

Annexure "F"

Traffic Impact Assessment

**TRAFFIC IMPACT AND ACCESS
ASSESSMENT**

FOR

PROPOSED RESIDENTIAL SUBDIVISION

AT

**NO. 187. 195 & 203
TURNER ROAD CURRANS HILL**

Ref. 15097r

June 2015



Prepared By

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1.0 INTRODUCTION

This report has been prepared as a Traffic Impact Assessment on behalf of Turner Road Developments and Ken and Lynne Broome to accompany an application in respect of a proposed residential subdivision to be located off Turner Road at Currans Hill.

The proposal detailed in the application involves a residential subdivision yielding 225 residential allotments accessed from New Market Street and Geraldton Drive to the east at two separate mid block new intersection locations.

This study has been prepared in accordance with the aims and objectives of State Environmental Planning Policy Infrastructure 2007 (formerly SEPP11) and in accordance with the guidelines and procedures for traffic generating developments as prepared by the Roads and Maritime Services (RMS) of NSW and with reference to with the provisions of Camden Council DCP 2011.

This report considers the following matters:

- The subdivision and road layouts
- Cycleway and pedestrian access
- Public transport provisions
- Traffic Generation
- Vehicular access to New Market Street and Geraldton Drive
- Future traffic impacts

This study is based on the master plan for development of the land prepared by John M Daly and Associates Pty Limited dated June 2015 and identified as Drawing No. 13011-DA (Master Plan).

2.0 THE SITE AND THE PROPOSAL

2.1 Site Location

The subject land is located on the north side of Turner Road west of Stockmann Road within the Currans Hill residential precinct.

The location of the land in the local context is shown in **Figure 1** and **2** overleaf.

2.2 Site Description

The subject land is described as Lots 36, 37 and 38 in DP 28024 and is approximately ? in area.

2.3 Existing Development

The subject site consists of 3 adjoining lots (land parcels) to be subdivided to 225 separate residential allotments. Existing development on the site consists of two larger rural residential homes. The remaining lands are mostly vacant.

2.4 Adjoining Development

The adjoining development consists of a mix of new residential housing to the east and south and older freestanding single level and 2 storey brick and tile residential dwellings on larger road parcels to the north and west within a newer 50km/h residential area.

Within the adjoining residential precinct to the east accessed via Ascot Drive, Newmarket Street, Gereladton Drive, Oaklawn Street, Caufield Street and Penola Street there are some 110 residential lots with 5 dwellings under construction (non occupied).

To the north and east of Turner Road via Ascot Drive a further 90 residential dwellings are also under construction.

2.5 Zoning

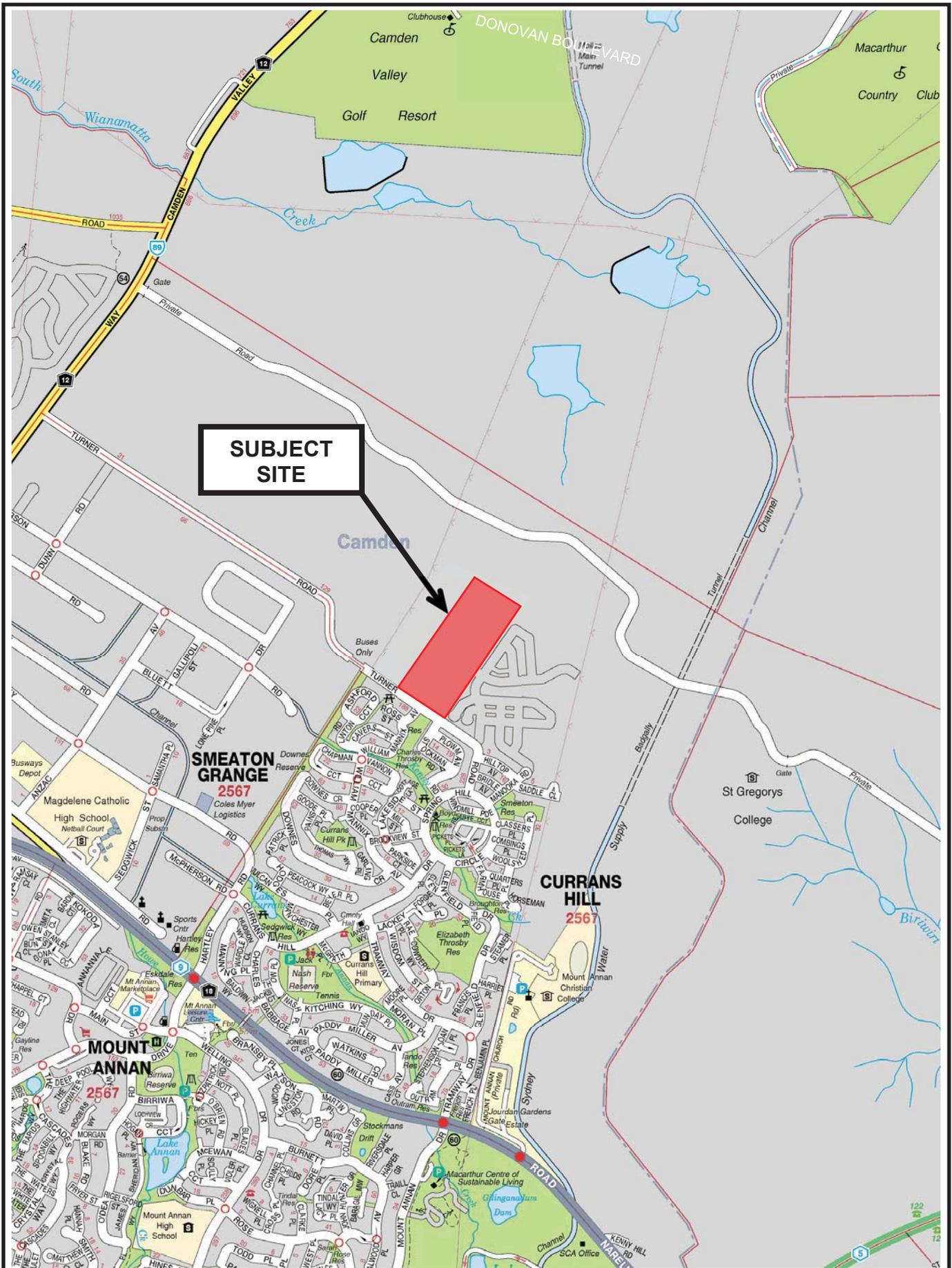
The current zoning of these lands comprise of mixed zoning and includes R1 General Residential, E2 Environmental Conservation and E4 Environmental Living. The residential subdivision of land is permissible within the R1 and E4 zoning; however, residential development is a prohibited use within the E2 zoning.

Development that is permissible with consent in the E2 zone is limited to environmental protection works; flood mitigation works; recreation areas; roads; and water reticulation systems. While the construction and provision of roads within this zone is permissible with consent, the subdivision of land for future residential purposes is prohibited in the E2 zone and cannot be supported by Council.

2.6 Access

Access to the area is generally from Narellan Road via Hartley Road and the roundabout junction at Currans Hill Drive.

Circuitous access is also available from Camden Valley Way via Anderson Road through the Smeaton Grange Industrial Area. No motor car access is available to Camden Valley Way via Turner Road.



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NOT TO SCALE

FIGURE 1
 PROPOSED SUBDIVISION
 187, 195 & 203 TURNERS RD, CURRANS HILL

SITE LOCATION

JOB NO. 15097



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N



NOT TO SCALE

FIGURE 2

PROPOSED SUBDIVISION
187, 195 & 203 TURNERS RD, CURRANS HILL

SUBJECT SITE

JOB NO. 15097

3.0 DEVELOPMENT PROPOSAL

3.1 Development Subdivision

The development lies within the Manooka Valley and involves the subdivision of the land to accommodate 225 residential allotments (over 3 land parcels) and 3 super or residue lots for future development, road construction, drainage, landscaping and associated site works, including construction and embellishment of a riparian zone as shown in the subdivision master plan prepared by John M Daly and Associates Pty Ltd attached as **Appendix 1**.

The Master plan envisages 139 lots and access roads in land parcels 1 and 2 and a drainage easement 26 metres to 42 metres wide. Land parcel 3 envisages a further 86 lots and access roads including a connection to Turner Road.

We understand development applications for the 3 land parcels will be lodged concurrently.

3.2 Road Layout and Guideline Standards

The subdivision layout has been designed generally in accord with AMCORD Guidelines and Camden Council's DCP 2011 Part C for new residential subdivisions.

Generally the road widths should comply with the provision of the Camden DCP 2011. However road widths of 11.4m are proposed adjacent to the riparian corridor compared to the 14m to 14.4m widths specified in the DCP.

A hierarchical road network is essential to maximise road safety, residential amenity and legibility. Each local access road in the subdivision will serve a distinct set of residential functions and has been designed accordingly. The design will convey to motorists the predominant low volume, low speed function of the road.

Within the subdivision each access road will reflect its role in the road hierarchy by its visual appearance and related physical design standards. All new access roads should differ in alignment and design standard according to the volume they are intended to carry, the desirable traffic speeds and other factors.

The number of turning movements at intersections or junctions that a visitor is required to undertake to reach a particular address within the development will be minimised.

Low speeds are desirable in lightly trafficked streets to protect pedestrians, cyclists and allow them to share the street with vehicles.

Future bus routes serving the area should be within acceptable walking distance (400 metres) of all dwellings.

The aims of the proposed local road system within the subdivision are to achieve:

- Convenient and safe access to all allotments for pedestrians, vehicles and cyclists.
- Safe, logical and hierarchical transport linkages with existing street system.
- Appropriate access for emergency and service vehicles.
- A quality product that minimises maintenance costs.
- A convenient way for public utilities.
- An opportunity for street landscaping.
- Convenient on and off street parking for visitors.

AMCORD recommends the following standards for the various classes of roads in new subdivisions.

TABLE 1
AMCORD RECOMMENDED GUIDELINES

Road Classification	Recommended Pavement Width	Max. Flow veh/day	Max. Road Length	Max. Dwellings Served
Access Place	3.5 – 3.7 metres	300	100 metres	30
Local Access Streets (A)	5.0 – 5.5 metres	1000	250 metres	100
Local Access Streets (B)	5.5 or 7.0 metres	2000	N/A	200
Collector Road	7.0 – 7.5 metres	3000	N/A	N/A

These roads should in terms of amenity and road safety afford the following environmental capacity/performance standards.

Road Class	Road Type	Desirable Max. Speed (km/hr)	Desirable Max. Peak Hour Volume (veh/hr)
Local	Accessway (with footpath) Street	25	100
	Street	40	200 environmental goal
	Street	40	300 maximum
Collector	Street	50	300 environmental goal
	Street	50	500 maximum

Past analysis of traffic volumes for new residential sub divisions has focussed on allotting appropriate maximum traffic volumes for new areas. *The Australian Model Code for Residential Development*, (1990), cites daily volume maximum of 1,000-2,000 veh/day for different types of local access streets, and 6,000 veh/day for trunk collector streets. This subject is discussed further in Section 7 of these guidelines.

Environmental Capacity for residential streets is best estimated by considering a range of differing perceptions and attitudes to traffic impacts in a particular area. The environmental expectations of residents often varies significantly, even within the same district. It is accepted that the performance standard usually occurs at the top end of a range. While it can be argued that there is no particular threshold beyond which problems may emerge, this standard is subject to the same constraints as all other standards. Engineering standards are often based on concepts of good practice, with a concerted focus on safety factors. While it is generally accepted that a departure from this standard may be accommodated to a degree. Table 1 sets out the recommended Environmental Capacity performance standards now for residential precincts. This table relates to streets with direct access to residential properties.

The proposed intersections are generally located in such a way that:

- New Roads intersect at right angles;

- The landform allows clear sight distance on each of the approach legs of the intersection;
- The vertical grade lines at the intersection do not impose undue driving difficulties;
- The vertical grade lines at the intersection will allow for any direct surface drainage.

Adequate stopping and sight distances will be provided for horizontal and vertical curves at all intersections as follows:

- | | |
|---|-----------|
| • 40kph minimum stopping sight distance | 30 metres |
| • 50kph minimum stopping sight distance | 40 metres |
| • 60kph minimum stopping sight distance | 55 metres |

Source: AUSTRROAD Guide to Traffic Engineering Practice 1992

3.3 Subdivision Access

Initially all vehicle access to the subdivision will be via Geraldton Drive and New Market Street to the east. In the longer term a further link to Turner Road will be provided over the most western land parcel no. 3 (refer subdivision masterplan).



Photo 1
Proposed Access from Geraldton Avenue



Photo 2
Proposed Access from Newmarket Street

In addition, advice (to date), from Council, indicates that:

- There will be no link via Turner Road to Camden Valley Way or the Smeaton Grange area; and
- There will be no link to the Gregory Hills residential area, to the north, from Manooka Valley.

3.4 Parking

Camden Council's Off Street car parking policy DCP 2011 Part B suggests on-site car parking be provided for larger residential dwellings at two (2) spaces per dwelling.

Future on-site car parking will be proposed for the various components of the subdivision in accordance with Council's car parking policy and the relevant codes.

3.5 Pedestrian and Cycleway Facilities

- Pedestrian paths are to be provided for pedestrian movement through the open spaces in Manooka Valley and connected into the wider Currans Hill area.
- Bridges, boardwalks and other landscape devices are to be used to limit pedestrian access into areas of high vegetation sensitivity, and to provide views of special interest points and the broader landscape.
- Dedicated cycle routes may be provided within the road reserve, and shall be off road.

3.6 Public Transport

In a broader regional context the future subdivision can be serviced by public transport comprising buses and taxis. Regular bus services are provided to Campbelltown, Narellan and Camden, Oran Park and Liverpool.

Bus services are provided by (local) private bus operators who provide regular services for the general public as well as school bus services.

- The layout of bus routes are shown in the Manooka Valley Masterplan.
- Bus route shall be extended into Manooka Valley along the Collector Road, in order to increase the number of dwellings within a reasonable walking distance to public transport.

Taxis are available in Narellan and Camden between the adjoining towns for people who choose not to use buses or who need to get from their residence to the shops or the railway station at Campbelltown.

Future release areas and land subdivisions can affect the delivery of public transport services by providing more people and good traffic circulation routes encouraging private bus operators to extend and increase the frequency of services.

4.0 EXISTING TRAFFIC CONDITIONS

4.2 Access Roads

The main access roads serving the Currans Hill Area are Narellan Road (north and south) and Camden Valley Way (east – west). Both routes are multi lane divided state roads. Access into Currans Hill from Narellan Road is via the Hartley Road traffic signals. Secondary, circuitous access to Camden Valley Way is also available via the Anderson Road traffic signals and through the Smeaton Grange industrial area.

Currans Hill Road to Ascot Drive is an undivided two way 2 lane residential collector road, 13.0 metres wide kerb to kerb, with a marked parking lane either side. Currans Hill Road and Ascot Drive are speed zoned to 50km/h. Newmarket Street and Geraldton Drive are both two way 2 lane local access roads with roll kerbs, linking to Ascot Drive and servicing the adjoining newer and adjoining residential subdivision.

4.2 Daily Traffic Flows

Recent RMS AADT daily vehicle counts on Narellan Road and Camden Valley Way indicate average daily passenger vehicle equivalents are as follows:

- Narellan Road east of Hartley Drive - 62,000 veh/day
- Camden Valley Way south of Cobbitty Road - 31,500 veh/day

Average daily traffic volumes on Hartley Road, at Narellan Road based on our recent **Appendix 2** traffic counts are projected at 17,000 veh/day.

Average daily traffic volumes on Ascot Drive at Turner Road are currently estimated at less than 1,000 vehicles per day.

4.2.2 Peak Hour Volumes

Current AM and PM peak hour volumes on Narellan Road, Hartley Road and Ascot Drive are summarised as follows:

TABLE 4.1

PEAK AM AND PM VOLUMES VEH/HOUR

Narellan Road at Hartley Road						
AM	EB	4389	WB	3012	2 Way	7401
PM	EB	4246	WB	5079	2 Way	9325
Hartley Road at Narellan Road						
AM	NB	910	SB	676	2 Way	1586
PM	NB	730	SB	1188	2 Way	1918
Ascot Drive at Turner Road						
AM	NB	30	SB	5	2 Way	35
PM	NB	10	SB	10	2 Way	20

4.3 Service Levels and Amenity

Existing traffic service levels in Turner Street, Ascot Drive and Currans Hill Road can be described as very good i.e. low traffic volumes and 85th% free flow speed around 50km/h.

In keeping with the RMS and AMCORD Environmental Capacity Performance Standard for local residential streets of less than 200veh.hr as an environmental goal and up to 300veh/hr as a maximum before amenity is compromised. Ascot Drive and Turner Street currently has a relatively high level of traffic amenity.

Hartley Road from Narellan Road to Currans Hill Road is a major collector route with a poor level of services in peak times due to excessive queueing and vehicle delays.

4.4 Road Safety

The existing level of road safety along Ascot Drive, Turner Street, Newmarket Street and Geraldton Drive is considered to be acceptable due to good sight distances, low traffic volumes, moderate free flow traffic speeds and minimal traffic, pedestrian and cyclist activity to/from adjoining residential properties.

A review of the RMS PC crash records for the 3 year period to mid 2014 did not reveal any adverse accident history for these local roads.

5.0 TRAFFIC ASSESSMENTS

5.1 Traffic Generation

RMS recommended traffic generation per freestanding residential household is between 8 and 9 movements per day. The peak period is normally 0.9 movements per dwelling per hour and the AM peak period represents only 7% of the daily total.

Based on the above (recommended RMS rates we would suggest future traffic generation levels for 225 residential allotments as follows:

- Daily vehicle trips (225 dwelling houses x 9) = 2025 trips daily
- Weekday peak hour vehicle trips (225 dwelling houses x 0.9) = 203 trips

In addition a further 99 peak hour trips can be expected from the existing residential lands to the east (110 lots) yet to be built upon.

Whilst it is appreciated that the future traffic situation in the subject subdivision is not necessarily an extension of existing low volume conditions, we believe the following factors are relevant in indicating a worst case trip generation scenario for the proposal:

- Car ownership rates are likely to increase in line with those for new middle income subdivision, housing young couples and families; and
- As a worst case the morning and evening peak hour is estimated at 10% of the daily rate.

5.2 Trip Distribution

RMS Guidelines also suggest that a distribution of peak hour arrival and departure journeys be undertaken to evaluate the traffic impacts on the adjoining road system. Normally as 80% outbound in the AM peak and 20% inbound and the reciprocal in the PM peak.

Given the limited access to the west via Turner Road, we have assumed all future traffic enter and exit the area from Narellan Road via Currans Hill Road.

The peak hour distribution of traffic to / from the site will be ultimately influenced by future traffic conditions, levels of service and vehicles origins / destinations regionally.

For the purpose of distributing the projected traffic generation to the existing road network and ultimately determining the extent of any future traffic impacts on the adjoining intersections, we have displaced the estimated AM and PM traffic generation (203 trips) in a proportion north and south of the site as follows:

TABLE 5.1

Origins and Destinations	AM Peak			PM Peak		
	In Trips	Out Trips	Total	In Trips	Out Trips	Total
Narellan and Camden	6	20	25	20	6	26
M5, Macarthur, Campbelltown (Narellan Rd)	15	61	76	61	15	76
Oran Park and Liverpool (Camden Valley Way)	15	61	76	61	15	76
Bringelly and Penrith (Old Northern Road)	5	20	25	20	5	25
Total Trips	41	162	203	162	41	206

The above traffic distribution equates to an additional 162 outbound and 41 inbound trips on Ascot Drive and Currans Hill Road during the (Mon-Fri) AM peak hour with a reciprocal flow during the PM peak.

NB. This does not include the 99 peak hour trips, still to be realised, from the existing adjoining lands under development.

5.3 Post Development Traffic Conditions

Currently Geraldton Drive and Newmarket Street are under utilised low volume local access roads. The future development of the subject and adjoining land will increase both daily and peak hour traffic volumes but not beyond any unacceptable threshold levels.

The ease at which traffic can enter or leave the development site will be directly related to future gaps in opposing traffic flows along the adjoining access roads and at the Hartley Road / Narellan Road traffic signals.

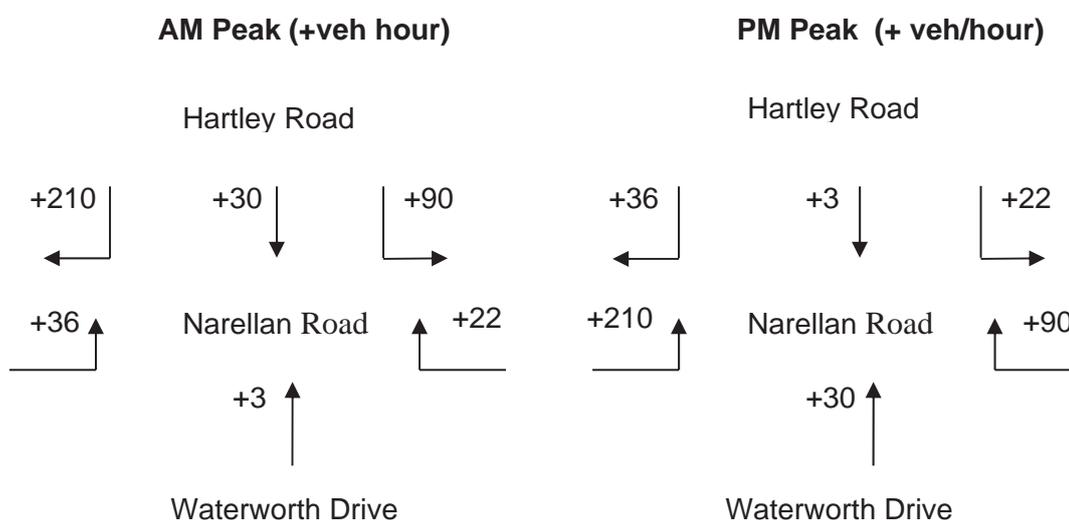
Additional traffic movements to / from the subject land parcels are likely to be around +203veh/hr. The total two way flow of traffic on Ascot Drive at Turner Road will increase to about or approximately 3-4 vehicles every minute.

In our view, it is unlikely the existing traffic service levels, road safety or amenity threshold will be compromised by the additional traffic volumes or the interaction of traffic entering and exiting the two new (mid block) 'Tee' intersections as proposed at Newmarket Street or Geraldton Drive.

5.4 Traffic Impacts and Level of Service

The likely post development traffic impacts at Geraldton Drive and Newmarket Street are not likely to be significant however for the purpose of evaluating the likely traffic impact at the Hartley Road and Narellan Road intersection we have run SIDRA models for the existing and post development AM and PM scenarios, assuming all new traffic only to utilise Hartley Road to access and egress the Currans Hill area.

The additional post development peak hour traffic volume for the subject lands (203 trips) plus adjoining land under development (99 trips) have been assigned to the existing Hartley Road intersection as follows:



A revised summary of the SIDRA output data is shown in Table 5.1 below.

TABLE 5.2

**NARELLAN ROAD & HARTLEY ROAD
EXISTING SIGNAL OPERATION – (AT 140 SECOND CL)**

Criteria	AM Peak		PM Peak	
	Intersection	Hartley Road	Intersection	Hartley Road
Level of Service	E	D	F	F
Degree of Saturation	0.925	0.881	1.270	1.083
Average Vehicle Delay Hartley Road	53.8	54.8	103.5	137.3

TABLE 5.3

**NARELLAN ROAD & HARTLEY ROAD – (AT 140 SECOND CL)
PROJECTED POST DEVELOPMENT SIGNAL OPERATION**

Criteria	AM Peak		PM Peak	
	Intersection	Hartley Road	Intersection	Hartley Road
Level of Service	F	F	F	F
Degree of Saturation	1.138	1.092	1.270	1.104
Average Vehicle Delay Hartley Road	108.2	89.6	113.9	161.3

NB: also includes +99 future trips from the adjoining precinct under construction.

In the AM peak the additional post development traffic will increase the intersection LoS from E to F with an average vehicle delay doubling to 108 sec per vehicle. In the PM peak intersection LoS F is unchanged but average vehicle delay increased by around 10 sec per vehicle to 114 sec per vehicle.

In both the AM and PM peak, at full development, average vehicle delays in Hartley Road can be expected to increase by around 30 seconds per vehicle.

In reality, and keeping with the RMS arterial road co-ordination strategy, the LoS on Narellan Road and rate of delay is likely to be better than LOS F due to the favourable signal co-ordination bias to Narellan Road but delay and queue lengths in the side streets (i.e. Hartley Road and Waterworth Drive) may be marginally worse.

Alternatively if access to/from the area was available via Turner Road to Camden Valley Way or through to Gregory Hills to Camden Valley Way the likely post development peak hour traffic impacts at Hartley Road and Narellan Road would significantly (by up to 63%).

6.0 SUMMARY AND CONCLUSIONS

It is our view that the subdivision proposal represents an appropriate use of the site economically from both a traffic planning and road safety viewpoint. The conceptual design measures incorporated therein are intended to minimise any affect on adjoining lands. The proposed access treatments to the lands from the state road network are minimal and should not impede the operation, efficiency or safety of the adjoining local road system.

The proposed pavement width will allow vehicles to proceed safely at the operating speed (ie. 40-50 km/h) intended for that level of road in the local and internal network and with only minimal delays in the peak period.

The safety of pedestrians and cyclists where it is intended they use the carriageway will also be assured by providing sufficient width and reducing travel speeds.

The pavement widths and sight lines will also provide for unobstructed access to individual allotments. Motorists should be able to comfortably enter or reverse from an allotment in a single movement, taking into consideration the possibility of a vehicle being parked on the carriageway opposite the driveway.

In accord with RMS traffic generation rates the full development of all allotments is likely to result in an additional 203 peak hour trips along Ascot Street. These 203 vehicle movements represents significant increase over existing low volumes during the AM/PM peak hour. However, combined future traffic volumes (ie. existing plus projected) are still likely to result in two way totals of around 300 vehicles per hour, which is in keeping with the recommended RMS/AMCORD threshold for collector roads.

The impact of the additional traffic generation by the proposal should not diminish the acceptable level of service to existing traffic flows on Ascot Street or Currans Hill Road in the short term and in the broader sense have a marginal impact on other major road or intersections on the adjacent road network given the existing poor intersection service levels accessing Narellan Road.

Existing local road safety and traffic amenity should not be compromised by the additional traffic likely to arrive and depart the residential development.

The proposed access to/from Geraldton Drive and Newmarket Street is in keeping with the intent and function of these routes within the residential precinct. Generally traffic service levels and road safety on these streets will not be adversely impeded by either traffic volumes or vehicle speeds.

Longer term pedestrian and bicycle facilities will be provided through the open spaces and connecting into the existing Currans Hill area.

On site residential parking for each allotment so as not to obstruct through traffic as described in this report is considered to be reasonable and in accordance with Council's residential code.

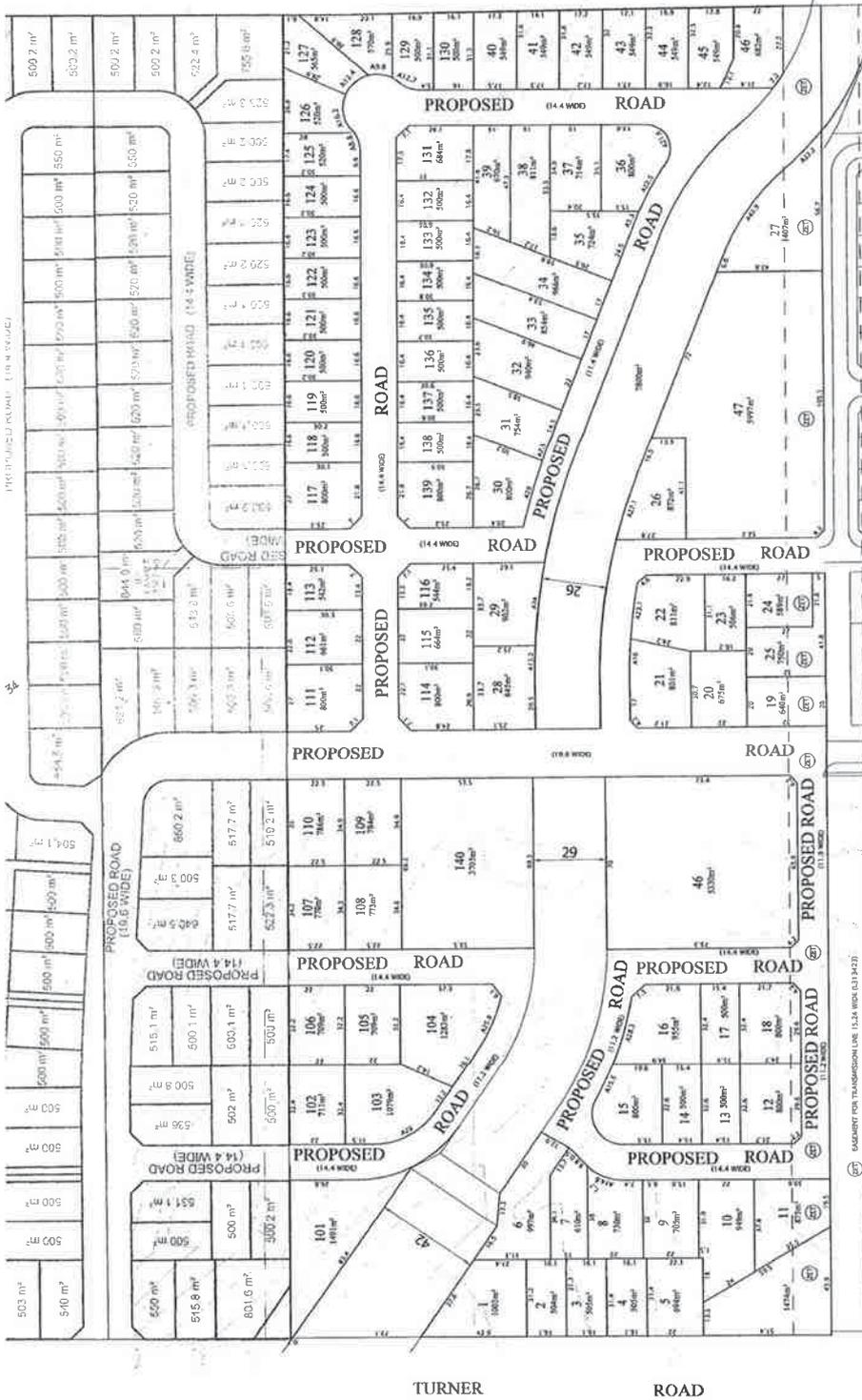
Recommendations

Our findings are that the future residential development of this land as proposed above, will not have any detrimental impact on surrounding land uses or the community, and is in keeping with the adjoining zoning and development within the Currans Hill residential precinct.

Conversely, there may be benefits for the local community and traffic conditions generally in that the development of this land to satisfy the demands for residential sites in accordance with Council's residential development strategy may negate the economic and social demand for similar such residential sub divisions in other less desirable locations.

On the basis of these findings, the traffic modelling and assessments made in sections of this report, it is **recommended** that Camden Council approve this application to enable this future 3 land parcel sub division, east of Turner Road to take place.

APPENDIX 1



PLAN NOTES

P.1. THESE NOTES AND LEGEND BE SHOWN FORM PART OF THE SURVEY INSTRUMENT AND MUST BE READ IN CONJUNCTION WITH THE PLAN IN ORDER TO UNDERSTAND THE SURVEY.

P.2. THE SURVEY INFORMATION SHOWN HERE HAS BEEN PREPARED FOR A SPECIFIC PURPOSE AND IS NOT TO BE USED FOR ANY OTHER PURPOSE OR FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN AUTHORIZATION OF THE SURVEYOR.

P.3. THIS PLAN HAS BEEN PROVIDED IN ELECTRONIC FORM AND IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN AUTHORIZATION OF THE SURVEYOR.

P.4. THE SURVEYOR'S NAME AND CONTACT INFORMATION IS SHOWN ON THIS PLAN AND MUST BE USED TO OBTAIN A COPY OF THIS PLAN OR TO CHECK TEXT AND DIMENSIONS.

P.5. THE PLAN HAS BEEN PROVIDED FOR INFO COPY (FOR INFO) ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN AUTHORIZATION OF THE SURVEYOR.

P.6. ALL DIMENSIONS AND BOUNDARIES HAVE BEEN COMPILED FROM DATA PROVIDED BY DEPT OF LANDS AND ARE APPROXIMATE.

LIMITATION NOTES

L.1. CONTAINS SHOWN HEREON EXCEPT THE GENERAL BOUNDARIES ONLY, SUBJECT AT EACH LEVEL SHOWN, THEY REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT.

CADASTRAL NOTES

C.1. THE PROPOSED DIMENSIONS SHOWN ARE APPROXIMATE ONLY, THEY HAVE BEEN COMPILED FROM TITLE INFORMATION AND ARE NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN AUTHORIZATION OF THE SURVEYOR.

Sheet 1 of 1 sheets	Ref: 130110A
Project: TURNERS ROAD, CURRANS HILL	
Client: BROOME	
Designed by: N/A	
Date of Drawing: 11-04-2013	
Ratio (A1): 1:1000	
Date of Survey: DATE OF SURVEY	
Origin of Levels: N/A	
Drawn: A.H.D.	
John M. Day & Associates PTY LTD A.B.N. 48051977989 111-111-111 33 Idunthe Street P.O. BOX 25 CAMPELLTOWN N.S.W. 2350 e-mail: admin@jmd.com.au	
 JMD Development Consultants	
Locality: CURRANS HILL L.G.A.: CAMDEN S:\DATA\Turner Rd\130110A\Brooma SURV\DATA Plans\130110A.dwg CADD (REV)	



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Client : TUPA
Job No/Name : 5672 MT. ANNAN Hartley Rd
Day/Date : Thursday 25th June 2015

Lights	NORTH			WEST			SOUTH			EAST			
	Hartley Rd			Narellan Rd			Waterworth Dr			Narellan Rd			
	L	I	R	L	I	R	L	I	R	L	I	R	
Time Per	45	17	16	29	386	10	12	73	159	47	185	63	TOT
0630 - 0645	45	17	16	29	386	10	12	73	159	47	185	63	1043
0645 - 0700	59	19	17	51	283	28	21	93	234	84	254	87	1230
0700 - 0715	82	40	23	35	298	16	27	70	212	39	195	83	1120
0715 - 0730	57	29	15	50	252	11	36	71	179	64	233	46	1043
0730 - 0745	58	34	11	45	301	37	24	115	149	77	258	52	1161
0745 - 0800	62	56	24	51	268	22	22	116	169	77	285	51	1203
0800 - 0815	60	59	63	37	194	25	22	110	161	96	207	69	1103
0815 - 0830	48	65	34	43	220	36	24	93	144	107	284	69	1167
Period End	471	319	203	341	2202	185	188	741	1407	591	1901	520	9069

Lights	NORTH			WEST			SOUTH			EAST			
	Hartley Rd			Narellan Rd			Waterworth Dr			Narellan Rd			
	L	I	R	L	I	R	L	I	R	L	I	R	
Peak Time	243	105	71	165	1219	65	96	307	784	234	867	279	TOT
0630 - 0730	243	105	71	165	1219	65	96	307	784	234	867	279	4435
0645 - 0745	256	122	66	181	1134	92	108	349	774	264	940	268	4554
0700 - 0800	259	159	73	181	1119	86	109	372	709	257	971	232	4527
0715 - 0815	237	178	113	183	1015	95	104	412	658	314	983	218	4510
0730 - 0830	228	214	132	176	983	120	92	434	623	357	1034	241	4634
PEAK HOUR	228	214	132	176	983	120	92	434	623	357	1034	241	4634

Combined	NORTH			WEST			SOUTH			EAST			
	Hartley Rd			Narellan Rd			Waterworth Dr			Narellan Rd			
	L	I	R	L	I	R	L	I	R	L	I	R	
Time Per	61	17	16	30	413	10	12	75	163	49	195	71	TOT
0630 - 0645	61	17	16	30	413	10	12	75	163	49	195	71	1112
0645 - 0700	81	25	17	53	295	29	21	94	236	90	271	100	1312
0700 - 0715	108	40	26	36	314	17	29	71	214	43	214	91	1203
0715 - 0730	72	34	15	50	270	11	36	72	182	65	248	54	1109
0730 - 0745	72	38	13	45	316	37	25	119	152	81	281	66	1245
0745 - 0800	90	59	25	54	287	23	22	117	174	77	297	62	1287
0800 - 0815	82	63	68	38	202	26	24	111	165	100	230	80	1189
0815 - 0830	64	66	36	45	231	36	24	95	145	110	305	78	1235
Period End	630	342	216	351	2328	189	193	754	1431	615	2041	602	9692

Combined	NORTH			WEST			SOUTH			EAST			
	Hartley Rd			Narellan Rd			Waterworth Dr			Narellan Rd			
	L	I	R	L	I	R	L	I	R	L	I	R	
Peak Time	322	116	74	169	1292	67	98	312	795	247	928	316	TOT
0630 - 0730	322	116	74	169	1292	67	98	312	795	247	928	316	4736
0645 - 0745	333	137	71	184	1195	94	111	356	784	279	1014	311	4869
0700 - 0800	342	171	79	185	1187	88	112	379	722	266	1040	273	4844
0715 - 0815	316	194	121	187	1075	97	107	419	673	323	1056	262	4830
0730 - 0830	308	226	142	182	1036	122	95	442	636	368	1113	286	4956
PEAK HOUR	308	226	142	182	1036	122	95	442	636	368	1113	286	4956

Heavies	NORTH			WEST			SOUTH			EAST			
	Hartley Rd			Narellan Rd			Waterworth Dr			Narellan Rd			
	L	I	R	L	I	R	L	I	R	L	I	R	
Time Per	16	0	0	1	27	0	0	2	4	2	10	8	TOT
0630 - 0645	16	0	0	1	27	0	0	2	4	2	10	8	70
0645 - 0700	22	6	0	2	12	1	0	1	2	6	17	13	82
0700 - 0715	26	0	3	1	16	1	2	1	2	4	19	8	83
0715 - 0730	15	5	0	0	18	0	0	1	3	1	15	8	66
0730 - 0745	14	4	2	0	15	0	1	4	3	4	23	14	84
0745 - 0800	28	3	1	3	19	1	0	1	5	0	12	11	84
0800 - 0815	22	4	5	1	8	1	2	1	4	4	23	11	86
0815 - 0830	16	1	2	2	11	0	0	2	1	3	21	9	68
Period End	159	23	13	10	126	4	5	13	24	24	140	82	623

Heavies	NORTH			WEST			SOUTH			EAST			
	Hartley Rd			Narellan Rd			Waterworth Dr			Narellan Rd			
	L	I	R	L	I	R	L	I	R	L	I	R	
Peak Time	79	11	3	4	73	2	2	5	11	13	61	37	TOT
0630 - 0730	79	11	3	4	73	2	2	5	11	13	61	37	301
0645 - 0745	77	15	5	3	61	2	3	7	10	15	74	43	315
0700 - 0800	83	12	6	4	68	2	3	7	13	9	69	41	317
0715 - 0815	79	16	8	4	60	2	3	7	15	9	73	44	320
0730 - 0830	80	12	10	6	53	2	3	8	13	11	79	45	322
PEAK HOUR	80	12	10	6	53	2	3	8	13	11	79	45	322

Peds	NORTH			WEST			SOUTH			EAST			
	Hartley Rd			Narellan Rd			Waterworth Dr			Narellan Rd			
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED							
Time Per	0	2	0	0	0	0	0	0	0	0	0	0	TOT
0630 - 0645	0	2	0	0	0	0	0	0	0	0	0	0	2
0645 - 0700	1	0	0	0	0	0	0	0	0	0	0	0	1
0700 - 0715	0	0	0	0	0	1	0	0	0	0	0	0	1
0715 - 0730	0	0	1	1	0	0	0	0	0	0	0	0	1
0730 - 0745	0	2	2	2	0	0	0	0	0	0	0	0	2
0745 - 0800	1	2	2	2	0	0	0	0	1	1	1	0	4
0800 - 0815	3	13	13	13	0	0	0	0	0	0	0	0	16
0815 - 0830	0	2	2	2	1	1	1	1	1	0	0	0	3
Period End	5	22	22	22	2	2	2	2	2	1	1	1	30

Peds	NORTH			WEST			SOUTH			EAST			
	Hartley Rd			Narellan Rd			Waterworth Dr			Narellan Rd			
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED							
Peak Per	1	3	3	3	3	3	1	1	1	0	0	0	TOT
0630 - 0730	1	3	3	3	3	3	1	1	1	0	0	0	5
0645 - 0745	1	3	3	3	3	3	1	1	1	0	0	0	5
0700 - 0800	1	5	5	5	5	5	1	1	1	1	1	1	8
0715 - 0815	4	18	18	18	18	18	0	0	0	1	1	1	23
0730 - 0830	4	19	19	19	19	19	1	1	1	1	1	1	25
PEAK HR	4	19	19	19	19	19	1	1	1	1	1	1	25



R.O.A.R DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob. 0418 239019

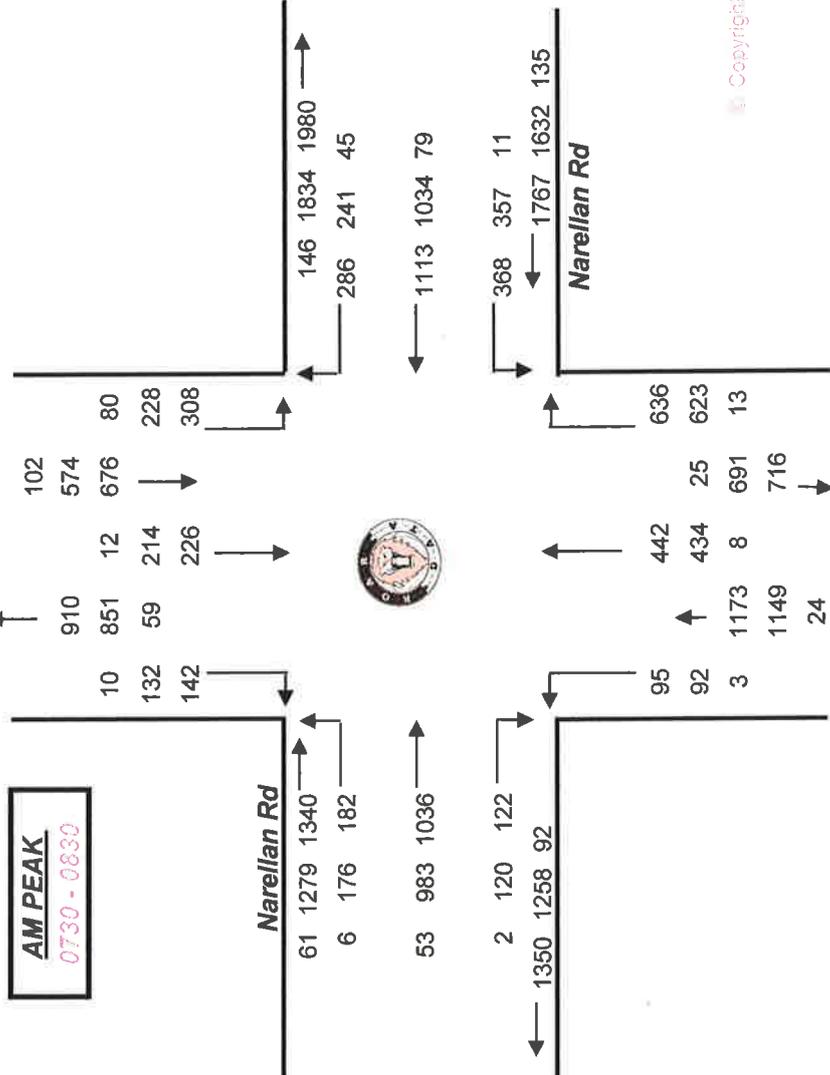
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Job No/Name : 5672 MT. ANNAN Hartley Rd

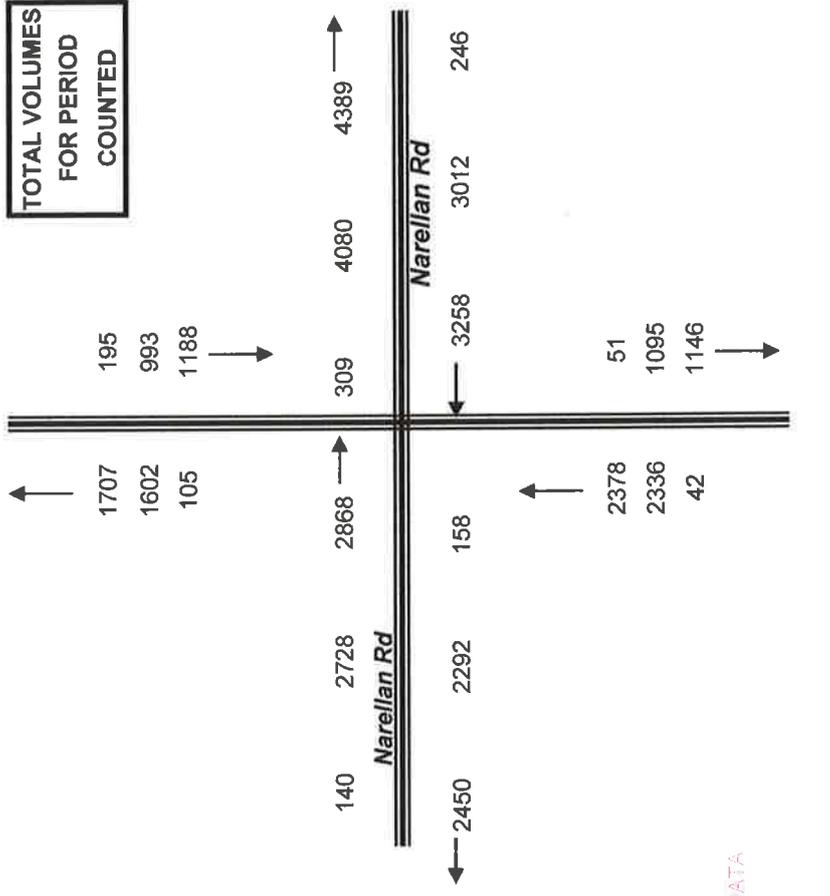
Day/Date : Thursday 25th June 2015



AM PEAK
0730 - 0830



TOTAL VOLUMES FOR PERIOD COUNTED



Copyright ROAR DATA



R.O.A.R DATA

Reliable, Original & Authentic Results

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Client : TUPA

Job No/Name : 5672 MT. ANNAN Hartley Rd

Day/Date : Thursday 25th June 2015

