

**TRAFFIC MODELLING REPORT FOR
RECONSTRUCTION OF EXISTING
TRAFFIC SIGNAL CONTROLLED INTERSECTION
OF
CHILVERS ROAD, THE ESPLANADE AND
DUFFY AVENUE
THORNLEIGH**

Ref. 17208r

23 April 2018

Prepared By

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1.0 INTRODUCTION

Hornsby Council, on behalf of the RMS, propose to reconstruct the intersection of Chilvers Road/The Esplanade/Duffy Avenue at Thornleigh which will improve the alignment of Chilvers Road and The Esplanade at the cross junction intersection. **Figure 1** shows the location of the intersection.

Transport and Urban Planning Pty Ltd has been engaged to prepare the detailed traffic signal design plan for Council.

As part of this work, traffic modelling has been undertaken to confirm the traffic signal phasing for the intersection with the proposed new geometric alignment.

This report documents the results of the traffic modelling.

2.0 PROPOSED WORKS AND BACKGROUND

Chilvers Road and The Esplanade form an offset cross junction intersection with Duffy Avenue. The existing intersection is controlled by traffic signals. The existing intersection layout is shown on the traffic signal design plan contained in Appendix 1.

The existing intersection has a poor crash history mostly involving opposing through and right turn vehicles. The crash diagram for the intersection is contained in Appendix 2.

The proposal is to realign Chilvers Road and The Esplanade to create an angled cross junction intersection which will remove the offset (dog leg) alignment between these roads and provide appropriate traffic signal phasing that will address the poor crash history at the intersection.

A concept plan of the new layout is contained in Appendix 3.

The realigned intersection will require the traffic signal to be reconstructed to suit the new layout and current RMS standards.

3.0 TRAFFIC AND PEDESTRIAN VOLUMES USING THE INTERSECTION

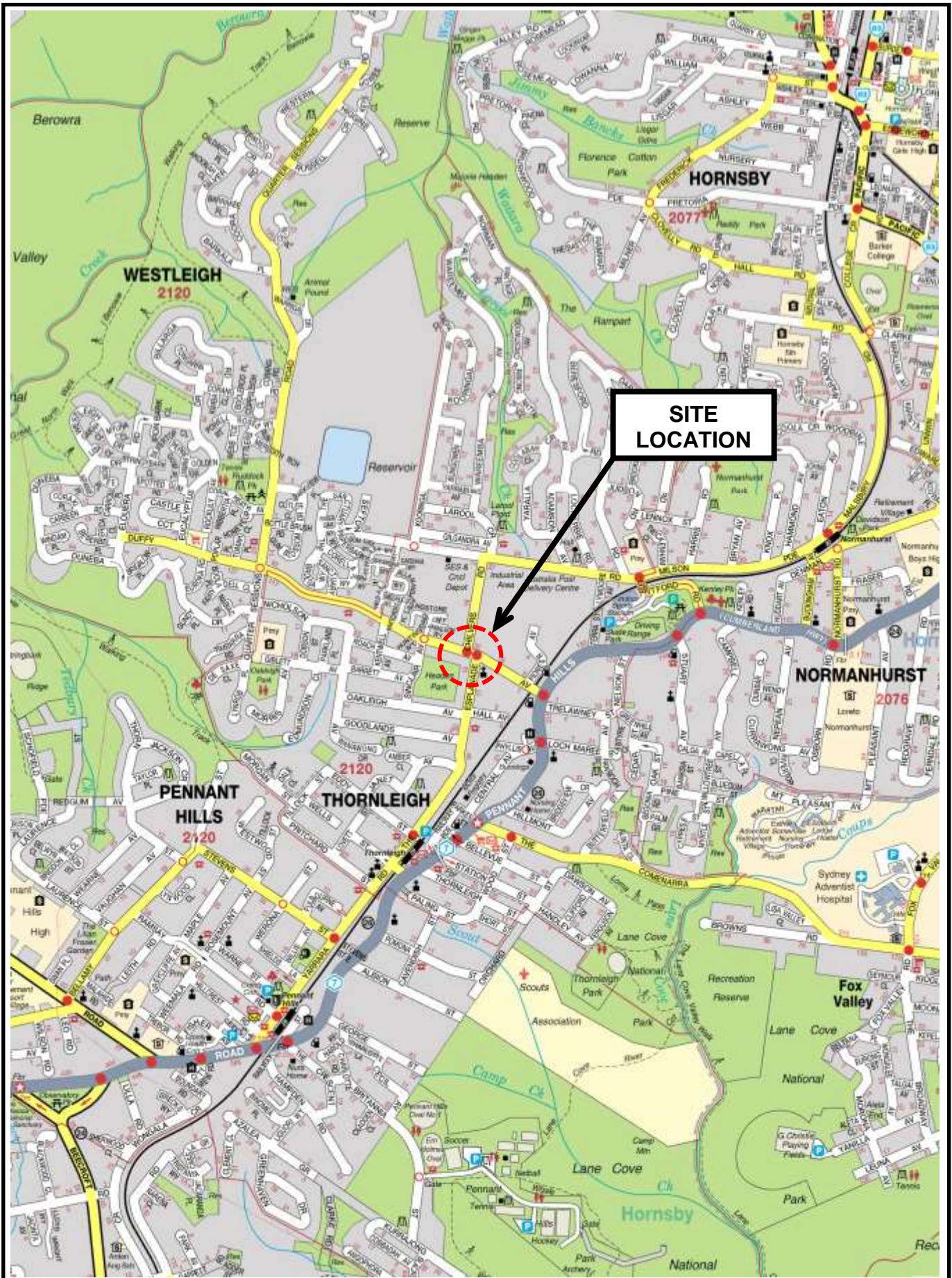
Hornsby Council supplied existing weekday AM and PM traffic volumes for the intersection, together with future estimated traffic volumes for the weekday PM peak hour and the AM weekend (Saturday morning) peak hour.

The future weekday PM peak hour and future AM weekend peak hour were identified in a recent traffic study ⁽¹⁾ as the critical (busiest) periods for the intersection, based on the additional traffic generation from known proposals in the area.

Figures 2 and 3 show the existing intersection traffic and pedestrian traffic volumes for the weekday AM and PM peak hours.

Figures 4 and 5 show the future intersection and pedestrian volumes for the weekend AM peak hour and for the weekday PM peak hour.

⁽¹⁾ *Westleigh Park Masterplan – Traffic and Access Assessment Report – November 2017. Positive Traffic Pty Ltd*



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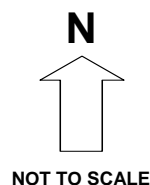
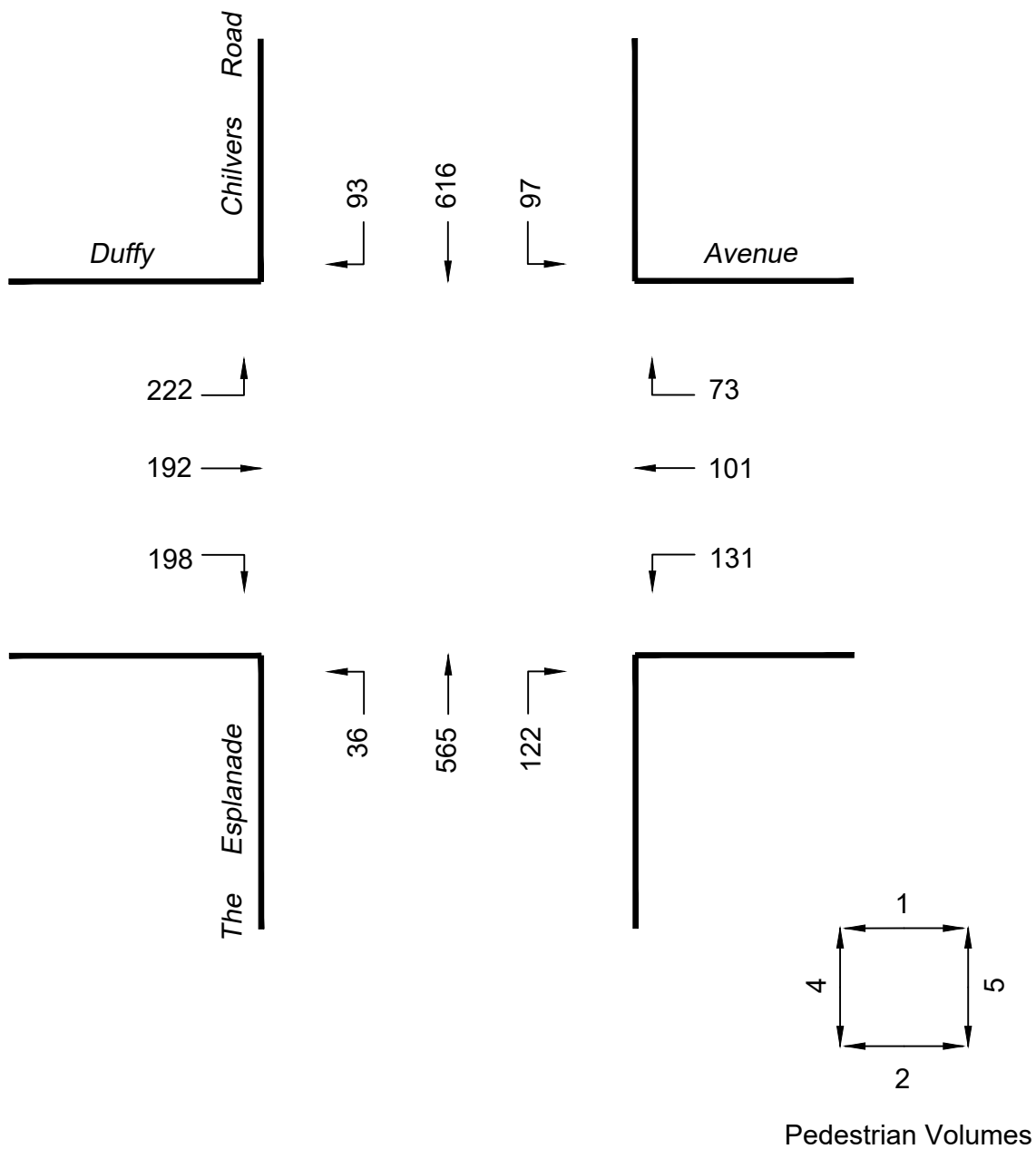


FIGURE 1
 CHILVERS RD, THE ESPLANADE & DUFFY AVE
 THORNLEIGH
LOCATION OF INTERSECTION
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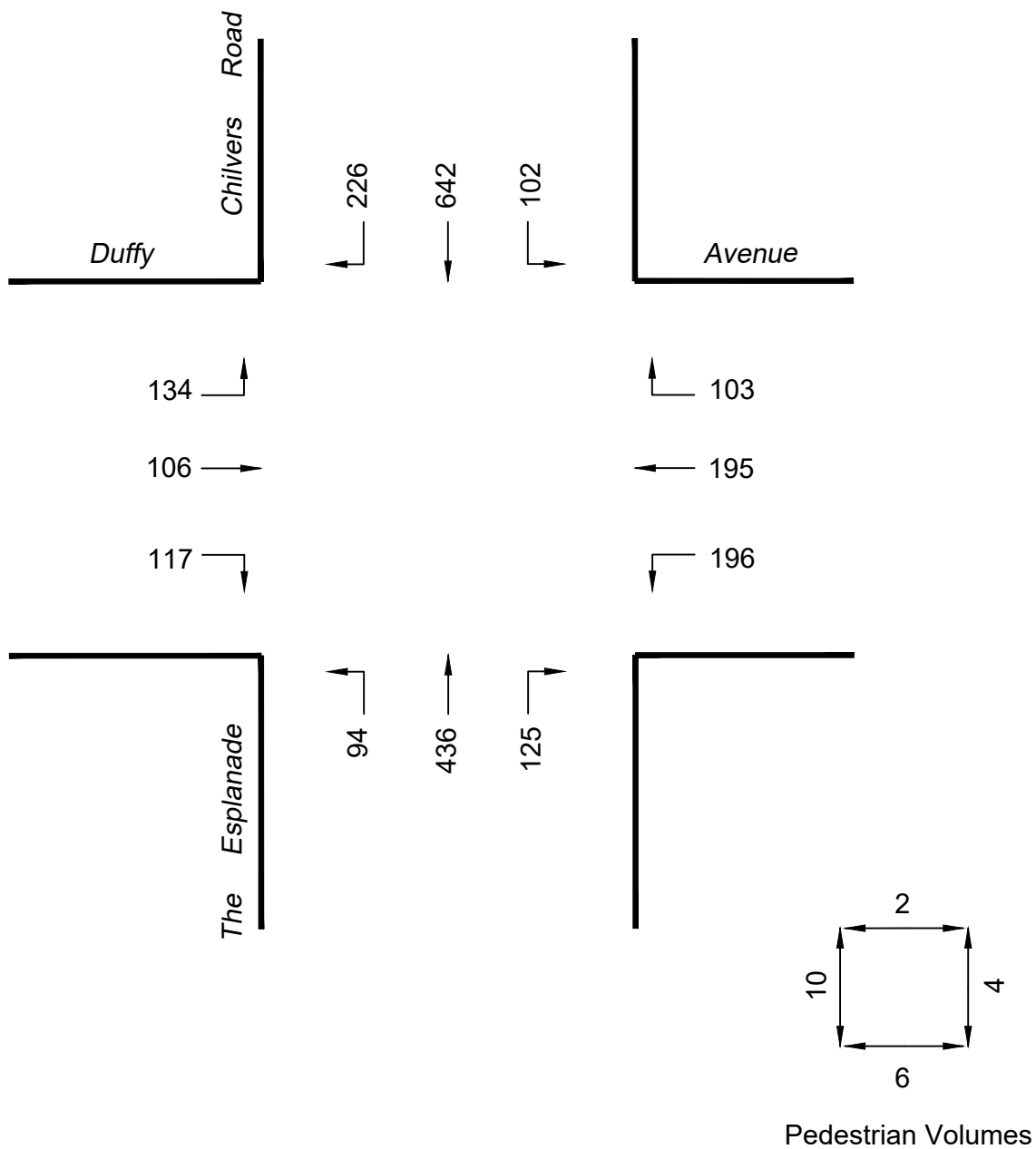
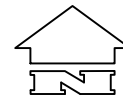
FIGURE 2

CHILVERS RD, THE ESPLANADE & DUFFY AVE, THORNLEIGH
TRAFFIC MODELLING REPORT

**EXISTING WEEKDAY AM PEAK HOUR TRAFFIC
& PEDESTRIAN VOLUMES**

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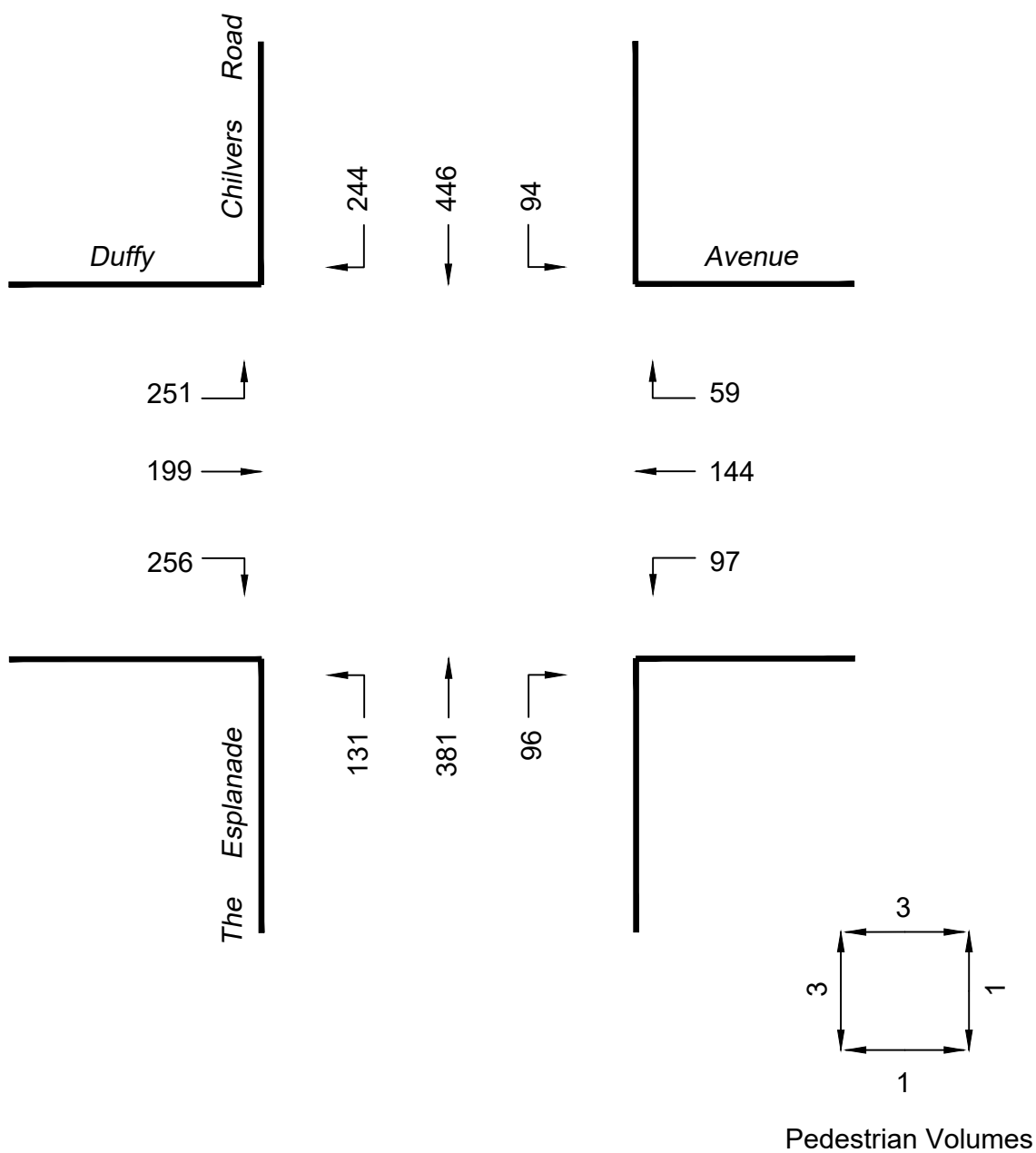
FIGURE 3

CHILVERS RD, THE ESPLANADE & DUFFY AVE, THORNLEIGH
TRAFFIC MODELLING REPORT

**EXISTING WEEKDAY PM PEAK HOUR TRAFFIC
& PEDESTRIAN VOLUMES**

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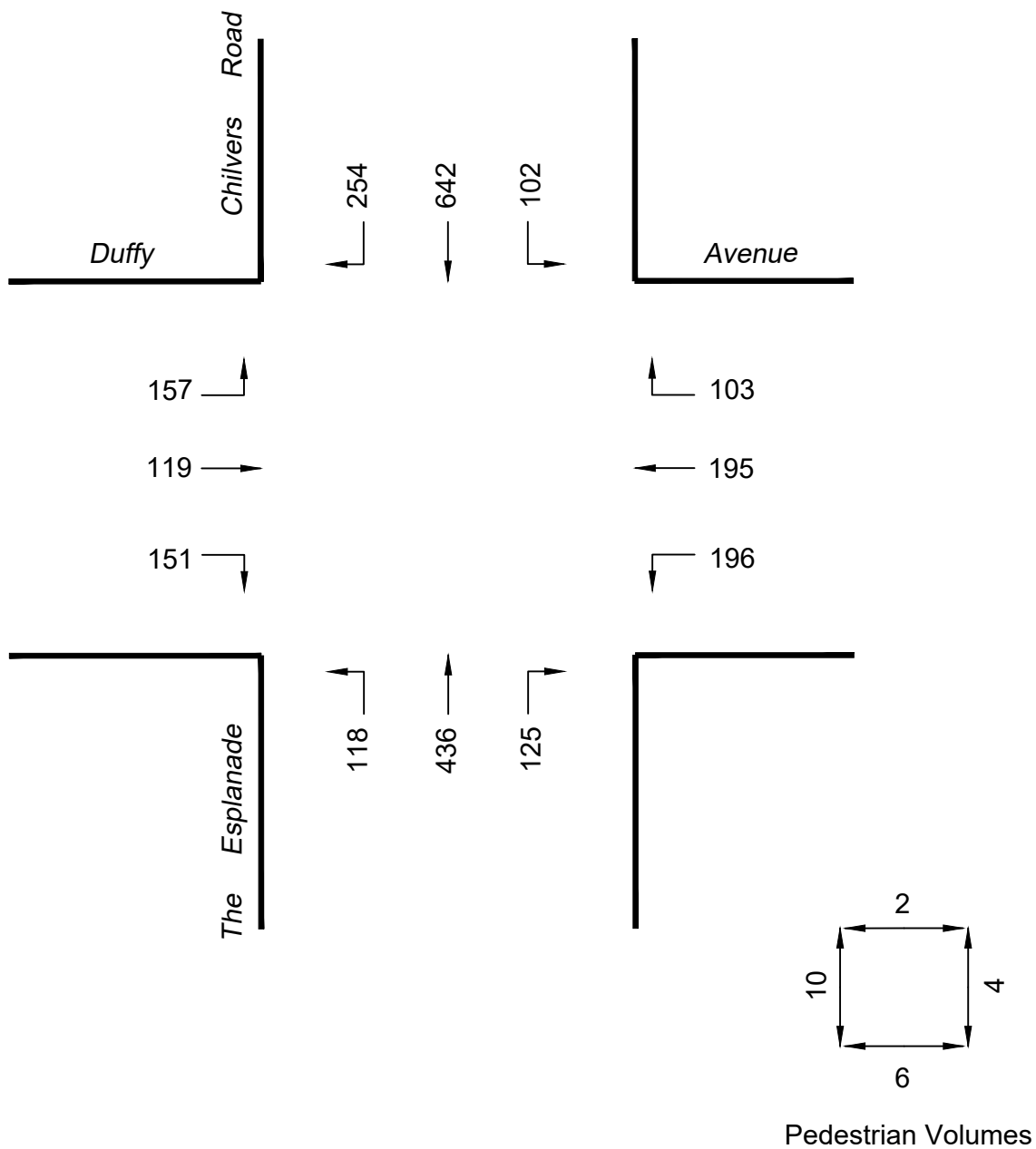
FIGURE 4

CHILVERS RD, THE ESPLANADE & DUFFY AVE, THORNLEIGH
TRAFFIC MODELLING REPORT

**FUTURE WEEKEND AM PEAK HOUR TRAFFIC
& PEDESTRIAN VOLUMES**

JOB NO.17208

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FIGURE 5

CHILVERS RD, THE ESPLANADE & DUFFY AVE, THORNLEIGH
TRAFFIC MODELLING REPORT

**FUTURE WEEKDAY PM PEAK HOUR TRAFFIC
& PEDESTRIAN VOLUMES**

JOB NO.17208

16/04/18

4.0 PROPOSED TRAFFIC SIGNAL PHASING

Following a review of the existing and future traffic and pedestrian volumes at the intersection, the crash history and other advice provided by Council and the proposed intersection layout, a double diamond traffic signal phasing design has been adopted as the preferred traffic signal phasing.

This phasing design requires dedicated right turn lanes/bays in each approach of the intersection so that the diamond right turn phasing can operate efficiently.

While signalised pedestrian crossings will be provided across all approaches of the intersection, the actual number of pedestrians crossing at the intersections are very small (i.e. 0-10 pedestrians per hour) during the weekday and weekend peak periods. (See **Figures 2-5**).

The proposed traffic signal design plan is shown in Appendix 4.

5.0 TRAFFIC MODELLING

The SIDRA 7.0 Network traffic model was used to assess the operational capacity of the intersection with the proposed traffic signal phasing.

All the models were configured to operate with double diamond right turn phasing using the traffic and pedestrian volumes as shown in **Figures 2 to 5** for the various peak hour scenarios, together with the lane configuration and the parking controls that will operate at the intersection. Based on the proposed geometry, no filter right turn movements were permitted in the through traffic phases in any approach. All right turn movements were designated to occur in the diamond turn phases.

SIDRA is a suitable model to assess the operational performance of intersections. Criteria for interpreting an intersection operation under traffic signal controls are Level of Service (LS), Degree of Saturation (DS) and Average Vehicle Delay (AVD).

Table 5.1 below is reproduced from the RTA's Guide to Traffic Generation Developments (October 2002) and provides an explanation of the various levels of service for intersections.

A Level of Service D or better (i.e. A, B, C or D) is generally considered to be minimum design requirement for intersections. The level of service for intersections controlled by traffic signals is determined from the average vehicle delay of all vehicles using the intersection. While estimated delays and Levels of Service are also calculated for individual movements, they are not particularly relevant for traffic signal operation as SIDRA calculates the minimum average vehicle delay for all vehicles using the intersection.

TABLE 5.1**LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS**

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

The results of the modelling are shown in Table 5.2 including the 95th percentile queue lengths for all of the right turn movements at the intersection, as well as the longest queue length, at the intersection.

Reference to Table 5.2 shows that for the existing weekday AM and PM peak hours the intersection with the Double Diamond phasing will have a Level of Service C/D operation with the PM peak hour the peak (or busiest) hour.

For the future scenarios the modelling indicates that these will operate at a Level of Service D/E operation, with the future weekday PM peak hour operating close to capacity with a Level of Service E operation.

To put this in context most major intersections in the Sydney Metropolitan area operate close to capacity in the weekday peak hours, so that this operation would not be unique to this intersection. As noted previously, the reconstruction of the intersection and the traffic signal phasing changes are being undertaken to address the existing poor crash history at the intersection.

TABLE 5.2**SIDRA TRAFFIC MODELLING RESULTS**

Criteria	Existing Weekday AM	Existing Weekday PM	Future Weekend AM	Future Weekday PM
LS	C	D	D	E
DS	0.895	0.945	0.936	0.969
AVD (seconds)	36.7	48.7	46.2	60.9
95% Queue Length (metres)	187.3	220.0	191.6	287.5

Where: LS
DS
AVD
95% Queue Length

Level of Service
Degree of Saturation
Average Vehicle Delay in Seconds
Longest 95% Queue Length in metres

Table 5.3 shows the 95th percentile queue lengths for all movements/lanes as calculated by the modelling for the various scenarios.

The traffic signal design plan prepared by Transport and Urban Planning Pty Ltd has incorporated the right turn bay lengths as calculated by the modelling except for the Duffy Avenue West approach for the future weekend operation, which would require a length of 95 metres plus taper, which is not easily achievable.

Transport and Urban Planning Pty Ltd recommends that the lead in for the right turn bay treatments use a C1 line which tapers to a road centre line, rather than a painted chevron median type treatment which will lengthen the road space required for the right turn bay and the lead in treatment.

Based on the modelling and the right turn bay lengths adopted in the traffic signal design, additional parking restrictions (i.e. full time No Stopping) will be required in;

- The Esplanade approach (i.e. western side of The Esplanade);

The existing parking restrictions (i.e. full time No Stopping) may also need to be revised in the;

- Duffy Avenue West approach (i.e. northern side of Duffy Avenue West); and
- Duffy Avenue East approach (i.e. southern side of Duffy Avenue East).

It is recommended that Council follow this up when the linemarking and signposting plans are finalised for the intersection design works.

TABLE 5.3

95TH PERCENTILE QUEUE LENGTHS IN METRES FOR MOVEMENTS FOR ALL SCENARIOS

Approach/Movement	Existing Weekday AM	Existing Weekday PM	Future Weekend AM	Future Weekend PM
The Esplanade				
Left	187.3	220.0	191.6	287.5
Through	187.3	220.0	191.6	287.5
Right	40.5	38.0	27.8	43.3
Duffy Avenue East				
Left	82.5	156.8	99.3	205.7
Through	82.5	156.8	99.3	205.7
Right	20.4	35.9	16.5	38.2
Chilvers Road				
Left	37.2	48.6	35.2	55.2
Through	120.0	177.7	104.1	193.4
Right	28.0	87.7	96.6	129.0
Duffy Avenue West				
Left	52.7	26.0	60.5	36.0
Through	63.1	27.6	68.7	36.3
Right	63.6	46.4	94.6	69.9

The SIDRA Traffic Modelling Outputs are contain in Appendix 5.

6.0 CONCLUSIONS

This report documents traffic modelling for the future traffic signal phasing at the Chilvers Road/The Esplanade/Duffy Avenue intersection at Thornleigh.

The recommended traffic signal phasing is a double diamond overlap traffic signal operation which will require dedicated right turn lanes/bays in each approach of the intersection.

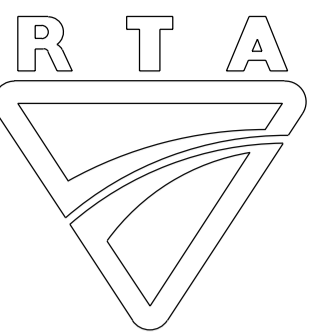
Changes may be required to the parking restrictions (i.e. full time No Stopping) in a number of the approach roads to accommodate the required lane lengths for the right turn bays in the approach road. Section 5 of this report provides details of this and the changes to the parking restrictions should be investigated and documented in the final linemarking and signposting plans for the intersection, prepared by Council.

APPENDIX 1

Existing Traffic Signal Plan

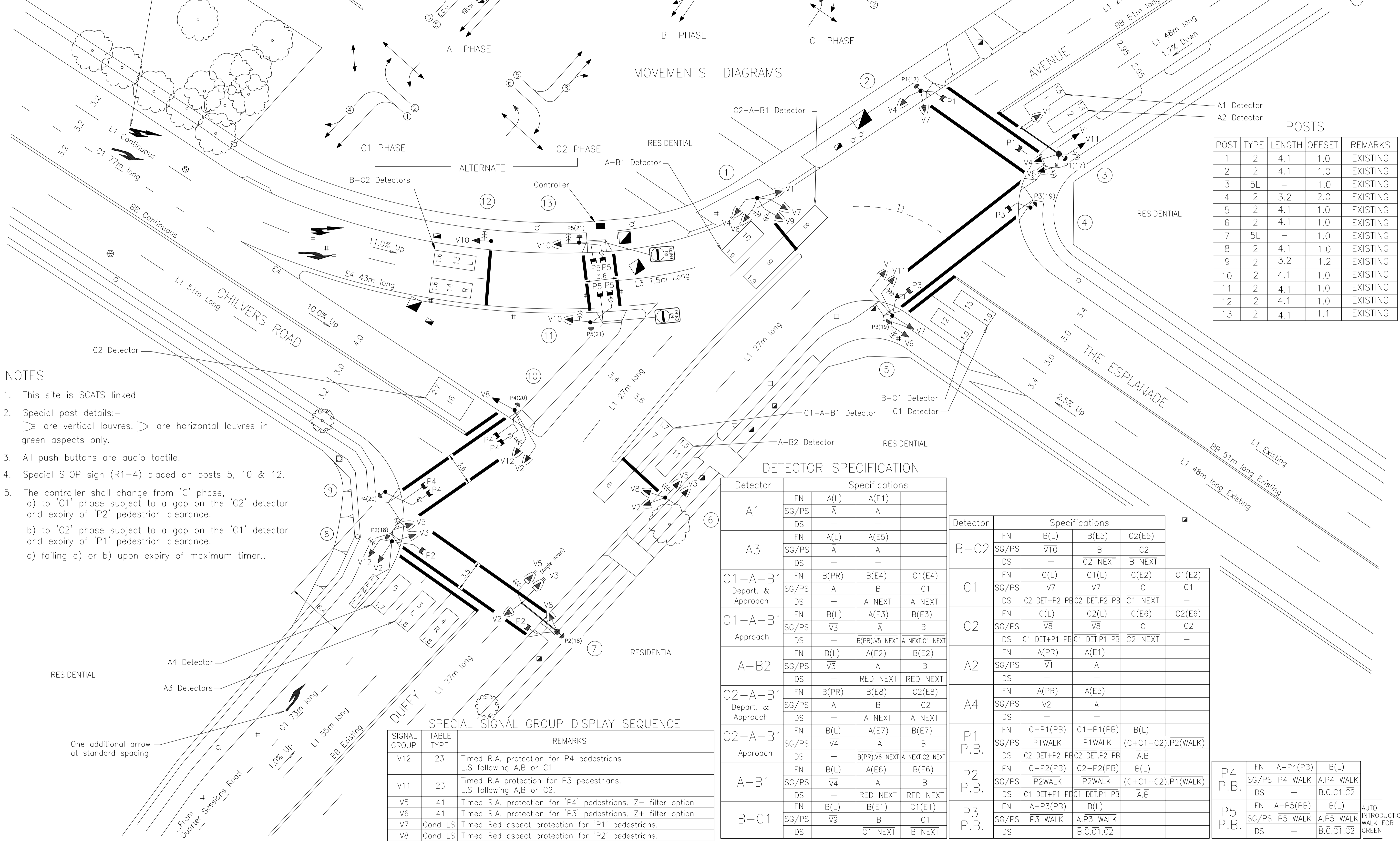
DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 27/02/85



7000.201.W.1737

One additional set of arrows at standard spacing



MOVEMENTS DIAGRAMS

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	EXISTING
2	2	4.1	1.0	EXISTING
3	5L	-	1.0	EXISTING
4	2	3.2	2.0	EXISTING
5	2	4.1	1.0	EXISTING
6	2	4.1	1.0	EXISTING
7	5L	-	1.0	EXISTING
8	2	4.1	1.0	EXISTING
9	2	3.2	1.2	EXISTING
10	2	4.1	1.0	EXISTING
11	2	4.1	1.0	EXISTING
12	2	4.1	1.0	EXISTING
13	2	4.1	1.1	EXISTING

NOTES

- This site is SCATS linked
- Special post details:-
 - are vertical louvres, are horizontal louvres in green aspects only.
- All push buttons are audio tactile.
- Special STOP sign (R1-4) placed on posts 5, 10 & 12.
- The controller shall change from 'C' phase,
 - to 'C1' phase subject to a gap on the 'C2' detector and expiry of 'P2' pedestrian clearance.
 - to 'C2' phase subject to a gap on the 'C1' detector and expiry of 'P1' pedestrian clearance.
 - failing a) or b) upon expiry of maximum timer..

DETECTOR SPECIFICATION

Detector	Specifications			
	FN	A(L)	A(E1)	
A1	FN	A(L)	A(E1)	
	SG/PS	A	A	
	DS	-	-	
A3	FN	A(L)	A(E5)	
	SG/PS	A	A	
	DS	-	-	
C1-A-B1	FN	B(PR)	B(E4)	C1(E4)
	SG/PS	A	B	C1
	DS	-	A NEXT	A NEXT
C1-A-B1	FN	B(L)	A(E3)	B(E3)
	SG/PS	V3	A	B
	DS	-	B(PR).V5 NEXT	A NEXT.C1 NEXT
A-B2	FN	B(L)	A(E2)	B(E2)
	SG/PS	V3	A	B
	DS	-	RED NEXT	RED NEXT
C2-A-B1	FN	B(PR)	B(E8)	C2(E8)
	SG/PS	A	B	C2
	DS	-	A NEXT	A NEXT
C2-A-B1	FN	B(L)	A(E7)	B(E7)
	SG/PS	V4	A	B
	DS	-	B(PR).V6 NEXT	A NEXT.C2 NEXT
A-B1	FN	B(L)	A(E6)	B(E6)
	SG/PS	V4	A	B
	DS	-	RED NEXT	RED NEXT
B-C1	FN	B(L)	B(E1)	C1(E1)
	SG/PS	V9	B	C1
	DS	-	C1 NEXT	B NEXT

Detector	Specifications			
	FN	B(L)	B(E5)	C2(E5)
B-C2	FN	B(L)	B(E5)	C2(E5)
	SG/PS	V10	B	C2
	DS	-	C2 NEXT	B NEXT
C1	FN	C(L)	C1(L)	C(E2)
	SG/PS	V7	V7	C
	DS	C2 DET+P2 PB	C2 DET.P2 PB	C1 NEXT
C2	FN	C(L)	C2(L)	C(E6)
	SG/PS	V8	V8	C
	DS	C1 DET+P1 PB	C1 DET.P1 PB	C2 NEXT
A2	FN	A(PR)	A(E1)	
	SG/PS	V1	A	
	DS	-	-	
A4	FN	A(PR)	A(E5)	
	SG/PS	V2	A	
	DS	-	-	
P1 P.B.	FN	C-P1(PB)	C1-P1(PB)	B(L)
	SG/PS	P1WALK	P1WALK	(C+C1+C2).P2(WALK)
	DS	C2 DET+P2 PB	C2 DET.P2 PB	A.B
P2 P.B.	FN	C-P2(PB)	C2-P2(PB)	B(L)
	SG/PS	P2WALK	P2WALK	(C+C1+C2).P1(WALK)
	DS	C1 DET+P1 PB	C1 DET.P1 PB	A.B
P3 P.B.	FN	A-P3(PB)	B(L)	
	SG/PS	P3 WALK	A.P3 WALK	
	DS	-	B.C.C1.C2	

Signal Group	Table Type	REMARKS	
		TABLE TYPE	REMARKS
V12	23	Timed R.A. protection for P4 pedestrians	L.S following A,B or C1.
V11	23	Timed R.A protection for P3 pedestrians.	L.S following A,B or C2.
V5	41	Timed R.A. protection for 'P4' pedestrians. Z- filter option	
V6	41	Timed R.A. protection for 'P3' pedestrians. Z+ filter option	
V7	Cond LS	Timed Red aspect protection for 'P1' pedestrians.	
V8	Cond LS	Timed Red aspect protection for 'P2' pedestrians.	

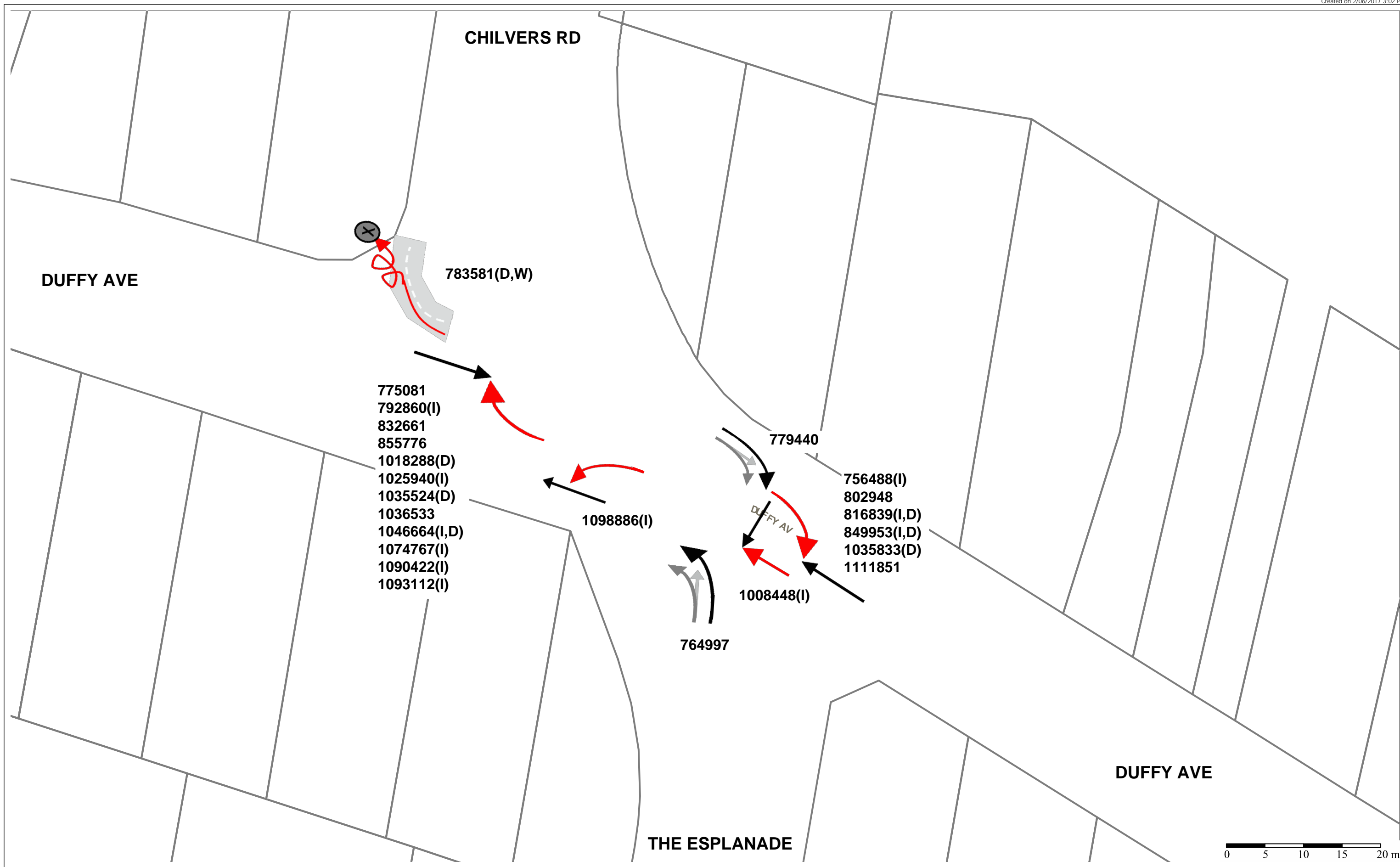
SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
V12	23	Timed R.A. protection for P4 pedestrians
V11	23	Timed R.A protection for P3 pedestrians.
V5	41	Timed R.A. protection for 'P4' pedestrians. Z- filter option
V6	41	Timed R.A. protection for 'P3' pedestrians. Z+ filter option
V7	Cond LS	Timed Red aspect protection for 'P1' pedestrians.
V8	Cond LS	Timed Red aspect protection for 'P2' pedestrians.

<p>A ORIGINAL ISSUE</p> <p>B ISSUE - WAE</p> <p>C CONTROLLER RELOCATED + MINOR POST POSITION CHANGES</p> <p>DN 4/05</p>	<p>PUBLIC UTILITY LEGEND</p> <p>HYDRANT</p> <p>STOP VALVE</p> <p>GAS VALVE</p> <p>SEWER MANHOLE</p> <p>TELECOM PIT</p> <p>ELECT LIGHT POLE</p> <p>POWER POLE</p> <p>STAY POLE</p> <p>TELEPHONE BOX</p> <p>TELECOM PILLAR</p>	<p>REFERENCE PLANS</p> <p>SYMBOLS/ABBS. VD003-6</p> <p>STD POSIT. VD001-5</p> <p>DET SCHED EXP VD018-10</p> <p>PRES. DETECT V005-17</p> <p>SSG DIS. SEQ. VD018-8</p>	<p>U.B.D. Ref. Map 153 A10</p> <p>I.S.G. E: 307 400</p> <p>CO-ORDS N: 1 266 917</p> <p>DESIGNED: S.M</p> <p>CHECKED: D.THOMPSON</p> <p>D.THOMPSON SITE CHECKED</p> <p>D.THOMPSON RECOMMENDED</p>	<p>APPROVED</p> <p>D. THOMPSON</p> <p>NAME D.THOMPSON</p> <p>POSITION PRINCIPAL</p> <p>DATE 12/10/2004</p>	<p>THIS DRAWING IS RECOMMENDED FOR ACCEPTANCE</p> <p>NETWORK OPERATIONS TEAM LEADER</p> <p>DATE 14/10/2004</p> <p>ACCEPTED G. KEVILL</p> <p>DATE 14/10/2004</p>	<p>Roads and Traffic Authority, N.S.W</p> <p>HORNSBY SHIRE COUNCIL AREA</p> <p>TRAFFIC SIGNALS AT DUFFY AVENUE, THE ESPLANADE AND CHILVERS ROAD</p> <p>THORNLEIGH</p> <p>DESIGN LAYOUT</p> <p>TCS No 1737</p>	<p>DESIGN OFFICE PARRAMATTA - PROJECT DESIGN SECTION</p> <p>CADD FILE: W1737_10B.DGN</p> <p>SCALE 5 0 (1:200) 5 10</p> <p>FILE 201 TS 179</p> <p>REGN. 7000.201.W.1737</p>	<p>ISSUE</p> <p>B</p> <p>SHEET</p> <p>10</p>
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APPENDIX 2

Crash Diagram for Intersection

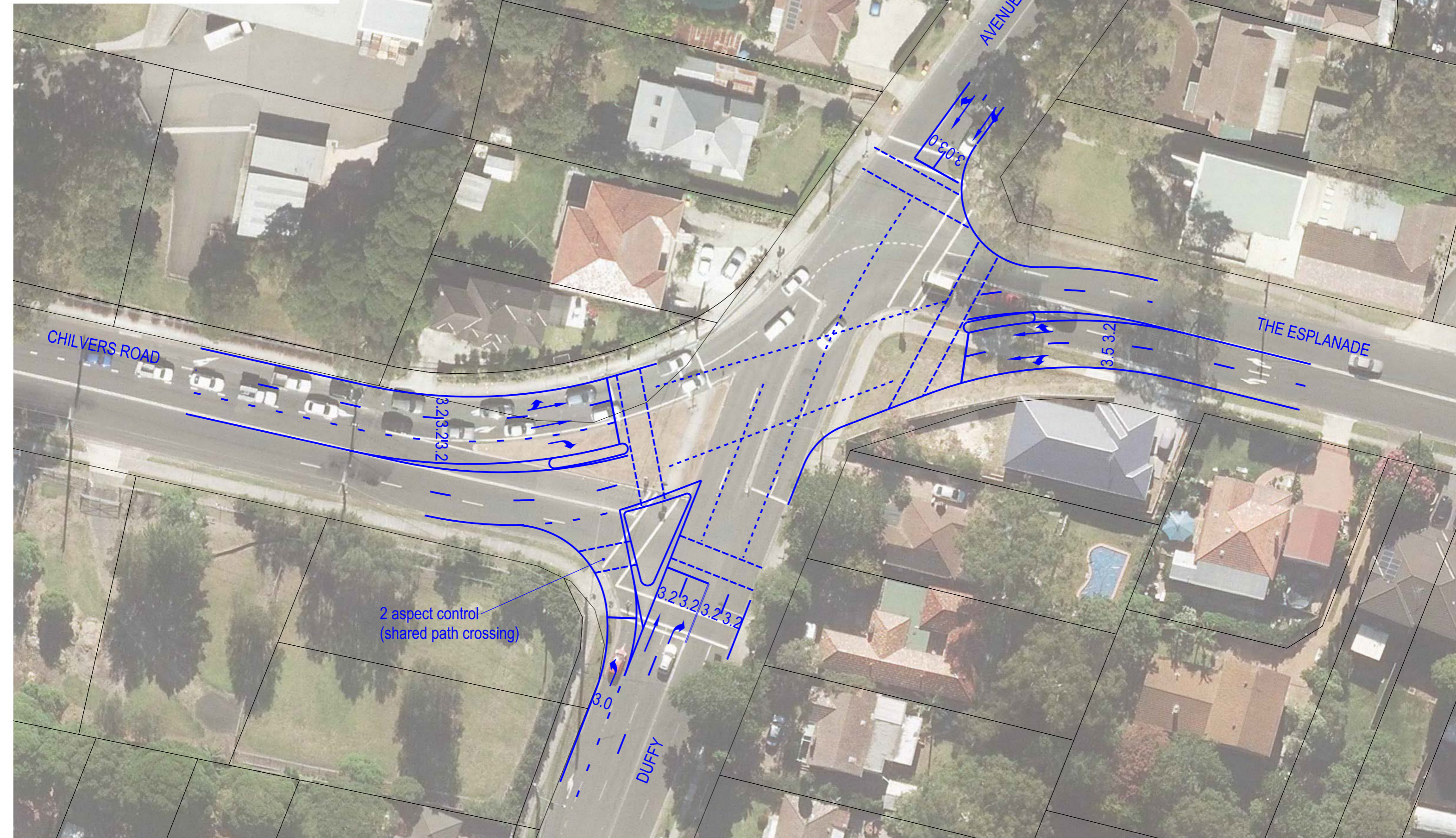


Projection:	GDA94 / MGA zone 56
Date:	2/06/2017

APPENDIX 3

Concept Intersection Layout

OPTION 3 - Existing Road Reserve
- Pavement arrows indicate lane use only.
- Property Boundary information shown has been extracted from the NSW Land & Property Information cadastral data.

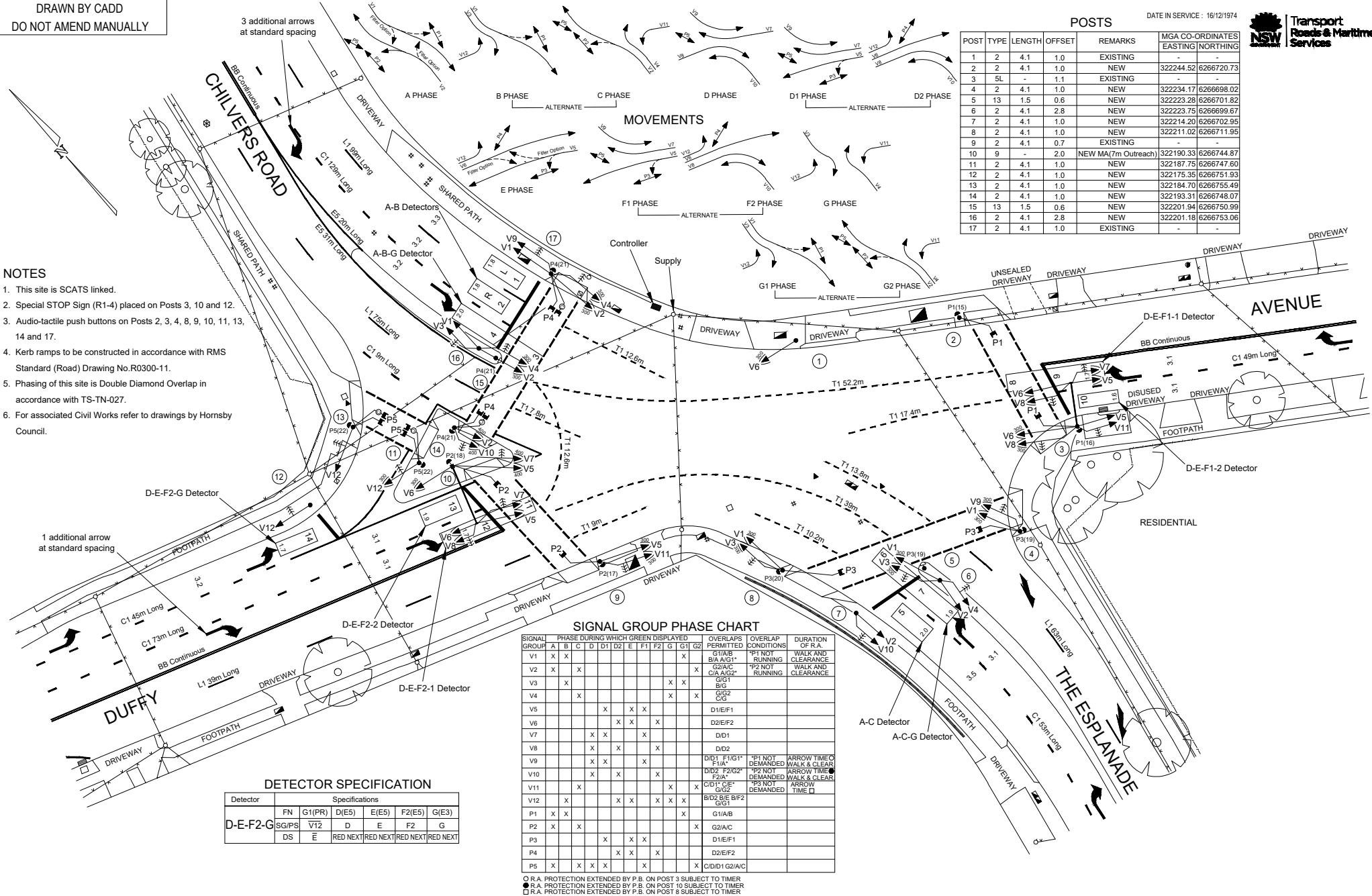


APPENDIX 4

Proposed Traffic Signal Design Plan

DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 16/12/1974



POSTS							MGA CO-ORDINATES	
POST	TYPE	LENGTH	OFFSET	REMARKS	EASTING	NORTHING		
1	2	4.1	1.0	EXISTING	-	-		
2	2	4.1	1.0	NEW	322244.52	6266720.73		
3	5L	-	1.1	EXISTING	-	-		
4	2	4.1	1.0	NEW	322234.17	6266698.02		
5	13	1.5	0.6	NEW	322223.28	6266701.82		
6	2	4.1	2.8	NEW	322237.35	6266699.67		
7	2	4.1	1.0	NEW	322214.20	6266702.95		
8	2	4.1	1.0	NEW	322211.02	6266711.95		
9	2	4.1	0.7	EXISTING	-	-		
10	9	-	2.0	NEW MA(7m Outreach)	322190.33	6266744.87		
11	2	4.1	1.0	NEW	322187.75	6266747.60		
12	2	4.1	1.0	NEW	322175.35	6266751.93		
13	2	4.1	1.0	NEW	322184.70	6266755.49		
14	2	4.1	1.0	NEW	322193.31	6266748.07		
15	13	1.5	0.6	NEW	322201.94	6266750.99		
16	2	4.1	2.8	NEW	322201.18	6266753.06		
17	2	4.1	1.0	EXISTING	-	-		

- NOTES**
- This site is SCATS linked.
 - Special STOP Sign (R1-4) placed on Posts 3, 10 and 12.
 - Audio-tactile push buttons on Posts 2, 3, 4, 8, 9, 10, 11, 13, 14 and 17.
 - Kerb ramps to be constructed in accordance with RMS Standard (Road) Drawing No.R0300-11.
 - Phasing of this site is Double Diamond Overlap in accordance with TS-TN-027.
 - For associated Civil Works refer to drawings by Hornsby Council.

SIGNAL GROUP PHASE CHART

SIGNAL GROUP	A	B	C	D	DT	D2	E	F1	F2	G	G1	G2
V1	X	X										X
V2	X	X										X
V3	X							X	X			
V4	X									X		
V5				X	X	X	X					
V6				X	X	X	X					
V7		X	X					X	X			
V8		X	X					X	X			
V9		X	X					X	X			
V10		X	X					X	X			
V11		X	X					X	X			
V12	X			X	X	X	X			X		
P1	X	X									X	
P2	X	X								X		
P3				X	X	X						X
P4				X	X	X						X
P5	X	X	X	X	X					X		

DETECTOR SPECIFICATION

Detector	Specifications					
FN	G1(PR)	D(E5)	E(E5)	F2(E5)	G(E3)	
D-E-F2-G	SG/PS	V12	D	E	F2	G
	DS	E	RED NEXT	RED NEXT	RED NEXT	RED NEXT

○ R A PROTECTION EXTENDED BY P.B. ON POST 3 SUBJECT TO TIMER
 ● R A PROTECTION EXTENDED BY P.B. ON POST 10 SUBJECT TO TIMER
 ○ R A PROTECTION EXTENDED BY P.B. ON POST 8 SUBJECT TO TIMER

<p>A. ORIGINAL ISSUE</p> <p>STATES STMS FILES</p>	<p>PUBLIC UTILITY LEGEND</p> <p>INVERT: [Symbol] SYMBOLS: V0000-6</p> <p>STOP VALVE: [Symbol] STD. POSN. CHPT: V0001-6</p> <p>SEWER VALVE: [Symbol] INSTL. STOP DET: V0005-7</p> <p>GAS MANHOLE: [Symbol] VEH. GROUP OP: TS-TN-019</p> <p>COMMS PIT: [Symbol] DET. LOGIC OP: TS-TN-020</p> <p>ELECT. LIGHT POLE: [Symbol] PED. MVT. OP: TS-TN-021</p> <p>POWER POLE: [Symbol] C/I</p> <p>STAY POLE: [Symbol]</p> <p>TELEPHONE BOX: [Symbol]</p> <p>COMMS PILLAR: [Symbol]</p>	<p>REFERENCE PLANS</p> <p>U.S.D. Ref: Map 153 A10</p> <p>U.S.D. E: 307 400</p> <p>CONTRACT N: 1288/97</p> <p>DESIGNED: LISA TULAU</p> <p>CHECKED: TERRY LAURENCE</p> <p>LISA TULAU</p> <p>SITE CHECKED: TERRY LAURENCE</p> <p>DATE: _____</p>	<p>DESIGN APPROVAL</p> <p>APPROVED: _____</p> <p>TERRY LAURENCE</p> <p>POSITION: _____</p> <p>DATE: 23.4.18</p> <p>DESIGN PREPARED BY: _____</p> <p>TRANSPORT AND URBAN PLANNING PL</p>	<p>RMS RECOMMENDATION</p> <p>ROAD DESIGN ENGINEERING: _____</p> <p>NAME: _____</p> <p>POSITION: _____</p> <p>DATE: _____</p> <p>NETWORK OPERATIONS</p> <p>NAME: _____</p> <p>POSITION: _____</p> <p>DATE: _____</p>	<p>RMS ACCEPTANCE</p> <p>ACCEPTED: _____</p> <p>NAME: _____</p> <p>POSITION: _____</p> <p>DATE: _____</p> <p>ACCEPTED BY: _____</p> <p>SECTION: _____</p>	<p>ROADS AND MARITIME SERVICES</p> <p>HORNSBY COUNCIL AREA</p> <p>TRAFFIC SIGNALS AT</p> <p>DUFFY AVENUE, THE ESPLANADE AND CHILVERS ROAD,</p> <p>THORNLEIGH</p>	<p>EXISTING <input type="checkbox"/> PROPOSED <input checked="" type="checkbox"/></p> <p>CADD FILE: VV1737_7A.DWG</p> <p>SCALE: 1:200</p> <p>FILE: SF0000/000000</p> <p>REG No: DS0000/000000</p>	<p>ISSUE: A</p> <p>SUPERSEDES SHEET ISSUE: 10/B</p> <p>TCS No: 1737</p> <p>SHEET: -</p>
	<p>Revision 6 - July 2011</p> <p>© COPYRIGHT ROADS AND MARITIME SERVICES</p>							

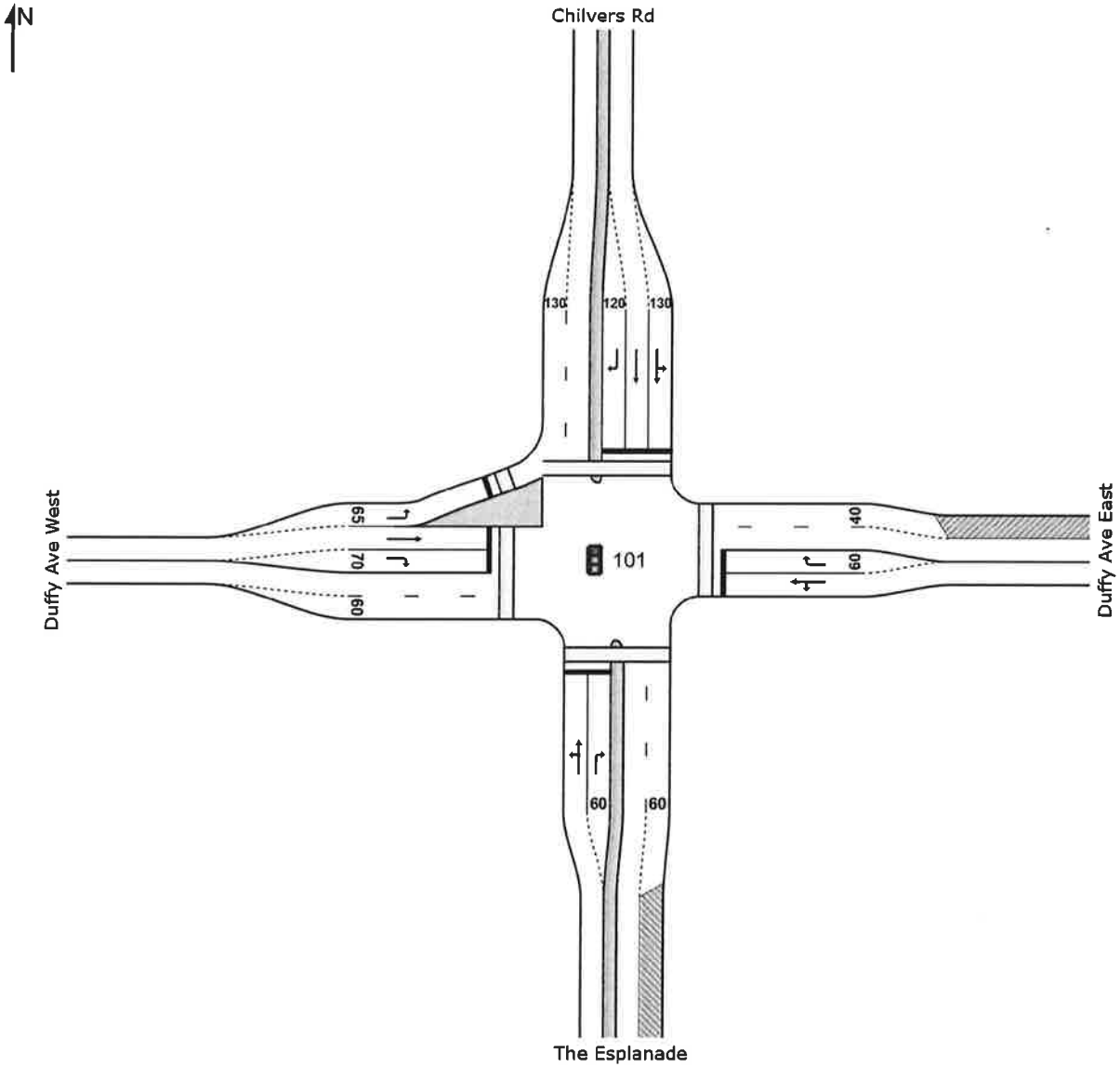
APPENDIX 5

SIDRA Modelling Outputs

SITE LAYOUT

Site: 101 [Duffy & Chilvers - Ex AM Weekday]

Ex AM
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [Duffy & Chilvers - Ex AM Weekday]

Ex AM

Signals - Fixed Time Isolated Cycle Time = 80 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
South: The Esplanade											
1	L2	36	2.0	0.879	40.4	LOS C	26.3	187.3	0.95	1.04	37.4
2	T1	565	2.0	0.879	34.8	LOS C	26.3	187.3	0.95	1.04	38.1
3	R2	122	2.0	0.888	56.1	LOS D	5.7	40.5	1.00	1.04	30.8
Approach		723	2.0	0.888	38.7	LOS C	26.3	187.3	0.96	1.04	36.6
East: Duffy Ave East											
4	L2	131	7.5	0.895	54.8	LOS D	11.1	82.5	1.00	1.11	31.7
5	T1	101	7.5	0.895	49.1	LOS D	11.1	82.5	1.00	1.11	32.3
6	R2	73	7.5	0.331	41.8	LOS C	2.7	20.4	0.95	0.76	35.0
Approach		305	7.5	0.895	49.8	LOS D	11.1	82.5	0.99	1.02	32.7
North: Chilvers Rd											
7	L2	97	2.4	0.263	22.3	LOS B	5.2	37.2	0.70	0.67	44.5
8	T1	616	2.4	0.687	21.3	LOS B	16.8	120.0	0.86	0.77	44.3
9	R2	93	2.4	0.679	48.7	LOS D	3.9	28.0	1.00	0.83	32.9
Approach		806	2.4	0.687	24.6	LOS B	16.8	120.0	0.86	0.76	42.6
West: Duffy Ave West											
10	L2	222	1.7	0.461	32.8	LOS C	7.4	52.7	0.89	0.80	38.7
11	T1	192	1.7	0.885	48.4	LOS D	8.9	63.1	1.00	1.06	33.5
12	R2	198	1.7	0.863	51.7	LOS D	9.0	63.6	1.00	1.00	31.9
Approach		612	1.7	0.885	43.8	LOS D	9.0	63.6	0.96	0.95	34.7
All Vehicles		2446	2.7	0.895	36.7	LOS C	26.3	187.3	0.93	0.92	37.3

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.

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		Prop. Queued	Effective Stop Rate per ped	
					Pedestrian ped	Distance m			
P1	South Full Crossing	2	34.2	LOS D	0.0	0.0	0.93	0.93	
P2	East Full Crossing	5	21.8	LOS C	0.0	0.0	0.74	0.74	
P3	North Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93	
P4	West Full Crossing	4	21.8	LOS C	0.0	0.0	0.74	0.74	
P4S	West Slip/Bypass Lane Crossing	4	7.7	LOSA	0.0	0.0	0.44	0.44	
All Pedestrians		16	20.6	LOS C			0.70	0.70	

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: 101 [Duffy & Chilvers - Ex AM Weekday]

Ex AM

Signals - Fixed Time Isolated Cycle Time = 80 seconds (Optimum Cycle Time - Minimum Delay)

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	Dist m				
South: The Esplanade													
Lane 1	601	2.0	684 ¹	0.879	100	35.1	LOS C	26.3	187.3	Full	500	0.0	0.0
Lane 2	122	2.0	137	0.888	100	56.1	LOS D	5.7	40.5	Short	60	0.0	NA
Approach	723	2.0		0.888		38.7	LOS C	26.3	187.3				
East: Duffy Ave East													
Lane 1	232	7.5	259	0.895	100	52.3	LOS D	11.1	82.5	Full	500	0.0	0.0
Lane 2	73	7.5	220	0.331	100	41.8	LOS C	2.7	20.4	Short	60	0.0	NA
Approach	305	7.5		0.895		49.8	LOS D	11.1	82.5				
North: Chilvers Rd													
Lane 1	202	2.4	767	0.263	38 ⁶	19.4	LOS B	5.2	37.2	Short	130	0.0	NA
Lane 2	511	2.4	744	0.687	100	22.2	LOS B	16.8	120.0	Full	500	0.0	0.0
Lane 3	93	2.4	137	0.679	100	48.7	LOS D	3.9	28.0	Short	120	0.0	NA
Approach	806	2.4		0.687		24.6	LOS B	16.8	120.0				
West: Duffy Ave West													
Lane 1	222	1.7	482	0.461	100	32.8	LOS C	7.4	52.7	Short	65	0.0	NA
Lane 2	192	1.7	217	0.885	100	48.4	LOS D	8.9	63.1	Full	500	0.0	0.0
Lane 3	198	1.7	229	0.863	100	51.7	LOS D	9.0	63.6	Short	70	0.0	NA
Approach	612	1.7		0.885		43.8	LOS D	9.0	63.6				
Intersection	2446	2.7		0.895		36.7	LOS C	26.3	187.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
- 6 Lane under-utilisation due to downstream effects

PHASING SUMMARY

Site: 101 [Duffy & Chilvers - Ex AM Weekday]

Ex AM

Signals - Fixed Time Isolated Cycle Time = 80 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program

Phase Sequence: Variable Phasing

Reference Phase: Phase E

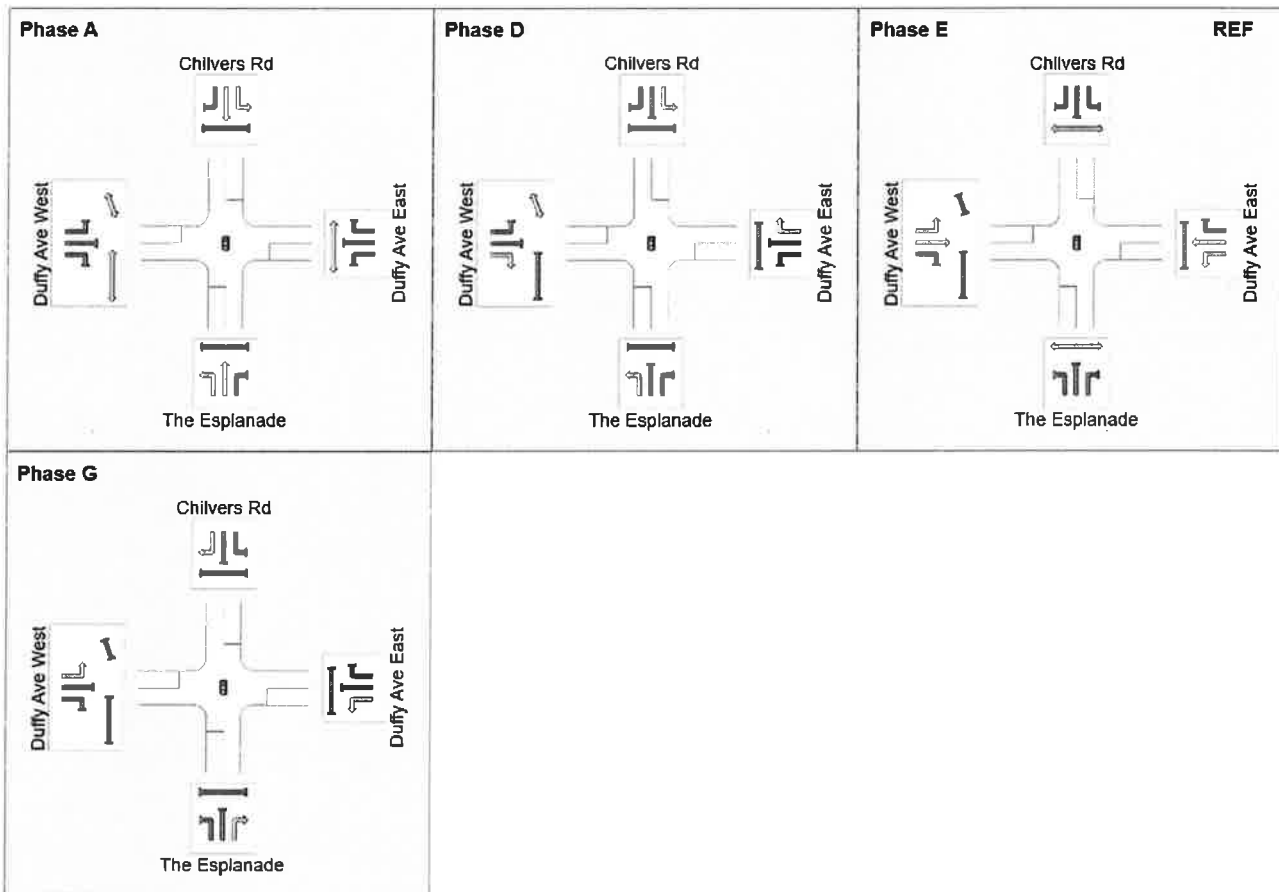
Input Phase Sequence: A, D, E, G

Output Phase Sequence: A, D, E, G

Phase Timing Results

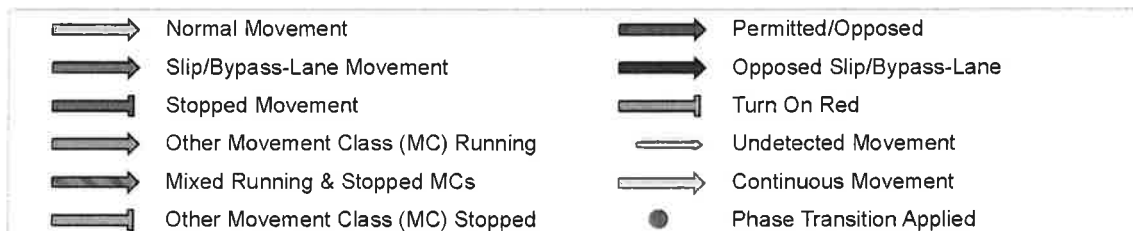
Phase	A	D	E	G
Phase Change Time (sec)	27	64	0	15
Green Time (sec)	31	10	9	6
Phase Time (sec)	37	16	15	12
Phase Split	46%	20%	19%	15%

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

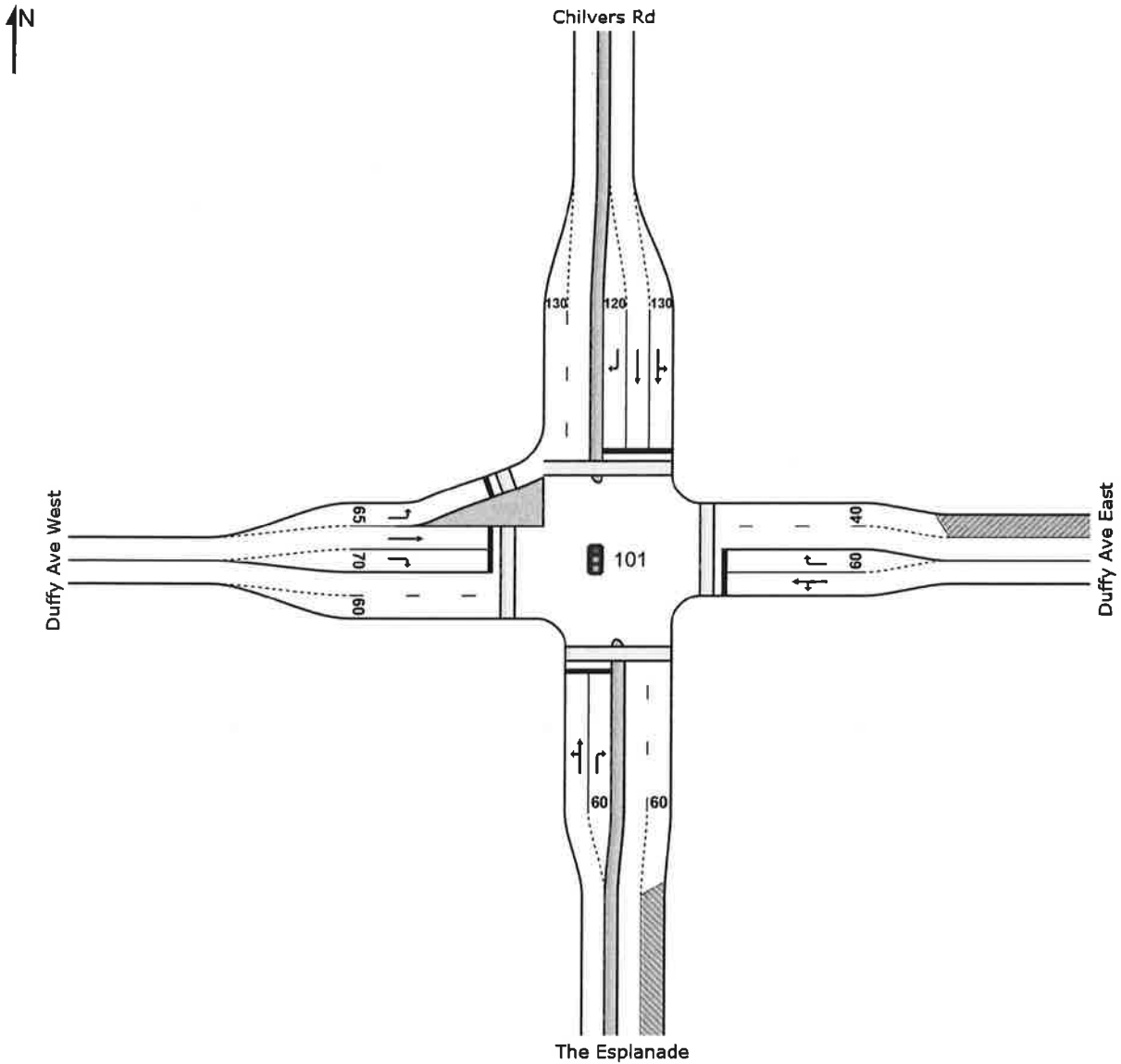
VAR: Variable Phase



SITE LAYOUT

Site: 101 [Duffy & Chilvers - Ex PM Weekday]

Ex PM
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [Duffy & Chilvers - Ex PM Weekday]

Ex PM

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Esplanade											
1	L2	94	2.0	0.934	61.0	LOS E	30.9	220.0	1.00	1.23	30.7
2	T1	436	2.0	0.934	55.4	LOS D	30.9	220.0	1.00	1.23	31.2
3	R2	125	2.0	0.512	46.3	LOS D	5.3	38.0	0.98	0.79	33.5
Approach		655	2.0	0.934	54.5	LOS D	30.9	220.0	0.99	1.15	31.6
East: Duffy Ave East											
4	L2	196	0.0	0.929	63.2	LOS E	22.4	156.8	1.00	1.20	29.7
5	T1	195	0.0	0.929	57.6	LOS E	22.4	156.8	1.00	1.20	30.2
6	R2	103	0.0	0.832	58.2	LOS E	5.1	35.9	1.00	0.94	30.4
Approach		494	0.0	0.929	59.9	LOS E	22.4	156.8	1.00	1.14	30.0
North: Chilvers Rd											
7	L2	102	1.0	0.327	29.1	LOS C	6.9	48.6	0.78	0.72	41.2
8	T1	642	1.0	0.853	35.8	LOS C	25.2	177.8	0.96	0.97	37.7
9	R2	226	1.0	0.919	64.0	LOS E	12.4	87.7	1.00	1.10	29.0
Approach		970	1.0	0.919	41.7	LOS C	25.2	177.8	0.95	0.97	35.5
West: Duffy Ave West											
10	L2	134	0.0	0.176	23.6	LOS B	3.7	26.0	0.67	0.73	42.9
11	T1	106	0.0	0.257	32.4	LOS C	3.9	27.6	0.88	0.69	39.2
12	R2	117	0.0	0.945	70.9	LOS F	6.6	46.4	1.00	1.15	27.4
Approach		357	0.0	0.945	41.7	LOS C	6.6	46.4	0.84	0.86	35.4
All Vehicles		2476	0.9	0.945	48.7	LOS D	30.9	220.0	0.96	1.03	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	6	38.3	LOS D	0.0	0.0	0.92	0.92	
P2	East Full Crossing	4	28.0	LOS C	0.0	0.0	0.79	0.79	
P3	North Full Crossing	2	39.2	LOS D	0.0	0.0	0.93	0.93	
P4	West Full Crossing	10	28.0	LOS C	0.0	0.0	0.79	0.79	
P4S	West Slip/Bypass Lane Crossing	10	14.5	LOS B	0.0	0.0	0.57	0.57	
All Pedestrians		32	26.4	LOS C			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: 101 [Duffy & Chilvers - Ex PM Weekday]

Ex PM

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

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	Dist m				
South: The Esplanade													
Lane 1	530	2.0	568 ¹	0.934	100	56.4	LOS D	30.9	220.0	Full	500	0.0	0.0
Lane 2	125	2.0	244	0.512	100	46.3	LOS D	5.3	38.0	Short	60	0.0	NA
Approach	655	2.0		0.934		54.5	LOS D	30.9	220.0				
East: Duffy Ave East													
Lane 1	391	0.0	421 ¹	0.929	100	60.4	LOS E	22.4	156.8	Full	500	0.0	0.0
Lane 2	103	0.0	124	0.832	100	58.2	LOS E	5.1	35.9	Short	60	0.0	NA
Approach	494	0.0		0.929		59.9	LOS E	22.4	156.8				
North: Chilvers Rd													
Lane 1	211	1.0	646	0.327	38 ⁶	26.2	LOS B	6.9	48.6	Short	130	0.0	NA
Lane 2	533	1.0	624	0.853	100	38.3	LOS C	25.2	177.8	Full	500	0.0	0.0
Lane 3	226	1.0	246	0.919	100	64.0	LOS E	12.4	87.7	Short	120	0.0	NA
Approach	970	1.0		0.919		41.7	LOS C	25.2	177.8				
West: Duffy Ave West													
Lane 1	134	0.0	763	0.176	100	23.6	LOS B	3.7	26.0	Short	65	0.0	NA
Lane 2	106	0.0	412	0.257	100	32.4	LOS C	3.9	27.6	Full	500	0.0	0.0
Lane 3	117	0.0	124	0.945	100	70.9	LOS F	6.6	46.4	Short	70	0.0	NA
Approach	357	0.0		0.945		41.7	LOS C	6.6	46.4				
Intersection	2476	0.9		0.945		48.7	LOS D	30.9	220.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
- 6 Lane under-utilisation due to downstream effects

PHASING SUMMARY

Site: 101 [Duffy & Chilvers - Ex PM Weekday]

Ex PM

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program

Phase Sequence: Variable Phasing

Reference Phase: Phase E

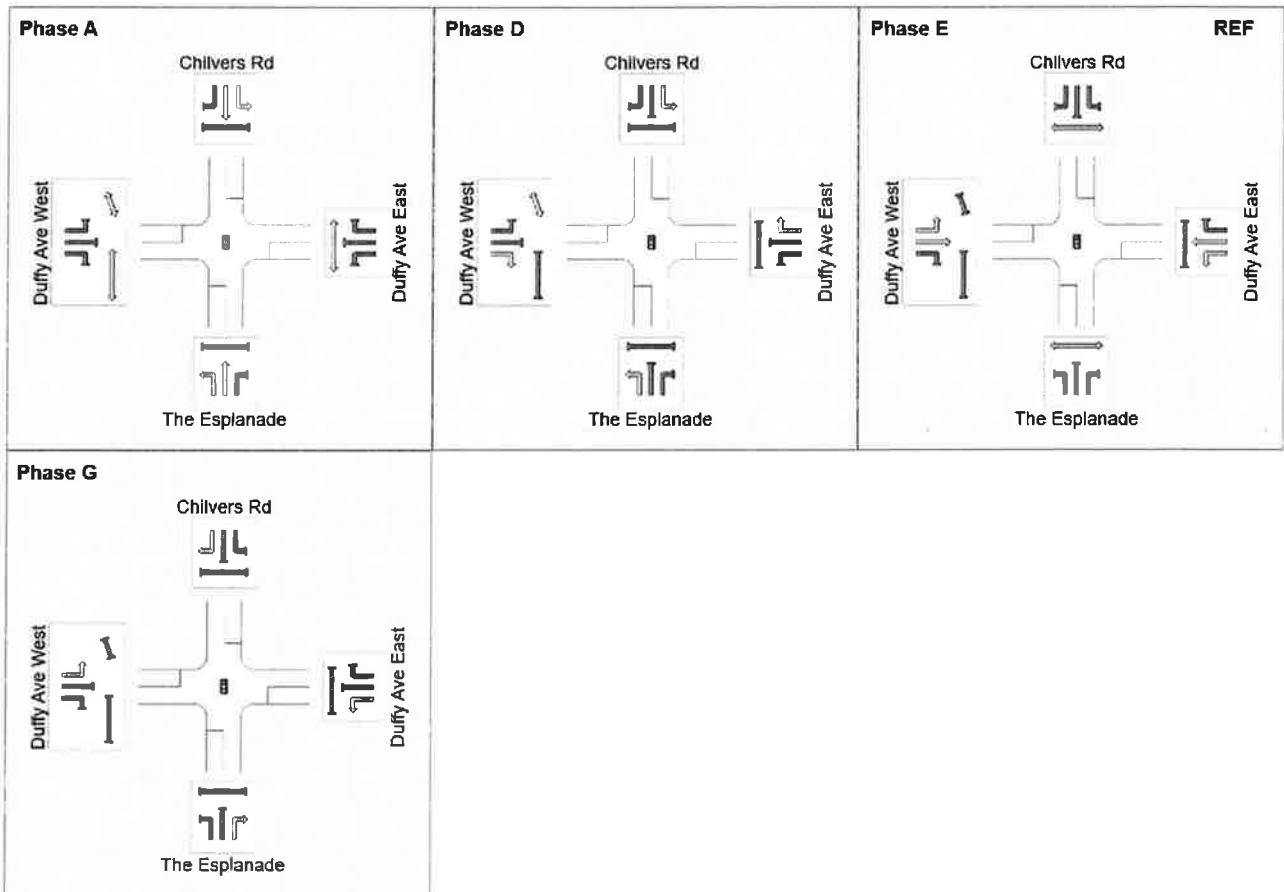
Input Phase Sequence: A, D, E, G

Output Phase Sequence: A, D, E, G

Phase Timing Results

Phase	A	D	E	G
Phase Change Time (sec)	43	78	0	25
Green Time (sec)	29	6	19	12
Phase Time (sec)	35	12	25	18
Phase Split	39%	13%	28%	20%

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



REF: Reference Phase

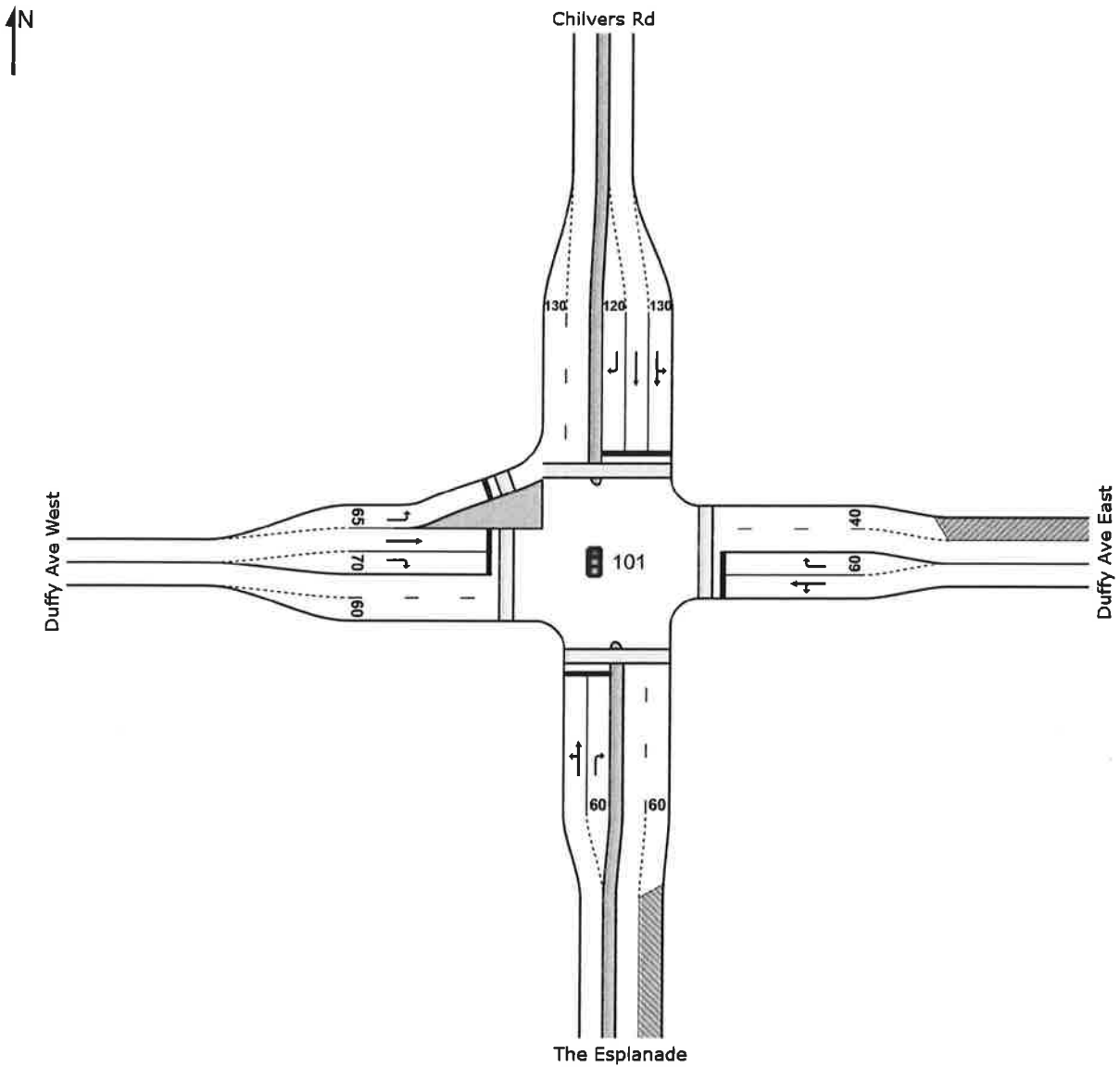
VAR: Variable Phase



SITE LAYOUT

Site: 101 [Duffy & Chilvers - Future AM Weekend]

Future AM Weekend
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [Duffy & Chilvers - Future AM Weekend]

Future AM Weekend

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
South: The Esplanade											
1	L2	131	1.0	0.905	52.7	LOS D	27.1	191.6	1.00	1.13	32.9
2	T1	381	1.0	0.905	47.2	LOS D	27.1	191.6	1.00	1.13	33.4
3	R2	96	1.0	0.360	44.3	LOS D	3.9	27.8	0.94	0.77	34.2
Approach		608	1.0	0.905	47.9	LOS D	27.1	191.6	0.99	1.07	33.4
East: Duffy Ave East											
4	L2	97	2.0	0.936	68.5	LOS E	13.9	99.3	1.00	1.20	28.6
5	T1	144	2.0	0.936	62.9	LOS E	13.9	99.3	1.00	1.20	29.0
6	R2	59	2.0	0.207	42.3	LOS C	2.3	16.5	0.91	0.74	35.0
Approach		300	2.0	0.936	60.7	LOS E	13.9	99.3	0.98	1.11	29.9
North: Chilvers Rd											
7	L2	94	2.0	0.245	28.3	LOS B	4.9	35.2	0.76	0.71	41.2
8	T1	446	2.0	0.640	28.1	LOS B	14.6	104.1	0.89	0.78	40.9
9	R2	244	2.0	0.923	64.6	LOS E	13.6	96.6	1.00	1.10	28.8
Approach		784	2.0	0.923	39.5	LOS C	14.6	104.1	0.91	0.87	36.2
West: Duffy Ave West											
10	L2	251	1.0	0.408	30.7	LOS C	8.6	60.5	0.82	0.79	39.6
11	T1	199	1.0	0.840	49.1	LOS D	9.7	68.7	1.00	0.98	33.3
12	R2	256	1.0	0.892	58.4	LOS E	13.4	94.6	1.00	1.03	30.2
Approach		706	1.0	0.892	45.9	LOS D	13.4	94.6	0.94	0.93	34.0
All Vehicles		2398	1.5	0.936	46.2	LOS D	27.1	191.6	0.95	0.97	33.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate per ped	
					Pedestrian ped	Distance m			
P1	South Full Crossing	1	39.2	LOS D	0.0	0.0	0.93	0.93	
P2	East Full Crossing	1	28.8	LOS C	0.0	0.0	0.80	0.80	
P3	North Full Crossing	3	39.2	LOS D	0.0	0.0	0.93	0.93	
P4	West Full Crossing	3	28.8	LOS C	0.0	0.0	0.80	0.80	
P4S	West Slip/Bypass Lane Crossing	3	10.8	LOS B	0.0	0.0	0.49	0.49	
All Pedestrians		11	27.7	LOS C			0.76	0.76	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 101 [Duffy & Chilvers - Future AM Weekend]

Future AM Weekend

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

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	HV %						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec		m		m	%	%	
South: The Esplanade													
Lane 1	512	1.0	565 ¹	0.905	100	48.6	LOS D	27.1	191.6	Full	500	0.0	0.0
Lane 2	96	1.0	266	0.360	100	44.3	LOS D	3.9	27.8	Short	60	0.0	NA
Approach	608	1.0		0.905		47.9	LOS D	27.1	191.6				
East: Duffy Ave East													
Lane 1	241	2.0	257	0.936	100	65.2	LOS E	13.9	99.3	Full	500	0.0	0.0
Lane 2	59	2.0	285	0.207	100	42.3	LOS C	2.3	16.5	Short	60	0.0	NA
Approach	300	2.0		0.936		60.7	LOS E	13.9	99.3				
North: Chilvers Rd													
Lane 1	157	2.0	640	0.245	38 ⁶	26.1	LOS B	4.9	35.2	Short	130	0.0	NA
Lane 2	383	2.0	599	0.640	100	29.0	LOS C	14.6	104.1	Full	500	0.0	0.0
Lane 3	244	2.0	264	0.923	100	64.6	LOS E	13.6	96.6	Short	120	0.0	NA
Approach	784	2.0		0.923		39.5	LOS C	14.6	104.1				
West: Duffy Ave West													
Lane 1	251	1.0	615	0.408	100	30.7	LOS C	8.6	60.5	Short	65	0.0	NA
Lane 2	199	1.0	237	0.840	100	49.1	LOS D	9.7	68.7	Full	500	0.0	0.0
Lane 3	256	1.0	287	0.892	100	58.4	LOS E	13.4	94.6	Short	70	0.0	NA
Approach	706	1.0		0.892		45.9	LOS D	13.4	94.6				
Intersection	2398	1.5		0.936		46.2	LOS D	27.1	191.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
- 6 Lane under-utilisation due to downstream effects

PHASING SUMMARY

Site: 101 [Duffy & Chilvers - Future AM Weekend]

Future AM Weekend

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program

Phase Sequence: Variable Phasing

Reference Phase: Phase E

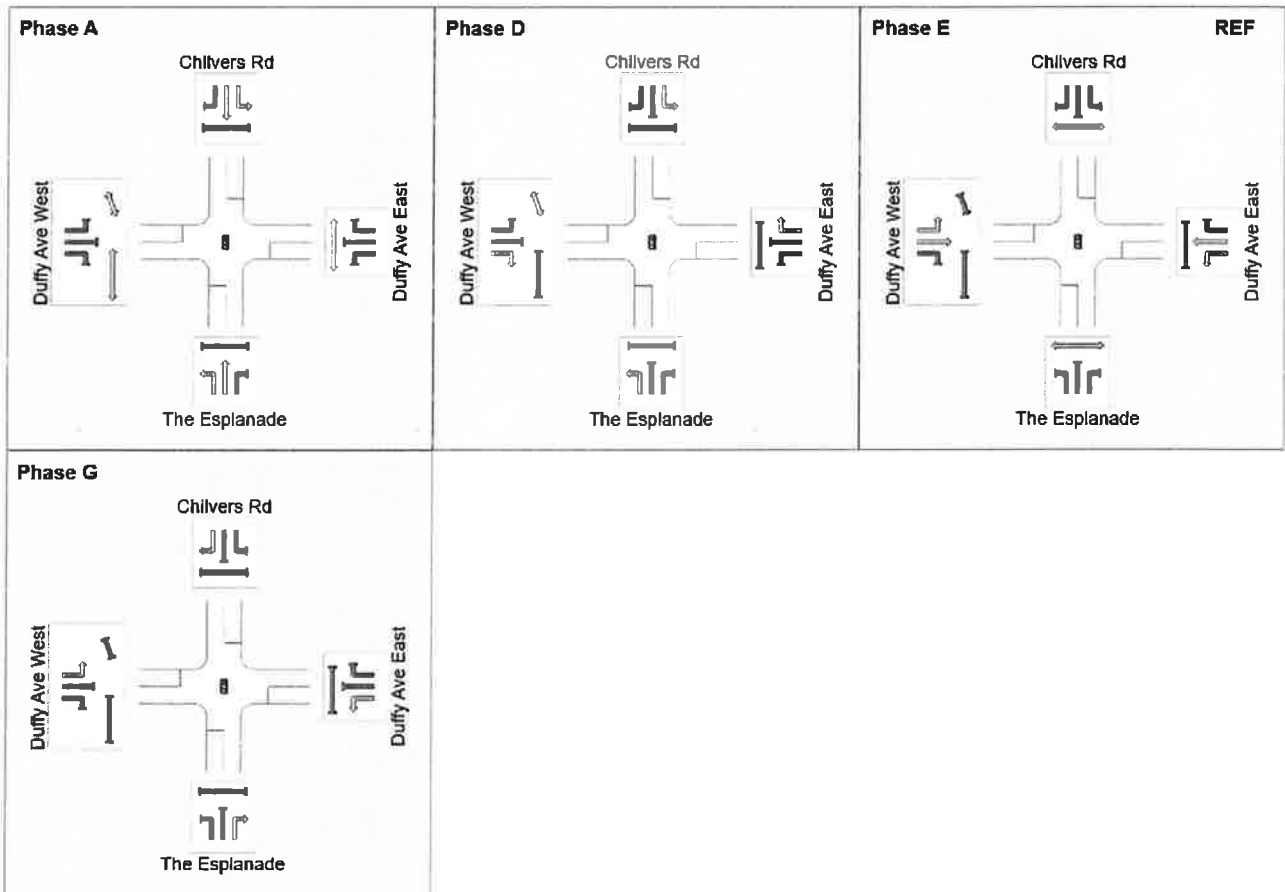
Input Phase Sequence: A, D, E, G

Output Phase Sequence: A, D, E, G

Phase Timing Results

Phase	A	D	E	G
Phase Change Time (sec)	36	70	0	17
Green Time (sec)	28	14	11	13
Phase Time (sec)	34	20	17	19
Phase Split	38%	22%	19%	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

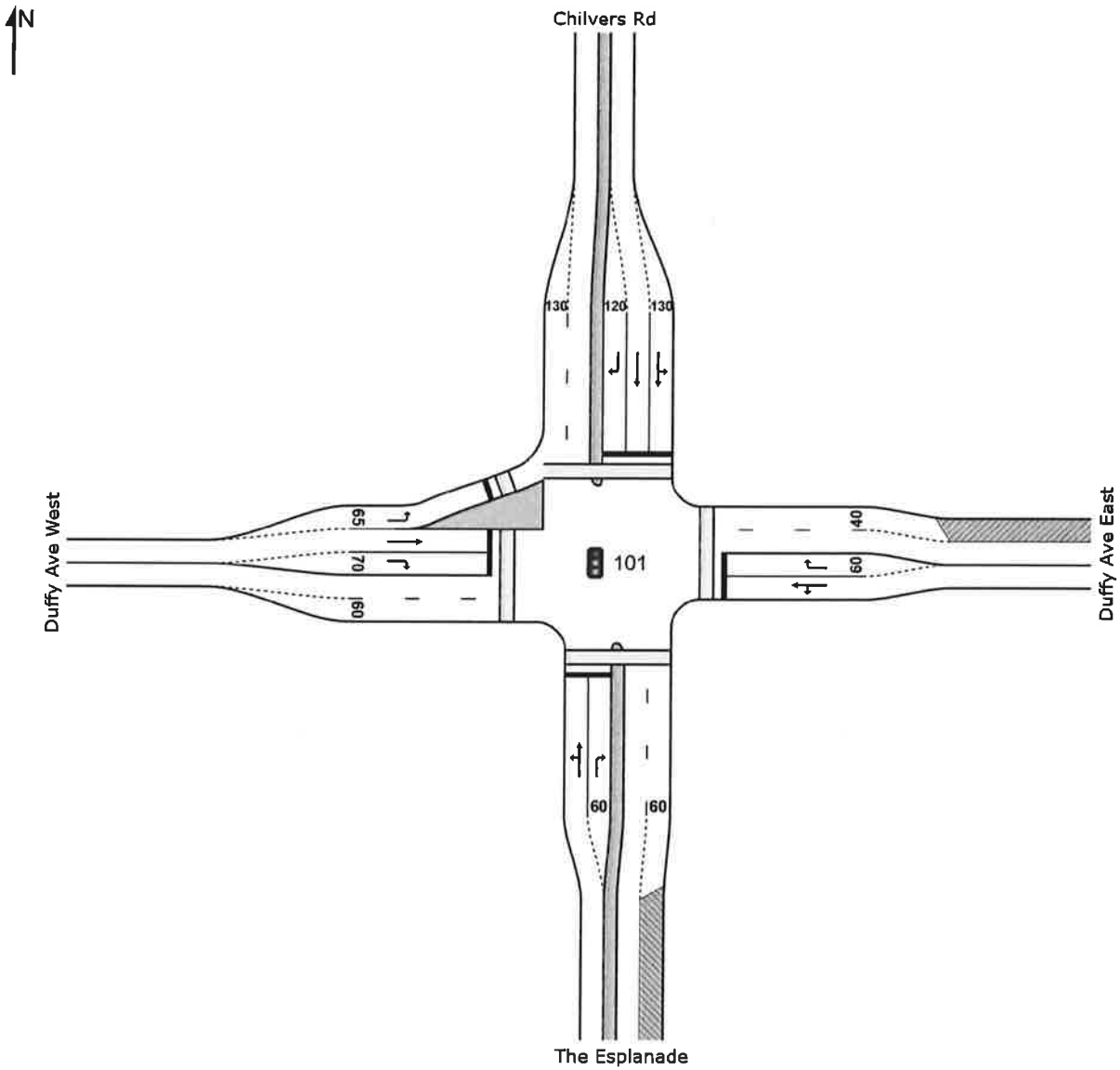
VAR: Variable Phase



SITE LAYOUT

Site: 101 [Duffy & Chilvers - Future PM Weekday]

Future PM
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [Duffy & Chilvers - Future PM Weekday]

Future PM

Signals - Fixed Time Isolated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: The Esplanade											
1	L2	118	2.0	0.960	79.2	LOS F	40.4	287.5	1.00	1.30	26.6
2	T1	436	2.0	0.960	73.6	LOS F	40.4	287.5	1.00	1.30	27.0
3	R2	125	2.0	0.478	51.5	LOS D	6.1	43.3	0.97	0.79	32.0
Approach		679	2.0	0.960	70.5	LOS F	40.4	287.5	0.99	1.20	27.7
East: Duffy Ave East											
4	L2	196	0.0	0.969	89.2	LOS F	29.4	205.7	1.00	1.31	24.6
5	T1	195	0.0	0.969	83.6	LOS F	29.4	205.7	1.00	1.31	24.8
6	R2	103	0.0	0.647	59.1	LOS E	5.5	38.2	1.00	0.82	30.1
Approach		494	0.0	0.969	80.7	LOS F	29.4	205.7	1.00	1.21	25.7
North: Chilvers Rd											
7	L2	102	1.0	0.317	32.2	LOS C	7.8	55.2	0.77	0.71	39.8
8	T1	642	1.0	0.827	37.3	LOS C	27.4	193.4	0.95	0.91	37.1
9	R2	254	1.0	0.964	87.9	LOS F	18.3	129.0	1.00	1.18	24.4
Approach		998	1.0	0.964	49.7	LOS D	27.4	193.4	0.95	0.96	32.9
West: Duffy Ave West											
10	L2	157	0.0	0.206	26.9	LOS B	5.1	36.0	0.68	0.74	41.3
11	T1	119	0.0	0.291	38.0	LOS C	5.2	36.3	0.89	0.71	37.0
12	R2	151	0.0	0.949	80.8	LOS F	10.0	69.9	1.00	1.14	25.5
Approach		427	0.0	0.949	49.1	LOS D	10.0	69.9	0.85	0.87	33.0
All Vehicles		2598	0.9	0.969	60.9	LOS E	40.4	287.5	0.95	1.06	29.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	6	43.0	LOS E	0.0	0.0	0.90	0.90	
P2	East Full Crossing	4	30.5	LOS D	0.0	0.0	0.76	0.76	
P3	North Full Crossing	2	44.8	LOS E	0.0	0.0	0.92	0.92	
P4	West Full Crossing	10	30.5	LOS D	0.0	0.0	0.76	0.76	
P4S	West Slip/Bypass Lane Crossing	10	15.5	LOS B	0.0	0.0	0.54	0.54	
All Pedestrians		32	29.0	LOS C			0.73	0.73	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 101 [Duffy & Chilvers - Future PM Weekday]

Future PM

Signals - Fixed Time Isolated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

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	Dist m				
South: The Esplanade													
Lane 1	554	2.0	577 ¹	0.960	100	74.8	LOS F	40.4	287.5	Full	500	0.0	0.0
Lane 2	125	2.0	262	0.478	100	51.5	LOS D	6.1	43.3	Short	60	0.0	NA
Approach	679	2.0		0.960		70.5	LOS F	40.4	287.5				
East: Duffy Ave East													
Lane 1	391	0.0	404 ¹	0.969	100	86.4	LOS F	29.4	205.7	Full	500	0.0	0.0
Lane 2	103	0.0	159	0.647	100	59.1	LOS E	5.5	38.2	Short	60	0.0	NA
Approach	494	0.0		0.969		80.7	LOS F	29.4	205.7				
North: Chilvers Rd													
Lane 1	210	1.0	663	0.317	38 ⁶	29.3	LOS C	7.8	55.2	Short	130	0.0	NA
Lane 2	534	1.0	646	0.827	100	39.5	LOS C	27.4	193.4	Full	500	0.0	0.0
Lane 3	254	1.0	263	0.964	100	87.9	LOS F	18.3	129.0	Short	120	0.0	NA
Approach	998	1.0		0.964		49.7	LOS D	27.4	193.4				
West: Duffy Ave West													
Lane 1	157	0.0	761	0.206	100	26.9	LOS B	5.1	36.0	Short	65	0.0	NA
Lane 2	119	0.0	409	0.291	100	38.0	LOS C	5.2	36.3	Full	500	0.0	0.0
Lane 3	151	0.0	159	0.949	100	80.8	LOS F	10.0	69.9	Short	70	0.0	NA
Approach	427	0.0		0.949		49.1	LOS D	10.0	69.9				
Intersection	2598	0.9		0.969		60.9	LOS E	40.4	287.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
- 6 Lane under-utilisation due to downstream effects

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Organisation: TRANSPORT AND URBAN PLANNING | Processed: Thursday, 12 April 2018 12:41:04 PM

Project: C:\Users\Terry\Documents\17208-2 Chilvers_Sidra.sip7

PHASING SUMMARY

Site: 101 [Duffy & Chilvers - Future PM Weekday]

Future PM

Signals - Fixed Time Isolated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program

Phase Sequence: Variable Phasing

Reference Phase: Phase E

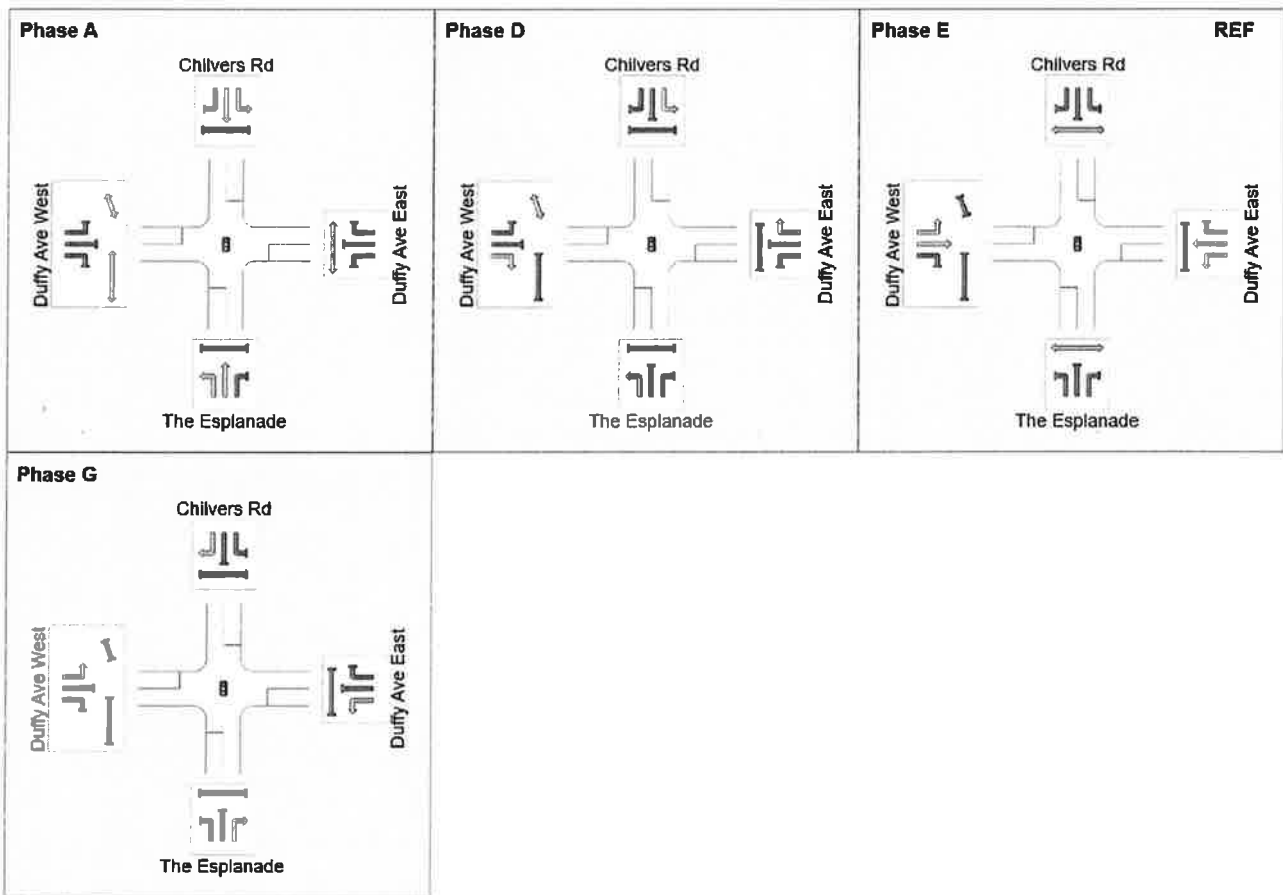
Input Phase Sequence: A, D, E, G

Output Phase Sequence: A, D, E, G

Phase Timing Results

Phase	A	D	E	G
Phase Change Time (sec)	49	90	0	28
Green Time (sec)	35	9	22	15
Phase Time (sec)	41	15	28	21
Phase Split	39%	14%	27%	20%

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



REF: Reference Phase

VAR: Variable Phase

