Bannockburn
GROWTH FRAMEWORK PLAN
TRAFFIC NETWORK ASSESSMENT
AUGUST 2020

VICTORIA State Government

Victorian Planning Authority
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1 INTRODUCTION

1.1 PURPOSE

The Victorian Planning Authority (VPA) in partnership with Golden Plains Shire Council is preparing the Bannockburn Growth Plan (the Growth Plan) to guide the sustainable development of Bannockburn to the year 2050.

Bannockburn has a population of around 7,000 and is the largest town in Golden Plains Shire.

The town has consistently been one of the fastest growing regional areas in Victoria, mainly due to its affordable housing, infrastructure and proximity to Geelong.

The Growth Plan responds to the Minister for Planning’s support to review existing planning mechanisms to accommodate additional population growth and new employment opportunities in Bannockburn. It will provide a strategic basis for infrastructure and service planning as well as the sequencing and staging of land release.

This paper has been prepared to identify a possible future road network and arterial road options for investigation for Bannockburn. It provides an assessment of existing network conditions and investigates the need to expand the arterial road network to accommodate projected growth.

1.2 WHAT IS A GROWTH AREA FRAMEWORK PLAN?

1.2.1 Planning for Growth

The Growth Plan is a long-term land use plan for the current and future urban areas of Bannockburn. It is a broad high-level strategy that:

- Sets out a vision for Bannockburn.
- Guides sustainable growth and development over the next 30 years.
- Identifies the steps needed to manage growth.
- Defines key projects and infrastructure required to support growth.
- Provides a decision making framework for public and private investment.

The Growth Plan addresses key challenges to guide housing, employment, infrastructure, services and other opportunities for residents and visitors while ensuring Bannockburn becomes more accessible, sustainable and liveable. The Growth Plan aims to maintain and enhance the unique attributes of Bannockburn and sets a vision for how the urban area will grow and change until the year 2050.
1.2.2 Planning Context

Growth Area Framework Plans sit within the planning hierarchy that comprises a framework of State, regional and local policies.

Growth Area Framework Plans set the framework for urban growth based on the strategic directions of Regional Growth Plans. The relevant Regional Growth Plan for Bannockburn is the G21 Regional Growth Plan. They identify future precincts where more detailed planning work will take place in the future in the form of precinct structure plans or development plans.

In terms of their content, Growth Area Framework Plans show:

- broad land use patterns
- committed and proposed transport networks and regional open space
- significant waterways and areas of potential environmental sensitivity
1.2.3 Components of the Plan

The components of a Growth Area Framework Plan are described within the Victoria Planning Provisions (VPPs). In accordance with Clause 11 of the VPPs, Growth Area Framework Plans are required to:

1. **Identify the long-term pattern of urban growth.**
2. **Identify the location of broad urban development types, for example activity centre, residential, employment, freight centres and mixed-use employment.**
3. **Identify the boundaries of individual communities, landscape values and, as appropriate, the need for discrete urban breaks and how land uses in these breaks will be managed.**
4. **Identify the location of open space to be retained for recreation, and/or biodiversity protection and/or flood risk reduction purposes guided and directed by regional biodiversity conservation strategies.**
5. **Show significant waterways as opportunities for creating linear trails, along with areas required to be retained for biodiversity protection and/or flood risk reduction purposes.**
6. **Identify transport networks and options for investigation.**

In the preparation of the Growth Plan, each of the above-listed requirements is being investigated and draft findings are being developed. As set out in the purpose, the focus of this paper is the above-listed requirement 6, to identify transport networks and options for investigation.

1.3 TRANSPORT NETWORKS AND OPTIONS FOR INVESTIGATION

In accordance with Victorian Government policy, the Growth Plan will show a possible future transport network to meet the needs of future development and population growth.

The delivery and management of any particular infrastructure element in the Growth Plan may be a combination of State, local government or private sector (either as part of major developments or otherwise) responsibility. Responsibility will be subject to various agreements, obligations and protocols between Governments, infrastructure agencies and developers.

The Growth Plan will indicate existing and proposed major roads. In the case of Bannockburn, that will be limited to arterial roads and connector roads.

The location of the potential network options is indicative and will be considered as each option is investigated further and future transport needs are refined. Input will be provided into the development and review of structure plans to ensure that opportunities to accommodate future transport infrastructure are integrated with land use planning at a local and regional level.

The Growth Plan will show the regional public transport network, including potential network options that are to be subject to further investigation and assessment. Other network options may also be investigated over time in conjunction with other agencies, for example through the precinct structure planning process.

1.4 GROWTH PLAN INVESTIGATION AREA

A Growth Plan Investigation Area was derived based on development constraints to the north, east and west of the town. The investigation area extends to the south and west of the existing urban area of Bannockburn. The southern boundary of the investigation area is the Gheringhap to Maroona freight railway line. The western boundary is the Bannockburn recreation reserve. Refer Figure 1.
Figure 2  Regional Road and Rail Networks

Bannockburn Growth Plan - Traffic network assessment – August 2020

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2 EXISTING CONDITIONS

2.1 TRANSPORT NETWORKS

2.1.1 Arterial Roads

Bannockburn-Shelford Road is the arterial road through Bannockburn, which traverses the central town area as the local High Street and becoming Geelong Road through to the Midland Highway. Bannockburn-Shelford Road serves as the only district crossing of both Bruce’s Creek and the Geelong to Ballarat freight railway line, highlighting the lack of network resilience within Bannockburn (see Figure 2).

The bridge over Bruce’s Creek is at the western edge of the town and the railway level crossing is on the bend between High Street and Geelong Road at the north-western edge of the central commercial area.

Bannockburn-Shelford Road is a Declared Arterial Class C road and approved B-double route. It has a single traffic lane in each direction along most of its route plus local access service roads through the central town area. Bannockburn-Shelford Road and Geelong Road have a posted speed limit of 60km/hr through the central township, beyond which they transition to 80km/hr.

The Midland Highway bounds Bannockburn to the north, connecting Geelong through to Ballarat via Meredith. The intersection of Midland Highway and Geelong Road is controlled by a roundabout which marks the start of the Bannockburn township.

Further south of Bannockburn and accessed via local roads (Burnside Road and Harvey Road) is the Hamilton Highway, which connects Geelong through to Hamilton via Mortlake.

Both Midland Highway and Hamilton Highway are identified on Victoria’s Draft Principal Freight (Road) Network (PFN), currently under review by DoT. Bannockburn-Shelford Road is not identified on the Draft PFN, but is acknowledged as a key freight pathway between Skipton and Geelong.

2.1.2 Planned Traffic Projects

Midland Highway Duplication

The State Government is currently investigating options for the duplication of the Midland Highway in the section between Bannockburn and Geelong. The options under investigations are shown in Figure 3 below.

Figure 3 Midland Highway upgrade options
Figure 4  Bannockburn-Shelford Truck Traffic Count Locations

Victorian Planning Authority
Midland Highway / Clyde Road Roundabout:
The intersection of the Midland Highway and Clyde Road has been identified as a safety concern by Council and the local community. Funding has been secured to upgrade this intersection to a roundabout to improve safety and support growth in Bannockburn.

Bannockburn-Shelford Road Roundabout
The Geelong Road / Clyde Road / Kelly Road intersection has been identified as a safety problem by road authorities and the local community. Funding has been secured to upgrade this intersection and construction of a roundabout is anticipated to commence shortly.

2.1.3 Local Roads
The existing local road network includes the main connector roads to/from the town such as Clyde Road, Kelly Road, McPhillips Road, Burnside Road and Harvey Road. Within the township, new and older local residential streets include Milton Street, Moreillon Boulevard, Pope Street and Moore Street.

2.1.4 Railways
The Geelong-Ballarat railway line traverses through Bannockburn on a north-west alignment. The line is managed by V-Line and is currently used for freight. Further south of the town is the Gheringhap to Maroona freight railway line connecting to the State's central west. Both these rail lines are identified on Victoria’s Draft Principle Freight (Rail) Network.

The regional road and rail network is shown in Figure 2.

2.2 TRAFFIC CONDITIONS

2.2.1 Traffic Counts
Traffic count data for Bannockburn and the surrounding area has been collated from the following sources.

- Existing Conditions & Issues and Opportunities Assessment Report, Cardno (Jan 2019), prepared for Council (refer Table 1 and Chart 1)
- Automatic Traffic Count Data, undertaken by DoT in 2019 (to supplement Cardno truck traffic counts, refer Chart 1)
- Arterial Road Traffic Volume data via the DoT Open Data portal (to supplement count data as required)

The locations of Bannockburn-Shelford Road truck counts are shown in Figure 4.
### Table 1 – Traffic Count Summary

<table>
<thead>
<tr>
<th>Road</th>
<th>Location of count</th>
<th>Location context</th>
<th>AM Peak (veh/hr)</th>
<th>Daily Traffic (veh/day)</th>
<th>Daily Trucks (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelford-Bannockburn Road</td>
<td>West of Harvey Road</td>
<td>west of township</td>
<td>429</td>
<td>5441</td>
<td>716 (13%)</td>
</tr>
<tr>
<td>High Street</td>
<td>South of McPhillips Street</td>
<td>main section before railway line</td>
<td>946</td>
<td>10365</td>
<td>864 (8%)</td>
</tr>
<tr>
<td>Geelong Road</td>
<td>East of Francis Court</td>
<td>midway along road</td>
<td>900</td>
<td>9659</td>
<td>1120 (12%)</td>
</tr>
<tr>
<td>Clyde Road</td>
<td></td>
<td></td>
<td>95</td>
<td>1428</td>
<td>136 (10%)</td>
</tr>
<tr>
<td>Kelly Road</td>
<td></td>
<td></td>
<td>53</td>
<td>448</td>
<td>61 (14%)</td>
</tr>
<tr>
<td>Burnside Road</td>
<td>South of Yverdon Dr</td>
<td>at the bend</td>
<td>130</td>
<td>1444</td>
<td>170 (12%)</td>
</tr>
<tr>
<td>Levy Road</td>
<td>between Fenwich Fwy and Dalruin Dr</td>
<td>south of Burnside Rd</td>
<td>42</td>
<td>447</td>
<td>25 (6%)</td>
</tr>
<tr>
<td>Harvey Road</td>
<td>South of Ormond St</td>
<td>midway along road</td>
<td>84</td>
<td>939</td>
<td>100 (11%)</td>
</tr>
<tr>
<td>Pope Street</td>
<td>btw Byron St and Moore St</td>
<td>east of High Street</td>
<td>116</td>
<td>1474</td>
<td>65 (4%)</td>
</tr>
</tbody>
</table>
2.2.3 Heavy Vehicles

Pathways

Bannockburn is located on an important east-west freight pathway. To the south-east, the main destination is either Greater Geelong or beyond to Melbourne via the M1 Freeway. To the west, Bannockburn-Shelford Road is fed by the network of arterial and local roads throughout the Central Highlands and other southern and western parts of the State. Some of the freight generating activity around Bannockburn and in the broader Central West of Victoria include:

- Colac Otway – Agriculture & timber
- Golden Plains – Intensive agriculture, broad acre grain farming, pig and poultry farming
- Geelong – Advanced manufacturing
- Surf Coast – Agriculture

An analysis of regional traffic movements has been carried out using the DoT Open Data portal, which indicates that through Bannockburn:

- Heavy vehicle traffic increases between Rokewood-Shelford Road and Bannockburn-Shelford Road, which could signify that heavy vehicle traffic is being generated in the area around Shelford/Teesdale. (approximately 10 to 17 km west of Bannockburn)
- Some heavy vehicle traffic is generated by local industrial uses at the Holder Road business park (at the western edge of town).
- Some heavy vehicle traffic is generated by local intensive agriculture (e.g. broiler farms).
- Some heavy vehicle traffic supplies the town shopping centre.
- In addition to Bannockburn-Shelford Road, heavy vehicles are using Burnside Road (11% trucks) and Harvey Road (13% trucks).
- There is a low usage of Inverleigh-Shelford Road by heavy vehicles, suggesting that drivers are not using this route to access the Hamilton Highway to the south.
- Heavy vehicle traffic in the west (including along Colac-Ballarat Road) could be generated by timber plantations in the proximity of Enfield State Park. (approximately 45km north west of Bannockburn)

2.2.2 Travel Behaviour

The travel patterns of Bannockburn residents have been analysed using Australian Bureau of Statistics (ABS) data. Place of Work data for the Bannockburn township (SA2 level) reveals that residents work in:

Geelong 56%  Bannockburn 18%

Bannockburn is located 20-25 minutes’ drive from Geelong, so the above data is consistent with its location. Destinations within Geelong include such suburbs as North Geelong, Corio-Norlane and Lara.
2.3 ISSUES AND OPPORTUNITIES

2.3.1 Previous Investigations

Council engaged transport consultants Cardno to prepare the *Existing Conditions and Issues and Opportunities Report* (2019) for Bannockburn. This report was prepared prior to the commencement of the Growth Plan and provides a range of useful information that has been used in defining the transport needs associated with the Growth Plan outlined in this paper. Specifically, the Cardno traffic data has been used as the basis for existing traffic conditions and analysis as detailed in subsequent chapters of this paper.

The sections below summarise some of Cardno’s key findings. In summary, the Cardno investigations highlight that the transport network in Bannockburn is, in many ways sub-standard and not suitable to meet the needs of the growing community and other passing traffic.

For completeness, excerpts from the Cardno report have been reproduced here in full, but the VPA has not adopted individual recommendations, each of which will be assessed on their merits in the context of the Growth Plan.

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**Previous Bypass Study**

Anecdotally, the presence of heavy vehicle traffic on High Street, the main activity centre of the town, has been recognised by Council and residents as a significant issue due to amenity and safety concerns.

In response, Council commissioned a Heavy Vehicle Alternative Route Study in 2013. The report prepared by GHD consultants included consultation with the community, businesses and the freight industry. In summary the report found that:

- In 2013, heavy vehicle traffic along the route increased from 470 trucks per day west of the town to 810 trucks per day through the centre of town.
- 70% of freight and transport industry respondents indicated their support for an alternative route around Bannockburn.
- The main destinations of trucks were Geelong, Mount Gambier, Melbourne, Bannockburn and surrounds.
- Trucks travel through Bannockburn to save time and fuel as it is a direct route and a B-double route.
- Freight industry representatives wanted a quicker route through to Geelong, improved pedestrian safety, the opportunity to refresh/rest, and a route that was as short as possible with no need for enforcement.
- 70% of community respondents indicated that an alternative heavy vehicle route would have a positive impact on Bannockburn.
- The community wants the improvement of amenity within the town centre by removing heavy vehicles, and a route that minimises losses of native vegetation and impacts on local business.
- 40% of businesses in the town centre estimated that they were not reliant on passing traffic, and 14% estimated that between 10–30% of their monthly business was from passing trade.
- 76% of businesses believed that an alternate heavy vehicle route would have no effect on their business, while 17% said it would have a positive impact.

A summary of the outcomes of the bypass route investigations is presented in Chapter 5.1.1.
2.3.2 Cardno Findings - Traffic and Road Network

Issues

- There are currently a high number of heavy vehicles that utilise Bannockburn-Shelford Road and travel through the town centre.
- There are a high number of service road entry and exit points along High Street, creating conflict points.
- The intersection of Geelong, Clyde and Kelly Roads has unsafe sightlines and confusing priority.
- The volume of traffic on Geelong Road in peak hours makes it difficult for vehicles to egress from side roads.
- Speeding vehicles are creating safety problems for motorists and pedestrians.
- The limited public transport opportunities promote car usage.

Opportunities

- Upgrade road network to ensure future traffic volumes are catered for and do not have adverse impacts.
- Consider upgrading key intersections such as at Geelong/Clyde & Kelly Roads, Clyde Road & Midland Highway, Bannockburn-Shelford and Burnside Roads, Bannockburn-Shelford Road & Moreillon Boulevard, and Milton and Burns Streets.
- Improve Charlton Road/Levy Road intersection including southern extension of Levy Road to support development south of Charlton Road.
- Review road hierarchy so that it remains appropriate for nature of traffic characteristics as development increases.
- Investigate speed reduction in certain areas.
- Consider investigating and altering service road access points in the town centre.
- Review proposed road network to ensure it remains appropriate for location and nature of future development, including links over Bruce’s Creek.
- Consider a route to detour heavy vehicles away from High Street.
- Consider extending High Street service roads south of Pope Street.

2.3.3 Cardno Findings - Public Transport

Issues

- Extremely limited bus services
- Only one bus stop within Bannockburn, at corner of High Street and McPhillips Road, with another stop just south of Geelong Road on the Midland Highway.
- Existing bus timetables makes it unfeasible for residents to commute to Geelong or Melbourne.
- The majority of dwellings are not within an acceptable walking distance to a bus stop.
- Bannockburn railway station is currently not in operation, limiting travel options for residents and workers.

Opportunities

- Consider the advantages and disadvantages of extending the PTV local bus service to include a wider catchment in Bannockburn.
- Advocate for additional bus services for Bannockburn which would make commuting to Geelong and possibly Melbourne by bus feasible for residents.
- Consider a Council/community funded shuttle bus for residents to the High Street bus interchange.
- Ensure future school bus services meet demand.
- Consider the long-term option of reopening passenger rail from Bannockburn to Geelong.
2.3.4 Cardno Findings - Pedestrian and Cycling Network

**Issues**

- Lack of safe pedestrian crossings on High Street, with a high volume of vehicles reducing the ability of pedestrians to cross the road.
- There are no safe crossings at the intersection of Clyde, Kelly and Geelong Roads.
- Pedestrian links on Clyde and Kelly Roads are inconsistent.
- Pedestrian links are missing on sections of Burnside and Charlton Roads.
- There are no safe pedestrian crossings on Burnside Road.
- Missing shared path link between Burnside Road and the western growth area along Bannockburn-Shelford Road.
- There is currently only one pedestrian crossing over the rail line.
- There’s a lack of on or off-road bicycle paths on key arterial links connecting to or through the town centre.
- Missing bicycle path links on Burnside Road and Pope Street.

**Opportunities**

- Strengthen pedestrian and cycling connections throughout Bannockburn.
- Provision of off-road shared paths on key connectivity routes identified within Bannockburn.
- Provision of new or improved pedestrian paths on existing and future links, including Clyde and Kelly Roads between Geelong Road and the Midland Highway, Bannockburn-Shelford Road west of Moreillon Boulevard, Moore Street, Byron Street, Burnside Road, and Charlton Road.
- Improving connectivity across Bruce’s Creek.
- Improve pedestrian and cyclist crossing points along key roads.
- Investigate potential for a shared pathway along the Midland Highway to Lethbridge and Batesford.
- Investigate the need and suitable location of a second pedestrian crossing point of the rail line.
2.3.5 Cardno Findings – Car Parking

**Issues**
- No undercover parking in the town centre.
- 10% of parking in town centre timed, reducing turnover.
- Parking along both sides of narrow residential streets impacting two-way traffic flow.
- Parking issues identified during specific events in town centre such as market days.

**Opportunities**
- Review on and off-street parking in town centre to allow mixture of timed and unrestricted parking to cater for all user needs.
- Ensure future developments provide parking in line with the planning scheme.
- Investigate and identify additional areas for off-street parking in the town centre.

2.4 SUMMARY

The existing conditions analysis shows that:
- High Street in central Bannockburn is carrying approximately 10,365 vehicles per day (veh/day), of which 8% are heavy vehicles.
- Geelong Road is carrying approximately 9,659 veh/day, of which 12% are heavy vehicles.
- West of the central town, Bannockburn-Shelford Road is carrying approximately 5,441 veh/day, of which 13% are heavy vehicles.
- A significant proportion of heavy vehicles through Bannockburn are semi-trailers and B-doubles.
- Truck volumes through Bannockburn fluctuate significantly over the year, which could be explained by forestry and agriculture harvest times. Small and medium trucks showed the most variance, with large trucks having the most-steady volumes across the year.
- The 2013 bypass study indicated a positive overall response to the idea of an alternative heavy vehicle route around Bannockburn.
3 GROWTH PLAN OVERVIEW

The Growth Plan will identify three potential growth areas which will include mainly residential land uses, as shown in Figure 5. The inclusion of some retail, commercial and industrial land uses is still under investigation.

The Growth Plan will set a land use planning framework to support the town’s long-term growth including approximately 8,700 additional dwellings and 25,000 additional residents, as detailed in Table 2. For context, the current Bannockburn township comprises approximately 2,000 dwellings.

<table>
<thead>
<tr>
<th>Growth area precinct</th>
<th>Total land (ha)</th>
<th>Developable land (ha)</th>
<th>Number of Dwellings</th>
<th>Est Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East growth area</td>
<td>490</td>
<td>294</td>
<td>3,528</td>
<td>10,408</td>
</tr>
<tr>
<td>South West growth area</td>
<td>558</td>
<td>335</td>
<td>4,018</td>
<td>11,852</td>
</tr>
<tr>
<td>North West growth area</td>
<td>164</td>
<td>98</td>
<td>1,181</td>
<td>3,483</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>1212</strong></td>
<td><strong>727</strong></td>
<td><strong>8,726</strong></td>
<td><strong>25,743</strong></td>
</tr>
</tbody>
</table>
Figure 6  Bannockburn Draft Connector Road Network Skeleton
4 DESIGNING THE ROAD NETWORK

4.1 KEY REQUIREMENTS

As set out in Chapter 1.2, the key requirements of the Growth Plan process are to:

1. Identify the long-term pattern of urban growth.
2. Identify the location of broad urban development types, for example activity centre, residential, employment, freight centres and mixed-use employment.
3. Identify the boundaries of individual communities, landscape values and, as appropriate, the need for discrete urban breaks and how land uses in these breaks will be managed.
4. Identify the location of open space to be retained for recreation, and/or biodiversity protection and/or flood risk reduction purposes guided and directed by regional biodiversity conservation strategies.
5. Show significant waterways as opportunities for creating linear trails, along with areas required to be retained for biodiversity protection and/or flood risk reduction purposes.
6. Identify transport networks and options for investigation.

The items listed 1–5 above broadly cover matters of land use, regional open space, waterways and areas of environmental sensitivity. VPA has commenced and is continuing with preliminary investigations in these areas. The detailed assessment of the transport network investigations (item 6) is set out in the balance of this document.

4.2 OVERALL APPROACH

When designing and building the ultimate growth area network, transport infrastructure must be provided that can deliver the desired road function to an acceptable level of service for all transport modes.

With this ultimate goal in mind, a preliminary skeleton of connector and arterial roads has been developed through the process set out below.

As mentioned in Chapter 1.3, the consideration of the road network under a Growth Framework Plan is undertaken at a high level, sufficient to show a possible future transport network to meet the needs of future development and population growth.

The location of the potential network options is indicative and will be considered as each option is investigated further and future transport needs are determined. Input will be provided into the development and review of structure plans to ensure that opportunities to accommodate future transport infrastructure are integrated with land use planning at a local and regional level.
4.3 CONNECTOR ROADS

The Bannockburn network of connector roads has been developed through the following process:

- Build on the existing local road network
- Create future road links at suitable spacings
- Additional connector level creek crossings provided in the north and south
- Additional capacity provided by utilising and extending existing local streets into the growth area

Current connector roads within Bannockburn include Milton Street, Clyde Road, Kelly Road, Burnside Road and Harvey Road. Harvey Road and Burnside Road are identified as being suitable connector roads to service the growth areas to the south on both the eastern and western sides of Bruce’s Creek. Improvements and extensions of Levy Road and Ormond Street south could provide additional connectors in the southern growth area. A connector street with a creek crossing has been included for the southern third of the growth area, and an additional creek crossing is recommended to extend from Milton Street in the north, before turning towards the business park in the south.

Ultimately the connector road network will be designed to support and align with the arterial road network, so it may be modified subject to the outcomes of arterial road planning. The preliminary connector road network skeleton is presented in Figure 6.

4.4 ARTERIAL ROADS

4.4.1 Purpose

Bannockburn-Shelford Road–Geelong Road is currently the only arterial route through Bannockburn. Moreover, it provides the only crossing of the Ballarat railway line and Bruce’s Creek in the vicinity of the town.

The planned residential precincts will increase traffic through the town and with the current road configuration, most traffic will use Bannockburn-Shelford Road to access external destinations such as Geelong and Ballarat.

The fundamental issue to be resolved through the Growth Plan process, is whether an additional arterial road in or around the township is warranted, and if so where it should go.

In considering these questions, the key matters of safety, amenity, sustainability, capacity and access have been reviewed.
4.4.2 Existing Traffic Issues

Bannockburn-Shelford Road’s ability to meet the demands of increased traffic must consider existing traffic issues affecting the town:

- The route is an important freight path between the Central Highlands and the Midland Highway so significant levels of truck traffic, including large trucks (semi-trailers and B-doubles) currently utilise the route to travel to/from Geelong and Melbourne.
- The Bannockburn-Shelford Road service roads through the central township (known locally as High Street) are not designed to current standards of safety.
- Traffic volumes along Geelong Road make turning into/out of side roads difficult and unsafe during peak periods.

An alternative arterial route for heavy vehicles provides an opportunity to improve general traffic operations and safety in the township.

4.4.3 Existing High Street Amenity

Bannockburn-Shelford Road through Bannockburn is the town High Street and local access route.

Due to its regional function as an arterial route and freight pathway, High Street has been built to design standards that favour higher-speed motorised traffic.

As a result, the town centre streetscape environment is less favourable to walking and cycling.

In addition to facilitating the growth of the Bannockburn community, the Growth Plan presents an important opportunity to improve the safety and amenity of the central township.

4.4.4 Balancing Movement and Place

The Department of Transport (DoT) Movement and Place framework recognises that streets not only keep people and goods moving, they’re also places for people to live, work and enjoy. DoT defines three principles in their approach to transport planning:

**People First**

- There is a need to view transport systems from the perspective of a variety of different users.
- People need to be included in the design and decision making.
- Outcomes focused
- Deliver more choice, connections and confidence in travel.
- All tools need to be used and improved upon.

**One system**

- Think of transport as one system, not as individual projects or modes.
- Consider all transport modes.

Movement and Place views transport links as not only utilities to move people from A to B, but as destinations in themselves. Movement and Place seeks to understand the needs of transport users and potential solutions in local contexts.

In Bannockburn’s High Street, there is a clear imbalance in the existing movement and place priorities, with the needs of regional traffic overshadowing the needs of the local community. The Growth Plan presents an important opportunity to facilitate placemaking improvements in the central township.
4.4.5 Understanding the Needs of Freight

DoT’s Draft Principal Freight Network (PFN) does not identify Bannockburn-Shelford Road as a freight route. Nonetheless, the route serves an important freight function that must inform the network planning for the investigation area.

The 2013 bypass study revealed that the directness of the route and the associated fuel/travel time savings are the main reason for its use by truck drivers. The study also revealed an appetite amongst the freight and transport community for an alternative route around Bannockburn for reasons that include concern for pedestrian safety.

The existing conditions analysis set out in Chapter 2 shows that heavy vehicle traffic through Bannockburn ranges from approximately 700 - 1,235 trucks per day, depending on the location and time of year. As an approved B-double route, it carries in the range 250-310 large trucks per day.

The significant volumes of heavy vehicle traffic along Bannockburn-Shelford Road will be impacted by the increases in local traffic generated by the Growth Plan and must be considered in network planning.

4.4.6 Planning for Public Transport

Rural and regional public transport aims to provide a network of core rail and coach services connecting regional centres and metropolitan Melbourne. Local services aim to provide for local buses, taxis and school bus services.

Bannockburn's relationship to Geelong is highlighted by the Place of Work data presented in Chapter 2.2.2, which shows that approximately 56% of Bannockburn residents travel to Geelong for work. To provide sustainable travel options for these journeys, network planning should aim to improve connections to Geelong via rail (by reopening the passenger service), and by bus via expanded PTV and V/Line bus services.

It is the role of the Growth Plan to consider not just what new public transport networks will be provided, but also how new development will impact the services that will be available. According to the Public Transport Guidelines for Land Use and Development (see reference below under Railway Level Crossing), land use proposals must not delay public transport services (except through increased patronage) or otherwise detrimentally impact on public transport operations.

The Growth Plan’s arterial road network planning must have regard to the adequacy of the existing single connection to the Midland Highway (that includes a railway level crossing) to meet the needs of future public transport services.
4.4.7 Railway Level Crossing

The issue of the level crossing in Bannockburn is one that must be considered in the network planning process.

In regard to current planning for level crossings, Clause 18 of the State Planning Policy Framework of the Victoria Planning Provisions relates to the Road System. The Clause sets out how to achieve general implementation of the policy and the provision particularly specifies to:

“provide grade separation at level crossings except with the approval of the Minister for Transport.”

Additionally, Planning Scheme Amendment VC49 was gazetted on 15 Sept 2008 and made the Public Transport Guidelines for Land Use and Development a reference document in applications for planning consent. The Guidelines note at 5.3.1 Level Crossings:

“Development proposals which will generate significant volumes of traffic in the road network around an existing level crossing, should endeavour to direct traffic away from the level crossing by creating alternative access / egress points.

“Development proposals in the vicinity of existing at-grade crossings will need to reflect any grade separation works proposed for the crossing and / or respond to the need to upgrade the crossing resulting from demand generated by the development.”

Under State planning guidelines, grade separations for level crossings must be planned for in the Growth Plan.

4.4.8 Providing for Movement and Access

For the planned growth area, a significant proportion of new dwellings will be located south-west of the existing town and as highlighted previously, the Geelong region is a major destination for the Bannockburn community.

It is therefore vital for the Growth Plan to provide access and movement networks that support not just local trips, but also these longer distance movements.

For growth areas around metropolitan Melbourne, it is standard practice to develop a network of primary and secondary arterial roads to cater for corridor through-movement functions and in the case of secondary arterials, to also provide access to local and abutting land uses. These arterial roads are typically provided at a 1.6km grid spacing with broadly alternating primary and secondary arterial functions. They are spaced to provide growth areas with convenient access to the arterial road network and key destinations.

According to these principles, the existing arterial road network in Bannockburn requires expansion to meet the movement and access needs of the Growth Plan.
Figure 7  2013 Heavy Vehicle Alternative Route Study Final Options

Bannockburn Growth Plan - Traffic network assessment – August 2020
5 CORRIDOR INVESTIGATIONS

5.1 OVERALL APPROACH

From the findings above, the preliminary hypothesis is that an additional arterial road is required to meet the needs of the Growth Plan. The process of testing that hypothesis has been undertaken as follows:

- The recommendations of previous Bannockburn bypass investigations were reviewed in the context of the Growth Plan.
- GIS was used to plot potential constraints mapping.
- Five options for an additional arterial road alignment were identified.
- Supporting local network was overlayed.
- Traffic Impact Assessment undertaken to understand traffic implications.

A concise summary of these tasks is presented below, with the detailed Traffic Impact Assessment presented in Chapter 6.

5.2 PREVIOUS BYPASS INVESTIGATIONS

As detailed in Chapter 2.2.3, earlier investigations into a second arterial were conducted by GHD on behalf of Council in 2013. The intended outcome of this study was the provision of an arterial route that would allow heavy vehicle traffic to be diverted away from High Street due to amenity and safety concerns.

A total of 13 options, as well as the base case of “do nothing”, were assessed further after a review by a steering committee. After an analysis of all options, three were recommended for further investigation, all to the south of the town (refer Figure 7, which shows the GHD final options relative to the Growth Plan investigation area).
5.3 GIS CONSTRAINTS MAPPING

GIS data was amalgamated to demonstrate where constraints could affect the viability of corridor options, as shown in Figure 8. Key constraints include waterways, areas of cultural sensitivity and designated recreational reserves.
Figure 9  Five Corridor Options
Victorian Planning Authority
5.4 CORRIDOR OPTIONS

The routes considered in this transport assessment paper were based on the 13 routes investigated in the GHD Alternative Route Study. Overall, they were regarded as providing a sound technical basis for Growth Plan investigations.

Five arterial corridor options were developed, as shown in Figure 9. They were chosen to represent a range of alignment options and potential impacts. Additionally, a base line ‘minimal change’ option has been evaluated to understand the impacts of not providing an additional arterial road with the Growth Plan.

The assessment of the corridor options does not allow for a detailed design of each road alignment, which provides some flexibility in the early stages of planning a new route. Options 3, 4 and 5 have been identified for a connection to the Midland Highway. The final alignment and connection point onto the Midland Highway would need to be determined through further investigations. Two alternate options are proposed on Figure 9.
6 TRAFFIC IMPACT ASSESSMENT

6.1 METHODOLOGY

Large scale developments and land use changes have the potential to impact adjacent and nearby road corridors. In the assessment of those potential impacts, the methodology set out in the Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments has been generally followed. The guide is applicable to residential subdivisions, whether for a limited number of lots or for a major expansion of an urban area and therefore regarded as an appropriate reference document.

For the purposes of a Growth Plan transport assessment, where only high-level investigations are required, the transport impact assessment has been limited to the road network, with a specific focus on private vehicle trips generated by the residential land uses.

6.2 EXISTING AND DESIGN YEAR CONDITIONS

The existing conditions traffic data from Chapter 2.2 has been adopted for base line conditions.

For design year conditions the following has been assumed:

- all local traffic growth in Bannockburn attributed to the Growth Plan
- 2% compound traffic growth rate applied to through-traffic along Bannockburn-Shelford Road

6.3 TRAFFIC GENERATION

The adopted traffic generation rate for the residential land uses is based on the database of empirical rates for households in greenfield and regional areas, held by VPA. Additionally, a first principles verification check has been undertaken using an approximation of existing township traffic volumes and households.

Based on the empirical data, the estimated traffic generation for Growth Plan residential dwellings is 5 vehicle trips per household per day (veh/hh/day).

Applying the adopted trip rate to the dwelling yields set out in Chapter 3, the estimated traffic generation of the Growth Plan by potential growth area is summarised in the table 3:
The estimated distribution of residential traffic under the Growth Plan is based on a regional context review, considering local and surrounding land uses and the layout of the surrounding road network. For trips with a destination outside Bannockburn, ABS journey to work data for Bannockburn SA2 (refer Chapter 2.2.2) has been referenced.

The adopted distribution of external traffic from the Growth Plan areas (i.e. destinations outside Bannockburn) is 70% of trips to/from the Greater Geelong LGA.

### Table 3 – Growth Plan Traffic Generation

<table>
<thead>
<tr>
<th>Growth area</th>
<th>Number of dwellings</th>
<th>Traffic Generation Rate veh/hh/day</th>
<th>Daily Traffic veh/day</th>
<th>peak hour rate veh/hr</th>
<th>Peak Hour Traffic veh/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East growth area</td>
<td>3528</td>
<td>5</td>
<td>17640</td>
<td>0.5</td>
<td>1764</td>
</tr>
<tr>
<td>South West growth area</td>
<td>4018</td>
<td>5</td>
<td>20090</td>
<td>0.5</td>
<td>2009</td>
</tr>
<tr>
<td>North West growth area</td>
<td>1181</td>
<td>5</td>
<td>5905</td>
<td>0.5</td>
<td>590</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>8726</strong></td>
<td></td>
<td><strong>43635</strong></td>
<td></td>
<td><strong>4363</strong></td>
</tr>
</tbody>
</table>

### 6.5 TRAFFIC ASSIGNMENT

The forecast traffic generated by the Growth Plan has been assigned to each of the five corridor options and the draft connector road network skeleton.

The assignment of traffic has taken into account the approach and departure directions as established under the traffic distribution, and the road skeleton layout. Where practical, Google maps journey planner was used to determine likely trip routes from individual growth areas.
6.6 TRAFFIC IMPACTS

The results of the traffic impact analysis for each of the 5 route options and the do minimal option are summarised in the tables below. The findings focus on key roads including sections of Bannockburn-Shelford Road (High Street and Geelong Road).

Option 1 provides an alternative route for trucks but will result in significant vehicle trips on High Street and other existing roads. Its distance and alignment around the township mean that it provides no ancillary benefit to the town as a second arterial road connection to the Midland Highway.

- Largest impact on High Street traffic, which is forecast to increase from 5,000 veh/day to 30,000 veh/day
- Geelong Road approx 20,000 veh/day
- Burnside Road approx 14,000+ veh/day

Option 2 is effectively a town ring road that diverts traffic around the central High Street. Provides an alternative route for trucks but will result in significant vehicle trips on the centrally located new route and on Geelong Road.

- High Street approx 13,000 veh/day
- new Route 2 approx 31,000+ veh/day
- Geelong Road approx 30,000 veh/day
Option 3 provides an alternative route for trucks and removes vehicles from High Street by providing a second connection to the Midland Highway, partially through the south west growth area.

- High Street traffic approx. 15,000 veh/day
- new Route 3 approx. 32,000 veh/day
- Burnside Road approx. 18,000 veh/day

Option 4 provides an alternative route for trucks and removes vehicles from High Street by providing a second connection to the Midland Highway, and is partially adjacent to the south west growth area.

- High Street approx. 15,000 veh/day
- new Route 4 approx. 32,000 veh/day
- Burnside Road approx. 22,000 veh/day

Option 5 provides an alternative route for trucks and removes vehicles from High Street by providing a second connection to the Midland Highway however, is somewhat longer than other options. It is proximate to the south west growth area.

- High Street approx. 18,000 veh/day
- New Route 5 approx. 30,000 veh/day
7 ARTERIAL ROUTE OPTIONS EVALUATION

7.1 EVALUATION CRITERIA

In considering the alignment of an additional arterial road, it is important to consider the principal objective of the route, which in this case is to meet the needs of the Bannockburn community in the context of the Growth Plan.

In this context, each route option has been evaluated against a range of transport, economic, environmental and social criteria. Additionally, a baseline minimal change option has been evaluated to understand the impacts of not providing an additional arterial road. The high-level evaluation considers:

- impact on existing residents.
- impact on future residents.
- High Street amenity outcomes – whether the alignment would result in vehicle traffic being diverted away from High Street.
- potential economic opportunities – whether the alignment presented an opportunity to align with future retail land.
- projected cost – length of the road, whether existing infrastructure exists and new infrastructure required.
- possible funding arrangements – opportunities for developer contributions to contribute to the road’s delivery.
- improvements for through traffic, particularly freight.

7.2 EVALUATION FINDINGS

The evaluation of each of the options against the criteria is summarised in Table 4.
### Table 4 – Route Options Evaluation Summary

<table>
<thead>
<tr>
<th></th>
<th>Option 1 (GHD O2/O9/O10)</th>
<th>Option 2 (GHD O1)</th>
<th>Option 3 (GHD O12 &amp; O7/O4)</th>
<th>Option 4 (GHD O4 &amp; O7/O8)</th>
<th>Option 5 (GHD O12/O13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Average</td>
<td>Good</td>
<td>Poor</td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>High Street Amenity</td>
<td>Poor</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Average</td>
</tr>
<tr>
<td>Potential Economic Opportunity</td>
<td>Poor</td>
<td>Poor</td>
<td>Good</td>
<td>Good</td>
<td>Average</td>
</tr>
<tr>
<td>Impact on existing residents</td>
<td>Good</td>
<td>Poor</td>
<td>Average</td>
<td>Poor</td>
<td>Average</td>
</tr>
<tr>
<td>Impact on future residents</td>
<td>Good</td>
<td>Good</td>
<td>Poor</td>
<td>Average</td>
<td>Average</td>
</tr>
<tr>
<td>Funding arrangements</td>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Through movements</td>
<td>Good</td>
<td>Average</td>
<td>Good</td>
<td>Good</td>
<td>Average</td>
</tr>
</tbody>
</table>
7.3 ROUTE EVALUATION SUMMARY

The findings in the preceding sections indicate that the Growth Plan will put significant strain on Bannockburn-Shelford Road if it is retained as the only arterial route serving the town.

With its current two-lane cross section, it would require duplication to accommodate the forecast traffic.

On balance, the minimal change option is regarded as untenable and would result in unacceptable levels of traffic on the existing arterial road, alongside limiting opportunities for amenity and safety improvements in the town centre and surrounding local residential neighbourhoods. It offers nothing to improve network resilience and negatively impacts on local and through users of the Bannockburn arterial road network as well as both travel time and reliability for freight movements.

Specifically, duplicating the existing arterial road is not regarded favourably for the following reasons:

- It does not alleviate the impacts of truck traffic, including semi-trailers and B-doubles through the town centre.
- It does not resolve the existing issue of a disconnected and uninviting town High Street.
- It will significantly increase traffic through the existing level crossing.

With regard to the 5 route options tested in the evaluation, the conclusions of the assessment were that:

- Option 1 would result in an unreasonable level of traffic through central Bannockburn.
- Option 2 will result in significant levels of traffic on the new route and undesirable levels of traffic on Geelong Road.
- Option 5 will be expensive to construct and potentially unlikely to be used from a driver behaviour perspective.
- Options 3 and 4 were the most favourable.
- Option 3 was a recommended alignment in the GHD report.
- Option 4 utilises existing road infrastructure.
- Options 3, 4 and 5 could be coordinated with ongoing duplication works and intersection upgrades on the Midland Highway.
8 CONCLUSIONS

Based on the assessments presented in this paper:

- An additional arterial road is required through Bannockburn to meet the forecast traffic demands generated by the Growth Plan over 30 years.
- An additional arterial road through Bannockburn would:
  - provide an alternative arterial route for heavy vehicles and provide scope to improve general traffic operations and safety in the township;
  - present an important opportunity to improve the safety and amenity of the central township;
  - redress the imbalance in the existing movement and place priorities through the High Street;
  - facilitate placemaking improvements in the central township;
  - support the needs of future public transport services;
  - provide a grade separated crossing of the Geelong to Ballarat railway line.
- Based on a high-level evaluation, Route Options 3 and 4 are found to be the most viable corridor options for an arterial road and are recommended for inclusion in the Draft Growth Framework Plan.