Appendix B

Traffic count data

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Traffic Count Summary Report

Count Number	**5349**	Ref : **TFIX**	**Lat/Long : 32 12.320 / 149 25.770**	**GOOGLE**
Street	**CASTLEREAGH HIGHWAY, DUNEDOO : Between DUNGOG TOWNSHIP & GOLDEN HIGHWAY, DUNEDOO (bidirectional) :**			
Location	Proposed Access 2 400m north of Tucklan Rd on tree Week 1			*Carriageway*

TOTAL COUNT MATRIX

Start Date	29-JAN-10
Start Time	1500
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	97
Weekly 85th Percentile Speed	108
Five Day AADT	671
Seven Day AADT	664

	MON *1ST*	TUE *2ND*	WED *3RD*	THU *4TH*	FRI *29TH / 5TH*	SAT *30TH*	SUN *31ST*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	3	0	2	5	5	4	**10**	**2**	**19**	**3**
1am - 2am	1	2	0	1	5	1	5	**9**	**2**	**15**	**2**
2am - 3am	3	1	2	0	0	2	3	**6**	**1**	**11**	**2**
3am - 4am	2	1	2	3	1	5	1	**9**	**2**	**15**	**2**
4am - 5am	7	5	5	7	5	3	0	**29**	**6**	**32**	**5**
5am - 6am	9	8	10	9	11	3	2	**47**	**9**	**52**	**7**
6am - 7am	13	17	17	21	17	14	4	**85**	**17**	**103**	**15**
7am - 8am	31	40	23	36	23	23	14	**153**	**31**	**190**	**27**
8am - 9am	40	52	40	**57**	48	40	22	**237**	**47**	**299**	**43**
9am - 10am	41	**63**	**44**	49	37	57	37	**234**	**47**	**328**	**47**
10am - 11am	42	54	35	46	**55**	**64**	**59**	**232**	**46**	**355**	**51**
11am - Midday	**50**	49	43	34	41	49	58	**217**	**43**	**324**	**46**
Midday - 1pm	48	**54**	52	43	65	**50**	64	**262**	**52**	**376**	**54**
1pm - 2pm	**55**	30	53	60	65	44	**74**	**263**	**53**	**381**	**54**
2pm - 3pm	46	51	**56**	**72**	60	47	72	**285**	**57**	**404**	**58**
3pm - 4pm	53	44	45	60	46	44	46	**248**	**50**	**338**	**48**
4pm - 5pm	43	42	49	62	61	45	57	**257**	**51**	**359**	**51**
5pm - 6pm	49	44	33	41	**69**	38	48	**236**	**47**	**322**	**46**
6pm - 7pm	26	32	32	20	46	32	33	**156**	**31**	**221**	**32**
7pm - 8pm	24	21	23	22	31	18	25	**121**	**24**	**164**	**23**
8pm - 9pm	13	16	16	28	31	12	12	**104**	**21**	**128**	**18**
9pm - 10pm	20	10	24	14	19	12	21	**87**	**17**	**120**	**17**
10pm - 11pm	9	4	9	9	12	6	10	**43**	**9**	**59**	**8**
11pm - Midnight	2	1	6	6	10	4	4	**25**	**5**	**33**	**5**
Total	**627**	**644**	**619**	**702**	**763**	**618**	**675**	**3355**	**671**	**4648**	**664**

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Traffic Count Summary Report

Count Number	**5350**	Ref : **TFIX**	**Lat/Long : S32 06 13.2 / E149 13 52.3** **GOOGLE**
Street	**NEWELL HWY.-GOLDEN HYW., PEEK HILL : Between FORBES TOWNSHIP & DUNEDOO TOWNSHIP (bidirectional) :**		
Location	Proposed Access 1, 50m north of Spring Ridge Road Sign post Week 1		*Carriageway*

TOTAL COUNT MATRIX

Start Date	29-JAN-10
Start Time	1600
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	102
Weekly 85th Percentile Speed	110
Five Day AADT	1078
Seven Day AADT	1039

	MON *1ST*	TUE *2ND*	WED *3RD*	THU *4TH*	FRI *29TH / 5TH*	SAT *30TH*	SUN *31ST*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	6	13	10	12	13	2	10	**54**	**11**	**66**	**9**
1am - 2am	2	7	8	1	3	8	9	**21**	**4**	**38**	**5**
2am - 3am	7	4	14	5	9	9	3	**39**	**8**	**51**	**7**
3am - 4am	3	12	6	4	3	1	4	**28**	**6**	**33**	**5**
4am - 5am	8	7	10	14	5	9	6	**44**	**9**	**59**	**8**
5am - 6am	13	17	7	9	15	9	4	**61**	**12**	**74**	**11**
6am - 7am	32	44	33	27	35	29	9	**171**	**34**	**209**	**30**
7am - 8am	58	65	50	56	59	42	31	**288**	**58**	**361**	**52**
8am - 9am	74	71	58	59	69	46	39	**331**	**66**	**416**	**59**
9am - 10am	76	70	**69**	62	81	80	74	**358**	**72**	**512**	**73**
10am - 11am	72	**93**	57	65	**89**	89	62	**376**	**75**	**527**	**75**
11am - Midday	**88**	46	55	**85**	**89**	**100**	**76**	**363**	**73**	**539**	**77**
Midday - 1pm	84	54	72	77	81	78	74	**368**	**74**	**520**	**74**
1pm - 2pm	74	**96**	73	70	81	68	65	**394**	**79**	**527**	**75**
2pm - 3pm	**106**	75	**76**	73	**108**	**80**	85	**438**	**88**	**603**	**86**
3pm - 4pm	82	75	73	**80**	93	55	**87**	**403**	**81**	**545**	**78**
4pm - 5pm	76	76	75	70	80	67	59	**377**	**75**	**503**	**72**
5pm - 6pm	81	73	65	62	76	53	69	**357**	**71**	**479**	**68**
6pm - 7pm	45	51	57	67	77	46	52	**297**	**59**	**395**	**56**
7pm - 8pm	52	27	29	44	53	37	31	**205**	**41**	**273**	**39**
8pm - 9pm	25	29	20	37	30	17	28	**141**	**28**	**186**	**27**
9pm - 10pm	35	21	19	23	23	11	20	**121**	**24**	**152**	**22**
10pm - 11pm	28	14	11	18	18	8	7	**89**	**18**	**104**	**15**
11pm - Midnight	11	16	21	7	10	10	25	**65**	**13**	**100**	**14**
Total	**1138**	**1056**	**968**	**1027**	**1200**	**954**	**929**	**5389**	**1077**	**7272**	**1038**

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Traffic Count Summary Report

Count Number	**5463**	Ref : **TFIX**	**Lat/Long : S32 06 13.2 / E149 13 52.3** **GOOGLE**
Street	**NEWELL HWY.-GOLDEN HYW., PEEK HILL : Between FORBES TOWNSHIP & DUNEDOO TOWNSHIP (bidirectional) :**		
Location	Proposed Access 1, 50m north of Spring Ridge Road Sign post Week 2		*Carriageway*

TOTAL COUNT MATRIX

Start Date	05-FEB-10
Start Time	1600
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	103
Weekly 85th Percentile Speed	110
Five Day AADT	1135
Seven Day AADT	1078

	MON *8TH*	TUE *9TH*	WED *10TH*	THU *11TH*	FRI *12TH / 5TH*	SAT *6TH*	SUN *7TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	4	11	8	5	9	9	7	**37**	**7**	**53**	**8**
1am - 2am	5	4	13	2	8	5	10	**32**	**6**	**47**	**7**
2am - 3am	1	7	5	6	10	3	7	**29**	**6**	**39**	**6**
3am - 4am	5	11	5	9	6	6	1	**36**	**7**	**43**	**6**
4am - 5am	3	7	14	3	10	7	3	**37**	**7**	**47**	**7**
5am - 6am	18	9	16	11	14	11	0	**68**	**14**	**79**	**11**
6am - 7am	39	40	30	23	30	20	21	**162**	**32**	**203**	**29**
7am - 8am	**85**	71	58	49	59	48	23	**322**	**64**	**393**	**56**
8am - 9am	66	60	59	71	55	60	42	**311**	**62**	**413**	**59**
9am - 10am	76	**73**	**71**	**74**	82	**89**	62	**376**	**75**	**527**	**75**
10am - 11am	84	70	45	**74**	**100**	72	46	**373**	**75**	**491**	**70**
11am - Midday	80	57	54	57	84	62	**69**	**332**	**66**	**463**	**66**
Midday - 1pm	80	77	63	**97**	94	65	101	**411**	**82**	**577**	**82**
1pm - 2pm	66	79	66	68	100	72	97	**379**	**76**	**548**	**78**
2pm - 3pm	80	92	74	65	106	71	91	**417**	**83**	**579**	**83**
3pm - 4pm	**97**	94	78	92	108	**77**	**104**	**469**	**94**	**650**	**93**
4pm - 5pm	69	**129**	**83**	89	**119**	42	92	**489**	**98**	**623**	**89**
5pm - 6pm	68	85	68	79	107	34	79	**407**	**81**	**520**	**74**
6pm - 7pm	49	83	58	55	68	37	60	**313**	**63**	**410**	**59**
7pm - 8pm	31	42	36	50	51	22	41	**210**	**42**	**273**	**39**
8pm - 9pm	21	30	41	36	27	8	27	**155**	**31**	**190**	**27**
9pm - 10pm	28	23	15	26	28	10	20	**120**	**24**	**150**	**21**
10pm - 11pm	30	18	33	17	16	8	15	**114**	**23**	**137**	**20**
11pm - Midnight	20	12	23	7	12	3	12	**74**	**15**	**89**	**13**
Total	**1105**	**1184**	**1016**	**1065**	**1303**	**841**	**1030**	**5673**	**1134**	**7544**	**1077**

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Traffic Count Summary Report

Count Number	**5464**	Ref : **TFIX**	**Lat/Long : 32 12.320 / 149 25.770**	**GOOGLE**
Street	**CASTLEREAGH HIGHWAY, DUNEDOO : Between DUNGOG TOWNSHIP & GOLDEN HIGHWAY, DUNEDOO (bidirectional) :**			
Location	Proposed Access 2 400m north of Tucklan Rd on tree Week 2			*Carriageway*

TOTAL COUNT MATRIX

Start Date	05-FEB-10
Start Time	1500
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	97
Weekly 85th Percentile Speed	108
Five Day AADT	701
Seven Day AADT	682

	MON *8TH*	TUE *9TH*	WED *10TH*	THU *11TH*	FRI *12TH / 5TH*	SAT *6TH*	SUN *7TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	2	1	12	9	3	4	7	**27**	**5**	**38**	**5**
1am - 2am	4	4	1	2	1	9	7	**12**	**2**	**28**	**4**
2am - 3am	0	1	0	1	3	0	0	**5**	**1**	**5**	**1**
3am - 4am	6	3	2	0	3	5	1	**14**	**3**	**20**	**3**
4am - 5am	5	4	6	8	7	3	1	**30**	**6**	**34**	**5**
5am - 6am	8	11	17	11	14	7	2	**61**	**12**	**70**	**10**
6am - 7am	13	11	11	20	28	10	2	**83**	**17**	**95**	**14**
7am - 8am	35	32	33	25	33	30	16	**158**	**32**	**204**	**29**
8am - 9am	51	38	43	54	46	32	20	**232**	**46**	**284**	**41**
9am - 10am	54	**47**	40	46	**63**	49	44	**250**	**50**	**343**	**49**
10am - 11am	50	**47**	46	**63**	57	**61**	**55**	**263**	**53**	**379**	**54**
11am - Midday	**64**	45	**48**	41	62	55	52	**260**	**52**	**367**	**52**
Midday - 1pm	48	51	**52**	**57**	53	**55**	60	**261**	**52**	**376**	**54**
1pm - 2pm	57	47	44	51	59	40	**64**	**258**	**52**	**362**	**52**
2pm - 3pm	**64**	**59**	46	52	69	51	50	**290**	**58**	**391**	**56**
3pm - 4pm	52	48	49	51	66	39	59	**266**	**53**	**364**	**52**
4pm - 5pm	54	49	48	38	**70**	31	57	**259**	**52**	**347**	**50**
5pm - 6pm	44	49	44	53	51	32	54	**241**	**48**	**327**	**47**
6pm - 7pm	43	17	31	38	37	35	48	**166**	**33**	**249**	**36**
7pm - 8pm	25	23	23	25	22	14	22	**118**	**24**	**154**	**22**
8pm - 9pm	6	16	15	28	23	10	15	**88**	**18**	**113**	**16**
9pm - 10pm	12	5	12	19	21	8	17	**69**	**14**	**94**	**13**
10pm - 11pm	7	8	15	9	15	14	8	**54**	**11**	**76**	**11**
11pm - Midnight	7	4	12	6	12	7	8	**41**	**8**	**56**	**8**
Total	**711**	**620**	**650**	**707**	**818**	**601**	**669**	**3506**	**701**	**4776**	**682**

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Traffic Count Summary Report

Count Number	**7956**	Ref : **EMG**	**Lat/Long : S32 06 20.0 / E149 13 47.2**	**GOOGLE**
Street	**SPRING RIDGE ROAD, GULGONG : Between GOOMLA ROAD & GOLDEN HIGHWAY (bidirectional) :**			
Location	Site 1 Sealed, about 200 Mtrs south of the Golden Highway, T-int Sign			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	60
Weekly 85th Percentile Speed	74
Five Day AADT	49
Seven Day AADT	60

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	0	0	0	0	0	2	0	**0**	**0**	**2**	**0**
1am - 2am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
2am - 3am	0	0	0	0	1	0	0	**1**	**0**	**1**	**0**
3am - 4am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
4am - 5am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
5am - 6am	0	0	0	0	1	0	0	**1**	**0**	**1**	**0**
6am - 7am	2	1	1	**2**	0	0	0	**6**	**1**	**6**	**1**
7am - 8am	2	4	2	1	4	3	3	**13**	**3**	**19**	**3**
8am - 9am	**9**	**11**	**12**	**2**	**5**	11	4	**39**	**8**	**54**	**8**
9am - 10am	5	4	3	1	3	5	5	**16**	**3**	**26**	**4**
10am - 11am	5	4	2	**2**	3	**18**	**14**	**16**	**3**	**48**	**7**
11am - Midday	7	6	3	0	1	10	4	**17**	**3**	**31**	**4**
Midday - 1pm	4	4	4	3	2	3	4	**17**	**3**	**24**	**3**
1pm - 2pm	**9**	2	**6**	**5**	**5**	4	8	**27**	**5**	**39**	**6**
2pm - 3pm	5	4	5	2	2	11	**10**	**18**	**4**	**39**	**6**
3pm - 4pm	3	**9**	5	4	1	**12**	3	**22**	**4**	**37**	**5**
4pm - 5pm	4	5	4	1	**5**	9	4	**19**	**4**	**32**	**5**
5pm - 6pm	2	5	**6**	3	0	8	9	**16**	**3**	**33**	**5**
6pm - 7pm	0	1	4	1	2	6	1	**8**	**2**	**15**	**2**
7pm - 8pm	1	0	1	0	2	2	0	**4**	**1**	**6**	**1**
8pm - 9pm	0	0	1	0	2	0	0	**3**	**1**	**3**	**0**
9pm - 10pm	0	0	1	0	0	0	0	**1**	**0**	**1**	**0**
10pm - 11pm	1	1	0	0	0	0	0	**2**	**0**	**2**	**0**
11pm - Midnight	1	0	0	0		0	0	**1**	**0**	**1**	**0**
Total	**60**	**61**	**60**	**27**	**39**	**104**	**69**	**247**	**49**	**420**	**60**

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Traffic Count Summary Report

Count Number	**7957**	Ref : **EMG**	**Lat/Long : S32 15 52.8 / E149 19 35.3**	**GOOGLE**
Street	**SPRING RIDGE ROAD, GULGONG : Between GOOMLA ROAD & GOLDEN HIGHWAY (bidirectional) :**			
Location	Site 2 Sealed, at the Warrambungle/Mid Western Council boundary, on Midwestern Sign			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	80
Weekly 85th Percentile Speed	94
Five Day AADT	88
Seven Day AADT	95

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	1	0	0	1	2	1	**2**	**0**	**5**	**1**
1am - 2am	0	0	0	0	1	0	0	**1**	**0**	**1**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
4am - 5am	0	0	1	0	0	0	0	**1**	**0**	**1**	**0**
5am - 6am	1	2	1	3	1	0	0	**8**	**2**	**8**	**1**
6am - 7am	5	2	6	3	4	0	1	**20**	**4**	**21**	**3**
7am - 8am	5	**10**	6	**7**	8	4	2	**36**	**7**	**42**	**6**
8am - 9am	5	8	**11**	5	**14**	5	3	**43**	**9**	**51**	**7**
9am - 10am	5	7	3	5	5	8	6	**25**	**5**	**39**	**6**
10am - 11am	**6**	4	3	4	5	**37**	**10**	**22**	**4**	**69**	**10**
11am - Midday	1	6	6	5	2	11	7	**20**	**4**	**38**	**5**
Midday - 1pm	6	1	2	2	6	4	5	**17**	**3**	**26**	**4**
1pm - 2pm	10	7	11	3	**8**	7	9	**39**	**8**	**55**	**8**
2pm - 3pm	4	5	5	3	7	**21**	5	**24**	**5**	**50**	**7**
3pm - 4pm	3	6	8	4	4	12	7	**25**	**5**	**44**	**6**
4pm - 5pm	**13**	**12**	**13**	7	7	10	**10**	**52**	**10**	**72**	**10**
5pm - 6pm	7	4	9	**11**	5	5	**10**	**36**	**7**	**51**	**7**
6pm - 7pm	3	5	8	4	6	8	4	**26**	**5**	**38**	**5**
7pm - 8pm	3	4	6	1	**8**	1	5	**22**	**4**	**28**	**4**
8pm - 9pm	1	1	2	0	3	0	2	**7**	**1**	**9**	**1**
9pm - 10pm	2	0	1	1	2	2	1	**6**	**1**	**9**	**1**
10pm - 11pm	1	1	3	0		0	1	**5**	**1**	**6**	**1**
11pm - Midnight	2	1	1	0		1	0	**4**	**1**	**5**	**1**
Total	**83**	**87**	**106**	**68**	**97**	**138**	**89**	**441**	**88**	**668**	**95**

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Traffic Count Summary Report

Count Number	**7958**	Ref : **EMG**	**Lat/Long : S32 19 03.2 / E149 27 29.8**	**GOOGLE**
Street	**LAHEYS CREEK ROAD, GULGONG : Between SPRING RIDGE ROAD & CASTLEREAGH HIGHWAY (bidirectional) :**			
Location	Site 3 Sealed, about 500 Mtrs west of the Castlereagh Highway, on Give Way Sign			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	76
Weekly 85th Percentile Speed	88
Five Day AADT	280
Seven Day AADT	266

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	1	1	0	1	2	3	**3**	**1**	**8**	**1**
1am - 2am	0	0	0	0	1	0	1	**1**	**0**	**2**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	1	0	1	**1**	**0**	**2**	**0**
4am - 5am	0	1	0	1	1	0	0	**3**	**1**	**3**	**0**
5am - 6am	3	1	3	4	9	2	0	**20**	**4**	**22**	**3**
6am - 7am	8	9	11	9	6	3	3	**43**	**9**	**49**	**7**
7am - 8am	12	20	15	16	17	7	5	**80**	**16**	**92**	**13**
8am - 9am	22	**29**	**44**	**34**	**36**	16	9	**165**	**33**	**190**	**27**
9am - 10am	**23**	19	21	19	16	21	17	**98**	**20**	**136**	**19**
10am - 11am	17	19	14	22	17	**31**	**29**	**89**	**18**	**149**	**21**
11am - Midday	14	20	18	17	13	25	14	**82**	**16**	**121**	**17**
Midday - 1pm	15	14	19	13	20	18	**19**	**81**	**16**	**118**	**17**
1pm - 2pm	27	18	25	18	16	19	12	**104**	**21**	**135**	**19**
2pm - 3pm	16	21	22	23	19	20	14	**101**	**20**	**135**	**19**
3pm - 4pm	26	21	18	22	**31**	20	13	**118**	**24**	**151**	**22**
4pm - 5pm	**28**	**25**	25	16	22	**27**	16	**116**	**23**	**159**	**23**
5pm - 6pm	**28**	19	**26**	**26**	17	18	14	**116**	**23**	**148**	**21**
6pm - 7pm	12	18	16	11	18	13	11	**75**	**15**	**99**	**14**
7pm - 8pm	8	9	10	3	11	7	8	**41**	**8**	**56**	**8**
8pm - 9pm	6	2	7	3	6	2	5	**24**	**5**	**31**	**4**
9pm - 10pm	3	4	1	3	3	3	2	**14**	**3**	**19**	**3**
10pm - 11pm	4	3	7	1	6	5	1	**21**	**4**	**27**	**4**
11pm - Midnight	2	1	1	0	0	6	0	**4**	**1**	**10**	**1**
Total	**274**	**274**	**304**	**261**	**287**	**265**	**197**	**1400**	**280**	**1862**	**266**

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Traffic Count Summary Report

Count Number	**7959**	Ref : **EMG**	**Lat/Long : S32 06 26.2 / E149 11 48.9**	**GOOGLE**
Street	**SANDY CREEK ROAD, GULGONG : Between GOLDEN HIGHWAY & SPRING RIDGE ROAD (bidirectional) :**			
Location	Site 4 Unsealed, about 100 Mtrs south of the Golden Highway			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	36
Weekly 85th Percentile Speed	48
Five Day AADT	4
Seven Day AADT	3

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	**0**	0	0	0	0	**2**	**0**	**0**	**0**	**2**	**0**
1am - 2am	**0**	0	0	0	0	0	**0**	**0**	**0**	**0**	**0**
2am - 3am	**0**	0	0	0	0	0	**0**	**0**	**0**	**0**	**0**
3am - 4am	**0**	0	0	0	0	0	**0**	**0**	**0**	**0**	**0**
4am - 5am	**0**	0	0	0	0	0	**0**	**0**	**0**	**0**	**0**
5am - 6am	**0**	0	0	0	0	0	**0**	**0**	**0**	**0**	**0**
6am - 7am	**0**	0	0	0	0	0	**0**	**0**	**0**	**0**	**0**
7am - 8am	**0**	0	0	0	**1**	0	**0**	**1**	**0**	**1**	**0**
8am - 9am	**0**	**2**	1	**1**	0	0	**0**	**4**	**1**	**4**	**1**
9am - 10am	**0**	1	0	0	**1**	0	**0**	**2**	**0**	**2**	**0**
10am - 11am	**0**	1	1	**1**	0	0	**0**	**3**	**1**	**3**	**0**
11am - Midday	**0**	1	**2**	0	0	0	**0**	**3**	**1**	**3**	**0**
Midday - 1pm	**0**	0	1	0	**0**	**0**	**0**	**1**	**0**	**1**	**0**
1pm - 2pm	**0**	0	1	0	**0**	**0**	**0**	**1**	**0**	**1**	**0**
2pm - 3pm	**0**	0	0	0		**0**	**0**	**0**	**0**	**0**	**0**
3pm - 4pm	**0**	0	0	**1**		**0**	**0**	**1**	**0**	**1**	**0**
4pm - 5pm	**0**	**1**	**4**	0		**0**	**0**	**5**	**1**	**5**	**1**
5pm - 6pm	**0**	0	0	0		**0**	**0**	**0**	**0**	**0**	**0**
6pm - 7pm	**0**	0	0	0		**0**	**0**	**0**	**0**	**0**	**0**
7pm - 8pm	**0**	0	0	0		**0**	**0**	**0**	**0**	**0**	**0**
8pm - 9pm	**0**	0	0	0		**0**	**0**	**0**	**0**	**0**	**0**
9pm - 10pm	**0**	0	0	0		**0**	**0**	**0**	**0**	**0**	**0**
10pm - 11pm	**0**	0	0	0		**0**	**0**	**0**	**0**	**0**	**0**
11pm - Midnight	**0**	0	0	0		**0**	**0**	**0**	**0**	**0**	**0**
Total	**0**	**6**	**10**	**3**	**2**	**2**	**0**	**21**	**4**	**23**	**3**

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Traffic Count Summary Report

Count Number	**7960**	Ref : **EMG**	**Lat/Long : S32 07 39.4 / E149 10 12.9**	**GOOGLE**
Street	**SWEENEYS LANE, GULGONG : Between GOLDEN HIGHWAY & TALLAWONGA ROAD (bidirectional) :**			
Location	Site 5 Unsealed, about 50 Mtrs south of the Golden Highway, on T-int Sign			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	36
Weekly 85th Percentile Speed	46
Five Day AADT	16
Seven Day AADT	15

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	0	0	0	0	0	**2**	1	**0**	**0**	**3**	**0**
1am - 2am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
4am - 5am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
5am - 6am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
6am - 7am	1	0	0	0	0	0	0	**1**	**0**	**1**	**0**
7am - 8am	1	0	**3**	0	**2**	0	0	**6**	**1**	**6**	**1**
8am - 9am	1	1	**3**	0	1	1	0	**6**	**1**	**7**	**1**
9am - 10am	0	1	1	1	**2**	0	1	**5**	**1**	**6**	**1**
10am - 11am	1	**4**	0	**2**	0	1	**3**	**7**	**1**	**11**	**2**
11am - Midday	**2**	0	0	0	1	0	0	**3**	**1**	**3**	**0**
Midday - 1pm	2	**5**	0	0	1	0	**4**	**8**	**2**	**12**	**2**
1pm - 2pm	1	0	0	1	0	**1**	2	**2**	**0**	**5**	**1**
2pm - 3pm	0	**5**	1	1	1	0	1	**8**	**2**	**9**	**1**
3pm - 4pm	0	2	1	0	0	**1**	3	**3**	**1**	**7**	**1**
4pm - 5pm	**4**	1	**5**	0	1	0	1	**11**	**2**	**12**	**2**
5pm - 6pm	3	1	2	**2**	1	**1**	1	**9**	**2**	**11**	**2**
6pm - 7pm	1	0	1	1	**2**	**1**	1	**5**	**1**	**7**	**1**
7pm - 8pm	1	0	0	1	0	0	0	**2**	**0**	**2**	**0**
8pm - 9pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
9pm - 10pm	2	1	0	0		0	0	**3**	**1**	**3**	**1**
10pm - 11pm	1	0	0	0		0	1	**1**	**0**	**2**	**0**
11pm - Midnight	0	0	0	0		0	0	**0**	**0**	**0**	**0**
Total	**21**	**21**	**17**	**9**	**12**	**8**	**19**	**80**	**16**	**107**	**15**

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Traffic Count Summary Report

Count Number	**7961**	Ref : **EMG**	**Lat/Long : S32 08 43.6 / E149 13 38.1**	**GOOGLE**
Street	**DANABAR ROAD, GULGONG : Between SANDY CREEK ROAD & SPRING RIDGE ROAD (bidirectional) :**			
Location	Site 6 Unsealed, about 300 Mtrs west of Spring Ridge Road			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	39
Weekly 85th Percentile Speed	52
Five Day AADT	12
Seven Day AADT	10

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	0	0	0	0	0	**2**	0	**0**	**0**	**2**	**0**
1am - 2am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
4am - 5am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
5am - 6am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
6am - 7am	**1**	0	0	0	0	0	0	**1**	**0**	**1**	**0**
7am - 8am	**1**	**3**	1	**1**	**1**	0	**1**	**7**	**1**	**8**	**1**
8am - 9am	0	**3**	**3**	0	0	1	**1**	**6**	**1**	**8**	**1**
9am - 10am	**1**	1	0	**1**	0	0	0	**3**	**1**	**3**	**0**
10am - 11am	0	2	2	**1**	**1**	0	**1**	**6**	**1**	**7**	**1**
11am - Midday	0	2	1	**1**	**1**	0	0	**5**	**1**	**5**	**1**
Midday - 1pm	**3**	1	2	0	**1**	0	**0**	**7**	**1**	**7**	**1**
1pm - 2pm	0	1	1	**1**	0	0	**0**	**3**	**1**	**3**	**0**
2pm - 3pm	0	0	2	0	**1**	0	**0**	**3**	**1**	**3**	**0**
3pm - 4pm	0	**2**	**5**	**1**	**1**	0	**0**	**9**	**2**	**9**	**1**
4pm - 5pm	0	**2**	2	**1**	0	0	**0**	**5**	**1**	**5**	**1**
5pm - 6pm	1	0	0	0	0	**1**	**0**	**1**	**0**	**2**	**0**
6pm - 7pm	1	0	2	0	0	0	**0**	**3**	**1**	**3**	**0**
7pm - 8pm	1	0	0	0	0	0	**0**	**1**	**0**	**1**	**0**
8pm - 9pm	1	0	0	0		0	**0**	**1**	**0**	**1**	**0**
9pm - 10pm	0	0	0	0		0	**0**	**0**	**0**	**0**	**0**
10pm - 11pm	0	0	0	0		0	**0**	**0**	**0**	**0**	**0**
11pm - Midnight	0	0	0	0		0	**0**	**0**	**0**	**0**	**0**
Total	**10**	**17**	**21**	**7**	**6**	**4**	**3**	**61**	**12**	**68**	**9**

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Traffic Count Summary Report

Count Number	**7962**	Ref : **EMG**	**Lat/Long : S32 11 32.6 / E149 16 14.5**	**GOOGLE**
Street	**DAPPER STREET, GULGONG : Between SANDY CREEK ROAD & SPRING RIDGE ROAD (bidirectional) :**			
Location	Site 7 Unsealed, about 500 Mtrs west of Spring Ridge Road			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	46
Weekly 85th Percentile Speed	58
Five Day AADT	20
Seven Day AADT	19

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	0	0	0	0	0	2	1	**0**	**0**	**3**	**0**
1am - 2am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
4am - 5am	0	0	1	0	0	0	0	**1**	**0**	**1**	**0**
5am - 6am	1	0	0	0	0	0	0	**1**	**0**	**1**	**0**
6am - 7am	0	0	0	1	1	0	0	**2**	**0**	**2**	**0**
7am - 8am	0	1	0	0	**4**	0	0	**5**	**1**	**5**	**1**
8am - 9am	2	2	**3**	**3**	3	0	1	**13**	**3**	**14**	**2**
9am - 10am	**4**	1	1	0	2	0	1	**8**	**2**	**9**	**1**
10am - 11am	0	3	1	1	1	1	1	**6**	**1**	**8**	**1**
11am - Midday	2	**5**	1	0	0	**5**	**4**	**8**	**2**	**17**	**2**
Midday - 1pm	1	1	2	2	2	0	1	**8**	**2**	**9**	**1**
1pm - 2pm	2	**3**	1	0	1	1	**4**	**7**	**1**	**12**	**2**
2pm - 3pm	2	**3**	2	1	1	1	3	**9**	**2**	**13**	**2**
3pm - 4pm	0	1	0	**4**	0	**3**	0	**5**	**1**	**8**	**1**
4pm - 5pm	**3**	2	**3**	1	**6**	0	1	**15**	**3**	**16**	**2**
5pm - 6pm	0	1	1	3	0	**3**	0	**5**	**1**	**8**	**1**
6pm - 7pm	1	2	2	1	0	1	0	**6**	**1**	**7**	**1**
7pm - 8pm	0	0	1	0		1	0	**1**	**0**	**2**	**0**
8pm - 9pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
9pm - 10pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
10pm - 11pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
11pm - Midnight	0	0	0	0		0	0	**0**	**0**	**0**	**0**
Total	**18**	**25**	**19**	**17**	**21**	**18**	**17**	**100**	**20**	**135**	**19**

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Traffic Count Summary Report

Count Number	**7963**	Ref : **EMG**	**Lat/Long : S32 12 06.2 / E149 16 45.1**	**GOOGLE**
Street	**TUCKLAN ROAD, GULGONG : Between SPRING RIDGE ROAD & CASTLEREAGH HIGHWAY (bidirectional) :**			
Location	Site 8 Unsealed, also known as Laheys Creek Road, about 100 Mtrs east of Spring Ridge Road			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	42
Weekly 85th Percentile Speed	55
Five Day AADT	23
Seven Day AADT	41

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	0	0	2	0	**0**	**0**	**2**	**0**
1am - 2am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
4am - 5am	0	0	0	1	0	0	0	**1**	**0**	**1**	**0**
5am - 6am	1	2	1	0	1	0	0	**5**	**1**	**5**	**1**
6am - 7am	1	0	2	0	1	0	0	**4**	**1**	**4**	**1**
7am - 8am	1	2	1	**2**	**3**	0	1	**9**	**2**	**10**	**1**
8am - 9am	2	**3**	**3**	1	**3**	9	3	**12**	**2**	**24**	**3**
9am - 10am	1	**3**	1	0	**3**	8	2	**8**	**2**	**18**	**3**
10am - 11am	**4**	2	0	**2**	2	**35**	**6**	**10**	**2**	**51**	**7**
11am - Midday	0	1	1	1	1	17	2	**4**	**1**	**23**	**3**
Midday - 1pm	2	0	2	1	**2**	4	1	**7**	**1**	**12**	**2**
1pm - 2pm	**7**	**3**	1	2	1	11	2	**14**	**3**	**27**	**4**
2pm - 3pm	0	1	1	1	1	**23**	**4**	**4**	**1**	**31**	**4**
3pm - 4pm	2	2	2	1	**2**	21	1	**9**	**2**	**31**	**4**
4pm - 5pm	1	2	3	1	**2**	5	2	**9**	**2**	**16**	**2**
5pm - 6pm	1	0	**4**	**3**	1	4	0	**9**	**2**	**13**	**2**
6pm - 7pm	0	1	2	1	1	6	0	**5**	**1**	**11**	**2**
7pm - 8pm	0	1	0	0	0	1	1	**1**	**0**	**3**	**0**
8pm - 9pm	0	0	0	0	1	0	0	**1**	**0**	**1**	**0**
9pm - 10pm	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
10pm - 11pm	1	0	0	0		0	1	**1**	**0**	**2**	**0**
11pm - Midnight	0	0	0	0		0	0	**0**	**0**	**0**	**0**
Total	**24**	**23**	**24**	**17**	**25**	**146**	**26**	**113**	**22**	**285**	**40**

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Traffic Count Summary Report

Count Number	**7964**	Ref : **EMG**	**Lat/Long : S32 12 12.1 / E149 25 28.8**	**GOOGLE**
Street	**TUCKLAN ROAD, GULGONG : Between SPRING RIDGE ROAD & CASTLEREAGH HIGHWAY (bidirectional) :**			
Location	Site 9 Unsealed, west of Castlereagh Highway, at Causeway			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	44
Weekly 85th Percentile Speed	62
Five Day AADT	66
Seven Day AADT	61

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	1	0	2	0	**1**	**0**	**3**	**0**
1am - 2am	0	0	0	0	0	0	2	**0**	**0**	**2**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
4am - 5am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
5am - 6am	1	1	1	0	0	1	0	**3**	**1**	**4**	**1**
6am - 7am	1	5	4	4	1	2	2	**15**	**3**	**19**	**3**
7am - 8am	2	4	6	7	1	0	0	**20**	**4**	**20**	**3**
8am - 9am	3	5	11	**11**	3	1	4	**33**	**7**	**38**	**5**
9am - 10am	2	3	7	4	4	**5**	5	**20**	**4**	**30**	**4**
10am - 11am	3	3	**12**	5	**5**	2	**6**	**28**	**6**	**36**	**5**
11am - Midday	**4**	**6**	6	8	3	4	**6**	**27**	**5**	**37**	**5**
Midday - 1pm	1	0	5	6	6	**4**	3	**18**	**4**	**25**	**4**
1pm - 2pm	0	4	4	9	3	3	**7**	**20**	**4**	**30**	**4**
2pm - 3pm	**7**	6	10	**11**	5	**4**	5	**39**	**8**	**48**	**7**
3pm - 4pm	4	6	**13**	9	**10**	3	6	**42**	**8**	**51**	**7**
4pm - 5pm	2	**8**	3	1	9	2	3	**23**	**5**	**28**	**4**
5pm - 6pm	2	3	3	6	4	**4**	1	**18**	**4**	**23**	**3**
6pm - 7pm	2	2	1	3	1	1	4	**9**	**2**	**14**	**2**
7pm - 8pm	1	1	3	2	1	2	0	**8**	**2**	**10**	**1**
8pm - 9pm	0	0	0	1	1	1	0	**2**	**0**	**3**	**0**
9pm - 10pm	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
10pm - 11pm	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
11pm - Midnight	0	0	0	1	2	0	0	**3**	**1**	**3**	**0**
Total	**35**	**57**	**89**	**89**	**59**	**41**	**54**	**329**	**65**	**424**	**60**

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Traffic Count Summary Report

Count Number	**7965**	Ref : **EMG**	**Lat/Long : S32 04 12.5 / E149 24 10.0**	**GOOGLE**
Street	**TUCKLAN ROAD, GULGONG : Between CASTLEREAGH HIGHWAY & GOLDEN HIGHWAY (bidirectional) :**			
Location	Site 10, Sealed, also known as Wargundy Street, approx 6 Kms south of Dunedoo			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	88
Weekly 85th Percentile Speed	99
Five Day AADT	138
Seven Day AADT	125

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	0	0	3	2	**0**	**0**	**5**	**1**
1am - 2am	0	0	0	0	0	0	3	**0**	**0**	**3**	**0**
2am - 3am	0	0	0	0	0	0	2	**0**	**0**	**2**	**0**
3am - 4am	0	0	0	0	1	1	1	**1**	**0**	**3**	**0**
4am - 5am	2	0	0	0	0	0	0	**2**	**0**	**2**	**0**
5am - 6am	3	4	4	3	1	1	1	**15**	**3**	**17**	**2**
6am - 7am	3	7	5	6	5	0	2	**26**	**5**	**28**	**4**
7am - 8am	**13**	10	9	13	**15**	2	4	**60**	**12**	**66**	**9**
8am - 9am	7	**18**	**18**	**16**	12	3	6	**71**	**14**	**80**	**11**
9am - 10am	10	9	9	2	8	7	4	**38**	**8**	**49**	**7**
10am - 11am	9	8	11	4	7	**10**	7	**39**	**8**	**56**	**8**
11am - Midday	4	11	8	5	8	8	**11**	**36**	**7**	**55**	**8**
Midday - 1pm	5	8	9	9	9	2	**9**	**40**	**8**	**51**	**7**
1pm - 2pm	14	8	6	3	9	**10**	4	**40**	**8**	**54**	**8**
2pm - 3pm	11	**16**	11	7	9	9	7	**54**	**11**	**70**	**10**
3pm - 4pm	7	10	10	5	**19**	4	8	**51**	**10**	**63**	**9**
4pm - 5pm	7	15	10	11	16	9	3	**59**	**12**	**71**	**10**
5pm - 6pm	**15**	11	**15**	**17**	14	6	4	**72**	**14**	**82**	**12**
6pm - 7pm	6	8	4	4	6	7	7	**28**	**6**	**42**	**6**
7pm - 8pm	6	7	4	7	6	5	0	**30**	**6**	**35**	**5**
8pm - 9pm	3	2	2	1	4	2	0	**12**	**2**	**14**	**2**
9pm - 10pm	2	1	0	2	3	3	3	**8**	**2**	**14**	**2**
10pm - 11pm	0	0	1	1	3	2	1	**5**	**1**	**8**	**1**
11pm - Midnight	1	0	1	0	1	0	0	**3**	**1**	**3**	**0**
Total	**128**	**153**	**137**	**116**	**156**	**94**	**89**	**690**	**138**	**873**	**124**

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Traffic Count Summary Report

Count Number	**7966**	Ref : **EMG**	**Lat/Long : S32 20 59.9 / E149 26 31.6** **GOOGLE**
Street	**MEBUL ROAD, GULGONG : Between GOOLMA ROAD & SPRING RIDGE ROAD (bidirectional) :**		
Location	Site 11 Sealed, about 100 Mtrs west of Spring Ridge Road, 30 Mtrs east of House No. 19		*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	59
Weekly 85th Percentile Speed	71
Five Day AADT	82
Seven Day AADT	82

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	3	1	2	0	**4**	**1**	**6**	**1**
1am - 2am	0	0	0	1	1	2	1	**2**	**0**	**5**	**1**
2am - 3am	0	0	0	0	0	0	2	**0**	**0**	**2**	**0**
3am - 4am	0	0	0	0	1	1	1	**1**	**0**	**3**	**0**
4am - 5am	1	1	0	0	0	0	1	**2**	**0**	**3**	**0**
5am - 6am	2	2	0	1	0	0	2	**5**	**1**	**7**	**1**
6am - 7am	1	3	2	5	5	0	0	**16**	**3**	**16**	**2**
7am - 8am	3	4	3	**7**	5	3	1	**22**	**4**	**26**	**4**
8am - 9am	6	7	**6**	4	7	6	**6**	**30**	**6**	**42**	**6**
9am - 10am	6	2	2	4	**9**	5	5	**23**	**5**	**33**	**5**
10am - 11am	4	**12**	5	3	3	3	1	**27**	**5**	**31**	**4**
11am - Midday	**10**	3	5	4	5	**9**	4	**27**	**5**	**40**	**6**
Midday - 1pm	6	5	5	1	9	4	9	**26**	**5**	**39**	**6**
1pm - 2pm	4	3	3	7	5	**9**	6	**22**	**4**	**37**	**5**
2pm - 3pm	5	8	4	5	5	4	7	**27**	**5**	**38**	**5**
3pm - 4pm	**8**	4	**6**	5	6	**9**	**12**	**29**	**6**	**50**	**7**
4pm - 5pm	7	**9**	5	**10**	**14**	4	9	**45**	**9**	**58**	**8**
5pm - 6pm	**8**	**9**	5	8	4	4	7	**34**	**7**	**45**	**6**
6pm - 7pm	2	6	2	5	7	4	2	**22**	**4**	**28**	**4**
7pm - 8pm	3	7	3	4	1	7	1	**18**	**4**	**26**	**4**
8pm - 9pm	3	1	3	3	2	1	7	**12**	**2**	**20**	**3**
9pm - 10pm	0	2	3	1	1	3	1	**7**	**1**	**11**	**2**
10pm - 11pm	0	0	0	1	0	0	0	**1**	**0**	**1**	**0**
11pm - Midnight	3	1	1	0	2	0	0	**7**	**1**	**7**	**1**
Total	**82**	**89**	**63**	**82**	**93**	**80**	**85**	**409**	**81**	**574**	**82**

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Traffic Count Summary Report

Count Number	**7967**	Ref : **EMG**	**Lat/Long : S32 22 53.6 / E149 18 22.6** **GOOGLE**
Street	**MEBUL ROAD, GULGONG : Between GOOLMA ROAD & SPRING RIDGE ROAD (bidirectional) :**		
Location	Site 12 Sealed, about 200 Mtrs north Goolma Road, on Bend Sign		*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	58
Weekly 85th Percentile Speed	74
Five Day AADT	51
Seven Day AADT	51

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	0	0	2	1	**0**	**0**	**3**	**0**
1am - 2am	0	0	0	0	1	0	0	**1**	**0**	**1**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	1	0	0	**1**	**0**	**1**	**0**
4am - 5am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
5am - 6am	0	0	1	1	1	0	0	**3**	**1**	**3**	**0**
6am - 7am	1	1	2	2	1	1	0	**7**	**1**	**8**	**1**
7am - 8am	3	2	**4**	6	5	1	1	**20**	**4**	**22**	**3**
8am - 9am	**8**	**8**	**4**	2	7	1	**3**	**29**	**6**	**33**	**5**
9am - 10am	3	2	**4**	2	1	3	**3**	**12**	**2**	**18**	**3**
10am - 11am	2	2	3	2	6	3	**3**	**15**	**3**	**21**	**3**
11am - Midday	3	1	0	**9**	**8**	**6**	**3**	**21**	**4**	**30**	**4**
Midday - 1pm	4	0	1	2	2	2	4	**9**	**2**	**15**	**2**
1pm - 2pm	0	2	2	3	5	2	**8**	**12**	**2**	**22**	**3**
2pm - 3pm	2	2	4	4	0	**7**	1	**12**	**2**	**20**	**3**
3pm - 4pm	2	5	2	2	2	3	3	**13**	**3**	**19**	**3**
4pm - 5pm	**5**	3	**7**	**5**	**6**	5	2	**26**	**5**	**33**	**5**
5pm - 6pm	2	**7**	2	4	0	5	5	**15**	**3**	**25**	**4**
6pm - 7pm	2	4	6	4	4	**7**	5	**20**	**4**	**32**	**5**
7pm - 8pm	0	1	5	3	3	0	2	**12**	**2**	**14**	**2**
8pm - 9pm	3	3	0	3	1	**7**	0	**10**	**2**	**17**	**2**
9pm - 10pm	1	1	**7**	0	0	0	1	**9**	**2**	**10**	**1**
10pm - 11pm	2	2	2	0	2	0	0	**8**	**2**	**8**	**1**
11pm - Midnight	0	0	0	0	0	3	0	**0**	**0**	**3**	**0**
Total	**43**	**46**	**56**	**54**	**56**	**58**	**45**	**255**	**51**	**358**	**51**

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Traffic Count Summary Report

Count Number 7968 Ref : EMG **Lat/Long : S32 17 34.0 / E149 23 28.5** GOOGLE

Street **UPPER MEBUL ROAD, GULGONG : Between MEBUL ROAD & SPRING RIDGE ROAD (bidirectional) :**

Location Site 13 Sealed, about 50 Mtrs west of Spring Ridge Road, on Gate *Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	33
Weekly 85th Percentile Speed	39
Five Day AADT	13
Seven Day AADT	16

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	0	0	0	0	0	**2**	1	**0**	**0**	**3**	**0**
1am - 2am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
2am - 3am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	0	0	1	0	0	**1**	**0**	**1**	**0**
4am - 5am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
5am - 6am	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
6am - 7am	0	0	0	0	0	0	1	**0**	**0**	**1**	**0**
7am - 8am	1	1	0	0	0	0	1	**2**	**0**	**3**	**0**
8am - 9am	0	1	**3**	1	**3**	0	2	**8**	**2**	**10**	**1**
9am - 10am	**2**	1	0	1	**3**	1	**4**	**7**	**1**	**12**	**2**
10am - 11am	0	2	1	1	1	1	3	**5**	**1**	**9**	**1**
11am - Midday	**2**	**3**	1	**2**	2	0	1	**10**	**2**	**11**	**2**
Midday - 1pm	0	**3**	1	**1**	0	3	0	**5**	**1**	**8**	**1**
1pm - 2pm	**3**	1	1	**1**	0	2	1	**6**	**1**	**9**	**1**
2pm - 3pm	1	1	**4**	**1**	0	3	0	**7**	**1**	**10**	**1**
3pm - 4pm	2	1	0	0	**1**	2	1	**4**	**1**	**7**	**1**
4pm - 5pm	1	0	0	0		3	**2**	**1**	**0**	**6**	**1**
5pm - 6pm	2	1	1	**1**		**8**	0	**5**	**1**	**13**	**2**
6pm - 7pm	1	0	0	0		3	0	**1**	**0**	**4**	**1**
7pm - 8pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
8pm - 9pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
9pm - 10pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
10pm - 11pm	1	0	0	0		1	0	**1**	**0**	**2**	**0**
11pm - Midnight	0	0	0	0		3	0	**0**	**0**	**3**	**1**
Total	**16**	**15**	**12**	**9**	**11**	**32**	**17**	**63**	**12**	**112**	**16**

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Traffic Count Summary Report

Count Number	**7973**	Ref : **EMG**	**Lat/Long : S32 16 06.0 / E149 16 14.4**	**GOOGLE**
Street	**SANDY CREEK ROAD, GULGONG : Between GOLDEN HIGHWAY & SPRING RIDGE ROAD (bidirectional) :**			
Location	Site 14 Unsealed, about 7 Kms west of Spring Ridge Road			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-OCT-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	53
Weekly 85th Percentile Speed	71
Five Day AADT	4
Seven Day AADT	5

	MON *17TH*	TUE *18TH*	WED *19TH*	THU *20TH*	FRI *21ST*	SAT *15TH*	SUN *16TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	0	0	**0**	0	0	**2**	0	**0**	**0**	**2**	**0**
1am - 2am	0	0	**0**	0	0	0	0	**0**	**0**	**0**	**0**
2am - 3am	0	0	**0**	0	0	0	0	**0**	**0**	**0**	**0**
3am - 4am	0	0	**0**	0	0	0	0	**0**	**0**	**0**	**0**
4am - 5am	0	0	**0**	0	0	0	0	**0**	**0**	**0**	**0**
5am - 6am	0	0	**0**	0	0	0	0	**0**	**0**	**0**	**0**
6am - 7am	0	0	**0**	0	0	0	0	**0**	**0**	**0**	**0**
7am - 8am	0	0	**0**	**1**	0	0	0	**1**	**0**	**1**	**0**
8am - 9am	0	0	**0**	0	**1**	0	0	**1**	**0**	**1**	**0**
9am - 10am	**1**	0	**0**	0	0	**2**	**1**	**1**	**0**	**4**	**1**
10am - 11am	0	0	**0**	0	**1**	0	0	**1**	**0**	**1**	**0**
11am - Midday	0	**1**	**0**	0	0	0	**1**	**1**	**0**	**2**	**0**
Midday - 1pm	0	**2**	1	0	**2**	0	0	**5**	**1**	**5**	**1**
1pm - 2pm	0	0	**3**	0	0	0	2	**3**	**1**	**5**	**1**
2pm - 3pm	0	1	0	**1**	0	0	**4**	**2**	**0**	**6**	**1**
3pm - 4pm	1	0	0	0		0	0	**1**	**0**	**1**	**0**
4pm - 5pm	**2**	0	0	0		0	0	**2**	**0**	**2**	**0**
5pm - 6pm	1	0	0	0		**2**	0	**1**	**0**	**3**	**1**
6pm - 7pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
7pm - 8pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
8pm - 9pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
9pm - 10pm	0	0	0	0		0	0	**0**	**0**	**0**	**0**
10pm - 11pm	0	0	0	0		1	0	**0**	**0**	**1**	**0**
11pm - Midnight	0	0	0	0		1	0	**0**	**0**	**1**	**0**
Total	**5**	**4**	**4**	**2**	**4**	**8**	**8**	**19**	**3**	**35**	**5**

Appendix C

Road and Intersection Capacity Standards

Adopting a lower standard than that mentioned within Section 3.2 will compromise road safety thereby increasing stake holder's risk to litigation.

3.2.2 Two Lane Two Way Rural Roads

Minimum traffic lane widths for two lane two way rural road applications should be determined from Table 3.2-4.

TABLE 3.2-4 Lane Widths Two Lane Two Way Rural Roads

A.A.D.T (1)	No. of Lanes	Lane Width (m)
1 - 150	1	3.5
150 - 500	2	3.0
500 - 2000	2	3.0 - 3.5
>2000	2	3.5

NOTE:
(1) end of design life of road pavement (generally 20 years)

Where the intended design speed through mountainous terrain will be in excess of 80km/h, or 100km/h in undulating terrain, or where there is a predominantly high percentage of heavy vehicles (20% for 500 AADT and 5% for 2000 AADT), a lane width of 3.5m is desirable.

3.2.3 Multilane Rural Roads

The lane widths provided on multilane rural roads should be 3.5m. Desirably any rural road consisting of four lanes or more should have a central median, separating opposing traffic flows.

3.2.4 Urban Roads

It is desirable for traffic lanes on urban roads to be 3.5m wide but if the road reserve is restricted, the lane width/s may be reduced.

Quite often the designer is faced with the task of "squeezing" an extra lane from an existing or partially widened road formation.

To allocate lane widths on an equitable basis, the differing functions and interfaces of each lane needs to be taken into account.

It should be noted that "effective" lane widths are measured from the centreline of linemarking or from the face of kerb. See Figure 3.2.1

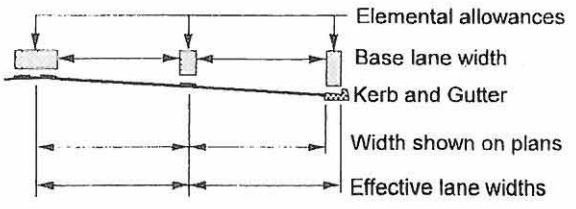


Figure 3.2-1 Lane Width Notation

Following are guidelines for calculation of lane widths according to various local parameters.

3.2.4.1 Lane widths if total width is known.

- Determine the number of lanes that are required and the elemental allowance between each lane according to function
- Add all of the elemental allowances and subtract them from the total available width. Divide this figure by the determined number of lanes to ascertain the base lane width.
- Add half the adjoining element allowance to each base lane width to give the effective lane width. This will necessitate adding the full kerbside allowance to the adjoining lane.
- Check that these calculated effective lane widths conform with the allowable minimum, taking into consideration the influence of widening where curved alignments occur.
- Round the lane widths as required.

For example; consider an existing six lane, 21.1m carriageway on straight alignment. A right turn bay is required with the possibility of continuing the raised median along this length to fit in with the 1.2m median on each approach. What lane widths can be accommodated? See Figure 3.2.2.

3.2.4.2 Widening required for given number of lanes and functions.

- Determine the elemental allowance between each lane according to function
- Add half of the adjoining element allowance to each of the base lane widths to give the effective lane width. This will require the addition of the full kerbside allowance to the adjoining lane.
- Determine the effective minimum lane width, taking into consideration the horizontal alignment. See Figure 3.2.4.
- Deduct the smallest adjoining element allowance from the minimum effective lane width to give the base lane width that needs to be applied for each lane.
- Add the base lane width to the adjoining element allowance for each remaining lane to determine the effective lane widths.
- Round the lane widths as required.
- Add the effective lane widths and deduct the existing width of carriageway to give the total widening required.

For example; consider an existing carriageway of 12.8m on a curve of radius 170m. A right turn bay is required at a side street. What is the minimum widening required? See Figure 3.2.3.

3.3 SHOULDERS

3.3.1 General

The shoulder is that portion of the carriageway beyond the traffic lanes, adjacent to, and flush with the surface of the pavement. Its purpose is to accommodate stopped vehicles and offer lateral support to the road pavement layers

The shoulder width is measured from the edge of the traffic lane to the verge. All safety barriers, signs, guide posts, drains and kerbs are to be contained within the verge. Fixed objects within the verge should be frangible or protected with a safety barrier (see Section 3.6.2 verges).

If local circumstances warrant, the width of shoulder and/or seal other than that specified may be provided. Adopting a lower standard than that mentioned within Section 3.3 will compromise road safety thereby increasing stake holder's risk to litigation.

3.3.2 Two Lane Two Way Rural Roads

(a) Widths

Table 3.3.1 lists shoulder width requirements for two lane rural roads based on AADT volumes with minimal pedestrian and/or bicycle traffic.

TABLE 3.3-1 Shoulder Widths for Two Lane Two Way Rural Roads

A.A.D.T. (1)	Shoulder Width (m)
1 - 500	1.0 - 1.5 (2)
500 - 1000	1.0 - 2.0 (2)
over 1000	2.0 - 3.0 (3)
Adjacent to barrier lines	3.0

NOTES:
(1) at end of road pavement design life (generally 20 yrs)
(2) where 1.0m shoulders are used, provide lay bys
(3) adopt 3.0m where heavy vehicle volumes are high

Shoulders 3.0m wide should be provided adjacent to all barrier lines and as required at intersection layouts and merge areas. A taper of 1:50 should be applied between different width shoulders that adjoin one another. This taper transition may need to be lengthened to ensure the taper's appearance is satisfactory.

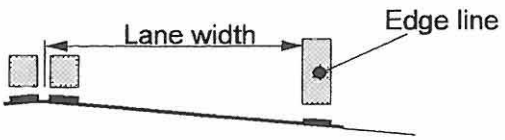
(b) Shoulder Sealing

Shoulders should be sealed to a width of 0.5m from the edge of the sealed lane, when the predicted AADT is less than 2000, and 1m when the predicted AADT is greater than 2000.

A full width seal should be provided under the following conditions:

- Adjacent to a lined table drain, kerb or dyke;
- Where a safety barrier is provided adjacent to a 1.0m wide shoulder;
- On the outer shoulder of a superelevated curve;
- On floodways.
- Where rigid pavement is proposed.

Edge lines should be marked so that their inside edge corresponds to the outside of the lane.



3.3.3 Multilane Rural Roads

On a rural road with a median and two lanes or more in each direction the shoulders should be 2.0m wide (sealed 1.0m) on the nearside and 1.0m wide (sealed full width) on the offside (median).

The need to provide lay bys on multilane roads is not as critical as on two lane two way roads. However, consideration should still be given to providing these facilities, particularly for heavy vehicles, at approximately 10 km intervals.

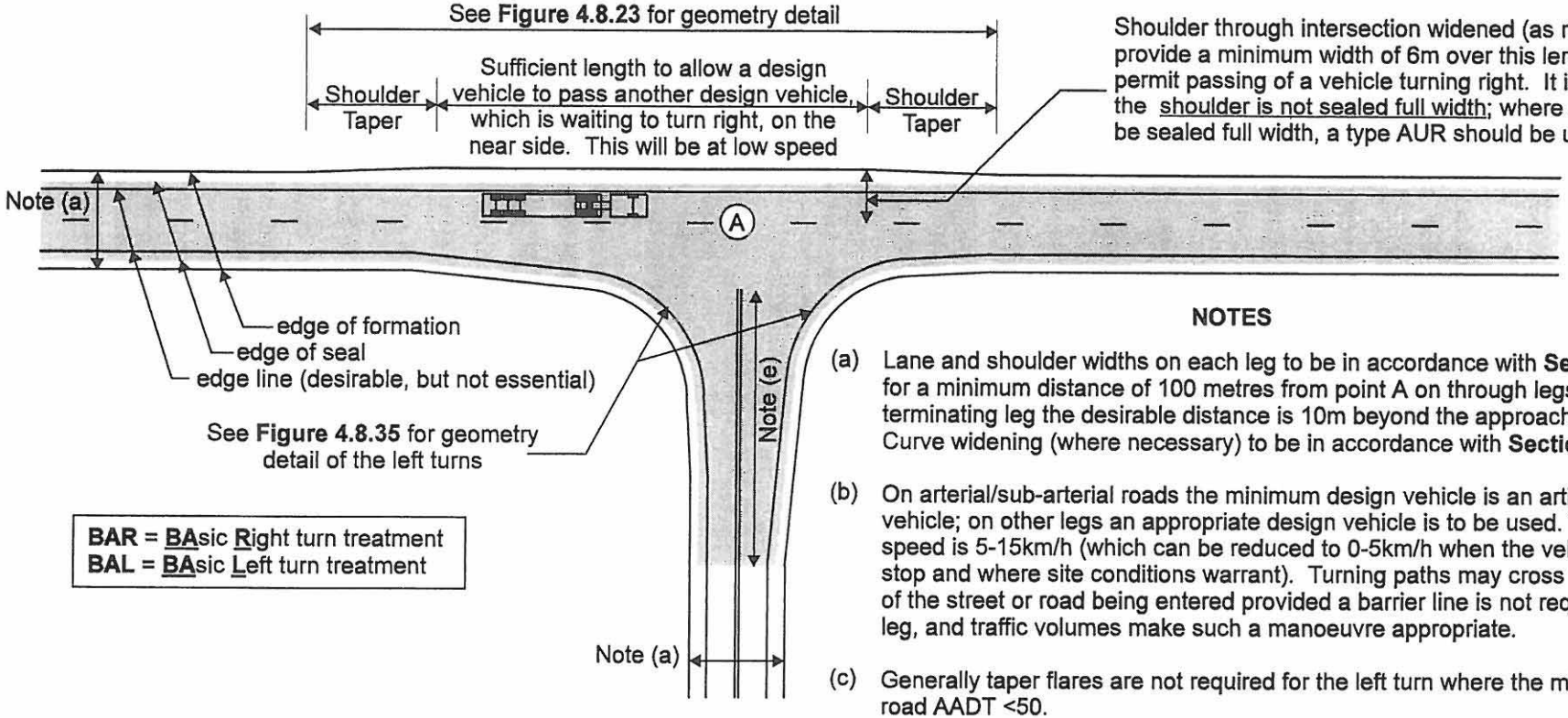
3.3.4 Auxiliary Lanes

Nearside shoulder widths adjacent to auxiliary lanes should generally be 1.0m, widened to 2.0m adjacent to a safety barrier and 3.0m at merge areas (see RTA Road Design Guide - Section 9.1, Figure 9.1.3.). At merge locations it is important that the shoulder remain traffickable, thus a full width seal is desirable.

3.3.5 Ramps

Desirably, shoulder widths on ramps should be 2.0m on the nearside and 1.0m on the offside. Shoulder seal shall be full width. Under special circumstances the shoulders may be reduced but the total carriageway width should not be less than 5.5m.

This layout does not rely on pavement markings and can be used on an unsealed wearing surface.
This layout suits sites where the amount of turning traffic is small.



***Section 4.8** provides details of geometry whilst **"Signs and Markings"** gives the location of signs and details of pavement marking.*

NOTES

(a) Lane and shoulder widths on each leg to be in accordance with **Section 3** for a minimum distance of 100 metres from point A on through legs; on terminating leg the desirable distance is 10m beyond the approach taper. Curve widening (where necessary) to be in accordance with **Section 2**.

(b) On arterial/sub-arterial roads the minimum design vehicle is an articulated vehicle; on other legs an appropriate design vehicle is to be used. Turning speed is 5-15km/h (which can be reduced to 0-5km/h when the vehicle must stop and where site conditions warrant). Turning paths may cross the centreline of the street or road being entered provided a barrier line is not required for that leg, and traffic volumes make such a manoeuvre appropriate.

(c) Generally taper flares are not required for the left turn where the minor road AADT <50.

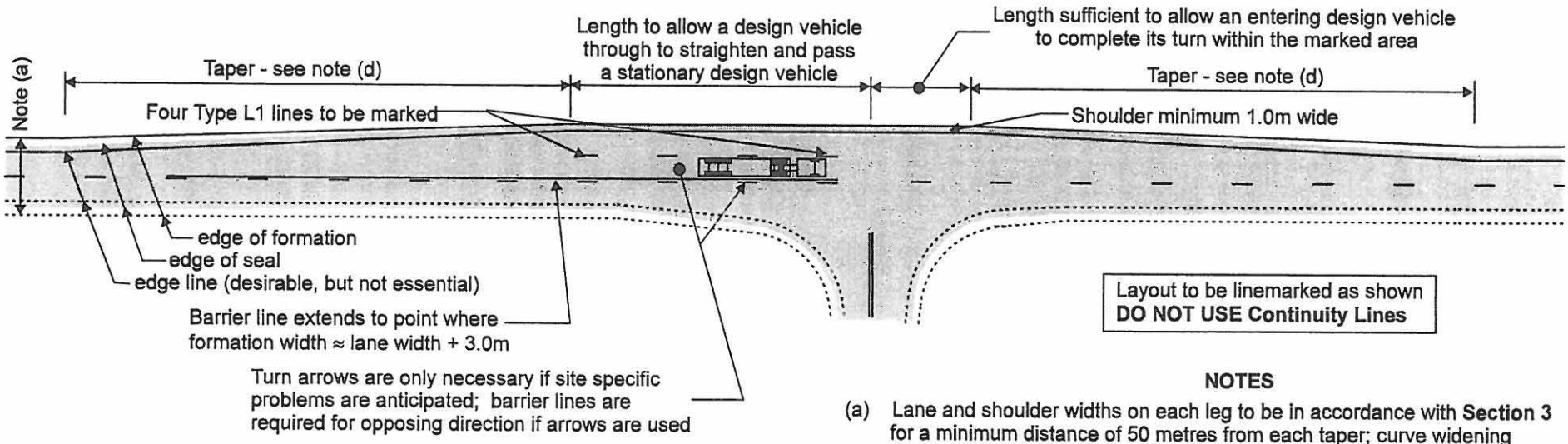
(d) Sight distance to be appropriate for the 85th percentile free speed of each approach movement. Furniture (especially signs) and planting are not to interfere with sight distance requirements.

(e) Where through road is sealed and side road is not, the side road is to be sealed to the end of the turn as a minimum and, preferably, to the start of the tapers.

(f) All non-frangible furniture to be located outside clear zone or be protected. Locate drainage headwalls and raised letter box type grates outside the clear zone of the through road.

Figure 4.5.2 - Type BAR and BAL Layout Combined to show a Basic Rural Intersection Treatment on both a Through and a Terminating Leg

This layout is particularly suited to rural areas where high speed, low volume traffic occurs, yet the volume of turning traffic is sufficient to make a conflict likely.



AUR = **AU**xiliary lane **R**ight turn treatment
AUL = **AU**xiliary lane **L**eft turn treatment

This layout is designed to store one design vehicle and allow another design vehicle to pass. Where longer storage is necessary a channelised layout is preferred. Where an auxiliary right turn lane is required on the terminating leg, the "AUL" layout can be used.

***Section 4.8** provides details of geometry whilst **"Signs and Markings"** gives the details and location of signs and pavement marking. Advanced warning signs, alerting drivers to the presence of the intersection, may be required.*

NOTES

(a) Lane and shoulder widths on each leg to be in accordance with **Section 3** for a minimum distance of 50 metres from each taper; curve widening (where necessary) to be in accordance with **Section 2.**

(b) On arterial/sub-arterial roads an articulated vehicle is the minimum design vehicle used to define the turning path. Turning speed is 5-15km/h. Turning paths may cross the centreline of the street or road being entered provided a barrier line is not required for that leg, and traffic volumes make such a manoeuvre appropriate.

(c) Approach sight distance to be appropriate for the 85th percentile free speed of each approach movement and measured 1.15 to zero (because of the pavement markings). Furniture (especially signs) and planting are not to interfere with sight distance requirements.

(d) Taper length determined on basis that some reduction in speed occurs.

(e) All furniture to be located outside the shoulder. Furniture (guideposts, kerbs, etc. can be used to control the area of conflict.

(f) All non-frangible furniture to be located outside clear zone or be protected. Locate drainage headwalls and raised letter box type grates outside the clear zone of the through road

Figure 4.5.3 - Rural Type "AUR" Layout

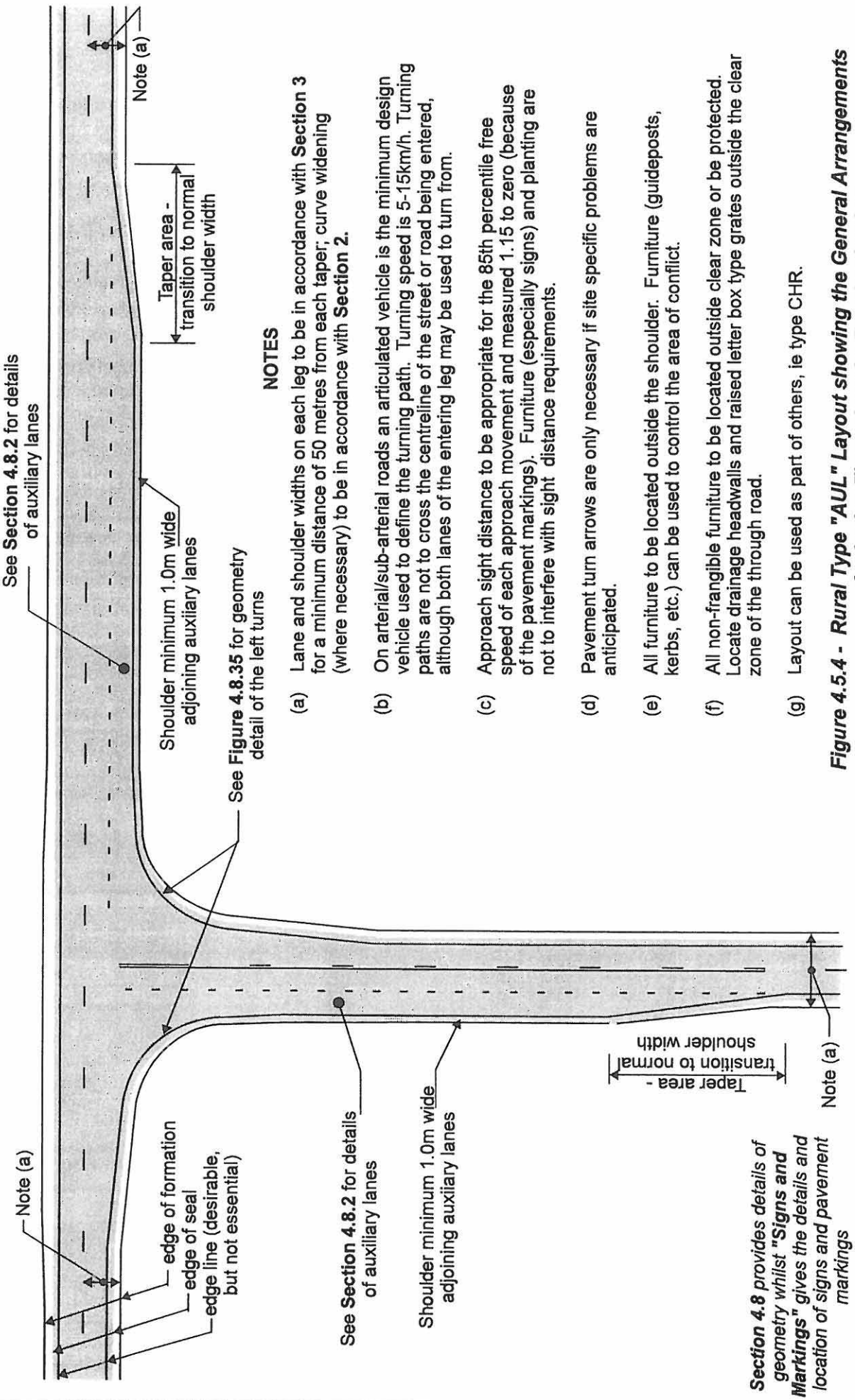
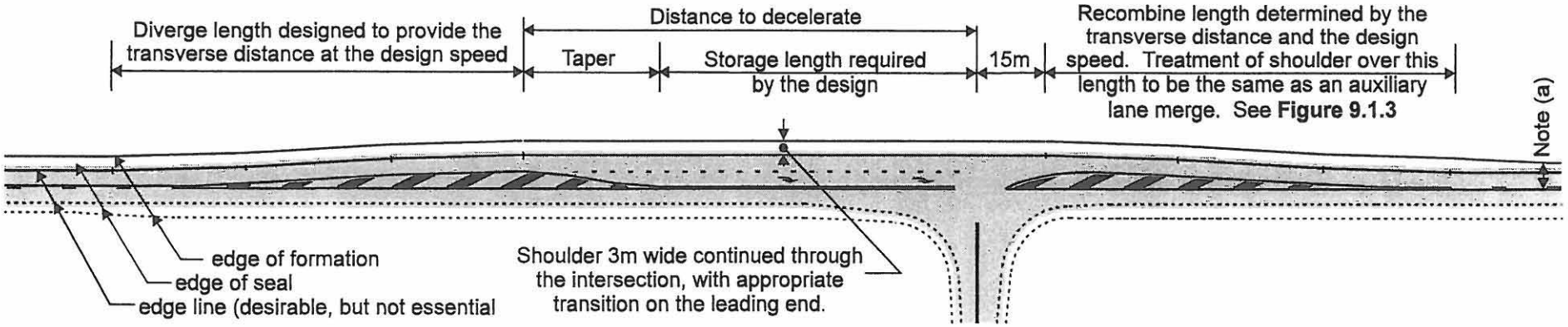


Figure 4.5.4 - Rural Type "AUL" Layout showing the General Arrangements for both a Through and a Terminating Leg.

This form of layout has particular application at complex sites with heavy, turning movements, and accident black spots which could be assisted by separation of movements.



NOTES

(a) Lane and shoulder widths on each leg to be in accordance with **Section 3** for a minimum distance of 100 metres from the start of each median; curve widening (where necessary) to be in accordance with **Section 2.**

(b) The longest expected vehicle to be used to define the turning path. Turning speed is 5-15km/h (which can be reduced to 0-5km/h where site conditions warrant). Turning paths are NOT to cross the centreline of the street or road being entered.

(c) Approach sight distance to be appropriate for the 85th percentile free speed of each approach movement and measured 1.15m to zero (because of the pavement markings). Furniture (especially signs) and planting are not to interfere with sight distance requirements.

(d) On a curved alignment the diverge and recombine lengths are still to have geometry appropriate to the design speed. A system of offsets (as shown in **Figure 4.8.25**) may be used to determine initial geometry.

(e) All non-frangible furniture to be located outside the clear zone or protected. Locate drainage headwalls and raised letter box type grates outside the clear zone of the through road.

***Section 4.8** provides details of geometry whilst **"Signs and Markings"** gives the details and location of signs and pavement marking. Advanced warning signs, alerting drivers to the presence of the intersection, may be required.*

Figure 4.5.6 - Type "CHR" Rural T Intersection Layout General Details

4.5.4 Output

The output of this process of considering the layout options for the site will be a number of intersection layouts, and forms of control, that are clearly ***inappropriate***. The remaining options and forms of control are then carried forward into the evaluation process. This process is detailed in **Section 4.6.**

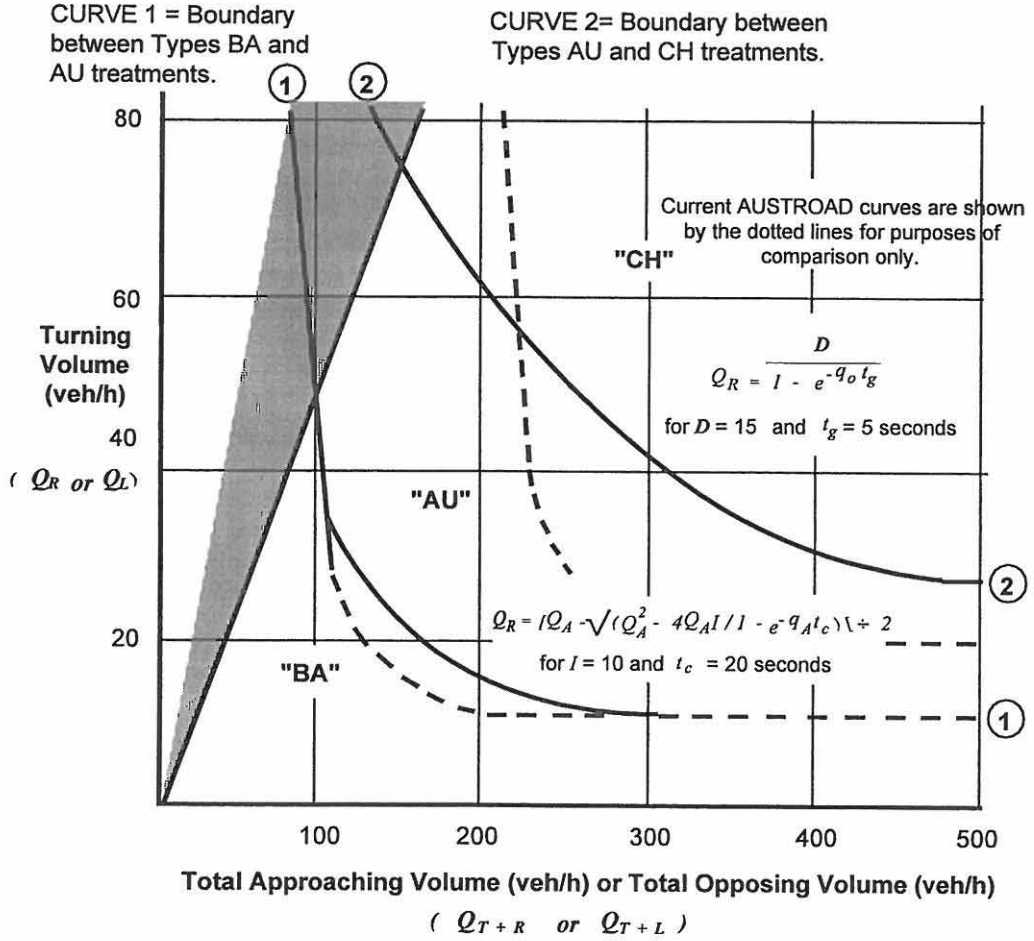
In the absence of any other information, **Table 4.5.3** can assist in identifying layout options, and forms of control, which are not suited to a site.

At RURAL sites McKerral, Leong & Dominis (ref 11) considered the probability of interference to a through vehicle by a turning vehicle slowing down, or stopping in front. This is shown in **Figure 4.5.12** below.

Curve 1 shows the relationship where 10 vehicles are required to slow each hour (I=10) and the conflict time (t_c) is 20 seconds. In the formula, Q_A is the total approach volume (veh/hr), Q_R (or Q_L) the turning volume (ie. Q_A) (veh/hr), and q_A the total approach volume given as veh/sec.

Curve 2 shows where 15 veh/h must stand waiting for a gap (t_g) of 5 secs. Here q_0 is the volume of opposing traffic in veh/sec., and tg is the gap necessary to turn (assumed as 5 secs.

It must be stressed that **Figure 4.5.12** is only a guide and the final choice should take into account strategic aspects such as planning for more consistency in driver expectations along key routes.



NOTES:

1. *Where peak hour volumes are not available, assume the design peak hour volume equals 15% of the AADT. for 500 hours each year; use 5% of AADT for the rest of the year. See Section 1.4. for further details.*
2. *Use graph "AU" to select need for an auxiliary lane. Use "CH" to determine if a sheltered right turn is required. On high speed roads with substantial volumes of heavy vehicles, the use of Type "AU " and "CH" is preferred for safety reasons.*
3. *Use of Types "AU" and "CH" is preferred on high speed and/or heavy vehicle routes to enhance safety.*

In this region more than 50% of the approaching traffic turns. Hence consideration needs to be given to possible realignment of the intersection to suit the major traffic movement.

Figure 4.5.12 - Warrants for Rural Turn Lanes

TABLE 3.2-6 Minimum Volume Warrants for Selected Road Improvement Options

Improvement Option (100km/h design speed)	Initial Year AADT					
	Flat		Rolling		Hilly	
	BCR = 1.0	BCR = 2.0	BCR = 1.0	BCR = 2.0	BCR = 1.0	BCR = 2.0
2. Auxiliary lanes on 10% of length	2600	4000	1400	2300	400	800
3. Auxiliary lanes on 15% of length	3000	#	1700	#	500	#
4. Auxiliary lanes on 25% of length	3200	4800	1700	2700	700	1300
5. Auxiliary lanes on 30% of length	3200	#	1900	#	700	#
6. (a) 25% four lanes Undivided	4500	6500	2900	4400	1300	2300
6. (b) 25% four lanes Divided	5500	#	3500	#	1700	#
7. (a) 50% four lanes Undivided	4900	#	3400	#	2000	#
7. (b) 50% four lanes Divided	6000	#	4300	#	2600	#
8. (a) 4 lanes Undivided throughout	5700	>8000	4300	6400	2800	4600
8. (b) 4 lanes Divided throughout	6800	#	5000	#	3700	#

Source: (2) "Guidelines for Rural Road Improvements - A Simulation Study - ARRB IR AIR 359-10

NOTE: # Not simulated, interpolation may be appropriate.

The Authority's corporate objective is to construct road projects when the Benefit Cost Ratio exceeds 1.0. Comparing figures in Table 3.2-6, it can be seen that substantial improvements in traffic performance may be achieved through the use of auxiliary lanes and sections of four lane roads. In some cases where major upgrading is proposed at a future date, it may be appropriate to consider the use of overtaking lanes as an interim measure.

3.2.12 Location of Kerb and/or Gutters

Kerb and/or gutters are located outside the travel lanes on both the nearside and offside of the road. A 1.0m offset to the kerb face shall be provided when the design speed >80km/h. If the design speed is ≤80km/h, an offest of 0.5m is permitted in unlit situations with 0.0m offset permitted in lit areas. (See Section 3.5.5)

The type of slow vehicle influences the nature of overtaking demand. Some vehicles can be overtaken easily anywhere along a route, while for others an upgrade overtaking opportunity is desirable. In evaluating the need for auxiliary lanes, attention should be given to the type of slow vehicles involved, and whether the overtaking demand is continous along a route, or confined to specific problem locations.

9.1.3 Overtaking Opportunities

On two-lane roads, the availabilty of overtaking opportunities depends on sight distance (section 6.7) and gaps in the opposing traffic stream. As opposing traffic volume increases, overtaking opportunities become restricted even if sight distance is adequate. Sight distance which appears adequate may also be unusable on occasions due to the size of the vehicle in front, particularly on left-hand curves.

On an existing road, overtaking opportunities can be increased either by improved alignment or the provision of auxiliary lanes. Of the two options, auxiliary lanes will generally prove to be the most cost-effective in reducing the level of traffic bunching. This is because realignment to provide overtaking opportunities is likely to be a much more expensive option, and even then the opportunities are only available when opposing traffic permits. This has been demonstrated by ARRB simulation studies, which showed that the provision of auxiliary lanes at regular spacings often led to greater improvements in overall traffic operations than even major alignment improvements (Hoban 1983).

Improved alignment may, however, be required for reasons of safety or a consistent speed environment (Section 2.4). In this context it should be noted that alignment consistency may be more important for traffic safety than simply applying high geometric standards. Particularly when road funds are limited, the greatest safety benefits will generally be achieved through improving consistency and upgrading hazardous road features on a large number of roads, rather than reconstructing some specific road sections to high standards of width and design speed.

A two lane road with auxiliary lanes at regular intervals provides an intermediate level of service between those of two lanes and four lanes. The auxiliary lanes thus offer an economical means for deferring the need for the provision of dual carriageways. Where a four lane road has already been provided, and traffic volumes are consistently high, the need for auxiliary lanes on grades may still arise when there is a high proportion of heavy vehicles.

9.2 Justification for Auxiliary Lanes

9.2.1 General

When determining whether an auxiliary lane is justified on a two-lane road, whether it is climbing, descending or overtaking, the evaluation needs to be carried out over a significant route length and not be isolated to the particular length over which the auxiliary lane might be constructed. Overtaking opportunities outside the particular length can affect the result considerably. These considerations may not apply to multi-lane roads, since the need for auxiliary lanes on these roads depends only on a localised reduction of capacity and level of service, usually due to grades.

The guidelines presented in Sections 9.2.2 to 9.2.5 are based on initial ARRB research using traffic simulation and benefit-cost analysis (Hoban and Morrall 1985). Alternatively, the need for auxiliary lanes can be evaluated in terms of level of service. In special circumstances, a more detailed evaluation may be undertaken using traffic simulation or the results of prior ARRB research (Hoban 1983).

9.2.2 Overtaking Lanes

The justification for overtaking lanes is based on the traffic volume, the percentage of slow vehicles (including light trucks and cars towing) and the availability of overtaking opportunities on adjoining sections. The determination of the percentage of road allowing overtaking is defined in Section 6.7.

Table 9.1 gives the current-year design volumes (AADT) at which overtaking lanes would normally be justified. These guidelines apply for short low-cost auxiliary lanes at spacings of 10 to 15km or more along a road in a given direction. The length, location and cost of auxiliary lanes are discussed in further detail in Section 9.3. If auxiliary lane spacings are closer or construction costs are high, the volume guidelines in Table 9.1 may need to be modified accordingly, that is, higher volumes may be required to justify construction.

Table 9.1 Recommended Volume Guidelines for Consideration of Overtaking Lanes

Overtaking Opportunities Over Preceding 5 km (a)		Current-year design volume (AADT)		
	Percent Length Providing Overtaking(b)	Percentage of slow vehicles(c)		
Description		5	10	20
Excellent	70 - 100	5670	5000	4330
Good	30 - 70	4330	3670	3330
Moderate	10 - 30	3130	2800	2470
Occasional	5 - 10	2270	2000	1730
Restricted	0 - 5	1530	1330	1130
Very Restricted(d)	0	930	800	670

(a) Depending on road length being evaluated, this distance could range from 3 to 10km.
(b) See Section 6.7.
(c) Including light trucks and cars towing trailers, caravans and boats.
(d) No overtaking for 3 km in each direction.

7.3 Right-turn Bans at Signalised Intersections

Consideration should be given to banning a right turn where:

- a right-turn lane cannot be provided and the right-turning traffic would cause a safety and/or a capacity problem
- sight distance is poor and cannot be corrected, and other options such as erecting advance signs are not satisfactory.

If the right-turn can be banned, several options may be considered as described in Section 2.2.3 of the *Guide to Traffic Management – Part 6: Intersections, Interchanges and Crossings* (Austroads 2007) and illustrated in Section 4.14 of this guide.

7.4 Right-turn Lanes for Cyclists

Right-turn lanes for cyclists are rarely used and should generally not be provided for cyclists at right-turn treatments on arterial roads or busy traffic routes because of the difficulty and crash risk for cyclists moving from the left of an intersection to the centre of the road in order to utilise such treatments. Conditions for the use of cyclist right-turn lanes and illustrations of their use at an intersection are provided in Section 10.6.4 of this guide.

7.5 Rural Right-turn Treatments – Undivided Roads

All the turn treatments described in this section are applicable to two-lane two-way rural roads. They can also be applied to multi-lane rural roads (divided and, less commonly, undivided), except for the BAR turn treatment.

7.5.1 Rural Basic Right-turn Treatment (BAR)

The basic right-turn treatment (BAR) shown in Figure 7.5 is the minimum treatment for right-turn movements from a through road to side roads and local access points. This treatment provides sufficient trafficable width for the design through vehicle to pass on the left of a stationary turning vehicle. This is achieved by widening the shoulder to provide a minimum width sufficient to allow the vehicles to pass. Substantial speed reduction (potentially half of the design speed) is a feature of this layout.

Other aspects of the design are:

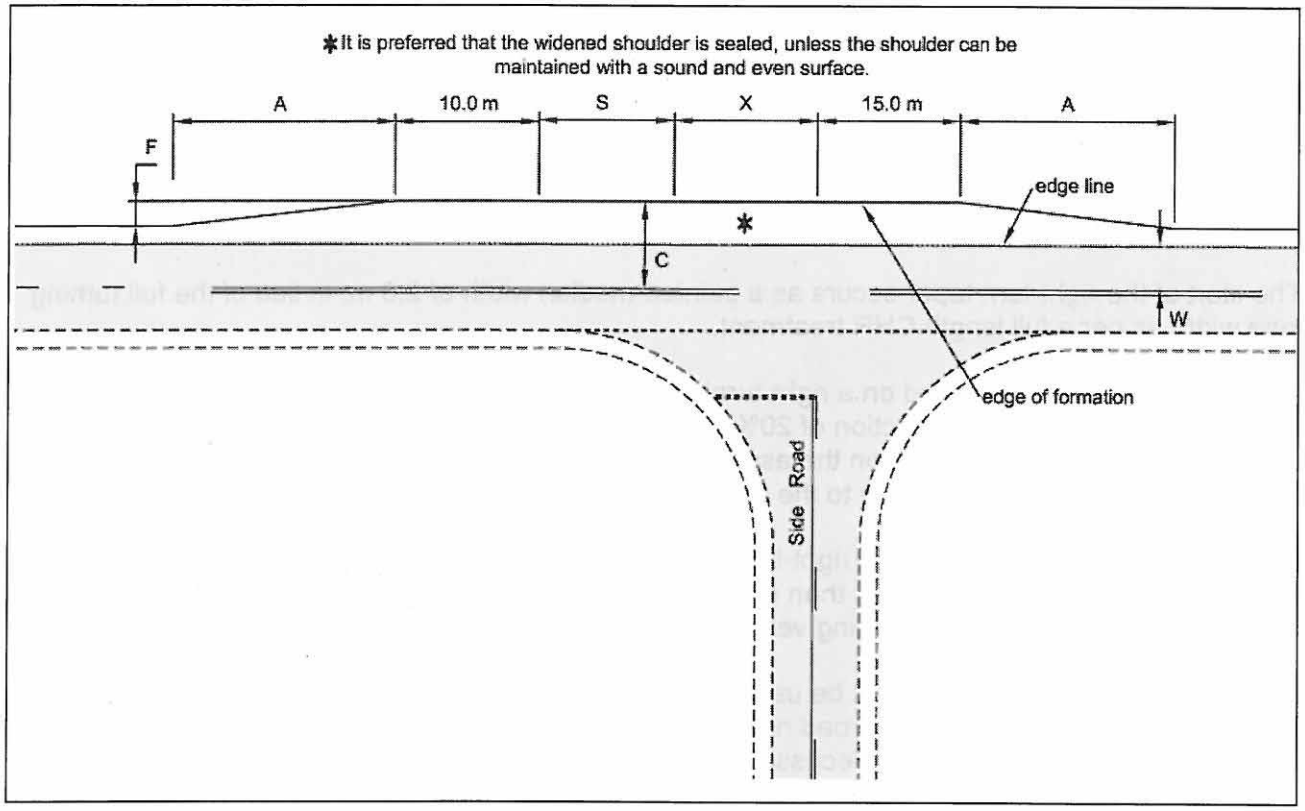
- on a terminating intersection leg no special provision is usually made for right-hand turns when a BAR is used
- this layout can be used on both sealed and unsealed roads
- it is preferred that the widened shoulder at BAR turn treatments is sealed, unless the shoulder can be maintained with a sound and even surface
- this layout should not be used where there is reduced visibility to the turn treatment. Right turning drivers on the major road need to perceive the location of the side road and stop if necessary in the through lane before the intersection.

Where adequate through sight distance exists, BAR turn treatments will generally be marked with a broken centreline to allow overtaking on the major road through the intersection. This will not restrict overtaking opportunities, thereby minimising delays. However, there may be instances where a BAR turn treatment on a section of road with good overtaking opportunities will yield a high likelihood of crashes resulting from inappropriate overtaking through the intersection. In such cases, a barrier line should be used. Examples of such instances include the following:

- The turn treatment is located after a significant length of roadway that has no overtaking opportunities. This geometry would result in drivers often overtaking through the intersection because of the large amount of time spent following other vehicles prior to the intersection. The increased exposure of overtaking may result in an excessively high overtaking-intersection vehicle crash rate.
- There are reasonably high right-turning volumes.
- The warrants dictate that a higher-level turn treatment is appropriate.

It is suggested that BAR treatments should generally have a barrier line on the major road approaches to reduce the likelihood of overtaking vehicles colliding with vehicles entering from the side road. Consideration should only be given to the use of a broken centreline in situations where overtaking opportunities are limited and the volume on the side road is very low.

The BAR turn treatment on a two-lane rural road as shown in Figure 7.5 has limited applications. It is mainly applicable at the junction of side roads and rural arterial roads with lower traffic volumes. Such turn treatments can record high crash rates, especially in high-speed areas. A more desirable treatment at such sites is a CHR(S) turn treatment discussed in Section 7.5.2.



Notes:

1. This treatment applies to the right turn from a major road to a minor road.
2. The dimensions of the treatment are defined thus:

W = **Nominal through lane width (m) (including widening for curves). Width to be continuous through the intersection.**

C = **On straights – 6.5 m minimum**

7.0 m minimum for Type 1 & Type 2 road trains

On curves – widths as above + curve widening (based on widening for the design turning vehicle plus widening for the design through vehicle).

A = $\frac{0.5VF}{3.6}$

Increase length A on tighter curves (e.g. those with a side friction demand greater than the maximum desirable). Where the design through vehicle is larger than or equal to a 19 m semi-trailer the minimum speed used to calculate A is 80 km/h.

V = **Design speed of major road approach (km/h).**

F = **Formation/carriageway widening (m).**

S = **Storage length to cater for one design turning vehicle (m) (minimum length 12.5 m).**

X = **Distance based on design vehicle turning path, typically 10–15 m.**

Source: QDMR (2006).

Figure 7.5: Basic right (BAR) turn treatment on a two-lane rural road

7.5.2 Rural Channelised T-junction – Short Lane Type CHR(S)

The CHR(S) turn treatment shown in Figure 7.6 is a more desirable treatment than the BAR treatment because it provides greater protection for vehicles waiting to turn right from the centre of the road. This treatment is suitable where there are low to moderate through and turning volumes. For higher volume sites, a full-length CHR turn treatment (Figure 7.7) is preferred.

This type of intersection can only be used with linemarking. It is not to be used with raised or depressed islands as the turn lane is short and it is desirable that right-turning drivers travel over the painted chevron to exit the through traffic stream as soon as possible.

For the CHR(S) turn treatment, all through traffic is required to deviate, hence the deviation must be designed to suit the operating speed. A minimum shoulder width of 1.0 m must be used on the through lane deviation.

The start of the right-turn taper occurs as a painted median width of 2.0 m, in lieu of the full turning lane width as per a full length CHR treatment.

The length of turn slot is based on a right-turning vehicle slowing to 80% of the design speed on the approach (i.e. a speed reduction of 20% in the through lane), prior to moving into the turn lane and decelerating. This is based on the assumption that drivers decelerate at a maximum value of 3.5 m/s^2 from the start of the taper to the start of the storage length.

Although some deceleration of the right-turning vehicles occurs in the through lane, this treatment records far fewer rear-end crashes than do BAR turn treatments. The good safety performance occurs by removing stationary turning vehicles from the through traffic stream.

CHR(S) turn treatments should not be used where there is reduced visibility to the turn treatment. Right-turning drivers on the major road need to perceive the location of the deceleration lane and the side road in time to make the necessary speed reduction in the through lane prior to diverging.

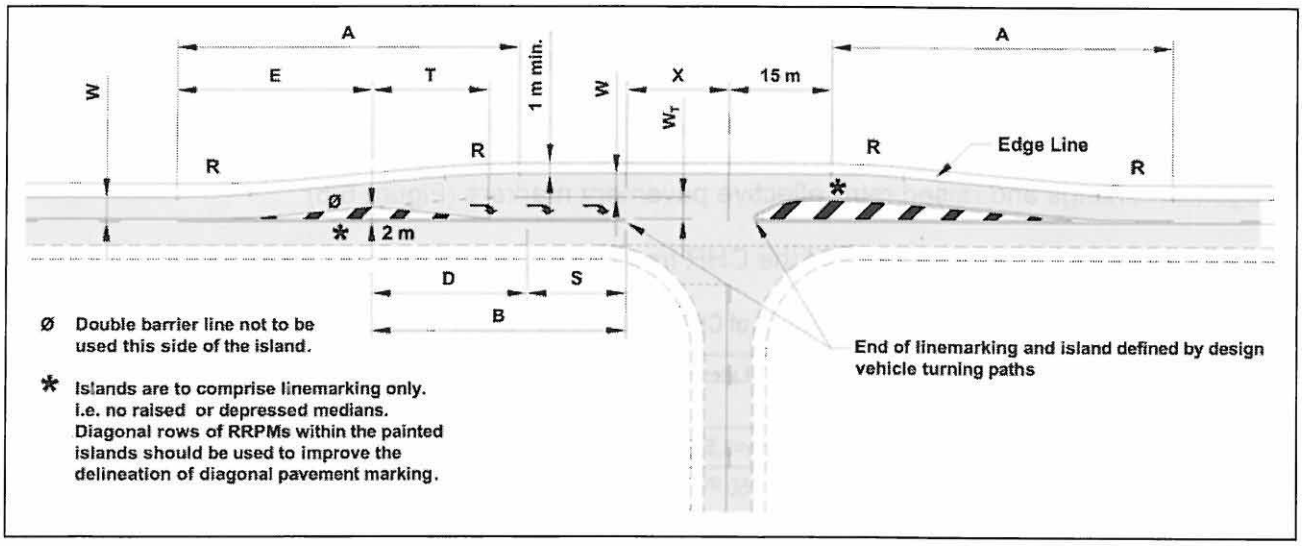
Table 7.1 provides the dimensions of the CHR(S) treatment for various design speeds.

Table 7.1: Dimensions of CHR(S) treatment for various design speeds

Design speed of major road approach (km/h)	Lateral movement length A (m)1	Diverge/ deceleration length D (m)2	Desirable radius R (m)	Taper length T (m)3
50	40[4]	15	110	15
60	50[4]	25	175	15
70	60	35	240	20
80	65	45	280	20
90	75	55	350	25
100	85	70	425	30
110	95	85	500	30
120	100	100	600	35

Notes:

1. Based on a diverge rate of 1m/sec and a turn lane width of 3.0 m. Increase lateral movement length if the turn lane width >3 m. If the through road is on a tight horizontal curve (e.g. one with a side friction demand greater than the maximum desirable), the lateral movement length should be increased so that a minimal decrease in speed is required for the through movement.
2. Based on a 20% reduction in through road speed at the start of the taper to a stopped condition using a value of deceleration of 3.5 m/s^2 (Table 5.2). Adjust for grade using the 'correction to grade' factor in Table 5.3.
3. Based on a turn lane width of 3.0 m.
4. Where Type 2 road trains are required, minimum A = 60 m.



Note: The dimensions of the treatment are defined below and values of A, D, R and T are shown in Table 7.1:

W = Nominal through lane width (m) (including widening for curves). For a new intersection on an existing road, the width is to be in accordance with the current link strategy.

W_T = Nominal width of turn lane (m), including widening for curves based on the design turning vehicle = 3.0 m minimum.

B = Total length of auxiliary lane including taper, diverge/deceleration and storage (m).

E = Distance from start of taper to 2.0 m width (m) and is given by:

$$E = 2\left(\frac{A}{W_T}\right)$$

T = Taper length (m) and is given by:

$$T = \frac{0.33xVxW_T}{3.6}$$

S = Storage length to cater for one design turning vehicle (m).

V = Design speed of major road approach (km/h).

X = Distance based on design vehicle turning path, typically 10–15 m.

Source: QDMR (2006).

Figure 7.6: Channelised right-turn treatment with a short turn slot [CHR(S)] two-lane rural road

7.5.3 Rural Channelised T-junction – Full Length (CHR)

For this layout, all traffic is required to deviate and therefore the road alignment for the through movement must be designed to suit the operating speed. This deviation requires the pavement to be widened to provide a full-length right-turn lane as shown in Figure 7.7.

The minimum lengths of deceleration (D) for different design speeds are shown in Table 5.2 and should be based on the comfortable deceleration rate of 2.5 m/s^2. The storage length (S) is usually determined through the use of computer programs such as aaSIDRA.

Details of the departure end of the right-turn lane should be determined using turning path templates (minimum radius 15.0 m). This will depend on the width and the angle of intersection of the road that the turning vehicle is entering.

There are no numerical warrants for the provision of raised medians in lieu of the painted medians, and some jurisdictions may require road lighting where raised medians are provided.

Pavement marking should be provided as shown in Figure 7.7. If the painted separation between opposing traffic flows is wider than a double white line, then the median should be delineated with diagonal markings and raised retroreflective pavement markers (Figure 6.5).

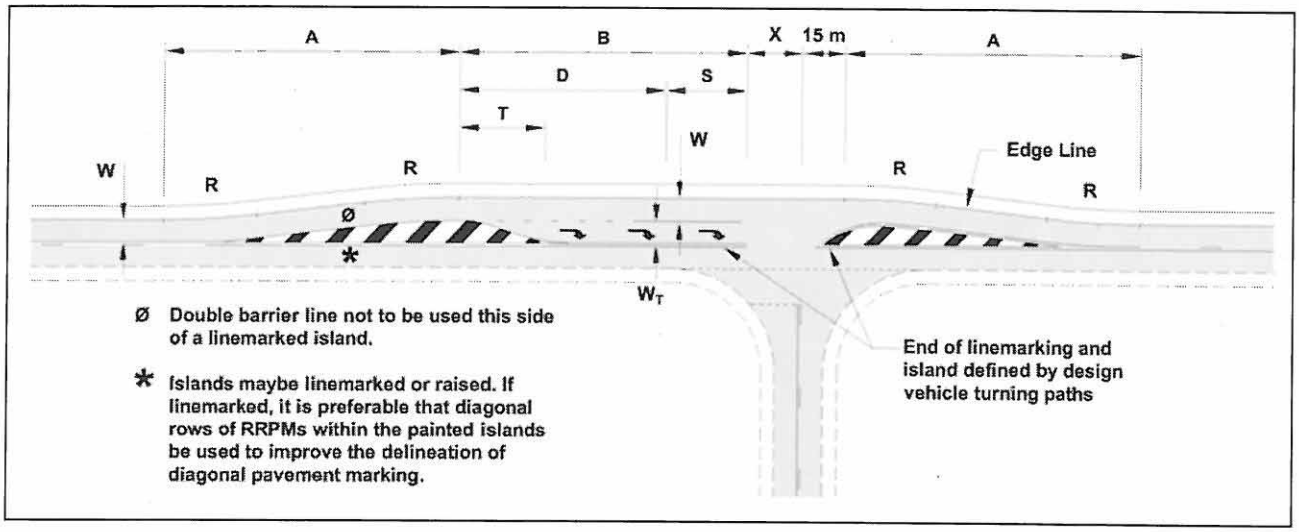
Table 7.2 provides the dimensions of the CHR treatment for various design speeds.

Table 7.2: Dimensions of CHR treatment for various design speeds

Design speed of major road approach (km/h)	Lateral movement length A (m) [1]		Desirable radius R (m)
	W_T=3.5 m	W_T=3.0 m	
50	50 [2]	40 [2]	110
60	60	50 [2]	175
70	70	60	240
80	80	65	280
90	90	75	350
100	100	85	425
110	110	95	500
120	120	100	600

Notes:

1. Based on a diverge rate of 1 m/sec. If the through road is on a tight horizontal curve (e.g. one with a side friction demand greater than the maximum desirable) increase the lateral movement length so that a minimal decrease in speed is required for the through movement.
2. Where Type 2 road trains are required minimum A = 60.0 m.



Notes:

1. An alternative to the double white line on the offside edge of the right-turn slot is a 1.0 m painted median. The 1.0 m median is particularly useful when the major road is on a tight horizontal curve and oncoming vehicles track across the centreline. Provision of this median will require the dimension 'A' to be increased.
2. A raised concrete median on the minor road may be used with this treatment to minimise 'corner cutting', particularly for higher turning volumes.
3. The dimensions of the treatment are defined below and values of A, D, R and T are shown in Table 7.2:

W = **Nominal through lane width (m) (including widening for curves). For a new intersection on an existing road, the width is to be in accordance with the current link strategy.**

W_T = **Nominal width of turn lane (m), including widening for curves based on the design turning vehicle. Desirable minimum = W, absolute minimum = 3.0 m.**

B = **Total length of auxiliary lane including taper, diverge/deceleration and storage (m).**

D = **Diverge/deceleration length including taper. Adjust for grade using the 'correction to grade' factor (Section 5)**

T = **Physical taper length (m) and is given by:**

$$T = \frac{0.33VW_T}{3.6}$$

S = **Storage length (m) should be the greater of:**

1. the length of one design turning vehicle or

2. (calculated car spaces –1) x 8 m (*Guide to Traffic Management – Part 3: Traffic Studies and Analysis* (Austroads 2009h), or use computer program e.g. aaSIDRA).

V = **Design speed of major road approach (km/h)**

X = **Distance based on design vehicle turning path, typically 10–15 m**

Source: Based on QDMR (2006).

Figure 7.7: Channelised right turn (CHR) on a two-lane rural road

7.5.4 *Rural Right-Left Staggered T*

Basic two-lane two-way road

This layout should be designed to ensure that:

- the stagger distance between the minor legs is large enough to discourage drivers from 'taking a short-cut on the wrong side of the traffic islands (e.g. at least 15 m to 25 m depending on the site characteristics)
- the island treatments in the minor roads are long enough to also discourage wrong way movements
- sufficient width is provided on the major road within the intersection to enable through vehicles to pass slowly to the left of vehicles waiting to turn right (e.g. 12 m), a similar principle to the BAR treatment.