chapter 3

3. public transport - on a roll

Melburnians are returning to the city's public transport system in historically large numbers. Indeed, recent public transport patronage growth has been so strong that Metlink was probably guilty of an understatement when it noted in its submission to the EWLNA that:

"Melbourne's public transport system is enjoying a major resurgence".[1]

The last time public transport enjoyed these levels of patronage was in the 1950s – before car ownership became widespread across the city. But – clearly – the change is on. In the last three years, patronage on Melbourne's public transport system has grown substantially, with most of the growth being on Melbourne's trains.

Analysis undertaken for the Study Team clearly identifies rail as the key public transport mode in Melbourne in terms of its capacity to move large numbers of people. However, the growing demand for train travel suggests that, in the absence of further investment, it is the public transport mode that will be most constrained in the future.

3.1 Melbourne's public transport network

Melbourne's public transport network consists of trains, trams and buses. The train and tram networks have largely developed along radial lines, while buses mostly provide local and orbital links. The network plays two key roles in the functioning of the city:

- Mass transit – primarily for people commuting to work, school or education in central Melbourne during peak periods

- Social transit – primarily for people traveling during off-peak periods or at weekends and for people who do not have easy access to alternative forms of transport.

Public transport use tends to be concentrated in the inner and middle suburbs of Melbourne, where there is a dense network of infrastructure that includes railways, tram lines and bus routes. Beyond the inner suburbs, public transport infrastructure comprises radial train services and feeder and orbital buses.

3.1.1 Rail network

Melbourne's passenger (broad gauge) rail network has been in place for more than 100 years, with the radial bones of the network being laid down in the late 19th century. The last piece of major rail infrastructure constructed in Melbourne was the City Loop, which opened in stages during the 1980s. The most recent network extension was the electrification of the Broadmeadows line to Craigieburn, which opened in September 2007.

Melbourne's rail system performs four functions:

- It provides more than 1,860 suburban passenger rail services each day that carry around 200 million passengers each year.

- It provides access to and from central Melbourne for V/Line passenger rail services that carry 15 million passengers each year – people who are commuting or travelling to and from towns and regional centres along the Geelong, Ballarat, Bendigo, Wodonga and Traralgon corridors.

- It provides access to and from central Melbourne for interstate passenger trains to Sydney and Adelaide.

- It provides for freight trains into and out of Melbourne – mostly to and from rail terminals adjacent to the Port of Melbourne.

The network is an extensive one, comprising around 430 kilometres of rail lines, 209 stations and 170 trains. The majority of the network consists of double track, although there are around 65 kilometres of single track and 30 kilometres of triple or greater track. 'Park & ride' travel is a significant feature of the system, with the suburban network including free parking spaces for around 30,000 cars.

The network is laid out on a radial basis with the CBD at its hub. A total of 16 lines progressively converge on the CBD in four distinct rail 'groups':

- Northern Rail Group – Werribee, Williamstown, Sydenham, Craigieburn and Upfield lines

- Caulfield Rail Group – Sandringham, Frankston, Cranbourne and Pakenham lines

- Clifton Hill Rail Group – Hurstbridge and Epping lines

- Burnley Rail Group – Lilydale, Belgrave, Alamein and Glen Waverley lines.

The four groups converge on the Inner Core Network, which comprises the Melbourne Underground Rail Loop, Flinders Street Station and Southern Cross Station, as well as the links to North Melbourne, Jolimont and Richmond Stations. Three stations are located on the underground loop: Parliament, Melbourne Central and Flagstaff.

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1. Metlink submission to the EWLNA (2007), p.4

Figure 26 – Melbourne's passenger rail network
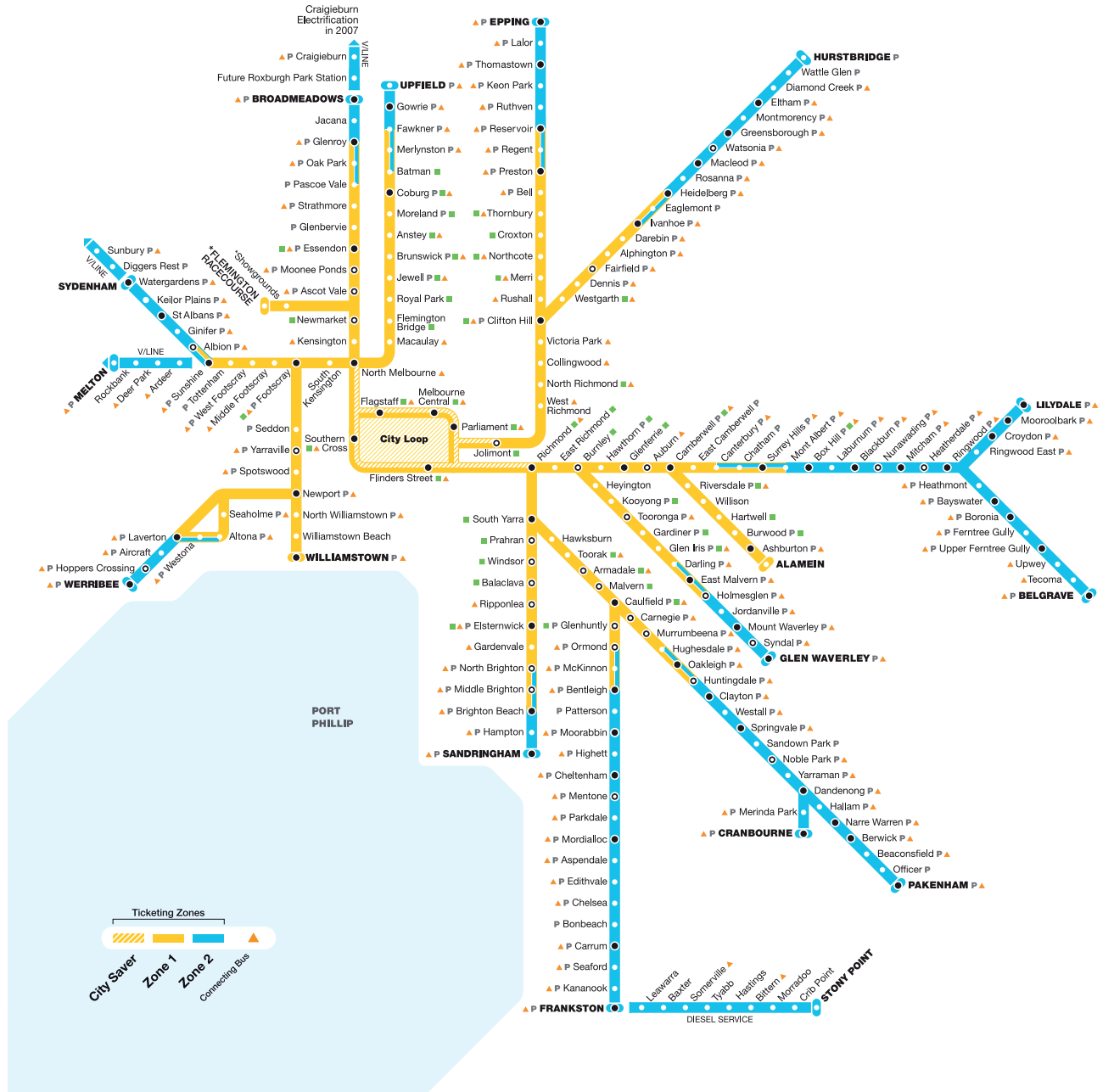
Source: Public Transport Division (DOI)

The network is oriented around moving large numbers of commuters into and out of central Melbourne. In the morning peak period, around two thirds of travel from suburban stations has a final destination at a City Loop or Inner Core station (with around 68 per cent of travellers going to work and around 25 per cent going to school, university or college). Over the course of an entire day, around half of all trips are oriented toward the City Loop or Inner Core stations.

Each rail group operates through the Loop, with one track dedicated to each group. However, not all lines operate through the Loop because of capacity constraints and conflicts with other lines. These trains travel direct to Flinders Street and either travel through the CBD or reverse back out.

Running these four rail groups is a complex operation, especially during the morning peak hour when more than 100 suburban and V/Line trains arrive in central Melbourne.

As with the road network, Melbourne's rail network has a theoretical daily capacity that exceeds demand. However, there is a considerable imbalance between heavily loaded peak period trains and relatively lightly loaded off-peak trains. This imbalance means that the network runs at capacity for relatively short periods, while trains throughout the rest of the day carry relatively low numbers of passengers – although recent patronage growth has meant significant loads on a number of off-peak services.

Changes to the rail network

A number of changes to the network were announced through the Victorian Government's *Meeting Our Transport Challenges* statement, including:

- Track duplication – Clifton Hill to Westgarth, Keon Park to Epping

- Track triplication on the Dandenong line

- Sunshine track triplication/quadruplication

- New train stabling facilities near Werribee

- Signalling upgrade – Hurstbridge line, Werribee line

- Loop reversal – Clifton Hill group

- New stations at Lynbrook, Cardinia Road, Point Cook, Coolaroo

- Additional platforms at Sandringham, Pakenham, Dandenong

- Expanded Park and Ride facilities

- New trains

- Station interchange upgrades across the network.

3.1.2 Tram network

Melbourne's tram network is now the largest in the world in terms of operational track length (after St Petersburg recently removed some track from its network). The network includes around 240 kilometres of double track, 475 trams and 1,813 tram stops. Trams operated along 27 routes and carried 150 million passengers in 2006-07 (the highest level for several decades).

The tram network extends from the CBD to inner and middle suburbs and is largely a high capacity commuting option for inner city residents. Operations are carried out in four different environments:

- Shared on-street operations (sharing the road with other vehicles)

- Exclusive right of way operations

- Segregated in road median operations

- Segregated on-street operations.

Currently a range of trams are in service across the network, from 50-year old W class trams (operating along heritage routes) to modern D class level access trams.

Tram operations are much less complex than rail operations. Trams generally run the full distance between terminals all hours of the day and week, with regular service frequencies along each route of 4 to 8 minutes during peak periods, 8 to 12 minutes during the day and 15 to 20 minutes in the evenings and at weekends.

Figure 27 – Melbourne's tram network

Source: EWLNA

Reliability is the key issue for tram operations in Melbourne, with several factors playing a role:

- Tram stops are located at varied spacing along each route. Most stop intervals are between 200 and 500 metres, but in places they are less than 200 metres. While close stop spacing increases convenience in terms of access, it reduces the average speed of the service – making tram travel frustrating for passengers, especially commuters.

- Most tram routes converge on the CBD, with many routes sharing track and stops as they get closer to the central city. This increases the frequency of services, but can also lead to irregular service frequencies, imbalanced passenger loads, congestion and slower speeds.

- Unlike the separated tram systems in many other cities, the vast majority of Melbourne's network involves shared on-street operations. This means that priority for trams is a significant issue, with delays caused by traffic signals, obstruction by other road vehicles and traffic congestion. These delays mean that service speeds are slow by world standards, averaging 15 km/hour across the network and slowing to an average speed of 11 km/hour in the CBD.[2] While the segregated sections of track achieve speeds of around 25 km/hour, this represents only a small portion of the network; however, these sections are a good indicator of the speeds that can be achieved when priority is given to trams.

Changes to the tram network

In recent years, a number of extensions have been made to the tram network, including:

- Routes 30 and 48 extended to Docklands

- Route 109 extended from Mont Albert to Box Hill

- Route 75 extended and a new tram/bus interchange built at Vermont South

Other improvements to the network include:

- Extension of tram operating hours on Friday and Saturday nights

- Extension of the Think Tram program (which gives more priority to trams to improve travel speeds)

- Replacement of stepped access trams with low floor, level access trams (and the leasing of five new high capacity, low floor trams ahead of the next delivery of new trams)

- Replacement of kerb access and safety zone stops with raised platform stops

- Introduction of tramTRACKER, which enables passengers to call or SMS a remote tram tracking system to find out when the next tram will arrive.

3.1.3 Bus network

Around 250 bus routes serve metropolitan Melbourne, recording approximately 85 million boardings each year. Most services operate in the middle and outer suburbs, with only a relatively small number of routes serving the CBD and inner suburbs.

In general, buses provide public transport in areas of the city that are not close to the rail and tram networks and they are the only form of public transport that is easily accessible for a great many Melburnians.

Buses perform several important functions:

- Radial routes link middle and outer suburbs with the CBD (especially those areas that are distant from or between rail and tram routes, such as the western suburbs and the Doncaster corridor).

- Orbital cross-town routes link major suburban centres, providing opportunities for cross-town travel without having to go through the CBD.

- Feeder routes provide access to local shopping centres, service centres and railway stations.

While buses are the primary form of public transport in many cities around the world, historically Melbourne has not managed its bus network particularly well by global standards. While other cities have moved to high capacity, sophisticated Bus Rapid Transit systems, buses have remained something of a 'poor relation' in Melbourne's transport network.

For many years, the city's buses have not provided a convenient transport option for most people due to low frequencies and limited hours of operation. Until recently, most routes did not operate later than 7pm on weekdays and many routes do not operate on Sundays. In many suburbs, bus frequencies have been low compared to tram services and services between key activity centres have been indirect and circuitous.

Through its *Meeting Our Transport Challenges* statement, the Victorian Government is significantly improving bus services across Melbourne. Additional services, route extensions and more frequent services should make bus travel a more attractive and convenient travel option.

New SmartBus routes are also improving the range and reliability of bus services across the city. These routes operate 19 hours a day at no more than 15 minute intervals for most of the day on weekdays and 30 minute intervals on weekends. The SmartBus rollout will deliver a higher quality bus service along new orbital routes across Melbourne, giving people more options to make a cross-city trip without having to change buses or pass through the central city. Four new SmartBus orbital links are currently planned for Melbourne.

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2. Metlink submission to the EWLNA (2007)

Figure 28 – Melbourne's bus network

Bus Routes

Source: EWLNA

While the use of bus services across the city is increasing – and services are being improved and extended – the bus network still faces constraints to further growth, including:

- Restricted hours of operation and low service frequencies

- Indirect and circuitous routes

- Limited provision of up-to-the-minute information on services and timetables

- Vulnerability of services to accidents and congestion.

Changes to the bus network

Changes to the bus network being made through the *Meeting Our Transport Challenges* statement include:

- A new network of cross-town SmartBus routes on major arterial roads, including four new orbital routes through Melbourne's suburbs

- Improvements to local bus services, including new routes, extensions to existing routes and upgrades to services on more than 250 routes (with services running later and more frequently)

- Additional measures to give buses priority at intersections

- Minimum service standards applied to all routes, including minimum service frequencies and hours of operation

- Upgrading of services to Doncaster as part of the Doncaster Area Rapid Transit (DART) project to provide a level of service that is comparable with trains and trams (see Chapter 7).

## 3.2 Melbourne's trains – a resurgence in patronage

Across the city, the demand for train travel is increasing. Patronage growth on Melbourne's rail network has been more than 30 per cent over the past three years – an annual average growth rate of 10.2 per cent, a sharp contrast to the 1 or 2 per cent growth rates over the previous two decades. There are no signs of this growth slowing.

This strong growth means that in 2007, an additional 160,000 people were travelling each day on Melbourne's trains compared to 2002. With a typical electric suburban train in Melbourne regarded as overcrowded when it holds more than 800 people, this represents the equivalent of an extra 200 trainloads.

In 2007-08, Melbourne's train system will carry about 200 million passengers[3] – an historically high number exceeding the peak of the 1940s and 1950s. However, when measured in passenger kilometres – rather than simple passenger numbers– today's rail system performs a much greater task than in the 1950s (see *Melbourne's trains – then and now*, page 76).

When discussing the resurgence in rail travel, it is important to keep in mind that the overall number of trips being made each day in Melbourne is growing rapidly. This means that, while public transport's share of daily journeys to work has grown from 13.4 per cent in 2001 to 14.5 per cent in 2006,[4] the number of car trips still greatly exceeds public transport trips by a factor of 5 to 1 (although car trips are growing at a slower rate).

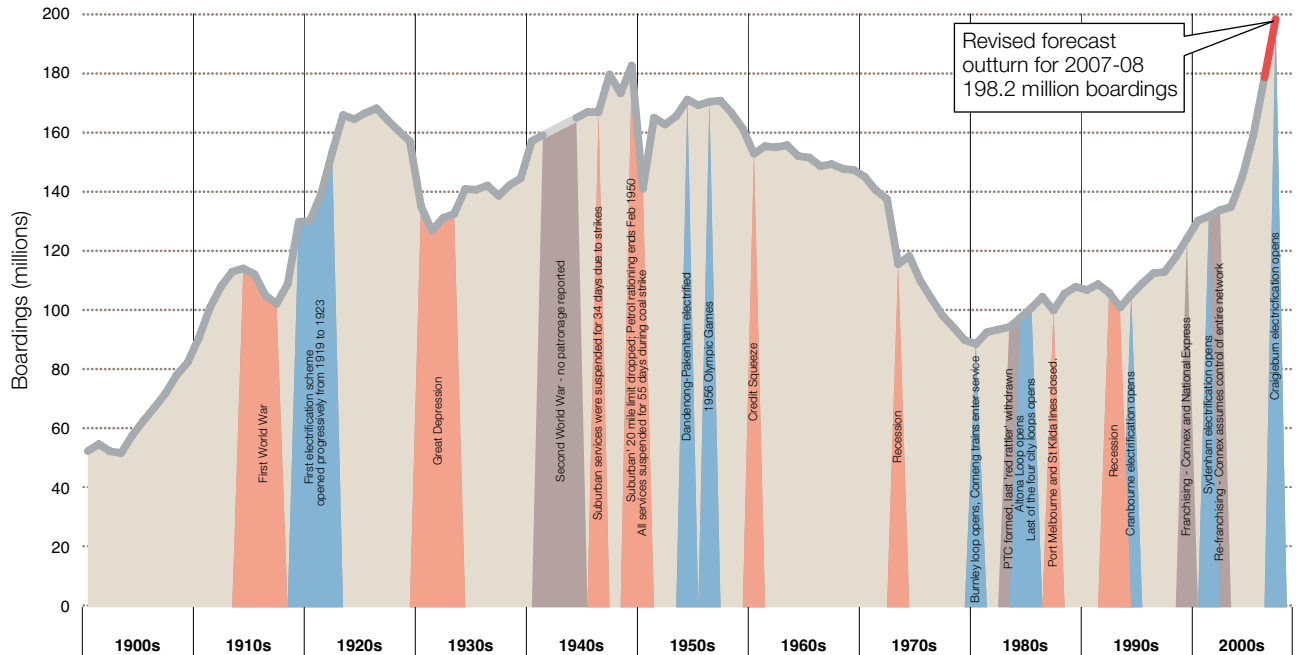*Figure 29 – Train average annual patronage growth, 1983 to 2007*
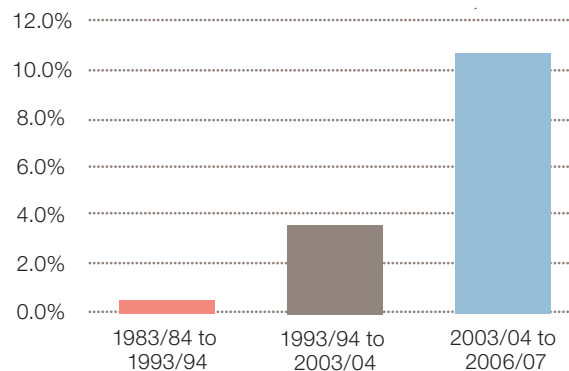
Source: Public Transport Division, DOI

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3. Information provided by the Public Transport Division, Department of Infrastructure
4. DOI (2008) - Using ABS Census 2006 data

Figure 30 – Estimated metropolitan train patronage, 1900s to 2000s (excluding Commonwealth Games)

Note:
Prior to 1982-83 patronage was enumerated as journeys derived from ticket sales.
Figures prior to ths date have been factored up by 5% to allow for journeys involving more than one train boarding.

Source: Public Transport Division, DOI

3.2.1 Why the resurgence?

A recent survey conducted by the Public Transport Division (PTD) of Victoria's Department of Infrastructure provides some explanation for the resurgence in rail travel in Melbourne.

First, the size of the public transport market is expanding due to strong population and jobs growth in central Melbourne and in the city's growth corridors, particularly the middle suburbs where public transport provides a good alternative to car travel. As noted throughout this report, public transport's largest market is delivering people to work in the central city: in the past three years, strong CBD employment growth has meant that more people need to get to work in the city and are using public transport for that purpose.

Secondly, there is some evidence of a shift in people's travel behaviour. While this is difficult to determine, many factors appear to have aligned to make public transport more attractive, including rising petrol prices, increased congestion, the abolition of Zone 3, the desire for more exercise, environmental concerns and parking costs. In addition, many Melburnians tried out the public transport system for the first time, or after a long break, during the 2006 Commonwealth Games – and discovered the benefits of train travel. Some of that market has been retained.

The PTD survey shows the importance of cost issues in changing people's behaviour, with petrol prices and parking costs (including the Victorian Government's congestion levy) strongly influencing Melburnians' travel choices. The relative convenience and low stress aspects of travelling by train were also strong factors, especially among older travellers, suggesting that traffic congestion is having an impact on behaviour. Environmental concerns about greenhouse gases and climate change were a factor, although not generally people's primary concern.

A number of submissions to the EWLNA argued that as petrol prices continue to increase, more and more people will turn to public transport. The PTD survey supports this to some extent, with many people making the shift away from private vehicle travel saying that they have done so due to petrol price increases.

However, car owners will consider whether public transport is a viable alternative to using their cars based on a number of factors in addition to petrol prices, including the type of trip, its origin and destination, the urgency of the trip, the perceived safety of the trip and the time available to complete the trip. The fact that car travel is better suited to a wider range of trips than public transport is reflected in the evidence that, while public transport enjoys a strong market share in daily work trips to the central city (see Chapter 2.2.3), the vast majority of all trips around Melbourne are made by private vehicle.

Melbourne's trains – then and now

With the city's train system only recently exceeding the number of passengers carried in the 1950s, some Melburnians ask the question: if the system could carry that many people 50 years ago, why is it so hard today?

The geographic expansion of Melbourne (with low density land use and widely spread employment and residential locations), together with the introduction of express commuter trains, means that a direct comparison between the passenger numbers carried today and those carried in the 1950s is more complex than simply counting passengers.

Melbourne has changed considerably since the 1950s – and so has the way the city's trains are operated. In the 1950s Melbourne's population was around 1.5 million, with 70 per cent living within 10 km of the GPO. Today, Melbourne's population is moving towards 4 million, with around 16 per cent of people living within 10 kilometres of the GPO.[5]

Industry was concentrated in the inner and middle suburbs, meaning that people had very short journeys from home to work. In addition, very few people owned cars – in 1950, there were less than 200,000 cars in Melbourne (around 113 vehicles per 1,000 people) compared to today's 3.5 million vehicles (around 680 vehicles per 1,000 people).[6]

With such short journeys to work and with so few people owning cars, there was no great demand for express trains over such short distances, and no competitive pressure from car travel. Melbourne's trains ran regular services of short distances compared to today, with very few express trains.

In 2008, express trains are a highly valued part of the metropolitan train timetable, with some Melburnians commuting 40 or even 60 km each day from the outer suburbs to the CBD. Express trains were introduced partly as a response to competition from the rise in car ownership: as car ownership exploded in the 1960s, people began to leave the public transport system and a long steady decline commenced that has only recently turned around.

Express trains 'eat up' capacity. Where express trains share track with 'stopping all stations' trains, greater space between trains must be 'hard coded' into the timetable, limiting the number of trains that can be run on the line. Reducing the number of express trains would help to increase capacity, but would significantly increase travel times from the outer suburbs and may dissuade commuters from using the train at all. Boarding data supplied to the EWLNA shows a clear commuter preference for express trains, with maximum loads on these trains and 'stopping all stations' trains carrying significantly lower loads.

The distance people travel on the train has also increased as the city has grown. Today, the average journey length is around 18 km; in 1930, it was less than 11 km. The result is that when the number of passenger kilometres run today is compared to that of the 1950s, the load being carried by the system in 2008 is far greater.

In addition, the peak hour 'spike' is far more extreme today than in the past. Today, the system has to cope with a peak period of extreme demand that is 50 per cent greater than 1969, stretches system capacity and makes it difficult to meet that demand with extra services.

These differences between the way the system operated in the 1950s and today mean that direct comparisons about passenger numbers are misleading.

Figure 31 – Percentage of trains running express, 1940 and 2006

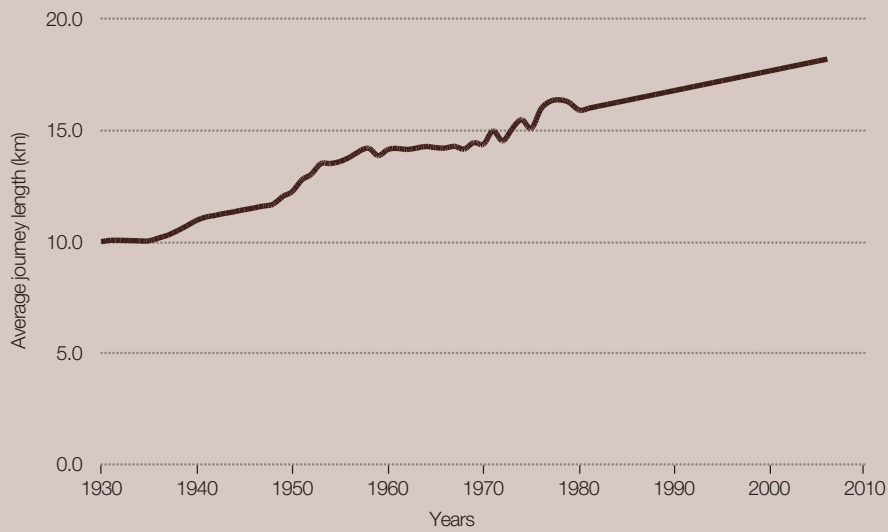5pm to 6pm departures
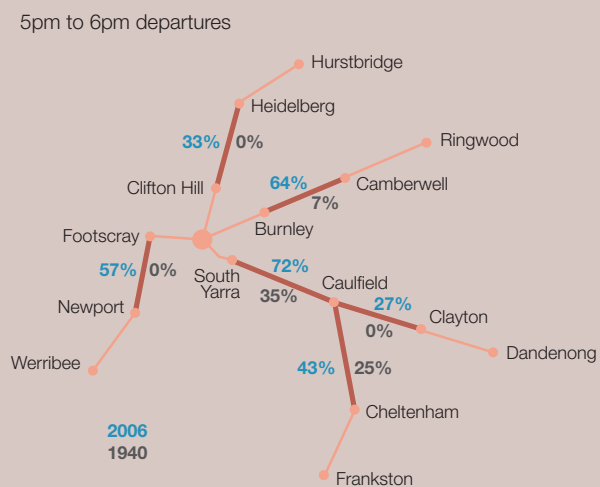
2006
1940

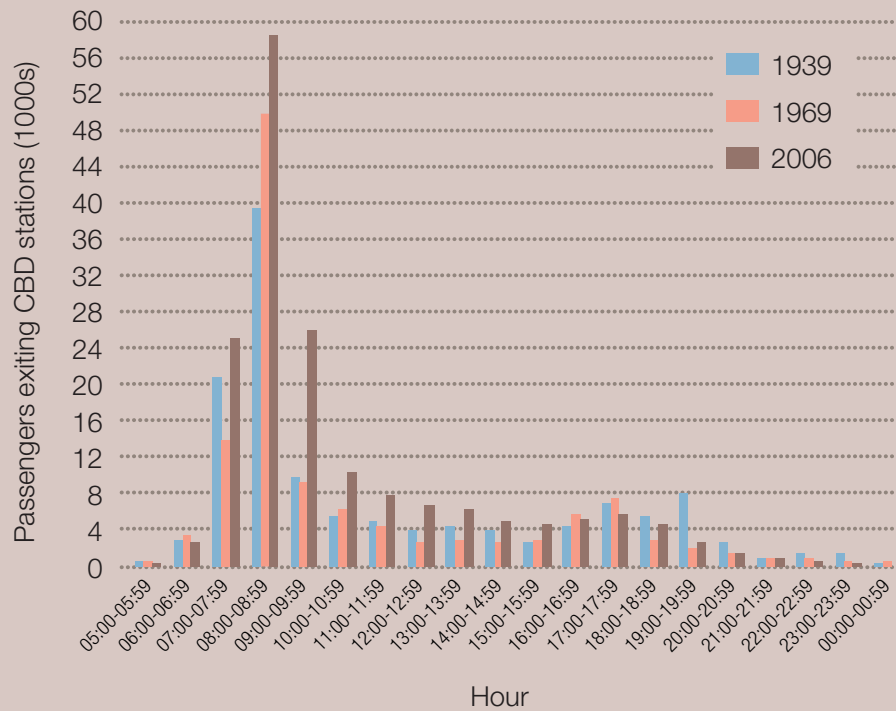Source: Public Transport Division, DOI

5. DSE (2006)
6. DSE (2006)

Figure 32 – Average distance passengers travel by train, 1930 to 2006

Source: Public Transport Division, DOI

Figure 33 – CBD station exits, 1939, 1969 and 2006

Source: Public Transport Division, DOI

3.2.2 Future growth and trends

Planning for service changes and capacity enhancements to Melbourne's rail system requires long term forecasts of patronage demand. In some ways, making such forecasts and then shaping the system to meet them is self-fulfilling. If no system capacity or operational changes are made, patronage will inevitably plateau at capacity; making more system enhancements and improving the service will attract more people.

As noted in Chapter 2.3, the Study Team used a multi-modal transport model and worked with the Public Transport Division (PTD) to consider the possible impact of the recent resurgence in rail patronage. This resulted in a range of rail patronage forecasts used by the Study Team as the basis for considering the need for enhancements to the rail network. Not surprisingly, given the recent growth rate, the PTD forecast was higher than the Study Team model output.

At the upper level, the PTD forecast recognises that the key drivers of recent growth are not expected to abate in the immediate years ahead: population growth will continue, as will growth in CBD employment. With the price of oil expected to trend upwards, the PTD forecast assumes that petrol prices will rise in real terms and that other factors, such as environmental concerns and congestion, will also continue to influence modal choice.

At the lower level, the EWLNA transport model forecast examines the demand outcome in the event that recent trends are a short term aberration and that only population and CBD employment growth drive patronage, rather than behavioural change in the longer term.

Accordingly, the patronage forecast range assumes:

- *PTD forecast* – a continuation in the factors driving behavioural change in recent years at a lower, but still historically high, growth rate of **6.6 per cent** per annum, tapering off after 2021. The forecast growth rate would vary from line to line in the network.

- *EWLNA transport model* – assumes that patronage growth will follow more historic patterns and grow along with the size of the market (through population growth and CBD employment growth), with other issues that have recently driven patronage growth continuing for a short period, then tapering off. This scenario is the equivalent of **2.1 per cent** patronage growth per annum. The forecast growth rate would vary from line to line in the network.

The EWLNA transport model predicts a public transport modal share of motorised trips of around 9 per cent by 2031. If capacity is not provided to allow patronage to grow to its potential, the Study Team believes the Victorian Government's 20/2020 target (public transport comprising 20 per cent of motorised trips by 2020) cannot be met.

Given Government policy and recent changes in community travel behaviour, it is important that (when planning the future rail network) the ability to meet public transport patronage objectives is not constrained by capacity limitations. Accordingly, the Study Team considers there is a compelling argument for making network investment decisions based on the higher PTD forecast.

Achieving the level of behaviour change assumed by this forecast would go a long way towards contributing to the Victorian Government's 20/2020 target.

Applying these forecasts to Melbourne's four rail groups, it is evident that the strong growth in train travel will place the rail network under considerable additional stress, with the greatest pressure occurring on the Northern and Caulfield Rail Groups due to capacity constraints.

As shown in Table 10, strong patronage growth is already taking place across all line groupings, but the strongest growth is occurring in Melbourne's growth corridors. The most pronounced is the Northern Group, servicing Melbourne's rapidly growing west, north-west and northern suburbs. Each year for the last three years, this group has recorded a very substantial 13 per cent increase in patronage.

The number of trains that will be required to service this increasing passenger demand is substantial. Using the Northern Group as an example, about 20,000 people catch the train during the busiest hour in the morning peak. By 2021, this will have increased to 45,000 people, if recent behavioural change continues. Even if recent behavioural change does not continue, population growth and employment trends will see passenger numbers increase to 36,000 in the busiest hour.

Table 10 – Annual patronage growth forecasts, AM peak hour

	Actual 2004-2007	EWLNA Transport Model 2008-2031	PTD 2008-2031
Northern	12.9%	3.1%	9.5%
Caulfield	8.4%	1.7%	5.5%
Burnley	4.3%	0.9%	3.4%
Clifton Hill	5.9%	2.1%	7.0%
All Services	7.6%	2.1%	6.6%

Source: Public Transport Division, DOI

With the standard capacity of Melbourne's trains at 800 passengers per train trip, growth of this magnitude will require very substantial increases in peak hour services.

Of course, the spare capacity on each line grouping varies. Where there is spare capacity on the network, increasing the number of services is as 'simple' as purchasing new rolling stock, making timetable additions and commencing operation of the services.

However, in some instances, minor or major infrastructure works are necessary before new services can be added. In addition, the timetabling changes required to add services can have a negative impact on customers. For example, the removal of a popular express service or a City Loop service – or the slowing down of a V/Line service – may create a pathway for an additional train, but would be regarded by some as a reduction in service. The end result is an increase in overall services for commuters.

3.2.3 A system under strain

As people board Melbourne's trains at record levels, the signs of strain in the system are beginning to show.

Since 2005, the number of trains suffering 'load breaches' has been rising steadily (see Figure 34). A load breach is defined as more than a rolling average of 798 people on board (bearing in mind that there are typically 528 seats on a suburban train). Not only are there more trains suffering load breach; the amount by which they are in breach is increasing.

While reliable statistics are not available, there is evidence that many people are being left behind on platforms, unable or unwilling to board excessively crowded trains. This is most likely to occur when a train service has been cancelled or is running late.

Melbourne's rail operator Connex, in conjunction with the Victorian Government, has been introducing new services to meet and encourage the growing demand for train travel. However, as the train network runs closer to capacity – and more trains are added to an already crowded timetable – there is less room to recover from incidents and delays, and the overall reliability of the network deteriorates.

Incidents will always occur, many outside the control of the rail operator: vandalism, passengers falling ill and level crossing accidents fall into this category. There are also system failings: trains breaking down, signal faults, track maintenance, capital works, driver shortages and long 'dwell' times at stations as people try to alight and board crowded trains. When there are gaps in the schedule, incidents or breakdowns can be more easily 'worked around'. As the gaps in the timetable are taken up to provide more services, the impact of these incidents is more difficult to manage and more trains are adversely affected.

Figure 35 shows reliability levels in recent times on Melbourne's suburban rail system during the morning peak. It shows a system that is losing its flexibility to recover when incidents occur. It also shows a system beginning to feel the first signs of capacity constraint.

These results demonstrate that while the surge in train patronage is welcome and should be encouraged, finding ways to meet the demand is proving problematic. This is reflected in declining levels of public satisfaction with the train system. At the same time that Melburnians are returning to the system, growing problems of reliability and overcrowding are having a negative impact on people's perceptions and feelings about the quality of their travel experience.

This decline in customer satisfaction is another manifestation of a system under strain (see Figure 36). Importantly, it also undermines efforts to encourage more people to shift away from private vehicle travel in the future.

Figure 34 – Train overcrowding – load breaches on morning peak period trains, 2001 to 2007
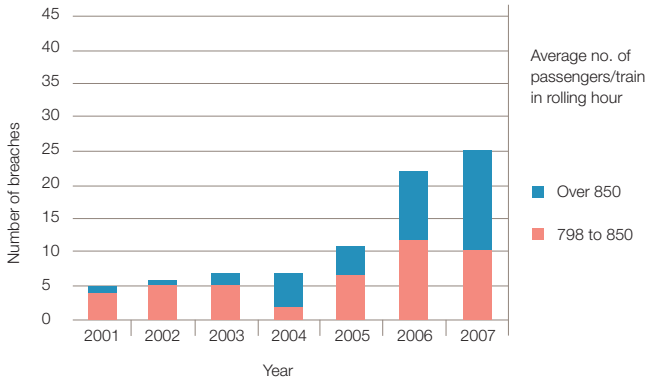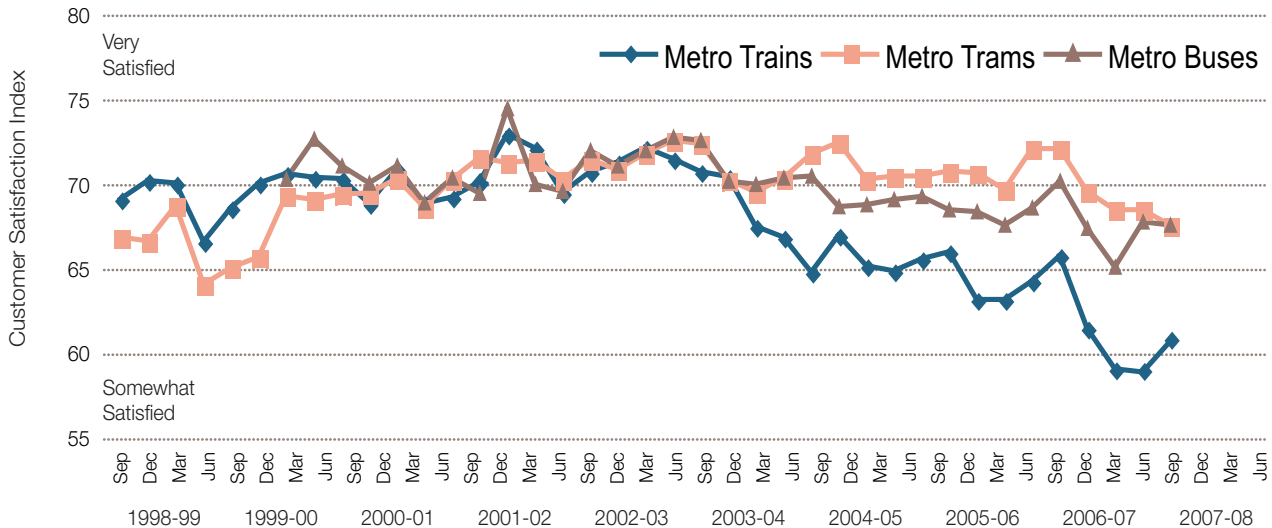

Source: PTD and EWLNA. (Figures are average annual growth. Projections assume a high initial growth rate, tapering off over time.)

Figure 35 – Reliability of morning peak services, 2001 to 2007
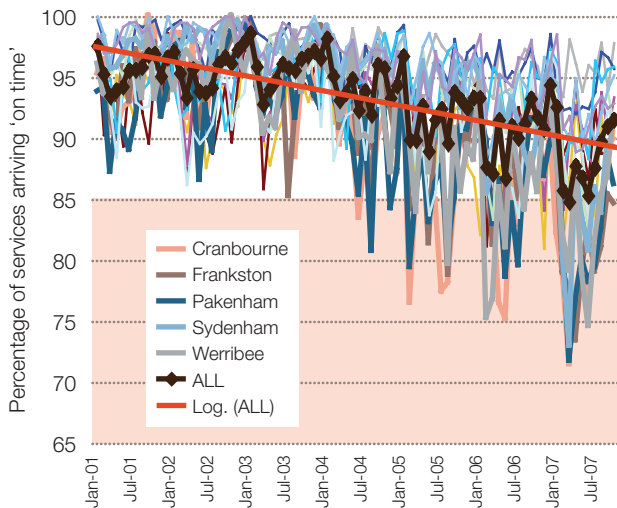
Source: Public Transport Division, DOI

Figure 36 – Customer satisfaction index for overall satisfaction with metropolitan public transport

Source: Public Transport Division, DOI

3.2.4 Limits on rail capacity

The design of rail network infrastructure, the operational systems used to control the movements of trains, the design and length of trains, and the design of stations all contribute to the rail system's capacity. In particular:

- The *geographic reach* of the network affects its capacity. Melbourne's track network has not altered much since the early 1940s. With the exception of the Melbourne Underground Rail Loop, and extensions of the electrified network to Pakenham, Cranbourne, Sydenham and Craigieburn, there has been little change in the broad reach of the network. However, as many people who live beyond the network's reach drive to their nearest stations to commence their train journeys, network extensions may reduce some car travel to and from these stations but will not necessarily translate into greatly increased rail patronage.

- *Single or double track* is a major determinant of system capacity. Since the 1940s, much of the single track has been duplicated, allowing for bi-directional running, although some single track remains on the network.

- *Train pathways and stopping patterns* also affect capacity. Each railway line has a finite number of train pathways[7], which are determined by the characteristics of the infrastructure and the frequency and type of trains operated. Because express services are provided for longer distance commuters (and usually share the same track as other trains that stop at all stations), the timetable must be constructed to provide enough space between trains to allow free running for express services without running up against slower trains. This reduces the number of pathways that can be provided on each line.

On many of the Metro systems that people experience when travelling in cities such as London, Paris and Singapore, all trains run end to end and stop at all stations. In such instances, with all trains running to uniform stopping patterns, it is possible to add many more train pathways to a line. However, adopting this option in Melbourne would mean the reduction or removal of express services at great disadvantage to outer suburban commuters – and, ultimately, at the expense of public transport patronage.

- The track configuration at *junctions and terminal stations* directly influences the capacity of the network and the number of pathways that can be provided. Trains need to be separated at points of conflicting movements to ensure safe operations. Melbourne's rail network has many such points of conflict, with lines converging as they approach the city centre near stations such as Footscray, North Melbourne, South Yarra, Caulfield and Clifton Hill. The network plan in Figure 37 shows how every junction and conflict point reduces the capacity of the lines joining at that point.

For example, in the afternoon peak hour on the Werribee line, four trains run to Werribee. The 20 train per hour limit between the city and North Melbourne means that Werribee services cannot be increased without reducing services on the Williamstown, Watergardens, Broadmeadows or Upfield lines.

Similarly, the seven trains to Frankston in the evening peak period cannot be increased without an impact on Cranbourne or Pakenham services.

While this analysis is a little simplistic (shuttle trains between conflict points and other timetable variations can squeeze more local services from the system), it demonstrates that the high number of junctions and conflict points in Melbourne makes large service increases difficult without major infrastructure works.

- *Other constraints* affecting the capacity of the system include signalling systems (with more sophisticated systems enabling smaller 'headways' between trains); power supply capability (with some substations along the network supplying only two trains, while others provide for more than five trains); train dwell times (with trains spending longer at stations as trains and platforms become more crowded); and passenger access and egress (with the controlled movement of passengers onto stations, platforms and trains a key factor in minimising delays).

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7. The railway timetable is constructed on the basis that a train can run without being held unduly at stations, from origin to destination. This train run is termed a pathway. A mixture of stopping patterns for trains sharing a track reduces the number of pathways that can be provided.

Figure 37 – Number of services departing Melbourne between 5pm and 6pm, 2006

Source: Public Transport Division, DOI

3.2.5 Expanding rail capacity

Good economic management demands that the best use is made of existing assets before investing in expensive new ones.

The Study Team notes that the Victorian Government has recognised the need – and taken action – to expand the capacity of Melbourne's public transport network. The Government's 2006 *Meeting Our Transport Challenges* statement provides $2 billion for rail network and service improvements and $1.3 billion for new trains and trams.

PTD has identified two stages of system enhancement to augment capacity across the network:

Stage 1: Immediate initiatives

A program of operational changes, new infrastructure works and pricing incentives are underway or are being planned to expand peak capacity until the arrival of new generation rolling stock (commencing in 2013) and to allow maximum utilisation of this new stock when delivered. These initiatives include:

- Demand management initiatives – including free 'early bird' travel to encourage passengers to travel before the morning peak period and the 'Flex in the City initiative, where employers permit flexible work hours for employees to further encourage commuters to travel outside peak hours.

- Interim rolling stock – steps are being taken to expand the available train fleet in advance of new generation trains, including the purchase of 18 trains of the current style (to be delivered from late 2009) and associated train stabling and maintenance facilities; and the introduction by Connex of more efficient train maintenance procedures that have already released an extra 9 trains for daily service and are expected to release a further 4 trains by the end of 2008.

- Simplified operating patterns – including aiming to have no more than two stopping patterns on the one track; simplified timetables supported by depot and maintenance facilities that will allow direct running into and out of service without complicated positional runs; exploration of the potential to run more trains direct to and from Flinders Street rather than through the City Loop; and the upgrading of Laverton Station (to allow more services to run on the Werribee line).

- Separation of metropolitan and V/Line services in the south-east through the triplication of sections of the Dandenong line.

- Additional tracks – implementing the MOTC program of works that includes adding tracks to existing lines, improving platforming at terminal stations, adding new stabling and maintenance facilities and upgrading signalling.

Stage 1: Additional initiative – Sunbury electrification

As noted throughout this Chapter, the Northern Group of lines are under significant pressure from growing patronage. The Sydenham line services are the most heavily loaded on the suburban railway network, with strong growth projected into the future.

Patronage on the line has grown by 55 per cent over the past three years – the most rapid growth on the network. Peak hour services are severely overcrowded, with trains regularly carrying more than 1100 passengers. The increase in patronage has also led to a substantial decline in reliability, with peak period train services on the Sydenham line declining from 96 per cent in 2002-03 to 82 per cent in 2006-07.

Capacity on the line can be significantly improved with the electrification of the line to Sunbury.

The extension of electrified services to Sunbury would allow an additional 2,800 passengers to be carried in the morning peak period. It would relieve the chronic overcrowding on the Sydenham line and improve reliability of services. It would also provide Sunbury and Diggers Rest with a quality of service comparable to other parts of the Melbourne metropolitan area.

The EWLNA Study Team notes that this project would deliver very significant benefits to Melbourne's growing west and north-west and could be undertaken in the short to medium term.

Stage 2: New generation trains

The replacement of existing trains and the provision of new services provides an opportunity to provide more capacity commencing in 2013. With nearly one half of the existing train fleet being replaced over a period of eight to 10 years, two main options are available for the design of the new fleet:

- Double-deck trains

- Single deck trains re-configured for increased capacity.

Double deck trains offer more capacity on each train but the longer loading and unloading times (longer dwell times) reduces the numbers of trains that can be run. New single deck trains could be designed with wider doors for reduced dwell times and higher passenger capacity through different seating configurations. Either option will allow for a 25 per cent increase in effective line capacity.

The design of existing central area stations, especially in the underground loop, effectively precludes the operation of significantly longer trains. However, the Study Team notes that any new piece of standalone rail network infrastructure could be designed to allow for longer trains.

Study Team Finding

The Victorian Government should continue to make better use of the existing network to increase capacity and should commence work on the electrification of the network to Sunbury to boost services on the Sydenham line.

3.2.6 Hitting the wall – reaching rail capacity

At the completion of these Stage 1 and 2 capacity improvements, there will be sufficient capacity to operate reliable rail services for the long term on the Burnley Rail Group. With strong growth occurring to the north of Melbourne, further capacity may be needed on the Clifton Hill Group in the medium term.

However the recent and forecast growth on the Northern and Caulfield Rail Groups is expected to outstrip the available capacity much sooner. The balance between patronage growth on the Northern Group and Caulfield Group, and the capacity that can be provided through the Stage 1 and Stage 2 initiatives, is shown in Figures 38 and 39.

Capacity is depicted by the red line – the upper limit based on 1,000 people on board the train; the lower limit based on 800 people on board.

As these figures clearly show:

- With a load limit of 800 people per train, the significant spare capacity that was available in 2000 has been totally absorbed by the recent patronage growth.

- New initiatives will not keep pace with growing demand on the Northern Rail Group.

- Substantial overcrowding will be evident in 2013 and beyond on the Northern Group and 2019 and beyond on the Caulfield Group.

In effect, the optimal number of services that can be provided on these groups will not cater sufficiently for the projected growth in demand over the medium to longer term. Furthermore, network extensions into growth areas such as Melton will not be possible if additional capacity is not provided on the existing network.

As the Public Transport Division has noted, without the provision of substantial additional capacity on the Northern and Caulfield Rail Groups:

> "…the network's reliability will diminish and its ability to provide a competitive public transport option to the growth areas of Melbourne will be significantly constrained. Furthermore … this constraint will also have a negative affect on the growth of central Melbourne."[8]

Growth in mode share of the rail network will be significantly inhibited should capacity improvements be limited to the Stage 1 and 2 initiatives. While the completion of the MOTC initiatives and the replacement of the existing Comeng fleet will enable the network to carry around 110,000 passengers in the morning peak hour (without load breaches), demand will continue to grow well beyond that level.

Clearly, additional steps are needed to provide more capacity for the Northern and Caulfield Rail Groups as a matter of priority. The Study Team believes that this requires a 'generational step-up in rail capacity' – and that this step-up can only be achieved through major investment in substantial new network infrastructure.
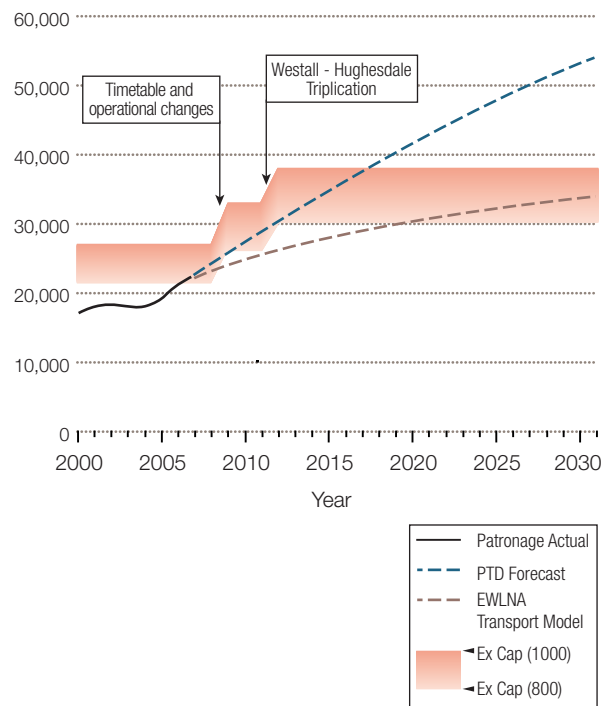
It is apparent that Melbourne's rail network has reached the point where it is experiencing the first 'growing pains' associated with moving from a suburban rail network to the 'metro style' system enjoyed by large European cities.

Figure 38 – Northern Rail Group: patronage versus capacity
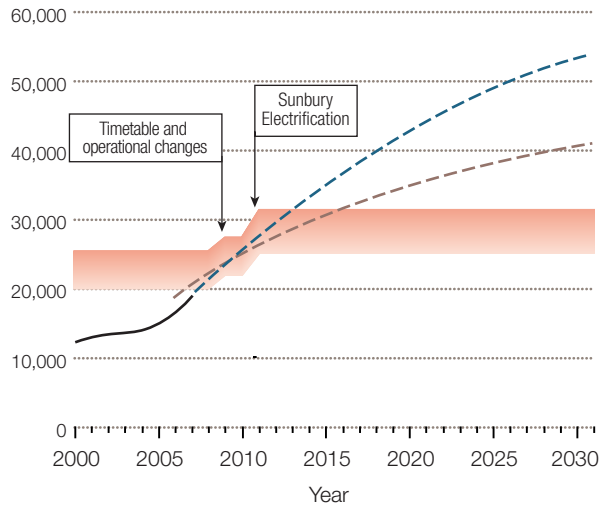
Source: EWLNA

Figure 39– Caulfield Rail Group: patronage versus capacity

Source: EWLNA

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8. PTD: Public Transport Division (2008), Analysis on rail capacity, Report prepared for EWLNA

While localised improvements can be made in different parts of the network, moving towards a 'metro style' system will require the 'untangling' of the inner core of the rail network in order to free up capacity across the board – because the inner core junctions, terminal stations and the loop are creating the bottlenecks that preclude timetable additions and outer network extensions to the city's growing west.

The Study Team notes that the seriousness of the looming capacity crisis on the Northern Rail Group is exacerbated by road capacity issues facing those parts of Melbourne served by this rail group. With the West Gate Bridge and the limited road crossings over the Maribyrnong River also lacking the capacity to cater for projected motor vehicle traffic growth, the failure to address rail capacity issues on the Northern Rail Group will leave current and potential rail patrons from the fast growing Geelong, Werribee, Altona and Tarneit areas with little alternative but to use their cars – further increasing congestion on roads to and from the city's west.

The Team's view is that the correct transport strategy for Melbourne is to provide excellent public transport services as the priority mode for daily journeys into the central city.

Together with the PTD, the EWLNA Study Team examined a range of track infrastructure and signalling options to deliver the 'generational improvement in rail capacity' required to address these issues. In particular, five options were explored in detail:

- Expansion of the Melbourne Underground Rail Loop

- Expanding the viaduct between Southern Cross and Flinders Street stations

- Connecting the Northern and Burnley underground loops

- Upgrading the signalling system

- Developing a new east-west rail tunnel.[9]

3.2.7 A new rail tunnel

After evaluating these options, the Team has concluded that a new east-west rail tunnel, augmented by a new Tarneit rail line, is the option that delivers the best results for Melbourne in terms of creating more metropolitan and V/Line train paths and bringing significant numbers of additional commuters into the city in the morning peak period.

In particular, a new rail tunnel offers the prospect of:

- Providing significantly improved capacity for the Northern Rail Group (an 80 per cent increase) and the Caulfield Rail Group (a 60 per cent increase), catering for forecast high population growth in areas served by these lines

- When combined with a new Tarneit line, substantially improving travel reliability for V/Line Geelong, Ballarat and Bendigo services

- Providing easy train-to-train connections for all Melbourne rail users wishing to access the new link to Parkville, St Kilda Road, Footscray, Caulfield and all stations beyond these points

- Improving service reliability through complete sectorisation of all Northern Rail Group lines and removal of conflict points and junctions

- Providing a seamless underground rail connection between Footscray and the rest of the inner city, contributing towards absorbing Footscray into the central city core and stimulating economic growth in the west

- Providing a new direct underground rail connection to the important areas of Parkville, Southbank and St Kilda Road

- Simplifying and 'untangling' a large part of the inner core network, creating the opportunity to add new services to the growing outer western and north-western suburbs in the future

- Taking two passenger lines underground near Caulfield, creating the opportunity in the future to develop a dedicated standard gauge freight line to Dandenong and Hastings

- Improving capacity for travel in the busy Melbourne University – St Kilda Road corridor, relieving pressure on tram services in Swanston Street and St Kilda Road

- Taking the first step towards a 'metro-style' system in the longer term.

The Study Team's view is these very substantial benefits can only be delivered by a new rail tunnel and that Melbourne should take this 'once in a generation' opportunity to significantly improve the rail network and encourage an even greater uptake in public transport within the city.

9. A detailed evaluation of these options is contained in the PTD report prepared for the EWLNA.

Tarneit Link

The Study Team's view is that, in order to extract the full capacity benefits from the new tunnel, it will be necessary to being forward construction of the third and fourth tracks from Footscray to Sunshine (already committed to in Meeting Our Transport Challenges) to enable the construction of a new rail link from West Werribee to Sunshine (the Tarneit link)

The Tarneit link would deliver substantial benefits, including delivering a major boost in capacity on the Werribee line, providing residents in the growth areas of Tarneit and Derrimut with a high standard rail link and improving the number and reliability of services on the Geelong, Ballarat and Bendigo lines.

Flow-on impacts

The development of a 'new generation' rail tunnel is designed to increase capacity in order to run more rail services to Melbourne's west and south-east. Additional rail services in the future will require more rolling stock and will involve more rail traffic interfacing with the road network at level crossings. Such flow-on impacts are recognised by the Study Team, but have not been explored in detail on the basis that these impacts will be common to all service expansions.

Study Team Findings

Across the city, the demand for train travel has grown by more than 30 per cent over the past three years and shows no signs of slowing.

This growth is putting the rail network under considerable pressure, with the Northern and Caulfield Rail Groups likely to 'hit the wall' and outstrip available capacity within the next decade.

To move more people and encourage even greater public transport patronage, the capacity of Melbourne's rail network must be expanded. To achieve the required capacity – and to provide a foundation for further extensions in the passenger rail network – major new investment is needed to deliver a 'generational improvement' to the city's rail network.

Without major investment in capacity, the Victorian Government's 20/2020 target cannot be met.

Melbourne must take the bold first step towards a modern rail 'metro' by building a new cross-city rail tunnel. This tunnel will not only expand capacity, it will also deliver very substantial economic, social and environmental benefits for Melbourne.

What other cities are doing

Several cities have recognised the importance of boosting public transport and are making major investments in their rail networks.

London (UK) – London's Crossrail project is a major new cross town railway link that will connect central London with Heathrow and commuter areas east and west of the city. The line will run through twin tunnels under the centre of London, passing over and under existing sections of the underground railway, as well as passing under the Thames River. The project will cost around £16 billion and aims to provide 40 per cent of the extra rail capacity that London will need over the coming decade.

Beijing (China) – Beijing's planning authorities have recently given permission for six new subway lines, with work scheduled to begin in late 2008. The six new lines have a total length of 152 km.

Shanghai (China) – The Shanghai metro is one of the youngest in the world and among the most rapidly expanding. The first line opened in 1995 as a north-south axis from the Central Station to the southern suburbs; by the end of 2007, the network had reached a total length of 227 km, with 161 stations and 8 lines.

Madrid (Spain) – In 2007, the Madrid Metro became the second largest metro network in Europe after London (415 km). In 2006, the total length was 227 km with 236 stations (counted separately for each line), but with the completion of a major four-year expansion programme in spring of 2007 and another short extension, the total length of the network is now 284 km.

Buenos Aires (Argentina) – is one of South America's biggest cities with 3 million inhabitants (and 12 million in the larger metropolitan area). For a city of this size, the metro rail network is small, although it is by far the oldest subway in South America. After losing many passengers during the 1980s, the Subte was privatised and is now operated by Metrovías, which immediately started refurbishing stations and buying new rolling stock to replace older trains, some of which have been running since the Subte opened. The total network is now around 46.8 km in length and totally underground.

3.3 Buses and trams – also growing strongly

Alongside strong growth in train travel, Melbourne's buses and trams are also enjoying significant increases in patronage.

3.3.1 Expanding bus services

Patronage across the bus network grew strongly over the past year (increasing by 7.4 per cent) – driven in part by the development of SmartBus routes and the first service extensions introduced under the Victorian Government's 2006 *Meeting Our Transport Challenges* statement.[10]

Bus patronage has been stable or has grown only slowly over the last 25 years due to the historic affordability of private car travel, the change in commuting patterns and changing demographics. The recent recovery in patronage has not been as strong as for rail – this may be the result of the relative low speed of buses (due to sharing road space with other vehicles), which means they generally do not provide a fast commuter trip option.

In its submission to the EWLNA, Metlink points out that this recent growth in patronage has led to overcrowding on a number of peak-hour services, with some commuters unable to board full buses. Metlink notes that instances of overcrowding along the east-west corridor include Eastern Freeway services, services along the Sunshine to Footscray corridor, and services from Footscray to East Melbourne.[11]

In areas relevant to the EWLNA, a number of bus routes with an east-west orientation operate in the inner northern areas to complement the tram and train network. Metlink states that several of these routes suffer overcrowding and/or are subject to high levels of congestion.

The Study Team notes that the major expansion of the SmartBus network and the extension of local services being undertaken as part of *Meeting Our Transport Challenges* will significantly improve cross city and localised public transport options. Evidence to date suggests that these service extensions have been well-received by Melburnians and that strong patronage growth will continue as services expand.

The Team also notes that – unlike rail – demand for specific services can be managed relatively easily, with services added or extended as required. While expressing the view that there needs to be a particular focus on extending bus services in Melbourne's growing west, the Team has made a general recommendation in relation to the importance of priority and bus-only lanes and specific recommendations in relation to new bus services for the Doncaster region (see Chapter 7).

3.3.2 Steady growth on trams

Melbourne's tram network is a highly valuable piece of the city's infrastructure. With a number of European cities now looking to rebuild tram networks previously closed down (and finding it a very costly exercise), Melbourne's tram network should be acknowledged as a great asset for the city and one that would be extremely difficult to replace.

According to Metlink, Melbourne's trams carried 150 million passengers in 2006-07 (the highest level for many years) and have been recording steady growth in patronage at an average of 2.9 per cent each year.[12] However, in the 12 months to September 2007, patronage growth is reported to have climbed to 5.3 per cent – an unprecedented level.[13]

Similar to bus and train patronage, tram patronage declined from the 1950s to the 1970s, reflecting increasing private car ownership and the convenience and speed advantage of cars. Patronage began picking up in the 1980s as congestion, fuel costs and parking costs began to increase. Demographic changes have also played a part, with Melbourne's inner suburbs becoming more gentrified and the tram service being a highly accessible form of transport for the increasingly dense inner city.

Overcrowding on trams regularly occurs along routes connecting with Bridge Road, St Kilda Junction and Lygon Street and on the various routes that intersect with Alexandra Parade. Yarra Trams has responded by reallocating large trams to resolve these issues. However, the limited number of large trams available across the fleet means that this strategy has now reached a limit.

The Victorian Government has acknowledged this and recently announced that it will lease five new high capacity, low-floor trams to meet patronage growth (until the next delivery of new trams occurs in 2010-11).[14]

The steady increase in tram patronage has occurred alongside the increase in traffic congestion in the inner city. This congestion will continue to affect the reliability, regularity and speed of tram services. The fact that tram patronage continues to grow in the inner city despite these problems may indicate a latent demand for tram use, and result in stronger growth in tram patronage once these issues are resolved.

10. SKM Maunsell/Evans and Peck (2008a)
11. Metlink submission to the EWLNA (2007)

12. MetLink submission to the EWLNA (2007)
13. Minister for Public Transport, 'Five more trams to be added to metropolitan system', Media Release, 7 February 2008, accessed at Victorian Government media site: www.dpc.vic.gov.au/pressrel
14. Ibid

Other than the St Kilda Road route, more trams can be run on existing tracks, provided the network is freed up from car congestion through greater priority. Compared to other cities, Melbourne runs fewer trams on the available network. This means that there is some room to meet future patronage increases.
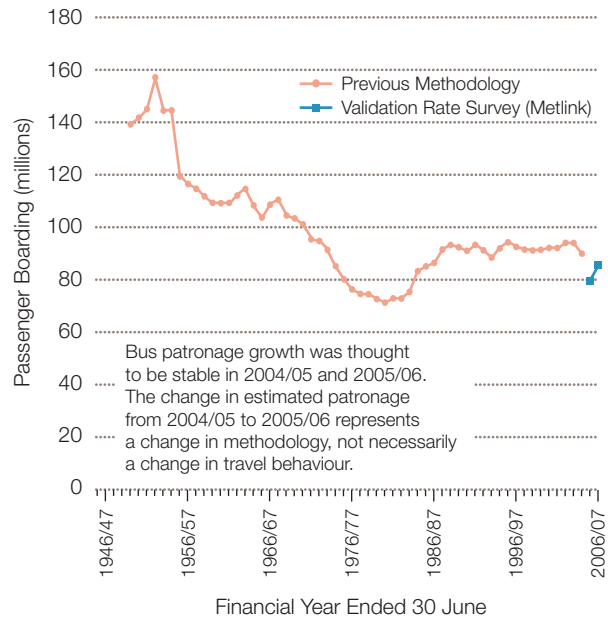
The Study Team notes that its recommendation for new rail infrastructure will provide a travel alternative for many people using the St Kilda Road tram services, relieving pressure on this busy route.

Busiest tram route in the world?

St Kilda Road and Swanston Street may be the busiest tram route in the world with:
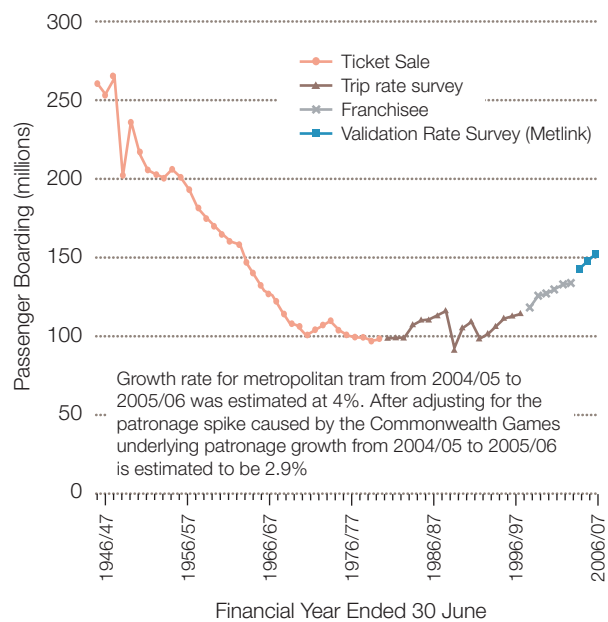
- A service every one minute (each way)

- Daily patronage (at Domain interchange) of 40,000 passengers on 1,400 trams

- Around 75 per cent of all motorised passengers travelling on trams along St Kilda Road (25 per cent are in cars and taxis)

- Trams representing 8 to 9 per cent of all vehicles on St Kilda Road

- Federation Square tram stop handling more people that any rail station except Flinders Street.

Figure 40 – Estimated metropolitan bus patronage, 1945-6 to 2006-07 (excluding Commonwealth Games)

Bus patronage growth was thought to be stable in 2004/05 and 2005/06. The change in estimated patronage from 2004/05 to 2005/06 represents a change in methodology, not necessarily a change in travel behaviour.

Source: Public Transport Division (DOI)

Figure 41 – Estimated metropolitan tram patronage, 1945-46 to 2006-07 (excluding Commonwealth Games)

Growth rate for metropolitan tram from 2004/05 to 2005/06 was estimated at 4%. After adjusting for the patronage spike caused by the Commonwealth Games underlying patronage growth from 2004/05 to 2005/06 is estimated to be 2.9%

Source: Public Transport Division (DOI)

3.3.3 Priority issues

The more efficient allocation of road space (in favour of mass transit and particularly during peak periods) is important to improving public transport patronage and reducing car use. With successful tram and bus services dependent upon priority in the inner city – and with congestion increasing in these areas – establishing more priority measures for trams and buses, and ensuring the consistent and effective enforcement of these measures, is critical to the city's transport future.

Buses

Bus services operate entirely within existing road space and compete with other users for this space. While there has been some progress in providing bus only lanes, these are compromised by local conditions, car parking requirements, existing legislation that allows for left turning vehicles to enter bus lanes and inadequate enforcement. For example, the T2 lane (northbound on Hoddle Street) is generally regarded as a failure, with buses frequently stranded in general traffic.

Bus priority options are being developed for the Doncaster Area Rapid Transit (DART) project (see Chapter 7), bus only lanes along freeways and toll roads are being considered and Lonsdale Street in the CBD has peak hour bus lanes. However, the Study Team believes that more can be done (in conjunction with local councils) to improve and enforce these priority options across the city.

Trams

As already noted, most of Melbourne's tram network shares road space with other vehicles. One consequence of this road-sharing is declining tram speeds due to general traffic congestion.

The Victorian Government's Think Tram program is intended to protect trams from the impact of increasing traffic congestion to enable them to operate more effectively and to ensure that growth in tram travel is not stifled.

To achieve greater tram priority, the Victorian Government and relevant agencies face some bold and difficult decisions regarding road space allocation between private vehicles and trams.

As Figure 42 illustrates, the Melbourne tram network runs fewer trams per section of track when compared to other tram services during peak hours. With successful tram and bus services dependent upon priority in the inner city – and with congestion increasing in these areas – establishing more priority measures for trams, and ensuring the consistent and effective enforcement of these measures, is critical to improving public transport patronage.

The only major east-west routes in the west are along Mount Alexander Road (routes 55 and 59) and Racecourse Road (route 57). There will be some traffic relief along these roads associated with adopting the EWLNA road recommendations, which will create the opportunity to improve tram running times along these east-west routes. However, it is important to note that this will not be achieved without an impact upon other road users.

Think Tram

The Think Tram program includes:

- Platform stops (in the CBD) to improve dwell times, amenity and access for people with disabilities

- Tram separation (curbing) and defined tram lanes – 20 km installed

- Intersection reprogramming, including 'T lights' and right hand turn phases

- Improved signage on tram lanes

- Introduction of some new peak period tram lanes

- The 'obey the yellow' campaign, which aims to educate motorists about the function of tram lanes.

Figure 42 – City comparisons: density of operation – vehicles in peak per kilometre of double track
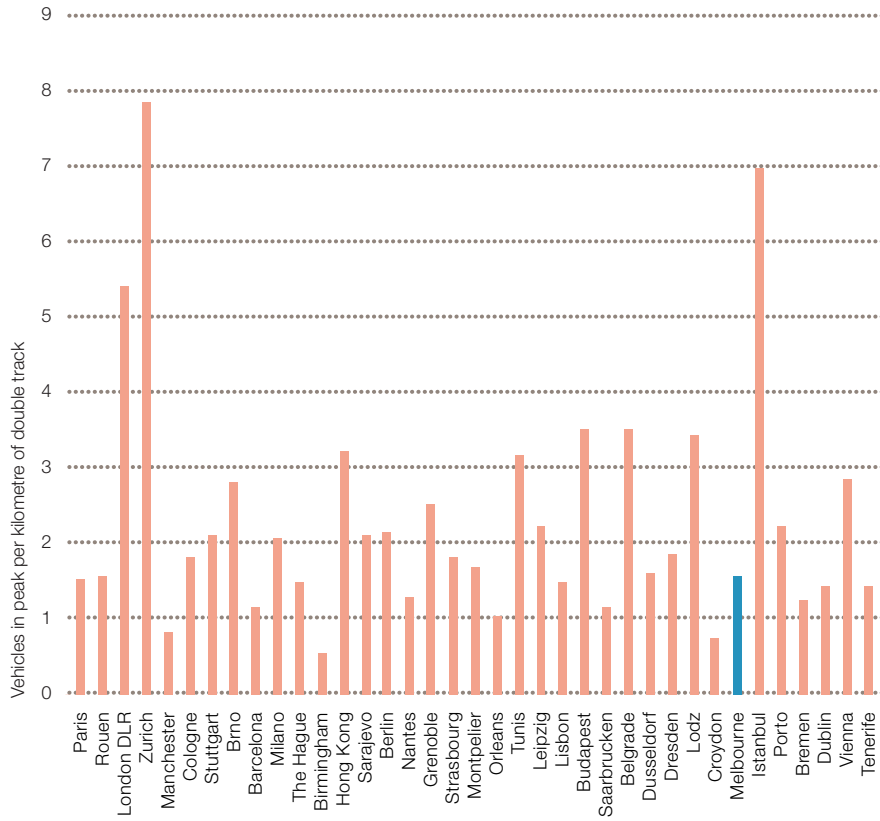
Source: UITP International Light Rail Committee (2007), Working Group for Light Rail Statistics Report

3.4 Park & Ride facilities

Park & Ride facilities effectively expand the reach and accessibility of the rail network, and also help to transfer parking demand from the central city to suburban locations.

Park & Ride facilities are critical to improving public transport patronage, especially along growth corridors. A recent NRMA audit of Park & Ride facilities in Sydney found that more than 40 per cent of motorists who currently drive all the way to work would prefer to park at a station and commute if there were sufficient car parking spaces available.[15]

While this percentage is unlikely to be as high in Melbourne, it does suggest that improved Park & Ride facilities could have a significant impact on improving train patronage and reducing traffic congestion. As noted in Chapter 2.2.2, evidence from the 2006 Census of a decline in Melbourne in driving the car to the station and catching the train to work may also be due to inadequate parking facilities at railway stations.

The Victorian Government's 2006 *Meeting Our Transport Challenges* plan allocated $90 million towards additional Park & Ride spaces across Melbourne – with the aim of providing an additional 5,000 car spaces over the next 10 years. Since MOTC was announced, Park & Ride facilities have been upgraded at a number of stations, including Laverton, Beaconsfield and Cranbourne.

However, as MOTC noted, many current facilities are at or near capacity – reflecting the popularity of the program, but also raising issues about how best to provide for growing demand in the future.

A survey conducted by the Public Transport Division (DOI) in October 2006 identified 30,000 car parking spaces at metropolitan stations, with 40,000 commuter cars parked in, or close to, these facilities and stations.[16] With the abolition of Zone 3 fares, the PTD estimates that the demand for car parking at former Zone 3 stations increased by 15 to 25 per cent within a year. Much of this increase in parking is spilling out into adjacent shopping centres and residential streets.[17]

The forecast strong growth in train travel (see Chapter 3.2), suggests that the demand for Park & Ride facilities is likely to increase considerably. While noting the Victorian Government's significant efforts in this area, the Study Team believes that an even greater concerted effort must be made to ensure that Park & Ride facilities keep pace with rail patronage.

Achieving a consistent flow of funds to continually expand Park & Ride facilities has proven difficult given the many competing demands for public transport investment. The Team believes that a dedicated fund should be established to identify sites, purchase land and construct additional Park & Ride facilities, with priority given to providing more car spaces at stations in the city's growing west and north-west, and along the Doncaster corridor.

15. Besser, Linton, 'Lack of parking puts train users on road', *The Sydney Morning Herald* (25 February 2008)

16. Information provided by the Public Transport Division (DOI)
17. Information provided by the Public Transport Division (DOI)