

2013

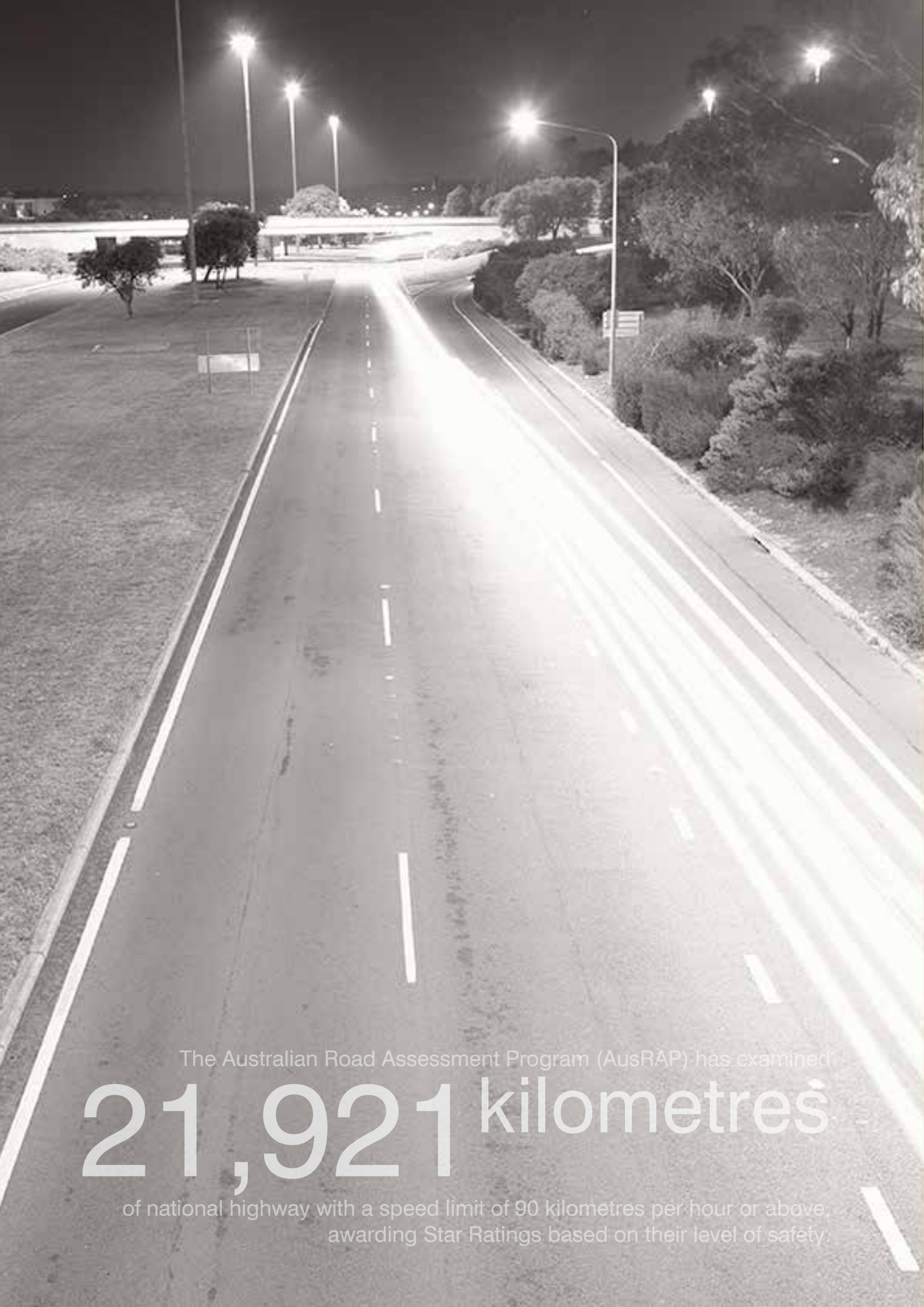


AUSTRALIAN
AUTOMOBILE
ASSOCIATION

Star Rating

AUSTRALIA'S NATIONAL NETWORK OF HIGHWAYS





The Australian Road Assessment Program (AusRAP) has examined

21,921 kilometres

of national highway with a speed limit of 90 kilometres per hour or above,
awarding Star Ratings based on their level of safety.

Star Rating

Australia's National Network of Highways



Acknowledgements

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- New South Wales Roads and Maritime Services;
- VicRoads, Victoria;
- Queensland Department of Transport and Main Roads;
- South Australian Department of Planning, Transport and Infrastructure;
- Main Roads, Western Australia;
- Tasmanian Department of Infrastructure, Energy and Resources;
- Northern Territory Department of Transport; and
- Australian Capital Territory, Territory and Municipal Services.

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Overview

Each year road crashes in Australia result in tragic levels of death and serious injury. It is essential that Australia commits to an accelerated program of upgrading our national highways.

The Australian Road Assessment Program (AusRAP) has examined 21,921 kilometres of national highway with a speed limit of 90 kilometres per hour or above, awarding Star Ratings based on their level of safety. Sections of road are rated on a scale of 1 to 5-stars, with 1-star being the least safe and 5-star being the safest. Safe roads with design elements such as dual-lane divided carriageways, good line marking and wide lanes have a higher star rating. Lower-rated roads are

likely to have single-lanes and be undivided with poor line marking and hazards such as trees, poles and steep embankments close to the edge of the road.

Figure 1 shows the Star Rating results for 2013 in the form of a map, revealing that almost 40 per cent of Australia's network is rated as either 1 or 2-star. More than 60 per cent of the network surveyed falls within the 3 to 4-star ranges. While 5-star stretches of road were identified throughout the country, these were negligible and did not register as a percentage on the national breakdown. Star Ratings are also available for every individual State and Territory as shown in **Table 1**.

Figure 1:
Star Rating
Results for 2013



Table 1: Distribution of Star Ratings by State/Territory – National Highways

Jurisdiction	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
New South Wales	4,721.6	9%	42%	46%	2%	0%
Australia Capital Territory	16.9	0%	18%	60%	21%	0%
Victoria	2,363.4	1%	22%	62%	13%	2%
Queensland	5,108.5	1%	29%	63%	6%	0%
Western Australia	4,671.4	5%	22%	57%	16%	0%
South Australia	2,041.1	14%	23%	59%	4%	0%
Tasmania	366.6	20%	46%	32%	2%	0%
Northern Territory	2,632.2	29%	32%	34%	5%	0%
Total	21,921.7	9%	30%	53%	8%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

For the first time in 2013, AusRAP has developed Safer Roads Investment Plans (SRIPs) for Australia's national highways. These plans draw on more than 50 countermeasures to generate costed* road upgrade proposals which can prevent tens of thousands of fatalities and serious injuries over a 20-year period. The plans use estimates of reductions in fatalities and serious injuries to quantify safety benefits.

Only countermeasures with a benefit cost ratio (BCR) greater than one are considered by the SRIP, indicating a positive economic return on investing in road improvements. Implementing these plans would reduce the proportion of 1 and 2-star sections of national highway and prevent casualties on Australian roads each year. SRIPs for Australia and each State and Territory are shown in **Table 2**.

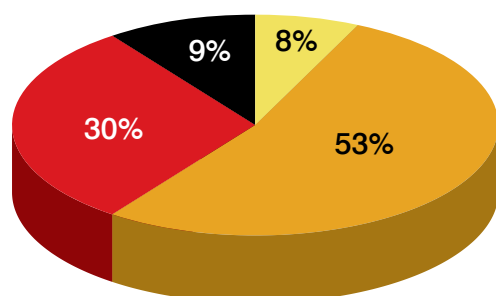
Table 2: Safer Roads Investment Plans Summaries by State/Territory (20-year period)

Jurisdiction	Fatalities and Serious Injuries Saved	Safety Benefits (\$ million)	Estimated Cost (\$ millions)	Program BCR
New South Wales	15,700	7,098	1,958	3.62
Australian Capital Territory	35	16	6	2.66
Victoria	2,700	1,223	391	3.12
Queensland	10,400	4,719	1,470	3.21
Western Australia	4,150	1,881	450	4.18
South Australia	1,900	859	187	4.59
Tasmania	400	186	74	2.51
Northern Territory	1,200	548	198	2.76
Total	36,485	16,530	4,734	3.49

The AusRAP analysis shown in **Figure 2** indicates that an investment of approximately \$4.7 billion would bring 85 per cent of the national highway network to a standard of 3-star or above with only 15 per cent comprising 1 or 2-star rated roads. The improved road conditions are estimated to prevent more than 36,000 fatalities and serious injuries nationally over a 20-year period. The AAA policy position of eliminating 3-star rated highways requires additional safety improvements. The SRIPs recommended in this report achieve the vast majority of the improvements required, but further enhancements will be required for a safer, more efficient road network.

* See Appendix B for more information.

Star Ratings Before Investment Plan



Star Ratings After Investment Plan

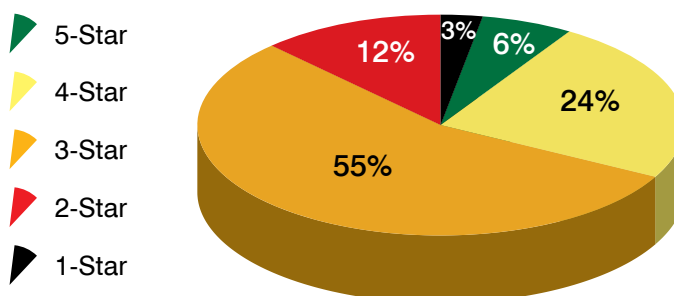


Figure 2: National Star Ratings Before and After Safer Roads Investment Plans

Policymakers need to make road safety a national priority. It is essential that steps are taken to reduce the social and economic cost of road crashes by ensuring our highways are safer for everyone. The Australian Automobile Association and the Australian

motoring clubs urge the Federal Government to work with the state and territory governments to fund the Safer Roads Investment Plans identified in this report as a first step to eliminating 1 and 2-star rated roads.

Engineering Safer Roads

The national road toll remains at unacceptably high levels, with sub-standard sections of highway being a significant contributing factor.

In 2012, road crashes killed 1,300 people and hospitalised more than 30,000 across Australia. It is estimated that road trauma costs the community \$27 billion a year, so it is essential to pursue a targeted and effective strategy to reduce the economic and human cost of road trauma.

The Australian Government and State and Territory governments have agreed on a National Road Safety Strategy 2011-2020 (NRSS) with the goal of reducing the number of deaths and serious injuries from road crashes by at least 30 per cent by 2020. Recent progress has been insufficient and we are in danger of not meeting the national road safety targets.

Mistakes, errors of judgment and poor decisions are intrinsic to humans. It has been estimated that around 1 in 500 driving decisions can be wrong, involving a mistake, an error of judgement, a missed signal or the like. Sober, drug-free, responsible drivers obeying the speed limit and wearing seatbelts frequently crash on our roads. A safe road system is designed and operated to account for human error. Safe roads minimise the chances of a crash happening and, if they do occur, they minimise the severity of the crash.

Simple, cost effective countermeasures to improve safety have the potential to prevent deaths and injuries for decades after they are implemented.

We should strive to create a genuinely safe road system in which improving the safety of drivers, vehicles and roads is of mutual importance. A road system in which we have 5-star drivers in 5-star cars on 5-star roads should involve no deaths.

The AusRAP Star Rating process identifies the national highways which lack adequate safety-enhancing design elements. It is important to focus on the national highways because they are some of the longest and most important road links in Australia. Safer Roads Investment Plans (SRIPs) provide costed engineering countermeasures to improve safety of these highways, using treatments that provide a positive return on investment.



Overall, the Star Rating process combined with SRIPs provides a valuable tool for determining funding priorities for our highways. The Star Rating also serves as an information source for motorists wishing to determine the level of safety of roads. Most importantly, this process demonstrates that implementing simple, effective countermeasures will contribute towards a reduction in the number of people being killed or seriously injured on Australia's roads. In time, this will alleviate the trauma for victims and families as well as easing the financial burden on Australia's health and welfare system.

About AusRAP

AusRAP is a program run by the Australian Automobile Association (AAA) and State and Territory motoring clubs, dedicated to saving lives through advocating for safer road infrastructure. AusRAP is part of the International Road Assessment Program (iRAP), a worldwide movement to improve the safety of roads and a proud supporter of the Decade of Action for Road Safety 2011-2020, a global plan to reduce the number of road deaths worldwide. The AAA gratefully acknowledges the financial support from the Australian Government to assist with this AusRAP project. The assistance offered by Austroads and its members, iRAP and ARRB is also greatly appreciated.

AusRAP's objectives are to:

- reduce deaths and injuries on Australia's roads by systematically assessing risk and identifying safety shortcomings that can be addressed with practical road-improvement measures; and
- put risk assessment at the heart of strategic decisions on road improvements, crash protection and standards of road management.

AusRAP works in partnership with government and non-government organisations to:

- inspect national and state highways and develop Star Ratings and SRIPs;
- track road safety performance through risk maps so that funding agencies can assess the benefits of their investments; and
- explain the benefits of safer road infrastructure to the community by describing why some roads are safer than others.

AusRAP uses four complementary methods — or protocols — for assessing the safety of roads: Risk Mapping, Performance Tracking, Star Ratings and SRIPs. Risk Maps use detailed crash data to illustrate the actual number of deaths and injuries on a road network. Performance Tracking enables the use of Star Ratings and Risk Maps to track road safety performance and establish policy positions. Star Ratings provide a simple and objective measure of the level of safety provided by a road's design. SRIPs draw on proven road improvement options to generate affordable and economically sound infrastructure options for saving lives.

Star Rating

The Star Ratings and SRIPs, which are the focus of this report, measure the inherent safety of a road's infrastructure – that is, the degree to which built-in safety features prevent crashes from occurring and reduce the severity of those crashes which do occur.

Each road is assigned a Star Rating which tells us how safe the road itself is and allows road safety improvements to be identified and costed.

AusRAP's Star Rating analyses safety features of a given road or road network. The Star Rating method for this report has been refined to account for the latest research in this area and therefore the results cannot be compared to previous AusRAP results. Further details on the AusRAP methodology are contained in the appendix of the report.

Examination of a road's infrastructure elements is done at a single point in time and AusRAP cannot take into account routine maintenance issues, such as the development of potholes. Funding for routine road maintenance is a separate issue which remains a strong focus of the Australian motoring clubs.

Safer Roads Investment Plans

For the first time in 2013, AusRAP has developed Safer Roads Investment Plans (SRIPs).

AusRAP considers more than 50 proven road improvement options to generate affordable and economically sound SRIPs that, if implemented, will prevent a significant number of deaths and serious injuries nationwide. Road improvement options range from low-cost shoulder rumble strips that alert drivers they are leaving the road and crash barriers which reduce run-off-road and head-on crashes, to higher-cost intersection upgrades and full highway duplication.

Plans are developed in three key steps:

1. Drawing on the Star Ratings and traffic volume data, recorded deaths and serious injuries are distributed throughout the road network.
2. For each 100 metre section of road, countermeasure options are tested for their potential to reduce deaths and serious injuries. For example, an intersection that has poor lighting and high traffic volumes might be a candidate for street lighting.
3. Each countermeasure option is assessed against affordability and economic effectiveness criteria. The economic benefit of a countermeasure (measured in terms of the economic benefit of the deaths and serious injuries prevented) must, at a minimum, exceed the cost of its construction and maintenance (that is, it must have a benefit cost ratio (BCR) greater than one).

The AAA policy position of having no highway with less than a 3-star rating will require additional safety improvements. The SRIPs recommended in this report achieve the vast majority of the improvements required. In addition further infrastructure improvements have been identified by AAA as being required for a more efficient road network.



The individual SRIP summary for each State and Territory has been provided in this report. The analysis shows that a national investment of just over \$4.7 billion has the potential to prevent over 36,000 fatalities and serious injuries over a 20-year period across the surveyed network. With a BCR of 3.49, the program represents a sound investment and an opportunity to save lives and reduce the burden of trauma from injuries.

Safety Countermeasures

1. Roadside barriers

Estimated investment: \$2.3 billion
Estimated deaths and serious injuries prevented: 19,300
Economic benefit: \$ 8.7 billion



2. Central median barrier (no duplication)

Estimated investment: \$522 million
Estimated deaths and serious injuries prevented: 5,700
Economic benefit: \$2.6 billion



3. Shoulder rumble strips

Estimated investment: \$746 million
Estimated deaths and serious injuries prevented: 4,090
Economic benefit: \$1.85 billion



4. Skid resistance (paved road)

Estimated investment: \$227 million
Estimated deaths and serious injuries prevented: 2,500
Economic benefit: \$1.1 billion



5. Protected turned lanes

Estimated investment: \$82 million
Estimated deaths and serious injuries prevented: 1,340
Economic benefit: \$609 million



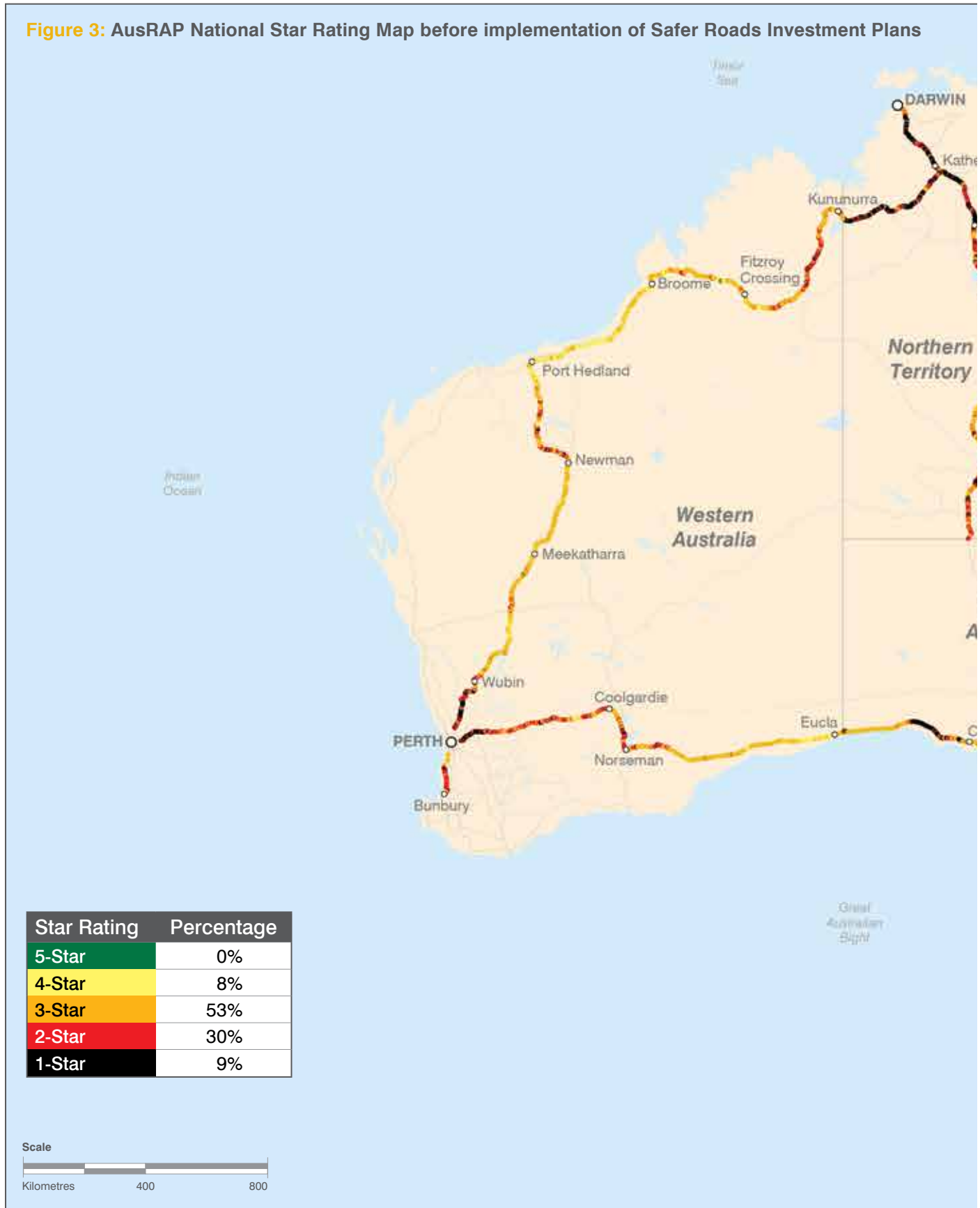
6. Additional lane

Estimated investment: \$361 million
Estimated deaths and serious injuries prevented: 950
Economic benefit: \$432 million



Australia

Figure 3: AusRAP National Star Rating Map before implementation of Safer Roads Investment Plans



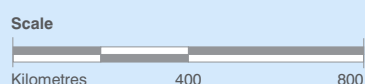
Before Implementation of Safer Roads Investment Plans



Figure 4: AusRAP National Star Rating Map after implementation of Safer Roads Investment Plans



Star Rating	Percentage
5-Star	6%
4-Star	24%
3-Star	55%
2-Star	12%
1-Star	3%



After Implementation of Safer Roads Investment Plans



Australia

Table 3: National Safer Roads Investment Plans Summary (20-year period)

Fatalities and Serious Injuries Saved	Safety Benefit (\$ million)	Estimated Cost (\$ million)	Program BCR
36,485	16,530	4,734	3.49

The 2013 AusRAP Star Rating process surveyed the safety features of a total of 21,921 kilometres of Australia's national highways. **Figure 3** shows that almost 40 per cent of the network is rated as unacceptably dangerous, with nine per cent of the network rated as 1-star and 30 per cent as 2-star. Where interventions are feasible 1 and 2-star stretches of road should be eliminated as this would result in a significant reduction in the number of people who die or are seriously injured on Australian roads each year.

More than half (53 per cent) of the surveyed highways fall within the 3-star category. A low percentage of the surveyed roads achieved the safer 4 or 5-star ratings. Eight per cent of roads attained a 4-star rating. While 5-star stretches of road were identified throughout the country, these were negligible and did not register as a percentage on the national breakdown.

The Safer Roads Investment Plans (SRIPs) for Australia, summarised in **Table 3**, have identified a number of countermeasures which would improve the safety of the national highway network and prevent tens of thousands of fatalities and serious injuries over a 20-year period. Implementing all of the countermeasures that deliver a positive economic benefit would cost approximately \$4.7 billion, saving over 36,000 lives and serious injuries. The safety benefit generated by the full suite of countermeasures is estimated to be more than \$16.5 billion, meaning a benefit cost ratio (BCR) of 3.49. **Table 4** and **Figure 4** show that implementing the suggested countermeasures would significantly improve the state of the national highway network by reducing the proportion of 1 and 2-star rated roads in each State and Territory.



Table 4: Star Ratings for jurisdictions Before and After Safer Roads Investment Plans

Jurisdiction	Proportion in each Star Rating				
	1-Star	2-Star	3-Star	4-Star	5-Star
Australia					
Before	9%	30%	53%	8%	0%
After Investment \$4.7b	3%	12%	55%	24%	6%
New South Wales					
Before	9%	42%	46%	2%	0%
After Investment \$1.9b	0%	2%	54%	26%	17%
Australia Capital Territory					
Before	0%	18%	60%	21%	0%
After Investment \$6m	0%	0%	35%	51%	14%
Victoria					
Before	1%	22%	62%	13%	2%
After Investment \$391m	0%	4%	35%	49%	11%
Queensland					
Before	1%	29%	63%	6%	0%
After Investment \$1.4b	0%	6%	63%	27%	3%
Western Australia					
Before	5%	22%	57%	16%	0%
After Investment \$450m	1%	14%	66%	19%	0%
South Australia					
Before	14%	23%	59%	4%	0%
After Investment \$187m	9%	14%	51%	20%	6%
Tasmania					
Before	20%	46%	32%	2%	0%
After Investment \$74m	0%	29%	57%	14%	0%
Northern Territory					
Before	29%	32%	34%	5%	0%
After Investment \$198m	16%	37%	39%	7%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

The SRIP for the surveyed national highways has identified dozens of countermeasures with a BCR greater than one. However, the countermeasures listed in **Table 5** feature consistently across jurisdictions and are responsible for the bulk of recommended investment and fatalities and serious injuries saved. While the provision of roadside barriers is the most costly recommended countermeasure (representing more than half of the

total cost of the SRIP), it is also the measure which would prevent 19,300 fatalities and serious injuries, by far the most of any countermeasure. Installing a central median barrier on 1,300 kilometres of the network would prevent 5,700 deaths and serious injuries. Other significant countermeasures include installing shoulder rumble strips, improving skid resistance and providing protected turning lanes.



Table 5: Countermeasures which prevent the most fatalities and serious injuries

Countermeasure	Length/Sites	Fatalities and Serious Injuries Saved	Safety Benefit (\$ million)	Estimated Cost (\$ million)	Program BCR
Roadside barriers	8,450 km	19,300	8,739	2,328	3.75
Central median barrier (no duplication)	1,328 km	5,700	2,582	522	4.95
Shoulder rumble strips	4,745 km	4,090	1,852	746	2.48
Skid resistance (paved road)	898 km	2,500	1,130	227	4.98
Protected turn lanes	1,782 sites	1,340	609	82	7.42
Additional lane (2 + 1 road with barrier)	98 km	950	432	361	1.20
Clear roadside hazards	2,213 km	750	341	68	5.00
Shoulder sealing	1,401 km	710	320	167	1.91

New South Wales/ Australian Capital Territory

More than 4,700 kilometres of highway were analysed in New South Wales and the Australian Capital Territory. More than half of highways surveyed were rated as 1-star (nine per cent) or 2-star (42 per cent). Just under half (46 per cent) of the network attained a 3-star rating, while only two per cent of stretches of road were awarded the safer 4-star rating. Highways with a high proportion of 1 and 2-star rated roads include the F3 Freeway, the F6 Freeway, Great Western Highway, Mitchell Highway, New England Highway, Newell Highway and Pacific Highway.

The SRIP for New South Wales and the Australian Capital Territory would cost over \$1.9 billion, preventing over 15,000 fatalities and serious injuries over 20 years. The safety benefits would be over \$7 billion delivering a BCR of 3.62. Implementing the plan would have a dramatic result on the network's Star Ratings, eliminating 1-star roads and reducing the proportion of 2-star rated roads to a mere two per cent. Just over half (54 per cent) of the network would be rated as 3-star, 26 per cent would attain a 4-star rating and 17 per cent would be rated as 5-star.

Table 6: New South Wales/Australian Capital Territory Star Rating Distribution by Highway

NSW Highways	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A25 Barton Highway	48.5	0%	62%	38%	0%	0%
M1/A1 F3 Freeway	248.6	15%	45%	38%	1%	0%
A1 F6 Freeway	105.7	13%	55%	30%	2%	0%
M23 Federal Highway	131.7	0%	52%	43%	5%	0%
A32 Great Western Highway	137.6	52%	34%	8%	2%	0%
M31 Hume Highway	996.9	2%	27%	67%	2%	0%
A32 Mitchell Highway	176.0	2%	62%	35%	0%	0%
A15 New England Highway	499.4	12%	60%	26%	1%	0%
A39 Newell Highway	975.3	9%	54%	36%	1%	0%
M1/A1 Pacific Highway	839.6	10%	32%	51%	5%	0%
A20 Sturt Highway	562.3	12%	32%	54%	2%	0%
ACT Highways						
A25 Barton Highway	10.3	0%	30%	70%	0%	0%
M23 Federal Highway	6.6	0%	0%	45%	55%	0%
Total	4,738.5	9%	42%	46%	2%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

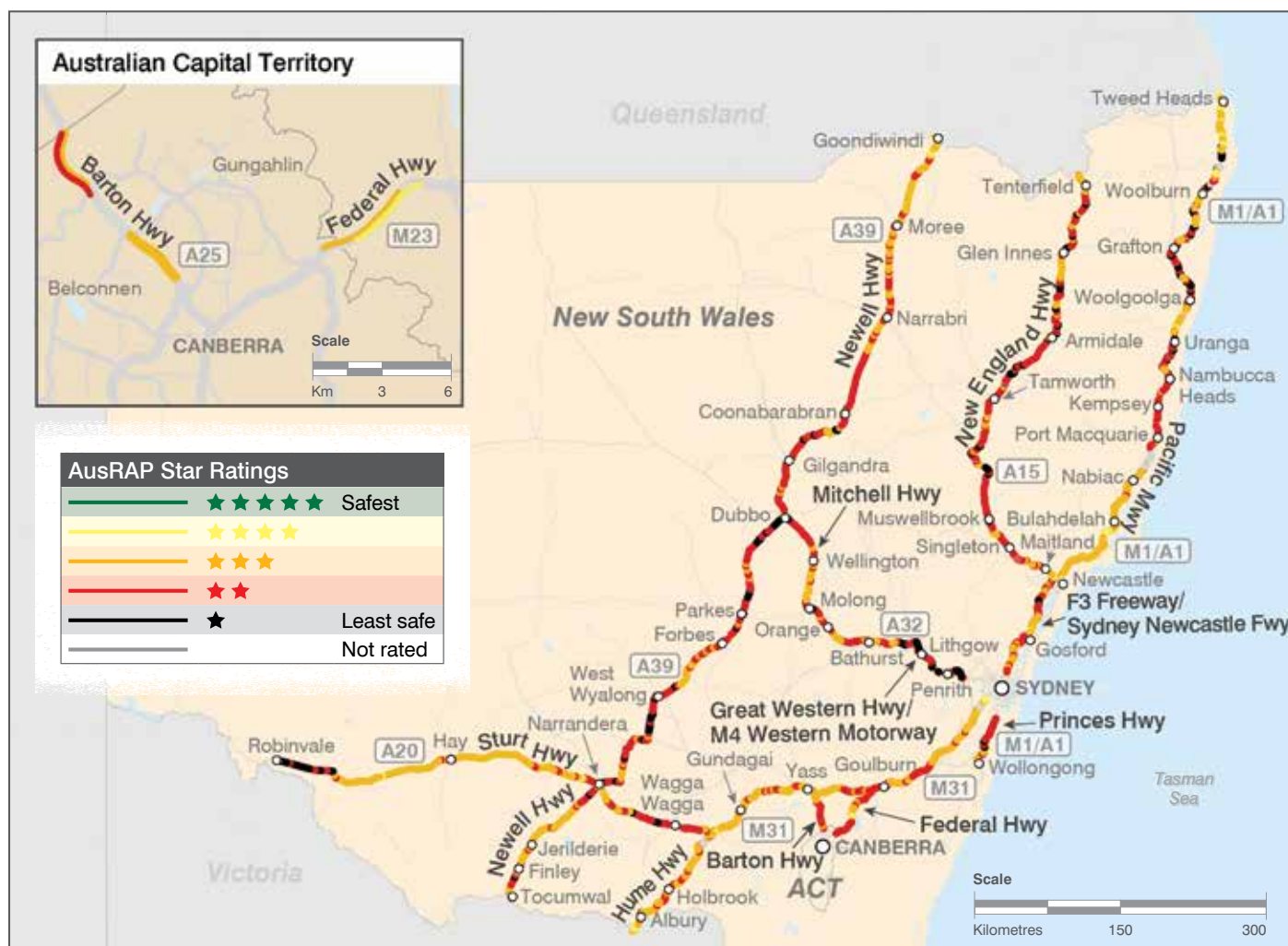
Table 7: New South Wales/Australian Capital Territory Safer Roads Investment Plans Summary (20 years)

	Fatalities and Serious Injuries Saved	Safety Benefits (\$ million)	Estimated Cost (\$ million)	Program BCR
NSW	15,700	7,098	1,958	3.62
ACT	35	16	6	2.66
Total	15,735	7,114	1,964	3.62

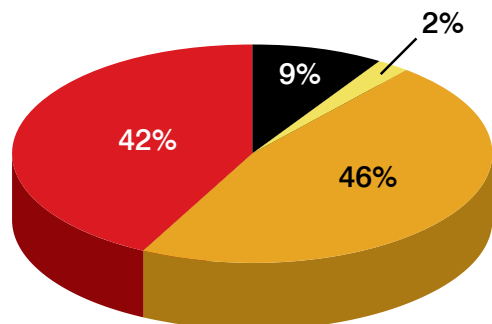
The SRIP for New South Wales and the Australian Capital Territory would prevent over 15,000 fatalities and serious injuries over 20 years at a cost of

\$1.96billion

Figure 5: AusRAP New South Wales/Australian Capital Territory Star Rating Map



NSW/ACT Star Ratings Before Safer Roads Investment Plans



NSW/ACT Star Ratings After Safer Roads Investment Plans

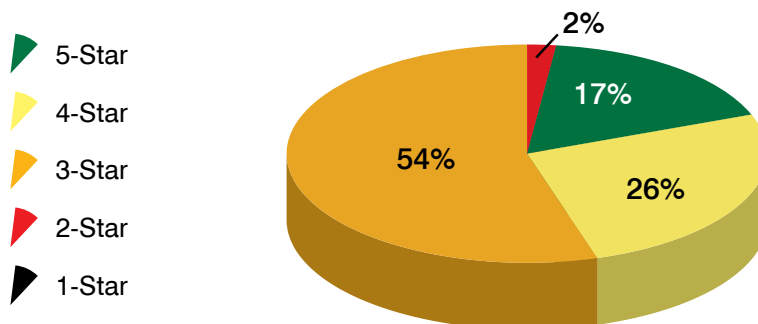


Figure 6: NSW/ACT Star Ratings Before and After Safer Roads Investment Plans

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

Victoria

Of the 2,363 kilometres of road surveyed in Victoria, 23 per cent is rated as 1 or 2-star. Sixty-two per cent of the network is rated as 3-star and 13 per cent as 4-star. Victoria is the only jurisdiction which has 5-star stretches of road significant enough to register as a percentage of the total state breakdown; two per cent of the highway network is rated as 5-star.

Among the highways of concern is the Calder Highway with 49 per cent of the highway composed of 1 or 2-star ratings. Victoria's safest highway is the Princes Freeway/Highway West, including Geelong Ring Road, which is composed of 35 per cent 4-star and 26 per cent 5-star highway.

The SRIP for Victoria proposes to spend over \$390 million on upgrades which would prevent approximately 2,700 fatalities and serious injuries over a 20-year period. The safety benefits would be over \$1.2 billion delivering a BCR of 3.12. If fully implemented, the SRIP would completely eliminate 1-star roads on Victoria's highways and reduce the proportion of 2-star roads to only four per cent. Nearly 60 per cent of roads would be either 4-star (49 per cent) or 5-star (11 per cent). Additional treatments will be identified to improve the remaining four per cent.

Table 8: Victoria Star Rating Distribution by Highway

Highways	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
M79/A79 Calder Freeway/Highway	591.7	3%	46%	48%	3%	0%
M39/A39 Goulburn Valley Highway	162.3	0%	16%	54%	29%	0%
M31 Hume Freeway/Highway	586.7	0%	5%	78%	17%	0%
M1/A1 Princes Freeway/Highway East	215.7	1%	21%	71%	7%	0%
M1/A1 Princes Freeway/Highway West	191.5	0%	10%	29%	35%	26%
A20 Sturt Highway	105.7	0%	23%	77%	0%	0%
M8/A8 Western Freeway/Highway	466.4	1%	22%	69%	6%	0%
M80 Western Ring Road	43.4	0%	0%	34%	47%	0%
Total	2,363.4	1%	22%	62%	13%	2%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

Table 9: Victoria Safer Roads Investment Plans Summary (20 years)

Fatalities and Serious Injuries Saved	Safety Benefits (\$ million)	Estimated Cost (\$ million)	Program BCR
2,700	1,223	391	3.12

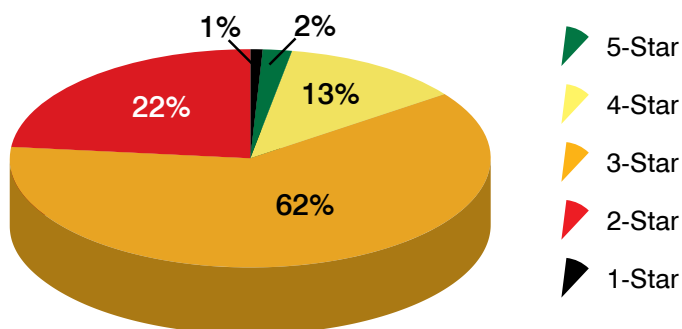
The SRIP for Victoria would save approximately 2,700 fatalities and serious injuries over 20-years at a cost of

\$391 million

Figure 7: AusRAP Victoria Star Rating Map



Victoria Star Ratings Before Safer Roads Investment Plans



Victoria Star Ratings After Safer Roads Investment Plans

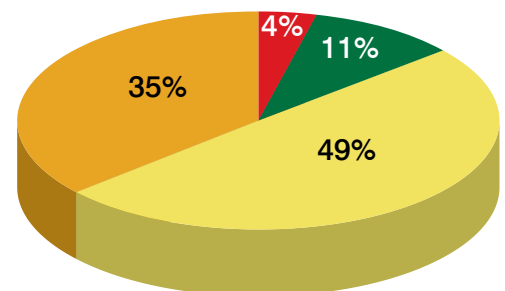


Figure 8: Victoria Star Ratings Before and After Safer Roads Investment Plans

Queensland

With over 5,100 kilometres of national highway, Queensland has the longest network of all the jurisdictions surveyed. Twenty-nine per cent of roads surveyed in Queensland are rated as 2-star. Sixty-three per cent of roads are rated as 3-star, but only six per cent carry a 4-star rating. Roads of concern with a high proportion of 1 or 2-star rated sections include the Bruce Highway, the Cunningham Highway, the Gore Highway, the New England Highway and the Warrego Highway.

Implementing the SRIP in Queensland will prevent approximately 10,400 fatalities and serious injuries over a 20-year period at a cost of \$1.47 billion. With a BCR of 3.21, the SRIP would improve the Queensland network's Star Ratings dramatically. Only six per cent of roads would be rated 2-star, down from the current figure of 29 per cent. In addition, the State's national highway network would be rated as 63 per cent 3-star, 27 per cent 4-star and three per cent 5-star.

Table 10: Queensland Star Rating Distribution by Highway

Highways	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A2 Barkly Highway	312.1	0%	10%	74%	16%	0%
M1/A1 Bruce Highway	1,673.1	3%	42%	52%	3%	0%
M15/A15 Cunningham Highway	130.1	9%	58%	28%	0%	0%
A6 Flinders Highway	743.3	0%	20%	76%	3%	0%
M1 Gateway Arterial	79.0	0%	12%	48%	37%	4%
A39 Gore Highway	193.4	0%	53%	47%	0%	0%
M7/M2 Ipswich Motorway	38.4	0%	0%	16%	55%	10%
A2 Landsborough Highway	1,011.2	0%	13%	86%	0%	0%
A15 New England Highway	92.5	0%	46%	54%	0%	0%
M1 Pacific Motorway	158.8	0%	0%	63%	37%	0%
M2/A2 Warrego Highway	676.6	2%	37%	53%	7%	1%
Total	5,108.5	1%	29%	63%	6%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

Table 11: Queensland Safer Roads Investment Plans Summary (20 years)

Fatalities and Serious Injuries Saved	Safety Benefits (\$ million)	Estimated Cost (\$ million)	Program BCR
10,400	4,719	1,470	3.21

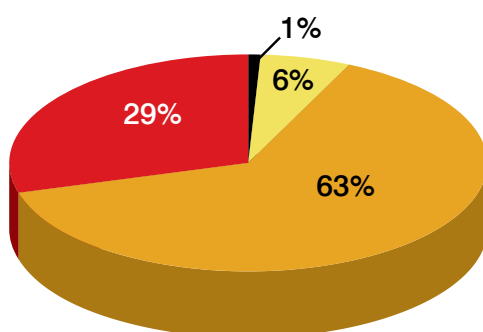
The SRIP for Queensland will prevent approximately 10,400 fatalities and serious injuries over a 20-year period at a cost of

\$1.47billion

Figure 9: AusRAP Queensland Star Rating Map



Queensland Star Ratings Before Safer Roads Investment Plans



Queensland Star Ratings After Safer Roads Investment Plans

- 5-Star
- 4-Star
- 3-Star
- 2-Star
- 1-Star

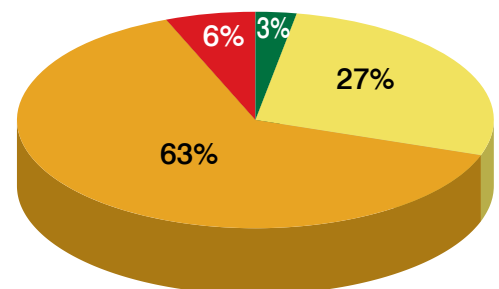


Figure 10: Queensland Star Ratings Before and After Safer Roads Investment Plans

Western Australia

The Star Rating process covered 4,671 kilometres of Western Australia's highways. Five per cent of the network is rated as 1-star and 22 per cent is rated as 2-star. The majority (57 per cent) of road links in the State are rated as 3-star and 16 per cent are rated as 4-star.

The Great Northern Highway, which comprises the bulk of the State's network, performs well in comparison to other highways in Western Australia. However, some sections of the Great Northern Highway rated more poorly than others, such as between Muchea and Wubin. Roads of concern in the State are the Coolgardie-Esperance Highway,

the Great Eastern Highway and the Perth-Bunbury Highway (excludes Forrest Highway).

The SRIP which has been developed for Western Australia would save approximately 4,150 lives and serious injuries. If fully implemented, this would cost almost \$450 million with a relatively high benefit-cost ratio of 4.18. Fully implementing the SRIP would reduce the proportion of 1-star rated roads from five per cent to one per cent. Two-star rated roads would decrease from 22 per cent to 14 per cent. The proportion of 3-star (66 per cent) and 4-star (19 per cent) roads would increase to 85 per cent.

Table 12: Western Australia Star Rating Distribution by Highway

Highways	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A94 Coolgardie-Esperance Highway	163.0	7%	47%	46%	0%	0%
A1 Eyre Highway	718.5	1%	9%	71%	20%	0%
A94 Great Eastern Highway	507.1	15%	52%	28%	4%	0%
A95 Great Northern Highway	3,041.4	4%	17%	60%	19%	0%
M1 Perth-Bunbury Highway*	161.6	6%	70%	22%	3%	0%
M1 Victoria Highway	79.8	0%	15%	84%	0%	0%
Total	4,671.4	5%	22%	57%	16%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

*Note 2: Excludes Forrest Highway.

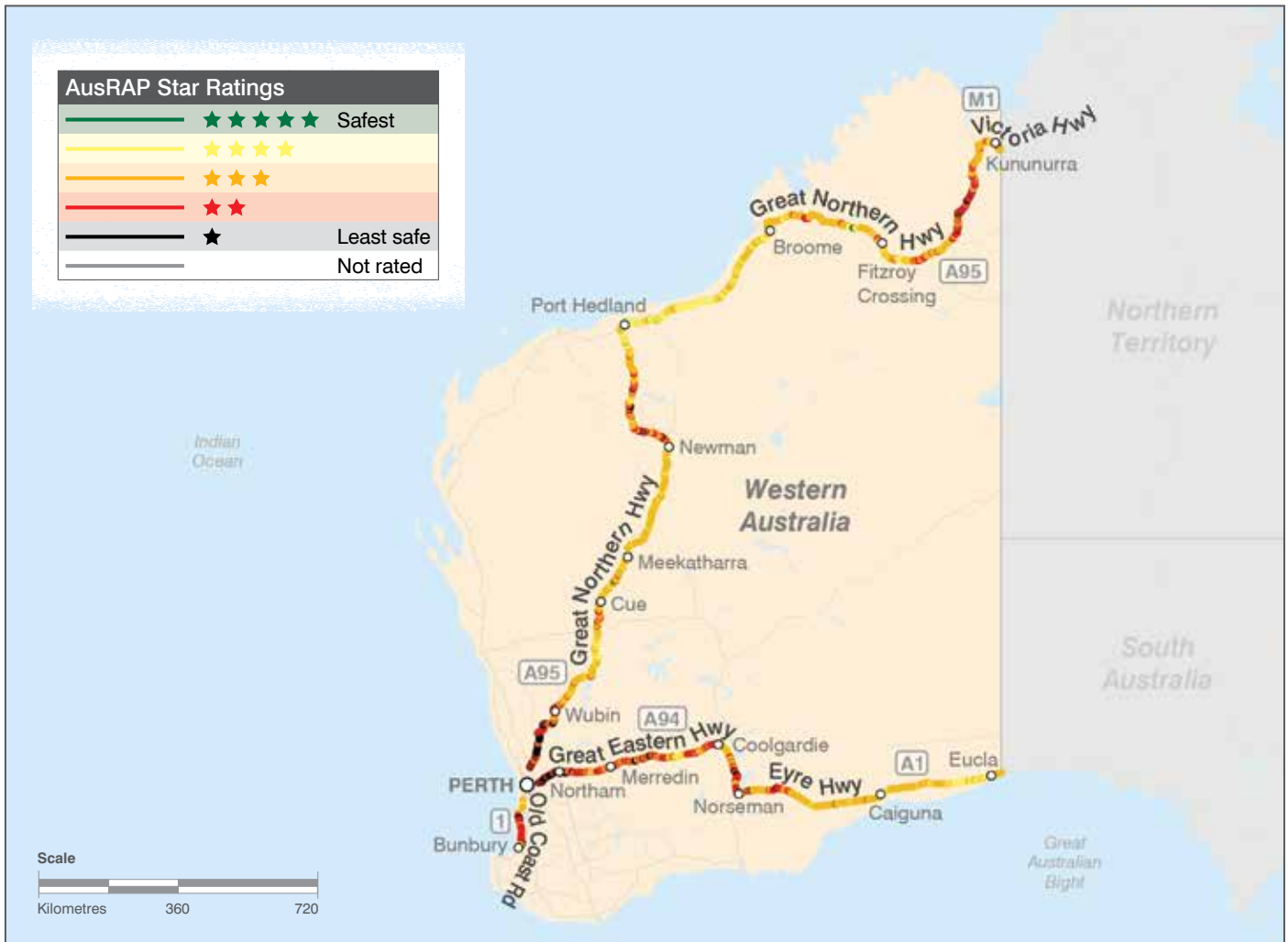
Table 13: Western Australia Safer Roads Investment Plans Summary (20 years)

Fatalities and Serious Injuries Saved	Safety Benefits (\$ million)	Estimated Cost (\$ million)	Program BCR
4,150	1,881	450	4.18

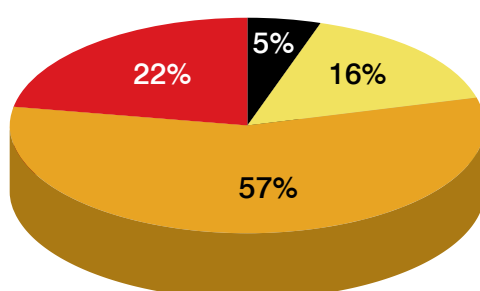
The SRIP for Western Australia would save approximately
4,150 lives and serious injuries at a cost of

\$450million

Figure 11: AusRAP Western Australia Star Rating Map



**Western Australia Star Ratings
Before Safer Roads Investment Plans**



**Western Australia Star Ratings
After Safer Roads Investment Plans**

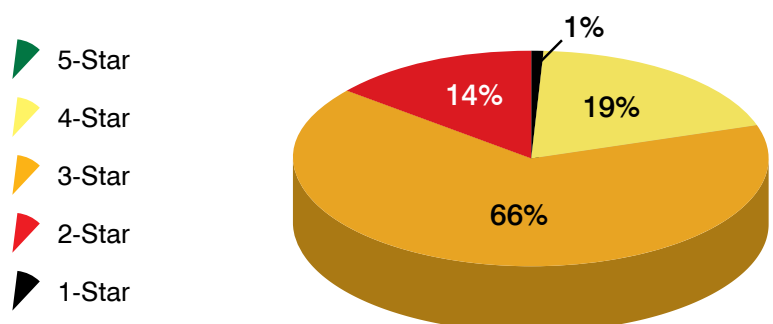


Figure 12: Western Australia Star Ratings Before and After Safer Roads Investment Plans

South Australia

More than 2,040 kilometres of road network was analysed in South Australia. The network has a relatively high proportion of 1 and 2-star rated roads. Fourteen per cent of the network is rated as 1-star and 23 per cent incurs a 2-star rating. Most of the roads (59 per cent) have been awarded a 3-star rating, but only a small fraction (four per cent) is rated as 4-star. Almost 50 per cent of the state's longest highway, the Eyre Highway, is rated as either 1-star (27 per cent) or 2-star (22 per cent). Other roads of concern include the Dukes Highway and the Port Augusta/Port Wakefield Highway.

Adopting the SRIP in South Australia would see the proportion of 1-star rated roads decrease to nine per cent and the proportion of 2-star rated roads would be reduced to 14 per cent. More than 50 per cent of the network would be of a 3-star standard, while the proportion of 4-star (20 per cent) and 5-star (six per cent) rated roads would rise markedly. In addition, it is estimated that 1,900 fatalities and serious injuries would be prevented over 20 years at an approximate cost of \$187 million.

Table 14: South Australia Star Rating Distribution by Highway

Highways	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A8 Dukes Highway	191.8	7%	28%	59%	5%	0%
A1 Eyre Highway	926.3	27%	22%	50%	1%	0%
A1 Port Augusta/Port Wakefield Road	360.7	2%	31%	61%	5%	0%
M1 South East Freeway	162.9	0%	16%	84%	0%	0%
A87 Stuart Highway	201.6	6%	18%	64%	12%	0%
A20 Sturt Highway	197.8	2%	16%	75%	6%	0%
Total	2,041.1	14%	23%	59%	4%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

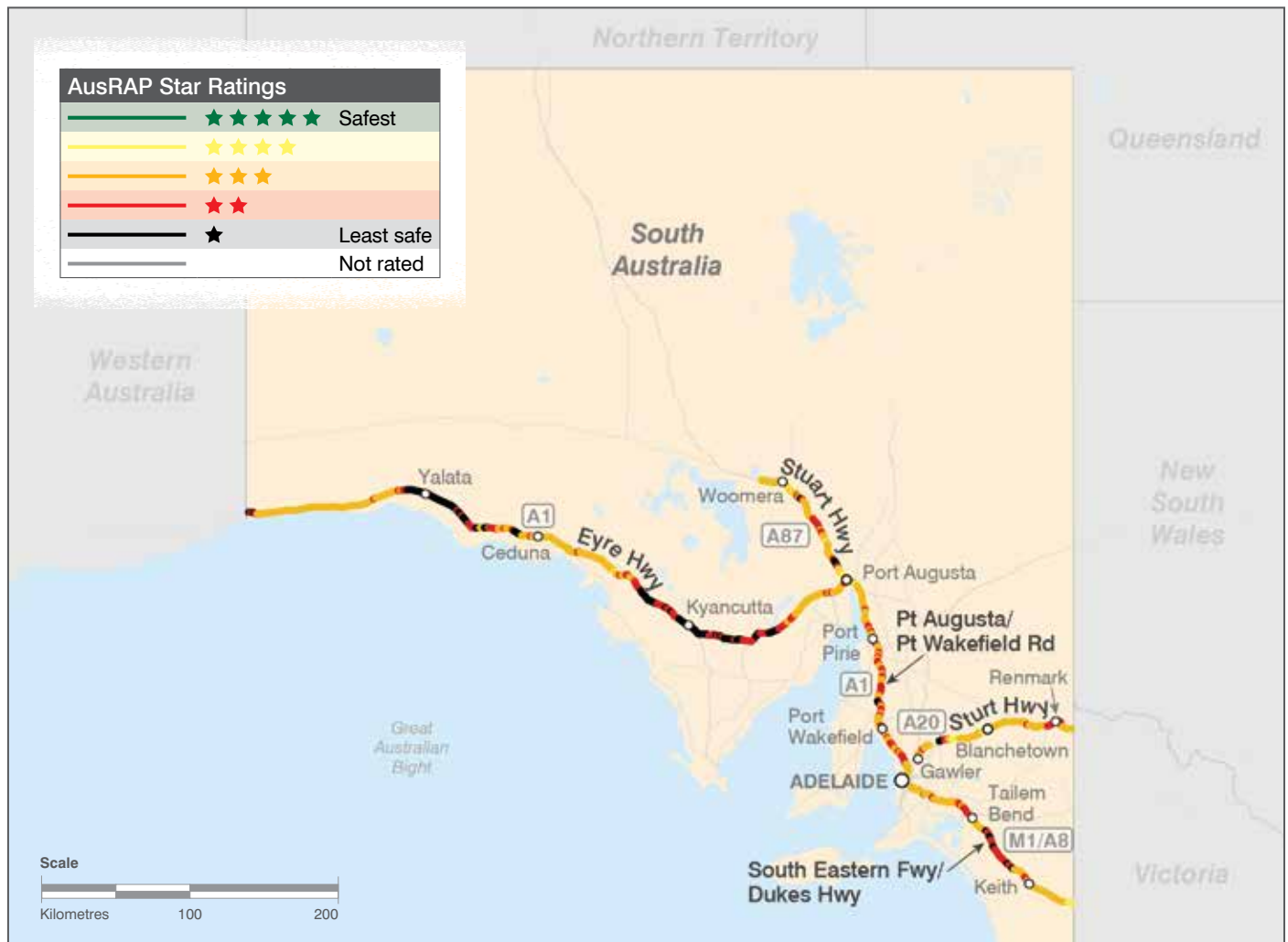
Table 15: South Australia Safer Roads Investment Plans Summary (20 years)

Fatalities and Serious Injuries Saved	Safety Benefits (\$ million)	Estimated Cost (\$ million)	Program BCR
1,900	859	187	4.59

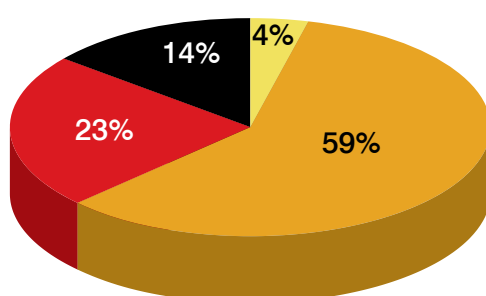
An estimated 1,900 fatalities and serious injuries in South Australia would be prevented over 20 years at an approximate cost of

\$187million

Figure 13: South Australia Star Rating Map



South Australia Star Ratings Before Safer Roads Investment Plans



South Australia Star Ratings After Safer Roads Investment Plans

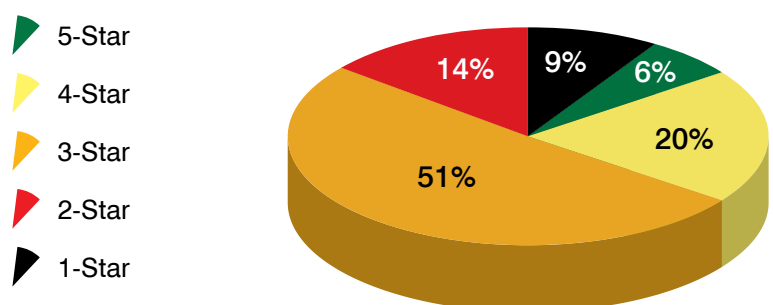


Figure 14: South Australia Star Ratings Before and After Safer Roads Investment Plans

Tasmania

Tasmania's 366 kilometres of highway has a high proportion of 1 and 2-star rated roads. Two-thirds of the State's highway network is rated as either 1-star (20 per cent) or 2-star (46 per cent). Tasmania has the lowest proportion of 3-star roads in the country with only 32 per cent attaining this rating. The amount of 4-star rated roads is negligible (two per cent) and there are no stretches of 5-star roads.

The State's two longest highways, the Bass and Midland Highways, both have high proportions of 1 or 2-star rated roads with 66 per cent and 86 per cent respectively. A number of the shorter highways,

such as the Brooker and the Tasman, have very low proportions of 1 or 2-star rated roads with high proportions of 3-star rated roads.

Implementing the SRIP in full would cost approximately \$74 million, preventing 400 fatalities or serious injuries over 20 years. The investment would significantly improve the State's star rating, eliminating 1-star stretches of road and reducing the proportion of 2-star rated roads from 46 per cent to 29 per cent. Most roads would be brought up to a standard of 3-stars or above, with 57 per cent rated 3-star and 14 per cent rated 4-star.

Table 16: Tasmania Star Rating Distribution by Highway

Highways	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
M2/A2 Bass Highway	128.5	33%	30%	34%	2%	0%
M1 Brooker Highway	12.9	3%	0%	96%	1%	0%
A8 East Tamar Highway	36.6	0%	47%	46%	3%	0%
M1 Midland Highway	165.4	18%	68%	13%	2%	0%
A3 Tasman Highway	23.2	0%	1%	99%	0%	0%
Total	366.6	20%	46%	32%	2%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

Table 17: Tasmania Safer Roads Investment Plans Summary (20 years)

Fatalities and Serious Injuries Saved	Safety Benefits (\$ million)	Estimated Cost (\$ million)	Program BCR
400	186	74	2.51

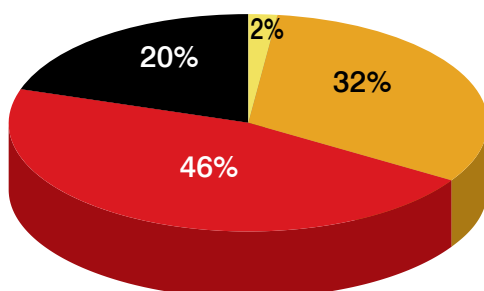
The SRIP for Tasmania would prevent 400 fatalities or serious injuries over 20 years for approximately

\$74million

Figure 15: AusRAP Tasmania Star Rating Map



**Tasmania Star Ratings
Before Safer Roads Investment Plans**



**Tasmania Star Ratings
After Safer Roads Investment Plans**

- 5-Star
- 4-Star
- 3-Star
- 2-Star
- 1-Star

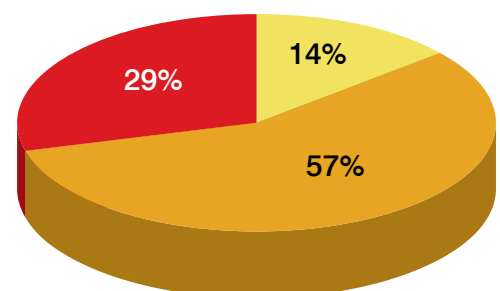


Figure 16: Tasmania Star Ratings Before and After Safer Roads Investment Plans

Northern Territory

The Northern Territory has the highest proportion of 1-star rated roads nationally with 29 per cent. The quantity of 2-star rated roads is also relatively high with 32 per cent. Less than 40 per cent of the Northern Territory's roads are rated as 3-star or above, with 34 per cent rated as 3-star and five per cent rated as 4-star. There are no 5-star sections of road on the entire 2,632 kilometre-length of the Territory's highway network.

The Stuart Highway, which forms the majority of the Northern Territory's network, comprises 61 per cent 1-star or 2-star rated roads. The second longest

highway, the Victoria Highway, has a very high proportion of 1 or 2-star rated roads with 92 per cent falling into this category.

The SRIP for the Northern Territory requires a cost of about \$198 million, which will prevent approximately 1,200 fatalities and serious injuries over a 20-year period. Implementing all the suggested countermeasures will reduce the proportion of 1-star rated roads from 29 per cent to 16 per cent. The proportion of 3 or 4-star rated roads will increase to 46 per cent from the current figure of 39 per cent.

Table 18: Northern Territory Star Rating Distribution by Highway

Highways	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A66 Barkly Highway	433.2	0%	30%	60%	9%	0%
A87 Stuart Highway	1,741.8	28%	33%	34%	5%	0%
A1 Victoria Highway	457.2	61%	31%	9%	0%	0%
Total	2,632.2	29%	32%	34%	5%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

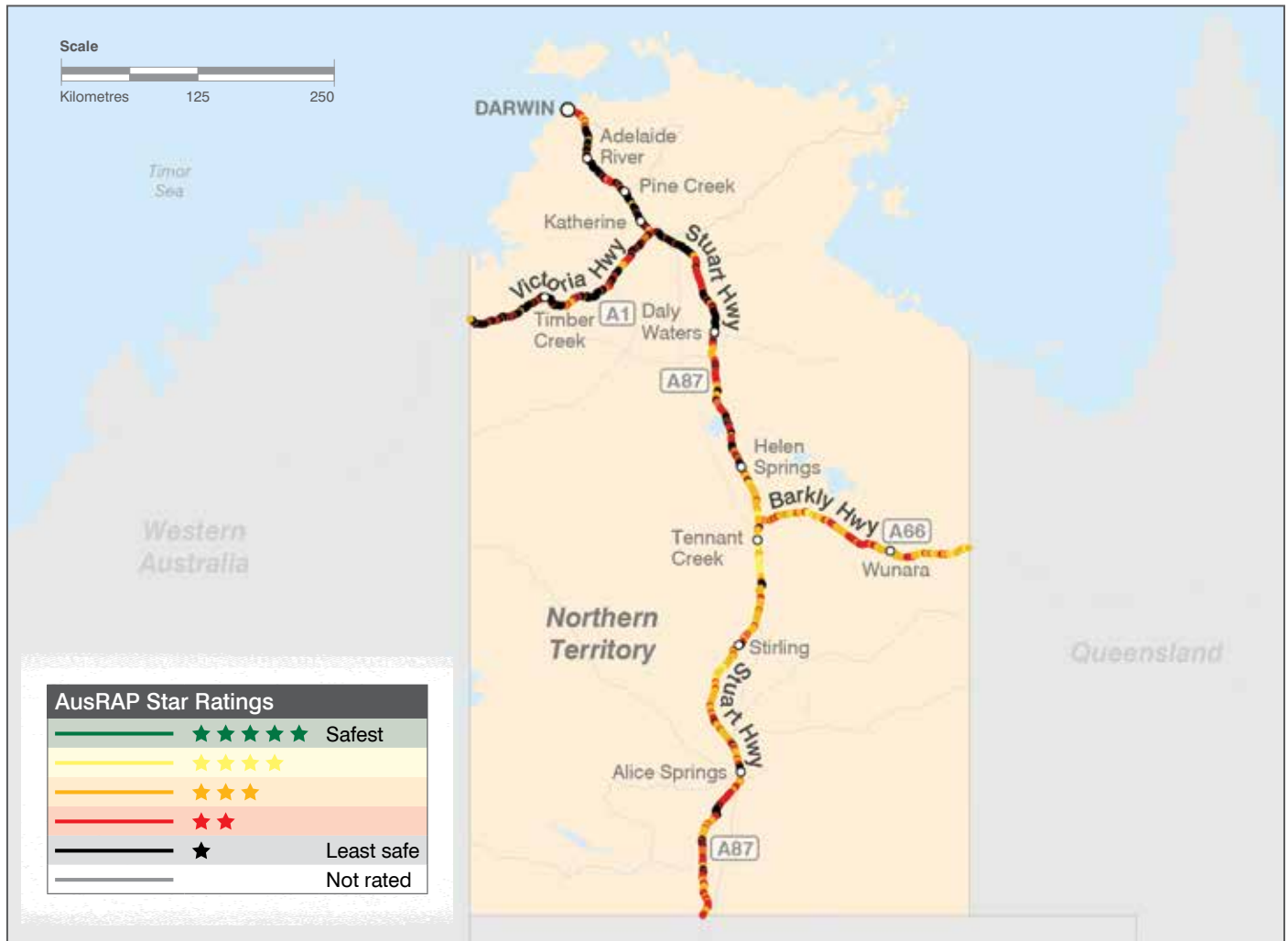
Table 19: Northern Territory Safer Roads Investment Plans Summary (20 years)

Fatalities and Serious Injuries Saved	Safety Benefits (\$ million)	Estimated Cost (\$ million)	Program BCR
1,200	548	198	2.76

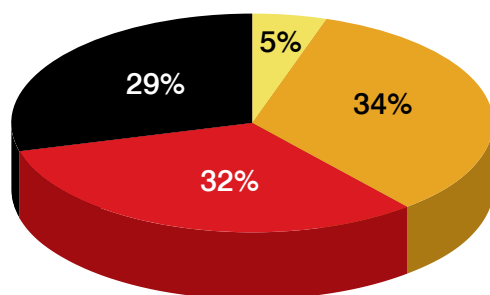
The SRIP for the Northern Territory which will prevent approximately 1,200 fatalities and serious injuries over 20 years at a cost of

\$198million

Figure 17: AusRAP Northern Territory Star Rating Map



Northern Territory Star Ratings Before Safer Roads Investment Plans



Northern Territory Star Ratings After Safer Roads Investment Plans

- 5-Star
- 4-Star
- 3-Star
- 2-Star
- 1-Star

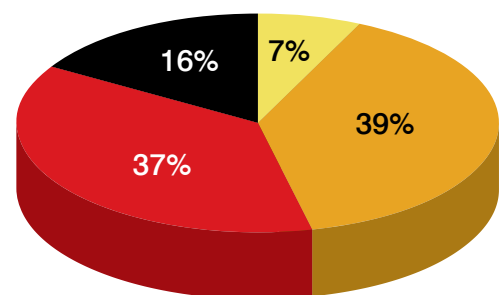


Figure 18: Northern Territory Star Ratings Before and After Safer Roads Investment Plans



Appendix

Australia's National Network of Highways



Appendix A

Complete results for the National Network of Highways

New South Wales	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A25 Barton Highway	39.4	0%	76%	23%	0%	0%
ACT border to Murrumbateman	20.8	0%	85%	14%	0%	0%
Murrumbateman to Hume Highway	18.6	0%	67%	33%	0%	0%
A25 Barton Highway (southbound)						
Hume Highway to Murrumbateman	9.1	0%	0%	100%	0%	0%
M1/A1 F3 Freeway (southbound)	124.5	7%	44%	48%	1%	0%
New England Highway to Ryhope	32.2	17%	54%	28%	0%	0%
Ryhope to Wyong	34.3	9%	35%	52%	4%	0%
Wyong to Calga Interchange	30.1	0%	56%	44%	0%	0%
Calga Interchange to Sydney	27.9	0%	30%	70%	0%	0%
M1/A1 F3 Freeway (northbound)	124.1	23%	47%	29%	0%	0%
Sydney to Calga Interchange	28.3	11%	26%	64%	0%	0%
Calga Interchange to Wyong	29.8	0%	60%	40%	0%	0%
Wyong to Ryhope	30.1	46%	40%	10%	0%	0%
Ryhope to New England Highway	35.9	33%	58%	8%	0%	0%
A1 F6 Freeway (northbound)	52.5	11%	59%	30%	0%	0%
Wollongong to Bulli	31.3	19%	31%	50%	0%	0%
Bulli to Waterfall	21.2	0%	100%	0%	0%	0%
A1 F6 Freeway (southbound)	53.2	15%	51%	29%	5%	0%
Waterfall to Bulli	19.1	16%	79%	6%	0%	0%
Bulli to Wollongong	34.1	15%	35%	43%	8%	0%
M23 Federal Highway (northbound)	65.7	0%	32%	68%	0%	0%
ACT border to Collector Creek	42.3	0%	35%	65%	0%	0%
Collector Creek to Hume Highway	23.4	0%	26%	74%	0%	0%
M23 Federal Highway (southbound)	66.0	0%	73%	18%	9%	0%
Hume Highway to Collector Creek	23.3	0%	100%	0%	0%	0%
Collector Creek to ACT border	42.7	0%	58%	28%	14%	0%



(...continued)

New South Wales	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A32 Great Western Highway	106.1	52%	31%	10%	2%	0%
Lapstone to Katoomba	28.2	26%	35%	17%	6%	0%
Katoomba to Lithgow	23.6	78%	7%	9%	0%	0%
Lithgow to Bathurst	54.3	54%	40%	6%	0%	0%
A32 Great Western Highway (eastbound)	31.5	54%	41%	3%	2%	0%
Bathurst to Lithgow	13.0	30%	61%	7%	2%	0%
Lithgow to Katoomba	4.1	12%	80%	0%	5%	0%
Katoomba to Lapstone	14.4	88%	13%	0%	0%	0%
M31 Hume Highway	507.1	3%	25%	67%	2%	0%
Glenfield to Welby	71.2	0%	11%	74%	4%	0%
Welby to Goulburn	85.3	11%	54%	35%	0%	0%
Goulburn to Barton Highway Yass	72.8	0%	0%	100%	0%	0%
Barton Highway Yass to Muttama Rd overpass Coolac	84.7	0%	21%	79%	0%	0%
Muttama Rd overpass Coolac to Tarcutta	63.1	10%	52%	29%	5%	0%
Tarcutta to Holbrook	67.5	0%	0%	89%	4%	0%
Holbrook to Albury	62.5	0%	32%	62%	3%	0%
M31 Hume Highway (northbound)	489.8	0%	29%	68%	2%	0%
Albury to Holbrook	53.1	0%	27%	62%	11%	0%
Holbrook to Tarcutta	61.6	0%	31%	68%	0%	0%
Tarcutta to Muttama Rd overpass Coolac	60.1	0%	10%	85%	5%	0%
Muttama Rd overpass Coolac to Barton Highway Yass	84.9	0%	29%	71%	0%	0%
Barton Highway Yass to Goulburn	72.7	0%	46%	54%	0%	0%
Goulburn to Welby	85.3	0%	42%	58%	0%	0%
Welby to M7 exit	72.1	0%	8%	80%	2%	0%
A32 Mitchell Highway	176.0	2%	62%	35%	0%	0%
Bathurst to Orange	46.5	1%	62%	37%	0%	0%
Orange to Wellington	88.5	3%	53%	44%	0%	0%
Wellington to Dubbo	41.0	2%	85%	13%	0%	0%



(...continued)

New South Wales	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A15 New England Highway	471.0	13%	63%	23%	1%	0%
Pacific Highway to Four Mile Creek	8.2	0%	0%	63%	37%	0%
Rutherford to Branxton	7.9	0%	76%	24%	0%	0%
Branxton to Singleton	18.1	1%	67%	17%	3%	0%
Singleton to Muswellbrook	37.8	1%	74%	25%	0%	0%
Muswellbrook to Scone	16.7	2%	98%	0%	0%	0%
Scone to Blandford	26.8	16%	84%	0%	0%	0%
Blandford to Tamworth	72.2	9%	67%	23%	0%	0%
Nemingha to Armidale	91.8	20%	75%	3%	0%	0%
Armidale to Guyra	91.4	17%	46%	37%	0%	0%
Guyra to Glen Innes	85.3	18%	58%	24%	0%	0%
Glen Innes to QLD border	14.8	0%	0%	100%	0%	0%
A15 New England Highway (southbound)	28.4	0%	23%	77%	0%	0%
Armidale to Nemingha	5.5	0%	0%	100%	0%	0%
Tamworth to Blandford	6.5	0%	54%	46%	0%	0%
Singleton to Branxton	7.9	0%	38%	62%	0%	0%
Four Mile Creek to Pacific Highway	8.5	0%	0%	100%	0%	0%
A39 Newell Highway	975.3	9%	54%	36%	1%	0%
VIC border to Jerilderie	48.7	6%	40%	53%	0%	0%
Jerilderie to Narrandera	102.8	3%	29%	68%	0%	0%
Narrandera to West Wyalong	132.1	25%	59%	16%	0%	0%
West Wyalong to Forbes	96.6	3%	55%	42%	0%	0%
Forbes to Parkes	26.9	22%	67%	11%	0%	0%
Parkes to Dubbo	105.8	28%	66%	6%	0%	0%
Dubbo to Gilgandra	58.3	0%	81%	19%	0%	0%
Gilgandra to Coonabarabran	84.4	11%	70%	19%	0%	0%
Coonabarabran to Narrabri	112.4	3%	72%	25%	0%	0%
Narrabri to Moree	90.8	0%	51%	49%	0%	0%
Moree to QLD border	116.5	0%	23%	72%	5%	0%



(...continued)

New South Wales	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
M1/A1 Pacific Highway	555.0	15%	43%	35%	2%	0%
Hexham to Karuah	24.4	0%	30%	70%	0%	0%
Karuah to Bulahdelah	40.7	0%	44%	54%	1%	0%
Bulahdelah to Wootton	26.7	0%	25%	75%	0%	0%
Wootton to Taree	37.8	0%	53%	47%	0%	0%
Taree to Coopernook	23.4	0%	36%	64%	0%	0%
Coopernook to Oxley Highway	38.1	0%	20%	31%	0%	0%
Oxley Highway to Kempsey	27.4	9%	91%	0%	0%	0%
Kempsey to Macksville	44.6	7%	92%	1%	0%	0%
Macksville to Coffs Harbour	39.1	24%	35%	40%	0%	0%
Coffs Harbour to Grafton	69.4	42%	50%	8%	0%	0%
Grafton to Maclean	39.1	21%	67%	10%	0%	0%
Maclean to Ballina	69.9	25%	37%	33%	0%	0%
Ballina to Byron Bay	14.1	82%	2%	16%	0%	0%
Byron Bay to Yelgun	16.9	0%	0%	99%	1%	0%
Yelgun to QLD border	43.4	0%	14%	59%	27%	0%
M1/A1 Pacific Highway (southbound)	284.6	0%	10%	81%	9%	0%
QLD border to Yelgun	42.9	0%	7%	65%	28%	0%
Yelgun to Byron Bay	16.9	0%	0%	71%	29%	0%
Byron Bay to Ballina	2.0	0%	0%	100%	0%	0%
Ballina to Maclean	17.8	0%	0%	92%	8%	0%
Maclean to Grafton	2.8	0%	7%	93%	0%	0%
Grafton to Coffs Harbour	4.9	0%	0%	100%	0%	0%
Coffs Harbour to Macksville	16.6	0%	0%	82%	18%	0%
Macksville to Kempsey	8.3	0%	72%	28%	0%	0%
Kempsey to Oxley Highway	2.9	0%	100%	0%	0%	0%
Oxley Highway to Coopernook	17.7	0%	64%	36%	0%	0%
Coopernook to Taree	21.0	0%	17%	83%	0%	0%
Taree to Wootton	37.5	0%	7%	93%	0%	0%
Wootton to Bulahdelah	26.2	0%	0%	85%	15%	0%
Bulahdelah to Karuah	36.3	0%	0%	100%	0%	0%
Karuah to Hexham	30.8	0%	0%	100%	0%	0%



(...continued)

New South Wales	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A20 Sturt Highway	562.3	12%	32%	54%	2%	0%
Hume Highway to Wagga Wagga	33.7	0%	62%	38%	0%	0%
Wagga Wagga to Narrandera	88.1	10%	54%	34%	0%	0%
Narrandera to Hay	167.9	0%	19%	77%	4%	0%
Hay to Balranald	128.9	0%	7%	91%	2%	0%
Balranald to Euston	75.5	60%	36%	5%	0%	0%
Euston to Mildura	68.2	22%	59%	20%	0%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).



Australian Capital Territory	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A25 Barton Highway						
ACT border to Federal Highway	5.0	0%	0%	100%	0%	0%
A25 Barton Highway (southbound)						
Federal Highway to ACT border	5.3	0%	58%	42%	0%	0%
M23 Federal Highway						
ACT border to Antill Street	3.8	0%	0%	79%	21%	0%
M23 Federal Highway (southbound)						
Antill Street to ACT border	2.8	0%	0%	0%	100%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).



Victoria	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
M79/A79 Calder Highway/Freeway	470.5	4%	55%	40%	1%	0%
Calder Park to Woodend	46.9	0%	6%	93%	0%	1%
Woodend to Pyrenees Highway	33.7	0%	0%	100%	0%	0%
Pyrenees Highway to Bendigo	34.0	0%	22%	67%	11%	0%
Bendigo to Wedderburn	56.0	3%	63%	34%	0%	0%
Wedderburn to Culgoa	95.4	4%	60%	36%	0%	0%
Culgoa to Sunraysia Highway	106.4	6%	67%	27%	0%	0%
Sunraysia Highway to Mildura	98.1	6%	87%	7%	0%	0%
M79/A79 Calder Freeway/Highway (southbound)	121.2	0%	10%	78%	12%	0%
Bendigo to Pyrenees Highway	33.2	0%	18%	72%	9%	1%
Pyrenees Highway to Woodend	36.1	0%	0%	83%	17%	0%
Woodend to Calder Park	44.3	0%	7%	81%	12%	0%
Calder Park to Western Ring Rd	7.6	0%	39%	61%	0%	0%
M39/A39 Goulburn Valley Highway	119.6	0%	22%	60%	18%	0%
Hume Freeway to Nagambie	22.4	0%	18%	80%	2%	0%
Nagambie to Arcadia	32.8	0%	9%	26%	64%	1%
Arcadia to Shepparton	6.1	0%	51%	49%	0%	0%
Shepparton to Numurkah	23.9	0%	33%	67%	0%	0%
Numurkah to NSW border	34.4	0%	25%	75%	0%	0%
M39/A39 Goulburn Valley Highway (southbound)	42.7	0%	0%	39%	61%	0%
Arcadia to Nagambie	26.0	0%	0%	12%	88%	0%
Nagambie to Hume Freeway	16.7	0%	0%	81%	19%	0%
M31 Hume Freeway/Highway	296.2	0%	10%	77%	13%	0%
Metropolitan Ring Rd to Craigieburn	17.2	0%	0%	53%	47%	0%
Craigieburn to Seymour	71.6	0%	30%	66%	4%	0%
Seymour to Euroa	45.0	0%	0%	93%	7%	0%
Euroa to Winton	59.3	0%	10%	64%	25%	0%
Winton to Springhurst	58.5	0%	5%	80%	15%	0%
Springhurst to Murray River	44.6	0%	0%	100%	0%	0%
M31 Hume Highway (southbound)	290.5	0%	0%	79%	21%	0%
Murray River to Springhurst	44.8	0%	0%	93%	7%	0%



(...continued)

Victoria	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
Springhurst to Winton	53.1	0%	0%	71%	29%	0%
Winton to Euroa	59.2	0%	0%	59%	41%	0%
Euroa to Seymour	44.9	0%	0%	93%	7%	0%
Seymour to Craigieburn	71.2	0%	0%	91%	9%	0%
Craigieburn to Metropolitan Ring Rd	17.3	0%	0%	48%	52%	0%
M1/A1 Princes Freeway/Highway East	125.2	1%	22%	67%	9%	0%
Nar Nar Goon to Warragul	35.8	0%	0%	68%	32%	0%
Warragul to Trafalgar	18.4	0%	16%	84%	0%	0%
Trafalgar to Morwell	21.7	0%	14%	86%	0%	0%
Morwell to Traralgon	10.2	17%	0%	83%	0%	0%
Traralgon to Rosedale	18.1	0%	70%	30%	0%	0%
Rosedale to Sale	21.0	0%	43%	57%	0%	0%
M1/A1 Princes Freeway/Highway East (westbound)	90.5	0%	20%	76%	5%	0%
Rosedale to Traralgon	2.4	0%	0%	100%	0%	0%
Traralgon to Morwell	12.9	0%	1%	99%	0%	0%
Morwell to Trafalgar	21.1	0%	28%	72%	0%	0%
Trafalgar to Warragul	16.2	0%	74%	26%	0%	0%
Warragul to Nar Nar Goon	37.9	0%	0%	89%	11%	0%
M1/A1 Princes Freeway/Highway West	122.9	0%	16%	40%	22%	21%
Western Ring Rd to Hoppers Crossing	11.7	0%	0%	26%	74%	0%
Hoppers Crossing to Little River	17.0	0%	0%	0%	0%	100%
Little River to Corio	17.4	0%	0%	69%	31%	0%
Corio to Waurin Ponds	22.5	0%	0%	0%	60%	40%
Waurin Ponds to Winchelsea	20.9	0%	71%	29%	0%	0%
Winchelsea to Colac	33.4	0%	15%	85%	0%	0%
M1/A1 Princes Freeway West (eastbound)	68.6	0%	0%	9%	58%	33%
Waurin Ponds to Corio	22.2	0%	0%	0%	59%	41%
Corio to Little River	17.4	0%	0%	17%	48%	34%
Little River to Hoppers Crossing	16.9	0%	0%	0%	53%	47%
Hoppers Crossing to Western Ring Rd	12.1	0%	0%	25%	75%	0%



(...continued)

Victoria	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A20 Sturt Highway	105.7	0%	23%	77%	0%	0%
Mildura to Cullulleraine	48.8	0%	12%	88%	0%	0%
Cullulleraine to SA border	56.9	0%	32%	68%	0%	0%
M8/A8 Western Freeway/Highway	374.9	1%	25%	68%	4%	0%
Western Ring Rd to Melton	13.5	0%	0%	60%	40%	0%
Melton to Ballan	40.9	0%	0%	92%	8%	0%
Ballan to Ballarat	32.5	0%	0%	99%	1%	0%
Ballarat to Beaufort	42.3	9%	55%	17%	0%	0%
Beaufort to Ararat	39.6	0%	17%	83%	0%	0%
Ararat to Stawell	21.1	0%	72%	28%	0%	0%
Stawell to Horsham	57.8	0%	50%	50%	0%	0%
Horsham to Nhill	67.0	0%	19%	77%	4%	0%
Nhill to SA border	60.2	0%	14%	81%	5%	0%
M8/A8 Western Freeway/Highway (eastbound)	91.5	0%	8%	76%	16%	0%
Beaufort to Ballarat	7.7	0%	12%	88%	0%	0%
Ballarat to Ballan	28.7	0%	0%	79%	21%	0%
Ballan to Melton	40.8	0%	15%	78%	7%	0%
Melton to Western Ring Rd	14.3	0%	0%	58%	42%	0%
M80 Western Ring Road	20.4	0%	0%	50%	50%	0%
Princes Freeway West to Western Freeway	7.9	0%	0%	0%	100%	0%
Western Freeway to Calder Freeway	4.4	0%	0%	48%	52%	0%
Calder Freeway to Hume Freeway	8.1	0%	0%	100%	0%	0%
M80 Western Ring Road (southbound)	23.0	0%	0%	19%	43%	0%
Hume Freeway to Calder Freeway	10.6	0%	0%	12%	16%	0%
Calder Freeway to Western Freeway	4.1	0%	0%	76%	0%	0%
Western Freeway to Princes Freeway West	8.3	0%	0%	0%	100%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).



Queensland	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A2 Barkly Highway	312.1	0%	10%	74%	16%	0%
Cloncurry to Mount Isa	114.9	0%	27%	71%	3%	0%
Mount Isa to NT border	197.2	0%	0%	76%	24%	0%
M1/A1 Bruce Highway	1,555.2	3%	45%	50%	2%	0%
Bald Hills to Caloundra	61.0	0%	5%	66%	30%	0%
Caloundra to Cooroy	41.1	0%	0%	94%	6%	0%
Cooroy to Gympie	38.3	0%	92%	7%	1%	0%
Gympie to Childers	131.1	9%	70%	21%	0%	0%
Childers to Miriam Vale	149.5	6%	39%	54%	1%	0%
Miriam Vale to Rockhampton	162.7	0%	44%	55%	1%	0%
Rockhampton to St Lawrence	164.6	5%	76%	18%	0%	0%
St Lawrence to Sarina	122.5	2%	48%	50%	0%	0%
Sarina to Mackay	23.0	27%	63%	10%	0%	0%
Mackay to Proserpine	118.5	0%	40%	60%	0%	0%
Proserpine to Ayr	163.2	0%	7%	93%	0%	0%
Ayr to Townsville	75.1	0%	73%	27%	0%	0%
Townsville to Ingham	100.7	0%	34%	63%	2%	0%
Ingham to Innisfail	136.5	2%	46%	51%	1%	0%
Innisfail to Cairns	67.4	5%	52%	43%	1%	0%
M1/A1 Bruce Highway (southbound)	117.9	1%	3%	74%	19%	3%
Cairns to Innisfail	2.4	0%	0%	50%	50%	0%
Innisfail to Ingham	2.3	0%	0%	100%	0%	0%
Ingham to Townsville	3.6	0%	56%	44%	0%	0%
Townsville to Ayr	0.9	0%	100%	0%	0%	0%
Mackay to Sarina	0.9	33%	67%	0%	0%	0%
Childers to Gympie	2.9	41%	0%	59%	0%	0%
Gympie to Cooroy	3.1	0%	0%	19%	71%	10%
Cooroy to Caloundra	40.8	0%	0%	90%	10%	0%
Caloundra to Bald Hills	61.0	0%	0%	70%	25%	5%
M15/A15 Cunningham Highway	116.4	10%	55%	32%	0%	0%
Ipswich to Willowbank	15.5	0%	28%	68%	0%	0%
Willowbank to Kalbar	34.7	0%	90%	10%	0%	0%
Kalbar to Warwick	66.2	17%	42%	35%	0%	0%



(...continued)

Queensland	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
M15/A15 Cunningham Highway (northbound)						
Willowbank to Ipswich	13.7	0%	89%	0%	0%	0%
A6 Flinders Highway	743.3	0%	20%	76%	3%	0%
Townsville to Charters Towers	118.9	0%	27%	73%	0%	0%
Charters Towers to Hughenden	236.0	1%	33%	66%	0%	0%
Hughenden to Richmond	109.6	0%	0%	100%	0%	0%
Richmond to Julia Creek	146.4	0%	8%	92%	0%	0%
Julia Creek to Cloncurry	132.4	0%	20%	61%	18%	0%
M1 Gateway Arterial Road (northbound)						
SE Freeway to Bruce Highway	39.5	0%	8%	49%	43%	0%
M1 Gateway Arterial Road (southbound)						
Bruce Highway to SE Freeway	39.5	0%	15%	46%	31%	8%
A39 Gore Highway	193.4	0%	53%	47%	0%	0%
Toowoomba to Millmerran	73.5	0%	18%	82%	0%	0%
Millmerran to NSW border	119.9	0%	75%	25%	0%	0%
M7/M2 Ipswich Motorway (eastbound)						
Ipswich to Brisbane	19.2	0%	0%	16%	43%	10%
M7/M2 Ipswich Motorway (westbound)						
Brisbane to Ipswich	19.2	0%	0%	16%	67%	9%
A2 Landsborough Highway	1,011.2	0%	13%	86%	0%	0%
Morven to Barcaldine	404.4	0%	16%	84%	0%	0%
Barcaldine to Winton	276.8	0%	3%	96%	1%	0%
Winton to Flinders Highway	330.0	0%	19%	80%	1%	0%
15 New England Highway	92.5	0%	46%	54%	0%	0%
Warwick to Stanthorpe	53.2	0%	52%	48%	0%	0%
Stanthorpe to NSW border	39.3	0%	37%	63%	0%	0%



(...continued)

Queensland	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
M1 Pacific Motorway (northbound)	79.5	0%	0%	63%	37%	0%
NSW border to Smith Street Motorway	29.5	0%	0%	77%	23%	0%
Smith Street Motorway to Logan Motorway	36.0	0%	0%	42%	58%	0%
Logan Motorway to Gateway Motorway	14.0	0%	0%	86%	14%	0%
M1 Pacific Motorway (southbound)	79.3	0%	0%	63%	37%	0%
Gateway Motorway to Logan Motorway	14.0	0%	0%	100%	0%	0%
Logan Motorway to Smith Street Motorway	36.1	0%	0%	50%	50%	0%
Smith Street Motorway to NSW border	29.2	0%	0%	62%	38%	0%
M2/A2 Warrego Highway	586.9	2%	39%	52%	6%	1%
Cunningham Highway to Gatton	55.6	0%	36%	57%	3%	1%
Gatton to Helidon	19.9	0%	0%	70%	30%	0%
Helidon to Toowoomba	15.1	0%	0%	93%	7%	0%
Toowoomba to Dalby	71.3	0%	46%	54%	0%	0%
Dalby to Roma	253.2	0%	48%	47%	5%	0%
Roma to Morven	171.5	7%	31%	53%	7%	2%
M2/A2 Warrego Highway (eastbound)	89.7	0%	26%	55%	19%	0%
Toowoomba to Helidon	14.3	0%	39%	61%	0%	0%
Helidon to Gatton	20.2	0%	0%	26%	74%	0%
Gatton to Cunningham Highway	55.2	0%	33%	64%	3%	1%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).



Western Australia	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A94 Coolgardie-Esperance Highway						
Coolgardie to Norseman	163.0	7%	47%	46%	0%	0%
A1 Eyre Highway	718.5	1%	9%	71%	20%	0%
Norseman to Caiguna	368.9	2%	17%	79%	2%	0%
Caiguna to SA border	349.6	0%	0%	62%	38%	0%
A94 Great Eastern Highway	496.7	15%	52%	29%	4%	0%
Mundaring to The Lakes	10.2	0%	100%	0%	0%	0%
The Lakes to Northam	44.6	77%	22%	0%	1%	0%
Northam to Southern Cross	258.4	15%	55%	29%	0%	0%
Southern Cross to Coolgardie	183.5	0%	52%	36%	11%	0%
A94 Great Eastern Highway (westbound)						
The Lakes to Mundaring	10.4	29%	71%	0%	0%	0%
A95 Great Northern Highway	3,041.4	4%	17%	60%	19%	0%
Muchea to Wubin	201.1	37%	46%	16%	0%	0%
Wubin to Meekatharra	484.8	1%	13%	73%	13%	0%
Meekatharra to Newman	412.9	0%	0%	89%	11%	0%
Newman to NW Coastal Turnoff	439.5	4%	28%	51%	17%	0%
NW Coastal Turnoff to Sandfire Roadhouse	269.3	0%	0%	25%	75%	0%
Sandfire Roadhouse to Broome T/Off	283.7	0%	0%	60%	40%	0%
Broome T/Off to Fitzroy Crossing	357.4	0%	6%	79%	12%	2%
Fitzroy Crossing to Halls Creek	290.8	0%	15%	71%	14%	0%
Halls Creek to Victoria Highway	301.9	6%	55%	39%	0%	0%
M1 Perth-Bunbury Highway*	108.0	6%	61%	30%	4%	0%
Rockingham to Mandurah	17.1	0%	0%	73%	27%	0%
Dawesville to Preston Beach	34.6	17%	59%	23%	0%	0%
Preston Beach to Bunbury	56.3	0%	80%	20%	0%	0%
M1 Perth-Bunbury Highway (northbound)						
Bunbury to Preston Beach	53.6	6%	88%	7%	0%	0%
M1 Victoria Highway						
Great Northern Highway to NT border	79.8	0%	15%	84%	0%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

*Note 2: Excludes Forrest Highway.



South Australia	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A8 Dukes Highway	191.8	7%	28%	59%	5%	0%
Tailem Bend to Keith	118.2	12%	46%	42%	0%	0%
Keith to Bordertown	40.3	0%	0%	100%	0%	0%
Bordertown to VIC border	33.3	0%	0%	70%	30%	0%
A1 Eyre Highway	926.3	27%	22%	50%	1%	0%
WA border to Yalata	277.1	21%	6%	73%	0%	0%
Yalata to Fowlers Bay	93.6	58%	32%	10%	0%	0%
Fowlers Bay to Ceduna	103.5	12%	12%	74%	3%	0%
Ceduna to Kyancutta	207.8	26%	30%	42%	1%	0%
Kyancutta to Lincoln Highway	214.4	34%	37%	30%	0%	0%
Lincoln Highway to Port Augusta	29.9	0%	20%	80%	0%	0%
A1 Port Augusta Port Wakefield Road	280.7	3%	27%	64%	6%	0%
Port Augusta to Port Pirie	81.2	0%	16%	79%	5%	0%
Port Pirie to Bute	74.1	2%	48%	47%	3%	0%
Bute to Port Wakefield	43.0	14%	49%	37%	0%	0%
Port Wakefield to Old Port Wakefield Rd	82.4	0%	7%	80%	13%	0%
A1 Port Augusta Port Wakefield Road (northbound)						
Old Port Wakefield Rd to Port Wakefield	80.0	0%	47%	49%	4%	0%
M1 South East Freeway	87.2	0%	15%	85%	0%	0%
Crafrers Interchange to Verdun Interchange	15.0	0%	21%	79%	0%	0%
Verdun Interchange to Mt Barker Interchange	9.9	0%	9%	91%	0%	0%
Mt Barker Interchange to Tailem Bend	62.3	0%	15%	85%	0%	0%
M1 South East Freeway (northbound)	75.7	0%	18%	82%	0%	0%
Tailem Bend to Mt Barker Interchange	51.6	0%	24%	76%	0%	0%
Mt Barker Interchange to Verdun Interchange	10.0	0%	9%	91%	0%	0%
Verdun Interchange to Crafrers Interchange	14.1	0%	0%	100%	0%	0%



(...continued)

South Australia	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A87 Stuart Highway						
Port Augusta to Woomera	201.6	6%	18%	64%	12%	0%
A20 Sturt Highway	197.8	2%	16%	75%	6%	0%
Gawler Bypass to Daveyston	15.6	0%	19%	81%	0%	0%
Daveyston to Truro	9.0	54%	0%	46%	0%	0%
Truro to Blanchetown	46.8	0%	13%	68%	19%	0%
Blanchetown to Barmera	81.4	0%	4%	93%	4%	0%
Barmera to Berri	13.9	0%	0%	100%	0%	0%
Berri to Renmark	11.5	0%	97%	3%	0%	0%
Paringa to VIC border	19.6	0%	46%	54%	0%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).



Tasmania	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
M2/A2 Bass Highway	128.5	33%	30%	34%	2%	0%
Midland Highway to Hagley St Overpass	23.0	0%	78%	22%	0%	0%
Hagley St Station Overpass to Railton Rd	32.3	40%	36%	24%	0%	0%
Railton Rd to Parramatta Creek	15.5	99%	1%	0%	0%	0%
Parramatta Creek to Victoria Bridge	19.1	75%	25%	0%	0%	0%
Victoria Bridge to Forth River Bridge	12.0	0%	36%	64%	0%	0%
Forth River Bridge to Knights Rd Underpass	10.7	0%	0%	72%	28%	0%
Knights Rd Underpass to Nine Mile Rd	13.5	0%	0%	100%	0%	0%
Nine Mile Rd to Stowport Rd	2.4	0%	0%	100%	0%	0%
M1 Brooker Highway						
Berridale to Granton	6.5	6%	0%	92%	2%	0%
M1 Brooker Highway (southbound)						
Granton to Berridale	6.4	0%	0%	100%	0%	0%
A8 East Tamar Highway	36.6	0%	47%	46%	3%	0%
Alanvale Connector to Dalrymple Rd	15.1	0%	25%	68%	0%	0%
Dalrymple Rd to Bell Bay Rd	21.5	0%	63%	31%	6%	0%
M1 Midland Highway	155.4	19%	72%	7%	2%	0%
Rifle Range Rd to Quoin Rd Underpass	15.7	11%	61%	28%	0%	0%
Quoin Rd Underpass to Lower Marshes Rd	22.0	0%	100%	0%	0%	0%
Lower Marshes Rd to Sorell Springs Rd	24.5	26%	74%	0%	0%	0%
Sorell Springs Rd to Campbell Town	35.6	17%	83%	0%	0%	0%
Campbell Town to Evandale Main Rd	47.8	31%	69%	0%	0%	0%
Evandale Main Rd to Howick Street	9.8	0%	0%	69%	31%	0%
M1 Midland Highway (southbound)						
Howick Street to Evandale Main Rd	10.0	0%	0%	100%	0%	0%
A3 Tasman Highway						
Macquarie Street to Holyman Avenue	11.7	0%	0%	100%	0%	0%
A3 Tasman Highway (southbound)						
Holyman Avenue to Macquarie Street	11.5	0%	2%	98%	0%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).



Northern Territory	Length (km)	Proportion in each Star Rating				
		1-Star	2-Star	3-Star	4-Star	5-Star
A66 Barkly Highway	433.2	0%	30%	60%	9%	0%
Stuart Highway to Wunara	280.6	0%	38%	55%	7%	0%
Wunara to Qld border	152.6	0%	17%	70%	13%	0%
A87 Stuart Highway	1,709.4	28%	33%	34%	6%	0%
Darwin to Pine Creek	172.9	58%	28%	14%	0%	0%
Pine Creek to Katherine	87.1	78%	22%	0%	0%	0%
Katherine to Daly Waters	275.7	60%	36%	4%	0%	0%
Daly Waters to Helen Springs	251.9	26%	51%	23%	0%	0%
Helen Springs to Barkly Highway	130.7	13%	16%	62%	9%	0%
Barkly Highway to Stirling	273.4	6%	16%	54%	24%	0%
Stirling to Alice Springs	235.5	6%	20%	67%	7%	0%
Alice Springs to SA border	282.2	13%	53%	34%	0%	0%
A87 Stuart Highway (northbound)						
Pine Creek to Darwin	32.4	0%	32%	68%	0%	0%
A1 Victoria Highway	457.2	61%	31%	9%	0%	0%
Katherine to Timber Creek	276.0	54%	33%	13%	0%	0%
Timber Creek to WA border	181.2	71%	27%	2%	0%	0%

Note: For some short sections, the rating is not applicable due to road construction and other activity on the days that the data were collected and could not be star rated (i.e. not rated and so percentages do not add to 100 per cent).

Appendix B

Methodology and Modelling Parameters

Methodology

The iRAP v3 model used by AusRAP considers the physical attributes of a road and quantifies the safety risk associated with each of these to produce a Star Rating Score, from which Star Ratings can be determined. The model produces different Star Ratings for vehicle occupants, motorcycles, cyclists and pedestrians as the safety risks from a given road attribute vary for each of these road user groups.

This project analysed roads on the Australian rural high speed national highway network with a speed limit of 90 km/h or greater. Results presented in this report are for vehicle occupants, as the national highway network has relatively low volumes of motorcycles, bicycles and pedestrians.

The road attributes are analysed every 100 metres, and the results are smoothed to reduce fluctuations in Star Ratings that might otherwise occur every 100m. All results presented in this report are smoothed.

For divided roads with carriageways separated by a dividing median, each carriageway is analysed separately. In these circumstances, the roads are denoted as northbound, southbound, eastbound or westbound as appropriate.

Further information on the methodology is available from www.irap.org, www.toolkit.irap.org/ and <http://capacity.irap.org/>.

Modelling Parameters

For the calculation of the Safer Roads Investment Plans, the analysis model requires values for the modelling parameters to be set. These are shown in Table B1. The model also requires the specification of costs of potential road treatments that can be applied to reduce or eliminate safety risks. Where provided, costs from road authorities were used in the model, and the model also considers situations in which additional cost may be incurred, for example with significant earthworks required. The costs are calculated such that the treatments are projected to last for 20-years, and the cost of treatments with a service life of less than 20-years are scaled to be over a 20-year timeframe.

The recommended treatments in the SRIP are based on an assessment of the safety of the road at the 100 metre level. A more detailed engineering investigation would be required to optimise treatments and costs at specific locations.

The benefits of the Safer Roads Investment Plans are calculated over a 20-year period, estimating the fatalities and serious injuries that can be saved, and the associated economic benefits.

The estimated costs and benefits of each potential road treatment are evaluated and the benefit cost ratio is determined, and only those treatments with a benefit cost ratio greater than one are contained in this report.

This is consistent with current government practice to select projects that have a return on investment.

The results presented in this report are calculated from the most recent available data. However, the large and complex task of collecting data on more than 21,000 kilometres of road means that it is not possible to collect data on the whole network at the same point in time and some of the information is up to three-years old. As a result, Star Ratings may not reflect recent road improvements and some of the countermeasures recommended by the Safer Roads Investment Plans (SRIPs) may already have been undertaken. Some short parts of the network were affected by roadwork or other activities on the day that the data were collected and could not be star rated.

Table B1: Modelling Parameters

AADT	<p>The Annual Average Daily Traffic (AADT) volumes on the roads assessed were provided by the jurisdictional road authorities.</p> <p>The growth in traffic volume needs to be forecast for the future 20-year period over which the benefits of road investment are calculated, and an AADT growth figure of three per cent per annum was used in this report.</p>
Fatality Growth Rate	<p>The current number of fatalities on Australian roads is known, but the growth in fatalities (and serious injuries) needs to be forecast for the future 20-year period over which the benefits of road investment are estimated. The growth rate for fatalities and serious injuries was set to zero (fatalities and serious injuries assumed to remain unchanged over the 20-year period).</p>
Discount Rate	<p>The economic analysis for lives and serious injuries estimated to be saved in the future requires consideration of a discount rate to determine present value of the future savings. A discount rate of 4% was selected for the analysis.</p>
Cost of Life and Serious Injury	<p>The monetary value of a life and serious injury needs to be quantified to determine the benefit cost ratio of road investments.</p> <p>Previous Australian estimates of the cost of life and serious injury have used the Human Capital method, but the Willingness to Pay (WTP) method is now favoured. Some jurisdictions continue to use Human Capital costs, while others have adopted WTP costs.</p> <p>For this project, costs of \$7.2 million for a fatality and \$340,000 for a serious injury were used.</p>
Fatal to Serious Injury Ratio	<p>The model uses a ratio of 20 serious injuries for each fatality.</p>
Multiple Countermeasure Adjustment	<p>To avoid a benefit calculation that may predict saving more than 100 per cent of the fatal and serious injuries when more than one countermeasure treatment is applied to a road, the AusRAP model incorporates Multiple Countermeasure Adjustment. This compensates for potential overestimating of cumulative benefits of multiple countermeasures.</p>

Safer Roads Investment Plans
are calculated over a

20-year
period





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