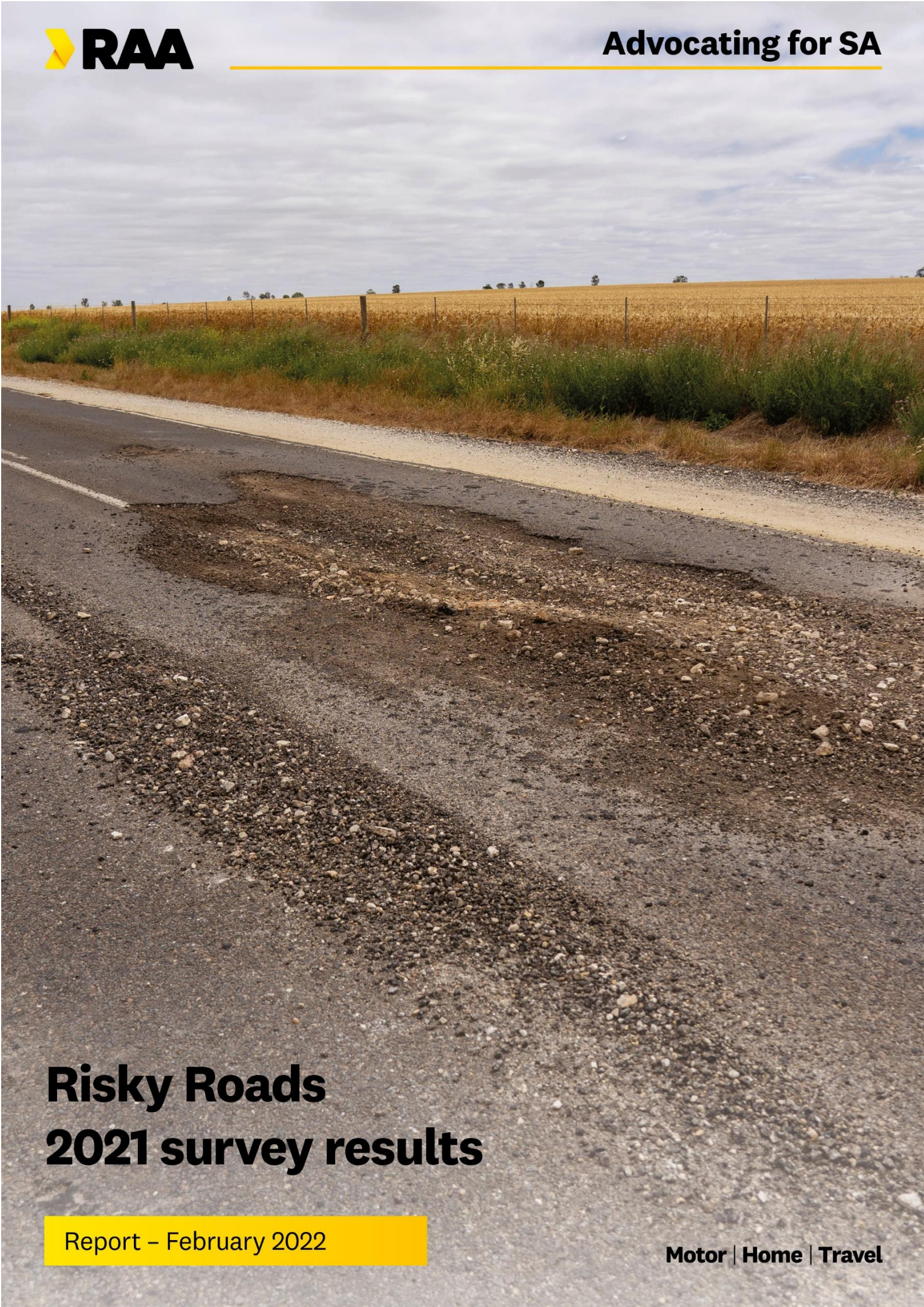
RAA

Advocating for SA



Risky Roads 2021 survey results

Report – February 2022

Motor | Home | Travel

RAA at a glance

South Australia's largest
member-owned
organisation

Advocating for South Australians for over
115 years

780k+
current members
(55% of SA adults)

400k+
insured
South Australians

1000+
staff employed
across SA

337k+
roadside rescues
per year

280k+
uses of the MyRAA app
fuel feature per month

5000+
solar panel installations
since 2020

5000+
SA travel experiences
booked per year

31k+
school students
educated on
road safety each year

8500+
child restraints
fitted or checked
each year

$350k+
per year invested
in SA community
organisations

Prepared by

RAA Safety and Infrastructure

08 8202 4517

roadsafety@raa.com.au

Cover image: Owen Road, Templers – Photo taken December 2021

Disclaimer

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Contents

Acknowledgement of Country

We acknowledge and respect Aboriginal peoples as the state's first peoples and nations, and recognise them as traditional owners and occupants of land and waters in South Australia.

Further, we acknowledge that the spiritual, social, cultural and economic practices of Aboriginal peoples come from their traditional lands and waters, that they maintain their cultural and heritage beliefs, languages and laws which are of ongoing importance, and that they have made and continue to make a unique and irreplaceable contribution to the state.

Executive summary

In November 2021, RAA launched its fourth Risky Roads survey, following the success of earlier iterations in 2013, 2017 and 2019. The Risky Roads survey invites all South Australians to nominate roads and intersections that they find confusing, difficult to negotiate or that make them feel unsafe. The survey is highly effective at identifying trouble spots from a user's perspective on the metropolitan and regional road network, enabling RAA to advocate for required upgrade and maintenance work. Understanding these issues is a vital asset in allocating resources to current and future advocacy work.

The survey was open for one month and received a total of 2,132 nominations, of which 1,465 were for roads and 667 were for intersections. More than 250 roads and intersections received multiple nominations, with Main South Road between Aldinga and Sellicks Beach attracting the highest number of individual nominations, with 224. The intersection with Curtis Road and Heaslip Road in Angle Vale attracted the highest number of intersection nominations, with 22.

Poorly maintained road surfaces were the most frequently nominated issue, with almost three quarters of road nominations citing a road surface issue as one of the reasons for nominating the road. This is an unsurprising result, given that South Australia faces an enormous road maintenance backlog. RAA acknowledges and welcomes recent investment in maintenance across the road network, however the results of this survey highlight that there is still a long way to go before this backlog is eliminated.

As with previous surveys, regional roads dominated the responses, with 8 of the top 12 roads nominated in regional SA. In total, 36% of nominations were received for regional roads, despite only 23% of the South Australian population living in regional South Australia.

Since the 2019 survey, there have been a substantial number of improvements and commitments to improve roads and intersections featured in the top 10. A total of more than $330m has been spent or committed to upgrades of the 2019 top ten metro roads, regional roads and intersections. These substantial improvements have culminated in only 30% of locations in the 2019 top 10 road and intersection lists featuring again in the 2021 top ten road and intersection lists.

Some upgrades and commitments following the 2019 survey results include:

- More than $100m in funding for stage two of the Main South Road upgrade.
- Introduction of a third lane on Main North Road between Kesters Road and Kings Road as part of an upgrade of the Kings Road intersection.
- $35m in pavement rehabilitation on the South Eastern Freeway between Glen Osmond and Crafers.
- More than $30m in additional funding towards Horrocks Highway upgrades.
- $15m in safety improvements on Victor Harbor Road.
- $6m upgrade of Upper Yorke Road between Maitland and Arthurton.
- Planning studies at 5 of the top 10 nominated intersections as part of the $10m *Transport Network Planning Studies Program*.

RAA welcomes recently announced maintenance on roads nominated in the 2021 survey, including on Main South Road, Main North Road, and the South Eastern Freeway, and looks forward to collaborating further with all levels of government to ensure safe journeys for all road users.

The top 10 metro roads, regional roads and intersections nominated by South Australians are listed on the following page.

South Australia's Top 10 Risky Roads

1. Regional roads

1	2	3	4	5	6	7	8	9	10
Southern Ports Highway *Beachport – Millicent*	**Horrocks Highway** *Gawler – Rhynie*	**Upper Yorke Road** *Arthurton – Kulpara*	**Victor Harbor Road**	**Princes Highway** *Tailem Bend – Mt Gambier*	**Owen Road**	**Inman Valley Road**	**Long Valley Road**	**Torrens Valley Road**	**Goolwa Road**

2. Metro roads

1	2	3	4	5	6	7	8	9	10
Main South Road *Aldinga – Sellicks Beach*	**Main Road** *Coromandel Valley – Chandlers Hill*	**Main North Road** *Gepps Cross – Gawler*	**Glynburn Road** *Payneham Rd - Magill Rd*	**Kings Road** *Salisbury Highway – Bolivar Rd*	**South Eastern Freeway** *Stirling – Monarto*	**Greenhill Road** *Burnside – Summertown*	**Heaslip Road**	**North East Road** *Tea Tree Gully – Walkerville*	**Grand Junction Road** *Sudholz Rd – Hampstead Rd*

3. Intersections

1	2	3	4	5	6	7	8	9	10
Curtis Road/ Heaslip Road *Angle Vale*	**Britannia Roundabout** *Adelaide*	**Victor Harbor Road/ Hindmarsh Tiers Road** *Hindmarsh Valley*	**Main South Road/Aldinga Beach Road** *Aldinga*	**Blackwood Roundabout** *Blackwood*	**Strathalbyn Road/ Whites Road** *Flaxley*	**Main North Road/Grand Junction Road** *Gepps Cross*	**Payneham Road/ Lower North East Road** *Glynde*	**Bull Creek Road/Paris Creek Road** *Meadows*	**Main South Road/Sellicks Beach Road** *Sellicks Beach*

Legend

- Potholes, cracks or rutting
- Crumbling road edges
- Rough, slippery or loose surface
- Lack of overtaking opportunities
- Inappropriate speed limit
- Narrow road, lanes or bridges
- Sunken utility pit covers
- Inadequate crossing or turning opportunity
- No traffic signals
- Inefficient / ineffective traffic signals
- Poor or confusing layout
- Confusing signs or line marking
- Poor sight distance
- Tight curves / blind crests
- Lacks turning/ acceleration lanes

South Australia's Risky Roads

Total nominations

2,132
1,465 for roads
667 for intersections

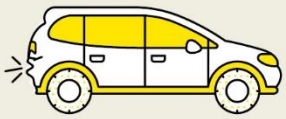
38%
of nominations for top 10 roads or intersections

262
locations with multiple nominations:
162 roads, 100 intersections

Crash data for top 10 roads and intersections (2016–20)

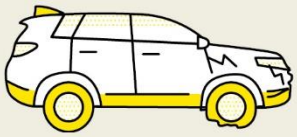
2564 minor injuries **284** serious injuries **39** fatalities

Most common crash type on the top 10 metro roads



51% rear end
14% right angle, **10%** right turn

Most common crash type on the top 10 regional roads



45% single vehicle run off*
15% rear end, **14%** right angle

Most common crash type at the top 10 intersections

39% right angle
34% rear end, **17%** right turn

Nominated issues

1,465
road nominations^

- **15%** the roadside
- **40%** road design
- **72%** road surface
- **13%** signs, lines, signals and lighting

667
intersection nominations^

- **62%** road design
- **48%** signs, lines, signals and lighting
- **23%** the roadside
- **7%** road surface

DP2122-554

* Single vehicle run off road includes 'hit fixed object', 'roll over' and left road – out of control' crashes
^ Note that percentages add up to more than 100% because some nominations were for multiple issues

Notes

Notes on crash data

Unless otherwise specified, crash data quoted within this report is sourced from the Road Crash Data dataset uploaded by the Department for Infrastructure and Transport on the Data SA website. Crash data is for the five-year period between 2016 and 2020 (unless otherwise specified) because it is the most recent five year data period available at the time of publishing this report.

Casualty crashes are defined as a crash where at least one person is injured or killed as a result of the crash. Property damage only crashes are not considered in crash data analysis within this report unless explicitly specified.

Notes on star ratings

AusRAP star ratings are discussed for several roads throughout this report. The AusRAP star rating system, a subsidiary of the International Road Assessment Program (iRAP), assesses several key criteria to establish the safety rating of a road from one to five stars with the latter representing the safest. Star ratings have been provided for discrete sites throughout the Fleurieu Peninsula region that are typical of the overall road network or to highlight certain deficiencies. These ratings have been calculated using the iRAP 'ViDA' demonstrator tool. AusRAP star ratings are based on the international iRAP model which estimates an average 40% reduction in fatal and serious crashes for each incremental increase in star rating[1].

Table 1: Estimated reduction in fatalities and serious injuries with increases in AusRAP star rating (iRAP, 2020).

Star rating	Relative proportion of fatalities and serious injuries
1	1
2	0.6
3	0.36
4	0.216
5	0.1296

RAA advocates for all regional highways to be maintained/upgraded to achieve a minimum rating of three stars to reduce the number of lives lost and serious injuries on South Australian roads. Our recent submission to the South Australian Road Safety Strategy to 2031 recommends firstly that these ratings are released publicly, and secondly, they are used as a tool to identify and justify safety upgrades across South Australia's regional road network to achieve a three-star rating or better on all state highways.

[1] iRAP, 2020, *The Business Case for Safer Roads*, <https://www.vaccinesforroads.org/business-case-for-safer-roads/>.

Introduction

Background and objectives

In November 2021, RAA launched its fourth Risky Roads survey, following successful iterations in 2013, 2017 and 2019.

RAA has been running its Risky Roads initiative since 2013, enabling road users to nominate roads or intersections they find confusing, difficult to negotiate or that make them feel unsafe. The survey is highly effective at identifying trouble spots on the metropolitan and regional road network, enabling RAA to advocate for required upgrade and maintenance work. Understanding these issues is a vital asset in allocating resources to current and future advocacy work.

Methodology

RAA created an online survey enabling South Australians to nominate up to 10 risky roads or intersections. The community were able to nominate a road or intersection by phone, post or online with forms included in the Summer 2021-22 edition of RAA's *samotor* magazine. Participants were encouraged to nominate risky roads and intersections through the online survey which allowed them to choose the location on a map. Online nominations opened on Wednesday 3 November 2021 to correspond with *samotor* mailing dates and closed on Friday, 3 December 2021.

To engage a broad cross section of the community, the survey was promoted through an RAA media release, RAA's *samotor* enews and print magazine, RAA's social media channels and through RAA's network of retail shops.

A total of 2,132 responses were received over the survey period.

On 15 December 2021, RAA publicised the list of the top 10 nominated roads and top 5 nominated intersections via the RAA Daily and *samotor* websites, as well as through *samotor* e-news.

About this report

This report summarises the results of the 2021 Risky Roads survey and profiles each of the top 10 nominated regional roads, metro roads and intersections, drawing on survey feedback, crash and traffic volume data, and site assessments conducted by RAA. Verbatim responses quoted throughout this report are the views of individual survey respondents, and not necessarily the views held by RAA.

Progress on 2019 results

At the time of writing this report, 80 per cent of the roads featuring in the 2019 top 10 roads and intersections list had either received some level of improvement or are scheduled for upgrade or planning study. RAA commends the state government on swift action to address many of the road infrastructure issues that were highly raised by the South Australian community during our last survey.

Overall, 70% of roads and intersections nominated in the 2021 top 10 were not nominated in the 2019 top 10, highlighting improved community attitudes towards many of these roads.

However, there are still nine road sections and intersections that have featured in successive top 10 lists, albeit some are nominated for different reasons in 2021 than they were in 2019.

To date, more than $330m has been committed or spent on upgrades to 2019's top 10 Risky Roads and intersections since the survey.

RAA welcomes the $10m *Transport Network Planning Studies* program announced in 2020, which includes detailed planning studies on five of the top 10 intersections raised in 2019 and three of the top 10 metro roads.

In the following tables, care should be taken when comparing the number of nominations in 2019 to the number of nominations in 2021, given that there was a total of 1,343 responses to the 2019 survey, and 2,132 responses to the 2021 survey.

RAA leveraged the findings of the 2019 Risky Roads survey to advocate for improvements to the top nominated metro roads. We used our state budget submissions and a COVID-19 economic stimulus proposal to call for increased road maintenance funding to resurface roads in poor condition, including Brighton Road, Fullarton Road, Greenhill Road and Salisbury Highway. We also used state budget submissions to recommend additional lanes for Main North Road (Gepps Cross – Salisbury Heights).

We have played an active role in engaging with the South Australian Government on its consultations for the Fleurieu Connections Main South Road duplication project and for the North-South Corridor. In 2020 we carried out more detailed assessments of the South Eastern Freeway and Main Road (Cherry Gardens), resulting in standalone reports with recommendations for safety improvements. We promoted these recommendations through the media, through communications with the Minister for Infrastructure and Transport and in state budget submissions.

Table 2 highlights progress to date on the top 10 nominated metro roads from 2019. Some notable observations include:

- A significant increase in nominations for Main South Road in 2021 due to the poor condition of the road at the time the survey was conducted.
- A significant increase in nominations for Main Road due to a lack of progress on road upgrades in recent years and several areas of concern raised by the community in 2021.
- A substantial reduction in nominations for the South Eastern Freeway (Crafers – Tollgate) Salisbury Highway, Greenhill Road and Fullarton Road, reflecting the improvements made by the Department for Infrastructure and Transport to the road surface on each of these corridors since the 2019 survey.

Table 2: Progress to at the time of writing on the top 10 metro roads nominated in the 2019 survey

	Top 10 metro roads in 2019	Upgrades/commitments since 2019	Nominations	
			In 2019	In 2021
1	Main South Road (Aldinga – Sellicks Beach)	A commitment was made in 2017 to duplicate the road from Seaford to Sellicks Beach. However, in 2019 only funding for the Seaford to Aldinga section had been committed to, and the local community was concerned that the second stage to Sellicks Beach would not be funded. Funding has since been provided to upgrade stage two to Sellicks Beach to a 2+1 road layout.	46	224 (1st)
2	Main North Road (Gepps Cross – Salisbury Heights)	$13m in funding for an upgrade at McIntyre Road/Kings Road, which also involved installing a third lane in each direction between Kesters Road and Kings Road. A corridor planning study has also been committed to for this section of Main North Road under the $10m Transport Network Planning Studies Program.	27	30 (3rd)
3	South Eastern Freeway (Mt Barker – Glen Osmond)	$35m in funding for pavement rehabilitation between Glen Osmond and Crafers, $14.2m for the Crafers-Stirling managed motorway upgrade and third lane, $4m for activated warning signage, $250m for Hahndorf traffic improvements, and announcement of a South Eastern Freeway corridor planning study under the $10m Transport Network Planning Studies Program.	22	14 (6th)
4	Salisbury Highway (Port Wakefield Road – South Road)	5.5km of resurfacing between Elder Smith Road and the North-South Motorway (as part of $90m package of works on 65km of metro roads)	14	2
5	Upper Penneys Hill Road	RAA is not aware of any major upgrades since 2019.	14	0
6	Brighton Road	Brighton Road Corridor Planning Study was undertaken in 2021, with a $30m funding announcement for intersection improvements on Brighton Road in December 2021. This will deliver traffic signals at Wattle Street and Edwards Street.	11	6
7	Main Road (Coromandel Valley – Cherry Gardens)	RAA is not aware of any major upgrades since 2019.	10	38 (2nd)
8	South Road (Tonsley – Hindmarsh)	Significant progress has been made with community consultation and the development of a reference design for the North South Corridor between Tonsley and Hindmarsh	10	9
9	Greenhill Road (Glynburn Road – Glen Osmond Road)	Resurfacing between Glynburn Road and Glen Osmond Road (as part of $90m package of works on 65km of metro roads)	9	0
10	Fullarton Road (Payneham Road – Kensington Road)	Resurfacing between Rundle St and Britannia Roundabout and between Glen Osmond Road and Carrick Hill Drive (as part of $90m package of works on 65km of metro roads)	9	0

RAA leveraged the findings of the 2019 Risky Roads survey to advocate for improvements to the top nominated regional roads. We used our state budget submissions and a COVID-19 economic stimulus proposal to call for fast tracking of road maintenance funding to resurface and upgrade roads in poor condition, including Barrier Highway, Horrocks Highway, Owen Road and Thiele Highway. Horrocks Highway, Owen Road and Thiele Highway are once again highlighted in RAA's 2022 election priorities as key regional roads in need of major maintenance works.

Our state budget submissions have also recommended investment in upgrades to Upper Yorke Road and Spencer Highway. In 2020 we carried out a more detailed assessment of Victor Harbor Road, resulting in a standalone report with recommendations for safety improvements. We promoted these recommendations through the media, through communications with the Minister for Infrastructure and Transport, through our input into the Fleurieu Connections Victor Harbor Road duplication project consultation, in state budget submissions and as part of RAA's 2022 election priorities.

RAA has used our state budget submissions to advocate for upgrades to Riddoch Highway, including additional overtaking lanes, and our 2022 election platform calls for further overtaking lanes on both Riddoch Highway and Thiele Highway. Finally, RAA has used state and federal budget and election submissions to advocate for the staged duplication of Augusta Highway.

Table 3 highlights progress at the time of writing on the top 10 nominated regional roads from 2019. Some notable observations include:

- Horrocks Highway was nominated as the riskiest regional road in both the 2017 and 2019 surveys, however major improvements and ongoing upgrades to address issues on this corridor have seen the road nominated lower in 2021, although the community has some concern about the timing of works between Gawler and Rhynie.
- Investment in regional road maintenance has increased in 2020 and 2021, which can be partially attributable to stimulus funding provided as a result of the Covid-19 pandemic, but this has seen welcome improvements on most of the top nominated regional roads in the 2019 survey.
- Despite significant upgrade commitments on Victor Harbor Road, it continues to be frequently raised by the community

Table 3: Progress to date on the top 10 regional roads nominated in the 2019 survey

	Top 10 regional roads	Upgrades/commitments since 2019	Nominations	
			In 2019	In 2021
1	Horrocks Highway	Significant progress has been made towards improving safety on the highway between Clare and Wilmington, and pavement rehabilitation between Auburn and Clare. In 2022 and 2023, pavement rehabilitation works will continue between Gawler and Clare to improve the road surface along with the installation of new overtaking lanes. Since the 2019 survey, and additional $37.5m in funding has been committed to upgrading Horrocks Highway, taking the total funding to over $90m.	47	49 (2nd)
2	Owen Road	$500,000 funding towards reconstruction of an 800m section near Alma Road, however, RAA is not aware of any other major improvements.	22	22 (6th)
3	Victor Harbor Road	$15m commitment to installing an overtaking lane between Mount Compass and Victor Harbor, together with other safety upgrades including roadside barriers and audio tactile line marking. Duplication of Victor Harbor Road between Old Noarlunga and McLaren Vale is expected to commence in 2022, whilst a planning study is in progress for the section ongoing between McLaren Vale and Willunga.	19	28 (4th)

	Top 10 regional roads	Upgrades/commitments since 2019	Nominations	
			In 2019	In 2021
4	Upper Yorke Road (Maitland – Arthurton)	$6m provided for 14km of pavement rehabilitation and shoulder sealing works which was completed in 2021.	17	0
5	Caddy Road, Loveday	RAA is not aware of any major upgrades since 2019.	17	0
6	Riddoch Highway	$5.1m in upgrades to improve surface, widen shoulders and curves and install audio tactile line marking. Funding has also been committed to construct three additional overtaking lanes between Keith and Penola.	17	7
7	Augusta Highway	A total of $185m commitment to highway duplication between Port Wakefield and Lochiel has commenced. This project includes a planning study for future duplication works between Port Pirie and Crystal Brook. A further $7.5m in pavement rehabilitation works was completed between Snowtown and Redhill in 2021.	12	5
8	Barrier Highway	A total of $62.5m has been committed for upgrades along 305km of the highway between Cockburn and Burra. Work commenced in 2020, and 14.5km of widening and shoulder sealing on the approaches to Mount Bryan and Hallett was completed in 2021. The major upgrade is scheduled for completion by mid-2023.	12	4
9	Thiele Highway	RAA is not aware of any major upgrades since 2019, however some minor pavement rehabilitation work has been undertaken.	12	3
10	Spencer Highway (Maitland – Minlaton)	Road widening and shoulder sealing works were announced in 2021 and commenced in January 2022.	11	4

RAA leveraged the findings of the 2019 Risky Roads survey to advocate for improvements to the top nominated intersections. We have played an active role in engaging with the South Australian Government on its consultations for the Fleurieu Connections Main South Road and Victor Harbor Road duplication project, which covers the intersections of Main South Road with Tatachilla Road and Victor Harbor Road with Seaview Road. In 2020 we carried out a more detailed assessment of the intersection of the South Eastern Freeway with Portrush Road as documented within the South Eastern Freeway highway assessment report, with recommendations focused around improving pedestrian safety. RAA has included the installation of a signalised pedestrian crossing on Cross Road near the intersection with Waite Road as one of our 2022 election priorities.

Table 4 highlights progress at the time of writing on the top 10 nominated intersections from 2019. Some notable observations include:

- Significant progress has been made towards major upgrades at several intersections raised in the 2019 top 10 list
- A total in $10m in planning studies have been committed to under the Transport Network Planning Studies Program, with five of the top 10 nominated intersections in 2019 subject to planning studies.
- Intersection nominations were low in 2019, and Blackwood Roundabout received a higher proportion of intersection nominations in 2019 compared to 2021, which saw it drop from the highest raised intersection to fifth highest. This may be somewhat reflective of an improved community understanding of the intersection since the upgrade, which was only completed 6 months before the 2019 survey.
- The Gepps Cross five-way continues to be nominated in the top 10 intersections, despite substantial advances to North South Corridor (Regency to Pym, Northern Connector) between 2019 and 2021 which have drawn some traffic away from this intersection.

Table 4: Progress to date on the top 10 intersections nominated in the 2019 survey

	Top 10 intersections	Upgrades/commitments since 2019	Nominations	
			In 2019	In 2021
1	Blackwood Roundabout	RAA is not aware of any major changes since 2019.	12	14 (5th)
2	Main South Road/Tatachilla Road	Commitment was made in 2021 to grade separate Main South Road and Tatachilla Road as part of stage one of the Main South Road Duplication Project commencing in 2022.	8	3
3	Gepps Cross Five-way	No major changes, however, a planning study has been committed to under the $10m Transport Network Planning Studies Program.	7	10 (7th)
4	South Eastern Freeway/Portrush Road	Full pavement rehabilitation was completed over 2021/22, and a planning study has been committed to under the $10m Transport Network Planning Studies Program.	6	1
5	Victor Harbor Road/Seaview Road	Significant improvements committed to as part of the Victor Harbor Road duplication project commencing in 2022 which will reduce traffic at the intersection approaching from Seaview Road and improve intersection layout.	6	5
6	ANZAC Highway/Morphett Road	RAA is not aware of any major changes since 2019, however, a planning study has been committed to under the $10m Transport Network Planning Studies Program.	6	4
7	Augusta Highway/Copper Coast Highway	Construction of a major $124.5m upgrade including full grade separation and highway duplication commenced at the end of 2020. The overpass opened in late 2021, with the project to be fully completed by late 2022.	5	0
8	Main North Road/Fitzroy Terrace	No major changes, however, a planning study has been committed to under the $10m Transport Network Planning Studies Program.	5	1
9	Renmark Avenue/Twentyfirst Street	RAA is not aware of any major changes since 2019.	5	2
10	Cross Road/Waite Road	RAA is not aware of any major changes since 2019, however, a Cross Road corridor planning study has been committed to under the $10m Transport Network Planning Studies Program, and RAA ensured this intersection was raised during consultation in 2021.	5	0

Casualty crash data review

Over the past few decades, the overall trend in road fatalities is on the decline, and the average number of lives lost in 2021 is less than half of what it was in 1993, where an average of 203 lives had been lost per year over the five years prior. Figure 1 tracks the decline in the five-year average number of lives lost on SA roads since 1989.

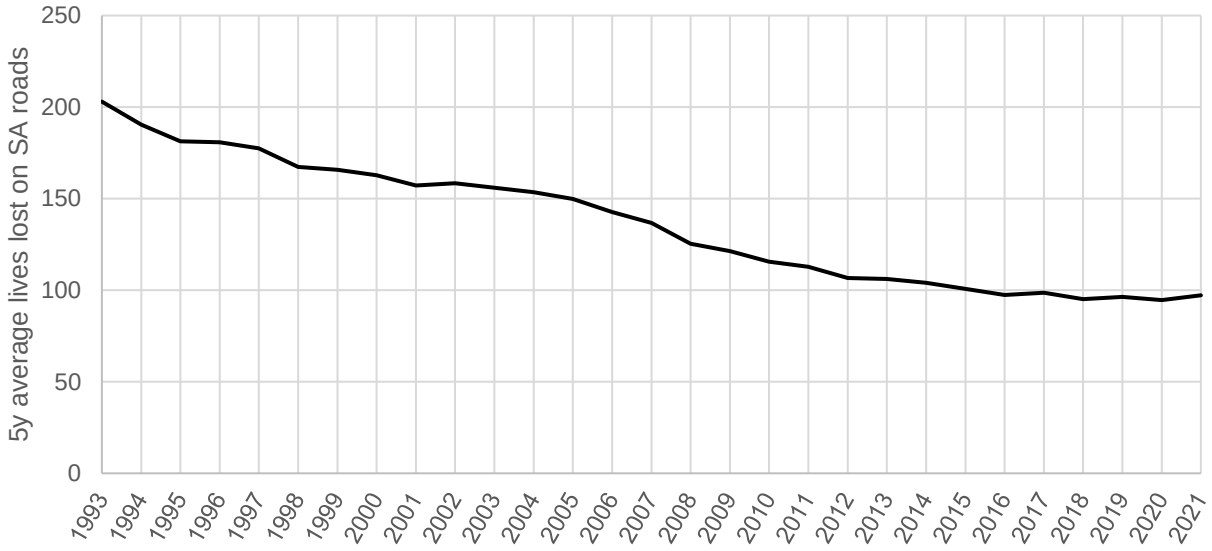


Figure 1: 5 year average in the annual number of lives lost on SA Roads between 1993 and 2021.

Between 2016 and 2020, 473 lives were lost on South Australian Roads. A further 3,438 people were seriously injured, and 25,923 sustained minor injuries. The economic cost of fatal and serious road crashes on our roads is currently estimated to be more than one billion dollars annually[2].

Of these casualties, 39 fatalities, 284 serious injuries and 2,564 minor injuries occurred on the top 10 roads and intersections raised by the community in this Risky Roads survey. This represents 9.7% of injuries and deaths on South Australian roads in the five years between 2016 and 2020.

The most common casualty crash type in South Australia is a rear end crash, and these account for 27% of crashes resulting in death or injury on our roads. However, rear end crashes are more frequent during heavy metropolitan traffic, at lower speeds, and in 96% of casualty rear end crashes the outcome is minor injuries. Right angle (20% of casualty crashes) and hit fixed object crashes (15% of casualty crashes) round out the top three crash types that occur across South Australia.

Figure 2 shows the distribution of casualty crash types in South Australia by severity between 2016 and 2020.

[2] RAA estimate using road crash data and Willingness to Pay costs outlined in *Austroads Guide to Road Safety Part 2: Safe Roads*.

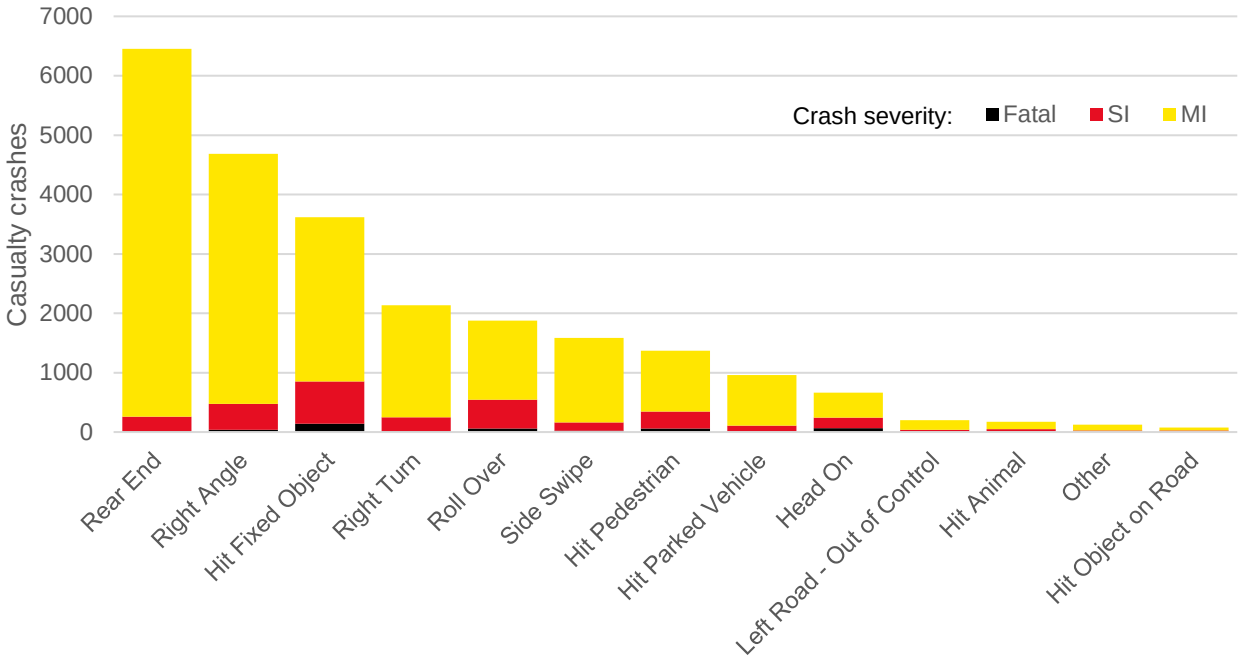


Figure 2: Casualty crash types occurring in South Australia between 2016 and 2020

When looking at the crash types that result in fatality or serious injury (FSI), single vehicle run off road crash types are dominant, with one in four FSI crashes occurring due to a collision with a fixed object, and 16% occurring due to a roll over. Right angle crashes account for 14% of FSI crashes, whilst collisions with pedestrians account for 10%.

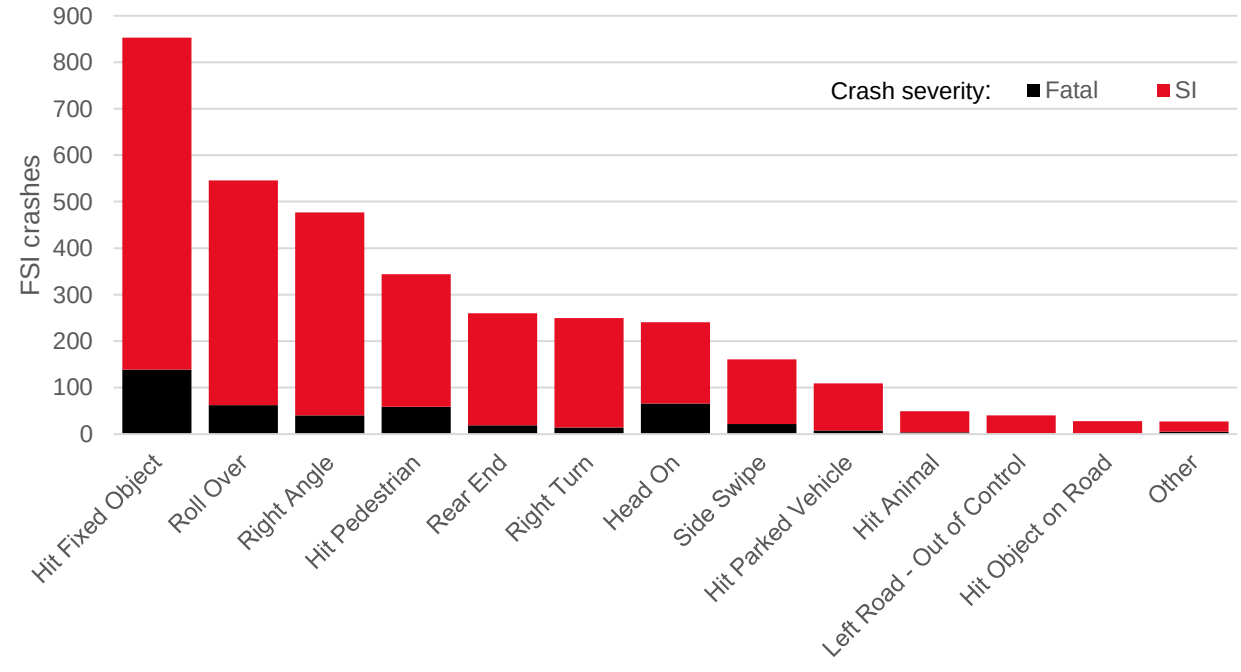


Figure 3: FSI crash types occurring in South Australia between 2016 and 2020

In regional South Australia, the most common crash type, accounting for 30% of all casualty crashes is a collision with a fixed roadside object, with trees a commonly occurring hazard across the network. The next most common crash type is a roll over crash, accounting for 22% of regional crashes. In total, single vehicle run off road crash types make up 55% of casualty crashes on regional roads. Despite making up only 5% of regional casualty crashes, head on crashes are the second most common fatal crash type, accounting for 20% of fatal crashes.

In metropolitan Adelaide, rear end crashes account for 31% of casualty crashes. These are most frequent during the morning and afternoon peak periods, with 49% of rear end casualty crashes occurring between the hours of 7:00-9:00am and 3:00-6:00pm on weekdays. Right angle crashes at intersections are the next most common crash type, accounting for 21% of metropolitan crash types.

Table 5: Casualty crash types occurring in South Australia between 2016 and 2020

Crash type	Percent of casualty crashes		
	Metro SA	Regional	Total
Rear End	31%	7%	27%
Right Angle	21%	15%	20%
Hit Fixed Object	12%	30%	15%
Right Turn	10%	3%	9%
Roll Over	5%	22%	8%
Side Swipe	7%	4%	7%
Hit Pedestrian	6%	4%	6%
Hit Parked Vehicle	4%	3%	4%
Head On	2%	5%	3%
Left Road - Out of Control	<1%	3%	<1%
Hit Animal	<1%	3%	<1%
Other	<1%	<1%	<1%
Hit Object on Road	<1%	<1%	<1%

2021 Results

Survey responses

A total of 2,132 nominations were received in RAA's 2021 Risky Roads survey, of which 1,465 were for roads and 667 were for intersections. Of these nominations, 38% were for roads or intersections that featured in the top 10 metro road, top 10 regional road and top 10 intersections lists.

Overall, 162 roads received multiple nominations, and 100 intersections received multiple nominations during the survey period.

Profile of respondents

Responses were received from a fairly even split of males and females, with slightly more responses received from males.

36% of nominations were by people residing in regional South Australia, despite this area only making up 23% of the South Australian population.

A wide variety of ages were represented in responses, with 57% of respondents aged 55 and over but over 250 responses received from South Australians aged 16 to 34.

Table 6: Survey respondent demographics

Subgroup	No. of responses	
Gender		
Male	1139	53%
Female	973	46%
Non-binary	2	<1%
Prefer not to say	18	<1%
Location		
Greater Adelaide	1357	64%
Regional SA	767	36%
Other/Unknown	8	<1%
Age		
16-24	77	4%
25-34	192	9%
35-44	290	14%
45-54	353	17%
55-64	428	20%
65-74	560	26%
75+	232	11%
Total	**2132**	**100%**

Nominated issues

When nominating an issue, respondents were asked to select whether the issue was relevant to motorists, motorcyclists, pedestrians, or cyclists. Respondents were required to select at least one road user; however, they were able to select all applicable users in their nomination. In total:

- 96% of nominations were relevant to motorists,
- 15% of nominations were relevant to motorcyclists,
- 13% of nominations were relevant to cyclists, and
- 11% of nominations were relevant to pedestrians.

When making a nomination, respondents could select up to five issues from four overarching categories. Table 7 displays the overarching categories and individual issues that could be nominated under each category

Table 7: Categories and individual issues that could be nominated with each Risky Roads nomination

Road surface	**Roadside issues**
Crumbling road edges	Hazardous roadside objects
Narrow or uneven footpath	Inadequate rest areas
Potholes, cracks or rutting	Poor access for wheelchairs or electric wheelchairs
Rough, slippery or loose surface	Poor or no guard barriers
Sunken utility pit covers	Poor sight distance
Uneven or undulating surface	Vegetation/objects block visibility
Uneven surface in cycle lane	Vehicles parked in cycle lanes
Road/pavement design	On-street parking restricts traffic
Poor or confusing road/intersection layout	**Signs, lines, traffic signals and lighting**
Cycle lanes not continuous	Lacks traffic signals
Inadequate crossing or turning opportunity	Inefficient or ineffective traffic signals
Inappropriate speed limit	Lack of cycle lanes
Lacks median strip or separation from oncoming traffic	Poor or no edge line markings
Poor or no pedestrian crossing facilities	Poor or no road lighting
Lacks overtaking opportunities	Poor or no road markings
Narrow road, lanes or bridges	Poor pedestrian crossing line markings
Tight curves or blind crests	Confusing signs or line marking
Unsealed road shoulders	Clearway/cycle lane hours too short
Lacks turning/acceleration lanes	

For road nominations:

- 72% included an issue in the road surface category
- 40% included an issue in the road design category
- 13% included an issue in the signs/lines category
- 15% included an issue in the roadside issues category

For intersection nominations:

- 7% included an issue in the road surface category
- 62% included an issue in the road design category
- 48% included an issue in the signs/lines category
- 23% included an issue in the roadside issues category

Figure 4 shows the top 10 issues nominated for roads.

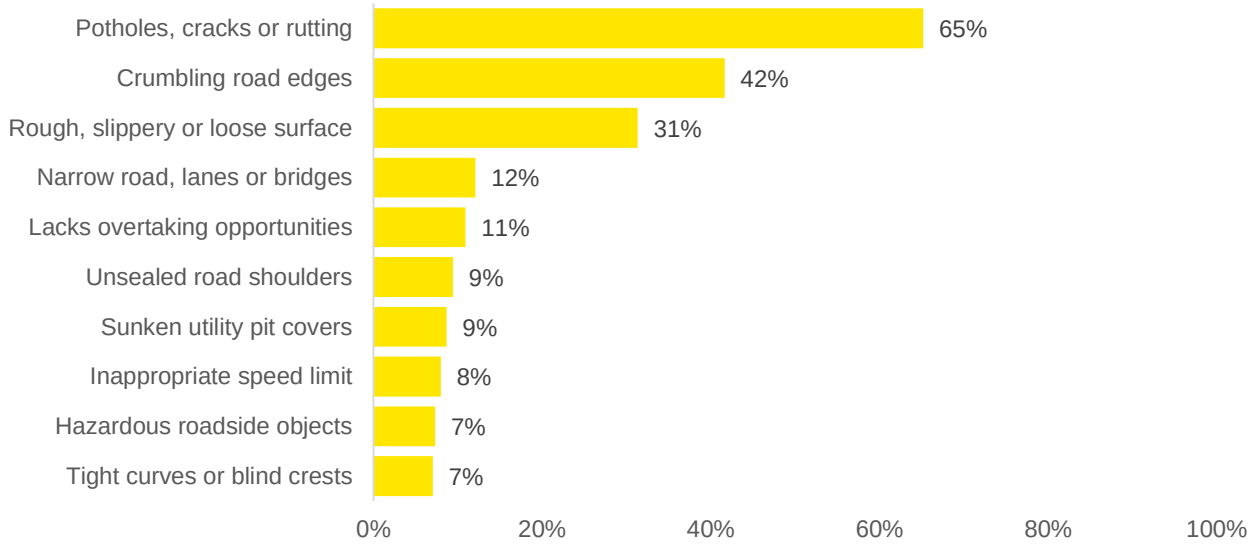


Figure 4: Top 10 issues nominated for roads

Figure 5 shows the top 10 issues nominated for intersections.

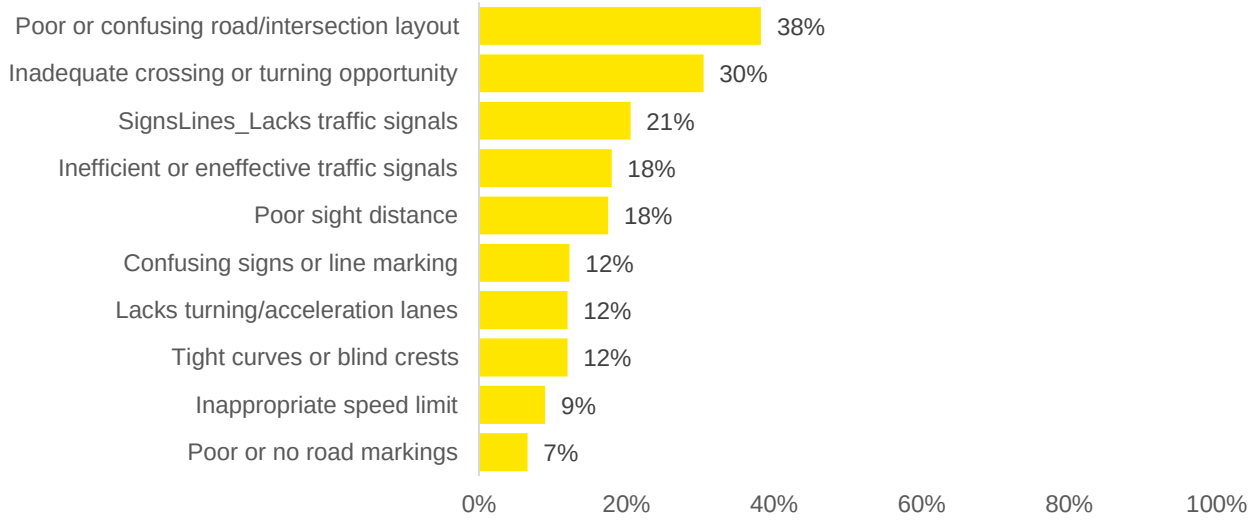


Figure 5: Top 10 issues nominated for intersections

Top 10 roads

The overall top 10 Risky Roads as nominated by South Australians are tabulated in Table 8. Where roads were tied on an equal number of nominations, recent crash history, planned upgrades, traffic volumes, and RAA's prior assessments have been drawn on to rank them.

The top ten list comprises of six regional roads, two peri-urban roads, and two metropolitan roads.

Table 8: Top 10 nominated roads in the 2021 Risky Roads survey

	Road	Top three issues raised
1	Main South Road (Aldinga – Sellicks Beach)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
2	Southern Ports Highway (Beachport –Millicent)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
3	Horrocks Highway (Gawler –Rhynie)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
4	Main Road (Coromandel Valley – Chandlers Hill)	Inappropriate speed limit | Potholes, cracks or rutting | Crumbling road edges
5	Upper Yorke Road (Arthurton – Kulpara)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
6	Main North Road (Gepps Cross – Gawler)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
7	Victor Harbor Road	Potholes, cracks or rutting | Lacks overtaking opportunities | Crumbling road edges
8	Princes Highway (Tailem Bend – Mt Gambier	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
9	Glynburn Road (Payneham Rd – Magill Rd)	Potholes, cracks or rutting | Rough, slippery or loose surface | Crumbling road edges
10	Owen Road	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface

Table 9 lists the top 10 nominated metro and regional roads, which are all discussed within this report.

Table 9: Top 10 nominated metro roads and top 10 nominated regional roads in the 2021 Risky Roads survey

	Top 10 regional roads	Top 10 metro roads
1	Southern Ports Highway (Beachport to Millicent)	Main South Road (Aldinga to Sellicks Beach)
2	Horrocks Highway (Gawler to Rhynie)	Main Road (Coromandel Valley to Chandlers Hill)
3	Upper Yorke Road (Arthurton to Kulpara)	Main North Road (Gepps Cross to Gawler)
4	Victor Harbor Road	Glynburn Road (Payneham Rd to Magill Rd)
5	Princes Highway (Tailem Bend to Mt Gambier)	Kings Road (Salisbury Hwy to Bolivar Rd)
6	Owen Road	South Eastern Freeway (Stirling to Monarto)
7	Inman Valley Road	Greenhill Road (Burnside to Summertown)
8	Long Valley Road	Heaslip Road
9	Torrens Valley Road	North East Road (Tea Tree Gully to Walkerville)
10	Goolwa Road	Grand Junction Road (Sudholz Rd to Hampstead Rd)

Top 10 intersections

The overall top 10 risky intersections as nominated by South Australians are tabulated in Table 10. Where intersections were tied on an equal number of nominations, recent crash history, planned upgrades, traffic volumes, and RAA's prior assessments have been drawn on to rank them.

Table 10: Top 10 nominated intersections in the 2021 Risky Roads survey

	Intersection	Top three issues raised
1	Curtis Road/Heaslip Road (Angle Vale)	Inadequate crossing or turning opportunity | Potholes, cracks or rutting | Lacks traffic signals
2	Britannia Roundabout (Adelaide)	Poor or confusing road/intersection layout | Lacks traffic signals | confusing signs or line marking
3	Victor Harbor Road/Hindmarsh Tiers Road (Hindmarsh Valley)	Poor or confusing road/intersection layout | Inappropriate speed limit | Inadequate crossing or turning opportunity
4	Main South Road/Aldinga Beach Road (Aldinga Beach)	Inadequate crossing or turning opportunity | Poor or confusing road/intersection layout |Lacks traffic signals
5	Blackwood Roundabout (Blackwood)	Poor or confusing road/intersection layout | Confusing signs or line marking | Lacks traffic signals
6	Strathalbyn Road/Whites Road (Flaxley)	Tight curves or blind crests | Poor sight distance | Inadequate crossing or turning opportunity
7	Gepps Cross five-way (Gepps Cross)	Poor or confusing road/intersection layout | Inadequate crossing or turning opportunity | Inefficient or ineffective traffic signals
8	Glynde Corner (Glynde)	Poor or confusing road/intersection layout | Inefficient or ineffective traffic signals | Inadequate crossing or turning opportunity
9	Bull Creek Road/Paris Creek Road (Meadows)	Poor sight distance | Tight curves or blind crests | Poor or confusing road/intersection layout
10	Main South Road/Sellicks Beach Road (Sellicks Beach)	Inadequate crossing or turning opportunity | Lacks turning/acceleration lanes | Inappropriate speed limit

Top 10 maps

The locations of nominated metro and Adelaide Hills roads and intersections are mapped in Figure 6.

Figure 6: Map of the top nominated metro roads and intersections

The locations of nominated regional roads and intersections are mapped in Figure 7.

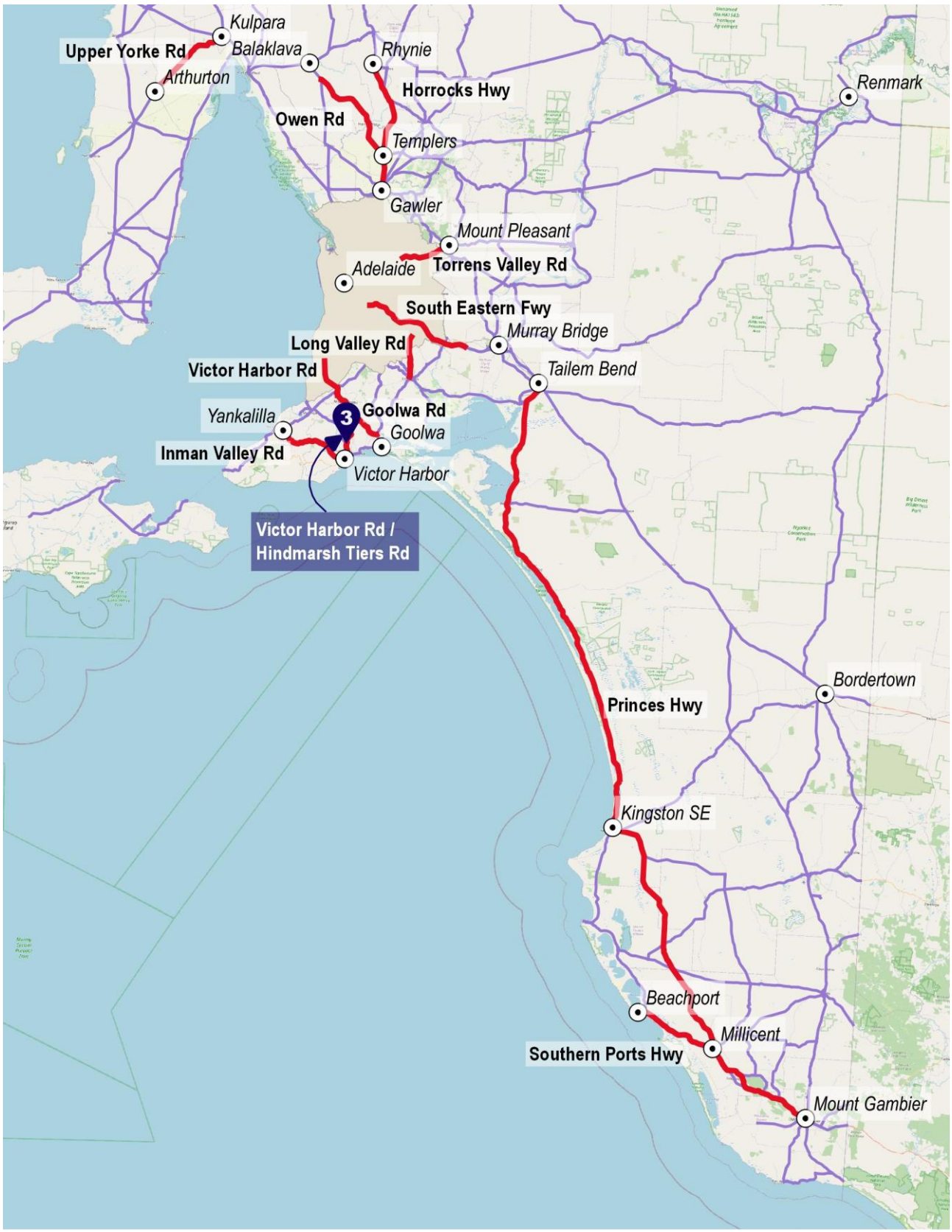


Figure 7: Map of the top nominated regional roads and intersections

Discussion

Top 10 metro roads

The top 10 nominated metro roads are listed in Table 9. Where roads were tied on an equal number of nominations, recent crash history, planned upgrades, traffic volumes, and RAA's prior assessments have been drawn on to rank them.

Table 11: Top 10 nominated metro roads in the 2021 Risky Roads survey

	Top 10 metro roads	Top three issues raised
1	Main South Road (Aldinga to Sellicks Beach)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
2	Main Road (Coromandel Valley to Chandlers Hill)	Inappropriate speed limit | Potholes, cracks or rutting | Crumbling road edges
3	Main North Road (Gepps Cross to Gawler)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
4	Glynburn Road (Payneham Rd to Magill Rd)	Potholes, cracks or rutting | Rough, slippery or loose surface | Crumbling road edges
5	Kings Road (Salisbury Hwy to Bolivar Rd)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
6	South Eastern Freeway (Stirling to Monarto)	Potholes, cracks or rutting | Rough, slippery or loose surface | Inappropriate speed limit
7	Greenhill Road (Burnside to Summertown)	Potholes, cracks or rutting | Narrow road, lanes or bridges | Crumbling road edges
8	Heaslip Road	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
9	North East Road (Tea Tree Gully to Walkerville)	Potholes, cracks or rutting | Sunken utility pit covers | Rough, slippery or loose surface
10	Grand Junction Road (Sudholz Rd to Hampstead Rd)	Potholes, cracks or rutting | Sunken utility pit covers | Poor or no road markings

Main South Road - Aldinga to Sellicks Beach

Metro ranking	1 (1 overall)			
Total nominations	224			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	27	41	6	0

Once again, a section of Main South Road has been nominated as South Australia's riskiest metropolitan road, receiving 224 nominations over the survey period. Main South Road is one of only two roads to have featured in every RAA Risky Roads survey since inception in 2013, where it was nominated the second riskiest metro road between Seaford and Aldinga.

On its northern end, Main South Road is a metropolitan arterial road that begins at Darlington, following the coastline to Sellicks Beach. Beyond Sellicks Beach, Main South Road continues along the west coast of the Fleurieu Peninsula through to Cape Jervis as the primary route between Kangaroo Island and Adelaide.

In 2017, Main South Road was nominated due to the road capacity, with most respondents citing that duplication was needed between Seaford and Sellicks Beach. Shortly after the 2017 survey, a $305m commitment was made to duplicate the road between Seaford and Sellicks Beach. However, the funding was only allocated for stage one between Seaford and Aldinga.

In 2019, Main South Road was nominated due to community anxiety about stage two of the project, which had still not received funding commitments at that stage. However, in 2020, $170m in state and commonwealth funding was committed to fund the upgrade between Aldinga and Sellicks Beach.

The majority of 2021 survey responses about Main South Road were raising sections between Seaford and Sellicks Beach, with most referring to the poor state of the road on the six-kilometre section between Aldinga and Sellicks Beach. This section of Main South Road is under the care and control of the Department for Infrastructure and Transport and lies fully within the City of Onkaparinga Council area. The road carries approximately 10,800 vehicles per day between Aldinga Beach Road and Norman Road, and 8,000 vehicles per day between Norman Road and Sellicks Beach Road.

The top five issues raised in nominations for Main South Road are listed in order below:

1. Potholes, cracks or rutting, in 91% of nominations
2. Crumbling road edges, in 48% of nominations
3. Rough, slippery or loose surface, in 39% of nominations
4. Lacks overtaking opportunities, in 9% of nominations
5. Sunken utility pit covers, in 7% of nominations

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents mostly highlighted the poor road surface. To reduce risk, respondents were clear that a full reconstruction was what they wanted to see, and that it would be inappropriate to neglect maintenance works until the upgrade commences.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"The road is potholed, it is crumbling through to the base bed, when it rains mud comes up through the cracking, it rides like a roller coaster as the under bed has shifted and collapsed. It is the Main Road to the Fleurieu Tourist areas, and Kangaroo Island."

"Drivers drive all over the lanes to avoid the cracking/potholes."

"This road is bad enough when driving a car and has caused damage to my vehicle (dented rim/flat front tyre) but I avoid this road completely when on the motorcycle now as it is just too dangerous. Popping a front tyre at 90kmh on a motorcycle won't end well."

Question: What do you think would be the most effective way to reduce this risk?

"Rebuild from base up. The road needs total replacement. That is all. It has been promised since before the last State Election, and nothing, not one thing, has been done to improve the road since."

"Resurface the road properly and stop patching the holes. We can't wait for the new upgrade, which isn't going through to Sellicks Beach in the first stage anyway."

"Properly repair the road. It seems that due to plans to upgrade and duplicate Main South Road, upkeep has been minimal and full repairs are not being undertaken. The potholes that have been 'repaired' are just being filled with bitumen, which washes out as soon as there is any precipitation, causing more debris to by lying on the road."

In late November 2021, whilst the survey was still open for responses, a series of short-term repairs were made along this section of Main South Road, which addressed the most significant failures in the road surface. This will improve safety and comfort for road users until the major upgrade commences.

Figure 8: Major pavement failures on Main South Road between Aldinga and Sellicks Beach in November 2020

Figure 9: Most failures were repaired in late November, whilst the Risky Roads survey was still open

The trend in casualty crashes on this section of Main South Road over the past decade has appeared to decline slightly, with the three years between 2018 and 2020 all recording a lower number of crashes than the 10-year average.

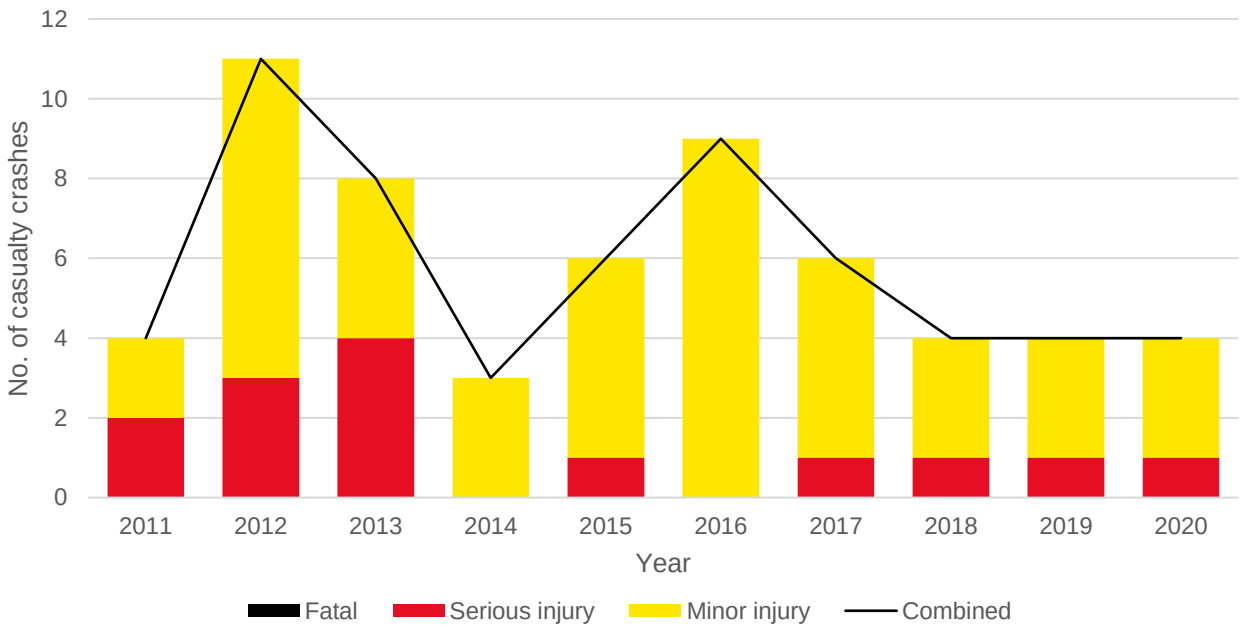


Figure 10: Ten year trend in casualty crashes on Main South Road (Aldinga – Sellicks)

Over the past five years, intersection crash types are the most commonly occurring on this section of Main South Road, accounting for more than half of all crashes and 5 of 6 serious injuries recorded on the road section.

Table 12: Casualty crash types occurring on Main South Road between Aldinga and Sellicks Beach (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Right Angle	7	6	1	11	2
Right Turn	7	5	2	8	3
Rear End	6	6	0	10	0
Head On	2	2	0	8	0
Side Swipe	2	2	0	2	0
Roll Over	1	0	1	0	1
Hit Animal	1	1	0	1	0
Hit Fixed Object	1	1	0	1	0
Total	**27**	23	**4**	**41**	**6**

Crash hotspots occur at intersections along the corridor, especially at the intersection with Aldinga Beach Road, and the intersection with Sellicks Beach Road.

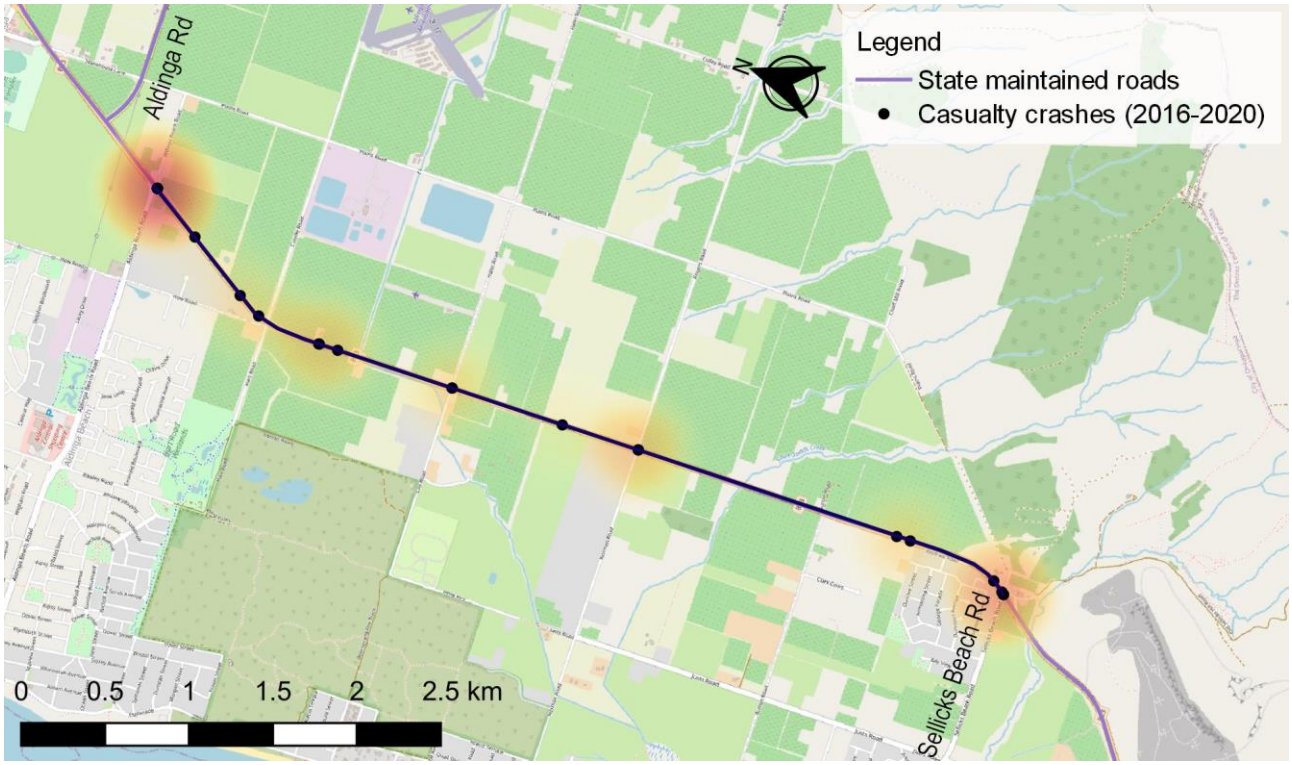


Figure 11: Heatmap of casualty crash locations on Main South Road between Aldinga Beach Road and Sellicks Beach Road

Other sections of Main South Road attracting a smaller number of nominations included:

- The section between Victor Harbor Road and the Southern Expressway, due to capacity issues with the current road alignment; and
- The section between Sellicks Beach and Cape Jervis, due to a lack of overtaking opportunities and high tourist and heavy vehicle volumes to and from Kangaroo Island.

Final comment

RAA has been aware of the poor pavement condition on Main South Road for some time, especially between Aldinga and Sellicks Beach, and has called for maintenance works to occur prior to the major upgrade, now proposed as a 2+1 layout between Aldinga and Sellicks Beach. Most recently, the road condition was reviewed in our *2021 Fleurieu Peninsula Regional Road Assessment*[3], with a priority recommendation to rehabilitate the surface south of Aldinga.

On 19 November, the State Government announced[4] a “repair blitz” that was being undertaken on the six-kilometre section Main South Road between Aldinga Beach Road and Sellicks Beach Road, in the lead up to the Christmas holiday period. This was targeting 115 different sites where the road surface was damaged.

An RAA assessment of the road condition before and after these works indicated that whilst major pavement failures had been patched up and a safer, smoother surface was provided, there were still some sections experiencing failure that will deteriorate further in the coming months, as well as undulations still present between Aldinga Beach Road and Hahn Road.

Given the major stage two upgrade of Main South Road, expected to commence in the coming years, RAA expects maintenance to keep the road to a safe and acceptable standard, however, does not expect full or major reconstruction works to occur until such time that the stage two upgrade commences, as this upgrade is likely to substantially change the road configuration.

[3] RAA, 2021, *Regional Road Assessment: Fleurieu Peninsula – 2021 Report*, accessed at <www.raa.com.au/roadassessments>.

[4] Government of South Australia, 2021, Media releases, *A smoother journey ahead for holidaymakers heading south*, accessed at <https://www.premier.sa.gov.au/news/media-releases/news/a-smoother-journey-ahead-for-holidaymakers-heading-south>.

Main Road - Coromandel Valley to Chandlers Hill

Metro ranking	2 (4 overall)			
Total nominations	38			
Top 3 issues	Inappropriate speed limit | Potholes, cracks or rutting | Crumbling road edges			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	40	39	5	1

Main Road features in the top ten metro roads for the third consecutive time since the 2017 survey where it was nominated as the fourth riskiest metro road and 2019 where it was nominated as the seventh riskiest metro road. In 2021, Main Road is now the state's second riskiest metro road.

Main Road is an arterial corridor extending for 14km between Belair Road in Belair and Chandlers Hill Road in Chandlers Hill via Blackwood and Coromandel Valley. The road traverses built up areas between Belair and Coromandel Valley, however the southern 5km between Black Road Valley and Chandlers Hill Road is more akin to a regional road, with less adjacent development.

Speed limits, maintenance and infrastructure design were the top issues raised on Main Road, with the top five issues nominated including:

1. Inappropriate speed limit, in 42% of nominations
2. Potholes, cracks or rutting, in 42% of nominations
3. Crumbling road edges, in 39% of nominations
4. Narrow road, lanes or bridges, in 37% of nominations
5. Poor or no pedestrian crossing facilities, in 24% of nominations

Survey respondents nominated three key sections of Main Road, namely:

- Safety at the children's crossing outside Coromandel Valley Primary School,
- Safety of pedestrians crossing near Coromandel Valley Shopping Centre,
- Safety south of Black Road

Figure 12: Main Road between Black Road and Oakridge Road is narrow and windy with unforgiving roadsides

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted its narrowness and poor geometry south of Black Road most frequently together with concerns about pedestrian safety near the Coromandel Valley Primary School and Shopping Centre. Respondents suggested several improvements, including pavement rehabilitation, road widening and barrier installation south of Black Road. There were calls for improvements to pedestrian crossings on Main Road, with consideration for a fully signalised crossing outside the primary school and pedestrian refuge island near Coromandel Valley Shopping Centre.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Narrow main road with the whole road surface crumbling. A few patches have been repaired lately, but nowhere near enough. Steep drop offs along much of this road with no barriers at all."

"In most places the lanes are very narrow which have been made worse by placing roadside safety barriers too close to the road edge. There are steep hillsides and jutting rocks on the inside lane going uphill and no road edges to speak of for most of its length. Where there are road edges, there are jutting rocks from the worn foundation that have destroyed car tyres. There are no cycle lanes, but on weekends, this steep narrow road is cluttered with very slow moving bicycles. Sight lines are very poor, limiting opportunities to safely overtake. This is a very busy road serving a number of hills communities, Strathalbyn, Macclesfield, Meadows, Kangarilla, Clarendon etc. all of which have had significant housing development over the years."

"The traffic has to come to a stop when people are turning in to drop their kids at Coromandel Valley Primary school. Cars queue in the bus stop facing the wrong direction and there are young kids everywhere trying to cross the road and driveway of the school with cars basically making up their own rules."

"There are no refuges for pedestrians. Cars travel well above the speed limit constantly. Needs slow points/roundabouts."

Question: What do you think would be the most effective way to reduce this risk?

"Between Black Road and Cherry Gardens Road, it needs to be widened, resurfaced, and have barriers placed along entire road."

"Widen the road surface by at least 2 metres and install a cycle lane on the upgrade side. Cyclists seem to keep up with the average speed of traffic on the down grade. In its present state, the speed limit needs to be reduced from 70 to 60 KPH similar to Upper Sturt Road."

"There needs to be a pedestrian crossing WITH LIGHTS at the primary school. Many cars do not slow or stop when lights are flashing. Suitable, island pedestrian crossing with median rest point needed at shops."

"Reduce speed limit to 50km/h, add pedestrian islands to make crossing safe."

"Widen road near school to allow for cars to have a turning lane into the school."

"Reduce speed to 50km/h as it is near Blackwood."

Figure 13: The existing koala crossing outside Coromandel Valley Primary School

There are no significant upwards or downwards trends in the number of casualty crashes occurring in Coromandel Valley through to Chandlers Hill Road in the past decade. Between 2011 and 2015 and average of 8.4 casualty crashes occurred per year, whilst between 2016 and 2020 an average of 8 casualty crashes occurred per year.

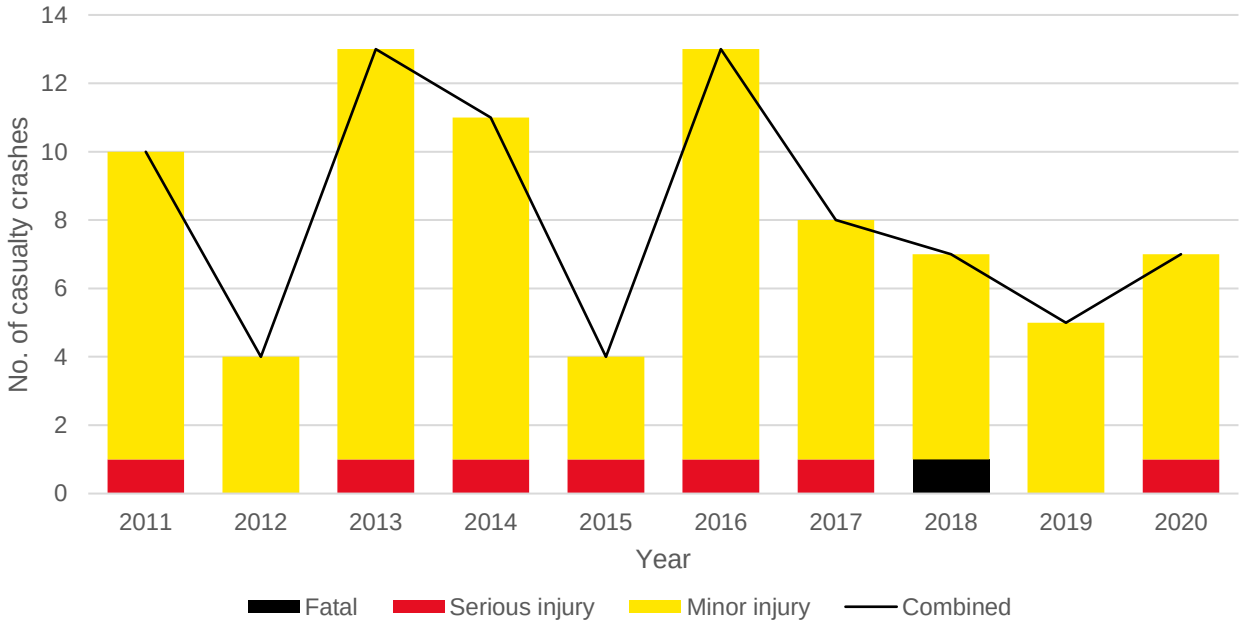


Figure 14: Ten year trend in casualty crashes on Main Road between Coromandel Valley and Chandlers Hill Road

Collisions with fixed objects were the most prevalent crash types occurring on this section Main Road between 2016 and 2020, with 92% of these occurring on curves.

Table 13: Casualty crash types occurring on Main Road between Coromandel Valley and Chandlers Hill Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Hit Fixed Object	13	9	3	1	9	5	1
Rear End	8	8	0	0	8	0	0
Head On	5	5	0	0	7	0	0
Roll Over	5	5	0	0	6	0	0
Right Angle	5	5	0	0	5	0	0
Right Turn	3	3	0	0	3	0	0
Side Swipe	1	1	0	0	1	0	0
Total	**40**	**36**	**3**	**1**	**39**	**5**	**1**

Casualty crashes occur consistently along the length of Main Road between Coromandel Valley and Oakridge Road, with the numbers dropping off between Oakridge Road and Chandlers Hill Road. Whilst the heatmap in Figure 15 shows the frequency of casualty crashes, it is important to consider that average traffic volumes south of Black Road are only 1,300vpd, whilst volumes north of Black Road are 10,000vpd – 12,000vpd. Previous analysis on this section of Main Road identified a crash rate per vehicle kilometre travelled that is more than four times higher between Black Road and Oakridge Road than it is for adjacent sections of the corridor.

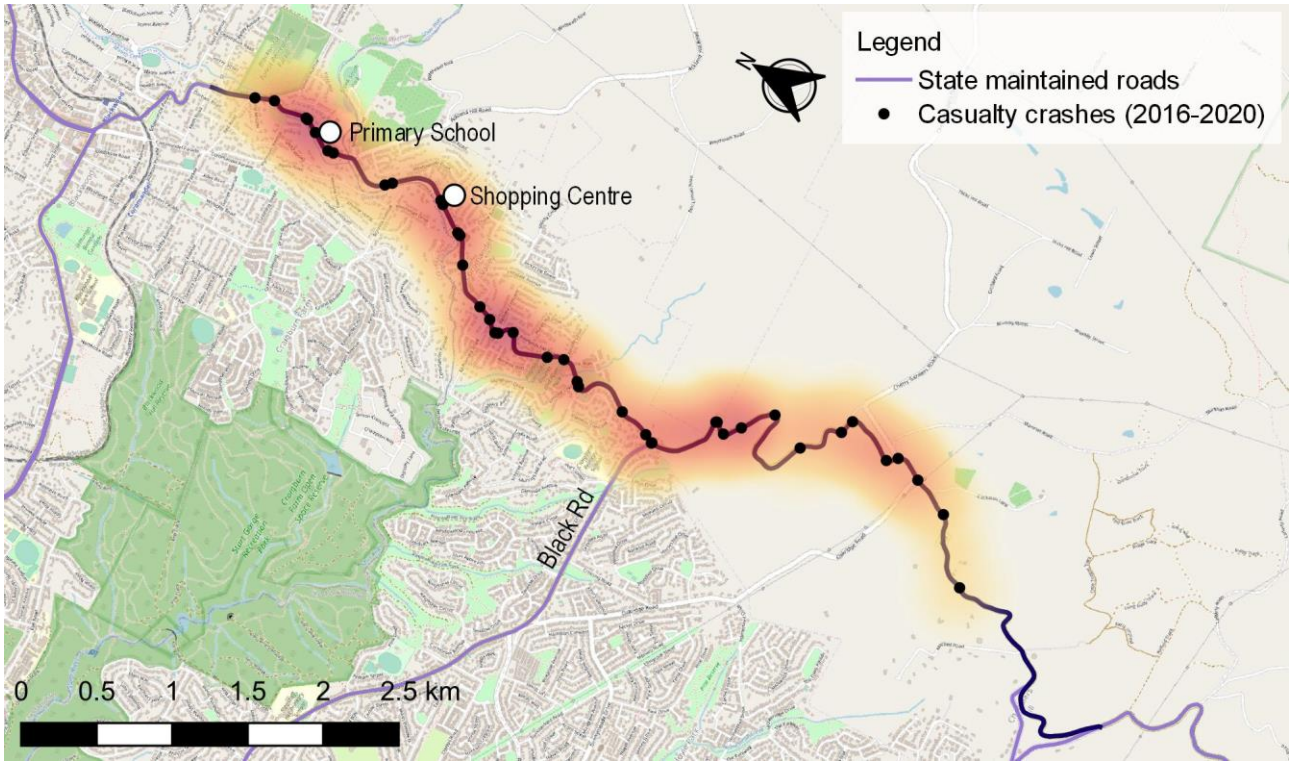


Figure 15: Heatmap of casualty crash locations on Main Road between Coromandel Valley and Chandlers Hill Road

In December 2021, the Minister for Transport announced a review of speed limits in the Adelaide Hills including Main Road in Cherry Gardens.

Final comment

Main Road has been a frequently raised issue over the years and it is not surprising to see it nominated so highly in our 2021 Risky Roads survey. RAA reviewed the Black Road to Chandlers Hill Road section in 2020, recommending relatively low-cost improvements such as pavement rehabilitation, speed limit reduction to 60km/h (between Black Road and Oakridge Road), hazard protection and improvements to delineation and sight distance. Respondents were supportive of and suggested a lower speed limit than the current 70km/h limit, and RAA testing of a change to 60km/h has previously indicated that this would result in marginal increase to travel times[5], whilst improving road safety.

Ultimately, the narrow, winding section between Black Road and Oakridge Road should be widened to provide better curvilinear alignment, but also wider lanes and shoulders. Improvements to pedestrian crossing facilities should be considered, and RAA considers a central refuge island to be a viable treatment near Coromandel Valley Shopping Centre.

Whilst RAA would support the installation of a signalised pedestrian crossing near Coromandel Primary School in principle, careful consideration must be given to the potential length of vehicle queues, and the sight distance to the rear of queued vehicles when approaching around blind or partially blind curves.

[5] RAA, 2020, *Main Road review: Black Road to Oakridge Road – October 2020*, accessed at <www.raa.com.au/roadassessments>.

Main North Road - Gepps Cross to Gawler

Metro ranking	3 (6 overall)			
Total nominations	30			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	738	895	65	9

Main North Road features in the top 10 risky roads for the third time, following its nomination as the second riskiest metro road in both the 2017 and 2019 iterations of the survey.

Main North Road is a metropolitan arterial, extending for 34km between Adelaide and Gawler, passing through the Prospect, Port Adelaide Enfield, Salisbury, Playford and Gawler local government areas. Traffic volumes are high along the full length of Main North Road, typically between 40,000 and 50,000 vehicles per day, but peaking at 63,800 between The Grove Way and Black Top Road in Salisbury Heights.

Most of the key issues raised were in relation to pavement maintenance, with 70% of nominations citing potholes, cracks or rutting along the road. Poor or confusing layout was cited in 15% of nominations, and hazardous roadside objects in 12% of nominations. The top five issues nominated on the road included:

1. Potholes, cracks or rutting, in 70% of nominations
2. Rough, slippery or loose surface, in 30% of nominations
3. Crumbling road edges, in 24% of nominations
4. Poor or confusing road/intersection layout, in 15% of nominations
5. Hazardous roadside objects, in 12% of nominations

Figure 16: Deteriorating surface of Main North Road in Hillbank

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents primarily highlighted issues with lack of maintenance north of Salisbury Heights, and issues with capacity between Mawson Lakes and Salisbury Heights. To reduce risk, respondents suggested that a third lane be installed for the length of the Mawson Lakes to Salisbury Heights section, and that additional maintenance be undertaken between Salisbury Heights and Gawler, especially between The Grove Way and Hogarth Road.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

> ""From One Tree Hill turn off at Hillbank through to Gepps Cross, we go from three lanes to two lanes to three lanes to two lanes to three lanes back to two lanes. This is an accident waiting to happen. When you cross The Grove Way heading south, the three lanes drop back to two and at peak times it is a nightmare with cars speeding up and forcing their way into the reduced two lanes just past the Salisbury Fire Station. Plenty of accidents have occurred along this stretch of road but no minister wants to recognise or do anything about it."
>
> "Whole of road in all three lanes – especially heading south – is cracked. It has 100mm corrugations and road breaking away where it's damaged, the speed limit is 80km/h and if you're not paying attention you can easily lose control and or damage your car. I have had the steering knocked out of my hands on my motorcycle travelling at 80km/h quiet violently, I have never seen any maintenance to the section of road in my whole 22 years of driving."
>
> "The road surface makes it scary for bikes and motorcycles. They should fix this road sooner before it gets worse."
>
> "Between Midway Road and The Grove Way, Main North Road is literally crumbling in all lanes, as well as the edges. There are holes, undulations, traffic light sensors uncovered. It's dangerous for cars, let alone motorbikes and cyclists."
>
> "Very slippery and crumbling and breaking apart in sections."

Question: What do you think would be the most effective way to reduce this risk?

> "Make the road three lanes from Hillbank to Gepps Cross."
>
> "Reseal the road to make it smoother. Constant bulbs cause unsafe for drivers and motorbike users."
>
> "The whole stretch should be three lanes each way, like it is south of Montague Road and north of Saints Road. A large volume of traffic turns off at Saints Road and it seems odd that the narrower section with fewer lanes has more traffic than the wider section beyond."
>
> "Get rid of the tree roots and reseal the road. This section between John rice and the Grove way has been dangerous for years and is getting worse."

A high proportion of casualty crashes on this section of Main North Road have resulted in minor injuries, and the trend in minor injury crashes over the decade has decreased from an average of 161 per year between 2011 and 2015 to 131 per year between 2016 and 2020. However, crashes with fatal or serious injury outcomes (FSI crashes) have trended upwards over the decade, with 2017, 2019 and 2020 being the worst three years for FSI crashes in the decade. 2020 was the lowest year in the decade for all casualty crashes, but this is most likely due to the impacts of reduced traffic due to the COVID-19 pandemic..

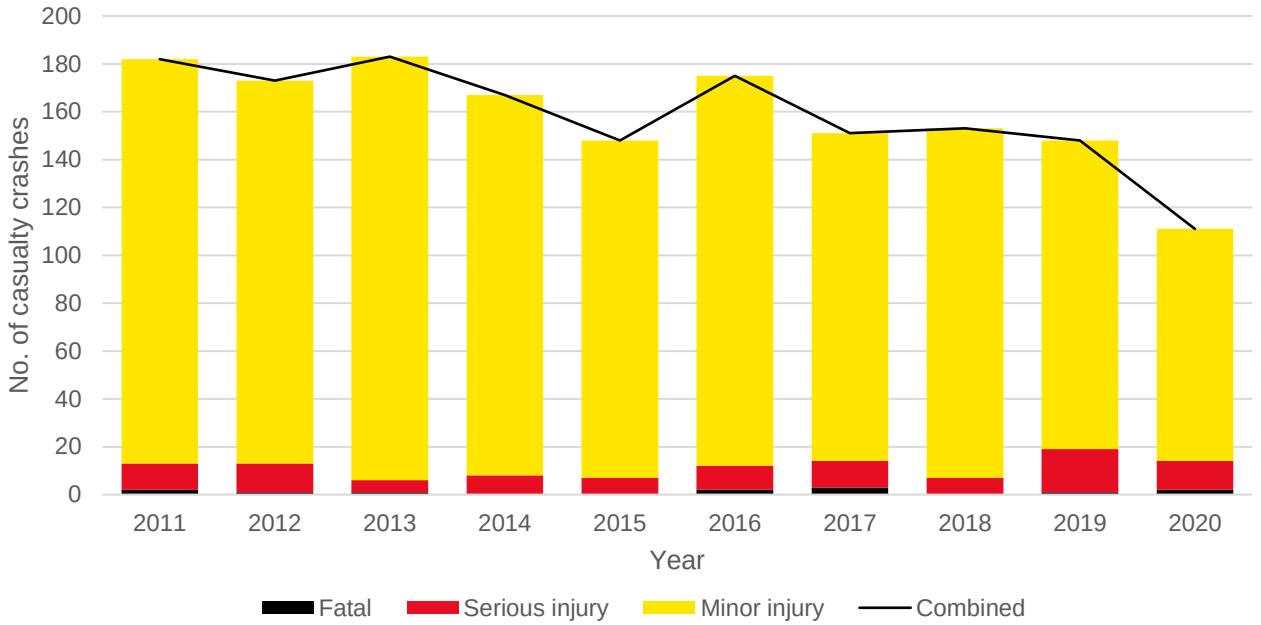


Figure 17: Ten year trend in casualty crashes on Main North Road

Rear end crashes are the most common crash type by an overwhelming amount on Main North Road. Rear end crashes numbers are generally high on roads that experience high levels of traffic and congestion, with many intersections. Right angle crashes at intersections are the next most frequent casualty crash type, and have a much higher likelihood of resulting in serious injury or death

Table 14: Casualty crash types occurring on Main North Road between Gepps Cross and Gawler (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Rear End	466	447	18	1	583	18	1
Right Angle	85	73	11	1	116	12	1
Hit Fixed Object	56	43	12	1	47	13	1
Right Turn	51	42	7	2	70	7	3
Side Swipe	45	39	5	1	48	8	1
Hit Pedestrian	13	9	3	1	10	3	1
Roll Over	10	9	1	0	9	1	0
Hit Parked Vehicle	6	6	0	0	7	0	0
Head On	4	2	1	1	3	3	1
Hit Object on Road	1	1	0	0	1	0	0
Left Road - Out of Control	1	1	0	0	1	0	0
Total	**738**	672	**58**	**8**	**895**	**65**	**9**

Busy sections around Salisbury Plain, Elizabeth and Smithfield appear to be crash hotspots, and this is partially attributable to the higher number of closely spaced busy intersections in these areas.

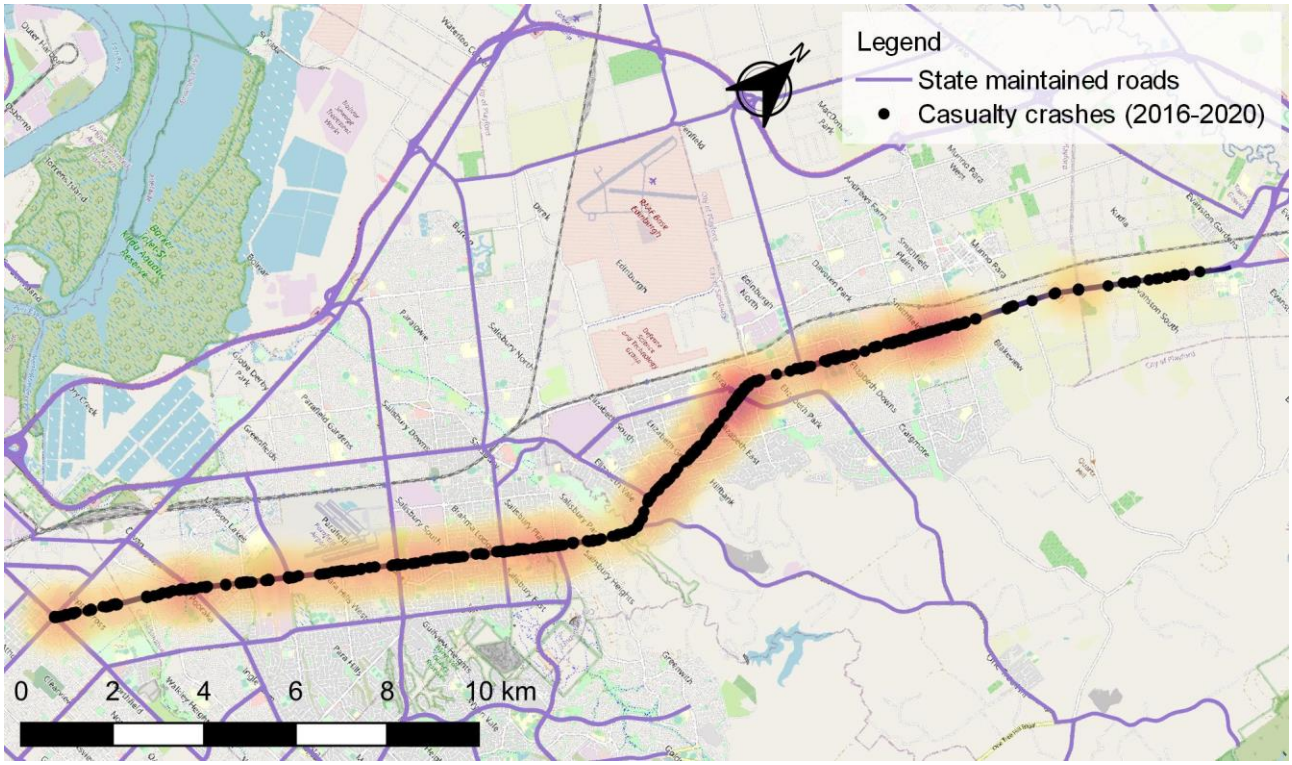


Figure 18: Heatmap of casualty crash locations on Main North Road

A $7.9m upgrade at the intersection with Dalkieth Road in Blakeview was completed in early 2019, following this intersection being nominated fifth in the 2017 Risky Roads survey.

Several sections of Main North Road are listed for pavement rehabilitation works under the DIT forward program including:

- The Grove Way to Hogarth Road
- Elizabeth Way to north of Midway Road
- Curtis Road to Dalkieth Road.

In early February 2022, major pavement rehabilitation works commenced on the section between The Grove Way and Hogarth Road. RAA welcomes these works to address the most highly raised section of Main North Road by the local community.

Final comment

RAA has been calling for a third lane and planning study for Main North Road between Gepps Cross and Salisbury Heights for several years. RAA welcomes the installation of a third lane between McIntyre Road and Kesters Road as part of the Main North Road/McIntyre Road intersection upgrade, which removes multiple merge and diverge points. RAA also welcomes the 2021 commencement of a planning study between Gepps Cross and Salisbury Heights, and has provided feedback to the community engagement phase of this study to highlight this issue as well as concerns with the Gepps Cross intersection, the presence of roadside hazards, cycling and public transport.

Maintenance is an ongoing issue on Main North Road, with undulations due to tree roads frequently occurring, as well as cracks and ruts along much of the road between Salisbury Heights and Gawler. Works commencing in February 2022 are welcome and will address the most highly raised pavement issues in the 2021 Risky Roads survey. Other works currently listed on the DIT forward program should be funded and completed as soon as possible

Glynburn Road - Payneham Road to Magill Road

Metro ranking	4 (9 overall)			
Total nominations	23			
Top 3 issues	Potholes, cracks or rutting | Rough, slippery or loose surface | Crumbling road edges			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	114	135	5	0

In 2021, Glynburn Road features in the top ten nominated metro risky roads for the first time.

Glynburn Road is a metropolitan arterial corridor under the care and control of DIT, extending north-south for 6km between Glynde and Beaumont. The northern part of the road defines the boundary between the Campbelltown City Council and the City of Norwood, Payneham and St Peters, whilst the southern section is within the City of Burnside. The busiest section is between Glynde Corner and Magill Road, which mostly carries about 30,000 vehicles per day, whilst the southern section carries between 18,000 and 21,000 vehicles per day.

Maintenance was the key issue raised in nominations for the road, with potholes, cracks or rutting category selected in most nominations, with the top five categories raised all being in relation to maintenance. The top five issues nominated on the road included:

1. Potholes, cracks or rutting, in 91% of nominations
2. Rough, slippery or loose surface, in 39% of nominations
3. Crumbling road edges, in 30% of nominations
4. Sunken utility pit covers, in 30% of nominations
5. Uneven or undulating surface, in 26% of nominations

Figure 19: Cracking, ruts and potholes present on Glynburn Road near Firle Plaza

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, all respondents highlighted the poor surface between Glynde Corner and Magill Road. To reduce risk, all respondents suggested that resurfacing works were required for this section, whilst some also added suggestions such as duplication between Magill Road and Greenhill Road, and traffic signals at the intersection with Reid Avenue.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"The road surface quality of this section of Glynburn Road is terrible. Patches everywhere which are uneven, potholes & cracking everywhere, and a very poor ride quality. A recent burst water main repair on the southbound carriageway just south of Arthur Street was resealed with terrible quality."

"Potholes, cracked and crumbling sections of road driving from Montacute Road towards Magill Road - mostly noticed in middle lane."

"Glynburn Road is so rough between Hectorville Road and Magill Road. With the amount of road upgrades currently being done I'm surprised this road hasn't had any attention."

Question: What do you think would be the most effective way to reduce this risk?

"A complete resurfacing of the road in both directions between Magill Rd and Glynde Corner."

"Glynburn Road heading South from the Glynde Intersection to Magill Road intersection badly needs resurfacing."

"The intersection of Glynburn Road and Reid Avenue needs a set of traffic lights."

There have been no significant trends in casualty crashes on this section of Glynburn Road over the past decade, with an average of 22 casualty crashes occurring on this section each year.

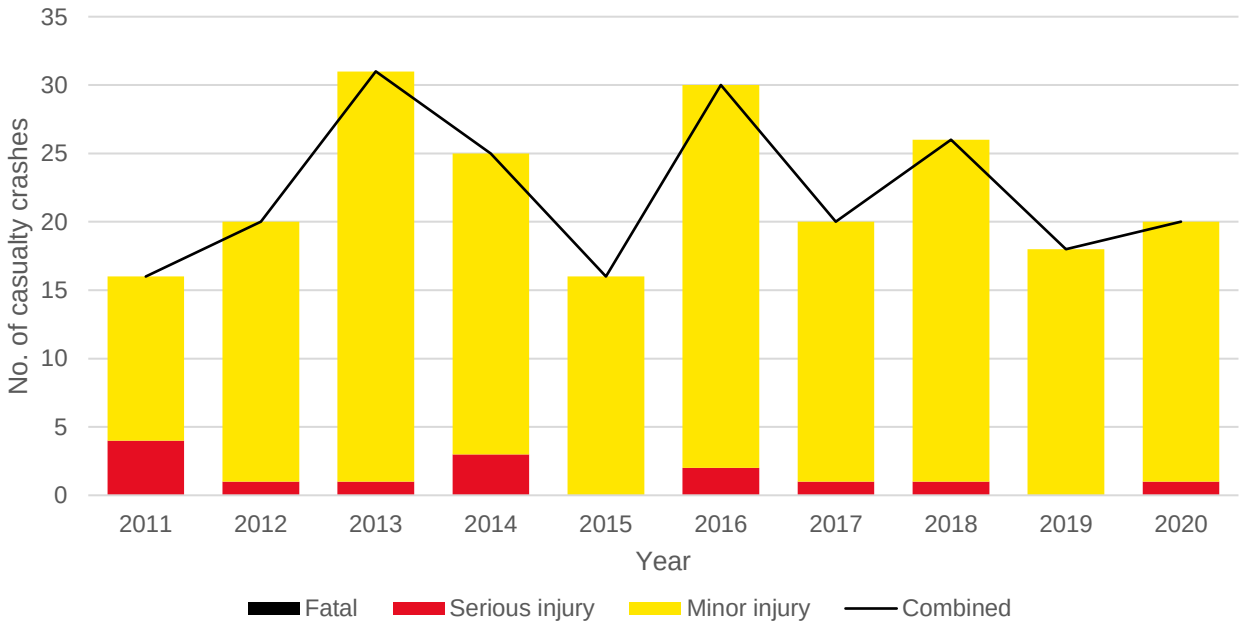


Figure 20: Ten year trend in casualty crashes on Glynburn Road between Payneham Road and Magill Road

Right angle and right turn crashes are the most frequently occurring crash types along this section of Glynburn Road, and this is due to the high number of side road approaches allowing right turns.

Table 15: Casualty crash types occurring on Glynburn Road between Payneham Road and Magill Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Right Angle	37	35	2	46	2
Right Turn	32	29	3	40	3
Rear End	24	24	0	27	0
Side Swipe	9	9	0	10	0
Hit Pedestrian	6	6	0	6	0
Hit Parked Vehicle	3	3	0	3	0
Hit Fixed Object	2	2	0	2	0
Roll Over	**1**	1	0	**1**	**0**
Total	**114**	109	**5**	**135**	**5**

Crash hotspots occur at Glynde Corner, where the road meets Payneham Road, Lower North East Road and Montacute Road (nominated 8th riskiest intersection overall), and in the vicinity of Firle Plaza, between Arthur Street (9 casualty crashes in 5 years) and Shelley Street (10 casualty crashes in 5 years).

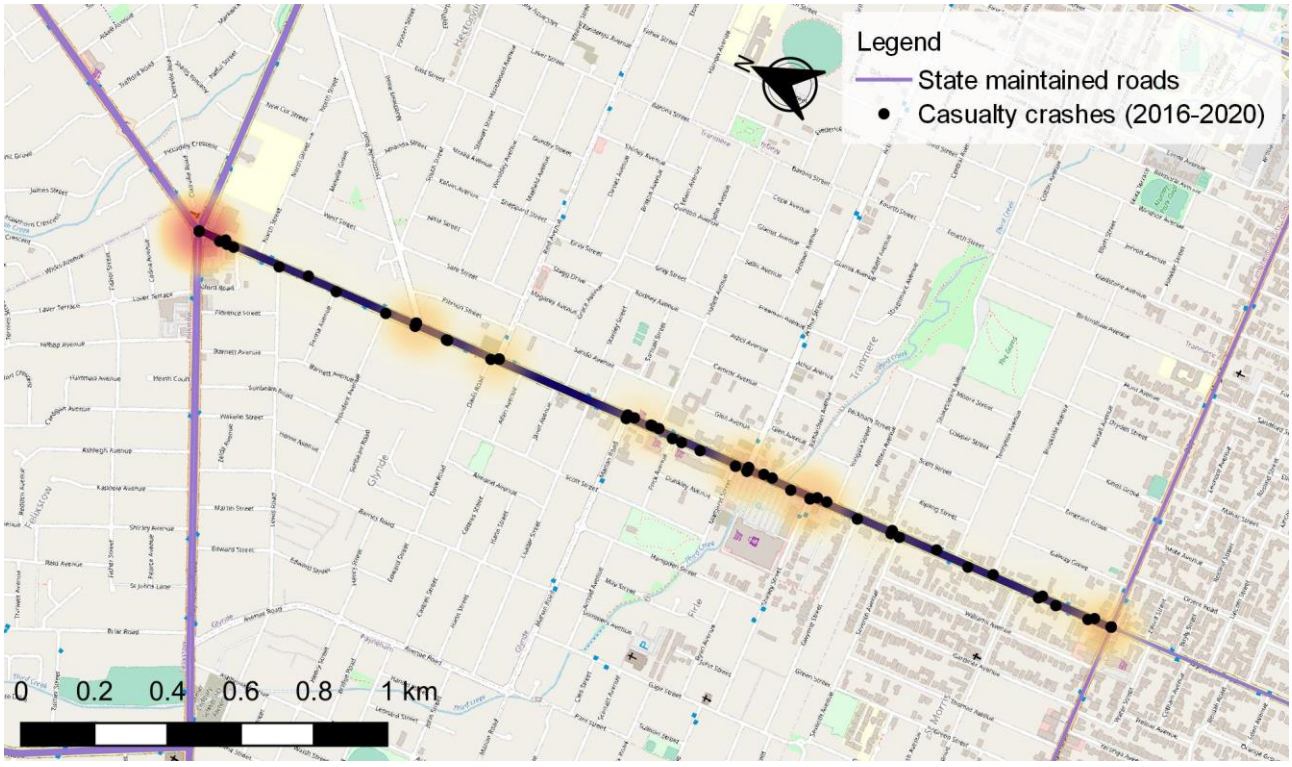


Figure 21: Heatmap of casualty crash locations on Glynburn Road between Payneham Road and Magill Road (2016 – 2020)

Pavement rehabilitation works are proposed for the section between Hallett Avenue and Magill Road under DIT's forward program, however, RAA suggests that this also needs to include the section between Hallett Avenue and Payneham Road, which is also in a state of disrepair.

Final comment

Glynburn Road is generally in poor condition between Payneham Road and Magill Road. RAA received several complaints about the road condition over the 18 months prior to the survey and is not surprised to see it nominated highly in this Risky Roads survey. A commitment to a full reseal of Glynburn Road between Payneham Road and Magill Road is needed to address the poor surface nominated by survey respondents.

Furthermore, after reviewing crash data, it's evident that there is a high number of right turn and right angle crashes occurring on this section of Glynburn Road. Right turns to and from a four-lane carriageway generate additional risk, and often there is no need to allow full access into every side road. Of 28 side road intersections along this section of Glynburn Road, 25 of them allow full turn movements. A review of median turning arrangements along the corridor may be able to generate some substantial safety improvements by closing several median openings and ensuring those that remain open offer a safe intersection arrangement.

Kings Road - Salisbury Highway to Bolivar Road

Metro ranking	5 (13 overall)			
Total nominations	16			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	44	46	4	0

In 2021, Kings Road features in the top ten nominated metro risky roads for the first time.

Kings Road is a metro arterial under the care and control of DIT, extending for 6km between Main North Road in Parafield and Bolivar Road in Bolivar, which connects with Port Wakefield Road and includes an interchange for access onto the Northern Connector. Kings Road is located fully within the city of Salisbury, and traffic volumes sit between 17,000 to 20,000 vehicles per day northwest of Salisbury Highway, and 30,000 to 33,000 vehicles per day southeast of Salisbury Highway.

The categories most frequently raised in nominations for the road were to do with maintenance, with 82% of nominations citing potholes, cracks or rutting. The top five issues nominated on the road included:

1. Potholes, cracks or rutting, in 82% of nominations
2. Crumbling road edges, in 65% of nominations
3. Rough, slippery or loose surface, in 53% of nominations
4. Unsealed road shoulders, in 29% of nominations
5. Sunken utility pit covers, in 24% of nominations

Figure 22: Poor drainage and deteriorated road surface on Kings Road

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. In this section, respondents mostly highlighted their concerns with road capacity and poor condition, with drainage and lighting issues also raised by several respondents. To reduce risk, most respondents suggested that duplication was required between Salisbury Highway and Bolivar, which would need to include improvements to drainage, road surface and street lighting.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Road needs to be two lanes. Road constantly floods. Very poor lighting. Very few pedestrian crossings to access bus stops. Road is heavily congested."

"It starts at Salisbury Highway as 2 lanes and merges into 1 near a road that turns to the right. The road should be 2 lanes from Salisbury Highway to Port Wakefield Road. The amount of traffic it carries is significant each day."

"The section of Kings Road between Salisbury Highway and Bolivar Road needs duplicating urgently with the volume of traffic it carries, especially now that it connects to the on/off ramps for the Northern Expressway."

"This section of Kings Road is a major freight route and is used by semi-trucks to get to the shopping centre and Aldi. It often floods, which has caused a lot of damage to the road. There are areas where the bitumen is cracking and breaking off which can cause a major hazard when large trucks or semis go along it, as these vehicles tyres can kick the pieces up into the air which can hit other vehicles, pedestrians or cyclists."

Question: What do you think would be the most effective way to reduce this risk?

"Two lanes. Proper drainage. Better lighting. Better pedestrian access to bus stops."

"Two lanes instead of one as there is room to fix this problem and make the road much safer to travel on. Currently it has a service road on one side for residents with a verge then the main road. Opposite side of the road has space to widen the road.."

"Two lanes in both directions from Salisbury Hwy to Bolivar Rd."

Over the past decade, casualty crashes have trended upwards on this section of Kings Road, from an average of 7.2 per year between 2011 and 2015 to an average of 8.8 per year between 2016 and 2020. 2017 and 2018 were the highest years in this time, recording annual figures of 13 and 14 casualty crashes, respectively.

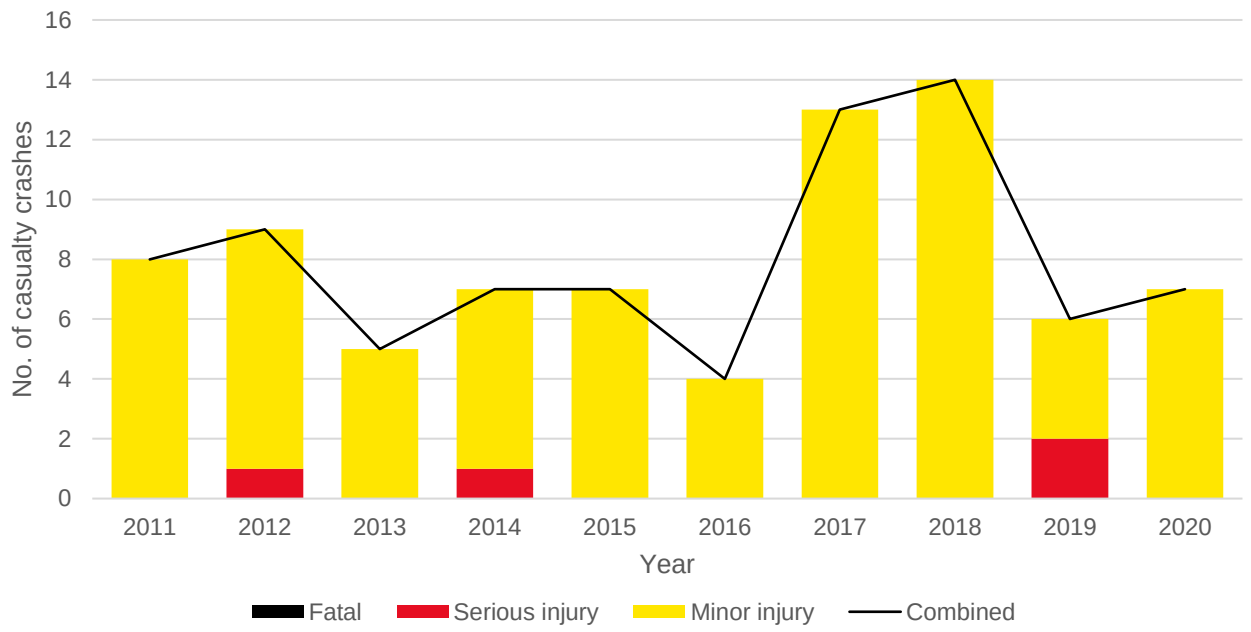


Figure 23: Ten year trend in casualty crashes on Kings Road between Salisbury Highway and Bolivar Road

Rear end crashes made up almost half of all casualty crashes on this section of Kings Road between 2016 and 2020, with right angle crashes the next most commonly occurring crash type. Note that crashes at the intersection with Salisbury Highway have been excluded from this analysis.

Table 16: Casualty crash types occurring on Kings Road between Salisbury Highway and Bolivar Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Rear End	21	21	0	22	0
Right Angle	7	7	0	8	0
Hit Fixed Object	6	5	1	5	3
Side Swipe	4	4	0	4	0
Head On	3	3	0	5	0
Roll Over	2	1	1	1	1
Right Turn	1	1	0	1	0
Total	**44**	**42**	**2**	**46**	**4**

The most significant casualty crash hotspot on Kings Road is in the vicinity of the Martins Road roundabout, where the road briefly becomes two lanes in each direction. Eight casualty crashes occurred at the roundabout between 2016 and 2020, with a further 7 occurring on Kings Road within 100m of the roundabout.

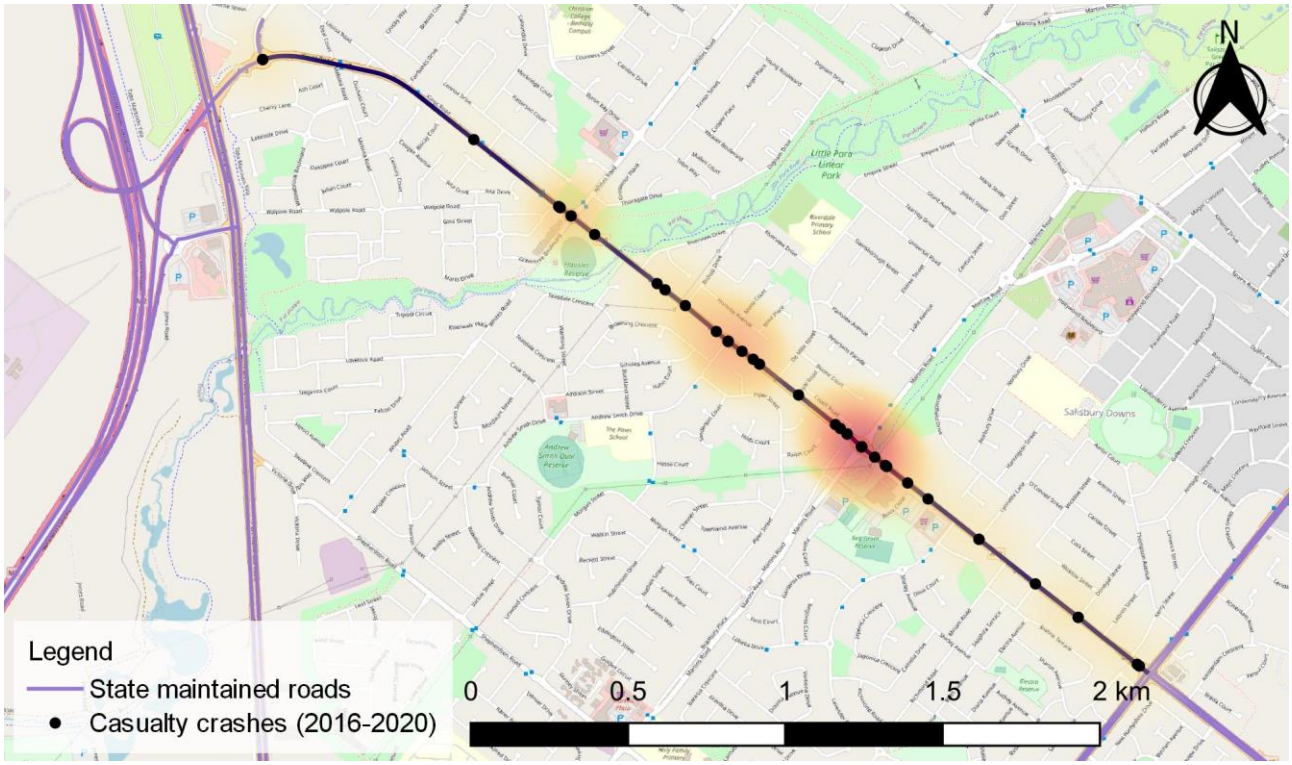


Figure 24: Heatmap of casualty crash locations on Kings Road between Salisbury Highway and Bolivar Road (2016 – 2020)

RAA is not aware of any recent or planned significant upgrades to this section of Kings Road.

Final comment

RAA expected Kings Road to feature in the top 10 metropolitan roads given the numerous complaints received about the corridor since the opening of the Northern Connector in March 2020. The opening of this major piece of new road infrastructure, with an interchange at the end of Kings Road has generated additional traffic and highlighted pavement and drainage issues that have plagued the road for many years.

Kings Road has not received much attention in recent years, despite high population growth in Paralowie and Parafield Gardens. The road provides a critical link to communities in Paralowie, Parafield Gardens and Salisbury Downs, as well as Parafield Airport and the Salisbury South industrial precinct. Duplication of this corridor is essential to help unlock the full potential of the North-South Corridor and will substantially improve connectivity. This upgrade should also include improvements to road surface, drainage and lighting as well as upgraded pedestrian, cyclist and public transport infrastructure.

Upgrades and ultimately full duplication of Kings Road between Salisbury Highway and Bolivar Road are included in RAA's priorities for the 2022 state election. This upgrade priority is in conjunction with other much needed road upgrades in the northern suburbs including on Curtis Road, Waterloo Corner Road and Elder Smith Road.

South Eastern Freeway - Stirling to Monarto

Metro ranking	6 (14 overall)			
Total nominations	14			
Top 3 issues	Potholes, cracks or rutting | Rough, slippery or loose surface | Inappropriate speed limit			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	140	151	30	2

In 2021, the section of the South Eastern Freeway between Stirling and Monarto is nominated as the states sixth riskiest metro road, and traverses areas that are considered both regional and metropolitan. The South Eastern Freeway is one of only two roads to have featured in every RAA Risky Roads survey since inception in 2013, where it was nominated the fifth riskiest metro road. The road was nominated sixth for metro roads in 2017, and third in 2019. Its position in the list has dropped in 2021 largely due to the significant and highly effective pavement reconstruction works undertaken over 2021 between Crafers and Glen Osmond, which was the source of most 2019 nominations for the road.

The South Eastern Freeway provides a crucial link between Adelaide and the Adelaide Hills, extending through to Murray Bridge. Further, this road serves an important function linking the Murraylands and Limestone Coast regions to Adelaide, as well as more broadly into Victoria as part of the most direct route between Adelaide and Melbourne.

The section between Verdun and Glen Osmond typically carries between 45,000 and 50,000 vehicles per day, about 33,000 between Verdun and Mount Barker, and 15,000 between Mount Barker and Murray Bridge.

The majority of nominations for the South Eastern Freeway were in relation to the condition of the road surface between Stirling and Monarto, and in particular between Bridgewater and Nairne.

The key issues raised were in relation to maintenance, with potholes, cracks or rutting identified in 69% of nominations. Inappropriate speed limit was raised in 19% of nominations, however some of these responses were referring to the temporary 60km/h speed limit in place between Crafers and Glen Osmond for wearing in of the new surface. The top three overall issues nominated on the road included

1. Potholes, cracks or rutting, in 69% of nominations
2. Rough, slippery or loose surface, in 31% of nominations
3. Inappropriate speed limit, in 19% of nominations

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted sections of poor pavement, with most of these being located between Stirling and Monarto. General concerns regarding short onramps, and heavy vehicle use were also raised. To reduce risk, respondents suggested pavement rehabilitation and drainage improvements, and acknowledged the good work undertaken between Crafers and Glen Osmond.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Most drivers and trucks are hugging the centre line or road edge to avoid ruts and rough broken surface."

"If you are heading outbound, the problematic area is just before the exit for Monarto and heading outbound past Nairne."

"Surface of left lane in both directions is breaking up from heavy vehicles. Particularly bad under Old Mt Barker Road Bridge, Stirling, outbound; 500m west of Bridgewater exit outbound; Bridgewater on ramp to Mt Barker (outbound)."

"Feed in ramps have poor visibility and the entry speed is too fast; never sure if vehicle already in left lane of freeway will let you in!! Frightening. All feed-in lanes in the Adelaide Hills have too high feed-in speeds, and no protection from vehicles already in left lane of the freeway."

"Too steep for trucks and dangerous to drive up or down when there is a breakdown and if a fire a hazard to move cars out of hills. Send the trucks another way,"

Question: What do you think would be the most effective way to reduce this risk?

"Resurfacing and better control of water run off on approach to the Hahndorf exit."

"Complete resurface with excavation and replacement similar to current Crafers to Glen Osmond works."

"Bridgewater exit to Hahndorf exit – on the up track. Total re-surface of this section of the freeway."

"Signage to alert drivers there is a risk of Black Ice at Verdun."

In the past decade, casualty crashes have increased along this section of the South Eastern Freeway. In the second half of the decade, an average of 28 casualty crashes occurred per year, compared with an average of 16.4 per year in the first half of the decade. When looking at FSI crashes, an average of 2.7 occurred each year in the second half of the decade, compared to 1.6 per year in the first half of the decade, representing a significant increase.

These increases are most likely driven by substantial growth around Mount Barker and the subsequent increase in traffic volumes.

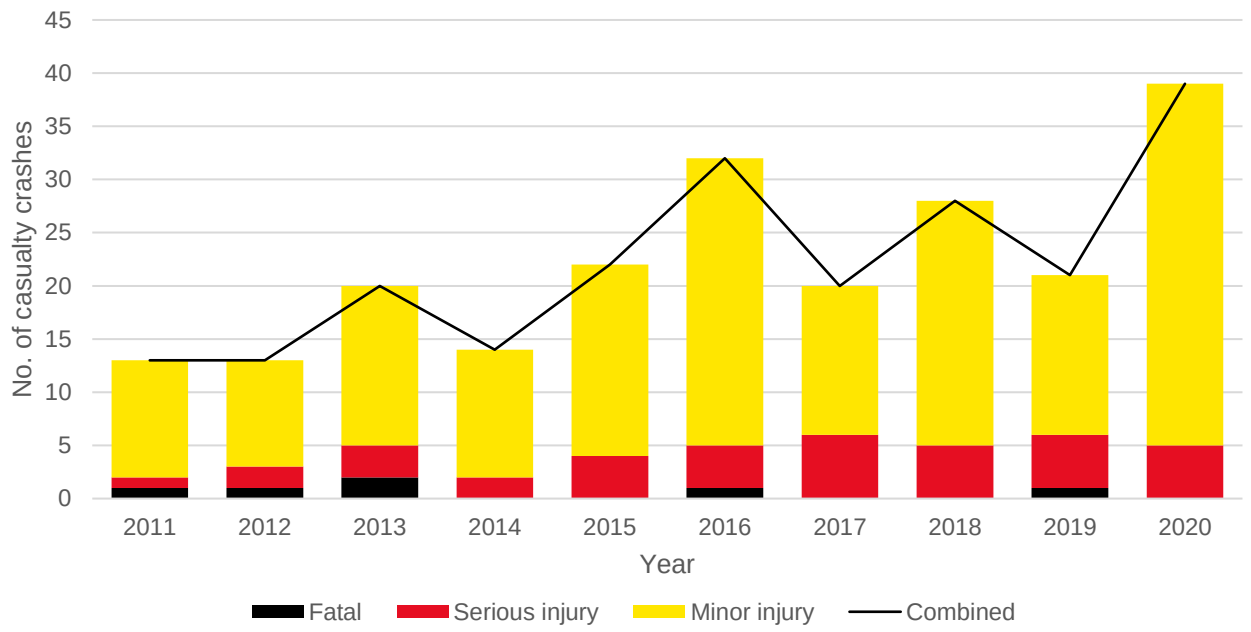


Figure 25: Ten year trend in casualty crashes on the South Eastern Freeway between Stirling and Monarto

Rear end crashes were the most frequently occurring casualty crash type between 2016 and 2020, making up 41% of all crashes. Collisions with fixed objects were the next most common, making up 17% of casualty crashes.

Table 17: Casualty crash types occurring on the South Eastern Freeway between Stirling and Monarto (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Farality
Rear End	58	50	7	1	66	9	1
Hit Fixed Object	24	18	6	0	21	8	0
Side Swipe	13	11	2	0	14	2	0
Roll Over	12	7	5	0	12	5	0
Right Angle	11	10	0	1	15	0	1
Right Turn	9	8	1	0	12	1	0
Hit Parked Vehicle	5	3	2	0	5	2	0
Hit Pedestrian	3	2	1	0	2	1	0
Hit Animal	2	2	0	0	2	0	0
Head On	1	0	1	0	0	2	0
Hit Object on Road	1	1	0	0	1	0	0
Left Road - Out of Control	1	1	0	0	1	0	0
Total	**140**	113	**25**	**2**	**151**	**30**	**2**

The busier sections of the freeway, between Stirling and Verdun, and around Mount Barker see the highest frequency of crashes along this section. At Mount Barker, this is exacerbated by the intersections at the interchange, with a combined 14 casualty crashes occurring at the two busy intersections.

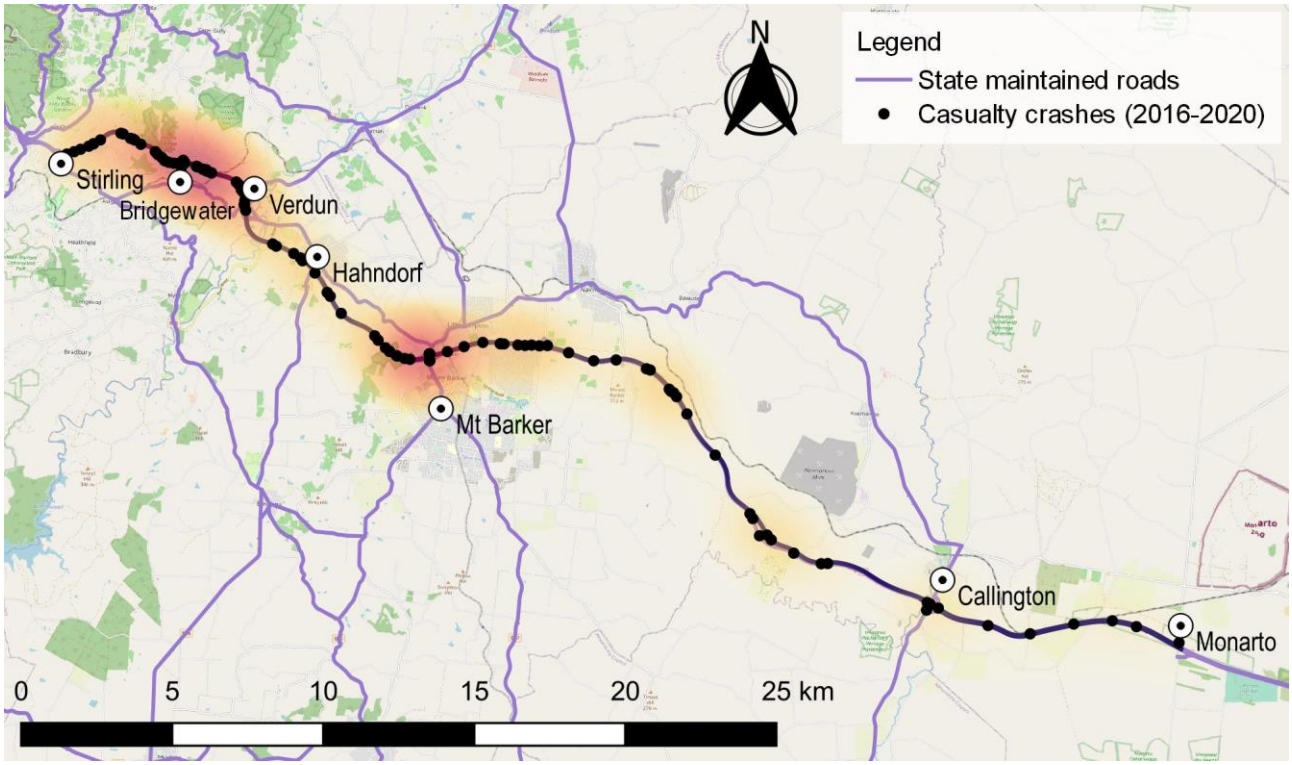


Figure 26: Heatmap of casualty crash locations on the South Eastern Freeway between Stirling and Monarto (2016 – 2020)

On 9 December 2021, $9m in pavement works were announced for the South Eastern Freeway between Bridgewater and Callington as part of the $250m Princes Highway Corridor Package. These works are expected to commence in the first quarter of 2022 and cover 11.4km of the South Eastern Freeway including 7.7km of the inbound carriageway between Callington and Mount Barker and 3.7km of the outbound carriageway between Bridgewater and Hahndorf. RAA welcomes this announcement and expects these works to address most of the pavement failures raised by survey respondents.

RAA also welcomes the February 2022 announcement of $75m in funding to ease traffic congestion in the event of incidents on the freeway by installing movable concrete barriers between Stirling and Glen Osmond. State government figures indicated that there were 200 partial shutdowns and 2 full shutdowns of the South Eastern Freeway in 2021.

Recent and planned upgrade works on the South Eastern Freeway are welcome and will improve safety on the road. These include:

- 2022+: Movable concrete barriers to ease traffic congestion when incidents occur ($75m)
- 2022: 11.4km in pavement works between Bridgewater and Callington ($9m)
- 2021-2022: Heysen Tunnels refit and upgrade ($75m)
- 2021: Full pavement reconstruction between Crafers and Glen Osmond ($35m)
- 2021: Speed activated warning signs on the freeway downtrack ($5m)
- 2020: Introduction of a third lane between Crafers and Stirling ($14.2m)

- 2020: 11.6km of resurfacing between Mount Barker and Callington ($7.4m)
- 2016: Construction of Bald Hills interchange ($27m)

Furthermore, the $250m *Hahndorf Township Improvements and Access Upgrade Project* will deliver further improvements to the South Eastern Freeway. Whilst design options are still being developed and reviewed, this is expected to include a new freeway access at Hahndorf for city bound traffic and upgrades to the Mount Barker interchange, as a minimum.

On 9 February 2022, concept plans for a $45m Mount Barker interchange upgrade were announced as part of the *Hahndorf Township Improvements and Access Upgrade Project*. This proposal aligns highly with RAA's 2020 recommendations for the interchange, and RAA welcomes this important initiative.

Final comment

Due to its strategic importance to the state and national road network, the South Eastern Freeway is one of Adelaide's most critical road corridors. Closures or restrictions on the South Eastern Freeway have the potential to isolate communities in the Adelaide Hills and sever the critical link between Adelaide and the state's South East, through to Victoria and Melbourne.

RAA's *2020 Highway Assessment: South Eastern Freeway*[6] outlined several key recommendations along the corridor, and some of these have been addressed since the release of the report. Other than the recently announced Bridgewater to Callington pavement works, and the Hahndorf upgrades currently being planned, RAA considers that the following two high priority initiatives along the South Eastern Freeway still need to be addressed:

- the introduction of a third lane between Stirling and Verdun, with planning to take place for a third lane between Verdun and Mount Barker
- the introduction of a third safety ramp at the bottom of the South Eastern Freeway descent to provide an additional opportunity for errant vehicles to safely leave the road before reaching the Portrush Road intersection.

RAA are calling for commitment towards progressing both of these initiatives in the lead up to the 2022 state election, which are included in RAA's 2022 election priorities.

Other outstanding recommendations from our 2020 report include:

- Investment of income generated by the Crafers and Leawood Gardens speed cameras directly into improving safety on the South Eastern Freeway.
- Further speed limit signage upgrades between Crafers and Glen Osmond
- Pedestrian safety upgrades at the intersection with Portrush Road
- Interchange improvements at Mount Osmond, Stirling, Bridgewater, and Monarto South

[6] RAA, 2020, *Highway Assessment: South Eastern Freeway report: May 2020*, accessed at <www.raa.com.au/roadassessments>.

Greenhill Road - Burnside to Summertown

Metro ranking	7 (15 overall)			
Total nominations	14			
Top 3 issues	Potholes, cracks or rutting | Narrow road, lanes or bridges | Crumbling road edges			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	38	41	5	0

In 2021, the eastern section of Greenhill Road is nominated as the state's seventh riskiest metro road, following on from its position of ninth metro road in the 2019 Survey. In 2019, the section between Glynburn Road and Glen Osmond Road was the section most frequently raised, however the investment in pavement upgrades which RAA welcomes has significantly improved this section of the road for all users since the 2019 survey. Notably, there were no nominations for the metropolitan section of Greenhill Road in 2021, indicating that the community is largely satisfied with the work that has been carried out. All nominations in the 2021 survey were for the section of Greenhill Road in the Adelaide Hills, which is a vastly different road environment to the section between Burnside and Keswick.

This section of Greenhill Road east of Hallett Road serves an important arterial function between Balhannah and Burnside (and the Adelaide metropolitan area), especially for communities in Balhannah, Uraidla and Summertown. The road is also one of the primary connections between the Adelaide Hills and Adelaide, should there be an incident forcing a closure of the South Eastern Freeway.

Most nominations for Greenhill Road were for the section between Burnside and Summertown and were largely about the roads narrow lanes and tight curves, as well as poor maintenance. The top five issues nominated on the road included:

1. Narrow road, lanes or bridges, in 40% of nominations
2. Potholes, cracks or rutting, in 40% of nominations
3. Tight curves or blind crests, in 33% of nominations
4. Crumbling road edges, in 33% of nominations
5. Rough, slippery or loose surface, in 27% of nominations

Figure 27: Greenhill Road is a narrow corridor, and popular with cyclists

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted that drivers struggled to remain fully within their lane, causing near misses, and that it was a dangerous corridor for cycling, particularly on the up-track. To reduce risk, respondents suggested a range of improvements such as audio tactile line markings (similar to Gorge Road), road surface improvements and widening, as well as a reduced speed limit.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Traffic mix on this section of road is extremely dangerous, due to speed, cyclists, tourists, recreational activities, buses, children school runs etc as the road is narrow with poor camber, blind corners and inappropriate passing sections. This is an old neglected section of Greenhill Road and urgently needs upgrading as it also is used as Adelaide access road when Freeway is compromised, it is also a venue for the Classic Adelaide Car Event. This section also terrifies some who visit the Adelaide Hills Region and will avoid at all costs."

"This is a popular road for cyclists but there is no bicycle lane; this presents many risks including collisions with cyclists; collisions with oncoming vehicles that are overtaking cyclists; the road is very bumpy and narrow and there is not much space for vehicles passing each other; minimal margin for driver error or negligence, such as cutting corners."

"The road has not been resurfaced for around 35 years, except for patches. Also, it is used as a racetrack at night by hoons."

Question: What do you think would be the most effective way to reduce this risk?

"People cut corners on blind corners, need multi-rut painted lines, the ones that shake your steering wheel if you cross."

"A proper rebuilding of the road and policing to stop the speeding."

"The road is in bad need of upgrading. The surface is breaking up; there are insufficient areas to safely pass and there needs to be better policing of the road particularly on weekend nights when hoons use it as a racetrack and tail gate other motorists."

"Designate appropriate cycle routes in the hills. Develop the alternatives (there are plenty of tracks than can be improved for cyclist use. Ban cyclists on inappropriate roads like this section of Greenhill Road. Close it for events only."

"Speed limit needs to be reduced to 60kph!"

Over the past decade, there were no significant trends in the yearly number of casualty crashes occurring on this section of Greenhill Road, with 38 casualty crashes occurring in the 5 years between 2016 and 2020, and 35 in the five years between 2011 and 2015, however the number of crashes resulting in serious injury has tended to decline, with half as many occurring in the latter half of the decade.

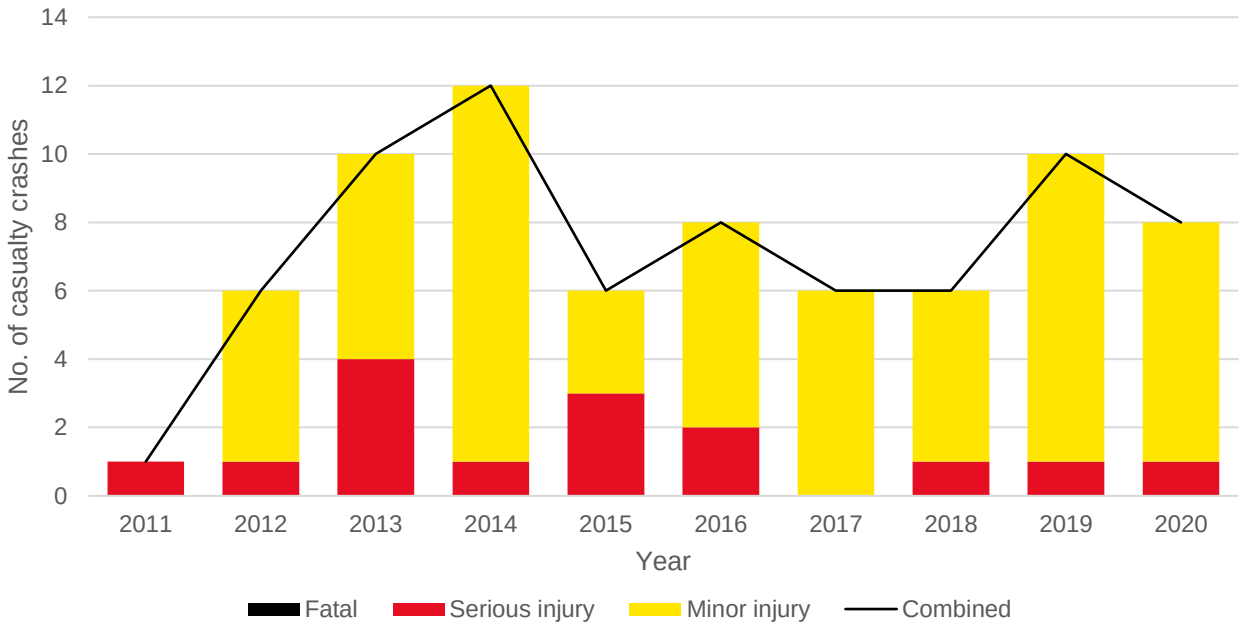


Figure 28: Ten year trend in casualty crashes on Greenhill Road between Burnside and Summertown

Collisions with fixed roadside objects are the most frequently occurring crash types on this section of Greenhill Road, and account for 39% of casualty crashes between 2016 and 2020. When combined with other single vehicle crash types, 61% of casualty crashes involve only one vehicle.

Head on crashes are also a high cause for concern, and are the second most common crash type occurring on this section of Greenhill Road.

Table 18: Casualty crash types occurring on Greenhill Road between Burnside and Summertown (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Hit Fixed Object	15	13	2	14	2
Head On	7	5	2	6	2
Roll Over	6	5	1	7	1
Side Swipe	2	2	0	3	0
Rear End	2	2	0	2	0
Other	1	1	0	1	0
Hit Animal	1	1	0	1	0
Hit Parked Vehicle	1	1	0	1	0
Right Turn	1	1	0	1	0
Hit Pedestrian	1	1	0	1	0
Right Angle	1	1	0	4	0
Total	**38**	**33**	**5**	**41**	**5**

The section between Burnside and Greenhill has a higher crash frequency, however there are several hot spots along the corridor, most notably on or near curves, with 87% of casualty crashes occurring on curves or crests.

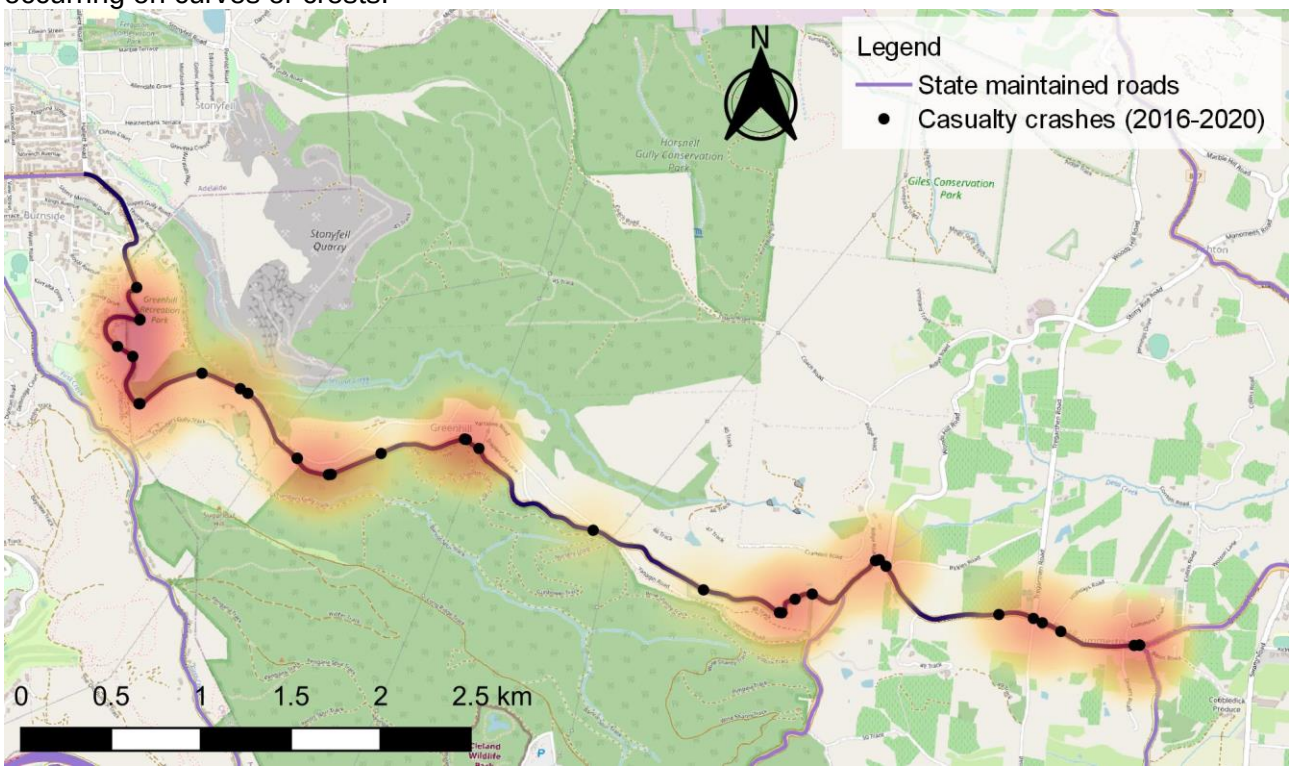


Figure 29: Heatmap of casualty crash locations on Greenhill Road between Burnside and Summertown (2016 – 2020)

A series of recommendations to improve safety for this section of Greenhill Road were identified in RAA's 2020 *Adelaide Hills Regional Road Assessment*[7]. However, we are not aware of any significant upgrade works planned.

Final comment

Greenhill Road in the Adelaide Hills is an inherently risky road, with tight curves, steep inclines, narrow lanes and steep drop-offs. Measurements taken during our 2020 Adelaide Hills Regional Road Assessment indicated lane widths of about 2.7m and a total seal width of 5.6m, including narrow shoulders. Whilst this geometry is far below the Austroads recommended minimum of 8.8m (3.3m lanes, 1.0m shoulders), providing an additional 3.2m of carriageway on Greenhill Road would come at immense cost, and would not be justifiable when weighed against other significant road upgrades that are needed across the state.

Whilst in the longer term targeted road widening would improve the level of safety, RAA's 2020 report highlighted several high priority recommendations that could be undertaken in the near future including:

- A speed limit review between Burnside and Summertown, with consideration to adopting a 60km/h speed limit for this section, and
- A full road reseal between Burnside and Summertown.

Centre line audio tactile line marking was also recommended to deter road users from crossing the centreline. This treatment has been effective at reducing crashes on Gorge Road, which has comparable alignment to this part of Greenhill Road.

[7] RAA, 2020, Regional Road Assessment: Adelaide Hills Report: December 2020, accessed at <www.raa.com.au/roadassessments>.

Heaslip Road

Metro ranking	8 (16 overall)			
Total nominations	13			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	55	67	6	2

In 2021, Heaslip Road features in the top ten nominated metro risky roads for the first time, nominated as the eighth riskiest metropolitan road.

Heaslip Road is under the care and control of DIT and extends for 14km between Waterloo Corner Road and Angle Vale Road, bisected by the Northern Expressway. At the southern end, Heaslip Road provides critical access to the Edinburgh industrial estate which contains several major distribution centres, manufacturing plants and logistics companies, and runs adjacent to the Edinburgh RAAF base and airport. At the northern end, Heaslip Road provides a link between the Northern Expressway for residents of Angle Vale and MacDonald Park, as well as to market gardens in Penfield Gardens and Angle Vale.

The southern end of Heaslip Road carries traffic volumes of 12,000 to 15,00vpd, with up to 2,600 heavy vehicles. The northern end carries 7,000 to 8,000vpd and more than 400 heavy vehicles.

Most issues raised for the road concern the road surface, with 93% of nominations for the road citing potholes, cracks or rutting. The top five overall issues nominated on the road included:

1. Potholes, cracks or rutting, in 93% of nominations
2. Crumbling road edges, in 50% of nominations
3. Rough, slippery or loose surface, in 29% of nominations
4. Unsealed road shoulders, in 21% of nominations
5. Narrow or uneven footpath, in 14% of nominations

Figure 30: Cracks and rutting on Heaslip Road

Two key issues were raised most frequently on sections of Curtis Road, including

- Poor surface between Waterloo Corner Road and Womma Road, and
- Lack of a footpath and poor drainage between Curtis Road and Angle Vale

Furthermore, the intersection with Curtis Road was the highest nominated intersection in the survey and is discussed in further detail later in this report. To reduce the risk associated with these issues, responses suggested pavement resealing works were required for sections of the road between Waterloo Corner Road and Womma Road, as well as the addition of footpaths and improved drainage in Angle Vale.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"From Waterloo Corner Road to Edinburgh Road, the left side lane prior to roundabout on Waterloo Corner Road is too narrow for the high volume of heavy vehicles."

"A lot of trucks use this road and even we are getting thrown around due to the roughness of the section between Diment Road and Edinburgh Road."

"No sidewalk for pedestrians. Large puddles on side of road after it rains take days to go away. The road is horrible to drive on and needs turning lanes at intersections for traffic to flow better."

"Between Curtis Road and Angle Vale Road, the issue has been caused by increased development in area and road infrastructure not taken into consideration for upgrades to suit. The whole section needs work, it dangerous with the deep potholes and council/state government keep pointing fingers to each other."

"There is no footpath from the Miravale Estate to the shopping centre (footpath starts after) and there are lots of cars and trucks driving on that road. I had to walk with my pram the other day and felt quite unsafe. There is also no crossing or medium strip."

Question: What do you think would be the most effective way to reduce this risk?

"Full resurface between Northern Expressway and Angle Vale Road with construction to handle increased traffic numbers and construction vehicles due to housing developments."

"Fixing the road putting pedestrian sidewalk with storm water and having turning lanes at large intersections."

"Scarify and re-bitumise between Waterloo Corner Road and Edinburgh Road"

In 2015 there was a large increase in the annual number of casualty crashes occurring on Heaslip Road; however, since 2015 this figure has started to decline back towards 2011 levels.

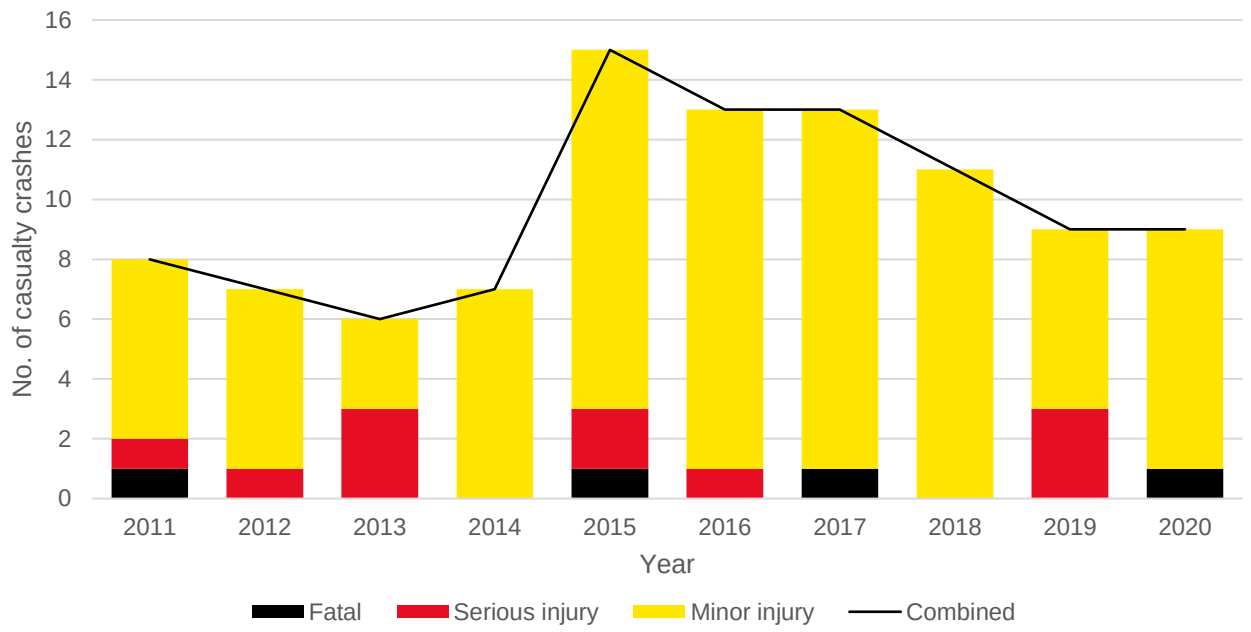


Figure 31: Ten year trend in casualty crashes on Heaslip Road

Right angle crashes at intersections are the most commonly occurring crash type along Heaslip Road, followed by rear end crashes, which commonly occur at intersections.

Table 19: Casualty crash types occurring on Heaslip Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Right Angle	20	16	3	1	31	4	1
Rear End	16	16	0	0	18	0	0
Hit Fixed Object	5	5	0	0	5	0	0
Side Swipe	4	4	0	0	5	0	0
Roll Over	4	4	0	0	4	0	0
Head On	3	2	0	1	2	1	1
Right Turn	2	1	1	0	1	1	0
Hit Pedestrian	1	1	0	0	1	0	0
Total	**55**	**49**	**4**	**2**	**67**	**6**	**2**

Between 2016 and 2020, casualty crash hotspots on Heaslip Road occur between Waterloo Corner Road and Edinburgh Road, and at the intersection with Curtis Road in Angle Vale.

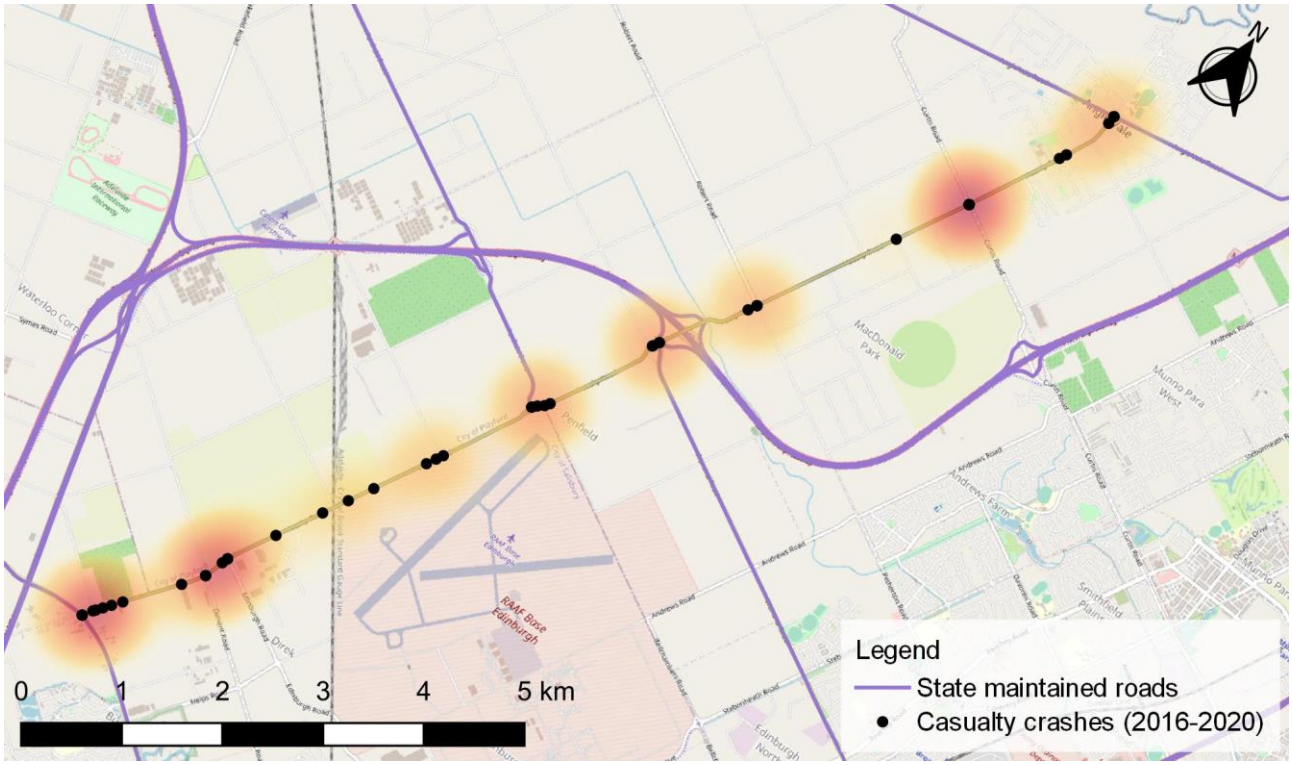


Figure 32: Heatmap of casualty crash locations on Heaslip Road between 2016 and 2020

RAA is not aware of any significant upgrade works planned for Heaslip Road.

Final comment

Survey respondents clearly identified a need for pavement rehabilitation along sections of Heaslip Road, mostly towards the southern end, and these works should be committed to by state government in a timely manner.

Large scale growth in the Angle Vale and Munno Para areas have also triggered a need for improved infrastructure between Curtis Road and Angle Vale. Upgrades to footpaths, drainage and intersections are required on this section of Angle Vale. RAA knows that infrastructure deeds between state government, local government and private developers are in place for financial contributions to road, stormwater and social infrastructure in the area. However, there is growing angst in the community that this infrastructure is not being delivered at appropriate times, and that funding should be brought forward for road and stormwater upgrades in Angle Vale.

North East Road, Tea Tree Gully to Walkerville

Metro ranking	9 (19 overall)			
Total nominations	12			
Top 3 issues	Potholes, cracks or rutting | Sunken utility pit covers | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	500	556	40	1

North East Road makes its third appearance in RAA's Risky Roads survey, nominated as the ninth riskiest metro road in 2021. This follows it being nominated the third riskiest metro road in both the 2013 and 2017 iterations of the survey.

North East Road is a metropolitan arterial road extending for almost 30km between the outskirts of Adelaide through to Gorge Road in Chain of Ponds in the Adelaide Hills. Nominations in the 2021 survey were for the 15km section between Tea Tree Gully and Walkerville, which is the most direct corridor between the north-eastern suburbs and the city.

Traffic volumes along the corridor are very high, with most of the road between Modbury and Walkerville carrying between 45,000 and 50,000 vehicles per day.

The key issue raised along North East Road was in relation to road maintenance, while half of nominations also cited sunken utility pit covers. The top five issues raised on the road were:

1. Potholes, cracks or rutting, in 92% of nominations
2. Sunken utility pit covers, in 50% of nominations
3. Rough, slippery or loose surface, in 50% of nominations
4. Crumbling road edges, in 17% of nominations
5. Uneven or undulating surface, in 17% of nominations

Figure 33: Deteriorated pavement between Golden Grove Road and Hancock Road

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted a range of issues along the length of the road between Tea Tree Gully and Walkerville. The most prominent issues raised were about the poor surface (especially between Golden Grove Road and Hancock Road), insufficient cycle infrastructure and sunken utility pit covers. Respondents suggested introduction of continuous cycle lanes, pavement rehabilitation and a reduction of the number of right turns to and from the road to improve safety along this busy corridor.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Manhole covers along north and south bound lanes between Sudholz Rd and Ascot Rd. Motorists swerve or deviate to avoid the many sunken manhole covers."

"Road surface is shocking. No bike lane. Lake of cycle infrastructure from the City-TTP bike path through TTP interchange to North East Road."

"Very hazardous road for cycling - cycle lanes come and go, and are missing where needed the most (e.g City to Ascot Ave, Muller Rd to Fosters Rd, northeast of Sudholz Rd). As a driver, I witness near misses regularly on the uphill sections between Suzholz Road and Kelly Rd."

"Between Golden Grove Road and Hancock Road it's in very poor condition."

Question: What do you think would be the most effective way to reduce this risk?

"Introduce continuous cycle lanes along the length of North East Road, and repair poor road surface."

"Reduce/eliminate right turns. Repair the road surface properly."

"Redo the road, new surface to make the road safe."

In general, there has been a slightly increasing trend in casualty crashes occurring on North East Road over the past decade, with the exception of 2020, which recorded fewer casualty crashes than any other year in the decade which may be due to lower traffic volumes as a result of travel restrictions during the height of the Covid-19 pandemic.

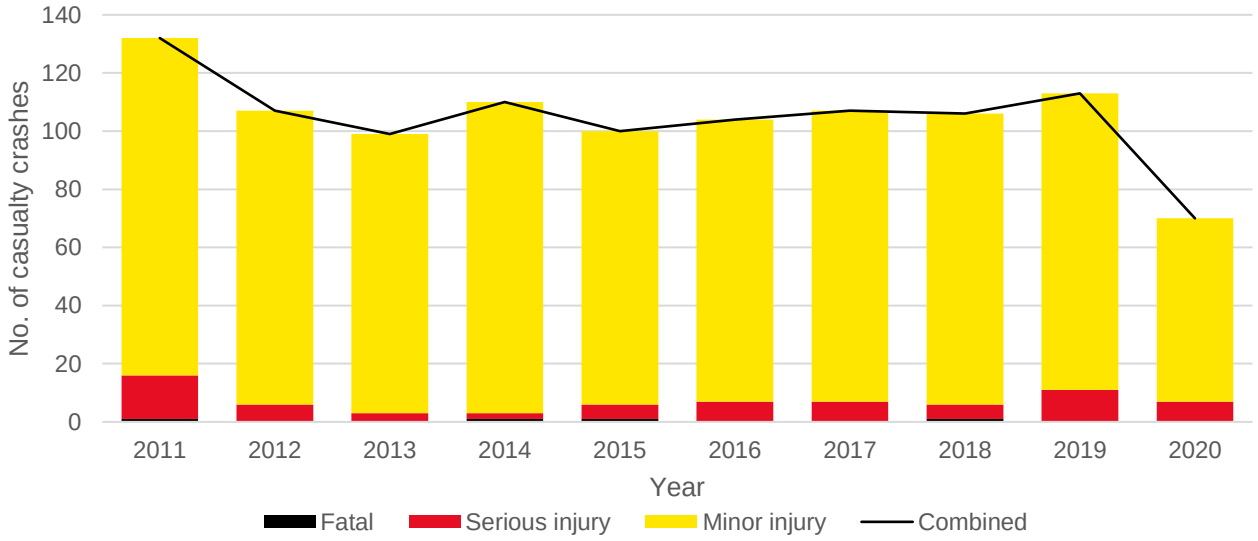


Figure 34: Ten year trend in casualty crashes on North East Road

Rear end crashes account for more than half of casualty crashes occurring on North East Road, which is common for major metropolitan arterials, with signalised intersections and experiencing peak hour congestion. Right angle and right turn crashes are also common on North East Road, and combined make up 28% of casualty crashes.

Table 20: Casualty crash types occurring on North East Road between 2016 – 2020

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Rear End	254	248	6	0	288	6	0
Right Angle	75	66	9	0	92	9	0
Right Turn	65	62	3	0	77	3	0
Side Swipe	29	27	2	0	35	2	0
Hit Fixed Object	27	25	2	0	27	2	0
Hit Pedestrian	23	17	6	0	17	6	0
Roll Over	12	9	3	0	9	3	0
Hit Parked Vehicle	7	5	2	0	6	2	0
Head On	7	3	3	1	5	6	1
Left Road - Out of Control	1	0	1	0	0	1	0
Total	**500**	**462**	**37**	**1**	**556**	**40**	**1**

Casualty crash hotspots occur in Greenacres, Windsor Gardens and Gilles Plains, however the frequency of crashes is high along the entire corridor.

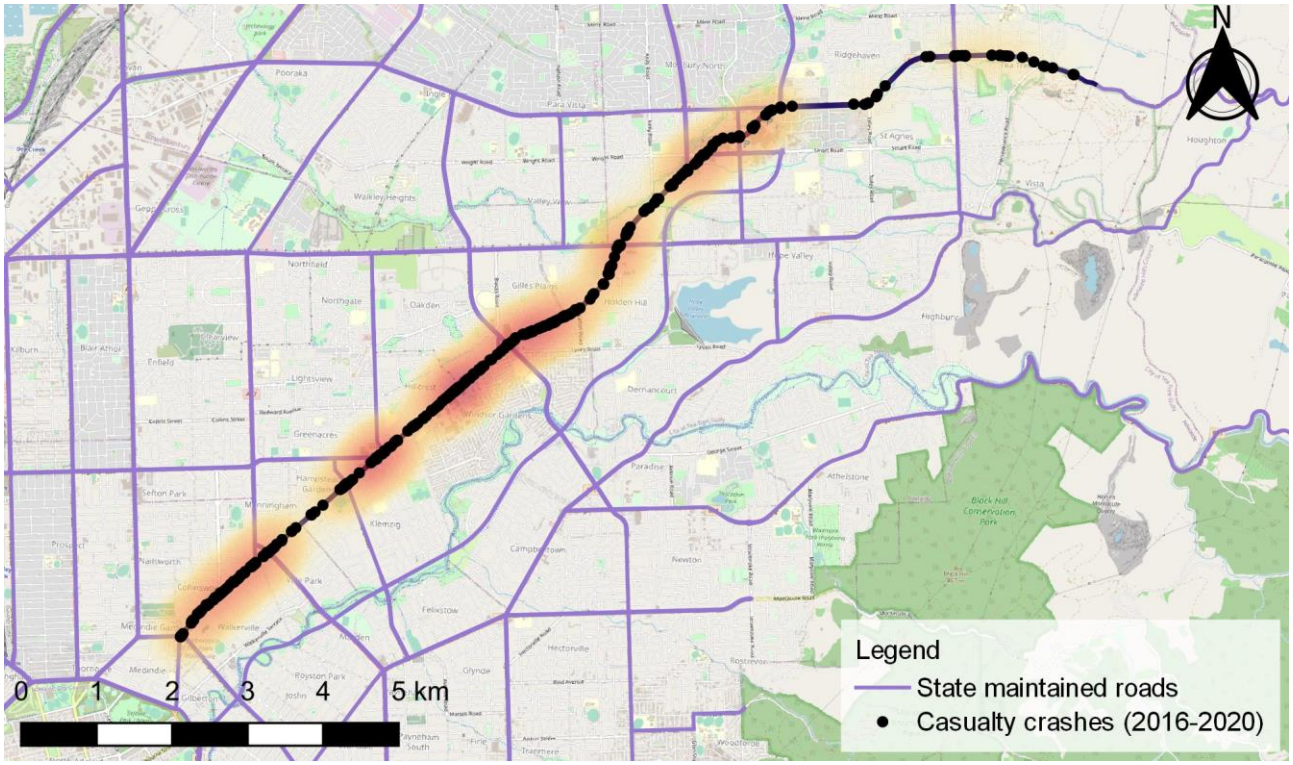


Figure 35: Heatmap of casualty crash locations on North East Road between 2016 and 2020

RAA welcomes works that commenced on 13 February 2022 to resurface North East Road between Hancock Road and Montague Road, which is one of the priority sections listed within this report.,

Sections to receive significant maintenance funding in recent years include between Sudholz Road and Tarton Road (2019/20), between Muller Road and O.G Road (2019/20), and the intersection with Grand Junction Road (2016/17).

Final comment

North East Road is one of Adelaide's busiest arterial corridors, providing the most direct link between Adelaide and the north eastern suburbs. Whilst the very popular and highly utilised River Torrens Linear Park an O-Bahn Bikeway run adjacent to the road corridor, about 1km south of North East Road, North East Road remains a popular cycling corridor as it provides a straight and direct route into the city for higher speed road cyclists.

Whilst cycle lanes are present in some places on the corridor, they are missing in critical locations, and scarcely provided through intersections. Locations lacking cycle lanes include:

- Between Hancock Road and Sudholz Road (incorporating 8 major intersections, and access to the start of the O-Bahn Bikeway)
- Between Fosters Road and Muller Road (incorporating both intersections)
- Southwest through the intersection with O.G Road
- Between Ascot Avenue and Nottage Terrace (incorporating 5 major intersections)

RAA acknowledges that installing cycle lanes at some of these locations will not be straightforward and will require changes to the cross-sectional carriageway width, intersection upgrades and potentially some service relocation works.

Improvements to the deteriorating road surface of North East Road are also required. Whilst the section between Golden Grove Road and Hancock Road is considered the highest priority section of North East Road, there are other areas requiring attention, such as the southwest bound carriageway between Grand Junction Road and Tarton Road.

Grand Junction Road, Sudholz Road to Hampstead Road

Metro ranking	10 (20 overall)			
Total nominations	12			
Top 3 issues	Potholes, cracks or rutting | Sunken utility pit covers | Poor or no road markings			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	32	32	5	1

In 2021, Grand Junction Road was nominated as the state's tenth riskiest metro road. This is the first time Grand Junction Road has featured in a Risky Roads top ten list.

Grand Junction Road is a metropolitan arterial corridor extending for 20km between Port Adelaide, on the coast, and Highbury, in the foothills. The road passes through the City of Tea Tree Gully and City of Port Adelaide Enfield, and parts of it form the boundary between the City of Charles Sturt and City of Port Adelaide Enfield.

Traffic volumes on Grand Junction Road are moderate to high, with the busiest section between Hampstead Road and the South Road Superway carrying between 32,000 and 38,000 vehicles per day. This part of Grand Junction Road forms part of the Outer Adelaide Ring Route and is a critical part of the National Land Transport Network, under the care and control of the Federal Government. This part also serves a crucial purpose to freight, forming part of the link between the South Eastern Freeway and the North-South Corridor.

The section between Sudholz Road and Hampstead Road carries about 28,000 vehicles per day.

The key issues raised in nominations for the road were related to maintenance, with potholes, cracks or rutting the most frequently nominated issue, followed by sunken utility pit covers. The top five issues nominated on the road included

1. Potholes, cracks or rutting 46% of nominations
2. Sunken utility pit covers 23% of nominations
3. Poor or no road markings 15% of nominations
4. Hazardous roadside objects 15% of nominations
5. Crumbling road edges 15% of nominations

Figure 36: Cracks and a pothole forming on Grand Junction Road in Northgate

Three quarters nominations for Grand Junction Road were for the undulating and poorly maintained section between Sudholz Road and Hampstead Road, in the vicinity of the Adelaide Women's Prison and Yatala Labour Prison.

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents mostly highlighted the undulating pavement between Sudholz Road and Hampstead Road, suggesting that pavement rehabilitation works were required.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Near Fire Station past Sudholz Rd, tree stumps close to road or on road are also hazardous."

"Between prison to Fosters Road lights towards the hillside, a couple of areas are very uneven."

"North East Road to Hampstead Road has been ignored for quite some time and has broken down considerably to the point of being dangerous to drive on."

"Many sections of undulating road. One in particular is very dangerous for heavier vehicles in the left lane near the new construction at the Adelaide Gaol. Grand Junction Road has been dug up that many times with burst water mains occurring often."

Question: What do you think would be the most effective way to reduce this risk?

"Completely redoing some of Grand Junction Road to fix dangerous sections. Testing and regular maintenance for on road hazards."

"Raise the manhole covers to road level."

"The road needs to be repaired and levelled."

Despite a somewhat sporadic casualty crash history, the general trend in casualty crashes on this section of Grand Junction Road looks to be increasing. 2019 was the worst year of the decade, recording 14 casualty crashes including one fatal crash and three serious injury crashes. Note that crashes at the intersections with Hampstead Road and Sudholz Road have not been included in the crash analysis for this road section.

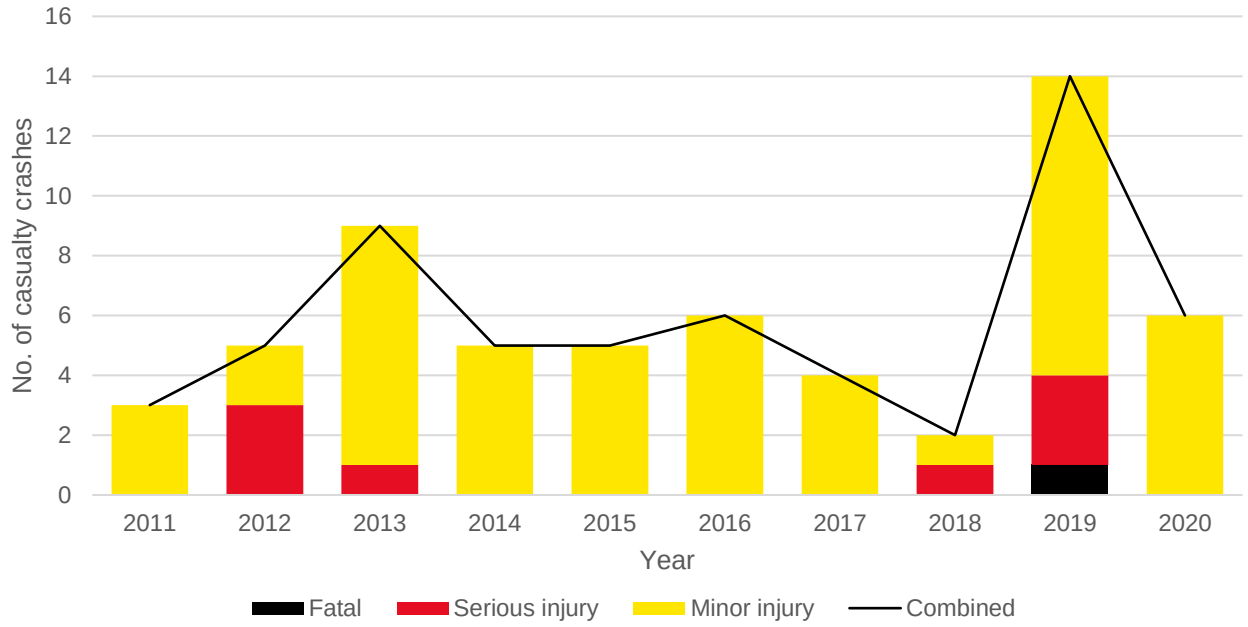


Figure 37: Ten year trend in casualty crashes on Grand Junction Road between Sudholz Road and Hampstead Road

Rear end crashes are the most commonly occurring crash type, making up almost two thirds of casualty crashes between Sudholz Road and Hampstead Road.

Table 21: Casualty crash types occurring on Grand Junction Road between Sudholz Road and Hampstead Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Rear End	20	20	0	0	20	0	0
Hit Fixed Object	3	2	1	0	4	1	0
Right Turn	2	2	0	0	2	0	0
Hit Pedestrian	2	1	0	1	1	1	1
Roll Over	1	0	1	0	0	1	0
Side Swipe	1	1	0	0	1	0	0
Hit Parked Vehicle	1	1	0	0	2	0	0
Head On	**1**	0	1	0	2	1	0
Right Angle	1	0	1	0	0	1	0
Total	**32**	**27**	**4**	**1**	**32**	**5**	**1**

Crash hotspots occur near the intersection with Fosters Road, and in the 500m section east of Hampstead Road. Thirty casualty crashes occurred at the Hampstead Road intersection. This intersection was upgraded in 2021 and RAA will be monitoring crash data to see whether this results in a lower number of crashes occurring at this location.

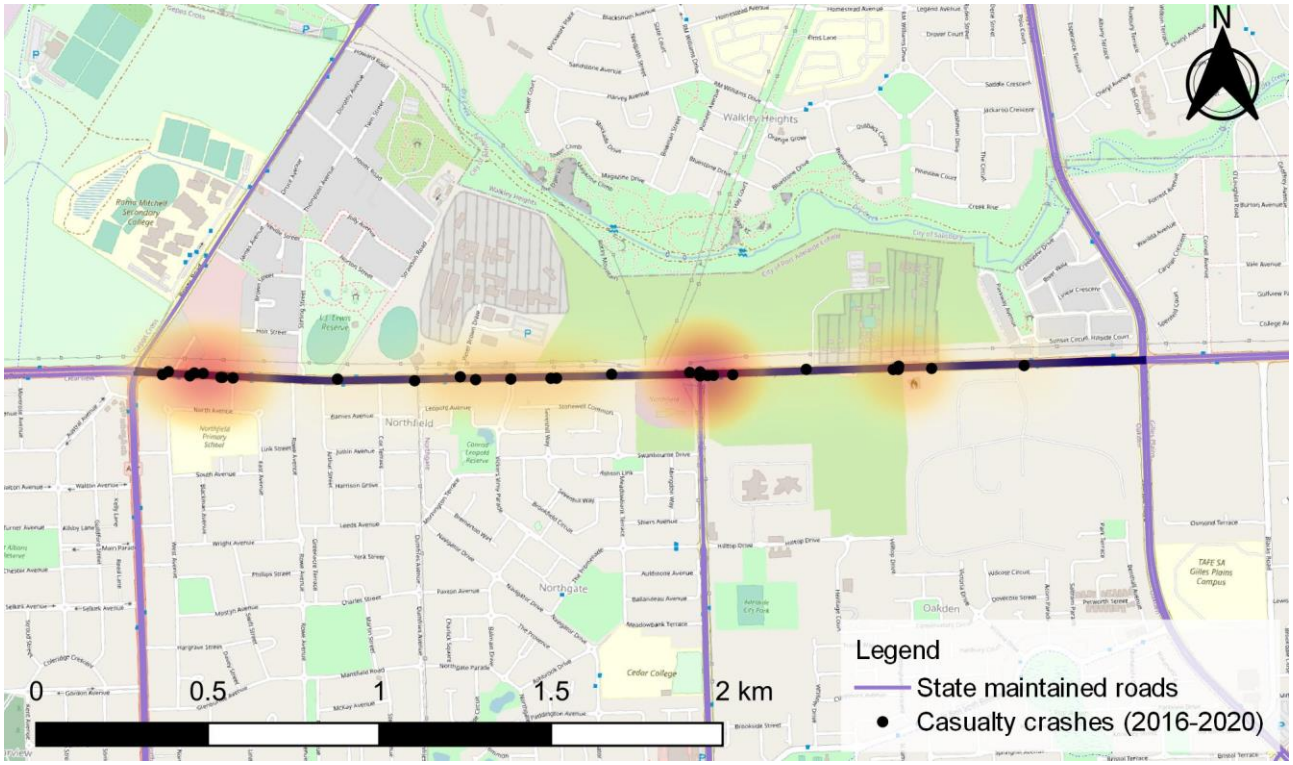


Figure 38: Heatmap of casualty crash locations on Grand Junction Road between Sudholz Road and Hampstead Road (2016-2020)

Pavement rehabilitation works were completed on this section in the 2014/15 financial year, however, these works have already deteriorated. This road section is currently listed for pavement rehabilitation works under DIT's forward program.

Final comment

The undulating surface of Grand Junction Road between Sudholz Road and Hampstead Road is largely due to the reactive soils in the area, and as such, localised resealing and surface improvement works will only have a short lifespan. Full depth pavement reconstruction is required to remediate this undulating road, and even once completed, the lifespan of these works may be shorter than usually expected.

The undulations are significant enough to cause loss of control, or to dislodge an unstable load, and funding for both short and longer term remedial works is required.

Top 10 regional roads

The top 10 nominated regional roads are listed in Table 9. Where roads were tied on an equal number of nominations, recent crash history, planned upgrades, traffic volumes, and RAA's prior assessments have been drawn on to rank them.

Table 22: Top 10 nominated regional roads in the 2021 Risky Roads survey

	Top 10 regional roads	Top three issues raised
1	Southern Ports Highway (Beachport to Millicent)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
2	Horrocks Highway (Gawler to Rhynie)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
3	Upper Yorke Road (Arthurton to Kulpara)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
4	Victor Harbor Road	Potholes, cracks or rutting | Lacks overtaking opportunities | Crumbling road edges
5	Princes Highway (Tailem Bend to Mt Gambier)	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
6	Owen Road	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
7	Inman Valley Road	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface
8	Long Valley Road	Lacks overtaking opportunities | Potholes, cracks or rutting | Inappropriate speed limit
9	Torrens Valley Road	Potholes, cracks or rutting | Rough, slippery or loose surface | Crumbling road edges
10	Goolwa Road	Potholes, cracks or rutting | Crumbling road edges | Lacks overtaking opportunities

Southern Ports Highway, Beachport to Millicent

Regional ranking	1 (2 overall)			
Total nominations	61			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	19	26	2	0

Southern Ports Highway is a regional highway extending for 106km along the coast between Kingston SE and Millicent, via Robe and Beachport. The highway is under the care and control of the Department for Infrastructure and Transport, and traverses three local government areas in Kingston DC, DC of Robe, and Wattle Range Council. The busiest section of the highway is between Beachport and Millicent, where it carries as many as 2,000 vehicles per day on average.

Southern Ports Highway returns to the top ten nominated regional roads for the first time since 2017, when it was nominated as SA's 5th riskiest regional road (10th overall). After the 2017 survey, $2.1m was spent on shoulder sealing and installation of audio tactile line marking, and the Highway did not feature in the top ten nominated roads in 2019.

Most nominations for Southern Ports Highway identified the section between Beachport and Millicent, with potholes, cracks or rutting, and crumbling road edges the most raised issues. Almost half of respondents identified a rough, slippery or loose surface, and more than one quarter found that unsealed shoulders contributed to the risk. The top five issues raised by respondents were:

1. Potholes, cracks or rutting, in 97% of nominations
2. Crumbling road edges, in 91% of nominations
3. Rough, slippery or loose surface, in 44% of nominations
4. Unsealed road shoulders, in 27% of nominations
5. Lacks overtaking opportunities, in 13% of nominations

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted the poor condition, but also frequently raised that the road is highly used by tourists, and in particular caravans – which can be difficult to overtake. To reduce risk, respondents suggested several improvements including road reconstruction and widening, overtaking lanes and turn lanes at intersections.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"It is very dangerous with animals and oncoming traffic, the road is treacherous as it is not wide enough to be safe."

"No passing lanes, heavy use over summer to nearby beaches and towns (Caravans, mobile homes, lobster buyers trucks and vans). Also frequent touring cyclists."

"From Beachport to Millicent, this road is meant to represent a highway. It is a very poor extremely unsafe road, it damages your car tyres and steering with the amount of pitches, crumbling sides - they aren't even painted so unsafe at night also. This highway has no turning lane into Southend, very dangerous. Also no overtaking lanes. This highway is a tourist hotspot area, so it's not just local traffic, it's trucks, transport, holiday makers that use this unsafe one lane highway."

Question: What do you think would be the most effective way to reduce this risk?

"The road requires a complete remake. Not just more "patch ups" which have occurred over recent years."

"Quicker repairs. Renewed bitumen of worst sections. Aprons to widen road past the white lines so safer edges. Better bitumen mix or drainage."

"Total resurface and extending the width and having over taking and turning lanes."

In 2019, RAA undertook a regional road assessment in the Limestone Coast region[8], which included several recommendations to improve safety on the Southern Ports Highway as a result of community feedback received through this assessment. These recommendations included additional shoulder sealing in various locations, pavement rehabilitation and reconstruction, bridge widening and intersection upgrades.

The number of crashes on Southern Ports Highway over the decade between 2011 and 2020 has tended to decline, particularly in relation to fatal and serious crashes, with only two FSI crashes recorded between 2016 and 2020, in contrast to 15 occurring between 2011 and 2015.

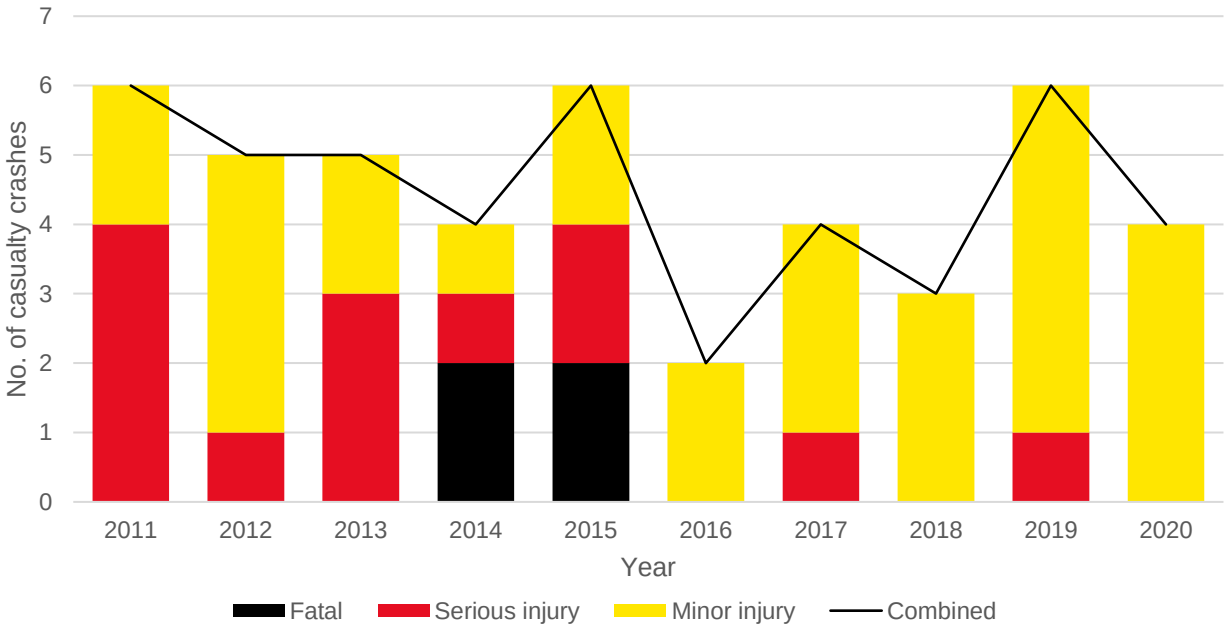


Figure 39: Ten year trend in casualty crashes on Southern Ports Highway between Beachport and Millicent

Between 2016 and 2020, single vehicle run off road crash types were the most frequently occurring crashes on the Southern Ports Highway, accounting for 58% of casualty crashes. There was a total of 19 casualty crashes that occurred between Beachport and Millicent, resulting in 26 people sustaining minor injuries and two people sustaining serious injuries.

[8] RAA, 2019, *Regional Road Assessment: Limestone Coast – 2019 Report*, accessed at <www.raa.com.au/roadassessments>.

Table 23: Casualty crash types occurring on Southern Ports Highway between Beachport and Millicent (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Roll Over	6	6	0	6	0
Hit Fixed Object	4	4	0	5	0
Right Angle	2	2	0	2	0
Hit Animal	2	1	1	2	1
Right Turn	1	1	0	6	0
Head On	1	1	0	1	0
Side Swipe	1	1	0	2	0
Left Road - Out of Control	1	1	0	1	0
Rear End	1	0	1	1	1
Total	**19**	**17**	**2**	**26**	**2**

Between 2016 and 2020, 58% of all casualty crashes occurred on the section between Beachport and Millicent, highlighted by the heatmap in Figure 40, which shows the location of all casualty crashes along the highway over this time.

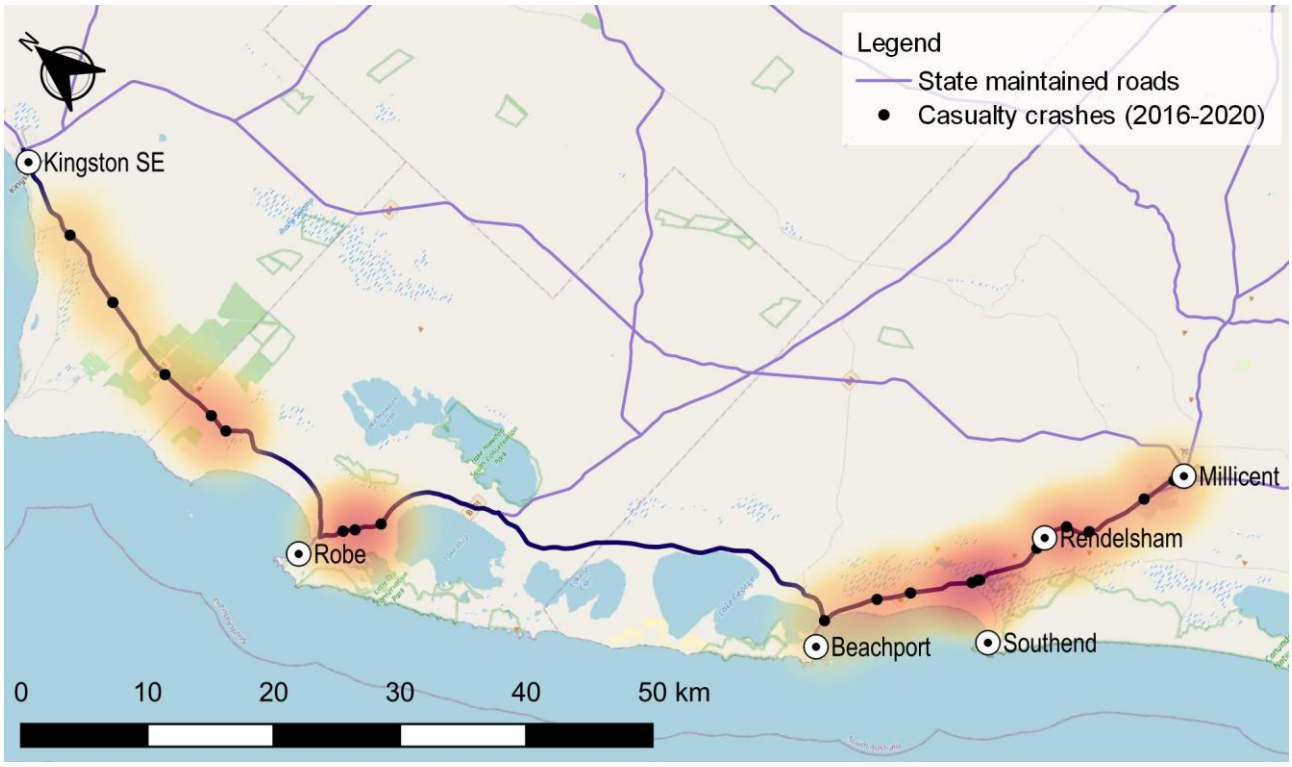


Figure 40: Heatmap of casualty crash locations on Southern Ports Highway between 2016 and 2020

Final comment

Survey respondents criticised the poor condition of Southern Ports Highway, particularly between Millicent and Beachport. RAA is not aware of any major works currently planned to address these issues. Pavement rehabilitation and reconstruction, as necessary, should be undertaken as a matter of urgency to ensure that these concerns are addressed in a timely manner.

Additional maintenance funding for the states regional road network is a key element of RAA's advocacy. In the lead up to the 2022 state election, RAA are calling for a four-year road maintenance fund with a minimum value of $600m to address the significant maintenance backlog across the state.

RAA have scheduled a site investigation in March 2022 to review the current condition of the entire Southern Ports Highway, and will be forwarding the findings of this review to the Department for Infrastructure and Transport.

Horrocks Highway, Gawler to Rhynie

Regional ranking	2 (3 overall)			
Total nominations	49			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	39	45	9	0

Horrocks Highway is a regional highway extending for 283km between Gawler on the fringe of the metropolitan Adelaide and Quorn, in the Flinders Ranges. The highway passes through many townships in the Clare Valley and Flinders Ranges regions and is critical to the tourism and agriculture industries which rely on the corridor to transport visitors and goods. The highway is under the care and control of the Department for Infrastructure and Transport, and traverses six local government areas - Light Regional Council, Clare and Gilbert Valleys Council, Wakefield Regional Council, Northern Areas Council, the DC of Mount Remarkable and the Flinders Ranges Council.

The section between Gawler and Clare is the busiest, with volumes varying between 1,800 and 6,500 vehicles per day. Volumes on road sections north of Clare are much lower with this part of the highway typically carrying fewer than 1,000 vehicles per day, on average.

Horrocks Highway is a repeat-offender in RAA Risky Roads surveys, with it being nominated as the state's riskiest regional road in both the 2017 and 2019 iterations of the survey. Following the 2017 survey, $55m in funding was announced to improve the highway, with a sizeable portion of these works completed in 2020 and 2021. In 2021, an additional $37m was included in the budget to improve the highway, taking the total commitment to at least $92m, at the time of writing this report.

Most survey respondents nominated a section of the highway only, with the majority of these raising the section between Gawler and Rhynie.

Most nominations for Horrocks Highway raised concerns with the road surface with potholes, cracks or rutting, and crumbling road edges the most frequently raised issues – both raised in more than half of nominations. A quarter of respondents also identified a lack of overtaking opportunities along the highway. The top five issues raised by respondents were:

1. Potholes, cracks or rutting, in 78% of nominations
2. Crumbling road edges, in 51% of nominations
3. Rough, slippery or loose surface, in 31% of nominations
4. Lacks overtaking opportunities, in 24% of nominations
5. Sunken utility pit covers, in 10% of nominations

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted the poor condition of the road, and a significant lack of overtaking opportunities. To reduce risk, respondents suggested that additional investment was needed to improve the road south of Rhynie, and that additional overtaking lanes were needed.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"It's disgusting from its southern end all the way through to about Rhynie. I know it is slowly being resurfaced at the Clare end, but even those areas are already lumpy and uneven!"

"The road is a constant talking point and not in a positive way. The whole road from Gawler to Rhynie needs serious attention. The area between Linwood and Templers is potholed, undulating and an extremely unpleasant area to drive through."

"So badly maintained this road is genuinely dangerous to use. Many people who have to travel to and from the Clare Valley go the long way via Port Wakefield Road rather than risk Horrocks Highway."

"This road is a very important access road to the Clare Valley. It carries a lot of traffic for tourists, locals, farmers and freight trucks. The surface is dreadful and there are long sections where overtaking is not an option."

"Undulating and potholes and trees from the caravan park into Clare. Large trees too close to the road, especially south from Rhynie to Macaw Creek turnoff. Resealing work in progress is good so far."

Question: What do you think would be the most effective way to reduce this risk?

"Re-do the whole road - including widening / overtaking lanes / make it suitable to take the amount of traffic it carries."

"Install guard rails and remove some trees that are 1.2m from edge of bitumen"

"Widen to a dual-lane highway with better marking and even sealed surface."

"Re-do the road. No band aid fixes, just re-do the whole road."

Figure 41: A section of Horrocks Highway between Rhynie and Tarlee assessed by RAA in September 2021

This feedback confirms the results of RAA's September 2021 review of the highway, where it was identified that pavement rehabilitation and reconstruction was still required between Gawler and Rhynie, acknowledging the substantial improvements made between Clare and Wilmington. Upgrades between Clare and Wilmington have included shoulder sealing, pavement rehabilitation and barrier installation, which have all contributed to a higher AusRAP star rating being achieved along this part of the corridor. An example of this is shown in Table 24 below, where the AusRAP star rating on the pictured section increased from one to three stars.

Table 24: Before and after star rating example on Horrocks Highway, near Laura

Site coordinates: -33.1624422,138.2975442 (facing north)	**Star rating**	**Comments**
Before upgrade (footage from 2015 RAA review): 	★☆☆☆☆ (24.31)	Positives • Good pavement condition • Narrow sealed shoulders • Wide lanes • Good delineation Negatives • Moderate curve • Trees 1-5m from edge • 100km/h speed limit
After upgrade (footage from 2021 RAA review): 	★★★☆☆ (11.64)	Positives • Good pavement condition • Moderate width sealed shoulders • Wide lanes • Good delineation • Safety barrier reducing exposure to hazards Negatives • Moderate curve • Trees 5-10m from edge • 100km/h speed limit

The trend in crashes on Horrocks Highway between Gawler and Rhynie over the decade between 2011 and 2020 has not experienced any significant upwards or downwards trend, with 39 casualty crashes recorded between 2016 and 2020, compared with 42 between 2011 and 2015.

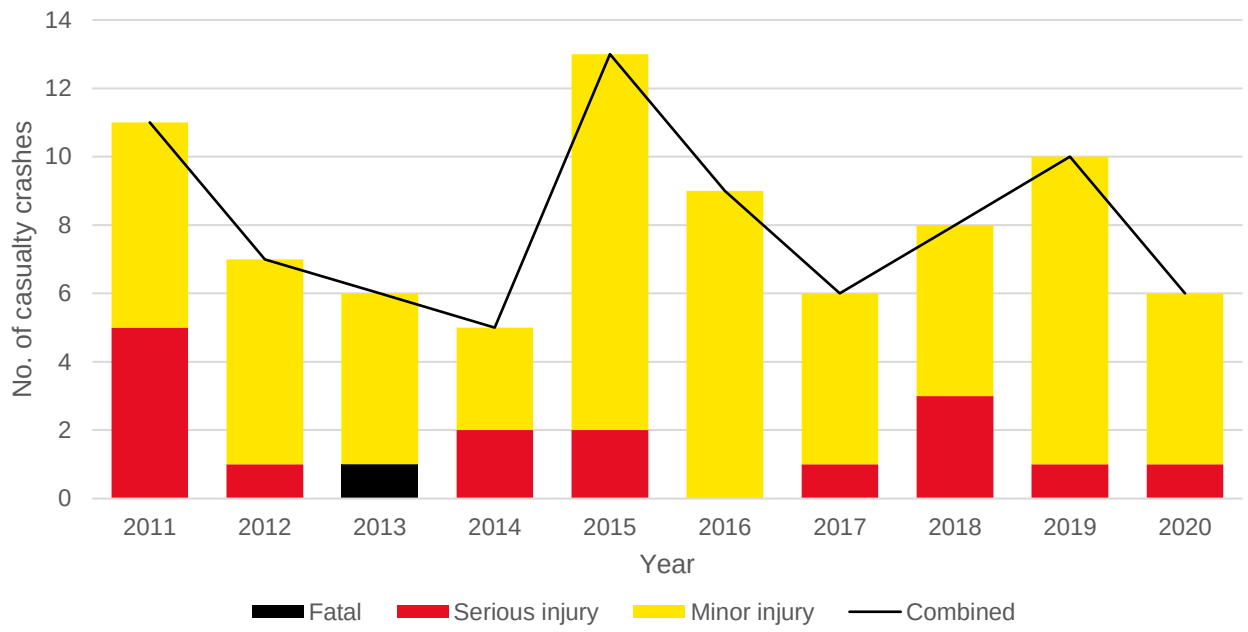


Figure 42: Ten year trend in casualty crashes on Horrocks Highway between Gawler and Rhynie

Between 2016 and 2020, 39 casualty crashes occurred between Gawler and Rhynie, with right angle and rear end crashes the most frequently occurring crash types, each making up 26% of crash types along this section of the highway.

Table 25: Casualty crash types occurring on Horrocks Highway (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Rear End	10	9	1	10	1
Right Angle	10	10	0	15	0
Hit Fixed Object	6	5	1	5	1
Roll Over	3	1	2	1	2
Side Swipe	2	2	0	2	0
Head On	2	1	1	5	3
Hit Object on Road	1	1	0	1	0
Hit Parked Vehicle	1	1	0	1	0
Hit Animal	1	1	0	1	0
Left Road - Out of Control	1	1	0	2	0
Other	1	0	1	0	2
Right Turn	1	1	0	2	0
Grand Total	**39**	**33**	**6**	**45**	**9**

Between 2016 and 2020, almost 40% of casualty crashes along Horrocks Highway occurred between Gawler and Rhynie, with a further 30% occurring between Rhynie and Clare. The locations of casualty crashes along the full length of the highway are shown in the heatmap in Figure 40.

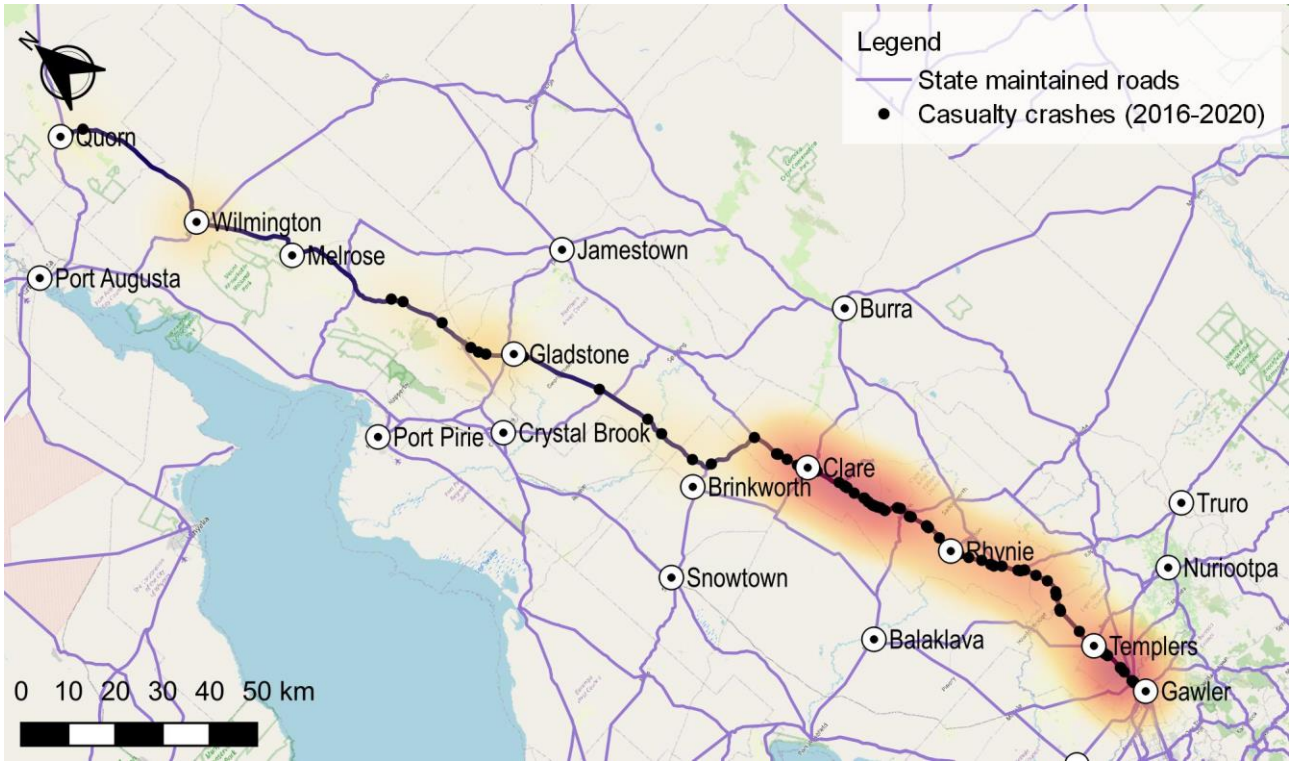


Figure 43: Heatmap of casualty crash locations on Horrocks Highway between 2016 and 2020

Final comment

Recently completed works between the Clare Valley and Wilmington have made a substantial improvement to safety along the northern part of Horrocks Highway, which has resulted in many road sections seeing an incremental increase in AusRAP star rating. This improvement is reflected by the number of nominations received in the 2021 survey, given that Horrocks Highway received more nominations than any other road in the 2019 survey, and in 2021 received far fewer nominations than in 2019, dropping from first overall to third overall.

The position of Horrocks Highway in the 2021 Risky Roads survey still indicates that South Australians are concerned about the poor condition Horrocks Highway, particularly between Templers and Rhynie. However, RAA is aware of $31m in pavement rehabilitation and reconstruction works planned for this section of the highway, as well as an additional $6.5m between Stone Cutter Road and Bungaree Road. There are also plans to construct up to six overtaking lanes between Gawler and Clare, which will further improve safety and efficiency along the highway. RAA is concerned that the current funding allocation will still not be sufficient to rectify all the surface issues on this section and will continue to monitor progress on these highly important works.

Additional maintenance funding between Gawler and Templers is one of four high-priority regional road maintenance projects RAA are advocating for in our 2022 state election campaign. This would ideally be addressed as part of a four-year road maintenance fund with a minimum value of $600m.

Upper Yorke Road, Kulpara to Arthurton

Regional ranking	3 (5 overall)			
Total nominations	35			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	2	4	0	0

Upper Yorke Road is a regional arterial road extending approximately 103km between Port Broughton and Maitland, on the Yorke Peninsula and passes through the townships of Bute, Kulpara and Arthurton. The highway is under the care and control of the Department for Infrastructure and Transport, and traverses areas of the Barunga West Council and Yorke Peninsula Council.

RAA is very familiar with Upper Yorke Road, given the Bute to Kulpara section was nominated as the state's second riskiest regional road in our 2013 Risky Roads survey, and the Maitland to Arthurton section nominated as the fourth riskiest regional road in our 2019 survey. In both cases, RAA welcomed much needed upgrades to both road sections shortly after, including:

- a $9m upgrade between Bute and Kulpara, undertaken between 2015 and 2017, and
- a $6m upgrade between Maitland and Arthurton completed in 2021.

Figure 44: The section between Arthurton and Maitland is significantly safer following an upgrade in 2021

The 2021 upgrade between Arthurton and Maitland has improved the typical AusRAP star rating of this section from one star to three stars, which will substantially reduce the likelihood of serious and fatal crashes occurring.

The road was also frequently raised by the Yorke Peninsula community and assessed in full as part of RAA's *2019 Yorke Peninsula Regional Road Assessment*[9].

[9] RAA, 2019, *Yorke Peninsula Regional Road Assessment: April 2019*, accessed at <www.raa.com.au/roadassessments>.

In this 2021 iteration of the survey, most nominations for Upper Yorke Road specifically called out the section between Kulpara and Arthurton. This section connects the two previously nominated, and upgraded sections of Upper Yorke Road, and remains in a poor state. Nominations raised concerns with the road surface with potholes, cracks or rutting, and crumbling road edges the most frequently raised issues. The top five issues raised by respondents were:

1. Potholes, cracks or rutting, in 83% of nominations
2. Crumbling road edges, in 77% of nominations
3. Rough, slippery or loose surface, in 57% of nominations
4. Narrow road, lanes or bridges, in 23% of nominations
5. Unsealed road shoulders, in 14% of nominations

Figure 45: Upper Yorke Road is very narrow with an unforgiving roadside between Kulpara and Arthurton

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents mostly highlighted their concerns about the narrow road, and challenges when encountering heavy vehicles and caravans. To reduce risk, respondents mostly suggested that road widening and shoulder sealing was required, and that pavement rehabilitation or reconstruction was also needed. Many respondents also acknowledged the significant road improvement that had just been completed between Maitland and Arthurton.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"For the most of this section the road is only just 5m wide with shocking shoulders. It is a main haul road for local farmers and two trucks cannot safely pass each other without dropping wheels onto the shoulders. It's a main route for the Kadina school bus and it's not a nice road at all."

"It is very dangerous when towing a caravan or boat when there is oncoming traffic, especially B-double trucks and farmers towing machinery equipment as the road is very narrow and extremely bumpy. The road is very narrow and there is no room to move over."

"Aged, outdated road that is a patchwork of varying quality and aged patches and potholes a hazard to drive on."

Question: What do you think would be the most effective way to reduce this risk?

"Immediately rework the shoulders of the road with a five-year plan to replace the bitumen like they have just completed from Arthurton to Maitland. This road has never in my 34-year life had major works completed. Only ever patch work."

"Do the same to this road as what has been done to the road from Arthurton to Maitland which is now a dream to drive."

"Time to re-do the roadway to current specs, need a decent width roadway so everyone however especially heavy vehicles can drive the road safely."

Only two casualty crashes occurred on Upper Yorke Road between 2016 and 2020, however this does not imply that the road is safe. This section of Upper Yorke Road carries very low traffic volumes, with 120 vehicles per day using the road on average, and about 14% of this traffic is commercial vehicles, with the route gazetted for b-double use.

Table 26: Casualty crash types occurring on Upper Yorke Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Roll over	1	1	0	1	0
Right angle	1	1	0	3	0
Total	**2**	**2**	**0**	**4**	**0**

Final comment

Upper Yorke Road is a narrow road with very poor curvilinear geometry. RAA last assessed this corridor in 2019 as part of our *2019 Yorke Peninsula Regional Road Assessment*[10], where 2.7m wide lanes and unsealed shoulders were the typical geometry along this section. A review in January 2022 indicated that some sections had only 5.3m of sealed road for which to travel. The 2019 assessment identified this as the poorest section of Upper Yorke Road, and failures identified included potholes, cracks, rutting and edge break up, with significant investment required to bring it to a safe and acceptable standard.

RAA's key recommendation of this assessment was to fully reseal and widen this part of Upper Yorke Road, to provide 3.3m wide lanes and 1.0m wide sealed shoulders between Kulpara and Maitland. RAA welcomes the recent completion of this work between Maitland and Arthurton, however the 35km section between Arthurton and Kulpara remains in poor condition.

[10] RAA, 2019, *Yorke Peninsula Regional Road Assessment: April 2019*, accessed at <www.raa.com.au/roadassessments>.

Victor Harbor Road

Regional ranking	4 (7 overall)			
Total nominations	28			
Top 3 issues	Potholes, cracks or rutting | Lacks overtaking opportunities | Crumbling road edges			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	110	127	35	9

Victor Harbor Road is a major rural arterial corridor under the care and control of the Department for Infrastructure and Transport. Victor Harbor Road extends for 47km between Main South Road in Old Noarlunga and Port Elliot Road in Hayborough (including Adelaide Road) and is the primary route between Adelaide and Victor Harbor. While the road bypasses McLaren Vale and Willunga, both with grade separated interchanges, it continues through the township of Mount Compass.

Victor Harbor Road carries high daily traffic volumes, which taper off as the road continues south towards Victor Harbor. Average daily volumes as of 2021 are approximately:

- 25,000vpd between Old Noarlunga and McLaren Vale
- 14,000vpd between McLaren Vale and Willunga
- 12,000vpd between Willunga and Mount Compass
- 6,700vpd between Mt Compass and Victor Harbor

Victor Harbor Road first featured in RAA's Risky Roads survey in 2019, where it was nominated as the state's third riskiest regional road, with a lack of overtaking opportunities the most highly raised issue at the time, and many calls for road duplication. The Old Noarlunga to McLaren Vale duplication was announced just prior to the 2019 survey, in April 2019.

Whilst a lack of overtaking opportunities was raised again in 2021, and some respondents suggested that full duplication was required, the primary concern raised with Victor Harbor Road was in relation to road maintenance. In 59% of nominations, potholes, cracks or rutting was raised as an issue, ahead of overtaking opportunities, which was raised in 28% of nominations. The top five issues nominated on Victor Harbor Road included:

1. Potholes, cracks or rutting, in 59% of nominations
2. Lacks overtaking opportunities, in 28% of nominations
3. Crumbling road edges, in 19% of nominations
4. Tight curves or blind crests, in 19% of nominations
5. Lacks median strip or separation from oncoming traffic, in 16% of nominations

Figure 46: Sections of Victor Harbor Road between McLaren and Willunga are in poor condition

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted that the surface was in poor condition, particularly between McLaren Vale and Willunga. Concerns about road drainage, alignment, and poor driver behaviour were also raised. To reduce risk, respondents suggested improved maintenance, clearance of roadside vegetation, changes to speed limits, more overtaking lanes, centre barriers and ultimately full duplication.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Highly used Road. Poorly maintained. Surface crumbling and potholes developing."

"Extremely poor surface with cracking which allows water to damage road further. Cause is heavy freight coming from Mount compass sand mine, fertiliser plant, and stock trucks."

"Road surface/alignment number of lanes/overtaking possibilities totally inadequate. Separation with oncoming traffic at overtaking lanes inadequate, and dangerous. Band aid measures like guardrail and rumble strips do not fix problem."

"We have seen too many times seen vehicles in opposite lanes overtaking at high speed and nearly impacting. We have seen a vehicle swerve to avoid oncoming vehicles and lose control and end up on the shoulder."

Question: What do you think would be the most effective way to reduce this risk?

"Reduce roadside vegetation, widen the existing road, improve water runoff, upgrade painted lines."

"Reduce speed down from 100km/h to 80km/h."

"Dual lanes in both directions with preferably a medium strip separating the outside lanes or alternatively a wire rope barrier separating the lanes."

"Double lanes each way. If 1 is too expensive, (as I'm sure it is) more passing lanes."

The total number of casualty crashes occurring each year on Victor Harbor Road has generally increased over the past decade, and has tended to plateau in recent years. However, seven lives were lost in five fatal crashes between 2018 and 2020. This is compared to five lives lost on the road between 2011 and 2017.

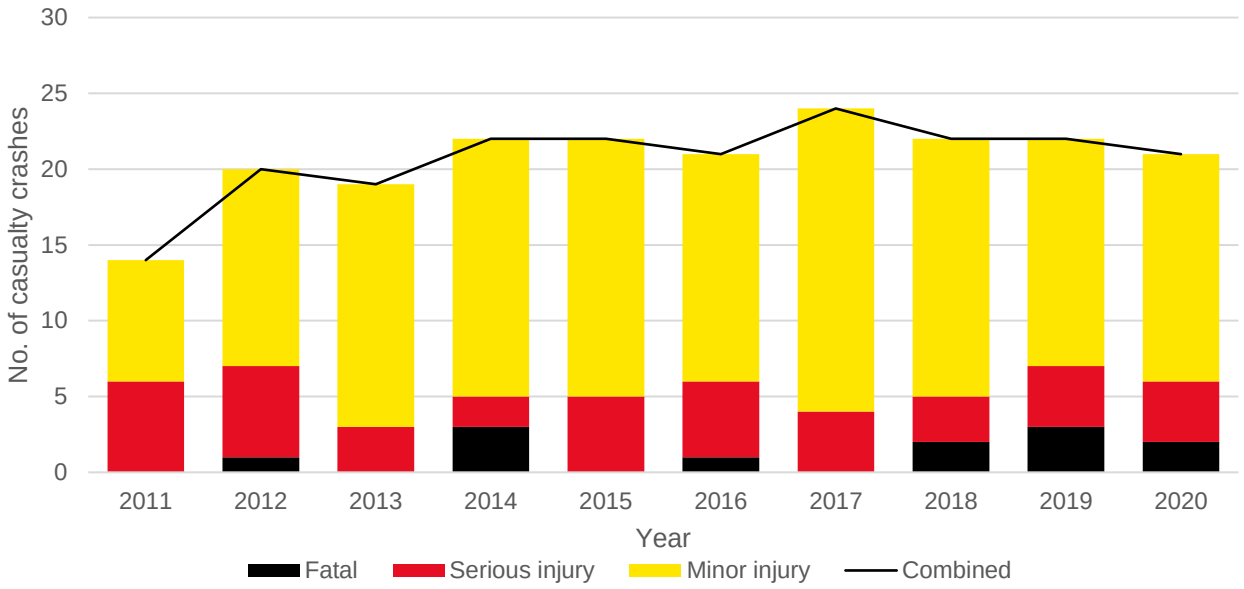


Figure 47: Ten year trend in casualty crashes on Victor Harbor Road

Between 2016 and 2020, rear end crashes were the most common crash type on Victor Harbor Road, accounting for 23% of all casualty crashes on the road. These are also most prominent on the busiest section between Old Noarlunga and McLaren Vale. Overall, rear end crashes only make up 11% of FSI crashes on the road. Head on crashes are a high cause for concern, and account for 39% of FSI crashes, whilst making up only 10% of all casualty crashes over this time.

Table 27: Casualty crash types occurring on Victor Harbor Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Rear End	25	22	3	0	27	4	0
Hit Fixed Object	23	18	4	1	23	4	1
Right Angle	23	21	2	0	39	3	0
Head On	17	6	7	4	22	17	5
Roll Over	6	3	2	1	3	2	1
Side Swipe	5	4	1	0	5	2	0
Hit Animal	3	3	0	0	4	0	0
Right Turn	3	2	0	1	6	0	1
Hit Parked Vehicle	2	1	1	0	2	2	0
Other	1	1	0	0	1	0	0
Left Road - Out of Control	1	1	0	0	1	0	0
Hit Pedestrian	1	0	0	1	1	1	1
Total	**110**	**82**	**20**	**8**	**127**	**35**	**9**

The section between Old Noarlunga and McLaren Vale is a crash hotspot, with more than one quarter of casualty crashes on the road occurring on this 4km road section. Thankfully, this section is flagged for duplication with construction to commence in 2022.

Almost half of casualty crashes on Victor Harbor Road occurred between Mount Compass and Victor Harbor, which gives it the highest crash rate per vehicle kilometre travelled. Traffic volumes on this section of Victor Harbor Road are about 25% of the volume between Old Noarlunga and McLaren Vale, and 50% of the volume between McLaren Vale and Mount Compass.

Figure 48: Heatmap of casualty crash locations on Victor Harbor Road

The most significant Victor Harbor Road upgrade in recent history is due to commence in 2022, with the road to be duplicated between Old Noarlunga and McLaren Vale, at an approximate cost of $92m. Furthermore, a planning study on an upgrade between McLaren Vale and Willunga was underway at the time of writing this report.

Other recently completed, or planned upgrades include:

- $600k upgrade at the intersection with Goolwa Road in Mount Compass (completed 2020)
- $3m for 3.5km of resurfacing between Willunga and Mount Compass (completed 2021)
- Additional overtaking lane (due for construction in 2022)
- Audio tactile line marking (completed 2021)
- Barrier installation between Mount Compass and Victor Harbor (completed 2021)

Final comment

Victor Harbor Road is notorious for serious crashes, despite being built to a higher standard than most other roads in the Fleurieu Peninsula. Due to having significantly higher traffic volumes than other roads in the area, the likelihood of being involved in a serious crash involving another vehicle is much higher. This is highlighted by crash statistics that show almost 70% of crashes on Victor Harbor Road involve multiple vehicles, compared to 40% for the rest of the Fleurieu Peninsula region.

RAA assessed the corridor as part of our *2021 Victor Harbor Road Highway* Assessment[11], following a high amount of feedback during our concurrent Fleurieu Peninsula Regional Road Assessment. This highway assessment resulted in 14 recommendations, including installation of overtaking lanes, pavement rehabilitation, road widening and central barrier between Mount Compass and Victor Harbor, intersection upgrades at Goolwa Road, Crows Nest Road and Hindmarsh Tiers Road, and future duplication planning studies.

As part of our 2022 state election campaign, RAA is calling for a commitment to implement these recommended road safety improvements along the length Victor Harbor Road.

RAA welcomes safety advances along the corridor implemented since the release of this report which include installation of additional barries and ATLM (Audio Tactile Line Marking), as well as the commencement of a corridor planning study which is looking at the feasibility of future improvements between McLaren Vale and Willunga, which may include duplication.

[11] RAA, 2021, *Highway Assessment: Victor Harbor Road – May 2021*, accessed at <www.raa.com.au/roadassessments>.

Princes Highway, Tailem Bend to Mount Gambier

Regional ranking	5 (8 overall)			
Total nominations	27			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	78	82	34	6

Absent from the top 10 regional roads list in the 2019 Risky Road survey, Princes Highway returns to the top 10 list of regional roads for the first time since 2017, where it was nominated as South Australia's second riskiest regional road with most nominations for the section between Kingston SE and Millicent. This contrasts with the 2021 survey results, where the Tailem Bend to Kingston SE and Millicent to Mount Gambier sections were most frequently raised, after substantial upgrades to the Kingston SE to Millicent section in recent years.

Princes Highway is a regional arterial highway under the care and control of the Department for Infrastructure and Transport. The highway extends for 370km between Murray Bridge and the Victorian border via Tailem Bend, Meningie, Kingston, Millicent and Mount Gambier. The highway traverses seven local government areas and is important to industry and tourism in both the Murraylands and Limestone Coast regions of the state.

Surface condition was the primary issue raised in the Risky Roads survey, particularly between Tailem Bend and Kingston, and between Millicent and Mount Gambier. Potholes, cracks or rutting were identified in 77% of nominations, and crumbling road edges in 73% of nominations for the highway. Almost one quarter of survey respondents indicated that the highway did not have enough overtaking opportunities. The top five issues nominated on the road included:

1. Potholes, cracks or rutting, in 77% of nominations
2. Crumbling road edges, in 73% of nominations
3. Rough, slippery or loose surface, in 40% of nominations
4. Lacks overtaking opportunities, in 23% of nominations
5. Unsealed road shoulders, in 17% of nominations

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents mostly highlighted the poor condition of the road, with several mentions of freight interactions and limited overtaking opportunities. To reduce risk, respondents suggested that major pavement work was required between Tailem Bend and Kingston, and between Millicent and Mount Gambier. Several respondents also called for additional overtaking lanes, especially between Tailem Bend and Kingston, where there is currently only one in each direction over almost 200km.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Road surface along most of the road between Millicent and Mount Gambier has large potholes ranging from small to very large over 30-60cm wide. These potholes are along the edges, driving lines and centre of road surface. The local tyre dealers have mentioned they are having an higher than normal amount of people coming in with tyres that need replacing more often and with road damage caused by pot holes."

"This road between Tailem Bend and Kingston is terrible. It is narrow and of poor quality with limited passing opportunities, potholes, undulations, poor edging."

"A busy Tourist and transport highway which has many kilometresm of very undulating, rough surface making driving difficult for those towing trailers and caravans, along with trucks. Also uncomfortable for everyday motorists. Not welcoming to the many tourists who visit the region."

Question: What do you think would be the most effective way to reduce this risk?

"Resurface and add overtaking lanes."

"Decent extended shoulders, not only provide for safer run off from the lane for all vehicles but move the water run off further out to stop soft edges being broken away by trucks."

"More money should be allocated and spent on maintenance and clearing wide, treeless verges on all roads (not planting shrubs and trees close to edges of roads to harbour wildlife!)."

There has been no significant upwards or downwards shift in the total annual number of casualty crashes occurring on this section of the Princes Highway over the past decade, although crash data from 2019 and 2020 shows these two years to be the lowest for the decade. There does appear to have been a reduction in FSI crashes in the second half of the decade, with an average of 7 per year between 2011 and 2015 reducing to an average of 5.4 per year between 2016 and 2020.

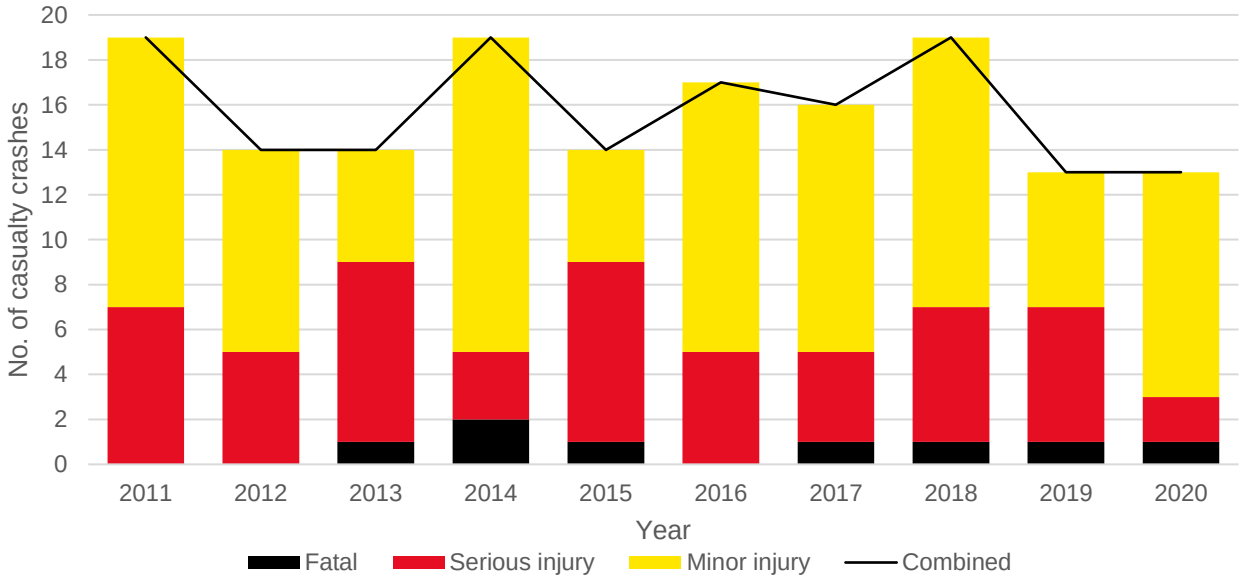


Figure 49: Ten year trend in casualty crashes on Princes Highway between Tailem bend and Mt Gambier

Single vehicle run off road crashes account for more than half of casualty crashes occurring on this section of Princes Highway, with hit fixed object and roll over the most prominent. Head on crashes are concerningly the third most frequently occurring crash type along this section of the highway, and despite making up 10% of casualty crashes, they have caused one third of serious injuries and fatalities.

Table 28: Casualty crash types occurring on Princes Highway between Tailem Bend and Mt Gambier (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Hit Fixed Object	23	15	7	1	20	8	1
Roll Over	15	11	4	0	18	6	0
Head On	8	3	3	2	6	9	4
Hit Animal	6	4	2	0	4	2	0
Right Angle	6	5	1	0	8	1	0
Side Swipe	5	4	1	0	2	3	1
Rear End	5	1	3	1	11	1	0
Right Turn	4	3	1	0	8	3	0
Hit Parked Vehicle	2	2	0	0	2	0	0
Left Road - Out of Control	2	1	1	0	1	1	0
Other	1	1	0	0	1	0	0
Hit Pedestrian	1	1	0	0	1	0	0
Total	**78**	**51**	**23**	**4**	**82**	**34**	**6**

The busiest section of the highway, between Millicent and Mount Gambier had the highest occurrence of casualty crashes between 2016 and 2020. This was followed by a section along the Coorong, approximately half-way between Meningie and Kingston SE.

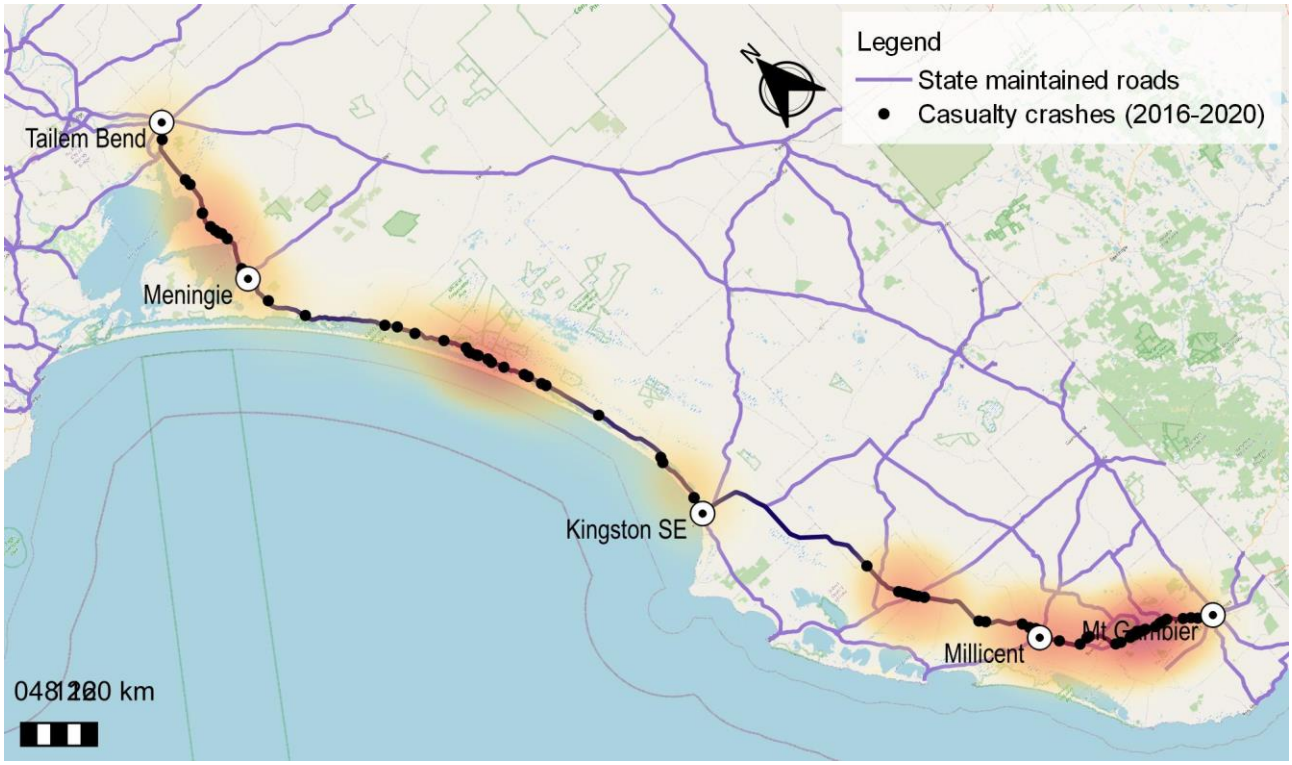


Figure 50: Heatmap of casualty crash locations on Princes Highway between Tailem Bend and Mount Gambier

In 2021, $9m of shoulder sealing was completed between Kingston SE and Millicent, which has made a noticeable improvement along this section of the highway, nominated as South Australia's second riskiest regional road in 2017.

Furthermore, a total of $250m is being invested along the Princes Highway corridor over the next several years which should substantially improve the safety and ride quality of this important highway.

Final comment

RAA is aware of the $250m funding commitment to upgrade infrastructure along the Princes Highway corridor in SA. This total length of this corridor is about 430km between Adelaide and Victoria (South Eastern Freeway/Princes Highway), and an additional 260km between Virginia and Port Augusta (Port Wakefield Road/Augusta Highway). This funding is being flagged for many upgrades including intersection upgrades, overtaking lanes, barrier and centreline treatments, shoulder sealing, pavement improvements, rest areas and bridge widening.

RAA has previously provided feedback to the federal government as part of the Princes Highway Corridor consultation phase in 2019, highlighting the key recommendations of our 2019 corridor review as part of our 2019 Limestone Coast Regional Road Assessment[12]. RAA outlined 34 recommendations for the Princes Highway as part of this report, including additional maintenance, overtaking lanes, intersection upgrades, bridge widening, pavement rehabilitation, lane and shoulder widening.

[12] RAA, 2019, *Regional Road Assessment: Limestone Coast – September 2019*, accessed at <www.raa.com.au/roadassessments>.

Owen Road

Regional ranking	6 (10 overall)			
Total nominations	22			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	9	9	1	1

Owen Road makes its third appearance in RAA Risky Roads surveys, with it being nominated as the state's third riskiest regional road in 2017 and second riskiest regional road in 2019. Despite continued advocacy to see significant pavement rehabilitation undertaken on Owen Road, there have been minimal commitments to major works along most of the corridor, other than about 5km of pavement rehabilitation and shoulder sealing north of Hamley Bridge in 2018.

Owen Road is a regional corridor extending for 44km between Templers and Balaklava in the Adelaide Plains region of the state. The highway passes through Hamley Bridge and Owen and is critical to the agriculture industry in region, with the corridor important for the transport of farm machinery and goods and provides direct link to the Bowmans intermodal facility on Balaklava Road. The road is under the care and control of the Department for Infrastructure and Transport, and spans parts of the Light and Wakefield Regional Councils.

Figure 51: Previous minor repairs have not held up well along Owen Road

Figure 52: Major pavement failures such as the one pictured above (December 2021) appear regularly on Owen Road

The majority of nominations raised concerns about the road surface with potholes, cracks or rutting, and crumbling road edges raised in almost every nomination. Unsealed road shoulders were also raised in more than one quarter of nominations for Owen Road. The top five issues raised by respondents were:

1. Potholes, cracks or rutting, in 100% of nominations
2. Crumbling road edges, in 96% of nominations
3. Rough, slippery or loose surface, in 63% of nominations
4. Unsealed road shoulders, in 29% of nominations
5. Narrow or uneven footpath, in 13% of nominations

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted the poor condition of the road, coupled with high freight volumes. To reduce risk, respondents suggested that major improvements were needed as repairs have not been satisfactory, as confirmed in Figure 51 and Figure 52.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Narrow road so can't dodge the potholes."

"New Northern Expressway has increased regional traffic on this route. Rural, industrial and commercial heavy vehicles share road with local traffic and commuters."

"In desperate need of repair, has been since Pinery fires melted the road."

"Because of the bad state of the road it is crumbling and is only getting worse.in the middle of the lanes it has lumps that could cause a motorcyclist to become unbalanced if they hit it."

Question: What do you think would be the most effective way to reduce this risk?

> “The road has been neglected for more than 40 years. it needs to be fixed.”
>
> “Redo whole road. It floods really bad with not much rainfall.”
>
> “The entire road needs redoing not just patches that explode in the heat and with the weight of trucks.”
>
> "Total re-build. Resurface at very least. Local reactive soils combined with high traffic, poor maintenance and a 100km/h speed limit make this road one of the worst in SA."

The has been no upward or downward long-term trend in crashes on Owen Road over the decade between 2011 and 2020, with nine casualty crashes recorded between 2016 and 2020, and nine recorded between 2011 and 2015.

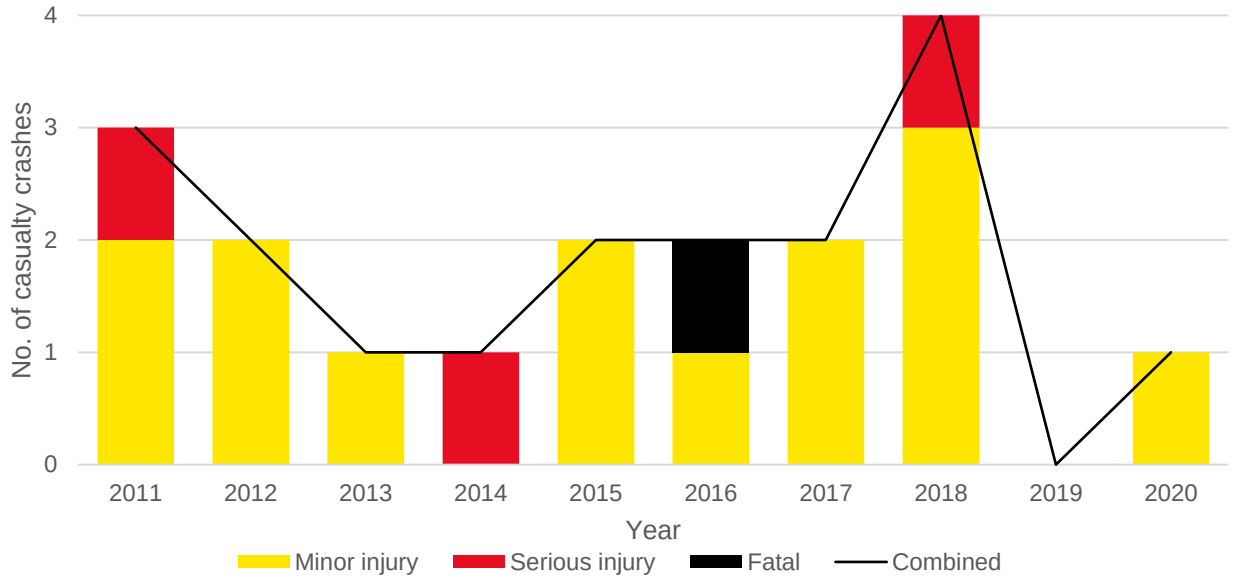


Figure 53: Ten year trend in casualty crashes on Owen Road

Of the nine casualty crashes occurring between 2016 and 2020, collisions with fixed objects were the most frequently occurring type, accounting for 44% of crashes.

Table 29: Casualty crash types occurring on Owen Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Hit Fixed Object	4	2	1	1	2	1	1
Hit Animal	2	2	0	0	2	0	0
Right Angle	1	1	0	0	2	0	0
Roll Over	1	1	0	0	2	0	0
Left Road - Out of Control	1	1	0	0	1	0	0
Total	**9**	**7**	**1**	**1**	**9**	**1**	**1**

These crashes were fairly evenly dispersed along the 44km length of road.

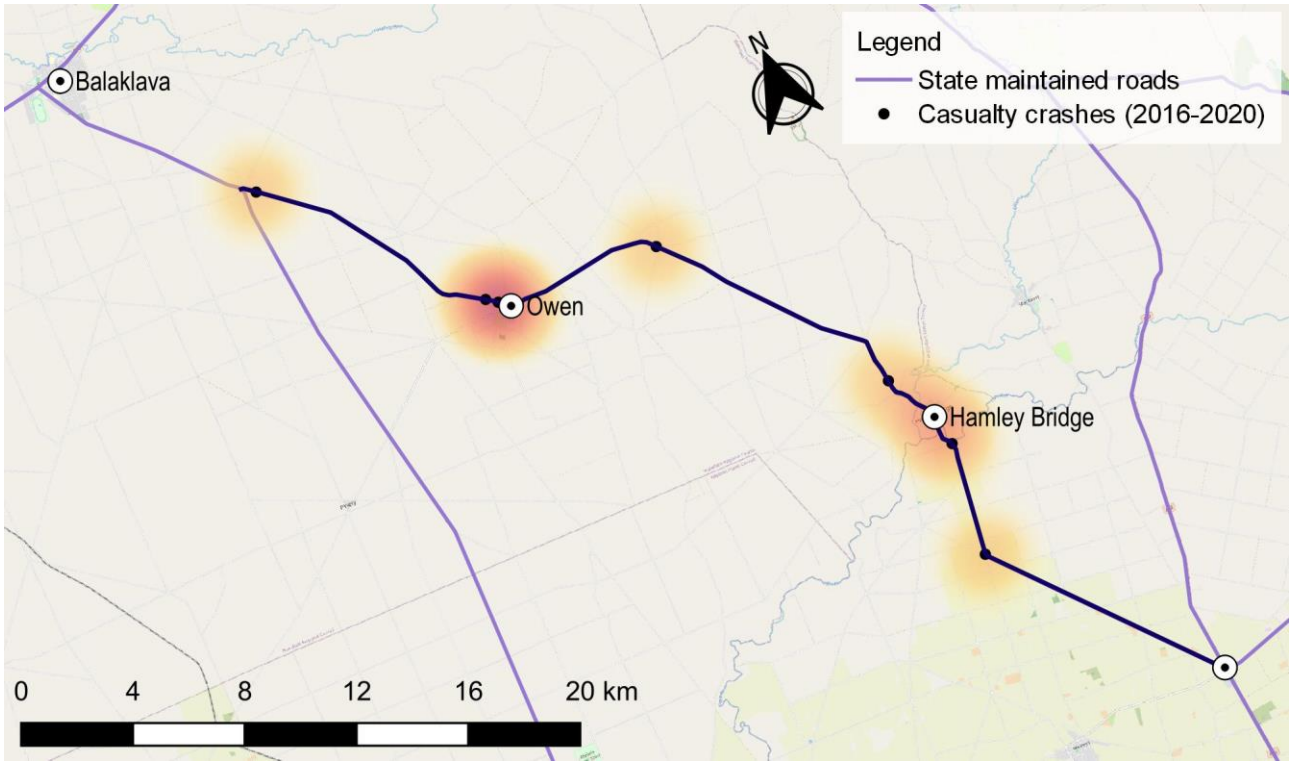


Figure 54: Heatmap of casualty crash locations on Owen Road between 2016 and 2020

At the time of writing, RAA is not aware of any plans for substantial upgrades to Owen Road, however, the sections pictured earlier in this report have been patched.

Final comment

RAA has called for improvements to Owen Road since our 2017 Risky Roads survey, where it was nominated as the state's third riskiest regional road, and the road has featured in every Risky Roads survey since. Due to a high level of community feedback in the regions, RAA reviewed the corridor in 2017, and again in 2019 as part of our Barossa Valley, and Yorke Peninsula regional road assessments – with key recommendations including road widening, shoulder sealing, and pavement rehabilitation works.

The section immediately north of Hamley Bridge was improved in 2017, with shoulder sealing and some pavement reconstruction undertaken, as well as an 800m section near Alma Road in Owen. Following a site assessment by RAA in December 2021, significant failures in the pavement can be observed along most of the roads 44km length, and major pavement reconstruction works are required to address this along the full length of the corridor.

Additional maintenance funding for Owen Road is one of four high-priority regional road maintenance projects RAA are advocating for in our 2022 state election campaign. This would ideally be addressed as part of a four-year road maintenance fund with a minimum value of $600m.

Inman Valley Road

Regional ranking	7 (11 overall)			
Total nominations	20			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Rough, slippery or loose surface			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	17	14	5	0

Inman Valley Road is nominated in the state's top ten risky regional roads for the first time in the history of RAA's Risky Roads survey. Inman Valley Road is a regional arterial road extending for 30km between Yankalilla and Victor Harbor, on the Fleurieu Peninsula, and is the most direct link between these two popular tourist destinations.

Traffic volumes on Inman Valley Road are moderate, with 1,700vpd using the eastern end of the road near Victor Harbor, reducing to 1,000vpd through Inman Valley and 1,400vpd near Yankalilla. Commercial vehicles make up between 8 and 9.5% of this traffic, with 140 commercial vehicle movements per day on the eastern end of the road.

Road maintenance concerns were highly raised in nominations for Inman Valley Road, with 90% of nominations highlighting potholes, cracks or rutting, and three quarters of nominations highlighting crumbling road edges. Hazardous roadside objects and a lack of overtaking opportunities were raised by more than one quarter of respondents. The top five issues nominated on the road were:

1. Potholes, cracks or rutting, in 90% of nominations
2. Crumbling road edges, in 75% of nominations
3. Rough, slippery or loose surface, in 40% of nominations
4. Hazardous roadside objects, in 30% of nominations
5. Lacks overtaking opportunities, in 25% of nominations

Figure 55: Inman Valley Road is narrow with a high speed limit and unforgiving roadsides.

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents highlighted the narrow road and tight curves as well as poor level of maintenance. To reduce risk, respondents suggested improvements to the road including resurfacing, widening, and shoulder sealing, as well as improvements to the roadside by removing hazardous trees.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Visibility is not good. Many corners are tight and the surface is less than adequate."

"The entire road from Yankalilla to Victor Harbor is in a terrible state of disrepair. The road is rough, full of holes and uneven surface. It is very narrow and this has been made worse by the installation of guard rails."

"This road has no run off in places, just a bank coming down to roads edge. As it is very narrow in sections it makes it impossible to avoid a vehicle that has strayed on to the wrong side of the road."

"Currently has 100km/h speed limit which is too fast for condition of road."

Question: What do you think would be the most effective way to reduce this risk?

"Upgrade road surface, widen the shoulder and remove trees close to road."

"Upgrade to allow speed limit to be maintained."

"The entire road needs to be resurfaced and widened – shoulders included. There needs to be provision of space for motorists to pull over if they have trouble with their vehicle (flat tyre etc)."

The yearly average number of casualty crashes occurring on Inman Valley Road has remained fairly steady over the past decade, with an average of 3 casualty crashes per year between 2011 and 2015, compared to 3.4 per year between 2016 and 2020. Overall, the severity of crashes over the most recent five years has been much lower than the five year period prior.

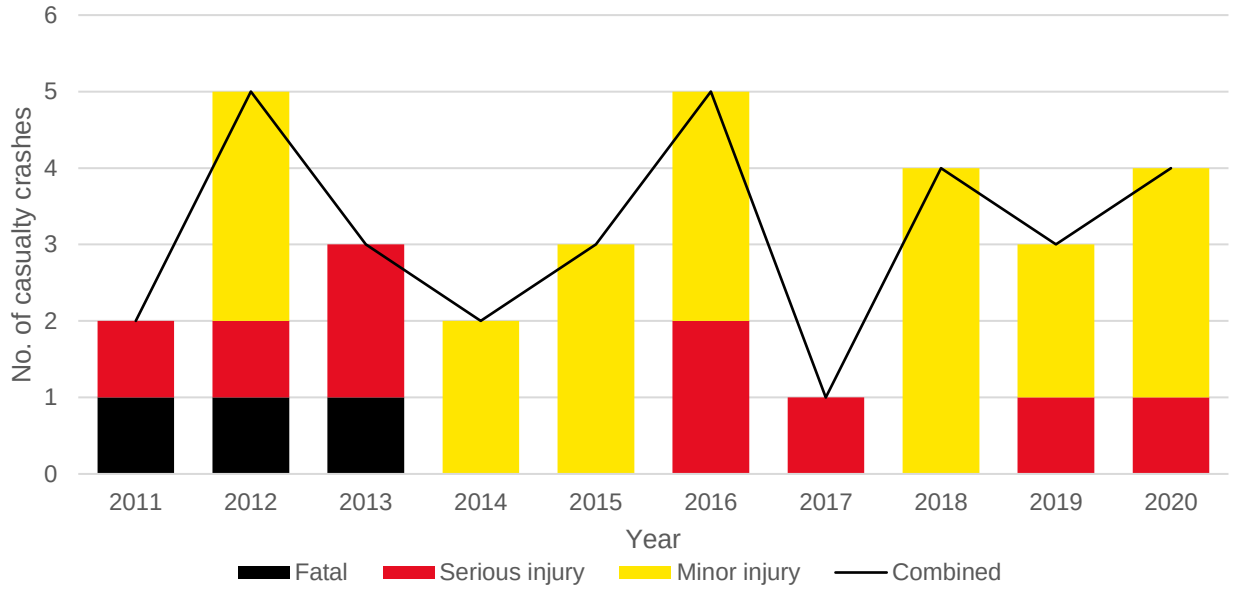


Figure 56: Ten year trend in casualty crashes on Inman Valley Road

Single vehicle run off road crash types were the dominant crash types occurring on Inman Valley Road between 2016 and 2020 and made up 82% of all casualty crashes occurring on the road, with collisions with fixed object the most frequently occurring of these types.

Table 30: Casualty crash types occurring on Inman Valley Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Hit Fixed Object	9	7	2	7	2
Left Road - Out of Control	3	1	2	1	2
Rear End	2	2	0	2	0
Hit Animal	1	1	0	1	0
Side Swipe	1	1	0	3	0
Roll Over	1	0	1	0	1
Total	**17**	**12**	**5**	**14**	**5**

The majority of recent casualty crashes on Inman Valley Road occurred between Inman Valley and Yankalilla, which has generally poor vertical and horizontal alignment compared to the section between Inman Valley and Victor Harbor. Furthermore, this section is narrow and has no sealed shoulders.

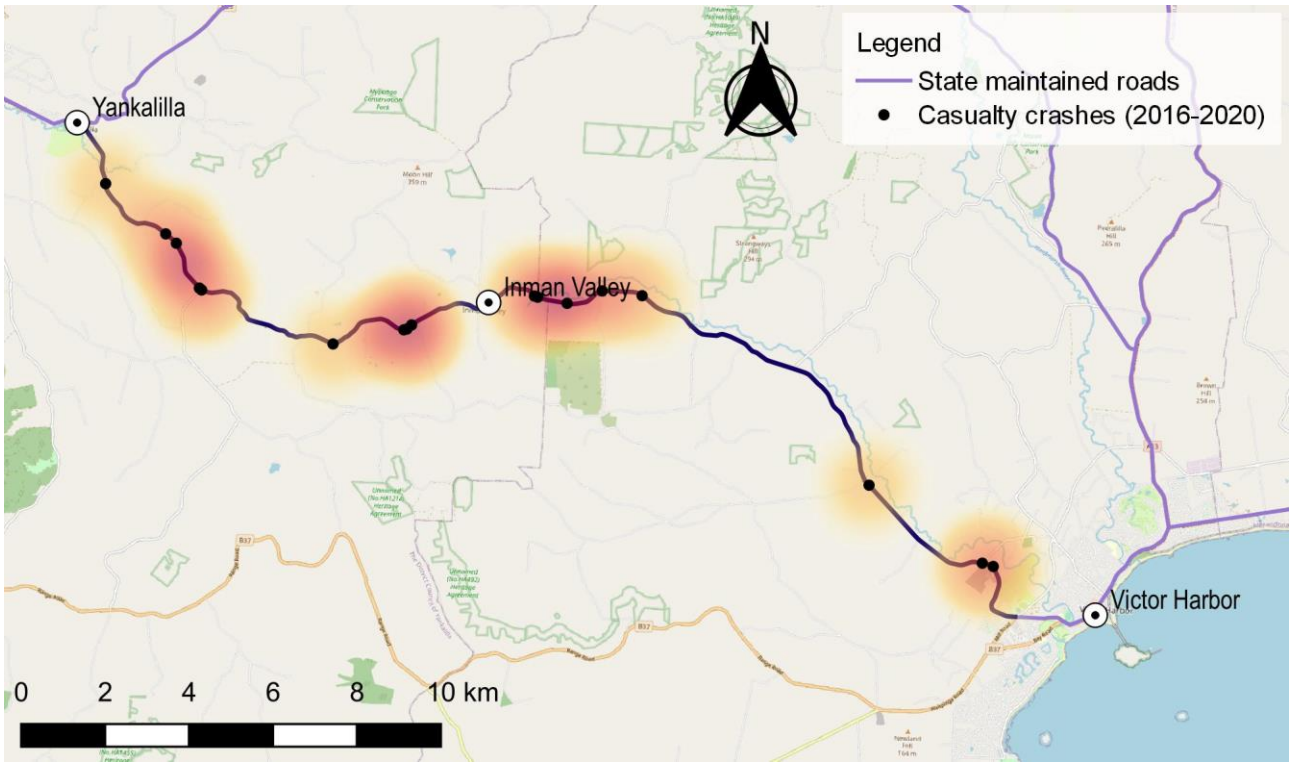


Figure 57: Heatmap of casualty crash locations on Inman Valley Road between 2016 and 2020

At the time of writing, RAA is not aware of any major planned upgrades or pavement rehabilitation works for Inman Valley Road, however, the section between Inman Valley and Torrens Vale Road is proposed for pavement rehabilitation in the DIT forward program.

Final comment

Inman Valley Road's inclusion on list of the top 10 risky regional roads comes as no surprise, as it was one of the most highly raised roads by the Fleurieu Peninsula community during RAA's *2021 Fleurieu Peninsula regional road assessment*[13]. The issues raised in this survey are reflective of what we heard from the community as part of this assessment, in that the road is in need of maintenance, has narrow sections, with an unforgiving roadside environment.

In our 2021 assessment, RAA made six recommendations to improve safety on Inman Valley Road. These are road widening and shoulder sealing, barrier installation (incorporating motorcycle under run), pavement rehabilitation, and an intersection upgrade at the intersection with Hancock Road. A reduced speed limit should also be considered for the road, however these recommended upgrades would also be effective in improving safety at the current 100km/h speed limit.

[13] RAA, 2021, *Regional Road Assessment: Fleurieu Peninsula – August 2021*, accessed at <www.raa.com.au/roadassessments>.

Long Valley Road

Regional ranking	8 (12 overall)			
Total nominations	20			
Top 3 issues	Lacks overtaking opportunities | Potholes, cracks or rutting | Inappropriate speed limit			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	33	31	5	5

Long Valley Road is nominated in the state's top ten risky regional roads for the first time in the history of RAA's Risky Roads survey. Long Valley Road is a regional arterial road extending for 16km between Wistow and Strathalbyn and is a critical connection between Strathalbyn and Mount Barker and on to the South Eastern Freeway.

Long Valley Road carries high traffic volumes, with 7,000vpd on average. This represents a 50% increase in the daily traffic volumes over the decade since 2011, when the road carried an average of 4,600vpd. Commercial vehicle traffic has grown at an even faster rate, more than doubling in the ten year period from 240vpd (5% of traffic) in 2011 to 550vpd (8% of traffic) in 2021.

The main issue raised by survey respondents was a lack of overtaking opportunities, in two thirds of nominations. Potholes, cracks and rutting were raised highly, and more than one third of respondents believed the speed limit was inappropriate. The top five issues nominated on the road included:

1. Lacks overtaking opportunities, in 65% of nominations
2. Potholes, cracks or rutting, in 40% of nominations
3. Inappropriate speed limit, in 35% of nominations
4. Lacks turning/acceleration lanes, in 30% of nominations
5. Inadequate crossing or turning opportunity, in 25% of nominations

Figure 58: Overtaking opportunities are scarce on Long Valley Road due to curves and crests and high traffic volumes

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents mostly highlighted inadequate overtaking opportunities, and that driver behaviour was poor. To reduce risk, respondents suggested that additional overtaking lanes were required, and also suggested that there were sections requiring maintenance. Respondents had mixed opinions in relation to speed limit, with several people suggesting a reduced speed limit, and several suggesting that the infrastructure should be improved to accommodate the existing 100km/h speed limit.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"No overtaking lane coming from Wistow to Strathalbyn. Road inadequate for the increasing amount of traffic."

""'Reducing speed limit is not a issue the road surface has been recently resurfaced which is breaking apart. There have been several complaints put in to federal road infrastructure. Car rims have been broken."

"High traffic road with poor road manners by many...mainly slow drivers! Poor intersections and overtaking opportunities. Needs a major fix."

"The speed on this road desperately needs to be lowered. Presently set at 100 km/h and so often people tailgate, pass on double lines and also pass and travel at speeds well in excess of 100km/h , all when other drivers are travelling at 100km/h!"

Question: What do you think would be the most effective way to reduce this risk?

""'Resurface road and widen it with two more overtaking lanes. Resurface from Wellington Rd Wistow to Strathalbyn."

"1. Speed 90km/h 2. Build slip lanes and turning bays 3. Extra passing lanes. "

"This road needs to be modernised with greatly improved passing opportunities, further slow vehicle turnouts if it is deemed as not for consideration for four lanes. I do not feel it requires the current speed limit to be lowered, but the road condition, surfaces, camber and further passing lanes need to be completed sooner rather than later."

Over the past decade, there has been an increasing trend with casualty crashes on Long Valley Road, which correlates with the substantial growth in traffic. Between 2011 and 2015, an average of 3.8 casualty crashes occurred each year, which increased to an average of 6.6 casualty crashes per year between 2016 and 2020. Tragically, there have been three fatal head on crashes over the 2018-2020 period, which resulted in the loss of five lives.

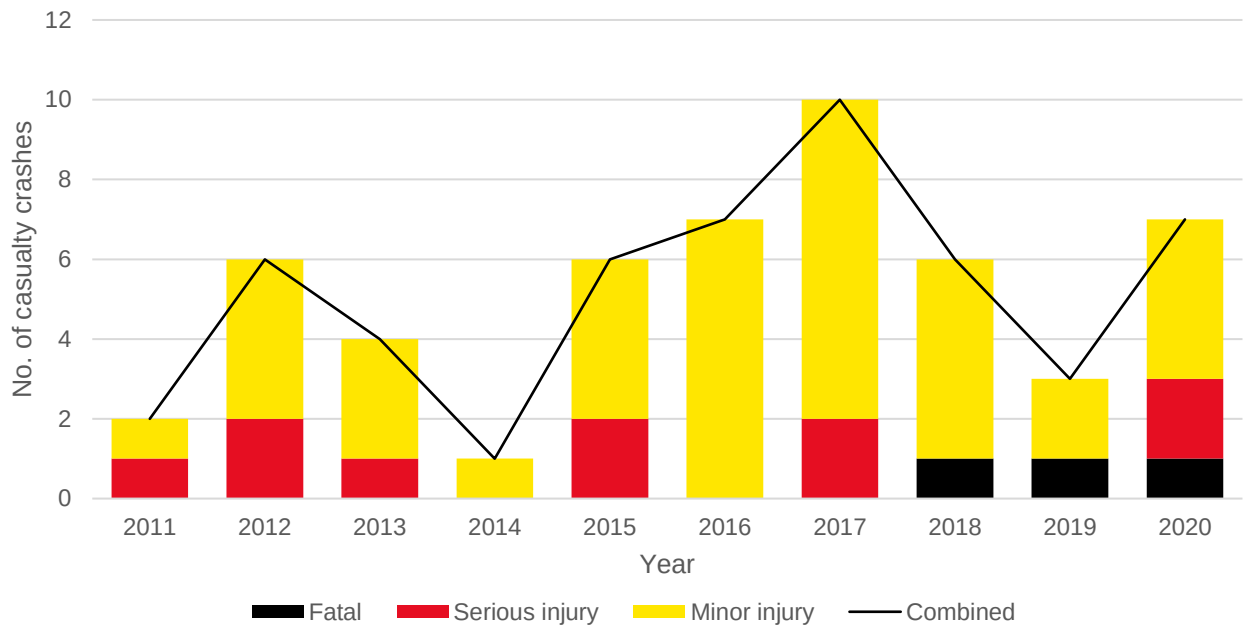


Figure 59: Ten year trend in casualty crashes on Long Valley Road

Collisions with fixed objects were the most prominent casualty crash types on Long Valley Road between 2016 and 2020, followed closely by head on crashes. The high number of head on crashes is a significant cause for concern, with head on crashes responsible for more than half of casualties over the five year period.

Table 31: Casualty crash types occurring on Long Valley Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Hit Fixed Object	11	8	3	0	8	3	0
Head On	8	5	0	3	9	1	5
Rear End	6	6	0	0	6	0	0
Roll Over	4	3	1	0	3	1	0
Right Angle	2	2	0	0	3	0	0
Side Swipe	1	1	0	0	1	0	0
Left Road - Out of Control	1	1	0	0	1	0	0
Total	**33**	**26**	**4**	**3**	31	5	5

Casualty crashes are evenly speed at locations along the length of Long Valley Road, as shown in the heatmap in Figure 60.

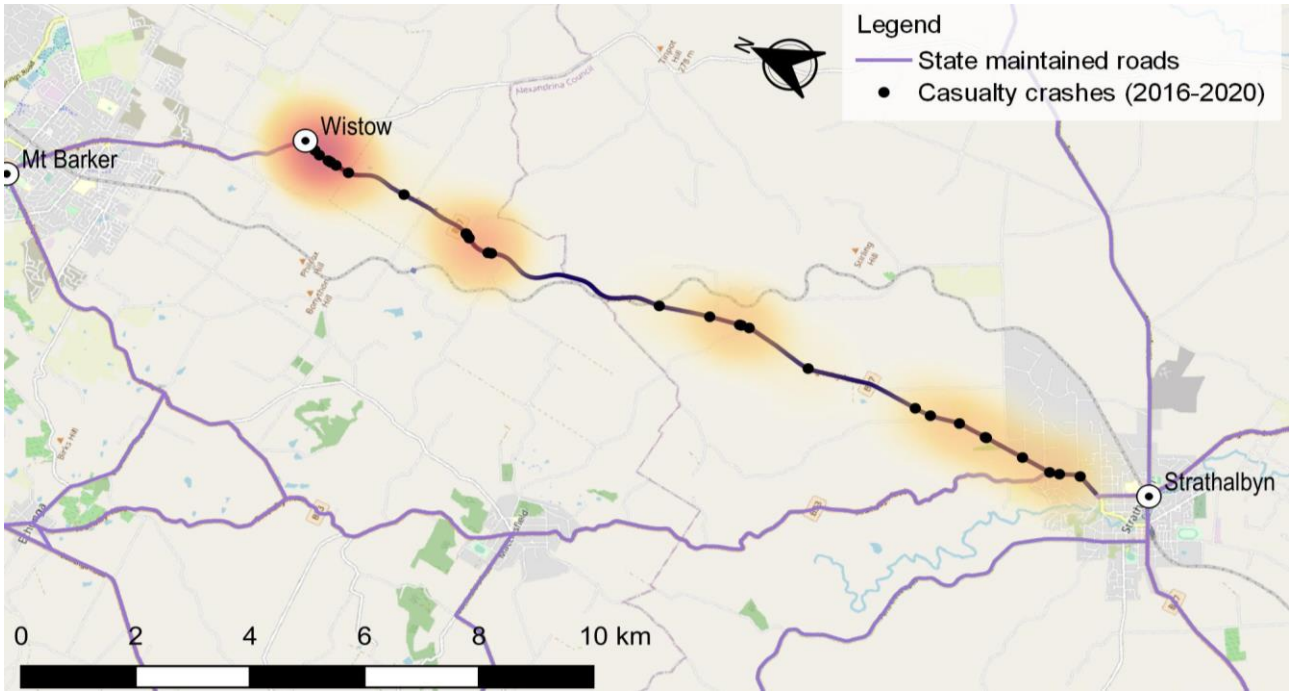


Figure 60: Heatmap of casualty crash locations on Long Valley Road between 2016 and 2020

Several upgrades to Long Valley Road have been made since 2020, which have included localised sealed shoulder widening, pavement rehabilitation, barrier installation and clearance of vegetation.

$6m of improvement works for Long Valley Road commenced in January 2022 and includes:

- installation of turning lanes at the junctions with Treutler, Bonython and Archer Hill roads
- installation of a sheltered left and right turn lane at the junction with Pursell Road
- road widening
- safety barrier installation
- sight distance improvements at all junction approaches
- drainage and services works.

A further $5.4m in works to install a southbound overtaking lane and intersection upgrades at Stirling Hill Road and Gemmell Road will be completed by late 2022.

Final comment

Long Valley Road has seen a high degree of public scrutiny in recent years, following three head on fatal crashes in as many years, which resulted in the loss of five lives. The busy thoroughfare between Strathalbyn and Mount Barker is seeing increasing traffic volumes year on year and is in desperate need of additional overtaking lanes. One overtaking lane was committed to in 2019, however, work has yet to commence on this, and is expected to commence by mid 2022.

Road geometry is generally reasonable, and consideration should be given to installing a second northbound overtaking lane to complement the first, currently being planned. Furthermore, in the mid-term, consideration of a central wire rope dividing barrier should be considered, as recommended during RAA's *2020 Adelaide Hills Regional Road Assessment*[14].

[14] RAA, 2020, *Regional Road Assessment: Adelaide Hills – December 2020*, accessed at <www.raa.com.au/roadassessments>.

Torrens Valley Road

Regional ranking	9 (17 overall)			
Total nominations	13			
Top 3 issues	Potholes, cracks or rutting | Rough, slippery or loose surface | Crumbling road edges			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	45	46	9	1

Torrens Valley Road is nominated in the state's top ten risky regional roads for the first time in the history of RAA's Risky Roads survey. Torrens Valley Road is a state maintained arterial road in the Adelaide Hills, commencing at the intersection with Gorge Road and North East Road (Chain of Ponds) and extending for 11km through to Mount Pleasant, via Gumeracha and Birdwood.

Traffic volumes on Torrens Valley Road are quite high, and sit between 2,000vpd and 3,000vpd for the length of the road.

The majority of issues raised on Torrens Valley Road fell under the road surface category, and the top four issues nominated on the road included:

1. Potholes, cracks or rutting, in 100% of nominations
2. Rough, slippery or loose surface, in 77% of nominations
3. Crumbling road edges, in 46% of nominations
4. Tight curves or blind crests, in 15% of nominations

Figure 61: Parts of Torrens Valley Road are in poor condition, which is worse around curves

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the road, respondents discussed the poor road condition, and pointed out deteriorating pavement

around curves, with some acknowledging the hazard this poses to motorcyclists. To reduce risk, almost all respondents suggested that road resurfacing was required.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Multiple accidents have occurred. Road condition is appalling."

"The road is deteriorating and there has been no works on this road in years. Someone is going to die on this road soon and the government will be to blame for not replacing the surface. There are many cracks, holes, parts where the road has split, parts where the subsurface is coming through. very bad."

"The road surface is very poor, particularly at corners. I think the speed limit and suggested speeds at bends should be reviewed - I frequently see cars cutting double lines because they have taken corners too fast. I think a number of the suggested corner speeds are far too low, which means drivers might be inclined to ignore them."

"I think that there are hundreds of motorcycles that use this road, that there has been a death at that corner, and if you didn't ride that road on a motorcycle you wouldn't realise it was a hazard."

Question: What do you think would be the most effective way to reduce this risk?

"Resurface with hot mix it lasts so much longer than spray seal and doesn't bleed or deteriorate in hot weather with heavy traffic."

"Urgent resurfacing!!"

"Resurface the whole road, it's shocking even in the Mt Pleasant Main Street."

Over the past decade, there has been a general increase in the average number of casualty crashes occurring per year on Torrens Valley Road.

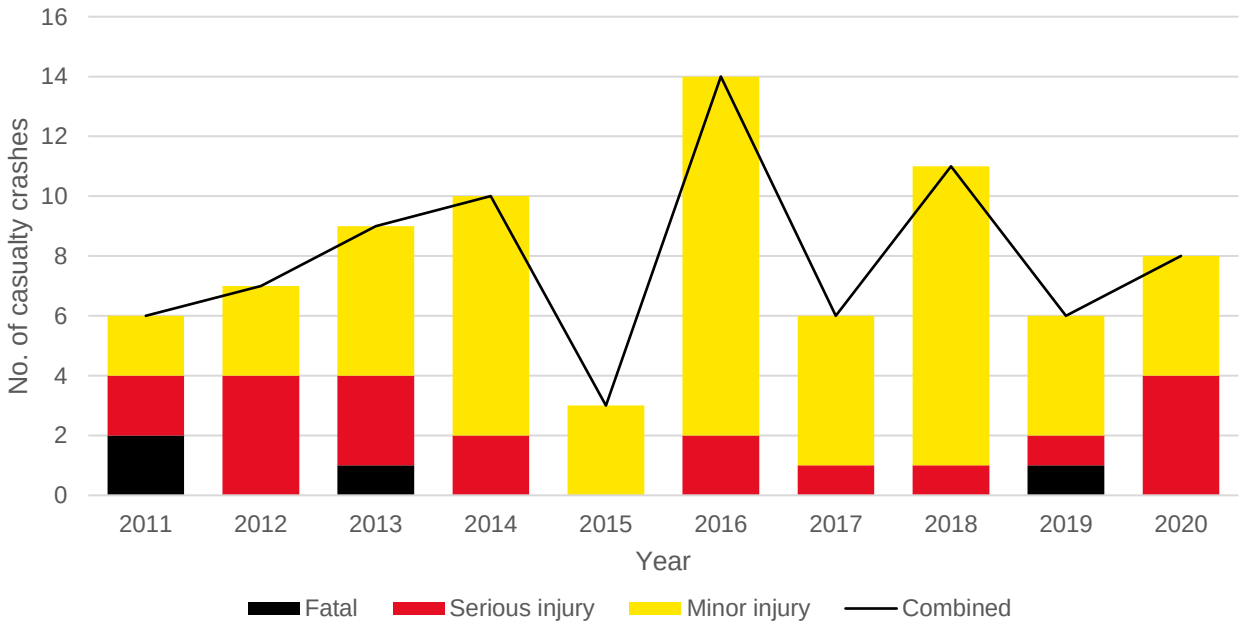


Figure 62: Ten year trend in casualty crashes on Torrens Valley Road

Collisions with fixed objects are the primary crash type on Torrens Valley Road and made up 62% of casualty crashes between 2016 and 2020. Head on crashes were the next most frequently occurring crash type, making up 9% of all casualty crashes.

Table 32: Casualty crash types occurring on Torrens Valley Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatality
Hit Fixed Object	28	21	6	1	27	6	1
Head On	4	2	2	0	5	2	0
Left Road - Out of Control	3	3	0	0	3	0	0
Rear End	3	3	0	0	3	0	0
Roll Over	2	2	0	0	3	0	0
Hit Object on Road	1	1	0	0	1	0	0
Hit Parked Vehicle	1	1	0	0	1	0	0
Right Angle	1	0	1	0	1	0	0
Hit Animal	1	1	0	0	1	0	0
Right Turn	1	1	0	0	1	1	0
Total	**45**	35	**9**	**1**	**46**	**9**	**1**

Whilst most of the road has an 80km/h speed limit, the 100km/h section that extends for 3km between Birdwood and Randell Road is highlighted as a particular problem area for crashes to occur. The section between Gorge Road and Gumeracha also appears to have a higher crash frequency than other parts of the corridor. RAA welcomes the recent announcement to reduce the speed to 80km/h between Birdwood and Randell Road, which will improve safety on the section of road exhibiting a higher crash frequency than other parts of the road.

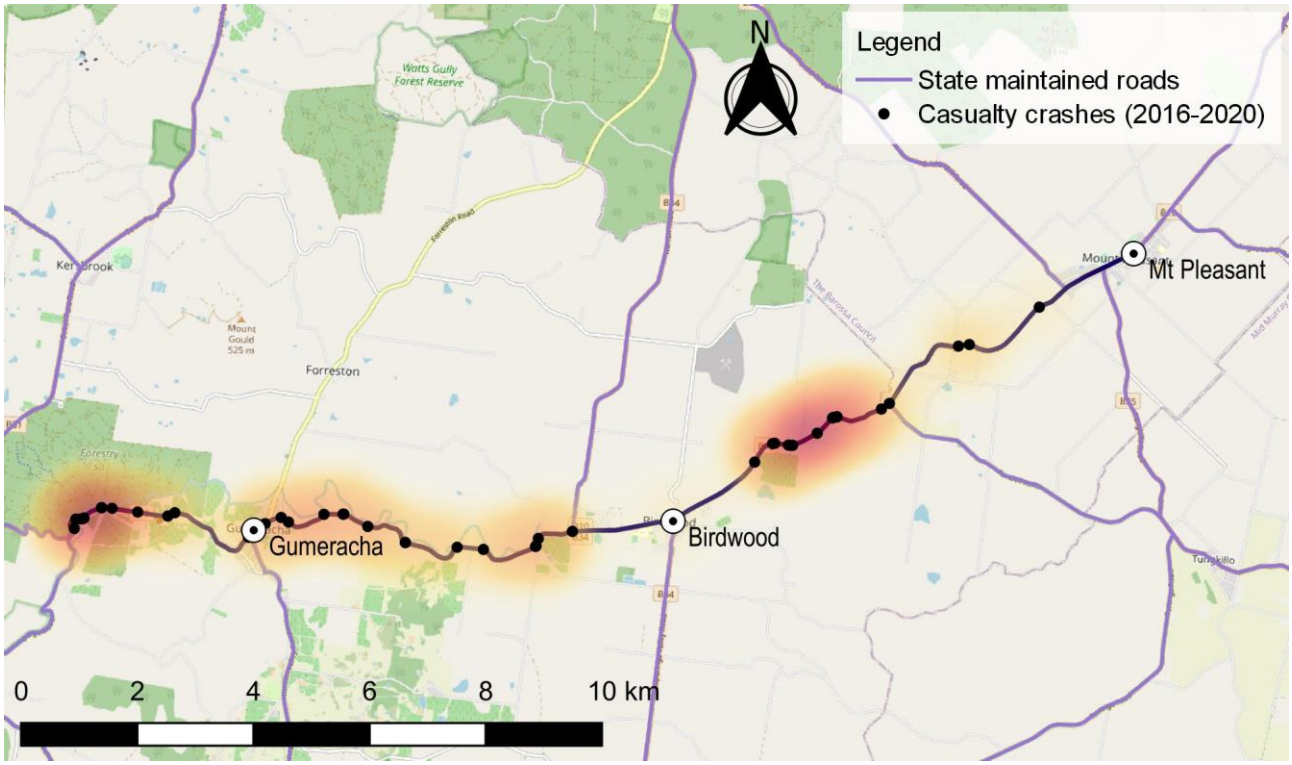


Figure 63: Heatmap of casualty crash locations on Torrens Valley Road between 2016 and 2020

At the time of writing, RAA is not aware of any planned upgrade or pavement rehabilitation works along Torrens Valley Road, however, the main street of Mount Pleasant is proposed for pavement rehabilitation works in the DIT forward program.

Final comment

Torrens Valley Road is another corridor that was reviewed in RAA's 2020 *Adelaide Hills Regional Road Assessment*[15]. Our key recommendations as part of this review included installation of additional barrier protection incorporating motorcycle under run protection, pavement rehabilitation (especially on curves), bridge widening, and the introduction of an 80km/h speed limit on the 3km section between Birdwood and Randell Road.

RAA welcomes the recent decision to reduce the speed limit to 80km/h between Birdwood and Randell Road, however it is important that much needed maintenance and installation of physical barrier protection along this section of Torrens Valley Road is undertaken irrespective of the lowered speed limit.

[15] RAA, 2020, *Regional Road Assessment: Adelaide Hills – December 2020*, accessed at <www.raa.com.au/roadassessments>.

Goolwa Road

Regional ranking	10 (18 overall)			
Total nominations	12			
Top 3 issues	Potholes, cracks or rutting | Crumbling road edges | Lacks overtaking opportunities			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	14	20	0	0

Goolwa Road is a new nomination in the state's top ten risky regional roads in RAA's Risky Roads survey and is another Fleurieu Peninsula Road that has been recently reviewed by RAA. Goolwa Road is a regional arterial road extending for 30km between Mount Compass and Currency Creek, and traffic volumes are high, with the road traversed by 3,100vpd, representing a 20% increase in traffic since 2011.

Road maintenance was a major cause of concern on Goolwa Road, however half of respondents also commented on the lack of safe overtaking opportunities, with the top five issues nominated on the road including:

1. Potholes, cracks or rutting, in 92% of nominations
2. Crumbling road edges, in 67% of nominations
3. Lacks overtaking opportunities, in 50% of nominations
4. Narrow road, lanes or bridges, in 25% of nominations
5. Rough, slippery or loose surface, in 17% of nominations

Figure 64: Goolwa Road is busy and overtaking opportunities are scarce

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about

the road, respondents mostly highlighted their concerns about a lack of overtaking opportunities, and subsequent risky overtaking manoeuvres. Several respondents also raised their concerns with the road surface. To reduce risk, almost all respondents suggested that they would like to see overtaking lanes installed, with many also commenting about improvements to vertical and horizontal alignment.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"This road is in bad condition, narrow and lacks overtaking opportunities with frustrated motorists taking risks."

"This is a poorly maintained single lane country roads. Over the past 5 to 10 years, the traffic volume has increased significantly. There are no safe places to pass on whole road, but due to multiple hills, no passing or slow vehicle pull off lanes, drivers are regularly taking risks."

"The bend on 'Adelaide Hill' is steep, sharp. The locals know this bend but visitors don't."

Question: What do you think would be the most effective way to reduce this risk?

"1. Passing lanes on major hill inclines. 2. Resurface and widen road. 3. Where possible remove blind crests. 4. Install median strip from Victor Harbor Rd to Flagstaff Hill Rd."

"Straighten the various bends (need to acquire land). Passing lanes. Resurface parts to remove undulations."

"Maintain the road and at least put two overtaking lanes on the road to prevent motorists taking unnecessary risks in overtaking slow traffic such as farm machinery."

Between 2013 and 2015, various safety improvements including safety barriers and shoulder sealing were implemented along Goolwa Road, and it appears that these works have made a positive improvement to the rate of casualty crashes occurring along Goolwa Road. Between 2016 and 2020, an average of 2.8 casualty crashes occurred per year, with no FSI crashes. This is in stark contrast to the five years between 2011 and 2015, where an average of 6.4 casualty crashes per year occurred, including one fatal crash and five serious injury crashes.

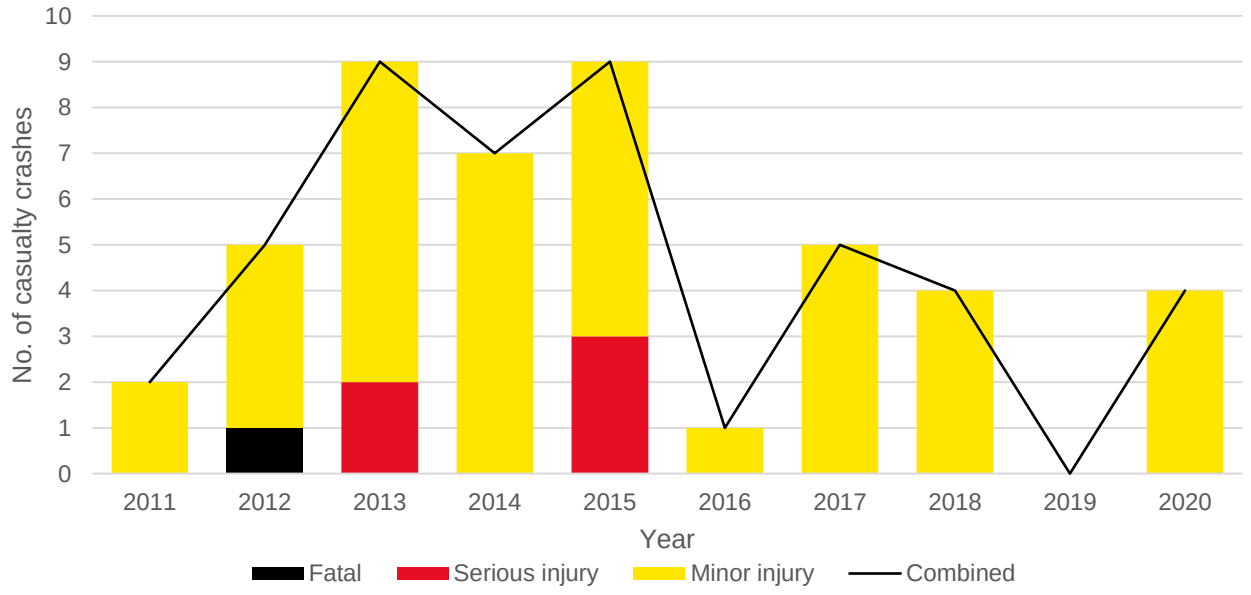


Figure 65: Ten year trend in casualty crashes on Goolwa Road

Collisions with fixed objects were the most commonly occurring crash types on Goolwa Road between 2016 and 2020. Right angle crashes also appear to occur regularly, with further investigation indicating that four of the five right angle crashes occurred at the intersection with Victor Harbor Road, just south of Mount Compass.

Table 33: Casualty crash types occurring on Goolwa Road (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Hit Fixed Object	5	5	0	8	0
Right Angle	5	5	0	8	0
Rear End	2	2	0	2	0
Other	1	1	0	1	0
Roll Over	1	1	0	1	0
Total	**14**	**14**	**0**	**20**	**0**

Crashes on Goolwa Road mostly occur on, or near curves, or at the intersection with Victor Harbor Road. Crashes at the Victor Harbor Road intersection account for 36% of Goolwa Road crashes, whilst crashes on curves make up more than half of the remaining crashes.

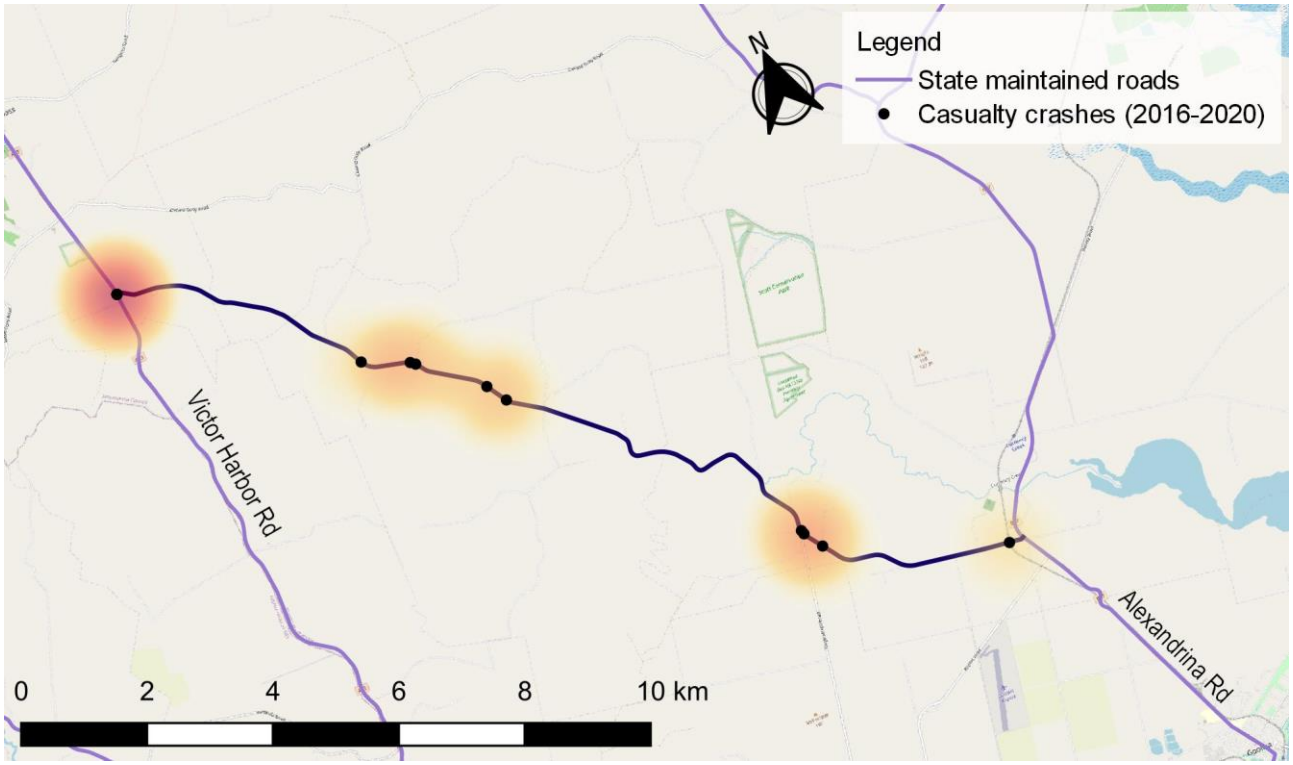


Figure 66: Heatmap of casualty crash locations on Goolwa Road

At the time of writing, RAA is not aware of any significant planned upgrades or rehabilitation on Goolwa Road.

Final comment

Goolwa Road is the third Fleurieu Peninsula road raised in the top 10 risky roads and is another that was reviewed in our *2021 Fleurieu Peninsula Regional Road Assessment*[16]. The findings of our 2021 review indicated that Goolwa Road exceeded the Austroads criteria for the provision of overtaking lanes, and it was subsequently recommended that at least two overtaking lanes be provided on Goolwa Road.

Other recommendations of our 2021 assessment included installation of a roundabout at the intersection with Victor Harbor Road, pavement rehabilitation between Victor Harbor Road and Kokoda Road, installation of safety barriers, and pavement reconstruction at the Currency Creek level crossing.

The strong community feedback received during our 2021 Risky Roads survey confirms that our recommendations align with both road safety infrastructure principles and the community's expectations along Goolwa Road.

As part of our 2022 state election campaign, RAA are campaigning for the construction of two overtaking lanes on Goolwa Road as part of a rolling package of overtaking lane construction.

[16] RAA, 2021, *Regional Road Assessment: Fleurieu Peninsula – August 2021*, accessed at <www.raa.com.au/roadassessments>.

Top 10 intersections

The top 10 nominated intersections are listed in Table 9. Where intersections were tied on an equal number of nominations, recent crash history, planned upgrades, traffic volumes, and RAA's prior assessments have been drawn on to rank them.

Table 34: Top 10 nominated intersections in the 2021 Risky Roads survey

	Top 10 intersections	Top three issues raised
1	Curtis Road/Heaslip Road (Angle Vale)	Inadequate crossing or turning opportunity | Potholes, cracks or rutting | Lacks traffic signals
2	Britannia Roundabout (Adelaide)	Poor or confusing road/intersection layout | Lacks traffic signals | confusing signs or line marking
3	Victor Harbor Road/Hindmarsh Tiers Road (Hindmarsh Valley)	Poor or confusing road/intersection layout | Inappropriate speed limit | Inadequate crossing or turning opportunity
4	Main South Road/Aldinga Beach Road (Aldinga Beach)	Inadequate crossing or turning opportunity | Poor or confusing road/intersection layout |Lacks traffic signals
5	Blackwood Roundabout (Blackwood)	Poor or confusing road/intersection layout | Confusing signs or line marking | Lacks traffic signals
6	Strathalbyn Road/Whites Road (Flaxley)	Tight curves or blind crests | Poor sight distance | Inadequate crossing or turning opportunity
7	Gepps Cross five-way (Gepps Cross)	Poor or confusing road/intersection layout | Inadequate crossing or turning opportunity | Inefficient or ineffective traffic signals
8	Glynde Corner (Glynde)	Poor or confusing road/intersection layout | Inefficient or ineffective traffic signals | Inadequate crossing or turning opportunity
9	Bull Creek Road/Paris Creek Road (Meadows)	Poor sight distance | Tight curves or blind crests | Poor or confusing road/intersection layout
10	Main South Road/Sellicks Beach Road (Sellicks Beach)	Inadequate crossing or turning opportunity | Lacks turning/acceleration lanes | Inappropriate speed limit

Curtis Road and Heaslip Road, Angle Vale

Ranking	1			
Total nominations	23			
Top 3 issues	Inadequate crossing or turning opportunity | Potholes, cracks or rutting | Lacks traffic signals			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	9	15	0	1

The intersection of Curtis Road and Heaslip Road in Angle Vale is a four-way crossroad intersection, with Curtis Road traffic controlled by stop signs. The intersection has some channelisation, with dedicated right turn lanes provided from Heaslip Road to Curtis Road in both directions, and a dedicated left turn lane from Curtis Road to Heaslip Road on the south-eastern approach to the intersection. Heaslip Road is under the care and control of the Department for Infrastructure and Transport, and within the local government area of the City of Playford.

Curtis Road and Heaslip Road both function as arterial roads, and both have interchanges with the Northern Expressway. Traffic counts taken in 2017 indicate that Heaslip Road carries 7,800vpd between the intersection and Angle Vale, and 6,700vpd south of Curtis Road. Whilst recent traffic volume data is not publicly available for Curtis Road, the 2007 *Northern Expressway Environmental Report*[17] highlighted 2006 traffic volumes of 5,000vpd, which were expected to increase to 9,000vpd by 2026. Given the extent of development in Munno Para and Angle Vale, RAA considers 9,000vpd to be a reasonable estimate of the current traffic volume for this section of Curtis Road. RAA estimates that at least 15,000 vehicles traverse this intersection daily.

The majority of nominations cited inadequate crossing or turning opportunities at the intersection, with surface issues such as potholes, cracks and rutting also raised. Respondents also raised a lack of traffic signals, and a poor or confusing layout quite frequently. The top five issues raised by respondents were:

1. Inadequate crossing or turning opportunities, in 52% of nominations
2. Potholes, cracks or rutting, in 43% of nominations
3. Lacks traffic signals, in 39% of nominations
4. Poor or confusing road/intersection layout, in 35% of nominations
5. Inefficient or ineffective traffic signals, in 30% of nominations

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. Most respondents raised the high number of housing developments in Angle Vale and Munno Para as a trigger for increased traffic through the intersection, and more than 9 in 10 suggested a roundabout should be installed, with some respondents also indicating that signalisation seemed appropriate.

[17] DTEI (former DIT), 2007, *Northern Expressway Environmental Report,* volume 2, part D, chapter 13 - Transport, accessed at <https://www.southroad.sa.gov.au/northern_expressway/environment/environmental_reports/download>.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Stop signs not adequate. Multiple crashes from cars not adhering to signs and driving straight through intersection."

"The speed limit changes from 80km/h to 60km/h shortly before the intersection but lots of people fail to slow down before reaching it. It's getting busier and busier due to the new developments in the area and really needs to be a roundabout or have traffic lights added."

"Traffic has increased and will continue to do so with high levels of housing development in the area. Crossing/turning onto Heaslip Road can be difficult, and cars often don't stop at the stop signs as they try to squeeze through traffic gaps."

Question: What do you think would be the most effective way to reduce this risk?

"I believe this intersection would benefit from a roundabout due to the number of accidents here. A roundabout will encourage people to slow down and give way before turning or going straight. There have been many scenarios where people have not stopped at the sign and gone speeding through causing a crash."

"A two-lane road and a roundabout."

"A round about or traffic lights need to be installed ASAP."

Figure 67: The intersection of Curtis Road and Heaslip Road in Angle Vale

The trend in crashes at the intersection over the decade between 2011 and 2020 has shown an overall increase in crashes since 2011, with nine casualty crashes occurring in the past five years (2016-2020) compared with six in the five years prior (2011-2015).

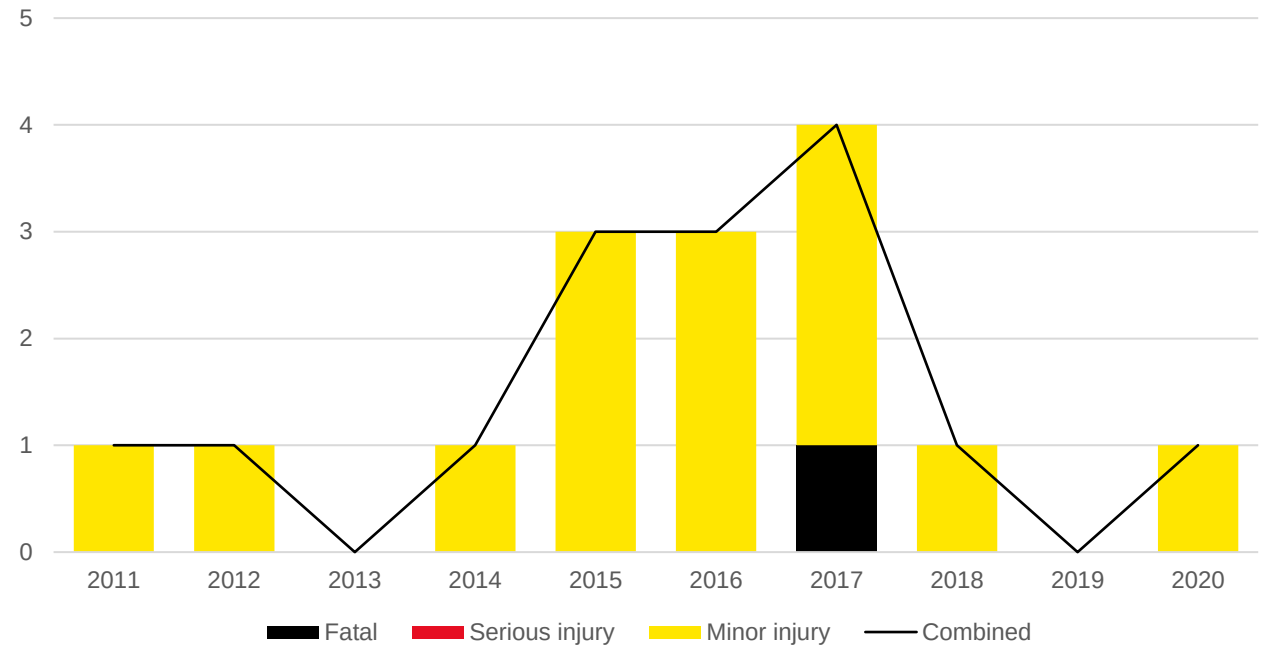


Figure 68: Ten year trend in casualty crashes at the intersection with Curtis Road and Heaslip Road

Between 2016 and 2020, right angle and right turn crashes were the only crash types occurring at the intersection.

Table 35: Casualty crash types occurring at the Curtis Road/Heaslip Road intersection (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity			Number of casualties		
		Minor inj.	Serious inj.	Fatal	Minor inj.	Serious inj.	Fatalities
Right Angle	8	7	0	1	14	0	1
Right turn	1	1	0	0	1	0	0
Total	**9**	**8**	**0**	**1**	**15**	**0**	**1**

All crashes between 2016 and 2020 involved vehicles on Curtis Road driving into the path of vehicles on Heaslip Road. Crashes were common with both directions of Curtis Road traffic, and most commonly involved a failure to give way to a vehicle approaching from the right.

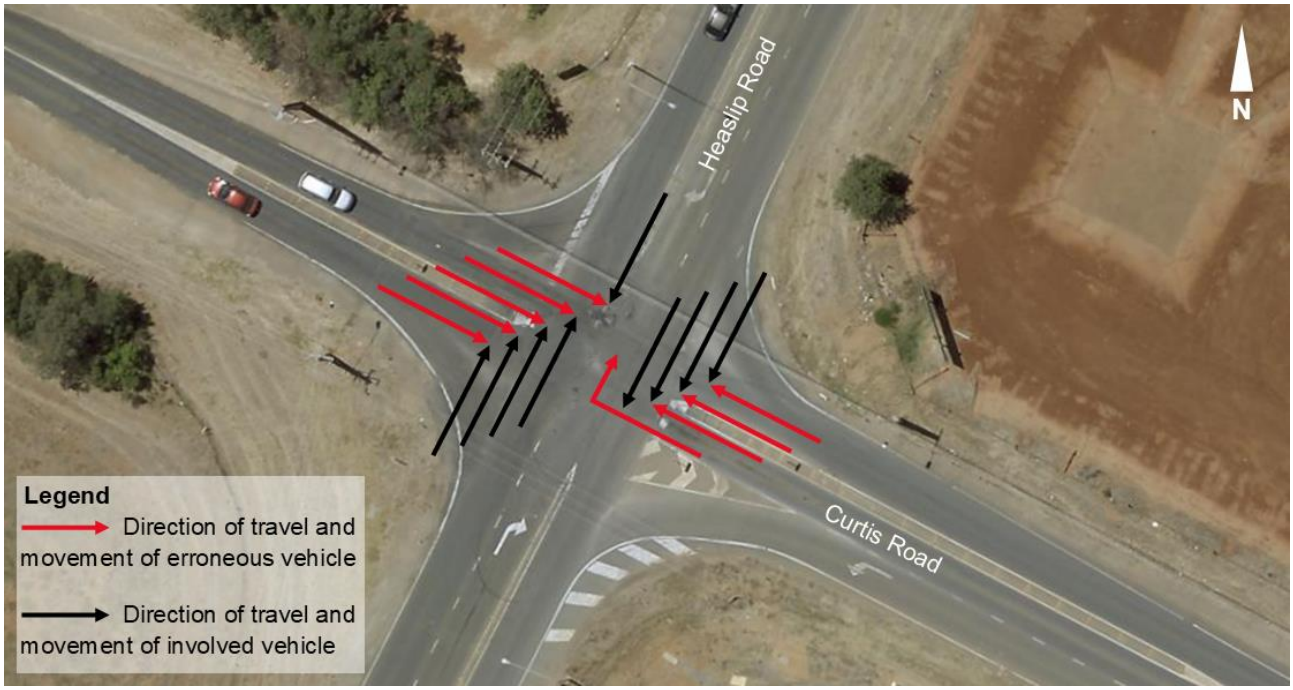


Figure 69: Diagram showing the crash types and directions at the Curtis Road/Heaslip Road intersection (2016 – 2020)

At the time of writing, RAA is not aware of any state government funding commitment to upgrade this intersection.

Final comment

Four-way crossroad intersections are generally a legacy of agricultural areas, where land is divided into a grid by roads to form square or rectangular boundaries. Across the Adelaide Plains, these blocks are typically half a square mile (or 320 acres) in area, which results in a grid of roads about 1150 metres apart.

As agricultural areas become more densely populated and land use changes, this layout of roads creates an inherently dangerous system, as four-way crossroad intersections provide a poor level of safety for road users. One of the most effective treatments at busy four-way crossroad intersections in this environment is to install a roundabout. This reduces speeds through the intersection, and improves impact angles, should a crash occur.

There are significant residential growth areas in Angle Vale and Munno Para (Playford Alive), which will see the population in these areas continue to grow rapidly over the next decade and into the future. An upgrade of this intersection must be seen as a high priority by all levels of government and funded by state government. A roundabout would provide a far safer environment for road users and would also contribute to smoother and improved traffic flow.

Britannia Roundabout, Adelaide

Ranking	2			
Total nominations	16			
Top 3 issues	Poor or confusing road/intersection layout | Lacks traffic signals | confusing signs or line marking			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	43	46	3	0

Britannia Roundabout is nominated as the state's second riskiest intersection in 2021 despite not being in the top 10 since 2013 where it was nominated as the state's riskiest intersection before the construction of the current dual roundabout layout.

Britannia Roundabout is located on the inner city ring route, and following a $3.2m upgrade late in 2013 consists of two roundabouts at the five way intersection of Dequetteville Terrace, Fullarton Road, Kensington Road and Wakefield Road

Almost three quarters of nominations were for a poor or confusing layout, and more than one third indicated a lack of traffic signals was the problem. The top 5 issues nominated at the intersection were:

1. Poor or confusing road/intersection layout, in 71% of nominations
2. Lacks traffic signals, in 35% of nominations
3. Confusing signs or line marking, in 35% of nominations
4. Inadequate crossing or turning opportunity, in 24% of nominations
5. Poor or no pedestrian crossing facilities, in 24% of nominations

Figure 70: Britannia roundabout is Adelaide's busiest roundabout

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, respondents highlighted that they felt the roundabouts added to confusion, and that driver behaviour was poor. To reduce risk, respondents primarily suggested that an overpass or traffic signals were required at the intersection.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Five unregulated intersecting roads make the intersection extremely hazardous for unskilled or older drivers at peak hours. Coming out of Kensington Road, you have two major traffic lines intersecting simultaneously from the right."

"Despite an upgrade to 2 roundabouts, this intersection is too busy, no longer fit for especially during peak periods. With 5 roads meeting it can be extremely difficult for traffic from Fullarton Road heading south to access the intersection and I have witnessed many near misses and the aftermath of a couple of collisions. There are no provisions for pedestrians that I can see."

"A complete re-design is needed. For goodness sake cut down a few trees and do it properly."

"Britannia roundabout has been a hazard for many years, even after the extra round about was added. Drivers are constantly cutting in front of cars they should be giving way to."

Question: What do you think would be the most effective way to reduce this risk?

"Perhaps a fly-over Kensington Rd to Wakefield St/Dequetteville Tce."

"Traffic lights are desperately needed, as at all similar intersections interstate, such as Woolongabba in Brisbane or Camberwell Junction in Melbourne."

"As there are three exit points for all directions, I would go back to ONE large round about which would give motorists plenty of time to enter and leave the round about as other motorists are about to enter, giving way to the right at all times."

"An overhead bridge would solve the issue or reroute traffic from northern Fullarton Road to Dequetteville terrace hence making it a 4 way rather than 5 way intersection."

Crash data discussed in this section has been combined for both roundabouts. Over the past decade, an average of 9.4 casualty crashes occurred each year at Britannia Roundabout. There is a slight downwards trend in recent years, with four of the past five years recording figures below this average. The chart below shows the crash data at the roundabout for the seven years before and after the upgrade, which shows no notable trends before and after the upgrade occurred.

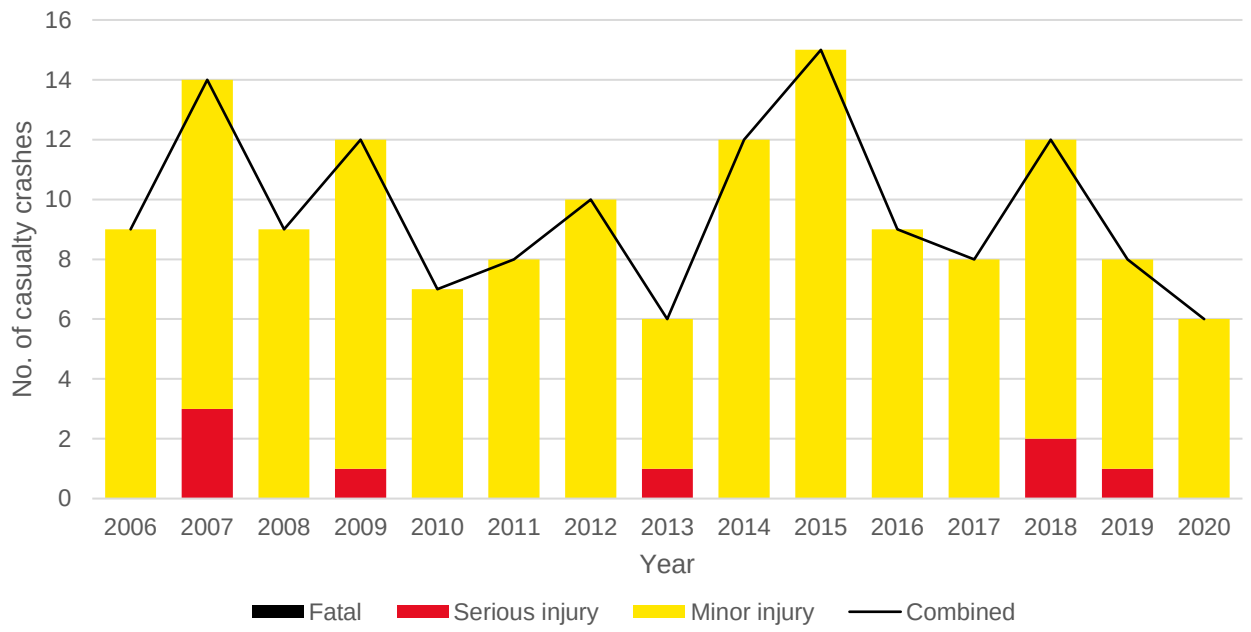


Figure 71: Ten year trend in casualty crashes at Britannia Roundabout

However, it is important to consider traffic volumes at the intersection. In 2012, before the upgrade, average daily traffic volumes were about 55,000 vehicles per day, which increased to about 61,000 vehicles per day in 2014, after the upgrade. Volumes have not risen significantly since then and are currently around 62,000 vehicles per day.

Right angle crashes are the primary crash type occurring at Britannia Roundabout and are generally due to a vehicle entering the roundabout without giving way to another vehicle already on the roundabout. Rear end crashes are also common and were most prominent on the Dequetteville Terrace approach to the larger roundabout.

Table 36: Casualty crash types occurring at Britannia Roundabout (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Right Angle	32	30	2	32	2
Rear End	9	8	1	8	1
Side Swipe	2	2	0	3	0
Total	**43**	40	**3**	**46**	**3**

The crash diagram in Figure 72 shows the crash types and vehicle movements in these crashes between 2016 and 2020. The most common crash location was a right angle crash on the large roundabout, involving a vehicle approaching from the west and a vehicle about to exit the roundabout onto Fullarton Road and continue north. Twelve of these crashes occurred over the five year period, with eleven being attributed to the vehicle entering the roundabout. The next most common location, with seven crashes, was a right angle crash involving a vehicle approaching on Kensington Road and a vehicle travelling south through the roundabout about to exit onto Fullarton Road and continue south.

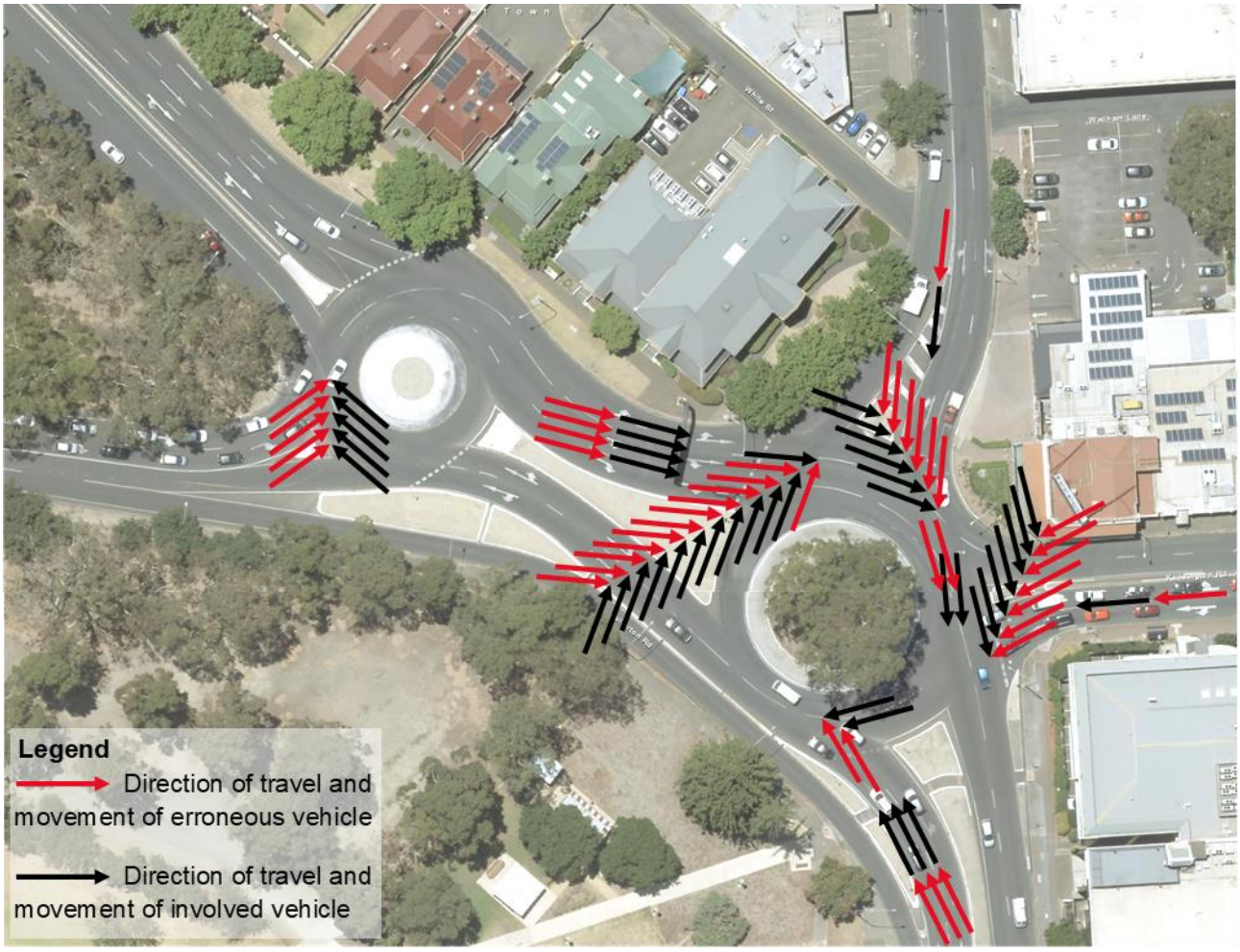


Figure 72: Diagram showing the crash types and directions at Britannia Roundabout between 2016 and 2020

RAA is not aware of any major upgrade plans for this intersection.

Final comment

Britannia Roundabout is Adelaide's busiest roundabout, with more than 62,000 vehicles travelling through the roundabout each day. Despite receiving an upgrade in 2013, the number of casualty crashes occurring at the intersection each year has not substantially reduced. However, the intersection performs better, with less delays occurring at the intersection, even with an increase in traffic since the upgrade.

When both roundabouts are combined, the Britannia Roundabout recorded more casualty crashes than any other intersection in South Australia. Almost 90% of casualty crashes occurred at the large roundabout, which is the busier of the two and has four approaches compared to the three of the smaller roundabout. The most frequent crash type involves a driver failing to give way to other vehicles already on the roundabout, resulting in a right angle collision.

Survey respondents would prefer to see an over or underpass installed at the intersection, and RAA would consider this to be most effective from Fullarton Road (south) to Dequetteville Terrace, as this is one of the most frequent movements through the roundabouts and provides continuity along the City Ring Route. However, this would most likely result in a significant loss to open space and vegetation in the Adelaide Parklands and detract from the area's visual amenity.

Some respondents also suggested that signalisation would be preferred, however this would be complex and is unlikely to significantly improve traffic flow unless some traffic movements were

prohibited. Partial signalisation of one or more approaches could be considered to provide additional control to some of the conflict points with high casualty crash numbers.

Victor Harbor Road, Hindmarsh Tiers Road and Virgin Road, Hindmarsh Valley

Ranking	3			
Total nominations	15			
Top 3 issues	Poor or confusing road/intersection layout | Inappropriate speed limit | Inadequate crossing or turning opportunity			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	5	7	2	0

The intersection of Victor Harbor Road and Hindmarsh Tiers Road was nominated as the third riskiest intersection in the 2021 survey having not previously featured in a Risky Roads top 10 intersection list.

The intersection is a four way crossroad between Victor Harbor Road, Hindmarsh Tiers Road and Virgin Road, located about 5km north of Victor Harbor and within the City of Victor Harbor Council. Both Victor Harbor Road and Hindmarsh Tiers Road are under the care and control of DIT, whilst Virgin Road, which is a local no-through-road providing access to several properties, is under the care and control of the City of Victor Harbor Council.

On average, about 7,500 vehicles travel through the intersection each day, however, this can be substantially higher during summer months due to the popularity of the south coast as a tourist destination for overnight stays and day trips from Adelaide. Most of this traffic is on Victor Harbor Road, where daily volumes are about 7,200 vehicles per day, however, an average of 1,100 vehicles use Hindmarsh Tiers Road each day as well.

Two thirds of nominations raised a poor or confusing intersection layout, and more than half considered the speed limit to be inappropriate. The top five issues nominated were:

1. Poor or confusing road/intersection layout, in 67% of nominations
2. Inappropriate speed limit, in 53% of nominations
3. Inadequate crossing or turning opportunity, in 47% of nominations
4. Lacks turning/acceleration lanes, in 40% of nominations
5. Lacks median strip or separation from oncoming traffic, in 33% of nominations

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, respondents most frequently commented that speed limits were too high through the intersection, sight distance was poor and that driver behaviour was poor. In relation to driver behaviour, most of these complaints were regarding dangerous overtaking manoeuvres when a northbound vehicle is stopped on the carriageway or slowing to turn right into Virgin Road. Several respondents also highlighted the fatal crash that occurred at the intersection in April 2021.

When asked what respondents would see to improve the intersection, a roundabout was the most frequent suggestion, with almost three quarters suggesting this option. The next most frequent suggestion was a speed limit reduction to 80km/h, with other suggestions including the addition of turn lanes, and replacing give way signs with stop signs.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Cars driving too fast, this intersection is approx. 100m from a sharp corner where cars are travelling too fast and not giving us time to turn safely onto Victor Harbor Rd. Drivers turning right onto V/H Rd often do not give way to drivers opposite on Virgin Rd turning left. This is why a Stop Sign may prevent a nasty accident. A fatality did occur here this year."

"There are no turning lanes for drivers entering Virgin Road from Victor Harbor Road. I have had several instances of near misses here. The new overtaking lane is going to make this intersection more dangerous."

"The intersection is very dangerous (1 fatality, multiple accidents, daily close misses). Right turn into Virgin Road has no lane, vehicles pass on LHS illegally in front of traffic on Hindmarsh Tiers Road waiting to turn into VH Road. Vision both ways is impaired by corner/rise in road. We have been drawing attention to this intersection for years now! There is a renewed push since fatality. It is bad when entering or exiting VH Road from both side roads. These near misses occur almost daily when exiting VH Road into Virgin Road."

"Line of sight from both Hindmarsh Tiers Road and Virgin Road is inadequate when turning into 100km/h traffic - there have been serious accidents and a death recently. Plus increased traffic is significant."

Question: What do you think would be the most effective way to reduce this risk?

"It needs a roundabout, similar to the one just a bit further south on Victor harbor Road."

"I believe that this intersection requires a large Stop sign & clear marking."

"A roundabout would help slow the traffic but not hold any one road up. Sometimes traffic is banked on Hindmarsh Tiers Rd for quite a while."

"Better signage, dedicated RH turn lane for Virgin Road. Flashing warning light for traffic approaching from Hindmarsh Rd. Slow traffic to 80kph. Any upgrade to Victor Harbor Rd (which is often talked about) must include this section/intersection. A roundabout would be the best!"

"A roundabout would slow cars down, lower speed limit to 80 kms from Crows Nest Rd to Urimbirra roundabout, change give way sign to stop sign at Hindmarsh Tiers Rd."

Figure 73: Dashcam footage at the intersection was provided by a survey respondent showing a very near miss between a vehicle performing an illegal overtaking manoeuvre and a cyclist on Hindmarsh Tiers Road

The intersection has an increasing trend in crashes over the decade, with five casualty crashes recorded in the three years between 2018 and 2020, and only one casualty crash in the seven years between 2011 and 2017. Tragically, in 2021 a life was lost in a right angle crash at the intersection. At the time of writing, RAA is aware of at least three other crashes that occurred at the intersection in 2021, however, do not know the severity of any injuries (if any) that resulted from these crashes.

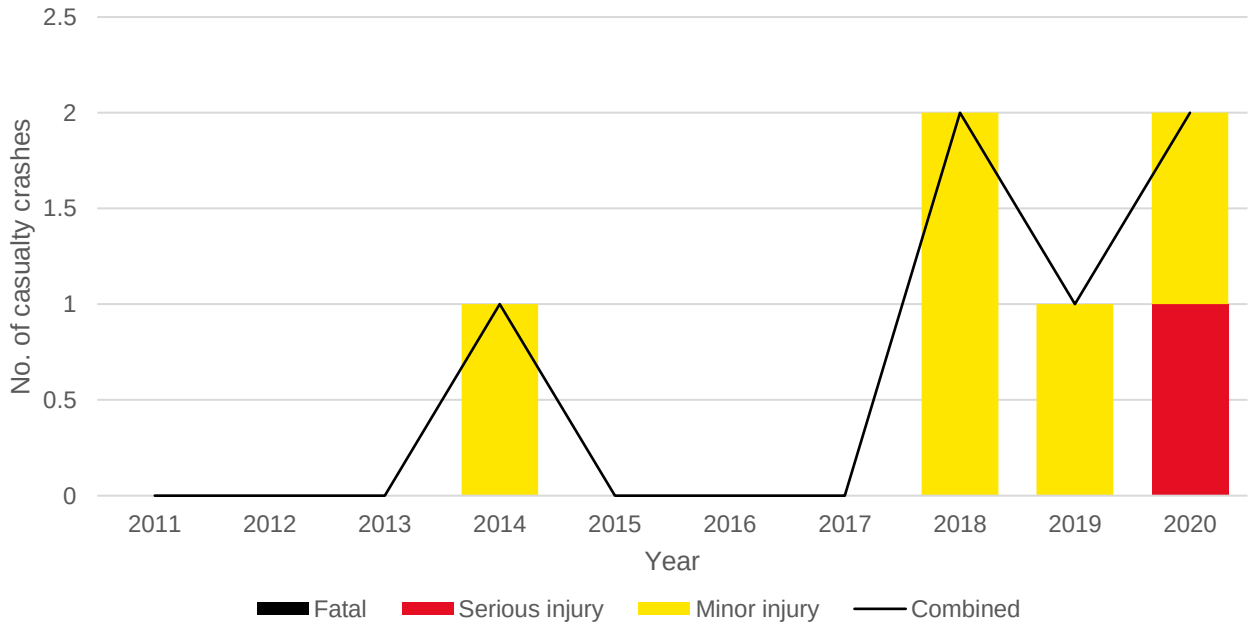


Figure 74: Ten year trend in casualty crashes at the Victor Harbor Road/Hindmarsh Tiers Road intersection

All five casualty crashes between 2016 and 2020 were right angle crashes.

Table 37: Casualty crash types occurring at the Victor Harbor Road/Hindmarsh Tiers Road intersection (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Right angle	5	4	1	7	2

Each of the crashes between 2016 and 2020 were between a vehicle on Hindmarsh Tiers Road entering Victor Harbor Road, and a northbound vehicle on Victor Harbor Road. In four crashes, the vehicle on Hindmarsh Tiers Road was turning right, and in one, the vehicle was turning left.

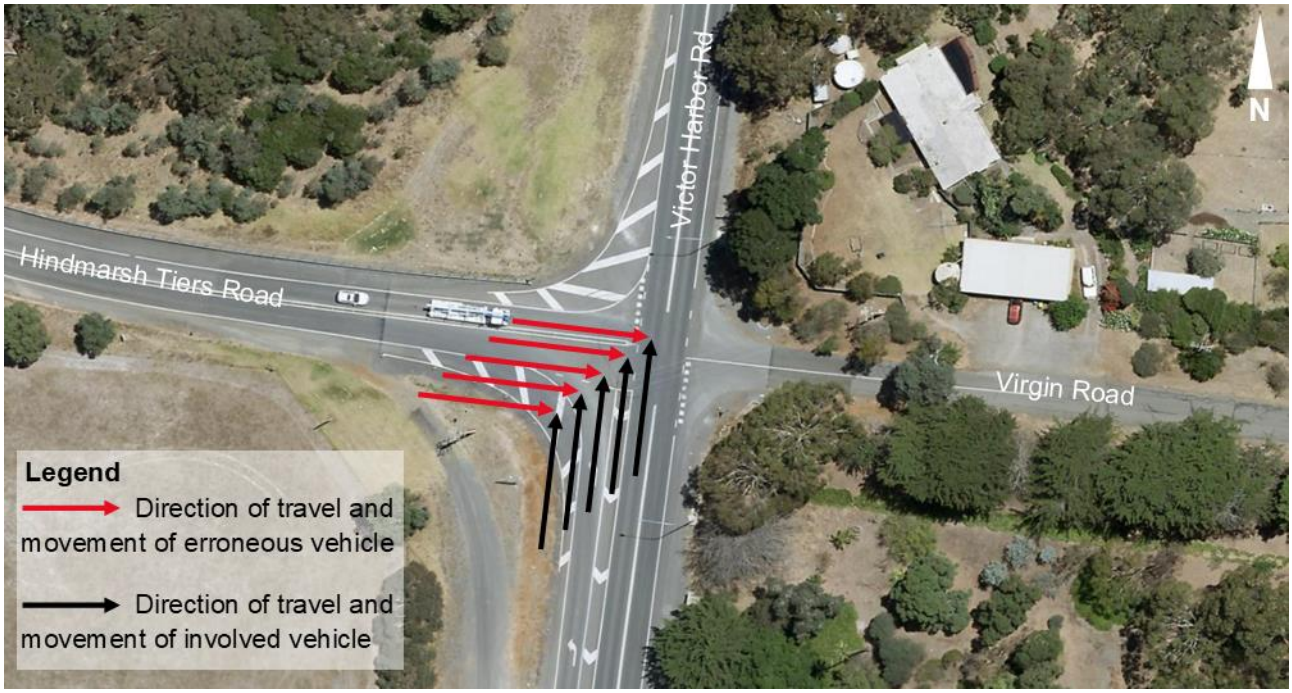


Figure 75: Diagram showing the crash types and directions at the intersection (2016 – 2020)

RAA is not aware of any current funding or upgrade commitments at this intersection.

Final comment

RAA is aware of the intersection with Victor Harbor Road, Hindmarsh Tiers Road and Virgin Road, which was assessed in 2021 as part of our *Victor Harbor Road Highway Assessment*[18] and *Fleurieu Peninsula Regional Road Assessment*[19]. These assessments recommended a roundabout be installed at the intersection, combined with an extension of the 80km/h speed limit from Welch Road through to Hindmarsh Tiers Road. This recommendation was founded on safe system principles for road design and aligns closely with the community feedback.

There is a recently increasing trend in casualty crashes occurring at this intersection, with a fatal crash occurring in 2021. The state government must strongly consider an investment in redesigning and improving safety at this intersection as a matter of urgency to reduce the likelihood of further serious crashes occurring at this location.

[18] RAA, 2021, *Highway Assessment: Victor Harbor Road – May 2021*, accessed at <www.raa.com.au/roadassessments>.

[19] RAA, 2021, *Regional Road Assessment: Fleurieu Peninsula and McLaren Vale – August 2021*, accessed at <www.raa.com.au/roadassessments>.

This intersection upgrade is part of a suite of upgrades on Victor Harbor Road that RAA are campaigning for in the lead up to the 2022 state election.

Main South Road and Aldinga Beach Road, Aldinga

Ranking	4			
Total nominations	15			
Top 3 issues	Inadequate crossing or turning opportunity | Poor or confusing road/intersection layout |Lacks traffic signals			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	8	13	1	0

The intersection with Main South Road and Aldinga Beach Road was nominated fourth riskiest amongst intersections in the 2021 Risky Roads survey. This intersection was previously nominated third riskiest in the 2017 survey.

The intersection is located in Aldinga within the City of Onkaparinga and is used by about 20,000 vehicles every day. Main South Road is an arterial road under the care and control of DIT, whilst Aldinga Beach Road is under the care and control of the City of Onkaparinga.

The highest raised issue at the intersection was an inadequate crossing or turning opportunity, highlighting the difficulties faced turning right from Aldinga Beach Road. Poor intersection layout and a lack of traffic signals were also raised in more than one third of nominations. The top five issues nominated at the intersection included:

1. Inadequate crossing or turning opportunity, in 63% of nominations
2. Poor or confusing road/intersection layout, in 38% of nominations
3. Lacks traffic signals, in 38% of nominations
4. Lacks turning/acceleration lanes, in 25% of nominations
5. Inefficient or ineffective traffic signals, in 25% of nominations

Figure 76: Turning right onto Main South Road can be frustrating due to the high traffic volumes at the intersection

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, the majority of respondents highlighted the difficulties and delays faced making a right turn from Aldinga Beach Road, which were leading to risk taking behaviour – especially during the afternoon peak. To reduce risk, respondents made several suggestions, ranging from traffic signals to an overpass, however, the most common suggestion, made by 44% of respondents was to install a roundabout.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"This intersection is dangerous when turning on to Aldinga Beach Road from either the north or south of Main South Road. To the south there needs to be a give way sign as often the line marking is obscured, or people just don't know the road rules."

"Very confusing and have had many close encounters as it is difficult to gauge who you are giving way to because there are so many directions of traffic, and it is often quite busy. Roundabout would be much safer."

"Turning right from Aldinga Beach Road is very difficult in peak times, many near misses as build up of traffic turning into this road obscures view of traffic travelling south."

"Always accidents. It takes so long to get From Aldinga Beach Road onto Main South Rd heading south. Many people take risks due to impatience."

Question: What do you think would be the most effective way to reduce this risk?

"Roundabout, giving all traffic a chance. This area is increasing in population rapidly, with many schools, and needs upgrade."

"Traffic lights or underpass."

"Main South Road to have over pass. Traffic lights or roundabout will only add to banking traffic issues which again cause accidents."

"Put in a roundabout please!"

The trend in casualty crashes occurring at the intersection is quite sporadic over the past decade, with six casualty crashes occurring in 2012, and none in 2013, 2014 and 2020.

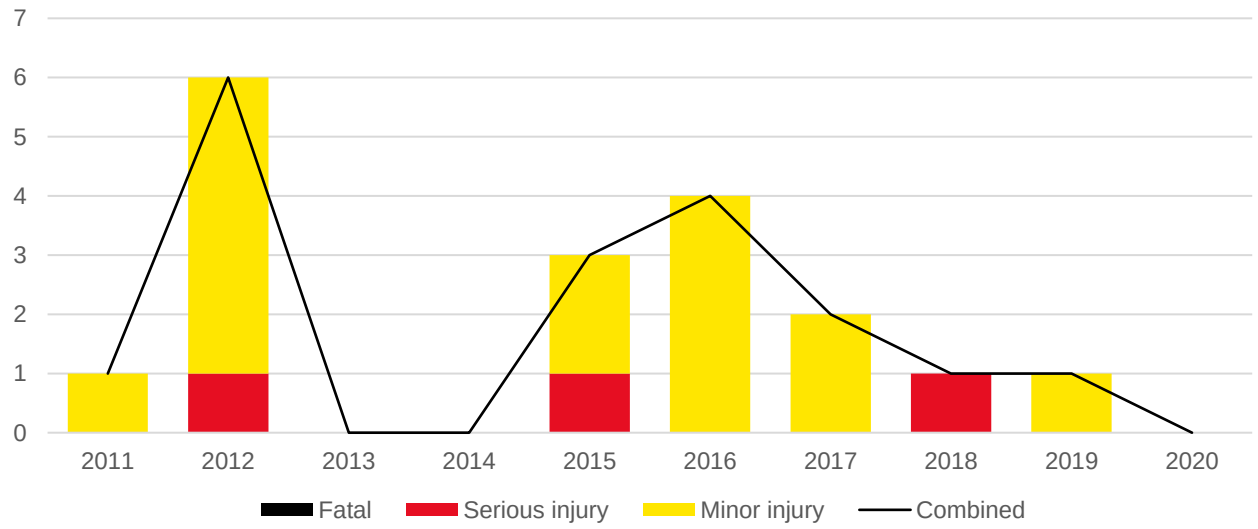


Figure 77: Ten year trend in casualty crashes at the Main South Road/Aldinga Beach Road intersection

Between 2016 and 2020, seven casualty crashes occurred at the intersection, with half of these occurring in 2016. Right angle crashes made up five of these crashes, with right turn crashes making up the remaining three.

Table 38: Casualty crash types occurring at the Main South Road/Aldinga Beach Road intersection (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Right angle	5	5	0	9	0
Right turn	3	2	1	4	1
Total	**8**	7	**1**	**13**	**1**

Seven of the eight crashes at the intersection involved a turning vehicle (either onto, or from Aldinga Beach Road) and a northeast bound vehicle on Main South Road. Five of the eight crashes were right angle crashes involving vehicles turning onto Main South Road from Aldinga Beach Road.

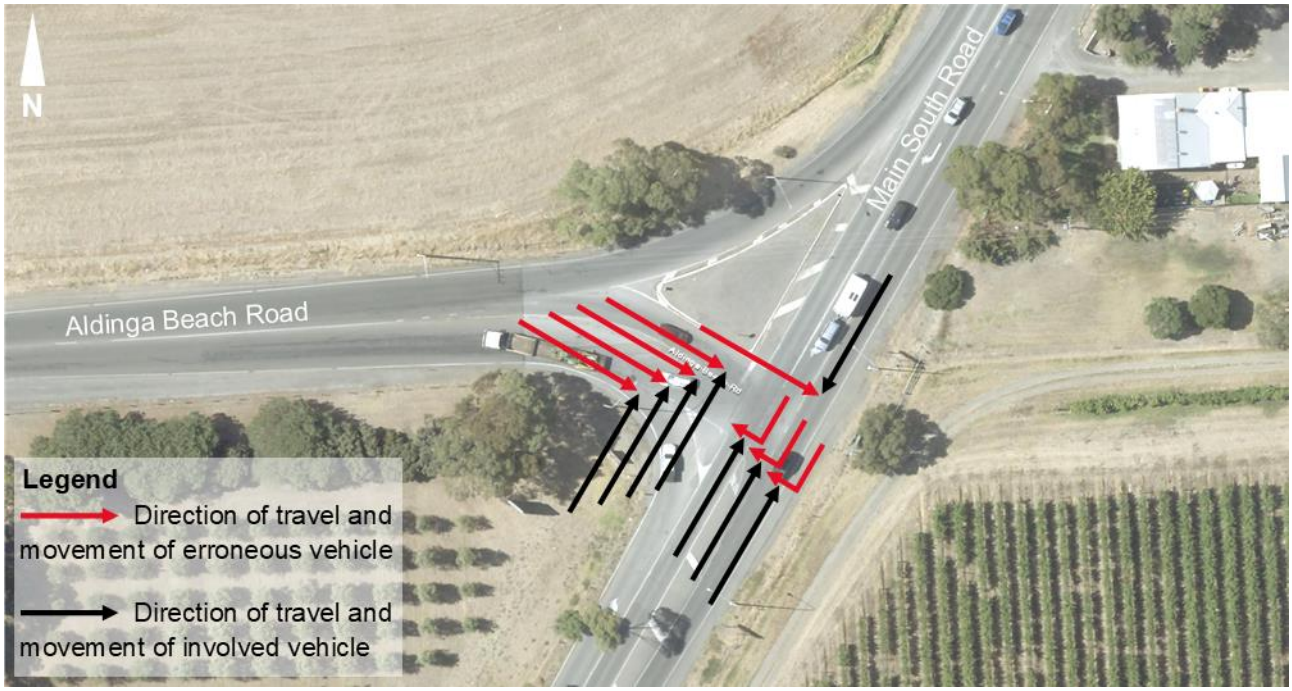


Figure 78: Diagram showing the crash types and directions at the Main South Road/Aldinga Beach Road intersection (2016 – 2020)

Final comment

This intersection will be upgraded as part of the Main South Road duplication project, set to commence in early 2022. The current reference design includes a right turn ban from Aldinga Beach Road to Main South Road, however, a roundabout will be installed at the nearby intersection with Aldinga Road, which will allow drivers wishing to head south onto Main South Road to turn left onto Main South Road then undertake a U-turn at the roundabout to continue south.

From a safety perspective, RAA supports the right turn ban from Aldinga Beach Road in principle, noting that drivers wishing to turn right will be required to turn left, then perform a U-turn at the proposed Aldinga Road roundabout. While this may add about 1km to travel distance, the expected travel time loss is relatively minor, and during peak periods, may result in gains. In current conditions, it can sometimes take several minutes to make a right turn from Aldinga Beach Road on to Main South Road, particularly during the afternoon peak. During the morning peak especially, it may be challenging for some of these drivers to change lanes from left to right before the roundabout in order to make a U-turn at the roundabout.

Blackwood Roundabout, Blackwood

Ranking	5			
Total nominations	14			
Top 3 issues	Poor or confusing road/intersection layout | Confusing signs or line marking | Lacks traffic signals			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	8	7	1	0

The Blackwood roundabout was nominated as the fifth highest intersection in the 2021 Risky Roads survey, which is the lowest it has placed after being nominated highly in each of the past surveys. In 2013 and 2017, the roundabout was nominated second highest, whilst in 2019 the intersection was nominated highest.

This roundabout is located at the five-way intersection of Main Road, Shepherds Hill Road, Coromandel Parade and Station Road, located in Blackwood in the City of Mitcham. Main Road and Shepherds Hill Road carry most of the traffic through the intersection and are under the care and control of DIT, whilst Station Road and Coromandel Parade are under the care and control of the City of Mitcham. Approximately 30,000 vehicles travel through the roundabout daily, with the northern (Main Road) and western (Shepherds Hill Road) legs being the busiest.

An upgrade of the roundabout was completed in early-2019 and involved the removal of turn movements out of Station Parade, relocating and enlarging the central island, and minor changes to the alignment of approach roads and traffic islands. In the 2019 risky roads survey, there was significant community angst about the upgrade, with concerns raised regarding approach speeds and difficult interactions.

RAA considers the upgrade to be an improvement overall on the previous roundabout, however, there are several traffic issues caused by the alignment of this intersection. These issues are difficult to overcome based on the skewed nature of approach roads and the level of roadside development near to the kerb line. Sight lines are poor on some approaches, and the elevation changes across the roundabout, all making it more difficult to navigate.

The key issues raised in nominations for the road in the 2021 survey were a poor or confusing layout, confusing signs or line marking, and a lack of traffic signals. The top 5 issues nominated at the intersection were:

1. Poor or confusing road/intersection layout, in 64% of nominations
2. Confusing signs or line marking, in 57% of nominations
3. Lacks traffic signals, in 50% of nominations
4. Poor sight distance, in 21% of nominations
5. Tight curves or blind crests, in 14% of nominations

Figure 79: Blackwood roundabout is one of Adelaide's busiest roundabouts

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, respondents highlighted difficulties exiting the roundabout from the inside lane, and issues with high vehicle speeds. To reduce risk, almost 80% of respondents suggested that traffic lights were required at the intersection, with several suggestions that these should only operate during peak periods. Respondents also suggested that advance direction signage needed to be enhanced and changes needed to be made to reduce the approach speed of vehicles.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Every time I use this roundabout to get to Hawthorndene every car using the roundabout from whichever road lane is just taking a chance and hoping they do not crash with the other roads trying to navigate this really dangerous roundabout."

"Having 2 lanes all the way around allows drivers to overtake on the roundabout with some outside lane traffic travelling faster than inside lane traffic. This means that when leaving the roundabout from the inside lane you have to cut across in front of faster moving traffic in outside lane."

"At busy times it is often difficult to see road markings or anticipate other road users' intentions."

"The intersection/roundabout was redesigned only a short while ago to improve traffic flow. It has resulted in motorists moving through the round-about at considerably increased speed. Travelling from south to north, from Coromandel Parade onto Main Road, traffic virtually travels in a straight line and at speed. In addition, a considerable amount of lane changing occurs, after entering the intersection, probably due to poor signage and/or design. Earlier there were accidents but they were minor due to low speed but now from our observation there are still accidents but more serious ones due to increased speed."

Question: What do you think would be the most effective way to reduce this risk?

"Put a traffic light system in."

"Clearer signage particularly on the Shepherd's Hill Road approach, reducing speed on the approach to the roundabout and police monitoring at random times."

"Put overhead signage on every entry point approaching the roundabout to indicate how people should turn on the roundabout and what lanes to use. Like at many other major roundabouts in the city and suburbs. John Rice Avenue in Elizabeth and the Dequetteville Terrace roundabouts both have excellent signage prior to entering the roundabouts. Why not put traffic lights at the intersection for the high level of traffic crossing the intersection particularly at peak hour. I would have thought traffic lights would have been better to control flow of traffic."

"Lights please or clearer markings everywhere or only allow left turn from the left lane. And please - something to slow drivers down in this roundabout."

"Signal control at peak times."

The trend in casualty crashes has tended to decline in the years following the 2019 roundabout upgrade, with only two casualty crashes recorded in the two years following the upgrade, compared to an average of 2.2 crashes per year in the five years before the upgrade. Due to the volatility of a low number of casualty crashes, the data is insufficient to determine that the roundabout upgrade has made a substantial improvement to safety, however the early indications are indicating a lower casualty crash rate after the upgrade than before the upgrade.

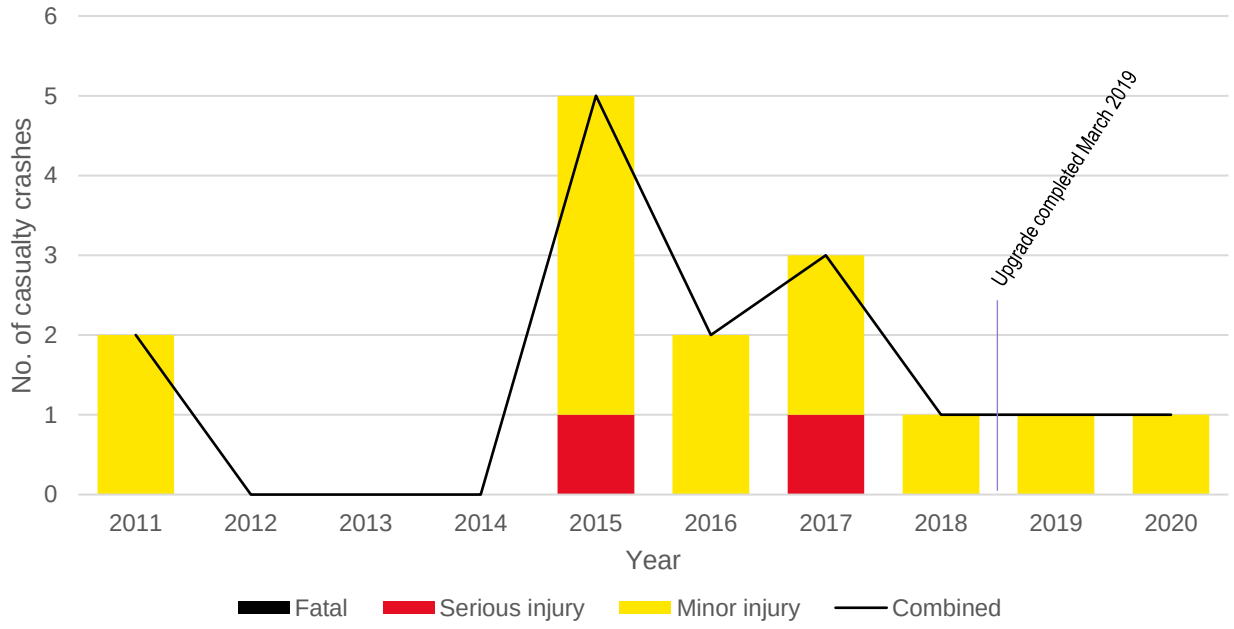


Figure 80: Ten year trend in casualty crashes at Blackwood Roundabout

Right angle crashes were the most common crash type, accounting for three quarters of casualty crashes at the intersection between 2016 and 2020.

Table 39: Casualty crash types occurring at Blackwood Roundabout (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Right angle	6	5	1	5	1
Rear end	2	2	0	2	0
Total	**8**	**7**	**1**	**7**	**1**

There have been no significant trends in casualty crash locations at the roundabout over the past five years, with the eight crashes occurring in six different locations. Both crashes following the 2019 upgrade were right angle crashes, with one involving a vehicle entering from Shepherds Hill Road, and another involving a vehicle entering from Coromandel Parade.

The crash diagram shows a right angle crash involving a vehicle entering the roundabout from Station Road. This crash occurred prior to the 2019 upgrade that eliminated the Station Road roundabout entry.

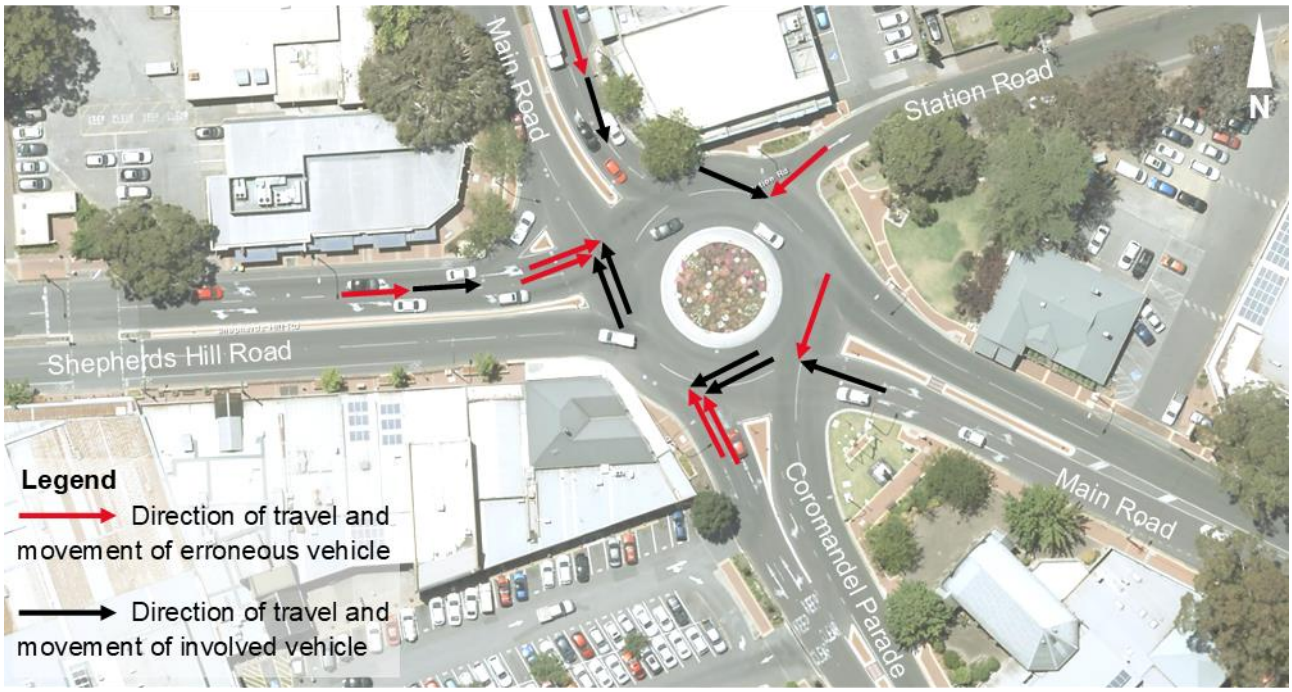


Figure 81: Diagram showing the crash types and directions at Blackwood Roundabout between 2016 and 2020

Some minor signage and pavement arrow improvements have been made since the 2019 upgrade, however, RAA is not aware of any further plans to upgrade the intersection.

Final comment

Blackwood Roundabout is still of high concern to regular users. Its lower ranking in the 2021 top ten list compared with previous surveys may indicate that drivers are more familiar with the changes made in 2019, however it is clear that there is still a high level of concern.

The two most significant issues with the current design are

- The high approach speeds and lack of horizontal deflection for northbound traffic on Coromandel Parade, and
- Conflict between traffic in the right lane of Shepherds Hill Road travelling onto Main Road (south) and traffic in the left lane of Main Road (north) travelling onto Coromandel Parade.

RAA has developed a concept sketch which aims to address these two issues, shown in Figure 82.

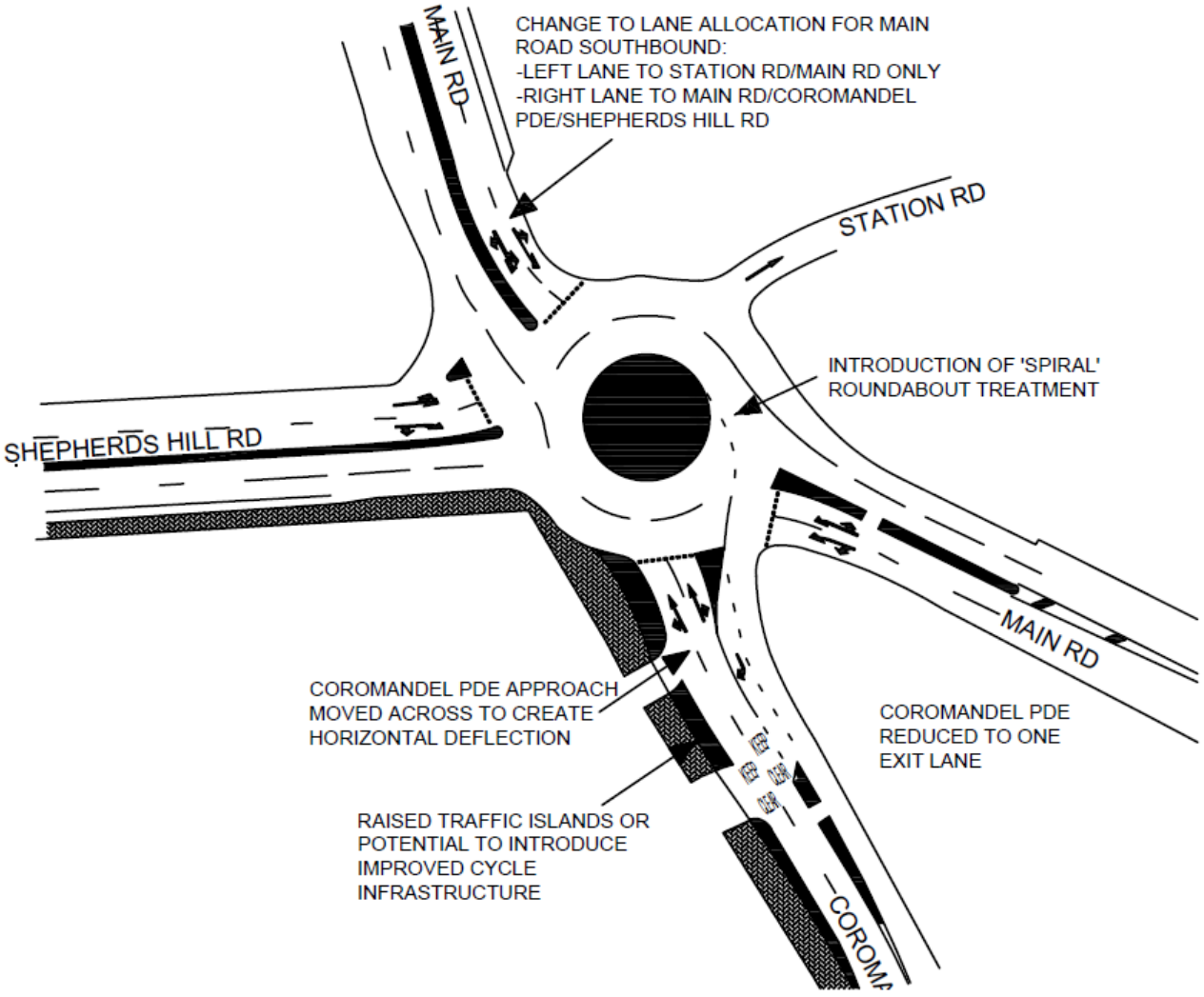


Figure 82: Sketch of potential Blackwood Roundabout improvements

This design reduces the likelihood of conflict between traffic in the right lane of Shepherds Hill Road travelling onto Main Road (south) and traffic in the left lane of Main Road (north) travelling onto Coromandel Parade by removing the option of travelling from the left lane of Main Road (north) onto Coromandel Parade. However, this means that additional traffic would use the right lane of Main Road (north), and traffic modelling to determine the impacts on queueing and lane utilisation is required.

By making the above change, the Coromandel Parade departure leg can be reduced to a single lane, which frees up space on Coromandel Parade to introduce additional horizontal deflection. Additional benefits are that it eliminates the zip merge on Coromandel Parade and makes it safer for pedestrians to cross Coromandel Parade using the refuge island. This change will result in naturally lower speeds through the roundabout for northbound traffic on Coromandel Parade. It may also be desirable to augment this with a flat top speed hump to further limit vehicle speed.

In isolation, a flat top speed hump on the Coromandel Parade approach is worth considering, regardless of what modelling of the above design indicates. Should the approach remain tangential to the roundabout, this will be an effective method of reducing the approach speed of vehicles. Furthermore, fully raising the circulating carriageway of the roundabout would be another option to consider, which could result in a reduction in approach speeds on every approach to the roundabout.

RAA would strongly support the installation of advance directional signage mounted on overhead gantries on each approach to the roundabout. This would replace the existing advance direction signage, mounted above the footpath in a less conspicuous location.

Intersection signalisation is feasible; however, this could be detrimental to traffic flow unless road widening were to occur, resulting in substantial land acquisition.

Strathalbyn Road and Whites Road, Flaxley

Ranking	6			
Total nominations	12			
Top 3 issues	Tight curves or blind crests | Poor sight distance | Inadequate crossing or turning opportunity			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	0	0	0	0

The intersection of Strathalbyn Road and Whites Road was nominated sixth highest in the 2021 Risky Roads survey and is the first time the intersection has featured in a Risky Roads top ten list.

The intersection is located in Flaxley, between Echunga and Macclesfield, within the District Council of Mount Barker. Strathalbyn Road is an arterial road under the care and control of DIT and carries an average of 1,000 vehicles per day. Whites Road is under the care and control of Mount Barker District Council and functions as a local collector road to the localities of Flaxley, Green Hills Range and Meadows, and is part of an indirect route between Meadows and Mount Barker, and as such does not carry a high traffic volume.

The primary issue raised in nominations for the intersection was to do with sight distance when turning right from Strathalbyn Road onto Whites Road due to a blind curve near the intersection. As such, the top 5 issues nominated were all to related to this, and were:

1. Tight curves or blind crests, in 69% of nominations
2. Poor sight distance, in 54% of nominations
3. Inadequate crossing or turning opportunity, in 31% of nominations
4. Poor or confusing road/intersection layout, in 23% of nominations
5. Vegetation/objects block visibility, in 23% of nominations

Figure 83: Sight distance is extremely poor when turning right from Strathalbyn Road onto Whites Road

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, respondents consistently highlighted the poor sight distance when turning right onto Whites Road. To reduce risk, respondents made a range of suggestions including installing convex mirrors, reducing speeds, removing vegetation and embankment slopes, and intersection realignment.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"This is a blind corner. Every day residents put their lives on the line to turn right into Whites Rd. You cannot see any oncoming traffic. Strathalbyn Road is an 80km/h road, there has been many near misses but thankfully no deaths."

"There have been several close calls that we know about from community members who are aware that it is a dangerous intersection. Therefore, I imagine there would be lots more from others that we don't know about. Coming from Flaxley and turning right onto Whites Road, you cannot see around the corner to know when it is clear. When towing a trailer or for trucks who need more time, there is soon to be a "T Bone" accident at the bare minimum. At the moment locals are turning before the intersection onto a strip of dirt on the wrong side and slowly progressing toward the intersection. Much safer but against the road rules. What do we do, risk our life every turn or break the law?"

"When approaching the intersection from the Flaxley side along the Strathalbyn Road, it's a game of Russian Roulette. It's impossible to see for oncoming traffic until one is already committed to the turn into Whites Road. I actually dread it for my family and myself."

Question: What do you think would be the most effective way to reduce this risk?

"It would be great to have a large mirror installed to be able to see if there is any oncoming traffic. Or make a proper turn right lane where oncoming traffic can be seen."

"Reduce speed limit sign to 50km/h when someone is turning at corner like Paris Creek/Meadows intersection so people hopefully slow down. Making the road straighter to avoid blind corner."

"Remove verge on the eastern side to create more visibility."

"Intersection needs to be moved 150 metres to ensure sight of oncoming traffic."

"Provision to turn into Whites Rd earlier, ie crossing Strathalbyn Road at a point where line of sight includes oncoming traffic from a safe distance."

No casualty crashes were recorded at the intersection in the decade between 2011 and 2020. However, in this instance, a lack of crash history is not an indicator that the intersection is safe. When turning right from Strathalbyn Road southbound onto Whites Road westbound, there are two critical sight distance measures for traffic on Strathalbyn Road, both of which are very poor for this intersection.

Firstly, for vehicles turning right from Strathalbyn Road, sight distance (measured along the carriageway) to northbound traffic approaching on Strathalbyn Road is only about 50m. This sight distance measurement is called the 'minimum gap sight distance', and is important for right turning drivers, and should be sufficient to allow a driver sufficient time to judge a safe and appropriate gap

in traffic. *Austroads Guide to Road Design Part4A: Unsignalised and Signalised Intersections*[20] indicates that this minimum gap sight distance for an intersection on an 80km/h two-lane two-way road should be at least 89m, and this is assuming a minimum value for gap acceptance time of four seconds.

Secondly, for northbound vehicles approaching the intersection on Strathalbyn Road, the sight distance (measured along the carriageway) to the point of conflict is about 70m. This sight distance measurement is called the 'safe intersection sight distance', and is important for northbound drivers, and should be sufficient for a driver to observe a potential hazard, and then make a safe and appropriate reaction, which would bring the vehicle to a stop before any conflict point. The measurement is essentially how far back a northbound vehicle can observe a vehicle turning right across the intersection. In this instance, the Austroads guide indicates that this safe intersection sight distance (for cars) should be 174m, given a standard 3 second observation time and 2 second reaction time, and assuming a 4% upgrade on approach to the intersection.

RAA is not aware of any upgrade works planned at this intersection.

Final comment

Sight distance is an obvious issue at the intersection with Strathalbyn Road and Whites Road, and current measurements are far below the recommended minimum values specified in *Austroads Guide to Road Design Part4A: Unsignalised and Signalised Intersections*.

To achieve the Austroads recommended sight distance values, the embankment on the inside of the curve would have to be cut back approximately eight metres at the apex of the curve. This would result in the loss of more than a dozen trees situated on the inside of the curve and may require some land acquisition. These embankment works would also create sufficient space for a southbound right turn lane to be installed. This would be RAA's preferred treatment to improve safety at the intersection.

Alternatively, Whites Road could be realigned 50m to 100m to the north, which would improve the sight distance without impeding on existing vegetation, however, this would require far more substantial land acquisition.

A less invasive treatment may be to reduce the speed limit through the intersection. However, RAA would expect compliance with a reduced speed limit to be low, given the surrounding roadside environment. Even at 60km/h, the Austroads recommended sight distances are not met.

While usually used to detect vehicles on a minor road approach, an RJAWS type system could also be appropriate. However, this would require a channelised right turn lane be installed on Strathalbyn Road to differentiate through traffic and right turning traffic, which would likely require cutting into the embankment – negating the benefits of this as a low-cost alternative.

[20] Austroads, 2021, *Guide to Road Designn Part 4A: Unsignalised and Signalised Intersections*, page 14 – 28, accessed at <https://austroads.com.au/publications/road-design/agrd04a>.

Gepps Cross five-way, Gepps Cross

Ranking	7			
Total nominations	10			
Top 3 issues	Poor or confusing road/intersection layout | Inadequate crossing or turning opportunity | Inefficient or ineffective traffic signals			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	23	27	3	0

The Gepps Cross five-way is the major five-way intersection between Main North Road, Grand Junction Road and Port Wakefield Road, in Gepps Cross and was previously nominated as the fourth riskiest intersection in the 2013 survey, and third riskiest in the 2019 survey.

The intersection is within the City of Port Adelaide Enfield, and all five approach roads to the intersection are under the care and control of DIT. However, Grand Junction Road is also part of the National Land Transport Network, forming part of the link between the South Eastern Freeway and the North-South Corridor. Port Wakefield Road was also once part of this network, but it has since been replaced by the North-South Motorway and Northern Connector.

On average, about 84,000 vehicles travel through the intersection each day, making it one of South Australia's busiest intersections. Freight movements through the intersection are also high, and commercial vehicles account for 8% of all traffic, or more than 6,500vpd. This is highest on Grand Junction Road, where commercial vehicles account for up to 11% of all traffic.

Four in five nominations for the intersection cited a poor or confusing intersection layout, while half indicated that there were inadequate crossing or turning opportunities at the intersection. The top 5 issues nominated at the intersection were:

1. Poor or confusing road/intersection layout, in 80% of nominations
2. Inadequate crossing or turning opportunity, in 50% of nominations
3. Inefficient or ineffective traffic signals, in 20% of nominations
4. Poor or no edge line markings, in 20% of nominations
5. Poor or no road markings, in 20% of nominations

Figure 84: The Gepps Cross five-way is wide and expansive to facilitate most turning movements

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, respondents highlighted issues with confusion and congestion, especially in the right turn lane from Grand Junction Road onto Main North Road/Port Wakefield Road. To reduce risk, respondents suggested several improvements, including introducing additional right turn capacity from Grand Junction Road to head north, and major upgrades involving grade separation.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Turning right onto Main North Road or Port Wakefield Road can be confusing and has the potential of turning right into oncoming traffic travelling the opposite direction. The turning right lane is a single lane and has inadequate light signal rotation. The traffic backs up for hundreds of metres during peak hours particularly. It's literally quicker to travel straight up Grand Junction Road and make a u-turn to then turn left onto Main North Road or Port Wakefield Road. I avoid this intersection at all costs."

"Used by semi-trailers all hours of the day and night. Very busy intersection indeed. Something needs to be done to keep the traffic flowing smoothly there as it's a dog's breakfast at present. The white lines are non-existent and there are not enough travelling lanes in each direction. A tunnel or overpass is long overdue. Frightening to drive that road at times."

"There is only 1 lane if turning right from Grand Junction Road onto either Main North Road or Port Wakefield Road. As there is only one lane, it blocks off the lane that is continuing along Grand Junction Road."

Question: What do you think would be the most effective way to reduce this risk?

"Have 2 lanes for traffic continuing along Grand Junction Road and 2 lanes for vehicles turning right onto Main North Rd. As there are numerous trucks using this intersection, one continuing lane is blocked off because of the long line of traffic waiting to turn right."

"Main North Road should merge into Port Wakefield Road north of intersection."

"An overpass on either of the main roads."

Casualty crashes at the intersection have tended to decline over the decade, with the annual average number of crashes more than twice as high for the 2011-2015 period (10.6 per year) compared to the 2016-2020 period (4.6 per year).

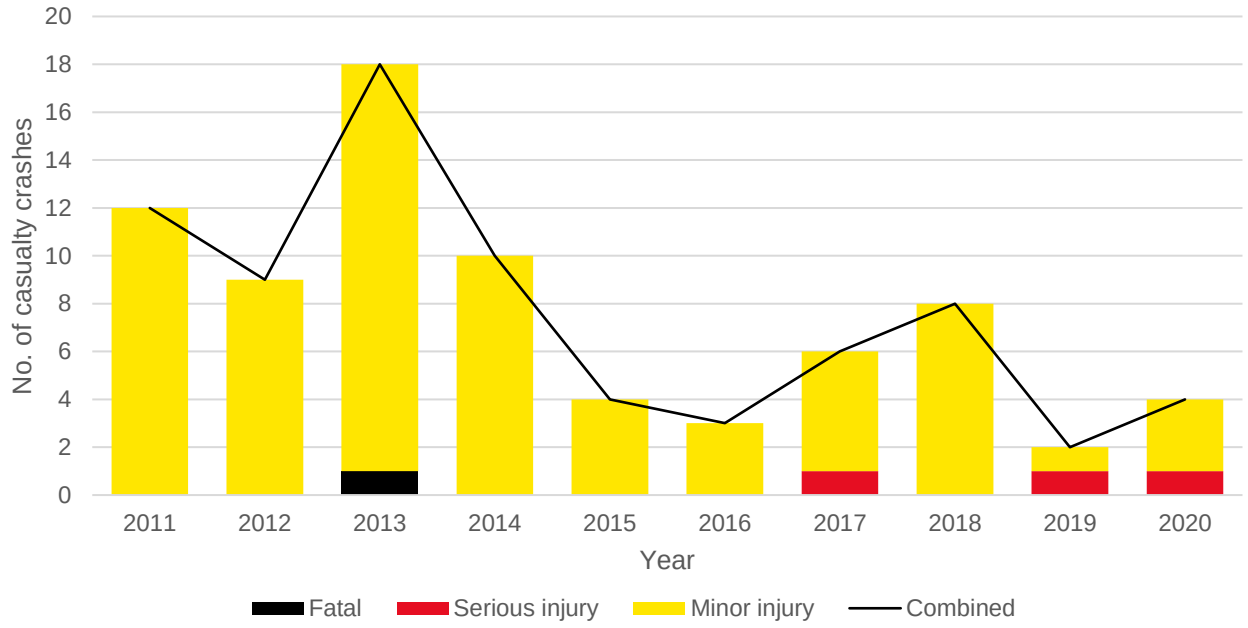


Figure 85: Ten year trend in casualty crashes at the Gepps Cross five-way

Over the five years between 2016 and 2020, rear end crashes made up 70% of all casualty crashes occurring at the intersection, potentially indicating congestion and queueing issues.

Table 40: Casualty crash types occurring at the Gepps Cross five-way (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Rear End	16	15	1	21	1
Right Angle	3	2	1	3	1
Side Swipe	2	1	1	1	1
Right Turn	2	2	0	2	0
Total	**23**	**20**	**3**	**27**	**3**

Rear end crashes most frequently occurred on the Grand Junction Road approaches to the intersection, with five in the eastbound direction and four in the westbound direction. There were no significant trends with turning or side swipe crashes, which occurred in a range of locations.

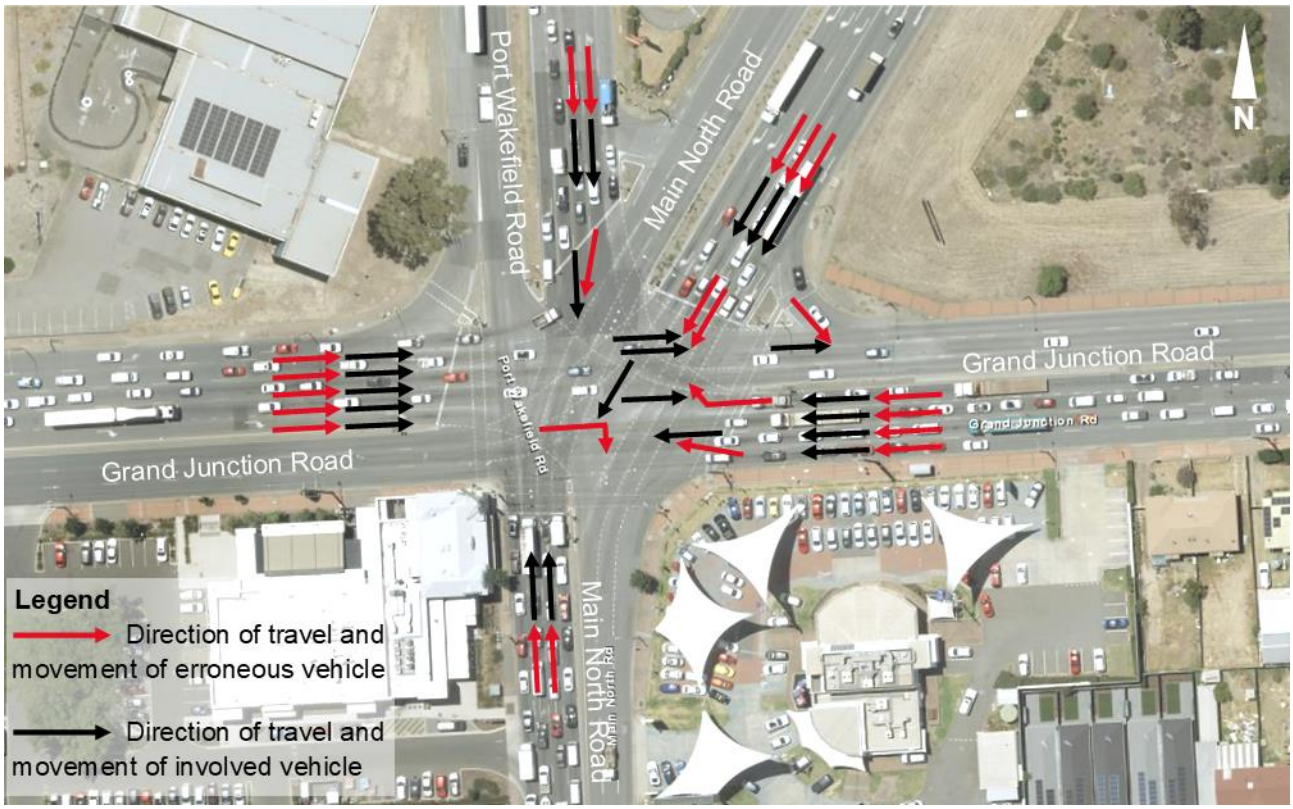


Figure 86: Diagram showing the crash types and directions at the Gepps Cross five-way between 2016 and 2020

Whilst there are no immediate plans to upgrade the intersection, RAA is aware of a planning study being conducted under a $10m *Transport Network Planning Studies Program*. This is one of over 30 transport planning studies being undertaken across metropolitan Adelaide.

Final comment

The Gepps Cross five-way is well known for being a busy and confusing intersection. Major infrastructure upgrades progressing the North South Corridor have resulted in some reduction in traffic on the north-south movements through the intersection, with traffic volumes reducing by about 10% since 2010 on Port Wakefield Road and Main North Road. However, during this time, traffic on Grand Junction Road has increased by about 10%.

RAA considers the current planning study an important step towards progressing a much needed upgrade at this intersection, and consider grade separation to be an appropriate mid-long term goal – which would improve safety and efficiency for tens of thousands of daily motorists.

Glynde Corner, Glynde

Ranking	8			
Total nominations	7			
Top 3 issues	Poor or confusing road/intersection layout | Inefficient or ineffective traffic signals | Inadequate crossing or turning opportunity			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	28	35	1	0

Glynde Corner is the intersection with Payneham Road, Lower North East Road, Glynburn Road and Montacute Road, in Glynde. The intersection has not previously been nominated in a Risky Roads top ten intersection list, however, Payneham Road was highly raised during our 2020 Risky Rides campaign, which identified locations that cyclists found risky on the road network, with many of the complaints in relation to this intersection.

All roads at the intersection are under the care and control of DIT, and the intersection is on the boundary of the City of Campbelltown and the City of Norwood, Payneham and St. Peters. On average, the intersection carries an average of 60,000 vehicles per day, with the busiest legs being Payneham Road and Lower North East Road, which individually carry more than 40,000 vehicles per day.

Most nominations for the intersection were for a poor or confusing layout and inefficient traffic signals. The top 5 issues nominated at the intersection were:

1. Poor or confusing road/intersection layout, in 57% of nominations
2. Inefficient or ineffective traffic signals, in 43% of nominations
3. Inadequate crossing or turning opportunity, in 29% of nominations
4. Confusing signs or line marking, in 29% of nominations
5. Lacks turning/acceleration lanes, in 14% of nominations

Figure 87: Glynde Corner is a busy intersection, and a notorious crash hotspot.

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, respondents mostly highlighted capacity issues with the right turn lanes from Payneham Road onto Montacute Road and Glynburn Road To reduce risk, respondents made several suggestions including adjusting signal phasing, introducing additional right turn lanes, and a major overhaul of the intersection.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Coming towards the intersection from Payneham Road - the different directions are poorly done and lead people to do weird/dangerous movements to get around traffic or change lanes, as the amount of demand for the turning lanes is incredibly high."

"Build-up of right turning traffic into Glynburn Road from city creates a bottleneck, right arrow does not allow enough traffic to clear intersection."

"My brother recently collided with a car at this intersection. The angles of the connecting roads and position of the lights can confuse motorists as to which road has priority. This led to the driver of the car inadvertently entering the intersection against a red light leading to the collision."

"As Campbelltown grows with the huge volume of housing each year, the intersection is not large enough to take the flow. Add to that schools off Montacute Road adding to greater congestion."

Question: What do you think would be the most effective way to reduce this risk?

"Change light sequence and improve road surface."

"Perhaps the two turning lanes could commence earlier and have adequate markings so that motorists know which lane is for Glynburn Road and which lane is for Montacute Road. I believe this may help prevent traffic banking up on Payneham Road."

"Redesign the intersection to close Alford Road at Payneham Road, increase the east bound lanes on Montacute Road from one to two, and increase the straight-ahead lanes on Payneham Road to Montacute Road from one to two. Add a small concrete road barrier on Payneham Road to separate the two short lanes from the two main lanes that veer left onto Lower North East Road to prevent barging."

"Traffic light system needs to change so all lanes from Payneham Road turn at same time allowing cars to turn onto Lower North East Rd as well as Montacute Road and Glynburn Road."

Figure 88: The volume of turning traffic on Payneham Road regularly surpasses the capacity of the right turn lanes

The number of casualty crashes occurring at the intersection has remained fairly steady over the past decade, with an average of 5.5 casualty crashes occurring every year.

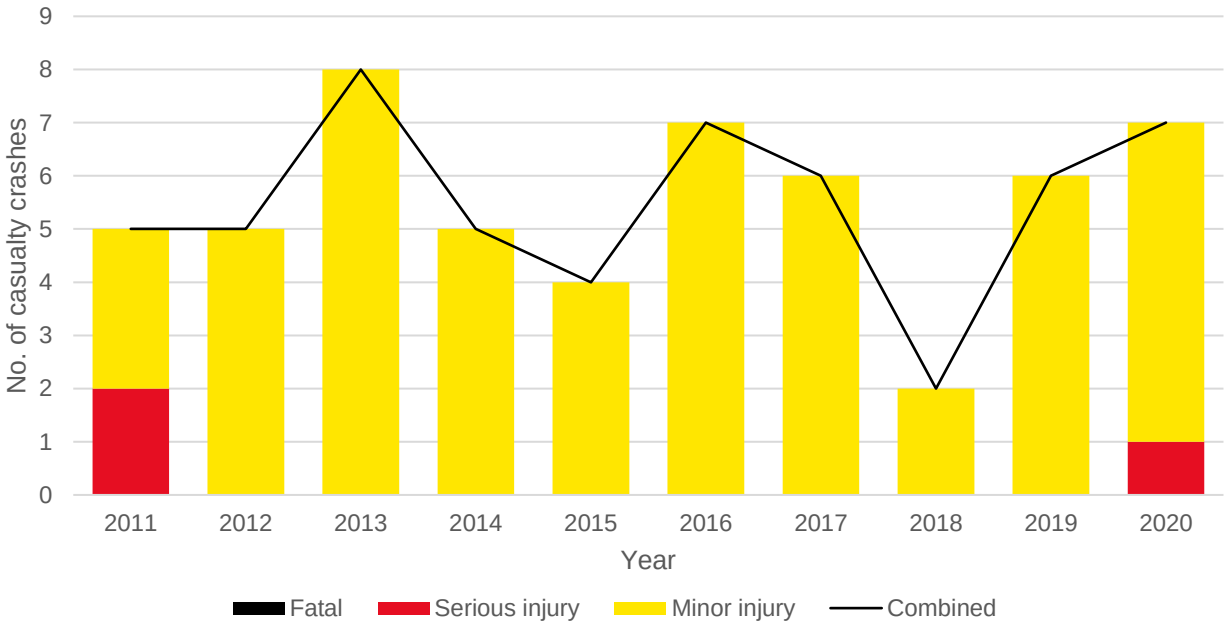


Figure 89: Ten year trend in casualty crashes at Glynde Corner

Right turn crashes are the predominant crash type that occurred at Glynde Corner between 2016 and 2020, making up almost two thirds of casualty crashes at the intersection. A high number of right turn crashes is usually highly concerning due to a higher likelihood of crashes resulting in more serious outcomes. At Glynde Corner, the skewed approaches to the intersection somewhat mitigate this higher likelihood as crash angles are less likely to be at 90 degrees.

Table 41: Casualty crash types occurring at Glynde Corner (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Right Turn	18	17	1	24	1
Rear End	6	6	0	7	0
Side Swipe	2	2	0	2	0
Hit Pedestrian	1	1	0	1	0
Right Angle	1	1	0	1	0
Total	**28**	**27**	**1**	**35**	**1**

From the crash diagram in Figure 90, it is clear that the main crash issue at the intersection involves vehicles turning right from Payneham Road. In particular, there were 10 casualty crashes involving a vehicle turning right onto Glynburn Road and a vehicle travelling straight from Montacute Road onto Payneham Road. The vehicle turning right was deemed responsible in nine of these crashes.

Also of concern are six right turn crashes involving a vehicle turning right from Payneham Road and a vehicle continuing straight ahead on Lower North East Road. The available crash data does not have enough information to determine whether Payneham Road traffic was turning onto Montacute Road or Glynburn Road, or whether Lower North East Road traffic was turning onto Glynburn Road or Payneham Road, however, based on a review of signal phasing, it is considered more likely that they involve traffic turning from Payneham Road onto Montacute Road.

Furthermore, not shown on the crash diagram is a crash between an eastbound vehicle and a northbound pedestrian. In this crash, the northbound pedestrian was determined to be responsible for the crash.

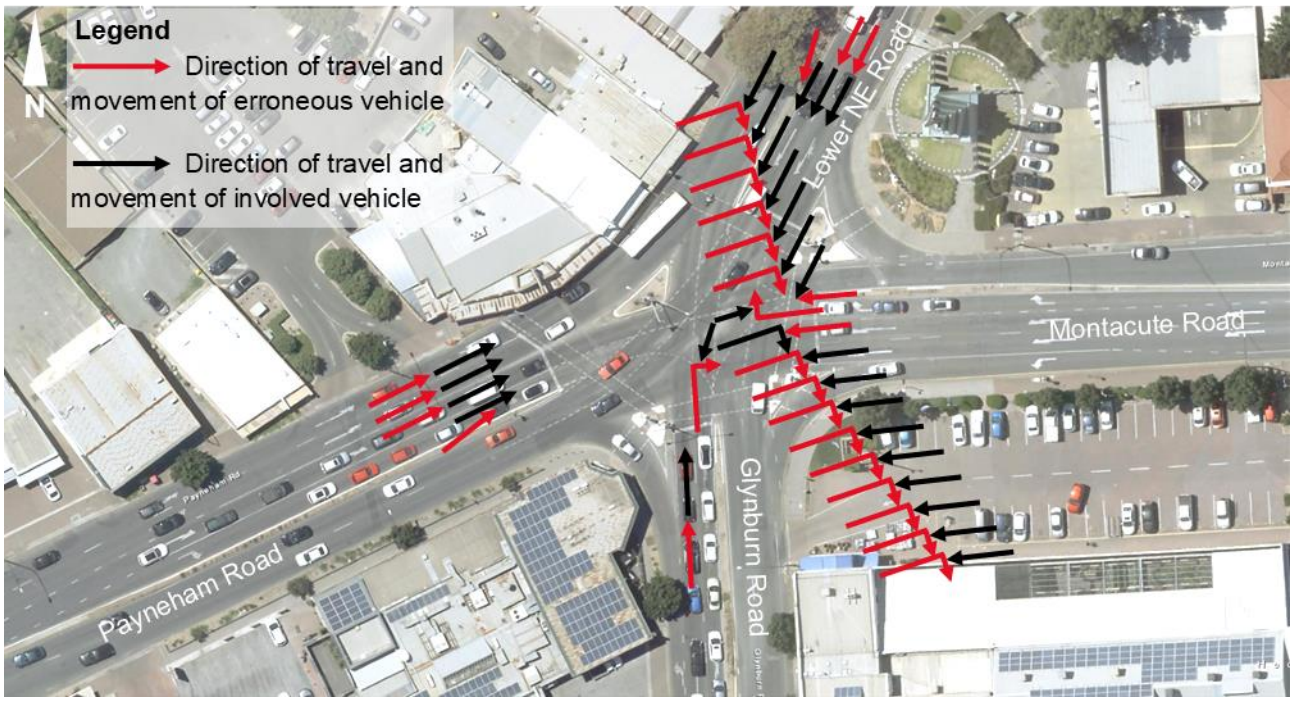


Figure 90: Diagram showing the crash types and directions at Glynde Corner

In general, a high number of right turn crashes can indicate several issues, including

- An inappropriate location for filter turns (not applicable at this intersection),
- A potential capacity issue (running a red light at the end of green phase)
- A potential driver confusion issue causing red light running (e.g. Payneham Road drivers starting a right turn as green phase starts for Payneham Road onto Lower North East Road)

After reviewing traffic signal phasing, and given the nature of complaints for this intersection, RAA considers that these crashes are more likely to be due to the low right turn capacity from Payneham Road onto Glynburn Road/Montacute Road, and that introducing additional right turn capacity may alleviate these crash types.

RAA is not aware of any significant upgrades planned for this intersection.

Final comment

Between 2016 and 2020, Glynde Corner had the seventh highest number of casualty crashes across all intersections in South Australia. This is largely due to the trend in right turn crashes from Payneham Road, which made up about two thirds of casualty crashes at the intersection over this five-year period. This aligns with community feedback, which was focussed on the right turn movements from Payneham Road.

Extending the length of the right turn lanes will introduce some additional space for queueing and reduce the conflict between right turning traffic and traffic bound for Lower North East Road, however, this will do little to resolve extended periods of queuing to turn right. Improvements to intersection efficiency are required to address this. This could be directly, in the form of additional turn lanes on Payneham Road, however the road corridor is constrained by significant structures on both sides. Improvements to capacity on other approaches could benefit Payneham Road traffic indirectly. Improving throughput on other approaches, could allow for the provision of additional green time being allocated towards the right turn phase on Payneham Road. Widening of Lower North East Road to create an additional approach lane and fully separate the Glynburn Road and Payneham Road traffic streams may be one of the less invasive treatments to improving overall intersection capacity.

Ultimately, as traffic volumes continue to rise, a major intersection overhaul may be required to improve safety and ease traffic congestion at the intersection.

Bull Creek Road and Paris Creek Road, Meadows

Ranking	9			
Total nominations	7			
Top 3 issues	Poor sight distance | Tight curves or blind crests | Poor or confusing road/intersection layout			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	3	2	2	0

The intersection with Bull Creek Road and Paris Creek Road in Meadows was nominated ninth for intersections across SA. The intersection has been nominated in the survey twice previously; fifth in 2013, and seventh in 2017. In 2018, a rural junction active warning system (RJAWS) trial commenced at the intersection. This low-cost treatment uses built-in sensors to reduce the speed limit on Bull Creek Road to 50km/h only when a vehicle is approaching the intersection from Paris Creek Road.

Both roads serve a critical purpose for movement through the region and are under the care and control of DIT, whist the intersection is within the boundary of the Mount Barker District Council. An average of 3,000 vehicles use the intersection each day, and the majority of this traffic is to and from Meadows, with the left turn volume from Paris Creek Road to Bull Creek Road very low. The northern leg of Bull Creek Road carries about 3,000 vehicles each day, whilst the southern leg carries only 1,200. The Paris Creek Road leg of the intersection carries 1,800 vehicle per day.

Poor sight distance and poor intersection design were the overarching issues raised at the intersection and the top 5 issues nominated were:

1. Poor sight distance, in 86% of nominations
2. Tight curves or blind crests, in 43% of nominations
3. Poor or confusing road/intersection layout, in 29% of nominations
4. Inadequate crossing or turning opportunity, in 14% of nominations
5. Confusing signs or line marking, in 14% of nominations

[INSERT IMAGE]

Figure 91: [image of road if available]

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, respondents all highlighted the poor sight distance for drivers entering Bull Creek Road from Paris Creek Road. To reduce risk, respondents suggested redesigning the intersection to square up the Paris Creek Road approach and improve sight distance. Several respondents acknowledged the RJAWS system but held reservations about its effectiveness given that it relies on drivers reducing speed, which doesn't always occur.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

> "For a driver approaching the Bull Creek [main] Road from along Paris Creek Road, unless the driver knows of the long view available to the south, that when arriving at the t-intersection, they will find gaining a very clear view of the Bull Creek Road to the left is VERY difficult and requires a bit of "craning" the neck and the flexibility of a contortionist in order to maybe get a clear view. This T-intersection was maybe okay back in the slow-moving horse and buggy era but in our modern era, it should be totally remade so to remove every piece of the late 1800's poor road design for the 2000's."

"This has always been a dangerous intersection. Speed sensors have been put on Bull Creek approach, but I can't see these as being effective. By removing a small hill, sight would be fine. It is also an angled road. There has been a fatality and several collisions.."

"The stop sign on Paris Creek Road is fine. There is a 50km/h speed limit when a vehicle approaches the intersection however this is a popular motorcycle route and even at 50km/h, a collision could be fatal. It is very likely that motorcycles are going faster. Visibility when at the stop sign is non-existent. Each time that you stop, it's heart in mouth before proceeding despite 50km/h speed limit.."

Question: What do you think would be the most effective way to reduce this risk?

"Widening the intersection on the Paris Creek side and have the road at right angle to Bull Creek Road and not a 45 degree angle."

"All this intersection needs is one of those convex mirrors so that motorists can see what is coming on their left. It is physically impossible to crane your neck enough to see clearly for any distance."

"Close while the massive remodelling of the T-Intersection is underway. All traffic to be diverted to Ashbourne."

"Remove a small hill obscuring the view."

Four casualty crashes occurred at the intersection over the past decade, with three occurring in the most recent five-year period. The RJAWS was installed in late 2018, after three casualty crashes occurred in the 18 months prior, including two resulting in serious injuries. RAA are not aware of any casualty crashes occurring since installation.

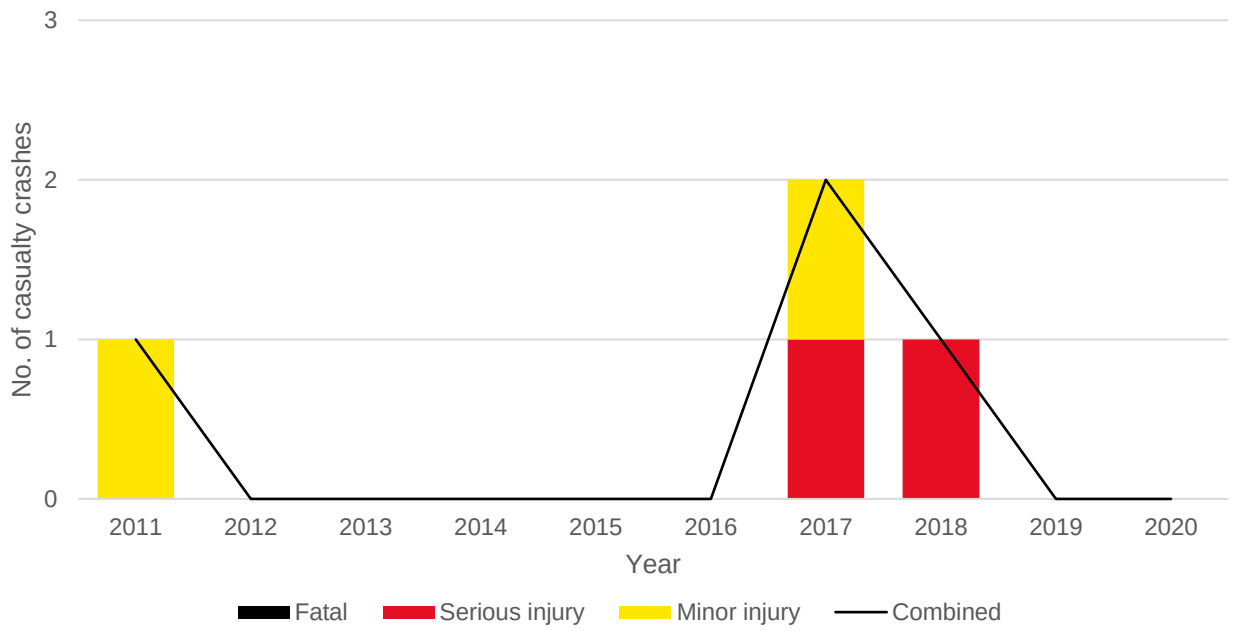


Figure 92: Ten year trend in casualty crashes at the Bull Creek Road/Paris Creek Road intersection

The three crashes between 2016 and 2020 included two right angle crashes, and one rollover crash.

Table 42: Casualty crash types occurring at the Bull Creek Road/Paris Creek Road intersection (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Right angle	2	1	1	2	1
Roll over	1	0	1	0	1
Total	**3**	**1**	**2**	**2**	**2**

Whilst all three crashes at the intersection between 2016 and 2020 were in different circumstances, each involved a southbound vehicle on Bull Creek Road and can potentially be linked to poor visibility to the approaching intersection when travelling south.

- One was a right angle collision between a southbound motorcycle, and a vehicle turning right from Paris Creek Road.
- One was a right angle collision between a vehicle turning left onto Paris Creek Road and a vehicle stopped on the carriageway of Paris Creek Road to turn right.
- One was a rollover, involving a southbound vehicle turning left onto Paris Creek Road.

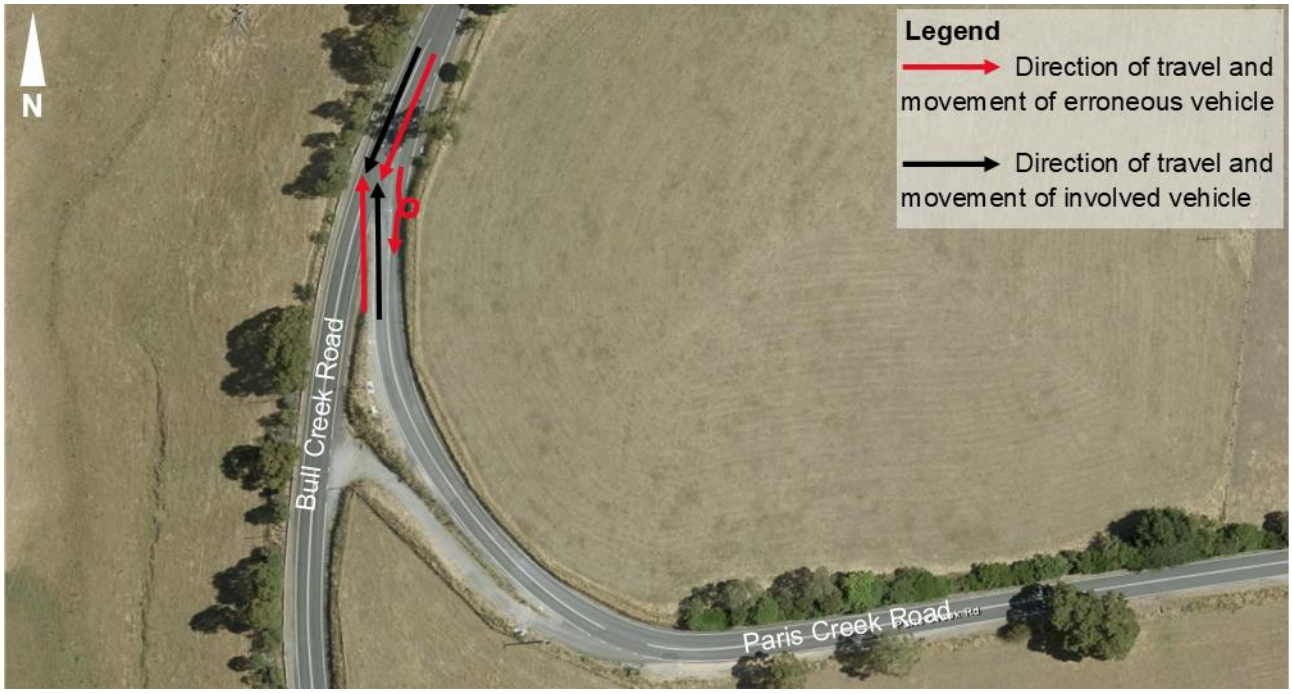


Figure 93: Diagram showing the crash types and directions at the Bull Creek Road/Paris Creek Road intersection between 2016 and 2020

RAA is not aware of any planned upgrades at this intersection.

Final comment

The notorious junction of Bull Creek Road and Paris Creek Road still causes concern to the local community, due to its poor sight distance. RAA welcomed the addition of the RJAWS at the intersection, installed in 2018, and RAA are not aware of any casualty crashes occurring at the intersection since installation.

An evaluation by the Centre for Automotive Safety Research[21] in 2021 reviewed behaviour change at the four trial RJAWS sites implemented in 2018 and how this translated the risk of casualty crash occurring and found that the RJAWS effectively caused drivers to reduce their speed when travelling through these intersections.

Data for this intersection shows that a significant change in behaviour occurs when the reduced speed is activated despite compliance with the 50km/h being relatively low. More than 71% of drivers travel at 60km/h or below through the intersection when the 50km/h signs are activated, compared to 33% of drivers that would travel 60km/h or below through the intersection before the trial. Overall, the results indicated that the expected casualty crash risk reduced by an average of 50% across the four trial sites.

Regardless of these positive results, the intersection by design is still unsafe due to the poor sight distance and potentially high travel speeds, however RAA acknowledges that the RJAWS has substantially reduced the risk of serious crashes occurring.

RAA considers that a major upgrade to improve approach angles and sight distance will ultimately be necessary at this intersection, especially as traffic volumes increase. However, RAA also acknowledges that there would be a significant cost required to achieve a worthwhile infrastructure upgrade at the intersection to align with current design guidelines and best practice, and that current funding could be channelled more effectively into other safety upgrades in the area.

RAA will continue to monitor data at this intersection and across other intersections treated with the RJAWS.

[21] Mario Mongiardini, Christopher S. Stokes & Jeremy E. Woolley (2021): *Evaluation of a warning system to reduce the risk of casualty crashes at rural junctions in South Australia, Traffic Injury Prevention*, DOI: https://doi.org/10.1080/15389588.2021.1905160

Main South Road and Sellicks Beach Road, Sellicks Beach

Ranking	10			
Total nominations	6			
Top 3 issues	Inadequate crossing or turning opportunity | Lacks turning/acceleration lanes | Inappropriate speed limit			
5 year crash data (2016 – 2020)	Casualty crashes	Minor injuries	Serious injuries	Fatalities
	4	5	0	0

The intersection with Main South Road and Sellicks Beach Road was nominated tenth for intersections overall in the 2021 Risky Roads survey and is the first time the intersection has appeared in a Risky Roads top ten list.

The intersection is located in Sellicks Beach, within the City of Onkaparinga. Main South Road is an arterial road under the care and control of DIT, and carries an average of 8,100 vehicles per day, whilst Sellicks Beach Road is a collector road under the care and control of the City of Onkaparinga. Both roads can experience significant seasonal fluctuations in traffic, due to the popularity of the region for tourism in summer months.

Most issues raised at the intersection related to a lack of turning lanes and poor turning opportunities, whilst several respondents felt the 90km/h speed limit was inappropriate. The top 5 issues nominated at the intersection were:

1. Inadequate crossing or turning opportunity, in 67% of nominations
2. Lacks turning/acceleration lanes, in 67% of nominations
3. Inappropriate speed limit, in 50% of nominations
4. Poor or confusing road/intersection layout, in 33% of nominations
5. Lacks overtaking opportunities, in 33% of nominations

Figure 94: Poor sight distance when turning on to Main South Road from Sellicks Beach Road

Survey respondents were given open response fields to describe the issues and provide their suggestions as to how the risk should be reduced. When asked what else they found risky about the intersection, respondents highlighted that turning right onto Sellicks Beach Road was dangerous due to the high speed limit and lack of turning lanes. To reduce risk, respondents were supportive of installing a right turn lane, with other suggestions to reduce the speed limit and replace the existing give way sign with a stop sign.

Question: Is there anything else you'd like to tell us about this road that makes it risky?

"Vehicles travelling on Main South Road have a 90km/h speed limit and there isn't a turning lane onto Sellicks Beach Road."

"Dangerous for turning traffic in to Sellicks Beach. I always get nervous."

"The corner of Sellicks Beach Road and South Road on top of a hill with a bend."

Question: What do you think would be the most effective way to reduce this risk?

"Put in turning lane reduce speed limit."

"Install a right turning lane at Sellicks Hill, heading south along Main South Road."

"Change it to a stop sign."

Whilst casualty crash numbers are low, all four casualty crashes over the past decade occurred between 2017 and 2020, indicating a potential upwards trend.

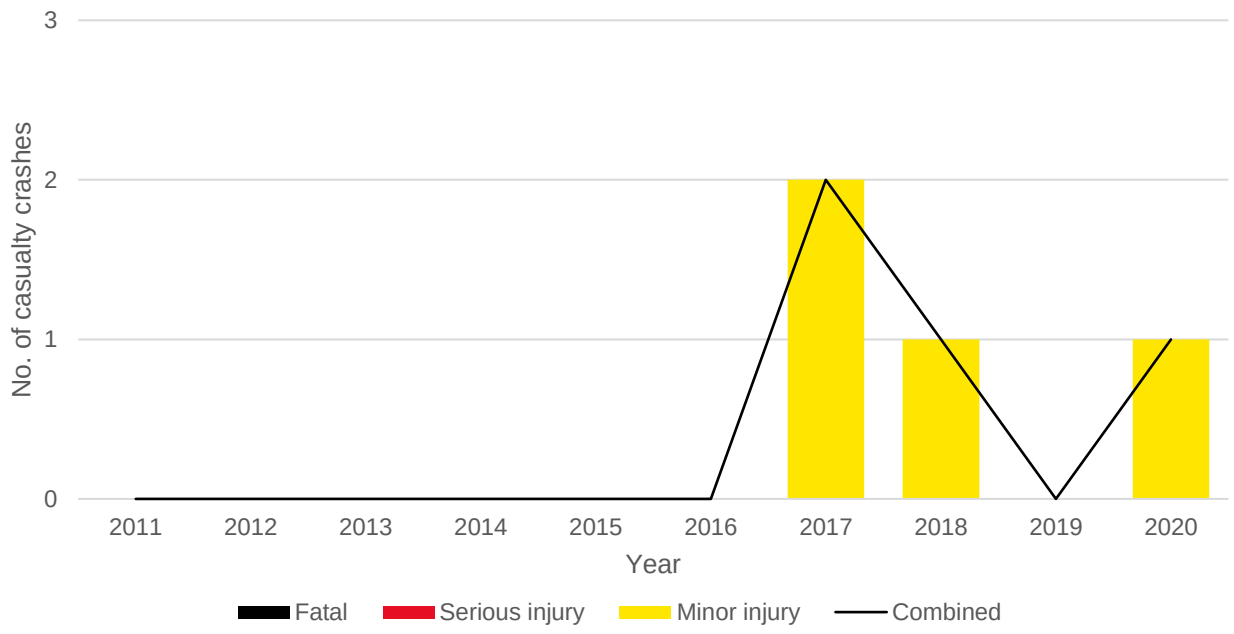


Figure 95: Ten year trend in casualty crashes at the Main South Road/Sellicks Beach Road intersection

Rear end crashes accounted for two crashes at the intersection between 2016 and 2020, with one right turn and one right angle crash occurring.

Table 43: Casualty crash types occurring at the Main South Road/Sellicks Beach Road intersection (2016 – 2020)

Crash type	Number of casualty crashes	Crash severity		Number of casualties	
		Minor inj.	Serious inj.	Minor inj.	Serious inj.
Rear end	2	2	0	3	0
Right turn	1	1	0	1	0
Right angle	1	1	0	1	0
Total	**4**	**4**	**0**	**5**	**0**

There are no strong trends with the four crashes, which are all in different locations at the intersection.

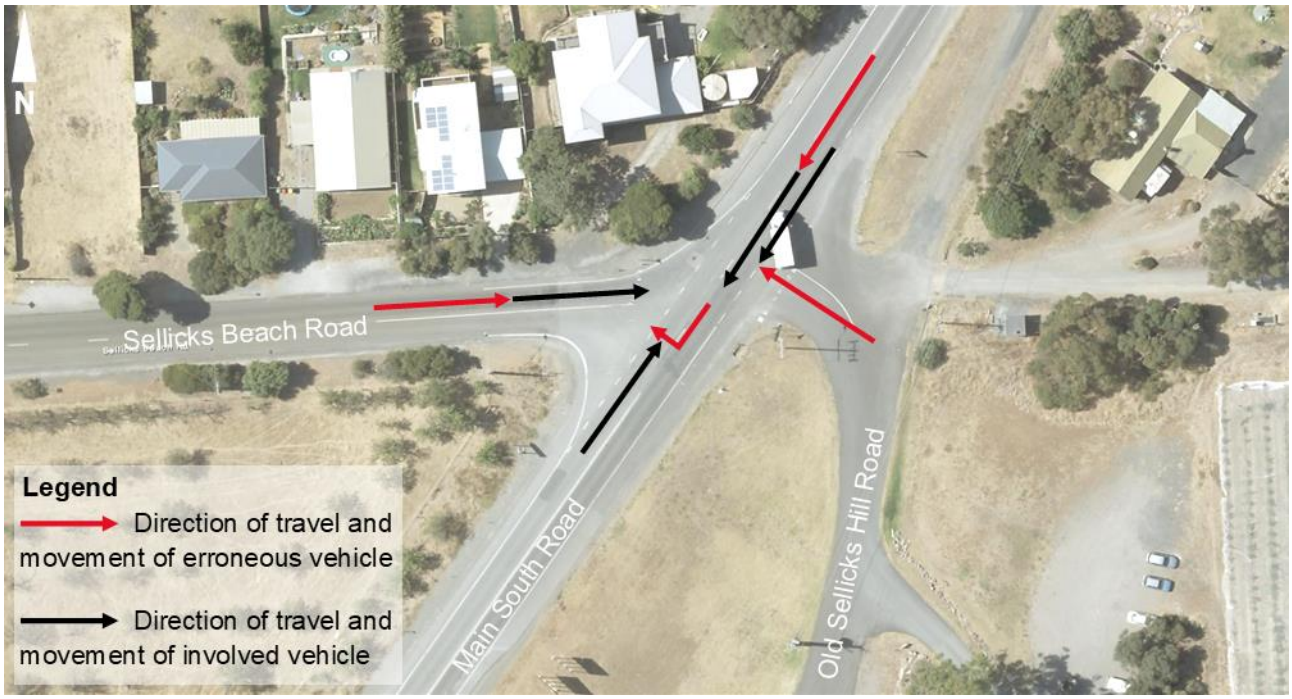


Figure 96: Diagram showing the crash types and directions at the Main South Road/Sellicks Beach Road intersection between 2016 and 2020

RAA is not aware of any planned upgrades at the intersection, however, the intersection is the end point of the second stage of the Main South Road upgrade between Seaford and Sellicks Beach. RAA considers it likely that this project will include a safety upgrade at the intersection and have raised this during submissions to the Main South Road upgrade project team.

Final comment

This busy intersection is in a highly popular tourism region, and the existing infrastructure is not appropriate for the current use of the intersection. RAA last reviewed the intersection during our 2021 *Fleurieu and McLaren Vale Regional Road Assessment*[22] and have raised an intersection upgrade at this location to be of high importance in the second stage of the Main South Road upgrade between Aldinga and Sellicks Beach.

As a minimum, the 90km/h speed limit needs to be reviewed, channelised turn lanes constructed, and pedestrian infrastructure considered (due to proximity of the Victory Hotel), noting that constructing footpaths may encourage more pedestrians to cross in this dangerous location. In conjunction with these upgrades, it is highly desirable to realign the intersection to improve sight lines and improve street lighting.

[22] RAA, 2021, *Regional Road Assessment: Fleurieu Peninsula and McLaren Vale – August 2021*, accessed at <www.raa.com.au/roadassessments>.