Village of Ellalong - Traffic Sensitivity Analysis

Sanctuary Villages

November, 2008

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NCSI Certified Quality System ISO 9001

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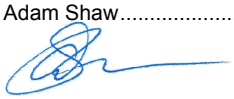
Signed: 

Date: 19 November 2008.....

Distribution: .....

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Executive summary

In response to community consultation in relation to the proposed Sanctuary Villages development near Paxton, New South Wales, it was identified that additional analysis was required to investigate likely traffic impacts on the village of Ellalong.

The existing traffic environment in Ellalong was found to have ample capacity to accommodate the likely traffic generation from the Sanctuary Villages Development. Journey to work analysis obtained from the Australian Bureau of Statistics indicates that conservatively, 8% of the Sanctuary Villages traffic may be distributed towards Ellalong.

The two way amenable capacity through Ellalong is in the order of 1800 vehicles per hour, while the existing and likely future peak hour volumes are 120 vehicles and 170 vehicles per hour respectively. Accordingly, the development may increase the traffic demand from 6.5% to 9.5% of capacity. The associated impact on traffic is not considered unreasonable, notwithstanding that this represents an approximately 40% increase in the peak hour volume.

In order to account for the uncertainty in predicting future traffic generation, particularly with respect to the likely draw from the proposed development by the currently developing HEZ site at Kurri Kurri, PB has performed sensitivity analysis assuming up to 50% of the Sanctuary Villages Traffic would travel through Ellalong. While extremely unlikely, this traffic volume would still have considerably little impact on Ellalong.

Accordingly, it is concluded that the development will have a negligible real impact on Ellalong and no additional measures are required.

1. Introduction

1.1 Background

Sanctuary Villages is a proposed development comprising 700 lots near the villages of Millfield and Paxton in the Hunter Valley, NSW. The development is the subject of an application pursuant to Part 3A of the Environmental Planning and Assessment Act, 1979 with the determining authority being the NSW Planning Minister.

In May 2008, Parsons Brinckerhoff (PB) produced a report (2122870A PR_0800) investigating the likely traffic impacts of the proposed development. This report assumed that the majority of the traffic from the proposed development would be distributed onto the road network heading north to Cessnock, with the balance heading west towards Wollombi. Subsequently, consultation with the Community Reference Group has identified that some of the traffic generated by the development may travel south on Millfield Road through and impacting upon the nearby village of Ellalong.

This report is an addendum to the May 2008 report and investigates the existing traffic climate at Ellalong. It then predicts the likely future impact of the Sanctuary Villages development using various distribution assumptions.

This report is structured as follows:

- Chapter 1 sets out the background, scope and methodology
- Chapter 2 sets out the existing traffic conditions, traffic generation from Sanctuary Village, and results of sensitivity analysis on traffic distribution.
- Chapter 3 provides recommendations and conclusions

This report should be read in conjunction with PB Report 2122870A PR_0800.

Forecasting future traffic and resultant impacts in rural locations can be considered to have two key components: traffic generation and traffic distribution.

The de-facto methodology for traffic generation is set out in RTA “Guide to Traffic Generating Developments 2003” which has been used within PB’s report 2122870A PR_0800 to predict the likely traffic generation for the Sanctuary Village development.

Traffic distribution is more complex and depends on driver decisions regarding destination and choice of route.

The unknown factor in the assessment is the selection of an appropriate traffic distribution from the development through the village of Ellalong. Existing traffic distributions can be approximated from the journey to work survey collected as part of the census 2006. PB analysed the census data for the Cessnock area, which includes Millfield, Paxton and Ellalong. This suggests that approximately 8% of trips from the Cessnock area are to Lake Macquarie, Gosford and the south.

However, some concern has been expressed regarding the future development of the HEZ industrial zone near Kurri Kurri and it’s perceived propensity to draw traffic from the Sanctuary Villages development through Ellalong.

Accordingly, PB has undertaken a sensitivity analysis assuming 10%, 20% and 50% of traffic generated by the Sanctuary Villages development would pass through Ellalong, the results and impacts are discussed later in this report.

It should be noted that the selected distribution may also have an effect in reducing the impacts of the development on the traffic route to the north, i.e. Wollombi Road.

2. Existing conditions

2.1 Road network

Ellalong is located approximately 2.5km east of Paxton. The main route through Ellalong is Millfield Road, Helena Street, Church Street, South Street and Sandy Creak Road. The village comprises a grid network of mostly unsealed roads either side of the main through roads. All the roads in Ellalong are of a rural character without kerb and gutter. The main road through the village is sealed and has an average width of 7.5m.

2.2 Traffic volumes

Traffic counts have been sourced from Northern Traffic Planners Pty Ltd and were collected from 28/10/08 to 3/11/08. Traffic counters were placed on South Street, just west of Hamilton Street to capture the majority of through traffic in Ellalong.

The data shows that the total weekly-averaged daily traffic through Ellalong is approximately 1000 vehicles per day in both directions with approximately 500 of vehicles per day travelling in each direction.

The peak hours for each direction occur on a Friday. For westbound traffic the peak hour is between 4pm and 5pm with approximately 50 vehicles, and for eastbound traffic between 2pm and 3pm approximately 70 vehicles. This pattern of afternoon Friday peak hour is typical of that experienced across the Hunter Valley.

Accordingly, it is assessed that the current two way peak hour flow for Ellalong is not higher than 120 Vehicles per hour. This figure is considered to be conservative due to the differing time bands for the east and west bound peaks.

2.3 Traffic distribution

PB examined the New South Wales journey to work data for 2006 obtained from the Australian Bureau of Statistics (ABS) for the statistical local area of Cessnock. This data shows that for trips originating within the Cessnock statistical area (which includes Millfield, Paxton and Ellalong) approx 70% of trips are to Cessnock town centre, 11% to Maitland, 5% to Lake Macquarie, 5% to Newcastle, 5% Singleton and 3% to Sydney, Central coast and South, the remaining 1 % to other destinations.

Using the above and assuming all generated traffic from the development heading for Lake Macquarie and Sydney used Sandy Creek this would give an approximately distribution of 8% of traffic.

2.4 Existing Amenity

While the primary function of a road is to transport people and goods other uses (such as the ability for children to play safely and for people to walk freely without fear from traffic) can add to the amenity. The amenity of a road is affected by several factors, namely the volume

and composition of the traffic stream, the speed environment and, the character and geometry of the road.

Generally, as traffic volumes increase, amenity is decreased, and is also dependent on the functional class and volume of vehicles a road is expected to transport. For a rural road, such as the main road through Ellalong a typical amenable capacity would be 900 vehicles per hour in each direction accounting for the rural nature of the road. However, the current maximum peak hour flow of 120 vehicles an hour represents only 6.5% of the road's capacity.

3. Future Traffic

3.1 General

Future traffic through Ellalong is likely to be composed of several elements:

- exiting traffic
- general or background traffic growth
- traffic growth generated by the Sanctuary Village development
- future traffic distribution depending on existing distribution and likely changes to distribution due to surrounding land use and social platform changes.

3.2 Traffic generation

Traffic generation is discussed in the body of the main report and has been calculated in accord with the RTA guide to traffic generating developments. This yields, at full development 595 vehicle trips in the peak hour. For the PM peak hour this equates to 477 trips inbound to the development and 119 trips outbound. Table 3-1 summarises the likely traffic generation for the new development for each stage.

Table 3-1: Estimated peak hour traffic generation of proposed development

Development Staging	Units	Trip rate	AM Peak		PM Peak	
			IN (20%	OUT (80%)	IN (80%)	OUT (20%)
Millfield Stage 1	100	0.85	17	68	68	17
Millfield Stage 2	195	0.85	33	133	133	33
Millfield Stage 3	335	0.85	57	228	228	57
Millfield Stage 4	470	0.85	80	320	320	80
Paxton Stage 1	100	0.85	17	68	68	17
Paxton Stage 2	174	0.85	30	118	118	30
Paxton Stage 3	230	0.85	39	157	157	39
Total peak hour trips	**700**	**0.85**	**119**	**477**	**477**	**119**

3.3 Traffic growth

As discussed in the main report, traffic growth is likely to be limited by the S117 ministerial direction restricting further rezoning west of Cessnock. Notwithstanding any residual potential that may exist for growth, it has not been included within this analysis as a conservative assumption because any future growth would reduce the relative impact of the Sanctuary Villages development.

3.4 Traffic Distribution

PB has used the existing traffic distribution to calculate the likely increase in traffic in Ellalong. Increased distribution percentages have been used to study the sensitivity of the distribution.

3.4.1 8% traffic distribution

Future traffic patterns are likely to be similar to existing. Using the ABS journey to work data as a basis for determining south bound distribution from Sanctuary Villages, the traffic percentages originating from the Cessnock locality for destinations in Lake Macquarie, Central coast, Sydney and further south total 8%. This is likely to be conservative for the Sanctuary Villages as in practice many drivers will choose to use Wollombi Road in preference to Sandy Creek Road. Table 3-2 shows the additional traffic that could be expected to pass through Ellalong in the peak PM hour based on the above 8% traffic distribution.

In the PM peak at full development an additional 48 trips per hour could occur. When added to the existing (refer Section 2.2) of 50 westbound and 70 eastbound vehicles (120 total), the total trips on full development could be 168 (rounded up to 170 for the purposes of this analysis) vehicles per peak hour or 3 vehicles per minute for all traffic in both directions. This represents a degree of saturation of 9.5% of the nominal 1800 vehicle per hour two way amenable capacity.

Table 3-2: Additional Vehicles through Ellalong assuming distribution of 8%

Development Staging	Units	Trip rate	PM Peak hour Trips		8% Distribution	
			IN (80%)	OUT (20%)	IN	OUT
Millfield Stage 1	100	0.85	68	17	5	1
Millfield Stage 2	195	0.85	133	33	11	3
Millfield Stage 3	335	0.85	228	57	18	5
Millfield Stage 4	470	0.85	320	80	26	6
Paxton Stage 1	100	0.85	68	17	5	1
Paxton Stage 2	174	0.85	118	30	9	2
Paxton Stage 3	230	0.85	157	39	13	3
Total peak hour trips	**700**	**0.85**	**477**	**119**	**38**	**10**

3.4.2 10% traffic distribution

Having regard to any potential errors in the assumptions, it is pertinent to consider at 10% traffic distribution for the purposes of sensitivity analysis. Table 3-3 shows the additional traffic that could be experienced in Ellalong assuming that 10% of the traffic generated by the Sanctuary Villages is distributed through Ellalong. The total traffic in the PM peak hour in both directions could be up to 180 vehicles per hour. This equates to 3 vehicles per minute and a degree of saturation of 10%.

Table 3-3 Additional Vehicles through Ellalong assuming distribution of 10%

Development Staging	Units	Trip rate	PM Peak hour Trips		10% Distribution	
			IN (80%)	OUT (20%)	IN	OUT
Millfield Stage 1	100	0.85	68	17	7	2
Millfield Stage 2	195	0.85	133	33	13	3
Millfield Stage 3	335	0.85	228	57	23	6
Millfield Stage 4	470	0.85	320	80	32	8
Paxton Stage 1	100	0.85	68	17	7	2
Paxton Stage 2	174	0.85	118	30	12	3
Paxton Stage 3	230	0.85	157	39	16	4
Total peak hour trips	**700**	**0.85**	**477**	**119**	**48**	**12**

3.4.3 15% traffic distribution

As there is some uncertainty in respect of the likely influence of Newcastle bound traffic (5% in the ABS Journey to work analysis), it is also relevant to consider approximately a 15% sensitivity analysis. Table 3-4 shows the additional traffic that could be experienced in Ellalong assuming that 15% of the traffic generated by the Sanctuary Villages is distributed through Ellalong. The total traffic in the PM peak hour in both directions could be up to 209 vehicles per hour. This equates to 3.5 vehicles per minute and a degree of saturation of 12%.

Table 3-4: Additional Vehicles through Ellalong assuming distribution of 15%

Development Staging	Units	Trip rate	PM Peak hour Trips		10% Distribution	
			IN (80%)	OUT (20%)	IN	OUT
Millfield Stage 1	100	0.85	68	17	10	2
Millfield Stage 2	195	0.85	133	33	20	3
Millfield Stage 3	335	0.85	228	57	34	6
Millfield Stage 4	470	0.85	320	80	48	8
Paxton Stage 1	100	0.85	68	17	10	3
Paxton Stage 2	174	0.85	118	30	18	4
Paxton Stage 3	230	0.85	157	39	23	6
Total peak hour trips	**700**	**0.85**	**477**	**119**	**71**	**18**

3.4.4 20% traffic distribution

Having regard to potential draw on vehicle due to the development of the Hunter Economic Zone (HEZ), located at Kurri – Kurri, Table 3-5 shows the additional traffic that could be experienced in Ellalong assuming that 20% of the traffic generated by the Sanctuary Villages is distributed through Ellalong. The total traffic in the PM peak hour in both directions could be up to 239 vehicles per hour. This equates to 4 vehicles per minute and a degree of saturation of 14%.

Table 3-5: Additional Vehicles through Ellalong assuming distribution of 20%

Development Staging	Units	Trip rate	PM Peak hour Trips		10% Distribution	
			IN (80%)	OUT (20%)	IN	OUT
Millfield Stage 1	100	0.85	68	17	14	3
Millfield Stage 2	195	0.85	133	33	27	7
Millfield Stage 3	335	0.85	228	57	46	11
Millfield Stage 4	470	0.85	320	80	64	16
Paxton Stage 1	100	0.85	68	17	14	3
Paxton Stage 2	174	0.85	118	30	24	6
Paxton Stage 3	230	0.85	157	39	31	8
Total peak hour trips	**700**	**0.85**	**477**	**119**	**95**	**24**

3.4.5 50% traffic distribution

On the outside, absolutely unlikely event that all factors in the above sensitivity analysis would work together, Table 3-6 shows the additional traffic that could be experienced in Ellalong assuming that 50% of the traffic generated by the Sanctuary Villages is distributed through Ellalong. The total traffic in the PM peak hour in both directions could be up to 418 vehicles per hour. This equates to 7 vehicles per minute and a degree of saturation of 25%.

Table 3-6: Additional Vehicles through Ellalong assuming distribution of 50%

Development Staging	Units	Trip rate	PM Peak hour Trips		10% Distribution	
			IN (80%)	OUT (20%)	IN	OUT
Millfield Stage 1	100	0.85	68	17	34	9
Millfield Stage 2	195	0.85	133	33	66	17
Millfield Stage 3	335	0.85	228	57	114	28
Millfield Stage 4	470	0.85	320	80	160	40
Paxton Stage 1	100	0.85	68	17	34	9
Paxton Stage 2	174	0.85	118	30	59	15
Paxton Stage 3	230	0.85	157	39	78	20
Total peak hour trips	**700**	**0.85**	**477**	**119**	**238**	**60**

4. Conclusions and recommendations

4.1 General

Traffic surveys within Ellalong show that the average daily traffic volume is approximately 500 vehicles per day. Approximately 50 to 70 vehicles travel through Ellalong in each direction during the peak hours. The surveys show that the peak hour is on a Friday in the PM between 4pm and 5pm for eastbound traffic.

From the ABS data approximately 8% of trips within the Cessnock Local Government Area head south towards Lake Macquarie, Sydney and Gosford. The majority of trips are to Cessnock town centre. This travel pattern is unlikely to change with the building of the Sanctuary Villages development. However, there may be some influence due to the future development of the proposed Hunter Economic Zone (HEZ).

At completion of the 700 lots an additional 595 peak hour vehicle trips could be added to the road network. Of these trips 476 would be inbound to the development and 119 outbound during the PM peak hour.

PB considers that 8 % of traffic distributed through Ellalong is a conservative scenario. This case represents all southbound traffic using Sandy Creek Road which is unlikely given there are alternative routes available to drivers (Wollombi Road).

4.2 8% distribution

If 8% of all traffic generated by Sanctuary Village travelled through Ellalong, a total peak hour traffic volume of 170 vehicles per hour or 3 vehicles per minute may be experienced through Ellalong. During off peak times this traffic volume would be less. A traffic volume of 170 per hour represents approximately 9.5% of the capacity of the road but an increase in existing traffic of approximately 40%.

4.3 50% distribution

Sensitivity testing shows that even if 50% of the generated traffic were added to the road through Ellalong the road would have ample capacity during the peak hour. At 50% distribution the peak hour traffic volume could be approximately 420 vehicles per hour, or 7 vehicles per minute. This equates to approximately 25% of the roads capacity. At 420 vehicles per hour in the peak hour the road will function without delay to traffic. While the increase in traffic at 50% distribution would be noticeable by residents in Ellalong it would not represent an unreasonable traffic impact.

4.4 Traffic impacts on Ellalong

Assuming an 8% traffic distribution through Ellalong the following impacts may occur:

- Approximately 40% increase in traffic. The percentage increase can be attributed to the low base case scenario of existing traffic along Ellalong Road.
- An increase in peak hour traffic volumes from approximately 120 vehicles per hour to 170 vehicles per hour.
- Construction traffic during the building period could introduce additional heavy vehicle traffic through Ellalong, however, this would be temporary.

The change in traffic volume is unlikely to affect vehicle speed or potential for accidents. Furthermore, the traffic impacts to the township of Ellalong are not considered unreasonable.

It should be noted that the potential for damage to road pavements is generally linked to heavy vehicles. However, as the Sanctuary Villages is a proposed residential estate, the majority of vehicles are likely to be light vehicles with little or no impact on road surface quality.

4.5 Wider network impacts

If greater amounts of traffic than the 8% PB considers reasonable do travel through Ellalong in preference to Wollombi Road, less impact would be experienced on the network through Millfield and beyond. This may in turn reduce the need for upgrade works in this direction as contemplated in the parent report.

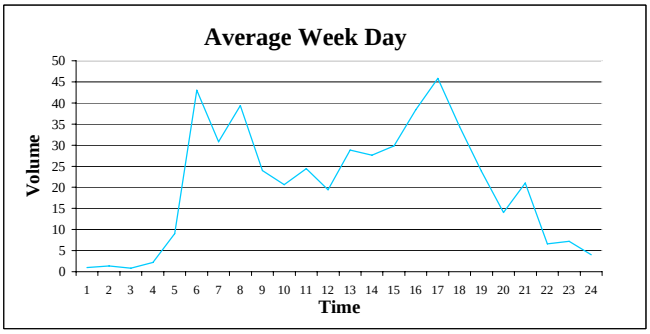
PB does not consider that the traffic patterns will change significantly as a result of the development and considers that Cessnock will continue to be the major trip attractor within this area. The assumptions within the original report that 90% of trips from Sanctuary Village will head to Cessnock remains unchanged along with the analysis that follows from this, including the impacts and need for upgrades to intersections.

Appendix A

Traffic Counts

South Street, Ellalong **Westbound**

Day	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*	*Sun*	*Mon*	*W/Day*	*W/End*	*7 Day*
Time	28-Oct-08	29-Oct-08	30-Oct-08	31-Oct-08	1-Nov-08	2-Nov-08	3-Nov-08	*Ave.*	*Ave.*	*Ave*
0:00	1	1	1	1	3	4	1	1	4	2
1:00	1	2	1	2	2	2	1	1	2	2
2:00	1	0	2	0	1	1	1	1	1	1
3:00	4	1	3	2	2	2	1	2	2	2
4:00	9	10	11	8	7	3	7	9	5	8
5:00	46	42	41	46	17	4	40	43	11	34
6:00	31	24	31	32	6	9	36	31	8	24
7:00	43	34	37	43	22	14	40	39	18	33
8:00	16	21	28	33	25	22	22	24	24	24
9:00	18	18	27	22	41	25	18	21	33	24
10:00	16	29	25	30	34	33	22	24	34	27
11:00	13	18	24	24	33	33	18	19	33	23
12:00	30	30	31	25	35	26	28	29	31	29
13:00	27	29	21	40	24	39	21	28	32	29
14:00	30	27	24	40	37	33	28	30	35	31
15:00	42	36	33	43	32	37	38	38	35	37
16:00	41	47	49	47	36	36	45	46	36	43
17:00	36	31	30	40	25	27	35	34	26	32
18:00	23	19	20	34	14	19	23	24	17	22
19:00	14	13	17	16	13	12	10	14	13	14
20:00	17	27	27	15	10	10	19	21	10	18
21:00	6	5	5	7	6	3	10	7	5	6
22:00	6	9	7	10	10	5	4	7	8	7
23:00	5	2	5	5	4	4	3	4	4	4
Total	**476**	**475**	**500**	**565**	**439**	**403**	**471**	**497**	**421**	**476**

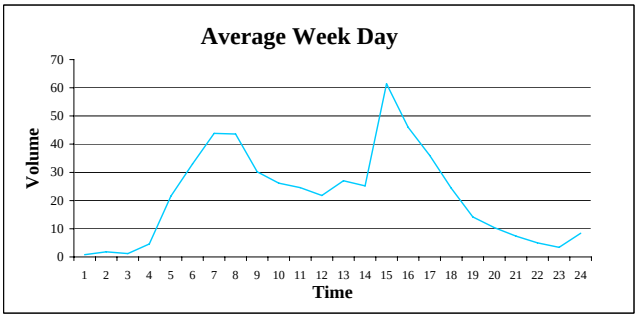


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**46**
PM Peak	4:00 PM	5:00 PM	**49**
Week Day Average			**497**
Weekend Day Average			**421**
7 Day Average			**476**

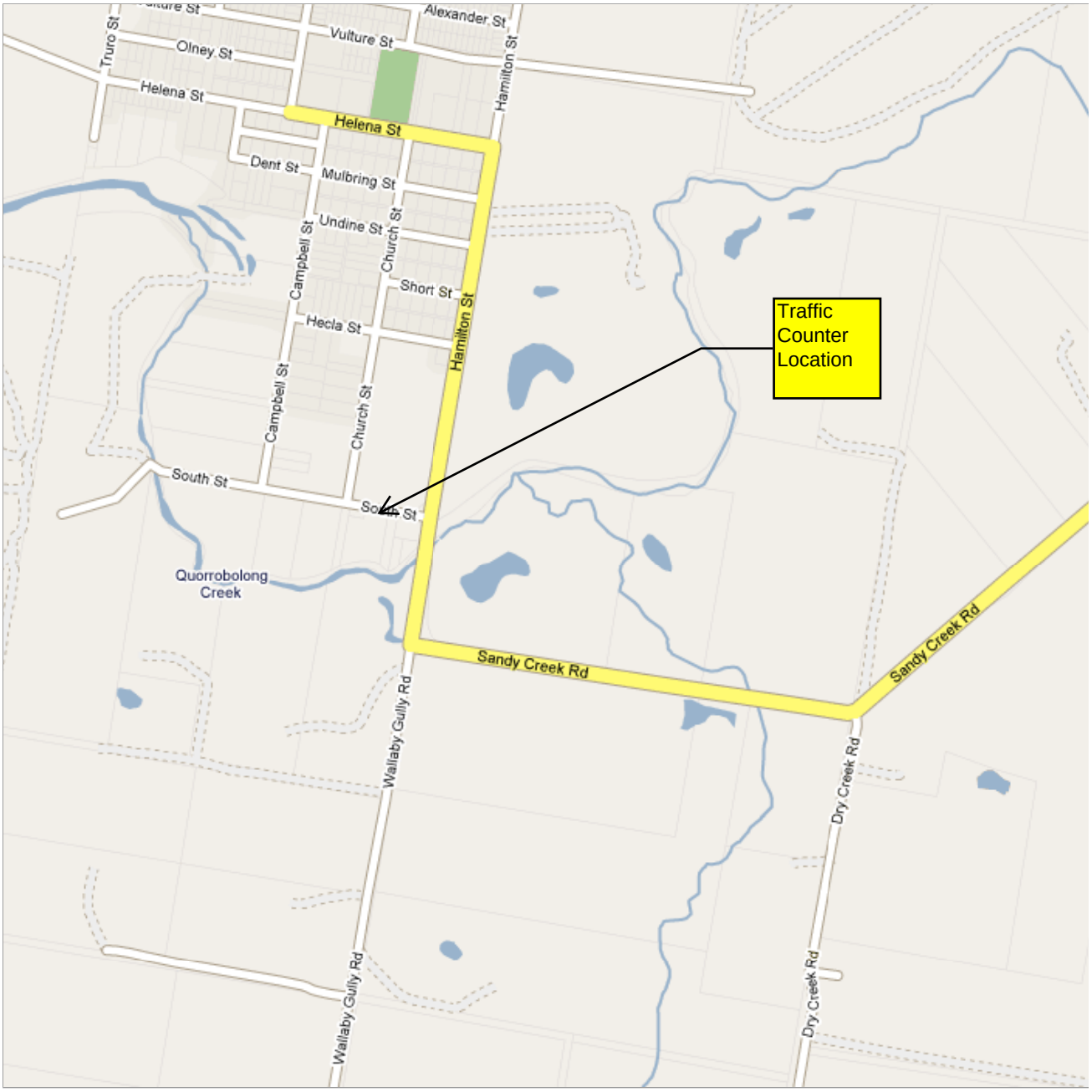
South Street, Ellalong **Eastbound**

Day	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*	*Sun*	*Mon*	*W/Day*	*W/End*	*7 Day*
Time	28-Oct-08	29-Oct-08	30-Oct-08	31-Oct-08	1-Nov-08	2-Nov-08	3-Nov-08	*Ave.*	*Ave.*	*Ave*
0:00	1	0	0	1	3	1	2	1	2	1
1:00	2	2	2	1	2	0	2	2	1	2
2:00	3	0	1	2	3	1	0	1	2	1
3:00	5	3	6	4	6	2	5	5	4	4
4:00	22	25	22	23	8	6	16	22	7	17
5:00	40	33	21	32	15	7	39	33	11	27
6:00	48	33	40	48	35	14	50	44	25	38
7:00	48	46	42	42	15	26	40	44	21	37
8:00	28	29	25	47	42	24	22	30	33	31
9:00	20	25	32	23	30	36	31	26	33	28
10:00	23	19	26	33	22	33	22	25	28	25
11:00	18	25	19	26	40	33	21	22	37	26
12:00	20	22	32	32	23	27	29	27	25	26
13:00	29	21	18	37	34	61	21	25	48	32
14:00	48	60	68	58	32	33	73	61	33	53
15:00	46	53	42	46	33	35	43	46	34	43
16:00	33	35	39	33	32	22	40	36	27	33
17:00	22	17	19	32	20	27	32	24	24	24
18:00	8	8	14	19	17	13	22	14	15	14
19:00	9	11	14	13	18	9	5	10	14	11
20:00	8	8	11	6	11	7	4	7	9	8
21:00	1	5	6	8	4	6	5	5	5	5
22:00	3	0	2	9	3	4	3	3	4	3
23:00	8	12	9	1	6	0	12	8	3	7
Total	**493**	**492**	**510**	**576**	**454**	**427**	**539**	**522**	**441**	**499**



Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	**50**
PM Peak	2:00 PM	3:00 PM	**73**
Week Day Average			**522**
Weekend Day Average			**441**
7 Day Average			**499**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Mulbring St
Undine St
Church St
Campbell St
Short St
Hecla St
Traffic Counter Location
Campbell St
Church St
Hamilton St
South St
Quorrobolong Creek
Sandy Creek Rd
Sandy Creek Rd
Wallaby Gully Rd
Dry Creek Rd
Wallaby Gully Rd
Dry Creek Rd