

# **Clare and Goyder**

**Regional Road Assessment February 2018** 



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# Executive Summary

RAA's Road Safety team periodically evaluates the South Australian regional road network. This assessment of the Clare Tourism region reviews the road network within both the Clare and Gilbert Valley Council and Regional Council of Goyder districts and is largely based on the biggest concerns of RAA members in the region.

RAA consulted the community through a stakeholder consultation session and a survey of Members and residents living in the Clare and Goyder council districts to determine areas of concern. RAA then undertook three days of site investigations covering a distance of over 1200 kilometres. These traffic and road assessments took place between the 9<sup>th</sup> and 11<sup>th</sup> of January 2018. In addition, the Horrocks Highway was assessed separately in mid-December 2017 taking a full day in itself.

From the Member survey, key transport issues identified included:

- Appropriate speed limits for unsealed roads
- Poor road maintenance on both sealed and unsealed roads
- Troublesome and dangerous freight interactions
- Access to the unsealed road network during inclement weather
- Heavy vehicle access through the town centre of Clare
- Confusion relating to inconsistent speed limit changes in the region
- Inadequate alternative transport options

As a result of our investigations and community feedback, the RAA Road Safety Team have identified some key areas of improvement and further investigation that are required in the region including:

- Major improvements and upgrades needed on Horrocks Highway
- Investigation into the feasibility of a Clare freight bypass
- Safety improvements to the freight network within the region which will benefit all road users, particularly on Farrell Flat Road and Blyth Road
- Changes from traditional intermediate speed buffer zones to 'speed limit ahead' zones on major approaches to townships to reduce confusion with the total number of speed zone changes
- Improvements to other major highways including Barrier Highway, Goyder Highway and Thiele Highway
- Implementation of a sealed tourist route incorporating Spring Gully Road and Saw Mill Road

Further to these points, RAA have listed key recommendations for a number of roads and intersections assessed in this report as a result of our traffic investigations in the region. These recommendations have been made to upgrade the roads assessed to a higher level of safety. However, RAA also understands the need to secure funding and prioritise projects based on traffic volumes and crash history. It is therefore understood that to implement all recommendations in this report will not be possible in a short timeframe, however should be used as a target for the region.



# Contents

Executive Summary	ii
Contents	iii
Background	1
Recommendations	3
Discussion and Survey Analysis	8
Community Engagement	8
Member Sampling Frame	8
The Region	9
Mobility Profile	9
Road Maintenance	9
Unsealed Roads	
Freight	
Road Safety	
Speed Zones	
Tourism	
Cycling	
Walking	
Alternative Transport	
Community Transport	
Taxi and App-based Ride sharing	20
Site Investigation Details and Recommendations	21
Horrocks Highway (Tarlee – Bungaree)	21
Barrier Highway (Giles Corner to Terowie)	
Farrell Flat Road	
Blyth Road (Blyth Plains Road to Clare)	42
Goyder Highway (Spalding – Morgan)	49
Thiele Highway (Morgan - Eudunda)	53
Worlds End Highway	55
RM Williams Way (Bungaree – Spalding)	58
Saddleworth Road (Marrabel to Auburn)	61
Balaklava Road	63
Blyth Plains Road	66
Tarlee Road	



Spring Gully Road/Saw Mill Road	70
Booborowie Road	72
Black Springs Road	73
Main Road 45 (Marrabel – Waterloo Road)	75
Other Roads/Issues Assessed	77
Appendices	81
Appendix A – Investigation Locations	82
Appendix B – Summary of Crash Statistics	83
Appendix C – Speed Survey Results	85



# Background

The RAA Road Safety Team periodically evaluates the South Australian regional road network. This is the first assessment of the Clare Tourism region and covered more than 1200 kilometres assessing more than 30 roads and intersections over 3 days in January 2018. RAA have previously assessed some of the major highways in the region with an assessment undertaken in July 2015. Roads that were assessed in 2015 with sections re-assessed in 2018 include Saddleworth Road, Goyder Highway, RM Williams Way, Worlds End Highway and Blyth Road.

RAA consulted with local authorities and stakeholders as well as sending a detailed survey to over 2000 members residing in the Clare and Gilbert Valleys Council and Regional Council of Goyder regions. We sought information on locations that posed safety concerns in order to assist with generating our list of traffic and road assessments to conduct over the three day assessment period.

The area assessed is shown in the map below and is defined by the combined boundaries of the Clare and Gilbert Valleys Council and the Regional Council of Goyder.

The Roads and locations assessed are listed in Appendix A in the approximate order they appear in this report and a summary of crash statistics in Appendix B.





The area and roads assessed as part of this tourism region assessment



# Recommendations

A table summarising RAA's recommendations for the region can be found below. Each of these recommendations are discussed throughout this report.

Key Recommendations	Authority
RAA, in conjunction with DPTI, MAC & regional tourism authorities develop an education and information strategy for both interstate and overseas tourists to the region	All
Speed limits into townships are reviewed and consolidated throughout the region together with a program of consistent signage to warn motorists of changing speeds.	All
Additional connectivity between the regions' towns by way of dedicated cycling paths similar to the current Riesling Trail.	All
Horrocks Highway – Key Recommendations	Authority
Full reseal to address surface issues, with full pavement reconstruction required in some locations.	DPTI
Widen sealed shoulders.	DPTI
Install additional hazard barrier protection.	DPTI
Install audio tactile edge lines along the length.	DPTI
Install an overtaking lane in each direction between Auburn and Clare.	DPTI
To reduce the number of speed limit changes, consider replacing current intermediate speed buffer zones with G9-79 'Speed Limit ahead signs at all major entrances to townships in the region.	DPTI
Seal the apron of James street in Rhynie.	DPTI
Assess all tourism signage and replace deteriorated signs.	CGV
Assess on street parking in Auburn near the St Vincent St, King St and North St intersections and paint continuity lines along the edge of Horrocks highway at these intersections.	DPTI/CGV
Extend southbound left turn deceleration lane at the intersection with Mintaro Road and reseal the intersection.	DPTI
Trim vegetation impeding sight distance at Quelltaler Road in Watervale, and consider R1-1 'stop' sign treatment if improvements are not significant. Continuity line should also be installed across this intersection to delineate the edges of Horrocks Highway.	DPTI/CGV
Just south of the Victoria Road roundabout, ban right turns into the service station for southbound traffic on Horrocks Highway as alternate access points are safer.	DPTI
Conduct further investigation into the speed profile of vehicles travelling through townships along Horrocks Highway due to the high frequency of speeding vehicles.	DPTI



Review levels of policing and consider increasing where necessary.	SAPOL
Consider installation of TES 16005 'SPEED CAMERAS USED REGULARLY IN THIS AREA' signs in townships where speeding is prevalent.	DPTI/SAPOL
Increase the size of '50' and 60' signs leading into these speed zones to increase their prominence.	DPTI
Consider seasonal speed reduction treatments such as mobile speed feedback signs.	DPTI
Barrier Highway – Key Recommendations	Authority
Install minimum 1.0m wide sealed shoulders and 3.3m wide lanes south of Mount Bryan and North of Hallett as a priority, with other insufficient sections to follow and meet this minimum requirement.	DPTI
Review the 110km/h speed limit through Terowie and consider applying an 80km/h limit through Terowie.	DPTI
Repaint missing line marking south of Saddleworth where recent repairs have been completed.	DPTI
Undertake surface rehabilitation works between Saddleworth and Manoora.	DPTI
Additional barrier protection to reduce to severity of single vehicle/inattention crashes where a vehicle runs off the road or hits a fixed object.	DPTI
Installation of ATLM between Horrocks Highway and Saddleworth, and between Burra and Terowie as a minimum.	DPTI
Widen inside shoulders and the carriageway around the 'S bend' north of Mount Bryan as well as installing W1-8 'tilting truck' signs on each approach to warn of the rollover risk on this curve.	DPTI
Replace street name sign at Hilldrop Road and consider installing a stop sign at this intersection due to the reduced approach sight distance introduced by the W Beam barrier installed on Barrier Highway.	DPTI/RCG
Farrell Flat Road – Key Recommendations	Authority
Widen bridges east of Clare.	DPTI
Widen inside shoulders on tight curves between Clare and Farrell Flat.	DPTI
Install 1.0m sealed shoulders between Farrell Flat and Barrier Highway.	DPTI
Install set back give way holding line (and R1-2 'give way' sign) at the Barrier Highway intersection.	DPTI
Additional Barrier protection for drop-offs and large trees.	CGV
Remove disused rail crossing and reconstruct road surface in this location.	DPTI/CGV
At the intersection with White Hut Road, refresh line marking, reseal failing section of White Hut Road, and install a grate over the south-eastern stormwater pit.	DPTI/CGV
Blyth Road – Key Recommendations	Authority

Blyth Road – Key Recommendations	Autho



Widen lanes and install 1.0m sealed shoulders along the length.	DPTI
Investigate the feasibility of an overtaking lane on the uphill section east of Old Blyth Road. As a minimum, a slow vehicle turnout should be provided.	DPTI
Install additional barrier protection to protect drop-offs and significant roadside vegetation.	DPTI
Remove current zigzag markings on both approaches to the school zone for Clare High School and re-paint in advance of the school zone signage in accordance with section 3.21 of the DPTI Pavement Marking Manual.	DPTI
Improve pedestrian safety by restricting access at the intersection with Horrocks Highway. Tubular fencing or W Beam barrier can be used to discourage pedestrians crossing in unsafe locations.	CGV
Improve safety at the intersection With Hicks Road/Boconnoc Park Road by implementing a number of signage and line marking changes as well as vegetation maintenance to improve sight distance.	DPTI/CGV
Goyder Highway (Spalding - Morgan) – Key Recommendations	Authority
Consider future upgrade/widening of the Freshwater Creek bridge in Spalding to improve safety and freight productivity.	DPTI
Undertake local surface repair works between Spalding and Burra and near the Quarantine bin 30km north-west of Morgan.	DPTI
Install barrier protection for the pipeline between Spalding and Burra as well as for stobie poles on curves and close to the edge.	DPTI
Implement an additional rest stop between Burra and Morgan, this could be achieved by upgrading the facilities at the Quarantine bin 30km north-west of Morgan.	DPTI
Seal shoulders to a minimum of 0.5m for the 20km of Highway north-east of Morgan as a priority.	DPTI
Thiele Highway (Morgan – Eudunda) – Key Recommendations	Authority
Implement a shoulder sealing program for all sections that currently lack sealed shoulders to provide a minimum 0.5m shoulder seal.	DPTI
Provide additional barrier protection for roadside vegetation.	DPTI
Install barrier protection for the pipeline between Spalding and Burra as well as for stobie poles on curves and close to the edge.	DPTI
Worlds End Highway – Key Recommendations	Authority
Provide a minimum 3.3m lane widths and 0.5m shoulder seal south of Robertstown.	DPTI
Install barrier protection for stobie poles along the length of the highway.	DPTI
Install continuity line at the intersection with Goyder Highway.	DPTI
RM Williams Way (Bungaree – Spalding) – Key Recommendations	Authority



Repair localised surface and shoulder failures between Bungaree and Euromina.	DPTI
Consider future re-seal on southern sections to rectify surface polishing and uneven surface.	DPTI
Additional barrier protection/ATLM between Bungaree and Euromina.	DPTI
Saddleworth Road – Key Recommendations	Authority
Widen lanes and install sealed shoulders between Saddleworth and Auburn.	DPTI
Install additional safety barrier to protect roadside hazards between Saddleworth and Auburn.	DPTI
Install additional safety barrier to protect stobie poles along the length of Saddleworth Road.	DPTI
Balaklava Road – Key Recommendations	Authority
Further barrier protection for drop offs and hazardous roadside vegetation.	DPTI
Pavement rehabilitation works to repair rutting west of Halbury.	DPTI
Survey heavy vehicle movements between Balaklava and Auburn and if necessary install advisory signage to remind heavy vehicle operators to use Blyth Plains Road for freight access to Clare.	DPTI
Blyth Plains Road – Key Recommendations	Authority
Install 1.0m wide sealed shoulders along Blyth Plains Road, prioritised in the section between Woodlands Road and Jericho Road.	DPTI
Installation of W Beam barrier protection to reduce the likelihood of serious collisions with roadside hazards.	DPTI
Tarlee Road – Key Recommendations	Authority
Provide 1.0m sealed shoulders between Kidman Road and Kapunda Cemetery.	DPTI
Provide additional barrier protection of roadside hazards and drop-offs.	DPTI
Repair localised surface failures on the north-western end of Tarlee Road.	DPTI
Spring Gully Road/Saw Mill Road – Key Recommendations	Authority
Install additional barrier protection of drop-offs and large trees, as well as guide posts to improve delineation.	CGV
Seal the remainder of Spring Gully Road and Saw Mill Road.	CGV
Booborowie Road – Key Recommendations	Authority
Formalise intersections such as those with Collins Road and Sunshine Road with R1-	
2 'give way' signs.	RCG
2 'give way' signs. Consider sealing the currently unsealed section north of Farrell Flat Road.	RCG RCG



Consider Black Spring Road for future sealing to improve the Robertstown – Clare link.	CGV/RCG
Conduct a heavy grade to improve current surface and prevent further deterioration.	CGV/RCG
Improve the intersection with Black Springs Road/Barton Hill Road/Barrier Highway. Preferred option is an extensive apron seal to delineate minor alignment changes, however as an absolute minimum, the Barton Hill Road apron must be re-sealed, the give way sign replaced in a prominent position and all line markings refreshed.	CGV
Main Road 45 – Key Recommendations	Authority
Trim and maintain tall grasses on the verge north of Waterloo.	CGV
Refresh line marking on the sealed section through Waterloo.	CGV
Install barrier protection for stobie poles along the western side of the road.	CGV
Consider future sealing of unsealed sections.	GCV
Other Key Recommendations	Authority
Consider the feasibility of a Clare freight bypass to remove freight from the Clare town centre.	DPTI/CGV
Trim and maintain tall grasses growing alongside Hilltown Road among other unsealed routes.	RCG
Refresh line marking on Bennys Hill Road and install barrier protection on steep drop- offs as well as additional guide post installation.	CGV
Consider Emu Flat Road for councils re-sheeting programme, and remove some vegetation that is encroaching onto and over the carriageway.	CGV
Undertake a heavier grade than the general routine maintenance to improve the surface condition of Karoonda Road before it deteriorates further.	RCG/CGV
Assess and trim/remove vegetation at risk of falling over or dropping large branches onto Neagles Rock Road.	CGV
Review grading schedule for Neagles Rock Road and consider more frequent grading	CGV
to dealess configurions on steep memes.	



# Discussion and Survey Analysis

# **Community Engagement**

When planning a road assessment, we have found from previous regional road assessments that the most effective way to identify trouble spots is to ask those that use the roads regularly. The RAA Road Safety team developed a survey for members in the Clare and Goyder region to best determine their access, mobility and safety concerns within the region.

Prior to developing the Member survey questions or determining the final roads for assessment, the RAA Road Safety team met with a number of key stakeholders and community members. Consultation included a presentation by RAA on local crash statistics in the Clare and Gilbert Valley and Goyder region, together with results from RAA's 2017 Risky Roads campaign.

The information obtained assisted RAA to develop a survey for the region. Member commentary from this survey has been cited throughout this report.

## Member Sampling Frame

A total of 2,082 Members were sent an email inviting them to participate in the confidential survey, along with a separate link forwarded to stakeholders for distribution.

A total of 419 responses were received, 152 directly from RAA Member engagement and a further 267 through external engagement opportunities. When analysed, 402 responses were able to be cited, with over 80 per cent of these respondents holding RAA membership.

68 per cent of survey respondents reside in the Clare and Gilbert Valley Council Region, with 18 per cent of respondents residing in the Goyder Council Region and 14 per cent who live outside of the Clare and Goyder region, but who identify with it.

The confidence interval recorded was within the acceptable range of less than  $\pm$  5%.

	Mid North Regional Population	Sample (Members and Non Members) <sup>1</sup>	Confidence Interval Accuracy at one point-in-time	Confidence Level
Online	13,289	402(Respondents)	±4.81	95%

#### Table 1: Confidence intervals of Member responses

The **confidence level** – accuracy at one point in time will provide how often the percentage of the population would choose a particular answer. When the confidence level is combined with the **confidence interval**, you can say that you are 95% sure that the true percentage of the population is between  $\pm$  4.81%. In addition the larger the sample size, the more you can be sure that the answers truly reflect the population.

<sup>&</sup>lt;sup>1</sup> RAA Members and Non-Members who have recorded the Clare/Goyder region as residential location.



## The Region

In 2015, the Australian Bureau of Statistics reported a population for the Clare and Gilbert Valley District Council of around 9,057 people, and Goyder Council a population of around 4,220.

The two council regions cover approximately 8,521 square kilometres, and the two Councils are responsible for the maintenance of over 400 kilometres of sealed roads and 4500 kilometres of unsealed roads. In addition, there are over 500km of sealed arterial roads maintained by the Department of Planning, Transport and Infrastructure.

Key industries vary across the two district councils, however there is commonality in the top three industry categories as identified in the 2011 Census:

- > Agriculture, Forestry and Fishing (17.9% Clare & Gilbert Valley, 31.60% Goyder)
- Manufacturing (11.6% Clare & Gilbert Valley, 10.5% Goyder)
- > Health care and social assistance (11.3% Clare & Gilbert Valley, 9.3% Goyder)

# **Mobility Profile**

Cars and mobility are very important to our Members. When asked about their driving habits, residents in the Clare and Gilbert Valley district were slightly more inclined to drive every day (67%) compared to Goyder residents and the wider RAA Membership<sup>2</sup> (62% and 55% respectively).

When asked to consider their regular travel, 89 per cent of respondents cited regularly traveling outside of their region, with work, shopping and health the most common reasons.

15 per cent of respondents use alternative transport regularly, with the most common alternative transport types being bicycle (45%), Motorcycle (43%) and Bus (11%).

# Road Maintenance

Only 8 per cent of survey respondents, considered that roads are maintained to an acceptable standard in the Clare & Gilbert Valley Council region.

Just over 6 per cent of respondents agree that roads are maintained to an acceptable standard in the Goyder Council region.

A greater percentage of people don't believe that roads are maintained to an acceptable standard in the Clare and



Gilbert Valley region (70%), when compared to the Goyder region (56%).

Horrocks Highway is a key road in this assessment, known for its undulating and uneven surface.

Horrocks Highway was the highest nominated regional road in the RAA 2017 Risky Roads Survey and the second highest nominated road in the state with over 100 nominations primarily relating to the section between Gawler and Clare. Similarly, in our survey of Clare and Goyder Members, Horrocks Highway featured prominently as the road that most people in the region are concerned about.

<sup>&</sup>lt;sup>2</sup> 2016 RAA Advocacy survey



When asked to list the top three road maintenance concerns across the region, the top three were; undulating and uneven surface (32%), pot holes (27%) and lack of overtaking opportunities (15%).



# **Unsealed Roads**

There are over 4500 kilometres of unsealed roads across the Clare & Gilbert Valley and Goyder District Council regions that form a vital part of the road network, with many carrying significant volumes of traffic. Motorists driving on these roads also have varying degrees of experience when driving in unpredictable road conditions.

The default rural road speed limit of 100km/h applies to most unsealed roads, however 63 per cent of respondents were not aware of this with 60 per cent citing a lower speed.





A subsequent question was asked to gauge support for a blanket speed reduction to 80km/h on unsealed roads. Support was 43 per cent that would consider a reduction and 49 per cent that do not support a blanket reduction. 8 per cent of respondents were not sure, or needed further information.

Based upon these results, RAA recommends not introducing blanket speed reductions on unsealed roads, but rather adopting an evidence based approach to any future speed reductions.



When asked to compare perceived crash probabilities of local and tourist drivers on unsealed roads, 55 per cent of respondents felt they were less likely to crash on an unsealed road compared to a tourist driver.





Access to some unsealed roads was identified as a concern during consultations and when asked, over three quarters of respondents agreed that weather can reduce mobility and access on the unsealed road network in the region.

During consultation it was raised that a lot of the unsealed road network also supports significant volumes of freight movement. Residents were given the opportunity to identify unsealed roads that they believed should be considered for sealing. Reasons given for roads nominated included, enhanced freight movement in a safer and more efficient manner, with access and dust other key issues.

Key roads and member comments include:

- > Spring Gully Road high tourist use, weather vulnerability and pot holes
- > Main Road 45 high freight usage and very loose surface
- Saw Mill Road high tourist use, seal remaining Spring Gully loop road
- > Black Springs Road rough and uneven with significant traffic
- Bennys Hill Road narrow and mixed local and tourist traffic



# Freight

Road surface (39%) was the most significant road safety concern when considering interactions with freight movements in the region, followed by Road width (23%) and ability to overtake safely (19%). While not in the same order these are the same top three issues as identified for the Barossa and Light region assessed in 2017.

The Horrocks and Barrier Highways were cited as major concerns, along with many unsealed roads that form part of freight and commodity routes throughout the region. Identification of an alternate route to Horrocks highway was raised a number of times, along with a freight bypass for the Main Street of Clare.



When asked to specify major road or transport improvements in the region, responses highlighted frustration with the condition of the roads and safe interactions with all road users. A selection of survey responses is included below:

- > All major roads in these areas need serious consideration for upgrading.
- > Alternative truck route on Horrocks Highway.
- Auburn/Saddleworth B84 needs shoulder upgrade, road very poor when large trucks meet cars. This is an important link for the agriculture section of this area.
- B double transports are permitted to travel at 100 km/h down the Clare hills on poorly maintained narrow roads. Edges badly worn also on Horrocks highway where road is narrow and undulating with poor edges.
- Clare to Blyth road, Clare to Farrell Flat Road these two routes need to have the pavement widened and the shoulders formed to enable a loaded truck to pull off.
- Horrocks Highway needs to be dual lane from Willaston to Barrier Highway intersection. In accordance with all other major roads heading to Adelaide.
- Main Street of Clare, there should be a bypass for trucks, and other large vehicles.
- Town of Clare needs a heavy vehicle bypass. Farrell Flat Road is too narrow, not enough guard rails, surface is poor. Potholes in general are patched, and shoulders are crumbling. Overall maintenance is poor.



## **Road Safety**

Road safety is everyone's responsibility and incorporates road conditions, maintenance and human involvement. Road maintenance (conditions of sealed and unsealed roads) and road conditions (loose surfaces, sight distance) and roadside vegetation are the top concerns, with the behaviour of tourist

drivers and roadside vegetation also of concern to residents.

Tourist driver behaviour has also been identified as a key concern during our regional assessments of Kangaroo Island and the Barossa Valley and Light region. Further investigation into why tourist driver behaviour is featuring in these surveys consistently across the state may be warranted.



When asked to highlight examples of unsafe interactions between all road users an additional 200 comments were made including the following:

- Barrier Highway south of Mount Bryan is a disgrace. One must get off the road sometimes when transports are trying to negotiate bends. The unsealed verges have broken away. This makes it most unsafe for all traffic.
- Burra Bypass Intersection onto Barrier Highway and the intersection adjacent to the Bon Accord Hotel on the Bypass road in Burra. Visibility is restricted due to the layout and many trucks frequent that road all day and night.
- Copperhouse Rd/Barrier Highway intersection at Burra DAILY near misses and long history of casualty/fatality crashes both for heavy transport and normal traffic.
- Corner Horrocks Hwy and Victoria Road, Clare where vehicles leaving the roundabout heading south turn right across a solid white line to enter OTR service station holds traffic up across the roundabout. Should be no access.
- Roundabouts at the north and south ends of the Clare Main Street. Some people have no idea how to enter or continue around a roundabout safely. I have witnessed people stopping their vehicle on the actual roundabout to give way to another vehicle.

It is recommended that RAA in conjunction with the Department for Planning Transport and Infrastructure, the Motor Accident Commission and the regional tourism authorities develop an education and information strategy for both interstate and overseas tourists to the region.



## **Speed Zones**

Changing speed zones can cause confusion for drivers, especially if there are multiple changes in what appears to be similar driving conditions over short stretches of road. Half of all respondents believed the Clare and Gilbert Valley had too many speed zone changes, while less than 15 per cent felt the same in the Goyder region.



Confusion over changing speed limits along the Horrocks Highway,

when passing through the smaller villages and towns was also highlighted.

Comments included:

- The stretch from Auburn to Clare is up and down with 50, 60, 80 & 100km/h zones. Make it 100km/h out of settlements and 60km/h in the small towns.
- Inconsistent speed zones through townships some at 80 km/h (Leasingham), some at 60km/h (Watervale), and some at 50km/h (Auburn and Clare) for example. Confusing for motorists and more likely to infringe if they miss signage.
- > Horrocks Highway through main streets and towns, all different.
- Clare only needs 50km/h zone in the main street, had it right before changing to current zone, far too long a 50km/h zone.

Other speed concerns include:

- They adjust and lower speed limits to reduce costs in maintenance as in 110km/h to 100km/h the maintenance is less of a priority as it's a lower speed road and falls in to a greater state of needing repair.
- > More signage is needed along the Highways.
- Farrell Flat Rd should be 110km/h all the way not be reduced to 100km/h just out of Clare. Also the speed limit being reduced to 100km/h at Saddleworth on Barrier Hwy is crazy. The governments easy way out is to reduce speed limits instead of addressing the road conditions.
- Burra Clare, Clare Tarlee, Clare Snowtown.
- 100 to 80 to 60, 100 to 80 to 50km/h. I like what is happening in Barossa and Light which has 100km/h to 50km/h ahead.

It is recommended that speed limits into townships are reviewed and consolidated throughout the region together with a program of consistent signage to warn motorists of changing speed limits. This would involve the use of advisory G9-79 'Speed Limit Ahead' signage to replace the 80km/h buffer zone signage into townships as long as the speed environment within the 80km/h buffer zone is suitable for the higher speed limit.



## Tourism

The South Australian Tourism Commission has valued the tourism in the Clare Valley alone at a potential \$99M in 2020, with a current (2016) value of \$96M. The tourism industry directly employs

300 people, with over 460,000 visitor nights spent per year. With 40 per cent of overnight visits being made by interstate or international visitors and 60 per cent by South Australian visitors, tourism is a significant industry within the region.

65 per cent of respondents believe that the road network in the Clare and Gilbert Valley region is not suitable for the number of visiting tourists. The Goyder district fared slightly better with just less than 45 per cent believing the road network was not suitable.





When asked if there were any other ways the road infrastructure could be improved to enhance visitor's experience, improving poor road surfaces and road maintenance were the top ranked responses.

Parking for Recreational Vehicles or caravans ranked number three, with public transport availability fourth.

Comments left in the survey supported this trend, along with a number of additional suggestions:

- > Follow the lead of NSW and their serviced wayside stops especially Broken Hill Highway east.
- > All roads need to be upgraded and resealed for a more comfortable drive.
- Better signage to identify parking for caravans and RV parking.
- Burra needs designated caravan parking places. Tourists park their caravans/cars in the few parking spaces in the Main Street without any concern for local traffic.
- Improved signage welcoming visitors to the towns. Currently visiting our towns, it is difficult to determine where town centres start and stop. Perhaps signs identifying the Main Street or more comprehensive signage directing visitors to tourist destinations would also be beneficial.
- > More Information bays with maps of the region.
- Not road specifically tourist trains need to be introduced.
- So long as the road system is maintained to a satisfactory level and standard this adds to the experience of visitors to the areas. Both councils have secondary roads which are adequate for access to points of interest wineries etc. In fact I feel it enhances the experience of the visitors provided they are maintained to an acceptable level.



# Cycling

Cycling was the second most common form of alternative transport identified by survey participants. Cycling is both recreational and a family activity often not considered as alternative transport.

Three in five people believe the road network does not encourage cycling in the region, with nearly 65 per cent of respondents believing the region is not safe for children to cycle.

Comments suggest better connectivity and dedicated cycling infrastructure like the Riesling and Rattler trails is needed encouraging more cycling. Sharing the road with cars and freight trucks was considered extremely dangerous on a poorly maintained road network, however, there is huge potential to develop the current infrastructure.



Some comments from the survey pertaining to cycling include:

- Cycle lanes or roads eg to Sevenhill from Clare the road is too narrow for cyclists to be safe.
- Put them on the Riesling and other trails, ban them from the Clare to Blyth Road and build an alternative "challenge circuit" for those who insist on cycling fast.
- Ride a bike for pleasure, would never let a child ride with me. Too many trucks, farmers and equipment not doing the speed limit.
- The rail trail networks should be explored to link towns off of the main highways. There are so many blind corners on our roads that it is unsafe for both cyclists and drivers. Moving bike riders off the road and onto cycling paths would enhance the cycling experience and make it far safer for all road users. This would also prove a fantastic tourism opportunity for the Clare Valley Tourism Region to become renowned as a cycling and outdoor travel destination.
- My children cannot ride bikes to school because Blyth Road is narrow and drops away at the side. There is nowhere they can get off the road if a truck or car is coming. On the occasions when they have walked home they have feared for their safety for the same reasons. There is nowhere to get off the road when traffic comes.

In future planning, RAA recommends that additional connectivity between townships in the region is provided by way of dedicated cycling paths, similar to the current Riesling Trail.



## Walking

Motorists traditionally walk at some point in the journey so active mobility and improving people's choices provides an opportunity to look at the walking journey and how this can be enhanced.

Neighbourhood walking received a very positive response from locals, with nearly 70 per cent citing they regularly walk around their neighbourhood.

While the number of people walking the neighbourhood is encouraging, people did not have the same positive response about their streets. 52 per cent of people believe their local streets are not easy to walk around. This is supported in the verbatim comments where over 80 per cent of responses cited the single biggest concern as lack of or the poor state of footpaths.



Some comments from the survey pertaining to walking and footpaths include:

- Trucks are a big problem most do not slow down and take things for granted that no-one will step in their path. The huge length is also a problem - when shopping - I have almost stepped into the trailer that has a long tow bar after the truck had passed.
- Much more maintenance is needed on footpaths. Many are too uneven which causes tripping. On many streets there are no footpaths.
- > Footpath upgrades, sealed paths, even surfaces. Some streets in Goyder don't have a footpath.
- > Footpaths in Burra North. My street doesn't even have a footpath.
- I know there is the Riesling trail to walk on, but really! There are a large number of people that drive up the road to walk on it because the footpaths are too poor to actually walk there.
- The speed of cars near very narrow, poorly maintained footpaths. Some roads like Agnes Street do not have a footpath in parts, people have to walk on the road or cross road to get to footpath - cannot access footpath for wheelchairs and baby prams and if there is footpath it is very narrow and overgrown with vegetation making it impossible but to walk on the road.





With a number of towns in both district councils having either Horrocks or Barrier Highway as the main street we asked members to consider safety when crossing the main street of their town. Nearly 85 per cent of respondents consider it safe to cross the main streets of their towns. Of those that felt unsafe, safety and the interaction with highway traffic were of most concern.

- Auburn traffic does not slow down so crossing from the hotel or the supermarket to the other side can be hard.
- > Balaklava-dedicated zebra crossing is required.
- Burra A direct crossing path from the way of the creek between cook-o-Burra and the Burra hotel across to the other side as school students do not use the other bridge up near the skate park.
- Clare Main Street Many people do not cross at crossing and stand in middle of the road. An island by Target is required
- > Horrocks Highway is the main street and the speed limit is not enforced.
- The give way sign on the main Bridge in Burra near the Council chambers should be on the other end of the bridge, traffic is forced to bank up at the BP.
- > Tarlee. Slow down the heavy vehicle traffic to 40 km/h.
- > Hallett A pedestrian island is required.

# **Alternative Transport**

Regional centres typically have limited alternative transport options outside of private vehicles. The Mid North region has limited alternative transport with Yorke Peninsula Coaches offering a paid service 4 days a week across the region. Comments have suggested that the current timetable limits the viability as an alternative transport option.

Across both Clare and Gilbert Valley and Goyder regions, people do not feel there is adequate alternative transport options when a personal car is not available. Over three quarters of respondents (76%) in both regions felt alternative transport options were inadequate.



# **Community Transport**

The Mid North Community Passenger Network has seven cars based at hospitals and councils over the Mid North region. This is a not for profit community based service, aimed at making a difference for those unable to organise their own transport within the region. Transport is provided for medical appointments and social outings, including regular medical bus services to Adelaide for specialist appointments.

59 per cent of respondents are aware of the community transport services within the Mid North region, with 43 per cent agreeing the service was adequate to meet community need.





There were a number of comments on improved transport options, including the frequency of bus services and the need for more community transport cars:

- > A permanently circulating mini bus for elderly and disabled would be great.
- > It's very difficult to get an appointment with the passenger network.
- If you need to go to Adelaide and back in one day, pricing is very high and keeps going up

   there needs to be a Saturday return bus.
- > Public transport to Adelaide & return would benefit some people.



## Taxi and App-based Ride sharing

Taxi and Chauffeur cars have long operated in a market with limited disruption, the introduction of app-based ride sharing services like Uber has changed the face of fare based services.

Uber was granted official accreditation to operate in April 2017, this followed the 2015 review of the taxi and chauffeur industry and subsequent 2016 legislation being introduced into State Parliament.

Regional towns often have limited alternative transport options, with limited Taxi and Chauffeur services, and little or no regular public transport. App-based ride sharing offers a localised alternative solution.

Approximately one in five residents had used a taxi service in the local area in the past six months.

36 per cent of residents would consider an app-based ridesharing service in the future. A small number of people indicated they had utilised app-based ride sharing in the region indicating a presence of service.







# Site Investigation Details and Recommendations

# Horrocks Highway (Tarlee – Bungaree)

Horrocks Highway between Gawler and Tarlee was covered in RAA's Barossa and Light Tourism Region Assessment undertaken in 2017. Details in this report primarily pertain to the section within the Clare and Gilbert Valleys Council between Tarlee and Bungaree.



Road reconstruction is required south of Tarlee to address major failures, which was a major issue identified in RAA's Barossa and Light Tourism Region Assessment

Horrocks Highway is a state maintained road and was the most frequently raised road by RAA Members in our regional Member survey. This was also the highest nominated regional road (and #2 overall) in the RAA's 2017 risky roads survey. Most Members were concerned about the poor condition of the surface, and the lack of overtaking lanes. At the time of writing this report, RAA are lobbying current political candidates to commit to improving Horrocks Highway between Gawler and Clare and address the surface issues amongst other safety concerns. Due to this, Horrocks Highway was assessed prior to other roads in this report (December 2017) to prepare for this campaign.

Horrocks Highway cannot safely carry the amount of traffic it carries. Either tourists sightseeing or slow heavy vehicles result in frustrating convoys which are impossible to overtake.

Horrocks Highway is abysmal from Roseworthy to Clare - whole road needs replacement as a safe heavy traffic passage.

**RAA Members** 

Other concerns raised involved a number of intersections with Horrocks Highway as well as the speeds of vehicles travelling through townships. A number of intersections were assessed and RAA also conducted some short speed surveys to identify any issues.



#### <u>Crash History</u>

Note that these statistics refer to only the section of Horrocks highway between the Light River (South of Tarlee) and the Border of the Clare and Gilbert Valleys Council approximately 1 kilometre west of Bungaree Road

In the Clare Valley region there were a total of 61 casualty crashes on Horrocks Highway in the five year period between 2012 and 2016. 48 of these crashes resulted in minor injuries, eight resulted in serious injuries and five resulted in a fatality. Of the 61 crashes, 15 occurred at intersections and 46 occurred in mid-block sections of the highway. This is by far, the highest crash rate of any road in the region.

Mid-block crashes were distributed along the highway with the most common crash type being 'hit fixed object' in almost 40 per cent of these crashes whilst rollover crashes were the next most common, making up 13 per cent of mid-block crashes. 43 per cent of mid-block crashes were attributed to inattention whilst 15 per cent of mid-block crashes were attributed to drivers having alcohol or drugs in their system.

The intersection with Blyth Road, north of Clare was the location of three casualty crashes, and two casualty crashes occurred at the intersection of Gillen Street in Clare.

#### Traffic Volumes

Traffic Volumes on Horrocks Highway are the highest in the region with most sections south of Clare transporting well over 3000 vehicles per day, including a high volume of freight. These traffic volumes indicate an increase in traffic of over 20% since 2007 in some locations.

Segment	AADT	% Commercial Vehicles
Templers – Tarlee	3300	9.5% (320)
Tarlee – Barrier Highway	3400	11.0% (370)
Barrier Highway – Auburn	1700	9.5% (160)
Auburn – Watervale	2900	7.0% (210)
Watervale – Jolly Road (Sevenhill)	3100	10.5% (320)
Jolly Road – Spring Gully Road	3800	8.0% (310)
Spring Gully Road – Stanley Place (Clare)	5200	8.0% (410)
Stanley Place – Farrell Flat Road (Clare)	7900	10.0% (800)
Farrell Flat Road – Blyth Road (Clare)	6400	10.0% (650)
Blyth Road – Bungaree Road	1700	15.5% (260)
Bungaree Road (S) – R M Williams Way	1200	12.5% (150)
RM Williams Way – Bungaree Rd (N)	600	12.5% (75)
Bungaree Road (N) – Stone Cutter Road	750	12.5% (95)

#### Horrocks Highway Traffic Volumes



#### <u>Road Widths</u>

Shoulder seal has been applied to the length of Horrocks Highway through the Clare Valley however there are sections where this should be widened. Lane widths are generally good.

	-	-	
Location	Lane Width	Sealed Shoulder Width	Total Seal Width
S of Tarlee	3.3m	1.7m	10.0m
N of Barrier Highway	3.3 – 3.4m	1.0 – 1.1m	8.8m
S of Auburn	3.5m	0.9m	8.8m
S of Watervale	3.3 – 3.4m	0.7m	8.1m
N of Clare	3.4 – 3.5m	0.5m	7.9m

#### Horrocks Highway Road Widths

#### Speed Limits

The speed limit of Horrocks Highway through the Clare Valley outside of built up areas is 100km/h.

The speed limit is reduced to 80km/h through Leasingham and Penwortham.

The speed limit is reduced to 60km/h through Tarlee, Rhynie, Watervale and Sevenhill via and 80km/h buffer zone and increased to 100km/h via an 80km/h zone.

The speed limit is reduced to 50km/h through Auburn and Clare via an 80km/h buffer zone and increased to 100km/h via an 80km/h zone.

There was significant feedback in the survey regarding the regularly changing speed limits along Horrocks Highway. Whilst RAA generally agree with the posted speed limits and they adhere to current regulations regarding buffer zones where speed limits reduce by greater than 30km/h, some improvement can be made to reduce the number of speed changes required. Consideration should be given to replacing the current intermediate speed buffer zones with G9-79 'speed limit ahead' signs. These would replace the '80' speed limit signs on approach to each township and if installed, should be installed at all major approaches to towns in the region to reduce confusion.

#### **Observations**

#### Tarlee – Rhynie

A handful of large undulations were noted in this section and the surface was generally in poor condition with rutting noticed as well as significant surface polishing. Use of Barrier protection is very limited between Tarlee and Rhynie and a significant number of unprotected trees exist alongside the road, particularly on the approach to Rhynie.

There is one overtaking lane provided in each direction.





Rutting and surface polishing is prevalent between Tarlee and Rhynie

#### Rhynie – Auburn

Shoulder width was narrower in this section and localised edge breakup was noted. Once again, the use of Barrier protection was insufficient with numerous roadside hazards and curves left unprotected. Stobie poles and trees were located up to 3.0m from the edge of the road.

Surface rehabilitation is required to address rutting, corrugations and polishing between Rhynie and Auburn, and one overtaking lane is provided in each direction.

#### Auburn – Clare

The surface is less undulating north of Auburn with only localised undulations experienced. Textural issues such as surface polishing and rutting still exist, and barrier protection is more prevalent.

Shoulder seal is narrower again through this section providing very little room for cyclists that may use segments of the highway when visiting attractions located away from the Riesling Trail.

No overtaking lanes are provided between Auburn and Clare. This is a particular issue do the mixed road use of local traffic, tourist traffic and freight. As a minimum, two overtaking lanes are needed between Auburn and Clare – one in each direction.

#### Summary

Horrocks Highway carries the highest volume of traffic through the region, however, it is one of the most unsafe roads, which has led to a very poor crash record. Significant improvements are required including:

- Reseal to address surface and textural issues
- Shoulder widening to improve safety, especially between Auburn and Clare
- Barrier protection to reduce the severity of run off road type crashes
- Installation of audio tactile edge line marking along the length of the Highway to reduce the likelihood of run off road type crashes
- Installation of at least one overtaking lane in each direction between Auburn and Clare



#### James Street Intersection

James Street in Rhynie is unsealed and has a steep slope on approach to Horrocks Highway. Due to this, it is very common for vehicles to spin their wheels when accelerating and turning onto Horrocks Highway. This has caused rutting on James Street and also causes loose material to be scattered across Horrocks Highway. It is recommended that an apron seal is provided to prevent this occurring.

#### Auburn Intersections

A number of intersections in Auburn were raised by Members and assessed during our visit to the region.

Issues with freight turning left from Port Road onto Horrocks Highway were raised. Due to the location of the stobie pole on the corner, long vehicles turning left must do so by encroaching into the southbound lanes creating a safety hazard. On assessment of DPTIs RAVnet freight route maps, this is only a commodity route and should experience low and seasonal freight movements only. We have provided a recommendation in the Balaklava Road assessment that heavy vehicle movements are investigated at the Blyth Plains Road intersection, and improvements are made to encourage heavy vehicles to use this route to Clare rather than driving into Auburn.

Signage at this intersection was also significantly faded and is due to be replaced. It was also noted that signage had been installed low on the post and was a hazard to pedestrians walking underneath. Both of these issues were prevalent throughout the region and it is recommended that council undertake an assessment of all signage and replace the significantly deteriorated signs throughout the region.

The intersections of Horrocks Highway with St Vincent Street, King Street and North Street were also assessed and all experienced similar issues. Vehicles parked close to these intersections impede sight distance and create difficulties turning out of these streets.

The T-junction on the corner of North St in Auburn and Horrocks Highway: traffic leaving North Street has no clear view of oncoming traffic from the south when SUVs are parked legally within marked lines

#### RAA Member

It is recommended that on street parking is assessed and altered to provide additional sight distance for vehicles exiting side streets. The hatched areas either side of North Street appeared effective and are obvious no parking zones and similar treatments should be used at the other intersections in town. Installation of a continuity line such as the one at the Port Road intersection would delineate the edges of the highway and indicate to motorists the maximum distance they can creep past the give way holding line to maximise their sight distance without encroaching into the traffic lanes.





A continuity line such as this one pictured at the Port Road intersection helps maximise sight distance past parked vehicles

#### Mintaro Road Intersection

It is obvious by the signage at this intersection that it is frequently used by tourists with many tourist destination leading off Horrocks Highway at this point.

The southbound left turn deceleration lane into Mintaro Road is very short and does not provide adequate distance for vehicles to slow down from 80km/h. It is recommended that this lane is extended and left turn arrows painted.

There were also a significant number of small potholes forming at the intersection as well as cracking and rutting, with the whole intersection overdue for a reseal.



The surface of Horrocks Highway at the Mintaro Road intersection is very poor



#### Quelltaler Road Intersection

Sight distance in both directions is very poor when turning out of Quelltaler Road in Watervale due to the curvature of Horrocks Highway in this location. As the speed limit is only just reduced to 60km/h, southbound vehicles tend to still be approaching the intersection faster than 60km/h.

Roadside vegetation compounds sight distance issues when looking north and south and it is recommended that this is assessed by council and vegetation trimmed/removed to maximise sight distance.

An R1-1 'Stop' sign treatment may be more appropriate than the current give way signage and it is recommended that this is considered. A continuity line installed along the edge of Horrocks Highway is also highly recommended to delineate the edges and to assist motorists in determining a suitable position to maximise sight distance.



Top: Poor sight distance to the north Bottom: Poor sight distance to the south



#### Victoria Road Intersection

The primary issue raised at this intersection related to southbound vehicles turning right to access the service station on the south-western corner. When vehicles turn right into the service station, there can occasionally be a significant wait for a safe gap in northbound traffic causing traffic to queue around the roundabout.

Access to the service station is safer and easier via the alternate entrance on Victoria Road and it is therefore recommended that a right turn ban is imposed into the service station from Horrocks Highway to prevent queueing on the roundabout.

#### Stradbrooke Road Intersection

Stradbrooke Road runs alongside the Clare Valley Racing Club and the intersection with Horrocks Highway is controlled with a stop sign. Sight distance to the north when turning right from Stradbrooke Road was severely compromised due to the close proximity of the Hutt River Bridge. This bridge is raised, and corresponding barrier protection also impedes sight distance.



Sight distance to the north is very poor

RAA welcomes the recent announcement to improve this intersection by installing radar activated speed limit signs to improve safety. This system will detect traffic on Stradbrooke Road, and temporarily reduce the speed limit on Horrocks Highway to improve safety when a vehicle is turning out of Stradbrooke Road.



#### Speeding through Townships

A major concern of many survey respondents was the speed of vehicles through townships along Horrocks Highway. Vehicles speeding through Rhynie had previously been brought to our attention through our Report A Road system as well. A number of members specifically mentioned freight as the main culprit, however there were also mentions of all types of vehicles.

Through most small towns, heavy freight vehicles don't stay on speed limits and tailgate those who do the signed speed limit.

*Horrocks Highway – more speed cameras and/or surveillance.* 

**RAA Members** 

As a result of these concerns, our team conducted a short speed survey in the townships of Rhynie, Auburn and Watervale. Due to time and resource limitations, each survey measured the speed of vehicles travelling in each direction for a 30 minute period. This is not sufficient time to determine a full profile of all road users, however allowed us to identify some of the issues mentioned.

The below table shows the results of the speed surveys conducted, with full results in Appendix C.

	Rhynie	Auburn	Watervale
Date	11/01/2017	11/01/2017	11/01/2017
Start Time	8:55AM	9:46AM	10:28AM
Finish Time	9:25AM	10:16AM	10:58AM
Speed Limit	60km/h	50km/h	60km/h
Average Speed	57.0	50.1	53.7
85th Percentile Speed	62.0	59.2	59.0
Max Speed	79.0	77.0	74.0

In each survey, there were vehicles detected exceeding the speed limit by significant amounts with most drivers adhering to the designated limits. In Rhynie, detections of 77km/h and 79km/h were most concerning, as was a vehicle travelling 77km/h (27km/h over the speed limit) in Auburn. In Watervale, motorists appeared to adhere to the speed limit with the most concerning detections being 74km/h and 69km/h.

It is highly recommended that further investigation is conducted into the speed profile of vehicles travelling through townships. With this many detections being made in three 30 minute surveys, we have a high level of concern that speeding issues occur throughout the day.

It is recommended that the levels of policing are reviewed in townships along Horrocks Highway and increased where necessary. Installation of TES 16005 'SPEED CAMERAS USED REGULARLY IN THIS AREA' signs in accordance with DPTI Operational Instruction 5.1 should be considered in townships where speeding is prevalent. Larger, more prominent '50' and '60' signs on entry to these speed limit zones will also act to reduce the levels of speeding motorists.

Further treatments such as mobile speed feedback signs during peak seasons could also be used to alert motorists of the prevailing speed limit and their speed in relation to this. These signs are generally mounted on a trailer with a variable message sign and will notify motorists of the speed they are travelling at. Importantly, they should not display a speed higher than the speed limit, but instead display a message advising to slow down.



Key Recommendations	
Horrocks Highway – Key Recommendations	Authority
Full reseal to address surface issues, with full pavement reconstruction required in some locations.	DPTI
Widen sealed shoulders.	DPTI
Install additional hazard barrier protection.	DPTI
Install audio tactile edge lines along the length.	DPTI
Install an overtaking lane in each direction between Auburn and Clare.	DPTI
To reduce the number of speed limit changes, consider replacing current intermediate speed buffer zones with G9-79 'Speed Limit ahead signs at all major entrances to townships in the region.	DPTI
Seal the apron of James Street in Rhynie.	DPTI
Assess all tourism signage and replace deteriorated signs.	CGV
Assess on street parking in Auburn near the St Vincent St, King St and North St intersections and paint continuity lines along the edge of Horrocks highway at these intersections.	DPTI/CGV
Extend southbound left turn deceleration lane at the intersection with Mintaro Road and reseal the intersection.	DPTI
Trim vegetation impeding sight distance at Quelltaler Road in Watervale, and consider R1-1 'stop' sign treatment if improvements are not significant. Continuity line should also be installed across this intersection to delineate the edges of Horrocks Highway.	DPTI/CGV
Just south of the Victoria Road roundabout, ban right turns into the service station for southbound traffic on Horrocks Highway as alternate access points are safer.	DPTI
Conduct further investigation into the speed profile of vehicles travelling through townships along Horrocks Highway due to the high frequency of speeding vehicles.	DPTI
Review levels of policing and consider increasing where necessary.	SAPOL
Consider installation of TES 16005 'SPEED CAMERAS USED REGULARLY IN THIS AREA' signs in townships where speeding is prevalent.	DPTI/SAPOL
Increase the size of '50' and 60' signs leading into these speed zones to increase their prominence.	DPTI
Consider seasonal speed reduction treatments such as mobile speed feedback signs.	DPTI



## Barrier Highway (Giles Corner to Terowie)

Barrier Highway is a State maintained road and is a major interstate freight and tourist route, heading to Broken Hill and through into New South Wales and Sydney. The section assessed lies within the Clare and Gilbert Valley Council and Goyder Regional Council areas and extends approximately 130 kilometres between Giles Corner and Terowie. For the purpose of this assessment, Barrier Highway was travelled from Giles Corner to Terowie but throughout the course of other investigations, we covered some segments of the highway in both directions.

Barrier Highway received a significant number of nominations in the Clare member survey and also featured as equal 10<sup>th</sup> across all roads in the state in our 2017 Risky Road Survey.

With the Barrier Highway (main freight route from Adelaide to Broken Hill) the highway is dangerous and should be looked at the entire way down. Narrow sections, undulating and road potholes make it dangerous. Fix the road don't just reduce speed limits!!

RAA Member

A number of issues were assessed along the length of the highway including the segment between Saddleworth and Manoora, the intersection with Copperhouse Road, and the 'S bend' north of Mount Bryan. The intersection of Copperhouse Road and the 'S bend' north of Mount Bryan are discussed in further detail later in this section.

#### Crash History

These crash statistics pertaining to Barrier Highway are for the segment between Horrocks Highway and Terowie only. In the five years between 2012 and 2016, 33 casualty crashes occurred on this section (or at intersections with this section) of Barrier Highway including three fatal crashes, eight serious injury crashes and 22 minor injury crashes.

Two of the fatal crashes occurred in 2015. One involved a driver hitting a tree attributed to inattention and the other involved a driver hitting a tree possibly due to fatigue. The third fatal crash was at the intersection of Copperhouse Road and involved a vehicle crossing Barrier Highway failing to give way to a motorcyclist heading northeast towards Burra.

Of the 33 casualty crashes, 16 were attributed to inattention, seven involved a failure to give way and two were attributed to driving under the influence of alcohol or drugs.

Of these 33 crashes, 13 hit fixed object crashes, eight rollover crashes, four right angle crashes and four side swipe crashes occurred. The high number of single vehicle hit fixed object/rollover crashes is common on roads of this nature and this is often be caused by inattention or fatigue amongst other factors.

#### Traffic Volumes

#### **Barrier Highway Traffic Volumes**

Segment	AADT	% Commercial Vehicles
Horrocks Highway – Riverton	1600	14.5% (230)
Riverton – Saddleworth	1500	14.5% (220)
Burra Rd (Main St Saddleworth)	2000	15.0% (300)


Saddleworth – Farrell Flat Road	950	19.0% (180)
Farrell Flat Road – Copperhouse Road (Burra)	1100	15.5% (170)
Copperhouse Road – John Barker Street (Burra)	850	10.0% (85)
Commercial St (Burra)	1700	10.0% (170)
Market Street (Burra)	1800	7.0% (130)
Market Street – West Street (Burra)	1200	12.5% (150)
West Street – Goyder Highway	1400	18.0% (250)
Goyder Highway - Hallett	850	21.0% (180)
Hallett – Terowie	600	21.5% (130)

#### Road Widths

Typical lane widths on Barrier Highway between Giles Corner and Terowie do not vary considerably and are relatively consistent at 3.3m which is suitable for the roads purpose, however, the width of shoulder seal provided does vary greatly along this length affecting driver's perception of the usable road width. Most of the highway assessed did have some form of shoulder seal, however, there were some sections where it was completely lacking. These segments south of Mount Bryan and north of Hallett should be prioritised to receive a minimum 1.0m shoulder seal and 3.3m lane widths with other sections to also be improved to this minimum standard.

#### **Barrier Highway Road Widths**

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
Near Hoopers Rd (Giles Corner)	3.3m	0.7 – 0.9m	8.2m
Near Camacs Rd (Riverton)	3.3m	0.8m	8.2m
N of Vogts Rd (Saddleworth)	3.2 – 3.4m	1.0 – 1.2m	8.8m
N of Black Springs Rd (Black Springs)	3.4m	0.5 – 0.7m	8.0m
S of Wheetelande Rd (Porter Lagoon)	3.4 – 3.5m	0.4m	7.7m
Near Leighton Rd (Burra)	3.3 – 3.4m	0.4m	7.5m
Goyder Hwy – Mount Bryan	3.1m	N/A	6.2m
N of Mount Bryan	3.3m	0.5m	7.6m
Near Petherton Road (Mount Bryan)	3.3m	1.0m	8.6m
N of Hallett	3.2m	N/A	6.4m
Near Ulooloo Rd (Ulooloo)	3.2m	0.5m	7.4m
N of Whyte Yarcowie	3.3m	1.0m	8.6m



## <u>Speed Limits</u>

Outside of townships, the speed limit from Horrocks Highway through to Saddleworth is 100km/h with a 50km/h speed limit through Riverton and a 60km/h speed limit through Saddleworth. Each of these speed limit reductions is supplemented with an 80km/h buffer zone when entering and leaving the township.

North of Saddleworth, the speed limit is 110km/h with 50km/h and 60km/h limits through Burra, a 60km/h limit through Manoora, Mount Bryan and Hallett, and an 80km/h limit through Whyte Yarcowie. Speed reductions through each of these townships are all supplemented with 80km/h buffer zones into and out of town.

The speed limit through Terowie and past the Terowie roadhouse remains at 110km/h. We recommend that this is reviewed and an 80km/h speed limit is considered due to the number of vehicles slowing down and accelerating on this section of highway for entry and egress to the roadhouse as well as accessing Third Street into Terowie.

### **Observations**

In general, most of the surface of the 130km of Barrier Highway assessed was in serviceable condition and fit for its purpose and traffic volumes, however, there are a number of areas that were identified to increase the standard and safety of this major interstate freight and tourist corridor.

RAA welcomes the recent surface repair works that have been completed south of Saddleworth, however, at the time of assessment no new line marking had been marked and there were significant segments of road missing crucial centre and edge line markings. This has potential to confuse drivers, especially at night.

There are sections of the highway where the pavement is failing and cracks and potholes are present, indicating that there are areas that may be nearing the end of their serviceable life. There are also sections where the drop off from sealed to gravel shoulder is in the order of 50-100mm.



Severe edge drop-off south of Riverton



There is no noticeable improvement to safety or road quality north of Saddleworth where the speed limit increases to 110km/h and the surface condition was often quite uneven as highlighted by our members in the 2017 Risky Roads survey. It is recommended that surface rehabilitation works between Saddleworth and Manoora are undertaken.

One of the primary safety concerns was the number of unprotected roadside hazards present along the length of the highway. One example of this is just north of Riverton where there are long rows of unprotected mature gum trees. As almost 50 per cent of casualty crashes are single vehicle crashes (rollover/hit fixed object/left road – out of control) attributed to inattention, additional barrier protection installation should be treated as a priority.

Strategic installation of audio tactile line marking (ATLM) should be considered in areas where run off road/hit fixed object crashes have been particularly prevalent such as Horrocks Highway to Saddleworth and Burra to Terowie.

RAA are aware of some recent improvements made by the state government including:

- [2014] 22km of shoulder sealing between Hallett and Terowie (However approximately 8km immediately north of Hallett still has no sealed shoulder)
- [2017] \$600,000 spent on 18km of resurfacing works under the Periodic Road Maintenance Program
- [2017-18] \$65000 funding for Barrier protection at the Farrell Flat Road/Barrier Highway intersection

However, a commitment and investment to further improvements to the safety of Barrier Highway is needed.



Localised cracks and potholes indicate that the pavement is failing and near the end of its serviceable life



#### Intersection Copperhouse Road/Barrier Highway

Barrier Highway is a DPTI maintained highway, and Copperhouse Road is maintained by the Regional Council of Goyder. Copperhouse Road is used as the heavy vehicle bypass of Burra and links the western approach of Burra to West Street then back to the Barrier Highway north of Burra. This intersection was raised as an issue many times in our survey of Members in the along with a great deal of concern regarding the poor recent crash history and several safety issues experienced by locals at this intersection.

The bypass on entry to Burra from the southern end of town where it meets the highway. People often overshoot not realising they are coming to the highway.

RAA Member

This intersection has one of the worst crash histories in the region with four casualty crashes over the 2012-2016 period including a fatality. All four crashes involved southbound vehicles moving from Copperhouse Road onto or across Barrier Highway failing to give way to vehicles already on Barrier Highway.

In its current state the intersection is not fit for the level of use or its designated purpose of diverting heavy vehicles around Burra. RAA identified a number of safety issues including a lack of turning lanes, a lack of visibility of Barrier Highway and the intersection for southbound vehicles on Copperhouse Road and poor signage.



The intersection of Barrier Highway and Copperhouse Road is not fit for its intended purpose

RAA welcome the \$1.6M investment into this intersection recently announced as part of 2017/18 regional road safety funding. Improved street lighting, left turn deceleration lanes and alterations to the alignment of the intersection should significantly improve the safety at this intersection. We will continue to monitor this intersection as the upgrade takes place and intend to return to re-assess following the upgrade.



### Mount Bryan 'S Bend'

Numerous reports were made in RAA's 2017 Risky Roads campaign regarding the S bend north of Mount Bryan which flagged this section for investigation during this regional assessment. The S bend was initially installed to provide a right angle approach to the old rail crossing at this location which has not been in use for many years.

Section between Mt Bryan and Hallett, S bends very tricky for trucks even though it has been widened. This is left over from the railway days a long time ago... and not necessary today. Accidents often happening here.

RAA Member (Risky Roads 2017)

Following an assessment of crash history, we have identified that three semi-trailer rollovers have occurred here since 2007. Each of these rollover crashes resulted in injuries and were vehicles heading south towards Mount Bryan. The advisory speed limit through this 'S bend' is 85km/h which is suitable for cars and perhaps small trucks however on observing B-doubles through this intersection, 85km/h is far too fast and the observed speed of these vehicles was much lower. For truck drivers that are unfamiliar with this section of road there is a serious risk of a rollover if they travel at high speed due to the sudden change in camber and curvature of the road.



The sudden change in camber and curvature presents a high risk of rollover to semi-trailers

The preferred improvement to this 'S bend' would be to modify the alignment such that the highway continues straight through this section removing the 'S bend' completely, however the estimated high cost of such a project reduces its feasibility.

As a minimum, the inside shoulders and the trafficable surface of the road should be widened such that there is a less sudden change of direction. W1-8 'tilting truck' warning signage with a reverse curve symbol should also be installed before the 'S bend' in each direction to advise truck drivers of the hazard ahead.



W beam barrier restricts the approach sight distance of approaching vehicles on Hilldrop Road and a stop sign treatment would ensure vehicles stop to ensure the road is clear before entering. It was also noted that the street name signage is damaged and needs replacing.

	<u>(ey Recommendations</u>	
	Barrier Highway – Key Recommendations	Authority
	Install minimum 1.0m wide sealed shoulders and 3.3m wide lanes south of Mount Bryan and North of Hallett as a priority, with other insufficient sections to follow and meet this minimum requirement.	DPTI
	Review the 110km/h speed limit through Terowie and consider applying an 80km/h limit through Terowie.	DPTI
	Repaint missing line marking south of Saddleworth where recent repairs have been completed.	DPTI
	Undertake surface rehabilitation works between Saddleworth and Manoora.	DPTI
	Additional barrier protection to reduce to severity of single vehicle/inattention crashes where a vehicle runs off the road or hits a fixed object.	DPTI
	Installation of ATLM between Horrocks Highway and Saddleworth, and between Burra and Terowie as a minimum.	DPTI
	Widen inside shoulders and the carriageway around the 'S bend' north of Mount Bryan as well as installing W1-8 'tilting truck' signs on each approach to warn of the rollover risk on this curve.	DPTI
	Replace street name sign at Hilldrop Road and consider installing a stop sign at this intersection due to the reduced approach sight distance introduced by the W Beam	DPTI/RCG

barrier installed on Barrier Highway.



## Farrell Flat Road

Farrell Flat Road is a state maintained road and links Clare to the Barrier Highway and through to Burra via Farrell Flat. At least five members raised narrow bridges (particularly on the western end) that cause issues with freight interaction as a serious issue and the road received over 10 mentions in the survey.

Road from Farrell Flat to Clare. Road in poor state as well as bridges so narrow - there have been accidents involving trucks and cars and there will be more if not attended to soon.

Heading towards Burra from Clare on Farrell Flat Road, those tight hook turns with a car and truck is scary.

**RAA Members** 

### Crash History

10 casualty crashes occurred on Farrell Flat Road between 2012 and 2016 making it the third worst road in the region for crashes behind Horrocks and Barrier Highways.

Two rollover crashes occurred attributed to drivers driving under the influence of drugs or alcohol, one resulting in fatality and the other in serious injury. Other crashes were generally attributed to inattention and were rollover or hit fixed object crashes.

### Traffic Volumes

Farrell Flat Road experiences some of the higher traffic volumes in the region as it is a major route between the two large townships of Burra and Clare.

Segment	AADT	% Commercial Vehicles
Horrocks Highway – York Road (Clare)	2500	9.5% (240)
York Road – High Street (Farrell Flat)	1000	9.5% (95)
High Street – Barrier Highway	650	14.0% (90)

### **Farrell Flat Road Traffic Volumes**

### <u>Road Widths</u>

Road widths and shoulder seal on the eastern section of the road are generally good (other than localised sections mentioned later in this section) however this treatment needs to be replicated between Farrell Flat and Barrier Highway.

#### **Farrell Flat Road Widths**

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
Near Kirribilly Road	3.1 – 3.2m	1.2m	8.7m
Near Blieschke Road	3.1m	N/A	6.2m



## Speed Limits

The speed limit in Clare is 50km/h, and changes to 80km/h shortly after the old rail bridge (now part of the Riesling Trail). The 80km/h zone extends beyond the two narrow bridges and changes to 100km/h approximately 500m east of Spring Farm Road. The 100km/h section continues through the winding and hilly section before becoming 110km/h near the intersection of Mount Rufus Road. This 110km/h speed limit continues through to Barrier Highway.

## **Observations**

A number of key issues were present on Farrell Flat Road. Freight between Clare and Farrell Flat faces a number of constraints including:

- Two narrow/concealed bridges close to Clare (Approx. 6.4m wide)
- 4.4m vertical clearance under disused rail overpass/Riesling Trail
- Multiple tight corners and steep ascents/descents
- Narrow lanes east of Farrell Flat.

At the time of our assessment numerous hay trucks and wine tankers were witnessed using Farrell Flat Road through the section with tight corners and narrow bridges. These bulk commodity transport vehicles are permitted to use this road as shown in the RAVnet map below.



B double routes on Farrell Flat Route<sup>3</sup>

Widening the bridges just east of Clare and widening the inside shoulders around tight curves should be a priority to facilitate safer interactions with heavy vehicles using this important link. Road widening around the tight curves does face some major geographical hurdles requiring significant earth works.

RAA welcomes recent shoulder sealing between Clare and Farrell Flat but this treatment is lacking on the western end of the road and installing 1.0m sealed shoulders will significantly bolster safety for all road users. This will also address the significant edge drop-off noted east of Farrell Flat.

<sup>&</sup>lt;sup>3</sup> DPTI RAVnet (<u>http://maps.sa.gov.au/ravnet/index.html</u>) last accessed 29/1/2018





Narrow lanes and significant edge drop-off are the primary hazards east of Farrell Flat

It is also advised that a give way holding line (and corresponding R1-2 'give way' sign) set back from the intersection of Barrier Highway is installed so vehicles turning right out of Farrell Flat Road do not impede the turn path of vehicles turning right into Farrell Flat Road from Barrier Highway. As a minimum, a continuity line should be painted along the edge of Barrier Highway through the intersection.



A give way holding line set back from the intersection will clarify a safe location to stop when giving way to turning vehicles

Some use of barrier protection was noted but there were still a number of unprotected drop-offs and large trees that require barrier protection.



The disused rail crossing just west of Farrell Flat should also be removed and the road surface reconstructed to rectify surface issues resulting from this old rail crossing.

The intersection of Farrell Flat Road and White Hut Road was also assessed due to a number of mentions in our Member survey. The surface at the intersection (particularly along White Hut Road) was in poor condition and exhibiting early signs of failure with significant cracking and potholes forming. A stormwater pit on the south-eastern corner was exposed presenting a significant hazard to pedestrians. Line marking was also very faded and is due for refreshing. It is recommended that Line marking is refreshed, a grate over the stormwater pit is installed, and the failing section of White Hut Road resealed.

Key Recommendations

Farrell Flat Road – Key Recommendations	Authority
Widen Bridges east of Clare.	DPTI
Widen inside shoulders on tight curves between Clare and Farrell Flat.	DPTI
Install 1.0m sealed shoulders between Farrell Flat and Barrier Highway.	DPTI
Install set back give way holding line (and R1-2 'give way' sign) at the Barrier Highway intersection.	DPTI
Additional Barrier protection for drop-offs and large trees.	CGV
Remove disused rail crossing and reconstruct road surface in this location.	DPTI/CGV
At the intersection with White Hut Road, refresh line marking, reseal failing section of White Hut Road, and install a grate over the south-eastern stormwater pit.	DPTI/CGV



## Blyth Road (Blyth Plains Road to Clare)

Blyth Road, east of Blyth Plains Road is maintained by the State government and carries relatively high volumes of traffic. Blyth Road forms part of the heavy vehicle route through the region and is an important link between Clare and Port Wakefield. A number of issues were raised in the Member survey and locals appear to be very concerned with safety involving heavy vehicle interactions. Concerns were also raised regarding pedestrian safety on Blyth Road. For the purposes of this assessment, Blyth Road was driven from west to east.

The road between Balaklava and Clare via Blyth should not have B doubles on it.

Blyth Road from the high school to Armagh, many school kids walk along this road which has no safe walking path and is an 80km/h zone, many trucks and large vehicles use this very busy road.

RAA Members

Also of concern was pedestrian access at the intersection with Horrocks Highway, as well as the alignment and sight distance of the Hicks Road/Boconnoc Park Road intersection. These intersections were assessed and will be discussed in further detail later in this section.

### Crash Statistics

There were eight casualty crashes on this section of Blyth Plains Road with three of those occurring at the intersection with Horrocks Highway in Clare.

At the Horrocks Highway intersection, two crashes were caused by vehicles turning onto Horrocks highway failing to give way to north bound vehicles and the third involved a driver hitting a guard rail at the intersection.

Of the remaining five crashes, two were rollover crashes attributed to inattention, one was a hit fixed object crash attributed to driving under the influence of drugs or alcohol, one was a hit animal crash and one involved a driver failing to give way when exiting a driveway.

### Traffic Volumes

Traffic Volumes for Blyth Road are among the highest in the Clare and Goyder Region assessed, with only Horrocks Highway and sections of Barrier Highway having higher volumes.

Segment	AADT	% Commercial Vehicles
Blyth Plains Road – Blyth	1200	8.5% (100)
Blyth – Hicks Road	1400	8.5% (120)
Hicks Road – Clare High School	1900	6.5% (120)
Clare High School – Horrocks Highway	3700	8% (290)

#### **Blyth Road Traffic Volumes**



## <u>Road Widths</u>

Blyth Road is generally very narrow with 3.0-3.1m lane widths east of Blyth and 2.0m gravel shoulders with no edge line marking. Edge lines were painted for approximately 1.0km east of Bride Road (Armagh) but do not last for long, and do not include any significant shoulder seal. As Blyth Road approaches the suburban sprawl of Clare, concrete kerb and gutter is provided on the south side of the road east of James Road and also on the north side of the road east of Pollock Crescent.

## **Blyth Road Widths**

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
East of Blyth	3.0 – 3.1m	n/a	6.1m

## <u>Speed Limits</u>

The speed limit on Blyth Road is predominantly 100km/h. The speed limit is reduced to 80km/h approximately 200m west of Hicks Road and then 50km/h approximately 100m west of James Road as Blyth Road approaches Clare. Along the length of the 80km/h zone between Hicks Road and Clare, there are numerous side roads leading to residences in Armagh as well as the intersection of Hicks Road with poor alignment.

## **Observations**

Blyth Road has a mix of different road environments. Straight, flat segments of open road are situated to the west, with hills and curving road alignment towards the east, and the residential area and Clare High School on the far eastern end of the road.

When travelling east from Blyth, the road is very narrow and gravel shoulders are not easily distinguishable from the road. Some edge break-up was identified and there were periods of double white centre lines restricting dangerous overtaking however numerous overtaking opportunities were presented. Some barrier protection was used around curves improving safety but further barrier installation should be installed to further bolster safety and reduce the severity of run-off road crashes as well as reducing the likelihood of colliding with roadside hazards. Additionally, lanes should be widened and 1.0m sealed shoulders installed to reduce the likelihood of run off road crashes and create safer interactions with freight.





Blyth Road is very narrow east of Blyth (2015 Google imagery used)

Due to the high traffic volumes, the frequency of oncoming traffic can create difficulty in achieving suitable space to safely overtake a slow moving vehicle. An overtaking lane should be considered, or at the very least a slow vehicle turnout provided on the uphill section east of Old Blyth Road.

Between Old Blyth Road and Clare, freight interactions can be particularly difficult due to the road geometry, and 1.0m sealed shoulders and wider lanes would greatly improve the safety for all motorists. We understand that this will be difficult to achieve in all locations and incur significant costs due to a number of physical restraints such as steep drop offs, hills and vegetation, however, improving the safety on Blyth Road will also have positive effect on efficiency of transport between Clare and Blyth.

Crumbling edges and corrugations on uphill sections were also identified on the eastern section of Blyth Road. Crumbling edge issues will be addressed with a shoulder seal, however localised pavement rehabilitation is required to address the corrugations. The most severe drop-offs have already been protected with W beam barrier but some smaller drop-offs and hazardous vegetation were still seen close to the road edges and additional barrier protection is required in these locations.





Narrow lanes, curves, and steep terrain are the primary issues on the eastern section of Blyth Road

It was also noted that line marking of the school zone 'zigzags' was incorrect near Clare High School. Zigzag pavement markings were painted beyond the school zone advisory signage and did not provide sufficient advance warning of the upcoming school zone. It is recommended that the current zigzag markings be removed and re-painted in advance of the school zone signage in accordance with section 3.21 of the DPTI pavement marking manual.

### Intersection Blyth Road and Horrocks Highway

Numerous concerns were raised in our Member survey regarding the safety of pedestrians at this intersection. We are not aware of any pedestrian crashes at this location however the intersection was still assessed due to the number of comments received and the potential risk of a crash occurring. This intersection is close to Clare High School, and it is highly likely that numerous students cross here when walking towards the Clare town Centre but students crossing could not be assessed as the dates of our assessment were during school holidays.

Blyth turn off from Main North Road. Kids crossing where they shouldn't and traffic backed up at peak times. A recipe for disaster. Round about or traffic lights required.

RAA Member

It was evident from the wear in the bark garden that pedestrians frequently cross here. It was also noted that large stones had been placed to deter pedestrians from using this route as it is not a formal footpath and it is a dangerous location to cross.





It is obvious that pedestrians regularly use this unsafe location to cross Blyth Road

A number of hazards were identified with crossing at this location:

- Sight distance of pedestrians crossing the road is limited for vehicles travelling on Blyth Road due to the geometry of Blyth Road approaching the intersection.
- Sight distance of pedestrians crossing the road is restricted for vehicles turning left onto Blyth Road from Horrocks Highway due to vegetation, signage and the geometry of Horrocks Highway approaching the intersection. This is compounded by this left turn being wide and not at 90 degrees, increasing the speed at which drivers can comfortably navigate the corner.
- The intersection is busy during peak school drop off/pick up times and pedestrians are more likely to take risks.
- Blyth Road is wide at this location and there is no safe refuge island for pedestrians to make a two stage crossing.

The existing footpath alignment requires pedestrians to cross West Terrace, and walk along the southwestern side of Blyth Road before crossing Blyth Road in a safer location further northwest.

To encourage pedestrians to use the designated footpath and safer crossing points, it is recommended that tubular fencing at a minimum height of 1.2m is installed alongside the footpath to restrict pedestrian access and discourage climbing. Care must be taken that this fence does not impede sight distance at the intersection for motorists. Alternatively a W Beam crash barrier could be installed around the curve which would provide additional safety protection as well as discourage pedestrians crossing in this location.

A sketch of these proposed options is provided below and includes the existing footpath location and crossing points.





## Intersection Blyth Road and Hicks Road/Boconnoc Park Road

This intersection was raised in the Member survey and strong safety concerns were raised. There were no reported casualty crashes at the intersection between 2012 and 2016 however an initial desktop investigation caused concern regarding the alignment and sight distances.

## The Blyth Road, Hicks Road and Boconnoc Park Road intersection is suicide. Most locals avoid it. RAA Member

On site, the primary concerns identified regarded sight distance along Blyth Road to the northeast, as well as some signage and line marking issues.

When turning out of Hicks Road, sight distance to the north-east is hindered by vegetation growing along the north-western side of Blyth Road. It is highly recommended that this vegetation is cut back as far as possible and regularly monitored to allow the best possible sight distance. This vegetation also restricted sight distance when turning right from Blyth Road into Boconnoc Park Road.

It was also noted that there was no margin for error due to the placement of the give way holding lines. The risk with this is that vehicles will stop at the holding line and naturally begin to creep forward to attain better sight distance. With the current placement of the holding line, there is a risk that vehicles creeping forward to improve sight distance may mistakenly pull out in front of eastbound traffic on Blyth Road. It is recommended that when sight lines have been improved, sight distance is re-assessed and the give way holding lines are shifted further back from the continuity line if appropriate.

It was also noted that the give way sign on Hicks Road was obscured by vegetation which must be trimmed and that due to the current road alignment a W3-2 'give way sign ahead' sign should also be installed on Hicks Road.

Finally, short left turn lanes have been installed, and it is recommended that left turn arrows are painted in these lanes to deter frustrated motorists from attempting to use them to overtake.



<u>Key Recommendations</u>	
Blyth Road – Key Recommendations	Authority
Widen lanes and install 1.0m sealed shoulders along the length.	DPTI
Investigate the feasibility of an overtaking lane on the uphill section east of Old Blyth Road. As a minimum, a slow vehicle turnout should be provided.	DPTI
Install additional barrier protection to protect drop-offs and significant roadside vegetation.	DPTI
Remove current zigzag markings on both approaches to the school zone for Clare High School and re-paint in advance of the school zone signage in accordance with section 3.21 of the DPTI pavement marking manual.	DPTI
Improve pedestrian safety by restricting access at the intersection with Horrocks Highway. Tubular fencing or W Beam barrier can be used to discourage pedestrians crossing in unsafe locations.	CGV
Improve safety at the intersection with Hicks Road/Boconnoc Park Road by implementing a number of signage and line marking changes as well as vegetation maintenance to improve sight distance.	DPTI/CGV



## Goyder Highway (Spalding – Morgan)

Goyder Highway is a State Maintained Road connecting Crystal Brook in the West and Barmera in the East. The segment of highway assessed as part of the Clare regional assessment was between Spalding and Morgan via Burra. There was little mention of the Highway in the Member Survey however this is a major route and was assessed for completeness. For the purposes of this investigation, this segment of Goyder Highway was travelled from west to east.

### Crash History

Only one casualty crash occurred on Goyder Highway between Spalding and Burra and this was a hit animal crash resulting in serious injuries to the vehicle occupant.

Six casualty crashes occurred between Spalding and Morgan. Four of these were rollover crashes attributed to inattention resulting in minor injuries. One was a hit fixed object crash resulting in minor injuries due to inattention and the other was a side swipe crash due to overtaking without due care that resulted in serious injuries.

### Traffic Volumes

### **Goyder Highway Traffic Volumes**

Segment	AADT	% Commercial Vehicles
Spalding - Burra	400	17.5% (70)
Burra – Worlds End Highway	490	20.5% (100)
Worlds End Highway - Morgan	390	25.5% (100)

## <u>Road Widths</u>

#### **Goyder Highway Road Widths**

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
Near Marble Hill Road	3.1 – 3.2m	1.0 – 1.1m	8.4m
E of Booborowie Road	3.1 – 3.2m	0.4m	7.1m
Near Kooringa Road (Burra)	3.5 – 3.7m	0.7 – 0.9m	8.8m
Near Florieton Road	3.5m	1.7 – 1.8m	10.5m
Near Wonga Road	3.0m	0.5 – 0.6m	7.1m
SE of 5 Mile Road	3.3 – 3.4m	n/a	6.9m

### Speed Limits

The speed limit for this segment of Goyder Highway is generally 110km/h. The speed limit is increased to 110km/h when leaving both Spalding and Burra via an 80km/h buffer zone. A short section of Barrier Highway must be traversed through Burra to access the next section of Goyder Highway heading east out of Burra.



## <u>Observations</u>

Spalding - Burra

When leaving Spalding, a narrow bridge is first encountered over Freshwater Creek. The bridge is currently accessibly by B Doubles however it is very narrow and encounters between B Doubles and opposing vehicles are difficult. The speed limit is 50km/h over the bridge and considering the low speed limit, there is a reasonable sight distance of opposing vehicles reducing the overall risk at this bridge however it should be considered for widening or replacement to improve freight productivity and overall safety in the future.

Shoulder seal is wide around the curves and appears recent and barrier protection is generally sufficient however there are some localised surface failures that need to be repaired.



Shoulders have been recently widened, especially around curves

Two pipelines run along sections of the highway on one or both sides of the road at differing points and it is recommended that these are protected by barriers due to the likely high severity of a run off road crash into these pipelines.

Unprotected stobie poles were noted on both sides of the road and varying locations and they were noted to generally be 3-5m from the edge however as a minimum, at locations where the stobie poles are closer to the road and around bends, additional barrier protection should be provided.

Sealed shoulder widening between Booborowie and Spalding appears fairly recent and is a welcome improvement however the sealed shoulders east of Booborowie Road are much narrower and widening these shoulders would improve safety east of Booborowie.

Some large trees were noted to be approximately 5m from the edge and the surface was in serviceable condition with some minor local failures. Shoulders narrow to 0.2m in some locations and the road feels much more restricted, especially when encountering heavy vehicles.



#### Burra – Morgan

The majority of Goyder Highway between Burra and Morgan was in good condition and was suitable for its current purpose and level of use. The winding section when heading east out of Burra was generally well protected with barriers and the lane and shoulder widths and prominent use of guide posts were very effective in enhancing the safety.

The vast majority of the Highway between Kooringa Road and Morgan was treated with audio tactile edge lines with approximately 60km of ATLM in each direction. Significant signs of deterioration were shown on the raised thermoplastic bumps however they were still very effective at achieving their purpose of creating noise when traversed. In the eastbound lane, there is a significant localised failure of previous repair works at the quarantine bin site 30km northwest of Morgan and it is recommended that this is repaired as a priority. There was a similar failure in the pavement just to the east in the westbound lane. Segments of edge drop off were also identified and additional material may need to be added to the gravel shoulder to reduce this edge drop off.



Pavement failure and 50mm+ edge drop off at the Quarantine bin site

It was also noted that there were limited rest areas and facilities at these areas were very limited. As inattention is a leading factor in crashes on this section of Goyder Highway and the road is generally straight and flat it is recommended that an additional rest stop is implemented. The quarantine bin approximately 30km northwest of Morgan could be a suitable site to upgrade as it is evident that motorists regularly stop in this location by the amount of rubbish on the ground as no bin is provided other than the quarantine bin. Some shade, seating and bins would encourage people to use this as a rest stop and also to dispose of any fruit or vegetables they are bringing into the region.

The worst segment of the highway assessed is the 20km section northwest of Morgan. Southeast of Mine Mallee Road, sealed shoulders, edge line marking, and ATLM treatments terminate and the total road seal width significantly narrows. It is recommended that a minimum 0.5m sealed shoulder is provided in to Morgan as a priority. 3 casualty crashes occurred on this 20km stretch of road between



2012 and 2016 which also highlights it as the worst section from crash history perspective between Spalding and Morgan

Key Recommendations	
Goyder Highway (Spalding - Morgan) – Key Recommendations	Authority
Consider future upgrade/widening of the Freshwater Creek bridge in Spalding to improve safety and freight productivity.	DPTI
Undertake local surface repair works between Spalding and Burra and near the Quarantine bin 30km north-west of Morgan.	DPTI
Install barrier protection for the pipeline between Spalding and Burra as well as for stobie poles on curves and close to the edge.	DPTI
Implement an additional rest stop between Burra and Morgan, this could be achieved by upgrading the facilities at the Quarantine bin 30km north-west of Morgan.	DPTI
Seal shoulders to a minimum of 0.5m for the 20km of Highway north-east of Morgan as a priority.	DPTI



## Thiele Highway (Morgan - Eudunda)

Thiele Highway is a state maintained Highway linking Gawler and Morgan via Kapunda and Eudunda. Thiele Highway between Gawler and Eudunda was assessed in our Barossa Valley and Light Tourism Region Assessment in late 2017. The segment investigated as a part of this regional assessment is between Worlds End Highway (Bruce St) in Eudunda to Murraylands Road in Morgan and was assessed from east to west.

## <u>Crash History</u>

Between 2012 and 2016, six casualty crashes occurred on Thiele Highway between Eudunda and Morgan. Three of these crashes were rollover crashes attributed to inattention, two were hit fixed object crashes (one due to inattention and on possibly due to fatigue) and one was a hit animal crash.

### Traffic Volumes

Thiele Highway carries relatively low volumes of traffic between Eudunda and Morgan and the proportion of commercial vehicle traffic is also reasonably low.

### **Thiele Highway Traffic Volumes**

Segment	AADT	% Commercial Vehicles
Bruce Street – Eudunda Road	600	13.5% (80)
Eudunda Road – Bower Boundary Road	390	13.0% (50)
Bower Boundary Road – Murraylands Road	390	13.0% (50)

## <u>Road Widths</u>

The majority of Thiele Highway between Morgan and Eudunda was approximately 6.5m wide with 3.2m lane widths. There was a section approximately 8km long through Bower where narrow sealed shoulders and edge lines were provided. Also a recent black spot project involved installing 1.0m sealed shoulders and edge lines for approximately 10km into Eudunda.

### **Thiele Highway Road Widths**

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
Just SW of Morgan	3.1 – 3.4m	n/a	6.5m
Near Bower Boundary Road (Bower)	3.2 – 3.3m	0.4m	7.3m
E of Sutherlands Road	3.1 – 3.4m	n/a	6.5m
Near Neales Road	3.2m	1.0m	8.4m

### Speed Limits

This segment of Thiele Highway is signposted as 110km/h with 80km/h reductions through Bower and Sutherlands.



## **Observations**

Thiele Highway was generally quite narrow and edge drop-offs were frequent on both sides of the road. There was a significant amount of roadside vegetation and little barrier protection between Morgan and Mount Mary. Vegetation was scarce west of Mount Mary however there were still occasional clusters where barrier protection should be considered.

The surface was generally reasonable with some uneven sections close to Morgan requiring repair works however our primary safety concern is the narrow sealed carriageway for the majority of the length of the road and a minimum 0.5m shoulder seal is recommended to improve safety and reduce the risk of single vehicle crashes on Thiele Highway.



The narrow carriageway and lack of sealed shoulders are a safety concern on Thiele Highway

Key Recommendations	
Thiele Highway (Morgan – Eudunda) – Key Recommendations	Authority
Implement a shoulder sealing program for all sections that currently lack sealed shoulders to provide a minimum 0.5m shoulder seal.	DPTI
Provide additional barrier protection for roadside vegetation.	DPTI
Install barrier protection for the pipeline between Spalding and Burra as well as for stobie poles on curves and close to the edge.	DPTI



## Worlds End Highway

Worlds End Highway is a state maintained road linking the Thiele Highway in Eudunda with the Goyder Highway east of Burra. The largest settlement along Worlds End Highway is Robertstown and Point Pass lies between Robertstown and Eudunda. The highway was not mentioned significantly in our Clare and Goyder regional Member survey, however numerous nominations were received in our 2017 Risky Roads survey with members concerned about the narrow road and interactions with heavy vehicles between Eudunda and Robertstown. For the purpose of this investigation, Worlds End Highway was travelled in full from south to north

This road is a busy B double truck route. The road is extremely narrow and when trucks are passing each other they are right on the very edge and are breaking it up."

RAA Member (Risky Roads 2017)

## Crash History

Six casualty crashes were reported on Worlds End Highway between Eudunda and the Goyder Highway. Four of these were between Eudunda and Robertstown and two were at the intersection with Goyder Highway.

The four casualty crashes south of Robertstown included one rollover due to inattention (minor injury), one rollover due to overtaking without due care (fatal), one sideswipe due to inattention (serious injury) and one head on due to failing to keep left (serious injury)

Both crashes at the Worlds End Highway/Goyder Highway intersection were rollover crashes attributed to inattention resulting in minor injuries. One involved a Semi Trailer turning right into Worlds End Highway (estimated speed 50km/h) and the other involved a vehicle turning right onto Goyder highway (estimated speed 80km/h)

## Traffic Volumes

Traffic volumes on Worlds End Highway are generally quite low with the majority of traffic travelling between Eudunda and Robertstown. Traffic volumes north of Robertstown are very low.

Segment	AADT	% Commercial Vehicles
Eudunda – Point Pass	500	9.5% (48)
Point Pass – Robertstown	340	12.0% (40)
Robertstown – Fettke Road	170	20.5% (35)
Fettke Road – Goyder Highway	120	20.0% (24)

### **Worlds End Highway Traffic Volumes**



## <u>Road Widths</u>

The road is narrow south of Robertstown with consistent 3.1 - 3.2m lane widths and graded shoulders. North of Robertstown, the lane width is sufficient and generally 3.5m and narrow sealed shoulders are provided along the length.

### Worlds End Highway Road Widths

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
Near Myrtle Road	3.2 – 3.3m	N/A	6.5m
N of Robertstown	3.5 – 3.7m	0.3 – 0.4m	7.9m

## Speed Limits

The speed limit of Worlds End Highway is 110km/h between Eudunda and Robertstown. The speed limit is increased to 110km/h out of Eudunda from 50km/h via an 80km/h buffer zone. The speed limit is reduced to 60km/h through Point Pass via an 80km/h buffer zone and to 50km/h through Robertstown via an 80km/h Buffer zone. 80km/h intermediate speed limits are also used when returning to the speed limit.

The speed limit between Robertstown and Goyder Highway is 100km/h and although the road quality is generally much better, the road is subject to flooding and the 100km/h speed limit is more appropriate and gives motorists more time to assess the potentially hazardous and variable road conditions.

### **Observations**

The difference in Worlds End Highway north and south of Robertstown is very noticeable. The southern section is narrow, has no sealed shoulders and little barrier protection yet a speed limit of 110km/h applies. The northern section is much wider, has sealed shoulders and is governed by a 100km/h speed limit. The southern section carries up to 500 vehicles per day whilst the northern section generally carries less than 200 vehicles per day.

Considering the very low traffic volumes north of Robertstown, investment on Worlds End Highway should be targeted south of Robertstown until both the northern and southern segments of the highway are at comparable levels of safety. All 4 casualty crashes between 2012 and 2016 occurred on the southern section whist none occurred on the section north of Robertstown further highlighting the difference in safety between north and south.

South of Robertstown, we also noted some local pavement failures and undulations as well as stobie poles located up to 3m from the bitumen seal.

North of Robertstown, the road itself was much safer due to the wider sealed carriageway. There are many floodways along this section of road and many parts of the carriageway are subject to flooding due to the flat topography in the surrounding area. Depth indicators were provided at floodways so road users can easily assess the depth of floodwaters. There were unprotected curves and drop offs noted and a row of stobie poles along the eastern side of the road beginning just north of Robertstown.

At the junction with Goyder Highway, the approach was well signed with W2-3 'T intersection' signs with '400m' and '200m' supplementary plates. At the intersection it was noted that a continuity line should be provided along the Goyder Highway edge line to improve delineation and reduce the chance



of motorists turning out of Worlds End Highway mistakenly creeping onto the traffic lane of Goyder Highway.



Top: Worlds End Highway north of Robertstown

Bottom: Worlds End Highway south of Robertstown

RAA recommend that a minimum 0.5m shoulder seal and 3.3m lane widths are provided to improve safety between Eudunda and Robertstown and localised pavement failures are repaired. Barrier protection should also be provided for stobie poles.

<u>Key Recommendations</u>	
Worlds End Highway – Key Recommendations	Authority
Provide a minimum 3.3m lane widths and 0.5m shoulder seal south of Robertstown.	DPTI
Install barrier protection for stobie poles along the length of the highway.	DPTI
Install continuity line at the intersection with Goyder Highway.	DPTI



## RM Williams Way (Bungaree – Spalding)

RM Williams Way is maintained by the State Government and Links Clare to Jamestown via Spalding but continues significantly further north through the southern Flinders Ranges to Hawker spanning a total length of over 200km. The section assessed in this assessment was only the 25km between Horrocks Highway and Spalding. Little information or mention of RM Williams Way was provided in the Member Survey however as it is a major route through the region and en route to our start point for Goyder Highway assessment it was assessed in the northbound direction.

RAA did not expect to identify any major issues as there have been a number of improvements implemented since it featured just outside the top 10 riskiest roads in the 2013 Risky Roads survey. At that time, 11 casualty crashes had occurred in the 5 years previous (2008-2012) and issues such as crumbling edges and a poor surface, narrow lanes and unsealed shoulders were prevalent.

DPTI have recently targeted a 6km stretch of the road with upgrades including shoulder widening, pavement reconstruction, full reseal and installation of audio tactile edge lines installed in 2016. An additional \$310,000 was funded under the 2017-18 DPTI annual program for additional shoulder sealing and safety barrier installation.

### Crash History

Five casualty crashes occurred between Bungaree and Spalding in the five years between 2012 and 2016. Three resulted in minor injury and two resulted in serious injury. Other than one 'hit animal' type crash the remaining were single vehicle crashes attributed to inattention (one hit fixed object, two left road out of control, one roll over)

### Traffic Volumes

Average traffic volumes vary between 650-700 vehicles per day between Horrocks Highway and Goyder Highway in Spalding.

### **RM Williams Way Traffic Volumes**

Segment	AADT	% Commercial Vehicles
Horrocks Highway – Andrews Road	700	13% (90)
Andrews Road – Goyder Highway (Spalding)	650	15.5% (100)

## <u>Road Widths</u>

Lane widths were typically constant at approximately 3.2m. Sealed shoulder width did vary along the length of the road however was generally adequate.

### **RM Williams Way Road Widths**

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
2km N of Horrocks Highway	3.2m	0.8m	8.0m
1km S of Walkandi Road	3.0 – 3.3m	1.0 - 1.1 m	8.4m



## <u>Speed Limits</u>

The speed limit of RM Williams Way between Bungaree and Spalding is the default 100km/h. The speed limit is reduced to 50km/h into Spalding and '50 ahead' advisory signage is applied prior to the speed reduction.

### **Observations**

Generally the road was in good condition between Bungaree and Spalding, particularly the northern section where recent works had been targeted. In the southern sections, the surface was highly polished in places creating potential traction issues in wet weather. There were also sections where the road surface was uneven and rutting was forming. Localised surface failures were noticed, primarily over bridges and culverts and some local undulations were experienced.



Surface polishing is evident on the southern section of RM Williams Way

Sealed shoulders were provided along the length of the road however they appeared narrower in some locations. The northern section of the road has been designed and constructed to a high standard with audio tactile edge lines, wide sealed shoulders and significant installation of W Beam crash barrier to protect drop offs and around curves. Double white centre lines restricted overtaking throughout this section due to the curving and undulating terrain but the relatively low traffic volumes do not justify the installation of overtaking lanes at this stage.

Some localised surface and shoulder failures between Bungaree and Euromina require repair works, and a re-seal in the longer term as well as additional barrier protection and ATLM installation will bolster the safety of this road.

In general, this segment of RM Williams Way performed sufficiently better than it did during our assessment in 2015 where very narrow lane widths and significant edge drop off were identified south of Spalding and considered to be among the poorest in the Mid North region.



<u>Key Recommendations</u>	
RM Williams Way (Bungaree – Spalding) – Key Recommendations	Authority
Repair localised surface and shoulder failures between Bungaree and Euromina.	DPTI
Consider future re-seal on southern sections to rectify surface polishing and uneven surface/	DPTI
Additional barrier protection/ATLM between Bungaree and Euromina/	DPTI



## Saddleworth Road (Marrabel to Auburn)

Saddleworth Road is a state maintained road and links Marrabel to Auburn through Saddleworth, crossing the Barrier Highway. For the purpose of this assessment, the road was travelled from Marrabel to Auburn. Members mainly raised issues regarding shoulder and edge drop off on the section between Saddleworth and Auburn however for completeness we assessed both sections of road. RAA were aware of the issues between Saddleworth and Auburn due to a recent nomination on our 'Report a Road' system and this sentiment was enforced after reading comments left by our members in our Clare regional survey.

Auburn-Saddleworth (B84) needs shoulder upgrade – road very poor when large trucks meet cars. This is an important link for the agriculture section of this area

RAA Member

#### Crash History

Two casualty crashes occurred on Saddleworth Road between 2012 and 2016 and both of these occurred between Marrabel and Saddleworth in 2012. One of these crashes was a hit fixed object crash resulting in a fatality and the other was a rollover crash resulting in minor injury.

#### Traffic Volumes

Saddleworth Road is the primary east-west route through the southern Clare and Goyder region and has a mixed use with both private and commercial vehicles utilising this route.

#### Saddleworth Road Traffic Volumes

Segment	AADT	% Commercial Vehicles
Marrabel – Saddleworth	470	16.0% (75)
Saddleworth – Auburn	700	13.0% (90)

### <u>Road Widths</u>

Between Marrabel and Saddleworth, the road width was suitable and wide sealed shoulders were generally provided. It was noted that \$1.825M in shoulder sealing had been completed relatively recently and was signed in both directions. The section between Saddleworth and Auburn was very narrow with only graded gravel shoulders and no shoulder seal.

#### Saddleworth Road Widths

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
Marrabel – Saddleworth	3.2m	0.8-1.0m	8.2m
Saddleworth – Auburn	3.0m	n/a	6.0m

#### Speed Limits

The speed limit for both segments of Saddleworth Road is 100km/h and 80km/h buffer zones are used to increase and reduce speed limits to 50km/h into Saddleworth and Auburn and 60km/h into Marrabel.



### **Observations**

The Marrabel to Saddleworth segment was generally of a fairly high standard. Lane widths were suitable and wide shoulder seal was provided extensively. W Beam barrier protection was also used to protect hazards including curves, vegetation, drop-offs and culverts. There was a row of stobie poles that ran along the southern side of the road and most of these were set back from the road however barrier protection of these stobie poles would further improve safety. Guide posts were effectively used along the length of the road to aid delineation.

The Saddleworth to Auburn segment of Saddleworth Road differed significantly. The road was very narrow with lanes 3.0m wide and gravel shoulders along the length. The edge of the road was breaking up in places and the drop off onto the gravel was generally quite significant.

The camber felt steep, and was especially steep on some of the gravel shoulders where steeper dropoffs occurred.

These factors all contribute to a greater risk of a vehicle losing control or rolling over in the event that a vehicle leaves the sealed surface and it is recommended that the width of this road is brought up to the standard of the eastern segment and 3.2m lane widths and 1.0m sealed shoulders are provided.



Narrow lanes and edge drop-off posed a serious risk between Saddleworth and Auburn

It was also noted that very little barrier protection was provided in vast contrast to the eastern segment and we also recommend that additional barrier protection is strategically installed to protect roadside hazards such as vegetation and stobie poles as well as steep embankments and curves on Saddleworth Road.

Key Recommendations	
Saddleworth Road – Key Recommendations	Authority
Widen lanes and install sealed shoulders between Saddleworth and Auburn/	DPTI
Install additional safety barrier to protect roadside hazards between Saddleworth and Auburn.	DPTI
Install additional safety barrier to protect stobie poles along the length of Saddleworth Road.	DPTI



## Balaklava Road

Balaklava Road is a State Maintained Road and links Port Wakefield to Auburn via Balaklava as well as providing the initial link of the route between Port Wakefield and Clare. Heavy Vehicles heading to/from Port Wakefield towards Clare are generally required to turn off at Blyth Plains Road east of Balaklava. This route was assessed between Auburn and Blyth Plains Road primarily due to a complaint that heavy vehicle interactions were deemed dangerous between Balaklava and Auburn and that they could not safely navigate the left hand turn onto Horrocks Highway in Auburn.

## Crash History

There were four casualty crashes between Balaklava and Auburn between 2012 and 2016, with three being hit fixed object crashes, and one of unknown type. One of the hit fixed object crashes may have been due to fatigue, the other three were attributed to inattention.

## Traffic Volumes

Balaklava Road Traffic Volumes				
Segment	AADT	% Commercial Vehicles		
Auburn – Blyth Plains Road	500	16.0% (80)		
Blyth Plains Road - Balaklava	1300	15.5% (200)		

## <u>Road Widths</u>

No formal measurements were taken on Balaklava Road however lane widths were estimated to be 3.2m wide. Black spot funding has recently addressed some sections and 1.0m sealed shoulders were provided between Baum Road and Roberts Road. Further west, 0.3m sealed shoulders were provided.

## Speed Limits

The speed limit between Auburn and Balaklava is 100km/h. The speed limit is reduced to 60km/h through Halbury via an 80km/h buffer zone.

## **Observations**

The road surface for most of the road within the Clare and Gilbert Valleys Council was quite good, with good use of guide posts and clear line marking. Some steep drop-offs and hazardous roadside vegetation was protected with barriers however there were also some unprotected drop-offs noted and some vegetation up to 2.0m from the edge line that could use additional barrier protection.

In the western parts of the Clare and Gilbert Valleys Council region, shoulders became very narrow in places and this continued through to Balaklava. The surface was uneven in places and localised surface failures, rutting and edge break-up were noted.

Severe rutting was identified west of Halbury and there was evidence of previous repairs however these did not address the recurring rutting issue. The worst sections require pavement rehabilitation works to prevent rutting and cracking from re-appearing as minor pavement repairs previously undertaken have not been adequate.





Pavement rehabilitation is required to address rutting west of Halbury

RAA welcome the recent announcement of \$1.36M in shoulder sealing between Balaklava and Halbury and it is very positive that the issues with narrow shoulders are being addressed however it is just as important that surface rehabilitation works are also undertaken.

### Heavy Vehicle operations east of Blyth Plains Road

The eastern end of Balaklava towards Auburn was generally in winding and undulating terrain making heavy vehicle movement along the road difficult. Assessing general heavy vehicle routes on RAVnet, the section between Blyth Plains Road and Auburn is a commodity route only and as such should experience low or seasonal heavy vehicle use. During our assessment, numerous long vehicles were witnessed to be using the route however it was not able to be determined if they were permitted to do so as part of a commodity freight route.





DPTIs RAVnet approved routes [23m B Double (GML)]<sup>4</sup>

Freight between Port Wakefield/Balaklava and Clare should generally be turning left from Balaklava Road onto Blyth Plains Road however this is not always adhered to leading to heavy vehicles having difficulty negotiating the Port Road/Horrocks Highway intersection in Auburn.

The Port Road/Horrocks Highway intersection was investigated and the current alignment and site constraints make heavy vehicle movements (especially left from Port Road onto Horrocks Highway) difficult. A stobie pole close to the Kerb is the major risk and long vehicles cannot complete the left turn without using the southbound lanes of Horrocks Highway. To safely facilitate heavy vehicle movements at this intersection, major service relocation and potential land acquisition would be required in order to account for the swept path of longer vehicles. This work would require a large investment for a relatively low net return.

It is recommended that current heavy vehicle counts and movements are assessed between Balaklava and Auburn, and if necessary install advisory signage to remind freight operators to use Blyth Plains Road rather than Balaklava Road.

Key Recommendations	
Balaklava Road – Key Recommendations	Authority
Further barrier protection for drop offs and hazardous roadside vegetation/	DPTI
Pavement rehabilitation works to repair rutting west of Halbury/	DPTI
Survey heavy vehicle movements between Balaklava and Auburn and if necessary install advisory signage to remind heavy vehicle operators to use Blyth Plains Road for freight access to Clare.	DPTI

<sup>&</sup>lt;sup>4</sup> DPTI RAVnet (<u>http://maps.sa.gov.au/ravnet/index.html</u>) last accessed 23/1/2018



## **Blyth Plains Road**

Blyth Plains Road is maintained by the state government and is part of the Heavy vehicle route between Port Wakefield and Clare. The road lies outside of the boundary for the purposes of this regional assessment and is within the Wakefield Council however is an important route for heavy vehicles in and around the Clare Valley. Some issues were raised by Members in our survey and it was decided to asses Blyth Plains Road as a part of this Clare and Goyder regional assessment.

Blyth Plains Road. A major transport corridor, the road is third world standard.

RAA Member

### Crash History

Between 2012 and 2016 there were five casualty crashes, with four of them occurring on the straight section between Hoyleton and Balaklava Road. Three of these crashes were hit fixed object crashes attributed to inattention, one was a rollover due to inattention and the other involved a young pedestrian on the road who was hit and passed away due to the injuries sustained.

### Traffic Volumes

On average, 600 vehicles use Blyth Plains Road every day with a high percentage of these being commercial vehicles.

#### **Blyth Plains Road Traffic Volumes**

Segment	AADT	% Commercial Vehicles
Balaklava Road – Blyth Road	600	20.0% (120)

### <u>Road Widths</u>

Blyth Plains Road was generally very narrow. Approximately 2.0km of edge line marking and narrow sealed shoulders were provided in the vicinity of Tucker Road.

#### **Blyth Plains Road Widths**

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
Near Bigg Road	3.0 – 3.4m	n/a	6.4m
Near Tucker Road	3.1 – 3.2m	0.2 – 0.3m	6.8m

#### <u>Speed Limits</u>

The speed limit for Blyth Plains Road is the default 100km/h.

#### **Observations**

Lane widths were generally narrow and steep edge drop-offs and crumbling edges were noted in some locations. The narrow lane widths present greater risk and difficulties for heavy vehicles as well as increasing the risk of run off road and hit fixed object crashes.



Generally the surface was smooth however some localised failures and undulations were seen. Recent investment into culvert widening and protection works is good to see however the entire road needs to be widened to cater for safer freight operations.



Blyth Plains Road is very narrow and would significantly benefit from shoulder sealing

It is recommended that a 1.0m shoulder seal is applied to Blyth Plains Road. This should be prioritised on the between Woodlands Road and Jericho Road to allow safer cornering and additional sealed surface to allow for the swept path of longer vehicles. Sealed shoulders will also address the steep edge drop-off and crumbling edges identified in some locations.

Roadside hazards present included vegetation within 3.0m of the sealed edges, and a row of stobie poles that predominantly runs along the western edge of the road set back approximately 5.0m. Following shoulder seal works, it is also recommended that barrier protection is installed to protect roadside hazards, particularly around the Jericho Road/Woodlands Road curves.

Key Recommendations	
Blyth Plains Road – Key Recommendations	Authority
Install 1.0m wide sealed shoulders along Blyth Plains Road, prioritised in the section between Woodlands Road and Jericho Road.	DPTI
Installation of W Beam barrier protection to reduce the likelihood of serious collisions with roadside hazards.	DPTI


## Tarlee Road

Tarlee is a state maintained road connecting the towns of Tarlee and Kapunda.

The issues raised by members on Tarlee Road related to a poor surface and one comment indicated that the road was too narrow without room to safely navigate around bicycles. Interaction with heavy vehicles was also raised as passing oncoming trucks can be quite risky on narrow sections of road.

Tarlee to Kapunda Rd in particular is quite narrow and no room to safely go around bikes, especially if a truck is coming as well.

RAA Member

#### Crash History

Between 2012 and 2016 there were two casualty crashes on Tarlee Road. A fatality attributed to driving under the influence of alcohol or drugs occurred in 2015 and a minor injury crash involving hitting an animal occurred in 2014.

#### Traffic Volumes

On average, Tarlee road is travelled by 700 vehicles per day of which 100 are commercial vehicles.

#### **Tarlee Road Traffic Volumes**

Segment	AADT	% Commercial Vehicles
Tarlee – Kapunda	700	14.5% (100)

#### <u>Road Widths</u>

Typically, Tarlee Road has 3.2m lane widths with 1.0m wide sealed shoulders. A short section of approximately 700m between Kidman Road and the Kapunda Cemetery is narrow and lacks sealed shoulders and edge line markings and it is recommended that 1.0m sealed shoulders are provided along this 100km/h stretch of road

#### **Tarlee Road Widths**

Location	Lane Width	Sealed Shoulder Width	Total Seal Width
Near Dennett Rd	3.1 – 3.3m	1.1 – 1.3m	8.6m

#### <u>Speed Limits</u>

The speed out of Kapunda is 50km/h and becomes 100km/h outside of the Kapunda township. When driving into Tarlee, the speed is reduced from 100km/h to 60km/h with an 80km/h buffer zone.

#### **Observations**

Initially, when heading west out of Kapunda, Tarlee Road is very narrow and does not have marked edge lines. This section is approximately 700m in length should be brought up to the standard of the majority of Tarlee Road with 1.0m shoulder seal.



The central section of the road is in good condition with sufficient lane and shoulder widths. Overtaking opportunities are limited as there are extensive segments controlled by a double unbroken centreline prohibiting overtaking due to the curves and crests of the road.

Some Barrier protection has been provided to protect hazards and drop-offs however there are sections that still require protection to improve overall safety, especially on sections where there are steep drop-offs with unprotected trees.

The north-western segment of the road approximately 3km out of Tarlee through to Tarlee is in poor condition and there are a many localised pavement failures such as the below photograph taken near Grant Road.



One of many local pavement failures on the north western end of Tarlee Road

Tarlee Road – Key Recommendations	Authority
Provide 1.0m sealed shoulders between Kidman Road and Kapunda Cemetery.	DPTI
Provide additional barrier protection of roadside hazards and drop-offs.	DPTI
Repair localised surface failures on the north-western end of Tarlee Road.	DPTI



# Spring Gully Road/Saw Mill Road

The Spring Gully Road/Saw Mill Road drive is a heavily promoted tourist route through the Clare Valley and is the primary access to many attractions and various accommodation in the region. Roads to recovery funding was recently utilised by the Clare and Gilbert Valleys Council to seal a significant portion of Spring Gully Road however residents are still raising their concerns about the remaining unsealed sections of Spring Gully Road and Saw Mill Road.



Left: Tourist signage on Spring Gully Road

Right: Tourist Signage on Bayes Road (2014 Google imagery used)

Spring Gully Road heads west from Horrocks Highway near the Clare Caravan Park and meanders through the hills towards Spring Gully Conservation Park. Saw Mill Road continues from Spring Gully Conservation Park back towards Horrocks Highway before ending at Hughes Park Road. The below map shows the location of Spring Gully Road and Saw Mill Road and the locations of the sealed and unsealed portions of road.



The Spring Gully Road/Sawmill Road Route



Saw Mill Road leading into Spring Gully Road. This is a major loop road promoted for visitors to the valley and a good part of Spring Gully Road has been sealed (finally); now it's opportune to seal the remainder, and Saw Mill Road completing a safe and picturesque drive.

RAA Member

The sealed section is relatively narrow and is subject to an 80km/h speed limit however is fit for purpose and is a good improvement over the previous unsealed surface. Some barrier protection of trees and drop-offs would further improve safety.

Numerous potholes were noted on the unsealed surface that begins north of the Eldredge Cellar Door with numerous small potholes forming at the intersection with Fitzgerald Road among other locations along the road.

Along Saw Mill Road, some severe corrugations were felt on inclines and large potholes were also seen. Very few guide posts are used and the road is narrow and winding, which can be especially hazardous to those unfamiliar with the road or unaccustomed to driving on unsealed roads.

Spring Gully Road should be strongly considered for sealing to improve the safety as well as improve the appeal to tourists that may otherwise choose to drive only on sealed roads as many car hire companies restrict the use of hire cars on unsealed roads.

<u>Key Recommendations</u>	
Spring Gully Road/Saw Mill Road – Key Recommendations	Authority
Install additional barrier protection of drop-offs and large trees, as well as guide posts to improve delineation.	CGV
Seal the remainder of Spring Gully Road and Saw Mill Road.	CGV



## **Booborowie Road**

Booborowie Road is predominantly maintained by the regional council of Goyder with a short segment near Wilkins Highway maintained by the Northern Areas Council. For the purpose of this investigation, Booborowie Road was travelled from north to south. Due to a moderate level of member correspondence in the survey, RAA assessed Booborowie Road between Whyte Road in the north and Farrell Flat Road in the south, crossing the Wilkins and Goyder Highways.

Between Whyte Road and Wilkins Highway, the road was fit for its intended purpose without any significant potholes or corrugations. The intersections with Collins Road and Sunshine Road should have priorities formalised as there is no R1-2 'give way' signs on any approach to these intersections.

Between Wilkins Highway and Goyder Highway, the northern section is unsealed past the power station and the sealed section through Booborowie to Goyder Highway begins just south of The Bluff Road. This section of road was sealed by the council using federal Roads to Recovery funding. The sealed section is in good condition with lanes approximately 3.3m wide and sealed shoulders approximately 300mm wide. The line marking was generally quite faded for most of the Road through to Goyder Highway and is due for refreshing.

There is no urgent need to seal the road through to Wilkins Highway and the unsealed section is in reasonable condition. The road was in good condition and drainage works were ongoing in the vicinity of the Hallett Power Station with the section north of Booborowie through to the council border in Canowie receiving significant funding as part of the roads to recovery programme for drainage and vertical realignment works. Should council wish to seal this section in future, it may be worth seeking a contribution from energy Australia as the power station is one of the main destinations along this road.

South of Goyder Highway, the sealed section of the road is in good condition with safety barriers in strategic locations. Traffic volumes were noted to be very low at the time of our assessment. Guide posts are used consistently to aid delineation and line marking was clear. Roadside hazards were generally minimal with the exception of the pipelines for a length of the road and some stobie poles on the western side of the road. Roads to Recovery funding has also been used to fund the sealing of parts of this section of Booborowie Road.

When driving south, there is no warning signage that the road becomes gravel and the change in surface is drastic so it is suggested that W5-19 'gravel road' warning sign is installed prior to the change in surface conditions.

Small potholes were noted along the length of the road with a large cluster near the intersection with Four Trees Road. Sealing the section north of Farrell Flat should be considered by council to complete the sealed link between Farrell Flat Road and Goyder Highway.

<u>Key Recommendations</u>	
Booborowie Road – Key Recommendations	Authority
Formalise intersections such as those with Collins Road and Sunshine Road with R1-2 'give way' signs.	RCG
Consider sealing the currently unsealed section north of Farrell Flat Road.	RCG



# Black Springs Road

Black Springs Road links Robertstown and the Barrier Highway and is a key link between Robertstown and Clare. The eastern part (approx. 5km) is under the jurisdiction of the Clare and Gilbert Valleys Council, with the remainder maintained by the Regional Council of Goyder. A number of Members raised their concern about the poor surface of Black Springs Road in the survey and highlighted that it would be a good route to consider for sealing in future. The road is sealed for approximately 12km between Robertstown and Burra Road and the remaining 13km between Burra Road and Barrier Highway is unsealed. Only the unsealed section was assessed by our team.

A corrugated surface was noted on Black Springs Road during our assessment and a number of short bitumen sections were provided past residential properties for dust mitigation.

The remainder of Black Springs Road should be assessed by both the Clare and Gilbert Valleys Council and Regional Council of Goyder for a potential seal however current low use and traffic volumes may not warrant this treatment. As a minimum, a heavy grade should be undertaken to improve the corrugated surface and prevent further deterioration.

A Member also mentioned that the Barton Hill Road/Barrier Highway/Black Springs Road intersection was troublesome which was also assessed and some safety issues were identified.



The intersection of Black Springs Road/Barton Hill Road/Barrier Highway was troublesome

The above photo is taken on Black Springs Road looking towards Barton Hill Road with the intersection of Barton Hill Road and Barrier Highway to the right. The intersection is very wide and wheel tracks indicate that vehicles traverse the intersection many different ways. Travelling southwest on Black Springs Road, it was noted that Black Springs Road could easily be mistaken for the through road and Barrier Highway could be the continuation of an 'S bend' on this through road as the 'give way' sign was bent and not easily visible from Black Springs Road especially for motorists who cut the corner turning right.

It is recommended that this intersection is narrowed and priorities are made clear at the Black Springs Road/Barton Hill Road intersection and the Barrier Highway/Barton Hill Road intersection by separating these two intersections using an alignment as shown in the below sketch.





Suggested alignment for the Black Springs Road/Barton Hill Road/Barrier Highway intersection

This alignment would be easiest to achieve by sealing the apron of Barrier Highway and Barton Hill road in a westerly direction beyond Black Springs Road and then sealing the Black Springs Road apron on Barton Hill Road and providing guide posts to delineate the preferred alignment

This may also be achieved through fencing off the north-western corner and installing guide posts to delineate the preferred alignment.

As an absolute minimum, the Barton Hill Road apron must be re-sealed, the give way sign replaced in a prominent position and all line markings refreshed.

Key Recommendations	
Black Springs Road – Key Recommendations	Authority
Consider Black Spring Road for future sealing to improve the Robertstown – Clare link.	CGV/RCG
Conduct a heavy grade to improve current surface and prevent further deterioration.	CGV/RCG
Improve the intersection with Black Springs Road/Barton Hill Road/Barrier Highway. Preferred option is an extensive apron seal to delineate minor alignment changes however as an absolute minimum, the Barton Hill Road apron must be re-sealed, the give way sign replaced in a prominent position and all line markings refreshed.	CGV



# Main Road 45 (Marrabel – Waterloo Road)

Main Road 45 is maintained by the Clare and Gilbert Valleys Council and links Marrabel and Black Springs through the township of Waterloo. For the purpose of this assessment, Main Road 45 was travelled from north to south. In our Member survey, the poor condition of the sealed surface of the road was raised numerous times, primarily between Marrabel and Waterloo.

The Waterloo-Marrabel Road is SO bad, there are pot holes everywhere that get patched up from time to time. It needs a big overhaul - it's a disgrace!

RAA Member

There were no reported casualty crashes on Main Road 45 between 2012 and 2016 and traffic counts are not publicly available however at the time of our assessment, traffic volumes were considered moderate considering the road purpose and surrounding townships.

There is a bitumen seal through the settlement of Waterloo and past a number of residences for dust mitigation, and a bitumen seal is provided for almost 10km north of Marrabel. The remainder of the road is unsealed.

North of Waterloo, guide posts were present and were often obscured by tall grass. It is recommended that council trim and maintain this growth more frequently as it can pose a safety and fire risk. Some minor corrugations were experienced however the general surface condition was what you would expect for a road of this nature.

Line marking on the sealed section through Waterloo was very faded and it is recommended that this is refreshed and some minor edge breakup and localised surface failures were present. Other than routine surface maintenance, it is recommended that line marking is fully refreshed on this section of road.

The southern segment of seal begins south of Steelton Road and is initially in serviceable condition with reasonable lane widths and narrow shoulder seal. Stobie poles run along the western side of the road between Waterloo and Marrabel posing a risk in a run off road crash however they are spaced approximately 5m from the edge of the road and other roads with higher traffic volumes could be targeted for barrier protection first.

From just north of Range Road towards Marrabel (5km north of Marrabel) the road conditions suddenly change with many large potholes and very significant pavement failures across a long stretch of road. Potholes were as deep as 100mm in places and are a major safety concern. In locations where potholes were not as prevalent, the road surface was considerably cracked





Potholes on the southern end of Main Road 45 were the worst seen on this assessment

Following further investigation, the Clare and Gilbert Valleys Council annual business plan for 2017/18 lists reconstruction of failing sections along Main Road 45 in their budget and significant investment to improve the quality of the road. The Road Safety team have confirmed with council that works are planned to commence in late January 2018 and will address the issues beginning near Range Road and continuing south towards Marrabel. The Road Safety team will re-assess improvements when next in the region.

The unsealed sections should be considered for sealing in the future and council could apply for state or federal funding to cover some of the associated costs.

Key Recommendations	
Main Road 45 – Key Recommendations	Authority
Trim and maintain tall grasses on the verge north of Waterloo	CGV
Refresh line marking on the sealed section through Waterloo	CGV
Install barrier protection for stobie poles along the western side of the road	CGV
Consider future sealing of unsealed sections	GCV

## <u>Key Recommendations</u>



# Other Roads/Issues Assessed

## Clare Heavy Vehicle Bypass

Throughout our member survey, numerous members indicated their desire to see a heavy vehicle bypass of Clare in order to keep heavy vehicles out of the town centre. Our observations during our visit to the region were that there is a significant volume of freight transport through the Clare town centre and this poses a hazard with high pedestrian volumes and traffic parallel parking and frequently entering/leaving the main road. A bypass would also significantly improve efficiency.

Large trucks via main North Road and in particular, through the middle of Clare are dangerous. A bypass might work but the concern is losing traffic of tourists via Clare.

Main Street of Clare, there should be a bypass for trucks and other large vehicles.

**RAA Members** 

DPTI traffic volume estimates indicate that on average, almost 800 (10% of total traffic) commercial vehicles travel through Clare each day as specified in the table below.

#### Commercial Vehicle types through Clare

Vehicle Class	AADT
Class 3 to 5 Commercial	550
Class 6 to 9 Commercial	170
Class 10 Commercial	38

- Class 3 to 5 vehicles include vehicles up to three axle buses and four axle trucks between 5.5m and 14.5m in length
- Class 6 to 9 vehicles include 3 to 6 axle articulated vehicles between 11.5m and 19.0m in length
- Class 10 vehicles are B doubles or heavy truck and trailer combinations with greater than 6 axles between 17.5m and 36.5m in length

A specific route is very difficult to determine due to the surrounding terrain the nature of the Clare road network. A bypass to the west linking up near Blyth Road is the first option that comes to mind however linking this up to Farrell Flat Road will prove difficult. A bypass to the east linking with Farrell Flat Road would also pose similar geographical challenges, and Farrell Flat Road itself poses numerous challenges for freight as it is.

In addition to physical and monetary constraints, constructing a bypass of Clare could have a considerable impact on local businesses that benefit from motorists travelling through the town centre.

In future as the area expands further, it will be desirable to remove freight from the town centre and the feasibility of a Clare bypass in the future should be discussed.



## <u>Andrews Road</u>

Andrews Road was assessed as there was concern that heavy vehicles were using it as a shortcut between RM Williams Way and Goyder Highway to avoid travelling through Spalding. There were no obvious signs of frequent heavy vehicle use, nor were any other vehicles sighted on the road during our assessment. Andrews Road is part of the commodity freight route and as such, infrequent B doubles may access it on a seasonal or low frequency basis to transport bulk primary products from the place of production to the place of processing. At the time of our assessment the surface was in a generally good condition.

### <u>Hilltown Road</u>

The unsealed section of Hilltown Road was assessed to be in reasonable condition at the time of our assessment with a wide and mostly smooth surface. Guide posts were present however often were concealed by tall grass. It is recommended that this grass is maintained as it can become a fire hazard but also to allow better visibility of the guide posts which aid in delineation of the carriageway.

### Bennys Hill Road

Bennys Hill Road was not raised by many members and the concerns mentioned were only vague however it was en route to another destination. The segment of Bennys Hill Road assessed was between Victoria Road in Clare and Emu Flat Road.

It was noted that there were numerous steep drop offs without any barrier protection and trees were very close to the edge of the road. Lanes were very narrow (estimated 3.0m) and there was no sealed shoulder and only a minimal gravel shoulder. Guide posts were used reasonably well to aid delineation however could be provided in more locations. Corrugations were noted in some locations, and the centre lime marking was very faded.

It is recommended that the centre line is refreshed, barrier protection is provided on steep drop-offs and additional guide posts are provided.

## <u>Emu Flat Road</u>

Emu Flat Road is a very narrow unsealed road linking Bennys Hill Road and Blyth Road. Severe corrugations were encountered as were numerous potholes. There were some unprotected drop-offs and trees very close to the roadside and encroaching onto and over the carriageway. There are a number of blind crests and curves which are difficult to navigate as the road is so narrow.

It is recommended that the road considered for re-sheeting as a significant amount of the gravel surface has been lost and regular grading will have a limited improvement on the quality of the surface.

### <u>Koonoona Road</u>

Koonoona Road is primarily maintained by the Regional Council of Goyder and heads south from Burra through Koonoona onto Black Springs Road near the Barrier Highway. The southern end (approx. 3km) is under the jurisdiction of the Clare and Gilbert Valleys Council. This road was only mentioned once in the Member survey and was en route to other destinations so a brief assessment was made.

Koonoona Rd (Old Adelaide Rd). This road is in constant disrepair and is a school bus route. Heavy vehicle road. Very dangerous road.

RAA Member



RAA noted that there was some use of curve advisory signage and a number of different surface materials appeared to be used along the length. Signage indicated and warned motorists that this was a school bus route and to be alert to the possibility of school children and a school bus on the road.

The northern section (between Burra Road and Barrier Highway) is a commodity freight route and as such low or seasonal freight of bulk primary products can be expected.

Some corrugations and pot-holes were noted and it is recommended that a heavier grade than the general routine maintenance is undertaken to improve the surface condition before it deteriorates further.

#### Neagles Rock Road

A substantial amount of vegetation was noted on Neagles Rock Road. Some of this vegetation, particularly on the northern sealed section looked as though it may give way or drop large branches onto the road, and this should be monitored and any at risk branches or trees removed.

Neagles Rock Road from Spring Gully Road to Clare. Blind hills, dust, livestock, susceptibility to rutting, which all make it dangerous and difficult to brake safely.

RAA Member

On the unsealed section of Neagles Rock Road, corrugations were noted and a number of blind/steep crests were present. Grading will remove these corrugations however they will begin to re-appear fairly rapidly, particularly on steep inclines on unsealed surfaces. Some large trees close to the edge were also noted and would benefit from barrier protection.

To address previously mentioned issues as well potential speeding issues due to the steep downhill sections and a road environment that is not self-regulating in many places, a W1-SA101 'gravel roads – maximum 80km/h' advisory sign should be considered. This sign can be installed at each end of the unsealed section of Neagles Rock Road in accordance with DPTI operational instruction 4.10. This sign is not an enforceable speed limit however has previously had success reducing speeds in a trial within the Yankalilla District Council.



W1-SA101 'gravel roads – maximum 80km/h' advisory sign



Other Key Recommendations	Authority
Consider the feasibility of a Clare freight bypass to remove freight from the Clare town centre.	DPTI/CGV
Trim and maintain tall grasses growing alongside Hilltown Road among other unsealed routes.	RCG
Refresh line marking on Bennys Hill Road and install barrier protection on steep drop- offs as well as additional guide post installation.	CGV
Consider Emu Flat Road for councils re-sheeting programme, and remove some vegetation that is encroaching onto and over the carriageway.	CGV
Undertake a heavier grade than the general routine maintenance to improve the surface condition of Karoonda Road before it deteriorates further.	RCG/CGV
Assess and trim/remove vegetation at risk of falling over or dropping large branches onto Neagles Rock Road	CGV
Review grading schedule for Neagles Rock Road and consider more frequent grading to address corrugations on steep inclines.	CGV
Consider installing W1-SA101 'gravel roads – maximum 80km/h' advisory signs on the unsealed section of Neagles Rock Road.	CGV



Appendices



## Appendix A – Investigation Locations

- Horrocks Highway including
  - o Intersection with James St (Rhynie)
  - Intersection with Mintaro Road (Leasingham)
  - Intersection with Quelltaler Road (Watervale)
  - Intersection with Victoria Road (Clare)
  - Intersection with Stradbrooke Road (Stanley Flat)
  - And speed surveys in Rhynie, Auburn and Watervale
- Barrier Highway including
  - Intersection with Copperhouse Road (Burra)
  - o Mount Bryan 'S Bend'
- Farrell Flat Road
- Blyth Road including
  - Intersection with Horrocks Highway
  - o Intersection with Hicks Road/Boconnoc Park Road
- Goyder Highway
- Thiele Highway
- Worlds End Highway
- RM Williams Way
- Saddleworth Road
- Balaklava Road
- Blyth Plains Road
- Tarlee Road
- Spring Gully Road
- Saw Mill Road
- Booborowie Road
- Black Springs Road
- Main Road 45
- Andrews Road
- Hilltown Road
- Bennys Hill Road
- Emu Flat Road
- Koonoona Road
- Neagles Rock Road



Appendix B – Summary of Crash Statistics









# Appendix C – Speed Survey Results



	Southboun					
	d			Northbo	und	
Average Speed	60.2			56.8		
85th Percentile Speed	67.1			60.0		
Max Speed	79.0			63.0		
			Motorbik			Motorbik
	Car	Truck	е	Car	Truck	е
Average Speed	59.5	57.0	0.0	56.5	57.7	58.5
85th Percentile Speed	66.2	59.9	0.0	60.0	59.5	58.9
Max Speed	79.0	63.0	0.0	63.0	61.0	59.0
	60	56	0	55	59	58
	57	63		57	59	59
	41	53		52	58	
	55	56		57	55	
	55			63	61	
	53			58	54	
	77			58		
	52			58		



79	63
64	57
53	62
62	55
65	57
55	58
56	49
58	59
68	59
62	55
50	50
54	55
68	60
62	60
61	52
60	46
60	57





	Southbound			Northboun	d	
Average Speed	52.8			46.4		
85th Percentile Speed	59.2			58.0		
Max Speed	63.0			65.0		
	Car	Truck	Motorbike	Car	Truck	Motorbike
Average Speed	53.4	55.0	0.0	51.3	0.0	0.0
85th Percentile Speed	59.8	58.5	0.0	58.0	0.0	0.0
Max Speed	77.0	60.0	0.0	65.0	0.0	0.0
	55	50	0	50	0	0
	46	60		47		
	77			47		
	46			62		
	47			51		
	47			50		
	53			47		
	52			54		
	60			46		
	61			49		
	59			58		
	58			49		
	57			42		

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## WATERVALE SPEED SURVEY

Date	11/01/2017
Start Time	10:28AM
Finish Time	10:58AM
Speed Limit	60km/h
Average Speed	53.7
85th Percentile Speed	59.0
Max Speed	74.0

**Camera location and direction** 

Approx. detection zone



	Southbound			Northbou	ınd	
Average Speed	53.1			54.4		
85th Percentile Speed	59.7			59.0		
Max Speed	74.0			69.0		
	Car	Truck	Motorbike	Car	Truck	Motorbike
Average Speed	54.2	53.0	0.0	54.1	56.5	60.0
85th Percentile Speed	60.0	53.0	0.0	59.0	59.7	60.0
Max Speed	74.0	53.0	0.0	69.0	61.0	60.0
	46	53	0	53	61	60
	54			50	52	
	58			44		
	74			49		
	64			54		
	51			59		
	56			50		
	60			59		
	55			56		
	56			57		
	55			49		
	37			59		
	53			57		
	51			54		



58	53
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45	51
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64	58
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62	52
55	54
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48	53
59	57
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50	53
51	51
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54	69
54	58
58	46
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53	58
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