

5. Bannockburn railway station is currently not in operation limiting the area's connectivity to other parts of Melbourne via passenger heavy rail and reducing travel options for local residents, businesses/people working in Bannockburn Growth Area.

Based on a review of existing conditions and identified issues and early consultation with PTV, V/Line, VicTrack and TfV has identified a number of potential opportunities to improve public transport in Bannockburn Growth Area including:

1. Consider the advantages and disadvantages of extending the PTV local bus service to include a wider catchment throughout the Bannockburn Growth Area as residential development increases.
2. Advocate to PTV and V/Line for additional bus services to and from Bannockburn with new services making it viable for residents to commute for work to and from Geelong, and potentially connecting to trains from Geelong to Melbourne.
3. Consider a Council or community funded shuttle bus for residents within the growth area to the McPhillips Road/High Street bus interchange.
4. Liaise with local schools and PTV to ensure that future school bus services meet demand.
5. Continue to consider the long term option of reopening the passenger heavy rail service from Geelong at Bannockburn.

Ongoing consultation with PTV and TfV will further identify potential opportunities and improvements to future public transport access to and within Bannockburn.

5.3 Walking and Cycling

Based on a review of available information, site observations and early consultation, a number of key pedestrian and cycling issues have been identified throughout Bannockburn, including:

1. There is a lack of safe pedestrian crossings on High Street between Burnside Road and McPhillips Road, and a high volume of vehicles travelling through the town centre reduces the ability for pedestrians to cross the road.
2. There is no safe pedestrian crossing on the western section of Geelong Road near the Clyde Road / Kelly Road intersection. Similarly there are currently no safe pedestrian crossings on any arm of the Clyde Road / Kelly Road intersection near the rail crossing.
3. Pedestrian links on Clyde Road and Kelly Road are inconsistent between Geelong Road and the Midland Highway.
4. Missing pedestrian link on Burnside Road between Glen Avon Drive and Yverdon Drive.
5. Missing pedestrian link on Charlton Road between Burnside Road and Willowbrae Way incorporating a shared pedestrian path crossing Bruce's Creek.
6. No safe pedestrian crossing across Burnside Road to connect with the existing pedestrian path on the northern side of Burnside Road west of Dalcrain Drive.
7. Missing shared path links on Shelford-Bannockburn Road between Burnside Road and the western growth area boundary incorporating a connection to the existing underpass crossing Bruce's Creek.
8. There is currently only the single pedestrian crossing over the rail line.
9. Lack of on-road bicycle lanes on key arterial links connecting to or through Bannockburn Town Centre;
10. Missing formal on-road or off-road bicycle path along Burnside Road between Shelford-Bannockburn Road and the existing shared path on the north side of Burnside Road east of Pope Street; and
11. Missing on-road or off-road bicycle path along Pope Street between Burnside Road and Shelford- Bannockburn Road.

Based on a review of existing conditions and identified issues, and a review of the Paths and Trails Strategy, a number of opportunities have been identified to improve the access and mobility for active transport modes in Bannockburn Growth Area and encourage walking and cycling including:

1. Strengthen pedestrian and cyclist connections through Bannockburn Growth Area, linking the north/south and east/west growth area boundaries.

2. Provision of off-road shared paths on key connectivity links identified within the growth area, as identified in the Bannockburn Paths and Trails Strategy.
3. Provision of new or improved pedestrian footpaths on key existing and future links within residential areas accessing main roads within the growth area including:
 - > Clyde Road and Kelly Road to Midland Highway;
 - > Shelford-Bannockburn Road west of Moreillon Boulevard;
 - > Moore Street and Byron Street; and
 - > Burnside Road and Charlton Road.
4. Improving active travel connectivity across Bruce's Creek as development within the growth area continues.
5. Improve pedestrian and cyclist crossing locations along key roads within the growth area including Geelong Road and Shelford-Bannockburn Road.
6. Investigate potential for a shared path along the Midland Highway to Lethbridge and Batesford.
7. Investigate the need for and a suitable location to provide a second pedestrian crossing over the rail line to provide safe pedestrian access at desire lines.

Figure 5-2 illustrates the gaps in the existing walking and cycling network within Bannockburn Growth Area and future potential improvements.

Figure 5-2 Pedestrian and Cycling gaps and future potential improvements



5.4 Parking

Based on a review of available information, parking surveys, and site observations, a number of key parking issues have been identified within the growth area, and in particular the town centre area, including:

1. No undercover parking present within the town centre.
2. 10% of parking within the vicinity to the commercial area is timed with the remaining unrestricted, reducing turnover parking for visitors to the town centre.
3. Unrestricted parking proximate to key generators including Bannockburn Primary School, Bannockburn Library and Bannockburn Recreational Reserve.
4. Cars parked on both sides of the narrow residential streets can impact two-way traffic flow.
5. Car parking issues identified during specific events in the town centre such as Market days.

Based on a review of existing conditions and identified issues, a number of opportunities have been identified to improve the parking within Bannockburn Town Centre including:

1. Review of on-street and off-street parking within the Bannockburn Town Centre to allow a mixture of timed and unrestricted parking to cater for all users' needs, considering the additional parking provision within the redeveloped Bannockburn Plaza.
2. Ensure future development proposals provide parking in accordance with the Golden Plains Shire Planning Scheme.
3. Investigate and identify additional areas within the town centre to supply additional off-street parking, catering to specific development needs.

6 Conclusions

The issues and opportunities report findings for Bannockburn Growth Area identified a significant number of issues and opportunities for walking, cycling, public transport, traffic and parking. Some of the key issues include:

1. Addressing the gaps in off-road walking and cycling links within Bannockburn and improve connectivity within the growth area.
2. Investigate opportunities to improve on-street walking and cycling links within Bannockburn to key generators.
3. Identify solutions to improve pedestrian and cycling links over Bruce's Creek.
4. The need to implement pedestrian and cycling safety, including the provision of safe crossing locations over major roads.
5. Investigate opportunities with V/Line and McHarry's bus service to provide additional services to and from Geelong and ensure commuting via public transport to Melbourne CBD is viable.
6. It is suggested to advocate to McHarry's bus service to alter their existing bus routes to include areas within Bannockburn Growth Area.
7. Further investigate with PTV the potential for re-opening Bannockburn rail station to improve public transport connectivity with surrounding key locations.
8. Consider a Council or community funded shuttle bus for Bannockburn residents to Bannockburn town centre from residential areas within the growth area.
9. Review on-street and off-street parking restrictions within the town centre to ensure a mixture of timed and unrestricted parking caters for all users' needs.
10. Undertake further investigations regarding a heavy vehicle bypass around Bannockburn Town Centre.
11. Review the speed limits within the growth area and consider lowering / increasing on key traffic routes.
12. Investigate opportunities to upgrade key intersections to cater for future development within Bannockburn.

The findings of this issues and opportunities report, in conjunction with feedback received from key stakeholders and the public, will contribute to the development of the Bannockburn Transport Strategy.

Bannockburn Transport Strategy

Appendices Document

V171834



Prepared for
Golden Plains Shire

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Planning Policy Context

This appendix provides a detailed analysis of the relevant transport policy and strategic documentation that has been referred to in Section 2. The following sections highlight where the proposed Bannockburn Town Centre will facilitate the delivery of the appropriate regional and local transport and movement strategy and policy goals and objectives.

Golden Plains Shire Planning Scheme

Bannockburn is the largest urban centre in Golden Plains Shire and a key regional centre within the Shire's network of townships across the south-east, serving residential, commercial and administrative functions. The Golden Plains Shire Planning Scheme (GPSPS) highlights key issues within Bannockburn, including:

- > The continued management of residential growth including land supply, infrastructure provision and maintenance of the urban growth boundary;
- > Enhancement of economic growth and well-being to encourage local business opportunities, employment, expenditure and town centre activity;
- > The need to guide commercial growth and manage change as the town expands; and
- > Protection and enhancement of the natural and built environment including environmental assets, the Bruce's Creek environs, town character and rural ambience.

To address the key issues stipulated in the GPSPS, objectives and strategies have been put in place to achieve this. These include:

- > To promote growth in Bannockburn that is sustainable in accordance with the Overall Principles Plan and Land Use Precinct Plan by developing Milton Street to provide a future road link across Bruce's Creek to serve future residential areas to the west of Bannockburn and facilitate creek crossings in accordance with the Bruce's Creek Masterplan. Additionally the GPSPS aims to provide walking and cycling linkages to open space areas, community facilities and the town centre in new development and subdivision;
- > To create a prosperous and sustainable Bannockburn Town Centre by facilitating growth within the Bannockburn Town Centre that is consistent with the Land Use Precinct Plan and the principles of the Bannockburn Urban Design Framework and provide attractive and usable public spaces adjacent to or close to the town centre to encourage social activity (cafes, restaurants, etc.) and pedestrian and cycle connectivity;
- > To provide an integrated and environmentally responsive open space network throughout Bannockburn township by providing open space areas in new developments that incorporate pedestrian, bicycle or riding trail paths to other open space areas which are preferably off-street and utilising the rail corridor as an open space link incorporating a shared footpath, bicycle and riding trail;
- > To restore and protect the Bruce's Creek and environs by providing walking and cycling trails, preferably on the eastern side of the creek;
- > To maintain the village character of Bannockburn by upgrading main road avenues of wide, tree-lined road reserves in accordance with the Bannockburn Urban Design Framework; and
- > To improve the infrastructure of Bannockburn by directing traffic movements to use the Shelford- Bannockburn Road and encourage the provision of off-street car parking in accessible locations with good pedestrian and cycling links as identified by the Bannockburn Town Centre Investment Strategy 2008.

Bannockburn Town Centre Investment Strategy (BTCIS)

The strategy was prepared to provide a comprehensive and coordinated framework for new retail and commercial developments required to support an increasing population base. The population within Bannockburn and surrounding districts increased 39.3% between 2001 and 2006 to 8,140 and is forecasted to grow to 12,260 by 2021.

As part of the strategy additional traffic management and service provision within the town will need to be upgraded to accommodate the new growth. New residential areas west of the town centre will alter the character of some local streets and change the traffic management requirements at some intersections within the town centre. Additionally, significant improvements to traffic management will be required to accommodate additional traffic generated by new development and growth within the Bannockburn catchment area. The following traffic management devices are proposed to help cater for the new developments and growth:

- > Traffic signals at the intersection of Milton Street and High Street;
- > Roundabout at the intersection of Burns Street and Milton Street;
- > Roundabout at the intersection of Milton street and Byron street; and
- > Roundabout at the intersection of Milton Street and Moore Street.

The study area for Bannockburn Investment Strategy is shown in Figure A-1.

Figure A-1 Bannockburn Investment Strategy study area



Key findings of the Investment Strategy include:

- > The lack of traffic management in the Town Centre is becoming an issue given the continual population growth in Bannockburn;
- > The road network that exists around Bannockburn is adequate and allows easy access to and from the town;
- > The frequency of bus services in Bannockburn is poor, leaving public transport nearly non-existent;

- > Walking paths that exist in and around Bannockburn do not necessarily link to places of interest or gathering;
- > Parking within the Town Centre is becoming inadequate to meet demand during daily peak periods; and
- > The current car parking layout in Bannockburn is not user friendly, however, the ability to access High Street from Burns Street is important for local traders and traffic circulation in the area.

The BTCIS sets out the vision and objectives for the Bannockburn Town Centre. Council's vision is:

"To maintain the rural atmosphere of Bannockburn by managing future development in a way that enhances the regional role of the township, maintaining high service provision and providing opportunities for local employment, while improving traffic circulation and public access."

Council's vision will be achieved by implementing the following objectives which will provide guidance in relation to future planning and development of the Bannockburn Town Centre. Council's objectives include but are not limited to:

- > Promote traffic management outcomes that cater for increased traffic and parking demands associated with the growth of Bannockburn;
- > Provide specific control measures at key intersections in Bannockburn;
- > Define a road hierarchy to facilitate traffic movement through and within the town;
- > Provide adequate and suitably located car parking to cater to retail and commercial land uses;
- > Enhance pedestrian and cycle connectivity within the town; and
- > Provide attractive and usable public spaces adjacent to or within close proximity to the retail centre.

The BTCIS highlights the proposed investment and land use strategy for Bannockburn Town Centre (shown in Figure A-2) which will assist in meeting future requirements for the expansion of the town centre.

Figure A-2 Investment and Land Use Strategy for Bannockburn Town Centre



The Investment and Land Use Strategy sets out future commercial and retail land use sizes and allocates Gross Floor Area (GFA) to blocks within the Bannockburn Town Centre. It is anticipated an additional 32,175sqm of commercial and retail GFA will be developed within the town centre. Summarised land uses for the town centre are shown in Table A-1.

Table A-1 Future commercial and retail land use

<i>Use</i>	<i>Total Gross Buildable Floor Area</i>
Retail (Block 1)	8750sq.m
Retail (Block 2)	5450sq.m
Total Retail	14,200sq.m
Commercial (Block 3)	4500sq.m
Commercial (Block 4)	8175sq.m
Commercial (Block 5)	5300sq.m
Total Commercial	17,975sq.m
Total Commercial and Retail	32,175sq.m

By applying the future traffic generation rates set out in the BTCIS for residential, commercial and retail developments proposed for the Bannockburn Town Centre to the existing conditions supplied within the investment strategy, estimated traffic volumes for the major roads within the Bannockburn Town Centre were established as part of the BTCIS as shown in Table A-2 below.

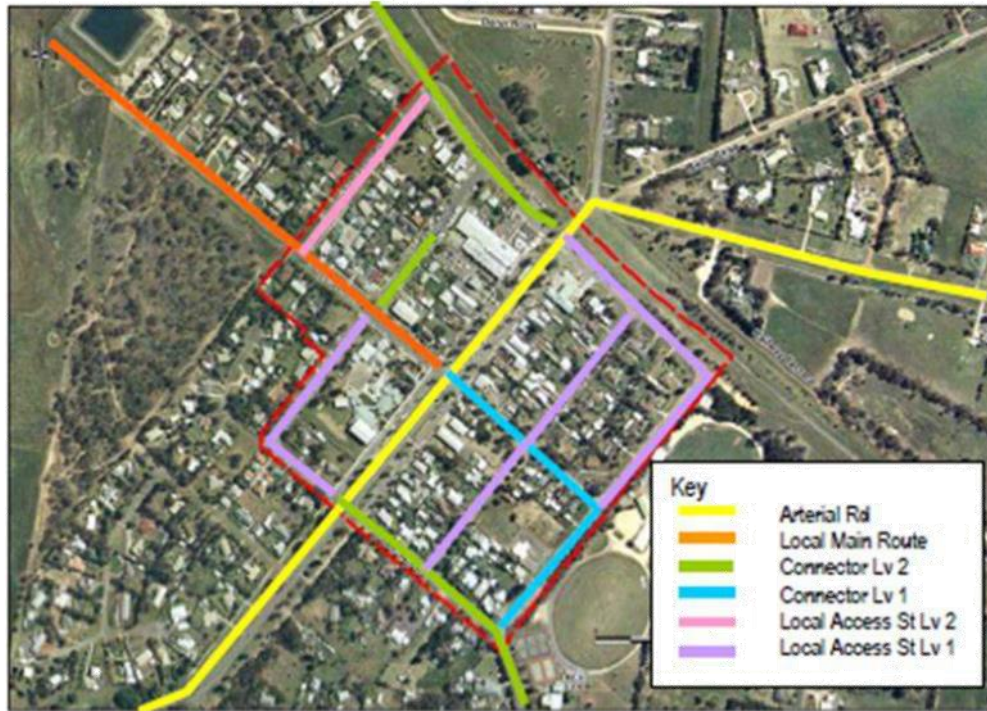
Table A-2 Estimated 2017 Daily Traffic Volumes

<i>Street</i>	<i>Location</i>	<i>Estimated 2007 Daily Traffic Volumes [1]</i>	<i>Development Traffic</i>	<i>Additional Through Traffic 2017</i>	<i>2017 Traffic Volumes</i>
High Street	South of McPhillips Rd	4550	7000	1700	13,250
	South of Milton St	5450	3100	1700	10,250
	South of Pope St	4700	1800	1700	8200
High St Service Rd – nth-bound	Btw Milton & McPhillips Rd	150	1600	-	1750
	Btw Pope & Milton St	250	300	-	550
High St Service Rd – sth-bound	Btw Milton & McPhillips Rd	500	400	-	900
McPhillips Road	South east of High St	1150	100	-	1250
	North west of High St	550	700 - 1900	-	1250 - 2450
Milton Street	South east of High St	1000	800	-	1800
Pope Street	South east of High St	900	1500	-	2400

[1] Estimated daily volumes from Existing Conditions Report

Based on the likely development traffic and future traffic volumes set out in the BTCIS a future road hierarchy plan for the Bannockburn Town Centre was identified and is shown in Figure A-3.

Figure A-3 Bannockburn future road hierarchy



Given the proposed future road hierarchy and traffic volumes within the Bannockburn Town Centre the BTCIS recommends traffic management treatments to assist in alleviating traffic and pedestrian issues as shown in Figure A-4.

Figure A-4 Recommended intersection treatments



The anticipated future developments proposed within the BTCIS will require additional on and off-street parking to cater for the increase in traffic visiting the town centre. Table A-3 highlights the recommended car parking requirements to cater for the increase in commercial and retail developments within the town centre.

Table A-3 Recommended on and off street retail and commercial parking requirements

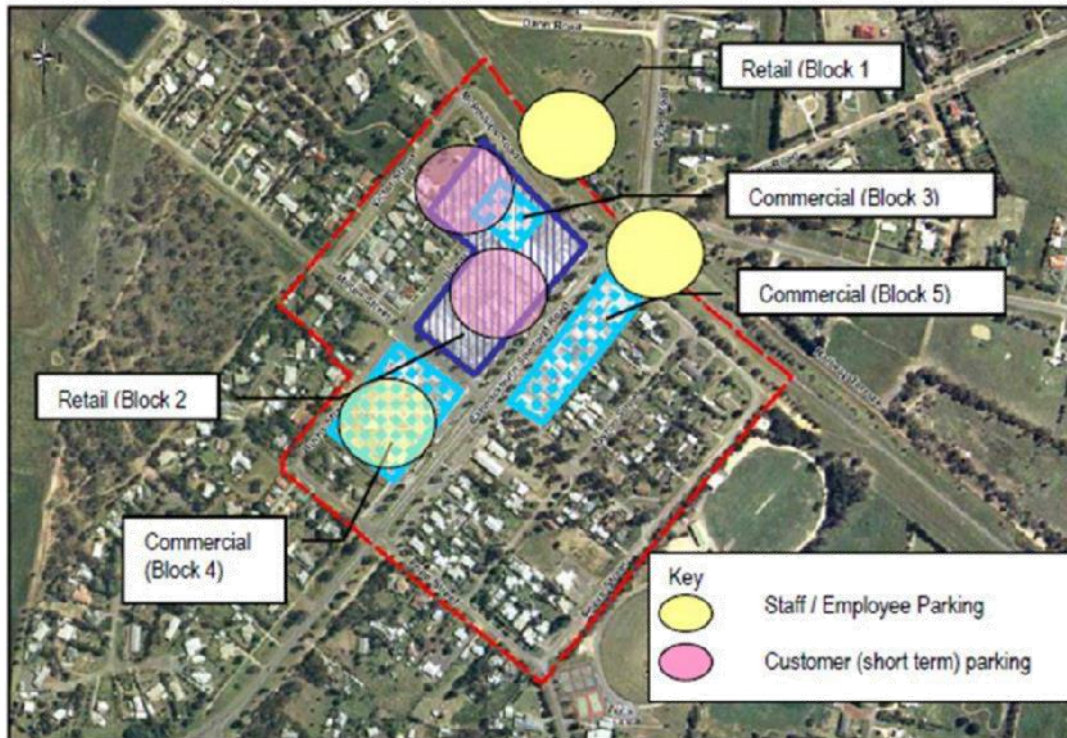
Use		Gross Floor Area	Total Parking Requirement [1]	On Street abutting Site [2]	Off Street Requirement
Retail	Block 1	8750sq.m	490 spaces	14 spaces	476 spaces
	Block 2	5450sq.m	305 spaces	22 spaces	283 spaces
Total Retail		14,200sq.m	795 spaces	36 spaces	759 spaces
Commercial	Block 3	4500sq.m	158 spaces	-	158 spaces
	Block 4	8175sq.m	286 spaces	57 spaces	229 spaces
	Block 5	5300sq.m	186 spaces	56 spaces	130 spaces
Total Commercial		17,975sq.m	630 spaces		517 spaces

[1] Based on 4.3 spaces per 100sq.m for retail and 3.5 spaces per 100sq.m for commercial

[2] Table 3.1 of the Existing Conditions Report

To ensure there is adequate off-street parking within the Bannockburn Town Centre the BTCIS recommends parking locations to serve the increase in commercial and retail GFA and in turn the increase in visitors to the town centre. Figure A-5 identifies areas suitable for parking associated with the individual commercial and retail development blocks. It is recommended within the BTCIS to split the future off-street car spaces into short and long term spaces to cater for staff and visitors to Bannockburn.

Figure A-5 Recommended off street car parking locations



To integrate the existing pedestrian and cycle network within the town centre to residential, retail and commercial areas additional pedestrian links will need to be provided between new and existing residential areas and the retail precinct, school and civic activities and provide safe crossing locations across High Street. Figure A-2 above recommends additional pedestrian links to assist in creating easier pedestrian access to the town centre.

Furthermore, due to an increase in retail and commercial developments (shown in Table A-1) additional 'end of trip' facilities will need to be provided in line with Golden Plains Shire Planning Scheme, shown in Table A-4.

Table A-4 Future bicycle parking requirements

Use	Bicycle Parking Provision Rate		Minimum Bicycle Parking Requirements	
	Employee	Visitor / Shopper	Employee	Visitor / Shopper
Retail (14,200sq.m)	1 to each 300sq.m leasable area	1 to each 500sq.m of leasable area	47	28
Commercial (17,975sq.m)	1 to each 300sq.m of net floor area	1 to each 1000sq.m of net floor area	60	18
			107	46

The BTCIS also recommends additional public and community transport to accommodate the proposed population and development growth within the town centre. Recommended new services include:

- > New transport services connecting the retail precinct with new residential subdivisions to the north west of the town;
- > Expanded services connecting the town centre retail and commercial precinct with outlying communities; and
- > A dedicated taxi rank within the town centre that provides convenient drop-off and waiting areas for taxis servicing the expanded retail and commercial precinct.

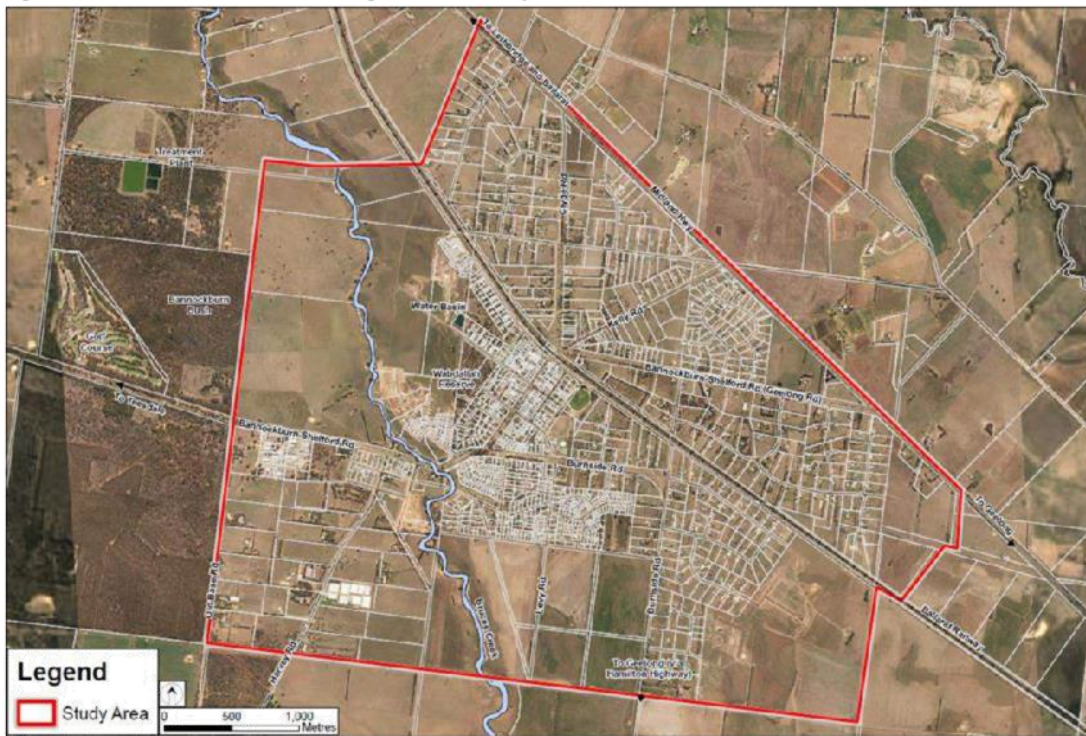
The information provided within the BTCIS will be part of the foundation to ensure Council's vision is reflected within the Bannockburn Transport Strategy.

Bannockburn Urban Design Framework (2011)

The Bannockburn Urban Design Framework (BUDF) has functioned as the key strategic reference through which to guide land use planning in Golden Plains Shire’s largest and fastest growing population centre.

The study area is the Bannockburn Township which is bounded by Midland Highway to the north, extent of the rural residential development to the south, extent of the existing Structure Plan boundary to the east and Bannockburn Bush to the west as shown in Figure A-6.

Figure A-6 Bannockburn Urban Design Framework Study Area



The BUDF takes into account projected future population within the Bannockburn urban growth area to determine future infrastructure, commercial, retail, recreation and educational needs for the community. Population projections for the urban growth area are shown in Table A-5.

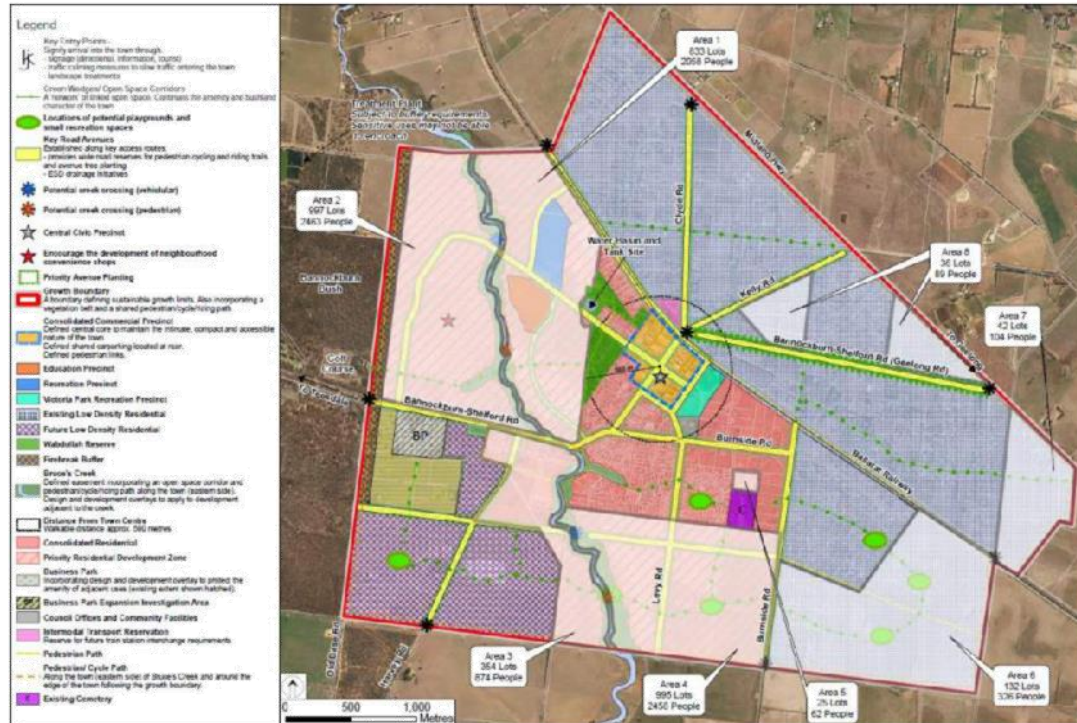
Table A-5 Population growth within the urban growth area

Development Type	Zoning	Population Capacity (2023)	Recent Population Growth (2005 to present)	Remaining Capacity (Projected Growth)
Medium – High Density ¹	R1Z	7787	613	7174
Low Density ²	LDRZ	519	257	262
Current Bannockburn Population (UGB)				3259
Projected Growth Area Population (UGB)				7436
Total Projected Bannockburn Population (UGB)				10,474

Based on the projected 2023 population of 10,474, Bannockburn has capacity for 7,400 additional people within the high, medium and low density suburbs within the growth area. There is also additional scope for

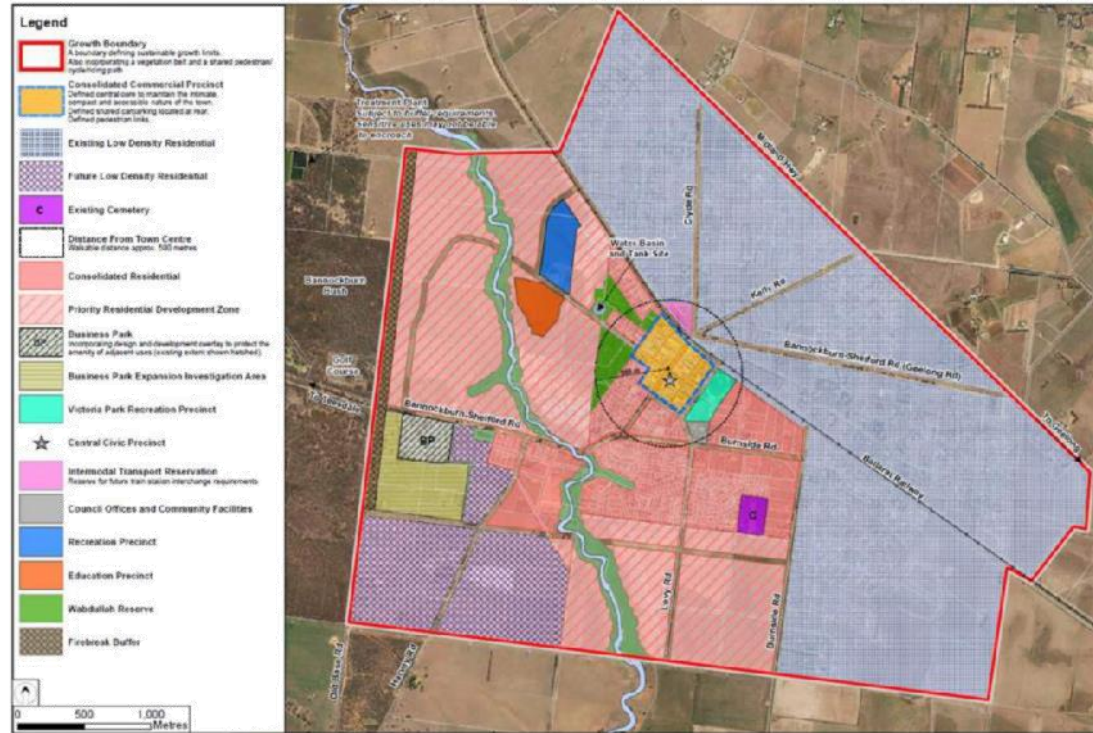
increased densities at strategic locations near schools and recreation facilities. The capacity of Bannockburn's future population and location is illustrated on Figure A-7.

Figure A-7 Bannockburn future population and locations



In order to accommodate the future projected population of Bannockburn growth area an increase in the current educational, recreational, residential, commercial and retail sectors of the Township are desirable to ensure the long term economic viability of the town and as such land uses and activities throughout the Bannockburn Township have been strategically placed to ensure this long term economic viability. Figure A-8 provides an overview of Bannockburn's land use and activity precincts.

Figure A-8 Bannockburn land use and activity precincts



The land use and activity precincts within the growth area that are to serve the proposed population growth at the present time do not have the infrastructure to cater for the increase in traffic, car parking, transport, pedestrian and vehicle access. Through community feedback and detailed analysis it was found the key movement issues predicted within the BUDF once development and population has increased include:

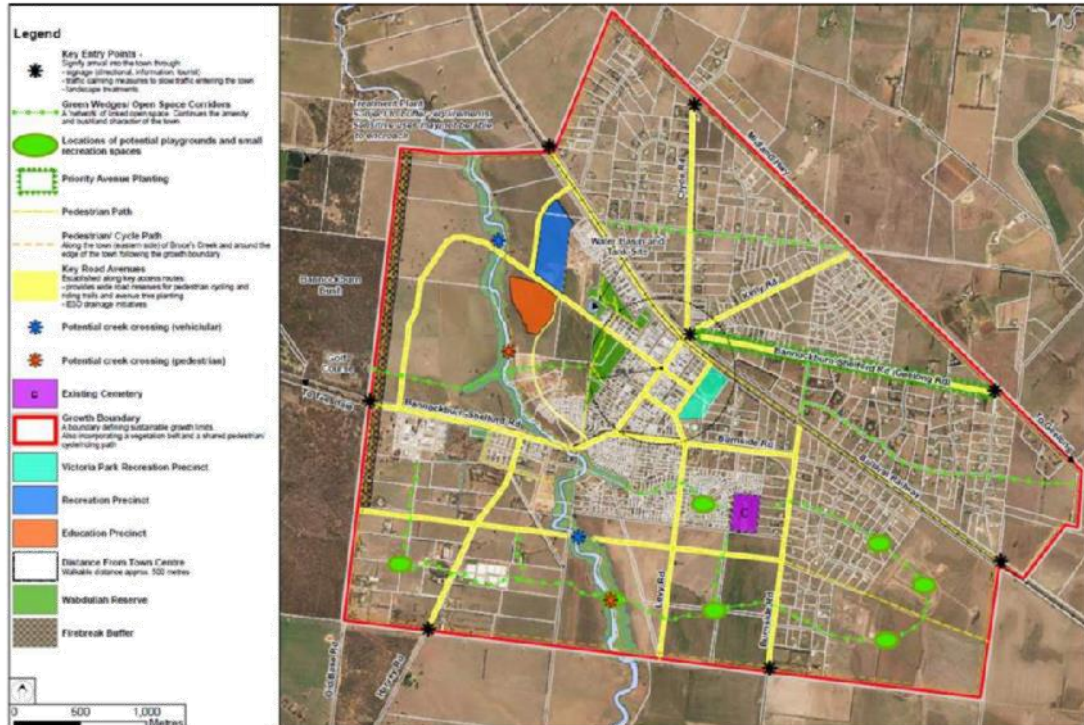
- > Entry into the town from the east via the Midland Highway slip lane is poorly signed and the slip lane does not slow vehicles, although they are required to give way;
- > The main entry into the town at the rail line is difficult in terms of sightlines, the number of converging roads, a narrowing across the rail line, and concerns regarding pedestrian access and safety;
- > The level of heavy vehicle movements along High Street is currently considered to be a modest 11%, there is a need to identify a by-pass route to accommodate future increased traffic flow;
- > The number of service road and driveway entries into High Street is high and confusing, with 11 different openings along two blocks;
- > There is a need for improvement in the approach routes and entrances to the Bannockburn Town Centre;
- > There is a shortage of car parking within the town centre;
- > New development areas should provide open space, with direct connections into other networks; and
- > The need for a public open space reserve with a shared walking/bicycle/riding trail network at the town boundary edge.

To alleviate the movement issues within the Bannockburn growth area the BUDF recommends the following actions:

- > Priority to be given to Shelford-Bannockburn Road traffic at the High Street entry, with consideration given to closing or truncating Kelly Road at the southern end and rerouting along a newly opened road section of Gillett Street;
- > Create a gateway zone at the 80/60 km transition into the town;
- > As per the Bannockburn Town Centre Investment Strategy intersection treatments should be considered along High Street (Shelford-Bannockburn Road) and along Milton Street taking into account the anticipated levels of traffic associated with planned developments;
- > Investigate possible treatments for the High Street / McPhillips Road intersection to ensure safety and functionality are maximised;
- > Use the rail corridor and the wide road reserves as multi use (bicycle, pedestrian) trail links to open space, education and recreation zones;
- > Determine main road avenues and connections through the town, for the future planning of the road network, infrastructure and services, trail system, and drainage (particularly WSUD treatments incorporated into the road system);
- > Consider additional, formalised pedestrian crossings across High Street;
- > Determine future parking areas at the rear of commercial zones, ensuring direct connections and a 'loop system' for vehicles, and direct access to commercial/retail areas for pedestrians;
- > Investigate opportunities for providing alternative routes and rail crossings as part of the access opportunities to both Geelong and the Geelong Bypass;
- > Identify a local bus service route that connects existing and future residential developments to the town centre and railway station;
- > New developments should supply off-street car parking at the rates recommended in the Planning Scheme, encourage shared access points, provide good pedestrian links;
- > Investigate the relocation of industrial/service type land uses within the town centre to provide additional, strategically located car parking;
- > Provide additional pedestrian connections off-street to follow desire lines, connect activity areas and link car parks to ensure an accessible and permeable town centre with minimal reliance on vehicle travel; and
- > Limit the number of creek crossings to two, one north and one south of the existing crossing on Shelford-Bannockburn Road. Crossing should be for vehicles and pedestrians.

Figure A-9 shows the proposed future road, pedestrian and open space network for the Bannockburn Growth Area.

Figure A-9 Bannockburn growth area road, pedestrian and open space network



Recommendations from the Bannockburn Urban Design Framework will be key reference points for the Bannockburn Transport Strategy and future car parking, traffic movements and active and public transport upgrades within the Bannockburn Town Centre.

Bruce’s Creek Masterplan, Bannockburn (2009)

The Bruce’s Creek Open Space Reserve will be a significant landscape corridor with high environmental values. It will provide the community with a central focal point for activity through the provision of open space areas, recreation and education precincts and shared trail networks. The corridor will facilitate the integration of new and planned residential areas with the established township, connecting a growing, walkable, healthy and integrated community.

The Bruce’s Creek Masterplan seeks to support and implement the key recommendations identified in the Bannockburn Urban Design Framework and the Golden Plains Shire Planning Scheme, Clause 21.05. The primary purpose of the Bruce’s Creek Masterplan (BCM) is to develop a set of guidelines and actions that address the following key considerations:

- > Paths / trails;
- > Access and activity; and
- > Supporting infrastructure / facility requirements.

Through extensive community and stakeholder consultation the BCM recommends a number of creek crossing points, a hierarchy of paths and trails to fulfil a range of circulation and recreation roles and general locations and routes for the path system. The Bruce’s Creek Masterplan context plan is shown in Figure A-10 and highlights the recommendations from masterplan.

Figure A-10 Bruce’s Creek Masterplan context plan



Recommendations from the masterplan will provide input into the Bannockburn Transport Strategy and future network links within the growth area.

Paths and Trails Strategy (2013 – 2017)

The aim of the Paths and Trails Study (PTS) was to develop a strategy to guide the future provision of paths and trails across the Golden Plains Shire and within Bannockburn.

The key objectives of the study were to:

- > Develop an inventory of paths and trails provision;
- > Identify gaps, deficiencies or oversupply in provision;
- > Provide directions to Council regarding the future provision of paths and trails; and
- > Develop a prioritised set of recommendations for future provision.

Golden Plains Shire Council undertook extensive consultation with the community, stakeholders, Councillors and Council staff to create an action plan to implement future paths and trails. Figure A-11 contains Golden Plains Shire action plan for future paths and trails within Bannockburn growth area.

Figure A-11 Paths and Trails Strategy action plan



No	Action	Est. cost	Priority
1	Construct path along McPhillips Rd from High St to Moore St	33800	2
2	Construct path along north side of Milton St from Byron St to Moore St	14900	2
3	Construct paths along north and south sides of Milton St from Banks St to Recreation Centre	169000	1
4	Construct path along Kelly Rd from Clyde Rd to existing path	75483	2
5	Construct path along Byron St from McPhillips Rd to Pope St	59800	3
6	Construct path along Moore St from McPhillips Rd to Rope St	57200	3
7	Construct path along full length of Eliaz Cr.	33800	3
8	Construct path along Earl Crescents from Alice Mews to Levy Rd	72500	3
9	Construct path along Charlton Rd from Glenbrae Ct to path near Fernack Fairways	68250	3
10	Construct path along Douglas Cr from existing path to Charlton Rd	22100	3
11	Construct path along full length of Glenbrae Cr.	39000	3
12	Construct path along full length of Edenborough Way	26000	3
13	Construct path along full length of Camden Mews	14300	3
14	Construct path along Alice Mews (western end to James Place)	13050	3
15	Construct path along Burraide Ave from end of existing path to Glen Aven Drive	156000	2
16	Construct path along Delcruin Dve from existing pathway to Burraide Rd	33800	
17	Reseal the granite sand path along Clyde Rd between Sheffield - Bannockburn Rd and Lowndes Rd	15600	1
18	Explore the feasibility of developing a path network in the established residential area north west of High St/Sheffield Bannockburn Rd between Milton Rd and Barriest Drive	169000	4
19	Explore the feasibility of developing a circuit path around or a NE-SW link through Victoria Park	60000	5
20	Explore the feasibility of developing a trail along the Bannockburn-Sheffield Rd linking the residential areas to the business estate	80000	5
21	Explore the feasibility of extending the path along Clyde Rd from Lowndes Rd to Warrack Dve	32000	6
22	Explore the feasibility of developing a trail along the railway line or the Midland Hwy to Lethbridge	425000	6
-	Make provision for the development of a trail around the perimeter of the growth boundary of the township	850000	As development occurs

The action plan derived from the Paths and Trails Strategy will help develop the Active and Public Transport component of the Bannockburn Transport Strategy.

G21 Physical Activity Strategy (2014 – 2017)

The G21 Physical Activity Strategy (PAS) aims to provide an evidence base to guide policy and decision making at a regional and municipal level. This will assist in creating an environment that supports physical activity and generating recommendations linked into the G21 Health and Wellbeing Plan.

Specific objectives of the strategy are to:

- > provide the policy context that describes the role of the G21 region and other key stakeholders in planning, developing, managing and supporting opportunities that foster physical activity;
- > integrate planning for physical activity at a regional and municipal level;
- > identify enablers and barriers to physical activity at a local level;
- > provide evidence to develop guidelines and principles to inform policy and decision making that supports physical activity; and
- > provide recommendations for resource allocation to support physical activity.

Key actions of the strategy for Golden Plains Shire Council are highlighted in Table A-6.

Table A-6 G21 Key action plan for Golden Plains Shire Council

NO	ACTION	STAKEHOLDERS	FUNDING SOURCE
RESOURCING			
4	Implement recommendations contained within Golden Plains Shire's Paths and Trails Strategy.	GPS (Rec)	GPS / grants
TRANSPORT POLICIES & SYSTEMS			
5	Develop a Bicycle Strategy.	GPS (Rec)	Subject to grant
6	Evaluate Golden Plains Shire's Golden Connections Community Transport program to inform a sustainable community transport model.	GPS (HWB)	GPS
7	Provide a community transport program that provides and delivers integrated transport options.	GPS (HWB)	Subject to grant
URBAN DESIGN			
8	Develop a Horse Trail Strategy.	GPS	Subject to grant
9	Connect paths and trails networks that encourage community participation, active travel and safe movement around townships.	GPS (Rec)	GPS / grants
10	Ensure new public infrastructure design processes for streetscapes, footpaths, buildings and public open spaces are universally accessible.	GPS (Engineering and HWB)	GPS
11	Extend roadside maintenance that supports safe and accessible walking paths.	GPS (Engineering)	GPS
12	Provide accessible and high quality open spaces in new developments.	GPS (Planning)	GPS
13	Develop the physical activity components of the Bannockburn Civic Heart Project.		

The objectives and actions set out in the G21 PAS will assist with developing strategies to promote the construction of new infrastructure to cater for active travel including walking and cycling within Bannockburn.

Community Engagement Strategy (2016 – 2020)

Golden Plains Shire Community Engagement Strategy (CES) aims to build a more comprehensive and consistent approach to engagement processes that responds to community interest.

Key objectives of the strategy include:

- > Accessible and transparent engagement practice by creating more active participation in engagement processes, reducing barriers for wider community involvement and more consistently communicate how community input has contributed to Council's decision making processes; and
- > Aligned policy and practice framework by ensuring the community engagement policy is actively used in the planning of engagement processes.

The strategic direction set out in the CES will ensure the key actions are undertaken by Golden Plains Shire Council to improve community engagement. Key actions include:

- > Review and expand Council's "Have Your Say" online engagement approach; and
- > Promote and build capacity of the community to access Council's new website and "Have Your Say" online engagement page.

The CES will ensure community consultation for the Bannockburn Transport Strategy is undertaken comprehensively through multiple mediums including a community survey via mail, online via "Have Your Say" and in person as part of the Bannockburn street talk activity.

Bannockburn Heavy Vehicle Alternative Route Study

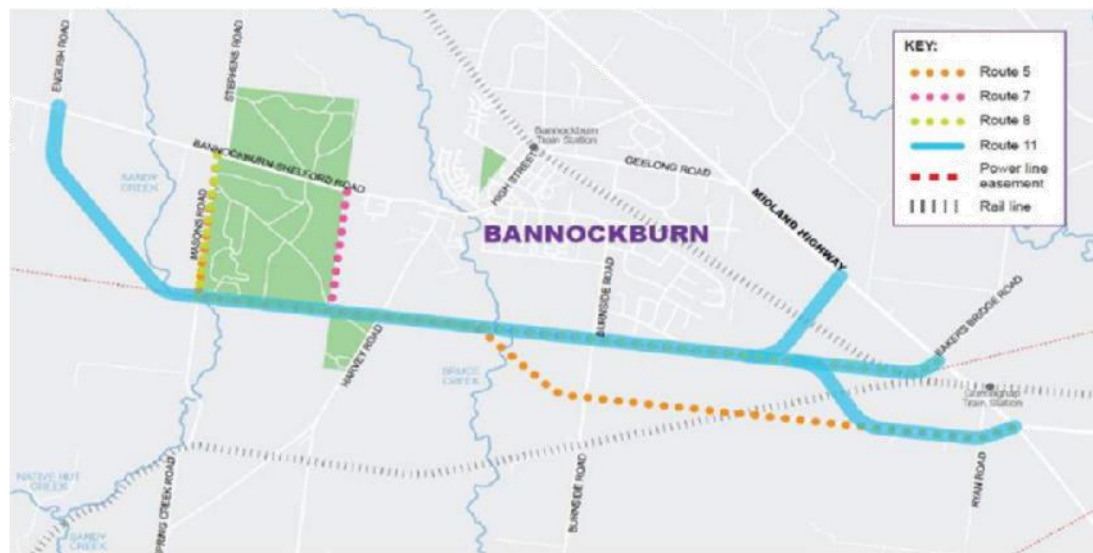
The aim of the study was to identify a suitable heavy vehicle alternative route which considers not only the technical, land use and environmental issues, but also has been considered by the local community and key stakeholders.

The study developed a range of high-level options for an alternative heavy vehicle route around Bannockburn including:

- > Option 5 - Masons Road/south of Bannockburn Reserve/Transmission Line Easement to east of Bruce's Creek/Parallel to easement to connect with Midland Highway at McCurdy Road;
- > Option 7 - Old Base Road/Transmission Line Easement/Connect with Midland Highway at Bakers Bridge Road;
- > Option 8 - Masons Road/southern boundary of Bannockburn Reserve/Transmission Line Easement/Connect with Midland Highway at Bakers Bridge Road; and
- > Option 11 South leg at Shelford-Bannockburn Road and English Road intersection/south east to Masons Road/southern boundary of Bannockburn Reserve/Transmission Line Easement/Connect with Midland Highway at Bakers Bridge Road.

Figure A-12 below shows the proposed heavy vehicle routes to be considered.

Figure A-12 Proposed Bannockburn heavy vehicle alternative routes



The Bannockburn Heavy Vehicle Study Alternative Route Study will assist in providing advice on heavy vehicle movements within Bannockburn as part of the Bannockburn Transport Study.

Bannockburn Civic Heart Project (2014)

The Bannockburn Civic Heart Project (BCHP) was established to ensure a vibrant Civic Heart in the centre of Bannockburn. The civic heart is located at 27 – 29 High Street and is currently occupied by the SES, CFA, Bannockburn Community and Cultural Centre. Figure A-13 shows the locality of the Civic Centre in relation to Bannockburn Town Centre.

Figure A-13 Bannockburn Civic Heart locality



Extensive community consultation was undertaken to determine the best use for the site and to reflect the guiding principles developed through initial community and stakeholder consultation. Key principles and objectives of the BCHP include:

- > The Civic Heart and its surrounds should be considered in an integrated way by providing safe connections between the Civic Heart and the school; and
- > Vehicle access and parking should be flexible and convenient but not dominate the core of the precinct by ensuring car parking and vehicle access areas are designed to provide safe and legible movements for pedestrians.

Further to community consultation, a Final Vision Plan was established which provides insight into the proposed layout of the Civic Heart and proposed car parking and pedestrian links, see Figure A-14.

Figure A-14 Bannockburn Civic Heart Final Vision Plan



Outcomes of the Bannockburn Transport Strategy will reflect key Final Vision Plan and principles set out in the Bannockburn Civic Heart Project.

G21 Public Transport Strategy (2014)

The G21 Region Public Transport Strategy (PTS) goal is to increase utilisation of public transport, and in turn:

- > Reduce traffic congestion;
- > Improve the environment; and
- > Overcome social isolation.

Through community and stakeholder consultation a four year action plan was developed to meet the goals set out in the PTS. Key Actions of the PTS relating to Bannockburn are shown in Table A-7.

Table A-7 Key actions of the G21 Public Transport Strategy

Actions that particularly benefit Golden Plains
» Encourage PTV and coach operators to research and trial new vehicles for longer distance bus services in the region, with better accessibility and more luggage storage.
» Encourage the building of transport hubs, particularly in major regional towns e.g. Bannockburn.
» Advocate to PTV to provide a high quality connection between central Werribee, East Werribee Employment Precinct and G21 region when Regional Rail Link opens.
» Advocate for an increase in service levels between Geelong, Colac, Warrnambool, Ballarat (serving Bannockburn) and Apollo Bay to five services daily in the short-term, using coaches primarily but trains where feasible.

Actions from the PTS will be incorporated into Bannockburn’s Transport Strategy to ensure public transport increases to and from the town centre in the future.

Golden Plains Shire Recreation Strategy Plan (2015 – 2019)

The Recreation Strategy document outlines the Golden Plains Shire's key directions and priorities for recreation provision in the Shire and the actions it will take during the period 2015-2019 to implement these directions and priorities. Provisions provided in the strategy relating to the Bannockburn Town Centre include:

- > Make provision for the development of a trail around the perimeter of the growth boundary of the Bannockburn Town Centre;
- > Explore the feasibility of developing a circuit path around or through the NE – SW corner of Victoria park;
- > Explore the feasibility of developing a trail along the Shelford-Bannockburn Road linking the residential areas to the Business Estate;
- > Explore the feasibility of developing a trail along the railway line or Midland Highway to Lethbridge;
- > Explore the feasibility of extending the path along Clyde Road to Warrak Drive;
- > Construct a new soccer pavilion at the Bannockburn Recreation Precinct; and
- > Adopt and progressively implement the Victoria Park Redevelopment Masterplan.

Based on the directions and priorities established in the Recreation Strategy an action plan was developed to ensure funding was granted to implement the above provisions. See Table A-8 for a list of the adopted action plans.

Table A-8 Golden Plains Shire Recreation Strategy Plan Action Plan

Bannockburn							
31	Adopt and progressively implement the Victoria Park Redevelopment Masterplan (masterplan is currently in draft form and has not been formally adopted by Council): - Replace the perimeter fence along Moore St with a 2m high black coated chain wire fence - Seal the carpark located to the north-east of the Oval 1 changerooms - Renovate/upgrade the public toilet block - Rectify drainage problems on the track around Oval 1 (water is ponding in some areas) - Repair the pipe fence around Oval 1 - Lower the grassed edges around the centre wicket on Oval 1 - Replace the synthetic carpet on the centre wicket on Oval 1 - Improve the run-ups to the centre wicket on Oval 1 - Relocate the cricket nets to the east of the netball courts. Erect 3 nets. Cover the wickets with synthetic carpet (full length). Remove the existing nets. - Redevelop the netball facilities: >Extend and resurface 2 courts (acrylic resin surface) >Line only for netball >Repair the fence (sagging in parts) >Erect benches between the courts >Erect a new shelter on the western side >Remove the surplus court area - Lower the grassed edges around the centre wicket on Oval 2 - Replace the synthetic carpet on the centre wicket on Oval 2 - Improve the run-ups to the centre wicket on Oval 2 - Upgrade the playing surface on Oval 2 - Erect training lights over Oval 2 - Install a turf wicket table (3 pitches) on Oval 2 (pending Council decision) - Provide proper winter covers for the centre cricket wickets - Add more pieces to the play area - Provide seating around the Park – around the playing fields, near the playground.	GPS COM Clubs	\$40,000 \$35,000 \$50,000 \$10,000 \$4,000 Maintenance \$5,000 Maintenance \$80,000 \$230,000	GPS RDV COM Clubs Other	5 3 1 2 1 2 2 1 1 2 2 2 3 4 5 1 4 2	- - - - - - - - - - - - - - - - -	\$40,000 \$35,000 \$50,000 \$10,000 \$4,000 -\$ \$5,000 -\$ \$80,000 -\$ -\$ -\$ -\$ \$160,000 \$70,000 \$8,000 \$60,000 \$30,000
32	Construct a new soccer pavilion at the Bannockburn Recreation Precinct.	GPS	\$650,000	GPS RDV	1	-	\$650,000
33	Meet with DEECD to discuss the potential for and feasibility of developing recreation facilities at or near the new school campus in Bannockburn, being: - The addition of a 3rd court at the Bannockburn Recreation Precinct Stadium - The construction of a multi-use lit synthetic surface sports field (hockey, athletics, soccer).	GPS DEECD	Officer time	GPS DEECD RDV Other	1	Officer time	-
34	Investigate designation of a reserve in Bannockburn as a dog-off-leash venue.	GPS	Officer time	GPS	4	Officer time	-
35	Explore facility options for the Bannockburn Anglers Club.	GPS Anglers Club	Officer time	GPS	2	Officer time	-
36	Develop the recreation elements of the Bannockburn Civic Heart Project, being a destination adventure playground which includes play equipment and water play area.	GPS	\$680,000	GPS RDV DIRD Other	1	-	\$680,000

The implementation of the Recreation Strategy Action Plan will allow for more visitors to access the Bannockburn recreation area, most notably Victoria Park. An increase of visitors to the area will require additional infrastructure to cater for more users.



APPENDIX
B
DAILY TRAFFIC VOLUMES

Figure B-1 Traffic Survey Location Map

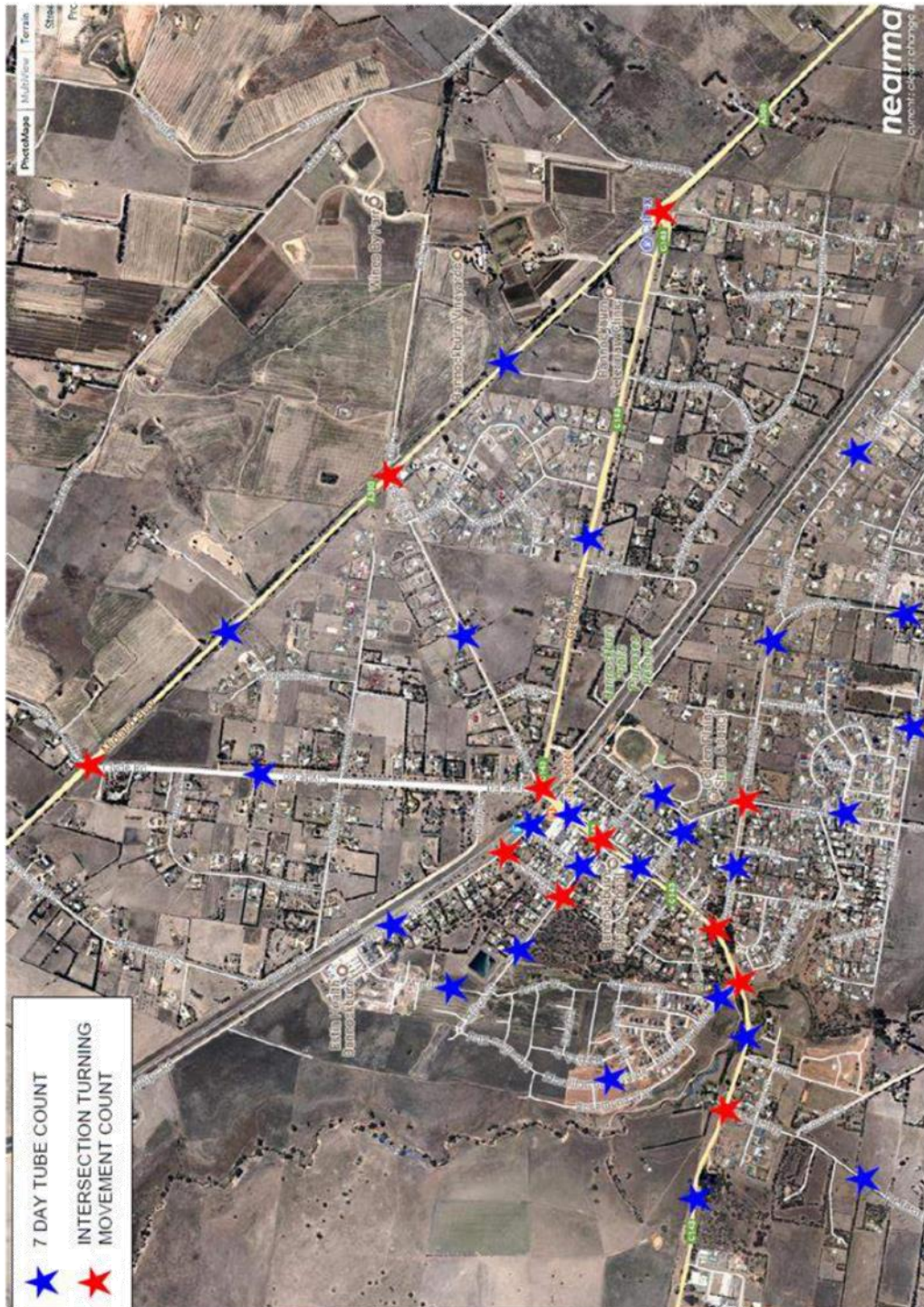
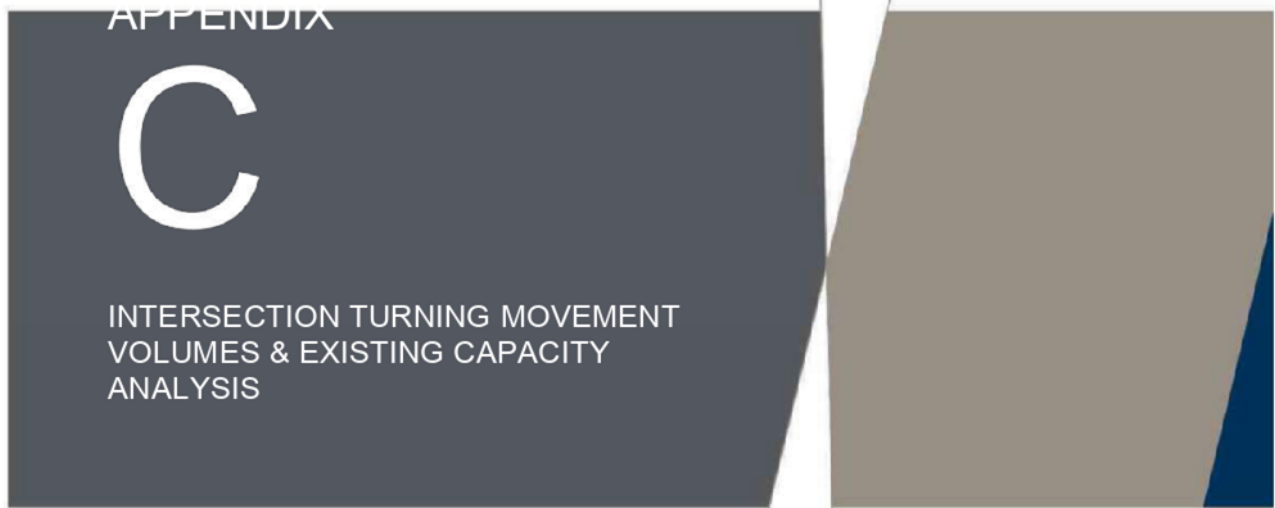


Table B-1 Weekday Daily Traffic Volume

Location	Speed Limit (km/h)	Weekday Daily Volume			AM Peak (8am - 9am)			PM Peak (4pm - 5pm)			85th %ile (km/h)
		EB/NB	WB/SB	Combined	EB/NB	WB/SB	Combined	EB/NB	WB/SB	Combined	
Midland Hwy 600m SE of Kelly Road	100	2812	2750	5562	239	181	420	208	274	482	102
Midland Hwy 800m NW of Kelly Road	100	2690	2661	5351	223	167	390	196	262	458	104
Clyde Rd btw Warrak Dr and Lowdes Rd	80	690	738	1428	40	55	95	72	86	158	80
Kelly Road 300m NE of Gillett St	60	258	190	448	29	24	53	23	17	40	80
Geelong Rd btw Francis Ct and Inverlochy Dr	80	4855	4804	9659	596	304	900	307	570	877	79
Yverdon Dr at No. 74	50	329	345	674	19	52	71	45	22	67	72
Burnside Rd btw Dalcrain Dr and Yverdon Dr	60	1193	1237	2430	94	141	235	141	111	252	71
Burnside Rd btw Earl Cr and Elrae Ct	50	761	710	1471	83	64	147	72	69	141	61
Burnside Rd south of Charlton Rd	80	962	684	1646	62	84	146	104	57	161	80
Burnside Rd south of Yverdon Dr	60	740	704	1444	57	73	130	77	59	136	71
Charlton Rd btw Charlton Rd and Burnside Rd	50	134	119	253	11	16	27	11	16	27	71
Levy Rd btw Fenwick Fairway and Dalcrain Dr	50	214	233	447	18	24	42	18	24	42	59
Pope St btw Byron St and Moore St	50	630	844	1474	43	73	116	78	61	139	56
Moore St btw Pope St and Milton St	50	815	1050	1865	126	135	261	89	129	218	56
Bannockburn - Shelford Rd just nth Pope St	60	4396	4341	8737	426	210	636	328	486	814	57
McPhillips Rd at No. 63	60	504	367	871	42	16	58	36	34	70	65
McPhillips Rd just east of Burnside St	60	980	644	1624	76	28	104	84	66	150	53
Imperial Way btw merlot Ct and Milton St	50	400	248	648	22	30	52	40	19	59	55
Milton St east of Archer Way	50	1501	1671	3172	274	241	515	125	163	288	58
Moreillon Blvd btw McKenna St and Dairriwell Dr	50	278	256	534	67	40	107	16	25	41	55
Harvey Rd 300m sth of Ormond St	80	453	486	939	42	42	84	41	55	96	89
Bannockburn - Shelford Rd just sth McPhillips St	60	5037	5328	10365	587	359	946	355	578	933	49
Moreillon Blvd btw Bannockburn - Shelford Rd and Dairriwell Dr	50	612	632	1244	73	82	155	64	45	109	52
Bannockburn - Shelford Rd btw Bruce St and Moreillon Blvd	60	3386	3297	6683	356	188	544	261	358	619	70
Bannockburn - Shelford Rd btw Harvey Rd and Holder Rd	80	2771	2670	5441	285	144	429	210	284	494	83
Milton St Btw Burns St and Bannockburn - Shelford Rd	50	2637	2273	4910	308	287	595	263	234	497	49

Table B-2 Saturday Daily Traffic Volumes

Location	Speed Limit (km/h)	Saturday Daily Volume			Midday Peak (12pm - 1pm)			85th %ile (km/h)
		EB/NB	WB/SB	Combined	EB/NB	WB/SB	Combined	
Midland Hwy 600m SE of Kelly Road	100	3434	3291	6725	365	385	750	102
Midland Hwy 800m NW of Kelly Road	100	3356	3237	6593	376	397	773	101.5
Clyde Rd btw Warrak Dr and Lowdes Rd	80	880	940	1820	201	210	411	75.7
Kelly Road 300m NE of Gillett St	60	235	183	418	26	17	43	84.6
Geelong Rd btw Francis Ct and Inverloch Dr	80	3992	3948	7940	315	316	631	77.6
Yverdon Dr at No. 74	50	277	281	558	22	21	43	71.2
Burnside Rd btw Dalcrain Dr and Yverdon Dr	60	1146	1136	2282	101	110	211	73.9
Burnside Rd btw Earl Cr and Eirae Ct	50	644	673	1317	49	64	113	63
Burnside Rd south of Charlton Rd	80	974	754	1728	102	64	166	82.6
Burnside Rd south of Yverdon Dr	60	701	708	1409	72	59	131	73.7
Charlton Rd btw Charlton Rd and Burnside Rd	50	109	118	227	10	9	19	66
Levy Rd btw Fenwick Fairway and Dalcrain Dr	50	196	193	389	23	27	50	55
Pope St btw Byron St and Moore St	50	590	805	1395	59	84	143	56
Moore St btw Pope St and Milton St	50	538	741	1279	61	86	147	55
Bannockburn - Shelford Rd just nth Pope St	60	4106	3923	8029	352	384	736	54.9
McPhillips Rd at No. 63	60	505	367	872	90	62	152	62.6
McPhillips Rd just east of Burnside St	60	915	635	1550	118	73	191	49.6
Imperial Way btw merlot Ct and Milton St	50	411	252	663	77	29	106	56.6
Milton St east of Archer Way	50	929	1130	2059	64	125	189	57.3
Morrison Blvd btw McKenna St and Dairriwell Dr	50	157	159	316	21	11	32	58
Harvey Rd 300m sth of Ormond St	80	469	482	951	45	50	95	89
Bannockburn - Shelford Rd just sth McPhillips St	60	4217	4786	9003	409	454	863	45.9
Moreillon Blvd btw Bannockburn - Shelford Rd and Dairriwell Dr	50	485	544	1029	44	37	81	49
Bannockburn - Shelford Rd btw Bruce St and Moreillon Blvd	60	2940	2883	5823	234	254	488	68
Bannockburn - Shelford Rd btw Harvey Rd and Holder Rd	80	2324	2262	4586	181	193	374	81
Milton St Btw Burns St and Bannockburn - Shelford Rd	50	2069	1681	3750	204	197	401	49



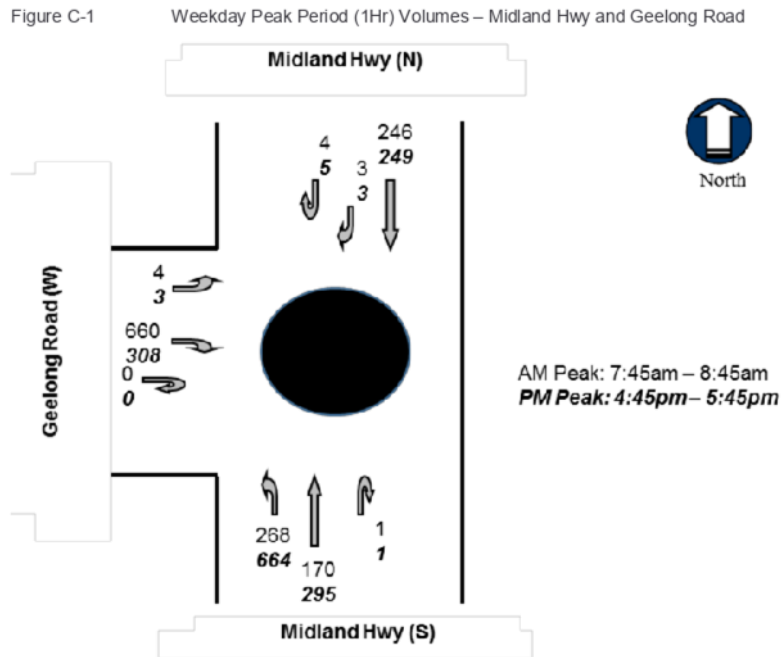


Table C-1 SIDRA Results Midland Highway / Geelong Road

	Approach	Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Midland Hwy (SE)	0.304	7 sec	2.1 m
	Midland Hwy (NW)	0.373	11.6 sec	2.1 m
	Geelong Rd (W)	0.604	12.2 sec	4.2 m
PM Peak	Midland Hwy (SE)	0.652	7 sec	7.2 m
	Midland Hwy (NW)	0.28	9.1 sec	1.3 m
	Geelong Rd (W)	0.336	12.6 sec	1.7 m

Figure C-2 Weekday Peak Period (1Hr) Volumes – Midland Hwy, Kelly Road and Kelly Lane

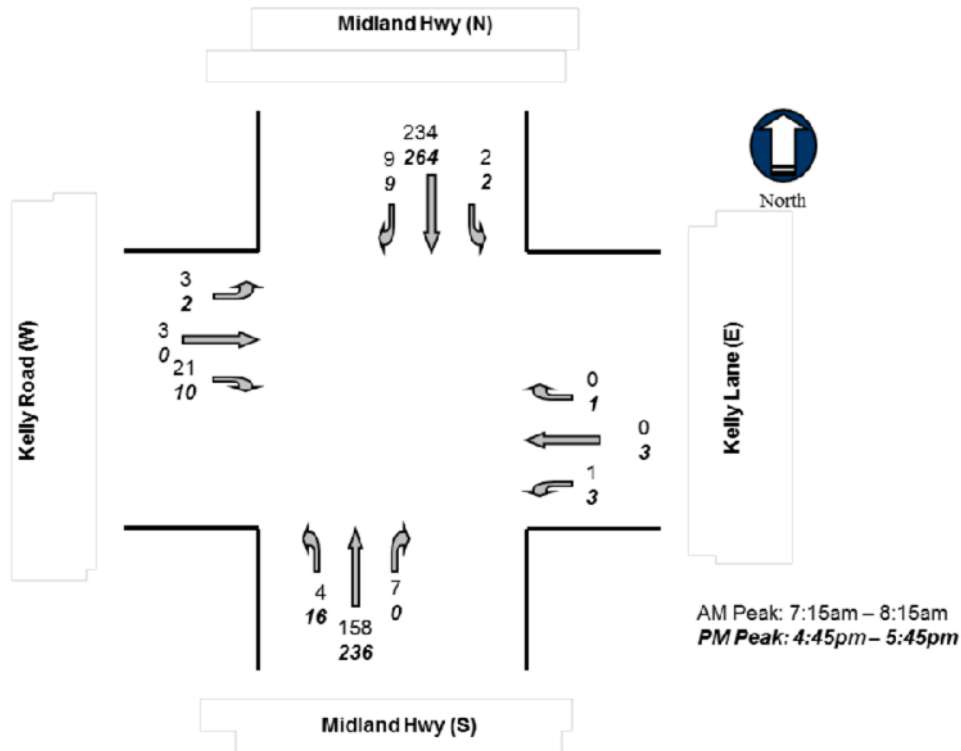


Table C-2 SIDRA Results Midland Highway / Kelly Road / Kelly Lane

Approach	Degree of Saturation	Average Delay	95th %tile Queue
AM Peak	Kelly Ln (E)	0.004	7.5 sec
	Kelly Road (SW)	0.057	10.9 sec
	Midland Hwy (SE)	0.101	0.6 sec
	Midland Hwy (NW)	0.148	0.5 sec
PM Peak	Kelly Ln (E)	0.01	7.6 sec
	Kelly Road (SW)	0.044	11.2 sec
	Midland Hwy (SE)	0.139	0.7 sec
	Midland Hwy (NW)	0.17	0.4 sec

Figure C-3 Weekday Peak Period (1Hr) Volumes – Midland Hwy, Clyde Road and Clyde Hill Road

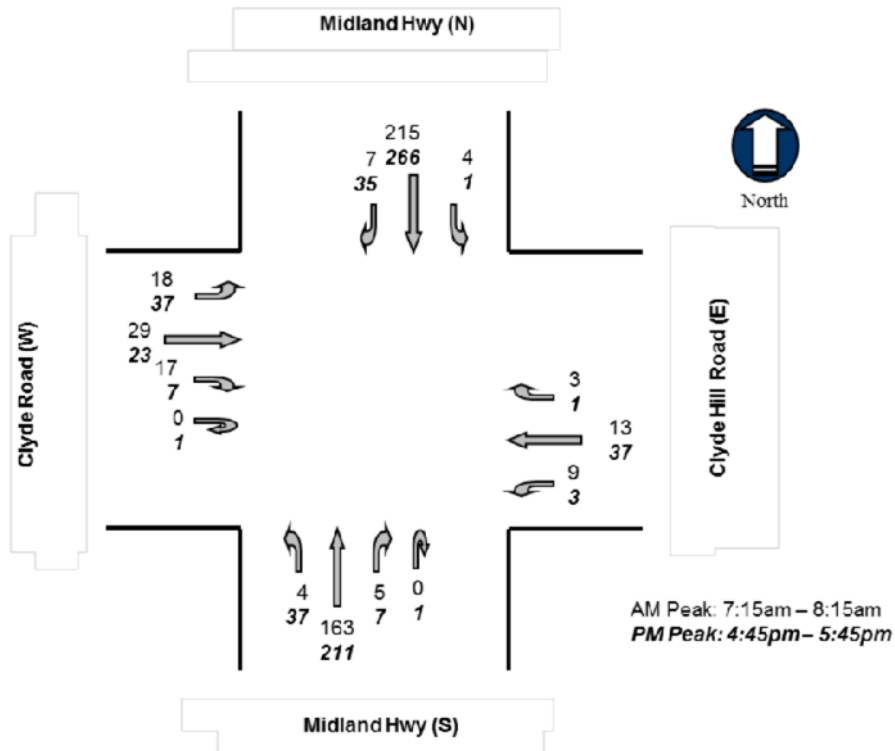


Table C-3 SIDRA Results Midland Highway / Clyde Road / Clyde Hill Road

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Clyde Rd (S)	0.102	10.6 sec
	Clyde Hill Rd (NE)	0.023	8.6 sec
	Midland Hwy (SE)	0.097	0.5 sec
	Midland Hwy (NW)	0.124	0.6 sec
PM Peak	Clyde Rd (S)	0.089	10.6 sec
	Clyde Hill Rd (NE)	0.06	9.5 sec
	Midland Hwy (SE)	0.141	1.5 sec
	Midland Hwy (NW)	0.152	0.9 sec

Figure C-4 Weekday Peak Period (1Hr) Volumes – Bannockburn-Shelford Road and Kelly Road

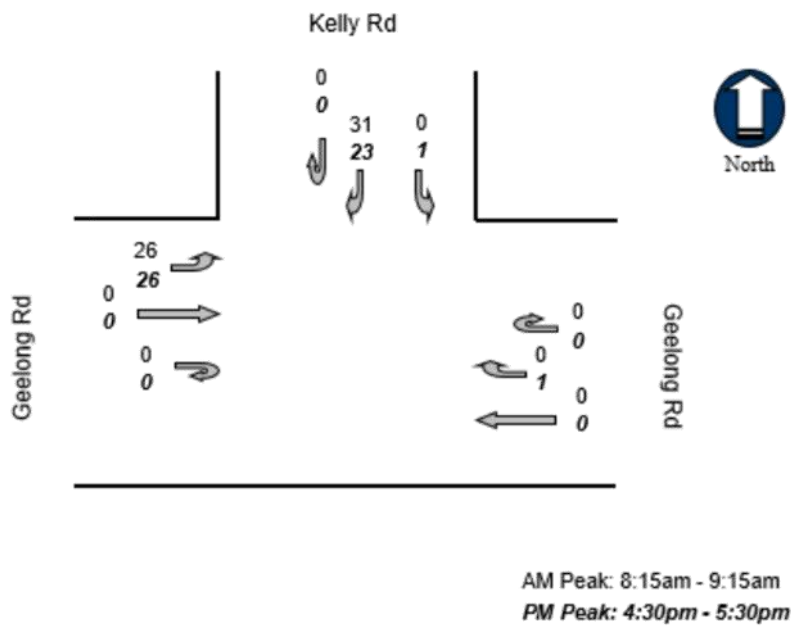


Table C-4 SIDRA Results Geelong Road / Kelly Road

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Kelly Rd (NE)	0.105	13.9 sec
	Geelong Rd (E)	0.175	5.3 sec
	Geelong Rd (SW)	0.396	4.5 sec
PM Peak	Kelly Rd (NE)	0.063	14.3 sec
	Geelong Rd (E)	0.377	5.3 sec
	Geelong Rd (SW)	0.214	4.4 sec

Figure C-5 Weekday Peak Period (1Hr) Volumes – Bannockburn-Shelford Rd, Geelong Road and Clyde Road

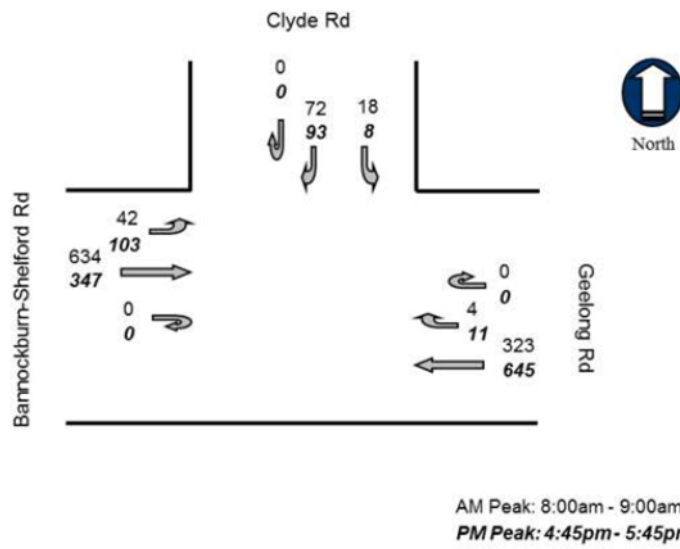


Table C-5 SIDRA Results Bannockburn-Shelford Rd / Geelong Road / Clyde Road

	Approach	Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Clyde Rd (N)	0.247	14 sec	0.8 m
	Geelong Rd (E)	0.193	5.4 sec	0.0 m
	Bannockburn-Shelford Rd (SW)	0.411	5.1 sec	2.9 m
PM Peak	Clyde Rd (N)	0.328	16.7 sec	1.2 m
	Geelong Rd (E)	0.388	5.4 sec	0.1 m
	Bannockburn-Shelford Rd (SW)	0.273	5.2 sec	1.6 m

Figure C-6 Weekday Peak Period (1Hr) Volumes – McPhillips Road and Victor Street

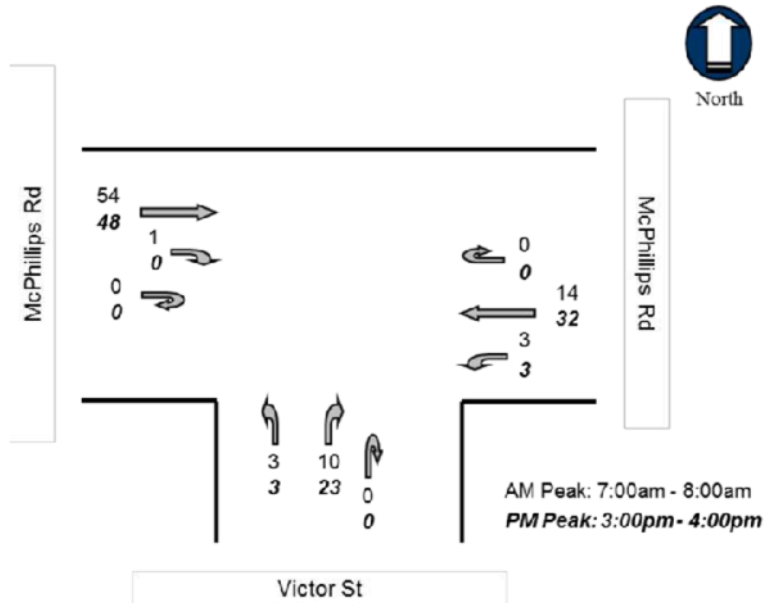


Table C-6 SIDRA Results McPhillips Road / Victor Street

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Victor St (SW)	0.011	4.9 sec
	McPhillips Rd (SE)	0.01	1 sec
	McPhillips Rd (NW)	0.033	0.1 sec
PM Peak	Victor St (SW)	0.023	5 sec
	McPhillips Rd (SE)	0.021	0.5 sec
	McPhillips Rd (NW)	0.029	0.1 sec

Figure C-7 Weekday Peak Period (1Hr) Volumes – Victor Street and Milton Street

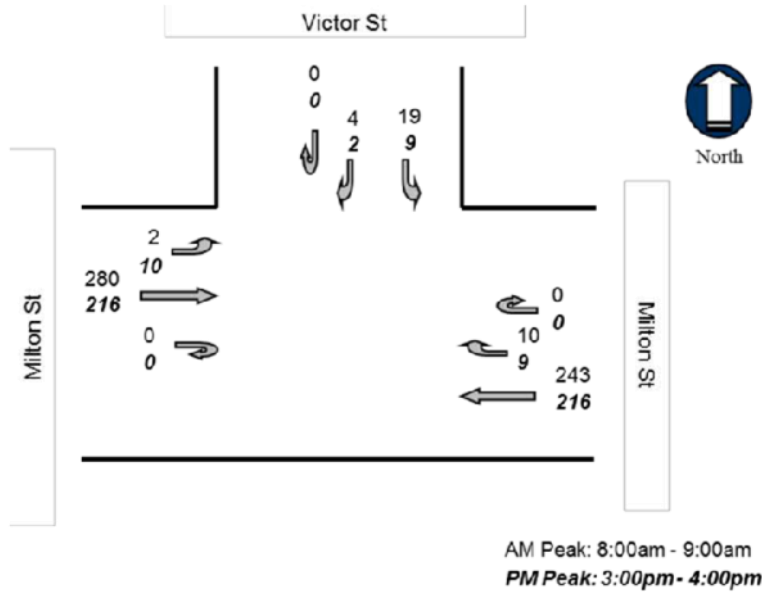


Table C-7 SIDRA Results Victor Street / Milton Street

Approach		Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Victor St (NE)	0.025	6.1 sec	0.1 m
	Milton St (SE)	0.14	0.4 sec	0.1 m
	Milton St (NW)	0.156	0 sec	0.0 m
PM Peak	Victor St (NE)	0.011	5.7 sec	0.0 m
	Milton St (SE)	0.124	0.3 sec	0.1 m
	Milton St (NW)	0.126	0.2 sec	0.0 m

Figure C-8 Weekday Peak Period (1Hr) Volumes – Milton Street and Bannockburn-Shelford Road

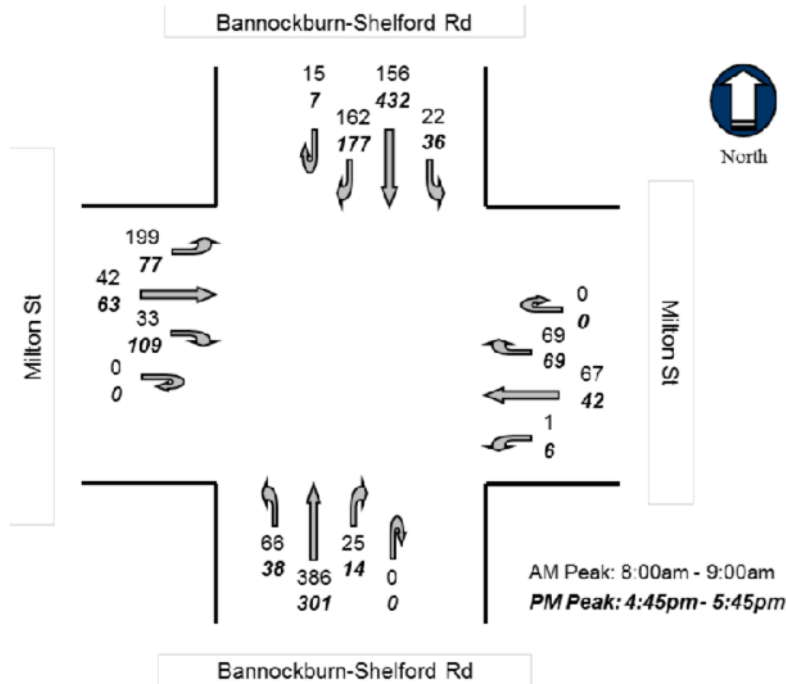


Table C-8 SIDRA Results Bannockburn-Shelford Road/ Milton Street

	Approach	Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Milton St (SE)	0.775	49.2 sec	4.7 m
	Milton St (NW)	0.332	11.3 sec	1.3 m
	Bannockburn-Shelford Rd (NE)	0.179	4.3 sec	0.8 m
	Bannockburn-Shelford Rd (SW)	0.252	1.1 sec	0.1 m
PM Peak	Milton St (SE)	0.872	79.6 sec	5.6 m
	Milton St (NW)	1.152	147 sec	22.8 m
	Bannockburn-Shelford Rd (NE)	0.262	2.3 sec	0.7 m
	Bannockburn-Shelford Rd (SW)	0.189	0.9 sec	0.1 m

Figure C-9 Weekday Peak Period (1Hr) Volumes – Burnside Road, Pope Street and Levy Road

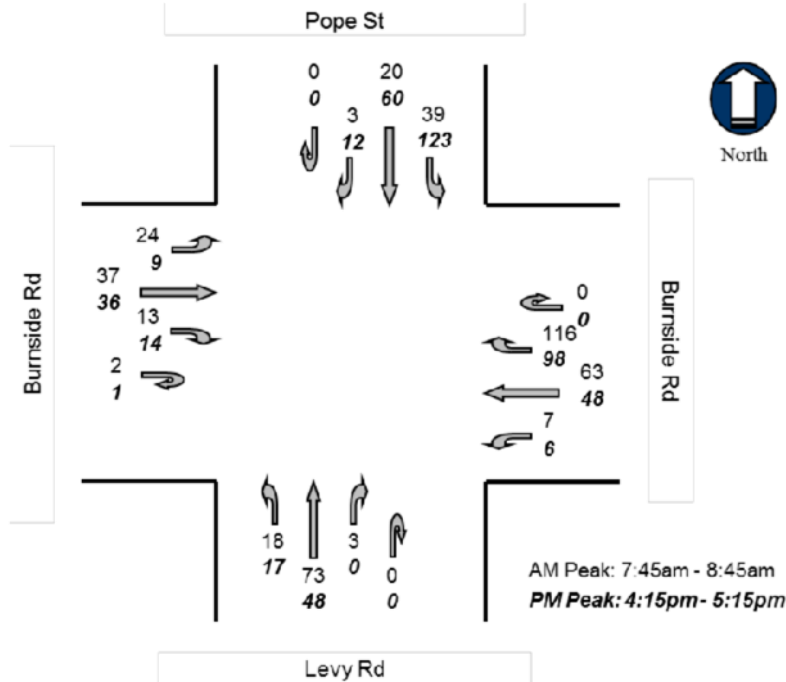


Table C-9 SIDRA Results Burnside Road / Pope Street / Levy Road

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Levy Rd (S)	0.15	7.1 sec
	Pope St (NW)	0.08	6.1 sec
	Burnside Rd (E)	0.202	6.6 sec
	Burnside Rd (W)	0.118	7.8 sec
PM Peak	Levy Rd (S)	0.105	6.7 sec
	Pope St (NW)	0.225	6.1 sec
	Burnside Rd (E)	0.2	7.5 sec
	Burnside Rd (W)	0.089	7.3 sec

Figure C-10 Weekday Peak Period (1Hr) Volumes – Burnside Road and Bannockburn-Shelford Road

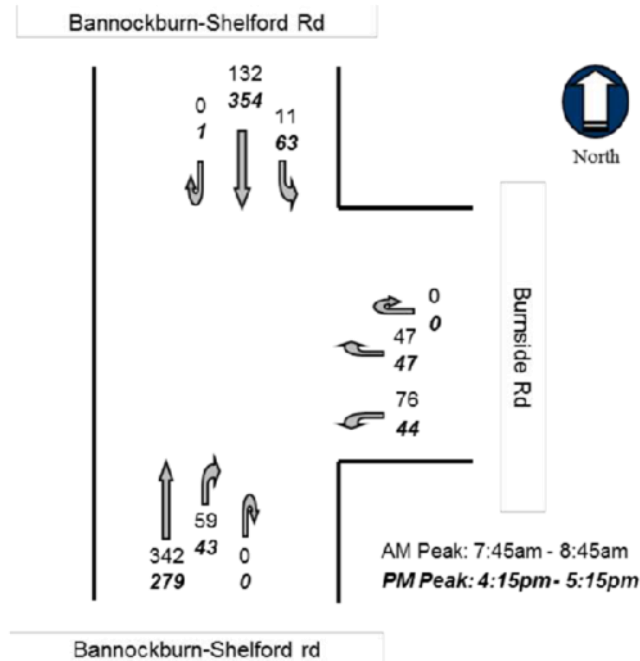


Table C-10 SIDRA Results Bannockburn-Shelford Road/ Burnside Road

	Approach	Degree of Saturation	Average Delay	95 th %tile Queue
AM Peak	Burnside Rd (SE)	0.127	7.1 sec	0.5 m
	Bannockburn-Shelford Rd (NE)	0.076	0.4 sec	0.0 m
	Bannockburn-Shelford Rd (SW)	0.226	1 sec	0.5 m
PM Peak	Burnside Rd (SE)	0.129	8.6 sec	0.4 m
	Bannockburn-Shelford Rd (NE)	0.221	0.9 sec	0.0 m
	Bannockburn-Shelford Rd (SW)	0.193	1.5 sec	0.5 m

Figure C-11 Weekday Peak Period (1Hr) Volumes – Moreillon Blvd and Bannockburn-Shelford Road

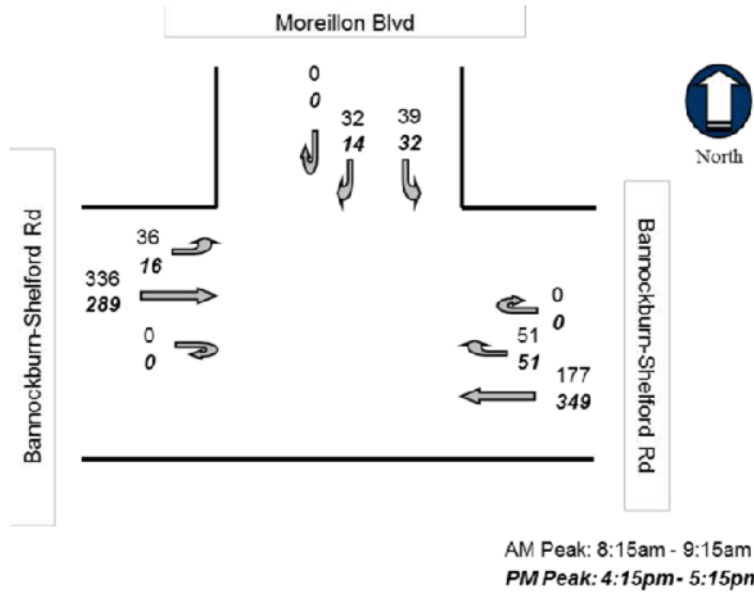
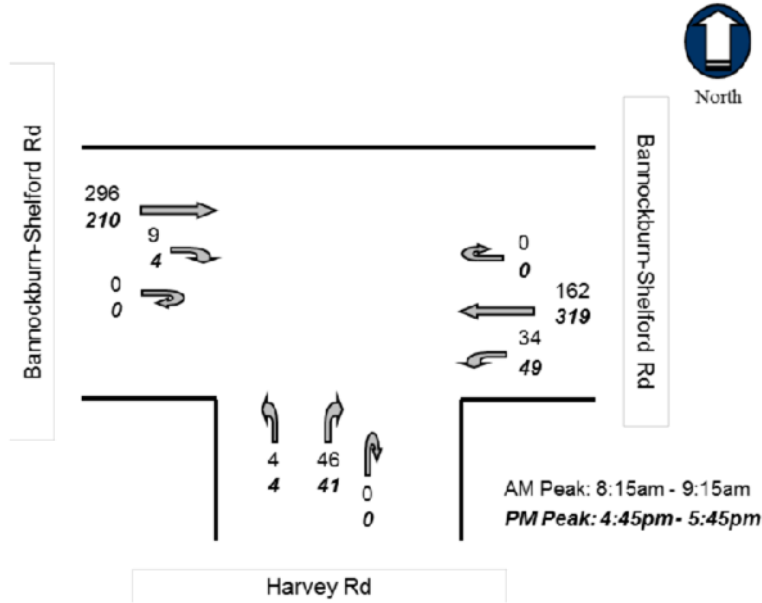


Table C-11 SIDRA Results Bannockburn-Shelford Road/Moreillon Boulevard

	Approach	Degree of Saturation	Average Delay	95th %tile Queue
AM Peak	Moreillon Bvd (NW)	0.122	9.5 sec	0.4 m
	Bannockburn-Shelford Rd (NE)	0.102	1.7 sec	0.2 m
	Bannockburn-Shelford Rd (SW)	0.193	0.5 sec	0.0 m
PM Peak	Moreillon Bvd (NW)	0.076	9.2 sec	0.3 m
	Bannockburn-Shelford Rd (NE)	0.201	0.9 sec	0.2 m
	Bannockburn-Shelford Rd (SW)	0.166	0.3 sec	0.0 m

Figure C-12 Weekday Peak Period (1Hr) Volumes – Harvey Road and Bannockburn-Shelford Road



The Saturday peak (1 hour) turning movement volumes for these intersections are presented below.

Figure C-13 Saturday Peak Period (1Hr) Volumes – Midland Hwy and Geelong Road

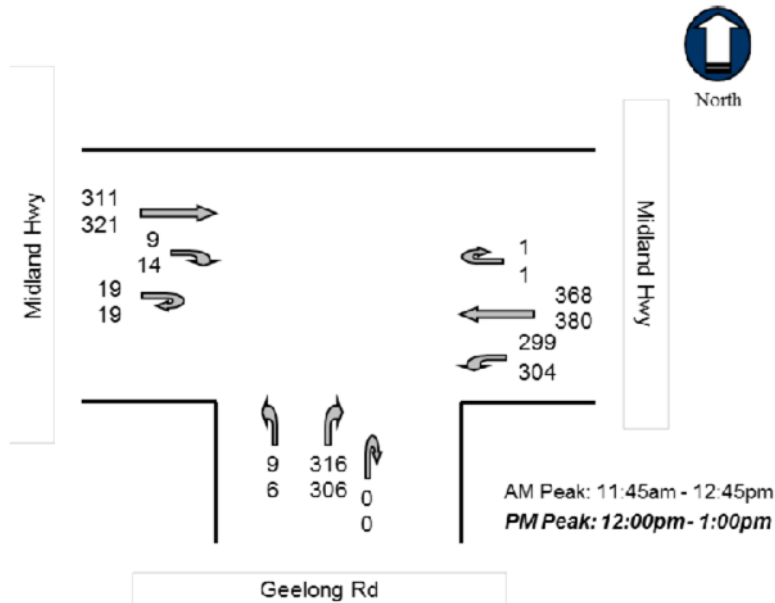


Table C-12 SIDRA Results Midland Highway / Geelong Road

	Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Midland Hwy (SE)	0.515	7.3 sec	4.2 m
	Midland Hwy (NW)	0.385	9.8 sec	1.9 m
	Geelong Rd (W)	0.342	13 sec	1.8 m

Figure C-14 Saturday Peak Period (1Hr) Volumes – Midland Hwy, Kelly Road and Kelly Lane

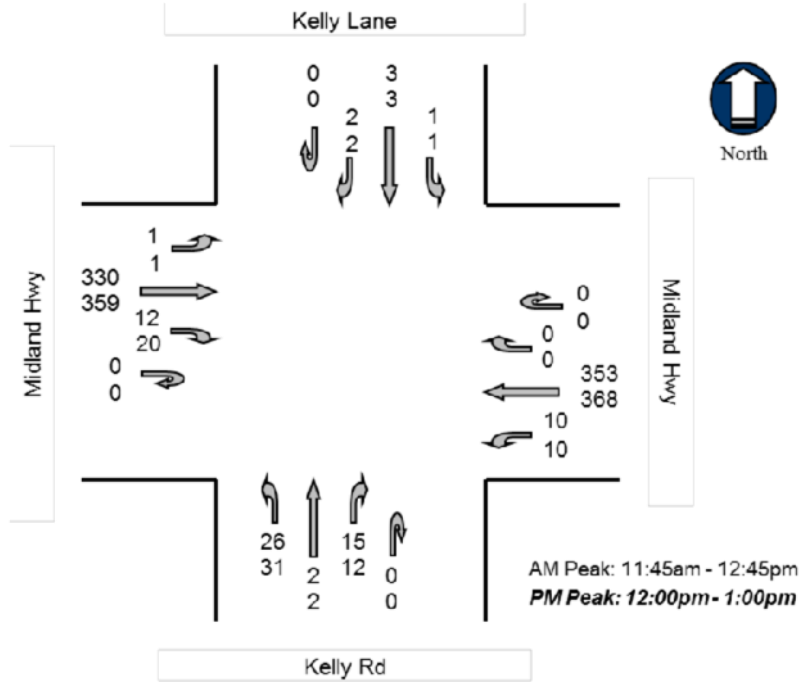


Table C-13 SIDRA Results Midland Highway / Kelly Road / Kelly Lane

Approach	Degree of Saturation	Average Delay	95th %tile Queue	
Saturday Peak	Kelly Ln (E)	0.013	11 sec	0.0 m
	Kelly Road (SW)	0.089	12 sec	0.3 m
	Midland Hwy (SE)	0.214	0.3 sec	0.0 m
	Midland Hwy (NW)	0.236	0.9 sec	0.3 m

Figure C-15 Saturday Peak Period (1Hr) Volumes – Midland Hwy, Clyde Road and Clyde Hill Road

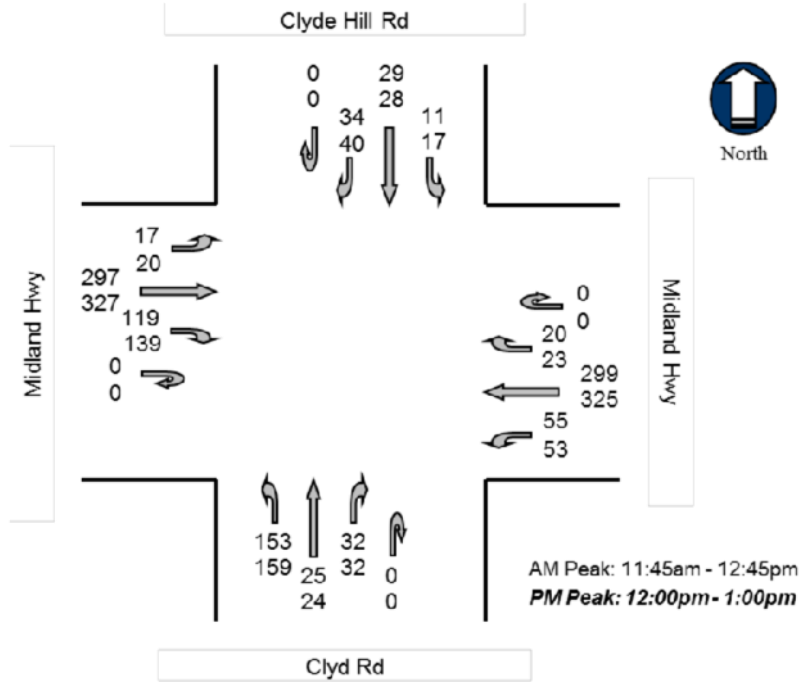


Table C-14 SIDRA Results Midland Highway / Clyde Road / Clyde Hill Road

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Clyde Rd (S)	0.32	14 sec
	Clyde Hill Rd (NE)	0.345	23.8 sec
	Midland Hwy (SE)	0.223	1.8 sec
	Midland Hwy (NW)	0.198	2.6 sec

Figure C-16 Saturday Peak Period (1Hr) Volumes – Bannockburn-Shelford Rd, Clyde Road and Geelong Rd

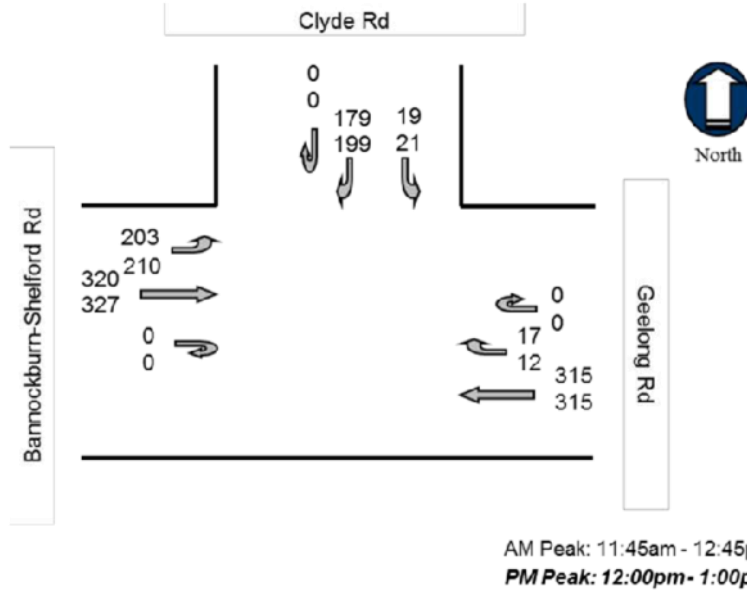


Table C-15 SIDRA Results Bannockburn-Shelford Road / Geelong Road / Clyde Road

	Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Clyde Rd (N)	0.427	12 sec	1.9 m
	Geelong Rd (E)	0.195	5.5 sec	0.1 m
	Bannockburn-Shelford Rd (SW)	0.322	5.2 sec	1.9 m

Figure C-17 Saturday Peak Period (1Hr) Volumes – Geelong Road and Kelly Road

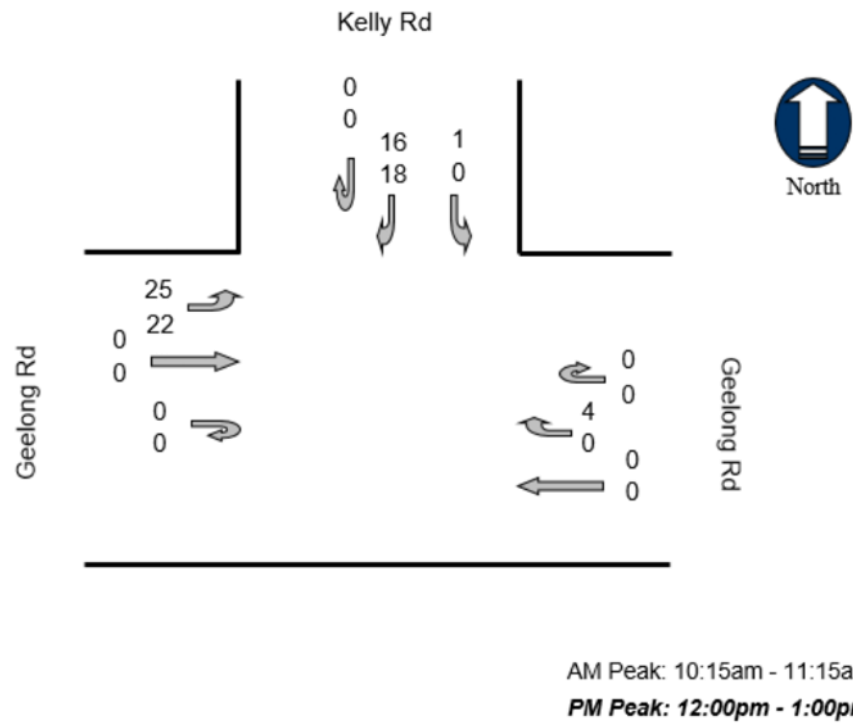


Table C-16 SIDRA Results Geelong Road / Kelly Road

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Kelly Rd (NE)	0.029	8.6 sec
	Geelong Rd (E)	0.188	5.3 sec
	Geelong Rd (SW)	0.208	4.4 sec

Figure C-18 Saturday Peak Period (1Hr) Volumes – McPhillips Road and Victor Street

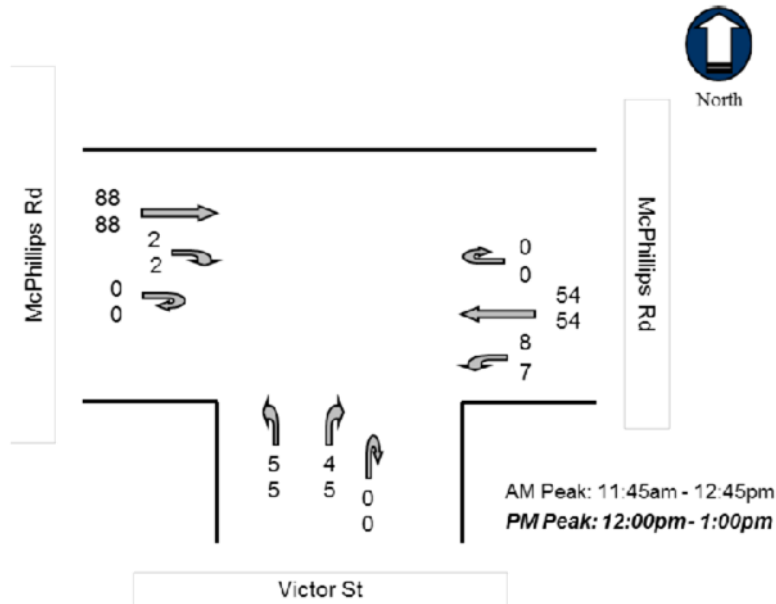


Table C-17 SIDRA Results McPhillips Road / Victor Street

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Victor St (SW)	0.008	5 sec
	McPhillips Rd (SE)	0.037	0.6 sec
	McPhillips Rd (NW)	0.054	0.1 sec

Figure C-19 Saturday Peak Period (1Hr) Volumes – Milton Street and Victor Street

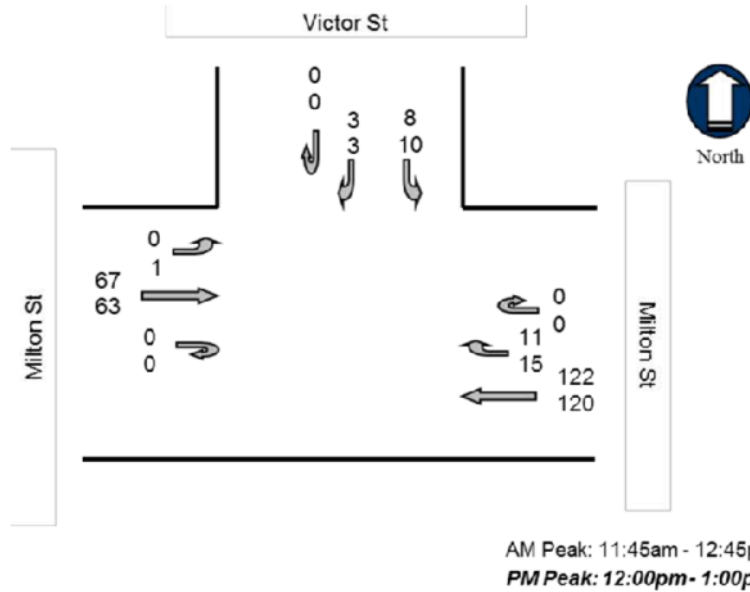


Table C-18 SIDRA Results Victor Street / Milton Street

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Victor St (NE)	0.011	4.9 sec
	Milton St (SE)	0.076	0.6 sec
	Milton St (NW)	0.036	0.1 sec

Figure C-20 Saturday Peak Period (1Hr) Volumes – Milton Street and Bannockburn-Shelford Road

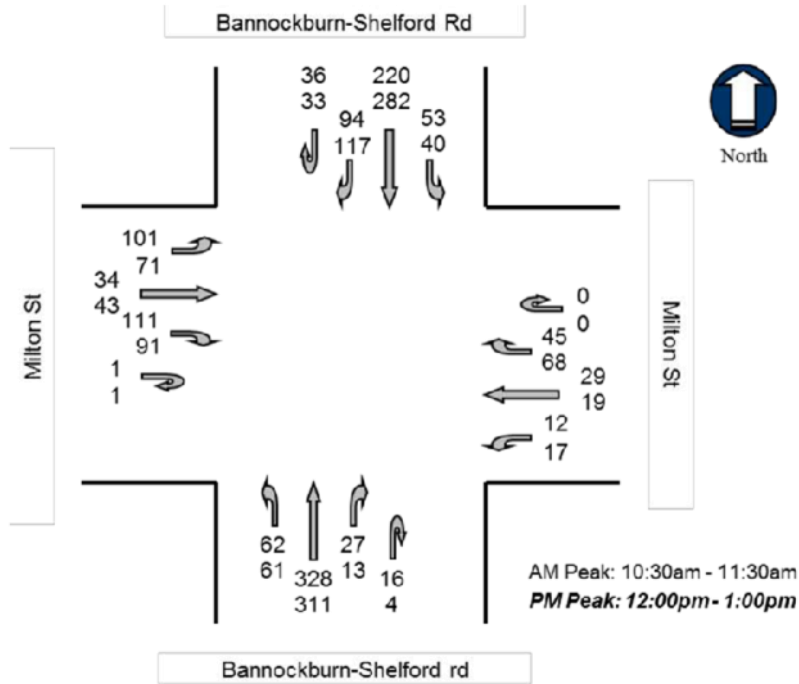


Table C-19 SIDRA Results Bannockburn-Shelford Road/ Milton Street

	Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Milton St (SE)	0.231	11 sec	5.9 m
	Milton St (NW)	0.266	8.4 sec	1.0 m
	Bannockburn-Shelford Rd (NE)	0.295	7 sec	1.3 m
	Bannockburn-Shelford Rd (SW)	0.306	5 sec	1.5 m

Figure C-21 Saturday Peak Period (1Hr) Volumes – Burnside Road, Pope Street and Levy Road

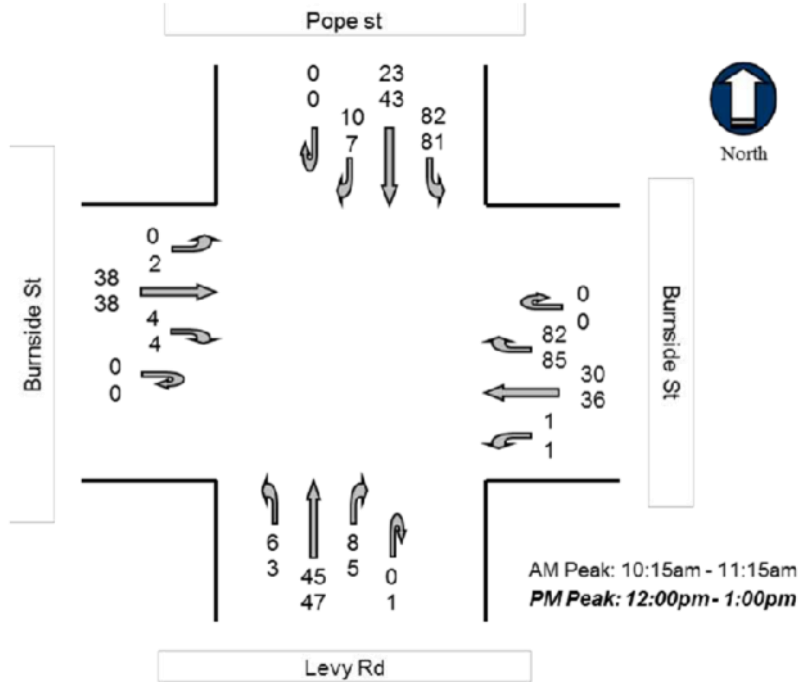


Table C-20 SIDRA Results Burnside Road / Pope Street / Levy Road

Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Levy Rd (S)	0.08	6.3 sec
	Pope St (NW)	0.154	6 sec
	Burnside Rd (E)	0.149	7 sec
	Burnside Rd (W)	0.066	6.6 sec

Figure C-22 Saturday Peak Period (1Hr) Volumes – Burnside Road and Bannockburn-Shelford Road

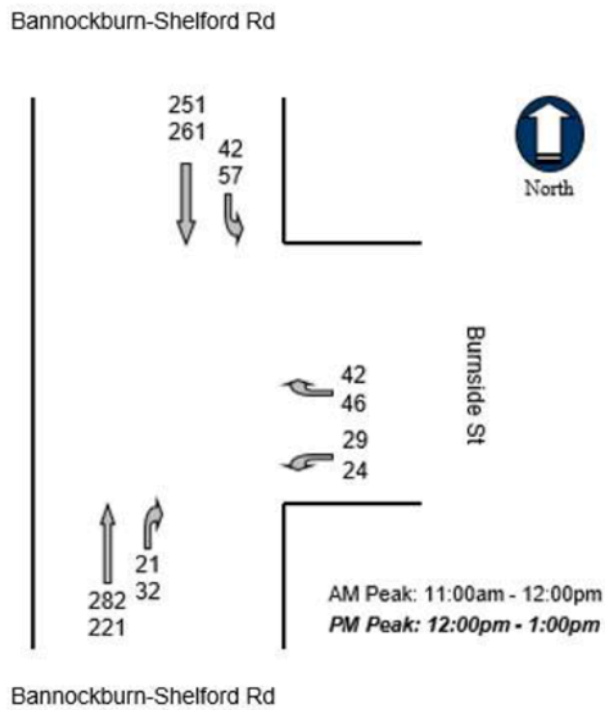


Table C-21 SIDRA Results Bannockburn-Shelford Road/ Burnside Road

	Approach	Degree of Saturation	Average Delay	95 th %tile Queue
Saturday Peak	Burnside Rd (SE)	0.098	8.4 sec	0.3 m
	Bannockburn-Shelford Rd (NE)	0.214	0.9 sec	0.0 m
	Bannockburn-Shelford Rd (SW)	0.146	1.3 sec	0.3 m

Figure C-23 Saturday Peak Period (1Hr) Volumes – Bannockburn-Shelford Road and Moreillon Blvd

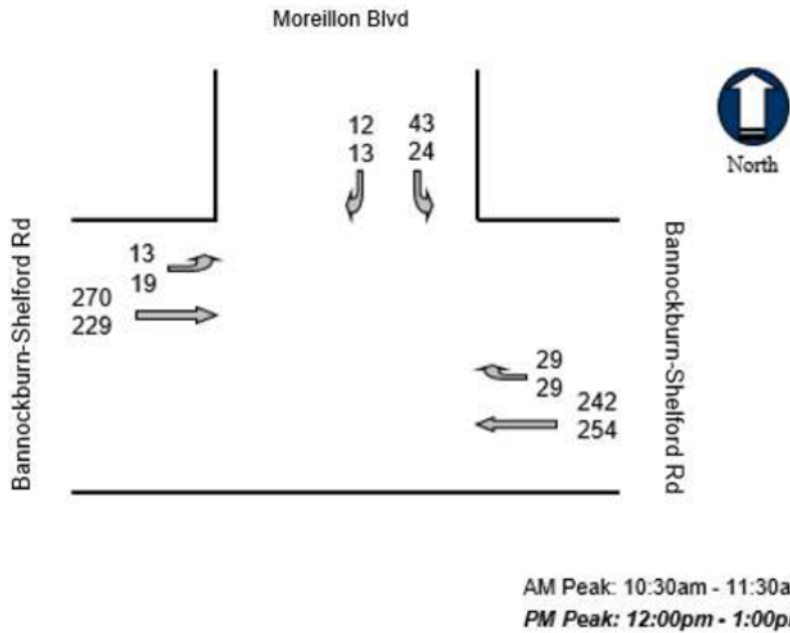
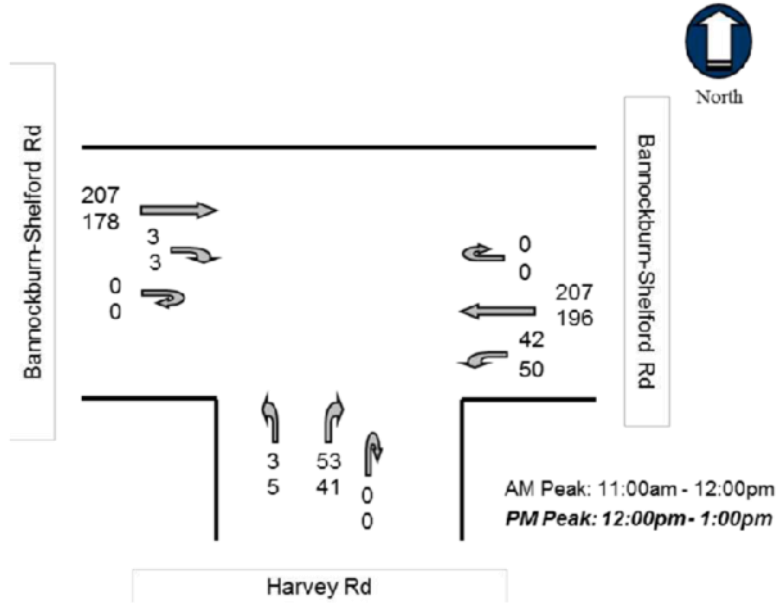


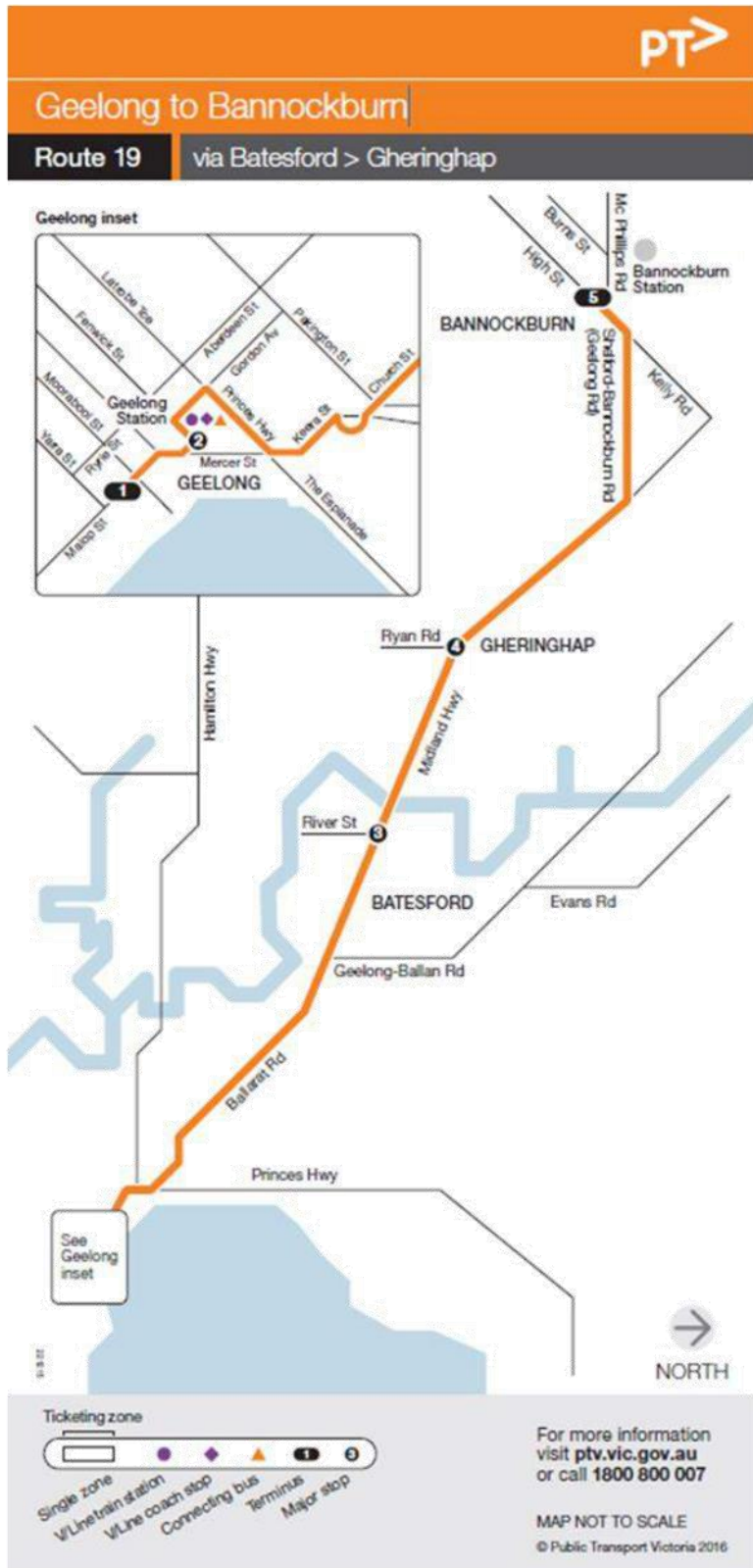
Table C-22 SIDRA Results Bannockburn-Shelford Road/Moreillon Boulevard

	Approach	Degree of Saturation	Average Delay	95th %tile Queue
Saturday Peak	Moreillon Bvd (NW)	0.076	9.2 sec	0.3 m
	Bannockburn-Shelford Rd (NE)	0.201	0.9 sec	0.2 m
	Bannockburn-Shelford Rd (SW)	0.166	0.3 sec	0.0 m

Figure C-24 Saturday Peak Period (1Hr) Volumes – Harvey Road and Bannockburn-Sheffield Road







Geelong – Bendigo



Geelong to Bendigo via Ballarat

Bendigo to Geelong via Ballarat

Effective 27/08/17

	Monday to Friday	
	COACH	COACH
Service information	Δ	Δ
GEELONG STATION depart	08.00	11.35
Bell Park	08.09u	11.42u
Batesford	08.15	11.49
Gheringhap	08.18	11.51
Bannockburn	08.24	12.01
Lethbridge	08.25	12.11
Meredith	08.47	12.24
Elaine	08.55	12.33
Clarendon	09.03	12.41
Lal Lal	09.07	--
Yendon	09.12	--
Navigators	09.16	--
Warrenheip Turn Off	09.18	--
Buninyong	--	12.51d
Sovereign Hill	--	12.59d
BALLARAT STATION arrive	09.35	13.10
Change service	COACH	
BALLARAT STATION depart	10.05	13.50
Creswick Novotel	10.21	--
Creswick	10.23	14.08
Creswick Station	10.26	14.12
Creswick North	10.28	--
Broomfield	10.31	--
Allendale	10.33	--
Smeaton	10.38	--
Campbelltown	10.48	--
Newstead (1)	10.59	--
Newstead (2)	11.01	--
Welshman's Reef	11.05	--
Maldon	11.13	--
Spring Creek (1)	11.26	--
Lockwood	11.28	--
Newlyn	--	14.19
Blampied	--	14.25
Daylesford	--	14.45
Guldford	--	15.05
Castlemaine Station	--	15.20
Harcourt	--	15.27
Kangaroo Flat	11.39	15.50d
BENDIGO STATION arrive	11.53	16.05

	Mon-Fri	Mon-Thu	Friday
	COACH	COACH	COACH
Service information	Δ	Δ	Δ
BENDIGO STATION depart	06.35	12.25	15.15
Kangaroo Flat	06.43u	12.33u	15.23u
Lockwood	--	12.44	15.34
Spring Creek (2)	--	12.46	15.36
Maldon	--	13.00	15.50
Welshman's Reef	--	13.07	15.57
Newstead (2)	--	13.12	16.02
Newstead (1)	--	13.14	16.04
Campbelltown	--	13.24	16.14
Smeaton	--	13.26	16.26
Allendale	--	13.40	16.30
Broomfield	--	13.42	16.32
Harcourt	07.01	--	--
Castlemaine Station	07.15	--	--
Guldford	07.26	--	--
Daylesford	07.55	--	--
Blampied	08.03	--	--
Newlyn	08.06	--	--
Creswick North	--	13.45d	16.35d
Creswick Station	08.20	13.48	16.38
Creswick	08.30	13.51	16.41
Creswick Novotel	--	13.53	16.43
BALLARAT STATION arrive	08.52	14.10	17.03
Change service		COACH	
Service information		Δ	
BALLARAT STATION depart	09.40	16.00	
Sovereign Hill	09.46	--	
Buninyong	09.58u	--	
Warrenheip Turn Off	--	15.10	
Navigators	--	15.12	
Yendon	--	15.16	
Lal Lal	--	15.21	
Clarendon	10.06	15.26	
Elaine	10.14	15.34	
Meredith	10.23	15.42	
Lethbridge	10.35	15.54	
Bannockburn	10.47	16.05	
Gheringhap	10.53	16.11	
Batesford	10.58	16.14	
Bell Park	11.09d	16.20d	
GEELONG STATION arrive	11.15	16.35	

Δ Wheelchair accessible / u - Pick up only / d - Set down only / Coach services shown in red
Altered timetables may apply on public holidays. Please check vline.com.au prior to travelling.

Coach stop locations	Allendale - Township / Bannockburn - Township / Batesford - Opposite Hotel / Bell Park - Grace McAllister House, Midland Highway / Blampied - Township / Broomfield - Township / Buninyong - Township / Campbelltown - Opposite old garage / Clarendon - Township / Creswick - Bus Stop, Albert Street / Creswick North -	Corner Clunes-Creswick and Creswick-Smeaton Roads / Daylesford - Bridport Street, opposite CFA / Elaine - General Store / Geelong City - Westpac Bank, Malop Street / Gheringhap - Highway Bus Shelter / Guldford - General Store / Harcourt - Township / Kangaroo Flat - Corner High Street and Station Street /	Lal Lal - General Store / Lethbridge - General Store / Lockwood - Calder Alternative Highway / Maldon - Post Office / Meredith - Shell Garage, Midland Highway / Navigators - Township / Newlyn - Antique Shop / Newstead (1) - Railway Hotel / Newstead (2) - Township / Smeaton - Hotel /	Sovereign Hill - Main Entrance / Spring Creek (1) - Bendigo-Maldon Road at McGlazens Road / Spring Creek (2) - Bendigo-Maldon Road at Pirjara Drive / Welshman's Reef - Maldon-Newstead Road / Yendon - Township
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For more information visit ptv.vic.gov.au or call 1800 800 007



Authorised by V/Line Pty Ltd, 750 Collins Street, Docklands

108J



Figure E-1 Car Parking Survey Locations



Table E-1 Car Parking Occupancy Survey Results (Thursday 1st March 2018)

Area	Street	Section	Side	Type	Restriction	Time	Suppl	Ches	7:40 AM - 8:59 AM	9:00 AM - 10:59 AM	11:00 AM - 12:59 PM	1:00 PM - 1:59 PM	2:00 PM - 3:59 PM	4:00 PM - 5:59 PM	6:00 PM - 7:59 PM	
E031	McPhillips Rd	Burns St to High St	North	Unrestricted			9	6	0	0	0	0	0	0	0	0
E032	McPhillips Rd	High St to Burns St	North	Unrestricted			17	17	3	4	3	3	4	3	3	3
A033	McPhillips Rd	High St to Burns St	South	Unrestricted			15	13	2	1	0	0	0	0	0	0
A034	McPhillips Rd	High St to Burns St	South	Unrestricted			8	8	1	0	0	0	0	0	0	0
B02	Millon St	Victor St to Burns St	North	Unrestricted			9	8	0	0	0	0	0	0	0	0
B03	Millon St	Victor St to Burns St	South	Unrestricted			10	10	0	0	0	0	0	0	0	0
B04	Millon St	Burns St to High St	North	Unrestricted			3	3	0	0	1	1	1	1	1	1
B04	Millon St	Burns St to High St	South	Unrestricted			16	16	0	0	0	0	0	0	0	0
B04	Millon St	Burns St to High St	Unrestricted				1	1	0	0	0	0	0	0	0	0
B05	Millon St	High St to Byrne St	North	Unrestricted			14	14	0	0	1	0	0	0	1	3
B06	Millon St	High St to Byrne St	South	Unrestricted			19	19	0	0	0	0	0	0	0	0
C01	Burns St	McPhillips Rd to Millon St	West	Unrestricted			21	21	5	6	19	10	16	15	13	14
C02	Millon St	McPhillips Rd to Millon St	East	Unrestricted			7	7	0	0	0	0	0	0	0	0
C02	Millon St	McPhillips Rd to Millon St	West	Unrestricted			2	2	0	0	0	0	0	0	0	0
C02	Millon St	McPhillips Rd to Millon St	Unrestricted				12	13	2	4	1	0	3	4	5	1
D01	High St Service Rd	Scops Frontage	West	Unrestricted	Burns St Resident Exceeded		5	5	1	3	2	2	3	3	1	2
D01	High St Service Rd	Scops Frontage	East	Unrestricted			1	1	0	0	0	0	1	1	0	0
D02	High St Service Rd	Scops Frontage	East	Unrestricted			9	9	2	6	1	1	9	10	8	0
D03	High St Service Rd	Car Park Access to Millon St	West	Unrestricted	Unrestricted		3	3	0	1	1	1	9	10	1	2
D03	High St Service Rd	Car Park Access to Millon St	East	Unrestricted	Unrestricted		2	2	0	2	2	1	2	1	2	6
D03	High St Service Rd	Car Park Access to Millon St	Unrestricted				2	2	0	2	2	1	2	1	2	6
D04	High St Service Rd	Car Park Access to Millon St	East	Unrestricted			9	9	0	7	8	8	3	6	4	7
D05	High St Service Rd	Millon St to School Crossing	West	Unrestricted			5	5	0	1	0	0	1	1	2	3
D06	High St Service Rd	Millon St to School Crossing	East	Unrestricted			10	10	0	0	0	0	0	0	0	0
D07	High St Service Rd	School Crossing to Pope St	West	Unrestricted			17	17	1	5	6	6	6	6	2	1
D07	High St Service Rd	School Crossing to Pope St	East	Unrestricted			12	12	0	3	2	4	3	2	4	0
D08	High St Service Rd	McPhillips Rd to Service Rd Access	West	Unrestricted			16	16	0	0	1	4	2	1	5	0
D08	High St Service Rd	McPhillips Rd to Service Rd Access	East	Unrestricted			9	9	3	4	2	5	6	5	6	7
D10	High St Service Rd	McPhillips Rd to Service Rd Access	Unrestricted				9	9	1	2	5	6	5	6	5	5
D11	High St Service Rd	Service Rd Access to Millon St	West	Unrestricted			11	11	0	0	1	6	5	3	6	7
D12	High St Service Rd	Service Rd Access to Millon St	East	Unrestricted			15	15	0	0	4	5	6	5	7	5
D13	High St Service Rd	Millon St to Service Rd Access	West	Unrestricted			4	4	0	1	2	2	2	2	1	0
D13	High St Service Rd	Millon St to Service Rd Access	East	Unrestricted			11	11	0	0	1	3	7	3	4	4
D13	High St Service Rd	Millon St to Service Rd Access	Unrestricted				2	2	0	0	1	3	7	3	4	4
D16	High St Service Rd	Service Rd Access to Pope St	West	Unrestricted			10	10	0	0	4	4	7	1	1	3
D16	High St Service Rd	Service Rd Access to Pope St	East	Unrestricted			9	9	0	0	1	1	1	1	1	1
E01	Brown St	McPhillips Rd to Millon St	West	Unrestricted			11	11	0	0	0	0	0	0	0	0
E02	Brown St	McPhillips Rd to Millon St	East	Unrestricted			11	11	0	0	0	0	0	0	0	0
E03	Brown St	Millon St to Pope St	West	Unrestricted			10	10	0	0	0	0	0	0	0	0
E04	Brown St	Millon St to Pope St	East	Unrestricted			10	10	1	1	1	1	1	1	1	1
CP1	Off Street Car Park	North of McPhillips Rd	Unrestricted				1	1	1	1	1	1	1	1	1	1
CP2	Off Street Car Park	Woodworth's Car Park (North)	Unrestricted				40	40	1	6	13	11	10	16	21	12
CP2	Off Street Car Park	Woodworth's Car Park (North)	Unrestricted				1	1	0	1	0	0	1	0	1	0
CP2	Off Street Car Park	Woodworth's Car Park (North)	Unrestricted				26	26	10	14	22	20	26	26	23	19
CP3	Off Street Car Park	Woodworth's Car Park (South)	Unrestricted				2	2	0	0	1	2	6	2	1	1
CP3	Off Street Car Park	Woodworth's Car Park (South)	Unrestricted				49	49	3	7	0	35	35	34	23	43
CP4	Off Street Car Park	Cm of Millon St/Brown St	Unrestricted				2	2	0	0	0	0	0	0	0	0
CP4	Off Street Car Park	Cm of Millon St/Brown St	Unrestricted				40	40	0	0	4	4	4	4	3	0



Table F-1 Summary of CrashStats Data

Date	Road Name	Road Class	Intersection	Crash type	No. of persons killed	No. of people injured	DCA Code	DCA Description	Accident no.
23/04/2013	Midland Highway		Geelong Road	Collision with vehicle	0	1	130	REAR END(VEHICLES IN SAME LANE)	T20130010000
23/04/2013	Midland Highway		Madden Road	Collision with vehicle	0	2	120	HEAD ON (NOT OVERTAKING)	T20130008159
7/05/2013	Midland Highway		Madden Road	Collision with vehicle	0	3	130	REAR END(VEHICLES IN SAME LANE)	T20130009405
24/05/2013	Moreillon Boulevard		Sunset Way	Collision with a fixed object	0	1	149	OTHER MANOEUVRING NOT INCLUDED IN DCAs 140-148	T20130010018
8/07/2013	Geelong Road		Gillett Street	Collision with vehicle	0	1	120	HEAD ON (NOT OVERTAKING)	T201300104131
2/11/2013	Burnside Road		Glen Avon Drive	Collision with a fixed object	0	1	179	OFF END OF ROAD/T-INTERSECTION	T20130023477
15/11/2013	Midland Highway		Geelong Road	Collision with vehicle	0	1	130	REAR END(VEHICLES IN SAME LANE)	T20130024025
2/02/2014	Garonne Drive		Knights Park Crescent	No collision and no object struck	0	1	174	OUT OF CONTROL ON CARRIAGEWAY (ON STRAIGHT)	T20140002941
13/06/2014	Bannockburn-Shelford Road		Bruce Street	Collision with vehicle	0	4	120	HEAD ON (NOT OVERTAKING)	T20140012262
30/08/2014	Geelong Road - High Street		McPhillips Road	Collision with vehicle	0	1	111	RIGHT FAR (INTERSECTIONS ONLY)	T20140016681
18/08/2014	Midland Highway		Kelly Lane	Collision with vehicle	0	1	120	HEAD ON (NOT OVERTAKING)	T20140017094
23/12/2014	Clyde Road		Lowndes Road	Collision with vehicle	0	2	110	CROSS TRAFFIC(INTERSECTIONS ONLY)	T20140020489
23/02/2015	Guinane Court		Hollder Road	Vehicle overturned (no collision)	0	1	147	OTHER MANOEUVRING NOT INCLUDED IN DCAs 140-148	T20150002721
3/03/2015	Midland Highway		Kelly Lane	Collision with vehicle	0	1	120	HEAD ON (NOT OVERTAKING)	T20150004513
4/04/2015	Geelong Road		Clyde Road	Collision with vehicle	0	1	147	VEHICLE STRIKES ANOTHER VEH WHILE EMERGING FROM DRIVEWAY	T20150007530
6/05/2015	Glen Avon Drive		Macrossan Avenue	No collision and no object struck	0	2	179	OTHER ACCIDENTS-OFF STRAIGHT NOT INCLUDED IN DCAs 170-175	T20150010547
12/05/2015	Midland Highway		Geelong Road	Collision with vehicle	0	2	111	RIGHT FAR (INTERSECTIONS ONLY)	T20150019068
27/10/2015	Burnside Road		Yvercon Drive	Collision with a fixed object	0	1	181	OFF RIGHT BEND INTO OBJECT/PARKED VEHICLE	T20150022700
25/05/2016	High Street		Wilton Street	Collision with vehicle	0	1	110	CROSS TRAFFIC(INTERSECTIONS ONLY)	T20160011939
28/05/2016	Moreillon Boulevard		Bannockburn-Shelford Road	No collision and no object struck	0	2	174	OFF CARRIAGEWAY TO LEFT	T20160011722
7/07/2016	High Street		High Street	Collision with a fixed object	0	1	146	REVERSING INTO FIXED OBJECT/PARKED VEHICLE	T20160014863
11/12/2016	Midland Highway		Kelly Road	Collision with vehicle	0	2	130	REAR END(VEHICLES IN SAME LANE)	T20160026741
12/04/2017	Midland Highway		Clyde Road	Collision with vehicle	2	2	110	CROSS TRAFFIC(INTERSECTIONS ONLY)	T20170007426
15/05/2017	Burnside Road		Charlton Road	Collision with vehicle	0	1	111	RIGHT FAR (INTERSECTIONS ONLY)	T20170009519
4/06/2017	Glen Avon Drive		n/a	Collision with a fixed object	0	1	171	LEFT OFF CARRIAGEWAY INTO OBJECT/PARKED VEHICLE	T20170010726
16/06/2017	Midland Highway		Madden Road	Collision with vehicle	0	1	130	REAR END(VEHICLES IN SAME LANE)	T20170015690
Total					3	38			

Figure F-1 Location of Incidents Within the Study Area (CrashStats)

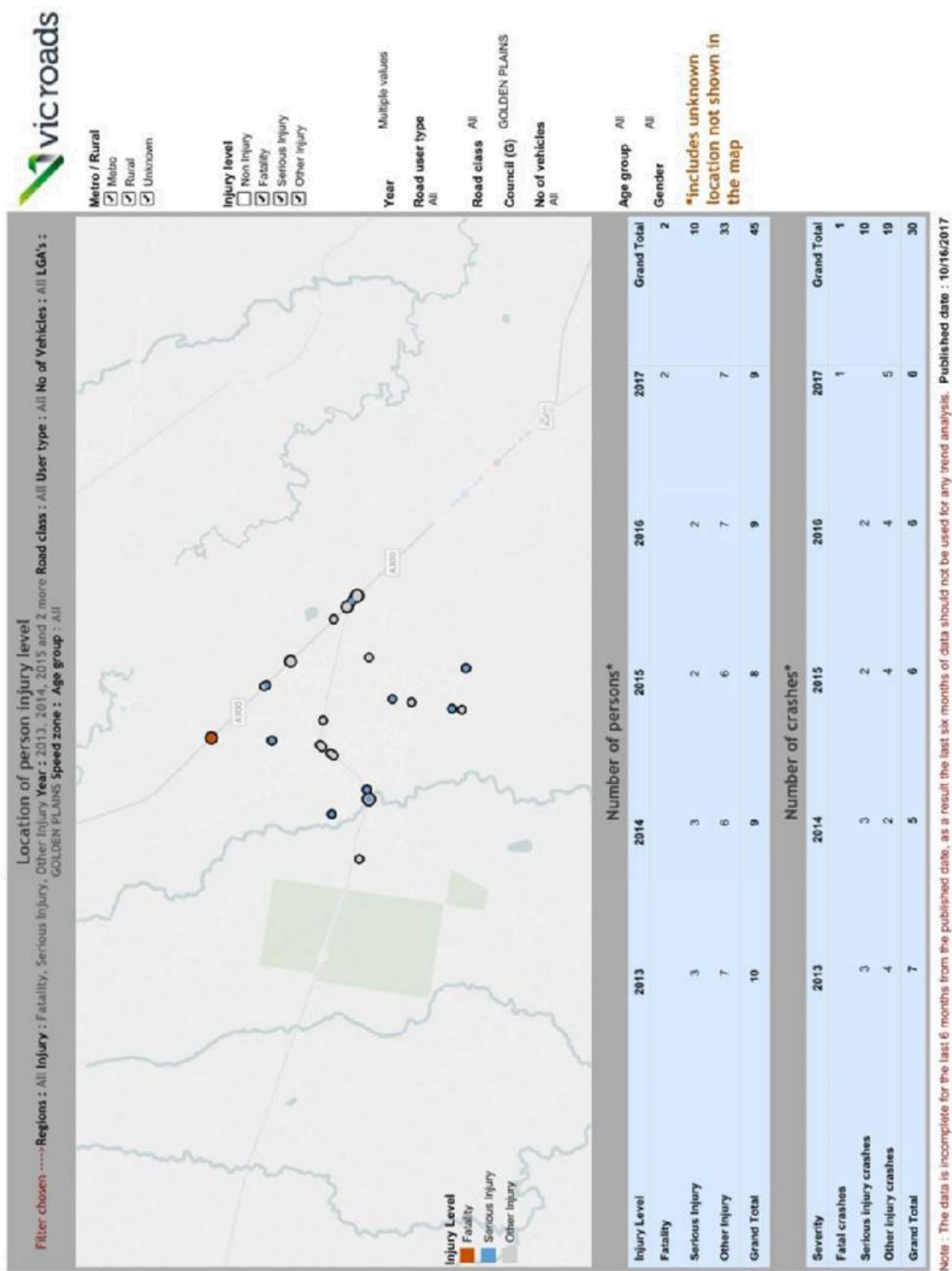


Figure F-2 DCA Categories

DEFINITIONS FOR CLASSIFYING ACCIDENTS									
VEHICLE POSITION	VEHICLES FROM ADJACENT INTERSECTION (DVA)	VEHICLES FROM OPPOSITE DIRECTION	VEHICLES FROM SAME DIRECTION	REAR/DEPARTING	OVERTAKING	ON PATH	ON PATH ON STRAIGHT	ON PATH ON CURVE	PASSENGERS AND MISCELLANEOUS
100 NEAR SIDE	110 CROSS TRAFFIC	108 1 - AROUND SIDE 2 - OTHER (SEE EXPLANATION)	130 REAR END	140 3 - TURN	150 REAR END	160 REAR END	170 OFF-CURVE	180 OFF-CURVE	190 FALL OFFSIDE VEHICLE
101 THROUGH	111 RIGHT TURN	109 RIGHT THROUGH	131 LEFT REAR	141 VEHICLE IN PARALLEL PARKED VEHICLE	151 OUT OF CONTROL	161 DOUBLE PARKED	171 OFF-CURVE	181 OFF-CURVE	191 LAND OR MISSILE STRUCK VEHICLE
102 THROUGH	112 LEFT THROUGH	110 LEFT THROUGH	132 REAR FRONT	142 LEAVING PARKING	152 PULLING OUT	162	172 OFF-CURVE	182 OFF-CURVE	192 STRUCK TRAIN
103 THROUGH	113 RIGHT NEAR	111 RIGHT THROUGH	133 LANE SIDE SWIPE	143 EXITING PARKING	153 CUTTING IN	163 VEHICLE DOOR	173 OFF-CURVE	183 OFF-CURVE	193 STRUCK RAILWAY UNCONTROLLED JUNCTION
104 THROUGH	114 THROUGH NEAR	112 RIGHT THROUGH	134 LANE CHANGE LEFT	144 REVERSING	154 CUTTING IN	164	174 OFF-CURVE	184 OFF-CURVE	194 PARKED CAR RUN AWAY
105 THROUGH	115 RIGHT/LEFT FAR	113 RIGHT THROUGH	135 LANE CHANGE RIGHT	145 REVERSING	155 CUTTING IN	165	175 OFF-CURVE	185 OFF-CURVE	195
106 THROUGH	116 LEFT NEAR	114 RIGHT THROUGH	136 RIGHT TURN SIDE SWIPE	146 REVERSING	156 CUTTING IN	166	176 OFF-CURVE	186 OFF-CURVE	196
107 THROUGH	117 LEFT/RIGHT FAR	115 RIGHT THROUGH	137 LEFT TURN SIDE SWIPE	147 REVERSING	157 CUTTING IN	167	177 OFF-CURVE	187 OFF-CURVE	197
108 THROUGH	118 TWO LEFT TURN	116 RIGHT THROUGH	138 OTHER SAME DIRECTION	148 OTHER REVERSING	158 CUTTING IN	168	178 OFF-CURVE	188 OFF-CURVE	198 OTHER
109 THROUGH	119 OTHER ADJACENT	117 RIGHT THROUGH	139 OTHER OPPOSITE	149 OTHER REVERSING	159 CUTTING IN	169	179 OFF-CURVE	189 OFF-CURVE	199 UNKNOWN

1. Definition for classifying accidents (DCA) should be determined by the position of the vehicle at the time of the accident. The vehicle's position should determine the primary movement of the vehicle involved in the initial event. It does not matter if the vehicle subsequently moves to a different position after the initial event.
 2. The sub-system observer should determine the primary movement of the vehicle involved in the initial event. It does not matter if the vehicle subsequently moves to a different position after the initial event.
 3. Supplementary codes may be used for most sub-categories. These codes are further defined in the 'Other' column.
 4. The number 1-2 is used for individual vehicles involved in the accident. For DCA 3, codes are used for each vehicle other than the vehicle involved in the accident.
 5. These codes were used for 1987 accidents and replace the Road User Management (RUM) codes.



Memo



Project No: V171834

Date: 29 August 2018

Project: Bannockburn Transport Strategy

Subject: Summary of Community and Stakeholder Consultation

To: Angela Vary	Company: Golden Plains Shire Council	Email/Fax: avary@gplains.vic.gov.au
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<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/> Urgent	<input type="checkbox"/> For your review	<input type="checkbox"/> Reply ASAP
<input type="checkbox"/> Please comment	<input type="checkbox"/> Original in mail	
Attachments:	<input checked="" type="checkbox"/> Community Consultation Materials <input type="checkbox"/>	

Cardno was engaged by Golden Plains Shire Council to assist in the preparation of a Transport Strategy for Bannockburn, which is being undertaken in response to a rapidly growing population and subsequent need for a coordinated transport network plan. The Strategy will outline the required infrastructure and network upgrades to support the expected population growth in Bannockburn over the next 15 to 20 years.

As part of the engagement, Cardno has undertaken a series of community and stakeholder consultation stages and exercises to understand the issues and opportunities within the local transport network in Bannockburn. The following presents a summary of the consultation works undertaken to date.

Community Consultation

Understanding the Issues

The first stage of community consultation was undertaken to collect feedback from the community regarding the existing transport network issues within Bannockburn. A letter and survey were sent via post to all residents and businesses within the study area in April 2018, and an online version of the survey was made available from 30 April 2018 until 2 June 2018 (relevant materials have been appended to this report). The survey asked community members to nominate locations where they have noted issues and advise whether it was not an issue, a minor issue or a major issue, and provide any suggestions to overcome the issues they have noted.

A total of 193 online survey responses and 101 letter survey responses were received by 2 June 2018. A summary of the collated findings from the online survey is presented below.

Online Surveys

In response to Question 1: *Overall, which streets / intersections in Bannockburn are of most concern to you? Please tick up to THREE options*, the following responses were noted:

- o Geelong Rd/Kelly Rd/Clyde Rd/Bannockburn-Shelford Rd was selected the most (157), followed by Clyde Rd/Midland Hwy (65) and Geelong Road between Midland Hwy and Bannockburn-Shelford Road (52).
- o Charlton Road west of Burnside Road (1), Victor St/McPhillips Rd (1) and Charlton Rd/Levy Rd (2) received the lowest amount of selections.
- o 'Other' was selected as an option 49 times.

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29 August 2018

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Page 1 of 5

M:\2017\1501_2000\V171834_Bannockburn_Parking_&_TM_Strategy\Traffic\Engineering\Documents\V171834MEMO01.docx

The following table presents a summary of the traffic-related responses recorded in Part B of Question 2.

Table 1 Question 2 B) Responses

Category	Not an issue	Minor issue	Major issue	TOTAL
Traffic speed	37	52	68	157
Traffic Volume	45	34	70	149
Through Traffic	52	26	60	138
Heavy Vehicle Traffic	44	31	79	154
Unsafe Location	51	13	79	143
TOTAL	229	156	356	741

In summary, the highest proportion of responses were noted as a 'major issue' across all categories, most notably in the 'unsafe location' category.

Table 2 presents a summary of the responses to Part B of Question 3.

Table 2 Question 3 B) Responses

Category	Not an issue	Minor issue	Major issue	TOTAL
Lack of Pedestrian Crossings	44	40	45	129
Lack of On-Road Bicycle Facilities	55	30	37	122
Lack of Off-Road Bicycle/Shared Facilities	52	28	40	120
Unsafe Crossing Points	38	31	68	137
TOTAL	189	129	190	508

Across the categories, a relatively even distribution was recorded for 'not an issue', 'minor issue' and 'major issue' responses. In the lack of bicycle facilities categories, the highest proportion of responses were noted as 'not an issue', whilst in the pedestrian facilities categories, 'major issue' represented the highest proportion.

Table 3 presents a summary of the responses relating to car parking, within Part B of Question 4.

Table 3 Question 4 B) Responses

Category	Not an issue	Minor issue	Major issue	TOTAL
Car Parking Overflow into Local Streets	71	28	21	120
Informal Car Parking Areas	76	21	13	110
Lack of parking for large vehicles	61	31	30	122
Inappropriate car parking	69	19	23	111
TOTAL	277	99	87	463

Evidently, the majority of responses noted car parking as 'not an issue' across all categories. The highest number of 'major issue' responses was recorded for a lack of parking for large vehicles, however this represents just 25% of the total responses for this category.

The responses for Question 5 B) have been summarised in Table 4 below.

Table 4 Question 5 B) Responses

Category	Not an issue	Minor issue	Major issue	TOTAL
Lack of bus services	20	24	107	151
Lack of bus route connectivity	26	26	74	126
Bus stop accessibility and condition	39	34	54	127
Distance to bus stops / services	38	34	58	130
TOTAL	123	118	293	534

The majority of responses recorded a 'major issue', notably in the lack of bus services and lack of route connectivity categories – notably all categories recorded 'major issue' as having the highest proportion of responses.

Community Day

Following the collection of the survey data, the second stage of community consultation was undertaken to understand the community's prioritisation of the major issues noted in the first stage of consultation. A 'Community Day' public drop-in session was undertaken on Wednesday 11 July 2018 from 10:00am to 4:00pm, where Council and Cardno staff were available to discuss and explain the project scope and invite community members to partake in an interactive feedback activity.

The activity used large aerial images of the locations / issues that received the most feedback during the first stage of consultation – community members were asked to place stickers within a table indicating whether they thought the issue should be addressed as soon as possible (red dots), should be addressed at some stage (yellow dots), or does not need to be addressed (blue dots). Feedback forms were also available to record any additional feedback that community members had during the session.

The following represents a summary of the interactive drop-in session findings:

- Approximately 50 members of the community participated in the session.
- A total of 453 dots were recorded, split into 338 'very concerned', 42 'somewhat concerned' and 73 'not concerned' dots.
- The locations that received the highest number of 'very concerned' dots were:
 - Geelong Rd/Kelly Rd/Clyde Rd/Bannockburn Shelford Rd intersection (114 dots), with poor sight distance receiving the highest no. of very concerned dots (37 dots).
 - Geelong Road between Midland Highway and Railway Crossing (47 dots), with volumes of heavy vehicles receiving the highest no. of very concerned dots (14 dots).
 - Clyde Road / Midland Highway intersection (46 dots), with volumes of heavy vehicles receiving the highest no. of very concerned dots (18 dots).
- The issues that received the highest number of very concerned dots were:
 - High speed vehicles (86 dots).
 - Volumes of heavy vehicles (74 dots).
 - Poor sight distance (64 dots).

Stakeholder Consultation

In addition to undertaking consultation with the community, key stakeholders have also been consulted in the early stages of the development of the Bannockburn Transport Strategy.

The first stage of stakeholder consultation was undertaken to collect knowledge and understand the key issues and opportunities from the perspective of the stakeholders. An inception meeting was held at Golden Plains Shire Council with a range of Council departments to collect information and understand who the key stakeholders are. The list presented in

Table 5 Key Stakeholders

Stakeholder Category	Identified Stakeholder
State Authority / Organisation	VicRoads Southwestern Region
	Transport for Victoria (TV)
	Public Transport Victoria (PTV)
	VLine
	VicTrack
	Department of Education
	Transport Accident Commission (TAC)
Local Authority / Organisation	Golden Plains Shire Council (GPSC)
	Catholic School
	Bannockburn P-12 School
	Bannockburn Library
	Bannockburn Chamber of Commerce
	Local Freight Industry Groups
	Country Fire Authority (CFA)
	State Emergency Service (SES)
	Ambulance Victoria
	Victoria Police
	Ballarat Environment Network
	Access and Inclusion
	Local School Buses
	McHarrys Bus Services Geelong
	Gold Bus Ballarat
Local Sporting / Recreation / Hobby Groups	Bannockburn Nursing Home
	YMCA Geelong
	Bannockburn Football/Netball Club
	Golden Plains Hockey Club
	Golden Plains Soccer Club
	Bannockburn Tennis Club
	Bannockburn Auskick
	Bannockburn Cricket Club
	Skate / Scooter Youth Groups
	Bannockburn Park Run
	Bannockburn and District Riders and Runners
	Bannockburn Community Planning
	Bannockburn Trailblazer Walking Group
	Bannockburn Senior Citizens Group
	Friends of Bannockburn Bush
Local Businesses	Bannockburn Men's Shed
	Local Industry Representatives

An email was sent to the stakeholders to invite their participation in the formation of the strategy. The following sections present a summary of the responses to date.

VicRoads

Cardno and Council attended a meeting with VicRoads and Transport for Victoria on Friday 6 July 2018 to understand the existing knowledge base of the arterial road network in Bannockburn. Two key projects were identified:

1. Clyde Road / Midland Highway Intersection Upgrade: a funded project to install a roundabout at the intersection, estimated to begin construction in early 2020.
2. Geelong Road / Bannockburn-Shelford Road / Clyde Road / Kelly Road Intersection Upgrade: an identified project which has been earmarked for upgrade to a roundabout, however no funding has been committed.

A key outcome of this meeting was to involve VicRoads in the next stage of community consultation, in order to gauge the community's response to the two projects outlined above.

PTV / TV

A response was received from representatives at Transport for Victoria, who indicated their support for the project and willingness to be involved during the development of the strategy

V/Line

A response was received from a representative at V/Line, who indicated the following key points in relation to the project:

- There are currently no plans to increase the current road coach service frequency through Bannockburn in the foreseeable future.
- We also have had no feedback from the coach operators to indicate that they have any problems with the current access arrangements for the coaches.
- As far as the reinstatement of the rail services between Geelong and Ballarat is not part of any of the RRR projects now or into the future and the changing of the rail gauge between Geelong and Ballarat to purely standard gauge as part of the Murray Basin Project will make the return of passenger rail more difficult into the future given the V/Line fleet is primarily broad gauge.

Bannockburn Transport Strategy

Traffic Modelling Report

V171834



Prepared for
Golden Plains Shire

09/09/2019



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1 Traffic Modelling Overview

1.1 Introduction

Cardno has been commissioned to develop Transport Strategies for Traffic Management, Car Parking, and Sustainable Transport within Bannockburn Growth Area.

A key element in determining potential future road network issues and requirements due to future residential and commercial development in Bannockburn is gaining an understanding of future traffic flows and intersection performance resulting from this development.

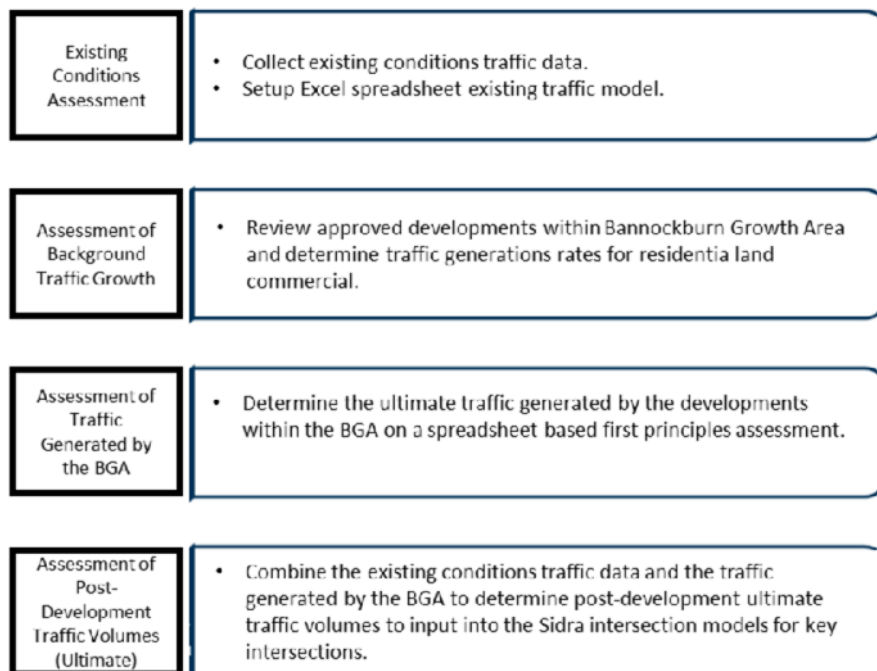
Cardno has developed a first principles spreadsheet model to estimate these future year traffic flows and intersection turning movements for analysis using the SIDRA intersection modelling software. This intersection modelling has allowed us to determine which intersections will require future improvements and assist in determining the nature of these improvements.

1.2 Modelling Methodology

The modelling methodology adopted for this study uses strategic modelling to assess the background traffic growth and first principles spreadsheet modelling to assess the traffic generated by the development of the of the Bannockburn Growth Area. The strategic modelling component of the methodology entailed using

The modelling approach for assessing the ultimate (2036) traffic volumes on the road network is outlined in below.

Figure 1-1 Modelling Methodology



As outlined above, the modelling methodology involved the following:

1. Assessing the current traffic volumes on the existing road network.
2. Assess the future proposed residential and commercial developments within the Bannockburn Growth Area to determine traffic generation rates.
3. Determine the traffic generated by residential and commercial developments within Bannockburn town Centre. .

-
4. Combine the existing traffic volumes and the traffic generated by the Bannockburn growth Area to obtain "post-development" traffic volumes for the ultimate (2036) traffic scenario.

1.3 Assessment of Existing Traffic Volumes

Existing conditions traffic data was sourced from various sources to inform the excel traffic model for the Bannockburn Growth Area and subsequent Bannockburn Transport Strategy. These sources included Cardno collected turning movement counts and speed / volume surveys traffic survey data.

1.4 Modelling Assumptions

The following assumptions were used in regard to the ultimate (2036) development scenario:

1. 100% of the Bannockburn Growth Area has been fully developed.
2. No changes to the existing road network has occurred between the time the existing conditions were surveyed and the 2036 modelling year.
3. The traffic generation rates taken from the RMS Guide to Traffic Generating Developments do not change between 2013 and 2036.
4. Whilst this Bannockburn Transport Strategy will recommend further investigations on additional strategic road network access proposals, this traffic modelling exercise assumes that proposals of this nature have not been implemented. These include but may not be limited to:
 - Alternative access across the railway line to Midland Highway;
 - Improvements to Burnside Road south of the Bannockburn Urban Design Investigation Area;
or
 - Heavy vehicle bypass options.

2 Land Use Inputs

Precinct demographic data for the Bannockburn Growth Area was sourced from the Bannockburn Town Centre Investment Strategy and Bannockburn Urban Design Framework in relation to the ultimate development scenario.

2.1 Commercial Land Use

Bannockburn Town Centre Investment Strategy sets out future commercial and retail land use sizes and allocates Gross Floor Area (GFA) to blocks within the Bannockburn Town Centre. The below figures illustrate the proposed locations and sizes of the commercial and retail blocks. Furthermore, the below figure highlights the nominal ultimate commercial and retail land use GFA's

Figure 2-1 Ultimate commercial and retail block locations

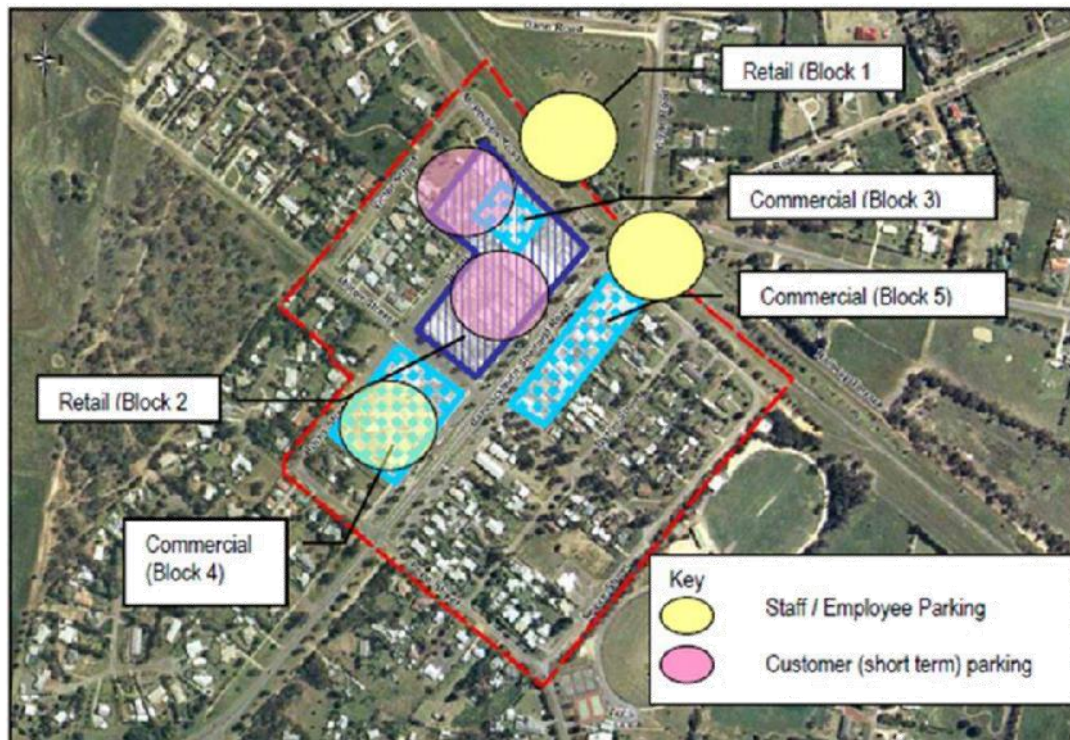


Table 2-1 Future commercial and retail land use GFA's

Use	Total Gross Buildable Floor Area
Retail (Block 1)	8750sq.m
Retail (Block 2)	5450sq.m
Total Retail	14,200sq.m
Commercial (Block 3)	4500sq.m
Commercial (Block 4)	8175sq.m
Commercial (Block 5)	5300sq.m
Total Commercial	17,975sq.m
Total Commercial and Retail	32,175sq.m

2.2 Residential Land Use

Bannockburn Urban Design Framework sets out areas within Bannockburn Growth Area for high, medium and low density suburbs to accommodate future population growth within Bannockburn. There is also additional scope for increased densities at strategic locations near schools and recreation facilities. The capacity of Bannockburn's future population and growth locations are illustrated and summarised in below.

Figure 2-2 Bannockburn future population and growth locations

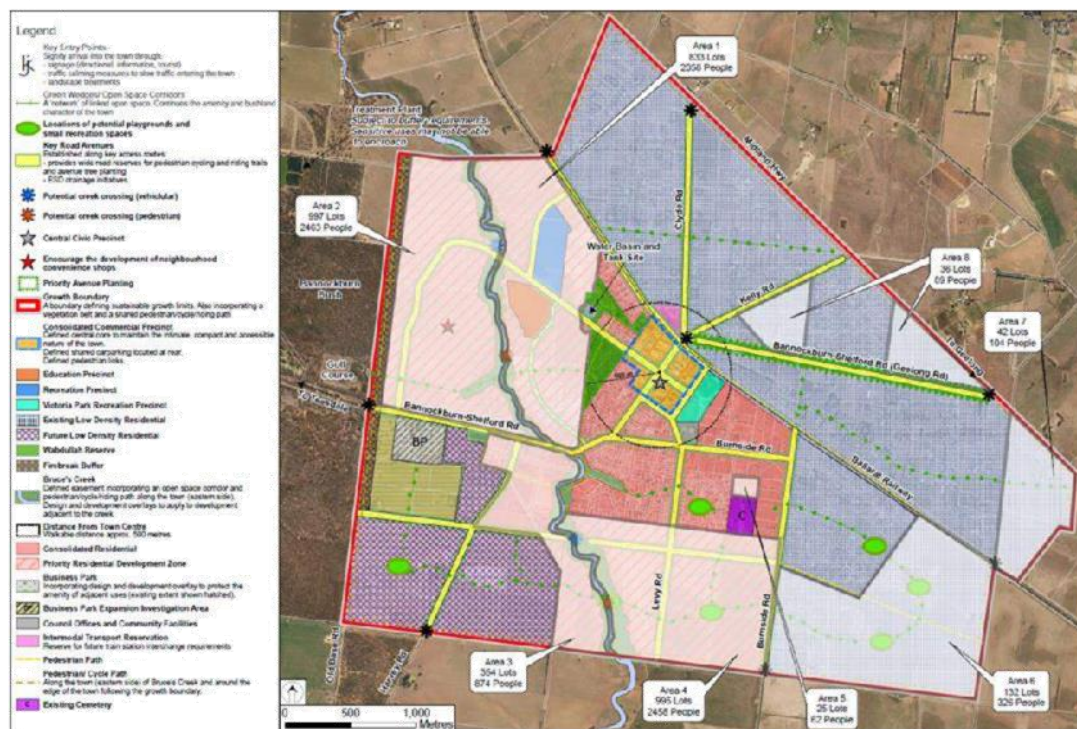


Table 2-2 Summary of population growth and areas

Location	Use	Lots	People
Area 1	Residential Low Density	483*	1,193
Area 2	Residential Low Density	997	2,463
Area 3	Residential Low Density	354	674
Area 4	Residential Low Density	995	2,458
Area 5	Residential Low Density	25	62
Area 6	Residential Low Density	26*	64
Area 7	Residential Low Density	42	104
Area 8	Residential Low Density	36	89
	Total	2,958	7,107

* The number of lots has been adjusted from Figure 2-2 to reflect the existing housing growth which has occurred within residential growth areas 1 and 6, with forecast lot growth reduced by 42% and 80% respectively.

3 Assessment of the Bannockburn Growth Area Traffic Generation Rates

3.1 Overview

The Bannockburn Growth Area assessment involved applying traffic generation rates to the proposed land uses and distributing the trips onto the wider road network. The following subsections discuss the adopted traffic generation rates and the traffic distribution methodology.

3.2 Adopted Traffic Generation Rates

The adopted traffic generation rates for the various proposed land uses have been sourced from rates taken from the New South Wales Roads and Maritime Services (RMS) "Guide to Traffic Generating Developments" document. The rates adopted for the various land uses are outlined in the following subsections.

3.2.1 Residential Dwellings

The RMS guide suggests an average peak hour trip rate of 0.78 trips per dwelling and a maximum of 0.9 trips per dwelling in regional areas for low density residential in the PM peak hour and 0.71 trips and a maximum 0.85 in the AM peak hour. To determine a trip rate per dwelling to be used within the Bannockburn Transport Study for future growth, an assessment was made on developments within the RMS guide which had attributes similar to the Bannockburn Growth Area. The below table shows the size and location of the developments assessed within the RMS "Guide to Traffic Generating Developments".

Table 3-1 Assessed low density residential developments taken from RMS "Guide to Traffic Generating Developments"

Location	Goonellabah	Calare	Glenfield Park
No, of Dwellings	556	697	554
Population	1378	2037	1391
Peak vehicle trips Per Dwelling	0.8	0.97	0.87

Based on the above traffic generation assessment Cardno has adopted a traffic generation rate of 0.85 trips per dwelling in the AM peak hour and 0.9 trips per dwelling in the PM peak hour. Cardno has adopted the maximum traffic generation rate for the AM and PM peak periods due to Bannockburn having limited access to public and active transport and high car dependency.

3.2.2 Commercial Office

The RMS guide suggests a morning AM peak hour vehicle trip rate of 1.6 trips per 100 SQM of gross floor area for office blocks and 1.2 trips per 100 SQM of gross floor area in the afternoon PM peak hour. To determine a trip rate per 100 SQM of gross floor area to be used within the Bannockburn Growth Area for future growth an assessment was made on developments within the RMS guide which had attributes similar to Bannockburn. The below table shows the size and location of the developments assessed within the RMS "Guide to Traffic Generating Developments".

Table 3-2 Assessed regional office developments taken from RMS "Guide to Traffic Generating Developments"

Location	Norwest	Newcastle	Wollongong
Size (sqm)	1200	12182	12921
Weekday AM Peak Hour			
Trips	34	172	158
Trips/100m2 GFA	2.83	1.41	1.22
Weekday PM Peak Hour			
Trips	14	139	100
Trips/100m2 GFA	1.17	1.57	0.99

Based on the above trips generated per 100 SQM of gross floor area for each of the assessed office developments an average rate of trips per AM and PM peak hour can be determined. The average AM and PM peak hour trips generated for the office development are summarised below.

Table 3-3 Regional office developments taken from RMS "Guide to Traffic Generating Developments" average traffic generation rates

Calculated Traffic Generation Rates for Rural Office Developments	
Time	Calculated Rate
Weekday AM Peak	1.82
Weekday PM Peak	1.24

The summarised results in above indicate an AM peak hour traffic generation rate of 1.82 vehicle trips per 100 SQM of gross floor area and 1.24 vehicle trips per 100 SQM in the PM peak hour.

Cardno will be adopting the above traffic generation rates for commercial office within this study.

3.2.3 Retail

Based on the nature of the Bannockburn Growth Area and the mixture of retail uses, Cardno has undertaken an assessment of the retail component of the Bannockburn Town Centre developments based on a shopping centre traffic generation rate.

The New South Wales Roads and Maritime Services (RMS) "Guide to Traffic Generating Developments" conducted extensive surveys of shopping centres in 2011 involving ten large shopping centres, seven in the Sydney metropolitan area and one each at Mittagong, Shellharbour and Tuggerah. Peak hour trip generation rates are as follows.

Table 3-4 RMS "Guide to Traffic Generating Developments shopping centre traffic generation rates

Range in Total Floor Area (GLFA – m ²)	Peak Hour Generation Rate (vehicles per 100m ² GLFA)			
	Thursday (V(P)/A)	Friday (V(P)/A)	Saturday PVT (A)	Sunday
0 – 10,000	12.3	12.5	16.3	
10,000 – 20,000	7.6 (6.2)	6.2 (6.7)	7.5 (7.5)	(6.6)
20,000 – 30,000	5.9 (6.0)	5.6 (5.9)	7.5 (7.0)	(6.3)
30,000 – 40,000	4.6	3.7	6.1	
40,000 – 70,000	(4.4)	(4.4)	(5.5)	(4.6)
70,000+	(3.1)	(4.0)	(3.6)	(3.2)

* Figures in brackets refer to 2011 surveys.

In order to assess the likely traffic generation of the Bannockburn Growth Area, Cardno will assume each block operates as one large shopping precinct for the ultimate case. When applying a traffic generation rate for retail, Cardno will be utilising the 2011 Thursday and Saturday peak hour traffic generation rates in the table above and applying a rate based on the total commercial gross floor area for the Bannockburn Growth Area as also shown above.

Based on the total commercial gross floor areas calculated for the Bannockburn Growth Area above (32,175sqm), the adopted traffic generation rates per 100sqm of gross floor area that Cardno will utilise within this study is as follows.

Table 3-5 Ultimate case adopted retail traffic generation rates /100sqm GFA

Traffic Generation Rate / 100sqm GFA		
Weekday AM Peak	Weekday PM Peak	Saturday Peak
4.6	4.6	6.1

4 Traffic Generation and Distribution

4.1 Ultimate Case Traffic Generation

Cardno sourced the ultimate case developments proposed for the Bannockburn Growth Area including residential and commercial from the Bannockburn Urban Design Framework and the Town Centre Investment Strategy.

In order to model the ultimate case traffic generation Cardno, in conjunction with Golden Plains Shire Council determined the commercial use splits between retail and office for the ultimate case to apply traffic generation rates to obtain ultimate traffic generation volumes. The determined splits per commercial block are as follows.

Table 4-1 Ultimate case commercial land use split per block

Block	Commercial Use		
	Office	Retail	Total
Retail Block 1	20%	80%	100%
Retail Block 2	20%	80%	100%
Commercial Block 3	10%	90%	100%
Commercial Block 4	30%	70%	100%
Commercial Block 5	30%	70%	100%

By applying the above commercial use splits to the ultimate development scenario, Cardno calculated the ultimate commercial GFA for the Bannockburn growth Area. The ultimate commercial GFA's per use are highlighted below.

Table 4-2 Ultimate case commercial GFA's

Location	Use	Total (GFA)
Block 1	Commercial (GFA SQM)	8750
	Commercial (Office SQM)	1750
	Commercial (Retail SQM)	7000
	Commercial (Supermarket SQM)	0
Block 2	Commercial (GFA SQM)	5450
	Commercial (Office SQM)	1090
	Commercial (Retail SQM)	4360
	Commercial (Supermarket SQM)	0
Block 3	Commercial (GFA SQM)	4500
	Commercial (Office SQM)	450
	Commercial (Retail SQM)	0
	Commercial (Supermarket SQM)	4050
Block 4	Commercial (GFA SQM)	8175
	Commercial (Office SQM)	2453
	Commercial (Retail SQM)	5723
	Commercial (Supermarket SQM)	0
Block 5	Commercial (GFA SQM)	5300
	Commercial (Office SQM)	1590
	Commercial (Retail SQM)	3710
	Commercial (Supermarket SQM)	0

Based on the adopted traffic generation rates and applying the adopted rates to the proposed residential developments and commercial developments, the resulting peak hour traffic generations for the Bannockburn Growth Area are summarised below.

Table 4-3 Ultimate weekday AM peak hour traffic generation

Ultimate AM Peak Hour Traffic Generated					
Location	Residential	Office	Retail	Supermarket	Total
Block 1	0	32	322	0	354
Block 2	0	20	201	0	220
Block 3	0	8	0	186	194
Block 4	0	45	263	0	308
Block 5	0	29	171	0	200
Area 1	411	0	0	0	411
Area 2	847	0	0	0	847
Area 3	301	0	0	0	301
Area 4	846	0	0	0	846
Area 5	21	0	0	0	21
Area 6	22	0	0	0	22
Area 7	36	0	0	0	36
Area 8	31	0	0	0	31

Table 4-4 Ultimate weekday PM peak hour traffic generation

Ultimate PM Peak Hour Traffic Generated					
Location	Residential	Office	Retail	Supermarket	Total
Block 1	0	22	322	0	344
Block 2	0	14	201	0	214
Block 3	0	6	0	186	192
Block 4	0	30	263	0	294
Block 5	0	20	171	0	190
Area 1	435	0	0	0	435
Area 2	897	0	0	0	897
Area 3	319	0	0	0	319
Area 4	896	0	0	0	896
Area 5	23	0	0	0	23
Area 6	24	0	0	0	24
Area 7	38	0	0	0	38
Area 8	32	0	0	0	32

Table 4-5 Ultimate Saturday peak hour traffic generation

Ultimate Saturday Peak Hour Traffic Generated					
Location	Residential	Office	Retail	Supermarket	Total
Block 1	0	0	427	0	427
Block 2	0	0	266	0	266
Block 3	0	0	0	247	247
Block 4	0	0	349	0	349
Block 5	0	0	226	0	226
Area 1	358	0	0	0	358
Area 2	738	0	0	0	738
Area 3	262	0	0	0	262
Area 4	736	0	0	0	736
Area 5	19	0	0	0	19
Area 6	20	0	0	0	20
Area 7	31	0	0	0	31
Area 8	27	0	0	0	27

4.2 Ultimate Case Traffic Distribution

To determine the distribution of traffic from the ultimate proposed developments within Bannockburn Growth Area, Cardno has applied the following peak hour traffic distribution splits per use to ensure the ultimate traffic model represents the future road network traffic movements into/out of the Bannockburn Growth Area. The traffic distribution splits applied by Cardno for residential and commercial uses are as follows.

Table 4-6 Peak hour traffic distribution splits

Use	AM In	AM Out	PM In	PM Out	Sat In	Sat Out
Residential	20%	80%	60%	40%	50%	50%
Office	90%	10%	10%	90%	50%	50%
Retail	50%	50%	50%	50%	50%	50%
Supermarket	50%	50%	50%	50%	50%	50%

By applying the peak hour distribution rates to the ultimate case traffic generated, Cardno has determined the following ingress and egress traffic distributions for the ultimate case development scenario for Bannockburn Growth Area for the AM weekday peak hour, for the weekday PM peak hour the Saturday peak hour.

Table 4-7 Weekday AM peak hour traffic distribution

Location	Residential		Office		Retail		Supermarket		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out
Block 1	0	0	29	3	161	161	0	0	190	164
Block 2	0	0	18	2	100	100	0	0	118	102
Block 3	0	0	7	1	0	0	93	93	101	94
Block 4	0	0	40	4	132	132	0	0	172	136
Block 5	0	0	26	3	85	85	0	0	111	88
Area 1	82	329	0	0	0	0	0	0	82	329
Area 2	169	678	0	0	0	0	0	0	169	678
Area 3	60	241	0	0	0	0	0	0	60	241
Area 4	169	677	0	0	0	0	0	0	169	677
Area 5	4	17	0	0	0	0	0	0	4	17
Area 6	4	18	0	0	0	0	0	0	4	18
Area 7	7	29	0	0	0	0	0	0	7	29
Area 8	6	24	0	0	0	0	0	0	6	24

Table 4-8 Weekday PM peak hour traffic distribution

Location	Residential		Office		Retail		Supermarket		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out
Block 1	0	0	2	20	161	161	0	0	163	181
Block 2	0	0	1	12	100	100	0	0	102	112
Block 3	0	0	1	5	0	0	93	93	94	98
Block 4	0	0	3	27	132	132	0	0	135	159
Block 5	0	0	2	18	85	85	0	0	87	103
Area 1	261	174	0	0	0	0	0	0	261	174
Area 2	538	359	0	0	0	0	0	0	538	359
Area 3	191	127	0	0	0	0	0	0	191	127
Area 4	537	358	0	0	0	0	0	0	537	358
Area 5	14	9	0	0	0	0	0	0	14	9
Area 6	14	10	0	0	0	0	0	0	14	10
Area 7	23	15	0	0	0	0	0	0	23	15
Area 8	19	13	0	0	0	0	0	0	19	13

Table 4-9 Saturday peak hour traffic distributions

Location	Residential		Office		Retail		Supermarket		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out
Block 1	0	0	0	0	214	214	0	0	214	214
Block 2	0	0	0	0	133	133	0	0	133	133
Block 3	0	0	0	0	0	0	124	124	124	124
Block 4	0	0	0	0	175	175	0	0	175	175
Block 5	0	0	0	0	113	113	0	0	113	113
Area 1	179	179	0	0	0	0	0	0	179	179
Area 2	369	369	0	0	0	0	0	0	369	369
Area 3	131	131	0	0	0	0	0	0	131	131
Area 4	368	368	0	0	0	0	0	0	368	368
Area 5	9	9	0	0	0	0	0	0	9	9
Area 6	10	10	0	0	0	0	0	0	10	10
Area 7	16	16	0	0	0	0	0	0	16	16
Area 8	13	13	0	0	0	0	0	0	13	13