.9	0.78	0.77	33.8

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Processed: Thursday, 29 September 2011 3:10:26 PM
SIDRA INTERSECTION 4.0.12.1029
Project: P:\IM20000-20990\IM20761\Sidra Scats\110927-IM20761 Double RHT Lanes.sip
8000056, GTA CONSULTANTS, FLOATING

SIDRA INTERSECTION

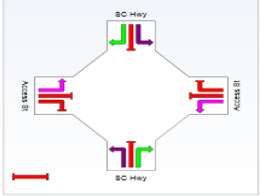
PHASING SUMMARY

Site: Access St/SC Hwy AM - Interim

Access St/SC Hwy
Signals - Fixed Time Cycle Time = 125 seconds

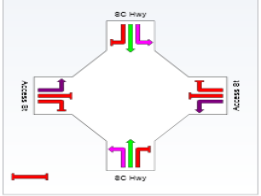
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase A



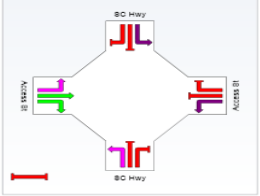
Green Time = 18 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 24 sec
Phase Split = 19 %

Phase B



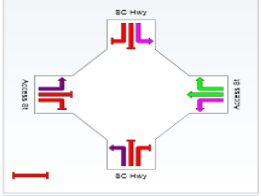
Green Time = 49 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 55 sec
Phase Split = 44 %

Phase C



Green Time = 28 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 34 sec
Phase Split = 27 %

Phase D



Green Time = 6 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 12 sec
Phase Split = 9 %

MOVEMENT SUMMARY

Site: Access St/SC Hwy PM - Interim

Access St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	85	0.0	0.070	10.3	LOS B	0.3	2.2	0.06	0.67	56.7
2	T	834	0.0	0.707	40.5	LOS D	21.4	150.1	0.90	0.78	32.8
3	R	153	0.0	0.865	76.0	LOS E	11.4	79.9	1.00	0.91	21.0
Approach		1072	0.0	0.865	43.2	LOS D	21.4	150.1	0.85	0.79	31.5
East	Access St										
4	L	229	0.0	0.476	37.3	LOS D	12.8	89.4	0.81	0.93	32.5
5	T	106	0.0	0.476	28.2	LOS C	12.8	89.4	0.81	0.79	31.3
6	R	426	0.0	0.862	56.9	LOS E	13.2	92.4	0.84	0.92	25.6
Approach		762	0.0	0.862	47.0	LOS D	13.2	92.4	0.83	0.90	28.1
North	SC Hwy										
7	L	284	0.0	0.244	11.3	LOS B	3.7	25.8	0.23	0.71	55.2
8	T	1226	0.0	0.867	42.6	LOS D	35.2	246.4	0.96	0.93	31.8
9	R	199	0.0	0.707	64.4	LOS E	12.9	90.0	0.98	0.84	23.6
Approach		1709	0.0	0.867	39.9	LOS D	35.2	246.4	0.84	0.88	32.7
West	Access St										
10	L	100	0.0	0.759	45.1	LOS D	7.8	54.8	1.00	0.86	29.5
11	T	45	0.0	0.758	36.0	LOS D	7.8	54.8	1.00	0.86	27.7
12	R	37	0.0	0.337	71.1	LOS E	3.2	22.4	1.00	0.73	22.3
Approach		182	0.0	0.759	48.1	LOS D	7.8	54.8	1.00	0.83	27.3
All Vehicles		3725	0.0	0.867	42.7	LOS D	35.2	246.4	0.85	0.86	31.0

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

Processed: Thursday, 29 September 2011 3:09:49 PM

SIDRA INTERSECTION 4.0.12.1029
www.sidrasolutions.com
Project: P:\IM20000-20990\IM20761\Sidra Scats\110927-IM20761 Double RHT Lanes.sip
8000056, GTA CONSULTANTS, FLOATING

SIDRA INTERSECTION

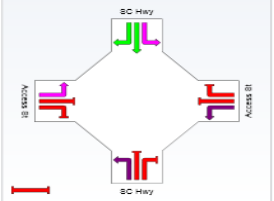
PHASING SUMMARY

Site: Access St/SC Hwy PM - Interim

Access St/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

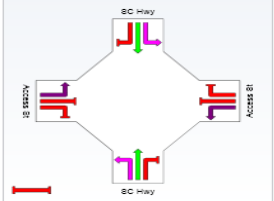
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D, Copy of A
Output Sequence: A, B, C, D, Copy of A

Phase A



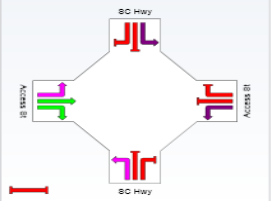
Green Time = 1 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 7 sec
Phase Split = 5 %

Phase B



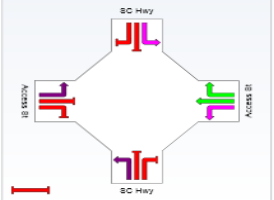
Green Time = 35 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 41 sec
Phase Split = 34 %

Phase C



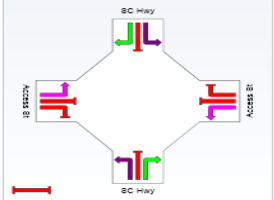
Green Time = 7 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 13 sec
Phase Split = 10 %

Phase D



Green Time = 36 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 42 sec
Phase Split = 35 %

Phase Copy of A



Green Time = 11 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 17 sec
Phase Split = 14 %

Boundary Road and SC Hwy (Interim)

MOVEMENT SUMMARY

Site: Boundary Rd/SC Hwy AM Interim

Boundary Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	22	0.0	0.016	10.0	LOS A	0.1	0.4	0.05	0.67	57.2
2	T	1241	0.0	0.709	25.4	LOS C	26.3	183.9	0.77	0.69	41.4
3	R	239	0.0	0.621	57.8	LOS E	13.9	97.6	0.93	0.83	25.4
Approach		1502	0.0	0.709	30.3	LOS C	26.3	183.9	0.79	0.71	38.1
East	Boundary Rd										
4	L	60	0.0	0.281	32.3	LOS C	3.5	24.4	0.89	0.78	34.9
5	T	28	0.0	0.281	23.2	LOS C	3.5	24.4	0.89	0.70	33.5
6	R	111	0.0	0.393	68.9	LOS E	4.5	31.7	0.99	0.75	22.7
Approach		199	0.0	0.393	51.3	LOS D	4.5	31.7	0.95	0.75	26.7
North	SC Hwy										
7	L	444	0.0	0.414	10.7	LOS B	2.4	16.6	0.08	0.68	56.1
8	T	665	0.0	0.380	21.0	LOS C	12.0	84.1	0.58	0.50	45.4
9	R	61	0.0	0.163	52.8	LOS D	3.9	27.4	0.80	0.76	27.0
Approach		1171	0.0	0.414	18.8	LOS B	12.0	84.1	0.40	0.58	47.1
West	Boundary Rd										
10	L	298	0.0	0.804	31.1	LOS C	12.9	90.3	0.54	0.85	35.2
11	T	112	0.0	0.618	59.2	LOS E	8.3	58.0	1.00	0.80	22.0
12	R	89	0.0	0.636	70.9	LOS E	7.0	49.2	1.00	0.80	22.3
Approach		499	0.0	0.804	44.5	LOS D	12.9	90.3	0.73	0.83	28.7
All Vehicles		3371	0.0	0.804	29.7	LOS C	26.3	183.9	0.65	0.69	37.8

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

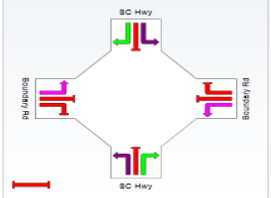
PHASING SUMMARY

Site: Boundary Rd/SC Hwy AM Interim

Boundary Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

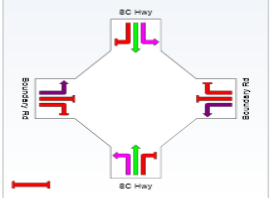
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase A



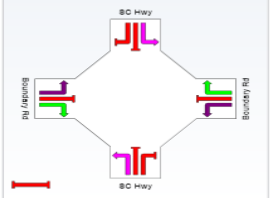
Green Time = 24 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 30 sec
Phase Split = 25 %

Phase B



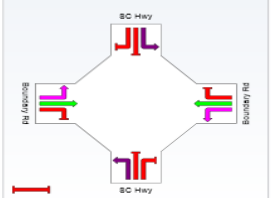
Green Time = 52 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 58 sec
Phase Split = 48 %

Phase C



Green Time = 9 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 15 sec
Phase Split = 12 %

Phase D



Green Time = 11 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 17 sec
Phase Split = 14 %

MOVEMENT SUMMARY

Site: Boundary Rd/SC Hwy PM Interim

Boundary Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	SC Hwy										
1	L	103	0.0	0.092	10.4	LOS B	0.4	2.9	0.06	0.67	56.5
2	T	1076	0.0	0.761	35.2	LOS D	26.6	186.0	0.89	0.79	35.4
3	R	120	0.0	0.673	63.4	LOS E	8.5	59.2	1.00	0.80	23.9
Approach		1299	0.0	0.761	35.8	LOS D	26.6	186.0	0.83	0.78	34.9
East	Boundary Rd										
4	L	179	0.0	0.724	50.3	LOS D	15.6	109.3	0.98	0.94	27.9
5	T	129	0.0	0.724	41.2	LOS D	15.6	109.3	0.96	0.93	26.2
6	R	333	0.0	0.760	68.9	LOS E	11.7	82.2	1.00	0.88	22.7
Approach		641	0.0	0.760	58.1	LOS E	15.6	109.3	0.99	0.90	24.6
North	SC Hwy										
7	L	222	0.0	0.164	10.1	LOS B	0.8	5.5	0.06	0.67	57.0
8	T	1251	0.0	0.688	23.4	LOS C	25.3	176.8	0.73	0.66	42.9
9	R	214	0.0	0.719	63.8	LOS E	13.6	95.3	0.98	0.84	23.8
Approach		1686	0.0	0.719	26.8	LOS C	25.3	176.8	0.68	0.68	40.4
West	Boundary Rd										
10	L	122	0.0	0.345	18.5	LOS B	4.2	29.3	0.48	0.73	42.8
11	T	56	0.0	0.162	45.5	LOS D	4.0	27.7	0.89	0.68	25.7
12	R	44	0.0	0.224	62.0	LOS E	3.5	24.2	0.94	0.74	24.3
Approach		222	0.0	0.345	33.9	LOS C	4.2	29.3	0.67	0.72	32.7
All Vehicles		3848	0.0	0.761	35.5	LOS D	26.6	186.0	0.78	0.76	34.5

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on average delay for all vehicle movements.

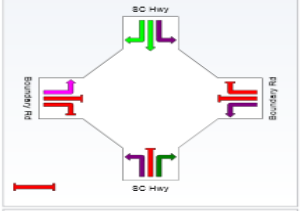
PHASING SUMMARY

Site: Boundary Rd/SC Hwy PM Interim

Boundary Rd/SC Hwy
Signals - Fixed Time Cycle Time = 120 seconds

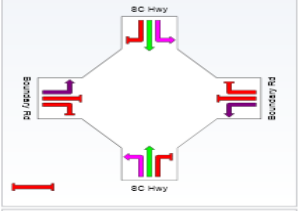
Cycle Time Option: **Optimum Cycle Time (Minimum Delay)**
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D, Copy of A
Output Sequence: A, B, C, D, Copy of A

Phase A



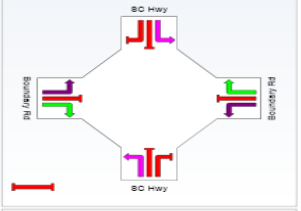
Green Time = 6 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 12 sec
Phase Split = 10 %

Phase B



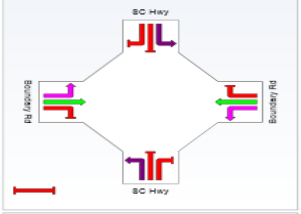
Green Time = 42 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 48 sec
Phase Split = 40 %

Phase C



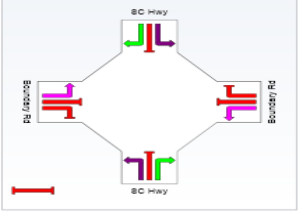
Green Time = 14 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 20 sec
Phase Split = 16 %

Phase D



Green Time = 21 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 27 sec
Phase Split = 22 %

Phase Copy of A



Green Time = 7 sec
Yellow Time = 4 sec
All-Red Time = 2 sec
Phase Time = 13 sec
Phase Split = 10 %

Left in left Out – South (Interim)

MOVEMENT SUMMARY

Site: Left in Left Out South AM - Interim

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RoadName											
1	L	196	0.0	0.105	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	1301	0.0	0.334	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1497	0.0	0.334	1.1	LOS A	0.0	0.0	0.00	0.09	58.3
North: RoadName											
8	T	698	0.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		698	0.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: RoadName											
10	L	393	0.0	0.942	53.6	LOS F	15.1	105.5	0.98	1.93	24.2
Approach		393	0.0	0.942	53.6	LOS F	15.1	105.5	0.98	1.93	24.2
All Vehicles		2587	0.0	0.942	8.8	NA	15.1	105.5	0.15	0.34	48.4

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: Left in Left Out South PM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RoadName											
1	L	160	0.0	0.086	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	552	0.0	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		712	0.0	0.094	1.8	LOS A	0.0	0.0	0.00	0.15	57.1
North: RoadName											
8	T	1463	0.0	0.250	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1463	0.0	0.250	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: RoadName											
10	L	68	0.0	0.068	10.5	LOS B	0.4	2.6	0.54	0.74	46.5
Approach		68	0.0	0.068	10.5	LOS B	0.4	2.6	0.54	0.74	46.5
All Vehicles		2243	0.0	0.250	0.9	NA	0.4	2.6	0.02	0.07	58.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

Left In left Out – North (Interim)

MOVEMENT SUMMARY

Site: Left in Left Out North AM - Interim

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RoadName											
1	L	39	0.0	0.021	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	1241	0.0	0.318	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1280	0.0	0.318	0.2	LOS A	0.0	0.0	0.00	0.02	59.6
North: RoadName											
8	T	1199	0.0	0.307	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1199	0.0	0.307	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: RoadName											
10	L	155	0.0	0.311	17.0	LOS C	1.7	12.2	0.79	0.96	40.8
Approach		155	0.0	0.312	17.0	LOS C	1.7	12.2	0.79	0.96	40.8
All Vehicles		2634	0.0	0.318	1.1	NA	1.7	12.2	0.05	0.07	58.2

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: Left in Left Out North PM - Interim

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RoadName											
1	L	140	0.0	0.075	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	1358	0.0	0.348	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1498	0.0	0.348	0.8	LOS A	0.0	0.0	0.00	0.06	58.8
North: RoadName											
8	T	1798	0.0	0.461	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1798	0.0	0.461	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: RoadName											
10	L	60	0.0	0.150	17.5	LOS C	0.7	4.9	0.80	0.93	40.5
Approach		60	0.0	0.149	17.5	LOS C	0.7	4.9	0.80	0.93	40.5
All Vehicles		3356	0.0	0.461	0.7	NA	0.7	4.9	0.01	0.04	58.9

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

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