

**Proposed
Residential Estate
North of Bulahdelah
Traffic Impact Study**

Prepared by

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1. INTRODUCTION

This report provides an assessment of the Traffic Impacts of a proposed 200 lot residential development north of Bulahdelah adjacent to the Bulahdelah Golf Course.

This proposed residential development will be established adjacent to a previously approved complex, which includes a Tourist Resort and Brewery.

Access to this proposed group of developments will be significantly affected by the new interchange to be constructed north of Bulahdelah as part of the Bulahdelah By-Pass.

2. SITE

The layout of the proposed development used for this supplementary traffic assessment is shown below in Figure 2-1.

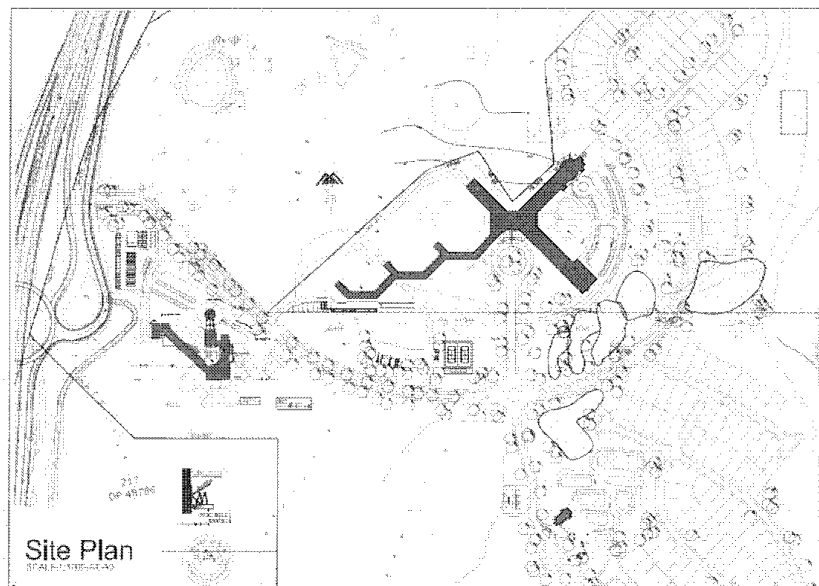


Fig 2.2 - The Proposed Development

Figure 2-1: Layout of Proposed Development

3. EXISTING TRAFFIC

Intersection Counts

Surveys of existing vehicle movements at the intersections of Pacific Highway/Golf Course Access were carried out as follows:

Intersection	Date of Survey	Time of Survey	
Pacific Hwy / Golf Course Access	14/5/2010	Week Day PM	Figure 3-1
	15/5/2010	Weekend SAT	Figure 3-2

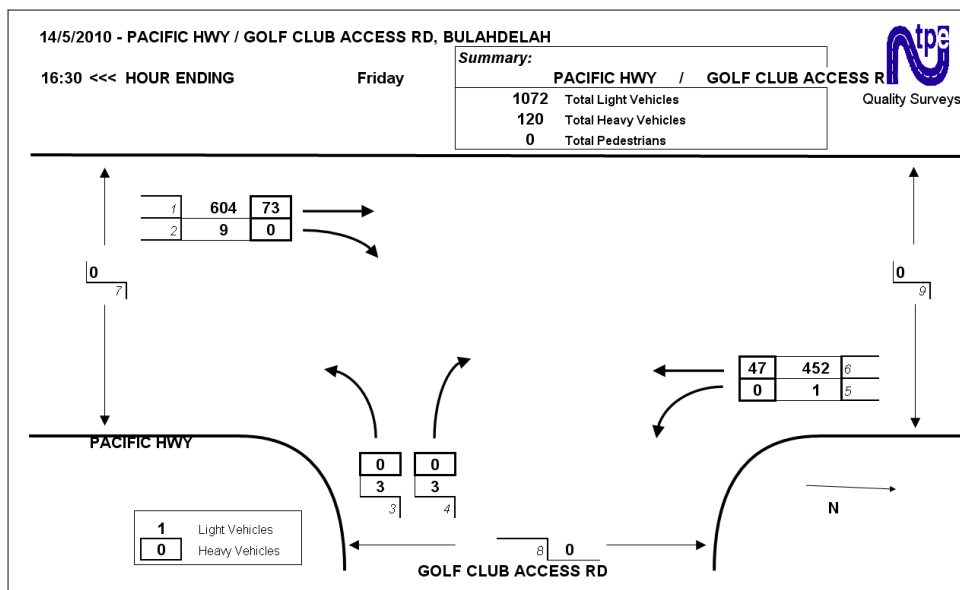


Figure 3-1: Pacific Hwy / Golf Course Access – Existing PM Peak Hour Count

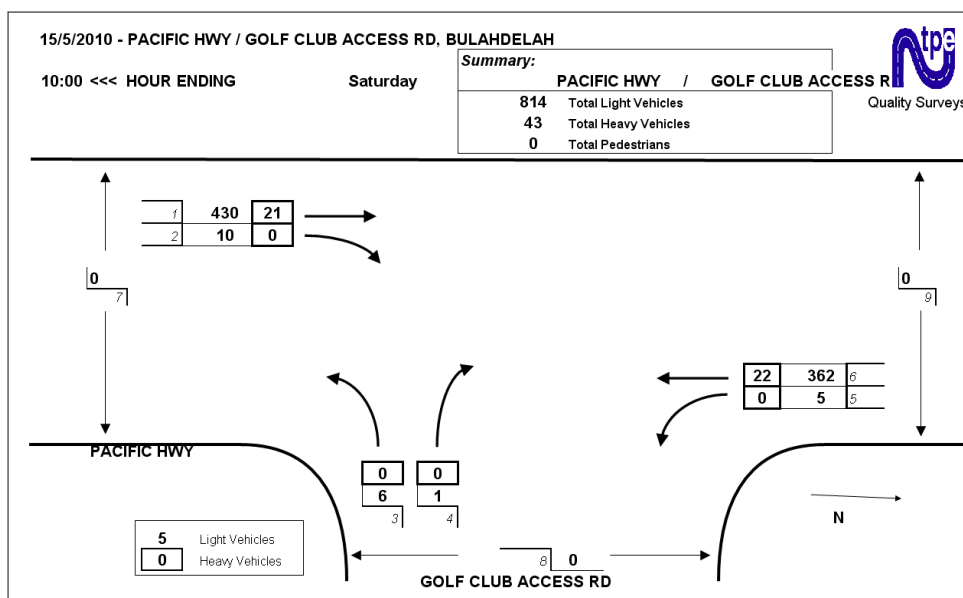


Figure 3-2: Pacific Hwy / Golf Course Access – Existing SAT Peak Hour Count

A full report of these intersection counts is attached as Appendix A

Automatic Vehicle Counts

Automatic Vehicle counts were carried out on the Access to the Golf Course from the 15th May to 28th May:

A summary of the results of this survey are presented in Table 3-1 below:

Table 3-1: Average Week Day Traffic Flows

<i>Street</i>	<i>Direction</i>	<i>AM Peak 10am-11am</i>	<i>PM Peak 6pm-7pm</i>	<i>Daily</i>
Access Road	Inbound	13	13	137
		<i>10am-11am</i>	<i>3pm-4pm</i>	
	Outbound	12	12	135
	Total	25	25	272

A full report on the results of these automatic vehicle counts are attached as Appendix B.

4. ACCESS

The access to the development will be via a T-junction off a service road to be constructed as part of the Bulahdelah Bypass. This service road will also provide access the Golf Club and Council's Water Treatment Plant.

The access road will also provide access to the proposed Tourist Resort and Brewery as detailed in the a extract from the Bulahdelah Brewery & Resort Traffic Report 5 presented below in Figure 4-1:

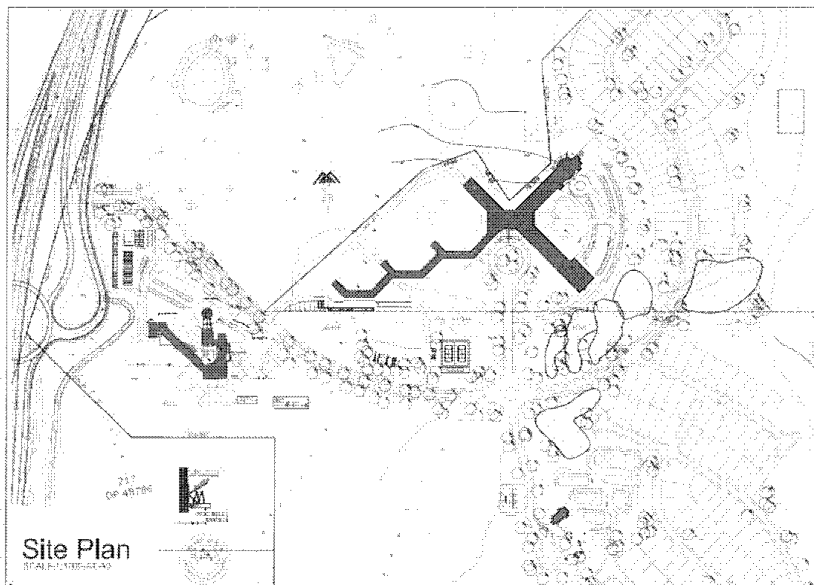


Fig 2.2 - The Proposed Development

Figure 4-1: Overall Layout and Access Arrangements for Residential Dev/Resort and Brewery

The layout for the T Intersection where the Access Road joins the service road has been assessed as a type B intersection with widening provided to allow through traffic to flow past a vehicle waiting to turn right into the access road.

The RTA has made provision in the design of the proposed Northern Interchange of the Bulahdelah Bypass.

Details of this layout are presented in Figure 4-2 below:

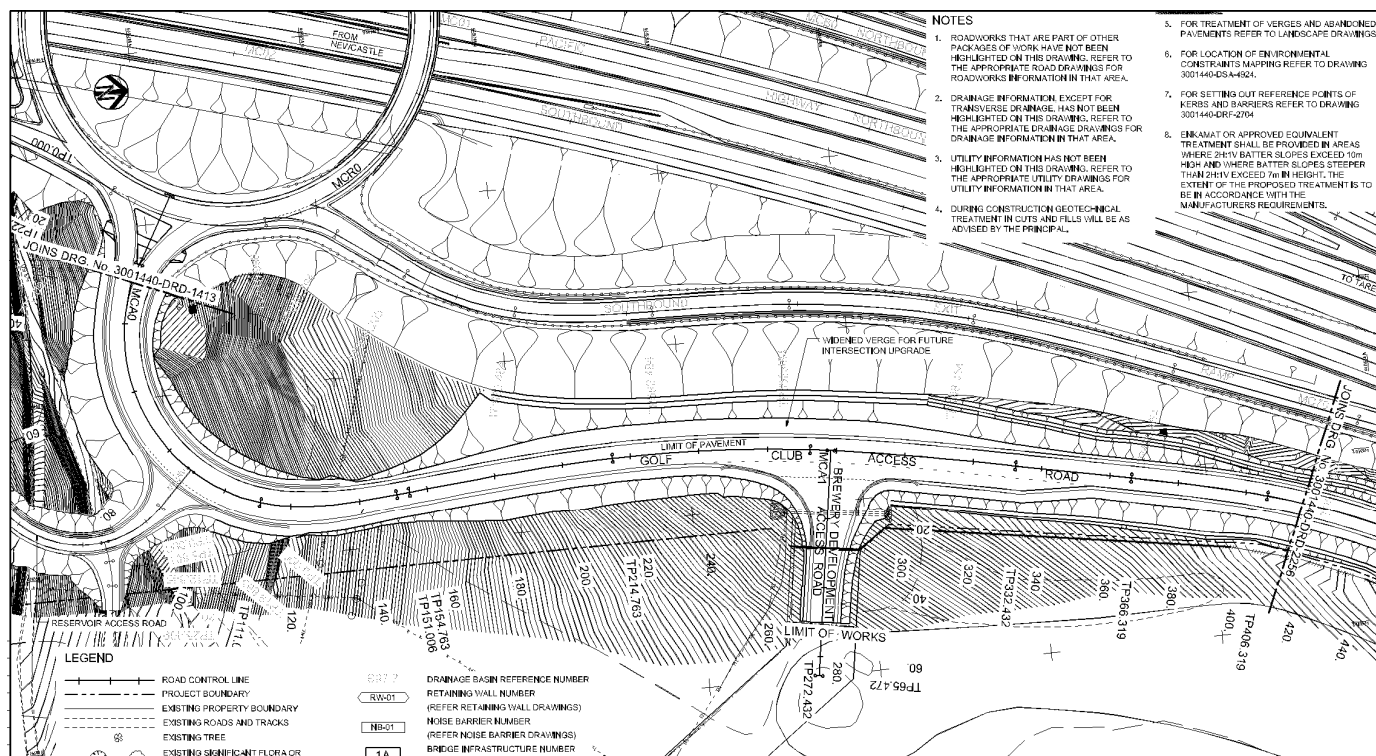


Figure 4-2: RTA Northern Interchange – Design provision for Access Rd off Service Rd.

5. TRIP GENERATION OF PROPOSED RESIDENTIAL DEVELOPMENT

RTA Guide to Traffic Generating Developments recommends that the daily trip generation from residential blocks should be:

	Daily	Peak Hour
Dwelling Houses	9	0.85

The RTA trip generation rates have been used to derive predicted trip generation from the proposed residential estate. The full development will provide a total of 200 rural residential lots. The trips generated by the full development and the proposed development are presented in Table 5-1 below:

Table 5-1: Predicted Trip Generation: Proposed Full Development

	<i>Lots</i>	<i>Daily Rate / Dwelling</i>	<i>Peak Hour Rate/ Dwelling</i>	<i>Daily Trips</i>	<i>Peak Hour Trips</i>
<i>Full Development</i>	200	9	0.85	1800	170

6. TRIP GENERATION OF TOURIST RESORT AND BREWERY

The predicted trip generation from the previously approved Tourist Resort and Brewery is detailed Traffic Report 5 for the Bulahdelah Brewery & Resort. An extract from that report specifically identifying the AM Peak Hour trip generation from these developments is presented below in Table 6-1:

Table 6-1: Predicted Traffic Flows – Brewery / Tourist Resort and Residential Development

Item	Facility	Vehicle Type & user	Daily Traffic AADT	Peak Traffic V/Hr	Peak Hr Time	Alternate PH Factor	Peak Sat Noon	Peak WkDay AM
BWP	Brewery Precinct						VT/Hr	VT/Hr
1	Brewery plant & administration offices	Staff cars	20	10	WD am	0.50	5	10
		HGV	18	6	WD am	0.20	1	6
2	Visitors plaza & viewing area	Visitor cars	200	50	Sat noon	0.20	50	10
3	Café, bar & tasting area	Buses	24	6	Sat noon	0.20	6	1
HCP	Hotel Convention Precinct							
4	206 Room Hotel	Guests	525	70	WD am	0.50	35	70
		Buses	12	2	WD am	0.50	1	2
5	110 Serviced Apartments	Guests	415	42	WD am	0.50	21	42
6	Convention Rooms for 300 people; Chapel facilities	Guests Included	170	85	WD am	0.50	43	85
7	Restaurant, dining for 200 guests	Guest & Visitor cars	85	21	Sat noon	0.20	21	4
8	Reserv'n, cleaning, kitchen & admin'n facilities	Staff cars	200	20	WD am	0.50	10	20
Traffic	HCP & BWP	VT/D	1,670	310		VT/Hr	200	250
GCP	Golf Course Precinct							
9	18 hole course & Clubhouse (presently 9 holes)	Players	400	100	Sat noon	0.50	100	50
10	Restaurant and bar	Visitors	100	50	Sat noon	0.20	50	10
SWP	Sewage & Waste Precinct							
11	Sewage treatment plant; Waste receival and transfer	Cars & trucks	100	20	WD am	0.50	10	20
Traffic	GCP & SWP	VT/D	600	170		VT/Hr	160	80
NRP	North Residential							
12	100 Residential Lots, 800-1,000 m ²	Residents	900	85	WD am	0.50	43	85
SRP	South Residential							
13	100 Residential Lots, 800-1,000 m ²	Residents	900	85	WD am	0.50	43	85
Traffic	NRP & SRP	VT/D	1,800	170		VT/Hr	85	170
Total Traffic Generation			4,069 VT/D				438	500
Rounded to			4,070 VT/D			VT/Hr	445	500

Table 2.2 Generated Traffic at full Operation of each Precinct

Discussion

The trip rates used in this assessment appear to be reasonable with the total peak hour traffic flow estimated to be 500 vehicles per hour including the predicted trips from the proposed residential estate.

6. TRIP DISTRIBUTION OF PROPOSED FULL DEVELOPMENT

The trips generated by the proposed development have been distributed based on the assumptions detailed in Table 6-2 below:

	<i>AM</i> <i>In</i>	<i>Out</i>	<i>PM</i> <i>In</i>	<i>Out</i>
Brewery	50%	50%	50%	50%
Resort	70%	30%	30%	70%
Golf Course #	70%	30%	30%	70%
Sewerage and Waste Water	50%	50%	50%	50%
Residential	30%	70%	70%	30%

Table 6-2: Trip Distribution

The trip assignment derived from these trip distribution assumptions are presented in Table 6-3 below:

	<i>Total</i> * <i>Peak Hr</i>	<i>AM</i> <i>In</i>	<i>Out</i>	<i>PM</i> <i>In</i>	<i>Out</i>
Brewery	27	14	14	14	14
Resort #	223	154	63	63	154
Golf Course # (to/from Resort etc)	6	4	2	2	4
Golf Course (to/from Outside)	54	38	16	16	38
Sewerage and Waste Water	20	10	10	10	10
Residential	170	51	119	119	51
Total	500	271	223	223	271

Note: # For the purpose of this assessment it is assumed that 10% of all trips to/from the Golf Course are from/to the adjacent Resort.

* Peak Hour Flows from Table 6-1

Table 6-2: Trip Assignment

7. PREDICTED TRAFFIC FLOWS WITH FULL DEVELOPMENT

The trip distribution and assignment derived in Section 6 is presented graphically below in Figure 7-1:

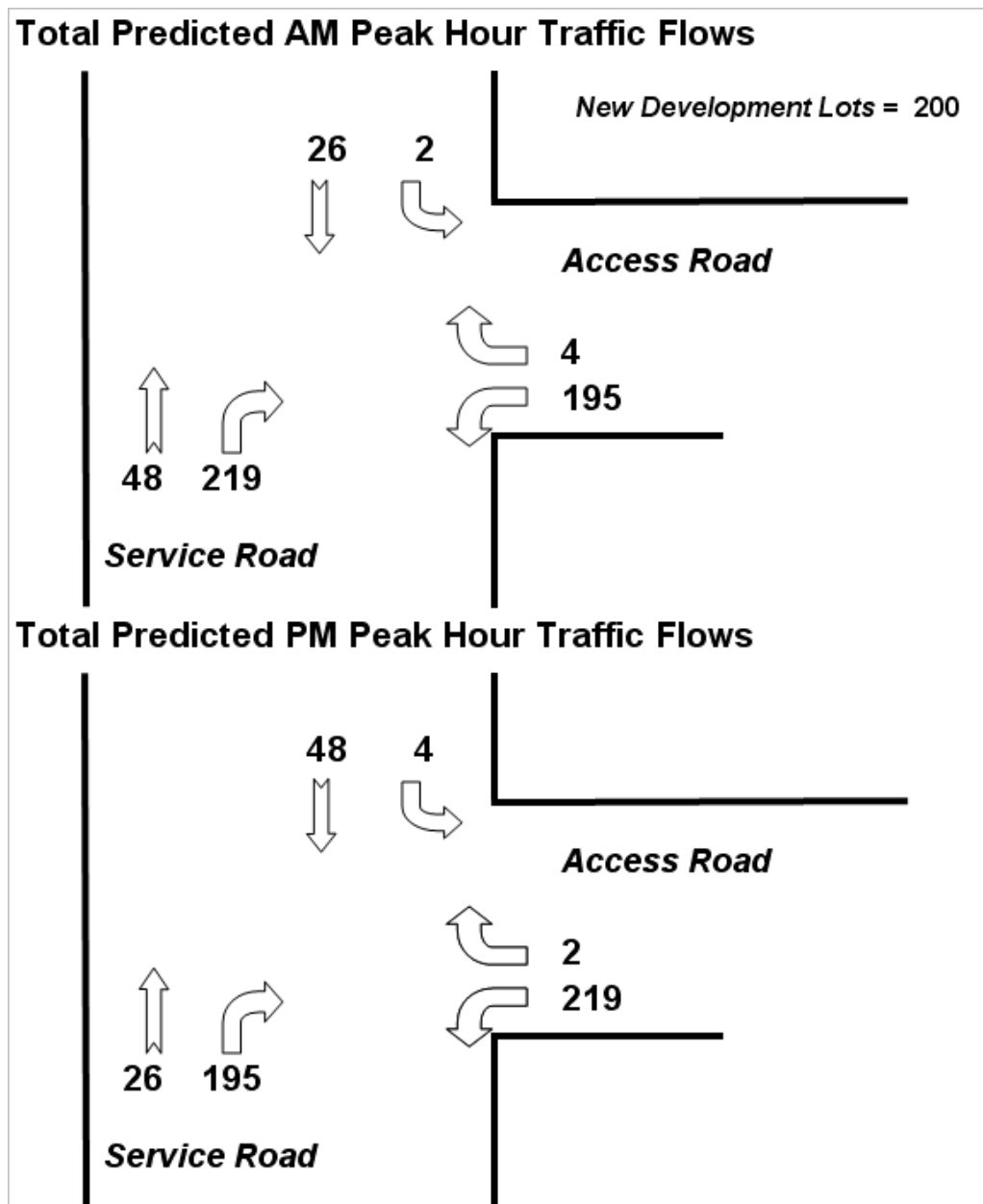


Figure 7-1: Predicted Traffic Flows - Full Development

8. SIDRA RESULTS – ACCESS ROAD / SERVICE ROAD

The intersection of the Service Road and Access Road was analysed using the model SIDRA to determine the impact of the predicted traffic generated by the proposed residential and surrounding developments. The volumes used in the analysis are taken from Section 7 of this report.

A stylised intersection layout as modelled by SIDRA is shown below in Figure 8-1.

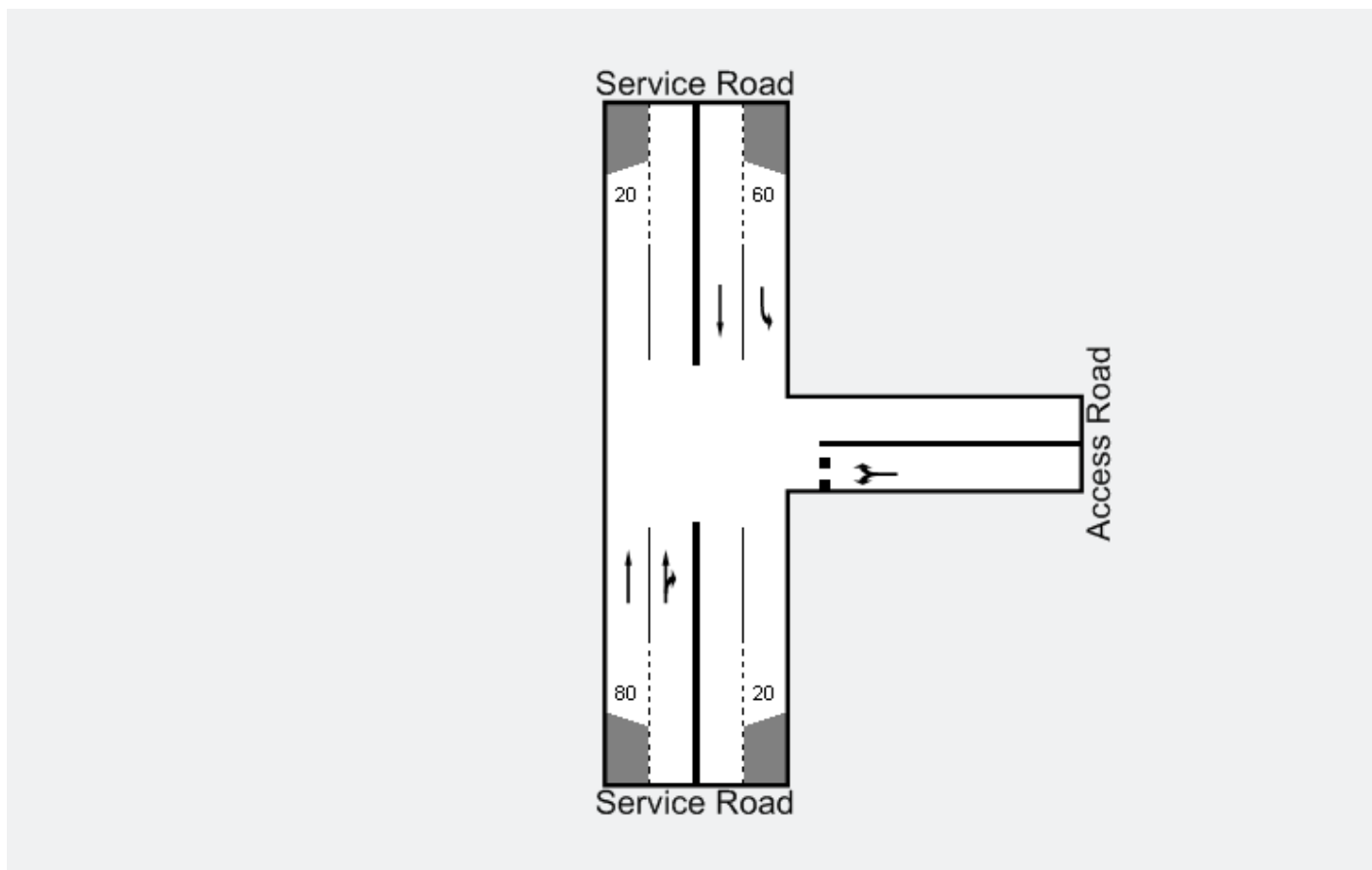


Figure 8-1: New England Highway/River Road – Intersection Layout

The results of the SIDRA Analysis are detailed below in Table 8-1:

Table 8-1: Results of SIDRA Analysis for AM and PM Peak Hour – Service Rd / Access Rd

Access Road / Service Rd AM Peak											
Full Development											
Mov ID	Turn	Demand Flow veh/h	Deg. HV %	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: Service Road											
2 T		48	1	0.025	0	LOS A	0.9	6.2	0	0	60
3 R		219	1	0.156	8.5	LOS A	0.9	6.2	0.11	0.64	48.4
Approach		267	1	0.16	6.9	LOS A	0.9	6.2	0.09	0.52	50.1
East: Access Road											
4 L		195	1	0.174	8.4	LOS A	0.9	6.3	0.1	0.63	48.5
6 R		4	0	0.174	8.5	LOS A	0.9	6.3	0.1	0.71	48.4
Approach		199	1	0.17	8.4	LOS A	0.9	6.3	0.1	0.63	48.5
North: Service Road											
7 L		2	0	0.001	8.2	LOS A	0	0	0	0.67	49
8 T		26	2	0.014	0	LOS A	0	0	0	0	60
Approach		28	2	0.01	0.6	LOS A	0	0	0	0.05	59.1
All Vehicles		494	1	0.17	7.2	NA	0.9	6.3	0.09	0.54	49.9

Access Road / Service Rd PM Peak											
Full Development											
Mov ID	Turn	Demand Flow veh/h	Deg. HV %	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: Service Road											
2 T		26	1	0.013	0	LOS A	0.8	5.5	0	0	60
3 R		195	1	0.142	8.6	LOS A	0.8	5.5	0.15	0.63	48.2
Approach		221	1	0.14	7.6	LOS A	0.8	5.5	0.13	0.56	49.3
East: Access Road											
4 L		219	1	0.195	8.5	LOS A	1	7.2	0.15	0.62	48.3
6 R		2	0	0.2	8.6	LOS A	1	7.2	0.15	0.72	48.2
Approach		221	1	0.2	8.5	LOS A	1	7.2	0.15	0.63	48.3
North: Service Road											
7 L		4	0	0.002	8.2	LOS A	0	0	0	0.67	49
8 T		48	2	0.025	0	LOS A	0	0	0	0	60
Approach		52	2	0.03	0.6	LOS A	0	0	0	0.05	59
All Vehicles		494	1	0.2	7.3	NA	1	7.2	0.13	0.54	49.7

Discussion

The proposed Type B intersection layout will be able to comfortably accommodate predicted traffic flows with the full development of 200 Residential Lots plus the Brewery and Tourist Resort.

9. RECOMMENDATION

Based on this assessment of predicted traffic impacts it is recommended that the proposed development be approved.

Appendix A:

Intersection Counts

Pacific Hwy / Golf Course Access

14/5/2010 - PACIFIC HWY / GOLF CLUB ACCESS RD, BULAHDELAH

16:30 <<< HOUR ENDING

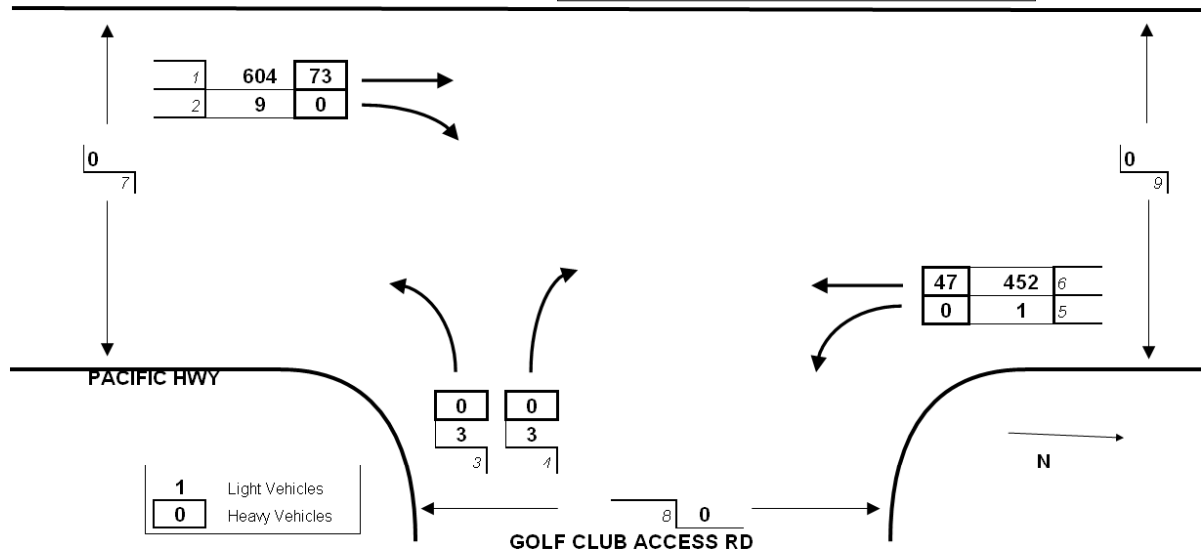
Friday

Summary:

PACIFIC HWY / GOLF CLUB ACCESS RD

1072	Total Light Vehicles
120	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys



14/5/2010 - PACIFIC HWY / GOLF CLUB ACCESS RD, BULAHDELAH

Light Vehicles							Total Vehicles		Pedestrians		
1	2	3	4	5	6	15 MIN HOUR			7	8	9
15:15	115	4	1	0	1	72	193		0	0	0
15:30	141	2	3	0	2	104	252		0	0	0
15:45	135	3	2	0	1	129	270		0	0	0
16:00	154	1	1	1	0 <	119	276	991	0	0	0
16:15	161	3	0	1	0	100 <	265	1063	0	0	0
16:30	154 <	2	0	1	0	104 <	261	1072 <	0	0	0
16:45	131	2	0	2	0	90	225	1027	0	0	0
17:00	130	4	3	2	0	90	229	980	0	0	0
17:15	137	2	1	1	0	92	233	948	0	0	0
17:30	126	4	7	0	2	102	241	928	0	0	0
17:45	136	7 <	2	4	1	88	238	941	0	0	0
18:00	116	0	4 <	4 <	1 <	79	204	916	0	0	0

Heavy Vehicles							Total Vehicles	
1	2	3	4	5	6	15 MIN HOUR		
15:15	15	2	2	0	0	12	31	
15:30	19	0	0	0	0	9	28	
15:45	23	0	0	0	0	14	37	
16:00	9	0 <	0 <	0	0	13 <	22	118
16:15	22 <	0	0	0	0	11	33	120 <
16:30	19 <	0	0	0	0	9	28	120 <
16:45	12	0	0	0	0	9	21	104
17:00	13	0	0	0	0	11	24	106
17:15	15	0	0	0	0	7	22	95
17:30	14	0	0	0	0	8	22	89
17:45	13	0	0	0	0	8	21	89
18:00	16	0	0	0	0	9	25	90

All Vehicles							Total Vehicles	
1	2	3	4	5	6	15 MIN HOUR		
15:15	130	6	3	0	1	84	224	
15:30	160	2	3	0	2	113	280	
15:45	158	3	2	0	1	143	307	
16:00	163	1	1	1	0 <	132	298	1109
16:15	183	3	0	1	0	111 <	298	1183
16:30	173 <	2	0	1	0	113 <	289	1192 <
16:45	143	2	0	2	0	99	246	1131
17:00	143	4	3	2	0	101	253	1086
17:15	152	2	1	1	0	99	255	1043
17:30	140	4	7	0	2	110	263	1017
17:45	149	7 <	2	4	1	96	259	1030
18:00	132	0	4 <	4 <	1 <	88	229	1006

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

15/5/2010 - PACIFIC HWY / GOLF CLUB ACCESS RD, BULAHDELAH

10:00 <<< HOUR ENDING

Saturday

Summary:

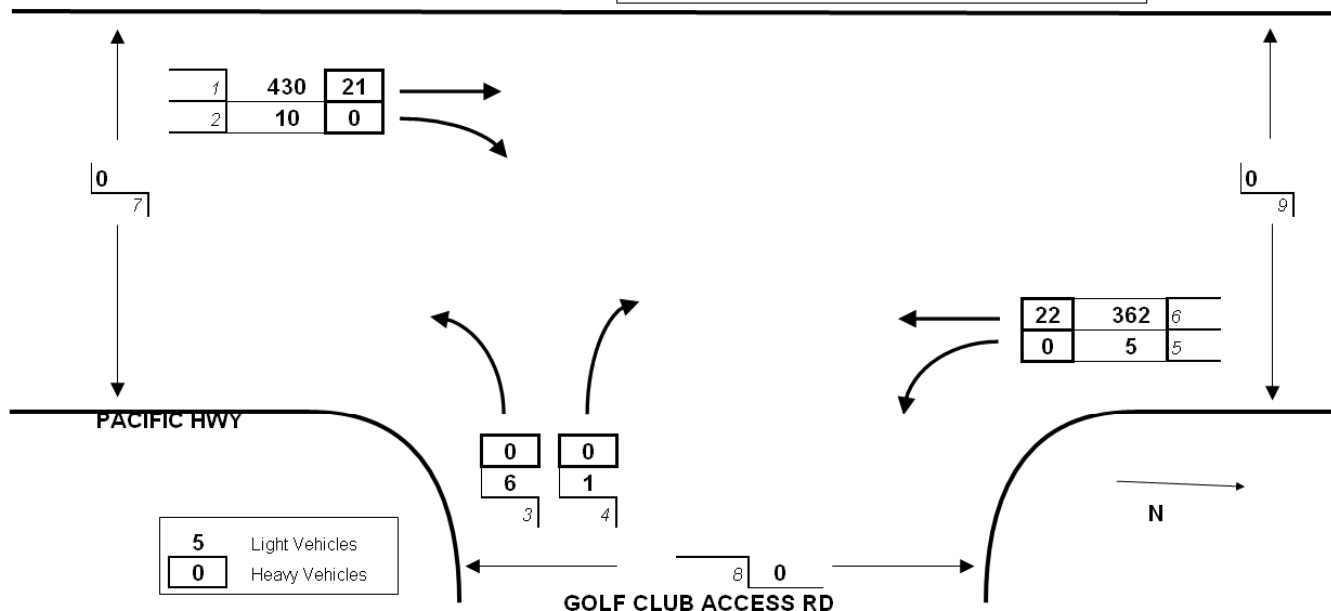
PACIFIC HWY / GOLF CLUB ACCESS RD

814 Total Light Vehicles

43 Total Heavy Vehicles

0 Total Pedestrians

Quality Surveys



15/5/2010 - PACIFIC HWY / GOLF CLUB ACCESS RD, BULAHDELAH

	Light Vehicles						Total Vehicles		Pedestrians		
	1	2	3	4	5	6	15 MIN HOUR		7	8	9
08:15	27	0	0	1	1	32	61		0	0	0
08:30	72	3	1	0	1	66	143		0	0	0
08:45	81	2	0	1	2	91	177		0	0	0
09:00	98	3	1	2 <	1	78	183	564	0 ✓	0 ✓	0 ✓
09:15	100	3 <	2	0	2 <	76	183	686	0 ✓	0 ✓	0 ✓
09:30	93	1	0	0	0	73	167	710	0 ✓	0 ✓	0 ✓
09:45	122	2	1	0	0	98	223	756	0 ✓	0 ✓	0 ✓
10:00	115 <	4	3 <	1	3	115 <	241	814 <	0 ✓	0 ✓	0 ✓

	Heavy Vehicles						Total Vehicles	
	1	2	3	4	5	6	15 MIN HOUR	
08:15	2	0	0	0	0	8	10	
08:30	3	0	0	0	0	4	7	
08:45	4	1	1	1	0	9	16	
09:00	4	2 <	0 <	1 <	0	3 <	10	43
09:15	7	0 <	0 <	0 <	0	7	14	47
09:30	4	0 <	0 <	0 <	0	4	8	48 <
09:45	5	0	0	0	0	5	10	42
10:00	5 <	0	0	0	0	6	11	43

	All Vehicles						Total Vehicles	
	1	2	3	4	5	6	15 MIN HOUR	
08:15	29	0	0	1	1	40	71	
08:30	75	3	1	0	1	70	150	
08:45	85	3	1	2	2	100	193	
09:00	102 ✓	5 ✓	1 ✓	3 <	1 ✓	81	193	607
09:15	107 ✓	3 <	2 ✓	0 ✓	2 <	83	197	733
09:30	97	1	0	0	0	77	175	758
09:45	127	2	1	0	0	103	233	798
10:00	120 <	4	3 <	1	3	121 <	252	857 <

Note: Arrows "<" indicate the end time for the peak hour for each turning movement.

Appendix B:

Automatic Count

Bulahdelah Golf Course Access

Bulahdelah Golf Club Access Road**Inbound**

	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Averages Weekdays	Weekly
Hour									
0000-0100	6	1	0	0	1	1	0	0	1
0100-0200	0	1	2	0	0	0	1	0	0
0200-0300	0	1	0	1	1	1	0	0	0
0300-0400	0	0	1	0	1	0	1	0	0
0400-0500	0	1	1	1	0	0	1	1	1
0500-0600	1	1	2	0	1	0	2	1	1
0600-0700	2	2	4	4	3	3	2	3	3
0700-0800	9	7	7	4	7	7	7	6	6
0800-0900	22	14	5	7	13	11	9	9	11
0900-1000	31	< 16	< 12	9	7	8	16	< 10	14
1000-1100	14	13	15	< 12	< 13	< 10	13	13	< 13
1100-1200	12	13	13	12	7	15	< 11	12	12
1200-1300	13	20	17	< 11	14	12	11	13	14
1300-1400	8	18	15	10	11	11	8	11	12
1400-1500	11	12	8	6	7	12	< 15	9	10
1500-1600	9	12	11	10	14	< 11	13	12	11
1600-1700	9	14	7	6	7	6	15	7	9
1700-1800	12	24	< 2	4	9	11	12	7	10
1800-1900	14	< 9	3	21	< 12	12	24	< 13	< 13
1900-2000	8	3	2	3	7	3	16	5	5
2000-2100	3	2	1	1	5	2	5	2	2
2100-2200	1	0	1	2	2	3	2	2	1
2200-2300	3	1	1	2	4	1	1	2	2
2300-2400	1	0	0	1	1	1	1	1	1
Totals									
0700-1900	162	170	112	111	119	124	153	121	133
0600-2200	175	177	118	120	135	134	178	133	144
0600-0000	179	177	119	122	140	135	180	135	147
0000-0000	186	181	123	124	142	136	183	137	150
AM Peak	900	900	1000	1000	1000	1100	900		
	31	16	15	12	13	15	16		
PM Peak	1800	1700	1200	1800	1500	1400	1800		
	14	24	17	21	14	12	24		

Bulahdelah Golf Club Access Road**Outbound**

	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Averages Weekdays	Week
Hour									
0000-0100	5	1	0	0	1	2	0	0	1
0100-0200	0	0	1	0	0	0	1	0	0
0200-0300	1	2	0	0	0	0	0	0	0
0300-0400	0	0	1	1	1	1	1	1	1
0400-0500	0	1	1	1	1	0	0	0	0
0500-0600	1	2	2	0	1	0	1	1	1
0600-0700	2	3	2	3	2	2	3	2	2
0700-0800	8	4	6	2	5	9	5	5	5
0800-0900	8	9	5	6	7	7	7	6	7
0900-1000	8	12	9	9	6	8	8	8	8
1000-1100	9	10	15	< 10	11	< 12	13	< 12	< 11
1100-1200	29	< 16	< 13	< 12	< 10	< 15	< 10	12	15
1200-1300	12	14	15	11	7	13	14	11	12
1300-1400	15	17	16	< 10	15	< 16	< 12	14	< 14
1400-1500	15	15	7	8	12	12	13	10	11
1500-1600	16	< 15	11	7	11	12	27	< 12	13
1600-1700	7	18	9	9	7	5	10	8	9
1700-1800	12	19	< 3	4	8	9	11	6	9
1800-1900	15	11	2	5	6	13	16	7	9
1900-2000	11	10	1	2	6	6	10	4	6
2000-2100	5	5	0	2	6	2	19	4	4
2100-2200	4	4	1	16	< 5	5	7	7	6
2200-2300	2	0	1	5	11	2	4	4	3
2300-2400	1	1	0	1	1	1	1	1	1
Totals									
0700-1900	153	158	108	91	102	126	146	111	124
0600-2200	174	179	111	113	120	140	185	128	142
0600-0000	177	179	111	119	132	142	190	133	146
0000-0000	184	184	115	120	134	144	192	135	149
AM Peak	1100 29	1100 16	1000 15	1100 12	1000 11	1100 15	1000 13		
PM Peak	1500 16	1700 19	1300 16	2100 16	1300 15	1300 16	1500 27		