

Traffic Monitor 2011-2012

JULY 2013



keeping victorians connected

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Victoria's traffic performance - key points

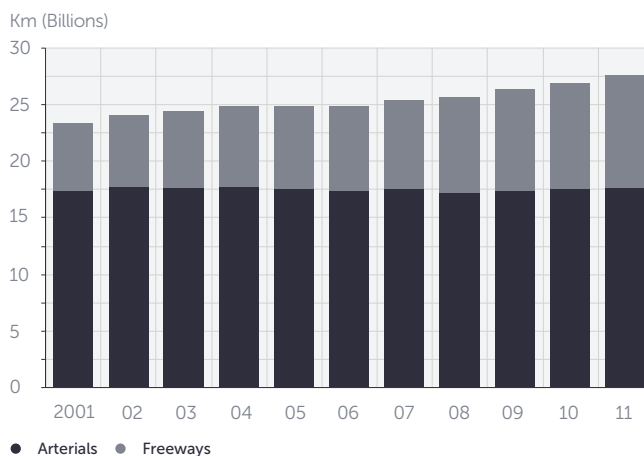
- The trend in average travel speed on the monitored network in the morning peak shows a decrease of 1.6 km/h over the last 10 years.
- The trend in average travel speed on the monitored network in the afternoon peak shows a decrease of 3.6 km/h over the last 10 years.
- Over the last 10 years, the trend shows that the number of vehicle kilometres travelled in Melbourne have increased by 15.4%, which equates to 1.4% per year.
- In 2011, vehicles travelled 27.6 billion kilometres on Melbourne's arterial roads and freeways, an increase from the 23.5 billion kilometres travelled in 2001.
- The trend shows that the growth of vehicle kilometres travelled in Melbourne has been almost entirely on freeways which increased by an average of 4.9% per year over the last 10 years.
- Over the last 10 years, the trend shows that truck vehicle kilometres travelled in Melbourne have increased by 416 million kilometres, an average of 2.2% per year.
- Over the last 10 years, the trend shows that average delay on the monitored network has increased during both peak and off-peak periods. The trend in delay during the morning peak suggests that an average 10km trip in 2011-12 would take about 50 seconds longer than the same trip in 2001-02.
- Since 2001-02, the trend shows that weekday car occupancy rates in the morning peak in Melbourne have dropped by 4.9%, the equivalent of one less person for every 17 cars (or 470 less people per hour on a four-lane freeway).
- Car occupancy rates are lowest during the morning peak.
- The trend shows that weekday bicycle counts have increased by 33% since 2006-07 (an average of 6% per year).
- Public transport boardings increased by 16% on metropolitan bus routes in 2011-12 compared to 2010-11.
- Public transport boardings increased by 4.5% on trams and decreased by 3.3% on trains in 2011-12 compared to 2010-11.
- Note: Vehicle kilometres travelled is reported by calendar year as opposed to travel speed, delay and variability which are reported by financial year.

Change in average travel speed



Change in average travel speed on the monitored network by time period

Vehicle kilometres travelled in Melbourne



Vehicle kilometres travelled in metropolitan Melbourne by road type

Introduction

VicRoads has systematically collected, analysed and published traffic performance information on freeways and arterial roads in Melbourne since 1994. This report provides information on the performance of the State's arterial road and freeway network for the 2011-12 financial year.

The road network is critical to the economic prosperity and wellbeing of the Victorian community. In keeping Victorians connected, VicRoads builds, operates and maintains the arterial road network to better enable people to access social and economic opportunities. It connects people with activities and workplaces as well as enhancing opportunities for growth in both metropolitan and regional Victoria.

Over 85% of public transport service kilometres are provided by buses and trams and the performance of the road and public transport systems are therefore closely related. Improvements to the road network assist the flow of public transport vehicles, contributing to increasing numbers of people using trams and buses.

Impacts on network performance

Road network performance is affected by a wide range of factors. The volume of traffic using the road network is the single largest factor influencing performance. As the population and economy of Victoria grow, the demand for travel also grows leading to more freight, public transport and private vehicles on the roads.

The road network has a limited vehicle carrying capacity. As the number of vehicles using the network nears this capacity, the performance of the network deteriorates, leading to reduced travel speeds, increased delays and high travel time variability.

The volume of traffic on our roads is also influenced by the mode of travel people choose. Buses, trams, bicycles, pedestrians and motorcycles all use less road space per person than a single car with a driver alone. In the same way, larger trucks also use less road capacity per tonne of freight than small trucks and vans.

How is VicRoads helping improve network performance?

VicRoads seeks to operate and maintain the road system to help our customers travel easily and reliably. VicRoads also develops the road system to improve connections between places that are important to people and businesses.

VicRoads network operating strategy, SmartRoads, provides guiding principles for the priority use of arterial roads in Melbourne by mode of transport, place of activity and time of day. These principles guide decisions to ensure that network efficiency is maximised and the right balance is struck between the needs of diverse transport users (private vehicles, heavy vehicles, public transport, motorcyclists, cyclists, and pedestrians), particularly in peak periods and in congested locations.

VicRoads implements a number of improvement works each year which help reduce delays at some highly congested locations. The growing population and demand for travel reinforces the importance of these works but also highlights the need for ongoing investment in public transport, integrated land use and transport planning, to help reduce the demand for travel.

Some of the key freeway and highway projects in 2011-12 aimed at increasing the capacity of the network included:

- Calder Freeway/Kings Road interchange and duplication in Taylors Lakes
- Ongoing works to increase capacity on the M80 (Western and Metropolitan Ring Road) Freeway.

Other projects aimed at relieving congestion on the arterial road network that were completed in 2011-12 included:

- Pound Road Upgrade in Dandenong South
- Princes Highway East/Cardinia Road intersection reconfiguration in Pakenham.

Some of the key projects that VicRoads undertook to maintain and improve the arterial road network in regional Victoria included:

- Completion of Geelong Ring Road Section 4A (connection to Anglesea Road)
- Breakwater Road new bridge and road realignment in Geelong.

Key network management initiatives undertaken in 2011-12 included:

- Providing incident response services on Melbourne's inner freeways
- Managing and enforcing clearways
- Coordinating and optimising traffic lights
- Scheduling roadworks to minimise disruption
- Prioritising specific modes in accordance with SmartRoads.

VicRoads also works to encourage the use of lower-impact transport modes through a range of alternative mode programs which contribute to improving road network performance. These include:

- Tram priority projects which improve tram travel times and reliability. These projects include traffic management measures, amendments to the road rules and the use of new technology to improve traffic flow.
- Bus priority projects which improve the reliability and travel times of buses on key routes across Melbourne, including bus lanes, traffic light priority and changes to parking. VicRoads and Public Transport Victoria are also improving bus stops along SmartBus routes and undertaking bus priority work to make our roads more 'bus friendly'.
- Funding bicycle projects on Melbourne's Principal Bicycle Network which aims to increase the use of bicycles as a transport mode. Projects include on-road bicycle lanes and off-road paths as well as intersection improvements aimed at improving bicycle safety.
- Pedestrian crossings such as pedestrian operated signals.

Other external factors have a major influence on road users' choice of transport mode, such as the price of petrol, the availability and cost of public transport and the complexity of individuals' travel patterns.

VicRoads, the Department of Transport, Planning and Local Infrastructure and Public Transport Victoria continue to encourage the use of sustainable means of travel, tackle congestion, and improve accessibility and road safety through a wide range of programs and initiatives. These initiatives also contribute to state and national economies and the liveability of Melbourne and regional Victoria.

The metropolitan monitored network

VicRoads uses a sample of arterial roads and freeways as the basis for efficiently monitoring the performance of the network. This sample of roads is known as the 'monitored network' and includes:

- 100% of freeways
- 22% of undivided arterials
- 22% of divided arterials
- 22% of undivided arterials with trams.

The monitored network was established in 1994 as a representative of the network at that time. Not all arterial roads are included in the monitored network due to the expense of collecting detailed performance data. The monitored network is also divided into inner and outer areas as shown in the 'Metropolitan Melbourne Monitored Network 2011-12' map.

New freeway links and some arterials have been added to the monitored network over time but there is currently limited representation of Melbourne's growth areas and urban fringe. Monitored roads carry approximately 44% of the vehicle travel that occurs on Melbourne's freeways

and arterial roads. It is therefore important to consider the limitations of the monitored network when analysing performance data from this report.

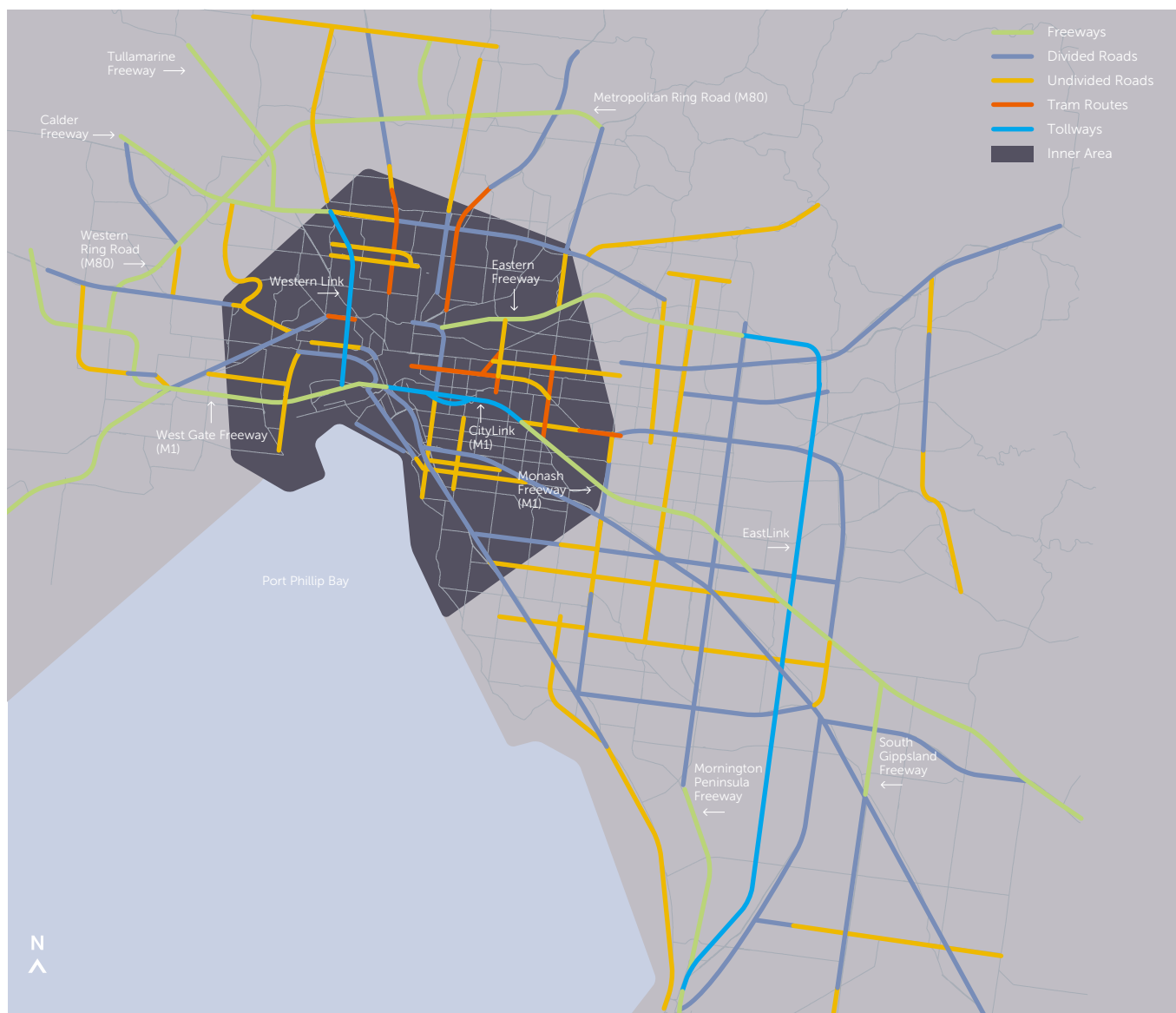
Time periods

The data from the monitored network is also collected for the purpose of reporting Austroads National Performance Indicators (NPIs). Austroads publishes NPIs annually to allow member road authorities to benchmark the performance of their networks over time. NPIs for Melbourne and other state capitals can be found on the Austroads website at austroads.com.au.

In order to provide Austroads with data that is consistent with the other states, VicRoads collects data in accordance with the following time periods as defined by Austroads. This report also uses the same time periods in discussing network performance. These are the weekdays of a normal working week defined by:

- Morning peak (AM): 7:30am to 9:00am
- Afternoon peak (PM): 4:30pm to 6:00pm
- Off-peak: 10:00am to 3:00pm

Metropolitan Melbourne monitored network 2011-12



Arterial roads and freeways which are monitored by VicRoads for the purpose of determining network performance

Road network performance

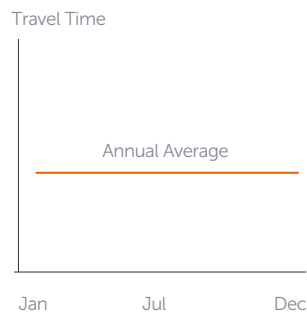
This section describes the different network performance indicators, including how the data is collected, what the indicators mean and how they should be interpreted. The performance indicators in this section are:

- Average travel speed
- Average Delay
- Travel time variability
- Peak spreading
- Lane occupancy.

Each indicator has been presented in terms of trend over recent years. This presentation has been used since the values recorded can vary significantly from year to year and only the longer term trend shows a true picture of how performance is changing.

As these trends are averages across the network they do not highlight best or worst performing links. The averages also hide the impacts of unexpected incidents such as breakdowns, illegal parking, crashes or construction zones which may cause significant delays for the motorists on individual days. The results for variability (detailed later in this report) show that travel times vary by about 20% from the average on a typical journey without incidents. Incidents cause much higher levels of variation from the average, and it is these incidents that motorists most readily remember (see figure below).

How traffic conditions are measured for this report



How traffic conditions are perceived

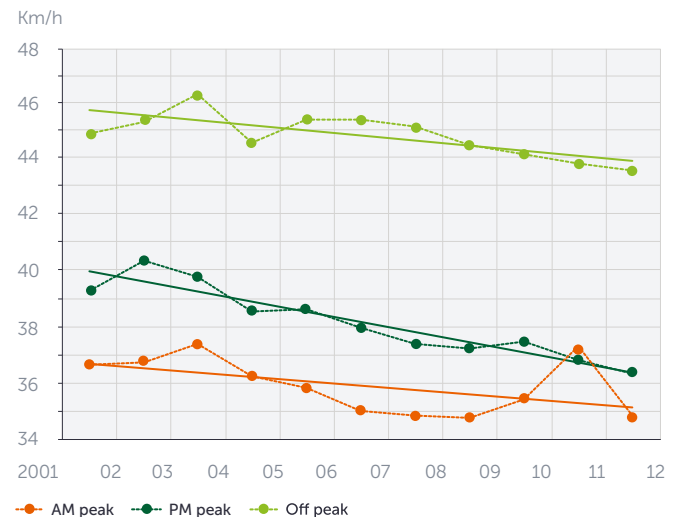


Source: Federal Highway Administration (2006)

Average travel speed

Average travel speed is calculated by measuring the time taken to travel a length of road. Average travel speed will be affected by any time stopped at traffic lights and other intersections as well as the slower speeds and stoppages due to congestion. At times when congestion is not affecting travel times, average travel speed will still be below the posted speed limit on arterial roads, due to traffic lights and other intersections controls.

Average travel speed



Average travel speed on the monitored network by time period

Average travel speed has been decreasing over the last 10 years in both peak and off-peak periods. Since 2001-02, the trends show a reduction in average travel speed of approximately 1.6 km/h in the morning peak and 3.6 km/h in the afternoon peak.

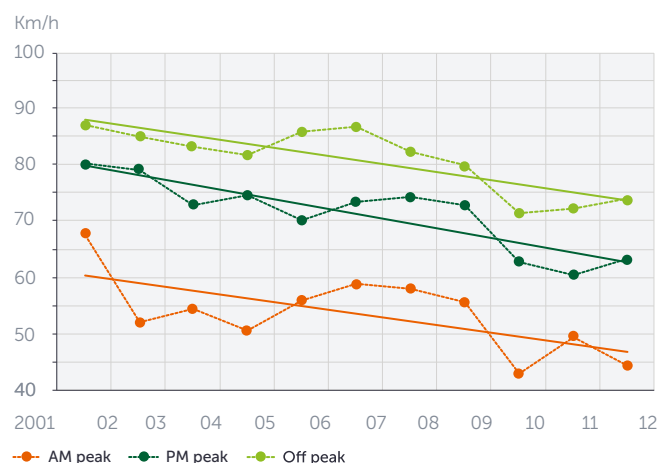
The average travel speed recorded in 2011-12 is close to the long-term trend in all time periods. The average travel speed recorded in the morning peak returned to the long-term trend after an unusually high average travel speed recorded in 2010-11.

Average travel speeds by road category and area

Freeways

Speeds on freeways in the inner area have been decreasing in all time periods since 2001-02. The morning peak has the slowest travel speeds with the trend showing an average speed in 2011-12 of approximately 47 km/h. Freeways in the inner area are also slower than freeways in the outer area in all three time periods.

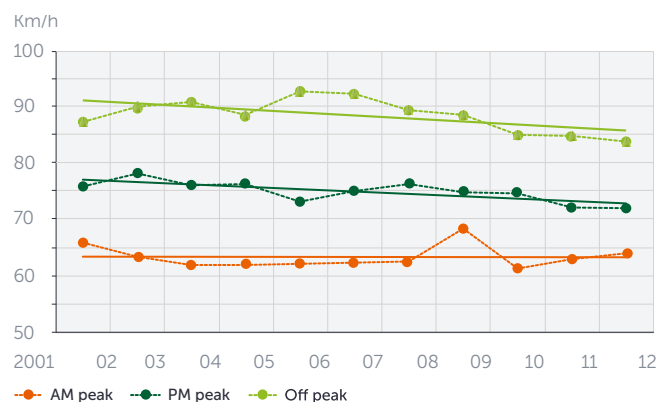
Average travel speed - inner freeways



Average travel speed on Melbourne's freeways in the inner area by time period

Speeds on freeways in the outer area have been decreasing less than those on freeways in the inner area with the trend showing a change of approximately 4 km/h in the afternoon peak and 5 km/h in the off-peak period since 2001-02. Morning peak speeds have remained virtually unchanged over the last 10 years. Freeways in the outer area have the fastest average travel speed of all roads in all time periods.

Average travel speed - outer freeways

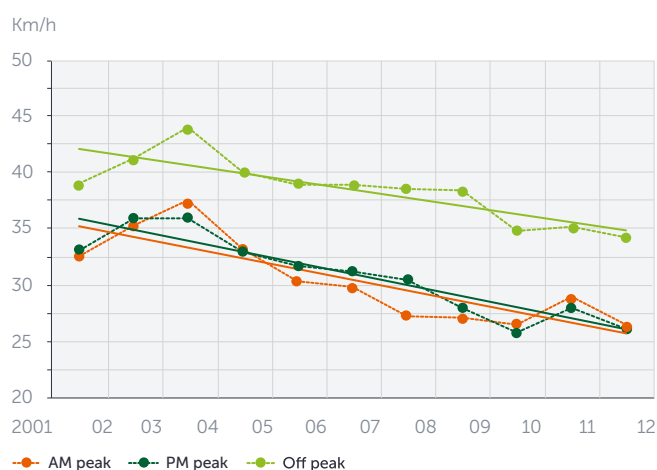


Average travel speed on Melbourne's freeways in the outer area by time period

Divided arterial roads

Speeds on divided arterial roads in the inner area are similar in morning and afternoon peaks with both trends declining to around 26 km/h in 2011-12. This is a decrease of approximately 10 km/h since 2001-02. Divided arterial roads are slower in the inner area than the outer area in all recorded time periods.

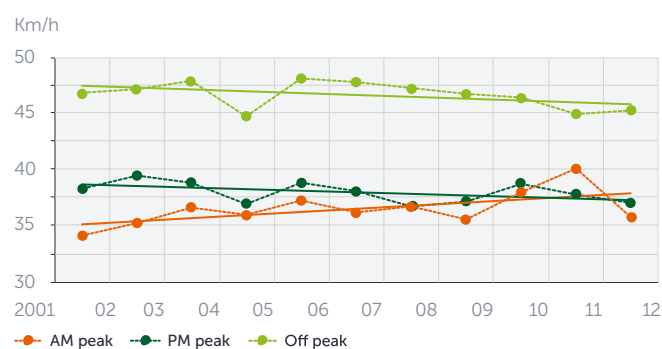
Average travel speed - inner divided roads



Average travel speed on divided arterial roads in the inner area by time period

Morning peak speeds on divided arterial roads in the outer area have been increasing since 2001-02. In 2011-12 morning peak speeds decreased for the first time since 2008-09. The trend shows that the afternoon peak and off-peak average travel speeds have each decreased by less than 2 km/h over the last 10 years.

Average travel speed - outer divided roads

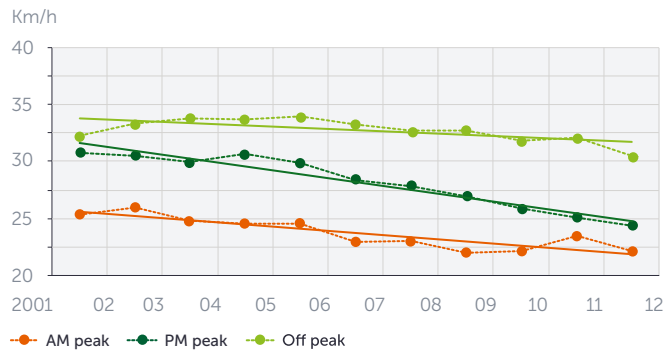


Average travel speed on divided arterial roads in the outer area by time period

Undivided arterial roads

Speeds on undivided arterial roads in the inner area have experienced declining trends in both morning and afternoon peaks. Speeds are similar on both divided and undivided roads in the afternoon peak in the inner area. Undivided arterial roads in the inner area are the only group of arterial roads which have consistently been faster in the afternoon peak compared with the morning peak.

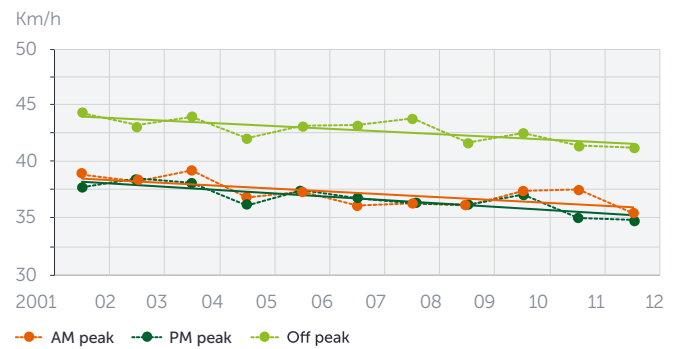
Average travel speed - inner undivided roads



Average travel speed on undivided arterial roads in the inner area by time period

In both morning and afternoon peak periods the trend in speeds on undivided arterial roads in the outer area has been approximately the same since 2001-02, with both declining slowly (approximately 3 km/h since 2001-02). Morning and afternoon peak average travel speeds in the outer area are approximately the same on both divided and undivided arterial roads.

Average travel speed - outer undivided roads



Average travel speeds on undivided arterial roads in the outer area by time period

Freeway average travel speed map

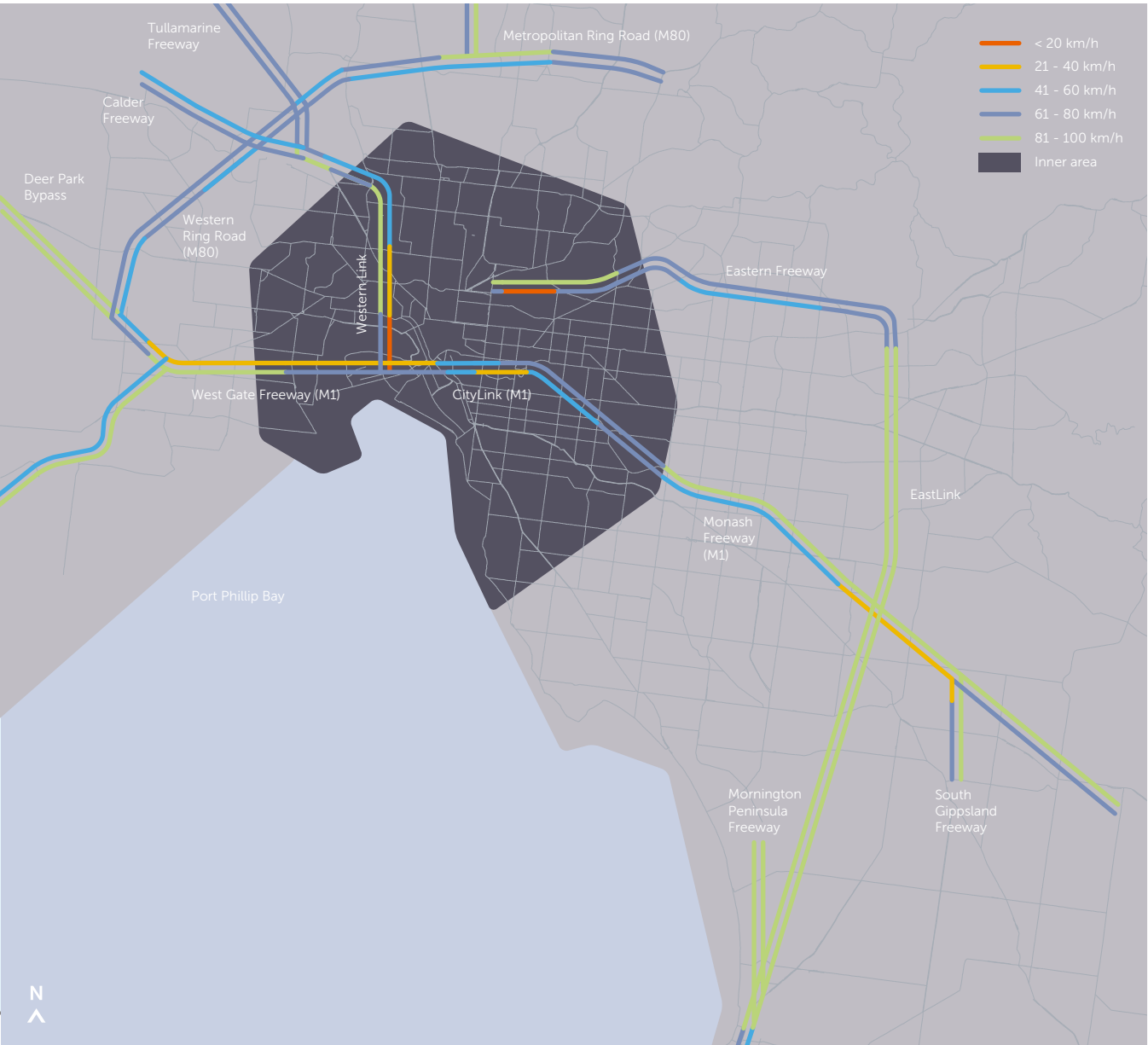
The average freeway travel speed images presented here provide a snapshot of the performance of these freeways in 2011-12. As speeds can vary significantly from year to year, the travel speeds shown on these maps should be read as indicative only.

During the morning peak period, the slowest travel speeds are on freeways that lead towards central Melbourne. Inbound average travel speeds on the managed section of the Monash Freeway, between Warrigal Road and Toorak Road, increased compared to 2010-11, showing the benefits of the M1 upgrade project, although speeds between South Gippsland Freeway and Jacksons Road slowed.

Speeds on CityLink (Western Link) increased between the Calder Interchange and Brunswick Road while speeds returned to 2009-10 level south of Brunswick Road after higher speeds were recorded last year. Changes in travel speeds on different sections of the M80 Ring Road have been varied as major works continue.

Average travel speeds are noticeably higher in the afternoon peak than the morning peak, with few links showing average speeds below 40 km/h. Speeds on CityLink (Western Link) outbound improved compared to the previous year while speeds on the West Gate Freeway, between Williamstown Road and the M80 Ring Road declined. Outbound speeds on the Monash Freeway also declined between Burnley and Jacksons Road. The M80 Ring Road recorded some of the slowest average travel speeds in 2011-12 as major road works continue.

Average freeway travel speeds (morning peak)

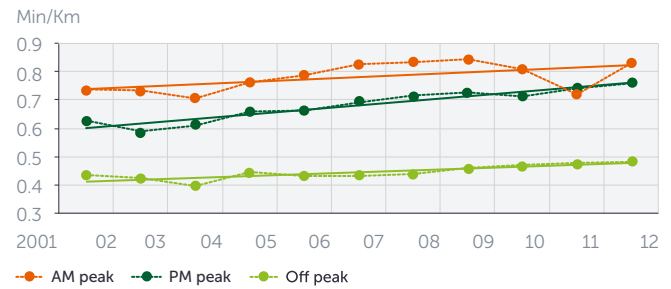


Average travel speed on Melbourne freeways in the morning peak (7.30am to 9.00am) for 2011-12 (travel speeds are represented by traffic direction)

Average delay

Average delay indicates the level of stoppage and congestion on the road network. Average delay is calculated by measuring the time taken to travel a length of road and comparing this time against the time it would have taken to travel the same length of road at the speed limit, without stopping. This means that delay includes all time stopped at traffic lights and other intersections, as well as the slower speed due to congestion caused by other traffic. At times when congestion is not affecting travel times, delays will still occur on arterial roads due to traffic lights and other intersections.

Average delay



Average delay on the monitored network by time period

Over the last 10 years, the trend shows that average delay on the monitored network has increased during both peak and off-peak periods. Average delay has been increasing at the greatest rate during the afternoon peak and least during the off-peak period. The trend in delay during the morning peak suggests that an average 10km trip in 2011-12 would take about 50 seconds longer than the same trip in 2001-02.

Average freeway travel speeds (afternoon peak)

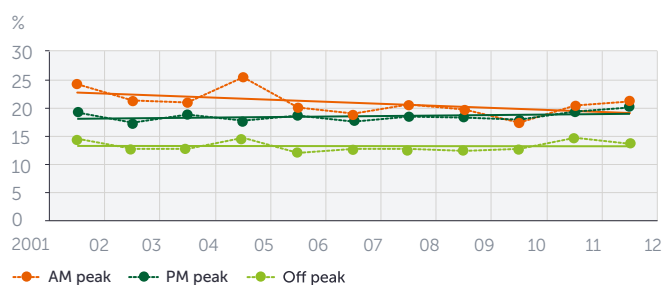


Average travel speed on Melbourne freeways in the afternoon peak (4.30am to 6.00pm) for 2011-12 (travel speeds are represented by traffic direction)

Travel time variability

Travel Time Variability is an indication of the difference in travel times on different days on the monitored network. Travel Time Variability is calculated by recording the travel time along a length of road multiple times and comparing the results. It is expressed as a percentage of the average travel time, such that 85% of all trips are within a range between the average travel time minus the variability and the average travel time plus the variability. A consistent travel time (ie low Travel Time Variability) is considered desirable.

Travel time variability



Travel time variability on the monitored network by time period

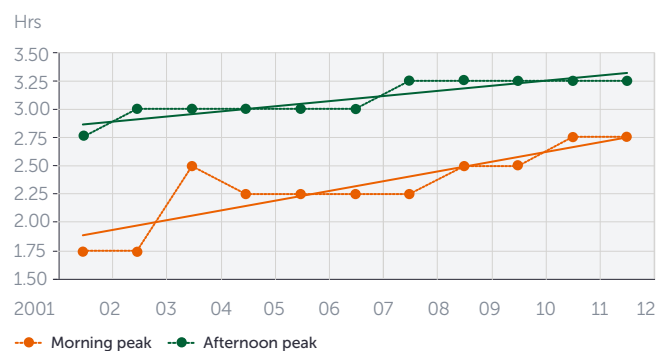
The trend over the last 10 years shows that Travel Time Variability has been decreasing during the morning peak and has stayed relatively stable during the afternoon peak and off-peak periods.

Peak spreading

The duration of the peak periods is an indicator of the level of traffic congestion. As traffic demand continues to increase, evidenced by continuing growth in vehicle kilometres travelled, the capacity of the road system is exceeded for longer periods each day, resulting in the extension of peak traffic periods. This is referred to as 'peak spreading'.

For comparative purposes, a consistent definition of peak period is required. The definition used here is the length of time for which the traffic volume is above 85% of the highest volume recorded during the given peak. The duration of the peak period is most clearly observed on freeways where road capacity is relatively constant and is not constrained by traffic signals, parking, pedestrians and stopping vehicles.

Peak period duration (freeways)

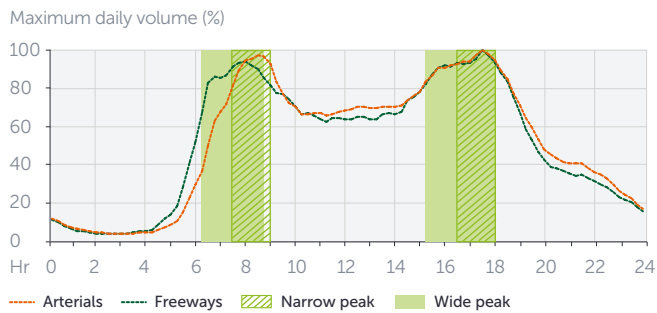


Duration of weekday peak periods on metropolitan freeways by time period

The durations of the peak periods on Melbourne's roads have been changing over time with increasing peak durations observed in both morning and afternoon periods. The peak is longer in the afternoon than in the morning.

The 'Peak Travel Periods' figure shows the typical weekday traffic profile on both freeways and arterial roads. The peak periods of travel are also highlighted. The 'narrow peak' periods shown in the figure are the representative periods defined by Austroads for measuring peak traffic conditions - refer to 'Time periods' on page 6. The 'wide peak' periods are calculated based on the peak period definition described in this section.

Peak travel periods



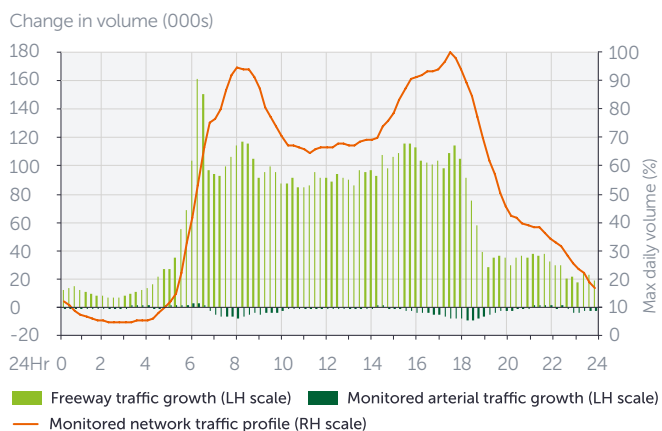
Peak travel periods on the monitored network

Road use growth by time of the day

Peak spreading can also be seen in the timing of traffic growth on both freeways and arterials. These figures allow a comparison to be made between the times when existing traffic volumes are the highest and the times when changes in volume are occurring.

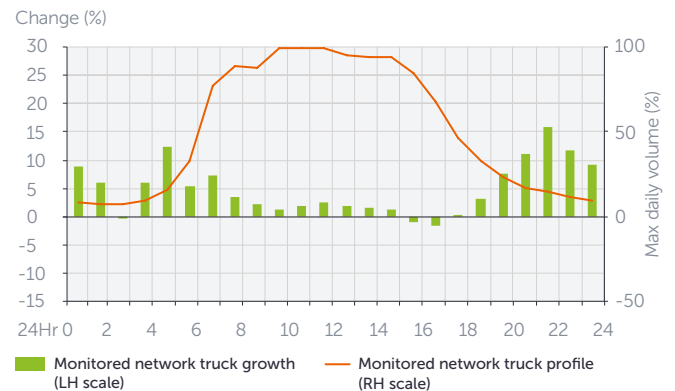
The contour line in each figure shows the relative volume of traffic at the given time of day (the percentages shown on the right) while the bars show the growth in traffic since 2007-08 at the same time of day (in thousands or percentage change, shown on the left).

Distribution of traffic growth (freeways and arterial roads)



Growth in traffic volumes (since 2007-08) and relative traffic volume profile by time of day for all traffic on the monitored network

Distribution of traffic growth (trucks)



Percentage volume growth (since 2007-08) and volume profile by time of day for truck traffic on the monitored network.

Freeway volumes have increased most between 6am and 6pm while volume growth on arterial roads is occurring just prior to the morning peak. Freeways have experienced growth during most of the day, due to significant capacity upgrades in the past decade, while monitored arterial roads have not. During the peak periods, monitored arterial roads carried less traffic in 2011-12 than in 2007-08. Growth in truck volumes has also occurred outside the peak periods, with the strongest growth occurring just before the morning commuter peak and in the late evenings.

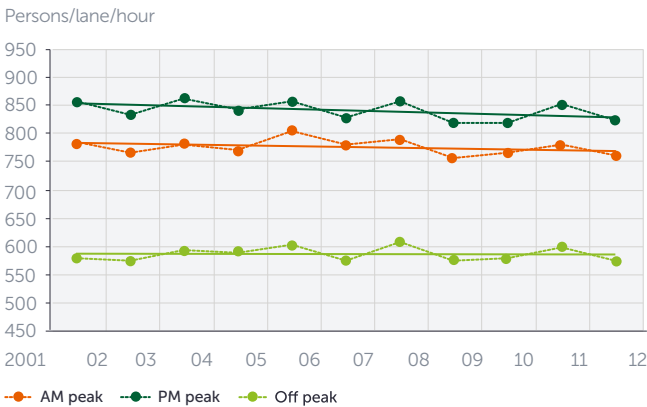
Lane occupancy

Lane occupancy is an indicator of how efficiently the road network is being used. If more freight and people are able to be moved on each traffic lane, then fewer traffic lanes will be required. Lane occupancy rates are calculated for both people and freight during specified time periods and are measured in persons per lane per hour and tonnes per lane per hour respectively.

Person lane occupancy

Person lane occupancy (PLO) is a measure of how efficiently the road network is being used to move people. VicRoads seeks to move as many people as possible in each lane in order to maximise the use of road space. The patronage of on-road public transport, the number of people travelling in each private car and the management of the network all have an impact on this measure. PLO rates are recorded by observers counting, or estimating, the occupancy of each vehicle as it passes a set point on the road.

Person lane occupancy



Person lane occupancy rates on the monitored network by time period

Person lane occupancy rates on the monitored network have been consistently higher in the afternoon peak than the morning peak. The ‘Person Lane Occupancy’ figure shows PLO rates are reducing slowly in both peak periods (2% in AM peak and 3% in PM peak). This is despite significant increases in bus and tram patronage, suggesting that reductions in car occupancy have had a major impact on PLO.

A detailed analysis of arterial roads that are part of key public transport routes suggests that where the quality of on-road public transport is high PLO has increased even where drops in traffic volumes and car occupancy have occurred. For example, on Bridge Road, Richmond, PLO increased by approximately 4% in the morning peak (between 2007 and 2010) despite a 7% reduction in the number of people being moved by car over the same period. Similar results have been recorded at a range of other sites where PLO has increased despite a reduction (or no change) in the number of people being moved by car.

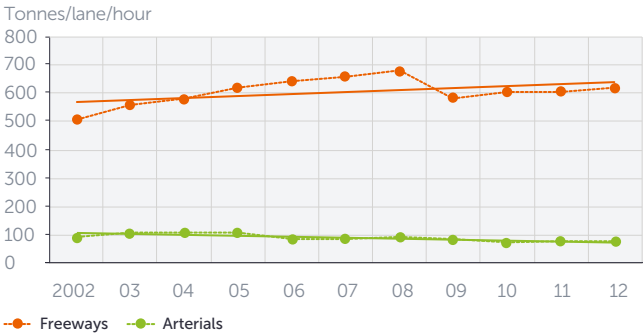
Freight lane occupancy

Freight lane occupancy rates are an estimate of the efficiency with which freight is moved on the road network. The number of freight vehicles on the road and the capacity of each vehicle are the major factors affecting freight occupancy.

Freight lane occupancy rates are recorded by automated counts and observations of different types of trucks being multiplied by set estimates of weight by truck type.

This method of data analysis is approximate as it uses weight to quantify freight movement. The capacity of a vehicle is constrained by its volume and weight; thus a vehicle can be loaded to its maximum volume but not necessarily at its maximum weight. Therefore weight is not a perfect indicator of the efficiency and values should be interpreted accordingly.

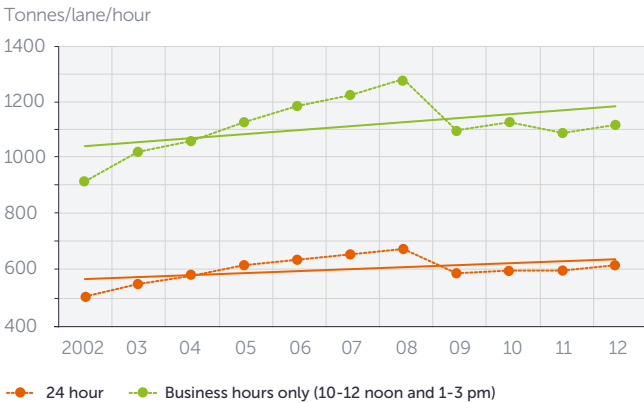
Freight lane occupancy



All day freight lane occupancy rates on the monitored network by road type

The lane occupancy rates for freight on freeways have increased each year, except for 2008-09 when EastLink was added to the monitored network. EastLink has a lower freight lane occupancy rate than other freeways in Melbourne; this means that its addition to the network temporarily lowered the average occupancy rate. The lane occupancy rates for freight on primary arterials have been decreasing over time. This is likely due to freight vehicles increasingly choosing to travel on new or upgraded freeway links.

Freeway freight lane occupancy



Freight lane occupancy on the monitored network by time of day

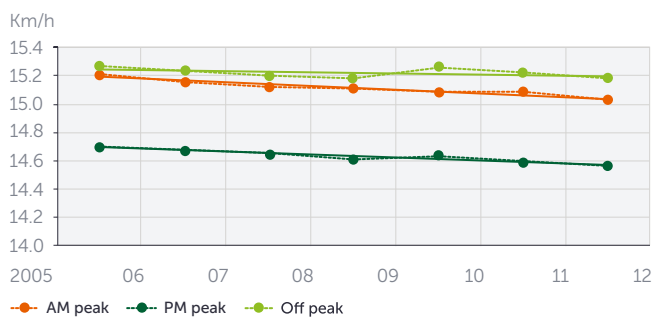
Freight volumes are highest during business hours, shown in the higher than average freight lane occupancy observed during this time. While not shown here, this higher occupancy rate is also observed on primary arterial roads.

Trams on the road network

Melbourne has one of the world's largest on-road tram networks. This makes managing the interaction between trams and other vehicles that share limited road space important. This section looks at the operational performance of trams on the arterial road network.

Over the last 10 years, tram speeds have been declining at a slow rate in both peak periods, with tram speed in the afternoon peak being slower than in the morning peak. This is in contrast with general traffic where afternoon peak speeds are typically faster than in the morning peak. Tram travel speeds are heavily influenced by operational factors such as scheduling and stopping for passengers.

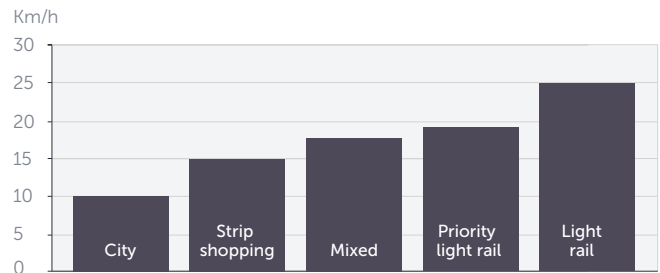
Average tram travel speeds



Average tram travel speeds in metropolitan Melbourne by time period
Source: Public Transport Victoria

Sharing road space with traffic has an impact on the performance of trams. Trams which operate in a mixed traffic environment have a slower average travel speed than those that operate in separated tramways. The 'Average Tram Travel Speeds by Operating Environment' figure shows that trams achieve the lowest average travel speeds in the Melbourne CBD followed by strip shopping environments. Trams achieve the highest average travel speeds when in a 'Light Rail' environment, at around 25 km/h, where they have full priority over traffic such as on route 109 in Port Melbourne. 'Priority Light Rail' refers to situations where trams do not share road space but do have to give way to cars when they cross other roads (such as along Victoria Parade).

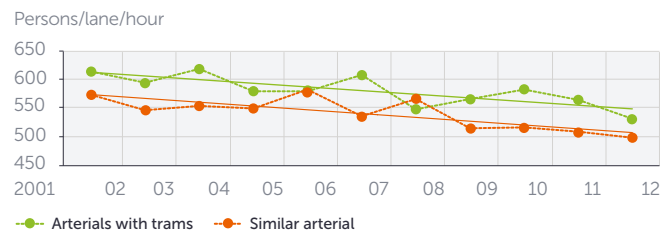
Average tram travel speeds by operating environment



Average tram travel speeds in metropolitan Melbourne by operating environment
Source: Public Transport Victoria (2011-12)

The 'Tram Impacts on Person Lane Occupancy' figure shows the person lane occupancy rate on monitored arterials with trams and on comparable arterials without trams. The trends presented show that roads with trams carry people more efficiently (i.e. move a greater number of people per lane per hour). While the person lane occupancy on both road types has been declining in recent years, due to reduced car occupancies and car travel speeds, the gap between the two road types has remained approximately the same. Roads with trams carry more people per lane per hour during all recorded time periods. Lane occupancy rates include tram passengers.

Tram impacts on person lane occupancy



Person lane occupancy rates for inner undivided arterials with and without trams (averaged across AM, PM and off-peak periods) on the monitored network

Factors affecting network performance

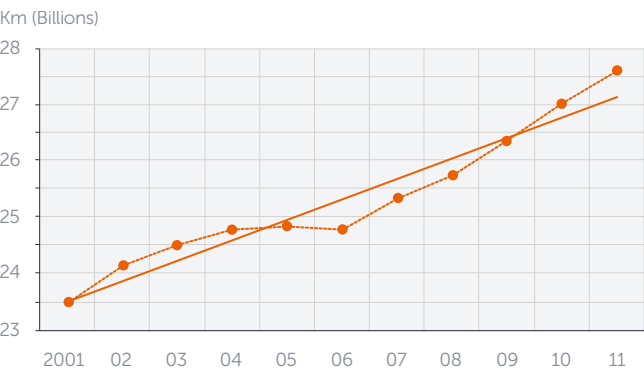
Road network performance is affected by a wide range of factors. The volume of traffic using the road network is the single largest factor influencing performance. As the population and economy of Victoria grow, the demand for travel also grows leading to more freight, public transport and private vehicles on the roads.

Road use

The biggest factor affecting road network performance is the amount of traffic using the network at any time. The term traffic refers to all vehicles using the road, including cars, buses, trams, trucks, motorcycles and bicycles. All of these vehicles have an impact on road network performance. The indicator used to represent road use is the number of vehicle kilometres travelled (VKT) on the road network. VKT is calculated by counting the number of vehicles passing a given location, then multiplying that volume by the length of road represented by that count. Counting methods and/or technologies at some locations are not able to record bicycles, motorcycles and trams. Note that unlike travel speed, delay and variability, VKT is reported by calendar year as opposed to financial year.

Melbourne road use – all traffic

Total vehicle kilometres travelled in Melbourne

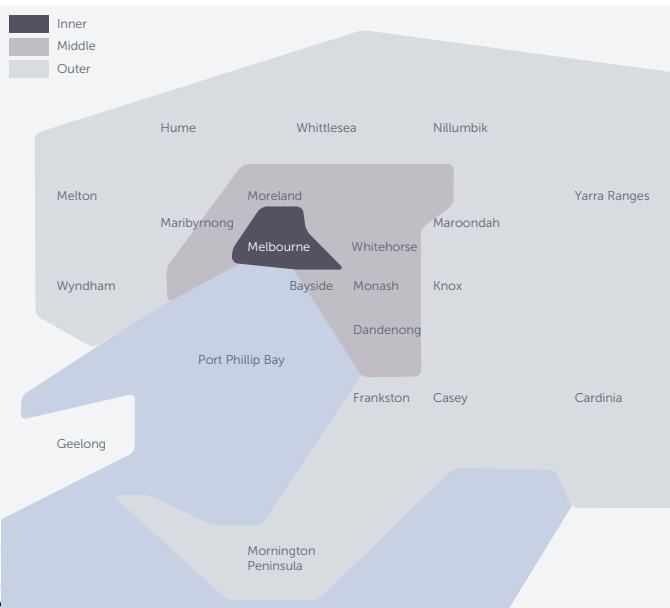


Vehicle kilometres travelled on arterial roads and freeways in Melbourne

Road use in Melbourne has experienced strong growth over the last 10 years with the trend showing average growth of approximately 1.4% per year. Growth has been particularly strong since 2006.

For the purpose of reporting VKT estimates, Melbourne has been broken up into three 'zones'. These three zones are different from the two 'areas' used to report on the performance of the monitored network. The three zones used for VKT data divide Melbourne into inner, middle and outer and are shown in the 'Zones Used for Reporting Vehicle Kilometres Travelled' figure. These zones are based on municipal boundaries.

Zones used for reporting vehicle kilometres travelled

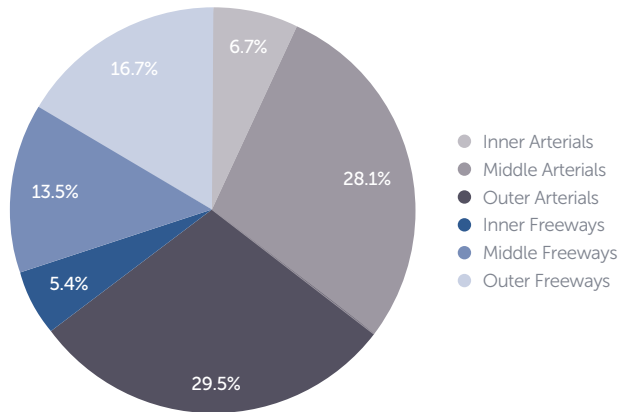


The three zones used for reporting on vehicle kilometres travelled in metropolitan Melbourne (based on local council boundaries)

Inner	Middle	Outer
Melbourne City	Banyule City	Brimbank City
Port Phillip City	Bayside City	Cardinia Shire
Stonnington City	Boroondara City	Casey City
Yarra City	Darebin City	Frankston City
	Glen Eira City	Hume City
	Greater Dandenong City	Knox City
	Hobsons Bay City	Maroondah City
	Kingston City	Melton Shire
	Manningham City	Mornington Peninsula Shire
	Maribyrnong City	Nillumbik Shire
	Monash City	Whittlesea City
	Moonee Valley City	Wyndham City
	Moreland City	Yarra Ranges Shire
	Whitehorse City	

In 2011, 64% of VKT was recorded on arterial roads and 36% on freeways. Of all VKT recorded 12% was within the inner zone, 42% in the middle zone and 46% in the outer zone.

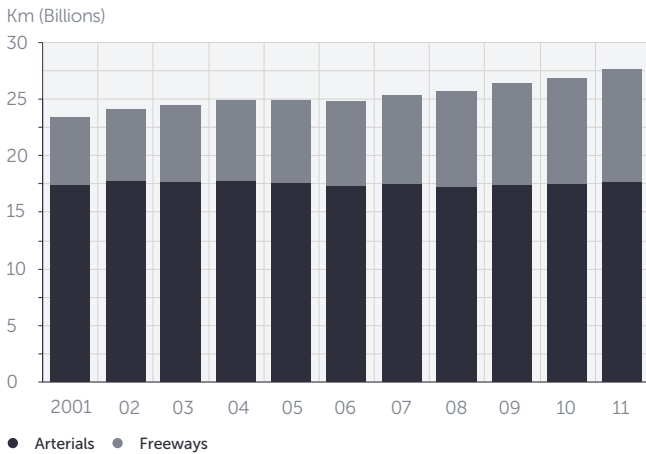
Distribution of vehicle kilometres travelled in Melbourne



Share of vehicle kilometres travelled by road type and zone in Melbourne

The 'Vehicle Kilometres Travelled in Melbourne' figure demonstrates the share of vehicle kilometres travelled (VKT) over a 10-year period for both freeways and arterial roads.

Vehicle kilometres travelled in Melbourne

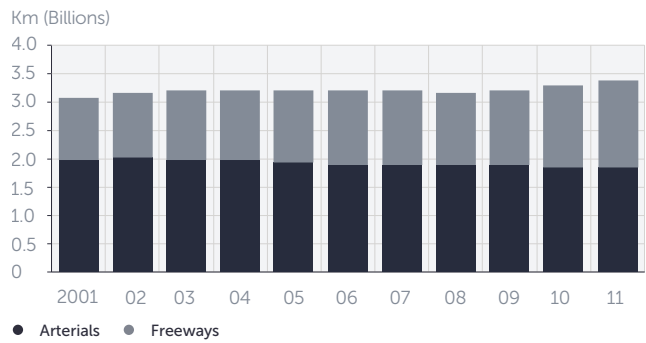


Vehicle kilometres travelled in metropolitan Melbourne by road type

The growth in VKT has occurred almost entirely on freeways with VKT on arterial roads remaining approximately the same between 2001 and 2011. Over the last 10 years, the trend shows that average growth in VKT on Melbourne's freeways has been 4.9% or around 370 million vehicle kilometres per year. The percentage of VKT taking place on freeways increased from 26% in 2001 to 36% in 2011.

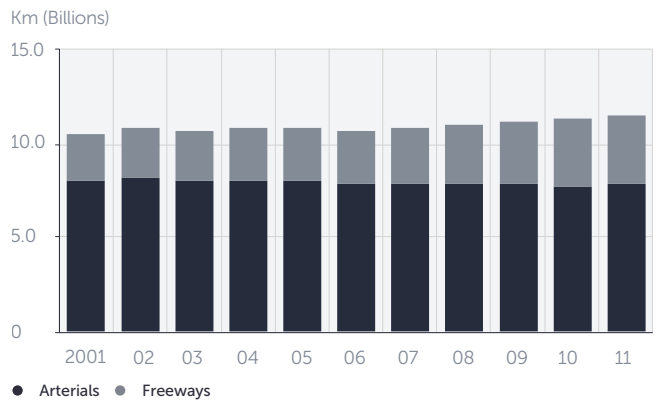
All zones have experienced a trend of growth in VKT over the last 10 years. Both the inner and middle zones have experienced a slight decline in arterial VKT, representing a shift of travel from arterial roads onto improved freeway links. The outer zone has experienced a trend of increasing VKT on both arterial roads and freeways and has experienced the largest growth of the three zones.

VKT in inner zone of Melbourne



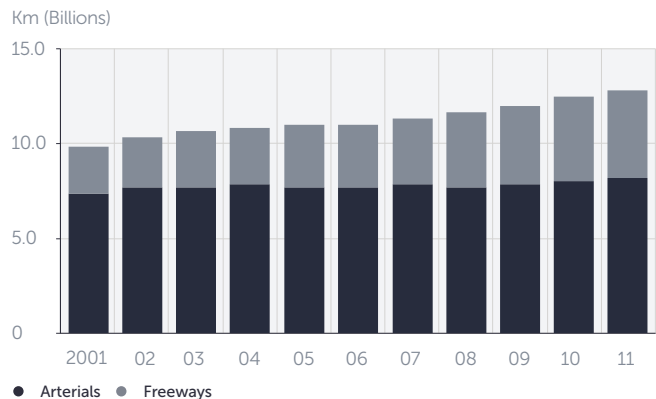
Vehicle kilometres travelled in inner zone of metropolitan Melbourne by road type

VKT in middle zone of Melbourne



Vehicle kilometres travelled in middle zone of metropolitan Melbourne by road type

VKT in outer zone of Melbourne



Vehicle kilometres travelled in outer zone of metropolitan Melbourne by road type

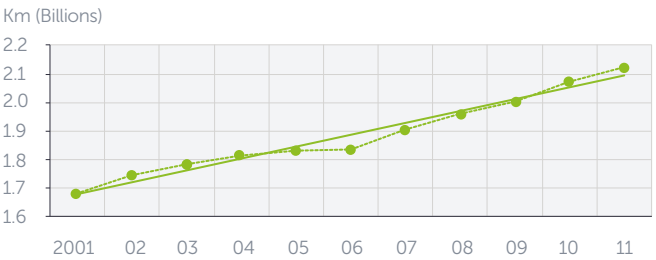
Freight road use

Freight movement is extremely important for Victoria's economic prosperity and must be effectively managed. Freight estimates on Melbourne freeways are made by counting the number and type of freight vehicles and using set estimates for the load of each vehicle.

The M1 (Monash, CityLink, West Gate) Freeway continues to carry the highest volume of freight in Melbourne, making it vital to the city's economic success. The M80 Ring Road also carries large volumes of freight while CityLink (Western Link) and EastLink are becoming increasingly important.

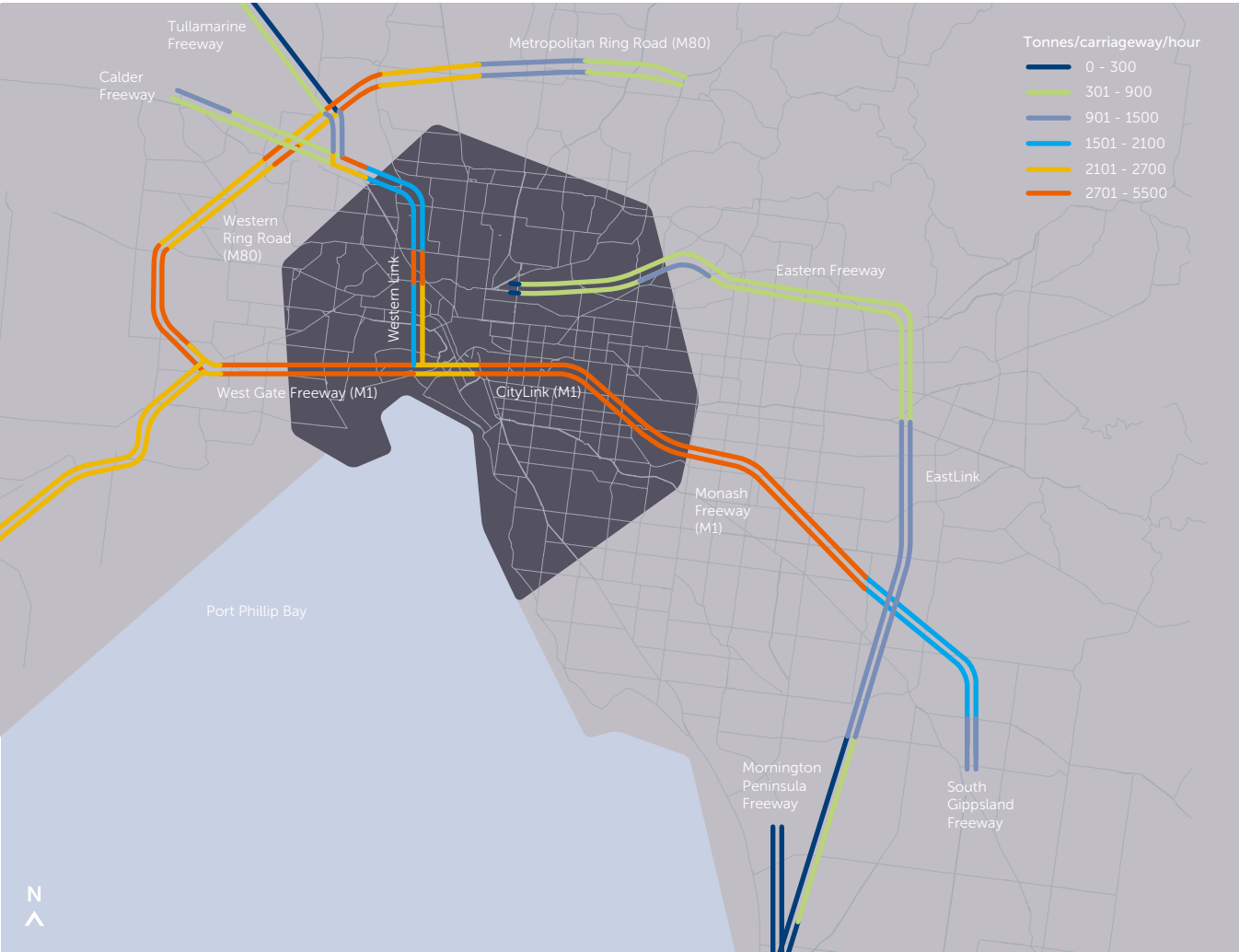
Truck volumes in Melbourne have been increasing in recent years. The growing Victorian economy is increasing demand for freight transport, leading to more trucks using the road network. Since 2001, the trend shows that truck VKT in Melbourne has increased at an average of 2.2% per year.

Truck vehicle kilometres travelled in Melbourne



Vehicle kilometres travelled on arterial roads and freeways by freight vehicles in metropolitan Melbourne

Freeway freight volumes for 2011-12



Freight volumes on Melbourne freeways in 2011-12 (freight volumes are represented by traffic direction)

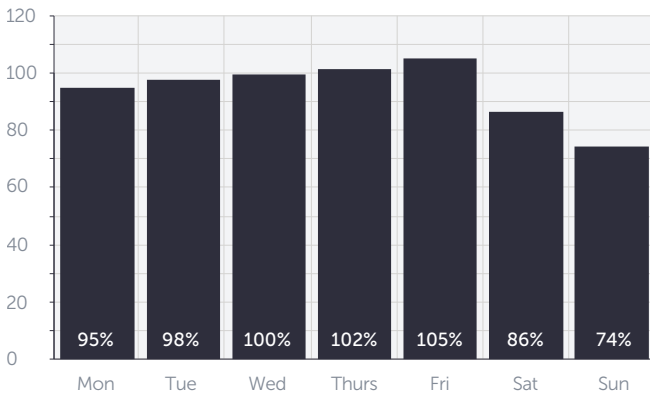
Melbourne traffic profiles (road use by day, week & year)

Traffic volumes vary based on the day of the week and time of the year.

There is as much as a 10% variation in weekday traffic volumes depending on the day of the week. Weekends have average daily traffic volumes below those of all weekdays.

Traffic volumes by day of the week

Percentage of average weekday



Proportion of the average 24 hour weekday traffic volume experienced on each day of the week

Traffic volumes change at different times of the year.

This figure shows the variations in average weekday 24 hour traffic volume by week of the year. The figure demonstrates below average volumes recorded during school holidays, especially during January. The highest weekly volumes are recorded in November and December. Note that the average week is taken across the whole year excluding public holidays.

Traffic volumes by week of the year

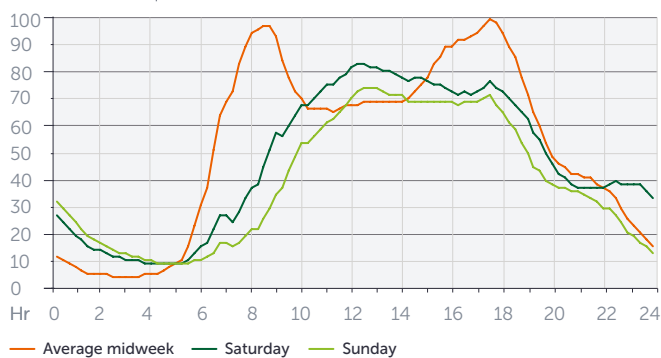


Traffic volume variations (from average non-holiday week) by week of the year

Daily traffic profiles vary depending on the day of the week. This is most noticeable for weekends where volumes peak in the middle of the day rather than in the morning and afternoon as they do during the week. Traffic volumes at midday on the average weekend are higher than volumes at the same time of day on weekdays. Peak volumes on weekends are significantly below peak volumes on weekdays.

Traffic volumes by time of day

Melbourne traffic profile (%)

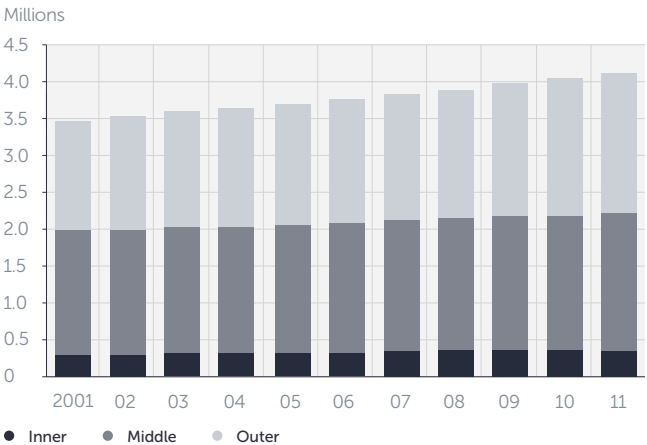


Proportion of the maximum weekday traffic volume experienced at different times of the day on weekdays and weekends

Population growth

The largest contributor to the increase in road use in Melbourne is the growth in population. Between 2001 and 2010 the population of Melbourne grew by approximately 17%.

Population of Melbourne



Population growth in Melbourne by zone
Source: Australian Bureau of Statistics

Population growth has occurred in all three zones although the majority occurred in the outer zone. The inner and outer zones recorded similar average annual growth rates of 2.5% and 2.4% per year respectively, while the middle zone grew at a much slower 0.9% per year.

The different population growth rate of each zone has led to a shift in the relative share of population in each zone. In 2001 the outer zone accounted for 43% of Melbourne’s population, whereas in 2011 this had increased to 46%. This 3% increase in population has occurred at the same time as almost 4% increase in the share of VKT in the outer zone. Over the same period, the share of population in the middle zone has decreased by 4%, matched by a VKT share decrease of 3% (refer to VKT discussed on page 17). This pattern highlights the influence of population on VKT growth.

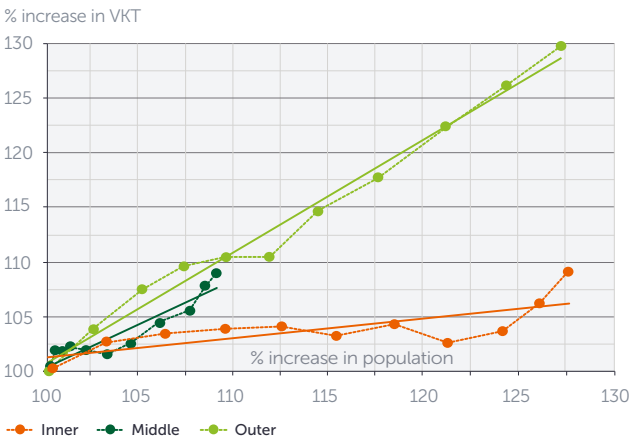
Land use change

Land use change is a key factor affecting transport demand. The location and density of residential, employment, business, health and educational areas/services play a major role in determining how far people travel and which modes they use. New developments without access to high quality public transport necessitate the use of private cars to access jobs and services.

The ‘Growth in VKT Against Growth in Population’ figure demonstrates the impact that population growth in different areas of Melbourne has on road use. The trend, between 2001 and 2011, shows that in the outer and middle zones the percentage growth in VKT has followed the percentage growth in population very closely. The inner zone has experienced a significantly different trend, where a 28% increase in population has resulted in only a 5% increase in VKT. This suggests that population growth in the inner suburbs of Melbourne has a far smaller impact on the road network than growth in the middle and outer suburbs. This may be a result of a number of factors including:

- better public transport;
- better access to employment, education and other services; and
- shorter trip lengths in the inner zone.

Growth in VKT against growth in population



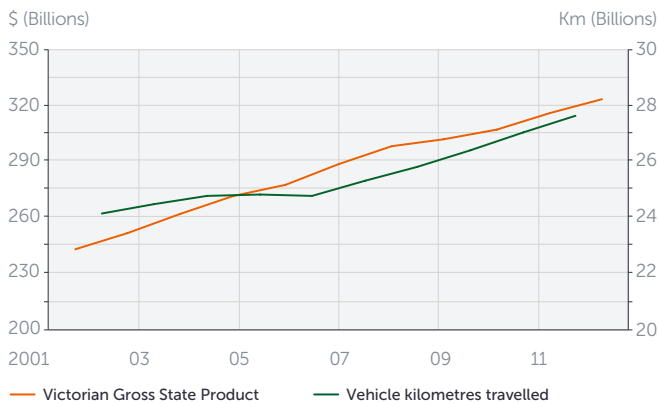
Change in vehicle kilometres travelled and change in population for each zone in metropolitan Melbourne (2001 to 2011)

This analysis compares the population growth within a given geographical area with the traffic growth in the same area. There is an underlying assumption implied in this analysis that only people living within each zone are using the roads in that zone. This is clearly not the case, as although it is likely that the majority of road travel in the outer zone is undertaken by people living within that zone, the inner zone is likely to have a high percentage of use by those living in other zones. This means that the difference in the traffic impacts of population growth between the inner and outer zones is in fact greater than that shown in the ‘Growth in VKT Against Growth in Population’ figure.

Economic growth

The amount of economic activity taking place in Victoria is a major driver of demand for travel. The need to travel to business and employment opportunities and during the course of those activities makes up a significant portion of the demand for travel in Melbourne. The income earned by individuals in a strong economy also gives them the ability to travel for social and recreational activities, thus further increasing demand.

Economy and road use



Gross State Product of Victoria and vehicle kilometres travelled in Melbourne
Source: Australian Bureau of Statistics

Victoria's gross state product (a key indicator of the size of the Victorian economy) increased by 32% between 2001-02 and 2011-12. This increase in the strength of the Victorian economy increased the demand for transport leading to an increased use of the road network.

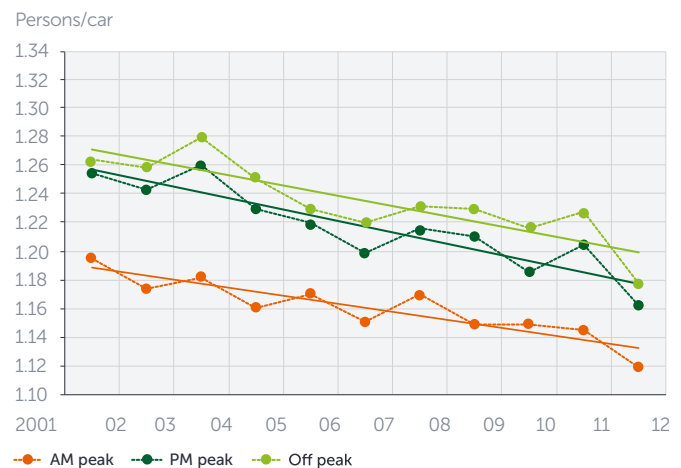
Travel behaviour

The volume of traffic on our roads is also influenced by the mode of travel people choose to use. Buses, trams, bicycles, pedestrians and motorcycles all use less road space per person than a single car with a driver alone. In the same way, larger trucks also use less road capacity per tonne of freight than small trucks and vans.

Car occupancy

The car occupancy rate is the average number of people per car as measured by visual observations of vehicles travelling on the monitored network. As an example, car occupancy of 1.2 persons per car would mean that there is an average of six people for every five cars or one car in every five was carrying two people. A higher car occupancy rate is seen as preferable, as a full car takes up the same amount of road space as a car with a driver alone.

Car occupancy



Weekday car occupancy rate for monitored network across all time periods

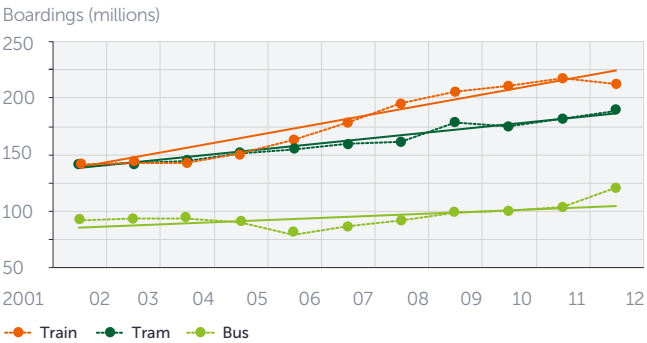
The trend shows that car occupancy has been decreasing at approximately the same rate in each time period over the last 10 years. The change in car occupancy since 2001-02 is equivalent to one less passenger for every 17 cars in the morning peak and for every 12 cars in the afternoon peak. Given that a freeway lane can carry around 2000 cars per hour, this change in occupancy would mean a four-lane freeway would carry 470 less people per hour in the morning peak and 600 less people per hour in the afternoon peak.

There has also been a reduction in the rate at which people travel to work as a passenger in a car over the last 10 years. Between 2001 and 2011 the percentage of people who travelled as a passenger in a car as part of their journey to work, on census day, fell from 7.1% to 6.1% (ABS Census).

Public transport patronage

Public transport boardings are a record of the number of times a passenger gets on a train, tram or bus. A passenger using multiple public transport modes (ie train and tram) will record multiple boardings for the one trip. Boardings figures are used as an indicator of public transport patronage.

Public transport boardings in Melbourne



Annual public transport boardings by mode for Melbourne
Source: Public Transport Victoria

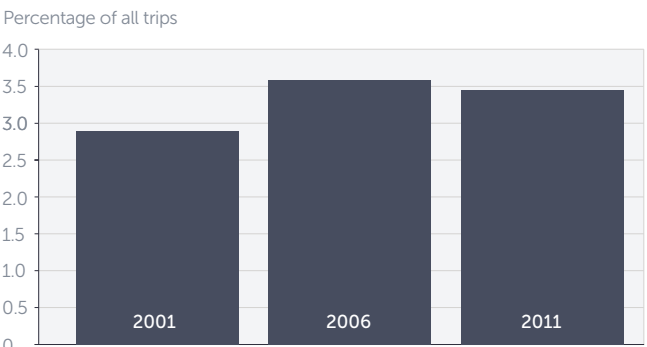
Public transport patronage has increased on all modes since 2001-02. This increase has been fastest on Melbourne trains although overall patronage on metropolitan trains decreased by 3% since 2010-11. In Melbourne more than 85% of public transport service kilometres are on the road network making road performance critical to public transport provision.

There has also been an increase in the rate at which people travel to work using public transport over the last 10 years. Between 2001 and 2011 the percentage of people who used public transport as part of their journey to work, on census day, increased from 13% to 16% (ABS Census).

Walking

Data on walking as a mode of transport is taken from the national census and shows the percentage of people who get to work by walking only. This does not include people who walk as part of their journey, such as to a train station.

Journey to work trips - walking only



Share of Journey to Work trips which were walking only
Source: ABS Census

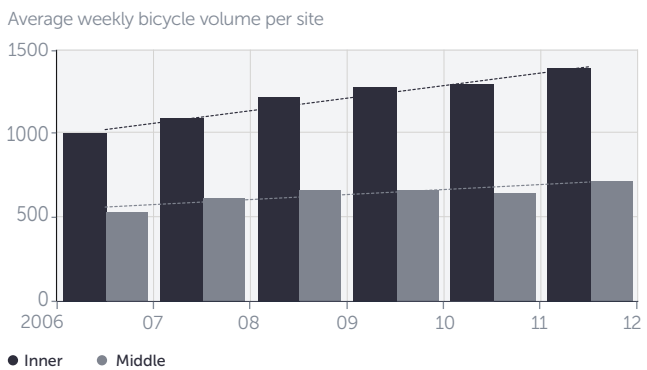
Between 2001 and 2011 the number of people walking to work in Melbourne increased by 50%. The number of people walking all the way to work in 2011 accounted for 3.4% of all trips to work.

Bicycles

Bicycle counts are used as an indicator of the use of bicycles in Melbourne. VicRoads has installed permanent counters in various strategic locations across Melbourne that record bicycle volumes continuously. This information is useful for monitoring changes in bicycle use over the seasons as well as from year to year.

Detailed statistics from permanent count sites are available on VicRoads' website at vicroads.vic.gov.au. VicRoads does not currently have any permanent bicycle counters in the outer zone.

Bicycle volumes at selected sites in Melbourne



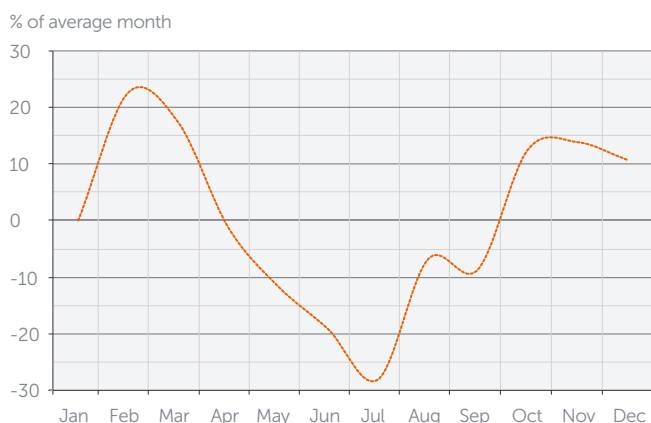
Weekday bicycle use recorded at selected permanent count sites in metropolitan Melbourne

Bicycle volumes have shown an increasing trend since 2006-07 in both the inner and middle zones. Since 2006-07, the trend shows that recorded bicycle volumes increased by 37% in the inner zone and 27% in the middle zone. These increases in volume at permanent count sites suggest bicycle volumes have been increasing across the network in recent years. While count locations are on popular commuter routes, the volumes recorded do include recreational bicycle use.

There has also been an increase in the rate at which people travel to work using bicycles over the last 10 years. Between 2001 and 2011 the percentage of people who used a bicycle as part of their journey to work, on census day, increased from 1.2% to 1.8% (ABS Census).

Bicycle volumes in the inner zone are consistently higher than in the middle zone. This is likely because of slower vehicle travel speeds and shorter trip distances in the inner zone.

Seasonality of bicycle use in Melbourne



Monthly bicycle volume variation from average month – 24 hour/7 day volumes (2006-07 to 2010-11)

Bicycle use in Melbourne varies (up to around 50%) at different times of the year. This variation loosely follows the seasons with higher volumes recorded in the warmer months.

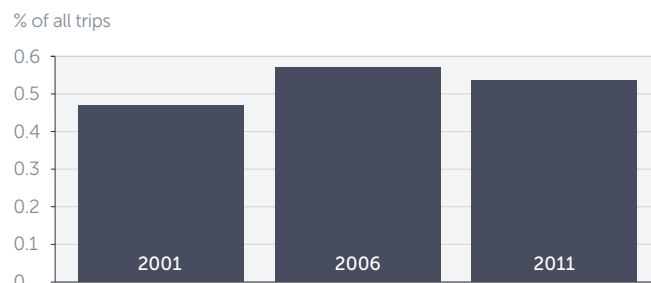
Motorcycles and other powered two-wheelers

Data on the use of motorcycles and other powered two-wheelers* (PTW) is taken from the national census and shows the percentage of people who used a PTW to get to work on census day.

There has been a small increase in the rate at which people travel to work using PTWs over the last 10 years. Between 2001 and 2011 the percentage of people who used a PTW as part of their journey to work, on census day, increased from 0.47% to 0.53%.

The percentage of people who travelled to work in 2011 using PTWs (0.53%) is well below the percentage of PTWs registered in the vehicle fleet (3.36%) in the same year.

Journey to work trips - PTW



Share of Journey to Work trips which used a powered two wheeler
Source: ABS Census

*The definition of 'Powered Two-Wheeler' includes motorcycles, scooters, mopeds, motor tricycles and motorcycles with sidecars.

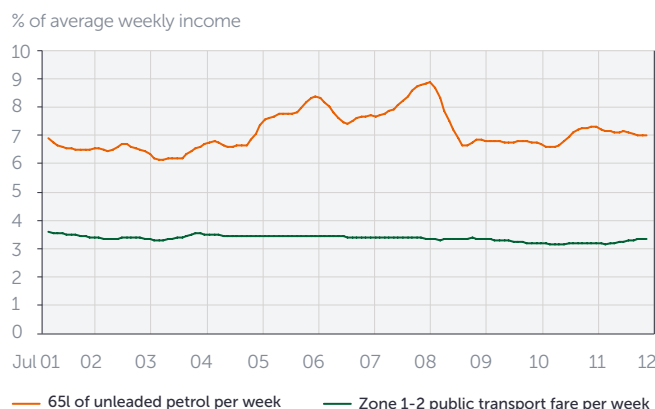
Transport costs

The costs of transport affect the choices people make about how they travel. As transport costs change, individuals reassess the transport decisions they have made. Increasing costs for one mode of transport can lead to an increase in the use of other modes.

While the cost of petrol is only a small part of the cost of owning and operating a car it is a very visible component of the cost of car use. Increasing petrol prices have been associated with reduced car use and have the potential to influence the way the road network is used. Public transport fares are also very visible and are often the only cost involved in the use of public transport.

The relative cost of fuel is measured as the percentage of the average weekly income that is required to purchase a 65 litre tank of unleaded petrol each week. Public transport costs are approximated by the weekly share of the price of a zone 1 and 2 monthly ticket. This indicator takes into account the costs of fuel and public transport fares as well as the average income in order to provide an insight into the affordability of transport.

Relative costs of transport



Percentage of average weekly income needed to purchase one 65 litre tank of unleaded petrol and the weekly share of a zone 1 and 2 monthly ticket in Victoria

Source: Australian Bureau of Statistics
Public Transport Victoria

The relative transport costs figure indicates that the relative cost of a 65 litre tank of unleaded petrol has been comparatively stable since prices dropped in 2008 after the global financial crisis. The average relative price of fuel in 2011-12 was 7.1 per cent, well below the peak of 8.9 per cent in mid 2008.

The relative cost of public transport fares has been between 3% and 4% consistently over the last 10 years. In general the cost of a 65 litre tank of unleaded petrol has been around double the cost of using public transport for a week.

Further information

The information and results in this brochure represent an overview summary of the extent of information available from the surveys undertaken. Further information is available and can be provided at nominal cost by contacting one of the following VicRoads officers:

Manager – Program Outcomes

Policy and Programs

Telephone: (03) 9854 2592

Manager – Traffic and Transport Information

Information Management and Technology

Telephone: (03) 9090 4631

