4.3 Internal Residential Traffic Distribution

In order to determine the internal residential traffic trips to Bannockburn Town Centre from the future residential development areas 1 – 7 above, Cardno undertook an analysis of the existing Australian Bureau of Statistics (ABS) travel behaviour for the years 2011 and 2016.

A summary of ABS data is presented in section 3.7 of the Existing Conditions & Issues and Opportunities Assessment Report.

The results indicate that Bannockburn Growth Area has high car dependency with limited to no travel via public transport or active travel.

As such Cardno has applied the below splits to the traffic generated by residential areas 1- 7 in the AM, PM and Saturday peak hours to account for internal trips to the Bannockburn Town Centre commercial area and school precinct.

Table 4-10 Residential areas 1-7 traffic generation splits

Residential Area	AM Peak Trips To Town Centre	AM Peak Trips To External Road Network	PM Trips from Town Centre	PM Trips from External Road Network	Saturday Peak Trips to Town Centre	Saturday Peak Trips External Road network
1	25%	75%	25%	75%	25%	75%
2	25%	75%	25%	75%	25%	75%
3	25%	75%	25%	75%	25%	75%
4	25%	75%	25%	75%	25%	75%
5	25%	75%	25%	75%	25%	75%
6	25%	75%	25%	75%	25%	75%
7	25%	75%	25%	75%	25%	75%

5 Future Traffic Growth

To determine the increase in background traffic volumes travelling through Bannockburn Town Centre for the future 2036 modelling year, Cardno undertook an assessment of VicRoads traffic profiles over the previous 15 years (2001 – 2016) to determine the increase in traffic growth percentile per year on the VicRoads arterial roads approaching Bannockburn Town Centre.

Assessments were undertaken at the following three locations:

- Shelford-Bannockburn Road between Inverleigh-Shelford Road and Burnside Road.
- Midland Highway between Geelong Road and Bakers Road;
- Midland Highway between Brunel Street and Tolson Street; and

The increase in traffic per year was calculated to be as follows:

Table 5-1 Percent Traffic Growth Per Annum

Road	Percent increase per annum
Shelford-Bannockburn Road (eastbound) at Harvey Road	2.1%
Midland Highhway (Northbound) south of Geelong Road	2.7%
Midland Highhway (Southbound) north of Clyde Road	2.3%

By applying the above traffic growth rates to the existing 2018 Cardno turning movement count data, at the three key entry points to Bannockburn Town Centre, Cardno was able to determine the future background traffic growth for traffic entering Bannockburn.

A summary of the increase in traffic growth applied to the Bannockburn traffic model is presented below.

Table 5-2 Increase in traffic growth 2018 - 2036

Road	Ex AM peak (2018)	Future AM peak (2036)	Difference (applied to model)	EX PM Peak (2018)	Future PM peak (2036)	Difference (applied to model)	EX Sat peak (2018)	Future Saturday peak (2036)	Difference (applied to model)
Shelford-Bannockburn Road(eastbound) at Harvey Road	305	431	126	214	302	88	181	256	75
Midland Highhway (Northbound) south of Geelong Road	438	690	252	959	1511	552	684	1078	394
Midland Highhway (Southbound) north of Clyde Road	226	333	107	302	445	143	486	715	229

6 Intersection Analysis

6.1 Future Link Flows

From the preceding tasks, future traffic volumes have been calculated on key roads to give an insight on post development traffic volumes to assist in determining locations where road upgrades within the study area may be required.

Table 6-1 Existing and Future Bannockburn Traffic Flows

Location	Link Capacity (vpd) (IDM Standards)	Existing Traffic Volumes (%Heavy)		Future Traffic Volumes	
		Weekday	Saturday	Weekday	Saturday
Midland Hwy 600m SE of Kelly Rd	18,000*	5562 (12.3%)	6725 (6.6%)	8,240	11,187
Midland Hwy 800m NW of Kelly Rd	18,000*	5351 (14.1%)	6593 (8.1%)	7,991	11,527
Geelong Rd btw Francis Ct and Inverlochy Dr	18,000*	9659 (11.6%)	7940 (7.5%)	33,382	20,356
Shelford-Bannockburn Rd nth of Pope St	18,000*	8737 (8.0%)	8029 (4.5%)	24,268	18,758
Shelford-Bannockburn Rd sth of McPhillips St	18,000*	10365 (7.9%)	9003 (4.5%)	35,626	28,785
Shelford-Bannockburn Rd btw Bruce St and Moreillon Blvd	18,000*	6684 (10.2%)	5823 (5.1%)	16,102	13,661
Shelford-Bannockburn Rd btw Harvey Rd and Holder Rd	18,000*	5441 (13.2%)	4586 (6.3%)	9,440	13,741
Clyde Rd btw Warrak Dr and Lowndes Rd	2,500-6,000	1428 (9.5%)	1820 (4.7%)	3,870	13,821
Kelly Road 300m NE of Gillett St	1,000-2,500	448 (13.6%)	418 (11.2%)	596	10,891
Burnside Rd btw Dalcruin Dr and Yverdon Dr	2,500-6,000	2430 (12.6%)	2282 (9.1%)	6,019	6,250
Burnside Rd btw Earl Cr and Elrae Ct	2,500-6,000	1471 (8.5%)	1317 (3.7%)	4,079	2,701
Levy Rd btw Fenwick Fairway and Dalcruin Dr	1,000-2,500	447 (5.7%)	389 (2.1%)	4,241	5,510
Pope St btw Byron St and Moore St	2,500-6,000	1474 (4.4%)	1395 (2.1%)	5,510	5,543
McPhillips Rd at No. 63	1,000-2,500	871 (11.3%)	872 (6.9%)	1,412	2,616
Harvey Rd 300m sth of Ormond St	1,000-2,500	939 (10.6%)	951 (6.1%)	5,403	5,009
Moreillon Blvd btw Shelford-Bannockburn Rd and Darriwell Dr	2,500-6,000	1244 (7.4%)	1029 (8.6%)	4,077	3,276
Milton St Btw Burns St and Shelford-Bannockburn Rd	2,500-6,000	4910 (5.6%)	3750 (4.1%)	15,981	16,944

*Austroads Theoretical Capacity

6.2 Intersection Analysis

6.2.1 Background

The operation of the key intersections within the Bannockburn study area have been analysed using SIDRA Intersection. As discussed, the intersections have been analysed to understand current performance conditions, and then with the ultimate forecast traffic flows to understand which intersections will require modifications.

With an understanding of the nature of the issues with each intersection, modifications were then tested to provide a solution. Given the high volumes of future traffic, these upgrades have included the provision of a roundabout or upgrading to signals in some cases.

The SIDRA computer package, originally developed by the Australian Road Research Board, provides information about the capacity of an intersection in terms of a range of parameters, as described below:

Degree of Saturation (D.O.S.) is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various values of degree of saturation and their rating are shown in Table 1-1.

Table 1-1 Rating of Degrees of Saturation

D.O.S.	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

It is considered acceptable for some critical movements in an intersection to operate in the range of 0.9 to 1.0 during the high peak periods, reflecting actual conditions in a significant proportion of suburban signalised intersections.

The ***95th Percentile (95%ile) Queue*** represents the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour; and

Average Delay is the delay time, in seconds, which can be expected over all vehicles making a particular movement in the peak hour.

6.2.2 Analysis and Results Summary

The results of the SIDRA Intersection analysis are summarised in the following table, showing the performance (Degree of Saturation) of each intersection analysed under current conditions, future conditions, and with upgrades if required. Should an upgrade be required, the option of upgrading to a roundabout was first analysed, and should that not be adequate, the option of signals has also been analysed.

Full details of the modelling and proposed upgrades are provided in Appendix A.

Table 6-2 Intersection Analysis Summary

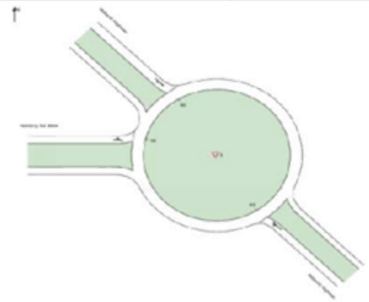
Intersection	DoS (existing volumes & conditions)	DoS (future volumes & existing conditions)	DoS (future volumes, roundabout)	Dos (future volumes, signals)
Midland Highway / Geelong Road	0.652	2.144	2.414	0.996
Midland Highway / Kelly Road / Kelly Lane	0.236	0.351	n/a	n/a
Midland Highway / Clyde Road / Clyde Hill Road	0.345	6.291	0.656	n/a
Kelly Road / Geelong Road	0.396	5.789	1.000	0.904
Bannockburn-Shelford Road / Geelong Road / Clyde Road	0.427	84.121	1.000	0.891
Bannockburn-Shelford Road / McPhillips Road	n/a	35.263	1.425	0.901
McPhillips Road / Victor Street	0.054	0.122	n/a	n/a
Bannockburn-Shelford Road / Milton St	0.503	2.513	1.203*	1.259
Milton Street / Victor Street	0.156	0.559	n/a	n/a
Bannockburn-Shelford Road / Pope St	n/a	30.151	0.716	0.905
Burnside Road / Pope Street / Levy Road	0.225	1.808	1.329*	0.902
Bannockburn-Shelford Road / Burnside Road	0.226	0.670	n/a	n/a
Bannockburn-Shelford Road / Moreillon Boulevarde	0.201	5.185	0.847	n/a
Bannockburn-Shelford Road / Harvey Road	0.183	3.804	0.855	n/a
Bannockburn-Shelford Road / new connector road	n/a	5.364	0.567	0.874

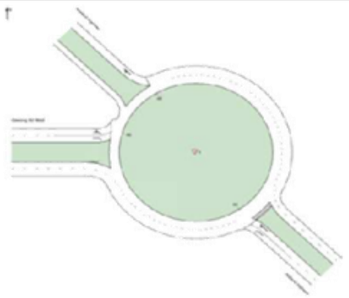
* proposed modification to existing roundabout

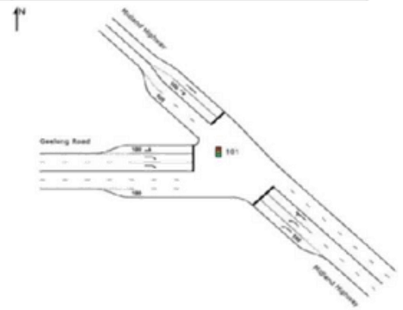
APPENDIX A

INTERSECTION ANALYSIS DETAILS

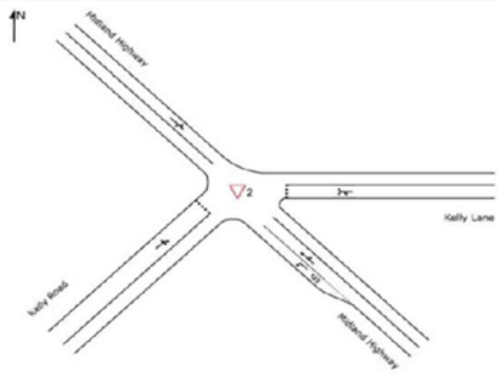
		Existing Volumes and Conditions			Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)			Future Volumes and Cardno Conditions (Signals)		
Midland Highway / Geelong Road	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Midland Hwy (SE)	0.304	7	15.9	0.725	7	93	0.363	6.9	23.1	0.889	25.3	162.9
	Midland Hwy (NW)	0.373	11.6	16.2	1.237	261.2	441.7	2.414	1292.9	1060.6	0.774	59.6	183
	Geelong Rd (W)	0.604	12.2	31.4	2.144	1043.3	6272.9	0.992	35.9	315.4	0.923	37.9	602.7
PM Peak	Midland Hwy (SE)	0.652	7	55.6	1.944	857.6	8904.4	0.976	9.6	1220.9	0.995	54.5	694.9
	Midland Hwy (NW)	0.280	9.1	9.9	1.107	150.1	307.5	1.054	126	255.5	0.345	15.9	104.4
	Geelong Rd (W)	0.336	12.6	12.5	1.111	121	748.5	0.71	16	61.7	0.996	110.5	426.2
Saturday Peak	Midland Hwy (SE)	0.515	7.3	32.8	1.23	217.4	3207.2	0.614	7.2	56.6	0.889	19.2	222.2
	Midland Hwy (NW)	0.385	9.8	15	0.896	29.7	105.1	1.069	119.6	317.7	0.488	14.1	90.3
	Geelong Rd (W)	0.342	13	13.1	1.37	352.7	1452.3	0.636	16.9	46.2	0.875	44.5	169.7



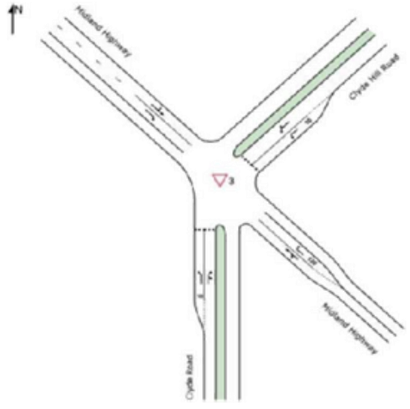


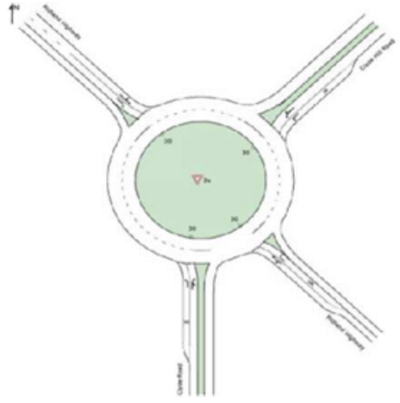


		Existing Volumes and Conditions			Future Volumes and Existing Conditions		
Midland Highway / Kelly Road / Kelly Lane	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Midland Hwy (SE)	0.101	0.6	0.5	0.156	0.7	1
	Kelly Lane (E)	0.004	7.5	0.1	0.005	9.1	0.1
	Midland Hwy (NW)	0.148	0.5	0.9	0.209	0.5	1.4
	Kelly Rd (SW)	0.057	10.9	1.6	0.078	14.8	2.1
PM Peak	Midland Hwy (SE)	0.139	0.7	0.1	0.231	0.6	0.1
	Kelly Lane (E)	0.010	7.6	0.3	0.012	9.8	0.3
	Midland Hwy (NW)	0.170	0.4	0.8	0.244	0.7	1.9
	Kelly Rd (SW)	0.044	11.2	1.2	0.070	20	1.8
Saturday Peak	Midland Hwy (SE)	0.214	0.3	0.1	0.340	0.3	0.2
	Kelly Lane (E)	0.013	11	0.3	0.028	19.9	0.6
	Midland Hwy (NW)	0.236	0.9	2.5	0.351	1.9	7.8
	Kelly Rd (SW)	0.089	12.3	2.4	0.197	21.4	4.9

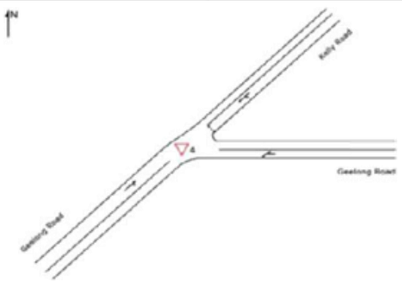


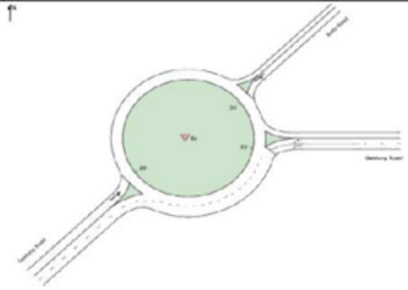
		Existing Volumes and Conditions			Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)		
Midland Highway / Clyde Road / Clyde Hill Road	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Clyde Rd (S)	0.102	10.6	2.8	0.423	15.5	15.2	0.118	10.3	4.5
	Midland Hwy (SE)	0.097	0.5	0.1	0.148	0.5	0.2	0.177	8.3	7.8
	Clyde Hill Rd (NE)	0.023	8.6	0.6	0.045	10.1	1.1	0.022	7.3	0.7
	Midland Hwy (NW)	0.124	0.6	0.4	0.183	0.4	0.3	0.256	8.8	11.7
PM Peak	Clyde Rd (S)	0.089	10.6	2.3	0.557	23.1	18.7	0.098	10.1	3.9
	Midland Hwy (SE)	0.141	1.5	0.3	0.240	1.6	0.3	0.325	8.8	15.9
	Clyde Hill Rd (NE)	0.060	9.5	1.5	0.184	13.5	4.6	0.071	7.1	2.3
	Midland Hwy (NW)	0.152	0.9	0.9	0.224	1.4	2.4	0.302	9.1	14.7
Saturday Peak	Clyde Rd (S)	0.320	14	8.8	6.291	2320.7	1287.9	0.403	11.7	19.9
	Midland Hwy (SE)	0.223	1.8	0.6	0.347	1.8	1.1	0.656	14.9	54.8
	Clyde Hill Rd (NE)	0.345	23.8	9.6	2.438	1233.8	615.3	0.236	9.3	8.9
	Midland Hwy (NW)	0.198	2.6	4.3	0.374	4.2	15.6	0.488	11.1	28.5



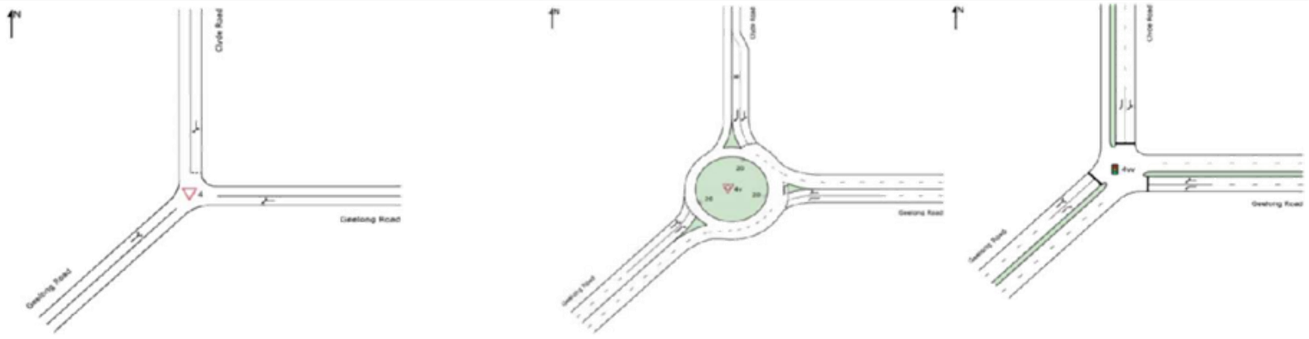


		Existing Volumes and Conditions			Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)			Future Volumes and Cardno Conditions (Signals)		
Kelly Road / Geelong Road	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Geelong Rd (E)	0.175	5.3	0.1	0.503	5.3	0.1	0.593	4.2	63.9	0.893	51.2	105.3
	Kelly Rd (NE)	0.105	13.9	2.6	5.789	4548.7	229.1	1.000	491.8	25.2	0.029	7.6	3.5
	Geelong Rd (SW)	0.396	4.5	20.3	1.378	346.3	4750.6	0.721	7.6	71.4	0.889	31.8	262.5
PM Peak	Geelong Rd (E)	0.377	5.3	0.1	1.426	388.3	3529.1	0.808	4.3	163	0.904	37.8	293.8
	Kelly Rd (NE)	0.063	14.3	1.5	4.040	2988.9	145.7	0.063	19.4	3.3	0.043	22.5	5.2
	Geelong Rd (SW)	0.214	4.4	8.9	0.698	4.5	64	0.722	7.6	78	0.875	44.6	141.2
Saturday Peak	Geelong Rd (E)	0.188	5.3	0.1	0.692	5.3	0.1	0.396	4	4.1	0.768	18.1	50
	Kelly Rd (NE)	0.029	8.6	0.8	3.102	2235.1	141	0.054	15.5	0.3	0.049	11.1	2.2
	Geelong Rd (SW)	0.208	4.4	8.5	0.617	4.5	45.7	0.636	7.6	6.2	0.710	16.6	40.9

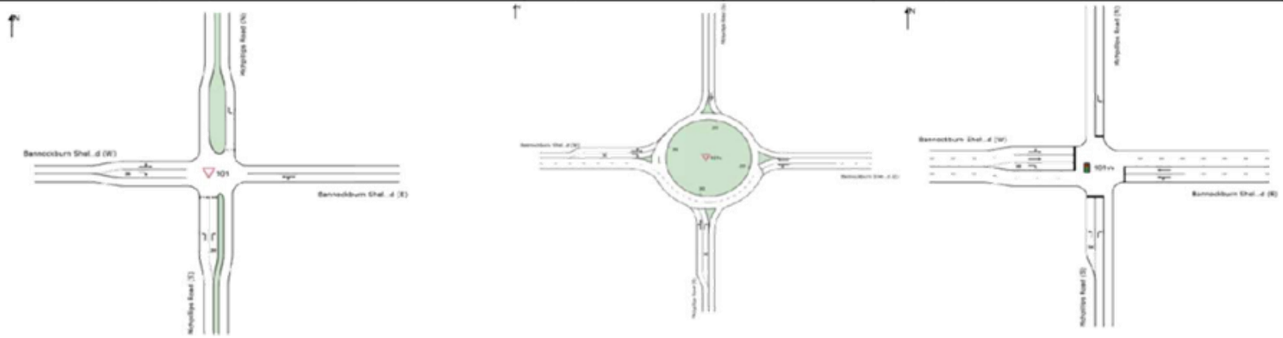




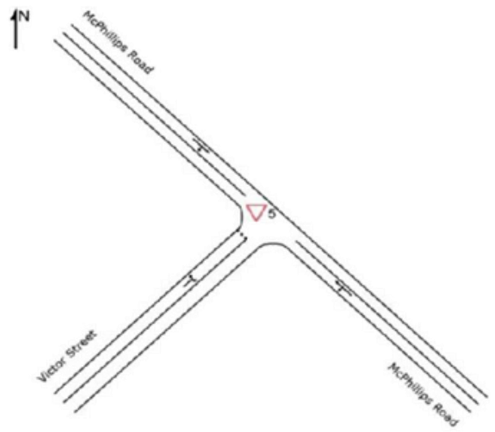
		Existing Volumes and Conditions			Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)			Future Volumes and Cardno Conditions (Signals)		
Bannockburn-Shelford Road / Geelong Road / Clyde Road	**Approach**	**DOS**	**Average Delay (s)**	**95th %tile Queue (m)**	**DOS**	**Average Delay (s)**	**95th %tile Queue (m)**	**DOS**	**Average Delay (s)**	**95th %tile Queue (m)**	**DOS**	**Average Delay (s)**	**95th %tile Queue (m)**
AM Peak	Geelong Rd (E)	0.193	5.4	0.2	0.525	5.4	0.7	0.315	4.4	21.8	0.342	11.3	78.2
	Clyde Rd (N)	0.247	14	6.2	18.07	15472	706.4	1.000	260	51.6	0.544	68.3	26.1
	Geelong Rd (SW)	0.411	5.1	21.5	1.481	439.7	5325.4	0.724	7.6	94.2	0.87	17.3	378.9
PM Peak	Geelong Rd (E)	0.388	5.4	0.8	1.437	399.4	3637.9	0.96	18.8	290	0.852	12.8	318.3
	Clyde Rd (N)	0.328	16.7	8.5	30.220	26372.1	1227.5	0.181	20.3	10.4	0.891	72.6	42.3
	Geelong Rd (SW)	0.273	5.2	11.9	0.838	5.4	134.4	0.43	7.2	35	0.886	47.2	296.3
Saturday Peak	Geelong Rd (E)	0.195	5.5	0.8	0.714	6	7.6	0.681	12	68.4	0.594	15.1	100.1
	Clyde Rd (N)	0.427	12.1	14.2	84.121	74875.7	3707.6	0.425	19.4	26.8	0.792	39.3	69.4
	Geelong Rd (SW)	0.322	5.2	14.2	0.965	6.6	488	0.497	6.5	43.9	0.838	26.1	205.4



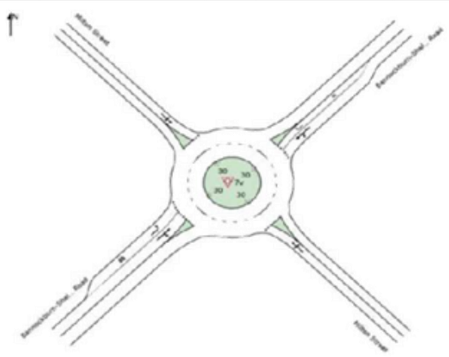
		Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)			Future Volumes and Cardno Conditions (Signals)		
Bannockburn-Shelford Road / McPhillips Road	**Approach**	**DOS**	**Average Delay (s)**	**95th %tile Queue (m)**	**DOS**	**Average Delay (s)**	**95th %tile Queue (m)**	**DOS**	**Average Delay (s)**	**95th %tile Queue (m)**
AM Peak	McPhillips Rd (S)	2.807	983.6	81.1	0.026	10.3	0.8	0.168	35	3.7
	Bannockburn-Shelford Rd (E)	0.659	0.4	0	0.379	4.3	28.3	0.494	5.6	66.5
	McPhillips Rd (N)	35.263	30941.3	198	1.425	428.1	314.4	0.854	40.6	51.1
	Bannockburn-Shelford Rd (W)	1.143	66.2	0.2	1.251	225.8	3546.5	0.868	17.3	240.7
PM Peak	McPhillips Rd (S)	2.632	1875.8	79.8	0.094	24.2	4.1	0.346	81	8.7
	Bannockburn-Shelford Rd (E)	1.466	215.6	0	0.840	4.3	161.3	0.901	10.4	507.1
	McPhillips Rd (N)	1.168	219.9	148.8	0.757	90.1	73.3	0.882	88.6	99.2
	Bannockburn-Shelford Rd (W)	2.281	2699.6	29885.4	0.867	4.5	180.5	0.504	5.1	127.3
Saturday Peak	McPhillips Rd (S)	3.158	1467.2	97.7	0.052	11	1.7	0.095	23.4	2.6
	Bannockburn-Shelford Rd (E)	0.936	1.4	0	0.537	4	41.1	0.851	15.8	145.7
	McPhillips Rd (N)	2.553	1455.5	62.8	1	204.2	100.4	0.529	24.1	20.4
	Bannockburn-Shelford Rd (W)	1.42	682.3	1426.1	0.992	10.6	658.1	0.783	11.3	109.8



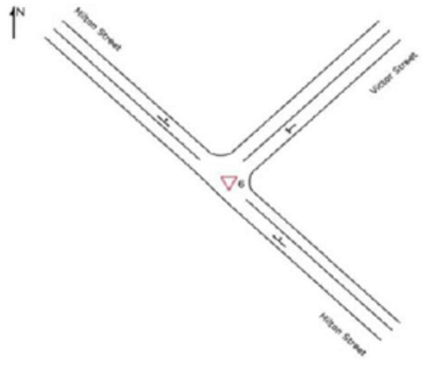
		Existing Volumes and Conditions			Future Volumes and Existing Conditions		
McPhillips Road / Victor Street	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	McPhillips Rd (SE)	0.01	1	0	0.022	0.5	0
	McPhillips Rd (NW)	0.033	0.1	0	0.122	0	0.1
	Victor St (SW)	0.011	4.9	0.3	0.012	5.4	0.3
PM Peak	McPhillips Rd (SE)	0.021	0.5	0	0.026	0.4	0
	McPhillips Rd (NW)	0.029	0.1	0	0.072	0.6	0.6
	Victor St (SW)	0.023	5	0.5	0.024	5.2	0.6
Saturday Peak	McPhillips Rd (SE)	0.037	0.6	0	0.069	0.3	0
	McPhillips Rd (NW)	0.054	0.1	0.1	0.117	0.6	0.9
	Victor St (SW)	0.008	5	0.2	0.009	5.4	0.2



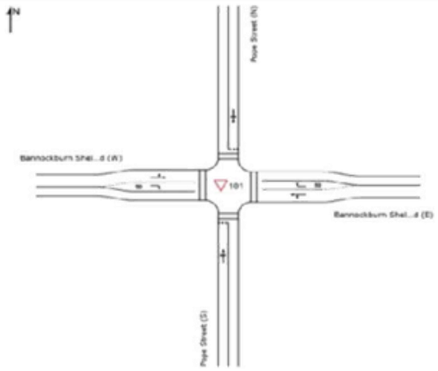
		Existing Volumes and Conditions			Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)			Future Volumes and Cardno Conditions (Signals)		
Bannockburn-Shelford Road / Milton St	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Milton St (S)	0.153	6.5	5.1	0.861	20.8	75.2	0.432	9.7	19	0.567	16.7	20.5
	Bannockburn-Shelford Rd (NE)	0.14	6.8	6	0.348	7	19.6	0.362	7.3	15.6	0.751	14.6	33
	Milton St (NW)	0.36	6.6	16.7	2.513	1377.9	3030.4	1.203	177.2	734.8	0.551	11.9	22
	Bannockburn-Shelford Rd (SW)	0.36	5.3	15	1.363	252.3	1185.1	0.733	10.8	47.8	0.765	13.6	68.6
PM Peak	Milton St (S)	0.16	8.5	6.1	1.395	387.7	571.9	0.768	42	51.9	0.501	63.3	56.2
	Bannockburn-Shelford Rd (NE)	0.503	5.2	30.7	1.606	404.2	3563.5	1.208	199.7	1287.5	1.259	237	1768.9
	Milton St (NW)	0.295	7.3	12.6	1.300	294.7	903.6	0.642	11.5	40.1	1.242	125.7	314.1
	Bannockburn-Shelford Rd (SW)	0.25	4.4	9.9	1.311	236.7	971.2	0.689	11	45.2	0.337	11	93.4
Saturday Peak	Milton St (S)	0.129	8.1	4.4	1.087	129.1	247.9	0.537	16.4	28.3	0.504	61.8	61.6
	Bannockburn-Shelford Rd (NE)	0.262	5.9	12.5	0.805	7.9	93.5	0.739	9.5	61.1	1.17	168.1	814.6
	Milton St (NW)	0.245	7.3	10.2	2.122	1029.6	2192.9	0.832	17.6	77.4	1.181	94.5	293.6
	Bannockburn-Shelford Rd (SW)	0.267	4.7	10	1.046	66.3	393	0.727	11.2	50	0.401	11.8	116.9



		Existing Volumes and Conditions			Future Volumes and Existing Conditions		
Milton Street / Victor Street	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Milton St (SE)	0.14	0.4	0.8	0.48	9.5	33.3
	Victor St (NE)	0.025	6.1	0.7	0.045	9.8	1.1
	Milton St (NW)	0.156	0	0	0.428	0.8	0
PM Peak	Milton St (SE)	0.124	0.3	0.7	0.559	6	41.5
	Victor St (NE)	0.011	5.7	0.3	0.183	6.9	5.3
	Milton St (NW)	0.126	0.2	0	0.251	0.7	0
Saturday Peak	Milton St (SE)	0.076	0.6	0.9	0.548	6.3	42.3
	Victor St (NE)	0.011	4.9	0.3	0.182	6.1	5.5
	Milton St (NW)	0.036	0.1	0	0.186	0.9	0



		Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)			Future Volumes and Cardno Conditions (Signals)		
Bannockburn-Shelford Road / Pope St	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Pope St (S)	30.151	26282.6	2537.9	0.365	9.7	18.6	0.89	32.9	99.5
	Bannockburn-Shelford Rd (E)	0.284	3.7	7.1	0.19	4.8	7.2	0.587	16.8	67.1
	Pope St (N)	2.847	1726.9	461.1	0.375	29.3	24.4	0.171	16.3	13.6
	Bannockburn-Shelford Rd (W)	0.592	0.6	0.9	0.579	8	37.9	0.859	24.2	143.2
PM Peak	Pope St (S)	41.689	36700.2	1849.3	0.716	74.3	78.9	0.889	65.8	117.9
	Bannockburn-Shelford Rd (E)	0.808	1.8	3.8	0.577	4.8	34.9	0.905	32.9	482.8
	Pope St (N)	11.396	9462.4	844.3	0.144	10.2	7.5	0.265	46.8	38.9
	Bannockburn-Shelford Rd (W)	0.87	11.3	20.7	0.321	5.7	14.9	0.526	14.1	148.8
Saturday Peak	Pope St (S)	23.866	20649.2	1629.9	0.369	16.1	21.7	0.812	25.1	40.7
	Bannockburn-Shelford Rd (E)	0.54	1.6	3.7	0.45	5.4	20.7	0.781	15.3	103.7
	Pope St (N)	3.814	2605.7	672.2	0.169	9.9	8.8	0.326	19.1	16.6
	Bannockburn-Shelford Rd (W)	0.423	4.6	12.6	0.317	6.6	14.6	0.701	12.8	60.8



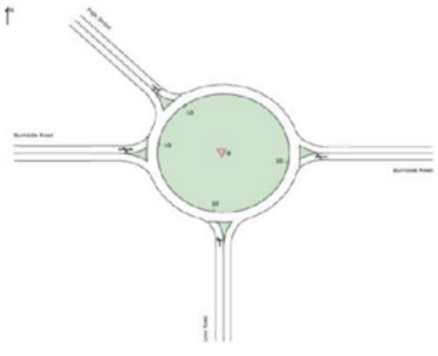
Existing Volumes and Conditions

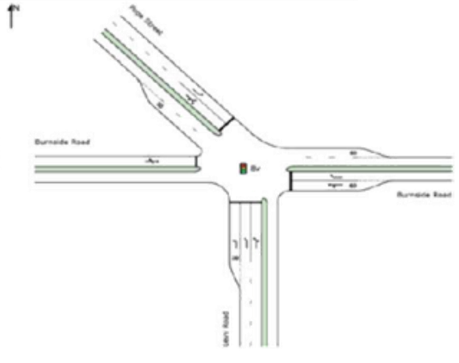
Future Volumes and Existing Conditions

Future Volumes and Cardno Conditions (Roundabout)

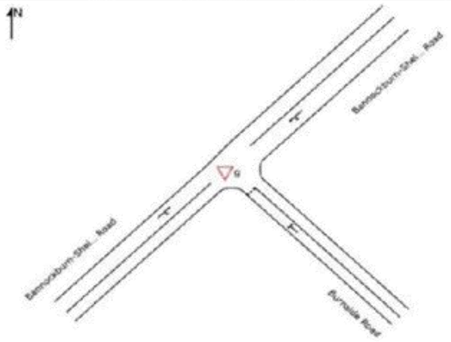
Future Volumes and Cardno Conditions (signals)

Burnside Road / Pope Street / Levy Road	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Levy Rd (S)	0.15	7.1	5.8	1.808	748.2	1528.3	1.329	320.6	906	0.892	53.6	251.5
	Burnside Rd (E)	0.202	6.6	8.9	0.661	8.9	51.4	0.422	7.9	23.6	0.902	50.1	200.8
	Pope St (NW)	0.08	6.1	3.1	0.303	7.5	15	0.303	7.6	15.2	0.868	69.1	77.6
	Burnside Rd (W)	0.118	7.8	4.2	0.53	23.2	26.4	0.662	35.4	37.3	0.229	25.5	44.9
PM Peak	Levy Rd (S)	0.105	6.7	4	0.717	21.8	55.1	0.551	13.2	33.2	0.838	26.6	40.5
	Burnside Rd (E)	0.200	7.5	8.6	0.563	8.5	36.9	0.278	7.4	13.1	0.756	20	39.4
	Pope St (NW)	0.225	6.1	10.3	0.346	7.5	17.8	0.345	7.5	17.7	0.684	23.9	29.4
	Burnside Rd (W)	0.089	7.3	3.2	0.377	13.8	16.2	0.371	13.7	15.8	0.390	16.3	20.4
Saturday Peak	Levy Rd (S)	0.080	6.3	3	0.755	22.7	64.5	0.576	13	36.8	0.796	29	53.6
	Burnside Rd (E)	0.149	7	6.2	0.662	14.5	52.8	0.367	9.5	17.9	0.835	27.1	56.2
	Pope St (NW)	0.154	6	6.5	0.568	8.3	37.7	0.567	8.3	37.6	0.801	27.6	65.2
	Burnside Rd (W)	0.066	6.6	2.3	0.352	14.7	14.8	0.346	14.6	14.2	0.354	19.5	21.7

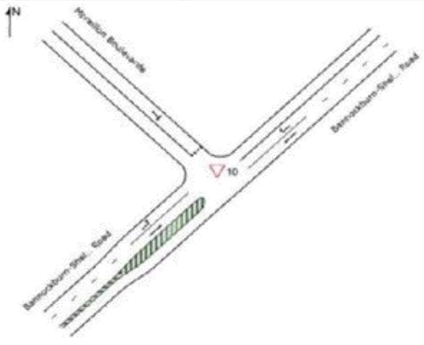


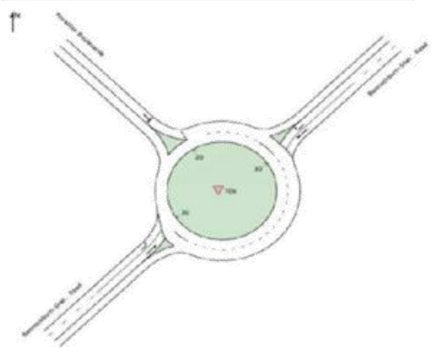


		Existing Volumes and Conditions			Future Volumes and Existing Conditions		
Bannockburn-Shelford Road / Burnside Road	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Burnside Rd (SE)	0.127	7.1	3.4	0.67	29.8	28.4
	Bannockburn-Shelford Rd (NE)	0.076	0.4	0	0.184	0.2	0
	Bannockburn-Shelford Rd (SW)	0.226	1	3.8	0.659	2.2	30.4
PM Peak	Burnside Rd (SE)	0.129	8.6	3.2	0.61	21.4	21.5
	Bannockburn-Shelford Rd (NE)	0.221	0.9	0	0.424	0.7	0
	Bannockburn-Shelford Rd (SW)	0.193	1.5	3.8	0.538	6.5	35.5
Saturday Peak	Burnside Rd (SE)	0.098	8.4	2.3	0.241	10.8	6.2
	Bannockburn-Shelford Rd (NE)	0.214	0.9	0	0.246	0.9	0
	Bannockburn-Shelford Rd (SW)	0.146	1.3	2.5	0.404	1.8	11.1

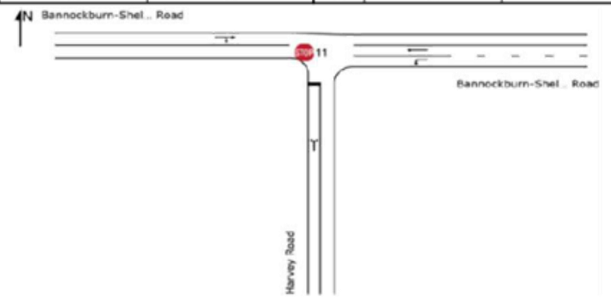


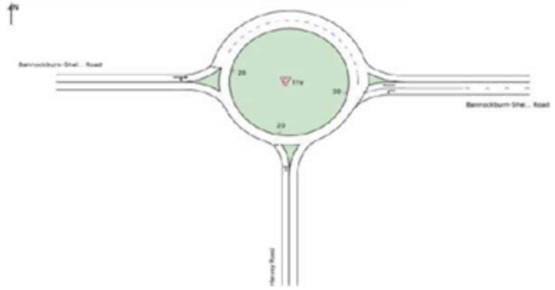
		Existing Volumes and Conditions			Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)		
Bannockburn-Shelford Road / Moreillon Boulevarde	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Bannockburn-Shelford Rd (NE)	0.102	1.7	1.6	0.6	7.5	18.5	0.318	5.7	18.2
	Moreillon Bvd (NW)	0.122	9.5	3.1	4.354	3049.6	1241.7	0.825	47	88.8
	Bannockburn-Shelford Rd (SW)	0.193	0.5	0	0.573	0.4	0	0.764	5.5	73.4
PM Peak	Bannockburn-Shelford Rd (NE)	0.201	0.9	1.5	0.543	3	19.1	0.685	5.6	65.7
	Moreillon Bvd (NW)	0.076	9.2	1.9	5.185	3822.1	935.1	0.321	10.4	15.9
	Bannockburn-Shelford Rd (SW)	0.166	0.3	0	0.356	0.5	0	0.555	5.9	34.3
Saturday Peak	Bannockburn-Shelford Rd (NE)	0.201	0.9	1.5	0.388	2.2	8.5	0.474	8.7	31.2
	Moreillon Bvd (NW)	0.076	9.2	1.9	1.654	634.1	470	0.376	10.5	20.5
	Bannockburn-Shelford Rd (SW)	0.166	0.3	0	0.371	0.5	0	0.847	22.3	120.4



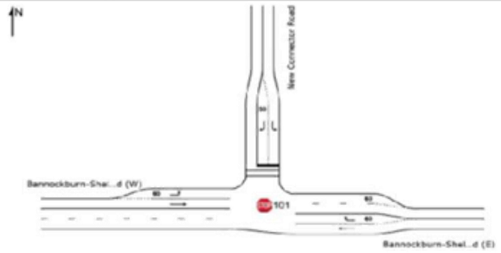


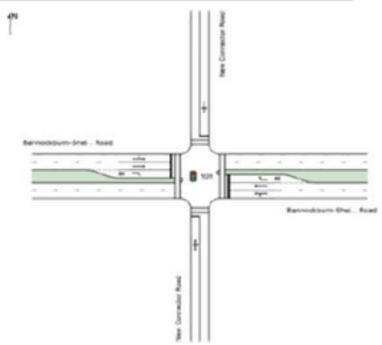
		Existing Volumes and Conditions			Future Volumes and Existing Conditions			Future Volumes and Cardno Conditions (Roundabout)		
Bannockburn-Shelford Road / Harvey Road	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Harvey Rd (S)	0.097	12.5	2.7	3.741	2506.5	1219.7	0.399	10.5	22.5
	Bannockburn-Shelford Rd (E)	0.093	1.2	0	0.235	1.3	0	0.325	6.9	19.5
	Bannockburn-Shelford Rd (W)	0.175	0.3	0.7	0.662	4	37.8	0.855	12.2	133.5
PM Peak	Harvey Rd (S)	0.099	13.6	2.6	3.804	2566	976.2	0.638	27.9	51.2
	Bannockburn-Shelford Rd (E)	0.183	1	0	0.508	1.1	0	0.713	8	62.2
	Bannockburn-Shelford Rd (W)	0.123	0.2	0.4	0.914	37.2	166.8	0.557	8.6	46.3
Saturday Peak	Harvey Rd (S)	0.077	11.3	2.1	1.811	773.9	592.5	0.391	12.4	21.7
	Bannockburn-Shelford Rd (E)	0.113	1.4	0	0.346	1.3	0	0.479	7.3	31
	Bannockburn-Shelford Rd (W)	0.103	0.2	0.2	0.6	8.7	6.4	0.578	8.6	47.6





		Future Volumes and 'Existing' Conditions			Future Volumes and Cardno Conditions (Roundabout)			Future Volumes and Cardno Conditions (Signals)		
Bannockburn-Shelford Road / new connector road	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Bannockburn-Shelford Rd (E)	0.287	1.9	5.3	0.405	5.1	23.2	0.435	12.9	33
	new connector rd (N)	4.967	1462.6	673.3	0.296	10.3	12.3	0.770	21.5	66.4
	Bannockburn-Shelford Rd (W)	0.49	0.8	0	0.497	4	31.3	0.806	18.1	84.5
	new connector rd (S)							0.136	15.3	6.9
PM Peak	Bannockburn-Shelford Rd (E)	0.565	4.4	24.6	0.567	6.1	39.9	0.842	12.9	55.4
	new connector rd (N)	5.364	2070.8	579.4	0.152	9.3	6.1	0.874	31	50.2
	Bannockburn-Shelford Rd (W)	0.321	1.4	0	0.488	5.6	27.2	0.425	8.5	37.5
	new connector rd (S)							0.431	21	17.5
Saturday Peak	Bannockburn-Shelford Rd (E)	0.32	2.8	10.1	0.424	5.5	24.8	0.579	11.6	5.5
	new connector rd (N)	1.784	371	265.1	0.136	8.9	5.3	0.61	17	28.6
	Bannockburn-Shelford Rd (W)	0.324	1.2	0	0.42	4.7	22.3	0.619	11.4	27.5
	new connector rd (S)							0.153	13.5	38.6





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Mr Tim Waller
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Golden Plains Shire Council
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BANNOCKBURN VIC 3331

Dear Tim

BANNOCKBURN TRANSPORT STRATEGY
EXISTING CONDITIONS, ISSUES AND OPPORTUNITIES ASSESSMENT REPORT

Thank you for the opportunity to provide feedback on Golden Plains Shire Council's *Bannockburn Transport Strategy – Existing Conditions & Issues and Opportunities Assessment Report* (the Report) which will contribute to the development of the *Bannockburn Transport* Strategy (the Strategy).

The Department of Transport (DoT) takes an integrated approach to planning, coordination and management of Victoria's transport system. Integral to DoT's vision is improving the productivity and liveability of regional cities and townships through integrated transport and land-use planning.

This letter supplements a previous correspondence provided by Regional Roads Victoria (RRV) dated 18 June 2019. This previous feedback provided input on several elements of the Report including speed limits, road hierarchy, network function, cycling as well as treatments to improve pedestrian amenity in the town centre.

Alignment with regional and State planning and transport initiatives

The potential for this work to be a strategic reference document which supports the future development of initiatives in Bannockburn the surrounding areas is supported by DoT. Ensuring State and regional for land use and transport considerations are embedded in the strategy would provide the opportunity to achieve an integrated approach across all levels of government consistent with objectives of the Transport Integration Act.

VICTORIA State Government

Accordingly, DoT has the following recommendations for the Strategy:

- **Wider Planning and Growth Context**

  The City of Greater Geelong's Northern and Western Geelong Areas Framework Plan (NWGGA) projects that over 60,000 people will be accommodated within the Western Growth Area alone, expanding Geelong's existing urban area west of the Geelong Ring Road (M1) toward Bannockburn.

  The Western Growth Area is being planned to provide increased employment, services and education within 10km of Bannockburn, and will become a key trip generator for the region once fully developed. The proximity of the Western Growth Area to Bannockburn will alter journeys reducing the need for many trips from Bannockburn to the Geelong CBD.

  These large-scale proposed changes to the land uses will impact Bannockburn and change its transport needs, and this will present future issues and opportunities for the town. Given this, it is important that the Strategy acknowledges these fast-changing external conditions that will impact the models and objectives which underpin the current Strategy.

- **Upgrades to regional arterial roads**

  Various upgrades to the Midland and Hamilton highways are also identified as short-term priorities in the *G21 Road Transport Plan 2017-27*, including the Bannockburn Heavy Vehicle Alternate Route (long term). Generally, this regional transport plan should provide a high-level guide to develop the Strategy's initiatives.

  The Federal and State governments have $2 million for planning a Midland Highway upgrade, which includes developing options to increase road capacity between Bannockburn and the M1. Regional Roads Victoria are preparing a business case to assess the safety, transport, land use and economic benefits of the project, as well as any social or environmental impacts.

  Additionally, RRV are currently upgrading the Hamilton Highway between Geelong and Cressy, improving access from Bannockburn to Geelong via Fyansford.

  There is extensive work and data available from the project development teams at RRV who could provide further context to the surrounding road transport planning – including planning of a Heavy Vehicle Alternate Route and Midland Highway.

- **Regional Public Transport Planning**

  The conceptual bus network illustrated on the Public Transport Opportunities map (prepared by Cardno, dated 21 March) is not consistent with current public transport planning principles (as set out in DoT's *Public Transport Guidelines for Land Use and Development*) for settlements of this size and proximity to larger regional centres like Geelong (and its emerging NWGGA).

  A more likely scenario would be based around improved frequency of existing regional routes servicing Bannockburn, and future local services better integrating Bannockburn with Geelong's public transport network.

- **Active Transport**

  The *Victorian Cycling Strategy 2018-28* sets a strategic approach to guide engagement between the State Government and local governments to define Strategic Cycling Corridors (SCCs) that can be subject to future investment by the State Government to deliver high quality cycling infrastructure. Following engagement by DoT on the development of draft SCCs, Council provided in-principle support for Bannockburn's proposed SCC network in May 2019.

  To ensure future investment is coordinated through integrated planning, DoT encourages Council to align the cycling opportunities identified with Section 5.3 of the draft (and corresponding maps) with the proposed SCC network (attached).

- **Town centre treatments**

  As identified in Section 5 of the Report, there are conflict issues between vehicles (including a high volume of heavy vehicles) and pedestrians and cyclists within Bannockburn's town centre and the arterial road network including Shelford-Bannockburn Road.

  Council's *Bannockburn Urban Design Framework* (2011) and *Bannockburn Civic Heart Project* (2014) identify tensions between Bannockburn's growth, increased traffic volumes and the desired land use and amenity expected by the community of this place.

  As recommended by RRV, DoT also suggests the use of the *Movement and Place Framework* inform the proposed initiatives to address the issues identified in the Report. This framework can help decision makers to understand the wider context and function of the movement corridors and their surrounding places (particularly Bannockburn's town centre and residential areas that interface with arterial roads) in the development and prioritisation of road and place-based interventions.

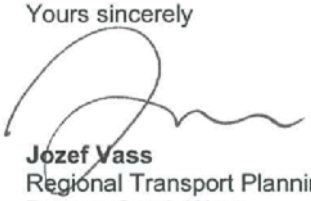
Previous engagement with the Department of Transport

The Report indicates that PTV and TfV (now merged into a single DoT) participated in the consultation process. Neither the Geelong or Ballarat-based Regional Transport Planning teams have been involved to date in the preparation of this Strategy or provided any previous comments on the Report.

Thank you again for the opportunity to provide feedback on the *Bannockburn Transport Strategy – Existing Conditions & Issues and Opportunities Assessment Report.* DoT look forward to continuing to work with Golden Plains Shire in the development of the *Bannockburn Transport Strategy.*

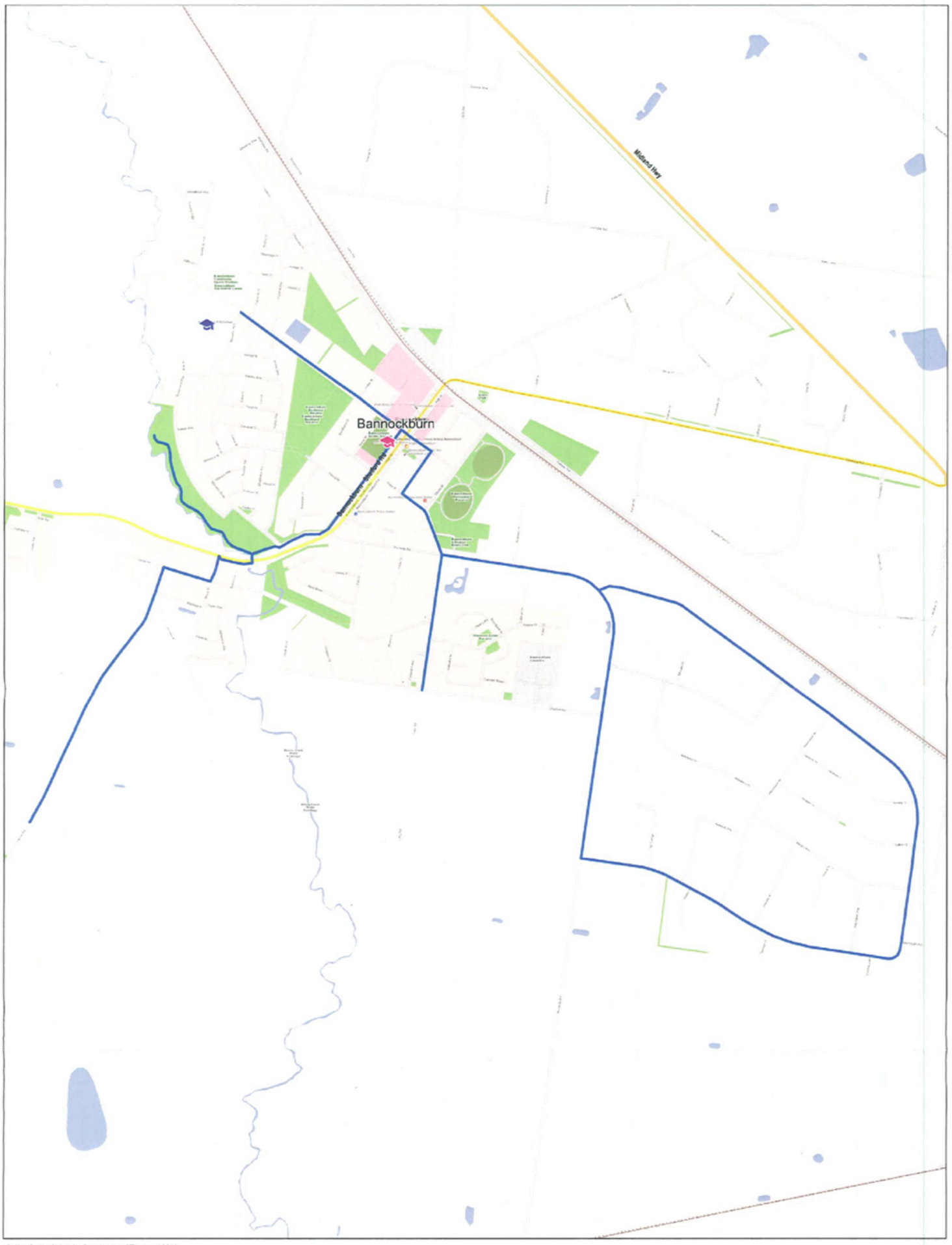
If you have any questions regarding this submission, please do not hesitate to contact me at jozef.vass@ecodev.vic.gov.au or on 5225 2524.

Yours sincerely



Jozef Vass
Regional Transport Planning Manager
Barwon South West

9 / 7 / 2019



NORTH

Tertiary Education Facility
Secondary School
Primary School
Health Care Facility

SCC Main Route
Railway Line
Principal Bike Network - Existing and Proposed
Commercial Zone 1

VICTORIA State Government | Department of Transport

Transport Analysis and Assessment Branch | Mapping Team
Revision Date: 19/06/2019 Created By: victrpv Map Reference: MAP-705-7

Bannockburn Proposed SCC

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GOLDEN PLAINS SHIRE

Golden Plains Shire Council
2 Pope Street, PO Box 111
Bannockburn, Victoria, 3331
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4 September 2019

Ref: 60-06-035

Department of Transport
Attn: Jozef Vass
180 Fyans Street
SOUTH GEELONG VIC 3220

Dear Jozef,

Thank you for your feedback in relation to the Bannockburn Transport Strategy Existing Conditions, Issues and Opportunities Assessment Report. Please find below a response to the concerns raised in your submission dated 15th July 2019. Please note a final copy of the Strategy will be presented to Council for their endorsement at the Council meeting being held on 24 September 2019.

Wider Planning and Growth Context

In response to your comments regarding the wider growth context it is important to note that detail of the Northern and Western Growth Areas Framework Plan (NWGGA) came about after completion of the background work for this study. Whilst it is acknowledged that the Western Growth Area is likely to have impacts on traffic movements across the southern portion of Golden Plains Shire, the predicted implications for Bannockburn traffic distribution to the Midland Highway are considered to be appropriately addressed. Council and its consultant team have identified a long term option should include the provision of additional points of access to the Midland Highway recognising that there will be significant upgrades required to High Street in Bannockburn should alternative options to cross the railway line not be secured.

Upgrades to regional arterial roads

We acknowledge the report does not consider the G21 Road Transport Plan 2017-27. The Issues and Opportunities report has now been revised as it does support some of the Strategy recommendations.

Previous traffic modelling showed minimal traffic using Burnside Road as a means to travel south to the Hamilton Highway in 2046. There may be a small impact with an upgrade to conditions such as a heavy vehicle bypass, alternative railway crossings and/or delays at the High Street railway crossing. While we have considered strategic work completed to date the project concentrated on the current Bannockburn Growth Area. In 2020 Golden Plains Shire will embark on the development of a new growth plan for Bannockburn. This work is likely to have major implications for traffic utilising Burnside Road to access the Hamilton Highway. At this time a significant revision of the BTS will be required.

Regional Public Transport Planning
The strategy considers the G21 Public Transport Strategy and the final BTS includes a recommendation to facilitate future bus routes through development. In doing so ensuring road network designs are bus capable. The strategy also recommends advocating for increased frequency of the Bannockburn-Geelong Bus services and reinstatement of a passenger train service on the Ballarat-Geelong line as future growth is experienced.

Active Transport
Officers note your comments regarding the Strategic Cycling Corridors and have amended the final Strategy accordingly.

Town Centre Treatments
The application of the Movement and Place Framework was not part of the initial scope of the project. It was discussed in early consultation with VicRoads, however it was resolved by Council that it did not need to form part of this study. It is noted that the general Movement and Place framework/tool has changed considerably since these early discussions, and the application of it now would be a considerable task.

It is acknowledged that this strategy could benefit from a Movement and Place analysis in the future, particularly around the town centre. Regardless Movement and Place principles have been considered albeit in an informal manner. With High Street representing the only route crossing the railway line, it has to remain as a movement corridor. Maintaining the service roads facilitates a means to retain or promote an element of place. Detailed measures to enhance place making objectives would be subject to future studies.

Previous Engagement
With regards to previous engagement throughout the development of the project I can provide the following timeline:

- The consultants (Cardno) made contact with yourself and Cait Jones from TfV on July 5, 2018.
- Officers from both Council and Cardno met with Mark Tonkin and Kimberly Adams from VicRoads on July 6, 2018 at the Geelong Office to introduce the project and seek information from VicRoads officers. It is understood that you were unable to attend given short notice.
- Information regarding bus services was received from Joe Russell (TfV) on July 31, 2018.
- Information was received from Michael Fullard (PTV) on July 27, 2018.
- The consultants and Council Officers met with Mark Tonkin on February 18, 2019. Following the meeting Mark was emailed a copy of the traffic modelling report.
- On March 6, 2019 Mark responded with comments regarding the traffic generation assumptions which were then considered by Cardno and Council officers.

If you have any further enquiries in relation to this project please contact Laura Wilks, Strategic Planning Team Leader on 5220 7271 or email lwilks@gplains.vic.gov.au.

Yours faithfully

TIM WALLER
DEVELOPMENT MANAGER

regional roads victoria

180 Fyans Street
South Geelong Vic 3220
regionalroads.vic.gov.au

Mr Tim Waller
Development Manager
Golden Plains Shire
PO Box 111
BANNOCKBURN VIC 3331

Contact: Mark Tonkin
Telephone: 0466 045 345

18 June 2019

Dear Mr Waller

Thank you for the opportunity to comment on the draft Bannockburn Transport Strategy.

Regional Roads Victoria is strongly supportive of Golden Plains Shire undertaking the study. The study will provide strong guidance on the long term needs of the transport network, and identify the interventions required to make Bannockburn a safe and accessible township in the future.

I understand that Mr Mark Tonkin has been involved in reviewing the traffic modelling and has met with Cardno and the Golden Plain Shire team to discuss the draft outcomes. I encourage you to continue to involve the RRV team in the finalisation of the study, particularly following the upcoming round of community feedback on 19 June 2019.

I have attached a number of comments on the draft report that we have identified. These may have significant consideration in the recommended outcomes of the study. The most notable comment relates the to the traffic modelling assumptions, which appear to overestimate the traffic growth in Bannockburn, and will impact on the recommendations of the strategy. We are available to meet with the project team to clarify these issues further if required.

Please contact Mr Tonkin on email: mark.tonkin@roads.vic.gov.au or Tel: 0466 045 345 should you wish to discuss this matter further.

Yours sincerely

SAM PIRROTTA
MANAGER PLANNING
SOUTH WESTERN REGION

vicroads

VicRoads ABN 61 760 960 480

Road Network Hierarchy

It was noted that the future growth area identified to the south of the town centre has no clear distinction in the hierarchy to promote preferred points of access into the town centre (i.e. Pope Street, Burnside Road, Milton St, McPhillip Rd are all defined as connector roads.) There may also be a potential for Moore Street/ Byron Street to become a rat run. These have been identified as pedestrian issue locations within the strategy, and a close assessment of each road and their likely use should be undertaken to make sure intersection treatments are appropriately located and encourage those movements.

Intersection analysis

In regard to the intersection analysis, there are a number of SIDRA assessments that have been undertaken which identify that dual lane roundabouts will fail. In the image provided of the roundabout in the assessment, all roundabouts show the analysis includes a section of one lane component of the two lane roundabout. This has a significant impact on the capacity the model. It is expected that the dual lane roundabout, once modelled properly, will perform significantly better than presented in this report.

Other considerations include:

- Combining the Shelford Bannockburn Road (Geelong Road), Clyde Road and Kelly Road in one intersection analysis (it is likely the intersection will remain as one).
- Ensure that traffic lane inclusion or exclusion in the design is based on traffic flow demands.
- The need for a review of data entry in SIDRA, with significant variation in outcomes between the AM, PM and the Saturday peak for Clyde Road and Midland Highway being a stand out.

Broad Network aspirations

The report identifies some strategic work, most notably the Bannockburn Heavy Vehicle alternative route and the Bannockburn civic heart projects. Both projects identify the desire to minimise the amenity issues as a result of traffic in High Street by reducing heavy vehicles and traffic in general, improve pedestrian access and priority, which will result in increased economic activity in the town centre either side of High Street.

The traffic modelling assignment, and more importantly the treatment recommendations in this traffic report, do not reflect the network aspirations of the township of those studies, by setting up the network to cater for 35,000 vehicles per day in the main street.

It is recommended that before developing intersection treatments, consideration be placed on classifying the different segments of the road network to determine the role as a movement function and roadside place function. This allows a stronger method of identifying what the likely problems will be (level of service) as a result and can then assist in identifying treatments that cater for the gaps in performance, not just intersection capacity.

This assessment will also allow for stronger decision making when it comes to setting speed limits, undertaken Local Area Traffic Management treatments, identifying heavy vehicle preferred routes and pedestrian and cycling preferred routes.

Existing traffic counts and travel speeds vs limits

It is noted that there are some sections of road where the speed limit and the 85%ile speeds are significantly different. It is strongly recommended that some of these locations be closely assessed and determine if the speed limits adopted align to community expectations in terms of the feeling of safety and movement function.

Speed limits are a key component of managing primary corridors on a network and should ideally be considered as part of developing township strategy. Higher speed limits are typically appropriate on primary traffic routes to promote these routes over the local network. Lower speed limits are an important consideration in high activity pedestrian and cyclist zones where properly supported by appropriate infrastructure. There is an opportunity within the strategy to consider how speed limits could best support movement and place within the township.

It is noted that on page 37 the report identifies that speed limits should be reviewed and consideration be given to lowering speed limits on key traffic routes. This broad approach is not considered appropriate.

This transport strategy should provide more appropriate guidance on speed management and expectations on the road network, and what infrastructure changes would be needed to support limit changes, as this plays a major role in safer outcomes for the community.

Safe System outcomes

This strategy has a very strong focus on capacity provision, being primarily a traffic modelling and intersection capacity assessment. This report also needs to consider how the road network of Bannockburn can be developed to ensure a Safe System is provided. This can be done through identifying what opportunities can be developed to cater for the different road users in minimising conflict point (crash point) speeds, or removal of conflict points.

Cycling and pedestrian network development

Although the community have highlighted a number of key locations, and broad connections have been identified, the strategy presents an opportunity to identify how cycling and walking can reduce car trips, particularly for internal trips. The map in a broad sense does not appear to link into the main shopping centre or connect to the school precinct.

It is highly recommended that off road shared paths be adopted as the first priority, rather than on road cycling facilities to encourage a mode shift for cyclists. Off road infrastructure is 3-4 times more likely to attract cyclists trips compared to on road facilities.

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4 September 2019

Ref: 60-06-035

Regional Roads Victoria
Attn: Mark Tonkin
180 Fyans Street
SOUTH GEELONG VIC 3220

Dear Mark,

Thank you for your feedback in relation to the Bannockburn Transport Strategy. Please find below a response to the concerns raised in your submission dated 18th June 2019. Please note a final copy of the Strategy will be presented to Council for their endorsement at the Council meeting being held on 24 September 2019.

Road Network Hierarchy

In response to your comments regarding the road network hierarchy it is important to note that the collector road status was derived from IDM standards to reflect the potential traffic flows and the desired cross section. It is intended that the majority of additional traffic from the south would enter the town centre via Pope Street, with traffic management measures employed to dissuade through traffic via Byron Street and Moore Street. In response to your comments, the Strategy has been revised to better reflect this. The Strategy seeks to maintain a pedestrian focus, particularly on Milton Street between High Street and Moore Street.

Intersection Analysis

Additional analysis has been undertaken to ensure that the appropriate circulating sections are two lanes, with the results showing minimal improvement in the Degrees of Saturation (DoS) on each approach. The table below summarises the maximum DoS for each affected intersection, with Roundabout A being Cardno's previous analysis, and Roundabout B being this revised analysis. More detailed SIDRA outputs for these intersections are enclosed for your information.

Intersection	Maximum Intersection DoS with Future Traffic		
	Existing Layout	Roundabout A	Roundabout B
Midland Highway/Geelong Rd	2.144	2.414	1.988
B-S Rd/Geelong Rd/Clyde Rd	84.121	1.000	1.085
B-S Rd/Pope St	41.689	0.716	0.627
Burnside Rd/Pope St/Levy Rd	1.808	1.329	1.159
B-S Rd/Moreillon Blvd	5.185	0.847	0.848
B-S Rd/Harvey Rd	3.804	0.855	0.856

- **Combining the Shelford Bannockburn Road (Geelong Road), Clyde Road and Kelly Road in one intersection analysis (it is likely the intersection will remain as one).**

It is shown that under ultimate traffic conditions a 2 lane roundabout without Kelly Road already exceeds capacity, therefore it would be expected that by adding Kelly Road it will further exacerbate the congestion. It is noted that a roundabout at this intersection including Kelly Road in the interim will improve the intersection safety and performance until capacity is reached. If the roundabout is increased to 2 lane circulating, a 20m radius centre island would be required under AustRoads guidance which would likely require land acquisition.

- **Ensure that traffic lane inclusion or exclusion in the design is based on traffic flow demands.**
- **The need for a review of data entry in SIDRA, with significant variation in outcomes between the AM, PM and the Saturday peak for Clyde Road and Midland Highway being a stand out.**

Cardno has reviewed the data input to the SIDRA intersection models, particularly in relation to discrepancies noted between the Saturday peak and weekday peak results. This review determined that the data has been correctly entered in to the models. However upon interrogation, it was found that there was an error in the distributions in the spreadsheet model at the Midland Highway / Clyde Road intersection, in turn impacting the SIDRA result. It was found that the AM peak distribution proportions for vehicles from the Clyde Road south approach were unintentionally applied to the PM peak and Saturday peak scenarios.

The spreadsheet model and SIDRA inputs have been amended to reflect the correct distributions. Under the existing intersection conditions, there is minimal change in the intersection performance in the PM peak, but in the Saturday peak, a reduced DoS from 6.3 to 2.5 for the south approach is noted, the northeast approach displayed an increased DoS from 2.4 to 3.1. The other outputs remained fairly consistent. Under the proposed roundabout option, there is minimal change in the intersection performance in all peak scenarios. More detailed SIDRA outputs for this intersection are enclosed.

Broad Network Aspirations

The Bannockburn Transport Strategy was developed on the premise that there would be no alternative access constructed over the railway line during the development time frames considered within the Urban Design Framework. The indicative future traffic on High Street is based on this assumption.

Bannockburn Heavy Vehicle Bypass Study – The 2015 Aecom traffic modelling indicated that there would be a reduction in total vehicles on High Street as a result of an alternative route, however only a minimal reduction in heavy vehicles (90 vehicles per day). The modelling also showed a significant portion of vehicles diverting from High Street would be via Burnside Road, which would result in a significant additional increase in vehicles on Burnside Road (7,000 vehicles per day). It is also noted that there has been no further action on providing a heavy vehicle alternate route since the 2013 report or 2015 modelling.

Bannockburn Civic Heart Project – The Civic Heart project focuses on an interface with Milton Street and Byron Street as well as an access to High Street. The Bannockburn Transport Strategy maintains the pedestrian focus on Milton Street and Byron Street, in line with the Civic Heart Project. The impact / interface with the increase in traffic on High Street is somewhat mitigated by the retention of the service road between the Civic Heart site and the main carriageway. The eventual provision of traffic signals at the Milton Street intersection will also improve pedestrian access and safety between High Street and the site of the Civic Heart.

The application of the Movement and Place Framework was not part of the initial scope of the project. It was discussed in early consultation with VicRoads, however it was resolved that it did not need to form part of this study. It is noted that the general Movement and Place framework / tool has changed considerably since these early discussions, and the application of it now would be a considerable task.

It is acknowledged that this Strategy could benefit from a formal Movement and Place analysis in the future, particularly around the town centre. The Movement and Place principles have still been considered albeit in an informal manner. With High Street representing the only route crossing the railway line, it has to remain as a movement corridor. By maintaining the service roads, we have tried to facilitate a means to retain or promote an element of place. Detailed measures to enhance place making objectives would be subject to future studies.

Existing Traffic Counts & Travel Speeds vs Limits

It appears that the main locations where the 85th percentile is higher than the specified limit is around the Burnside Road / Yverdon Drive / Charlton Road area. Significant future development in this area or influencing traffic flows in this area will impact future speeds on these links. Road improvements and traffic management measures will also help manage speeds in this location. Milton Street west of High Street is the other location with higher speeds. The final Strategy has been reviewed and more detail regarding speed limits has been included where possible.

Safe System Outcomes

The Safe Systems tool was not included in the original scope of the project, which commenced in 2017. Whilst the strategy regrettably will not include reference to the 'Safe Systems' tool, it does consider the integration of various modes and the safety of all road users.

Cycling and Pedestrian Network Development

There are a considerable number of existing and proposed shared path and footpath connections into the town centre from all directions. Shared paths either exist or are recommended on all major approaches to the school precinct.

The Active Transport plans predominantly provide off road shared paths for cyclists. It recommends on road cycle lanes to be integrated into the strategic road network and High Street upgrades to improve safety for more experienced or touring cyclists, who are less likely to use local shared paths.

If you have any further enquiries in relation to this project please contact Laura Wilks, Strategic Planning Team Leader on 5220 7271 or email lwilks@gplains.vic.gov.au.

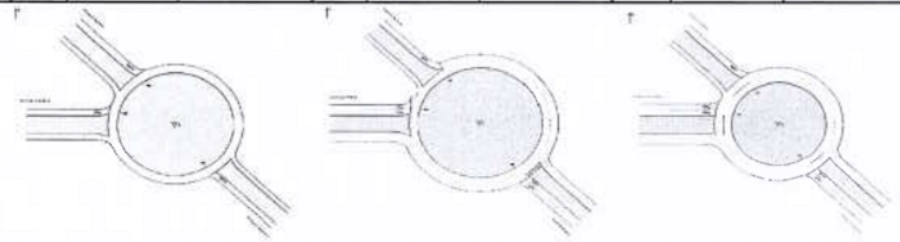
Yours faithfully

TIM WALLER
DEVELOPMENT MANAGER

REVISED SIDRA INTERSECTION RESULTS

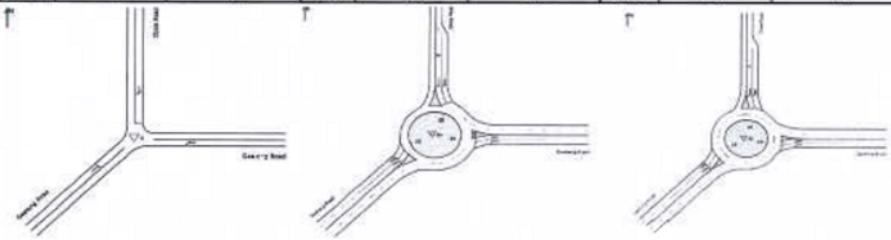
Midland Highway / Geelong Road

		Future Volumes and Existing Conditions			Future Volumes (Cardno Roundabout A)			Future Volumes (Cardno Roundabout B)		
	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Midland Hwy (SE)	0.725	7	93	0.363	6.9	23.1	0.382	6.9	21
	Midland Hwy (NW)	1.237	261.2	441.7	2.414	1292.9	1060.6	1.988	912.8	941.9
	Geelong Rd (W)	2.144	1043.3	6272.9	0.992	35.9	315.4	1.069	85	576.2
PM Peak	Midland Hwy (SE)	1.944	857.6	8904.4	0.976	9.6	1220.9	1.027	35.9	222.8
	Midland Hwy (NW)	1.107	150.1	307.5	1.054	126	255.5	0.828	18.5	5.9
	Geelong Rd (W)	1.111	121	748.5	0.71	16	61.7	0.694	15.6	6.5
Saturday Peak	Midland Hwy (SE)	1.23	217.4	3207.2	0.614	7.2	56.6	0.655	7.2	54.9
	Midland Hwy (NW)	0.896	29.7	105.1	1.069	119.6	317.7	0.93	25.3	10
	Geelong Rd (W)	1.37	352.7	1452.3	0.636	16.9	46.2	0.625	16.7	4.9



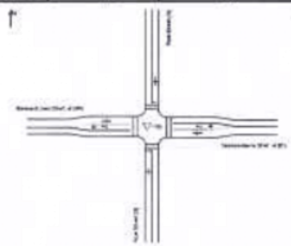
Bannockburn-Shelford Road / Geelong Road / Clyde Road

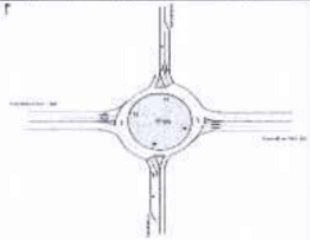
		Future Volumes and Existing Conditions			Future Volumes (Cardno Roundabout A)			Future Volumes (Cardno Roundabout B)		
	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Geelong Rd (E)	0.525	5.4	0.7	0.315	4.4	21.8	0.364	4.4	21.6
	Clyde Rd (N)	18.07	15472	706.4	1.000	260	51.6	0.152	19.8	5.7
	Geelong Rd (SW)	1.481	439.7	5325.4	0.724	7.6	94.2	0.816	7.6	17.9
PM Peak	Geelong Rd (E)	1.437	399.4	3637.9	0.96	18.8	290	1.085	92	765
	Clyde Rd (N)	30.220	26372.1	1227.5	0.181	20.3	10.4	0.147	12.3	4.8
	Geelong Rd (SW)	0.838	5.4	134.4	0.43	7.2	35	0.479	7.2	36.6
Saturday Peak	Geelong Rd (E)	0.714	6	7.6	0.681	12	68.4	0.762	12.1	66.1
	Clyde Rd (N)	84.121	74875.7	3707.6	0.425	19.4	26.8	0.406	14	17.6
	Geelong Rd (SW)	0.965	6.6	488	0.497	6.5	43.9	0.555	6.4	46.6



Bannockburn-Shelford Road / Pope Street

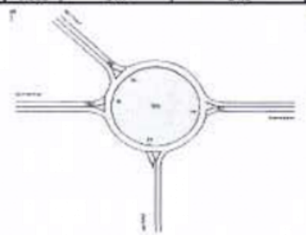
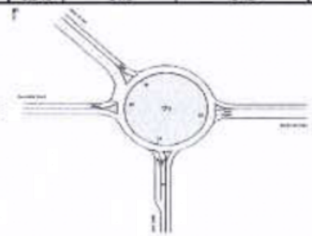
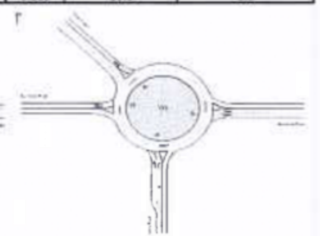
		Future Volumes and Existing Conditions			Future Volumes (Cardno Roundabout A)			Future Volumes (Cardno Roundabout B)		
Bannockburn-	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Pope St (S)	30.151	26282.6	2537.9	0.365	9.7	18.6	0.361	8.9	13.5
	Bannockburn-Shelford Rd (E)	0.284	3.7	7.1	0.19	4.8	7.2	0.201	4.6	7.5
	Pope St (N)	2.847	1726.9	461.1	0.375	29.3	24.4	0.194	9.1	7.8
	Bannockburn-Shelford Rd (W)	0.592	0.6	0.9	0.579	8	37.9	0.627	7.9	37.2
PM Peak	Pope St (S)	41.689	36700.2	1849.3	0.716	74.3	78.9	0.405	12.9	18.8
	Bannockburn-Shelford Rd (E)	0.808	1.8	3.8	0.577	4.8	34.9	0.608	4.6	37.6
	Pope St (N)	11.396	9462.4	844.3	0.144	10.2	7.5	0.130	6.9	4.6
	Bannockburn-Shelford Rd (W)	0.87	11.3	20.7	0.321	5.7	14.9	0.344	5.5	13.6
Saturday Peak	Pope St (S)	23.866	20649.2	1629.9	0.369	16.1	21.7	0.293	10.4	12.7
	Bannockburn-Shelford Rd (E)	0.54	1.6	3.7	0.45	5.4	20.7	0.477	5.3	22.4
	Pope St (N)	3.814	2605.7	672.2	0.169	9.9	8.8	0.154	6.8	5.5
	Bannockburn-Shelford Rd (W)	0.423	4.6	12.6	0.317	6.6	14.6	0.34	6.4	13





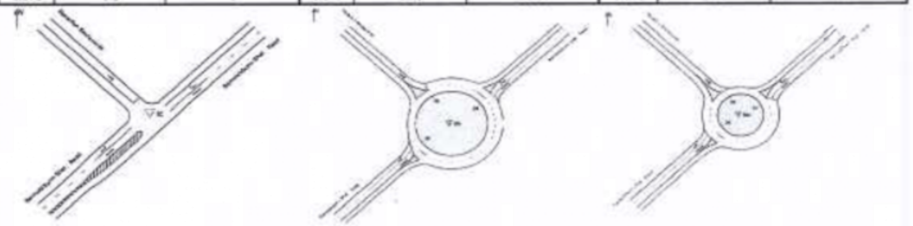
Burnside Road / Pope Street / Levy Road

		Future Volumes and Existing Conditions			Future Volumes (Cardno Roundabout A)			Future Volumes (Cardno Roundabout B)		
Bannockburn-	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Levy Rd (S)	1.808	748.2	1528.3	1.329	320.6	906	1.159	165.4	547
	Burnside Rd (E)	0.661	8.9	51.4	0.422	7.9	23.6	0.413	8	19.5
	Pope St (NW)	0.303	7.5	15	0.303	7.6	15.2	0.293	7.1	12.5
	Burnside Rd (W)	0.53	23.2	26.4	0.662	35.4	37.3	0.515	15.9	19.2
PM Peak	Levy Rd (S)	0.717	21.8	55.1	0.551	13.2	33.2	0.494	9	21.6
	Burnside Rd (E)	0.563	8.5	36.9	0.278	7.4	13.1	0.271	7.3	10.8
	Pope St (NW)	0.346	7.5	17.8	0.345	7.5	17.7	0.333	7	14.5
	Burnside Rd (W)	0.377	13.8	16.2	0.371	13.7	15.8	0.317	9.8	10
Saturday Peak	Levy Rd (S)	0.755	22.7	64.5	0.576	13	36.8	0.520	9	24.6
	Burnside Rd (E)	0.662	14.5	52.8	0.367	9.5	17.9	0.348	9	14.6
	Pope St (NW)	0.568	8.3	37.7	0.567	8.3	37.6	0.548	7.8	30.7
	Burnside Rd (W)	0.352	14.7	14.8	0.346	14.6	14.2	0.289	10.6	8.8

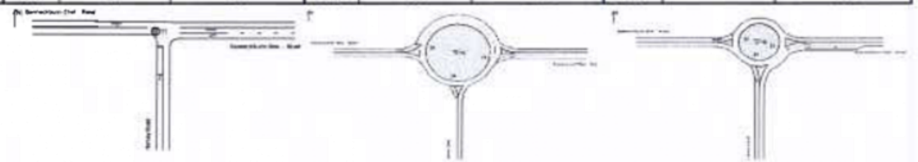
Bannockburn-Shelford Road / Morellion Boulevarde

		Future Volumes and Existing Conditions			Future Volumes (Cardno Roundabout A)			Future Volumes (Cardno Roundabout B)		
	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Bannockburn-Shelford Rd (NE)	0.6	7.5	18.5	0.318	5.7	18.2	0.279	5.6	17.9
	Moreillon Bvd (NW)	4.354	3049.6	1241.7	0.825	47	88.8	0.729	32.8	68.7
	Bannockburn-Shelford Rd (SW)	0.573	0.4	0	0.764	5.5	73.4	0.765	5.2	73.7
PM Peak	Bannockburn-Shelford Rd (NE)	0.543	3	19.1	0.685	5.6	65.7	0.619	5.5	59.4
	Moreillon Bvd (NW)	5.185	3822.1	935.1	0.321	10.4	15.9	0.287	9.6	14.7
	Bannockburn-Shelford Rd (SW)	0.356	0.5	0	0.555	5.9	34.3	0.555	5.7	34.3
Saturday Peak	Bannockburn-Shelford Rd (NE)	0.388	2.2	8.5	0.474	8.7	31.2	0.425	8.7	30.2
	Moreillon Bvd (NW)	1.654	634.1	470	0.376	10.5	20.5	0.336	9.7	18.9
	Bannockburn-Shelford Rd (SW)	0.371	0.5	0	0.847	22.3	120.4	0.848	22.2	120.8



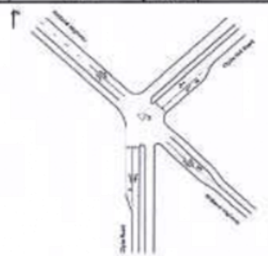
Bannockburn-Shelford Road / Harvey Road

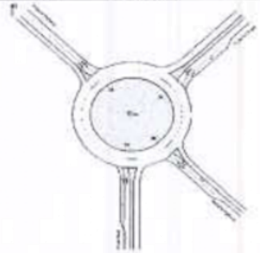
		Future Volumes and Existing Conditions			Future Volumes (Cardno Roundabout A)			Future Volumes (Cardno Roundabout B)		
	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Harvey Rd (S)	3.741	2506.5	1219.7	0.399	10.5	22.5	0.4	10.5	22.7
	Bannockburn-Shelford Rd (E)	0.235	1.3	0	0.325	6.9	19.5	0.302	7	20.1
	Bannockburn-Shelford Rd (W)	0.662	4	37.8	0.855	12.2	133.5	0.856	12.1	133.6
PM Peak	Harvey Rd (S)	3.804	2566	976.2	0.638	27.9	51.2	0.637	27.8	50.9
	Bannockburn-Shelford Rd (E)	0.508	1.1	0	0.713	8	62.2	0.669	7.9	60.5
	Bannockburn-Shelford Rd (W)	0.914	37.2	166.8	0.557	8.6	46.3	0.557	8.5	46.3
Saturday Peak	Harvey Rd (S)	1.811	773.9	592.5	0.391	12.4	21.7	0.393	12.4	21.9
	Bannockburn-Shelford Rd (E)	0.346	1.3	0	0.479	7.3	31	0.447	7.3	31.5
	Bannockburn-Shelford Rd (W)	0.6	8.7	6.4	0.578	8.6	47.6	0.578	8.5	47.6



Midland Highway / Clyde Road / Clyde Hill Road

		Future Volumes and Existing Conditions			Future Volumes and Existing Conditions - Revised			Future Volumes and Roundabout			Future Volumes and Roundabout - Revised		
	Approach	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)	DOS	Average Delay (s)	95th %tile Queue (m)
AM Peak	Clyde Rd (S)	0.423	15.5	15.2	0.423	15.5	15.2	0.118	10.3	4.5	0.118	10.3	4.5
	Midland Hwy (SE)	0.148	0.5	0.2	0.148	0.5	0.2	0.177	8.3	7.8	0.177	8.3	7.8
	Clyde Hill Rd (NE)	0.045	10.1	1.1	0.045	10.1	1.1	0.022	7.3	0.7	0.022	7.3	0.7
	Midland Hwy (NW)	0.183	0.4	0.3	0.183	0.4	0.3	0.256	8.8	11.7	0.256	8.8	11.7
PM Peak	Clyde Rd (S)	0.557	23.1	18.7	0.535	19	17.6	0.098	10.1	3.9	0.14	9.4	5.8
	Midland Hwy (SE)	0.240	1.6	0.3	0.240	1.6	0.3	0.325	8.8	15.9	0.325	8.8	15.9
	Clyde Hill Rd (NE)	0.184	13.5	4.6	0.185	13.6	4.7	0.071	7.1	2.3	0.071	7.1	2.3
	Midland Hwy (NW)	0.224	1.4	2.4	0.224	1.4	2.4	0.302	9.1	14.7	0.300	9	14.7
Saturday Peak	Clyde Rd (S)	6.291	2320.7	1287.9	2.471	264.9	354.2	0.403	11.7	19.9	0.613	17.3	40.1
	Midland Hwy (SE)	0.347	1.8	1.1	0.347	1.8	1.1	0.656	14.9	54.8	0.642	14.6	51.7
	Clyde Hill Rd (NE)	2.438	1233.8	615.3	3.13	1808.8	712.1	0.236	9.3	8.9	0.222	9.3	7.8
	Midland Hwy (NW)	0.374	4.2	15.6	0.374	4.2	15.6	0.488	11.1	28.5	0.398	9.8	21.8





BANNOCKBURN TRANSPORT STRATEGY

FEEDBACK FORM

PLEASE PROVIDE YOUR DETAILS BELOW

Name: Brendan O'Loan - Planning Manager St Quentin

Address: PO Box 919 Geelong 3220

Contact telephone number: 5201 1811

Email: brendan@stqc.com.au

DO YOU HAVE ANY FEEDBACK REGARDING THE PROJECT RECOMMENDATIONS?

'Please see attached'

ECM Captured
File No:
ECM Ref:
Initials: Date:

GOLDEN PLAINS SHIRE

Signature..... Date 3.7.19

5220 7111 PO Box 111, Bannockburn VIC 3331 goldenplains.vic.gov.au enquiries@gplains.vic.gov.au

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3 July, 2019

Tim Waller
Development Manager
Golden Plains Shire
PO Box 111 Bannockburn
VIC 3331

Hi Tim,

Bannockburn Transport Strategy

As you are aware St Quentin has multiple existing clients in the Bannockburn locality including a significant land holder immediately to the west of Bruces Creek on the north side of Bannockburn-Shelford Road. I have reviewed the Bannockburn Transport Strategy (Strategy) and provide the following comments.

The Strategy discusses the current movement issues within the BUDF using SIDRA intersection analysis and identifies the Milton Street North-West PM approach with Bannockburn-Shelford Road as one of the worst performing intersections in Bannockburn with a Degree of Saturation of 1.152.

The 'predicted movement issues' once development and population has increased is summarised on page 12 of Appendix A of the Strategy. The issues do not identify the western approach of Bannockburn-Shelford Road as being of major concern.

Despite Milton Road/Bannockburn-Shelford Road intersection being a major concern and capacity of Bannockburn-Shelford Road not being of concern, the Strategy still identifies a Bruce's Creek bridge to the north of Bannockburn-Shelford Road, as an action to alleviate the movement issues.

First, this vehicle creek crossing will direct more vehicles to use the Milton Street North-West approach with Bannockburn Shelford Road making this intersection more congested then it currently is.

Second the vehicle creek crossing does not appear to be needed in terms of Bannockburn-Shelford Road being unable to handle the additional traffic due to population growth on the western side of Bruce's Creek. The Strategy states that the Bannockburn-Shelford Road has a theoretical capacity of 18,000 vehicles and has a current volume of approximately 10,000 vehicles daily.

In conclusion there appears to be little basis for including a Bruces Creek vehicle crossing north of Bannockburn- Shelford Road. Its construction would likely make the Milton Street North-West approach with Bannockburn-Shelford Road intersection worse. Potentially a pedestrian bridge linking the east and the west residential areas either side of Bruces Creek is all that is needed or justified to achieve overall better outcomes for the transport within Bannockburn.

If you would like to discuss this in more detail, please feel free to contact me.

Kind Regards,

Brendan O'Loan
Planning Manager MPIA

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Local call: 1300 363 036
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GOLDEN PLAINS SHIRE

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Bannockburn, Victoria, 3331
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4 September 2019

Ref: 60-06-035

St. Quentin Consulting
Attn: Brendan O'Loan
PO Box 919
GEELONG VIC 3220

Dear Brendan,

Thank you for your feedback in response to the Bannockburn Transport Strategy. Please find below a response to the concerns raised in your submission dated 3rd July, 2019. Please note a final copy of the Strategy will be presented to Council for their endorsement at the Council meeting being held on 24 September 2019.

With regards to the forecast traffic flows, the analysis undertaken investigated the existing intersection layout and concluded that all existing approaches at that intersection are over capacity in the PM peak. The more relevant analysis can be found in the future conditions, whereby additional capacity (and demand) is provided at the intersection, reducing the Degree of Saturation on the same approach to 0.642 in the PM peak.

In response to the concerns relating to the western approach of Bannockburn-Shelford Road and the use of a creek crossing to alleviate movement issues to the north of Bannockburn-Shelford Road, the content you reference has been extracted from the 2011 Bannockburn Urban Design Framework. There has not been any detailed intersection analysis completed to support these findings from the UDF, however current analysis undertaken as part of the Bannockburn Transport Strategy supports the principles outlined in the UDF. This includes the provision of a creek crossing connecting Milton Street and development west of Bruce's Creek. Furthermore, intersection analysis undertaken along Bannockburn-Shelford Road suggests that if all traffic west of Bruce's Creek was routed via Bannockburn-Shelford Road without the introduction of a creek crossing, these intersections would exceed capacity.

Overall, the creek crossing will more evenly distribute traffic entering the town centre, particularly providing more direct access from the west, without the need to utilise Bannockburn-Shelford Road. Additionally, the improvements at Bannockburn Shelford Road/Milton Street intersection will help relieve congestion.

In response to your comments regarding the current volumes and estimated capacity of Bannockburn-Shelford Road, the figures quoted in your submission reflect the current volumes.

...where opportunities grow...

Future traffic volumes are considerably higher, potentially up to 25,000 vehicles per day between Pope and Milton Streets, and 35,000 vehicles per day between Milton Street and McPhillips Road. Additionally, the performance of the intersections during the peak periods play a key role in determining overall road network requirements. Without the provision of a creek crossing, the flows south of Milton Street would increase to an amount greater than the estimated 25,000 vehicles per day.

Should you wish to discuss this matter further, please do not hesitate to contact Laura Wilks, Strategic Planning Team Leader 5220 7271 or email lwilks@gplains.vic.gov.au.

Yours faithfully,

TIM WALLER
DEVELOPMENT MANAGER