



Traffic Monitor 2010-2011

AUGUST 2012



keeping victorians connected



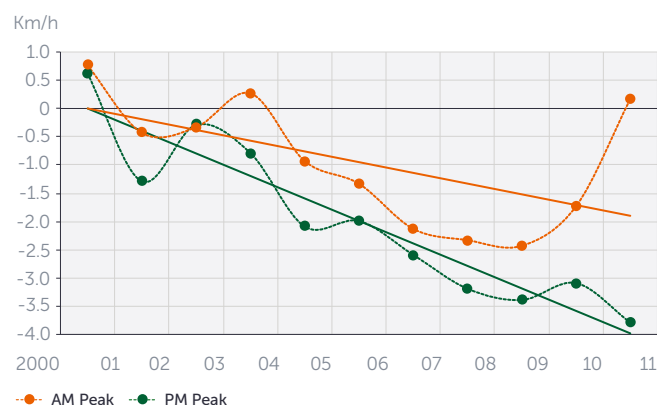
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Victoria's traffic performance - key points

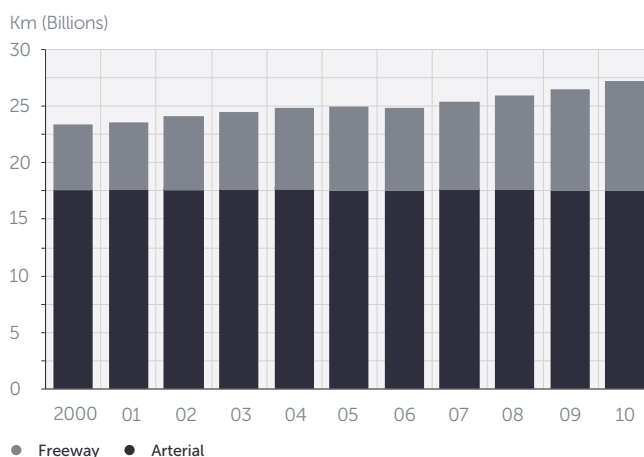
- The trend in average travel speed on the monitored network in the morning peak shows a decrease of 1.9 km/h over the last 10 years.
- In the morning peak, the 10-year trend to 2010-11 showed an average decrease in travel speed of 0.2 km/h per year. This is an improvement over the 10-year trend to 2009-10 which showed an average decrease in travel speed of 0.3 km/h per year.
- The trend in average travel speed on the monitored network in the afternoon peak shows a decrease of 4 km/h over the last 10 years (0.4 km/h per year).
- Over the last 10 years, the number of vehicle kilometres travelled in Melbourne has increased by 16%.
- In 2010, vehicles travelled 27.3 billion kilometres on Melbourne's arterial roads and freeways, an increase from the 23.5 billion kilometres travelled in 2000.
- The growth in 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, 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 2010-11 would take about one minute longer than the same trip in 2000-01.
- Between 2000 and 2010, truck vehicle kilometres travelled increased by 420 million kilometres. This represents a trend of 2.5% per year.
- Since 2000-01, weekday car occupancy rates in the morning peak in Melbourne have dropped by 3.7%, the equivalent of one less person for every 22 cars (or 360 less people per hour on a four-lane freeway).
- Car occupancy rates are lowest during the morning peak.
- Over the last 10 years, monitored arterials with trams have consistently carried approximately 45 more people per lane per hour (including tram passengers) than similar roads that do not have trams.
- Weekday bicycle counts at key sites have increased by 29% since 2006-07 (an average of 6.6% per year).
- Public transport boardings increased in 2010-11 compared to the previous year: train by 4.4%; tram by 4.1%; and bus by 3.9%.

Change in average travel speed



Change in average travel speeds on arterial roads and freeways in Melbourne since 2000-01

Vehicle kilometres travelled in Melbourne



Vehicle kilometres travelled on arterial roads and freeways in metropolitan Melbourne

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 2010-11 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 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.

How is VicRoads helping improve the network performance?

VicRoads seeks to operate and maintain the road system to help our customers travel easily and reliably and to develop 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 and integrated land use and transport planning to help reduce the demand for travel.

Some of the key freeway and highway projects in 2010-11 aimed at increasing the capacity of the network included:

- Completion of major works on the M1 (Monash, CityLink, Westgate) Project, including the opening of the fifth lane to traffic on the West Gate Bridge
- The realignment of the Western Highway between Melton and Bacchus Marsh through Anthony's Cutting
- 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 2010-11 included:

- George Street Bridge over the railway line at Dandenong
- Cranbourne-Frankston Road duplication between Hall Road and the Western Port Highway
- Kororoit Creek Road duplication between Grieve Parade and Millers Road.

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

- Completion of the Barwon Heads Bridge replacement
- Duplication of the Bass Highway from Kings Road to Woolmar Road, Bass
- New overtaking lanes on Princes Highway West at Illowa
- Undertaking a trial of High Performance Freight Vehicles in the Green Triangle region of western Victoria to improve the efficiency of freight movement in regional Victoria.

Key network management initiatives undertaken in 2010-11 included:

- Installing freeway management as part of the M1 Project
- 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 the Department of Transport are also improving bus stops along SmartBus routes and undertaking bus priority work to make our roads more 'bus friendly'.
- Bicycle projects on both local and arterial roads which aim 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 projects such as new pedestrian refuges and traffic lights.

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 and the Department of Transport 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 2010–11' 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.

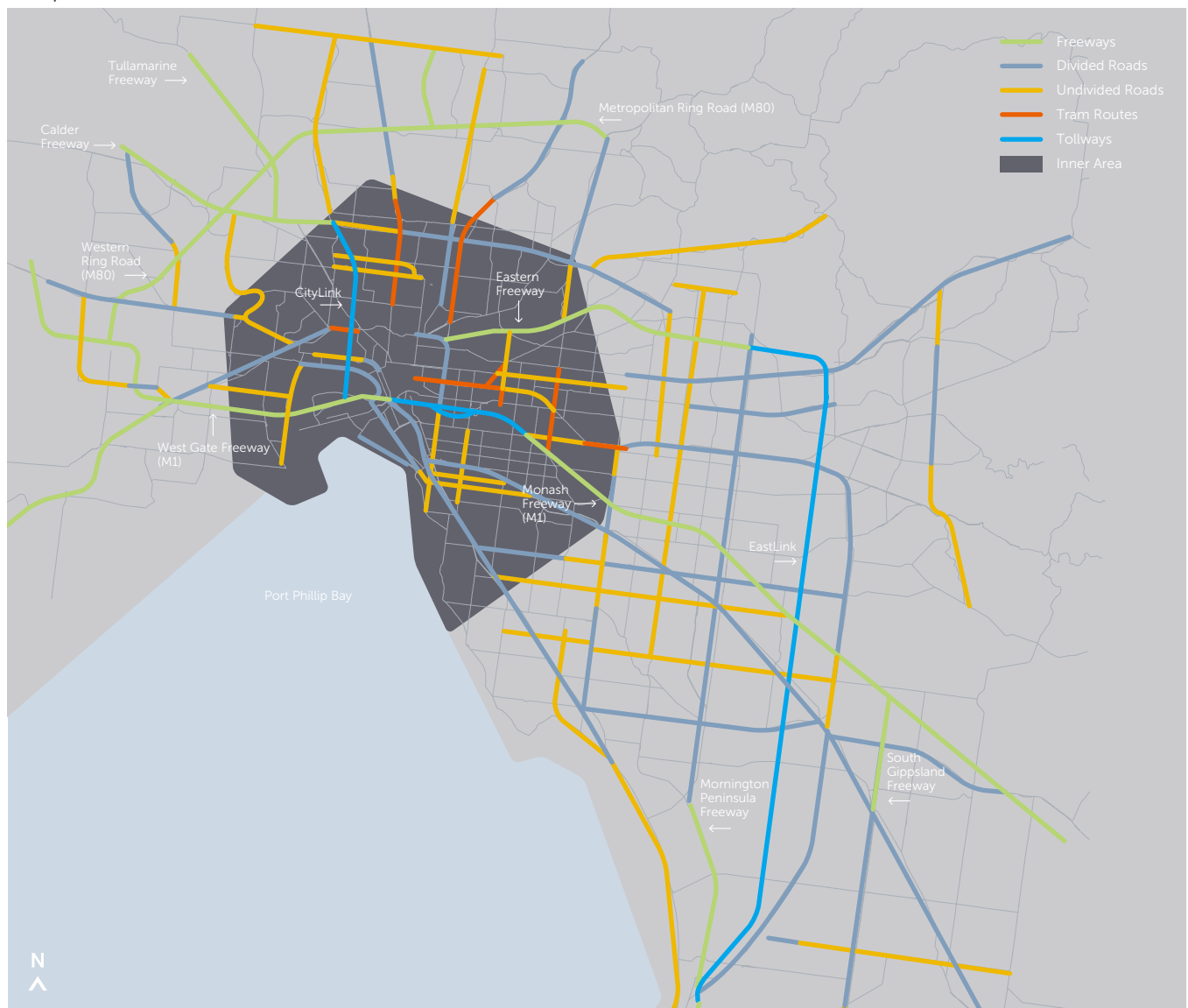
Time periods

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 may 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.

- 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 2010–11



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

Road network performance

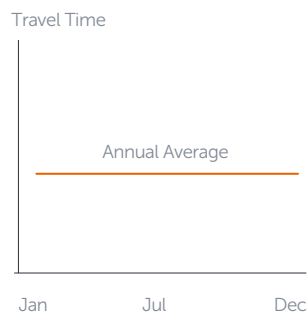
This section describes the different network performance indicators, including how the data is collected, what the indicators mean and how they should be interpreted. The performance indicators in this section are:

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

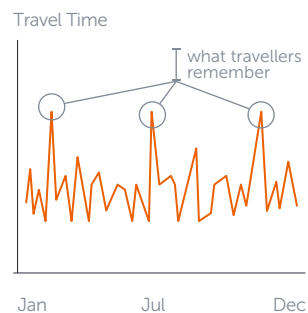
Each indicator has been presented in terms of trend over recent years. This presentation has been used since the values recorded can vary significantly from year to year and only the longer term trend shows a true picture of how performance is changing.

As these trends are averages across the network they do not highlight best or worse 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 (later section) 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

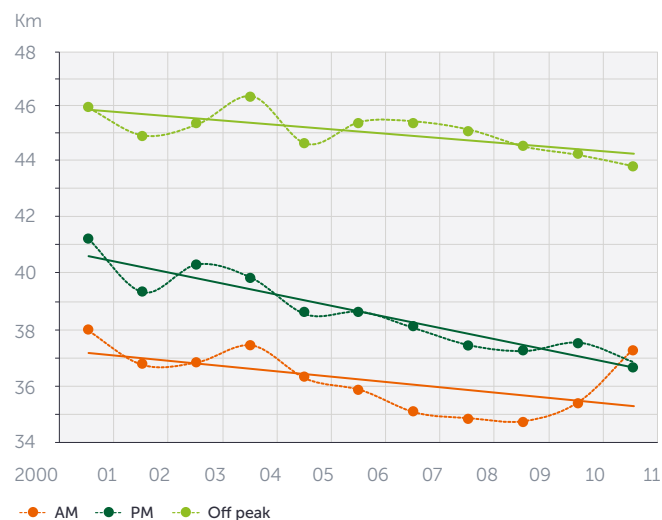


Source: Federal Highway Administration (2006)

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 travelled 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.

Average travel speeds



Average travel speeds on the metropolitan Melbourne monitored network by time of day

Average travel speed has been decreasing over the last 10 years in both peak and off-peak periods. Since 2000–01, the trends show a reduction in average travel speed of approximately 2 km/h in the morning peak and 4 km/h in the afternoon peak.

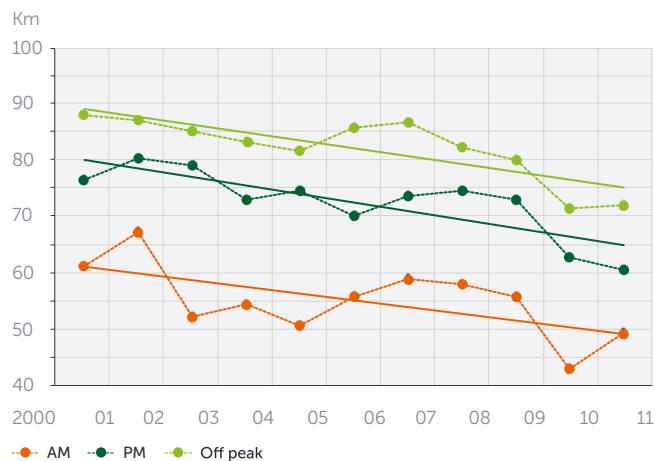
The average travel speed recorded in 2010–11 is close to the long-term trend in the afternoon and off-peak periods. The average travel speed recorded in the morning peak is well above the long-term trend, but it is too soon to say whether this represents real improvement in network performance.

Average travel speeds by road category and area

Freeways

Speeds on freeways in the inner area have been decreasing in all time periods since 2000–01, however the morning peak speed has decreased less than other periods (~11 km/h since 2000–01). The morning peak has the slowest travel speeds with the trend showing an average speed during this period of approximately 50 km/h. Freeways in the inner area are also slower than freeways in the outer area in all three time periods.

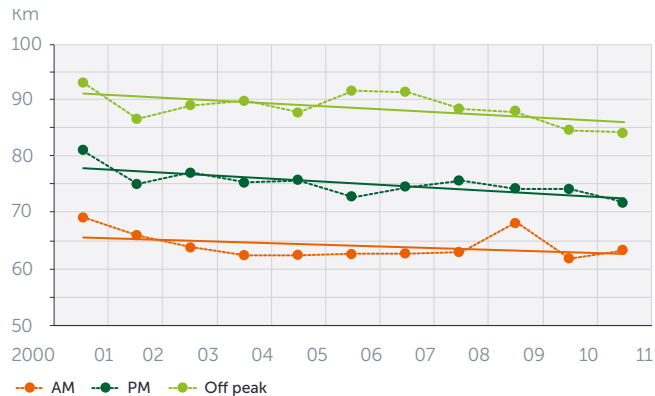
Average travel speeds - freeways (inner area)



Average travel speeds on freeways in the inner area of Melbourne by time of day

Speeds on freeways in the outer area have been decreasing less than those on freeways in the inner area with a change of approximately 5 km/h since 2000–01 in all recorded time periods. Morning peak speeds have remained virtually unchanged since 2003–04. Freeways in the outer area have the fastest average travel speed of all roads in all time periods.

Average travel speeds - freeways (outer area)

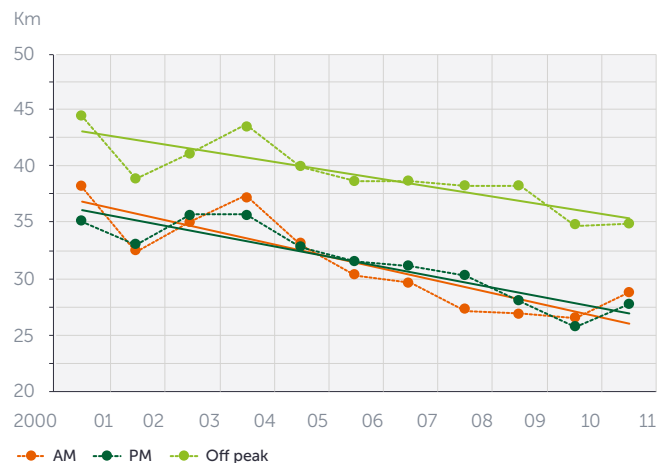


Average travel speeds on freeways in the outer area of Melbourne by time of day

Divided monitored network

Speeds on divided arterial roads in the inner area are similar in morning and afternoon peaks with both trends declining to around 27 km/h in 2010–11. This is a decrease of approximately 10 km/h since 2000–01. Divided arterial roads are slower in the inner area than the outer area in all recorded time periods.

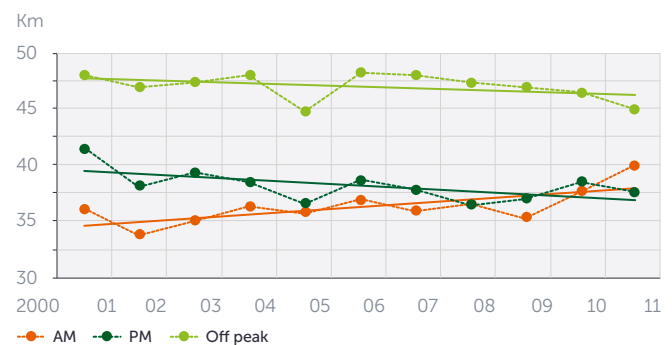
Average travel speeds - divided arterial roads (inner area)



Average travel speeds on divided arterial roads in the inner area of Melbourne by time of day

Morning peak speeds on divided arterial roads in the outer area have been increasing since 2000–01 and are now faster than afternoon peak speeds on the same roads. Morning peak speeds have increased in each year since 2008–09. This is possibly a result of EastLink reducing traffic volumes on some of these roads

Average travel speeds - divided arterial roads (outer area)

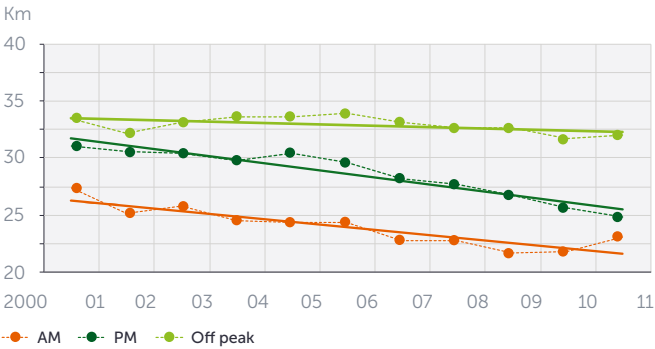


Average travel speeds on divided arterial roads in the outer area of Melbourne by time of day

Undivided monitored network

Undivided arterial roads in the inner area have experienced declining trends in both morning and afternoon peaks (reduction of approximately 5 km/h since 2000–01). Speeds are similar on both divided and undivided roads in the afternoon peak. Undivided arterial roads in the inner area are the only group of arterials which have consistently been faster in the afternoon peak compared to the morning peak.

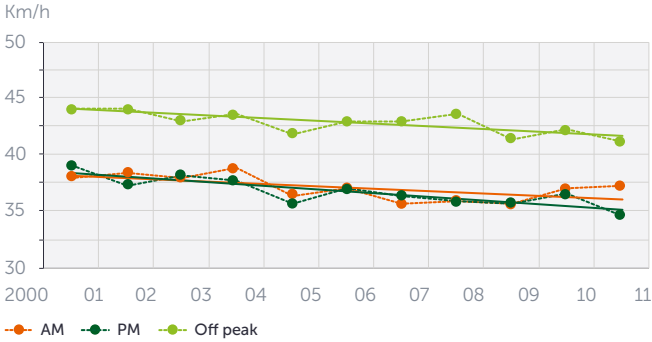
Average travel speeds - undivided arterial roads (inner area)



Average travel speeds on undivided arterial roads in the inner area of Melbourne by time of day

Speeds on undivided arterial roads in the outer area have been approximately the same in both morning and afternoon peak periods since 2000–01, with both declining slowly (approximately 2 km/h since 2000–01). Average travel speeds in the outer area are approximately the same on both divided and undivided roads, for morning and afternoon peaks.

Average travel speeds - undivided arterial roads (outer area)



Average travel speeds on undivided arterial roads in the outer area of Melbourne by time of day

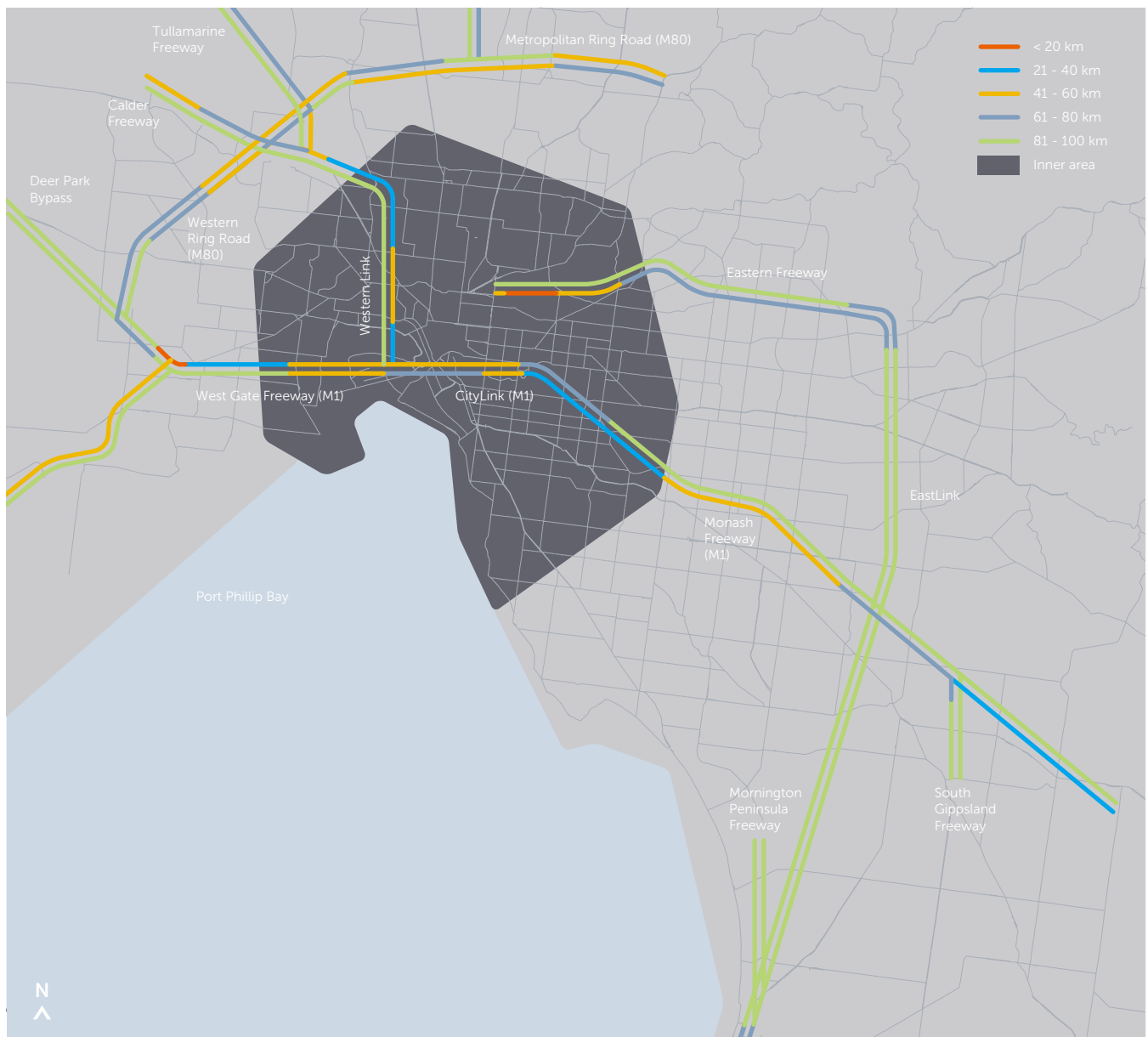
Freeway Average Travel Speed Map

The average freeway travel speed images presented here provide a snapshot of the performance of these freeways in 2010–11. 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. The Monash and West Gate Freeways experienced reduced travel speeds inbound during this period compared to the previous year. The Tullamarine and CityLink (Western Link) Freeways were slower inbound between Melbourne Airport and Brunswick Road when compared to 2009–10, however the CityLink (Western Link) Freeway improved from Brunswick Road to West Gate Freeway. This may be in part due to drivers avoiding roadworks on the M80 (Western and Metropolitan) Ring Road. Some sections of

the Monash Freeway also recorded faster travel speeds than in the previous year, which is likely to be as a result of the conclusion of the M1 upgrade. The M80 Ring Road has improved but is still experiencing delays due to roadwork. Hallam Bypass, inbound, stands out as being among the slowest freeways in the outer metropolitan area.

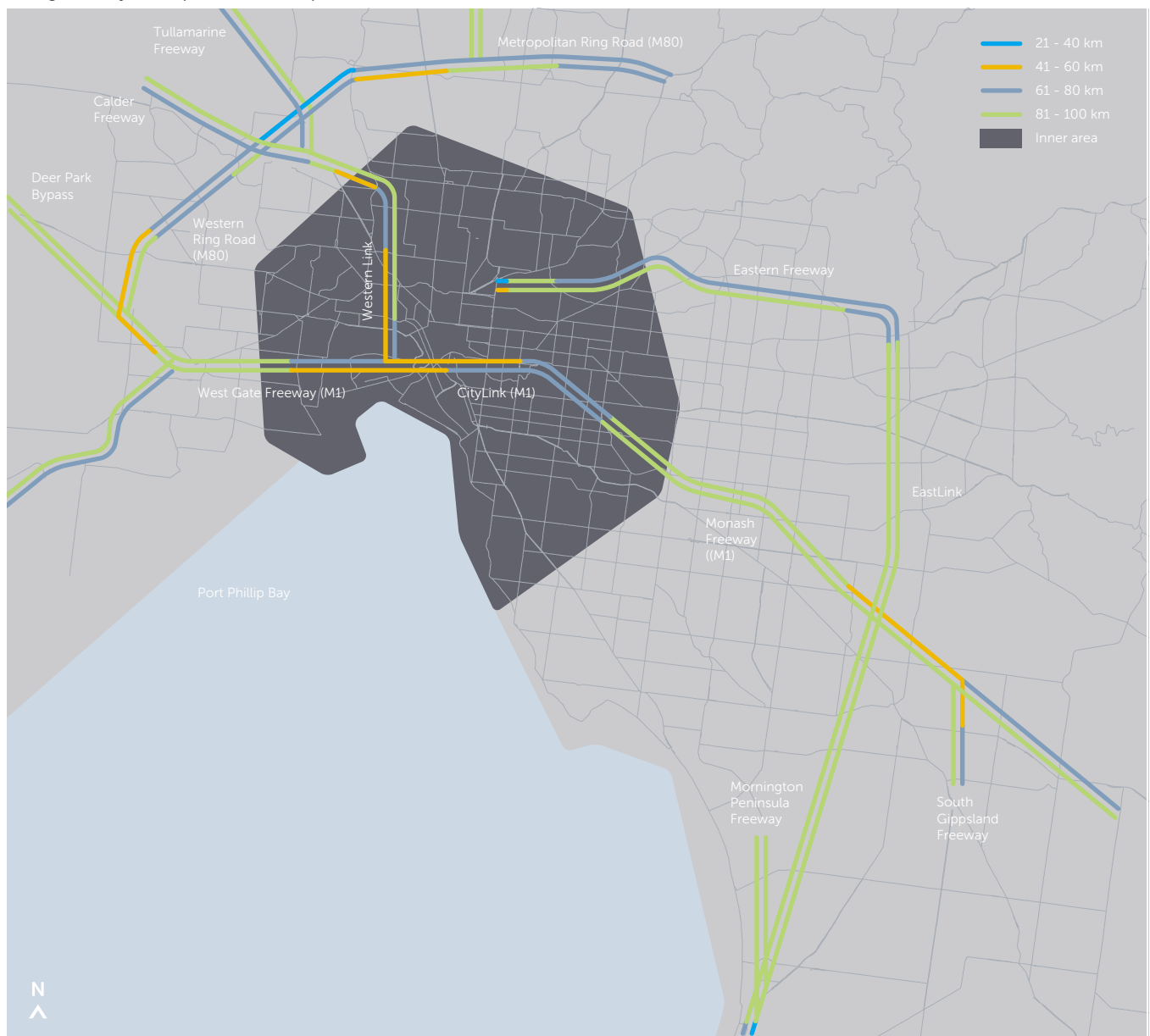
Average freeway travel speeds (morning peak)



Average travel speed on Melbourne freeways in the morning peak (7:30am to 9:00am)

Average travel speeds are noticeably higher in the afternoon peak than the morning peak, with very few links showing average speeds below 40 km/h. The M80 Ring Road continues to experience delays, while the CityLink (Western Link) Freeway outbound between West Gate Freeway and the M80 Ring Road also experienced slower travel speeds than in 2009-10. These reductions in speed are likely to be caused by roadworks on the M80 Ring Road. The M1 improved in both directions between CityLink (Western Link) Freeway and Warrigal Road with the completion of major works.

Average freeway travel speeds (afternoon peak)

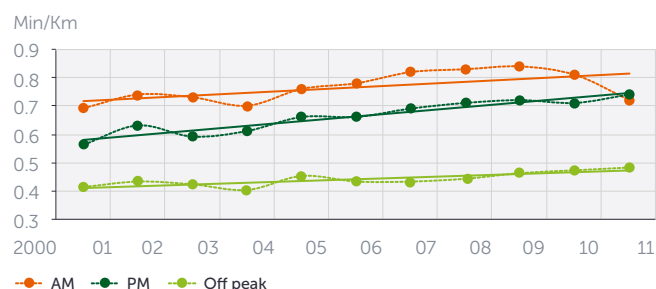


Average travel speed on Melbourne freeways in the afternoon peak (4:30pm to 6:00pm)

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 travelled 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



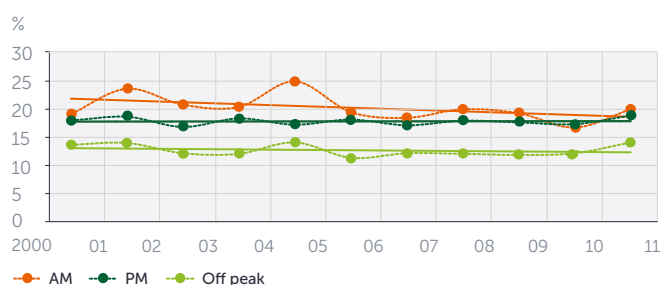
Average delay (in minutes per kilometre) on the metropolitan Melbourne monitored network by time of day

Over the last 10 years, average delay on the monitored network has increased during both peak and off-peak periods. Average delay has been increasing most 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 2010–11 would take about one minute longer than the same trip would have in 2000–01.

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 metropolitan Melbourne monitored network by time of day

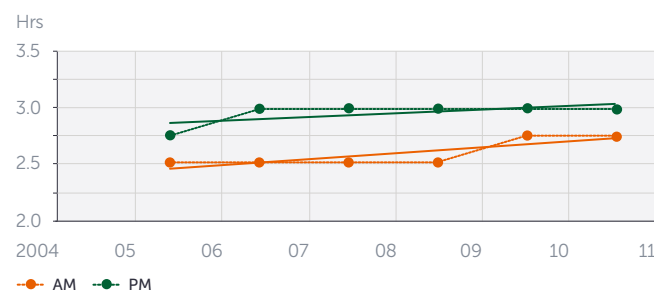
The trend over the last 10 years shows that Travel Time Variability has been decreasing during the morning peak and has stayed relatively stable during the afternoon peak and off-peak periods. This figure shows that the variability recorded each year may be significantly different from that recorded in the years before and after. For this reason, it is more meaningful to look at the overall trend in variability rather than at the value recorded in any given year.

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.

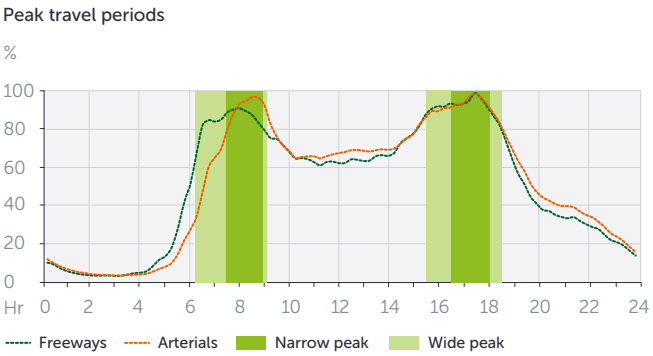
Peak period duration (freeways)



Duration of weekday peak periods on freeways in Melbourne

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. The 'wide peak' periods are calculated based on the peak period definition described in this section.



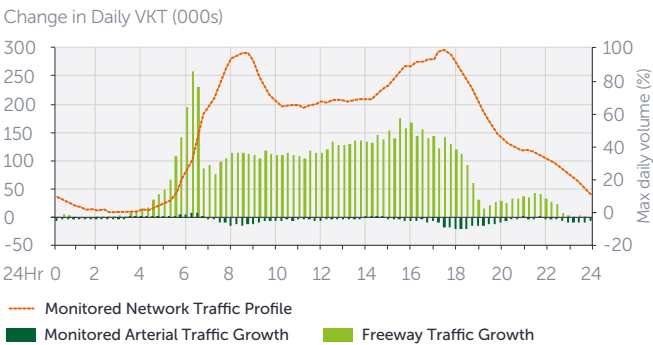
Peak travel periods on the metropolitan Melbourne monitored network

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.

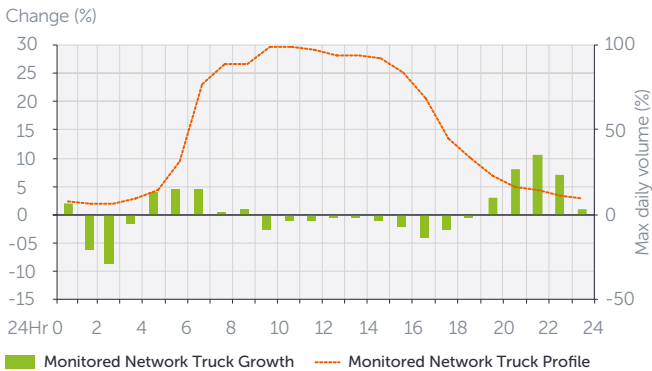
The line in each figure shows the relative volume of traffic at the given time of day (against the percentages shown on the right) while the bars show the growth in traffic at the same time of day (in thousands or percentage change, shown on the left).

Distribution of traffic growth (freeways and arterial roads)



Relative traffic volume by time of day and traffic volume growth (since 2006-07)

Distribution of traffic growth (trucks)



Relative truck traffic volume by time of day and percentage truck traffic volume growth (since 2006-07)

The largest volume growth on both freeways and arterials is occurring just prior to the morning peak, generally from 5am to 6:30am. This has the effect of making the peak period begin earlier and persist longer. 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 around 3% less traffic in 2010–11 than in 2006–07. 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 evenings.

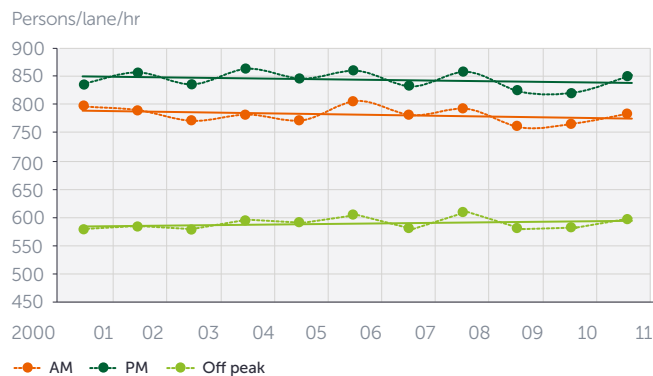
Lane occupancy

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 rates

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. Person lane occupancy 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 metropolitan Melbourne monitored network by time of day

Person lane occupancy rates on the monitored network have been consistently higher in the afternoon peak than the morning peak. This difference is possibly related to the higher traffic volumes and higher car occupancy rates in the afternoon peak.

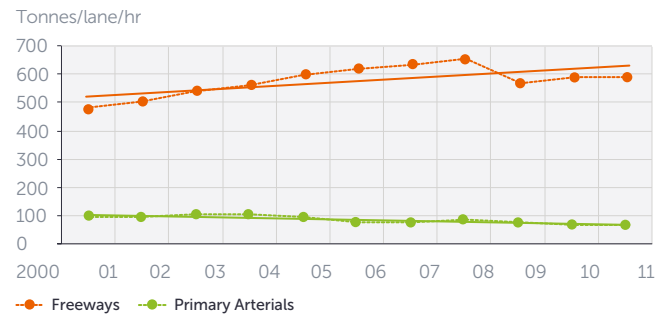
The 'Person Lane Occupancy' figure shows PLO rates reducing slowly in both peak periods. This is despite significant increases in bus and tram patronage, suggesting that reductions in car occupancy have had a major impact on PLO. Person lane occupancy rates have been increasing in the off-peak, which is likely to be due to increased traffic volumes taking up available capacity during this lower demand time.

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 effecting freight occupancy. As this measure uses weight to quantify freight movement, it is not a good indicator of the efficiency of the movement of goods which are volume, rather than weight, constrained.

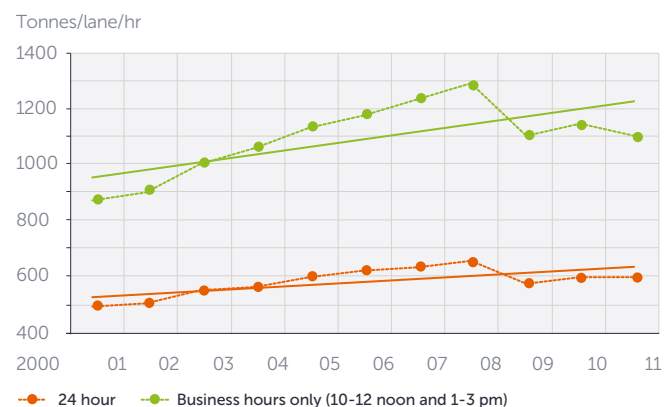
Freight lane occupancy



24 hour freight lane occupancy rates on the metropolitan Melbourne 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 rates on the Melbourne freeways by time of day

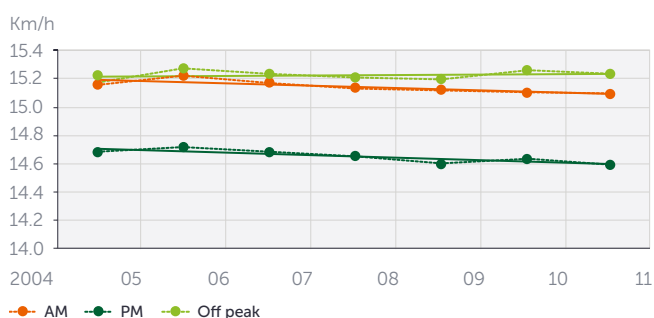
Freight volumes are highest during business hours, shown in the higher than average freight lane occupancy observed during this time. This higher occupancy rate is also observed on primary arterial roads.

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.

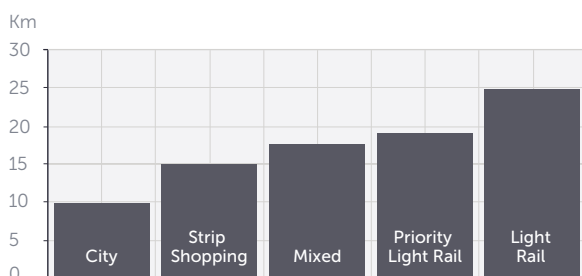
Average tram travel speeds



Average travel speeds for all trams in metropolitan Melbourne by time of day
– Source: Victorian Department of Transport

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 travel speeds when in a 'Light Rail' environment, 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).

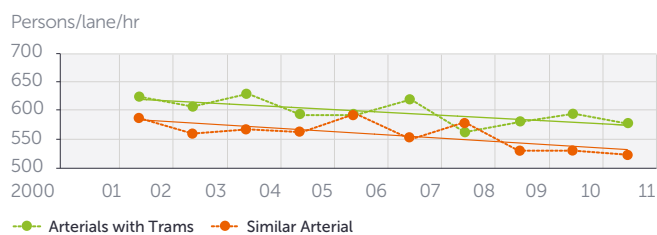
Average tram travel speeds by operating environment



24 hour average travel speeds for trams in metropolitan Melbourne by operating environment – Source: Victorian Department of Transport

The 'Trams 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 a greater number of people per lane. 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. Monitored arterial roads with trams carry approximately 45 extra people per lane per hour across the day than comparable arterials. Roads with trams carry more people per lane per hour during all recorded time periods. Lane occupancy rates include tram passengers.

Tram impacts on personal lane occupancy



Person lane occupancy rates for undivided arterial roads with and without trams (average across morning peak, afternoon peak and off-peak)

Factors affecting network performance

Road use

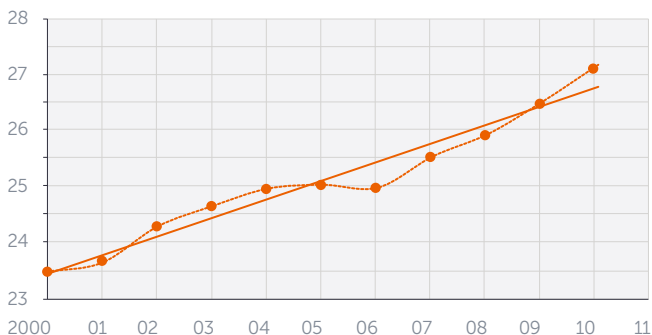
The biggest factor affecting road network performance is the amount of traffic using the network at any time. The term traffic refers to all vehicles using the road, including cars, buses, trams, trucks, motorcycles and bicycles. All of these vehicles have an impact on road network performance. The indicator 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.

Melbourne road use

VicRoads has recently developed a new method for estimating road use in Melbourne. The new method uses all available vehicle counts to calculate VKT for all arterial roads and freeways in Melbourne. VKT values used in previous editions of the Traffic Monitor were derived from the monitored network only. The new method captures travel for the whole of Melbourne and allows for VKT estimates to be retrospectively made for previous years. All VKT figures in this report have been calculated using this new method and are for all arterial roads and freeways in Melbourne.

Total vehicle kilometres travelled in Melbourne

Km (Billions)

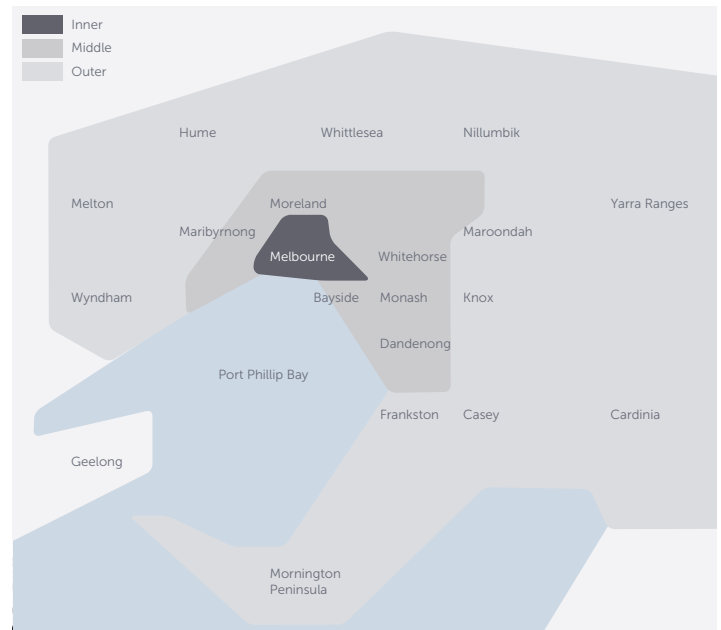


Vehicle kilometres travelled on arterial roads and freeways in metropolitan Melbourne (24 hours/day, 365 days/year)

Road use in Melbourne has experienced strong growth over the last 10 years with the trend showing average growth of approximately 1.5% 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 below. These zones are based on municipal boundaries.

Zones used for reporting vehicle kilometres travelled

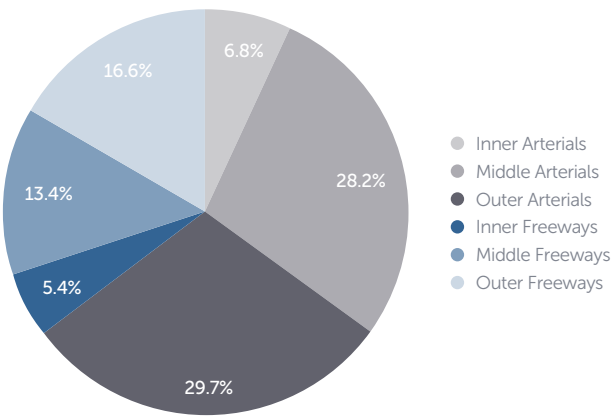


The three zones used for reporting on vehicle kilometres travelled in metropolitan Melbourne (based on local council boundaries)

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 2010, 65% of VKT was recorded on arterial roads and 35% on freeways. 12% of all VKT was recorded within the inner zone, 42% in the middle zone and 46% in the outer zone.

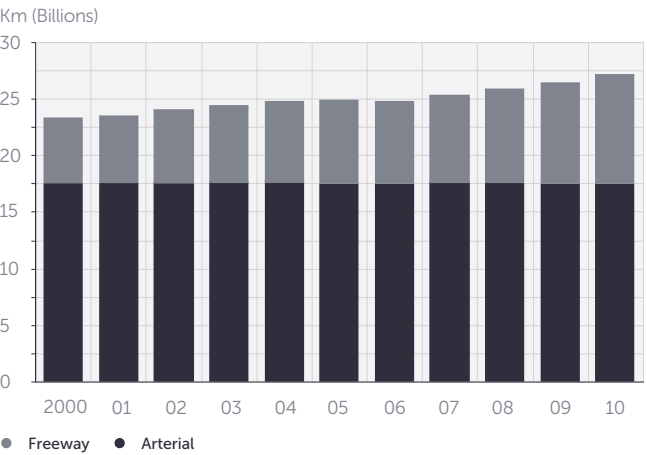
Distribution of vehicle kilometres travelled in Melbourne



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

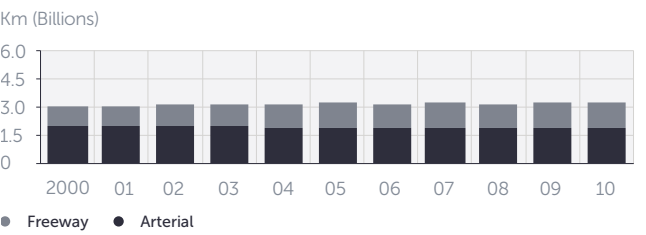


Vehicle kilometres travelled in metropolitan Melbourne by road type (24 hours/day, 365 days/year)

At a network level, the growth in VKT has been carried almost entirely by freeways with VKT on arterial roads remaining approximately the same between 2000 and 2010. Over the last 10 years, the average growth in VKT on Melbourne's freeways has been 4.9% or around 350 million vehicle kilometres per year. This growth in freeway travel has resulted in a large shift in the percentage of VKT taking place on freeways from 26% in 2000 to 35% in 2010.

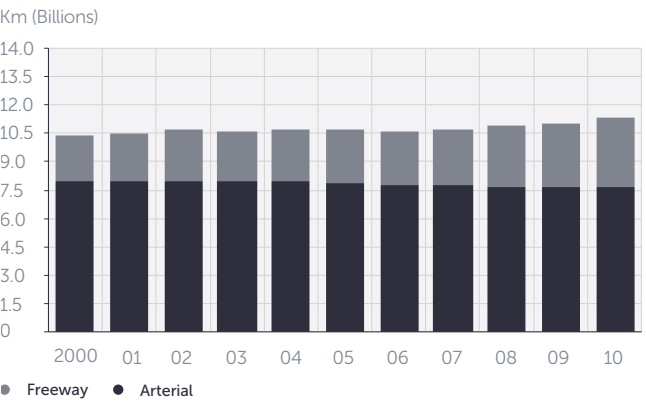
All zones have experienced a trend of growth in VKT over the last 10 years. Both the inner and middle zones have experienced a slight decline in arterial VKT, representing a shift of travel from arterial roads onto improved freeway links. The outer zone has experienced a trend of increasing VKT on both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

Vehicle kilometres travelled in inner zone of Melbourne



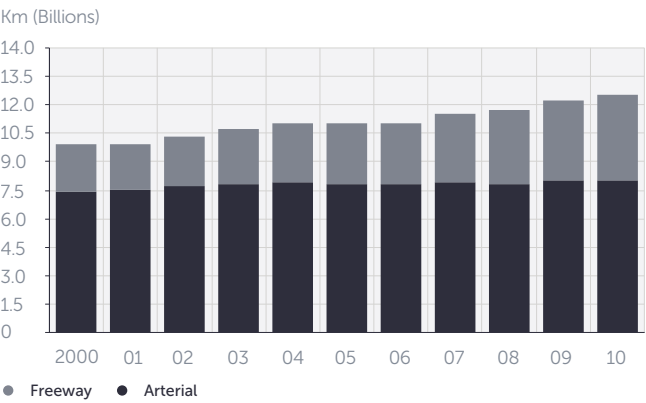
Vehicle kilometres travelled in inner zone of metropolitan Melbourne by road type

Vehicle kilometres travelled in middle zone of Melbourne



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

Vehicle kilometres travelled in outer zone of Melbourne



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

Freight road use

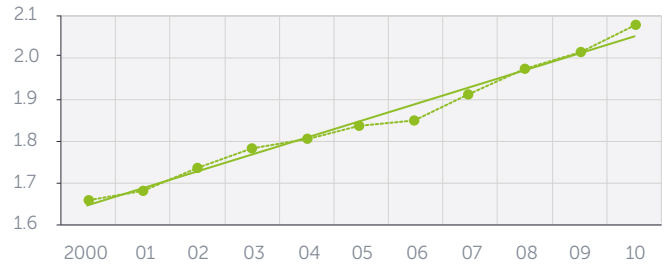
Freight movement is extremely important for the economic success of Victoria and must be effectively managed. Freight estimates on Melbourne freeways are made by counting the number and type of freight vehicles and using set estimates for the load of each vehicle.

The M1 (Monash, CityLink, West Gate) Freeway continues to carry the highest volume of freight in Melbourne, as shown in the figure below, making it vital to the city's economic success. The M80 (Western and Metropolitan) Ring Road also carries large volumes of freight while CityLink (Western Link) Freeway 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 2000, truck volumes in Melbourne have increased at an average of 2.5% per year.

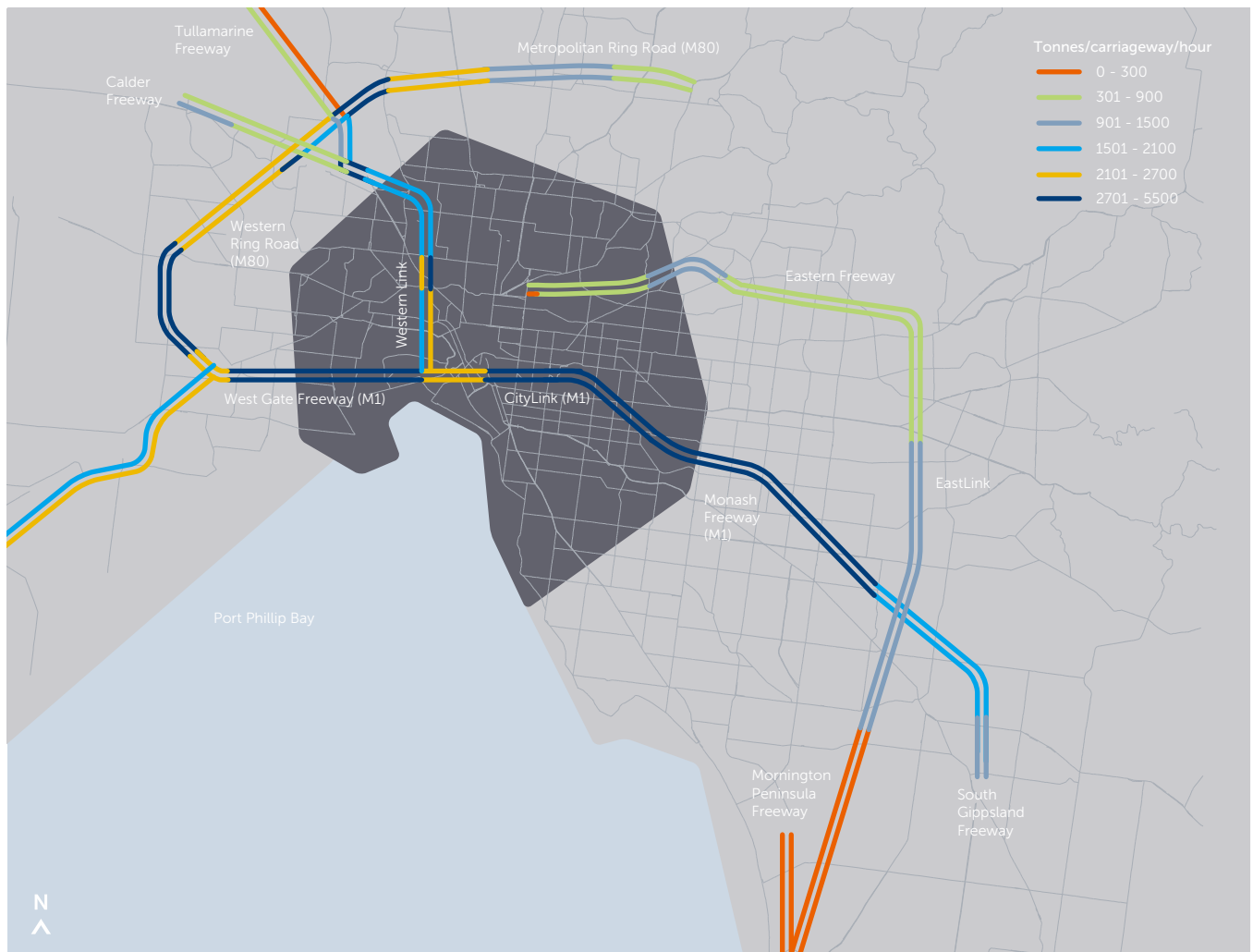
Truck vehicle kilometres travelled in Melbourne

Km (Billions)



Vehicle kilometres travelled on arterial roads and freeways by freight vehicles in metropolitan Melbourne (24 hours/day, 365 days/year)

Freeway freight volumes for 2010-11



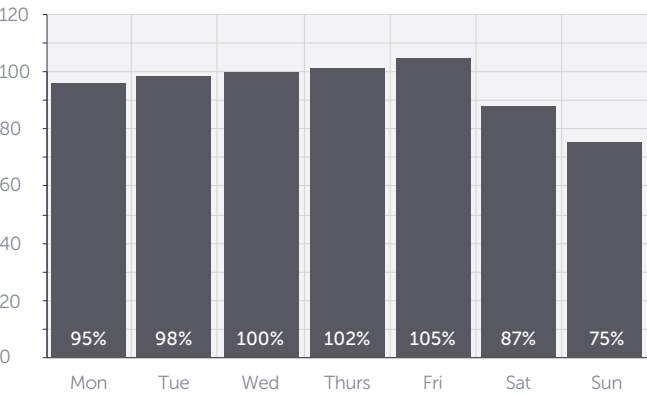
Freight volumes on metropolitan Melbourne freeways in 2010-11

Melbourne traffic profiles

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.

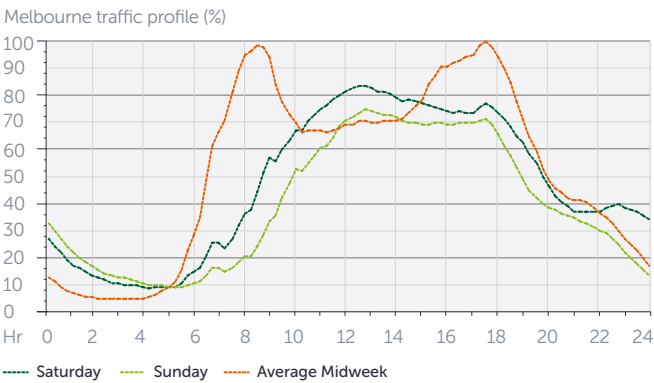
Traffic volumes by day of the week



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

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.

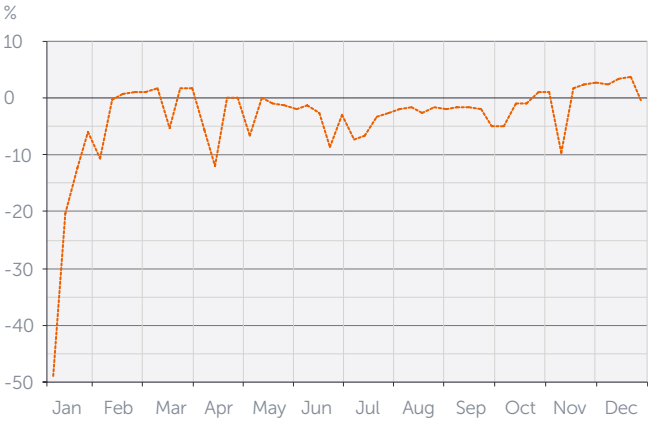
Traffic volumes by time of day



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

Traffic volumes change at different times of the year. This figure shows the variations in average weekday 24 hour traffic volume (in comparison with average non holiday week) 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.

Traffic volumes by week of the year

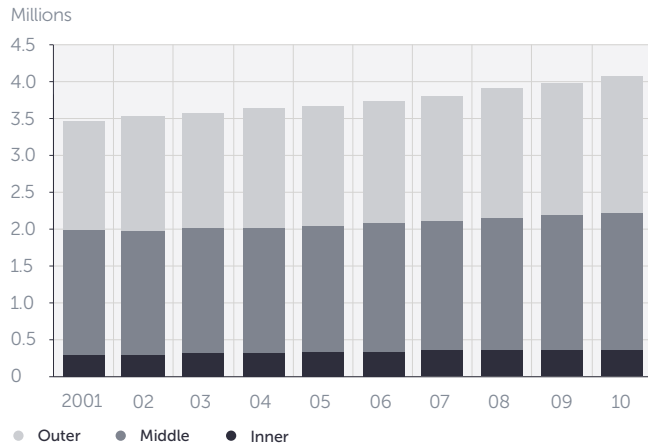


Variation from the average non-holiday week traffic volume by week of the year

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



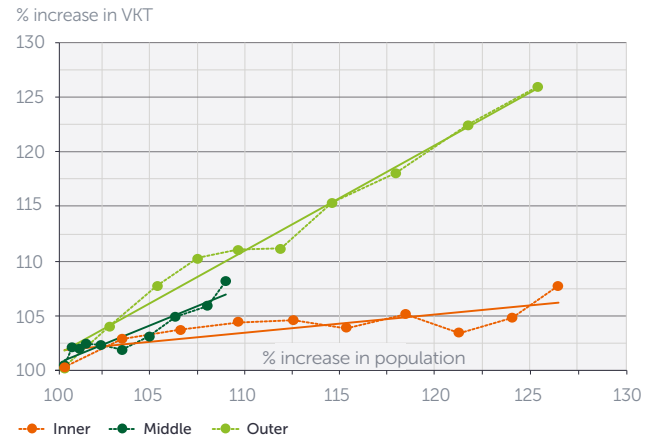
Population of metropolitan Melbourne - Source: Australian Bureau of Statistics

Population growth has occurred in all three zones although the majority (63%) occurred in the outer zone. The inner and outer zones recorded similar average annual growth rates of 2.7% and 2.6% 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 2010 this had increased to 46%. This 3% increase in population has occurred at the same time as an almost a 3.8% 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 3.6%, matched by a VKT share decrease of 2.9%. This pattern highlights the influence of population on VKT growth.

The 'Road Use Impacts of Population Growth' figure demonstrates the impact that population growth has on road use by comparing the growth in vehicle kilometres travelled (VKT) in each zone against the population growth in that same zone.

Road use impacts of population growth



Change in vehicle kilometres travelled and change in population for each zone in metropolitan Melbourne (2001 to 2010)

The growth in population in different zones of Melbourne has had varying impacts on the road network. Between 2001 and 2010 the trend shows that in the outer and middle zones the percentage growth in VKT has followed very closely the percentage growth in population. The inner zone has experienced a significantly different trend, where a 25% increase in population has resulted in only a 4% 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 as a result of better public transport provision and shorter trip lengths in the inner zone.

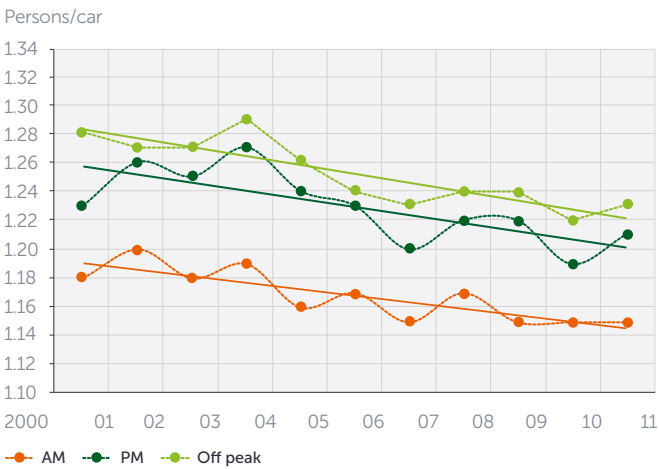
This analysis compares the population growth within a given geographical area with the traffic growth in the same area. There is an underlying assumption implied in this analysis that only people living within each zone are using the roads in that zone. This is clearly not the case, as although it is 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 'Road Use Impact of Population Growth' figure.

Travel behaviour

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 rates are recorded for the monitored network through roadside observations.

Car occupancy



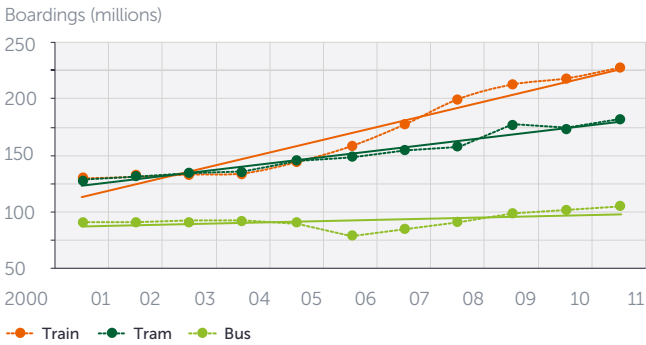
Car occupancy has been decreasing at approximately the same rate in each time period over the last 10 years. The change in car occupancy since 2000–01 is equivalent to one less passenger for every 22 cars in the morning peak and for every 18 cars in the afternoon peak. Given that a freeway lane can carry around 2000 cars per hour, this change in occupancy would mean a four-lane freeway would carry 360 less people per hour in the morning peak and 440 less people per hour in the afternoon peak.

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.

All public transport patronage figures are taken from Department of Transport’s ‘Track Record’ performance report which can be found at transport.vic.gov.au

Public transport boardings in Melbourne



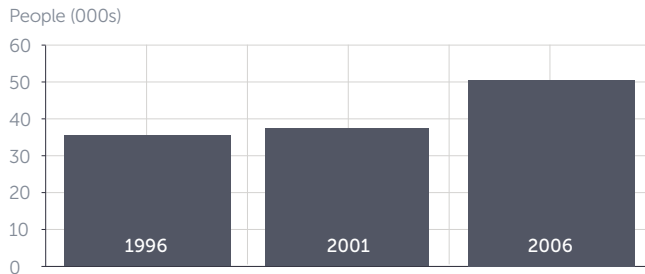
Annual public transport boardings in metropolitan Melbourne by mode

Public transport patronage has increased on all modes since 2000–01. This increase has been fastest on Melbourne trains, although trams have also experienced a rapid increase in boardings. Train trips are typically much longer than those made by tram or bus, making the increase in train boardings most significant. In Melbourne more than 85% of public transport service kilometres are on the road network making road performance critical to public transport provision.

Walking

Data on walking as a mode of transport is taken from the national census and shows the number 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.

Walking to work in Melbourne



Census response rates for walking as sole mode of transport to work.

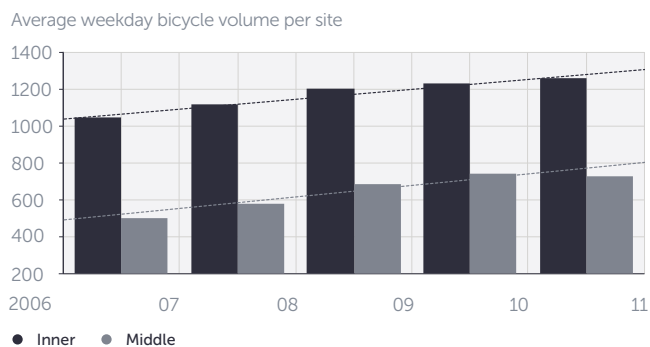
Between 1996 and 2006 the number of people walking to work in Melbourne increased by 43%. The number of people walking to work in 2006 accounted for 3% of all trips to work, more than twice the number riding bicycles or motorcycles.

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.

Sites have been selected for this report based on the availability of continuous data over the last five years. 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



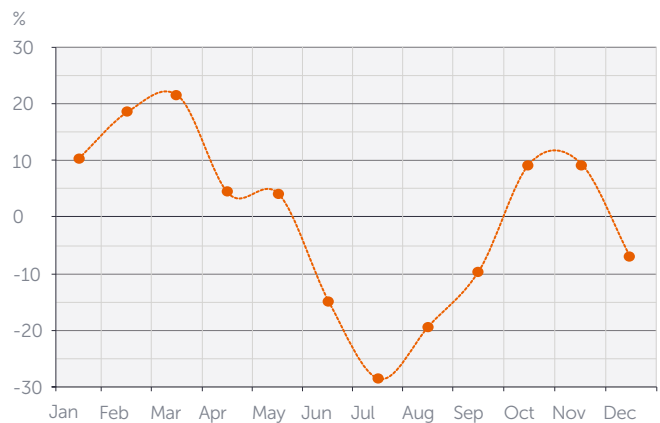
Weekday bicycle use recorded at selected permanent count sites in metropolitan Melbourne

Bicycle volumes have shown an increasing trend since 2006–07 in both the inner and middle zones. Between 2006–07 and 2010–11 recorded bicycle volumes increased by 25% in the inner zone and 60% 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.

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.

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. The only months when volumes do not follow the seasonal pattern are April and December which is likely due to holiday periods.

Seasonality of bicycle use in Melbourne



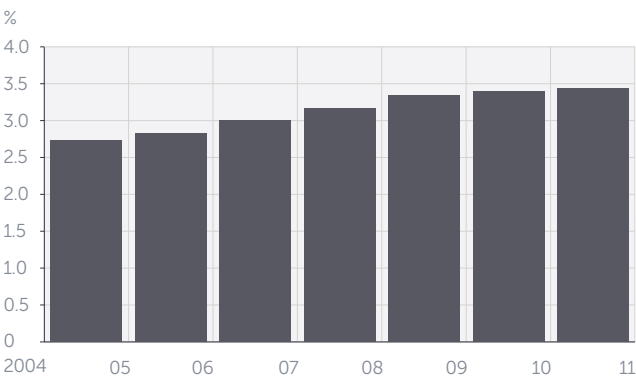
Monthly bicycle volume variation from average month – 24 hour/7 day volumes (2006/07 to 2010-11)

Motorcycles and other powered two-wheelers

The number of registered motorcycles and other powered two-wheelers* (PTW) is used as an indicator of the use of PTWs in the State. In order to put the growth in PTWs into perspective, the proportion of registered vehicles that are PTWs has been used.

The number of motorcycle registrations in Victoria has risen by 57% since 2002/03, resulting in motorcycles becoming a larger proportion of all registered vehicles. In 2010/11 PTWs accounted for 3.4% of registered vehicles in Victoria with one PTW registered for every 33 Victorians. This is compared to one light vehicle# registered for every 1.1 people.

Powered two-wheelers as a percentage of all registered vehicles



Percentage of all Victorian registered vehicles which are powered two-wheelers

*The definition of 'Powered Two-Wheeler' includes motorcycles, scooters, mopeds, motor tricycles and motorcycles with sidecars.
#Light vehicles include cars, vans and light trucks.

Petrol prices

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.

The price of petrol is a very visible component of the cost of car use. Increasing petrol prices have often been associated with reduced car use and have the potential to influence the way the road network is used.

The relative cost of fuel is measured as the percentage of the average wage that is required to purchase a 65 litre tank of unleaded petrol each week. This indicator takes into account the cost of fuel as well as the average income in order to measure the affordability of petrol.

Relative price of fuel



Percentage of the average wage needed to purchase one 65 litre tank of unleaded petrol per week in Victoria – Source: Australian Bureau of Statistics

The chart indicates that in 2010–11, the relative cost of a 65 litre tank of petrol increased from 6.8 per cent to 7.3 per cent of the average weekly wage. However, the relative cost in 2010–11 was less than in 2000–01. The relative cost of fuel peaked at 8.9 per cent in July 2008.

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

Network and Asset Planning
Telephone: (03) 9854 2592

Team Leader – Data Analysis

Road Information Services
Telephone: (03) 9090 4640

