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GUIDELINES FOR SIDRA ANALYSIS DRAFT V 1.0

Purpose

Transport Canberra and City Services (TCCS) is currently reviewing the Guidelines for SIDRA Analysis to assist the traffic and transport practitioners for intersection modelling.

Background

For SIDRA modelling purpose, TCCS has adopted the Roads and Maritime Services (RMS) NSW Traffic Modelling Guidelines (version 1.0, 2013) as its primary technical reference, unless and otherwise specified explicitly in this note. It is advised that practitioners refer to Chapter 14 in this document and Appendix E on gap acceptance parameters.

If a SIDRA parameter is not mentioned within the guideline then the default value should be used. If practitioners wish to adopt alternative settings and/or parameters, their use should be noted and justified in the accompanying traffic study report.

Traffic Counts

The time when the traffic counts were taken (i.e. 15-18 November 2016) and any assumptions regarding turning proportions should be noted. For modelling existing conditions, if the traffic counts are greater than one year old, then the traffic growth needs to be established using the approaches outlined in section 4.6. If data on growth is limited, then a growth rate is to be determined from historical traffic counts where possible otherwise a base growth rate of 2% per annum can be used.

Traffic Signals

For existing sites:

It should be noted that the default signals parameters in the SIDRA can significantly vary from existing signals operation parameters. Therefore to achieve the accuracy of models, the practitioner should obtain signals operation information from the Roads ACT and modify the input parameters accordingly.

On request, Roads ACT provides ‘SCATS Summaries’ tech notes which outlines the existing signals controller settings such as cycle length, phase timings, minimum green, inter-green, pedestrian crossing times, and coordination details (see Appendix A).

For complex intersections such as median approaches (e.g. Northbourne Avenue/Bunda Street/Rudd Street), staggered intersections, closely spaced intersections (e.g. Newcastle Street between Monaro Highway ramps and Gladstone Street), the practitioners/modellers are suggested to discuss and confirm with Roads ACT on the scope of network and methodology before undertaking modelling.

For new or proposed upgraded sites:

a) Consult Roads ACT to confirm signals controller information such as cycle time, phasing and sequence, minimum green, inter green (yellow/red), and pedestrian clearance times (walk + clearance).

   By default, it is suggested to consider 8 sec minimum green, 4 sec and 5 sec yellow for 60 km/h and 80 km/h road speed limit respectively.

b) The intersection performance should be assessed against to the future design years (2021 and 2031) and must satisfy the following performance criteria:

SIDRA output parameter	**New Signals**
Degree of Saturation	≤ 0.9
Level of Service (LOS) – Delay RTA NSW method	"E" or better

Models reporting requirements

a) Electronic SIDRA Intersection Project (.SIP) files for base case and all scenario models.

b) For easy comparison, tables and/or figures should be provided showing base and option model inputs/outputs details such as (see Appendix C):

   a. Intersection geometry

   b. Input volumes summary

   c. Movement summary

   d. Lane summary

   e. Phasing summary

c) Traffic data and signals controller info (SCATS summaries) used for modelling

d) Design drawings/plans for proposed intersection treatments showing the geometry layouts

Key checks

To assess the validity and robustness of models, Roads ACT undertakes technical reviews on the submitted models. Appendix D outlines the key aspects considered during the review. It is suggested that the practitioners use this checklist to:

- Verify base models, prior to start developing option/test models
- Verify models, prior to the TIA submission.

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Appendix A – SCATS Summary example

Set 199 – Eastern Valley Way/Cameron Avenue/Aikman Drive, Belconnen

Site details

- Single Diamond Operation (SDO) on Eastern Valley Way, and Split Approach (SA) on Aikman Drive and Cameron Avenue.
- Phase sequence: A-D-E-F at all times.

Right turn operation

- Right turns on Eastern Valley way are fully controlled (i.e. no filters).

Phase time and cycle length details

- Maximum cycle time is 110 sec
- Average phase time (sec) and cycle length (sec) details on 20-22 October 2015:

Peak	Time Period	Avg CL	A	D	E	F/ F1*
AM	0800-0900	100	39	17	29	15
Business	1400-1500	85	33	20	18	14
PM	1700-1800	110	34	33	21	22
Minimum Green time (sec)			8	8	8	8
Yellow Time (sec)			4	4	4	4
Red Time (sec)			2	3	3	2
Intergreen time (Yellow + Red)			6	7	7	6

- *Right turns from north ran only 12 times (out of 36 cycles) in AM peak, 17 times (out of 42 cycles) in business peak, and 15 times (out of 33 cycles) in PM peak. This means, F1 phase ran a considerable number of times in peak periods.

Linking

- None

SIDRA coordination

- Eastern Valley Way south and Aikman Drive is ‘favourable’ in all peak periods.
- All other approaches are ‘not favourable’ in any period.

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Pedestrian timings

Ped walk	Vehicle phase(s)	Walk+ clearance time (in sec)
P1	A, F1	20
P2	A, F2	22
P3	D	14
P4	D, E	20
P5	E	14
P6	D, E	24

SCATS graphics

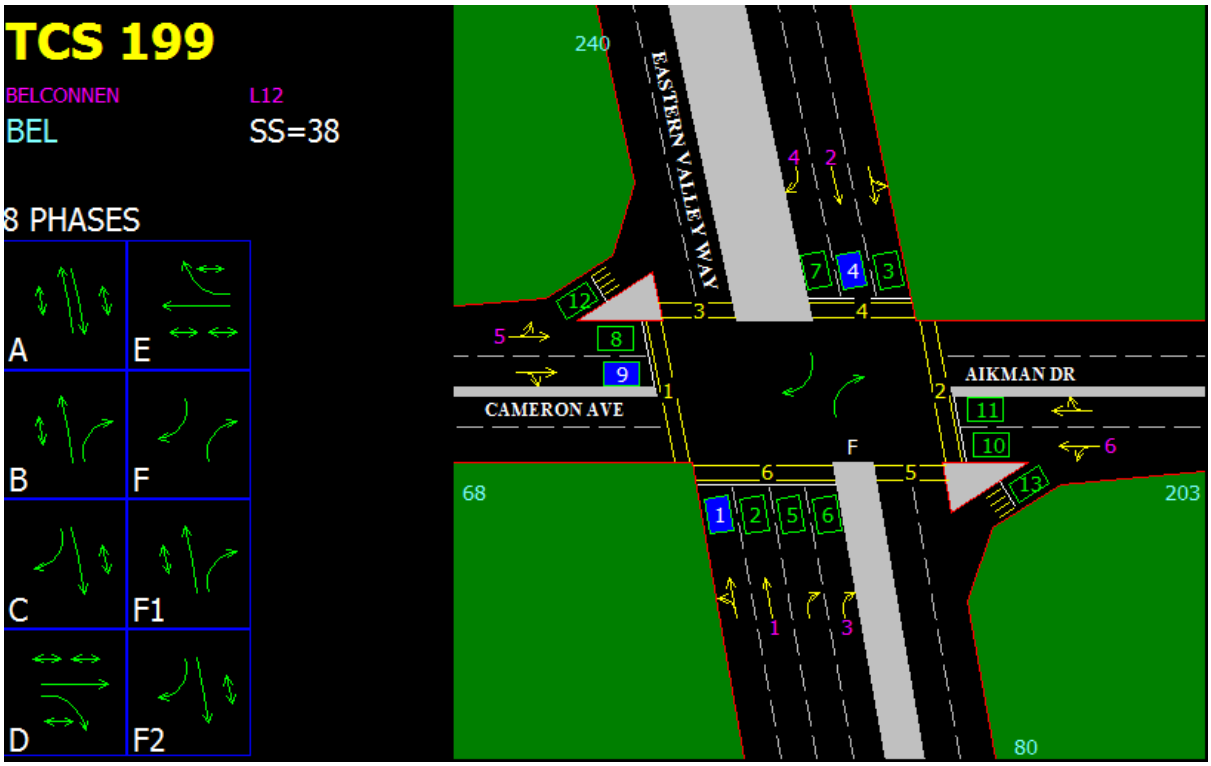

Figure 1 - SCATS graphics

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Appendix B – SCATS Traffic Data example

Site: 199 Thursday 8 September 2016 Traffic Flow filename:BEL_20160908.VS

Thursday 8 September 2016

Approach detector(s)

	1	2	3	4	5	6	7	8	9	10	11	12	13	
00:15	3	4	0	0	0	1	0	0	5	1	0	0	1	15
00:30	4	4	0	0	0	1	0	0	3	2	2	1	2	19
00:45	2	1	0	0	0	0	3	0	1	1	0	1	2	11
01:00	3	2	0	0	0	0	2	0	4	0	1	0	2	14
01:15	2	1	0	0	0	0	0	0	3	1	1	1	0	9
01:30	3	2	0	0	0	0	0	0	0	0	0	0	0	5
01:45	1	3	0	0	0	1	0	0	5	0	0	0	2	12
02:00	5	1	0	0	0	0	1	0	2	0	0	2	0	11
02:15	0	1	0	0	0	0	0	0	0	2	0	0	0	3
02:30	0	2	0	0	0	1	1	0	2	3	1	0	0	10
02:45	1	1	0	0	0	0	0	0	1	0	2	1	0	6
03:00	2	3	0	0	0	0	0	0	1	1	0	0	1	8
03:15	1	0	0	0	0	1	0	0	4	0	0	0	0	6
03:30	0	1	0	0	0	0	0	0	0	0	1	0	0	2
03:45	3	1	0	0	0	0	0	0	0	1	0	0	0	5
04:00	1	1	0	0	0	0	2	0	0	0	0	0	1	5
04:15	0	0	0	0	0	0	0	0	5	0	1	3	1	10
04:30	0	1	0	0	0	0	0	0	0	1	0	1	1	4
04:45	0	0	0	0	0	1	0	0	2	1	0	0	1	5
05:00	0	1	0	0	0	0	0	0	1	3	1	0	2	8
05:15	1	4	0	0	0	1	0	0	1	3	0	0	3	13
05:30	1	1	0	0	0	1	0	0	1	1	3	0	17	25
05:45	6	3	0	0	0	3	0	0	1	4	7	1	16	41
06:00	11	9	0	0	0	5	6	0	0	7	5	1	23	67
06:15	9	8	0	0	0	5	0	0	7	4	8	0	57	98
06:30	18	11	0	0	0	8	0	0	7	4	5	1	34	88
06:45	16	10	0	0	0	22	2	0	8	15	18	1	81	173
07:00	33	12	0	0	0	25	7	0	5	16	33	2	138	271
07:15	31	13	0	0	0	25	4	0	12	21	23	2	38	169
07:30	34	13	0	0	0	10	5	0	11	31	31	0	65	200
07:45	28	12	0	0	0	9	4	0	13	41	45	3	96	251
08:00	58	17	0	0	0	19	4	0	22	47	66	1	148	382
08:15	59	17	0	0	0	15	4	0	24	65	79	3	179	445
08:30	77	28	0	0	0	25	5	0	18	54	76	2	170	455
08:45	86	25	0	0	0	26	3	0	28	55	79	2	136	440
09:00	55	24	0	0	0	19	3	0	16	56	77	2	171	423
09:15	53	20	0	0	0	22	4	0	31	59	70	5	164	428
09:30	44	22	0	0	0	16	5	0	34	54	67	8	170	420
09:45	61	19	0	0	0	21	4	0	30	21	35	3	97	291
10:00	37	15	0	0	0	22	4	0	27	26	36	7	50	224
10:15	32	11	0	0	0	16	3	0	23	18	32	5	93	233
10:30	45	17	0	0	0	21	2	0	27	18	38	4	141	313
10:45	50	14	0	0	0	26	2	0	36	18	17	4	124	291
11:00	43	14	0	0	0	18	2	0	24	12	22	4	192	331
11:15	57	13	0	0	0	22	1	0	36	19	25	7	100	280
11:30	54	10	0	0	0	22	4	0	30	14	27	3	143	307
11:45	53	15	0	0	0	19	5	0	35	12	19	4	70	232
12:00	50	23	0	0	0	22	2	0	29	26	29	8	52	241
12:15	64	15	0	0	0	26	5	0	39	9	20	12	58	248
12:30	54	20	0	0	0	26	5	0	39	21	34	8	70	277

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12:45	47	12	0	0	0	19	5	0	33	16	19	5	40	196
13:00	44	15	0	0	0	19	2	0	34	24	30	8	25	201
13:15	54	27	0	0	0	18	5	0	49	16	15	8	30	222
13:30	47	20	0	0	0	15	7	0	42	11	25	10	70	247
13:45	52	17	0	0	0	18	4	0	41	16	21	4	45	218
14:00	25	13	0	0	0	19	3	0	43	13	25	6	42	189
14:15	48	16	0	0	0	23	3	0	42	16	23	3	67	241
14:30	51	18	0	0	0	22	5	0	51	13	21	9	108	298
14:45	51	22	0	0	0	19	1	0	62	14	22	2	95	288
15:00	44	11	0	0	0	23	5	0	57	17	28	8	67	260
15:15	41	14	0	0	0	27	1	0	61	14	15	7	47	227
15:30	50	21	0	0	0	32	7	0	50	25	42	10	103	340
15:45	70	21	0	0	0	21	7	0	73	18	27	10	91	338
16:00	81	27	0	0	0	37	1	0	54	15	29	5	139	388
16:15	53	26	0	0	0	29	4	0	94	18	20	10	67	321
16:30	68	25	0	0	0	27	3	0	88	23	28	5	51	318
16:45	65	10	0	0	0	32	7	0	80	18	19	14	75	320
17:00	61	17	0	0	0	34	3	0	103	21	38	13	62	352
17:15	90	17	0	0	0	61	1	0	118	9	24	34	60	414
17:30	88	28	0	0	0	50	3	0	125	23	32	13	59	421
17:45	94	33	0	0	0	54	5	0	86	20	23	20	47	382
18:00	77	27	0	0	0	36	1	0	81	20	27	15	39	323
18:15	67	28	0	0	0	50	8	0	75	11	26	13	28	306
18:30	77	31	0	0	0	38	5	0	48	10	16	7	27	259
18:45	76	31	0	0	0	44	3	0	49	9	20	10	28	270
19:00	71	25	0	0	0	34	7	0	29	13	25	9	35	248
19:15	68	13	0	0	0	27	2	0	39	8	15	9	21	202
19:30	51	20	0	0	0	14	4	0	37	5	15	8	18	172
19:45	53	22	0	0	0	19	1	0	22	13	21	4	23	178
20:00	42	22	0	0	0	22	2	0	29	16	10	3	10	156
20:15	50	15	0	0	0	18	8	0	19	9	8	7	13	147
20:30	31	12	0	0	0	15	5	0	36	9	11	9	16	144
20:45	39	14	0	0	0	10	5	0	29	9	12	4	15	137
21:00	36	19	0	0	0	15	3	0	33	7	5	5	11	134
21:15	25	11	0	0	0	16	7	0	22	3	7	2	7	100
21:30	17	8	0	0	0	6	2	0	16	5	5	5	8	72
21:45	25	11	0	0	0	5	6	0	18	4	3	4	8	84
22:00	14	11	0	0	0	5	3	0	13	3	5	4	5	63
22:15	14	5	0	0	0	6	4	0	14	2	5	0	5	55
22:30	18	8	0	0	0	6	1	0	12	4	2	0	6	57
22:45	16	14	0	0	0	3	4	0	13	3	4	5	7	69
23:00	18	8	0	0	0	3	2	0	6	1	1	1	2	42
23:15	6	4	0	0	0	2	1	0	11	2	0	3	0	29
23:30	7	8	0	0	0	2	2	0	5	0	2	2	1	29
23:45	5	6	0	0	0	2	2	0	20	1	1	0	5	42
24:00	7	4	0	0	0	3	0	0	12	0	1	1	4	32

AM peak 1793 08:05 - 09:05 PM peak 1579 16:55 - 17:55 Daily Total 17356

Appendix C – SIDRA Outputs example

Figure 1: Intersection Geometry – Base model vs Option model

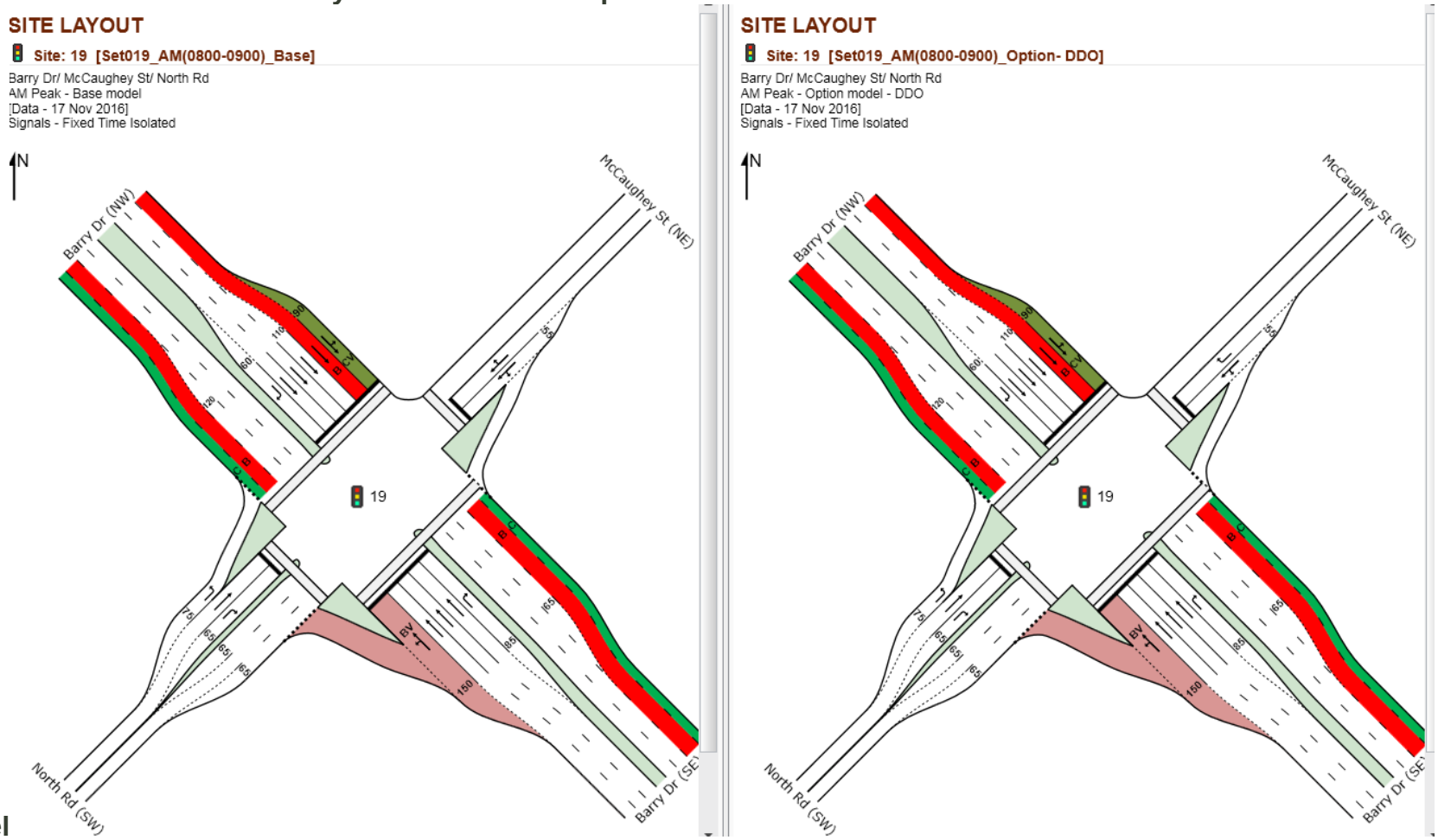
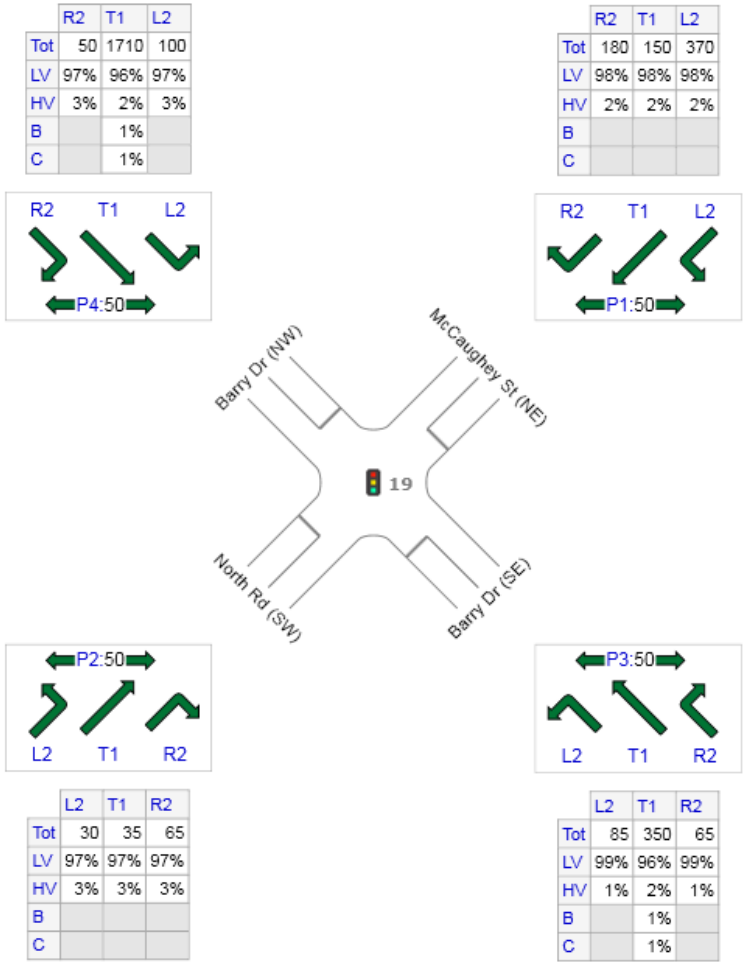


Figure 2: Input Volumes Summary – Base model vs Option model



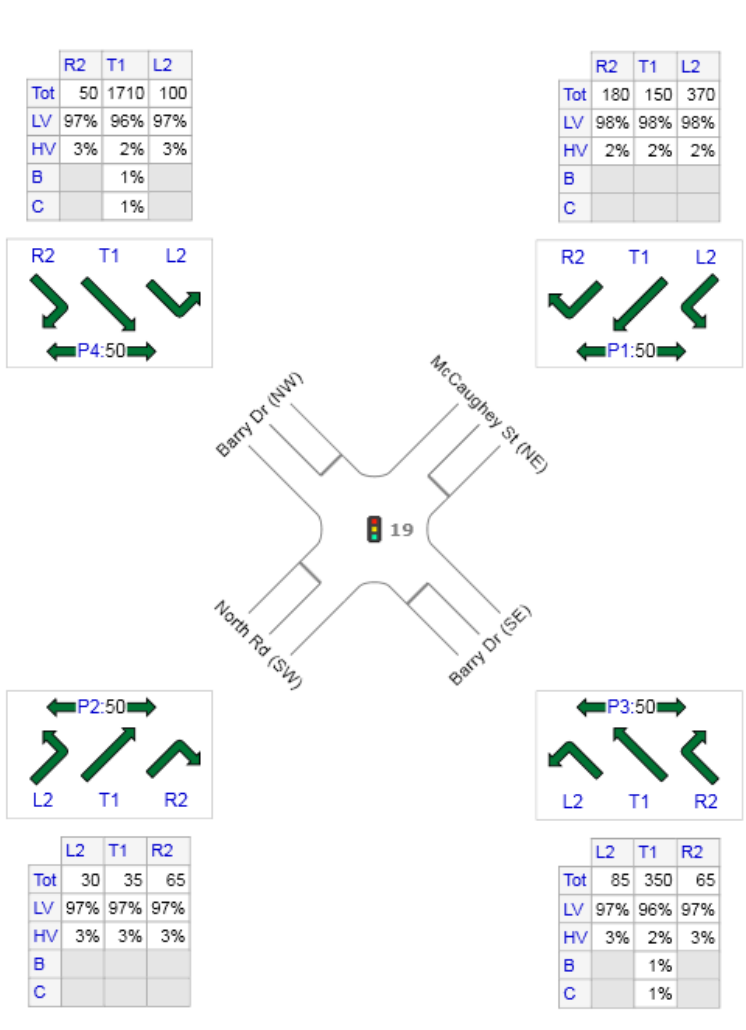


Figure 3: Movement Summary – Base model vs Option model

MOVEMENT SUMMARY

Site: 19 [Set019_AM(0800-0900)_Base]

Barry Dr/ McCaughey St/ North Rd
AM Peak - Base model
[Data - 17 Nov 2016]
Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Pro Queu
SouthEast: Barry Dr (SE)									
21	L2	85	1.0	0.100	26.2	LOS B	3.2	22.9	0
22	T1	350	3.0	0.231	36.8	LOS C	6.2	43.8	0
23	R2	65	1.0	0.517	71.9	LOS F	4.2	29.6	1
Approach		500	2.4	0.517	39.6	LOS C	6.2	43.8	0
NorthEast: McCaughey St (NE)									
24	L2	370	2.0	0.515	25.6	LOS B	15.7	112.0	0
25	T1	150	2.0	1.077	209.8	LOS F	43.4	309.1	0
26	R2	180	2.0	1.077	264.9	LOS F	43.4	309.1	1
Approach		700	2.0	1.077	126.6	LOS F	43.4	309.1	0
NorthWest: Barry Dr (NW)									
27	L2	100	3.0	0.162	33.4	LOS C	4.9	31.7	0
28	T1	1710	3.0	1.536	398.9	LOS F	159.1	1132.8	0
29	R2	50	3.0	0.330	40.4	LOS C	2.0	14.0	0
Approach		1860	3.0	1.536	369.6	LOS F	159.1	1132.8	0
SouthWest: North Rd (SW)									
30	L2	30	3.0	0.023	6.6	LOS A	0.2	1.5	0
31	T1	35	3.0	0.085	43.6	LOS D	1.8	12.7	0
32	R2	65	3.0	0.170	50.4	LOS D	3.4	24.1	0
Approach		130	3.0	0.170	38.5	LOS C	3.4	24.1	0
All Vehicles		3190	2.7	1.536	251.1	LOS F	159.1	1132.8	0

MOVEMENT SUMMARY

Site: 19 [Set019_AM(0800-0900)_Option- DDO]

Barry Dr/ McCaughey St/ North Rd
AM Peak - Option model - DDO
[Data - 17 Nov 2016]
Signals - Fixed Time Isolated Cycle Time = 130 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
SouthEast: Barry Dr (SE)								
21	L2	85	3.0	0.100	14.9	LOS B	1.8	12.8
22	T1	350	3.0	0.214	34.2	LOS C	5.9	42.3
23	R2	65	3.0	0.590	73.9	LOS F	4.3	30.8
Approach		500	3.0	0.590	36.1	LOS C	5.9	42.3
NorthEast: McCaughey St (NE)								
24	L2	370	2.0	1.008	101.2	LOS F	45.5	323.9
25	T1	150	2.0	1.008	95.5	LOS F	45.5	323.9
26	R2	180	2.0	1.174	401.7	LOS F	35.2	250.3
Approach		700	2.0	1.174	177.2	LOS F	45.5	323.9
NorthWest: Barry Dr (NW)								
27	L2	100	3.0	0.124	22.8	LOS B	3.9	25.1
28	T1	1710	3.0	1.159	50.5	LOS D	48.0	341.6
29	R2	50	3.0	0.182	32.7	LOS C	1.5	10.9
Approach		1860	3.0	1.159	48.6	LOS D	48.0	341.6
SouthWest: North Rd (SW)								
30	L2	30	3.0	0.023	8.0	LOS A	0.3	2.4
31	T1	35	3.0	0.085	43.6	LOS D	1.8	12.7
32	R2	65	3.0	0.431	69.1	LOS E	4.1	29.3
Approach		130	3.0	0.431	48.1	LOS D	4.1	29.3
All Vehicles		3190	2.8	1.174	74.8	LOS F	48.0	341.6

Figure 4: Phasing Summary – Base model vs Option model

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Site: 19 [Set019_AM(0800-0900)_Base]

Barry Dr/ McCaughey St/ North Rd
AM Peak - Base model
[Data - 17 Nov 2016]
Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Phase Times specified by the user
Sequence: SCATS phasing
Reference Phase: Phase A
Input Sequence: A, B, D, E, F
Output Sequence: A, B, D, E, F

Phase Timing Results

Phase	A	B	D	E	F
Phase Change Time (sec)	0	44	47	81	115
Green Time (sec)	38	2	28	28	9
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	44	3	34	34	15
Phase Split	34 %	2 %	26 %	26 %	12 %

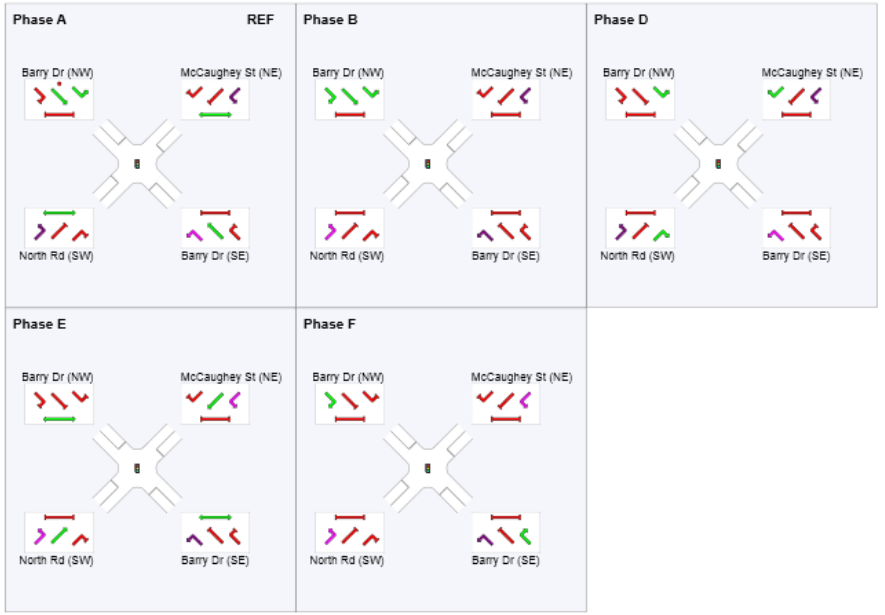
Site: 19 [Set019_AM(0800-0900)_Option- DDO]

Barry Dr/ McCaughey St/ North Rd
AM Peak - Option model - DDO
[Data - 17 Nov 2016]
Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Cycle Time)

Phase Times determined by the program
Sequence: Option- DDO
Reference Phase: Phase A
Input Sequence: A, B, D, E, F
Output Sequence: A, B, D, E, F

Phase Timing Results

Phase	A	B	D	E	F
Phase Change Time (sec)	0	47	65	82	116
Green Time (sec)	41	12	11	28	8
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	47	18	17	34	14
Phase Split	36 %	14 %	13 %	26 %	11 %



REF: Reference Phase
VAR: Variable Phase

Appendix D – Key checks on SIDRA models

Lane geometry	Lane widths	Comments
	Slip lane storage lengths	
	Pedestrian crossing widths (if site or approach has higher ped-crossing demands)	
	Merging/weaving lanes and lengths	
	Lane configurations (shared/dedicated movements)	
	Lane capacity	
Lane movements	Approach lane to exit lane delineation	
	Approach lane to exit lane vehicle type flow consistency (e.g. bus lane on approach side should direct to bus lane on exit side)	
Pedestrian	Modelled crossing width	
	Pedestrian actuation	
Volumes	Traffic data source	
	Heavy vehicles %	

Priorities	Vehicle to vehicle movements	
	Vehicle to pedestrian movements	
Gap acceptance	Critical gap	
	Follow-up headway	
	Gap acceptance capacity model	
Vehicle movement data	Approach and exit cruise speeds (and by veh type)	
	Signals coordination	
	Minimum green	In base model, existing minimum green in SCATS should be provided. In option model, 8 sec should be provided.
	Early cut-off (ECO)	
	Late start	
Phasing and timings	Phase sequence	In base model, current SCATS phase sequence and any overlaps are expected.
	Phase times	In base model, current operating phase

		times are expected (and cycle time option should be ticked as ‘user-given phase times’)
	Phase frequency	Based on no. of activations in existing operation, phase frequency mode (program or input) should be opted.
	Yellow and red times	In base model, existing values should be provided. In option models: Yellow – 3 sec for 60km/h and 4 sec for 80km/h Red – determined based on the intersection crossing width for each turning movement.
	Cycle time	In base model, ‘user-given phase times’ should be enabled. In option model, either ‘optimum cycle time’ or ‘user-given cycle time’ should be enabled. If recommended optimum cycle time (by SIDRA) seems unreasonable from practical

		sense, then user-given cycle time should be opted to provide sensible cycle time.
Outputs	Queue lengths	
	Delays	
	Degree of saturation	
	Level of service	