

9. Traffic and Transport

The Traffic and Transport Assessment examined the extent to which the Project is expected to address road safety, accessibility, transport efficiency and capacity as articulated in the Project Objectives, refer to Section 2.2 of Chapter 3 (Project Rationale). It also examines how the Project would affect road users during both the construction and operation phases. The Traffic and Transport Assessment also considered the relevant differences between the interim upgrade (duplicated highway – AMP3) and ultimate upgrade (freeway – AMP1).

The Project is expected to eliminate a number proportion of existing road safety risks and deliver improved road safety across the study area. This would be achieved through; increased clear zone widths, bypassing the township of Buangor, providing adequate rest areas, providing central medians and overall improvements to the horizontal and vertical alignment. For the ultimate freeway upgrade, additional safety improvements would be realised through intersection grade separation and controlling local access via service roads. It is anticipated that the Project would result in a reduction in the number of crashes on the highway, which would assist in reaching the target of reducing the incidence and severity of road crashes by 30%, by 2017 (an objective of Arrive Alive! 2008-2017 Victoria's Roads Safety Strategy). Road safety outcomes are expected to be significant for the Project, with the ultimate AMP1 upgrade having a slight improvement on the interim AMP3 upgrade.

The Project would increase the capacity of the highway so that it can accommodate the traffic volumes predicted for 2040. This would be the same for interim and ultimate upgrade.

The Project is expected to provide travel time savings of around two minutes for vehicles travelling along the Western Highway through the study area due to continuous overtaking opportunities, higher posted speed limit, better grade line and a reduction in the number of intersections. Travel times are expected to be slightly improved further for the ultimate AMP1 upgrade as compared to the interim upgrade. Improved travel times would have a number of benefits including improved access and amenity for motorists, improved travel cost efficiency for road-based freight vehicles and improved travel times for emergency vehicles and buses. It is reasonable to assume a travel time saving for the majority of road users, though it is anticipated that some local landowners /

occupiers would have slightly increased travel times, due to reduced access to the highway, particularly for farm machinery. Whilst this cannot be avoided, it is offset by improved safety of access and mitigated by incorporating sufficient locations to enable U-turns. The Project would also enable High Productivity Freight Vehicles to use the highway/freeway, thereby contributing to further improvements to freight efficiency.

The majority of the adverse impacts on road users are expected to occur during the construction phase, when the proposed works could impact on the road safety and transport efficiency. However, the assessment concluded that acceptable outcomes would be achieved through the implementation of detailed Traffic Management Plans and through community consultation to inform road users of what to expect during construction.

There are no significant differences between Options 1 and 2 with regard to transport outcomes. The key difference between the interim and ultimate upgrade is access to the freeway. For the ultimate freeway upgrade, access would be limited to grade-separated interchanges and service roads would be provided to provide access to the local road network and individual properties. This would further improve road safety and transport efficiency but further increase the distance required to access the freeway for some local landowners/occupiers.

The Traffic and Transport Assessment concluded that whilst some adverse impacts to road users have been identified, these are mostly related to the construction period and can be managed to achieve acceptable outcomes. The Project would improve road safety and transport efficiency, resulting in a net transport benefit to the community.

9.1 EES Objectives

The EES objectives for traffic and transport are:

- *To provide for the duplication of the Western Highway between Beaufort and Ararat to address safety, efficiency and capacity issues.*
- *To avoid or minimise disruption and other adverse effects on infrastructure, land use (including agriculture) and households, as well as road users resulting from the construction and operation of the highway duplication.*

This chapter discusses the existing Western Highway conditions, including capacity, safety and accessibility and the potential impacts associated with the construction and operation of the interim upgrade to duplicated highway standard (AMP3) and

the ultimate freeway (AMP1) standard. Where appropriate, mitigation measures have been recommended to minimise the potential impact. More specifically, this chapter addresses the following EES scoping requirements:

- Identify expected or modelled transport outcomes of the Project in terms of capacity, traffic volumes, travel times, safety and accessibility.
- Describe road design features and the alignments that have been adopted to optimise the benefits (including increased safety) of the duplication for road users, having regard to effects on other environmental and social values.
- Address potential risk areas to road safety, such as wildlife corridors, and outline any specific measures to avoid, minimise and mitigate road safety issues.
- Characterise the current traffic conditions in terms of capacity, travel times, safety and accessibility.
- Identify and assess potential effects of the Project on existing traffic conditions, including traffic movement and access. This should include potential effects of heavy vehicles required for construction on nearby existing arterial roads and the ability of these roads to accommodate potential effects during the project's construction.
- Identify and assess potential effects of road construction and operation on the rail line and interface especially near intersections and crossings.
- Identify traffic management and safety principles for the construction and operation phases, covering (where appropriate) road safety, different traffic routes, hours of use, traffic speeds, types of vehicles and emergency services access provisions.
- Assess the consistency of the final project design with the objectives of relevant Victorian transport policies.
- Provide an integrated assessment of the Project, drawing on the findings of specific assessments required under previous sections of this document.

This chapter is based on a Traffic and Transport Assessment completed by GHD Pty Ltd (2012b). The detailed assessment report is included in Technical Appendix D.

9.2 Study Area

The study area for the traffic and transport assessment is the same as the EES project area, which extends 1500 metres (m) to the north and south of the edge of existing Western Highway road reserve.

Figure 9-1 shows this study area and the location of the intersecting roads.

9.3 Methodology

The Traffic and Transport Assessment included a desktop review of information, as well as site inspections to confirm the findings of the desktop review. The following tasks were completed:

- Review of completed reports related to the Project including review of traffic data collected in 2009 for the study area.
- Visiting the site on a typical day to understand the existing traffic conditions and identify any safety and/or accessibility issues along the route. In addition, any pedestrian, cyclist, public transport and heavy vehicle facilities were identified.
- Undertaking an up-to-date crash history assessment for the study area.
- Review of the public transport timetables and identifying any existing bus and rail services within the vicinity of the study area.
- Consideration of potential impacts to road users during construction and operation of the Project on road safety, traffic operations, and access.



Western Highway looking east



Figure 9-1 Study area showing intersecting roads

9.4 Legislation and Policy

The relevant legislation and government policies related to traffic and transport are outlined in Table 9-1.

Table 9-1 Relevant legislation and government policies

Legislation / Policy	Description
State	
<i>Transport Integration Act 2010</i>	<p>The <i>Transport Integration Act 2010</i> sets out the charter for Victoria's transport agencies, including VicRoads, to:</p> <ul style="list-style-type: none"> Manage the road system in a manner which supports a sustainable Victoria by seeking to increase the share of public transport, walking and cycling trips as a proportion of all transport trips in Victoria. <p>All new transport projects must be assessed using a triple bottom line framework which considers the economic, environmental and social costs and benefits of the project.</p>
<i>Road Management Act 2004</i>	<p>The Victorian <i>Road Management Act 2004</i> provides 'practical guidance to any person conducting, or proposing to conduct, any works on a road in Victoria.' The Act has been established to promote safe and efficient road networks and a coordinated approach for the management of public roads. The <i>Road Management Act (General) Regulations 2005</i> and the <i>Road Management Act (Works and Infrastructure) Regulations 2005</i> have been established under the <i>Road Management Act</i> and are to be complied with for all public roads.</p>
VicRoads Access Management Policies (2006)	<p>The VicRoads Access Management Policies provide the design criteria for each road classification. The duplication of Western Highway is to be designed for Access Management Policy 3 (AMP3) and planned for eventual upgrade to Access Management Policy 1 (AMP1).</p>
Arrive Alive 2008-2017, Victoria's Road Safety Strategy	<p>This strategy has the objective of significantly improving road safety across the State and substantially reducing the incidence of deaths and serious injuries on Victorian roads.</p> <p>Improvement works to this section of the Western Highway are expected to offer crash reductions over the life of the project (30 years), which will ultimately contribute to the achievement of this Government objective.</p>

9.5 Existing Conditions

The Western Highway is the key road link between Melbourne and Adelaide. From Melbourne's western fringe to the Sunraysia Highway in Ballarat, it is a freeway standard, dual-carriageway road. However, beyond this point, it reduces to a single carriageway two-lane, two-way rural highway road with overtaking lanes in appropriate locations. The Western Highway is a VicRoads declared arterial road (highway) which facilitates vehicle movement and supports regional industries. The Highway also carries traffic travelling between Melbourne and Adelaide and forms part of the national highway network.

9.5.1 Road Network

The existing Western Highway within the study area intersects 11 main roads and 17 minor roads. A description of each of the main roads which intersect the Western Highway within the study area from Beaufort to Ararat is provided in Table 9-2. The location of these roads is shown in Figure 9-1. Access to the Western Highway from these roads currently allows for vehicles to turn either left or right onto the highway. In addition to these

intersections, there are also some driveways that provide access from properties directly onto the Western Highway.



Warrayatkin Road

Table 9-2 Intersecting road summary

Road name	Description
Eurambeen-Streatham Road	<ul style="list-style-type: none"> Two-way sealed road that forms a T-intersection with the Western Highway, approaching the highway from the south.
Eurambeen-Raglan Road	<ul style="list-style-type: none"> Two-way road that forms a cross intersection with the Western Highway. Approaching the Western Highway from the north, the road is sealed; from the south it is unsealed. Provides access to properties and Eurambeen-Streatham Road.
Ferntree Gully Road/ Goulds Lane	<ul style="list-style-type: none"> Two-way unsealed road (except for the approach to the intersection with Western Highway) that forms a cross intersection with the Western Highway.
Middle Creek Road	<ul style="list-style-type: none"> Two-way sealed, no through road that forms a T-intersection with the Western Highway, approaching the highway from the south.
Main Road	<ul style="list-style-type: none"> Two-way sealed road within the township of Buangor that forms a T-intersection with the Western Highway from the south.
Buangor-Ben Nevis Road	<ul style="list-style-type: none"> Two-way sealed road that forms a T-intersection with the Western Highway, approaching from the north.
Gravel Route Road	<ul style="list-style-type: none"> Two-way unsealed road that forms a T-intersection with the Western Highway, approaching from the south.
Warrayatkin Road	<ul style="list-style-type: none"> Two-way sealed road that forms a T-intersection with the Western Highway, approaching from the north.
Aerodrome Link	<ul style="list-style-type: none"> Wide, two-way sealed road that forms a T-intersection with the Western Highway, approaching from the south. Provides access to the Ararat Aerodrome.
Geelong Road	<ul style="list-style-type: none"> Two -way sealed road that forms a T-intersection with the Western Highway
Green Hill Lake Road	<ul style="list-style-type: none"> Two -way sealed road that forms a T-intersection with the Western Highway, approaching from the north.

9.5.2 Traffic Volumes and Capacity

Current Traffic Conditions

Traffic volume information was collected by VicRoads for the week 29 February 2012 to 6 March 2012. This data is summarised in Table 9-3 by direction, for average daily volumes and median peak hour volumes.

The hourly volumes in Table 9-3 demonstrate that the Western Highway is currently operating below theoretical capacity (2,473 vehicles per hour (vph), two-way). The maximum observed peak hour volume for available data on the existing Western Highway is 315 vehicles in the westbound direction, between Heath Street and Green Hill Lake Road.



Table 9-3 Western Highway Traffic Volumes – 29 February to 6 March 2012

Direction	Average 7-Day Volume (vpd)	Average Weekday Volume (vpd)	Median Midweek AM Peak Volume (vph)	Median Midweek PM Peak Volume (vph)
Western Highway West of Geelong Road				
Eastbound	All Veh: 2994 HV: 826	All Veh: 3,079 HV: 971	242 (10.00am – 11.00am)	288 (4.00pm-5.00pm)
Westbound	All Veh: 3111 HV: 894	All Veh: 3276 HV: 1056	268 (11.00am-12.00pm)	291 (3.00pm-4.00pm)
Total	All Veh: 6105	All Veh: 6355		
Western Highway between Martins Lane & Old Shirley Road				
Eastbound	All Veh: 2903 HV: 853	All Veh: 2941 HV: 987	255 (11.00am-12.00pm)	297 (4.00pm-5.00pm)
Westbound	All Veh: 3052 HV: 297	All Veh: 3219 HV: 1096	236 (10.00am-11.00am)	312 (3.00pm-4.00pm)
Total	All Veh: 5955	All Veh: 6160		
Western Highway between Heath Street & Green Hill Lake Road				
Eastbound	All Veh: 2923 HV: 791	All Veh: 2913 HV: 906	231 (10.00am-11.00am)	289 (3.00pm-4.00pm)
Westbound	All Veh: 3149 HV: 849	All Veh: 3283 HV: 990	258 (11.00am-12.00pm)	315 (4.00pm-5.00pm)
Total	All Veh: 6072	All Veh: 6169		

All Veh – all vehicles; HV – heavy vehicles

Vpd – vehicles per day

Source: VicRoads 2012

Future Traffic Volumes

The growth rate of 1.59% (DOTARS 2007 Melbourne – Adelaide Corridor Strategy) was adopted to predict future traffic volumes. Based on the 1.59% growth rate and utilising the highest traffic volume count location (Western Highway west of Geelong Road),

the daily two-way traffic volumes are expected to increase to 9,884 vehicles per day (vpd), for a 5-day average in 2040.

The forecasted traffic volumes are shown in Table 9-4.

Table 9-4 Forecast Future Traffic Volumes (two-way direction)

Year	7 day average (vpd)	7 day % HV	5 day average (vpd)	5 day %HV
2012	6105	28%	6355	32%
2015	6401	28%	6663	32%
2025	7495	29%	7802	33%
2040	9496	30%	9884	33%

Source: VicRoads 2012 Data, CPG Traffic Assessment 2009 Growth Rate, GHD Analysis

9.5.3 Crash History

An analysis of the casualty crash history, sourced from VicRoads' CrashStats database, has been completed for the latest available five year period between 1 January 2007 and 31 December 2011. The review of the crash data indicates that there are 5.5 crashes per 100 million km travelled per year. During the five year period, there have been 20 casualty crashes within the study area and these have occurred at 20 different locations, as shown in Figure 9-2.

The following is a summary of the 20 crashes:

- Two collisions resulted in a fatality, both of which were head on collisions;

- 11 collisions resulted in serious injury;
- 10 collisions were run-off-road, with eight of these occurring on a straight section of road;
- Two collisions occurred at intersections which are 'T' Intersections
 - Eurambeen-Streatham Road;
 - Crockers Lane; and
- 13 collisions occurred in dry conditions, while seven collisions occurred in wet conditions.

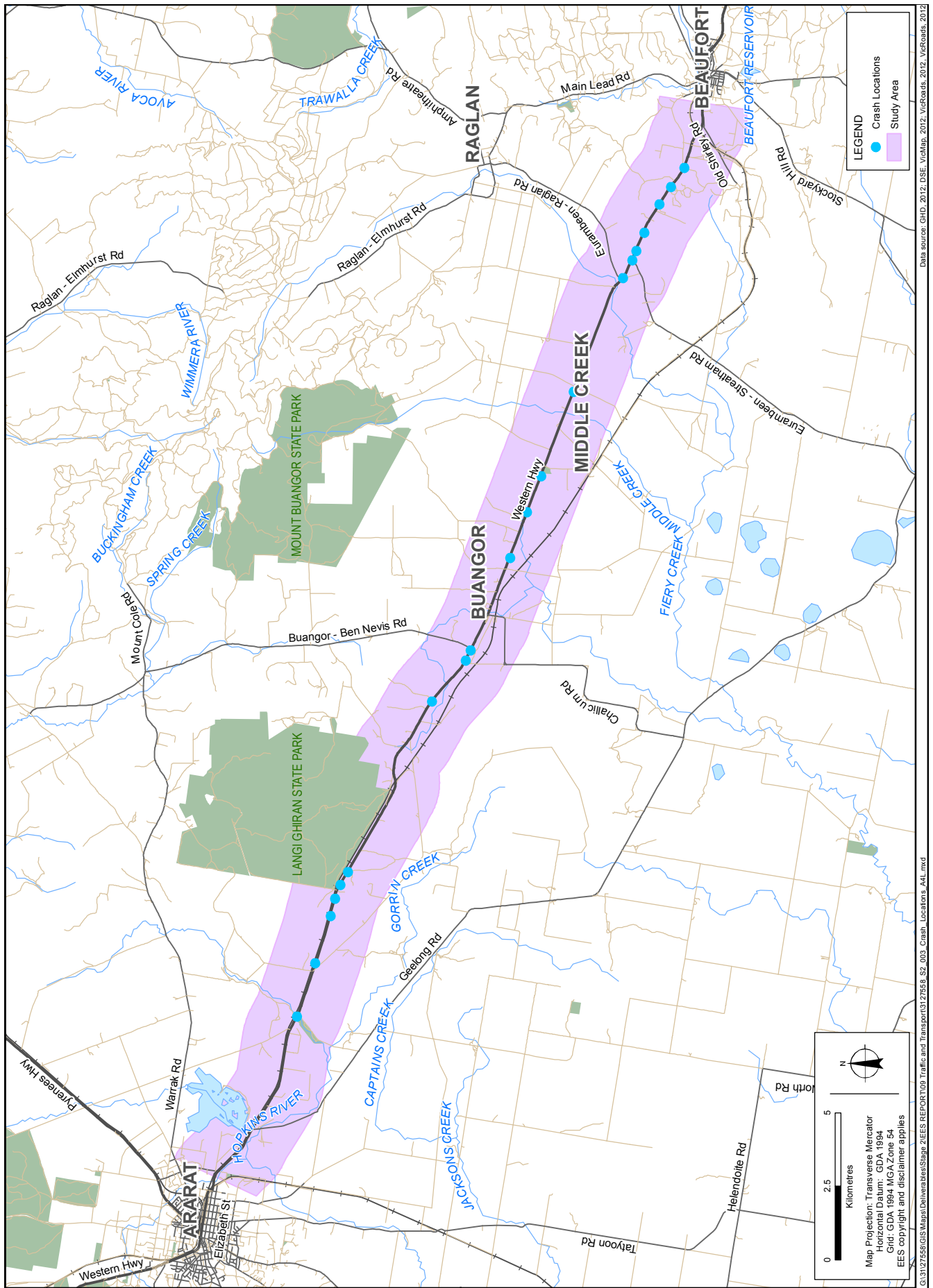


Figure 9-2 Location of crashes in the study area

9.5.4 Public Transport

The Ballarat-Ararat railway line generally follows the alignment of the Western Highway. The railway line is located to the north of the highway within Beaufort and crosses underneath the highway west of Old Shirley Road. The railway line crosses under the highway again east of the intersection with Hillside Road (West) and closely follows the highway alignment on the north side of the highway into Ararat.

The regional V/Line bus services operate along the Western Highway between Ararat and Ballarat. Bus stops are located within Trawalla, Beaufort, Buangor and Ararat. The only stop in the study area is at the former Buangor Hotel.

School bus services in the region also operate along sections of the Western Highway, within Ararat, Beaufort and Buangor. The bus routes and schedule vary depending on the number and location of students.

9.5.5 Bicycle Lanes

There are no designated bicycle lanes on the Western Highway within the study area. There are 2.5m sealed shoulders on the existing Highway, which may be used by cyclists, however no cyclists were observed during the project investigations.

9.6 Impact Assessment

This impact assessment includes consideration of the traffic impacts associated with construction and operation of both the interim upgrade to duplicated highway (AMP3) standard and the ultimate freeway (AMP1) standard configuration.

9.6.1 Key Issues

The Project would create both positive benefits and some local adverse impacts. Both the preferred option (Option 2) and the alternate option (Option 1) have been assessed, with the impacts identified being relatively similar for both options.

The benefits the Project would create include:

- Increased capacity, which would enable this key link to accommodate the expected future traffic volumes in 2040.
- Travel time saving due to, continuous overtaking opportunities, expected higher posted speed limit, better grades and by reducing the number of intersections along the Western Highway. These benefits are applicable both for the interim and ultimate conditions.
- Increased safety along the route due to improved alignment, treatment of roadside hazards and provision of median, increased provision of Clear Zones and improved safety due to provision of adequate and improved rest areas.
- Increased safety through the township of Buangor by removing through traffic.

- Increased safety with key intersections becoming grade-separated for the proposed ultimate (AMP1) upgrade. Improved efficiency of freight by designing to accommodate High Productivity Freight Vehicles.
- Potential to reduce the traffic from local roads due to the Western Highway becoming the preferred route. This increases safety within the region as the Highway is designed to be a higher standard road and would not have at-grade intersections, when built to AMP1 standard.

The key issues the Project may create include:

- Changed road environment during construction may result in a temporary general reduction to road safety. Examples of road environment changes include: heavy vehicles entering/exiting construction accesses, additional or closer roadside hazards, variable speed limits, and unfamiliar conditions.
- Changed road environment during construction may result in a short-term general reduction to performance and efficiency of travel modes. Examples of road environment changes include speed reductions, works resulting in temporary road or lane closures or cumulative impacts of the simultaneous construction of multiple sections of the Western Highway.
- The duplication has the potential to disrupt local access routes post-construction.
- Potential for some aspects of road safety to be degraded. For example, wildlife crossing a wider road may exacerbate frequency of accidents.

These issues and benefits are discussed in further detail in later sections of this chapter.

9.6.2 Construction

Short-term traffic impacts considered for the construction of the Project include:

- Traffic management impacts associated with the construction of new carriageways, construction sites and haulage routes.
- The impacts of construction traffic on the operation and safety of the existing road network.

Construction Traffic Volumes and Haulage Routes

Traffic generated by the construction of the Project would predominantly be associated with the transport of construction machinery and materials to and from the site. Traffic would also be generated by worksite contractors accessing the site across the day during a six day working week.

It is expected that construction of the Project would be staged to minimise disruptions and maintain traffic flow along the existing Western Highway in both directions. It is not anticipated that any night works would be required, although they would be

considered where they may mitigate the construction impacts on the community or travelling public.

The haulage routes for heavy vehicle traffic for the construction stage would broadly be determined by the construction contractor(s). Given the connectivity of the Western Highway itself, it is likely that the majority of haulage would be undertaken on the Highway to the location of construction sites.

The roadwork contractor(s) would be required to develop a Traffic Management Strategy and detailed Traffic Management Plans (TMPs) for construction stages to minimise the impacts of construction traffic on use of the highway.

Changed Road Conditions

During construction, it is anticipated that there would be changes in road conditions, such as construction sites located immediately adjacent to the existing highway. In addition, slow moving vehicles entering or exiting the traffic stream of the Highway may have some localised impacts on traffic. A higher level of driver awareness would be required during these conditions as road-users would not be familiar with the changed conditions.

The TMPs required to be prepared for the Project may include reductions in speed near the location of construction sites, to reduce the likelihood of accidents occurring due to changed road conditions.

Highway Access

As a result of construction activities, there is potential for short-term disruptions to local access points such as intersecting roads or direct property access. Longer term disruptions are not expected.

Where appropriate, detour routes would be provided and are expected to be detailed in the TMPs. Based on similar projects, it is generally considered that the impacts would be able to be appropriately managed.

Construction - AMP3 to AMP1

Construction of the freeway (AMP1 standard) is not expected to have unacceptable impacts on the operation of the duplicated highway (AMP3 standard) during the construction period. The assessment has identified that acceptable outcomes would be achieved through the implementation of TMPs and through community consultation to inform road users' expectations during the construction period.

9.6.3 Operation of Interim New Road (Duplicated Highway - AMP3 standard)

This section addresses the anticipated operational impacts to the transport network and road users within the study area as a result of the Project at the interim upgrade (duplicated Highway), i.e. AMP3 standard for the entire length.

Road Safety

The Project would deliver improved road safety across the study area through:

- Provision of central medians to reduce occurrence of head-on collisions
- Ability for drivers to safely overtake vehicles along the length of the study area
- Increased clear zone widths
- Bypassing of the township of Buangor
- Providing adequate rest area facilities that comply with rest area guidelines
- Horizontal and vertical alignments designed to higher standards.

These design features are expected to eliminate a high proportion of existing road safety risks and provide for a higher road safety standard than currently exists.

Based on the crash history of the existing road, it is estimated that the crashes per 100 million km travelled per year would reduce from 5.5 to 3.94 for the interim upgrade. Hence, the Project is anticipated to substantially reduce the incidence of casualty crashes in the study area.

The provision of additional overtaking lanes was also considered as an alternative. Refer to Section 5.2.2.3 in Chapter 5 (Project Alternatives) for more information.

Capacity and Travel Times

The Project is expected to provide travel time savings of around two minutes for vehicles travelling along the Western Highway through the study area. This travel time saving is to be accommodated through a number of aspects including an increased speed limit (100km/h to 110km/h), duplication providing continuous overtaking opportunities along the entire length of the study area and bypass of Buangor township (current speed limit of 90km/h). The theoretical travel time for the existing highway and the two options under the interim upgrade has been estimated to be:

- Existing: 24 minutes 40 seconds.
- Alternate Option (1): 22 minutes 10 seconds.
- Preferred Option (2): 22 minutes 0 seconds.

Improved travel times for highway road users provide social and economic benefits including improved access and amenity for motorists, improved travel cost efficiency for road-based freight vehicles, improved travel times for emergency vehicles and improved travel time for buses.

Road Network Impacts

To provide access and improve road safety a number of intersections are proposed to be upgraded to be wide-median treatments during the interim upgrade of the Western Highway Project (AMP3 standard).

The design of these intersections would make provision for heavy vehicles in a manner which is consistent with consideration for road safety. The intersections which would be upgraded to have a wide median treatment include:

- Eurambeen-Raglan Road Eurambeen-Streatham Road. Note access to Crockers Lane is via this intersection
- Ferntree Gully Road – Goulds Lane
- Peacocks Road
- Hillside Road Extension
- Langi Ghiran Picnic Ground Road
- Hillside Road (West) and Brady Road
- Warrayatkin Road.

Within the vicinity of the Buangor bypass a number of intersecting side roads would have direct access to the Highway removed. Access to these roads would be provided through connections to the proposed Peacocks Road wide median treatment via a service road or along the existing Highway. Woodnaggerak Road would have access to the Western Highway removed, however access would be provided via Middle Creek Road. This interim access arrangement is likely to increase travel time slightly for users, however on balance, it is expected to be acceptable.

The Project would increase the capacity of the Western Highway and reduce the number of at-grade intersections which would improve the overall operational performance of the highway. The expected capacity of the Western Highway would increase from 2,473 vph to 4,909 vph as a result of the Project.

Highway Access

Existing direct property access to the Western Highway would typically be maintained, however the majority would be restricted to be 'left-in' and 'left-out' for safety reasons. To access those properties from the opposing direction, vehicles would be required to travel to the nearest wide median treatment or median break and complete a 'U-Turn'.

Given the restriction to 'left-in' and 'left-out' access to the Highway, vehicles associated with direct property access may be required to drive further in order to drive in their desired direction of travel. The effect may be an increased travel time for those road users. However, the increase in travel time is not considered to be an unreasonable change in order to achieve desired road safety benefits.

Public Transport

The proposed new crossing of the Ballarat-Ararat railway line, west of Buangor, is to be grade separated. Consequently, it is anticipated that the Project would have minimal impact on the safety and operation of the railway line. There are currently three weekday return V/Line passenger rail services

that operate between Melbourne and Ararat. All V/Line passenger services stop at Beaufort Railway Station.

The Regional V/Line bus services are anticipated to benefit from the improved travel times and travel time reliability along the length of the study area. The only designated V/Line bus stop currently within the study area is in the township of Buangor. The existing bus stop within Buangor would not be affected. School bus stops within the study area may need to be relocated. However, school bus services change on an annual basis due to changes in student enrolment, affecting the location of school bus stops.

Heavy Vehicles and Freight Task

The Project would generate improvements to the freight task by having the road designed to accommodate high productivity freight vehicles, thereby allowing improvements to efficiency of the freight task by enabling transportation of a greater volume in a single vehicle, reducing the overall heavy vehicle volume achieving and travel time savings due to the increased speed limit, intersection grade separation and other measures to reduce vehicle conflict points.

It is also noted that during community consultation, some landowners expressed concern about the impact of the Project on the ability of B-double heavy vehicles to enter properties. A wide median of typically 30m has been designed in order to permit for turning movements of these 25m long vehicles at wide median intersection treatments.

Other Road Users

As identified in Section 9.5.5, there are limited bicycle facilities along the existing Western Highway. Cyclists would be able to use the sealed shoulder of the proposed highway.

Emergency vehicles would benefit from the increase in highway capacity and reduction in travel times. In some locations, emergency vehicles may be required to drive to a median break and perform a U-turn to drive in their preferred direction of travel.

9.6.4 Operation of Ultimate New Road (Freeway to AMP1 standard)

The EES and associated draft Planning Scheme Amendment (PSA) has been developed to plan for the eventual upgrade of the Western Highway to a freeway (AMP1) standard. This upgrade to a freeway standard would not occur for many years into the future, however its impacts have been addressed in the Traffic and Transport assessment.

The construction impacts of AMP1 would be similar to AMP3.

Capacity and Operational Impacts

The capacity and operational impacts are generally expected to be the same for the interim upgrade (AMP3 duplicated highway) and ultimate upgrade (AMP1 freeway).

The freeway is expected to provide further travel time savings for vehicles travelling along the Western Highway, because all access to properties would be via grade-separated interchanges, which would not require vehicles to slow down along the carriageway. The theoretical travel time for the existing alignment and for the two options under ultimate upgrade has been estimated to be:

- Existing: 24 minutes 40 seconds
- Alternate Option (1): 21 minutes 40 seconds
- Preferred Option (2): 21 minutes 30 seconds.

Access to Freeway and Road Safety

The major difference between the interim (AMP3) and ultimate (AMP1) upgrade in regard to road safety impacts is access to the freeway, which is limited to grade-separated interchanges, and service roads that would provide access to the local road network and adjacent properties. The intersections which are proposed to be grade-separated and have access to the Western Freeway include, Eurambeen-Streatham Road/Eurambeen-Raglan Road, Peacocks Road, Hillside Road and Langi Ghiran Picnic Ground Road. The Ferntree Gully Road/Goulds Lane intersection is proposed to be grade separated, however access to the Western Freeway is not proposed.

Additionally, under the ultimate upgrade the at-grade rail crossing at Langi Ghiran Picnic Ground Road is proposed to be removed. This would improve road and rail safety at this location by removing a conflict point.

Based on the crash history of the existing road, it is estimated that the crashes per 100 million km travelled per year would reduce from 5.5 to 3.37 under the ultimate upgrade. Hence, the Project is anticipated to substantially reduce the incidence of casualty crashes in the study area.

9.7 Risk Assessment

An environmental risk assessment was undertaken on the Project options to identify key environmental issues associated with the construction and operation of the Project. The methodology for this risk assessment has been described in Section 4.2. A risk assessment report that explains the process in detail and contains the complete project risk register has also been included in Technical Appendix Q. Table 9-5 shows a summary for traffic and transport of:

- The impact pathways identified; and
- A description of the consequence.



Table 9-5 Risk Assessment

Risk No.	Impact Pathway	Description of Consequence
T1	<p>Changed road environment during construction results in general reduction to road safety.</p> <p>Examples of road environment changes include heavy vehicles entering/exiting construction accesses, additional or closer roadside hazards, variable speed limits, unfamiliar conditions.</p> <p>Impacted road users include private vehicles, public transport, school buses, cyclists and pedestrians.</p>	Increased incidence of accidents that one or more incident may result in a fatality.
T2	<p>Changed road environment during construction results in general reduction to performance and efficiency of travel modes.</p> <p>Examples of road environment changes include speed reductions, works resulting in temporary road or lane closures or cumulative impacts of the simultaneous construction of three sections of Western Highway.</p> <p>Impacted users can include private vehicles, public transport, school buses, emergency services, cyclists, pedestrians and rail.</p>	Increased disruption or displacement of road users, and increased travel time and/or distance.
T3	The duplication disrupts/severs local access routes including cyclist connectivity post-construction (interim and ultimate operation).	<p>Economic and social disruption through increased travel times and reduces accessibility.</p> <p>Vehicle traffic, public transport, school buses, emergency services, cyclists, pedestrians, rail crossings and private accesses affected</p>
T4	<p>Potential for some aspects of road safety, during (interim) operation of the new road to be degraded. For example:</p> <ul style="list-style-type: none"> ▪ Increased crossing distance for wildlife exacerbates frequency of accidents. ▪ Increased distance for farm machinery to be travelling along the road. ▪ Changes in atmospheric conditions i.e. fog, sunglare. ▪ Movements at intersections and property accesses that are retained. 	Increased incidence of accidents that one or more incident may result in a fatality.
T5	<p>Potential for some aspects of road safety, during (interim and ultimate) operation of the new road to be degraded. For example:</p> <ul style="list-style-type: none"> ▪ Increased crossing distance for wildlife exacerbates frequency of accidents. ▪ Increased distance for farm machinery to be travelling along the road. ▪ Changes in atmospheric conditions i.e. fog, sunglare. 	Increased incidence of accidents that one or more incident may result in a fatality.
T6	Potential for some aspects of road safety to be degraded through inadequate design, including horizontal and vertical geometry, sight distance at all intersections and merge locations (ramps and service road entry/exit)	Increased incidence of accidents that one or more incident may result in a fatality.
T7	Traffic volumes significantly increase due to induced demand and cause congestion (for the interim and ultimate solutions).	Increased travel time for road users.

9.8 Environmental Management Measures

VicRoads has a standard set of environmental management measures which are typically incorporated into their construction contracts for road works and bridge works. These measures have been used as the starting point for the assessment of construction related risks and are described in detail in Chapter 21 (Environmental Management Framework). In some instances, additional Project

specific environmental management measures have been proposed to reduce risks.

Management measures specific to each identified traffic and transport risk, and the residual risk rating after these environmental management measures have been applied, are outlined in Table 9-6.

9.8.1 Residual Risks

Following implementation of the proposed mitigation measures there are not expected to be any significant impacts. The overall risk to traffic and transport is medium.

Table 9-6 Traffic and Transport Environmental Management Measures and Residual Risk

Risk No.	Impact Pathway	Consequence Description
T1	Contractors to have TMPs for the construction works prepared. TMPs to comply with standard VicRoads practices, the Traffic Management Code of Practice and the <i>Road Management Act 2004</i> . TMPs to be reviewed by VicRoads prior to implementation. Road Safety Audits (RSAs) to be undertaken on TMPs. Construction vehicles would generally avoid local roads. Haulage routes for construction traffic and heavy vehicles to be appropriately designated and managed as part of TMPs, with consideration for safety. Implement a communication strategy with the key stakeholders to manage impacts, and inform road users and the community.	Medium
T2	Contractors to have TMPs for the construction works prepared. TMPs to comply with standard VicRoads practices, the Traffic Management Code of Practice and the <i>Road Management Act 2004</i> . TMPs to be reviewed by VicRoads prior to implementation. Road Safety Audits (RSAs) to be undertaken on TMPs. Buses would be provided for rail users in the event that rail operations are temporarily suspended (in consultation with PTV, bus and rail operators). Construction to be staged to allow one carriageway to be operational at all times and traffic flow not to be stopped for any extended period of time. Appropriate consideration to be made in non-motorised road users (ensuring connectivity is not removed), public transport, school buses, emergency services and rail interfaces.	Medium
T3	Design to maintain access to side roads and properties under interim and ultimate upgrade arrangements. Local community and stakeholders to be engaged and informed of positive project outcomes as part of broader community consultation process to address perceptions of localised adverse impacts. Signage and design to allow cyclists to continue to use the shoulder of the highway such that it meets the road rule 95(2) requirements. Possible compensation through the <i>Land Acquisition and Compensation Act</i> .	Low
T4	Road safety audit completed for the design. Assess wildlife corridors and identify mitigation measures to reduce wildlife crossing Western Highway via trafficked carriageway. Assessment of atmospheric conditions within the study area.	Medium
T5	As per risk T4.	Medium
T6	As per risk T4.	Medium
T7	Risk is negligible and therefore there are no mitigation measures recommended to manage the risk. Risk is negligible and therefore there are no mitigation measures recommended to manage the risk.	Negligible

9.9 Conclusion

Construction of the Project is not expected to have unacceptable impacts to the operation of the Highway. The risk assessment has addressed potential operational and road safety impacts and outlined mitigation measures for the identified road users.

The majority of potential negative impacts of the Project with regard to road operations, safety and effects on road users would be expected to occur during the construction phase of the duplicated highway where construction related activity would impact on the existing network. The traffic and transport assessment has identified that acceptable outcomes would be achieved through the implementation of detailed TMPs and through

community consultation to inform road users' expectations during the construction stages.

During the operation phase of the Project it is expected that there would be benefits for traffic and transport including an increase in safety, reduced travel times, increased capacity of the Western Highway/Freeway, increase in the efficiency of freight movements and reduced traffic on local roads.

There is no discernible difference between the benefits and potential negative impacts of either Option 1 or Option 2 from a traffic and transport perspective.

