9

Greater Adelaide

9.1 Adelaide has grown, and so has its transport task

Adelaide's transport network performance over the past decade

Between 2006 and 2016, Adelaide's population rose from 1.1 million to 1.3 million residents. Growth during this period was particularly focused in Adelaide's inner suburbs, while also involving some development on the city's fringes.[177] Adelaide's primary urban areas sit between the coast and the Adelaide Hills to the city's east, extending from there generally in a north-south direction.

Adelaide's population growth during this period has greatly increased the city's transport task. In 2016, residents of Adelaide collectively travelled 66 million kilometres further on the city's road network than in 2006.[178]

9.2 There are variations between the 2015 and 2019 Audit forecasts

There have been substantial changes to the 2019 Audit inputs and assumptions

Since the 2015 Audit, Adelaide's forecast cost of road congestion has decreased by 30% (Table 37 and Figure 97). This is due to changes in model calibration to reflect actual journey to work data.

Table 37: The cost of road congestion and public transport crowding in Greater Adelaide, 2016 and 2031

	Cost of public transport crowding ($ millions)	Cost of road congestion ($ millions)	Total ($ millions)
2016 (2019 Audit)	**1**	**1,444**	**1,445**
2031 (2019 Audit)	**4**	**2,619**	**2,623**
2031 (2015 Audit)	N/A	3,747	N/A
2031 (change from 2015 Audit)		-1,128 (-30%)	

Source: Infrastructure Australia (2015) and Veitch Lister Consulting (2019)[179]

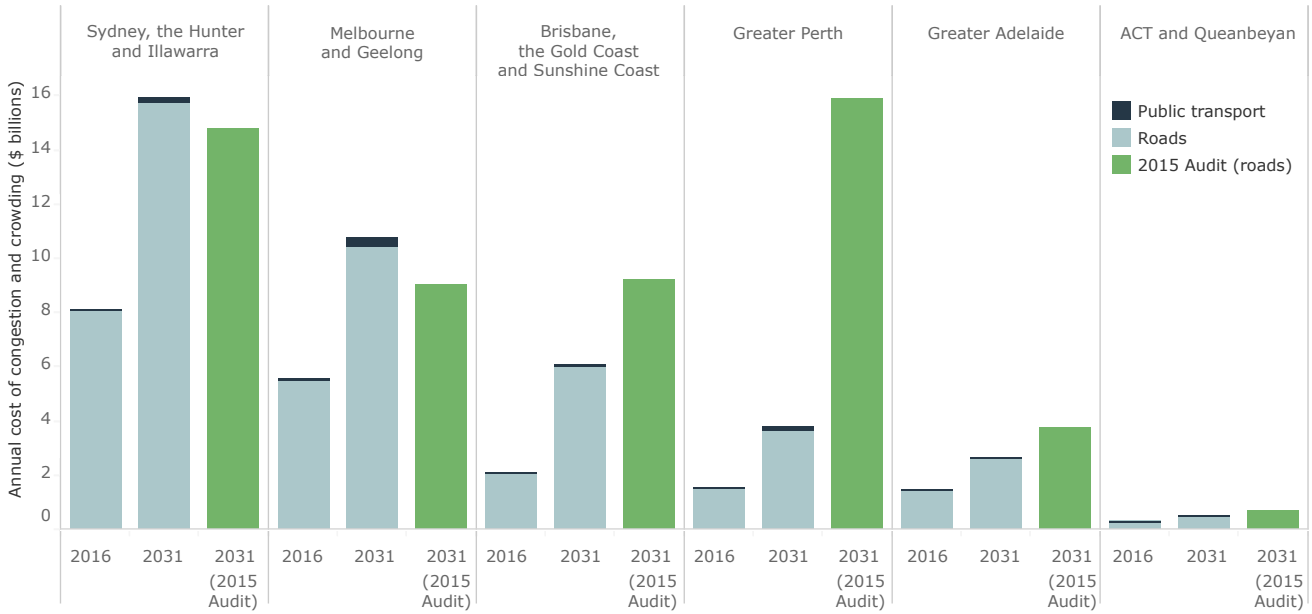
In the 2015 Audit, 2031 population projections for Adelaide were extracted from ABS Series B projections. In the latest work, projections have been provided by the South Australian Government. Overall the demographic forecasts used in the 2019 Audit were fairly similar to those used in the 2015 Audit. Both audits forecast approximately 1.6 million people will live in the Adelaide Greater Capital City Statistical Area in 2031. How population is distributed is also largely aligned in both audits.

By contrast, the proportion of forecast employment in the modelled areas is forecast to drop from 0.8 million to 0.7 million.

The largest single contributor to the decreased forecast cost of road congestion in Adelaide has been the recalibration of the transport model based on actual journey-to-work data from the 2016 Census. This recalibration has resulted in the number of road trips increasing in length but decreasing in number, thereby subtracting from the disproportionate impact, modelled and forecast in the 2015 Audit, of additional vehicles being added to already congested roads.

Table 38 reflects changes in model inputs and key outputs between 2015 and 2019 Audit modelling.

Figure 97: The cost of road congestion and public transport crowding, 2016 and 2031



Source: Infrastructure Australia (2015) and Veitch Lister Consulting (2019)[180]

Table 38: Changes in key model inputs and outputs between 2015 and 2019 modelling in Greater Adelaide

		Demographic assumptions		Network assumptions		Travel cost assumptions			
		Population	Jobs	Road investment	Public transport investment	Fuel	PT fares	Parking	Tolls
Change in inputs		— Population forecasts are similar (-%)	⇩ Employment forecasts have reduced (-12%), however the proportion of jobs in Adelaide City SA3 remains stable	⇧ More investment in the road network (+10% network lane km)	⇧ More investment in the PT network (+27% service kms)	⇩ Reduction in fuel price (140 c/L to 104 c/L AUD 2011)	— No change in other transport costs		
Impact on output (AM peak)	Total trips (-41%)	— As population forecasts are similar, this would have minimal impact on model results	— Total trips are generated by population assumptions and model parameters only						
	Car trips (-17%)	— As population forecasts are similar, this would have minimal impact on model results	— The distribution of employment is similar between the audits, as such a decline in overall employment does not substantially alter the balance between car and PT travel	⇧ Better roads encourage car travel	⇩ Better PT can encourage more PT travel and fewer car trips	⇧ Lower fuel prices encourage car travel	— No change = no impact		
	Car vehicle kms travelled (-%)	— As population forecasts are similar, this would have minimal impact on model results	— The distribution of employment is similar between the audits, as such a decline in overall employment does not substantially alter the balance between car and PT travel	⇧ Better roads encourage car travel	⇩ Better PT can encourage more PT travel and fewer car kms	⇧ Lower fuel prices encourage car travel	— No change = no impact		
	Public transport trips (-35%)	— As population forecasts are similar, this would have minimal impact on model results	— The distribution of employment is similar between the audits, as such a decline in overall employment does not substantially alter the balance between car and PT travel	⇩ Better roads encourage car travel and fewer PT trips	⇧ Better PT can encourage more PT travel	⇩ Lower fuel prices encourage car travel and reduce PT travel	— No change = no impact		

Source: Veitch Lister Consulting (2019)[181]

New network assumptions

Both audits use a similar approach to developing network assumptions that assumes only projects with funding or significant levels of political commitment will be completed by 2031. For Adelaide, there are two key differences in network assumptions. The City Tram extension and the Port Dock Railway Line are included in the 2019 Audit but not the 2015 Audit.

Variation between road network capacities in 2031

Traffic volumes on the most delayed corridors are broadly consistent between both audits. The top four most congested corridors at AM peak (South Rd/Main South Rd Corridor, Outer Main North Rd Corridor, Port Wakefield Rd/Main North Rd Corridor, Princess Hwy (M1)/ Glen Osmond Rd Corridor) are the same in both audits. Results for the PM peak show a similar outcome.

Sections of the M2 near Reynella, Reynella East and Sheidow Park are forecast to have higher congestion in the 2019 Audit. Similarly, the Northern Expressway in Penfield Gardens is also forecast to have higher traffic volumes.

Table 39 compares corridor-level average traffic and delay hours for the AM peak for the ten most delayed corridors in the 2019 Audit.

Table 39: Most congested roads ranked by total delay hours, 2031 AM Peak and ranking in 2015 Audit in Greater Adelaide

City rank (2019 Audit)	Corridor	Direction	Average peak hour traffic volumes:			Total delay hours			City rank (2015 Audit)
			2015 Audit	2019 Audit	Difference	2015 Audit	2019 Audit	Difference	
1	Main South Road / South Road corridor	N/B	1,800	2,000	9%	4,000	3,600	-10%	2
2	Outer Main North Road corridor	S/B	2,800	2,600	-5%	3,800	2,800	-28%	3
3	Port Wakefield Road / Main North Road corridor	S/B	2,500	2,100	-18%	6,600	2,400	-63%	1
4	Princes Highway (M1) / Glen Osmond Road corridor	N/B	3,200	3,200	1%	2,900	2,300	-18%	4
5	South Road / Main South Road corridor	S/B	1,200	1,400	23%	1,200	2,300	94%	17
6	North East Road corridor	S/B	2,400	2,300	-2%	2,300	2,200	-4%	8
7	Commercial Road / Dyson Road / Lonsdale Road / Brighton Road / Tapleys Hill Road corridor	N/B	1,700	1,700	4%	2,400	2,100	-14%	7
8	Marion Road corridor	N/B	2,000	1,900	-6%	2,400	1,900	-23%	6
9	Port Road corridor	E/B	2,700	2,700	1%	1,700	1,800	7%	11
10	Lower North East Road / Payneham Road corridor	W/B	1,900	1,800	-5%	2,100	1,800	-15%	9

Note: N/B, S/B, W/B and E/B represent northbound, southbound, westbound and eastbound, respectively.

Source: Veitch Lister Consulting (2019)[182]

Variation between public transport capacities in 2031

Similar levels of public transport demand are identified in the 2015 and 2019 Audits.

Both audits identify that the majority of the Gawler Line as well as parts of the Seaford and Tonsley lines will be operating well above seated capacity, but below crush capacity, in the AM peak. The 2019 Audit identifies that the worst levels of crowding are forecast to the south of Salisbury, as opposed to the 2015 Audit that identified lines south of the Adelaide CBD would have the highest demand.

Both audits project that Adelaide's bus routes will be more crowded by 2031.

9.3 Commuters in Adelaide experience substantial levels of road congestion and public transport crowding every day

Snapshot of Adelaide's road network in 2016

Adelaide's drivers already experience significant levels of congestion, particularly in the AM peak (Figure 98). Our modelling indicates the annualised cost of road congestion was approximately $1.4 billion in 2016.

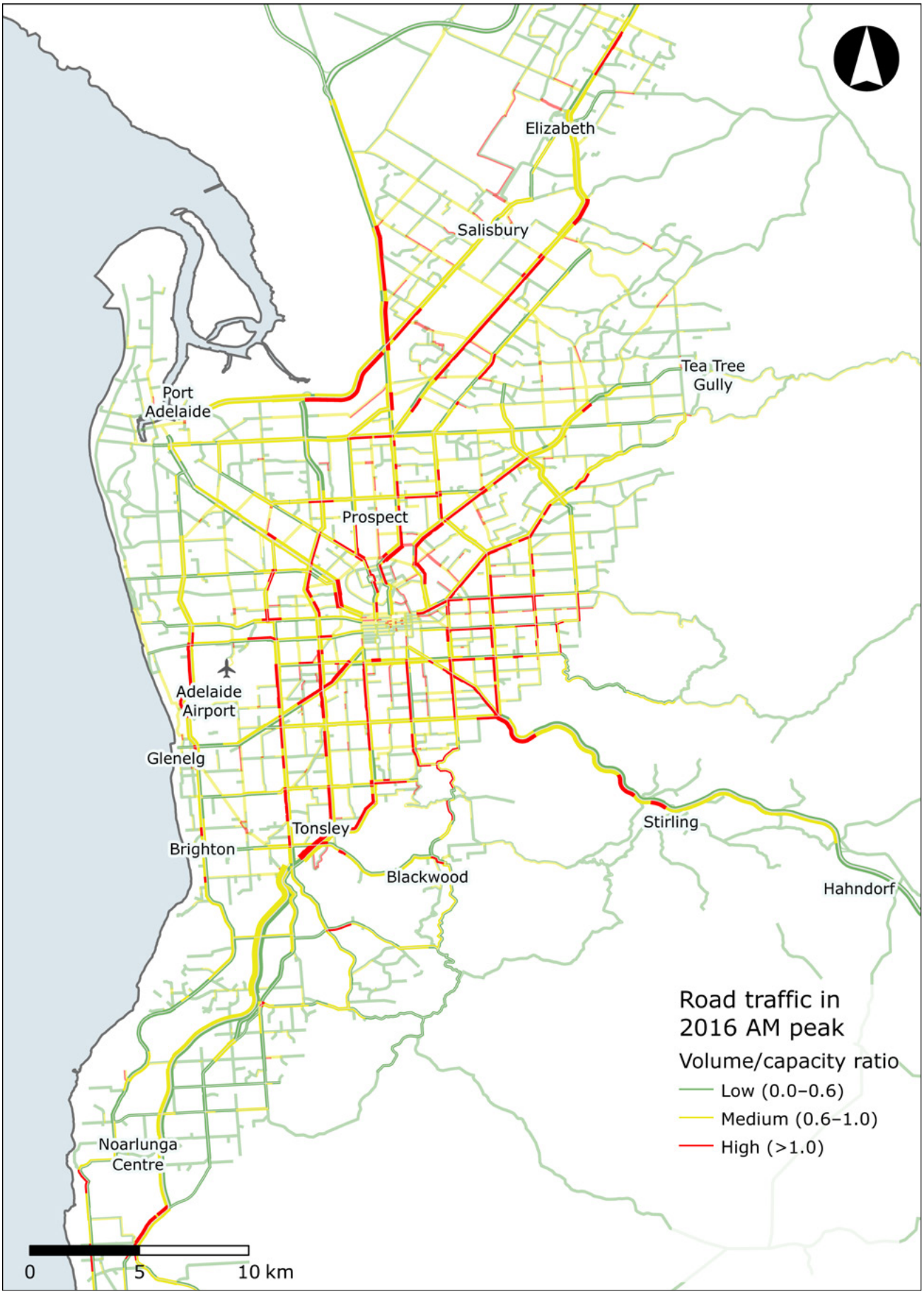
Adelaide's most congested roads are those that accommodate north-south travel, with more severe levels of congestion experienced closer to the CBD. These roads provide access to Adelaide's central employment cluster from surrounding suburbs.

Adelaide's most congested roads in 2016: what the driver experiences

Infrastructure Australia has measured the most congested corridors in Adelaide using several customer-focused metrics. The ten most congested corridors in the AM and PM peaks from a user's perspective are shown in Table 40 and Figure 99.

Adelaide's most congested road corridors from a driver's perspective in 2016 were the Fullarton Road and Goodwood Road corridors. While these roads are relatively short, under 10km in length, peak period drivers can expect to spend around 60% of their travel time in congested traffic. Both of these corridors carry north-south movements close to the CBD.

Figure 98: Adelaide weekday traffic volume/ capacity ratio, 2016 AM peak



Note: Volume / capacity ratios show the quantity of traffic relative to a road's capacity. Any link operating at a VCR above 1.0 is coloured red, indicating that more vehicles are using the road than it was designed to accommodate under free-flow conditions.

Source: Veitch Lister Consulting (2019)[183]

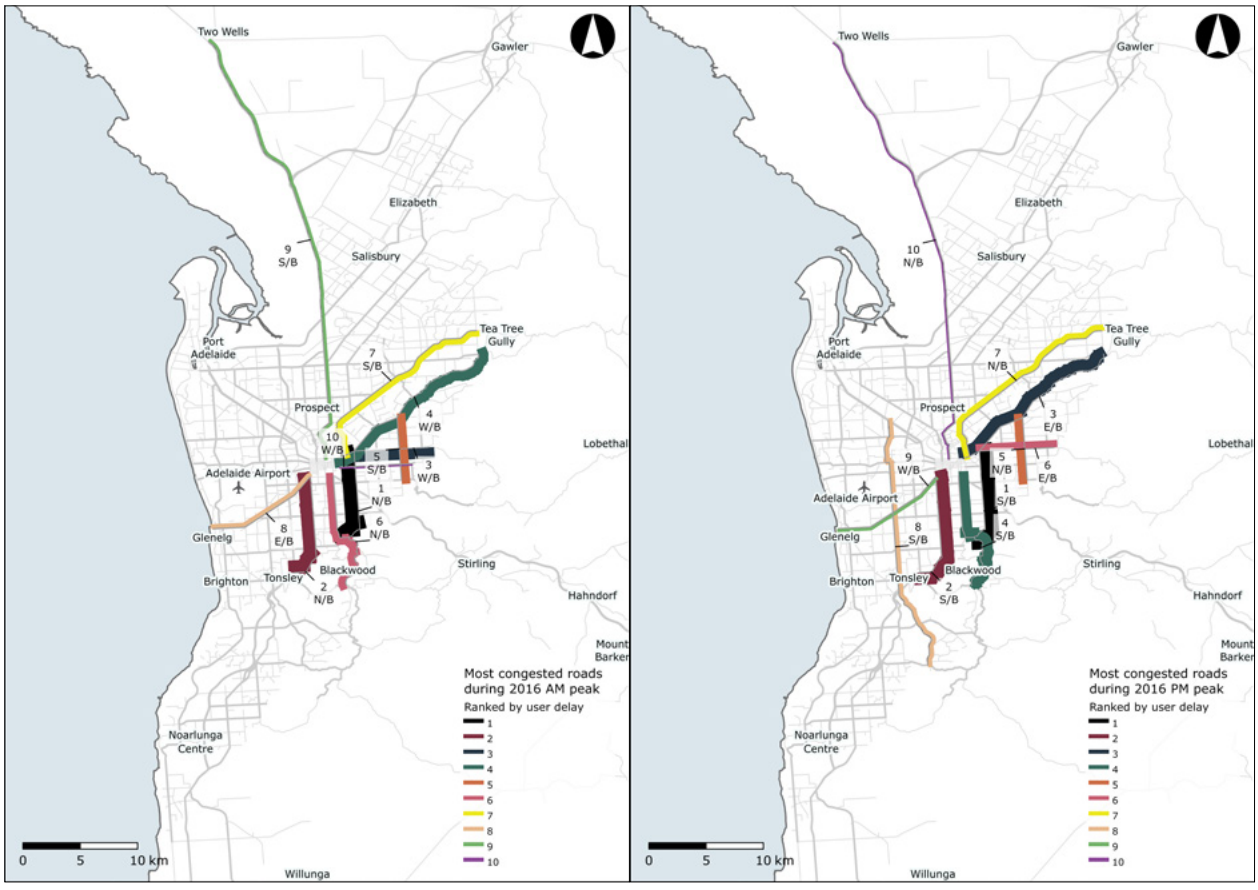
Table 40: Adelaide's most congested roads (user experience), 2016

City rank	Corridor including origin / destination connected (direction)	Length (km)	Share of journey time due to congestion	Delay per vehicle (mins)	Cost of congestion for a car	Cost of congestion for a heavy commercial vehicle
AM peak						
1.	Fullarton Road corridor (N/B)	8	60%	13	$3.59	$15.47
2.	Goodwood Road corridor (N/B)	9	59%	15	$4.14	$17.85
3.	Magill Road corridor (W/B)	5	55%	8	$2.21	$9.52
4.	Lower North East Road / Payneham Road corridor (W/B)	14	55%	20	$5.52	$23.79
5.	Glynburn Road corridor (S/B)	5	55%	8	$2.21	$9.52
6.	Belair Road / Unley Road corridor (N/B)	11	54%	17	$4.69	$20.22
7.	North East Road corridor (S/B)	16	50%	19	$5.25	$22.60
8.	Anzac Highway corridor (E/B)	9	49%	11	$3.04	$13.09
9.	Port Wakefield Road / Main North Road corridor (S/B)	39	48%	28	$7.73	$33.31
10.	Kensington Road corridor (W/B)	5	47%	6	$1.66	$7.14
PM peak						
1.	Fullarton Road corridor (S/B)	8	57%	12	$3.31	$14.28
2.	Goodwood Road corridor (S/B)	9	56%	14	$3.87	$16.66
3.	Payneham Road / Lower North East Road corridor (E/B)	14	52%	18	$4.97	$21.41
4.	Unley Road / Belair Road corridor (S/B)	11	51%	15	$4.14	$17.85
5.	Glynburn Road corridor (N/B)	5	51%	7	$1.93	$8.33
6.	Magill Road corridor (E/B)	5	50%	6	$1.66	$7.14
7.	North East Road corridor (N/B)	16	48%	18	$4.97	$21.41
8.	Marion Road corridor (S/B)	23	47%	22	$6.08	$26.17
9.	Anzac Highway corridor (W/B)	9	46%	10	$2.76	$11.90
10.	Main North Road / Port Wakefield Road corridor (N/B)	39	45%	26	$7.18	$30.93

Note: N/B, S/B, W/B and E/B represent northbound, southbound, westbound and eastbound, respectively.

Source: Veitch Lister Consulting (2019)[184]

Figure 99: Adelaide's most congested roads (user experience), 2016 AM (left) and PM (right) peak periods



Source: Veitch Lister Consulting (2019)[185]

Adelaide's most congested roads in 2016: the cost to the community of total vehicle delays

As a measure of the whole-of-system impacts of congestion, Infrastructure Australia has also identified the most congested road corridors in Greater Adelaide by aggregating the total delay hours experienced by all vehicles using the congested road during the modelled period. The ten most congested corridors under this approach are shown in Table 41 and Figure 100, for the AM and PM peak.

In 2016, Adelaide's most congested road corridors carried CBD-bound movements. The worst-performing corridor was the South Road / Main South Road corridor, which serves travel between the city's south and its centre. In 2016 this corridor contributed approximately 2,500 delay hours in both the AM and PM peak, and was congested along most of its length.

The Tapleys Hill Road / Brighton Road / Lonsdale Road / Dyson Road / Commercial Road corridor also contributed significantly to total delays in 2016. This corridor runs north-south along the coast and contributed 1,400 delay hours in both peak periods. Delays on this road highlight how demand for north-south access is the primary driver of congestion on Adelaide's road network.

Adelaide's public transport system in 2016

Use of public transport in Adelaide has grown in recent years, partly due to progressive improvements to service levels and frequencies, and also as a result of population growth. Adelaide's public transport is mostly radial to the CBD. Most train, bus and tram routes provide access to central areas either directly, or through feeder services to train stations. Consequently, peak periods are dominated by city-centric movements.

Adelaide's rail network serves the far north and south of the city. Adelaide's most crowded rail lines in the AM peak are the northern and southern lines from Gawler and Seaford to the CBD, respectively. As they reach the city, trains on these lines exceed or have reached their seated capacity but, on average, are still under maximum or crush capacity (Figure 101).

Buses perform the majority of Adelaide's public transport task and carry the greatest number of passenger kilometres, passenger hours and boardings. Adelaide's bus network includes high-capacity trunk routes, feeder services and local services. Adelaide's most crowded bus corridors in 2016 are on the south-eastern corridor, particularly beyond Stirling where high volume/capacity ratios may reflect low levels of service provision and limited alternative public transport options. In addition, some routes in the north-east also experience crowding beyond seated capacity (Figure 102).

Adelaide currently has a single tram corridor connecting Glenelg in the city's south west to the CBD and the Entertainment Centre at Hindmarsh. This corridor experiences low average crowding even in peak periods (Figure 103).

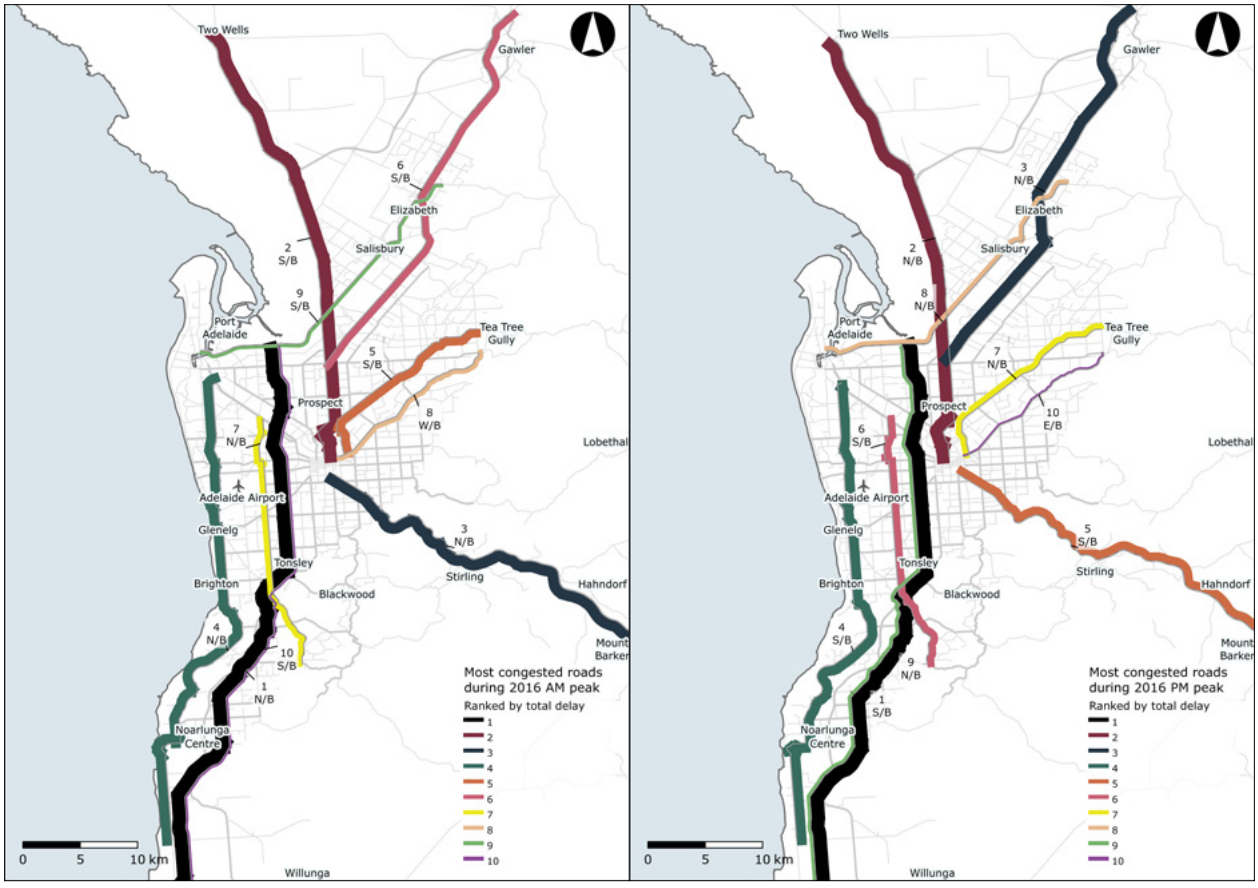
Table 41: Adelaide's most congested roads (total vehicle delays), 2016

City rank	Corridor	Direction	Total delay hours	Cost of congestion (daily)
AM peak				
1.	Main South Road / South Road corridor	N/B	2,300	$44,000
2.	Port Wakefield Road / Main North Road corridor	S/B	2,200	$44,000
3.	Princes Highway (M1) / Glen Osmond Road corridor	N/B	1,400	$26,000
4.	Commercial Road / Dyson Road / Lonsdale Road / Brighton Road / Tapleys Hill Road corridor	N/B	1,400	$27,000
5.	North East Road corridor	S/B	1,300	$24,000
6.	Outer Main North Road corridor	S/B	1,300	$25,000
7.	Marion Road corridor	N/B	1,300	$24,000
8.	Lower North East Road / Payneham Road corridor	W/B	1,100	$20,000
9.	Phillip Highway / Salisbury Highway corridor	S/B	1,100	$22,000
10.	South Road / Main South Road corridor	S/B	1,000	$20,000
PM peak				
1.	South Road / Main South Road corridor	S/B	2,500	$47,000
2.	Main North Road / Port Wakefield Road corridor	N/B	2,200	$43,000
3.	Outer Main North Road corridor	N/B	1,500	$28,000
4.	Tapleys Hill Road / Brighton Road / Lonsdale Road / Dyson Road / Commercial Road corridor	S/B	1,400	$26,000
5.	Glen Osmond Road / Princes Highway (M1) corridor	S/B	1,300	$24,000
6.	Marion Road corridor	S/B	1,300	$24,000
7.	North East Road corridor	N/B	1,300	$23,000
8.	Salisbury Highway / Phillip Highway corridor	N/B	1,100	$21,000
9.	Main South Road / South Road corridor	N/B	1,100	$21,000
10.	Payneham Road / Lower North East Road corridor	E/B	1,100	$20,000

Note: N/B, S/B, W/B and E/B represent northbound, southbound, westbound and eastbound, respectively

Source: Veitch Lister Consulting (2019)[186]

Figure 100: Adelaide's most congested roads (total vehicle delays), 2016 AM (left) and PM (right) peak periods

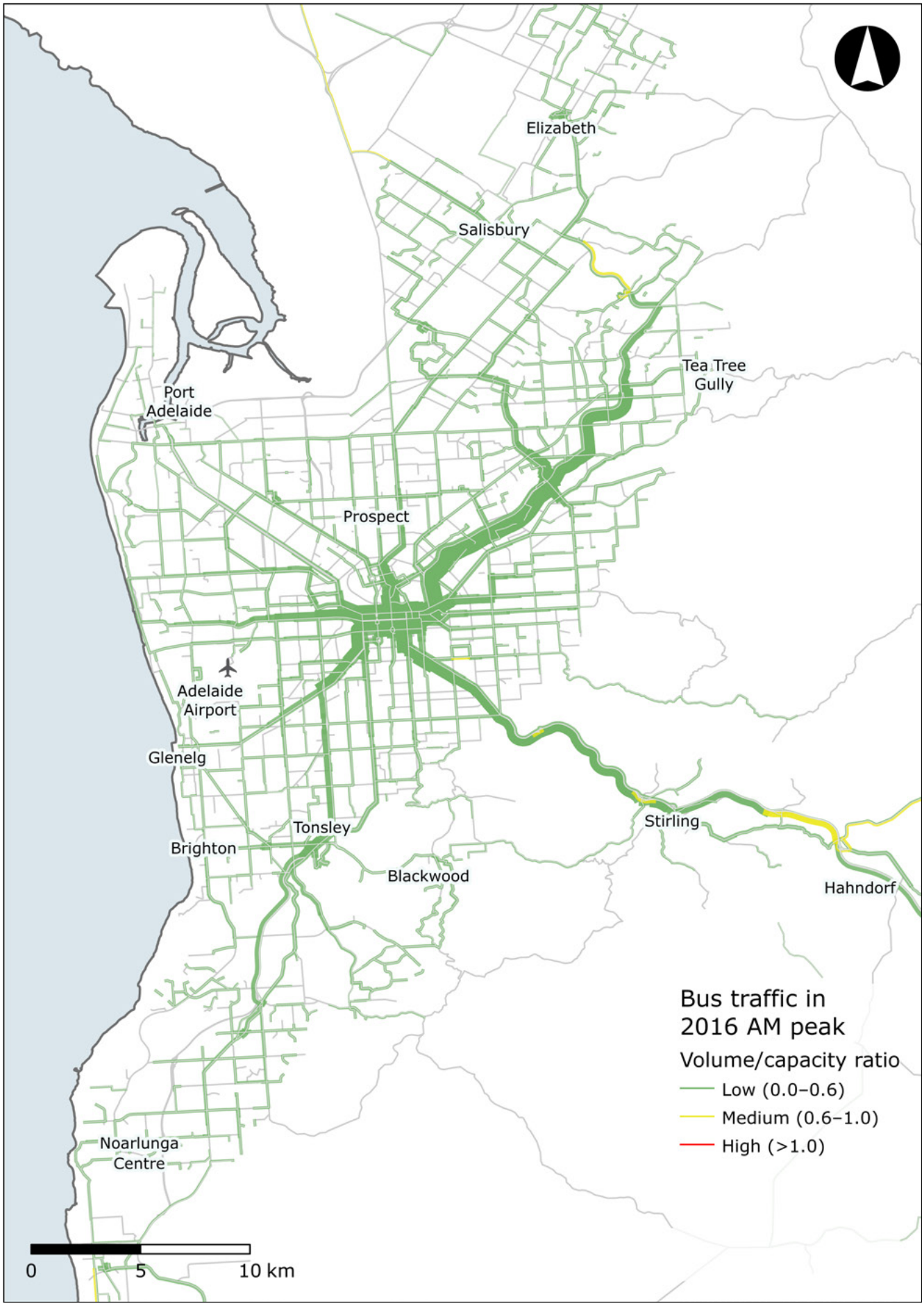


Source: Veitch Lister Consulting (2019)[187]

Figure 101: Adelaide weekday train passenger volume / capacity ratio, 2016 AM peak

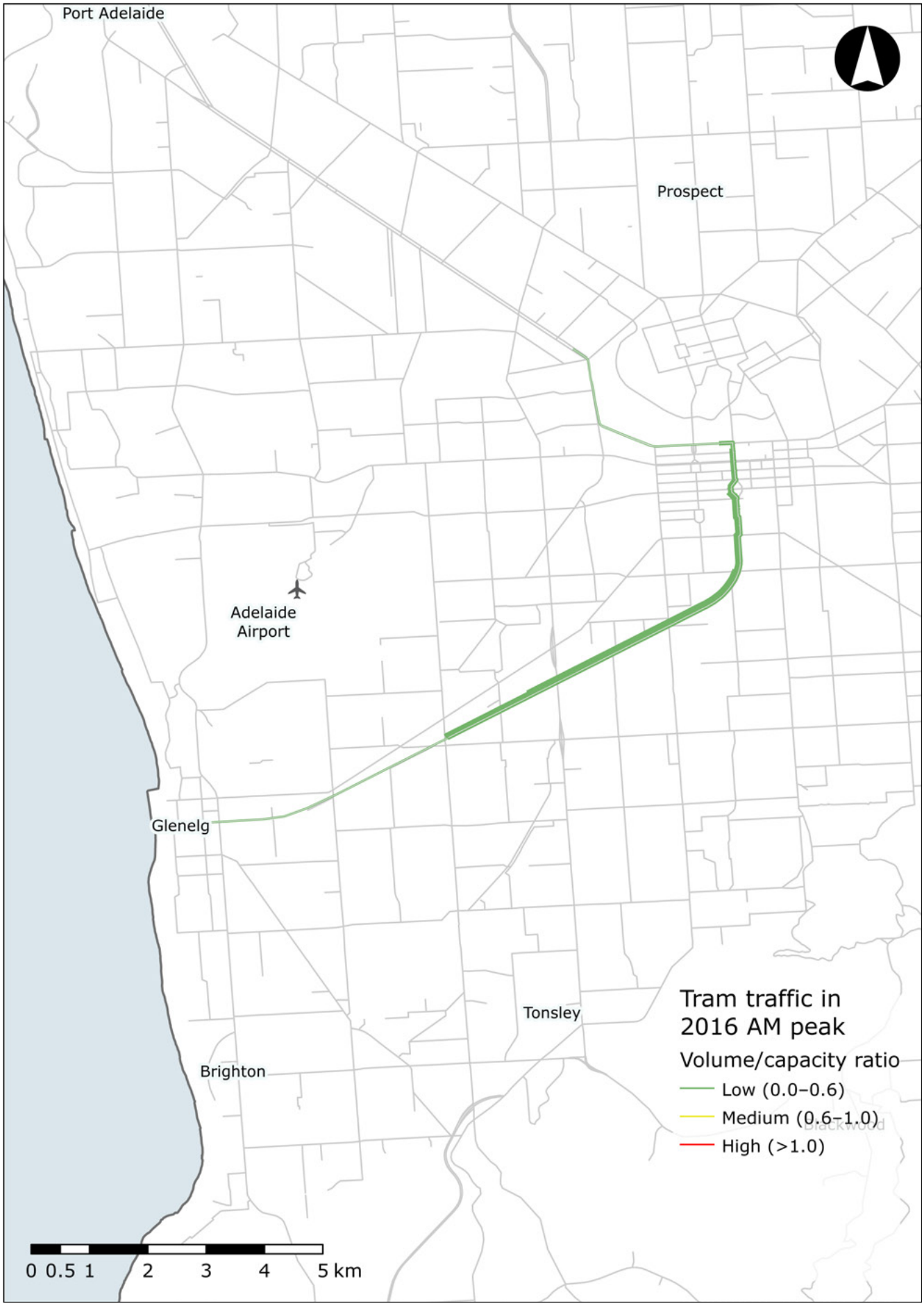
Source: Veitch Lister Consulting (2019)[188]

Figure 102: Adelaide weekday bus passenger volume / capacity ratio, 2016 AM peak



Source: Veitch Lister Consulting (2019)[189]

Figure 103: Adelaide weekday tram passenger volume / capacity ratio, 2016 AM peak



Source: Veitch Lister Consulting (2019)[190]

Findings

- Consistent with its coastal urban form Adelaide's north-south road corridors are the heaviest-used and most congested corridors in the city. Congested conditions extend over 20km to the north and over 15km to the south.
- With the high concentration of Adelaide's employment in the CBD, the worst congestion is seen in the inner city.
- Small sections of the arterial road network see bi-directional congestion in the AM peak. This is more severe in the PM peak, especially on South Road and other arterial routes to the north-west of the city centre.
- Most of Adelaide's bus network currently operates without capacity issues. The O-Bahn corridor servicing the inner to middle north-eastern suburbs carries a large volume of passengers in conditions of low crowding. Some lower-volume bus routes serving Adelaide's outer suburbs are seeing low levels of crowding, as a function of the limited service frequencies typical of outer urban areas.
- Gawler train line services used by passengers commuting from the Elizabeth and Salisbury corridor to the north of Adelaide are reaching seated capacity as they approach the CBD.

9.4 Even with programmed investment, Adelaide's transport networks are forecast to become more congested

Snapshot of Adelaide's transport networks in 2031

Looking out to 2031, Adelaide's roads and public transport will have to handle a significantly larger transport task. The city's population is predicted to grow from 1.3 million to 1.6 million, an 18% increase. Population distribution is expected to remain relatively similar to today, with higher densities in the city centre and lower relative densities on the urban fringe.

Demand for transport in Adelaide is predicted to increase by a rate slightly higher than projected population growth by 2031. Trips on Adelaide's transport network will increase by 24%, to over 4 million daily trips. This comparatively higher rate of trip growth results from a projected decrease in the size of the average household.

Trips by public transport will grow slightly faster than by car, which suggests a shift towards public transport in the city as Adelaide's population grows. Trips on public transport will increase by 31% and will increase by car by 24%.

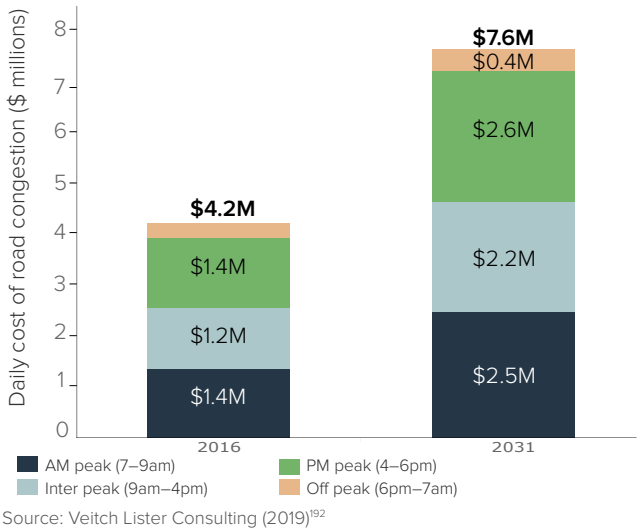
Adelaide's road congestion and public transport crowding are forecast to grow considerably. Our modelling indicates the annualised cost of road congestion and public transport crowding will be approximately $2.6 billion in 2031. This will result in more time spent stuck in traffic and standing on delayed public transport services.

The daily cost of road congestion on Adelaide's roads is expected to almost double, from about $4.2 million to $7.6 million in 2031 (Figure 104).

The modelled cost of public transport crowding is significantly less than for road congestion in Adelaide, reflecting the high reliance on private vehicles. While the cost of public transport crowding in 2016 is negligible, it increases to $4.4 million per year by 2031. This comparatively small cost reflects the residual capacity available in Adelaide's public transport network, and the city's smaller population.

These forecast outcomes account for projects that were either under construction, under procurement or had funding for construction committed from all relevant governments at the time of modelling for the *Australian Infrastructure Audit*[191]

Figure 104: Adelaide's average weekday cost of road congestion, 2016 and 2031



Source: Veitch Lister Consulting (2019)[192]

Major projects included in Adelaide's 2031 forecast comprise:

- Northern Connector Freeway
- Darlington Upgrade Project
- Flinders Link
- Port Dock Railway Line.

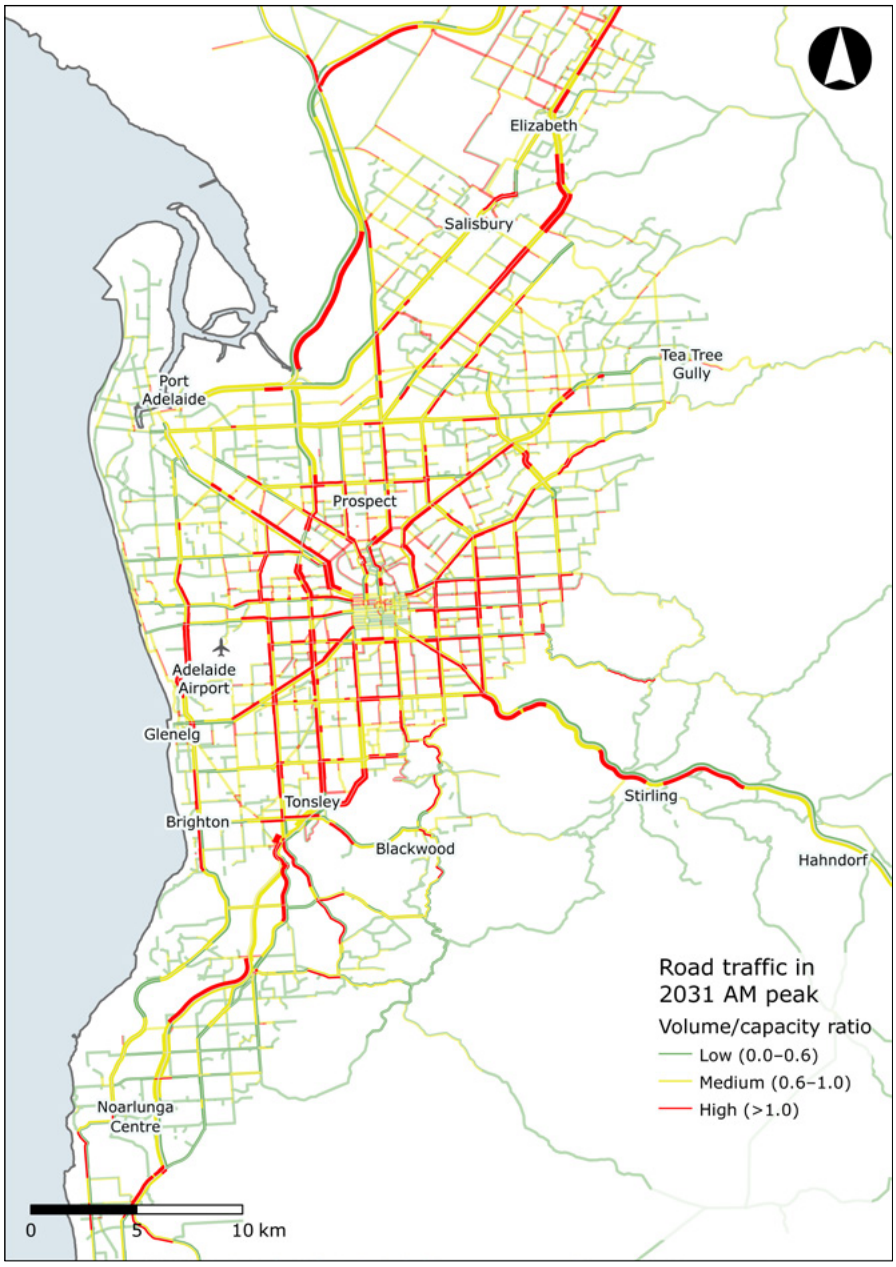
Following the completion of the modelling for this report, the South Australian Government cancelled the Port Dock Railway Line. The modelling and the complementary analysis within this paper therefore underestimates congestion and crowding on parallel roads or bus services.

Adelaide's most congested roads in 2031: what the driver will experience

Despite the mode shift from cars to public transport, congestion on Adelaide's roads will continue to grow substantially. Adelaide's most congested roads in 2031 are similar to those in 2016 (Figure 105), while the proportion of travel time attributable to congestion is forecast to generally increase from 50–60% in 2016 to 60–70% in 2031.

The worst performers in both 2016 and 2031 are the Fullarton Road, Goodwood Road, Glynburn Road, Magill Road and Lower North East Road / Payneham Road corridors, while some of their relative standings interchange between the two modelled years. Based on estimating the percentage of journey time that will be spent in congestion on Adelaide's road network in 2031, Table 42 and Figure 106 show the ten most congested corridors in the AM and PM peak periods, respectively.

Figure 105: Adelaide weekday traffic volume / capacity ratio, 2031 AM peak



Source: Veitch Lister Consulting (2019)[193]

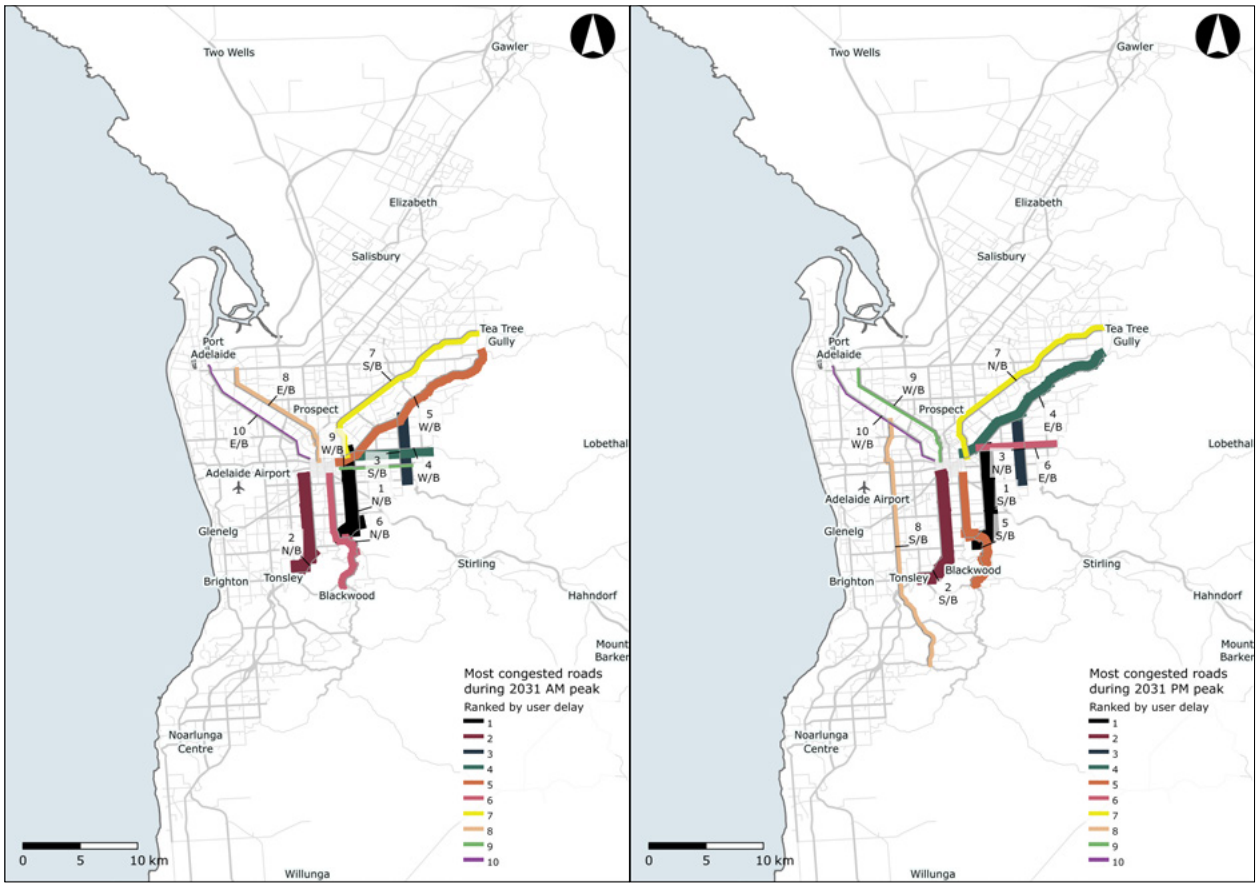
Table 42: Adelaide's most congested roads (user experience), 2031

City rank	Corridor including origin / destination connected (direction)	Length (km)	Share of journey time due to congestion	Delay per vehicle (mins)	Cost of congestion for a car	Cost of congestion for a heavy commercial vehicle
AM peak						
1.	Fullarton Road corridor (N/B)	8	67%	18	$4.97	$21.41
2.	Goodwood Road corridor (N/B)	9	66%	20	$5.52	$23.79
3.	Glynburn Road corridor (S/B)	5	66%	12	$3.31	$14.28
4.	Magill Road corridor (W/B)	5	66%	12	$3.31	$14.28
5.	Lower North East Road / Payneham Road corridor (W/B)	14	64%	30	$8.29	$35.69
6.	Belair Road / Unley Road corridor (N/B)	11	63%	24	$6.63	$28.55
7.	North East Road corridor (S/B)	16	60%	29	$8.01	$34.50
8.	Torrens Road corridor (E/B)	11	59%	20	$5.52	$23.79
9.	Kensington Road corridor (W/B)	5	59%	9	$2.49	$10.71
10.	Port Road corridor (E/B)	11	57%	19	$5.25	$22.60
PM peak						
1.	Fullarton Road corridor (S/B)	8	65%	17	$4.69	$20.22
2.	Goodwood Road corridor (S/B)	9	65%	20	$5.52	$23.79
3.	Glynburn Road corridor (N/B)	5	63%	11	$3.04	$13.09
4.	Payneham Road / Lower North East Road corridor (E/B)	14	62%	27	$7.46	$32.12
5.	Unley Road / Belair Road corridor (S/B)	11	61%	22	$6.08	$26.17
6.	Magill Road corridor (E/B)	5	60%	10	$2.76	$11.90
7.	North East Road corridor (N/B)	16	58%	26	$7.18	$30.93
8.	Marion Road corridor (S/B)	23	57%	33	$9.11	$39.26
9.	Torrens Road corridor (W/B)	11	56%	18	$4.97	$21.41
10.	Port Road corridor (W/B)	11	56%	17	$4.69	$20.22

Note: N/B, S/B, W/B and E/B represent northbound, southbound, westbound and eastbound, respectively.

Source: Veitch Lister Consulting (2019)[194]

Figure 106: Adelaide's most congested roads (user experience), 2031 AM (left) and PM (right) peak periods



Source: Veitch Lister Consulting (2019)[195]

Between 2016 and 2031, vehicle congestion in Adelaide is expected to worsen and spread. The heaviest congestion is expected to occur within about 5km of the CBD. Adelaide's motorists can expect longer traffic delays and to spend a larger share of their journey time in congestion. Users of Adelaide's most delayed roads can expect to spend between 55% and 70% of their trip duration in dense traffic during peaks. Despite road upgrades to parts of Adelaide's north-south corridor stretching from Noarlunga to Gawler, this will remain one of the city's most congested routes, compromising its role in facilitating north-south travel.

Efforts to strengthen Adelaide's primary road spine will include improvements such as the new Northern Connector and the Darlington Upgrade near Bellevue Heights. These upgrades will provide additional capacity for commuters entering the city centre from northern and southern suburbs, and are expected to provide some congestion relief. While the Northern Connector is forecast to redirect traffic from the Port Wakefield Road and Salisbury Highway corridor, by 2031 these corridors are expected to still be significantly congested during peak periods.

Population growth to the city's south is expected to increase traffic substantially on northbound roads during the AM peak. By 2031 key access routes are expected to be operating over capacity. The Princes Highway / South Eastern Freeway corridor, as well as the arterial roads that connect to it, is expected to be most affected by northbound traffic congestion during this period.

Generally, it is expected that by 2031 many of Adelaide's roads will be operating over their design capacity, causing delays to bus passengers, motorists and freight operators. Many of the worst-performing corridors in 2031 are marked as National Key Freight Routes by the Australian Government.[196]

Adelaide's most congested roads in 2031: the forecast cost to the community of total vehicle delays

Modelling has forecast the most congested road corridors in Greater Adelaide for 2031, as for 2016, based on aggregating the total delay hours experienced by all vehicles using the congested road during the modelled period. The ten most congested corridors in the AM and PM peak periods under this approach are shown in Table 43 and Figure 107.

Planned responses forecast substantial traffic growth on Adelaide's road network and see additional motorway-standard capacity provided to service the city's growing northern suburbs. The Northern Connector is predicted to attract some traffic from the Port Wakefield Road and Salisbury Highway routes. Sections of the North-South Corridor, which includes South Road and Main South Road, will also be upgraded to motorway standard, relieving traffic on remaining surface road sections, such as the section crossing Port Road.

In the context of Adelaide's well-established grid street layout, these projects will provide an opportunity for urban domain improvements on surface roads. As with other capital cities, realising such opportunities in Adelaide will require 'link and place' road planning and operation principles.

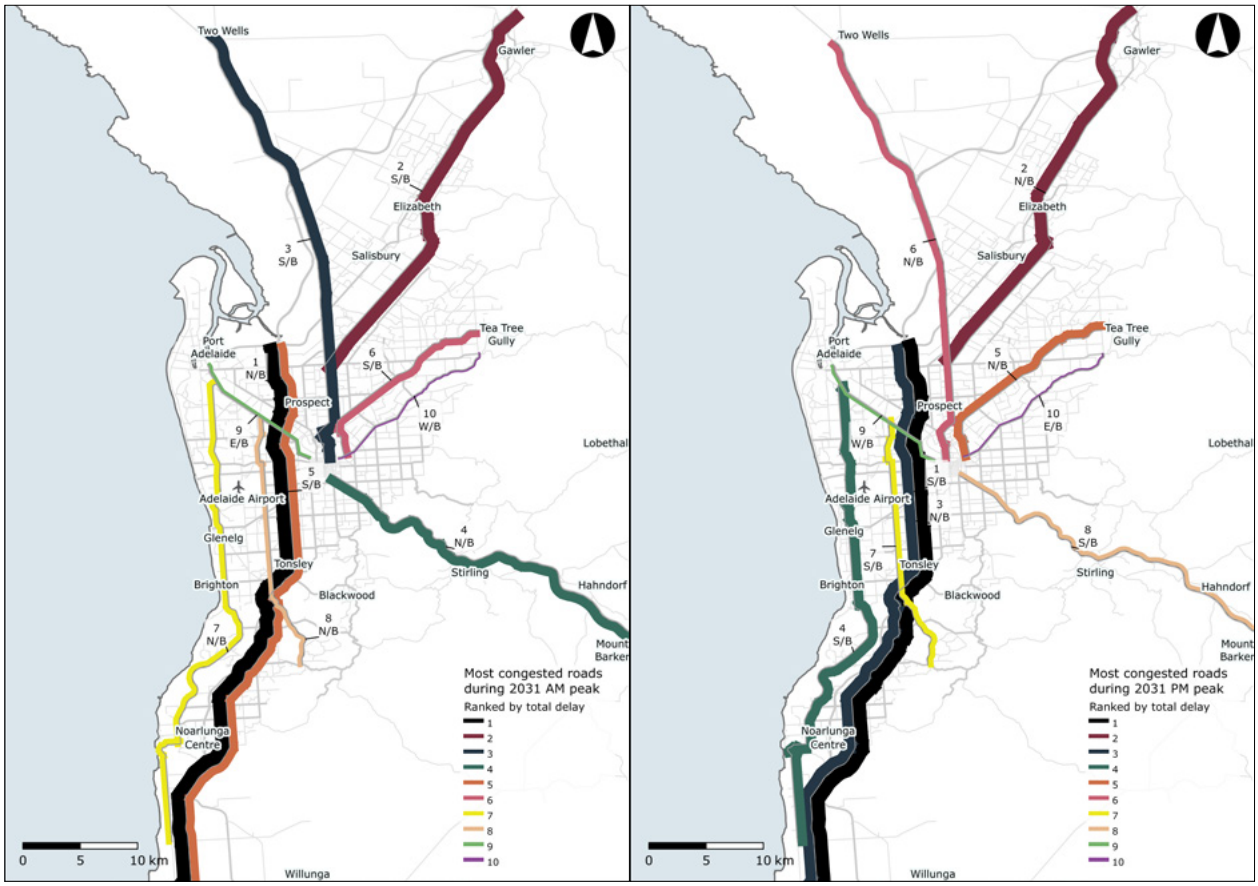
Table 43: Adelaide's most congested roads (total vehicle delays), 2031

City rank	Corridor	Direction	Total delay hours	Cost of congestion (daily)
AM peak				
1.	Main South Road / South Road corridor	N/B	3,600	$69,000
2.	Outer Main North Road corridor	S/B	2,800	$52,000
3.	Port Wakefield Road / Main North Road corridor	S/B	2,400	$46,000
4.	Princes Highway (M1) / Glen Osmond Road corridor	N/B	2,300	$42,000
5.	South Road / Main South Road corridor	S/B	2,300	$45,000
6.	North East Road corridor	S/B	2,200	$41,000
7.	Commercial Road / Dyson Road / Lonsdale Road / Brighton Road / Tapleys Hill Road corridor	N/B	2,100	$40,000
8.	Marion Road corridor	N/B	1,900	$36,000
9.	Port Road corridor	E/B	1,800	$35,000
10.	Lower North East Road / Payneham Road corridor	W/B	1,800	$33,000
PM peak				
1.	South Road / Main South Road corridor	S/B	3,800	$71,000
2.	Outer Main North Road corridor	N/B	2,800	$51,000
3.	Main South Road / South Road corridor	N/B	2,600	$50,000
4.	Tapleys Hill Road / Brighton Road / Lonsdale Road / Dyson Road / Commercial Road corridor	S/B	2,400	$44,000
5.	North East Road corridor	N/B	2,100	$38,000
6.	Main North Road / Port Wakefield Road corridor	N/B	2,100	$40,000
7.	Marion Road corridor	S/B	2,100	$39,000
8.	Glen Osmond Road / Princes Highway (M1) corridor	S/B	2,100	$39,000
9.	Port Road corridor	W/B	1,800	$34,000
10.	Payneham Road / Lower North East Road corridor	E/B	1,700	$31,000

Note: N/B, S/B, W/B and E/B represent northbound, southbound, westbound and eastbound, respectively.

Source: Veitch Lister Consulting (2019)[197]

Figure 107: Adelaide's most congested roads (total vehicle delays), 2031 AM (left) and PM (right) peak periods



Source: Veitch Lister Consulting (2019)[198]

‘Link and place’: balancing the dual roles of city streets

A major new direction in integrated road network and land-use planning involves the application of a ‘link and place’ (also called ‘movement and place’) framework. This is used to categorise roads according to their relative importance both as corridors, or links in a network, for the movement of people, goods and services, and as places where people shop, live, work, socialise, walk and so on.

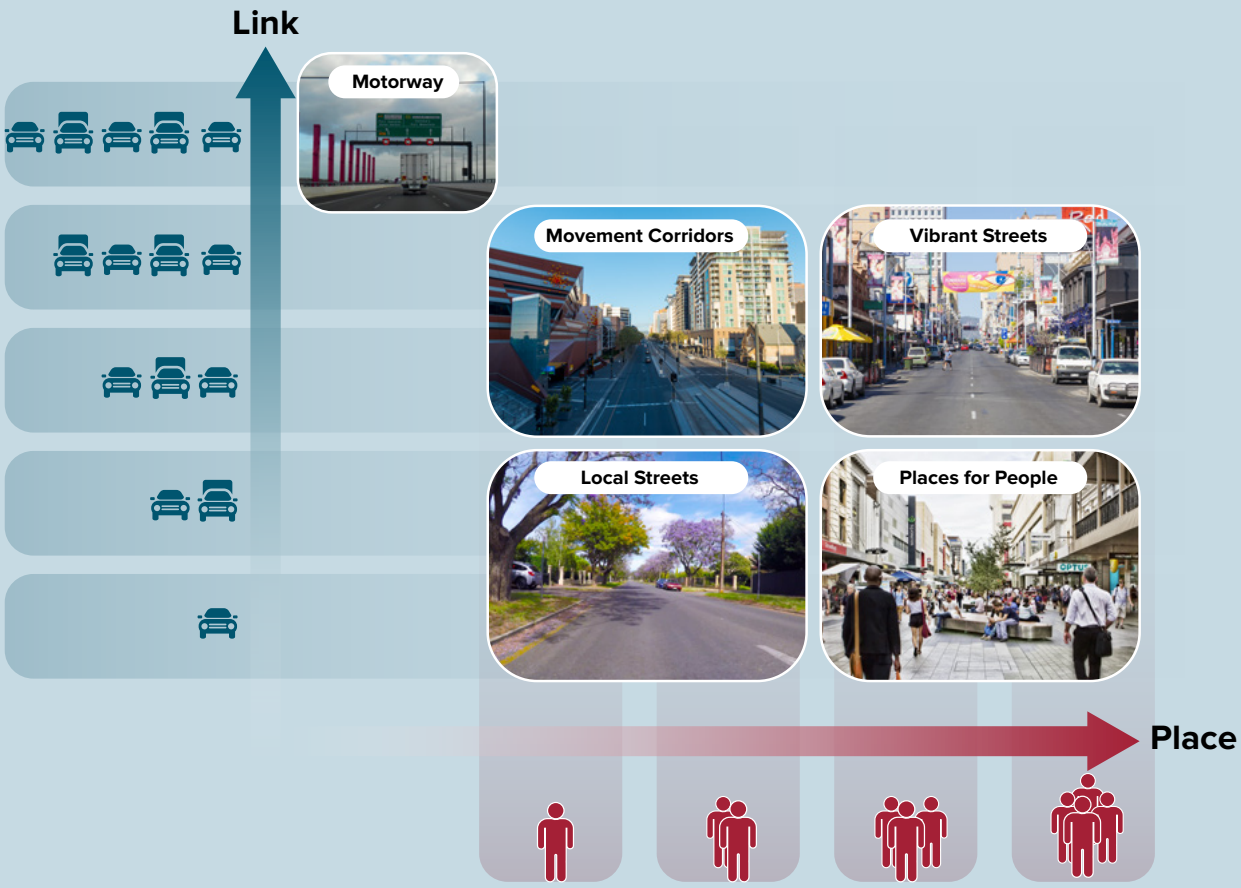
As one of the Australian cities noted for the connected grid layout of its 19th century establishment, Adelaide is well placed to understand the need for and to use such an approach.

Compared with other city road systems that are constrained by ridge-and-valley topography or the need to cross waterways, grid street networks can have the advantage of offering multiple parallel movement corridors. However, secondary network links will lose their amenity as places to live and play if the movement of motor vehicles along those place-rich corridors is not carefully managed.

The South Australian Government has recognised the importance of ‘link and place’ in planning for Adelaide’s growth.[199] Establishing a balance between these two functions is essential to designing and managing streets that otherwise could be overwhelmed by population growth-generated traffic.

An array of tools (Figure 108) is now available to guide future urban planning and transport decisions for large Australian cities, such as Adelaide, where increased traffic flows need to be managed to protect the amenity of the places that motor vehicles are trying to reach. ‘Link and place’ solutions developed using these tools will be as diverse as a city’s streets. In the long term, for example, the upgrade of a motorway or other major movement corridor could be balanced against the traffic calming of a parallel surface street. This could create both a link which moves large numbers of people on foot or by bike, and a high-amenity place that supports the expansion of local business.

Figure 108: 'Link and place' framework



"Signage at the interchange of the M2 North South Motorway/A9 Port River Expressway/A13 Salisbury Highway. Adelaide, South Australia" by Alexczarn is licensed under CC BY-SA 4.0.

Source: Based on Austroads (2016)[200]

Adelaide's public transport system in 2031

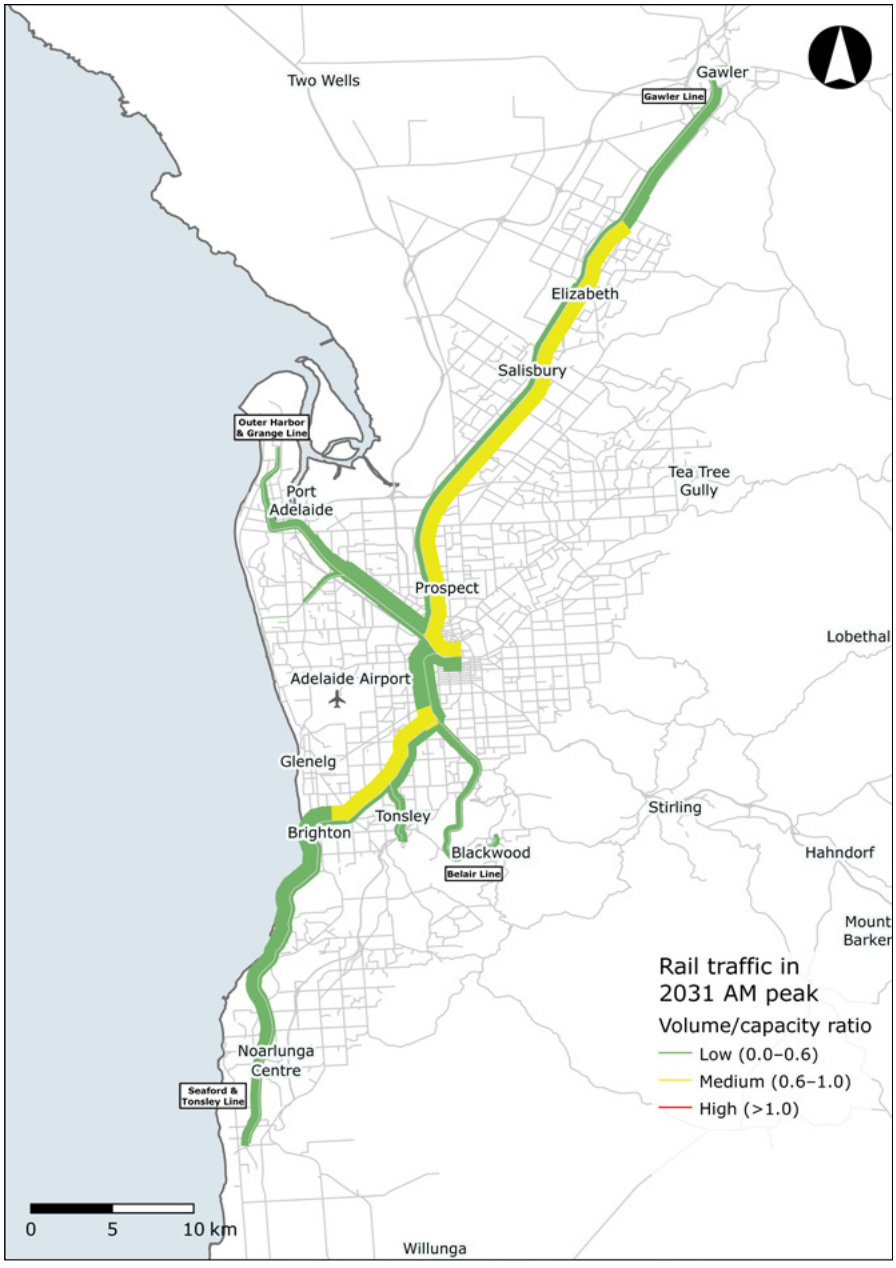
By 2031 car travel is predicted to remain the dominant form of travel in Adelaide, although the use of public transport will significantly increase. Public transport use is forecast to grow by 31% between 2016 and 2031, influenced by the increased time and monetary costs of car travel. As a result, crowding on Adelaide's public transport network is expected to increase.

For Adelaide's rail network, usage is forecast to increase particularly on lines linking the outer suburbs to the north and south with the city centre, driven by population growth on the urban fringe. The majority of the Gawler Line as well as parts of the Seaford and Tonsley lines will be operating well above seated capacity, but below crush capacity, in the AM peak. The worst levels of crowding expected on the rail network are forecast to the south of Salisbury. Other parts of the train network will still offer spare capacity in 2031 (Figure 109).

Adelaide's bus routes are projected to become incrementally more crowded by 2031. Some routes are expected to become busy in growth areas between Elizabeth, Tea Tree Gully and Salisbury in the north. Routes feeding the O-Bahn are also expected to experience moderate levels of crowding (Figure 110).

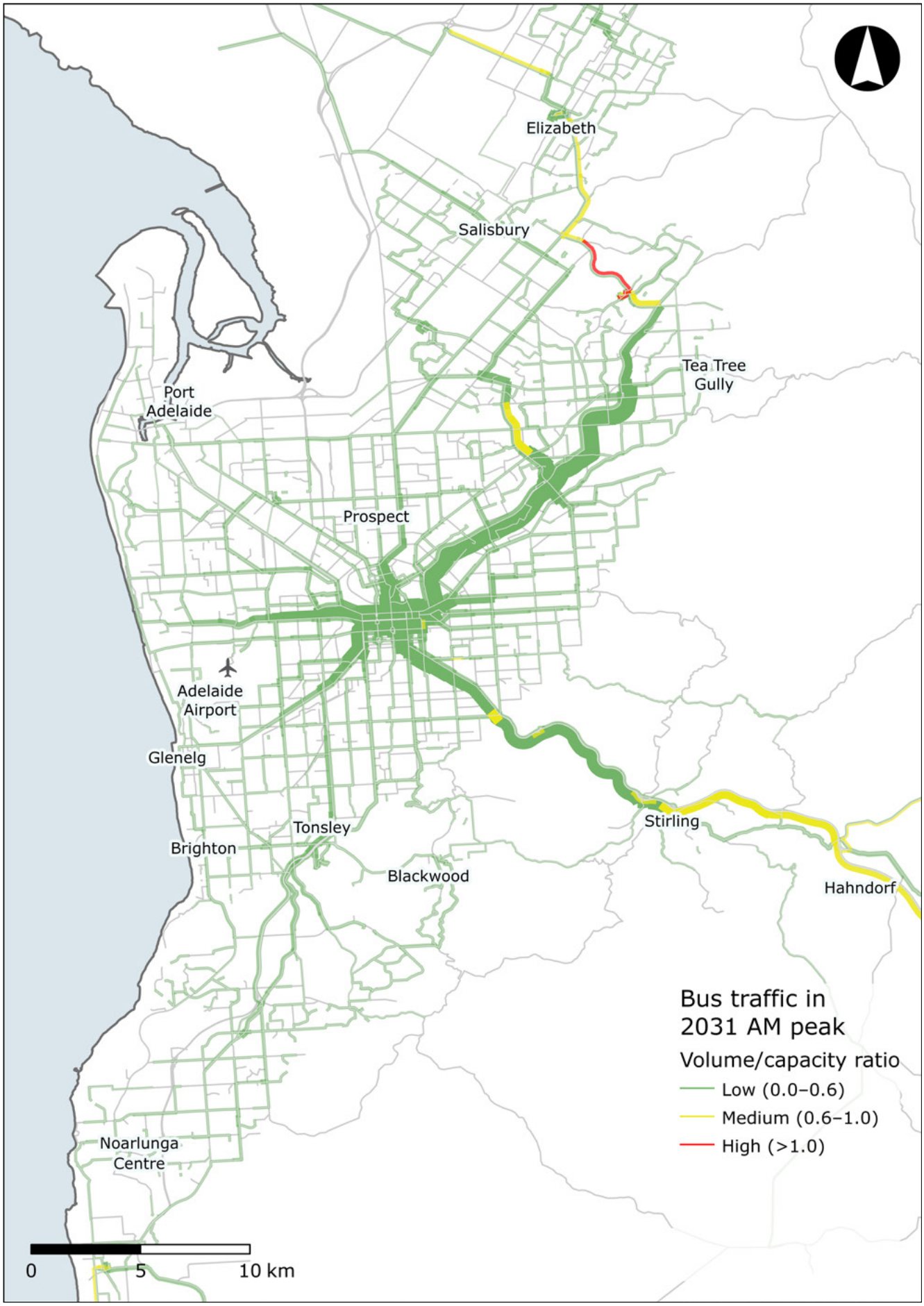
Adelaide's Glenelg tram currently experiences low levels of crowding. Light crowding is forecast to be the case to 2031, for both peak periods (Figure 111), which suggests that there is opportunity for passenger growth. As the tram currently serves both the dense CBD and areas with high levels of recreational activity, the service could be integrated into active travel networks to increase passenger use.

Figure 109: Adelaide weekday train passenger volume / capacity ratio, 2031 AM peak



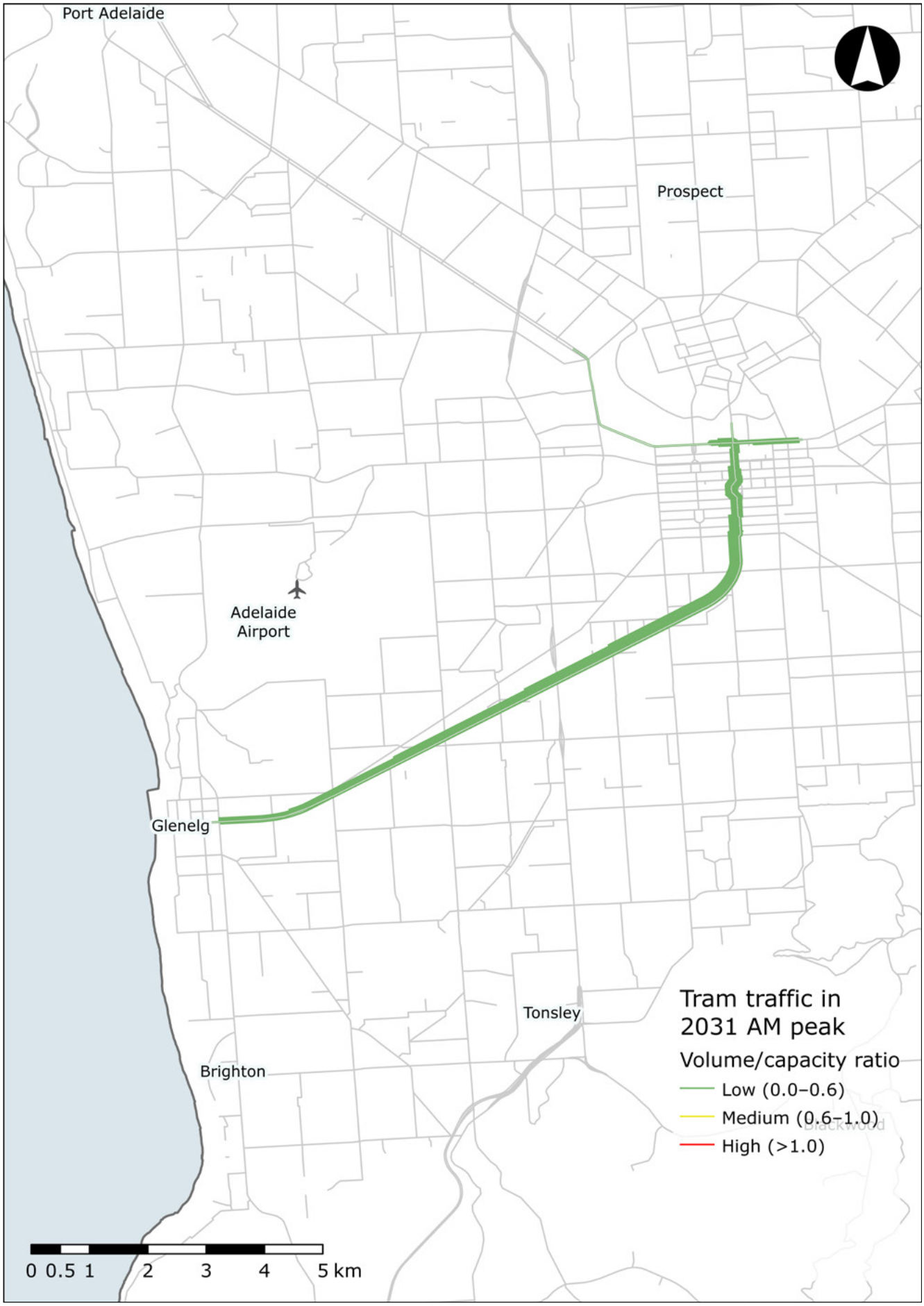
Source: Veitch Lister Consulting (2019)[201]

Figure 110: Adelaide weekday bus passenger volume / capacity ratio, 2031 AM peak



Source: Veitch Lister Consulting (2019)[202]

Figure 111: Adelaide weekday tram passenger volume / capacity ratio, 2031 AM peak



Source: Veitch Lister Consulting (2019)[203]

Findings

- The 2019 Audit forecasts that the annualised cost of road congestion for Greater Adelaide will grow from approximately $1.4 billion in 2016 to $2.6 billion in 2031. This is 31% lower than the 2031 forecast cost of road congestion in the 2015 Audit.
- North-south travel is the movement for which there is expected to be the strongest demand. This demand will be relatively evenly distributed across Adelaide's north-south arterial network.
- Traffic volumes on the North-South Corridor are expected to grow particularly strongly. The new Northern Connector feeding the North-South Motorway section of this corridor provides additional capacity to Adelaide's growing northern suburbs and will attract some traffic from the Port Wakefield Road and Salisbury Highway corridor.
- Other sections of the North-South Corridor (including South Road and Main South Road), when upgraded to motorway standard, will similarly relieve traffic on remaining surface road sections.
- These improvements, along with the Darlington Upgrade near Bellevue Heights, strengthen the North-South Corridor as Adelaide's primary road spine. The corridor will also experience the effects of population growth to the city's south, evident in the substantial increase in traffic forecast for the Southern Expressway.
- Strong traffic growth is forecast on the arterial roads serving Adelaide's emerging employment hubs in Elizabeth and areas south of Bellevue Heights.
- In terms of demand from the south-east, traffic on the South Eastern Freeway is predicted to increase, reflecting both projected population growth in the Adelaide Hills as well as the fact that it is the only major highway providing passage through the region.
- Although the highest concentration of heavily utilised roads is around the CBD, the Tapleys Hill corridor - which runs north-south along the coast - is also forecast to carry substantial additional traffic.
- Because CBD-bound travel is better served by public transport, it is north-south travel that is primarily driving an increase in demand on Adelaide's roads. As such, some of the demand on radial routes such as Port Road, North East Road and Anzac Highway is driven by cross-city travel.
- Congestion of Adelaide's road network will not only affect commuting drivers and bus passengers, but also disrupt the city's function by delaying commercial vehicles. Adelaide's north-south train lines will be operating above their seated capacity for longer sections close to the CBD during peak periods. As will the Gawler Line, the Seaford and Tonsley Line will see this effect on the section north-east of Brighton.
- Many bus routes, particularly in outer growth areas, will become significantly more crowded by 2031. The most severely affected routes are forecast to be services connecting Salisbury to the high-patronage north-eastern bus corridor that feeds the O-Bahn.
- As of today, Adelaide's single suburban tram route is forecast to still offer significant unused capacity in 2031.

9.5 Transport decisions impact access to jobs and services

Hospital access in Adelaide – by car and public transport, in 2031

Greater Adelaide's access to critical healthcare is measured by the travel time to their nearest public hospital, or hospital with an emergency department, by car versus public transport (Figure 112).

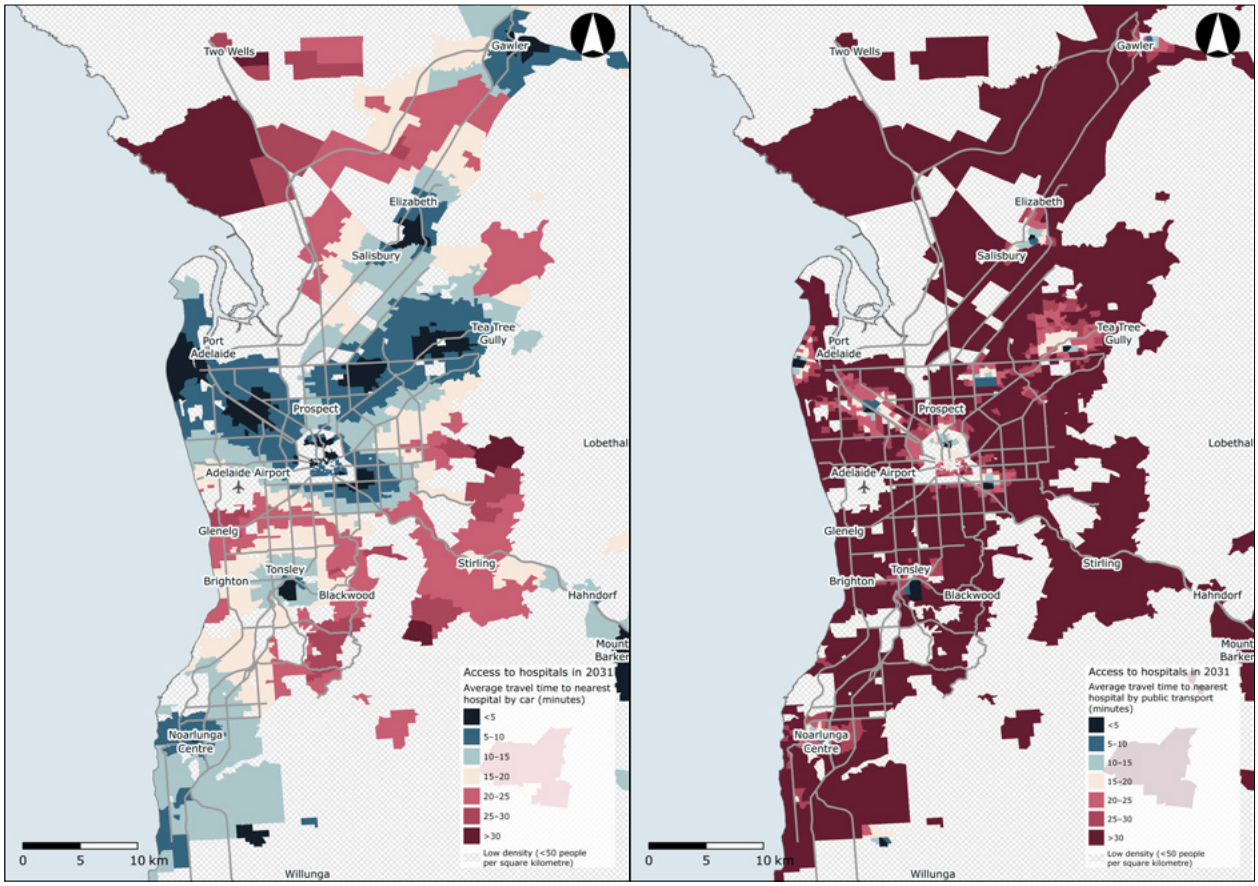
Access to public hospitals in Adelaide is substantially quicker by car than by public transport. For residents of the inner city, travel times are relatively short by both transport choices. However, travel times become more extended for residents of outer areas such as Gawler-Two Wells and Playford. On average, access to a public hospital in Greater Adelaide in 2031 is forecast to take 13 minutes by car, and 47 minutes by public transport, both slightly increased from 2016. For people living in Adelaide City (and along trunk public transport corridors further out) these travel times are significantly reduced, to five minutes by car and 21 minutes by public transport, in 2031.

Access to childcare and schools in Adelaide – by car and public transport, in 2031

With access to a car, the average resident of the Greater Adelaide region can reach childcare services, public primary schools and public secondary schools within a six-minute trip in 2016. This is expected to extend to a seven-minute trip by 2031 (Figure 113, Figure 114 and Figure 115). For residents without access to a car, travel times are significantly longer by public transport. Travel times generally average just under 30 minutes for childcare and public primary school services, and over 30 minutes for public secondary schools.

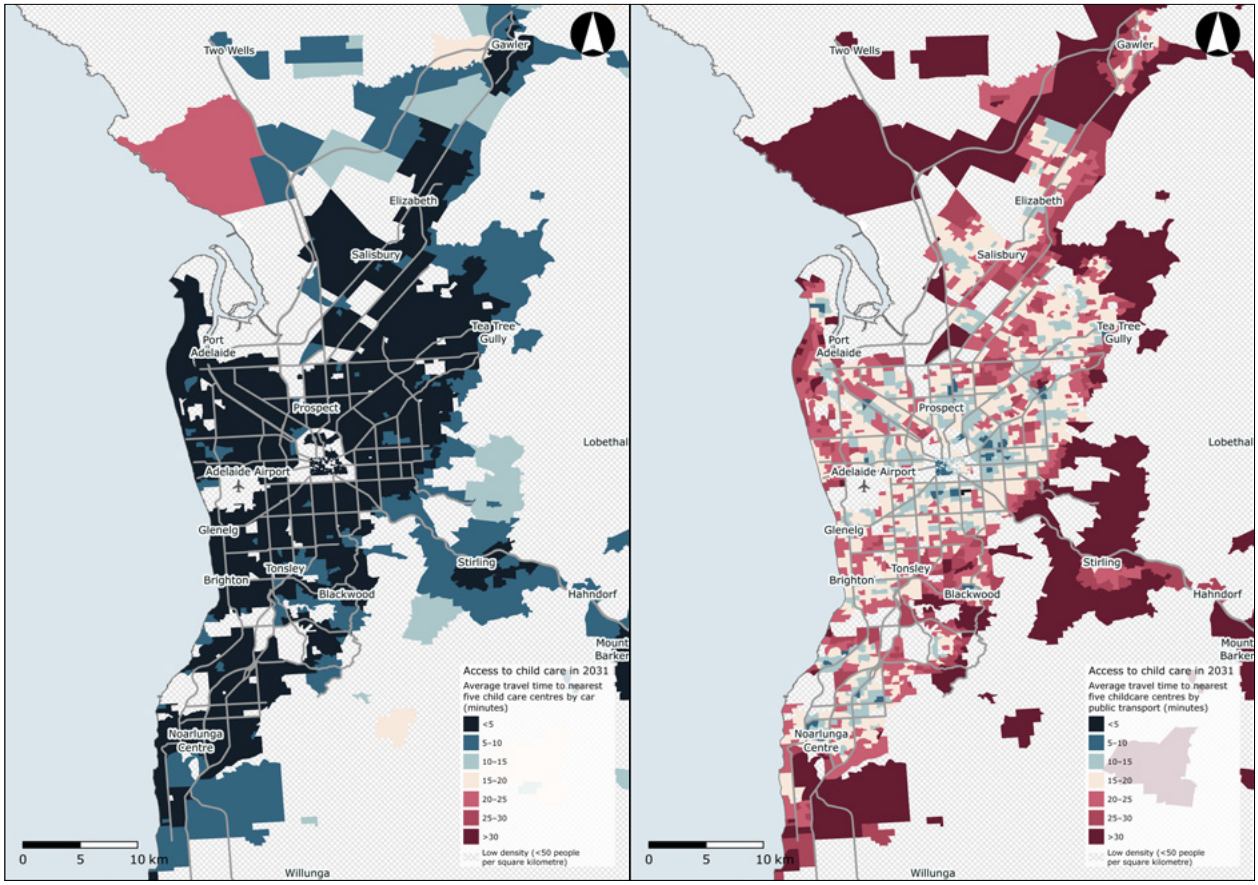
Travel times by car are expected to worsen between 2016 and 2031 due to increased traffic congestion. By public transport, travel times are expected to reduce. While slightly reduced by 2031, travel times by public transport to these social infrastructure services will remain comparatively much less attractive for most of Greater Adelaide. This is one result of the radial nature of Adelaide's public transport system. It is effective in carrying people from outer areas to the centre, but less effective at servicing local travel.

Figure 112: Greater Adelaide average time to nearest hospital by car (left) and public transport (right), 2031 AM peak



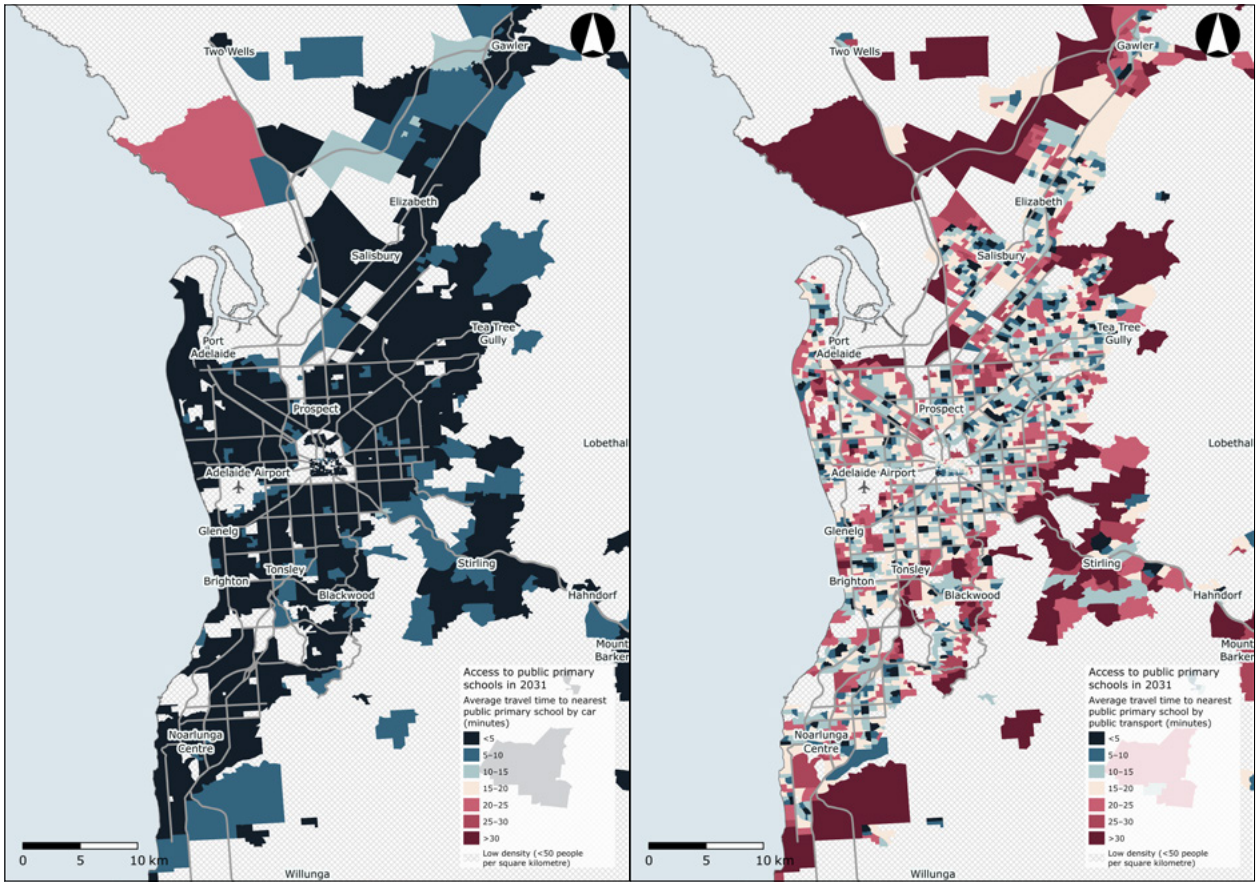
Source: Veitch Lister Consulting (2019)[204]

Figure 113: Greater Adelaide average time to nearest five childcare centres by car (left) and public transport (right), 2031 AM peak



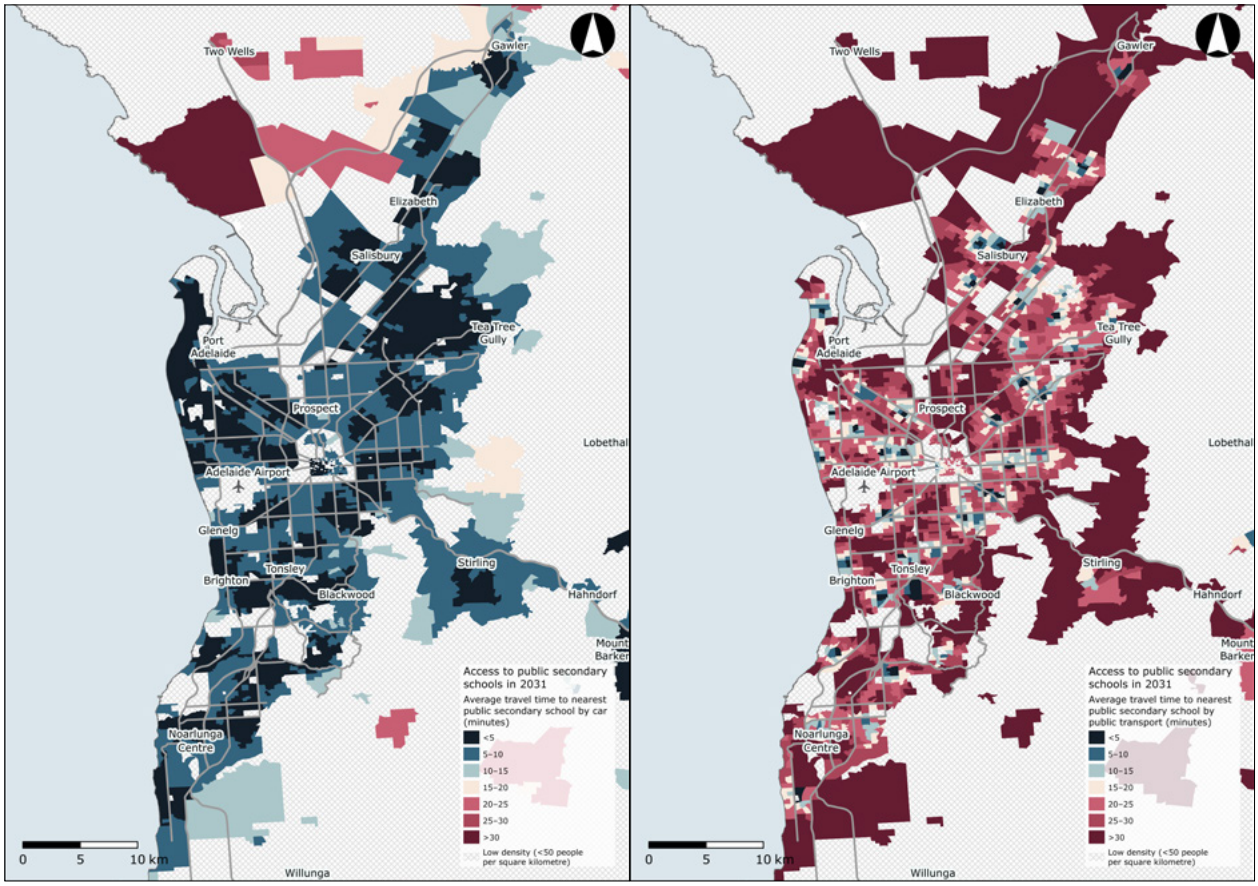
Source: Veitch Lister Consulting (2019)[205]

Figure 114: Greater Adelaide average time to nearest public primary school by car (left) and public transport (right), 2031 AM peak



Source: Veitch Lister Consulting (2019)[206]

Figure 115: Adelaide average time to nearest public secondary school by car (left) and public transport (right), 2031 AM peak



Source: Veitch Lister Consulting (2019)[207]

Access to jobs in Adelaide – by car and public transport, in 2016 and 2031

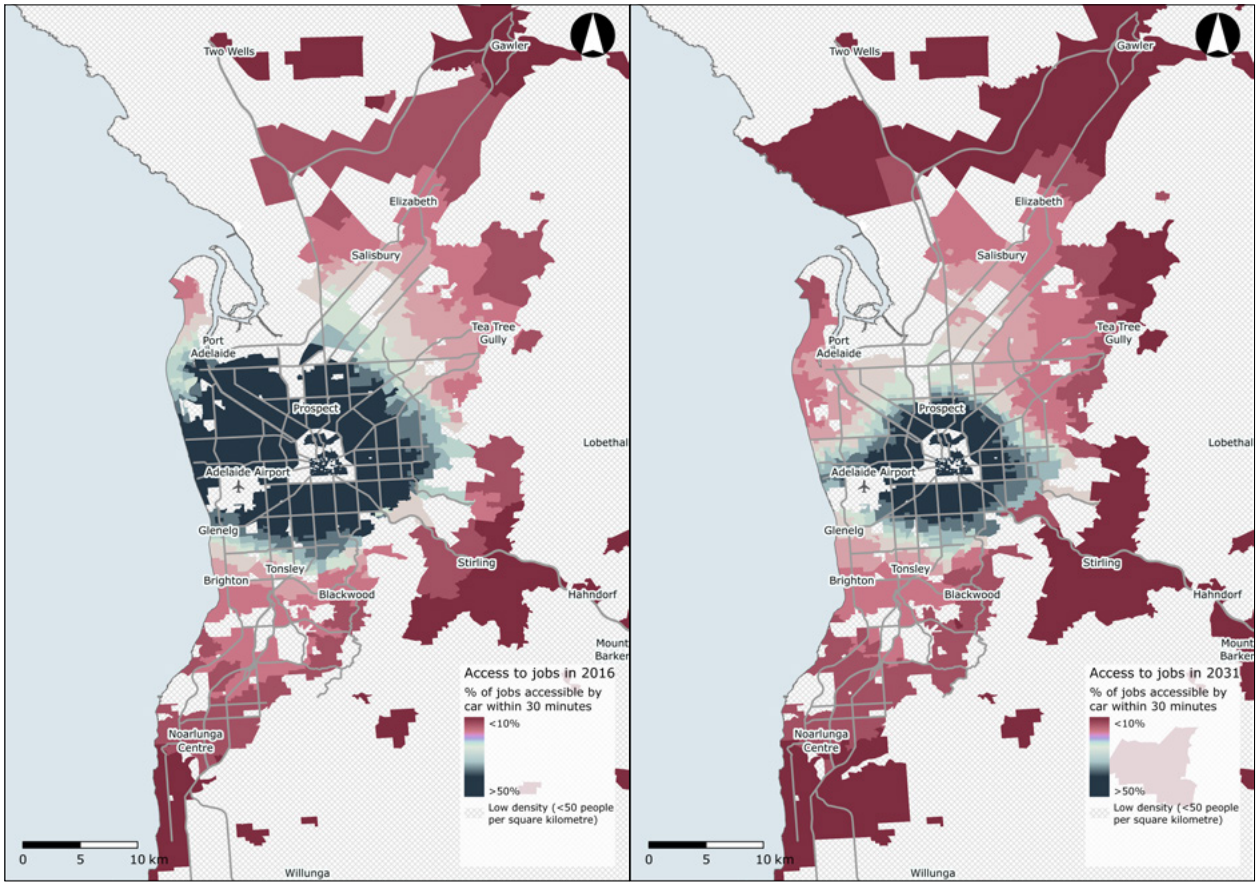
Employment accessibility has been measured as the percentage of jobs that can be reached in Greater Adelaide within 30 minutes of home by car (Figure 116) and by public transport (Figure 117) in the two modelled years.

Access to employment across Greater Adelaide differs based on where a person lives and which mode of transport they opt for. Due to the high current and future concentration of jobs in Adelaide's city centre, accessibility to this area is the main driver of employment advantage.

Job accessibility by car is expected to reduce by 2031 due to road congestion. As a result, motorists are expected to be able to reach a smaller proportion of jobs in 30 minutes by car in 2031 than in 2016. As the location of job opportunities in Adelaide is expected to stay relatively constant, reduced accessibility to employment will most affect the residents of outer suburbs, and inner city dwellers will continue to have access to a wide variety of opportunities.

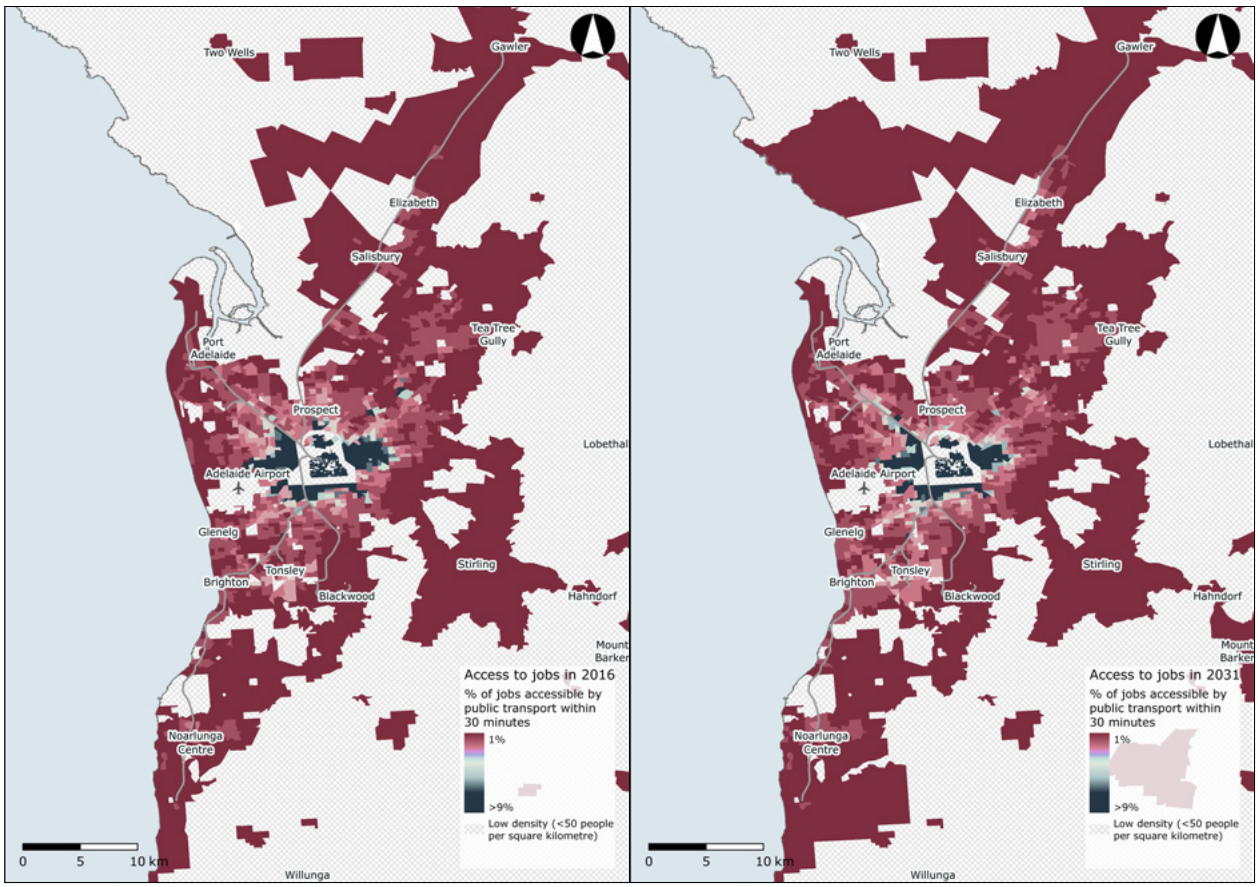
Job accessibility by public transport is forecast to remain relatively stable between 2016 and 2031. This is partially a result of the fairly consistent location of jobs over the 15-year horizon. Areas with good accessibility to jobs by public transport in 2016 are forecast to remain in this situation in the future. Access to jobs for Adelaide's growing northern population will be enhanced for areas with access to the Gawler rail line, but other areas without direct access to trains will see a decline in job accessibility due to the impact of road congestion on bus services.

Figure 116: Greater Adelaide access to jobs by car, 2016 and 2031 AM peak



Source: Veitch Lister Consulting (2019)[208]

Figure 117: Greater Adelaide's access to jobs by public transport, 2016 and 2031 AM peak



Source: Veitch Lister Consulting (2019)[209]

Findings

- Car access to Adelaide's social infrastructure will remain universally faster than travel by public transport, despite the impacts of road congestion and public transport upgrades expected by 2031.
- Adelaide's public transport network is effective at supporting the movement of people into and out of the CBD, but less effective at catering for local travel needs.
- Inner city residents will continue to have much greater access to a wide variety of job opportunities by both car and public transport, compared to the residents of outer suburbs.
- Traffic congestion will cause delays to buses, diminishing access to jobs within 30 minutes by public transport for residents of Adelaide's outer suburbs that are not serviced by rail.

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