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Technical Memorandum

Project: **Georges River Housing Strategy (Part 2)**

Date: 6 October 2020

To: Ms. Anne Qin
Coordinator Strategic Planning

From: Bernard Lo
Transport and Traffic Planning Associates

Re: Analysis Findings Summary

Precincts:

1. Lily Street
2. Narwee

Expected Yield (each precinct)

	Existing	Projection
Lily Street	? dwellings	380 units
Narwee	? dwellings	390 units

The assessment does not discount the traffic movements generated by the existing dwellings in the precincts and assumes an overall yield of 400 units in each precinct. The conservative approach is intended to account for any additional traffic generated by the various development applications and planning proposals currently under review by the Council.

Analysis Parameters:

Traffic Generation Rate & Calculation

0.60 vehicle trips per hour (vtph) per unit (two-way)

Development Traffic Generation

= 400 units x 0.60 vtph/unit
= 240 vtph (two-way)

'Internal' Traffic Distribution (In:Out)

AM peak (PM)
In 20%
Out 80%

PM peak (PM)
In 80%
Out 20%

Midday (MD)
In 50%
Out 50%

Note: Midday overall traffic generation is 50% of 240 vtph = 120 vtph.

External Road Network Traffic Distribution

North/East	60%	Sydney & CBD, East and Northern suburbs
West	20%	Western Sydney (e.g. Parramatta, Liverpool)
South	20%	Hurstville and further south

Development Traffic by Direction

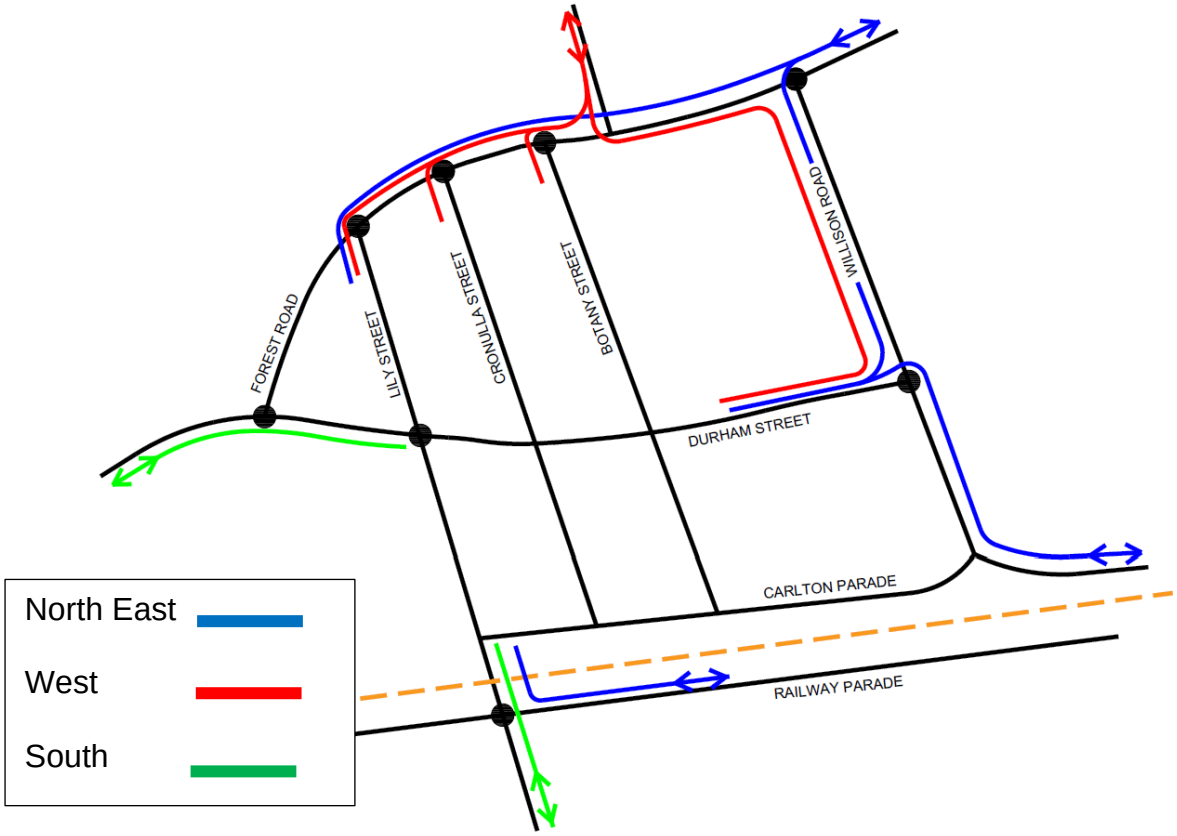
		AM		PM		MD	
		In	**Out**	**In**	**Out**	**In**	**Out**
		20%	**80%**	**80%**	**20%**	**50%**	**50%**
Development Traffic		48	192	192	48	60	60
Distribution							
North/East	60%	29	116	116	29	36	36
West	20%	10	39	39	10	12	12
South	20%	10	39	39	10	12	12
Total	*100%*	*49*	*194*	*194*	*49*	*60*	*60*

Note:

1. ***Total*** is higher than ***Development Traffic*** as a conservative approach (e.g. 49, 194 vs 48, 192 in the AM period)
2. The assessment assumes the calculated development traffic to be net additions to each of the precincts. Traffic movements associated with all existing dwellings in the precincts have not been discounted from the above total flows.

Lily Street Precinct

Intersection Distribution Diagram



Key intersections that provide access to the precinct

Intersections	Control
Forest Road/Durham Street	Give Way
Forest Road/Lily Street	Traffic Signals
Forest Road/Cronulla Street	Give Way
Forest Road/Botany Street	Give Way
Forest Road/Willison Road	Traffic Signals
Willison Road/Durham Street	Roundabout
Lily Street/Railway Parade	Traffic Signals

Traffic Analyses

SIDRA 8.0 is used to analyse the intersections in this study.

Existing Traffic Operations

The existing traffic operations are indicated by the outcome of SIDRA analysis as follows.

Existing	**AM**		**PM**		**MD**	
	LOS	**AVD**	**LOS**	**AVD**	**LOS**	**AVD**
Forest Road/Durham Street	A	10.4s	A	8.9s	A	8.8s
Forest Road/Lily Street	B	21.5s	B	19.2s	B	19.9s
Forest Road/Cronulla Street	D	49.7s	F	374.5s	B	18.5s
Forest Road/Willison Road	C	38.3s	B	27.3s	B	15.9s
Willison Road/Durham Street	A	12.4s	A	10.7s	A	9.4s
Lily Street/Railway Parade	E	65.4s	F	76.9s	C	38.4s

Note: The worst performing movement is reported for priority intersections.

The LOS 'F' movements at the Forest Road/Willison Road traffic signals are:

Movement	**AM**		**PM**		**MD**	
	LOS	**AVD**	**LOS**	**AVD**	**LOS**	**AVD**
Right turn from Forest Road to Willison Road	F	117.2s	F	94.1s	-	-
Left turn from Willison Road to Forest Road	F	116.3s	F	77.0s	-	-

Post-development Traffic Operations

The existing traffic operations are indicated by the outcome of SIDRA analysis as follows.

Post-development	**AM**		**PM**		**MD**	
	LOS	**AVD**	**LOS**	**AVD**	**LOS**	**AVD**
Forest Road/Durham Street	A	10.4s	A	8.9s	A	8.8s
Forest Road/Lily Street	B	22.0s	B	19.2s	B	20.1s
Forest Road/Cronulla Street	E	67.4s	F	457.1s	B	19.3
Forest Road/Willison Road	D	47.1s	C	39.9s	B	16.2s
Willison Road/Durham Street	B	15.2s	A	10.7s	A	9.4s
Lily Street/Railway Parade	F	79.3s	F	98.7s	C	41.8s

Note: The worst performing movement is reported for priority intersections.

The LOS 'F' movements at the Forest Road/Willison Road traffic signals are:

Movement	**AM**		**PM**		**MD**	
	LOS	**AVD**	**LOS**	**AVD**	**LOS**	**AVD**
Right turn from Forest Road to Willison Road	F	156.9s	F	158.8s	-	-
Left turn from Willison Road to Forest Road	F	130.6s	F	145.1s	-	-

Constraint and Recommendations

Forest Road/Cronulla Street

The right turn movement from Cronulla Street to Forest Road currently operates with a LOS F during the PM peak. Following the uplift, the movement will deteriorate to LOS F in the AM and PM peaks. This movement is satisfactory during the School peak (MD).

It is recommended that the right-turn movement be prohibited during the AM and PM peak periods to overcome capacity constraints at this intersection. It is expected that the diverted right turn movements will approach Forest Road via Lily Street at the Forest Road/Lily Street traffic signals. The impact of this diversion has been assessed using SIDRA and the model outcome is summarised below.

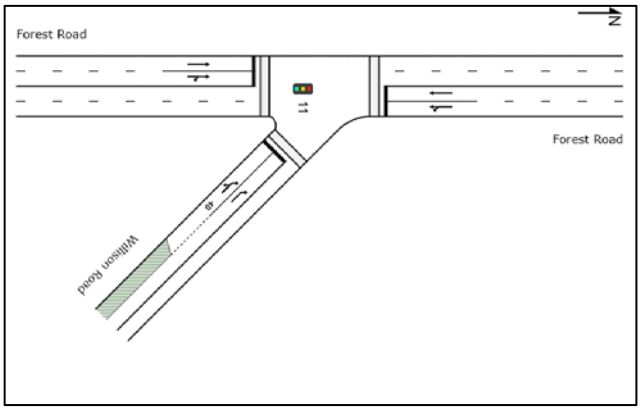
	AM		**PM**	
	LOS	**AVD**	**LOS**	**AVD**
Forest Road/Cronulla Street (No right turn)	A	12.5s	C	39.5
Forest Road/Lily Street (with diverted right turn)	B	22.7s	B	20.2s

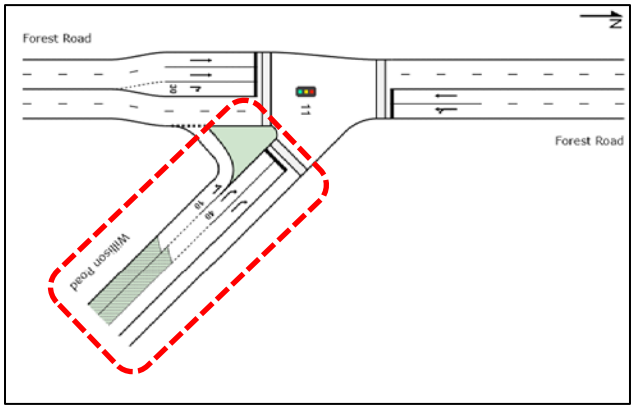
The assessment confirms that the right turn prohibition from Cronulla Street to Forest Road will have no undue impact on the Forest Road/Lily Street traffic signals.

Forest Road/Willison Street

The overall intersection LOS is satisfactory; however, the right-turn movement from Forest Road to Willison Road and left-turn movement from Willison Road to Forest Road currently operate with LOS F. These movement delays will exacerbate when the uplift occurs (LOS F). The intersection operates satisfactorily during the School peak (MD).

It will be necessary to acquire land (145-147 Willison Road) to extend the existing intersection on the east approach to increase capacity (see below).





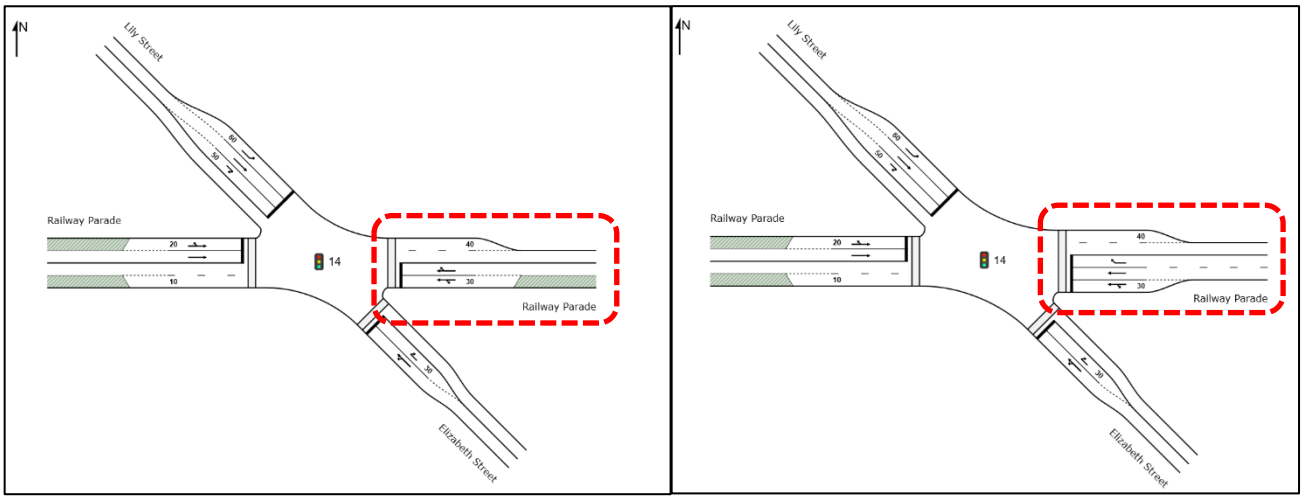
The operational performance of the intersection upgrade has been assessed using SIDRA. The model results, which indicate a satisfactory outcome, are summarised below.

	AM		PM	
Overall	**LOS**	**AVD**	**LOS**	**AVD**
Forest Road/Willison Road	B	26.9s	B	22.2s
Worst movements				
Right turn from Forest Road to Willison Road	C	38.1	C	36.7s
Left turn from Willison Road to Forest Road	A	12.6s	A	6.1s
Right turn from Willison Road to Forest Road	D	54.4s	D	56.5s

Lily Street/Railway Parade/Elizabeth Street

The intersection operates with LOS E i.e. near capacity in the AM peak and LOS F in the PM peak under current traffic conditions. The intersection operates satisfactorily in the MD peak. The intersection will continue to operate satisfactorily in the MD peak following the uplift; however, it will operate with LOS F in the AM and PM peak periods.

It will be necessary to acquire part of No.432-434 Railway Parade and restrict parking on the southern part of Railway Parade to extend the east approach to add capacity to the intersection (see below).

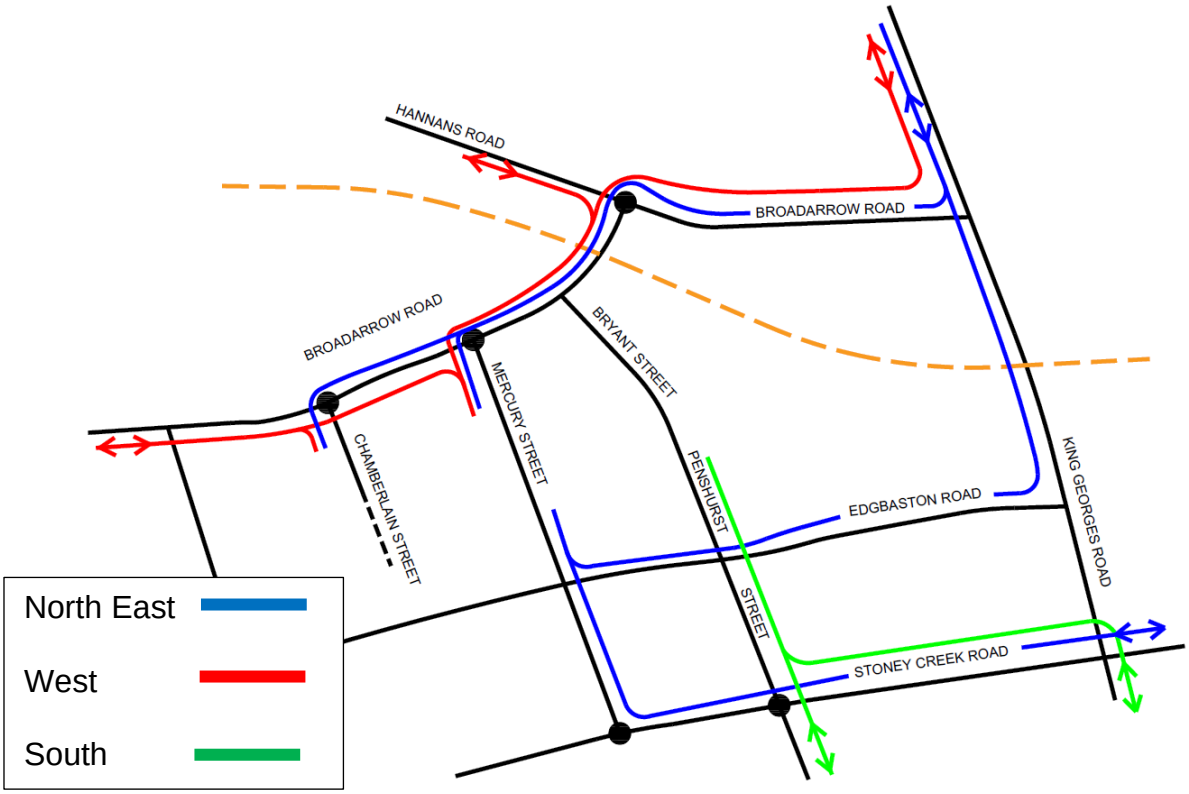


The operational performance of the intersection upgrade has been assessed using SIDRA. The model results, which indicate a satisfactory outcome, are summarised below.

	AM		PM	
Overall	**LOS**	**AVD**	**LOS**	**AVD**
Lily Street/Railway Parade/Elizabeth Street	C	31.4s	C	28.9s
Worst movements				
Right turn from Railway Parade to Lily Street	E	67.6s	D	50.1s

Narwee Precinct

Intersection Distribution Diagram



Key intersections that provide access to the precinct

Intersections	Control
Broadarrow Road/Hannans Road	Traffic Signals
Broadarrow Road/Mercury Street	Give Way
Broadarrow Road/Chamberlain Street	Give Way
Stoney Creek Road/Mercury Street	Give Way
Stoney Creek Road/Penshurst Street	Traffic Signals

Traffic Analyses

SIDRA 8.0 is used to analyse the intersections in this study.

Existing Traffic Operations

The existing traffic operations are indicated by the outcome of SIDRA analysis as follows.

	AM		PM		MD	
	LOS	**AVD**	**LOS**	**AVD**	**LOS**	**AVD**
Broadarrow Road/Hannans Road	B	21.1s	B	19.3s	B	16.8s
Broadarrow Road/Mercury Street	A	11.6s	A	11.4s	A	8.5s
Broadarrow Road/Chamberlain Street	A	8.6s	A	9.6s	A	8.0s
Stoney Creek Road/Mercury Street	C	30.7s	F	91.7s	B	25.0s
Stoney Creek Road/Penshurst Street	C	30.8s	C	32.9s	C	29.8s

Note: The worst performing movement is reported for priority intersections.

Post-development Traffic Operations

The existing traffic operations are indicated by the outcome of SIDRA analysis as follows.

	AM		PM		MD	
	LOS	**AVD**	**LOS**	**AVD**	**LOS**	**AVD**
Broadarrow Road/Hannans Road	B	25.2s	B	19.5s	B	17.0s
Broadarrow Road/Mercury Street	A	12.3s	A	12.8s	A	8.8s
Broadarrow Road/Chamberlain Street	A	8.8s	A	9.7s	A	8.0s
Stoney Creek Road/Mercury Street	D	25.6s	F	91.6s	B	23.6s
Stoney Creek Road/Penshurst Street	C	31.6s	C	34.8s	C	30.2s

Note: The worst performing movement is reported for priority intersections.

Constraint and Recommendations

The critical intersections which serve the precinct are generally satisfactory, even with the uplift. The Mercury Street approach at the intersection with Stoney Creek Road operates with a LOS F under current traffic conditions, and this will continue to operate with LOS F following the uplift. The actual increase in traffic delay due to the uplift is only 4 seconds, as shown in the above tables.

To overcome the capacity constraint, the right turn movement from Mercury Street to Stoney Creek Road can be restricted using appropriate signage during the PM peak period. It is expected that the right turn movements will occur via Penshurst Street (north approach) at the intersection with Stoney Creek Road.

The impact of this diversion has been assessed using SIDRA, and the model outcome is summarised below.

	PM	
	LOS	**AVD**
Stoney Creek Road/Mercury Street (No right turn)	A	7.7s
Stoney Creek Road/Penshurst Street (with diverted right turn)	D	43.5s

The assessment found that the right turn prohibition at Mercury Street approach will have no undue impact on the Penshurst Street traffic signals.

Summary

It is understood that Council intends to proceed with one of the two assessed precincts.

Both the Lily Street and Narwee precincts are located in close proximity to public transport services (Lily Street: Allawah Station, Narwee: Narwee Station). By comparison, Narwee benefits from its proximity to the M5 Motorway, which interconnects with M8.

There is more spare capacity in the existing Narwee road network than in the Lily Street precinct.

The Lily Street precinct will require upgrades to 3 intersections to accommodate the projected uplift, being:

i. No right turn restriction (by sign) from Cronulla Street to Forest Road during the AM and PM peaks
ii. Land acquisition at No. 145-147 Willison Road to accommodate a left turn slip lane from Willison Road to Forest Road and a new right-turn bay at Forest Road (south approach)
iii. Land acquisition at No. 432-434 Railway Parade and removal of kerbside parking on Railway Parade (east approach) to accommodate additional through and right-turn lane

Narwee precinct will only require one treatment, being a no right turn restriction (sign) from Mercury Street to Stoney Creek Road in the PM peak period.

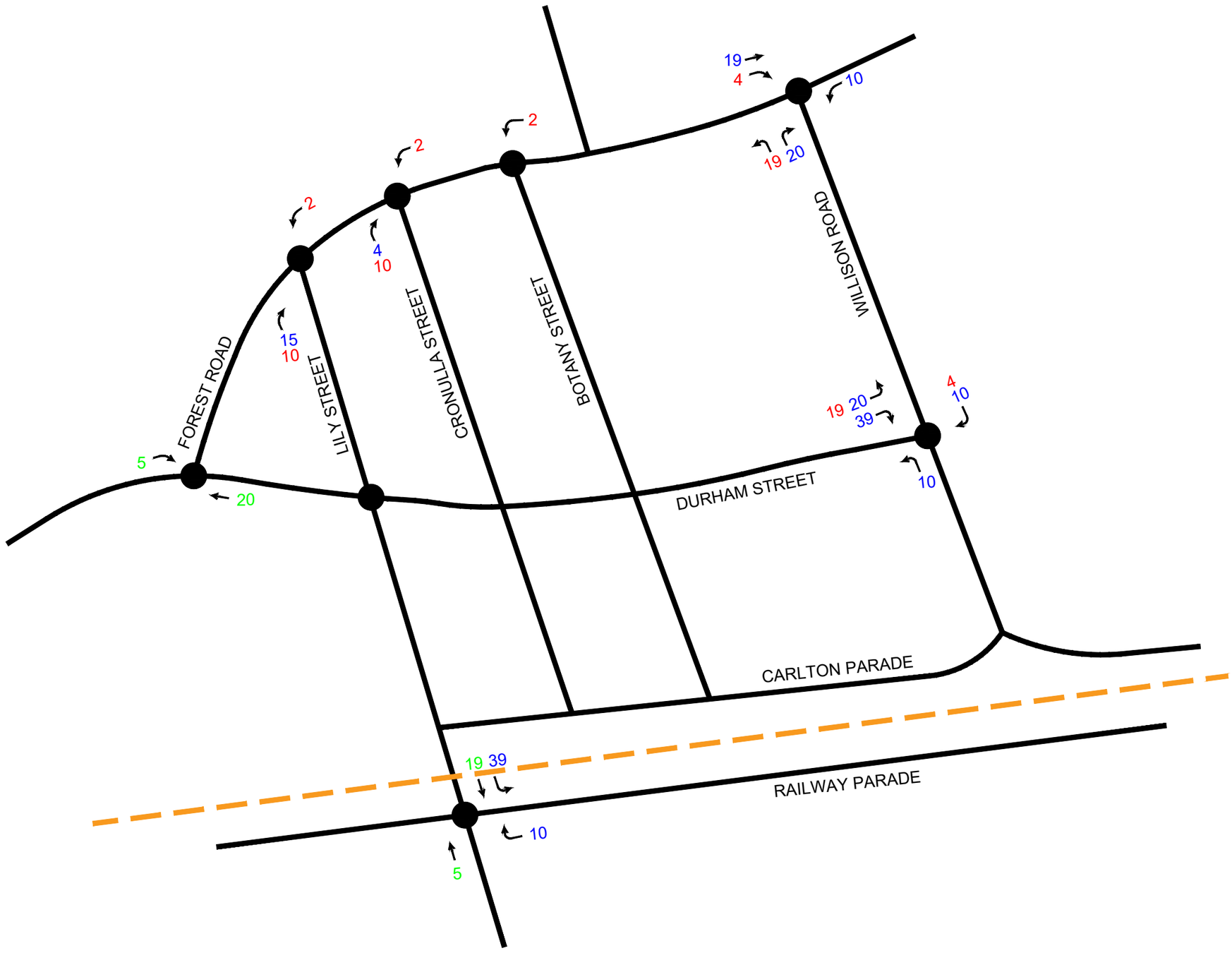
Having regard for the traffic analysis undertaken as part of this assessment and the locality of precincts and their proximities to the arterial road network, it is quite apparent that the Narwee precinct presents as a more superior ‘candidate’ to accommodating higher density residences.

Enclosed:

1. Lily Street Development Traffic and Distribution Diagrams
2. Narwee Development Traffic and Distribution Diagrams

Appendix 1

Lily Street Development Traffic and Distribution Diagrams



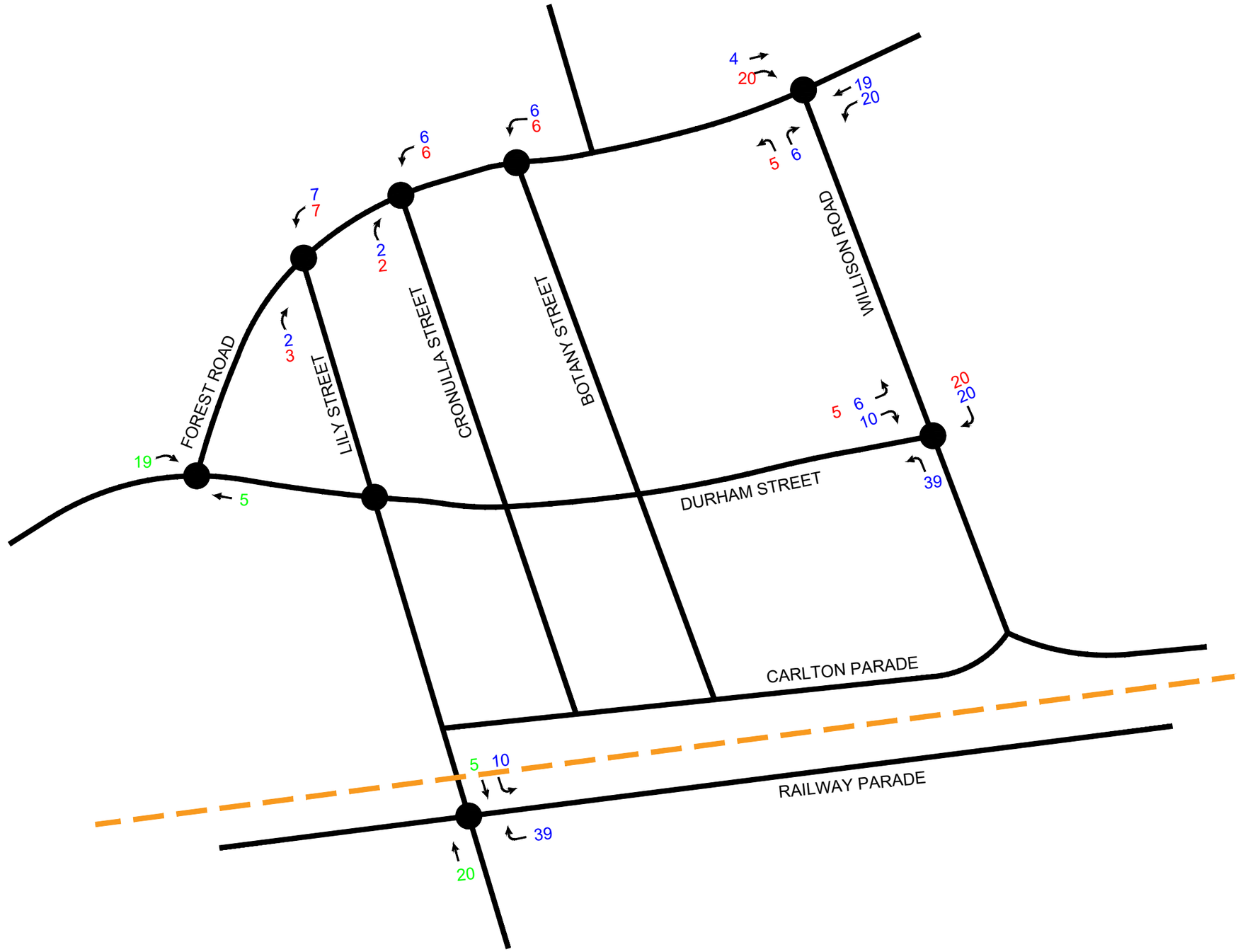
LEGEND

IN	29	10	10
OUT	116	39	39

N

LILY STREET
AM
UPLIFT TRAFFIC
VOLUMES

FIG 1

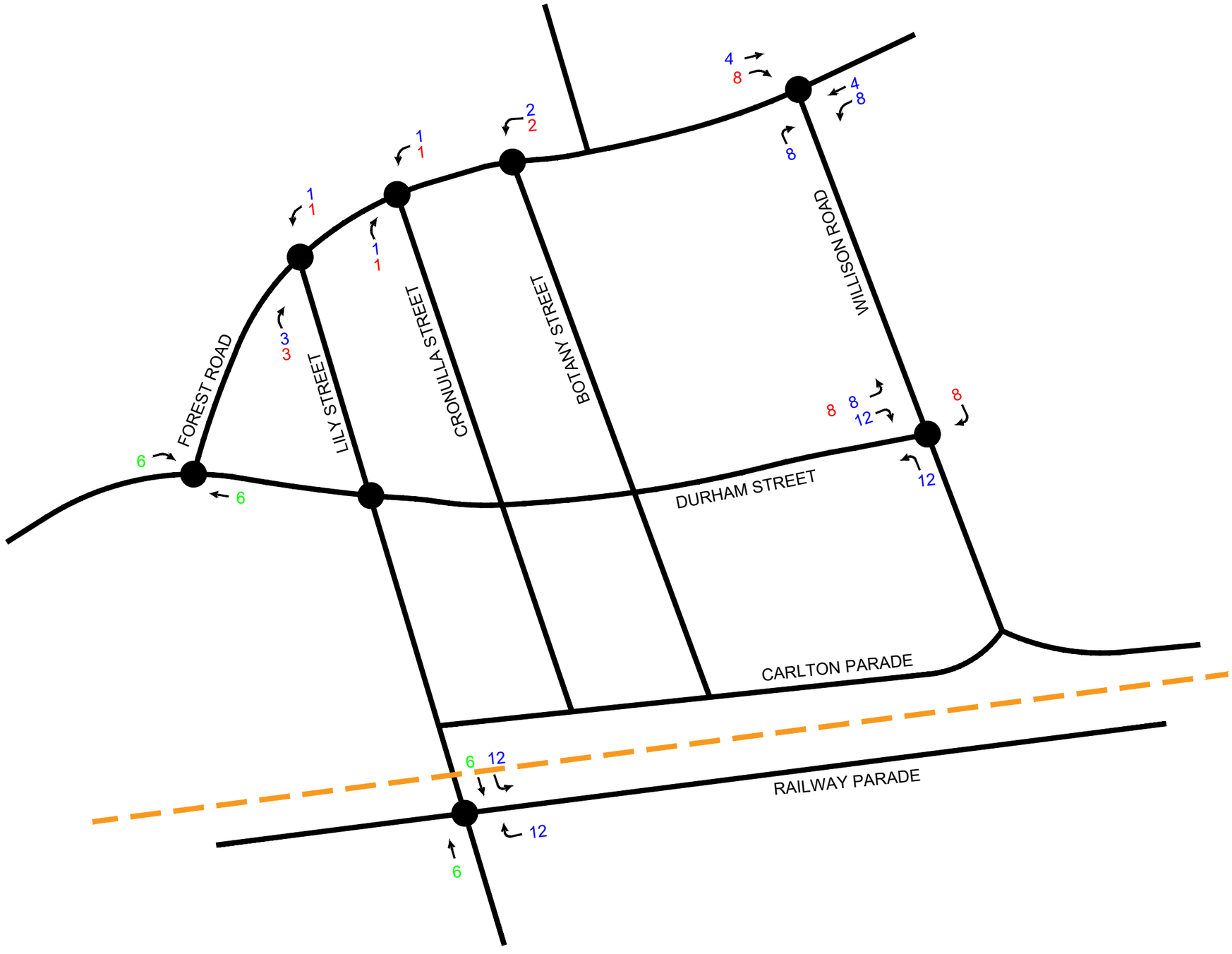


LEGEND

IN	116	39	39
OUT	29	10	10

LILY STREET
PM
UPLIFT TRAFFIC
VOLUMES

FIG 2



LEGEND

IN	36	12	12
OUT	36	12	12

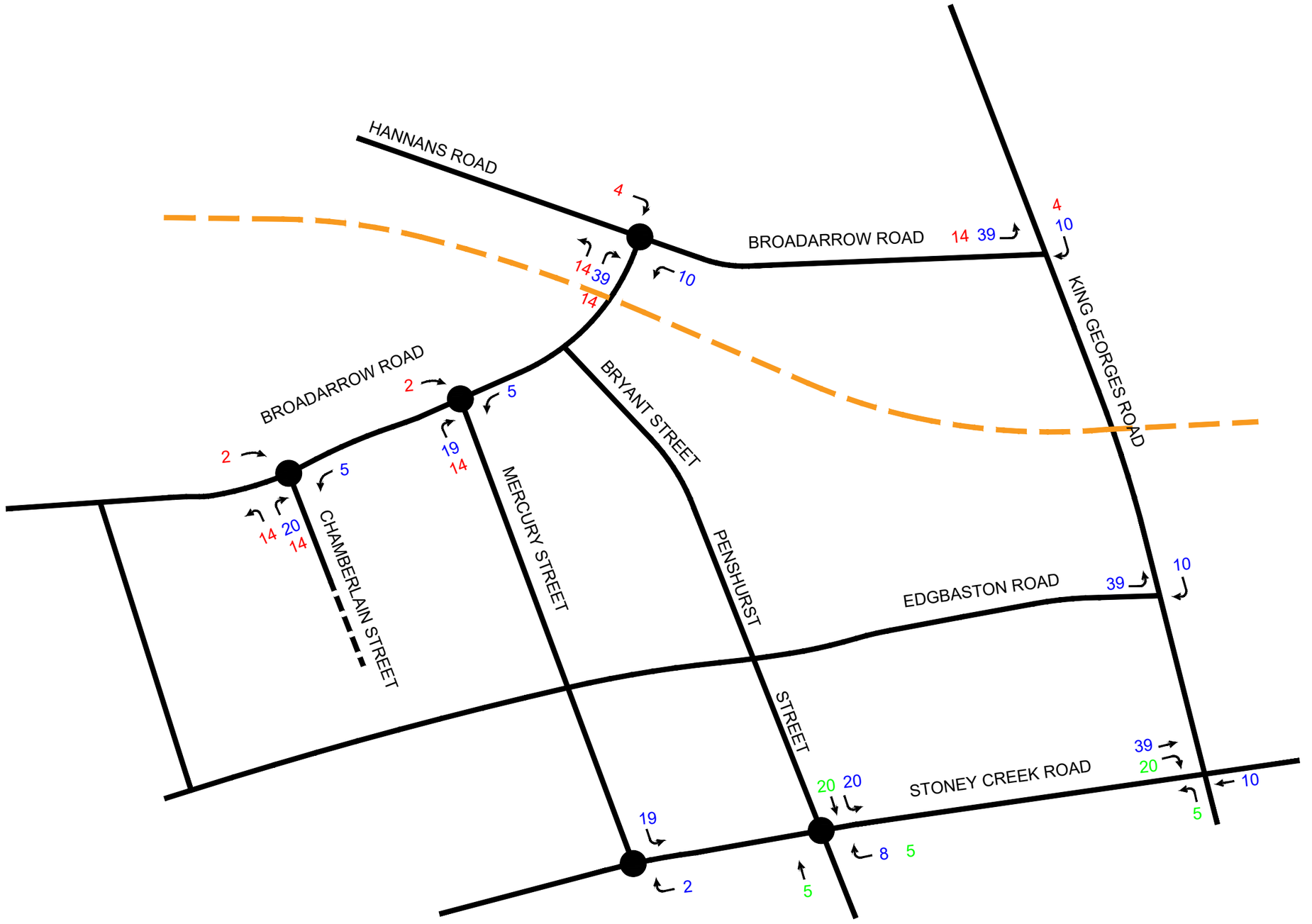
N

LILY STREET
MD
UPLIFT TRAFFIC
VOLUMES

FIG 3

Appendix 2

Narwee Development Traffic and Distribution Diagrams

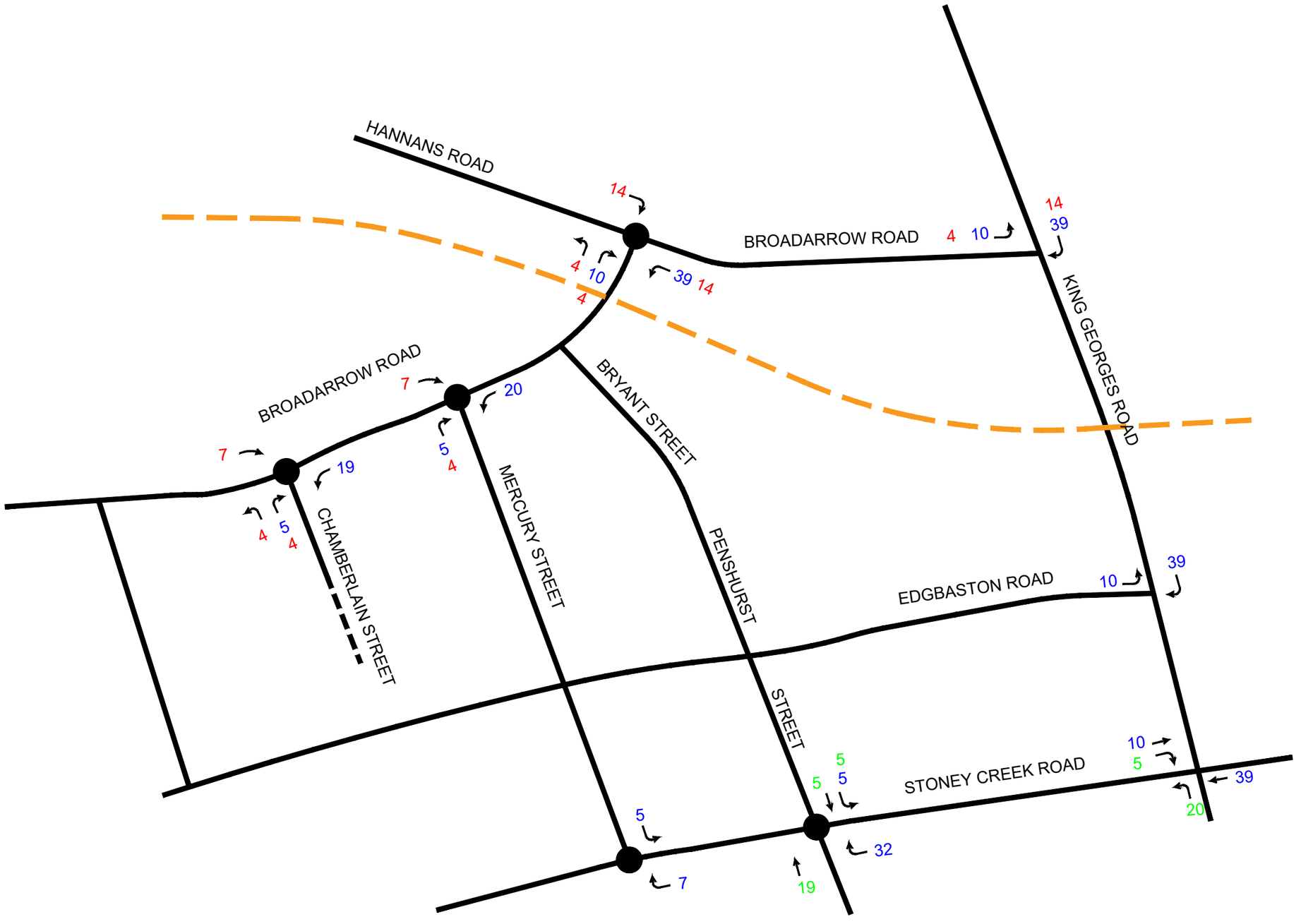


LEGEND

IN	29	10	10
OUT	116	39	39

NARWEE
AM
UPLIFT TRAFFIC VOLUMES

FIG 1

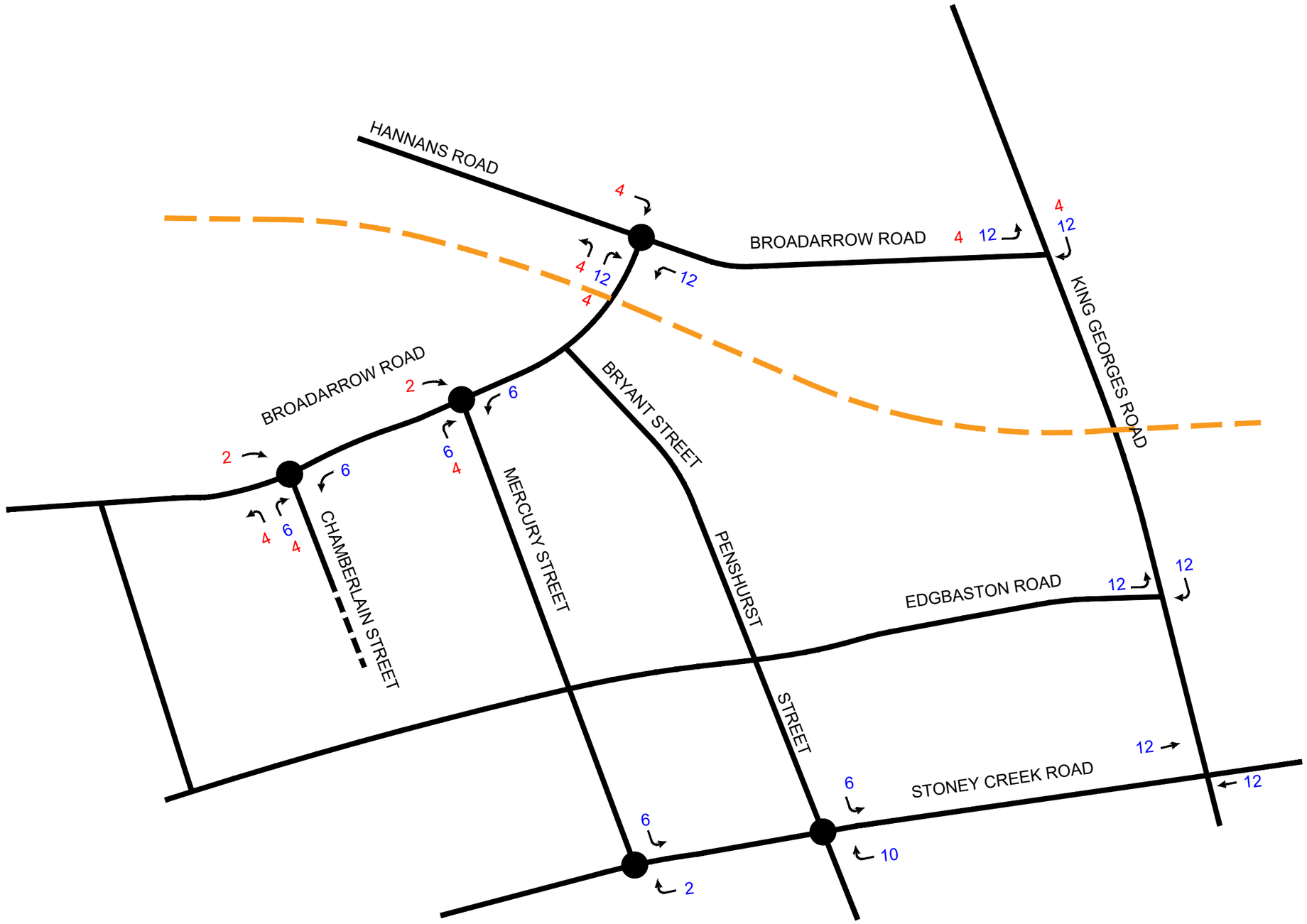


LEGEND

IN	116	39	39
OUT	29	10	10

NARWEE
PM
UPLIFT TRAFFIC VOLUMES

FIG 2



LEGEND

IN	36	12	12
OUT	36	12	12

N

NARWEE
MD
UPLIFT TRAFFIC VOLUMES

FIG 3