



Vehicle speeds in South Australia 2022

CASR239

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Report documentation

REPORT NO.	DATE	PAGES	ISBN	ISSN
CASR239	August 2024	36	978-1-925971-72-9	1449-2237

Title

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Performing Organisation

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Funding

This research was funded via a deed with the South Australian Government

Available From

Centre for Automotive Safety Research; <http://casr.adelaide.edu.au/publications/list>

Abstract

A systematic and ongoing method of measuring vehicle speeds was introduced in South Australia in 2007 to assess the effects of speed reduction countermeasures and to monitor the speed behaviour of South Australian motorists over time. More than 100 sites around South Australia have speed measurements taken for a one-week period at the same time each survey year. This Report summarises the data collected in 2022 and makes comparisons with previous surveys dating back to 2007. The following general observations are apparent when considering all the surveys and all the speed measurements: vehicle speeds have been trending down on all road types over the course of the surveys; the percentage of vehicles obeying the speed limit has been increasing; reductions in high level speeding are more pronounced than those for low level speeding; speed limit compliance is lowest on Adelaide 50 km/h collector roads and rural 100 km/h arterial roads; and vehicle speeds in 2022 appeared to generally decrease compared to 2020.

Keywords

Vehicle speed, Speed limit, Driver behaviour, Urban road, Rural road, Statistics.

Summary

A systematic and ongoing method of measuring vehicle speeds was introduced in South Australia in 2007 in order to assess the effects of speed reduction countermeasures and to monitor the speed behaviour of South Australian motorists over time. Travelling speed is an important metric to measure for road safety performance and is one of the Safety Performance Indicators in the current South Australian Road Safety Strategy (2021). The Centre for Automotive Safety Research has analysed each of the surveys conducted in this series.

More than 100 sites around South Australia have speed measurements taken for a one-week period at the same time of year. Groups of sites, based on road location and speed limit, are analysed for changes in vehicle speeds between surveys (both all vehicles and solely free speed vehicles).

This report summarises vehicle speed changes in 2022 and makes comparisons with previous surveys dating back to 2007. The mean speeds by road type and survey year are shown in the following Table.

Mean speeds (km/h) by road type and survey year

Year	Adelaide local (50)	Adelaide collector (50)	Adelaide arterial (60)	Rural local (50)	Rural hills arterial (80)	Rural arterial (100)	Rural arterial (110)
2007	44.24	50.65	56.76	43.50	78.50	98.06	103.38
2008	43.75*	49.79	55.96	42.65	76.59	96.83	103.23
2009	44.10	49.67	55.82*	41.87	77.15	96.87	103.38
2010	43.37*	49.46	55.53	42.15	77.41	96.66	103.02
2011	43.56	49.74	55.43	42.71	-	97.24	103.64*
2012	43.14*	49.11	55.52	42.28	76.87	96.38*	102.09*
2013	42.39*	48.75	54.92*	42.30	74.49*	97.00	102.22
2014	41.68*	48.17*	54.93	41.65*	73.86*	96.94	102.48
2015	41.38	47.88	54.98	41.97	73.51*	96.61	102.29
2016	41.67	47.99	54.55*	41.65	74.04	96.20	101.74
2018	41.47	47.26*	54.53	41.78	74.01	95.51	101.33*
2020	42.12*	47.46	54.79	42.16	74.54	95.76	101.95*
2022	41.12*	47.26	54.61	41.43*	73.83*	95.60	101.95

* statistically significant change from previous survey (p < 0.05)

The following general observations are apparent when considering all the surveys and all the speed measurements:

- Vehicle speeds have been trending down on all road types since 2007
- The percentage of vehicles at or below the speed limit has been increasing
- Reductions in high level speeding are more pronounced than those for low level speeding
- Speed limit compliance is lowest on Adelaide 50 km/h collector roads and rural 100 km/h arterial roads
- Vehicle speeds in 2020 generally appeared to increase compared to 2018, but in 2022, there was a general decrease in vehicle speeds, consistent with the patterns observed before 2020

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1. Introduction

Speed is an important determinant of crash incidence and outcome. Numerous initiatives are being implemented in South Australia with the aim of increasing compliance with speed limits. Travelling speed is an important metric to measure for road safety performance and is one of the Safety Performance Indicators in the current South Australian Road Safety Strategy (2021). A systematic and ongoing method of measuring vehicle speeds in South Australia is required to assess the effects of speed reduction countermeasures and to monitor the speed behaviour of motorists over time.

The South Australian Department for Infrastructure and Transport (formerly the Department of Planning, Transport and Infrastructure) has, for many years, tasked CASR to oversee and analyse speed data from a selection of sites in South Australia. The first full set of measurements was taken in 2007 and are reported in Kloeden and Woolley (2009). Follow up surveys were conducted in 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, and 2018 (Kloeden and Woolley, 2010, 2012, 2012a, 2012b, 2013, 2015, 2017, 2017a, 2020, 2023). No surveys were conducted in 2017, 2019 and 2021.

This Report summarises the data collected in 2022 and compares it with previous surveys dating back to 2007.

As the sampling period included the duration of the COVID-19 pandemic, Section 5 outlines the effects of the pandemic on some sites, and some discussion on how the pandemic influenced the outcomes observed in this study.

2. Methodology

2.1. Site selection

A range of sites were selected to be used in the evaluation of the introduction to the default 50 km/h speed limit (Kloeden, Woolley and McLean; 2004, 2006). These sites were surveyed by a contractor for one day each in 2002, 2003 and 2005. From 2007 onwards, these sites were surveyed by a contractor to collect a full week of data (usually in November/December) each survey year. Additional sites were surveyed from 2007 for a full week (usually in November/December) each survey year. Due to the nature of data collection and for consistency in comparisons, surveyed data prior to 2007 is not included in this report. Further details regarding the history of data collection from 2002-2005 can be found in previous reports. Some points of note are highlighted below.

Data from relevant rural permanent speed sites maintained by the Department for Infrastructure and Transport were obtained for August of each survey year from 2006 onwards. One week of data was selected from each site for analysis. A series of one-week surveys at five 100 km/h rural sites and six 110 km/h rural sites were conducted by the Department in August of each year. These surveys ceased to be conducted regularly in 2015 and are no longer used as sites going forward.

Some sites had their location moved or had their layout changed and so were given a new site ID and considered to be a new site to reflect the fact that speeds were not comparable before and after the change.

There was data collection at six Adelaide arterial 80 km/h sites from 2007 to 2012. However, these sites were dropped completely from 2013 onwards and are not reported here. The data for these sites can be found in a previous report in this series (Kloeden and Woolley, 2013a).

There was data collection at five rural arterial 60 km/h sites from 2007 to 2014. However, these sites were dropped completely from 2015 onwards and are not reported here. The data for these sites can be found in a previous report in this series (Kloeden and Woolley, 2015).

Note also that there were problems with a new contractor identifying the correct locations for the rural arterial (100 km/h) sites in 2011 meaning that no data is available for 2011.

Table 2.1 shows the number of sites surveyed in each year by road type. Table 2.2 shows the number of site/direction combinations that were successfully surveyed in each year by road type.

Table 2.1
Number of speed survey sites by survey year and road type

Year	Road type (speed limit in km/h)							Total
	Adelaide local (50)	Adelaide collector (50)	Adelaide arterial (60)	Rural local (50)	Rural hills arterial (80)	Rural arterial (100)	Rural arterial (110)	
2007	27	11	18	9	36	4	13	118
2008	27	10	18	9	35	6	13	118
2009	27	11	18	10	34	6	13	119
2010	27	11	18	10	35	6	12	119
2011	24	11	17	10	34	-	10	106
2012	21	11	17	13	34	6	12	114
2013	25	12	18	13	34	11	13	126
2014	23	12	17	15	34	11	12	124
2015	24	11	18	10	25	12	12	112
2016	26	12	18	11	26	10	12	115
2018	24	11	18	12	25	11	12	113
2020	23	12	14	11	21	8	12	101
2022	24	10	12	12	27	10	8	103

Table 2.2
Number of site/direction combinations by road type and survey year

Year	Road type (speed limit in km/h)							Total
	Adelaide local (50)	Adelaide collector (50)	Adelaide arterial (60)	Rural local (50)	Rural hills arterial (80)	Rural arterial (100)	Rural arterial (110)	
2007	54	22	35	18	72	8	25	234
2008	54	20	35	18	70	12	25	234
2009	53	22	34	20	68	12	25	234
2010	54	22	34	20	70	12	23	235
2011	47	22	33	20	68	-	20	210
2012	41	22	33	26	68	12	24	226
2013	50	24	35	26	68	22	26	251
2014	46	24	33	30	68	22	24	247
2015	47	22	35	20	50	24	24	222
2016	51	24	35	21	52	20	24	227
2018	45	22	35	24	50	22	24	222
2020	43	24	28	22	42	16	24	199
2022	48	20	23	24	54	20	16	205

2.2. Data collected

The data was collected in most cases using a standard traffic counter with pneumatic tubes that were set up by either a contractor or the Department for Infrastructure and Transport personnel. At some sites, induction loops were used for measurements. The following information was recorded for each vehicle that passed during each survey period:

- date
- time (to nearest second)
- direction of travel
- speed (to nearest 0.1 km/h or 0.01 km/h in more recent surveys)
- wheelbase (to nearest 0.1 m or 0.01 m in more recent surveys)
- headway (to nearest 0.1 second)
- number of axles
- class of vehicle (based on number of axles and wheelbases)

The aim was to capture data at each site for a continuous one-week period either in August or November depending on the site. Due to equipment malfunctions, some of the time periods had to be extended to capture a full week of valid data.

Note that on multilane roads, sampling was based on whether a median separator was present. Where a median was present, speeds were measured in the median traffic lane. Where a median was not present, speeds were measured in the kerbside traffic lane.

2.3. Quantifying and testing speed changes

Due to individual sites becoming unsuitable or changing speed limits and new sites being added over time, a method was developed for tracking year to year changes on a varying number and group of sites.

By concentrating on the changes between one survey and the next rather than on absolute values, sites can be added to and removed from the survey set. This methodology was introduced in the analysis of the 2009 survey year data (Kloeden and Woolley, 2012) and is explained in detail in Kloeden and Woolley (2012b).

Essentially, all sites that are successfully sampled in adjacent years are compared for changes in a particular speed measurement. The median of these changes is taken as the best estimate of the change from year to year and a Wilcoxon signed rank test is applied to determine the statistical significance of the change. The changes are successively applied to baseline median speed measurements from 2007 to give indicative absolute speed measurements for each year.

This method uses all the available data for determining changes, is tolerant of sites dropping out and allows new sites to be added to the analysis over time (thus increasing the statistical power of detecting speed changes).

2.4. Quantifying traffic volume changes

In order to quantify the changes in vehicle volumes over time, a similar method to that for speed changes was used. For all sites in a road type successfully sampled in adjacent surveys: the ratio of the count in the latter survey to the earlier survey was calculated for each sample and the median value of these was taken as the proportional change from the earlier to the latter survey. The survey in 2007 was considered to be 100% and the calculated ratios were applied successively to get cumulative volume estimates in subsequent survey years. This gives the relative traffic volumes in each road type over time.

3. Speeds of all vehicles

This Section compares the speeds of all vehicles collected in the various surveys on the different road types.

3.1. Adelaide 50 km/h local roads

The summary speed measurements for all vehicles passing the measured sites for all the surveys conducted on Adelaide 50 km/h local roads are presented in Table 3.1 and the changes from one survey to the next in Table 3.2.

Table 3.1
Adelaide 50 km/h local road speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007	44.24	45.40	53.50	24.65	11.95	5.15	1.85
2008	43.75	44.70	52.80	22.47	11.28	4.91	1.79
2009	44.10	45.10	52.80	23.23	11.39	4.84	1.65
2010	43.37	44.35	52.10	21.35	10.49	4.45	1.38
2011	43.56	44.75	52.41	22.88	11.12	4.51	1.56
2012	43.14	44.45	52.01	22.19	10.55	4.32	1.53
2013	42.39	43.85	51.36	20.09	9.35	4.09	1.33
2014	41.68	43.25	50.76	19.98	9.27	4.02	1.26
2015	41.38	42.95	50.36	19.28	9.17	3.80	1.20
2016	41.67	43.21	50.41	20.03	9.28	4.04	1.30
2018	41.47	43.18	50.23	19.65	9.12	3.86	1.25
2020	42.12	43.88	50.97	20.88	9.46	3.96	1.15
2022	41.12	42.99	49.65	16.89	8.02	3.57	0.97

Table 3.2
Adelaide 50 km/h local road speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007-2008	-0.50*	-0.70	-0.70	-2.18*	-0.68*	-0.24	-0.06
2008-2009	0.35	0.40	0.00	0.76	0.11	-0.07	-0.13*
2009-2010	-0.73*	-0.75*	-0.70*	-1.89*	-0.90*	-0.39*	-0.27*
2010-2011	0.19	0.40	0.31	1.53*	0.64	0.06	0.18
2011-2012	-0.42*	-0.30*	-0.40*	-0.69*	-0.58*	-0.19	-0.03
2012-2013	-0.75*	-0.60	-0.66*	-2.10*	-1.20*	-0.23*	-0.20*
2013-2014	-0.71*	-0.60*	-0.60*	-0.12	-0.08	-0.07	-0.07*
2014-2015	-0.31	-0.30	-0.40*	-0.70*	-0.10*	-0.22	-0.06
2015-2016	0.30	0.26	0.05	0.75	0.12	0.24	0.10*
2016-2018	-0.20	-0.03	-0.18	-0.38	-0.17	-0.18	-0.06
2018-2020	0.64*	0.70*	0.75*	1.23	0.34	0.10	-0.10
2020-2022	-1.00*	-0.89*	-1.32*	-3.99*	-1.44*	-0.39*	-0.18*

* statistically significant change (p < 0.05)

3.2. Adelaide 50 km/h collector roads

The summary speed measurements for all vehicles passing the measured sites for all the surveys conducted on Adelaide 50 km/h collector roads are presented in Table 3.3 and the changes from one survey to the next in Table 3.4.

Table 3.3
Adelaide 50 km/h collector road speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007	50.65	50.80	57.88	55.02	25.84	9.21	2.94
2008	49.79	49.98	56.98	49.97	23.04	7.89	2.34
2009	49.67	50.08	56.53	49.99	22.88	7.49	2.32
2010	49.46	50.03	56.48	49.88	22.12	7.32	2.08
2011	49.74	50.33	56.93	52.05	22.97	7.53	2.02
2012	49.11	49.58	55.98	48.07	20.15	6.53	1.68
2013	48.75	49.18	55.48	45.06	18.59	5.72	1.42
2014	48.17	48.83	55.33	43.35	17.93	5.55	1.42
2015	47.88	48.38	54.63	40.87	15.57	4.84	1.21
2016	47.99	48.55	54.86	42.60	16.03	5.08	1.29
2018	47.26	47.84	53.93	37.22	14.17	4.67	1.18
2020	47.46	48.23	54.11	39.00	14.92	4.51	1.08
2022	47.26	47.95	53.82	36.23	14.40	4.47	1.08

Table 3.4
Adelaide 50 km/h collector road speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007-2008	-0.87	-0.82	-0.90	-5.05*	-2.80*	-1.32*	-0.59*
2008-2009	-0.12	0.10	-0.45	0.02	-0.17	-0.40	-0.02
2009-2010	-0.21	-0.05	-0.05	-0.10	-0.76	-0.17	-0.24
2010-2011	0.28	0.30	0.45	2.16	0.85	0.21	-0.06
2011-2012	-0.63	-0.75*	-0.95*	-3.98*	-2.82*	-1.00*	-0.34*
2012-2013	-0.37	-0.40	-0.50*	-3.01	-1.57*	-0.81*	-0.26*
2013-2014	-0.57*	-0.35	-0.15	-1.71	-0.66	-0.17	-0.00
2014-2015	-0.29	-0.45	-0.70*	-2.48	-2.36*	-0.71*	-0.21*
2015-2016	0.10	0.18	0.23	1.73	0.46	0.24	0.08
2016-2018	-0.73*	-0.71*	-0.93*	-5.39*	-1.86*	-0.41*	-0.12
2018-2020	0.20	0.39	0.17	1.78	0.74	-0.17	-0.10
2020-2022	-0.20	-0.28	-0.29	-2.77	-0.52	-0.04	0.00

* statistically significant change (p < 0.05)

3.3. Adelaide 60 km/h arterial roads

The summary speed measurements for all vehicles passing the measured sites for all the surveys conducted on Adelaide 60 km/h arterial roads are presented in Table 3.5 and the changes from one survey to the next in Table 3.6.

Table 3.5
Adelaide 60 km/h arterial road speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 60 km/h	% above 65 km/h	% above 70 km/h	% above 75 km/h
2007	56.76	57.45	62.15	27.29	5.64	1.27	0.43
2008	55.96	56.65	61.30	21.82	3.95	0.93	0.34
2009	55.82	56.45	61.00	19.83	3.53	0.83	0.31
2010	55.53	56.15	60.60	17.73	3.05	0.69	0.27
2011	55.43	56.15	60.60	17.87	3.08	0.70	0.26
2012	55.52	56.15	60.40	17.52	2.80	0.60	0.21
2013	54.92	55.35	59.60	12.61	1.92	0.47	0.17
2014	54.93	55.40	59.55	12.21	1.77	0.44	0.16
2015	54.98	55.55	59.85	13.74	2.04	0.50	0.18
2016	54.55	55.18	59.34	12.43	1.78	0.45	0.17
2018	54.53	55.13	59.23	12.06	1.67	0.41	0.14
2020	54.79	55.24	59.37	12.89	1.73	0.40	0.13
2022	54.61	55.03	59.21	12.56	1.65	0.43	0.15

Table 3.6
Adelaide 60 km/h arterial road speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 60 km/h	% above 65 km/h	% above 70 km/h	% above 75 km/h
2007-2008	-0.80*	-0.80*	-0.85*	-5.47*	-1.69*	-0.34*	-0.09*
2008-2009	-0.14	-0.20	-0.30	-1.99	-0.42*	-0.10*	-0.03*
2009-2010	-0.29*	-0.30*	-0.40*	-2.10*	-0.49*	-0.14*	-0.04*
2010-2011	-0.10	0.00	0.00	0.14	0.04	0.01	-0.01
2011-2012	0.10	-0.00	-0.20	-0.35	-0.28	-0.10	-0.04
2012-2013	-0.60*	-0.80*	-0.80*	-4.92*	-0.88*	-0.13*	-0.05*
2013-2014	0.00	0.05	-0.05	-0.39	-0.15	-0.04	-0.01
2014-2015	0.05	0.15	0.30	1.53	0.27	0.06*	0.02*
2015-2016	-0.42*	-0.38	-0.51*	-1.31	-0.26*	-0.05	-0.01
2016-2018	-0.02	-0.04	-0.11	-0.36	-0.11	-0.04*	-0.03*
2018-2020	0.26	0.11	0.14	0.82	0.06	-0.01	-0.01
2020-2022	-0.18	-0.21*	-0.16	-0.33	-0.09	0.03	0.02

* statistically significant change (p < 0.05)

3.4. Rural 50 km/h local roads

The summary speed measurements for all vehicles passing the measured sites for all the surveys conducted on rural 50 km/h local roads are presented in Table 3.7 and the changes from one survey to the next in Table 3.8.

Table 3.7
Rural 50 km/h local road speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007	43.50	44.70	54.10	31.60	15.04	7.28	2.04
2008	42.65	43.70	53.02	28.56	12.79	5.78	0.99
2009	41.87	43.20	52.92	28.37	12.77	5.80	1.09
2010	42.15	43.50	52.82	29.32	14.07	6.10	1.26
2011	42.71	43.90	52.67	29.48	13.81	6.31	0.84
2012	42.28	43.60	52.09	27.93	12.86	5.51	0.68
2013	42.30	43.75	52.17	28.93	12.50	5.52	0.77
2014	41.65	43.30	51.12	26.25	10.51	5.07	0.58
2015	41.97	43.58	51.35	26.03	10.69	5.14	0.81
2016	41.65	43.19	51.48	25.59	10.79	5.16	1.25
2018	41.78	43.34	51.28	25.41	10.63	4.97	0.58
2020	42.16	43.79	51.56	26.17	10.71	5.02	0.95
2022	41.43	43.20	50.91	24.94	10.19	4.95	0.94

Table 3.8
Rural 50 km/h local road speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007-2008	-0.85*	-1.00*	-1.09*	-3.03*	-2.25*	-1.50*	-1.05*
2008-2009	-0.78	-0.50	-0.10	-0.19	-0.02	0.02	0.10
2009-2010	0.28	0.30	-0.10	0.95	1.30	0.30	0.17*
2010-2011	0.56	0.40	-0.14	0.16	-0.26	0.20	-0.41
2011-2012	-0.43	-0.30	-0.58	-1.55*	-0.95	-0.79*	-0.16
2012-2013	0.02	0.15	0.07	1.00	-0.36	0.01	0.09
2013-2014	-0.65*	-0.45*	-1.05*	-2.69*	-1.99*	-0.45	-0.19
2014-2015	0.32	0.27	0.23	-0.22	0.19	0.07	0.23
2015-2016	-0.32	-0.39	0.13	-0.44	0.09	0.02	0.44
2016-2018	0.13	0.16	-0.20	-0.18	-0.16	-0.19*	-0.67*
2018-2020	0.37	0.44	0.29	0.76	0.08	0.05	0.37
2020-2022	-0.73*	-0.58*	-0.66	-1.23	-0.52	-0.07	-0.01

* statistically significant change (p < 0.05)

3.5. Rural hills 80 km/h arterial roads

The summary speed measurements for all vehicles passing the measured sites for all the surveys conducted on rural hills 80 km/h arterial roads are presented in Table 3.9 and the changes from one survey to the next in Table 3.10. Note that there were problems with a new contractor identifying the correct locations for these sites in 2011 meaning that no data is available for 2011, so 2012 data is compared to data from 2010.

Table 3.9
Rural hills 80 km/h arterial road speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 80 km/h	% above 85 km/h	% above 90 km/h	% above 95 km/h
2007	78.50	78.30	87.05	40.80	20.59	9.70	4.74
2008	76.59	76.60	84.73	34.41	18.71	8.98	4.15
2009	77.15	77.23	85.28	36.99	19.49	9.80	4.75
2010	77.41	77.38	85.18	37.49	19.54	9.92	4.63
2012	76.87	77.05	84.28	35.68	17.39	8.49	3.16
2013	74.49	74.70	80.73	26.85	11.68	5.37	1.94
2014	73.86	73.80	79.98	24.99	10.27	5.07	1.76
2015	73.51	73.60	79.04	23.74	9.10	4.19	1.23
2016	74.04	73.94	79.43	25.17	9.82	4.46	1.33
2018	74.01	74.04	79.20	23.86	9.58	4.34	1.28
2020	74.54	74.62	79.60	26.16	10.32	4.42	1.32
2022	73.83	73.75	79.05	25.02	9.72	4.16	1.23

Table 3.10
Rural hills 80 km/h arterial road speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 80 km/h	% above 85 km/h	% above 90 km/h	% above 95 km/h
2007-2008	-1.91	-1.70	-2.32	-6.39	-1.89	-0.72	-0.60
2008-2009	0.56	0.62	0.55	2.59	0.78	0.82	0.60
2009-2010	0.27	0.15	-0.10	0.50	0.05	0.11	-0.12
2010-2012	-0.55	-0.32	-0.90	-1.81	-2.15	-1.43	-1.47*
2012-2013	-2.37*	-2.35*	-3.55*	-8.83*	-5.71*	-3.12*	-1.22*
2013-2014	-0.63*	-0.90*	-0.74*	-1.86	-1.41*	-0.30	-0.18
2014-2015	-0.35*	-0.20	-0.94*	-1.25	-1.17*	-0.88*	-0.53*
2015-2016	0.52	0.34	0.39	1.44	0.72	0.27	0.10
2016-2018	-0.03	0.09	-0.23	-1.31	-0.24	-0.13	-0.05
2018-2020	0.54	0.58	0.40	2.31	0.74	0.09	0.04
2020-2022	-0.72*	-0.87*	-0.56	-1.14	-0.60	-0.26*	-0.09*

* statistically significant change ($p < 0.05$)

3.6. Rural 100 km/h arterial roads

The summary speed measurements for all vehicles passing the measured sites for all the surveys conducted on rural 100 km/h arterial roads are presented in Table 3.11 and the changes from one survey to the next in Table 3.12.

Table 3.11
Rural 100 km/h arterial road speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 100 km/h	% above 105 km/h	% above 110 km/h	% above 115 km/h
2007	98.06	99.15	108.15	46.22	24.02	11.34	5.16
2008	96.83	98.10	106.80	42.29	20.56	9.81	4.63
2009	96.87	98.10	106.35	41.84	20.12	9.49	4.63
2010	96.66	97.73	106.20	41.11	19.54	8.91	4.43
2011	97.24	98.23	106.40	43.76	20.48	9.29	4.55
2012	96.38	97.38	105.45	39.28	16.60	7.59	3.69
2013	97.00	97.93	106.00	42.02	17.88	7.97	3.80
2014	96.94	97.93	105.70	42.25	17.50	7.64	3.69
2015	96.61	97.63	105.20	40.15	16.36	7.22	3.59
2016	96.20	97.43	104.76	37.96	15.99	7.24	3.60
2018	95.51	96.91	104.52	35.47	15.03	6.83	3.40
2020	95.76	96.68	104.20	34.68	14.85	6.62	3.37
2022	95.60	96.49	103.99	33.67	14.82	6.72	3.42

Table 3.12
Rural 100 km/h arterial road speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 100 km/h	% above 105 km/h	% above 110 km/h	% above 115 km/h
2007-2008	-1.23	-1.05*	-1.35*	-3.93*	-3.46*	-1.53*	-0.53*
2008-2009	0.04	0.00	-0.45	-0.45	-0.44	-0.31	0.00
2009-2010	-0.21	-0.38	-0.15	-0.73	-0.59	-0.58	-0.20
2010-2011	0.58	0.50	0.20	2.65	0.95	0.38	0.12
2011-2012	-0.86*	-0.85*	-0.95*	-4.48*	-3.89*	-1.70*	-0.87*
2012-2013	0.62	0.55	0.55	2.74*	1.29	0.38	0.11
2013-2014	-0.06	0.00	-0.30	0.23	-0.38	-0.33	-0.11
2014-2015	-0.33	-0.30	-0.50	-2.10	-1.14	-0.43	-0.09
2015-2016	-0.40	-0.20	-0.44	-2.19	-0.37	0.03	0.00
2016-2018	-0.69	-0.52	-0.24	-2.49	-0.95*	-0.41*	-0.20*
2018-2020	0.24	-0.23	-0.32	-0.79	-0.19	-0.21	-0.03
2020-2022	-0.15	-0.19	-0.20	-1.01	-0.03	0.10	0.05

* statistically significant change (p < 0.05)

3.7. Rural 110 km/h arterial roads

The summary speed measurements for all vehicles passing the measured sites for all the surveys conducted on rural 110 km/h arterial roads are presented in Table 3.13 and the changes from one survey to the next in Table 3.14.

Table 3.13
Rural 110 km/h arterial road speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 110 km/h	% above 115 km/h	% above 120 km/h	% above 125 km/h
2007	103.38	104.45	114.00	28.05	12.62	4.49	1.75
2008	103.23	104.43	113.66	27.37	11.87	3.96	1.59
2009	103.38	104.58	113.56	27.61	11.92	3.82	1.54
2010	103.02	104.18	113.19	26.16	11.25	3.50	1.44
2011	103.64	104.83	113.49	26.86	11.70	3.79	1.59
2012	102.09	103.33	111.44	20.96	8.64	2.70	1.05
2013	102.22	103.58	111.59	21.83	8.52	2.71	1.04
2014	102.48	103.88	111.47	20.91	8.19	2.59	0.91
2015	102.29	103.63	111.22	19.88	7.83	2.47	0.91
2016	101.74	103.34	110.68	18.46	7.05	2.18	0.77
2018	101.33	102.86	109.70	15.59	5.80	1.83	0.64
2020	101.95	103.77	109.92	16.68	6.15	2.01	0.65
2022	101.95	103.93	110.05	17.48	6.35	2.05	0.67

Table 3.14
Rural 110 km/h arterial road speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 110 km/h	% above 115 km/h	% above 120 km/h	% above 125 km/h
2007-2008	-0.14	-0.03*	-0.34*	-0.69*	-0.75*	-0.53*	-0.16*
2008-2009	0.15	0.15	-0.10	0.24	0.06	-0.13	-0.05
2009-2010	-0.36	-0.40	-0.37*	-1.45	-0.67*	-0.33*	-0.10*
2010-2011	0.62*	0.65*	0.30	0.70	0.44	0.30	0.16
2011-2012	-1.55*	-1.50*	-2.05*	-5.91*	-3.06*	-1.09*	-0.54*
2012-2013	0.13	0.25	0.15	0.88	-0.11	0.01	-0.01
2013-2014	0.26	0.30	-0.12	-0.93	-0.34*	-0.13*	-0.13*
2014-2015	-0.19	-0.25	-0.25	-1.02	-0.36	-0.12	-0.00
2015-2016	-0.54	-0.29	-0.54	-1.42	-0.77	-0.29	-0.14
2016-2018	-0.42*	-0.48*	-0.98*	-2.87*	-1.25*	-0.35*	-0.13*
2018-2020	0.63*	0.90*	0.23	1.08	0.35	0.18	0.01
2020-2022	0.00	0.16	0.12	0.80	0.20	0.03	0.02

* statistically significant change (p < 0.05)

4. Speeds of free speed vehicles

This Section compares the speeds of all free speed vehicles collected in the various surveys on the different road types. Free speed vehicles were defined as those that had at least a four second headway to the vehicle in front of them (i.e., the time between the front wheels of the two vehicles passing the measurement site was at least four seconds). This is a commonly adopted definition of free speed used in traffic management.

The drivers of free speed vehicles are assumed to be able to choose the speed they travel at, unlike the drivers of vehicles in a platoon that are limited to the speed of the front vehicle. By examining just free speed vehicles, freely chosen speeds can be analysed. However, this is not the same as the speeds that all drivers would choose if they could do so, as the preferred speeds of drivers behind other vehicles cannot be known. This method also tends to bias measured speeds to those times when traffic volumes are low. Our preference is for using all vehicle speeds as these are not subject to the same biases as free speeds and they represent the total speed behaviour of all vehicles. However, since free speeds are commonly reported, they are calculated and presented below.

The results for free speed vehicles were very similar to those for all vehicles. While the free speed measurements were slightly higher than all speed measurements (as would be expected) the changes between survey years were very similar and the sets of changes between survey years that were statistically significant were almost identical.

For the years of data collection between 2007 and 2022, around 50 million vehicle speeds were recorded and over 29 million (57.2%) of those were travelling at a free speed.

4.1. Adelaide 50 km/h local roads

The summary speed measurements for all free speed vehicles passing the measured sites for all the surveys conducted on Adelaide 50 km/h local roads are presented in Table 4.1 and the changes from one survey to the next in Table 4.2.

Table 4.1
Adelaide 50 km/h local road free speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007	44.65	45.50	54.20	26.00	13.27	5.49	1.93
2008	44.23	44.90	53.80	23.69	12.69	5.25	1.88
2009	44.54	45.15	53.80	24.28	12.75	5.12	1.75
2010	43.88	44.33	53.16	22.39	11.78	4.69	1.52
2011	43.98	44.73	53.46	23.72	12.27	4.69	1.63
2012	43.55	44.53	53.16	23.11	11.79	4.55	1.60
2013	42.77	43.93	52.56	20.66	10.62	4.32	1.38
2014	42.04	43.33	51.96	20.55	10.48	4.24	1.32
2015	41.73	43.03	51.66	19.85	10.39	4.01	1.25
2016	42.08	43.25	51.69	20.82	10.52	4.21	1.35
2018	41.96	43.23	51.52	20.56	10.36	4.04	1.31
2020	42.58	43.89	52.31	21.95	10.80	4.14	1.21
2022	41.53	43.05	50.97	17.77	9.33	3.72	1.01

Table 4.2
Adelaide 50 km/h local road free speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007-2008	-0.43*	-0.60*	-0.40	-2.32*	-0.57*	-0.24	-0.06
2008-2009	0.32	0.25	0.00	0.59	0.05	-0.13	-0.13*
2009-2010	-0.66*	-0.82*	-0.64*	-1.88*	-0.97*	-0.43*	-0.23*
2010-2011	0.10	0.40	0.30	1.33*	0.49	0.00	0.11
2011-2012	-0.42*	-0.20*	-0.30*	-0.61*	-0.48*	-0.14	-0.03
2012-2013	-0.78*	-0.60	-0.60*	-2.46*	-1.17*	-0.23*	-0.21*
2013-2014	-0.73*	-0.60*	-0.60*	-0.11	-0.14	-0.07	-0.07*
2014-2015	-0.31	-0.30	-0.30*	-0.70*	-0.09*	-0.23	-0.06
2015-2016	0.35	0.22	0.03	0.97	0.12	0.20	0.10*
2016-2018	-0.12	-0.02	-0.17	-0.25	-0.15	-0.17	-0.04
2018-2020	0.62*	0.66	0.79*	1.39	0.43	0.10	-0.10
2020-2022	-1.05*	-0.84*	-1.34*	-4.18*	-1.46*	-0.42*	-0.20*

* statistically significant change (p < 0.05)

4.2. Adelaide 50 km/h collector roads

The summary speed measurements for all free speed vehicles passing the measured sites for all the surveys conducted on Adelaide 50 km/h collector roads are presented in Table 4.3 and the changes from one survey to the next in Table 4.4.

Table 4.3
Adelaide 50 km/h collector road free speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007	50.82	50.90	57.95	55.48	26.21	9.37	3.05
2008	49.94	50.10	57.15	50.48	23.19	8.01	2.43
2009	49.84	50.10	56.70	50.67	22.94	7.59	2.43
2010	49.65	50.05	56.50	50.63	22.29	7.46	2.18
2011	49.94	50.30	56.90	52.71	23.10	7.64	2.11
2012	49.34	49.55	56.00	48.62	20.17	6.50	1.75
2013	48.93	49.15	55.40	45.61	18.96	5.73	1.46
2014	48.32	48.90	55.25	44.38	18.43	5.53	1.46
2015	48.02	48.45	54.55	42.05	15.83	4.87	1.25
2016	48.18	48.66	54.83	44.26	16.42	5.16	1.36
2018	47.52	47.98	53.89	38.71	14.38	4.64	1.20
2020	47.64	48.26	54.04	40.29	14.95	4.45	1.09
2022	47.41	48.03	53.75	37.41	14.44	4.46	1.10

Table 4.4
Adelaide 50 km/h collector road free speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007-2008	-0.88	-0.80*	-0.80	-5.00*	-3.02*	-1.36*	-0.63*
2008-2009	-0.10	0.00	-0.45	0.19	-0.25	-0.42	0.00
2009-2010	-0.19	-0.05	-0.20	-0.04	-0.65	-0.13	-0.25
2010-2011	0.28	0.25	0.40	2.08	0.81	0.18	-0.07
2011-2012	-0.60	-0.75*	-0.90*	-4.09*	-2.93*	-1.14*	-0.36*
2012-2013	-0.41	-0.40	-0.60*	-3.02	-1.20*	-0.77*	-0.29*
2013-2014	-0.60*	-0.25	-0.15	-1.23	-0.53	-0.19	0.00
2014-2015	-0.30	-0.45	-0.70*	-2.33	-2.60*	-0.66*	-0.21*
2015-2016	0.16	0.21	0.28	2.21	0.59	0.28	0.10
2016-2018	-0.66*	-0.69*	-0.94*	-5.56*	-2.04*	-0.52*	-0.16*
2018-2020	0.12	0.28	0.15	1.58	0.57	-0.19	-0.11
2020-2022	-0.23	-0.23	-0.29	-2.88	-0.51	0.01	0.02

* statistically significant change (p < 0.05)

4.3. Adelaide 60 km/h arterial roads

The summary speed measurements for all free speed vehicles passing the measured sites for all the surveys conducted on Adelaide 60 km/h arterial roads are presented in Table 4.5 and the changes from one survey to the next in Table 4.6.

Table 4.5
Adelaide 60 km/h arterial road free speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 60 km/h	% above 65 km/h	% above 70 km/h	% above 75 km/h
2007	57.35	57.90	63.00	33.20	8.26	2.06	0.75
2008	56.61	57.15	62.20	28.77	6.29	1.56	0.60
2009	56.40	56.95	61.90	26.47	5.46	1.40	0.53
2010	56.08	56.55	61.50	24.20	4.78	1.18	0.45
2011	56.14	56.55	61.60	24.48	4.67	1.18	0.42
2012	56.24	56.55	61.60	24.49	4.40	1.02	0.35
2013	55.57	55.75	60.80	18.70	3.08	0.74	0.26
2014	55.56	55.80	60.70	18.19	2.91	0.68	0.24
2015	55.76	55.90	60.90	20.27	3.35	0.81	0.28
2016	55.31	55.55	60.40	18.71	2.97	0.76	0.27
2018	55.27	55.48	60.24	17.86	2.78	0.68	0.22
2020	55.39	55.63	60.41	18.86	2.84	0.66	0.20
2022	55.27	55.49	60.38	18.76	2.72	0.72	0.23

Table 4.6
Adelaide 60 km/h arterial road free speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 60 km/h	% above 65 km/h	% above 70 km/h	% above 75 km/h
2007-2008	-0.74*	-0.75*	-0.80*	-4.44*	-1.97*	-0.51*	-0.15*
2008-2009	-0.21	-0.20	-0.30	-2.30	-0.83*	-0.16*	-0.07*
2009-2010	-0.32*	-0.40*	-0.40*	-2.26*	-0.67*	-0.22*	-0.08*
2010-2011	0.05	0.00	0.10	0.28	-0.12	-0.01	-0.03
2011-2012	0.10	0.00	0.00	0.01	-0.27	-0.16	-0.07
2012-2013	-0.67*	-0.80*	-0.80*	-5.79*	-1.32*	-0.28*	-0.09*
2013-2014	-0.01	0.05	-0.10	-0.51	-0.18	-0.06	-0.01
2014-2015	0.20	0.10	0.20	2.08	0.44	0.13*	0.04*
2015-2016	-0.44	-0.35	-0.50*	-1.55	-0.38*	-0.05	-0.01
2016-2018	-0.04	-0.07	-0.16	-0.85	-0.20	-0.07*	-0.05*
2018-2020	0.12	0.15	0.17	1.00	0.06	-0.02	-0.02
2020-2022	-0.12	-0.14	-0.03	-0.10	-0.12	0.05	0.03

* statistically significant change (p < 0.05)

4.4. Rural 50 km/h local roads

The summary speed measurements for all free speed vehicles passing the measured sites for all the surveys conducted on rural 50 km/h local roads are presented in Table 4.7 and the changes from one survey to the next in Table 4.8.

Table 4.7
Rural 50 km/h local road free speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007	43.51	44.75	54.26	31.77	15.08	7.53	2.28
2008	42.67	43.85	53.26	28.84	12.76	5.83	1.10
2009	42.02	43.35	53.16	28.78	12.74	5.81	1.26
2010	42.25	43.65	53.16	29.51	13.95	6.10	1.36
2011	42.59	43.93	53.05	29.67	13.49	6.34	0.94
2012	42.35	43.75	52.64	27.94	12.48	5.50	0.78
2013	42.31	43.90	52.70	28.71	12.02	5.50	0.87
2014	41.72	43.30	51.60	25.97	10.05	5.07	0.65
2015	42.11	43.58	51.87	25.84	10.14	5.14	0.90
2016	41.81	43.19	52.07	25.39	10.24	5.15	1.34
2018	41.92	43.33	51.83	25.15	10.04	4.94	0.64
2020	42.26	43.74	51.97	25.75	10.15	4.99	1.03
2022	41.49	43.14	51.30	24.51	9.62	4.96	1.02

Table 4.8
Rural 50 km/h local road free speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 50 km/h	% above 55 km/h	% above 60 km/h	% above 65 km/h
2007-2008	-0.84*	-0.90*	-1.00*	-2.92*	-2.32*	-1.70*	-1.19*
2008-2009	-0.65	-0.50	-0.10	-0.06	-0.02	-0.02	0.16
2009-2010	0.23	0.30	0.00	0.73	1.21	0.29	0.10
2010-2011	0.34	0.27	-0.11	0.16	-0.46	0.24	-0.42
2011-2012	-0.24	-0.18	-0.41	-1.73*	-1.01	-0.84*	-0.16
2012-2013	-0.04	0.15	0.06	0.77	-0.46	0.01	0.10
2013-2014	-0.59*	-0.60*	-1.10*	-2.74*	-1.97*	-0.44	-0.23
2014-2015	0.39	0.28	0.27	-0.13	0.09	0.07	0.25
2015-2016	-0.30	-0.39	0.20	-0.45	0.09	0.01	0.44
2016-2018	0.12	0.14	-0.24	-0.24	-0.20	-0.21*	-0.70*
2018-2020	0.33	0.41	0.13	0.60	0.11	0.05	0.39
2020-2022	-0.77*	-0.60*	-0.66	-1.24	-0.53	-0.03	-0.01

* statistically significant change (p < 0.05)

4.5. Rural hills 80 km/h arterial roads

The summary speed measurements for all free speed vehicles passing the measured sites for all the surveys conducted on rural hills 80 km/h arterial roads are presented in Table 4.9 and the changes from one survey to the next in Table 4.10. Note that there were problems with a new contractor identifying the correct locations for these sites in 2011 meaning that no data is available for 2011, so 2012 data is compared to data from 2010.

Table 4.9
Rural hills 80 km/h arterial free road speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 80 km/h	% above 85 km/h	% above 90 km/h	% above 95 km/h
2007	79.53	79.15	88.10	45.06	23.69	11.46	5.73
2008	77.69	77.40	85.80	38.24	21.38	10.55	5.02
2009	78.40	78.03	86.30	40.83	22.25	11.67	5.85
2010	78.72	78.08	86.00	41.06	21.87	11.60	5.71
2012	78.10	78.03	85.00	40.39	19.79	10.05	4.57
2013	75.68	75.68	81.35	31.63	13.25	6.63	3.21
2014	74.85	74.88	80.20	29.55	11.83	6.25	3.01
2015	74.54	74.68	79.30	29.01	10.64	5.38	2.44
2016	75.01	74.93	79.52	29.99	11.16	5.62	2.61
2018	75.02	74.99	79.29	28.84	11.01	5.69	2.60
2020	75.47	75.50	79.64	30.82	11.63	5.80	2.62
2022	74.79	74.78	79.12	29.58	11.11	5.48	2.49

Table 4.10
Rural hills 80 km/h arterial road free speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 80 km/h	% above 85 km/h	% above 90 km/h	% above 95 km/h
2007-2008	-1.84	-1.75	-2.30	-6.82	-2.32	-0.91	-0.71
2008-2009	0.71	0.62	0.50	2.59	0.87	1.12	0.83
2009-2010	0.32	0.05	-0.30	0.23	-0.38	-0.07	-0.14
2010-2012	-0.62	-0.05	-1.00	-0.68	-2.07	-1.55	-1.14*
2012-2013	-2.42*	-2.35*	-3.65*	-8.75*	-6.54*	-3.42*	-1.36*
2013-2014	-0.82*	-0.80*	-1.15*	-2.08	-1.42*	-0.38	-0.20
2014-2015	-0.31*	-0.20	-0.90*	-0.54	-1.20*	-0.87*	-0.57*
2015-2016	0.47	0.26	0.23	0.99	0.52	0.23	0.17
2016-2018	0.01	0.06	-0.23	-1.16	-0.15	0.07	-0.00
2018-2020	0.45	0.51	0.35	1.98	0.63	0.12	0.02
2020-2022	-0.68	-0.71*	-0.52	-1.24	-0.53	-0.32	-0.13

* statistically significant change ($p < 0.05$)

4.6. Rural 100 km/h arterial roads

The summary speed measurements for all free speed vehicles passing the measured sites for all the surveys conducted on rural 100 km/h arterial roads are presented in Table 4.11 and the changes from one survey to the next in Table 4.12.

Table 4.11
Rural 100 km/h arterial road free speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 100 km/h	% above 105 km/h	% above 110 km/h	% above 115 km/h
2007	98.41	99.55	108.54	47.53	24.89	11.98	5.55
2008	97.21	98.55	107.09	42.90	20.99	10.36	4.86
2009	97.30	98.55	106.60	42.38	20.56	10.01	4.86
2010	97.05	98.30	106.50	41.47	20.16	9.36	4.59
2011	97.64	98.73	106.65	43.87	21.28	9.76	4.76
2012	96.80	98.00	105.70	39.43	17.50	8.20	3.80
2013	97.42	98.55	106.25	42.52	18.99	8.71	4.00
2014	97.33	98.50	105.90	42.62	18.31	8.28	3.89
2015	96.98	98.15	105.30	40.36	16.83	7.74	3.73
2016	96.55	97.77	104.84	38.15	16.54	7.82	3.74
2018	95.84	97.32	104.63	35.41	15.27	7.30	3.57
2020	95.96	97.21	104.44	34.68	15.04	7.01	3.53
2022	95.90	97.04	104.28	33.90	14.91	7.12	3.55

Table 4.12
Rural 100 km/h arterial road free speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 100 km/h	% above 105 km/h	% above 110 km/h	% above 115 km/h
2007-2008	-1.20	-1.00*	-1.45*	-4.63*	-3.90*	-1.62*	-0.70
2008-2009	0.10	0.00	-0.49	-0.51	-0.44	-0.35	0.01
2009-2010	-0.26	-0.25	-0.10	-0.91	-0.40	-0.65	-0.27
2010-2011	0.59	0.43	0.15	2.40	1.12	0.40	0.16
2011-2012	-0.84*	-0.73*	-0.95*	-4.44*	-3.79*	-1.57*	-0.95*
2012-2013	0.62	0.55	0.55	3.09	1.49	0.51	0.20
2013-2014	-0.09	-0.05	-0.35	0.09	-0.68	-0.43	-0.11
2014-2015	-0.35	-0.35	-0.60	-2.26	-1.47	-0.54	-0.16
2015-2016	-0.44	-0.38	-0.46	-2.20	-0.29	0.08	0.01
2016-2018	-0.71	-0.44	-0.21	-2.75	-1.27	-0.52*	-0.17*
2018-2020	0.13	-0.12	-0.19	-0.72	-0.23	-0.29	-0.04
2020-2022	-0.06	-0.16	-0.16	-0.78	-0.13	0.11	0.02

* statistically significant change (p < 0.05)

4.7. Rural 110 km/h arterial roads

The summary speed measurements for all free speed vehicles passing the measured sites for all the surveys conducted on rural 110 km/h arterial roads are presented in Table 4.13 and the changes from one survey to the next in Table 4.14.

Table 4.13
Rural 110 km/h arterial road free speed results by survey

Survey year	Mean speed	Median speed	85th percentile speed	% above 110 km/h	% above 115 km/h	% above 120 km/h	% above 125 km/h
2007	103.82	104.95	114.30	29.83	13.15	4.89	1.87
2008	103.55	104.70	113.75	28.74	12.20	4.29	1.71
2009	103.55	104.75	113.65	28.78	12.17	4.11	1.64
2010	103.22	104.30	113.37	27.55	11.51	3.82	1.51
2011	103.79	104.90	113.57	28.11	11.90	4.05	1.67
2012	102.22	103.45	111.57	21.63	8.60	2.93	1.08
2013	102.35	103.60	111.72	22.71	8.48	2.94	1.07
2014	102.61	103.90	111.57	21.94	8.16	2.78	0.93
2015	102.44	103.55	111.27	20.78	7.75	2.71	0.95
2016	101.95	103.29	110.89	19.35	6.84	2.47	0.81
2018	101.47	102.71	109.91	16.46	5.64	2.09	0.64
2020	102.01	103.55	110.19	17.60	5.78	2.23	0.67
2022	101.99	103.76	110.32	18.44	6.06	2.33	0.70

Table 4.14
Rural 110 km/h arterial road free speed changes between surveys

Compared years	Mean speed	Median speed	85th percentile speed	% above 110 km/h	% above 115 km/h	% above 120 km/h	% above 125 km/h
2007-2008	-0.27	-0.25*	-0.55*	-1.09*	-0.95*	-0.60*	-0.16*
2008-2009	-0.00	0.05	-0.10	0.04	-0.03	-0.18	-0.06
2009-2010	-0.33	-0.45	-0.29*	-1.23	-0.67*	-0.29*	-0.13*
2010-2011	0.57*	0.60*	0.20	0.56	0.39	0.24	0.15
2011-2012	-1.56*	-1.45*	-2.00*	-6.48*	-3.30*	-1.13*	-0.59*
2012-2013	0.13	0.15	0.14	1.08	-0.12	0.01	-0.01
2013-2014	0.26	0.30	-0.15	-0.77	-0.31*	-0.16*	-0.14*
2014-2015	-0.18	-0.35	-0.30	-1.16	-0.41	-0.07	0.02
2015-2016	-0.49	-0.26	-0.38	-1.43	-0.91	-0.24	-0.14
2016-2018	-0.48*	-0.58*	-0.98*	-2.89*	-1.20*	-0.38*	-0.17*
2018-2020	0.54*	0.84*	0.28	1.14	0.14	0.14	0.03
2020-2022	-0.02	0.20	0.13	0.84	0.28	0.10	0.04

* statistically significant change (p < 0.05)

5. Discussion

The following statistically significant changes and observed changes in speed measurements between 2020 and 2022 are shown in Table 5.1.

Table 5.1
Statistically significant changes and observed changes in speed measurements between 2020 and 2022

Road type	Statistically significant changes	Observed changes
Adelaide 50 km/h local roads	Decreases in mean, median and 85 th percentile speeds	-
Adelaide 50 km/h collector roads	-	General decreases in speeds
Adelaide 60 km/h arterial roads	Decrease in median speed	-
Rural 50 km/h local roads	Decrease in mean and median speeds	-
Rural hills 80 km/h arterial roads	Decreases in mean and median speeds	-
Rural 100 km/h arterial roads	-	General decreases in speeds
Rural 110 km/h arterial roads	-	General increases in speeds

While these changes are the ones that we have some confidence in, they may be spurious (especially since so many changes are being examined) or they may be due to system wide effects in a specific year (weather or amount of travel). For these reasons, it is more important to examine the size and general direction of the changes over a long time period.

The following Sections (Figures 5.1-5.7) present a graphical overview of vehicle volume and speed changes over the course of the surveys for each of the road types examined.

The following general observations are apparent:

- Vehicle speeds have been trending down on all road types over the course of the surveys
- The percentage of vehicles compliant with the speed limit has been increasing
- Reductions in high level speeding are more pronounced than those for low level speeding
- Speed limit compliance is lowest on Adelaide 50 km/h collector roads and rural 100 km/h arterial roads
- Vehicle speeds in 2020 generally appeared to increase compared to 2018, but in 2022, there was a general decrease in vehicle speeds, consistent with the patterns observed before 2020

The observed reductions suggest that the combined legislative, enforcement, and media regimes of the last 19 years have slowly been pushing vehicle speeds in the right direction.

The COVID-19 pandemic

No presentation of data collected in 2020 would be complete without exploring the potential effects of the COVID-19 pandemic and the associated restrictions to individuals on movement and activities.

The survey dates for the rural 100 and 110 km/h arterial roads ranged from 31 July 2020 to 28 August 2020. In South Australia, there were minimal restrictions to personal movement in place during this time period (noting that international tourism ceased on 20 March 2020). However, from 28 July 2020 and all the way through August, the South Australian border was closed to all travellers from Victoria (including returning SA residents) who were not classed as essential travellers.

This had an obvious effect on one 100 km/h site and four 110 km/h sites that were on roads leading into Victoria whereby traffic volumes were very much lower than previous years and speed distributions were different. It was decided to exclude these five sites from the 2020 analysis. The remaining 100 km/h sites showed traffic volumes in 2020 that were very similar to 2018. The remaining 110 km/h sites showed a 4% reduction in traffic volumes in 2020 compared to those in 2018; this may have been a factor in the observed increase in speeds on 110 km/h roads.

The 50-80 km/h site survey dates ranged from 12 November 2020 to 18 November 2020 (only some rural 50 km/h sites) and from 24 November 2020 to 18 December 2020. South Australia was placed into a stay-at-home lockdown from 19 November 2020 to 21 November 2020, however, no sampling was performed during this period. The greater than normal restrictions still in place after 21 November 2020 may have depressed traffic volumes but this is not readily apparent in the volume data collected.

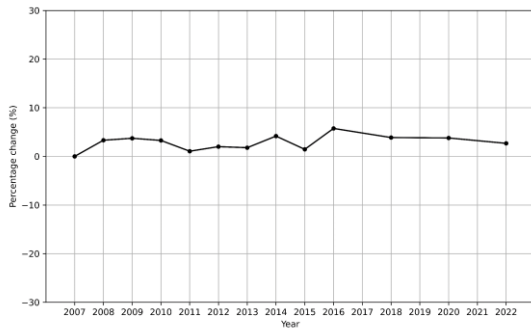
In general, lower traffic volumes would be expected to lead to higher speeds due to less congestion, less platooning and easier overtaking.

The psychological effect of the pandemic on driver choice of speed is unknown. Drivers may drive slower due to extra caution or may drive faster due to a lack of caution and a possible perceived reduction in enforcement levels. The data presented here suggests drivers on low-speed roads engaged in more low-level speeding (up to 10 km/h above the speed limit) but not high-level speeding in the aftermath of a major lockdown.

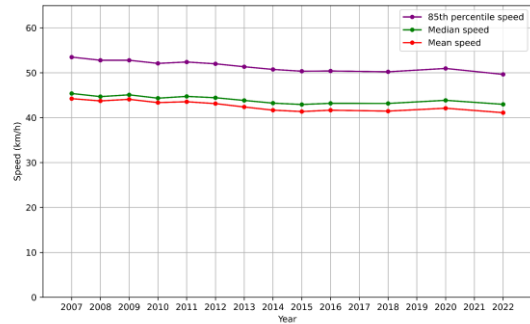
Traffic speeds, volumes, and injury crashes throughout the two lockdowns in South Australia were compared to equivalent periods in some years preceding the COVID-19 pandemic in Elsegood et al. (2022). The analysis showed during the two lockdown periods (mid-March to May, and mid-November), traffic volumes decreased significantly, while traffic speeds increased slightly, and injury crashes decreased.

5.1. Adelaide 50 km/h local roads

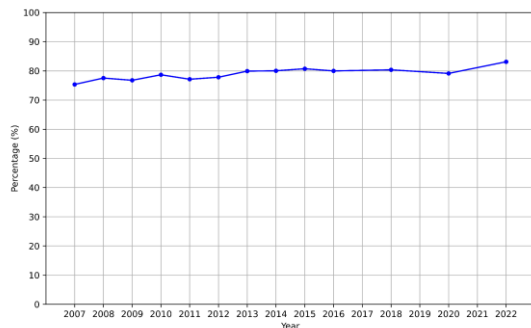
Figure 5.1
Volume and summary speed measurements by survey year



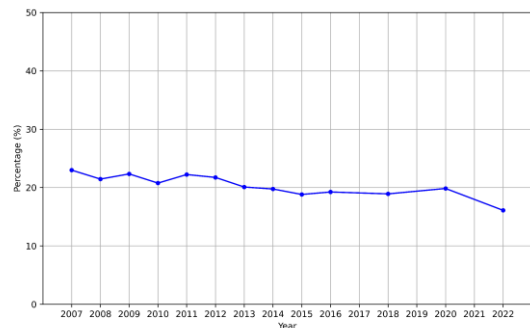
Traffic volume change relative to 2007



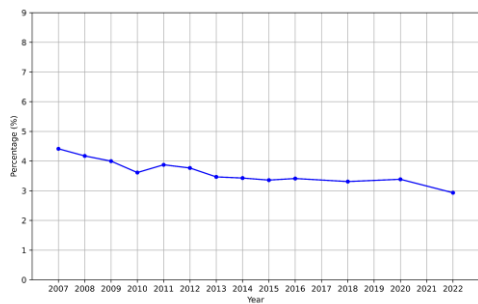
Speed measurements



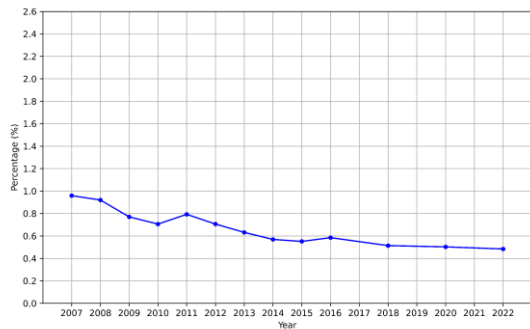
% under 50 km/h



% 50-60 km/h



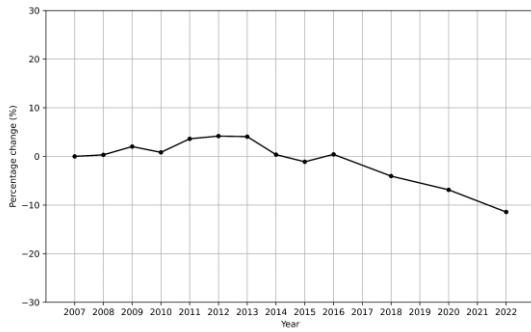
% 60-70 km/h



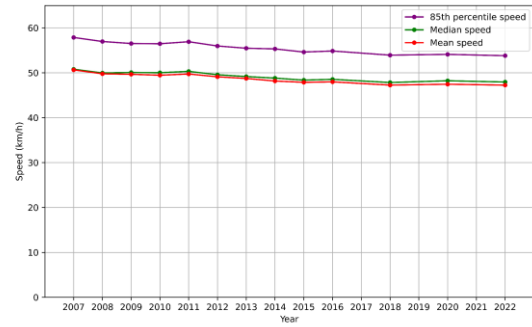
% over 70 km/h

5.2. Adelaide 50 km/h collector roads

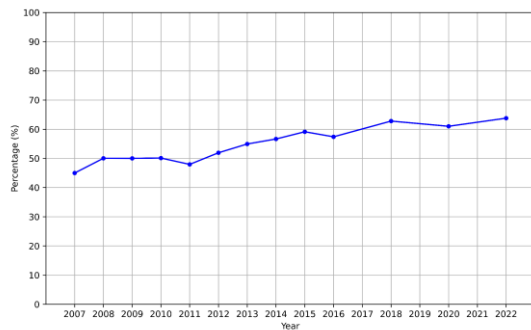
Figure 5.2
Volume and summary speed measurements by survey year



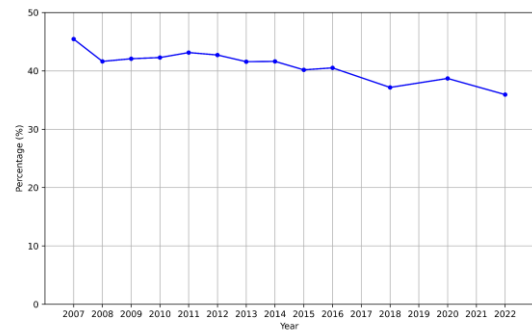
Traffic volume change relative to 2007



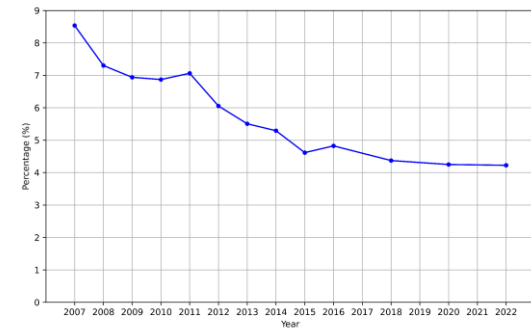
Speed measurements



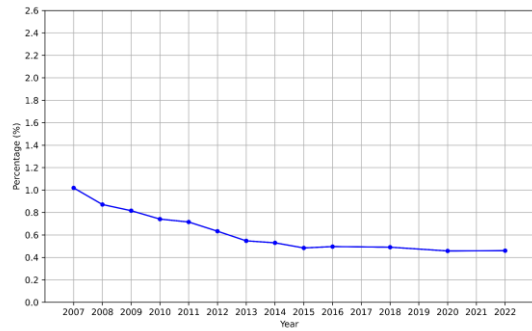
% under 50 km/h



% 50-60 km/h



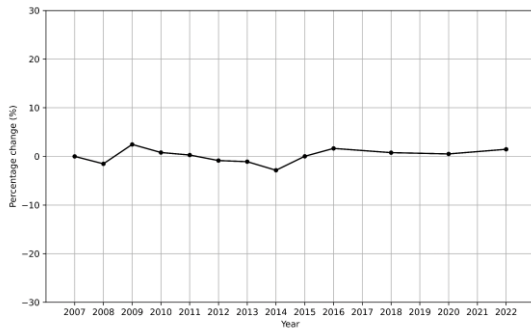
% 60-70 km/h



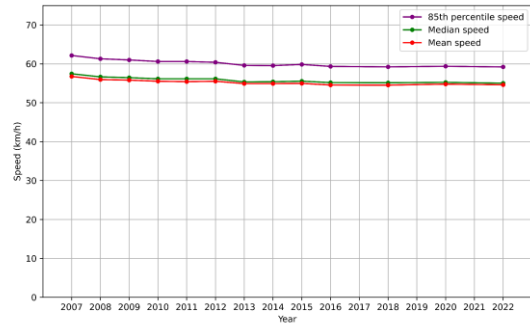
% over 70 km/h

5.3. Adelaide 60 km/h arterial roads

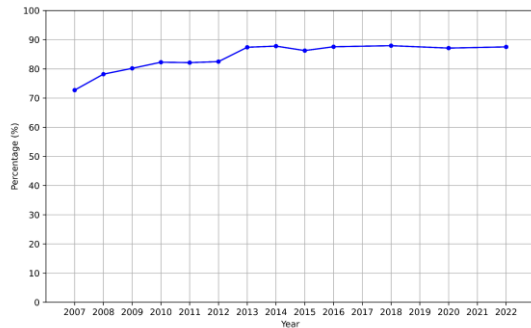
Figure 5.3
Volume and summary speed measurements by survey year



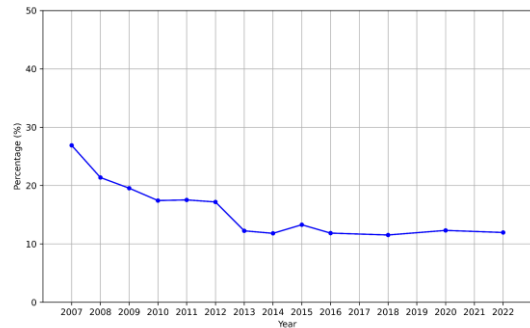
Traffic volume change relative to 2007



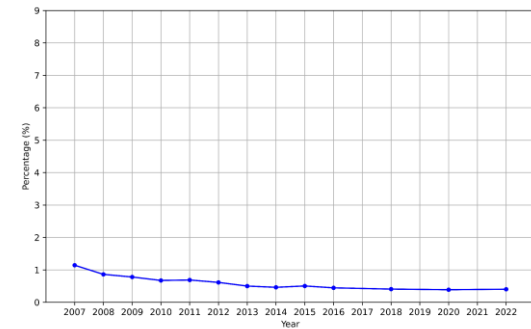
Speed measurements



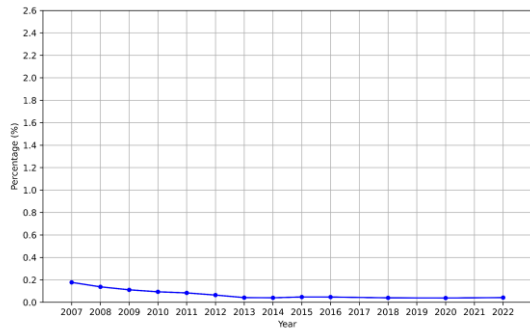
% under 60 km/h



% 60-70 km/h



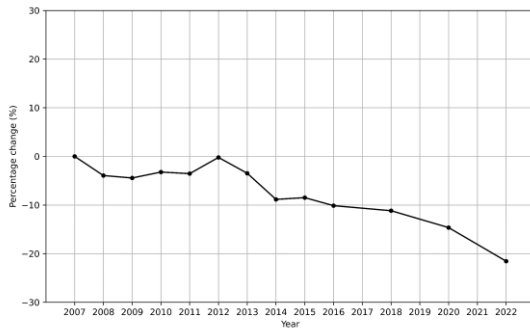
% 70-80 km/h



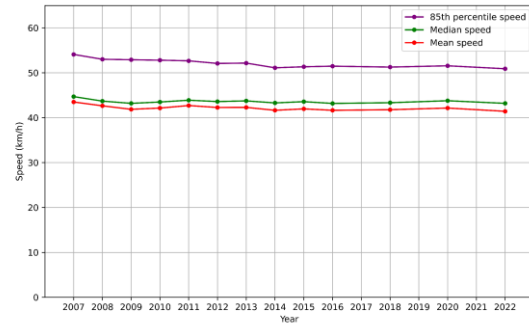
% over 80 km/h

5.4. Rural 50 km/h local roads

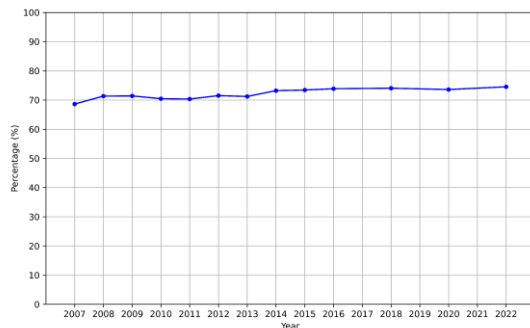
Figure 5.4
Volume and summary speed measurements by survey year



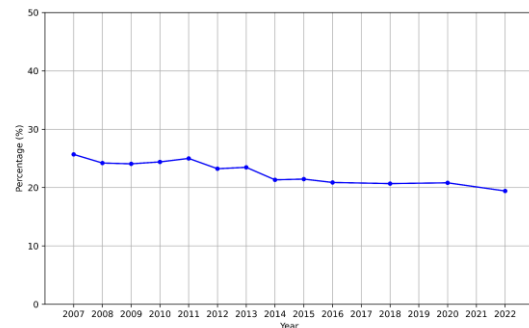
Traffic volume change relative to 2007



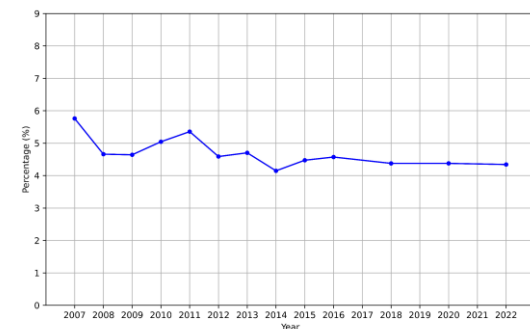
Speed measurements



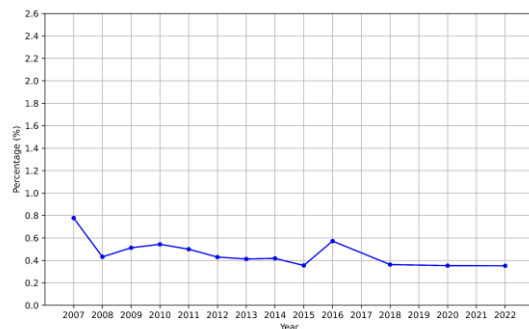
% under 50 km/h



% 50-60 km/h



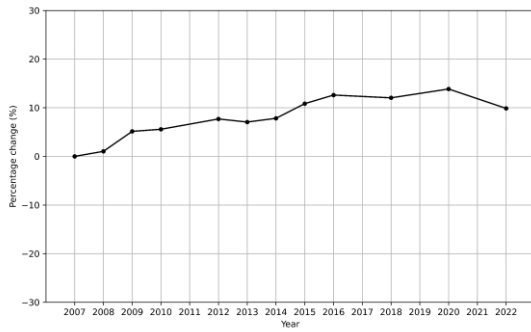
% 60-70 km/h



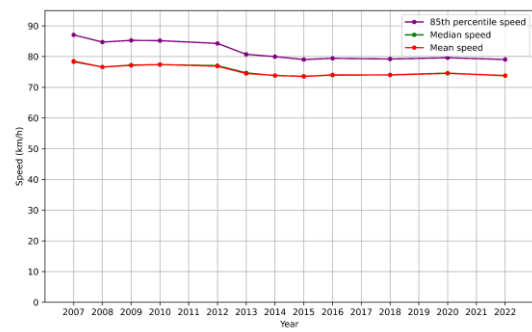
% over 70 km/h

5.5. Rural hills 80 km/h arterial roads

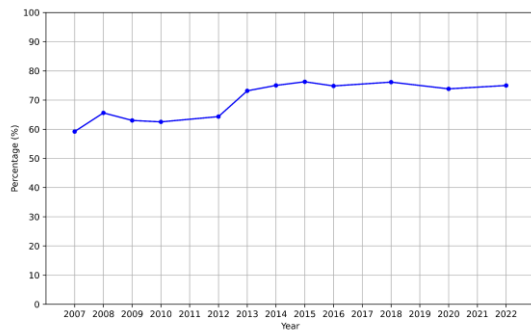
Figure 5.5
Volume and summary speed measurements by survey year



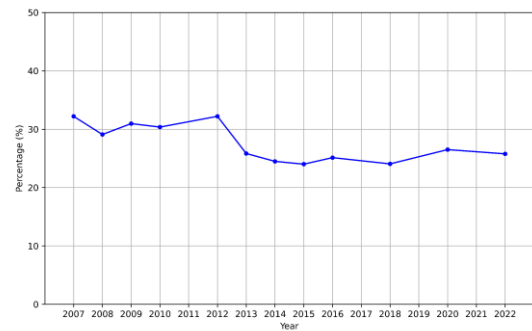
Traffic volume change relative to 2007



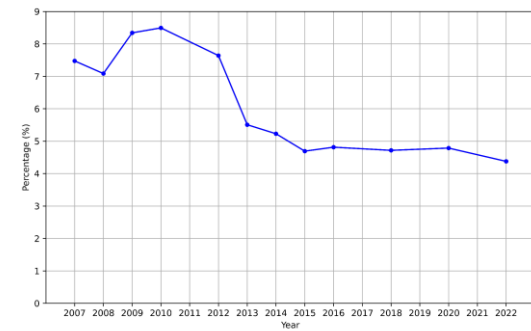
Speed measurements
(Note: median speed is similar to mean speed)



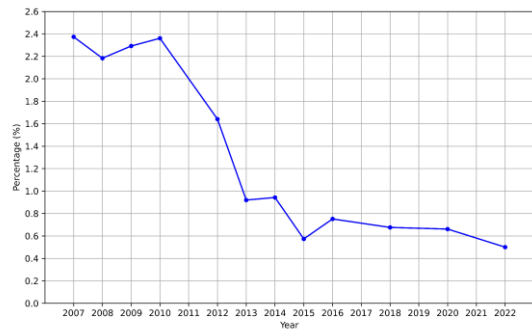
% under 80 km/h



% 80-90 km/h



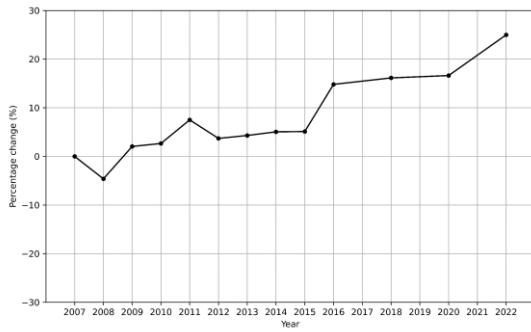
% 90-100 km/h



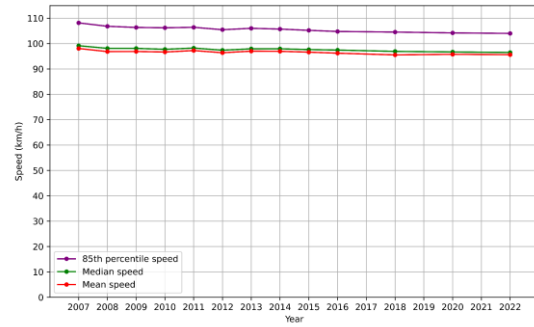
% over 100 km/h

5.6. Rural 100 km/h arterial roads

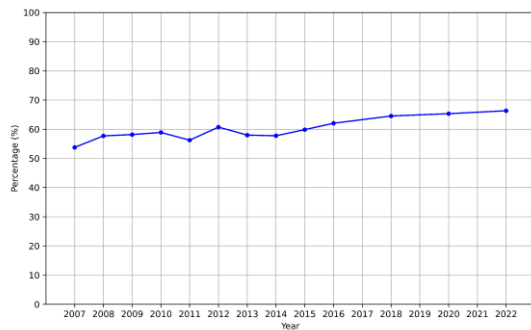
Figure 5.6
Volume and summary speed measurements by survey year



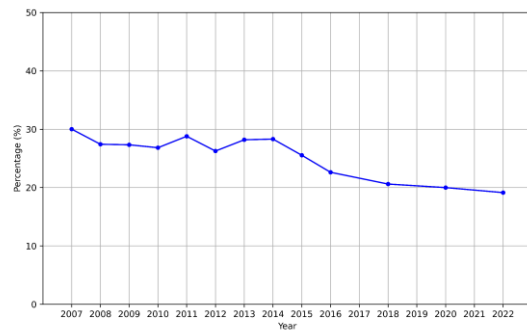
Traffic volume change relative to 2007



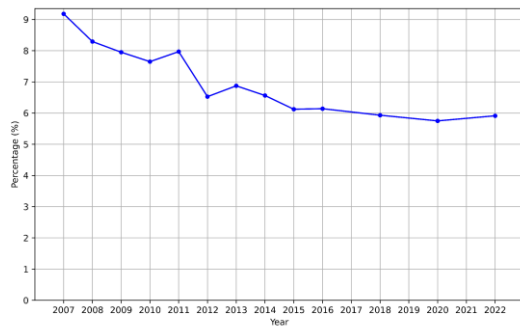
Speed measurements



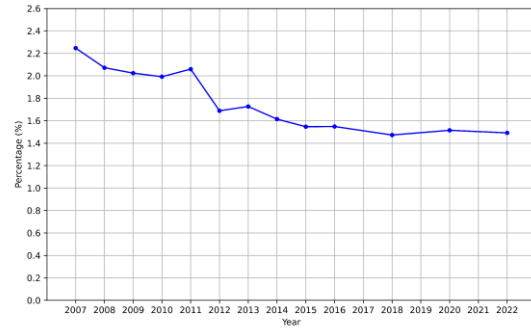
% under 100 km/h



% 100-110 km/h



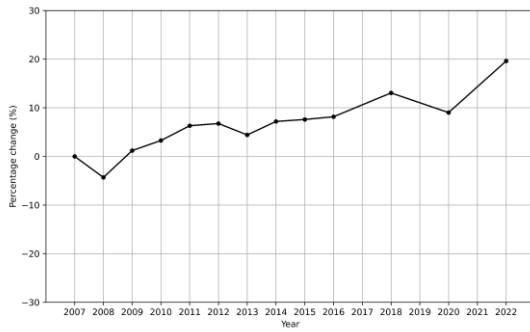
% 110-120 km/h



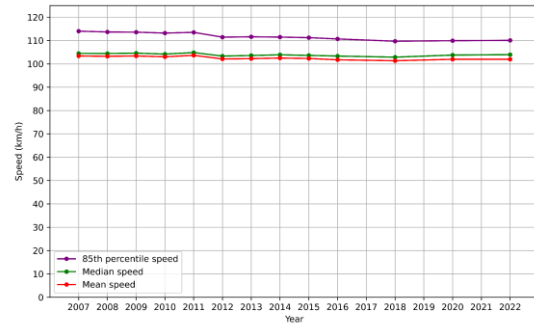
% over 120 km/h

5.7. Rural 110 km/h arterial roads

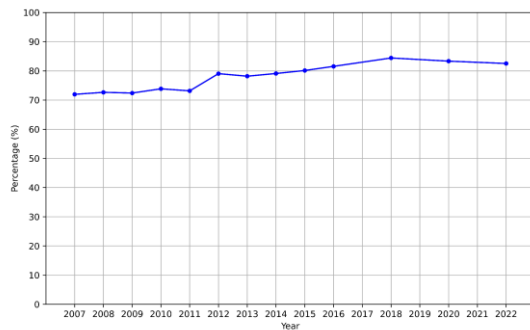
Figure 5.7
Volume and summary speed measurements by survey year



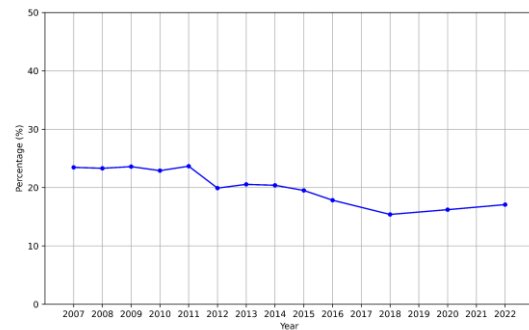
Traffic volume change relative to 2007



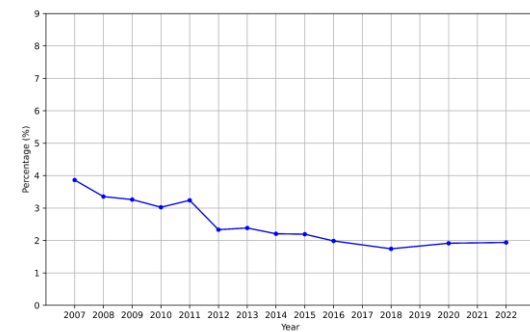
Speed measurements



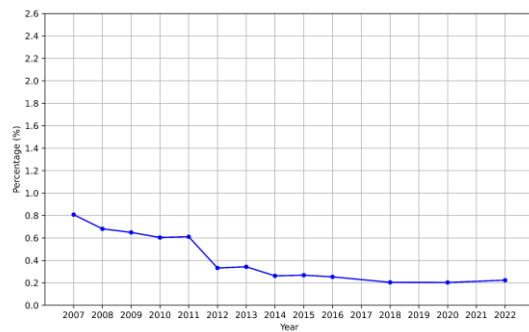
% under 110 km/h



% 110-120 km/h



% 120-130 km/h



% over 130 km/h

Acknowledgements

This research was funded via a deed with the South Australian Government.

The views expressed in this report are those of the authors and do not necessarily represent those of the University of Adelaide or the funding organisations.

References

- Elsesgood ME, Kloeden CN, & Mackenzie JRR (2022) *Traffic and road safety effects of the 2020 COVID-19 restrictions in South Australia* (CASR187). Centre for Automotive Safety Research, Adelaide.
- Government of South Australia: South Australia's Road Safety Strategy to 2031 (2021). Available at:
https://www.thinkroadsafety.sa.gov.au/_data/assets/pdf_file/0007/963187/SA_Road_Safety_Strategy_to_2031.pdf
- Kloeden CN, Woolley JE (2009) *Vehicle speeds in South Australia 2007* (CASR051), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2010) *Vehicle speeds in South Australia 2008* (CASR066), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2012) *Vehicle speeds in South Australia 2009* (CASR080), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2012a) *Vehicle speeds in South Australia 2010* (CASR097), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2012b) *Vehicle speeds in South Australia 2011* (CASR085), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2013) *Vehicle speeds in South Australia 2012* (CASR095), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2015) *Vehicle speeds in South Australia 2014* (CASR131), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2017) *Vehicle speeds in South Australia 2015* (CASR137), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2017a) *Vehicle speeds in South Australia 2016* (CASR137), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2020). *Vehicle speeds in South Australia 2018* (CASR155). Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE (2023). *Vehicle speeds in South Australia 2020* (CASR183). Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE, McLean AJ (2004) *Evaluation of the South Australian default 50 km/h speed limit* (CASR005), Centre for Automotive Safety Research, Adelaide.
- Kloeden CN, Woolley JE, McLean AJ (2006) *Further evaluation of the South Australian 50 km/h speed limit* (CASR034), Centre for Automotive Safety Research, Adelaide.