LENDLEASE

Jordan Springs East Stage 3C

Traffic Impact Assessment

JULY 2019

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Jordan Springs East Stage 3C
Traffic Impact Assessment

Lendlease

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

WSP has been engaged by the Maryland Development Company to prepare a Traffic Impact Assessment (TIA) report for the proposed Stage 3C development, which comprises of 59 residential allotments to accommodate 57 low-density dwellings and two residue lots within Jordan Springs East. The development of these residue lots are subject to the future development application approval.

As depicted in Figure 1.1, Jordan Springs East is located within the Penrith City Council Local Government Area (LGA) and forms part of the formerly known Central Precinct in the St Marys Development site. It is bounded by existing residential development in the suburbs of Werrington County and Werrington Downs to the south, land zoned for Regional Open Space to the east, and land zoned for Regional Park to the north and west. There is also an area zoned for drainage that adjoins the northern boundary of the precinct.

Figure 1.1 St Marys development site showing precinct locations

The Jordan Springs East site covers an area of approximately 133.1 hectares and is envisaged to consist of 1,436 residential dwellings to accommodate a population between 3,900 and 4,300. It is also proposed approximately 38 hectares of employment land use to accommodate around 760 jobs in light industrial and light manufacturing sectors.

The delivery of the Jordan Springs East master plan is staged with 931 residential dwellings proposed under Stages 1, 2, 3A, and 4A/4B. The approval of these stages has been obtained with consideration of all trips being assigned to The Northern Road via the internal roads in Jordan Springs (shown as Western Precinct in Figure 1.1).

Approval has also been obtained for 189 low-density residential dwellings under Stages 3B1/3B2 and 5A. Stages 3B1/3B2 and 5A TIAs were undertaken on the basis that occupation occurred post the opening of the East-West Connector Road as per a previous construction schedule. The opening of the East-West Connector Road will vastly change the distribution of trips made into/out of Jordan Springs East, and is likely to align with the trip distribution found in the ultimate year of the development, where 55 per cent and 53 per cent of trips are made towards the east in the respective AM and PM peak.

Furthermore, approval has been sought for Stages 3D and 4C. Stage 4C comprises of 18 low-density residential dwellings. Stage 3D comprises of a Village Centre, which includes residential terraces and apartments, shopping and retail, medical centre, and a childcare centre. More recently, a development application (DA) is being prepared to subdivide Lot 3001 into 16 lots containing 16 low-density dwellings. Lot 3001 was originally approved as a single residential lot use as part of Stage 3A. Stage 5B DA is also being prepared to include 21 low-density residential dwellings.

This TIA has considered the in-principle impact of the Stage 3C development and associated road layouts proposed. The assessment takes into consideration the existing traffic volumes and growth in Jordan Springs, trips generated from the approved and committed Stages in Jordan Springs East, and distribution of trips made with consideration of the opening of the East-West Connector Road.

Based on the Maryland Development Company's construction schedule, Stage 3C construction works are planned to occur post Stage 4C, in parallel to or prior to Stage 5B. The extent and location of Stages 3C in relation to the other stages of Jordan Springs East is further detailed in section 5.

1.2 OBJECTIVES

This TIA report outlines the following:

- Assess peak-hour trip demand from the Jordan Springs East precinct up to the latest proposed Stage 3C, in line with the trip generation rates published in Roads and Traffic Authority *Guide to Traffic Generating Development v2.2*
- Examine and analyse the existing intersection performance and the internal road mid-block volumes in Jordan Springs that are likely to be impacted by the latest proposed Stage 3C
- Assess the development cumulative impact in corresponding stages within Jordan Springs East, Jordan Springs, and Ropes Crossing at key intersections and mid-block road capacity within the confines of the St Marys development site
- Recommend remedial works (if any) to minimise the impact of the proposed Stage 3C development
- Assess the accessibility of the proposed development to the adjacent public transport services.

1.3 ASSUMPTIONS

The following assumptions apply to this report:

- Trip generation rates are as per the Roads and Traffic Authority *Guide to Traffic Generating Development* v2.2 and those agreed to by the Steering Committee in the Technical Memo.
- Traffic growth from the developments in Jordan Springs reflects the dwelling occupation status (as surveyed by Lendlease and provided to Council on 24 November 2016) with respect to the ultimate dwelling number proposed for Jordan Springs. This assumption is further detailed in section 4.2.1 of this report.
- Traffic growth on The Northern Road is consistent with the Roads and Maritime EMME strategic model.

1.4 EXCLUSIONS

The following exclusions apply to this report:

- This report does not assess the external road network of the St Marys Development site. A separate study is currently being undertaken to determine the holistic impact of the St Marys development to the external road network.
- This report does not assess on-street and off-street parking requirements.
- This report does not include turning path assessments, which have been undertaken as part of the road design prepared by others.

1.5 REFERENCE DOCUMENTS

The following documents were reviewed and referenced in this report:

- *Guide to Traffic Generating Developments* v2.2 (2002) and TDT 2013/04a (Roads and Traffic Authority)
- St Marys Jordan Springs East Plan – Traffic and Transport Report, May 2009 (SKM)
- Stage 3A: Jordan Springs East – Traffic Impact Assessment, January 2016 (Cardno)
- Central Precinct Plan and Development Control Strategy Amendment No.1, September 2018
- Proposed Traffic Modelling Methodology for St Marys Development Site, 27 March 2017 (WSP).

2 MEASURE OF PERFORMANCE AND CAPACITY

2.1 INTERSECTION PERFORMANCE

Level of Service (LoS) and Degree of Saturation (DoS) are both basic performance parameters used to describe the operation of an intersection. The LoS range from A to F based on the operational performance primarily determined by the average traffic delay at the signalised intersections and roundabouts as indicated in Table 2.1.

Table 2.1 Level of service criteria for signalised intersections

Level of Service	Average delay (seconds per vehicle)	Traffic signals
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity and incident would cause excessive delays
F	Greater than 71	Unsatisfactory with excessive queuing

Source: Roads and Traffic Authority *2002 Guide to Traffic Generating Developments*

2.2 MID-BLOCK CAPACITY

Extracted from Austroads *Guide to Traffic Management Part 3*, Table 2.2 sets out typical mid-block capacities for various types of urban roads with interrupted flow, with unflared major intersections and with interruptions from cross and turning traffic at minor intersections.

Table 2.2 Typical mid-block capacities for urban roads with interrupted flow

Type of lane	One-Way Mid-Block capacity (pc/h)
Median or inner lane	
Divided road	1000
Undivided road	900
Middle lane (of a three-lane carriageway)	
Divided road	900
Undivided road	1000
Kerb lane	
Adjacent to parking lane	900
Occasional parked vehicles	600
Clearway conditions	900

Sources: Austroads *Guide to Traffic Management Part 3: Traffic Studies and Analysis*

3 EXISTING CONDITIONS

3.1 SITE LOCATION

Stage 3C, in relation to the greater Jordan Springs East development site, is presented in Figure 3.1 below.

Figure 3.1 Location of Stage 3C in Jordan Springs East

3.2 ROAD NETWORK

The existing (external) road network impacted by the proposed Stage 3C are listed below. The operation of the relevant internal road network is further assessed in section 4 of this report. This considers the traffic volumes likely to be generated from the approved stages, which we note, were not constructed at the time that this report was prepared.

Source: Google Earth

Figure 3.2 Road network adjoining Jordan Springs

3.2.1 THE NORTHERN ROAD

The Northern Road is a State Road (Road Number 154), which travels in a north-south direction between Bringelly and Windsor. The Northern Road is located west of the St Marys development site, with direct available via Jardine Way (priority controlled left-in/left-out), Greenwood Parkway (signalised cross intersection), Watkin Street (priority controlled left-in/left-out), and Jordan Springs Boulevarde (signalised T-intersection) in the north to south direction.

North of Greenwood Parkway, The Northern Road is generally an undivided two-lane/two-way rural type road with approximately 3 metres wide travel lanes and 2 metres wide shoulders in each direction. This section of The Northern Road has a posted speed limit of 70 km/h.

South of Greenwood Parkway, The Northern Road is generally a divided four-lane/two-way urban type road with localised intersection flaring treatments commonplace at all major intersections. On-street bicycle lanes, measuring approximately 2 metres wide, are available along the kerbside in both direction. Off-street shared paths are generally available along the eastern kerbside of the Northern Road. This section of The Northern Road has a posted speed limit of 70 km/h.

A survey undertaken at The Northern Road-Jordan Springs Boulevarde intersection in October 2016 revealed a mid-block traffic volume south of Jordan Springs Boulevarde of approximately 1,000 vehicles northbound and 1,400 vehicles southbound during the AM peak. The survey undertaken during the PM peak revealed 1,350 vehicles northbound and 1,300 vehicles southbound.

3.2.2 JORDAN SPRINGS BOULEVARDE

Jordan Springs Boulevarde is a collector road located south of the Jordan Springs development, which travels east-west between The Northern Road and Lakeside Parade. For the most part, it is a divided four-lane/two-way road measuring approximately 17.5 metres kerb to kerb with a 4-metre-wide median island dividing the carriageway. Kerb narrowing treatments exist at its intersection with Tyler Street, reducing the travel lane to one-lane eastbound. Similar narrowing treatment also exists at its intersection with Lakeside Parade, reducing the travel lane at this intersection to one-lane westbound.

Jordan Springs Boulevarde consist of a shared path along the northern kerbside and a footpath network along the southern kerbside. Access to properties and on-street parking are generally restricted along the road, which maximises the operational capacity of the road. Jordan Springs Boulevarde is subjected to a posted speed limit of 50 km/h throughout.

3.2.3 LAKESIDE PARADE

Lakeside Parade is a two-way/two-lane undivided collector road in Jordan Springs which travels north-south between Greenwood Parkway and Jordan Springs Boulevarde, and east-west between Jordan Springs Boulevarde and Jubilee Drive. Lakeside Parade is measured at approximately 11.8 metres wide kerb to kerb with unrestricted on-street parking permitted, except for the on-street parking at the Jordan Springs village centre where 1-hour parking restriction applies.

In the section between Jordan Springs Boulevarde and Jubilee Drive (east), pedestrian refuges have been installed at each intersection to Lakeside Parade to provide a staged crossing for pedestrians. A shared path of approximately 2.5 metres wide has been provided along the southern kerbside of Lakeside Parade. Similarly, a footpath of approximately 1.5 metres wide have been provided along the northern kerbside.

Lakeside Parade is subjected to a posted speed limit of 50 km/h throughout.

3.2.4 WIANAMATTA PARKWAY

Wianamatta Parkway is an extension of Lakeside Parade, which functions as a collector road in the east-west direction connecting Jordan Springs East with Jordan Springs. Wianamatta Parkway is subjected to a posted speed limit of 50 km/h.

3.3 PUBLIC TRANSPORT

3.3.1 RAIL

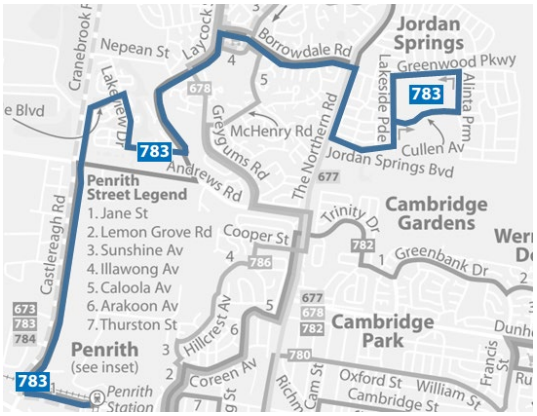
Kingswood Station is the closest train station, which is located approximately 8 km from the location of Stage 3C in Jordan Springs East.

Penrith interchange is located approximately 9 km from the location of Stage 3C.

Both train stations are serviced by the T1 Western Line (Emu Plains to the City). Penrith interchange provides access to the regional train network for the train line between Bathurst and the City, and an interchange for the local buses servicing suburbs surrounding Penrith.

3.3.2 BUS

Route 783 currently provides services between Jordan Springs and Penrith Station via Borrowdale Road and Castlereagh Road. Future planning of bus routes within Jordan Springs East are further detailed in section 6.3 of this report.



4 APPROVED DEVELOPMENTS

4.1 JORDAN SPRINGS EAST: STAGES 1, 2, 3A, 4A/4B, 3B1/3B2, AND 5A

It is understood that at the time of writing, Lendlease has obtained approval for a combined total of 1,120 residential dwellings across Stages 1, 2, 3A, 4A/4B, 3B1/3B2, and 5A. These stages, except for Stages 3B1 and 5A, have been approved with all development traffic proposed to access to The Northern Road only (i.e. west side of the development) via Lakeside Parade in Jordan Springs. From Stage 3B1 onwards, trips have been distributed to both the west (to The Northern Road via Wianamatta Parkway and Lakeside Parade) and to the east (via the East-West Connector Road). This aligns with the original indicative civil construction program provided by Lendlease. Due to the delay in opening of the East-West Connector Road, further assessment (as detailed in section 5.3) has been undertaken to re-examine the traffic impact generated from the stages that are likely to occur prior to the opening of the East-West Connector Road, with all traffic being assigned to The Northern Road only. It should be noted that, there had been no other types of land uses (i.e. retail, child care) included in any part of the approved stages of the development to attract any supplementary trips to the Jordan Springs East development other than those generated by the residential developments.

Stages 1, 2, 3A, 4A/4B, 3B1/3B2, and 5A combined will generate 851 trips and 1,086 trips in the respective weekday AM and PM peak hours. Table 4.1 below provides a breakdown of the combined trip generation for the approved stages in Jordan Springs East.

Table 4.1 Trip generation of approved developments in Jordan Springs East

	Number of low-density residential dwellings	AM peak – Trip generation rate	AM peak trips	PM peak – Trip generation rate	PM peak trips
Stage 1	400	0.76 trips/dwelling	304	0.97 trips/dwelling	388
Stage 2	278		211		270
Stage 3A	90		68		87
Stages 4A/4B	163		124		158
Stage 3B1	52		40		50
Stage 3B2	23		17		22
Stage 5A	114		87		111
TOTAL	1,120		851		1,086

Using an in/out trip distribution assumption of 20/80 in the AM peak and conversely 80/20 in the PM peak for residential developments, the resulting number of trips above are separated into the following inbound and outbound traffic trips.

Table 4.2 Inbound/outbound trips of approved developments in Jordan Springs East

	Inbound trips	Outbound trips
AM peak – 834 trips	170	681
PM peak – 1,064 trips	869	217

4.2 JORDAN SPRINGS

Jordan Springs is a residential suburb which forms part of the western precinct of the St Marys Development Site. In brief, Jordan Springs consists of over 3,400 dwellings, apartments, retail, and community facilities such as a school, childcare and medical centre.

The development and occupation of Jordan Springs is ongoing with the most current known progress detailed in Table 4.3 below. The development of Jordan Springs is envisaged to be completed and occupied prior to the occupation of Stage 3C of Jordan Springs East development.

This section aims to analyse the impact of growth in Jordan Springs to the road network in Jordan Springs before any Jordan Springs East traffic are added to the intersection.

4.2.1 GROWTH

At the time of the survey, construction of Jordan Springs had been ongoing with the status of the development summarised as follows.

Table 4.3 Land use and resulting trips in Jordan Springs

Land use	Occupied land use November 2016	Ultimate land use	Trip generating rates (AM/PM)	2016 resulting AM trips	2016 resulting PM trips	Ultimate resulting AM trips	Ultimate resulting PM trips
Residential dwellings	1,897	3,437	AM: 0.76 trips/dwelling PM: 0.97 trips/dwelling	1,442	1,840	2,612	3,334
Apartments	0	599	AM and PM: 0.5 trips/apartment	0	0	300	300
Retail (m^2) GFA	4,920	8,200	(<10,000 m^2 GLFA): AM: ½ of PM trips. PM: 12.3 trips/100 m^2	303	605	504	1,009
Childcare	60	200	AM: 1.4 trips per child PM: 0.8 trips per child	84	48	280	160
Medical Centre	3	3	AM and PM: 5.8 movements/practitioner	17	17	17	17
School (children)	0	460	AM: 0.8 trips per child	0	0	368	0
School Staff	0	15	AM and PM: 1 trip per 30 children	0	0	15	0
			TOTAL	1,846	2,511	4,097	4,819
			Proportion of 2016 resulting trip to 2021 (ultimate) resulting trip	1,846/4,097 45.1%	2,511/4,819 52.1%	-	-

Based on the above assessment, it is therefore estimated that the traffic volumes surveyed in October 2016 which also corresponds with the total of occupied developments in Jordan Springs account for approximately 45.1 per cent and 52.1 per cent of the respective AM and PM traffic volumes envisaged to be experienced in the ultimate completion year of 2021.

4.2.2 LAKESIDE PARADE/JORDAN SPRINGS BOULEVARDE

4.2.2.1 INTERSECTION COUNT

An intersection count undertaken in October 2016 revealed the following volumes for the intersection of Lakeside Parade/Jordan Springs Boulevarde.

Table 4.4 October 2016 intersection count at Lakeside Parade/Jordan Springs Boulevarde

2016	Lakeside Parade (north)		Lakeside Parade (south)		Jordan Springs Boulevarde	
Peak hour	T	R	L	T	L	R
AM (7.45–8.45)	10	92	143	16	61	54
PM (5.00–6.00)	22	125	97	8	168	155

Based on the growth of 45.1 per cent and 52.1 per cent in the respective AM and PM peak calculated in section 4.2.1 above, the following traffic volumes are calculated.

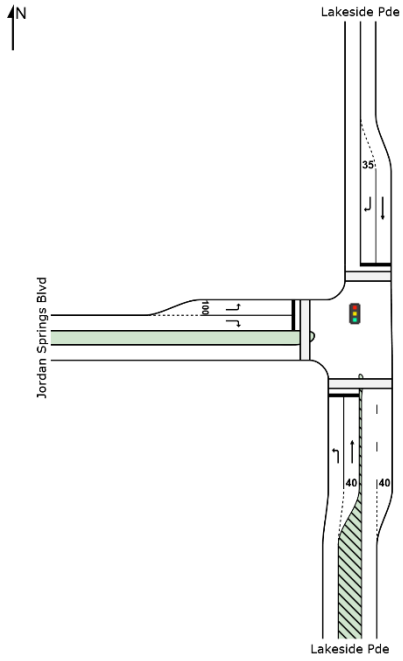
Table 4.5 Lakeside Parade/Jordan Springs Boulevarde predicted intersection volume at completion of Jordan Springs

2021	Lakeside Parade (north)		Lakeside Parade (south)		Jordan Springs Boulevarde	
Peak hour	T	R	L	T	L	R
AM (with 45.1% growth) (7.45–8.45)	22	204	317	35	135	120
PM (with 52.1% growth) (5.00–6.00)	42	240	186	15	322	298

4.2.2.2 INTERSECTION PERFORMANCE

The performance of Lakeside Parade/Jordan Springs Boulevarde intersection based on the October 2016 counts and the predicted volume at the completion of Jordan Springs is summarised below.

Table 4.6 Lakeside Parade/Jordan Spring Boulevarde performance summary with Jordan Springs traffic only

Lakeside Parade/Jordan Springs Boulevarde performance summary	
	
2016 AM peak Total Vehicle: 376 veh/h Degree of Saturation: 0.132 Average Delay: 17.2 Level of Service: B 95% Back of Queue: 16.7 metres (west approach)	**2021 AM peak with ultimate Jordan Springs Development** Total Vehicle: 833 veh/h Degree of Saturation: 0.340 Average Delay: 18.6 Level of Service: B 95% Back of Queue: 40.6 metres (west approach)
2016 PM peak Total Vehicle: 575 veh/h Degree of Saturation: 0.228 Average Delay: 21.3 Level of Service: C 95% Back of Queue: 38.7 metres (west approach)	**2021 PM peak with ultimate Jordan Springs Development** Total Vehicle: 1,103 veh/h Degree of Saturation: 0.460 Average Delay: 23.8 Level of Service: C 95% Back of Queue: 85.2 metres (west approach)

Based on the assessment above, it is determined that the estimated traffic volumes upon the ultimate completion of Jordan Springs can be satisfactorily accommodated with the current layout of Jordan Springs Boulevarde/Lakeside Parade. The worst performing Level of Service "C" was assessed at the intersection during the PM peak for 2016 and 2021 conditions with the Degree of Saturation (volume/capacity) observed to be reduced from 0.228 to 0.460.

The SIDRA output of the above assessments are attached in Appendix A.

4.2.3 THE NORTHERN ROAD/JORDAN SPRINGS BOULEVARDE

4.2.3.1 INTERSECTION COUNT

An intersection count undertaken in October 2016 revealed the following volumes for the intersection of The Northern Road/Jordan Springs Boulevarde

Table 4.7 October 2016 intersection count at Lakeside Parade/Jordan Springs Boulevarde

2016	The Northern Road (north)		The Northern Road (south)		Jordan Springs Boulevarde	
Peak hour	T	L	R	T	L	R
AM (7.45–8.45)	1189	37	174	844	261	32
PM (5.00–6.00)	1050	63	455	895	281	50

A check in the Roads and Maritime EMME strategic model revealed an annual growth in the Northern Road as follows:

Table 4.8 The Northern Road annual growth rate from 2016 to 2021

	The Northern Road – north of Jordan Springs Boulevarde		The Northern Road – south of Jordan Springs Boulevarde	
	Northbound	Southbound	Northbound	Southbound
AM	0.8% p.a.	1.0% p.a.	1.6% p.a.	2.8% p.a.
PM	0.1% p.a.	0.8% p.a.	1.9% p.a.	2.4% p.a.

Applying the growth subjected to The Northern Road as detailed above and the growth of trips generated from the Jordan Springs development, being 45.1 per cent and 52.1 per cent in the respective AM and PM peak calculated in section 4.2.1 above, the following traffic volumes are calculated.

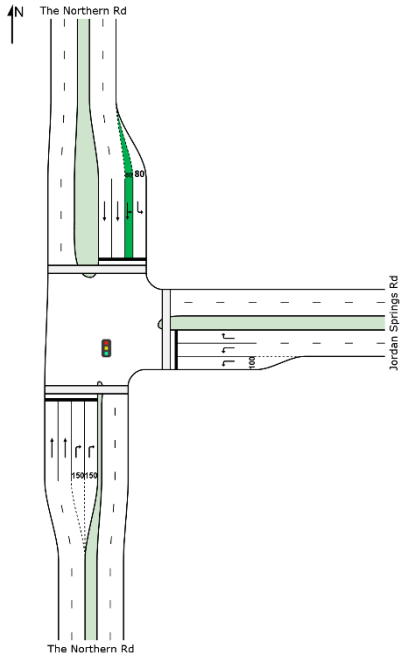
Table 4.9 Lakeside Parade/Jordan Springs Boulevarde predicted intersection volume at completion of Jordan Springs

2021	The Northern Road (north)		The Northern Road (south)		Jordan Springs Boulevarde	
Peak hour	T	L	R	T	L	R
AM (7.45–8.45)	1250	82	386	914	579	71
PM (5.00–6.00)	1093	121	873	983	539	96

4.2.3.2 INTERSECTION PERFORMANCE

The performance of The Northern Road/Jordan Springs Boulevarde intersection based on the October 2016 counts and the predicted volume at the completion of Jordan Springs is summarised below.

Table 4.10 The Northern Road/Jordan Springs Boulevarde performance summary with Jordan Springs traffic only

The Northern Road/Jordan Springs Boulevarde performance summary	
	
2016 AM peak Total Vehicle: 2,540 veh/h Degree of Saturation: 0.508 Average Delay: 14.9 Level of Service: B 95% Back of Queue: 121.7 metres (north approach)	**2021 AM peak with ultimate Jordan Springs Development** Total Vehicle: 3,282 veh/h Degree of Saturation: 0.619 Average Delay: 21.1 Level of Service: B 95% Back of Queue: 160.9 metres (north approach)
2016 PM peak Total Vehicle: 2,796 veh/h Degree of Saturation: 0.573 Average Delay: 20.4 Level of Service: B 95% Back of Queue: 133.9 metres (north approach)	**2021 PM peak with ultimate Jordan Springs Development** Total Vehicle: 3,705 veh/h Degree of Saturation: 0.748 Average Delay: 24.5 Level of Service: B 95% Back of Queue: 171.2 metres (north approach)

Based on the assessment above, it is determined that the estimated traffic volumes upon the ultimate completion of Jordan Springs can be satisfactorily accommodated with the current layout of Jordan Springs Boulevarde/The Northern Road. The worst performing Level of Service "B" was assessed at the intersection during both AM and PM peak for 2016 and 2021 conditions.

The SIDRA output of the above assessments are attached in Appendix B.

5 PROPOSED DEVELOPMENT

5.1 DESCRIPTION

The proposed Stage 3C development is located towards the east of the Jordan Springs East precinct. Stage 3C is located abutting Wianamatta Parkway (Road 001) to the north, Road 013 to the west, and Road 027 to the east and to the south. The extent and location of Stage 3C in relation to the other stages of Jordan Springs East are shown in Figure 5.1 below.

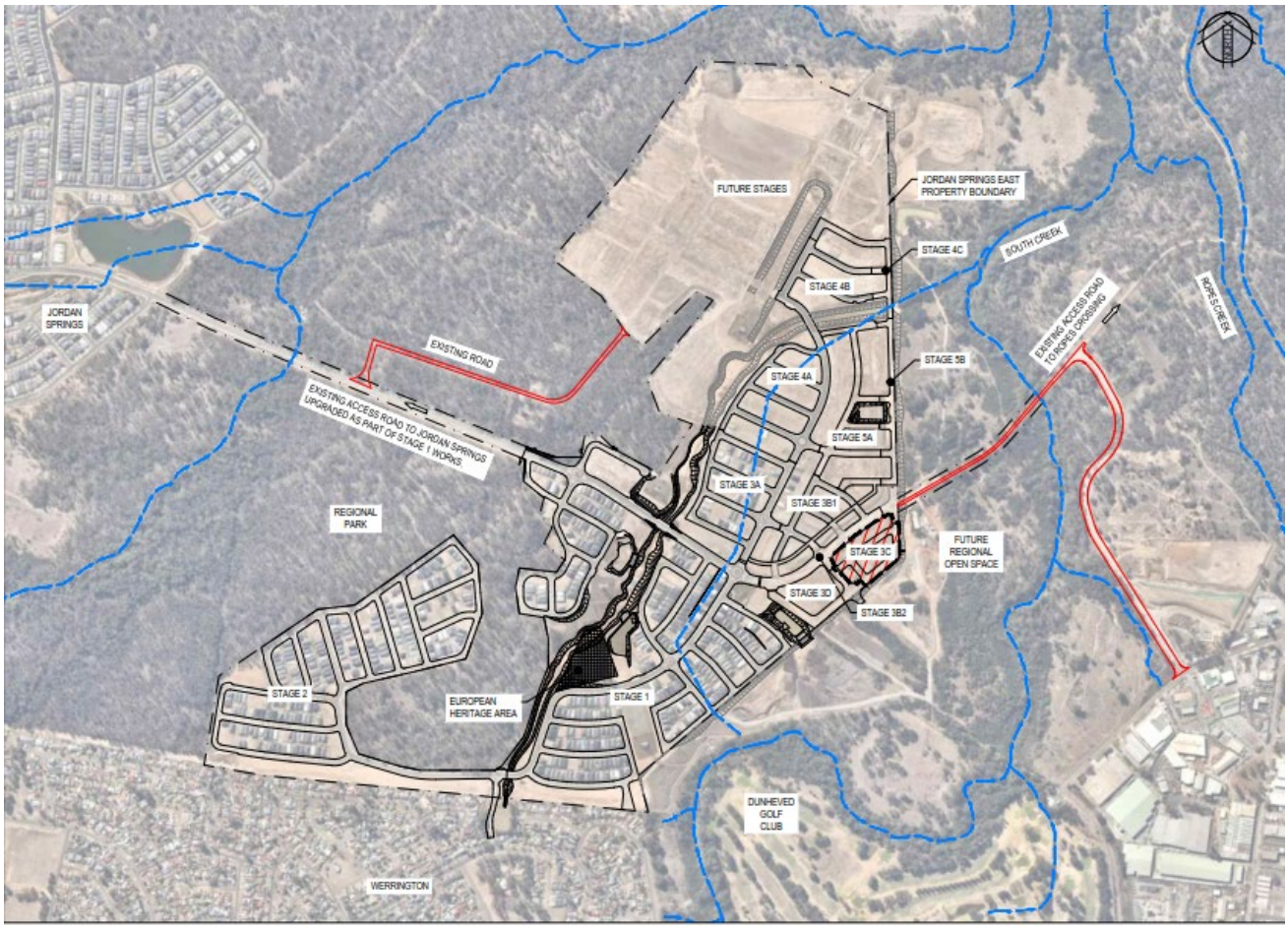


Figure 5.1 Stage 3C location within Jordan Springs East

5.2 CONSTRUCTION PROGRAM

The civil construction program summarised below in Table 5.1 outlines key program dates. These dates have been provided by Lendlease.

Table 5.1 Jordan Springs East construction program key dates

Stages	DA status	Description	Anticipated start date	Anticipated end date
Precinct wide		Fill	June 2015	June 2017
Stage 1	Approved	Civil Works	May 2016	May 2017
		Lot Registration	May 2017	July 2017
		Occupation	February 2018	-
Stage 2	Approved	Civil Works	December 2016	May 2017
		Lot Registration	July 2017	July 2017
		Occupation	March 2018	
Stage 3A	Approved	Civil Works	July 2017	October 2017
		Lot Registration	November 2017	December 2017
		Occupation	October 2018	
Stages 4A/4B	Approved	Civil Works	October 2017	April 2018
		Lot Registration	May 2018	June 2018
		Occupation	March 2019	
Stage 3B1	Approved	Civil Works	November 2017	May 2018
		Lot Registration	May 2018	June 2018
		Occupation	March 2019	
Stage 5A	Approved	Civil Works	December 2018	May 2019
		Lot Registration	July 2019	August 2019
		Occupation	August 2020	
Stage 3B2	Approved	Civil Works	July 2019	November 2019
		Lot Registration	November 2019	December 2019
		Occupation	December 2020	
The East-West Connector Road	Pending	Opening	Late 2020	
Stage 3D	Pending	Civil Works	July 2019	November 2019
		Lot Registration	November 2019	December 2019
		Occupation	N/A	
Lot 3001	Pending	Civil Works	September 2019	December 2019
		Lot Registration	January 2020	February 2020
		Occupation	February 2021	
Stage 4C	Pending	Civil Works	January 2020	May 2020
		Lot Registration	May 2020	June 2020

Stages	DA status	Description	Anticipated start date	Anticipated end date
		Occupation	June 2021	
Stage 3C	To be lodged	Civil Works	December 2019	April 2020
		Lot Registration	May 2020	June 2020
		Occupation	June 2021	
Stage 5B	To be lodged	Civil Works	January 2020	May 2020
		Lot Registration	May 2020	June 2020
		Occupation	June 2021	

Source: Lendlease

A Development Application (DA) for the East-West Connector Road is currently being assessed by Penrith City and Blacktown City Councils with construction proposed to be commenced promptly upon approval. It is anticipated that the East-West Connector Road will open in late 2020. Traffic distribution prior to the East-West Connector Road opening has re-considered all development stages up to Stage 3B2. Should the further occupation of Lot 3001, Stages 4C and 3D occur prior to the completion of the East-West Connector Road, the external road network west of Jordan Springs East is expected to have reduced capacity temporarily over a short duration.

5.3 PROPOSED TRIP GENERATION

With regards to Stage 3C development, the 59 lots are proposed to accommodate 57 low-density residential dwellings and two residue lots. Future developments on these residue lots are subject to future DA approval by Council.

Table 5.2 below provides a breakdown of the combined trip generation, in addition to the approved and committed stages in Jordan Springs East.

Table 5.2 Trip Generation of Approved, Committed and Proposed Developments in Jordan Springs East

	Number of low-density residential dwellings	AM peak trip generation (trips per dwelling)	Total AM trips	PM peak trip generation rate (trips per dwelling)	Total PM trips
Stage 1	400	0.76	304	0.97	388
Stage 2	278		211		270
Stage 3A[(1)]	89		68		86
Stage 4A/4B	163		124		158
Stage 3B1	52		40		50
Stage 5A	114		87		111
Stage 3B2	23		17		22
Stage 3D – low density			518		626
Stage 3D – medium density			505		560
Lot 3001	16		12		16
Stage 4C	18		14		17

	Number of low-density residential dwellings	AM peak trip generation (trips per dwelling)	Total AM trips	PM peak trip generation rate (trips per dwelling)	Total PM trips
Stage 3C	57		43		55
Stage 5B – proposed zoning	21		16		20
Total	**1231**		**1,454(2)**		**1,819(2)**

(1) The approved dwelling number is adjusted to exclude Lot 3001 from the original scheme under Stage 3A

(2) Utilising the higher trip generation between Stage 3D low and medium density scenarios.

Using an in/out trip distribution assumption of 20/80 in the AM peak and conversely 80/20 in the PM peak for residential developments, the resulting number of trips above are separated into the following inbound and outbound traffic. Non-residential developments under Stage 3D adopted different directional splits from the previous TIA studies.

Table 5.3 Inbound/outbound trips of committed and proposed developments in Jordan Springs East

		Inbound	Outbound
Trips generated from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2, and 5A + committed Stage 3D (1), Lot 3001 and Stage 4C + Proposed Stages 3C and 5B	AM peak – 963 trips	195 trips	768 trips
	PM peak – 1241 trips	994 trips	247 trips

(1) Utilising the higher trip generation (for external trips only) between Stage 3D low and medium density scenarios

5.4 TRIP ASSIGNMENT

5.4.1 ORIGIN-DESTINATION SURVEY RESULT

The Origin-Destination survey undertaken for trips currently generated and attracted from Jordan Springs to The Northern Road are as follows:

Table 5.4 Origin-Destination survey result of Jordan Springs traffic on The Northern Road

	AM inbound	AM outbound	PM inbound	PM outbound
To/From north	32%	29%	31%	24%
To/From west	20%	7%	20%	15%
To/From south	48%	64%	49%	61%

Assuming that the above travel pattern is followed by traffic into and out of Jordan Springs East. The distribution of the resulting trips out of Jordan Springs East (all committed and proposed stages) to The Northern Road prior and post the opening of the East-West Connector Road are shown Table 5.5 below.

WSP was informed that the delivery of East-West Connector Road had been delayed due to a pending DA determination. Based on the updated construction program, the distribution of trips has been made to The Northern Road up to Stage 3B2 to represent the interim traffic pattern prior to the opening of the East-West Connector Road. It is anticipated that the occupation of the stages beyond Stage 3B2 would occur post the opening of the East-West Connector Road. Consequently, the accumulative trip generation from all committed and proposed stages up to Stages 3C and 5B have

been distributed to both the west and the east to represent the ultimate traffic pattern post the opening of the East-West Connector Road. Because of the opening of East-West Connector Road, it is expected that there will be reduced trips from the Jordan Springs East development being distributed to The Northern Road at the ultimate stage. 55 per cent and 53 per cent of trips from Jordan Springs East will be distributed to the East-West Connector Road (towards east) in the respective AM and PM peak.

Table 5.5 Applied Origin-Destination Survey to trips made to The Northern Road

		AM inbound	AM outbound	PM inbound	PM outbound
Prior to the opening of the East-West Connector Road(1)					
Trips generated from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A	To/From north	54	203	269	52
	To/From west	34	49	174	33
	To/From south	82	448	425	132
Post the opening of the East-West Connector Road(2)					
Trips generated from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2, and 5A + committed Lot 3001, Stages 3D (3) and 4C + proposed Stages 3C and 5B	To/From north	34	100	163	28
	To/From west	21	24	105	17
	To/From south	52	221	258	71

(1) All trips are distributed to The Northern Road from Jordan Springs East (towards west).

(2) Only 45 per cent and 47 per cent of the respective AM and PM peak trips are distributed to The Northern Road from Jordan Springs East (towards west). This is due to the scheduled opening of the East-West Connector Road between Jordan Springs East and the Ropes Crossing precinct, currently scheduled in late 2020.

(3) Utilising the higher trip generation (for external trips only) between Stage 3D low and medium density scenarios.

5.5 IMPACT OF PROPOSED DEVELOPMENT TO JORDAN SPRINGS INTERNAL ROAD

5.5.1 LAKESIDE PARADE/JORDAN SPRINGS BOULEVARDE

For this study, the following route option assumptions are made at the intersection of Jordan Springs Boulevarde and Lakeside Parade, with regards to the turning movements made by the combined trips out of Jordan Springs East of the approved Stages 1, 2 and 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C and proposed Stages 3C and 5B.

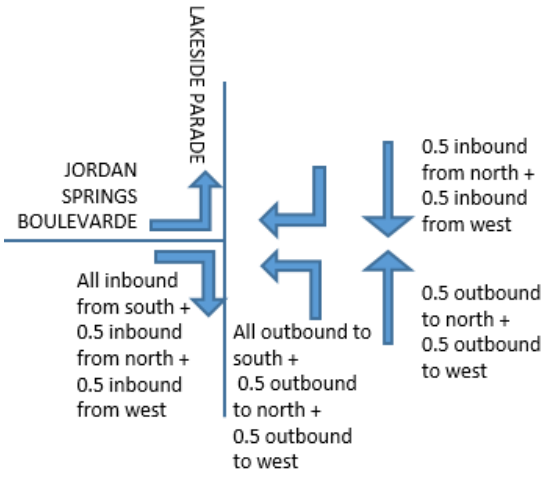


Figure 5.2 Route option Lakeside Parade/Jordan Springs Boulevarde

5.5.1.1 JORDAN SPRINGS BOULEVARDE/LAKESIDE PARADE INTERSECTION VOLUMES UNDER PROPOSED CONDITIONS

The resulting traffic volume at the intersection of Jordan Springs Boulevarde and Lakeside Parade is summarised in Table 5.6 below, taking into account of the traffic growth in Jordan Springs as calculated in section 4.2.1 and the trips generated from Jordan Springs East approved and proposed developments as detailed in section 5.3.

Table 5.6 Lakeside Parade/Jordan Springs Boulevarde – Estimated intersection volumes with inclusion of Jordan Springs East development traffic

		Lakeside Parade (north)		**Lakeside Parade (south)**		**Jordan Springs Boulevarde**	
	Peak hour	T	R	L	T	L	R
Prior to the opening of the East-West Connector Road							
Trips generated from approved Stages 1, 2, 3A, 4A/4B and 3B1/3B2 and 5A	AM peak	66	204	891	161	135	246
	PM peak	264	240	361	58	322	945
Post the opening of the East-West Connector Road							
Trips generated from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2, and 5A + committed Lot 3001, Stages 3D and 4C + Proposed Stages 3C and 5B	AM peak	50	204	600	97	135	200
	PM peak	176	240	280	38	322	690

Table 5.7 below summarises the mid-block traffic volume envisaged in the ultimate completion year of Stage 3C.

Table 5.7 Lakeside Parade and Jordan Springs Boulevarde – Estimated mid-block volumes including Stage 3C

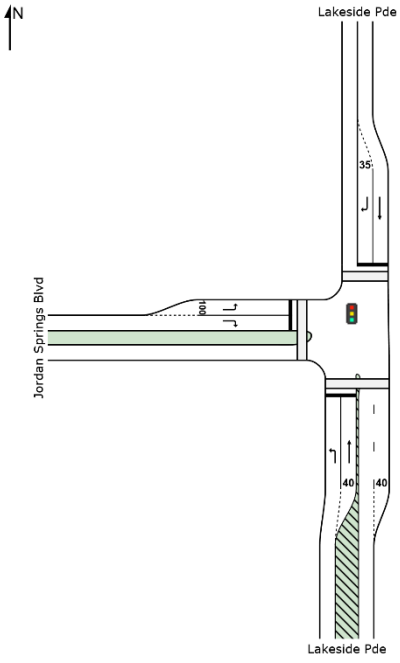
	AM peak		PM peak	
	NB/EB	SB/WB	NB/EB	SB/WB
Prior to the opening of the East-West Connector Road				
Lakeside Parade (north)	296	270	380	504
Lakeside Parade (south)	1,052	312	419	1,209
Jordan Springs Boulevarde	381	1,095	1,267	601
Post the opening of the East-West Connector Road				
Lakeside Parade (north)	232	254	360	416
Lakeside Parade (south)	697	250	318	866
Jordan Springs Boulevarde	335	804	1,012	520

Based on the above, the traffic volumes assessed at the approaches to Lakeside Parade and Jordan Springs Boulevarde intersection will be within the typical mid-block capacities recommended in the Austroads *Guide to Traffic Management Part 3*.

5.5.1.2 SIDRA ASSESSMENT

The resulting trips as shown in Table 5.6 were modelled in SIDRA using the existing layout of the intersection of Jordan Springs Boulevarde and Lakeside Parade. As shown in the performance summary Table 5.8, the intersection has been assessed to be performing satisfactorily, both prior to and post the opening of the East-West Connector Road. The worst performing condition has been assessed at a Level of Service (LoS) "D" during the PM peak prior to the opening of the East-West Connector Road.

Table 5.8 Lakeside Parade/Jordan Springs Boulevarde performance summary with inclusion of Jordan Springs East development traffic

Lakeside Parade/Jordan Springs Boulevarde performance summary		
	Prior to the opening of the East-West Connector Road	**Post the opening of the East-West Connector Road**
	**AM peak conditions with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2, and 5A**	**AM peak conditions with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C, and proposed Stages 3C and 5B**
	Total Vehicle: 1,703 veh/h Degree of Saturation: 0.789 Average Delay: 18.9 Level of Service: B 95% Back of Queue: 89.3 metres (west approach)	Total Vehicle: 1,286 veh/h Degree of Saturation: 0.506 Average Delay: 17.3 Level of Service: B 95% Back of Queue: 61.9 metres (west approach)
	PM peak conditions with all trips from approved Stages 1, 2, 3A, 4A/4B and 3B1/3B2, and 5A	**PM peak conditions with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C, and proposed Stages 3C and 5B**
	Total Vehicle: 2,190 veh/h Degree of Saturation: 0.958 Average Delay: 38.9 Level of Service: D 95% Back of Queue: 406.9 metres (west approach)	Total Vehicle: 1746 veh/h Degree of Saturation: 0.770 Average Delay: 23.7 Level of Service: C 95% Back of Queue: 189.1 metres (west approach)

The SIDRA output of the above assessments are attached in Appendix C.

5.5.2 THE NORTHERN ROAD/JORDAN SPRINGS BOULEVARDE

For this study, the route option assumptions shown in Figure 5.3 are made at the intersection of Jordan Springs Boulevarde and The Northern Road, with regards to the turning movements made by the combined trips out of Jordan Springs East of the approved Stages 1, 2 and 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C and proposed Stages 3C and 5B.

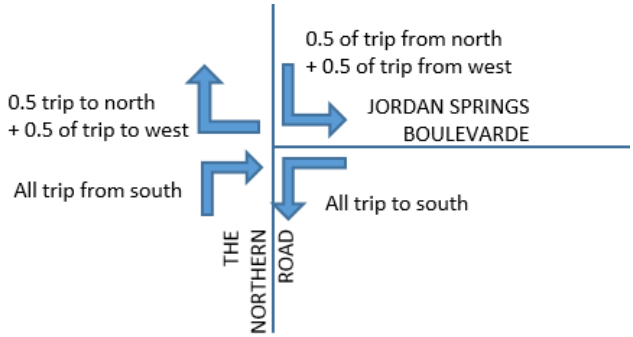


Figure 5.3 Route option Lakeside Parade/Jordan Springs Boulevarde

5.5.2.1 THE NORTHERN ROAD/JORDAN SPRINGS BOULEVARDE INTERSECTION VOLUMES UNDER PROPOSED CONDITIONS

The resulting traffic volumes at the intersection of Jordan Springs Boulevarde and The Northern Road is summarised in Table 5.9 below, which takes into account of the traffic growth in Jordan Springs as calculated in section 4.2.3 and the trips generated from Jordan Springs East approved and proposed developments as detailed in section 5.2.

Table 5.9 The Northern Road/Jordan Springs Boulevarde – Estimated intersection volumes with inclusion of Jordan Springs East development traffic

		The Northern Road (north)		**The Northern Road (south)**		**Jordan Springs Boulevarde**	
	Peak hour	T	L	R	T	L	R
Prior to the opening of the East-West Connector Road							
Trips Generated from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A	AM peak	1,250	126	468	914	1,027	197
	PM peak	1,093	343	1,298	983	671	139
Post the opening of the East-West Connector Road							
Trips Generated from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A + committed Lot 3001, Stages 3D and 4C + Proposed Stages 3C and 5B	AM peak	1,250	110	438	914	800	133
	PM peak	1,093	255	1,131	983	610	119

Table 5.10 below summarises the mid-block traffic volume envisaged in the ultimate completion year of the Stage 3C.

Table 5.10 The Northern Road and Jordan Springs Boulevarde – Estimated mid-block volumes including Stage 3C

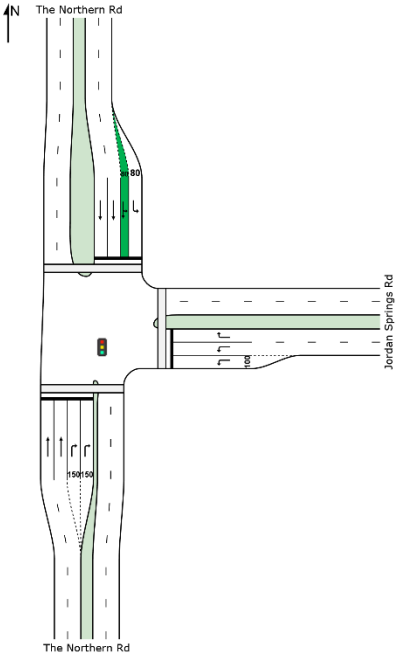
	AM peak		PM peak	
	NB/EB	SB/WB	NB/EB	SB/WB
Prior to the opening of the East-West Connector Road				
The Northern Road (north)	1,111	1,376	1,122	1,436
The Northern Road (south)	1,382	2,277	2,281	1,764
Jordan Springs Boulevarde	594	1,224	1,641	810
Post the opening of the East-West Connector Road				
The Northern Road (north)	1,047	1,360	1,102	1,348
The Northern Road (south)	1,352	2,050	2,114	1,703
Jordan Springs Boulevarde	548	933	1,386	729

It is noted that the traffic volumes assessed for Jordan Springs Boulevarde are found to be within the typical two-lane capacity of 1,900 passenger car unit (pcu)/hour as shown in Table 2.2. Prior to the opening of the East-West Connector Road, a volume of 1,224 westbound and 1,641 eastbound was estimated during the respective AM and PM peak. A volume of 933 westbound and 1,386 eastbound was assessed during the respective AM and PM peak post the opening of the East-West Connector Road.

5.5.2.2 SIDRA ASSESSMENT

The resulting trips as shown in Table 5.9 were modelled in SIDRA using the existing layout of the intersection of The Northern Road and Jordan Springs Boulevarde. The performance of the intersection is summarised in Table 5.11 below.

Table 5.11 The Northern Road/Jordan Springs Boulevarde performance summary with inclusion of Jordan Springs East Development Traffic

The Northern Road/Jordan Springs Boulevarde performance summary		
	Prior to the opening of the East-West Connector Road	**Post the opening of the East-West Connector Road**
	**AM peak conditions with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A**	**AM peak conditions with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C and proposed Stages 3C and 5B**
	Total Vehicle: 3,982 veh/h Degree of Saturation: 0.694 Average Delay: 25.7 Level of Service: B 95% Back of Queue: 181.3 metres (north approach)	Total Vehicle: 3,645 veh/h Degree of Saturation: 0.641 Average Delay: 23.3 Level of Service: B 95% Back of Queue: 164.3 metres (north approach)
	PM peak conditions with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A	**PM peak conditions with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C and proposed Stages 3C and 5B**
	Total Vehicle: 4,527 veh/h Degree of Saturation: 0.912 Average Delay: 35.5 Level of Service: C 95% Back of Queue: 257.8 metres (south approach)	Total Vehicle: 4,191 veh/h Degree of Saturation: 0.841 Average Delay: 29.4 Level of Service: C 95% Back of Queue: 201.6 metres (north approach)

As shown in the intersection performance summary table above, the addition of Stages 3C to the approved development Stages 1, 2, 3A, 4A/4B, 3B1/3B2, 5A and committed Lot 3001, Stages 3D and 4C, and proposed Stage 5B in Jordan Springs East will result in a satisfactory operation of The Northern Road/Jordan Springs Boulevarde intersection. The resulting Level of Service at the intersection have been assessed at a Level of Service "C" or better in both the AM and PM peak, prior to and post the opening of the East-West Connector Road.

The SIDRA output of the above assessments are attached in Appendix D.

5.6 DEVELOPMENT IMPACT TO JORDAN SPRINGS EAST INTERNAL ROAD

Assessment of the internal road in Jordan Springs East has been undertaken for the intersection of Road 001 (Wianamatta Parkway/the East-West Connector Road) and Road 002 (Armoury Road). This intersection provides direct access to Stage 1, 2 and 3D to the south and Stages 3A, 4A, 4B, 3B1/3B2, 5A/5B and 4C to the north. Stage 3C is located south-east of this intersection.

With the committed and proposed stages, the intersection of Road 001 and 002 will generate the traffic volume shown in Table 5.12 below. Traffic distribution has considered both prior to and post the opening of the East-West Connector Road.

This intersection is controlled by a single-lane roundabout with an inscribed radius of approximately 20 metres. The roundabout will accommodate a slip lane on Road 001 in the east approach in the westbound direction. A concrete median island is proposed along Road 001, which would prohibit any right-turn movements into and out of side streets and property accesses.

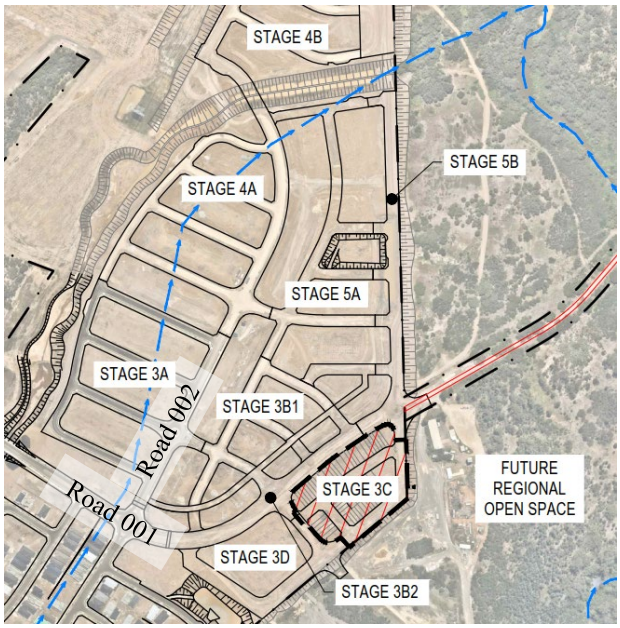


Table 5.12 Traffic volume intersection Road 001 and 002

	Road 002 (south)			Road 001 (east)			Road 002 (north)			Road 001 (west)		
	L	T	R	L	T	R	L	T	R	L	T	R
Prior to the opening of the East-West Connector Road												
AM	412	0	0	0	0	0	0	0	269	67	0	103
PM	132	0	0	0	0	0	0	0	85	342	0	526
Post the opening of the East-West Connector Road												
AM	185	0	268	79	67	72	182	0	112	33	10	46
PM	62	0	112	303	31	183	126	0	36	165	45	247

The intersection has been modelled in SIDRA Intersections and was found to be performing satisfactorily. The result is summarised below.

Table 5.13 Road 001–Road 002 Intersection performance summary

	Prior to the opening of the East-West Connector Road		Post the opening of the East-West Connector Road	
	Intersection performance with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A		Intersection performance with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C and proposed Stages 3C and 5B	
	AM peak	PM peak	AM peak	PM peak
Total Volume	859 vehicles	1,093 vehicles	1057 vehicles	1312 vehicles

	Prior to the opening of the East-West Connector Road		Post the opening of the East-West Connector Road	
	Intersection performance with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A		Intersection performance with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C and proposed Stages 3C and 5B	
	AM peak	PM peak	AM peak	PM peak
Degree of Saturation	0.386 (Road 002. south approach)	0.512 (Road 001. west approach)	0.412 (Road 002. south approach)	0.436 (Road 001. west approach)
Average Delay	10.5 seconds (Road 002 south approach right turn)	11.6 seconds (Road 002. north approach right turn)	10.7 seconds (Road 002 north approach right turn)	10.9 seconds (Road 002 north approach right turn)
Level of Service	LoS A	LoS A	LoS A	LoS A
95% Back of Queue	18.2 metres (Road 002. south approach)	31.6 metres (Road 001. west approach)	19.9 metres (Road 002. south approach)	21.6 metres (Road 001. west approach)

(1) For priority (sign) and roundabout controlled intersections, Level of Service is based upon the traffic movement with the worst vehicle average delay.

Based on the above performance, it is considered that the intersection of Road 001 and Road 002 will be performing satisfactorily with trips from committed and proposed stages, prior to and post the opening of the East-West Connector Road.

Post the opening of the East-West Connector Road, the mid-block volume will be within the maximum of 900 passenger car unit (pcu) per lane per hour, with a maximum of 460 vehicles/hour observed in the AM peak in the eastbound direction east of Road 001–Road 002 intersection. A maximum of 550 vehicles/hour observed in the PM peak in the southbound direction south of Road 001-Road 002 intersection. The SIDRA output of the above assessments are attached in Appendix E.

Assessment of the internal road in Jordan Springs East has been undertaken for the intersection of Road 001 (the East-West Connector Road) and Road 013 (Village Centre local street). This intersection provides direct access to Stage 3D to the south and Stages 3B1/3B2 and 5A/5B to the north. Stage 4C is located north-east of this intersection.

With the committed and proposed stages, the intersection of Road 001 and 013 will generate the traffic volume shown in Table 5.14 below. It is anticipated that the construction of this intersection would occur post the opening of the East-West Connector Road. Traffic distribution has therefore considered the ultimate scenario only.

The proposed signalised intersection includes two westbound lanes and one eastbound lane along Road 001. Short right-turn lanes will be provided on all approaches except for the north approach. A concrete median island is proposed along Road 001, which would prohibit any right-turn movements into and out of side streets and property accesses.

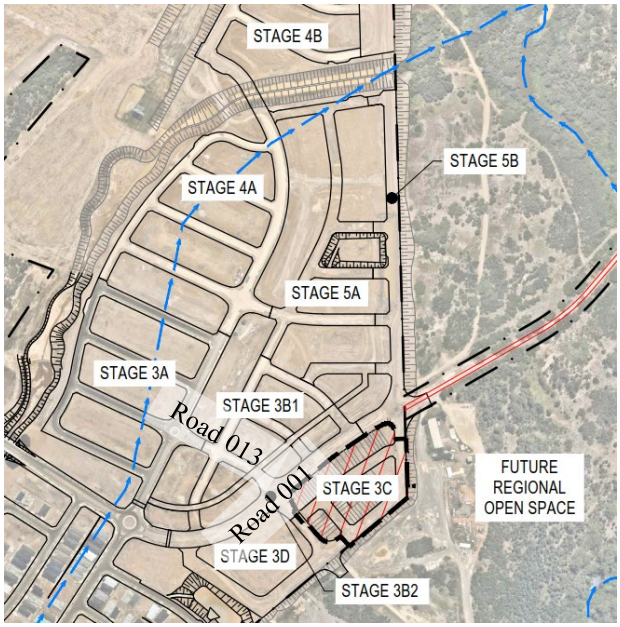


Table 5.14 Traffic volume at Road 001–Road 013 intersection

	Road 013 (south)			Road 001 (east)			Road 013 (north)			Road 001 (west)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM	88	20	141	87	191	11	65	6	31	3	341	141
PM	86	25	177	130	523	56	21	2	10	16	87	162

The intersection has been modelled in SIDRA Intersections and was found to be performing satisfactorily. The result is summarised below:

Table 5.15 Road 001–Road 013 intersection performance summary

	Post the opening of the East-West Connector Road Intersection performance with all trips from approved Stages 1, 2, 3A, 4A/4B, 3B1/3B2 and 5A, committed Lot 3001, Stages 3D and 4C and proposed Stages 3C and 5B	
	AM peak	PM peak
Total Volume	1,125 vehicles	1,295 vehicles
Degree of Saturation	0.404	0.640
Average Delay	6.7 seconds	17.0 seconds
Level of Service	LoS A	LoS B
95% Back of Queue	20.7 metres (Road No. 1 west approach)	47.1 metres (Road No. 1 east approach)

Based on the above performance, it is considered that the intersection of Road 001 and Road 013 will be performing satisfactorily with trips from committed and proposed stages post the opening of the East-West Connector Road.

The mid-block volume will be within the maximum of 900 passenger car unit (pcu) per lane per hour, with a maximum of 547 vehicles/hour observed in the AM peak in the eastbound direction east of Road 001–Road 013 intersection. A maximum of 709 vehicles/hour observed in the PM peak in the westbound direction east of Road 001–Road 013 intersection. The SIDRA output of the above assessments are attached in Appendix F.

6 JORDAN SPRINGS EAST PRECINCT PLAN

6.1 ROAD LAYOUT

In response to the current and proposed zoning scenarios for future stages, the internal road layout and functions planned for Jordan Springs East are shown in Figure 6.1 Stage 3C, located toward the eastern side of the Jordan Springs East development, will be predominantly serviced by Road 001 and Road 027.

The East-West Connector Road is currently being assessed by Penrith City and Blacktown City Councils, with construction proposed to be commenced promptly upon approval. The opening of the East-West Connector Road will vastly change trip distribution for Jordan Springs East, where 55 per cent and 53 per cent of trips are made towards the east in the respective AM and PM peak. This trip redistribution will consequently reduce the traffic impact in the Jordan Springs road network.

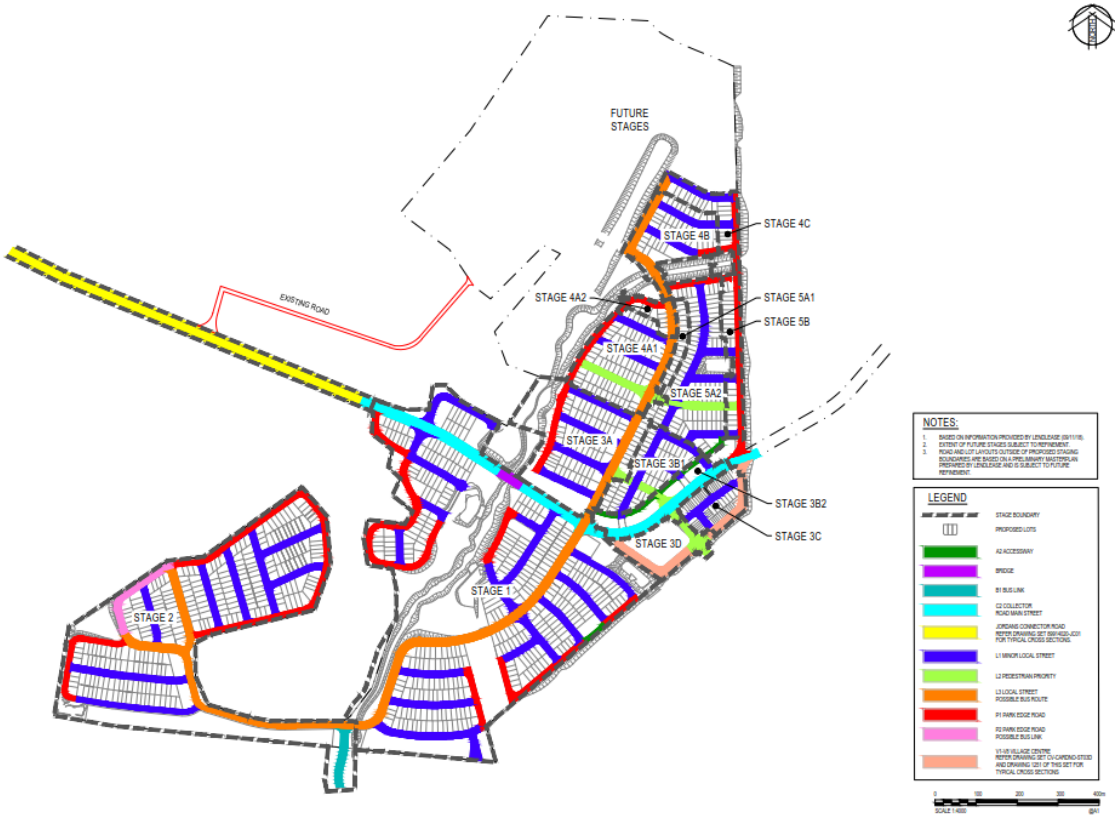


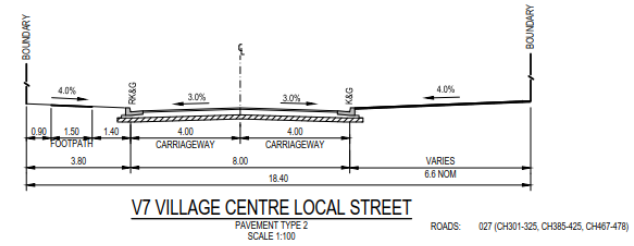
Figure 6.1 Road layout and functions Jordan Springs East

6.2 PROPOSED ROAD CROSS SECTIONS

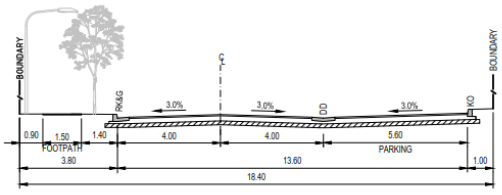
Stage 3C consists of the road types listed in this section. The design of the road cross section takes into consideration of the function of each road and the road users that are likely to utilise the road space, which include cars, buses, pedestrians and cyclists.

6.2.1 VILLAGE CENTRE LOCAL ROAD

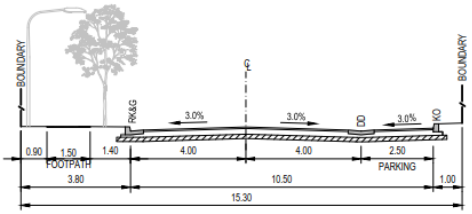
Village centre local road provides access to the residential properties and local village located east of the Jordan Springs East development. The kerb to kerb dimension ranges from 8 to 15.3 metres wide, with street lighting and 1.5 metre footpaths available on one side of the road. On-street parking is accommodated at some sections in the form of parallel parking or 90-degree angle parking.



V7 VILLAGE CENTRE LOCAL STREET
PAVEMENT TYPE 2
SCALE 1:100
ROADS: 027 (CH301-325, CH385-425, CH467-478)



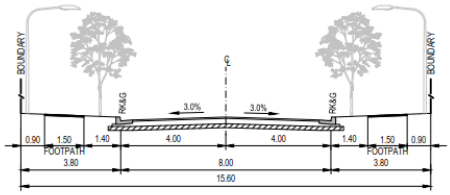
V8 VILLAGE CENTRE LOCAL STREET
PAVEMENT TYPE 2
SCALE 1:100
ROADS: 027 (CH 325-385)



V9 VILLAGE CENTRE LOCAL STREET
PAVEMENT TYPE 2
SCALE 1:100
ROADS: 027 (CH425-467)

6.2.2 MINOR LOCAL STREET

L1 Minor Local Street is local access roads to the residential properties. The kerb to kerb dimension is typically 8 metres wide, with street lighting and 1.5 metre footpaths available on either side of the road.



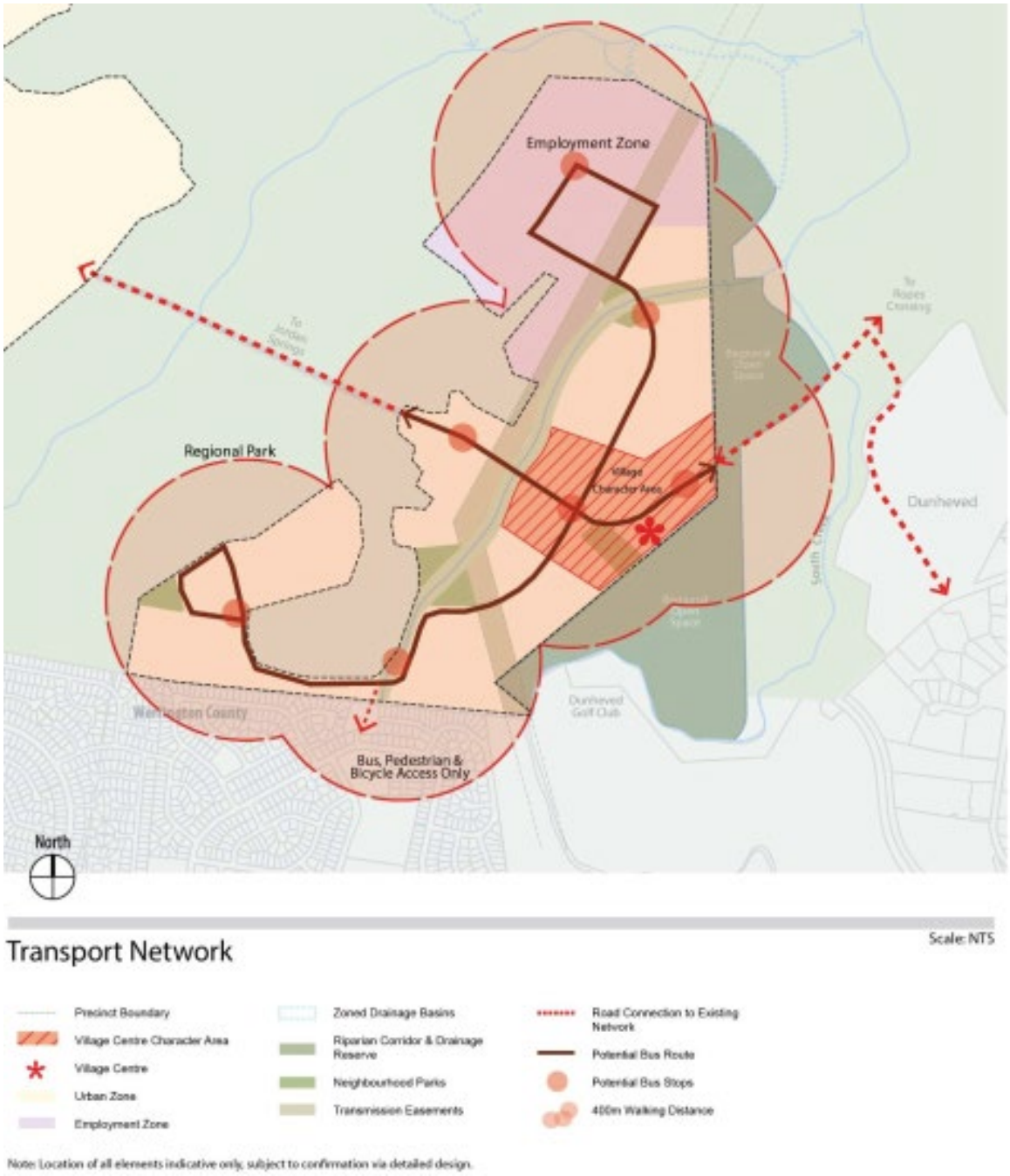
L1 MINOR LOCAL STREET
PAVEMENT TYPE 2
SCALE 1:100
ROADS: 028, 028A

Parking is generally made available on both sides of the road, unless otherwise restricted.

6.3 PUBLIC TRANSPORT

In Central Precinct Plan and Development Control Strategy Amendment No 1 (September 2018), it is envisaged that the various character areas (including urban area/neighbourhood character, village centre, parkland node, bushland edge and employment zone) within Jordan Springs East will be within 5–10 minutes of walking distance of a bus stop.

Figure 6.2 below depicts the proposed bus services and bus stop locations in Jordan Springs East, which will be mainly servicing both the north-south and east-west collector roads. As indicated in section 6.1 above, wider road widths apply to roads that are indicated to be part of the bus routes.

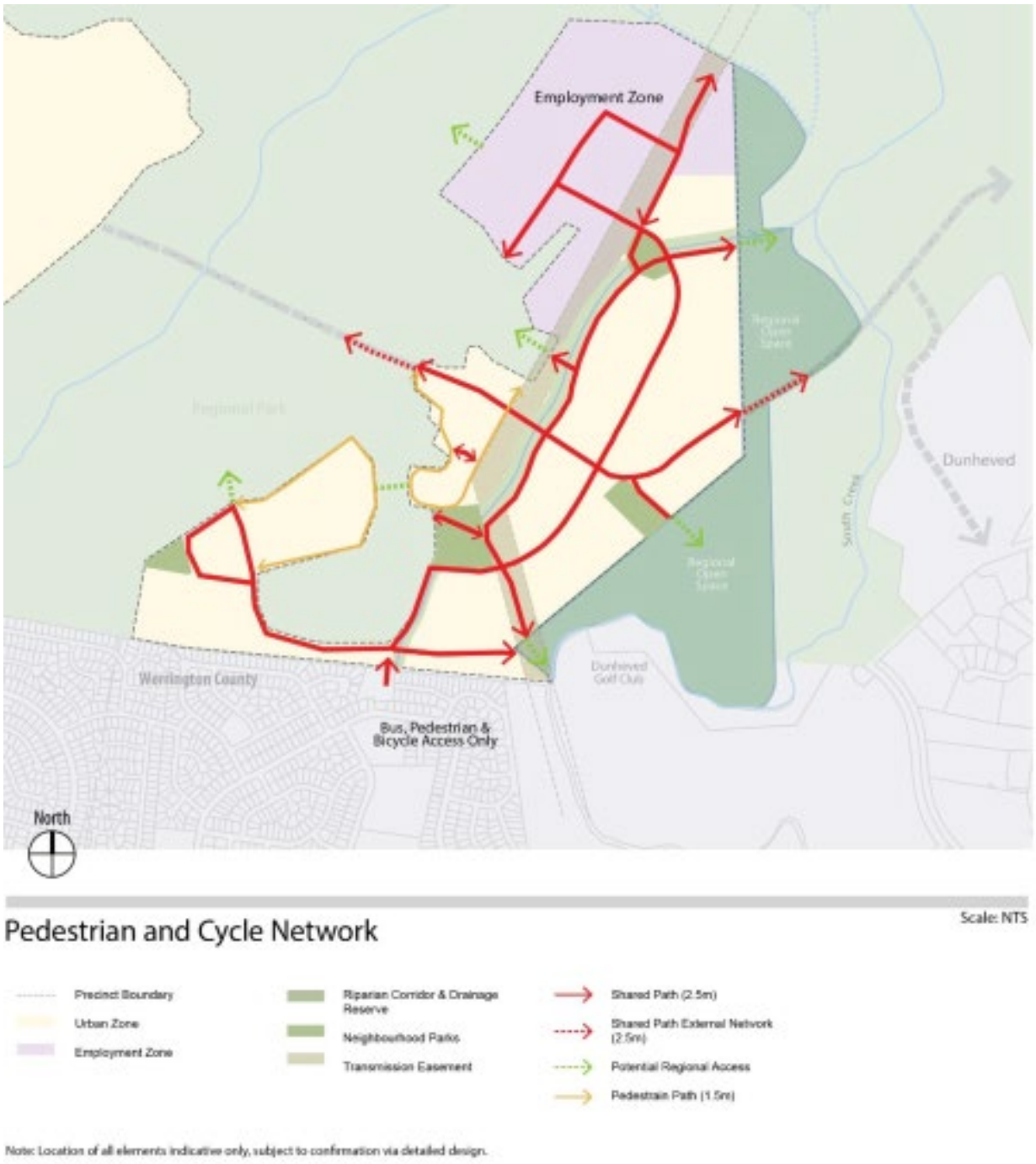


Source: Central Precinct Plan and Development Control Strategy Amendment No. 1 (September 2018)

Figure 6.2 Proposed bus services and bus stops in Jordan Springs East

6.4 PEDESTRIAN AND CYCLE NETWORK

As shown in section 6.2, it is proposed that all roads within Stage 3C of Jordan Springs East to consist of pedestrian paths in every street and shared paths along the major collector roads, including Road 001. Figure 6.3 below shows the extent of the shared path network in Jordan Springs East.



Source: Central Precinct Plan and Development Control Strategy Amendment No. 1 (September 2018)

Figure 6.3 Pedestrian and cycle network in Jordan Springs East

7 CONCLUSIONS

This report has been undertaken to consider the traffic impact of the proposed Stage 3C of Jordan Springs East, taking into consideration the existing traffic volumes and growth in Jordan Springs, trips generated from the approved Stages in Jordan Springs East and distribution of trips made with consideration of the opening of the East-West Connector Road. Stage 3C is located approximately to the east of Jordan Springs East development that abuts the East-West Collector Road to the north.

The occupation of Stage 3C is scheduled to be undertaken after the opening of the East-West Connector Road, which will significantly alter the trip distribution out of Jordan Springs East. It is expected that 55 per cent and 53 per cent of trips out of Jordan Springs East will utilise the East-West Connector Road during the respective AM and PM peak periods.

Assessments have been undertaken to investigate the performance of the affected intersections and mid-block capacity on Lakeside Parade in Jordan Springs. Assessments have also been undertaken to investigate the performance of the internal intersections and mid-block capacity on Road 001 in Jordan Springs East. The following concludes the findings of the assessment:

1. The intersection of Lakeside Parade-Jordan Springs Boulevarde and The Northern Road-Jordan Springs Boulevarde have been assessed to be performing with a satisfactory Level of Service (LoS), with the inclusion of Jordan Springs East Stage 3C development traffic in addition to the committed stages.
2. The internal intersections of Road 001–Road 002 and Road 001–Road 013 will be performing satisfactorily with trips from the committed and proposed stages being distributed to the east and west of the Jordan Springs East development.
3. The cross-section details of the roads within Stage 3C designed by others have been checked to take into consideration of the function of each road and the road users that are likely to utilise the road space, which include cars, buses, pedestrians and cyclists.
4. It is considered that the Stage 3C development will not have an adverse impact to the road network.

APPENDIX A

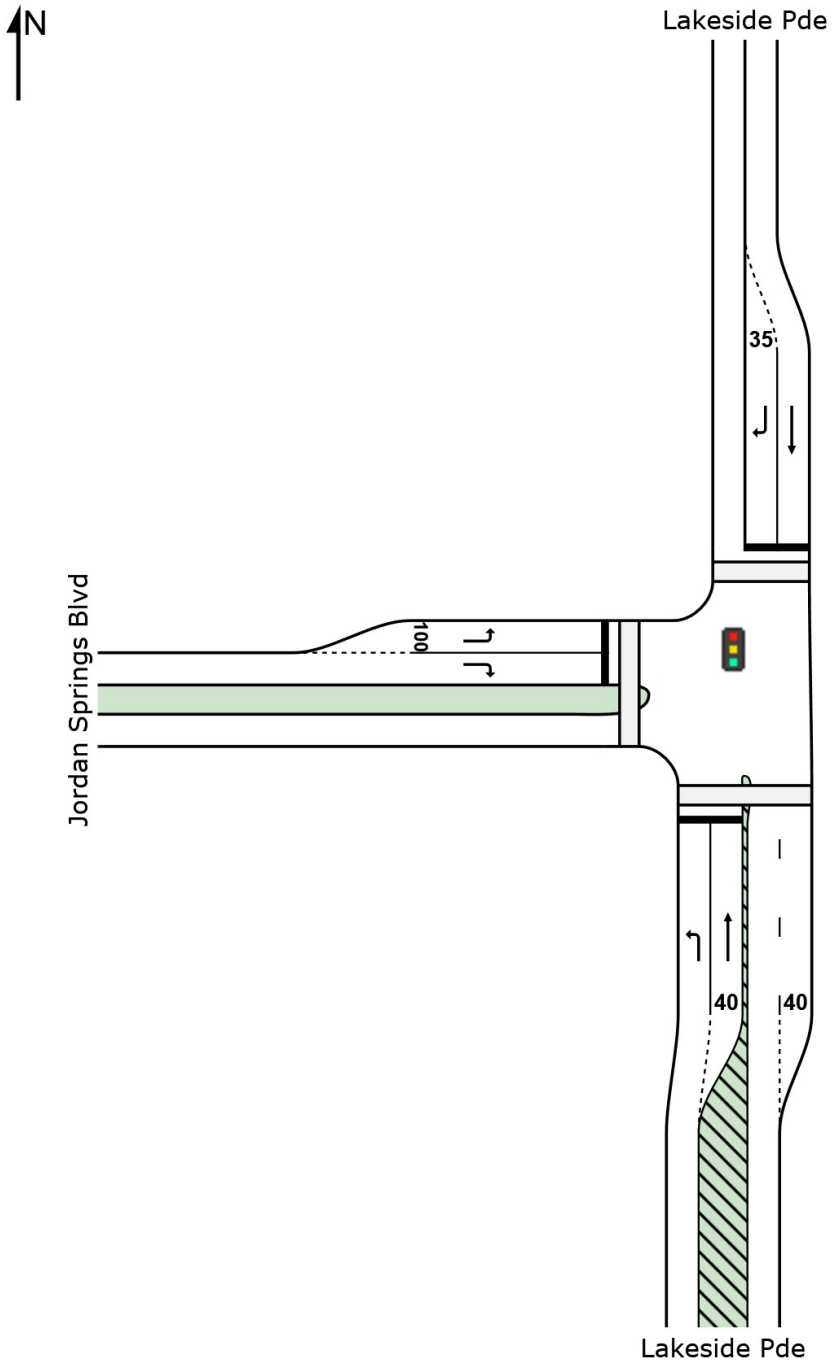
SIDRA OUTPUT – JORDAN SPRINGS BOULEVARDE/LAKESIDE PARADE

Intersection performance summary of trips generated by Jordan Springs precinct only

SITE LAYOUT

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Existing - Growth Only]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated



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LANE SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2016 - Existing]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Lakeside Pde													
Lane 1	143	0.3	1575	0.091	100	5.2	LOS A	0.7	4.7	Full	240	0.0	0.0
Lane 2	16	0.0	1151	0.014	100	8.8	LOS A	0.3	2.2	Short	40	0.0	NA
Approach	159	0.3		0.091		5.6	LOS A	0.7	4.7				
North: Lakeside Pde													
Lane 1	10	1.3	1141	0.009	100	8.8	LOS A	0.2	1.4	Full	160	0.0	0.0
Lane 2	92	1.1	698	0.132	100	15.8	LOS B	2.1	15.0	Short	35	0.0	NA
Approach	102	1.2		0.132		15.1	LOS B	2.1	15.0				
West: Jordan Springs Blvd													
Lane 1	61	5.0	466	0.131	100	35.2	LOS D	2.3	16.7	Short	100	0.0	NA
Lane 2	54	1.9	477	0.113	100	35.0	LOS C	2.0	14.3	Full	130	0.0	0.0
Approach	115	3.5		0.131		35.1	LOS D	2.3	16.7				
Intersection	376	1.5		0.132		17.2	LOS B	2.3	16.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

PHASING SUMMARY

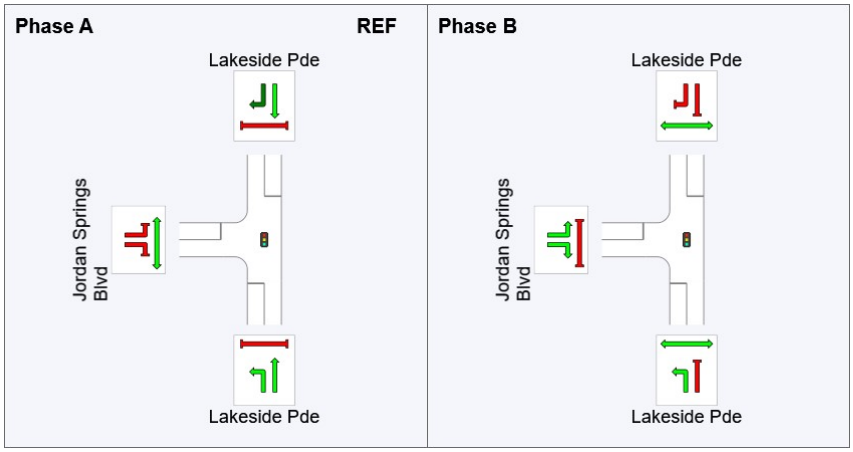
Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2016 - Existing]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Two-Phase
Movement Class: All Movement Classes
Input Sequence: A, B
Output Sequence: A, B

Phase Timing Results

Phase	A	B
Reference Phase	Yes	No
Phase Change Time (sec)	0	65
Green Time (sec)	59	29
Yellow Time (sec)	4	4
All-Red Time (sec)	2	2
Phase Time (sec)	65	35
Phase Split	65%	35%



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LANE SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-PM - 2016 - Existing]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Lakeside Pde													
Lane 1	97	0.3	1575	0.062	100	5.2	LOS A	0.4	3.1	Full	240	0.0	0.0
Lane 2	8	0.0	858	0.009	100	16.5	LOS B	0.2	1.5	Short	40	0.0	NA
Approach	105	0.3		0.062		6.1	LOS A	0.4	3.1				
North: Lakeside Pde													
Lane 1	22	1.3	851	0.026	100	16.7	LOS B	0.6	4.2	Full	160	0.0	0.0
Lane 2	125	1.1	547	0.228	100	25.3	LOS C	4.0	28.2	Short	35	0.0	NA
Approach	147	1.2		0.228		24.0	LOS C	4.0	28.2				
West: Jordan Springs Blvd													
Lane 1	168	5.0	735	0.228	100	25.2	LOS C	5.3	38.7	Short	100	0.0	NA
Lane 2	155	1.9	751	0.206	100	24.9	LOS C	4.8	34.4	Full	130	0.0	0.0
Approach	323	3.5		0.228		25.0	LOS C	5.3	38.7				
Intersection	575	2.3		0.228		21.3	LOS C	5.3	38.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

PHASING SUMMARY

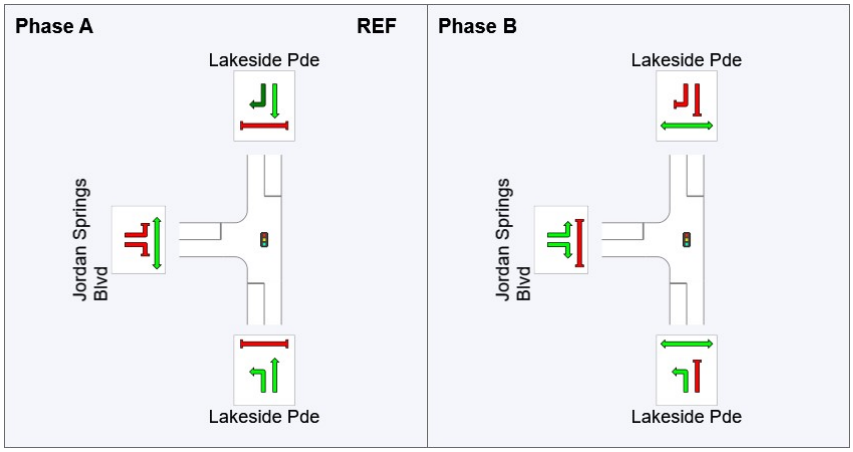
Site: 101 [I-28JordanSpringsBlvd-LakesideParade-PM - 2016 - Existing]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Two-Phase
Movement Class: All Movement Classes
Input Sequence: A, B
Output Sequence: A, B

Phase Timing Results

Phase	A	B
Reference Phase	Yes	No
Phase Change Time (sec)	0	50
Green Time (sec)	44	44
Yellow Time (sec)	4	4
All-Red Time (sec)	2	2
Phase Time (sec)	50	50
Phase Split	50%	50%



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LANE SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Existing - Growth Only]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Lakeside Pde													
Lane 1	317	0.3	1575	0.201	100	5.3	LOS A	1.7	11.6	Full	240	0.0	0.0
Lane 2	35	0.0	1209	0.029	100	7.7	LOS A	0.6	4.5	Short	40	0.0	NA
Approach	352	0.3		0.201		5.6	LOS A	1.7	11.6				
North: Lakeside Pde													
Lane 1	22	1.3	1199	0.018	100	7.6	LOS A	0.4	2.8	Full	160	0.0	0.0
Lane 2	204	1.1	600	0.340	100	16.5	LOS B	5.2	37.0	Short	35	0.0	NA
Approach	226	1.2		0.340		15.6	LOS B	5.2	37.0				
West: Jordan Springs Blvd													
Lane 1	135	5.0	413	0.327	100	39.6	LOS D	5.6	40.6	Short	100	0.0	NA
Lane 2	120	1.9	422	0.285	100	39.1	LOS D	4.9	34.7	Full	130	0.0	0.0
Approach	255	3.5		0.327		39.4	LOS D	5.6	40.6				
Intersection	833	1.5		0.340		18.6	LOS B	5.6	40.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

PHASING SUMMARY

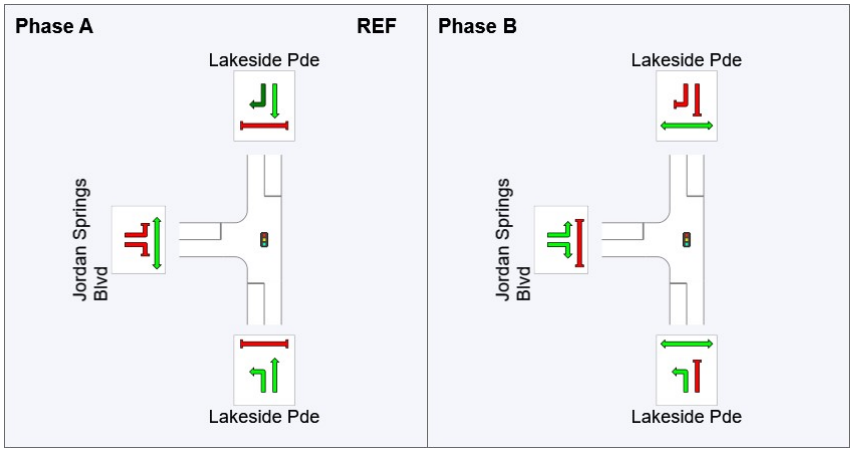
Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Existing - Growth Only]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Two-Phase
Movement Class: All Movement Classes
Input Sequence: A, B
Output Sequence: A, B

Phase Timing Results

Phase	A	B
Reference Phase	Yes	No
Phase Change Time (sec)	0	68
Green Time (sec)	62	26
Yellow Time (sec)	4	4
All-Red Time (sec)	2	2
Phase Time (sec)	68	32
Phase Split	68%	32%



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LANE SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - Existing - Growth Only]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Lakeside Pde													
Lane 1	186	0.3	1575	0.118	100	5.3	LOS A	0.9	6.3	Full	240	0.0	0.0
Lane 2	15	0.0	897	0.017	100	15.4	LOS B	0.4	2.7	Short	40	0.0	NA
Approach	201	0.3		0.118		6.0	LOS A	0.9	6.3				
North: Lakeside Pde													
Lane 1	42	1.3	889	0.047	100	15.7	LOS B	1.1	7.8	Full	160	0.0	0.0
Lane 2	240	1.1	521	0.460	100	27.3	LOS C	8.5	60.2	Short	35	0.0	NA
Approach	282	1.2		0.460		25.6	LOS C	8.5	60.2				
West: Jordan Springs Blvd													
Lane 1	322	5.0	700	0.460	100	29.0	LOS C	11.7	85.2	Short	100	0.0	NA
Lane 2	298	1.9	715	0.417	100	28.5	LOS C	10.6	75.2	Full	130	0.0	0.0
Approach	620	3.5		0.460		28.8	LOS C	11.7	85.2				
Intersection	1103	2.3		0.460		23.8	LOS C	11.7	85.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

PHASING SUMMARY

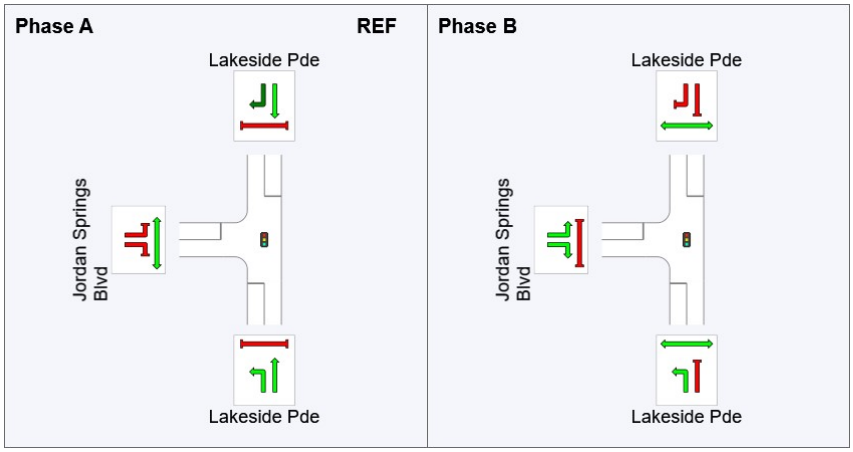
Site: 101 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - Existing - Growth Only]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Two-Phase
Movement Class: All Movement Classes
Input Sequence: A, B
Output Sequence: A, B

Phase Timing Results

Phase	A	B
Reference Phase	Yes	No
Phase Change Time (sec)	0	52
Green Time (sec)	46	42
Yellow Time (sec)	4	4
All-Red Time (sec)	2	2
Phase Time (sec)	52	48
Phase Split	52%	48%



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APPENDIX B

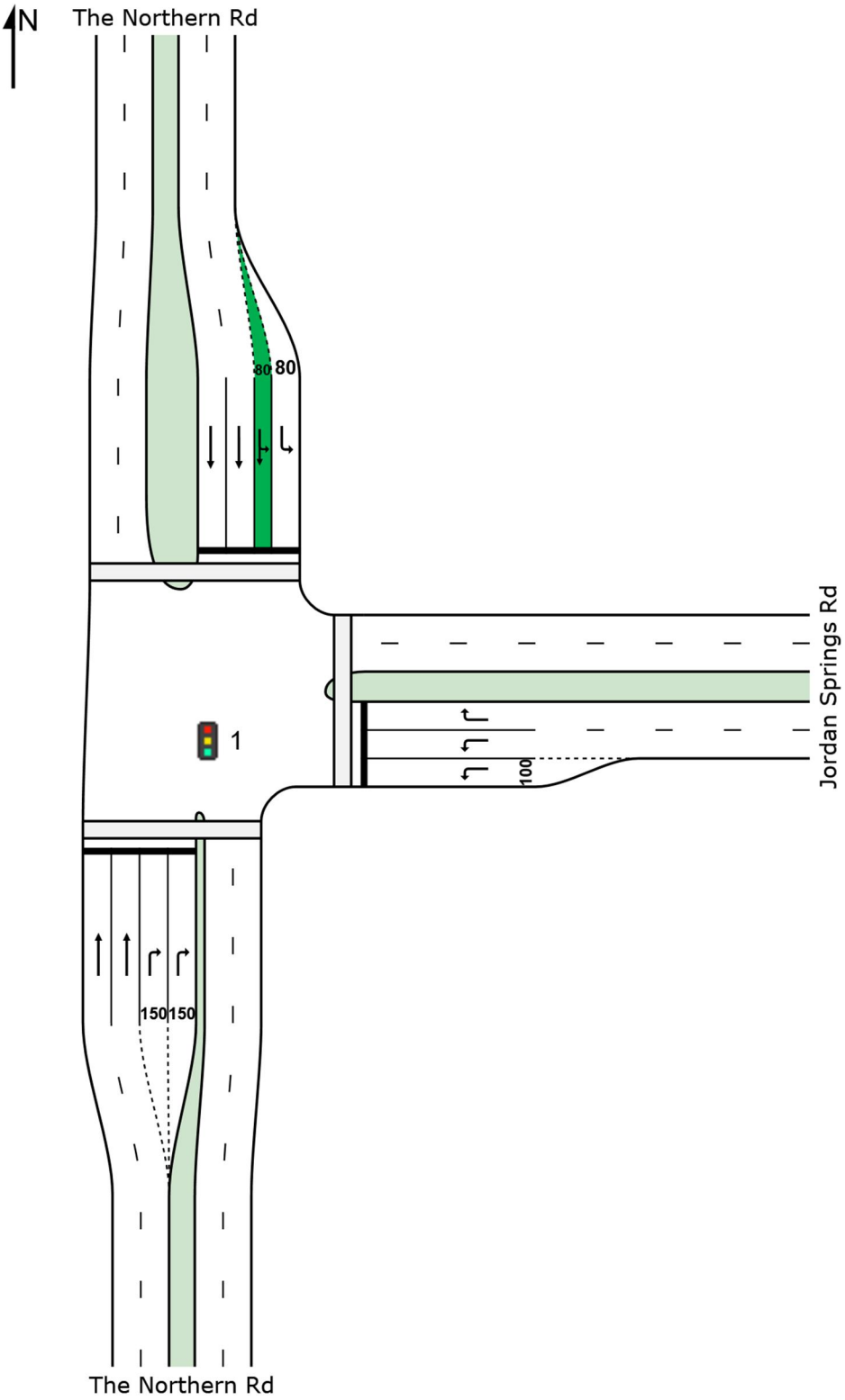
SIDRA OUTPUT – THE NORTHERN ROAD/ JORDAN SPRINGS BOULEVARDE

Intersection performance summary of trips generated by Jordan Springs precinct only

SITE LAYOUT

Site: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2016 Existing]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2016 Existing]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 105 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Northern Rd											
2	T1	844	7.9	0.288	3.1	LOS A	5.7	42.9	0.29	0.26	65.1
3	R2	174	4.6	0.391	53.8	LOS D	4.3	31.0	0.96	0.77	20.7
Approach		1018	7.4	0.391	11.8	LOS A	5.7	42.9	0.41	0.35	53.1
East: Jordan Springs Rd											
4	L2	261	1.5	0.249	35.7	LOS C	5.2	36.5	0.81	0.76	25.5
6	R2	32	3.1	0.206	54.8	LOS D	1.6	11.5	0.96	0.72	25.2
Approach		293	1.7	0.249	37.8	LOS C	5.2	36.5	0.83	0.75	25.4
North: The Northern Rd											
7	L2	38	10.5	0.036	15.9	LOS B	0.8	5.9	0.44	0.67	44.6
8	T1	1191	4.8	0.508	11.8	LOS A	16.7	121.7	0.60	0.54	54.7
Approach		1229	5.0	0.508	11.9	LOS A	16.7	121.7	0.59	0.54	54.4
All Vehicles		2540	5.6	0.508	14.9	LOS B	16.7	121.7	0.55	0.49	49.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	13.9	LOS B	0.1	0.1	0.52	0.52
P3	North Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		150	35.8	LOS D			0.80	0.80

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2016 Existing]

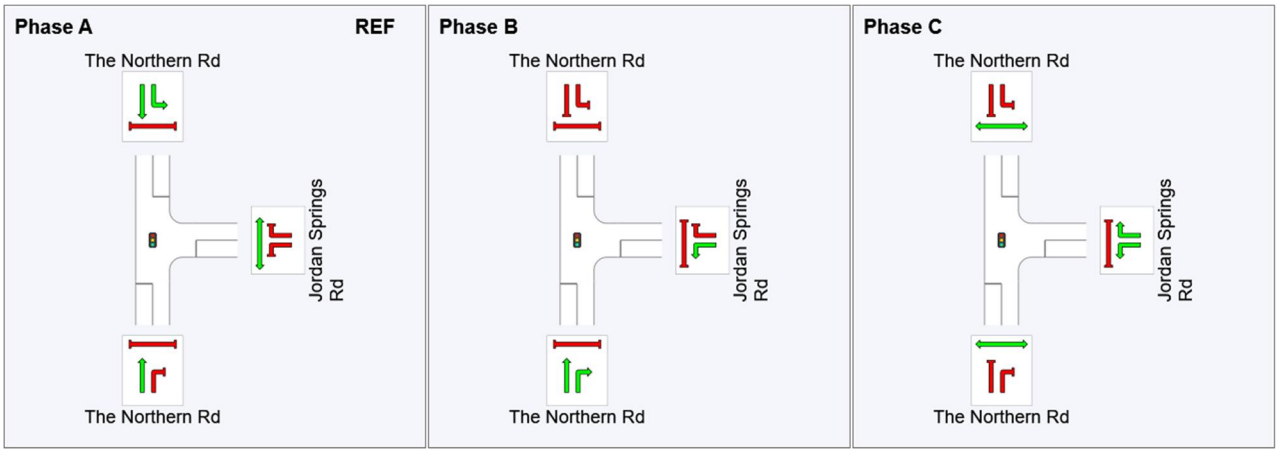
The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 105 seconds (User-Given Phase Times)

Phase Times specified by the user
Phase Sequence: TCS 4396
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	70	88
Green Time (sec)	65	13	12
Phase Time (sec)	70	18	17
Phase Split	67%	17%	16%

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-pm - 2016 Existing]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 102 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Northern Rd											
2	T1	895	3.0	0.314	4.6	LOS A	7.3	52.1	0.36	0.32	63.2
3	R2	455	0.2	0.569	45.7	LOS D	10.3	72.3	0.95	0.82	23.0
Approach		1350	2.1	0.569	18.4	LOS B	10.3	72.3	0.56	0.49	45.4
East: Jordan Springs Rd											
4	L2	281	1.1	0.181	24.3	LOS B	4.3	30.6	0.66	0.72	30.8
6	R2	50	6.0	0.220	48.9	LOS D	2.3	17.0	0.93	0.74	26.6
Approach		331	1.8	0.220	28.0	LOS B	4.3	30.6	0.70	0.72	29.9
North: The Northern Rd											
7	L2	64	4.7	0.078	23.3	LOS B	1.8	12.8	0.60	0.71	39.2
8	T1	1051	3.3	0.573	20.3	LOS B	18.6	133.9	0.77	0.68	47.2
Approach		1115	3.4	0.573	20.5	LOS B	18.6	133.9	0.76	0.69	46.8
All Vehicles		2796	2.6	0.573	20.4	LOS B	18.6	133.9	0.66	0.59	44.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	45.3	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	22.1	LOS C	0.1	0.1	0.66	0.66
P3	North Full Crossing	50	45.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		150	37.5	LOS D			0.85	0.85

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-pm - 2016 Existing]

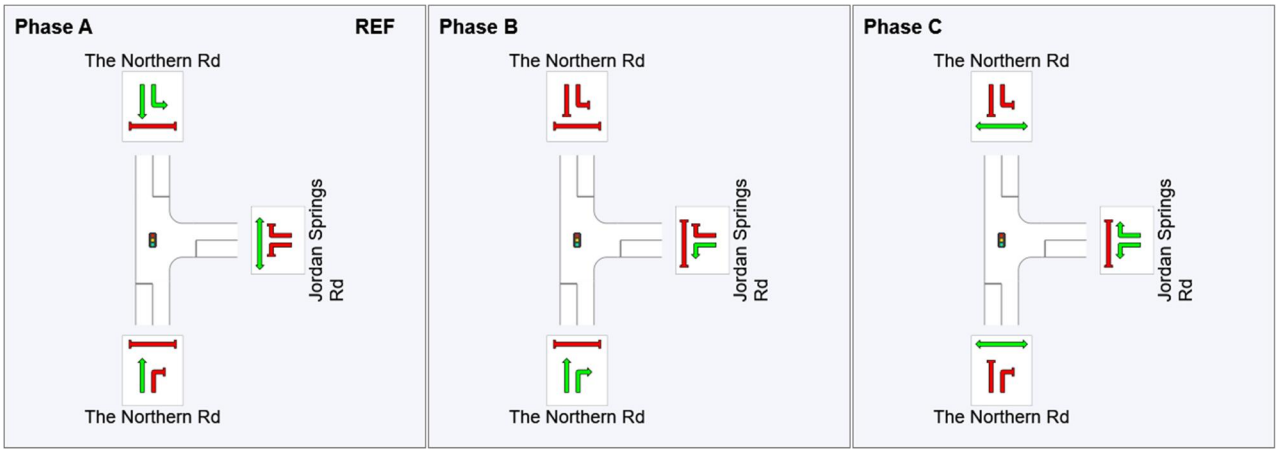
The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 102 seconds (User-Given Phase Times)

Phase Times specified by the user
Phase Sequence: TCS 4396
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	54	81
Green Time (sec)	49	22	16
Phase Time (sec)	54	27	21
Phase Split	53%	26%	21%

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2021 - Growth Only]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 105 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Northern Rd											
2	T1	914	7.9	0.323	4.2	LOS A	7.2	54.2	0.34	0.30	63.7
3	R2	386	4.6	0.593	50.1	LOS D	9.3	67.7	0.97	0.82	21.6
Approach		1300	6.9	0.593	17.8	LOS B	9.3	67.7	0.53	0.46	46.2
East: Jordan Springs Rd											
4	L2	579	1.5	0.424	31.0	LOS C	11.0	78.4	0.79	0.79	27.4
6	R2	71	3.1	0.342	52.5	LOS D	3.5	25.0	0.96	0.76	25.8
Approach		650	1.7	0.424	33.4	LOS C	11.0	78.4	0.81	0.78	27.1
North: The Northern Rd											
7	L2	82	10.5	0.092	20.8	LOS B	2.1	16.0	0.55	0.71	40.9
8	T1	1250	4.8	0.619	18.2	LOS B	22.1	160.9	0.75	0.68	48.9
Approach		1332	5.1	0.619	18.4	LOS B	22.1	160.9	0.74	0.68	48.4
All Vehicles		3282	5.2	0.619	21.1	LOS B	22.1	160.9	0.67	0.61	43.0

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	19.5	LOS B	0.1	0.1	0.61	0.61
P3	North Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		150	37.7	LOS D			0.83	0.83

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2021 - Growth Only]

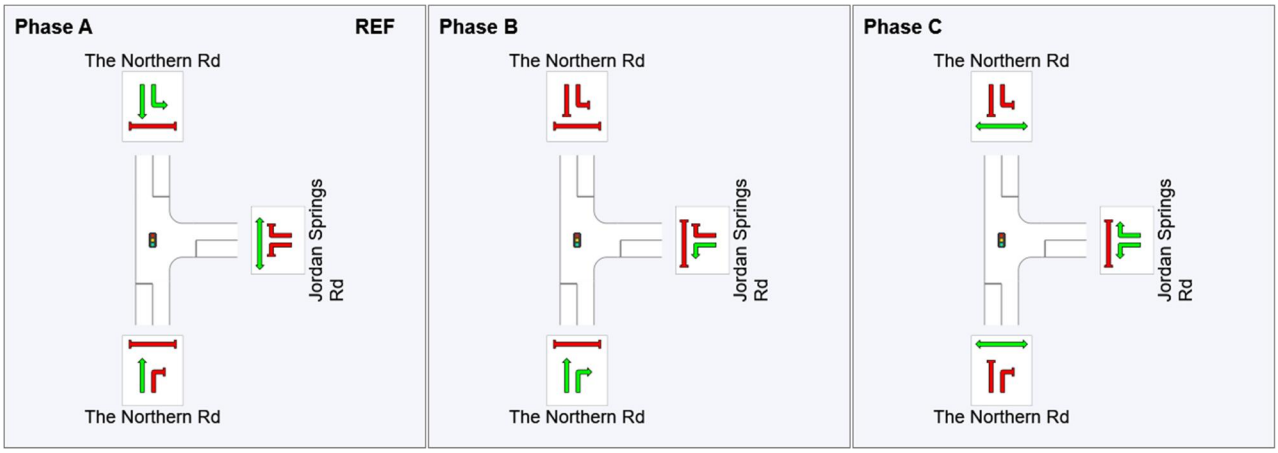
The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 105 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: TCS 4396
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	61	85
Green Time (sec)	56	19	15
Phase Time (sec)	61	24	20
Phase Split	58%	23%	19%

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



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 1 [I-05TheNorthernRd-JordanSpringsBlvd-pm - 2021 - Growth Only]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 102 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Northern Rd											
2	T1	983	3.0	0.340	4.3	LOS A	7.9	56.8	0.36	0.32	63.5
3	R2	873	0.2	0.728	40.1	LOS C	19.6	137.3	0.95	0.86	24.9
Approach		1856	1.7	0.728	21.2	LOS B	19.6	137.3	0.63	0.58	41.7
East: Jordan Springs Rd											
4	L2	539	1.1	0.281	19.2	LOS B	7.5	52.7	0.60	0.73	34.0
6	R2	96	6.0	0.458	51.7	LOS D	4.6	34.2	0.98	0.78	25.8
Approach		635	1.8	0.458	24.1	LOS B	7.5	52.7	0.66	0.73	31.9
North: The Northern Rd											
7	L2	121	4.7	0.188	30.9	LOS C	4.1	29.8	0.73	0.75	34.8
8	T1	1093	3.3	0.748	29.8	LOS C	23.8	171.2	0.93	0.83	41.0
Approach		1214	3.5	0.748	29.9	LOS C	23.8	171.2	0.91	0.82	40.4
All Vehicles		3705	2.3	0.748	24.5	LOS B	23.8	171.2	0.73	0.68	39.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	45.3	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	29.9	LOS C	0.1	0.1	0.77	0.77
P3	North Full Crossing	50	45.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		150	40.1	LOS E			0.88	0.88

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-pm - 2021 - Growth Only]

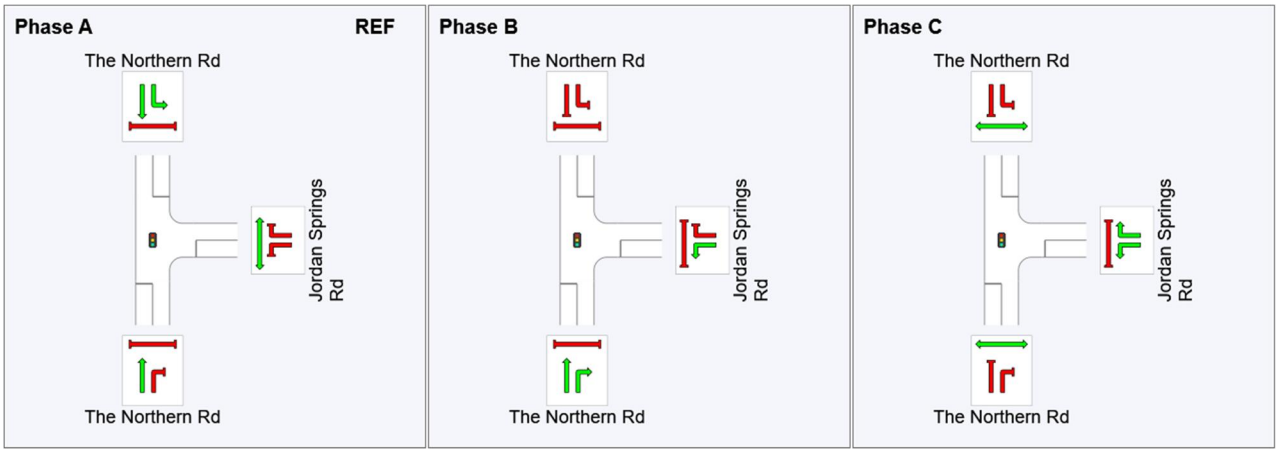
The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 102 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: TCS 4396
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	44	82
Green Time (sec)	39	33	15
Phase Time (sec)	44	38	20
Phase Split	43%	37%	20%

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



REF: Reference Phase
VAR: Variable Phase

APPENDIX C

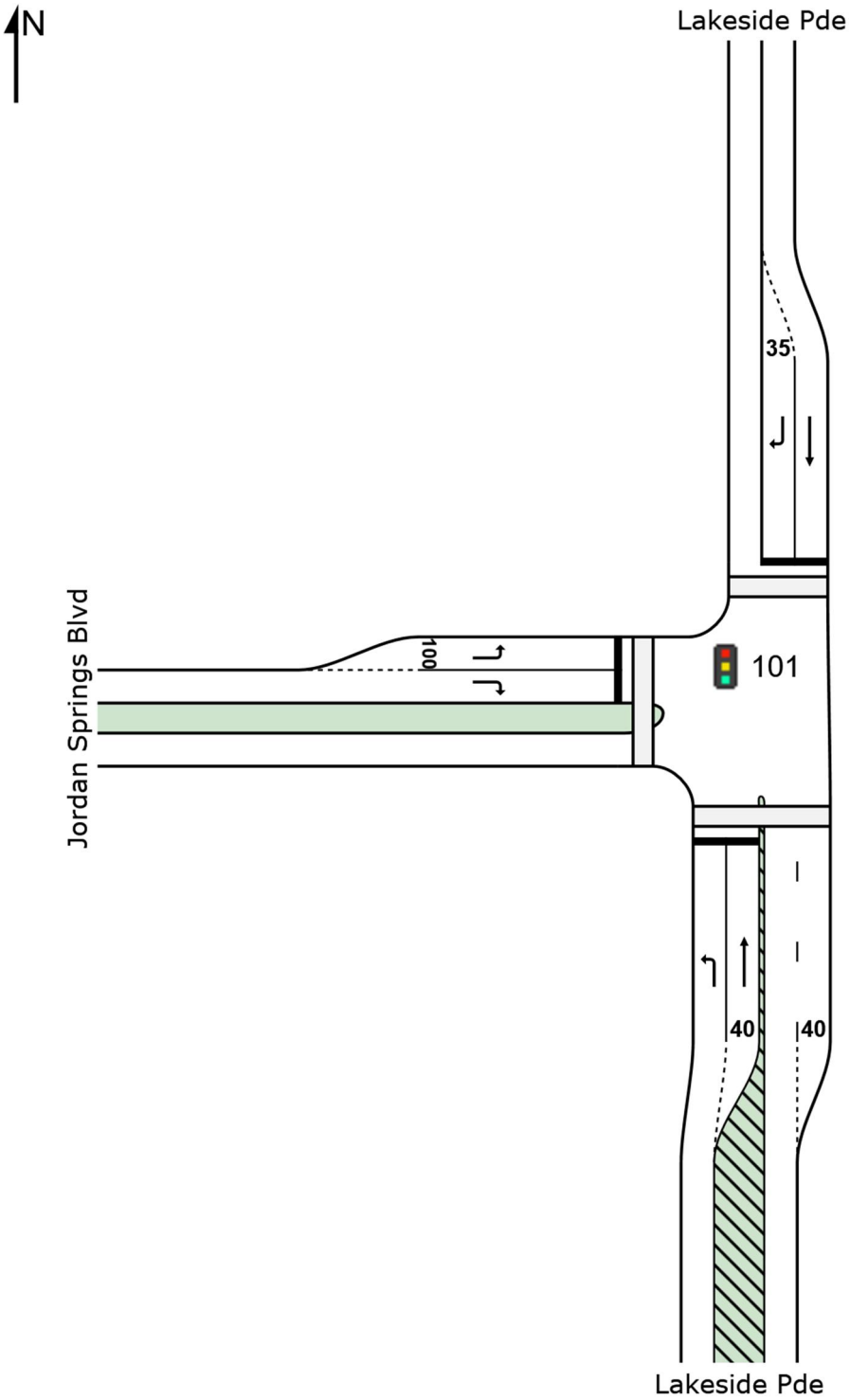
SIDRA OUTPUT – JORDAN SPRINGS BOULEVARDE/LAKESIDE PARADE

Intersection performance summary of trips generated by Jordan Springs and Jordan Springs East precinct

SITE LAYOUT

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Pre-EWC]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Pre-EWC]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lakeside Pde											
1	L2	891	0.3	0.559	5.6	LOS A	6.6	46.5	0.29	0.64	40.5
2	T1	161	0.0	0.121	5.9	LOS A	2.7	18.7	0.37	0.31	41.8
Approach		1052	0.3	0.559	5.6	LOS A	6.6	46.5	0.30	0.59	40.7
North: Lakeside Pde											
8	T1	66	1.3	0.050	5.6	LOS A	1.0	7.3	0.35	0.28	42.1
9	R2	204	1.1	0.771	33.3	LOS C	9.7	68.6	0.81	0.92	19.4
Approach		270	1.2	0.771	26.5	LOS C	9.7	68.6	0.69	0.76	23.2
West: Jordan Springs Blvd											
10	L2	135	5.0	0.443	45.8	LOS D	6.1	44.3	0.94	0.79	16.0
12	R2	246	1.9	0.789	52.3	LOS D	12.6	89.3	1.00	0.91	17.0
Approach		381	3.0	0.789	50.0	LOS D	12.6	89.3	0.98	0.87	16.7
All Vehicles		1703	1.0	0.789	18.9	LOS B	12.6	89.3	0.52	0.68	28.8

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	41.5	LOS E	0.1	0.1	0.91	0.91
P3	North Full Crossing	50	37.9	LOS D	0.1	0.1	0.87	0.87
P4	West Full Crossing	50	8.8	LOS A	0.1	0.1	0.42	0.42
All Pedestrians		150	29.4	LOS C			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 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Pre-EWC]

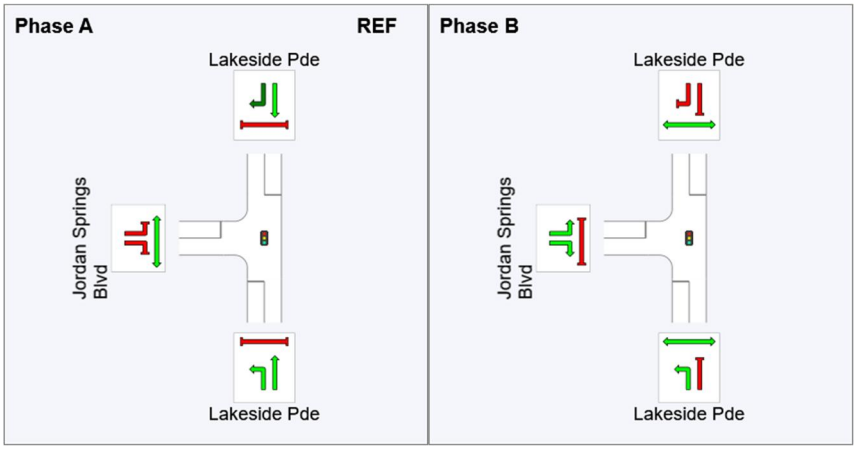
Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: Two-Phase
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	74
Green Time (sec)	68	20
Phase Time (sec)	74	26
Phase Split	74%	26%

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



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 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Post-EWC]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lakeside Pde											
1	L2	600	0.3	0.381	5.5	LOS A	3.9	27.0	0.24	0.62	40.7
2	T1	97	0.0	0.079	7.6	LOS A	1.8	12.6	0.41	0.33	39.9
Approach		697	0.3	0.381	5.8	LOS A	3.9	27.0	0.26	0.58	40.6
North: Lakeside Pde											
8	T1	50	1.3	0.041	7.4	LOS A	0.9	6.4	0.40	0.31	40.1
9	R2	204	1.1	0.506	19.5	LOS B	6.3	44.4	0.66	0.76	25.7
Approach		254	1.2	0.506	17.1	LOS B	6.3	44.4	0.61	0.67	28.2
West: Jordan Springs Blvd											
10	L2	135	5.0	0.342	40.6	LOS D	5.6	41.2	0.89	0.78	17.4
12	R2	200	1.9	0.496	42.0	LOS D	8.7	61.9	0.93	0.81	19.5
Approach		335	3.1	0.496	41.4	LOS D	8.7	61.9	0.91	0.79	18.7
All Vehicles		1286	1.2	0.506	17.3	LOS B	8.7	61.9	0.50	0.65	29.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	37.1	LOS D	0.1	0.1	0.86	0.86
P3	North Full Crossing	50	33.7	LOS D	0.1	0.1	0.82	0.82
P4	West Full Crossing	50	11.1	LOS B	0.1	0.1	0.47	0.47
All Pedestrians		150	27.3	LOS C			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 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Post-EWC]

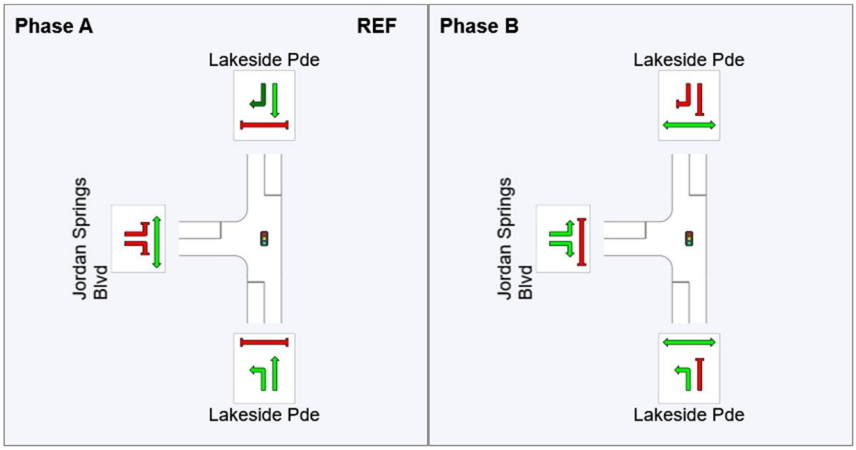
Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: Two-Phase
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	69
Green Time (sec)	63	25
Phase Time (sec)	69	31
Phase Split	69%	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 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - Pre-EWC - phasing adjusted]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 85 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lakeside Pde											
1	L2	361	0.3	0.227	5.7	LOS A	2.6	18.1	0.19	0.59	40.6
2	T1	58	0.0	0.169	32.6	LOS C	2.1	14.6	0.89	0.67	23.8
Approach		419	0.3	0.227	9.4	LOS A	2.6	18.1	0.28	0.60	36.8
North: Lakeside Pde											
8	T1	264	1.3	0.590	28.6	LOS C	9.4	66.5	0.90	0.75	25.5
9	R2	240	1.1	0.906	55.5	LOS E	12.2	86.0	1.00	1.13	13.9
Approach		504	1.2	0.906	41.4	LOS D	12.2	86.0	0.95	0.93	19.1
West: Jordan Springs Blvd											
10	L2	322	5.0	0.299	13.4	LOS B	6.5	47.1	0.52	0.70	30.4
12	R2	945	1.9	0.958	59.3	LOS E	57.2	406.9	0.90	1.11	15.7
Approach		1267	2.6	0.958	47.7	LOS D	57.2	406.9	0.80	1.01	17.5
All Vehicles		2190	1.9	0.958	38.9	LOS D	57.2	406.9	0.74	0.91	20.0

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	10.9	LOS B	0.1	0.1	0.51	0.51
P3	North Full Crossing	50	9.0	LOS A	0.1	0.1	0.46	0.46
P4	West Full Crossing	50	36.8	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		150	18.9	LOS B			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 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - Pre-EWC - phasing adjusted]

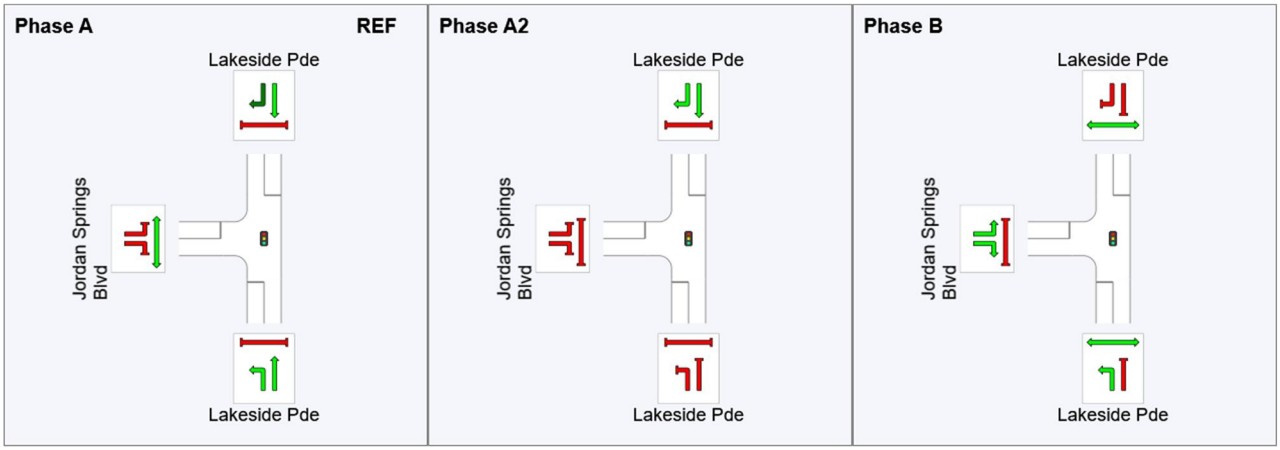
Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 85 seconds (User-Given Phase Times)

Phase Times specified by the user
Phase Sequence: Two-Phase - Copy
Reference Phase: Phase A
Input Phase Sequence: A, A2, B
Output Phase Sequence: A, A2, B

Phase Timing Results

Phase	A	A2	B
Phase Change Time (sec)	0	21	29
Green Time (sec)	15	3	53
Phase Time (sec)	20	6	59
Phase Split	24%	7%	69%

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

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MOVEMENT SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - Post-EWC]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Lakeside Pde											
1	L2	280	0.3	0.178	5.3	LOS A	1.5	10.2	0.19	0.59	41.0
2	T1	38	0.0	0.057	23.6	LOS C	1.2	8.6	0.70	0.53	27.9
Approach		318	0.3	0.178	7.5	LOS A	1.5	10.2	0.25	0.58	38.7
North: Lakeside Pde											
8	T1	176	1.3	0.268	25.7	LOS C	6.2	44.0	0.77	0.63	26.8
9	R2	240	1.1	0.757	43.1	LOS D	11.5	81.4	0.94	0.90	16.5
Approach		416	1.2	0.757	35.8	LOS D	11.5	81.4	0.87	0.79	20.4
West: Jordan Springs Blvd											
10	L2	322	5.0	0.352	20.2	LOS C	9.3	67.9	0.64	0.74	25.6
12	R2	690	1.9	0.770	25.6	LOS C	26.6	189.1	0.85	0.85	25.4
Approach		1012	2.8	0.770	23.9	LOS C	26.6	189.1	0.78	0.82	25.5
All Vehicles		1746	2.0	0.770	23.7	LOS C	26.6	189.1	0.71	0.77	25.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	16.3	LOS B	0.1	0.1	0.57	0.57
P3	North Full Crossing	50	14.1	LOS B	0.1	0.1	0.53	0.53
P4	West Full Crossing	50	28.9	LOS C	0.1	0.1	0.76	0.76
All Pedestrians		150	19.8	LOS B			0.62	0.62

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 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - Post-EWC]

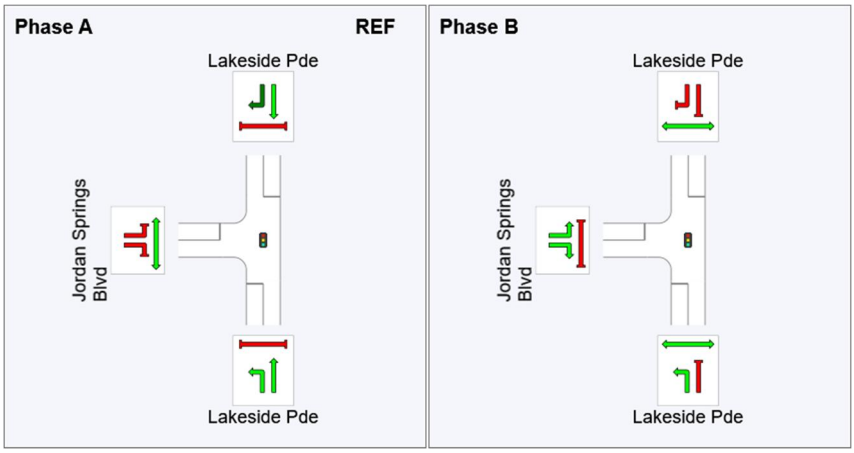
Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: Two-Phase
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	40
Green Time (sec)	34	54
Phase Time (sec)	40	60
Phase Split	40%	60%

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

APPENDIX D

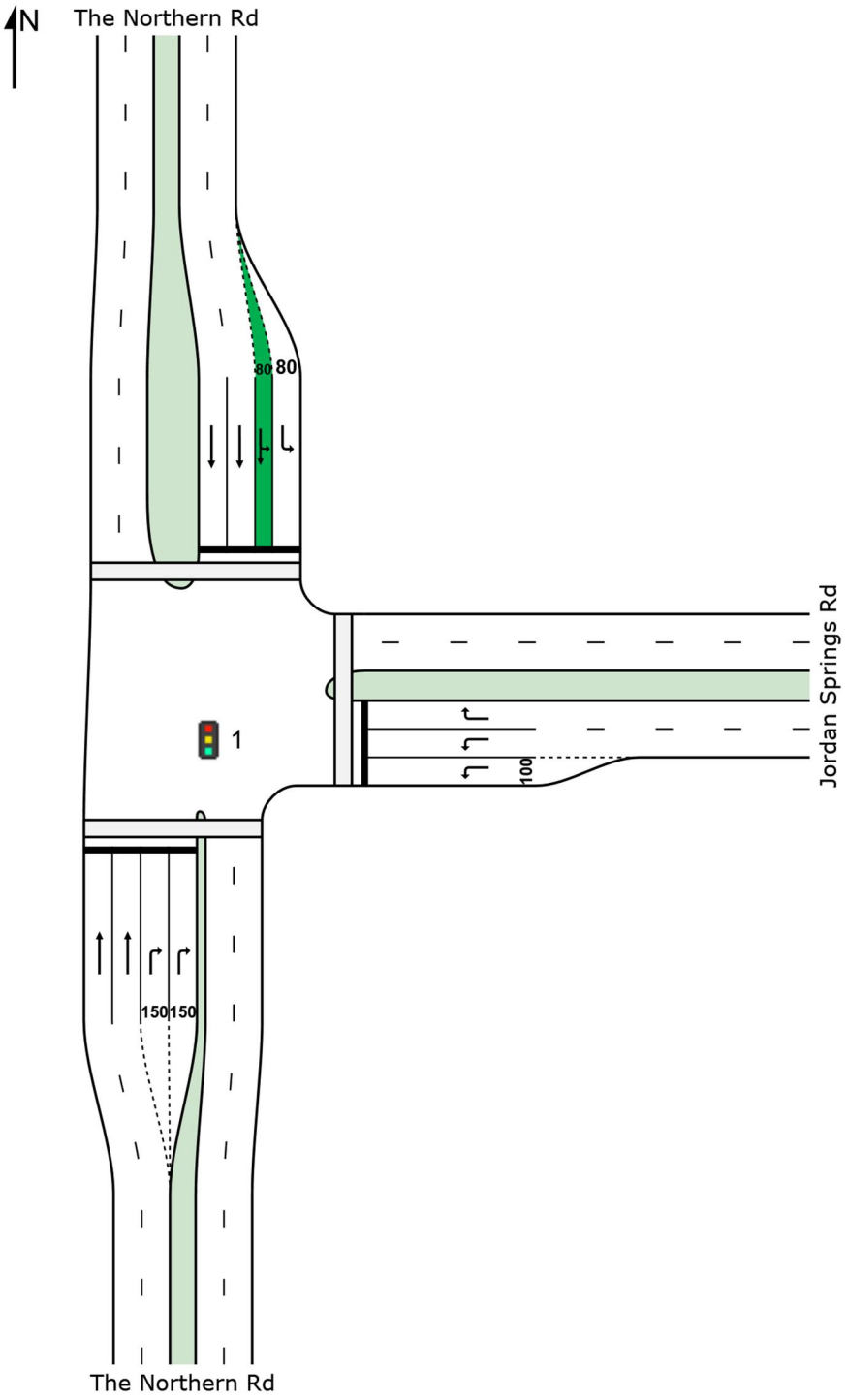
SIDRA OUTPUT – THE NORTHERN ROAD/ JORDAN SPRINGS BOULEVARDE

Intersection performance summary of trips generated by Jordan Springs and Jordan Springs East precinct

SITE LAYOUT

Site: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2021 - Pre-EWC]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2021 - Pre-EWC]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 105 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Northern Rd											
2	T1	914	7.9	0.345	6.0	LOS A	8.7	65.1	0.41	0.36	61.3
3	R2	468	4.6	0.683	50.8	LOS D	11.6	84.2	0.99	0.84	21.4
Approach		1382	6.8	0.683	21.2	LOS B	11.6	84.2	0.60	0.53	43.1
East: Jordan Springs Rd											
4	L2	1027	1.5	0.652	30.1	LOS C	20.8	147.6	0.85	0.83	27.8
6	R2	197	3.1	0.670	51.0	LOS D	9.9	71.1	0.99	0.84	26.2
Approach		1224	1.8	0.670	33.5	LOS C	20.8	147.6	0.87	0.84	27.4
North: The Northern Rd											
7	L2	126	10.5	0.159	24.8	LOS B	3.7	28.3	0.63	0.73	38.3
8	T1	1250	4.8	0.694	23.0	LOS B	24.9	181.3	0.84	0.76	45.3
Approach		1376	5.3	0.694	23.2	LOS B	24.9	181.3	0.82	0.76	44.7
All Vehicles		3982	4.7	0.694	25.7	LOS B	24.9	181.3	0.76	0.70	38.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	23.4	LOS C	0.1	0.1	0.67	0.67
P3	North Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		150	39.0	LOS D			0.85	0.85

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2021 - Pre-EWC]

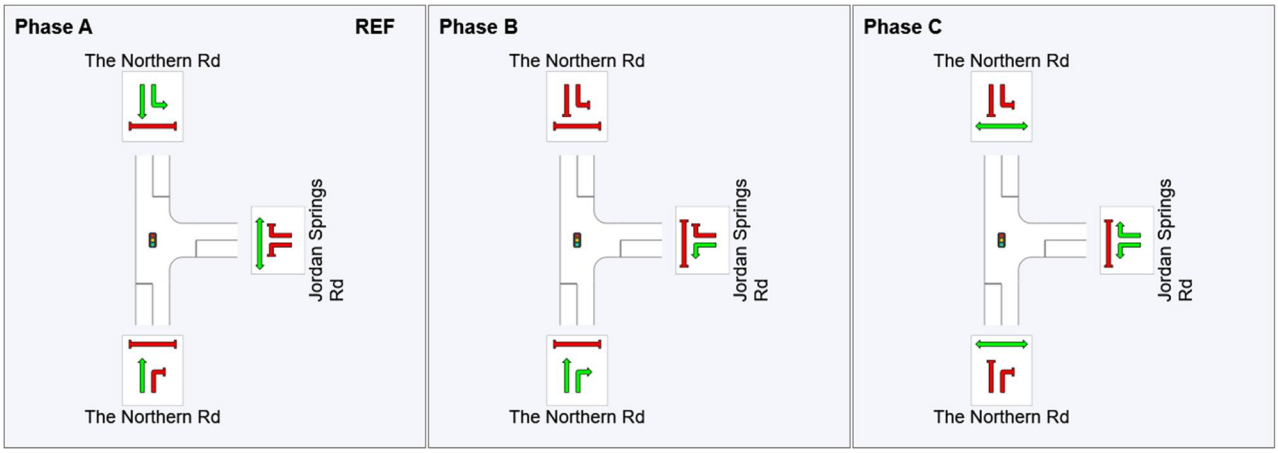
The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 105 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: TCS 4396
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	55	80
Green Time (sec)	50	20	20
Phase Time (sec)	55	25	25
Phase Split	52%	24%	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

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2021 - Post-EWC]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 105 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Northern Rd											
2	T1	914	7.9	0.323	4.2	LOS A	7.2	54.2	0.34	0.30	63.7
3	R2	438	4.6	0.639	49.8	LOS D	10.6	77.2	0.98	0.83	21.7
Approach		1352	6.9	0.639	18.9	LOS B	10.6	77.2	0.55	0.47	45.0
East: Jordan Springs Rd											
4	L2	800	1.5	0.572	32.3	LOS C	16.2	115.0	0.85	0.82	26.8
6	R2	133	3.1	0.641	55.1	LOS D	6.9	49.4	1.00	0.82	25.1
Approach		933	1.8	0.641	35.5	LOS C	16.2	115.0	0.87	0.82	26.5
North: The Northern Rd											
7	L2	110	10.5	0.125	21.6	LOS B	2.9	22.3	0.57	0.72	40.3
8	T1	1250	4.8	0.631	19.0	LOS B	22.5	164.3	0.77	0.69	48.3
Approach		1360	5.3	0.631	19.2	LOS B	22.5	164.3	0.75	0.69	47.7
All Vehicles		3645	5.0	0.641	23.3	LOS B	22.5	164.3	0.70	0.64	40.8

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	20.2	LOS C	0.1	0.1	0.62	0.62
P3	North Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		150	37.9	LOS D			0.84	0.84

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-am - 2021 - Post-EWC]

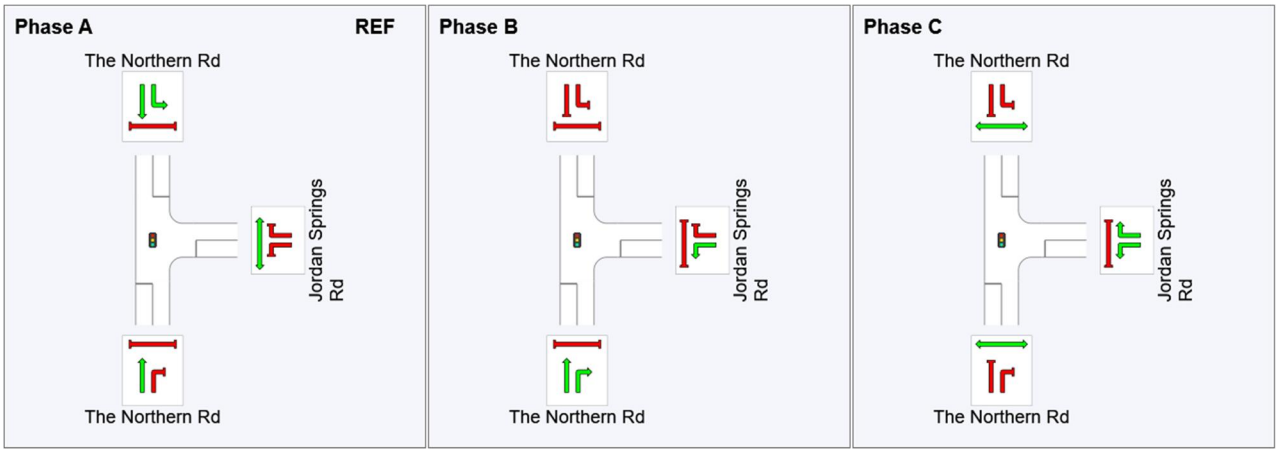
The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 105 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: TCS 4396
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	60	85
Green Time (sec)	55	20	15
Phase Time (sec)	60	25	20
Phase Split	57%	24%	19%

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



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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-pm - 2021 - Pre-EWC]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 102 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Northern Rd											
2	T1	983	3.0	0.340	4.3	LOS A	7.9	56.8	0.36	0.32	63.5
3	R2	1298	0.2	0.893	50.6	LOS D	36.8	257.8	1.00	0.98	21.6
Approach		2281	1.4	0.893	30.7	LOS C	36.8	257.8	0.72	0.70	34.6
East: Jordan Springs Rd											
4	L2	671	1.1	0.309	15.8	LOS B	8.3	58.5	0.54	0.71	36.5
6	R2	139	6.0	0.663	53.9	LOS D	7.0	51.7	1.00	0.84	25.2
Approach		810	1.9	0.663	22.3	LOS B	8.3	58.5	0.62	0.73	33.1
North: The Northern Rd											
7	L2	343	4.7	0.661	41.3	LOS C	15.0	109.2	0.94	0.84	30.3
8	T1	1093	3.3	0.912	53.4	LOS D	33.1	238.2	1.00	1.10	30.9
Approach		1436	3.7	0.912	50.5	LOS D	33.1	238.2	0.98	1.04	30.7
All Vehicles		4527	2.2	0.912	35.5	LOS C	36.8	257.8	0.79	0.81	32.8

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	45.3	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	35.5	LOS D	0.1	0.1	0.84	0.84
P3	North Full Crossing	50	45.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		150	42.0	LOS E			0.91	0.91

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-pm - 2021 - Pre-EWC]

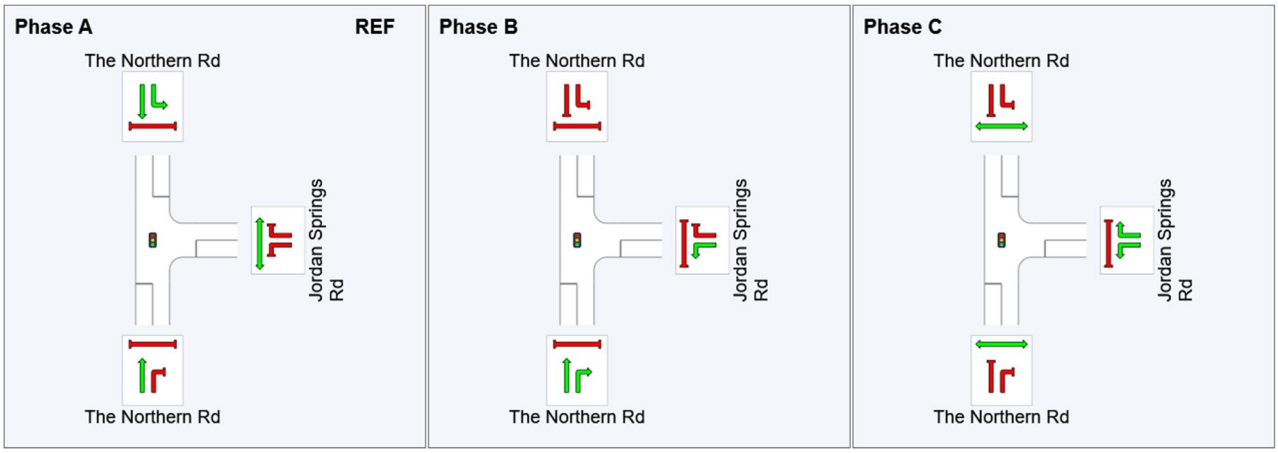
The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 102 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: TCS 4396
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	37	82
Green Time (sec)	32	40	15
Phase Time (sec)	37	45	20
Phase Split	36%	44%	20%

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



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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-pm - 2021 - Post-EWC]

The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 102 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Northern Rd											
2	T1	983	3.0	0.340	4.3	LOS A	7.9	56.8	0.36	0.32	63.5
3	R2	1131	0.2	0.841	44.7	LOS D	28.7	201.6	0.98	0.93	23.3
Approach		2114	1.5	0.841	25.9	LOS B	28.7	201.6	0.69	0.65	37.7
East: Jordan Springs Rd											
4	L2	610	1.1	0.296	17.2	LOS B	7.9	55.9	0.56	0.72	35.4
6	R2	119	6.0	0.568	52.5	LOS D	5.9	43.1	0.99	0.79	25.6
Approach		729	1.9	0.568	23.0	LOS B	7.9	55.9	0.63	0.73	32.7
North: The Northern Rd											
7	L2	255	4.7	0.445	36.5	LOS C	10.0	73.0	0.85	0.81	32.2
8	T1	1093	3.3	0.834	38.7	LOS C	27.6	198.5	0.99	0.96	36.5
Approach		1348	3.6	0.834	38.3	LOS C	27.6	198.5	0.96	0.93	35.7
All Vehicles		4191	2.2	0.841	29.4	LOS C	28.7	201.6	0.77	0.75	36.2

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	45.3	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	33.0	LOS D	0.1	0.1	0.81	0.81
P3	North Full Crossing	50	45.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		150	41.2	LOS E			0.90	0.90

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: 1 [I-05TheNorthernRd-JordanSpringsBlvd-pm - 2021 - Post-EWC]

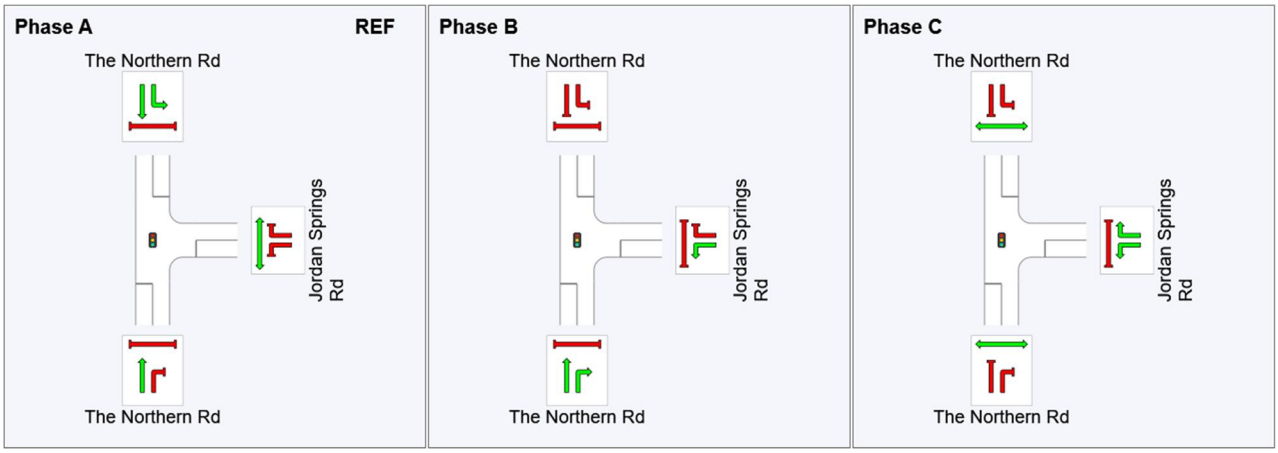
The Northern Rd/Jordan Springs Blvd
Signals - Fixed Time Isolated Cycle Time = 102 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: TCS 4396
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	40	82
Green Time (sec)	35	37	15
Phase Time (sec)	40	42	20
Phase Split	39%	41%	20%

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



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

APPENDIX E

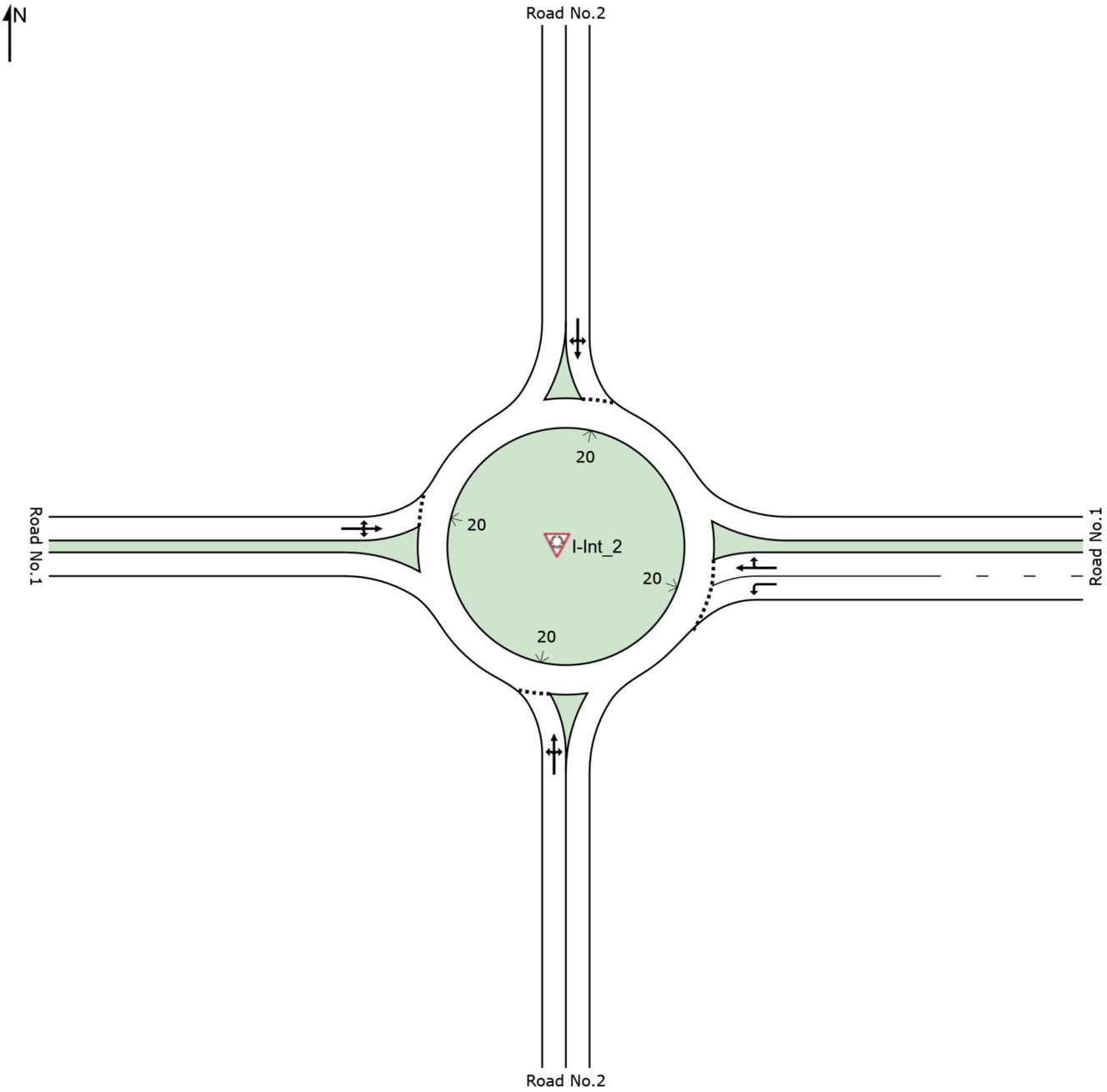
SIDRA OUTPUT – INTERSECTION OF ROAD NO.1 AND ROAD NO.2 IN JORDAN SPRINGS EAST

Intersection performance summary of trips generated by Jordan Springs East precinct

SITE LAYOUT

Site: I-Int_2 [AM_Road No.1, No.2 - pre EWC]

Intersection of Road No.1, No.2
Roundabout



MOVEMENT SUMMARY

Site: I-Int_2 [AM_Road No.1, No.2 - pre EWC]

Intersection of Road No.1, No.2
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road No.2											
1	L2	412	3.0	0.386	5.7	LOS A	2.5	18.2	0.55	0.62	53.2
2	T1	1	3.0	0.386	5.9	LOS A	2.5	18.2	0.55	0.62	52.2
3	R2	1	3.0	0.386	10.5	LOS A	2.5	18.2	0.55	0.62	52.6
Approach		414	3.0	0.386	5.7	LOS A	2.5	18.2	0.55	0.62	53.2
East: Road No.1											
4	L2	1	3.0	0.001	5.9	LOS A	0.0	0.0	0.48	0.48	51.0
5	T1	1	3.0	0.002	5.3	LOS A	0.0	0.1	0.45	0.51	49.8
6	R2	1	3.0	0.002	9.9	LOS A	0.0	0.1	0.45	0.51	38.8
Approach		3	3.0	0.002	7.0	LOS A	0.0	0.1	0.46	0.50	47.6
North: Road No.2											
7	L2	1	3.0	0.211	4.4	LOS A	1.1	8.1	0.28	0.62	38.8
8	T1	1	3.0	0.211	4.6	LOS A	1.1	8.1	0.28	0.62	48.5
9	R2	269	3.0	0.211	9.2	LOS A	1.1	8.1	0.28	0.62	47.1
Approach		271	3.0	0.211	9.2	LOS A	1.1	8.1	0.28	0.62	47.1
West: Road No.1											
10	L2	67	3.0	0.104	3.9	LOS A	0.6	4.1	0.03	0.60	48.5
11	T1	1	3.0	0.104	4.0	LOS A	0.6	4.1	0.03	0.60	51.2
12	R2	103	3.0	0.104	8.7	LOS A	0.6	4.1	0.03	0.60	53.9
Approach		171	3.0	0.104	6.8	LOS A	0.6	4.1	0.03	0.60	52.3
All Vehicles		859	3.0	0.386	7.0	LOS A	2.5	18.2	0.36	0.62	51.5

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

MOVEMENT SUMMARY

Site: I-Int_2 [AM_Road No.1, No.2 - post-EWC]

Intersection of Road No.1, No.2
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road No.2											
1	L2	185	3.0	0.411	5.6	LOS A	2.8	19.9	0.54	0.67	51.2
2	T1	1	3.0	0.411	5.8	LOS A	2.8	19.9	0.54	0.67	49.4
3	R2	268	3.0	0.411	10.4	LOS A	2.8	19.9	0.54	0.67	50.0
Approach		454	3.0	0.411	8.5	LOS A	2.8	19.9	0.54	0.67	50.5
East: Road No.1											
4	L2	79	3.0	0.069	4.9	LOS A	0.4	2.6	0.34	0.51	51.5
5	T1	67	3.0	0.101	4.6	LOS A	0.6	4.0	0.33	0.55	50.3
6	R2	72	3.0	0.101	9.3	LOS A	0.6	4.0	0.33	0.55	39.4
Approach		218	3.0	0.101	6.3	LOS A	0.6	4.0	0.33	0.54	48.2
North: Road No.2											
7	L2	182	3.0	0.295	5.9	LOS A	1.8	13.2	0.57	0.68	40.5
8	T1	1	3.0	0.295	6.0	LOS A	1.8	13.2	0.57	0.68	50.3
9	R2	112	3.0	0.295	10.7	LOS A	1.8	13.2	0.57	0.68	49.0
Approach		295	3.0	0.295	7.7	LOS A	1.8	13.2	0.57	0.68	44.5
West: Road No.1											
10	L2	33	3.0	0.090	5.6	LOS A	0.5	3.5	0.50	0.64	46.9
11	T1	10	3.0	0.090	5.8	LOS A	0.5	3.5	0.50	0.64	49.5
12	R2	46	3.0	0.090	10.4	LOS A	0.5	3.5	0.50	0.64	52.6
Approach		89	3.0	0.090	8.1	LOS A	0.5	3.5	0.50	0.64	50.7
All Vehicles		1056	3.0	0.411	7.8	LOS A	2.8	19.9	0.50	0.64	49.0

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

MOVEMENT SUMMARY

Site: I-Int_2 [PM_Road No.1, No.2 - pre-EWC]

Intersection of Road No.1, No.2
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road No.2											
1	L2	132	3.0	0.107	4.3	LOS A	0.6	4.3	0.27	0.48	54.1
2	T1	1	3.0	0.107	4.4	LOS A	0.6	4.3	0.27	0.48	53.5
3	R2	1	3.0	0.107	9.1	LOS A	0.6	4.3	0.27	0.48	53.8
Approach		134	3.0	0.107	4.3	LOS A	0.6	4.3	0.27	0.48	54.1
East: Road No.1											
4	L2	1	3.0	0.001	7.4	LOS A	0.0	0.0	0.59	0.52	49.6
5	T1	1	3.0	0.002	6.4	LOS A	0.0	0.1	0.58	0.53	48.9
6	R2	1	3.0	0.002	11.1	LOS A	0.0	0.1	0.58	0.53	37.8
Approach		3	3.0	0.002	8.3	LOS A	0.0	0.1	0.58	0.53	46.4
North: Road No.2											
7	L2	1	3.0	0.098	6.8	LOS A	0.5	3.6	0.57	0.72	36.8
8	T1	1	3.0	0.098	6.9	LOS A	0.5	3.6	0.57	0.72	46.9
9	R2	85	3.0	0.098	11.6	LOS A	0.5	3.6	0.57	0.72	45.4
Approach		87	3.0	0.098	11.5	LOS A	0.5	3.6	0.57	0.72	45.4
West: Road No.1											
10	L2	342	3.0	0.512	3.9	LOS A	4.4	31.6	0.05	0.59	48.4
11	T1	1	3.0	0.512	4.0	LOS A	4.4	31.6	0.05	0.59	51.1
12	R2	526	3.0	0.512	8.7	LOS A	4.4	31.6	0.05	0.59	53.8
Approach		869	3.0	0.512	6.8	LOS A	4.4	31.6	0.05	0.59	52.2
All Vehicles		1093	3.0	0.512	6.9	LOS A	4.4	31.6	0.12	0.59	52.0

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

MOVEMENT SUMMARY

Site: I-Int_2 [PM_Road No.1, No.2 - post-EWC]

Intersection of Road No.1, No.2
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road No.2											
1	L2	62	3.0	0.164	5.2	LOS A	0.9	6.6	0.46	0.64	51.2
2	T1	1	3.0	0.164	5.4	LOS A	0.9	6.6	0.46	0.64	49.5
3	R2	112	3.0	0.164	10.0	LOS A	0.9	6.6	0.46	0.64	50.1
Approach		175	3.0	0.164	8.3	LOS A	0.9	6.6	0.46	0.64	50.6
East: Road No.1											
4	L2	303	3.0	0.243	5.4	LOS A	1.5	11.1	0.50	0.59	50.9
5	T1	31	3.0	0.204	5.6	LOS A	1.2	8.6	0.50	0.67	48.1
6	R2	183	3.0	0.204	10.2	LOS A	1.2	8.6	0.50	0.67	37.0
Approach		517	3.0	0.243	7.1	LOS A	1.5	11.1	0.50	0.62	47.0
North: Road No.2											
7	L2	126	3.0	0.174	6.2	LOS A	1.0	7.2	0.57	0.67	41.2
8	T1	1	3.0	0.174	6.3	LOS A	1.0	7.2	0.57	0.67	50.9
9	R2	36	3.0	0.174	10.9	LOS A	1.0	7.2	0.57	0.67	49.7
Approach		163	3.0	0.174	7.2	LOS A	1.0	7.2	0.57	0.67	43.8
West: Road No.1											
10	L2	165	3.0	0.436	6.0	LOS A	3.0	21.6	0.60	0.70	46.4
11	T1	45	3.0	0.436	6.1	LOS A	3.0	21.6	0.60	0.70	49.0
12	R2	247	3.0	0.436	10.8	LOS A	3.0	21.6	0.60	0.70	52.3
Approach		457	3.0	0.436	8.6	LOS A	3.0	21.6	0.60	0.70	50.3
All Vehicles		1312	3.0	0.436	7.8	LOS A	3.0	21.6	0.54	0.66	48.7

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

APPENDIX F

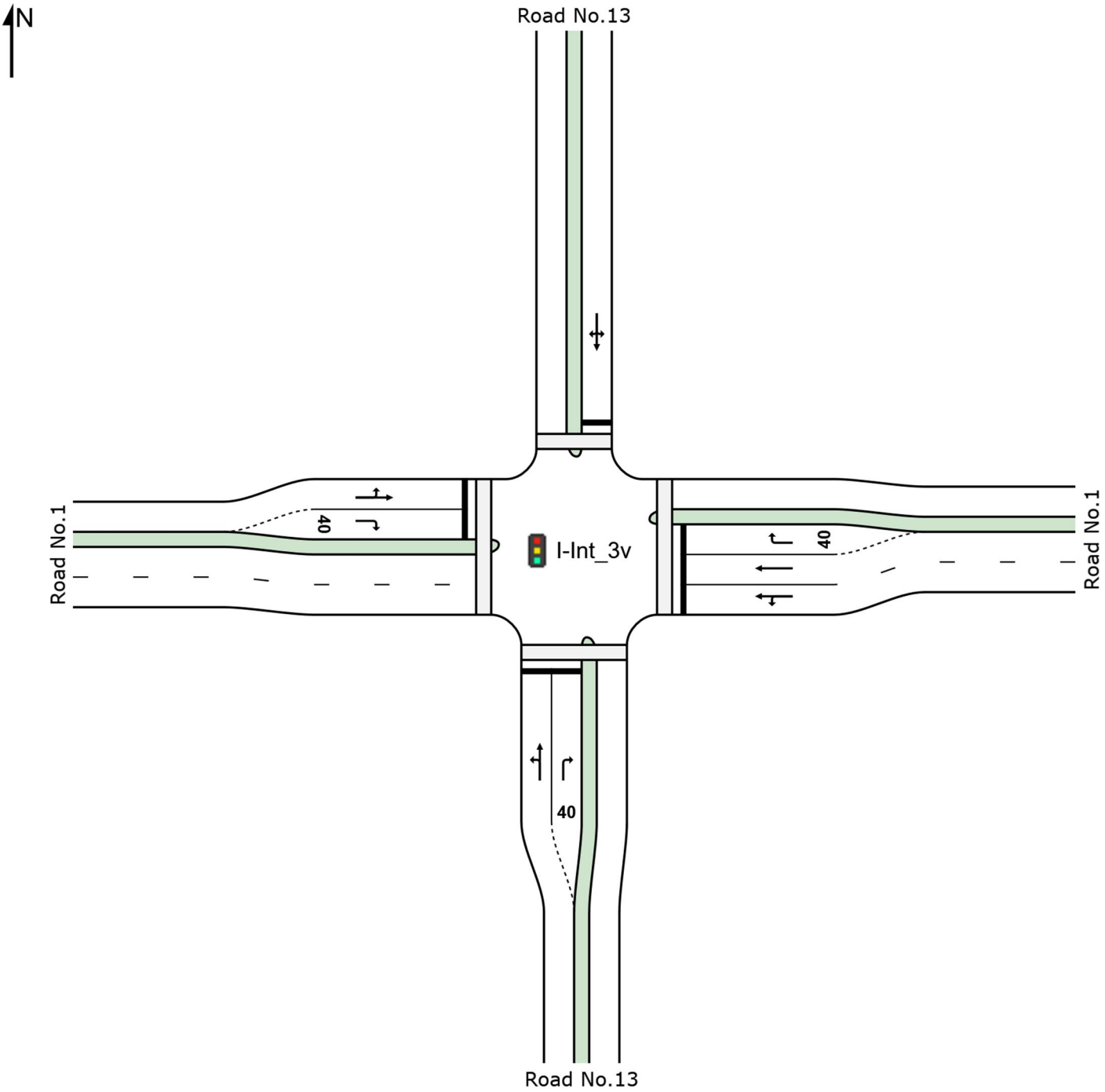
SIDRA OUTPUT – INTERSECTION OF ROAD NO.1 AND ROAD NO.13 IN JORDAN SPRINGS EAST

Intersection performance summary of trips generated by Jordan Springs East precinct

SITE LAYOUT

Site: I-Int_3v [AM_Road No.1, No.13 - post-EWC]

Intersection of Road No.1, No.13
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: I-Int_3v [AM_Road No.1, No.13 - post-EWC]

Intersection of Road No.1, No.13
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road No.13											
1	L2	88	3.0	0.324	17.3	LOS B	1.5	10.7	0.89	0.75	28.5
2	T1	20	3.0	0.324	12.1	LOS A	1.5	10.7	0.89	0.75	26.6
3	R2	141	3.0	0.414	18.4	LOS B	2.0	14.6	0.94	0.77	27.4
Approach		249	3.0	0.414	17.5	LOS B	2.0	14.6	0.92	0.76	27.7
East: Road No.1											
4	L2	87	3.0	0.182	12.1	LOS A	1.3	9.5	0.68	0.66	33.7
5	T1	191	3.0	0.182	6.5	LOS A	1.4	10.2	0.68	0.57	45.2
6	R2	11	3.0	0.026	13.9	LOS A	0.1	0.9	0.73	0.66	32.3
Approach		289	3.0	0.182	8.5	LOS A	1.4	10.2	0.68	0.60	41.2
North: Road No.13											
7	L2	65	3.0	0.360	18.0	LOS B	1.4	10.3	0.90	0.76	29.5
8	T1	6	3.0	0.360	12.4	LOS A	1.4	10.3	0.90	0.76	25.4
9	R2	31	3.0	0.360	18.0	LOS B	1.4	10.3	0.90	0.76	29.5
Approach		102	3.0	0.360	17.7	LOS B	1.4	10.3	0.90	0.76	29.3
West: Road No.1											
10	L2	3	3.0	0.434	13.0	LOS A	3.8	27.6	0.77	0.65	40.2
11	T1	341	3.0	0.434	7.4	LOS A	3.8	27.6	0.77	0.65	45.1
12	R2	141	3.0	0.269	13.3	LOS A	1.6	11.1	0.74	0.74	30.9
Approach		485	3.0	0.434	9.1	LOS A	3.8	27.6	0.76	0.68	40.7
All Vehicles		1125	3.0	0.434	11.6	LOS A	3.8	27.6	0.79	0.68	36.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	9.6	LOS A	0.0	0.0	0.80	0.80
P2	East Full Crossing	50	9.6	LOS A	0.0	0.0	0.80	0.80
P3	North Full Crossing	50	9.6	LOS A	0.0	0.0	0.80	0.80
P4	West Full Crossing	50	9.6	LOS A	0.0	0.0	0.80	0.80
All Pedestrians		200	9.6	LOS A			0.80	0.80

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.

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PHASING SUMMARY

Site: I-Int_3v [AM_Road No.1, No.13 - post-EWC]

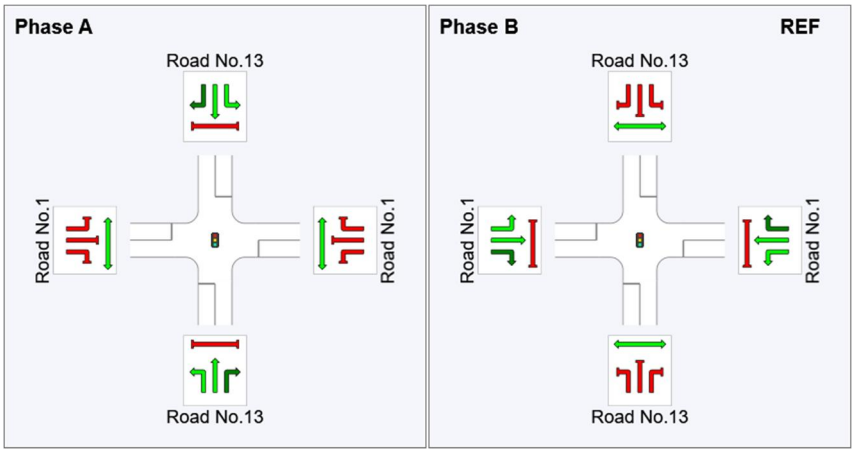
Intersection of Road No.1, No.13
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Practical Cycle Time)

Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	18	0
Green Time (sec)	6	12
Phase Time (sec)	12	18
Phase Split	40%	60%

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: I-Int_3v [PM_Road No.1, No.13 - post-EWC]

Intersection of Road No.1, No.2
Signals - Fixed Time Isolated Cycle Time = 45 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road No.2											
1	L2	86	3.0	0.210	17.9	LOS B	1.9	13.4	0.77	0.72	28.1
2	T1	25	3.0	0.210	12.8	LOS A	1.9	13.4	0.77	0.72	26.2
3	R2	177	3.0	0.640	26.7	LOS B	4.1	29.2	0.98	0.85	22.4
Approach		288	3.0	0.640	22.8	LOS B	4.1	29.2	0.90	0.80	24.1
East: Road No.1											
4	L2	130	3.0	0.583	21.0	LOS B	6.3	45.1	0.91	0.78	26.8
5	T1	523	3.0	0.583	15.4	LOS B	6.6	47.1	0.91	0.77	34.9
6	R2	56	3.0	0.125	18.8	LOS B	0.9	6.8	0.77	0.72	28.3
Approach		709	3.0	0.583	16.7	LOS B	6.6	47.1	0.90	0.77	32.9
North: Road No.2											
7	L2	21	3.0	0.125	24.4	LOS B	0.7	4.8	0.89	0.71	25.3
8	T1	2	3.0	0.125	18.8	LOS B	0.7	4.8	0.89	0.71	21.0
9	R2	10	3.0	0.125	24.4	LOS B	0.7	4.8	0.89	0.71	25.3
Approach		33	3.0	0.125	24.0	LOS B	0.7	4.8	0.89	0.71	25.1
West: Road No.1											
10	L2	16	3.0	0.095	10.6	LOS A	1.1	7.6	0.49	0.44	42.5
11	T1	87	3.0	0.095	5.1	LOS A	1.1	7.6	0.49	0.44	47.5
12	R2	162	3.0	0.339	13.5	LOS A	1.9	13.6	0.82	0.76	30.7
Approach		265	3.0	0.339	10.5	LOS A	1.9	13.6	0.70	0.63	36.4
All Vehicles		1295	3.0	0.640	17.0	LOS B	6.6	47.1	0.86	0.75	31.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	16.9	LOS B	0.1	0.1	0.87	0.87
P2	East Full Crossing	50	16.9	LOS B	0.1	0.1	0.87	0.87
P3	North Full Crossing	50	8.1	LOS A	0.0	0.0	0.60	0.60
P4	West Full Crossing	50	16.9	LOS B	0.1	0.1	0.87	0.87
All Pedestrians		200	14.7	LOS B			0.80	0.80

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.

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PHASING SUMMARY

Site: I-Int_3v [PM_Road No.1, No.13 - post-EWC]

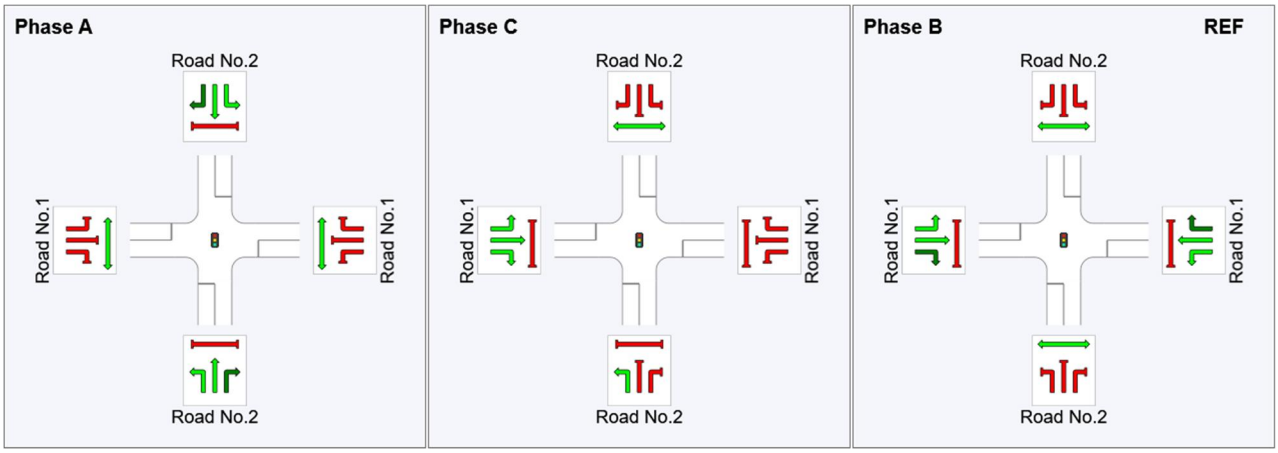
Intersection of Road No.1, No.2
Signals - Fixed Time Isolated Cycle Time = 45 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase B
Input Phase Sequence: A, C, B
Output Phase Sequence: A, C, B

Phase Timing Results

Phase	A	C	B
Phase Change Time (sec)	19	33	0
Green Time (sec)	8	6	13
Phase Time (sec)	14	12	19
Phase Split	31%	27%	42%

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