Queensland Government

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AURA

NORTH CENTRAL LOCALITY

Precincts 11 & 12 (Part): Traffic Assessment

PREPARED FOR STOCKLAND DEVELOPMENT PTY LTD

17-003001 | 17 April 2018

Calibre Consulting (QLD) Pty Ltd
ABN 38 109 428 506

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
0	20/12/2017	Final	SK	SB	DA (RPEQ 7637)
1	14/03/2018	Added Precinct Traffic Analysis	SK	SB	DA (RPEQ 7637)
2	09/04/2018	Revised development yield	SK	SB	DA (RPEQ 7637)
3	16/04/2018	Minor amendments	SK	SB	DA (RPEQ 7637)

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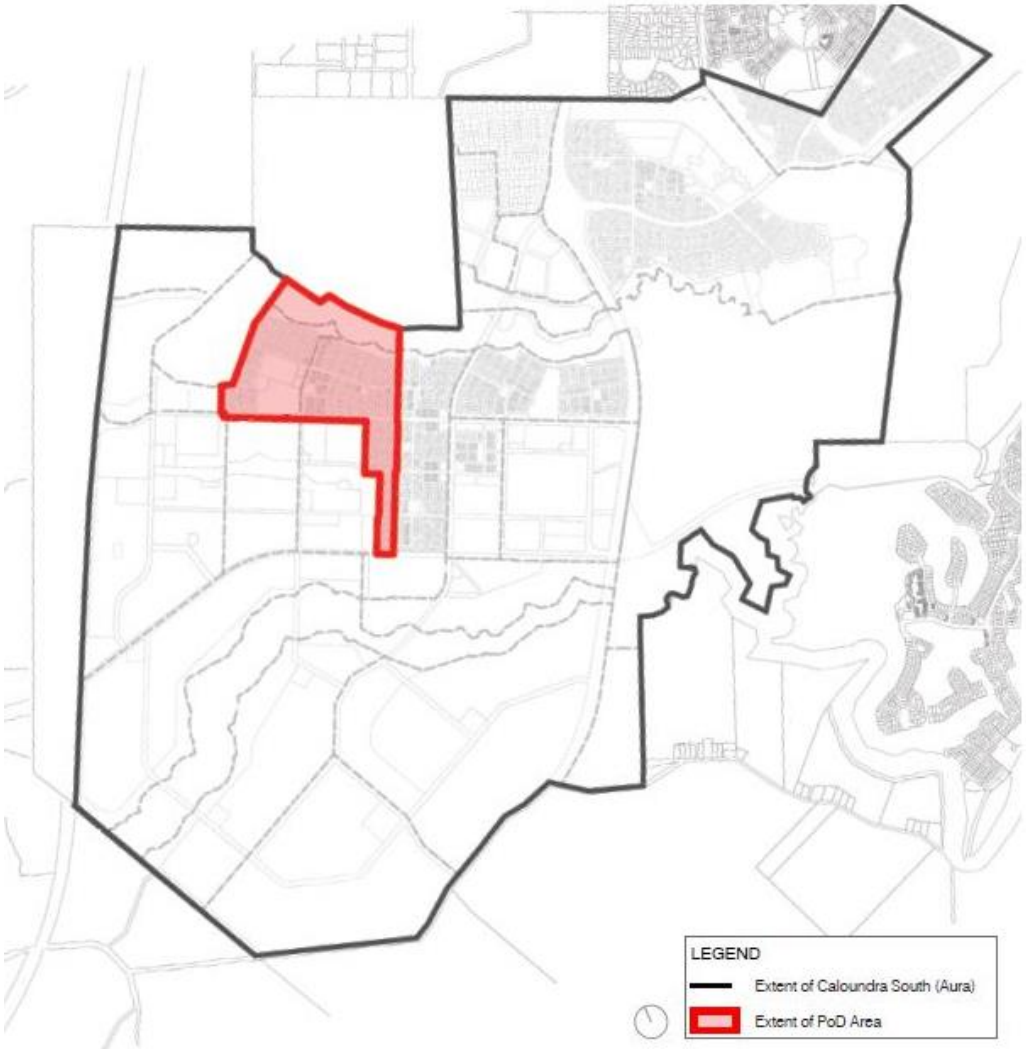
1 Introduction

Calibre has been commissioned by Stockland Development Pty Ltd to undertake a traffic assessment of parts of Precincts 11 and 12 of the Caloundra South masterplan, located within the Caloundra South Priority Development Area (PDA), to determine the layout and performance of major intersections within the sub-precincts. This report considers only the part of Precincts 11 and 12 included under this application, and associated enabling infrastructure. Impacts of the remaining areas of Precincts 11 and 12 will be assessed under future applications.

Figure 1.1 shows the location of the precincts under this application in relation to the wider network.

Precincts 11 and 12 (Part) will be completed in stages within different financial years. This has been taken into account in the traffic analysis, with the performance of each intersection analysed for the different completion years. Assessment for the ultimate year 2031 traffic volumes has been performed utilising information obtained from the revised Ultimate Caloundra South Transport Model prepared by MWH submitted to EDQ (and accepted by DTMR) in 2016.

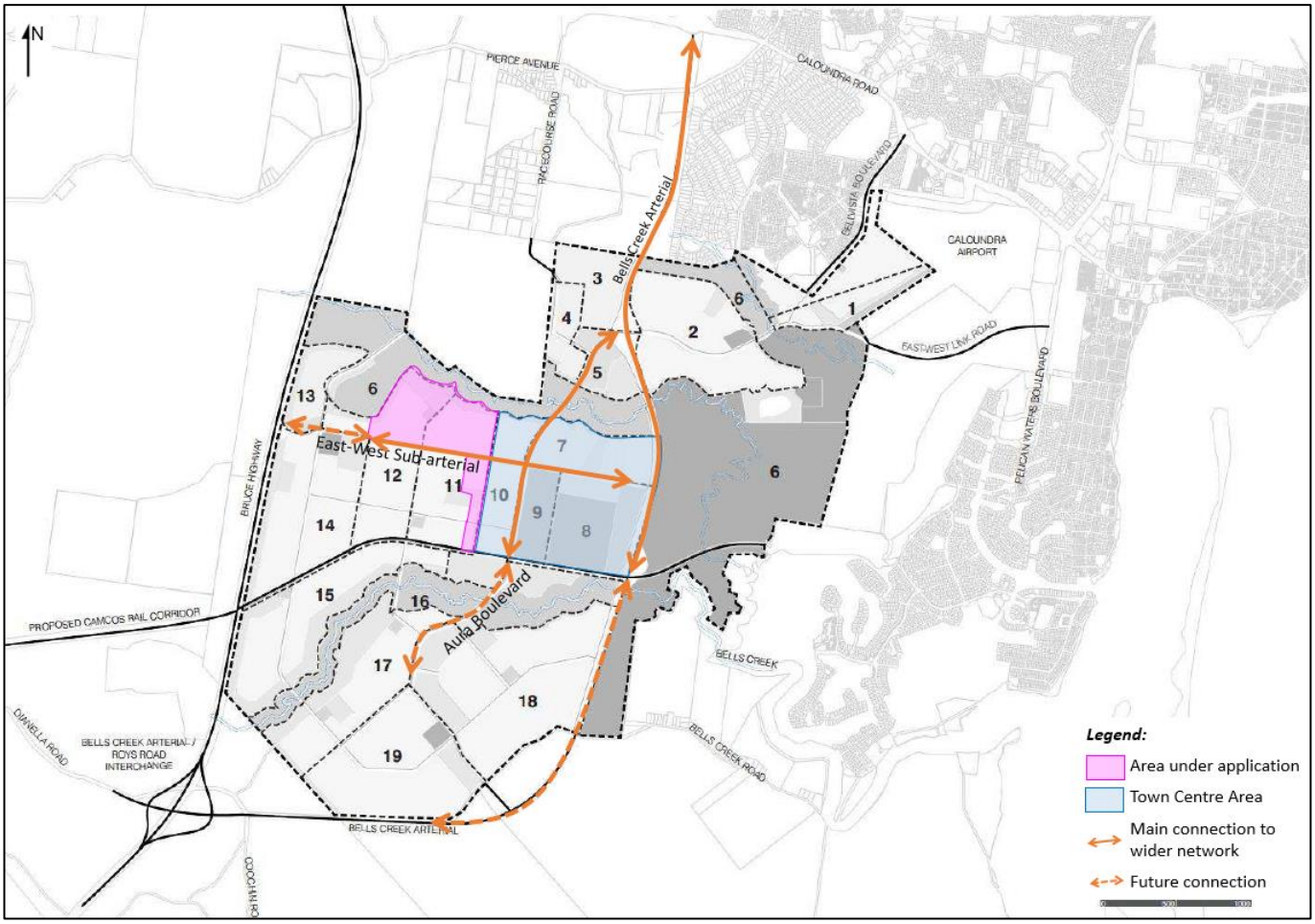
Figure 1.1 Location of Precincts 11.1, 11.2, 12.1 and 12.2.



1.1 Background

Caloundra South PDA will provide approximately 20,000 dwellings to a population of approximately 50,000 people. Several transport and traffic studies were previously undertaken for the Caloundra South masterplan (now known as the Aura masterplan) to help determine the ultimate masterplan road infrastructure required to accommodate the traffic volumes that will be generated by the development. The Ultimate Caloundra South Transport Model was originally developed by Montgomery Watson Harza (MWH) in 2012 to assess traffic demand from this development. The model was later updated from November 2013 to 2016 to include more details around the town centre areas, Precincts 7 to 10, which are located east of Precinct 11. The latest version of the model was submitted to EDQ and accepted by DTMR in 2016. Refer to ***Figure 1.2*** for a map of the precinct boundaries within the Caloundra South masterplan.

Figure 1.2 Precinct Plan from Caloundra South Infrastructure Agreement.



Several access points were proposed to connect the ultimate masterplan to the wider road network. The proposed main roads connecting Precincts 11 and 12 (Part) to the wider road network can be observed in ***Figure 1.2*** above. One of the proposed links includes the construction of south-facing ramps connecting the East-West Sub-arterial to Bruce Highway via Precinct 13. It is understood that timing for the construction of the interchange, under the Infrastructure Agreement with Department of Transport and Main Roads, is to construct it prior to the 14,000th Developed Lot, which will be well after the completion of this part of Precincts 11 and 12. Assessment of the interim layouts therefore assumes all interim traffic will utilise Aura Boulevard and Bells Creek Arterial to access the wider road network. For assessment of the ultimate layouts, traffic volumes from the Ultimate Caloundra South Transport Model were utilised.

1.2 Location

Precincts 11 and 12 (Part) are located on the north-western side of the Aura masterplan. This part of the Precincts 11 and 12 are bordered by Precinct 6 on the north, Precinct 14 and part of Precinct 11 on the west, Precinct 10 on the east and parts of Precincts 11 and 12 as well as the future Caboolture to Maroochydore Corridor (CAMCOS) on the south.

1.3 Compliance with Infrastructure Agreement

Clause 2 of Infrastructure Network 5- Local Transport within the Caloundra South PDA Infrastructure Agreement (Local Government Infrastructure) (IA) requires the following in relation to Caloundra South Traffic Models. A response to how the relevant clauses have been addressed within this report or previously, is summarised below.

IA Clause	Requirement	Response
2.1	The Developer and Council agree that the Agreed Baseline Traffic Model forms the appropriate basis for forecasting traffic volumes on the sub-arterial and arterial road network and that it is to be used as the basis for preparing the Detailed Traffic Models and the Precinct Traffic Analyses referred to in this clause 2.	Noted. The Agreed Baseline Traffic Model is defined in the IA as *"The Ultimate Caloundra South Transport Model, dated November 2013, prepared by MWH, and any updated versions accepted by DTMR from time to time."* This Model was updated as part of the Town Centre ROL Approval and a revised version of the Model was submitted to EDQ (and accepted by DTMR) in 2016. This later report forms the basis of the forecast traffic volumes in this Assessment, as confirmed in Sections 1.1, 2.3, 3.2.1 & 3.4
2.2	At all times, the platform for maintenance of the Agreed Baseline Traffic Model and the parameters underpinning the Agreed Baseline Traffic Model must not be changed from the platform and parameters contained in the Agreed Baseline Traffic Model at the Commencement Date.	No change has been made to the platform or parameters.
2.3	Prior to the Developer lodging any updated version of the Agreed Baseline Traffic Model with DTMR or a Detailed Traffic Model with MEDQ, the Developer must: 2.3.1 provide a copy to the Council; 2.3.2 consult with the Council; and 2.3.3 consider any written submissions that have been provided by the Council.	N/A – there is no change proposed to the Agreed Baseline Traffic Model.
2.4	The Council must provide to the Developer written submissions within 10 Business Days of receipt of any updated version of the Agreed Baseline Traffic Model or the Detailed Traffic Model.	N/A
2.5	The Developer must provide any written submissions and its response to those submissions to DTMR or MEDQ, as relevant, with the updated version of the Agreed Baseline Traffic Model or Detailed Traffic Model.	N/A
2.6	The Developer will provide to the Council, any updated version of the Agreed Baseline Traffic Model that has been accepted by DTMR within 10 Business Days of DTMR accepting that update to the Agreed Baseline Traffic Model.	N/A
2.7	At the time of lodging the first application for an ROL Approval for one of the following Precincts or any other Precinct identified by MEDQ, the Developer must provide a Detailed Traffic Model to MEDQ and Council for that Precinct: 2.7.1 Precinct 10; 2.7.2 Precinct 11; 2.7.3 Precinct 12; 2.7.4 Precinct 14; and 2.7.5 Precinct 15	A Detailed Traffic Model, complying with the definition within the IA, was lodged with EDQ as part of the Town Centre Application/approval on 9th March 2016. This clause has been satisfied.

IA Clause	Requirement	Response
2.8	At the time of lodging the first application for an ROL Approval for a Precinct, the Developer must provide to MEDQ and Council, a Precinct Traffic Analysis.	A Precinct Traffic Analysis, as defined in the IA means *"an analysis of the transport network for a Precinct, where that analysis identifies:* *(a) The volume and capacity of the road links; and* (b) *The capacity and operation of key intersections.* *for road classifications of Neighbourhood Connector, Centre Connector, Industrial Connector, Trunk Collector, Sub-Arterial and above."* Please refer to Section 3.5 of the Traffic Report, which provides an analysis of the volumes on these roads and the capacity of intersections and meets the requirements of a Precinct Traffic Analysis.
2.9	The Developer must provide a Detailed Traffic Model to MEDQ and the Council for Precincts 7, 8, 9 and 10 prior to any PDA development approval being granted by MEDQ for development in those Precincts.	N/A to this application for Precincts 11/12.

2 Development Traffic

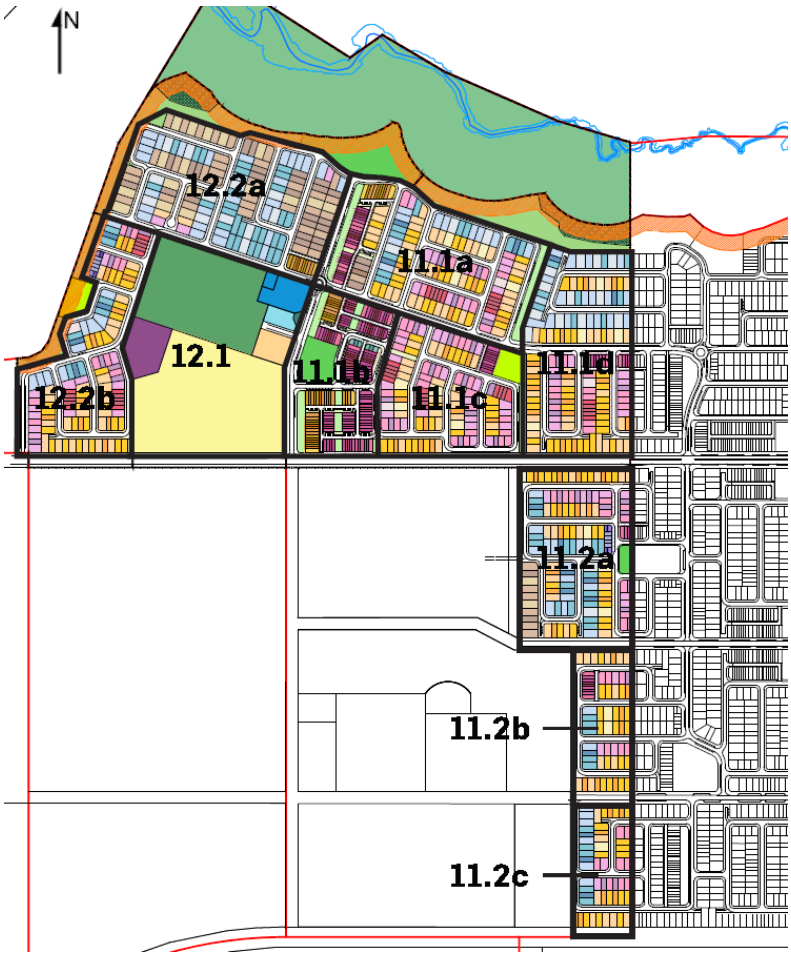
2.1 Development Yield

Precincts 11 and 12 (Part) comprise of Sub-precincts 11.1, 11.2, 12.1 and 12.2. Development yield for Sub-precincts 11.1, 11.2, 12.1 and 12.2, received from Urbis, are summarised below in ***Table 2.1*** while ***Figure 2.1*** displays the layout plan. The sub-precincts will mainly consist of low density residential dwellings, with a community hub, local retail shops, a childcare centre and a school located in Sub-precinct 12.1.

Table 2.1 Development yield

Development Use	Development Yield	Unit
Residential (low density)	1,189	Unit
Residential (apartment)	50	Unit
Community Hub	1,200	m^2
Retail	850	m^2
Childcare	132	Child
School	1,500	Student

Figure 2.1 Sub-precincts layout plan

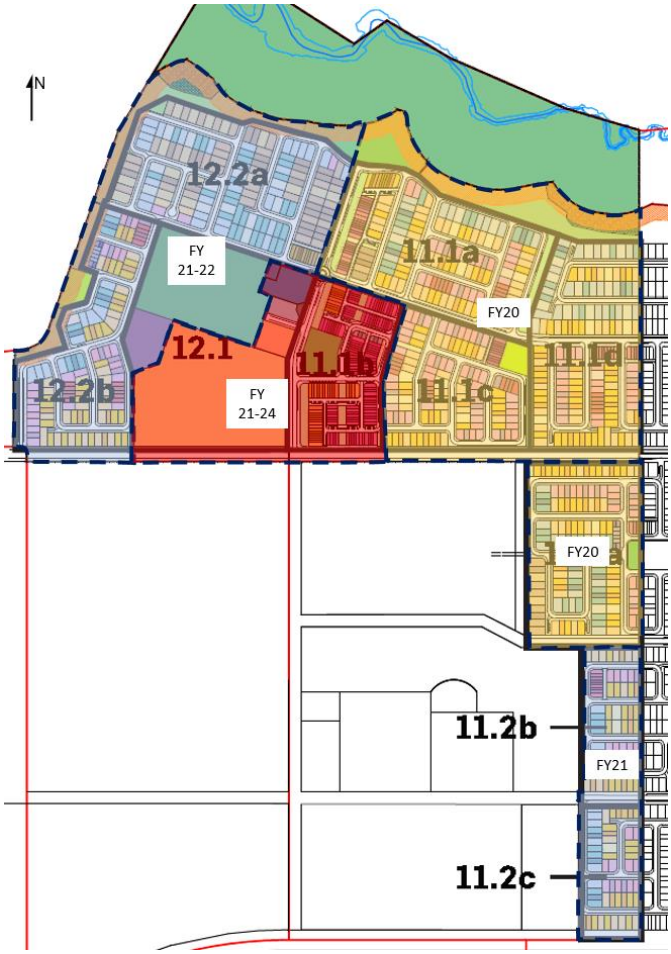


2.2 Development Staging

The proposed phasing plan of Sub-precincts 11.1, 11.2, 12.1 and 12.2 is illustrated in ***Figure 2.2*** below. The sub-precincts will be completed between years 2020 and 2024.

For the purpose of this traffic assessment, it is assumed that each phase will be fully occupied one year after completion.

Figure 2.2 Phasing plan



2.3 Traffic Generation

The amount of traffic that will be generated by the sub-precincts is tabulated in ***Table 2.2*** below. Traffic volumes were calculated based on the trip generation rates obtained from several sources as follow:

- Trip generation rates for residential dwellings (both low density and apartment) were obtained from New South Wales Roads and Maritime Services' Technical Direction (TDT 2013/ 04a) for the Guide to Traffic Generating Developments. The weekday average trip rates for regional areas were chosen as a more accurate representation of the circumstances in the sub-precincts.
- Trip generation rates for the community hub were obtained from Institute of Transport Engineers Trip Generation Manual (ITE) 9th edition
- Trip generation rates for the retail and school components were obtained from MWH's Precinct 2 Traffic Assessment (October 2014)
- Trip generation rates for the childcare centre were obtained from the RTA Guide to Traffic Generating Developments October 2002.

Several assumptions were adopted in determining the traffic generated by the sub-precincts:

- The community hub will generate minimal traffic during the morning peak
- The school will generate minimal traffic during the evening peak
- Gross leasable floor area (GFLA) is 75% of Gross Floor Area (GFA)
- No increase in public transport / active travel mode share has been considered for the interim assessment as the network is still incomplete. In the future, it is anticipated that the number of private vehicle trips would reduce as public transport services improve with the completion of the masterplan. Improvements to connectivity and accessibility of the pedestrian and cycling facilities in the future will also encourage increase in active travel, hence reducing the number of private vehicle trips.

Table 2.2 Traffic Generation

Development Use	Development Yield	Unit	AM Peak Trip Rate (veh/hr)	PM Peak Trip Rate (veh/hr)	AM Veh per hr	PM Veh per hr
Residential (low density)	1,189 units	Unit	0.71	0.78	844	927
Residential (apartment)	50 units	Unit	0.53	0.32	27	16
Community Hub	1,200 m^2	100m^2		1.56	0	19
Retail	850 m^2	100m^2 GLFA	9.4	12.5	60	80
Childcare	132 children	Child	0.8	0.7	106	92
School	1,500 students	Student	0.5	0	750	0
Total					**1,787**	**1,134**

It is assumed that 25% of the above calculated traffic will be internal to the four sub-precincts.

2.4 Development Profile

Table 2.3 lists our assumed development profile for the sub-precincts. The residential development and childcare profiles were based on information provided by Urbis and Stockland. School enrolments profile was pro-rata-ed between the opening year of the school and commercial hub, and the year of assumed full occupancy of Sub-precincts 11.1, 11.2, 12.1 and 12.2.

Table 2.3 Development profile

Year	Low Density Residential	Apartments	Community Hub	Retail	Childcare	School Enrolments
2021 (opening year)	311					
2022	622	50	1,200	283	80	375
2023	1,189	50	1,200	567	132	750
2024	1,189	50	1,200	850	132	1,125
2025 (full occupancy)	1,189	50	1,200	850	132	1,500

3 Intersection Performance

3.1 Interim Horizon

Several scenarios were assessed to evaluate the performance of intersections which will be impacted by development of the sub-precincts. These are based on the completion years discussed in Section 2.2. The years which were assessed include:

- Year 2021 – full occupation of first phase completed in year 2020
- Year 2022 – full occupation of second phase completed in year 2021, with operation of the school, community hub, childcare centre and retail facilities
- Year 2025 – full occupation of Sub-precincts 11.1, 11.2, 12.1 and 12.2

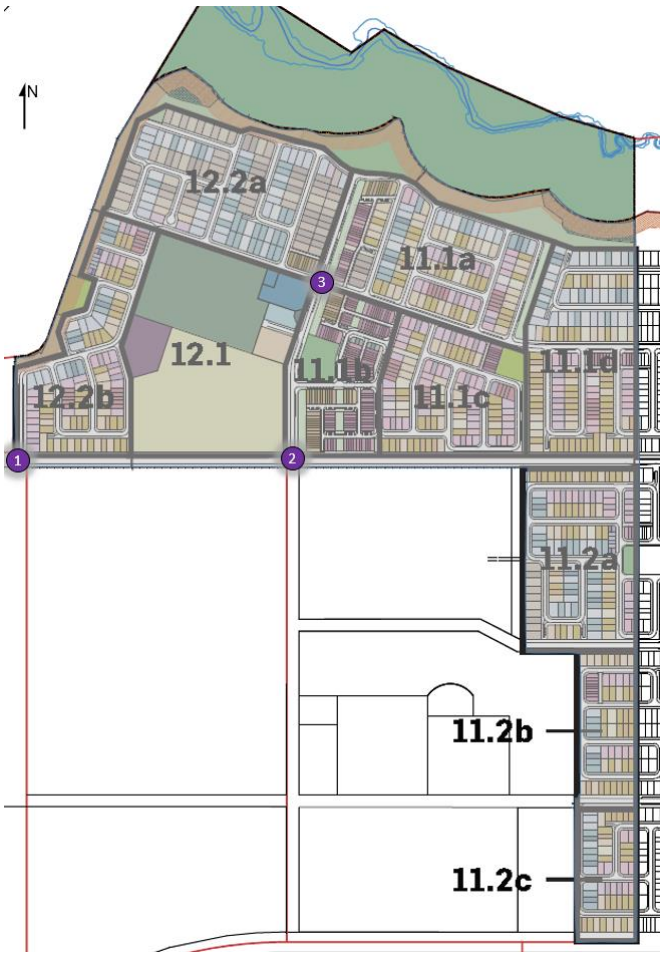
Three intersections were selected for assessment as they are deemed to be the major intersections within the sub-precincts. However, only Intersections 2 and 3, as shown in ***Figure 3.1*** have been assessed. Intersection 1 has been excluded from the assessment as the main traffic flow at this stage, with the development of Sub-precincts 11.1, 11.2, 12.1 and 12.2, will be eastbound for traffic egressing the residential area and northbound for traffic accessing the residential area. Conflicting traffic is minimal due to the lack of development to the west and south at this stage. The intersection will be assessed as part of future applications for surrounding precincts, as development yield and layouts for those precincts are confirmed.

It is assumed that Intersections 2 and 3 will be constructed in year 2021 as indicated in the phasing plan and will operate at full capacity in year 2022, therefore, traffic assessment for the intersections begins in year 2022.

It is also assumed that at its connections with Intersection 2, the East-West Sub-arterial will initially be constructed in its interim form, with one lane per direction. The layout of the East-West Sub-arterial will be discussed further in Section 3.4 below.

As mentioned in Section 1.1, the connection to Bruce Highway via the East-West Sub-arterial (west of Sub-precinct 12.1) will not be completed before opening of the sub-precincts. Hence all traffic will utilise Aura Boulevard to access the wider road network.

Figure 3.1 Location of intersections



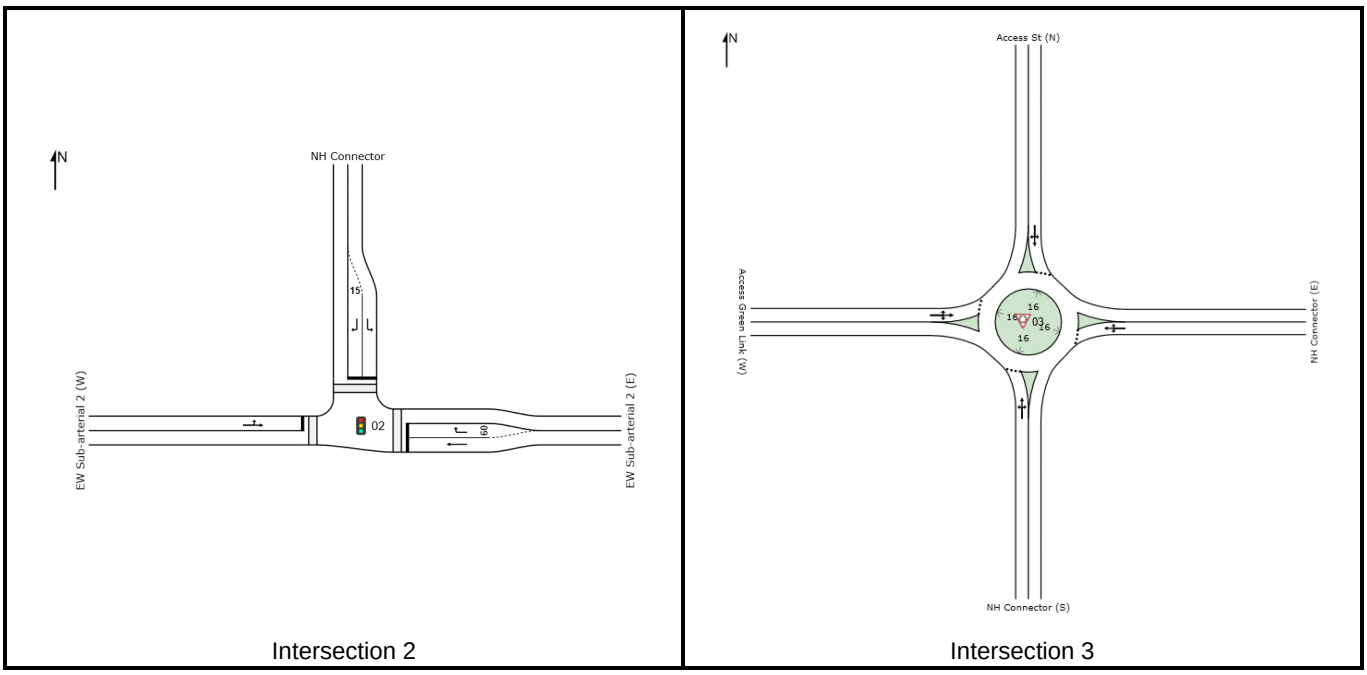
3.1.1 Interim Intersection Layout

Proposed interim intersection layouts can be observed in ***Figure 3.2***. Intersection 2 is proposed to be a 3-way signalised intersection with this application, with the East-West Sub-arterial in its interim form. It is noted that Intersection 2 is planned to be a 4-way signalised intersection ultimately, which will be discussed in Section 3.2. Further investigation of the interim layout will be required for this intersection for subsequent development applications as development yield and land use mix for future developments to the west and south are confirmed, to ensure appropriate access and acceptable intersection performance is provided. Allowance will be made in the detailed design stage to accommodate the final intersection layout.

Intersection 3 is proposed to be a roundabout in the interim horizon and it is anticipated that the layout will be maintained in the ultimate horizon.

Turning volumes entered into SIDRA for Intersections 2 and 3 for each assessment year can be found in **Appendix A**.

Figure 3.2 Interim Intersection Layout



Intersection 2 | Intersection 3

3.1.2 Interim Intersection Performance

The Infrastructure Network Schedule 5 within the Local Government Infrastructure Agreement (LGIA) provides the design criteria required for conducting intersection analysis, and relevant criteria are summarised in ***Table 3.1***.

Table 3.1 Criteria for Intersection Analysis from LGIA

Intersection Type	Criteria
Signalised Intersection	(i) SIDRA Intersection 6.0 (or later generally accepted intersection modelling software) will be adopted for intersection design. SIDRA calculations shall generally use default parameters however alternative parameters can be adopted where technical justification can be made; (ii) Shall have a volume on capacity ratio less or equal to 0.90; and (iii) A maximum cycle time of 140 seconds will only be used on Sub-arterial 3. All other roads will have a maximum cycle time of 120 seconds.
Roundabout	(i) SIDRA Intersection 6.0 (or later generally accepted intersection modelling software) will be adopted for intersection design. SIDRA calculations shall generally use default parameters however alternative parameters can be adopted where technical justification can be made and; (ii) Shall have a volume on capacity ratio less or equal to 0.85.

SIDRA Intersection 7.0 was utilised to conduct analysis of both Intersections 2 and 3. A cycle time of 120 seconds was adopted for Intersection 2 during all periods of assessment.

From ***Table 3.2***, it can be observed that both Intersections 2 and 3 will operate well at LOS C and above during all assessment years. Intersection 2 will operate at a maximum volume on capacity ratio of 0.412 throughout the assessment periods, which complies with the criteria indicated in the LGIA. Intersection 3 will operate at a maximum volume on capacity ratio of 0.085, which also complies with the criteria specified.

The results show that both intersections have ample spare capacity, with a maximum queue length of 82.5m in year 2025 on the eastern approach of Intersection 2.

Table 3.2 Interim Intersection Performance

Year	Peak	Intersection	Intersection Type	DOS	Ave Delay (s)	LOS	95% Queue (m)
2022	AM	2	3-way Signals	0.247	19.8	B	45.5
		3	4- way Roundabout	0.076	7.2	A	2.7
	PM	2	3-way Signals	0.239	21.2	C	49.6
		3	4- way Roundabout	0.082	5.0	A	3.2
2025	AM	2	3-way Signals	0.412	15.5	B	82.5
		3	4- way Roundabout	0.080	7.0	A	2.8
	PM	2	3-way Signals	0.253	19.8	B	52.3
		3	4- way Roundabout	0.085	5.1	A	3.3

3.2 Ultimate Horizon

The revised Ultimate Caloundra South Transport Models 2016 was developed for year 2031, which included the ultimate development yield of the masterplan as well as the various associated infrastructure proposed to cater for the masterplan traffic demand. Traffic volumes from the transport models were utilised to determine the ultimate intersection layouts.

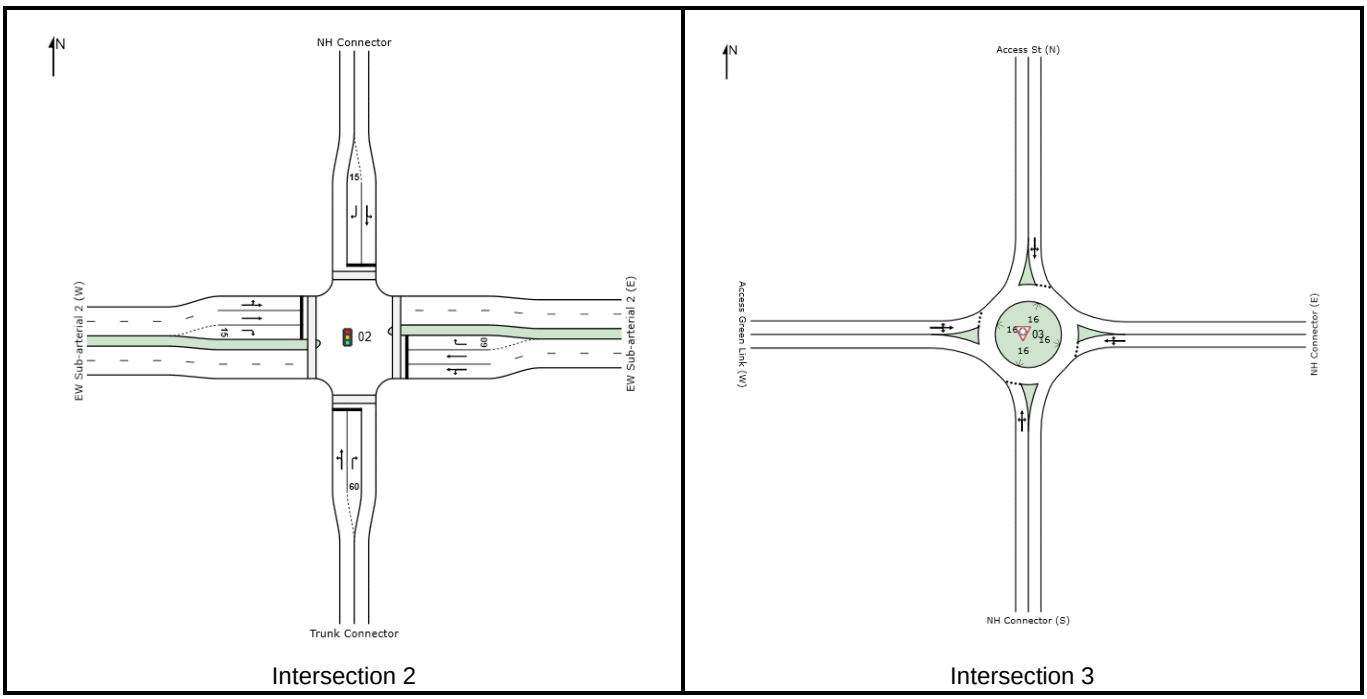
3.2.1 Ultimate Intersection Layout

Figure 3.3 shows the proposed ultimate intersection layout for both Intersections 2 and 3. It can be observed that Intersection 3 maintains the same layout as its interim arrangement, as it is expected that traffic volumes at the intersection will remain similar in the ultimate development.

Intersection 2 will be constructed as a 4-way signalised intersection in the ultimate arrangement.

Turning volumes extracted from MWH's updated VISUM models 2016 are attached in **Appendix A**.

Figure 3.3 Ultimate Intersection Layout



Intersection 2 | Intersection 3

3.2.2 Ultimate Intersection Performance

SIDRA 7.0 was utilised to assess the ultimate arrangement of the intersections. As with the interim arrangement, a 120 second cycle time was adopted for the signalised intersection.

Table 3.3 summarises the performance of the intersections in the ultimate year 2031. Intersection 2 will operate at LOS C during both AM and PM peak hours, with volume on capacity ratio of 0.477 and 0.419 for the AM and PM peak hours respectively. These comply with the design criteria stated in the LGIA. The longest queue of 114.3m during the morning peak will occur on the western approach, while the longest queue of 100.8m during the evening peak will occur on the eastern approach.

Intersection 3 is anticipated to perform as per year 2025, as traffic volumes are expected to remain similar with no additional developments surrounding the intersection.

Table 3.3 Ultimate Intersection Performance

Year	Peak	Intersection	Intersection Type	DOS	Ave Delay (s)	LOS	95% Queue (m)
2031	AM	2	4-way Signals	0.477	34.8	C	114.3
		3	4- way Roundabout	0.080	7.0	A	2.8
	PM	2	4-way Signals	0.419	32.4	C	100.8
		3	4- way Roundabout	0.084	5.1	A	3.2

3.3 Schools

It is anticipated that two schools will be located adjacent to Intersection 2 – one on the north-western corner which is included with this application, and one on the south-eastern corner which will be included in subsequent development application. These schools will generate high volumes of private vehicle traffic during the morning peak hour, as parents drop off their children at the schools. ***Figure 3.4*** shows the locations of the schools in Precincts 11 and 12.

Figure 3.4 Schools locations in Precincts 11 and 12.

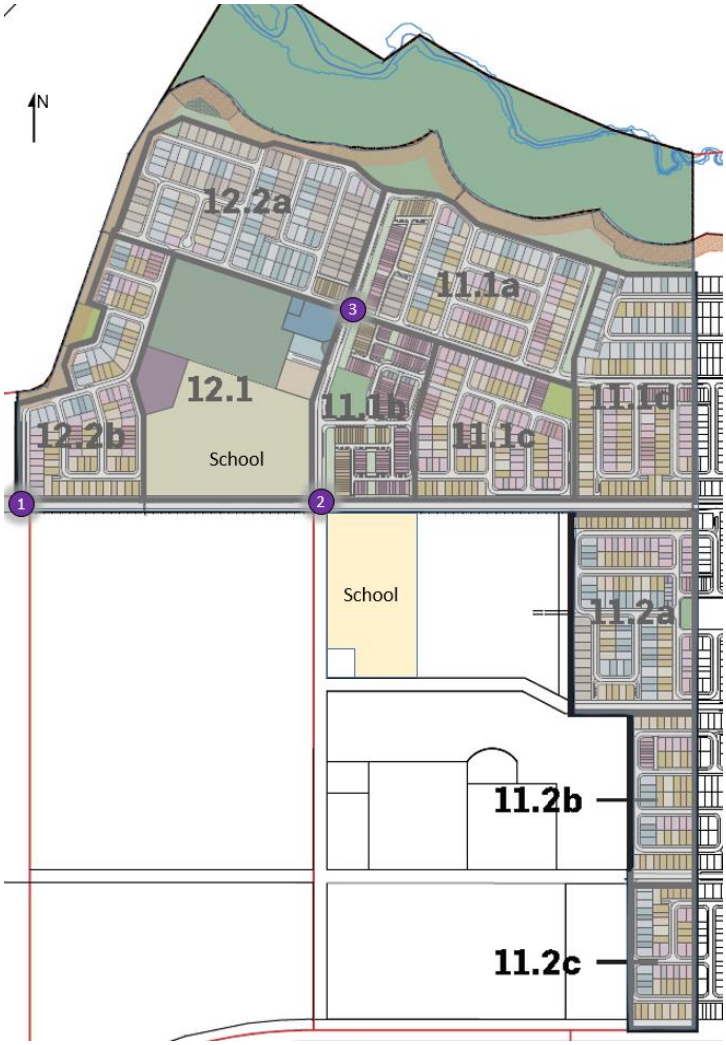
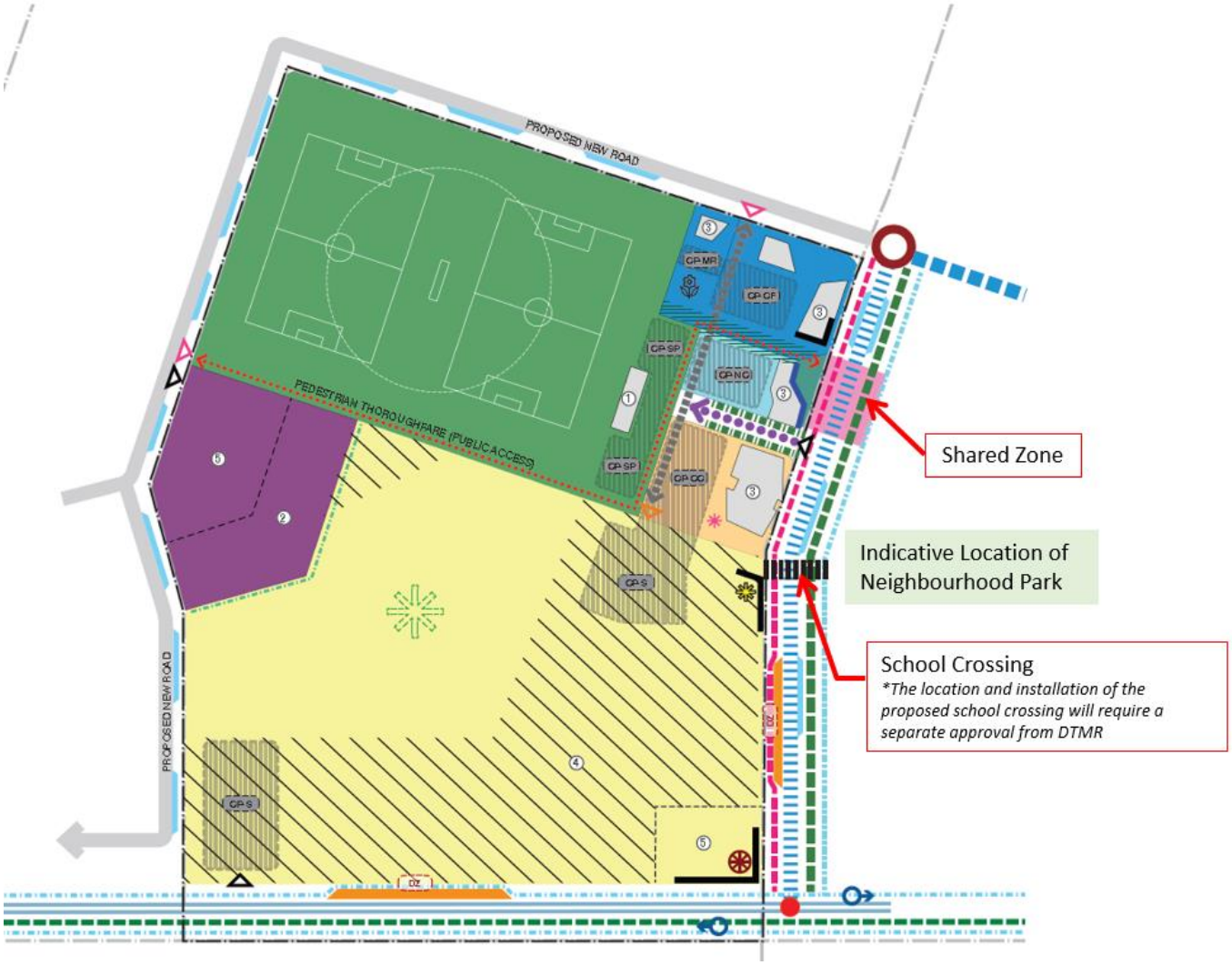


Figure 3.5 details the planning controls for the school within Sub-precinct 12.1 as included in the Plan of Development. The layout shows two potential accesses to the school –one on East-West Sub-arterial and one on the link between Intersections 2 and 3, via the community hub between the pedestrian crossing and shared zone. Indicative layout for the school on the south-eastern corner is yet to be confirmed. However, for the purpose of this assessment, it is assumed that access to the school will be located on the southern approach of Intersection 2.

Figure 3.5 Preliminary School Layout



SIDRA analysis of the ultimate arrangement of Intersection 2 indicates that the maximum queue length on the northern approach is approximately 56m. With the current potential access point via the community hub, located between the pedestrian crossing and shared zone, the queue length on the northern approach of Intersection 2 is unlikely to impact on the entry/exit movements from the school. Queue length for Intersection 3 is minimal hence it is also unlikely to impact on the vehicles accessing the school.

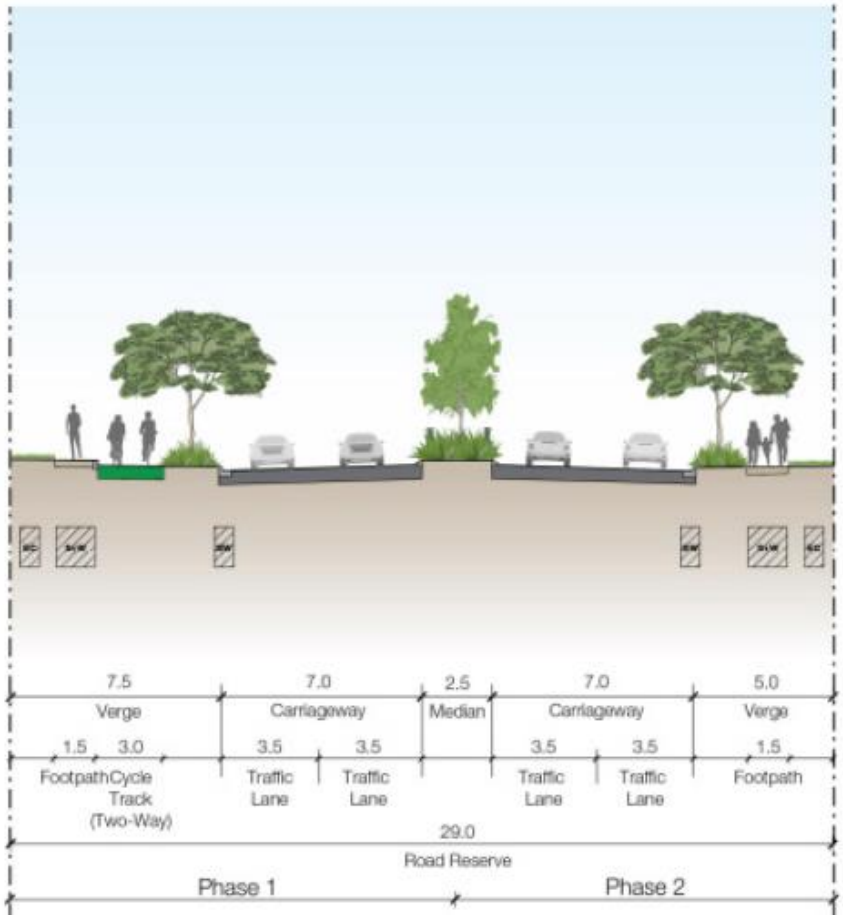
Similarly, for the school on the south-eastern corner, assuming that the access point will be located near the southern edge of the block, the anticipated maximum queue length of 39.7m is on the southern approach of Intersection 2 is unlikely to impact on the operation of the school.

Figure 3.5 indicated there will be a potential pedestrian crossing on the northern approach to Intersection 2. The location of the pedestrian crossing will provide better accessibility for pedestrians walking to the school, commercial hub and Neighbourhood Park. It is unlikely that the queue at Intersection 2 will impact on the operation of the pedestrian crossing as it is shorter than the distance between the intersection and pedestrian crossing.

3.4 East-West Sub-arterial

As mentioned in Section 3, the East-West Sub-arterial joining Intersection 2 will be constructed initially as a two lane two way carriageway. Trigger for the ultimate form of the East-West Sub-arterial east of Intersection 2, as mentioned in the LGIA (refer ***Figure 3.6***), is to complete the remaining two lanes before traffic volumes exceed 9,000 vehicles per day per lane on the road constructed in Phase 1. For the section west of Intersection 2, the LGIA has not indicated a trigger for the construction of the ultimate arrangement.

Figure 3.6 Cross section layout for East-West Sub-arterial



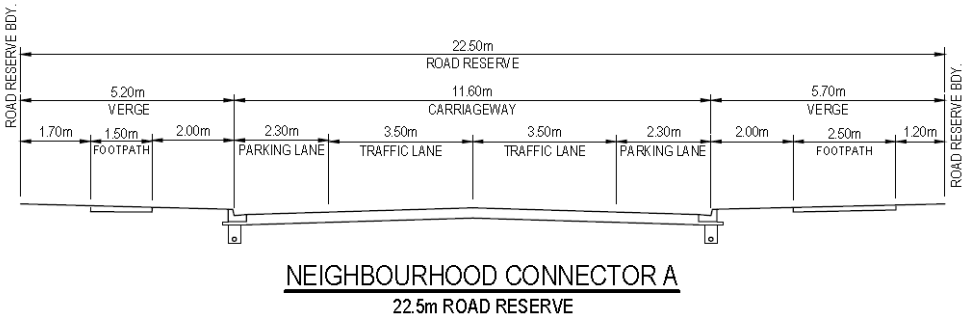
For the section east of Intersection 2, westbound traffic with the development of Sub-precincts 11.1, 11.2, 12.1 and 12.2, is estimated to be 4,200 vehicles per day, while eastbound traffic is estimated to be 4,050 vehicles per day. These daily traffic volumes are approximately half of the indicated trigger for the ultimate form of the East-West Sub-arterial. For year 2031, based on volumes from MWH's VISUM model 2016, daily westbound traffic is estimated to be 6,850 vehicles while eastbound traffic is estimated to be 8,000 vehicles per day. Based on these volumes, duplication of the East-West Sub-arterial is not expected to occur until post 2031.

The delivery of the infrastructure duplications will be verified through ongoing monitoring and collection of traffic volumes in line with the infrastructure agreement.

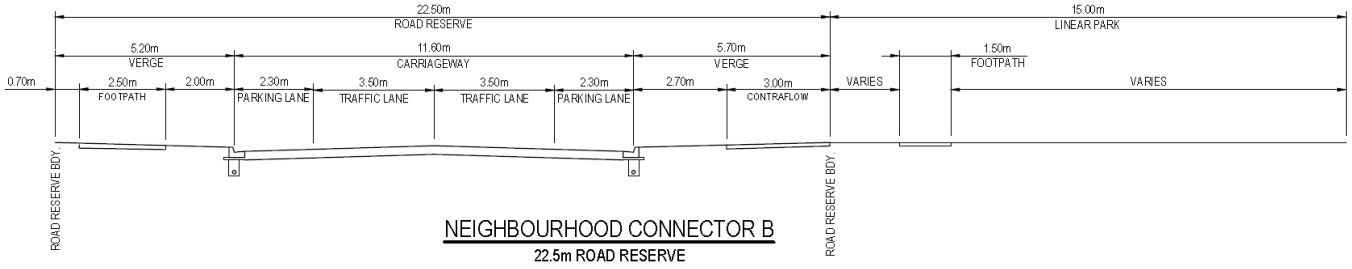
3.5 Precinct Traffic Analysis

Proposed Precincts 11 and 12 associated with this application (north of the east-west sub-arterial) are linked via Neighbourhood Connector A and Neighbourhood Connector B as identified in the image below.

Both the proposed Neighbourhood Connector A and B are contained within a 22.5m road reserve and provides a total carriageway width of 11.6m. The carriageway consists of 2 x 3.5m trafficable lanes and 2 x 2.3m parking lanes as illustrated in the cross section below.



NEIGHBOURHOOD CONNECTOR A
22.5m ROAD RESERVE



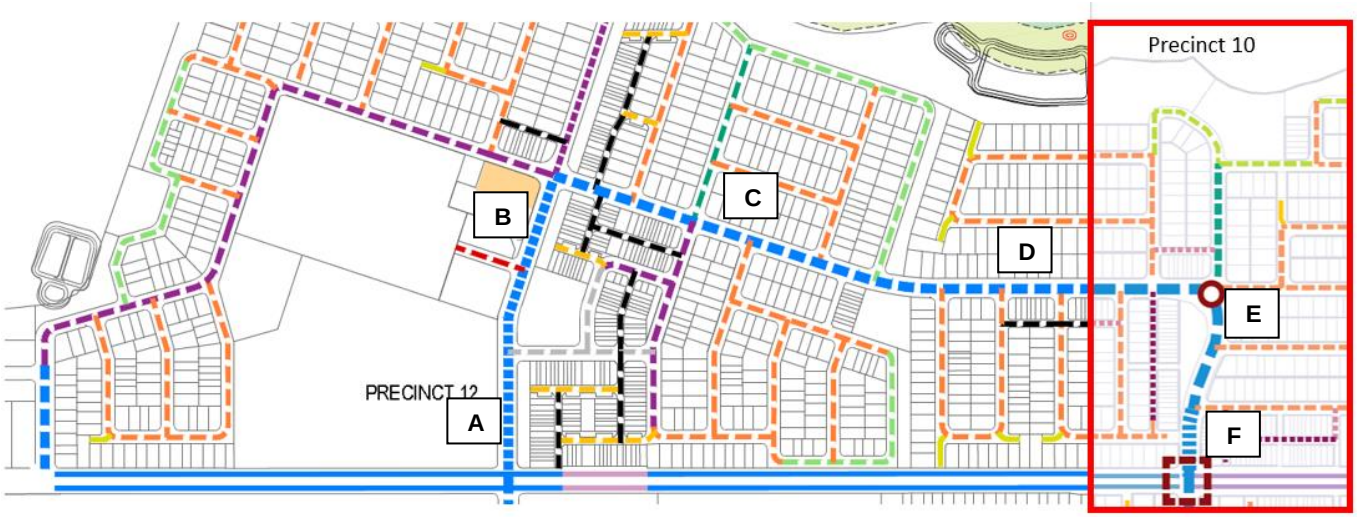
In accordance with the ULDA Guideline No 6 Street & Movement Network (April 2012) a Neighbourhood Connector has the following characteristics:

Street Type	**Neighbourhood Connector Street**
Function	Neighbourhood connector streets connect neighbourhood destinations including shops and parks, provide access to the surrounding road network and can include a bus and cycling route.
Traffic volume	**< 7,500vpd**
Reserve width	19.5 metres
Carriageway width	9.5 - 12 metres
Median (width)	No
No. traffic lanes	2 x 3.5 metres (1 each direction)
Parking / No. street sides	minimum on one or both sides
Footpath width / No. street sides	1.5 metres minimum on both sides

As MWH's strategic models focussed on the major roads, details on traffic volumes for the local internal roads within P11 and P12 were not available. In order to ensure traffic volumes for the Neighbourhood Connector Street comply with the allowable limit for the street type, daily traffic volumes for the proposed development has been prepared from first principles using available information and in accordance with the development yield in **Section 2**. It should be noted that no public transport and active travel mode share discounts have been applied in these calculations, and future traffic volumes are highly likely to be lower with the completion of the pedestrian, cycle and public transport networks.

These calculations confirm that the proposed Neighbourhood Connector and associated road networks comply with development standards, with traffic volumes less than 7,500 VPD as required from such a road hierarchy. The following table provides a summary of the estimated vehicles per day (VPD) which will utilise each leg of the Neighbourhood Connector below. It is also noted that the eastern legs of this Neighbourhood Connector contained within Precinct 10 (links E and F which are outside of this development application) have been checked to ensure compliance.

Road Link	**Vehicles Per Day (VPD)**
A	6,840
B	3,120
C	1,710
D	2,210
E	3,170
F	4,050



3.6 Intersections within Precinct 10

It is noted that traffic from Sub-precincts 11.1, 11.2, 12.1 and 12.2 will travel through several intersections within Precinct 10 to access Aura Boulevard and the wider network. These intersections have been assessed to ensure acceptable performance is maintained in relation to traffic from the sub-precincts. However, results for these intersections have not been included as they are outside the boundaries of the current application. It is also noted that these intersections will be assessed in regards to the whole masterplan during the detailed design stage for Precinct 10, which is beyond the scope of this application.

4 Conclusions

Traffic assessment was conducted for two intersections within Sub-precincts 11.1, 11.2, 12.1 and 12.2 to determine their proposed interim and ultimate layouts and performance. These intersections were selected as they are deemed to be the major intersections within the sub-precincts.

Results of the assessment show that both Intersections 2 and 3 will be performing at good level of service during both the interim and ultimate horizons, with the worst LOS being C. Both intersections have volume on capacity ratio less than the criteria specified in the LGIA.

The results also show that in the ultimate horizon, queueing on both the northern and southern approaches of Intersection 2 is unlikely to impede on turning movements into and out of the accesses for both schools. The pedestrian crossing adjacent to the school on the north-western corner will likely operate without being impacted by Intersection 2.

Based on traffic volumes from the MWH Caloundra South Transport model, the East-West Sub-arterial adjoining Intersection 2 will be able to operate in its initial form of one lane per direction, with duplication occurring post 2031.

It is noted that traffic from Sub-precincts 11.1, 11.2, 12.1 and 12.2 will travel through intersections in Precinct 10 to access the wider road network. These intersections were investigated in regards to land use and yield from Precinct 10 and Sub-precincts 11.1, 11.2, 12.1 and 12.2 and were shown to be operating at acceptable LOS. Results for these intersections are not included in this report as they fall outside the boundaries of the area under application. These intersections will be further investigated as part of the detailed design for Precinct 10.

Appendix A Traffic Volumes

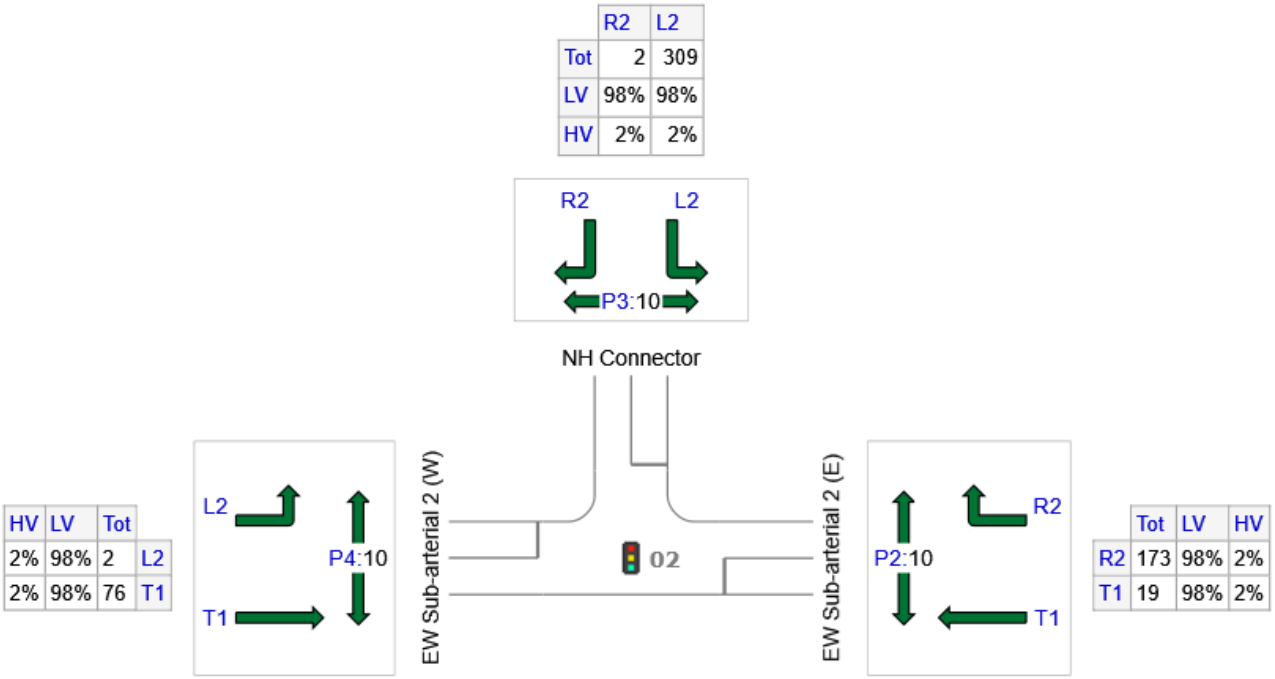
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 02 [2022 Site 02 - AM]

Site 02
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: EW Sub-arterial 2 (E)	192	188	4
N: NH Connector	311	305	6
W: EW Sub-arterial 2 (W)	78	76	2
Total	581	569	12

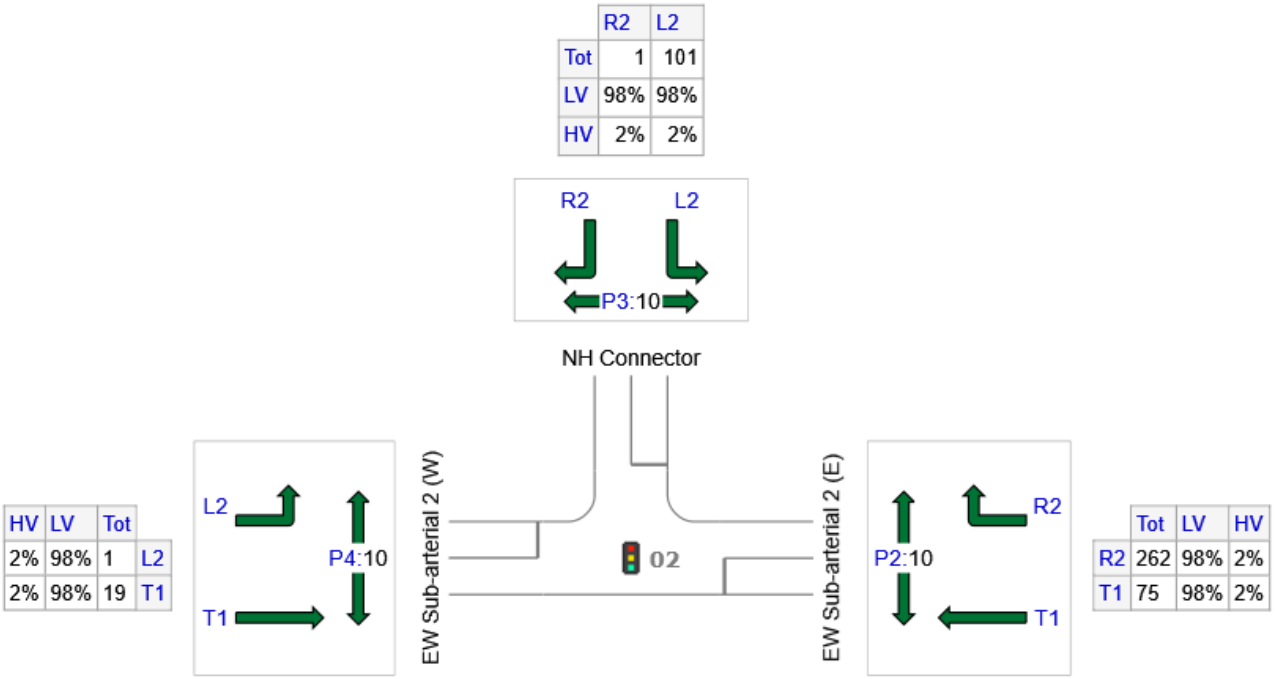
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 02 [2022 Site 02 - PM]

Site 02
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: EW Sub-arterial 2 (E)	337	330	7
N: NH Connector	102	100	2
W: EW Sub-arterial 2 (W)	20	20	0
Total	459	450	9

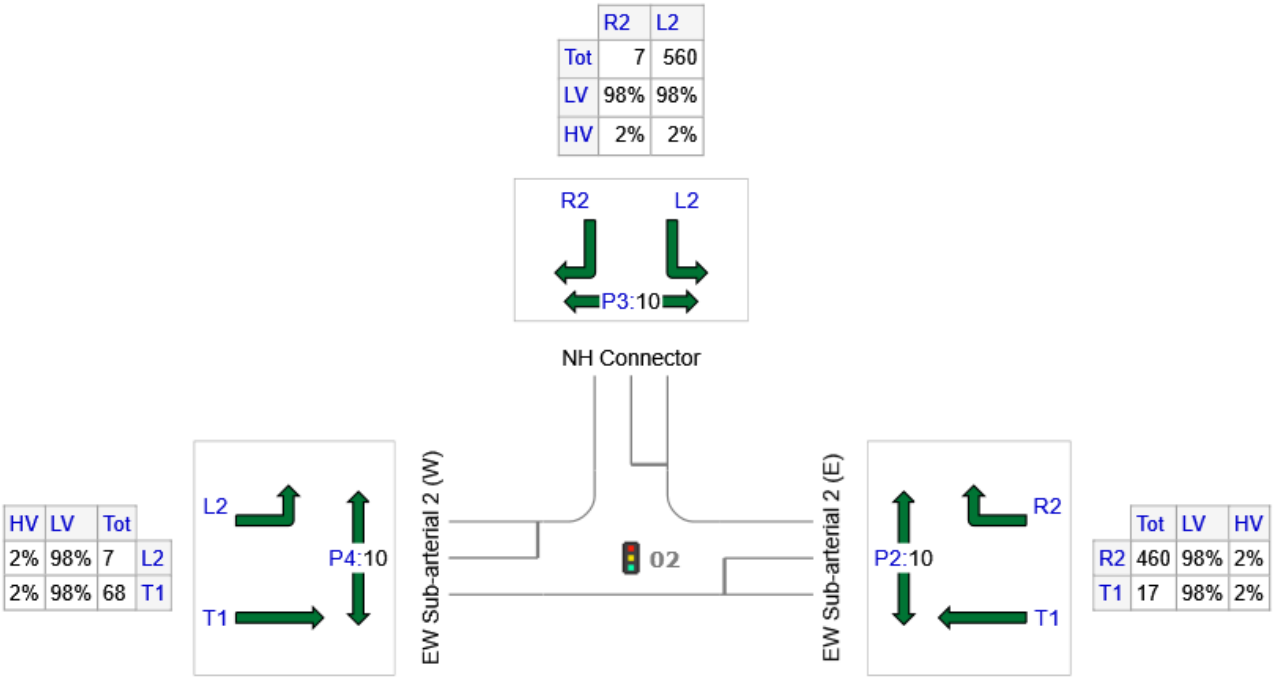
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 02 [2025 Site 02 - AM]

Site 02
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: EW Sub-arterial 2 (E)	477	467	10
N: NH Connector	567	556	11
W: EW Sub-arterial 2 (W)	75	74	2
Total	1119	1097	22

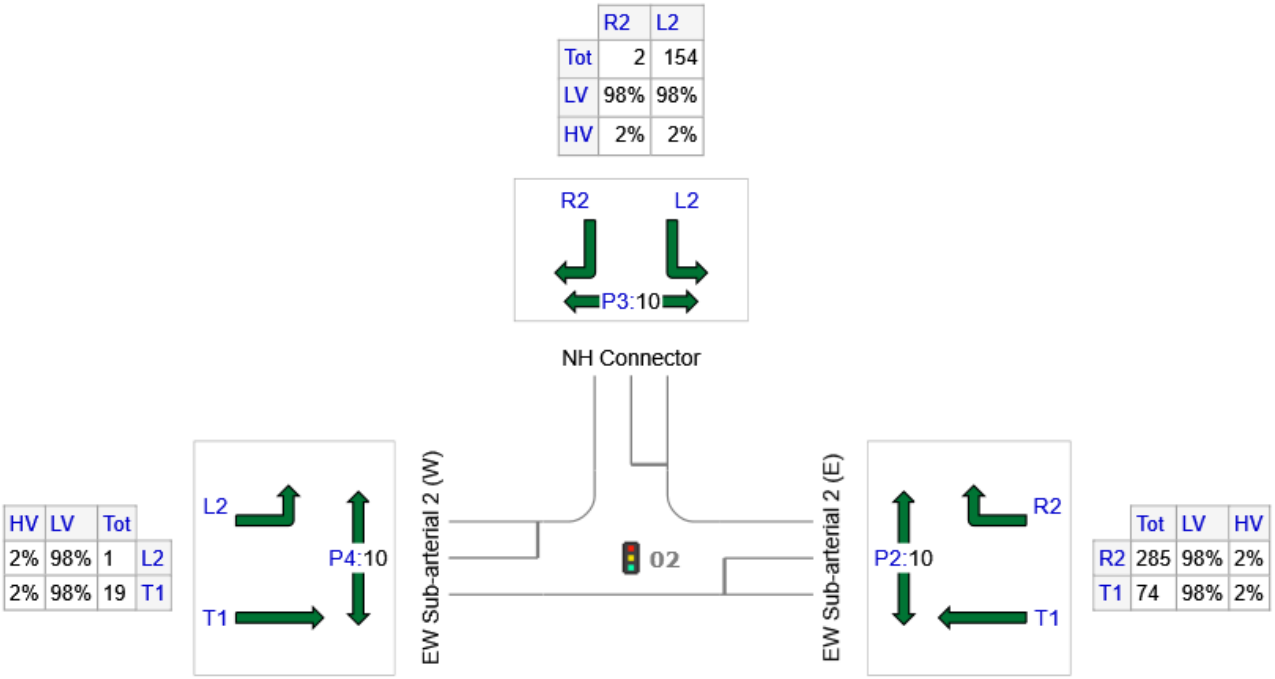
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 02 [2025 Site 02 - PM]

Site 02
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: EW Sub-arterial 2 (E)	359	352	7
N: NH Connector	156	153	3
W: EW Sub-arterial 2 (W)	20	20	0
Total	535	524	11

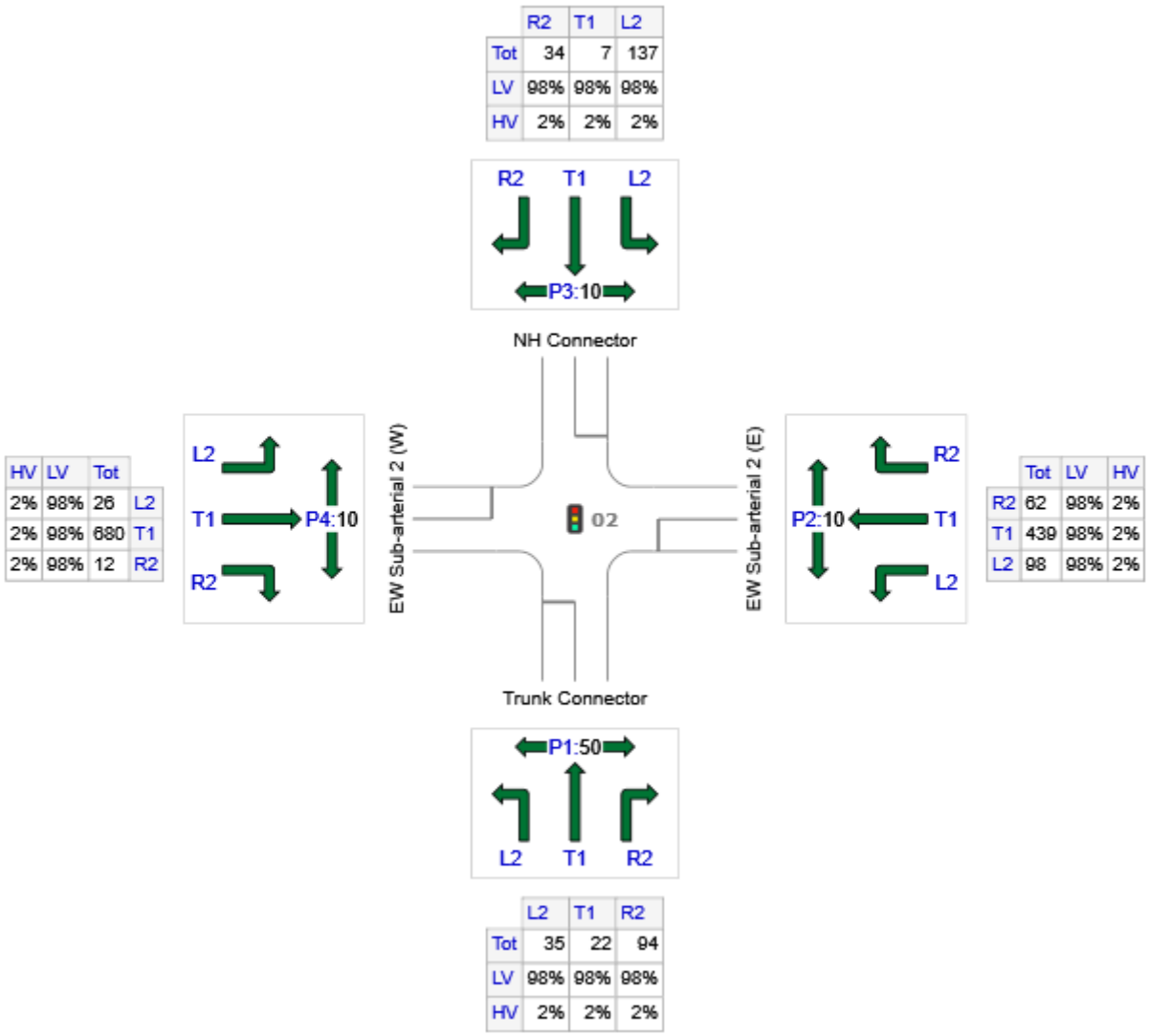
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 02 [2031 Site 02 - AM]

Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Trunk Connector	151	148	3
E: EW Sub-arterial 2 (E)	599	587	12
N: NH Connector	178	174	4
W: EW Sub-arterial 2 (W)	718	704	14
Total	1646	1613	33

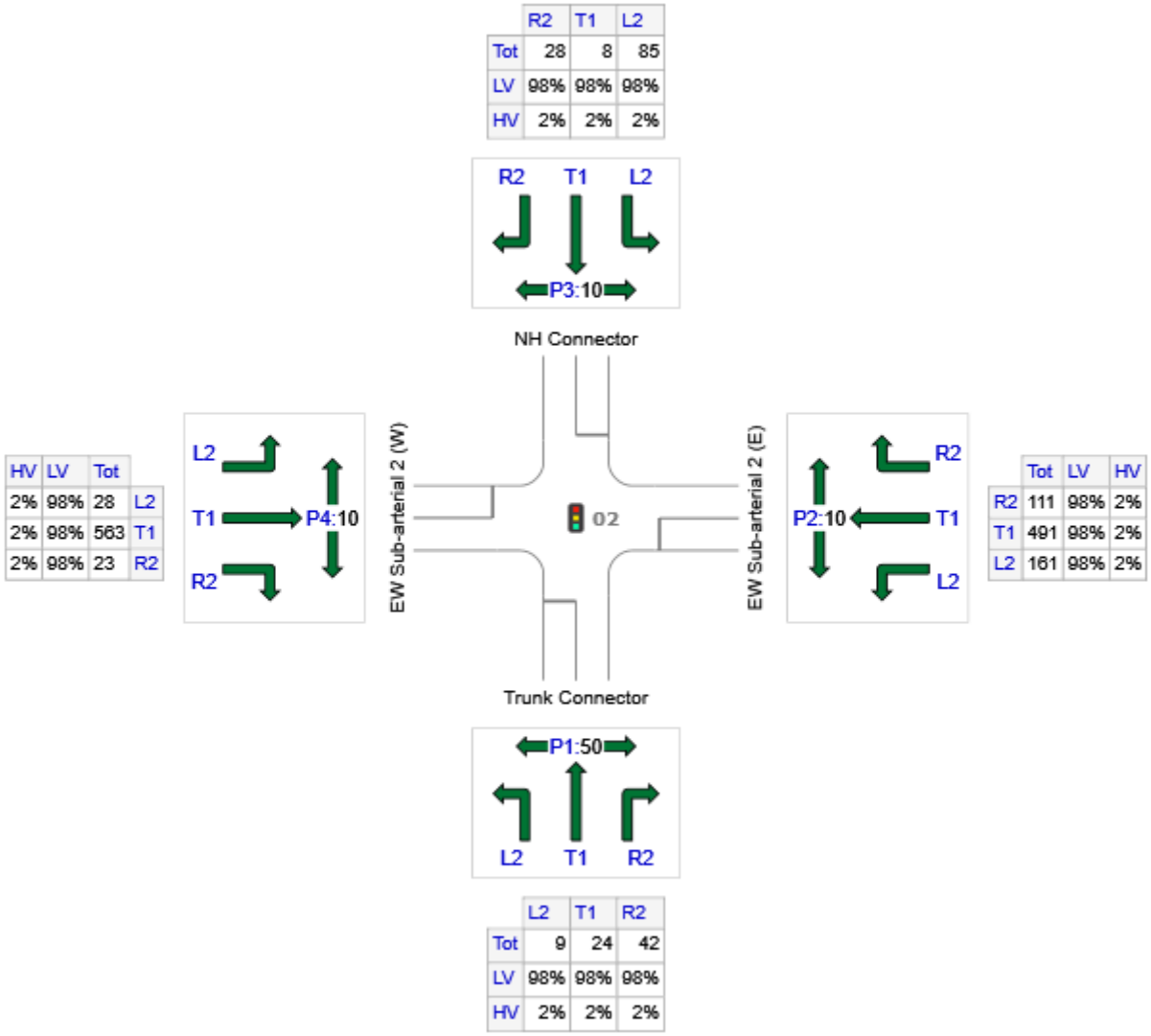
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 02 [2031 Site 02 - PM]

Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Trunk Connector	75	74	2
E: EW Sub-arterial 2 (E)	763	748	15
N: NH Connector	121	119	2
W: EW Sub-arterial 2 (W)	614	602	12
Total	1573	1542	31

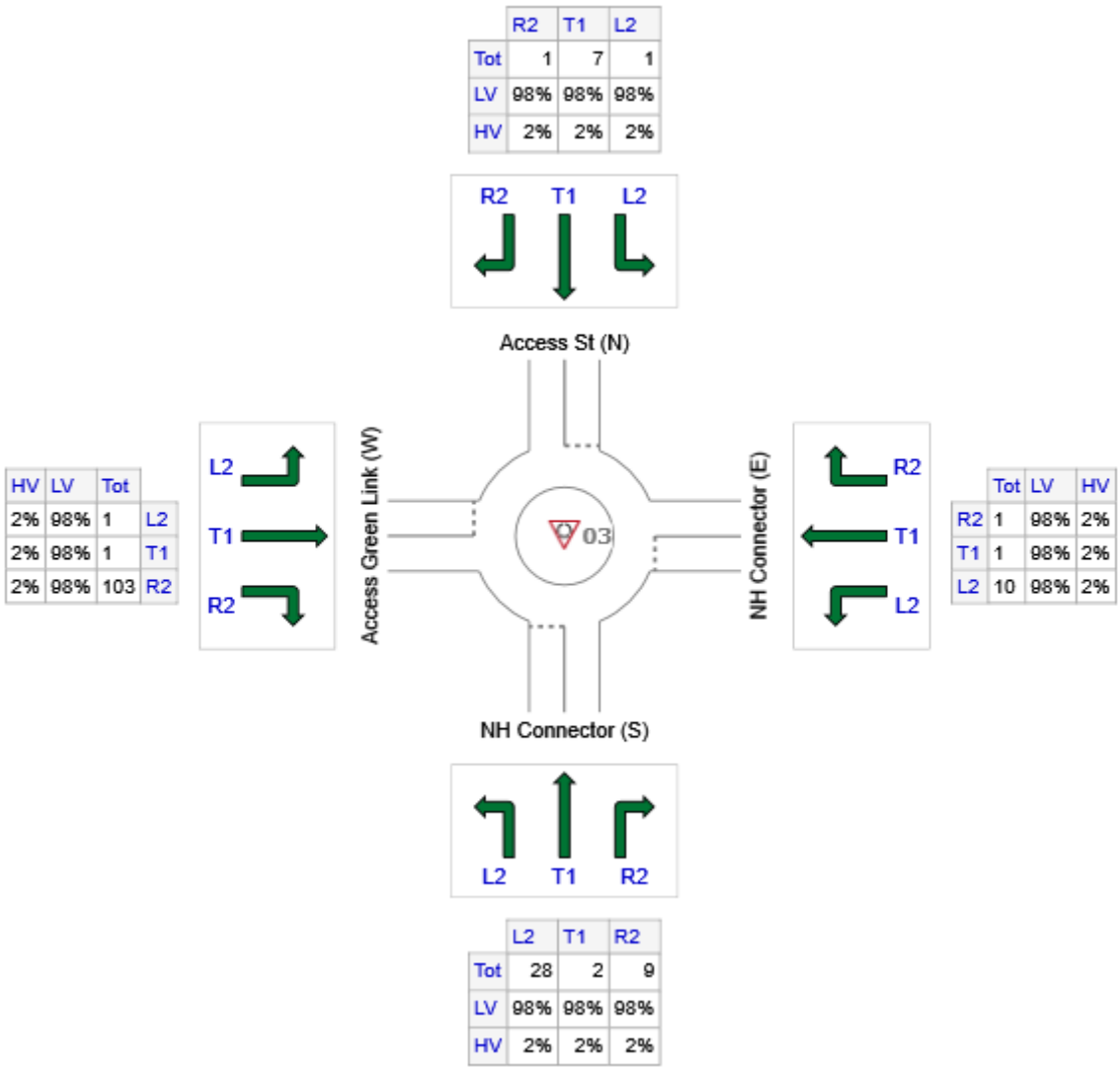
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 03 [2022 Site 03 - AM]

Site 03
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: NH Connector (S)	39	38	1
E: NH Connector (E)	12	12	0
N: Access St (N)	9	9	0
W: Access Green Link (W)	105	103	2
Total	165	162	3

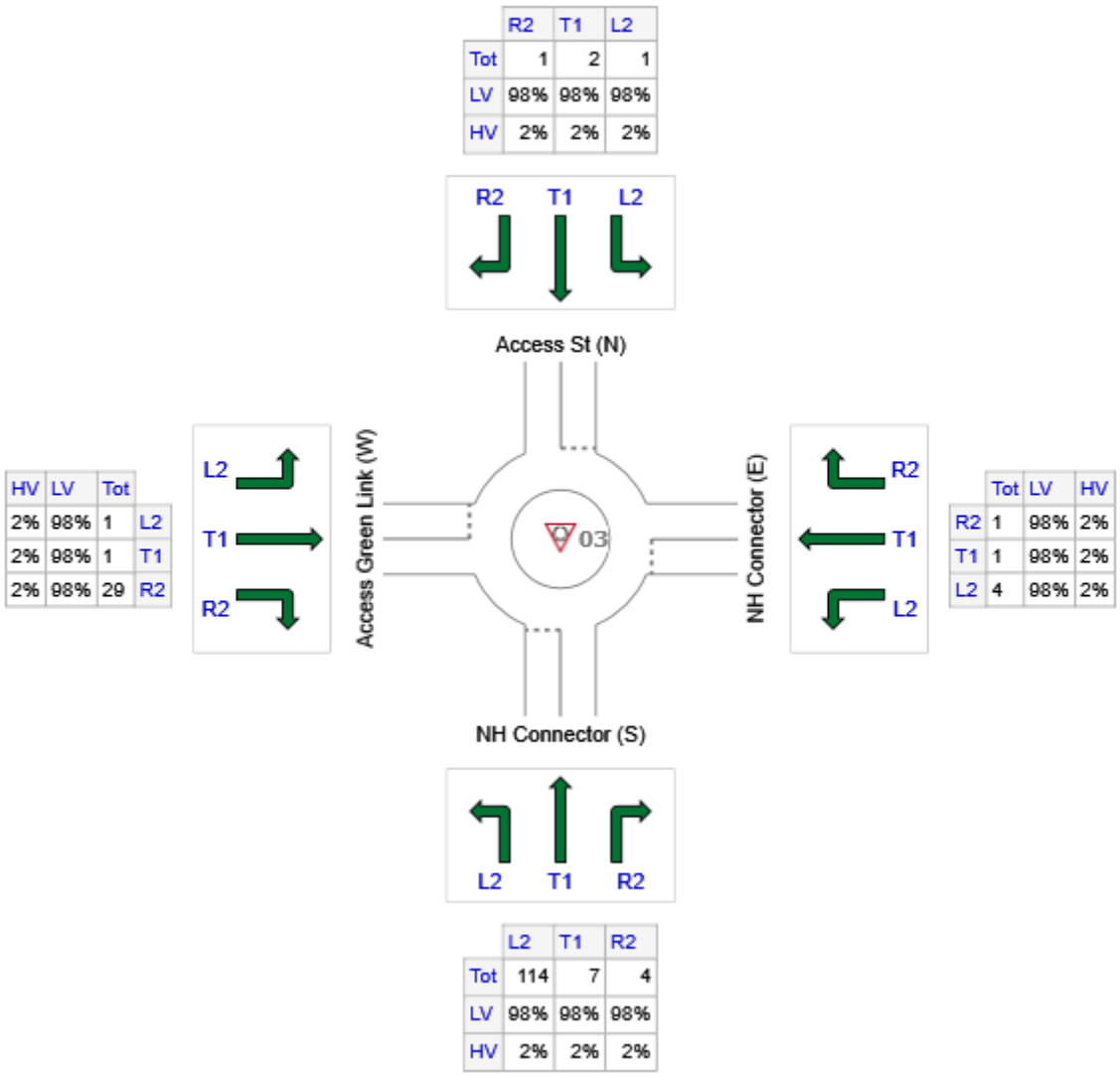
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 03 [2022 Site 03 - PM]

Site 03
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: NH Connector (S)	125	123	3
E: NH Connector (E)	6	6	0
N: Access St (N)	4	4	0
W: Access Green Link (W)	31	30	1
Total	166	163	3

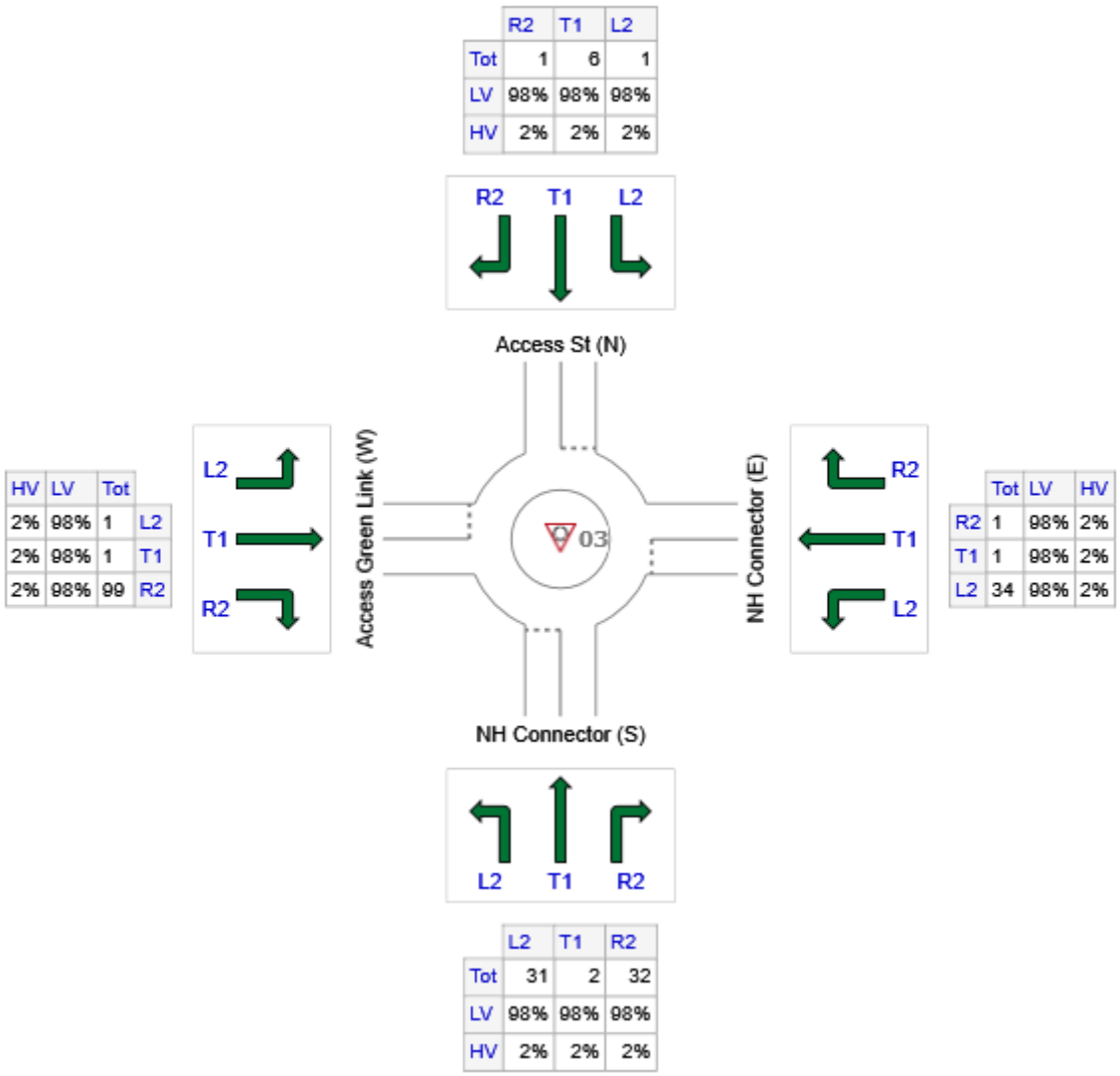
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 03 [2025-2031 Site 03 - AM]

Site 03
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: NH Connector (S)	65	64	1
E: NH Connector (E)	36	35	1
N: Access St (N)	8	8	0
W: Access Green Link (W)	101	99	2
Total	210	206	4

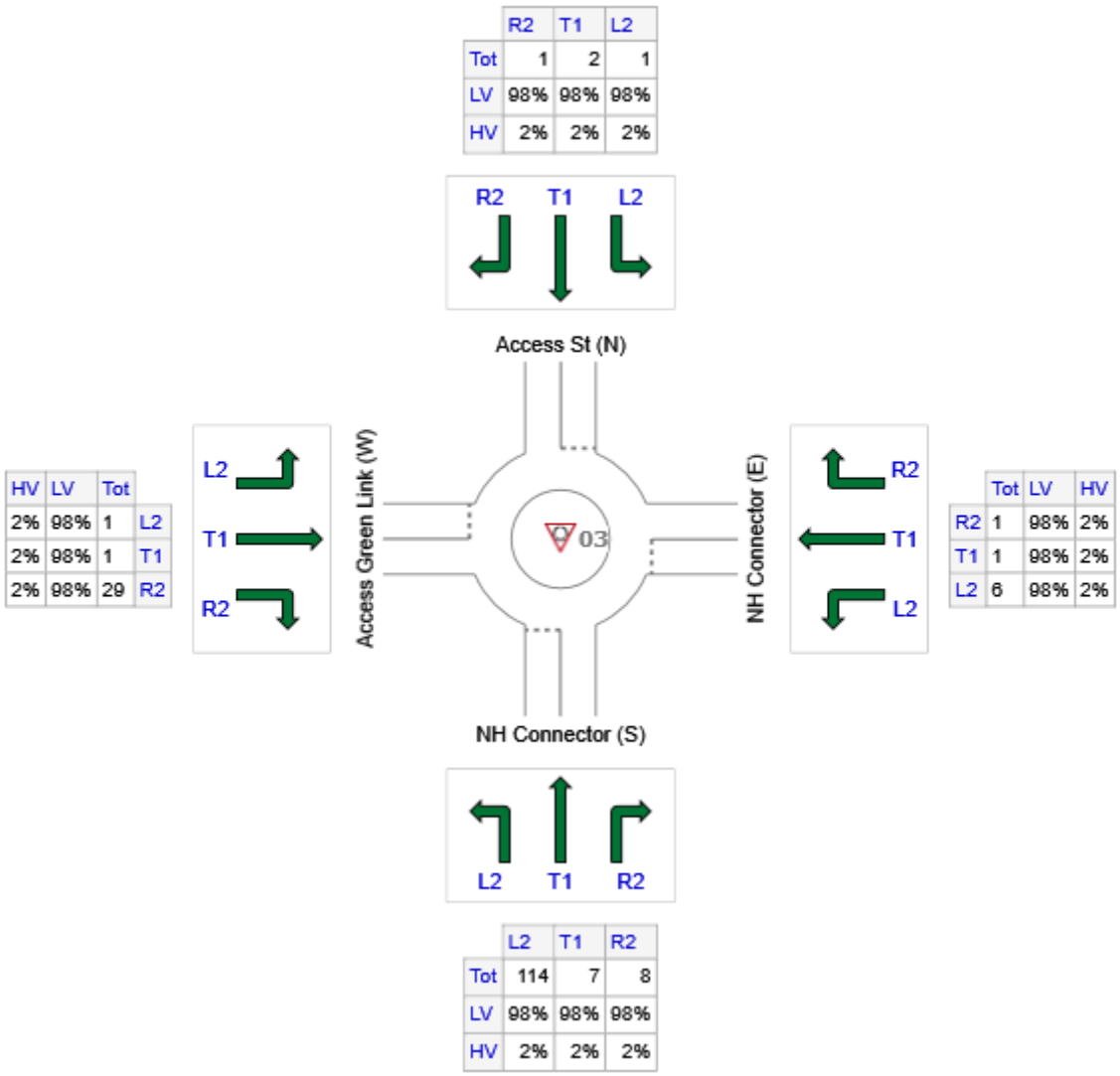
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 03 [2025-2031 Site 03 - PM]

Site 03
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: NH Connector (S)	129	126	3
E: NH Connector (E)	8	8	0
N: Access St (N)	4	4	0
W: Access Green Link (W)	31	30	1
Total	172	169	3

PRECINCTS 11 & 12 (PART): TRAFFIC ASSESSMENT

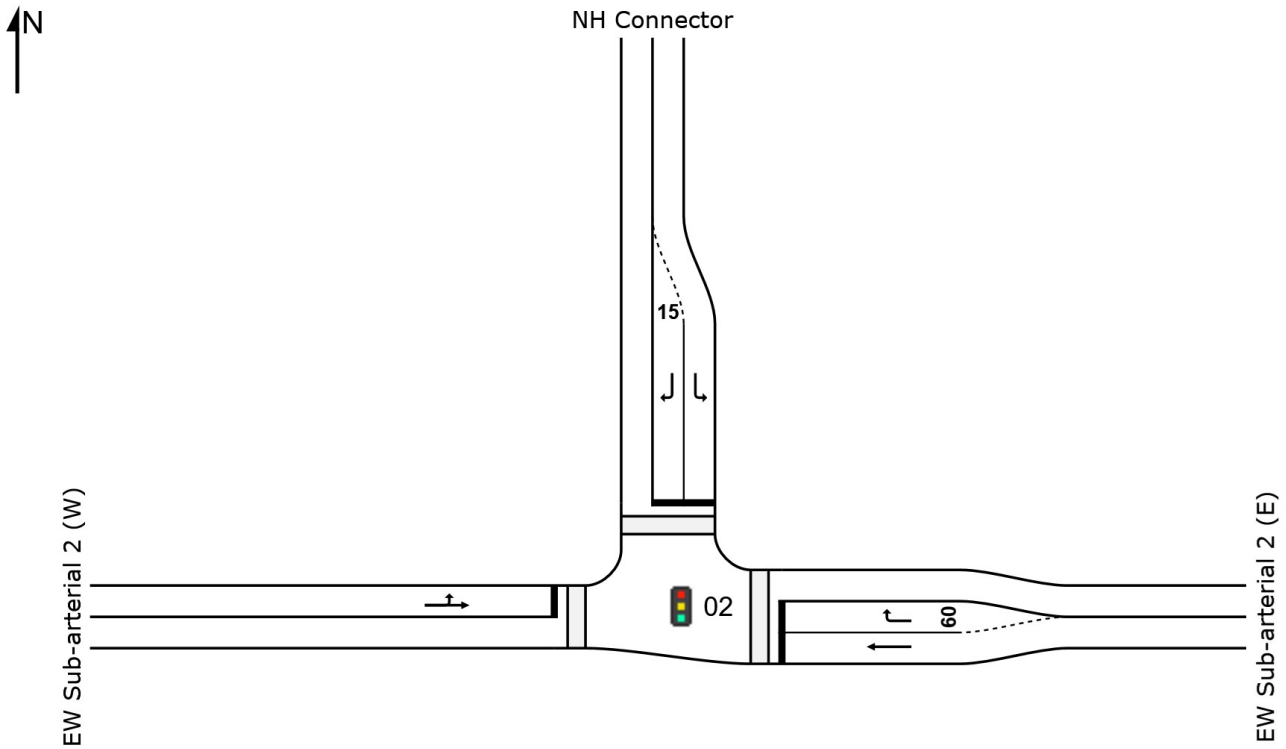
Appendix B SIDRA Outputs

STOCKLAND

SITE LAYOUT

Site: 02 [2022 Site 02 - AM]

Site 02
Signals - Fixed Time Isolated



Organisation: CALIBRE CONSULTING (QLD) PTY LTD | Created: Monday, 9 April 2018 12:41:37 PM
Project: H:\17-000000\17-003001\9_Tech\Traffic\P11&P12\Aura P11-P12 IC2_3 20180329_REV3.sip7

MOVEMENT SUMMARY

Site: 02 [2022 Site 02 - AM]

Site 02
Signals - Fixed Time Isolated Cycle Time = 120 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
East: EW Sub-arterial 2 (E)											
5	T1	20	2.0	0.059	44.4	LOS D	1.0	6.9	0.86	0.62	37.9
6	R2	182	2.0	0.176	19.2	LOS B	5.1	36.4	0.52	0.72	45.2
Approach		202	2.0	0.176	21.7	LOS C	5.1	36.4	0.55	0.71	44.3
North: NH Connector											
7	L2	325	2.0	0.247	11.7	LOS B	6.4	45.5	0.37	0.69	49.7
9	R2	2	2.0	0.010	55.9	LOS E	0.1	0.8	0.90	0.62	27.7
Approach		327	2.0	0.247	12.0	LOS B	6.4	45.5	0.37	0.69	49.5
West: EW Sub-arterial 2 (W)											
10	L2	2	2.0	0.242	51.9	LOS D	4.2	29.8	0.90	0.71	30.5
11	T1	80	2.0	0.242	46.3	LOS D	4.2	29.8	0.90	0.71	37.2
Approach		82	2.0	0.242	46.5	LOS D	4.2	29.8	0.90	0.71	37.1
All Vehicles		612	2.0	0.247	19.8	LOS B	6.4	45.5	0.50	0.70	45.4

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

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	11	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	11	47.7	LOS E	0.0	0.0	0.89	0.89
P4	West Full Crossing	11	14.0	LOS B	0.0	0.0	0.48	0.48
All Pedestrians		32	38.6	LOS D			0.78	0.78

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

LANE SUMMARY

Site: 02 [2022 Site 02 - AM]

Site 02
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: EW Sub-arterial 2 (E)													
Lane 1	20	2.0	340	0.059	100	44.4	LOS D	1.0	6.9	Full	750	0.0	0.0
Lane 2	182	2.0	1033	0.176	100	19.2	LOS B	5.1	36.4	Short	60	0.0	NA
Approach	202	2.0		0.176		21.7	LOS C	5.1	36.4				
North: NH Connector													
Lane 1	325	2.0	1318[1]	0.247	100	11.7	LOS B	6.4	45.5	Full	320	0.0	0.0
Lane 2	2	2.0	216	0.010	100	55.9	LOS E	0.1	0.8	Short	15	0.0	NA
Approach	327	2.0		0.247		12.0	LOS B	6.4	45.5				
West: EW Sub-arterial 2 (W)													
Lane 1	82	2.0	340	0.242	100	46.5	LOS D	4.2	29.8	Full	500	0.0	0.0
Approach	82	2.0		0.242		46.5	LOS D	4.2	29.8				
Intersection	612	2.0		0.247		19.8	LOS B	6.4	45.5				

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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 02 [2022 Site 02 - AM]

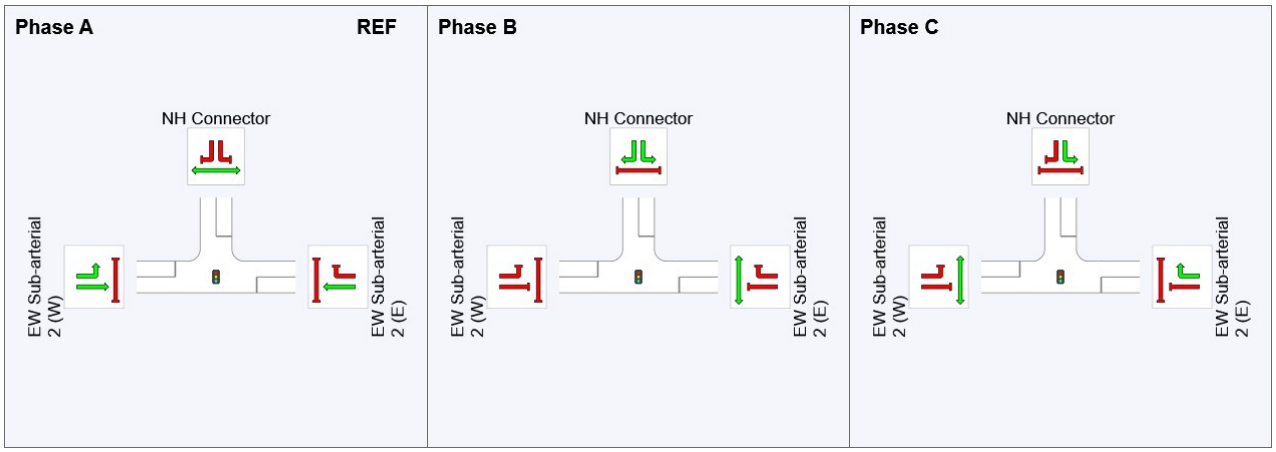
Site 02
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: 3 Phase
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	27	47
Green Time (sec)	21	14	67
Phase Time (sec)	27	20	73
Phase Split	23%	17%	61%

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

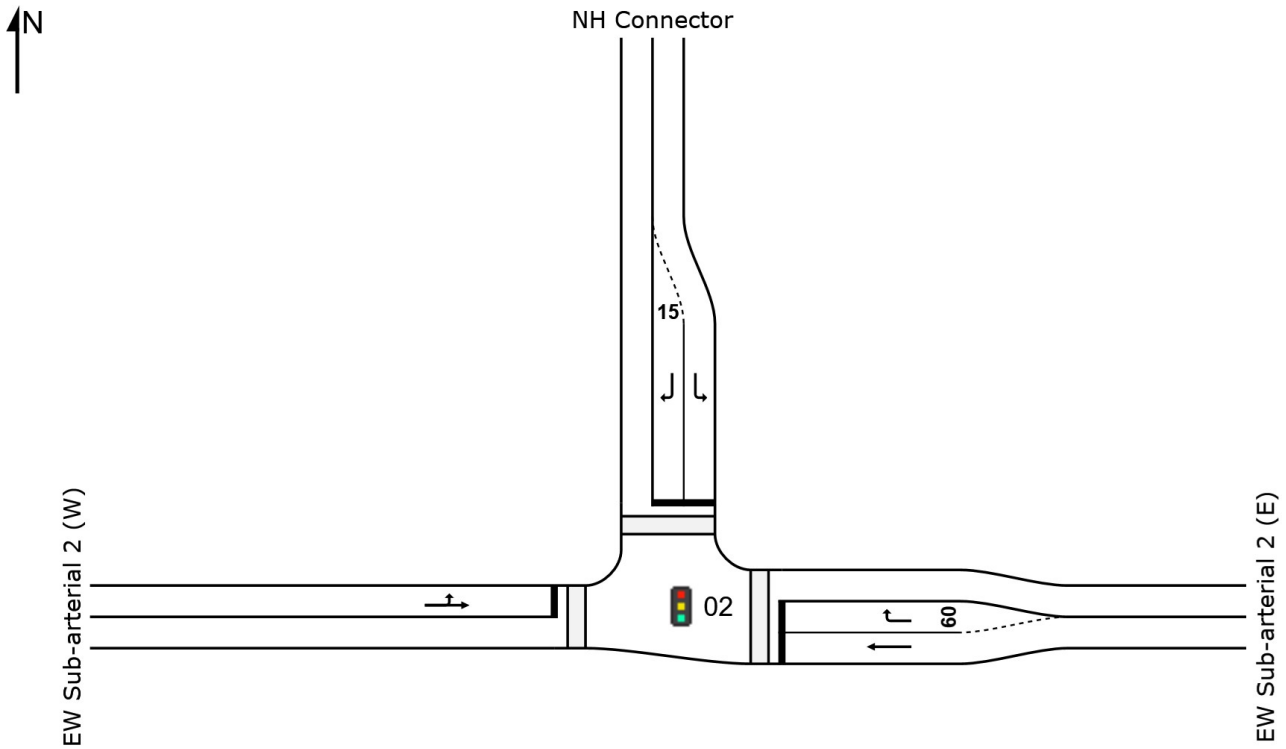


REF: Reference Phase
VAR: Variable Phase

SITE LAYOUT

Site: 02 [2022 Site 02 - PM]

Site 02
Signals - Fixed Time Isolated



Organisation: CALIBRE CONSULTING (QLD) PTY LTD | Created: Monday, 9 April 2018 12:42:03 PM
Project: H:\17-000000\17-003001\9_Tech\Traffic\P11&P12\Aura P11-P12 IC2_3 20180329_REV3.sip7

MOVEMENT SUMMARY

Site: 02 [2022 Site 02 - PM]

Site 02
Signals - Fixed Time Isolated Cycle Time = 120 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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: EW Sub-arterial 2 (E)											
5	T1	79	2.0	0.232	46.2	LOS D	4.0	28.6	0.90	0.70	37.3
6	R2	276	2.0	0.239	16.0	LOS B	7.0	49.6	0.47	0.72	47.0
Approach		355	2.0	0.239	22.7	LOS C	7.0	49.6	0.57	0.71	44.1
North: NH Connector											
7	L2	106	2.0	0.080	10.9	LOS B	1.8	12.9	0.32	0.65	50.2
9	R2	1	2.0	0.011	65.5	LOS E	0.1	0.4	0.97	0.59	25.4
Approach		107	2.0	0.080	11.4	LOS B	1.8	12.9	0.32	0.65	49.8
West: EW Sub-arterial 2 (W)											
10	L2	1	2.0	0.062	50.0	LOS D	1.0	7.3	0.86	0.63	31.1
11	T1	20	2.0	0.062	44.4	LOS D	1.0	7.3	0.86	0.63	37.8
Approach		21	2.0	0.062	44.7	LOS D	1.0	7.3	0.86	0.63	37.5
All Vehicles		483	2.0	0.239	21.2	LOS C	7.0	49.6	0.53	0.70	44.8

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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	11	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	11	47.7	LOS E	0.0	0.0	0.89	0.89
P4	West Full Crossing	11	10.4	LOS B	0.0	0.0	0.42	0.42
All Pedestrians		32	37.4	LOS D			0.75	0.75

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.

LANE SUMMARY

Site: 02 [2022 Site 02 - PM]

Site 02
Signals - Fixed Time Isolated Cycle Time = 120 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	%	%
East: EW Sub-arterial 2 (E)													
Lane 1	79	2.0	340	0.232	100	46.2	LOS D	4.0	28.6	Full	750	0.0	0.0
Lane 2	276	2.0	1156	0.239	100	16.0	LOS B	7.0	49.6	Short	60	0.0	NA
Approach	355	2.0		0.239		22.7	LOS C	7.0	49.6				
North: NH Connector													
Lane 1	106	2.0	1326	0.080	100	10.9	LOS B	1.8	12.9	Full	320	0.0	0.0
Lane 2	1	2.0	93	0.011	100	65.5	LOS E	0.1	0.4	Short	15	0.0	NA
Approach	107	2.0		0.080		11.4	LOS B	1.8	12.9				
West: EW Sub-arterial 2 (W)													
Lane 1	21	2.0	339	0.062	100	44.7	LOS D	1.0	7.3	Full	500	0.0	0.0
Approach	21	2.0		0.062		44.7	LOS D	1.0	7.3				
Intersection	483	2.0		0.239		21.2	LOS C	7.0	49.6				

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: 02 [2022 Site 02 - PM]

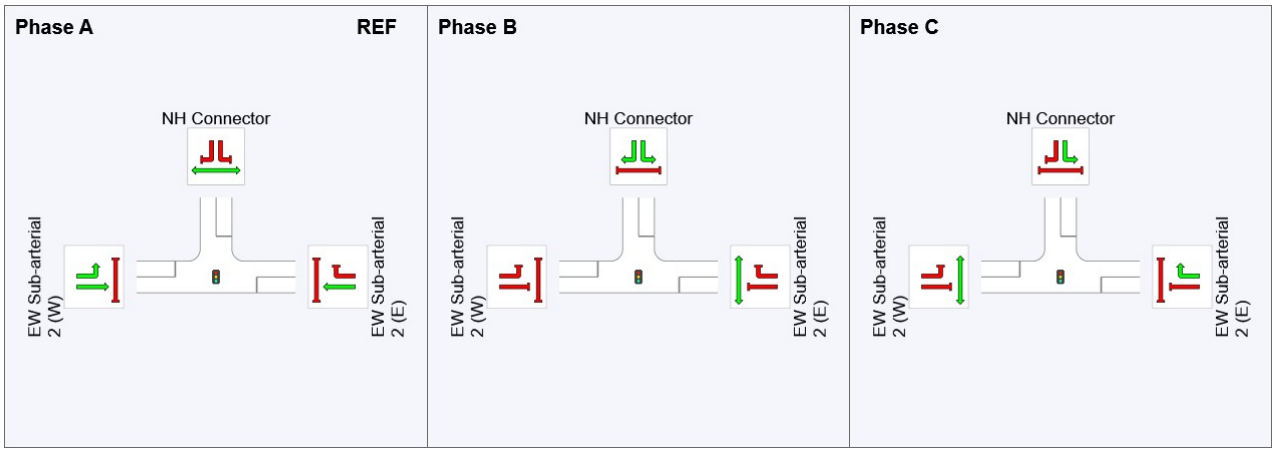
Site 02
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: 3 Phase
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	27	39
Green Time (sec)	21	6	75
Phase Time (sec)	27	12	81
Phase Split	23%	10%	68%

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

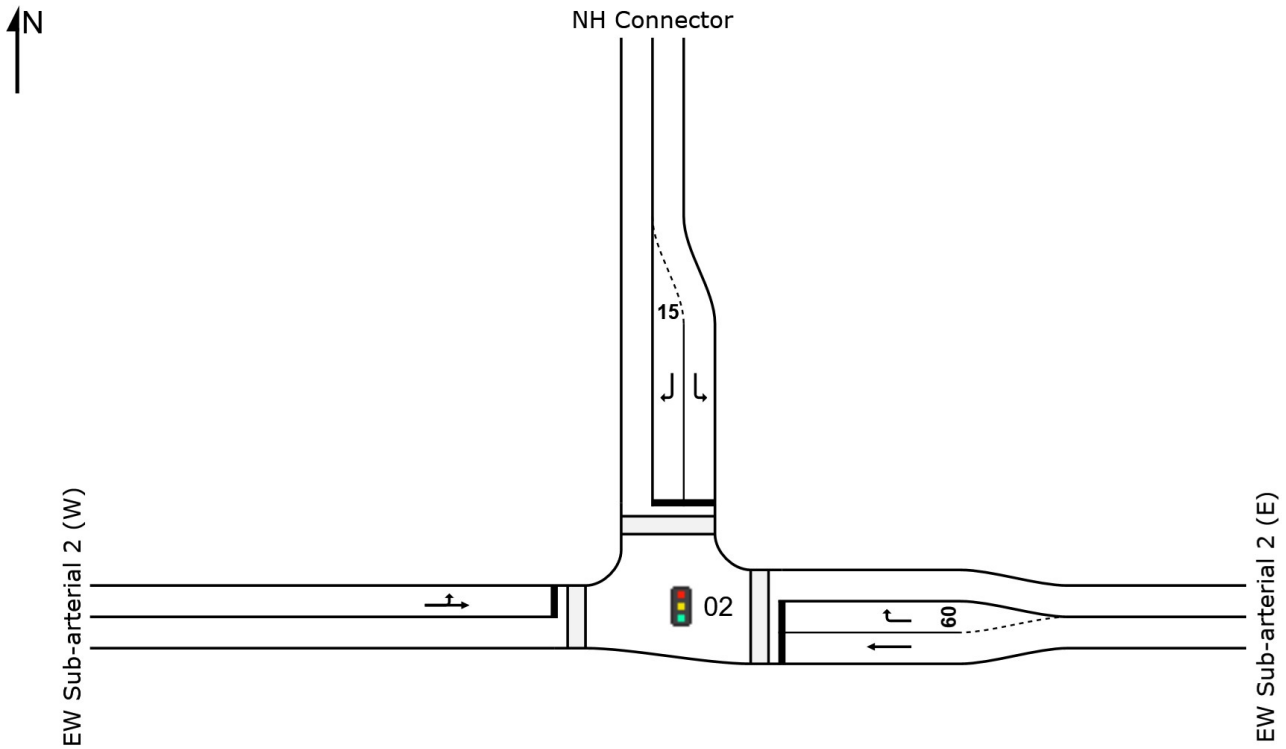


REF: Reference Phase
VAR: Variable Phase

SITE LAYOUT

Site: 02 [2025 Site 02 - AM]

Site 02
Signals - Fixed Time Isolated



Organisation: CALIBRE CONSULTING (QLD) PTY LTD | Created: Monday, 9 April 2018 12:42:27 PM
Project: H:\17-000000\17-003001\9_Tech\Traffic\P11&P12\Aura P11-P12 IC2_3 20180329_REV3.sip7

MOVEMENT SUMMARY

Site: 02 [2025 Site 02 - AM]

Site 02
Signals - Fixed Time Isolated Cycle Time = 120 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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: EW Sub-arterial 2 (E)											
5	T1	18	2.0	0.085	52.7	LOS D	1.0	6.8	0.93	0.66	35.4
6	R2	484	2.0	0.378	13.7	LOS B	11.6	82.5	0.45	0.72	48.3
Approach		502	2.0	0.378	15.1	LOS B	11.6	82.5	0.47	0.72	47.6
North: NH Connector											
7	L2	589	2.0	0.412	9.9	LOS A	10.7	76.3	0.34	0.69	50.9
9	R2	7	2.0	0.080	67.0	LOS E	0.4	3.1	0.98	0.66	25.1
Approach		597	2.0	0.412	10.6	LOS B	10.7	76.3	0.35	0.69	50.4
West: EW Sub-arterial 2 (W)											
10	L2	7	2.0	0.378	60.8	LOS E	4.4	31.6	0.97	0.75	27.9
11	T1	72	2.0	0.378	55.2	LOS E	4.4	31.6	0.97	0.75	34.6
Approach		79	2.0	0.378	55.7	LOS E	4.4	31.6	0.97	0.75	34.1
All Vehicles		1178	2.0	0.412	15.5	LOS B	11.6	82.5	0.44	0.71	47.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	11	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	11	54.2	LOS E	0.0	0.0	0.95	0.95
P4	West Full Crossing	11	7.4	LOS A	0.0	0.0	0.35	0.35
All Pedestrians		32	38.6	LOS D			0.75	0.75

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.

LANE SUMMARY

Site: 02 [2025 Site 02 - AM]

Site 02
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: EW Sub-arterial 2 (E)													
Lane 1	18	2.0	211	0.085	100	52.7	LOS D	1.0	6.8	Full	750	0.0	0.0
Lane 2	484	2.0	1280	0.378	100	13.7	LOS B	11.6	82.5	Short	60	0.0	NA
Approach	502	2.0		0.378		15.1	LOS B	11.6	82.5				
North: NH Connector													
Lane 1	589	2.0	1432[1]	0.412	100	9.9	LOS A	10.7	76.3	Full	320	0.0	0.0
Lane 2	7	2.0	93	0.080	100	67.0	LOS E	0.4	3.1	Short	15	0.0	NA
Approach	597	2.0		0.412		10.6	LOS B	10.7	76.3				
West: EW Sub-arterial 2 (W)													
Lane 1	79	2.0	209	0.378	100	55.7	LOS E	4.4	31.6	Full	500	0.0	0.0
Approach	79	2.0		0.378		55.7	LOS E	4.4	31.6				
Intersection	1178	2.0		0.412		15.5	LOS B	11.6	82.5				

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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 02 [2025 Site 02 - AM]

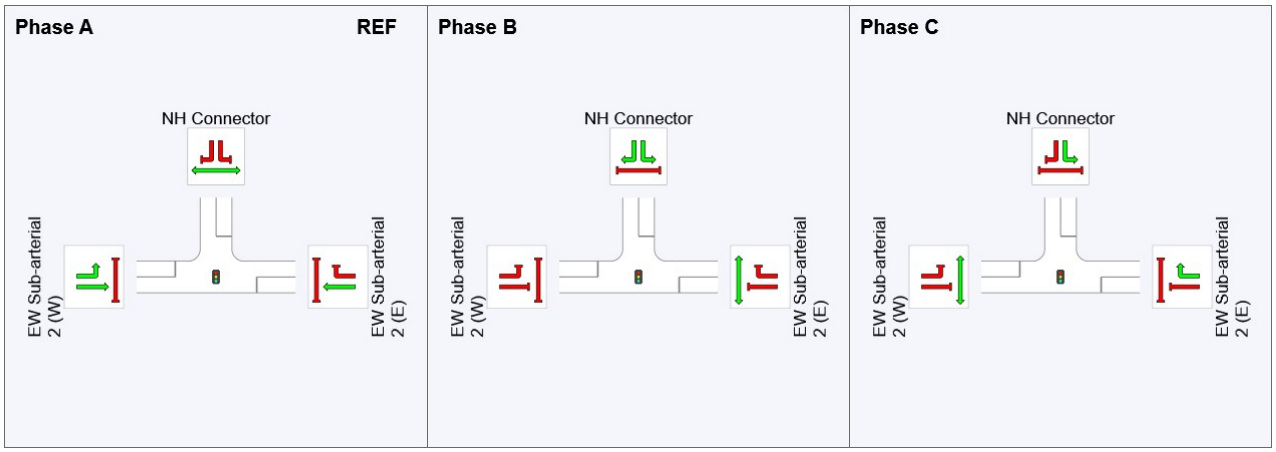
Site 02
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: 3 Phase
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	19	31
Green Time (sec)	13	6	83
Phase Time (sec)	19	12	89
Phase Split	16%	10%	74%

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

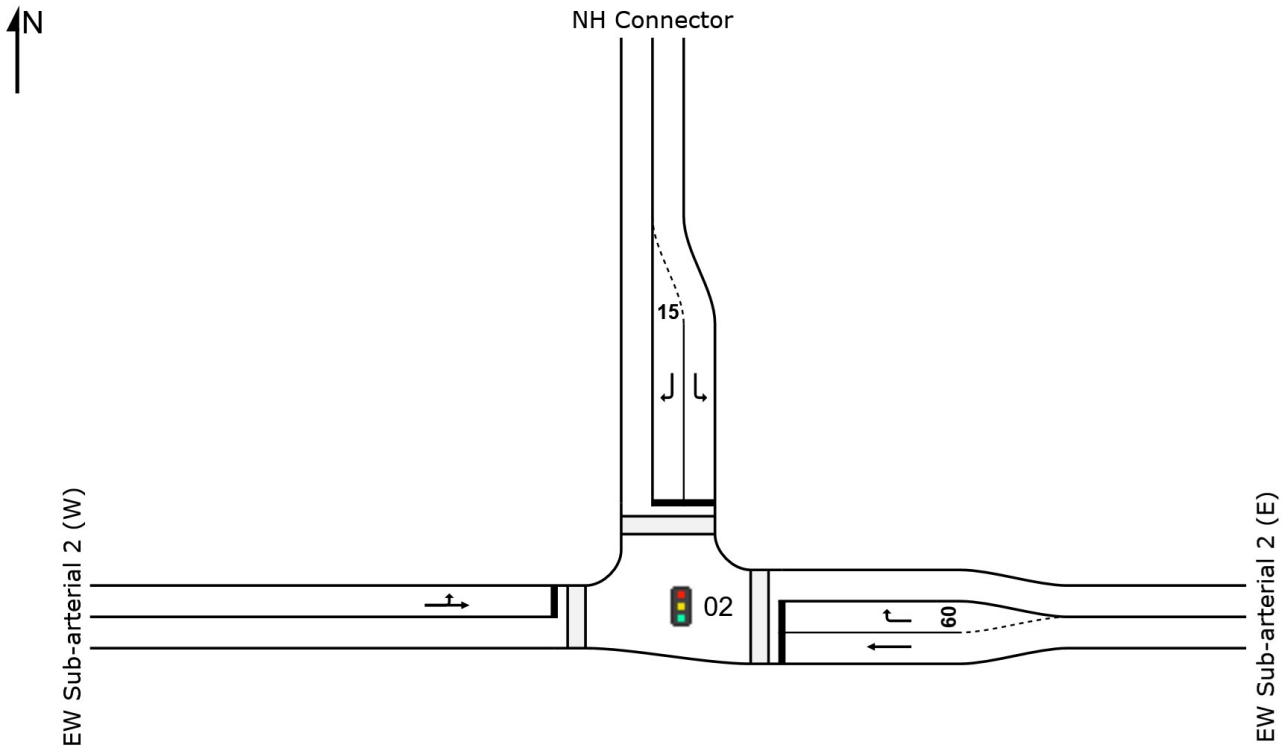


REF: Reference Phase
VAR: Variable Phase

SITE LAYOUT

Site: 02 [2025 Site 02 - PM]

Site 02
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 02 [2025 Site 02 - PM]

Site 02
Signals - Fixed Time Isolated Cycle Time = 120 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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: EW Sub-arterial 2 (E)											
5	T1	78	2.0	0.253	48.3	LOS D	4.1	28.8	0.92	0.71	36.7
6	R2	300	2.0	0.253	15.2	LOS B	7.3	52.3	0.46	0.71	47.4
Approach		378	2.0	0.253	22.0	LOS C	7.3	52.3	0.55	0.71	44.4
North: NH Connector											
7	L2	162	2.0	0.119	10.5	LOS B	2.7	19.2	0.31	0.66	50.5
9	R2	2	2.0	0.023	66.0	LOS E	0.1	0.9	0.97	0.61	25.3
Approach		164	2.0	0.119	11.2	LOS B	2.7	19.2	0.32	0.66	50.0
West: EW Sub-arterial 2 (W)											
10	L2	1	2.0	0.069	52.0	LOS D	1.1	7.5	0.88	0.64	30.5
11	T1	20	2.0	0.069	46.4	LOS D	1.1	7.5	0.88	0.64	37.1
Approach		21	2.0	0.069	46.7	LOS D	1.1	7.5	0.88	0.64	36.9
All Vehicles		563	2.0	0.253	19.8	LOS B	7.3	52.3	0.50	0.69	45.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	11	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	11	49.5	LOS E	0.0	0.0	0.91	0.91
P4	West Full Crossing	11	9.6	LOS A	0.0	0.0	0.40	0.40
All Pedestrians		32	37.8	LOS D			0.75	0.75

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.

LANE SUMMARY

Site: 02 [2025 Site 02 - PM]

Site 02
Signals - Fixed Time Isolated Cycle Time = 120 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	%	%
East: EW Sub-arterial 2 (E)													
Lane 1	78	2.0	308	0.253	100	48.3	LOS D	4.1	28.8	Full	750	0.0	0.0
Lane 2	300	2.0	1187	0.253	100	15.2	LOS B	7.3	52.3	Short	60	0.0	NA
Approach	378	2.0		0.253		22.0	LOS C	7.3	52.3				
North: NH Connector													
Lane 1	162	2.0	1357	0.119	100	10.5	LOS B	2.7	19.2	Full	320	0.0	0.0
Lane 2	2	2.0	93	0.023	100	66.0	LOS E	0.1	0.9	Short	15	0.0	NA
Approach	164	2.0		0.119		11.2	LOS B	2.7	19.2				
West: EW Sub-arterial 2 (W)													
Lane 1	21	2.0	307	0.069	100	46.7	LOS D	1.1	7.5	Full	500	0.0	0.0
Approach	21	2.0		0.069		46.7	LOS D	1.1	7.5				
Intersection	563	2.0		0.253		19.8	LOS B	7.3	52.3				

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: 02 [2025 Site 02 - PM]

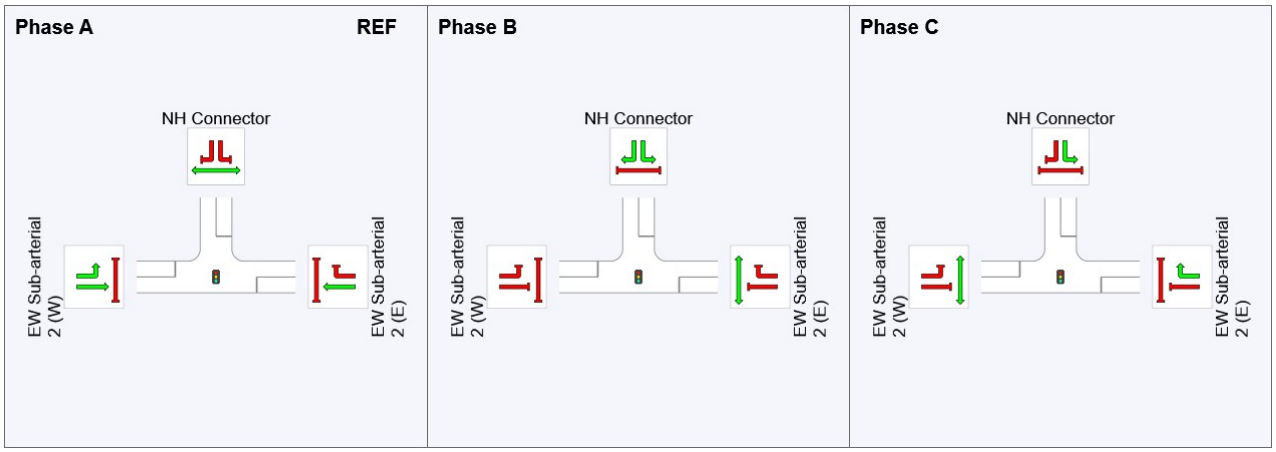
Site 02
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: 3 Phase
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	25	37
Green Time (sec)	19	6	77
Phase Time (sec)	25	12	83
Phase Split	21%	10%	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%.

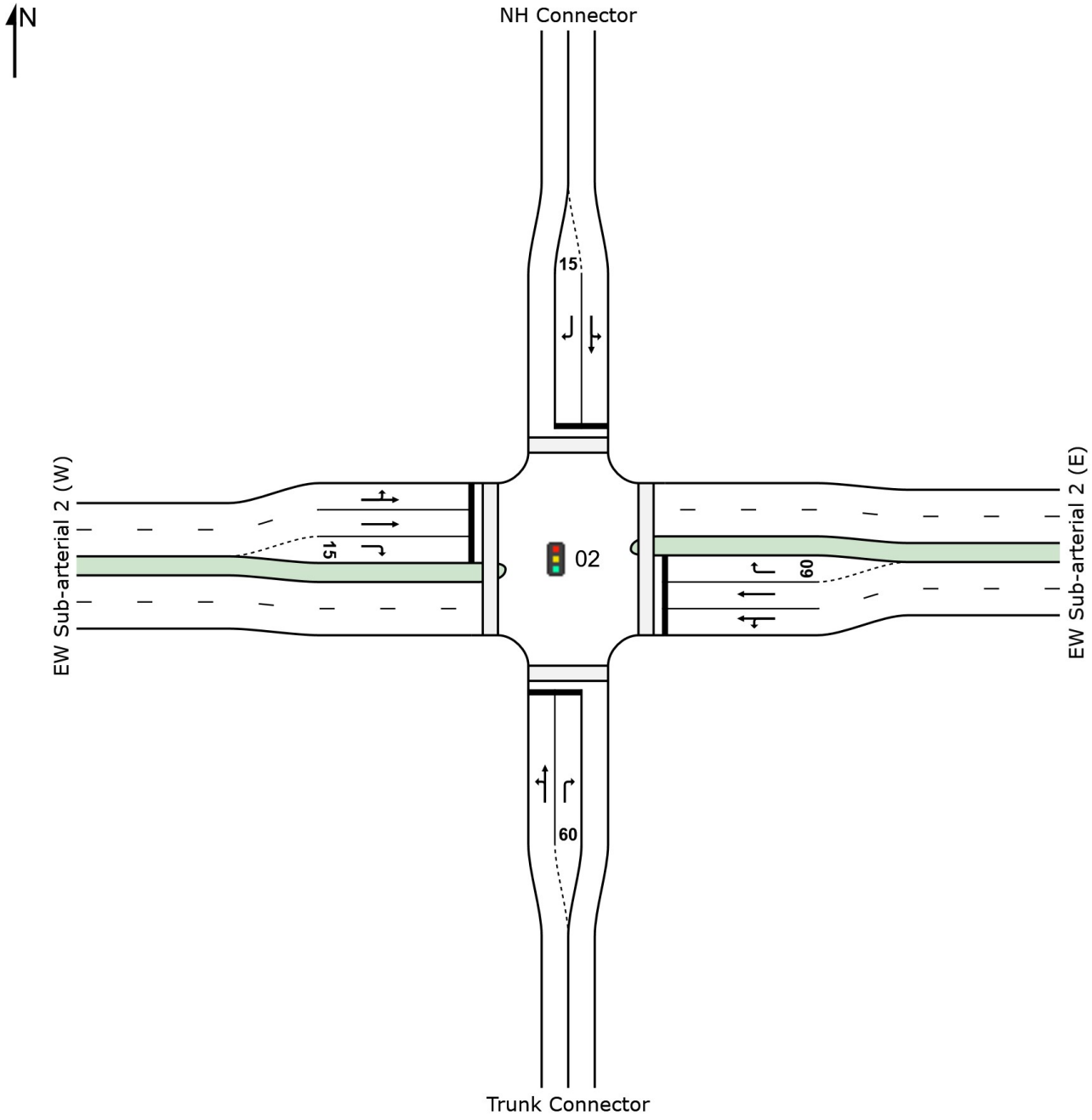


REF: Reference Phase
VAR: Variable Phase

SITE LAYOUT

Site: 02 [2031 Site 02 - AM]

Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 02 [2031 Site 02 - AM]

Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated Cycle Time = 120 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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trunk Connector											
1	L2	37	2.0	0.283	59.2	LOS E	3.3	23.5	0.95	0.74	27.1
2	T1	23	2.0	0.283	53.6	LOS D	3.3	23.5	0.95	0.74	23.9
3	R2	99	2.0	0.458	60.6	LOS E	5.6	39.7	0.98	0.78	30.3
Approach		159	2.0	0.458	59.2	LOS E	5.6	39.7	0.97	0.77	28.9
East: EW Sub-arterial 2 (E)											
4	L2	103	2.0	0.364	32.5	LOS C	11.2	80.0	0.75	0.70	40.2
5	T1	462	2.0	0.364	26.5	LOS C	11.6	82.8	0.74	0.66	44.1
6	R2	65	2.0	0.470	65.9	LOS E	3.9	27.5	1.00	0.76	29.5
Approach		631	2.0	0.470	31.6	LOS C	11.6	82.8	0.77	0.67	41.6
North: NH Connector											
7	L2	144	2.0	0.476	51.3	LOS D	7.9	56.0	0.92	0.79	33.1
8	T1	7	2.0	0.476	45.8	LOS D	7.9	56.0	0.92	0.79	25.4
9	R2	36	2.0	0.097	47.7	LOS D	1.7	12.2	0.85	0.72	30.3
Approach		187	2.0	0.476	50.4	LOS D	7.9	56.0	0.91	0.78	32.4
West: EW Sub-arterial 2 (W)											
10	L2	27	2.0	0.477	33.4	LOS C	16.1	114.3	0.79	0.69	37.5
11	T1	716	2.0	0.477	27.7	LOS C	16.1	114.3	0.78	0.69	43.9
12	R2	13	2.0	0.091	63.1	LOS E	0.7	5.1	0.96	0.68	25.6
Approach		756	2.0	0.477	28.5	LOS C	16.1	114.3	0.79	0.69	43.4
All Vehicles		1733	2.0	0.477	34.8	LOS C	16.1	114.3	0.81	0.70	40.0

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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	26.1	LOS C	0.1	0.1	0.66	0.66
P2	East Full Crossing	11	52.3	LOS E	0.0	0.0	0.93	0.93
P3	North Full Crossing	11	26.0	LOS C	0.0	0.0	0.66	0.66
P4	West Full Crossing	11	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		84	32.8	LOS D			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.

LANE SUMMARY

Site: 02 [2031 Site 02 - AM]

Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated Cycle Time = 120 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: Trunk Connector													
Lane 1	60	2.0	212	0.283	100	57.0	LOS E	3.3	23.5	Full	290	0.0	0.0
Lane 2	99	2.0	216	0.458	100	60.6	LOS E	5.6	39.7	Short	60	0.0	NA
Approach	159	2.0		0.458		59.2	LOS E	5.6	39.7				
East: EW Sub-arterial 2 (E)													
Lane 1	276	2.0	758	0.364	100	29.0	LOS C	11.2	80.0	Full	750	0.0	0.0
Lane 2	289	2.0	794	0.364	100	26.3	LOS C	11.6	82.8	Full	750	0.0	0.0
Lane 3	65	2.0	139	0.470	100	65.9	LOS E	3.9	27.5	Short	60	0.0	NA
Approach	631	2.0		0.470		31.6	LOS C	11.6	82.8				
North: NH Connector													
Lane 1	152	2.0	318[1]	0.476	100	51.1	LOS D	7.9	56.0	Full	320	0.0	0.0
Lane 2	36	2.0	370	0.097	100	47.7	LOS D	1.7	12.2	Short	15	0.0	NA
Approach	187	2.0		0.476		50.4	LOS D	7.9	56.0				
West: EW Sub-arterial 2 (W)													
Lane 1	377	2.0	790	0.477	100	28.2	LOS C	16.1	114.3	Full	500	0.0	0.0
Lane 2	366	2.0	769[1]	0.477	100	27.6	LOS C	15.5	110.3	Full	500	0.0	0.0
Lane 3	13	2.0	139	0.091	100	63.1	LOS E	0.7	5.1	Short	15	0.0	NA
Approach	756	2.0		0.477		28.5	LOS C	16.1	114.3				
Intersection	1733	2.0		0.477		34.8	LOS C	16.1	114.3				

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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 02 [2031 Site 02 - AM]

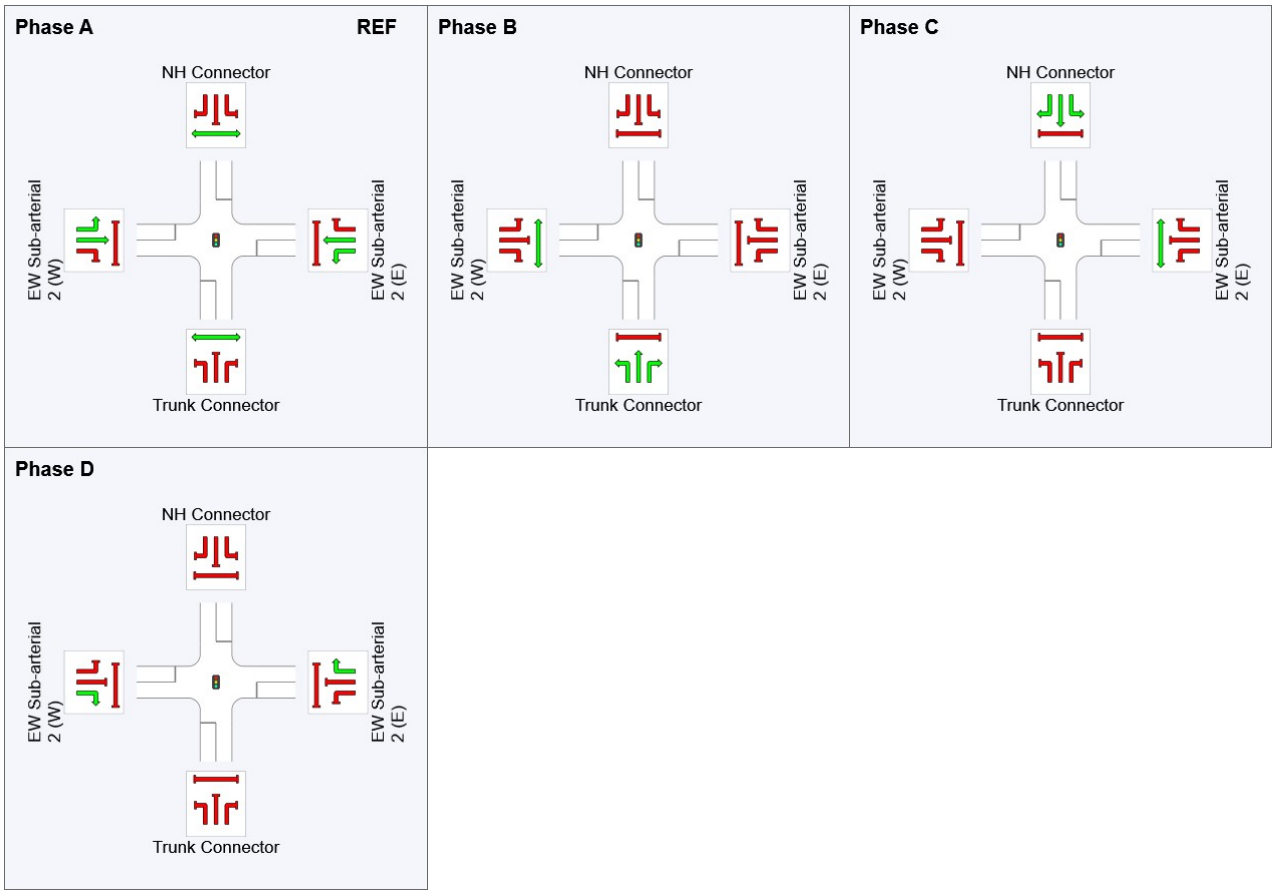
Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: 3 Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

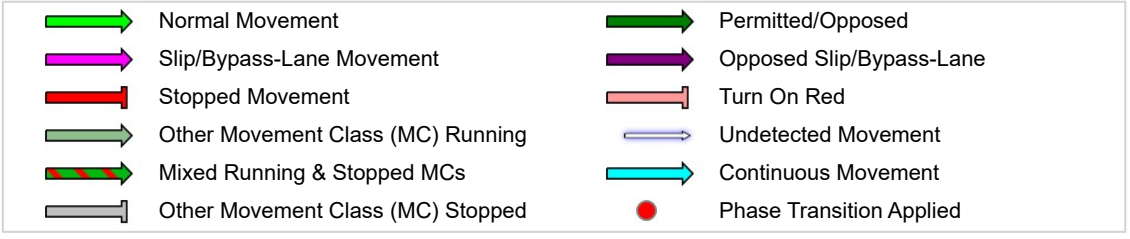
Phase Timing Results

Phase	A	B	C	D
Phase Change Time (sec)	0	55	75	105
Green Time (sec)	49	14	24	9
Phase Time (sec)	55	20	30	15
Phase Split	46%	17%	25%	13%

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



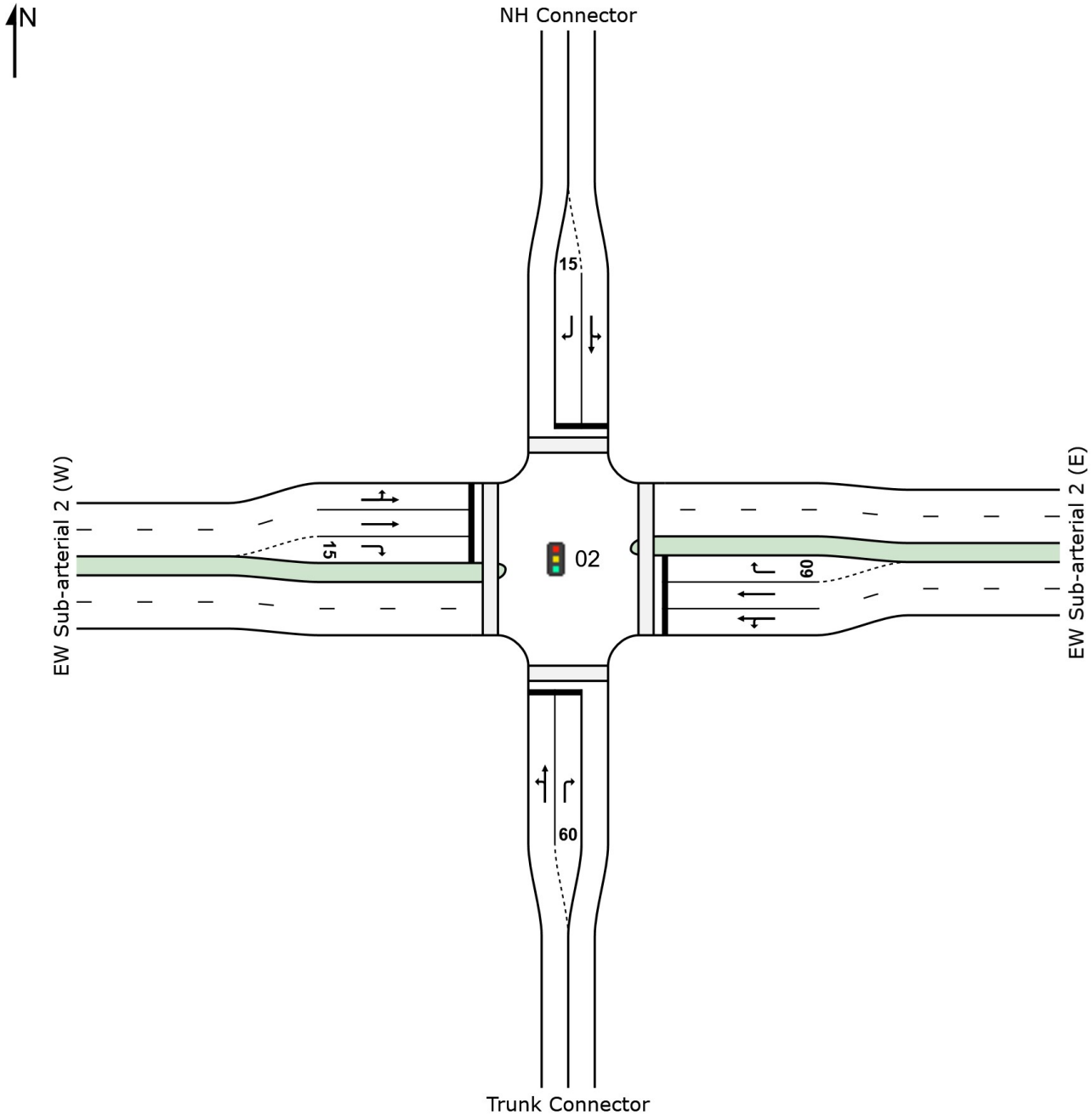
REF: Reference Phase
VAR: Variable Phase



SITE LAYOUT

Site: 02 [2031 Site 02 - PM]

Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated



Project: H:\17-000000\17-003001\9_Tech\Traffic\P11&P12\Aura P11-P12 IC2_3 20180329_REV3.sip7

MOVEMENT SUMMARY

Site: 02 [2031 Site 02 - PM]

Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated Cycle Time = 120 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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trunk Connector											
1	L2	9	2.0	0.320	67.4	LOS E	2.1	14.7	0.99	0.72	25.6
2	T1	25	2.0	0.320	61.9	LOS E	2.1	14.7	0.99	0.72	22.4
3	R2	44	2.0	0.410	68.0	LOS E	2.7	18.9	1.00	0.74	28.6
Approach		79	2.0	0.410	66.0	LOS E	2.7	18.9	1.00	0.73	26.6
East: EW Sub-arterial 2 (E)											
4	L2	169	2.0	0.419	31.3	LOS C	13.5	96.1	0.75	0.72	40.4
5	T1	517	2.0	0.419	25.3	LOS C	14.2	100.8	0.74	0.67	44.6
6	R2	117	2.0	0.399	55.4	LOS E	6.3	44.6	0.94	0.79	32.0
Approach		803	2.0	0.419	30.9	LOS C	14.2	100.8	0.77	0.70	41.6
North: NH Connector											
7	L2	89	2.0	0.399	56.1	LOS E	5.3	37.6	0.94	0.77	31.9
8	T1	8	2.0	0.399	50.5	LOS D	5.3	37.6	0.94	0.77	24.2
9	R2	29	2.0	0.106	53.5	LOS D	1.5	10.7	0.90	0.72	28.6
Approach		127	2.0	0.399	55.1	LOS E	5.3	37.6	0.93	0.76	30.8
West: EW Sub-arterial 2 (W)											
10	L2	29	2.0	0.381	30.1	LOS C	12.5	89.3	0.73	0.64	39.0
11	T1	593	2.0	0.381	24.4	LOS C	12.5	89.3	0.72	0.63	45.3
12	R2	24	2.0	0.083	52.2	LOS D	1.2	8.7	0.88	0.71	28.3
Approach		646	2.0	0.381	25.7	LOS C	12.5	89.3	0.73	0.63	44.4
All Vehicles		1656	2.0	0.419	32.4	LOS C	14.2	100.8	0.78	0.68	40.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	24.1	LOS C	0.1	0.1	0.63	0.63
P2	East Full Crossing	11	54.2	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	11	24.1	LOS C	0.0	0.0	0.63	0.63
P4	West Full Crossing	11	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		84	31.6	LOS D			0.71	0.71

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.

LANE SUMMARY

Site: 02 [2031 Site 02 - PM]

Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated Cycle Time = 120 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: Trunk Connector													
Lane 1	35	2.0	109	0.320	100	63.4	LOS E	2.1	14.7	Full	290	0.0	0.0
Lane 2	44	2.0	108	0.410	100	68.0	LOS E	2.7	18.9	Short	60	0.0	NA
Approach	79	2.0		0.410		66.0	LOS E	2.7	18.9				
East: EW Sub-arterial 2 (E)													
Lane 1	333	2.0	794	0.419	100	28.6	LOS C	13.5	96.1	Full	750	0.0	0.0
Lane 2	353	2.0	843	0.419	100	25.0	LOS C	14.2	100.8	Full	750	0.0	0.0
Lane 3	117	2.0	293	0.399	100	55.4	LOS E	6.3	44.6	Short	60	0.0	NA
Approach	803	2.0		0.419		30.9	LOS C	14.2	100.8				
North: NH Connector													
Lane 1	98	2.0	245[1]	0.399	100	55.6	LOS E	5.3	37.6	Full	320	0.0	0.0
Lane 2	29	2.0	278	0.106	100	53.5	LOS D	1.5	10.7	Short	15	0.0	NA
Approach	127	2.0		0.399		55.1	LOS E	5.3	37.6				
West: EW Sub-arterial 2 (W)													
Lane 1	320	2.0	838	0.381	100	25.1	LOS C	12.5	89.3	Full	500	0.0	0.0
Lane 2	303	2.0	793[1]	0.381	100	24.2	LOS C	11.7	83.6	Full	500	0.0	0.0
Lane 3	24	2.0	293	0.083	100	52.2	LOS D	1.2	8.7	Short	15	0.0	NA
Approach	646	2.0		0.381		25.7	LOS C	12.5	89.3				
Intersection	1656	2.0		0.419		32.4	LOS C	14.2	100.8				

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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 02 [2031 Site 02 - PM]

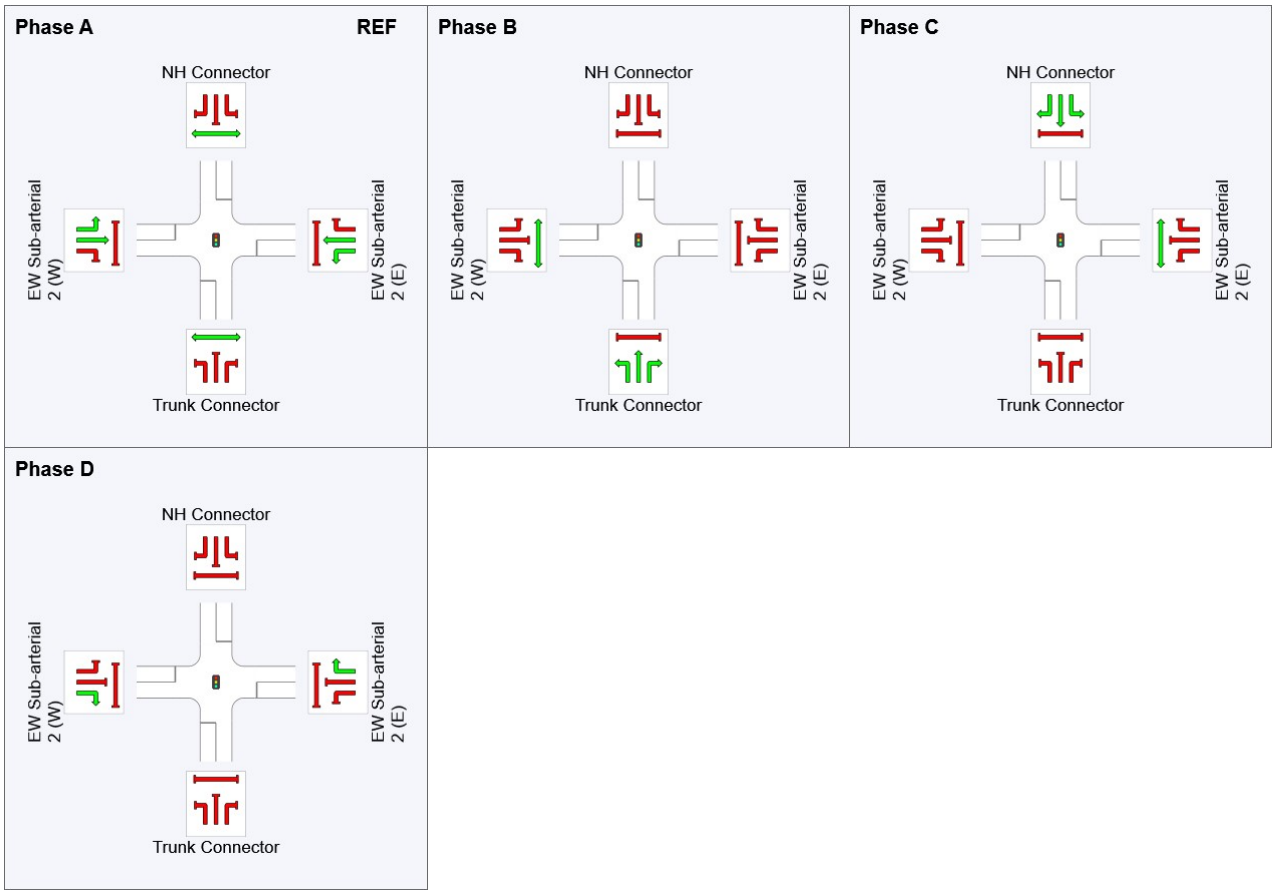
Site 02 - MWH VISUM Model
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: 3 Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

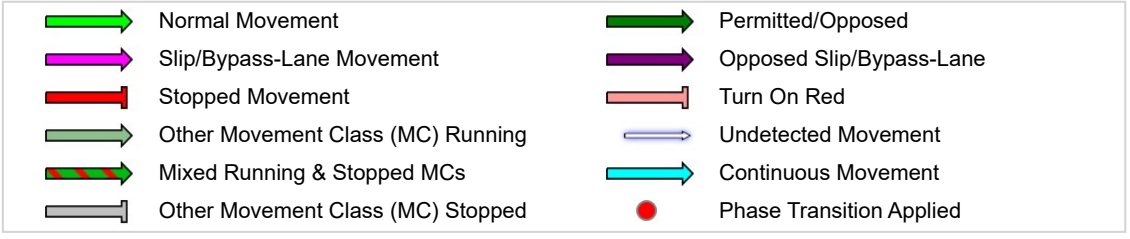
Phase Timing Results

Phase	A	B	C	D
Phase Change Time (sec)	0	58	71	95
Green Time (sec)	52	7	18	19
Phase Time (sec)	58	13	24	25
Phase Split	48%	11%	20%	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%.



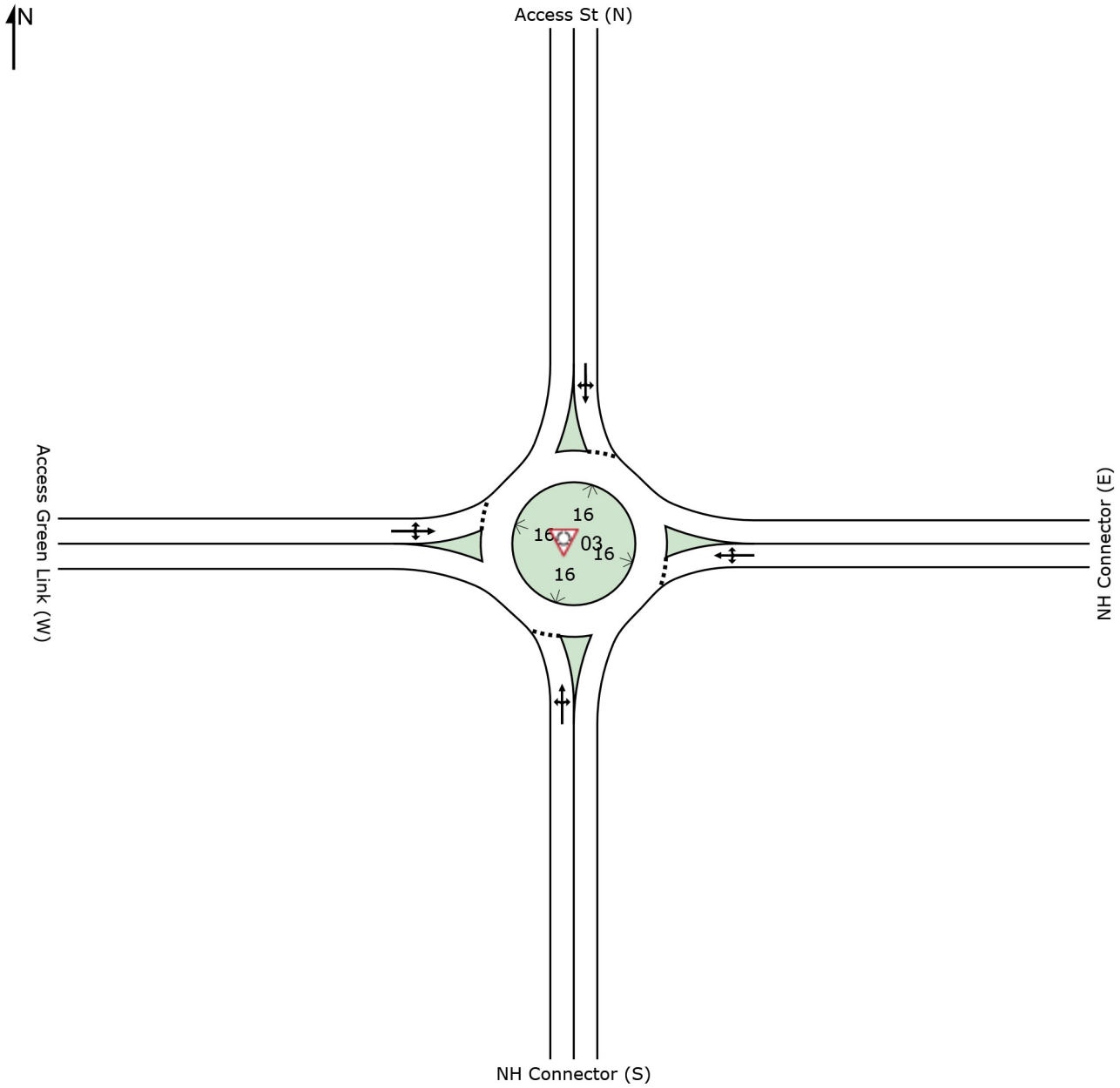
REF: Reference Phase
VAR: Variable Phase



SITE LAYOUT

Site: 03 [2022 Site 03 - AM]

Site 03
Roundabout



MOVEMENT SUMMARY

Site: 03 [2022 Site 03 - AM]

Site 03
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: NH Connector (S)											
1	L2	29	2.0	0.027	4.1	LOS A	0.1	1.0	0.03	0.55	50.3
2	T1	2	2.0	0.027	4.2	LOS A	0.1	1.0	0.03	0.55	51.2
3	R2	9	2.0	0.027	8.4	LOS A	0.1	1.0	0.03	0.55	55.3
Approach		41	2.0	0.027	5.1	LOS A	0.1	1.0	0.03	0.55	52.0
East: NH Connector (E)											
4	L2	11	2.0	0.011	4.7	LOS A	0.1	0.4	0.28	0.49	54.2
5	T1	1	2.0	0.011	4.8	LOS A	0.1	0.4	0.28	0.49	54.7
6	R2	1	2.0	0.011	9.0	LOS A	0.1	0.4	0.28	0.49	54.2
Approach		13	2.0	0.011	5.0	LOS A	0.1	0.4	0.28	0.49	54.2
North: Access St (N)											
7	L2	1	2.0	0.008	4.7	LOS A	0.0	0.3	0.29	0.46	53.0
8	T1	7	2.0	0.008	4.8	LOS A	0.0	0.3	0.29	0.46	50.2
9	R2	1	2.0	0.008	9.0	LOS A	0.0	0.3	0.29	0.46	48.3
Approach		9	2.0	0.008	5.3	LOS A	0.0	0.3	0.29	0.46	50.6
West: Access Green Link (W)											
10	L2	1	2.0	0.076	4.1	LOS A	0.4	2.7	0.07	0.63	44.1
11	T1	1	2.0	0.076	4.3	LOS A	0.4	2.7	0.07	0.63	52.6
12	R2	108	2.0	0.076	8.4	LOS A	0.4	2.7	0.07	0.63	47.9
Approach		111	2.0	0.076	8.3	LOS A	0.4	2.7	0.07	0.63	47.9
All Vehicles		174	2.0	0.076	7.2	LOS A	0.4	2.7	0.09	0.59	49.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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.

LANE SUMMARY

Site: 03 [2022 Site 03 - AM]

Site 03
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: NH Connector (S)													
Lane 1[d]	41	2.0	1508	0.027	100	5.1	LOS A	0.1	1.0	Full	320	0.0	0.0
Approach	41	2.0		0.027		5.1	LOS A	0.1	1.0				
East: NH Connector (E)													
Lane 1[d]	13	2.0	1159	0.011	100	5.0	LOS A	0.1	0.4	Full	740	0.0	0.0
Approach	13	2.0		0.011		5.0	LOS A	0.1	0.4				
North: Access St (N)													
Lane 1[d]	9	2.0	1157	0.008	100	5.3	LOS A	0.0	0.3	Full	180	0.0	0.0
Approach	9	2.0		0.008		5.3	LOS A	0.0	0.3				
West: Access Green Link (W)													
Lane 1[d]	111	2.0	1460	0.076	100	8.3	LOS A	0.4	2.7	Full	250	0.0	0.0
Approach	111	2.0		0.076		8.3	LOS A	0.4	2.7				
Intersection	174	2.0		0.076		7.2	LOS A	0.4	2.7				

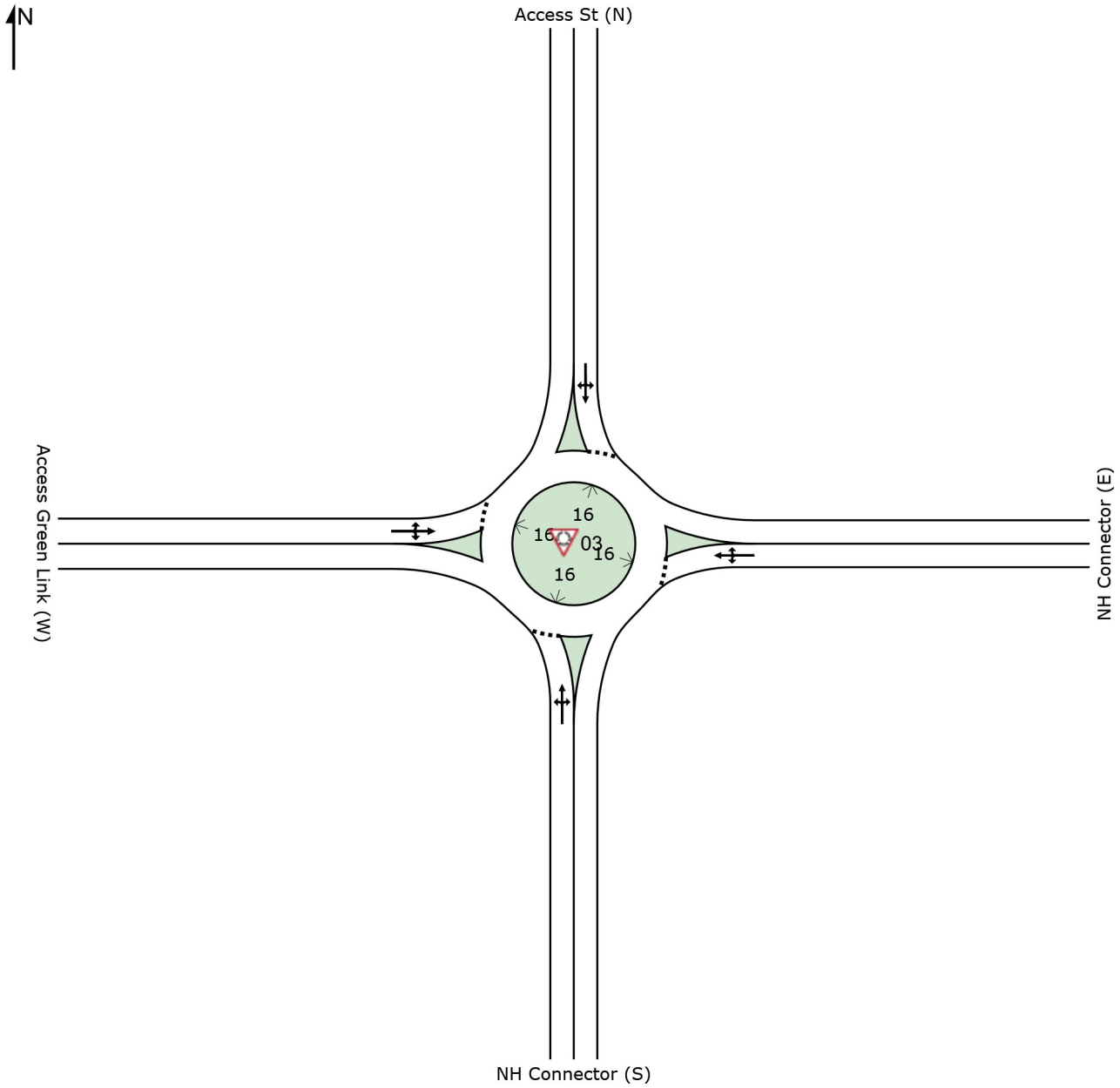
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for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

d Dominant lane on roundabout approach

SITE LAYOUT

Site: 03 [2022 Site 03 - PM]

Site 03
Roundabout



MOVEMENT SUMMARY

Site: 03 [2022 Site 03 - PM]

Site 03
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: NH Connector (S)											
1	L2	120	2.0	0.082	4.1	LOS A	0.4	3.2	0.03	0.51	51.2
2	T1	7	2.0	0.082	4.2	LOS A	0.4	3.2	0.03	0.51	52.3
3	R2	4	2.0	0.082	8.4	LOS A	0.4	3.2	0.03	0.51	55.9
Approach		132	2.0	0.082	4.2	LOS A	0.4	3.2	0.03	0.51	51.5
East: NH Connector (E)											
4	L2	4	2.0	0.005	4.2	LOS A	0.0	0.2	0.14	0.50	54.3
5	T1	1	2.0	0.005	4.4	LOS A	0.0	0.2	0.14	0.50	54.9
6	R2	1	2.0	0.005	8.5	LOS A	0.0	0.2	0.14	0.50	54.4
Approach		6	2.0	0.005	5.0	LOS A	0.0	0.2	0.14	0.50	54.4
North: Access St (N)											
7	L2	1	2.0	0.003	4.2	LOS A	0.0	0.1	0.15	0.49	53.2
8	T1	2	2.0	0.003	4.4	LOS A	0.0	0.1	0.15	0.49	50.5
9	R2	1	2.0	0.003	8.5	LOS A	0.0	0.1	0.15	0.49	48.6
Approach		4	2.0	0.003	5.4	LOS A	0.0	0.1	0.15	0.49	51.1
West: Access Green Link (W)											
10	L2	1	2.0	0.024	4.1	LOS A	0.1	0.8	0.07	0.63	44.3
11	T1	1	2.0	0.024	4.3	LOS A	0.1	0.8	0.07	0.63	52.8
12	R2	31	2.0	0.024	8.4	LOS A	0.1	0.8	0.07	0.63	48.1
Approach		33	2.0	0.024	8.1	LOS A	0.1	0.8	0.07	0.63	48.2
All Vehicles		175	2.0	0.082	5.0	LOS A	0.4	3.2	0.05	0.53	51.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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.

LANE SUMMARY

Site: 03 [2022 Site 03 - PM]

Site 03
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: NH Connector (S)													
Lane 1[d]	132	2.0	1604	0.082	100	4.2	LOS A	0.4	3.2	Full	320	0.0	0.0
Approach	132	2.0		0.082		4.2	LOS A	0.4	3.2				
East: NH Connector (E)													
Lane 1[d]	6	2.0	1264	0.005	100	5.0	LOS A	0.0	0.2	Full	740	0.0	0.0
Approach	6	2.0		0.005		5.0	LOS A	0.0	0.2				
North: Access St (N)													
Lane 1[d]	4	2.0	1261	0.003	100	5.4	LOS A	0.0	0.1	Full	180	0.0	0.0
Approach	4	2.0		0.003		5.4	LOS A	0.0	0.1				
West: Access Green Link (W)													
Lane 1[d]	33	2.0	1358	0.024	100	8.1	LOS A	0.1	0.8	Full	250	0.0	0.0
Approach	33	2.0		0.024		8.1	LOS A	0.1	0.8				
Intersection	175	2.0		0.082		5.0	LOS A	0.4	3.2				

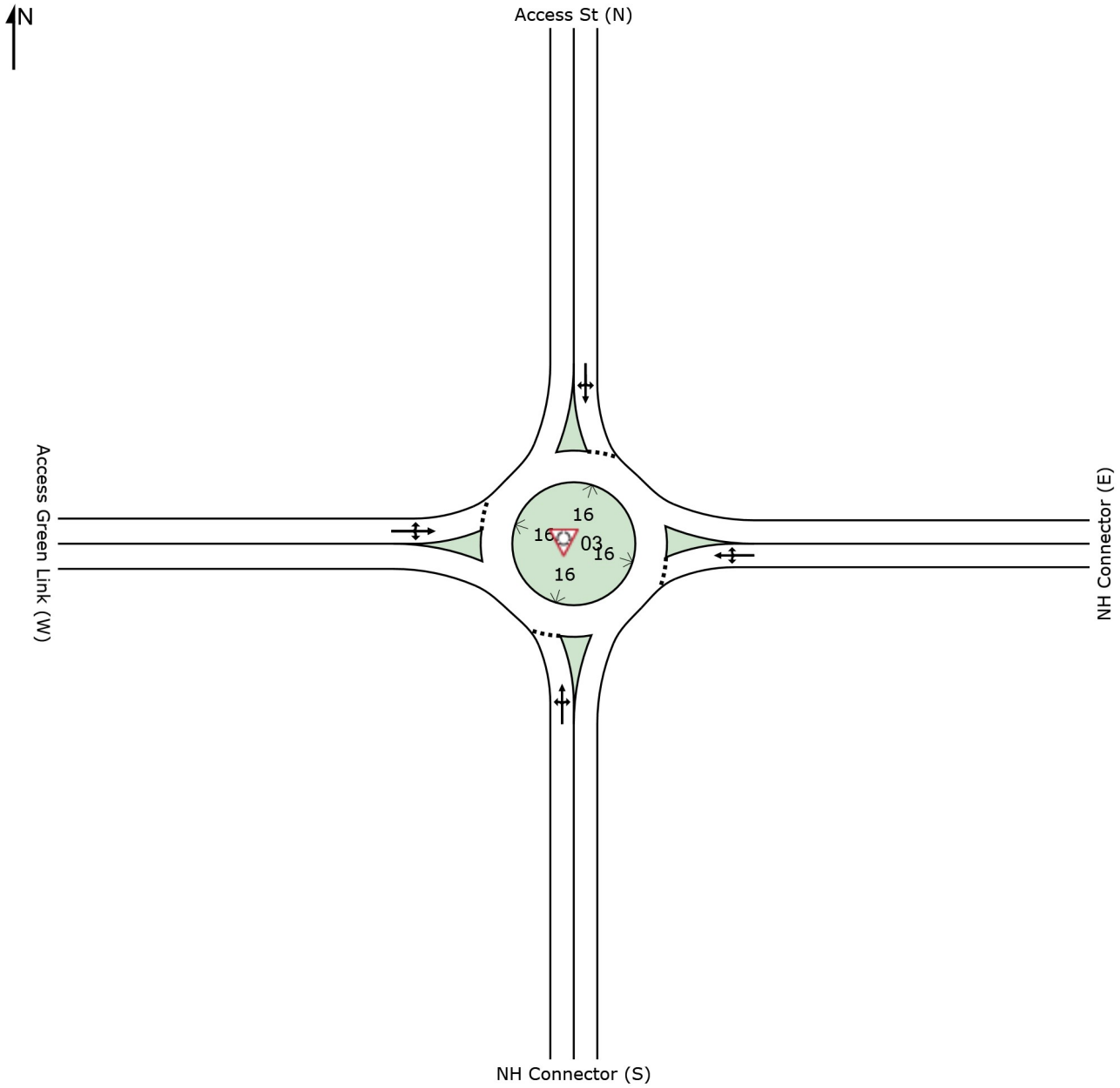
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for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

d Dominant lane on roundabout approach

SITE LAYOUT

Site: 03 [2025-2031 Site 03 - AM]

Site 03
Roundabout



MOVEMENT SUMMARY

Site: 03 [2025-2031 Site 03 - AM]

Site 03
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: NH Connector (S)											
1	L2	33	2.0	0.044	4.1	LOS A	0.2	1.7	0.03	0.59	49.1
2	T1	2	2.0	0.044	4.2	LOS A	0.2	1.7	0.03	0.59	49.7
3	R2	34	2.0	0.044	8.4	LOS A	0.2	1.7	0.03	0.59	54.4
Approach		68	2.0	0.044	6.2	LOS A	0.2	1.7	0.03	0.59	52.4
East: NH Connector (E)											
4	L2	36	2.0	0.033	4.7	LOS A	0.2	1.2	0.29	0.50	54.3
5	T1	1	2.0	0.033	4.8	LOS A	0.2	1.2	0.29	0.50	54.9
6	R2	1	2.0	0.033	9.0	LOS A	0.2	1.2	0.29	0.50	54.4
Approach		38	2.0	0.033	4.8	LOS A	0.2	1.2	0.29	0.50	54.4
North: Access St (N)											
7	L2	1	2.0	0.007	4.8	LOS A	0.0	0.3	0.31	0.46	52.9
8	T1	6	2.0	0.007	5.0	LOS A	0.0	0.3	0.31	0.46	50.0
9	R2	1	2.0	0.007	9.1	LOS A	0.0	0.3	0.31	0.46	48.1
Approach		8	2.0	0.007	5.5	LOS A	0.0	0.3	0.31	0.46	50.4
West: Access Green Link (W)											
10	L2	1	2.0	0.080	4.2	LOS A	0.4	2.8	0.15	0.62	43.7
11	T1	1	2.0	0.080	4.4	LOS A	0.4	2.8	0.15	0.62	52.4
12	R2	104	2.0	0.080	8.5	LOS A	0.4	2.8	0.15	0.62	47.6
Approach		106	2.0	0.080	8.5	LOS A	0.4	2.8	0.15	0.62	47.6
All Vehicles		221	2.0	0.080	7.0	LOS A	0.4	2.8	0.14	0.58	50.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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.

LANE SUMMARY

Site: 03 [2025-2031 Site 03 - AM]

Site 03
Roundabout

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: NH Connector (S)													
Lane 1[d]	68	2.0	1553	0.044	100	6.2	LOS A	0.2	1.7	Full	320	0.0	0.0
Approach	68	2.0		0.044		6.2	LOS A	0.2	1.7				
East: NH Connector (E)													
Lane 1[d]	38	2.0	1162	0.033	100	4.8	LOS A	0.2	1.2	Full	740	0.0	0.0
Approach	38	2.0		0.033		4.8	LOS A	0.2	1.2				
North: Access St (N)													
Lane 1[d]	8	2.0	1132	0.007	100	5.5	LOS A	0.0	0.3	Full	180	0.0	0.0
Approach	8	2.0		0.007		5.5	LOS A	0.0	0.3				
West: Access Green Link (W)													
Lane 1[d]	106	2.0	1334	0.080	100	8.5	LOS A	0.4	2.8	Full	250	0.0	0.0
Approach	106	2.0		0.080		8.5	LOS A	0.4	2.8				
Intersection	221	2.0		0.080		7.0	LOS A	0.4	2.8				

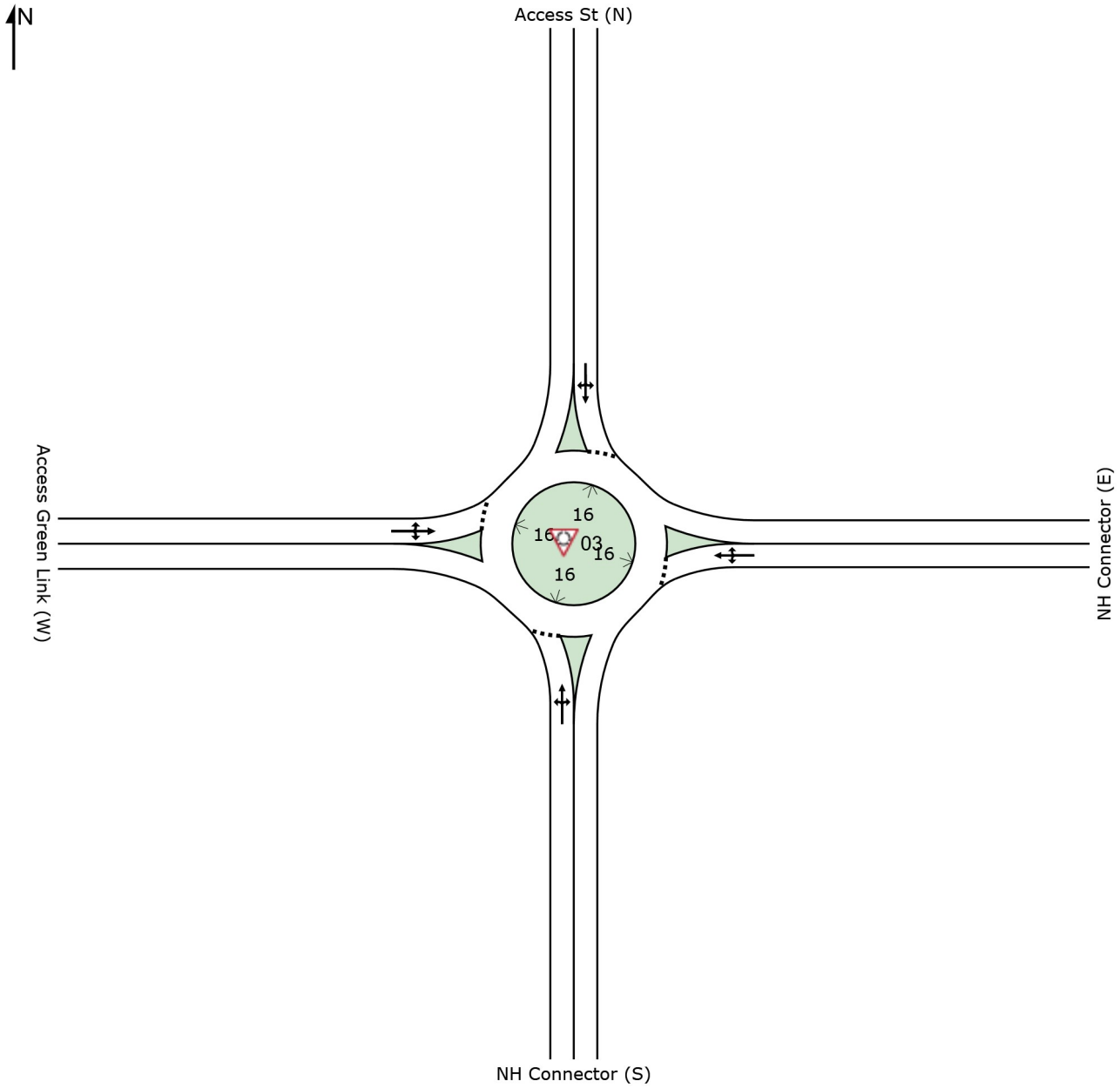
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for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

d Dominant lane on roundabout approach

SITE LAYOUT

Site: 03 [2025-2031 Site 03 - PM]

Site 03
Roundabout



MOVEMENT SUMMARY

Site: 03 [2025-2031 Site 03 - PM]

Site 03
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: NH Connector (S)											
1	L2	120	2.0	0.085	4.1	LOS A	0.5	3.3	0.03	0.52	51.1
2	T1	7	2.0	0.085	4.2	LOS A	0.5	3.3	0.03	0.52	52.1
3	R2	8	2.0	0.085	8.4	LOS A	0.5	3.3	0.03	0.52	55.8
Approach		136	2.0	0.085	4.3	LOS A	0.5	3.3	0.03	0.52	51.6
East: NH Connector (E)											
4	L2	6	2.0	0.007	4.2	LOS A	0.0	0.2	0.14	0.49	54.4
5	T1	1	2.0	0.007	4.4	LOS A	0.0	0.2	0.14	0.49	55.0
6	R2	1	2.0	0.007	8.5	LOS A	0.0	0.2	0.14	0.49	54.5
Approach		8	2.0	0.007	4.8	LOS A	0.0	0.2	0.14	0.49	54.5
North: Access St (N)											
7	L2	1	2.0	0.003	4.3	LOS A	0.0	0.1	0.16	0.49	53.1
8	T1	2	2.0	0.003	4.4	LOS A	0.0	0.1	0.16	0.49	50.4
9	R2	1	2.0	0.003	8.6	LOS A	0.0	0.1	0.16	0.49	48.5
Approach		4	2.0	0.003	5.4	LOS A	0.0	0.1	0.16	0.49	51.1
West: Access Green Link (W)											
10	L2	1	2.0	0.025	4.1	LOS A	0.1	0.8	0.09	0.62	44.2
11	T1	1	2.0	0.025	4.3	LOS A	0.1	0.8	0.09	0.62	52.7
12	R2	31	2.0	0.025	8.4	LOS A	0.1	0.8	0.09	0.62	48.0
Approach		33	2.0	0.025	8.2	LOS A	0.1	0.8	0.09	0.62	48.2
All Vehicles		181	2.0	0.085	5.1	LOS A	0.5	3.3	0.05	0.53	51.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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.

LANE SUMMARY

Site: 03 [2025-2031 Site 03 - PM]

Site 03
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: NH Connector (S)													
Lane 1[d]	136	2.0	1606	0.085	100	4.3	LOS A	0.5	3.3	Full	320	0.0	0.0
Approach	136	2.0		0.085		4.3	LOS A	0.5	3.3				
East: NH Connector (E)													
Lane 1[d]	8	2.0	1263	0.007	100	4.8	LOS A	0.0	0.2	Full	740	0.0	0.0
Approach	8	2.0		0.007		4.8	LOS A	0.0	0.2				
North: Access St (N)													
Lane 1[d]	4	2.0	1255	0.003	100	5.4	LOS A	0.0	0.1	Full	180	0.0	0.0
Approach	4	2.0		0.003		5.4	LOS A	0.0	0.1				
West: Access Green Link (W)													
Lane 1[d]	33	2.0	1329	0.025	100	8.2	LOS A	0.1	0.8	Full	250	0.0	0.0
Approach	33	2.0		0.025		8.2	LOS A	0.1	0.8				
Intersection	181	2.0		0.085		5.1	LOS A	0.5	3.3				

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

d Dominant lane on roundabout approach

CONTACT US

MARK WYER

Level 3, 16 Innovation Parkway
Birtinya
QLD 4575

WWW.CALIBREGROUP.COM