AECOM Imagine it. Delivered.

Hanson Construction Materials Pty Ltd
12-Mar-2018

Traffic Impact Assessment

Concrete Batching Plant, Glebe Island

Traffic Impact Assessment

Concrete Batching Plant, Glebe Island

Client: Hanson Construction Materials Pty Ltd

ABN: 90 009 679 734

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

12-Mar-2018

Quality Information

Document	Traffic Impact Assessment
Ref	60555976
Date	12-Mar-2018
Prepared by	Igor Mileusnic
Reviewed by	Martin Mallia

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
B	18-Dec-2017	Draft for client review	Dr Darran Jordan – Senior Archaeologist and Heritage Specialist	D. Jordan
0	12-March-2018	Final Report	Dr Darran Jordan – Senior Archaeologist and Heritage Specialist	D. Jordan

Table of Contents

List of Tables

List of Figures

1.0 Introduction

1.1 Background and Scope

AECOM has been commissioned by Hanson Construction Materials Pty Ltd to prepare a Transport and Accessibility Impact Assessment in support of an application for the development of a new concrete batching plant on Glebe Island, which will have the capacity to produce up to one million cubic metres of cement per annum.

Hanson currently operates a concrete batching facility at Blackwattle Bay, which is located on Bridge Road. The Blackwattle Bay facility also includes an aggregate shipping terminal, so it can take delivery of aggregates shipped from Hanson's Bass Point Quarry at Shellharbour.

Hymix, a subsidiary of Hanson, operates a concrete batching plant that is located north of the Sydney Fish Market at Bank Street, Pyrmont. The Hymix facility does not have shipping capability, so aggregates are delivered via road.

These sites have a combined capacity of up to 1,000,000m3 per annum and together supply approximately 35% of Sydney City's concrete requirements. They collectively employ approximately 67 full time equivalent employees.

Both of these existing concrete batching plants are located within the Bays Market District area of the Bays Precinct, which includes the Sydney Fish Market. This Bays Market District Area is nominated as the first stage of the Bays Precinct Transformation Program and is identified as an 'immediate priority' for redevelopment. The anticipated project timeline for stage one is 'now-2019'.

With consideration of the likely redevelopment of the Bays Market District in the immediate future as part of the Bays Precinct Transformation Program, Hanson is planning for the closure of the existing Blackwattle Bay concrete batching plant. In addition to the general concrete supply impacts arising from the closure of the Blackwattle Bay facility, it will also result in the loss of aggregate shipping capacity in Central Sydney.

At the same time Sydney, and in particular the areas around and within the Central Business District (CBD), is also currently experiencing very high levels of construction and building activity, with multiple infrastructure projects and a large number of significant developments underway. This is setting an unprecedented demand on concrete production capacities within Inner Sydney. These high levels of construction activity are expected to continue in the medium term, in part due to the ongoing delivery of major infrastructure projects by the NSW Government.

Hanson is therefore seeking to develop a new concrete batching plant at Glebe Island, where it can be co-located with aggregate shipping facilities. Co-location of a concrete batching plant within the operational port facility, in proximity to Sydney CBD and the Bays Precinct itself, is of strategic merit, and offers several logistical benefits. The proposed facility at Glebe Island will allow Hanson to continue its supply of concrete to a range of concrete intensive projects around Central Sydney in a way that is efficient and effective, and minimises regional road traffic impacts by securing ongoing aggregate shipping terminal capability.[1]

[1] Glebe Island SEARS Request, June 2017 – JBA Urban Planning Consultants Pty Ltd

1.2 Structure of Report

The report is structured as follows:

- Section 1 provides an introduction to the project;
- Section 2 provides the methodology used to assess the project;
- Section 3 summarises the existing traffic conditions in the area surrounding the site;
- Section 4 summarises the details of the proposed development;
- Section 5 assesses the impacts on the surrounding road network due to additional traffic generated by the Project;
- Section 6 provides an overview of the Traffic Management Plan;
- Section 7 provides an overview of the Green Travel Plan;
- Section 8 summarises the report and provides conclusions.

2.0 Methodology

An overview of the methodology for the Transport and Accessibility Impact Assessment is summarised below:

- Review the existing and proposed pedestrian / bicycle routes and facilities within the vicinity and surrounding the site, and to public transport facilities as well as measures to maintain road and personal safety in line with CPTED principles.
- Generate an estimate of the total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips.
- Verify details of anticipated shipping movements in Sydney Harbour.
- Check the adequacy of public transport to meet the likely future demand of the proposed development.
- Assess the impact of the proposed development on existing and future public transport and walking / cycling infrastructure within and surrounding the site.
- Determine the daily and peak (AM and PM) vehicle movements impact on nearby intersections (including intersection level of service modelling), with consideration of the cumulative impacts from other approved developments in the vicinity and the need / associated funding for upgrading or road improvement works (if required). The intersections selected for assessment are as listed below. Traffic count data will be collected to form the base traffic model for the assessment for:
  - City-West Link Road/ The Crescent
  - The Crescent/ James Craig Road
  - The Crescent/ Victoria Road.
- Consider the proposed walking and cycling access arrangements and connections to public transport services.
- Consider the proposed heavy vehicle routes including car pick-up/drop-off facilities and determine measures to mitigate any associated impacts on traffic, public transport, pedestrian and cycle networks.
- Evaluate the proposed car and bicycle parking provision, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian standards.
- Assess the provision of end of trip facilities (i.e. showers, lockers, change rooms) for the use of employees who choose to walk or cycle to/from work as well as undertake activities during work hours.
- Consider service vehicle access, delivery and loading arrangements and estimated service vehicles movements (including vehicle type and the likely arrival and departure times).
- Determine traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport, including the preparation of a draft construction traffic management plan to demonstrate the management of the proposed impact (which must include vehicle routes, number of trucks, hours of operation, access arrangement and traffic control measures for all demolition/construction activities)
- Recommend measures to promote travel choices that support sustainable travel, such as a location-specific sustainable travel plan, provision of end-of-trip facilities, green travel plans and wayfinding strategies.

3.0 Existing Conditions

3.1 Site Description

The site is located at Rozelle; Glebe Island and is surrounded by White Bay to the north, Johnston Bay to the east, and Rozelle Bay to the south. Glebe Island connects to mainland areas of Rozelle to its west. Road access to Glebe Island is provided via the City West Link and James Craig Road.

The port facility currently falls under the jurisdiction and management of the Port Authority of NSW. The site is legally described as Lot 10 under Deposited Plan 1170710.

Glebe Island currently accommodates warehouses, manufacturing plants and low to mid-rise commercial office buildings. The port's two eastern berths (Berth 1 and Berth 2) are located along the length of the Island's south-eastern edge. Much of the Glebe Island's remaining eastern part is undeveloped and currently incorporates at-grade parking. The extent of the site has been illustrated in **Figure 1** below.

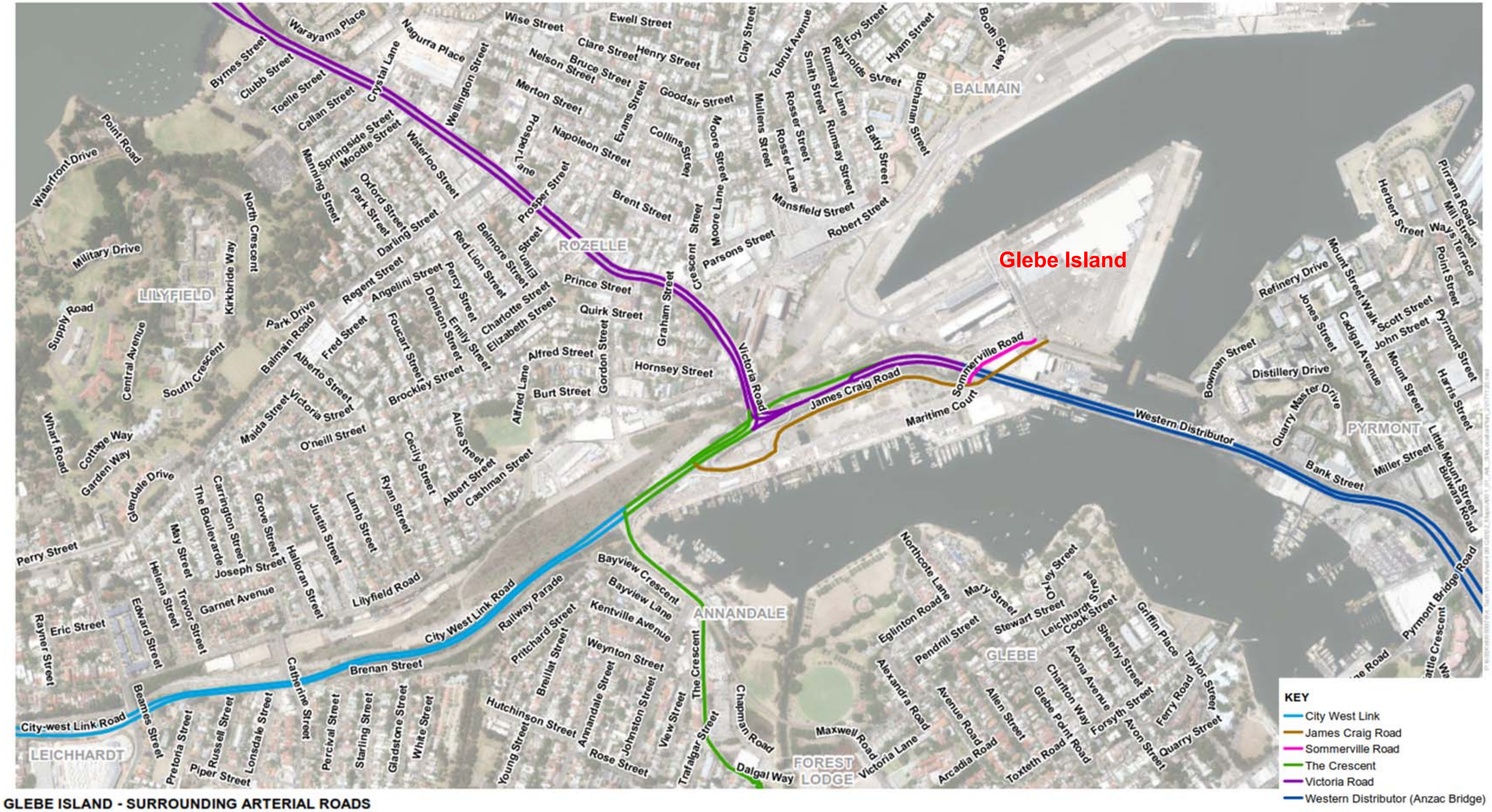
Figure 1 Site boundary

Source: AECOM 2017

3.2 Road Network

The site is situated to the east of the City West Link Road and James Craig Road with vehicular access provided via a private road network from James Craig Road as shown in **Figure 2**. The strategic road network surrounding the site includes City West Link Road, James Craig Road, The Crescent Victoria Road, and Sommerville Road.

Figure 2 Surrounding road network



Source: AECOM, 2017

3.2.1 City West Link Road (MR650)

City West Link Road is a major four-lane divided classified road providing connections to the Anzac Bridge, Victoria Road and the wider classified road network. It is used as a major link between the inner west suburbs of Sydney and the Sydney CBD. The route is signed at 70km/h in both directions.

3.2.2 James Craig Road

James Craig Road is a two lane undivided road providing access for business on Glebe Island to the wider classified road network. Glebe Island contains several bulk good facilities which store refined sugar, gypsum and cement. These facilities use the internal road network of Glebe Island via James Craig Road to distribute these goods by truck to a variety of locations in the Sydney Basin. The route is signed at 50km/h. There is a shared cycling and pedestrian path along the northern footpath.

3.2.3 The Crescent (MR666)

There are two sections to The Crescent. One is an east-west link which is the continuation of City West Link Road to Victoria Road and the other segment provides a north south link between City West Link and nearby suburbs such as Annandale, Forest Lodge and Glebe.

East-west

Between the Victoria Road and City West Link, The Crescent is a ten lane classified road. The Crescent is the key link for vehicles using James Craig Road as it provides access to the wider classified road network. The segment is signed at 70km/h. There is an off-road pedestrian / cycling footpath along the south-eastern side of The Crescent.

North-south

At the intersection of The Crescent and the City West Link, The Crescent comprises five traffic lanes. Three turning lanes provide east-west access and two lanes provide southbound access. South of the Light Rail overpass The Crescent is a two lane undivided classified road providing connection to the City West Link and the Anzac bridge as well as Inner West Suburbs. Majority of The Crescent includes parking lanes on both sides of the road. The route is signed at 60 km/h.

3.2.4 Victoria Road (MR165)

Victoria Road is a major six lane divided classified road. There is an additional parking lane eastbound that operates as a bus lane between 6 am and 10 am, Monday to Friday. Additionally, there are clearways in operation in both directions along Victoria Road. Victoria Road provides connections to the Anzac Bridge, The Crescent and the wider classified road network. It is a used as a major east-west link between the inner west, North West and the Sydney CBD. The route is signed at 60km/h in both directions.

3.2.5 Sommerville Road

Sommerville Road is a minor two lane road. Sommerville Road provides access to the internal road network within Glebe Island. It is the main access route between James Craig Road and Glebe Island. There is a ramp that links Sommerville Road to the Anzac Bridge pedestrian and cycling facilities. The ramp provides to Glebe Island and James Craig Road for pedestrian and cyclists. It is signposted at 30km/h for trucks, and a 50km/h speed zoning applies to all other vehicles.

3.3 Public transport network

3.3.1 Bus services

Sydney buses operate a number of services along Victoria Road. Victoria Road is a main bus corridor providing links to the Inner West, Sydney CBD and the North West. There are 17 services that stop some 1 kilometre (15 minute walk) from the proposed site location. Standard transport planning guidelines suggests that stops located within 400m of the subject site are advantageous to users of bus services. The large number of services stopping along the route results in a bus approximately every 5 minutes or less during the peak periods. The services operating along the route include: 441, 442, 500, 501, 502, 504, 505, 506, 507, 508, 510, 515, 518, 520, L37, M50, and M52. The bus routes in the vicinity of the site are presented in Figure 3.

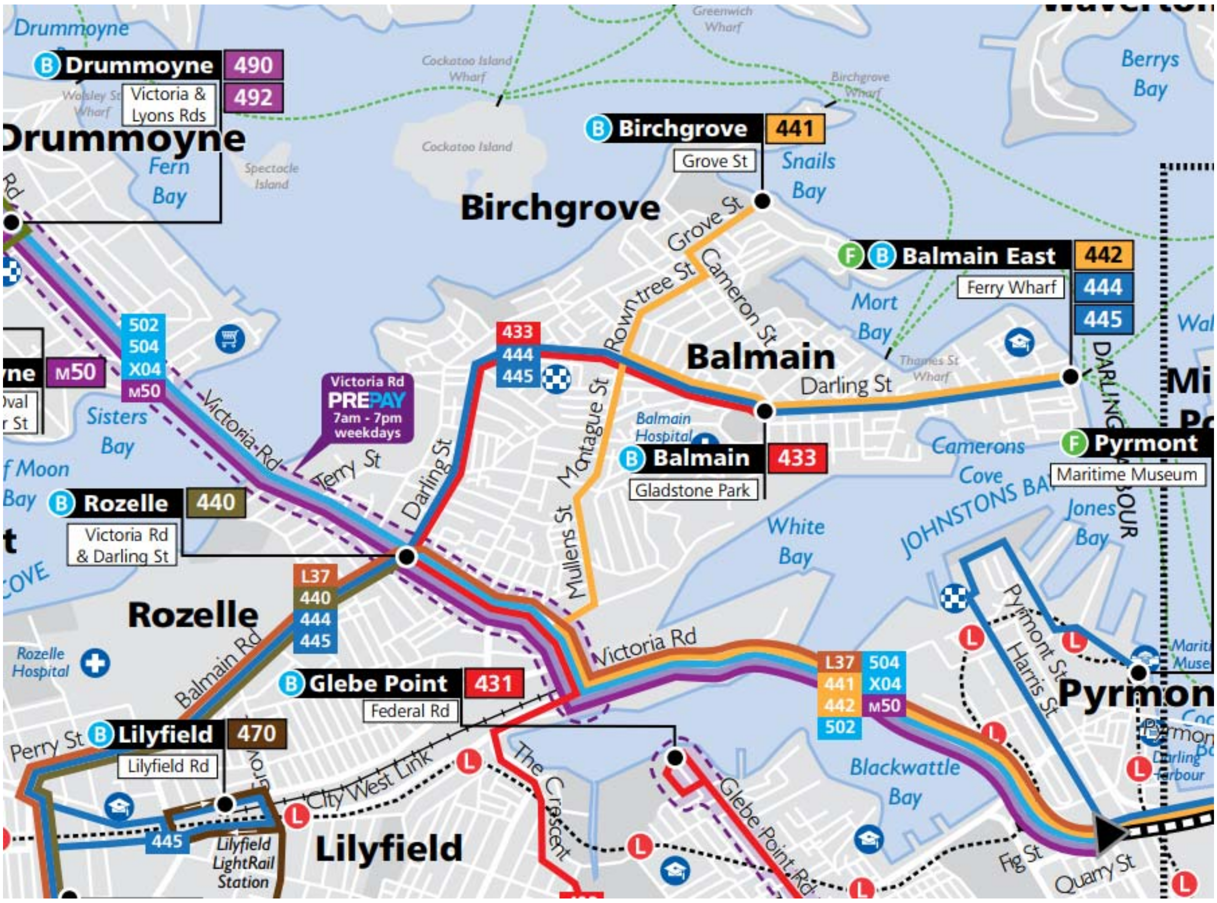
3.3.2 Light Rail

Rozelle Bay is the nearest light rail station, located approximately 1.1 km west of the site. The proposed site is located some 1.1 km from Rozelle Bay Light Rail stop. Rozelle Bay station is serviced by the Dulwich Hill line which provides services between Dulwich Hill and Central. The number and frequency of light rail services operating during peak hours is shown in **Table 1**.

Table 1 Light rail services

Destination	AM Peak (07:00 – 09:00)	PM Peak(16:00 – 18:00)
To Central	Every 7-8 minutes 8 services per hour	Every 7-8 minutes 8 services per hour
To Dulwich Hill	Every 7-8 minutes 8 services per hour	Every 7-8 minutes 8 services per hour

Figure 3 Public Transport Network Surrounding the Site



Source: transportnsw.info

3.4 Pedestrian routes and facilities

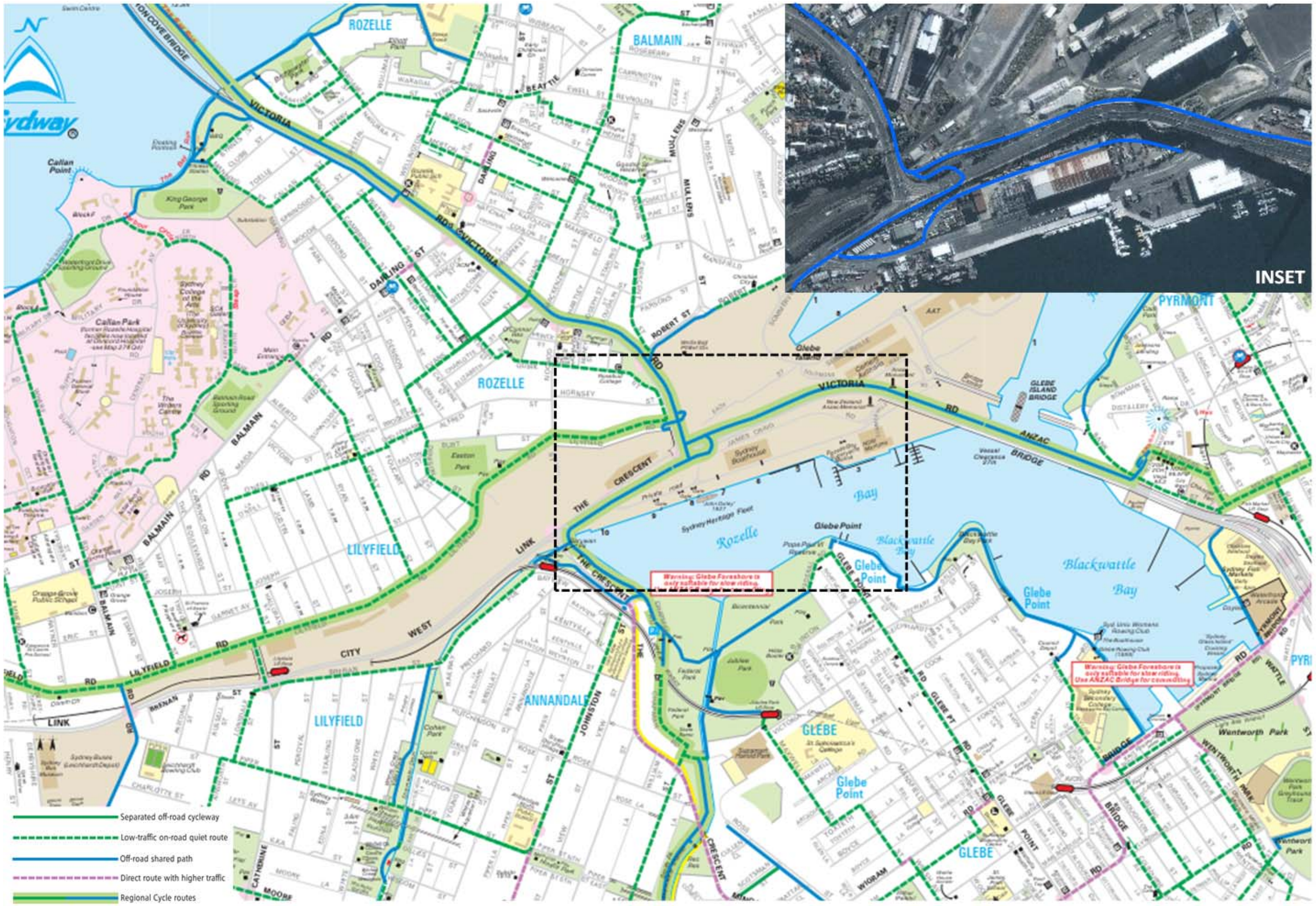
The site has reasonably good pedestrian access. There are a number of routes that provide safe pedestrian access to the proposed site. These include:

- Footpaths along the Anzac Bridge with a walkway down to Sommerville Road
- Footpath access along James Craig Road and The Crescent
- Footpath access along Victoria Road.

3.5 Cycling routes and facilities

The site has excellent cycling access. There are a number of off-road cycling routes within the area. The available cycling routes and facilities are illustrated in Figure 4 below.

Figure 4 Nearby cycling routes



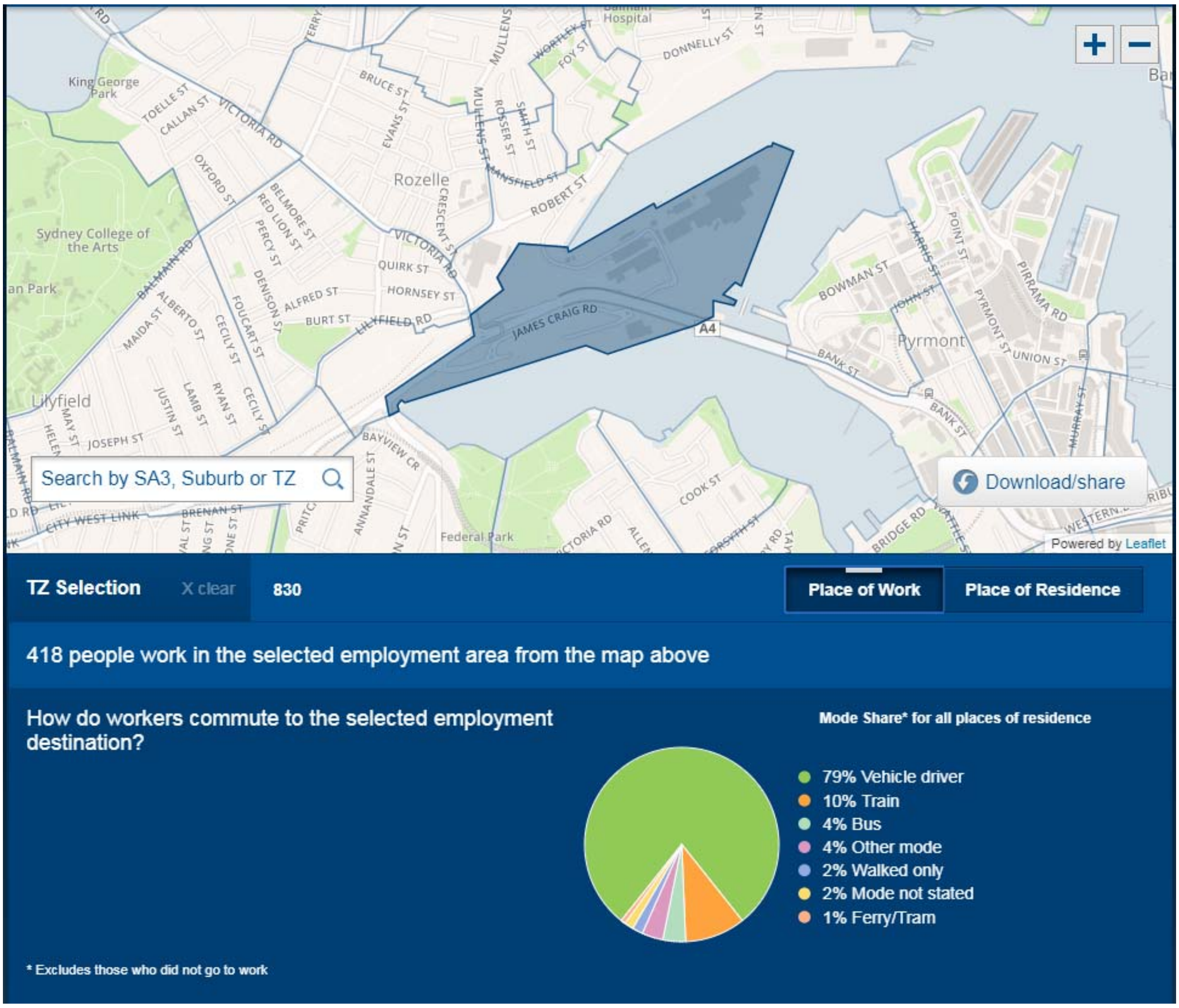
Source: sydneycycleways.net, 2017

3.6 Travel Behaviour

3.6.1 Journey to work data

Travel characteristics of residents travelling to work are gathered from the journey to work data extracted from the Australian Bureau of Statistics (ABS) 2011 census data. Journey to work data (JTW) includes details of the origin and destination of trips, together with the characteristics of the journey such as mode of travel. The project site is located within the Leichhardt LGA and Travel Zone (TZ) 830. JTW data to the proposed site has been analysed and summarised in **Figure 5**.

Figure 5 Journey to Work Data for Travel Zone 830



Source: Bureau of Transport Statistics

The data indicates that employees within the travel zone have a high dependency on private vehicles as a mode of travel to work. Approximately 79% of employees rely on cars with some 15% using public transport and 2% opting to walk to work. The high dependability on private vehicles is perhaps due to the limited public transport access nearby.

3.7 Existing Traffic Volumes

3.7.1 Daily Traffic Volumes

Daily traffic volumes were provided by Roads and Maritime. SCATS data at three Traffic Control Signal sites was provided and collated to determine the daily traffic rates between 18 September and 24 September 2017. The results are presented in **Table 2** below.

Table 2 Daily traffic volumes, source: Roads and Maritime, 2017

TCS	Intersection	Mon 18/09/17	Tue 19/09/17	Wed 20/09/17	Thur 21/09/17	Fri 2/09/17	Sat 23/09/17	Sun 24/09/17
0651	Victoria Road / The Crescent	79,363	83,579	85,805	88,888	89,151	85,720	74,812
1208	City West Link Road / The Crescent	88,824	93,584	95,259	96,807	101,141	100,463	84,033
3033	The Crescent / James Craig Road	87,376	92,134	94,263	97,752	99,516	98,028	81,220

3.7.2 Peak Hour Traffic Volumes

Intersection counts were undertaken at the following intersections on 21 September 2017 between 7am – 9am, and 4pm – 6pm, and on 23 September 2017 between 10am – 2pm for:

- City West Link Road / The Crescent
- The Crescent / James Craig Road
- The Crescent / Victoria Road.

Analysis of the counts for each intersection showed the AM and PM peaks occurred at the following times:

- The Crescent / Victoria Road –07:15am and 08:15am (AM peak) and 16:30pm and 17:30pm (PM peak)
- City West Link Road / The Crescent –07:30am and 08:30am (AM peak) and 16:30pm and 17:30pm (PM peak)
- The Crescent / James Craig Road –07:30am and 08:30am (AM peak) and 16:30pm and 17:30pm (PM peak).

Summaries of turning movements at the above mentioned intersections during the AM, PM and weekend peaks are shown in the following Figures. The full AM and PM counts are attached as part of **Appendix A**.

Figure 6 2017 traffic movements - The Crescent / James Craig Rd – Weekday

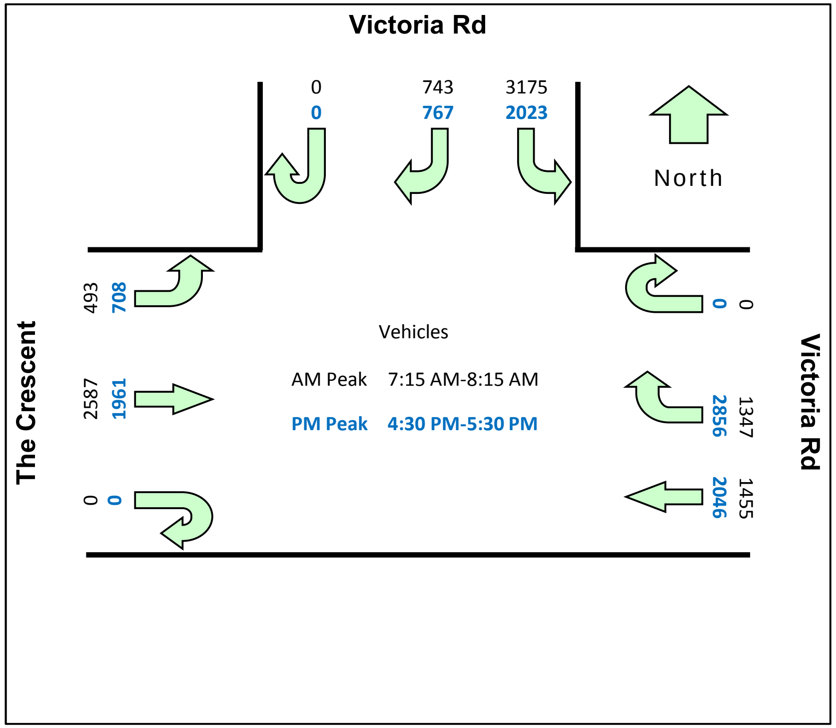


Figure 7 2017 traffic movements - The Crescent / James Craig Rd – Weekend

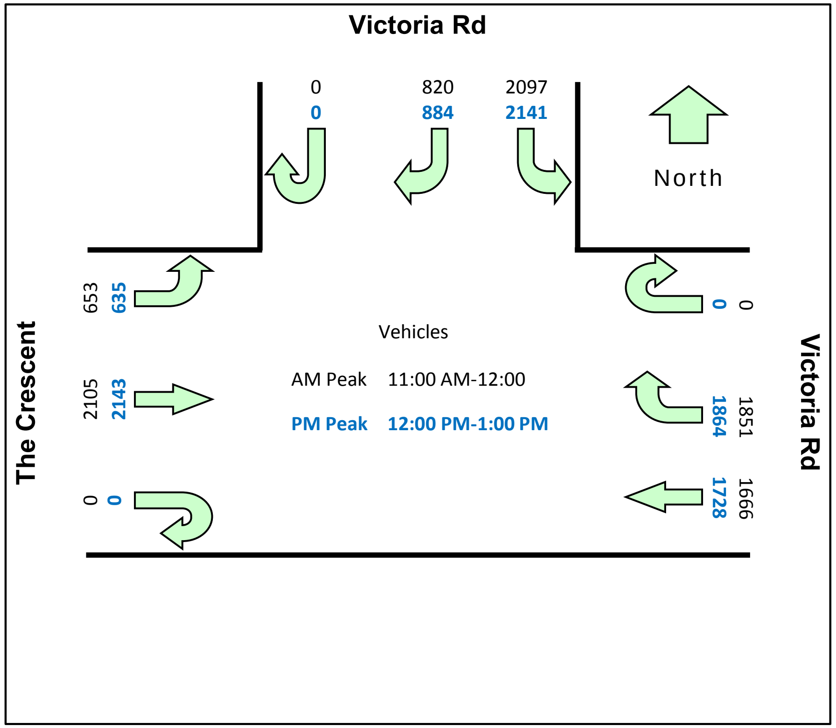


Figure 8 2017 traffic movements - City West Link road / The Crescent – Weekday

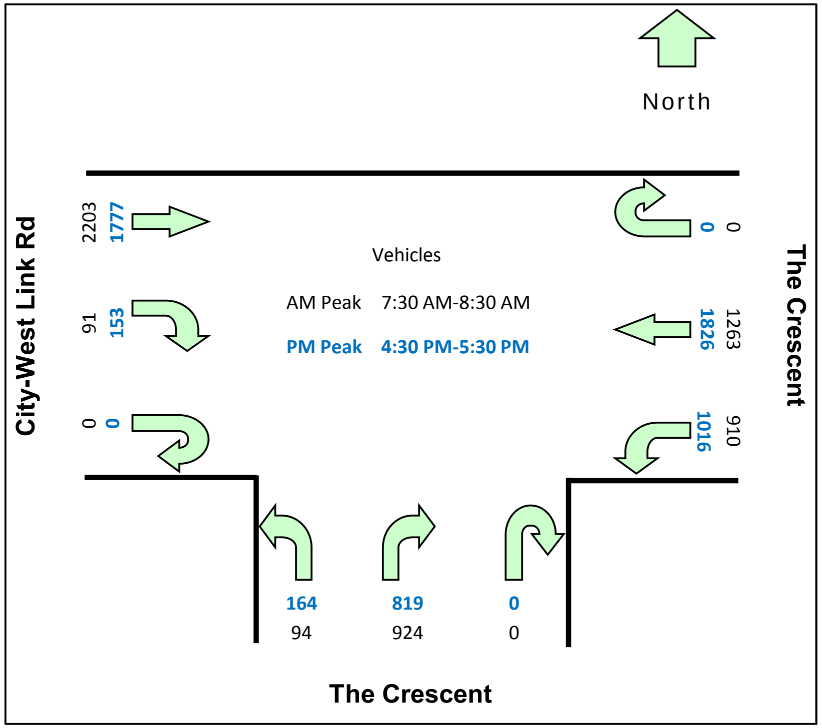


Figure 9 2017 traffic movements City - West Link road / The Crescent – Weekend

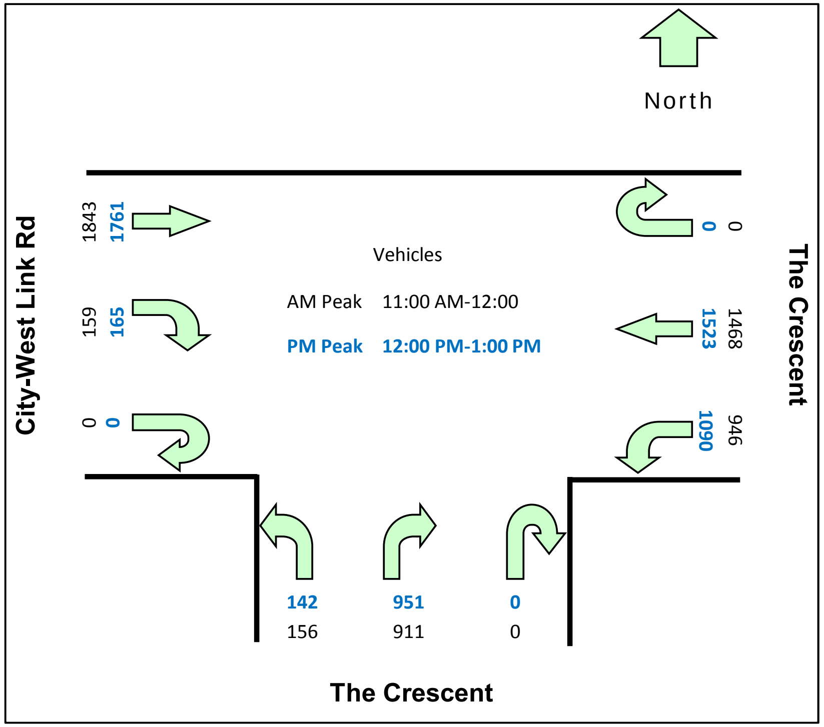


Figure 10 2017 traffic movements - The Crescent / James Craig Road – Weekday

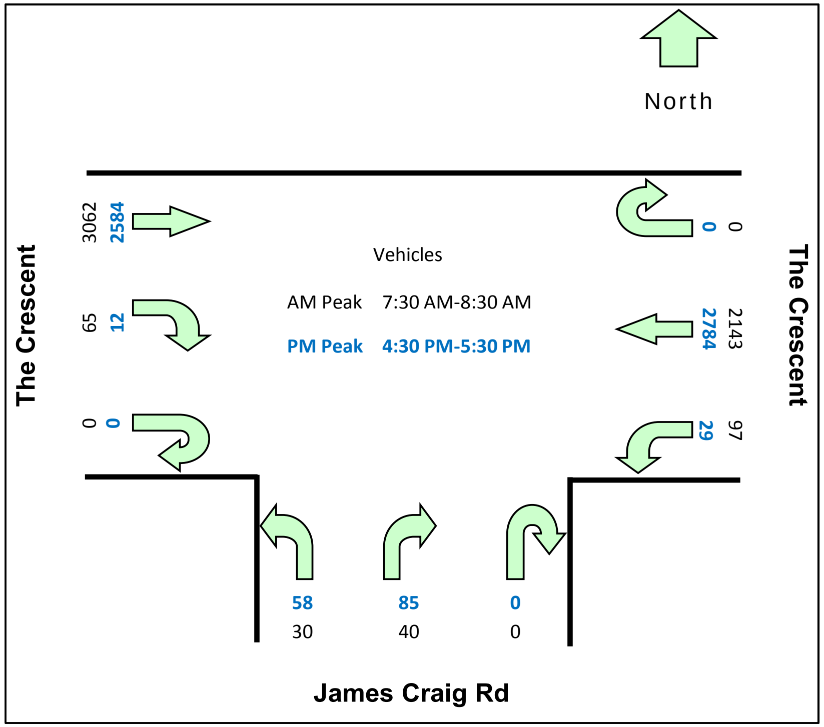
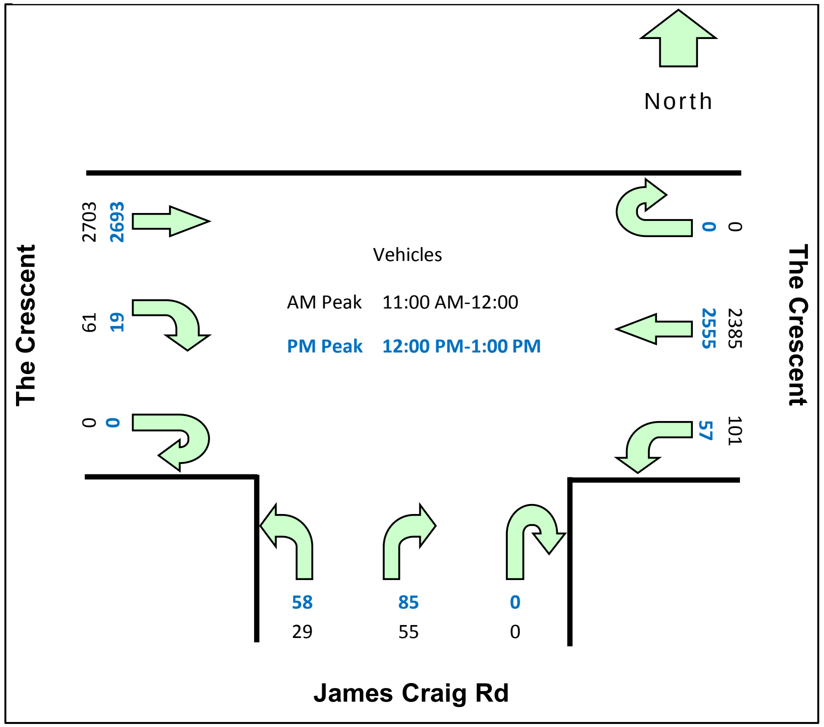


Figure 11 2017 traffic movements - The Crescent / James Craig Road – Weekend



3.7.3 Existing intersection performance

The intersection performance was evaluated using SIDRA Intersection 7.0, a computer-based modelling package designed for calculating isolated intersection performance. The performance indicators for SIDRA 7.0 applicable to the Project are:

- Degree of Saturation (DoS) – measure of the ratio between traffic volumes and capacity of the intersection is used to measure the performance of isolated intersections. As DoS approaches 1.0, both queue length and delays increase rapidly. Satisfactory operations usually occur with a DoS of less than 0.9
- Average Delay – duration, in seconds, of the average vehicle waiting at an intersection, which corresponds to the Level of Service (LoS) – a measure of the overall performance of the intersection. Intersection performance criteria are outlined below in **Table 3**.

Table 3 Level of Service criteria for intersections

Level of Service	Average Delay (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good Operation	Good Operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays	At capacity; requires other control mode
F	>70	Roundabouts require other control mode	At capacity; requires other control mode

Source: Guide to Traffic Generating Developments, RTA, 2002

Table 4 Existing Intersection Performance

Intersection	Demand flow (veh/h)	Deg of Saturation	Avg Delay	95% Back of Queue (m)	Level of Service
AM Peak					
Victoria Road / The Crescent	7505	0.862	23.2	289.4	B
The Crescent / James Craig Road	5723	0.903	9.8	293.8	A
The Crescent / City West Link Road	5774	1.008	30.7	469.2	D
PM Peak					
Victoria Road / The Crescent	8842	0.949	29.9	496.7	C
The Crescent / James Craig Road	5844	0.771	8.6	178.0	A
The Crescent / City West Link Road	6058	0.885	30.6	221.2	C

3.7.3.1 AM Peak Hour

The modelling results indicate that during the AM peak hour all of the above mentioned intersections are operating at an acceptable Level of Service.

The intersection of The Crescent and City West Link Road is currently operating at LoS D. Analysis of the intersection results show that the majority of the delay experienced at this intersection is attributed to the southern leg of The Crescent. This is expected as the southern leg of The Crescent carries fewer vehicles, and priority is given to the east-west phase along The Crescent / City-West Link Road as this is the dominant traffic movement at this intersection.

The modelling results also show that the intersection of The Crescent and James Craig Road operates at LoS A. However, the south eastern leg of James Craig Road is operating at LoS F. The two right hand turn manoeuvres from James Craig Road onto The Crescent experience significant average delays over 80 seconds. Whilst this increases the overall average delay at the intersection, James Craig Road is a minor road which facilitates about 1% of traffic at the intersection. Again, priority is given the dominant movement, which is along the east-west movement on The Crescent.

3.7.3.2 PM Peak Hour

In the PM peak hour, all of the intersections currently operate with a satisfactory Level of Service (LoS A and LoS C).

Similar to the AM peak, the intersections of The Crescent/ James Craig Road and The Crescent/ City West Link Road experience the same issues with higher average delays along the minor roads at the intersections.

3.7.4 Model Calibration

Analysis of the initial modelling results showed higher average delays for the right hand manoeuvre form James Craig Road onto The Crescent than was noted from the field investigations. A manual capacity adjustment factor was included on this leg in the model to represent real life conditions at this intersection as it was found that during the given phase times, the queues were generally cleared and intersection blocking was not observed. The capacity factor was adjusted accordingly to reflect the existing conditions.

4.0 Proposed Development

4.1 Introduction

Hanson Construction Materials Pty Ltd is seeking approval for the development of a new intermodal concrete plant to be located adjacent to Glebe Island Berth one (GLB1). The plan is for the proposed development to be designed with a capacity to produce up to 1 million cubic metres of concrete per annum.

The plant will be supported by the new aggregate shipping terminal facility at GLB1 with the concrete aggregate delivered to the plant by ship from the Hanson Bass Point Quarry. Additionally, the shipping facility will also support the Hymix concrete batching plant at Pyrmont. By facilitating delivery by ship, the proposed development will reduce the number of trucks required to haul aggregates into Sydney on the regional road network by up to 65,000 vehicles per annum.

The plant is expected to operate 24 hours a day, 7 days a week. The proposed facility will employ 67 employees across two shift patterns, a day shift and a night shift. Given the nature of the site operation, on-site workforce numbers would typically be spread across any given 24 hour period.

The site is located within the Inner West Leichhardt Council local government area; therefore, the site has been assessed against the relevant requirements that are outlined in the Leichhardt Development Control Plan (DCP) 2013.

4.2 Vehicular Access

The proposed access arrangement incorporates a single access point to the site from James Craig Road. Internally, there are several access and egress points located along the western site boundary. Due to the nature of the facility and the high volume of heavy vehicle movements, the access for heavy vehicles and employee / visitor parking has been separated to improve safety. The employee / visitor car park is accessed via a 5.5m wide driveway, which can facilitate two-way flow at this location. The B-Double vehicle access is located to the north of the site and is accessed by a one-way driveway of 7.8m in width, and the concrete truck access is located to the south of the B-Double access, and is accessed through a one-way roller door of 8m in width, which leads to the weight bridge for the site. The width of the internal road network has been designed to accommodate the manoeuvring of the largest vehicle to use the facility, a 25 metre B-Double cement truck.

A swept path analysis has been undertaken to ensure that the proposed internal and road network has been sufficiently designed to accommodate the vehicles expected to use the site. Full swept path analysis has been attached in **Appendix B**.

4.3 Parking provision

4.3.1 DCP requirements

Parking requirements for concrete batching plants are not specified in Council's DCP nor the Roads and Maritime Services – Guide to Traffic Generating Developments 2002. However, General Parking Rates control C14 in the Leichhardt 2013 DCP states that *Developments and land use, which are not specifically listed in Table C4: General Vehicle Parking Rates, will be assessed on their merit in accordance with the following criteria to determine the required parking provision:*

a. parking requirements established by survey of comparable establishments;

b. the person capacity of the premises;

c. the proportion of visitors, staff or patrons likely to arrive by car;

d. the characteristics of the use and whether persons are likely to arrive in concentrated groups and the consistency of such arrivals/departures;

e. the availability and level of service of public transport;

f. details provided in a site specific "Travel Plan";

g. the proportion of trips induced by the development that could be taken by bicycle.

Therefore, it was decided to adopt a first principles approach to determine the parking rate to ensure that adequate parking is provided. This approach assumes that all of the 67 employees use a private vehicle to travel to work and parked on-site. The proposed parking provision is outlined in the following section.

4.3.2 Proposed parking provision

The number of car parking spaces is as follows:

- 64 car parking spaces, comprising:
    - 59 employee spaces,
    - 4 visitor spaces, and
    - 1 accessible space.
- 55 heavy vehicle parking spaces.

To ensure that there is sufficient parking provision for the 67 employees; overflow parking has been provided in the form of shared use parking spaces for trucks and employee vehicles. This approach is deemed acceptable for the following reasons:

- All employees who park in these spaces will have had completed a full site induction. As such, they will be aware of the surrounding traffic and will be familiar with the site minimising the risk of collisions.
- These parking spaces will only be used as overflow parking once the regular car park is full.
- Parking will be managed through an on-site parking management guide, which is discussed in Section 4.6 of this report.
- It is proposed that once heavy vehicles are collected by staff, the vacant heavy vehicles parking spaces will be made available for staff arriving for later shifts.

4.3.3 Service vehicle access, delivery and loading

The daily activities of the site incorporate frequent loading and unloading of heavy vehicles. The site incorporates three key service vehicle types that regularly service the subject development. As such, the site provides sufficient facilities to accommodate the vehicle types and their design roles in a safe and efficient manner. Furthermore, to ensure effective management of all service vehicles, access, delivery and loading of service vehicles will be managed through an on-site parking management guide. The guide will specify what order the delivery vehicles will enter and exit the site. The parking management guide is discussed in Section 4.6 of this report.

4.4 Pedestrian and Cyclist facilities

4.4.1 Parking

The design of the internal road network and internal footpaths provide good connectivity to the surrounding pedestrian and cycling networks. Pedestrian access to the site is provided from the Sommerville Road ramp or from James Craig Drive.

To promote the use of active transport choices the proposed development will include end of trip facilities on site in accordance with the Leichhardt DCP 2013. Whilst it is noted that the specific land use is not listed in **Table C6** Bicycle parking provision rates, a generic rate for industry has been adopted to provide some guidance in determining the required number bicycle parking spaces. An excerpt of **Table C6** is shown below.

Figure 12 Bicycle parking rates – Leichhardt DCP 2013.

Table C6: Bicycle parking provision rates

Land use	Residents/staff	Customers/Visitors
Industry	1 space per 10 staff	Nil

The proposed development is required to provide seven bicycle parking spaces to comply with the requirements of the DCP. In response, seven bicycle parking spaces will be provided on the site and an indicative location is marked on the plans attached in **Appendix C**. The final dimensions and location of parking spaces will be provided prior to the issue of a Construction Certificate.

The number of cycle routes that are located within the area will encourage commuters to cycle from nearby suburbs and will provide commuters with an alternative to travelling to and from work via private car. This may reduce the trip generation from the proposed development and reduce the traffic impacts on the surrounding area.

4.4.2 End of trip facilities

To encourage active transport options, the proposed development will include end-of-trip facilities on site and in accordance with the requirements of the Leichhardt DCP 2013. The requirements for bicycle parking facilities are outlined in Control 21 and include:

- One (1) personal locker for each bicycle parking space
- One (1) shower/change cubicle for 1 up to 10 bicycle parking spaces.

Based on the above rates, seven personal lockers and one shower/change cubicle are required as part of the development. Lockers will be provided in the driver’s lunch room and one shower facility will be provided in the office building.

4.5 Design Requirements

The proposed development has been reviewed and checked for compliance against the following standards. These standards include:

- AS/NZS 2890.1:2004 Parking Facilities – Off-street car parking
- AS 2890.2-2002 Parking Facilities – Off-street commercial vehicle facilities
- AS 2890.3:2015 Parking facilities - Bicycle parking
- AS 2890.6:2009 Parking facilities – Off-street parking for people with disabilities.

The final drawings reviewed are attached in **Appendix C**. The design has been reviewed and is found to be largely compliant with the requirements of the above mentioned Standards. There are however some minor departures to the standards, which are outlined below.

4.5.1 Design Deficiencies

4.5.1.1 Roller doors

Access to the warehouse is gained internally through a number of roller doors located along the eastern face of the building. There are two types of roller doors provided, single roller doors and double roller doors. The single roller doors are currently designed at 4.0m high by 3.5m wide. As the vehicles using the site are classed Medium Rigid Vehicle (MRV) or higher, the minimum height clearance for the roller doors is required to be 4.5m (Table 2.1 – AS2890.2-2002). However, the roller doors provided are deemed satisfactory for the following reasons:

- The client has provided an overview of the vehicles that currently service the site. Currently, all the vehicles that service the site are less than 4m in height, with the vehicles’ maximum height 3.8m.
- Low clearance markings and a low height clearance bar is to be installed, warning drivers entering that there is a reduced height clearance.
- Parking and service vehicles entering and exiting the site are managed through an on-site parking management guide. Therefore, it is proposed that management ensure that any vehicles servicing the facility have a height clearance of less than 4.0m. If any vehicles exceeding the height clearance of the roller doors to the warehouse enter the site, they are required to exit through the southern access point and not through the warehouse.

The double roller doors provided on the eastern and western face of the warehouse are fully compliant with the requirements of the Standard in both height and width.

4.5.1.2 Parking spaces 54 and 55

Parking spaces 54 and 55 do not meet the requirements for the specified vehicle type, being an MRV. Parking space dimensions as per AS2890.2 – 2002 requires the spaces to be 3.5m wide and at least 8.8m long. Currently, the parking envelope of these two spaces is 3.0m wide. Whilst this does not meet the requirements of the Standard it is deemed acceptable for the following reasons:

- The two parking spaces are part of the wash bay. The design of the wash bay incorporates an elevated platform that workers use to wash the vehicles. If the spaces were widened this would create an unsafe environment for the workers as they would have to reach across the gap to wash the vehicle.
- Swept path analysis shows that vehicles can still enter and exit the site without the body of the vehicle coming in to contact with the surrounding structure.
- It is proposed that as part of the on-site parking guide, assistance be provided when vehicles are parking in these spaces. Assistance may include another employee standing in a safe location directing the driver as they park the truck.

4.5.1.3 Bicycle Parking

Control C19 of the Leichhardt DCP 2013, states that *'Bicycle parking facilities are to be provided in accordance with Australian Standard AS 2890.2-1993 Parking facilities – Bicycle parking facilities as follows:*

a. Class 1 Bicycle lockers – for occupants of residential buildings;

b. Class 2 Bicycle lockers – for staff/employees of any land use;

c. Class 3 bicycle rails-for visitors of any land use.'

The proposed facility does not provide dedicated Class 2 bicycle lockers. The purpose of a Class 2 facility is to provide a safe and secure area for bicycle parking. The proposed design incorporates bicycle rails as the primary form of bicycle parking. This is deemed satisfactory for the following reasons:

- The subject development is deemed a secure area. Vehicles accessing the site are required to pass through a security gate to reach the site. Therefore, it is expected that only authorised personnel will be accessing the site. This minimises the interaction with the general public and the chances for bicycles to be stolen. Given the site is in practical terms a secure site, it is unnecessary to provide secure bicycle lockers within a secure site.
- Furthermore, there will be 24-hour management on-site as the site is expected to operate 24 hours a day.
- Lastly, there is expected to be CCTV cameras monitoring the operations of the site, which will reduce the likelihood that any bicycles are stolen or vandalised.

4.6 On-site parking management guide

To manage the flow of vehicles and optimise the parking efficiency the site will have a parking management guide in place. The parking management guide will aim to ensure that specific parking spaces which may impede traffic flow remain unoccupied during daily operations. The guide also aims to manage the flow of heavy vehicles. Some key areas the parking management guide addresses are as follows:

- Cement Trucks (B-doubles) are to be managed to ensure that they circulate within the site one at a time, enter the warehouse one at a time and depart the warehouse one at a time. To minimise the likelihood that two trucks turn up at the same time, it is proposed that their delivery times be staged throughout the peak periods.
- Parking spaces 13, 26, 27 and 28 are to be the last truck parking spaces vehicles park in as they impede traffic flow.

- An overflow car park has been provided in front of spaces 16–25. As such, these truck parking spaces are not to be utilised if there are employees parked there, similarly employees are not to park in these spaces if there are vacancies in the normal car park.
- Parking space 25 is not to be utilised whilst aggregate truck deliveries are expected. Once all aggregate truck deliveries have been made for the day, the parking space can be utilised. Similarly, the space is to be vacated before any aggregates are delivered.
- Vehicles parking in spaces 54 and 55 are to be provided assistance when parking as the spaces are narrow. Assistance may be in the form of providing another employee to direct the driver as they are parking or fitting reversing cameras on vehicles to assist with parking.
- Any vans, utes or other smaller delivery vehicles are to use the employee car park.
- A site manager will be present at all times to manage vehicle movements across the site.

The parking management guide will be developed in full prior to the opening of the site and be in operation from the first day.

5.0 Traffic Impact Assessment

This section of the report assesses the likely traffic impacts of the proposed development on the local road network and recommends mitigation measures to alleviate any impacts if required.

The traffic assessment has considered the impacts of the proposed development during the typical weekday AM and PM peak hours.

5.1 Trip generation

Once the previous operations have been relocated from Blackwattle Bay to Glebe Island, there are plans to increase the capacity of the batching plant to be able to cater for some 1 million cubic metres of concrete per annum by 2019. The expected trip generation for a batching plant to be operating at this capacity has been provided by Hanson Concrete. The information provided outlines the total vehicle movements per day as well as the peak number of vehicle movements during the morning peak, evening peak and night shift. The daily trip generation is outlined in **Table 5**.

5.1.1 Daily trip generation

5.1.1.1 Trucks/Employees

Outlined below is the expected number of movements to be generated by the proposed development once it is operating at full capacity. There are three vehicle types expected to be used for site operation. The types of trucks are as follows:

- Concrete Truck – there are two different concrete trucks that service the site. These include:
  - Type 1 – 8.8 metre rigid vehicle, and
  - Type 2 - 14 metre articulated semi-trailer (3 axle prime mover + 3 axle trailer).
- Aggregate truck – 19 metre tipper (3 axle prime mover + 4 axle dog trailer).
- Cement Truck – a 25 metre B-Double.

Table 5 Daily Trip Generation

hour	Hour type	Cement Truck	Aggregate	Concrete Truck	
0 to 1	Night	2	6	14	10
1 to 2		2	6	16	
2 to 3		2	8	14	
3 to 4		2	8	19	
4 to 5		2	10	14	
5 to 6		2	26	26	
6 to 7		2	32	90	
7 to 8	Day	4	42	126	102
8 to 9		6	44	132	
9 to 10		4	40	56	
10 to 11		4	42	240	
11 to 12		4	44	180	
12 to 13		4	34	65	
13 to 14		4	24	56	
14 to 15		4	22	52	
15 to 16		4	17	46	

hour	Hour type	Cement Truck	Aggregate	Concrete Truck	
16 to 17		4	14	48	
17 to 18		2	13	42	
18 to 19	Evening	2	12	36	22
19 to 20		2	10	32	
20 to 21		2	8	26	
21 to 22		2	8	24	
22 to 23	Night	2	6	12	
23 to 24		2	6	12	
Total	**Daily**	**70**	**482**	**1378**	**134**
		2064 trips (in+out)			

There are two options proposed for the delivery of cement to the proposed site. Option 1 accounts for all cement deliveries to originate from the Cement Australia depot located along Sommerville Road on Glebe Island. Given that the Cement Australia depot is located a few hundred metres from the proposed site location, the trips impacting the surrounding road network would effectively be zero as all deliveries would be made internally. Option 2 incorporates cement truck deliveries to originate from other Cement Australia locations around NSW.

The 134 vehicle trips calculated for employees assumes a 'worst case scenario' where 100% of employees drive to work in a private, single occupancy vehicle.

5.1.1.2 Shipping

The proposed development is supported by the GLB1. As such, it is proposed that some of the materials used in the concrete batching process be delivered through the port access on the site. It is expected that the number of deliveries via ship will be 10 deliveries per month, with each delivery taking about 12 hours to complete.

5.1.2 Peak hour trip generation

5.1.2.1 Trucks Trips

Table 6 below shows the peak hour trip generation for the trucks associated with the proposed development's day to day operations.

Table 6 Truck Peak Hour Trip Generation

Truck type	Peak hour vehicle trips (in+out)			
	AM Peak (7:30-8:30)		PM Peak (16:30 – 17:30)	
	In	Out	In	Out
Concrete Truck	66	66	24	24
Cement Truck	3	3	2	2
Aggregate or Sand Truck	22	22	7	7
Total	**91**	**91**	**33**	**33**
	182 (in+out)		**66 (in+out)**	

5.1.2.2 Employee trips

In addition to the truck movements the site is expected to generate some vehicle movements from employees arriving and departing during the peak periods. A schedule of employee arrivals and departures has been provided by Hanson Concrete. The schedule provided, outlines the arrival / departure times for staff, assuming the concrete batching plant is operating at full capacity (1 million cubic metres). The schedule is outlined in **Table 7**.

Table 7 Employee Peak Hour Trip Generation

Shift	Trips	
AM Period	In	Out
05:00 – 06:00	34	5
06:00 – 07:00	27	0
07:00 – 08:00	7	0
PM Period	In	Out
15:00 – 16:00	0	34
16:00 – 17:00	0	27
17:00 – 18:00	11	7

As seen in the staff arrival and departure schedule in **Table 7**, the majority of staff will be arriving / departing outside of the identified commuter peak periods in the surrounding network. Under the current schedule, only 10% of staff (about seven staff) will be arriving during the network morning peak (07:30–08:30) with 90% of the day time employees arriving between 05:00 and 07:00.

During the PM peak (16:30–17:30), 50% of the employees leave before the network commuter peak. The current schedule outlines that 40% (27) of employees will be departing between 16:00–17:00, as such, it can be assumed that half of the 27 employees will be departing during the afternoon commuter peak. This would result in 14 employees departing during the afternoon commuter peak. Therefore, it is expected that there will be approximately 21 employees departing and approximately 11 employees arriving during part of the PM peak period.

The overnight shift spans from 20:00–07:00 which is outside the observed network commuter peak periods. As such, employees arriving for the overnight shift will be arriving outside of peak hours for both the morning and afternoon peaks.

A summary of the combined vehicle trips is outlined in **Table 8** below.

Table 8 Combined Peak Hour Trips

Total vehicle trips	Total peak hour vehicle trips (in+out)			
	AM Peak (7:30-8:30)		PM Peak (16:30 – 17:30)	
	In	Out	In	Out
Trucks	91	91	33	33
Employees	7	0	11	21
Trucks + Employee	98	91	44	54
Total	**189 (in+out)**		**98 (in+out)**	

It should be noted that truck trips have not been converted to Passenger Car Units (PCU). For the purpose of this assessment, when modelled using SIDRA 7, the software converts heavy vehicle trips into PCU's to ensure the impact of these vehicles is captured.

5.2 Trip distribution

In order to determine the net increase in employee trips in each travel direction, trip distribution for the vehicular movements for the current and future uses of the site have been determined using existing (2011) JTW patterns.

The tables below outline the expected travel directions of future trips for the AM peak hour. It has been assumed that the reverse travel pattern will occur for the PM peak.

Table 9 Trip Distribution Based on JTW Data – AM Peak

Origin	Strategic road link	Destination area	In
West	Via City West Link Road	Site	35%
North, Northwest	Via Anzac Bridge / M2	Site	58%
South, East	Via Western Distributor (Anzac Bridge)	Site	7%

Table 10 Trip Distribution Based on JTW Data – PM peak

Origin	Strategic road link	Destination area	out
Site	Via City West Link Road	West	35%
Site	Via Anzac Bridge / M2	North, Northwest	58%
Site	Via Western Distributor (Anzac Bridge)	South, East	7%

The client has also provided the expected origin and destination movements for trucks.

Table 11 Expected Distribution of Truck Movements to the Site

Vehicle	Origin	Strategic road link	Destination area	In
Concrete Truck	West	City West Link Road	Site	50%
	East	Western Distributor (Anzac Bridge) & Victoria Road	Site	50%
Aggregate Truck	West	City West Link Road	Site	75%
	East	Western Distributor (Anzac Bridge) & Victoria Road	Site	25%
Cement Truck (option 2)	West	City West Link Road	Site	100%

Note. The movements for cement trucks apply only if Option 2 is implemented. If Option 1 (cement delivered from Glebe Island) the distribution will be 0.

Table 12 Expected Distribution of Truck Movements from the Site

Vehicle	Origin	Strategic road link	Destination area	In
Concrete Truck	Site	City West Link Road	West	50%
	Site	Western Distributor (Anzac Bridge) & Victoria Road	East	50%
Aggregate Truck	Site	City West Link Road	West	75%
	Site	Western Distributor (Anzac Bridge) & Victoria Road	East	25%
Cement Truck (option 2)	Site	City West Link Road	West	100%

Note. The movements for cement trucks apply only if Option 2 is implemented. If Option 1 (cement delivered from Glebe Island) the distribution will be 0.

5.3 Forecast Traffic Flow

Typically, a traffic impact assessment is undertaken for a future design year of 10 years post opening / completion of the development. The base year was established as 2018. No growth factor has been applied to the existing traffic volumes as the counts were undertaken late in 2017. A design year of 2029 has been adopted for the purpose of this assessment. To determine the traffic volumes, a growth factor of 1% has been applied to the existing background traffic volumes. Comparison of the following scenarios have been undertaken to assess the impact on the surrounding road network. Scenarios include:

- Base year traffic volumes without development
- Base year traffic volumes with development
- Design year traffic volumes without development
- Design year traffic volumes with development.

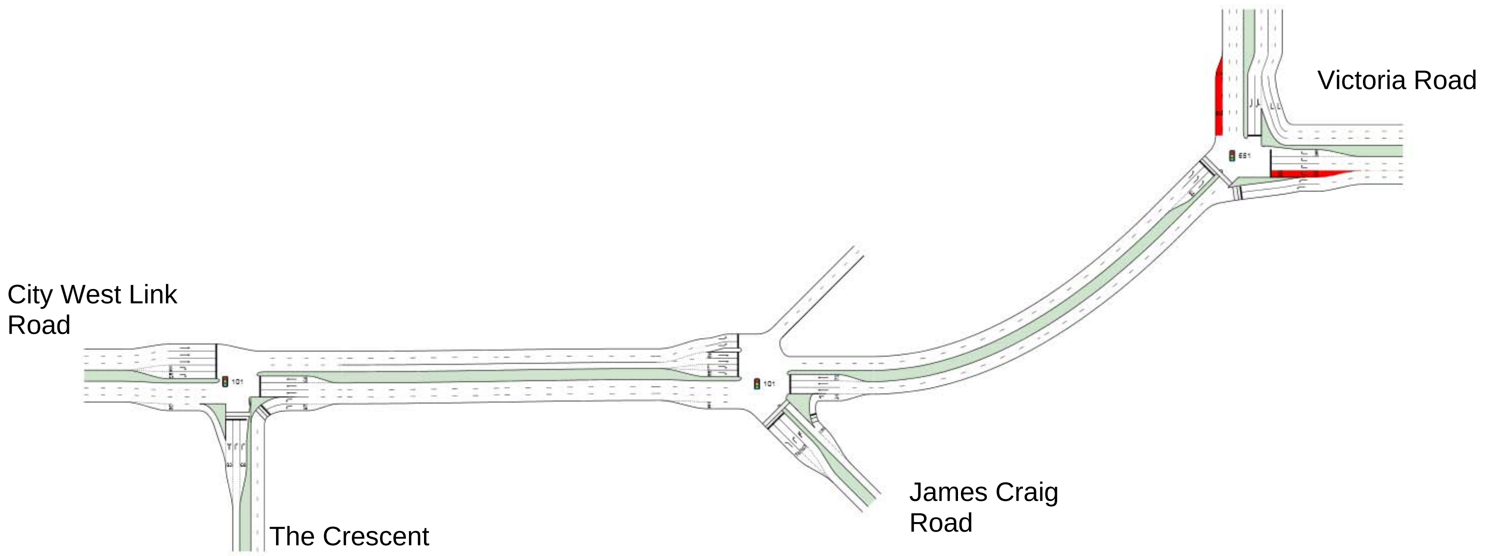
It should be noted that the impacts of WestConnex and road network upgrades in the Bays Precinct have not been considered as part of the design year modelling assessment as details have not been made available for the purposes of this assessment. It is expected that the completion of these projects will have impacts on traffic volumes in the area, and therefore further assessment will be required to further understand the design year impacts post completion of these projects.

5.4 Intersection Assessment

The intersections within the vicinity of the proposed development have been modelled as part of a network in SIDRA 7.08 in the weekday AM and PM peak hours. Traffic counts were collected on Saturday 23rd September, however the peak hour traffic volumes (between 10am-2pm) are generally lower than those identified during the weekday AM and PM peak hours. Cumulative traffic volumes with the development traffic are forecast to be lower during the Saturday lunchtime peak hour, and therefore the weekday AM and PM peak hours have been used as the 'worst case' for this assessment.

The network diagram is presented in **Figure 13**. The intersection performance for the road network during the AM and PM peak hour are shown in **Table 13** and **Table 14**. Detailed results are presented in **Appendix C**.

Figure 13 Network Diagram



5.4.1 Phase times

The phasing for each signalised intersection was calculated through the analysis of the video counts. Five separate readings for each phase were recorded during the peak period and averaged to give the total phase cycle time. These phase times were then used in the modelling of the existing (base traffic without development) volumes.

However, the site specific phase times have not been used in the modelling of the future traffic for the following reasons:

- All three intersections are part of the SCATS network. As such inputting the individual phase times will not accurately reflect the expected phase times once the additional traffic has been introduced.
- Construction of WestConnex is scheduled to begin in the area over the coming years. Once construction expands along the City West Link, it is likely that there will be construction constraints imposed on the existing road network. This may impact the volumes of traffic along the route.
- Once WestConnex is operational it is expected that volumes through the intersection will decrease as vehicles use the new tunnel.

It was found that the total cycle times were approximately between 140 seconds and 150 seconds. Therefore, it was decided that an optimised cycle time of 150 seconds would be adopted for the modelling of Base Year 2018 with development and both design Year 2029 scenarios. Whilst it is likely that the phase times will change depending on the volumes it is unlikely that the overall cycle time will change substantially during this period.

Table 13 Intersection performance of road network base and design years - AM Peak.

Intersection	AM Peak				
	Demand flow (veh/h)	Deg of Saturation	Avg Delay (sec)	95% Back of Queue (m)	Level of Service
Victoria Road / The Crescent					
Base Year 2018 Without development	7505	0.862	23.2	289.4	B
Base Year 2018 With development	7571	0.863	23.7	304.14	B
Design Year 2029 Without development	8376	0.993	31.9	498.7	C
Design Year 2029 With development	8434	0.954	30.8	482.7	C
The Crescent / James Craig Road					
Base Year 2018 Without development	5723	0.903	9.8	293.8	A
Base Year 2018 With development	5923	0.935	11.9	293.8	A
Design Year 2029 Without development	6387	0.906	10	293.8	A
Design Year 2029 With development	6584	0.983	12.2	293.8	A
The Crescent / City West Link Road					
Base Year 2018 Without development	5774	1.008	46.2	469.2	D
Base Year 2018 With development	5887	1.009	47.0	493.3	D
Design Year 2029 Without development	6443	1.394	102.3	571.2	F
Design Year 2029 With development	6554	1.433	105.7	587.0	F

It is forecast that during the AM peak there would be minimal changes in the overall network operations between the two Base Year 2018 scenarios. The intersection of The Crescent and James Craig Road is expected to operate at LoS A, however, the minor leg of James Craig Road operates at LoS F. The right hand movements from James Craig Road onto The Crescent experience increased average delays up to 120.7 seconds by 2029. Furthermore, it was found that Lane 3 is operating near capacity at a DOS of 0.983. However, James Craig Road is the minor road at this intersection accommodating about 3.5% of total traffic during the peak hour. As such, it is expected that priority be given the key east west movements along The Crescent.

As the intersection of The Crescent / City West Link Road reaches the design year, it is forecast under design year traffic volumes, with and without development that this intersection will operate at LoS F. It can be seen that in both scenarios the intersection operates at a DOS of between 1.3 and 1.45. Similar to the scenario discussed in the paragraph above, the leg failing is minor road, the southern section of The Crescent. The impact of the development in the design year does increase the average delay by about three seconds, however it should be noted that intersections operating at LoS F will experience exponential impacts in operation and are highly sensitive to relatively small increases in traffic volumes.

The modelling indicates that in the design year with development traffic, the intersection of Victoria Road and The Crescent is forecast to operate at LoS C. However, analysis showed that the right turn movement from Victoria Road onto The Crescent is experiencing high average delay, with delays reaching 86.5 seconds and the lane operating near capacity with a DOS of 0.954. However, based on the proposed changes to the road network in the vicinity of the site, the 2029 forecast is likely to improve on these results through the increase in network capacity provided by the WestConnex project.

Table 14 Intersection performance of road network base and design years - PM Peak.

Intersection	PM Peak				
	Demand flow (veh/h)	Deg of Saturation	Avg Delay (sec)	95% Back of Queue (m)	Level of Service
Victoria Road / The Crescent					
Base Year 2018 Without development	8842	0.949	29.9	496.7	C
Base Year 2018 With development	8873	0.993	31.8	507.1	C
Design Year 2029 Without development	9868	5.441	516.1	1278.5	F
Design Year 2029 With development	9894	5.470	524.2	1678.2	F
The Crescent / James Craig Road					
Base Year 2018 Without development	5844	0.771	8.6	178.0	A
Base Year 2018 With development	5946	0..970	10.0	178.1	A
Design Year 2029 Without development	6522	0.939	13.8	293.8	A
Design Year 2029 With development	6622	1.145	16.0	293.8	B
The Crescent / City West Link Road					
Base Year 2018 Without development	6058	0.885	30.6	221.2	C
Base Year 2018 With development	6109	0.886	29.5	218.8	C
Design Year 2029 Without development	6761	0.904	33.4	323.5	C
Design Year 2029 With development	6811	0.904	31.0	334.2	C

It is forecast that during the PM peak there would be minimal changes in network performance between Base Year 2018 without development and Base Year 2018 with development, with LoS maintained across all of the intersections and minor increases forecast in average delay.

Furthermore, the design year assessment also forecasts that minor increases in average delay are expected at The Crescents intersections with James Craig Road and City West Link Road. However, as the intersection of Victoria Road / The Crescent reaches the design year, it is forecast that the intersection will operate as LoS F under both scenarios. It can be seen that it in both scenarios the intersection operates at a DOS of greater than 5.4 and experiences significant average delays and queueing. The intersection will require infrastructure upgrades before the design year to ensure that it operates at an acceptable LoS. However, based on the proposed changes to the road network in the vicinity of the site, the 2029 forecast is likely to improve on these results through the increase in network capacity to be provided by the WestConnex project.

5.4.2 Summary of Impacts on Surrounding road network

It can be seen from the SIDRA modelling results discussed in Section 5.4 above that there is little difference in the network operation between the base 2018 without development and base 2018 with development. Whilst there may be an increase in the number of heavy vehicles on the road the increase during the peak hours is low relative to the existing traffic volumes. Furthermore, the impacts on the surrounding road network are minimised as the proposed development has spread the arrival and departure of vehicles throughout the day.

It can be seen that as the intersection operation approaches the design year of 2029, there are increases in queueing, average delays and the degrees of saturation. This occurs for both scenarios with and without development. As such, it is expected that further infrastructure will be required to facilitate these intersections, in particular the intersection of Victoria Road and The Crescent.

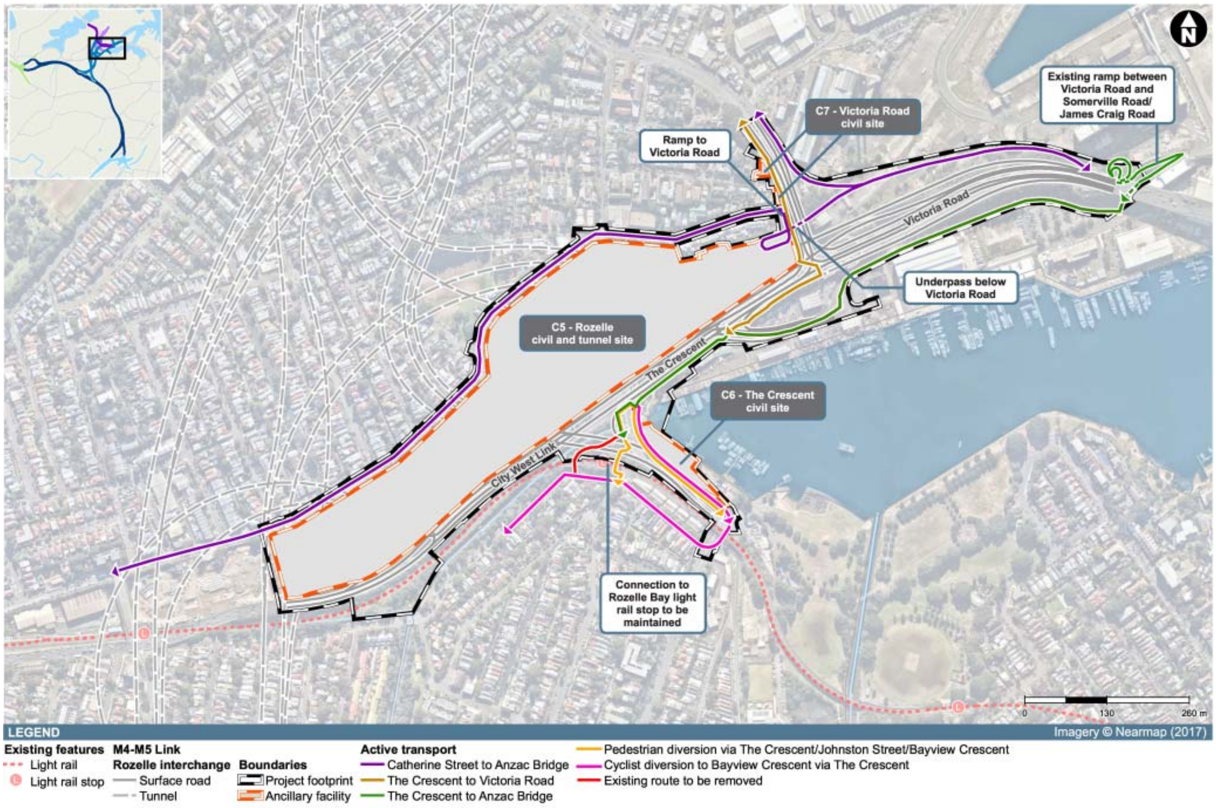
6.0 Assessment of Cumulative Impacts

This section provides an analysis of the potential cumulative impacts of major infrastructure and urban renewal projects in the vicinity of the subject site. These projects are WestConnex and the Western Harbour Tunnel, managed by NSW Roads and Maritime Services (RMS), The Bays Precinct Transformation, managed by UrbanGrowth NSW (UGNSW), The Multi-user facility at Glebe Island, managed by Port Authority NSW (PANSW) and the concrete batching site at Pyrmont, managed by Hymix.

6.1 Westconnex (M4-M5 Link)

The Westconnex M4-M5 Link will comprise a new road link between the M4 Motorway at Haberfield and the new M5 Motorway at St Peters. In particular to this assessment, the project will also include an interchange at Rozelle (the Rozelle Interchange) and a connection between Anzac Bridge and Victoria Road. More detail on this project can be found in the Westconnex M4-M5 Link Environmental Impact Statement dated August 2017. **Figure 14** presents the extent of the Rozelle Civil and Tunnel Site and its relationship with the existing road network.

Figure 14 Extent of Westconnex M4-M5 Link Rozelle Civil and Tunnel Site



The Environmental Impact Statement assesses a number of development scenarios at this location, which are described below:

- 2015 Base
- 2021 Without Construction
- 2021 With Construction
- 2023 Without Project
- 2023 With Project
- 2033 Without Project
- 2033 With Project.

The key intersection assessed as part of the Environmental Impact Statement is the same as those assessed for this study, being Victoria Road / The Crescent, The Crescent / James Craig Road and City West Link / The Crescent. The 2023 and 2033 With Project scenarios forecast significant improvement in intersection performance compared with the 2015 Base and 2023/2033 Without Project scenarios, particularly during the PM peak at the intersections of Victoria Road / The Crescent and City West Link / The Crescent which improve from intersection failure to LoS C, and The Crescent / James Craig Road improving from LoS C to LoS A. During the AM peak period, all of the intersection maintains a satisfactory LoS ranging from B to D.

During construction, access and egress from the Rozelle Civil and Tunnel Site will be provided from City West Link. Heavy vehicles would enter the site from the eastbound carriageway of City West Link via slip lanes and new driveways. A new temporary signalised intersection would be built along City West Link and a new northern leg added to the intersection of The Crescent to enable vehicles to exit the site and turn right at both these locations to head westbound on City West Link. Works would be carried out to facilitate these changes, which will result in temporary diversions, however all traffic lanes in each direction would generally be maintained with some short-term lane closures (outside of peak periods).

The 2021 With Construction development scenario assessed in the Environmental Impact Assessment forecasts that during the AM peak hour, the intersection of City West Link / The Crescent will deteriorate from LoS D to LoS E, however it is noted that the forecast increase in construction traffic is about 1%. LoS is forecast to remain the same at the intersections of The Crescent / James Craig Road and Victoria Road / The Crescent. During the PM peak hour, the LoS is forecast to remain the same at these three intersections.

In light on the Westconnex M4-M5 Link assessment, it is acceptable to assume that the impacts on the road network surrounding Glebe Island will experience improvements in performance, which will greatly reduce the chance of intersection failures that were identified during this study, which has not taken into account the impacts of Westconnex. During the construction phase, although the LoS deteriorates at the intersection of City West Link / The Crescent during the PM peak period, it is expected that the impacts of the Hanson Concrete Batching Plant will not have a significant negative impact on intersection performance as the PM peak movements to and from the site are forecast to be in the region of 98 trips (in and out), with approximately 50% of concrete trucks (accounting for about half of the truck movements at the site) arriving and departing from / to the east of the site and away from this intersection, and 65% of employee vehicles using the same routes.

6.2 The Western Harbour Tunnel

The Western Harbour Tunnel and Beaches Link was announced by the NSW Government in March 2017, with a State Significant Infrastructure Application lodged, and SEARs requested. The proposed tunnel is to start at the Rozelle interchange, with twin mainline tunnels passing under Balmain, crossing Sydney Harbour between Birchgrove and Balls Head linking directly to the Warringah Freeway around the Falcon Street overpass. The works at Rozelle are planned to comprise:

- free flowing general traffic lanes to provide onward connectivity with the WestConnex M4 East and WestConnex New M5 corridors; and

- a ramp connection between the project and the City West Link including intersections to provide connectivity with The Crescent, ANZAC Bridge and Victoria Road.

Roads and Maritime have stated that it is working closely with the Sydney Motorway Corporation to ensure coordination of works at the interface between WestConnex and the project. For example, there may be opportunities to use common construction sites to minimise cumulative impacts.

The project is expected to take around five to six years to build, although a start date has not been announced, with more information expected once the Environmental Impact Statement has been prepared.

RMS acknowledges the importance of commercial shipping operations in Sydney Harbour, and that the port handles a wide range of freight including dry bulk, bulk liquids and general cargo through berths at Glebe Island and White Bay. As a result construction of the Western Harbour Tunnel may affect commercial shipping operations and ferry services, particularly if an immersed tube tunnel design is pursued, which will need to be addressed as part of the design.

Glebe Island adjacent to White Bay is proposed to be used as a spoil handling area for the Western Harbour Tunnel and Warringah Freeway Upgrade project, prior to the commencement of works for the Bays Precinct in 2022. This may lead to cumulative impacts for the subject proposal including increases in truck movement activity and noise, which should be addressed as part of the environmental impact for the motorway project, although noting that due to the proposed timing, it is likely to result in a continuation of the construction activity for the WestConnex project rather than addition.

6.3 Sydney Metro West

Sydney Metro West is an underground metro rail that will link the Parramatta and Sydney CBDs. It is at the preliminary planning stage with little information available. The final number of potential stations are still being determined and will be identified following community and industry consultation. Four key precincts to be serviced have initially been identified, including one at The Bays Precinct, as well as the Sydney CBD, Sydney Olympic Park and Parramatta. Due to the limited information available, the impact on the subject site is unknown.

6.4 Potential future development at The Bays Precinct

UGNSW's planning for The Bays Precinct envisages an area with a broad range of uses and opportunities including places for cultural, maritime, recreational, retail, residential, research and development, education and commercial uses. It is a 25 year plan, with the short term works programmed for 2015-2019, including the Bays Waterfront Promenade from Pyrmont, Bays Market District, Wentworth Park and White Bay Power station.

The works in the medium term in The Bays Precinct, from 2019 to 2022, are the Rozelle Bay and Bays Waterways. The final stage, post 2022, include the Rozelle Rail Yards, White Bay and Glebe Island, which would coincide with the completion of the WestConnex works planned for 2023. This would reduce the cumulative impacts of the redevelopment of available sites within Glebe Island, and motorway construction activities.

6.5 Multi-user Facility, Glebe Island

In 2013, a Review of Environmental Factors (REF) was prepared by Sydney Ports Corporation (now Port Authority NSW) to assess the impacts of a multi-user facility at Glebe Island Berths 1 & 2. The REF proposed that in the majority of cases where both berths are occupied, one vessel will be loading / unloading liquid or dry bulk goods and another undertaking an ad hoc port related use, eg vessel lay-up. Therefore, the expected frequency of shipping deliveries are two per year from salt, between five and eight per year for Gypsum and 20 per year for Bulk Liquids. The number of truck movements associated with these deliveries will be associated with the loading / unloading of materials, and will be dependent on the quantity of product delivered.

Based on this, the REF goes on to describe that it is anticipated that up to 1,200 movements per day could be generated from site operations, based on the rare possibility of a salt, gypsum or bulk liquid vessel operating at the same time (noting only two berths available). In terms of peak hour impacts, the REF explains that the majority of the heavy vehicle traffic movements will likely occur at night or during the middle of the day due to the efficiencies offered by scheduling truck runs outside peak traffic hours. Therefore, peak hour road network impacts are not expected to be significant if the multi-user facility operated at its approved capacity.

The REF prepared in 2018 for the Multi-User Facility (AECOM, 2018) indicates that the total truck movements offsite for this proposed facility would be within the 600 trucks (1200 movements) per day assessed and approved under the 2013 Part 5 determination. It further indicates that during peak operations up to 20 trucks and dogs per hour would enter site, totalling about 500 vehicle movements (one way) over a 24 hour period, and that light vehicle movements are expected to be low, at approximately one vehicle movement per hour (one way).

6.6 Hymix Concrete Batching Site, Pymont

The operational relationship between the Glebe Island facility and the Hymix site at Pyrmont will be the supply of aggregates through the shipping port, i.e. aggregates received by ship will be transported via truck to the Hymix site at Pyrmont by road. These truck numbers are included in the indicated truck dispatch/movement profile provided. The shipping numbers will be 2-3 ships per week.

6.7 Public transport

The proposed development is not expected to impact the operation and public transport infrastructure. The number of additional vehicles that are expected to utilise Victoria Road, the key public transport route, as the preferred route choice is minimal. It is expected that the proposed development generates an additional 39 vehicles that utilise Victoria Road during the morning peak, about less than 1% of total traffic during that period. The PM peak is expected to generate fewer vehicles, about 14 vehicles during the PM peak.

6.8 Walking and cycling

The proposed development is expected to increase the number of heavy vehicles at the key intersections; however, it is believed that this will not impact the walking and cycling facilities within the area. As illustrated in **Figure 4**, the cycle routes within the study area are predominantly off-road cycle routes. Providing off-road facilities for cyclists and pedestrians means that the interaction between vehicles on the road will be at a minimum, with vehicle interaction generally occurring at crossings. Whilst cyclists still have to cross at intersections, the intersections and their associated crossing facilities have been designed as per the requirements of the standards and will result in safe operation if used as intended.

7.0 Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) aims to identify and describe the construction traffic and pedestrian management that are undertaken during the construction of the proposed development.

Given the early stage of the project, accurately determining the impacts of the construction process is not possible. The construction program and staging, and number, type, origin / destination of vehicles used throughout the construction process is generally provided by the builder who is engaged once the development has been approved.

Whilst specific details are not available at the current time the CTMP will include documentation and information for the construction of the project to be able to:

- provide an appropriate and convenient environment for pedestrians
- minimise the impact on pedestrian movements
- maintain appropriate capacity for pedestrians at all times on footpaths around the site
- maintain appropriate public transport access
- minimise the loss of parking
- maintain access to/from adjacent buildings
- restrict construction vehicle movements to designated routes to/from the site
- manage and control construction vehicle activity in the vicinity of the site
- carry out construction activity during approved hours of works.

Furthermore, the expected traffic generated by construction vehicles is expected to be significantly less than the number of heavy vehicles that will likely be generated by the site's operation. As discussed in Section 6.4, the traffic generated by the full operation of the development would result in little to no change in existing operation of the surrounding street network. Therefore, it is expected that the impacts of the construction traffic would not significantly impact the network operation.

A comprehensive CTMP detailing construction stages, frequency and type of vehicles, vehicle routes and detailed impacts on surrounding facilities will be prepared in full, prior to the issue of the Construction Certificate (CC) and will be listed as an item for exclusion from the current SEARS, to be addressed prior to construction approval.

8.0 Green Travel Planning

Travel Demand Management (TDM) strategies involve the application of policies, objectives, measures and targets to influence travel behaviour, to encourage the uptake of sustainable forms of transport, i.e. non-car modes, wherever possible and to reduce the need to travel and hence reduce overall transport and travel demand and the impacts of new development.

8.1 Employee information packs

Each employee in the proposed development would be provided with an information pack which would be a sustainable travel kit. This would incorporate public transport leaflets, route maps and timetables (including direction to the travel info travel information line and website and bus, train and fare information), pedestrian and cycle network maps, and information on sustainable workplace initiatives, such as Bicycle User Groups, Car Sharing Schemes and other projects that aim to reduce travel or encourage uptake of sustainable modes.

8.2 Car Sharing Scheme and Carpooling

Car share parking spaces can be implemented on site using an established provider (such as GoGet). Furthermore, a car pooling initiative is to be implemented by the management of the subject development. The carpooling initiative will promote and provide incentives for drivers who live in nearby areas to drive together to work.

8.3 Public transport measures

Whilst a ‘worst case scenario’ was assumed in the modelling and intersection analysis, realistically not all employees will drive to work. Journey to Work (JTW) data showed that some 15% of employees use public transport to commute to work in the area. The anticipated public transport usage is outlined in the table below.

Table 15 Public transport trips – peak hour

	Total public transport trips	
Total vehicle trips	**In**	**Out**
AM	7 x 0.15 = 1.05, say **1 trip**	
PM	11 x 0.15 = 1.65, say **2 trips**	21 x 0.15 = 3.15, say **3 trips**

It is expected that during the morning peak at least one of the employees arriving to work will be doing so via public transport. Similarly, during the PM peak it is expected that at least three will be leaving using public transport and two arriving using transport.

The public transport service improvements could encourage more people to reduce the car usage. It includes the improvements of:

- Bus and light rail network coverage
- Frequency of bus / light rail services
- Quality of bus stops / light rail stops.

8.4 Bicycle measures

The existing JTW data does not provide any information on the number of employees cycling to work within the study area. Given the vast off-road network in the surrounding area it is proposed to heavily promote the existing cycling network and provide incentives for employees who cycle to work or mix cycling with public transport. A few measures that are expected to improve the number of cyclists riding to work are as follows:

- Promoting the existing bicycle routes such as the dedicated cycleways nearby.

- Incorporating bicycle facilities as part of the design, such as bicycle secure bicycle parking and shower facilities for cyclists.
- Encouragement for a Local Bicycle User Group.
- Promotion of bicycle initiatives – NSW bicycle week, cycle to work day.

8.5 Pedestrian measures

The percentage of employees walking to work is approximately 2% within the study area. Given the low volume of employees arriving / departing from the site during the AM and PM peaks, the number of employees walking during this time is effectively 0. Key measures that may improve the number of employees walking to work or combining public transport with walking are as follows:

- Promote the extensive pedestrian routes located nearby.
- Provide end of trip facilities such as showers.
- Promotion and participation of pedestrian initiatives – walk to work day.

8.6 Active transport goals

Given the extensive pedestrian and cycling facilities located nearby, it is proposed that an active transport goal be established for the first two years of operation. It is proposed that management set a goal to achieve a total of 5% of travel to work be through an active transport mode within two years of opening. This will ensure that the focus on promoting sustainable and active transport is continued throughout the operations. After the two year period, a review is to be undertaken to determine if the goal was achieved.

9.0 Summary and Conclusion

AECOM has been commissioned by Hanson Construction Materials Pty Ltd to prepare a Traffic Impact Assessment in support of a planning proposal for a concrete batching plant at Glebe Island, Rozelle.

The site has relatively poor access to existing public transport services. Bus services and bus stops along Victoria Road are located about 1 km from the subject site, well outside the standard catchment of 400 metres. Similarly, the Rozelle bay light rail station is located about 1.1km from the subject site which is outside the standard 800 metre catchment distance.

Currently, the subject area has very few people cycling and walking within the vicinity of the site despite the excellent cycling and pedestrian facilities in the surrounding area with a number of off-road cycling routes located nearby. A green travel plan has been developed with the aim of increasing the number of employees using active / public transport as their primary mode of transport to and from work. A goal of reaching 5% of employee trips by active transport has been set for the first two years of operation.

The subject development comprises a concrete batching plant with the capability to produce 1 million cubic metres of concrete per annum. The development has been relocated from the existing site at Blackwattle Bay making room for the future development of the Bays Precinct.

The traffic generation by the subject site was derived from adopting a first principles approach as the Roads and Maritime Guide to Traffic Generating Developments did not accurately reflect the nature of operations for this specific development. The first principles approach assumed that all of the 67 employees would drive to work. Furthermore, the client provided AECOM with the expected truck movements during the AM and PM peaks. Based on the employee trip generation and truck movements, the site is expected to generate 189 and 98 vehicle trips during the AM and PM peak hours, respectively. There are currently 64 car parking spaces including an overflow car park of 12 spaces should capacity be exceeded.

The net vehicular impacts of the proposed development have been assessed using SIDRA intersection modelling software and show that largely, there will be minimal impact to the existing levels of traffic operations. Modelling was undertaken at the base year, 2018 with and without development, and a design year of 2029, with and without development. Modelling forecasts indicate that all of the intersections operate at acceptable levels of service in the base year; however, in both cases there is queueing along the minor roads at the intersections of The Crescent / City West Link Road and The Crescent / James Craig Road.

As the intersections approach the design year of 2029, regardless of the proposed Hanson Development the intersection of The Crescent / City West Link Road operates at LoS F during the AM peak hour, and Victoria Road / The Crescent operates at LoS F during the PM peak hour. The intersections experience significant average delays, queueing and operate above capacity. However, in light on the Westconnex M4-M5 Link assessment, it is acceptable to assume that the impacts on the road network surrounding Glebe Island will experience improvements in performance, which will greatly reduce the chance of intersection failures that were identified during this study, which has not taken into account the impacts of Westconnex. During the construction phase, although the LoS deteriorates at the intersection of City West Link / The Crescent during the PM peak period, it is expected that the impacts of the Hanson Concrete Batching Plant will not have a significant negative impact on intersection performance as the PM peak movements to and from the site are forecast to be in the region of 98 trips (in and out), with approximately 50% of concrete trucks (accounting for about half of the truck movements at the site) arriving and departing from / to the east of the site and away from this intersection, and 65% of employee vehicles using the same routes.

Appendix A

Traffic Surveys

Appendix A Traffic Surveys

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au

Intersection of Victoria Rd and Victoria Rd, Rozelle

Date:	Thu 21/09/17
Weather:	Overcast
Suburban:	Rozelle
Customer:	Darebin City Council

North:	Victoria Rd
East:	Victoria Rd
South:	N/A
West:	The Crescent

Survey Start		AM:	7:00	PM:	16:00
Vehicular Peakhour			**Pedestrians Peakhour**		
AM:	7:15 AM-8:15 AM		AM:	N/A	
PM:	4:30 PM-5:30 PM		PM:	N/A	

All Vehicles

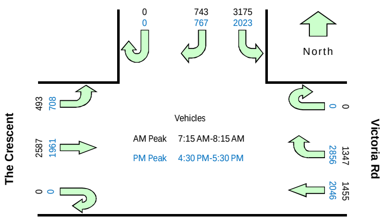
Time		**North Approach Victoria Rd**			**East Approach Victoria Rd**			**West Approach The Crescen**			**Hourly Total**	
Period Start	**Period End**	**U**	**R**	**L**	**U**	**R**	**WB**	**U**	**EB**	**L**	**Hour**	**Peak**
7:00	7:15	0	191	745	0	345	285	0	664	110	9739	
7:15	7:30	0	189	812	0	348	321	0	604	129	9800	Peak
7:30	7:45	0	178	798	0	347	387	0	661	130	9730	
7:45	8:00	0	195	797	0	330	374	0	686	113	9606	
8:00	8:15	0	181	768	0	322	373	0	636	121	9438	
8:15	8:30	0	203	715	0	311	349	0	617	138		
8:30	8:45	0	214	702	0	360	355	0	617	129		
8:45	9:00	0	175	696	0	352	380	0	586	138		
16:00	16:15	0	207	477	0	700	492	0	444	178	10062	
16:15	16:30	0	233	478	0	679	459	0	411	160	10147	
16:30	16:45	0	175	496	0	719	554	0	492	165	10361	Peak
16:45	17:00	0	201	472	0	715	492	0	476	187	10320	
17:00	17:15	0	181	513	0	742	501	0	478	168	10154	
17:15	17:30	0	210	542	0	680	499	0	515	188		
17:30	17:45	0	179	497	0	752	430	0	545	157		
17:45	18:00	0	184	468	0	648	435	0	475	167		

Oh 2600

20606 20652

Peak Time		**North Approach Victoria Rd**			**East Approach Victoria Rd**			**West Approach The Crescen**			**Peak**
Period Start	**Period End**	U	R	L	U	R	WB	U	EB	L	**total**
7:15	8:15	0	743	3175	0	1347	1455	0	2587	493	9800
16:30	17:30	0	767	2023	0	2856	2046	0	1961	708	10361

Graphic



1.115668

Light Vehicles

Time		**North Approach Victoria Rd**			**East Approach Victoria Rd**			**West Approach The Crescen**		
Period Start	**Period End**	U	R	L	U	R	WB	U	EB	L
7:00	7:15	0	185	721	0	326	269	0	606	104
7:15	7:30	0	179	779	0	331	292	0	583	119
7:30	7:45	0	164	763	0	329	361	0	631	123
7:45	8:00	0	187	759	0	307	344	0	645	109
8:00	8:15	0	176	732	0	292	351	0	607	118
8:15	8:30	0	195	675	0	286	311	0	579	132
8:30	8:45	0	207	668	0	340	313	0	582	122
8:45	9:00	0	167	672	0	324	328	0	559	129
16:00	16:15	0	206	459	0	680	472	0	428	174
16:15	16:30	0	224	464	0	658	442	0	393	158
16:30	16:45	0	173	472	0	698	541	0	468	163
16:45	17:00	0	198	455	0	690	478	0	455	184
17:00	17:15	0	178	496	0	720	483	0	463	162
17:15	17:30	0	207	521	0	649	489	0	490	185
17:30	17:45	0	178	485	0	725	419	0	529	153
17:45	18:00	0	178	452	0	623	421	0	462	162

North Approach Victoria Rd			**East Approach Victoria Rd**			**West Approach The Crescent**			
U	R	L	U	R	WB	U	EB	L	
0	722	2929	0	1214	1367	0	2462	482	Existing
0	806	3268	0	1354	1525	0	2747	538	2029

North Approach Victoria Rd			**East Approach Victoria Rd**			**West Approach The Crescent**			
U	R	L	U	R	WB	U	EB	L	
0	756	1944	0	2757	1991	0	1876	694	Existing
0	843	2169	0	3076	2221	0	2093	774	2029

Heavy Vehicles

Time		**North Approach Victoria Rd**			**East Approach Victoria Rd**			**West Approach The Crescen**		
Period Start	**Period End**	U	R	L	U	R	WB	U	EB	L
7:00	7:15	0	6	24	0	19	16	0	58	6
7:15	7:30	0	10	33	0	17	29	0	21	10
7:30	7:45	0	14	35	0	18	26	0	30	7
7:45	8:00	0	8	38	0	23	30	0	41	4
8:00	8:15	0	5	36	0	30	22	0	29	3
8:15	8:30	0	8	40	0	25	38	0	38	6
8:30	8:45	0	7	34	0	20	42	0	35	7
8:45	9:00	0	8	24	0	28	52	0	27	9
16:00	16:15	0	1	18	0	20	20	0	16	4
16:15	16:30	0	9	14	0	21	17	0	18	2
16:30	16:45	0	2	24	0	21	13	0	24	2
16:45	17:00	0	3	17	0	25	14	0	21	3
17:00	17:15	0	3	17	0	22	18	0	15	6
17:15	17:30	0	3	21	0	31	10	0	25	3
17:30	17:45	0	1	12	0	27	11	0	16	4
17:45	18:00	0	6	16	0	25	14	0	13	5

North Approach Victoria Rd			**East Approach Victoria Rd**			**West Approach The Crescent**			
U	R	L	U	R	WB	U	EB	L	
0	35	149	0	96	116	0	138	20	Existing
0	39	166	0	107	129	0	154	22	2029

North Approach Victoria Rd			**East Approach Victoria Rd**			**West Approach The Crescent**			
U	R	L	U	R	WB	U	EB	L	
0	11	79	0	99	55	0	85	14	Existing
0	12	88	0	110	61	0	95	16	2029

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Victoria Rd and Victoria Rd, Rozelle

Date:	Thu 21/09/17
Weather:	Overcast
Suburban:	Rozelle
Customer:	Darebin City Council

North:	Victoria Rd
East:	Victoria Rd
South:	N/A
West:	The Crescent

Survey Start	AM:	10:00	PM:	12:00
Vehicular Peakhour		Pedestrians Peakhour		
AM:	11:00 AM-12:00 PM	AM:	N/A	
PM:	12:00 PM-1:00 PM	PM:	N/A	

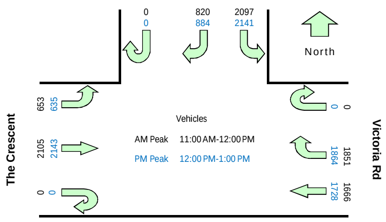
All Vehicles

Time		North Approach Victoria Rd			East Approach Victoria Rd			West Approach The Crescen			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
10:00	10:15	0	199	530	0	399	343	0	539	164	8784	
10:15	10:30	0	156	524	0	378	432	0	471	171	8875	
10:30	10:45	0	193	537	0	424	404	0	507	183	8968	
10:45	11:00	0	185	516	0	454	391	0	542	142	9086	
11:00	11:15	0	165	544	0	463	409	0	496	188	9192	Peak
11:15	11:30	0	224	519	0	451	382	0	501	148		
11:30	11:45	0	240	513	0	486	416	0	558	153		
11:45	12:00	0	191	521	0	451	459	0	550	164		
12:00	12:15	0	226	541	0	454	414	0	518	169	9395	Peak
12:15	12:30	0	220	542	0	469	458	0	517	163	9304	
12:30	12:45	0	220	524	0	480	433	0	575	154	9304	
12:45	13:00	0	218	534	0	461	423	0	533	149	9268	
13:00	13:15	0	181	510	0	436	447	0	516	141	9248	
13:15	13:30	0	219	529	0	463	460	0	568	130		
13:30	13:45	0	166	528	0	493	482	0	535	146		
13:45	14:00	0	196	517	0	490	462	0	490	143		

20494	Weekend peak
21668	PM peak
20722	AM Peak

Peak Time		North Approach Victoria Rd			East Approach Victoria Rd			West Approach The Crescen			Peak
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
11:00	12:00	0	820	2097	0	1851	1666	0	2105	653	9192
12:00	13:00	0	884	2141	0	1864	1728	0	2143	635	9395

Graphic



1.115668

Light Vehicles

Time		North Approach Victoria Rd			East Approach Victoria Rd			West Approach The Crescen		
Period Start	Period End	U	R	L	U	R	WB	U	EB	L
10:00	10:15	0	196	521	0	391	327	0	521	157
10:15	10:30	0	154	516	0	366	411	0	450	168
10:30	10:45	0	188	525	0	416	388	0	500	178
10:45	11:00	0	181	508	0	436	370	0	524	140
11:00	11:15	0	161	529	0	455	392	0	486	183
11:15	11:30	0	219	510	0	440	371	0	489	145
11:30	11:45	0	236	502	0	473	404	0	540	151
11:45	12:00	0	188	514	0	439	438	0	531	159
12:00	12:15	0	223	529	0	445	404	0	495	165
12:15	12:30	0	216	532	0	459	445	0	506	159
12:30	12:45	0	219	518	0	474	419	0	569	153
12:45	13:00	0	213	522	0	450	407	0	514	146
13:00	13:15	0	179	503	0	426	427	0	500	138
13:15	13:30	0	214	520	0	456	441	0	557	129
13:30	13:45	0	160	518	0	485	475	0	527	143
13:45	14:00	0	193	511	0	478	452	0	480	141

Heavy Vehicles

Time		North Approach Victoria Rd			East Approach Victoria Rd			West Approach The Crescen		
Period Start	Period End	U	R	L	U	R	WB	U	EB	L
10:00	10:15	0	3	9	0	8	16	0	18	7
10:15	10:30	0	2	8	0	12	21	0	21	3
10:30	10:45	0	5	12	0	8	16	0	7	5
10:45	11:00	0	4	8	0	18	21	0	18	2
11:00	11:15	0	4	15	0	8	17	0	10	5
11:15	11:30	0	5	9	0	11	11	0	12	3
11:30	11:45	0	4	11	0	13	12	0	18	2
11:45	12:00	0	3	7	0	12	21	0	19	5
12:00	12:15	0	3	12	0	9	10	0	23	4
12:15	12:30	0	4	10	0	10	13	0	11	4
12:30	12:45	0	1	6	0	6	14	0	6	1
12:45	13:00	0	5	12	0	11	16	0	19	3
13:00	13:15	0	2	7	0	10	20	0	16	3
13:15	13:30	0	5	9	0	7	19	0	11	1
13:30	13:45	0	6	10	0	8	7	0	8	3
13:45	14:00	0	3	6	0	12	10	0	10	2

TRANS TRAFFIC SURVEY trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of James Craig Rd and The Crescent, Rozelle

Date:	Thu 21/09/17		***North:***	N/A		**Survey Start**	AM:	7:00	PM:	16:00
Weather:	Overcast		***East:***	The Crescent		**Vehicular Peakhour**		**Pedestrians Peakhour**		
Suburban:	Rozelle		***South:***	James Craig Rd		AM:	7:30 AM-8:30 AM	AM:	N/A	
Customer:	AECOM		***West:***	The Crescent		PM:	4:30 PM-5:30 PM	PM:	N/A	

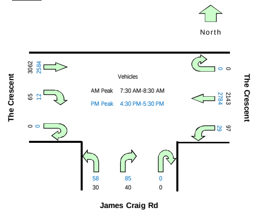
All Vehicles

Time		East Approach The Crescent			South Approach James Craig			West Approach The Crescent			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	0	451	25	0	9	8	0	9	765	5318	
7:15	7:30	0	491	19	0	7	8	0	22	726	5382	
7:30	7:45	0	536	29	0	13	11	0	15	778	5437	Peak
7:45	8:00	0	542	27	0	5	6	0	22	794	5386	
8:00	8:15	0	535	19	0	11	7	0	13	746	5299	
8:15	8:30	0	530	22	0	11	6	0	15	744		
8:30	8:45	0	547	22	0	10	5	0	11	736		
8:45	9:00	0	530	25	0	12	11	0	19	712		
16:00	16:15	0	690	9	0	21	12	0	4	601	5398	
16:15	16:30	0	683	9	0	12	16	0	3	559	5405	
16:30	16:45	0	722	7	0	29	17	0	4	628	5552	Peak
16:45	17:00	0	685	8	0	8	13	0	3	655	5478	
17:00	17:15	0	674	8	0	32	14	0	2	614	5382	
17:15	17:30	0	703	6	0	16	14	0	3	687		
17:30	17:45	0	602	7	0	24	18	0	4	678		
17:45	18:00	0	608	11	0	7	12	0	3	635		

		RMS				
	1	2	3			binh
7-8	960	714	433	2107		2020
8-9	1000	728	436	2164		2142

Peak Time		East Approach The Crescent			South Approach James Craig			West Approach The Crescent			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
7:30	8:30	0	2143	97	0	40	30	0	65	3062	5437
16:30	17:30	0	2784	29	0	85	58	0	12	2584	5552

Graphic



	right		through			
	LV	HV	LV	HV		
	AM		AM			
7.15-8.15	33	7	2911	151	Base	3062
	37	8	3248	168	Design	
						2584
	PM		PM			
	78	7	2492	92		
	87	8	2780	103		

RMS proportion	Straight right	Right	Straight left	Straight
AM	0.36	0.64	0.85	0.15
PM	0.46	0.54	0.74	0.26

Growth
1.115668

Proportion of Right and through right

AM								
Straight right		right		Straight left		Straight		
LV	HV	LV	HV	LV	HV	LV	HV	
12	3	21	4	2474	128	437	23	Base
13	3	24	4	2761	143	487	25	Design 2029

PM								
Straight right		right		Straight left		Straight		
LV	HV	LV	HV	LV	HV	LV	HV	
36	3	42	4	1844	68	648	24	Base
40	4	47	4	2057	76	723	27	Design 2029

2584

Future

RMS proportion	Straight right	Right	Straight left	Straight
AM	0.36	0.64	0.85	0.15
PM	0.46	0.54	0.74	0.26

HV	62	
Straight right		right
22		40
	6	

Light Vehicles

Time		East Approach The Crescent			South Approach James Craig			West Approach The Crescent		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
7:00	7:15	0	432	22	0	9	3	0	5	701
7:15	7:30	0	454	17	0	6	1	0	13	696
7:30	7:45	0	498	27	0	12	2	0	9	742
7:45	8:00	0	510	21	0	3	2	0	19	751
8:00	8:15	0	509	18	0	9	4	0	10	716
8:15	8:30	0	486	20	0	9	3	0	14	702
8:30	8:45	0	502	18	0	4	1	0	7	700
8:45	9:00	0	472	23	0	8	3	0	10	680
16:00	16:15	0	672	6	0	20	11	0	1	582
16:15	16:30	0	657	9	0	10	14	0	1	541
16:30	16:45	0	708	6	0	27	16	0	3	604
16:45	17:00	0	669	7	0	8	13	0	1	631
17:00	17:15	0	653	8	0	29	13	0	0	596
17:15	17:30	0	690	6	0	14	12	0	2	661
17:30	17:45	0	591	6	0	21	17	0	2	661
17:45	18:00	0	588	11	0	7	11	0	3	617

East Approach The Crescent			South Approach James Craig Rd			West Approach The Crescent			
U	WB	L	U	R	L	U	R	EB	
0	2003	86	0	33	11	0	52	2911	Existing
0	2235	96	0	37	12	0	58	3248	2029

East Approach The Crescent			South Approach James Craig Rd			West Approach The Crescent			
U	WB	L	U	R	L	U	R	EB	
0	2720	27	0	78	54	0	6	2492	Existing
0	3035	30	0	87	60	0	7	2780	2029

Heavy Vehicles

Time		East Approach The Crescent			South Approach James Craig			West Approach The Crescent		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
7:00	7:15	0	19	3	0	0	5	0	4	64
7:15	7:30	0	37	2	0	1	7	0	9	30
7:30	7:45	0	38	2	0	1	9	0	6	36
7:45	8:00	0	32	6	0	2	4	0	3	43
8:00	8:15	0	26	1	0	2	3	0	3	30
8:15	8:30	0	44	2	0	2	3	0	1	42
8:30	8:45	0	45	4	0	6	4	0	4	36
8:45	9:00	0	58	2	0	4	8	0	9	32
16:00	16:15	0	18	3	0	1	1	0	3	19
16:15	16:30	0	26	0	0	2	2	0	2	18
16:30	16:45	0	14	1	0	2	1	0	1	24
16:45	17:00	0	16	1	0	0	0	0	2	24
17:00	17:15	0	21	0	0	3	1	0	2	18
17:15	17:30	0	13	0	0	2	2	0	1	26
17:30	17:45	0	11	1	0	3	1	0	2	17
17:45	18:00	0	20	0	0	0	1	0	0	18

East Approach The Crescent			South Approach James Craig Rd			West Approach The Crescent			
U	WB	L	U	R	L	U	R	EB	
0	140	11	0	7	19	0	13	151	Existing
0	156	12	0	8	21	0	15	168	2029

East Approach The Crescent			South Approach James Craig Rd			West Approach The Crescent			
U	WB	L	U	R	L	U	R	EB	
0	64	2	0	7	4	0	6	92	Existing
0	71	2	0	8	4	0	7	103	2029

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au

Intersection of James Craig Rd and The Crescent, Rozelle

Date:	Thu 21/09/17
Weather:	Overcast
Suburban:	Rozelle
Customer:	AECOM

North:	N/A
East:	The Crescent
South:	James Craig Rd
West:	The Crescent

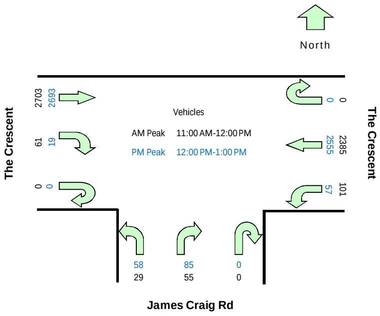
Survey Start		AM:	10:00	PM:	12:00
Vehicular Peakhour			**Pedestrians Peakhour**		
AM:	11:00 AM-12:00 PM		AM:	N/A	
PM:	12:00 PM-1:00 PM		PM:	N/A	

All Vehicles

Time		**East Approach The Crescent**			**South Approach James Craig**			**West Approach The Crescent**			**Hourly Total**				
Period Start	**Period End**	**U**	**WB**	**L**	**U**	**R**	**L**	**U**	**R**	**EB**	**Hour**	**Peak**			
10:00	10:15	0	526	16	0	10	5	0	7	693	5067				
10:15	10:30	0	575	13	0	3	4	0	5	639	5096				
10:30	10:45	0	585	12	0	8	5	0	5	682	5132				
10:45	11:00	0	563	13	0	10	4	0	10	674	5219				
11:00	11:15	0	542	32	0	14	11	0	17	670	5334	Peak			
11:15	11:30	0	584	22	0	12	7	0	13	637					
11:30	11:45	0	631	25	0	16	3	0	14	695					
11:45	12:00	0	628	22	0	13	8	0	17	701					
12:00	12:15	0	621	19	0	16	7	0	5	671	5467	Peak			
12:15	12:30	0	662	16	0	16	14	0	5	664	5429				
12:30	12:45	0	640	13	0	30	17	0	7	699	5440		2612	143	2712
12:45	13:00	0	632	9	0	23	20	0	2	659	5376				
13:00	13:15	0	617	11	0	31	14	0	2	626	5340				
13:15	13:30	0	668	11	0	17	9	0	2	681					
13:30	13:45	0	632	16	0	16	7	0	6	665					
13:45	14:00	0	651	7	0	3	10	0	8	630					

Peak Time		**East Approach The Crescent**			**South Approach James Craig**			**West Approach The Crescent**			**Peak**
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB	**total**
11:00	12:00	0	2385	101	0	55	29	0	61	2703	5334
12:00	13:00	0	2555	57	0	85	58	0	19	2693	5467

Graphic



Light Vehicles

Time		**East Approach The Crescent**			**South Approach James Craig**			**West Approach The Crescent**		
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB
10:00	10:15	0	509	14	0	6	2	0	3	672
10:15	10:30	0	554	11	0	2	1	0	2	616
10:30	10:45	0	566	10	0	7	3	0	3	671
10:45	11:00	0	540	11	0	7	4	0	9	657
11:00	11:15	0	526	27	0	10	6	0	10	659
11:15	11:30	0	570	20	0	8	3	0	10	626
11:30	11:45	0	620	20	0	12	2	0	13	679
11:45	12:00	0	608	18	0	13	5	0	11	677
12:00	12:15	0	614	13	0	13	6	0	4	647
12:15	12:30	0	647	14	0	16	10	0	3	649
12:30	12:45	0	625	13	0	26	11	0	1	696
12:45	13:00	0	611	9	0	19	13	0	0	641
13:00	13:15	0	596	10	0	30	14	0	2	608
13:15	13:30	0	644	11	0	16	7	0	1	670
13:30	13:45	0	624	11	0	15	2	0	1	655
13:45	14:00	0	638	7	0	2	2	0	3	619

Heavy Vehicles

Time		**East Approach The Crescent**			**South Approach James Craig**			**West Approach The Crescent**		
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB
10:00	10:15	0	17	2	0	4	3	0	4	21
10:15	10:30	0	21	2	0	1	3	0	3	23
10:30	10:45	0	19	2	0	1	2	0	2	11
10:45	11:00	0	23	2	0	3	0	0	1	17
11:00	11:15	0	16	5	0	4	5	0	7	11
11:15	11:30	0	14	2	0	4	4	0	3	11
11:30	11:45	0	11	5	0	4	1	0	1	16
11:45	12:00	0	20	4	0	0	3	0	6	24
12:00	12:15	0	7	6	0	3	1	0	1	24
12:15	12:30	0	15	2	0	0	4	0	2	15
12:30	12:45	0	15	0	0	4	6	0	6	3
12:45	13:00	0	21	0	0	4	7	0	2	18
13:00	13:15	0	21	1	0	1	0	0	0	18
13:15	13:30	0	24	0	0	1	2	0	1	11
13:30	13:45	0	8	5	0	1	5	0	5	10
13:45	14:00	0	13	0	0	1	8	0	5	11

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of The Crescent and The Crescent, Rozelle

Date:	Thu 21/09/17
Weather:	Overcast
Suburban:	Rozelle
Customer:	AECOM

North:	N/A
East:	The Crescent
South:	The Crescent
West:	City-West Link Rd

Survey Start	AM:	7:00	PM:	16:00
Vehicular Peakhour		**Pedestrians Peakhour**		
AM:	7:30 AM-8:30 AM	AM:	N/A	
PM:	4:30 PM-5:30 PM	PM:	N/A	

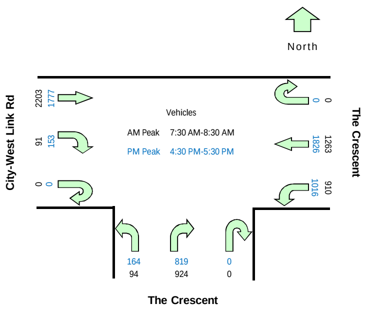
All Vehicles

Time		East Approach The Crescent			South Approach The Crescent			West Approach City-West Link			Hourly Total	
Period Start	**Period End**	**U**	**WB**	**L**	**U**	**R**	**L**	**U**	**R**	**EB**	**Hour**	**Peak**
7:00	7:15	0	265	194	0	173	21	0	15	601	5332	
7:15	7:30	0	285	214	0	251	20	0	20	497	5424	
7:30	7:45	0	340	207	0	252	14	0	25	541	5485	Peak
7:45	8:00	0	312	236	0	252	19	0	14	564	5475	
8:00	8:15	0	306	236	0	224	29	0	31	535	5414	
8:15	8:30	0	305	231	0	196	32	0	21	563		
8:30	8:45	0	264	288	0	223	33	0	37	524		
8:45	9:00	0	312	229	0	229	24	0	40	502		
16:00	16:15	0	455	247	0	177	40	0	38	428	5605	
16:15	16:30	0	445	254	0	172	33	0	39	390	5599	
16:30	16:45	0	493	246	0	189	38	0	47	443	5755	Peak
16:45	17:00	0	441	257	0	202	42	0	33	456	5681	
17:00	17:15	0	449	239	0	196	44	0	31	420	5609	
17:15	17:30	0	443	274	0	232	40	0	42	458		
17:30	17:45	0	403	217	0	182	40	0	40	500		
17:45	18:00	0	411	209	0	191	52	0	49	447		

	1	2	3				
4-5	149	664	602	1415	1834		
5-6	158	728	436	1322	1828		
	4	5	6		binh		
7-8	1075	1094	170	2339	2203	74	84
8-9	1020	1052	189	2261	2124	129	102

Peak Time		East Approach The Crescent			South Approach The Crescent			West Approach City-West Link			Peak
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB	**total**
7:30	8:30	0	1263	910	0	924	94	0	91	2203	5485
16:30	17:30	0	1826	1016	0	819	164	0	153	1777	5755

Graphic



1.115668

Light Vehicles

Time		East Approach The Crescent			South Approach The Crescent			West Approach City-West Link		
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB
7:00	7:15	0	245	190	0	166	20	0	15	540
7:15	7:30	0	248	207	0	246	18	0	18	463
7:30	7:45	0	301	199	0	244	13	0	23	507
7:45	8:00	0	292	220	0	247	19	0	13	523
8:00	8:15	0	285	228	0	214	26	0	29	512
8:15	8:30	0	272	217	0	189	30	0	20	527
8:30	8:45	0	229	274	0	217	27	0	36	490
8:45	9:00	0	265	210	0	218	24	0	35	472
16:00	16:15	0	438	245	0	173	37	0	38	410
16:15	16:30	0	424	247	0	169	33	0	37	373
16:30	16:45	0	480	244	0	186	38	0	46	421
16:45	17:00	0	428	254	0	200	41	0	33	432
17:00	17:15	0	432	234	0	192	44	0	30	404
17:15	17:30	0	432	270	0	226	39	0	40	437
17:30	17:45	0	393	215	0	180	39	0	40	483
17:45	18:00	0	392	207	0	187	52	0	48	433

East Approach The Crescent			South Approach The Crescent			West Approach City-West Link Rd				
U	WB	L	U	R	L	U	R	EB		
0	1150	864	0	894	88	0	85	2069	Existing	5485
0	1283	964	0	997	98	0	95	2308	Design 2029	

East Approach The Crescent			South Approach The Crescent			West Approach City-West Link Rd			
U	WB	L	U	R	L	U	R	EB	
0	1772	1002	0	804	162	0	149	1694	Existing
0	1977	1118	0	897	181	0	166	1890	Design 2029

Heavy Vehicles

Time		East Approach The Crescent			South Approach The Crescent			West Approach City-West Link		
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB
7:00	7:15	0	20	4	0	7	1	0	0	61
7:15	7:30	0	37	7	0	5	2	0	2	34
7:30	7:45	0	39	8	0	8	1	0	2	34
7:45	8:00	0	20	16	0	5	0	0	1	41
8:00	8:15	0	21	8	0	10	3	0	2	23
8:15	8:30	0	33	14	0	7	2	0	1	36
8:30	8:45	0	35	14	0	6	6	0	1	34
8:45	9:00	0	47	19	0	11	0	0	5	30
16:00	16:15	0	17	2	0	4	3	0	0	18
16:15	16:30	0	21	7	0	3	0	0	2	17
16:30	16:45	0	13	2	0	3	0	0	1	22
16:45	17:00	0	13	3	0	2	1	0	0	24
17:00	17:15	0	17	5	0	4	0	0	1	16
17:15	17:30	0	11	4	0	6	1	0	2	21
17:30	17:45	0	10	2	0	2	1	0	0	17
17:45	18:00	0	19	2	0	4	0	0	1	14

East Approach The Crescent			South Approach The Crescent			West Approach City-West Link Rd			
U	WB	L	U	R	L	U	R	EB	
0	113	46	0	30	6	0	6	134	Existing
0	126	51	0	33	7	0	7	149	Design 2029

East Approach The Crescent			South Approach The Crescent			West Approach City-West Link Rd			
U	WB	L	U	R	L	U	R	EB	
0	54	14	0	15	2	0	4	83	Existing
0	60	16	0	17	2	0	4	93	Design 2029

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au

Intersection of The Crescent and The Crescent, Rozelle

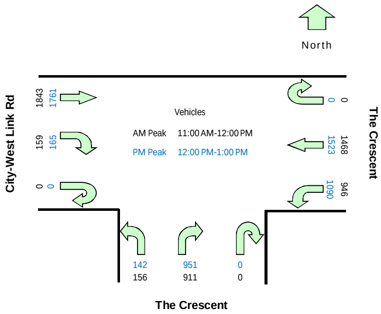
Date:	Thu 21/09/17	***North:***	N/A	**Survey Start**		AM:	10:00	PM:	12:00
Weather:	Overcast	***East:***	The Crescent	**Vehicular Peakhour**			**Pedestrians Peakhour**		
Suburban:	Rozelle	***South:***	The Crescent	AM:	11:00 AM-12:00 PM	AM:	N/A		
Customer:	AECOM	***West:***	City-West Link Rd	PM:	12:00 PM-1:00 PM	PM:	N/A		

All Vehicles

Time		East Approach The Crescent			South Approach The Crescent			West Approach City-West Link			Hourly Total	
Period Start	**Period End**	**U**	**WB**	**L**	**U**	**R**	**L**	**U**	**R**	**EB**	**Hour**	**Peak**
10:00	10:15	0	327	204	0	222	40	0	41	478	5308	
10:15	10:30	0	341	238	0	209	39	0	41	435	5319	
10:30	10:45	0	381	209	0	213	33	0	47	474	5342	
10:45	11:00	0	355	212	0	213	35	0	50	471	5387	
11:00	11:15	0	373	180	0	217	45	0	48	460	5483	Peak
11:15	11:30	0	334	257	0	216	40	0	45	434		
11:30	11:45	0	379	255	0	253	34	0	25	456		
11:45	12:00	0	382	254	0	225	37	0	41	493		
12:00	12:15	0	335	293	0	245	38	0	32	431	5632	Peak
12:15	12:30	0	402	274	0	232	37	0	45	437	5582	
12:30	12:45	0	391	266	0	214	37	0	45	492	5593	
12:45	13:00	0	395	257	0	260	30	0	43	401	5530	
13:00	13:15	0	371	260	0	179	21	0	44	449	5515	
13:15	13:30	0	391	286	0	254	38	0	40	429		
13:30	13:45	0	409	230	0	199	28	0	44	472		
13:45	14:00	0	426	235	0	175	42	0	30	463		

Peak Time		East Approach The Crescent			South Approach The Crescent			West Approach City-West Link			Peak
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB	**total**
11:00	12:00	0	1468	946	0	911	156	0	159	1843	5483
12:00	13:00	0	1523	1090	0	951	142	0	165	1761	5632

Graphic



Light Vehicles

Time		East Approach The Crescent			South Approach The Crescent			West Approach City-West Link		
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB
10:00	10:15	0	310	201	0	219	39	0	40	456
10:15	10:30	0	319	236	0	204	39	0	39	414
10:30	10:45	0	364	205	0	209	32	0	46	465
10:45	11:00	0	335	209	0	210	35	0	49	456
11:00	11:15	0	357	175	0	214	45	0	47	445
11:15	11:30	0	322	251	0	211	40	0	44	425
11:30	11:45	0	372	250	0	249	31	0	25	443
11:45	12:00	0	362	251	0	220	36	0	41	468
12:00	12:15	0	329	291	0	241	36	0	29	410
12:15	12:30	0	385	272	0	231	36	0	45	421
12:30	12:45	0	373	263	0	212	35	0	44	485
12:45	13:00	0	371	253	0	259	29	0	42	382
13:00	13:15	0	352	258	0	176	21	0	43	434
13:15	13:30	0	368	283	0	251	37	0	39	420
13:30	13:45	0	398	228	0	196	28	0	43	460
13:45	14:00	0	409	231	0	172	41	0	30	450

Heavy Vehicles

Time		East Approach The Crescent			South Approach The Crescent			West Approach City-West Link		
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB
10:00	10:15	0	17	3	0	3	1	0	1	22
10:15	10:30	0	22	2	0	5	0	0	2	21
10:30	10:45	0	17	4	0	4	1	0	1	9
10:45	11:00	0	20	3	0	3	0	0	1	15
11:00	11:15	0	16	5	0	3	0	0	1	15
11:15	11:30	0	12	6	0	5	0	0	1	9
11:30	11:45	0	7	5	0	4	3	0	0	13
11:45	12:00	0	20	3	0	5	1	0	0	25
12:00	12:15	0	6	2	0	4	2	0	3	21
12:15	12:30	0	17	2	0	1	1	0	0	16
12:30	12:45	0	18	3	0	2	2	0	1	7
12:45	13:00	0	24	4	0	1	1	0	1	19
13:00	13:15	0	19	2	0	3	0	0	1	15
13:15	13:30	0	23	3	0	3	1	0	1	9
13:30	13:45	0	11	2	0	3	0	0	1	12
13:45	14:00	0	17	4	0	3	1	0	0	13

truck Brekdwon

Victoria Road - The Crescent

AM Peak 7:15 - 8:15						PM Peak 16:30 - 17:30						Weekend 12:00 - 13:00					
North Approach Victoria Rd		**East Approach Victoria Rd**		**West Approach The Crescent**		**North Approach Victoria Rd**		**East Approach Victoria Rd**		**West Approach The Crescent**		**North Approach Victoria Rd**		**East Approach Victoria Rd**		**West Approach The Crescent**	
LV	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**
3739	179	2607	195	2935	145	2700	90	0	154	2570	99	2972	53	3503	89	2707	71
LV+HV		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**	
3918		2802		3080		2790		154		2669		3025		3592		2778	
Intersection total (LV+HV)						**Intersection total (LV+HV)**						**Intersection total (LV+HV)**					
9800						**5613**						**9395**					

James Craig - The Crescent

AM Peak 7:30 - 8:30						PM Peak 16:30 - 17:30						Weekend 12:00 - 13:00					
North Approach Victoria Rd		**East Approach Victoria Rd**		**West Approach The Crescent**		**North Approach Victoria Rd**		**East Approach Victoria Rd**		**West Approach The Crescent**		**North Approach Victoria Rd**		**East Approach Victoria Rd**		**West Approach The Crescent**	
LV	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**
2089	151	44	26	2963	164	2747	66	132	11	2498	98	2546	66	114	29	2641	71
LV+HV		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**	
2240		70		3127		2813		143		2596		2612		143		2712	
Intersection total (LV+HV)						**Intersection total (LV+HV)**						**Intersection total (LV+HV)**					
5437						**5552**						**5467**					

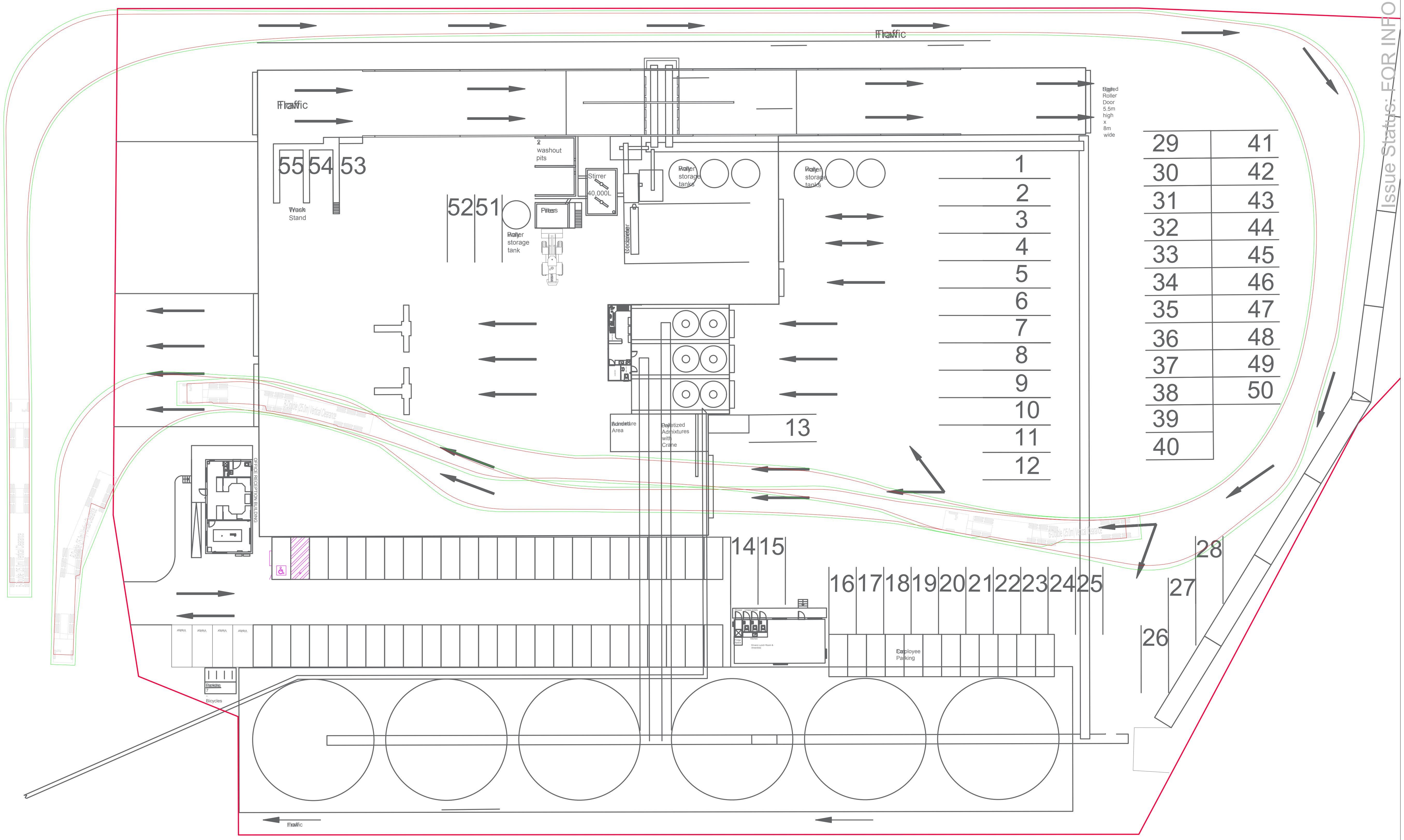
City West Link - The Crescent

AM Peak 7:30 - 8:30						PM Peak 16:30 - 17:30						Weekend 12:00 - 13:00					
North Approach Victoria Rd		**East Approach Victoria Rd**		**West Approach The Crescent**		**North Approach Victoria Rd**		**East Approach Victoria Rd**		**West Approach The Crescent**		**North Approach Victoria Rd**		**East Approach Victoria Rd**		**West Approach The Crescent**	
LV	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**
2014	159	982	36	2154	140	2774	68	966	17	1843	87	2537	76	2022	14	1858	68
LV+HV		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**		**LV+HV**	
2173		1018		2294		2842		983		1930		2613		2036		1926	
Intersection total (LV+HV)						**Intersection total (LV+HV)**						**Intersection total (LV+HV)**					
5485						**5755**						**6575**					

Appendix B

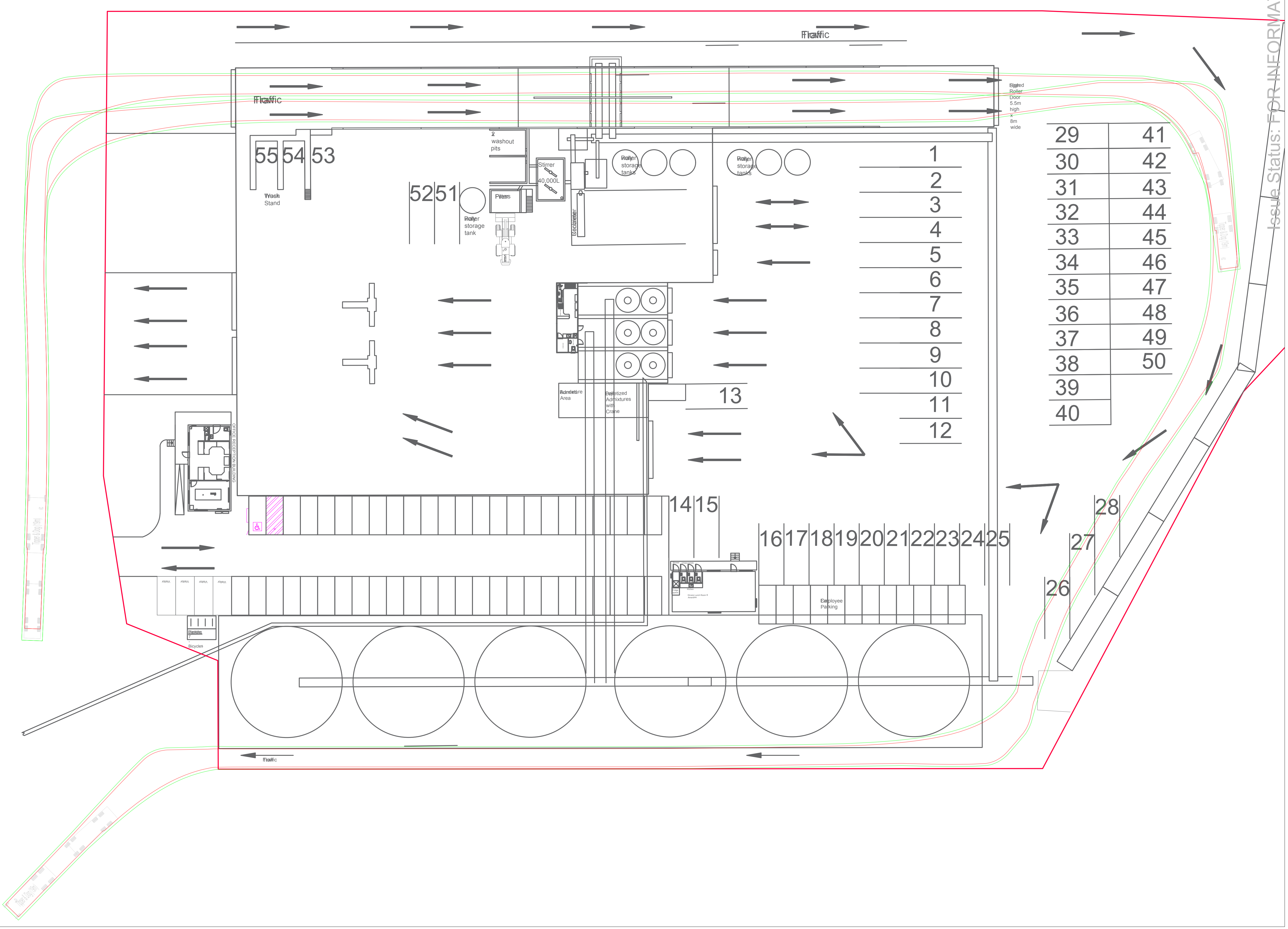
Swept Path Analysis

Appendix B Swept Path Analysis



Issue Status: FOR INFORMATION

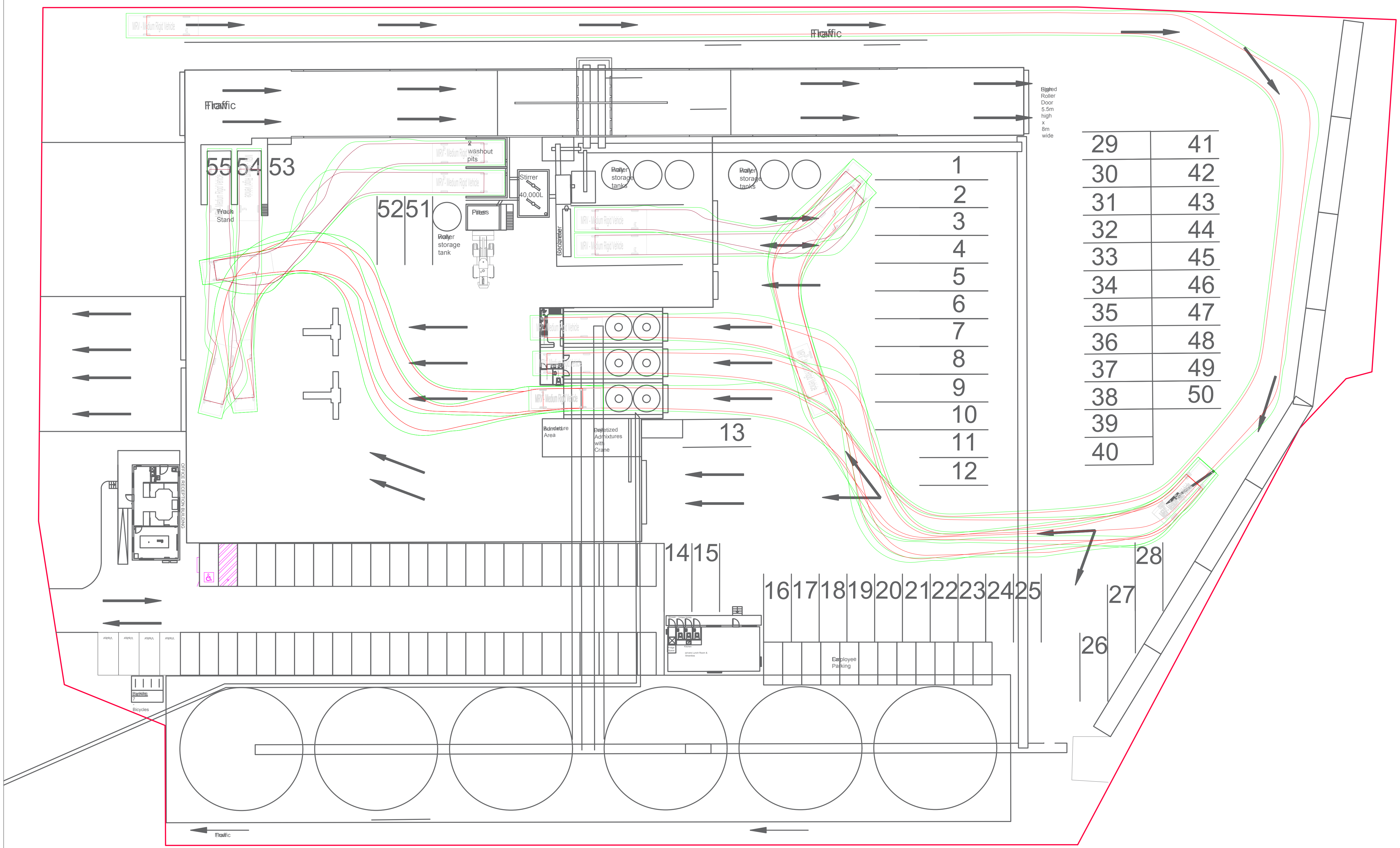
CONCRETE BATCHING PLANT - GLEBE ISLAND
DESIGN CHECKS
HANSON CONSTRUCTION MATERIALS PTY LTD
Project No.: 60555976



Issue Status: FOR INFORMATION

AECOM

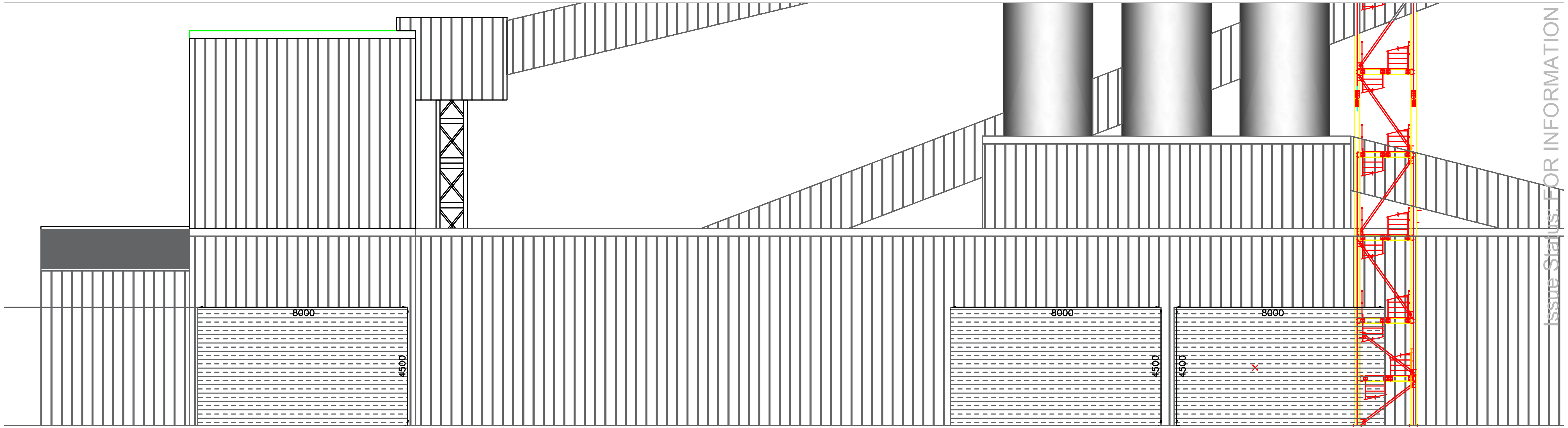
CONCRETE BATCHING PLANT - GLEBE ISLAND
DESIGN CHECKS
HANSON CONSTRUCTION MATERIALS PTY LTD
Project No.: 60555976



Issue Status: FOR INFORMATION

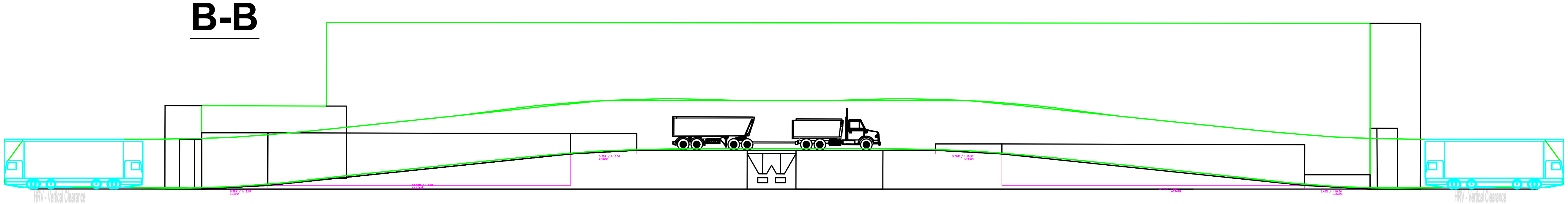
AECOM

CONCRETE BATCHING PLANT - GLEBE ISLAND
DESIGN CHECKS
HANSON CONSTRUCTION MATERIALS PTY LTD
Project No.: 60555976



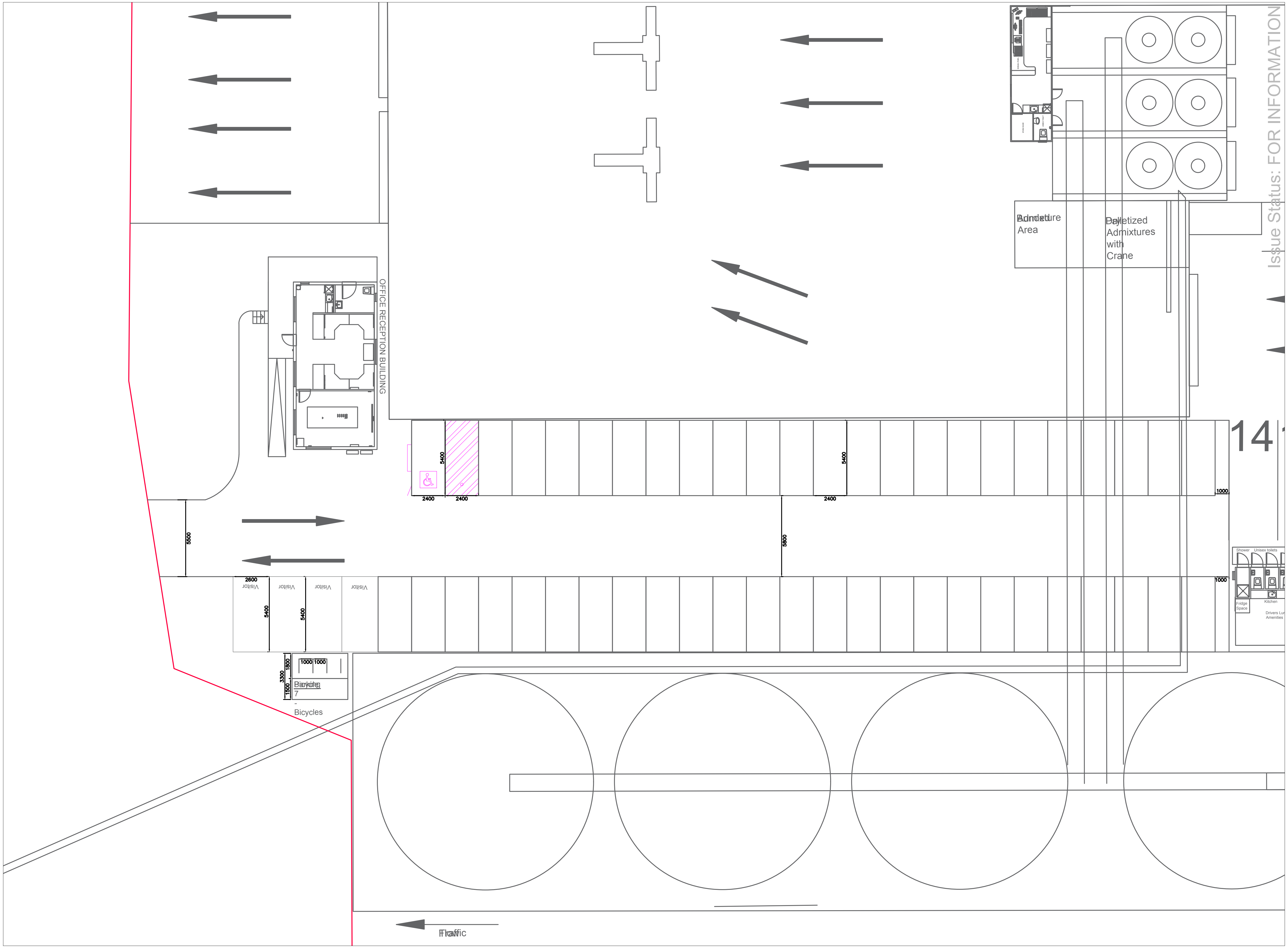
Issue Status: FOR INFORMATION

Section B-B



AECOM

CONCRETE BATCHING PLANT - GLEBE ISLAND
DESIGN CHECKS
HANSON CONSTRUCTION MATERIALS PTY LTD
Project No.: 60555976



Issue Status: FOR INFORMATION

AECOM

CONCRETE BATCHING PLANT - GLEBE ISLAND
DESIGN CHECKS
HANSON CONSTRUCTION MATERIALS PTY LTD
Project No.: 60555976

Appendix C

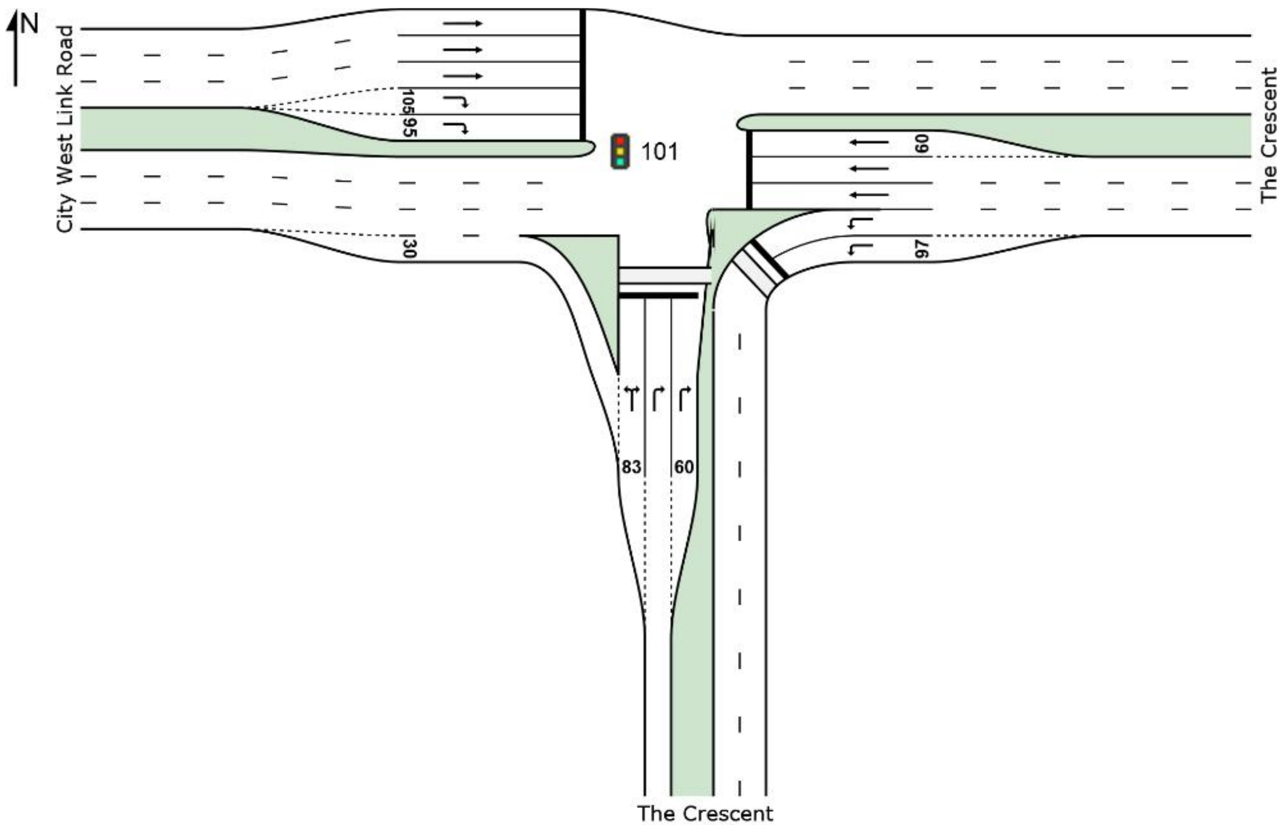
SIDRA Results

Appendix C SIDRA Results

SITE LAYOUT

Site: 101 [The Crescent - City West link PM Existing]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [The Crescent - City West link AM Existing]

Network: N101 [Network existing AM]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Crescent													
1	L2	99	6.4	99	6.4	1.008	123.1	LOS F	7.6	55.0	1.00	1.13	16.3
3	R2	973	3.2	973	3.2	1.008	126.0	LOS F	38.3	275.8	1.00	1.14	6.5
Approach		1072	3.5	1072	3.5	1.008	125.8	LOS F	38.3	275.8	1.00	1.14	7.5
East: The Crescent													
4	L2	958	5.1	958	5.1	0.311	8.3	LOS A	4.4	31.8	0.14	0.62	47.2
5	T1	1329	8.9	1329	8.9	0.570	24.6	LOS B	22.6	170.3	0.70	0.62	41.6
Approach		2287	7.3	2287	7.3	0.570	17.8	LOS B	22.6	170.3	0.46	0.62	43.2
West: City West Link Road													
11	T1	2319	6.1	2319	6.1	0.895	36.0	LOS C	63.7	469.2	0.91	0.92	29.8
12	R2	96	6.6	96	6.6	0.450	83.8	LOS F	3.6	26.3	1.00	0.75	21.5
Approach		2415	6.1	2415	6.1	0.895	37.9	LOS C	63.7	469.2	0.91	0.91	29.2
All Vehicles		5774	6.1	5774	6.1	1.008	46.2	LOS D	63.7	469.2	0.75	0.84	25.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 6.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	24.7	LOS C	0.1	0.1	0.57	0.57
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	47.0	LOS E			0.77	0.77

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

PHASING SUMMARY

Site: 101 [The Crescent - City West link AM Existing]

Network: N101 [Network existing AM]

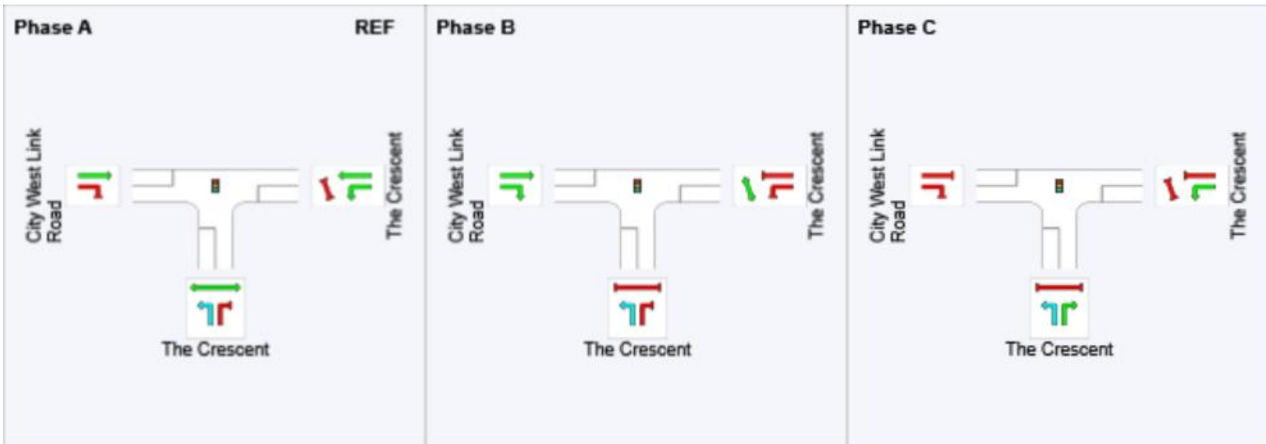
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	85	100
Green Time (sec)	79	9	44
Phase Time (sec)	85	15	50
Phase Split	57 %	10 %	33 %

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



REF: Reference Phase
VAR: Variable Phase

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

PHASING SUMMARY

Site: 101 [The Crescent - City West link PM Existing]

Network: N101 [Network existing PM]

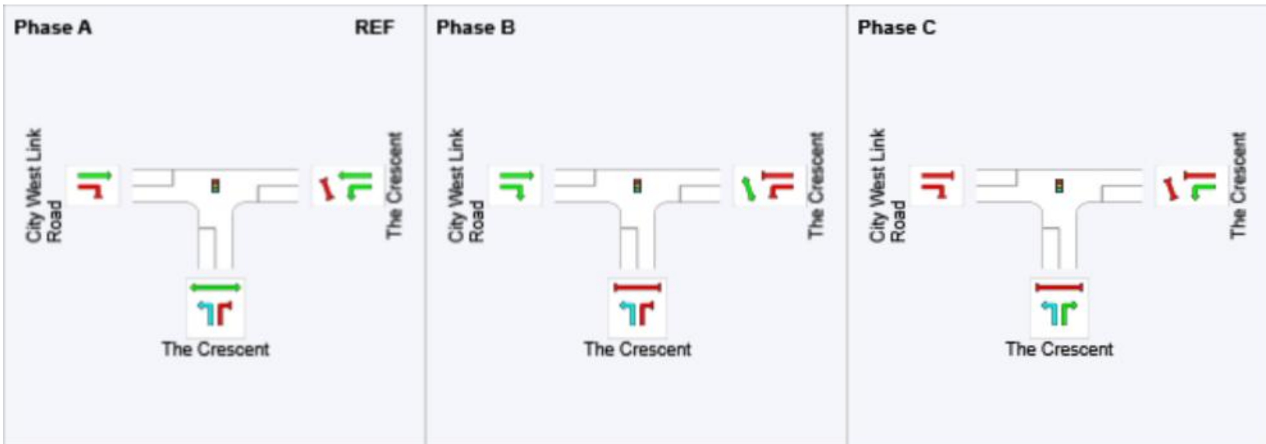
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	88	103
Green Time (sec)	82	9	41
Phase Time (sec)	88	15	47
Phase Split	59 %	10 %	31 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - City West link PM Existing]

Network: N101 [Network existing PM]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Crescent													
1	L2	173	1.2	173	1.2	0.885	71.3	LOS F	0.0	0.0	0.97	0.95	23.9
3	R2	862	1.8	862	1.8	0.885	72.1	LOS F	24.7	175.7	0.95	0.95	10.5
Approach		1035	1.7	1035	1.7	0.885	71.9	LOS F	24.7	175.7	0.95	0.95	13.3
East: The Crescent													
4	L2	1069	1.4	915	1.5	0.289	8.7	LOS A	6.0	42.9	0.20	0.64	47.2
5	T1	1922	3.0	1647	3.2	0.682	29.1	LOS C	30.8	221.2	0.79	0.71	38.7
Approach		2992	2.4	2562 N1	2.6	0.682	21.9	LOS B	30.8	221.2	0.58	0.68	40.6
West: City West Link Road													
11	T1	1871	4.7	1871	4.7	0.515	14.7	LOS B	23.8	173.5	0.57	0.52	45.1
12	R2	161	2.6	161	2.6	0.736	87.3	LOS F	6.2	44.6	1.00	0.83	21.0
Approach		2032	4.5	2032	4.5	0.736	20.5	LOS B	23.8	173.5	0.61	0.55	40.0
All Vehicles		6058	3.0	5628 N1	3.2	0.885	30.6	LOS C	30.8	221.2	0.66	0.68	32.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 100.0 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	23.0	LOS C	0.1	0.1	0.55	0.55
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	46.1	LOS E			0.76	0.76

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - City West link AM 2029]

Network: N101 [Network existing AM 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Crescent													
1	L2	110	6.4	110	6.4	1.394	428.0	LOS F	6.7	48.3	1.00	1.78	5.6
3	R2	1085	3.2	1085	3.2	1.394	429.5	LOS F	79.4	571.2	1.00	1.77	2.0
Approach		1196	3.5	1196	3.5	1.394	429.4	LOS F	79.4	571.2	1.00	1.77	2.3
East: The Crescent													
4	L2	1069	5.1	972	5.3	0.316	8.8	LOS A	6.6	48.5	0.21	0.64	46.5
5	T1	1484	8.9	1351	9.3	0.505	21.6	LOS B	22.8	172.6	0.67	0.59	43.8
Approach		2553	7.3	2324 [N1]	7.6	0.505	16.2	LOS B	22.8	172.6	0.48	0.61	44.6
West: City West Link Road													
11	T1	2588	6.1	2588	6.1	0.902	29.3	LOS C	65.9	485.2	0.86	0.87	33.4
12	R2	107	6.6	107	6.6	0.502	84.1	LOS F	4.0	29.5	1.00	0.75	21.4
Approach		2695	6.1	2695	6.1	0.902	31.4	LOS C	65.9	485.2	0.87	0.87	32.4
All Vehicles		6443	6.1	6214 [N1]	6.3	1.394	102.3	LOS F	79.4	571.2	0.75	0.95	13.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 51.5 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	18.3	LOS B	0.1	0.1	0.49	0.49
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	43.8	LOS E			0.73	0.73

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

PHASING SUMMARY

Site: 101 [The Crescent - City West link AM 2029]

Network: N101 [Network existing AM 2029]

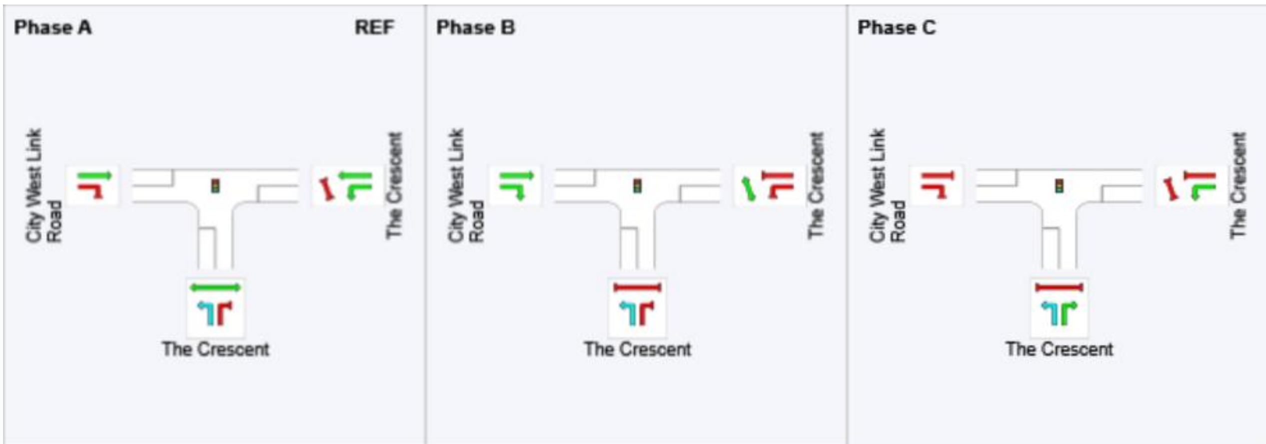
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	97	112
Green Time (sec)	91	9	32
Phase Time (sec)	97	15	38
Phase Split	65 %	10 %	25 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - City West link PM 2029]

Network: N101 [Network existing PM 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Crescent													
1	L2	193	1.2	193	1.2	0.904	70.8	LOS F	3.7	26.6	0.94	0.96	24.0
3	R2	962	1.8	962	1.8	0.904	72.0	LOS F	27.9	198.1	0.92	0.96	10.5
Approach		1155	1.7	1155	1.7	0.904	71.8	LOS F	27.9	198.1	0.93	0.96	13.3
East: The Crescent													
4	L2	1194	1.4	938	1.5	0.297	7.7	LOS A	6.3	44.4	0.20	0.60	46.1
5	T1	2145	3.0	1690	3.3	0.761	29.5	LOS C	34.0	244.7	0.82	0.73	35.2
Approach		3339	2.4	2628 N1	2.7	0.761	21.7	LOS B	34.0	244.7	0.60	0.69	37.5
West: City West Link Road													
11	T1	2088	4.7	2088	4.7	0.749	22.0	LOS B	44.4	323.5	0.77	0.71	35.2
12	R2	180	2.6	180	2.6	0.822	89.3	LOS F	7.1	51.1	1.00	0.90	20.0
Approach		2267	4.5	2267	4.5	0.822	27.3	LOS B	44.4	323.5	0.78	0.72	32.4
All Vehicles		6761	3.0	6050 N1	3.3	0.904	33.4	LOS C	44.4	323.5	0.73	0.75	29.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 239.7 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	26.5	LOS C	0.1	0.1	0.59	0.59
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	47.9	LOS E			0.78	0.78

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

PHASING SUMMARY

Site: 101 [The Crescent - City West link PM 2029]

Network: N101 [Network existing PM 2029]

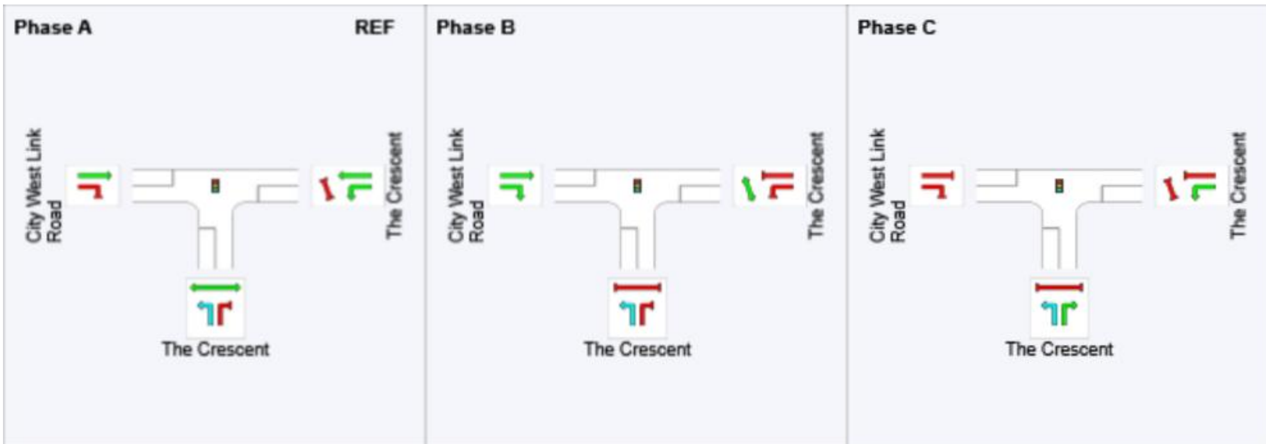
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	13	95	110
Green Time (sec)	76	9	47
Phase Time (sec)	82	15	53
Phase Split	55 %	10 %	35 %

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



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 101 [The Crescent - City West link AM Base 2018]

Network: N101 [Network AM Base 2018]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Crescent													
1	L2	99	6.4	99	6.4	1.009	124.2	LOS F	6.9	50.3	1.00	1.14	16.1
3	R2	973	3.2	973	3.2	1.009	126.9	LOS F	38.1	274.2	1.00	1.14	6.4
Approach		1072	3.5	1072	3.5	1.009	126.6	LOS F	38.1	274.2	1.00	1.14	7.5
East: The Crescent													
4	L2	958	5.1	958	5.1	0.311	8.6	LOS A	6.0	43.5	0.18	0.63	46.8
5	T1	1385	12.6	1385	12.6	0.609	26.1	LOS B	23.3	180.9	0.74	0.66	40.6
Approach		2343	9.5	2343	9.5	0.609	19.0	LOS B	23.3	180.9	0.51	0.65	42.3
West: City West Link Road													
11	T1	2377	8.3	2377	8.3	0.903	37.2	LOS C	65.8	493.3	0.92	0.93	29.2
12	R2	96	6.6	96	6.6	0.450	83.8	LOS F	3.6	26.3	1.00	0.75	21.5
Approach		2473	8.2	2473	8.2	0.903	39.0	LOS C	65.8	493.3	0.92	0.92	28.7
All Vehicles		5887	7.9	5887	7.9	1.009	47.0	LOS D	65.8	493.3	0.77	0.85	24.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 14.7 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	24.1	LOS C	0.1	0.1	0.57	0.57
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	46.7	LOS E			0.77	0.77

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

PHASING SUMMARY

Site: 101 [The Crescent - City West link AM Base 2018]

Network: N101 [Network AM Base 2018]

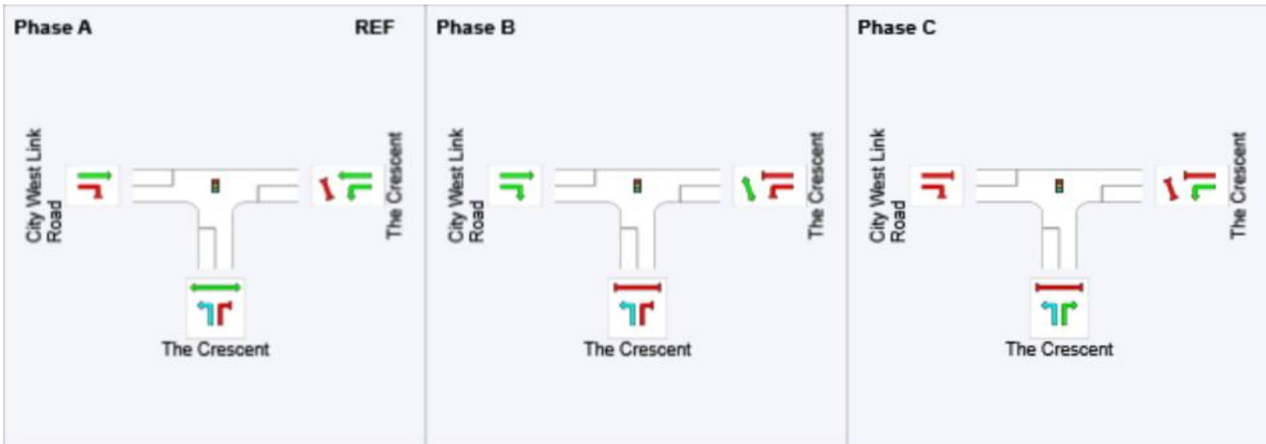
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	86	101
Green Time (sec)	80	9	43
Phase Time (sec)	86	15	49
Phase Split	57 %	10 %	33 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - City West link PM Base 2018]

Network: N101 [Network PM Base 2018]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Crescent													
1	L2	173	1.2	173	1.2	0.886	71.3	LOS F	0.0	0.0	0.97	0.95	23.9
3	R2	862	1.8	862	1.8	0.886	72.1	LOS F	24.7	175.8	0.95	0.95	10.5
Approach		1035	1.7	1035	1.7	0.886	72.0	LOS F	24.7	175.8	0.95	0.95	13.3
East: The Crescent													
4	L2	1069	1.4	936	1.5	0.296	8.7	LOS A	6.2	44.2	0.20	0.64	47.2
5	T1	1949	3.9	1711	4.2	0.718	25.9	LOS B	30.2	218.8	0.77	0.69	40.6
Approach		3019	3.0	2647 N1	3.3	0.718	19.8	LOS B	30.2	218.8	0.57	0.67	42.2
West: City West Link Road													
11	T1	1895	5.7	1895	5.7	0.525	14.9	LOS B	24.4	179.1	0.58	0.53	44.9
12	R2	161	2.6	161	2.6	0.736	87.3	LOS F	6.2	44.6	1.00	0.83	21.0
Approach		2056	5.4	2056	5.4	0.736	20.6	LOS B	24.4	179.1	0.61	0.55	39.9
All Vehicles		6109	3.6	5737 N1	3.9	0.886	29.5	LOS C	30.2	218.8	0.65	0.68	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 50.0 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	23.0	LOS C	0.1	0.1	0.55	0.55
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	46.1	LOS E			0.76	0.76

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

PHASING SUMMARY

Site: 101 [The Crescent - City West link PM Base 2018]

Network: N101 [Network PM Base 2018]

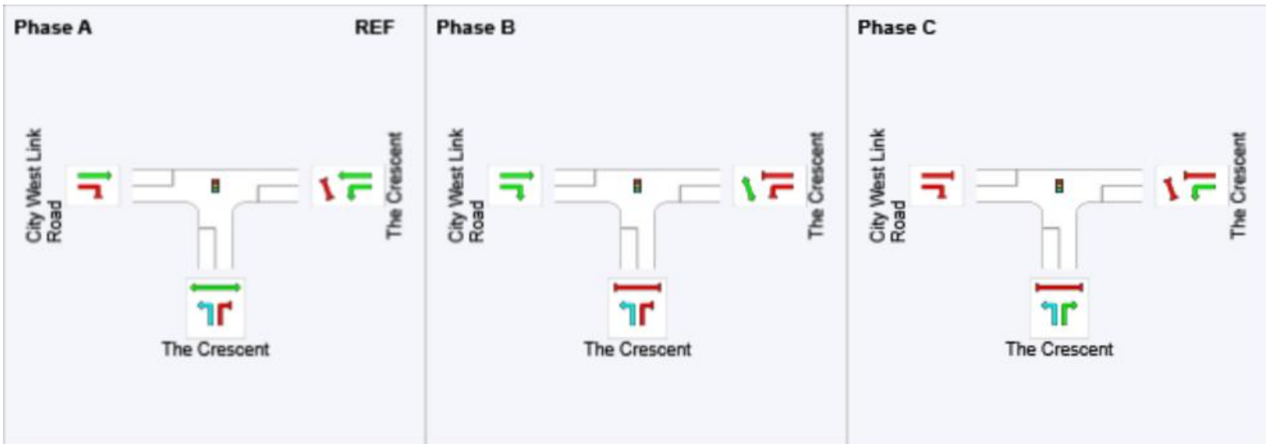
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	11	99	114
Green Time (sec)	82	9	41
Phase Time (sec)	88	15	47
Phase Split	59 %	10 %	31 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - City West link AM Design 2029]

Network: N101 [Network AM Design 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Crescent													
1	L2	111	6.7	111	6.7	1.433	461.6	LOS F	5.9	42.8	1.00	1.83	5.2
3	R2	1084	3.2	1084	3.2	1.433	462.9	LOS F	81.6	587.0	1.00	1.82	1.8
Approach		1195	3.5	1195	3.5	1.433	462.7	LOS F	81.6	587.0	1.00	1.82	2.2
East: The Crescent													
4	L2	1068	5.0	987	5.2	0.320	8.8	LOS A	6.7	48.9	0.20	0.64	46.6
5	T1	1539	12.2	1427	12.8	0.542	20.5	LOS B	23.8	185.2	0.66	0.59	44.6
Approach		2607	9.3	2414 N1	9.7	0.542	15.7	LOS B	23.8	185.2	0.47	0.61	45.2
West: City West Link Road													
11	T1	2644	8.0	2644	8.0	0.901	27.4	LOS B	64.8	485.0	0.85	0.86	34.5
12	R2	107	6.9	107	6.9	0.505	84.2	LOS F	4.0	29.7	1.00	0.75	21.4
Approach		2752	8.0	2752	8.0	0.901	29.6	LOS C	64.8	485.0	0.85	0.85	33.4
All Vehicles		6554	7.7	6360 N1	7.9	1.433	105.7	LOS F	81.6	587.0	0.74	0.94	13.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 107.9 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	17.3	LOS B	0.1	0.1	0.48	0.48
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	43.3	LOS E			0.72	0.72

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

PHASING SUMMARY

Site: 101 [The Crescent - City West link AM Design 2029]

Network: N101 [Network AM Design 2029]

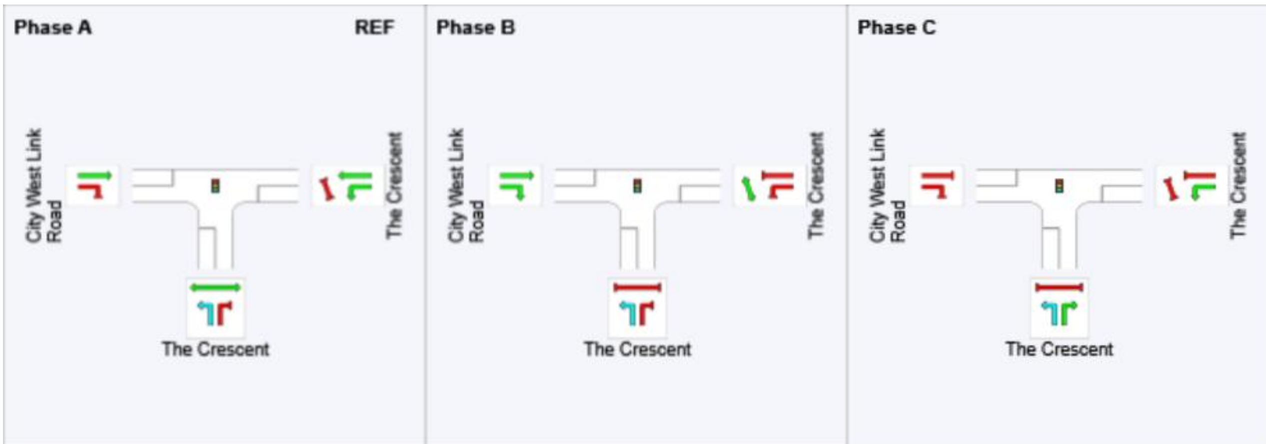
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	99	114
Green Time (sec)	93	9	30
Phase Time (sec)	99	15	36
Phase Split	66 %	10 %	24 %

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



REF: Reference Phase
VAR: Variable Phase

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Monday, 11 December 2017 5:13:54 PM
Project: P:\605X\60555976\4. Tech Work Area\4.7 Traffic\SIDRA\James Craig - Victoria Rd final 111217.sip7

MOVEMENT SUMMARY

Site: 101 [The Crescent - City West link PM Design 2029]

Network: N101 [Network PM Design 2029]

New Site
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Crescent													
1	L2	193	1.1	193	1.1	0.904	70.8	LOS F	6.1	43.4	0.94	0.96	24.0
3	R2	962	1.9	962	1.9	0.904	72.0	LOS F	27.9	198.1	0.92	0.96	10.5
Approach		1155	1.7	1155	1.7	0.904	71.8	LOS F	27.9	198.1	0.93	0.96	13.3
East: The Crescent													
4	L2	1194	1.4	849	1.6	0.269	8.6	LOS A	5.3	37.3	0.19	0.63	47.4
5	T1	2172	3.8	1556	4.5	0.637	17.8	LOS B	24.7	179.7	0.51	0.46	46.7
Approach		3365	3.0	2405 N1	3.5	0.637	14.6	LOS B	24.7	179.7	0.40	0.52	46.9
West: City West Link Road													
11	T1	2112	5.6	2112	5.6	0.762	22.4	LOS B	45.6	334.2	0.78	0.72	38.0
12	R2	179	2.4	179	2.4	0.816	90.0	LOS F	7.1	50.7	1.00	0.88	20.6
Approach		2291	5.3	2291	5.3	0.816	27.7	LOS B	45.6	334.2	0.79	0.73	34.8
All Vehicles		6811	3.6	5850 N1	4.1	0.904	31.0	LOS C	45.6	334.2	0.66	0.69	32.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 69.3 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	26.5	LOS C	0.1	0.1	0.59	0.59
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	47.9	LOS E			0.78	0.78

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

PHASING SUMMARY

Site: 101 [The Crescent - City West link PM Design 2029]

Network: N101 [Network PM Design 2029]

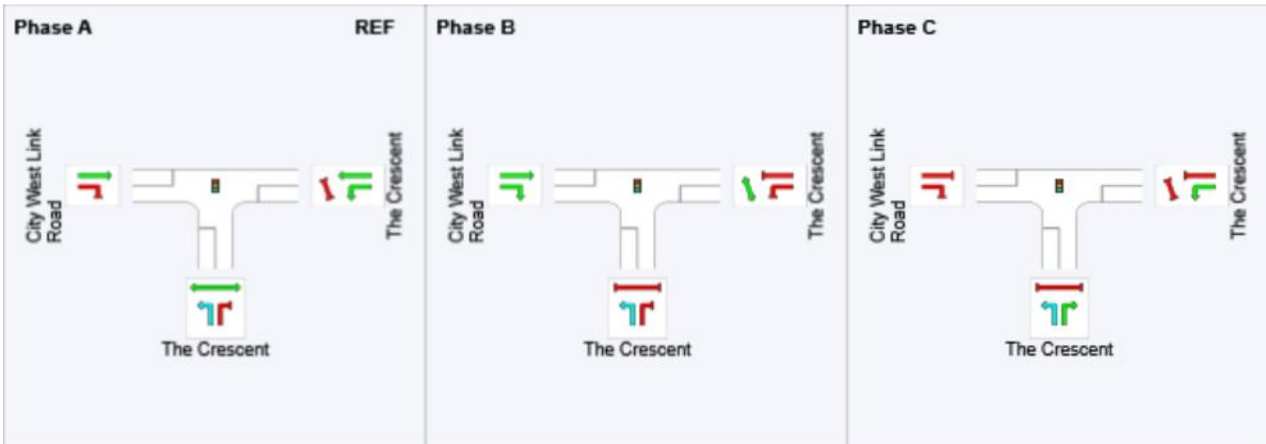
New Site
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	11	93	108
Green Time (sec)	76	9	47
Phase Time (sec)	82	15	53
Phase Split	55 %	10 %	35 %

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



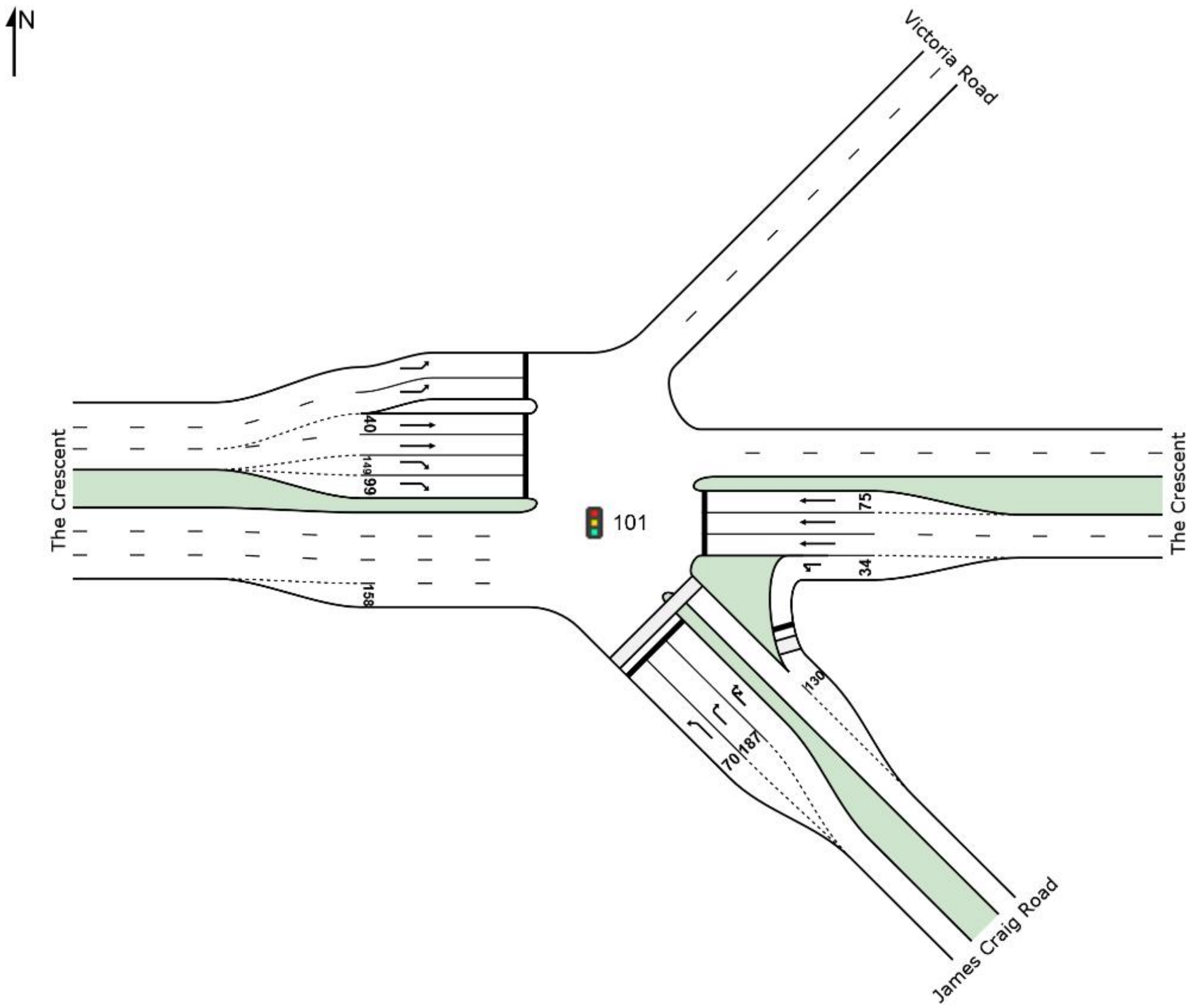
REF: Reference Phase
VAR: Variable Phase

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

SITE LAYOUT

Site: 101 [The Crescent - James Craid Road - City West Link AM Existing]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link AM Existing]

Network: N101 [Network existing AM]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: James Craig Road													
21a	L1	32	63.3	32	63.3	0.186	68.1	LOS E	2.1	22.9	0.93	0.72	17.8
23	R2	16	20.0	16	20.0	0.237	85.0	LOS F	1.2	9.8	1.00	0.69	23.2
23b	R3	26	16.0	26	16.0	0.438	87.8	LOS F	2.0	16.3	1.00	0.72	15.0
Approach		74	37.1	74	37.1	0.438	78.7	LOS F	2.1	22.9	0.97	0.71	18.3
East: The Crescent													
4b	L3	102	11.3	102	11.3	0.077	9.5	LOS A	1.0	7.4	0.14	0.64	47.1
5	T1	2256	6.5	2256	6.5	0.691	6.2	LOS A	21.4	158.5	0.43	0.39	41.5
Approach		2358	6.7	2358	6.7	0.691	6.3	LOS A	21.4	158.5	0.41	0.40	42.3
West: The Crescent													
10a	L1	2739	4.9	2739	4.9	0.903	10.6	LOS A	40.3	293.8	0.52	0.80	49.0
11	T1	484	5.0	484	5.0	0.149	1.1	LOS A	2.0	14.5	0.12	0.11	63.3
12a	R1	68	20.0	68	20.0	0.444	85.5	LOS F	2.7	21.7	1.00	0.73	19.4
Approach		3292	5.2	3292	5.2	0.903	10.8	LOS A	40.3	293.8	0.47	0.69	47.7
All Vehicles		5723	6.3	5723	6.3	0.903	9.8	LOS A	40.3	293.8	0.45	0.57	45.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 6.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	7.1	LOS A	0.1	0.1	0.31	0.31
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	38.2	LOS D			0.63	0.63

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

PHASING SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link AM Existing]

Network: N101 [Network existing AM]

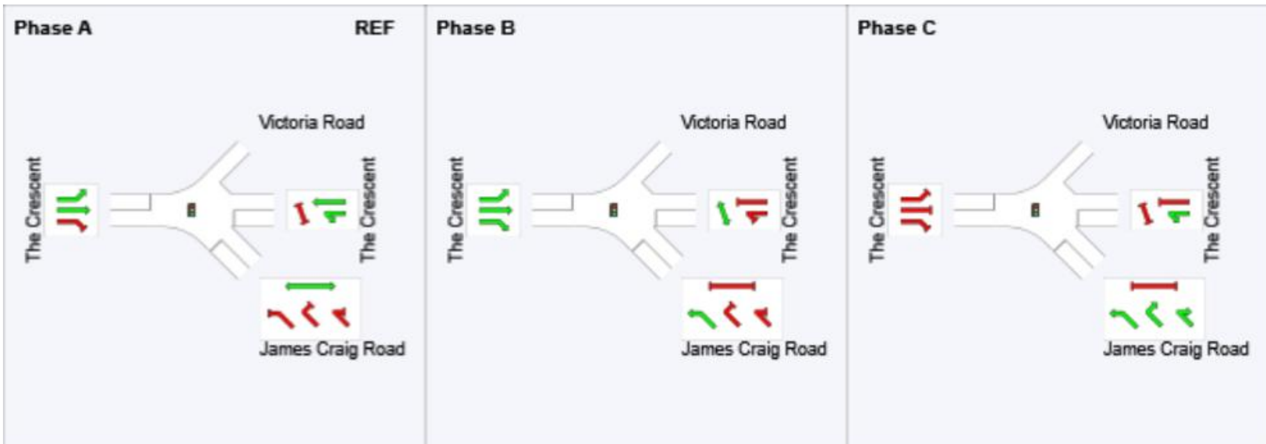
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	125	138
Green Time (sec)	119	7	6
Phase Time (sec)	125	13	12
Phase Split	83 %	9 %	8 %

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



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link PM]

Network: N101 [Network existing PM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: James Craig Road													
21a	L1	61	6.9	61	6.9	0.262	67.7	LOS E	4.1	30.3	0.94	0.75	17.9
23	R2	41	7.7	41	7.7	0.568	86.8	LOS F	3.2	23.8	1.00	0.75	23.5
23b	R3	48	8.7	48	8.7	0.771	91.7	LOS F	3.9	29.4	1.00	0.86	14.6
Approach		151	7.7	151	7.7	0.771	80.6	LOS F	4.1	30.3	0.98	0.79	18.7
East: The Crescent													
4b	L3	31	6.9	25	7.5	0.018	9.1	LOS A	0.2	1.4	0.11	0.63	47.4
5	T1	2931	2.3	2392	2.5	0.700	5.8	LOS A	23.5	168.1	0.37	0.34	42.7
Approach		2961	2.3	2417 N1	2.6	0.700	5.8	LOS A	23.5	168.1	0.37	0.35	42.9
West: The Crescent													
10a	L1	2013	3.6	2013	3.6	0.696	8.5	LOS A	24.7	178.0	0.29	0.72	51.5
11	T1	707	3.6	707	3.6	0.287	1.5	LOS A	5.4	38.7	0.17	0.16	60.8
12a	R1	13	50.0	13	50.0	0.097	83.9	LOS F	0.5	4.8	0.99	0.66	19.6
Approach		2733	3.8	2733	3.8	0.696	7.1	LOS A	24.7	178.0	0.27	0.57	51.7
All Vehicles		5844	3.2	5300 N1	3.5	0.771	8.6	LOS A	24.7	178.0	0.33	0.47	45.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 100.0 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	7.1	LOS A	0.1	0.1	0.31	0.31
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	38.2	LOS D			0.63	0.63

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

PHASING SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link PM]

Network: N101 [Network existing PM]

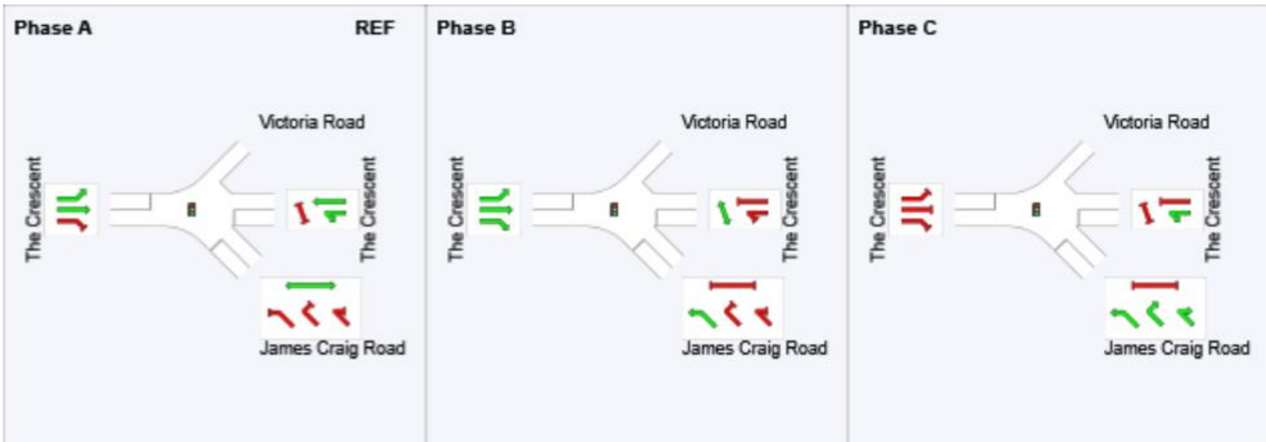
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	125	138
Green Time (sec)	119	7	6
Phase Time (sec)	125	13	12
Phase Split	83 %	9 %	8 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link AM Existing - 2029]

Network: N101 [Network existing AM 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: James Craig Road													
21a	L1	35	63.3	35	63.3	0.208	68.3	LOS E	2.4	25.6	0.93	0.73	17.8
23	R2	18	20.0	18	20.0	0.264	85.2	LOS F	1.3	11.0	1.00	0.70	23.2
23b	R3	29	16.0	29	16.0	0.489	88.1	LOS F	2.3	18.2	1.00	0.73	15.0
Approach		82	37.1	82	37.1	0.489	79.0	LOS F	2.4	25.6	0.97	0.72	18.3
East: The Crescent													
4b	L3	114	11.3	105	11.6	0.079	9.5	LOS A	1.0	7.8	0.14	0.64	47.1
5	T1	2517	6.5	2314	6.7	0.796	5.9	LOS A	26.0	192.3	0.39	0.36	42.4
Approach		2631	6.7	2419 [N1]	6.9	0.796	6.0	LOS A	26.0	192.3	0.38	0.38	43.0
West: The Crescent													
10a	L1	3057	4.9	2741	5.1	0.906	11.1	LOS A	40.2	293.8	0.53	0.80	48.5
11	T1	540	5.0	485	5.2	0.149	1.1	LOS A	2.0	14.8	0.12	0.11	63.3
12a	R1	76	20.0	69	20.7	0.449	85.6	LOS F	2.7	22.1	1.00	0.73	19.3
Approach		3673	5.2	3295 [N1]	5.5	0.906	11.2	LOS A	40.2	293.8	0.48	0.70	47.3
All Vehicles		6387	6.3	5796 [N1]	6.9	0.906	10.0	LOS A	40.2	293.8	0.45	0.56	45.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 51.5 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	7.1	LOS A	0.1	0.1	0.31	0.31
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	38.2	LOS D			0.63	0.63

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

PHASING SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link AM Existing - 2029]

Network: N101 [Network existing AM 2029]

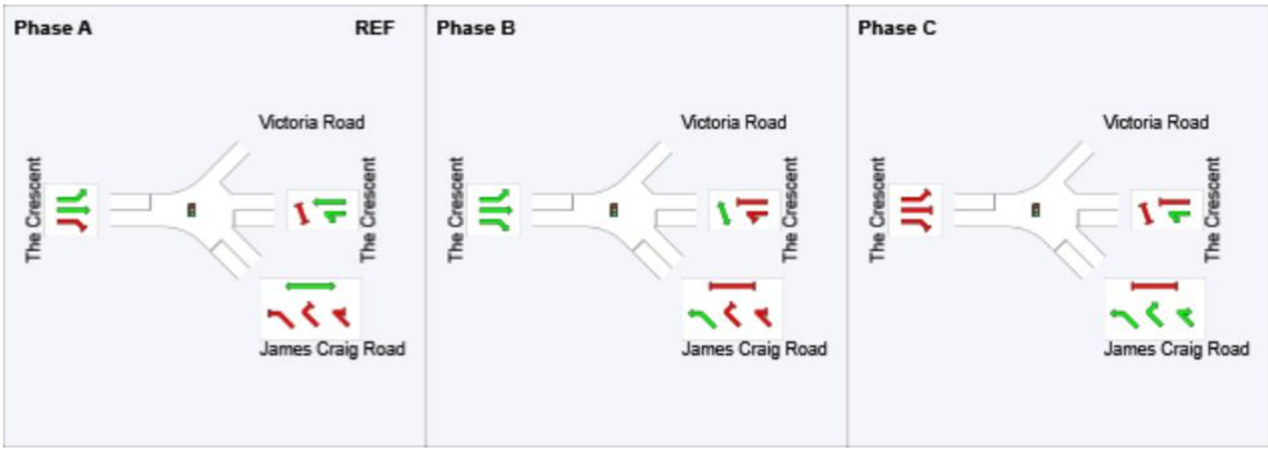
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	125	138
Green Time (sec)	119	7	6
Phase Time (sec)	125	13	12
Phase Split	83 %	9 %	8 %

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



REF: Reference Phase
VAR: Variable Phase

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Monday, 11 December 2017 5:10:30 PM
Project: P:\605X\60555976\4. Tech Work Area\4.7 Traffic\SIDRA\James Craig - Victoria Rd final 111217.sip7

MOVEMENT SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link PM 2029]

Network: N101 [Network existing PM 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: James Craig Road													
21a	L1	68	6.9	68	6.9	0.231	62.6	LOS E	4.4	32.4	0.91	0.74	18.8
23	R2	46	7.7	46	7.7	0.346	78.5	LOS F	3.3	24.7	0.99	0.74	24.9
23b	R3	54	8.7	54	8.7	0.939	112.3	LOS F	5.1	38.1	1.00	1.06	12.6
Approach		168	7.7	168	7.7	0.939	82.9	LOS F	5.1	38.1	0.96	0.85	18.3
East: The Crescent													
4b	L3	34	6.9	27	7.6	0.020	9.0	LOS A	0.2	1.3	0.09	0.62	47.6
5	T1	3270	2.3	2558	2.5	0.839	9.5	LOS A	29.5	210.8	0.43	0.41	34.1
Approach		3305	2.3	2585 N1	2.6	0.839	9.5	LOS A	29.5	210.8	0.43	0.41	34.5
West: The Crescent													
10a	L1	2246	3.6	2246	3.6	0.896	16.8	LOS B	40.7	293.8	0.53	0.81	43.9
11	T1	789	3.6	789	3.6	0.500	3.2	LOS A	7.6	54.7	0.29	0.26	52.9
12a	R1	14	50.0	14	50.0	0.108	84.1	LOS F	0.5	5.4	0.99	0.67	19.6
Approach		3050	3.8	3050	3.8	0.896	13.6	LOS A	40.7	293.8	0.47	0.67	44.3
All Vehicles		6522	3.2	5802 N1	3.5	0.939	13.8	LOS A	40.7	293.8	0.47	0.56	39.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 239.7 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	8.7	LOS A	0.1	0.1	0.34	0.34
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	39.0	LOS D			0.65	0.65

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

PHASING SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link PM 2029]

Network: N101 [Network existing PM 2029]

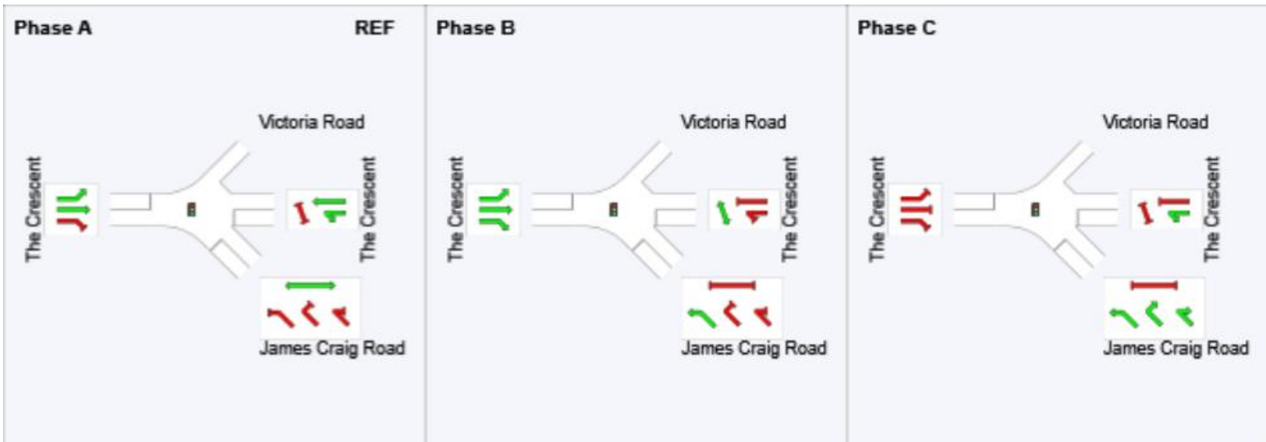
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	120	133
Green Time (sec)	114	7	11
Phase Time (sec)	120	13	17
Phase Split	80 %	9 %	11 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link AM Base 2018]

Network: N101 [Network AM Base 2018]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: James Craig Road													
21a	L1	87	86.7	87	86.7	0.519	70.4	LOS E	6.1	75.1	0.97	0.79	17.5
23	R2	36	64.7	36	64.7	0.686	91.0	LOS F	2.9	31.5	1.00	0.82	20.7
23b	R3	46	52.3	46	52.3	0.935	107.0	LOS F	4.1	41.9	1.00	1.04	13.1
Approach		169	72.7	169	72.7	0.935	84.7	LOS F	6.1	75.1	0.99	0.86	17.1
East: The Crescent													
4b	L3	148	35.5	148	35.5	0.130	10.1	LOS A	1.7	15.2	0.17	0.63	46.4
5	T1	2256	6.5	2256	6.5	0.746	6.4	LOS A	20.5	151.4	0.40	0.37	41.0
Approach		2404	8.3	2404	8.3	0.746	6.6	LOS A	20.5	151.4	0.39	0.39	42.0
West: The Crescent													
10a	L1	2739	4.9	2739	4.9	0.903	10.3	LOS A	40.3	293.8	0.50	0.79	49.3
11	T1	484	5.0	484	5.0	0.149	1.0	LOS A	1.9	13.7	0.12	0.10	63.6
12a	R1	126	55.0	126	55.0	0.774	92.0	LOS F	5.1	52.6	1.00	0.85	18.5
Approach		3349	6.8	3349	6.8	0.903	12.1	LOS A	40.3	293.8	0.46	0.69	46.4
All Vehicles		5923	9.3	5923	9.3	0.935	11.9	LOS A	40.3	293.8	0.45	0.57	42.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 14.7 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	7.7	LOS A	0.1	0.1	0.32	0.32
P2S	East Slip/Bypass Lane Crossing	53	68.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	38.0	LOS D			0.64	0.64

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

PHASING SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link AM Base 2018]

Network: N101 [Network AM Base 2018]

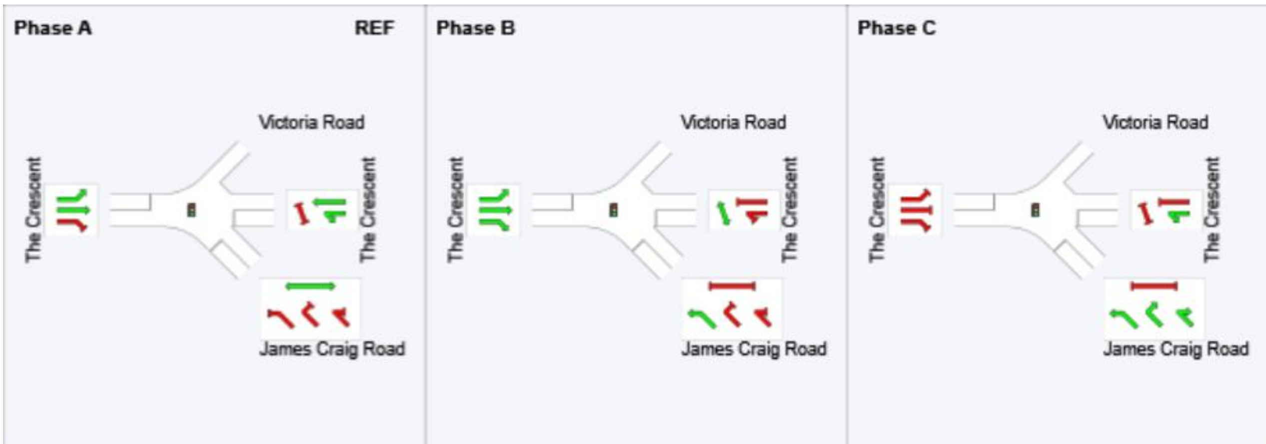
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	123	138
Green Time (sec)	117	9	6
Phase Time (sec)	123	15	12
Phase Split	82 %	10 %	8 %

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



REF: Reference Phase
VAR: Variable Phase

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

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Monday, 11 December 2017 5:12:08 PM
Project: P:\605X\60555976\4. Tech Work Area\4.7 Traffic\SIDRA\James Craig - Victoria Rd final 111217.sip7

MOVEMENT SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link PM Base 2018]

Network: N101 [Network PM Base 2018]

New Site
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: James Craig Road													
21a	L1	88	27.4	88	27.4	0.431	70.3	LOS E	6.1	52.9	0.97	0.78	17.8
23	R2	61	17.2	61	17.2	0.899	97.5	LOS F	5.1	41.3	1.00	0.96	22.4
23b	R3	57	20.4	57	20.4	0.970	113.8	LOS F	5.2	43.1	1.00	1.05	12.6
Approach		206	22.4	206	22.4	0.970	90.3	LOS F	6.1	52.9	0.99	0.91	17.8
East: The Crescent													
4b	L3	53	32.0	43	28.7	0.036	9.0	LOS A	0.3	2.9	0.12	0.60	48.2
5	T1	2931	2.3	2457	2.5	0.717	5.7	LOS A	24.3	174.0	0.36	0.33	42.8
Approach		2983	2.8	2500 N1	2.9	0.717	5.8	LOS A	24.3	174.0	0.35	0.34	43.1
West: The Crescent													
10a	L1	2013	3.6	2013	3.6	0.696	8.6	LOS A	24.7	178.1	0.29	0.72	51.5
11	T1	707	3.6	707	3.6	0.287	1.5	LOS A	5.4	38.7	0.17	0.16	60.8
12a	R1	37	71.4	37	71.4	0.314	88.2	LOS F	1.5	16.4	1.00	0.71	19.1
Approach		2757	4.5	2757	4.5	0.696	7.8	LOS A	24.7	178.1	0.27	0.57	50.8
All Vehicles		5946	4.3	5463 N1	4.6	0.970	10.0	LOS A	24.7	178.1	0.34	0.48	43.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 50.0 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	7.1	LOS A	0.1	0.1	0.31	0.31
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	38.2	LOS D			0.63	0.63

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

PHASING SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link PM Base 2018]

Network: N101 [Network PM Base 2018]

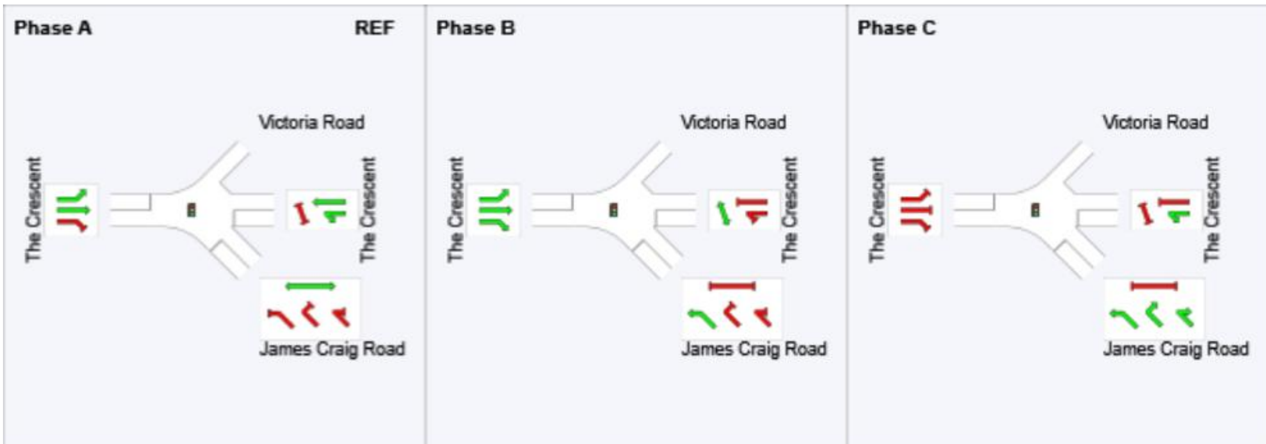
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	125	138
Green Time (sec)	119	7	6
Phase Time (sec)	125	13	12
Phase Split	83 %	9 %	8 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link AM Design 2029]

Network: N101 [Network AM Design 2029]

New Site
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: James Craig Road													
21a	L1	91	86.0	91	86.0	0.536	70.5	LOS F	6.4	77.7	0.98	0.79	17.5
23	R2	37	62.9	37	62.9	0.700	91.2	LOS F	3.0	32.1	1.00	0.83	20.7
23b	R3	49	48.9	49	48.9	0.983	120.7	LOS F	4.7	47.0	1.00	1.10	11.9
Approach		177	70.8	177	70.8	0.983	88.9	LOS F	6.4	77.7	0.99	0.89	16.5
East: The Crescent													
4b	L3	160	33.6	150	33.2	0.130	10.1	LOS A	1.7	15.1	0.17	0.63	46.5
5	T1	2517	6.5	2370	6.7	0.784	6.7	LOS A	22.8	169.1	0.42	0.39	40.2
Approach		2677	8.1	2520 N1	8.2	0.784	6.9	LOS A	22.8	169.1	0.41	0.40	41.4
West: The Crescent													
10a	L1	3057	4.9	2724	5.2	0.900	10.5	LOS A	40.2	293.8	0.52	0.80	49.1
11	T1	539	4.9	480	5.1	0.148	1.1	LOS A	2.1	15.2	0.13	0.11	63.0
12a	R1	135	53.1	127	55.6	0.780	92.5	LOS F	5.1	53.2	1.00	0.85	18.4
Approach		3731	6.7	3331 N1	7.1	0.900	12.2	LOS A	40.2	293.8	0.48	0.70	46.2
All Vehicles		6584	9.0	6029 N1	9.8	0.983	12.2	LOS A	40.2	293.8	0.46	0.58	42.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 107.9 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	7.7	LOS A	0.1	0.1	0.32	0.32
P2S	East Slip/Bypass Lane Crossing	53	68.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	38.0	LOS D			0.64	0.64

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

PHASING SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link AM Design 2029]

Network: N101 [Network AM Design 2029]

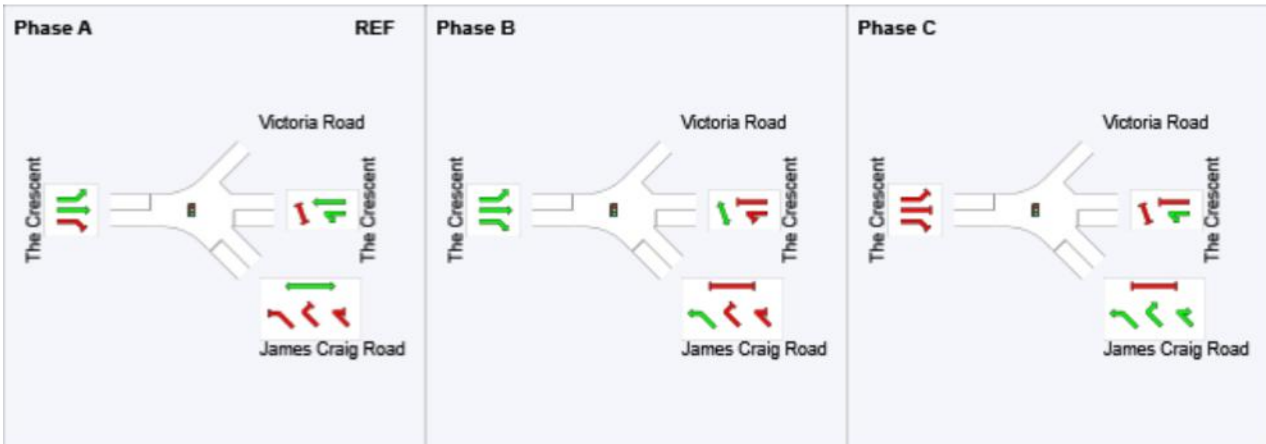
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	123	138
Green Time (sec)	117	9	6
Phase Time (sec)	123	15	12
Phase Split	82 %	10 %	8 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link PM Design 2029]

Network: N101 [Network PM Design 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: James Craig Road													
21a	L1	95	25.6	95	25.6	0.361	64.9	LOS E	6.3	53.5	0.94	0.77	18.7
23	R2	66	17.5	66	17.5	0.534	80.6	LOS F	4.9	39.4	1.00	0.77	24.9
23b	R3	62	18.6	62	18.6	1.145	231.6	LOS F	8.9	72.3	1.00	1.32	6.8
Approach		223	21.2	223	21.2	1.145	115.9	LOS F	8.9	72.3	0.97	0.92	14.7
East: The Crescent													
4b	L3	56	30.2	36	25.7	0.029	9.1	LOS A	0.3	2.6	0.12	0.61	48.1
5	T1	3269	2.3	2198	2.5	0.670	8.4	LOS A	27.2	194.4	0.50	0.46	36.2
Approach		3325	2.8	2234 N1	2.9	0.670	8.4	LOS A	27.2	194.4	0.49	0.46	36.8
West: The Crescent													
10a	L1	2245	3.6	2245	3.6	0.896	16.9	LOS B	40.7	293.8	0.54	0.81	43.9
11	T1	789	3.6	789	3.6	0.500	3.2	LOS A	7.6	54.8	0.29	0.26	53.0
12a	R1	39	70.3	39	70.3	0.331	88.4	LOS F	1.5	17.3	1.00	0.71	19.1
Approach		3074	4.4	3074	4.4	0.896	14.3	LOS A	40.7	293.8	0.48	0.67	43.7
All Vehicles		6622	4.1	5531 N1	5.0	1.145	16.0	LOS B	40.7	293.8	0.50	0.59	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 69.3 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	SouthEast Full Crossing	53	8.7	LOS A	0.1	0.1	0.34	0.34
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		105	39.0	LOS D			0.65	0.65

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

PHASING SUMMARY

Site: 101 [The Crescent - James Craid Road - City West Link PM Design 2029]

Network: N101 [Network PM Design 2029]

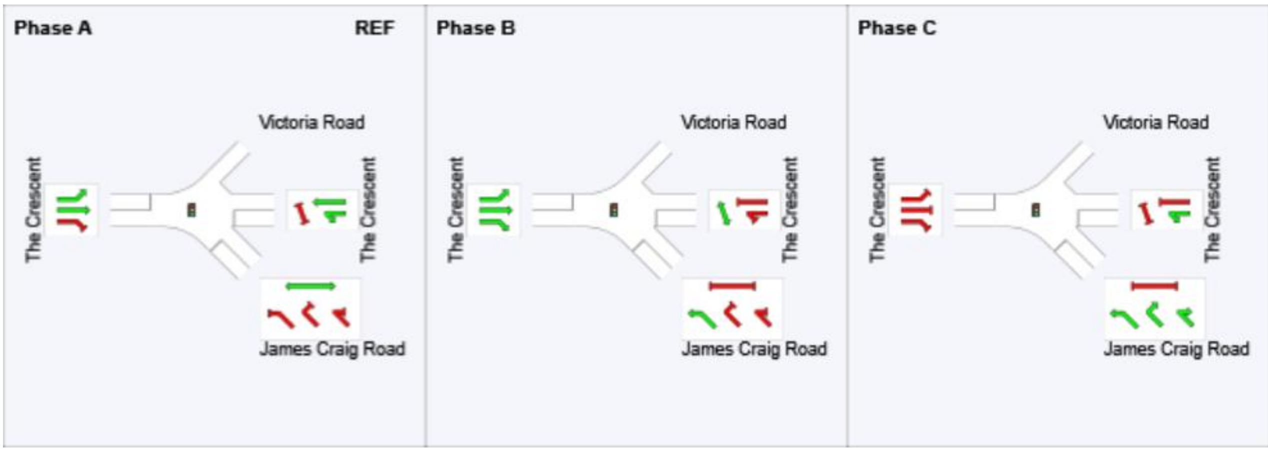
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	0	120	133
Green Time (sec)	114	7	11
Phase Time (sec)	120	13	17
Phase Split	80 %	9 %	11 %

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

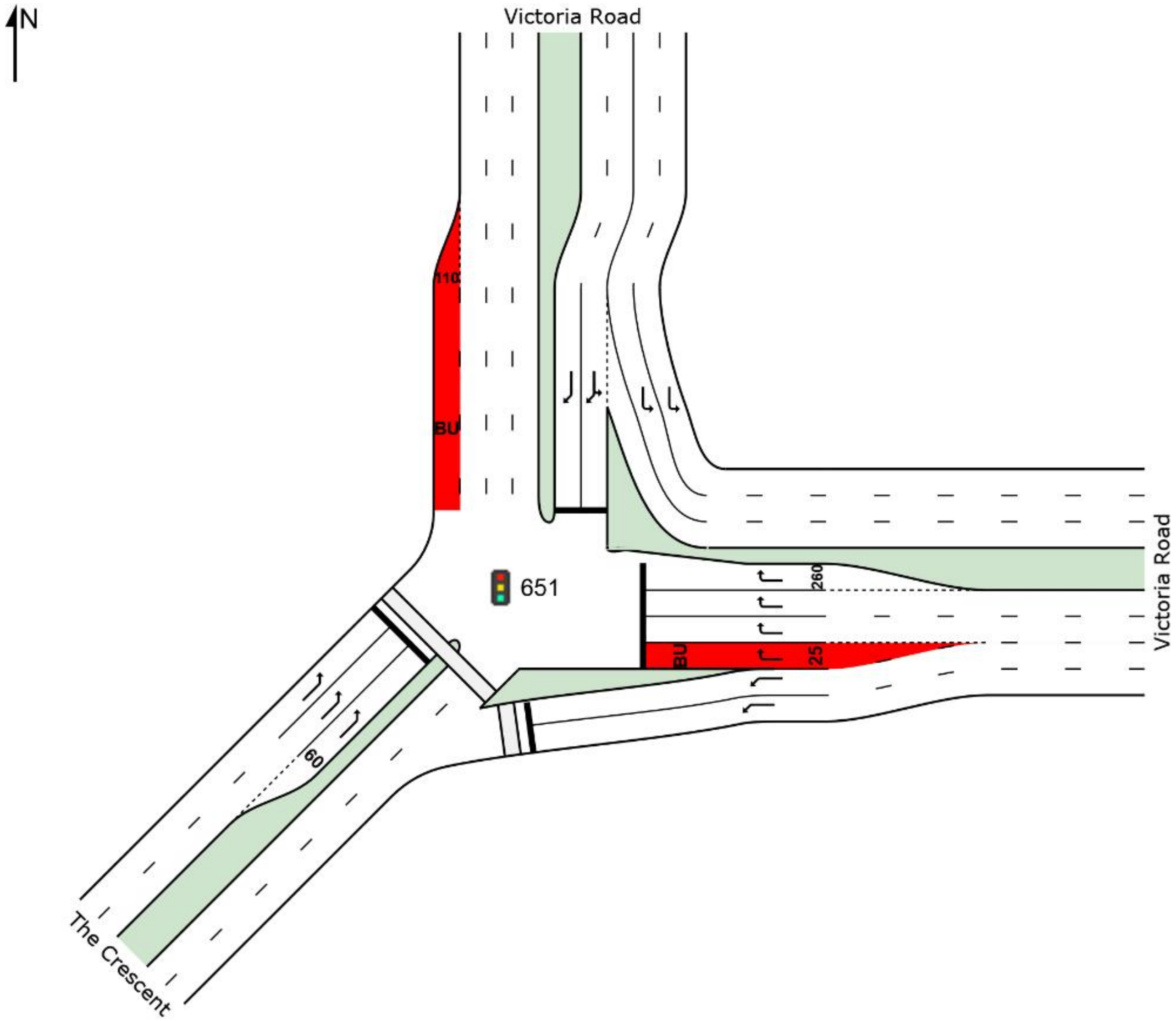


REF: Reference Phase
VAR: Variable Phase

SITE LAYOUT

Site: 651 [Victoria Rd - The Crescent AM existing]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 651 [Victoria Rd - The Crescent AM existing]

Network: N101 [Network existing AM]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Victoria Road													
4a	L1	1561	7.8	1561	7.8	0.709	25.0	LOS B	38.7	289.4	0.74	0.82	33.1
6	R2	1379	7.3	1379	7.3	0.397	20.3	LOS B	16.4	115.0	0.53	0.73	44.7
Approach		2940	7.6	2940	7.6	0.709	22.8	LOS B	38.7	289.4	0.64	0.78	39.7
North: Victoria Road													
7	L2	3240	4.8	3240	4.8	0.862	8.8	LOS A	36.2	263.5	0.04	0.54	52.4
9a	R1	797	4.6	797	4.6	0.862	65.3	LOS E	36.2	263.5	1.00	0.94	19.2
Approach		4037	4.8	4037	4.8	0.862	19.9	LOS B	36.2	263.5	0.23	0.62	44.1
SouthWest: The Crescent													
30a	L1	528	4.0	528	4.0	0.362	51.0	LOS D	12.6	90.9	0.90	0.80	26.9
Approach		528	4.0	528	4.0	0.362	51.0	LOS D	12.6	90.9	0.90	0.80	26.9
All Vehicles		7505	5.8	7505	5.8	0.862	23.2	LOS B	38.7	289.4	0.44	0.69	41.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 6.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P2S	East Slip/Bypass Lane Crossing	53	39.7	LOS D	0.2	0.2	0.73	0.73
P8	SouthWest Full Crossing	53	17.3	LOS B	0.1	0.1	0.48	0.48
All Pedestrians		105	28.5	LOS C			0.60	0.60

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

PHASING SUMMARY

Site: 651 [Victoria Rd - The Crescent AM existing]

Network: N101 [Network existing AM]

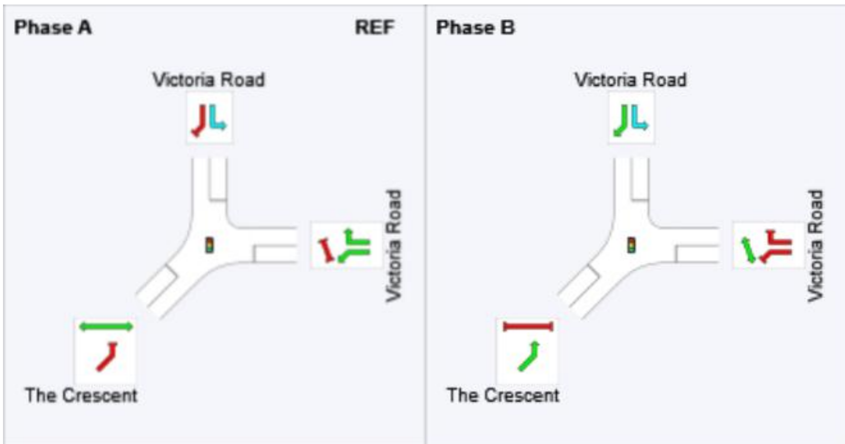
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	0	99
Green Time (sec)	93	45
Phase Time (sec)	99	51
Phase Split	66 %	34 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 651 [Victoria Rd - The Crescent PM]

Network: N101 [Network existing PM]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Victoria Road													
4a	L1	2154	2.7	2154	2.7	0.901	30.4	LOS C	69.4	496.7	0.90	0.92	30.2
6	R2	3006	3.5	3006	3.5	0.807	22.4	LOS B	51.6	361.4	0.73	0.83	43.5
Approach		5160	3.1	5160	3.1	0.901	25.7	LOS B	69.4	496.7	0.80	0.87	39.0
North: Victoria Road													
7	L2	2129	3.9	2129	3.9	0.589	5.8	LOS A	0.0	0.0	0.00	0.53	54.6
9a	R1	807	1.4	807	1.4	0.949	92.2	LOS F	37.0	262.5	1.00	1.03	15.0
Approach		2937	3.2	2937	3.2	0.949	29.5	LOS C	37.0	262.5	0.27	0.66	38.5
SouthWest: The Crescent													
30a	L1	745	2.0	745	2.0	0.726	59.8	LOS E	18.4	131.2	0.97	0.84	24.5
Approach		745	2.0	745	2.0	0.726	59.8	LOS E	18.4	131.2	0.97	0.84	24.5
All Vehicles		8842	3.1	8842	3.1	0.949	29.9	LOS C	69.4	496.7	0.64	0.80	37.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 100.0 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2S	East Slip/Bypass Lane Crossing	53	46.5	LOS E	0.2	0.2	0.79	0.79
P8	SouthWest Full Crossing	53	13.3	LOS B	0.1	0.1	0.42	0.42
All Pedestrians		105	29.9	LOS C			0.60	0.60

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

PHASING SUMMARY

Site: 651 [Victoria Rd - The Crescent PM]

Network: N101 [Network existing PM]

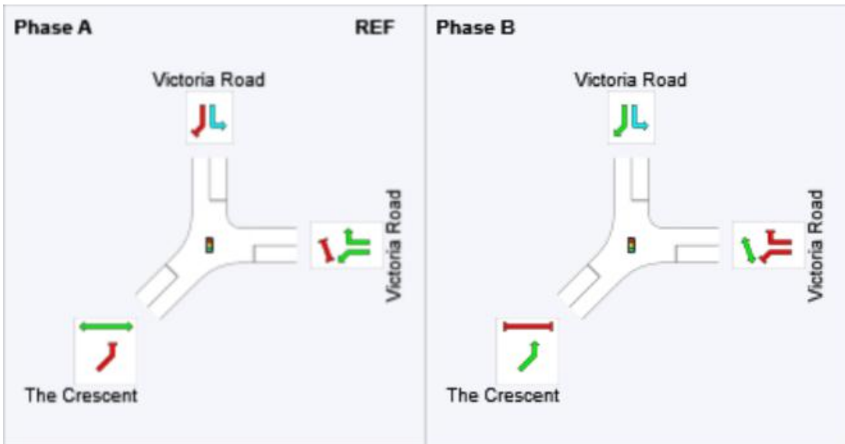
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - User-Given)

Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	0	108
Green Time (sec)	102	36
Phase Time (sec)	108	42
Phase Split	72 %	28 %

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



REF: Reference Phase
VAR: Variable Phase

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Monday, 11 December 2017 5:09:43 PM
Project: P:\605X\60555976\4. Tech Work Area\4.7 Traffic\SIDRA\James Craig - Victoria Rd final 111217.sip7

MOVEMENT SUMMARY

Site: 651 [Victoria Rd - The Crescent AM 2029]

Network: N101 [Network existing AM 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Victoria Road													
4a	L1	1742	7.8	1742	7.8	0.897	38.8	LOS C	66.8	498.7	0.93	0.94	26.5
6	R2	1539	7.3	1539	7.3	0.441	20.3	LOS B	18.9	132.3	0.54	0.73	44.7
Approach		3281	7.6	3281	7.6	0.897	30.1	LOS C	66.8	498.7	0.75	0.84	35.8
North: Victoria Road													
7	L2	3616	4.8	3616	4.8	0.993	11.3	LOS A	41.5	302.3	0.01	0.48	50.5
9a	R1	889	4.6	889	4.6	0.993	110.7	LOS F	54.0	393.0	1.00	1.10	13.0
Approach		4505	4.8	4505	4.8	0.993	30.9	LOS C	54.0	393.0	0.21	0.61	38.5
SouthWest: The Crescent													
30a	L1	590	4.0	539	4.1	0.378	51.0	LOS D	12.8	92.5	0.90	0.80	26.9
Approach		590	4.0	539 N1	4.1	0.378	51.0	LOS D	12.8	92.5	0.90	0.80	26.9
All Vehicles		8376	5.8	8325 N1	5.9	0.993	31.9	LOS C	66.8	498.7	0.46	0.71	36.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 51.5 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2S	East Slip/Bypass Lane Crossing	53	40.4	LOS E	0.2	0.2	0.73	0.73
P8	SouthWest Full Crossing	53	16.8	LOS B	0.1	0.1	0.47	0.47
All Pedestrians		105	28.6	LOS C			0.60	0.60

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

PHASING SUMMARY

Site: 651 [Victoria Rd - The Crescent AM 2029]

Network: N101 [Network existing AM 2029]

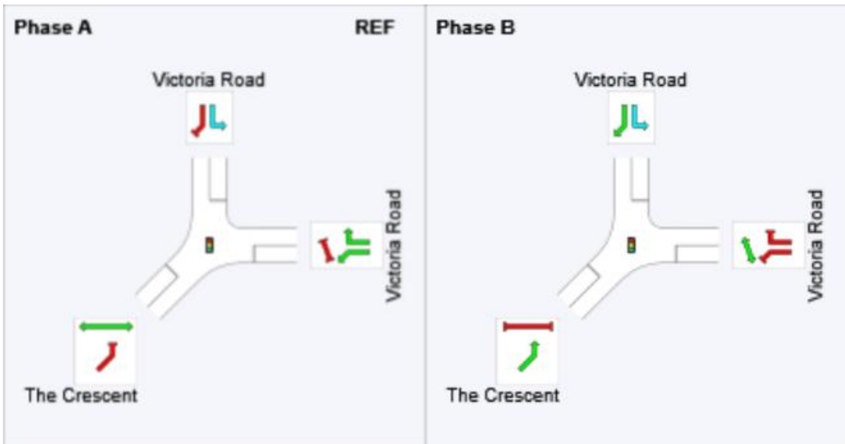
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	0	100
Green Time (sec)	94	44
Phase Time (sec)	100	50
Phase Split	67 %	33 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 651 [Victoria Rd - The Crescent PM 2029]

Network: N101 [Network existing PM 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Victoria Road													
4a	L1	2404	2.7	2404	2.7	1.021	86.6	LOS F	138.7	993.5	1.00	1.15	15.7
6	R2	3355	3.5	3355	3.5	0.707	9.3	LOS A	28.7	201.2	0.36	0.69	51.5
Approach		5759	3.1	5759	3.1	1.021	41.5	LOS C	138.7	993.5	0.63	0.88	32.1
North: Victoria Road													
7	L2	2376	3.9	2376	3.9	0.658	5.8	LOS A	0.0	0.0	0.00	0.53	54.6
9a	R1	901	1.4	901	1.4	5.441	4038.3	LOS F	180.4	1278.5	1.00	2.80	0.4
Approach		3278	3.2	3278	3.2	5.441	1114.4	LOS F	180.4	1278.5	0.27	1.15	2.7
SouthWest: The Crescent													
30a	L1	832	2.0	832	2.0	2.809	1444.5	LOS F	36.7	261.1	1.00	2.26	1.6
Approach		832	2.0	832	2.0	2.809	1444.5	LOS F	36.7	261.1	1.00	2.26	1.6
All Vehicles		9868	3.1	9868	3.1	5.441	516.1	LOS F	180.4	1278.5	0.54	1.09	5.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 239.7 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P8	SouthWest Full Crossing	53	4.3	LOS A	0.1	0.1	0.24	0.24
All Pedestrians		105	36.8	LOS D			0.60	0.60

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

PHASING SUMMARY

Site: 651 [Victoria Rd - The Crescent PM 2029]

Network: N101 [Network existing PM 2029]

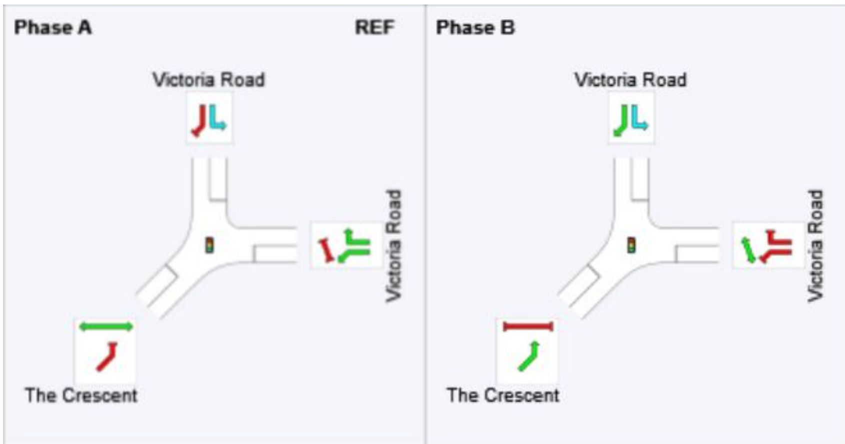
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	138	123
Green Time (sec)	129	9
Phase Time (sec)	135	15
Phase Split	90 %	10 %

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



REF: Reference Phase
VAR: Variable Phase

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

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Monday, 11 December 2017 5:11:19 PM
Project: P:\605X\60555976\4. Tech Work Area\4.7 Traffic\SIDRA\James Craig - Victoria Rd final 111217.sip7

MOVEMENT SUMMARY

Site: 651 [Victoria Rd - The Crescent AM Base 2018]

Network: N101 [Network AM Base 2018]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Victoria Road													
4a	L1	1585	9.0	1585	9.0	0.729	26.0	LOS B	40.3	304.1	0.76	0.83	32.5
6	R2	1379	7.3	1379	7.3	0.401	20.8	LOS B	16.7	117.2	0.54	0.73	44.4
Approach		2964	8.2	2964	8.2	0.729	23.6	LOS B	40.3	304.1	0.66	0.78	39.2
North: Victoria Road													
7	L2	3240	4.8	3240	4.8	0.863	8.7	LOS A	35.9	265.2	0.04	0.54	52.4
9a	R1	818	6.9	818	6.9	0.863	64.6	LOS E	36.2	268.1	1.00	0.94	19.4
Approach		4058	5.3	4058	5.3	0.863	20.0	LOS B	36.2	268.1	0.24	0.62	44.0
SouthWest: The Crescent													
30a	L1	548	7.5	548	7.5	0.376	51.2	LOS D	13.1	97.9	0.91	0.81	26.8
Approach		548	7.5	548	7.5	0.376	51.2	LOS D	13.1	97.9	0.91	0.81	26.8
All Vehicles		7571	6.6	7571	6.6	0.863	23.7	LOS B	40.3	304.1	0.45	0.70	40.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 14.7 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2S	East Slip/Bypass Lane Crossing	53	39.0	LOS D	0.2	0.2	0.72	0.72
P8	SouthWest Full Crossing	53	17.8	LOS B	0.1	0.1	0.49	0.49
All Pedestrians		105	28.4	LOS C			0.60	0.60

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

PHASING SUMMARY

Site: 651 [Victoria Rd - The Crescent AM Base 2018]

Network: N101 [Network AM Base 2018]

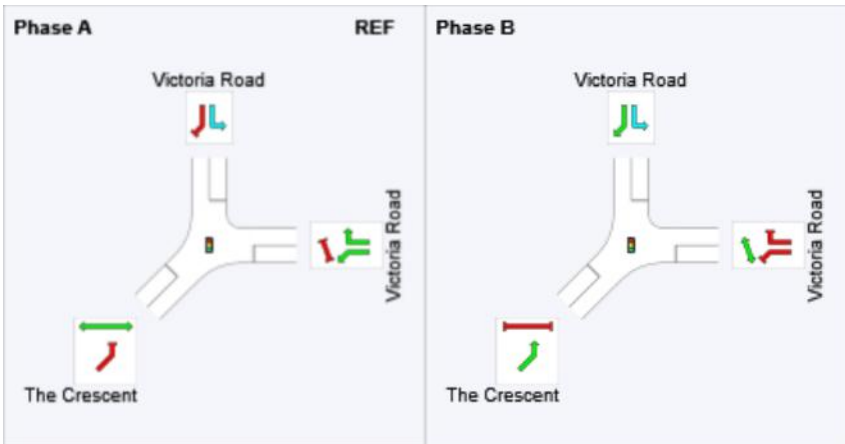
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	0	98
Green Time (sec)	92	46
Phase Time (sec)	98	52
Phase Split	65 %	35 %

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



REF: Reference Phase
VAR: Variable Phase

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

MOVEMENT SUMMARY

Site: 651 [Victoria Rd - The Crescent PM Base 2018]

Network: N101 [Network PM Base 2018]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Victoria Road													
4a	L1	2167	3.0	2167	3.0	0.901	29.4	LOS C	70.6	507.1	0.90	0.92	30.7
6	R2	3006	3.5	3006	3.5	0.799	21.7	LOS B	50.5	353.7	0.71	0.82	43.9
Approach		5174	3.3	5174	3.3	0.901	24.9	LOS B	70.6	507.1	0.79	0.86	39.4
North: Victoria Road													
7	L2	2129	3.9	2129	3.9	0.589	5.8	LOS A	0.0	0.0	0.00	0.53	54.6
9a	R1	816	2.3	816	2.3	0.993	112.8	LOS F	43.2	308.5	1.00	1.10	12.8
Approach		2945	3.5	2945	3.5	0.993	35.4	LOS C	43.2	308.5	0.28	0.68	36.0
SouthWest: The Crescent													
30a	L1	754	2.9	754	2.9	0.772	64.5	LOS E	19.5	138.9	0.99	0.86	23.4
Approach		754	2.9	754	2.9	0.772	64.5	LOS E	19.5	138.9	0.99	0.86	23.4
All Vehicles		8873	3.3	8873	3.3	0.993	31.8	LOS C	70.6	507.1	0.64	0.80	36.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 50.0 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2S	East Slip/Bypass Lane Crossing	53	47.3	LOS E	0.2	0.2	0.80	0.80
P8	SouthWest Full Crossing	53	12.8	LOS B	0.1	0.1	0.41	0.41
All Pedestrians		105	30.1	LOS D			0.60	0.60

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

PHASING SUMMARY

Site: 651 [Victoria Rd - The Crescent PM Base 2018]

Network: N101 [Network PM Base 2018]

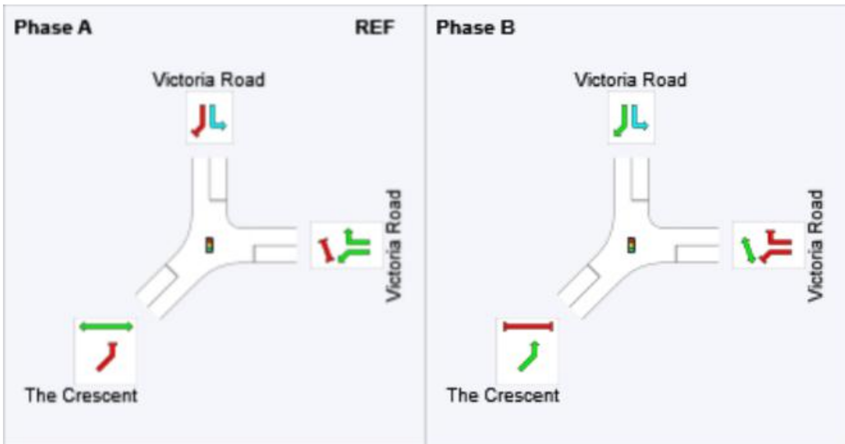
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	139	98
Green Time (sec)	103	35
Phase Time (sec)	109	41
Phase Split	73 %	27 %

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



REF: Reference Phase
VAR: Variable Phase

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

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Monday, 11 December 2017 5:13:01 PM
Project: P:\605X\60555976\4. Tech Work Area\4.7 Traffic\SIDRA\James Craig - Victoria Rd final 111217.sip7

MOVEMENT SUMMARY

Site: 651 [Victoria Rd - The Crescent AM Design 2029]

Network: N101 [Network AM Design 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Victoria Road													
4a	L1	1765	8.8	1765	8.8	0.902	43.4	LOS D	64.1	482.7	0.96	0.95	24.9
6	R2	1538	7.3	1538	7.3	0.473	23.6	LOS B	21.1	147.5	0.59	0.75	42.9
Approach		3303	8.1	3303	8.1	0.902	34.2	LOS C	64.1	482.7	0.79	0.86	33.9
North: Victoria Road													
7	L2	3615	4.8	3615	4.8	0.954	11.3	LOS A	50.3	370.1	0.05	0.54	50.6
9a	R1	911	6.7	911	6.7	0.954	86.5	LOS F	50.3	370.1	1.00	1.04	15.8
Approach		4525	5.2	4525	5.2	0.954	26.4	LOS B	50.3	370.1	0.24	0.64	40.6
SouthWest: The Crescent													
30a	L1	609	7.1	551	7.6	0.348	46.6	LOS D	12.5	93.2	0.86	0.79	28.2
Approach		609	7.1	551 N1	7.6	0.348	46.6	LOS D	12.5	93.2	0.86	0.79	28.2
All Vehicles		8438	6.5	8379 N1	6.5	0.954	30.8	LOS C	64.1	482.7	0.50	0.74	37.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 107.9 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2S	East Slip/Bypass Lane Crossing	53	36.1	LOS D	0.2	0.2	0.69	0.69
P8	SouthWest Full Crossing	53	19.8	LOS B	0.1	0.1	0.51	0.51
All Pedestrians		105	28.0	LOS C			0.60	0.60

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

PHASING SUMMARY

Site: 651 [Victoria Rd - The Crescent AM Design 2029]

Network: N101 [Network AM Design 2029]

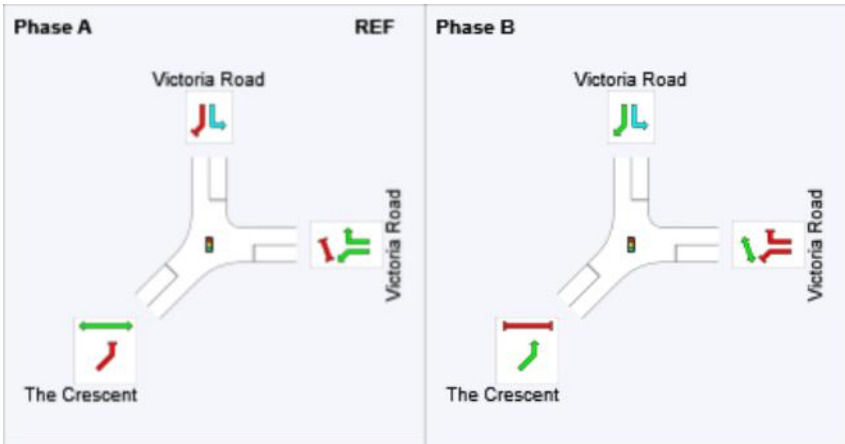
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	0	94
Green Time (sec)	88	50
Phase Time (sec)	94	56
Phase Split	63 %	37 %

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



REF: Reference Phase
VAR: Variable Phase

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

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Monday, 11 December 2017 5:13:54 PM
Project: P:\605X\60555976\4. Tech Work Area\4.7 Traffic\SIDRA\James Craig - Victoria Rd final 111217.sip7

MOVEMENT SUMMARY

Site: 651 [Victoria Rd - The Crescent PM Design 2029]

Network: N101 [Network PM Design 2029]

New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Victoria Road													
4a	L1	2416	3.0	2416	3.0	1.020	83.5	LOS F	160.4	1151.3	1.00	1.14	16.1
6	R2	3354	3.5	3354	3.5	0.707	9.3	LOS A	28.7	200.9	0.36	0.69	51.5
Approach		5769	3.2	5769	3.2	1.020	40.3	LOS C	160.4	1151.3	0.63	0.88	32.6
North: Victoria Road													
7	L2	2376	3.9	2376	3.9	0.657	5.8	LOS A	0.0	0.0	0.00	0.53	54.6
9a	R1	908	2.2	908	2.2	5.470	4064.1	LOS F	235.3	1678.2	1.00	2.85	0.4
Approach		3284	3.4	3284	3.4	5.470	1128.3	LOS F	235.3	1678.2	0.28	1.17	2.7
SouthWest: The Crescent													
30a	L1	840	2.9	840	2.9	2.854	1485.7	LOS F	36.7	261.1	1.00	2.28	1.6
Approach		840	2.9	840	2.9	2.854	1485.7	LOS F	36.7	261.1	1.00	2.28	1.6
All Vehicles		9894	3.3	9894	3.3	5.470	524.2	LOS F	235.3	1678.2	0.54	1.09	5.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 69.3 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2S	East Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P8	SouthWest Full Crossing	53	4.3	LOS A	0.1	0.1	0.24	0.24
All Pedestrians		105	36.8	LOS D			0.60	0.60

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

PHASING SUMMARY

Site: 651 [Victoria Rd - The Crescent PM Design 2029]

Network: N101 [Network PM Design 2029]

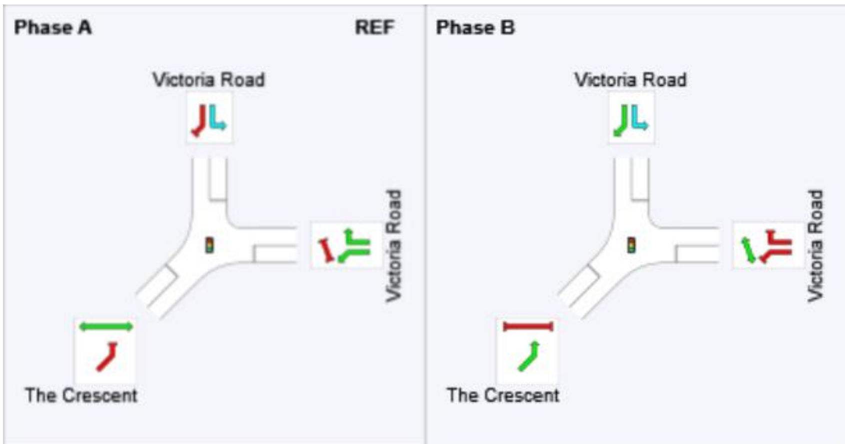
New Site
Signals - Fixed Time Coordinated   Cycle Time = 150 seconds (Network Cycle Time - Program)

Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	138	123
Green Time (sec)	129	9
Phase Time (sec)	135	15
Phase Split	90 %	10 %

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



REF: Reference Phase
VAR: Variable Phase

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Monday, 11 December 2017 5:14:46 PM
Project: P:\605X\60555976\4. Tech Work Area\4.7 Traffic\SIDRA\James Craig - Victoria Rd final 111217.sip7