Officer Precinct Structure Plan

Future Traffic Estimates and Road Infrastructure Requirements

For: Cardinia Shire Council

AUGUST 22, 2011

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1 INTRODUCTION

1.1 Overview

Cardinia Shire Council has prepared a Precinct Structure Plan (PSP) and associated Development Contributions Plan (DCP) for the Officer Precinct (the Precinct). SMEC Australia Pty Ltd has been engaged to assist with this process. SMEC's services include traffic modelling, refinement of the road hierarchy, preparation of functional layout plans and civil estimates for road and intersection construction for the purposes of the Development Contributions Plan (DCP).

1.2 Officer Precinct Structure Plan Area

The Precinct is located north of the Princes Freeway (Pakenham Bypass) between the existing Beaconsfield area and Gum Scrub Creek, as illustrated in Figure 1.

The Casey Cardinia Growth Area Framework Plan (DSE 2004) designates the Precinct for future residential development, identifying a new Major Activity Centre (MAC) adjacent to the existing Officer Railway Station. The Growth Area Framework Plan is implemented through the PSP.

The existing regional road network influences the development of the Precinct, with the Princes Highway running through the heart of the area and the Princes Freeway along its southern boundary. A number of new roads and road upgrades are planned to improve regional connectivity, including:

- Construction of Thompsons Road, Glasscocks Road/ Grices Road and associated Cardinia Creek crossings;
- Delivery of Officer South Road, Cardinia Road (south) and Soldiers Road to an urban arterial standard;
- Upgrade of the Beaconsfield freeway interchange (Princes Highway/ Princes Freeway), including construction of eastbound ramps; and
- Delivery of the Officer South Road freeway interchange, including both east and westbound ramps.

The staging of delivery of the regional road network upgrades has a direct relationship to the size and staging of the intersections and roads, which are outlined in this report.

The development of the Precinct and its road network is also influenced by the existing subdivision pattern and the presence of a number of existing road reserves (refer Figure 2). The abutting small lot subdivision affects the capacity for road upgrades, constraining opportunities for widening.

Figure 1 – Regional Context of Officer Precinct

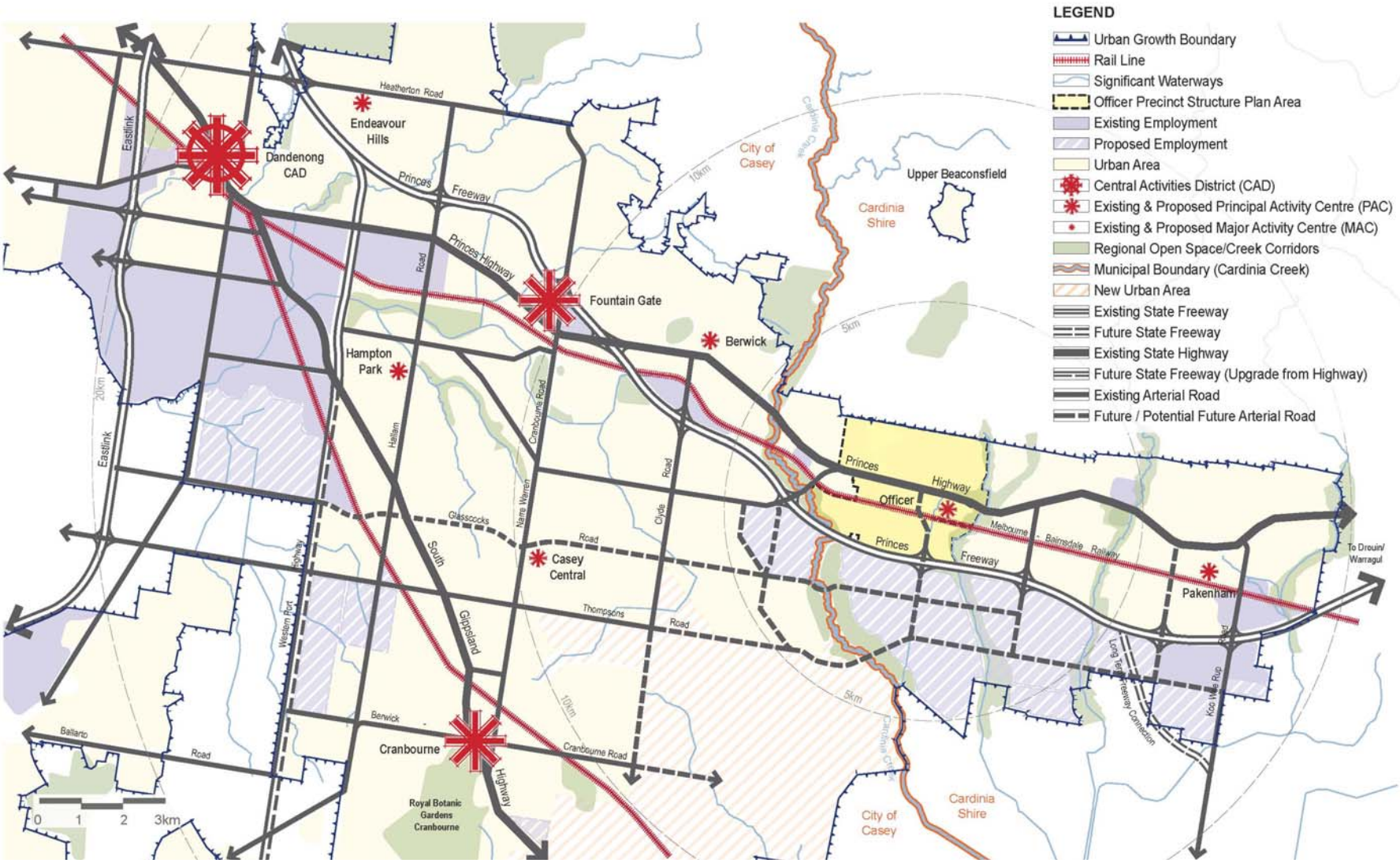
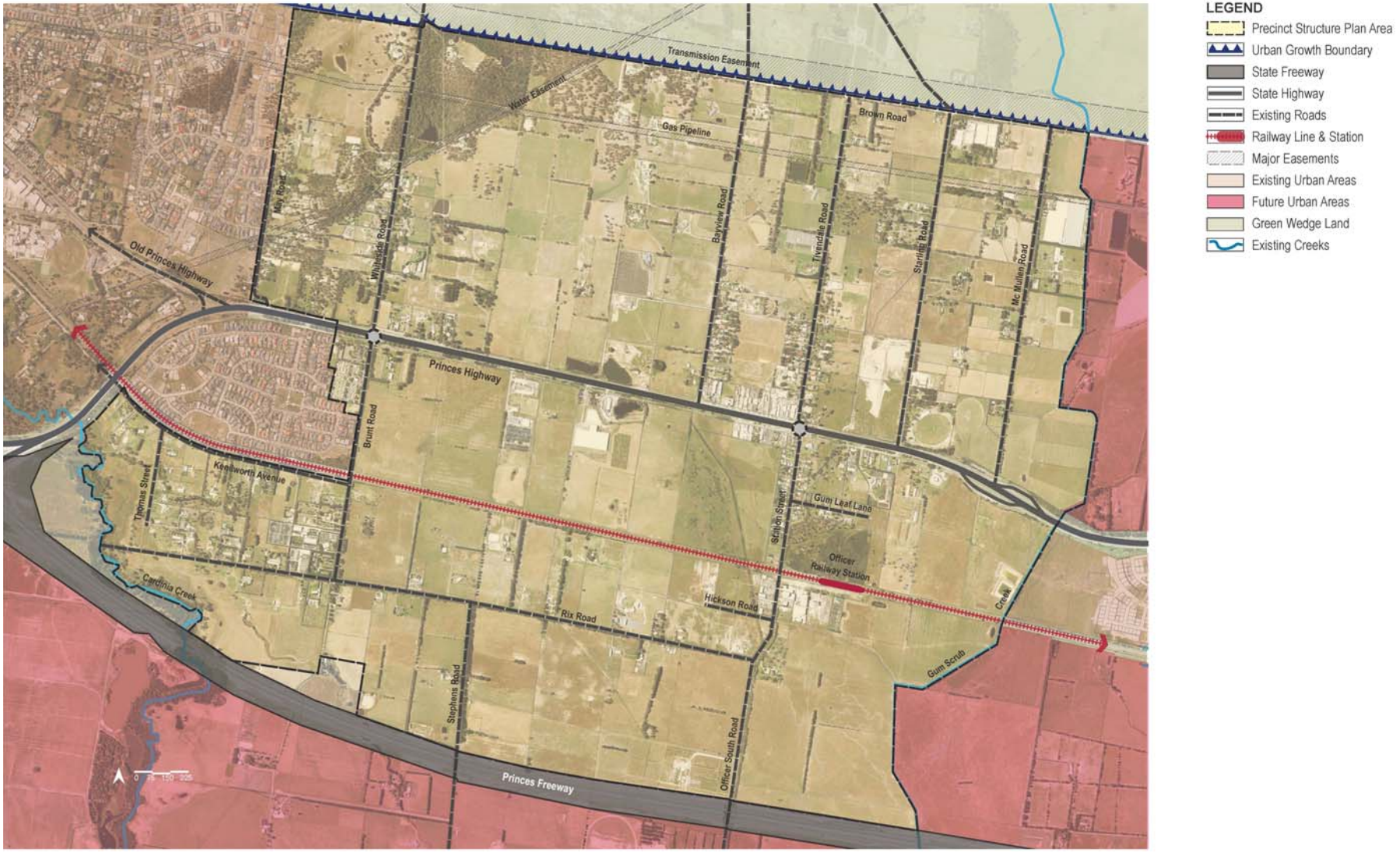


Figure 2 – Officer Precinct Structure Plan Area



LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary
- State Freeway
- State Highway
- Existing Roads
- Railway Line & Station
- Major Easements
- Existing Urban Areas
- Future Urban Areas
- Green Wedge Land
- Existing Creeks

1.3 Future Development of the Precinct

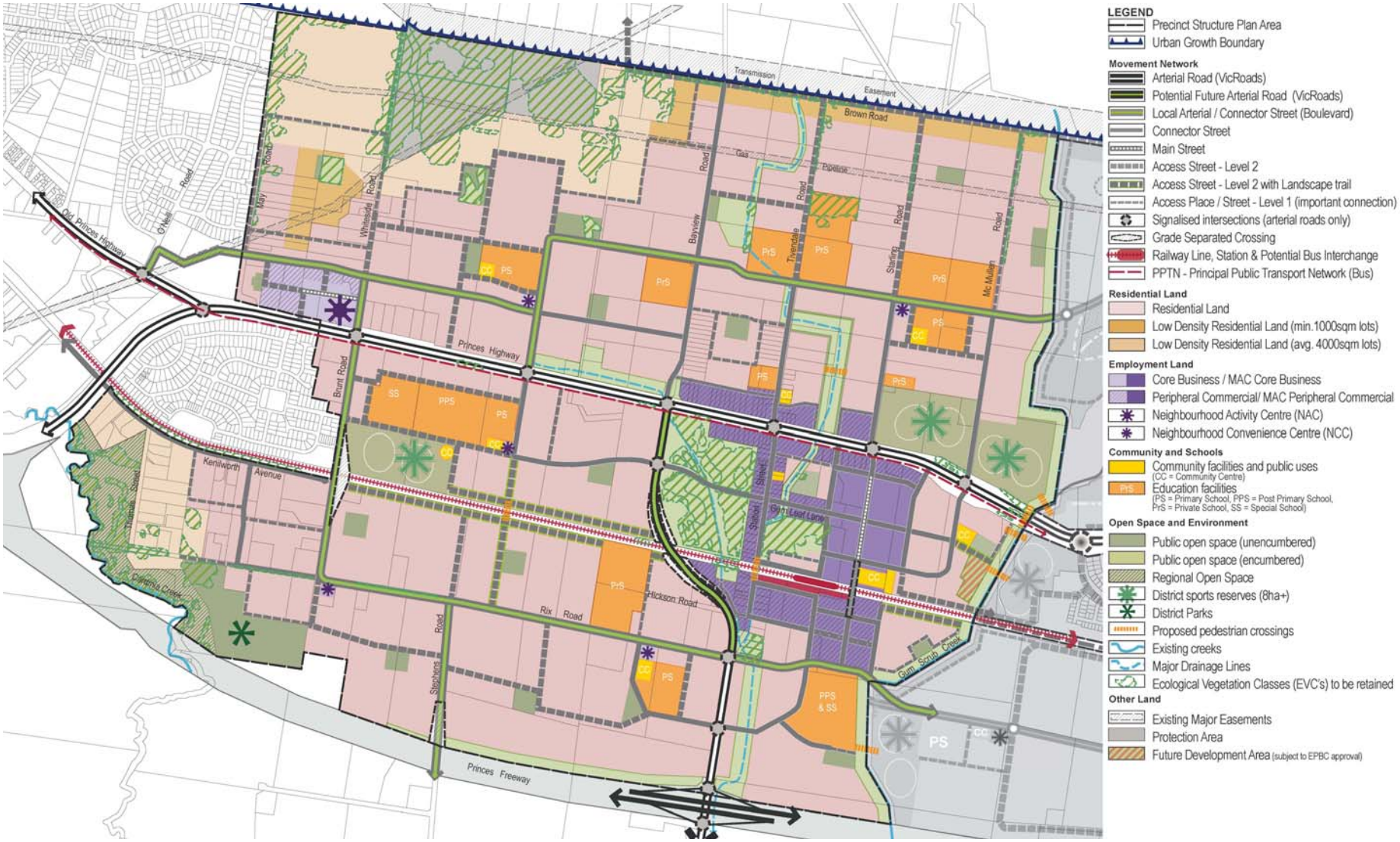
Substantial residential growth is planned for Officer delivering approximately 10,000 dwellings to the area, and increasing the population from 600 to 30,000 residents.

Key land use outcomes (refer Figure 3) include:

- Development of the Officer MAC adjacent to the Officer Railway Station, which is planned to accommodate up to 100,000 square meters of retail and commercial floor space.
- Establishment of over 600 dwellings in the core business and peripheral commercial areas of the Officer MAC.
- Conversion of existing businesses along the Princes Highway to showrooms and bulky goods type uses.
- Conversion of Station Street to a commercial and high density residential area.
- Development of a Neighbourhood Activity Centre (NAC) on the corner of Whiteside Road and the Princes Highway, providing 7,000 to 10,000 square meters of retail and commercial floor space.
- Development of approximately 35 hectares of land for new public schools.
- Establishment of district sports reserves east of McMullen Road on the Princes Highway, and east of Brunt Road abutting the rail line.
- Delivery of the North South Arterial connecting Officer South Road from Rix Road to Bayview Road.

To cater for this growth, substantive planning has been undertaken for the area, including traffic modelling of forecast future volumes, to determine the road network requirements.

Figure 3 – Officer Precinct Future Urban Structure Plan



1.4 Traffic Modelling Towards the Determination of a Future Road Network

Cardinia Shire Council has engaged SMEC to develop a transport model to better understand future travel patterns within Officer. The Department of Transport (DoT) has developed the Melbourne Integrated Transport Model (MITM) which is a strategic model that covers the entire metropolitan Melbourne area. The MITM modelling for Officer was produced from a process involving DoT, VicRoads, the Growth Areas Authority and Council. The version agreed as the basis for the Officer PSP is dated 08 December 2010.

This MITM model has been refined in a VISSIM micro-simulation model to improve the accuracy of travel patterns within Officer. The ultimate development scenario is considered in this analysis and represents the year 2031.

Tasks undertaken by SMEC include:

- Conversion of the MITM from a strategic model into a local network model to enable the design of intersections and the modification of the road hierarchy to create a functional road network and reasonable ultimate intersection designs.
- Subsequent re-run of the local traffic model to enable review/ adjustment of the local road hierarchy if substantial change is needed to generate reasonable intersection configurations.
- SIDRA analysis of all intersections, including adequate provision for turning movements.
- Advice on road and intersection staging and its implications for the DCP projects, including:
    - Interim and ultimate configurations and triggers for delivery;
    - Interim and ultimate concepts for arterial roads and boulevard connector streets, most intersections; and
    - The grade separated crossing of the railway line at Brunt Road and the new North South Arterial.

2 NETWORK TRAFFIC MODELLING

2.1 Strategic Modelling using MITM

The Melbourne Integrated Transport Model (MITM) is the strategic model used by Cardinia Shire for the purposes of the Officer PSP. Although MITM is developed by the Department of Transport (DoT), SMEC has refined the strategic model within the PSP area. This involved developing a finer zone system, modifying network link characteristics and reviewing travel patterns.

The current MITM model represents a 2 Hour AM peak period. In terms of model performance, consideration of the time period is an important factor as different travel patterns are observed throughout the day. For example, an AM peak model may capture home-to-work trips, however shopping trips may occur outside this period.

As a starting point for refining MITM within the Officer area, the road network and land use assumptions from an earlier Nigel Ashton model were extracted and applied to MITM. In terms of comparison, the original MITM had 2272 zones while the latest MITM provided by the DoT has 2806 zones which provides an insight into the level of disaggregation that has occurred in Officer and other growth areas around Melbourne. This level of disaggregation within the growth areas is due to the refinement by VicRoads.

Prior to commencing the modelling works, the correspondence between Council, VicRoads, Department of Transport (DoT), Growth Areas Authority (GAA) and GTA Consultants (on behalf of GAA) was reviewed. This formed the basis for the strategic modelling critique. It is understood that the strategic model for this area was been refined to better reflect the intended long term development outcomes being sought for Officer. The review of correspondence assisted in verifying that these refinements have been adopted within the latest MITM model.

SMEC liaised with both GAA and DoT in regards to obtaining the strategic model for the Officer area. Prior to reviewing the strategic model internally, the calibration performance of the model developed by AECOM (on behalf of DoT) was provided. The calibration report indicates that the base year model of the area has been calibrated to a set of screenlines based on a matrix estimation process.

Matrix estimation is the process by which current year modelled volumes are adjusted based on observed traffic counts. It is an iterative process whereby the adjusted trip matrices are assigned to a road network in an iterative manner until convergence is achieved. The modelled numbers are then reviewed and the trip matrix is adjusted accordingly. This process is repeated until the adjusted trip matrix eventually produces a set of modelled volumes which closely resemble the survey counts.

Although it may be difficult to calibrate the strategic model in an outer metropolitan area, the use of matrix estimation to calibrate a base year model may reduce the level of confidence in the strategic model in producing travel patterns.

The original MITM developed within DoT represents the Officer coarsely due to the fact that assumptions in certain growth areas of the model have changed drastically as a result of recent planning works.

The strategic model was reviewed for anomalies using a series of *select link* analyses. Once the MITM was satisfactory, trip patterns in the form of trip matrices were extracted to be used as an input for the micro-simulation model.

2.1.1 Geographical Extent

The geographical scope of the model has been determined by the extent of the original Officer PSP Future Urban Structure plan (refer Figure 3). This includes the improved Beaconsfield interchange in the west, the future Officer South Road interchange and the existing Cardinia Road interchange in the east. The Princes Highway has also been updated to reflect the future intersection layouts along the route and the intersecting roads.

In addition, the intersection of O'Neill Road and Old Princes Highway was included due to its close proximity to the recently upgraded Princes Highway intersection. Figure 4 provides a layout of the overall model extent.

Figure 4 - MITM Model Coverage

Note that the geographical extent is limited to the model cut out that was produced by the DoT from MITM. If an origin-destination (OD) matrix traffic demand was taken from MITM directly then the scope of the model would be much greater and include all of the many other existing roads beyond the Precinct.

2.1.2 Model Performance

Unlike SIDRA or micro-simulation models, the MITM strategic model performs at a regional scale. Therefore, this model will highlight how the Cardinia Shire integrates with the remaining metropolitan Melbourne area. This includes determining the number of trips generated, distribution of trips, mode of travel and the route choice on the network.

Strategic modelling requires that the model first be deemed satisfactory based on a calibration and validation process. This process involves developing a current year (or base year) model and making comparisons alongside observed travel patterns. This may involve gathering counts and actual traffic information from various sources. It is this calibrated model that is used for testing future year scenarios.

The strategic model is expected to be robust in performance as it will be used as a source of input for many other decisions and therefore, credibility in modelling processes and outputs is essential.

The strategic model post matrix estimation shows an R-Squared statistic of 0.96 which is well above the recommended model calibration and validation criteria outlined by VicRoads. This is expected as the estimation process modifies trip matrices to more accurately align with the observed volumes to improve the R-Squared statistic.

2.1.3 Ultimate Road Layout

The ultimate model represents the year 2031 within the extent of MITM. The strategic model (MITM cutout) for Officer has been developed using a combination of the original Nigel Ashton model representing the Precinct and the more recent MITM. Although the Nigel Ashton model represents a daily time period, the network from the Nigel Ashton model was incorporated into the latest version of MITM.

The calibration and validation of a model for the Officer PSP is a difficult task considering that growth areas on the fringes of the metropolitan area are difficult to forecast in a strategic model. This is due to the variability in traffic volumes and travel patterns, which are influenced by:

- the level of trip generation within growth areas (dependent upon the rate and type of development); and
- the staging of infrastructure projects.

To simplify the calibration and validation process, a matrix estimation process has been undertaken in order to begin the future year model testing of MITM. The output of the matrix estimation process indicated that along with additional demand within the Precinct, there are minor anomalies in the model. These anomalies have been investigated and taken into account when reviewing the outputs of the micro-simulation model.

The main anomaly observed within the model is the level of traffic utilising the O'Neil Road connection to the north-west of Officer. It appears that this road link is operating well above capacity and this has been noted by DoT, GAA, VicRoads, Council and the consultants along with other minor anomalies.

2.1.4 Interim Road Layout

The interim model was developed using the ultimate scenario MITM and represents the year 2021. A number of future road network changes were identified to be excluded in the interim micro-simulation model. These changes accord with the most realistic expectation of an interim future network and form the basis of the DCP costings.

The following changes were made to the ultimate road network scenario to develop the interim scenario:

- All trip matrices were scaled to 80% of their original value, with the exception of the Officer Employment Precinct which was scaled to 15%.
- Removal of the Thompsons Road and Grices Road bridge crossings (thereby making the Princes Highway and Princes Freeway the only east-west access routes between Casey and Cardinia within the Urban Growth Boundary).
- Conversion of both the Beaconsfield and Cardinia Road interchanges with the Princes Freeway from signalised intersections to roundabouts.

- Removal of the east-facing ramps at both the Officer South Road and Beaconsfield interchanges.
- Maintaining the existing two-lane, two-way bridge over the Princes Freeway at Cardinia Road.
- Removal of the North South Arterial between Rix Road and the Gum Leaf Lane extension, utilising Station Street as the main north-south route.
- Removal of the Stephens Road freeway overpass.

2.2 Micro-simulation Model

2.2.1 Model Choice

A VISSIM micro-simulation model was developed for the Officer PSP. Micro-simulation modelling allows traffic patterns and vehicle behaviour to be modelled more accurately at a local road level. Although the current strategic model (MITM) is able to provide information about the travel demand on roads within the Precinct, the accuracy of the forecasted demands is greatly increased using micro-simulation. The inclusion of specific network details such as intersection layout and local traffic calming measures in the model allow for a more accurate determination of the required future intersection treatments, cross-sections and road layouts.

The micro-simulation model can also be used to visually assess the performance and in particular, design features such as lane lengths, number of lanes and signal operation.

VISSIM micro-simulation modelling software represents the behaviour of individual vehicles/ drivers and the interactions between them. These models are flexible and sophisticated tools that combine a wide range of behavioural parameters, involving an element of randomness, and can be adapted to model most traffic conditions to a fine degree of detail.

2.2.2 Temporal Scope

The micro-simulation model is based on the road network and traffic flows extracted from the MITM 2031 model. The model comprises two one-hour peak models that represent the AM and PM peak periods for the year 2031.

Note that it is the preference of the SMEC project team to build and calibrate a 2010 model before building the 2031 model; however this task was not part of the consultant's brief.

The normal process of building a micro-simulation model has been followed and is summarised as follows:

- Define the standard road types and characteristics;
- Code the road components into the model based on plans produced by SMEC's design team;
- Code the signal operations;
- Define the vehicle parameters;
- Include public transport route and timetable information;
- Include public transport facilities and signal priorities as provided by DoT; and
- Input static traffic demand.

Once operational, the model is reviewed and the traffic signals are adjusted where possible to reach an optimal performance.

2.2.3 Model Inputs and Assumptions

The following outlines the various inputs and assumptions required to build the ultimate year 2031 micro-simulation model. The risks and errors associated with each assumption are stated along with a preferred alternative where possible.

Road Layout

The road layout is based entirely on the design drawings developed by SMEC. The road layout accurately represents the design and should not require any assumptions.

Road Types

Road types are used by VISSIM to assign characteristics to segments of a road based on a grouping by road classification and speed. Typical input characteristics include speed, capacity, lane width, shoulder width, and other technical traffic modelling inputs.

These characteristics are usually defined as part of the base model calibration process. Since there will be no base model to calibrate, the default VISSIM values are used where inputs are not known. Known inputs include speed and lane width. For the purpose of the model, all roads are to have a lane width of 3.5m. Speeds (posted) range from 50km/h to 90km/h, and as per the existing conditions. Note that posted speeds are defined as design speed minus 10km/h.

Vehicle Types

Two vehicle types are to be used in the micro-simulation model as per the level of detail able to be extracted from MITM, i.e. 'Cars' and 'HCVs'.

The vehicle input parameters have been applied based on the default parameters supplied in the VISSIM Modelling Manual. The 'car' and 'HCV' vehicle parameters are as defined in the manual and apply to the car and truck vehicle types respectively.

Signals

Signal phasing and timing is a key input to the model. SIDRA analyses have been conducted for a number of intersections within the Officer PSP for the interim (2021) and ultimate (2031) modelled years. Part of the output from these models is optimised signal phasing.

Where signal plans have not been developed, signal phasing has been determined based on the settings at intersections in the nearby vicinity.

Assumptions made in regards to the signal phasing are:

- Cycle time = 120 seconds (or 60 seconds for minor intersections with double cycling);
- Yellow time = 4 seconds; and
- Red time = 2 seconds.

Traffic Demand

It is the preferred methodology of the SMEC project team to build micro-simulation models based on origin-destination (OD) matrices. This method allows for the input of traffic at the 'edges' of the model, and once loaded on to the network each vehicle can take whichever is the preferred route. This requires OD matrices output from the MITM model in a cordon defined by the Precinct. Traffic demand is then dynamically assigned to the model until a point of convergence is reached.

Public Transport

The public transport assumptions have been derived from the strategic model.

As part the modelling exercise no information was provided that details bus priority at the signalised intersections. As a result, no priority has been given to approaching buses at the signalised intersections in the micro-simulation model.

2.2.4 Ultimate Micro-simulation Model Network

VicRoads have suggested a number of changes to the various intersections to accord with their expectations of the future traffic conditions and their minimum desirable intersection requirements for the future, i.e. double right turn lanes, etc. Although earlier versions of the AM modelling did not include these features, VicRoads have advised they require several of the Princes Highway intersections to include additional turning lanes and additional stand-up lanes to accord with the long term intersection requirements of the Princes Highway corridor. Desirable features include:

- 6 lane cross section;
- Double right turn lanes;
- Give way/siganlised left turn pockets;
- Continuous bicycle lanes; and
- Pedestrian crossing facilities across all approaches.

3 FUTURE ROAD NETWORK AND HIERARCHY

The outputs of the traffic modelling have been applied to the Future Urban Structure Plan. Through an iterative process, the road hierarchy proposed in the final plan (refer Figure 5) illustrates a network that will appropriately cater for the traffic movements generated by the Precinct at ultimate development.

3.1 Capacity to Upgrade Existing Network

The road reserve widths, existing infrastructure and native vegetation to be retained along existing roads (refer *Officer Native Vegetation Precinct Plan, June 2011*) affect the road hierarchy and cross sections that apply within the Precinct.

The cross sections (refer Appendix 3) generally accord with those set out in the GAA PSP Note for roads, and the Cardinia Shire standard drawings.

The potential to upgrade the following existing roads is affected by a number of constraints, including:

- Princes Highway:
  - is currently a four-lane two-way divided road connecting Beaconsfield to Berwick and further to the east
  - road reserve varies from 60 to 100 meters in width
  - carriageway varies in alignment within the road reserve and in several cases, sits too close to the property boundary to allow for service roads.
- Station Street:
  - has an existing 10 meter wide pavement with kerb and channel, overhead power lines and other infrastructure
  - road reserve is approximately 20 meters wide
  - is lined with existing small lot subdivisions, restricting the scope for road widening.
- Gum Leaf Lane:
  - comprises an existing 18 meter wide road reserve
  - has small, shallow depth lots on both sides, limiting the scope for road widening.
- Officer South Road:
  - comprises an existing 20 meter wide road reserve
  - has a freeway underpass already constructed, constraining the freeway interchange design.
- Rix Road (east of Brunt Road):
  - road reserve is approximately 20 meters wide
  - has substantial native vegetation on the north side that is to be retained in the *Officer Native Vegetation Precinct Plan, June 2011*
  - has overhead power lines located on the north side.
- Rix Road (immediately west of Brunt Road):
  - road reserve is approximately 20 meters wide
  - has substantial native vegetation on the south side that is to be retained in the *Officer Native Vegetation Precinct Plan, June 2011*.
- Stephens Road:
  - road reserve is approximately 20 meters wide.
- Kenilworth Avenue:
  - road reserve is up to 20 meters wide

    - has overhead power lines on the south side
    - has substantial native vegetation on the north side that is to be retained in the *Officer Native Vegetation Precinct Plan, June 2011*
    - abuts the rail reserve to the north, limiting the scope for road widening
    - is lined with existing small lot subdivisions along the southern edge of the street.

- Thomas Street:
    - road reserve is up to 20 meters wide
    - has Cardinia Creek parkland to the west, limiting the scope for future road widening.

- May Road:
    - road reserve is approximately 20 meters wide
    - has substantial native vegetation to the north that is to be retained in the *Officer Native Vegetation Precinct Plan, June 2011*.

- Whiteside Road:
    - road reserve is approximately 20 meters wide
    - has substantial native vegetation to the north that is to be retained in the *Officer Native Vegetation Precinct Plan, June 2011*.

- Bayview Road:
    - road reserve is approximately 20 meters wide
    - has overhead power lines along the west side
    - has small, township scale lots on the east side and a school with existing planning permits on the west side, which limit the scope for road widening.

- Tivendale Road:
    - road reserve is approximately 20 meters wide
    - has overhead power lines along the west side
    - has small, township scale lots, a school and existing businesses on the west side and a number of small lots on the east side, which limit the scope for road widening
    - northern section is already partially sealed with urban standard pavement and kerb and channel constructed.

- Starling Road:
    - road reserve is approximately 20 meters wide
    - has overhead power lines along the east side
    - has an existing recreation reserve on the east side of the Princes Highway.

- McMullen Road:
    - road reserve is approximately 20 meters wide
    - has an existing recreation reserve on the west side of the Princes Highway.

3.2 Road Hierarchy Assessment

The road network, hierarchy and cross sections that are applied to the roads within the Precinct have been guided by the outputs of the VISSIM micro-simulation model and the constraints outlined in the previous section.

Both the GAA and Cardinia Shire have standards relating to the daily vehicular capacity of particular road types. To assess the suitability of individual roads to carry the volumes forecast in the micro-simulation model, a number of select points were created to produce specific 'traffic counts' across the network. These have been tabulated against the volume thresholds of the GAA and Cardinia Shire for the Ultimate scenario (refer Appendix 2).

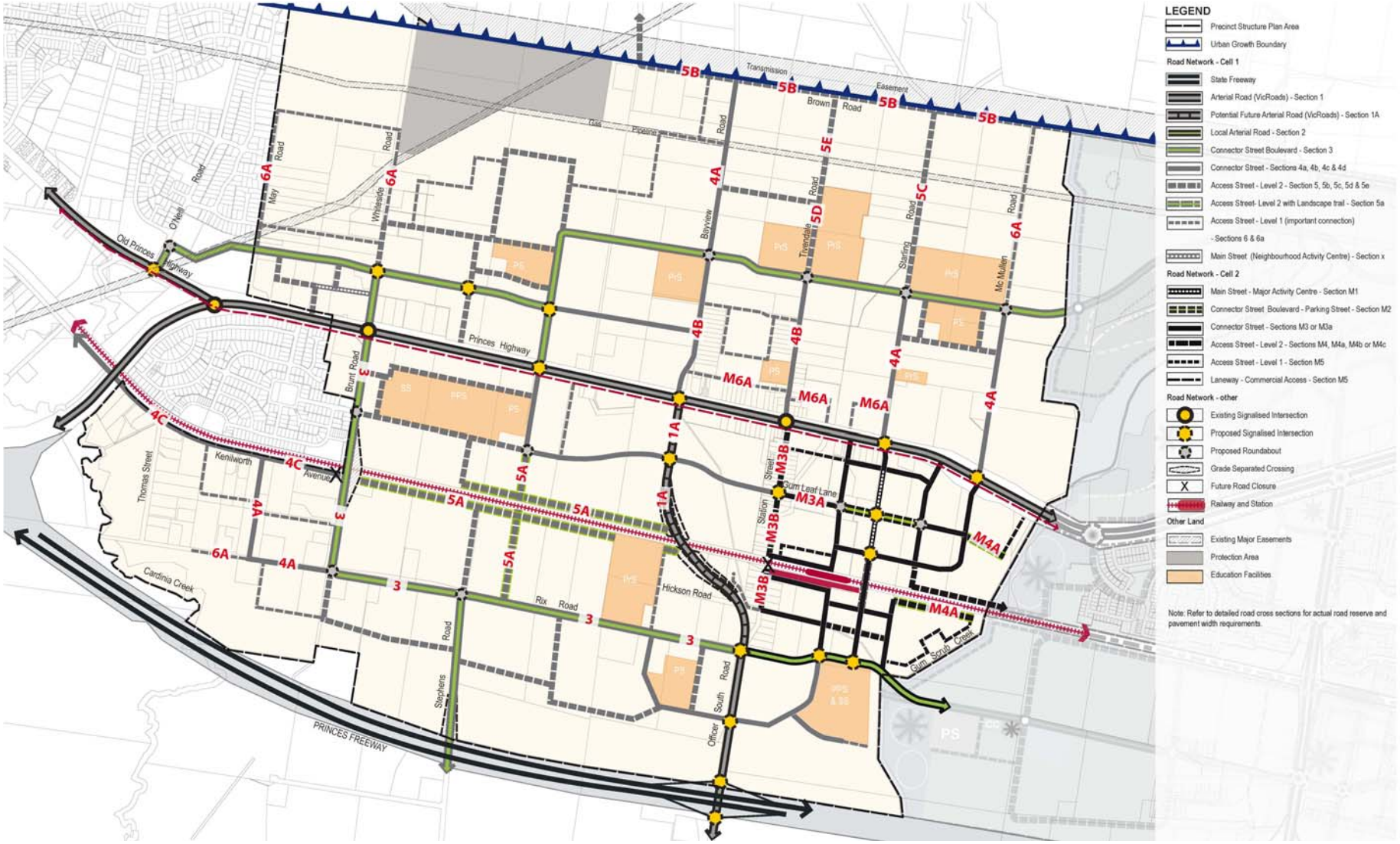
A number of roads appear to carry traffic volumes higher than their classification; however it is considered that the overall network has enough capacity to carry the expected level of traffic demand. Considerations in regards to the current volumes are as follows:

- East-West Connector Boulevard: It is expected that the traffic demands on minor roads to the North-East of the Precinct would realign to the Connector due to the excess capacity.

- Main Street Underpass: The volumes indicate that this section of road is carrying almost 10,000 vehicles per day. It should be noted that this is accepted due to the limitations of rail crossings adjacent to the town centre.

- Rix Road: It is expected that volumes would redistribute more evenly towards the south of the Precinct. The current model is dependent on the zone connector locations which load traffic to the model at specific points.

Figure 5 – Road Network Plan



3.3 Network Improvements – Regional and Local

The Officer Precinct has been modelled for the interim and ultimate scenarios; however certain improvements outside the Precinct are expected to have an impact on forecasted travel patterns.

Major improvements which are likely to have an impact include:

- Delivery of a freeway standard bypass connection from the Princes Freeway to Healesville-Koo Wee Rup Road;
- Widening of both Clyde Road and Narre Warren-Cranbourne Road;
- Changes in land use (including the development of the area shown as 'new urban area' in Figure 1);
- Delivery of the connection between the Beaconsfield interchange (Princes Highway/ Princes Freeway) and O'Shea Road; and
- Delivery of the Cardinia Creek crossings at Thompsons Road and Glasscocks Road/ Grices Road, and associated arterial road infrastructure.

It should be noted that although network changes will have an impact on travel patterns, the level of trip generation from the new development will impact on the distribution of traffic in the model is uncertain due to the nature of matrix estimation.

3.3.1 Beaconsfield Interchange

The modelling undertaken for the Officer PSP has demonstrated that an upgrade of the Beaconsfield interchange is likely to be required within the next 10 years.

The additional traffic generated by the development of the Officer PSP area is likely to increase volumes to the point where the interchange cannot function as uncontrolled roundabouts (assuming O'Shea Road is connected to the southern roundabout). At a minimum, ramp metering is likely to be required in the short term.

3.3.2 Cardinia Creek Crossings

The impact of bringing forward the delivery of regional east-west roads, including Thompsons Road and Glasscocks Road/ Grices Road, to alleviate the Beaconsfield interchange should be further investigated.

The modelling indicates that the through movements from Casey to Cardinia are likely to adversely impact on the function of this interchange, which will be exacerbated if the interchange remains in its current form. Alternative connections to provide a choice of route may improve the function of this interchange.

3.3.3 Cardinia Road Interchange

The modelling undertaken for the Officer PSP has demonstrated a high level of dependence on the Cardinia Road interchange for access to and from the Princes Freeway in the interim scenario. During this period, the model suggests that the Princes Highway through Officer will experience high levels of congestion, making access to the Princes Freeway via Cardinia Road a more attractive choice.

The need for an upgrade of the Cardinia Road interchange, including delivery of the second bridge, should be closely monitored as the Officer Precinct develops.

3.3.4 Rix Road/ Bridge Road Delivery

The modelling undertaken for the Officer PSP has demonstrated a high number of vehicles choosing to access the Princes Freeway via Cardinia Road (a full diamond interchange) in the interim scenario. As a result, the early delivery of Rix Road/ Bridge Road to a four-lane, divided local arterial standard should be prioritised.

4 SIDRA ANALYSIS

4.1 Overview

Analyses of a number of intersections were undertaken using SIDRA. Turning movement data extracted from the VISSIM micro-simulation model was used to inform the intersection design. SIDRA has been used to assess individual traffic signal controlled sites.

Where required, VISSIM micro-simulation modelling techniques have been used to demonstrate the coordination of traffic signals for the control of multiple traffic signal controlled sites. Traffic signal performance analysis has included selected midblock capacity analyses to guide the design and operational requirements of traffic signals. Analyses have been undertaken for the future 2031 design year.

The following design and operational requirements have been achieved:

- Lane configuration, signal phasing and coordination requirements at the traffic signals to ensure the safe and efficient operation of the road network for the current and future design traffic flows, as specified;
- Traffic signal integration within the VicRoads SCATS® system, which is used to monitor and control traffic signal operation; and
- The needs of all road users (e.g. private vehicles, heavy vehicles, freight, buses, pedestrians and cyclists) are taken into account.

Whereas micro-simulation is used for small, local area traffic analysis and intersection planning and design, SIDRA is used to confirm actual intersection layouts and preferred signal phasing settings. As an advanced micro-analytical evaluation tool, SIDRA is able to analyse lane-by-lane vehicle behaviour and optimise traffic signal timings to suit. It is a well known traffic analysis package used by traffic professionals throughout the world for intersection capacity, level of service and performance analysis, and design checks.

The modelling undertaken using SIDRA has confirmed that the traffic signal design and operation of individual sites satisfies the performance criteria as specified in Table 1 below.

Table 1 – SIDRA performance criteria

ITEM	NEW TRAFFIC SIGNALS
Degree of Saturation for each existing and new signal site	≤ 0.9
Level of Service (LOS)	"LOS D" or better

General descriptions of the operating conditions for each of the levels of service are as follows:

- LOS A describes primarily free-flow operations. Average operating speeds at the free-flow speed generally prevail. Vehicles are almost completely unimpeded in their ability to manoeuvre within the traffic stream. Even at the maximum density for LOS A, the average spacing between vehicles is about 160m, or 26 car lengths, which affords the motorist with a high level of physical and psychological comfort. The effects of incidents or point breakdowns are easily absorbed at this level.

- LOS B also represents reasonably free flow, and speeds at the free-flow speed are generally maintained. The lowest average spacing between vehicles is about 110m, or 18 car lengths. The ability to manoeuvre within the traffic the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still easily absorbed, though local deterioration in service may be more severe than for LOS A.
- LOS C provides for flow with speeds still at or near the free flow speed of the freeway. Freedom to manoeuvre within the traffic stream is noticeably restricted at LOS C, and lane changes require more vigilance on the part of the driver. Minimum average spacings are in the range of 70m, or 11 car lengths. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.
- LOS D is the level at which speeds begin to decline slightly with increasing flows. In this range, density begins to deteriorate somewhat more quickly with increasing flow. Freedom to manoeuvre within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.
- At its lower boundary, LOS E describes operation at capacity. Operations in this level are volatile, because there are virtually no useable gaps in the traffic stream. Vehicles are spaced at approximately 6 car lengths, leaving little room to manoeuvre within the traffic stream. Any disruption to the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes can cause following vehicles to give way to admit the vehicle. This can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity the traffic stream has no ability to dissipate even the most minor disruptions, and any incident can be expected to produce a serious breakdown with extensive queuing.
- LOS F describes breakdowns in vehicular flow. Such conditions generally exist within queues forming behind breakdown points. Such breakdowns occur for a number of reasons. Recurring points of congestion exist, such as merge or weaving areas, where the number of vehicles arriving is greater than the number of vehicles discharged. In forecasting situations, any location presents a problem when the projected peak hour (or other) flow rate exceeds the estimated capacity of the location.

The SIDRA works include a PM Peak analysis which is based on the Memorandum developed by GTA Consultants (25/10/10). The PM SIDRA works are based on inverting AM peak flows and modifying values to cater for heavy town centre traffic expected to be observed in the PM peak. It should be noted that the level of commuter traffic has been reduced to develop the PM peak SIDRAs.

The outputs extracted from the SIDRA analysis can be seen in Appendix 4.

4.2 Pedestrian and Cyclist Movements

All pedestrian and cyclist movements are incorporated in the traffic signal layouts. The pedestrians and cyclists share the same signal group within the phase in which they run.

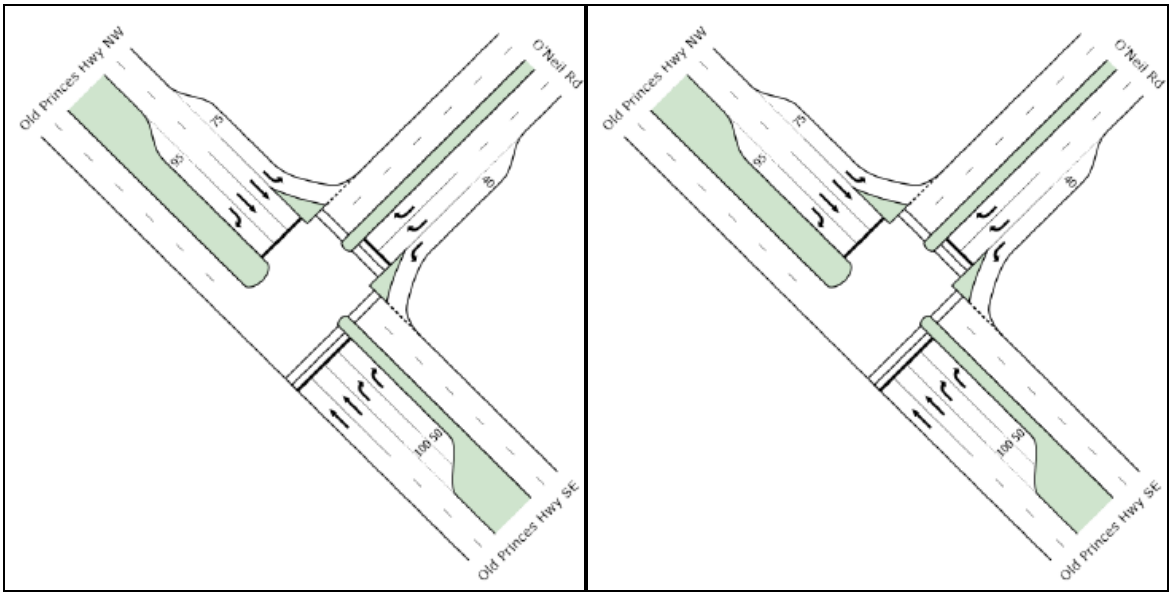
Pedestrians and cyclists using the pedestrian crossings have been allocated crossing time in the SIDRA models and lanterns would be provided post construction. It is assumed that all pedestrian facilities will be utilised by both pedestrians and cyclists.

Currently, SIDRA assumes that 50 pedestrians pass through each movement per hour. It should be noted that this is a conservative assumption as pedestrian movements tend only to be considered when pedestrian signals are activated.

5 DETAILED INTERSECTION ANALYSIS

5.1 O'Neill Road/ Old Princes Highway

The interim and ultimate layout of the O'Neill Road/ Old Princes Highway intersection is shown below.



Interim layout

Ultimate layout

5.1.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.678	0.633
Level of Service	B	B

The results show that the O'Neill Road/ Old Princes Highway intersection is expected to operate below capacity in 2021, and satisfies the performance criteria specified in Table 1.

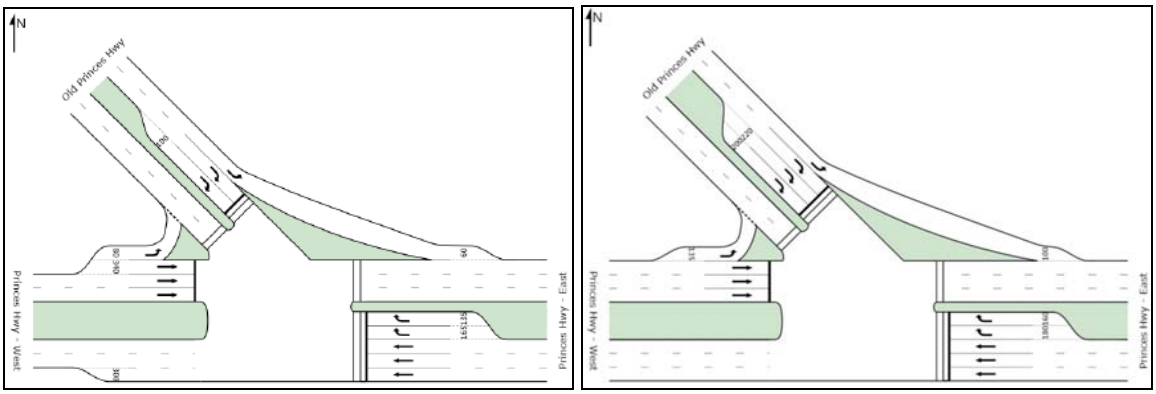
5.1.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.623	0.693
Level of Service	B	B

The results show that the O'Neill Road/ Old Princes Highway intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.2 Old Princes Highway/ Princes Highway

The interim and ultimate layout of the Old Princes Highway/ Princes Highway intersection is shown below.



Interim layout Ultimate layout

SIDRA cannot model a continuous left turn lane with a signalised pedestrian crossing therefore we have modelled the intersection with a continuous left turn lane only.

To determine the impact of a signalised pedestrian crossing on the continuous left turn lane, we have isolated the continuous left turn traffic lane and assessed its performance with pedestrian operated signals.

5.2.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Intersection		
Degree of Saturation	0.783	0.940
Level of Service	C	D
Traffic Lane with Pedestrian Operated Signals		
Degree of Saturation	0.286	0.356
Level of Service	A	A

The results show that the Old Princes Highway/ Princes Highway intersection is expected to operate below capacity in 2021, and satisfies the performance criteria specified in Table 1.

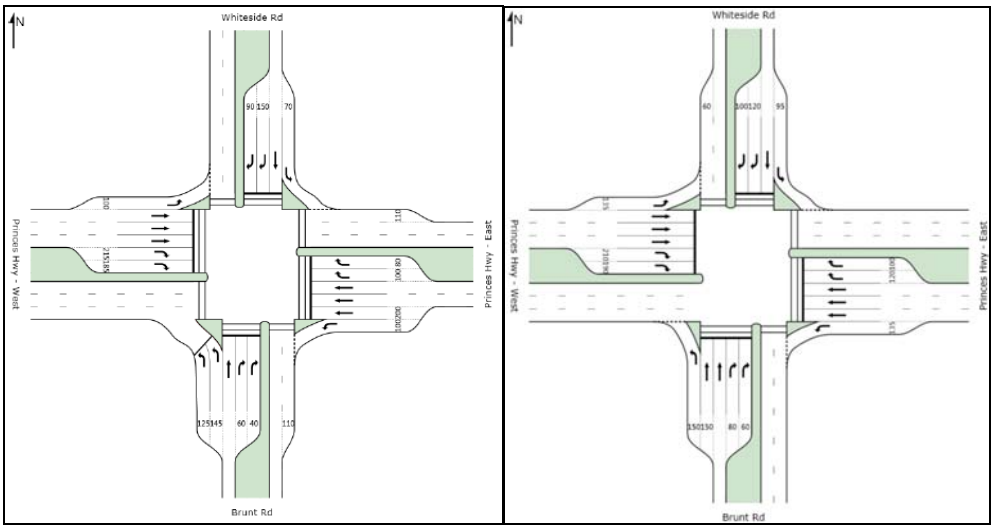
5.2.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Intersection		
Degree of Saturation	0.829	0.911
Level of Service	C	D
Traffic Lane with Pedestrian Operated Signals		
Degree of Saturation	0.382	0.764
Level of Service	A	C

The results show that the Old Princes Highway/ Princes Highway intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.3 Whiteside Road/ Princes Highway

The interim and ultimate layout of the Whiteside Road/ Princes Highway intersection is shown below.



Interim layout Ultimate layout

5.3.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	1.000*	1.252
Level of Service	F[1]	F[1]

* - short lane effect

[1] - approved by VicRoads

The results show that the Whiteside Road/ Princes Highway intersection is expected to operate above capacity in 2021 due to the following movements:

- In the AM peak hour:
  - Right turn movement on Princes Highway, west approach is operating at LOS F
- In the PM peak hour:
  - Through movement on Princes Highway, east approach is operating at LOS F
  - Right turn movement on Princes Highway, west approach is operating at LOS F.

5.3.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.843	1.073
Level of Service	C	F[1]

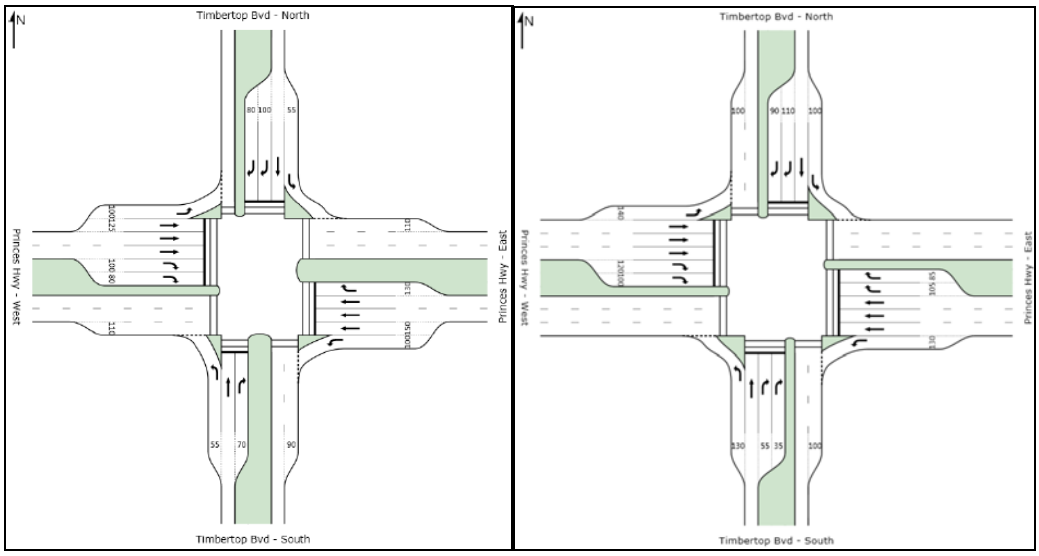
[1] - approved by VicRoads

The results show that the Whiteside Road/ Princes Highway intersection is expected to operate below capacity in the AM peak hour in 2031, and satisfies the performance criteria specified in Table 1. In the PM peak hour, the intersection is shown to operate above capacity due to the following movements:

- Right turn movement on Princes Highway, west approach is operating at LOS F
- Through movement on Princes Highway, east approach is operating at LOS F
- Through movement on Brunt Road is operating at LOS E.

5.4 Timbertop Boulevard/ Princes Highway

The interim and ultimate layout of the Timbertop Boulevard/ Princes Highway intersection is shown below.



Interim layout Ultimate layout

5.4.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.712	1.085
Level of Service	C	F[1]

[1] - approved by VicRoads

The results show that the Whiteside Road/ Princes Highway intersection is expected to operate above capacity in 2021 due to the following movements:

- In the PM peak hour:
  - Through movement on Princes Highway, east approach is operating at LOS F
  - Right turn movement on Princes Highway, west approach is operating at LOS F.

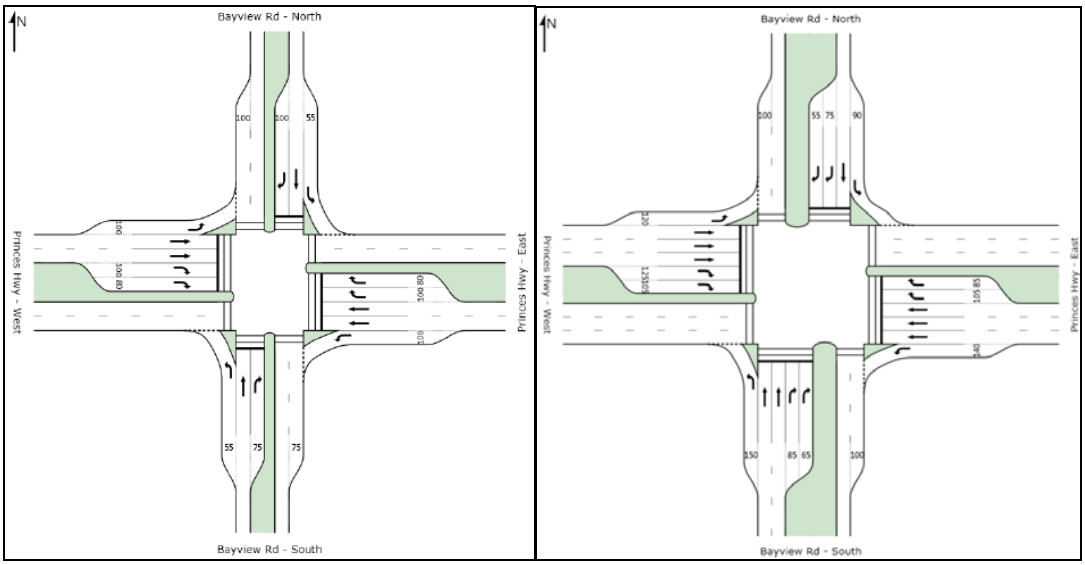
5.4.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.658	0.868
Level of Service	B	C

The results show that the Timbertop Boulevard/ Princes Highway intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.5 Bayview Road/ Princes Highway

The interim and ultimate layout of the Bayview Road/ Princes Highway intersection is shown below.



Interim layout

Ultimate layout

5.5.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.765	0.950
Level of Service	C	D

The results show that the Bayview Road/ Princes Highway intersection is expected to operate below capacity in 2021, and satisfies the performance criteria specified in Table 1.

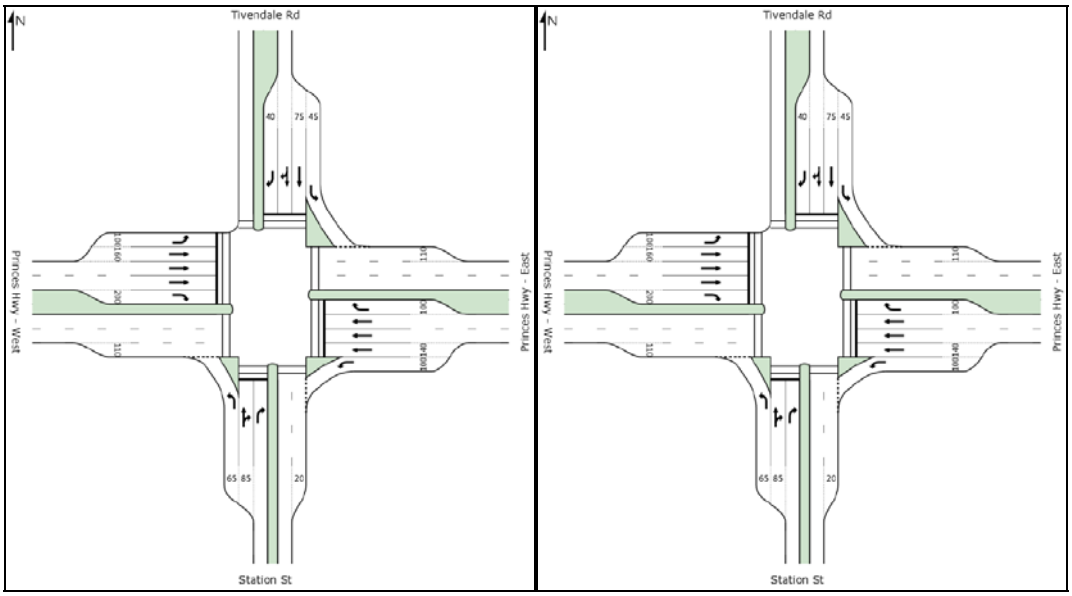
5.5.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.725	0.732
Level of Service	C	C

The results show that the Bayview Road/ Princes Highway intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.6 Tivendale Road/ Princes Highway

The interim and ultimate layout of the Tivendale Road/ Princes Highway intersection is shown below.



Interim layout

Ultimate layout

5.6.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.794	1.177
Level of Service	C	F[1]

[1] - approved by VicRoads

The results show that the Tivendale Road/ Princes Highway intersection is expected to operate below capacity in the AM peak hour in 2021, and satisfies the performance criteria specified in Table 1. In the PM peak hour, the intersection is shown to operate above capacity due to the following movements:

- Right turn and through movement on Princes Highway, east approach is operating at LOS F
- Right turn movement on Princes Highway, west approach is operating at LOS F.
- Right turn movement on Station Street, south approach is operating at LOS F.

5.6.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.652	0.993
Level of Service	B	E[1]

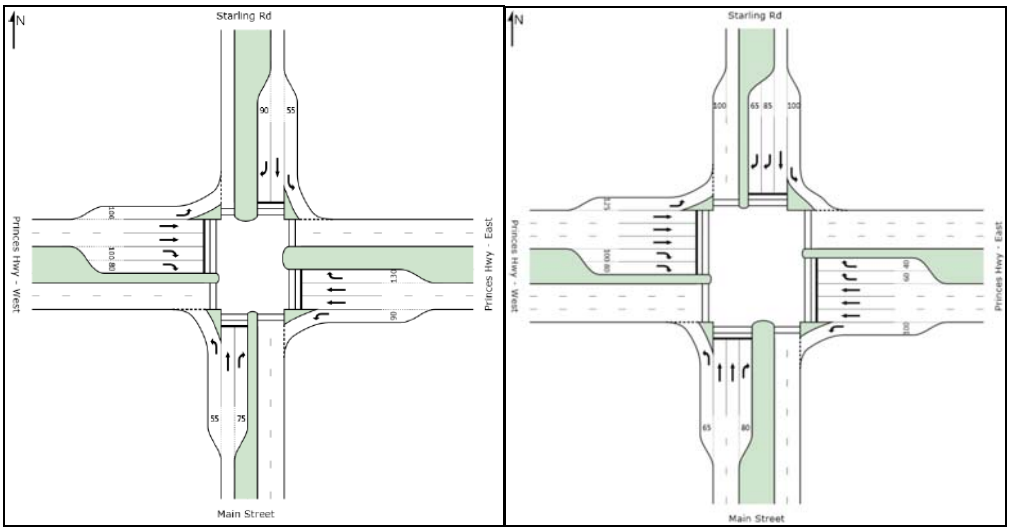
[1] - approved by VicRoads

The results show that the Tivendale Road/ Princes Highway intersection is expected to operate below capacity in the AM peak hour in 2031, and satisfies the performance criteria specified in Table 1. In the PM peak hour, the intersection is shown to operate above capacity due to the following movements:

- Right turn movement on Princes Highway, west approach is operating at LOS E
- Through movement on Princes Highway, east approach is operating at LOS E
- Tivendale Road is operating at LOS E.

5.7 Starling Road/ Princes Highway

The interim and ultimate layout of the Starling Road/ Princes Highway intersection is shown below.



Interim layout Ultimate layout

5.7.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.702	0.821
Level of Service	C	C

The results show that the Starling Road/ Princes Highway intersection is expected to operate below capacity in 2021, and satisfies the performance criteria specified in Table 1.

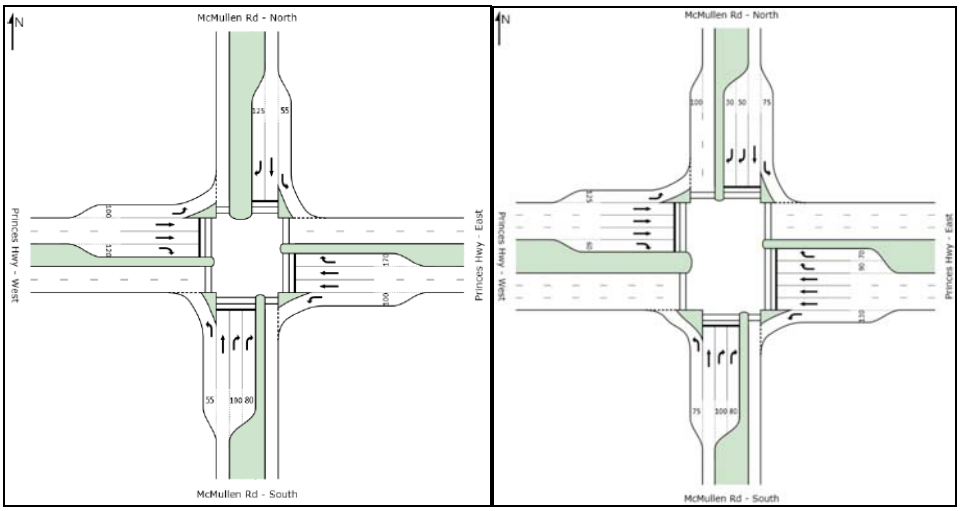
5.7.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.537	0.735
Level of Service	A	C

The results show that the Starling Road/ Princes Highway intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.8 McMullen Road/ Princes Highway

The interim and ultimate layout of the McMullen Road/ Princes Highway intersection is shown below.



Interim layout

Ultimate layout

5.8.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.682	0.841
Level of Service	B	C

The results show that the McMullen Road/ Princes Highway intersection is expected to operate below capacity in 2021, and satisfies the performance criteria specified in Table 1.

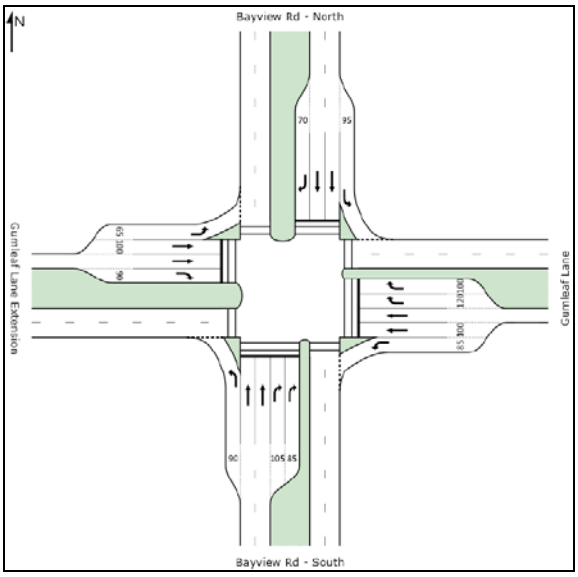
5.8.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.567	0.696
Level of Service	A	B

The results show that the McMullen Road/ Princes Highway intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.9 Bayview Road/ Gumleaf Lane

The ultimate layout of the Bayview Road/ Gumleaf Lane intersection is shown below.

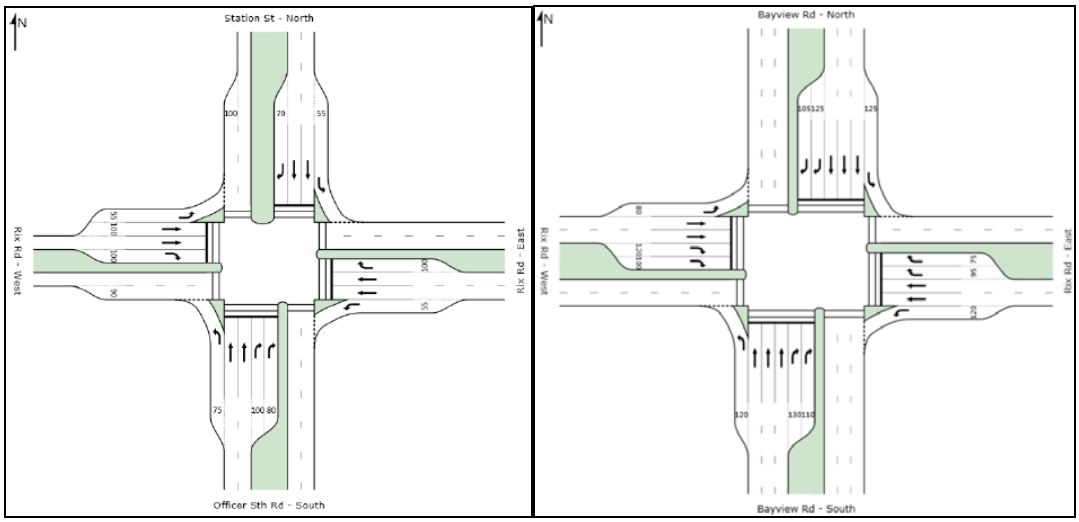


Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.586	0.821
Level of Service	A	C

The results show that the Bayview Road/ Gumleaf Lane intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.10 Bayview Road/ Rix Road

The interim and ultimate layout of the Bayview Road/ Rix Road intersection is shown below.



Interim layout

Ultimate layout

5.10.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.446	0.593
Level of Service	A	A

The results show that the Bayview Road/ Rix Road intersection is expected to operate below capacity in 2021, and satisfies the performance criteria specified in Table 1.

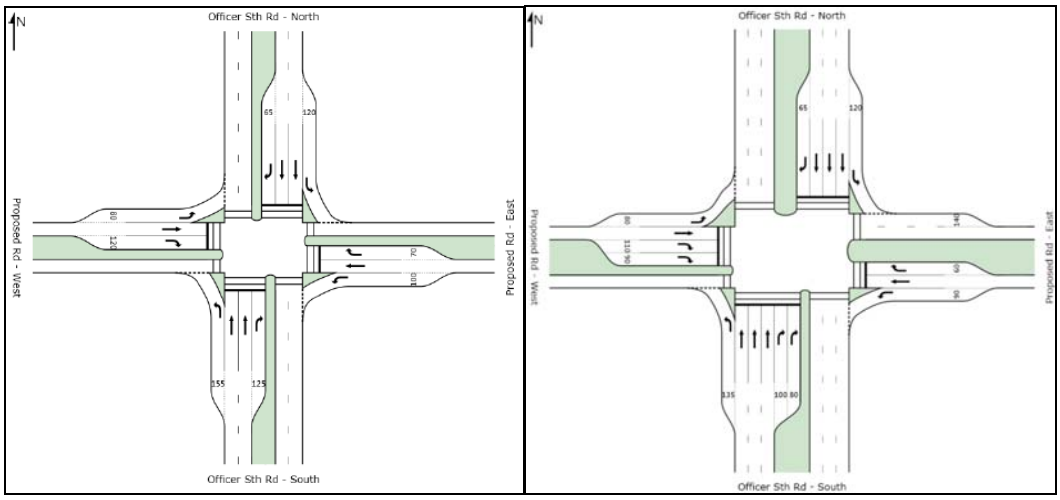
5.10.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.647	0.660
Level of Service	B	B

The results show that the Bayview Road/ Rix Road intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.11 Officer South Road/ Proposed Road

The interim and ultimate layout of the Officer South Road/ Proposed Road intersection is shown below.



Interim layout

Ultimate layout

5.11.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.893	0.867
Level of Service	C	C

The results show that the Officer South Road/ Proposed Road intersection is expected to operate below capacity in 2021, and satisfies the performance criteria specified in Table 1.

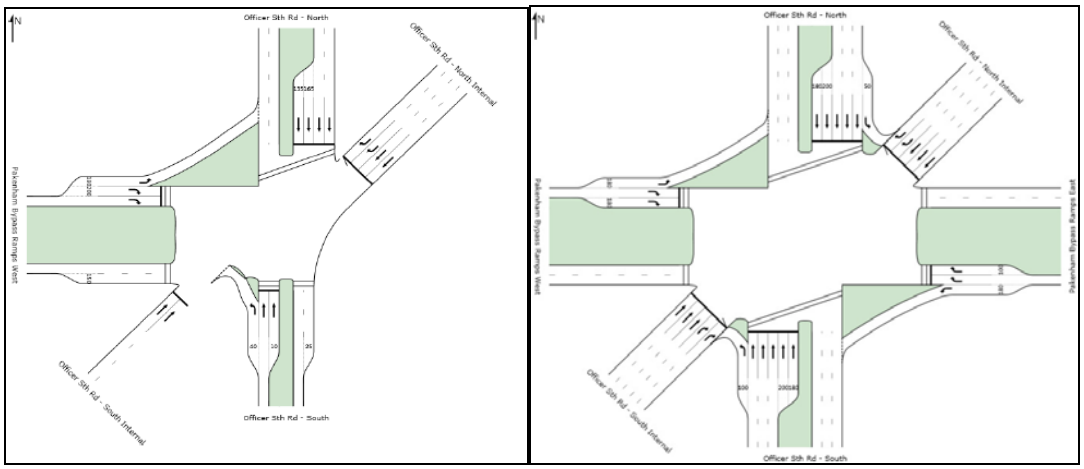
5.11.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.797	0.862
Level of Service	C	C

The results show that the Officer South Road/ Proposed Road intersection is expected to operate below capacity in 2031, and satisfies the performance criteria specified in Table 1.

5.12 Officer South Road/ Princes Freeway

The interim and ultimate layout of the Officer South Road/ Princes Freeway interchange is shown below.



Interim layout

Ultimate layout

5.12.1 Interim Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	0.917	1.000*
Level of Service	D	E[1]

* - short lane effect

[1] - approved by VicRoads

The results show that the South Road/ Princes Freeway intersection is expected to operate above capacity in 2021 due to the following movements:

- In the PM peak hour:
    - Left turn movement on Officer South Road, south approach is operating at LOS E

5.12.2 Ultimate Scenario

Performance Measure	AM Peak	PM Peak
Degree of Saturation	1.000*	1.000*
Level of Service	E[1]	E[1]

* - short lane effect

[1] - approved by VicRoads

The results show that the Officer South Road/ Princes Freeway interchange is expected to operate above capacity in 2031 due to the following movements:

- Left turn movement on Pakenham Bypass off-ramp, east approach is operating at LOS E due to short lane effect in the AM peak hour
- Left turn movement on Officer South Road, south approach is operating at LOS E due to short lane effect in the PM peak hour.

5.13 Summary

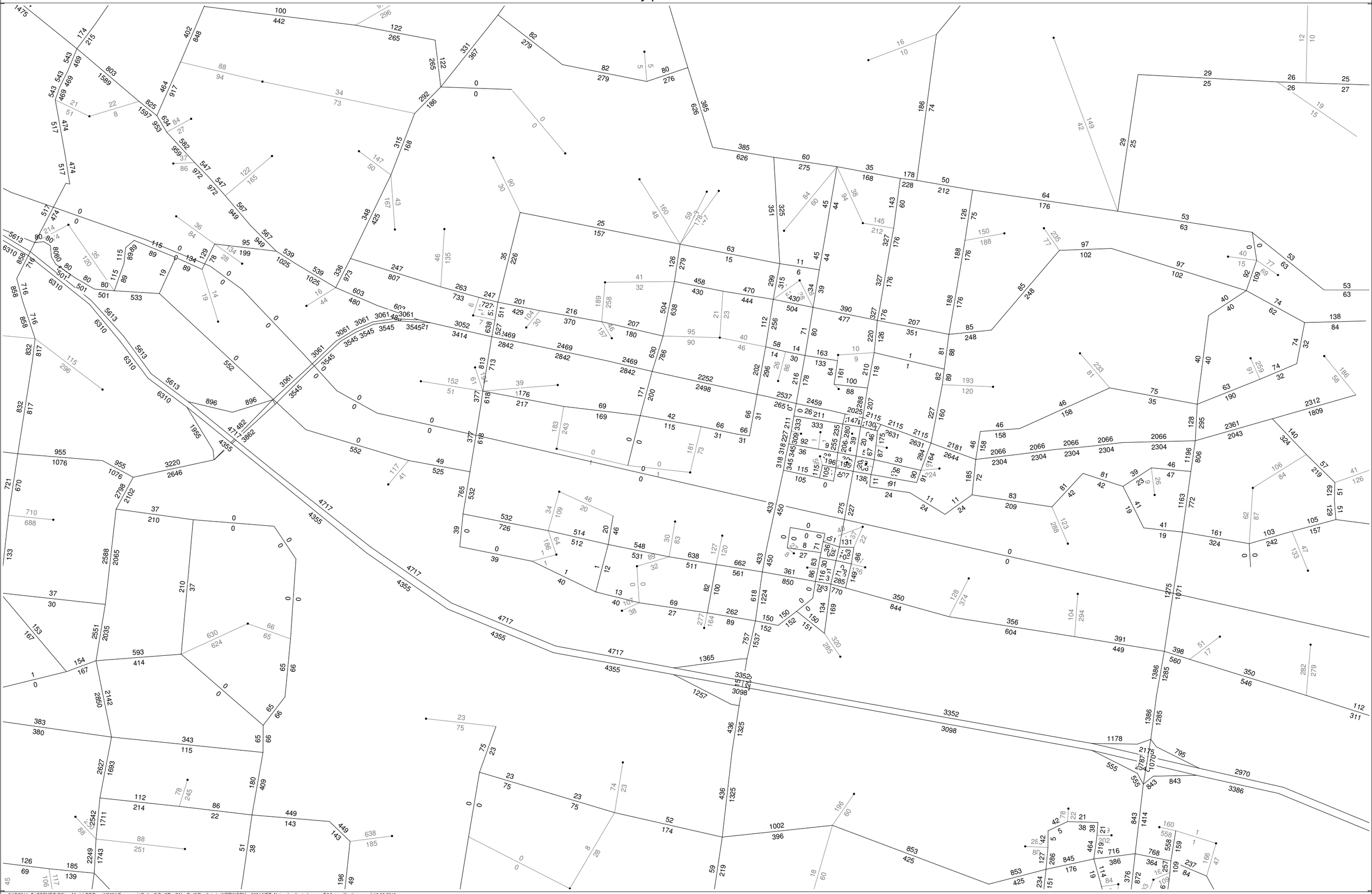
A summary of the intersections shown to operate above capacity in the SIDRA analysis is provided below:

- Whiteside Road/ Princes Highway signalised intersection during the AM and PM peak hour in 2021
- Whiteside Road/ Princes Highway signalised intersection during the PM peak hour in 2031
- Timbertop Boulevard/ Princes Highway signalised intersection during the PM peak hour in 2021
- Tivendale Road/ Princes Highway signalised intersection during the PM peak hour in 2021
- Tivendale Road/ Princes Highway signalised intersection during the PM peak hour in 2031
- Officer South Road/ Princes Freeway signalised interchange during the PM and PM peak hours in 2021
- Officer South Road/ Princes Freeway signalised interchange during the AM and PM peak hours in 2031.

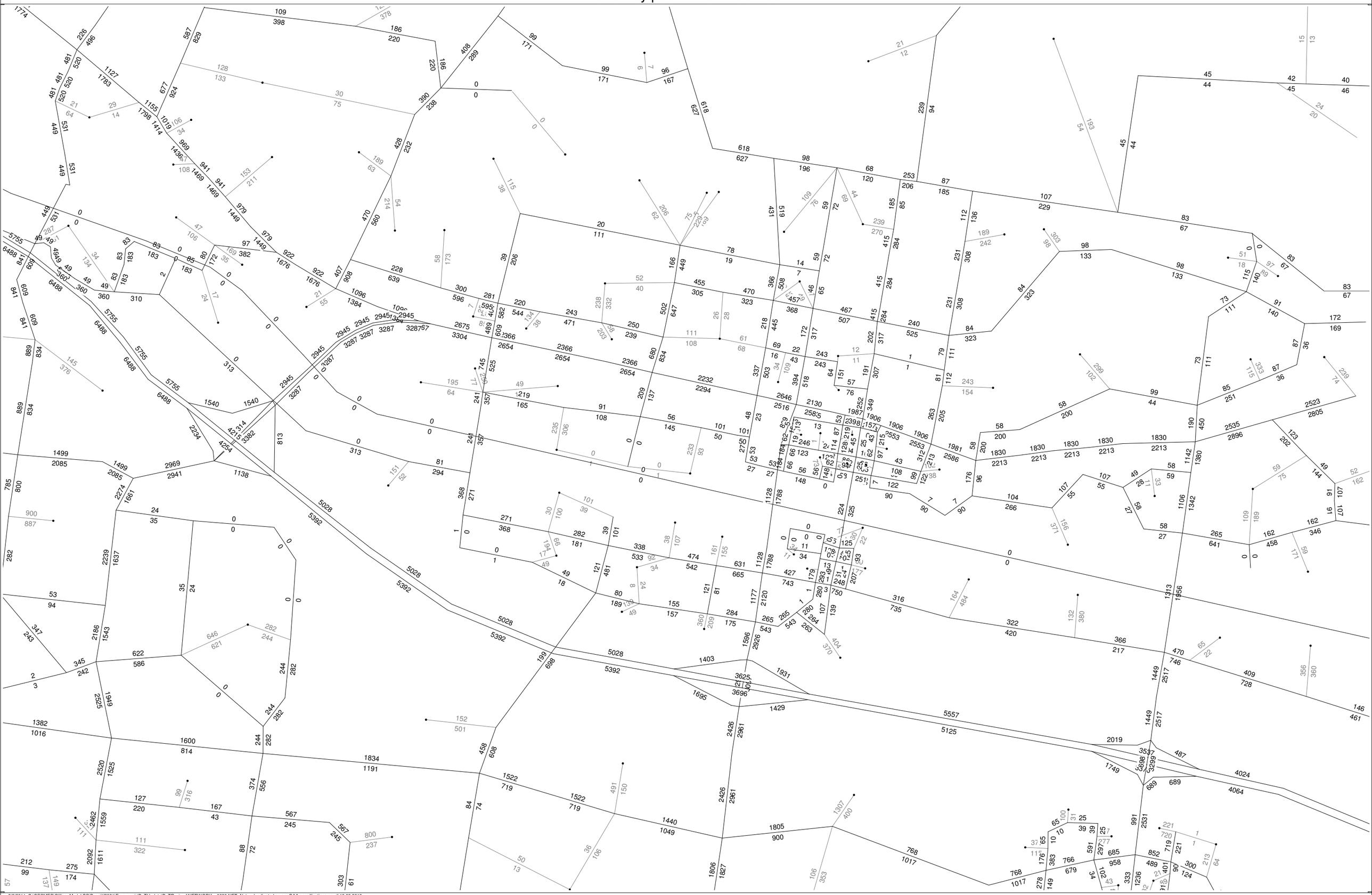
The operation of the signalised intersections listed above can be improved through the refinement of signal timings and coordination by VicRoads. This improvement is possible based on the micro-simulation model which shows that the interim and ultimate network would operate efficiently with the projected traffic volumes.

APPENDIX 1 – MITM PLOTS

Officer Precinct Model
2021 Interim Scenario - Aspirational Employment - Revised 17/02/10
One-way peak 1 hour volumes

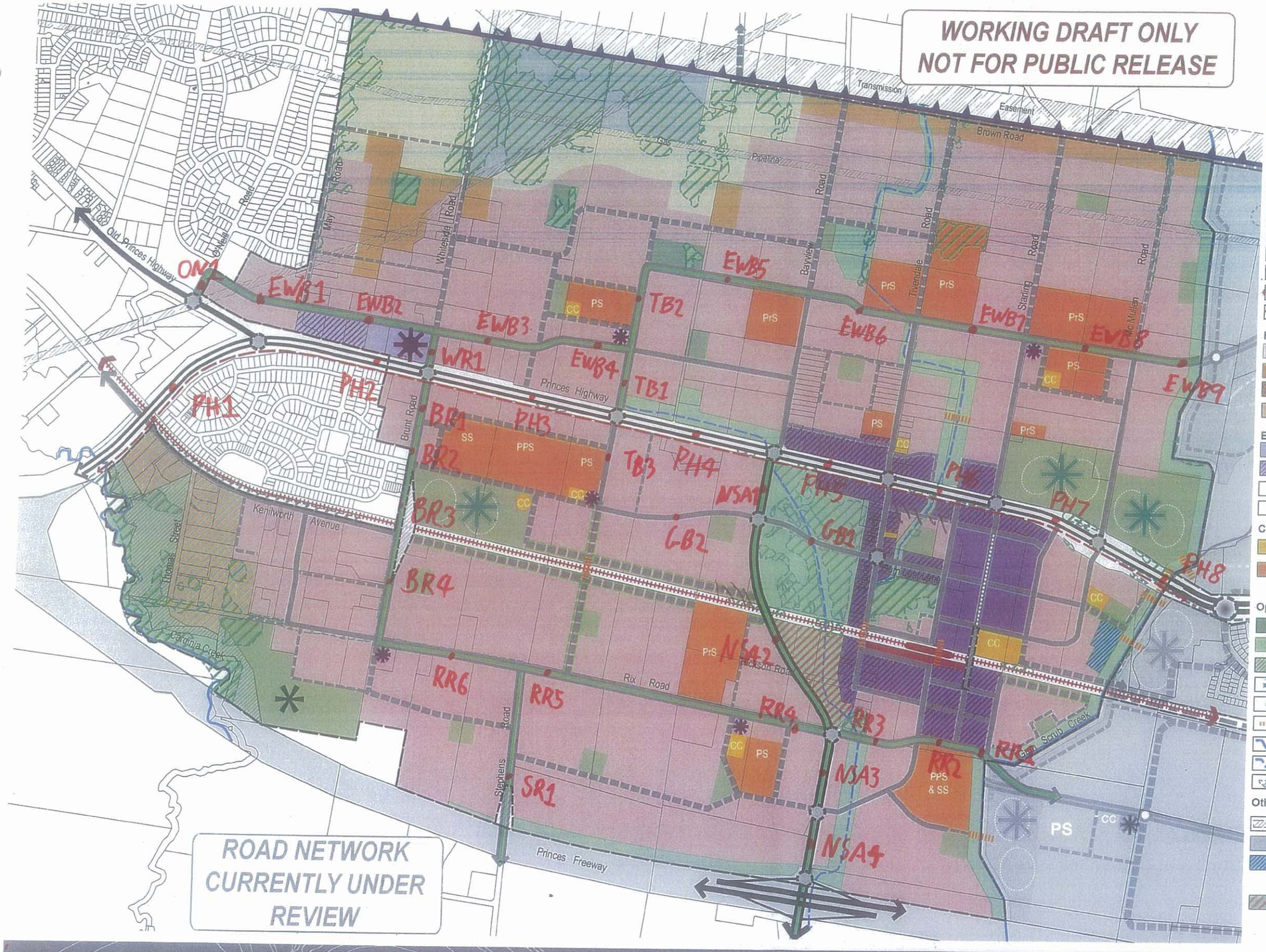


Officer Precinct Model
2031 Ultimate Scenario - Aspirational Employment - Revised 04/11/10
One-way peak 1 hour volumes



APPENDIX 2 – MICRO-SIMULATION VOLUME PLOTS AND TABLES

WORKING DRAFT ONLY
NOT FOR PUBLIC RELEASE



ROAD NETWORK CURRENTLY UNDER REVIEW

LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary

Movement Network

- Arterial Road (VicRoads)
- Potential Future Arterial Road (VicRoads)
- Local Arterial / Connector Street (Boulevard)
- Connector Street
- Main Street - MAC
- Access Street - Level 2
- Access Street - Level 2 with Landscape trail
- Access Place / Street - Level 1 (important connection)
- Signalised intersections (arterial roads only)
- Grade Separated Crossing
- Railway Line, Proposed Station & Bus Interchange
- PPTN - Principal Public Transport Network

Residential Land

- Residential Land
- Low density residential land (min.1000sqm lots)
- Low Density Residential Zone
- Low Density Residential land (min. 4000sqm lots)

Employment Land

- Core Business / MAC Core Business
- Peripheral Commercial/ MAC Peripheral Commercial
- Neighbourhood Activity Centre (NAC)
- Neighbourhood Convenience Centre (NCC)

Community and Schools

- CC — Community facilities and public uses
- PrS — Education facilities (PS = Primary School, PPS = Post Primary School, PrS = Private School, SS = Special School)

Open Space and Environment

- Public open space (unencumbered)
- Public open space (encumbered)
- Regional Open Space (Parks Victoria)
- District sports reserves (8ha+)
- District Parks
- Proposed pedestrian crossings
- Existing creeks
- Major Drainage Lines
- Ecological Vegetation Classes (EVC's) to be retained

Other Land

- Existing Major Easements
- Protection Area
- Encumbered land - potential future development area

- Area Subject to Further Investigation

Arterial & Boulevard Collector Count Locations 12/04 DS

Plan 5: Future Urban Structure
Officer Precinct Structure Plan

CARDINIA

WORKING DRAFT ONLY
NOT FOR PUBLIC RELEASE

Scale: 1:7500 @ A1
1:15000 @ A3

0 150 300 450m

please note:
This plan is based on preliminary information only and may be subject to change as a result of formal Council/Authority advice, detailed site investigations and confirmation by survey

ref. 3410344U
date: 31 March 2011
rev. X
drawn: HW
checked: DL

smec urban consulting group
planning & urban design
melbourne - tel 9869 0800

abn 47 065 475 149
trading as smec urban

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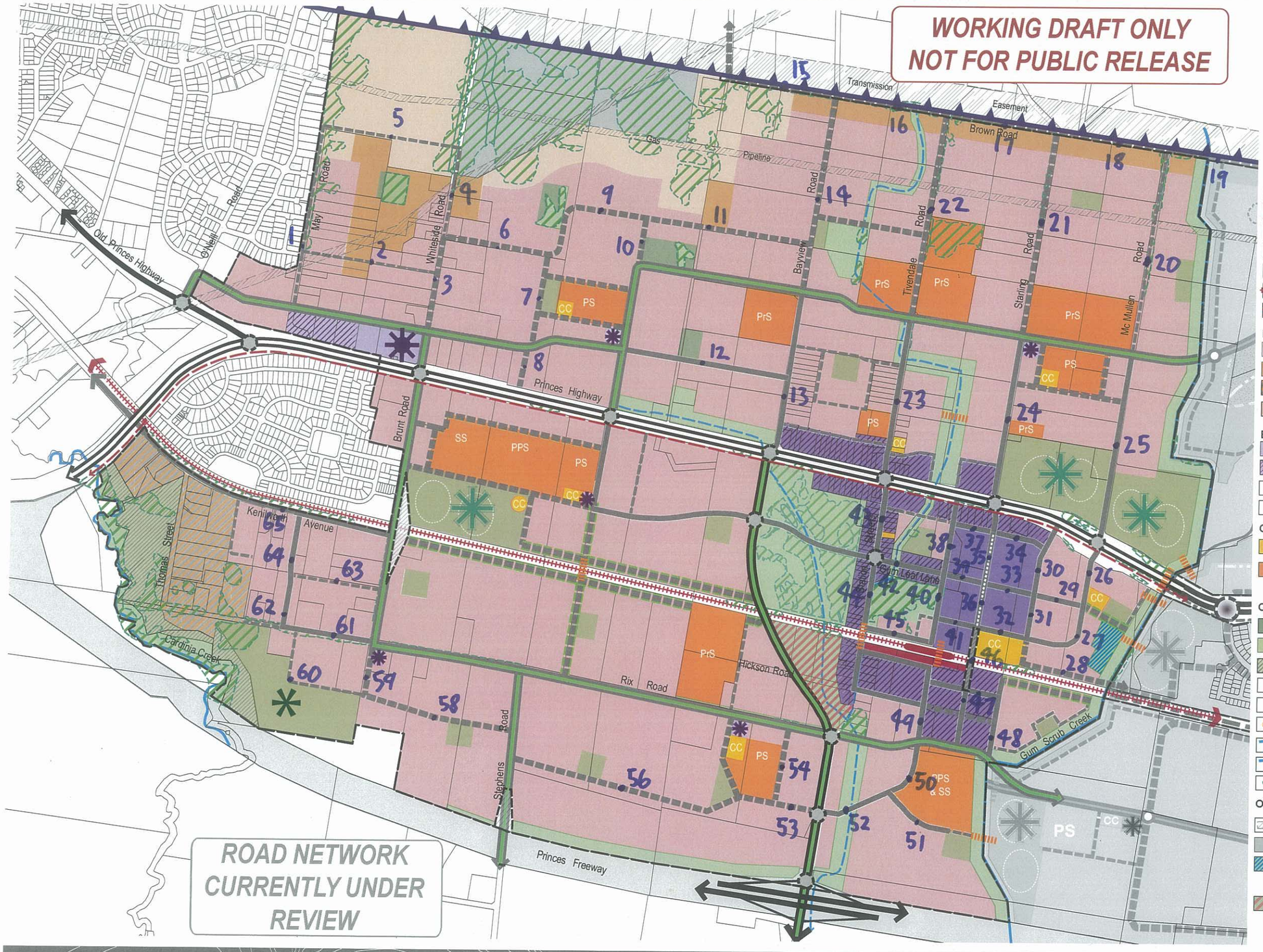

ROAD NETWORK CURRENTLY UNDER REVIEW

LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary

Movement Network

- Arterial Road (VicRoads)
- Potential Future Arterial Road (VicRoads)
- Local Arterial / Connector Street (Boulevard)
- Connector Street
- Main Street - MAC
- Access Street - Level 2
- Access Street - Level 2 with Landscape trail
- Access Place / Street - Level 1 (important connection)
- Signalised intersections (arterial roads only)
- Grade Separated Crossing
- Railway Line, Proposed Station & Bus Interchange
- PPTN - Principal Public Transport Network

Residential Land

- Residential Land
- Low density residential land (min.1000sqm lots)
- Low Density Residential Zone
- Low Density Residential land (min. 4000sqm lots)

Employment Land

- Core Business / MAC Core Business
- Peripheral Commercial/ MAC Peripheral Commercial
- Neighbourhood Activity Centre (NAC)
- Neighbourhood Convenience Centre (NCC)

Community and Schools

- CC — Community facilities and public uses
- PrS — Education facilities (PS = Primary School, PPS = Post Primary School, PrS = Private School, SS = Special School)

Open Space and Environment

- Public open space (unencumbered)
- Public open space (encumbered)
- Regional Open Space (Parks Victoria)
- District sports reserves (8ha+)
- District Parks
- Proposed pedestrian crossings
- Existing creeks
- Major Drainage Lines
- Ecological Vegetation Classes (EVC's) to be retained

Other Land

- Existing Major Easements
- Protection Area
- Encumbered land - potential future development area
- Area Subject to Further Investigation

Collector (undivided) + Local Access St Count Locations 12/04 DS

Plan 5: Future Urban Structure

Officer Precinct Structure Plan

smec urban consulting group

CARDINIA

WORKING DRAFT ONLY
NOT FOR PUBLIC RELEASE

Scale: 1:7500 @ A1
1:15000 @ A3

0 150 300 450m

please note:
This plan is based on preliminary information only and may be subject to change as a result of formal Council/Authority advice, detailed site investigations and confirmation by survey

ref.: 3410344U
date: 31 March 2011
rev.: X
drawn: HW
checked: DL

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Officer PSP – 2021 Interim Volumes with revised North-South arterial alignment (Vehicles per day)

Detector Points	Cardinia Shire Council		GAA		VISSIM (vpd)
	Volume	Category	Volume	Category	
ON1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	18290
EWB1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	8320
EWB2	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	7400
EWB3	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	7680
EWB4	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	8020
EWB5	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	5040
EWB6	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	6440
EWB7	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	5630
EWB8	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	4650
EWB9	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	3260
WR1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	10810
TB1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	6140
TB2	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	6780
TB3	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	7490
PH1	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	56200
PH2	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	43860
PH3	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	30250
PH4	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	21000
PH5	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	22170
PH6	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	24900
PH7	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	28600
PH8	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	32130
BR1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	21140
BR2	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	17810
BR3	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	10610
BR4	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	10640

Detector Points	Cardinia Shire Council		GAA		VISSIM (vpd)
	Volume	Category	Volume	Category	
NSA1	Less than 3,000	Collector Street	Up to 2,000	Local Access (Level 1)	3900
NSA2	N/A	N/A	N/A	N/A	N/A
NSA3	Generally 15,000+	Local Arterial (4 Lane Divided)	40,000 +	Primary Arterial Road	14780
NSA4	Generally 15,000+	Local Arterial (4 Lane Divided)	40,000 +	Primary Arterial Road	25290
RR1	More than 10,000	Local Arterial (4 Lane Divided)	12,000 to 40,000	Secondary Arterial Road	18200
RR2	More than 10,000	Local Arterial (4 Lane Divided)	12,000 to 40,000	Secondary Arterial Road	14220
RR3	More than 10,000	Local Arterial (4 Lane Divided)	12,000 to 40,000	Local Arterial Road	11530
RR4	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	8220
RR5	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	10410
RR6	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	11870
SR1	N/A	N/A	N/A	N/A	N/A
GB1	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	15350
GB2	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	13230
1	Less than 500	Local Street	Up to 2,000	Local Access (Level 1)	328
2	Less than 500	Local Street	Up to 2,000	Local Access (Level 1)	3952
3	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	5848
4	Less than 500	Local Street	Up to 2,000	Local Access (Level 1)	2008
5	Less than 500	Local Street	Up to 2,000	Local Access (Level 1)	520
6	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	4568
7	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	2032
8	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	1072
9	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	3568
10	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	2744
11	Less than 500	Local Street	Up to 2,000	Local Access (Level 1)	3504
12	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4128
13	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4136

Detector Points	Cardinia Shire Council		GAA		VISSIM (vpd)
	Volume	Category	Volume	Category	
14	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5768
15	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	7936
16	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	5616
17	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	4856
18	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	3128
19	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	1768
20	Less than 500	Local Street	Up to 2,000	Local Access (Level 1)	1568
21	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	2208
22	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	1680
23	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	6672
24	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	3472
25	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4824
26	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4376
27	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2472
28	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	3824
29	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2160
30	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	1312
31	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	1584
32	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5392
33	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	3152
34	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2152
35	Less than 10,000	Main Street Collector Street	3,000 to 7,000	Connector Street (Undivided)	2232
36	Less than 10,000	Main Street Collector Street	3,000 to 7,000	Connector Street (Undivided)	3128
37	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	3184
38	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4456
39	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	3488

Detector Points	Cardinia Shire Council		GAA		VISSIM (vpd)
	Volume	Category	Volume	Category	
40	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4008
41	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	3784
42	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	9264
43	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	8792
44	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	8312
45	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	1120
46	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	7656
47	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5288
48	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4744
49	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2240
50	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4216
51	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4680
52	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	6008
53	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	6680
54	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2936
55	Redundant marker				
56	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	1872
57	Redundant marker				
58	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	1672
59	Less than 3,000	Collector Street	2,000 to 3,000	Local Access (Level 2)	1304
60	Less than 500	Local Street	Up to 2,000	Local Access (Level 1)	672
61	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2672
62	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	3352
63	Less than 500	Local Street	Up to 2,000	Local Access (Level 1)	816
64	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4088
65	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4112

Officer PSP – 2031 Ultimate Volumes with revised North-South arterial alignment (Vehicles per day)

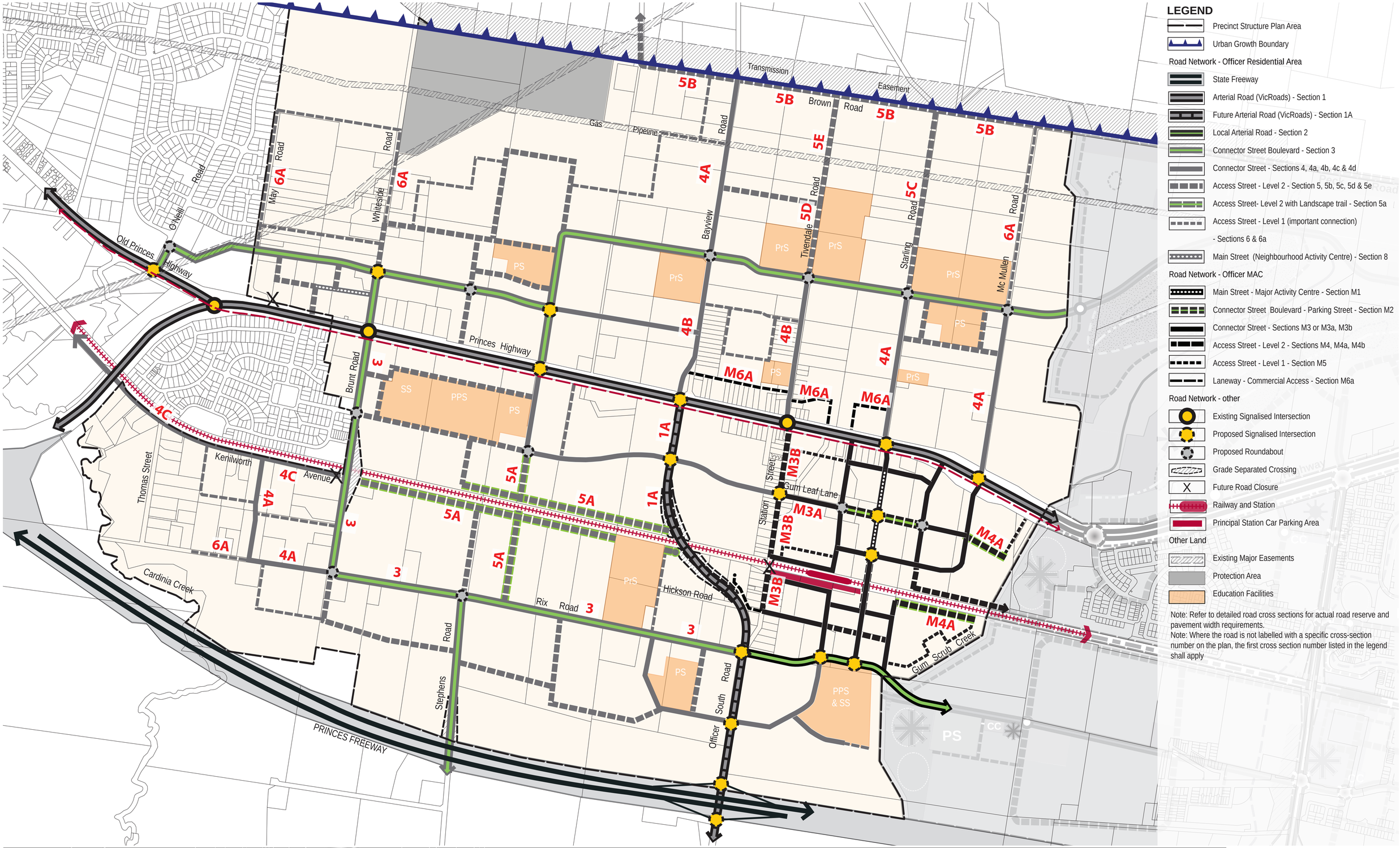
Detector Points	Cardinia Shire Council		GAA		VISSIM (vpd)
	Volume	Category	Volume	Category	
ON1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	17510
EWB1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	6810
EWB2	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	6270
EWB3	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	7660
EWB4	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	8410
EWB5	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	6110
EWB6	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	7340
EWB7	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	7760
EWB8	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	7040
EWB9	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	4140
WR1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	10780
TB1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	9830
TB2	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	11040
TB3	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	?
PH1	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	55250
PH2	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	45310
PH3	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	37240
PH4	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	31170
PH5	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	32690
PH6	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	28110
PH7	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	29790
PH8	Generally 15,000+	Arterial Road	40,000 +	Primary Arterial Road	33810
BR1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	14510
BR2	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	11070
BR3	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	9230
BR4	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	9290

Detector Points	Cardinia Shire Council		GAA		VISSIM (vpd)
	Volume	Category	Volume	Category	
NSA1	Generally 15,000+	VicRoads Arterial	40,000 +	Primary Arterial Road	10780
NSA2	Generally 15,000+	VicRoads Arterial	40,000 +	Primary Arterial Road	18020
NSA3	Generally 15,000+	VicRoads Arterial	40,000 +	Primary Arterial Road	26470
NSA4	Generally 15,000+	VicRoads Arterial	40,000 +	Primary Arterial Road	40780
RR1	More than 10,000	Local Arterial (4 lane divided)	12,000 to 40,000	Secondary Arterial	18980
RR2	More than 10,000	Local Arterial (4 lane divided)	12,000 to 40,000	Secondary Arterial	19110
RR3	More than 10,000	Local Arterial (4 lane divided)	12,000 to 40,000	Secondary Arterial	18520
RR4	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	6980
RR5	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	8230
RR6	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	9070
SR1	Less than 10,000	Local Arterial (2 Lane Divided)	7,000 to 12,000	Connector Street Boulevard	8550
GB1	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	10110
GB2	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	3510
1	Less than 500	Local Street	Up to 2,000	Access Street (Level 1)	496
2	Less than 500	Local Street	Up to 2,000	Access Street (Level 1)	3400
3	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	6096
4	Less than 500	Local Street	Up to 2,000	Access Street (Level 1)	2688
5	Less than 500	Local Street	Up to 2,000	Access Street (Level 1)	640
6	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	3856
7	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	1592
8	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	1960
9	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	2976
10	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	3792
11	Less than 500	Local Street	Up to 2,000	Access Street (Level 1)	3896
12	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Collector Street (Undivided)	3496
13	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5816

Detector Points	Cardinia Shire Council		GAA		VISSIM (vpd)
	Volume	Category	Volume	Category	
14	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	7248
15	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	9704
16	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	5976
17	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	5768
18	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	3952
19	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	2592
20	Less than 500	Local Street	Up to 2,000	Access Street (Level 2)	2096
21	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	2968
22	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	2296
23	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5648
24	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5184
25	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5840
26	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5272
27	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2592
28	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	2256
29	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2040
30	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	1224
31	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	1336
32	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5048
33	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2520
34	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	1544
35	Less than 10,000	Main Street Collector Street	3,000 to 7,000	Connector Street (Undivided)	3408
36	Less than 10,000	Main Street Collector Street	3,000 to 7,000	Connector Street (Undivided)	2792
37	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4288
38	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4040
39	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2240

Detector Points	Cardinia Shire Council		GAA		VISSIM (vpd)
	Volume	Category	Volume	Category	
40	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2864
41	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2568
42	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4176
43	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4576
44	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	760
45	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	760
46	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	9568
47	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5216
48	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4704
49	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	3408
50	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	4160
51	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	5984
52	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	7416
53	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	8104
54	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2832
55	Redundant marker				
56	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	3712
57	Redundant marker				
58	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	1008
59	Less than 3,000	Collector Street	2,000 to 3,000	Access Street (Level 2)	640
60	Less than 500	Local Street	Up to 2,000	Access Street (Level 1)	144
61	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	1552
62	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	1656
63	Less than 500	Local Street	Up to 2,000	Access Street (Level 1)	1104
64	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2688
65	Less than 10,000	Local Arterial (Undivided)	3,000 to 7,000	Connector Street (Undivided)	2688

APPENDIX 3 – ROAD CROSS SECTIONS



LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary

Road Network - Officer Residential Area

- State Freeway
- Arterial Road (VicRoads) - Section 1
- Future Arterial Road (VicRoads) - Section 1A
- Local Arterial Road - Section 2
- Connector Street Boulevard - Section 3
- Connector Street - Sections 4, 4a, 4b, 4c & 4d
- Access Street - Level 2 - Section 5, 5b, 5c, 5d & 5e
- Access Street- Level 2 with Landscape trail - Section 5a
- Access Street - Level 1 (important connection) - Sections 6 & 6a
- Main Street (Neighbourhood Activity Centre) - Section 8

Road Network - Officer MAC

- Main Street - Major Activity Centre - Section M1
- Connector Street Boulevard - Parking Street - Section M2
- Connector Street - Sections M3 or M3a, M3b
- Access Street - Level 2 - Sections M4, M4a, M4b
- Access Street - Level 1 - Section M5
- Laneway - Commercial Access - Section M6a

Road Network - other

- Existing Signalised Intersection
- Proposed Signalised Intersection
- Proposed Roundabout
- Grade Separated Crossing
- Future Road Closure
- Railway and Station
- Principal Station Car Parking Area

Other Land

- Existing Major Easements
- Protection Area
- Education Facilities

Note: Refer to detailed road cross sections for actual road reserve and pavement width requirements.
Note: Where the road is not labelled with a specific cross-section number on the plan, the first cross section number listed in the legend shall apply

Plan 15: Road Network
Officer Precinct Structure Plan

CARDINIA

DRAFT

Scale: 1:7500 @ A1
1:15000 @ A3

0 150 300 450m

please note:
This plan is based on preliminary information only and may be subject to change as a result of formal Council/Authority advice, detailed site investigations and confirmation by survey

ref.: 3410344
date: 16 June 2011
rev.: E-1
drawn: DM
checked: DL

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planning & urban design
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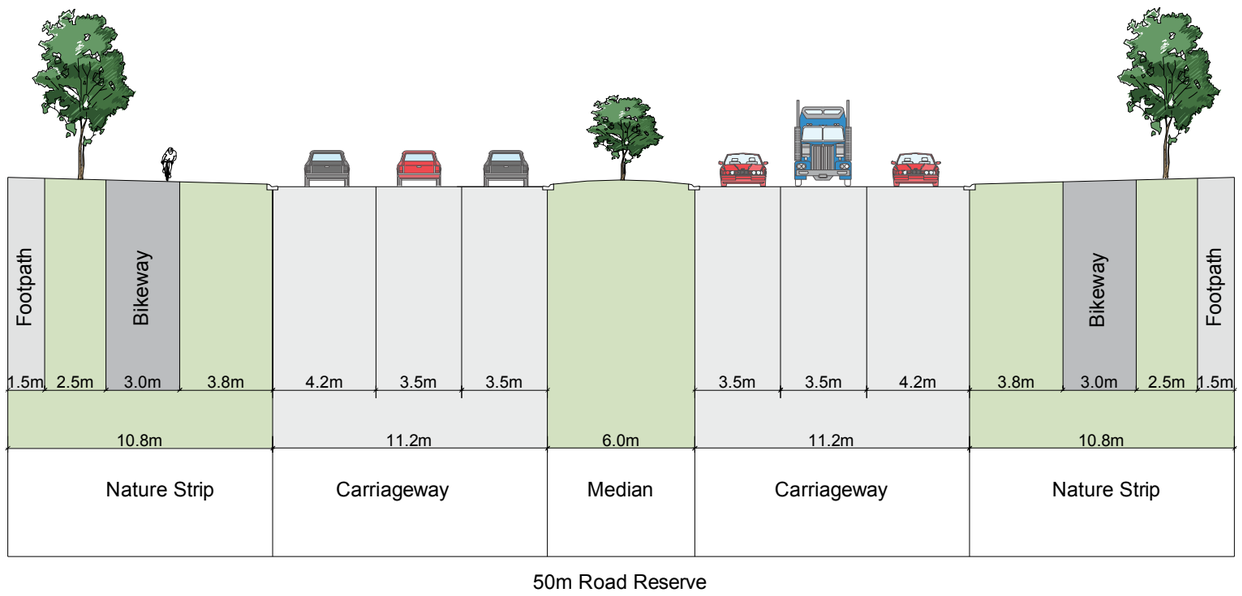
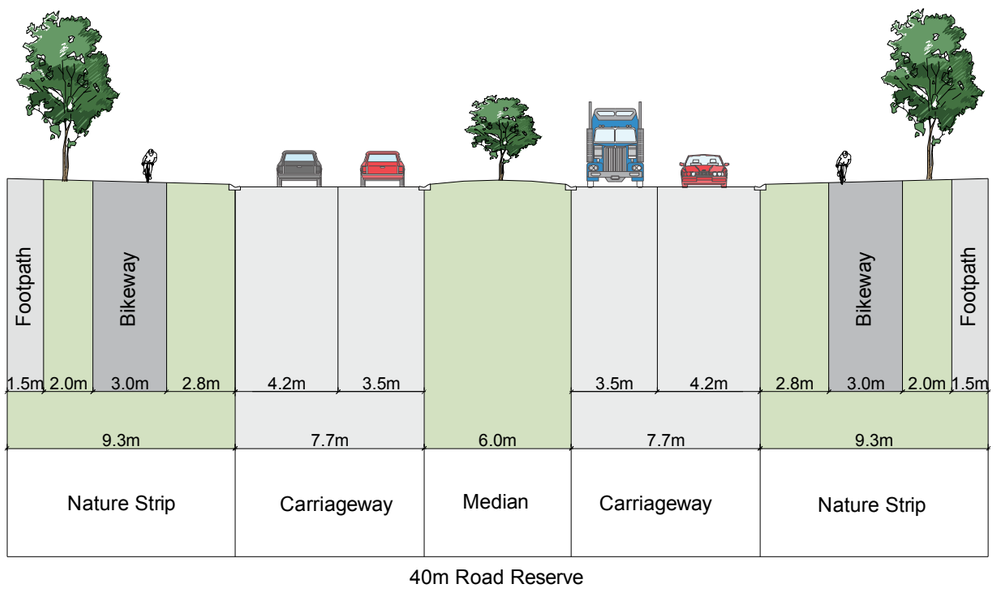
abn 99 124 206 819
trading as smec urban



Section 1: Arterial Road: VicRoads Declared Road (6 lanes) Arterial Road: Future VicRoads Declared Road (6 lanes)

- Road reservation of 50m has been set aside.
- Provision for up to six lane Arterial Road.
- No direct vehicular access to Arterial Roads is permitted from abutting properties. For properties abutting Arterial Roads, access is to be provided from the internal street network, which should include 'loop roads' that run parallel to the Arterial Road (consistent with the Section 7 Service Road Cross Section).
- The implementation of this cross section is subject to approval by VicRoads, Department of Transport and the Growth Areas Authority

* 'Grass Verge' will form part of slip lanes, turning lanes etc where required. Otherwise it will form an extension of the nature strip.



Section 1a: Arterial Road: Future VicRoads Declared Road (4 lanes)

- Road reservation of 40m has been set aside.
- No direct vehicular access to Arterial Roads is permitted from abutting properties. For properties abutting Arterial Roads, access is to be provided from the internal street network, which should include 'loop roads' that run parallel to the Arterial Road (consistent with the Section 7 Service Road Cross Section).
- The implementation of this cross section is subject to approval by VicRoads, Department of Transport and the Growth Areas Authority

* 'Grass Verge' will form part of slip lanes, turning lanes etc where required. Otherwise it will form an extension of the nature strip.

Road Cross Sections - Arterial Roads

Officer Precinct Structure Plan

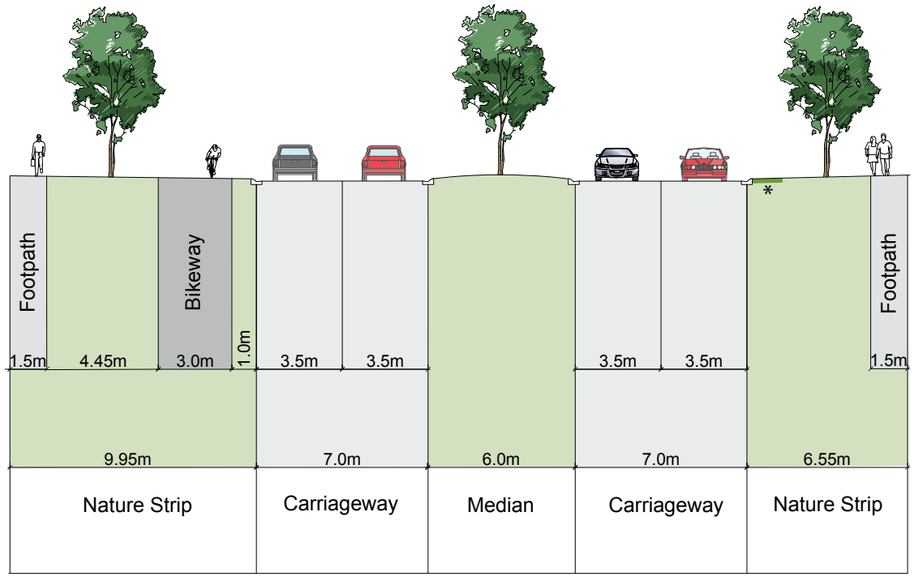
Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 08 June 2011
rev.: D
drawn: DL
checked: DM

planning & urban design
melbourne - tel 9869 0800

abn 47 065 475 149
trading as smec urban



36.5m Road Reserve

Section 2: Local Arterial Road (Council Road)

- Based on Cardinia Shire Council Standard Drawing Local Arterial Road (divided).
- Where this street type abuts a school, the verge should be hardstand with tree grates rather than grassed & planted.
- Widened to accommodate trunk services with all services including drainage at back of kerb.
- The implementation of this cross section is subject to approval by the Department of Transport and the Growth Areas Authority.

* 1.5m setback from kerb to trees and poles.

Road Cross Sections - Bikeway Alternatives

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 06 June 2011
rev.: B
drawn: DM
checked: DL

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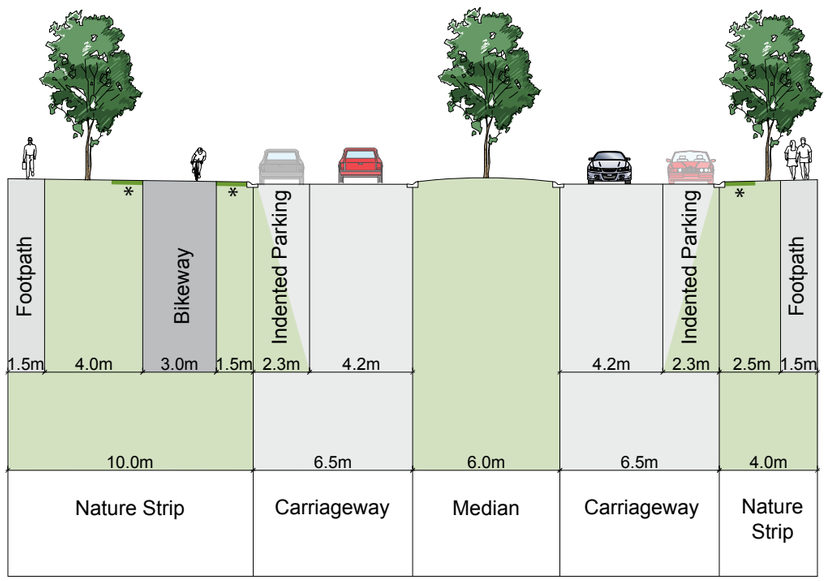
trading as smec urban



33m Road Reserve

Section 3: Connector Street Boulevard

- On-street parking with indented bays and tree outstands are allowed subject to traffic volumes.
- Based on Cardinia Shire Council Standard Drawing Local Arterial Road (divided).
- Where this street type abuts a school, the verge should be hardstand with tree grates rather than grassed & planted.
- The implementation of this cross section is subject to approval by the Department of Transport and the Growth Areas Authority

* 1.5m setback from kerb to trees and poles.

Road Cross Sections - Connector Street Boulevard

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 13 May 2010
rev.: B
drawn: RL
checked: DL

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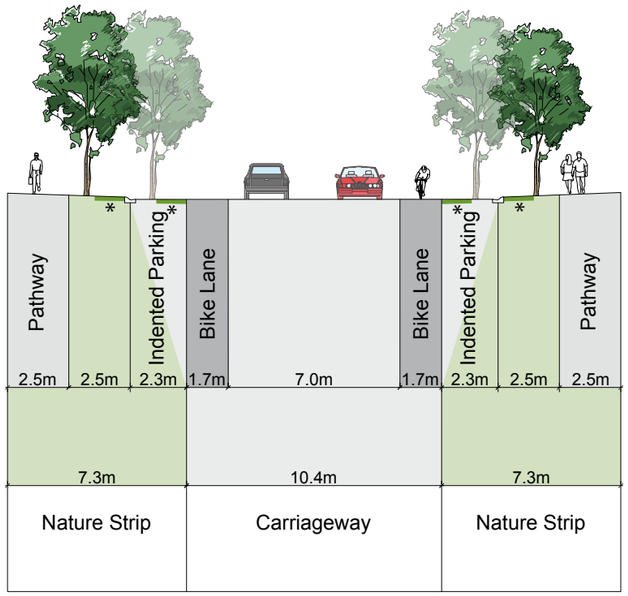
abn 47 065 475 149
trading as smec urban

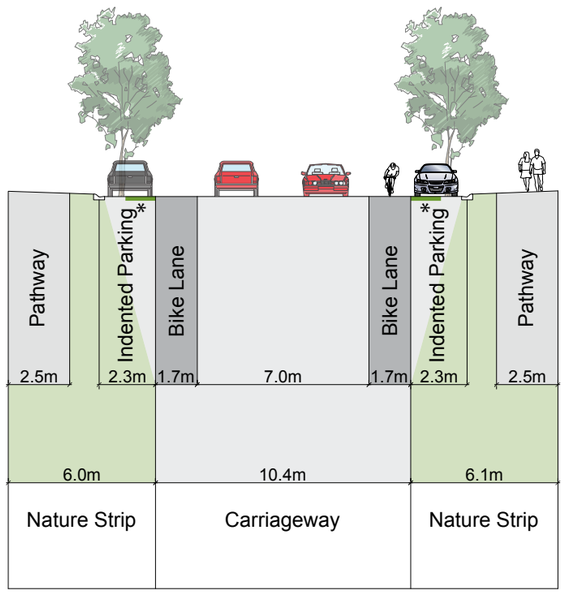


25m Road Reserve

Section 4: Connector Street

- Based on Cardinia Shire Council Standard Drawing Local Arterial Road (undivided).
- Where street abuts schools, indented parking and hardstand verge should be provided.

* 1.5m setback from kerb to trees and poles.



22.5m Road Reserve

Section 4a: Connector Street

- This section applies to Starling Road & McMullen Road between the Connector Street Boulevard and the Princes Highway, part of Bayview Road and part of Rix Road (west of Brunt).
- 2.5m widening of existing 20m road reserve and shared path to be provided from west side of Starling Road, to east side of McMullen Road, to east side of Bayview Road and south side of Rix Road.
- Based on Cardinia Shire Council Standard Drawing Local Arterial Road (undivided).
- Where street abuts schools, indented parking and hardstand verge should be provided.

* 1.5m setback from kerb to trees and poles.

Road Cross Sections - Connector Streets

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 08 June 2011
rev.: D
drawn: DM
checked: DL

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abn 47 065 475 149
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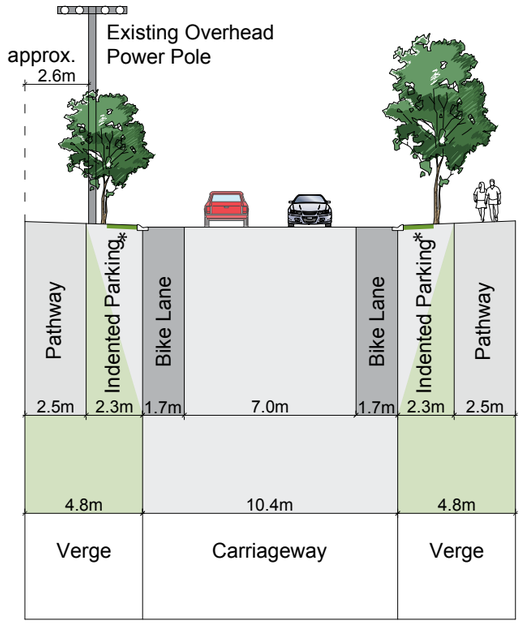
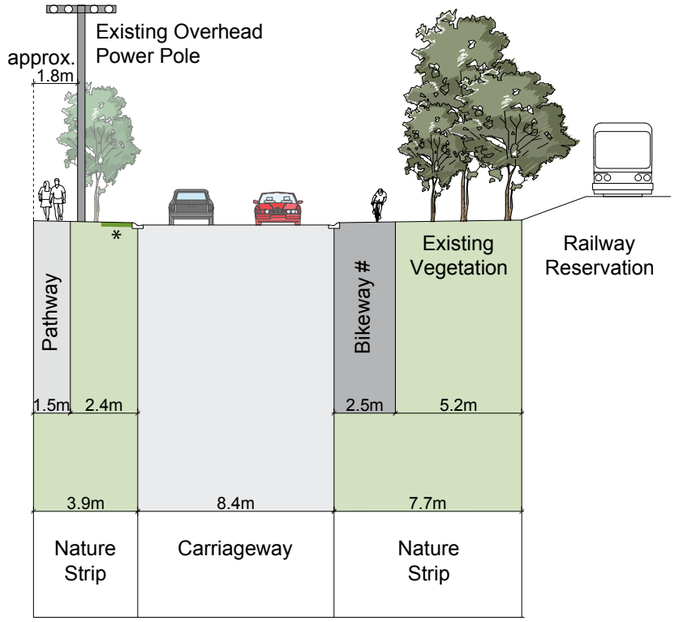


Section 4b: Connector Street

- This section applies to Bayview Road and Tivendale Road (between Princes Highway & the Connector Street Boulevard).
- Hardstand verge with indented parking to be provided between power poles, where possible.
- Outstands between powerpoles must be provided, incorporating street trees

* 1.5m setback from kerb to trees and poles.



Section 4c: Connector Street

- This section applies to Kenilworth Avenue.

* 1.5m setback from kerb to trees and poles.

Road Cross Sections - Connector Streets

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 08 June 2011
rev.: D
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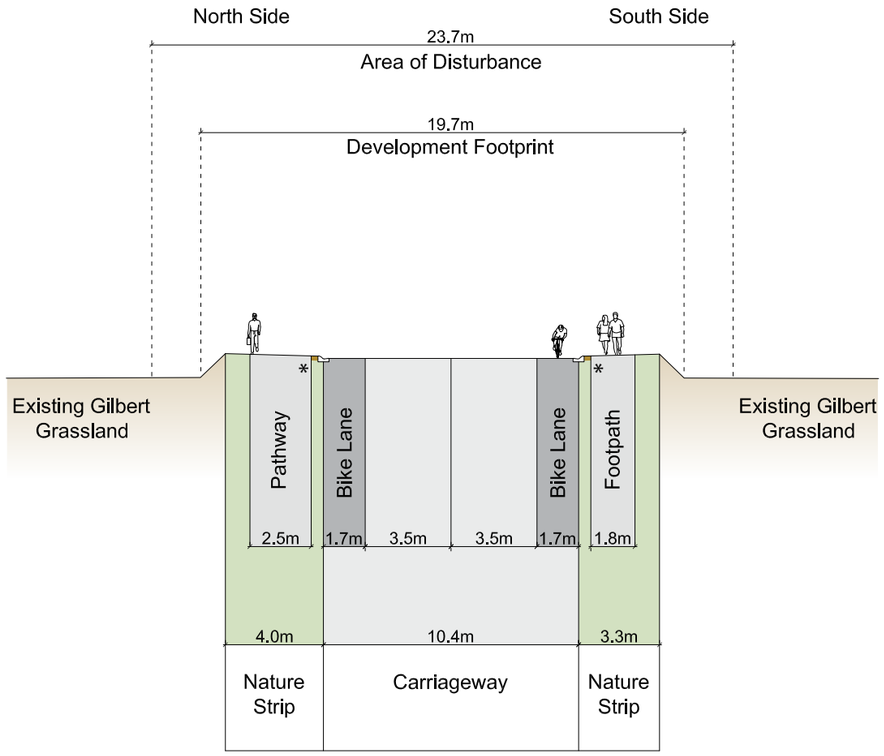

17.7m Road Reserve

Section 4d: Connector Street

- This is the typical cross section for the east-west road through the Gilbert reserve, from the North-South Arterial to Station Street.
- Assumes 1:1 batters.

* 0.5m setback to shared pathway.

Road Cross Sections - Gilbert Conservation Reserve

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 13 May 2011
rev.: C
drawn: DM
checked: DL

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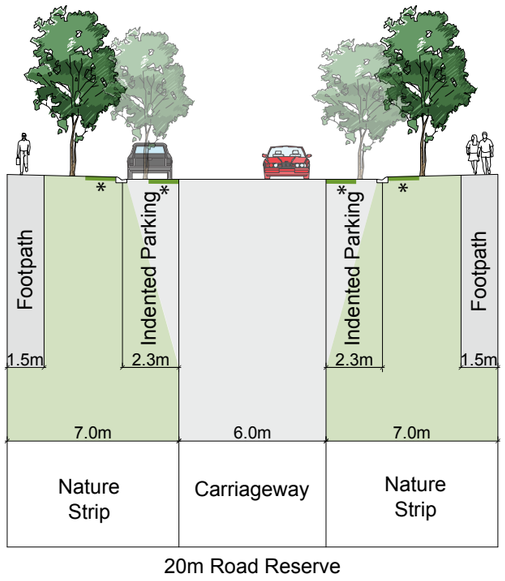
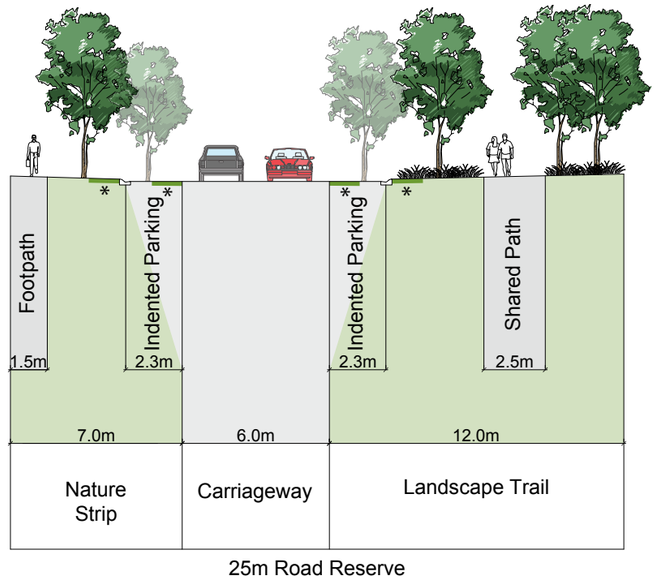
trading as smec urban



Section 5: Access Street - Level 2

- Two circulation lanes plus indented parking on both sides.
- Where road reserve abuts public open space, footpath is required on the developed edge only as long as footpaths are provided within the reserve & are readily accessible from the street.
- When this street type abuts a school, the verge should be hardstand with tree grates rather than grassed & planted.
- Trees must be provided in outstands.

* 1.5m setback from kerb to trees and poles.



Section 5a: Access Street - Level 2 with Shared Landscape Trail

- Two circulation lanes plus indented parking on both sides.
- Where road reserve abuts public open space, footpath is required on the developed edge only as long as footpaths are provided within the reserve & are readily accessible from the street.
- 2.5m shared path is to be constructed as a meandering trail.

* 1.5m setback from kerb to trees and poles.

Road Cross Sections - Access Street Level 2

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 13 May 2011
rev.: C
drawn: DM
checked: DL

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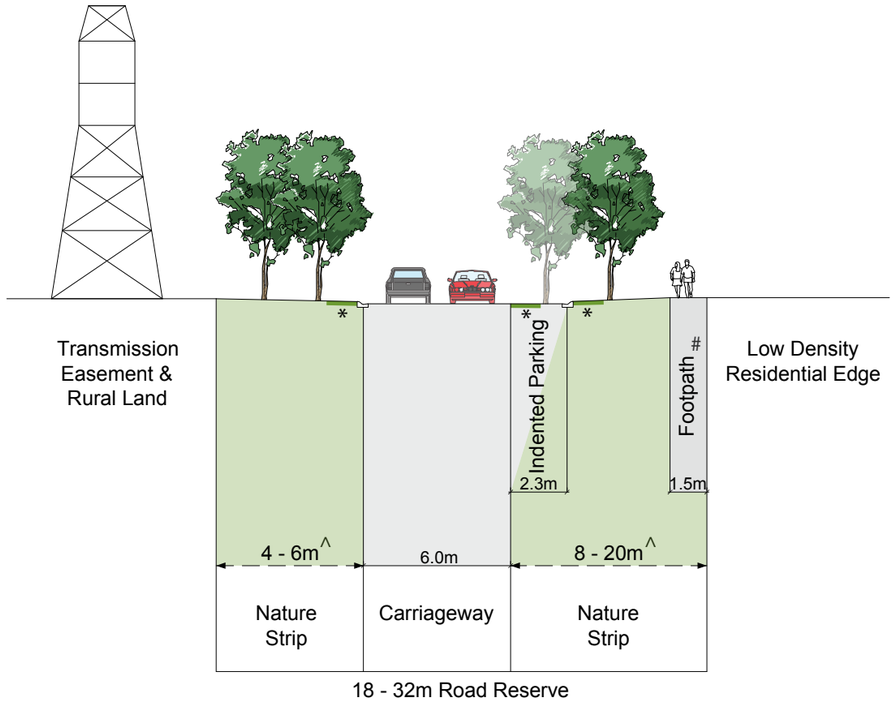
trading as smec urban



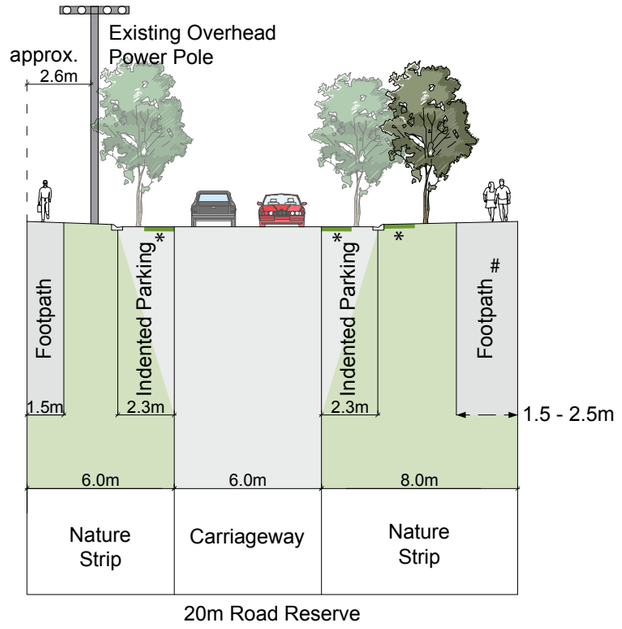
Section 5b: Access Street - Level 2 Rural Style Road

- This section applies to Brown Road.
- Indented parking to be provided along developed edge, between existing native vegetation.
- Where native vegetation constrains delivery of a footpath and services within the existing road reserve, additional land may need to be provided as part of the subdivision of abutting land.
- Detailed road design to be prepared to the satisfaction of CFA.

* 1.5m setback from kerb to trees and poles.

\# Location of footpath varies to fit with existing vegetation.

^ Width varies to accommodate existing vegetation.



Section 5c: Access Street - Level 2 Constrained Type 1

- Two circulation lanes plus indented parking on both sides.
- Where road reserve abuts public open space, footpath is required on the developed edge only as long as footpaths are provided within the reserve & are readily accessible from the street.
- When this street type abuts a school, the verge should be hardstand with tree grates rather than grassed & planted.
- Trees must be provided in outstands on the side where overhead powerlines exist.
- On the side where native vegetation is to be retained, indented parking is to be provided between vegetated areas.
- Where native vegetation constrains delivery of a footpath and services within the existing road reserve, additional land may need to be provided as part of the subdivision of abutting land.

* 1.5m setback from kerb to trees and poles.

\# Location of footpath varies to fit with existing vegetation. 2.5m path required abutting school sites.

Road Cross Sections - Access Street Level 2

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 08 June 2011
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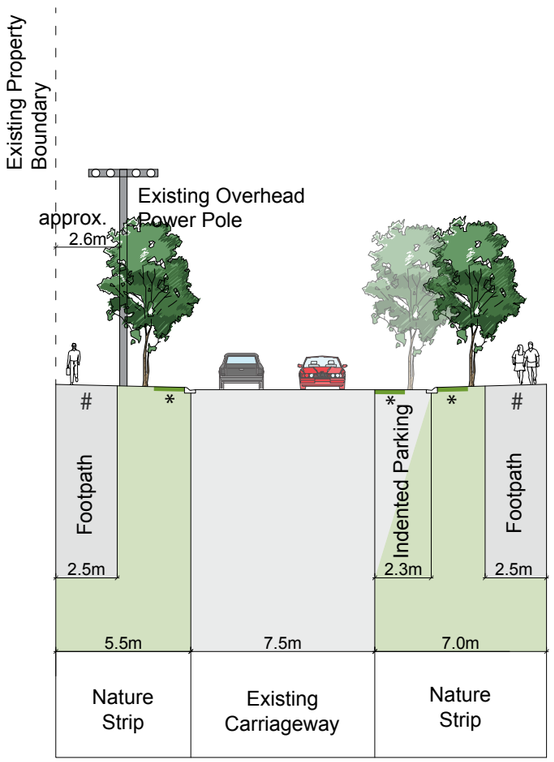
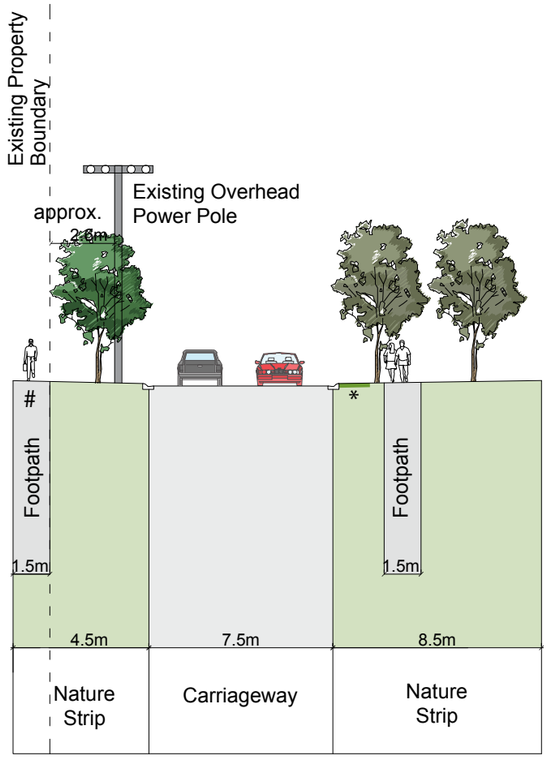


Section 5d: Access Street - Level 2 Constrained Type 2

- This section applies to Tivendale Road, north of the Connector Street Boulevard where the pavement, kerb and channel including major drainage pipes have already been constructed.

* 1.5m setback from kerb to trees and poles.
\# 2.5m footpath required abutting school sites.



Section 5e: Access Street - Level 2 Constrained Type 3

- This section applies to Tivendale Road, north of the Connector Street Boulevard, where there is no existing pavement.
- Additional land to be provided from west for footpath, enabling vegetation retention on the east side and street trees on the west side, avoiding existing power poles.

* 1.5m setback from kerb to trees and poles.
\# 1.5m footpath to be delivered as part of abutting development on the west side.

Road Cross Sections - Access Street Level 2

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 08 June 2011
rev.: C
drawn: DM
checked: DL

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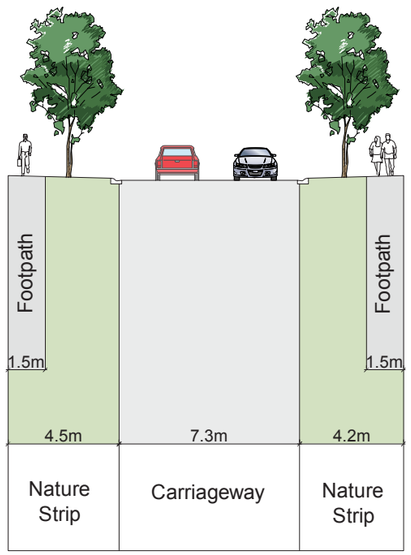
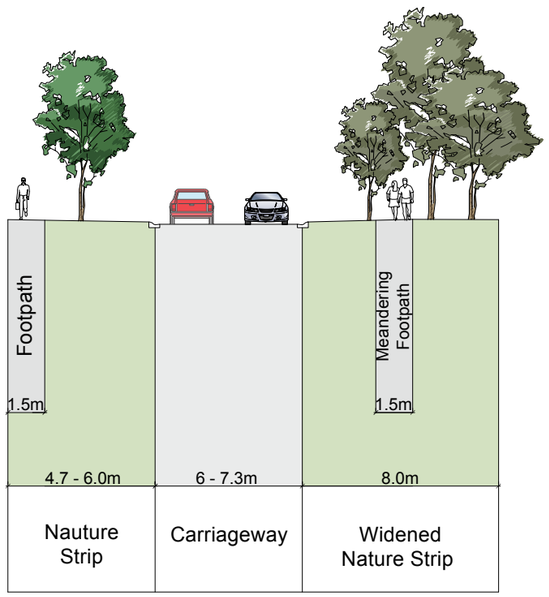
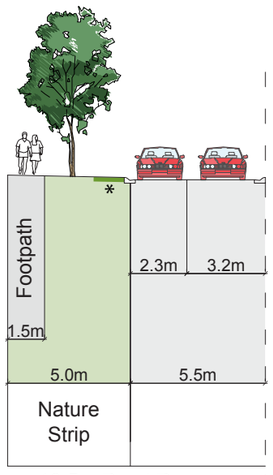


16m Road Reserve



20m Road Reserve



10.5m Road Reserve

Abuts Arterial
Section 1 or 2

Section 6: Access Street - Level 1

- Sufficient pavement width for two circulation lanes plus 'informal' on-street parking (unmarked spaces).
- Refer to Cardinia Shire Council Standard drawing Local Street for minimum standards.
- Where road reserve abuts public open space, footpath is required on the developed edge only as long as footpaths are provided within the reserve & are readily accessible from the street.
- All services, including drainage, are to be located back of kerb.

* 1.5m setback from kerb to trees and poles.

Section 6a: Access Street - Level 1 Rural Style Road

- This section applies to McMullen Road, north of the Connector Boulevard.
- Sufficient pavement width for two circulation lanes plus 'informal' on-street parking (unmarked spaces).
- 6m carriageway permitted if vehicle passing areas provided (i.e indented bays).
- Design should minimise impact on existing vegetation within road reserve.

* 1.5m setback from kerb to trees and poles.

\# Location of footpath varies to accommodate existing vegetation.

Section 7: Service Road

- Parallel parking on developed edge of road.
- Single-lane, one way traffic.
- May be utilised for either service roads, connecting to an Arterial Road (Section 1 or 2) or 'loop roads' that run parallel to an Arterial Road.

* 1.5m setback from kerb to trees and poles.

Road Cross Sections - Access Street Level 1 & Service Road

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 08 June 2011
rev.: D
drawn: DM
checked: DL

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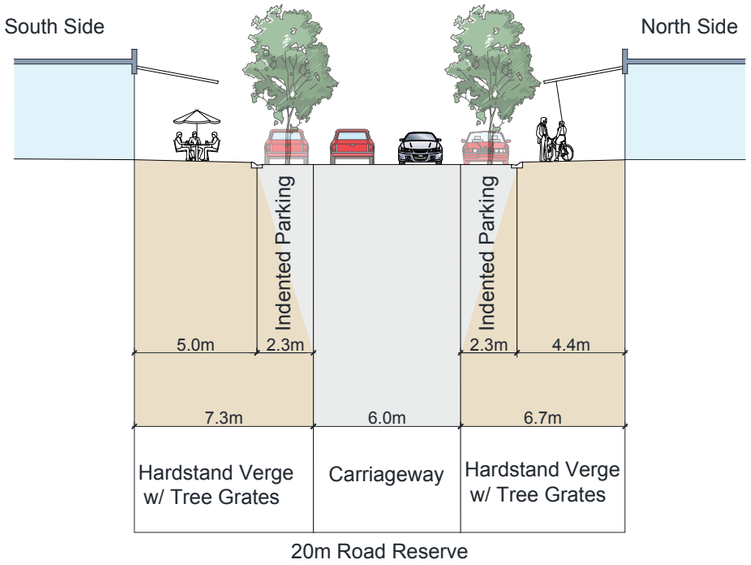

Section 8: Access Street Level 2 - Neighbourhood Activity Centre Main Street

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 26 May 2011
rev.: A
drawn: DM
checked: DL

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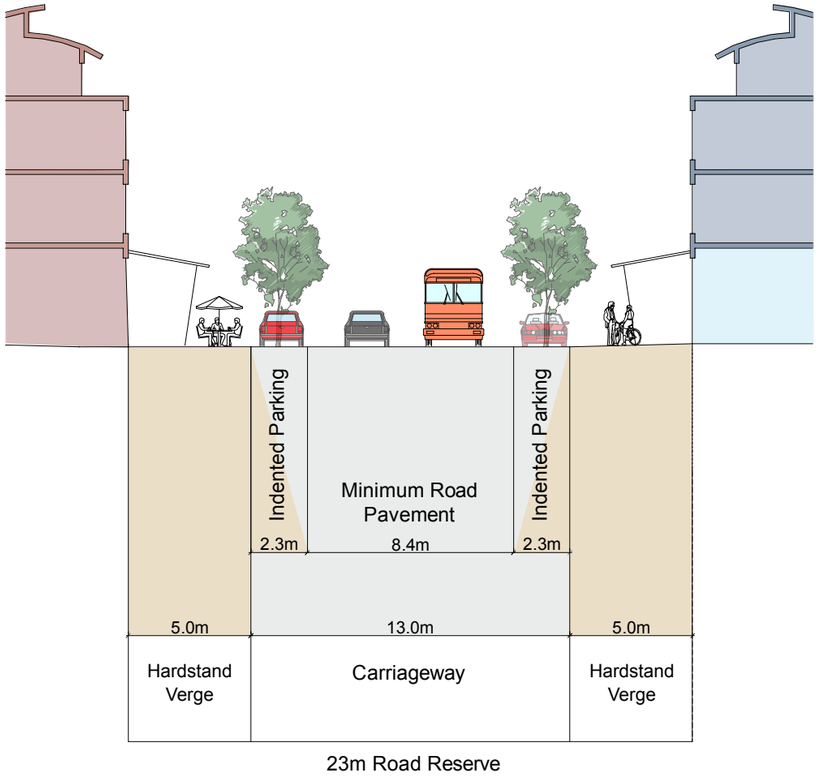
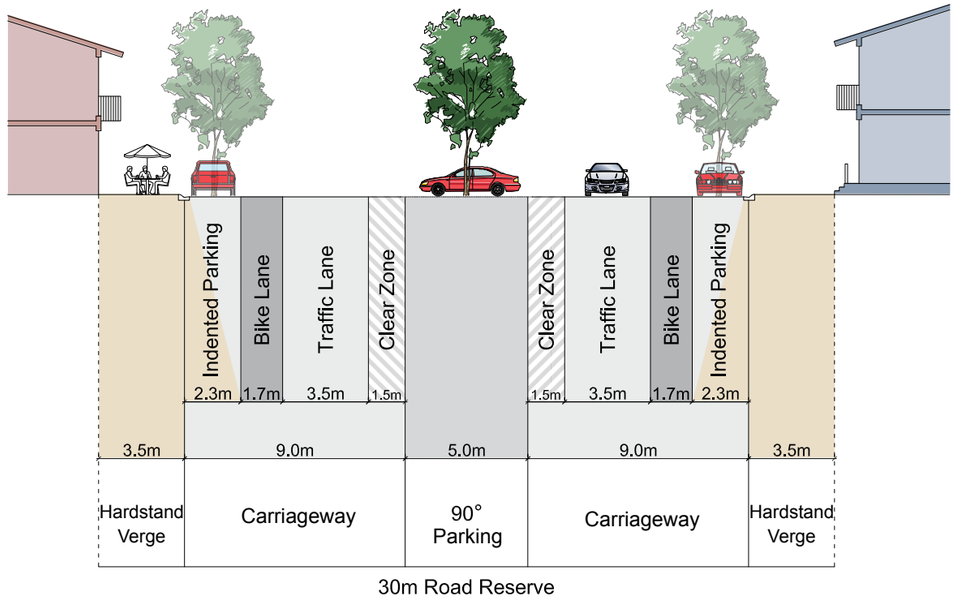


Section M1: Main Street - Major Activity Centre

- Hardstand verges & tree grates provided in indented parking areas.



Section M2: Connector Street Boulevard - Parking Street

- Hardstand verges with tree grates to be provided.
- Outstands must accommodate street trees.
- On-street parking design is to meet relevant standards/guidelines.

Road Cross Sections - MAC Main Streets

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 26 May 2011
rev.:B
drawn: DM
checked: DL

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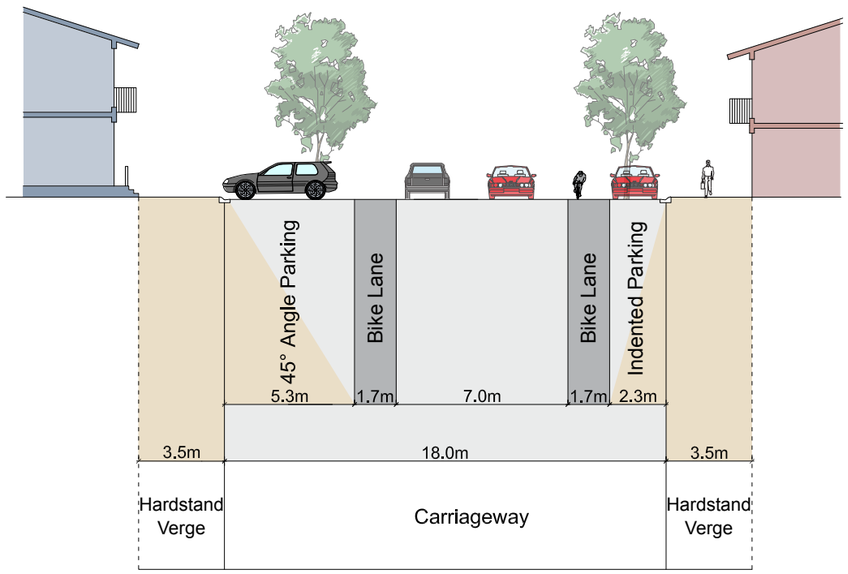
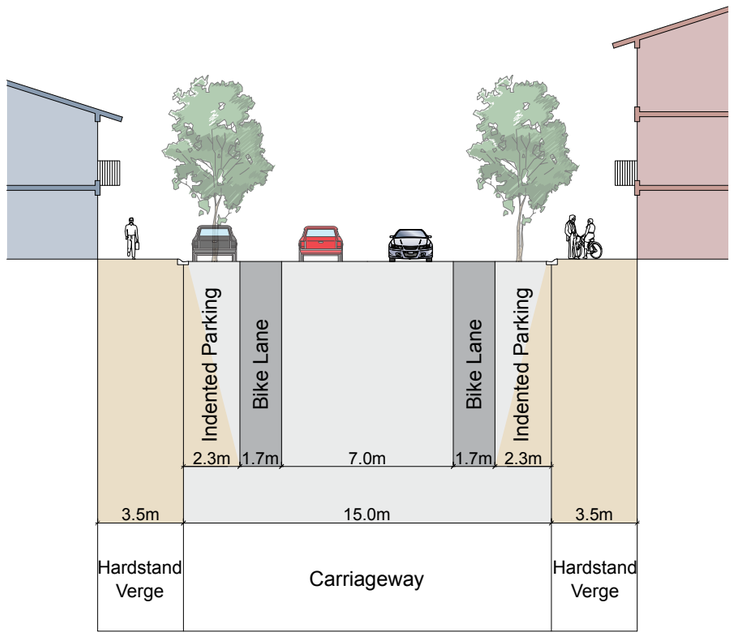


25m Road Reserve

Section M3: Connector Street - Option 1

- Hardstand verges & tree grates provided in indented parking areas.
- If this cross section is applied it is to be to the satisfaction of the Department of Transport



22m Road Reserve

Section M3: Connector Street - Option 2

- Hardstand verges & tree grates provided in indented parking areas.

Road Cross Sections - MAC Connector Streets

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 27 May 2011
rev.: B
drawn: DM
checked: DL

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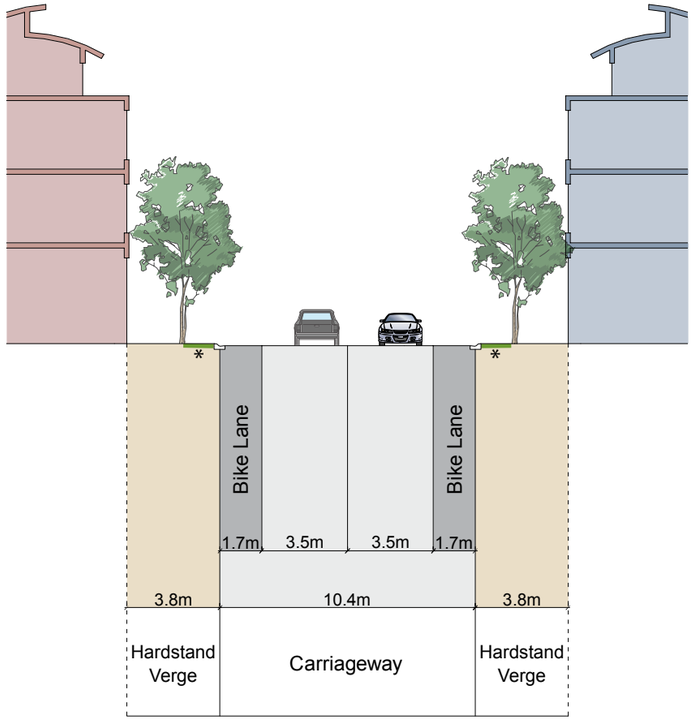
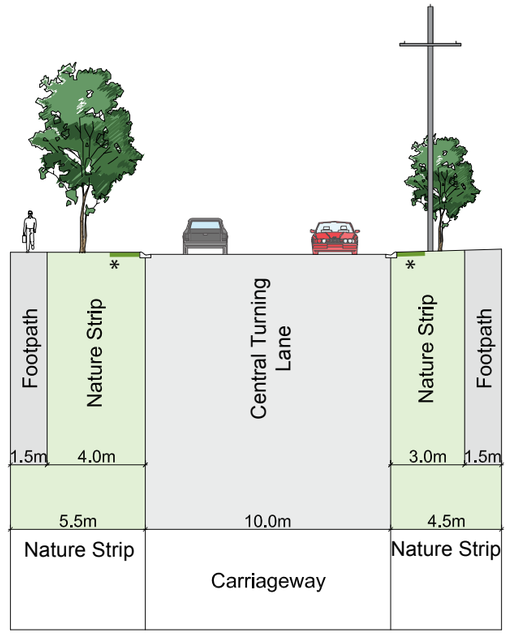


Section M3a: Connector Street - Constrained Type 1

- No on street parking provided.
- Hardstand verges & tree grates provided.
- This section applies to the existing length of Gum Leaf Lane.

* 1.5m setback from kerb to trees and poles.



Section M3b: Conncector Street - Constrained Type 2

- This section applies to Station Street and Officer South Road from Rix Road to Princes Highway.
- Extension of existing pavement kerb and channel in Station Street could accommodate up to three lanes with in carriageway.
- Existing footpath west side of rail line.
- Interim cross section. At Ultimate (when the North-South Arterial is constructed and the Station Street level crossing is closed) carriageway line marking could be modified to provide on-road bike lanes.

* 1.5m setback from kerb to trees and poles.

Road Cross Sections - MAC Connector Streets

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 27 May 2011
rev.: B
drawn: DM
checked: DL

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abn 47 065 475 149
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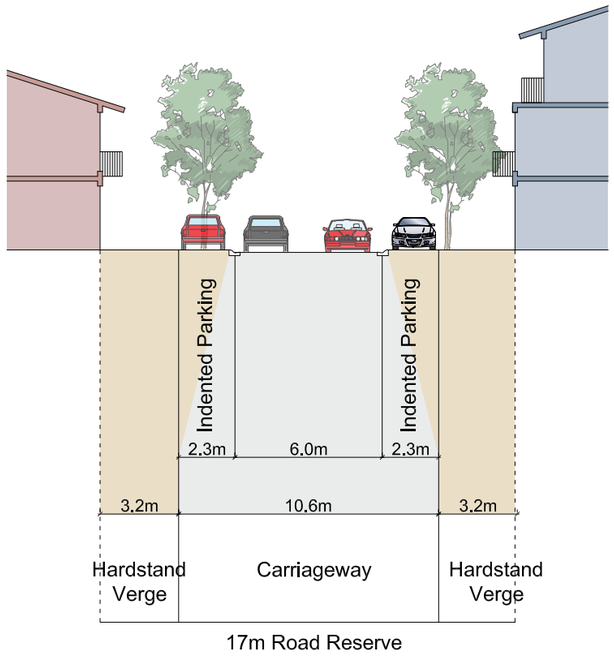

Section M4: Access Street - Level 2

- Hardstand verges & tree grates provided in indented parking areas.

Road Cross Sections - MAC Access Street Level 2

Officer Precinct Structure Plan

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 27 May 2011
rev.: B
drawn: DM
checked: HW

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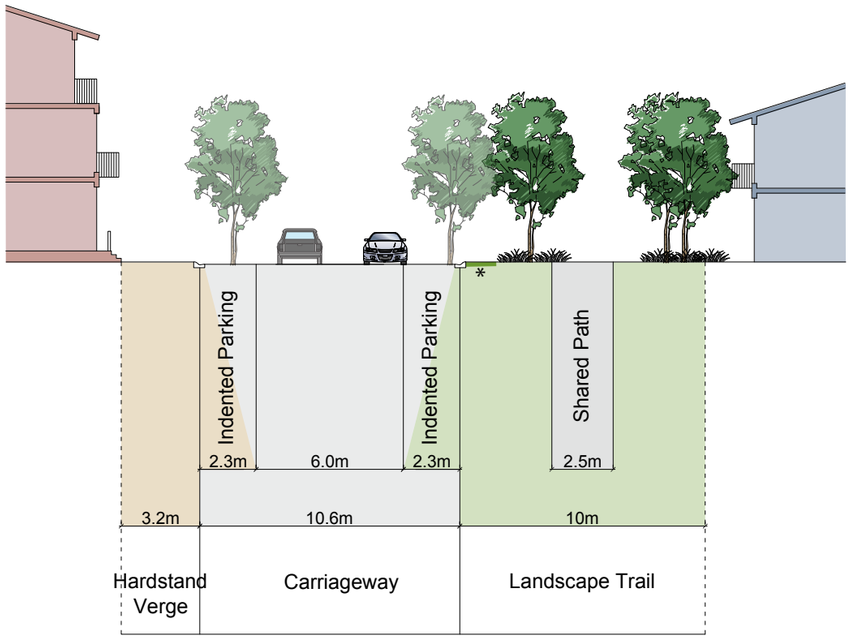
melbourne - tel 9869 0800

abn 47 065 475 149
trading as smec urban

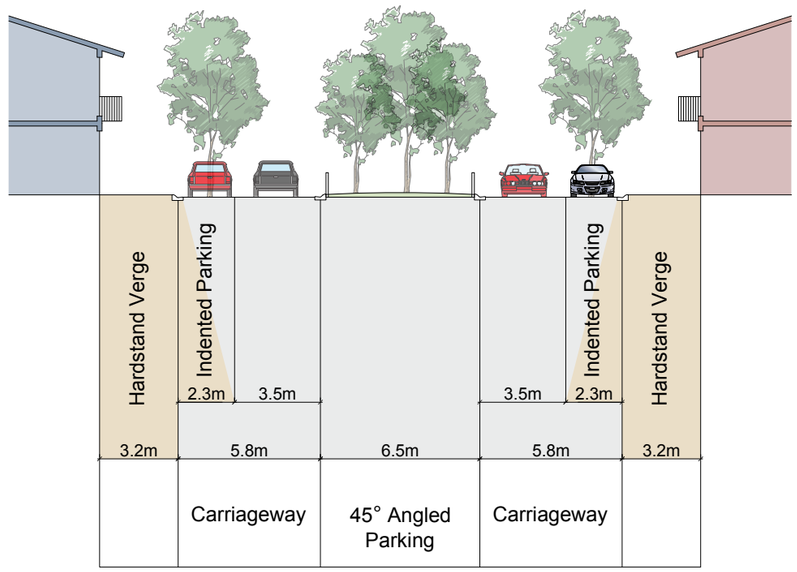


23.8m Road Reserve

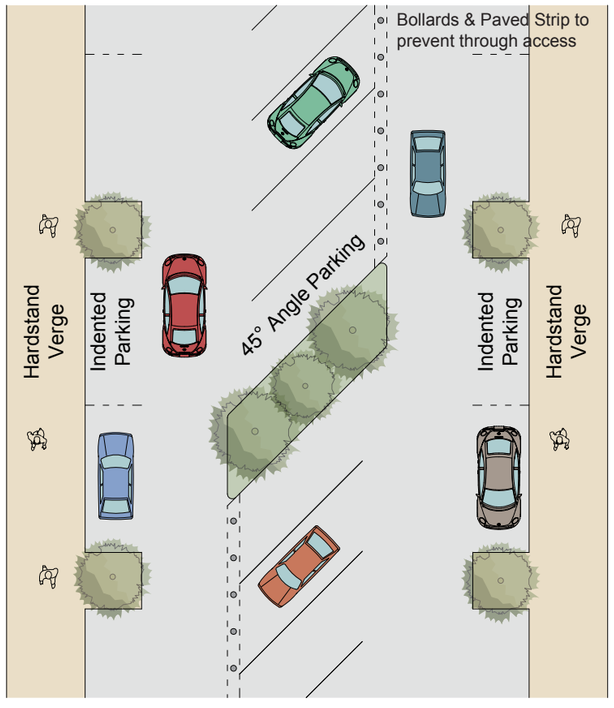
Section M4a: Access Street - Level 2 with Shared Landscape Trail

- Where road reserve abuts public open space, footpath is required on the developed edge only as long as footpaths are provided within the reserve & are readily accessible from the street.
- 2.5m pathway is to be constructed as a meandering trail.
- Hardstand verges & tree grates provided in indented parking areas.

* 1.5m setback from kerb to trees and poles.



24.5m Road Reserve



Section M4b: Access Street - Level 2 Parking Street

- On street parking design is to meet relevant standards/guidelines

Road Cross Sections - Access Street Level 2

Officer Precinct Structure Plan

smec urban consulting group

Scale: 1:250m @ A3

0 3 6 9m

ref.: 3410344U
date: 26 May 2011
rev.: B
drawn: DM
checked: DL

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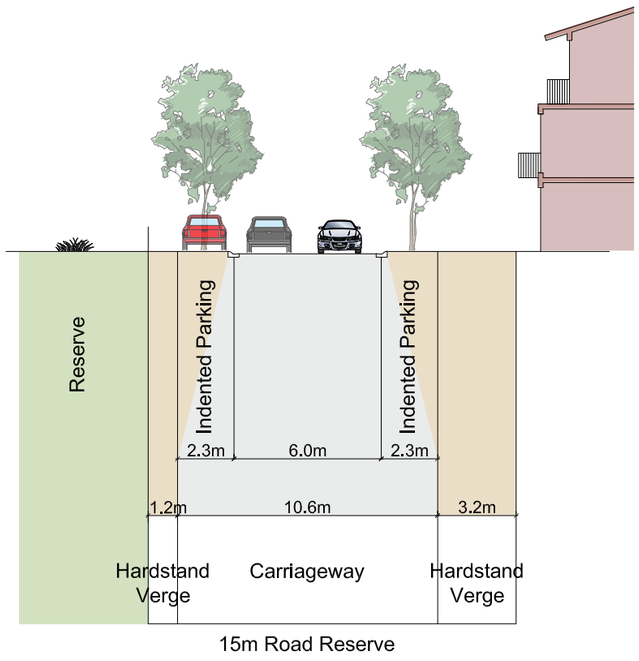
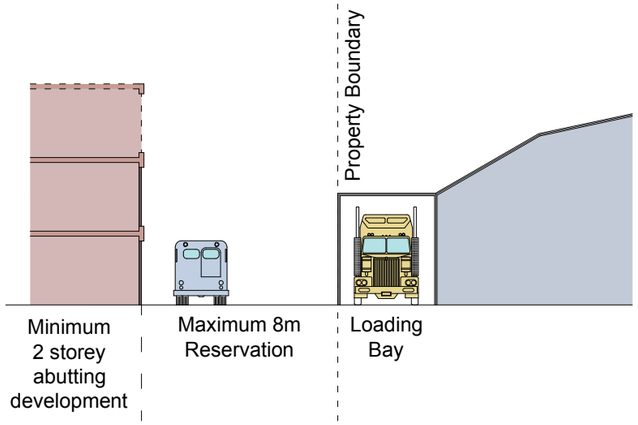
melbourne - tel 9869 0800

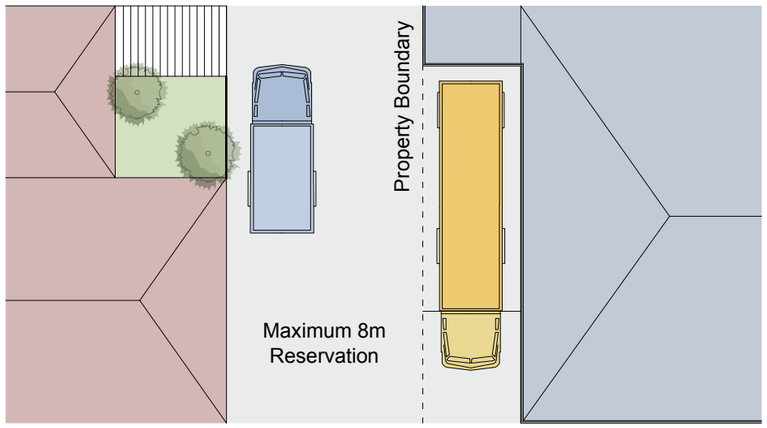
abn 47 065 475 149
trading as smec urban



Section M5: Access Street - Level 1

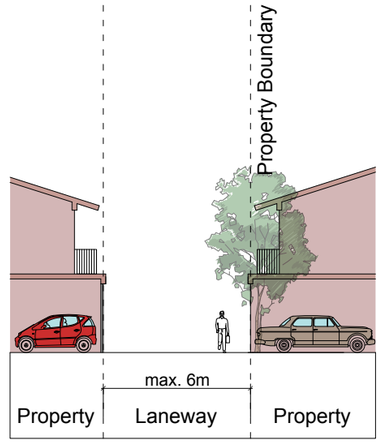
- Hardstand verges & tree grates provided in indented parking areas.
- Optional indented parking abutting open space to the satisfaction of the responsible authority.
- Subject to services being delivered in an alternative location (ie outside of this road reserve)

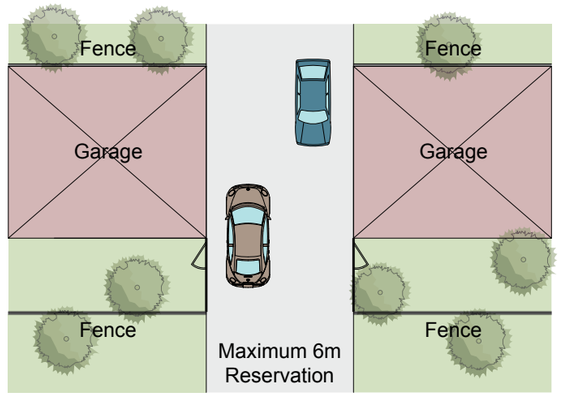




Section M6a: Laneway - Commercial Access

- Buildings & fences to be built to the edge of the Laneway Road Reserve.





Section M6b: Laneway - Residential Access

- Buildings & fences to be built to the edge of the Laneway Road Reserve.

Road Cross Sections - Access Street - Level 1 & Laneways

Officer Precinct Structure Plan

Scale: 1:250m @ A3

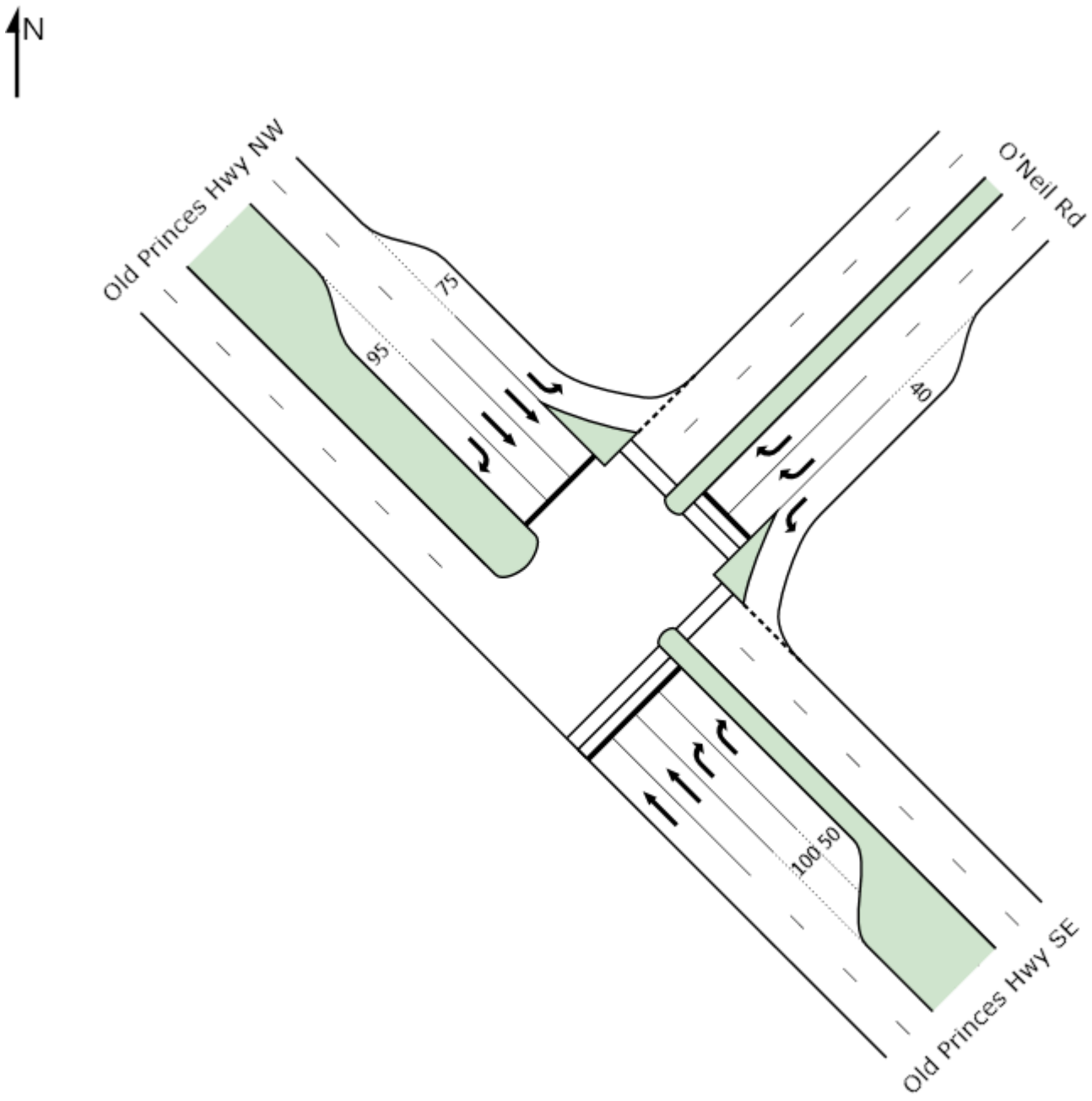
0 3 6 9m

ref.: 3410344U
date: 27 May 2011
rev.: B
drawn: DM
checked: HW

planning & urban design
melbourne - tel 9869 0800

abn 47 065 475 149
trading as smec urban

APPENDIX 4 – SIDRA MOVEMENT DATA


N
Old Princes Hwy NW
O'Neil Rd
Old Princes Hwy SE
75
95
40
100
50

LANE SUMMARY

Intersection 591 - AM Peak - 27/07/11
O'Neil Rd
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South East: Old Princes Hwy SE																
Lane 1	0	117	0	117	5.0	843	0.139	100	17.8	LOS A	3.0	22.0	240	–	0.0	0.0
Lane 2	0	117	0	117	5.0	843	0.139	100	17.8	LOS A	3.0	22.0	240	–	0.0	0.0
Lane 3	0	0	320	320	5.0	472[1]	0.678	100	43.4	LOS B	13.6	99.4	100	Turn Bay	0.0	4.5
Lane 4	0	0	190	190	5.0	280[1]	0.678	100	41.7	LOS B	7.3	53.6	50	Turn Bay	0.0	11.3
Approach	0	234	511	744	5.0		0.678		34.9	LOS B	13.6	99.4				
North East: O'Neil Rd																
Lane 1	285	0	0	285	5.0	789[1]	0.362	100	8.1	LOS A	0.8	5.8	40	Turn Bay	0.0	0.0
Lane 2	0	0	431	431	5.0	649	0.663	100	40.2	LOS B	19.2	140.4	60	–	0.0	84.7
Lane 3	0	0	431	431	5.0	649	0.663	100	40.2	LOS B	19.2	140.4	60	–	0.0	84.7
Approach	285	0	861	1146	5.0		0.663		32.2	LOS B	19.2	140.4				
North West: Old Princes Hwy NW																
Lane 1	262	0	0	262	5.0	804[1]	0.326	100	10.6	LOS A	0.9	6.4	75	Turn Bay	0.0	0.0
Lane 2	0	157	0	157	5.0	302	0.521	100	50.9	LOS A	8.3	60.8	430	–	0.0	0.0
Lane 3	0	157	0	157	5.0	302	0.521	100	50.9	LOS A	8.3	60.8	430	–	0.0	0.0
Lane 4	0	0	1	1	5.0	91	0.012	100	72.8	LOS A	0.1	0.4	95	Turn Bay	0.0	0.0
Approach	262	315	1	578	5.0		0.521		32.6	LOS A	8.3	60.8				
Intersection				2468	5.0		0.678		33.1	LOS B	19.2	140.4				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

LANE SUMMARY

Intersection 591 - PM Peak - 27/07/11
O'Neil Rd
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South East: Old Princes Hwy SE																
Lane 1	0	218	0	218	5.0	1129	0.193	100	7.1	LOS A	3.1	22.8	240	–	0.0	0.0
Lane 2	0	218	0	218	5.0	1129	0.193	100	7.1	LOS A	3.1	22.8	240	–	0.0	0.0
Lane 3	0	0	164	164	5.0	272	0.602	100	62.7	LOS B	8.9	65.2	100	Turn Bay	0.0	0.0
Lane 4	0	0	122	122	5.0	202[1]	0.602	100	61.3	LOS B	6.4	46.9	50	Turn Bay	0.0	0.0
Approach	0	437	285	722	5.0		0.602		28.8	LOS B	8.9	65.2				
North East: O'Neil Rd																
Lane 1	511	0	0	511	5.0	865[1]	0.590	100	8.3	LOS A	1.9	14.0	40	Turn Bay	0.0	0.0
Lane 2	0	0	131	131	5.0	377	0.347	100	51.7	LOS A	6.2	45.2	60	–	0.0	0.0
Lane 3	0	0	131	131	5.0	377	0.347	100	51.7	LOS A	6.2	45.2	60	–	0.0	0.0
Approach	511	0	262	773	5.0		0.590		23.0	LOS A	6.2	45.2				
North West: Old Princes Hwy NW																
Lane 1	861	0	0	861	5.0	1360[1]	0.633	100	11.3	LOS B	3.7	27.0	75	Turn Bay	0.0	0.0
Lane 2	0	184	0	184	5.0	938	0.196	100	14.1	LOS A	4.2	30.5	430	–	0.0	0.0
Lane 3	0	184	0	184	5.0	938	0.196	100	14.1	LOS A	4.2	30.5	430	–	0.0	0.0
Lane 4	0	0	1	1	5.0	91	0.012	100	72.8	LOS A	0.1	0.4	95	Turn Bay	0.0	0.0
Approach	861	367	1	1229	5.0		0.633		12.2	LOS B	4.2	30.5				
Intersection				2724	5.0		0.633		19.7	LOS B	8.9	65.2				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

PHASING SUMMARY

Intersection 591 - AM Peak - 27/07/11
O'Neil Rd
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, A1, B, C
Output Sequence: A, A1, B, C

Phase Timing Results

Phase	A	A1	B	C
Green Time (sec)	6	28	19	43
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	12	34	25	49
Phase Split	10 %	28 %	21 %	41 %

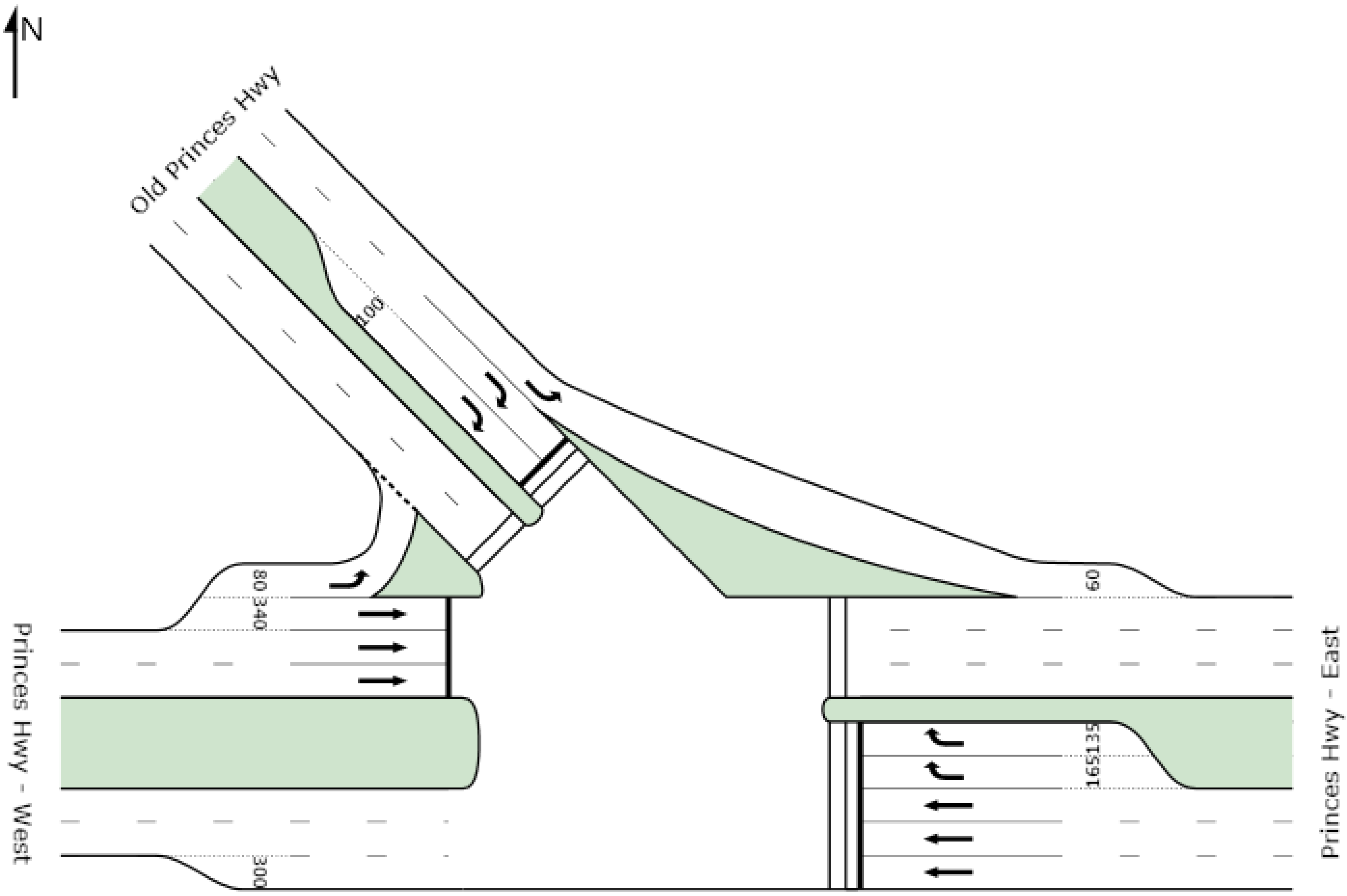
PHASING SUMMARY

Intersection 591 - PM Peak - 27/07/11
O'Neil Rd
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, A1, B, C
Output Sequence: A, A1, B, C

Phase Timing Results

Phase	A	A1	B	C
Green Time (sec)	6	6	59	25
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	12	12	65	31
Phase Split	10 %	10 %	54 %	26 %


N
Old Princes Hwy
100
80
340
60
Princes Hwy - West
165
135
300
Princes Hwy - East

LANE SUMMARY

Intersection 593 / 595 - AM Peak - 27/07/11
Princes Hwy
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
East: Princes Hwy - East																
Lane 1	0	827	0	827	5.0	1415	0.584	100	1.7	LOS A	5.3	38.9	500	–	0.0	0.0
Lane 2	0	827	0	827	5.0	1415	0.584	100	1.7	LOS A	5.3	38.9	500	–	0.0	0.0
Lane 3	0	827	0	827	5.0	1415	0.584	100	1.7	LOS A	5.3	38.9	500	–	0.0	0.0
Lane 4	0	0	90	90	5.0	242	0.373	100	61.2	LOS A	4.8	34.8	165	Turn Bay	0.0	0.0
Lane 5	0	0	90	90	5.0	242	0.373	100	61.2	LOS A	4.8	34.8	135	Turn Bay	0.0	0.0
Approach	0	2481	180	2661	5.0		0.584		5.7	LOS A	5.3	38.9				
North West: Old Princes Hwy																
Lane 1	252	0	0	252	5.0	1812	0.139	100	9.6	X	X	X	240	–	0.0	X
Lane 2	0	0	175	175	5.0	287	0.609	100	64.5	LOS B	9.5	69.3	240	–	0.0	0.0
Lane 3	0	0	175	175	5.0	287	0.609	100	64.5	LOS B	9.5	69.3	100	Turn Bay	0.0	0.0
Approach	252	0	349	601	5.0		0.609		41.5	LOS B	9.5	69.3				
West: Princes Hwy - West																
Lane 1	567	0	0	567	5.0	1426[1]	0.398	100	13.2	LOS A	1.8	13.4	80	Turn Bay	0.0	0.0
Lane 2	0	834	0	834	5.0	1065	0.783	100	14.7	LOS C	29.5	215.3	340	Turn Bay	0.0	0.0
Lane 3	0	834	0	834	5.0	1065	0.783	100	14.7	LOS C	29.5	215.3	500	–	0.0	0.0
Lane 4	0	834	0	834	5.0	1065	0.783	100	14.7	LOS C	29.5	215.3	500	–	0.0	0.0
Approach	567	2501	0	3068	5.0		0.783		14.4	LOS C	29.5	215.3				
Intersection				6331	5.0		0.783		13.3	LOS C	29.5	215.3				

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

LANE SUMMARY

Intersection 593 / 595 - PM Peak - 27/07/11
Princes Hwy
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
East: Princes Hwy - East																
Lane 1	0	987	0	987	5.0	1399	0.705	100	2.0	LOS C	8.6	62.7	500	–	0.0	0.0
Lane 2	0	987	0	987	5.0	1399	0.705	100	2.0	LOS C	8.6	62.7	500	–	0.0	0.0
Lane 3	0	987	0	987	5.0	1399	0.705	100	2.0	LOS C	8.6	62.7	500	–	0.0	0.0
Lane 4	0	0	187	187	5.0	242	0.774	100	66.9	LOS C	11.1	81.1	165	Turn Bay	0.0	0.0
Lane 5	0	0	187	187	5.0	242	0.774	100	66.9	LOS C	11.1	81.1	135	Turn Bay	0.0	0.0
Approach	0	2961	374	3335	5.0		0.774		9.3	LOS C	11.1	81.1				
North West: Old Princes Hwy																
Lane 1	314	0	0	314	5.0	1812	0.173	100	9.6	X	X	X	240	–	0.0	X
Lane 2	0	0	284	284	5.0	302	0.940	100	84.0	LOS D	19.8	144.4	240	–	0.0	0.0
Lane 3	0	0	284	284	5.0	302	0.940	100	84.0	LOS D	19.8	144.4	100	Turn Bay	0.0	38.6
Approach	314	0	567	881	5.0		0.940		57.5	LOS D	19.8	144.4				
West: Princes Hwy - West																
Lane 1	349	0	0	349	5.0	1422[1]	0.246	100	13.3	LOS A	1.1	7.8	80	Turn Bay	0.0	0.0
Lane 2	0	976	0	976	5.0	1049	0.930	100	32.2	LOS D	57.9	422.4	340	Turn Bay	0.0	24.7
Lane 3	0	976	0	976	5.0	1049	0.930	100	32.2	LOS D	57.9	422.4	500	–	0.0	0.0
Lane 4	0	976	0	976	5.0	1049	0.930	100	32.2	LOS D	57.9	422.4	500	–	0.0	0.0
Approach	349	2929	0	3279	5.0		0.930		30.2	LOS D	57.9	422.4				
Intersection				7495	5.0		0.940		24.1	LOS D	57.9	422.4				

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

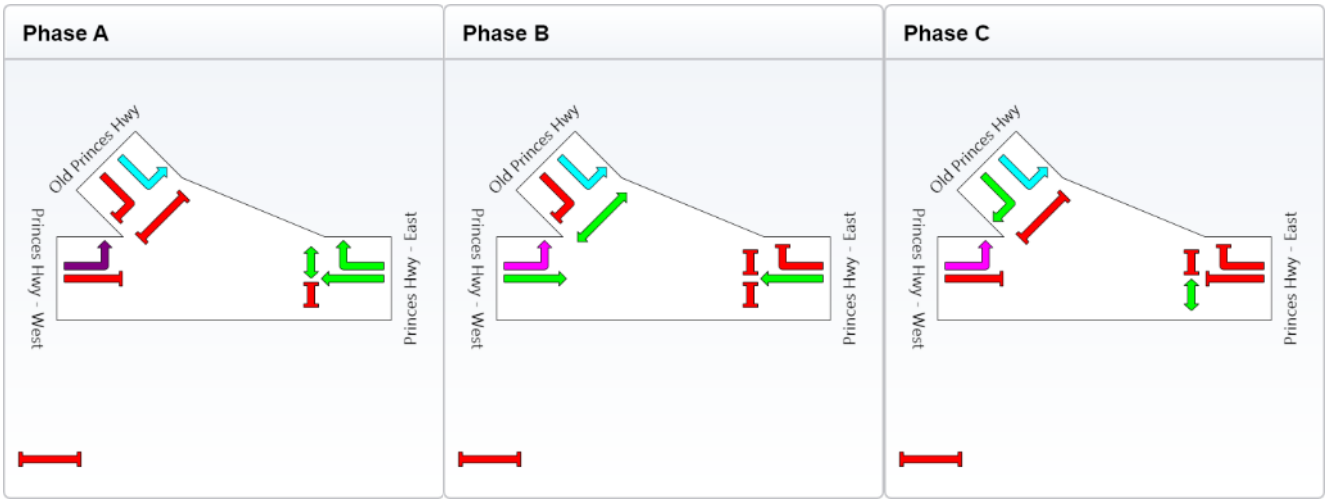
PHASING SUMMARY

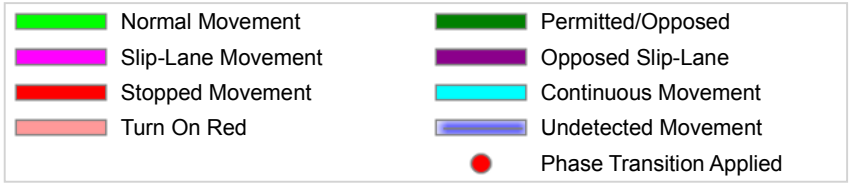
Intersection 593 / 595 - AM Peak - 27/07/11
Princes Hwy
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C
Green Time (sec)	16	67	19
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	22	73	25
Phase Split	18 %	61 %	21 %





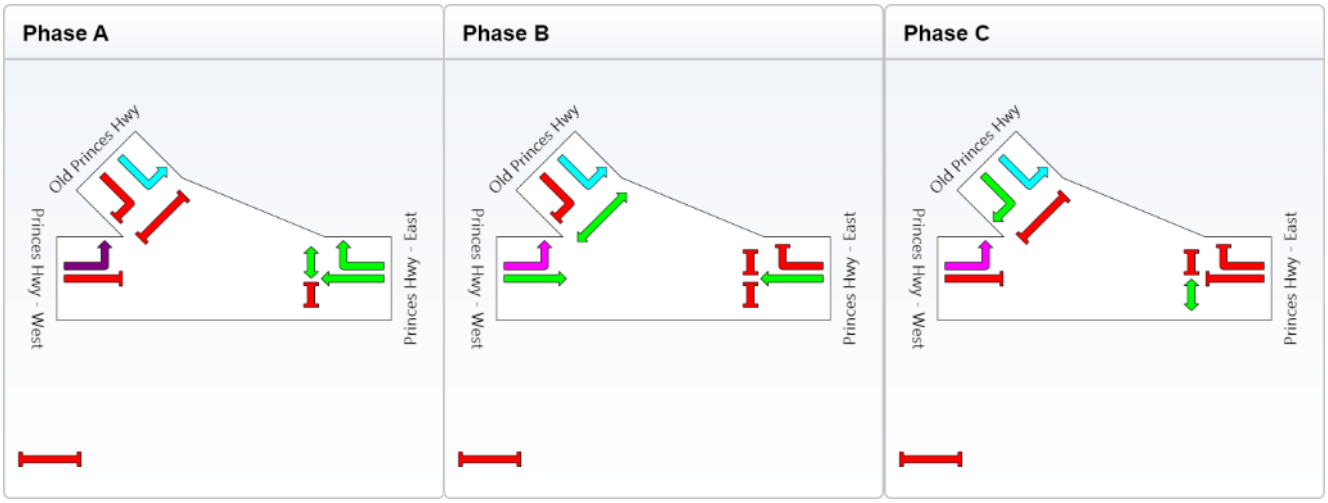
PHASING SUMMARY

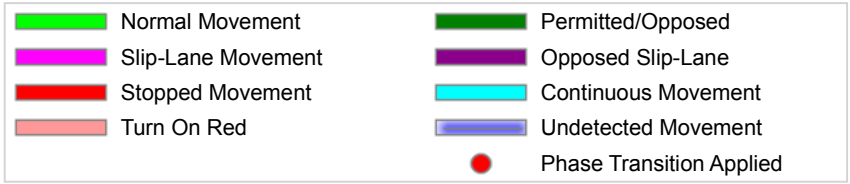
Intersection 593 / 595 - PM Peak - 27/07/11
Princes Hwy
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

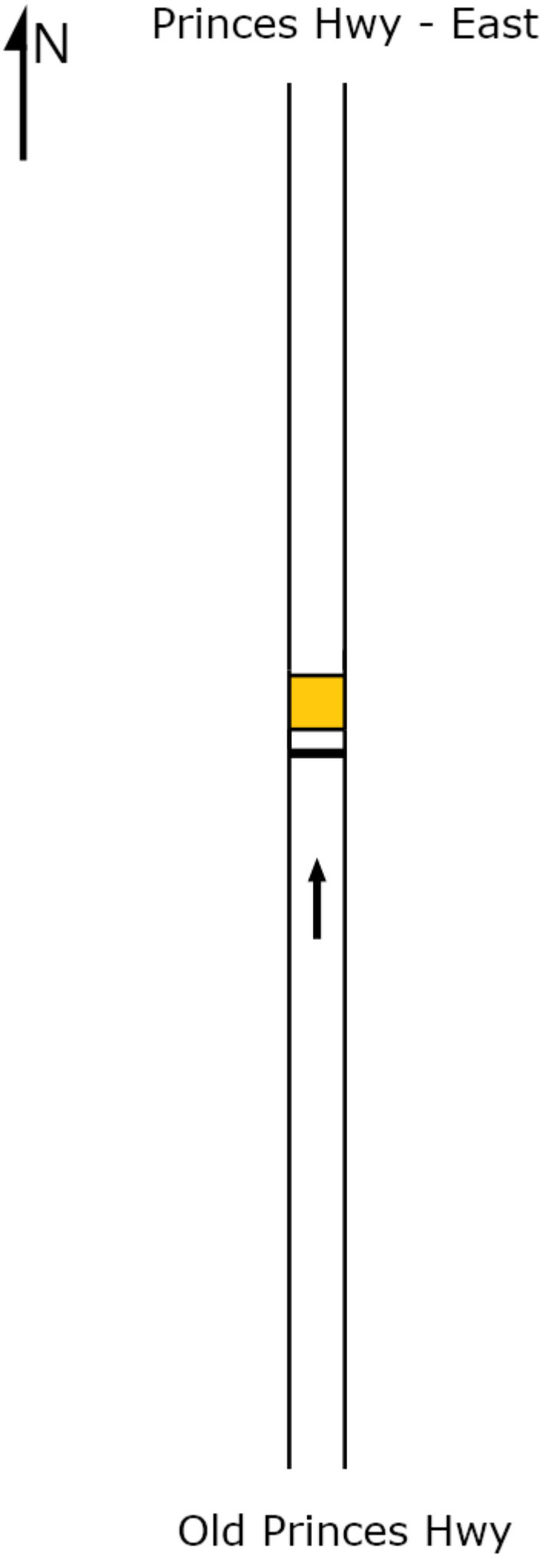
Phase times determined by the program
Sequence: Custom
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	16	66	20
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	22	72	26
Phase Split	18 %	60 %	22 %






N
Princes Hwy - East
Old Princes Hwy

LANE SUMMARY

Signalised pedestrian crossing across one-way road
Pedestrian Crossing (Signals) - Actuated Cycle Time = 26 seconds

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Old Princes Hwy																
Lane 1	0	252	0	252	5.0	881	0.286	100	5.1	LOS A	2.1	15.2	240	–	0.0	0.0
Approach	0	252	0	252	5.0		0.286		5.1	LOS A	2.1	15.2				
Intersection				252	5.0		0.286		5.1	LOS A	2.1	15.2				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

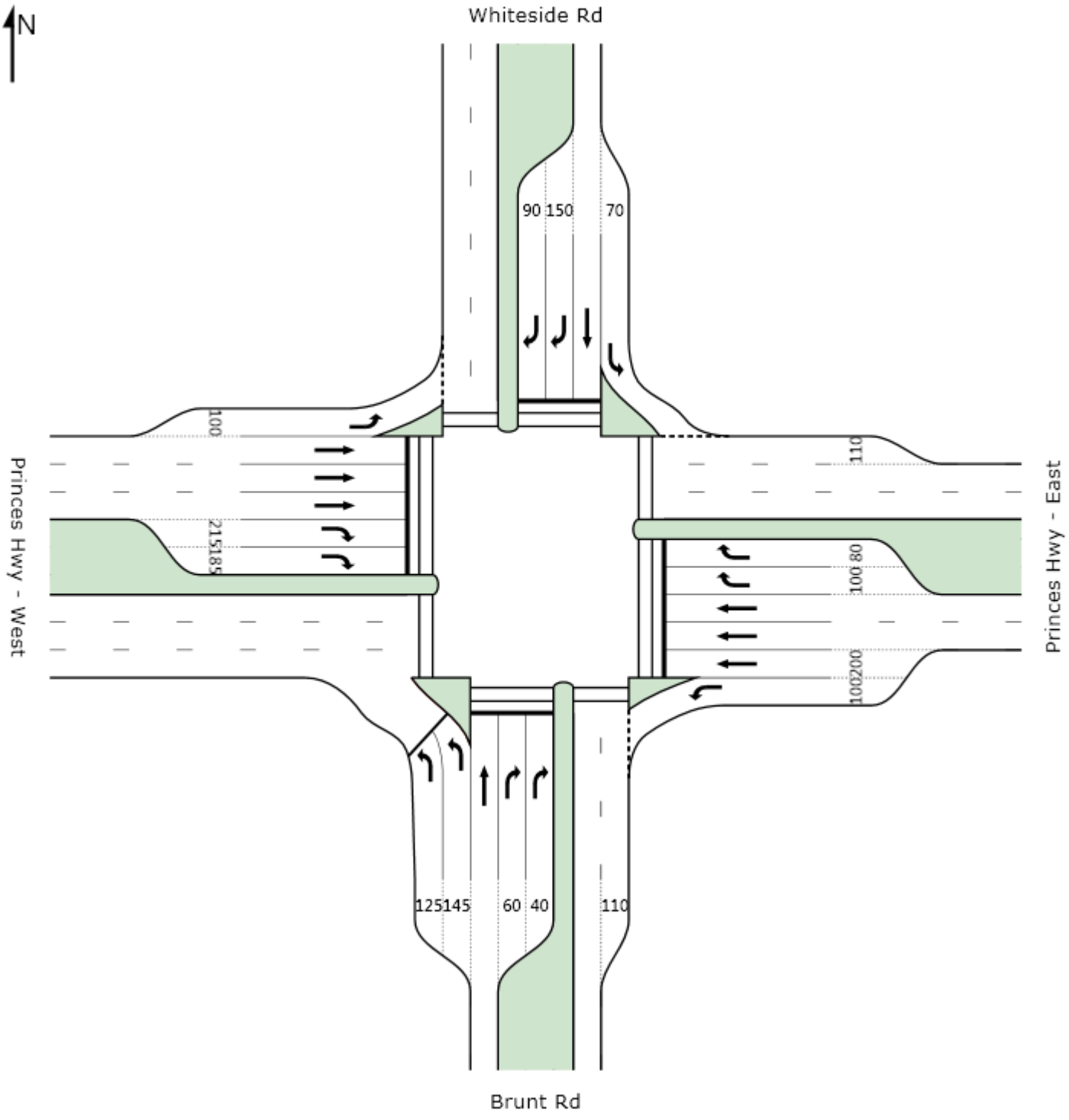
LANE SUMMARY

Signalised pedestrian crossing across one-way road
Pedestrian Crossing (Signals) - Actuated Cycle Time = 26 seconds

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Old Princes Hwy																
Lane 1	0	314	0	314	5.0	881	0.356	100	5.3	LOS A	2.7	19.7	240	–	0.0	0.0
Approach	0	314	0	314	5.0		0.356		5.3	LOS A	2.7	19.7				
Intersection				314	5.0		0.356		5.3	LOS A	2.7	19.7				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.


N
Whiteside Rd
90 150 70
100
215 185
110
100 80
100 200
Princes Hwy - West
Princes Hwy - East
125 145 60 40 110
Brunt Rd

LANE SUMMARY

Intersection 598 - AM Peak - 27/07/11
Princes Hwy
Whiteside Rd / Brunt Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Brunt Rd																
Lane 1	488	0	0	488	5.0	718[1]	0.679	100	28.9	LOS B	15.7	114.4	125	Turn Bay	0.0	0.0
Lane 2	527	0	0	527	5.0	776[1]	0.679	100	29.5	LOS B	17.7	129.6	145	Turn Bay	0.0	0.0
Lane 3	0	111	0	111	5.0	302	0.366	100	52.2	LOS A	5.6	41.1	160	–	0.0	0.0
Lane 4	0	0	28	28	5.0	247[1]	0.113	100	57.3	LOS A	1.3	9.7	60	Turn Bay	0.0	0.0
Lane 5	0	0	20	20	5.0	173[1]	0.113	100	56.9	LOS A	0.9	6.7	40	Turn Bay	0.0	0.0
Approach	1015	111	47	1173	5.0		0.679		32.5	LOS B	17.7	129.6				
East: Princes Hwy - East																
Lane 1	24	0	0	24	5.0	857[1]	0.028	100	16.7	LOS A	0.3	2.2	100	Turn Bay	0.0	0.0
Lane 2	0	383	0	383	5.0	398	0.963	100	75.4	LOS E	28.1	205.0	200	Turn Bay	0.0	7.2
Lane 3	0	383	0	383	5.0	398	0.963	100	75.4	LOS E	28.1	205.0	500	–	0.0	0.0
Lane 4	0	383	0	383	5.0	398	0.963	100	75.4	LOS E	28.1	205.0	500	–	0.0	0.0
Lane 5	0	0	59	59	5.0	91	0.657	100	75.6	LOS B	3.7	27.0	100	Turn Bay	0.0	0.0
Lane 6	0	0	59	59	5.0	91	0.657	100	75.6	LOS B	3.7	27.0	80	Turn Bay	0.0	0.0
Approach	24	1148	119	1292	5.0		0.963		74.3	LOS E	28.1	205.0				
North: Whiteside Rd																
Lane 1	112	0	0	112	5.0	548[1]	0.204	100	11.8	LOS A	1.1	8.2	70	Turn Bay	0.0	0.0
Lane 2	0	144	0	144	5.0	302	0.477	100	50.5	LOS A	7.6	55.1	210	–	0.0	0.0
Lane 3	0	0	266	266	5.0	287	0.927	100	76.6	LOS D	18.1	132.1	150	Turn Bay	0.0	0.0
Lane 4	0	0	266	266	5.0	287	0.927	100	76.6	LOS D	18.1	132.1	90	Turn Bay	0.0	40.1
Approach	112	144	532	787	5.0		0.927		62.7	LOS D	18.1	132.1				
West: Princes Hwy - West																
Lane 1	116	0	0	116	5.0	1404[1]	0.082	100	10.2	LOS A	0.3	1.9	100	Turn Bay	0.0	0.0
Lane 2	0	450	0	450	5.0	827	0.544	68[6]	23.0	LOS A	16.1	117.2	500	–	0.0	0.0
Lane 3	0	665	0	665	5.0	827	0.804	100	28.1	LOS C	31.1	227.3	500	–	0.0	0.0
Lane 4	0	628	35[0]	663	5.0	824	0.804	100	28.2	LOS C	31.1	226.8	500	–	0.0	0.0
Lane 5	0	0	341	341	5.0	498	0.684	68[5]	52.6	LOS B	17.0	124.0	215	Turn Bay	0.0	0.0
Lane 6	0	0	498	498	5.0	498	1.000[3]	100	100.5[8]	LOS F[8]	41.4[8]	301.9[8]	185	Turn Bay	0.0	50.0
Approach	116	1742	875	2733	5.0		1.000		42.8	LOS F	41.4	301.9				
Intersection				5984	5.0		1.000		50.2	LOS F	41.4	301.9				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
1 Reduced capacity due to a short lane effect
3 x = 1.00 due to short lane.
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

LANE SUMMARY

Intersection 598 - PM Peak - 27/07/11
Princes Hwy
Whiteside Rd / Brunt Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Brunt Rd																
Lane 1	433	0	0	433	5.0	573[1]	0.756	100	42.9	LOS C	19.3	141.2	125	Turn Bay	0.0	16.0
Lane 2	473	0	0	473	5.0	626[1]	0.756	100	43.5	LOS C	21.9	160.2	145	Turn Bay	0.0	14.0
Lane 3	0	165	0	165	5.0	302	0.547	100	53.9	LOS A	8.8	64.3	160	–	0.0	0.0
Lane 4	0	0	14	14	5.0	249[1]	0.057	100	56.7	LOS A	0.7	4.9	60	Turn Bay	0.0	0.0
Lane 5	0	0	10	10	5.0	175[1]	0.057	100	56.4	LOS A	0.5	3.4	40	Turn Bay	0.0	0.0
Approach	906	165	24	1096	5.0		0.756		45.1	LOS C	21.9	160.2				
East: Princes Hwy - East																
Lane 1	47	0	0	47	5.0	1132[1]	0.042	100	12.1	LOS A	0.2	1.6	100	Turn Bay	0.0	0.0
Lane 2	0	620	0	620	5.0	620	1.000[3]	80[5]	65.8[8]	LOS E[8]	44.7[8]	326.4[8]	200	Turn Bay	0.0	50.0
Lane 3	0	776	0	776	5.0	620	1.252	100	286.8	LOS F	116.9	853.6	500	–	0.0	54.2
Lane 4	0	776	0	776	5.0	620	1.252	100	286.8	LOS F	116.9	853.6	500	–	0.0	54.2
Lane 5	0	0	118	118	5.0	136	0.872	100	78.2	LOS C	7.7	56.0	100	Turn Bay	0.0	0.0
Lane 6	0	0	118	118	5.0	136	0.872	100	78.2	LOS C	7.7	56.0	80	Turn Bay	0.0	0.0
Approach	47	2173	237	2457	5.0		1.252		205.6	LOS F	116.9	853.6				
North: Whiteside Rd																
Lane 1	244	0	0	244	5.0	556[1]	0.439	100	17.1	LOS A	4.6	33.9	70	Turn Bay	0.0	0.0
Lane 2	0	132	0	132	5.0	302	0.436	100	50.1	LOS A	6.8	49.8	210	–	0.0	0.0
Lane 3	0	0	118	118	5.0	287	0.411	100	57.6	LOS A	6.1	44.4	150	Turn Bay	0.0	0.0
Lane 4	0	0	118	118	5.0	287	0.411	100	57.6	LOS A	6.1	44.4	90	Turn Bay	0.0	0.0
Approach	244	132	236	612	5.0		0.439		39.8	LOS A	6.8	49.8				
West: Princes Hwy - West																
Lane 1	652	0	0	652	5.0	1310[1]	0.497	100	10.7	LOS A	2.7	19.8	100	Turn Bay	0.0	0.0
Lane 2	0	496	0	496	5.0	779	0.637	68[6]	26.9	LOS B	20.1	146.9	500	–	0.0	0.0
Lane 3	0	734	0	734	5.0	779	0.942	100	51.2	LOS D	49.7	362.8	500	–	0.0	0.0
Lane 4	0	348	366[0]	715	5.0	758	0.942	100	51.7	LOS D	48.6	354.7	500	–	0.0	0.0
Lane 5	0	0	348	348	5.0	287	1.212	100	269.9[8]	LOS F[8]	48.1[8]	350.9[8]	215	Turn Bay	0.0	50.0
Lane 6	0	0	332	332	5.0	287	1.159	96[5]	224.8	LOS F	41.3	301.8	185	Turn Bay	0.0	50.0
Approach	652	1579	1046	3277	5.0		1.212		80.4	LOS F	49.7	362.8				
Intersection				7441	5.0		1.252		113.2	LOS F	116.9	853.6				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
1 Reduced capacity due to a short lane effect
3 x = 1.00 due to short lane.
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

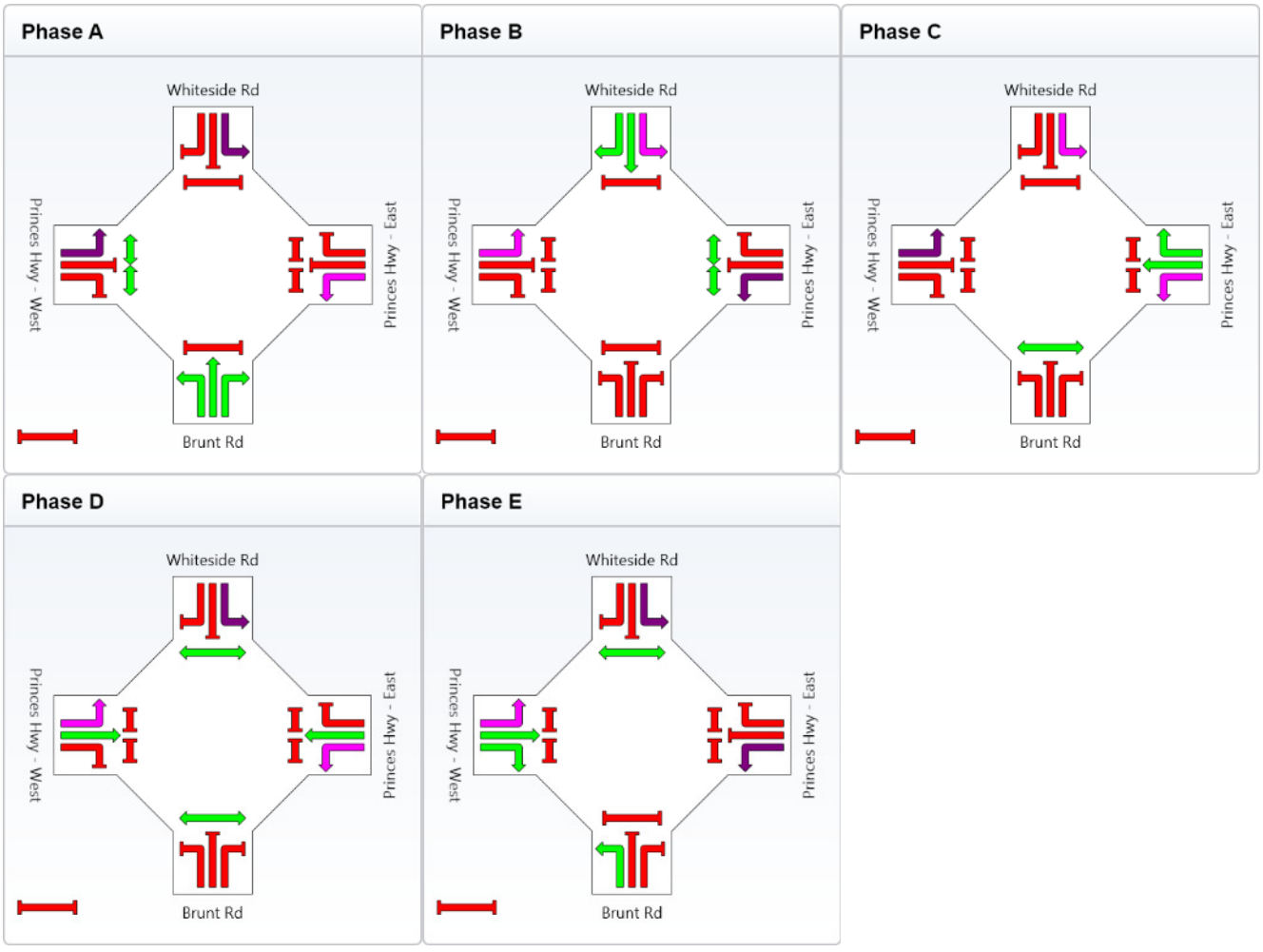
PHASING SUMMARY

Intersection 598 - AM Peak - 27/07/11
Princes Hwy
Whiteside Rd / Brunt Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split phase
Input Sequence: A, B, C, D, E
Output Sequence: A, B, C, D, E

Phase Timing Results

Phase	A	B	C	D	E
Green Time (sec)	19	19	6	13	33
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	25	25	12	19	39
Phase Split	21 %	21 %	10 %	16 %	33 %



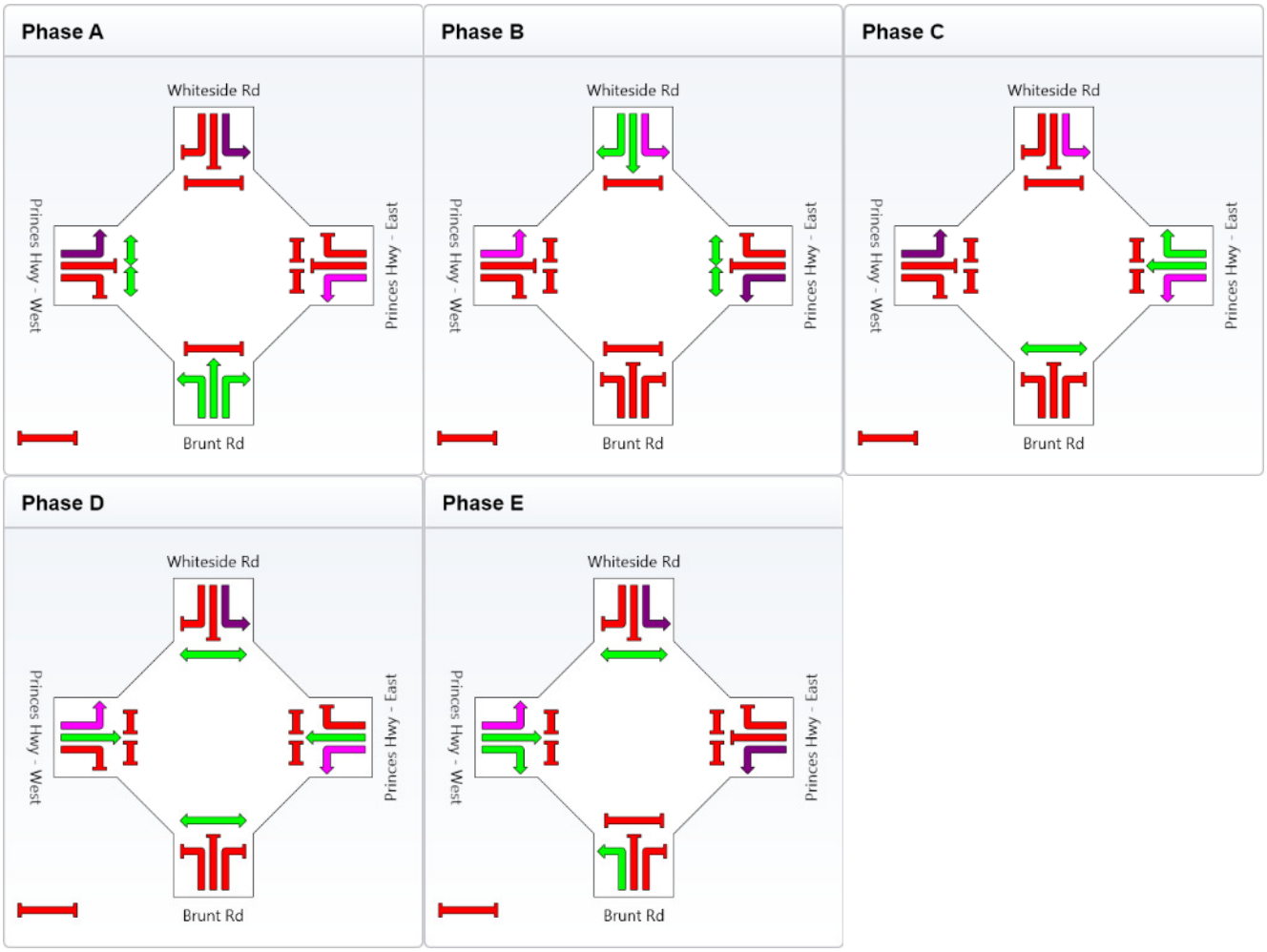
PHASING SUMMARY

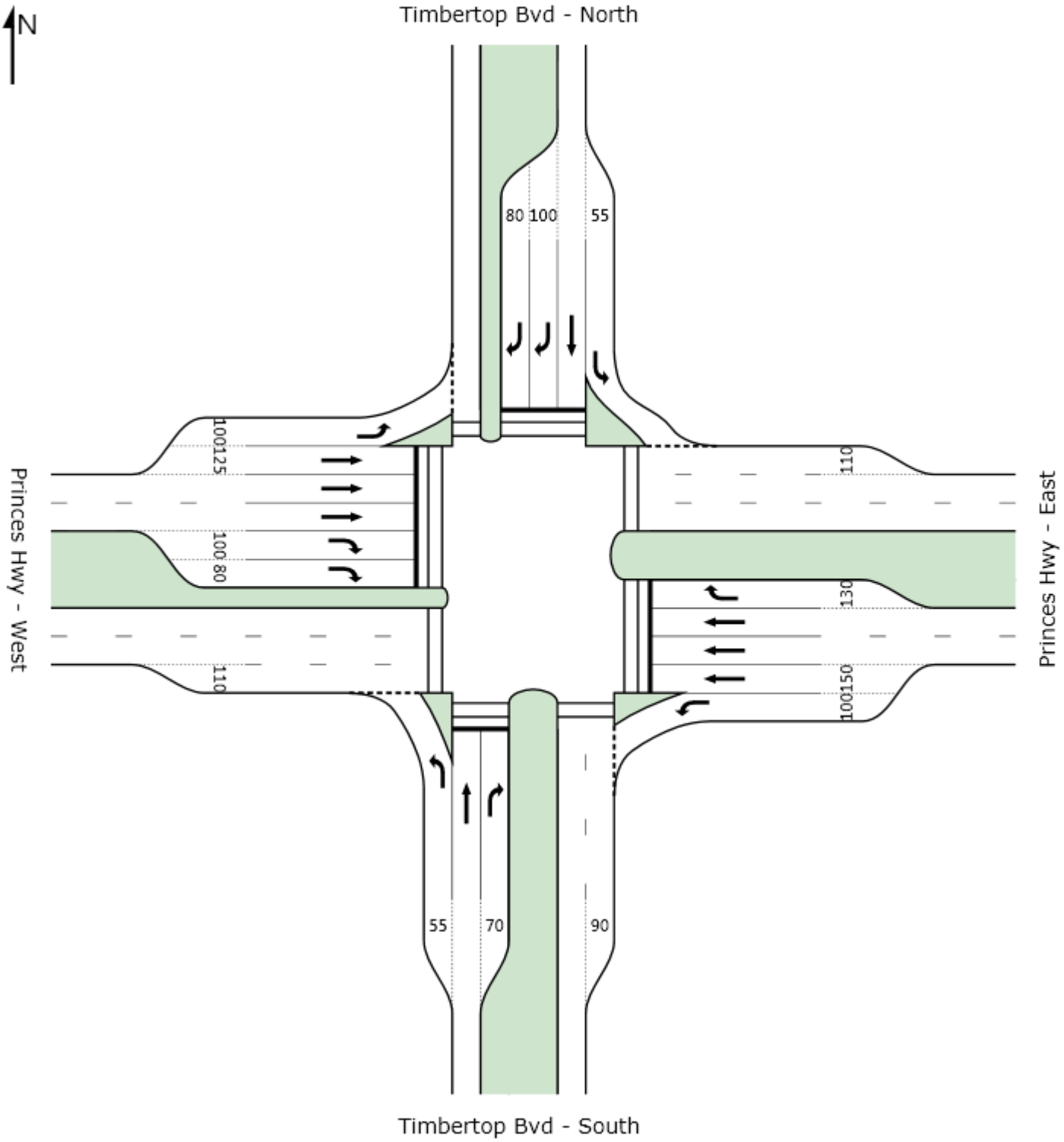
Intersection 598 - PM Peak - 27/07/11
Princes Hwy
Whiteside Rd / Brunt Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split phase
Input Sequence: A, B, C, D, E
Output Sequence: A, B, C, D, E

Phase Timing Results

Phase	A	B	C	D	E
Green Time (sec)	19	19	9	24	19
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	25	25	15	30	25
Phase Split	21 %	21 %	13 %	25 %	21 %




N
Timbertop Bvd - North
80 100 55
100 125
100 80
110
Princes Hwy - West
110
130
100 150
Princes Hwy - East
55 70 90
Timbertop Bvd - South

LANE SUMMARY

Intersection 604 - AM Peak - 27/07/11
Princes Hwy
Timbertop Bvd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Timbertop Bvd - South																
Lane 1	622	0	0	622	5.0	961[1]	0.647	100	8.9	LOS B	3.3	24.1	55	Turn Bay	0.0	0.0
Lane 2	0	24	0	24	5.0	302	0.080	100	46.6	LOS A	1.1	8.3	305	–	0.0	0.0
Lane 3	0	0	29	29	5.0	287	0.103	100	54.5	LOS A	1.4	10.2	70	Turn Bay	0.0	0.0
Approach	622	24	29	676	5.0		0.647		12.2	LOS B	3.3	24.1				
East: Princes Hwy - East																
Lane 1	17	0	0	17	5.0	1450[1]	0.012	100	10.1	LOS A	0.0	0.2	100	Turn Bay	0.0	0.0
Lane 2	0	105	0	105	5.0	831[1]	0.126	66[6]	16.2	LOS A	2.5	18.5	150	Turn Bay	0.0	0.0
Lane 3	0	168	0	168	5.0	875	0.192	100	16.9	LOS A	4.3	31.1	500	–	0.0	0.0
Lane 4	0	168	0	168	5.0	875	0.192	100	16.9	LOS A	4.3	31.1	500	–	0.0	0.0
Lane 5	0	0	62	62	5.0	91	0.686	100	75.9	LOS B	3.9	28.4	130	Turn Bay	0.0	0.0
Approach	17	441	62	520	5.0		0.686		23.6	LOS B	4.3	31.1				
North: Timbertop Bvd - North																
Lane 1	68	0	0	68	5.0	546[1]	0.125	100	9.6	LOS A	0.4	2.8	55	Turn Bay	0.0	0.0
Lane 2	0	25	0	25	5.0	254	0.099	100	49.7	LOS A	1.3	9.1	230	–	0.0	0.0
Lane 3	0	0	124	124	5.0	242	0.512	100	61.3	LOS A	6.7	49.2	100	Turn Bay	0.0	0.0
Lane 4	0	0	124	124	5.0	242	0.512	100	61.3	LOS A	6.7	49.2	80	Turn Bay	0.0	0.0
Approach	68	25	247	341	5.0		0.512		50.0	LOS A	6.7	49.2				
West: Princes Hwy - West																
Lane 1	209	0	0	209	5.0	1490[1]	0.141	100	10.1	LOS A	0.4	3.2	100	Turn Bay	0.0	0.0
Lane 2	0	337	0	337	5.0	719[1]	0.469	66[6]	18.8	LOS A	9.9	72.4	125	Turn Bay	0.0	0.0
Lane 3	0	623	0	623	5.0	875	0.712	100	23.0	LOS C	24.9	181.7	500	–	0.0	0.0
Lane 4	0	623	0	623	5.0	875	0.712	100	23.0	LOS C	24.9	181.7	500	–	0.0	0.0
Lane 5	0	0	24	24	5.0	91	0.265	57[6]	73.0	LOS A	1.4	10.4	100	Turn Bay	0.0	0.0
Lane 6	0	0	42	42	5.0	91	0.467	100	74.1	LOS A	2.6	18.7	80	Turn Bay	0.0	0.0
Approach	209	1583	66	1859	5.0		0.712		22.6	LOS C	24.9	181.7				
Intersection				3396	5.0		0.712		23.4	LOS C	24.9	181.7				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 604 - PM Peak - 27/07/11
Princes Hwy
Timbertop Bvd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Timbertop Bvd - South																
Lane 1	79	0	0	79	5.0	462[1]	0.171	100	20.0	LOS A	1.6	11.8	55	Turn Bay	0.0	0.0
Lane 2	0	25	0	25	5.0	302	0.084	100	46.6	LOS A	1.2	8.7	305	–	0.0	0.0
Lane 3	0	0	17	17	5.0	287	0.059	100	54.0	LOS A	0.8	5.8	70	Turn Bay	0.0	0.0
Approach	79	25	17	121	5.0		0.171		30.3	LOS A	1.6	11.8				
East: Princes Hwy - East																
Lane 1	29	0	0	29	5.0	1147[1]	0.026	100	10.3	LOS A	0.1	0.5	100	Turn Bay	0.0	0.0
Lane 2	0	482	0	482	5.0	675[1]	0.714	66[6]	29.8	LOS C	20.7	151.0	150	Turn Bay	0.0	5.6
Lane 3	0	793	0	793	5.0	731	1.085	100	138.9	LOS F	84.3	615.4	500	–	0.0	23.9
Lane 4	0	793	0	793	5.0	731	1.085	100	138.9	LOS F	84.3	615.4	500	–	0.0	23.9
Lane 5	0	0	68	68	5.0	226	0.302	100	62.6	LOS A	3.6	26.3	130	Turn Bay	0.0	0.0
Approach	29	2068	68	2166	5.0		1.085		110.5	LOS F	84.3	615.4				
North: Timbertop Bvd - North																
Lane 1	62	0	0	62	5.0	758[1]	0.082	100	8.4	LOS A	0.2	1.1	55	Turn Bay	0.0	0.0
Lane 2	0	24	0	24	5.0	254	0.095	100	49.7	LOS A	1.2	8.8	230	–	0.0	0.0
Lane 3	0	0	134	134	5.0	242	0.553	100	61.6	LOS A	7.4	53.7	100	Turn Bay	0.0	0.0
Lane 4	0	0	134	134	5.0	242	0.553	100	61.6	LOS A	7.4	53.7	80	Turn Bay	0.0	0.0
Approach	62	24	267	354	5.0		0.553		51.4	LOS A	7.4	53.7				
West: Princes Hwy - West																
Lane 1	304	0	0	304	5.0	1440[1]	0.211	100	10.2	LOS A	0.7	5.0	100	Turn Bay	0.0	0.0
Lane 2	0	244	0	244	5.0	629[1]	0.388	66[6]	25.4	LOS A	8.3	60.9	125	Turn Bay	0.0	0.0
Lane 3	0	431	0	431	5.0	731	0.590	100	28.8	LOS A	17.6	128.3	500	–	0.0	0.0
Lane 4	0	242	180[0]	422	5.0	715	0.590	100	28.8	LOS A	17.2	125.5	500	–	0.0	0.0
Lane 5	0	0	239	239	5.0	226	1.054	100	139.3[8]	LOS F[8]	22.4[8]	163.2[8]	100	Turn Bay	0.0	50.0
Lane 6	0	0	226	226	5.0	226	1.000[3]	95[5]	103.0[8]	LOS F[8]	17.9[8]	130.6[8]	80	Turn Bay	0.0	50.0
Approach	304	917	645	1866	5.0		1.054		48.4	LOS F	22.4	163.2				
Intersection				4507	5.0		1.085		78.0	LOS F	84.3	615.4				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

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1 Reduced capacity due to a short lane effect
3 x = 1.00 due to short lane.
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6 Lane underutilisation due to downstream effects
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

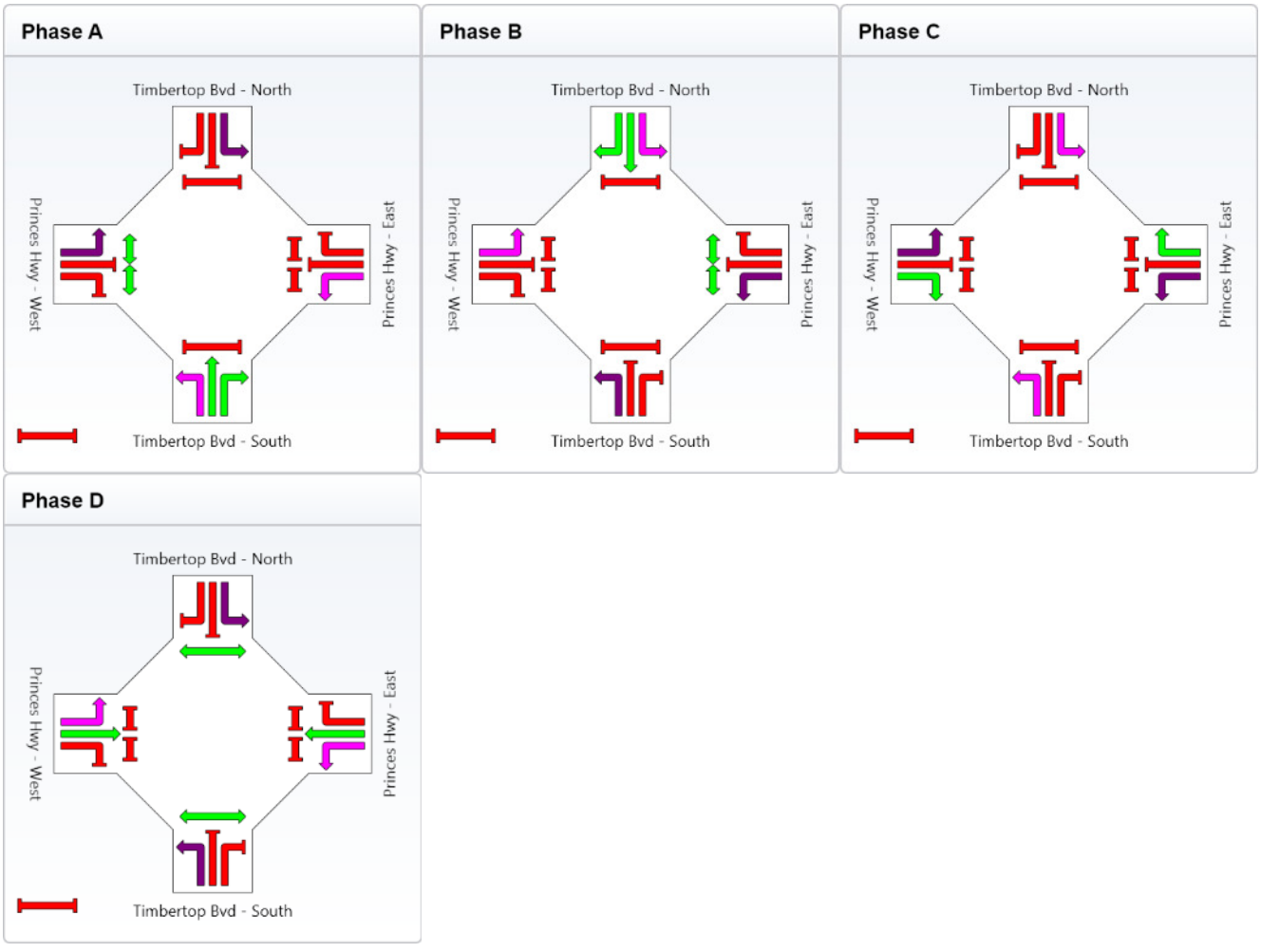
PHASING SUMMARY

Intersection 604 - AM Peak - 27/07/11
Princes Hwy
Timbertop Bvd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	19	16	6	55
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	25	22	12	61
Phase Split	21 %	18 %	10 %	51 %



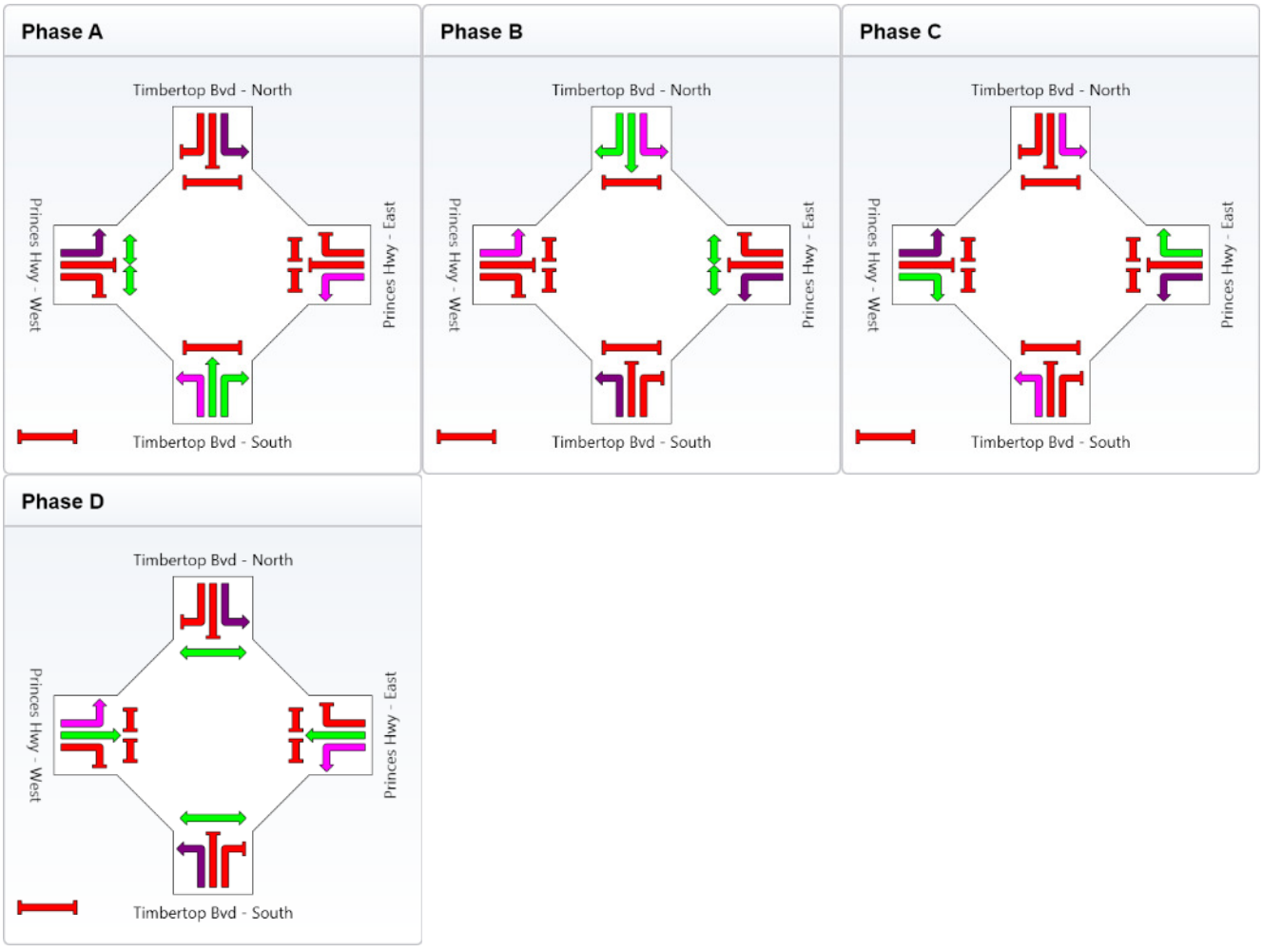
PHASING SUMMARY

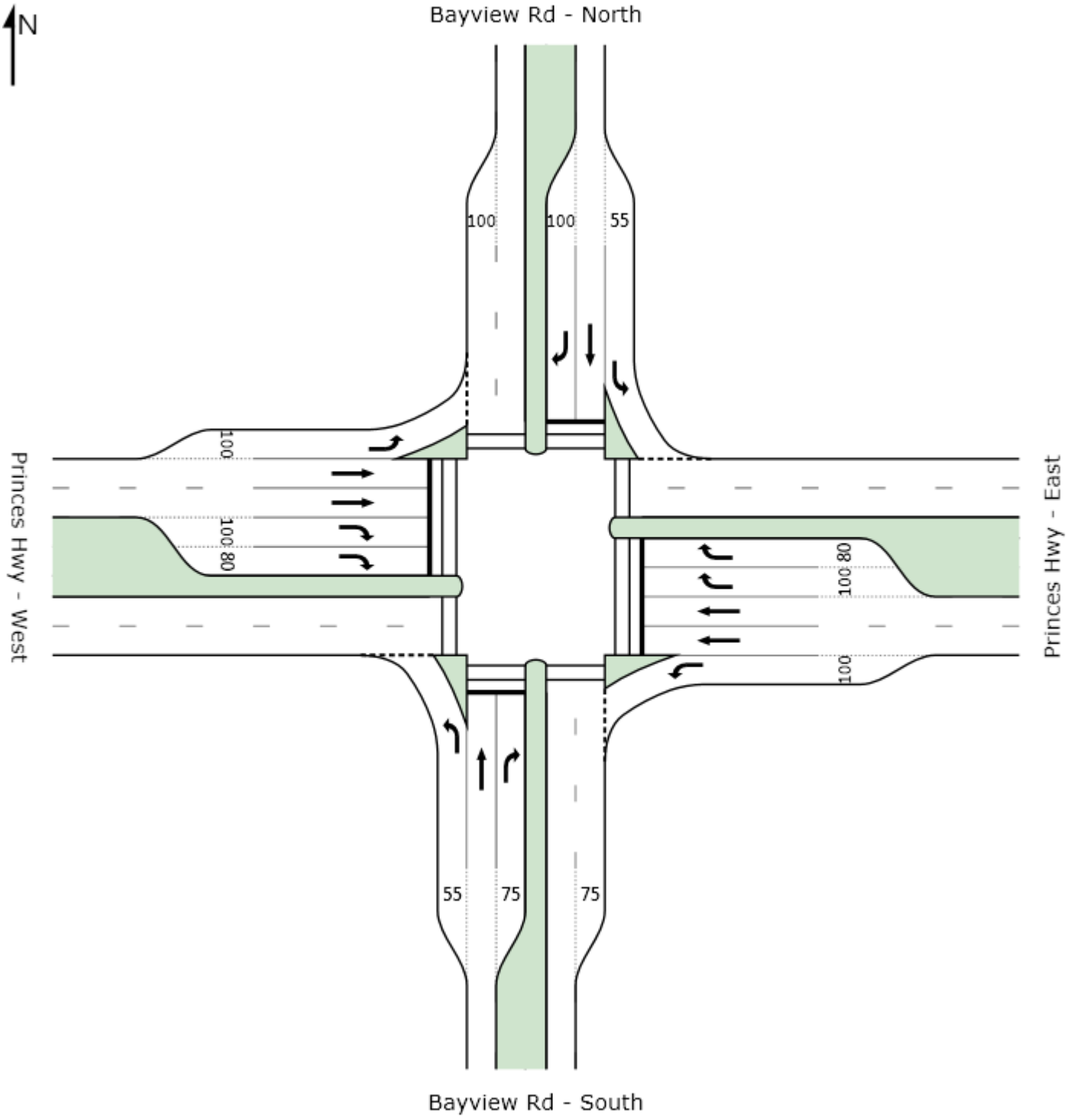
Intersection 604 - PM Peak - 27/07/11
Princes Hwy
Timbertop Bvd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	19	16	15	46
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	25	22	21	52
Phase Split	21 %	18 %	18 %	43 %




N
Bayview Rd - North
Princes Hwy - West
Princes Hwy - East
Bayview Rd - South
100
100
55
100
100
80
100
80
100
55
75
75

LANE SUMMARY

Intersection 1358 - AM Peak - 27/07/11
Princes Hwy
Bayview Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bayview Rd - South																
Lane 1	162	0	0	162	5.0	983[1]	0.165	100	8.0	LOS A	0.4	2.6	55	Turn Bay	0.0	0.0
Lane 2	0	34	0	34	5.0	254	0.132	100	50.1	LOS A	1.7	12.3	305	–	0.0	0.0
Lane 3	0	0	32	32	5.0	91	0.349	100	71.3	LOS A	1.9	13.8	75	Turn Bay	0.0	0.0
Approach	162	34	32	227	5.0		0.349		23.0	LOS A	1.9	13.8				
East: Princes Hwy - East																
Lane 1	43	0	0	43	5.0	1233[1]	0.035	100	10.1	LOS A	0.1	0.6	100	Turn Bay	0.0	0.0
Lane 2	0	165	0	165	5.0	986	0.167	100	12.0	LOS A	3.3	24.3	340	–	0.0	0.0
Lane 3	0	165	0	165	5.0	986	0.167	100	12.0	LOS A	3.3	24.3	340	–	0.0	0.0
Lane 4	0	0	79	79	5.0	181	0.437	59[6]	67.0	LOS A	4.4	32.4	100	Turn Bay	0.0	0.0
Lane 5	0	0	134	134	5.0	181	0.742	100	70.7	LOS C	8.1	59.0	80	Turn Bay	0.0	0.0
Approach	43	329	214	586	5.0		0.742		32.7	LOS C	8.1	59.0				
North: Bayview Rd - North																
Lane 1	200	0	0	200	5.0	377[1]	0.531	100	12.6	LOS A	2.6	18.7	55	Turn Bay	0.0	0.0
Lane 2	0	11	0	11	5.0	254	0.041	100	49.0	LOS A	0.5	3.7	115	–	0.0	0.0
Lane 3	0	0	38	38	5.0	91	0.418	100	71.7	LOS A	2.3	16.7	100	Turn Bay	0.0	0.0
Approach	200	11	38	248	5.0		0.531		23.1	LOS A	2.6	18.7				
West: Princes Hwy - West																
Lane 1	47	0	0	47	5.0	1233[1]	0.038	100	10.2	LOS A	0.1	0.8	100	Turn Bay	0.0	0.0
Lane 2	0	754	0	754	5.0	986	0.765	100	18.3	LOS C	28.7	209.6	500	–	0.0	0.0
Lane 3	0	754	0	754	5.0	986	0.765	100	18.3	LOS C	28.7	209.6	500	–	0.0	0.0
Lane 4	0	0	40	40	5.0	181	0.220	47[6]	65.3	LOS A	2.2	15.7	100	Turn Bay	0.0	0.0
Lane 5	0	0	85	85	5.0	181	0.471	100	67.2	LOS A	4.8	35.1	80	Turn Bay	0.0	0.0
Approach	47	1508	125	1681	5.0		0.765		21.6	LOS C	28.7	209.6				
Intersection				2743	5.0		0.765		24.3	LOS C	28.7	209.6				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 1358 - PM Peak - 27/07/11
Princes Hwy
Bayview Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bayview Rd - South																
Lane 1	186	0	0	186	5.0	331[1]	0.563	100	26.7	LOS A	5.6	40.9	55	Turn Bay	0.0	0.0
Lane 2	0	11	0	11	5.0	254	0.041	100	49.0	LOS A	0.5	3.7	305	–	0.0	0.0
Lane 3	0	0	43	43	5.0	106	0.408	100	70.2	LOS A	2.6	18.7	75	Turn Bay	0.0	0.0
Approach	186	11	43	240	5.0		0.563		35.5	LOS A	5.6	40.9				
East: Princes Hwy - East																
Lane 1	32	0	0	32	5.0	1298[1]	0.024	100	10.2	LOS A	0.1	0.5	100	Turn Bay	0.0	0.0
Lane 2	0	945	0	945	5.0	1002	0.943	100	38.8	LOS D	60.6	442.2	340	–	0.0	28.9
Lane 3	0	945	0	945	5.0	1002	0.943	100	38.8	LOS D	60.6	442.2	340	–	0.0	28.9
Lane 4	0	0	77	77	5.0	317	0.241	59[6]	56.6	LOS A	3.7	26.9	100	Turn Bay	0.0	0.0
Lane 5	0	0	130	130	5.0	317	0.409	100	58.2	LOS A	6.6	47.8	80	Turn Bay	0.0	0.0
Approach	32	1889	206	2127	5.0		0.943		40.2	LOS D	60.6	442.2				
North: Bayview Rd - North																
Lane 1	227	0	0	227	5.0	673[1]	0.338	100	8.4	LOS A	0.7	5.4	55	Turn Bay	0.0	0.0
Lane 2	0	36	0	36	5.0	254	0.141	100	50.2	LOS A	1.8	13.1	115	–	0.0	0.0
Lane 3	0	0	89	89	5.0	106	0.847	100	76.3	LOS C	5.8	42.2	100	Turn Bay	0.0	0.0
Approach	227	36	89	353	5.0		0.847		29.9	LOS C	5.8	42.2				
West: Princes Hwy - West																
Lane 1	84	0	0	84	5.0	1261[1]	0.067	100	10.2	LOS A	0.2	1.3	100	Turn Bay	0.0	0.0
Lane 2	0	355	0	355	5.0	827	0.430	100	21.6	LOS A	11.6	84.4	500	–	0.0	0.0
Lane 3	0	355	0	355	5.0	827	0.430	100	21.6	LOS A	11.6	84.4	500	–	0.0	0.0
Lane 4	0	0	67	67	5.0	151	0.445	47[6]	69.2	LOS A	3.9	28.1	100	Turn Bay	0.0	0.0
Lane 5	0	0	143	143	5.0	151	0.950	100	87.9	LOS D	10.1	73.8	80	Turn Bay	0.0	0.0
Approach	84	711	211	1005	5.0		0.950		33.3	LOS D	11.6	84.4				
Intersection				3725	5.0		0.950		37.0	LOS D	60.6	442.2				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

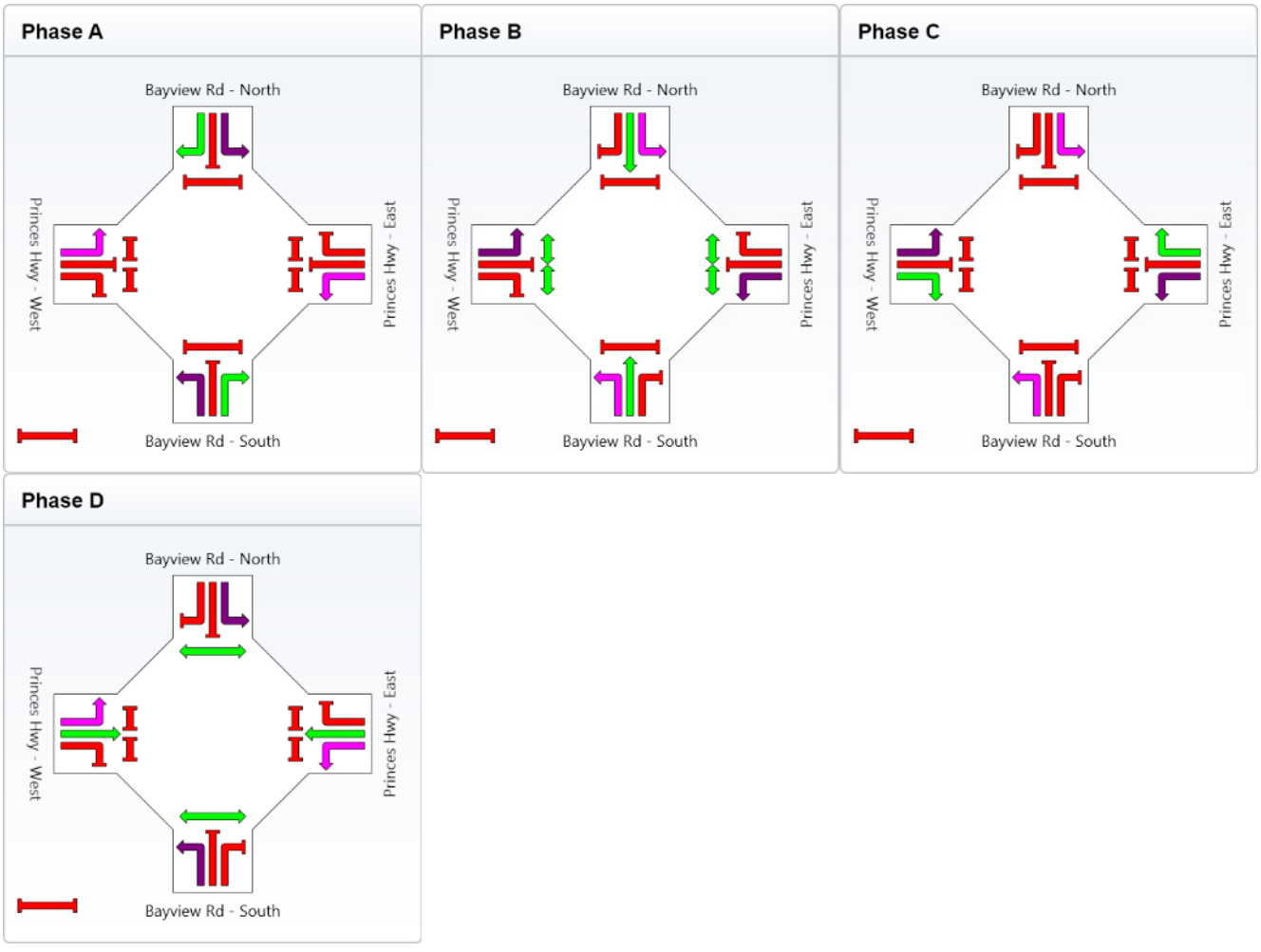
PHASING SUMMARY

Intersection 1358 - AM Peak - 27/07/11
Princes Hwy
Bayview Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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	16	12	62
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	12	22	18	68
Phase Split	10 %	18 %	15 %	57 %



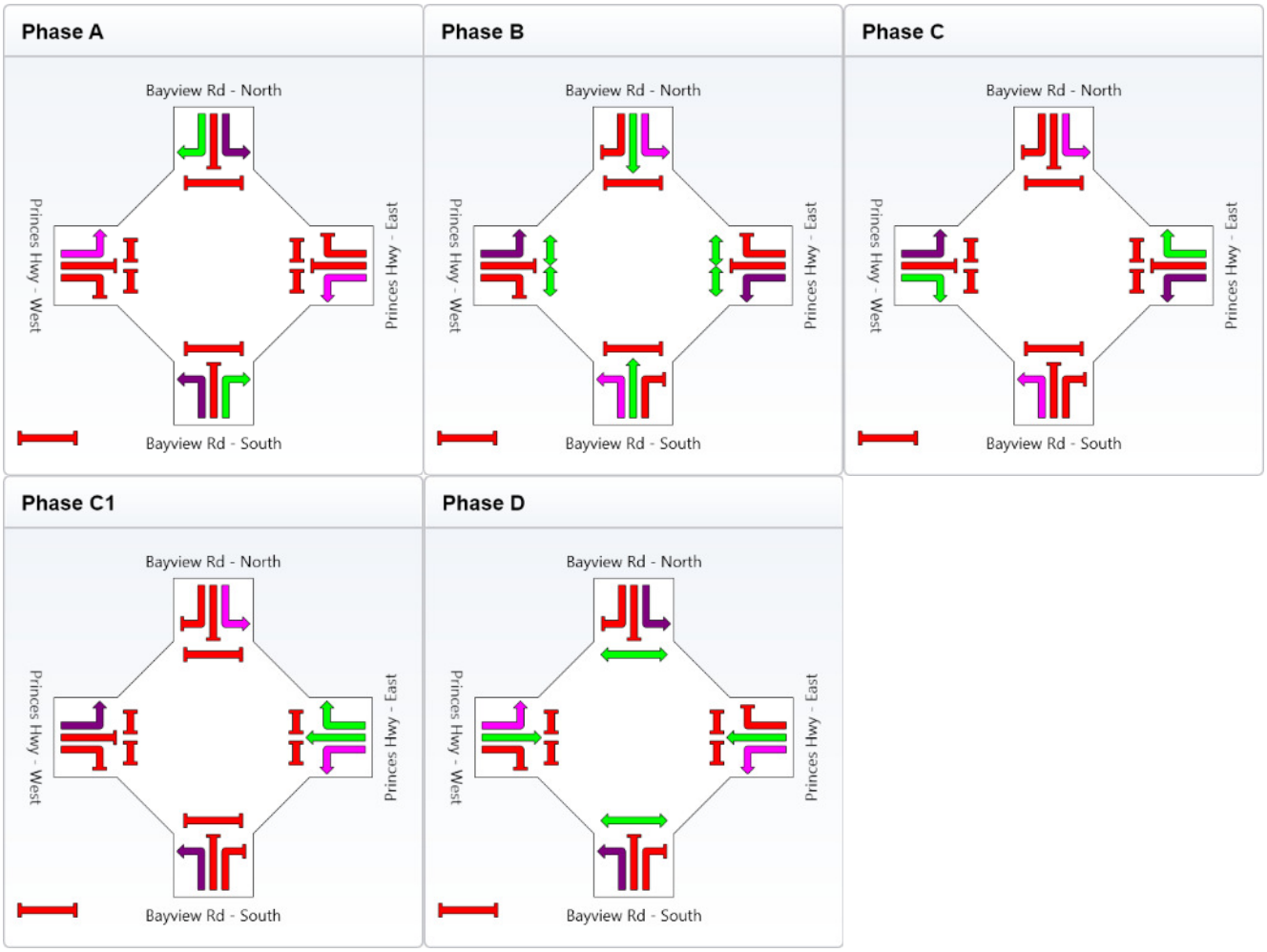
PHASING SUMMARY

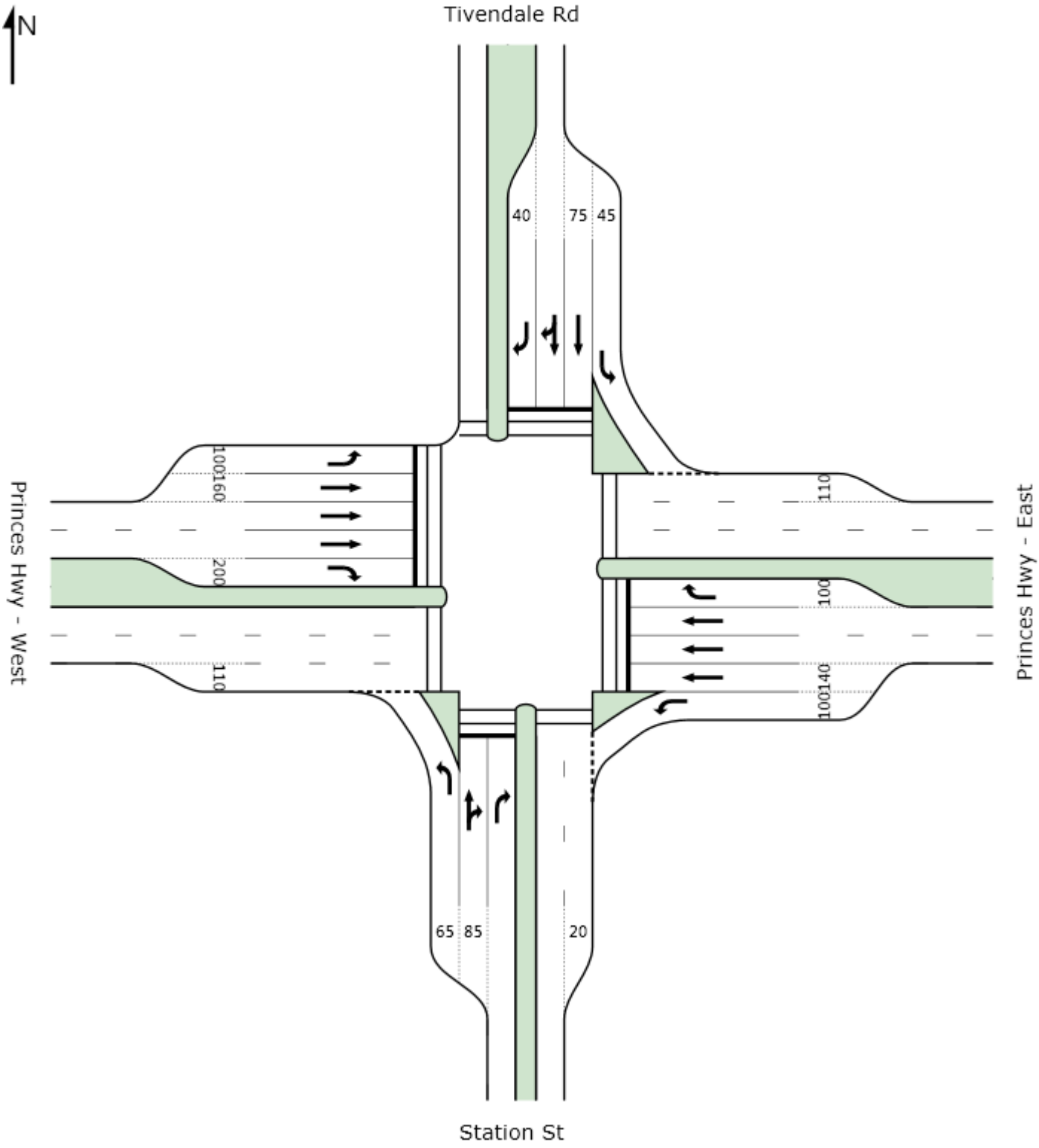
Intersection 1358 - PM Peak - 27/07/11
Princes Hwy
Bayview Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, C1, D
Output Sequence: A, B, C, C1, D

Phase Timing Results

Phase	A	B	C	C1	D
Green Time (sec)	7	16	10	5	52
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	13	22	16	11	58
Phase Split	11 %	18 %	13 %	9 %	48 %




N
Tivendale Rd
40
75
45
100
160
200
110
Princes Hwy - West
110
100
140
100
Princes Hwy - East
65
85
20
Station St

LANE SUMMARY

Intersection 612 - AM Peak - 27/07/11
Princes Hwy
Officer Sth Rd / Tivendale Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Station St																
Lane 1	193	0	0	193	5.0	1038[1]	0.186	100	11.7	LOS A	0.4	3.2	65	Turn Bay	0.0	0.0
Lane 2	0	87	0	87	5.0	302	0.289	100	53.3	LOS A	4.4	31.9	85	Turn Bay	0.0	0.0
Lane 3	0	0	79	79	5.0	287	0.275	95[5]	60.0	LOS A	3.9	28.7	280	–	0.0	0.0
Approach	193	87	79	359	5.0		0.289		32.4	LOS A	4.4	31.9				
East: Princes Hwy - East																
Lane 1	418	0	0	418	5.0	1217[1]	0.343	100	12.3	LOS A	1.5	10.7	100	Turn Bay	0.0	0.0
Lane 2	0	86	0	86	5.0	685[1]	0.126	64[6]	23.9	LOS A	2.7	19.4	140	Turn Bay	0.0	0.0
Lane 3	0	141	0	141	5.0	716	0.197	100	24.8	LOS A	4.5	33.0	480	–	0.0	0.0
Lane 4	0	141	0	141	5.0	716	0.197	100	24.8	LOS A	4.5	33.0	480	–	0.0	0.0
Lane 5	0	0	221	221	5.0	287	0.771	100	65.5	LOS C	12.9	94.2	100	Turn Bay	0.0	0.0
Approach	418	368	221	1007	5.0		0.771		28.5	LOS C	12.9	94.2				
North: Tivendale Rd																
Lane 1	128	0	0	128	5.0	654[1]	0.196	100	11.2	LOS A	1.1	8.3	45	Turn Bay	0.0	0.0
Lane 2	0	53	0	53	5.0	254	0.206	28[6]	50.8	LOS A	2.7	19.5	75	Turn Bay	0.0	0.0
Lane 3	0	191	0	191	5.0	254	0.749	100	57.1	LOS C	11.2	81.4	120	–	0.0	0.0
Lane 4	0	0	33	33	5.0	165[1]	0.198	26[5]	58.0	LOS A	1.6	11.9	40	Turn Bay	0.0	0.0
Approach	128	243	33	404	5.0		0.749		41.8	LOS C	11.2	81.4				
West: Princes Hwy - West																
Lane 1	157	0	0	157	5.0	242	0.649	100	65.4	LOS B	8.9	64.6	100	Turn Bay	0.0	0.0
Lane 2	0	339	0	339	5.0	668	0.508	64[6]	31.2	LOS A	13.8	101.0	160	Turn Bay	0.0	0.0
Lane 3	0	530	0	530	5.0	668	0.794	100	37.1	LOS C	27.0	197.1	340	–	0.0	0.0
Lane 4	0	530	0	530	5.0	668	0.794	100	37.1	LOS C	27.0	197.1	340	–	0.0	0.0
Lane 5	0	0	184	184	5.0	242	0.763	100	69.1	LOS C	10.9	79.5	200	Turn Bay	0.0	0.0
Approach	157	1400	184	1741	5.0		0.794		41.9	LOS C	27.0	197.1				
Intersection				3512	5.0		0.794		37.1	LOS C	27.0	197.1				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 612 - PM Peak - 27/07/11
Princes Hwy
Officer Sth Rd / Tivendale Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Station St																
Lane 1	414	0	0	414	5.0	525[1]	0.787	100	24.4	LOS C	9.3	68.1	65	Turn Bay	0.0	9.2
Lane 2	0	266	63	329	5.0	329[1]	1.000[3]	88[5]	57.9[8]	LOS E[8]	19.0[8]	139.0[8]	85	Turn Bay	0.0	50.2
Lane 3	0	0	395	395	5.0	347	1.138	100	206.7	LOS F	47.0	343.4	280	–	0.0	23.5
Approach	414	266	458	1138	5.0		1.138		97.4	LOS F	47.0	343.4				
East: Princes Hwy - East																
Lane 1	119	0	0	119	5.0	1175[1]	0.101	100	12.7	LOS A	0.5	3.6	100	Turn Bay	0.0	0.0
Lane 2	0	377	0	377	5.0	525	0.719	64[6]	42.7	LOS C	19.2	139.9	140	Turn Bay	0.0	4.9
Lane 3	0	590	0	590	5.0	525	1.124	100	179.7	LOS F	68.5	500.0	480	–	0.0	8.7
Lane 4	0	590	0	590	5.0	525	1.124	100	179.7	LOS F	68.5	500.0	480	–	0.0	8.7
Lane 5	0	0	142	142	5.0	121	1.177	100	242.9	LOS F	18.2	133.2	100	Turn Bay	0.0	31.1
Approach	119	1557	142	1818	5.0		1.177		145.3	LOS F	68.5	500.0				
North: Tivendale Rd																
Lane 1	235	0	0	235	5.0	608[1]	0.386	100	11.0	LOS A	2.2	15.9	45	Turn Bay	0.0	0.0
Lane 2	0	40	0	40	5.0	254	0.159	28[6]	50.3	LOS A	2.0	14.9	75	Turn Bay	0.0	0.0
Lane 3	0	70	73	143	5.0	248	0.577	100	58.1	LOS A	7.9	57.6	120	–	0.0	0.0
Lane 4	0	0	93	93	5.0	162[1]	0.577	100	60.4	LOS A	5.0	36.2	40	Turn Bay	0.0	0.0
Approach	235	111	166	512	5.0		0.577		36.3	LOS A	7.9	57.6				
West: Princes Hwy - West																
Lane 1	42	0	0	42	5.0	362	0.116	100	52.8	LOS A	1.9	13.7	100	Turn Bay	0.0	0.0
Lane 2	0	134	0	134	5.0	779	0.172	64[6]	21.2	LOS A	3.9	28.4	160	Turn Bay	0.0	0.0
Lane 3	0	210	0	210	5.0	779	0.269	100	22.2	LOS A	6.5	47.3	340	–	0.0	0.0
Lane 4	0	189	20[0]	209	5.0	775	0.269	100	22.2	LOS A	6.4	47.0	340	–	0.0	0.0
Lane 5	0	0	402	402	5.0	362	1.109	100	182.7	LOS F	44.7	326.4	200	Turn Bay	0.0	50.0
Approach	42	533	422	997	5.0		1.109		88.1	LOS F	44.7	326.4				
Intersection				4464	5.0		1.177		107.8	LOS F	68.5	500.0				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
1 Reduced capacity due to a short lane effect
3 x = 1.00 due to short lane.
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

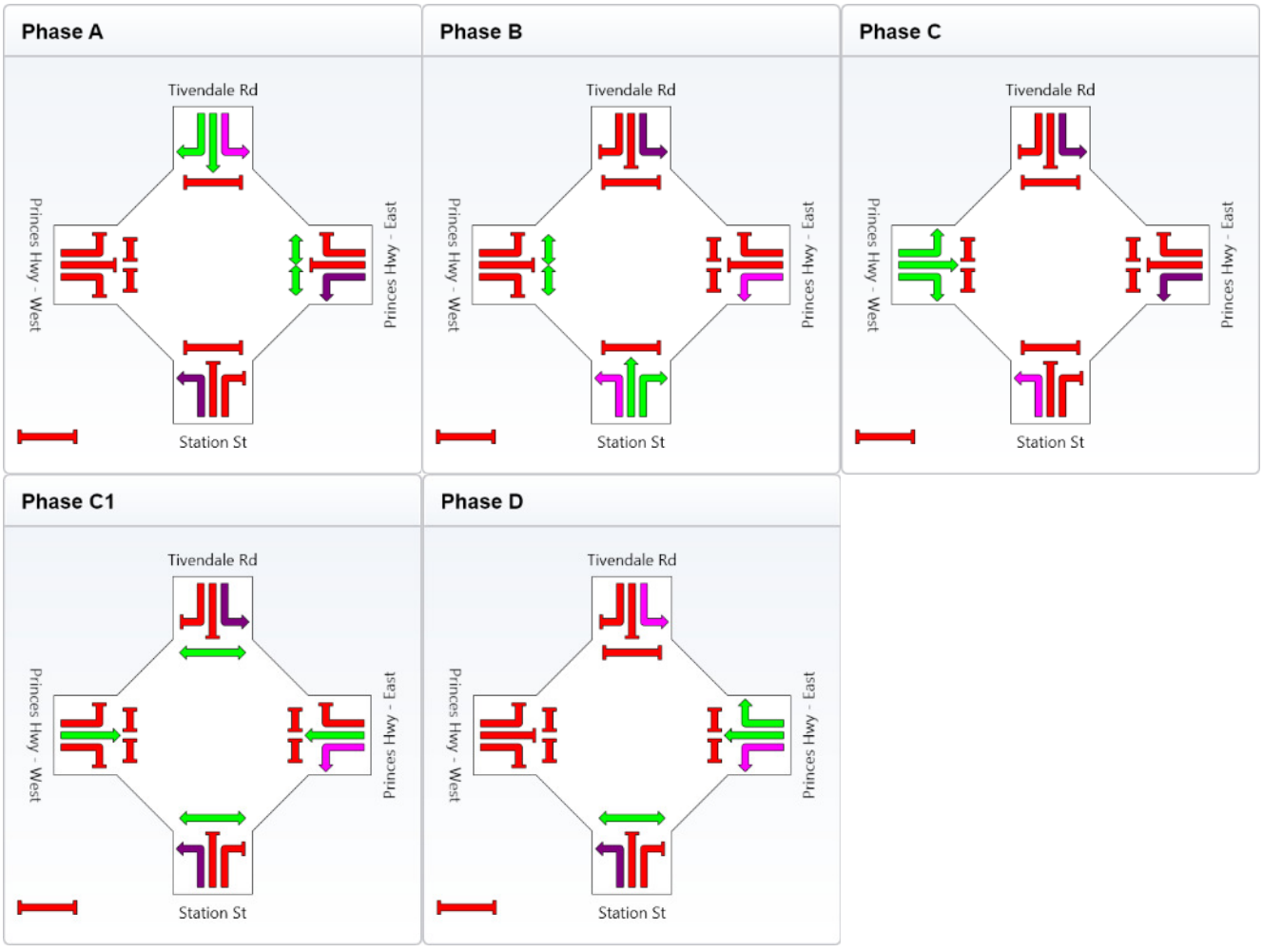
PHASING SUMMARY

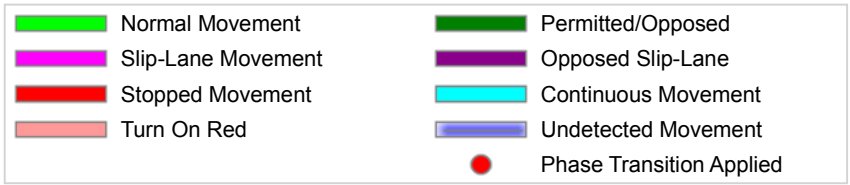
Intersection 612 - AM Peak - 27/07/11
Princes Hwy
Officer Sth Rd / Tivendale Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split phase
Input Sequence: A, B, C, C1, D
Output Sequence: A, B, C, C1, D

Phase Timing Results

Phase	A	B	C	C1	D
Green Time (sec)	16	19	16	20	19
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	22	25	22	26	25
Phase Split	18 %	21 %	18 %	22 %	21 %





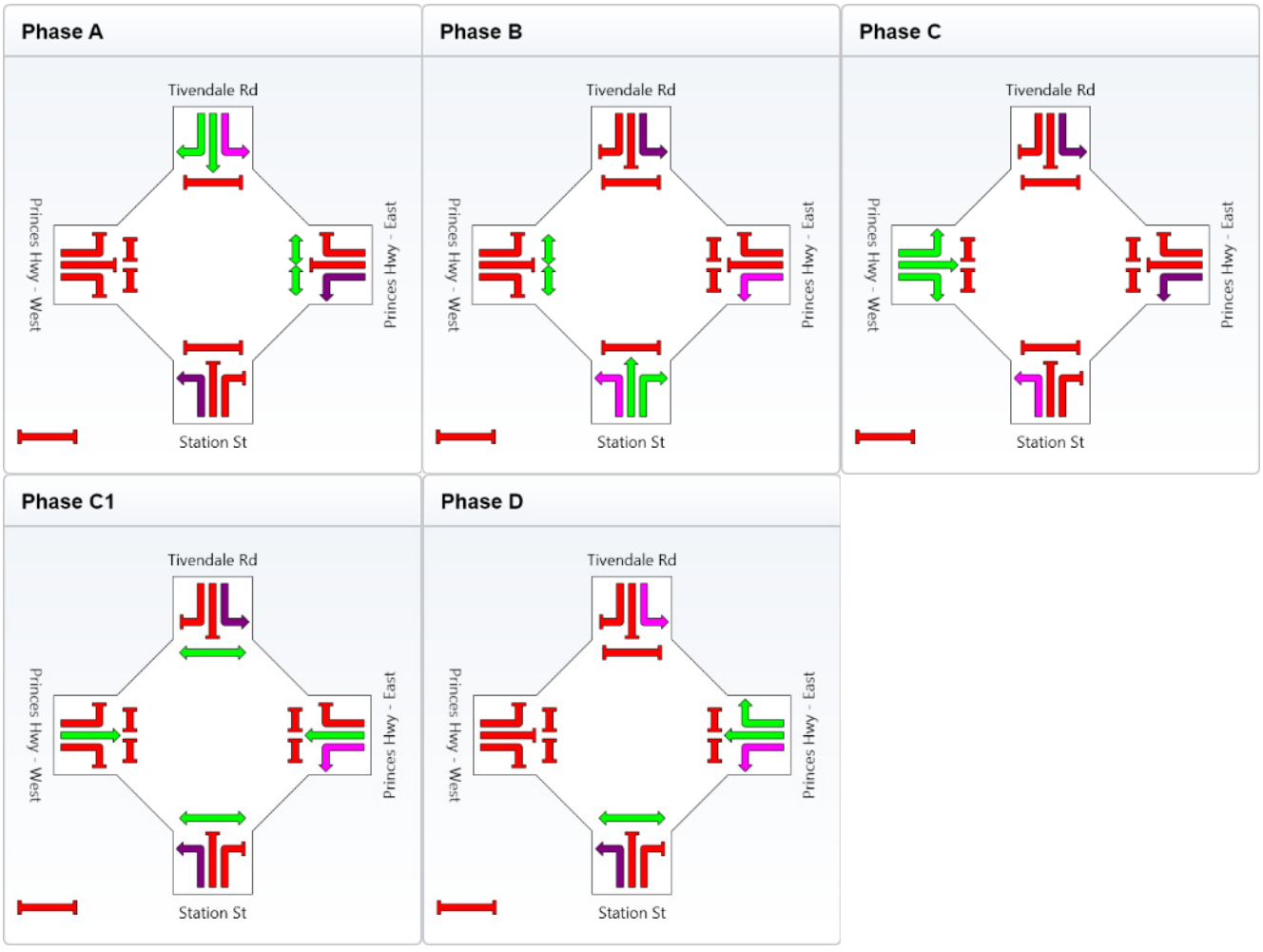
PHASING SUMMARY

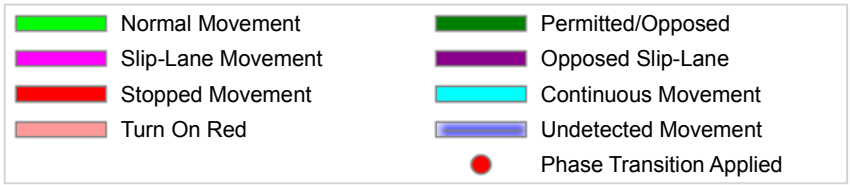
Intersection 612 - PM Peak - 27/07/11
Princes Hwy
Officer Sth Rd / Tivendale Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

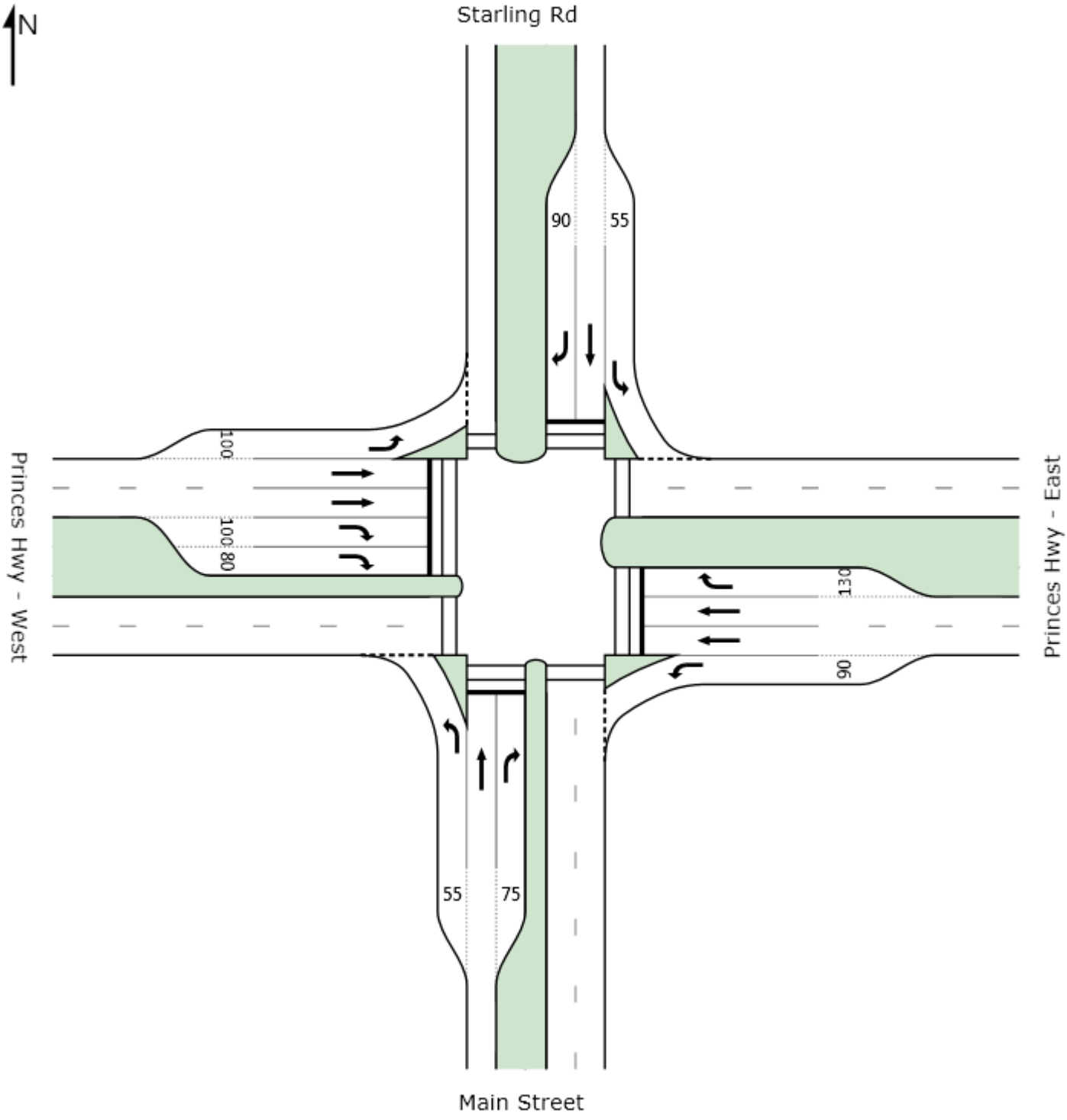
Phase times determined by the program
Sequence: Split phase
Input Sequence: A, B, C, C1, D
Output Sequence: A, B, C, C1, D

Phase Timing Results

Phase	A	B	C	C1	D
Green Time (sec)	16	23	24	19	8
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	22	29	30	25	14
Phase Split	18 %	24 %	25 %	21 %	12 %






N
Starling Rd
90
55
Princes Hwy - West
100
100
80
Princes Hwy - East
130
90
55
75
Main Street

LANE SUMMARY

Intersection 617 - AM Peak - 27/07/11
Princes Hwy
Starling Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Main Street																
Lane 1	42	0	0	42	5.0	409[1]	0.103	100	8.5	LOS A	0.1	0.8	55	Turn Bay	0.0	0.0
Lane 2	0	126	0	126	5.0	254	0.497	100	53.3	LOS A	6.8	50.0	85	–	0.0	0.0
Lane 3	0	0	89	89	5.0	136	0.659	100	69.8	LOS B	5.4	39.3	75	Turn Bay	0.0	0.0
Approach	42	126	89	258	5.0		0.659		51.7	LOS B	6.8	50.0				
East: Princes Hwy - East																
Lane 1	114	0	0	114	5.0	1305[1]	0.087	100	10.2	LOS A	0.2	1.8	90	Turn Bay	0.0	0.0
Lane 2	0	581	0	581	5.0	1034	0.562	100	13.4	LOS A	15.7	114.5	390	–	0.0	0.0
Lane 3	0	581	0	581	5.0	1034	0.562	100	13.4	LOS A	15.7	114.5	390	–	0.0	0.0
Lane 4	0	0	38	38	5.0	91	0.418	100	74.0	LOS A	2.3	16.7	130	Turn Bay	0.0	0.0
Approach	114	1162	38	1314	5.0		0.562		14.9	LOS A	15.7	114.5				
North: Starling Rd																
Lane 1	59	0	0	59	5.0	315[1]	0.187	100	10.8	LOS A	0.5	3.5	55	Turn Bay	0.0	0.0
Lane 2	0	83	0	83	5.0	254	0.327	100	51.9	LOS A	4.3	31.7	120	–	0.0	0.0
Lane 3	0	0	77	77	5.0	136	0.566	100	68.8	LOS A	4.5	33.1	90	Turn Bay	0.0	0.0
Approach	59	83	77	219	5.0		0.566		46.8	LOS A	4.5	33.1				
West: Princes Hwy - West																
Lane 1	69	0	0	69	5.0	1450[1]	0.048	100	10.3	LOS A	0.2	1.1	100	Turn Bay	0.0	0.0
Lane 2	0	726	0	726	5.0	1034	0.702	100	15.1	LOS C	23.6	172.6	480	–	0.0	0.0
Lane 3	0	726	0	726	5.0	1034	0.702	100	15.1	LOS C	23.6	172.6	480	–	0.0	0.0
Lane 4	0	0	33	33	5.0	91	0.360	100	73.7	LOS A	2.0	14.3	100	Turn Bay	0.0	0.0
Lane 5	0	0	33	33	5.0	91	0.360	100	73.7	LOS A	2.0	14.3	80	Turn Bay	0.0	0.0
Approach	69	1452	65	1586	5.0		0.702		17.3	LOS C	23.6	172.6				
Intersection				3377	5.0		0.702		20.9	LOS C	23.6	172.6				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

LANE SUMMARY

Intersection 617 - PM Peak - 27/07/11
Princes Hwy
Starling Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Main Street																
Lane 1	222	0	0	222	5.0	401[1]	0.554	100	15.9	LOS A	4.1	29.7	55	Turn Bay	0.0	0.0
Lane 2	0	93	0	93	5.0	254	0.364	100	52.2	LOS A	4.9	35.6	85	–	0.0	0.0
Lane 3	0	0	158	158	5.0	196	0.805	100	69.4	LOS C	9.7	70.7	75	Turn Bay	0.0	0.0
Approach	222	93	158	473	5.0		0.805		40.9	LOS C	9.7	70.7				
East: Princes Hwy - East																
Lane 1	104	0	0	104	5.0	1200[1]	0.087	100	10.4	LOS A	0.3	1.9	90	Turn Bay	0.0	0.0
Lane 2	0	757	0	757	5.0	922	0.821	100	23.7	LOS C	34.1	248.6	390	–	0.0	0.0
Lane 3	0	757	0	757	5.0	922	0.821	100	23.7	LOS C	34.1	248.6	390	–	0.0	0.0
Lane 4	0	0	65	65	5.0	136	0.480	100	70.5	LOS A	3.8	27.8	130	Turn Bay	0.0	0.0
Approach	104	1515	65	1684	5.0		0.821		24.7	LOS C	34.1	248.6				
North: Starling Rd																
Lane 1	44	0	0	44	5.0	327[1]	0.135	100	11.7	LOS A	0.4	3.1	55	Turn Bay	0.0	0.0
Lane 2	0	144	0	144	5.0	254	0.567	100	53.9	LOS A	7.9	57.9	120	–	0.0	0.0
Lane 3	0	0	79	79	5.0	196	0.402	100	63.4	LOS A	4.3	31.7	90	Turn Bay	0.0	0.0
Approach	44	144	79	267	5.0		0.567		49.7	LOS A	7.9	57.9				
West: Princes Hwy - West																
Lane 1	85	0	0	85	5.0	1333[1]	0.064	100	10.3	LOS A	0.2	1.4	100	Turn Bay	0.0	0.0
Lane 2	0	606	0	606	5.0	922	0.657	100	19.8	LOS B	21.6	157.9	480	–	0.0	0.0
Lane 3	0	606	0	606	5.0	922	0.657	100	19.8	LOS B	21.6	157.9	480	–	0.0	0.0
Lane 4	0	0	99	99	5.0	136	0.732	100	73.4	LOS C	6.1	44.5	100	Turn Bay	0.0	0.0
Lane 5	0	0	99	99	5.0	136	0.732	100	73.4	LOS C	6.1	44.5	80	Turn Bay	0.0	0.0
Approach	85	1212	199	1496	5.0		0.732		26.4	LOS C	21.6	157.9				
Intersection				3920	5.0		0.821		29.0	LOS C	34.1	248.6				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

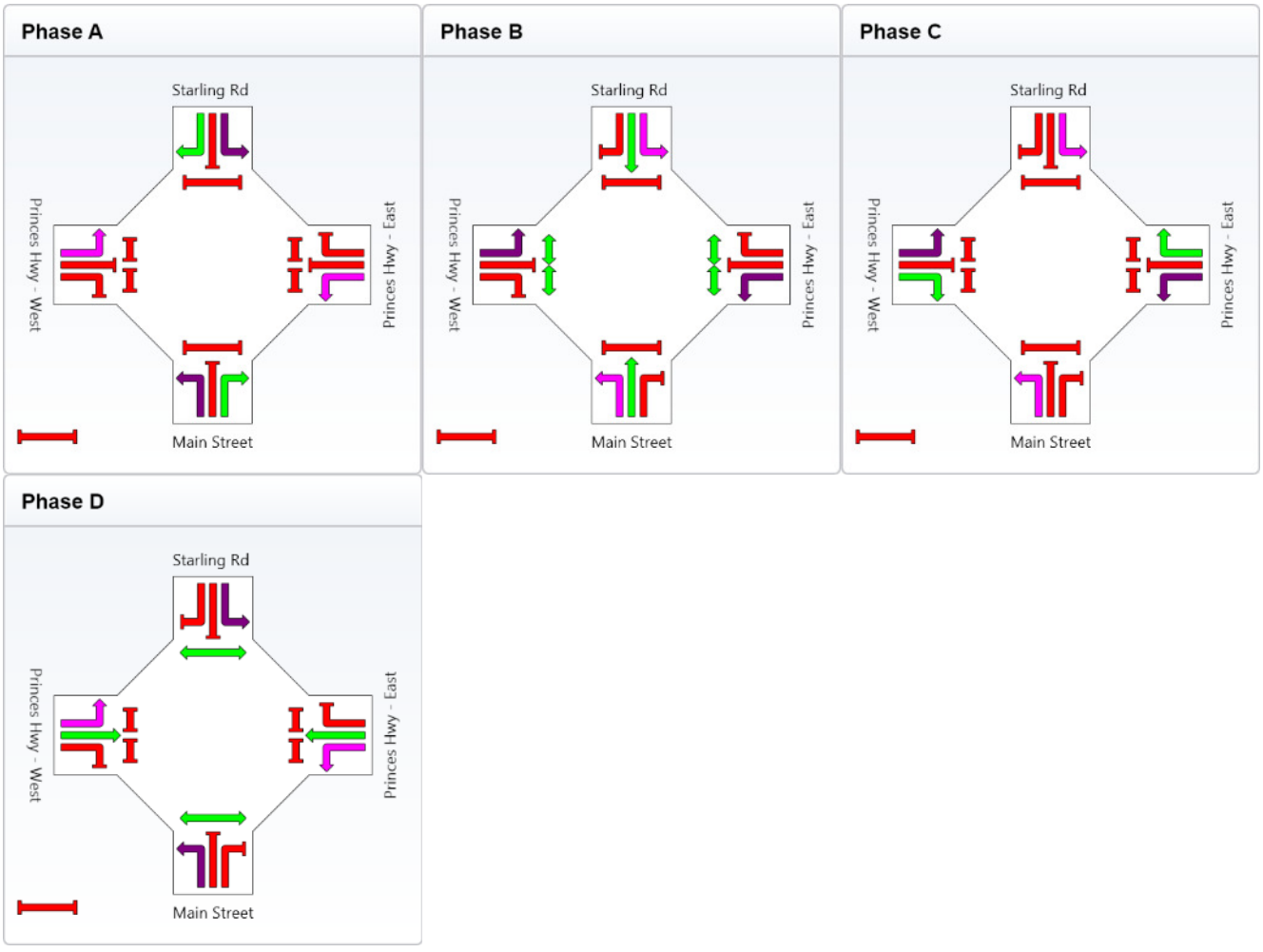
PHASING SUMMARY

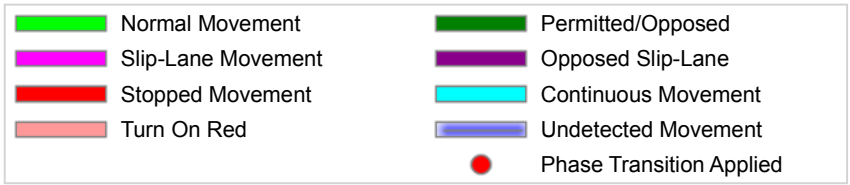
Intersection 617 - AM Peak - 27/07/11
Princes Hwy
Starling Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	9	16	6	65
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	15	22	12	71
Phase Split	13 %	18 %	10 %	59 %





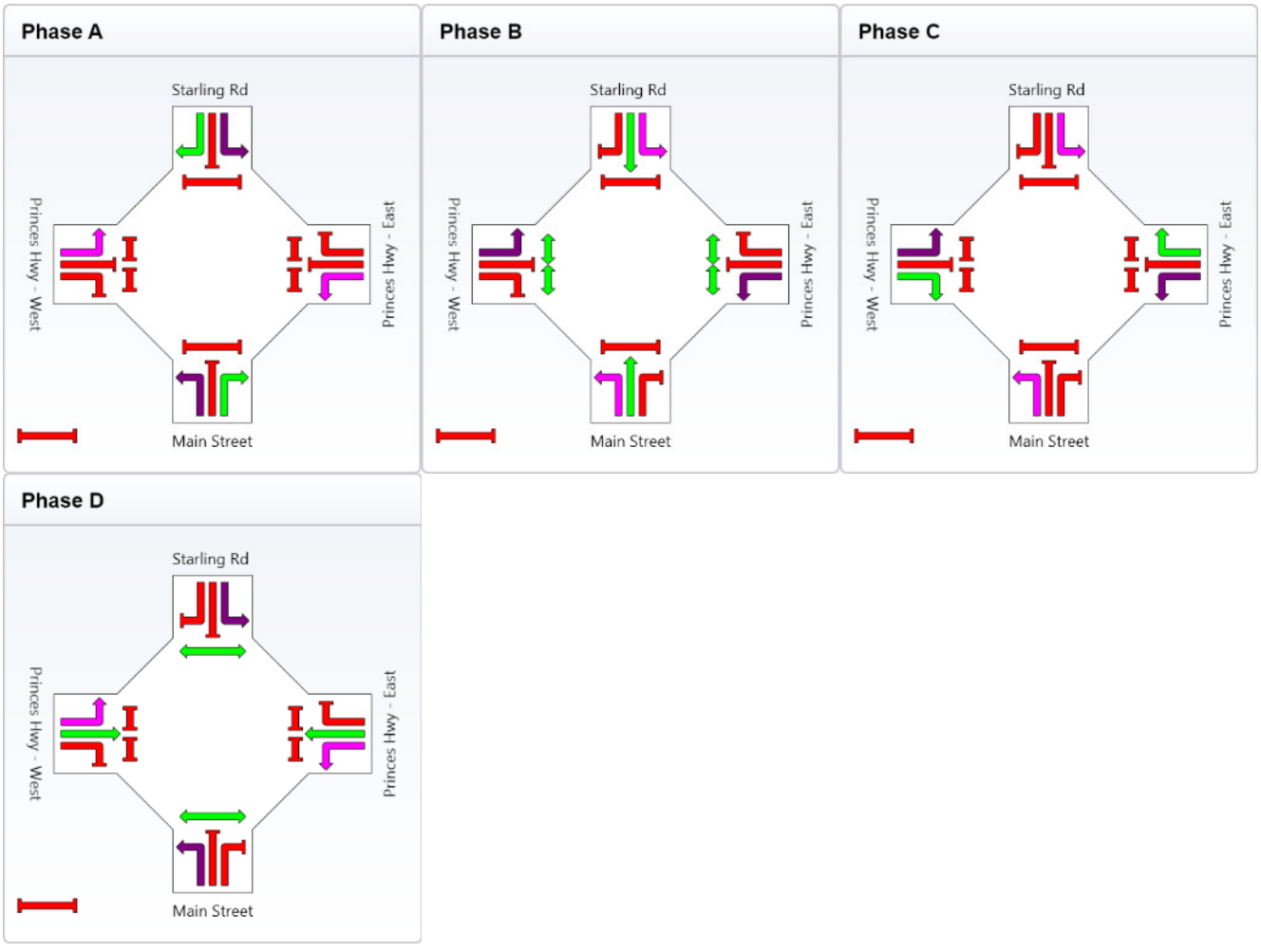
PHASING SUMMARY

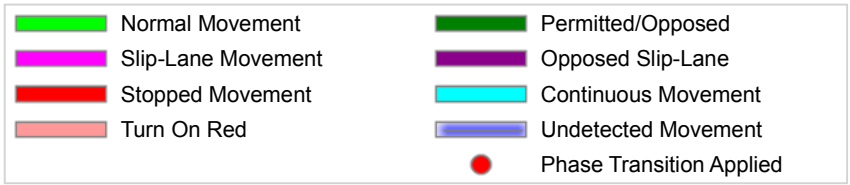
Intersection 617 - PM Peak - 27/07/11
Princes Hwy
Starling Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

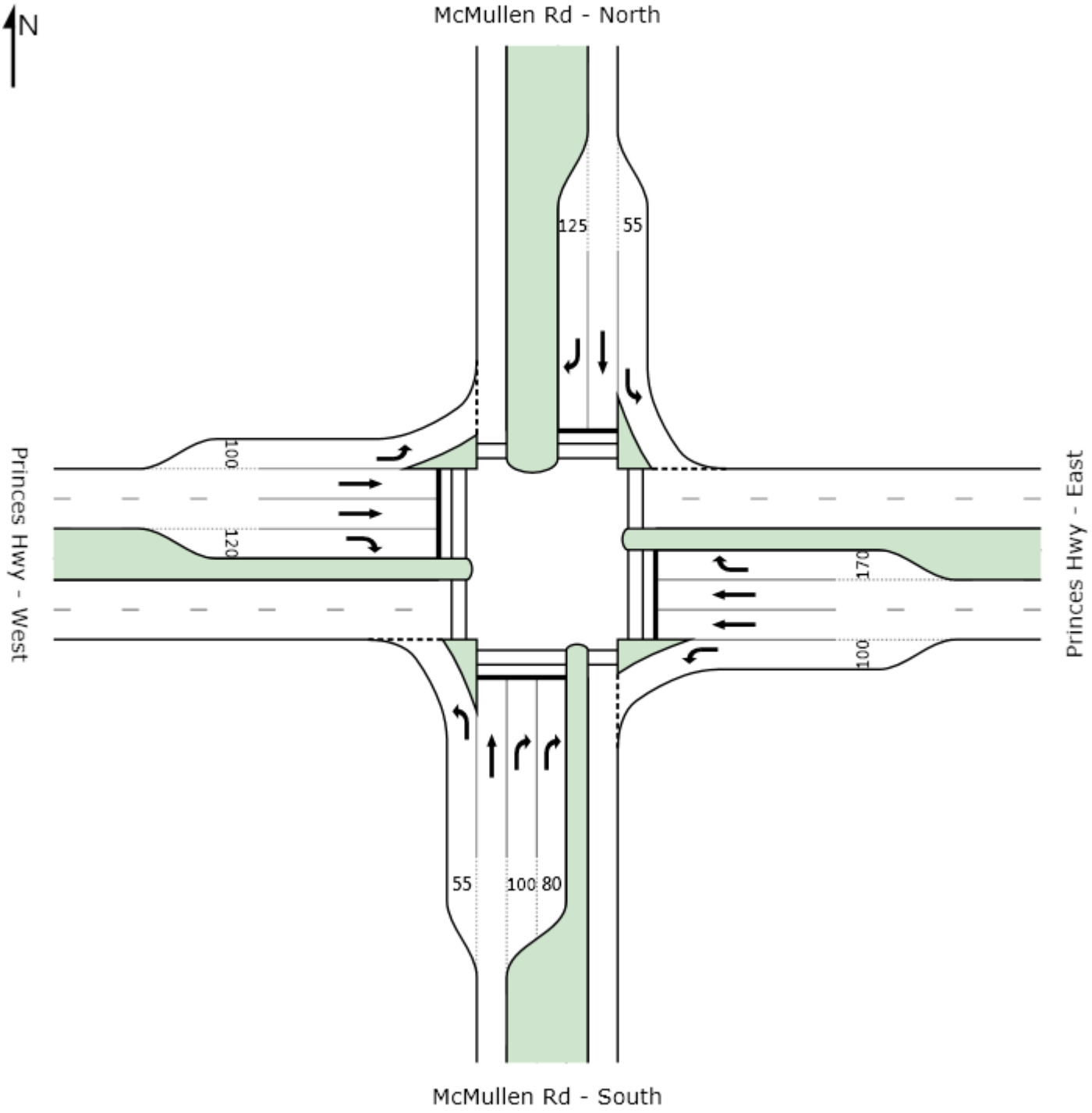
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	13	16	9	58
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	19	22	15	64
Phase Split	16 %	18 %	13 %	53 %






N
McMullen Rd - North
125
55
100
120
Princes Hwy - West
170
100
Princes Hwy - East
55
100
80
McMullen Rd - South

LANE SUMMARY

Intersection 622 - AM Peak - 27/07/11
Princes Hwy
McMullen Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: McMullen Rd - South																
Lane 1	33	0	0	33	5.0	327[1]	0.100	100	9.1	LOS A	0.1	1.0	55	Turn Bay	0.0	0.0
Lane 2	0	58	0	58	5.0	207	0.280	100	54.5	LOS A	3.1	22.7	220	–	0.0	0.0
Lane 3	0	0	72	72	5.0	106	0.677	100	72.5	LOS B	4.4	32.2	100	Turn Bay	0.0	0.0
Lane 4	0	0	72	72	5.0	106	0.677	100	72.5	LOS B	4.4	32.2	80	Turn Bay	0.0	0.0
Approach	33	58	143	234	5.0		0.677		59.2	LOS B	4.4	32.2				
East: Princes Hwy - East																
Lane 1	259	0	0	259	5.0	1333[1]	0.194	100	10.2	LOS A	0.6	4.2	100	Turn Bay	0.0	0.0
Lane 2	0	655	0	655	5.0	1018	0.644	100	15.1	LOS B	20.2	147.3	500	–	0.0	0.0
Lane 3	0	655	0	655	5.0	1018	0.644	100	15.1	LOS B	20.2	147.3	500	–	0.0	0.0
Lane 4	0	0	115	115	5.0	181	0.633	100	68.6	LOS B	6.7	48.7	170	Turn Bay	0.0	0.0
Approach	259	1311	115	1684	5.0		0.644		17.9	LOS B	20.2	147.3				
North: McMullen Rd - North																
Lane 1	148	0	0	148	5.0	327[1]	0.454	100	10.7	LOS A	1.3	9.3	55	Turn Bay	0.0	0.0
Lane 2	0	57	0	57	5.0	207	0.275	100	54.4	LOS A	3.1	22.3	500	–	0.0	0.0
Lane 3	0	0	65	65	5.0	106	0.618	100	71.8	LOS B	4.0	29.1	125	Turn Bay	0.0	0.0
Approach	148	57	65	271	5.0		0.618		34.6	LOS B	4.0	29.1				
West: Princes Hwy - West																
Lane 1	186	0	0	186	5.0	1333[1]	0.140	100	10.3	LOS A	0.5	3.4	100	Turn Bay	0.0	0.0
Lane 2	0	694	0	694	5.0	1018	0.682	100	15.5	LOS B	22.5	164.3	390	–	0.0	0.0
Lane 3	0	694	0	694	5.0	1018	0.682	100	15.5	LOS B	22.5	164.3	390	–	0.0	0.0
Lane 4	0	0	26	26	5.0	181	0.145	100	64.6	LOS A	1.4	10.2	120	Turn Bay	0.0	0.0
Approach	186	1388	26	1601	5.0		0.682		15.7	LOS B	22.5	164.3				
Intersection				3789	5.0		0.682		20.7	LOS B	22.5	164.3				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

LANE SUMMARY

Intersection 622 - PM Peak - 27/07/11
Princes Hwy
McMullen Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: McMullen Rd - South																
Lane 1	46	0	0	46	5.0	327[1]	0.142	100	19.6	LOS A	0.9	6.9	55	Turn Bay	0.0	0.0
Lane 2	0	73	0	73	5.0	207	0.351	100	55.0	LOS A	4.0	28.9	220	–	0.0	0.0
Lane 3	0	0	183	183	5.0	226	0.807	100	68.1	LOS C	11.1	81.1	100	Turn Bay	0.0	0.0
Lane 4	0	0	183	183	5.0	226	0.807	100	68.1	LOS C	11.1	81.1	80	Turn Bay	0.0	6.2
Approach	46	73	365	484	5.0		0.807		61.5	LOS C	11.1	81.1				
East: Princes Hwy - East																
Lane 1	201	0	0	201	5.0	1333[1]	0.151	100	10.2	LOS A	0.5	3.5	100	Turn Bay	0.0	0.0
Lane 2	0	748	0	748	5.0	890	0.841	100	27.1	LOS C	36.2	264.2	500	–	0.0	0.0
Lane 3	0	748	0	748	5.0	890	0.841	100	27.1	LOS C	36.2	264.2	500	–	0.0	0.0
Lane 4	0	0	148	148	5.0	181	0.819	100	73.1	LOS C	9.2	67.3	170	Turn Bay	0.0	0.0
Approach	201	1497	148	1846	5.0		0.841		29.0	LOS C	36.2	264.2				
North: McMullen Rd - North																
Lane 1	115	0	0	115	5.0	327[1]	0.351	100	17.3	LOS A	2.2	15.9	55	Turn Bay	0.0	0.0
Lane 2	0	74	0	74	5.0	207	0.356	100	55.1	LOS A	4.0	29.3	500	–	0.0	0.0
Lane 3	0	0	191	191	5.0	226	0.841	100	69.8	LOS C	11.9	86.5	125	Turn Bay	0.0	0.0
Approach	115	74	191	379	5.0		0.841		51.0	LOS C	11.9	86.5				
West: Princes Hwy - West																
Lane 1	65	0	0	65	5.0	1333[1]	0.049	100	10.4	LOS A	0.2	1.1	100	Turn Bay	0.0	0.0
Lane 2	0	695	0	695	5.0	890	0.781	100	23.3	LOS C	29.6	216.4	390	–	0.0	0.0
Lane 3	0	695	0	695	5.0	890	0.781	100	23.3	LOS C	29.6	216.4	390	–	0.0	0.0
Lane 4	0	0	53	53	5.0	181	0.291	100	65.8	LOS A	2.9	21.0	120	Turn Bay	0.0	0.0
Approach	65	1391	53	1508	5.0		0.781		24.3	LOS C	29.6	216.4				
Intersection				4218	5.0		0.841		33.0	LOS C	36.2	264.2				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

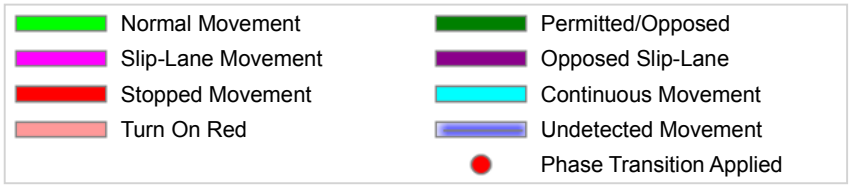
PHASING SUMMARY

Intersection 622 - AM Peak - 27/07/11
Princes Hwy
McMullen Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	7	13	12	64
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	13	19	18	70
Phase Split	11 %	16 %	15 %	58 %



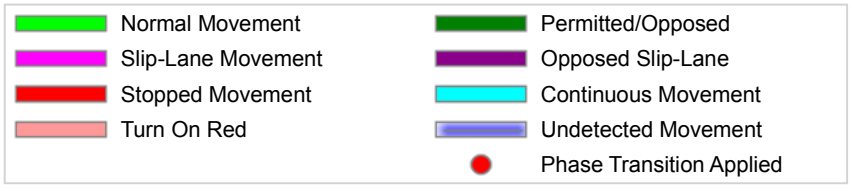
PHASING SUMMARY

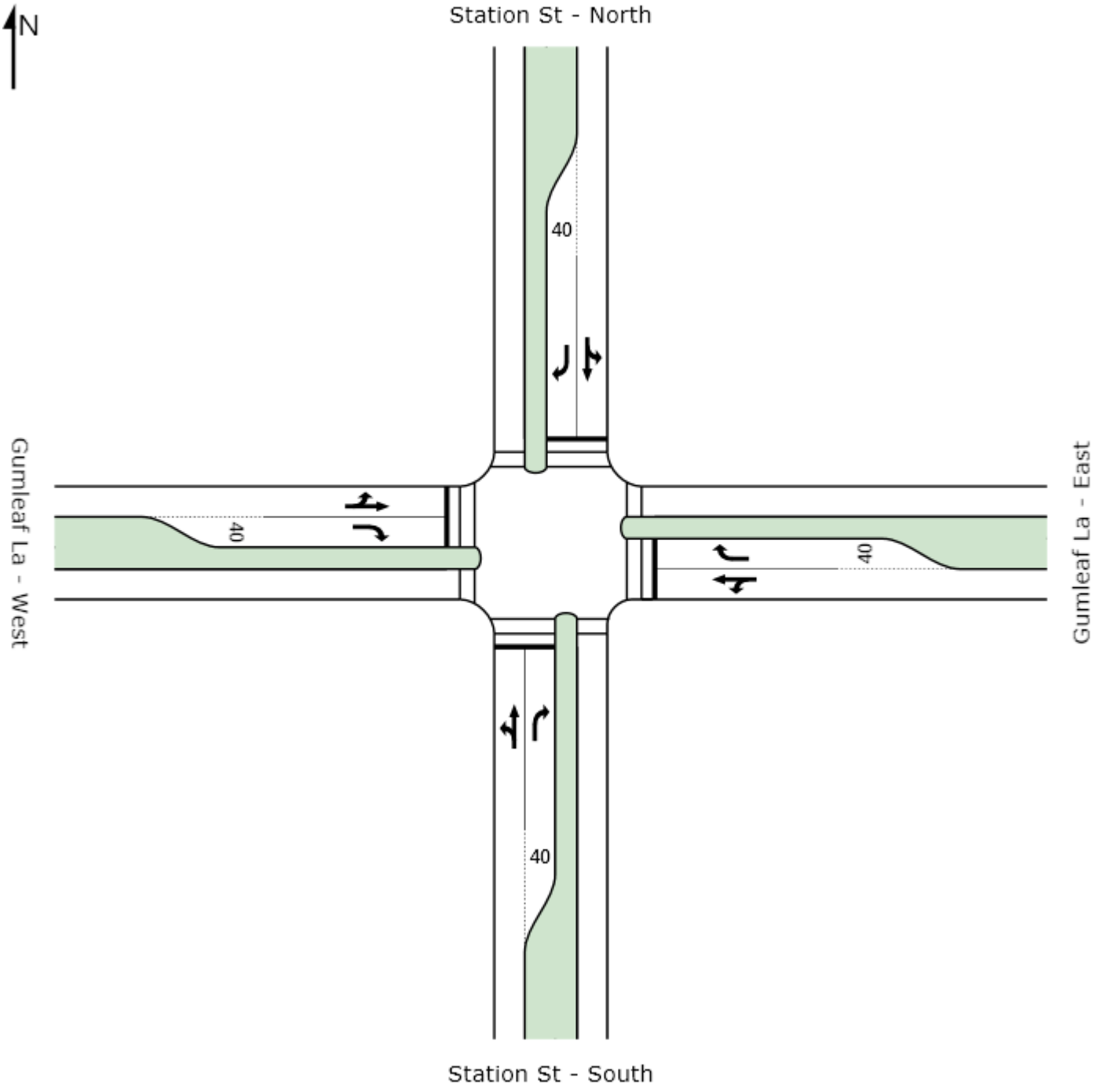
Intersection 622 - PM Peak - 27/07/11
Princes Hwy
McMullen Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	15	13	12	56
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	21	19	18	62
Phase Split	18 %	16 %	15 %	52 %




N
Station St - North
Gumleaf La - West
Gumleaf La - East
Station St - South
40
40
40
40

LANE SUMMARY

Intersection 43 - AM Peak - 27/07/11
Station St
Gumleaf La
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Station St - South																
Lane 1	158	258	0	416	5.0	545	0.762	100	45.5	LOS C	21.6	158.0	260	–	0.0	0.0
Lane 2	0	0	82	82	5.0	155[1]	0.529	100	63.2	LOS A	4.5	33.1	40	Turn Bay	0.0	0.0
Approach	158	258	82	498	5.0		0.762		48.4	LOS C	21.6	158.0				
East: Gumleaf La - East																
Lane 1	54	707	0	761	5.0	665	1.144	100	191.4	LOS F	93.4	681.7	250	–	0.0	99.9
Lane 2	0	0	42	42	5.0	91	0.465	100	71.5	LOS A	2.6	18.7	40	Turn Bay	0.0	0.0
Approach	54	707	42	803	5.0		1.144		185.1	LOS F	93.4	681.7				
North: Station St - North																
Lane 1	19	461	156[0]	636	5.0	548	1.160	100	209.9	LOS F	80.5	587.9	190	–	0.0	100.0
Lane 2	0	0	152	152	5.0	152[1]	1.000[3]	100	65.9[8]	LOS E[8]	8.9[8]	65.3[8]	40	Turn Bay	0.0	50.0
Approach	19	461	308	788	5.0		1.160		182.1	LOS F	80.5	587.9				
West: Gumleaf La - West																
Lane 1	67	307	0	375	5.0	661	0.567	100	33.3	LOS A	15.9	115.7	470	–	0.0	0.0
Lane 2	0	0	68	68	5.0	91	0.755	100	74.4	LOS C	4.3	31.7	40	Turn Bay	0.0	0.0
Approach	67	307	68	443	5.0		0.755		39.7	LOS C	15.9	115.7				
Intersection				2533	5.0		1.160		131.8	LOS F	93.4	681.7				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
1 Reduced capacity due to a short lane effect
3 x = 1.00 due to short lane.
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

LANE SUMMARY

Intersection 43 - PM Peak - 27/07/11
Station St
Gumleaf La
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Station St - South																
Lane 1	68	461	0	529	5.0	442	1.197	100	245.6	LOS F	71.9	524.5	260	–	0.0	70.2
Lane 2	0	0	54	54	5.0	91	0.593	100	72.6	LOS A	3.3	24.2	40	Turn Bay	0.0	0.0
Approach	68	461	54	583	5.0		1.197		229.6	LOS F	71.9	524.5				
East: Gumleaf La - East																
Lane 1	82	307	0	389	5.0	881	0.442	100	20.2	LOS A	11.7	85.7	250	–	0.0	0.0
Lane 2	0	0	19	19	5.0	91	0.209	100	70.0	LOS A	1.1	8.2	40	Turn Bay	0.0	0.0
Approach	82	307	19	408	5.0		0.442		22.5	LOS A	11.7	85.7				
North: Station St - North																
Lane 1	42	258	0	300	5.0	442	0.679	100	46.6	LOS B	15.5	113.1	190	–	0.0	0.0
Lane 2	0	0	67	67	5.0	91	0.744	100	74.4	LOS C	4.3	31.1	40	Turn Bay	0.0	0.0
Approach	42	258	67	367	5.0		0.744		51.7	LOS C	15.5	113.1				
West: Gumleaf La - West																
Lane 1	308	707	62[0]	1078	5.0	874	1.233	100	260.9	LOS F	159.1	1161.4	470	–	0.0	90.0
Lane 2	0	0	96	96	5.0	91	1.056	100	139.5	LOS F	8.9	64.7	40	Turn Bay	0.0	49.2
Approach	308	707	158	1174	5.0		1.233		251.0	LOS F	159.1	1161.4				
Intersection				2533	5.0		1.233		180.3	LOS F	159.1	1161.4				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane

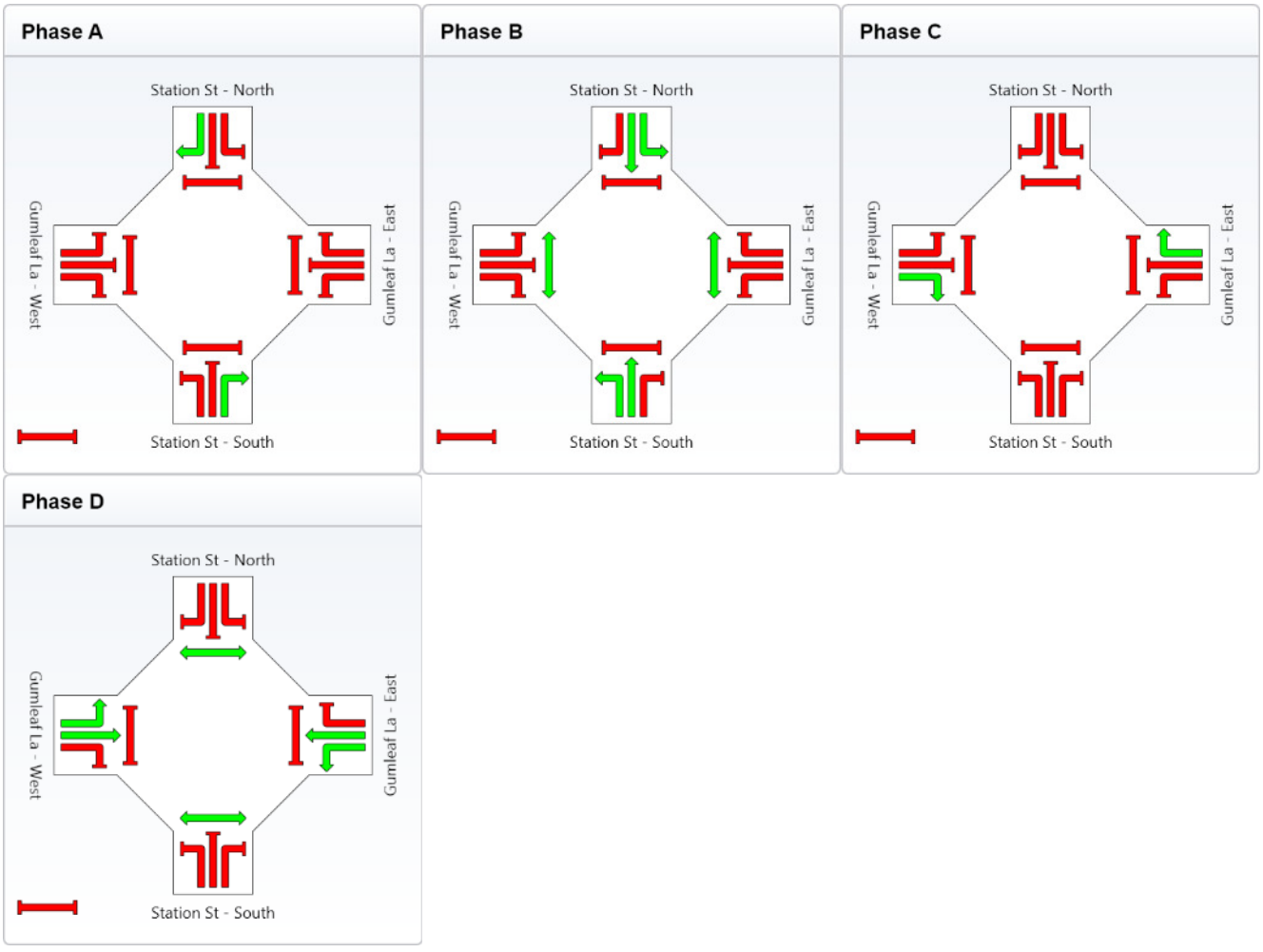
PHASING SUMMARY

Intersection 43 - AM Peak - 27/07/11
Station St
Gumleaf La
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	13	35	6	42
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	19	41	12	48
Phase Split	16 %	34 %	10 %	40 %



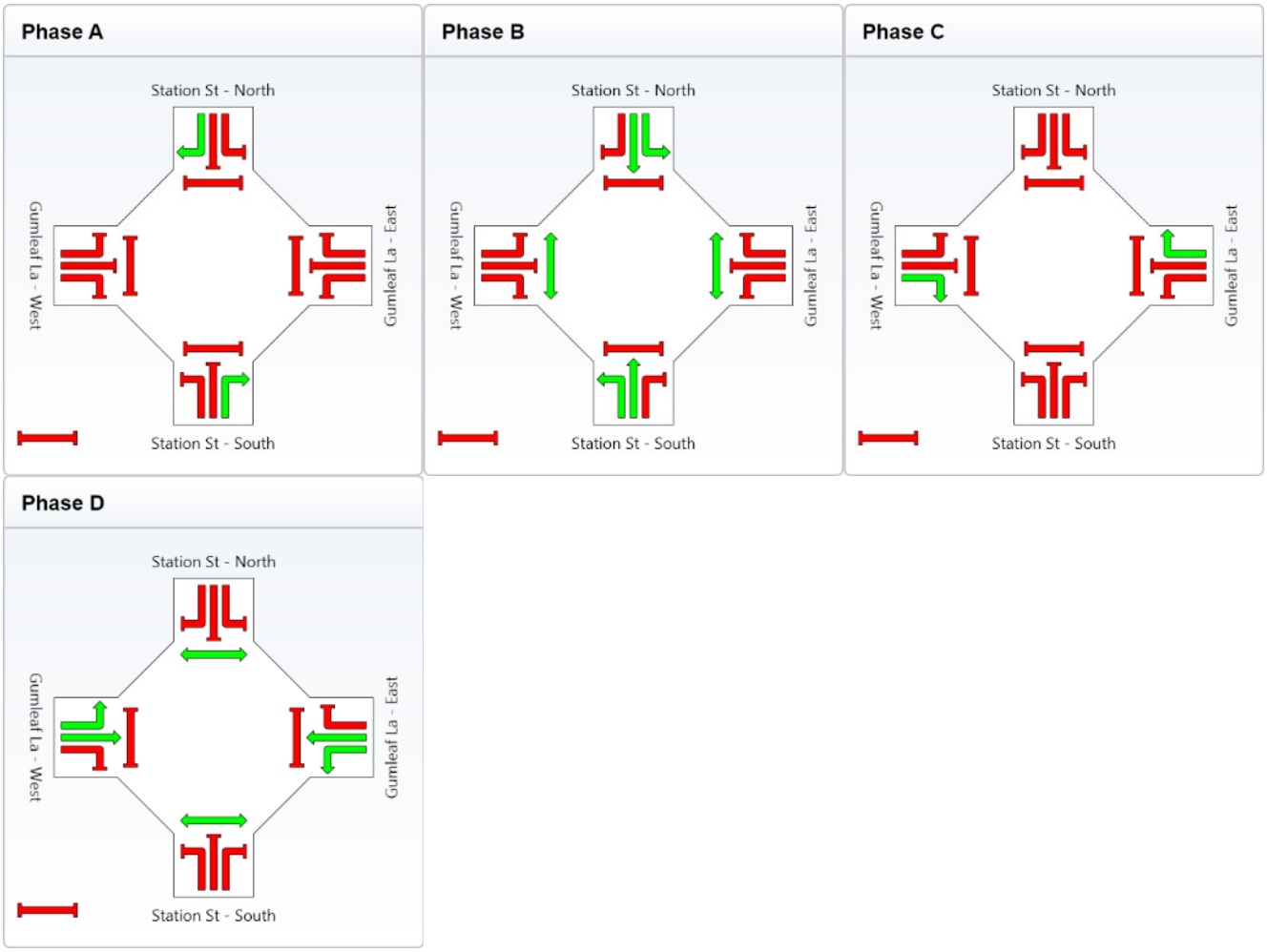
PHASING SUMMARY

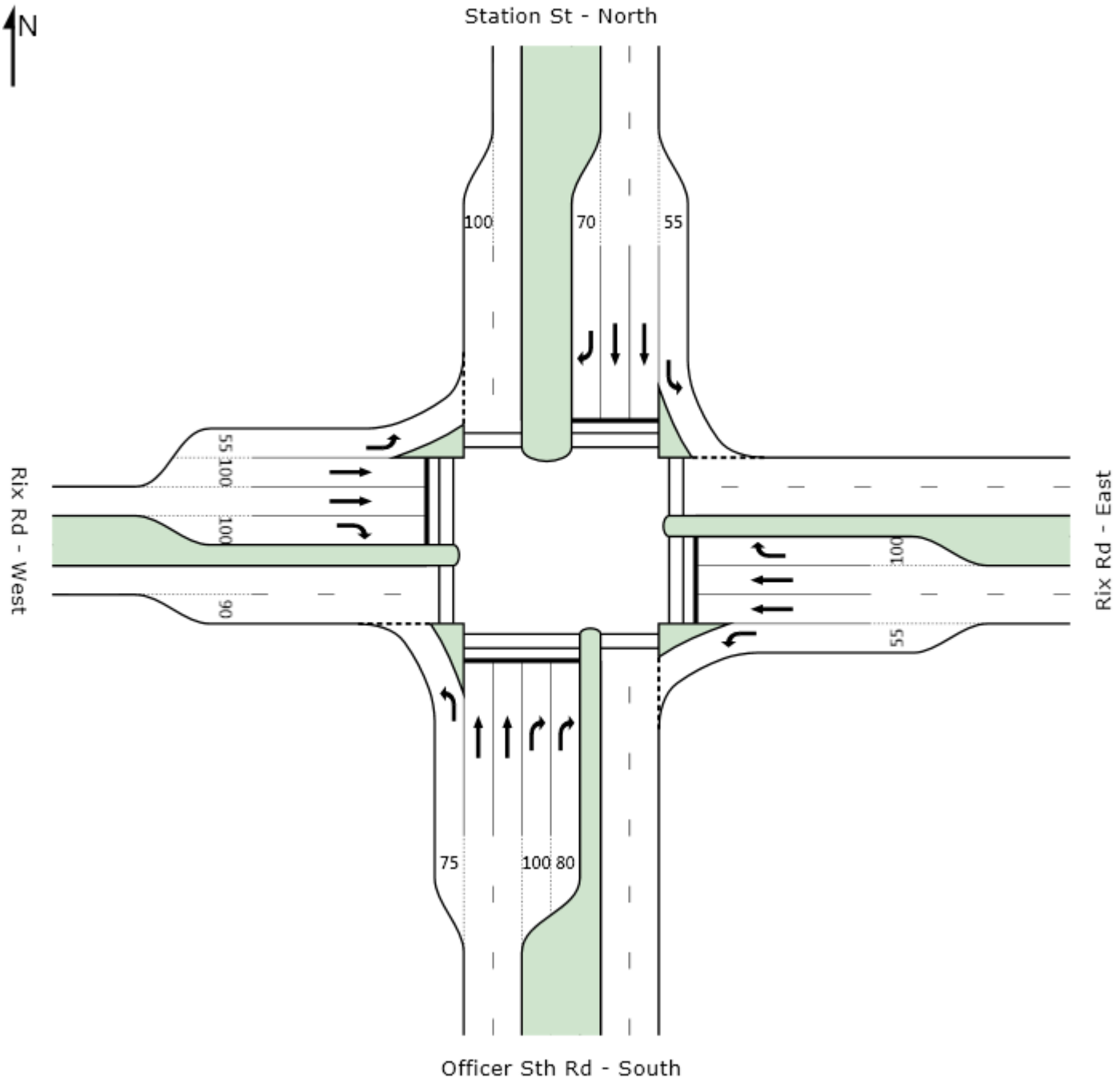
Intersection 43 - PM Peak - 27/07/11
Station St
Gumleaf La
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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	28	6	56
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	12	34	12	62
Phase Split	10 %	28 %	10 %	52 %




N
Station St - North
100
70
55
55
100
100
90
Rix Rd - West
100
55
Rix Rd - East
75
100
80
Officer Sth Rd - South

LANE SUMMARY

Intersection 1035 - AM Peak - 27/07/11
Officer Sth Rd
Rix Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	37	0	0	37	5.0	1057[1]	0.035	100	10.4	LOS A	0.1	0.6	75	Turn Bay	0.0	0.0
Lane 2	0	116	0	116	5.0	588	0.197	61[6]	32.0	LOS A	4.3	31.5	275	–	0.0	0.0
Lane 3	0	191	0	191	5.0	588	0.324	100	33.5	LOS A	7.6	55.1	275	–	0.0	0.0
Lane 4	0	0	117	117	5.0	272	0.432	100	61.1	LOS A	6.2	44.9	100	Turn Bay	0.0	0.0
Lane 5	0	0	117	117	5.0	272	0.432	100	61.1	LOS A	6.2	44.9	80	Turn Bay	0.0	0.0
Approach	37	306	235	578	5.0		0.432		42.9	LOS A	7.6	55.1				
East: Rix Rd - East																
Lane 1	374	0	0	374	5.0	838[1]	0.446	100	10.1	LOS A	1.4	10.3	55	Turn Bay	0.0	0.0
Lane 2	0	111	0	111	5.0	445	0.248	57[6]	40.4	LOS A	4.8	35.4	310	–	0.0	0.0
Lane 3	0	193	0	193	5.0	445	0.432	100	42.5	LOS A	9.0	65.9	310	–	0.0	0.0
Lane 4	0	0	12	12	5.0	196	0.059	100	61.8	LOS A	0.6	4.3	100	Turn Bay	0.0	0.0
Approach	374	303	12	688	5.0		0.446		24.9	LOS A	9.0	65.9				
North: Station St - North																
Lane 1	21	0	0	21	5.0	986[1]	0.021	100	10.4	LOS A	0.0	0.3	55	Turn Bay	0.0	0.0
Lane 2	0	257	0	257	5.0	588	0.437	100	34.9	LOS A	10.8	78.6	500	–	0.0	0.0
Lane 3	0	257	0	257	5.0	588	0.437	100	34.9	LOS A	10.8	78.6	500	–	0.0	0.0
Lane 4	0	0	67	67	5.0	272	0.248	100	59.4	LOS A	3.4	24.7	70	Turn Bay	0.0	0.0
Approach	21	514	67	602	5.0		0.437		36.8	LOS A	10.8	78.6				
West: Rix Rd - West																
Lane 1	89	0	0	89	5.0	1058[1]	0.085	100	9.6	LOS A	0.2	1.4	55	Turn Bay	0.0	0.0
Lane 2	0	133	0	133	5.0	420[1]	0.316	100	40.9	LOS A	5.9	43.3	100	Turn Bay	0.0	0.0
Lane 3	0	141	0	141	5.0	445	0.316	100	41.1	LOS A	6.3	46.1	500	–	0.0	0.0
Lane 4	0	0	86	86	5.0	196	0.440	100	65.1	LOS A	4.8	34.9	100	Turn Bay	0.0	0.0
Approach	89	274	86	449	5.0		0.440		39.4	LOS A	6.3	46.1				
Intersection				2318	5.0		0.446		35.3	LOS A	10.8	78.6				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 1035 - PM Peak - 27/07/11
Officer Sth Rd
Rix Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	86	0	0	86	5.0	1065[1]	0.081	100	10.5	LOS A	0.2	1.5	75	Turn Bay	0.0	0.0
Lane 2	0	268	0	268	5.0	747	0.359	61[6]	24.9	LOS A	9.2	66.8	275	–	0.0	0.0
Lane 3	0	442	0	442	5.0	747	0.592	100	27.9	LOS A	17.8	129.8	275	–	0.0	0.0
Lane 4	0	0	197	197	5.0	332	0.593	100	59.3	LOS A	10.4	75.8	100	Turn Bay	0.0	0.0
Lane 5	0	0	187	187	5.0	315[1]	0.593	100	59.0	LOS A	9.8	71.4	80	Turn Bay	0.0	0.0
Approach	86	711	384	1181	5.0		0.593		36.1	LOS A	17.8	129.8				
East: Rix Rd - East																
Lane 1	245	0	0	245	5.0	832[1]	0.295	100	9.8	LOS A	0.7	5.3	55	Turn Bay	0.0	0.0
Lane 2	0	110	0	110	5.0	334	0.329	57[6]	47.2	LOS A	5.4	39.5	310	–	0.0	0.0
Lane 3	0	191	0	191	5.0	334	0.573	100	49.7	LOS A	10.1	73.6	310	–	0.0	0.0
Lane 4	0	0	36	36	5.0	91	0.395	100	73.1	LOS A	2.2	15.7	100	Turn Bay	0.0	0.0
Approach	245	301	36	582	5.0		0.573		33.9	LOS A	10.1	73.6				
North: Station St - North																
Lane 1	26	0	0	26	5.0	903[1]	0.029	100	10.7	LOS A	0.1	0.5	55	Turn Bay	0.0	0.0
Lane 2	0	252	0	252	5.0	747	0.337	100	24.6	LOS A	8.5	61.7	500	–	0.0	0.0
Lane 3	0	252	0	252	5.0	747	0.337	100	24.6	LOS A	8.5	61.7	500	–	0.0	0.0
Lane 4	0	0	89	89	5.0	289[1]	0.310	100	55.9	LOS A	4.3	31.3	70	Turn Bay	0.0	0.0
Approach	26	503	89	619	5.0		0.337		28.5	LOS A	8.5	61.7				
West: Rix Rd - West																
Lane 1	67	0	0	67	5.0	679[1]	0.099	100	10.0	LOS A	0.2	1.3	55	Turn Bay	0.0	0.0
Lane 2	0	165	0	165	5.0	334	0.495	100	48.9	LOS A	8.5	62.2	100	Turn Bay	0.0	0.0
Lane 3	0	165	0	165	5.0	334	0.495	100	48.9	LOS A	8.5	62.2	500	–	0.0	0.0
Lane 4	0	0	37	37	5.0	91	0.407	100	73.2	LOS A	2.2	16.2	100	Turn Bay	0.0	0.0
Approach	67	331	37	435	5.0		0.495		44.9	LOS A	8.5	62.2				
Intersection				2817	5.0		0.593		35.3	LOS A	17.8	129.8				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

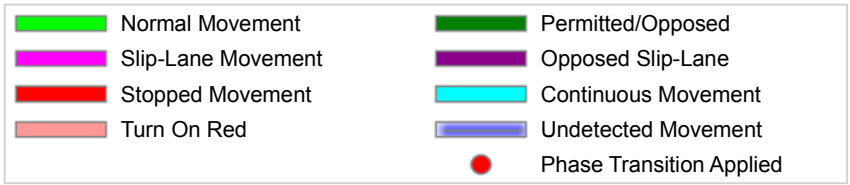
PHASING SUMMARY

Intersection 1035 - AM Peak - 27/07/11
Officer Sth Rd
Rix Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	13	28	18	37
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	19	34	24	43
Phase Split	16 %	28 %	20 %	36 %



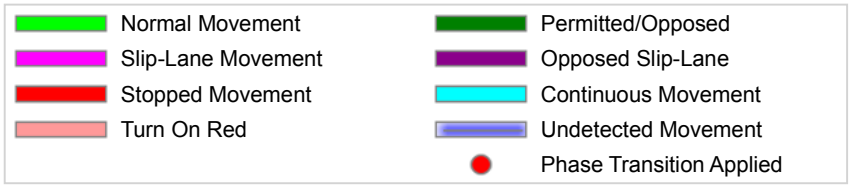
PHASING SUMMARY

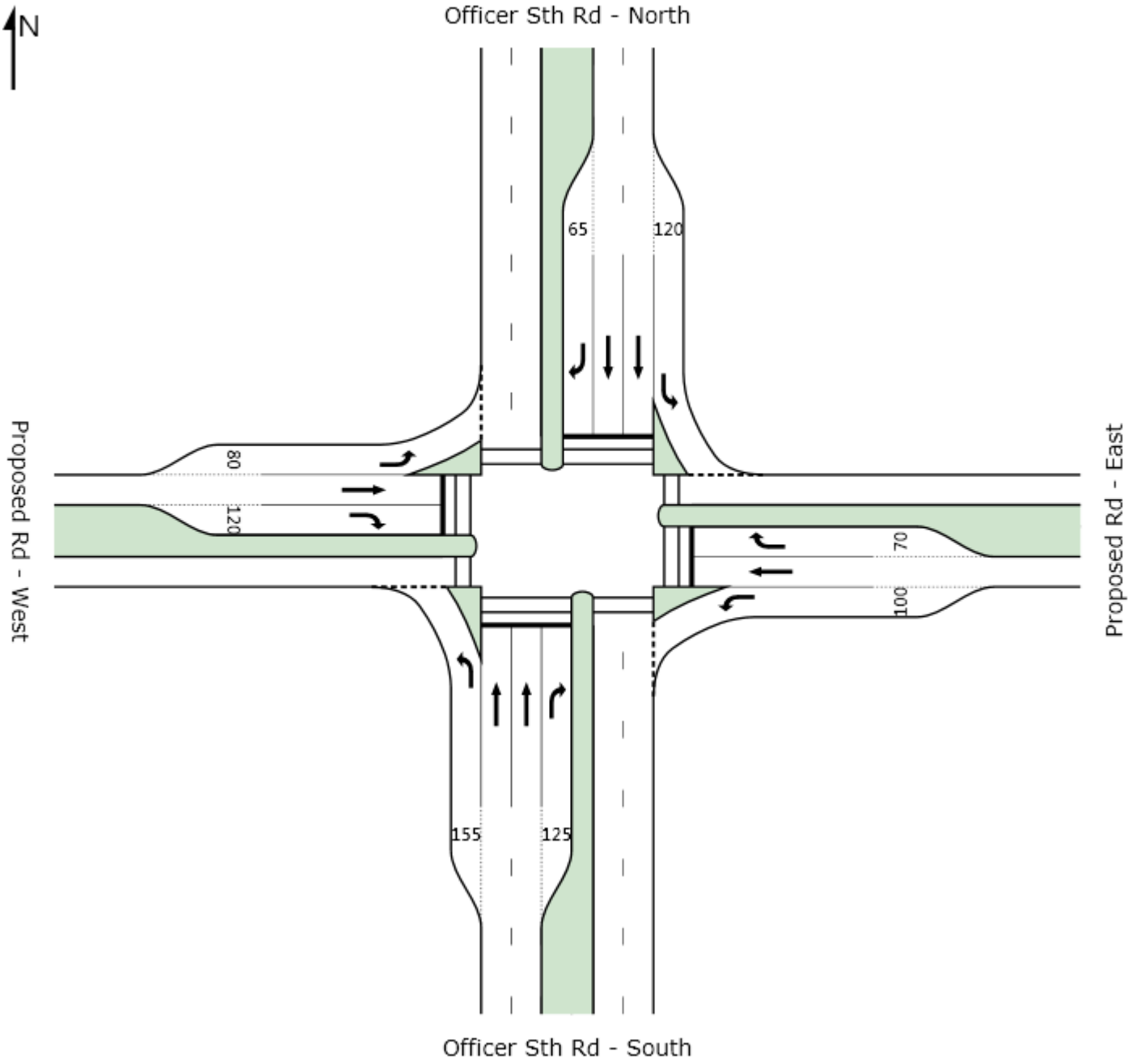
Intersection 1035 - PM Peak - 27/07/11
Officer Sth Rd
Rix Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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	21	22	47
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	12	27	28	53
Phase Split	10 %	23 %	23 %	44 %




N
Officer Sth Rd - North
65
120
Proposed Rd - West
80
120
Proposed Rd - East
70
100
155
125
Officer Sth Rd - South

LANE SUMMARY

Intersection 647 - AM Peak - 27/07/11
Officer Sth Rd
Proposed Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	209	0	0	209	5.0	1519	0.138	100	10.2	LOS A	0.5	3.3	155	Turn Bay	0.0	0.0
Lane 2	0	240	0	240	5.0	493	0.487	100	40.8	LOS A	11.1	81.1	260	–	0.0	0.0
Lane 3	0	240	0	240	5.0	493	0.487	100	40.8	LOS A	11.1	81.1	260	–	0.0	0.0
Lane 4	0	0	194	194	5.0	226	0.855	100	73.6	LOS C	12.2	88.9	125	Turn Bay	0.0	0.0
Approach	209	480	194	883	5.0		0.855		40.7	LOS C	12.2	88.9				
East: Proposed Rd - East																
Lane 1	465	0	0	465	5.0	616[1]	0.755	100	26.4	LOS C	15.6	113.8	100	Turn Bay	0.0	16.7
Lane 2	0	31	0	31	5.0	207	0.148	100	53.4	LOS A	1.6	11.7	290	–	0.0	0.0
Lane 3	0	0	15	15	5.0	196	0.075	100	58.8	LOS A	0.8	5.6	70	Turn Bay	0.0	0.0
Approach	465	31	15	511	5.0		0.755		29.0	LOS C	15.6	113.8				
North: Officer Sth Rd - North																
Lane 1	45	0	0	45	5.0	1322[1]	0.034	100	10.9	LOS A	0.1	0.7	120	Turn Bay	0.0	0.0
Lane 2	0	429	0	429	5.0	493	0.870	100	53.0	LOS C	26.0	189.6	275	–	0.0	0.0
Lane 3	0	429	0	429	5.0	493	0.870	100	53.0	LOS C	26.0	189.6	275	–	0.0	0.0
Lane 4	0	0	60	60	5.0	226	0.265	100	62.5	LOS A	3.1	22.9	65	Turn Bay	0.0	0.0
Approach	45	858	60	963	5.0		0.870		51.6	LOS C	26.0	189.6				
West: Proposed Rd - West																
Lane 1	87	0	0	87	5.0	1194[1]	0.073	100	8.1	LOS A	0.2	1.5	80	Turn Bay	0.0	0.0
Lane 2	0	40	0	40	5.0	588	0.068	100	31.8	LOS A	1.4	10.2	140	–	0.0	0.0
Lane 3	0	0	446	446	5.0	500[1]	0.893	100	59.0	LOS C	26.6	194.0	120	Turn Bay	0.0	49.1
Approach	87	40	446	574	5.0		0.893		49.3	LOS C	26.6	194.0				
Intersection				2931	5.0		0.893		44.0	LOS C	26.6	194.0				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

LANE SUMMARY

Intersection 647 - PM Peak - 27/07/11
Officer Sth Rd
Proposed Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	446	0	0	446	5.0	1499	0.298	100	10.3	LOS A	1.3	9.6	155	Turn Bay	0.0	0.0
Lane 2	0	533	0	533	5.0	906	0.588	100	19.6	LOS A	18.0	131.5	260	–	0.0	0.0
Lane 3	0	533	0	533	5.0	906	0.588	100	19.6	LOS A	18.0	131.5	260	–	0.0	0.0
Lane 4	0	0	476	476	5.0	549[1]	0.866	100	53.3	LOS C	25.7	187.8	125	Turn Bay	0.0	42.2
Approach	446	1065	476	1987	5.0		0.866		25.6	LOS C	25.7	187.8				
East: Proposed Rd - East																
Lane 1	204	0	0	204	5.0	930[1]	0.219	100	10.2	LOS A	2.2	15.9	100	Turn Bay	0.0	0.0
Lane 2	0	45	0	45	5.0	207	0.219	100	54.0	LOS A	2.4	17.5	290	–	0.0	0.0
Lane 3	0	0	45	45	5.0	196	0.231	100	60.3	LOS A	2.4	17.6	70	Turn Bay	0.0	0.0
Approach	204	45	45	295	5.0		0.231		24.6	LOS A	2.4	17.6				
North: Officer Sth Rd - North																
Lane 1	15	0	0	15	5.0	1016[1]	0.015	100	12.0	LOS A	0.1	0.5	120	Turn Bay	0.0	0.0
Lane 2	0	344	0	344	5.0	398	0.865	100	56.5	LOS C	21.1	153.8	275	–	0.0	0.0
Lane 3	0	344	0	344	5.0	398	0.865	100	56.5	LOS C	21.1	153.8	275	–	0.0	0.0
Lane 4	0	0	87	87	5.0	151	0.579	100	70.1	LOS A	5.1	37.4	65	Turn Bay	0.0	0.0
Approach	15	687	87	789	5.0		0.865		57.2	LOS C	21.1	153.8				
West: Proposed Rd - West																
Lane 1	60	0	0	60	5.0	780[1]	0.077	100	8.5	LOS A	0.2	1.1	80	Turn Bay	0.0	0.0
Lane 2	0	36	0	36	5.0	254	0.141	100	51.5	LOS A	1.8	13.1	140	–	0.0	0.0
Lane 3	0	0	209	209	5.0	242	0.867	100	71.0	LOS C	13.3	96.8	120	Turn Bay	0.0	0.0
Approach	60	36	209	305	5.0		0.867		56.4	LOS C	13.3	96.8				
Intersection				3377	5.0		0.867		35.7	LOS C	25.7	187.8				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

PHASING SUMMARY

Intersection 647 - AM Peak - 27/07/11
Officer Sth Rd
Proposed Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	37	13	15	31
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	43	19	21	37
Phase Split	36 %	16 %	18 %	31 %

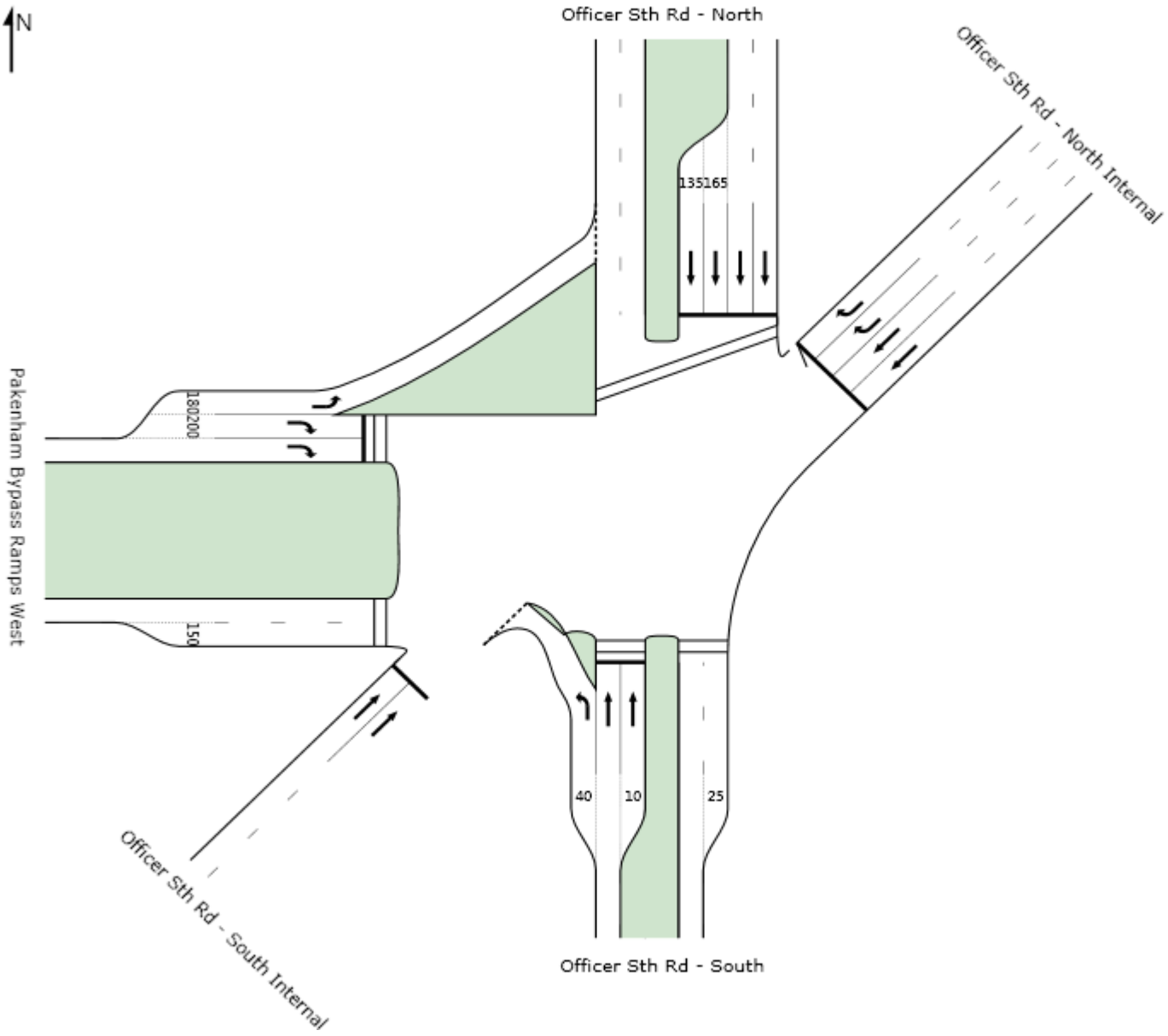
PHASING SUMMARY

Intersection 647 - PM Peak - 27/07/11
Officer Sth Rd
Proposed Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split phase
Input Sequence: A, B, C, C1, D
Output Sequence: A, B, C, C1, D

Phase Timing Results

Phase	A	B	C	C1	D
Green Time (sec)	16	13	10	26	25
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	22	19	16	32	31
Phase Split	18 %	16 %	13 %	27 %	26 %


N
Officer Sth Rd - North
Officer Sth Rd - North Internal
135
165
Pakenham Bypass Ramps West
180
200
150
40
10
25
Officer Sth Rd - South Internal
Officer Sth Rd - South

LANE SUMMARY

Site 1171 & 1172 - AM Peak - 27/07/11
Princes Freeway / Officer South Road

Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	298	0	0	298	5.0	352[1]	0.846	100	33.6	LOS C	7.9	57.6	40	Turn Bay	0.0	38.3
Lane 2	0	129	0	129	5.0	159	0.813	100	70.1	LOS C	8.1	58.8	500	–	0.0	0.0
Lane 3	0	33	0	33	5.0	40[1]	0.813	100	69.3	LOS C	1.9	14.1	10	Turn Bay	0.0	36.3
Approach	298	162	0	460	5.0		0.846		46.4	LOS C	8.1	58.8				
North East: Officer Sth Rd - North Internal																
Lane 1	0	337	0	337	5.0	1049	0.321	35[6]	1.7	LOS A	1.4	10.2	70	–	0.0	0.0
Lane 2	0	962	0	962	5.0	1049	0.917	100	6.9	LOS D	24.7	180.4	70	–	0.0	94.2
Lane 3	0	0	596	596	5.0	755	0.789	97[6]	32.8	LOS C	28.0	204.3	70	–	0.0	100.0
Lane 4	0	0	615	615	5.0	755	0.814	100	34.5	LOS C	30.2	220.7	70	–	0.0	100.0
Approach	0	1299	1211	2509	5.0		0.917		19.1	LOS D	30.2	220.7				
North: Officer Sth Rd - North																
Lane 1	0	141	0	141	5.0	1049	0.135	25[6]	15.3	LOS A	2.4	17.5	260	–	0.0	0.0
Lane 2	0	574	0	574	5.0	1049	0.547	100	18.4	LOS A	14.8	107.7	260	–	0.0	0.0
Lane 3	0	544	0	544	5.0	995[1]	0.547	100	18.1	LOS A	13.5	98.7	165	Turn Bay	0.0	0.0
Lane 4	0	497	0	497	5.0	908[1]	0.547	100	17.7	LOS A	11.7	85.4	135	Turn Bay	0.0	0.0
Approach	0	1757	0	1757	5.0		0.547		17.9	LOS A	14.8	107.7				
West: Pakenham Bypass Ramps West																
Lane 1	731	0	0	731	5.0	1400[1]	0.522	100	12.4	LOS A	6.4	46.5	180	Turn Bay	0.0	0.0
Lane 2	0	0	182	182	5.0	634	0.287	32[6]	39.8	LOS A	7.6	55.8	200	Turn Bay	0.0	0.0
Lane 3	0	0	571	571	5.0	634	0.900	100	63.3	LOS C	37.6	274.5	250	–	0.0	13.5
Approach	731	0	753	1483	5.0		0.900		35.3	LOS C	37.6	274.5				
South West: Officer Sth Rd - South Internal																
Lane 1	0	81	0	81	5.0	159	0.510	100	53.9	LOS A	4.5	33.0	70	–	0.0	0.0
Lane 2	0	81	0	81	5.0	159	0.510	100	53.9	LOS A	4.5	33.0	70	–	0.0	0.0
Approach	0	162	0	162	5.0		0.510		53.9	LOS A	4.5	33.0				
Intersection				6372	5.0		0.917		25.4	LOS D	37.6	274.5				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site 1171 & 1172 - PM Peak - 27/07/11
Princes Freeway / Officer South Road

Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	598	0	0	598	5.0	598[1]	1.000[3]	100	23.9[8]	LOS E[8]	8.9[8]	65.3[8]	40	Turn Bay	0.0	50.0
Lane 2	155[0]	671	0	826	5.0	913	0.904	100	39.6	LOS D	47.2	344.4	500	–	0.0	0.0
Lane 3	0	92	0	92	5.0	102[1]	0.904	100	41.6[8]	LOS D[8]	2.2[8]	16.3[8]	10	Turn Bay	0.0	50.0
Approach	753	763	0	1516	5.0		1.000		33.5	LOS E	47.2	344.4				
North East: Officer Sth Rd - North Internal																
Lane 1	0	175	0	175	5.0	1447	0.121	35[6]	0.8	LOS A	0.6	4.1	70	–	0.0	0.0
Lane 2	0	501	0	501	5.0	1447	0.346	100	1.0	LOS A	2.1	15.6	70	–	0.0	0.0
Lane 3	0	0	360	360	5.0	408	0.882	97[6]	60.8	LOS C	22.5	164.6	70	–	0.0	85.1
Lane 4	0	0	371	371	5.0	408	0.910	100	64.9	LOS D	24.4	177.9	70	–	0.0	92.8
Approach	0	677	731	1407	5.0		0.910		33.1	LOS D	24.4	177.9				
North: Officer Sth Rd - North																
Lane 1	0	84	0	84	5.0	1447	0.058	25[6]	6.7	LOS A	0.3	1.8	260	–	0.0	0.0
Lane 2	0	342	0	342	5.0	1447	0.236	100	6.9	LOS A	1.3	9.2	260	–	0.0	0.0
Lane 3	0	342	0	342	5.0	1447	0.236	100	6.9	LOS A	1.3	9.2	165	Turn Bay	0.0	0.0
Lane 4	0	342	0	342	5.0	1447	0.236	100	6.9	LOS A	1.3	9.2	135	Turn Bay	0.0	0.0
Approach	0	1109	0	1109	5.0		0.236		6.9	LOS A	1.3	9.2				
West: Pakenham Bypass Ramps West																
Lane 1	1211	0	0	1211	5.0	1348[1]	0.898	100	17.4[8]	LOS C[8]	40.2[8]	293.8[8]	180	Turn Bay	0.0	50.0
Lane 2	0	0	72	72	5.0	257	0.281	32[6]	60.2	LOS A	3.9	28.1	200	Turn Bay	0.0	0.0
Lane 3	0	0	226	226	5.0	257	0.880	100	75.5	LOS C	14.9	108.8	250	–	0.0	0.0
Approach	1211	0	298	1508	5.0		0.898		28.1	LOS C	40.2	293.8				
South West: Officer Sth Rd - South Internal																
Lane 1	0	382	0	382	5.0	922	0.414	100	2.1	LOS A	1.8	13.2	70	–	0.0	0.0
Lane 2	0	382	0	382	5.0	922	0.414	100	2.1	LOS A	1.8	13.2	70	–	0.0	0.0
Approach	0	763	0	763	5.0		0.414		2.1	LOS A	1.8	13.2				
Intersection				6304	5.0		1.000		23.7	LOS E	47.2	344.4				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
1 Reduced capacity due to a short lane effect
3 x = 1.00 due to short lane.
6 Lane underutilisation due to downstream effects
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

PHASING SUMMARY

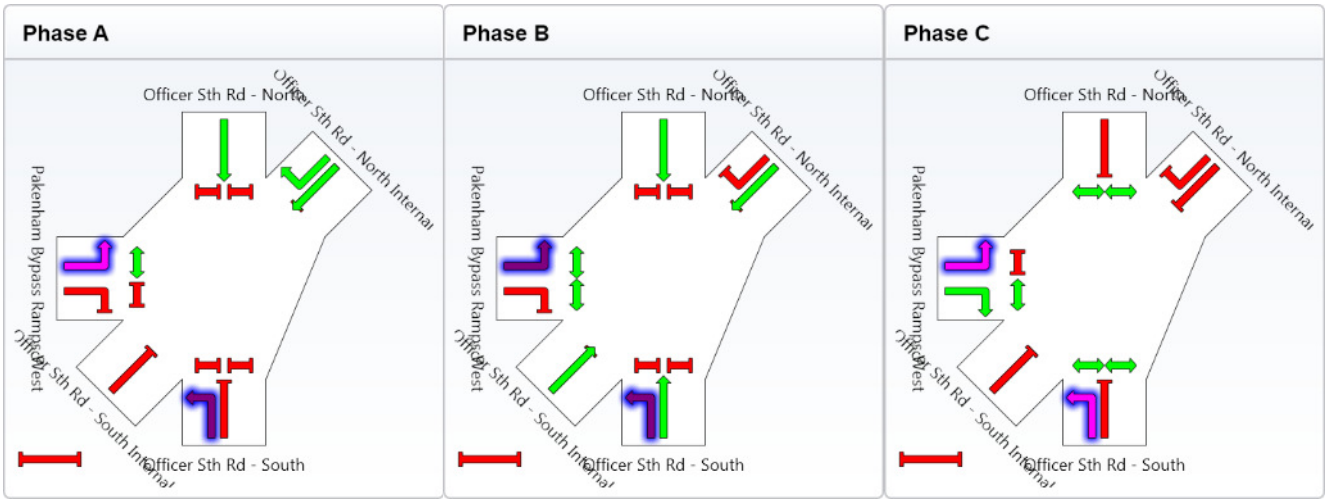
Site 1171 & 1172 - AM Peak - 27/07/11
Princes Freeway / Officer South Road

Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C
Green Time (sec)	50	10	42
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	56	16	48
Phase Split	47 %	13 %	40 %



PHASING SUMMARY

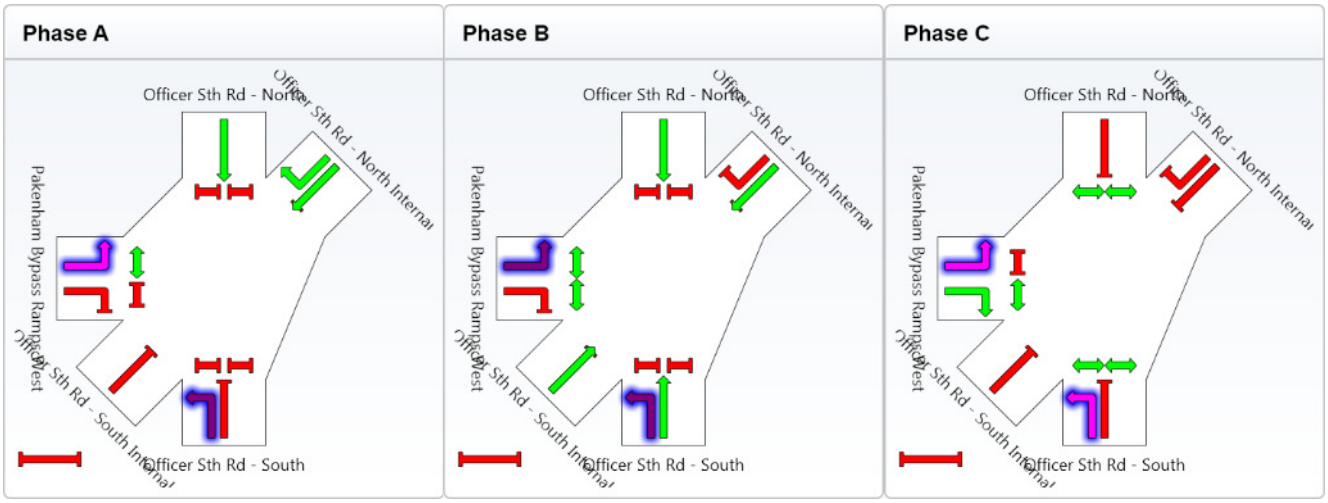
Site 1171 & 1172 - PM Peak - 27/07/11
Princes Freeway / Officer South Road

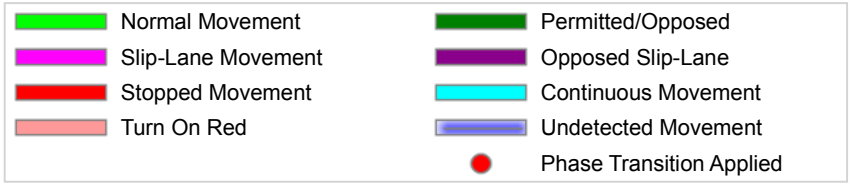
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

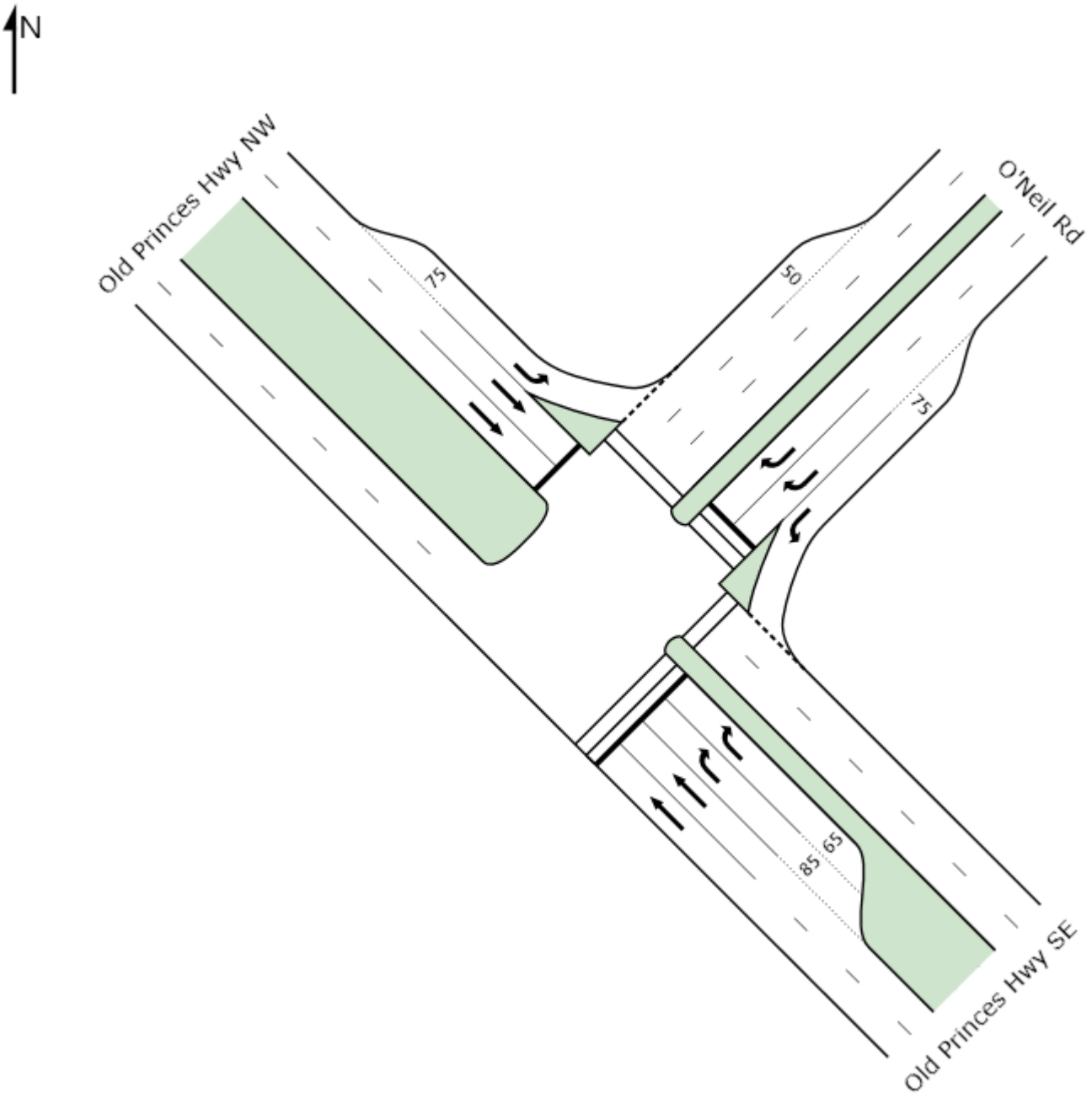
Phase times determined by the program
Sequence: Interchange
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	27	58	17
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	33	64	23
Phase Split	28 %	53 %	19 %






N
Old Princes Hwy NW
O'Neill Rd
Old Princes Hwy SE
75
50
75
85
65

LANE SUMMARY

Intersection 591 - AM Peak - 25/05/11
O'Neil Rd
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South East: Old Princes Hwy SE																
Lane 1	0	507	0	507	5.0	1113	0.456	100	9.2	LOS A	10.1	73.4	250	–	0.0	0.0
Lane 2	0	507	0	507	5.0	1113	0.456	100	9.2	LOS A	10.1	73.4	250	–	0.0	0.0
Lane 3	0	0	232	232	5.0	372[1]	0.623	100	51.0	LOS B	10.8	78.8	85	Turn Bay	0.0	0.0
Lane 4	0	0	188	188	5.0	302[1]	0.623	100	49.9	LOS B	8.4	61.5	65	Turn Bay	0.0	0.0
Approach	0	1015	420	1435	5.0		0.623		21.3	LOS B	10.8	78.8				
North East: O'Neil Rd																
Lane 1	376	0	0	376	5.0	948[1]	0.396	100	8.6	LOS A	1.6	11.6	75	Turn Bay	0.0	0.0
Lane 2	0	0	357	357	5.0	574	0.622	100	44.1	LOS B	16.4	119.7	100	–	0.0	21.3
Lane 3	0	0	357	357	5.0	574	0.622	100	44.1	LOS B	16.4	119.7	100	–	0.0	21.3
Approach	376	0	714	1089	5.0		0.622		31.9	LOS B	16.4	119.7				
North West: Old Princes Hwy NW																
Lane 1	325	0	0	325	5.0	1000[1]	0.325	100	10.5	LOS A	1.1	7.9	75	Turn Bay	0.0	0.0
Lane 2	0	326	0	326	5.0	525	0.621	100	41.1	LOS B	15.7	114.6	430	–	0.0	0.0
Lane 3	0	326	0	326	5.0	525	0.621	100	41.1	LOS B	15.7	114.6	430	–	0.0	0.0
Approach	325	652	0	977	5.0		0.621		30.9	LOS B	15.7	114.6				
Intersection				3501	5.0		0.623		27.3	LOS B	16.4	119.7				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

Project: I:\Projects\3004608 - Officer Precinct Structure Plan - Cardinia\Engineering\Transport & Traffic\SIDRA Assessment\VISSIM (Run 2011 25May)-Ultimate2031-AM&PM\Revised_110412 (FinalUltimate)\591.sip
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LANE SUMMARY

Intersection 591 - PM Peak - 25/05/11
O'Neil Rd
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South East: Old Princes Hwy SE																
Lane 1	0	402	0	402	5.0	1304	0.308	100	2.6	LOS A	2.9	20.8	250	–	0.0	0.0
Lane 2	0	402	0	402	5.0	1304	0.308	100	2.6	LOS A	2.9	20.8	250	–	0.0	0.0
Lane 3	0	0	206	206	5.0	317	0.649	100	60.7	LOS B	11.1	81.2	85	Turn Bay	0.0	0.9
Lane 4	0	0	170	170	5.0	262[1]	0.649	100	59.8	LOS B	8.9	65.3	65	Turn Bay	0.0	5.4
Approach	0	804	376	1180	5.0		0.649		21.0	LOS B	11.1	81.2				
North East: O'Neil Rd																
Lane 1	420	0	0	420	5.0	606[1]	0.693	100	10.7	LOS B	3.5	25.6	75	Turn Bay	0.0	0.0
Lane 2	0	0	163	163	5.0	393	0.414	100	51.5	LOS A	7.8	56.7	100	–	0.0	0.0
Lane 3	0	0	163	163	5.0	393	0.414	100	51.5	LOS A	7.8	56.7	100	–	0.0	0.0
Approach	420	0	325	745	5.0		0.693		28.5	LOS B	7.8	56.7				
North West: Old Princes Hwy NW																
Lane 1	714	0	0	714	5.0	1361[1]	0.524	100	11.0	LOS A	3.0	21.6	75	Turn Bay	0.0	0.0
Lane 2	0	591	0	591	5.0	875	0.676	100	22.5	LOS B	22.7	165.8	430	–	0.0	0.0
Lane 3	0	591	0	591	5.0	875	0.676	100	22.5	LOS B	22.7	165.8	430	–	0.0	0.0
Approach	714	1182	0	1896	5.0		0.676		18.2	LOS B	22.7	165.8				
Intersection				3821	5.0		0.693		21.0	LOS B	22.7	165.8				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

Project: I:\Projects\3004608 - Officer Precinct Structure Plan - Cardinia\Engineering\Transport & Traffic\SIDRA Assessment\VISSIM (Run 2011 25May)-Ultimate2031-AM&PM\Revised_110412 (FinalUltimate)\591.sip
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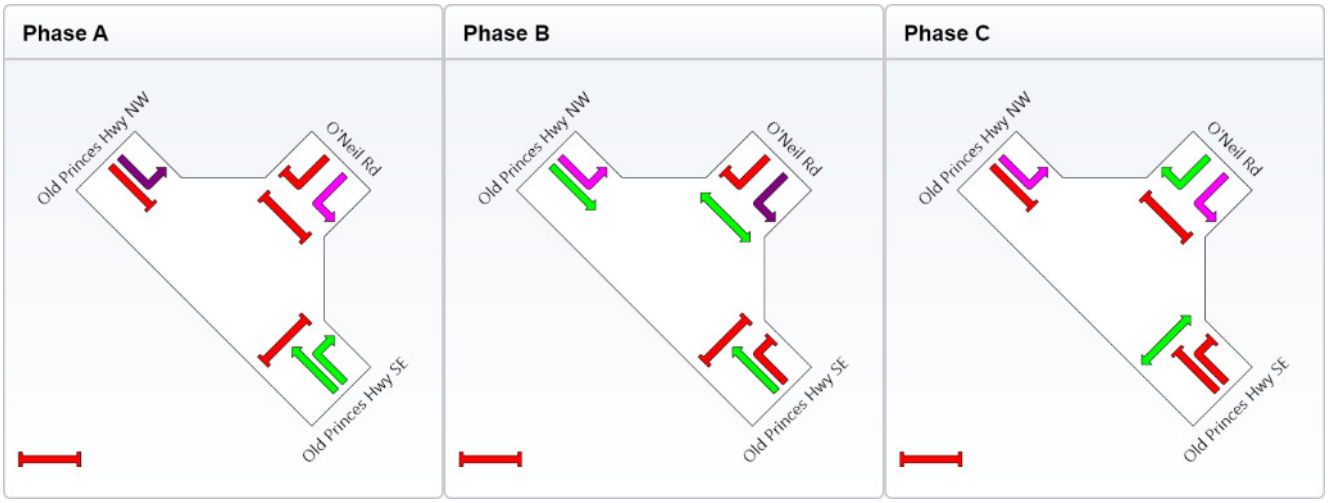
PHASING SUMMARY

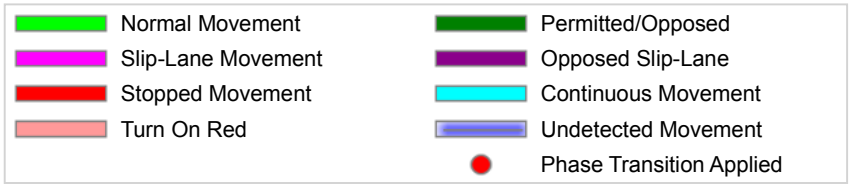
Intersection 591 - AM Peak - 25/05/11
O'Neil Rd
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C
Green Time (sec)	31	33	38
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	37	39	44
Phase Split	31 %	33 %	37 %





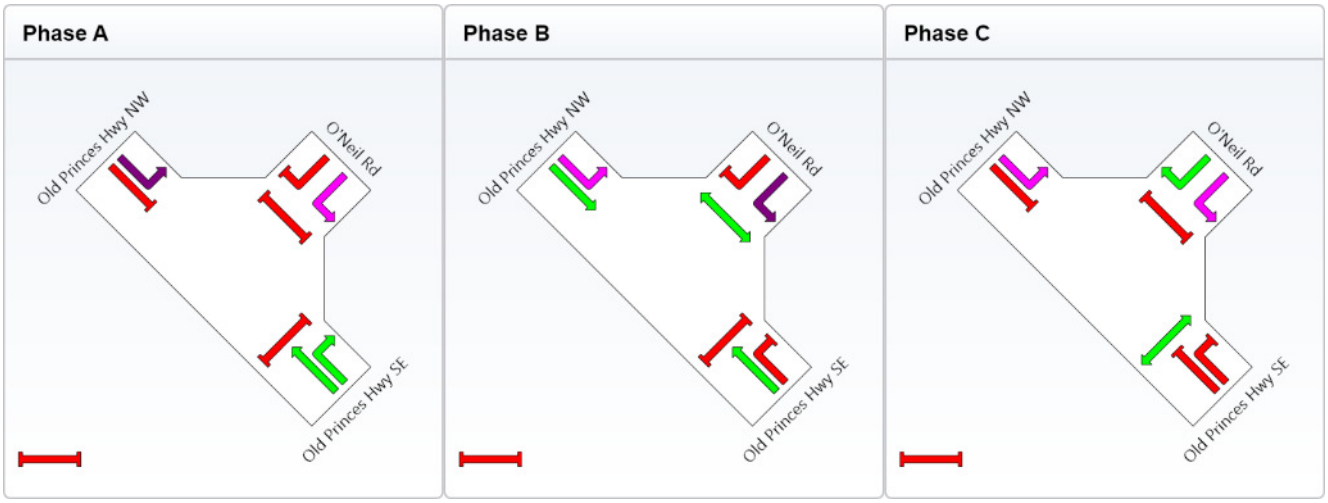
PHASING SUMMARY

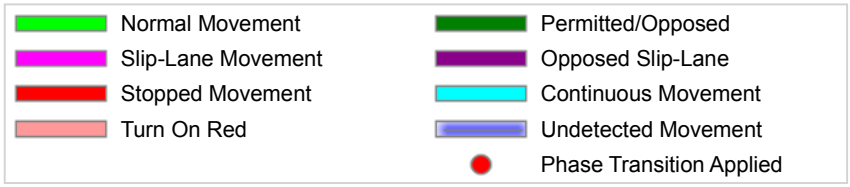
Intersection 591 - PM Peak - 25/05/11
O'Neil Rd
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

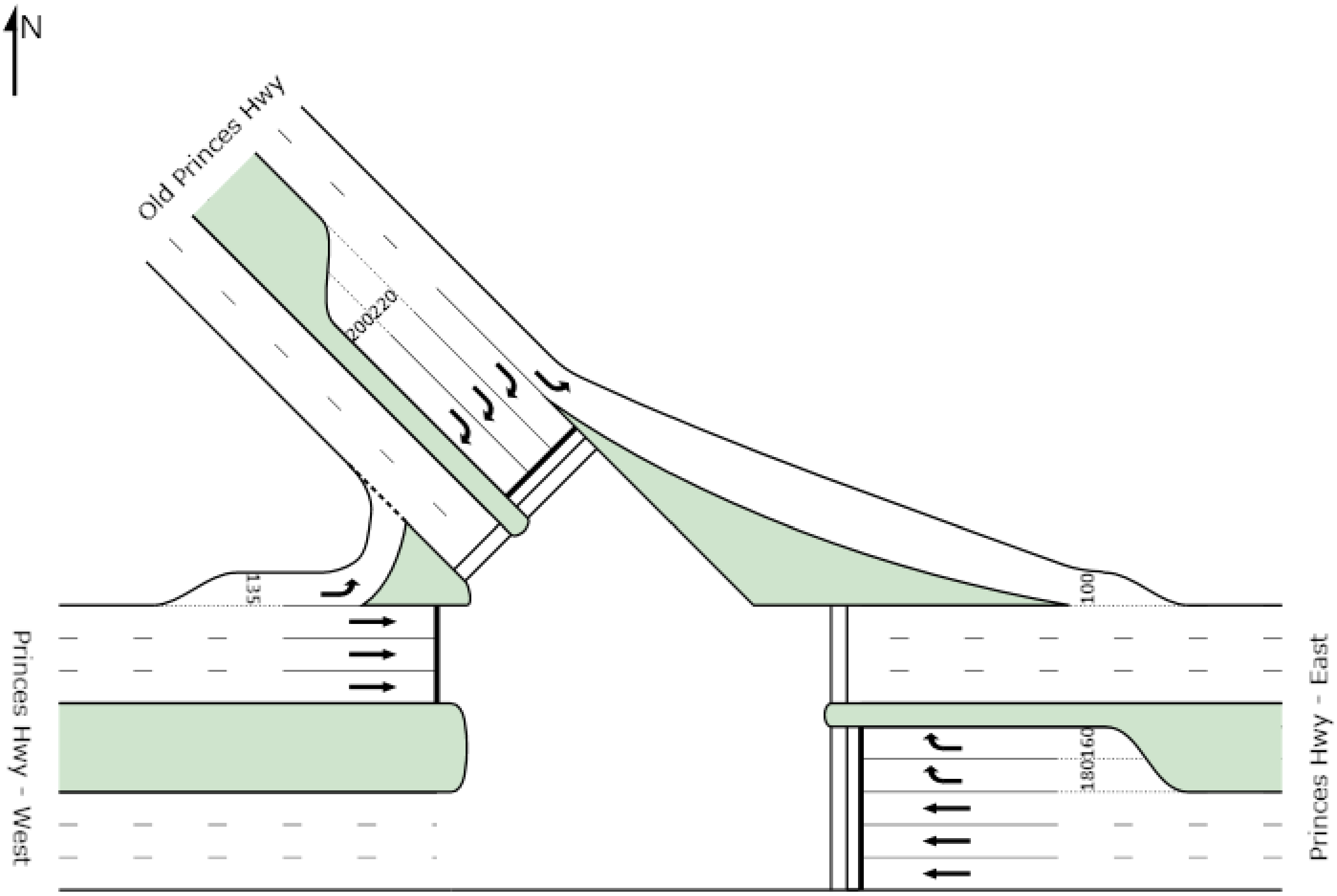
Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	21	55	26
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	27	61	32
Phase Split	23 %	51 %	27 %







N
Old Princes Hwy
200220
135
100
180160
Princes Hwy - West
Princes Hwy - East

LANE SUMMARY

Intersection 593 / 595 - AM Peak - 25/05/11
Princes Hwy
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
East: Princes Hwy - East																
Lane 1	0	754	0	754	5.0	1415	0.533	100	1.6	LOS A	4.4	32.0	500	–	0.0	0.0
Lane 2	0	754	0	754	5.0	1415	0.533	100	1.6	LOS A	4.4	32.0	500	–	0.0	0.0
Lane 3	0	754	0	754	5.0	1415	0.533	100	1.6	LOS A	4.4	32.0	500	–	0.0	0.0
Lane 4	0	0	357	357	5.0	438	0.816	100	59.0	LOS C	20.5	149.7	180	Turn Bay	0.0	0.0
Lane 5	0	0	357	357	5.0	438	0.816	100	59.0	LOS C	20.5	149.7	160	Turn Bay	0.0	0.0
Approach	0	2263	715	2978	5.0		0.816		15.3	LOS C	20.5	149.7				
North West: Old Princes Hwy																
Lane 1	337	0	0	337	5.0	1812	0.186	100	9.6	X	X	X	250	–	0.0	X
Lane 2	0	0	228	228	5.0	287	0.796	100	69.3	LOS C	13.5	98.9	250	–	0.0	0.0
Lane 3	0	0	228	228	5.0	287	0.796	100	69.3	LOS C	13.5	98.9	220	Turn Bay	0.0	0.0
Lane 4	0	0	228	228	5.0	287	0.796	100	69.3	LOS C	13.5	98.9	200	Turn Bay	0.0	0.0
Approach	337	0	685	1022	5.0		0.796		49.6	LOS C	13.5	98.9				
West: Princes Hwy - West																
Lane 1	724	0	0	724	5.0	1293	0.560	100	14.5	LOS A	3.3	23.8	135	Turn Bay	0.0	0.0
Lane 2	0	712	0	712	5.0	859	0.829	100	28.0	LOS C	34.2	250.0	500	–	0.0	0.0
Lane 3	0	712	0	712	5.0	859	0.829	100	28.0	LOS C	34.2	250.0	500	–	0.0	0.0
Lane 4	0	712	0	712	5.0	859	0.829	100	28.0	LOS C	34.2	250.0	500	–	0.0	0.0
Approach	724	2135	0	2859	5.0		0.829		24.6	LOS C	34.2	250.0				
Intersection				6859	5.0		0.829		24.3	LOS C	34.2	250.0				

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

LANE SUMMARY

Intersection 593 / 595 - PM Peak - 25/05/11
Princes Hwy
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
East: Princes Hwy - East																
Lane 1	0	903	0	903	5.0	1415	0.638	100	1.8	LOS B	6.6	48.0	500	–	0.0	0.0
Lane 2	0	903	0	903	5.0	1415	0.638	100	1.8	LOS B	6.6	48.0	500	–	0.0	0.0
Lane 3	0	903	0	903	5.0	1415	0.638	100	1.8	LOS B	6.6	48.0	500	–	0.0	0.0
Lane 4	0	0	245	245	5.0	272	0.901	100	74.0	LOS D	16.0	117.0	180	Turn Bay	0.0	0.0
Lane 5	0	0	245	245	5.0	272	0.901	100	74.0	LOS D	16.0	117.0	160	Turn Bay	0.0	0.0
Approach	0	2709	489	3199	5.0		0.901		12.8	LOS D	16.0	117.0				
North West: Old Princes Hwy																
Lane 1	882	0	0	882	5.0	1812	0.487	100	9.6	X	X	X	250	–	0.0	X
Lane 2	0	0	241	241	5.0	287	0.842	100	71.8	LOS C	14.8	108.1	250	–	0.0	0.0
Lane 3	0	0	241	241	5.0	287	0.842	100	71.8	LOS C	14.8	108.1	220	Turn Bay	0.0	0.0
Lane 4	0	0	241	241	5.0	287	0.842	100	71.8	LOS C	14.8	108.1	200	Turn Bay	0.0	0.0
Approach	882	0	724	1606	5.0		0.842		37.6	LOS D	14.8	108.1				
West: Princes Hwy - West																
Lane 1	685	0	0	685	5.0	1433	0.478	100	13.8	LOS A	2.3	17.0	135	Turn Bay	0.0	0.0
Lane 2	0	941	0	941	5.0	1034	0.911	100	28.3	LOS D	51.6	376.5	500	–	0.0	0.0
Lane 3	0	941	0	941	5.0	1034	0.911	100	28.3	LOS D	51.6	376.5	500	–	0.0	0.0
Lane 4	0	941	0	941	5.0	1034	0.911	100	28.3	LOS D	51.6	376.5	500	–	0.0	0.0
Approach	685	2823	0	3508	5.0		0.911		25.5	LOS D	51.6	376.5				
Intersection				8314	5.0		0.911		23.0	LOS D	51.6	376.5				

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

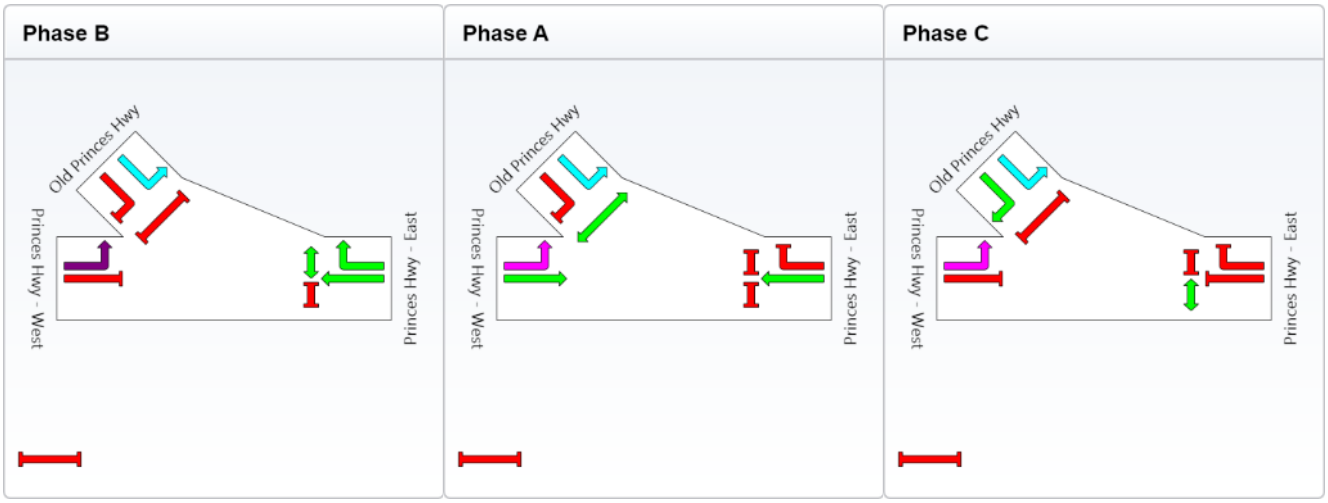
PHASING SUMMARY

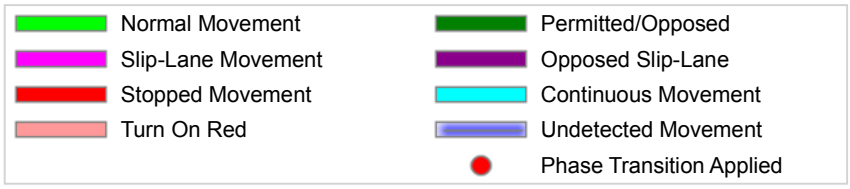
Intersection 593 / 595 - AM Peak - 25/05/11
Princes Hwy
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	B	A	C
Green Time (sec)	29	54	19
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	35	60	25
Phase Split	29 %	50 %	21 %





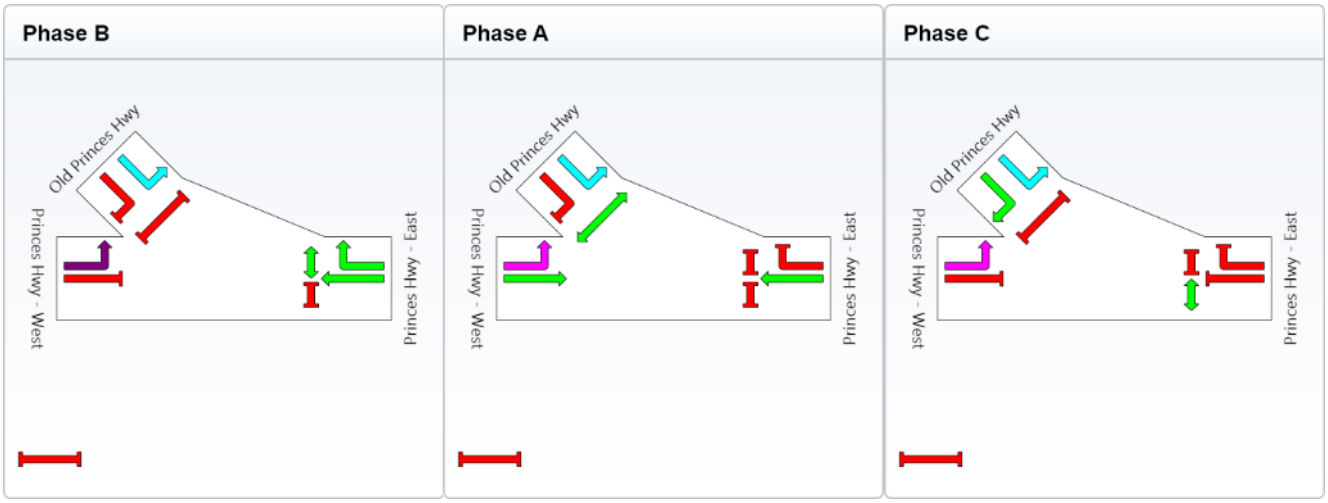
PHASING SUMMARY

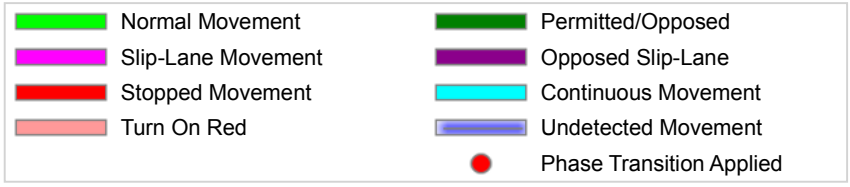
Intersection 593 / 595 - PM Peak - 25/05/11
Princes Hwy
Old Princes Hwy
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

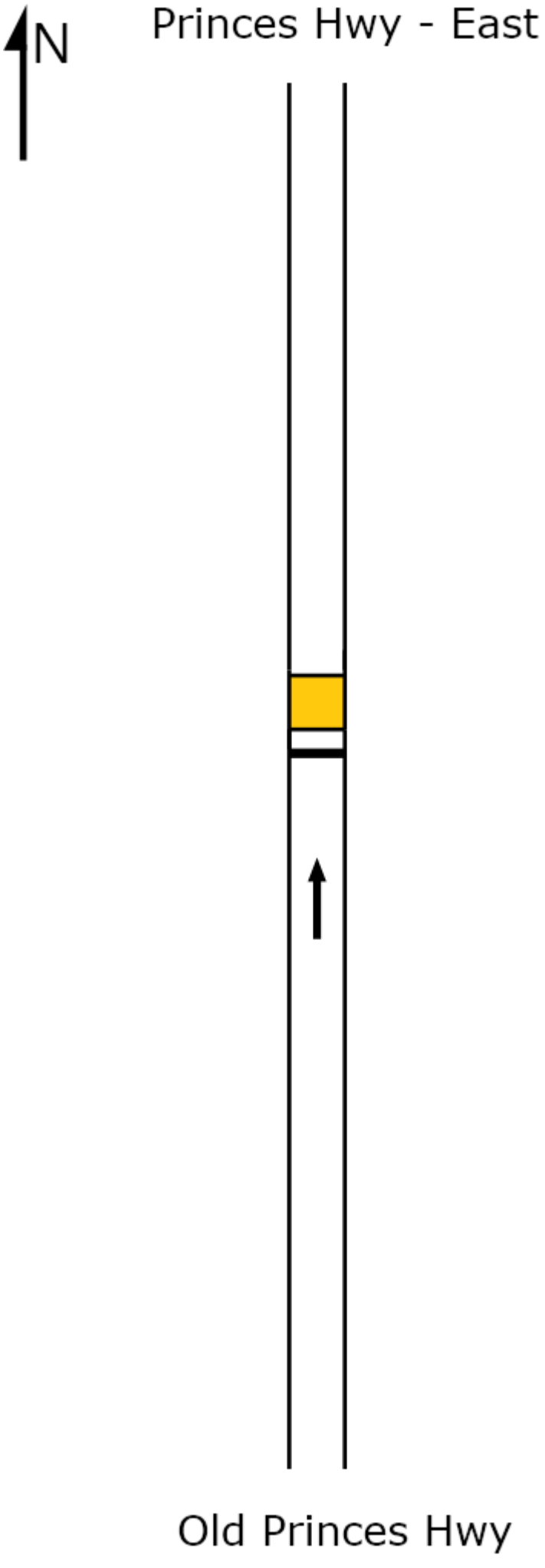
Phase times determined by the program
Sequence: Custom
Input Sequence: B, A, C
Output Sequence: B, A, C

Phase Timing Results

Phase	B	A	C
Green Time (sec)	18	65	19
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	24	71	25
Phase Split	20 %	59 %	21 %






N
Princes Hwy - East
Old Princes Hwy

LANE SUMMARY

Signalised pedestrian crossing across one-way road
Pedestrian Crossing (Signals) - Actuated Cycle Time = 26 seconds

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Old Princes Hwy																
Lane 1	0	337	0	337	5.0	881	0.382	100	5.4	LOS A	2.9	21.5	250	–	0.0	0.0
Approach	0	337	0	337	5.0		0.382		5.4	LOS A	2.9	21.5				
Intersection				337	5.0		0.382		5.4	LOS A	2.9	21.5				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

LANE SUMMARY

Signalised pedestrian crossing across one-way road
Pedestrian Crossing (Signals) - Actuated Cycle Time = 38 seconds

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Old Princes Hwy																
Lane 1	0	882	0	882	5.0	1155	0.764	100	6.4	LOS C	12.3	90.1	250	–	0.0	0.0
Approach	0	882	0	882	5.0		0.764		6.4	LOS C	12.3	90.1				
Intersection				882	5.0		0.764		6.4	LOS C	12.3	90.1				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

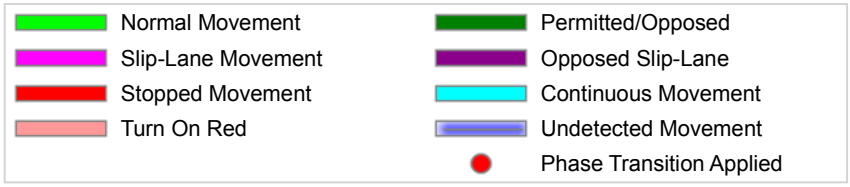
PHASING SUMMARY

Signalised pedestrian crossing across one-way road
Pedestrian Crossing (Signals) - Actuated Cycle Time = 26 seconds

Phase times determined by the program
Sequence: Two-Phase
Input Sequence: A, B
Output Sequence: A, B

Phase Timing Results

Phase	A	B
Green Time (sec)	12	2
Yellow Time (sec)	4	4
All-Red Time (sec)	2	2
Phase Time (sec)	18	8
Phase Split	69 %	31 %



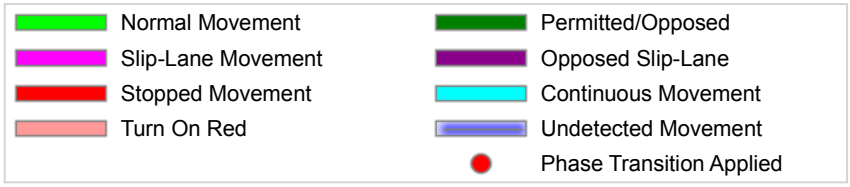
PHASING SUMMARY

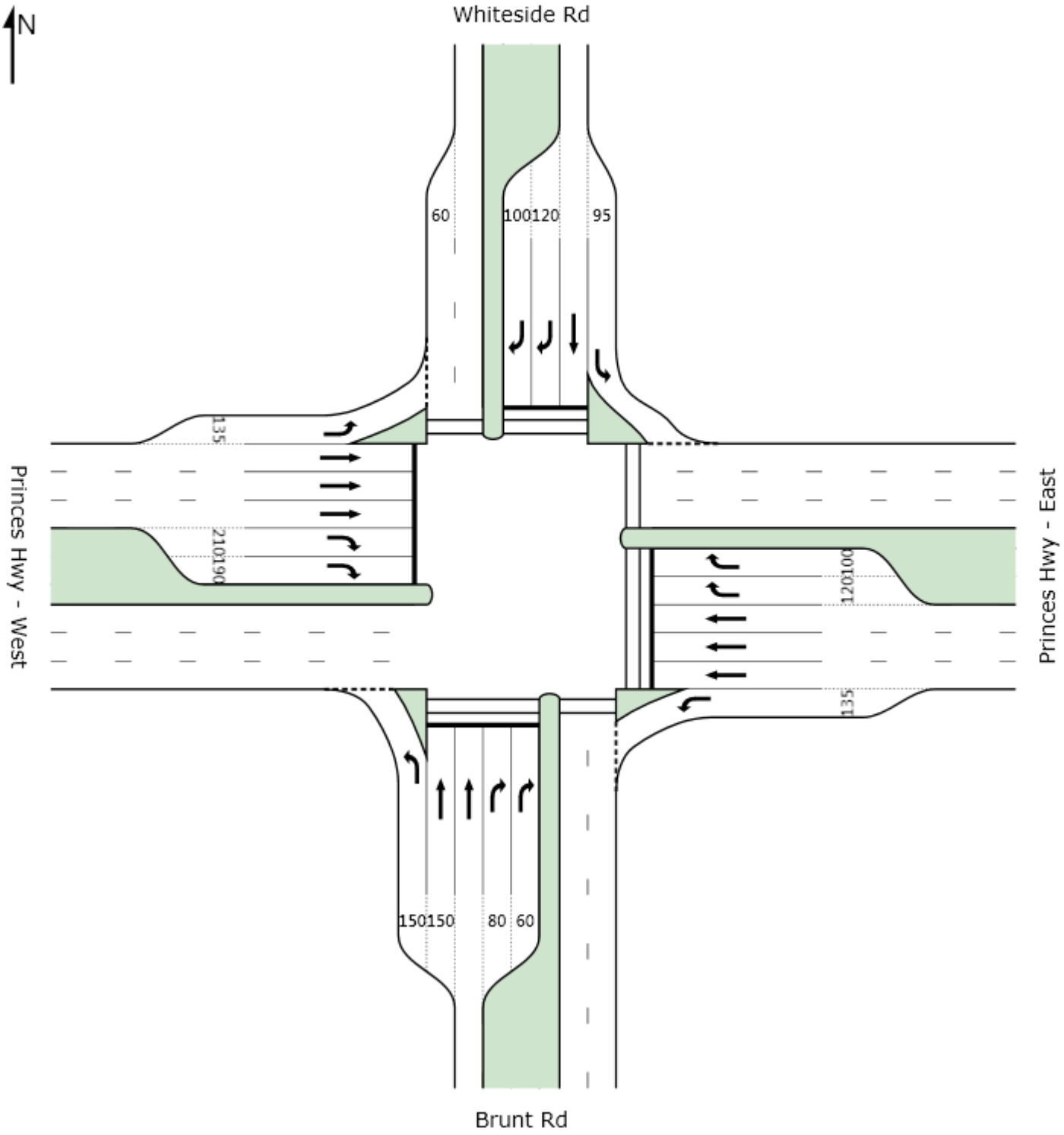
Signalised pedestrian crossing across one-way road
Pedestrian Crossing (Signals) - Actuated Cycle Time = 38 seconds

Phase times determined by the program
Sequence: Two-Phase
Input Sequence: A, B
Output Sequence: A, B

Phase Timing Results

Phase	A	B
Green Time (sec)	23	3
Yellow Time (sec)	4	4
All-Red Time (sec)	2	2
Phase Time (sec)	29	9
Phase Split	76 %	24 %




N
Whiteside Rd
60
100
120
95
135
210
190
Princes Hwy - West
120
100
Princes Hwy - East
135
150
150
80
60
Brunt Rd

LANE SUMMARY

Intersection 598 - AM Peak - 25/05/11
Princes Hwy
Whiteside Rd / Brunt Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Brunt Rd																
Lane 1	627	0	0	627	5.0	745	0.843	100	34.8	LOS C	29.4	214.3	150	Turn Bay	0.0	37.6
Lane 2	0	26	0	26	5.0	191	0.138	46[6]	57.1	LOS A	1.4	10.2	150	Turn Bay	0.0	0.0
Lane 3	0	57	0	57	5.0	191	0.298	100	58.5	LOS A	3.1	22.6	160	–	0.0	0.0
Lane 4	0	0	43	43	5.0	181	0.235	100	65.8	LOS A	2.3	16.8	80	Turn Bay	0.0	0.0
Lane 5	0	0	43	43	5.0	181	0.235	100	65.8	LOS A	2.3	16.8	60	Turn Bay	0.0	0.0
Approach	627	83	85	796	5.0		0.843		40.6	LOS C	29.4	214.3				
East: Princes Hwy - East																
Lane 1	134	0	0	134	5.0	979[1]	0.137	100	11.7	LOS A	0.5	3.5	135	Turn Bay	0.0	0.0
Lane 2	0	612	0	612	5.0	731	0.837	100	36.2	LOS C	32.3	235.6	500	–	0.0	0.0
Lane 3	0	612	0	612	5.0	731	0.837	100	36.2	LOS C	32.3	235.6	500	–	0.0	0.0
Lane 4	0	612	0	612	5.0	731	0.837	100	36.2	LOS C	32.3	235.6	500	–	0.0	0.0
Lane 5	0	0	14	14	5.0	91	0.156	42[6]	72.2	LOS A	0.8	6.0	120	Turn Bay	0.0	0.0
Lane 6	0	0	33	33	5.0	91	0.367	100	73.6	LOS A	2.0	14.6	100	Turn Bay	0.0	0.0
Approach	134	1836	47	2017	5.0		0.837		35.5	LOS C	32.3	235.6				
North: Whiteside Rd																
Lane 1	123	0	0	123	5.0	586[1]	0.210	100	9.6	LOS A	0.7	5.2	95	Turn Bay	0.0	0.0
Lane 2	0	202	0	202	5.0	350	0.578	100	48.9	LOS A	10.6	77.2	125	–	0.0	0.0
Lane 3	0	0	276	276	5.0	332	0.830	100	63.9	LOS C	16.6	120.9	120	Turn Bay	0.0	5.7
Lane 4	0	0	276	276	5.0	332	0.830	100	63.9	LOS C	16.6	120.9	100	Turn Bay	0.0	22.2
Approach	123	202	552	877	5.0		0.830		52.8	LOS C	16.6	120.9				
West: Princes Hwy - West																
Lane 1	106	0	0	106	5.0	1528[1]	0.070	100	10.1	LOS A	0.2	1.6	135	Turn Bay	0.0	0.0
Lane 2	0	605	0	605	5.0	890	0.680	100	21.7	LOS B	23.0	167.7	500	–	0.0	0.0
Lane 3	0	605	0	605	5.0	890	0.680	100	21.7	LOS B	23.0	167.7	500	–	0.0	0.0
Lane 4	0	605	0	605	5.0	890	0.680	100	21.7	LOS B	23.0	167.7	500	–	0.0	0.0
Lane 5	0	0	204	204	5.0	242	0.843	100	71.8	LOS C	12.6	92.3	210	Turn Bay	0.0	0.0
Lane 6	0	0	204	204	5.0	242	0.843	100	71.8	LOS C	12.6	92.3	190	Turn Bay	0.0	0.0
Approach	106	1816	407	2329	5.0		0.843		29.9	LOS C	23.0	167.7				
Intersection				6019	5.0		0.843		36.5	LOS C	32.3	235.6				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 598 - PM Peak - 25/05/11
Princes Hwy
Whiteside Rd / Brunt Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Brunt Rd																
Lane 1	447	0	0	447	5.0	739[1]	0.605	100	28.2	LOS B	14.2	103.9	150	Turn Bay	0.0	0.0
Lane 2	0	72	0	72	5.0	159	0.455	46[6]	61.7	LOS A	4.1	30.2	150	Turn Bay	0.0	0.0
Lane 3	0	156	0	156	5.0	159	0.982	100	89.9	LOS E	11.7	85.4	160	–	0.0	0.0
Lane 4	0	0	67	67	5.0	151	0.443	100	69.5	LOS A	3.8	28.0	80	Turn Bay	0.0	0.0
Lane 5	0	0	67	67	5.0	151	0.443	100	69.5	LOS A	3.8	28.0	60	Turn Bay	0.0	0.0
Approach	447	228	134	809	5.0		0.982		49.9	LOS E	14.2	103.9				
East: Princes Hwy - East																
Lane 1	85	0	0	85	5.0	979[1]	0.087	100	12.1	LOS A	0.4	2.9	135	Turn Bay	0.0	0.0
Lane 2	0	785	0	785	5.0	731	1.073	100	129.5	LOS F	80.7	589.2	500	–	0.0	19.9
Lane 3	0	785	0	785	5.0	731	1.073	100	129.5	LOS F	80.7	589.2	500	–	0.0	19.9
Lane 4	0	785	0	785	5.0	731	1.073	100	129.5	LOS F	80.7	589.2	500	–	0.0	19.9
Lane 5	0	0	83	83	5.0	211	0.394	42[6]	64.4	LOS A	4.5	33.1	120	Turn Bay	0.0	0.0
Lane 6	0	0	197	197	5.0	211	0.930	100	82.1	LOS D	13.5	98.3	100	Turn Bay	0.0	3.4
Approach	85	2354	280	2719	5.0		1.073		120.4	LOS F	80.7	589.2				
North: Whiteside Rd																
Lane 1	204	0	0	204	5.0	625[1]	0.327	100	21.1	LOS A	4.9	35.6	95	Turn Bay	0.0	0.0
Lane 2	0	109	0	109	5.0	302	0.362	100	49.4	LOS A	5.6	40.7	125	–	0.0	0.0
Lane 3	0	0	128	128	5.0	287	0.446	100	57.9	LOS A	6.7	48.6	120	Turn Bay	0.0	0.0
Lane 4	0	0	128	128	5.0	287	0.446	100	57.9	LOS A	6.7	48.6	100	Turn Bay	0.0	0.0
Approach	204	109	256	569	5.0		0.446		43.0	LOS A	6.7	48.6				
West: Princes Hwy - West																
Lane 1	701	0	0	701	5.0	1091[1]	0.642	100	11.0	LOS B	3.3	24.0	135	Turn Bay	0.0	0.0
Lane 2	0	791	0	791	5.0	843	0.939	100	46.6	LOS D	52.3	381.5	500	–	0.0	0.0
Lane 3	0	791	0	791	5.0	843	0.939	100	46.6	LOS D	52.3	381.5	500	–	0.0	0.0
Lane 4	0	791	0	791	5.0	843	0.939	100	46.6	LOS D	52.3	381.5	500	–	0.0	0.0
Lane 5	0	0	334	334	5.0	317	1.053	100	138.1	LOS F	31.6	230.6	210	Turn Bay	0.0	13.5
Lane 6	0	0	334	334	5.0	317	1.053	100	138.1	LOS F	31.6	230.6	190	Turn Bay	0.0	22.6
Approach	701	2374	667	3742	5.0		1.053		56.2	LOS F	52.3	381.5				
Intersection				7840	5.0		1.073		76.8	LOS F	80.7	589.2				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

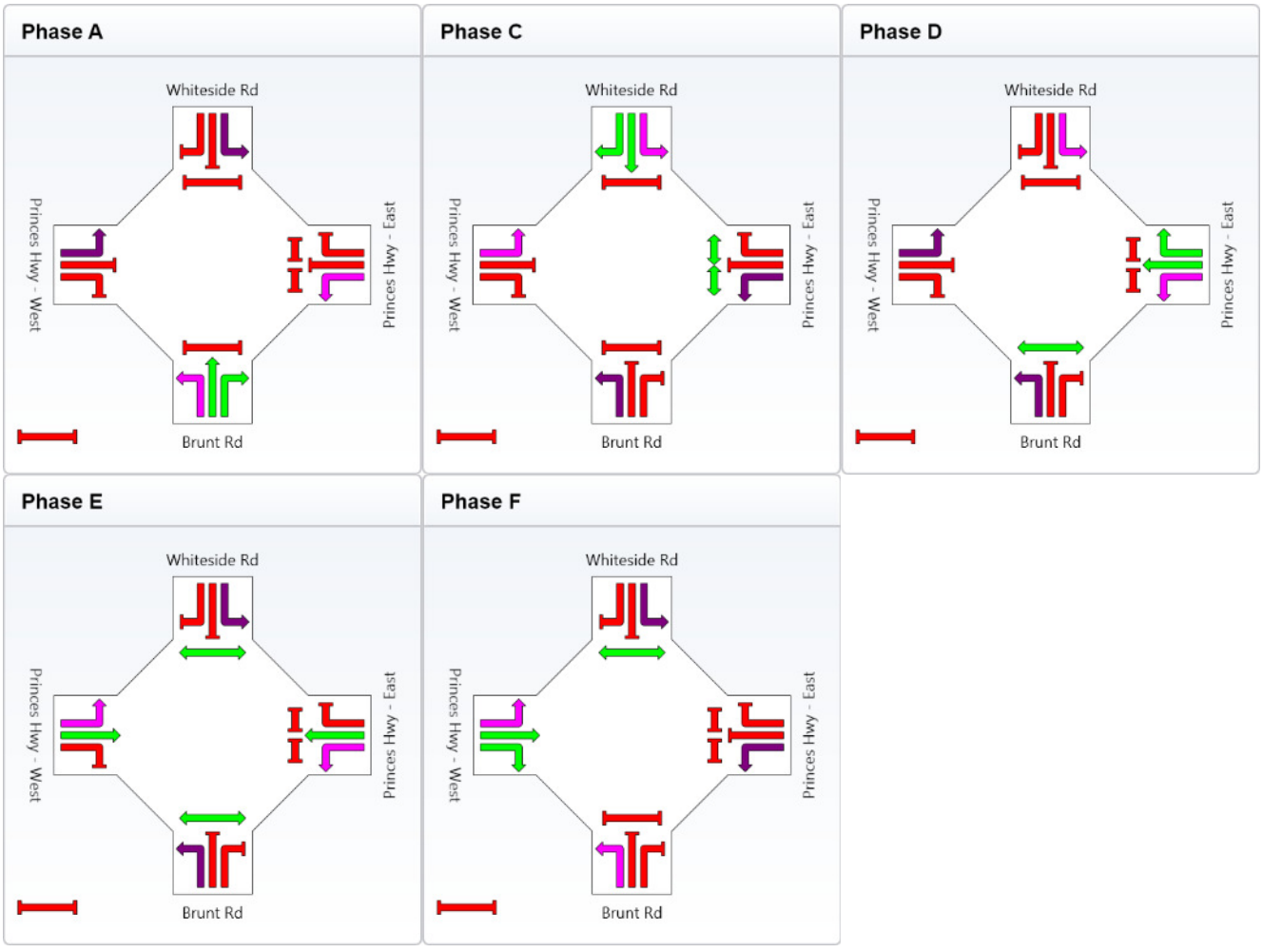
PHASING SUMMARY

Intersection 598 - AM Peak - 25/05/11
Princes Hwy
Whiteside Rd / Brunt Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	C	D	E	F
Green Time (sec)	12	22	6	34	16
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	18	28	12	40	22
Phase Split	15 %	23 %	10 %	33 %	18 %



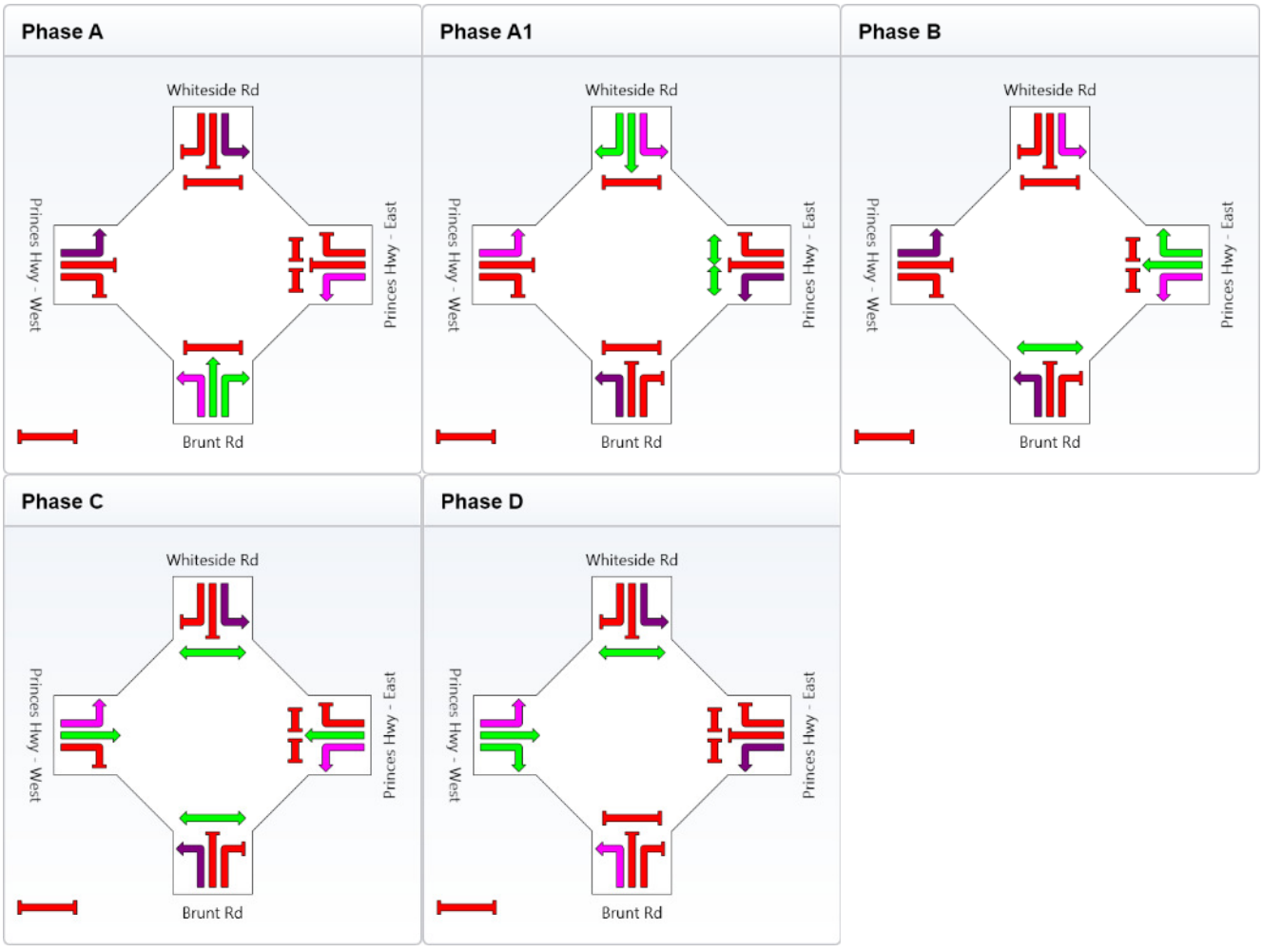
PHASING SUMMARY

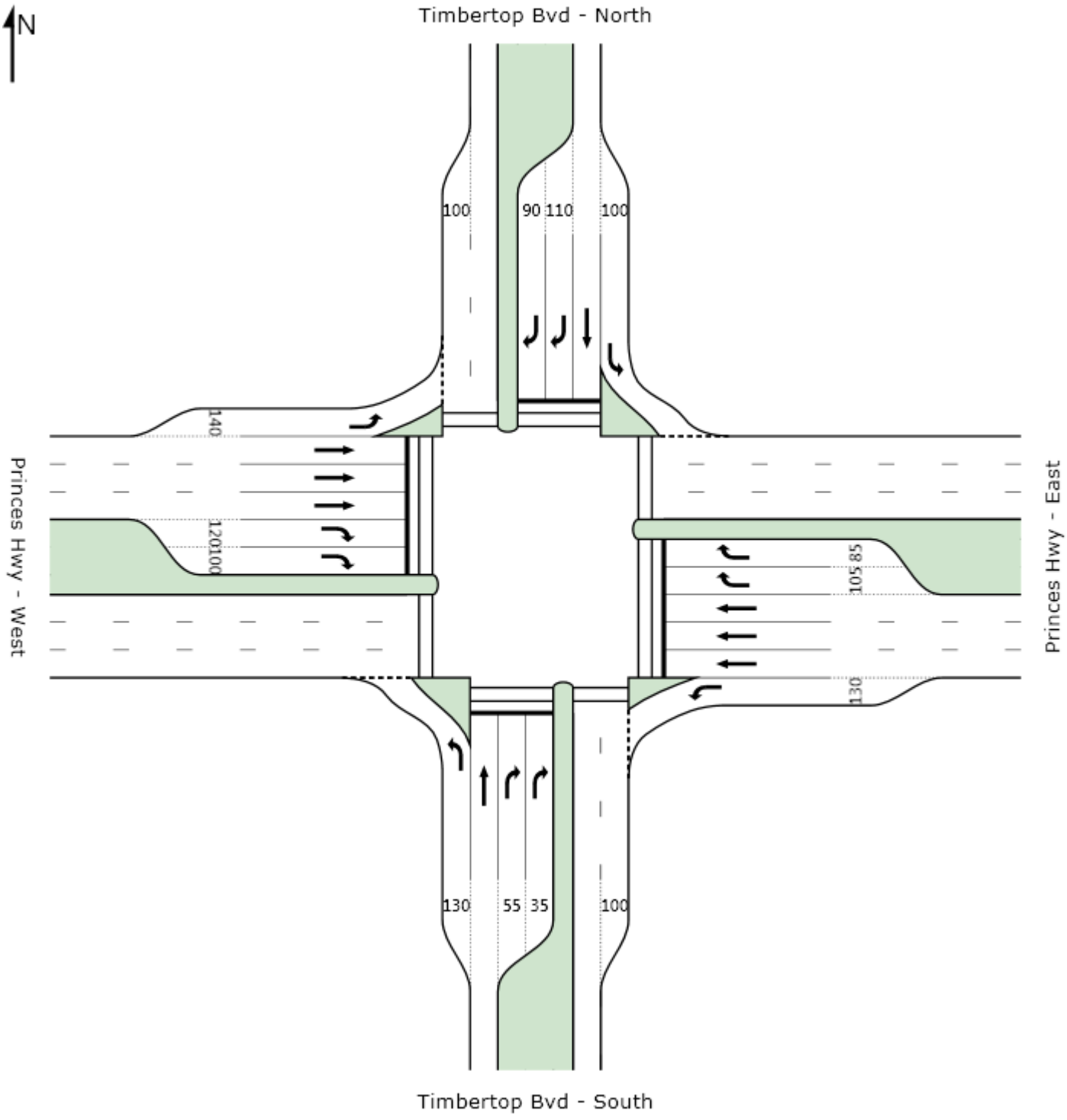
Intersection 598 - PM Peak - 25/05/11
Princes Hwy
Whiteside Rd / Brunt Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: New Sequence - 2
Input Sequence: A, A1, B, C, D
Output Sequence: A, A1, B, C, D

Phase Timing Results

Phase	A	A1	B	C	D
Green Time (sec)	10	19	14	26	21
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	16	25	20	32	27
Phase Split	13 %	21 %	17 %	27 %	23 %




N
Timbertop Bvd - North
100
90
110
100
140
120
100
Princes Hwy - West
105
85
130
Princes Hwy - East
130
55
35
100
Timbertop Bvd - South

LANE SUMMARY

Intersection 604 - AM Peak - 25/05/11
Princes Hwy
Timbertop Bvd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Timbertop Bvd - South																
Lane 1	225	0	0	225	5.0	749	0.301	100	12.5	LOS A	2.9	21.2	130	Turn Bay	0.0	0.0
Lane 2	0	65	0	65	5.0	302	0.216	100	48.0	LOS A	3.2	23.4	305	–	0.0	0.0
Lane 3	0	0	22	22	5.0	240[1]	0.092	100	51.3	LOS A	1.0	7.2	55	Turn Bay	0.0	0.0
Lane 4	0	0	15	15	5.0	161[1]	0.092	100	51.0	LOS A	0.7	4.8	35	Turn Bay	0.0	0.0
Approach	225	65	37	327	5.0		0.301		24.0	LOS A	3.2	23.4				
East: Princes Hwy - East																
Lane 1	72	0	0	72	5.0	1544	0.046	100	10.1	LOS A	0.1	1.0	130	Turn Bay	0.0	0.0
Lane 2	0	467	0	467	5.0	763	0.612	100	27.4	LOS B	18.8	137.3	500	–	0.0	0.0
Lane 3	0	467	0	467	5.0	763	0.612	100	27.4	LOS B	18.8	137.3	500	–	0.0	0.0
Lane 4	0	467	0	467	5.0	763	0.612	100	27.4	LOS B	18.8	137.3	500	–	0.0	0.0
Lane 5	0	0	38	38	5.0	106	0.361	62[6]	72.2	LOS A	2.3	16.5	105	Turn Bay	0.0	0.0
Lane 6	0	0	62	62	5.0	106	0.585	100	73.6	LOS A	3.8	27.4	85	Turn Bay	0.0	0.0
Approach	72	1401	100	1573	5.0		0.612		29.5	LOS B	18.8	137.3				
North: Timbertop Bvd - North																
Lane 1	143	0	0	143	5.0	676[1]	0.212	100	8.7	LOS A	0.5	3.5	100	Turn Bay	0.0	0.0
Lane 2	0	20	0	20	5.0	302	0.066	100	46.4	LOS A	0.9	6.9	230	–	0.0	0.0
Lane 3	0	0	212	212	5.0	332	0.637	100	57.3	LOS B	11.3	82.5	110	Turn Bay	0.0	0.0
Lane 4	0	0	212	212	5.0	332	0.637	100	57.3	LOS B	11.3	82.5	90	Turn Bay	0.0	0.0
Approach	143	20	423	586	5.0		0.637		45.1	LOS B	11.3	82.5				
West: Princes Hwy - West																
Lane 1	280	0	0	280	5.0	1494	0.187	100	10.2	LOS A	0.7	5.0	140	Turn Bay	0.0	0.0
Lane 2	0	502	0	502	5.0	763	0.658	100	28.0	LOS B	21.0	153.3	500	–	0.0	0.0
Lane 3	0	502	0	502	5.0	763	0.658	100	28.0	LOS B	21.0	153.3	500	–	0.0	0.0
Lane 4	0	502	0	502	5.0	763	0.658	100	28.0	LOS B	21.0	153.3	500	–	0.0	0.0
Lane 5	0	0	29	29	5.0	106	0.274	62[6]	71.6	LOS A	1.7	12.3	120	Turn Bay	0.0	0.0
Lane 6	0	0	47	47	5.0	106	0.444	100	72.6	LOS A	2.8	20.4	100	Turn Bay	0.0	0.0
Approach	280	1506	76	1862	5.0		0.658		27.2	LOS B	21.0	153.3				
Intersection				4348	5.0		0.658		30.2	LOS B	21.0	153.3				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 604 - PM Peak - 25/05/11
Princes Hwy
Timbertop Bvd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Timbertop Bvd - South																
Lane 1	92	0	0	92	5.0	734	0.125	100	19.5	LOS A	1.9	14.0	130	Turn Bay	0.0	0.0
Lane 2	0	20	0	20	5.0	302	0.066	100	46.4	LOS A	0.9	6.9	305	–	0.0	0.0
Lane 3	0	0	42	42	5.0	196	0.213	100	61.7	LOS A	2.2	16.2	55	Turn Bay	0.0	0.0
Lane 4	0	0	30	30	5.0	140[1]	0.213	100	61.2	LOS A	1.6	11.4	35	Turn Bay	0.0	0.0
Approach	92	20	72	183	5.0		0.213		38.9	LOS A	2.2	16.2				
East: Princes Hwy - East																
Lane 1	37	0	0	37	5.0	1415	0.026	100	10.3	LOS A	0.1	0.6	130	Turn Bay	0.0	0.0
Lane 2	0	704	0	704	5.0	811	0.868	100	34.7	LOS C	38.2	278.9	500	–	0.0	0.0
Lane 3	0	704	0	704	5.0	811	0.868	100	34.7	LOS C	38.2	278.9	500	–	0.0	0.0
Lane 4	0	704	0	704	5.0	811	0.868	100	34.7	LOS C	38.2	278.9	500	–	0.0	0.0
Lane 5	0	0	55	55	5.0	181	0.302	62[6]	65.8	LOS A	3.0	21.8	105	Turn Bay	0.0	0.0
Lane 6	0	0	89	89	5.0	181	0.489	100	67.2	LOS A	5.0	36.5	85	Turn Bay	0.0	0.0
Approach	37	2113	143	2293	5.0		0.868		36.3	LOS C	38.2	278.9				
North: Timbertop Bvd - North																
Lane 1	100	0	0	100	5.0	649[1]	0.154	100	12.6	LOS A	1.1	8.4	100	Turn Bay	0.0	0.0
Lane 2	0	65	0	65	5.0	318	0.205	100	46.9	LOS A	3.1	23.0	230	–	0.0	0.0
Lane 3	0	0	176	176	5.0	211	0.834	100	69.9	LOS C	11.0	80.0	110	Turn Bay	0.0	0.0
Lane 4	0	0	176	176	5.0	211	0.834	100	69.9	LOS C	11.0	80.0	90	Turn Bay	0.0	0.0
Approach	100	65	353	518	5.0		0.834		55.9	LOS C	11.0	80.0				
West: Princes Hwy - West																
Lane 1	495	0	0	495	5.0	1495	0.331	100	10.3	LOS A	1.5	10.8	140	Turn Bay	0.0	0.0
Lane 2	0	665	0	665	5.0	811	0.820	100	30.2	LOS C	32.5	237.3	500	–	0.0	0.0
Lane 3	0	665	0	665	5.0	811	0.820	100	30.2	LOS C	32.5	237.3	500	–	0.0	0.0
Lane 4	0	665	0	665	5.0	811	0.820	100	30.2	LOS C	32.5	237.3	500	–	0.0	0.0
Lane 5	0	0	97	97	5.0	181	0.534	62[6]	67.5	LOS A	5.5	40.2	120	Turn Bay	0.0	0.0
Lane 6	0	0	157	157	5.0	181	0.866	100	75.6	LOS C	10.0	73.2	100	Turn Bay	0.0	0.0
Approach	495	1996	254	2744	5.0		0.866		30.5	LOS C	32.5	237.3				
Intersection				5738	5.0		0.868		35.4	LOS C	38.2	278.9				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

PHASING SUMMARY

Intersection 604 - AM Peak - 25/05/11
Princes Hwy
Timbertop Bvd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Leading Right Turn (phase reduction applied)
Input Sequence: A, A1, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	22	19	7	48
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	28	25	13	54
Phase Split	23 %	21 %	11 %	45 %

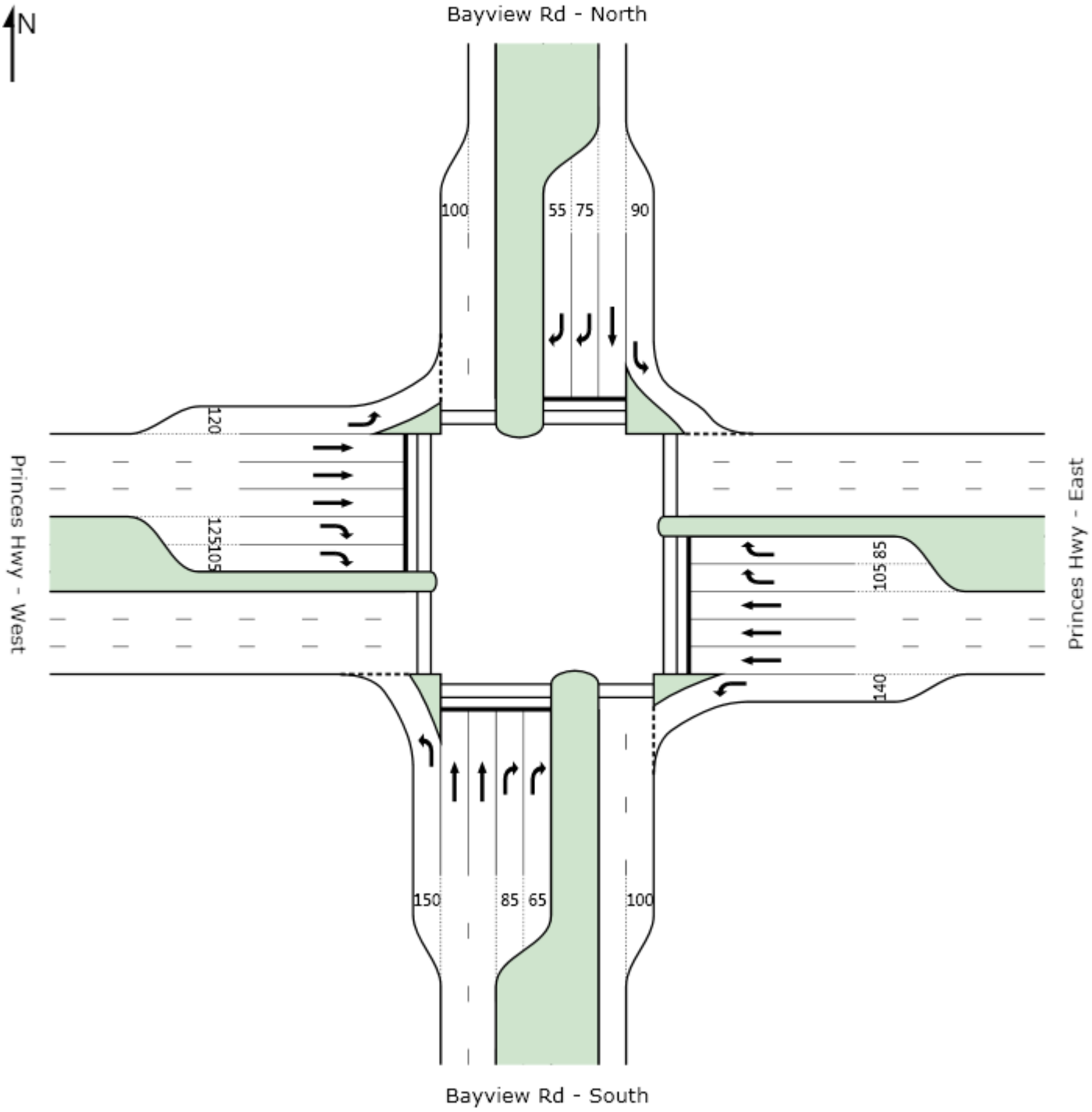
PHASING SUMMARY

Intersection 604 - PM Peak - 25/05/11
Princes Hwy
Timbertop Bvd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Leading Right Turn
Input Sequence: A, A1, B, C, D
Output Sequence: A, A1, B, C, D

Phase Timing Results

Phase	A	A1	B	C	D
Green Time (sec)	13	0	19	12	51
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	19	1	25	18	57
Phase Split	16 %	1 %	21 %	15 %	48 %


N
Bayview Rd - North
100
55
75
90
120
125
105
Princes Hwy - West
105
85
140
Princes Hwy - East
150
85
65
100
Bayview Rd - South

LANE SUMMARY

Intersection 1358 - AM Peak - 25/05/11
Princes Hwy
Bayview Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bayview Rd - South																
Lane 1	22	0	0	22	5.0	972	0.023	100	9.3	LOS A	0.1	0.7	150	Turn Bay	0.0	0.0
Lane 2	0	77	0	77	5.0	445	0.172	66[6]	39.5	LOS A	3.3	23.8	305	–	0.0	0.0
Lane 3	0	116	0	116	5.0	445	0.261	100	40.5	LOS A	5.1	37.2	305	–	0.0	0.0
Lane 4	0	0	91	91	5.0	136	0.666	100	69.8	LOS B	5.5	39.9	85	Turn Bay	0.0	0.0
Lane 5	0	0	91	91	5.0	136	0.666	100	69.8	LOS B	5.5	39.9	65	Turn Bay	0.0	0.0
Approach	22	193	181	396	5.0		0.666		52.0	LOS B	5.5	39.9				
East: Princes Hwy - East																
Lane 1	171	0	0	171	5.0	1174	0.145	100	11.6	LOS A	0.9	6.6	140	Turn Bay	0.0	0.0
Lane 2	0	512	0	512	5.0	716	0.715	100	31.6	LOS C	23.2	169.6	340	–	0.0	0.0
Lane 3	0	512	0	512	5.0	716	0.715	100	31.6	LOS C	23.2	169.6	340	–	0.0	0.0
Lane 4	0	512	0	512	5.0	716	0.715	100	31.6	LOS C	23.2	169.6	340	–	0.0	0.0
Lane 5	0	0	23	23	5.0	211	0.108	62[6]	62.0	LOS A	1.2	8.6	105	Turn Bay	0.0	0.0
Lane 6	0	0	37	37	5.0	211	0.176	100	62.6	LOS A	1.9	14.1	85	Turn Bay	0.0	0.0
Approach	171	1536	60	1766	5.0		0.715		30.7	LOS C	23.2	169.6				
North: Bayview Rd - North																
Lane 1	120	0	0	120	5.0	672[1]	0.178	100	9.6	LOS A	0.7	5.0	90	Turn Bay	0.0	0.0
Lane 2	0	313	0	313	5.0	445	0.702	100	46.1	LOS C	16.4	119.4	115	–	0.0	8.4
Lane 3	0	0	19	19	5.0	136	0.143	100	65.7	LOS A	1.1	7.9	75	Turn Bay	0.0	0.0
Lane 4	0	0	19	19	5.0	136	0.143	100	65.7	LOS A	1.1	7.9	55	Turn Bay	0.0	0.0
Approach	120	313	39	472	5.0		0.702		38.4	LOS C	16.4	119.4				
West: Princes Hwy - West																
Lane 1	38	0	0	38	5.0	1215[1]	0.031	100	10.2	LOS A	0.1	0.6	120	Turn Bay	0.0	0.0
Lane 2	0	460	0	460	5.0	716	0.643	100	30.4	LOS B	19.8	144.2	500	–	0.0	0.0
Lane 3	0	460	0	460	5.0	716	0.643	100	30.4	LOS B	19.8	144.2	500	–	0.0	0.0
Lane 4	0	460	0	460	5.0	716	0.643	100	30.4	LOS B	19.8	144.2	500	–	0.0	0.0
Lane 5	0	0	99	99	5.0	211	0.471	65[6]	64.8	LOS A	5.5	40.1	125	Turn Bay	0.0	0.0
Lane 6	0	0	153	153	5.0	211	0.725	100	68.1	LOS C	9.0	65.9	105	Turn Bay	0.0	0.0
Approach	38	1380	253	1671	5.0		0.725		35.5	LOS C	19.8	144.2				
Intersection				4304	5.0		0.725		35.4	LOS C	23.2	169.6				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 1358 - PM Peak - 25/05/11
Princes Hwy
Bayview Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bayview Rd - South																
Lane 1	539	0	0	539	5.0	985	0.547	100	10.0	LOS A	4.9	36.1	150	Turn Bay	0.0	0.0
Lane 2	0	136	0	136	5.0	302	0.449	66[6]	50.2	LOS A	7.1	51.5	305	–	0.0	0.0
Lane 3	0	205	0	205	5.0	302	0.680	100	52.9	LOS B	11.4	83.3	305	–	0.0	0.0
Lane 4	0	0	111	111	5.0	151	0.732	100	69.8	LOS C	6.7	49.0	85	Turn Bay	0.0	0.0
Lane 5	0	0	111	111	5.0	151	0.732	100	69.8	LOS C	6.7	49.0	65	Turn Bay	0.0	0.0
Approach	539	341	221	1101	5.0		0.732		35.0	LOS C	11.4	83.3				
East: Princes Hwy - East																
Lane 1	232	0	0	232	5.0	1240	0.187	100	10.9	LOS A	0.8	5.9	140	Turn Bay	0.0	0.0
Lane 2	0	525	0	525	5.0	795	0.661	100	26.4	LOS B	21.4	156.5	340	–	0.0	0.0
Lane 3	0	525	0	525	5.0	795	0.661	100	26.4	LOS B	21.4	156.5	340	–	0.0	0.0
Lane 4	0	525	0	525	5.0	795	0.661	100	26.4	LOS B	21.4	156.5	340	–	0.0	0.0
Lane 5	0	0	52	52	5.0	257	0.203	62[6]	59.8	LOS A	2.6	19.2	105	Turn Bay	0.0	0.0
Lane 6	0	0	85	85	5.0	257	0.330	100	61.0	LOS A	4.4	32.0	85	Turn Bay	0.0	0.0
Approach	232	1576	137	1944	5.0		0.661		26.9	LOS B	21.4	156.5				
North: Bayview Rd - North																
Lane 1	77	0	0	77	5.0	616[1]	0.125	100	12.3	LOS A	0.8	6.1	90	Turn Bay	0.0	0.0
Lane 2	0	221	0	221	5.0	302	0.732	100	54.1	LOS C	12.6	91.9	115	–	0.0	0.0
Lane 3	0	0	25	25	5.0	151	0.164	100	64.7	LOS A	1.4	9.9	75	Turn Bay	0.0	0.0
Lane 4	0	0	25	25	5.0	151	0.164	100	64.7	LOS A	1.4	9.9	55	Turn Bay	0.0	0.0
Approach	77	221	49	347	5.0		0.732		46.4	LOS C	12.6	91.9				
West: Princes Hwy - West																
Lane 1	51	0	0	51	5.0	1233[1]	0.041	100	10.4	LOS A	0.1	0.9	120	Turn Bay	0.0	0.0
Lane 2	0	580	0	580	5.0	795	0.730	100	27.5	LOS C	25.2	184.2	500	–	0.0	0.0
Lane 3	0	580	0	580	5.0	795	0.730	100	27.5	LOS C	25.2	184.2	500	–	0.0	0.0
Lane 4	0	580	0	580	5.0	795	0.730	100	27.5	LOS C	25.2	184.2	500	–	0.0	0.0
Lane 5	0	0	121	121	5.0	257	0.473	65[6]	62.0	LOS A	6.5	47.4	125	Turn Bay	0.0	0.0
Lane 6	0	0	187	187	5.0	257	0.729	100	65.6	LOS C	10.8	78.9	105	Turn Bay	0.0	0.0
Approach	51	1741	308	2100	5.0		0.730		32.5	LOS C	25.2	184.2				
Intersection				5493	5.0		0.732		31.9	LOS C	25.2	184.2				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

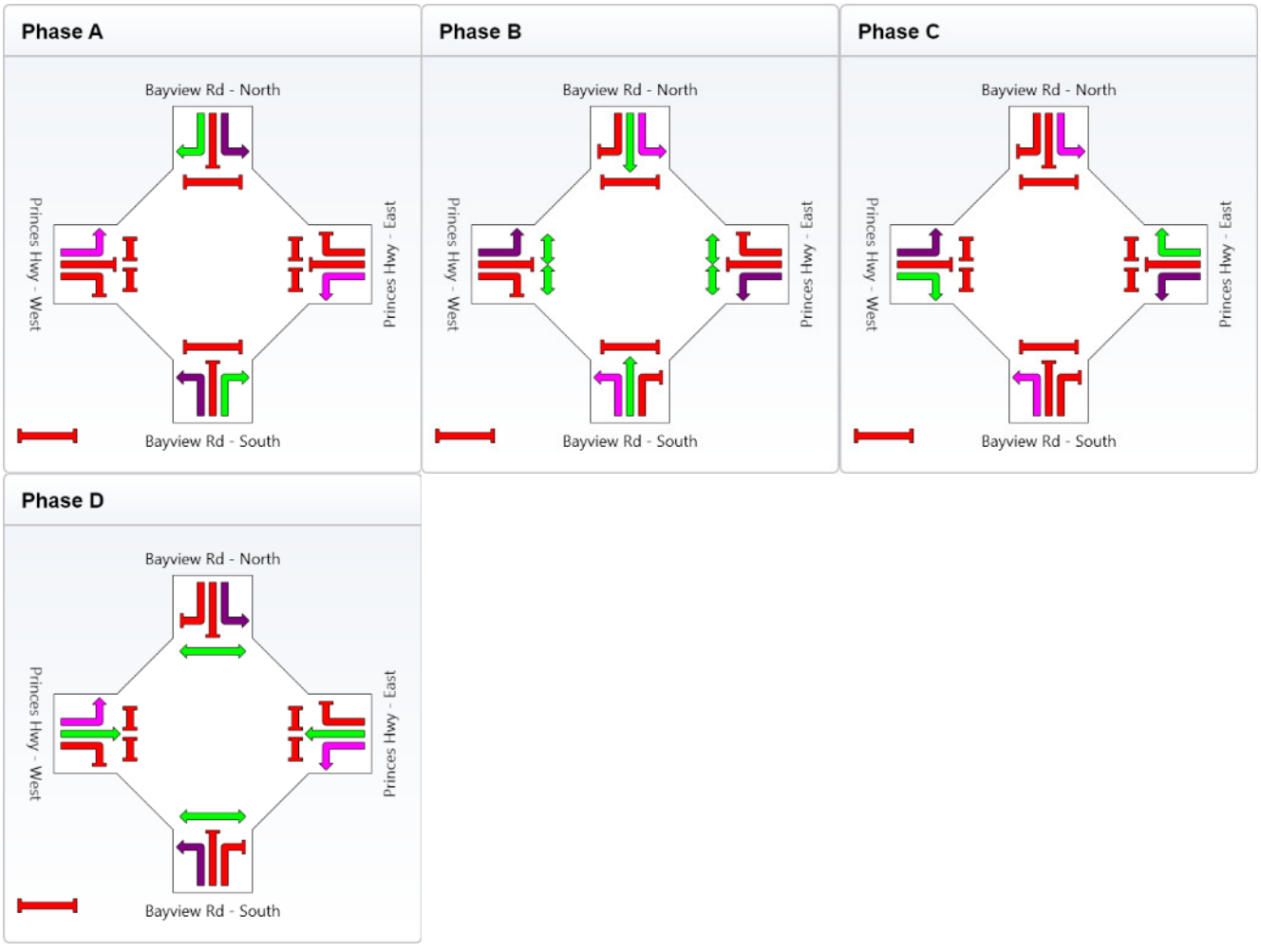
PHASING SUMMARY

Intersection 1358 - AM Peak - 25/05/11
Princes Hwy
Bayview Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	9	28	14	45
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	15	34	20	51
Phase Split	13 %	28 %	17 %	43 %



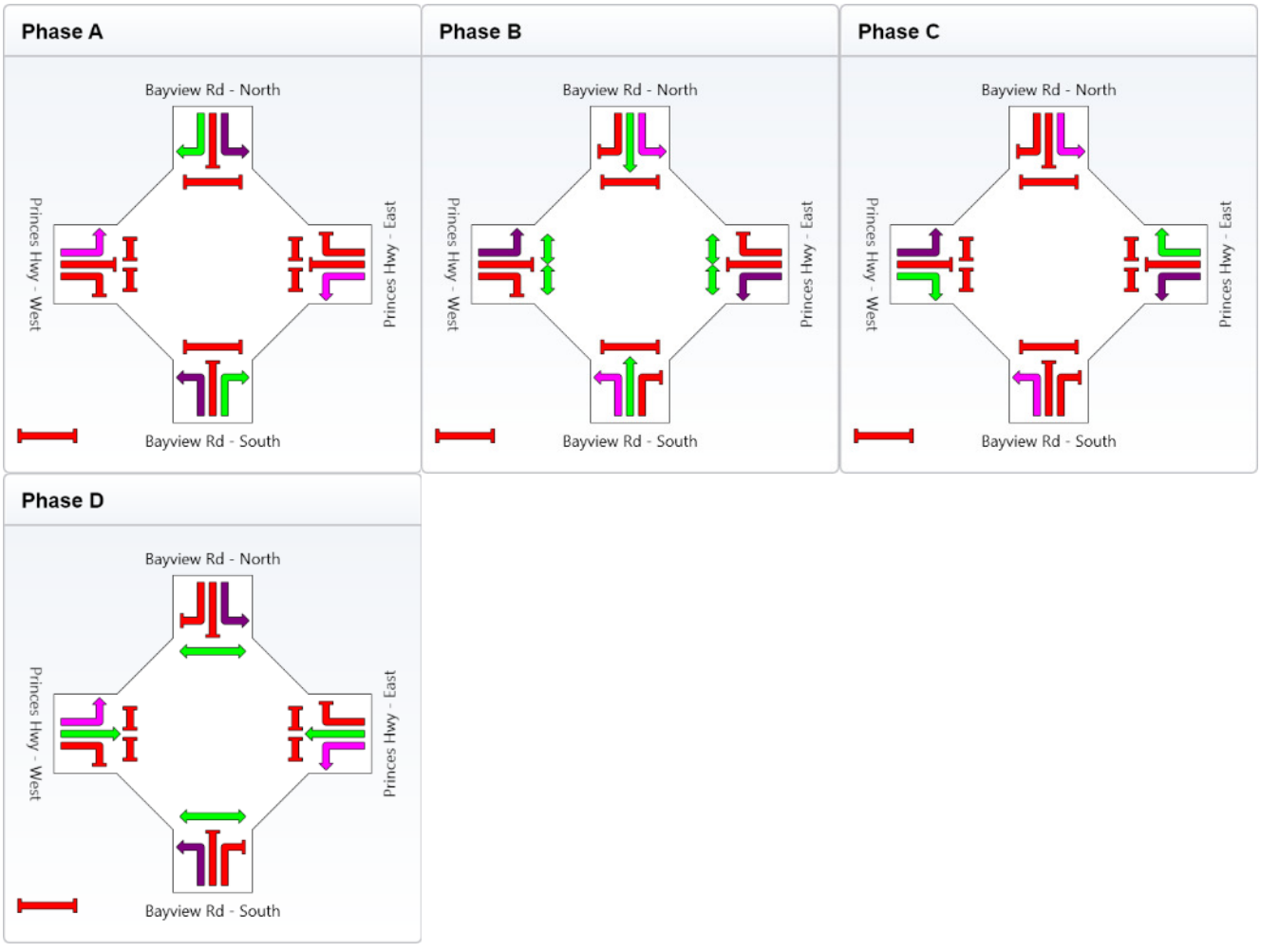
PHASING SUMMARY

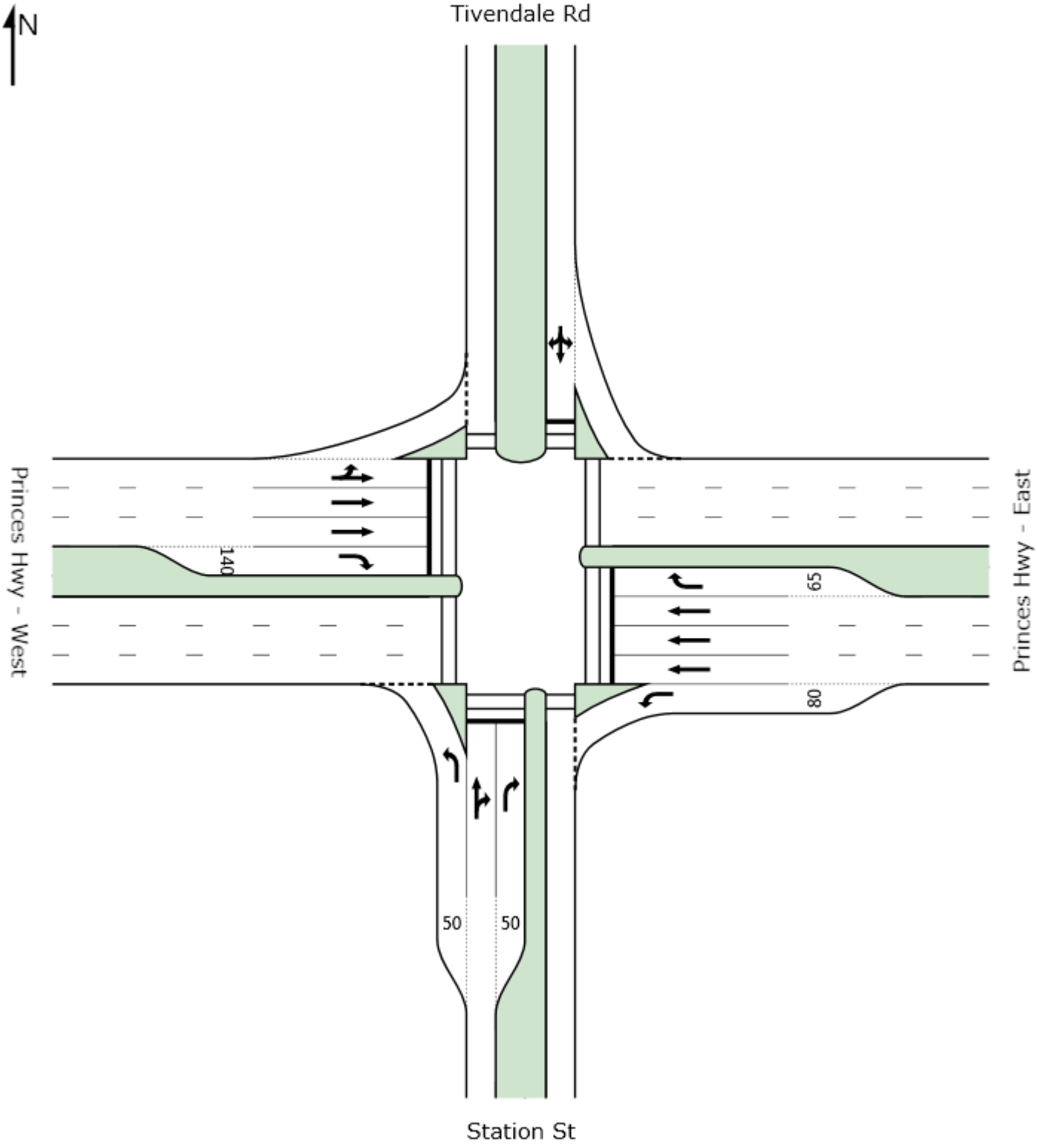
Intersection 1358 - PM Peak - 25/05/11
Princes Hwy
Bayview Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	10	19	17	50
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	16	25	23	56
Phase Split	13 %	21 %	19 %	47 %




N
Tivendale Rd
Princes Hwy - West
Princes Hwy - East
Station St
140
65
80
50
50

LANE SUMMARY

Intersection 612 - AM Peak - 25/05/11
Princes Hwy
Officer Sth Rd / Tivendale Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Station St																
Lane 1	295	0	0	295	5.0	612[1]	0.482	100	12.5	LOS A	1.2	9.0	50	Turn Bay	0.0	0.0
Lane 2	0	54	0	54	5.0	254	0.211	100	55.4	LOS A	2.7	20.0	280	–	0.0	0.0
Lane 3	0	0	42	42	5.0	201[1]	0.210	99[5]	62.0	LOS A	2.1	15.6	50	Turn Bay	0.0	0.0
Approach	295	54	42	391	5.0		0.482		23.7	LOS A	2.7	20.0				
East: Princes Hwy - East																
Lane 1	84	0	0	84	5.0	1318[1]	0.064	100	11.7	LOS A	0.2	1.3	80	Turn Bay	0.0	0.0
Lane 2	0	439	0	439	5.0	779	0.564	100	25.8	LOS A	16.8	122.5	480	–	0.0	0.0
Lane 3	0	439	0	439	5.0	779	0.564	100	25.8	LOS A	16.8	122.5	480	–	0.0	0.0
Lane 4	0	439	0	439	5.0	779	0.564	100	25.8	LOS A	16.8	122.5	480	–	0.0	0.0
Lane 5	0	0	82	82	5.0	151	0.544	100	69.8	LOS A	4.8	34.9	65	Turn Bay	0.0	0.0
Approach	84	1318	82	1484	5.0		0.564		27.4	LOS A	16.8	122.5				
North: Tivendale Rd																
Lane 1	79	137	155	371	5.0	568	0.652	100	21.1	LOS B	8.9	65.3	120	–	0.0	0.0
Approach	79	137	155	371	5.0		0.652		21.1	LOS B	8.9	65.3				
West: Princes Hwy - West																
Lane 1	215	353	0	567	5.0	875	0.648	100	23.0	LOS B	17.7	129.2	340	–	0.0	0.0
Lane 2	0	505	0	505	5.0	779	0.648	100	27.0	LOS B	20.7	151.0	340	–	0.0	0.0
Lane 3	0	505	0	505	5.0	779	0.648	100	27.0	LOS B	20.7	151.0	340	–	0.0	0.0
Lane 4	0	0	74	74	5.0	151	0.488	100	70.8	LOS A	4.3	31.1	140	Turn Bay	0.0	0.0
Approach	215	1363	74	1652	5.0		0.648		27.6	LOS B	20.7	151.0				
Intersection				3897	5.0		0.652		26.5	LOS B	20.7	151.0				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program

LANE SUMMARY

Intersection 612 - PM Peak - 25/05/11
Princes Hwy
Officer Sth Rd / Tivendale Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Station St																
Lane 1	151	0	0	151	5.0	363[1]	0.415	100	21.5	LOS A	3.0	21.6	50	Turn Bay	0.0	0.0
Lane 2	0	137	0	137	5.0	254	0.538	100	58.3	LOS A	7.5	54.6	280	–	0.0	0.0
Lane 3	0	0	84	84	5.0	198[1]	0.425	79[5]	63.5	LOS A	4.4	32.4	50	Turn Bay	0.0	0.0
Approach	151	137	84	372	5.0		0.538		44.6	LOS A	7.5	54.6				
East: Princes Hwy - East																
Lane 1	42	0	0	42	5.0	1210[1]	0.035	100	12.1	LOS A	0.1	0.8	80	Turn Bay	0.0	0.0
Lane 2	0	613	0	613	5.0	620	0.989	100	78.8	LOS E	49.0	357.7	480	–	0.0	0.0
Lane 3	0	613	0	613	5.0	620	0.989	100	78.8	LOS E	49.0	357.7	480	–	0.0	0.0
Lane 4	0	613	0	613	5.0	620	0.989	100	78.8	LOS E	49.0	357.7	480	–	0.0	0.0
Lane 5	0	0	87	87	5.0	121	0.723	100	74.3	LOS C	5.4	39.3	65	Turn Bay	0.0	0.0
Approach	42	1840	87	1969	5.0		0.989		77.2	LOS E	49.0	357.7				
North: Tivendale Rd																
Lane 1	99	56	267	422	5.0	425[1]	0.993	100	76.9	LOS E	24.1	175.7	120	–	0.0	39.9
Approach	99	56	267	422	5.0		0.993		76.9	LOS E	24.1	175.7				
West: Princes Hwy - West																
Lane 1	213	489	0	701	5.0	939	0.747	100	22.2	LOS C	24.5	178.7	340	–	0.0	0.0
Lane 2	0	653	0	653	5.0	875	0.747	100	23.6	LOS C	27.1	197.9	340	–	0.0	0.0
Lane 3	0	653	0	653	5.0	875	0.747	100	23.6	LOS C	27.1	197.9	340	–	0.0	0.0
Lane 4	0	0	355	355	5.0	362	0.979	100	94.3	LOS E	27.3	199.3	140	Turn Bay	0.0	37.3
Approach	213	1795	355	2362	5.0		0.979		33.8	LOS E	27.3	199.3				
Intersection				5125	5.0		0.993		54.8	LOS E	49.0	357.7				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program

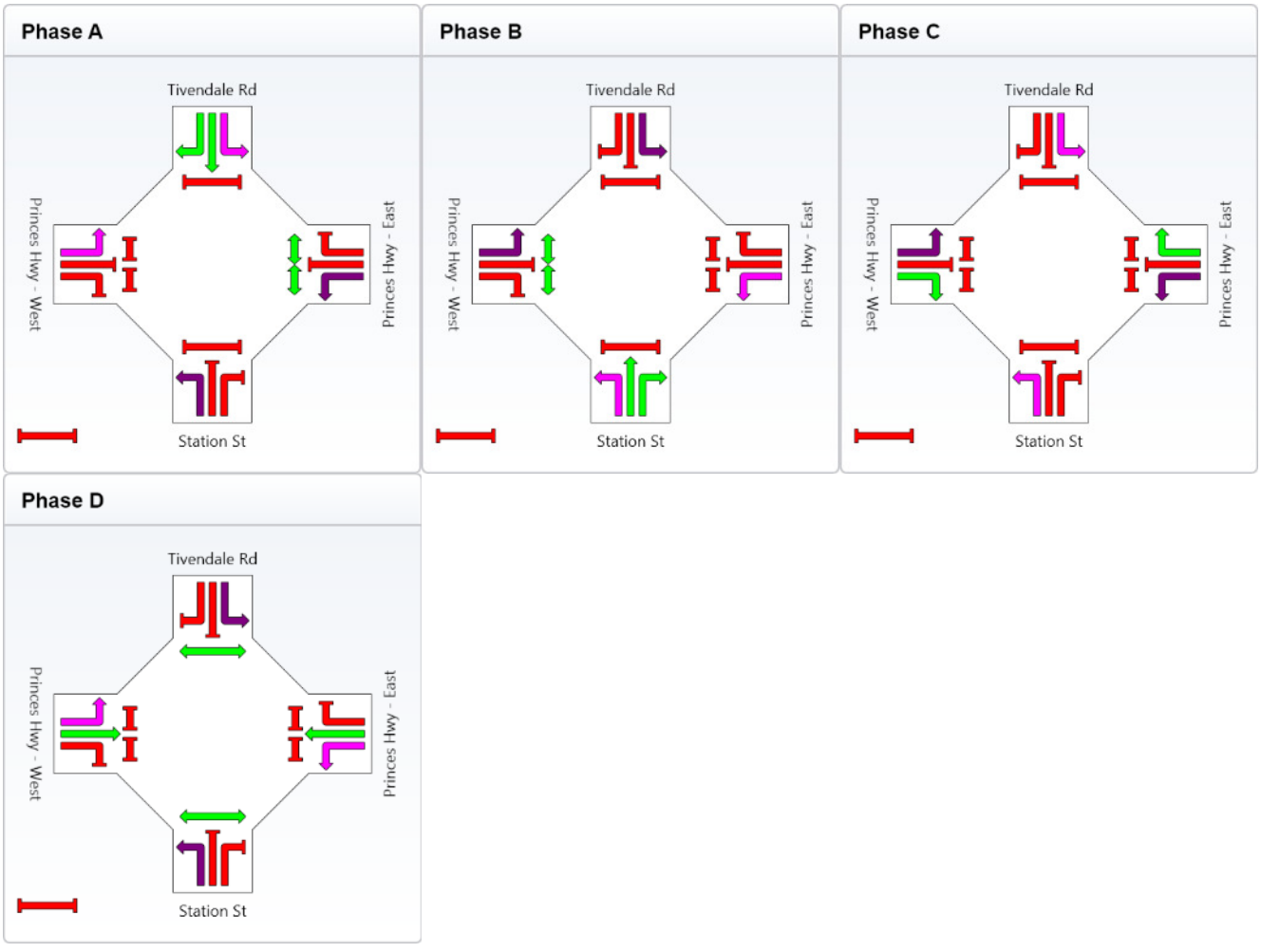
PHASING SUMMARY

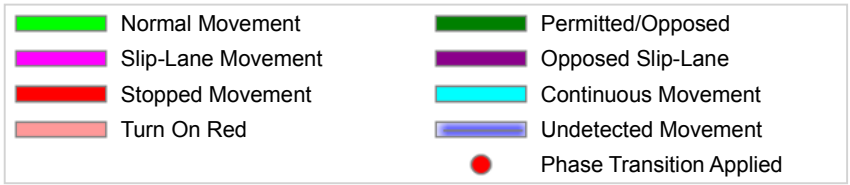
Intersection 612 - AM Peak - 25/05/11
Princes Hwy
Officer Sth Rd / Tivendale Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Modified
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	21	16	10	49
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	27	22	16	55
Phase Split	23 %	18 %	13 %	46 %





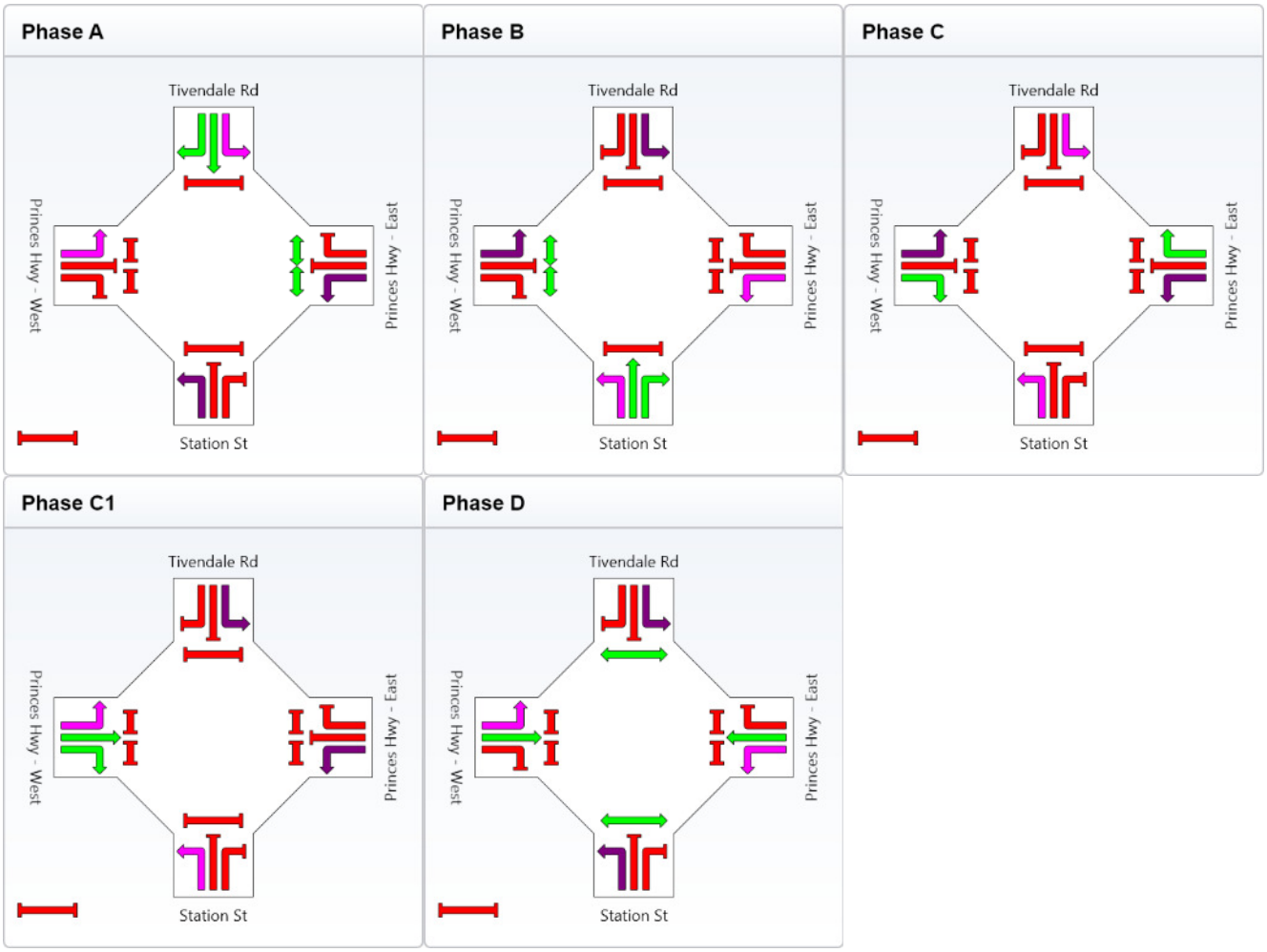
PHASING SUMMARY

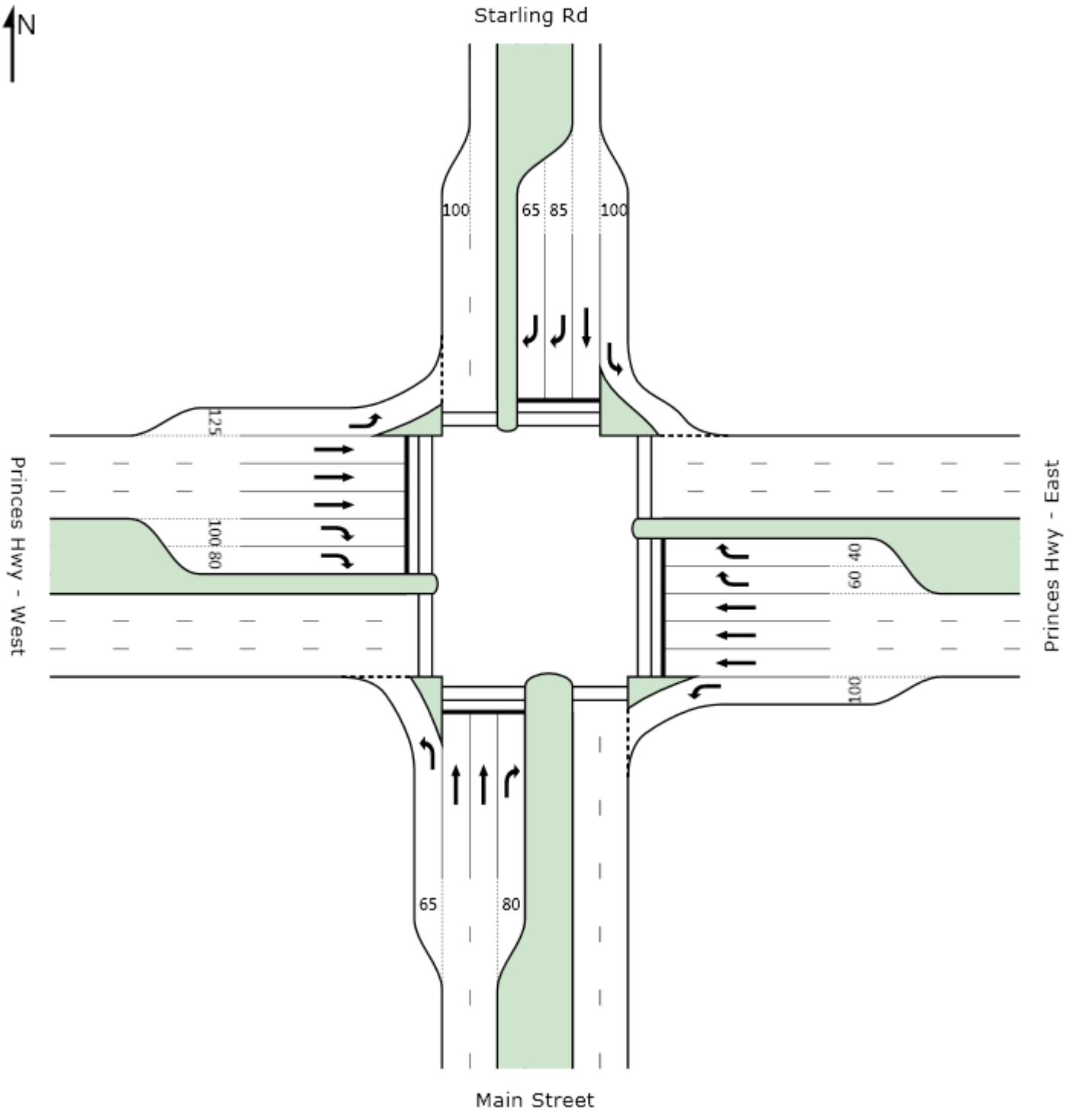
Intersection 612 - PM Peak - 25/05/11
Princes Hwy
Officer Sth Rd / Tivendale Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Modified 2
Input Sequence: A, B, C, C1, D
Output Sequence: A, B, C, C1, D

Phase Timing Results

Phase	A	B	C	C1	D
Green Time (sec)	17	16	8	10	39
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	23	22	14	16	45
Phase Split	19 %	18 %	12 %	13 %	38 %




N
Starling Rd
100
65
85
100
125
100
80
Princes Hwy - West
40
60
100
Princes Hwy - East
65
80
Main Street

LANE SUMMARY

Intersection 617 - AM Peak - 25/05/11
Princes Hwy
Starling Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Main Street																
Lane 1	29	0	0	29	5.0	493[1]	0.060	100	8.5	LOS A	0.1	0.6	65	Turn Bay	0.0	0.0
Lane 2	0	84	0	84	5.0	302	0.279	66[6]	48.6	LOS A	4.2	30.6	85	–	0.0	0.0
Lane 3	0	127	0	127	5.0	302	0.422	100	49.9	LOS A	6.6	48.0	85	–	0.0	0.0
Lane 4	0	0	114	114	5.0	226	0.502	100	62.0	LOS A	6.2	45.6	80	Turn Bay	0.0	0.0
Approach	29	212	114	355	5.0		0.502		50.0	LOS A	6.6	48.0				
East: Princes Hwy - East																
Lane 1	176	0	0	176	5.0	1264[1]	0.139	100	10.3	LOS A	0.4	3.2	100	Turn Bay	0.0	0.0
Lane 2	0	461	0	461	5.0	859	0.537	100	21.3	LOS A	15.7	115.0	390	–	0.0	0.0
Lane 3	0	461	0	461	5.0	859	0.537	100	21.3	LOS A	15.7	115.0	390	–	0.0	0.0
Lane 4	0	461	0	461	5.0	859	0.537	100	21.3	LOS A	15.7	115.0	390	–	0.0	0.0
Lane 5	0	0	23	23	5.0	121	0.193	62[6]	69.7	LOS A	1.3	9.7	60	Turn Bay	0.0	0.0
Lane 6	0	0	38	38	5.0	121	0.313	100	70.5	LOS A	2.2	16.0	40	Turn Bay	0.0	0.0
Approach	176	1382	61	1619	5.0		0.537		22.0	LOS A	15.7	115.0				
North: Starling Rd																
Lane 1	31	0	0	31	5.0	609[1]	0.050	100	8.4	LOS A	0.1	0.6	100	Turn Bay	0.0	0.0
Lane 2	0	137	0	137	5.0	302	0.453	100	50.2	LOS A	7.1	52.0	120	–	0.0	0.0
Lane 3	0	0	87	87	5.0	226	0.383	100	61.1	LOS A	4.7	34.0	85	Turn Bay	0.0	0.0
Lane 4	0	0	87	87	5.0	226	0.383	100	61.1	LOS A	4.7	34.0	65	Turn Bay	0.0	0.0
Approach	31	137	174	341	5.0		0.453		52.0	LOS A	7.1	52.0				
West: Princes Hwy - West																
Lane 1	63	0	0	63	5.0	1447	0.044	100	10.2	LOS A	0.1	1.0	125	Turn Bay	0.0	0.0
Lane 2	0	430	0	430	5.0	859	0.501	100	20.9	LOS A	14.2	104.0	480	–	0.0	0.0
Lane 3	0	430	0	430	5.0	859	0.501	100	20.9	LOS A	14.2	104.0	480	–	0.0	0.0
Lane 4	0	430	0	430	5.0	859	0.501	100	20.9	LOS A	14.2	104.0	480	–	0.0	0.0
Lane 5	0	0	57	57	5.0	121	0.471	100	71.4	LOS A	3.4	24.5	100	Turn Bay	0.0	0.0
Lane 6	0	0	57	57	5.0	121	0.471	100	71.4	LOS A	3.4	24.5	80	Turn Bay	0.0	0.0
Approach	63	1291	114	1467	5.0		0.501		24.3	LOS A	14.2	104.0				
Intersection				3782	5.0		0.537		28.2	LOS A	15.7	115.0				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 617 - PM Peak - 25/05/11
Princes Hwy
Starling Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Main Street																
Lane 1	309	0	0	309	5.0	725[1]	0.427	100	9.2	LOS A	1.6	11.6	65	Turn Bay	0.0	0.0
Lane 2	0	59	0	59	5.0	318	0.186	66[6]	46.7	LOS A	2.8	20.7	85	–	0.0	0.0
Lane 3	0	89	0	89	5.0	318	0.281	100	47.7	LOS A	4.4	32.1	85	–	0.0	0.0
Lane 4	0	0	232	232	5.0	316[1]	0.732	100	58.1	LOS C	12.7	92.4	80	Turn Bay	0.0	18.0
Approach	309	148	232	689	5.0		0.732		33.8	LOS C	12.7	92.4				
East: Princes Hwy - East																
Lane 1	132	0	0	132	5.0	1147[1]	0.115	100	10.6	LOS A	0.4	2.6	100	Turn Bay	0.0	0.0
Lane 2	0	456	0	456	5.0	668	0.684	100	33.8	LOS B	20.9	152.4	390	–	0.0	0.0
Lane 3	0	456	0	456	5.0	668	0.684	100	33.8	LOS B	20.9	152.4	390	–	0.0	0.0
Lane 4	0	456	0	456	5.0	668	0.684	100	33.8	LOS B	20.9	152.4	390	–	0.0	0.0
Lane 5	0	0	16	16	5.0	166	0.094	62[6]	65.1	LOS A	0.8	6.1	60	Turn Bay	0.0	0.0
Lane 6	0	0	23	23	5.0	154[1]	0.152	100	65.6	LOS A	1.3	9.2	40	Turn Bay	0.0	0.0
Approach	132	1369	39	1540	5.0		0.684		32.6	LOS B	20.9	152.4				
North: Starling Rd																
Lane 1	69	0	0	69	5.0	640[1]	0.108	100	13.3	LOS A	0.9	6.3	100	Turn Bay	0.0	0.0
Lane 2	0	234	0	234	5.0	318	0.735	100	53.4	LOS C	13.2	96.6	120	–	0.0	0.0
Lane 3	0	0	41	41	5.0	347	0.119	100	51.0	LOS A	1.9	13.6	85	Turn Bay	0.0	0.0
Lane 4	0	0	33	33	5.0	280[1]	0.119	100	50.7	LOS A	1.5	10.9	65	Turn Bay	0.0	0.0
Approach	69	234	75	378	5.0		0.735		45.5	LOS C	13.2	96.6				
West: Princes Hwy - West																
Lane 1	184	0	0	184	5.0	1434[1]	0.128	100	10.2	LOS A	0.4	3.0	125	Turn Bay	0.0	0.0
Lane 2	0	481	0	481	5.0	668	0.721	100	34.4	LOS C	22.6	165.0	480	–	0.0	0.0
Lane 3	0	481	0	481	5.0	668	0.721	100	34.4	LOS C	22.6	165.0	480	–	0.0	0.0
Lane 4	0	481	0	481	5.0	668	0.721	100	34.4	LOS C	22.6	165.0	480	–	0.0	0.0
Lane 5	0	0	113	113	5.0	166	0.678	100	70.1	LOS B	6.7	48.8	100	Turn Bay	0.0	0.0
Lane 6	0	0	113	113	5.0	166	0.678	100	70.1	LOS B	6.7	48.8	80	Turn Bay	0.0	0.0
Approach	184	1444	225	1854	5.0		0.721		36.3	LOS C	22.6	165.0				
Intersection				4461	5.0		0.735		35.4	LOS C	22.6	165.0				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

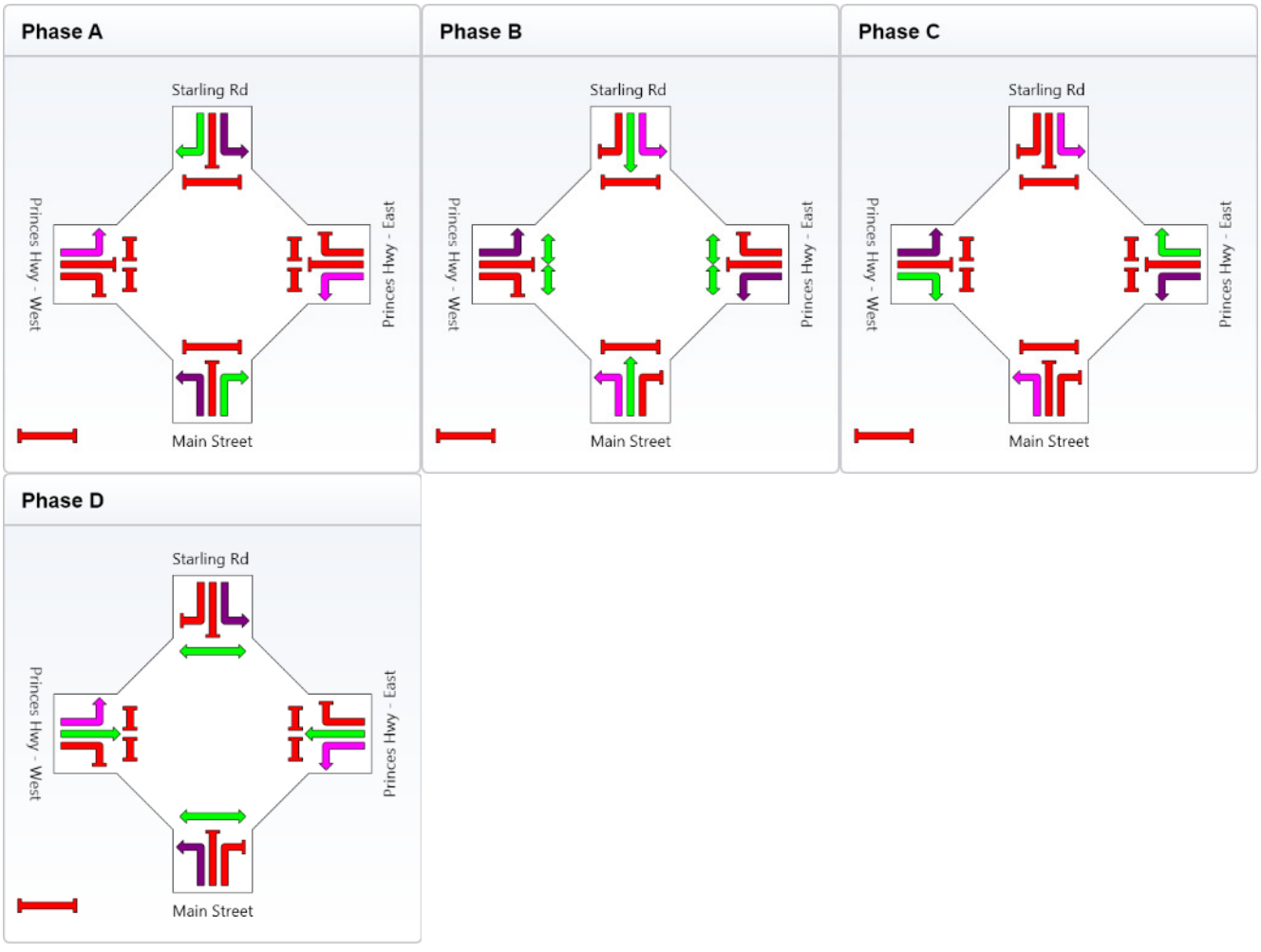
PHASING SUMMARY

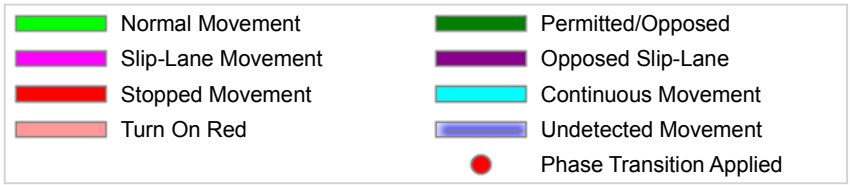
Intersection 617 - AM Peak - 25/05/11
Princes Hwy
Starling Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Leading Right Turn (phase reduction applied)
Input Sequence: A, A1, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	15	19	8	54
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	21	25	14	60
Phase Split	18 %	21 %	12 %	50 %





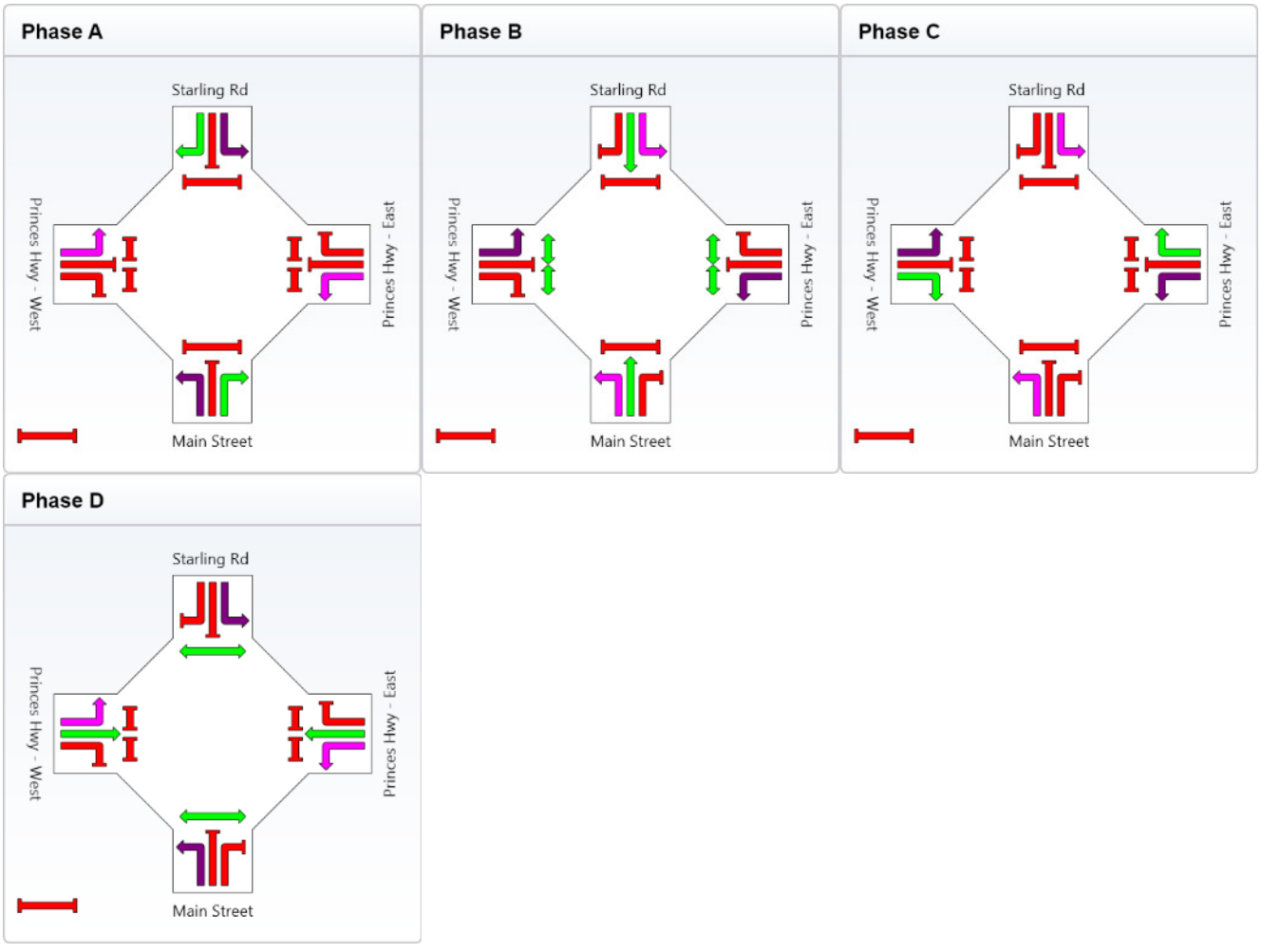
PHASING SUMMARY

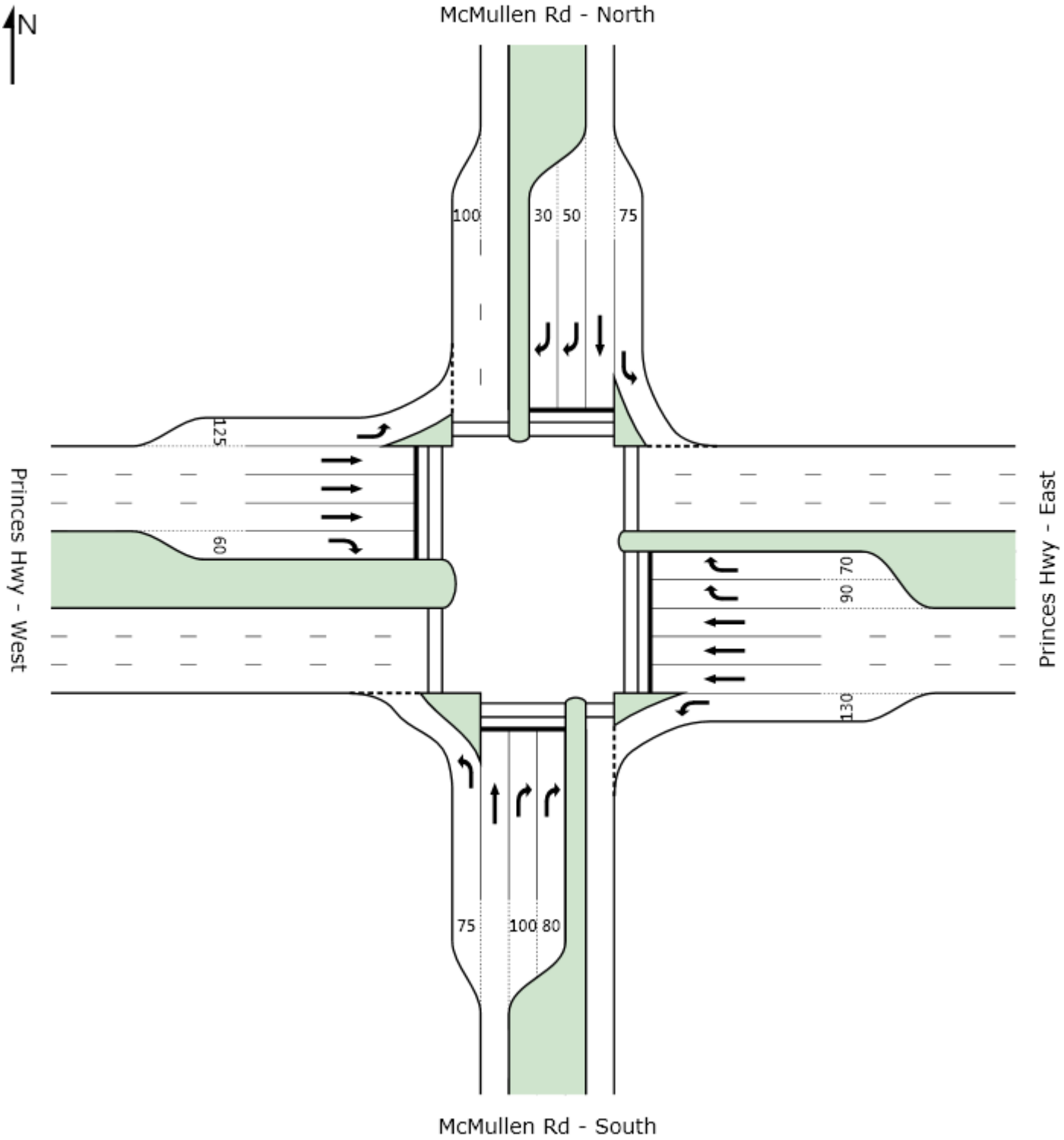
Intersection 617 - PM Peak - 25/05/11
Princes Hwy
Starling Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Leading Right Turn (phase reduction applied)
Input Sequence: A, A1, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	23	20	11	42
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	29	26	17	48
Phase Split	24 %	22 %	14 %	40 %




N
McMullen Rd - North
100
30
50
75
125
60
Princes Hwy - West
Princes Hwy - East
70
90
130
75
100
80
McMullen Rd - South

LANE SUMMARY

Intersection 622 - AM Peak - 25/05/11
Princes Hwy
McMullen Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: McMullen Rd - South																
Lane 1	120	0	0	120	5.0	468[1]	0.256	100	8.6	LOS A	0.4	2.8	75	Turn Bay	0.0	0.0
Lane 2	0	74	0	74	5.0	302	0.244	100	48.2	LOS A	3.6	26.6	220	–	0.0	0.0
Lane 3	0	0	106	106	5.0	196	0.539	100	64.3	LOS A	6.0	43.6	100	Turn Bay	0.0	0.0
Lane 4	0	0	106	106	5.0	196	0.539	100	64.3	LOS A	6.0	43.6	80	Turn Bay	0.0	0.0
Approach	120	74	212	405	5.0		0.539		44.9	LOS A	6.0	43.6				
East: Princes Hwy - East																
Lane 1	219	0	0	219	5.0	1535	0.143	100	10.1	LOS A	0.5	3.3	130	Turn Bay	0.0	0.0
Lane 2	0	487	0	487	5.0	859	0.567	100	21.7	LOS A	17.1	124.8	500	–	0.0	0.0
Lane 3	0	487	0	487	5.0	859	0.567	100	21.7	LOS A	17.1	124.8	500	–	0.0	0.0
Lane 4	0	487	0	487	5.0	859	0.567	100	21.7	LOS A	17.1	124.8	500	–	0.0	0.0
Lane 5	0	0	52	52	5.0	151	0.346	62[6]	68.3	LOS A	3.0	21.6	90	Turn Bay	0.0	0.0
Lane 6	0	0	85	85	5.0	151	0.561	100	69.8	LOS A	4.9	36.1	70	Turn Bay	0.0	0.0
Approach	219	1460	137	1816	5.0		0.567		23.9	LOS A	17.1	124.8				
North: McMullen Rd - North																
Lane 1	233	0	0	233	5.0	468[1]	0.497	100	8.8	LOS A	1.0	7.2	75	Turn Bay	0.0	0.0
Lane 2	0	49	0	49	5.0	302	0.164	100	47.5	LOS A	2.4	17.5	500	–	0.0	0.0
Lane 3	0	0	78	78	5.0	196	0.396	100	63.2	LOS A	4.3	31.2	50	Turn Bay	0.0	0.0
Lane 4	0	0	48	48	5.0	120[1]	0.396	100	61.9	LOS A	2.5	18.6	30	Turn Bay	0.0	0.0
Approach	233	49	125	407	5.0		0.497		30.1	LOS A	4.3	31.2				
West: Princes Hwy - West																
Lane 1	151	0	0	151	5.0	1460	0.103	100	10.2	LOS A	0.4	2.6	125	Turn Bay	0.0	0.0
Lane 2	0	421	0	421	5.0	859	0.490	100	20.7	LOS A	13.8	100.9	390	–	0.0	0.0
Lane 3	0	421	0	421	5.0	859	0.490	100	20.7	LOS A	13.8	100.9	390	–	0.0	0.0
Lane 4	0	421	0	421	5.0	859	0.490	100	20.7	LOS A	13.8	100.9	390	–	0.0	0.0
Lane 5	0	0	17	17	5.0	151	0.112	100	66.4	LOS A	0.9	6.7	60	Turn Bay	0.0	0.0
Approach	151	1263	17	1431	5.0		0.490		20.2	LOS A	13.8	100.9				
Intersection				4059	5.0		0.567		25.3	LOS A	17.1	124.8				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 622 - PM Peak - 25/05/11
Princes Hwy
McMullen Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: McMullen Rd - South																
Lane 1	42	0	0	42	5.0	487[1]	0.087	100	9.1	LOS A	0.2	1.3	75	Turn Bay	0.0	0.0
Lane 2	0	69	0	69	5.0	286	0.243	100	49.2	LOS A	3.5	25.4	220	–	0.0	0.0
Lane 3	0	0	176	176	5.0	257	0.685	100	62.6	LOS B	10.0	72.8	100	Turn Bay	0.0	0.0
Lane 4	0	0	176	176	5.0	257	0.685	100	62.6	LOS B	10.0	72.8	80	Turn Bay	0.0	0.0
Approach	42	69	352	463	5.0		0.685		55.7	LOS B	10.0	72.8				
East: Princes Hwy - East																
Lane 1	284	0	0	284	5.0	1388	0.205	100	10.5	LOS A	0.8	6.0	130	Turn Bay	0.0	0.0
Lane 2	0	466	0	466	5.0	747	0.624	100	28.4	LOS B	19.2	140.4	500	–	0.0	0.0
Lane 3	0	466	0	466	5.0	747	0.624	100	28.4	LOS B	19.2	140.4	500	–	0.0	0.0
Lane 4	0	466	0	466	5.0	747	0.624	100	28.4	LOS B	19.2	140.4	500	–	0.0	0.0
Lane 5	0	0	89	89	5.0	211	0.420	62[6]	64.6	LOS A	4.8	35.4	90	Turn Bay	0.0	0.0
Lane 6	0	0	144	144	5.0	211	0.681	100	67.4	LOS B	8.3	60.9	70	Turn Bay	0.0	0.0
Approach	284	1399	233	1916	5.0		0.681		30.3	LOS B	19.2	140.4				
North: McMullen Rd - North																
Lane 1	137	0	0	137	5.0	487[1]	0.281	100	12.7	LOS A	1.7	12.2	75	Turn Bay	0.0	0.0
Lane 2	0	94	0	94	5.0	286	0.327	100	50.0	LOS A	4.8	34.9	500	–	0.0	0.0
Lane 3	0	0	95	95	5.0	201[1]	0.475	100	59.0	LOS A	5.0	36.4	50	Turn Bay	0.0	0.0
Lane 4	0	0	60	60	5.0	127[1]	0.475	100	57.8	LOS A	3.1	22.4	30	Turn Bay	0.0	0.0
Approach	137	94	156	386	5.0		0.475		40.2	LOS A	5.0	36.4				
West: Princes Hwy - West																
Lane 1	125	0	0	125	5.0	1401[1]	0.089	100	10.4	LOS A	0.3	2.2	125	Turn Bay	0.0	0.0
Lane 2	0	520	0	520	5.0	747	0.696	100	29.5	LOS B	22.7	165.9	390	–	0.0	0.0
Lane 3	0	520	0	520	5.0	747	0.696	100	29.5	LOS B	22.7	165.9	390	–	0.0	0.0
Lane 4	0	520	0	520	5.0	747	0.696	100	29.5	LOS B	22.7	165.9	390	–	0.0	0.0
Lane 5	0	0	145	145	5.0	211	0.687	100	67.5	LOS B	8.4	61.6	60	Turn Bay	0.0	7.4
Approach	125	1560	145	1831	5.0		0.696		31.2	LOS B	22.7	165.9				
Intersection				4596	5.0		0.696		34.1	LOS B	22.7	165.9				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

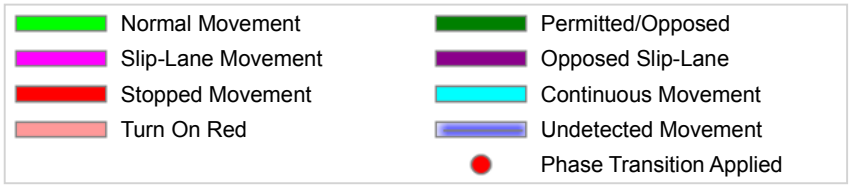
PHASING SUMMARY

Intersection 622 - AM Peak - 25/05/11
Princes Hwy
McMullen Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	13	19	10	54
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	19	25	16	60
Phase Split	16 %	21 %	13 %	50 %



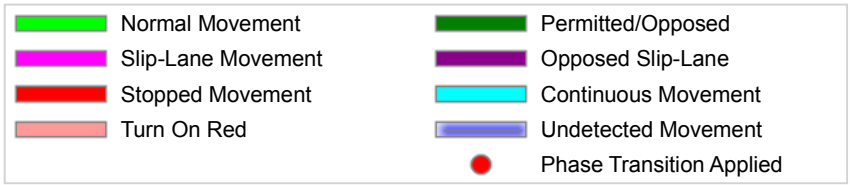
PHASING SUMMARY

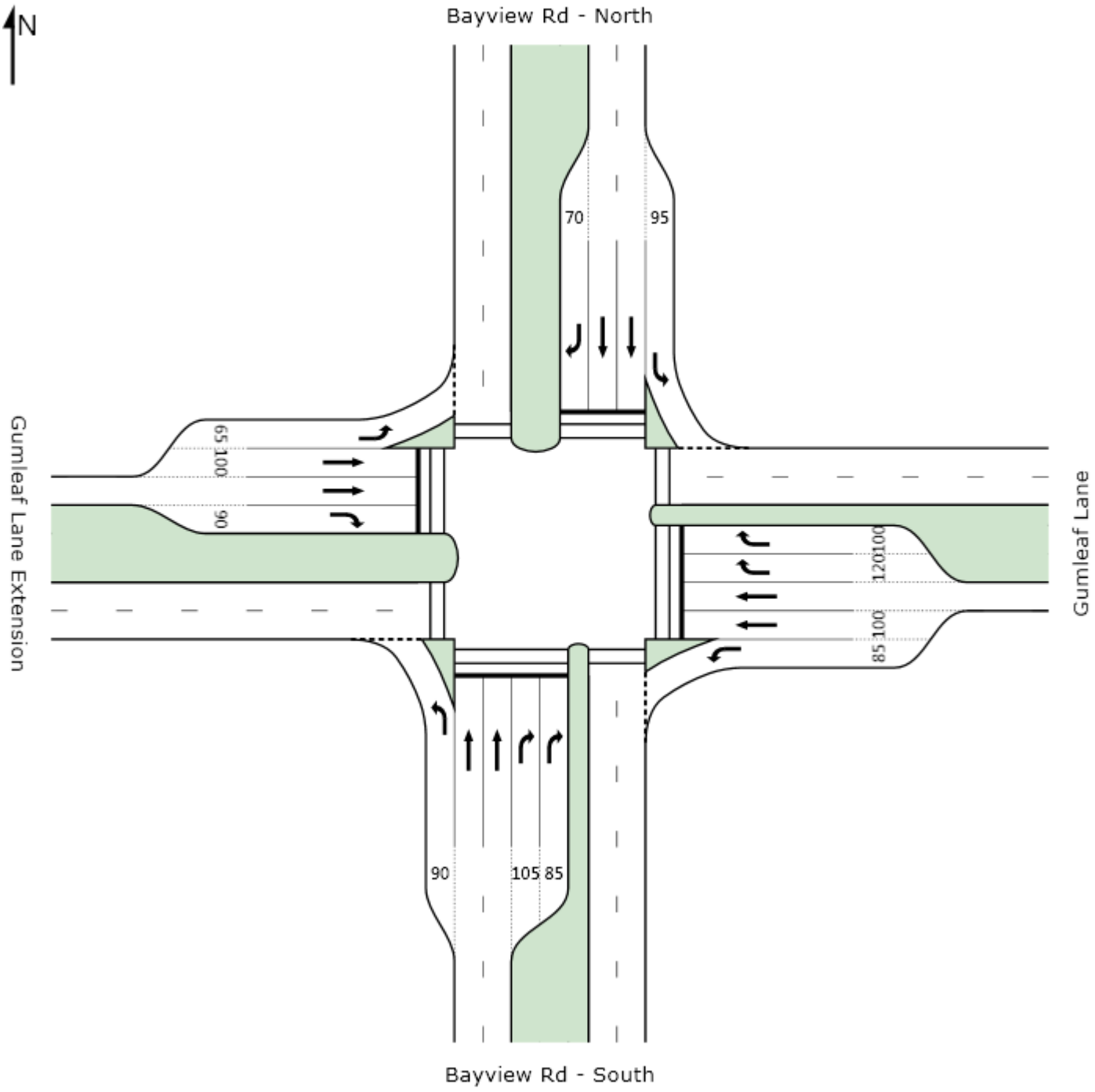
Intersection 622 - PM Peak - 25/05/11
Princes Hwy
McMullen Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	17	18	14	47
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	23	24	20	53
Phase Split	19 %	20 %	17 %	44 %




N
Bayview Rd - North
70
95
65
100
90
120
100
85
100
Gumleaf Lane Extension
Gumleaf Lane
90
105
85
Bayview Rd - South

LANE SUMMARY

Intersection 1875 - AM Peak - 25/05/11
Bayview Rd
Gumleaf Lane
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bayview Rd - South																
Lane 1	112	0	0	112	5.0	1356[1]	0.082	100	10.1	LOS A	0.2	1.5	90	Turn Bay	0.0	0.0
Lane 2	0	163	0	163	5.0	572	0.284	100	34.0	LOS A	6.4	46.9	500	–	0.0	0.0
Lane 3	0	163	0	163	5.0	572	0.284	100	34.0	LOS A	6.4	46.9	500	–	0.0	0.0
Lane 4	0	0	166	166	5.0	347	0.479	100	57.1	LOS A	8.4	61.2	105	Turn Bay	0.0	0.0
Lane 5	0	0	166	166	5.0	347	0.479	100	57.1	LOS A	8.4	61.2	85	Turn Bay	0.0	0.0
Approach	112	325	333	769	5.0		0.479		40.5	LOS A	8.4	61.2				
East: Gumleaf Lane																
Lane 1	500	0	0	500	5.0	853[1]	0.586	100	8.8	LOS A	2.4	17.5	85	Turn Bay	0.0	0.0
Lane 2	0	12	0	12	5.0	398	0.030	100	40.4	LOS A	0.5	3.7	100	Turn Bay	0.0	0.0
Lane 3	0	12	0	12	5.0	398	0.030	100	40.4	LOS A	0.5	3.7	465	–	0.0	0.0
Lane 4	0	0	7	7	5.0	181	0.038	100	61.1	LOS A	0.4	2.6	120	Turn Bay	0.0	0.0
Lane 5	0	0	7	7	5.0	181	0.038	100	61.1	LOS A	0.4	2.6	100	Turn Bay	0.0	0.0
Approach	500	24	14	538	5.0		0.586		11.5	LOS A	2.4	17.5				
North: Bayview Rd - North																
Lane 1	143	0	0	143	5.0	1173[1]	0.122	100	10.3	LOS A	0.3	2.5	95	Turn Bay	0.0	0.0
Lane 2	0	271	0	271	5.0	572	0.474	100	36.3	LOS A	11.7	85.7	280	–	0.0	0.0
Lane 3	0	271	0	271	5.0	572	0.474	100	36.3	LOS A	11.7	85.7	280	–	0.0	0.0
Lane 4	0	0	47	47	5.0	296[1]	0.160	100	53.4	LOS A	2.2	15.7	70	Turn Bay	0.0	0.0
Approach	143	542	47	733	5.0		0.474		32.3	LOS A	11.7	85.7				
West: Gumleaf Lane Extension																
Lane 1	61	0	0	61	5.0	1071[1]	0.057	100	8.0	LOS A	0.1	0.9	65	Turn Bay	0.0	0.0
Lane 2	0	21	0	21	5.0	398	0.053	100	40.7	LOS A	0.9	6.6	100	Turn Bay	0.0	0.0
Lane 3	0	21	0	21	5.0	398	0.053	100	40.7	LOS A	0.9	6.6	500	–	0.0	0.0
Lane 4	0	0	83	83	5.0	181	0.459	100	64.7	LOS A	4.7	34.1	90	Turn Bay	0.0	0.0
Approach	61	42	83	186	5.0		0.459		40.7	LOS A	4.7	34.1				
Intersection				2226	5.0		0.586		30.8	LOS A	11.7	85.7				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

LANE SUMMARY

Intersection 1875 - PM Peak - 25/05/11
Bayview Rd
Gumleaf Lane
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bayview Rd - South																
Lane 1	83	0	0	83	5.0	1327[1]	0.063	100	10.1	LOS A	0.1	1.1	90	Turn Bay	0.0	0.0
Lane 2	0	289	0	289	5.0	398	0.728	100	49.2	LOS C	15.8	115.2	500	–	0.0	0.0
Lane 3	0	289	0	289	5.0	398	0.728	100	49.2	LOS C	15.8	115.2	500	–	0.0	0.0
Lane 4	0	0	364	364	5.0	463[1]	0.785	100	50.4	LOS C	18.0	131.2	105	Turn Bay	0.0	25.2
Lane 5	0	0	313	313	5.0	399[1]	0.785	100	49.8	LOS C	14.9	108.9	85	Turn Bay	0.0	27.6
Approach	83	579	677	1339	5.0		0.785		47.2	LOS C	18.0	131.2				
East: Gumleaf Lane																
Lane 1	509	0	0	509	5.0	911[1]	0.559	100	8.6	LOS A	2.1	15.6	85	Turn Bay	0.0	0.0
Lane 2	0	21	0	21	5.0	398	0.053	100	40.7	LOS A	0.9	6.6	100	Turn Bay	0.0	0.0
Lane 3	0	21	0	21	5.0	398	0.053	100	40.7	LOS A	0.9	6.6	465	–	0.0	0.0
Lane 4	0	0	72	72	5.0	136	0.527	100	68.5	LOS A	4.2	30.7	120	Turn Bay	0.0	0.0
Lane 5	0	0	72	72	5.0	136	0.527	100	68.5	LOS A	4.2	30.7	100	Turn Bay	0.0	0.0
Approach	509	42	143	695	5.0		0.559		22.9	LOS A	4.2	30.7				
North: Bayview Rd - North																
Lane 1	14	0	0	14	5.0	976[1]	0.014	100	10.5	LOS A	0.0	0.2	95	Turn Bay	0.0	0.0
Lane 2	0	197	0	197	5.0	398	0.497	100	45.6	LOS A	9.8	71.4	280	–	0.0	0.0
Lane 3	0	197	0	197	5.0	398	0.497	100	45.6	LOS A	9.8	71.4	280	–	0.0	0.0
Lane 4	0	0	61	61	5.0	362[1]	0.169	100	40.8	LOS A	2.2	15.9	70	Turn Bay	0.0	0.0
Approach	14	395	61	469	5.0		0.497		44.0	LOS A	9.8	71.4				
West: Gumleaf Lane Extension																
Lane 1	47	0	0	47	5.0	697[1]	0.068	100	8.4	LOS A	0.1	0.9	65	Turn Bay	0.0	0.0
Lane 2	0	12	0	12	5.0	398	0.030	100	40.4	LOS A	0.5	3.7	100	Turn Bay	0.0	0.0
Lane 3	0	12	0	12	5.0	398	0.030	100	40.4	LOS A	0.5	3.7	500	–	0.0	0.0
Lane 4	0	0	112	112	5.0	136	0.821	100	73.4	LOS C	7.0	51.4	90	Turn Bay	0.0	0.0
Approach	47	24	112	183	5.0		0.821		52.2	LOS C	7.0	51.4				
Intersection				2686	5.0		0.821		40.7	LOS C	18.0	131.2				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

PHASING SUMMARY

Intersection 1875 - AM Peak - 25/05/11
Bayview Rd
Gumleaf Lane
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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)	23	36	12	25
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	29	42	18	31
Phase Split	24 %	35 %	15 %	26 %

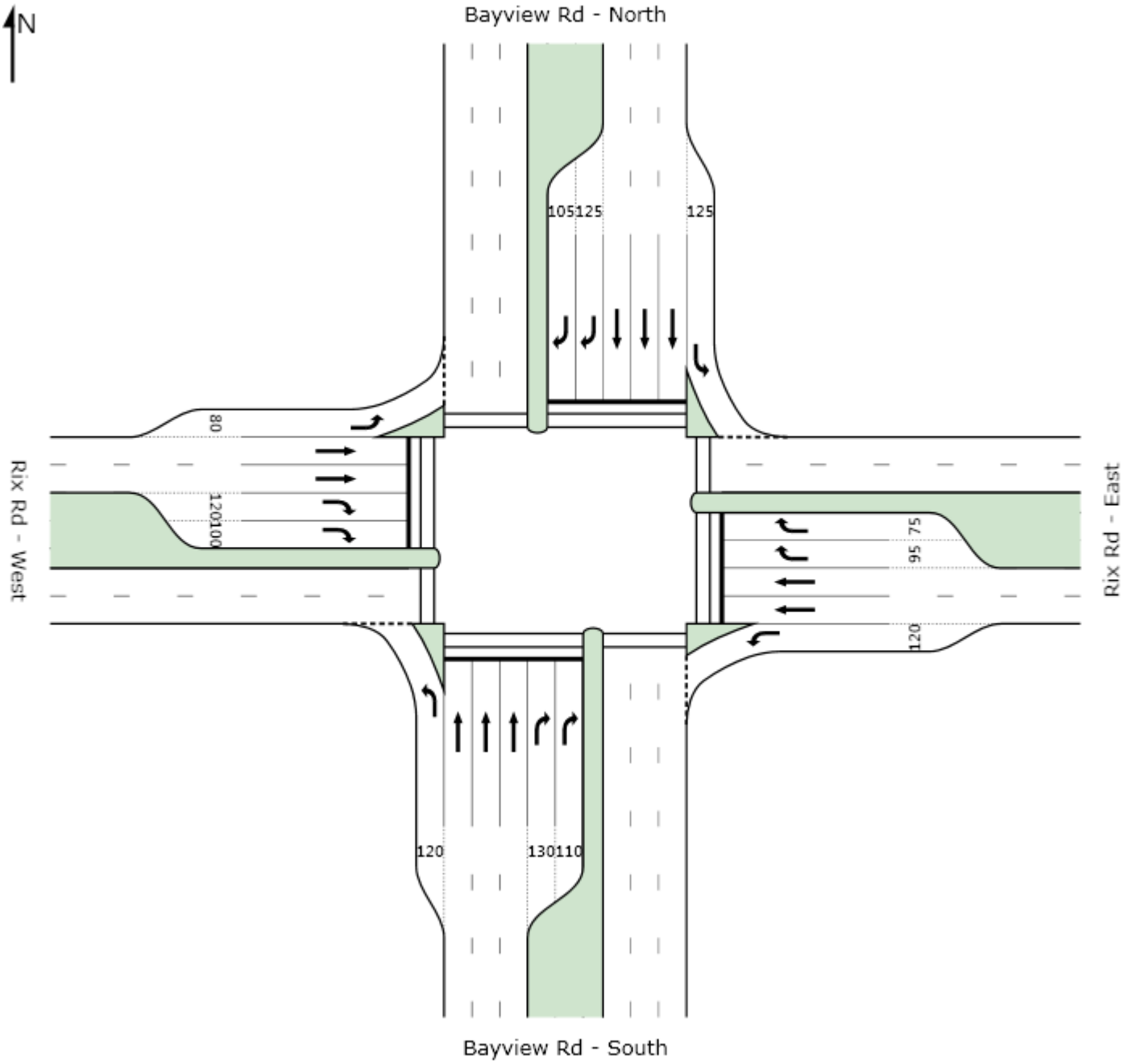
PHASING SUMMARY

Intersection 1875 - PM Peak - 25/05/11
Bayview Rd
Gumleaf Lane
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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	25	9	25
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	43	31	15	31
Phase Split	36 %	26 %	13 %	26 %


N
Bayview Rd - North
105
125
125
80
120
100
Rix Rd - West
95
75
120
Rix Rd - East
120
130
110
Bayview Rd - South

LANE SUMMARY

Intersection 1035 - AM Peak - 25/05/11
Bayview Rd
Rix Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bayview Rd - South																
Lane 1	28	0	0	28	5.0	1117[1]	0.025	100	10.3	LOS A	0.1	0.4	120	Turn Bay	0.0	0.0
Lane 2	0	198	0	198	5.0	779	0.254	100	22.1	LOS A	6.1	44.2	275	–	0.0	0.0
Lane 3	0	198	0	198	5.0	779	0.254	100	22.1	LOS A	6.1	44.2	275	–	0.0	0.0
Lane 4	0	198	0	198	5.0	779	0.254	100	22.1	LOS A	6.1	44.2	275	–	0.0	0.0
Lane 5	0	0	396	396	5.0	612[1]	0.647	100	38.5	LOS B	15.9	116.2	130	Turn Bay	0.0	0.0
Lane 6	0	0	357	357	5.0	552[1]	0.647	100	37.7	LOS B	13.8	100.6	110	Turn Bay	0.0	0.0
Approach	28	595	753	1376	5.0		0.647		30.6	LOS B	15.9	116.2				
East: Rix Rd - East																
Lane 1	561	0	0	561	5.0	1298	0.432	100	10.3	LOS A	2.8	20.3	120	Turn Bay	0.0	0.0
Lane 2	0	82	0	82	5.0	302	0.270	100	48.5	LOS A	4.1	29.6	310	–	0.0	0.0
Lane 3	0	82	0	82	5.0	302	0.270	100	48.5	LOS A	4.1	29.6	310	–	0.0	0.0
Lane 4	0	0	39	39	5.0	91	0.436	100	73.2	LOS A	2.4	17.4	95	Turn Bay	0.0	0.0
Lane 5	0	0	39	39	5.0	91	0.436	100	73.2	LOS A	2.4	17.4	75	Turn Bay	0.0	0.0
Approach	561	163	79	803	5.0		0.436		24.2	LOS A	4.1	29.6				
North: Bayview Rd - North																
Lane 1	193	0	0	193	5.0	801[1]	0.241	100	11.0	LOS A	0.7	5.0	125	Turn Bay	0.0	0.0
Lane 2	0	251	0	251	5.0	398	0.630	100	47.2	LOS B	13.0	94.9	500	–	0.0	0.0
Lane 3	0	251	0	251	5.0	398	0.630	100	47.2	LOS B	13.0	94.9	500	–	0.0	0.0
Lane 4	0	251	0	251	5.0	398	0.630	100	47.2	LOS B	13.0	94.9	500	–	0.0	0.0
Lane 5	0	0	83	83	5.0	332	0.249	100	55.6	LOS A	3.9	28.7	125	Turn Bay	0.0	0.0
Lane 6	0	0	83	83	5.0	332	0.249	100	55.6	LOS A	3.9	28.7	105	Turn Bay	0.0	0.0
Approach	193	752	165	1109	5.0		0.630		42.2	LOS B	13.0	94.9				
West: Rix Rd - West																
Lane 1	100	0	0	100	5.0	814[1]	0.123	100	9.6	LOS A	0.2	1.7	80	Turn Bay	0.0	0.0
Lane 2	0	100	0	100	5.0	302	0.331	100	49.1	LOS A	5.0	36.8	140	–	0.0	0.0
Lane 3	0	100	0	100	5.0	302	0.331	100	49.1	LOS A	5.0	36.8	140	–	0.0	0.0
Lane 4	0	0	38	38	5.0	91	0.418	100	73.1	LOS A	2.3	16.7	120	Turn Bay	0.0	0.0
Lane 5	0	0	38	38	5.0	91	0.418	100	73.1	LOS A	2.3	16.7	100	Turn Bay	0.0	0.0
Approach	100	200	76	376	5.0		0.418		43.4	LOS A	5.0	36.8				
Intersection				3664	5.0		0.647		34.0	LOS B	15.9	116.2				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

LANE SUMMARY

Intersection 1035 - PM Peak - 25/05/11
Bayview Rd
Rix Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bayview Rd - South																
Lane 1	76	0	0	76	5.0	1432	0.053	100	10.4	LOS A	0.2	1.2	120	Turn Bay	0.0	0.0
Lane 2	0	333	0	333	5.0	890	0.374	100	17.9	LOS A	9.5	69.0	275	–	0.0	0.0
Lane 3	0	333	0	333	5.0	890	0.374	100	17.9	LOS A	9.5	69.0	275	–	0.0	0.0
Lane 4	0	333	0	333	5.0	890	0.374	100	17.9	LOS A	9.5	69.0	275	–	0.0	0.0
Lane 5	0	0	303	303	5.0	548[1]	0.553	100	46.3	LOS A	13.5	98.2	130	Turn Bay	0.0	0.0
Lane 6	0	0	271	271	5.0	490[1]	0.553	100	45.5	LOS A	11.7	85.1	110	Turn Bay	0.0	0.0
Approach	76	998	574	1647	5.0		0.553		27.3	LOS A	13.5	98.2				
East: Rix Rd - East																
Lane 1	765	0	0	765	5.0	1160[1]	0.660	100	10.5	LOS B	5.2	38.2	120	Turn Bay	0.0	0.0
Lane 2	0	117	0	117	5.0	318	0.367	100	48.5	LOS A	5.9	43.0	310	–	0.0	0.0
Lane 3	0	117	0	117	5.0	318	0.367	100	48.5	LOS A	5.9	43.0	310	–	0.0	0.0
Lane 4	0	0	105	105	5.0	166	0.634	100	68.8	LOS B	6.2	45.1	95	Turn Bay	0.0	0.0
Lane 5	0	0	105	105	5.0	166	0.634	100	68.8	LOS B	6.2	45.1	75	Turn Bay	0.0	0.0
Approach	765	234	211	1209	5.0		0.660		28.0	LOS B	6.2	45.1				
North: Bayview Rd - North																
Lane 1	97	0	0	97	5.0	893[1]	0.108	100	10.7	LOS A	0.3	1.9	125	Turn Bay	0.0	0.0
Lane 2	0	280	0	280	5.0	445	0.630	100	44.9	LOS B	14.2	103.6	500	–	0.0	0.0
Lane 3	0	280	0	280	5.0	445	0.630	100	44.9	LOS B	14.2	103.6	500	–	0.0	0.0
Lane 4	0	280	0	280	5.0	445	0.630	100	44.9	LOS B	14.2	103.6	500	–	0.0	0.0
Lane 5	0	0	50	50	5.0	136	0.368	100	69.7	LOS A	2.9	21.0	125	Turn Bay	0.0	0.0
Lane 6	0	0	50	50	5.0	136	0.368	100	69.7	LOS A	2.9	21.0	105	Turn Bay	0.0	0.0
Approach	97	841	100	1038	5.0		0.630		44.1	LOS B	14.2	103.6				
West: Rix Rd - West																
Lane 1	165	0	0	165	5.0	546[1]	0.303	100	10.0	LOS A	0.5	3.9	80	Turn Bay	0.0	0.0
Lane 2	0	98	0	98	5.0	318	0.309	100	47.9	LOS A	4.9	35.6	140	–	0.0	0.0
Lane 3	0	98	0	98	5.0	318	0.309	100	47.9	LOS A	4.9	35.6	140	–	0.0	0.0
Lane 4	0	0	14	14	5.0	166	0.086	100	64.3	LOS A	0.8	5.5	120	Turn Bay	0.0	0.0
Lane 5	0	0	14	14	5.0	166	0.086	100	64.3	LOS A	0.8	5.5	100	Turn Bay	0.0	0.0
Approach	165	197	28	391	5.0		0.309		33.1	LOS A	4.9	35.6				
Intersection				4285	5.0		0.660		32.1	LOS B	14.2	103.6				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

PHASING SUMMARY

Intersection 1035 - AM Peak - 25/05/11
Bayview Rd
Rix Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C	D	E
Green Time (sec)	6	19	22	18	25
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	12	25	28	24	31
Phase Split	10 %	21 %	23 %	20 %	26 %

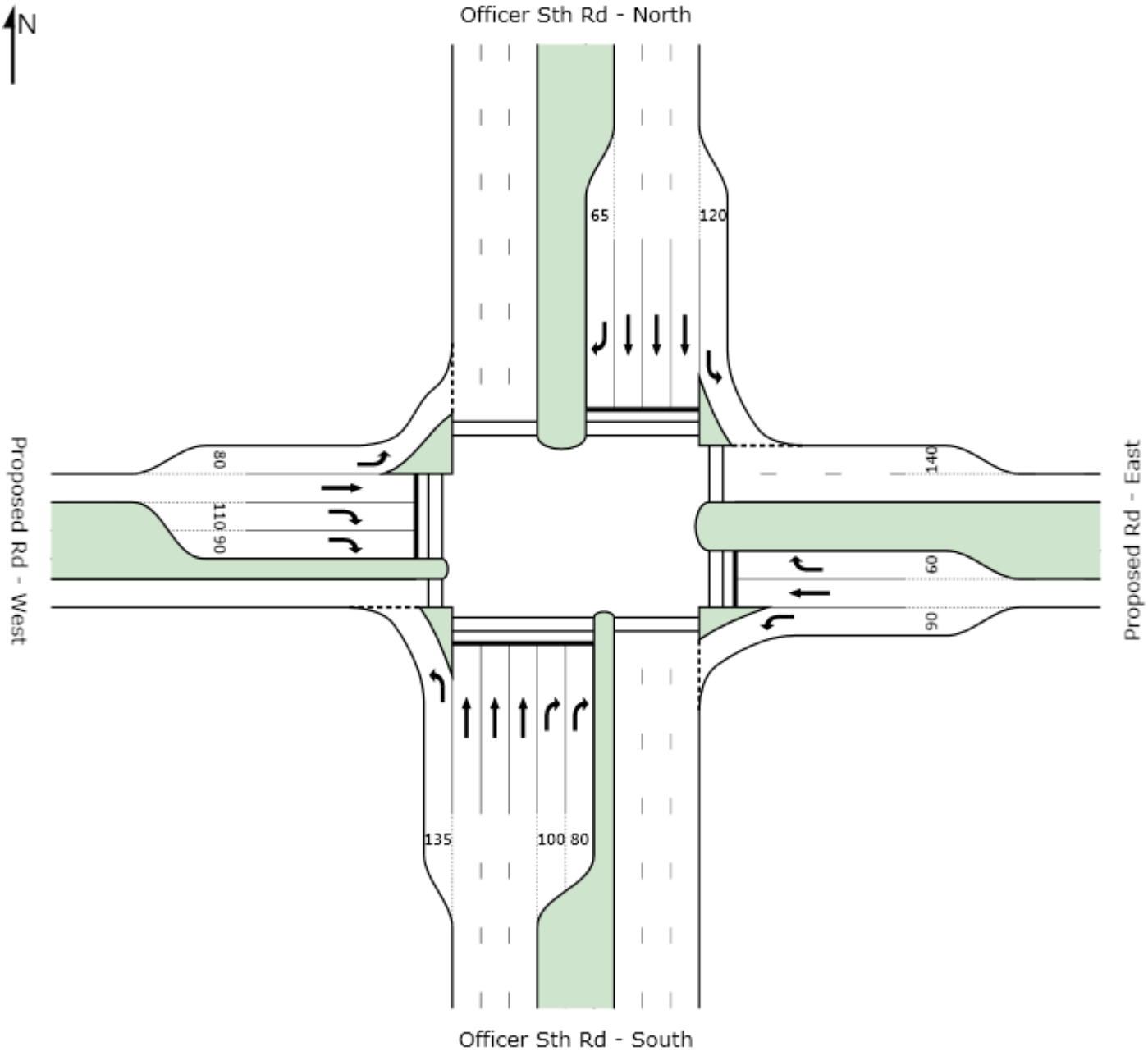
PHASING SUMMARY

Intersection 1035 - PM Peak - 25/05/11
Bayview Rd
Rix Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C	D	E
Green Time (sec)	11	20	9	22	28
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	17	26	15	28	34
Phase Split	14 %	22 %	13 %	23 %	28 %


N
Officer Sth Rd - North
65
120
Proposed Rd - West
80
110
90
140
60
90
Proposed Rd - East
135
100
80
Officer Sth Rd - South

LANE SUMMARY

Intersection 647 - AM Peak - 25/05/11
Officer Sth Rd
Proposed Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	314	0	0	314	5.0	1332[1]	0.236	100	10.2	LOS A	0.7	5.4	135	Turn Bay	0.0	0.0
Lane 2	0	421	0	421	5.0	557	0.756	100	42.2	LOS C	21.7	158.5	260	–	0.0	0.0
Lane 3	0	421	0	421	5.0	557	0.756	100	42.2	LOS C	21.7	158.5	260	–	0.0	0.0
Lane 4	0	421	0	421	5.0	557	0.756	100	42.2	LOS C	21.7	158.5	260	–	0.0	0.0
Lane 5	0	0	161	161	5.0	287	0.561	81[6]	62.1	LOS A	8.6	62.9	100	Turn Bay	0.0	0.0
Lane 6	0	0	198	198	5.0	287	0.691	100	64.0	LOS B	11.1	81.0	80	Turn Bay	0.0	6.2
Approach	314	1262	359	1935	5.0		0.756		40.9	LOS C	21.7	158.5				
East: Proposed Rd - East																
Lane 1	505	0	0	505	5.0	634[1]	0.797	100	20.4	LOS C	13.3	96.8	90	Turn Bay	0.0	11.5
Lane 2	0	23	0	23	5.0	302	0.077	100	46.5	LOS A	1.1	8.0	290	–	0.0	0.0
Lane 3	0	0	34	34	5.0	247[1]	0.136	100	53.0	LOS A	1.6	11.8	60	Turn Bay	0.0	0.0
Approach	505	23	34	562	5.0		0.797		23.5	LOS C	13.3	96.8				
North: Officer Sth Rd - North																
Lane 1	43	0	0	43	5.0	1348[1]	0.032	100	10.9	LOS A	0.1	0.7	120	Turn Bay	0.0	0.0
Lane 2	0	426	0	426	5.0	557	0.765	100	42.6	LOS C	22.2	162.0	275	–	0.0	0.0
Lane 3	0	426	0	426	5.0	557	0.765	100	42.6	LOS C	22.2	162.0	275	–	0.0	0.0
Lane 4	0	426	0	426	5.0	557	0.765	100	42.6	LOS C	22.2	162.0	275	–	0.0	0.0
Lane 5	0	0	64	64	5.0	262[1]	0.245	100	58.1	LOS A	3.2	23.1	65	Turn Bay	0.0	0.0
Approach	43	1278	64	1385	5.0		0.765		42.3	LOS C	22.2	162.0				
West: Proposed Rd - West																
Lane 1	99	0	0	99	5.0	1061[1]	0.093	100	8.6	LOS A	0.3	2.1	80	Turn Bay	0.0	0.0
Lane 2	0	17	0	17	5.0	366	0.046	100	43.7	LOS A	0.7	5.4	140	–	0.0	0.0
Lane 3	0	0	272	272	5.0	347	0.784	100	60.7	LOS C	15.7	114.3	110	Turn Bay	0.0	8.5
Lane 4	0	0	272	272	5.0	347	0.784	100	60.7	LOS C	15.7	114.3	90	Turn Bay	0.0	26.8
Approach	99	17	544	660	5.0		0.784		52.5	LOS C	15.7	114.3				
Intersection				4542	5.0		0.797		40.9	LOS C	22.2	162.0				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Intersection 647 - PM Peak - 25/05/11
Officer Sth Rd
Proposed Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	544	0	0	544	5.0	1489	0.365	100	10.3	LOS A	1.8	12.8	135	Turn Bay	0.0	0.0
Lane 2	0	512	0	512	5.0	795	0.644	100	26.1	LOS B	20.6	150.4	260	–	0.0	0.0
Lane 3	0	512	0	512	5.0	795	0.644	100	26.1	LOS B	20.6	150.4	260	–	0.0	0.0
Lane 4	0	512	0	512	5.0	795	0.644	100	26.1	LOS B	20.6	150.4	260	–	0.0	0.0
Lane 5	0	0	249	249	5.0	362	0.687	81[6]	59.7	LOS B	13.4	97.7	100	Turn Bay	0.0	2.9
Lane 6	0	0	269	269	5.0	318[1]	0.846	100	66.0	LOS C	15.9	115.7	80	Turn Bay	0.0	38.8
Approach	544	1537	518	2599	5.0		0.846		30.2	LOS C	20.6	150.4				
East: Proposed Rd - East																
Lane 1	372	0	0	372	5.0	683[1]	0.544	100	14.0	LOS A	7.1	51.5	90	Turn Bay	0.0	0.0
Lane 2	0	23	0	23	5.0	302	0.077	100	46.5	LOS A	1.1	8.0	290	–	0.0	0.0
Lane 3	0	0	43	43	5.0	246[1]	0.175	100	53.3	LOS A	2.1	15.2	60	Turn Bay	0.0	0.0
Approach	372	23	43	438	5.0		0.544		19.6	LOS A	7.1	51.5				
North: Officer Sth Rd - North																
Lane 1	34	0	0	34	5.0	1269[1]	0.027	100	11.0	LOS A	0.1	0.6	120	Turn Bay	0.0	0.0
Lane 2	0	507	0	507	5.0	588	0.862	100	47.2	LOS C	29.5	215.7	275	–	0.0	0.0
Lane 3	0	507	0	507	5.0	588	0.862	100	47.2	LOS C	29.5	215.7	275	–	0.0	0.0
Lane 4	0	507	0	507	5.0	588	0.862	100	47.2	LOS C	29.5	215.7	275	–	0.0	0.0
Lane 5	0	0	99	99	5.0	166	0.596	100	69.1	LOS A	5.8	42.0	65	Turn Bay	0.0	0.0
Approach	34	1521	99	1654	5.0		0.862		47.8	LOS C	29.5	215.7				
West: Proposed Rd - West																
Lane 1	64	0	0	64	5.0	824[1]	0.078	100	8.8	LOS A	0.2	1.6	80	Turn Bay	0.0	0.0
Lane 2	0	29	0	29	5.0	254	0.116	100	51.2	LOS A	1.5	10.7	140	–	0.0	0.0
Lane 3	0	0	157	157	5.0	242	0.649	100	62.8	LOS B	8.9	64.6	110	Turn Bay	0.0	0.0
Lane 4	0	0	157	157	5.0	242	0.649	100	62.8	LOS B	8.9	64.6	90	Turn Bay	0.0	0.0
Approach	64	29	314	407	5.0		0.649		53.4	LOS B	8.9	64.6				
Intersection				5098	5.0		0.862		36.8	LOS C	29.5	215.7				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

PHASING SUMMARY

Intersection 647 - AM Peak - 25/05/11
Officer Sth Rd
Proposed Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Modified
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	23	19	19	35
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	29	25	25	41
Phase Split	24 %	21 %	21 %	34 %

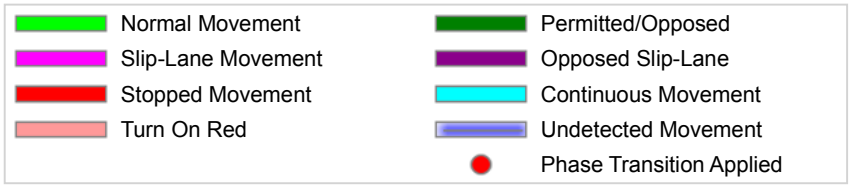
PHASING SUMMARY

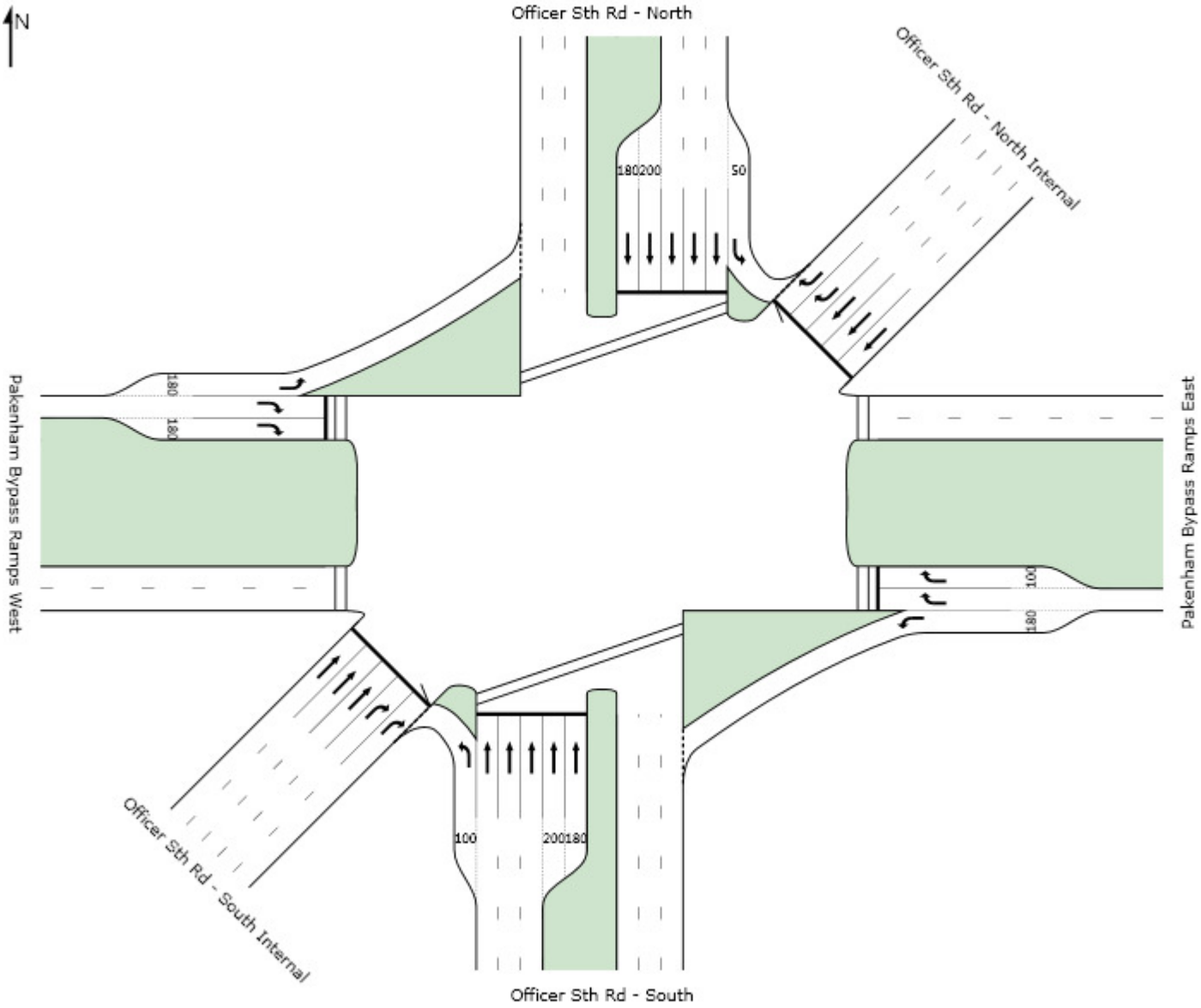
Intersection 647 - PM Peak - 25/05/11
Officer Sth Rd
Proposed Rd
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Modified 2
Input Sequence: A, B, C, D, E
Output Sequence: A, B, C, D, E

Phase Timing Results

Phase	A	B	C	D	E
Green Time (sec)	16	19	11	7	37
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	22	25	17	13	43
Phase Split	18 %	21 %	14 %	11 %	36 %




N
Officer Sth Rd - North
Officer Sth Rd - North Internal
180
200
50
Pakenham Bypass Ramps West
Pakenham Bypass Ramps East
180
180
100
180
Officer Sth Rd - South Internal
100
200
180
Officer Sth Rd - South

LANE SUMMARY

Site 1171 & 1172 - AM Peak - 25/05/11
Princes Freeway / Officer South Road

Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	421	0	0	421	5.0	561[1]	0.751	100	34.9	LOS C	13.6	99.3	100	Turn Bay	0.0	4.4
Lane 2	0	130	0	130	5.0	636	0.204	27[6]	35.1	LOS A	4.6	33.5	500	–	0.0	0.0
Lane 3	0	477	0	477	5.0	636	0.750	100	42.8	LOS C	23.4	170.7	500	–	0.0	0.0
Lane 4	0	477	0	477	5.0	636	0.750	100	42.8	LOS C	23.4	170.7	500	–	0.0	0.0
Lane 5	0	477	0	477	5.0	636	0.750	100	42.8	LOS C	23.4	170.7	200	Turn Bay	0.0	0.0
Lane 6	0	477	0	477	5.0	636	0.750	100	42.8	LOS C	23.4	170.7	180	Turn Bay	0.0	0.2
Approach	421	2037	0	2458	5.0		0.751		41.0	LOS C	23.4	170.7				
East: Pakenham Bypass Ramps East																
Lane 1	986	0	0	986	5.0	986[1]	1.000[3]	100	24.8[8]	LOS E[8]	40.3[8]	294.4[8]	180	Turn Bay	0.0	50.2
Lane 2	155[0]	0	5	160	5.0	393	0.406	100	53.2	LOS A	8.1	59.1	200	–	0.0	0.0
Lane 3	0	0	160	160	5.0	393	0.406	100	53.2	LOS A	8.1	59.1	100	Turn Bay	0.0	0.0
Approach	1141	0	164	1305	5.0		1.000		31.8	LOS E	40.3	294.4				
North East: Officer Sth Rd - North Internal																
Lane 1	0	571	0	571	5.0	636	0.898	100	24.0	LOS C	29.4	214.4	70	–	0.0	100.0
Lane 2	0	571	0	571	5.0	636	0.898	100	24.0	LOS C	29.4	214.4	70	–	0.0	100.0
Lane 3	0	571	0	571	5.0	636	0.898	100	24.0	LOS C	29.4	214.4	70	–	0.0	100.0
Lane 4	0	0	501	501	5.0	543	0.921	100	60.5	LOS D	33.1	241.8	70	–	0.0	100.0
Lane 5	0	0	501	501	5.0	543	0.921	100	60.5	LOS D	33.1	241.8	70	–	0.0	100.0
Approach	0	1714	1001	2715	5.0		0.921		37.5	LOS D	33.1	241.8				
North: Officer Sth Rd - North																
Lane 1	317	0	0	317	5.0	506[1]	0.626	100	18.0	LOS B	5.0	36.6	50	Turn Bay	0.0	0.0
Lane 2	0	127	0	127	5.0	636	0.200	27[6]	35.0	LOS A	4.5	32.9	260	–	0.0	0.0
Lane 3	0	468	0	468	5.0	636	0.736	100	42.3	LOS C	22.6	165.2	260	–	0.0	0.0
Lane 4	0	468	0	468	5.0	636	0.736	100	42.3	LOS C	22.6	165.2	260	–	0.0	0.0
Lane 5	0	468	0	468	5.0	636	0.736	100	42.3	LOS C	22.6	165.2	200	Turn Bay	0.0	0.0
Lane 6	0	468	0	468	5.0	636	0.736	100	42.3	LOS C	22.6	165.2	180	Turn Bay	0.0	0.0
Approach	317	2001	0	2318	5.0		0.736		38.6	LOS C	22.6	165.2				
West: Pakenham Bypass Ramps West																
Lane 1	595	0	0	595	5.0	1019[1]	0.584	100	15.9	LOS A	11.8	86.0	180	Turn Bay	0.0	0.0
Lane 2	0	0	357	357	5.0	393	0.909	100	74.7	LOS D	24.5	178.7	200	–	0.0	0.0
Lane 3	0	0	357	357	5.0	393	0.909	100	74.7	LOS D	24.5	178.7	180	Turn Bay	0.0	4.3
Approach	595	0	714	1308	5.0		0.909		48.0	LOS D	24.5	178.7				
South West: Officer Sth Rd - South Internal																
Lane 1	0	455	0	455	5.0	636	0.716	100	18.8	LOS C	17.0	123.9	70	–	0.0	57.6
Lane 2	0	455	0	455	5.0	636	0.716	100	18.8	LOS C	17.0	123.9	70	–	0.0	57.6
Lane 3	0	455	0	455	5.0	636	0.716	100	18.8	LOS C	17.0	123.9	70	–	0.0	57.6
Lane 4	0	0	418	418	5.0	543	0.769	100	44.8	LOS C	21.8	159.1	70	–	0.0	81.8
Lane 5	0	0	418	418	5.0	543	0.769	100	44.8	LOS C	21.8	159.1	70	–	0.0	81.8
Approach	0	1365	836	2201	5.0		0.769		28.7	LOS C	21.8	159.1				
Intersection				12305	5.0		1.000		37.3	LOS E	40.3	294.4				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
1 Reduced capacity due to a short lane effect
3 x = 1.00 due to short lane.

6 Lane underutilisation due to downstream effects

8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

LANE SUMMARY

Site: 1171 / 1172 - PM Peak - 25/05/11

Site 1171 & 1172 - PM Peak - 25/05/11
Princes Freeway / Officer South Road

Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Officer Sth Rd - South																
Lane 1	593	0	0	593	5.0	593[1]	1.000[3]	100	29.0[8]	LOS E[8]	22.4[8]	163.6[8]	100	Turn Bay	0.0	50.2
Lane 2	121[0]	34	0	155	5.0	672	0.231	27[6]	31.9	LOS A	5.2	37.9	500	–	0.0	0.0
Lane 3	0	595	0	595	5.0	700	0.850	100	45.2	LOS C	32.6	238.0	500	–	0.0	0.0
Lane 4	0	595	0	595	5.0	700	0.850	100	45.2	LOS C	32.6	238.0	500	–	0.0	0.0
Lane 5	0	595	0	595	5.0	700	0.850	100	45.2	LOS C	32.6	238.0	200	Turn Bay	0.0	20.8
Lane 6	0	595	0	595	5.0	700	0.850	100	45.2	LOS C	32.6	238.0	180	Turn Bay	0.0	30.4
Approach	714	2413	0	3126	5.0		1.000		41.4	LOS E	32.6	238.0				
East: Pakenham Bypass Ramps East																
Lane 1	836	0	0	836	5.0	953[1]	0.877	100	33.1	LOS C	36.6	267.4	180	Turn Bay	0.0	41.2
Lane 2	0	0	158	158	5.0	242	0.656	100	64.7	LOS B	9.2	66.9	200	–	0.0	0.0
Lane 3	0	0	158	158	5.0	242	0.656	100	64.7	LOS B	9.2	66.9	100	Turn Bay	0.0	0.0
Approach	836	0	317	1153	5.0		0.877		41.8	LOS C	36.6	267.4				
North East: Officer Sth Rd - North Internal																
Lane 1	0	631	0	631	5.0	700	0.902	100	20.0	LOS D	30.9	225.6	70	–	0.0	100.0
Lane 2	0	631	0	631	5.0	700	0.902	100	20.0	LOS D	30.9	225.6	70	–	0.0	100.0
Lane 3	0	631	0	631	5.0	700	0.902	100	20.0	LOS D	30.9	225.6	70	–	0.0	100.0
Lane 4	0	0	297	297	5.0	634	0.469	100	33.5	LOS A	11.8	86.5	70	–	0.0	24.2
Lane 5	0	0	297	297	5.0	634	0.469	100	33.5	LOS A	11.8	86.5	70	–	0.0	24.2
Approach	0	1894	595	2488	5.0		0.902		23.2	LOS D	30.9	225.6				
North: Officer Sth Rd - North																
Lane 1	164	0	0	164	5.0	383[1]	0.429	100	21.9	LOS A	2.8	20.4	50	Turn Bay	0.0	0.0
Lane 2	0	132	0	132	5.0	700	0.188	27[6]	31.4	LOS A	4.3	31.3	260	–	0.0	0.0
Lane 3	0	484	0	484	5.0	700	0.692	100	37.9	LOS B	21.8	159.2	260	–	0.0	0.0
Lane 4	0	484	0	484	5.0	700	0.692	100	37.9	LOS B	21.8	159.2	260	–	0.0	0.0
Lane 5	0	484	0	484	5.0	700	0.692	100	37.9	LOS B	21.8	159.2	200	Turn Bay	0.0	0.0
Lane 6	0	484	0	484	5.0	700	0.692	100	37.9	LOS B	21.8	159.2	180	Turn Bay	0.0	0.0
Approach	164	2067	0	2232	5.0		0.692		36.4	LOS B	21.8	159.2				
West: Pakenham Bypass Ramps West																
Lane 1	1001	0	0	1001	5.0	1066[1]	0.939	100	28.8[8]	LOS D[8]	40.2[8]	293.8[8]	180	Turn Bay	0.0	50.0
Lane 2	0	0	211	211	5.0	242	0.872	100	74.9	LOS C	13.8	100.6	200	–	0.0	0.0
Lane 3	0	0	211	211	5.0	242	0.872	100	74.9	LOS C	13.8	100.6	180	Turn Bay	0.0	0.0
Approach	1001	0	421	1422	5.0		0.939		42.4	LOS D	40.2	293.8				
South West: Officer Sth Rd - South Internal																
Lane 1	0	529	0	529	5.0	700	0.757	100	15.1	LOS C	18.5	135.4	70	–	0.0	66.1
Lane 2	0	529	0	529	5.0	700	0.757	100	15.1	LOS C	18.5	135.4	70	–	0.0	66.1
Lane 3	0	529	0	529	5.0	700	0.757	100	15.1	LOS C	18.5	135.4	70	–	0.0	66.1
Lane 4	0	0	571	571	5.0	634	0.900	100	51.0	LOS C	35.3	257.9	70	–	0.0	100.0
Lane 5	0	0	571	571	5.0	634	0.900	100	51.0	LOS C	35.3	257.9	70	–	0.0	100.0
Approach	0	1588	1141	2729	5.0		0.900		30.1	LOS C	35.3	257.9				
Intersection				13151	5.0		1.000		34.9	LOS E	40.2	293.8				

Level of Service (LOS) Method: Degree of Saturation (SIDRA METHOD).
Lane LOS values are based on degree of saturation per lane.
Intersection and Approach LOS values are based on worst degree of saturation for any lane.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
1 Reduced capacity due to a short lane effect
3 x = 1.00 due to short lane.

6 Lane underutilisation due to downstream effects

8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

PHASING SUMMARY

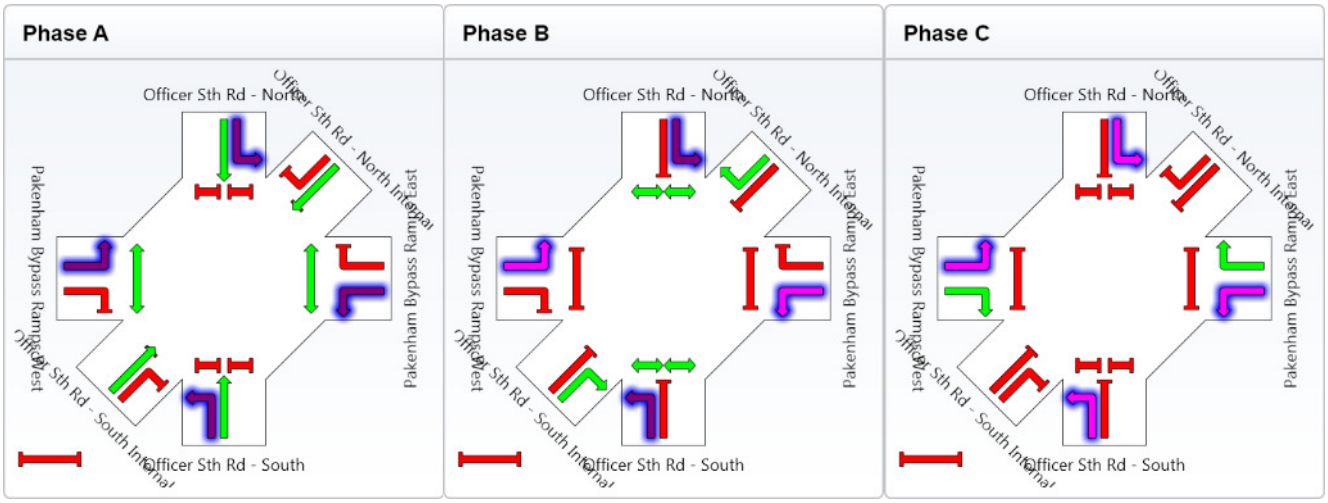
Site 1171 & 1172 - AM Peak - 25/05/11
Princes Freeway / Officer South Road

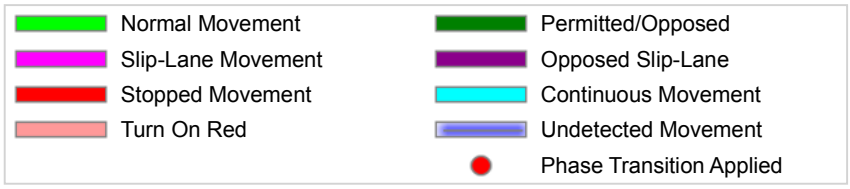
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C
Green Time (sec)	40	36	26
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	46	42	32
Phase Split	38 %	35 %	27 %





PHASING SUMMARY

Site 1171 & 1172 - PM Peak - 25/05/11
Princes Freeway / Officer South Road

Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

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

Phase Timing Results

Phase	A	B	C
Green Time (sec)	44	42	16
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	50	48	22
Phase Split	42 %	40 %	18 %