Sinclair Knight Merz

Huon Highway Upgrades
Traffic and Road Safety Study

December 2011

Contents

Figure Index

Table Index

1. Introduction

1.1 Background

Midson Traffic were engaged by Sinclair Knight Merz (SKM) to undertake a traffic and road safety study of the proposed upgrades to the Huon Highway between Franklin and Geeveston. This report forms part of an overall design and assessment prepared by SKM for the Department of Infrastructure Energy and Resources (DIER) and investigates the overall traffic flow and road safety impacts of the design between Huonville and Geeveston.

The budgeted $8M road upgrades are intended to provide a safe and unimpeded overtaking opportunity for vehicles travelling between Franklin and Geeveston and to improve safety for all road users. It is part of the $90 million Community Roads Package announced by the State Government in 2010.

1.2 Scope and Objectives

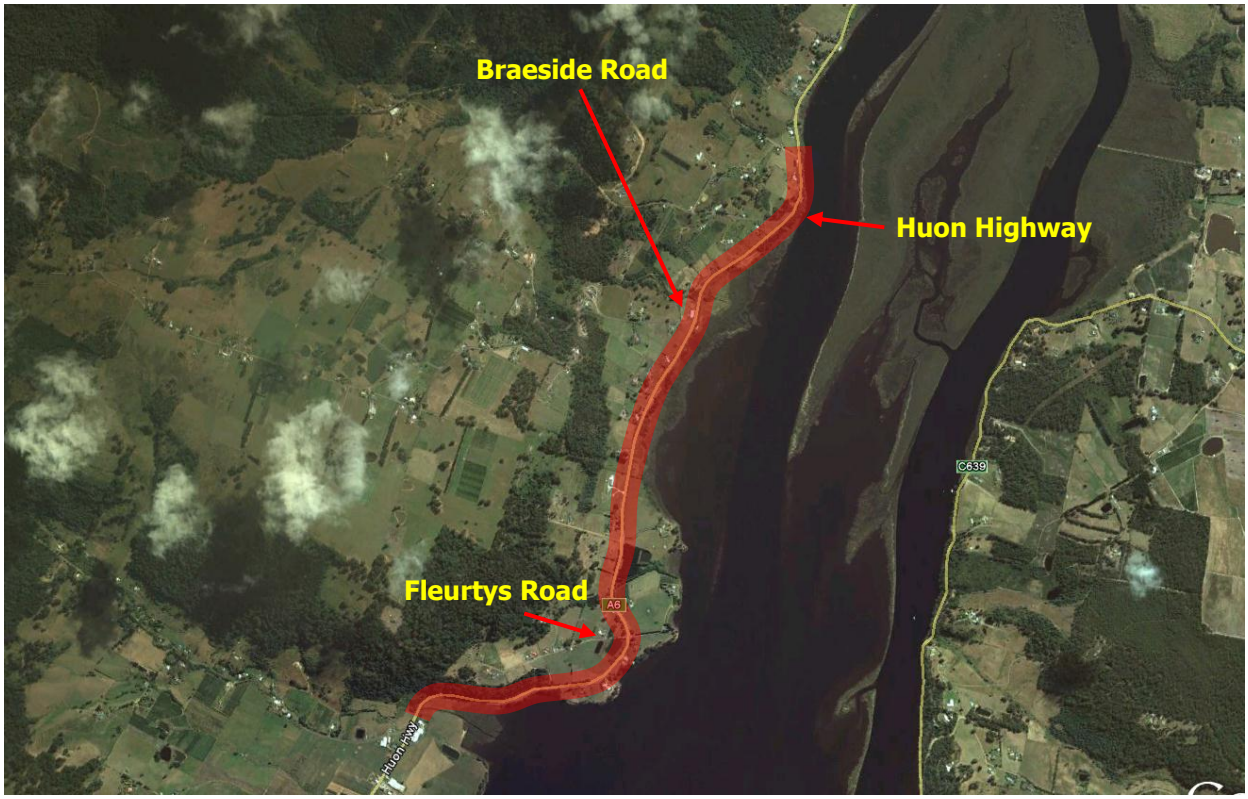
The objective of this report was to prepare a traffic and road safety assessment of the proposed modifications to the Huon Highway between Franklin and Geeveston. This involved the following scope:

- Site investigations;
- Review of existing conditions including traffic flow and road safety performance;
- Review of current standards and guidelines;
- Critical review of the project against current road safety strategies;
- Analysis of the traffic flow and road safety impacts of the proposal; and
- Provision of a report outlining the findings.

1.3 Study Area

The project design subject of this report is a 1.7km segment of the Huon Highway between Braeside Road and Fleurtys Road. This report investigates the traffic flow and road safety impacts of the design between Huonville and Geeveston. The area subject to the overtaking lane construction is shown in Figure 1.

Figure 1 Study Area (Source: Google Maps)



1.4 Proposed Works

The proposed road improvements involves the upgrade of the Huon Highway between Braeside Road and Fleurtys Road to a full-width, divided carriageway road with overtaking lanes in each direction. It includes upgrades to the intersections of Braeside Road and Fleurtys Road.

Existing property accesses along the Huon Highway within the study area will be provided for and several school bus stops will be constructed along this stretch.

1.5 Information and Data Sources

The following organisations were contacted during the preparation of this report:

- ***Department of Infrastructure, Energy and Resources (DIER) –*** Crash and traffic data;
- ***Huon Valley Council –*** Land use planning and general road network information
- ***Sinclair Knight Merz (SKM) –*** Project and design information.

1.6 Consultation

Consultation was undertaken by John Wadsley Planning and Heratige Consultancy in August 2011 with affected residents. The consultation revealed a mixed review from local residents, with keys issues identified around access and project justification, along with some support for the project.

The project is strongly supported by Huon Valley Council.

A detailed analysis of the consultation outcomes is provided in a separate report by John Wadsley Planning and Heritage Consultancy.

2. Existing Conditions

2.1 Transport Network

In the context of the proposed Huon Highway upgrades, the transport network consists of the following roads:

- Huon Highway – the main road corridor, subject of the primary design of the project. The section of the Highway between Huonville and Geeveston was considered in this report;
- Braeside Road – located at the northern end of the project's construction; and
- Fleurtys Road – located towards the southern end of the project's construction.

Other roads, such as Jacksons Road, were considered during the preparation of this report but were not examined in detail.

2.1.1 Huon Highway

This section of the Huon Highway is classified as a 'Category 3 – Regional Access Road' under the DIER publication, *Tasmanian State Road Hierarchy,* 2007. The function of Category 3 roads is as follows:

> *Regional Access Roads are of strategic importance to regional and local communities and economies; they link important towns to the Category 1 and Category 2 roads. While they are used by heavy freight vehicles, this use is less than that of Regional Freight Roads. Together with Regional Freight Roads, the Regional Access Roads also provide safe and efficient access to Tasmania's Regions. Regional Access Roads facilitate:*
>
> - *connection of smaller regional resource bases with trunk and regional freight roads;*
> - *local commercial interaction;*
> - *sub-regional and inter-regional freight movement by connecting with trunk and regional freight roads;*
> - *sub-regional passenger vehicle movement and connection to trunk and regional freight roads; and*
> - *sub-regional tourist movement and connection to trunk and regional freight roads.*

Huon Highway is a two-lane, two-way road for the majority of its length and connects between Southern Outlet, Kingston, and Kingfish Beach Road, Southport. Huon Highway provides access to Huonville, the Huon Valley and other southern regions of Tasmania.

Within the area of construction of the overtaking lanes, the Huon Highway has one lane travelling in each direction and a total pavement width of approximately 6 metres. The road has a gravel shoulder and no formal drainage. There are several existing property accesses along this stretch of the Huon Highway. The speed limit of the Highway is the general rural speed limit of 100-km/h, as signed by the "END-60" speed zoning.

A typical section of Huon Highway is shown in Figure 2.

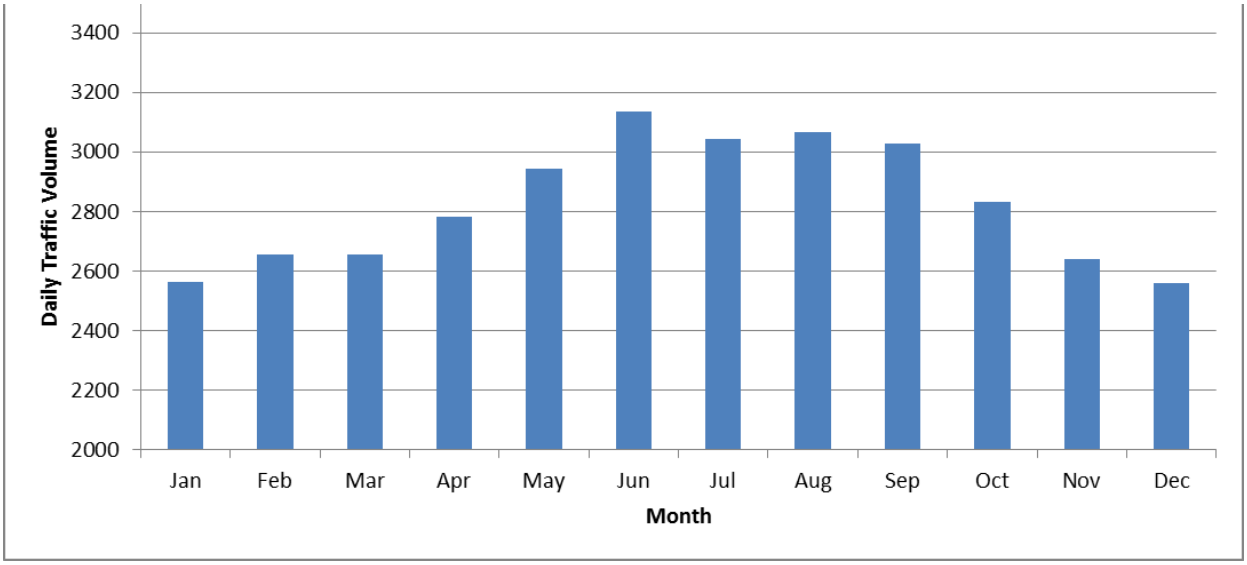
Figure 2 Huon Highway Typical Cross-Sections

A traffic survey on the Huon Highway south of Braeside Road was undertaken by Midson Traffic from 12th to 20th September, 2011 using pneumatic tube counters. The survey recorded the passage of every vehicle during this time, as well as its speed and classification (vehicle type). The results of the survey are summarised as follows:

- Average Weekday Daily Traffic (AWDT):
  - → Total 3,235 vehicles per day
  - → Northbound 1,610 vehicles per day
  - → Southbound 1,625 vehicles per day
- Average Daily Traffic (ADT)
  - → Total 3,030 vehicles per day
  - → Northbound 1,514 vehicles per day
  - → Southbound 1,516 vehicles per day
- Morning peak hour traffic:
  - → Total 242 vehicles per hour
  - → Northbound 141 vehicles per hour
  - → Southbound 101 vehicles per hour
- Evening peak hour traffic:
  - → Total 286 vehicles per hour
  - → Northbound 134 vehicles per hour
  - → Southbound 152 vehicles per hour

The Huon Highway experiences a significant seasonal variation ranging from -9.0% during the summer months to +11.4% midyear. The seasonal variation in AADT on the Huon Highway is shown in Figure 3 below (from DIER data). The seasonal variation is opposite to Highway corridors that service summer tourism regions (such as Tasman Highway and Arthur Highway), that have peaks during summer months.

Figure 3 Season traffic variation



DIER traffic data indicates a historic growth of approximately 2.2% per annum on the Huon Highway.

2.1.2 Huon Highway Overtaking Opportunities

An examination of the existing overtaking opportunities on the Huon Highway between Huonville and Geeveston was undertaken. The extent of the overtaking opportunities along this 21km length of the Highway is shown below:

- Double barrier line marking 8.0km 38%
- Broken centreline marking northbound 3.2km 15%
- Broken centreline marking southbound 2.7km 13%

The balance of approximately 10km is made up of townships (such as Franklin, Port Huon, Castle Forbes Bay, etc), where overtaking is not generally possible. The breakdown of line marking between Huonville and Geeveston is shown in Table 1.

Table 1 Line Marking Segments – Geeveston to Huonville

Double centreline	510m	2,240m	1,150m	940m	570m	2,125m	110m	360m		
Overtaking northbound	210m	260m	0	870m	300m	220m	280m	530m	390m	165m
Overtaking southbound	440m	195m	240m	806m	0	0	264m	623m	170m	0

The existing overtaking opportunities on the Highway between Geeveston and Huonville consists of broken centre line marking, where traffic must enter the opposing flow to overtake slow moving vehicles. Existing overtaking opportunities therefore diminish as traffic flow rates increase.

It can be seen from Table 1 that whilst overtaking opportunities exist in the form of broken centre line marking, that the available sections are relatively short. The longest sections are 870 metres and 806 metres for northbound and southbound respectively. Other sections are typically 200-300 metres in length, which are relatively ineffective in reducing platooning effects caused by slow moving traffic.

2.1.3 Braeside Road

Braeside Road is a local road originating at the Huon Highway and extending eastward for approximately 4km, providing access to a number of rural residential properties and vineyards along its length.

It is approximately 5.5 metres in width with narrow shoulders and open drains. It has a gentile uphill grade from the Highway. Traffic volumes are relatively low, in the order of 200 vehicles per day. Braeside Road is shown in Figure 4.

Figure 4 Braeside Road

2.1.4 Fleurtys Road

Fleurtys Road is a local road originating at the Huon Highway and extending eastward for approximately 3km, providing access to a number of rural residential properties.

Fleurtys Road is unsealed and has a typical road width of approximately 5 metres. Traffic volumes are very low, in the order of 50-100 vehicles per day. Fleurtys Road is shown in Figure 5.

Figure 5 Fleurtys Road

2.2 Road Safety Performance

Crash data can provide valuable information on the road safety performance of a road network. This information can be utilised as a tool to assist in the identification of possible road safety deficiencies associated with a transport network.

Crash data was obtained from DIER for the most recent 10 year time period (1 January 2001 to 30 August 2011) for a 3.7km segment of the Huon Highway, between Braeside Road and Fleurtys Road and 1km beyond these intersections.

The crash history is summarised as follows:

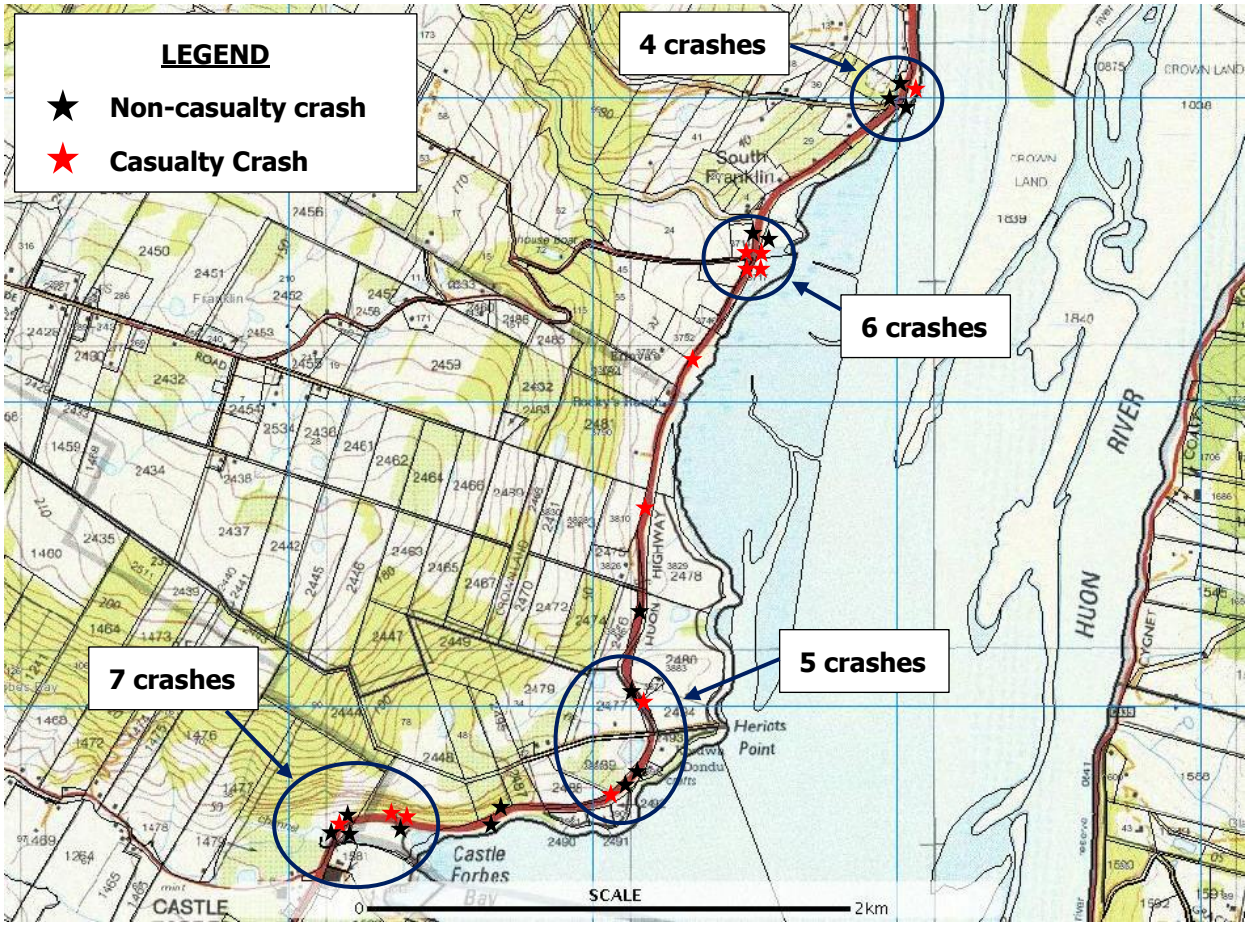
- There were a total of 27 crashes recorded during this time. Of these, 4 resulted in *serious injury,* 6 resulted in *minor injury* , 2 required the application of *first aid* at the scene, and the remaining 15 were *property damage only.*
- The majority of crashes, 20, occurred mid-block (ie. not at an intersection) on the Huon Highway. The location with the highest intersection crashes was the Braeside Road/ Huon Highway intersection with 4 recorded crashes.
- The most common crash type was *off path on curve* type crashes with 15 occurrences followed by *off path on straight* crashes with 3 occurrences. There were also 3 *head on*

collisions, 2 *overtaking* crashes, 1 *rear end,* 1 *right through* crash and 2 *miscellaneous* crashes.

The crash profile is typical of a two-lane, rural road such as the Huon Highway with the most common crashes being *off path on curve, off path on straight* and *head on* collisions. The 27 recorded crashes represent a 5 year crash exposure rate of approximately 99.7 crashes per 100,000 veh-km (AADT), which is considered to be relatively high.

The crashes on this section of Huon Highway are typically split into four "clusters" centred around the Jacksons Road intersection, the Braeside Road intersection, the Fleurtys Road intersection and a sweeping bend at the southern end of the road section. There were also three crashes located mid-block between the Fleurtys Road and Braeside Road intersections. These clusters are shown in Figure 6.

Figure 6 Crash locations (Source: DIER & LIST Database, DPIPWE)



The crash trends at each of the clusters shown in Figure 6 are summarised as follows:

- ***Jacksons Road Intersection***

  Of the 4 crashes near Jacksons Road, 1 involved a head on collision resulting in minor injury. The remaining 3 resulted in property damage only and involved a vehicle losing control on the curve slightly north of the intersection.

- ***Braeside Road Intersection***

  Of the 6 crashes surrounding the Braeside Road intersection, 3 involved a vehicle losing control on the curve with 2 of these resulting in minor injury and one in property damage only. One serious crash involved a right through manoeuvre at the intersection, one was due to a U-turn manoeuvre and one was a rear end collision which required the application of first aid at the scene.

- ***Fleurtys Road Intersection***

  All 5 crashes near the Fleurtys Road intersection involved a vehicle losing control on the curve directly adjacent to the intersection. Of these, 2 resulted in casualty with 1 requiring the application of first aid at the scene.

- ***Southern Bend***

  Of the 7 crashes at the sweeping bend at the southern end of the study area, 6 involved a vehicle losing control on the curve, with 2 of these resulting in casualty, 1 being serious. The other crash was a result of a vehicle striking an object on the carriageway and resulted in property damage only.

3. Design Review

3.1 Warrants for Overtaking Lanes

The Austroads publication, *Guide to Road Design – Part 3: Geometric Design,* 2009, outlines the warrants and design guidelines for auxiliary lanes including speed change lanes and overtaking lanes. Overtaking demand is described as follows:

> *The demand for overtaking occurs each time a vehicle catches up with another and the driver wishes to maintain the speed of travel. Provided there is no approaching traffic, this manoeuvre can occur where there is adequate sight distance.*
>
> *As traffic volume increases, the approaching traffic will restrict the available places where overtaking can occur and these will be further limited by the road geometry.*
>
> *If demand is not met the results are:*
>
> - *enforced following*
> - *the growth of traffic bunches*
> - *driver delay and frustration.*
>
> *In extreme no-overtaking situations, very long queues can develop behind the slowest vehicles in the traffic stream. The delay and frustration experienced on grades may be greater due to the slow speed of travel. The proportion of the journey time spent following in bunches is a useful measure of quality of service as seen by the driver.*
>
> *The type of slow vehicle influences the nature of overtaking demand. Some vehicles can be overtaken easily anywhere along a route, while for others an upgraded overtaking opportunity is desirable. In evaluating the need for auxiliary lanes, attention should be given to the type of slow vehicles involved and whether the overtaking demand is continuous along a route or confined to specific problem locations.*
>
> *Types of slow vehicles are:*
>
> - *vehicles with fairly high speeds, that slow down markedly on grades*
> - *vehicles with low speeds, not affected by grades*
> - *vehicles with average speeds that are seen as slow by those wishing to travel faster.*

The warrants for the installation of overtaking lanes depend largely on the existing overtaking opportunities preceding the location under consideration and the percentage of the traffic stream that is travelling at a relatively slow speed. In general, the minimum traffic volumes for which overtaking lanes are warranted are as listed in Table 2 below.

Table 2 Warrants for overtaking lanes (Austroads, 2009)

Overtaking opportunities over the preceding 5 km		Current-year design volume (AADT)		
Description	Percent length providing overtaking	Percentage of slow vehicles		
		5	10	20
Excellent	70 – 100	5,670	5,000	4,330
Good	30 – 70	4,330	3,670	3,330
Moderate	10 – 30	3,130	2,800	2,470
Occasional	5 – 10	2,270	2,000	1,730
Restricted	0 – 5	1,530	1,330	1,130
Very Restricted	0	930	800	670

The assessment of the project against these warrants is provided in Section 4.1.

3.2 Design of Overtaking Lanes

In general, the minimum length of overtaking lanes for an operating speed of 100-km/h is 550 metres with a desirable length of 950 metres to provide ample opportunity for a number of vehicles to perform overtaking manoeuvres.

It is important to provide sufficient sight distance to the overtaking lane termination so that the overtaking vehicle can decide whether to proceed or abandon the overtaking manoeuvre. The minimum merge sight distance for an operating speed of 100-km/h is 400 metres.

Merge and diverge taper lengths are provided in the Austroads design guide based on the design speed of the road and the width of the lane. Given a design speed of 100-km/h and a nominal lane width of 3.5 metres, minimum taper lengths are as follows:

- Diverge taper 100 metres
- Merge taper 165 metres

Overlapping merge tapers for overtaking lanes in both directions should be avoided to prevent conflict between merging vehicles.

In general, for a two-lane, two-way divided road, shoulders widths should be 2.5 metres on the left hand side and 1.0 metres on the median side in both directions.

3.3 Location of Road Improvements

The proposed location of the overtaking lanes was carefully selected based on vertical and horizontal geometry, minimum impact on adjacent property access, and physical location to maximise traffic flow benefits.

Through the preliminary design process, it was deemed that the proposed location of the overtaking lanes was the only viable location to achieve the intended benefits.

3.4 DIER Road Safety Strategy

The DIER publication, *Tasmanian Road Safety Strategy 2007 – 2016,* provides the strategic directions to be taken to achieve the specific road safety targets outlined in *Tasmania Together,* the Tasmanian Government's long-term social, economic and environmental plan for the future. The Tasmanian Road Safety Strategy also aligns with the National Road Safety Strategy.

The road safety targets are as follows:

- By 2010: 20% reduction in serious injuries and fatalities from 2005.
- By 2015: 20% reduction in serious injuries and fatalities from 2010.
- By 2020: 20% reduction in serious injuries and fatalities from 2015.

The Tasmanian Road Safety Strategy embraces the 'Safe Systems' approach to road safety. The Safe Systems recognises that people will make errors, and that there is a limit to the forces that a human body can withstand before injury occurs. The Safe Systems approach aims to minimise those forces so they don't result in serious injury or death.

In line with the Safe Systems approach, the Tasmanian Road Safety Strategy describes four key strategic directions for the achievement of these road safety targets:

1. Safer travel speeds,
2. Best practice infrastructure,
3. Increased safety for young road users, and
4. Enhanced vehicle safety.

This project falls under the category of providing better infrastructure. Key infrastructure methods that enhance safety are as follows:

- separation of opposing vehicles in high-speed settings (>70 km/h zones), using flexible barriers;
- roadside barriers;
- roundabouts at intersections in both urban and rural settings;
- safer roadside areas;
- high standards of delineation;
- sealed shoulders in rural areas;
- consistently high skid resistance or road pavements; and

- comprehensive coverage of roadside hazards using crashworthy barriers.

3.5 National Road Safety Strategy

The National Road Safety Strategy, 2011 – 2020 has recently been released. The Strategy sets out a comprehensive plan to reduce road trauma through improvements and interventions relating to safe roads, safe speeds, safe vehicles and safe people in line with the Safe Systems philosophy.

The Safe Roads component of the National Strategy states that:

> *"New roads need to be designed and built to high safety standards. On existing roads, safety treatments can help prevent crashes or minimise the consequences of a crash if it occurs. Three types of crashes are quite common: crashes where a vehicle leaves the road, crashes at intersections and head-on crashes. These need to be a focus for treatment".*

The Strategy provides a list of intervention steps, with the following relevant to the Huon Highway upgrade project:

> *"Road authorities certify that all new road projects are designed and built to reduce the risk of crashes, and better protect people in the event of a crash.*
>
> *More will be spent on treatments targeting head-on, run-off road and intersection crashes".*

The project involves the construction of overtaking lanes and a wire rope central median treatment. This treatment is aligned with the strategies to reduce head-on and run-off road collisions.

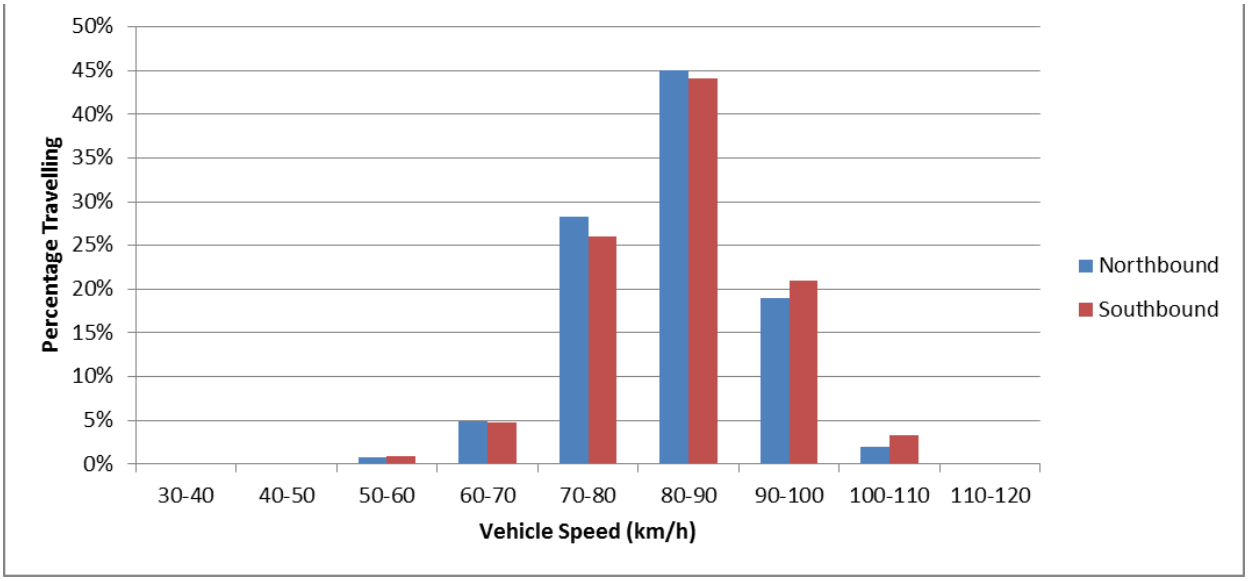
4. Traffic and Road Safety Analysis

4.1 Overtaking Lanes

The overtaking opportunity preceding the study area in the northbound direction is *restricted* as defined in Table 2 as having 0-5% of its length available for overtaking manoeuvres near the proposed construction site. Similarly, in the southbound direction, there is *occasional* opportunity for overtaking with 5-10% of its length available.

The existing vehicle speed profile, as recorded during the traffic count south of Braeside Road, is shown in Figure 7. Note that the counter was located on in the middle of a straight section of road and the speed profile is assumed to be indicative of 'free speed' in the absence of road geometry changes.

Figure 7 Existing Vehicle Speed Profile



The average speeds recorded were 82-km/h in the northbound direction and 83-km/h in the southbound direction. The 85th percentile speeds (defined as the speed not exceeded by 85% of vehicles) were 92.7-km/h and 94.0-km/h in the northbound and southbound directions respectively.

The traffic data indicated that the percentage of heavy vehicles were 8.0% and 7.9% for northbound and southbound directions respectively. Whilst not all of these vehicles would be travelling at a lower speed than normal cars, the relatively high proportion of these vehicles is likely to result in disparate vehicle speeds.

It is further noted that the region has a relatively high proportion of tourist traffic, caravans, cars with trailers, farming traffic , etc, in addition to heavy vehicle traffic. This explains the relatively large spread of traffic speeds along this section of the Highway, as shown in Figure 7. If slow vehicles are defined as

travelling 10% lower than the average speed, then the proportion of slow vehicles in the traffic steam is 7.0% for both northbound and southbound traffic.

Current and forecast traffic volumes (AADT) on the Huon Highway through this section, along with the minimum traffic volume that warrants the installation of overtaking lanes based on the prior overtaking opportunity in each direction, are shown in Table 3 below.

Table 3 Current and Forecast Traffic Volumes

Direction	AADT (2011) one-way	AADT (2021)* one-way	AADT (2031)* one-way	Warrants for Installation (min) one-way+
Northbound	1,514	1,882	2,340	725
Southbound	1,516	1,885	2,343	1,081

* *growth rate based on nominal 2.2% per annum growth*

+ *calculated by interpolating requirements in Table 2 (7% slow vehicles) and dividing by half to account for one-way volume.*

Therefore the Huon Highway meets the warrants for the provision of overtaking lanes in accordance with Austroads guidelines for '*occasional*' overtaking opportunities.

In terms of traffic flow, the proposed overtaking lanes will allow vehicles to travel more freely. The existing 85th percentile speed is approaching this speed, but the standard deviation of traffic flow is approximately 12-km/h, indicating that there is a relatively large spread of vehicle speeds within the traffic flow (for reasons explained previously). This spread of vehicle speeds typically leads to platooning of vehicles and may lead to risk taking behaviour due to the general lack of overtaking opportunities along this section of the Huon Highway.

Whilst slower vehicles (heavy vehicles and the like) are still likely to travel at relatively lower speeds, faster vehicles will have the option of overtaking without entering the opposing traffic flow with the proposed construction of the overtaking lanes.

4.2 Vehicle Queuing

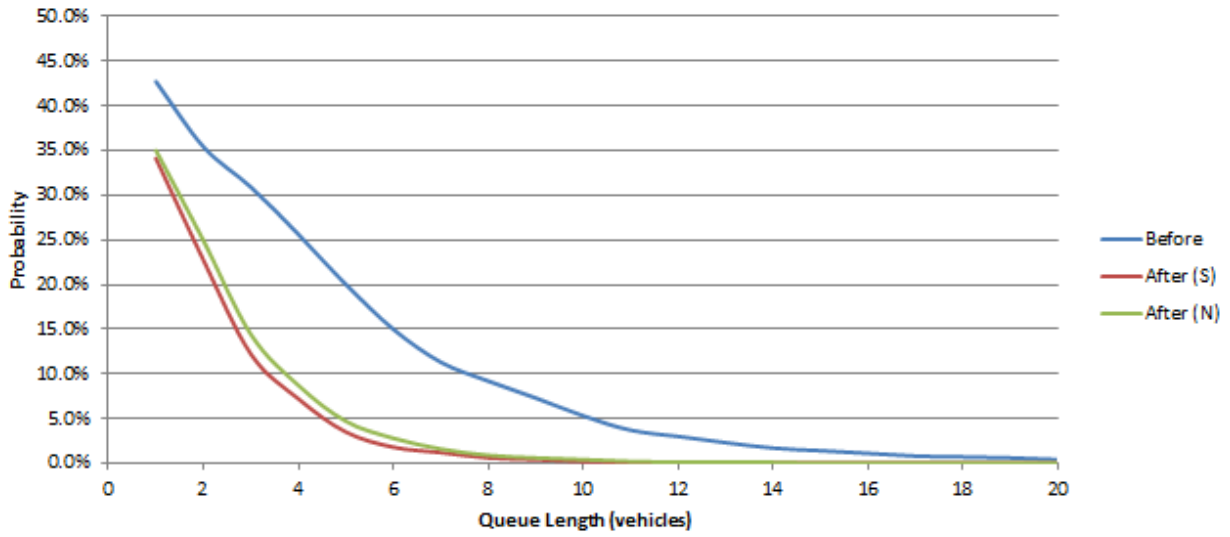
There are very limited overtaking opportunities between Geeveston and the subject site, and Huonville and the subject site. As discussed in Section 2.1.2, these overtaking opportunities currently consist of generally short sections broken centreline marking requiring vehicles to enter the opposing traffic flow. Using the proportions of slow and fast moving traffic (using the speed bins shown in Figure 7), the probability of various queue lengths was determined using typical flow rates.

The graphs shown in Figure 8 and Figure 9 show the probability of queue lengths for the existing Highway configuration (shown as "Before" in the graphs) compared to the queue lengths north and south of the subject site once the overtaking lanes have been constructed.

For northbound traffic, it can be seen in Figure 8 that the 95th percentile queue length[1] decreases from 10 cars under existing conditions to 5 cars once the overtaking lanes have been constructed. Similarly, for southbound traffic, Figure 9 shows the 95th percentile queue length decreases from 12 cars under existing conditions to 6 cars once the overtaking lanes have been constructed.

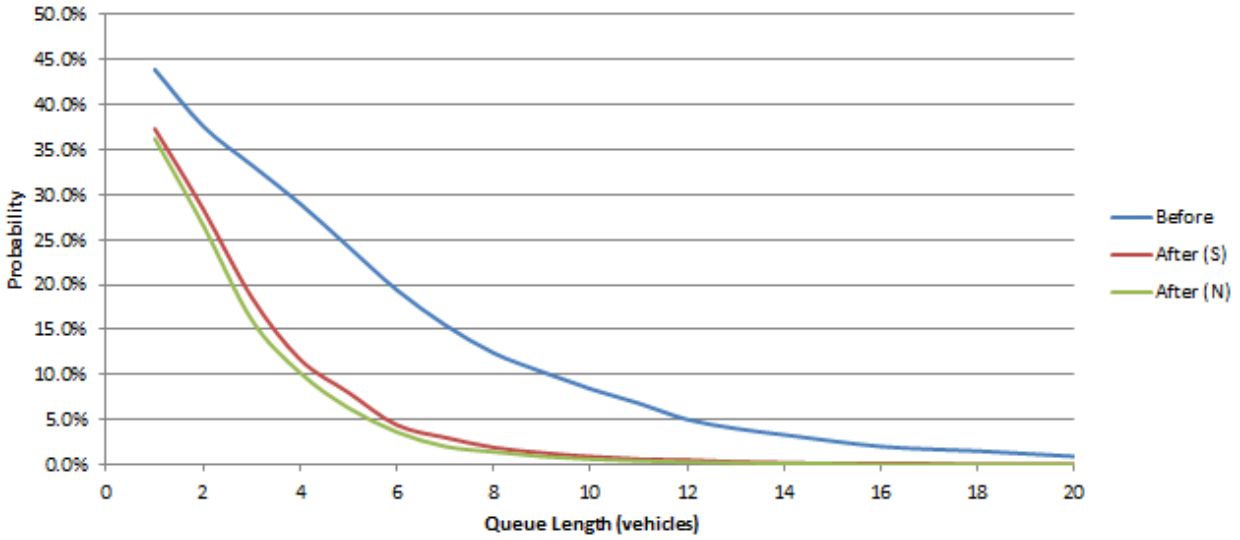
Average queue lengths are less than 1 car for all scenarios (existing and with overtaking lanes).

Figure 8 Platooning Queue Lengths (Northbound)



[1] The 95th percentile queue length is the queue not exceeded 95% of the time

Figure 9 Platooning Queue Lengths (Southbound)



The proposed overtaking lanes therefore effectively reduce the lengthy queues formed by slow moving traffic.

4.3 Road Design

The road design incorporates a number of key improvements. These are briefly summarised as follows:

- Improved geometry through the minor straightening of some curves.
- Improved delineation through the installation of upgraded line marking and the central median treatment.
- Consistent lane and shoulder widths (conforming to Austroads road design requirements). The design incorporates cut and fill along its length to ensure that appropriate widths are provided.

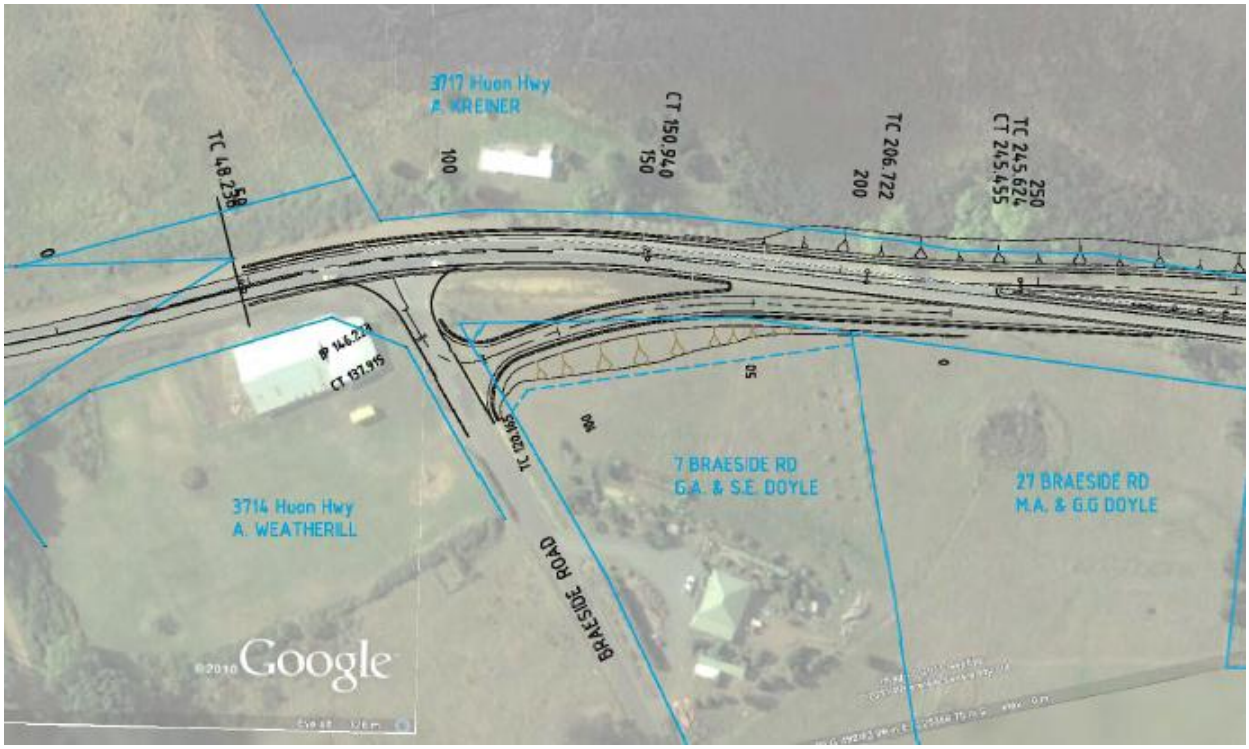
4.4 Intersection Design

Several intersections are located along the length of the site. The design of each of these intersections is outlined in the following sections.

4.4.1 Braeside Road

The Braeside Road junction is a standard T-junction on approximately the same alignment as the existing intersection. It is proposed to include a slip lane for northbound traffic to exit Huon Highway. This assists vehicles to undertake a U-Turn to access property on the opposing side of the central barrier within the overtaking section.

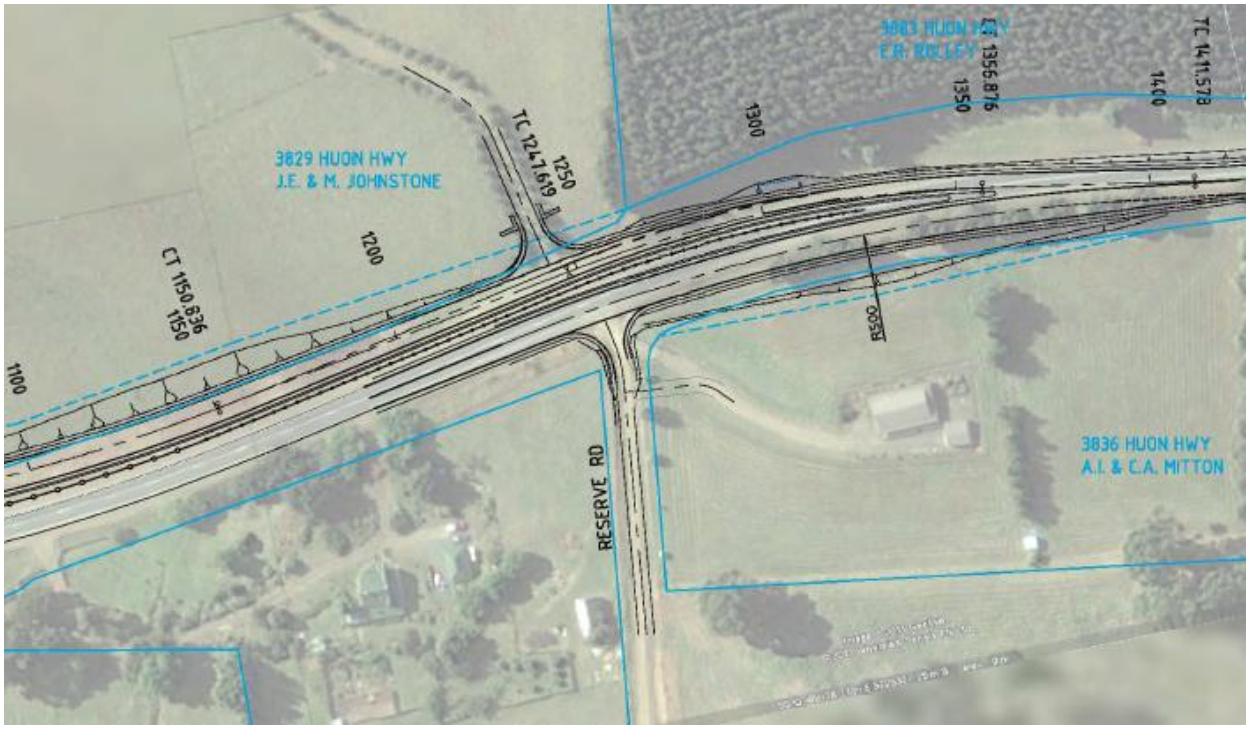
Figure 10 Braeside Road Junction Design



4.4.2 Reserve Road

The junction of Reserve Road is proposed to be two separated sealed T-junctions, with only left-in/ left-out turns permitted due to the installation of the central wire rope barrier. Slip lanes are provided at the Braeside and Fleurtys Road junctions to enable U-Turn manoeuvres to be undertaken to provide access.

Figure 11 Reserve Road Junction

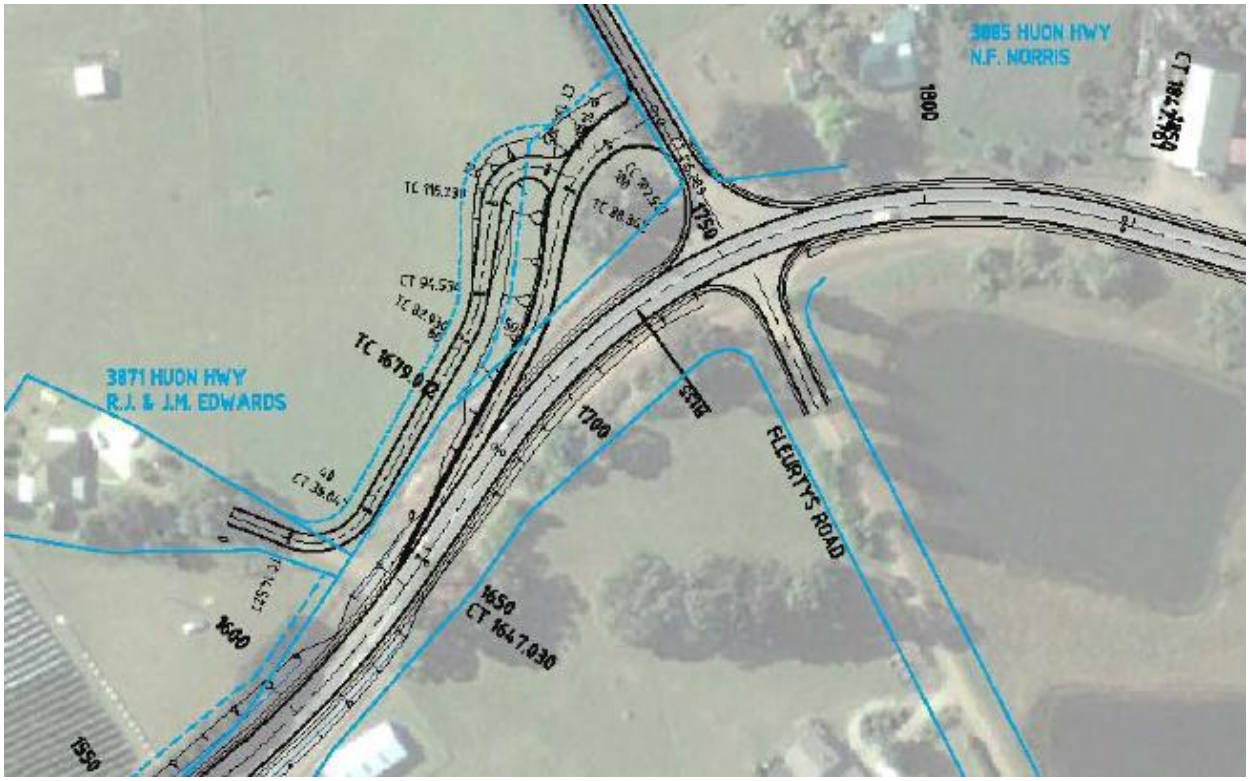


4.4.3 Fleurtys Road

The Fleurtys Road junction is proposed to be sealed and formalised. It is proposed to include a slip lane for southbound traffic to exit Huon Highway. This assists vehicles to undertake a U-Turn to access property on the opposing side of the central barrier within the overtaking section.

The Fleurtys Road junction design is shown in Figure 12.

Figure 12 Fleurtys Road Junction



4.5 Access Impacts

The proposed highway improvements will have an impact on property access between Fleurtys Road and Braeside Road due to the central median treatment restricting the ability for vehicles to undertake a right turn manoeuvre. Turning facilities, known as a "G-Turn" facility have been proposed at the Fleurtys Road and Braeside Road junctions to enable U-Turns to be performed for the purpose of accessing property.

The primary impact this for property access is the increased travel time associated with turning at either Braeside Road or Fleurtys Road.

As a worst case scenario, a comparison of travel time for the closest access to Braeside Road (3740 Huon Highway) has been assessed for existing and proposed conditions for traffic accessing the property from the north. This is outlined as follows:

- Additional distance travelled (both carriageways) = 2.8 km
- 85th percentile speed = 100-km/h (design speed)
- Additional through travel time = 1 minute, 10 seconds
- Additional G-Turn intersection delay = 4 seconds (based on opposing flow of 250 vehicles per hour)

- Total delay = 1 minute, 14 seconds (74 seconds)

Note that the time associated with undertaking the G-Turn manoeuvre is considered an overestimate, as under the existing conditions (ie. no central median barrier) there would be some delay associated with undertaking a normal right turn entry manoeuvre at the access and this time has not been included in the analysis (and would be in the order of 2 seconds average delay).

Therefore the additional travel time associated with right turn access will vary between 20 seconds and 90 seconds (accounting for the actual location of the access and different travel speeds). When considering this additional time in context with a journey from Huonville, the extra time represents less than 20% of additional travel time (based on a journey time from Huonville taking approximately 6 minutes).

4.6 Crash Reduction

The proposed development incorporates several design elements that will have positive road safety impacts. Countermeasure reduction factors are provided in the Austroads publication, *Guide to Traffic Engineering Practice, Part 4, Treatment of Crash Locations, 2004.* The crash reduction effectiveness of the proposed components of the design outlined in Table 4.

Table 4 Effectiveness of Countermeasures (Austroads)

Countermeasure	Target Crash Type	Effectiveness	Target Crashes (previous 10 years)	Future crash forecast (future 10 years)
Median treatment	Head-on	-90%	3	0
Overtaking lanes	Head-on	-30%		
Right turn restrictions due to central wire rope barrier	Rear end	-50%	1	0.5
Improved delineation	Off path	-40%	18	6.5
Seal shoulders	Off path	-40%		
Seal shoulders	Out of Control on Carriageway	-40%	2	1.2
Subtotal target crashes			**24**	**8.2**

When considering the crash rate for the previous 10 years (27 reported crashes), the forecast crash rate for the next 10 years is therefore likely to be in the order of 12 crashes. This is based on the target

crash reduction from 24 to 9 (rounded up from 8.2) in addition to the 3 crashes that are not specifically targeted by the proposed road improvements.

This represents approximately a 44% reduction in crashes. It should be noted however that crashes generally fluctuate from year to year, and other factors (such as traffic growth, policy decisions, etc) also impact on crash rates over time. The crash reduction calculations should therefore be considered in the context of these factors.

It should be noted that the crash reductions calculated in Table 4 do not account for the additional road safety benefits that are likely to be experienced further towards Huonville and Geeveston. The provision of vastly improved overtaking opportunities will reduce queuing and risk behaviour well beyond the physical extents of the road works.

5. Conclusions

The existing section of the Huon Highway between Franklin and Geeveston has narrow road width and narrow, unsealed shoulders. There are very limited overtaking opportunities within and on the northern and southern approaches to the subject site. Over the past 10 years there have been 27 crashes in the transport network near the subject site.

The budgeted $8M Huon Highway upgrades are intended to provide a safe and unimpeded overtaking opportunity for vehicles travelling between Franklin and Geeveston and to improve safety for all road users. It is part of the $90 million Community Roads Package announced by the State Government in 2010. The proposed upgrades incorporate a divided carriageway with overtaking lanes in each direction. The carriageways are separated by a central median with a wire rope barrier in line with current National and International practices. The proposed location of the overtaking lanes was carefully selected based on vertical and horizontal geometry, minimum impact on adjacent property access, and physical location to maximise traffic flow benefits.

The proposed overtaking lanes satisfy the Austroads warrants for installation based on traffic flow and existing overtaking opportunities.

The road works will deliver significant road safety improvements, predicted to equate to a reduction of approximately 44% of crashes over the next ten years. Travel time savings will extend well beyond the subject site, as the improved overtaking opportunities will reduce platooning caused by slow moving traffic. Queuing analysis indicates that 95th percentile platooning queues will halve once the overtaking lanes have been installed. This benefit extends between Geeveston and Huonville through the reduction of queuing and reduced risk taking driver behaviour.

Property access is likely to be impacted through the increased travel time associated with the central median treatment restricting the ability for vehicles to undertake a right turn manoeuvre. Turning facilities, known as a "G-Turn" facility have been proposed at the Fleurtys Road and Braeside Road junctions to enable U-Turns to be performed for the purpose of accessing property. The increased travel time is likely to be between 10 and 90 seconds depending on the location of the property along the proposed works.

In summary, the proposed overtaking lanes are meet Austroads warrants for installation, are located in the most appropriate location, and will deliver significant road safety and traffic flow benefits between Geeveston and Huonville.

Midson Traffic Pty Ltd ABN: 26 133 583 025

Room 7, Level 1, Bank Arcade
64 Liverpool Street, Hobart
TASMANIA 7000
T: (03) 6231 1111 E: admin@midsontraffic.com.au W: www.midsontraffic.com.au

Document Status

Revision	Author	Review	Date
DRAFT	Keith Midson	Mark Petrusma	9 October 2011
Rev01	Keith Midson	Julian Koning	22 November 2011
Rev03	Keith Midson	Julian Koning	5 December 2011