TECHNICAL NOTE

Transport Engineering

Project Code: N208800 (301400272) **Project Name:** Waverley Streetscapes

Date: 30 March 2023 **Version No.** B

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Reviewer: Brett Maynard

SUBJECT: Old South Head Road/ Curlewis Street/ O'Sullivan Road/ Birriga Road Intersection – SIDRA Modelling

Background

This technical note has been prepared by Stantec, on behalf of Northrop Consulting Engineers, and presents the impact of the proposed changes to the Old South Head Road/ Curlewis Street/ O'Sullivan Road/ Birriga Road intersection as part of the Waverley Streetscapes project.

The project proposes to remove the existing left turn slip lane from Old South Head Road into Curlewis Street to enhance pedestrian and bicycle connectivity through the intersection. The reclaimed area is to be converted to a section of shared path to allow cyclists to connect into the shared path/ cycleway proposed on the northern side of Curlewis Street. This technical note assesses the operational impact of the slip lane removal.

Traffic Volumes

Traffic movement counts at the study intersection were completed on Tuesday 1 June 2021, between 7:30am and 9:30am and between 3:00pm and 6:00pm.

The AM and PM peak hours were found to occur from 7:30am to 8:30am and 4:45pm to 5:45pm, respectively. Peak hour traffic volumes are summarised in Figure 1 and Figure 2, with full survey results contained in Attachment 1.

Figure 1: Existing AM peak hour traffic volumes

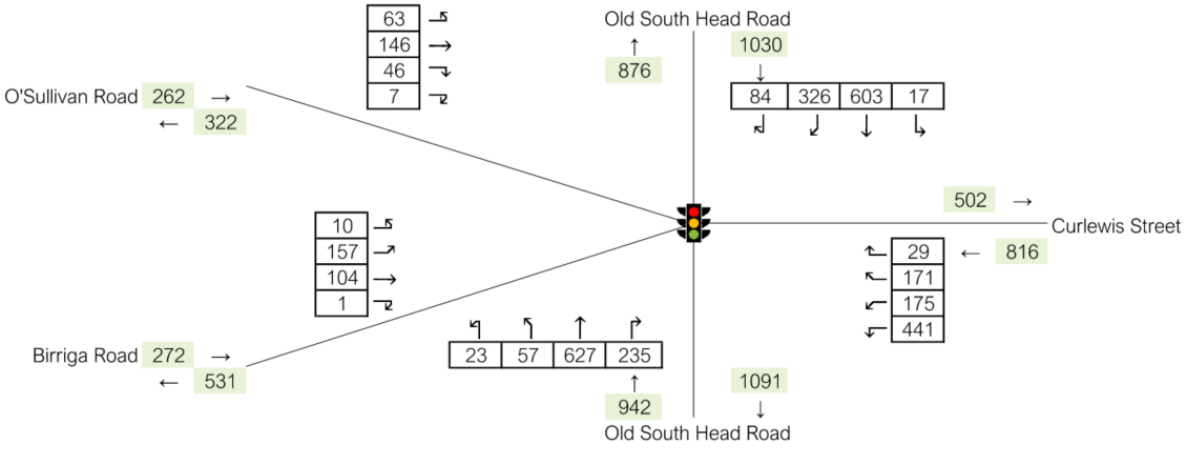

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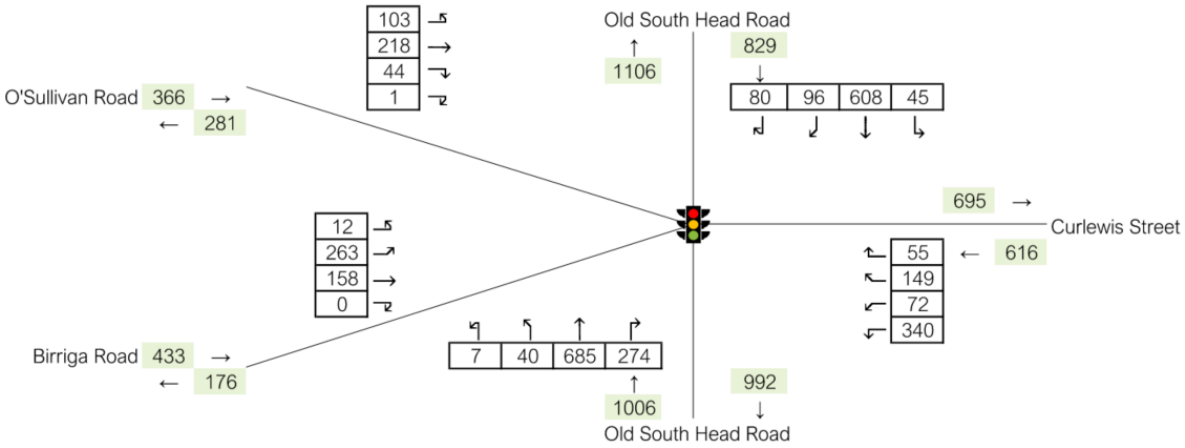
Figure 2: Existing PM peak hour traffic volumes



Existing Intersection Operation

The operation of the study intersection has been assessed using SIDRA INTERSECTION[1] (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service. Intersections operating at level of service D or better are generally considered to have acceptable delays.

Table 1 shows the criteria that SIDRA adopts in assessing the level of service.

Table 1: SIDRA level of service criteria

Level of service (LOS)	Average delay per vehicle (secs/veh)	Traffic signals, roundabout	Give way & stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 2 presents a summary of the existing intersection operation, with full results and calibration details included in Attachment 2.

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

Table 2: Existing operating conditions

Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
AM	Curlewis St (SE)	0.940	39.1	92.7	C
	Old South Head Rd (NE)	0.998	94.6	311.6	F
	O'Sullivan Rd (NW)	0.897	58.2	71.8	E
	Birriga Rd (W)	0.995	84.1	81.6	F
	Old South Head Rd (SW)	0.973	80.0	265.3	F
	Overall	**0.998**	**72.9**	**311.6**	**F**
PM	Curlewis St (SE)	0.977	40.3	98.6	C
	Old South Head Rd (NE)	0.879	56.8	200.2	E
	O'Sullivan Rd (NW)	0.875	62.9	91.6	E
	Birriga Rd (W)	0.990	90.9	133.6	F
	Old South Head Rd (SW)	0.999	100.6	315.2	F
	Overall	**0.999**	**72.2**	**315.2**	**F**

Based on the above assessment, the intersection of Old South Head Road/ Curlewis Street/ O'Sullivan Road/ Birriga Road currently operates beyond capacity at LoS F in both the AM and PM peak, with excessive delay on Old South Head Road and Birriga Road and significant queuing on Old South Head Road.

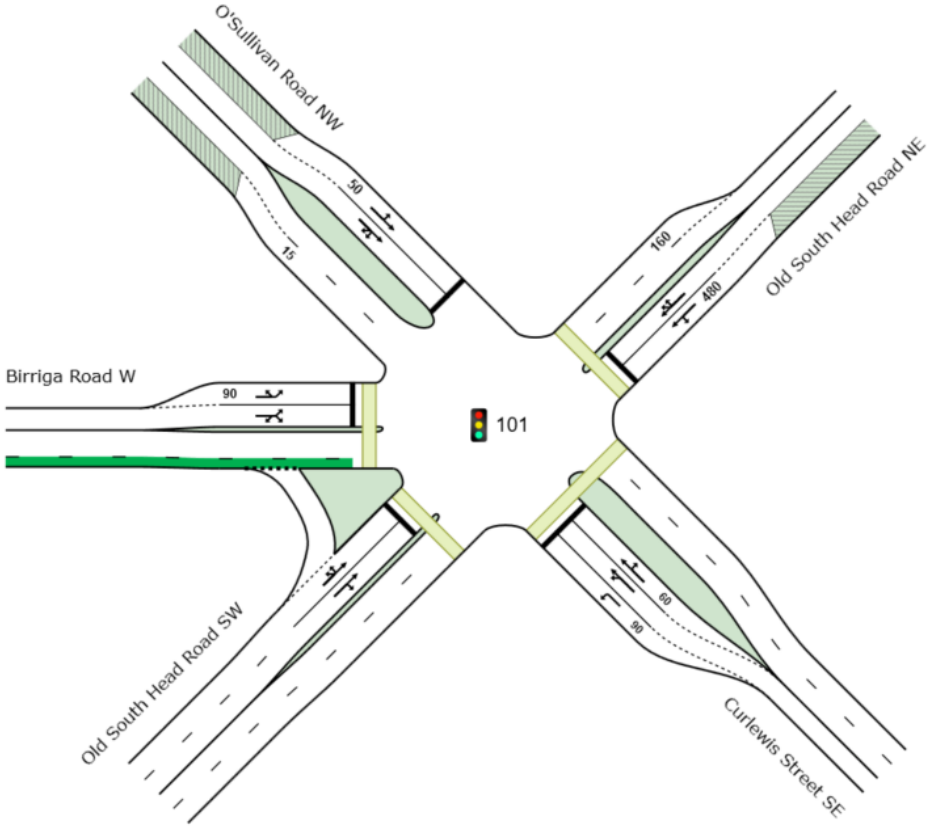
Proposed Intersection Layout

The project seeks to implement the following changes to the intersection:

- remove the existing left turn slip lane from Old South Head Road into Curlewis Street
- alteration of Curlewis Street exit lanes to create two exit lanes
- conversion of crossings from pedestrian only to shared pedestrian and cyclist.

The proposed layout is shown in Figure 3.

Figure 3: Proposed intersection layout



Traffic Impact

To determine the traffic impact of the proposed intersection layout changes, the existing phasing and traffic volumes were modelled. Table 3 presents a summary of the future operation of the intersection, with full results presented in Attachment 2.

Table 3: Future operating conditions

Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
AM	Curlewis St (SE)	0.939	39.1	92.7	C
	Old South Head Rd (NE)	1.000	92.5	312.2	F
	O'Sullivan Rd (NW)	0.912	58.7	72.7	E
	Birriga Rd (W)	0.992	83.2	81.1	F
	Old South Head Rd (SW)	0.973	80.0	265.3	F
	Overall	**1.000**	**73.2**	**312.2**	**F**
PM	Curlewis St (SE)	0.976	40.2	98.6	C
	Old South Head Rd (NE)	0.884	54.9	203.5	D
	O'Sullivan Rd (NW)	0.875	62.6	91.7	E
	Birriga Rd (W)	0.989	90.3	133.1	F
	Old South Head Rd (SW)	0.999	100.6	315.2	F
	Overall	**0.999**	**71.5**	**315.2**	**F**

Under the proposed intersection layout changes the intersection continues to operate at capacity in both the AM and PM peak periods. However, it is noted that given the intersection currently operates at or above effective capacity, it is sensitive to any model changes and therefore the results are not necessarily reliable.

The removal of the slip lane and changes to lane arrangements on Curlewis Street is shown to have a relatively minor impact in the AM peak and PM peak, with negligible changes in overall intersection average delays.

The project also seeks to convert the existing pedestrian crossings into shared pedestrian and cyclist crossings to cater for cyclist movements to and from the shared path. Due to the limitations of SIDRA, the impact of the proposed conversion cannot be integrated into the model. The likely impact of the conversion could be that the usage would increase, with both cyclists and pedestrians calling upon the crossings with the proposed layout. This may result in higher frequency of the crossings being called upon each phase. However, considering that cyclists would typically require less crossing time than pedestrians, it is envisaged that the proposed conversion will not have a material impact on the performance of the intersection in comparison to those summarised in Table 3.

Summary

Based on the analysis and information presented within this technical note, the following conclusions are made:

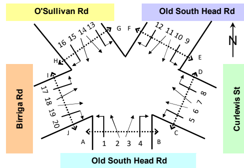
- The intersection of Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road currently operates beyond capacity at LoS F, with excessive delay and queues in both the AM and PM peak periods.
- Given the intersection currently operates at or above effective capacity, the model is sensitive to any changes in geometry, lane arrangements and traffic volumes. Therefore, modelling results may not be reliable.
- Future modelling was conducted to determine the impact of removing the left-turn slip lane from Old South Head Road to Curlewis Street and associated lane arrangement changes on Curlewis Street. The modelling adopted the existing signal phase times to determine a like-for-like operation comparison.
- The SIDRA results indicate that in both peak periods, the intersection continues to operate at capacity, however the proposed layout changes result in a relatively minor decrease in performance.
- The proposed layout also includes conversion of the existing pedestrian only crossings to shared pedestrian and cyclists crossings. The conversion is anticipated to increase the usage of the crossing, however will not impact the crossing time required as cyclists would typically cross faster than pedestrians. Therefore, the proposed conversion is anticipated to have no material impact on the performance of the intersection.

ATTACHMENT 1

Traffic Survey Data

Job No.	: AUNSW914
Client	: Stantec Australia Pty Ltd
Suburb	: Old South Head Rd
Location	: 1. Old South Head Rd/ Curlewis St/ O'Sullivan Rd/ Birriga Rd
Day/Date	: Tue, 1st June 2021
Weather	: Fine
Description	: Classified Intersection Count
	: 15 mins Data

	Class 1	Class 2	Class 3	Ped Class 1	Ped Class 2
Classifications	Lights	Heavies	Cyclists	Peds	Cyclists



Approach	Old South Head Rd																			
Direction	Direction 1				Direction 2				Direction 3				Direction 4				Direction 4U			
Time Period	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total
7:30 to 7:45	0	0	0	**0**	13	0	0	**13**	148	9	1	**158**	64	11	1	**76**	0	0	0	**0**
7:45 to 8:00	0	0	0	**0**	17	0	0	**17**	153	5	1	**159**	53	8	1	**62**	0	0	0	**0**
8:00 to 8:15	0	0	0	**0**	12	0	0	**12**	140	9	0	**149**	31	2	0	**33**	0	0	0	**0**
8:15 to 8:30	0	0	0	**0**	15	0	0	**15**	150	10	1	**161**	56	8	0	**64**	0	0	0	**0**
8:30 to 8:45	0	0	0	**0**	10	1	0	**11**	126	6	0	**132**	53	5	1	**59**	0	0	0	**0**
8:45 to 9:00	0	0	0	**0**	20	1	0	**21**	149	7	0	**156**	61	8	1	**70**	0	0	0	**0**
9:00 to 9:15	0	0	0	**0**	15	0	0	**15**	125	3	0	**128**	40	5	0	**45**	0	0	0	**0**
9:15 to 9:30	0	0	0	**0**	8	0	0	**8**	149	12	0	**161**	61	5	0	**66**	0	0	0	**0**
AM Totals	**0**	**0**	**0**	**0**	**110**	**2**	**0**	**112**	**1,140**	**61**	**3**	**1,204**	**419**	**52**	**4**	**475**	**0**	**0**	**0**	**0**
15:00 to 15:15	0	0	0	**0**	12	0	0	**12**	161	7	0	**168**	39	1	0	**40**	0	0	0	**0**
15:15 to 15:30	0	0	0	**0**	12	1	0	**13**	135	7	0	**142**	53	2	0	**55**	0	0	0	**0**
15:30 to 15:45	0	0	0	**0**	11	0	0	**11**	162	6	0	**168**	59	0	0	**59**	0	0	0	**0**
15:45 to 16:00	0	0	0	**0**	2	0	0	**2**	143	1	1	**145**	39	2	0	**41**	0	0	0	**0**
16:00 to 16:15	0	0	0	**0**	14	1	0	**15**	157	8	0	**165**	48	0	0	**48**	0	0	0	**0**
16:15 to 16:30	0	0	0	**0**	4	0	0	**4**	188	2	0	**190**	63	2	0	**65**	0	0	0	**0**
16:30 to 16:45	0	0	0	**0**	15	0	0	**15**	156	0	0	**156**	74	0	1	**75**	0	0	0	**0**
16:45 to 17:00	0	0	0	**0**	13	0	0	**13**	161	3	0	**164**	82	0	1	**83**	0	0	0	**0**
17:00 to 17:15	0	0	0	**0**	3	0	0	**3**	193	1	0	**194**	68	0	0	**68**	0	0	0	**0**
17:15 to 17:30	0	0	0	**0**	12	0	0	**12**	145	1	0	**146**	54	0	0	**54**	0	0	0	**0**
17:30 to 17:45	0	0	0	**0**	12	0	0	**12**	180	1	0	**181**	69	0	0	**69**	0	0	0	**0**
17:45 to 18:00	0	0	0	**0**	9	0	0	**9**	166	2	0	**168**	87	0	0	**87**	0	0	0	**0**
PM Totals	**0**	**0**	**0**	**0**	**119**	**2**	**0**	**121**	**1,947**	**39**	**1**	**1,987**	**735**	**7**	**2**	**744**	**0**	**0**	**0**	**0**

Approach	Curlewis St																			
Direction	Direction 5				Direction 6				Direction 7				Direction 8				Direction 8U			
Time Period	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total
7:30 to 7:45	144	4	0	**148**	25	1	1	**27**	51	1	2	**54**	9	1	1	**11**	0	0	0	**0**
7:45 to 8:00	96	2	0	**98**	40	1	0	**41**	39	3	4	**46**	5	0	0	**5**	0	0	0	**0**
8:00 to 8:15	92	0	0	**92**	59	0	3	**62**	38	2	2	**42**	5	1	0	**6**	0	0	0	**0**
8:15 to 8:30	102	1	0	**103**	43	1	1	**45**	29	0	0	**29**	6	0	1	**7**	0	0	0	**0**
8:30 to 8:45	88	1	0	**89**	36	1	3	**40**	41	1	2	**44**	9	1	0	**10**	0	0	0	**0**
8:45 to 9:00	72	2	0	**74**	38	0	0	**38**	53	0	0	**53**	15	0	0	**15**	0	0	0	**0**
9:00 to 9:15	100	2	0	**102**	32	0	1	**33**	48	0	0	**48**	16	0	0	**16**	0	0	0	**0**
9:15 to 9:30	84	3	0	**87**	19	0	0	**19**	42	0	0	**42**	11	1	0	**12**	0	0	0	**0**
AM Totals	**778**	**15**	**0**	**793**	**292**	**4**	**9**	**305**	**341**	**7**	**10**	**358**	**76**	**4**	**2**	**82**	**0**	**0**	**0**	**0**
15:00 to 15:15	107	5	0	**112**	21	0	0	**21**	37	0	0	**37**	9	0	0	**9**	0	0	0	**0**
15:15 to 15:30	102	4	0	**106**	14	1	1	**16**	34	0	0	**34**	12	0	0	**12**	0	0	0	**0**
15:30 to 15:45	98	4	0	**102**	23	0	0	**23**	31	0	0	**31**	9	0	0	**9**	0	0	0	**0**
15:45 to 16:00	86	3	0	**89**	23	0	0	**23**	30	0	0	**30**	16	0	0	**16**	0	0	0	**0**
16:00 to 16:15	111	3	0	**114**	21	0	0	**21**	25	0	0	**25**	16	0	0	**16**	0	0	0	**0**
16:15 to 16:30	75	3	0	**78**	20	0	0	**20**	37	0	0	**37**	12	0	0	**12**	0	0	0	**0**
16:30 to 16:45	75	2	0	**77**	19	0	0	**19**	33	0	2	**35**	13	1	0	**14**	0	0	0	**0**
16:45 to 17:00	86	6	0	**92**	16	0	0	**16**	44	1	0	**45**	8	1	0	**9**	0	0	0	**0**
17:00 to 17:15	90	2	0	**92**	23	0	0	**23**	25	0	0	**25**	13	0	0	**13**	0	0	0	**0**
17:15 to 17:30	80	4	0	**84**	18	1	0	**19**	45	0	0	**45**	16	0	1	**17**	0	0	0	**0**
17:30 to 17:45	70	2	0	**72**	14	0	0	**14**	33	1	0	**34**	16	0	0	**16**	0	0	0	**0**
17:45 to 18:00	54	3	0	**57**	20	0	1	**21**	37	0	1	**38**	17	0	0	**17**	0	0	0	**0**
PM Totals	**1,034**	**41**	**0**	**1,075**	**232**	**2**	**2**	**236**	**411**	**2**	**3**	**416**	**157**	**2**	**1**	**160**	**0**	**0**	**0**	**0**

Approach	Crossing Pedestrians																													
Direction	B to A			A to B			D to C			C to D			F to E			E to F			H to G			G to H			J to I			I to J		
Time Period	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total
7:30 to 7:45	8	1	**9**	8	1	**9**	4	0	**4**	3	1	**4**	5	0	**5**	8	1	**9**	0	0	**0**	0	0	**0**	2	1	**3**	8	0	**8**
7:45 to 8:00	6	1	**7**	8	0	**8**	1	1	**2**	1	0	**1**	5	1	**6**	4	1	**5**	0	0	**0**	0	0	**0**	3	1	**4**	1	1	**2**
8:00 to 8:15	10	0	**10**	3	1	**4**	1	0	**1**	2	0	**2**	8	0	**8**	6	3	**9**	0	0	**0**	0	0	**0**	5	0	**5**	9	0	**9**
8:15 to 8:30	4	0	**4**	11	0	**11**	0	1	**1**	4	0	**4**	1	0	**1**	3	4	**7**	0	0	**0**	0	0	**0**	4	0	**4**	7	1	**8**
8:30 to 8:45	15	0	**15**	6	1	**7**	0	2	**2**	3	0	**3**	9	1	**10**	2	1	**3**	0	0	**0**	0	0	**0**	7	0	**7**	6	0	**6**
8:45 to 9:00	0	0	**0**	7	0	**7**	1	2	**3**	0	1	**1**	1	2	**3**	1	1	**2**	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**1**
9:00 to 9:15	2	0	**2**	6	0	**6**	1	0	**1**	3	0	**3**	4	0	**4**	3	0	**3**	0	0	**0**	0	0	**0**	3	0	**3**	2	0	**2**
9:15 to 9:30	2	0	**2**	8	0	**8**	2	0	**2**	1	0	**1**	3	0	**3**	2	0	**2**	0	0	**0**	0	0	**0**	1	1	**2**	3	0	**3**
AM Totals	**47**	**2**	**49**	**57**	**3**	**60**	**10**	**6**	**16**	**17**	**2**	**19**	**36**	**4**	**40**	**29**	**11**	**40**	**0**	**0**	**0**	**0**	**0**	**0**	**25**	**3**	**28**	**37**	**2**	**39**
15:00 to 15:15	2	0	**2**	4	0	**4**	0	0	**0**	0	0	**0**	2	0	**2**	2	0	**2**	0	0	**0**	0	0	**0**	1	0	**1**	3	0	**3**
15:15 to 15:30	3	0	**3**	6	0	**6**	5	0	**5**	1	0	**1**	2	1	**3**	2	0	**2**	0	0	**0**	0	0	**0**	1	0	**1**	7	0	**7**
15:30 to 15:45	5	1	**6**	6	0	**6**	3	0	**3**	0	0	**0**	8	2	**10**	4	2	**6**	0	0	**0**	0	0	**0**	4	0	**4**	4	0	**4**
15:45 to 16:00	3	0	**3**	13	0	**13**	4	1	**5**	3	0	**3**	10	0	**10**	2	2	**4**	1	0	**1**	1	0	**1**	2	0	**2**	9	1	**10**
16:00 to 16:15	6	0	**6**	3	0	**3**	3	0	**3**	2	0	**2**	6	0	**6**	1	0	**1**	0	0	**0**	0	0	**0**	3	0	**3**	1	0	**1**
16:15 to 16:30	6	0	**6**	4	0	**4**	0	0	**0**	1	1	**2**	6	0	**6**	0	0	**0**	0	0	**0**	0	0	**0**	2	0	**2**	2	0	**2**
16:30 to 16:45	1	0	**1**	6	0	**6**	2	0	**2**	3	0	**3**	2	3	**5**	3	0	**3**	0	0	**0**	0	0	**0**	0	1	**1**	4	1	**5**
16:45 to 17:00	3	0	**3**	4	0	**4**	3	0	**3**	1	0	**1**	9	1	**10**	4	1	**5**	0	0	**0**	1	0	**1**	2	0	**2**	3	0	**3**
17:00 to 17:15	0	0	**0**	6	1	**7**	3	0	**3**	0	0	**0**	8	0	**8**	3	0	**3**	0	0	**0**	0	0	**0**	0	0	**0**	4	0	**4**
17:15 to 17:30	5	0	**5**	5	0	**5**	2	0	**2**	0	1	**1**	8	1	**9**	1	1	**2**	0	0	**0**	0	0	**0**	2	0	**2**	1	0	**1**
17:30 to 17:45	7	0	**7**	4	0	**4**	3	1	**4**	4	0	**4**	4	3	**7**	5	0	**5**	0	0	**0**	0	0	**0**	6	0	**6**	4	0	**4**
17:45 to 18:00	3	1	**4**	6	0	**6**	0	0	**0**	4	0	**4**	6	1	**7**	1	1	**2**	0	0	**0**	0	0	**0**	2	0	**2**	4	0	**4**
PM Totals	**44**	**2**	**46**	**67**	**1**	**68**	**28**	**2**	**30**	**19**	**2**	**21**	**71**	**12**	**83**	**28**	**7**	**35**	**1**	**0**	**1**	**2**	**0**	**2**	**25**	**1**	**26**	**46**	**2**	**48**

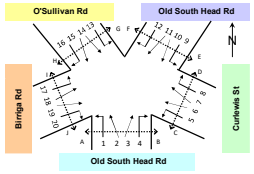
Approach	Old South Head Rd																			
Direction	Direction 9				Direction 10				Direction 11				Direction 12				Direction 12U			
Time Period	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total
7:30 to 7:45	6	0	0	**6**	149	0	0	**149**	56	3	0	**59**	15	2	0	**17**	0	0	0	**0**
7:45 to 8:00	2	0	0	**2**	146	4	0	**150**	86	4	1	**91**	30	2	0	**32**	0	0	0	**0**
8:00 to 8:15	2	0	0	**2**	152	4	1	**157**	87	3	1	**91**	16	1	0	**17**	0	0	0	**0**
8:15 to 8:30	7	0	0	**7**	142	5	0	**147**	82	3	0	**85**	18	0	0	**18**	0	0	0	**0**
8:30 to 8:45	4	1	0	**5**	121	6	0	**127**	83	3	0	**86**	17	0	0	**17**	0	0	0	**0**
8:45 to 9:00	10	0	1	**11**	128	4	0	**132**	54	3	1	**58**	27	1	0	**28**	0	0	0	**0**
9:00 to 9:15	8	0	0	**8**	138	9	0	**147**	32	1	1	**34**	13	1	0	**14**	0	0	0	**0**
9:15 to 9:30	9	1	0	**10**	143	10	0	**153**	39	2	0	**41**	18	2	1	**21**	0	0	0	**0**
AM Totals	**48**	**2**	**1**	**51**	**1,119**	**42**	**1**	**1,162**	**519**	**22**	**4**	**545**	**154**	**9**	**1**	**164**	**0**	**0**	**0**	**0**
15:00 to 15:15	9	1	0	**10**	188	6	0	**194**	26	1	0	**27**	15	0	0	**15**	0	0	0	**0**
15:15 to 15:30	11	0	0	**11**	176	6	0	**182**	18	1	0	**19**	12	2	1	**15**	0	0	0	**0**
15:30 to 15:45	11	0	0	**11**	173	15	1	**189**	18	2	0	**20**	6	1	0	**7**	0	0	0	**0**
15:45 to 16:00	9	0	0	**9**	163	8	0	**171**	20	1	0	**21**	15	2	0	**17**	0	0	0	**0**
16:00 to 16:15	11	0	0	**11**	173	15	0	**188**	23	2	0	**25**	8	0	0	**8**	0	0	0	**0**
16:15 to 16:30	13	0	0	**13**	165	7	0	**172**	27	2	0	**29**	13	0	0	**13**	0	0	0	**0**
16:30 to 16:45	18	0	0	**18**	164	9	0	**173**	13	1	0	**14**	14	1	0	**15**	0	0	0	**0**
16:45 to 17:00	12	0	0	**12**	131	5	0	**136**	20	1	0	**21**	25	0	0	**25**	0	0	0	**0**
17:00 to 17:15	15	0	0	**15**	144	1	1	**146**	28	1	0	**29**	22	0	0	**22**	0	0	0	**0**
17:15 to 17:30	7	0	0	**7**	153	2	0	**155**	21	1	0	**22**	16	0	0	**16**	0	0	0	**0**
17:30 to 17:45	11	0	0	**11**	168	2	1	**171**	23	1	0	**24**	17	0	0	**17**	0	0	0	**0**
17:45 to 18:00	8	0	0	**8**	116	2	0	**118**	18	4	0	**22**	9	0	0	**9**	0	0	0	**0**
PM Totals	**135**	**1**	**0**	**136**	**1,914**	**78**	**3**	**1,995**	**255**	**18**	**0**	**273**	**172**	**6**	**1**	**179**	**0**	**0**	**0**	**0**

Approach	O'Sullivan Rd																			
Direction	Direction 13				Direction 14				Direction 15				Direction 16				Direction 16U			
Time Period	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total
7:30 to 7:45	13	0	0	**13**	33	3	0	**36**	9	2	0	**11**	1	0	0	**1**	0	0	0	**0**
7:45 to 8:00	21	1	0	**22**	27	1	0	**28**	11	1	0	**12**	2	0	0	**2**	0	0	0	**0**
8:00 to 8:15	11	2	0	**13**	42	3	0	**45**	10	0	0	**10**	2	1	0	**3**	0	0	0	**0**
8:15 to 8:30	14	0	1	**15**	35	2	0	**37**	11	2	0	**13**	1	0	0	**1**	0	0	0	**0**
8:30 to 8:45	15	0	0	**15**	55	0	0	**55**	12	0	0	**12**	1	0	0	**1**	0	0	0	**0**
8:45 to 9:00	13	0	0	**13**	45	0	0	**45**	12	0	0	**12**	2	1	0	**3**	1	0	0	**1**
9:00 to 9:15	17	1	0	**18**	42	2	0	**44**	7	0	0	**7**	0	0	0	**0**	0	0	0	**0**
9:15 to 9:30	12	1	0	**13**	36	2	1	**39**	5	0	0	**5**	1	0	0	**1**	0	0	0	**0**
AM Totals	**116**	**5**	**1**	**122**	**315**	**13**	**1**	**329**	**77**	**5**	**0**	**82**	**10**	**2**	**0**	**12**	**1**	**0**	**0**	**1**
15:00 to 15:15	16	0	0	**16**	47	1	1	**49**	16	0	0	**16**	0	0	0	**0**	0	0	0	**0**
15:15 to 15:30	16	2	0	**18**	39	2	0	**41**	13	0	0	**13**	0	0	0	**0**	0	0	0	**0**
15:30 to 15:45	17	0	0	**17**	49	0	1	**50**	14	1	0	**15**	0	0	0	**0**	0	0	0	**0**
15:45 to 16:00	18	1	0	**19**	56	2	1	**59**	18	0	0	**18**	1	0	0	**1**	0	0	0	**0**
16:00 to 16:15	23	0	0	**23**	54	2	0	**56**	10	0	0	**10**	0	0	0	**0**	0	0	0	**0**
16:15 to 16:30	17	0	0	**17**	50	0	0	**50**	13	1	0	**14**	0	0	0	**0**	0	0	0	**0**
16:30 to 16:45	15	0	0	**15**	56	0	0	**56**	16	0	0	**16**	0	0	0	**0**	0	0	0	**0**
16:45 to 17:00	25	0	0	**25**	53	1	0	**54**	10	0	0	**10**	1	0	0	**1**	0	0	0	**0**
17:00 to 17:15	26	1	0	**27**	52	0	2	**54**	8	0	0	**8**	0	0	0	**0**	0	0	0	**0**
17:15 to 17:30	18	0	0	**18**	52	1	0	**53**	16	0	0	**16**	0	0	0	**0**	0	0	0	**0**
17:30 to 17:45	33	0	0	**33**	56	0	1	**57**	9	1	0	**10**	0	0	0	**0**	0	0	0	**0**
17:45 to 18:00	14	0	5	**19**	46	0	3	**49**	7	0	2	**9**	0	0	0	**0**	0	0	0	**0**
PM Totals	**238**	**4**	**5**	**247**	**610**	**9**	**9**	**628**	**150**	**3**	**2**	**155**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**0**

Approach	Birriga Rd																			
Direction	Direction 17				Direction 18				Direction 19				Direction 20				Direction 20U			
Time Period	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total
7:30 to 7:45	3	0	0	**3**	38	2	0	**40**	14	0	0	**14**	0	0	0	**0**	0	0	0	**0**
7:45 to 8:00	1	0	1	**2**	27	2	1	**30**	22	1	1	**24**	0	0	0	**0**	0	0	0	**0**
8:00 to 8:15	2	0	0	**2**	51	2	0	**53**	40	1	0	**41**	0	0	0	**0**	0	0	0	**0**
8:15 to 8:30	3	0	0	**3**	31	3	0	**34**	24	1	0	**25**	1	0	0	**1**	0	0	0	**0**
8:30 to 8:45	1	0	0	**1**	34	2	1	**37**	39	1	0	**40**	0	0	0	**0**	0	0	0	**0**
8:45 to 9:00	1	0	0	**1**	44	2	1	**47**	35	1	0	**36**	0	0	0	**0**	0	0	0	**0**
9:00 to 9:15	3	0	0	**3**	43	2	2	**47**	24	0	1	**25**	0	0	0	**0**	0	0	0	**0**
9:15 to 9:30	4	0	0	**4**	34	2	0	**36**	23	0	0	**23**	1	0	0	**1**	0	0	0	**0**
AM Totals	**18**	**0**	**1**	**19**	**302**	**17**	**5**	**324**	**221**	**5**	**2**	**228**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**0**
15:00 to 15:15	1	0	0	**1**	32	1	0	**33**	22	0	0	**22**	0	0	0	**0**	0	0	0	**0**
15:15 to 15:30	5	1	0	**6**	59	2	0	**61**	39	0	1	**40**	0	0	0	**0**	0	0	0	**0**
15:30 to 15:45	1	0	0	**1**	61	5	0	**66**	43	1	0	**44**	0	0	0	**0**	0	0	0	**0**
15:45 to 16:00	4	0	1	**5**	67	5	1	**73**	41	0	0	**41**	2	0	0	**2**	0	0	0	**0**
16:00 to 16:15	2	0	0	**2**	49	5	0	**54**	37	0	2	**39**	0	0	0	**0**	0	0	0	**0**
16:15 to 16:30	2	0	0	**2**	40	2	0	**42**	37	0	0	**37**	0	0	0	**0**	0	0	0	**0**
16:30 to 16:45	5	0	0	**5**	54	2	0	**56**	27	0	0	**27**	0	0	0	**0**	0	0	0	**0**
16:45 to 17:00	2	0	0	**2**	50	1	0	**51**	34	1	2	**37**	0	0	0	**0**	0	0	0	**0**
17:00 to 17:15	2	0	0	**2**	70	2	0	**72**	31	0	1	**32**	0	0	0	**0**	0	0	0	**0**
17:15 to 17:30	4	0	0	**4**	75	3	1	**79**	51	0	1	**52**	0	0	0	**0**	0	0	0	**0**
17:30 to 17:45	4	0	0	**4**	56	3	2	**61**	36	0	1	**37**	0	0	0	**0**	0	0	0	**0**
17:45 to 18:00	5	0	1	**6**	70	3	2	**75**	40	0	4	**44**	1	0	0	**1**	0	0	0	**0**
PM Totals	**37**	**1**	**2**	**40**	**683**	**34**	**6**	**723**	**438**	**2**	**12**	**452**	**3**	**0**	**0**	**3**	**0**	**0**	**0**	**0**

Job No. : AUNSW914
Client : Stantec Australia Pty Ltd
Suburb : Old South Head Rd
Location : 1. Old South Head Rd/ Curlewis St/ O'Sullivan Rd/ Birriga Rd

Day/Date : Tue, 1st June 2021
Weather : Fine
Description : Classified Intersection Count
: Hourly Summary



MATRIX
Traffic and Transport Data

Approach	Old South Head Rd																Curlewis St																Crossing Pedestrians																							
Direction	Direction 1				Direction 2				Direction 3				Direction 4				Direction 4U				Direction 5				Direction 6				Direction 7				Direction 8				Direction 8U				B to A			A to B			D to C			C to D			F to E			E to F			H to G			G to H			J to I			I to J		
Time Period	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total	Peds	Cyclists	Total
7:30 to 8:30	0	0	0	**0**	57	0	0	**57**	591	33	3	**627**	204	29	2	**235**	0	0	0	**0**	434	7	0	**441**	167	3	5	**175**	157	6	8	**171**	25	2	2	**29**	0	0	0	**0**	28	2	**30**	30	2	**32**	6	2	**8**	10	1	**11**	19	1	**20**	21	9	**30**	0	0	**0**	0	0	**0**	14	2	**16**	25	2	**27**
7:45 to 8:45	0	0	0	**0**	54	1	0	**55**	569	30	2	**601**	193	23	2	**218**	0	0	0	**0**	378	4	0	**382**	178	3	7	**188**	147	6	8	**161**	25	2	1	**28**	0	0	0	**0**	35	1	**36**	28	2	**30**	2	4	**6**	10	0	**10**	23	2	**25**	15	9	**24**	0	0	**0**	0	0	**0**	19	1	**20**	23	2	**25**
8:00 to 9:00	0	0	0	**0**	57	2	0	**59**	565	32	1	**598**	201	23	2	**226**	0	0	0	**0**	354	4	0	**358**	176	2	7	**185**	161	3	4	**168**	35	2	1	**38**	0	0	0	**0**	29	0	**29**	27	2	**29**	2	5	**7**	9	1	**10**	19	3	**22**	12	9	**21**	0	0	**0**	0	0	**0**	16	0	**16**	23	1	**24**
8:15 to 9:15	0	0	0	**0**	60	2	0	**62**	550	26	1	**577**	210	26	2	**238**	0	0	0	**0**	362	6	0	**368**	149	2	5	**156**	171	1	2	**174**	46	1	1	**48**	0	0	0	**0**	21	0	**21**	30	1	**31**	2	5	**7**	10	1	**11**	15	3	**18**	9	6	**15**	0	0	**0**	0	0	**0**	14	0	**14**	16	1	**17**
8:30 to 9:30	0	0	0	**0**	53	2	0	**55**	549	28	0	**577**	215	23	2	**240**	0	0	0	**0**	344	8	0	**352**	125	1	4	**130**	184	1	2	**187**	51	2	0	**53**	0	0	0	**0**	19	0	**19**	27	1	**28**	4	4	**8**	7	1	**8**	17	3	**20**	8	2	**10**	0	0	**0**	0	0	**0**	11	1	**12**	12	0	**12**
AM Totals	**0**	**0**	**0**	**0**	**110**	**2**	**0**	**112**	**1,340**	**61**	**3**	**1,206**	**419**	**52**	**4**	**475**	**0**	**0**	**0**	**0**	**778**	**15**	**0**	**793**	**292**	**4**	**9**	**305**	**341**	**7**	**10**	**358**	**76**	**4**	**2**	**82**	**0**	**0**	**0**	**0**	**47**	**2**	**49**	**57**	**3**	**60**	**10**	**6**	**16**	**17**	**2**	**19**	**36**	**4**	**40**	**29**	**11**	**40**	**0**	**0**	**0**	**0**	**0**	**0**	**25**	**3**	**28**	**37**	**2**	**39**
15:00 to 16:00	0	0	0	**0**	37	1	0	**38**	601	21	1	**623**	190	5	0	**195**	0	0	0	**0**	393	16	0	**409**	81	1	1	**83**	132	0	0	**132**	46	0	0	**46**	0	0	0	**0**	13	1	**14**	29	0	**29**	12	1	**13**	4	0	**4**	22	3	**25**	10	4	**14**	1	0	**1**	1	0	**1**	8	0	**8**	23	1	**24**
15:15 to 16:15	0	0	0	**0**	39	2	0	**41**	597	22	1	**620**	199	4	0	**203**	0	0	0	**0**	397	14	0	**411**	81	1	1	**83**	120	0	0	**120**	53	0	0	**53**	0	0	0	**0**	17	1	**18**	28	0	**28**	15	1	**16**	6	0	**6**	26	3	**29**	9	4	**13**	1	0	**1**	1	0	**1**	10	0	**10**	21	1	**22**
15:30 to 16:30	0	0	0	**0**	31	1	0	**32**	650	17	1	**668**	209	4	0	**213**	0	0	0	**0**	370	13	0	**383**	87	0	0	**87**	123	0	0	**123**	53	0	0	**53**	0	0	0	**0**	20	1	**21**	26	0	**26**	10	1	**11**	6	1	**7**	30	2	**32**	7	4	**11**	1	0	**1**	1	0	**1**	11	0	**11**	16	1	**17**
15:45 to 16:45	0	0	0	**0**	35	1	0	**36**	644	11	1	**656**	224	4	1	**229**	0	0	0	**0**	347	11	0	**358**	83	0	0	**83**	125	0	2	**127**	57	1	0	**58**	0	0	0	**0**	16	0	**16**	26	0	**26**	9	1	**10**	9	1	**10**	24	3	**27**	6	2	**8**	1	0	**1**	1	0	**1**	7	1	**8**	16	2	**18**
16:00 to 17:00	0	0	0	**0**	46	1	0	**47**	662	13	0	**675**	267	2	2	**271**	0	0	0	**0**	347	14	0	**361**	76	0	0	**76**	139	1	2	**142**	49	2	0	**51**	0	0	0	**0**	16	0	**16**	17	0	**17**	8	0	**8**	7	1	**8**	23	4	**27**	8	1	**9**	0	0	**0**	1	0	**1**	7	1	**8**	10	1	**11**
16:15 to 17:15	0	0	0	**0**	35	0	0	**35**	698	6	0	**704**	287	2	2	**291**	0	0	0	**0**	326	13	0	**339**	78	0	0	**78**	139	1	2	**142**	46	2	0	**48**	0	0	0	**0**	10	0	**10**	20	1	**21**	8	0	**8**	5	1	**6**	25	4	**29**	10	1	**11**	0	0	**0**	1	0	**1**	4	1	**5**	13	1	**14**
16:30 to 17:30	0	0	0	**0**	43	0	0	**43**	655	5	0	**660**	278	0	2	**280**	0	0	0	**0**	331	14	0	**345**	76	1	0	**77**	147	1	2	**150**	50	2	1	**53**	0	0	0	**0**	9	0	**9**	21	1	**22**	10	0	**10**	4	1	**5**	27	5	**32**	11	2	**13**	0	0	**0**	1	0	**1**	4	1	**5**	12	1	**13**
16:45 to 17:45	0	0	0	**0**	40	0	0	**40**	679	6	0	**685**	273	0	1	**274**	0	0	0	**0**	326	14	0	**340**	71	1	0	**72**	147	2	0	**149**	53	1	1	**55**	0	0	0	**0**	15	0	**15**	19	1	**20**	11	1	**12**	5	1	**6**	29	5	**34**	13	2	**15**	0	0	**0**	1	0	**1**	10	0	**10**	12	0	**12**
17:00 to 18:00	0	0	0	**0**	36	0	0	**36**	684	5	0	**689**	278	0	0	**278**	0	0	0	**0**	294	11	0	**305**	75	1	1	**77**	140	1	1	**142**	62	0	1	**63**	0	0	0	**0**	15	1	**16**	21	1	**22**	8	1	**9**	8	1	**9**	26	5	**31**	10	2	**12**	0	0	**0**	0	0	**0**	10	0	**10**	13	0	**13**
PM Totals	**0**	**0**	**0**	**0**	**119**	**2**	**0**	**121**	**1,947**	**39**	**1**	**1,987**	**735**	**7**	**2**	**744**	**0**	**0**	**0**	**0**	**1,034**	**41**	**0**	**1,075**	**232**	**2**	**2**	**236**	**411**	**2**	**3**	**416**	**157**	**2**	**1**	**160**	**0**	**0**	**0**	**0**	**66**	**2**	**46**	**67**	**1**	**68**	**28**	**2**	**30**	**19**	**2**	**21**	**71**	**12**	**83**	**28**	**7**	**35**	**1**	**0**	**1**	**2**	**0**	**2**	**25**	**1**	**26**	**46**	**2**	**48**

Approach	Old South Head Rd																O'Sullivan Rd																Birriga Rd																							
Direction	Direction 9				Direction 10				Direction 11				Direction 12				Direction 12U				Direction 13				Direction 14				Direction 15				Direction 16				Direction 16U				Direction 17				Direction 18				Direction 19				Direction 20				Direction 20U			
Time Period	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total	Lights	Heavies	Cyclists	Total
7:30 to 8:30	17	0	0	**17**	589	13	1	**603**	311	13	2	**326**	79	5	0	**84**	0	0	0	**0**	59	3	1	**63**	137	9	0	**146**	41	5	0	**46**	6	1	0	**7**	0	0	0	**0**	9	0	1	**10**	147	9	1	**157**	100	3	1	**104**	1	0	0	**1**	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**
7:45 to 8:45	15	1	0	**16**	561	19	1	**581**	338	13	2	**353**	81	3	0	**84**	0	0	0	**0**	61	3	1	**65**	159	6	0	**165**	44	3	0	**47**	6	1	0	**7**	0	0	0	**0**	7	0	1	**8**	143	9	2	**154**	125	4	1	**130**	1	0	0	**1**	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**
8:00 to 9:00	23	1	1	**25**	543	19	1	**563**	306	12	2	**320**	78	2	0	**80**	0	0	0	**0**	53	2	1	**56**	177	5	0	**182**	45	2	0	**47**	6	2	0	**8**	1	0	0	**1**	7	0	0	**7**	160	9	2	**171**	138	4	0	**142**	1	0	0	**1**	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**
8:15 to 9:15	29	1	1	**31**	529	24	0	**553**	251	10	2	**263**	75	2	0	**77**	0	0	0	**0**	59	1	1	**61**	177	4	0	**181**	42	2	0	**44**	4	1	0	**5**	1	0	0	**1**	8	0	0	**8**	152	9	4	**165**	122	3	1	**126**	1	0	0	**1**	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**
8:30 to 9:30	31	2	1	**34**	530	29	0	**559**	208	9	2	**219**	75	4	1	**80**	0	0	0	**0**	57	2	0	**59**	178	4	1	**183**	36	0	0	**36**	4	1	0	**5**	1	0	0	**1**	9	0	0	**9**	155	8	4	**167**	121	2	1	**124**	1	0	0	**1**	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**
AM Totals	**48**	**2**	**1**	**51**	**1,119**	**42**	**1**	**1,162**	**519**	**22**	**4**	**545**	**156**	**9**	**1**	**164**	**0**	**0**	**0**	**0**	**116**	**5**	**1**	**122**	**315**	**13**	**1**	**329**	**77**	**5**	**0**	**82**	**10**	**2**	**0**	**12**	**1**	**0**	**0**	**1**	**18**	**0**	**1**	**19**	**302**	**17**	**5**	**324**	**221**	**5**	**2**	**228**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**0**
15:00 to 16:00	40	1	0	**41**	700	35	1	**736**	82	5	0	**87**	48	5	1	**54**	0	0	0	**0**	67	3	0	**70**	191	5	3	**199**	61	1	0	**62**	1	0	0	**1**	0	0	0	**0**	11	1	1	**13**	219	13	1	**233**	145	1	1	**147**	2	0	0	**2**	0	0	0	**0**	2	0	0	**2**	0	0	0	**0**
15:15 to 16:15	42	0	0	**42**	685	44	1	**730**	79	6	0	**85**	41	5	1	**47**	0	0	0	**0**	74	3	0	**77**	198	6	2	**206**	55	1	0	**56**	1	0	0	**1**	0	0	0	**0**	12	1	1	**14**	236	17	1	**254**	160	1	3	**164**	2	0	0	**2**	0	0	0	**0**	2	0	0	**2**	0	0	0	**0**
15:30 to 16:30	44	0	0	**44**	674	45	1	**720**	88	7	0	**95**	42	3	0	**45**	0	0	0	**0**	75	1	0	**76**	209	4	2	**215**	55	2	0	**57**	1	0	0	**1**	0	0	0	**0**	9	0	1	**10**	217	17	1	**235**	158	1	2	**161**	2	0	0	**2**	0	0	0	**0**	2	0	0	**2**	0	0	0	**0**
15:45 to 16:45	51	0	0	**51**	665	39	0	**704**	83	6	0	**89**	50	3	0	**53**	0	0	0	**0**	73	1	0	**74**	216	4	1	**221**	57	1	0	**58**	1	0	0	**1**	0	0	0	**0**	13	0	1	**14**	210	14	1	**225**	142	0	2	**144**	2	0	0	**2**	0	0	0	**0**	2	0	0	**2**	0	0	0	**0**
16:00 to 17:00	54	0	0	**54**	633	36	0	**669**	83	6	0	**89**	60	1	0	**61**	0	0	0	**0**	80	0	0	**80**	213	3	0	**216**	49	1	0	**50**	1	0	0	**1**	0	0	0	**0**	11	0	0	**11**	193	10	0	**203**	135	1	4	**140**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**
16:15 to 17:15	58	0	0	**58**	604	22	1	**627**	88	5	0	**93**	74	1	0	**75**	0	0	0	**0**	83	1	0	**84**	211	1	2	**214**	47	1	0	**48**	1	0	0	**1**	0	0	0	**0**	11	0	0	**11**	214	7	0	**221**	129	1	3	**133**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**
16:30 to 17:30	52	0	0	**52**	592	17	1	**610**	82	4	0	**86**	77	1	0	**78**	0	0	0	**0**	84	1	0	**85**	213	2	2	**217**	50	0	0	**50**	1	0	0	**1**	0	0	0	**0**	13	0	0	**13**	249	8	1	**258**	143	1	4	**148**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**
16:45 to 17:45	45	0	0	**45**	596	10	2	**608**	92	4	0	**96**	80	0	0	**80**	0	0	0	**0**	102	1	0	**103**	213	2	3	**218**	43	1	0	**44**	1	0	0	**1**	0	0	0	**0**	12	0	0	**12**	251	9	3	**263**	152	1	5	**158**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**
17:00 to 18:00	41	0	0	**41**	581	7	2	**590**	90	7	0	**97**	64	0	0	**64**	0	0	0	**0**	91	1	5	**97**	206	1	6	**213**	40	1	2	**43**	0	0	0	**0**	0	0	0	**0**	15	0	1	**16**	271	11	5	**287**	158	0	7	**165**	1	0	0	**1**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**
PM Totals	**135**	**1**	**0**	**136**	**1,914**	**78**	**3**	**1,995**	**255**	**18**	**0**	**273**	**172**	**6**	**1**	**179**	**0**	**0**	**0**	**0**	**238**	**4**	**5**	**247**	**610**	**9**	**9**	**628**	**150**	**3**	**2**	**155**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**37**	**1**	**2**	**40**	**683**	**34**	**6**	**723**	**438**	**2**	**12**	**452**	**3**	**0**	**0**	**3**	**0**	**0**	**0**	**0**								

ATTACHMENT 2

SIDRA Calibration and Outputs

Existing Models Calibration

No site visit was undertaken to observe intersection performance due to COVID-19 restrictions in place at the time of modelling. SCATS historic files and the traffic survey video files were relied upon to assist in the calibration of the existing SIDRA models. The following information was used in the calibration:

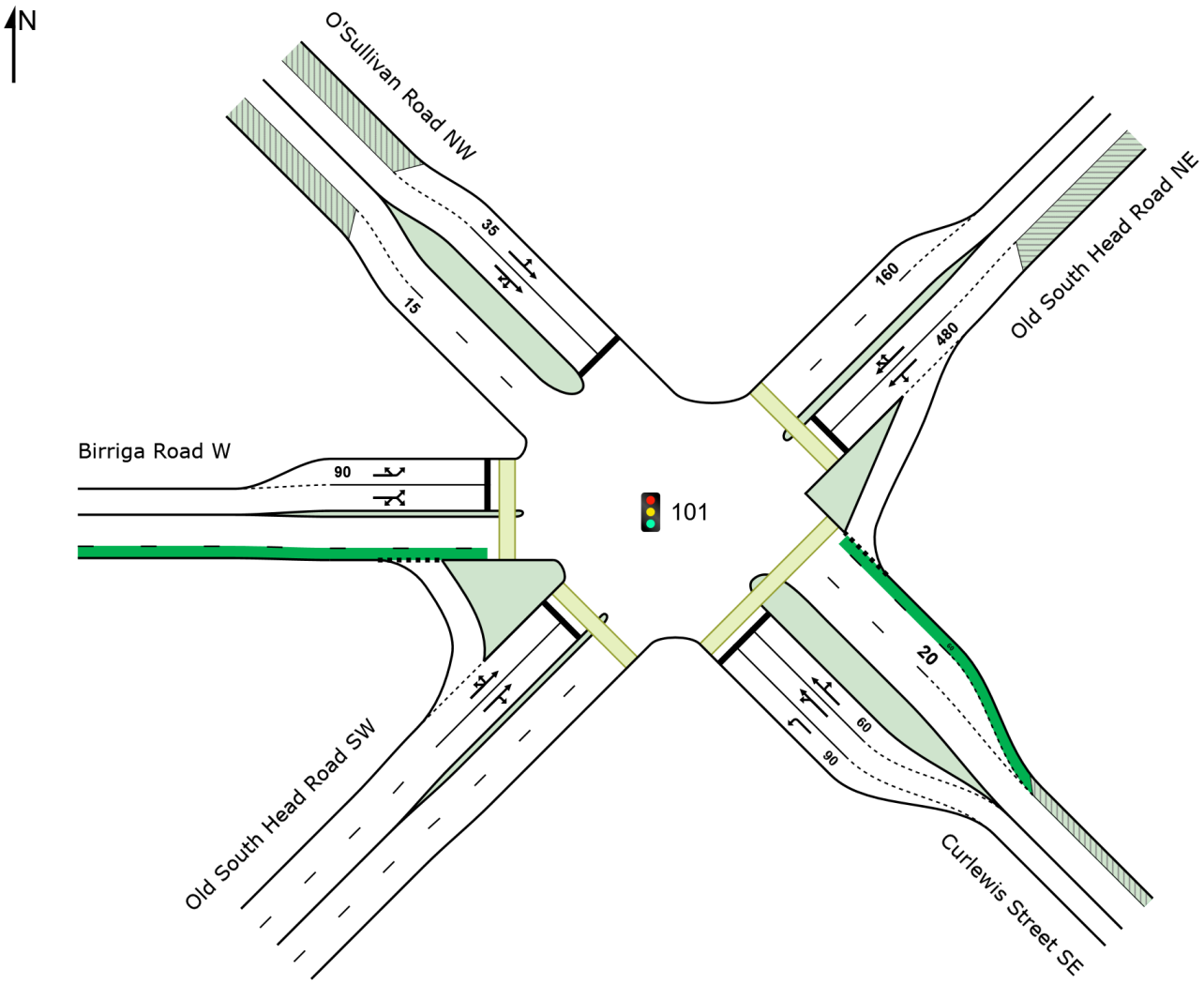
- Average phase cycle time was approximately 110 seconds and 120 seconds in the AM and PM peaks respectively.
- The exit lanes on O'Sullivan Road and Curlewis Street are not marked as two lanes, however are wide enough to accommodate two through vehicles for a short distance. Observations from videos indicate that eastbound through vehicles on O'Sullivan Road and Curlewis Street use either lane to travel through the intersection depending on whether their path is obstructed by left or right turning vehicles.
    - The model incorporates two exit lanes on O'Sullivan Road and Curlewis Street to reflect the above driver behaviour and allow SIDRA to model two through vehicles at the same time (noting this was observed to rarely occur and would typically only happen at the beginning of the phase).
- The median lanes for the O'Sullivan Road and Curlewis Street approaches were typically underutilised, with their use generally limited to right turn vehicles and the occasional through vehicle at the start of D Phase.
    - Lane utilisation was adjusted to reflect the high proportion of vehicles using the kerbside through lane despite the apparent downstream short lane effect identified in the model as a result of two exit lanes being modelled.
- Through movements from Old South Head Road (SW) and Birriga Road to Old South Head Road (NE) were typically evenly distributed between the approach lanes.
    - Lane utilisation for the kerbside lanes was adjusted to reflect the even distribution of vehicles in the approach lane despites the downstream short lane effect (160 metres) identified in the model.
- SCATS phasing data indicated pedestrian phases were not always running in each signal cycle, review of videos confirmed this. Additionally, it was noted that pedestrians (particularly on Birriga Road) crossed illegally and did not always wait for a green pedestrian signal.
    - Pedestrian phase actuation was adjusted to reflect the actuation observed in SCATS.
- Vehicles turning right into Old South Head Road (SW) from O'Sullivan Road were observed to turn at the same time as left turn vehicles from Curlewis Street, particularly at the end of the phase.
    - The conflicting priority for the right turn from O'Sullivan Road was therefore removed from Curlewis Street to allow these movements to occur simultaneously.
- Peak Flow Factors were adjusted based on movements where traffic volumes indicated the peak flow factor was above 95%. The following adjustments were made:
    - AM Peak Period
        - Old South Head Road (NE) Through Movement: 99%
        - Old South Head Road (SW) Through Movement: 99%
    - PM Peak Period
        - O'Sullivan Road (NW) Left Turn Movement: 99%
        - O'Sullivan Road (NW) Through Movement: 99%
        - Old South Head Road (SW) Through Movement: 100%
        - Old South Head Road (SW) All Other Movements (L3, L2 and R2): 96.5%

SITE LAYOUT

Site: 101 [AM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: Existing)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [AM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: Existing)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Curlewis Street SE														
4	L2	441	7	464	1.6	0.514	17.7	LOS B	13.1	92.7	0.72	0.78	0.72	39.9
21a	L1	175	3	184	1.7	0.799	57.3	LOS E	12.7	87.3	1.00	0.94	1.17	28.0
5	T1	171	6	180	3.5	* 0.940	69.1	LOS E	12.7	87.3	1.00	1.09	1.50	25.5
6	R2	29	2	31	6.9	0.940	78.0	LOS F	11.2	81.0	1.00	1.14	1.59	24.6
Approach		816	18	859	2.2	0.940	39.1	LOS C	13.1	92.7	0.85	0.89	1.01	32.4
NorthEast: Old South Head Road NE														
7	L2	17	0	18	0.0	0.998	100.2	LOS F	43.8	311.6	1.00	1.38	1.60	21.8
8	T1	603	13	609	2.2	* 0.998	95.0	LOS F	43.8	311.6	1.00	1.37	1.60	21.8
26a	R1	326	13	343	4.0	0.998	93.4	LOS F	41.7	301.2	1.00	1.29	1.61	22.2
9	R2	84	5	88	6.0	0.998	95.2	LOS F	41.7	301.2	1.00	1.29	1.61	22.0
Approach		1030	31	1059	3.0	0.998	94.6	LOS F	43.8	311.6	1.00	1.34	1.61	21.9
NorthWest: O'Sullivan Road NW														
10	L2	63	3	66	4.8	0.717	54.1	LOS D	9.8	71.8	0.99	0.87	1.08	29.3
11	T1	146	9	154	6.2	0.897	54.4	LOS D	9.8	71.8	0.99	0.91	1.19	28.4
12	R2	46	5	48	10.9	0.897	73.6	LOS F	5.7	43.4	1.00	1.03	1.57	25.1
29b	R3	7	1	7	14.3	0.897	74.4	LOS F	5.7	43.4	1.00	1.03	1.57	25.1
Approach		262	18	276	6.9	0.897	58.2	LOS E	9.8	71.8	0.99	0.92	1.24	27.9
West: Birriga Road W														
10b	L3	10	0	11	0.0	0.895	71.7	LOS F	8.4	60.9	1.00	1.04	1.48	25.2
10a	L1	157	9	165	5.7	0.995	77.2	LOS F	11.3	81.6	1.00	1.09	1.57	24.4
12a	R1	104	3	109	2.9	0.995	95.6	LOS F	11.3	81.6	1.00	1.23	1.84	21.8
12b	R3	1	0	1	0.0	* 0.995	97.8	LOS F	11.3	81.6	1.00	1.23	1.84	21.6
Approach		272	12	286	4.4	0.995	84.1	LOS F	11.3	81.6	1.00	1.14	1.67	23.3
SouthWest: Old South Head Road SW														
30b	L3	23	0	24	0.0	0.948	82.9	LOS F	34.4	249.0	1.00	1.23	1.41	24.4
1	L2	57	0	60	0.0	0.948	81.9	LOS F	34.4	249.0	1.00	1.23	1.41	24.3
2	T1	627	33	633	5.3	* 0.973	78.5	LOS F	35.3	265.3	1.00	1.22	1.45	24.1
3	R2	235	29	247	12.3	0.973	83.2	LOS F	35.3	265.3	1.00	1.21	1.52	23.6
Approach		942	62	965	6.6	0.973	80.0	LOS F	35.3	265.3	1.00	1.22	1.46	24.0
All Vehicles		3322	141	3445	4.3	0.998	72.9	LOS F	43.8	311.6	0.96	1.14	1.39	25.1

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Curlewis Street SE												
P1	Full	19	20	49.2	LOS E	0.1	0.1	0.95	0.95	222.3	225.0	1.01
NorthEast: Old South Head Road NE												
P3	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.5	216.0	1.00
West: Birriga Road W												
P2	Full	43	45	49.3	LOS E	0.1	0.1	0.95	0.95	214.5	214.9	1.00
SouthWest: Old South Head Road SW												
P4	Full	62	65	49.3	LOS E	0.2	0.2	0.95	0.95	215.0	215.4	1.00
All Pedestrians		174	183	49.3	LOS E	0.2	0.2	0.95	0.95	215.8	216.5	1.00

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 [AM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: Existing)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

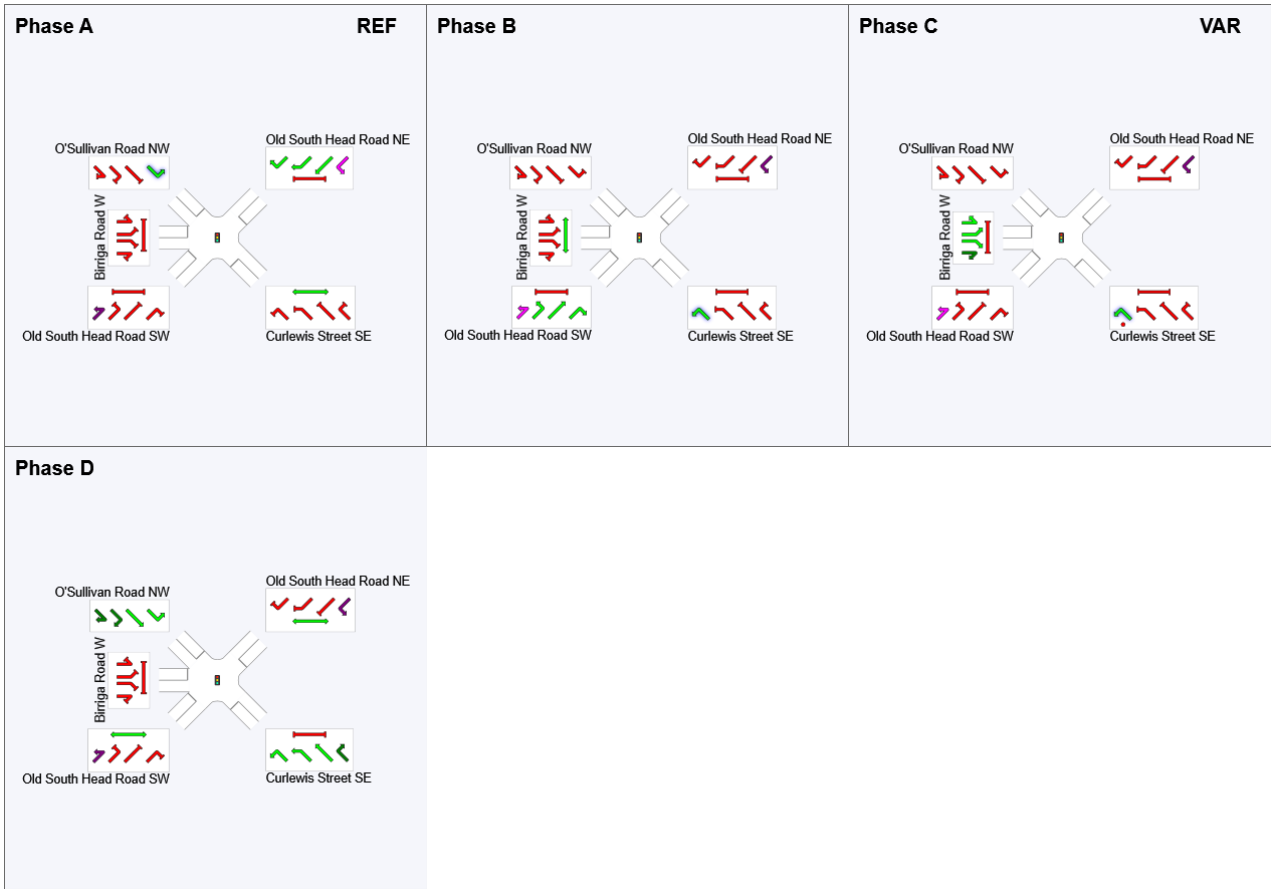
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C*, D
Output Phase Sequence: A, B, C*, D
(* Variable Phase)

Phase Timing Summary

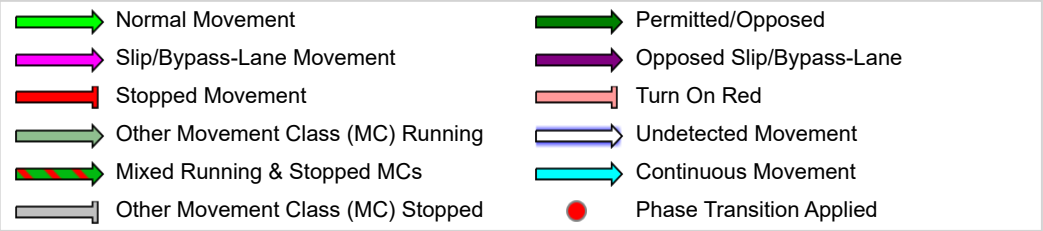
Phase	A	B	C	D
Phase Change Time (sec)	0	37	73	88
Green Time (sec)	31	30	9	16
Phase Time (sec)	37	36	15	22
Phase Split	34%	33%	14%	20%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

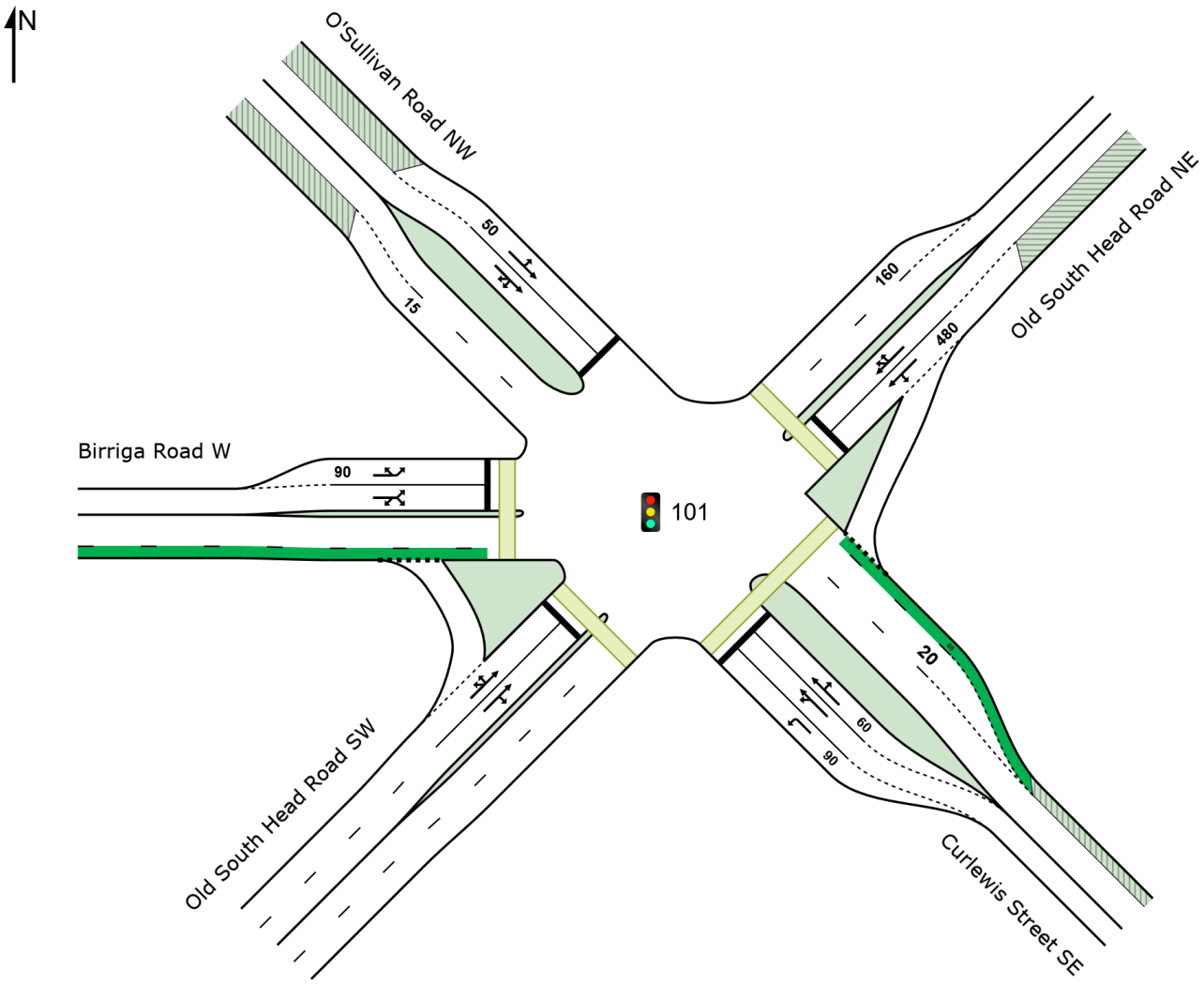


SITE LAYOUT

Site: 101 [PM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: Existing)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [PM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: Existing)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Curlewis Street SE														
4	L2	340	14	358	4.1	0.378	16.2	LOS B	9.5	69.1	0.62	0.74	0.62	40.6
21a	L1	72	1	76	1.4	0.830	64.1	LOS E	13.9	98.6	1.00	0.97	1.21	27.2
5	T1	149	2	157	1.3	* 0.977	63.1	LOS E	13.9	98.6	1.00	0.98	1.26	26.7
6	R2	55	1	58	1.8	0.977	95.6	LOS F	5.2	36.6	1.00	1.08	1.86	21.7
Approach		616	18	648	2.9	0.977	40.3	LOS C	13.9	98.6	0.79	0.86	0.96	32.2
NorthEast: Old South Head Road NE														
7	L2	45	0	47	0.0	0.835	60.2	LOS E	25.7	181.6	1.00	1.01	1.12	28.4
8	T1	608	10	640	1.6	* 0.879	55.8	LOS D	28.1	200.2	1.00	1.01	1.15	28.3
26a	R1	96	4	101	4.2	0.879	58.8	LOS E	28.1	200.2	1.00	1.02	1.20	28.3
9	R2	80	0	84	0.0	0.879	60.5	LOS E	28.1	200.2	1.00	1.02	1.20	27.9
Approach		829	14	873	1.7	0.879	56.8	LOS E	28.1	200.2	1.00	1.01	1.16	28.2
NorthWest: O'Sullivan Road NW														
10	L2	103	1	104	1.0	0.744	60.0	LOS E	13.1	91.6	1.00	0.89	1.09	27.9
11	T1	218	2	220	0.9	0.875	62.1	LOS E	13.1	91.6	1.00	0.95	1.22	26.9
12	R2	44	1	46	2.3	0.875	73.4	LOS F	9.9	70.0	1.00	1.02	1.38	25.4
29b	R3	1	0	1	0.0	0.875	74.1	LOS F	9.9	70.0	1.00	1.02	1.38	25.4
Approach		366	4	372	1.1	0.875	62.9	LOS E	13.1	91.6	1.00	0.94	1.21	27.0
West: Birriga Road W														
10b	L3	12	0	13	0.0	0.941	82.9	LOS F	15.8	113.0	1.00	1.12	1.50	23.7
10a	L1	263	9	277	3.4	0.990	86.8	LOS F	19.1	133.6	1.00	1.15	1.55	23.0
12a	R1	158	1	166	0.6	* 0.990	98.4	LOS F	19.1	133.6	1.00	1.26	1.68	21.3
12b	R3	1	0	1	0.0	0.990	100.7	LOS F	19.1	133.6	1.00	1.26	1.68	21.2
Approach		434	10	457	2.3	0.990	90.9	LOS F	19.1	133.6	1.00	1.19	1.59	22.4
SouthWest: Old South Head Road SW														
30b	L3	7	0	7	0.0	0.999	106.2	LOS F	44.7	315.2	1.00	1.34	1.57	21.2
1	L2	40	0	41	0.0	0.999	105.2	LOS F	44.7	315.2	1.00	1.34	1.57	21.1
2	T1	685	6	685	0.9	* 0.999	100.4	LOS F	44.7	315.2	1.00	1.30	1.57	21.2
3	R2	274	0	284	0.0	0.999	100.3	LOS F	42.9	301.2	1.00	1.24	1.58	21.3
Approach		1006	6	1018	0.6	0.999	100.6	LOS F	44.7	315.2	1.00	1.29	1.57	21.2
All Vehicles		3251	52	3367	1.6	0.999	72.2	LOS F	44.7	315.2	0.96	1.08	1.31	25.3

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Curlewis Street SE												
P1	Full	18	19	54.2	LOS E	0.1	0.1	0.95	0.95	227.3	225.0	0.99
NorthEast: Old South Head Road NE												
P3	Full	49	52	54.3	LOS E	0.2	0.2	0.95	0.95	220.5	216.0	0.98
West: Birriga Road W												
P2	Full	22	23	54.2	LOS E	0.1	0.1	0.95	0.95	219.5	214.9	0.98
SouthWest: Old South Head Road SW												
P4	Full	35	37	54.2	LOS E	0.1	0.1	0.95	0.95	220.0	215.4	0.98
All Pedestrians		124	131	54.2	LOS E	0.2	0.2	0.95	0.95	221.1	217.0	0.98

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 [PM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: Existing)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

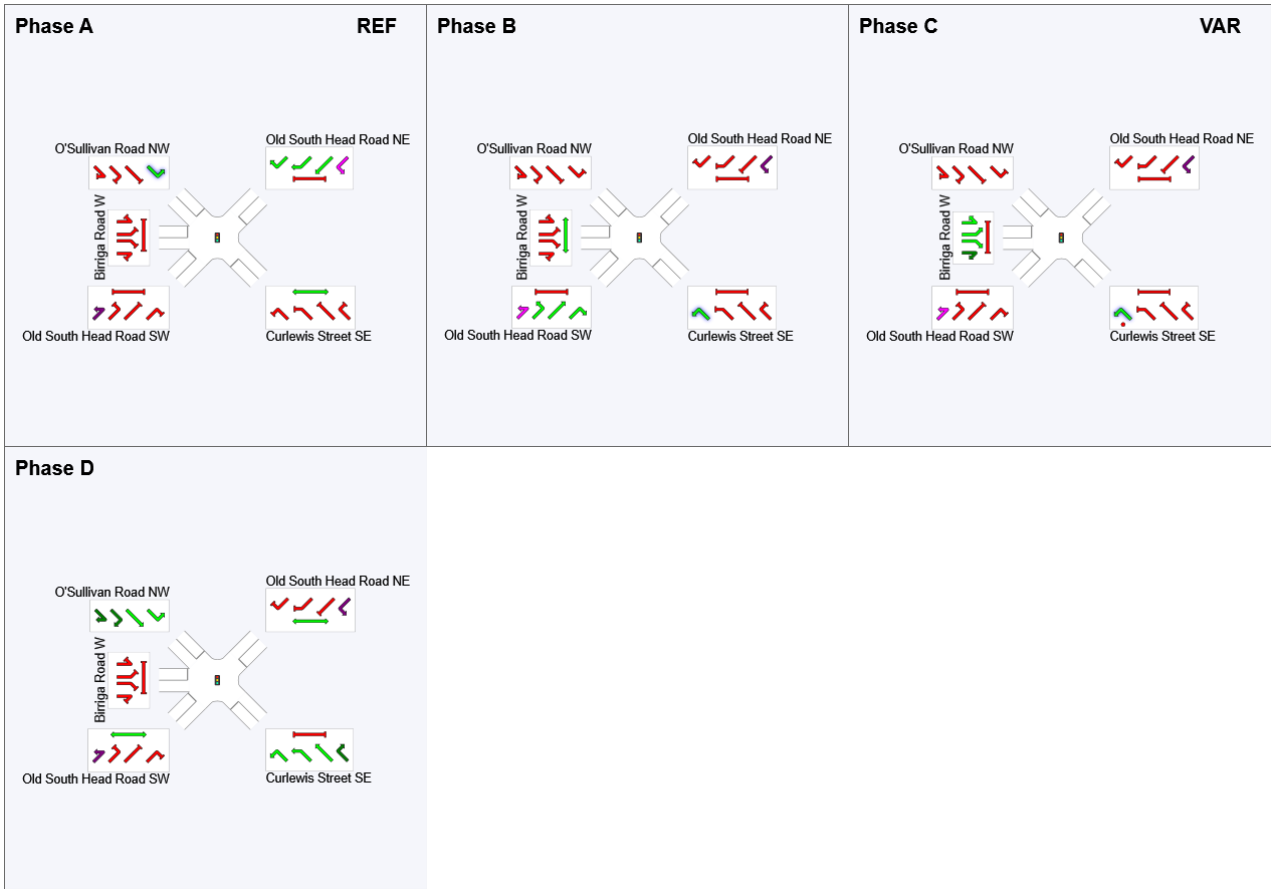
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C*, D
Output Phase Sequence: A, B, C*, D
(* Variable Phase)

Phase Timing Summary

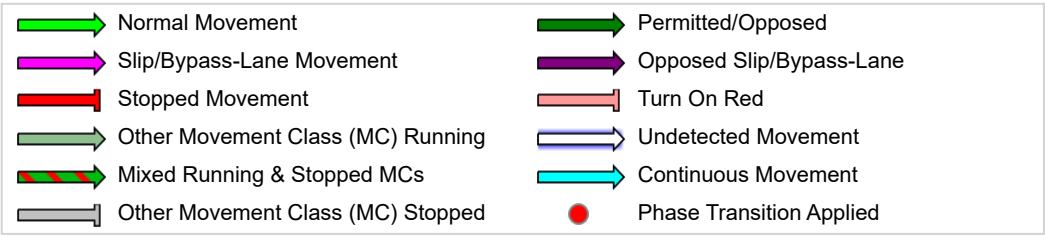
Phase	A	B	C	D
Phase Change Time (sec)	0	38	76	97
Green Time (sec)	32	32	15	17
Phase Time (sec)	38	38	21	23
Phase Split	32%	32%	18%	19%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

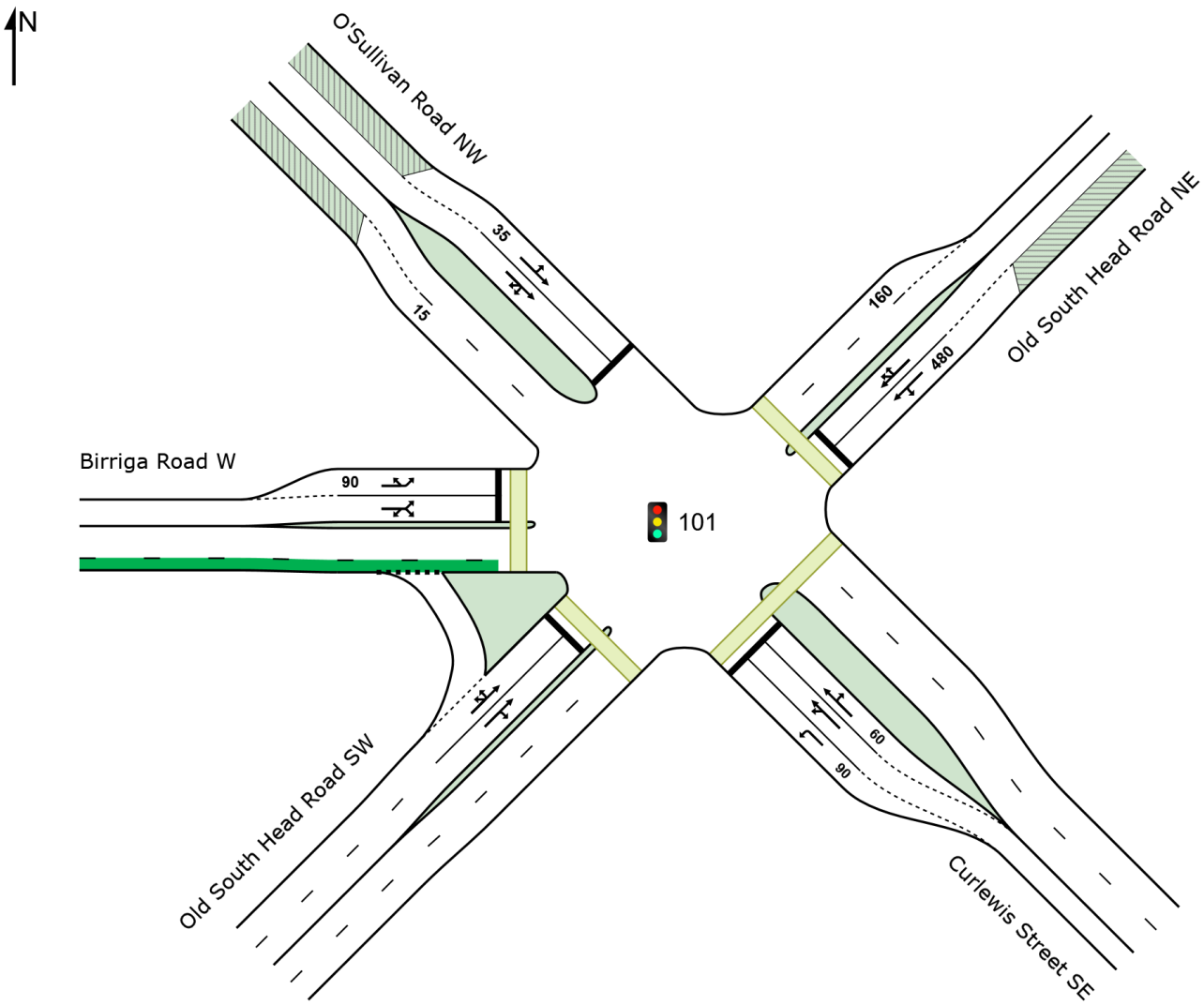


SITE LAYOUT

Site: 101 [AM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: 2023 Intersection Layout)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Created: Monday, 27 March 2023 1:27:41 PM
Project: Z:\301400272\technical\modelling\230327_Old South Head-Curlewis.sip9

MOVEMENT SUMMARY

Site: 101 [AM - Old South Head / Curlewis / O'Sullivan / Birriga - Copy (Site Folder: 2023 Intersection Layout)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Curlewis Street SE														
4	L2	441	7	464	1.6	0.514	17.7	LOS B	13.1	92.7	0.72	0.78	0.72	39.9
21a	L1	175	3	184	1.7	0.799	57.3	LOS E	12.7	87.2	1.00	0.94	1.17	28.0
5	T1	171	6	180	3.5	* 0.939	69.0	LOS E	12.7	87.2	1.00	1.09	1.49	25.6
6	R2	29	2	31	6.9	0.939	77.8	LOS F	11.2	80.9	1.00	1.14	1.59	24.6
Approach		816	18	859	2.2	0.939	39.1	LOS C	13.1	92.7	0.85	0.89	1.01	32.4
NorthEast: Old South Head Road NE														
7	L2	17	0	18	0.0	1.000	95.3	LOS F	43.9	312.2	1.00	1.36	1.61	22.3
8	T1	603	13	609	2.2	* 1.000	90.8	LOS F	43.9	312.2	1.00	1.35	1.61	22.3
26a	R1	326	13	343	4.0	1.000	94.5	LOS F	42.0	303.6	1.00	1.30	1.62	22.1
9	R2	84	5	88	6.0	1.000	96.2	LOS F	42.0	303.6	1.00	1.30	1.62	21.8
Approach		1030	31	1059	3.0	1.000	92.5	LOS F	43.9	312.2	1.00	1.33	1.62	22.2
NorthWest: O'Sullivan Road NW														
10	L2	63	3	66	4.8	0.730	54.5	LOS D	9.9	72.7	0.99	0.88	1.09	29.2
11	T1	146	9	154	6.2	0.912	54.3	LOS D	9.9	72.7	0.99	0.92	1.21	28.3
12	R2	46	5	48	10.9	0.912	75.8	LOS F	5.8	43.6	1.00	1.05	1.63	24.7
29b	R3	7	1	7	14.3	0.912	76.5	LOS F	5.8	43.6	1.00	1.05	1.63	24.7
Approach		262	18	276	6.9	0.912	58.7	LOS E	9.9	72.7	0.99	0.94	1.27	27.7
West: Birriga Road W														
10b	L3	10	0	11	0.0	0.893	71.4	LOS F	8.4	60.6	1.00	1.04	1.48	25.3
10a	L1	157	9	165	5.7	0.992	76.6	LOS F	11.3	81.1	1.00	1.09	1.56	24.5
12a	R1	104	3	109	2.9	0.992	94.2	LOS F	11.3	81.1	1.00	1.22	1.82	21.9
12b	R3	1	0	1	0.0	* 0.992	96.3	LOS F	11.3	81.1	1.00	1.22	1.82	21.7
Approach		272	12	286	4.4	0.992	83.2	LOS F	11.3	81.1	1.00	1.14	1.66	23.4
SouthWest: Old South Head Road SW														
30b	L3	23	0	24	0.0	0.948	82.9	LOS F	34.4	249.0	1.00	1.23	1.41	24.4
1	L2	57	0	60	0.0	0.948	81.9	LOS F	34.4	249.0	1.00	1.23	1.41	24.3
2	T1	627	33	633	5.3	* 0.973	78.5	LOS F	35.3	265.3	1.00	1.22	1.45	24.1
3	R2	235	29	247	12.3	0.973	83.2	LOS F	35.3	265.3	1.00	1.21	1.52	23.7
Approach		942	62	965	6.6	0.973	80.0	LOS F	35.3	265.3	1.00	1.22	1.46	24.0
All Vehicles		3322	141	3445	4.3	1.000	72.2	LOS F	43.9	312.2	0.96	1.14	1.40	25.2

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
SouthEast: Curlewis Street SE												
P1	Full	19	20	49.2	LOS E	0.1	0.1	0.95	0.95	221.1	223.5	1.01
NorthEast: Old South Head Road NE												
P3	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	215.5	216.0	1.00
West: Birriga Road W												
P2	Full	43	45	49.3	LOS E	0.1	0.1	0.95	0.95	214.5	214.9	1.00
SouthWest: Old South Head Road SW												
P4	Full	62	65	49.3	LOS E	0.2	0.2	0.95	0.95	215.0	215.4	1.00
All Pedestrians		174	183	49.3	LOS E	0.2	0.2	0.95	0.95	215.7	216.3	1.00

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

MOVEMENT SUMMARY

Site: 101 [PM - Old South Head / Curlewis / O'Sullivan / Birriga - Copy (Site Folder: 2023 Intersection Layout)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Curlewis Street SE														
4	L2	340	14	358	4.1	0.378	16.2	LOS B	9.5	69.1	0.62	0.74	0.62	40.6
21a	L1	72	1	76	1.4	0.830	64.1	LOS E	13.9	98.6	1.00	0.97	1.21	27.2
5	T1	149	2	157	1.3	*0.976	63.1	LOS E	13.9	98.6	1.00	0.98	1.26	26.7
6	R2	55	1	58	1.8	0.976	95.4	LOS F	5.2	36.6	1.00	1.08	1.86	21.7
Approach		616	18	648	2.9	0.976	40.2	LOS C	13.9	98.6	0.79	0.85	0.96	32.2
NorthEast: Old South Head Road NE														
7	L2	45	0	47	0.0	0.840	55.5	LOS D	26.1	184.5	1.00	0.97	1.13	29.3
8	T1	608	10	640	1.6	*0.884	53.3	LOS D	28.6	203.5	1.00	0.99	1.16	28.8
26a	R1	96	4	101	4.2	0.884	59.7	LOS E	28.6	203.5	1.00	1.03	1.21	28.1
9	R2	80	0	84	0.0	0.884	61.4	LOS E	28.6	203.5	1.00	1.03	1.21	27.8
Approach		829	14	873	1.7	0.884	54.9	LOS D	28.6	203.5	1.00	1.00	1.17	28.6
NorthWest: O'Sullivan Road NW														
10	L2	103	1	104	1.0	0.744	60.0	LOS E	13.1	91.7	1.00	0.89	1.09	27.9
11	T1	218	2	220	0.9	0.875	61.4	LOS E	13.1	91.7	1.00	0.95	1.22	26.9
12	R2	44	1	46	2.3	0.875	73.5	LOS F	9.9	70.0	1.00	1.02	1.38	25.4
29b	R3	1	0	1	0.0	0.875	74.2	LOS F	9.9	70.0	1.00	1.02	1.38	25.4
Approach		366	4	372	1.1	0.875	62.6	LOS E	13.1	91.7	1.00	0.94	1.21	27.0
West: Birriga Road W														
10b	L3	12	0	13	0.0	0.939	82.5	LOS F	15.8	112.5	1.00	1.11	1.50	23.7
10a	L1	263	9	277	3.4	0.989	86.3	LOS F	19.0	133.1	1.00	1.15	1.54	23.1
12a	R1	158	1	166	0.6	0.989	97.6	LOS F	19.0	133.1	1.00	1.25	1.67	21.4
12b	R3	1	0	1	0.0	*0.989	99.8	LOS F	19.0	133.1	1.00	1.25	1.67	21.3
Approach		434	10	457	2.3	0.989	90.3	LOS F	19.0	133.1	1.00	1.18	1.59	22.5
SouthWest: Old South Head Road SW														
30b	L3	7	0	7	0.0	0.999	106.2	LOS F	44.7	315.2	1.00	1.34	1.57	21.2
1	L2	40	0	41	0.0	0.999	105.2	LOS F	44.7	315.2	1.00	1.34	1.57	21.1
2	T1	685	6	685	0.9	*0.999	100.4	LOS F	44.7	315.2	1.00	1.31	1.57	21.2
3	R2	274	0	284	0.0	0.999	100.3	LOS F	42.9	301.2	1.00	1.24	1.58	21.3
Approach		1006	6	1018	0.6	0.999	100.6	LOS F	44.7	315.2	1.00	1.29	1.57	21.2
All Vehicles		3251	52	3367	1.6	0.999	71.5	LOS F	44.7	315.2	0.96	1.08	1.31	25.4

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
SouthEast: Curlewis Street SE												
P1	Full	18	19	54.2	LOS E	0.1	0.1	0.95	0.95	226.1	223.5	0.99
NorthEast: Old South Head Road NE												
P3	Full	49	52	54.3	LOS E	0.2	0.2	0.95	0.95	220.5	216.0	0.98
West: Birriga Road W												
P2	Full	22	23	54.2	LOS E	0.1	0.1	0.95	0.95	219.5	214.9	0.98
SouthWest: Old South Head Road SW												
P4	Full	35	37	54.2	LOS E	0.1	0.1	0.95	0.95	220.0	215.4	0.98
All Pedestrians		124	131	54.2	LOS E	0.2	0.2	0.95	0.95	221.0	216.7	0.98

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 [AM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: 2023 Intersection Layout)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C*, D
Output Phase Sequence: A, B, C*, D
(* Variable Phase)

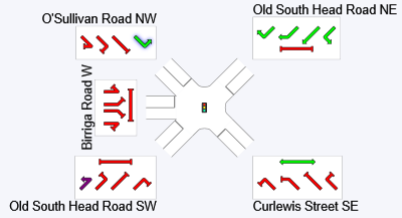
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	37	73	88
Green Time (sec)	31	30	9	16
Phase Time (sec)	37	36	15	22
Phase Split	34%	33%	14%	20%

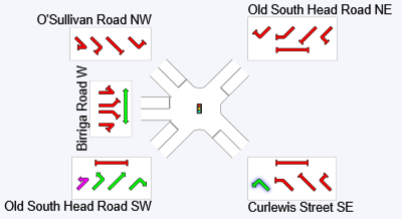
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Output Phase Sequence

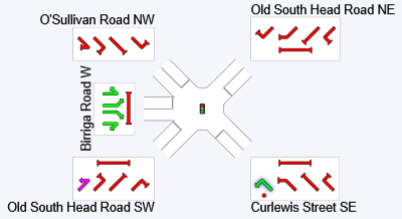
Phase A REF



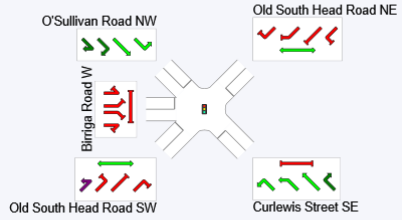
Phase B



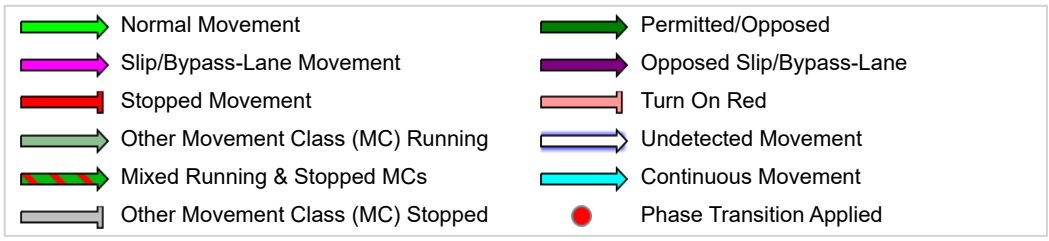
Phase C VAR



Phase D



REF: Reference Phase
VAR: Variable Phase

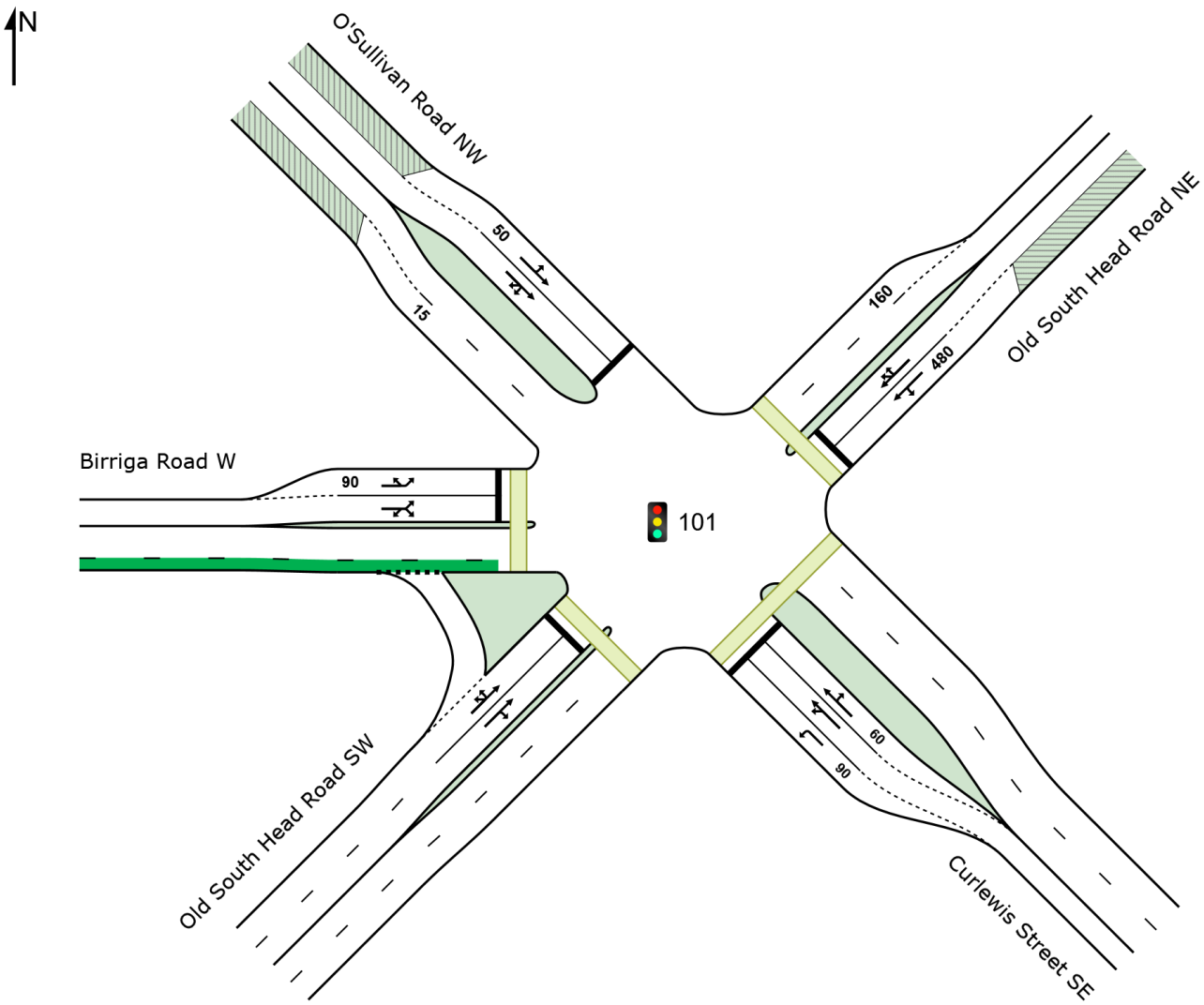


SITE LAYOUT

Site: 101 [PM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: 2023 Intersection Layout)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



PHASING SUMMARY

Site: 101 [PM - Old South Head / Curlewis / O'Sullivan / Birriga (Site Folder: 2023 Intersection Layout)]

Old South Head Road / Curlewis Street / O'Sullivan Road / Birriga Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

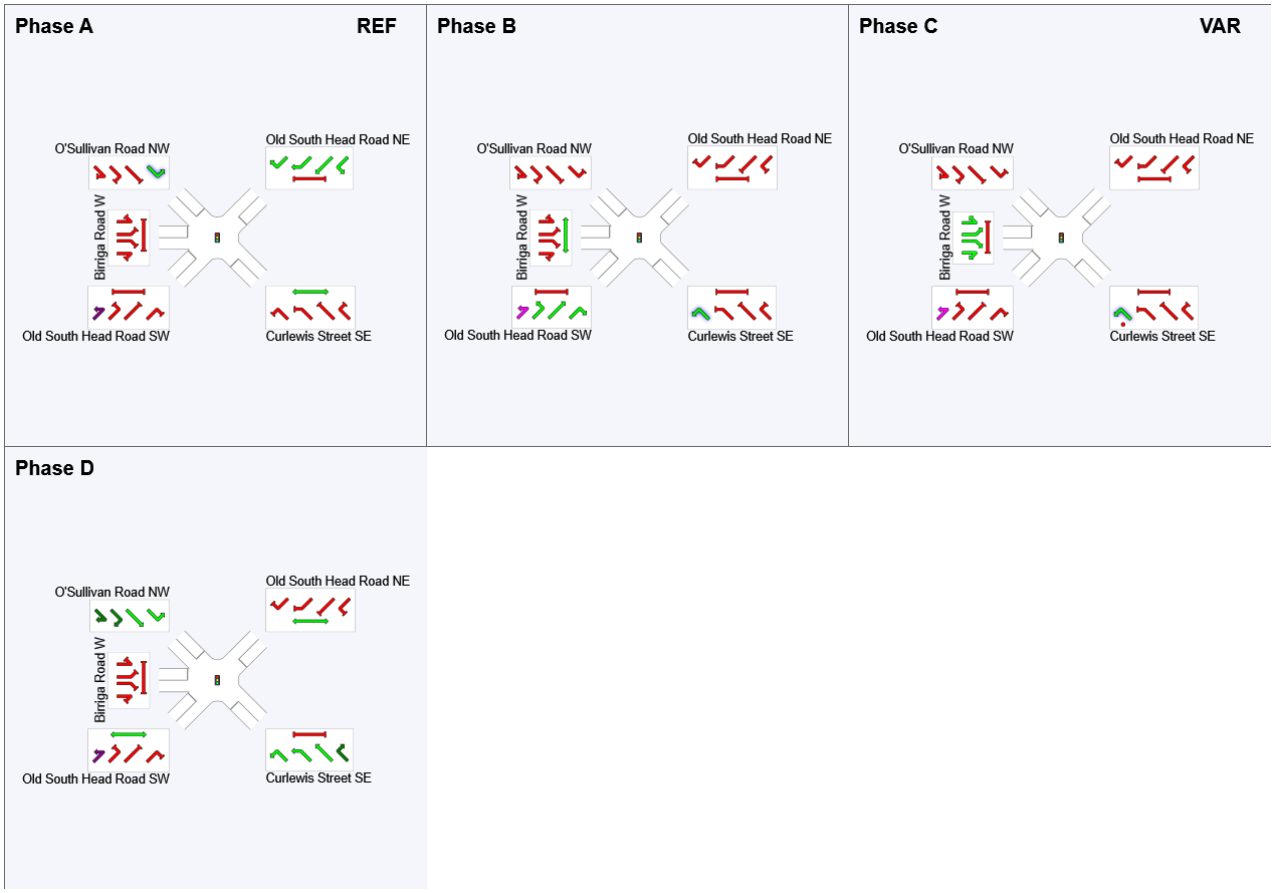
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C*, D
Output Phase Sequence: A, B, C*, D
(* Variable Phase)

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	38	76	97
Green Time (sec)	32	32	15	17
Phase Time (sec)	38	38	21	23
Phase Split	32%	32%	18%	19%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase