Making the right choices:

Options for managing transport congestion

A draft report for further consultation and input

April 2006

Victorian
Competition & Efficiency
Commission

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About the Victorian Competition and Efficiency Commission

The Victorian Competition and Efficiency Commission is the Victorian Government's principal body advising on business regulation reform and identifying opportunities for improving Victoria's competitive position. The Commission has three core functions:

- reviewing regulatory impact statements and advising on the economic impact of significant new legislation
- undertaking inquiries into matters referred to it by the Victorian Government
- improving the awareness of, and compliance with, competitive neutrality.

For further information on the Victorian Competition and Efficiency Commission, visit our website at: www.vcec.vic.gov.au

Opportunity for further comment

You are invited to examine this draft report and provide comment on it within the Commission's public inquiry process. The Commission will be accepting submissions commenting on this report and will be undertaking further consultation before delivering a final report to the Government.

Submissions may be sent by mail, fax, audio cassette or email.

By mail: Transport Inquiry
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The Commission should receive all submissions by close of business on **Friday 9 June 2006**.

Terms of Reference

VCEC Inquiry into Managing Transport Congestion

I, John Brumby MP, Treasurer, pursuant to section 4 of the State Owned Enterprises (State Body—Victorian Competition and Efficiency Commission) Order ("the Order"), hereby direct the Victorian Competition and Efficiency Commission ("the Commission") to conduct an inquiry into managing transport congestion in Victoria.

Background

An efficient, integrated system of roads and rail throughout Melbourne and in major regional cities is essential for the smooth transit of goods and people in a modern economy.

Transport congestion can cause lengthy, often unanticipated delays in traffic on freight and people movement, which can generate unnecessary costs for business and inconvenience for households and the community at large.

The Metropolitan Transport Plan sets out the Government's strategic directions in relation to reliability of public transport, improving use of existing roads, improved service co-ordination and better demand management.

To complement this, the Commission's inquiry into the effectiveness of policy instruments and institutional structures at the Government's disposal to implement the objectives of the Metropolitan Transport Plan will inform the development and application of future Victorian Government decisions.

Scope of the inquiry

The Commission is to inquire and report upon:

(1) the nature and incidence of transport congestion:
   a) in Melbourne;
   b) in major regional cities of Geelong, Ballarat and Bendigo; and
   c) at key modal and inter-modal freight transport facility interfaces (including road junctions, the port, airport, and rail–road terminals).

(2) the impact of transport congestion on businesses and supply chain efficiency in Victoria;

(3) any present regulatory and institutional barriers to achieving progress in tackling existing transport congestion and effective traffic demand management; and

(4) the potential application of approaches to tackling transport congestion used in other major international cities.

The Commission should take into account any substantive studies or developments undertaken in Victoria and elsewhere—including by the Commonwealth and other States, and international best practice.

Inquiry process

In undertaking this inquiry, the Commission is to have regard to the objectives and operating principles of the Commission, as set out in section 3 of the Order. The Commission must also conduct the inquiry in accordance with section 4 of the Order.

The Commission is to consult with key interest groups and affected parties, and may hold public hearings. The Commission should also draw on the knowledge and expertise of relevant Victorian Government departments and agencies.

The Commission is to produce a draft report for consultative purposes and a final report is to be provided to me within twelve months of receipt of this reference.

JOHN BRUMBY MP
Treasurer
14 September 2005

Preface

The release of this draft report of the inquiry into managing transport congestion gives interested participants the opportunity to comment on the Commission's analysis of transport congestion in Melbourne and the regional cities of Geelong, Ballarat and Bendigo and the options available to the Victorian Government for addressing it, prior to the presentation of the final report to government in September, 2006.

In preparing this draft report, the Commission has sought to consult widely with a range of government departments and agencies, public and private operators, local governments, businesses and individuals with an interest in transport congestion. The Commission would like to acknowledge the contribution made by those who participated in the inquiry, via the many meetings and through submissions. The Commission has also benefited from their input, and particularly wishes to acknowledge the help of the Department of Infrastructure.

The Commission invites written submissions on the draft report. These submissions may address any of the issues covered. In light of the submissions received, the Commission will hold public hearings as necessary.

At the conclusion of consultation on the draft report, the Commission will produce a final report to be presented to the Victorian Government. The Order in Council establishing the Commission says that the Treasurer should publicly release the final report within six months of receiving it and that the Victorian Government should publicly release a response to the final report within six months of the Treasurer receiving it.

The Commission looks forward to receiving feedback on the draft report.

The Commissioners have declared to the Victorian Government all personal interests that could have a bearing on current and future work. Moreover, while the Commissioners confirm their belief that they have no personal conflicts of interest in regard to this inquiry, the Chairman wishes to disclose that he has shares in Transurban and ConnectEast.

Graham Evans AO Chairman	Robert Kerr Commissioner	Alice Williams Commissioner

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Abbreviations

AARB	Australian Road Research Board
ABS	Australian Bureau of Statistics
ALGA	Australian Local Government Association
ANEF	Aircraft Noise Exposure Forecast
APAC	Australia Pacific Airports Corporation Ltd
ARTC	Australian Rail Track Corporation
ATC	Australian Transport Council
BAH	Booz Allen Hamilton
BART	Bay Area Rapid Transport
BTCE	Bureau of Transport and Communications Economics
BTE	Bureau of Transport Economics
BTRE	Bureau of Transport and Regional Economics
CBD	Central Business District
COAG	Council of Australian Governments
DCP	Development Contribution Plan
DDA	Disability Discrimination Act
DOI	Department of Infrastructure
DOTARS	Department of Transport and Regional Services
DSE	Department of Sustainability and Environment
ERITG	Eastern Regional Integrated Transport Group
FBT	Fringe Benefits Tax
GDP	Gross Domestic Product
GPS	Global Positioning System
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
ICT	Information and Communication Technologies

IPC	Infrastructure Planning Council
ITS	Intelligent Transportation Systems
LGAs	Local Government Areas
LPAC	London Planning Advisory Committee
MAV	Municipal Association of Victoria
MBTSA	Metropolitan Buses Transport Services Agreement
MITM	Melbourne Integrated Transport Model
MOU	Memorandum of Understanding
NBC	National Bus Company
NTC	National Transport Commission
PoM	Port of Melbourne
PoMC	Port of Melbourne Corporation
PPTN	Principal Public Transport Network
PRN	Principal Road Network
RACV	Royal Automobile Club Victoria
SCATS	Sydney Coordinated Adaptive Traffic System
SEITA	Southern and Eastern Integrated Transport Authority
TDM	Travel Demand Management
TEU	Twenty foot Equivalent Unit
TIDF	Transit Impact Development Fee
VACC	Victorian Automobile Chamber of Commerce
VATS	Victorian Activity and Travel Survey
VCEC	Victorian Competition and Efficiency Commission
VCR	Volume to Capacity Ratio
VECCI	Victorian Employers Chamber of Commerce and Industry
VFLC	Victorian Freight and Logistics Council
VPPs	Victorian Planning Provisions
WPT	Workplace Travel Plans

Key messages

- Transport congestion (affecting road, rail and public transport) is an increasing problem for Melbourne that, if not addressed, will impose increasing costs on the community.
- There are similar but more limited concerns about congestion in Geelong, Ballarat and Bendigo, although there are transport issues to be managed.
- Although congestion reflects some physical characteristics with parts of the road network and constraints on investment in public transport, many of the causes are much broader.
- These causes reflect the strength of the Victorian economy, but also the mobility choices that those living in Melbourne make on such matters as short car trips, using cars to take children to and from schools, and the greater use of just-in-time inventory management for many businesses.
- Addressing congestion is constrained by the radial pattern of the rail and tram network and Melbourne's geographical reach. It often involves difficult trade-offs, and the challenges associated with this are reflected in the lack of any consensus about the best options for managing congestion.
- The Commission has put forward a number of options to improve efficiency, most of which produce the greatest benefits when used in combination. These include options relating to:
  - the better management of existing road space, through measures such as ramp metering, variable speeds and improved communication, and allocation between users to give priority to trams and buses
  - for rail, better interchanges at North Melbourne and Richmond, improved signalling especially in the City Loop, duplication of single lines to maximise capacity, and progressively changed operating arrangements for the City Loop
  - an overhaul of the bus system, including an expansion of services, accelerated roll-out of SmartBus, the development of a bus rapid transit option for cross-town travel, and more innovative contractual arrangements
  - efficiency measures relating to freight movements, particularly for rail freight
  - location-specific use of peak–period pricing to improve congestion, including on CityLink and EastLink.
- In the longer term there is likely to be a need to consider more comprehensive road pricing. An enhanced public transport system would be a pre-condition, so that there are acceptable alternative forms of transport. Significant equity and distributional issues would need to be considered in any such decision.
- The Commission has suggested how major infrastructure projects should be evaluated to ensure that key factors such as induced demand and network benefits are appropriately incorporated in the analysis.
- Institutional changes that would improve management of transport congestion include a stronger role for public transport, a single transport budget, and common project appraisal criteria.

Overview

Context

Transport congestion is an increasing problem for Melbourne that if not addressed, will impose increasing costs on the community. In one sense congestion is a sign of mobility and economic success, but with it comes a range of undesirable side effects. Many people in metropolitan Melbourne, and to a lesser extent in Victoria's major regional centres, believe their daily activities are restricted by congestion. Public perceptions of congestion often relate to long and/or unexpected delays, but for policy-makers, persistent bottlenecks, often reflecting patterns of usage, and inefficiencies and capacity restrictions in the transport network, are the key challenges. Congestion is generally associated with road use, which in Melbourne also impacts on trams and buses, as users of roads. However, there are also capacity issues for trains and trams reflecting deficiencies in their infrastructure. As the RACV points out, congestion is not about cars versus public transport: 'both are essential and complementary components of a transport system' (sub. 59, p. 7).

But how serious is congestion in Melbourne? Is it getting worse? What is the situation in Ballarat, Bendigo and Geelong? What are the costs of congestion? Who is bearing these costs? To what extent are people able to manage the costs, for example, by adjusting their schedules, routes or locations? Are there any benefits from congestion? Is eradicating congestion a sensible goal for policy? If not, how much effort is warranted to reduce congestion? What are the best ways to manage congestion? Is building more roads the answer, or will this just induce more traffic? Should there be more use of demand management? What is the relationship to other policy issues, particularly land use planning? Are institutional arrangements encouraging or discouraging appropriate responses to congestion and development of a more efficient transport network?

This draft report aims to provide some clarity around the key issues, in order to assist policy development. It identifies a range of possible approaches for managing congestion, in line with the Government's request that the Commission identify options rather than put forward recommendations.

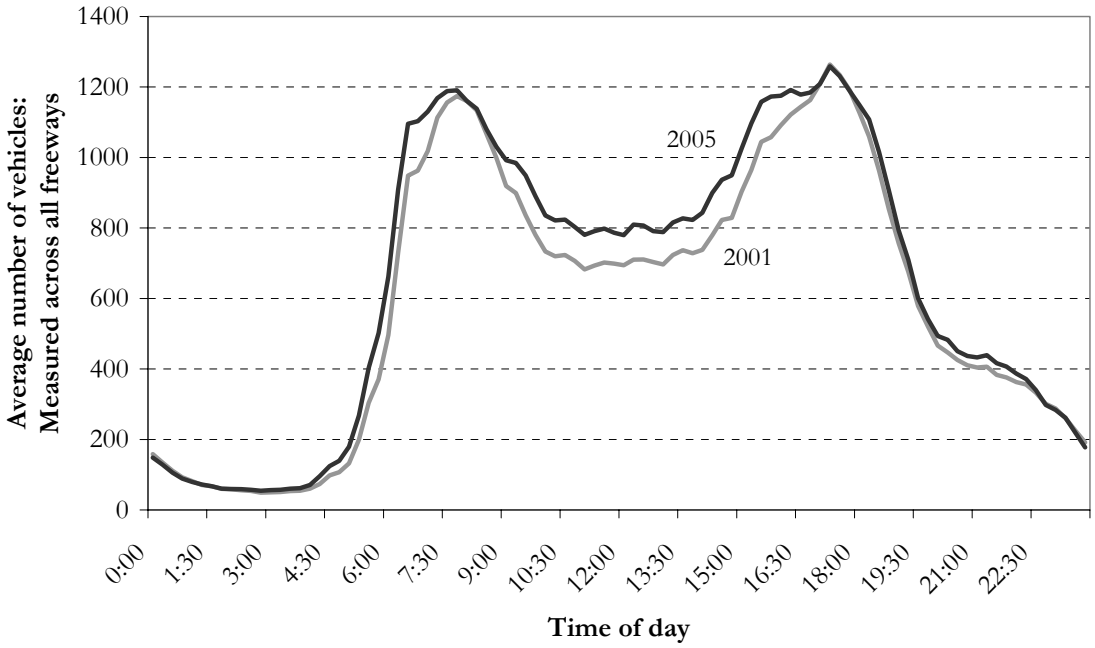
What is transport congestion?

Transport congestion is a location and time dependent phenomenon that occurs when the demand for use of transport infrastructure becomes excessive. The point at which the demands on infrastructure become 'excessive' is very hard to define and is likely to depend on various demand- and supply-side influences

operating in combination.[1] These factors include: the characteristics of the transport infrastructure (such as the capacity and configuration of freeways, arterials, and tram and train networks); patterns of usage; the alternative transport options open to people (in terms of mode, routes and time of usage); the values people and businesses ascribe to usage; and various other factors such as driver behaviour, transport incidents and weather conditions. There are some differences between the way congestion is defined for road and rail networks. On public transport, for example, congestion can involve passenger crowding on buses, trams or trains.

Some of the factors influencing congestion can give rise to recurrent bouts of congestion across a wide area. For example, there are regular weekday peaks in demand for the use of roads (figure 1) and trains caused by people travelling to work and education. Infrastructure characteristics such as bottlenecks can also give rise to recurring congestion at particular points on the network. At the same time, various non-recurring events such as accidents, breakdowns and other incidents can cause, or intensify, periods of congestion.

Figure 1 **Use of Melbourne's freeways**



[1] Congestion could be defined as being excessive when the marginal costs to society of congestion exceed the marginal benefits to society of efforts to reduce congestion (such as adding to road or other transport infrastructure).

What are the costs of transport congestion?

There is a widespread concern amongst inquiry participants that congestion in Melbourne imposes significant costs (time delays, pollution, accidents, driver stress and additional vehicle wear and tear). There are similar but more limited concerns also about congestion in Geelong. Although Ballarat and Bendigo do not suffer congestion of the kind found in Melbourne, there are transport issues to be managed.

Various attempts have been made to quantify the costs of road congestion for Melbourne—focusing on time delays and additional vehicle operating costs. Some studies have produced cost estimates ranging from $1.8-$4 billion per annum, growing to $4-$8 billion in the next decade or so. These have been used in some cases to argue for major policy shifts and large increases in infrastructure spending in an effort to reduce the costs of congestion.

Modelling undertaken for the Commission by the Department of Infrastructure (DOI) suggests that these estimates are too high, although projections of the outlook in 15 years also confirmed a worsening congestion problem. In any event, these estimates do not of themselves provide an adequate basis for some recent proposals relating to infrastructure spending.

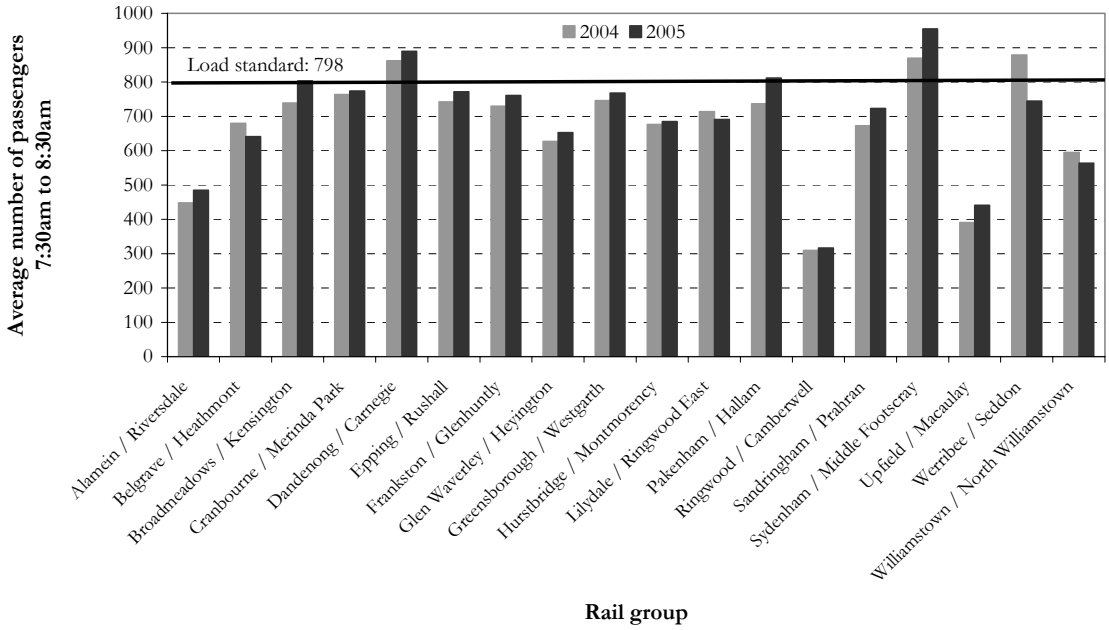
Of significance to policy formulation is the pattern of congestion. Reflecting the costs of collecting data, current monitoring of road conditions on much of the road network is confined to the freeways and some arterials (but is being extended). The available data from VicRoads, modelling by DOI for the Commission, and other sources indicate that the costs of congestion are unevenly spread across Melbourne.

The modelling suggests that costs are likely to increase throughout Melbourne but will grow most strongly in a few key areas. Costs are expected to grow most strongly in the central and inner suburbs as well as some middle suburbs, reflecting the limited scope for adding to capacity in those areas. Strong growth in costs is also predicted for some outer suburbs, but the extent is likely to be moderated by anticipated projects.

Capacity on key parts of the freeway network, particularly the Monash and West Gate Freeways, is under pressure from rising demand (with capacity exceeded during peak hours). There is evidence of peak spreading (figure 1) and significant variability in travel times during the morning peak. Congestion delays on the freeways could increase rapidly, unless the issue is addressed.

Submissions to the inquiry pointed to the growing impact of road congestion on public transport as well as capacity constraints contributing to a growing problem of overcrowding on some train and tram lines during peak periods. The evidence suggests that overcrowding is becoming more of a problem on some peak period rail (figure 2) and tram services, which is impacting on reliability. Indicators for trams and buses show that average speeds for buses have been stable in the last few years, while tram speeds have declined slightly.

Figure 2 **Average passenger loads on Melbourne's trains**



What causes transport congestion?

In considering options for tackling transport congestion it is important to consider the underlying causes, as the most effective options are likely to be those that address the causes rather than symptoms.

Congestion is a result of the interaction of demand- and supply-side factors. There appear to be several major causes of congestion on the demand side interacting with one another. For example, people are not generally aware of the cost they impose on others on the road, especially during peak hours, which means that the number of people choosing to drive at these times may exceed the capacity of the infrastructure. The result is slowing of traffic and queuing at the entry points to the major road network. This is likely to be a major source of congestion.

Several additional demand-related factors appear to be contributing to congestion, including:

- high use of cars for peak-period trips, both for work and education, reflecting their affordability and flexibility
- the lack of accessibility of alternatives to driving, such as public transport
- economic growth, which has contributed to rapid growth in the road freight task
- changing business practices (particularly just-in-time production and inventory management processes)
- patterns of urban settlement (including urban sprawl and dispersed land use).

Larger freight vehicles do not appear to be the major contributor to peak period congestion because a large proportion of truck movements are scheduled outside these periods (and are spread more evenly across the day). Light commercial vehicles, the use of which has grown significantly, do have an impact, especially around retail centres. Freight is a specific issue around the Port of Melbourne, and its impact will increase significantly.

On the supply-side, the capacity of transport networks, particularly roads, can also be affected by a variety of factors, including: infrastructure bottlenecks; road design issues; level crossings, intersections and roundabouts; and shared use of roads such as arterials that are used by trams, or are used for parking at certain times of the day. The influence of these various factors is difficult to quantify and likely to vary significantly across Melbourne.

While the costs of congestion are significant and likely to grow, tackling the problem will involve making some difficult trade-offs. Reducing congestion can deliver benefits in terms of reduced delays, improved reliability of travel times, and lower environmental and social costs. It can help to maintain Melbourne's competitive advantage as a place to live and do business. However, addressing the underlying causes of congestion involves a number of costs.

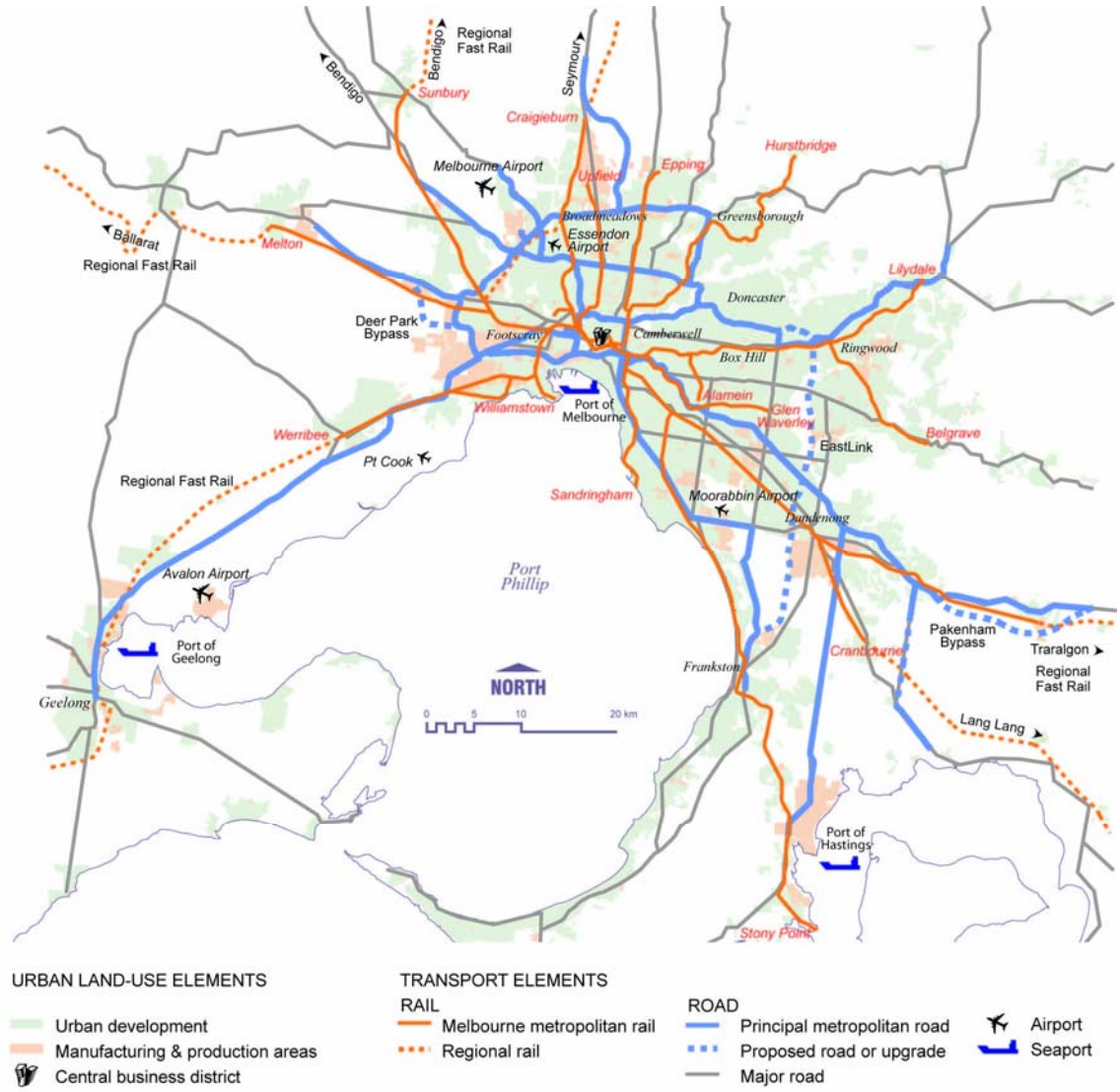
The transport network

Any discussion of options for addressing congestion in metropolitan Melbourne needs to recognise that the radial patterns of the transport network (including public transport), and the geographical reach of Melbourne, impose limitations and substantial costs on fundamental change. In the outer metropolitan areas, there is frequently no alternative to the use of cars.

Figure 3 illustrates Melbourne's transport network. The road network is extensive, with one of the greatest lengths of road and freeways per capita compared to other Australian and overseas cities. The major freeways and tollways of Melbourne largely radiate from the central business district (CBD) (with the exception of the Western Ring Road which provides an orbital route,

connecting freeways to the west and north of the CBD). Cross town travel requires frequent road changes and the need to pass through or close by the city. Melbournians rely heavily on private motor vehicles to get around; 75 per cent of all personal trips are by car and car ownership is high by international standards and growing. By comparison, walking accounts for 16 per cent of all trips and public transport for 6 per cent of all trips, or 9 per cent of all motorised trips. Reliance on motor vehicles is even higher in the regional cities and outer suburbs, given the limited public transport available in some areas. The Victorian freight task is also dominated by road transport, which carries almost 83 per cent of Victorian freight tonnes. In particular, the number of light commercial vehicles on the road is growing faster than cars and trucks.

Figure 3 **The metropolitan transport network**



Melbourne's tram system is the third longest in the world, covering most of the inner suburbs and a large proportion of the middle suburbs. Like the freeway network, the tram network is essentially a radial system of routes into and out of the city, largely unchanged from cable tram days (apart from extensions to Box Hill and the Docklands). About two thirds of the tram network shares road space with other vehicles.

Similarly, Melbourne's rail network radiates from the CBD. Various routes feed into the CBD through three key stations (North Melbourne, Jolimont and Richmond). Another five stations in the CBD create a 'loop' to allow trains to circulate around the city. While the rail network is primarily used for passenger traffic, it also accommodates rail paths for freight traffic. Rail carries around eight per cent of the Victorian freight task.

Buses are the only mode of public transport for large parts of Melbourne (mostly operating in the middle and outer suburbs) and in regional Victoria. Eighty-four per cent of Melbourne's population are within 400m of a bus route, compared to 15 per cent that are within 400m of a tram route and 23 per cent within 800m of a train station.

Intermodal hubs are an important link in the freight and logistics chain. An increasing trend for business is to focus on reducing costs by improving the efficiency of their logistics chain, resulting in large distribution centres. The main intermodal freight terminal areas in Melbourne are located at Altona, Dandenong, the Dynon Precinct, Somerton, Spotswood and the Swanston Docks. Melbourne has three freight airports but the freight task and associated traffic handled by these airports is relatively small. The Port of Melbourne is of particular importance in Victoria's freight task. It is Australia's largest container and general cargo port. Approximately 85 per cent of freight moving in and out of the Port of Melbourne is transported by road.

Options for managing congestion

The Commission received 92 submissions and inquiry participants put forward many options for managing congestion, with their interest itself evidence of the extent to which congestion is seen to be a problem. Chapter 5 describes these suggestions in detail. Some options would apply across the transport network, while others are location-specific. Many of those involving expansion of road and rail infrastructure and growth in public transport capacity would be more expensive and take longer to implement, while many of those involving efficiency improvements to the current capital stock can be done more quickly, and at less expense.

Many options are inter-related, for example:

- congestion is an issue that needs to be addressed in both the rail and road networks, not one in isolation (a view widely supported by industry bodies)
- a number of options may work together to reduce congestion at particular bottlenecks, as illustrated by the case of the West Gate Bridge (chapter 7)
- the location of road and rail infrastructure may influence the pattern of land use that develops, while expansions to transport infrastructure will influence developments in land use
- the introduction of pricing arrangements to discourage motor vehicle use in peak periods would require alternative public transport options to be made available, comparable in terms of reliability and service.

The Commission has looked not only at the options put to it in submissions (chapter 5), but also at relevant international and other Australian experience (chapter 6). It has focussed on options that are relevant to Melbourne and Geelong, Ballarat and Bendigo. In many cases, especially on the supply side, these options have already been canvassed in the *Metropolitan transport plan* (box 1).

BOX 1 Congestion strategies in the *Metropolitan transport plan*

The Plan articulates four strategies for managing congestion:

(1) *Improving the reliability and flow of public transport*, through measures such as signalling systems that give priority to trams and buses at intersections; separating cars from trams and/or buses; and more effective controls on kerbside parking.

(2) *Making existing roads operate better*, through, for example, establishing a hierarchy of road use; establishing more effective access controls; managing kerbside parking and optimising peak traffic flows on major arterial roads.

(3) *Improving service coordination*, integration and consumer interface, through measures such as upgrading interchange facilities; off-peak fares; state-wide integration of fare structures; and improving timetable coordination across modes.

(4) *Promoting sustainable travel through better demand management*, through, for example, investigating pricing options that reflect the full economic, social and environmental costs of transport; and the TravelSmart program.

Source: DOI (2004), *Linking Melbourne: Metropolitan transport plan*.

Chapters 7 and 8 report options that are particularly relevant for managing congestion in Melbourne and the regional cities of Geelong, Ballarat and Bendigo. These options are listed in table 1, at the end of this overview. Also shown in the table are some of the issues that would need to be addressed in implementing these options. In the same way as the causes of congestion are

multiple, and the bottlenecks dispersed, the response is likely to require a combination of measures, some short-term and others requiring longer lead times.

Options for addressing congestion are more likely to be effective if:

- based on recognition that options that work on both the supply and demand side of transport markets will be needed
- policy options for expenditure on roads and public transport are assessed at the same time, and the appraisal process for projects is rigorous and neutral between transport modes
- the information base for decision-making is improved
- institutional arrangements are reformed, with particular emphasis on improved inter-agency coordination.

Options that address both supply and demand will be needed

Thus far, more use has been made in Victoria of measures to expand the supply of transport infrastructure than to manage demand. Supply expansion will no doubt need to continue, but any response to managing congestion should ensure the current network is also used as efficiently as possible.

The Commission has identified a wide range of options for managing congestion. Many of these aim to increase the capacity of transport networks, by:

- increasing the efficiency of existing road and rail infrastructure; for example, by: increasing the use of traffic management techniques, especially on freeways; reallocating road space through measures such as establishing a hierarchy of road use; and improving rail signalling and platform interchanges and changing some operational arrangements for trains. Significant gains may be possible from measures that seek to use the existing capital stock more efficiently. While these options are not free of cost, they may make less call for large and lumpy expenditures
- focussing additional transport infrastructure on alleviating road and rail bottlenecks which impose the largest costs, or increasing services where they are deficient, as is the case with the bus network.

The Commission has also identified options that aim to reduce congestion by influencing the demand for travel, including:

- parking restraint measures, which effectively increase road travel costs and so discourage road use
- increasing government information programs on the range of travel choices available
- seeking to better control the road movement of containers at the Port of Melbourne in peak hours
- promoting flexible school or working hours.

Some of these measures are being applied already or were identified in the *Metropolitan transport plan*. Options put forward include expanding their application or implementing a number of them.

A more direct way to manage demand is to allow the price mechanism to operate. The Australian and international evidence suggests that if motorists do not bear the costs of congestion, they will seek the most expedient form of transport and a substantial part of any increased capacity will be largely absorbed by 'induced demand'. The Government has recognised that road congestion is an issue in its vision of a substantial switch to public transport. It is premature to form a view about whether and when comprehensive road pricing will be warranted. Whether it would generate net benefits depends on factors such as the severity of future congestion problems and the cost of implementing road pricing, which will be influenced by the technology available at the time. (The capital cost of implementing London's congestion tax was £180 million, while reducing congestion has only increased average speeds from 14.3 kilometres per hour to 16.3 kilometres per hour within the charging zone.) The impact on road congestion would depend in part on the availability of alternative transport options, particularly public transport. Significant equity and distributional issues would need to be considered in any such decision.

There may, however, be some short-term scope for location-specific tolls to help improve congestion or defer investment in major new projects. Options identified in the report include adjusting tolls on CityLink and EastLink to incorporate peak-period pricing and the introduction of this measure on one or more lanes on the West Gate Bridge. In the case of the latter, it could be combined with other efficiency-based measures, such as ramp metering. Such an approach would also need to consider the extent to which this simply resulted in congestion being shifted to other roads.

Rigorous project evaluation is vital

There is usually a number of ways to address any congestion problem. Whether the best solution is chosen depends on the quality of the project evaluation process.

The number of options that exist for addressing each congestion problem indicates the crucial importance of Victoria having a 'best practice' project evaluation process for choosing between the options. As pointed out in chapter 9, Victoria has committed to adopting Australian Transport Council-endorsed national guidelines for evaluating new public road and rail infrastructure projects.

More information is needed

With a large number of options, and the inevitability that the options and the factors that influence choices between them will evolve in unpredictable ways, project evaluation and decisions need to be based on up-to-date information.

There is a clear need for better data to inform choices on managing congestion. Opportunities exist to improve the information base in relation to freight and commercial distribution, passenger travel on public transport and private motor vehicles, and congestion. This information would help to quantify congestion costs (especially for the business sector), understand behavioural responses and land-use impacts, and identify options with long-term network benefits, including in those areas crucial to future economic growth. Improving the information base is an important priority in order to enable more informed public debate and decision making about transport issues.

With information at such a premium for good policy making, there is much to be gained from mechanisms that encourage the generation of information about how particular policy instruments work and about thresholds for identifying problems that need to be addressed. Research can contribute. As congestion is a national issue, a collaborative approach is needed. Peak industry bodies, including in the freight and logistics area, need to work collaboratively with the government to develop improved data to inform decision making. Trialling new approaches is another way to generate information about how policy instruments operate and about how people react to them. The Commission has identified a number of areas where trialling could be useful, including peak period pricing on existing tollways, Port of Melbourne peak period road freight levy, flexibility in school hours and using auctions to address the relative value of clearways.

Institutional issues

The regulatory and institutional framework that has been established around the transport sector is complex. The Commission has found it difficult to identify all of the relevant parts of the framework and to determine how they fit together. The framework incorporates many agencies (including privately operated transport organisations with a contractual relationship with government) and regulation at all levels of government that affect policy development and implementation, regulation, oversight and performance assessment, and operational management and use of the transport system. Table 1 provides a simplified matrix of one part of the framework: Victorian agencies with responsibilities related to road transport.

Table 1 **Responsibilities for functions related to road transport**

	Department of Sustainability and Environment	*Environment Victoria*	*Department of Infrastructure*	*VicRoads*	*Local Government*	*Private operators*	*Transport Accident Commission*	*Victoria Police*
Land use planning			As VicUrban					
Vehicle noise and emissions, drainage from roads				Operational	Operational			
Manage public transport franchises								
Road and traffic management			SEITA	Arterial roads and CityLink	Local roads	CityLink and EastLink		
License drivers								
Register vehicles								
Regulate heavy vehicles				Safety, protect infrastructure, efficiency				
Manage Ports								
Manage inter-modal facilities								
Operate services								
Road safety								

Source: VicRoads, sub. 50, p. 13

An effective institutional framework is essential if transport congestion in Victoria is to be managed effectively. Deficiencies in the current arrangements mean it is not clear that the best approaches to managing congestion are being identified and implemented:

- Policies tend to focus on expanding road capacity or increasing the attractiveness of public transport rather than directly reducing the demand for road use.
- The current arrangements carry a risk that road projects will be favoured over other transport projects.
- Contractual incentives for public transport operators do not encourage them to develop new and innovative or market-based service alternatives or to maximise inter-agency coordination.

The Commission has identified options—reported in table 3 at the end of the overview—which would address these and other deficiencies in the regulatory and institutional framework.

Recognise and respond to interdependencies

Most congestion problems have neither a common cause nor a single response. Interdependencies are the norm. Many of the institutional options explored in the report are intended to improve coordination and integration between the many government agencies and levels of government that are involved in tackling congestion. As far as possible, local problems should be solved locally. Often, however, there are material effects beyond local boundaries, requiring coordination between different levels of government. This challenge was consistently highlighted in the Commission's interaction with metropolitan and regional communities. The current legislative arrangements are confusing and could usefully be clarified.

There is evidence of inadequate coordination across governments, within the Victorian Government and across modes of transport. Government policies and the agencies charged with delivering them are not necessarily working towards the same objectives. In some cases, they undermine the effectiveness of each other's activities. Local government policies to reduce traffic flows in a local area and increase pedestrian access may work in opposition to VicRoad's objectives to increase the rate of through traffic and reduce congestion. The patronage levels for public transport in an area can depend on land-use planning decisions encouraging the density in development necessary to support an effective public transport system. These issues were also apparent in regional cities.

There will be some areas where full integration of decisions that affect transport and congestion is difficult. Local government, for example, is responsible for decision making on local road issues. The Commonwealth will also continue to

fund local and state road projects using criteria over which Victoria has only limited control.

The Commission has offered principles to guide complex institutional coordination (box 2) and has identified a range of options that would significantly improve the levels of integration and coordination and minimise problems in remaining areas.

First, a more balanced approach to public transport and road issues could be achieved by:

- clarifying the roles and responsibilities of DOI by strengthening its ability to exercise responsibility for overall policy coordination of the transport network
- putting operational arrangements for public transport and roads on a more equal footing by strengthening the public transport management group within DOI, including through the establishment of an advisory board, and enhancing its project management capabilities.

If these reforms were combined with a single integrated transport budget and a consistent framework for project assessment, most of the concern about unequal treatment between road and rail, and a lack of inter modal coordination, would be removed.

Box 2 Best practice principles on coordinating decision making

- **Clearly stated high level strategic goals.**
- **Appropriate allocation of roles and responsibilities.**
- **Clearly defined objectives for individual agencies.**
- **Transparency.**
- **Consultation.**
- **An integrated approach.**
- **Maximise the scope for market decisions.**
- **Capacity to implement.**

Coordination between State and local government cannot be achieved by reform of administrative structures. Instead mechanisms to facilitate coordination and communication are necessary. The Commission considers that the key options for reform include:

- legislative change to the Transport Act, the Road Management Act and the Local Government Act to clarify that all local government decisions about transport related activities are consistent with the objectives of transport legislation

- these changes can be supported by guidance notes issued by DOI to clarify government policy in key areas, such as decisions on public transport priority on roads, allocating bus lanes, restricted parking on arterial roads and improving facilities for pedestrians
- monitoring the Growth Areas Authority process, to assess its effectiveness and to determine whether it should be extended into other regions
- the Government making forward commitments on long term infrastructure plans, including in some cases making forward commitments to funding for key transport projects that have been identified, and assessed as critical to the outcomes of growth area plans and integrated transport strategies.

Effective coordination between land use and transport planning is vital to achieving effective outcomes in both areas of government policy. The consequences of a previous lack of coordination are obvious. Many new developments in outer suburbs and regional centres are car dependant because of a lack of transport alternatives. This is now expensive to address because adequate provision for transport alternatives was not made when the land was sub-divided, and the ability to use public transport to influence development patterns may have been lost.

Coordination arrangements between the Department of Sustainability and Environment and DOI could be developed, which clearly recognise the role of the DOI and public transport in planning regulation. This could involve a formal and publicly available Memorandum of Understanding (MOU), finalising negotiations to make DOI a referral body under the Planning and Environment Act and increasing the use of developer contributions to fund public transport projects.

Additional problems have arisen with coordination between transport and other areas of government. To give congestion issues greater priority, the Government could announce that it expects all major projects (for example, hospitals and schools) to be implemented consistent with the objectives in the *Metropolitan transport plan* and involve, where appropriate, consultation with DOI. Exemptions that some state government departments have from normal planning processes could also be made conditional on effective consultation taking place.

Option identification is crucial

As noted above, there are many options for managing transport congestion and they will be continuously changing and evolving. Options that get to the stage of being developed into specific proposals need to go through rigorous project evaluation, as pointed out above. The benefits of such a process will be seriously diminished, however, if worthwhile options are not considered in the first place.

The proposals to put public transport and roads on a more equal organisational footing, and have decisions made within the context of a single transport budget,

would help to ensure that worthwhile road and public transport options have an equivalent opportunity to proceed to project evaluation by DOI. The Department, supported as appropriate by other departments such as the Department of Treasury and Finance, could continue to have responsibility for ensuring that demand-side options are considered at the same time as supply-side options in addressing transport congestion.

Take advantage of incentives

While there is an important role for planning in the transport area, there are opportunities to expand incentives for private sector transport operators.

Opportunities are lost to harness private sector transport operators to contribute to reducing congestion, if the terms in their contracts do not maximise the incentives to provide efficient innovative services that actively attract passengers onto public transport. In particular, more flexibility is needed in contracts. This could be achieved by reducing the term of bus contracts from 10 to five years, providing guidelines on the assessment process for proposals to change or add services, and allowing buses to compete with trams on routes where tram overcrowding is a problem. Innovation could also be encouraged by allowing new operators to compete with existing bus services if the services they offer have features that differ significantly from those normally identified with traditional bus services. This is particularly the case with the proposed bus rapid transit trial (chapter 7).

The SmartCard ticketing system also provides an opportunity to use enhanced data to improve services. This data could be used to monitor coordination between services and modes, facilitate trials of pricing initiatives and to link more closely the remuneration for all public transport providers to patronage on their services. If general subsidies and payments for concession passengers were also separately identified, this would assist in transport planning by providing better information on the demand for services, the cost of those services and the categories of customers that use them.

Transparency

This report has stressed that some of the options to improve the efficiency of the transport network and enable it to better respond to the challenges of congestion are being constrained by institutional factors. Consultation is likely to be more effective when the costs and benefits of different solutions to a problem are transparent to all, and the trade-offs can consequently be recognised and addressed. In addition, transparent airing to the public of the costs and benefits of particular projects should provide some protection against the implementation of projects that do not pass a cost-benefit test. Public scrutiny of costs and benefits can also improve the accuracy of estimates of costs and benefits.

This process will be considerably strengthened if post-implementation reviews of major projects are also required. Such reviews will have more credibility if not undertaken by those involved in the project, although they should be able to comment on the review.

The Government can take a lead

There are opportunities for the Victorian Government to take the lead in both the options for managing congestion and in institutional reform.

The Government could illustrate the benefits of some options to reduce congestion by taking the lead and publicising its successes in, for example, increasing the flexibility of working hours of its own workforce, promoting car pooling amongst its own employees, or neutralising the impact of the fringe benefits tax on its employees' choice of transport mode. It can also explore the scope for more flexible school hours.

Some issues that have an indirect but nevertheless significant impact on congestion, such as the operation of the fringe benefits tax and the fuel excise, are the responsibility of the Commonwealth Government. The Victorian Government could use opportunities such as the forthcoming national review of urban congestion to adopt a national leadership position in arguing the case for reform of these taxes.

On the institutional front, areas in which the Government can take the lead include improving coordination between its own agencies and with local government, and ensuring that its own facilities are planned with regard to their congestion impacts.

Tables 2 and 3 summarise the options described in chapters 7, 8 and 9 and the issues that would be involved in implementing these options. A fuller description and assessment of the options can be found in the chapters.

Table 2 **Options for addressing transport congestion**

Reform option	Implementation issues
Road demand management (chapter 7)	
• Peak period pricing of CityLink and EastLink.	• Contractual arrangements may need to be renegotiated with Transurban and ConnectEast, including to achieve revenue neutrality.
• Monitor the impacts of the congestion levy; align the parking components of the Government's planning approval processes with council parking limitation objectives; replace minimum parking requirements in Victorian Planning Provisions with maximum limits; encourage councils to make more use of parking precinct plans.	• Government would need to work with councils (possibly through MAV) to progress options. • Reductions in parking availability, as an incentive to reduce car usage, need to be combined with increased availability of public transport.
• Government to discuss with the Commonwealth in the context of COAG's review of urban congestion options, the progressive replacement of fuel excise by road pricing in a revenue neutral manner, and modification of fringe benefits tax arrangements relating to company cars.	• Would need agreement of Commonwealth and other States. • Significant implementation issues relating to substitution of road pricing for fuel excise. • Increased availability of public transport would need to be implemented in parallel.
• Remove incentives for Victorian Government employees to use cars for commuting.	• Could be undertaken at same time as review of fringe benefits tax arrangements or independently.
• Continue to promote and expand TravelSmart information program, particularly for times of day and locations affected by congestion. Could extend further into Geelong, Ballarat and Bendigo.	• Greater frequency and reliability of public transport will encourage greater interest in information programs such as TravelSmart.
• Promoting awareness of benefits from greater flexibility in working and school hours, and car pooling, recognising that these cannot be mandated; encouraging use of public transport and improved bus services to reduce congestion around schools.	• Planning approval for new schools needs to include provision of parking and public transport access. • Flexibility in school hours with funding incentives could be trialled to assess scope for and interest in changed hours.

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Table 2 **Options for addressing transport congestion** (continued)

Road supply management/road space reallocation (chapter 7)	
• Expanded implementation of traffic management measures such as ramp metering, variable speed limits, priority traffic signalling and traffic information.	• Important to trial applications in Victoria and at particular locations and monitor performance. • Coordination between State and local governments, and VicRoads as an implementing road authority. • Information program to promote greater public awareness of links between these measures and congestion.
• Establish clear hierarchy of road use for Melbourne, and supporting measures, for example, traffic signal priorities and queuing for trams and buses, separation of trams, prioritising for bus/tram boarders.	• May increase congestion for cars on some roads. • Information program to promote greater public awareness of links between these measures and congestion. • Local council adoption and consistent application.
• Restrictions on kerbside parking on designated routes; consideration of part funding of alternative commercial parking in adjacent areas.	• Will require consultation with local councils. • Needs to be implemented progressively and outcomes monitored, including impacts on traders.
• High occupancy vehicles lanes on major congested routes, especially buses, trams, commercial vehicles and cars with more than one passenger.	• Will increase congestion for cars. • Regulatory arrangements need to be clear, and restriction on usage enforced.
• Infrastructure investment (roads) focused on major bottlenecks—the Commission has not attempted to include specific infrastructure options for addressing bottlenecks; there will generally be a range of options, as illustrated by the West Gate Bridge.	• Modelling of bottlenecks needs to be robust. • Explore a full range of transport alternatives. Cost-benefit appraisal of options needs to include induced demand, network benefits and long-term trends in usage.
Public transport management (chapter 7)	
• Improve the efficiency of the rail system (North Melbourne and Richmond interchanges; signalling in the City Loop; duplication of single tracks). More substantial additions to rail network, subject to cost-benefit analysis. Change operational arrangements for City Loop.	• Funding implications. • Changes to operational arrangements for City Loop will require greater number of passenger transfers; needs to be linked publicly to capacity enhancement. • May be contractual issues between Government and Connex.

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Table 2 **Options for addressing transport congestion** (continued)

• Upgrade local buses; accelerate roll-out of SmartBus; trial bus rapid transit system; expand park and ride.	• Contractual incentives to improve efficiency and increase patronage need to be sharpened. • Issues relating to real-time information and signalling for SmartBus need to be resolved before program is expanded. • Trial arrangements for bus rapid transit should be discussed with the Bus Association Victoria.
• Use opportunity SmartCard provides for more flexible public transport fares, both between times and in relation to distance.	• Monitoring of customer behaviour needs to precede changes to fare structures.
• Strengthen incentive structures for public transport operators.	• Would require discussion with public transport operators and possible contractual changes.
• Public transport operators look at scope for developing targeted loyalty schemes as part of broader branding program (as in Paris).	• Implications for current fare structures. • Allocation of costs and benefits between public transportation operators.
Urban land use policies (chapter 7)	
• Implement existing policies for restricting highest densities to Principal and Major Activity Centres; fast-track the Transit City program; assess ways to reduce congestion impacts of business zones outside major activity centres; improve coordination between relevant agencies.	• Ensure close relationship between policies concentrating land use and availability of adequate transport options.
• Ensure public transport and roads have equal access to developer contributions.	• Requires development of public transport options to be linked to new land sub-divisions and urban consolidation.
Freight (chapter 8)	
• Address the incidence of empty and partially loaded truck movements to and from the Port of Melbourne, including through freight consolidation; monitor the effectiveness of vehicle booking systems.	• Smart Freight programs to monitor and report on progress. • Likely to adversely affect smaller truck operators.
• Facilitate the development of inter modal hubs	• Essential Services Commission to monitor and advise on impacts of new rail access arrangements. • May be difficult to separate issues relating to rail access from commercial considerations.

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Table 2 **Options for addressing transport congestion** (continued)

• In the absence of equitable pricing between road and rail, introduce a levy, initially as a trial, on the road movement of containers at the Port of Melbourne to discourage peak period road traffic.	• Greater knowledge of the congestion costs would assist determination of pricing levels. • Discriminates against port-related road container traffic by excluding other peak period truck movements in the port precinct. • The capacity and layout of the rail system and intermodal hubs needs to be able to handle any displaced container traffic efficiently.
• Reserve corridors to ensure adequate road and rail network connectivity to the Port of Hastings.	• Consultation with relevant local councils required.
Longer-term options (chapter 7)	
• Test expanded use of road pricing.	• Monitoring and evaluation of impact of peak-period tolling. • Develop information base, including equity considerations; monitor technological developments. • Expansion of public transport capacity.

Table 3 **Options for institutional reform (chapter 9)**

Reform option	Implementation issues
Coordination within the transport portfolio	
• Include overarching and consistent objectives within the Transport Act and related legislation.	• Requires legislative amendment.
• Clarify the roles and responsibilities of the transport portfolio so that DOI has responsibility for policy development and coordination, and the public transport management group is strengthened, with an advisory board and enhanced project management capabilities.	• Need to ensure role of public transport management group in DOI complements contractual arrangements with service providers. • Advisory groups for both VicRoads and the public transport management group should be chosen for skill sets as well as representative functions. • VicRoads would lose its role in policy development relating to roads, though it would be fully consulted on operational implications.
• A single state budget for transport projects.	• Some funds will need to be reallocated from VicRoads into a common pool. • Given VicRoads' diverse funding sources, a fully integrated budget framework is useful for informing strategy and project choice.
• Adopt a consistent framework to assess the costs and benefits of all transport projects.	• Victoria has committed to the national road assessment framework and will need to build on the national model.
• Improve DOI's information base, through enhancement of its modelling capabilities and better understanding of factors influencing transport choices.	• Will require funding.
Coordination between state and local governments	
• Legislative change to the Transport Act, the Road Management Act and the Local Government Act to clarify that all local government decisions about transport related activities are to be consistent with transport legislation.	• Would require legislation, and consultation with councils (possibly through MAV) and public transport operators.
• Supported by guidance notes issued by DOI for decisions on public transport priority on roads, allocating bus lanes, restricting parking on arterial roads and improving pedestrian facilities.	• Would require consultation with councils (possibly through MAV) and public transport operators.

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Table 3 **Options for institutional reform (chapter 9)** (continued)

• Seek volunteer local councils to develop a MOU on integrated transport planning in local areas.	• This would enable the applicability and usefulness of such a MOU to be trialled. • Financial incentives could be offered to encourage councils to participate.
• Review the Growth Areas Authority process after three years to assess the scope to improve and extend their application to other regions.	• Issues which have resulted in establishment of the Growth Areas Authority have wider application.
• Make forward commitments to funding for key transport projects that have been identified and assessed as critical to the outcomes of growth area plans and integrated transport strategies.	• Would require budget commitment to future projects.
Coordination between land-use and transport planning	
• Negotiate a public MOU between DSE and DOI to ensure land-use planning and transport policies are fully integrated.	• Timeframes should be imposed on the negotiation of such an MOU to ensure the process is not protracted. • The success of the MOU should be monitored.
• Finalise negotiation on DOI's role and a referral authority under section 55 of the Planning and Environment Act.	• Currently under negotiation between DOI and DSE.
Coordination between transport and other state departments	
• Make exemption from the Planning Provisions conditional on demonstrated compliance with an effective consultation process.	• The characteristics of such a process would need to be agreed prior to granting the exemption.
• Government announce that it requires all departments to explicitly consider transport access and congestion for all major projects.	• Projects would need to be monitored to ensure departments comply with this announcement.
Improving market solutions	
• New bus contracts should be negotiated for five rather than 10 years.	• More frequent renegotiation involves additional costs for operators and government that would need to be considered against the benefits of greater flexibility and improved performance.

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Table 3 **Options for institutional reform (chapter 9)** (continued)

• New operators be allowed to compete with existing bus services if the services they offer have features that differ significantly from those normally identified with traditional bus services. This includes the proposed bus rapid transit trial.	• Adds some risk to bus contracts. • It may be difficult to define what constitutes a service that is significantly different from existing services.
• Allow buses to pick up and set down on tram routes once tram overcrowding reaches a set level.	• May not be possible given the conditions in existing tram contracts and, therefore, may need to be considered in the next renegotiation.
• Coordination between public transport services should be monitored and reported.	• Data limitations mean this is difficult until after SmartCard ticketing is established.
• Create a stronger linkage between patronage and remuneration for all public transport contracts and separate general subsidies and subsidies for concession passengers paid to bus operators.	• These reforms are difficult until after the SmartCard system is introduced. • The proportion of operator payments that should be linked to patronage may vary depending on the type of service.
• Project specifications for new toll roads to include proposals on how new infrastructure would enhance the efficiency of all parts of the transport network, including public transport.	• Could reduce attractiveness of projects to investors.

1 Introduction

This chapter provides the background to the inquiry and describes the inquiry process and approach taken by the Victorian Competition and Efficiency Commission in preparing this report. It also outlines the structure of the report.

1.1 Background to the inquiry

1.1.1 The transport context

Victorians travel more than 90 billion passenger kilometres each year and, on an average day, Melbournians make around 12 million personal trips, about three quarters of them by car (Apelbaum Consulting Group 2004, p. 2; Morris & Wang 2002, p. 4). While there has been a rebound in the number of public transport boardings in recent years, the number of boardings today is one third less than the number of boardings in 1950, even though our population is now two and a third times greater in size (AIUS and City of Melbourne 2005, p. 56). The car has revolutionised Victorians' living patterns and the environments within which they live. It has brought mobility and accessibility benefits, but with these benefits have come costs, one of which is traffic congestion.

Several indicators suggest that usage on key sections of Melbourne's freeways is approaching capacity. Average travel speeds on the freeways have fallen by about 3 km/h over the past 12 months and the variability of travel times has also increased. In addition to imposing delays, the increasing variability of travel times means that many people and businesses will need to put more time aside for travel, 'just in case' there are unexpected delays (sub. 50, p. 9). The duration of morning and afternoon peaks has also been increasing. Inquiry participants drew attention to congestion hotspots within the Melbourne metropolitan area and the regional centres, with prominent examples including the Monash-West Gate corridor, parts of the Tullamarine Freeway, the city end of the Eastern Freeway and several north-south routes to the west and east of the central business district (CBD). Also, average tram speeds have been declining slightly and there have been concerns about over-crowding of trains on some routes during peak periods.

The Government's vision for Melbourne is one in which public transport performs a larger role, accounting for 20 per cent of motorised trips by 2020 (currently around 9 per cent).[1] Achieving this will be challenging, given the flexibility of private motor vehicle travel and that the rail and tram networks radiate out from the CBD. Also, many travel movements are across the metropolitan area rather than into the CBD. Victorians' desire to travel is likely to continue to grow as population and incomes increase. With some forecasts suggesting that metropolitan travel could increase by around 25 per cent in the next 25 years (chapter 2), there are concerns that congestion could become a major problem. Compounding these concerns is the expected growth in road freight traffic, with some estimates predicting growth of around 50 per cent over the next 15 years (BTRE forthcoming). Economic growth, together with the changing structure of the economy and ways of doing business, are expected to substantially increase the freight task on the roads of Melbourne, Ballarat, Bendigo and Geelong.

These concerns raise a number of questions. How serious is congestion in Melbourne? Is it getting worse? What is the situation in Ballarat, Bendigo and Geelong? What are the costs of congestion? Who is bearing these costs? To what extent are people able to manage the costs; for example, by adjusting their schedules, routes or locations? Are there any benefits from congestion? Is eradicating congestion a sensible goal for policy? If not, how much expenditure is warranted to reduce congestion? What are the best ways to manage congestion? Is building more roads the answer, or will this just induce more traffic? Should there be more use of demand management? What is the relationship of policies to address congestion with other policy areas, particularly land use planning? Are institutional arrangements encouraging or discouraging appropriate responses to congestion and the development of solutions to congestion?

This draft report aims to provide some clarity around the key issues, in order to assist policy development. It identifies a range of possible approaches for managing congestion, in line with the Government's request that the Commission identify options rather than put forward recommendations.

[1] This estimate is based on 1999 data from the Victorian Activity Travel Survey over a 7 day week. Using 2002 Victorian Activity Travel Survey data, public transport accounted for 11 per cent of motorised trips (based on a 5 day week).

1.1.2 Defining congestion

One difficulty with addressing traffic congestion is that there is no universally accepted definition of what congestion is (chapter 3). Typically, congestion is defined as a situation where the demand for use of roads is excessive, resulting in slower than normal speeds. A report for the United States Federal Highway Administration, for example, defined road congestion as '… an excess of vehicles on a portion of roadway at a particular time resulting in speeds that are slower—sometimes much slower—than normal or "free flow" speeds' (FHWA 2005, p. ES-2).

Congestion can be *recurring* or *non-recurring*. It is said to be recurring if it is predictable. Recurring congestion often results from network *bottlenecks* and the way the network is used and managed. Although these recurring causes of congestion are significant, contributing about 40 per cent of congestion according to some overseas studies, because they recur they can be factored into trip times and decisions about where to live, work and locate businesses (ARRB 2006a, p.iii).

Non-recurring congestion is caused by events that do not occur with any consistent pattern, are unpredictable for drivers and have erratic impacts. It can be caused by traffic incidents, vehicle breakdowns, road works, weather, and special events. This type of congestion cannot be easily mitigated and travellers can only plan for it by allowing buffers in travel times that may not actually be required (ECMT 2005 cited in ARRB 2006a, p.iii). Some overseas studies have found that non-recurring events can account for as much as 60 per cent of congestion, suggesting that addressing non-recurring congestion is potentially as important as tackling recurring congestion (ARRB 2006a, p. 10).

Economists tend to think of congestion as a situation that develops when travellers do not bear the full costs that their travel imposes, including the costs on other users.[2] This leads to inefficiency because others using the road are delayed or held up in queues irrespective of whether they place a high or low value on the trips that they are undertaking and the time they spend in traffic. An economic perspective on congestion leads to consideration of the costs and benefits of different ways of reducing congestion not to zero, but to a level

[2] 'Economic theory attributes the problem of urban traffic congestion to the fact that road users do not take account of the full costs of their travel decisions. If road users did take account of the full costs, they would find that some trips are not worth making—in other words, that the benefits of these trips are less than their full cost. From the community's point of view, these low value trips should be rescheduled to less congested periods, or combined with other trips, or even suppressed altogether.' (BTCE 1996a, p. 21)

which maximises the net benefits to the community of investing resources for this purpose.

The concept of congestion is also relevant to public transport. Road traffic congestion can directly affect the performance of road-based public transport, such as average tram and bus speeds and service reliability. The issue of congestion on rail is more complex than for roads. Whereas access to the road network is generally open, access to the rail network is controlled and so should not become congested in the same way as happens on roads.[3] Passenger demand for use of the rail system can result in over-crowding, in the sense that the number of passengers on any one train might exceed the accepted capacity of that train.

Not everyone sees congestion as a bad thing. Some see a certain amount of congestion as an indication of a vibrant city. Others—coming from a quite different perspective—argue that road congestion is a good thing as it forces road users to think more carefully about alternative options, such as public transport, cycling and walking. They argue that use of alternative transport modes would result in a more attractive urban environment. Clearly there is a wide range of views about whether transport congestion is a problem, although many people see it as a major issue (box 1.1).

1.1.3 Possible costs of congestion

For personal travel, the adverse consequences of excessive congestion include:

- the costs of longer trips for all forms of travel, including the additional time taken or that needs to be allowed for travel, and the additional running costs of cars
- the additional 'external' costs of travel, including the increased emissions of pollutants and noise associated with 'stop-start' travel; more frequent episodes of 'road rage' may be partially attributable to more crowded roads.

Road congestion adversely affects business productivity. It does this by:

- requiring increased inventories—particularly when goods are perishable, difficult to warehouse or subject to rapid changes in value

3 The demand for track use by passenger and freight train operators might also exceed the capacity available. However, access to track is regulated and thus—unlike roads—the use of track by users is only allowed with the full consideration of the costs it might impose on other rail users.

- requiring freight companies to add vehicles and drivers and extend their hours of operation, to compensate for longer travel times and less reliable pick-up and delivery times
- reducing the market reach for businesses, resulting in smaller plants with higher unit costs and less access to specialised inputs
- encouraging businesses to revert to less efficient production scheduling processes
- increasing labour costs demanded by employees in exchange for longer commuting times (SGS Economics and Planning sub. 2, pp. 4–12 and FHWA 2005, p. 2-26.)
- potentially reducing the competitiveness of Australian exports owing to delays or uncertainty of delivery schedules.

BOX 1.1 Some views on transport congestion

Congestion is an inevitable element of any vibrant city, with no city in the world having successfully eliminated it. (Environment Victoria, sub. 73, p. 2)

By international standards, transport congestion in Melbourne is not very bad. (J. Toth, sub. 5, p. 1)

Some level of congestion is to be expected and is not necessarily a bad thing. Roads should be designed to congest in the busy hour. If they don't congest then the infrastructure cost should be questioned. (3068 Group, sub. 51, p. 2)

The City of Yarra is also disturbed that 'traffic congestion' seems to be identified in the issues paper as always undesirable. This leads readers to the conclusion that free flowing unrestricted traffic movement is therefore considered desirable in every situation. The City of Yarra contends that this is not necessarily the case since traffic congestion is, in itself, a regulator for ever increasing traffic growth. There must therefore be a more broad vision and approach to considering congestion. (City of Yarra, sub. 63, p. 2)

In a city that competes for business investment against other cities, such as Melbourne competing against in particular Sydney and Brisbane, existence or at least perception of high levels of congestion is likely to encourage diversion of at least some of that investment interstate. (Transurban, sub. 67, p. 5)

Melbourne experiences socially-costly traffic congestion that amounts to gross losses of billions of dollars annually. (Clarke and Andrews, sub. 3, p. 3)

In addition to substantial adverse environmental, social, health and amenity implications, congestion incurs significant economic costs. If the current trends continue, the annual cost of road congestion in Melbourne will increase more than threefold, from the current $2.7 billion in 1995 to $8 billion in 2015. By 2020, road congestion could cost close to $10 billion a year. (Municipal Association of Victoria, sub. 30, p. 4)

Sources: Clarke and Andrews, sub. 3; J. Toth, sub. 5; Municipal Association of Victoria, sub. 30; 3068 Group, sub. 51; City of Yarra, sub. 63; Transurban, sub. 67; Environment Victoria, sub. 73.

Road congestion can affect the operation and costs of public transport providers as well as delay passengers. It has also been suggested that congestion reduces mobility and thereby increases the market power of well located businesses and reduces competition. Access to competing businesses is limited by congestion, and land prices are increased, near to preferred destination points.

Freight and light commercial vehicles account for about 12 per cent of vehicles in the metropolitan area and the freight task they will need to carry is growing at a greater rate than economic growth (ABS 2005c). Most freight vehicles are light commercial vehicles, and VicRoads estimates that these vehicles will be the source of most growth in freight vehicle kilometres (chapter 2). The West Gate, Monash and Princes Freeways and sections of the Western Ring Road and Hume Highway are the freight routes which carry the highest volume of freight tonnes. However, the incidence of congestion for freight and commercial vehicles is broadly experienced across all urban areas and arterial routes. Many issues related to freight congestion are, however, concentrated around the Port of Melbourne, nearby suburbs and a limited number of major roads. This is because the Port of Melbourne is a major generator of freight traffic in the metropolitan area, and by 2010 it is projected that there will be five million container truck movements a year (Government of Victoria 2004a, p.55).

There are clearly many ways in which congestion can impose costs on individuals and businesses. At the broadest level, congestion affects the attractiveness of living in Melbourne, Geelong, Ballarat and Bendigo and increases the costs of doing business in these cities relative to cities elsewhere in Australia. Congestion can also impose a range of environmental and social costs.

1.1.4 The policy context

In 2001 the Government released *Growing Victoria Together*, which highlighted 'growing and linking all of Victoria' (Government of Victoria 2001, p. 16), and included goals to relating to rail's share of freight destined for ports and the use of public transport. The report stated that increased public transport use will bring economic, environmental and social benefits and relieve congestion. Transport goals were that:

- the proportion of freight transported to and from ports by rail will increase from 10 per cent to 30 per cent by 2010.
- public transport use in Melbourne as a proportion of trips taken by motorised means will increase from 11 per cent in 2002 to 20 per cent by 2020. (DPC 2006, p. 1)

SGS Economics and Planning points out that 'the relationship between economic performance and transport cannot be debated without examining the role of urban form.' (sub. 2, p. 11). In this context, the Victorian Government in

2002 published its strategy for managing the growth and development of metropolitan Melbourne (*Melbourne 2030*), to enable the city to absorb an anticipated 660 000 extra households over the next 30 years. The main thrust of the strategy is to concentrate future development:

> … in strategic redevelopment centres such as activity centres and undeveloped land … over time, there will be a shift away from growth on the fringe of the city … the trend towards fewer people in each household will continue to support demand for well-located apartment lifestyles and activity centres. This will be supported by an expanded and more attractive public transport system. (DOI 2002a, p. 12)

The Government expects that increasing the share of motorised trips on public transport in Melbourne to 20 per cent by 2020 will require:

> … major improvements to public transport through the Principal Public Transport Network. More than half of this network is already in place through metropolitan Melbourne's radial train and tram system. The rest of the network—some 40 per cent—will be added mainly through new cross-town bus routes. (DOI 2002a, p. 135)

To achieve its transport objectives, *Melbourne 2030* outlines eight transport 'directions' (see box 1.2), each of which is supported by a number of policy initiatives. It is immediately apparent that transport policy is characterised by interdependencies: between local and 'principal' public transport (point 1); between transport modes (points 2, 4 and 7); within transport modes (point 5); between transport and land use (points 3 and 7); and between transport and environmental policies (points 6 and 7). The extent of these interdependencies and how they can be most effectively managed will be consistent themes throughout this report.

Linking Victoria (ALP Victorian Branch 2002) was an election commitment to increase spending on Victoria's roads, rail, public transport and ports. The Government's economic statement, *Victoria Leading the Way,* emphasised improving the competitiveness of freight transport and port access (Government of Victoria 2004b, pp. 6 and 9).

In 2004, the Government explained how it intends to accommodate the transport needs of an expanding population in *Linking Melbourne: Metropolitan transport plan* (Government of Victoria 2004a). While Melbourne's population is expected to grow in established areas, development is also expected in designated growth areas in the outer suburbs, which will be serviced by public transport and roads. The Minister for Transport, in his foreword to the Plan, noted the

Government's intention to reduce congestion in inner Melbourne by increasing the efficiency of existing systems, while considering newer infrastructure in outer Melbourne. The Plan articulates four strategies for managing congestion:

(1) *improving the reliability and flow of public transport*, through measures such as signalling systems that give priority to trams and buses at intersections; separating cars from trams and/or buses; more effective controls on kerbside parking; and improving public transport in the Doncaster corridor
(2) *making existing roads operate better*, through, for example, establishing a hierarchy of road use; establishing more effective access controls; managing kerbside parking
(3) *improving service coordination, integration and consumer interface*, through measures such as upgrading interchange facilities; off-peak fares; state-wide integration of fare structures; and improving timetable coordination across modes
(4) *promoting sustainable travel through better demand management*, through, for example, investigating pricing options that reflect the full economic, social and environmental costs of transport; and the TravelSmart program.

Box 1.2 ***Melbourne 2030*: transport policy directions**

1. Upgrade and develop the Principal Public Transport Network and local public transport services to connect activity centres and link Melbourne to the regional cities.
2. Improve the operation of the existing public transport network with faster, more reliable and efficient on-road and rail public transport.
3. Plan urban development to make jobs and community services more accessible.
4. Coordinate development of all transport modes to provide a comprehensive transport system.
5. Manage the road system to achieve integration, choice and balance by developing an efficient and safe network and making the most of existing infrastructure.
6. Review transport practices, including design, construction and management, to reduce environmental impacts.
7. Give more priority to cycling and walking in planning urban infrastructure and in managing our road system and neighbourhoods.
8. Promote the use of sustainable personal transport systems.

Source: DOI 2002a, p. 134.

In addition to these measures that are aimed directly at managing transport congestion, the M*etropolitan transport plan* outlines strategies for improving transport safety, managing metropolitan growth and supporting economic growth (Government of Victoria 2004a). Many measures implemented through these strategies are likely to have a bearing on transport congestion.

1.2 Scope of the inquiry

Against this background of growing concerns about congestion, but with significant policy action already underway, the Victorian Government has asked the Victorian Competition and Efficiency Commission to conduct an inquiry into the management of transport congestion. The terms of reference define the scope of the inquiry, directing the Commission to inquire into and report on:

(1) the nature and incidence of transport congestion:
   a) in Melbourne;
   b) in major regional cities of Geelong, Ballarat and Bendigo; and
   c) at key modal and inter-modal freight transport facility interfaces (including road junctions, the port, airport, and rail–road terminals).

(2) the impact of transport congestion on businesses and supply chain efficiency in Victoria;

(3) any present regulatory and institutional barriers to achieving progress in tackling existing transport congestion and effective traffic demand management; and

(4) the potential application of approaches to tackling transport congestion used in other major international cities.

Four issues relating to the scope of this report need to be stressed. The report:

- proposes options, not recommendations
- is an input into a broader decision-making process
- does not solve location-specific congestion problems
- focuses on how best to achieve the Government's policy objectives, but does not question these objectives.

1.2.1 Options not recommendations

In his letter of transmittal, the Treasurer of Victoria asked the Commission to present 'options for consideration that will inform the development and application of future decisions about the effective management of transport congestion in the State'. Consistent with this, the Commission has sought to:

- identify and assess options, but not make recommendations
- provide information about the advantages and disadvantages of a wide range of options relating to demand management, improving supply capacity, and institutional and regulatory arrangements, drawing on a detailed examination of relevant international experience
- link the options to congestion problems that the Commission has identified
- identify options that could be implemented in the short term and in the long term, and to consider any interdependencies between them.

1.2.2 An input into a broader decision-making process

Policy making and implementation is a complex process involving many steps. All Australian governments have recently agreed to implement a framework that, taking the Government's high level policy objectives as the starting point, involves seven phases:

- *phase 1*: formulate transport system objectives and a hierarchy of integrated and linking supporting objectives
- *phase 2*: consider high level policy choices
- *phases 3 and 4*: develop strategies for the transport network and corridors
- *phase 5*: appraise individual projects and combine them into an investment program
- *phase 6*: implement projects/programs
- *phase 7*: undertake a post-completion review of the performance of projects, programmes, strategies, policies, and the degree of success in achieving desired objectives/outcomes; and review the whole framework and its components (Australian Transport Council 2004, p. 7).

In this report, the Commission's involvement in assessing policy options contributes in particular to phase 2 in the decision-making framework, by providing advice on policy choices. Outputs from this phase, as identified by the Australian Transport Council, typically include high level policy statements covering, for example, the relative roles of demand management and infrastructure supply in meeting objectives; specific policy measures to give effect to the policy statements (for example, pricing and regulation); and system performance measures (Australian Transport Council 2004, p. 24). In addition, some of the policy approaches suggested by the Commission extend into phases 3 and 4, as they relate to the transport network and corridors.

1.2.3 Not solving specific congestion problems

In the course of the inquiry, participants identified many proposals for rectifying specific congestion problems. As flagged in the issues paper, the Commission has not attempted to address these specific proposals. This would involve it in phase 5 of the policy making framework described in section 1.2.2. Undertaking project appraisals would involve, as a first step, clear identification of the problem that needs to be addressed, followed by identification of the many options that usually exist to address them. These options need to be comprehensively assessed. Addressing any one specific problem would involve a report in itself.

As an indication of how specific problems might be approached, the Commission sets out the wide range of options available for addressing the West Gate Bridge, currently a major choke point which restricts the capacity of the east-west corridor. Some of these options would enhance capacity, while others focus on managing demand. Some could be implemented quickly, while others are long-term options. Any response is likely to involve a number of measures.

1.2.4 Focus on achieving the Government's policy objectives

In undertaking its analysis, the Commission has taken as 'given' the strategic directions outlined in *Melbourne 2030* and *Linking Melbourne: Metropolitan transport plan*, outlined above. The Commission's role is not to assess the broad targets or strategies that the Government has established. Rather, its role is to provide a list of relevant options in accordance with the terms of reference, as a contribution to improved public debate and decision-making.

1.3 Conduct of the inquiry

The Commission advertised the inquiry in the daily press and made direct contact with interested parties, inviting submissions. The terms of reference and inquiry particulars were also listed on the Commission's website at www.vcec.vic.gov.au.

After receipt of the terms of reference, the Commission released an issues paper explaining the scope of the inquiry and calling for public submissions. The issues paper explained that the Commission intended to provide the Victorian Government with a better understanding of the broad nature and impact of transport congestion, the range of policy options available and methods for choosing between them. The issues paper indicated that the inquiry was not intended to identify and address every specific instance of congestion in Melbourne and the main regional cities.

The Commission received a total of 92 submissions, listed in appendix A. In addition, the Commission met with a wide range of interested parties to help identify and assess issues relevant to the inquiry. Appendix A contains a list of those with whom the Commission met. The Commission also requested ARRB to prepare a report on the definition of congestion and previous attempts to quantify congestion in Victoria. Booz Allen Hamilton was engaged to report on relevant approaches applied internationally to manage urban transport congestion. The Commission held a roundtable on 15 December 2005, at which early drafts of parts of these reports were discussed. Appendix A lists the participants at the roundtable.

The terms of reference direct the Commission to produce a draft report 'for consultation purposes'. The Commission invites submissions about the issues raised in this report. In light of the submissions received, the Commission will hold public hearings as necessary. The Commission will publish on its website a list of issues about which it is particularly keen to receive additional information.

1.4 Report structure

The remainder of this report is organised into two parts. The first part addresses the first and second items in the terms of reference, by providing information about the:

- nature of the transport task in the four cities
- institutional framework within which the transport sector operates
- nature and incidence of congestion.

The second part assesses the main instruments that could be used to manage transport congestion and assesses regulatory and institutional impediments to achieving progress in tackling congestion. It addresses the third and fourth items in the terms of reference.

Part A: Context

- *Chapter 2* describes the development and physical characteristics of the transport networks in the four cities, but particularly in Melbourne, and aspects of the demand for transport that the networks are servicing.
- *Chapter 3* examines approaches to defining and measuring transport congestion; reports estimates of some of the current and projected congestion costs; and describes the main patterns and causes of congestion in Melbourne. It also outlines the data shortcomings that need to be addressed to inform policy in the longer term.
- *Chapter 4* discusses the institutional framework within which decisions that affect transport congestion are made. It describes the role of the Commonwealth, State and local governments in planning, funding, managing and operating the transport networks. It pays particular attention to mechanisms for integrating approaches between levels of government and transport modes, and for reconciling conflicts about the use of scarce transport infrastructure.

Part B: The options

- *Chapter 5* describes the options that inquiry participants have suggested could be used to manage transport congestion.
- *Chapter 6* outlines international experience in addressing transport congestion, focusing on those examples that provide:
  - evidence relevant to the options in chapter 5
  - other feasible options for managing congestion that address the specific issues identified in chapter 3
  - different approaches to the implementation of measures currently being used to address congestion in Melbourne.
- *Chapter 7* assesses many of the options described in chapters 6 and 7, considering their relevance to the congestion problems in the four cities, their likely impact on congestion and cost-effectiveness, and the extent to which they affect other government objectives.
- *Chapter 8* addresses issues relating to freight transport.
- *Chapter 9* assesses alternative institutional arrangements for managing transport congestion. Having appropriate arrangements in place is particularly important, as it is these arrangements that will determine whether the best combination of options is selected and whether it is implemented effectively.
- *Chapter 10* draws out conclusions.

Supporting appendices provide:

- information on parties consulted during the course of the inquiry (via meetings, roundtable discussions, submissions and public hearings)
- information on transport elasticities and details about modelling of congestion costs
- a list of the options for managing congestion set out in the *Metropolitan transport plan*.

Part A

2 The transport network

Victoria's urban roads, rail and tram networks and the associated infrastructure (such as control systems, traffic lights, train signalling systems, depots and stations) serve vital economic and social functions. These networks facilitate the movement of people and goods, and link communities.

This chapter describes key features of Victoria's urban transport networks and outlines how the network is used. The focus is on land-based transport in metropolitan Melbourne (the area within the Melbourne Statistical Division) and in the regional cities of Geelong, Ballarat and Bendigo. The principal networks covered are: road (including road-based public transport by trams and buses) and rail. As well, the chapter describes the Port of Melbourne and airports, insofar as they have particular significance for the form and use of the transport network.

The chapter focuses on:

- the *physical characteristics* of Melbourne's transport network and briefly the regional cities of Geelong, Ballarat and Bendigo. It includes the historical development of the network, and the impacts of economic development, population growth and urban development.
- *usage* of transport networks, the factors that have contributed to increased use of private motor vehicles and the decline in relative importance of public transport in the overall transport task, and how this experience compares with that of other cities. The factors contributing to the use of road for freight movements are also examined.
- *drivers of usage* patterns, including factors influencing travel choices for passenger and freight travel, the values that people and businesses place on travel, and some of the ways that they adjust their behaviour in an effort to reduce travel costs.
- *future outlook*, focusing on the factors that will influence the shape of the urban transport network including population trends and economic development.

These aspects provide a background for the discussion in later chapters on the nature and extent of congestion, and the options for its management.

2.1 Physical characteristics

The physical characteristics of the transport networks in Melbourne and the regional cities are a product of historical development patterns and the forces shaping Victoria's growth. These characteristics influence the nature and significance of congestion and the options for addressing it.

Victoria's urban centres have extensive and well developed transport networks. Melbourne, in particular, has an extensive transport network facilitating the movement of people and goods across the city and connecting with regional centres such as Geelong, Ballarat and Bendigo (see figure 2.1 and table 2.1). The transport network comprises the road network, public transport systems (rail, tram and buses), walking and cycling infrastructure and freight hubs such as the Port of Melbourne and airports.

Although travel in private motor vehicles is the dominant mode of transport, this has not always been the case. Initially, motorised travel was based around a radial system of rail lines which were built from the central business district (CBD), radiating to the west, south-west, east and south-east of Melbourne. In the later part of the 19th century, a system of cable trams was developed to carry people from the suburbs into the city centre. Reflecting favourable topography and other conditions, much of Melbourne's early expansion, and hence development of the rail and tram systems, occurred to the east and south of the city centre (Beed 1981, cited in IC 1994a, p. 40).

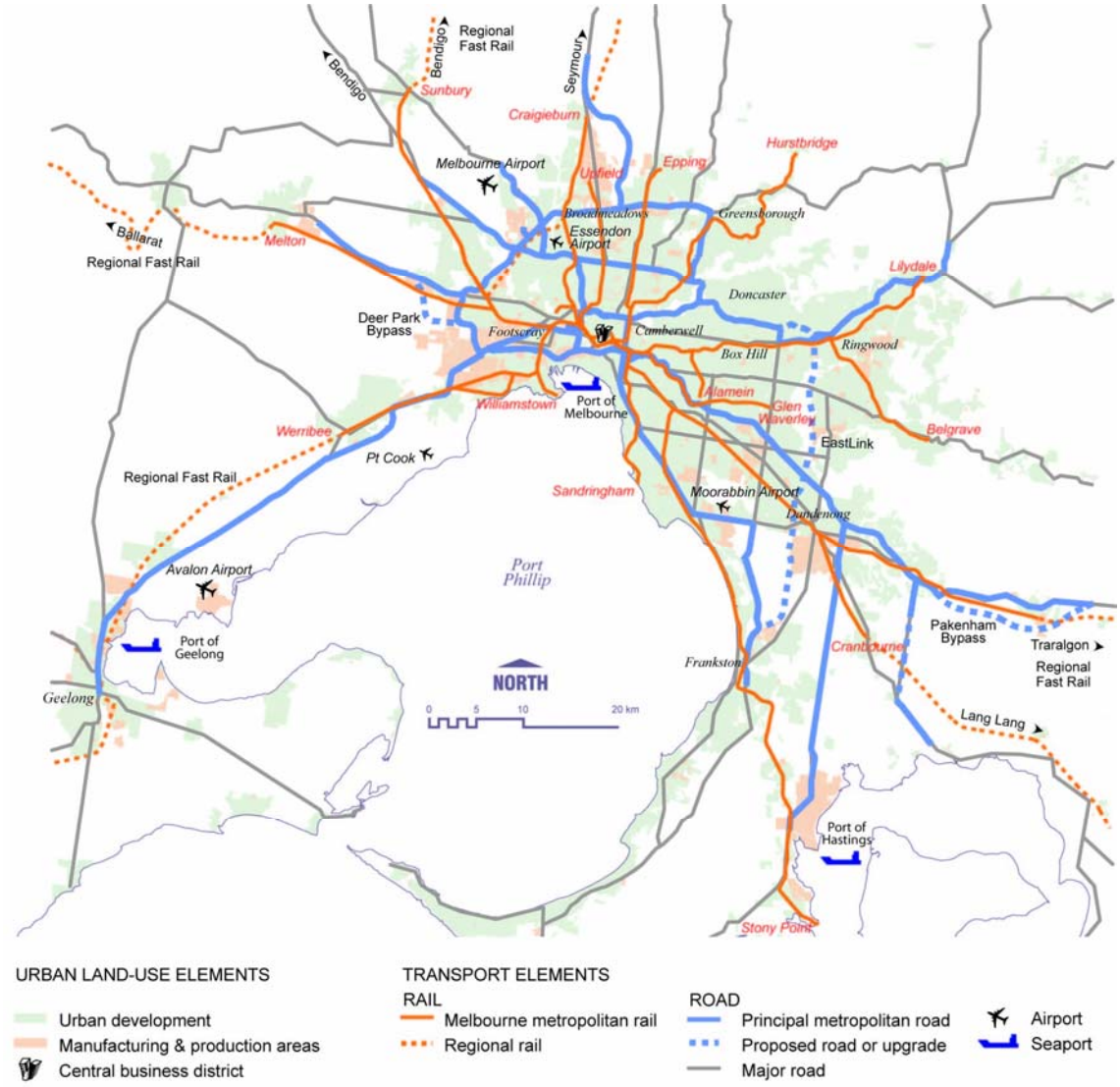
The motor vehicle has had a profound effect on the shape of urban development, particularly in Melbourne. Increasing car ownership facilitated urban expansion by opening up development in areas away from the rail and tram routes. Growing car ownership and investment in expanding the road network encouraged new subdivisions in the areas between the radial rail lines. Many of these new subdivisions were characterised by lower density housing developments. Increased use of motor vehicles also increased the flexibility of urban freight movements, enabling factories and warehouses to move away from wharves and rail sidings to a range of cheaper industrial sites on the city fringes (Beed 1981, cited in IC 1994a, p. 40).

Since the early 1990s, a large share of the growth in Melbourne's population has been in the inner and middle suburbs. These inner growth areas offer residents easy access to public transport and most services. However, the population of Melbourne has also grown strongly on the fringe. In these areas, public transport services are limited and people tend to travel longer distances, and have higher levels of car ownership (Clarke & Hawkins, sub. 3, p. 4).

Freight transport has also undergone significant change. The City of Melbourne notes that:

> …most freight was originally transported by coastal and inland shipping…until the rise of steam and rail in the late 19th century. Technological improvements in the road building and the economics of freight distribution soon saw road freight as the preferred mode for transporting freight. (City of Melbourne undated B, p. 5)

Figure 2.1 **The metropolitan transport network**



Source: Provided by the Department of Infrastructure.

Table 2.1 **Characteristics of Melbourne's public transport network**

	Train	*Tram*	*Bus*
Network length	366 km (mostly double track, 65 km single track[a] and 30 km triple track)	250 km of double track	n.a
Number of operators	1	1	24
Number of routes	15 (most electrified)[b]	25	298
Number of services per week	12 000	31 500	80 000
Number of stops/stations	207 stations	1770 stops	n.a
Fleet size	306 three car trains (different configurations are available)	500 trams (including low floor vehicles)	1470
Passengers per year (2004-05)	145 million	146 million	90 million

Notes: n.a denotes not available. [a] 7 lines have single track sections and 3 lines have single track terminals [b] Frankston to Stony Point, Sunbury to Watergardens, Melton to Sunshine and Craigieburn to Broadmeadows are not electrified. They work by diesel hauled rollingstock (Maunsell Australia 2003).

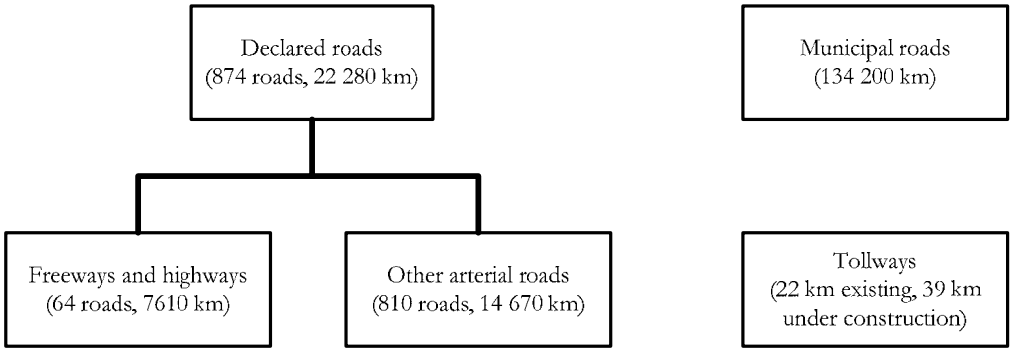
Sources: Maunsell Australia 2003; Cliche 2006; and DOI 2005i.

Victoria's urban transport networks have a number of features that are important to understanding the nature and extent of transport congestion, and approaches for addressing it. Although the various components of the transport network are interlinked, the following discussion looks at roads, public transport, and other modes such as cycling, walking, motorcycles and taxis. A separate discussion reviews Victoria's freight transport infrastructure.

2.1.1 Roads

Melbourne's road network is extensive (figure 2.2). SGS Economics reports that in 1995, Melbourne had more roads and freeways per capita than many other overseas cities (sub. 2, p. 17). This network serves a large and sophisticated economy and a population of more than 3.6 million people spread over a large area. Melbourne's road network carried approximately 2.5 million registered vehicles in 2005, 85 per cent of which are passenger vehicles (ABS 2005c).

Figure 2.2 **Summary of Victoria's road network**



The 'declared' road network constitutes those roads over which VicRoads has regulatory authority. Chapter 4 discusses the various regulatory arrangements governing the road network in more detail.

Sources: VicRoads 2004; Bracks 2004; Transurban 1999.

Some of the concerns about road congestion may reflect the fact that the expansion of the road network has not kept pace with population growth and motor vehicle use. Between 1961 and 1991, Melbourne's road network grew by 44 per cent. Over the same period, however, the population grew by 53 per cent and the number of registered vehicles on the road grew by 237 per cent (Kenworthy and Laube 1999, cited in sub. 3, p. 5).[1] Although comparable data on the growth of road freight movements are not available, between 1990 and 2004 it has been estimated that Melbourne's freight task grew by about 86 per cent, from around 5.7 to 10.6 billion tonne kilometres (BTRE forthcoming).

[1] VicRoads informed the Commission that recent road data are not comparable with historical data due to the adoption of different measurement methods and definitions (VicRoads, pers. comm., 14 March 2006).

Road congestion is also related to the functionality and performance of the road network. Major features that impact on use of the network include:

- much of the road network is laid out in a series of grids, often connected by major roads that do not run the length of the city, meaning that cross town travel requires frequent road changes (Clarke & Hawkins, sub. 3, p. 5)
- most major freeways and tollways radiate from the CBD (with the exception of the Western and Metropolitan Ring Roads, which provide an orbital route, connecting freeways to the west and north of the CBD). This reinforces the relative difficulty of undertaking cross town travel (figure 2.1).
- a proportion of the road network, particularly in the inner and middle suburbs, is shared with trams and buses, and is also used for parking. The Victorian Government has recently introduced a series of measures designed to give greater priority to road-based public transport (Think Trams and Smart Buses). The interaction between transport modes has implications for the efficient use of road space and congestion (chapter 3).
- some sections of road are reserved for high occupancy vehicles during peak periods (such as on the Eastern Freeway), and large parts of the main road network in inner and middle suburbs have clearways operating along some of the strip–shopping precincts during peak periods to improve traffic flow.
- freeways, highways and tollways carry a large proportion of Melbourne's freight traffic. VicRoads data indicate that in 2003-2004, Melbourne's freeways carried an average daily freight load of 572 tonnes per lane hour, compared to 107 tonnes per lane hour on the primary arterials and 227 tonnes on the network as a whole (VicRoads 2005c, p. 6).
- Melbourne has a major port bordering the CBD. The Port of Melbourne Corporation noted that about 80 per cent of the port's trade is currently carried by road, and estimated that this results in approximately 1.2 million truck visits to the port each year (sub. 53, p. 7).

Later chapters of this report explore how these features affect transport congestion in Melbourne and the options for managing that congestion.

2.1.2 Urban public transport

Melbourne and the regional cities are connected by heavy rail links that provide intra and inter-urban passenger services. In Melbourne, trains and trams play an important role in the overall transport task, but are largely designed for getting people to and from the city centre and are not designed to facilitate cross town travel (Clarke & Hawkins, sub. 3, p. 6). Bus services currently play a residual role in moving passengers, mostly school children and people without cars. Within the major regional cities, bus services are the main form of public transport.

The role of public transport in Victoria's urban transport is shaped by a number of operational features of the rail, tram and bus networks:

- Melbourne has one of the world's largest urban train networks that is amongst the top 30 systems in the world with regard to patronage numbers and route kilometres (Maunsell Australia 2003, p. 15). The network is laid out on a radial basis with the CBD at its hub (figure 2.1). Various routes feed into the CBD through three key stations—North Melbourne, Jolimont and Richmond. Another five stations in the CBD create a 'loop' to allow trains to circulate around the city. The radial layout of the network makes it particularly suited to serving the commuting needs of those travelling to the city centre.
- The metropolitan rail network also carries country passenger and freight services. Train services in Geelong, Bendigo and Ballarat link with Melbourne and other regional centres. These lines are part of the Regional Fast Rail project that involves new trains, upgraded tracks and signals, and more frequent and reliable services (DOI 2005i). The need to cater for a mix of services on urban tracks (with different needs related to frequency, stopping patterns and journey times) limits the operational flexibility of the metropolitan rail system and thus its ability to respond to consumer demand.
- Melbourne's tram system is the third longest in the world, covering most of the inner suburbs and a large proportion of the middle suburbs (DOI 2005i). Like trains, the tram network is essentially a radial system of routes into and out of the city. About two-thirds of the tram network shares road space with other vehicles. This means that road congestion has a significant impact on the performance of most of the tram system (chapter 3).
- Buses are the only mode of public transport for large parts of Melbourne and in regional Victoria. In the metropolitan area, they mostly operate in the middle and outer suburbs and most travel across town, linking shopping centres, train stations and schools. Smart Buses currently operate on three metropolitan routes, with further routes proposed (chapter 5).
- Eighty four per cent of Melbourne's population are within 400m of a bus route, compared to 15 per cent that are within 400m of a tram route and 23 per cent within 800m of a train station (DOI, pers. comm., 2 February 2006).[2] Bus services in regional Victoria can be broadly defined as either country route services or coach services. Country route services operate within a town or between small towns. Coach services provide long-distance travel between regional centres (DOI 2005i).

[2] Based on 2001Census population.

- The bus network faces fewer infrastructure constraints than other modes of public transport. Buses do not require overhead power supplies or tracks and hence are not physically constrained to predetermined routes set out by the track network. Buses also do not require level crossings and bus stops are placed over longer distance intervals, so they do not suffer the speed constraints experienced by trams. However, given that buses share the road space with other vehicles, road congestion also impacts on their performance (chapter 3).

Chapter 4 discusses the public transport operators and the institutional frameworks governing them.

2.1.3 Other modes including cycling, walking, taxis and motorcycles

In Melbourne, walking and cycling account for around 19 per cent of all trips, placing Melbourne 70th out of over 90 international cities (Kenworthy & Laube 2001).[3] Similar shares of walking and cycling were recorded in Geelong in 1996, accounting for 20 per cent of all trips (City of Greater Geelong 2003, p. 18). In Ballarat and Bendigo, of those that used one mode of travel to work, walking and cycling account for 6 and 7 per cent of work trips respectively (ABS 2001).

Victoria's bicycle network consists of a collection of routes that are managed by VicRoads, local councils, Parks Victoria and the Department of Sustainability and Environment.

Taxis are an important mode of transport for many people. Victoria's taxi industry operates through a pool of taxi licences, with one taxi per licence. There are more than 3500 taxi licences on issue in Melbourne and around 230 taxi licences in Ballarat, Bendigo and Geelong combined (DOI 2005i). Taxis provide short term, convenient travel and play an essential role in disability services provision (there are 228 wheelchair accessible taxis in Melbourne and 28 in the three regional centres) (DOI 2005i). The road network is also used by people riding motorcycles and scooters. Taxis, motorcycles and scooters accounted for around 1 per cent of all trips in 1999. The Australian Scooter Federation noted that registrations of scooters in Victoria has more than doubled in the last two years (sub. 8, p. 8).

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[3] International cities comparisons are drawn from *The millennium cities database for sustainable transport* (Kenworthy & Laube 2001), which uses 1995 data for 100 cities, including Melbourne. A more recent database is being compiled using 2001 data for 50 international cities, however, data for Melbourne had not been finalised at the time this draft report went to print.

2.1.4 Freight transport infrastructure

Victoria's urban road and rail network carries much of Victoria's freight task and link a number of key modal and intermodal freight transport facilities including freight hubs, the ports and airports.

The land based freight fleet includes rail, light commercial vehicles and a combination of trucks (light rigid, rigid and articulated trucks).

Road network

Most freight vehicles have access to the entire road network, including local roads under the control of councils and the declared road network for which VicRoads has regulatory authority.[4] Figure 2.3 identifies the main freight routes in Melbourne's road network, in particular, the key role played by CityLink, the Western Ring Road, the Hume Highway, Monash Freeway and the Westgate Freeway (VicRoads 2003, p. 16). It also shows where business activities generating the freight task are concentrated, in the Port of Melbourne and industrial areas located in the inner west, north (around Somerton) and around Dandenong, broadly corresponding to the location of the main industrial areas, principal activity centres and intermodal hubs.

Melbourne's road freight task on a per vehicle basis is dominated by light commercial vehicles, which represent a little less than 70 per cent of freight vehicles and carry just under 10 per cent of the freight task (VicRoads 2003, p. 23). However, on a tonnage basis, heavy vehicles provide the majority of capacity:

- rigid trucks (above 12 tonnes) represent about 20 per cent of the freight fleet and carry about 35 per cent of the freight task
- articulated vehicles (including B-Doubles and B-Triples) represent just over 10 per cent of the total freight fleet and carry about 55 per cent of freight tonnes (VicRoads 2003, pp. 23–4).

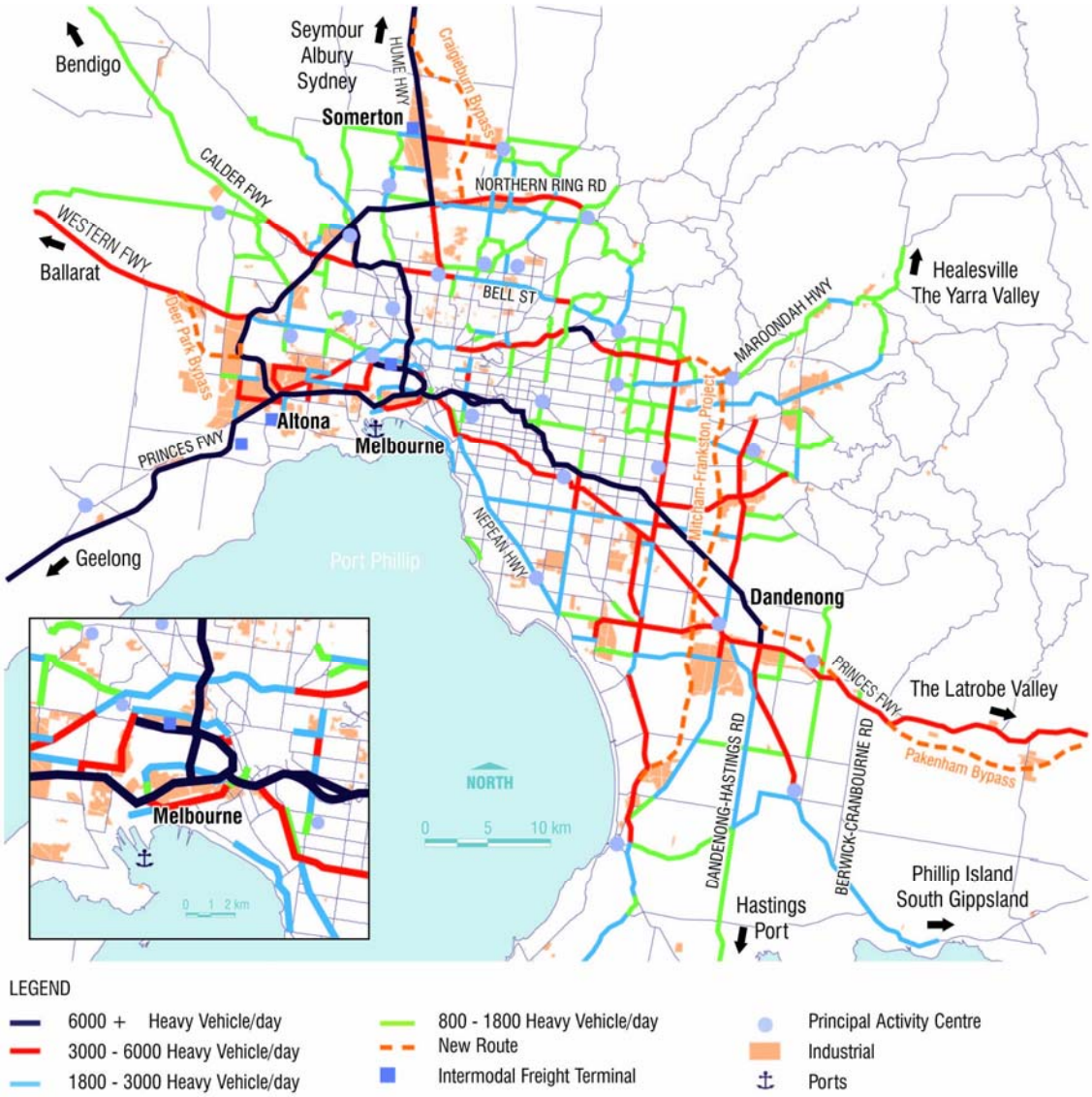
Rail network

The rail freight network comprises inter and intra-state connections via a standard gauge interstate main line, a standard gauge connection from the main line to Portland, and broad gauge regional lines connecting Melbourne with northern Victoria and Geelong (VicRoads 2003, p. 11). The metropolitan rail

[4] Vehicles heavier than 42.5 tonnes or with particular characteristics (such as high axle loadings or excessive length) are restricted to designated roads.

network accommodates rail paths for freight traffic, although it is primarily used for passenger traffic. While rail freight tends to have a competitive advantage in carrying freight on long-hauls, overall, it handles a small proportion of the Victorian freight task (around 8 per cent) (IPC 2002b, pp. 12–13).

Figure 2.3 **Metropolitan truck network and flows**



Note: this figure does not include light commercial vehicle movements (less than 4.5 tonnes). Heavy vehicles are those that are greater than 4.5 tonnes.

Source: Government of Victoria 2004a, p. 58.

Ports

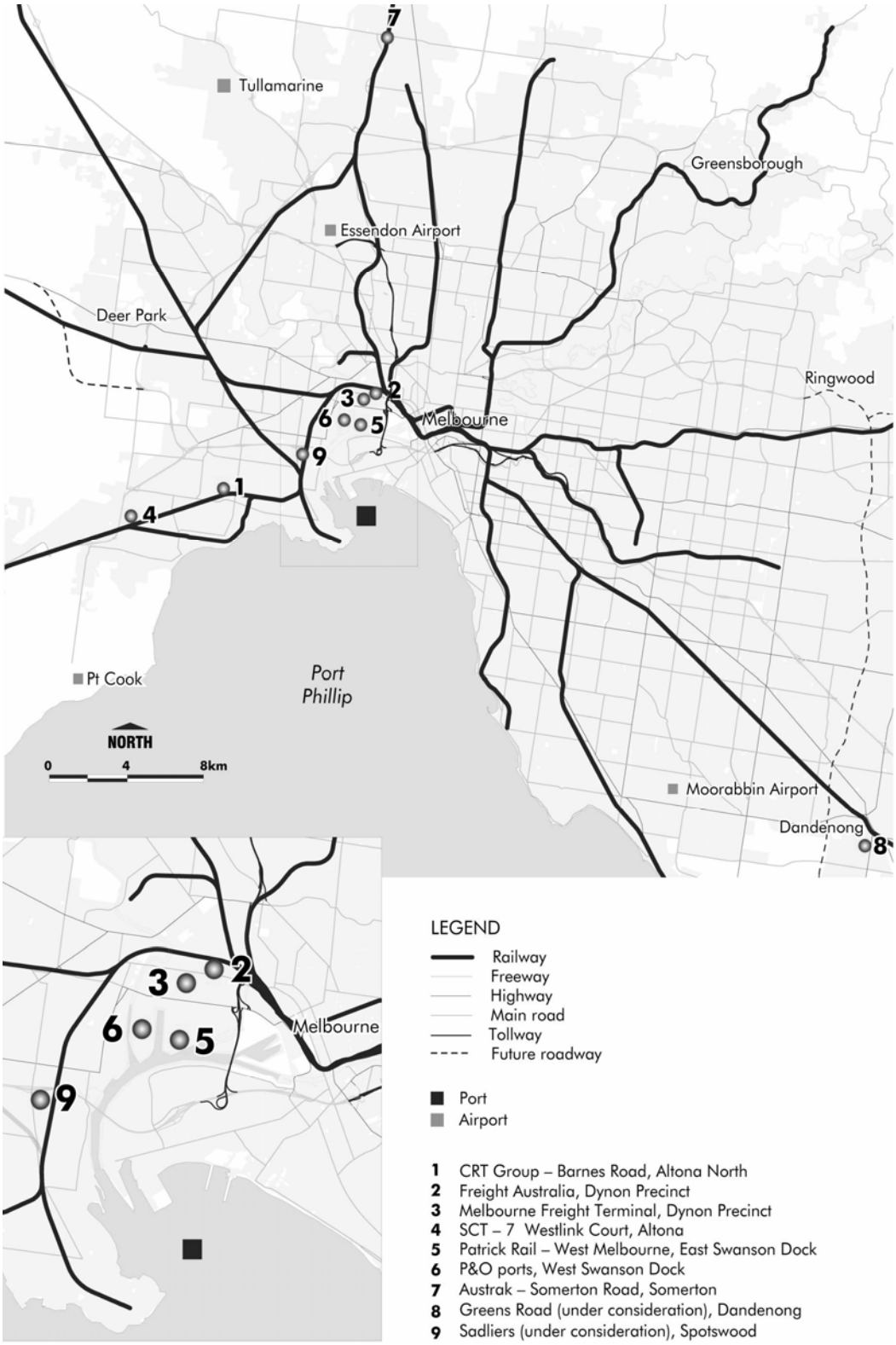
The Port of Melbourne is of particular importance in Victoria's freight task. The port is Australia's largest container and general cargo port, handling 39 per cent of the nation's container trade. It has experienced 13 consecutive years of trade growth, and for the 12 months to March 2005 experienced a 14 per cent growth in container throughput (POMC 2005, p. 1). The Patrick and P&O terminals at Swanson Dock, located on the Yarra River between the West Gate Bridge and the Melbourne central business district, handle nearly all international container movements through Victoria. A small amount of coastal container traffic is handled at Webb Dock, downstream from the West Gate Bridge, as well as new car imports and exports. Other docks operate for general freight, dry bulk and liquid bulk including chemicals and petroleum products (VicRoads 2003, p. 11).

The majority of exports from the Port of Melbourne is bulk freight, which typically arrives by rail. Most imports are in the form of containers, 90 per cent of which are delivered within the Melbourne metropolitan area, primarily by road (POMC 2005, p. 2). Of the freight moved by road and rail into and out of the Port of Melbourne, approximately 85 per cent is transported by road (VicRoads 2003, p. 5).

At present rail access to the port is via a single, dual gauge track which crosses Footscray Road, linking the port with South Dynon Rail terminal and the state and national rail systems. The interstate capital city rail freight network is standard gauge and the intrastate rail network is predominantly broad gauge with some standard gauge connections (POMC 2005, p. 3). Road connections of particular relevance for the Port of Melbourne are: Footscray Road; the West Gate Bridge; and Dock Link Road. Rail connection to the Port of Melbourne is via the inner western rail corridor and through the Melbourne freight hub to the north of Footscray Road.

The Port of Geelong handles mostly bulk freight and relies on the road network for its freight movements, as the port has no rail access. The Geelong Regional Alliance considers that this is contributing to the truck induced congestion in the city of Geelong (sub. 85, p. 7).

Figure 2.4 **Metropolitan intermodal freight terminal hubs**



Source: VFLC 2004, p. 9.

Freight hubs

Intermodal hubs are an important link in the freight and logistics chain. An increasing trend for business is to focus on reducing costs by improving the efficiency of their logistics chain through implementing changes to the size, location and style of warehousing operations. As a result, large distribution centres which involve significant cross docking facilities are increasing, at the expense of smaller warehouses. The development of the intermodal hub at Somerton in the north of Melbourne is an example of this trend. The main intermodal freight terminal areas in metropolitan Melbourne are located at Altona, Spotswood, the Dynon precinct, the Swanson Dock and Dandenong (figure 2.4).

Airports

Melbourne has three freight airports: Melbourne Airport (Tullamarine); Essendon Airport; and Avalon Airport (figure 2.4). Melbourne Airport is currently the only significant provider of air freight services in Victoria. Essendon Airport specialises in corporate jet, aircraft maintenance, airfreight, regional and interstate charters and emergency air services. Avalon Airport is located between Melbourne and Geelong and specialises in aircraft maintenance, pilot training, freight and international air shows (Linfox, undated). However, the freight task (and associated traffic) handled by these airports is relatively small. For example, although Melbourne Airport handles about 30 per cent of Australia's airfreight (making it Australia's second largest airfreight hub), in 2000-01, this only accounted for around 233 000 tonnes of international freight and 123 000 tonnes of domestic freight (City of Melbourne undated B, p. 23; DIIRD 2002, p. 9). This freight tends to be high unit value or perishable freight, for which timely delivery is likely to be particularly important. All freight is moved to and from the airport by trucks or light commercial vehicles.

2.2 Usage of urban transport networks

Understanding usage of urban transport networks assists in identifying the causes and effects of congestion, and in assessing potential responses to the various options for managing congestion. The available data on usage, whilst incomplete and somewhat dated (box 2.1), highlight two issues:

(1) Victorians predominantly use motor vehicles to get around and to move goods around the city.

(2) The various modes of motorised transport—cars, trucks, taxis, motorcycles and public transport such as trains, trams and buses—operate as part of an inter-linked transport system but currently perform different tasks.

Box 2.1 Data on Melbourne's travel patterns

For Melbourne, the major source of data on travel behaviour comes from the Victorian Activity and Travel Survey (VATS).

VATS data are used in most transport studies covering Melbourne and in models of Melbourne's transport network (chapter 3). The survey tracked the travel patterns of 5000 households in metropolitan Melbourne during 1994 and 1999. Further surveys were undertaken between 2000 and 2002, but the data collected were not validated and hence are not used in this report.

It is important to note the difference between trips and boardings used in this report. A trip is any travel linking two primary destinations and can include mode changes. For example, a home-based work trip is a commuting trip to and from home. Boardings on the other hand refer to public transport travel and are unlinked trips, counting the segments of trips that involve a mode transfer separately. VATS reports data in a number of formats, including trips.

While VATS data cover some work related travel, they do not cover business travel and much of the commercial traffic on the road (such as commercial distribution and freight movements).

The main data source for freight movements is from VicRoads, but it is generally only available for freeways and primary arterials. Data are collected on freight vehicles' time of road use, number of freight vehicles and freight vehicle/lane/hour for these roads. More detailed freight traffic data are available from the Port of Melbourne's container origin/destination studies.

Source: Morris & Wang 2002.

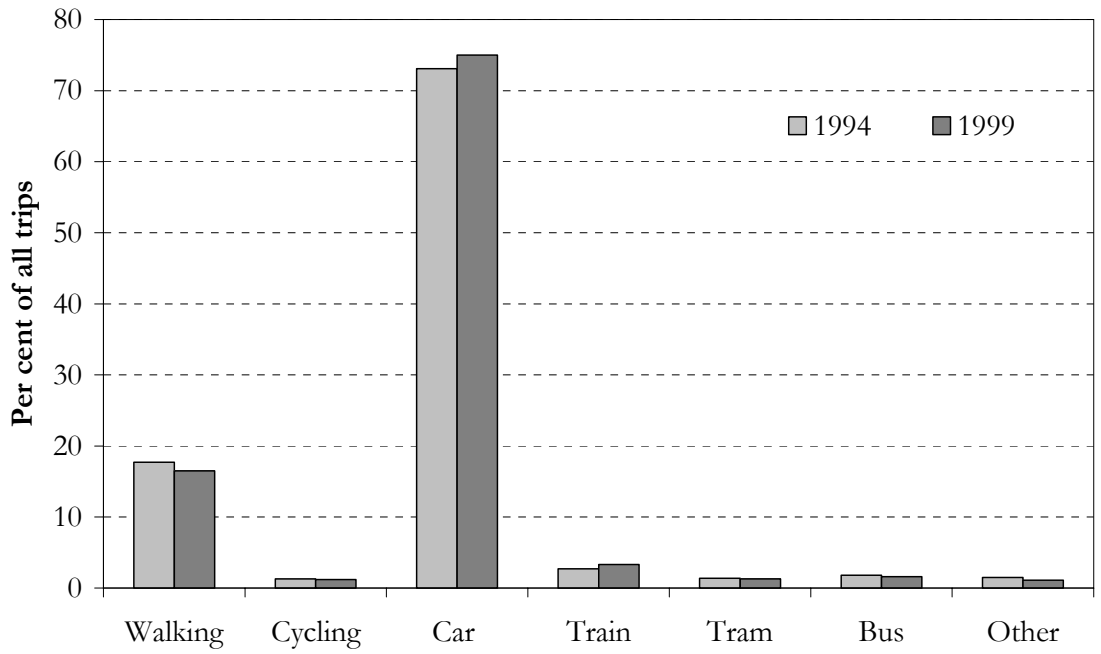
Melbournians mostly use private motor vehicles to get around:

- Around three-quarters of all personal trips were by car in 1999 (figure 2.5). By comparison, walking accounted for 16 per cent of all trips and public transport accounted for 6 per cent of all trips or 9 per cent of all motorised trips.[5] Usage of motor vehicles is even higher in the regional cities given the limited public transport available (Morris & Wang 2002, p. 14; City of Greater Geelong 2003, p. 18).
- Car ownership in Melbourne grew by 7 per cent between 1994 and 1999, with the average household owning roughly 1.6 cars in 1999 (Morris & Wang 2002, p. 33). Only 11 per cent of households in Melbourne did not have a car in 1999 (DOI 2000, p. 27).

[5] This estimate is based on 1999 VATS data over a 7 day week. Using 2002 VATS data, public transport accounted for 11 per cent of motorised trips (based on a 5 day week).

- Car use and ownership in Melbourne and the regional centres is high by international standards. In 1995, Melbourne ranked 14th out of 94 international cities in terms of car use (7649 km per capita) and 11th out of 100 cities in terms of car ownership (594 cars per 1000 people) (Kenworthy & Laube 2001).

Figure 2.5 **How people travel in Melbourne on an average weekday, 1994 and 1999**



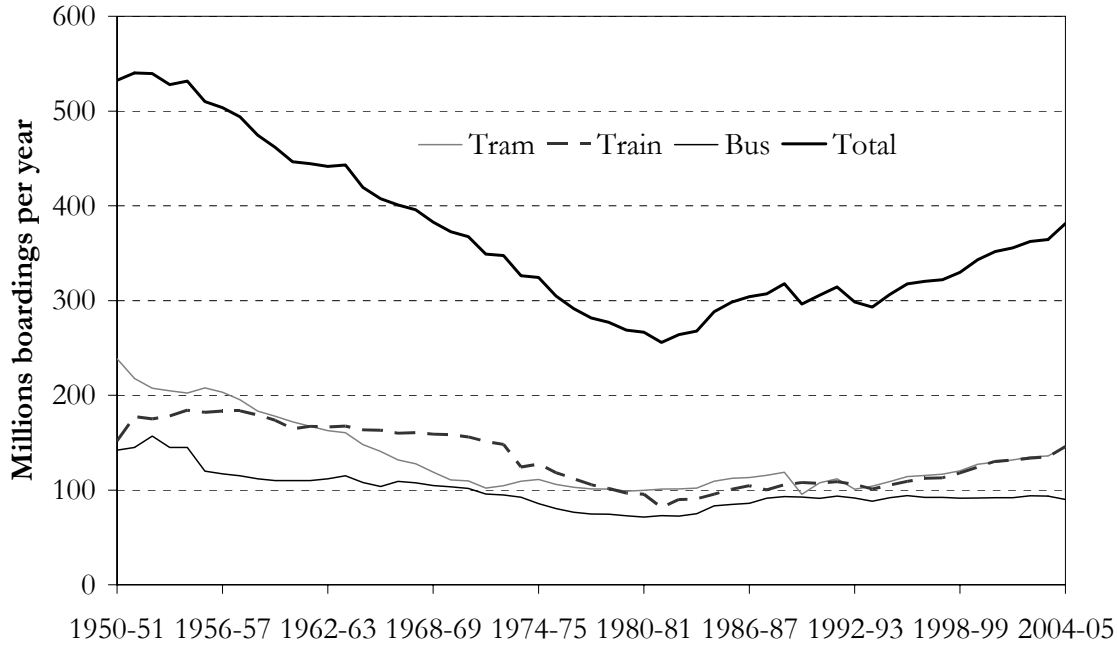
Source: VATS 1994 and 1999, cited in Morris & Wang (2002, p. 9).

However, Melbournians have not always used motor vehicles to get around. Figure 2.6 shows that the number of boardings on Melbourne public transport today is one third less than the number of boardings in 1950, even though our population is now two and a third times greater in size (AIUS and City of Melbourne 2005, p. 56). Patronage on public transport fell to its lowest level during the early 1980s, but has risen steadily since.[6] Between 1994-95 and 2004-05, patronage on Melbourne's train and tram networks grew by around 3.3 per cent and 2.9 per cent per annum respectively. Patronage growth on

[6] Between 1945 and the early 1980s, there was limited investment in network expansion. This point was also noted by the Property Council of Australia (sub. 48, p. 8) and the Bus Association Victoria (sub. 57, p. 32). For example, since the City Loop was completed in the early 1980s, there have not been any major extensions to the train network (Hughes 2006).

Melbourne's bus services over the same period was largely unchanged. According to Clarke and Hawkins, the lower level of bus patronage reflects the less frequent services and low population densities surrounding many bus routes (sub. 3, p. 7).

Figure 2.6 **Patronage on public transport in Melbourne**



Source: DSE 2005c.

In the past year, patronage on trains and trams increased by around 8 per cent and 7 per cent respectively. The Department of Infrastructure considers that the recent upturn in most public transport patronage can be partly attributed to the recent rise in petrol prices, the growing inner suburban population and 'rising traffic volumes [that] have encouraged some people to leave their cars at home and use public transport' (sub. 55, pp. 14, 29).

Public transport in the regional cities is mostly limited to buses and plays a smaller role in moving people around town. Residents of Geelong undertake an average of around 23 bus rides per person each year. Comparable figures for Ballarat and Bendigo are 20 and 16 bus rides respectively (City of Greater Geelong 2003, p. 44 and DOI 2000, p. 28).

The Victorian freight task is also dominated by road transport, which carries almost 83 per cent of Victorian freight tonnes:

- Information on freight movements around Melbourne is incomplete and often outdated. VicRoads (2003, p. 5) estimated that in 2000, total freight inflows to Melbourne were around 46 million tonnes, total freight outflows were around 31 million tonnes, and intra-metropolitan freight flows were estimated to be around 150 million tonnes. Road transport moves over 99 per cent of the intra-metropolitan freight task in Melbourne (VicRoads 2003, p. 21).
- Rail accounts for a small share of Victoria's overall freight task but is significant in some markets, such as bulk grain (54 per cent) and intermodal traffic (25 per cent—mostly containers) (DIIRD 2002, p. 8). Of the freight heading into and out of the Port of Melbourne, approximately 17 per cent is transported by rail (POMC 2005).
- A key trend has been the recent growth in commercial traffic. In 2005 light commercial vehicles accounted for around 10 per cent of registered vehicles on Melbourne's roads (ABS 2005c). The number of light commercial vehicles on the road is growing faster than cars and trucks. Between 2003 and 2005, the number of light commercial vehicles grew by 7.5 per cent compared to 4 per cent for cars and 6.7 per cent for trucks other than light commercial vehicles (ABS 2005c).

2.3 Key drivers of transport usage patterns

A number of interrelated factors have contributed to the increased use of motor vehicles. These include:

- urban sprawl and dispersed land use
- growing affordability of motor vehicles
- relative flexibility and accessibility of motor vehicles compared to public transport
- economic growth and the changing structure of the economy, which has contributed to growth in the road freight task.

2.3.1 Urban sprawl and dispersed land use

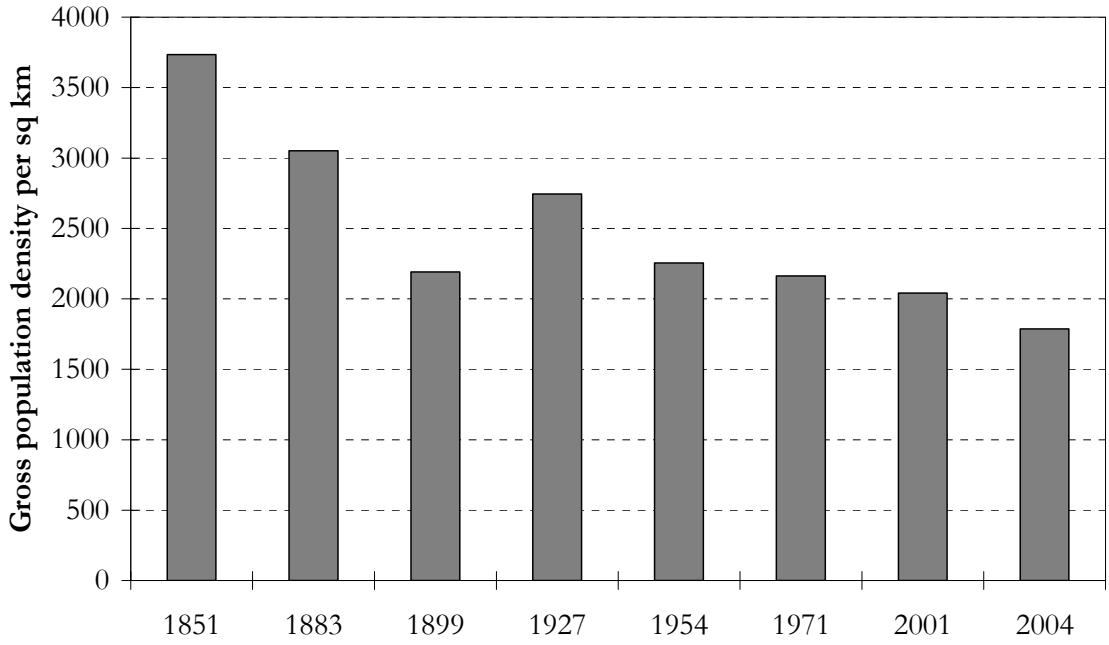
Transport use is closely related to urban densities and patterns of land use. In low density, sprawling cities, work, educational, shopping and recreational activities tend to be more dispersed, thereby encouraging use of more flexible forms of transport such as the motor vehicle. As noted by the Department of Infrastructure:

> The urban sprawl associated with the single dwelling that typifies so many Australian suburbs, encourages car ownership to enable residents to travel to their diverse work and education destinations with relative ease. (sub. 55, p. 23)

By international standards, Melbourne has a relatively low population density (13.7 persons per hectare)—the sixth lowest out of 96 international cities reviewed by Kenworthy & Laube (2001). However, Melbourne has not always been a low density city. Melbourne's population density in the late 1920s was around 2700 people per square kilometre or around 27 people per hectare (figure 2.7). As people became wealthier and more mobile (with the advent of motor vehicles), they sought larger houses on bigger blocks of land. The Department of Infrastructure, for example, noted that:

> In the early 1900s, many Melbourne workers were employed in the inner suburbs. The metropolitan area of Melbourne was compact, and many people lived in the relatively densely populated inner suburbs. They travelled to work by tram, train, bicycle or on foot.
>
> After the Second World War, immigration to Australia increased and economic conditions greatly improved. Melbourne's population growth was strong, and car ownership rates rose sharply. Cars enabled people to live further from the rail and tram lines and to commute to work by a new means. The land between the radial train lines was swallowed up by housing in the late 1950s and 1960s, and outer suburbs began to be developed. The population density in the middle and outer suburbs was considerably less than had been the case in the inner suburbs in the first half of the century. (sub. 55, p. 27)

Figure 2.7 **Melbourne's falling population density 1851–2004**



Note: 1899 may reflect inaccurate mapping of the total area of Melbourne.

Source: DSE 2005c.

As well as infill development and growth on the fringe, Melbourne has experienced a number of important changes in patterns of land use that have tended to reinforce the use of motor vehicles, especially for the transportation of goods. Between 1971 and 2001, the proportion of jobs located in the City of Melbourne fell from 31 per cent of total employment to around 19 per cent, as industries moved into the middle and outer suburbs (Unkles 2006, p. 6). Industries that have moved outwards to take advantage of more abundant and cheaper land include manufacturing, and transport and storage. Other industries such as retail, education and health have moved outwards (but in a more evenly distributed manner than manufacturing, transport and storage) to service the population growth in the suburbs (Unkles 2006, pp. 20, 22). Cars have facilitated these trends by enabling people to get to the increasingly dispersed jobs from their homes in the middle and outer suburbs (DOI, sub. 55. p. 27). A side-effect of lower population densities and more dispersed land use is that the largely fixed train and tram network has become proportionately less accessible to the population as a whole, and less competitive compared to driving.

The growth in car ownership also reflects a number of other factors, including increasing prosperity, an expanding road network and technological improvements that have kept the rate of growth in motoring costs below the growth in incomes (box 2.2).

Box 2.2 **Rising car affordability**

Increased incomes combined with more modest growth in motoring costs have made cars more affordable. While the purchase cost of cars is only one component of the cost of motoring (other costs include registration, petrol and insurance), DOI noted that:

> In 1995, a new Ford Falcon cost the equivalent of 44 weeks average salary. The price equivalent has fallen to around 38 weeks salary now. The comparable figures for a Mitsubishi Magna are 42 weeks in 1995 and 35 weeks now. These equate to savings of around $4,500.
>
> The increasing affordability of new cars…has contributed to the greater use of cars for commuting and other trips. (sub. 55, pp. 12, 29)

Average weekly wages in Melbourne have been steadily increasing since the 1990s, outpacing the growth in the cost of private motoring (ABS 2005b and 2005d). Tariff reductions, improvements in production techniques and improved fuel efficiency have contributed to a fall in the relative cost of motoring and have brought cars within reach of a wider range of the population.

There is also some evidence that the costs of using public transport may have grown more rapidly than private motoring costs. ABS data show that the cost of using public transport in Melbourne (based just on transport fares and not including other costs such as the cost of waiting) has risen more rapidly than the cost of private motoring (excluding the time cost of car use), even when public transport fares continue to be subsidised (ABS 2005b). Between December 1990 and December 2005, public transport fares in Melbourne rose by around 110 per cent, above the rate of growth in wages (88 per cent) and private motoring costs (car ownership and running costs) (37 per cent) (ABS 2005b and ABS 2005d).

Measures of total user costs potentially provide a better comparison between the costs of using various transport modes. According to Scheurer et al (2005, p. 6), the user cost for a car trip in Melbourne is about 2.8 times the cost of a public transport trip. While this may seem high enough to deter people from driving, the cost difference for Melbourne is below that in some other countries. For example, in Stockholm and Vienna, the user cost of car trips are over six times the cost of a public transport trip (Scheuerer et al 2005, p. 6). However, caution should be used about drawing conclusions from this correlation as the measures do not include travel time costs which may be expected to lower the cost gap.

Sources: ABS 2005b and 2005d; DOI, sub. 55; and Scheurer et al 2005.

2.3.2 Flexibility of motor vehicles

The increased use of motor vehicles also reflects the inherent flexibility that they provide, compared to alternatives such as public transport and rail freight.

Personal travel

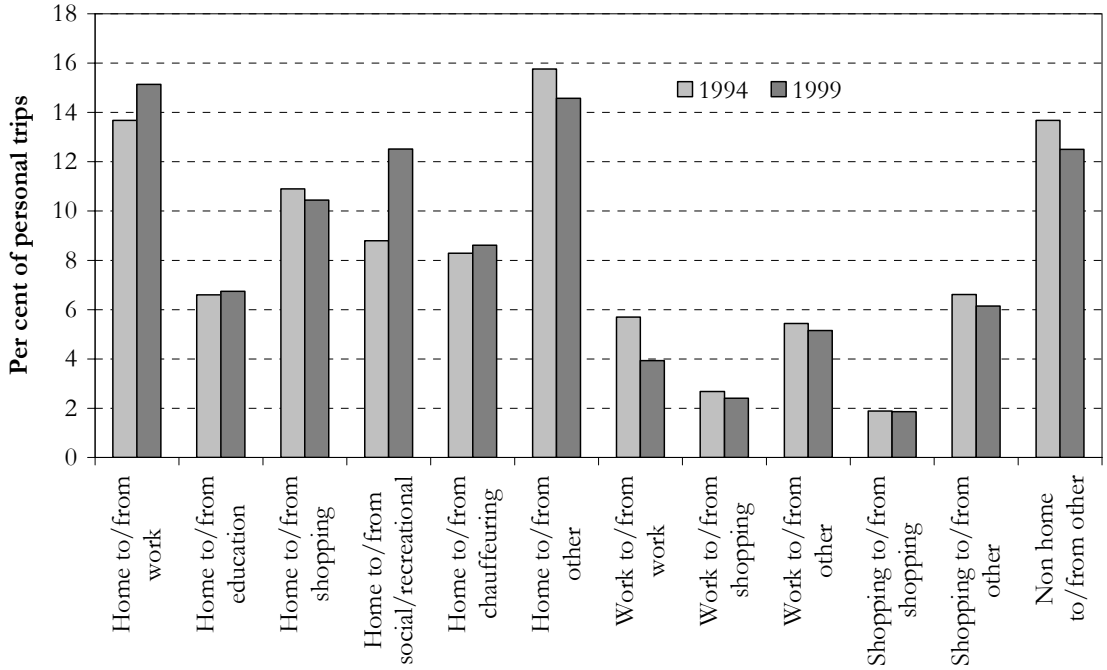
In areas that are well served by public transport, cars and public transport are relatively close substitutes. For example:

- the radial networks of trains and trams serve an important role for commuting to the CBD, where more than half (56 per cent) of morning peak travel to the CBD is made by public transport, twice the amount made by private car drivers (City of Melbourne undated B, p. 18).
- buses operating along the Eastern Freeway to the city in priority road space with relatively high frequency provide a competitive alternative to the car (Bus Association Victoria, sub. 57, p. 8).

For many trips, however, public transport has difficulty in competing with cars:

- *Complex trips*. As lifestyles become more complex, trips also become more complicated (DOI 2000, pp. 20 and 22). Figure 2.8 shows that the majority of trips (around 80 per cent) in Melbourne are not work related. Many trips cover relatively short distances (more than one million car trips are less than one kilometre each day) or involve multiple purposes and destinations (DSE 2002, p. 8). Trips from work to home, for example, may involve picking up the children, taking them to extracurricular activities or shopping. In 1998, around 6 per cent of trips from work to home involved buying something on the way and around 5.5 per cent of trips involved picking up someone (Brindle et al 2001, p. 83). Chapter 3 discusses the impact of trips to schools on congestion. The layout of the rail and tram networks, combined with the limited frequency of public transport services, means public transport is less suited to accommodating complex trip patterns. As people try to do more in less time, the convenience of cars becomes increasingly valuable.

Figure 2.8 **Purpose of personal trips on an average weekday in Melbourne, 1994 and 1999**

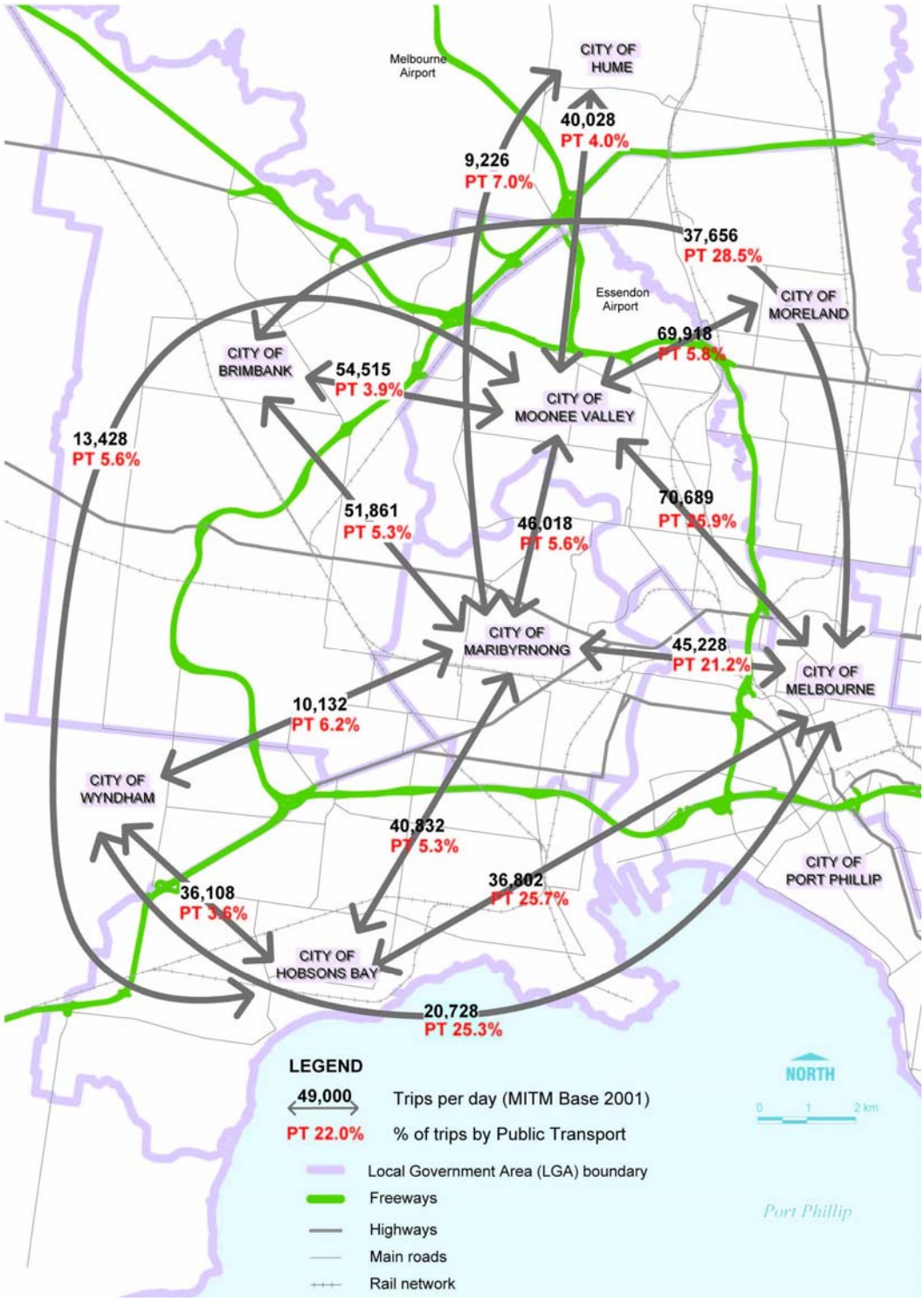


Note: Chauffeuring is a trip undertaken with the purpose of serving passengers.

Source: VATS 1994 and 1999 cited in Morris & Wang 2002, p. 7.

- *Cross town trips.* Clarke and Hawkins noted that 'many journeys are non-radially directed cross-town journeys … for example only one third of work-related journeys are directed to the city centre' (sub. 3, p. 5). In the outer metropolitan areas, the proportion of trips to the CBD is even smaller (less than 5 per cent) and 90 per cent of trips start and finish within the same or an adjoining municipality (Government of Victoria 2004a, p. 42). Further, journey to work data also show that 25–35 per cent of people work in the same municipality in which they live (DOI, sub. 55, p. 15). Figure 2.9 illustrates the complexity of trip patterns in the western suburbs of Melbourne. It also shows that public transport caters for radial trips well (indicated by the greater proportion of public transport trips) but less so for trips across town.

Figure 2.9 **Trip patterns in inner west Melbourne**

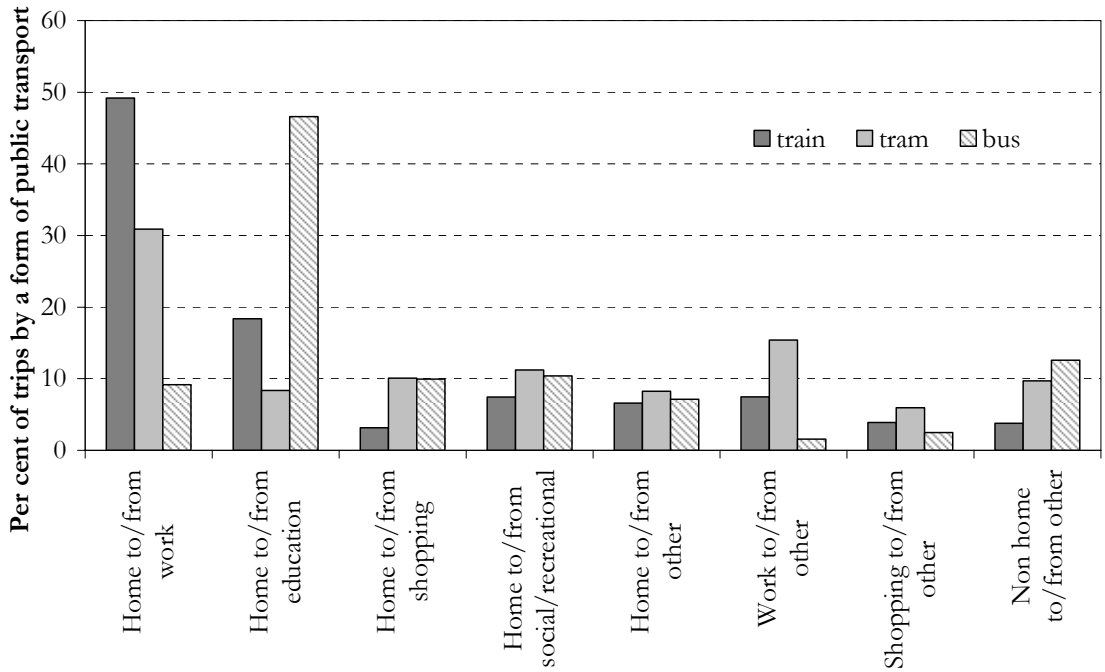


Notes: PT denotes public transport (train, tram or bus). MITM denotes Melbourne Integrated Transport Model

Source: Provided by DOI.

- *Trips outside peak hours.* Public transport is less suited to catering for the needs of those travelling at non-standard hours due to the lower frequency of services during off peak periods. The public transport system has traditionally catered to CBD commuters and students who tend to travel during the morning and afternoon peak periods (figure 2.10). But with the growth in part time, casual and self employment, particularly within the rapidly growing recreational and service industries, more people now work non-standard hours (Morris & Wang 2002, p. 37). The City of Melbourne also noted this trend in its draft transport strategy (City of Melbourne 2006a, p. 55). Also, it appears that a growing proportion of trips are undertaken for social and recreational reasons (figure 2.8). To the extent that these trips occur outside peak hours, the limited coverage of public transport during weekends and outside peak hours may reinforce the increased usage of motor vehicles. The Public Transport Users Association notes that the average Melbourne bus service runs every 40 minutes and finishes before 7 pm, and hence 'service spans are often too short to provide a genuine alternative to car use outside restricted hours of operation' (sub. 65, p. 27). Table 2.2 shows that the frequency of bus, train and tram services and coverage spans vary considerably.

Figure 2.10 **Purpose of trips by public transport on an average weekday 1999**



Source: Morris & Wang 2002, p. 17.

Table 2.2 **Frequency and coverage of public transport**

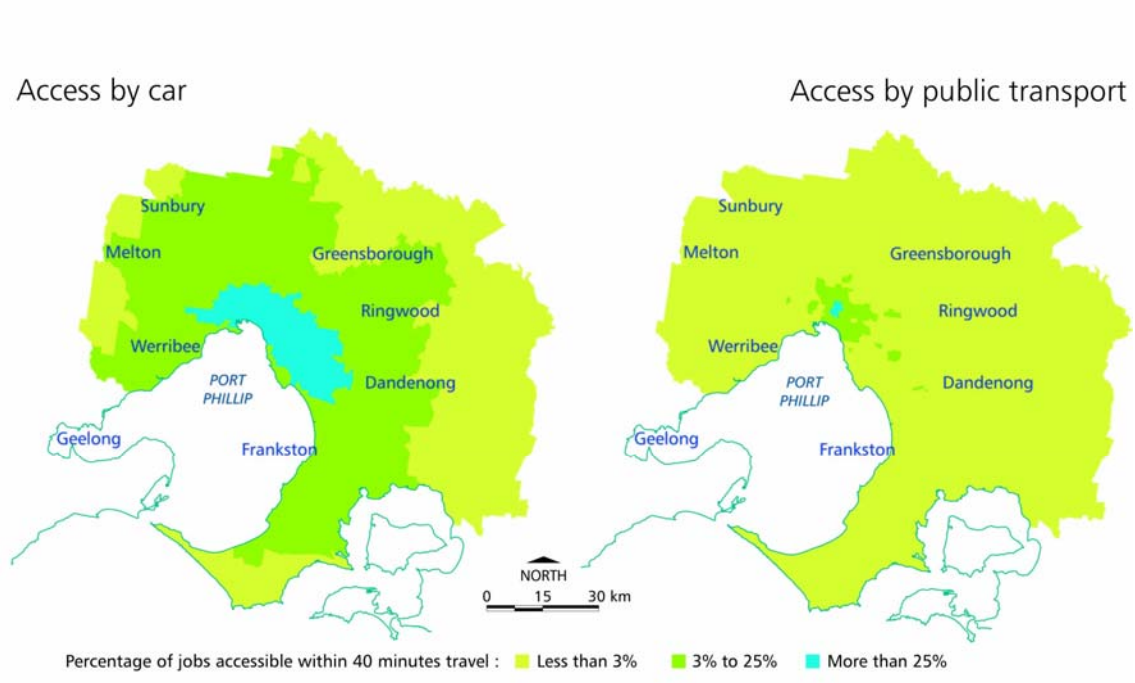
Indicator	*Train*	*Tram*	*Bus*
Average weekday peak frequency	15 mins	7 mins	40 mins
Average weekday inter-peak frequency	20 mins	12 mins	50 mins
Weekday average start time	5.00am	5.00am	6.46am
Weekday average finish time	12.00am	12.00am	6.53pm

Source: Stanley 2006.

- *Configuration of public transport.* A number of people consider that increased use of cars is also explained partly by the limited availability of public transport and perceptions that it is inconvenient. Figure 2.11 shows the distribution of jobs in Melbourne that are accessible within 40 minutes of travel by car and by public transport in 1996. More than 25 per cent of jobs in inner Melbourne are accessible within 40 minutes of travel by public transport. In contrast, less than 3 per cent of jobs in the middle and outer areas are accessible within 40 minutes of travel by public transport.

  DOI conducts passenger surveys that are published in the quarterly bulletin, *Track record.* Occasional surveys of non-users of public transport have found that the main reasons given for not using public transport were that it is considered to be inconvenient, it is too far away to access, there is not a need to go into the city, and/or that people surveyed had a company car (Maunsell Australia 2003, p. 31). According to Morris and Wang (2002, pp. 20–2), train and tram users are more likely to be 'choice' users of public transport, who work and live in the inner and middle suburbs of Melbourne. In comparison, most users of bus services are 'captive'—half of the users in 2003 were under 20 years of age; 69 per cent of all users did not have a drivers licence; and 72 per cent of users were unemployed (Bus Association of Victoria, sub. 57, p. 18). Around three-quarters of those buying a ticket on a bus purchased a concession ticket (Bus Association of Victoria, sub. 57, p. 18).

Figure 2.11 **Jobs within 40 minutes of travel by car and public transport**



Source: DSE 2002, p. 7.

Business and freight travel

For businesses and freight travel within metropolitan Melbourne or the main regional centres, the flexibility of road transport (in terms of geographic flexibility and scheduling) offers major advantages relative to rail. The dispersed location of different industries and time sensitive nature of much of the freight task means rail is simply not an option for much of the metropolitan freight task. Companies have also increasingly adopted the just-in-time business model—an area in which road has an inherent advantage in point to point, on-demand transport (Port of Melbourne, sub. 55, p. 13). As the City of Maribyrnong noted:

> Freight within cities is mostly carried on roads because patterns of origins and destinations are dispersed, distances are relatively short and many of the movements are time sensitive. (sub. 39, p. 3)

The following section discusses changes in the economy which have led to the increased use of road for freight movements.

2.3.3 Economic growth and changing economic structure

Economic growth and structural changes in the economy have led to increased use of road for freight movements. Gargett and Gafney (undated, p. 6) report that as the economy grows, the road freight task grows more quickly. However, the relationship between the road freight task and economic activity (called freight intensity) is complex (box 2.3). The City of Melbourne also noted the following trends over the past 20 years that have led to the increased freight activity:

- smaller numbers of much larger production plants, which source their raw materials from further and serve a geographically larger market, leading to greater transport requirements
- significant proliferation of different products servicing the same market need, providing more consumer choice but requiring significantly greater resources for warehousing and transport (City of Melbourne 2006a, p. 37).

These structural changes are also likely to have contributed to increased road use.

BOX 2.3 Key drivers of road freight intensity

Many factors affect road freight intensity. At the macro level, the structure of the economy has evolved more towards the services sector, with a corresponding decline in the industrial sector (although mining has increased its share in GDP). The services sector is much less freight intensive. Also, the value density—the ratio of product value to weight—may have changed due to the development of lighter materials. Offsetting these trends is the globalisation of the Australian economy, which has led to increases in the distances between the locations of consumption and production.

At the micro level, changes in both price and non-price factors have influenced the demand for road freight transport to a quite significant degree.

The demand for road freight transport is quite responsive to changes in real road freight rates, with the price elasticity of demand estimated to be around –0.9. A fall in real road freight rates would generally increase the average distance travelled, leading to the sourcing of inputs from wider geographic areas for production and consumption, and centralisation of distribution logistics.

Modal competition also affects the demand for road freight transport. Historical trends show periods of substantial divergence in real road and rail freight rates. This has implications for the price competitiveness of each mode.

Non-price factors that affect demand include time in transit, variance of time in transit, security of goods and accessibility to depots. Road is believed to have the advantage over rail in these areas.

Source: BTRE 2003, pp. 19–21.

2.4 Dynamics of modal choice

People and businesses make travel decisions (such as the type of mode, which route to take, and when to travel) based on two key factors that are constantly changing:

- *User costs*—the private cost of travelling. For private motor vehicles it comprises travel time, and direct money costs (such as vehicle ownership, parking and running cost). The second largest component of the user cost typically is the direct money cost (comprising the ownership cost plus variable vehicles costs) (Litman 2002, p. 3). For public transport it includes travel time (including the time spent accessing or waiting) and direct money costs (such as fares). For freight, the cost also includes the driver's wages and overheads. Travel time is usually the greatest cost component and includes time spent travelling (including an allowance for travelling in congested and uncongested conditions) (box 2.4).
- *Service quality*—the relative ease and comfort of a particular mode of transport. Dimensions of service quality can include convenience, flexibility, safety, and reliability, service accessibility and frequency. Punctuality and reliability rates for public transport are discussed in chapter 3.

Understanding how these factors influence modal choice is important in identifying the sorts of policy options that can influence travel demand and, therefore, transport congestion. There is, however, very little information on the relationship between user cost and service quality for Melbourne. Much of the available information is anecdotal or based on reports of surveys.

Box 2.4 The value of time

While various studies have attempted to estimate the value of travel time, the Commission is unaware of any attempts to do so for Melbourne, for either passenger or freight travel. Based on the observation that empirical studies had found that the demand for travel is more sensitive to changes in travel time than to changes in direct money costs, the Industry Commission concluded that the travel time cost 'far outweighs money costs for commuting in Australian cities' (IC 1994b, p. 48). Yarra Trams also considered that travel time is one of the most important elements affecting customer satisfaction (sub. 61, p. 2). For urban road freight, VicRoads has noted that travel time is a key cost driver (whereas for interstate or intrastate line haul the key driver is distance) (sub. 50, p. 12).

(continued next page)

Box 2.4 **The value of time** (continued)

The national road authority, Austroads, recommends that, in undertaking road project evaluations, authorities should value private travel time savings at 40 per cent of the average hourly earnings of the employed population and business travel savings at 100 per cent of the relevant wage depending on the class of driver (Austroads 1997, p. 1). In undertaking project evaluations and modelling, the Department of Infrastructure uses an average value of time for passengers of around $10 per hour. Recent work by the Bureau of Transport and Regional Economics used values in the vicinity of $21 per hour for light vehicle business use, to nearly $50 per hour for heavy freight vehicles (chapter 3).

Booz Allen Hamilton (2003) used stated preference survey data to estimate the value of time for motorists and bus travellers in Canberra. They found that the value of wait time for buses was 1.3 to 2.4 times the value of in-vehicle time, depending on the type of user (BAH 2003, p. 20). This is consistent with the Industry Commission's view that 'people would generally be willing to spend proportionately much more to reduce walking and waiting time than to reduce in-vehicle time by the same amount' (IC 1994b, p. 47).

In practice a range of factors will influence how people value travel time:

- mode, location and time of day
- type of trip—travel time costs for commuting are considered by some to be higher than for non-work related trips
- travel conditions—travel time costs may be higher under congested driving conditions, or when travelling as a passenger in uncomfortable or crowded conditions
- traveller preferences—some people may place a higher cost on time spent driving compared to time spent as a passenger or aboard public transport due to the opportunity to read or relax
- income—as incomes increase, people may be willing to pay more for travel time savings
- the amount of time people spend travelling—those spending one hour per day travelling may value a 10 minute travel time saving more highly than those who spend 15 minutes travelling per day (Litman 2002, p. 5.2-2 and IC 1994b, p. 47).

Expectations may also influence the value of travel time. People may put a low value on expected travel time but a higher value on unanticipated travel time (such as unexpected delays). For example, the Public Transport Users Association noted:

> Waiting is often the longest component of a public transport journey. This is especially so for local trips and those requiring a transfer … Studies show that an unknown wait [time] is perceived as being longer than a known wait, and a wait for a connection is perceived as much longer than the same time spent in-vehicle. (sub. 65, p. 26)

(continued next page)

Box 2.4 **The value of time** (continued)

Commercial travel time costs also differ as they include the time spent travelling by the employee, vehicle and goods. The Wyndham City Council considers that 'commercial vehicles have a higher operating and business value than commuter vehicles' (sub. 62, p. 10). Similarly, the Town and Country Planning Association considers that the value of time spent in the logistics freight chain differs from a commuter or recreational trip (sub. 68, p. 3). An Austroads study on valuing travel time for freight indicates that shippers in the automotive components industry place significant importance on getting shipments delivered reliably, within specified time windows and free of damage and loss (Austroads 2003, cited in ARRB 2006, p. 13).

Sources: ARRB 2006; Austroads 1997; IC 1994b; Litman 2003; and BAH 2003.

When the user cost of travelling and/or service quality change, travellers and businesses will consider a range of options to reduce their travel costs, including travelling at different times of day. Chapter 3 notes that a large proportion of truck movements occur between the morning and afternoon peak periods. It also highlights data showing that the peak periods on Melbourne's freeways are spreading. In the longer term, people have a greater ability to pursue a broader range of responses to changes in travel costs, including moving their place of residence, work or business. Some studies have suggested that people have on average, a fixed amount of time that they are prepared to spend travelling on a regular basis (box 2.5). The ability of people and businesses to adjust to changes in user cost of service quality will vary. Single people and those on high incomes may be able to move more readily than those with families (such as with children in schools) or those on low incomes.

Box 2.5 **Travel time budget**

Some studies consider that people face a travel time budget—a maximum amount of time they are willing to devote to travel on a regular basis (see, for example, Kenworthy & Laube 1999). The implication is that people will adjust their travel behaviour to ensure they stay within their travel time budget and will invest their travel time savings in additional travel.

The Department of Infrastructure noted that the average journey to work time over the past 100 years for Melbourne appears to have been relatively stable at 20 minutes despite significant changes in the physical characteristics of the city (sub. 55, p. 15). This suggests that, 'over the longer term, Melburnians have adjusted their living and work patterns to maintain a remarkably consistent commuting time … Businesses also make adjustments to reduce the impact of congestion, such as relocating their businesses and altering the time of day when they carry goods' (sub. 55, pp. 15, 30).

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Box 2.5 **Travel time budget** (continued)

The experience of stable journey to work times is not limited to Australian cities, or to cities with similar physical and travel characteristics. Kenworthy and Laube (1999, p. 612) have found that journey to work times are stable in North American, European and Asian cities at 26, 28 and 33 minutes respectively.

The UK's Standing Advisory Committee on Trunk Road Assessment (SACTRA 1994) report also noted that some research has found that journey to work times have been relatively stable for approximately six centuries. Although geographic areas of cities and hence trip distances have increased, transport speeds have also increased (SACTRA 1994, p. 40).

Sources: Kenworthy & Laube 1999 and SACTRA 1994.

There is a large amount of literature (overseas and Australian) that attempts to estimate the responsiveness of travel demand to changes in user cost and service quality. There have been few studies for Melbourne, however. Given the limited recent data available for Melbourne, appendix B summarises the findings of a number of Australian studies. In general, these show:

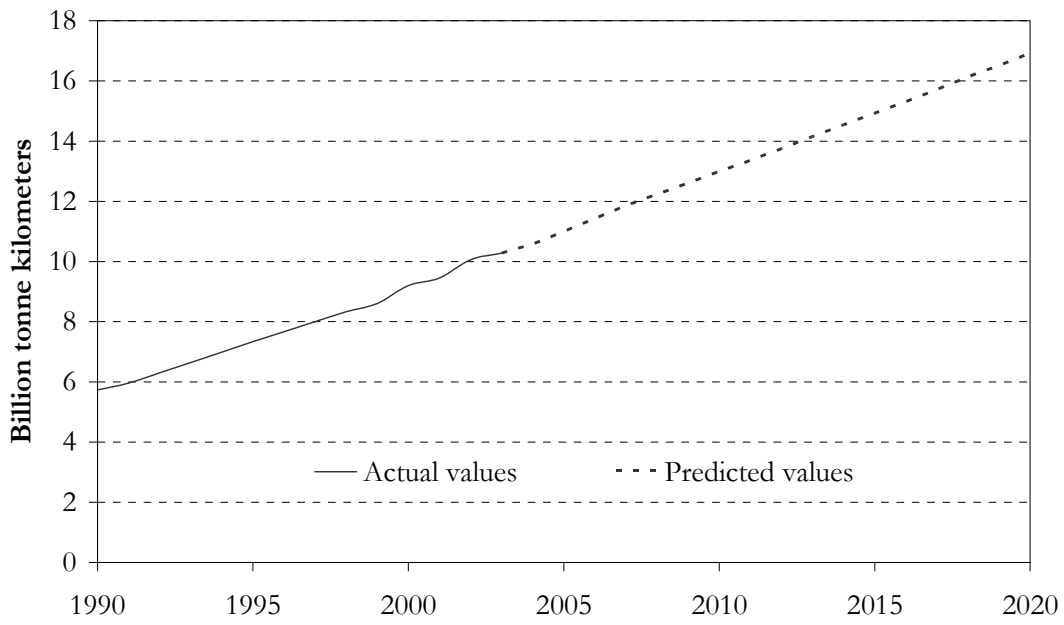
- motor vehicle users are relatively insensitive to changes in cost, travel time and petrol prices in the short term
- public transport users are relatively insensitive to changes in fares in the peak period. This may be because peak users have less discretion in their travel choices (with respect to timing and mode).
- demand for public transport is more responsive to changes in travel time than to changes in fares. This is not surprising given that travel time costs are usually the largest component of user costs.
- service quality is a more important determinant of demand for public transport than the cost of fares
- demand for car travel decreases as petrol prices increase. This effect is more pronounced in the long term as people have time to adjust and reduce their consumption or switch modes
- the responsiveness of demand for freight travel to changes in price depends on the type of goods transported, the length of the trip and the availability of alternative modes. In general, stronger competition between modes (road and rail) means demand for a particular mode is more responsive.
- the demand for road transport is more responsive to changes in GDP than to freight rates, highlighting the strong relationship between growth in the economy and the freight task.

2.5 Outlook for the demand for transport

Looking ahead, several factors suggest that under the current policy settings, the demand for travel and use of motor vehicles for personal and freight travel is likely to continue to grow.

- *Economic growth.* Demand for freight travel is expected to grow as the state becomes more prosperous and businesses seek to move more goods across the networks. The Bureau of Transport and Regional Economics has projected that Melbourne's road freight task will increase to around 17 billion tonne kilometres by 2020 (figure 2.12). VicRoads also expects strong future growth in travel by light commercial vehicles and articulated trucks (figures 2.13 and 2.14). The growth from light commercial vehicles will largely come from increased vehicle numbers and distance travelled, whereas the growth from articulated trucks is expected to come from the volume they carry, as well as the distance travelled. Predictions that much of the future growth in freight vehicles will comprise light commercial vehicles appear to be consistent with international trends (BAH 2006k, p. 9).

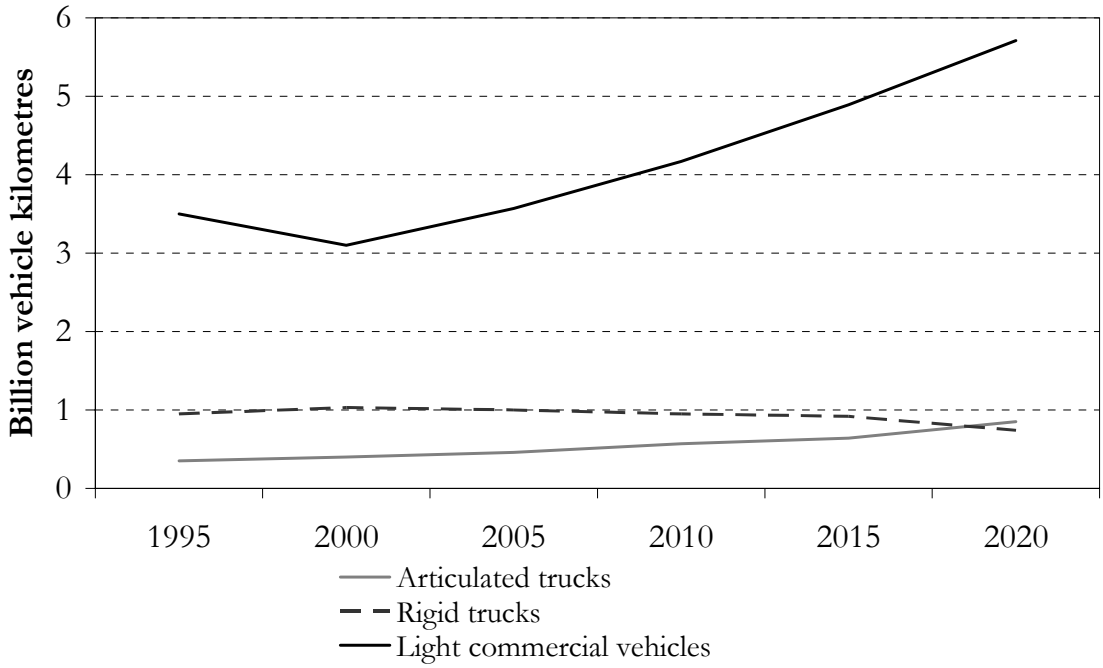
Figure 2.12 **Melbourne's road freight task 1990–2020**



Note: Projections of freight growth are not comparable to figures 2.13 and 2.14 as they are derived from different sources.

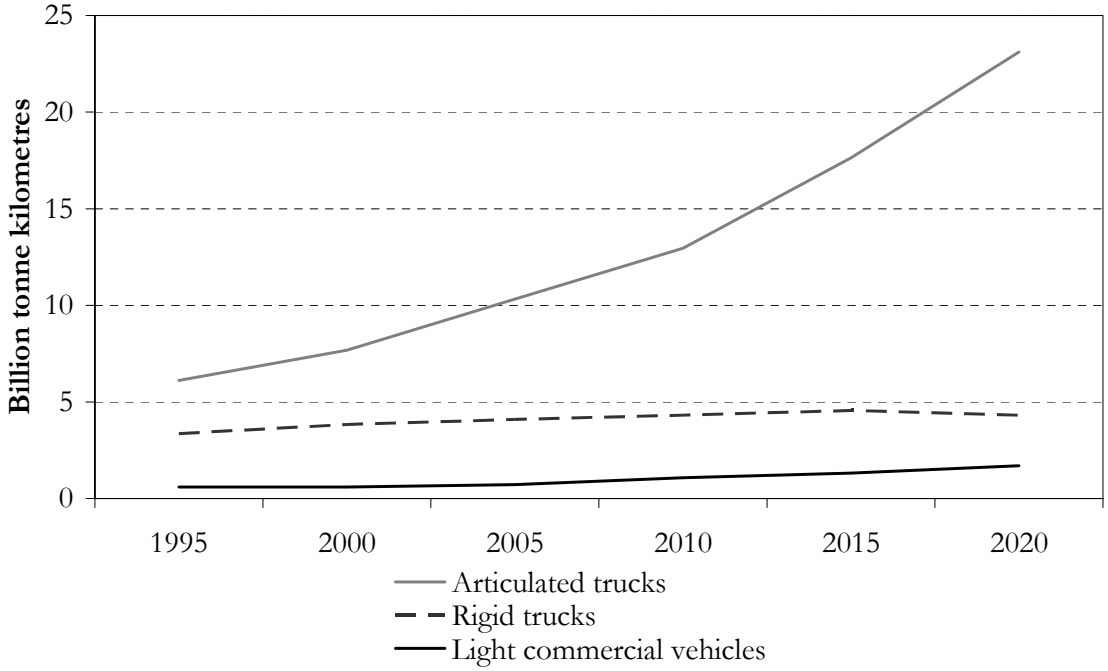
Source: Derived from BTRE (forthcoming).

Figure 2.13 **Growth in Melbourne's light commercial vehicles**



Source: VicRoads 2003, pp. 32–3.

Figure 2.14 **Growth in Melbourne's articulated trucks**



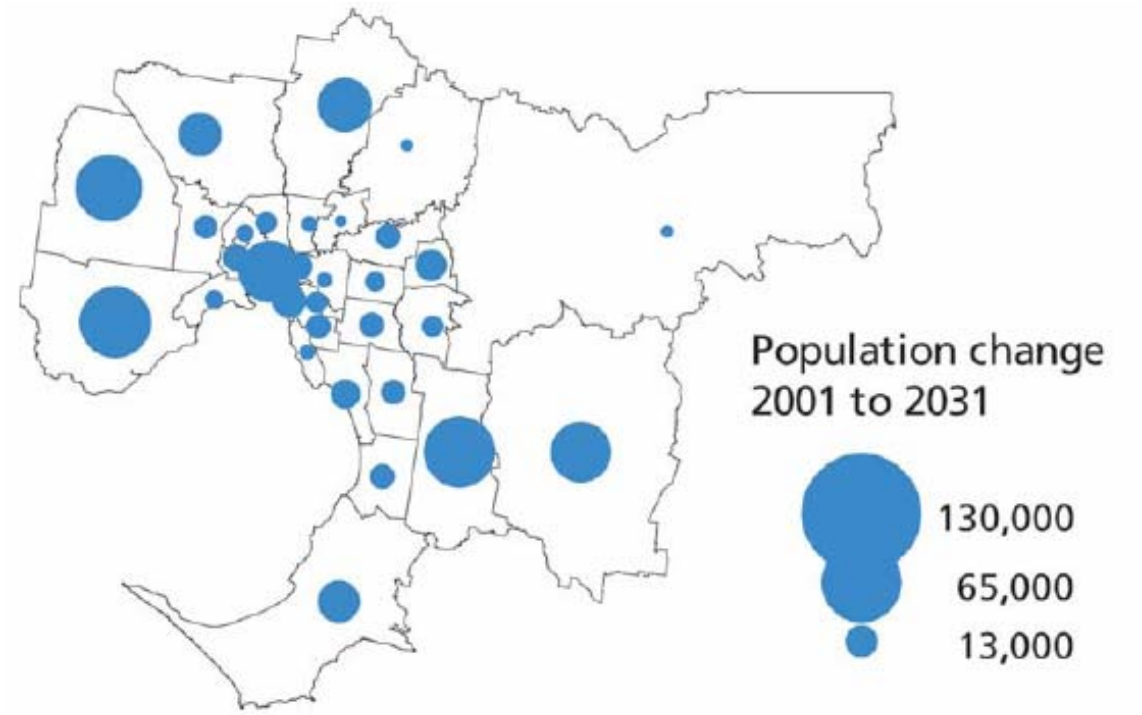
Source: VicRoads 2003, pp. 32–3.

- *Structural changes*. Structural changes in the economy may also contribute to future growth in the road freight task. According to DOTARS, expected trends include: the ongoing shift to just-in-time delivery as a replacement for point of sale inventory; increased specialisation of production, making manufacturing in particular more transport-intensive; increased differentiation of consumer tastes making retailing more transport-intensive; and the concentration of warehousing resulting in more and longer trips (DOTARS 2004). Increased use of road freight services is expected to occur as road freight prices continue to fall in real terms and given the inherent suitability of the road freight task for door-to-door pick-up and delivery and just-in-time delivery arrangements (DOTARS 2004).

- *Population growth*. The Department of Sustainability and Environment projects that in total, Melbourne's population will grow from 3.6 million people in 2004 to over 4.5 million by 2031 (DSE 2004, p. 46). This is estimated to add another three million trips (around 25 per cent)[7] each day to the personal travel task (DSE 2002, p. 10). Much of Melbourne's population growth in the next 25 years is expected to be in central Melbourne and the outer areas of Melton and Wyndham in the west, Hume and Whittlesea in the north, Casey and Cardinia in the south east (figure 2.15). As noted, these outer areas are currently not well served by public transport.
- *Income growth*. Incomes are also likely to grow. ABS *Household expenditure survey* data show that higher income groups tend to spend more on travel (ABS 2005a), suggesting that income growth will lead to greater personal travel. Transurban also noted that the number of car trips grow with income (sub. 67, p. 5). Moreover, as discussed, public transport is currently not well positioned to provide for the social and recreational trips that are likely to comprise a large part of this increased travel.
- *Employment growth*. Employment is expected to increase by around 30 per cent over the next 25 years, with half of the growth expected to occur in the inner areas of Melbourne, mainly in the business and services sectors (DSE, sub. 90, p. 19). DSE considers that the distribution of such growth would also tend to increase travel in peak times (sub. 90, p. 10).

[7] Based on the 1999 estimate of Melbournians undertaking 12 million trips a day (Morris & Wang 2002, p. 4)

Figure 2.15 **Projected population change in Melbourne 2001–2031**



Source: DSE 2004, p. 50.

- *Increasing working age.* People currently aged 45 to 55 years are expected to live and work longer, travel more and enjoy more mobility than the previous generation (Morris & Wang 2002, p. 48). Also, it is estimated that there will be a four fold increase in the number of people who are aged 60 years or older and hold a drivers licence in 2031 (DSE 2005c). The City of Bayside considers that because public transport may not provide the required coverage, safety or services for older populations, they are often selecting to drive, adding to congestion (sub. 37, p. 9).
- *Provision of infrastructure.* The provision of major roads is a key influence on development patterns. For example, the Western Ring Road has created an opportunity for industries that can take advantage of cross town travel that was not provided by the previous network (DOI 2000, p. 31). Chapter 7 discusses the impacts of new roads on travel demand in more detail.

The likelihood of continued growth in the demand for travel has given rise to concerns about the capacity of Victoria's urban transport infrastructure to cope with the increase. The Infrastructure Planning Council, for example, considered that:

> … the demand for transport is likely to increase significantly by 2020. Also, as trucks currently provide the majority of all freight movements in Victoria, and the car provides for most passenger movement, this is expected to translate into a major increase in demand for motor-vehicle transport.
>
> However, the continued and increased use of the car and truck will impinge upon urban city design and the quality of life with more and more limited space being taken up with roads and parking areas. As road congestion increases, the demand for space will create increasing pressure on key access points. Private commuters will compete with the freight task for critical access to the Port of Melbourne, the CBD and Melbourne Airport. (IPC 2002b, Ch. 7, pp. 43–4)

How these forces leading to increased demand for travel are likely to play out is uncertain. The next chapter examines the current nature and incidence of transport congestion in Melbourne and the regional cities and future trends.

3 Nature and incidence of congestion

The broad consensus is that transport congestion is imposing large costs on the community and that it is likely to worsen. This chapter examines the nature of these concerns as well as the major causes of congestion.

3.1 What is congestion?

Congestion is a location and time dependent phenomenon that can occur when the demand for use of transport infrastructure becomes excessive (chapter 1). The point at which the demands on infrastructure become 'excessive' is hard to define and is likely to depend on various demand and supply-side influences operating in combination.[1] These factors include the characteristics of the transport infrastructure (such as the capacity and configuration of freeways, arterials, and tram and train networks), the alternative transport options open to people (in terms of mode, route and time of usage), the values people and businesses ascribe to usage, and various other factors such as driver behaviour, incidents and weather conditions.

Some of these factors influencing congestion can give rise to recurrent bouts of congestion across a wide area. There are regular weekday peaks in demand for the use of roads and trains caused by people travelling to work and education. Infrastructure inefficiencies such as bottlenecks and deficiencies in management of the network can also cause recurring congestion at particular points on the network. At the same time, various non-recurring events such as accidents and other incidents can cause, or intensify, periods of congestion. There are some differences between the way congestion is defined for road and rail networks. On public transport, congestion can involve passenger crowding on buses, trams or trains, again in response to demand and supply-side factors (chapter 1).

Measuring congestion

The time and location-specific nature of congestion makes measurement extremely challenging. A variety of measures have been devised to assess the operational performance of the road network and public transport, and some of these can be used to track congestion (see box 3.1). Many of these measures are useful for looking at trends in congestion but they do not provide any insight into how people respond to congestion (by varying trip times, mode or route) or

[1] Congestion could be defined as being excessive when the marginal costs to society of congestion exceed the marginal benefits to society of efforts to reduce congestion (such as adding to road or other transport infrastructure).

whether congestion is excessive. Measures of average network speeds, average trip delays compared to 'normal' conditions, and the reliability of travel time can highlight if congestion is improving or worsening over time but they do not indicate whether congestion is excessive from the community's viewpoint.

BOX 3.1 Measures of transport congestion

A variety of indicators of system performance can be used to track trends in transport congestion on the road network and on public transport. Traffic engineers have developed many indicators of road congestion, often measuring the speed of travel relative to a defined benchmark. There is not agreement, however, about the best indicators. Australian road agencies use different indicators of network performance (sub. 50, p. 6). A recent US study listed 24 congestion performance indicators, which it described as a 'small sample' of those used to measure trends in congestion (FHWA 2005, p. 2-21).

A commonly used indicator of the performance of transport infrastructure (particularly road infrastructure) is the volume to capacity ratio (VCR). This ratio compares the average number of vehicles using a road per hour with the estimated capacity (number of vehicles it is designed to carry per hour). Some traffic engineers consider that congestion occurs when road use approaches capacity—that is, when the ratio has a value greater than 0.75 to 0.8 (ARRB 2006a, p. 8). This indicator is widely used in Australia, especially in transport models because of the ready availability of data but it does not provide any information on what a particular value means in terms of driving conditions.

To better reflect driving conditions, a number of user-based indicators are used to track congestion. Examples include indicators of average travel times and average delays, travel time variability and average network speeds. User-based indicators are widely used in Australia and overseas to compare road conditions across different cities and especially for analysis of congestion trends. The national body representing state road authorities (Austroads) publishes a variety of user measures for Australian cities. Some of these are reported for Melbourne later in the chapter.

These indicators are most useful for tracking trends in congestion. But crucially, they do not indicate whether any congestion is excessive from the community's viewpoint or whether any observed change in congestion is a good or bad thing. A reduction in average travel speeds, for example, may be unrelated to congestion and instead, be caused by changes in speed limits, changes in the road network or other factors.

For public transport, a common indicator of congestion is crowding levels on vehicles (trams, trains and buses). Published data on these for trams and buses is not readily available. A survey of passenger numbers on trains is undertaken each year in May. The contracts with the private operator specify a maximum average load standard of around 800 passengers per six-car train set. Average load standards exceeding this are interpreted as indicating congestion.

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Box 3.1 **Measures of transport congestion** (continued)

Indicators of percentage of public transport services delivered on time (on-time running) are also relevant to assessing congestion on public transport. Recurring and non-recurring congestion on the road network can delay tram and bus services. For trains, increasing levels of passenger crowding can also cause delays because boarding and alighting times and hence dwell times at stations increase. The main difficulty in interpreting these measures is that many factors besides congestion may cause changes in the indicators. Crowding levels and on-time running will be affected by operational practices, infrastructure problems and non-recurring factors such as accidents and faults. The ability to adjust schedules to take account of recurrent factors compounds difficulties in interpreting these indicators (see section 3.2.3).

Source: ARRB 2006a.

To assess whether congestion is excessive, information is needed on the marginal costs and benefits of increased traffic to individuals and society more broadly, as well as the benefits and costs of actions that reduce travel time on congested networks (see box 3.2). With this information, it would be possible to assess whether current usage of transport networks is excessive. The various indicators of congestion described above could then be used to track whether congestion costs are likely to be increasing or declining in response to policy measures.

Box 3.2 **Economic measures of congestion**

To estimate the gains from tackling congestion, information is needed on the costs of travel and the benefits that congestion reduction provides. The costs of travel include those incurred by individuals (such as the cost of car operation and ownership and time devoted to travelling). The social cost includes a number of costs that are not considered by people when making trip decisions, such as the impacts on other road users, environmental costs and losses in the amenity of people living alongside roads.

This can be illustrated diagrammatically (see below). The diagram shows how the costs to individuals and the costs to society rise with the total number of trips undertaken and how, beyond some point, the social and private costs of travel start to diverge. The slope of these cost curves depends on the relationship between road use and capacity (as expressed in the speed-flow curves) and between vehicle speed and some of the private and social costs of travel such as vehicle operating costs, fuel consumption, accidents and emissions of pollutants.

With a downward sloping demand function for travel showing the marginal benefits of trips, the total number of trips undertaken will expand to the point where the marginal benefit of an extra trip equals the marginal private cost of that trip (point e), leading to T_a trips being undertaken. The cost to society from this level of trips (point f), however, is greater than the benefits represented by the demand function. Society could be better off if the number of trips was reduced to T_m, which is the point where the marginal cost to society equals the marginal benefits.

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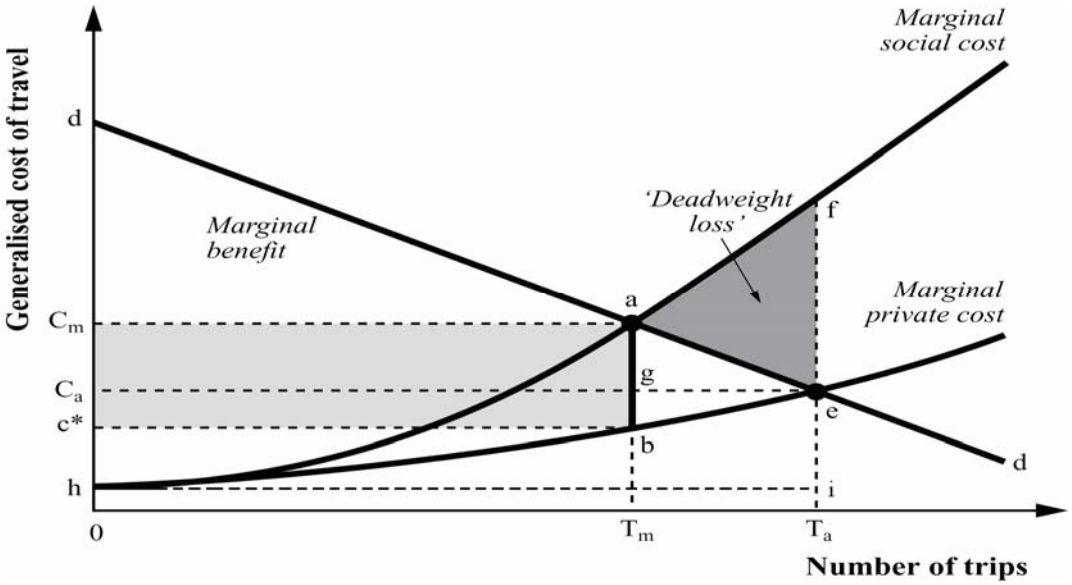
Box 3.3 **Economic measures of congestion** (continued)

The economic costs of congestion



Source: Adapted from ARRB 2006a, p. 15.

The economic cost of congestion is therefore the difference between the total social cost of travel at point T_a and the benefits that are derived, as shown by the triangular shaded area labelled 'Deadweight loss'.

The costs of congestion are sometimes measured as the area C_a, e, i, h. This area shows the total delay cost of congestion and it is typically larger than the deadweight loss. It represents the total increase in travel costs for a particular quantity of trips resulting from traffic being unable to travel at free-flow speeds.[2] The different methods of measuring congestion costs are described below.

This representation of congestion is highly simplified. In practice, there will be a different demand function for each period of the day and for different groups of travellers (such as commuters, students, shoppers, businesses, etc.), reflecting the differences in the benefits they derive from travel and their ability to adjust their behaviour. There will also be different speed-flow relationships for different parts of the road network, reflecting the characteristics of different parts of the network. Nevertheless, the diagram does usefully illustrate a couple of important points.

(1) The socially desirable level of traffic involves some degree of vehicle interactions—showing how *some* congestion can be a good thing from society's perspective.

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[2] The free-flow speed will vary depending on the type of road and is the speed that is achieved when the only constraints are those imposed by the physical characteristics of the transport infrastructure, such as intersections and traffic signals, which prevent drivers from travelling at posted speed limits.

Box 3.2 **Economic measures of congestion** (continued)

(2) It illustrates why it is so difficult to estimate the economic costs of congestion. To do so requires information on the demand for travel (such as the marginal benefits that different people derive from individual trips), as well as the costs to both individuals and society of a range of different trips.

Source: ARRB 2006a and Verhof 2002.

Costs of congestion

Many inquiry participants considered that transport congestion is a major problem for Melbourne and it is likely to worsen (box 3.3). Participants considered that congestion is also experienced in Geelong, especially during holidays and on some freight routes that pass through the city. In Ballarat and Bendigo it is not as great in magnitude or significance as in Melbourne, but these communities have highlighted localised episodes that warrant management.

There is a widespread view that road congestion in Melbourne is imposing large costs on the community and, therefore, there is an urgent need for additional resources to be put into its management. The main types of costs identified by participants were:

- travel delays to passengers and freight
- higher operating costs for motor vehicles and some public transport services
- reduced productivity due to increased transport costs, and loss of economies in production and transport
- increased driver stress
- losses in urban amenity
- increased vehicle emissions (noise and greenhouse gases)
- reduced speed and reliability of tram and bus services
- passenger discomfort due to over-crowding on train and tram services.

While many participants considered these costs are large, understandably few were able to quantify them or give specific examples to illustrate their significance. A number of participants cited results of research into congestion costs by the Bureau of Transport and Communications Economics (BTCE). Further efforts to quantify some of the costs were undertaken by the Department of Infrastructure (DOI). The results of these previous studies are described below.

Box 3.3 Views about the impact of congestion

A number of inquiry participants and others considered that congestion is imposing a number of significant economic, environmental and social costs on the Victorian community and that these costs will grow in future.

The Department of Infrastructure stated:

> Over the next few decades, continued growth in Melbourne will place increasing pressure on transport infrastructure and all published estimates suggest that the costs of congestion will rise. The extent of the cost increase will depend on the supply and demand side policies of government, and the responses of businesses and individuals.
>
> The indicators support a conclusion that the current policy settings are having an effect. Nonetheless, substantial challenges remain and further innovation will be required. These challenges include managing Melbourne's freeway system, particularly the east-west corridor and around the port of Melbourne, and access to and from the CBD.
>
> The principal instance of transport congestion in the three regional cities that are included in VCEC's inquiry is that experienced on and around the Princes Highway that currently traverses Geelong. (sub. 55, p. 3)

A number of submissions and reports cited the results of studies by the Bureau of Transport Economics (BTE) and Port Jackson Partners (for the Business Council of Australia). In a report prepared for the City of Melbourne, Professor Graham Currie stated that:

> Traffic Congestion has been increasing in Melbourne. The costs in terms of travel time, frustration and delay are difficult to estimate however the costs to business alone have been suggested at some $2.7 billion p.a. (Business Council of Australia 2005) and as high as $4 billion p.a. in total [Committee for Melbourne sub. 34]. The Bureau of Transport Economics (1996) has estimated that road traffic congestion cost Australia $12.8 billion nationally in 1995, with this cost expected to reach $29.7 billion by 2015 (by interpolation, annual congestion costs are probably of the order of $19-20 billion today). (Currie 2005a)

Also drawing on the BTE's work, the Committee for Melbourne considered that:

> The cost of congestion in Melbourne will double from $4 billion annually [currently] to $8 billion by 2015. Over 60% of these costs are business costs, particularly for the freight industry, thus influencing business' ability to maintain employment levels.' (sub. 34, p. 3)

According to Harry Clarke and Andrew Hawkins:

> There are no sound, up-to-date estimates of total congestion costs in Melbourne. Some dated estimates suggest costs of $2 billion dollars per year (Industry Commission (1994a, p. 220). These are gross cost estimates not deadweight loss estimates since they compare travel times with congestion times under free-flow. This exaggerates net costs in one sense but understates it in another by ignoring indirect costs such as pollution. Observed traffic delays suggest there are significant deadweight losses to Melbournians from traffic congestion. Preliminary BTCE (1996) estimates for 1995 of net congestion costs in Melbourne confirm this.

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Box 3.3 **Views about the impact of congestion** (continued)

> The BTCE estimated deadweight losses in Melbourne from failing to price of $466 million implying a 2005 cost of $698 million assuming (i) 11 per cent population growth [between 1995 and 2005] (ii) 23 per cent inflation and (iii) 12 per cent growth in the per capita car fleet size. This is a rough estimate. Supply improvements are ignored as are nonlinearities in the relation between vehicle numbers and travel times. (sub. 3, p. 8)

In a report prepared for the Business Council of Australia, Port Jackson Partners Limited (2005) estimated that congestion indicators (congested road length and vehicle hours) for Melbourne will double over 2001-2021 based on modelling results provided by DOI.

In discussions with the Commission, the City of Ballarat stated that serious transport congestion is not a challenge the Ballarat community faces in the immediate future (City of Ballarat, pers. comm., 17 Feb 2006). It pointed out, however, that the long lead times required for transport infrastructure development means that planning is required now to ensure that transport congestion does not become an issue in the medium to long term.

A number of inquiry participants considered that road congestion is slowing down road-based public transport (trams and buses), thereby discouraging their use. Some participants also considered that congestion, in the form of passenger crowding, is occurring on some train and tram services especially at peak periods.

Concerns were also expressed about the environmental impacts of congestion. According to Environment Victoria (sub. 73), motor vehicle emissions are a primary cause of air pollution and greenhouse gas emissions in Victoria, and impose significant environmental costs. The Department of Sustainability and Environment considered that, using carbon monoxide as an indicator, approximately 77 per cent of emissions in Melbourne are from motor vehicles (sub. 90, p. 14). Clarke and Hawkins stated that transport congestion exacerbates the social and environmental costs generated by motor vehicle emissions because under congested conditions motor vehicle fuel consumption and emission of pollutants increase (sub. 3, p. 8).

Sources: Business Council of Australia 2005; Clarke & Hawkins, sub. 3; Committee for Melbourne, sub. 34; Currie 2005a; DOI, sub. 55.

Some people have argued that the costs of congestion in Melbourne are relatively small in comparison with other Australian and international cities. Scheurer et al (2005, p. 22), took this view based on a comparison of the total annual vehicle kilometres travelled in the metropolitan area with the length of the road network for 14 cities (including Melbourne). While noting this indicator ignores localised or time-specific occurrences of traffic congestion, they argued that it indicates the relative ease of travel by private vehicle. With these qualifications, they

argued that 'Melbourne offers a low level of resistance to private vehicle travel, implying that the city's congestion problems are on the whole less severe than in most or all other cities in the sample.' Similarly, the City of Yarra considered:

> Melbourne already has average road network speeds higher than those of many of the other top 15 liveable cities as identified by the Economic Intelligence Unit, London. Melbourne's average urban speed of 43km/h is 'bettered' only by Toronto (51 km/h), Brisbane & Copenhagen (50 km/h) and Perth (46 km/h). When compared with other liveable cities Melbourne fares very favourably. (sub. 63, p. 6)

Others considered that people and businesses find ways to adapt to avoid recurring congestion. As noted in chapter 2, there is some evidence that people adjust their behaviour to maintain travel times within a fixed time budget. As DOI noted:

> The capacity to achieve steady commuting times suggests that, over time, many people adjust their place of residence or work to ensure that the two locations are reasonably close. The journey to work information collected in the census shows that 25-35 per cent of Melbournians work in the same municipality in which they live. Businesses also make adjustments to reduce the impact of congestion, such as relocating their businesses and altering the time of day when they carry goods. While these adjustments act to mitigate the effects of congestion, they are not costless and it is necessary to assess the extent to which other measures should be taken to alleviate congestion. (sub. 55, p. 30)

While some people may build in travel time buffers or adapt to congestion in other ways, it may be more difficult for people to adjust to non-recurring congestion. As Carlo Carli MP noted:

> A road system that is heavily congested and operating to its maximum capacity is more unstable and subject to greater variation. For a transport system to work well average speed is less important. People and goods can adjust to longer travel times but it is the instability and unreliability that imposes the greater cost. (sub. 64, p. 2)

To an extent, the different views about the nature and significance of transport congestion in Melbourne reflect the strengths and weaknesses of previous studies that have attempted to measure the costs for Melbourne. The next section reviews the available evidence on congestion.

3.2 Evidence for Melbourne and the regional cities

The terms of reference require the Commission to report on the nature and incidence of transport congestion and the impacts on business. Previous studies on congestion in Melbourne have produced cost estimates in the billions of dollars, rising rapidly over time.[3] A number of participants cited these cost estimates to support their arguments for large expenditures and major policy shifts to reduce car use and therefore current and future congestion problems.

3.2.1 Previous studies

A number of studies have attempted to estimate some of the costs associated with congestion for Melbourne. The Commission also asked DOI to look at the impacts of congestion using its model of Melbourne's transport network (the Melbourne Integrated Transport Model). The available evidence suggests that congestion on Melbourne's roads imposes costs on the community, with these costs predicted to grow rapidly under a range of scenarios (table 3.1). While the results of these studies are described in more detail in appendix B, they highlight a number of key points:

- By using a methodology which compares estimated travel speeds with free-flow speeds, some of the studies significantly overstate the potential gains from addressing congestion. The Commission is aware of only one previous attempt to measure the economic costs of congestion for Melbourne—that is, the potential gains from addressing congestion using optimal road user charges. The study by the BTCE (1996a, p. 52) reported estimates of both the economic costs of congestion and the total congestion delay cost, with the former roughly 55 per cent of the latter for Melbourne. Estimates of the total congestion delay cost by themselves do not provide an adequate justification for some of the major project proposals for tackling road congestion suggested by participants (see chapter 5 for a description of participants' views about how congestion should be tackled.)
- The results suggest that congestion costs will grow in the future. The major reason for the projected growth is the expectation that car use and road freight will continue to grow more rapidly than can be accommodated by expansion of the road network. The results of modelling undertaken for the Commission by DOI suggest that the total cost of delays resulting from congestion will grow by around five times over the next 17 years, with the weighted volume to capacity ratio for the entire modelled road network increasing from 0.37 to 0.47. The average speed on Melbourne's modelled

[3] The Commission is unaware of any studies that have sought to quantify congestion costs in the regional cities.

road network is predicted to decline by around 20 per cent, from under 47 km/h to around 37 km/h (see appendix B). The extent of the increase is also illustrated graphically in the following discussion about patterns of congestion. These results need to be interpreted carefully because they do not allow for some important behavioural responses to congestion delays, such as changes in the time when people choose to travel, decisions by people and businesses to move location, or future government investment in better managing or expanding transport infrastructure. Also, the use of average speeds does not reveal the range of congestion points across the road network.

Table 3.1 **Results of previous studies**

Study	*Methodology*	*Estimated annual cost ($m)*	
		Current	*Projected*
BTCE 1996a	Used Australian Road Research Board (ARRB) travel cost model. Estimated economic costs for Melbourne (defined as the net benefits of optimal road user charges).	466 (1995)	n.r.
	Transtep model of Melbourne's road network. Estimated total congestion delay costs for passenger and business traffic (AM peak only).	1725[a]	n.r
BTE 1999	Transtep model of Melbourne's road network. Estimated total delay costs to passenger and freight traffic.	2700 (in 1995)	8000 (in 2015)
DOI (undated)	MITM Model (2001 version). Estimated delay costs to passenger traffic. Excluded freight.	1800 (in 2001)[b]	2800 (in 2021)
DOI for VCEC	MITM Model (2004 version). Estimated delay costs to passenger traffic. Excluded freight.	770 (in 2004)[b]	3990 (in 2021)

Notes: n.r denotes not reported. [a] The BTCE (1996a, p. 52) estimated the total delay cost for the morning peak period only. This was scaled up to an annual figure by the Commission to allow a rough comparison with other results (see appendix B for details). [b] Using the MITM , DOI estimated delay costs for the AM peak only. These were scaled up to an annual figure using a consistent methodology (see appendix B). The differences between the current and projected results reflect a variety of factors such as differences in the specification of the road network, assumptions about vehicle operating costs, and estimates of population and employment growth (appendix B).

Sources: BTCE 1996a and 1996b; BTE 1999; ARRB 2006a; DOI modelling for the Commission (detailed in appendix B).

- The models are extremely sensitive to the specification of the road network, as well as the underlying data and assumptions. A key parameter in the models is the value ascribed to travel time. Modelling by DOI for the Commission used an average value of time for private motor vehicle passengers of around $10 per hour. Varying the value used by plus or minus 20 per cent has a significant impact on mode choice and the length of motor vehicle trips, causing the length of congested road estimated by DOI for the Commission to increase (decrease) by around 24 per cent (22 per cent) (see appendix B). In reality, different passengers are likely to place vastly different values on travel time, depending on trip purpose, duration, location and income opportunity cost. There may also be some threshold or expected delay built into time valuations so that variability in travel times or extreme bouts of congestion impose the major costs. There is minimal published information on how individuals and businesses in Melbourne value their travel time and the variability of these valuations (chapter 2).
- The estimates of congestion delay costs produced by DOI do not include any allowance for costs to business traffic (including freight). This reflects the very limited information available on business travel (including freight) for Melbourne. The Commission sought to obtain specific examples of the costs of congestion to business at an industry and individual company level. Participants were unable or unwilling to quantify or describe in any detail the impact of congestion on their business or overall industry costs. For freight companies, in most instances all costs, including congestion, were reflected in price. Companies did not specify the influence congestion may have on their location or costs of establishing their businesses. According to the Committee for Melbourne, the costs to businesses of congestion account for around 60 per cent of total congestion delay costs (sub. 34, p. 3).[4] Even though business traffic such as freight is a small proportion of all vehicle movements (with estimates for Melbourne putting its share at around 15 per cent), the valuations on travel time (and hence congestion-related delays) are considered to be larger for businesses than passengers (see chapter 2). Recent work by the BTRE has used values in the vicinity of $21 per hour for light commercial vehicle use, to nearly $50 per hour for heavy freight vehicles (BTRE, pers. comm., 14 March 2006).

[4] The Committee for Melbourne have advised that this figure is based on a number of assumptions. Firstly, that cars account for 90 per cent of total traffic and trucks account for the remaining 10 per cent. It is also assumed that one-quarter of car traffic is business related and the value of time placed on this use is three times private vehicle use. The value of time for truck use is also assumed to be 2.5 times that of private car use. No alternative allowance is made for differences in vehicle operating costs, which are therefore assumed to vary in the same way as time values (pers. comm., 22 February 2006).

- Improved information and modelling tools are needed to estimate the economic costs and therefore the potential gains from policies to address congestion. A satisfactory model that would enable estimation of the economic costs of congestion for Melbourne does not appear to have been developed. Reflecting the purpose for which they were developed, the existing models do not adequately specify how the demand for travel is determined and do not permit modelling of some potential costs of congestion—such as business and land-use impacts, the extent and costs of travel time variability, and the environmental and social amenity impacts of congestion (as distinct from the impacts of motor vehicle usage generally). Better estimates of the economic costs of congestion could be related to overall economic activity and the potential productivity gains from reducing those costs (for all its limitations, the estimate of the total delay cost of congestion in Melbourne would be much less than 1 per cent of Gross State Product).

Attempts to model congestion costs at least provide a very broad indication of possible future trends in congestion given anticipated expansion in the road network and population growth. The modelling, supplemented by additional information on network usage, also can be used to examine how congestion delays are spread across Melbourne. The next section examines evidence on the patterns of congestion in Melbourne.

3.2.2 Patterns of congestion in Melbourne

Understanding the aggregate costs of transport congestion is useful for assessing the degree of urgency around policy responses. Given the time and location specific nature of congestion, however, understanding how congestion affects different components of the road network is more useful because it helps to identify where congestion is most severe, and the relevant policy options.

According to the *Metropolitan transport plan* (Government of Victoria 2004a), congestion mostly affects the inner to middle suburbs of Melbourne within 15 kilometres of the Central Business District (where capacity for extending the road network is more limited). The Department of Infrastructure (sub. 55) added that congestion is a problem on the major freeways, as well as in some outer areas where there has been rapid population growth.

The data to enable a rigorous assessment of patterns of congestion is being developed. Whilst VicRoads has undertaken systematic periodic monitoring of arterial and highway performance for more than a decade, it is gradually

extending its monitoring of arterial roads.[5] The results of modelling undertaken by DOI for the Commission, together with information provided by VicRoads, enable some conclusions to be drawn. The available information broadly supported the conclusion that congestion is likely to become more widespread in future. However, particular pockets of congestion exist, or will become more intense, particularly around the inner and middle suburbs, on the major freeways and highways, and in some outer areas of Melbourne.

Is congestion greater in areas closer to the city centre?

There is some research from the United States suggesting that road congestion delays increase with the population size of cities.[6] Based on this it could be expected that congestion in Melbourne would be more severe in the more heavily populated areas closer to the city centre, and lighter in areas with a low population density, such as the outer suburbs.

As noted, DOI undertook modelling of congestion delay costs for the Commission. The estimates of delay costs obtained can be broken down across the various components of the road network. Based on allocating the delay costs to local government areas (LGAs), it appears that the central, inner and middle areas of Melbourne account for around 80 per cent of the total delay costs, with middle suburbs accounting for nearly 40 per cent, and outer areas somewhat less (table 3.2). [7] This suggests that congestion delays are most acute in central, inner and middle areas of Melbourne.

Although congestion appears to be somewhat less severe in outer areas overall, the modelling suggests that there are particular problem areas, such as in Hume, which has the second largest share of congestion delay costs,[8] and emerging problems in Casey and Greater Dandenong—where congestion delay costs are predicted to grow rapidly by 2021.

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[5] Until recently, detailed information of traffic conditions on arterials has been periodically collected using the Austroads data collection program. This is a sampled selection of 15 per cent of arterial roads for defined periods of the day (morning, afternoon and inter-peak periods) to enable trend analysis. Additional information on those and other parts of the network is collected on a case by case basis as required (VicRoads, pers. comm., 17 March 2006).

[6] See the report of Schrank and Lomax (2005) which examines congestion in 35 US cities, grouped by population, into small, medium and large cities.

[7] Central (Melbourne, Port Phillip, Yarra); Inner (Boroondara, Darebin, Glen Eira, Maribyrnong, Moonee Valley, Moreland, Stonnington); Middle (Bayside, Banyule, Brimbank, Greater Dandenong, Hobson's Bay, Kingston, Knox, Manningham, Maroondah, Monash, Whitehorse); Outer (Cardinia, Casey, Frankston, Hume, Melton, Mornington Peninsula, Nillumbik, Whittlesea, Wyndham, Yarra Ranges).

[8] The recent opening of the Craigieburn Bypass in December 2005 could be expected to significantly alter estimates of delay costs for Hume.

Congestion delay costs are also expected to grow by a large amount in all regions of Melbourne, but the greatest growth will occur in the central and inner areas respectively (table 3.2).[9] This pattern reflects the modelling assumption that a number of road projects are to be completed by 2021 in the outer areas of Melbourne, where rapid traffic growth is anticipated.

Table 3.2 **Share of weighted delay costs by region of Melbourne, 2004 and 2021 (am peak only)**

Region	*Per cent of weighted daily delay cost in 2004*	*Per cent of weighted daily delay cost in 2021*
Central	14	20
Inner	24	27
Middle	40	39
Outer	22	14

Note: This table shows estimated delay costs by link, allocated to LGAs in the central, inner, middle or outer regions of Melbourne. To account for the differing size of LGAs and regions, the total delay cost for each LGA was weighted according to rate of utilisation of that area's road network (that is, by the overall volume to capacity ratio of all the roads in each LGA).

Source: DOI for the Commission.

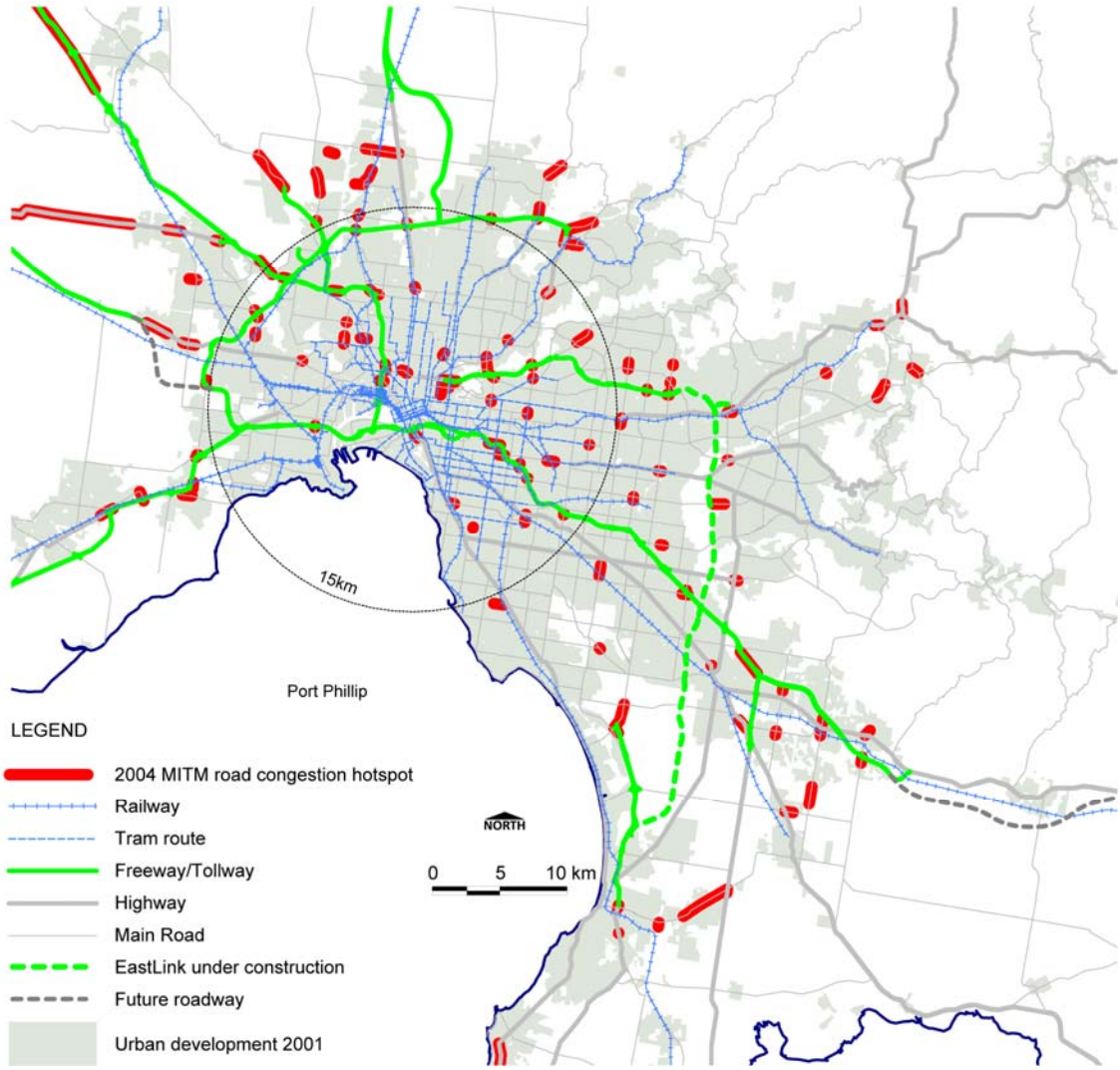
The significance of congestion delays for the central, inner and middle areas of Melbourne is reinforced when looked at using indicators of capacity usage. As noted, the volume to capacity ratio (VCR) shows the relationship between usage and capacity. There is no universally agreed optimal value for the VCR, with studies using values of between 0.7 and one to identify congested roads. According to the modelling, only a small proportion of Melbourne's road network is currently defined as being congested (with a VCR of one or more). When congestion is defined in this manner, the location of congested links appear to be scattered across the city (figure 3.1).[10] Much of the projected increase in congestion is expected to occur in the central, inner and middle areas of Melbourne, which shows up as a significant increase in the number of congested links within 15 kilometres of the city (figure 3.2). This analysis also highlights the modelling results in that some congestion problems may emerge in

[9] As noted, the results from MITM need to be interpreted carefully. The projected congestion delays costs, for example, do not factor in behavioural changes that are likely to occur in response to rising congestion costs (such as changes in where people live and work or government investment in transport infrastructure). The estimates of congestion delay costs also exclude freight and other commercial traffic.

[10] Sensitivity testing revealed that the share of the road network that is congested is sensitive to the threshold value for the VCR (appendix B).

the outer areas such as Casey and Greater Dandenong. An important qualification is that the modelling is limited in its ability to identify congestion on the freeway network.[11] A more detailed discussion of congestion delays on freeways, that draws on alternative data sources, is provided below.

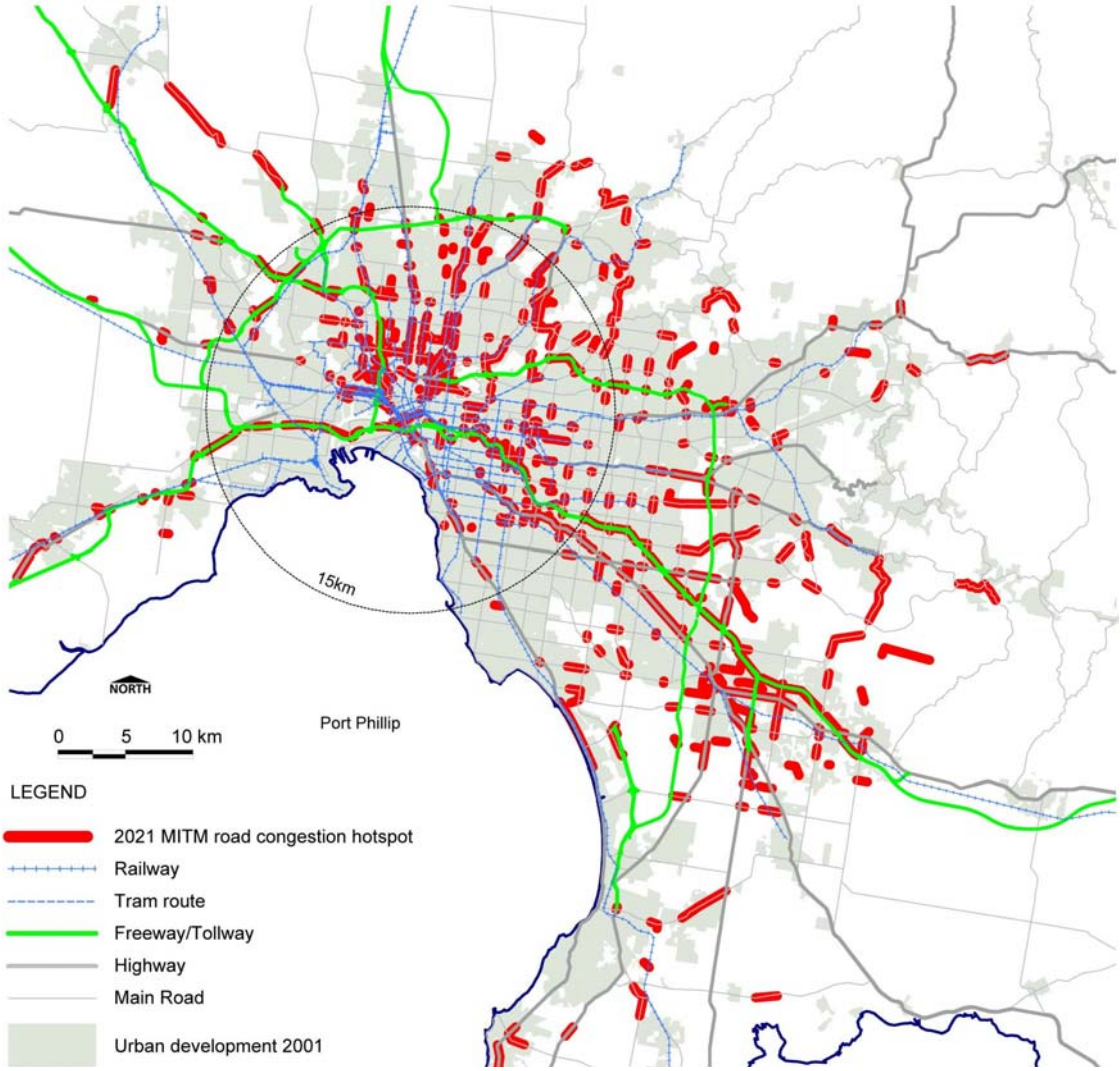
Figure 3.1 **Modelled congestion hotspots on arterial roads in Melbourne, 2004 (am peak)**



Source: DOI for the Commission.

[11] The modelling results do not take into account the variability in travel times that occurs on freeways resulting from a combination of high traffic volumes and non-recurring incidents such as accidents, poor weather conditions, road works and other incidents.

Figure 3.2 **Modelled congestion hotspots on arterial roads in Melbourne, 2021 (am peak)**



Source: DOI for the Commission.

Is congestion more of a problem on Melbourne's freeways?

As noted in chapter 2, Melbourne's freeways, highways and toll roads serve a vital strategic purpose in moving passenger vehicles and freight around Melbourne. These roads account for a relatively small share of the road network but are likely to account for a much larger share of overall traffic, and freight in particular. As a rule, freeways have twice the capacity of arterial roads in Melbourne—they can carry up to 2000 vehicles per lane per hour depending on road grades and vehicle mix. This compares to arterial roads with traffic signals which carry less than 700 vehicles per lane per hour. They are also vital to the movement of freight, carrying approximately 600 tonnes of freight per lane per

hour compared to only 100 tonnes of freight per lane per hour on primary arterials (VicRoads 2004).

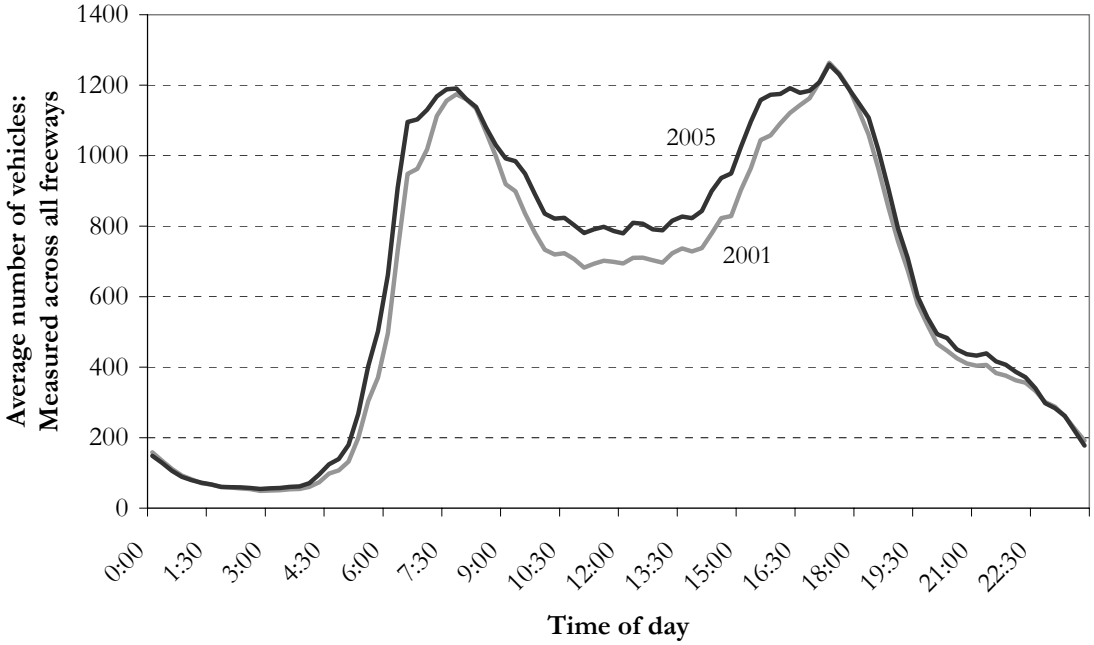
Information provided by DOI and VicRoads suggests that although there has been some spare capacity on Melbourne's freeways, associated with the completion during the late 1990s and early 2000s of major extensions (CityLink, Eastern Freeway to Springvale Road and the Western Ring Road), major parts of the freeway network appear to be approaching capacity.

Although VicRoads only periodically monitors usage on the highways, in recent years traffic growth on freeways has exceeded the growth of traffic on the network overall. According to VicRoads (sub. 50, p. 9) traffic on Melbourne's freeways has grown since 2003-04 by around 3.6 per cent in inner areas and around 0.8 per cent in outer areas. This has been accompanied by a small amount of traffic moving from arterials onto freeways. This behaviour is consistent with road users exploiting opportunities to achieve travel cost savings through using the freeway network.

Data suggest that the usage of some freeways is approaching capacity.

- Peak spreading appears to be occurring on the freeway system (figure 3.3).

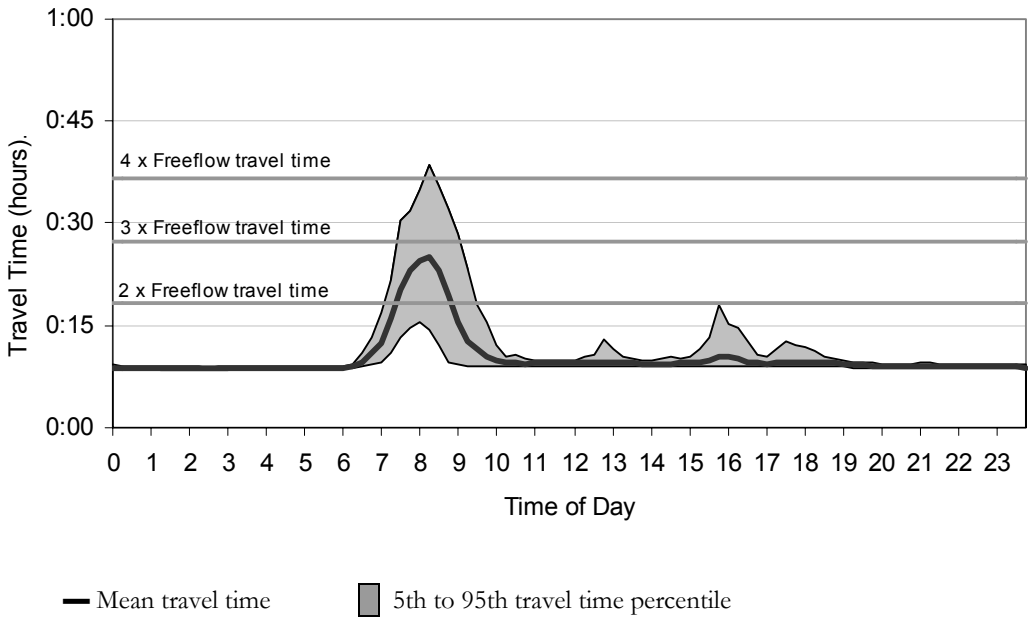
Figure 3.3 **Peak spreading on Melbourne's freeways**



Source: VicRoads.

- Average speeds on the monitored arterials and freeways have declined by around three km/h in the past 12 months, with most of this decline attributable to the freeways.
- Travel times along a number of major sections of the freeways are highly variable, possibly reflecting non-recurring events such as accidents and other incidents. As noted, travel time variability is more likely to occur as usage approaches road capacity. Travel times can reach three times the estimated free-flow time on occasions along sections of the Monash, West Gate and Tullamarine freeways during the morning peak periods, and two times free-flow on the Eastern and Princes Freeways. On the West Gate Freeway (Princes Freeway to Kings Way/Power Street), the average (mean) travel time measured at 8am over the period 30 May to 16 October 2005 was around 25 minutes but could vary between 15 minutes (37 per cent quicker) and 35 mins (42 per cent slower) (figure 3.4). Similarly, on the Monash Freeway (from Jacksons Road to Toorak Road) the average travel time at 8am over the same period was also 25 minutes, with a potential range of 14 minutes (43 per cent quicker) to 38 minutes (55 per cent slower) (figure 3.5).

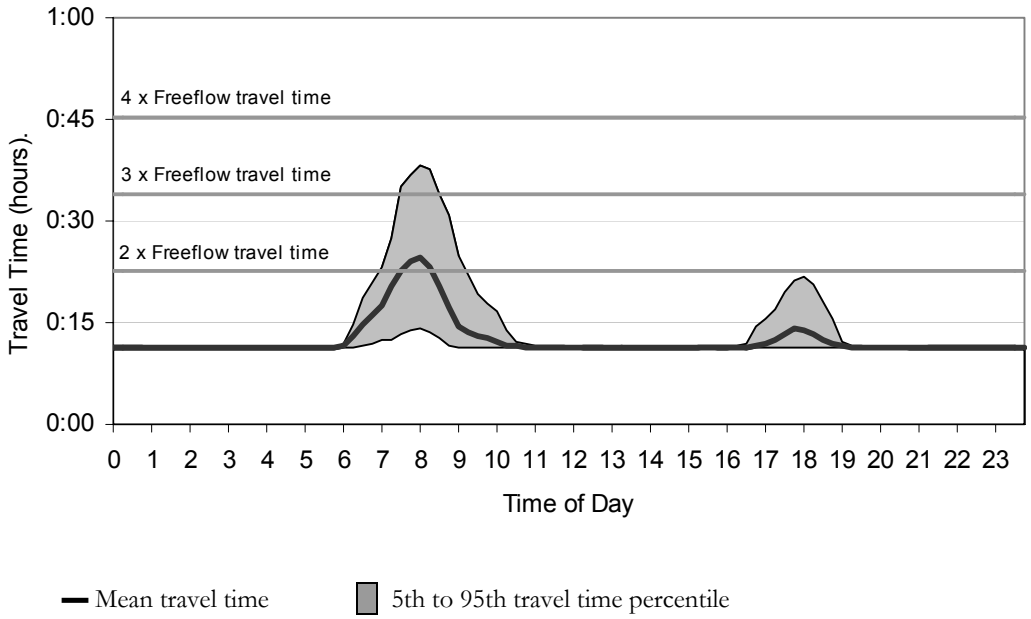
Figure 3.4 **Travel time on the Westgate Freeway (Princes Freeway to Kings Way/Power Street)[a]**



Notes: [a] Shows mean, 95th and 5th percentile travel times for the period 30 May 2005 to 16 October 2005.

Source: VicRoads.

Figure 3.5 **Travel time on the Monash Freeway (Jacksons Road to Toorak Road)[a]**



Notes: [a] Shows mean, 95th and 5th percentile travel times for the period 30 May 2005 to 16 October 2005.

Source: VicRoads.

- Travel time variability is less evident on the Western Ring Road (Hume Highway to West Gate Freeway) and the Metropolitan Ring Road (Plenty Road to the Hume Highway) during either the morning or afternoon peaks. Travel time variability is less severe on the Tullamarine Freeway, the Western and Metropolitan Ring Roads or the Eastern Freeway during the afternoon peaks (see appendix B).
- Variability in travel times also appears to be increasing. Using VicRoads data, DOI (sub. 55, p. 7) stated the variability of travel time (percentage difference in travel times experienced due to delay) in the morning peak has increased from 17.4 per cent to 25.3 per cent over the past five years. The variability of travel time in the evening peak increased from 15.8 per cent in 1999-2000 to 18.8 per cent in 2003-04, and then registered a fall to 17.7 per cent in 2004-05.

The VicRoads data pointing to the growing incidence of congestion on parts of the freeway network is broadly consistent with the results of modelling undertaken for the Commission by DOI. Classifying the congestion delay costs by road type (class) shows that although delay costs on the freeways and highways are not a large share of total delay costs (nine per cent), their share is

projected to grow to around 20 per cent by 2021 (table 3.3 and appendix B). Congestion delay costs on the highways and freeways account for approximately half of the congestion delay costs experienced in central areas of Melbourne in 2004.

Table 3.3 **Shares of weighted delay costs by road type for each region of Melbourne in 2004 and 2021**

	Central	*Inner*	*Middle*	*Outer*	*Total*
		2004			
Freeway	32%	9%	5%	3%	9%
Highway	19%	12%	39%	57%	34%
Arterial	31%	49%	47%	25%	40%
Sub-arterial	16%	27%	7%	12%	14%
Collector	1%	3%	2%	3%	3%
Local	1%	0%	1%	0%	0%
		2021			
Freeway	29%	23%	13%	21%	20%
Highway	5%	12%	33%	29%	22%
Arterial	54%	41%	45%	39%	45%
Sub-arterial	10%	21%	6%	7%	11%
Collector	1%	2%	3%	4%	2%
Local	1%	0%	1%	0%	0%

Source: DOI for the Commission.

The areas most likely to be affected by future growth in congestion delay costs on the highways and freeways are located in the western region of Melbourne. In a number of western LGAs, a large share of the projected increase in congestion delay costs is expected to occur on the freeways and highways. By 2021, the freeways and highways are expected to account for around 75 per cent of total delay costs in Brimbank and Hobson's Bay, and around 40 per cent in Moonee Valley and Maribyrnong. These results reflect the expected patterns of population growth in the western suburbs and existing travel patterns (such as the longer than average commutes and the heavier reliance on key freeways and highways) (appendix B).

Other congestion 'hotspots'

The discussion has so far focused on the broad location of congestion delays and the incidence of congestion on the freeways and highways. In addition to these areas, other locations may experience lower levels of more localised congestion at particular periods of the day such as in the vicinity of some schools or shopping centres around opening and closing times (VicRoads, sub. 50, p. 9). The two major sources of information on localised areas of congestion are VicRoads and the RACV (the latter via its annual 'redspot' survey).

VicRoads collects data on traffic conditions on the metropolitan arterial road network including freeways and strategic sites on the rural road network. This monitoring uses road sensors, the Freeway Incident Detection System (approximately 350 sites) and the traffic signal system (SCATS – Sydney Coordinated Adaptive Traffic System). SCATS is in place at around 2800 sites throughout Victoria. Information provided by SCATS and the Freeway Performance Monitoring System has been used by VicRoads to identify congested sections of the metropolitan road network. Congestion is defined as instances where the number of vehicles arriving at an intersection exceeds 95 per cent of the capacity of the intersection to move them through on one cycle of lights, and where freeway travel times have been degraded. This information shows that congestion (as defined) affects many parts of Melbourne along the highways and arterial roads. Reflecting the layout of the road network, much of the congested roads are located in the east (see figure 3.6).

This data should be interpreted carefully as there are a number of important limitations associated with identifying congested sections of the road network in this way.

- While the picture highlights entire roads or sections of roads that are considered to be congested, apart from the freeways, the data is recorded at signalised intersections only. Using it to infer that the traffic flow between intersections is also congested can be problematic.
- The definition of congestion is useful in tracking trends in congestion but it does not reveal whether the level of congestion is excessive from the community's point of view.
- There is no information on congestion at non-signalised intersections such as roundabouts. The results are biased towards intersections with a large number of approaches.
- It is not possible to identify whether some roads and intersections are more congested than others or whether traffic flows in one direction are more congested than others.

Figure 3.6 **Congested sections of Melbourne's arterial road network**

Source: VicRoads for the Commission.

The RACV's annual redspot survey also points to a number of potential problem areas in Melbourne. The redspot survey of road users attempts to identify parts of the road network that motorists consider are causing unnecessary and frustrating delays.[12] The most nominated sites in the survey for 2004 (RACV 2004) included:

- Inner
  - Calder Freeway interchange with Tullamarine Freeway, and Calder Freeway section between Green Gully Rd and Keilor Park Drive
  - Toorak Road / Monash Freeway, Kooyong
- Middle
  - Blackburn Road / Central Road, Blackburn
  - Mitcham Road / Whitehorse Road, Mitcham
  - Springvale Rd / Maroondah Highway, Nunawading
  - Wellington Road between Springvale Road, Mulgrave and Napoleon Road, Rowville
- Outer
  - Bridgewater Road / Craigieburn Road, Craigieburn
  - Ferntree Gully Road between Springvale Road, Glen Waverley and Stud Road, Scoresby
  - Fitzsimons Lane / Main Road, Eltham
  - Horne Street / Vineyard Road, Sunbury
  - Kimberley Drive / Maroondah Highway, Mooroolbark
  - Nepean Highway / Oakbank Road, Mornington
  - Plenty Road / George Road / McDonald's Road, South Morang
  - Pound Road / South Gippsland Highway, Dandenong South.[13]

The survey results are relevant for two main reasons. Firstly, they do not suggest any particular pattern in terms of the geographical location of the sites, but rather are dispersed around Melbourne. Secondly, a large proportion of the nominated sites were intersections (72 per cent), suggesting that the physical configuration of networks can play a role in perceptions about congestion impacts.

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[12] The latest survey available was for July 2004 and covered 7500 respondents and possibly reflects the location and travel patterns of RACV members.

[13] The nominated redspot sites were grouped by RACV into four major categories: intersections (72 per cent of all sites nominated), sections of road (19 per cent), rail crossings (9 per cent) and bus or tram stops (0 per cent). The intersection category is further subdivided into those that are: signalised (30 per cent), unsignalised (27 per cent) and roundabouts (15 per cent).

3.2.3 Congestion and the public transport system

As noted above, a number of inquiry participants expressed the view that road congestion is having an adverse effect on the speed and punctuality of trams and buses, thereby reducing the productivity of tram and bus operators, and deterring usage of public transport. Similarly, some participants expressed concerns about passenger crowding on trains adversely affecting the performance and productivity of passenger rail services. This section examines trends in congestion and public transport. Reflecting data availability, the focus is on Melbourne.[14]

The Department of Infrastructure (sub. 55) identified a number of indicators that are useful for examining the relationship between congestion and public transport:

- *Vehicle average speeds*—trends in speed can indicate whether buses and trams are being slowed down by increasing numbers of cars and trucks on the roads. Trains are less likely to experience a trend fall in speed, unless the track, signalling and communication infrastructure becomes less able to cope with the flow of trains in peak hour.
- *Proportion of services delivered on time*—trends in punctuality can indicate whether road congestion is impeding trams or buses. Trends can, however, be due to infrastructure and operational problems, or increases in demand that can cause increased dwell times at stops.
- *Crowding*—trends in passenger loads on public transport can indicate whether rolling stock capacity is fully utilised during peak hours.

These indicators are best used to assess trends but must be interpreted carefully. A range of factors, other than worsening congestion, may influence trends in these measures. Indicators of average speed and proportion of on-time services may, for instance, be influenced by factors such as changes in operational efficiency brought about by rescheduling or route prioritisation.

Average vehicle speeds

A variety of factors can cause changes in average speeds for trams and buses, including operational factors such as accidents and poor weather conditions and increases in demand (which may lengthen dwell times at stops). The available evidence suggests that while average bus speeds have been steady, the average speed of trams has fallen slightly.

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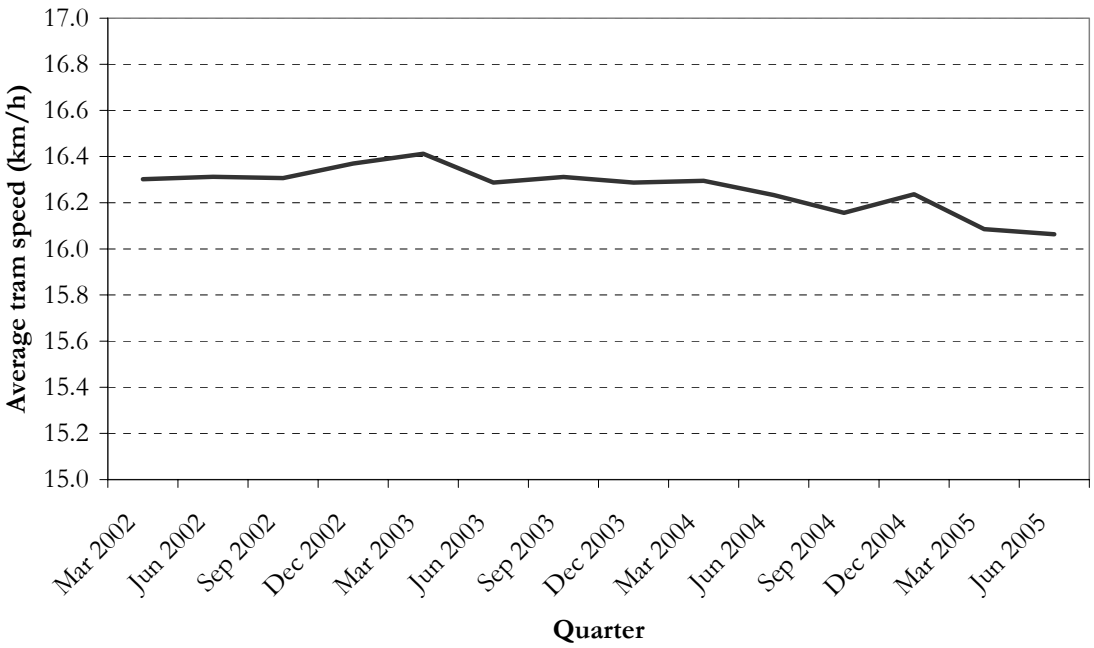
[14] The Department of Infrastructure commented that there is no evidence of public transport congestion in the regional centres, apart from small pockets of temporal congestion and non-recurrent incidents (sub 55, p. 12).

As most trams share the road with private vehicles, road congestion can have a significant effect on tram speeds. According to DOI (2004a, p. 4), approximately 40 per cent of total tram travel time is made up of delays attributable to mixed traffic operations.

The published information for trams shows a slight decline (of around two per cent) in average speeds over the last few years (figure 3.7). Although the decline has been small, DOI noted that it has occurred despite adjustments in scheduling times and changes in the network that were designed to facilitate tram movement (sub 55, p. 9) (see chapter 7 for a case study on road space management and trams).[15] These aggregate figures are also likely to mask differences in average speeds across the tram network. The lowest tram speeds are experienced in the city centre and through strip shopping centres at around 10–15 km/h in the morning peak; tram speeds in light rail corridors are in the order of 25–30 km/h in the morning peak (DOI 2004a, p. 4). Yarra Trams (sub. 61, p. 7) identified a number of areas within or close to the city centre which had previously been identified as having a high potential for speed improvements, namely Swanston Street, Bourke Street, Collins Street, Elizabeth Street, Flemington Road, St Kilda Road, Lygon Street and Bridge Road.

Figure 3.7 **Average tram speeds in Melbourne**



Source: DOI, sub. 55.

[15] Yarra Trams (sub. 61, p. 8) stated that on one route (route 19), these measures delivered real tram travel time improvements of around 5 per cent.

Unlike trams, data on average bus speeds is not available for the entire network. A recent report by DOI (2005h) reported that the average speed of services operated by the National Bus Company (which provides approximately 15 per cent of all bus services in Melbourne) was relatively stable over the three financial years between 2001-02 and 2004-05 at around 24 km/h. Average speeds will however, vary across the network. In discussions with the Commission, Grenda's Bus Services stated that in planning new bus routes, it assumes that inner city routes will be somewhat slower than those in outer areas (20 km/h and 22 km/h respectively).

Overall, the limited data that are available constrains the conclusions that can be drawn about the relationship between road congestion and public transport travel speeds. The available evidence shows that tram speeds have been declining slowly over a number of years. If this continues, it could adversely affect the productivity of the tram system (by requiring a larger fleet to service a given level of demand) and deter some people from using trams. No trend decline in average bus speeds is apparent from the available data.

Crowding

Crowding measures usually relate the number of passengers carried on a vehicle to some measure of its carrying capacity. Estimating carrying capacities can require judgements about the number of people that can safely or comfortably stand, particularly on trains and trams. Trends in crowding levels can, however, indicate worsening congestion.

Information from DOI suggests that peak period passenger loads on train rolling stock have increased on most of Melbourne's train lines. In some instances, the increase in passenger loads has led to overcrowding (figure 3.8). Such overcrowding can have a detrimental effect on the performance of the rail system, contributing to passenger dissatisfaction, and an increase in trains arriving late because of increased station dwell times. The Department of Infrastructure provided survey data on passenger loads during the busiest periods for train travel (7:30am to 8:30am on weekdays).[16] This shows the estimated average number of persons on a six-car train set, for in-bound services on each of the major rail service groups in 2004 and 2005.

The contract with the rail system operator, Connex, specifies maximum load standards. The load standard specified in the contracts is for 798 passengers for a six-car train (sub. 55, p. 11). The standard is defined as an average level over an

[16] Data is collected over a 4 week period in May. Surveys are conducted from Monday to Thursday, between 7:00am and 12:00 pm on services to the city, and 2:00pm to 8:00pm in the services travelling from the city. The network is divided into a number of sectors and counts are taken at selected stations in each sector (ARRB 2006, p. 38).

hour and does not include loadings within the city loop. Estimates of average passenger loads are derived from an annual passenger load survey undertaken over a four week period in May (ARRB 2006a, p. 38).

Load standards can vary between cities and countries depending on what users consider to be acceptable in each location. According to ARRB different countries use different load standards, to reflect what is considered acceptable by users in each location. Some cities use a standard of approximately 0.25 square metres per passenger while Victoria allows 0.66 square metres per passenger. Hence a train could be classed as fully loaded in Melbourne, but as having spare capacity in another country (ARRB 2006a, p. 39).

The available information shows that during 2005 contracted load standards were regularly exceeded during the morning peak period on the Broadmeadows, Dandenong, Pakenham and Sydenham service groups. This data also shows that most service groups experienced growth in passenger numbers between 2004 and 2005, possibly due to higher fuel prices encouraging more train use.

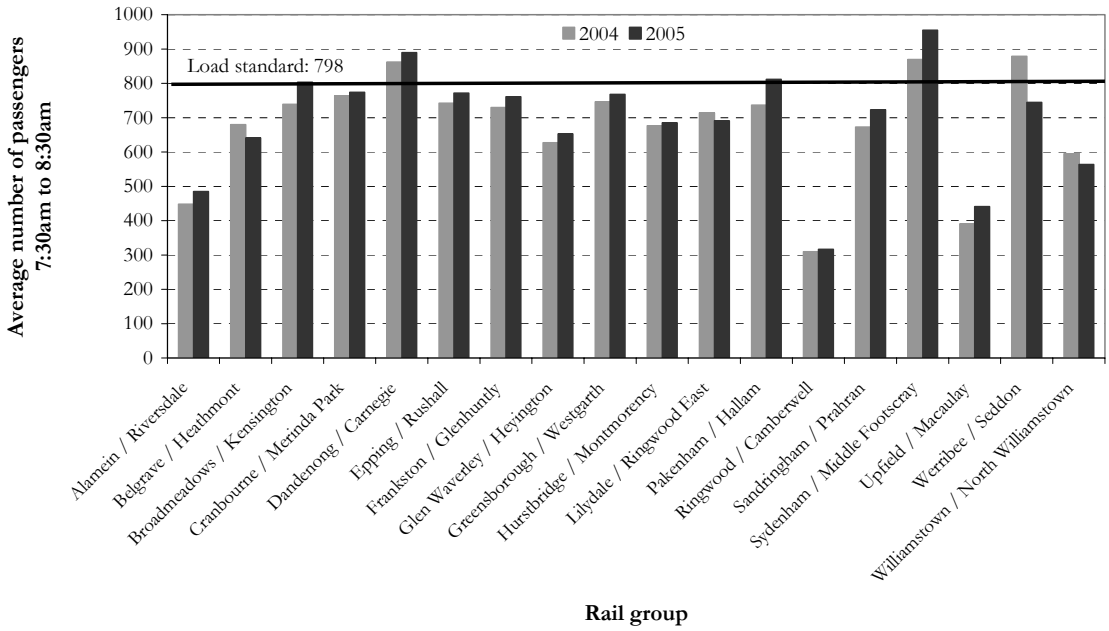
The data on average load standards reported in figure 3.8 does not, however, give an indication of the variability in instances of load standards, nor the frequency, relative to the total number of services. According to DOI (2006c), passenger loads on individual trains can typically vary significantly, ranging up to 1000 passengers. The average passenger loads could therefore be distorted somewhat by small numbers of extremely overcrowded trains. There is no publicly available information on the proportion of train services that are overcrowded during peak periods.

Some participants considered that overcrowding is also occurring on the tram network, usually in areas close to the city centre. The Committee for Melbourne (sub. 34, p. 42) argued that additional peak services are needed, partly to reduce overcrowding on trams. Some of the overcrowding that is likely to be occurring during peak periods is related to usage patterns. The franchise agreement with the tram operator imposes stricter load standards outside the city centre than inside it to reflect the 'propensity of passengers to make short trips within the city on which standing would cause relatively little discomfort' (DOI 2005f, p. 49).

Surveys are conducted to monitor tram operators' adherence to load standards. Surveys undertaken in 2002 revealed that there were peak period breaches on route 1/22 in Lygon Street, and route 96 in Nicholson Street. There were also near breaches at St Kilda Junction and at some locations along route 55 in the peak periods. In the CBD, there were instances where loads were at or above the CBD load standard in peak periods. However, this was not classified as a breach under the franchise agreement, as loadings in the CBD are averaged for all routes using any given street section.

Overcrowding is not considered to be a major issue for buses. The Victorian Bus Association (sub. 57, p. 21) stated that the incidence of overcrowding is relatively low, and limited to particular routes during peak times.

Figure 3.8 **Average passenger loads on Melbourne's trains**



Source: DOI, sub. 55.

Proportion of services delivered on time

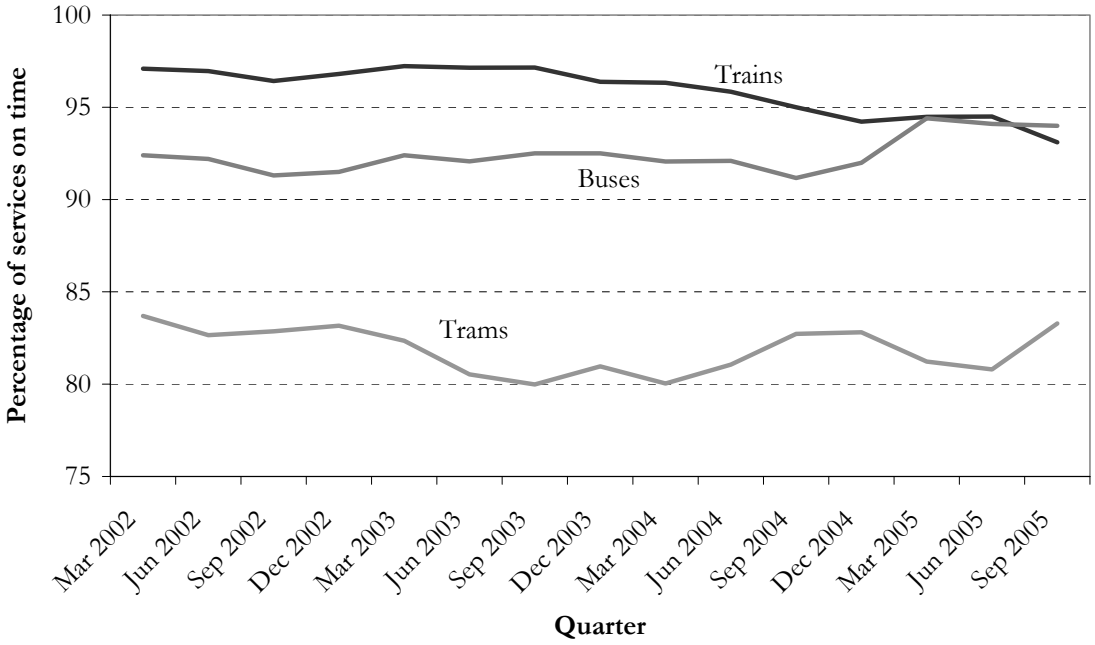
Chapter 2 noted that service time reliability is an important determinant of public transport usage.[17] A decrease in punctuality could be caused by increasing road congestion (for trams or buses) or by passenger crowding, especially on trains. This indicator needs to be interpreted carefully, however, because a number of additional factors can influence punctuality—such as failures in infrastructure, changes in operational management, increases in demand or road congestion impeding trams or buses (DOI, sub. 55, p. 6).

[17] According to ARRB (2006, p. 38), there is a view that unexpected waiting time at stops due to public transport unreliability have been valued at as much as five times the usual values for travel time. If correct, reliability will have a large impact on perceptions of the relative attractiveness of public transport.

The available information on trends in on-time performance of each of the public transport modes since early 2002 (figure 3.9) highlights a number of points:

- On-time performance of trams is well below the levels for trains and buses and more volatile. Trams operate in conditions that are different to trains and many bus routes. Most trams share the road space with private motor vehicles and, compared to buses, operate mostly in the more heavily congested inner and middle suburbs. Although the figures show no clear trend in on-time performance of trams over the period, DOI (sub. 55, p. 9) stated that changes in the tram network (route extensions or shortenings) and timetable changes make it difficult to interpret the data.
- Trains generally have a lower level of interaction with the road network than trams and buses (except when incidents occur at level crossings) and higher levels of average on-time performance. The overall punctuality of train services has declined in the past two years. The percentage of cancelled train services has also fallen slightly over the same period (DOI, sub. 55, p. 11). The Department of Infrastructure (sub. 55, p. 10) suggested that a combination of increased train patronage and the Southern Cross Station redevelopment may have contributed to reduced on-time running over the past two years. Driver shortages and fleet reliability issues also affected performance during 2004 (DOI 2004b, p. 1). On time running will vary across the network. Bayside City Council (sub. 37, p. 7), for example, stated that levels of on-time running on the Frankston line were around 89 per cent in the year to October 2005, compared with an average for the overall network of 93.5 per cent.
- The declining performance of train services has also been reflected in penalties imposed on the system operator (Connex) for breaches of punctuality and reliability of services. As noted in chapter 4, the contractual arrangements with public transport operators specify a number of minimum standards for service quality including punctuality (on-time running) and reliability (percentage of scheduled services completed).
- Bus punctuality levels have been stable and at high levels over the period. While the performance of buses appears to have improved over the past year, DOI (sub. 55, p. 10) cautioned that this improvement may reflect recent rescheduling of bus services and the small sample of buses surveyed rather than any increases in average speeds.

Figure 3.9 **On-time performance of public transport in Melbourne**



Note: A metropolitan train or tram service is considered on time if it arrives no more than 59 seconds before and no more than five minutes and 59 seconds after the time in the timetable. For metropolitan buses, on time is defined as not more than two minutes early or five minutes late at their destination (DOI 2004b, p. 4).

Source: DOI, sub. 55.

In summary, the indicators of speed, crowding, and on-time running for public transport are difficult to interpret due to the limited span of data available. Also, a range of factors in addition to road congestion and increased patronage could have contributed to the observed patterns. Improved public information on the performance of public transport and factors contributing to any trends would assist in the development of policy options.

The available information suggests that tram speeds have declined slightly, despite efforts to improve tram movement. Passenger loads on trains have increased recently on a number of lines, leading to breaches of contractual load standards on some lines (Broadmeadows, Dandenong, Pakenham and Sydenham). These trends are likely to contribute to increasing delays for public transport passengers and reduced productivity of public transport infrastructure, although the magnitude of these impacts is not known. A continuation of the recent strong growth in public transport patronage and road congestion is likely to place added pressures on the performance of public transport.

3.3 The underlying causes of congestion

The literature and submissions to this inquiry identified a number of possible causes of Melbourne's transport congestion. Against a background of steady increases in mobility associated with rising prosperity, the main causes identified were:

- externalities associated with road use
- patterns of usage of transport systems
- infrastructure constraints, including time and location-specific issues.

Participants also identified a number of factors potentially contributing to some of the congestion observed on the train system. These factors mainly related to infrastructure bottlenecks and operational factors.

3.3.1 Externalities associated with road use

A number of participants considered that the lack of a direct link between the costs of road use and traffic conditions is a major cause of road congestion.

Currently, individual motorists in Melbourne and the regional cities bear a number of costs associated with road use. Apart from the direct costs of car ownership and operation, individual motorists also pay fuel excise, registration charges, insurance, Goods and Services Tax and, on certain roads, tolls. Road use can, however, impose a number of 'social costs' which fall on other road users and society more broadly. The social costs of driving include delays inflicted on other road users, environmental costs and losses in the amenity of people living alongside roads, and tend to be largest during peak periods. The social costs of road use are called externalities because an individual driver is not forced to consider them in making travel decisions.

Some participants considered that current charges and taxes facing motorists are poorly aligned to traffic conditions. The Department of Infrastructure stated:

> The fuel excise means that motorists incur a charge every time that they access the road system, and the excise cost increases with the distance travelled and the litres of fuel used. However, fuel excise is levied uniformly across all roads at all times of day and night irrespective of road demand. The excise therefore does not carry an incentive for motorists to vary demand in response to changing traffic conditions, apart from the fact that their fuel consumption tends to be higher in congested conditions. (sub. 55, p. 12)

The Bus Association Victoria considered that congestion is caused by:

> … large numbers of vehicles choosing to travel on the roads at the same time. The level of congestion that results from this demand/supply imbalance is very much caused by the absence of proper pricing mechanisms that make users take account of the costs their travel choices impose on others. (sub. 57, p. 15)

Similarly, Harry Clarke and Andrew Hawkins stated that:

> Most of Melbourne's roads are not charged for at point-of-use and, because drivers prefer to travel to similar locations at similar times, are subject to congestion at peak times. Excluding taxes and charges road users only pay for a fraction of the social costs they impose. They do not bear the costs of delay their road use causes others or for pollution, noise, road construction, maintenance and external accident costs imposed. Drivers also benefit from fringe benefit tax concessions that favour salary packaging linked to private transport. Where road use is charged for at point-of-use, as on CityLink's Tollway or where it is anticipated to be practiced such as on the Mitcham-Frankston Project, it is (or will be) cost-recovery not efficiency-based with virtually no differentiation between peak and off-peak tolls. (sub. 3, p. 5)

The City of Yarra expressed a similar view:

> Traffic congestion is a symptom of cheap and easy access to cars, cheap fuel and free use of road infrastructure. (sub. 63, p. 9)

As noted, a characteristic of roads is the addition of an extra vehicle on a busy road can slow down the other vehicles using that road, thereby imposing a delay cost on other drivers. This effect may be imperceptible to other drivers, but can be quite large when added up across all the drivers on the road at that time. The cost that is borne by other road users is often called a congestion externality, mainly because the driver of the extra vehicle does not consider these costs in making a decision to drive.

The extent to which the disconnect between the costs of road use and traffic conditions has contributed to congestion in Melbourne is difficult to determine, but it is likely to be a key contributing factor, particularly given the congestion patterns described in section 3.2.2. The magnitude of the congestion and other externality costs associated with road use will vary across the network, depending on the amount and mix of traffic already occupying the road, the type of road and its capacity (which can also depend on factors such as weather conditions, traffic mix and driver behaviour). As noted in chapter 2, a number of studies have shown that the demand for road use is sensitive to the costs of usage, implying that the absence of a direct link between the costs of road use and traffic conditions will lead to an excessive amount of road use and increased congestion.

3.3.2 Patterns of usage

Fundamentally, congestion results from the interaction of travel demand and supply. Therefore a wide variety of factors that influence the demand for travel may be contributing to congestion, including:

- high use of cars for peak period trips, reflecting their affordability and flexibility
- the accessibility of alternatives to driving such as public transport
- economic growth which, as noted in chapter 2, has contributed particularly to rapid growth in the road freight task
- changing business practices—particularly just-in-time production and inventory management processes
- patterns of urban settlement and employment—including urban sprawl and dispersed land use.

It is difficult to isolate the influence of these various factors on congestion in Melbourne. As noted in chapter 2, a number of these factors have contributed to rapid growth in car ownership and usage, outstripping growth in the capacity of the road network. The information on these factors and their contribution to the demand for travel is limited. Despite the difficulties in isolating the effects of these factors on congestion, a number of relevant observations can be made:

- A large proportion of the peak period congestion observed on Melbourne's road and train networks is related to patterns of usage, particularly work and school hours. As noted in chapter 2, commuters and people travelling to school account for a significant share of the demand for travel in the morning and afternoon peaks. The Department of Infrastructure (sub. 55, p. 14) stated that 32 per cent of all weekday trips on Melbourne's rail system occur in the morning peak, and 30 per cent occur in the evening peak. One study estimated that children being driven to schools accounted for about 17 per cent of all trips in Melbourne in the half hour period between 8.30am and 9am (see box 3.4). The make up of peak hour traffic is likely to vary for different parts of the network depending on the location of schools and businesses and the transport options available to access them.
- The high use of cars for peak period trips has been brought about by a variety of factors, interacting with one another such as the dispersed patterns of land use and jobs, the unsuitability of public transport for some travel (such as cross-town trips), the limited availability of public transport, especially in the outer areas of Melbourne, and the general affordability and flexibility offered by driving (chapter 2). The difficulty and costs involved in changing some of these factors—land use and the configuration of the rail and tram networks, for example—has implications for the effectiveness of various policy options (chapter 7).

BOX 3.4 School trips and congestion

The available evidence suggests that car trips to school account for a significant share of trips, particularly during the morning peak.

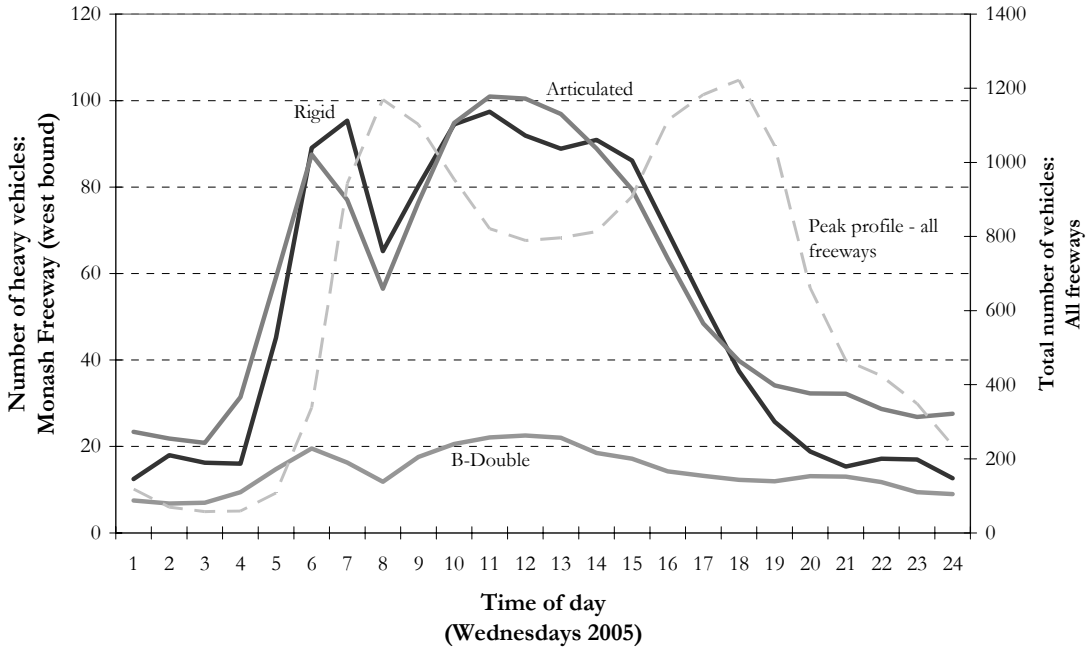
According to a recent analysis of travel data for Melbourne (Morris et al 2001), in 1999 around 21 per cent of all trips in Melbourne during the morning peak period (8.30am to 9am), were trips accompanying children to schools, with an estimated 84 per cent of these made by car. Children being driven to schools, therefore, accounted for about 17 per cent of all trips by all people in Melbourne in the half hour period between 8.30am and 9am (Morris et al 2001). The study also found that around 61 per cent of the chauffeuring trips to and from primary school made by car are linked trips. This means that other activities rather than going home are performed after dropping-off/picking-up children at school (linked afterwards) or before (linked before) or linked before and after (linked at both ends) (Morris et al 2001).

The reasons for the increasing proportion of children being driven to school are unclear. The study by Morris et al (2001) ascribed the trend to a variety of factors such as concerns over traffic safety and personal security, increasing distances between homes and schools attended, and changing lifestyles (including the increasing participation of women in workforce and the changing role of women at home). Whatever, the precise cause, the evidence suggests that travel patterns, particularly school hours and parents' growing preference for driving children, have influenced trends in congestion.

Sources: Morris et al 2001.

- Economic and population growth have contributed to growth in employment, the freight task, and car ownership and usage (chapter 2).
- Trends such as the growth in the freight task and in the number of registered light commercial vehicles have added to the demands placed on the road network (chapter 2). Road transport offers a number of benefits compared to rail in terms of flexibility in destination and scheduling, especially when industries are widely dispersed. Companies have also increasingly adopted the just-in-time business model, reinforcing the high use of road transport. Monitoring of truck movements on sections of Melbourne's road network suggests that many heavy vehicles travel on the major freeways and arterials outside peak periods, when road congestion is less severe (figure 3.10). This data does not, however, account for lighter commercial vehicles that may be performing a significant and growing proportion of the commercial distribution task in Melbourne (chapter 2).

Figure 3.10 **Heavy vehicle movements on the Monash Freeway, 2005 (Wednesday - west bound)**



Source: VicRoads.

3.3.3 Infrastructure issues

The configuration and operation of the road network can also impact on congestion. Input from participants suggests that a number of features of Melbourne's road network may be contributing to congestion in certain locations and at particular times of the day:

- Infrastructure bottlenecks such as the western end of the Eastern Freeway and sections of the freeways and arterial road networks that require traffic to merge.
- Road design issues such as sections of freeways that impede the smooth flow of traffic, for example, the Calder Highway-Tullamarine Freeway interchange,[18] and the weaving sections on some freeways, such as the West Gate Freeway between the Bolte Bridge and Lorimer Street, and on CityLink through the Domain Tunnel onto Monash Freeway.
- Roads that were designed for a purpose different to their current use, such as some outer metropolitan roads in growth areas.
- Level crossings, intersections and roundabouts.

[18] Work is currently underway to increase capacity on this interchange.

- Shared use roads such as arterials that are used by trams and/or buses, or are used for parking at certain times of the day.
- Geography, such as rivers and other land features that can funnel traffic onto particular roads or bridges, such as the West Gate Bridge.
- Coordination of traffic lights.
- Management of access to the highways and freeways.
- The existence of tolled and un-tolled roads which can create additional traffic on some routes as motorists avoid the tolled roads.
- Local government traffic calming measures.
- Prioritisation measures, such as priority bus lanes and high occupancy vehicle lanes.

As noted above, significant congestion is occurring on the Eastern Freeway between Chandler Highway and Hoddle Street during the morning peak. This is occurring because the amount of traffic seeking to exit the freeway is greater than the capacity of the adjoining arterial road network—around Hoddle Street and Alexandra Parade. On some parts of the freeway network, congestion is partly caused by the way the freeway entry and exit points are managed. According to VicRoads, there are opportunities to improve the flow of cars and freight through implementing better freeway controls over lane use, speed and entry (sub. 50, p. 16) (and see chapter 7).

A number of additional factors that are specific to particular locations or time periods may be contributing to congestion. There is growing recognition in Australia and internationally that location and time-specific factors are major contributors to transport congestion.

The Department of Infrastructure highlighted the potential significance of location and time-specific factors in its submission:

> Unpredictable congestion can also arise from non-recurring or unexpected factors, such as collisions, vehicle breakdowns and loss of cargo from trucks causing the closure of lanes. In addition, bad weather can cause flooding or wind damage that causes roads to close or, at the least, causes traffic to slow down. It is difficult to obtain precise estimates of the relative impact of accidents and incidents on road congestion, but information provided by VicRoads suggests that they are significant, contributing to perhaps over 20 per cent of congested conditions. (sub 55, p. 14)

The evidence for the impact of non-recurrent factors on congestion in Victoria is limited. Several overseas studies suggest, however, that the effects can be significant. A recent study in the United States by the Federal Highways and

Works Administration (FHWA 2005) identified several principal causes of congestion that interact with one another, including a number of non-recurring factors:

- physical bottlenecks (capacity)—capacity defined as the maximum amount of traffic that a given road can cope with
- traffic incidents—events that disrupt normal flow of traffic, and would include vehicle crashes, breakdowns and obstacles and debris
- work zones—construction activities on the road or adjacent property
- weather—changes in weather condition that can affect driver behaviour and traffic flow
- traffic control devices—disruption of traffic flow by control devices such as rail crossings and poorly coordinated traffic signals
- special events—demand fluctuations that can cause unusual traffic patterns, involving increases in traffic demand that may exceed the capacity of the system
- fluctuations in normal traffic—daily variability of demand resulting in fluctuations in traffic volumes.

A number of these factors have contributed to congestion in Melbourne.

A combination of physical bottlenecks, traffic incidents and fluctuations in traffic levels are likely to be major contributors to the congestion delays and variability being experienced on Melbourne's freeway system. The freeways serve a vital purpose in Melbourne, primarily as key freight and passenger routes, and as noted above, travel times during morning peak periods can reach two to three times the estimated free-flow speed on occasions on the Monash, West Gate, Tullamarine and Eastern freeways. On all of these links travel times can also be variable.

3.3.4 Public transport capacity

Some inquiry participants considered that overcrowding being experienced on the train and tram systems has resulted from recent strong demand growth which has effectively used up the spare capacity. The Department of Infrastructure (2006c) pointed out that patronage on metropolitan train services had grown by around 50 per cent since the last major addition to the network infrastructure—the underground City Loop—more than 20 years ago. The Department considered that even though some parts of the network are currently underutilised—including the Williamstown, Upfield and Alamein lines—other parts of the network, including several along major growth corridors, are overloaded—including the lines to Dandenong and Sydenham.

It would appear that any congestion being experienced on the metropolitan rail system, is caused by a combination of demand and supply-side factors. As noted above, it has been estimated that around 32 per cent of all weekday trips on Melbourne's rail system occur in the morning peak, and 30 per cent occur in the evening peak, suggesting that the demand patterns are likely to play a key role in explaining passenger crowding.

A number of supply-side factors may also be contributing to congestion on Melbourne's passenger rail services, including:

- service patterns on some tracks, including the number of express versus stopping all stations trains, growth in regional train services on some lines and the operation of the City Loop
- bottlenecks in the track infrastructure such as junctions where train tracks cross or merge, and the number of rail tracks on some train lines
- limitations on operating systems such as the signalling and train control systems
- other infrastructure constraints such as passenger interchange facilities at major stations and the location and number of platforms at stations.

A number of participants tended to emphasise the significance of infrastructure bottlenecks such as limits on the capacity of particular train tracks. These limits include the single track crossing of Merri Creek on the Clifton Hill group, and the double track sections on the Dandenong to Caulfield, Sunshine to Footscray and Blackburn to Box Hill lines. The Committee for Melbourne (sub. 34, p. 23) stated that 'capacity problems are apparent at various locations, including the Dandenong, Sunshine and Ringwood corridors.'

Other people have argued that some of the views about infrastructure capacity constraints are overstated and that problems such as passenger crowding also result from the operation of the metropolitan rail system. The Public Transport Users Association (sub. 65, p. 9), for example, stated that they 'do not believe that the bulk of claims about capacity constraints [on existing rail lines] stand up to closer scrutiny'. Similarly, in a recent report prepared for the Melbourne City Council, Paul Mees (2005, p. 32) from the University of Melbourne concluded that many of the claimed constraints on the capacity of the rail system have not been substantiated. This view was based predominantly on:

- fewer trains currently arriving at Flinders Street station than previously (116 in 1929 compared to 87 in 2005)
- the City Loop being designed to accommodate 181 trains per hour but operating at considerably less than half of its design capacity

- the City Loop not operating in the way that was originally intended, with a mix of services running via the City Loop and Flinders Street station
- the view that no evidence of rail network capacity constraints has been published.

Based on the publicly available information, it is difficult to assess the relative contribution of the various supply-side issues to any congestion on the rail network. The Commission asked DOI to comment on some of the issues raised by participants, and to identify the options for expanding capacity that do not involve major infrastructure extensions.

In response, the Department suggested that a number of operational and infrastructure-related features of the rail network can influence the usable capacity on Melbourne's rail system:

- Operating patterns—the metropolitan rail system in Melbourne caters for a mix of customer requirements. To meet these requirements a mix of expresses (including VLine services), semi-expresses and all station stopping trains are operated on the system. The need to operate this mixed operating pattern to suit customer requirements is the single largest contributor for capacity constraint on the middle and outer metropolitan system. An express train can take up between two to four train paths, depending on the particular line.
- System reliability—the greater the mix of operating patterns and utilisation of the capacity, the more difficult it is to maintain reliability. The on-time performance of the trains can be sacrificed for greater train throughput. However, every customer survey indicates that customer preference for reliability is paramount.
- Junctions—the presence of flat junctions reduces the throughput capacity of a line since trains have to merge/diverge and sufficient spacing between services must be maintained for safety reasons. There are several junctions on the metropolitan system such as at Caulfield, Jolimont, Sunshine and North Melbourne.
- Single lines—such as on the Cranbourne and Clifton Hill groups, impose constraints on the capacity of a line and the overall system since one track has to allow for services in both directions (DOI 2006b).

This suggests that any congestion on the metropolitan rail network is related to a combination of operational and infrastructure-related aspects of the system. Reflecting this, the Department (DOI 2006c) also listed a number of approaches to increasing the capacity of the rail network that involve changes in operational

practices and infrastructure investment, or a combination of both. These are broadly consistent with Linking Melbourne: *Metropolitan transport plan* (Government of Victoria 2004a). The options for addressing rail network capacity are explored in more detail in chapter 7.

3.4 Implications

While the costs of congestion are significant and likely to grow, addressing the problem will involve making some difficult trade-offs. Reducing congestion can deliver benefits in terms of reduced delays, improved reliability of travel times, and lower environmental and social costs. However, addressing the underlying causes of congestion involves a number of costs. As discussed in later chapters, these costs can be quite significant. It is important that they reflect an understanding of the likely impact on the causes of congestion and the potential benefits.

4 Regulatory and institutional framework

Chapter 3 notes that congestion is typically defined as a situation where demand for the use of a road becomes excessive. It results from a complex mix of social and economic influences:

- population and economic growth, and urban sprawl increase transport demand
- changes in the manufacture and distribution of goods
- social changes in work patterns, education and leisure also affect transport demand
- price signals are not linked to the cost of using congested roads so that price does not constrain demand
- unexpected incidents, like accidents and road works, temporarily increase congestion and create variable travel times.

In most industries demand and supply are balanced by adjustments in the market. When higher prices indicate shortages, producers increase supply and consumers reduce their demand, moving demand and supply into balance. In the transport sector, the forces that balance demand and supply are constrained. Some of these constraints are characteristics of the sector; others result from institutional arrangements and regulation. For example, government decisions on land use affect the demand for transport services. The State Government is also responsible for funding road and public transport infrastructure to meet that demand. If these decisions are not coordinated and far-sighted, a mismatch can occur. The congestion that results may be exacerbated when transport users do not get clear price signals that reflect the costs of using different transport services.

The regulatory and institutional framework that has been established to balance the trade-offs, including those normally delivered by the market, is complex. The Commission has found it difficult to identify all the relevant parts of the framework and determine how they fit. The framework incorporates agencies (including privately operated transport organisations with a contractual relationship with government) and regulation at all levels of government that affect policy development and implementation, regulation, oversight and performance assessment, and management operation and use of the transport system. The framework is characterised by:

- the interrelationship between congestion and other transport issues. Congestion is one of the consequences of transport use and can be increased or decreased by government actions targeting transport. Few parts of the institutional framework focus solely on congestion, but many affect the demand and supply of transport services and affect congestion

- complex interactions among all levels of government, state agencies and public and private service providers, who can affect congestion and the success of congestion reduction policies
- policies and processes that trade-off different objectives, simultaneously dealing with economic and social issues in a complex market (chapter 3)
- complicated regulation, encompassing many Acts and regulatory instruments and a complex division of responsibilities between numerous organisations
- long time frames between policy development, project implementation and the ability to test whether the policy is meeting its objectives
- different arrangements, and different incentives, facing the providers of each transport service mode.

While some aspects of the regulatory framework appear to be working well, participants, international experience and the research of the Commission indicate that there are areas that could be improved. This chapter focuses on Victorian and local governments, where the Victorian Government can most readily implement change. Commonwealth Government arrangements are outlined briefly, as they affect the national environment in which Victoria implements its policies.

The chapter presents an overview of the regulatory environment and then discusses:

- overarching policies and objectives that relate to transport congestion
- the institutional framework for transport at the Commonwealth, State and Local Government levels
- the framework for developing policies, setting priorities and managing infrastructure and service delivery for roads and public transport
- integrating transport issues with other areas of policy and regulation.

Chapter 9 discusses opportunities to improve the institutional framework consistent with principles of good regulation.

4.1 Overarching government policies and objectives

4.1.1 Overarching government policies

Reducing congestion has been given increasing attention in Victoria. The Government released a series of policies that prioritised diverting freight and passengers from road to other modes, managing Melbourne's growing demand for transport and maintaining mobility. These policies are discussed in chapter 1. They include:

- *Growing Victoria Together* (2001)—which highlighted 'growing and linking all of Victoria' (Government of Victoria 2001, p. 16), and included goals to increase rail's share of freight destined for ports and the use of public transport.
- *Melbourne 2030* (2002)—announced an action plan for sustainably managing Melbourne's population growth, which proposed integrating 'land use and transport policies around activity centres, to create a balanced and workable city' (DOI 2002a, p. iv).
- *Linking Victoria* (ALP Victorian Branch 2002)—an election commitment pledging additional funding for integrating Victoria's roads, rail, public transport and ports.
- *Victoria Leading the Way* (2004)—an economic statement that emphasised improving the competitiveness of freight transport and port access (Government of Victoria 2004b, pp. 6, 9).
- *Linking Melbourne: Metropolitan transport plan*—intended to provide 'a comprehensive and integrated transport plan for Melbourne' (Government of Victoria 2004a, p. ii).

4.1.2 Legislative objectives

The government's congestion policy priorities need to be supported by clear legislative objectives. If the legislation covering organisations charged with delivering the government's priorities does not reinforce the government's policy goals, it can undermine the incentives for agencies to deliver on those goals. This is true for most transport policy areas, but particularly important for congestion where the legislation needs to support a coordinated approach across many agencies if congestion is to be addressed effectively.

The *Transport Act 1983* (Vic.) is the principal Act relevant to transport congestion management. It sets overarching transport policy for the Department of Infrastructure (DOI), establishes transport services' institutional framework and provides for VicRoads' establishment and sets its objects and functions.

When the Transport Act was passed it repealed or amended a considerable number of existing Acts in addition to a multitude of regulations, by-laws and statutory instruments. It coordinated much of the regulation of land transport within one statute. Since 1983, the Act has been substantially amended and new legislation passed, reflecting changing government transport policies.

In addition, contrary to what is currently considered best practice, the Transport Act does not include a statement of the purpose or objects for the Act to guide interpretation and decision making. As noted below, it includes objectives for DOI, but the extent to which these apply to other agencies, such as VicRoads, is unclear.

The *Victorian Guide to Regulation* notes that:

> Unless the policy goals are clearly specified, identification of the appropriate alternative means of achieving them will be compromised. Clear objectives also enable more effective monitoring to assess the success of the regulation in achieving its stated aim. (DTF 2005, pp. 3-4–3-5)

Notwithstanding the absence of express objects for the Transport Act, this Act and other Acts state the legislative objectives and functions for the key government agencies involved in transport policy development and service delivery:

- DOI (Transport Act—objectives s.4(1) functions s.4(2))
- VicRoads (Transport Act—objectives and functions (s.16))
- local government road authorities (*Road Management Act 2004* (Vic.)—road management objectives s.20(1) and functions s.34)
- VicTrack (*Rail Corporations Act 1996* (Vic.)—objectives s.10)

While none of these objectives explicitly lists congestion, they all require agencies to ensure or improve the efficiency and effectiveness of transport facilities.

4.2 Summary of institutional arrangements

All governments set policies and undertake activities that affect transport. The City of Melbourne's description of each government's role (box 4.1) illustrates the diversity of policies and agencies.

The Commission has identified 16 Victorian public and private entities with transport responsibilities that could affect the development and implementation of congestion policy (not including individual local governments, the 24 bus operators and the airport operators). The roles of these agencies are summarised in table 4.1.

BOX 4.1 Government roles and responsibilities

Local government

Responsible for local planning, including developing municipal strategic statements and local planning policies, which set the strategic direction of local planning schemes. Planning can have transport specific effects, such as off-street parking in private developments.

Manages and maintains local roads and parking regulation on arterial roads. Responsible for part funding of some items approved by VicRoads (some pedestrian crossings, for example).

Controls pedestrian movement and amenity, bicycle movement, parking on all roads, vehicular traffic management on non-declared roads, local area traffic management, taxi ranks, bus parking bays and loading zones.

State government

Overriding responsibility for land use and regional planning and environmental policy (the Victorian Greenhouse Strategy, for example). Sets the State Planning Policy Framework, which limits local planning policies. The state can, in exceptional situations, intervene in local planning amendments.

Responsible for the metropolitan transport framework and other initiatives that can affect transport delivery, such as public transport privatisation. Manages arterial roads, freeways and ports, provides some road funding, and regulates transport, taxis and transport of hazardous materials. Approves, through VicRoads, traffic control items, such as pedestrian crossings. Accountable for state transport agencies, such as VicRoads, the Southern Cross Station Authority and the Port of Melbourne Authority.

Commonwealth government

Promotes and coordinates national transport infrastructure, with responsibility for taxation and some funding, for example local government grants and AusLink expenditure.

Responsible for consistency in the regulatory framework for road and rail safety, and environmental responsibility. Monitors and influences new technology, such as Intelligent Transport Systems, and establishes strategies to achieve national greenhouse objectives.

Source: City of Melbourne undated B, pp. 47–9.

Table 4.1 **Victorian transport organisations**

Responsible agency	*Area of responsibility*	*Powers and tools*
Victorian Government	Sets high level planning and transport objectives and priorities and approves funding	Releases public policies like *Growing Victoria Together*, *Melbourne 2030* and *Linking Melbourne: Metropolitan transport plan* (2004a) Provides funding approval through budget process
Roads		
Department of Infrastructure	Improves the efficiency and effectiveness of transport facilities, ensures adequate public transport system, funds private operators and undertakes integrated transport planning	*Transport Act 1983* (Vic.)
VicRoads	Manages Victoria's freeways and arterial road network, implements road safety strategies and provides vehicle registration and driver licensing services	*Transport Act 1983* (Vic.) *Road Management Act 2004* (Vic.) *Road Safety Act 1986* (Vic.)
Local Government	Manages local roads and traffic and exercises some functions over arterial roads	*Road Management Act 2004* (Vic.) *Local Government Act 1989* (Vic.)
The Southern and Eastern Integrated Transport Authority (SEITA)	SEITA was established to oversee the construction and delivery of the EastLink project	*Mitcham–Frankston Project Act 2004* (Vic.)
Tollway operators	Manages privately funded road projects	*Melbourne City Link Act 1995* (Vic.) *Mitcham–Frankston Project Act 2004* (Vic.)
Public transport		
DOI and Director of Public Transport	Enters into agreements with public transport operators. Accredits operators of bus, rail and tram services Leases track and rolling stock from VicTrack	*Rail Corporations Act 1996* (Vic.) *Public Transport Competition Act 1995* (Vic.)
Southern Cross Station Authority	Constructs Southern Cross station	*Rail Corporations Act 1996* (Vic.)
Metlink	Provides network-wide customer information about services, tickets and fares	Contract with government

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Table 4.1 **Victorian transport organisations** (continued)

Onelink	Operates ticket system	Contract with government
VicTrack	Owns all Victorian rail and tram fixed infrastructure and most rolling stock	*Rail Corporations Act 1996* (Vic.)
V/Line	Operates regional rail and coach services	*Rail Corporations Act 1996* (Vic.)
Connex	Manages operation of train services and maintenance of rail lines	Agreement with Director of Public Transport
Yarra Trams	Manages operation of tram services and maintenance of tramlines	Agreement with Director of Public Transport
Bus Operators	Manage operation of bus services	*Public Transport Competition Act 1995* (Vic.)
VicRoads	Implements policies to improve road based public transport	*Transport Act 1983* (Vic.)
Other transport infrastructure		
Port of Melbourne Corporation	Strategic port manager for the Port of Melbourne, with functions and powers to undertake integrated management and development of the land and water side of the port	*Port Services Act 1995* (Vic.)
Melbourne Airport	Australia Pacific Airports Corporation Limited operates Melbourne airport	*Airports Act 1996* (Cwlth) Lease from Cwlth Government
Avalon, Essendon, etc airports	Linfox, Linfox–Becton, etc operate other airports	
Land use planning		
Department of Sustainability and the Environment	Responsible for the framework and practice of planning, oversees local government operation of the planning scheme	*Planning and Environment Act 1987* (Vic.)
Local Government	Prepares and administers planning schemes, processes planning applications	*Local Government Act 1989* (Vic.)
VicRoads	A referral authority for planning applications	Victorian Planning Provisions

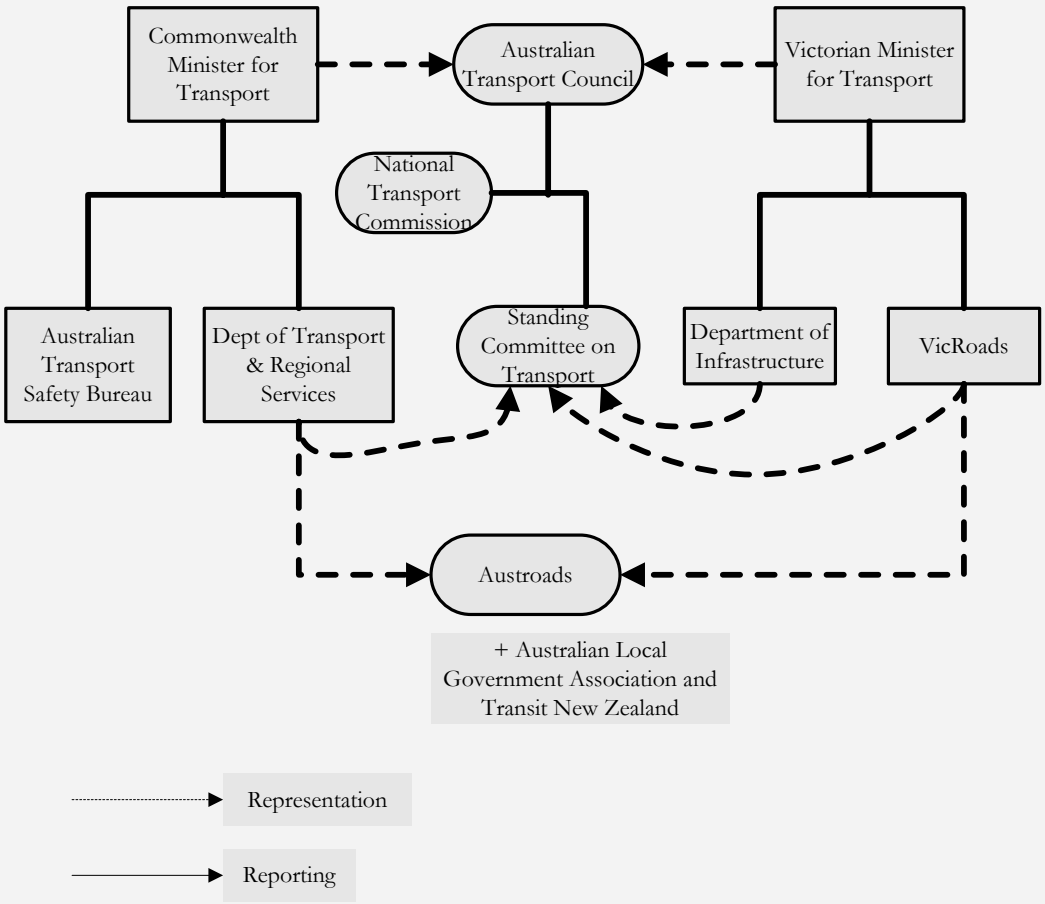
Table 4.1 illustrates the number and diversity of entities involved in transport provision and related activities at the state level, and the need for coordination to prevent overlap and gaps, given the complexity of the institutional arrangements. This complexity is compounded by the inter-relationships between government agencies, such as DOI, and the private sector. In addition, the activities of Victorian agencies are affected by national priority setting and Commonwealth funding of transport services (box 4.2).

BOX 4.2 National institutions and processes

Building, maintaining and operating roads and railways is a State responsibility. This does not mean national processes are irrelevant or insignificant. All Australian jurisdictions, and in some cases New Zealand, support and participate in national bodies to improve the coordination and consistency of planning, regulation and management of transport infrastructure and services.

The Commonwealth Government has considerable influence over transport policy and national processes through its provision of funding and its laws on taxation, excise and other matters. It takes a significant role in the development of national transport networks.

Commonwealth–State relationships



The Australian Transport Council (ATC) is the overarching national transport body, comprising Commonwealth, State, Territory and New Zealand Ministers responsible for transport, rail, roads, marine and ports issues.

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Box 4.2 **National institutions and processes** (continued)

The Standing Committee on Transport is a senior officials group that supports and advises the ATC. Its sub-committees include Austroads, the Public Transport Group, the Rail Group and the Maritime Group. Austroads is an association of Australian and New Zealand road transport and traffic authorities that improve transport outcomes through research, improving road agencies' practices and facilitating cooperation among road agencies.

The National Transport Commission (NTC) and its predecessor the National Road Transport Commission encourage nationally consistent transport policies and laws. In 2004 its focus was broadened to include rail and intermodal transport.

All these bodies recognise congestion issues. Ministers highlighted congestion as a national priority when they agreed to establish an inter-jurisdictional working group with urban congestion management as a key issue (ATC 2004). Travel demand management is also a strategic priority for Austroads (Austroads 2004a, p. 7) and congestion is recognised in the NTC strategic plan (NTC Australia undated, p. 7).

The House of Representatives Standing Committee on Environment and Heritage report, *Sustainable Cities* (2005), identified traffic congestion, water shortages and high energy demand as key concerns in creating sustainable cities and called for coordinated and concerted Commonwealth Government action. It recommended a significant boost in funding for public transport, reviews of current fringe benefits tax concessions for car use and tariff concessions for four-wheel drive vehicles with a view to reducing their use, and additional funding to promote and facilitate public and active transport options. It also noted that a congestion tax, as introduced in London, may be an option in Australia and that road pricing needs to be considered.

The Council of Australian Governments also considers transport issues from time to time. At its meeting in February 2006, it agreed to improve the efficiency, adequacy and safety of Australia's transport infrastructure by committing to high priority national transport market reforms. These include the reduction of current and projected urban transport congestion, within current jurisdictional responsibilities, informed by a review into the main causes, trends, impacts and options for managing congestion focusing on national freight corridors.

Sources: ATC 2004; Austroads 2004a; House of Representatives Standing Committee on Environment and Heritage 2005; and NTC Australia undated.

4.3 Road planning and management

Given that most congestion is road based, planning and management of the road system can have significant impacts on congestion and the success of congestion reduction policies. Congestion problems in one part of the road network may have a congestion impact elsewhere. The integration and coordination across road agencies is therefore very important. A number of agencies are involved in these processes in Victoria: a simplified matrix of these agencies and their responsibilities related to road transport is shown in table 4.2.

Table 4.2 **Agencies and responsibilities related to road transport**

	Department of Sustainability and Environment	*Environment Victoria*	*Department of Infrastructure*	*VicRoads*	*Local Government*	*Private operators*	*Transport Accident Commission*	*Victoria Police*
Land use planning			As VicUrban					
Vehicle noise and emissions, drainage from roads				Operational	Operational			
Manage public transport franchises								
Road and traffic management			SEITA	Arterial roads and CityLink	Local roads	CityLink and EastLink		
License drivers								
Register vehicles								
Regulate heavy vehicles				Safety, protect infrastructure, efficiency				
Manage Ports								
Manage inter-modal facilities								
Operate services								
Road safety								

Source: VicRoads, sub 50, p. 13.

The following discussion looks at:

- the allocation of responsibility among road management agencies, which influences whether the outcomes of plans and priorities are achieved
- the agencies responsible and the processes used for road planning and priority setting, which affect the priority given to congestion issues and the effectiveness of the framework for implementing congestion strategies

- funding, which determines whether processes for allocating money are conducive to implementing identified priorities and facilitates a broad consideration of policy options for addressing congestions

4.3.1 Road management

Road management responsibilities are divided by type of road. VicRoads has responsibility for freeways and arterial roads, local government has responsibility for local roads and parts of arterial roads not available to through traffic. This includes service lanes, footpaths, nature strips, roadside areas and indented car parking. Private companies manage toll roads.

The Crown owns freeways, arterial roads and other State roads (*Road Management* Act 2004 (Vic.) cl 1 of Schedule 5). Local governments own other roads within their municipal district. Private operators own the tollways with an agreement to transfer ownership back to the State at the end of the concession period for that road.

State and municipal roads

The Road Management Act establishes the statutory framework for managing Victoria's roads. Its objective is 'to establish a coordinated management system that will promote safe and efficient road networks at State and local levels and the responsible use of road reserves for other legitimate purposes' (s.4).

State and municipal roads are classified as:

- *arterial roads*—principal routes for the transport of people or goods, major routes for public transport services or roads with State-wide economic or tourism significance (criteria in s.14(1), (2) and (3))
- *freeways*—generally considered to be divided arterial roads with fully controlled access
- *municipal roads*—local roads
- *non-arterial State roads*—managed by agencies such as Parks Victoria and the Department of Sustainability and Environment.[1]

VicRoads decides (after consultation) on which roads should be declared an arterial road or freeway. Before declaring a road, VicRoads must notify relevant local councils, road authorities and infrastructure managers (such as power companies) with infrastructure in, on, under or over the road and consider any submissions from them.

[1] As these roads are outside the Commission's terms of reference (because they are located outside the main cities of Melbourne, Geelong, Ballarat and Bendigo) they are not discussed further.

A local council or road authority may appeal VicRoads' declaration to the Minister within 21 days of receiving notification of the declaration (s.14(7)). An infrastructure manager (or any other person affected by the declaration) has no right to appeal. VicRoads is responsible for managing a road once it is declared as an arterial road or freeway.

Sections 36 and 37 provide which road authorities are coordinating road authorities and which are responsible road authorities. A summary of these provisions is set out in table 4.3.

Table 4.3 **Road authorities and owners for state roads**

Road type	*Coordinating road authority*	*Responsible road authority*
Freeway	VicRoads	VicRoads
Arterial Roads (urban)	VicRoads	VicRoads (lanes for through traffic) Municipal council (parts of the road other than for 'through traffic')
Arterial Roads (non urban)	VicRoads	VicRoads
Municipal roads	Local council	Local council

Source: Road Management Act

Road authorities provide and maintain the roads for which they are responsible, manage road use and traffic, and undertake works and activities (s.34(1)). They have a duty to construct, inspect, repair and maintain roads (ss.40, 41) to the standard specified in their road management plan for that road, or class of roads, or if there is no specified standard, to a reasonable level (s.40(1)).

Coordinating road authorities coordinate the development and use of the road reserves generally (s.38(2)(d)). Anyone carrying out works on a road needs the approval of the coordinating authority.

In addition to its obligations as a coordinating and responsible road authority, VicRoads sets speed limits and, under the Road Safety Act 1986, its functions include vehicle registration, driver licensing and traffic control. The Road Safety Act's purpose is broader than traffic congestion (it includes safety, crime prevention and improving the administration of vehicle registration and driver licensing). Some aspects, however, such as powers to erect or remove traffic control items (speed-limit sign or a school zone sign, for example) and setting road rules, may affect congestion. To erect and remove a traffic control item on a local road VicRoads must consult with the relevant council (Reg 303(3)). If the council disagrees, VicRoads must publish its proposal in a statewide daily

newspaper and invite comments. After considering comments, VicRoads must publish its decision.

Local Government also has road traffic management responsibilities outside its role as a coordinating or responsible road authority. Under the Road Safety (Road Rules) Regulations 1999 a council may erect or remove a minor traffic control item. It may erect or remove a major traffic control item (including speed limit and stop signs) on a local road with VicRoads' consent, and in compliance with VicRoads' conditions.

The *Local Government Act 1989* (Vic.) complements the Road Management Act by giving councils powers to manage roads within their municipality—apart from freeways and the through lanes of arterial roads (s.206). Councils' powers over local roads are constrained by the need to obtain VicRoads' consent to implement policies where VicRoads has road or traffic management responsibility; at intersections between local and arterial roads. Subject to this constraint, councils can construct and maintain roads, deviate, discontinue and name roads, erect signs and narrow or widen roads (Schedule 10). They can also fix, rescind or vary parking times and fees, restrict traffic entry to roads or the use of roads by certain size vehicles, determine speed limits and prohibit traffic on unsafe roads (Schedule 11).

The Code of Practice made under the Road Management Act, *Operational responsibility for public roads,* states that councils, although not responsible for through lanes of arterial roads, are responsible for other parts, including indented parking bays and the road markings and parking signs. The code notes that VicRoads is responsible for any part of a roadway located 'kerb to kerb'—that is the roadway without indentation—that could be made available for through traffic, including areas of the roadway used for parking. VicRoads is not responsible for isolated parking areas of lengths less than 200 metres located on arterial roads between kerb outstands and trees on the road.

Decision making processes between VicRoads and local government are illustrated in box 4.3.

BOX 4.3 **Case study: traffic management on local roads**

Jika Street and Dora Street Heidelberg provide an alternative route for traffic bypassing the congested intersection at Lower Heidelberg Road and Banksia Street. Each week day they carry an average of 18 000 vehicles including around 4700 trucks, many of which are on their way to the Metropolitan Ring Road. Local residents told the Banyule Council that they were concerned about the speed, volume and noise of the traffic, particularly trucks at night. Residents' concerns included loss of amenity, danger to pedestrians and rear end accidents with vehicles turning into abutting properties.

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Box 4.3 **Case study: traffic management on local roads** (continued)

Jika Street and Dora Street Heidelberg provide an alternative route for traffic bypassing the congested intersection at Lower Heidelberg Road and Banksia Street. Each week day they carry an average of 18 000 vehicles including around 4700 trucks, many of which are on their way to the Metropolitan Ring Road. Local residents told the Banyule Council that they were concerned about the speed, volume and noise of the traffic, particularly trucks at night. Residents' concerns included loss of amenity, danger to pedestrians and rear end accidents with vehicles turning into abutting properties.

Jika Street and Dora Street are classified as local roads, which generally come under Banyule Council's responsibility. Lower Heidelberg Road and Banksia Street are arterial roads, which are VicRoads' responsibility. Installation and management of traffic control items, such as traffic signals, are regulated under the Road Safety (Road Rules) Regulations 1999.

Following consultation with Jika Street and Dora Street residents, Banyule Council concluded that remedial action was necessary and several options were considered. Banyule Council's preferred option took account of some of the needs of local residents while preserving the operation of the area's road network. One element of the proposal was the introduction of a curfew prohibiting truck traffic along the Dora Street/Jika Street link at night. The truck curfew could be implemented by the Banyule Council but required VicRoads' written consent (in accordance with regulation 306(a) of the Road Safety (Road Rules) Regulations 1999).

Banyule Council officers commenced discussions with VicRoads on the traffic management proposal on 2 December 2003 and requested approval for the truck curfew on 21 January 2004. On 3 March 2004, VicRoads responded to the council's request, advising that it had no objections in principle and requesting further information to enable it to consider the matter. The council's submission was sent to VicRoads in April 2004. After further discussions between council and VicRoads officers, a formal submission, which satisfied VicRoads' requirements, was lodged in September 2004.

VicRoads referred the formal submission to the Truck Operations Committee (an advisory body convened by VicRoads) in late 2004. On 21 February 2005, Council officers gave a presentation to the committee to support their submission. The committee supported the truck curfew and on 17 October 2005 VicRoads consented to installing the truck curfew signs. The curfew was to operate daily from 8.00 pm to 6.00 am. The committee did not consent to a curfew from 8.00 pm to 8.00 am as requested by Banyule Council, but council officers accepted the decision, rather than referring a dispute for resolution under the procedures in s.125 of the Road Management Act. Banyule Council introduced the curfew in late October 2005 and it appears to have successfully eliminated truck traffic at night.

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BOX 4.3 Case study: traffic management on local roads (continued)

Another element of the traffic management proposal was to discourage some traffic from using the Dora Street/Jika Street link by changing traffic signal configurations on an adjoining arterial road (Banksia Street). This was to allow fewer vehicles to turn right from Banksia Street into the Dora Street/Jika Street link and allow more vehicles to turn right from Banksia Street into Lower Heidelberg Road. Under regulation 303 of the Road Safety (Road Rules) Regulations, VicRoads has power over traffic signals on arterial roads and Banyule Council requested VicRoads to consider changing the traffic signal configurations on 21 January 2004, as part of the traffic management proposal. Some modifications were made to the traffic signals as part of the curfew to allow more 'green time' for those (particularly trucks) turning right during the curfew from Banksia Street into Lower Heidelberg Road.

Source: Banyule Council, pers. comm., February 2006.

Finally, utilities using and working in areas in, on, under or over roads can affect congestion, depending on the infrastructure's location and the management of maintenance and emergencies. Before a person conducts such works, they must obtain the consent of the coordinating road authority (s. 63(1)), unless exempt under the Road Management (Works and Infrastructure) Regulations 2005. A Code of Practice also governs the installation, maintenance and operation of utility and road infrastructure in road reserves.

Coordination between State and municipal roads

Despite a detailed legislative framework that tries to define the roles and responsibilities of VicRoads and local councils and a legislative obligation for road authorities to act cooperatively (s.38(2)(b)), there are tensions among agencies' roles. Tensions can arise where agencies' responsibilities meet, including where:

- local roads intersect with arterial roads or freeways
- VicRoads' responsibility for through traffic on arterial roads meets local council's responsibility for parts of the road not used by through traffic
- policies implemented on one part of the network change traffic flows and affect other parts of the network.

By their nature, the processes to deal with these tensions are complex and time consuming. Where local roads intersect with arterial roads, for example, a proposal by a council to address local road congestion involves extensive consultation and the council may need VicRoads' consent to implement its preferred solution. This process is illustrated in the example in box 4.3.

The Government has implemented several approaches to improve coordination and clarify responsibilities among road authorities and works and infrastructure managers. First, the Road Management Act allows the Minister for Transport to

provide practical guidance to road authorities, and works and infrastructure managers by making Codes of Practice (s.28). Five codes have been developed in accordance with the Act's consultative process. These codes are outlined in appendix D. They cover:

- operating responsibility for public roads—the allocation of responsibility among road authorities for parts of the road reserve
- clearways on declared arterial roads—VicRoads' processes for establishing, managing and consulting on clearways on arterial roads
- road management plans—the content of and processes for road management plans, a voluntary plan prepared by a responsible road authority to set standards for inspection, maintenance and repair of roads
- management of utility and road infrastructure on road reserves—planning and managing the installation, maintenance and operation of road and non-road infrastructure in road reserves, including consultation and dispute resolution processes
- worksite safety: traffic management—safe conduct of road works in Victoria.

A code of practice is also being developed for the management of roads with tramlines and rail crossings (Van Every 2005, p. 11).

Secondly, there are areas where VicRoads' powers are extended into municipal roads to enable it to fulfil its obligations to manage arterial roads and freeways, or because it has broader powers under other legislation, such as the Road Safety Act. VicRoads may perform any road management function under the Act on any road—irrespective of whether it is the responsible road authority—to facilitate road safety and traffic management for access to or from a freeway or arterial road. Before doing so, it must consult the relevant responsible road authority (s.119), but the final decision rests with VicRoads. As a result, the Code of Practice for operational responsibility for public roads clearly states that VicRoads is responsible for managing infrastructure and signage at intersections between local and arterial roads or freeways, even if those works are located on the local road section of the intersection

In some cases, such as the erection of traffic lights on local and arterial roads within a municipal district, councils must obtain the written consent of VicRoads and VicRoads can, by refusing consent, overrule councils' wishes (Road Safety (Road Rules) Reg 304) (box 4.4). But for many management issues on local roads, councils can make decisions independent of VicRoads.

BOX 4.4 Hypothetical: installation of traffic lights

A municipal council forms the view that, because of the number of older people in its district, more traffic lights should be installed on arterial and local roads and the lights should change less quickly so older people have more time to cross the roads. It approaches VicRoads.

VicRoads is responsible for erecting traffic lights on arterial roads (Road Safety (Road Rules) Reg 303). It considers the council's request having regard to the Road Management Act, including the 'principal object of road management' (to ensure a safe and efficient network of roads s.20(1)), and informs the council that its inquiries indicate that additional traffic lights would significantly increase congestion on the arterial roads. It refuses to install the lights and no further action is taken.

The council is responsible for traffic lights on municipal roads (unless the lights are linked into VicRoads coordinated traffic signals system), but VicRoads must consent to their installation or removal (Road Safety (Road Rules) Reg 306). If VicRoads concluded that installation of additional lights on the municipal road would create unacceptable congestion, it may withhold consent. If, after discussions conducted in good faith with VicRoads, the council remained of the view that the traffic lights are needed, it could seek to have the dispute with VicRoads resolved by the Minister for Transport and the Minister for Local Government, or their nominees, in accordance with the dispute resolution procedures in s.125 of the Road Management Act. Nonetheless, such referrals are understood to be rare.

Giving VicRoads responsibility for parking along arterial roads, when the space used for parking could potentially be used for through traffic, also allows it to decide the allocation of arterial roads space among parking, general traffic and priority traffic (for example, bus only lanes).

Thirdly, consultation among agencies is important for improving coordination. There are explicit requirements to consult in particular cases; for example, clearways created by VicRoads. VicRoads must consult with any affected councils according to procedures in the *Code of Practice for clearways on declared arterial roads*. The code provides the following steps for creating or amending a clearway:

- VicRoads considers matters, such as traffic congestion and local economic and social activity in the vicinity of the proposed clearway.
- VicRoads notifies and consults with those likely to be affected, including another road authority, such as the local council, or a provider of public transport, such as Yarra Trams. It must consider all submissions it receives and there are no time limits set for consultation.
- VicRoads makes its decision and notifies the council and others affected by the decision of the reasons for the decision. If the council is aggrieved by the decision, it may notify the Minister for Local Government.
- If aggrieved by the decision, the affected parties may also seek to resolve the matter through the dispute resolution processes in s.125 of the Act.

- VicRoads notifies the Minister for Transport of its decision and recommends that the Minister seek comment from the Minister for Local Government.
- The Minister for Transport can endorse or modify VicRoads' decision to create or amend a clearway.

Finally, dispute resolution and appeals processes can help overcome disputes when they occur and provide incentives for effective negotiation and consultation because of the discipline imposed by an independent review of these processes. Disputes among road authorities, utilities and public transport providers are resolved by the relevant ministers (or their nominees) according to s.125 of the Road Management Act. While this section does not specify a dispute resolution procedure, it means that disputes between VicRoads and a local council, which cannot be resolved by negotiation, may be resolved by the Ministers for Transport and Local Government or their nominees.

For most interested parties, formal dispute resolution or appeals processes are limited,[2] although there are some rights of appeal in specific circumstances, such as declaring controlled access roads (box 4.5).

BOX 4.5 Appeal processes for controlled access roads

A coordinating road authority may declare a public road under its responsibility to be a controlled access road (allowing it to restrict entry and exit to the road) and develop policies on access conditions between that road and adjacent land (Road Management Act s.42). If VicRoads is the coordinating road authority, it must consult with municipal councils affected by the declaration and give them a reasonable opportunity to submit their views (Schedule 2, cl.4).

The coordinating road authority must publish the proposed declaration in the Government Gazette and a local newspaper, advising that affected people may apply for the Victorian Civil and Administrative Tribunal to review the decision and may be entitled to compensation (Schedule 2, cl.5).

Source: Road Management Act.

Overall, engaging the community and informing them about road management processes can be further complicated by conflicting state and local priorities and the usual challenges in achieving effective community consultation. Different local government objectives under the Local Government Act and transport legislation could be an issue. When councils exercise their powers under the Local Government Act to enforce parking restrictions on arterial roads they are not acting as a 'road authority'. They are not required to have regard to wider

[2] Except for the standard rights to appeal under administration law.

interests identified in the Road Management Act, such as providing a safe and efficient network of roads primarily for travel and transport and may give higher weighting to the interests of the local community.[3]

In addition, the Road Management Act gives the Minister for Transport power to direct VicRoads and the Local Government Minister power to direct local government to undertake functions in the public interest (consistent with the Act) (s.22). Again, final decision making rests with different parties that potentially have slightly different priorities and this can add to the risk of uncoordinated responses by road authorities.

Generally, informing the community of road management processes, and who is responsible for those processes, can be difficult. Road authorities must consult with the community and disseminate information on their functions (s.34(3)(a)), but it is often difficult to engage members of the community even if their interests are being affected.

Performance monitoring

VicRoads' performance reporting framework appears to include some duplication. DOI and the Minister for Transport each have the power to set and monitor quantitative targets for VicRoads (box 4.6). The risk of setting conflicting targets is avoided in practice by consultation between VicRoads, DOI and the Minister.

BOX 4.6 VicRoads performance reporting

DOI coordinates transport services and develops strategic plans and resource budgets for itself and VicRoads. It also establishes quantitative targets to be attained by VicRoads (Transport Act s.4(2)). The Minister may also determine quantitative targets for VicRoads and a copy of the targets must be laid before both houses of Parliament (s.58). VicRoads can be directed by the Minister and must publish any ministerial direction in the *Victorian Government Gazette* (s.31).

VicRoads prepares an annual report for the Minister to present to Parliament. The report summarises VicRoads' statutory and government policy obligations and the performance measures used to determine how effectively it has met those objectives. Although 'congestion' is not a performance measure, it reports on traffic delays, variability of travel time and travel speed.

Councils' functions under the Local Government Act and the Road Management Act must be performed 'for the peace, order and good government of their municipal districts' (Local Government Act s.3A). The objective of good government is reinforced by the obligation to comply with 'Best Value

[3] Nonetheless, the role of a council includes 'acting as a responsible partner in government by taking into account the needs of other communities': s.3D(e) Local Government Act 1989.

Principles'. These principles require all council services to meet quality and cost standards and respond to the needs of their local community (Local Government Act s.208B). Councils report against these principles to the Best Value Commission, which then reports performance to the Minister for Local Government. Each council's best value report is available on the Internet, but the information is not compiled across councils.

Toll roads

Transurban has an exclusive right to operate and toll the CityLink tollway until 2034, when ownership then transfers to the State. The Concession Deed, the contract signed between Transurban and the Victorian Government, sets a process for agreeing on construction and maintenance standards and reporting and monitoring against those standards. The deed determines the formula for calculating tolls and requires quarterly reports of traffic figures. In June 2004, responsibility for overseeing CityLink was transferred to VicRoads.

In October 2004 the Government signed a Concession Deed with ConnectEast for the Mitcham–Frankston Freeway (known as the EastLink Project). ConnectEast will design and construct the freeway and then have an exclusive right to operate it until 2043. As with CityLink, the Concession Deed for the EastLink project sets a process for agreeing on construction and maintenance standards, formulae for calculating tolls and obligations to report traffic figures. The Southern and Eastern Integrated Transport Authority (SEITA) manages this project on behalf of the Government (box 4.7).

Box 4.7 Southern and Eastern Integrated Transport Authority

SEITA is established by the *Southern and Eastern Integrated Authority Act 2003* (Vic.) and is accountable to the Minister for Transport. It oversees and facilitates, on behalf of the State, delivery of the EastLink Project. Its roles included recommending a preferred bidder for EastLink and ensuring all land was acquired and contracts with the successful bidder finalised.

SEITA provides community information and invites inquiries through its website. It consulted with local councils throughout the bidding process and has established a Community Advisory Group, with an independent chair and 10 councillor members who provide community feedback on the project.

Source: Southern and Eastern Integrated Transport Authority website www.seita.com.au.

The objectives of the CityLink project (*Agreement for the Melbourne City Link Act 107/1995 – Concession Deed*, cl.2.1) incorporate improving traffic movement but do not explicitly list congestion reduction. They include facilitating traffic movement around Melbourne's central administrative district, rather than through it, improving freight movement to Melbourne ports, rail freight facilities,

the wholesale market and airports, and improving access to the central administrative district and other centrally located facilities such as Docklands, Southbank, and the Casino.

The objectives of the *Mitcham – Frankston freeway: Concession Deed* include:

- reducing travel times and improving travel time reliability for the movement of people, goods and services in the east and south-east regions of Melbourne through the design of the Freeway and connecting roads
- significantly improving commercial vehicle access to and between the important manufacturing and industrial areas within and around the Mitcham-Frankston corridor
- reducing traffic congestion on the surrounding road network, especially Springvale Road, Stud Road and the Maroondah Highway, by attracting traffic onto the Freeway. (ConnectEast & Government of Victoria 2004, p. 15)

The Concession Deed (cl.54.1) also imposes specific obligations on ConnectEast to manage traffic to minimise traffic congestion.

While both projects must report regularly on traffic flows, they do not have performance measures for congestion reduction. The measurement regime for the EastLink project is more detailed than for CityLink. ConnectEast's Concession Deed specifies key performance indicators and requires it to give regular users toll credits if these indicators are not met. The indicators include incident response times and meeting maintenance schedules, which can affect incident based congestion, but none of the indicators require performance against general congestion standards. If the Government wanted to include congestion as a performance indicator this should be considered at the time the agreement with the operator is negotiated, taking account of the impact on local roads and natural incentives for the operator to maximise traffic throughput.

The toll formulae in the Concession Deeds do not provide for congestion charging or peak and off-peak pricing, although they could be amended by agreement. ConnectEast's deed, however, sets a 20 per cent toll reduction for weekend use.

4.3.2 Road planning and priority setting processes

Transport planning processes set longer term strategies for construction and operation of transport infrastructure and provision of related services, such as parking. They affect the priority afforded congestion and the effectiveness of strategies to deliver this priority. Agencies and the Government use these plans to identify priority projects.

As noted previously, the Government's overarching policies guide road transport planning and priority setting. The Government's views on road policy priorities are articulated in documents such as *Melbourne 2030* (DOI 2002a) and *Linking Melbourne: Metropolitan transport plan* (Government of Victoria 2004a). It developed these policies with input from transport agencies and the community. As the development processes were largely internal to government it is difficult to ascertain the reasons for the weight given to particular policy areas.

Legislation requires that DOI and VicRoads operate consistently with these policies. DOI has responsibility under the Transport Act:

> to ensure the achievement of optimum overall transport outcomes by undertaking integrated transport planning and integrated transport system and service development linked to the overall planning strategies and other policies of the Government. (s.4(1)(c))

Under the Road Management Act, VicRoads performs its functions of providing and maintaining roads for use by the community and managing traffic after considering, among other things:

> any relevant environmental, economic, social or financial policies or objectives determined by the Government of Victoria.. (s.38(2)(a)(ii))

VicRoads has a major role in developing and prioritising roads projects. It identifies projects consistent with government policy and budget announcements, accounting for feedback from freight forums or community consultation, local government views and needs identified internally (including VicRoads regional offices). To help the consistency of the criteria used to compare projects, VicRoads developed freeway operational objectives and is setting arterial road operational objectives. These objectives may change as community priorities change.

Projects identified for each of VicRoads' core business areas[4] are evaluated and ranked according to a benefit cost ratio and/or multiple criteria. Criteria are drawn from the priority outcomes identified for that program area and linked back to VicRoads' strategic plan and overarching government policies. Program areas put suggested priorities to VicRoads' senior management annually.

Projects over $3 million are considered by VicRoads' Project Review Committee (senior staff in VicRoads). Large projects are assessed using the Austroads model, a detailed cost benefit analysis that includes estimates of time savings. This committee examines the project assessment and considers the project's

[4] VicRoads' core business areas include registration and licensing, road safety, road system management and traffic and transport integration.

consistency with VicRoads' overall strategy. Cost–benefit assessments are not publicly released but VicRoads produces brochures to explain major projects to the community.

One of the functions of the DOI is to 'develop, coordinate, implement and monitor strategic plans and resource budgets' for VicRoads (Transport Act s.4(2)(c)). In addition, VicRoads must each year submit an operating budget and capital works budget to the Minister for Transport for his approval (Transport Act s.60(1)).

DOI is responsible for the transport portfolio's annual budget bid, including projects proposed by VicRoads. In formulating that bid, DOI's project review committee reviews the business case for major infrastructure projects and their strategic fit with government objectives. A full business case must be developed for projects over $10 million, including those involving joint State/Commonwealth funding. DOI questions the assumptions and projections that underlie these proposals.

BOX 4.8 **Relationship between DOI and VicRoads**

It is difficult to identify a clear legislative foundation for the relationship between DOI and VicRoads. Section 4(2) of the Transport Act provides that DOI develops, coordinates, implements and monitors strategic plans and resource budgets for itself and VicRoads and makes DOI responsible for formulating transport policies and performance standards. DOI's functions also include establishing quantitative targets to be attained by VicRoads in the exercise of its functions.

In contrast, Division l of Part IV places VicRoads under the direction and budgetary control of the Minister. Section 58(1) provides:

> The Minister shall after consultation with the Corporation [VicRoads] make a written determination of the quantitative targets to be attained by the Corporation in a financial year.

In practice, VicRoads appears to operate with a high level of autonomy from DOI. There also appears to be overlap between VicRoads' and DOI's responsibilities. As noted above they are both involved in project assessment. They also have a role in policy setting. DOI's functions include 'to formulate transport policies' (s.4(2)(b)). VicRoads has a Business Operations Division charged with developing policy recommendations and program strategies. It is not clear the extent to which this group is involved in setting government policy, informing policy, or whether it focuses on VicRoads' operational policy issues.

Some overlapping functions may be justified to maintain accountability and coordination. Whether it is justified in this case is discussed in chapter 9.

Source: VCEC derived from Transport Act and VicRoads *Annual Report 2004-2005* (Vicroads 2005d).

DOI considers projects individually, and then prioritises them against others with similar objectives. It is more difficult to prioritise projects across objectives, and to consider fully the interactions between projects. The priority between government objectives (such as road safety and congestion) is affected by the amount of money the government has allocated to achieving those objectives. That assessment is made through the Cabinet process.

Projects that have been cleared through both the VicRoads and the DOI project review committees are submitted to the Government's Expenditure Review Committee for consideration for funding through the State Budget. (Box 4.8 outlines DOI and VicRoads' relationship.)

Local government is also involved in road planning and priority setting. As a road authority, a local council must 'ensure that a safe and efficient network of roads is provided primarily for travel and transport' (Road Management Act, s.20). Under the Local Government Act, a local council is also empowered to act as an advocate for local interests. The breadth of transport interests held by councils is illustrated in the responsibilities listed by the City of Melbourne:

(1) pedestrian movement and amenity
(2) bicycle movement
(3) parking on all roads
(4) vehicular traffic management on non-declared roads
(5) local area traffic management
(6) taxi ranks
(7) bus parking bays
(8) loading zones. (City of Melbourne undated B, p. 47)

Local government's role in land use planning is discussed in section 4.6.1. For local roads, local government can, in theory, set priorities independently of the objectives of state and other local governments, with possible congestion implications as actions in one area can shift or create congestion in others. The State and local governments rely on consultation to coordinate state objectives with local priorities. The City of Melbourne has drafted a 15-year planning strategy with a heavy focus on transport. It will be subject to public consultation and the council is hoping it will be endorsed by DOI (City of Melbourne, pers. comm., 19 December 2005).

For a number of years the Municipal Association of Victoria (MAV)/VicRoads Liaison Group has met regularly to improve coordination between VicRoads and councils. The liaison group comprises senior representatives of VicRoads, and the MAV and councillors. It discusses strategic and operational matters and its agendas have included school crossings, parking and clearways.

Project based consultation, often around the management and implementation of priorities, is discussed in section 4.3.4.

4.3.3 Road funding sources

Agencies need flexible funding to deliver priority roads projects and respond to changing transport needs, as well as ongoing funding for management and maintenance of existing infrastructure. In Australia there is an imbalance in taxing powers, with the result that the majority of tax revenue is collected by the Commonwealth Government. Commonwealth taxes consequently directly or indirectly fund most road works, even though the Commonwealth does not manage any of the road network. Direct funding is allocated through road grants and indirect funding is through general grants into State consolidated revenue. Other sources of funding include state taxes or local rates and charges.

A fourth source is private funding, either privately funded road projects, such as toll roads and the Melbourne airport second access road, or specific purpose development charges for road infrastructure.

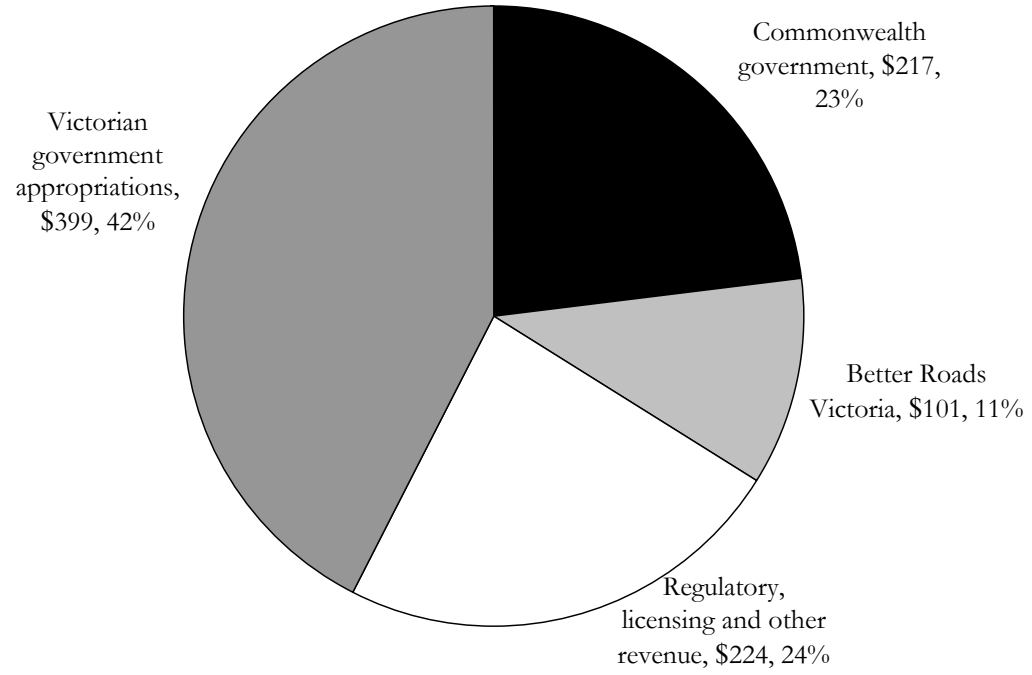
Government road funding sources

VicRoads and local government are responsible for expenditure on government roads projects. In 2004-05, VicRoads spent $1.3 billion on managing ($1 billion), and improving and expanding ($300 million) the road network (VicRoads 2005d, p. 85). VicRoads obtains funds from four sources (figure 4.1).[5]

The Commonwealth Government is phasing in a new funding model, AusLink, which commenced in July 2004. AusLink has broadened the scope of projects the Commonwealth may contribute to, but potentially requires more projects to be funded jointly between the Commonwealth and the State. Joint funding may extend to the National Highway System, where construction and maintenance was previously fully Commonwealth funded. For 2004-05 to 2008-09 funds committed to Victoria for Auslink projects totaled $1429 million, 85 per cent is for road projects, mostly in rural areas. Victoria will receive $225 million in AusLink funding in 2005-06 (Government of Victoria 2005c, p. 169).

[5] Some of VicRoads' 2004-05 expenditure was funded from previous years' allocations.

Figure 4.1 **VicRoads' funding 2004-05 ($ million)**



Source: VicRoads 2005d, p. 87.

DOI and VicRoads are jointly responsible for managing the Victorian Government's bid for AusLink funding which must be consistent with Commonwealth guidelines and priorities. AusLink funding is allocated for identified projects, with a small amount, $35 million in 2004-05, for maintenance of the existing road network. DOI and VicRoads are involved in major 'corridor studies' (including a Melbourne urban study) with the Commonwealth and interstate counterparts that will inform the Commonwealth's decisions on AusLink funding from 2009-10. Victorian Government priorities affect the projects for which DOI and VicRoads seek Commonwealth funding.

Victorian government funding is provided through government appropriations (output appropriations ($380 million) and contributed capital ($20 million)) and the Better Roads Victoria Trust Fund ($101 million) (box 4.9).

BOX 4.9 **Better Roads Victoria Trust Fund**

The VicRoads annual report 2004-05 presented the following information about the Better Roads Trust Fund.

> The Victorian Government's Better Roads Victoria Trust Fund was established under the *Business Franchise (Protection Products) Act 1979* (Vic.). The Act specifies that a State levy on petrol and diesel fuel sales was to be utilised to fund construction and maintenance of roads. Following the abolition of this levy in August 1997, the Victorian Government has continued to make equivalent payments to the Trust Fund, together with $17 per motor vehicle registration applicable from 1 July 2003.
>
> Two thirds of funding from the Trust Fund is directed to metropolitan road projects and one third directed to rural road projects.

This fund is used for projects that involve expenditure less than $10 million. VicRoads also stated that in the allocation of funds, there is an emphasis on projects which will contribute to economic development by reducing transport costs for business and improving the efficiency of Victoria's roads. As well, projects funded under the program are intended to:

- improve safety for all road users and make travelling more comfortable
- improve access for local communities
- create jobs in the construction industry and related support industries
- encourage further tourism. (VicRoads 2005a)

Source: VicRoads 2005d, pp. 85–6; VicRoads 2005a.

As noted in the previous section, projects funded from appropriations must be assessed through the government budget process via DOI's budget bid. But not all of VicRoads State Government funding goes through this process. Expenditure from the Better Roads Victoria Trust Fund is approved by the Minister for Transport. VicRoads generates a further $224 million from fees, fines and charges. Based on the Better Roads Victoria Trust Fund alone, in 2004-05, at least 34 per cent of VicRoads capital expenditure did not go through the annual budget process (VicRoads 2005d, pp. 89, 102). This figure was 50 per cent in 2003-04.

Local government receives road funding from both the Commonwealth and State governments. In 2004-05 the Commonwealth provided $97.6 million to Victorian local government in identified local roads grants (Government of Victoria 2005c, p. 169). These grants are transferred to local government through the State Government. The Commonwealth also makes money available directly to local government under the Roads to Recovery Program, which funds road construction and maintenance (until 30 June 2009), to facilitate renewal of local roads in rural, regional and metropolitan areas. Local governments have some flexibility in the use of this money.

Private road funding sources

The Victorian Government also contracts with private companies to fund road infrastructure. CityLink, owned by Transurban, upgraded or built the Western Link, which connects the Tullamarine Freeway to the West Gate Freeway; and the Southern Link, which connects the West Gate Freeway to the Monash (formerly South Eastern) Freeway. ConnectEast has been contracted to construct the Mitcham–Frankston Freeway. The private contractors are responsible for raising construction finance and are given an exclusive right to manage and charge tolls for the road over a set period. The structure and level of tolls are set in each operator's concession deed.

CityLink pays concession fees to the Government to reflect rent payable on state land and assets leased to CityLink and the Government's right to a share of revenue when patronage exceeds certain levels (VicRoads 2005d, p. 35). ConnectEast is required to make similar payments. It must also contribute $20 million for the upgrade of public transport and community infrastructure. (Concession Deed cl.38.1)

Development contributions provide scope for transport agencies to generate revenue, or require in-kind contributions, to build or expand the infrastructure needed to accommodate new developments. They appear to be used mostly in greenfield areas, rather than established parts of Melbourne. In 2004, the State Government amended the *Planning and Environment Act 1987* to improve the transparency and accountability of developer contribution plans (VCEC 2005, pp. 316–17).

> Major developments generally contribute towards the cost of state arterial roads through agreements with VicRoads. However, there is not a consistent approach to the application and recovery of contributions to roads from all developers. VicRoads estimates that the value of current contributions, where collected, averages approximately $55 000–$65 000 per hectare (mostly delivered as construction works, not payments). (Government of Victoria 2005b, p. 11)

When applied, development contributions have constituted approximately 12 per cent of the total cost of developer charges (Spiller, Gibbons & Swan 2001, cited in VCEC 2005, p. 329). The broader charges include land and development charges such as stamp duty, and utility charges such as levies associated with the provision of reticulated water, sewerage and drainage facilities under the *Water Act 1989* (Vic.).

The current development contributions system allows local or State government to levy developers through planning permit conditions, negotiated voluntary agreements or development contribution plans (DCPs). The Department of Sustainability and Environment (DSE) has stated that DCPs will continue to be

the key method for development contributions to be raised to fund local infrastructure (DSE 2003a, p. 3).

In November 2005, further reforms to developer contributions introduced a new approach for five growth areas (Casey–Cardinia, Hume, Melton–Caroline Springs, Whittlesea and Wyndham) (box 4.10).

BOX 4.10 Development contributions in growth areas

Under the new policy, in growth areas:

> Development contributions will support the provision of transport (roads and public transport), environmental facilities (such as regional open space, trails and creek protection) and State-supported community infrastructure (including libraries, neighbourhood houses and major recreation facilities). (Government of Victoria 2005b, p. 10)

These contributions will be based on development contribution plans (DCPs), which are part of a broader planning process. Through the Growth Areas Authority, the Department of Sustainability and Environment has a general planning framework for all growth areas, which includes infrastructure planning. Local Governments also have infrastructure plans for their municipalities. The DCP then draws on these plans to identify projects that will be part funded by developers.

In *A plan for Melbourne's growth areas* (Government of Victoria 2005b), the Government explains that while the majority of the costs of infrastructure required for growth areas will continue to be funded through the Budget, it intends DCPs to be used by local and State government to require developers to contribute to the cost of this infrastructure provision. The use of DCPs reflects the fact that decisions by local or State government to rezone or sub-divide urban land for development can generate an increase in land value up to $300 000–$400 000 per hectare (Charter Keck Cramer, cited in Government of Victoria 2005b, p. 11). Given developers benefit from this rezoning, the Government argues it is reasonable for developers to contribute to the provision of infrastructure. It is intended that in-kind contributions will be more flexible and a consistent formula will be used to calculate a levy across all identified growth areas. The contribution is set per hectare. Assuming 11 housing blocks per hectare, the contribution per block is expected to be:

- between $2700–$3100 per block for land within the urban growth boundary and zoned for urban development but not subdivided (based on 25 per cent of the value of public transport, environmental facilities and state-supported community infrastructure)
- between $4000–$4400 per block for land within the urban growth boundary but not yet zoned for urban development (based on 40 per cent of the value of public transport, environmental facilities and state-supported community infrastructure)
- between $4900–$5400 per block for land brought within the urban growth boundary in November 2005 (based on 50 per cent of the value of public transport, environmental facilities and state-supported community infrastructure) (Government of Victoria 2005b, p. 12).

Source: Government of Victoria 2005b.

The current developer contribution arrangements provide for developer contributions to the funding of community facilities, intersection upgrades, road widening and bus stops.

Developer contributions are subject to the principles of:

- *need*—the infrastructure need is generated by a development
- *nexus*—a connection between the development and the infrastructure
- *equity*—the contributions are a fair and reasonable apportionment of cost
- *accountability*—the money collected is spent on the infrastructure for which it was levied.

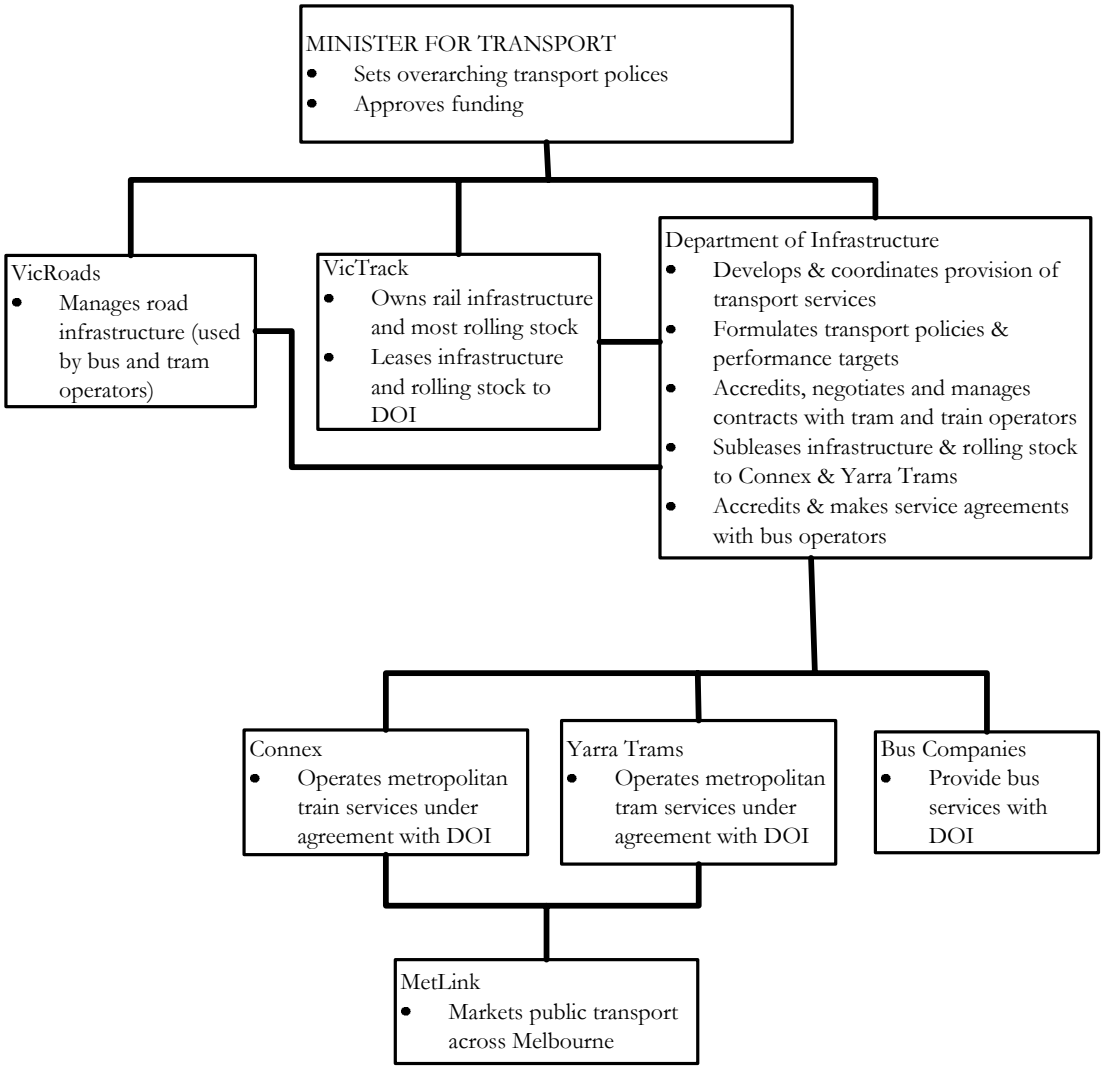
4.4 Public transport planning and management

The framework for the planning and management of public transport (figure 4.2) is different from the framework for the roads sector (table 4.1):

- DOI's responsibility for overall management and coordination is clearer
- private sector involvement is higher with train, tram and bus service provision contracted out, subject to operating goals and standards set by Government and embodied in the contracts
- the State Government's role is more comprehensive, as Commonwealth and local governments have only minor roles.

For a large part of the transport system, public transport is an alternative to road transport. In a competitive market, providers of alternative services strive to improve their services to attract customers from their competitors. Under these circumstances, public transport operators would try to encourage people off the road and onto trains, trams and buses, thereby helping to reduce congestion. As noted in chapter 3, the transport market, in many areas, is not competitively structured. Institutional arrangements are therefore needed to substitute for market forces. That is, the arrangements for managing, funding and planning and priority setting need to encourage service providers to attract customers away from roads and onto public transport, and to operate efficiently. Chapter 7 discusses the scope to divert people from road to public transport.

Figure 4.2 **Public transport planning and management roles**



4.4.1 Public transport management

Within the management of public transport services, operators' ability and incentive to attract customers off roads is affected by:

- the allocation of roles and responsibilities among institutions
- the flexibility of contracts to encourage innovation that attracts customers and reward service providers for their efforts to increase patronage
- the availability of performance indicators that measure the success of service providers in increasing patronage and provide incentives for them to achieve further gains
- the coordination between service providers and across modes, so that actions by one operator do not negate the efforts of others.

DOI is responsible for contracting with service providers and the ongoing management of those contracts; accrediting, coordinating and monitoring operators; and identifying opportunities to improve the transport network across all public transport modes. This is done by the Public Transport Division within DOI, which includes the office of the Director of Public Transport. The arrangements for managing service delivery differ between trains and trams, and buses.

Trains and trams

DOI coordinates the activities of most agencies involved in metropolitan passenger train and tram services. Management is split between infrastructure (track ownership and road management) and above track services. Separate arrangements also cover some major infrastructure projects, such as the redevelopment of Southern Cross Station.

The management of train and tram services changed significantly after the Rail Corporations Act 1996 was passed as part of the program to privatise public transport services. At that time, track ownership was separated from service provision and retained by Government. Operation of the above rail services was contracted out. The Act's main purpose is 'to establish Victorian Rail Track and certain passenger transport corporations and to provide for the transfer of property, rights and liabilities to them' (s.1). There are no objects stated in the Act.

Infrastructure management

Train and tram infrastructure is owned by VicTrack, a government owned corporation established in 1997 under the Rail Corporations Act. It has a board of directors that is subject to Ministerial direction. VicTrack's assets include rail land and buildings, track and overhead wiring, signals, power substations, and communications networks and base stations. These assets include the electrified train and tram network in suburban Melbourne, but exclude the Southern Cross Station precinct, privately owned sidings and certain tourist lines. VicTrack, through its wholly-owned subsidiary Rollingstock Holdings (Victoria) Pty Ltd, also owns a significant proportion of the State's existing suburban passenger rolling-stock (trains and trams).

Major projects may be managed by separate arrangements, such as the Southern Cross Station Authority. This authority is publicly owned with a board of directors. It manages the Southern Cross precinct, its redevelopment and monitors the current and future requirements for transport facilities in the precinct (Rail Corporations Act s.18ZJ).

While VicTrack owns the metropolitan rail and tram tracks, it is not involved in ongoing management and maintenance. Since 2004, it has leased the track to the

Director of Public Transport, who subleases it to train and tram operators. Operators are contracted to develop and maintain the infrastructure, consistent with their partnership agreement with government. VicTrack pursues opportunities to create and add value to its assets in areas other than transport, such as telecommunications, advertising and property development. Its current functions are narrower that those allowed for in the Rail Corporation Act (s.11), which provides that VicTrack may also establish, manage and maintain infrastructure and the Minister for Transport may direct it to provide passenger services.

Because much of the tram system is road based, track infrastructure is linked to road management. For the train system, however, the points of contact between road and track management are less than for trams, and generally only occur at level crossings. Conventions have been established to guide who is responsible for road maintenance around public transport tracks. Tram operators are responsible for maintaining the road between the tram tracks and half a metre either side. At level crossings, the rail operator maintains the road between the train tracks and 2 to 2.5 metres on either side of the outside train lines. Public transport utilities must maintain the road around their facilities to a standard consistent with the surrounding road. They also need the consent of the coordinating road authority prior to conducting work. Train and tram operators have the power to stop traffic in circumstances where it is reasonably necessary to do so, and in an emergency (Rail Corporations Act s.67). The code of practice for *Management of road and utility infrastructure in road reserves* currently covers public transport operators. The code of practice may be supplemented either by an appendix or by a separate code for public transport operators of train and tram services.

To the extent that train and tram operators are affected by road management decisions, they will be also affected by the road management arrangements discussed in section 4.3.

Train and tram services

Managers of rail and tram infrastructure and providers and operators of rolling stock must be accredited under Division 3 of Part VI of the Transport Act. DOI manages accreditation to maintain appropriate levels of safety while minimising transport costs (s.103). Accredited managers and operators are checked to ensure they can perform their functions safely, to facilitate an efficient and effective rail transport services network, and to increase competition in rail-based transport (s.110). The Secretary of DOI may take disciplinary action (such as suspending or cancelling a licence, warning the licence holder or imposing licence conditions) against an accredited person who has acted negligently or unsafely (s.127). Decisions by the Secretary are reviewable by the Victorian Civil and Administrative Tribunal (s.129B).

In April 2004, the Victorian Government entered into five-year partnership agreements with Connex and Yarra Trams to operate Melbourne's metropolitan passenger train and tram services respectively. The operators are responsible for:

- day-to-day operation of trains and trams to government performance standards
- customer service, including tickets sales, passenger security and station staff
- employment and management of staff
- maintenance and cleaning of vehicles, tracks and stations (DOI 2005e).

The Victorian Government is responsible for:

- safety regulation
- sustainable funding
- coordination of timetables between trains, trams and buses
- long-term network and strategic planning
- development of a new ticketing system (DOI 2005e).

Following the collapse of National Express (which triggered the need to renegotiate the tram and train agreements), the Government sought to reduce the number of operators to one for trains and one for trams, because of various problems caused by multiple businesses (DOI 2005g, pp. 18-19). Flexibility in service providers was not envisaged. These agreements do, however, allow for changes in service standards and service levels. They specify processes for the operators and the Government to seek changes in services:

- The Director can change passenger service requirements, but must also adjust the monthly contract sum to reflect any additional cost to the operator from these changes (cl.5.2). The agreement also sets the criteria for adjusting these payments.
- The operator can also request changes to services or service standards. It must obtain the approval of the Director for such changes and must consult with providers of connecting services, if the change affects the timetable.

Performance indicators and the processes for ongoing monitoring and reporting for train and tram services are in the partnership agreements, rather than legislation. The key features of the performance assessment regime are:

- quantitative indicators based on punctuality and reliability (box 4.11)
- preparation of a customer satisfaction index
- customer satisfaction surveys
- publication of results
- financial incentives and penalties based on performance.

BOX 4.11 Train and tram performance indicators

To assess the performance of public transport operators the partnership agreements include targets for service delivery and standards for customer service, relating to:

- punctuality—measured as a percentage of the services arriving on time at specified monitoring points
- reliability—measured as a proportion of the timetabled train or tram services that have run.

The benchmarks are based on absolute performance levels and improving performance against 1998 standards. Connex's benchmarks are to:

- deliver 98 per cent of train kilometres each month
- ensure that 92 per cent of services arrive at their destination no later than five minutes and 59 seconds after the timetabled arrival time
- improve operational performance by 36 per cent from July 2005 when compared with the 1998 benchmark.

Yarra Trams' benchmarks are to:

- ensure average punctuality of services is better than 80 per cent
- deliver 95 per cent reliability in the kilometres of services delivered
- improve operational performance by 31 per cent from July 2005 when compared with the 1998 benchmark.

Customer service standards are set in Customer Service Charters. Train and tram franchise contracts also contain performance requirements for minimising graffiti, keeping facilities and vehicles clean, complaints-handling processes, providing lighting and security, and providing information about services and facilities.

There are also mechanisms to monitor and manage overcrowding. The partnership agreements set load standards, based on numbers of standing passengers, for different vehicle types, Central Business District (CBD) and non-CBD services, and peak and off-peak services.

Source: DOI 2005g.

Performance monitoring is manual for trains and automated for trams. DOI analyses the information and independently surveys train performance to confirm the accuracy of the information provided. Tram data is electronically forwarded to DOI's central database from sensors located in all tram routes.

DOI also commissions monthly customer satisfaction surveys. The surveys ask users and non-users of public transport (including buses) about service delivery, railway stations, tram and bus stops, passenger comfort, ticketing, information services (including timetables), personal safety, value for money and staff service. The survey results are compiled into a quarterly customer satisfaction index. If the index for a train or tram operator falls in any one quarter, they must explain the deterioration. If it falls in two successive quarters, the operator must produce and implement a service improvement plan. The results of punctuality and

reliability monitoring and customer satisfaction surveys for trains, trams and buses are published quarterly in Track Record.

A range of risk sharing, performance payments and penalties, and other remedies are incorporated into the performance assessment regime. Several of these are potentially relevant to congestion management. First, incentive payments are available if operators generate service improvements greater than target levels and penalties paid if performance is below the target. DOI calculates performance based on service disruptions weighted by the number of passengers using the service and the time it operates. In 2005, Connex paid $22.6 million and Yarra Trams paid $79 000 in penalties. (DOI 2006e, pp. 9–10)

Secondly, compensation to customers, in the form of free tickets to holders of tickets for periods in excess of four weeks, is also payable for significant delays or consistent failures to provide service. Compensation has been paid on several occasions; for example, in 2006, Connex provided free daily tickets to train passengers because of its failure to meet punctuality targets. In addition, in 2005, Connex provided free tickets to train passengers who were significantly delayed as a result of flooding of signal boxes in a severe storm and, in 2003, M>Tram provided free tickets to passengers because of unpunctual services.

Thirdly, if overcrowding emerges as a problem, based on load standards, there are three stages of response:

(1) the franchisee is required to improve fleet utilisation, running extra services by reducing vehicle downtime
(2) the franchisee proposes to the Government a redeployment of vehicles across the network to address overcrowding on particular lines
(3) the government can provide the required funding and direct the franchisee to acquire additional vehicles (DOI 2005d, p. 49). The government provided funding at the time of the original franchising in 1999 and additional funding when the franchisee acquired five additional trains.

Fourth, an annual payment of up to $3 million for trains and $4 million for trams is available for improvements in service frequency beyond the service levels at the commencement of the franchise agreement (when additional services are approved by the government) (DOI 2005d, p. 59).

The link between these service incentives and congestion is difficult to establish. While service levels are important to public transport generating value for customers, their link to reducing traffic congestion is more difficult to establish because the factors that encourage passengers to shift from cars to public transport are not well understood. It is unclear whether the current performance incentives would drive reductions in congestion.

Buses

Unlike metropolitan train and tram services, which each have a single provider, there are 24 bus operators, each granted exclusive operating rights within a defined franchise area. Bus operators wishing to provide and charge for a bus service travelling regularly over a fixed route must be accredited and have a service contract with the Victorian Government. The arrangements for accreditation and service contracts are in the Public Transport Competition Act 1995. The Act is to be read as one with the Transport Act (s.3(3)) and, consequently, the objects of the Transport Act extend to the Public Transport Competition Act, ensuring consistency between the objects in the two Acts.

A person must not operate a road transport passenger service, broadly a bus service that charges fares and has more than 13 seats per bus, unless they are accredited by the DOI (Public Transport Competition Act s.4). Accreditation applies to:

- scheduled services including metropolitan and regional bus services, school bus services, inter-town coach services and airport bus services
- non-scheduled services such as tourist coach services and charter buses and coaches
- non-commercial services including private buses, courtesy buses and hire and drive buses.

The Secretary of DOI supervises accredited operators and can take action if a person has acted negligently or fraudulently or has committed a disqualifying offence. Operators can run regular passenger services within Victoria only if the services are authorised by a service contract with the State (Public Transport Competition Act s.25). DOI manages these contracts. Service contracts must set the contract period (not more than 10 years), penalties for contract breaches, service standards and minimum service levels (including frequency), maximum fares and methods of remunerating the operator (ss.26, 27). Existing operators have first right of refusal for new or extended services in their contract area (s.29(1)). The contracts give the operator an exclusive right to run regular passenger services on specified routes. Bus contracts are due to be renewed in 2007. The Minister may approve codes of practice 'for the purpose of providing practical guidance to accredited operators of road transport' (s.24A). At this stage there are no codes of practice for bus operators. Because buses run on roads, rather than dedicated infrastructure, they are affected by the arrangements for road management discussed in section 4.3. Box 4.12 includes examples specific to buses.

Box 4.12 **Bus lanes and bus shelters**

Dedicated bus lanes

Victoria Parade is a key arterial road for traffic entering and leaving central Melbourne. It has three through traffic lanes in each direction, with provision for parking by the kerb and in the lane by a large median strip. The median strip carries a tram line. During the morning, Victoria Parade has a priority lane for incoming buses, but no priority lane for outgoing buses in the afternoon. Afternoon buses are consequently caught in peak traffic, travel slowly and have 10 per cent fewer passengers than morning buses.

In 2002, VicRoads approached the City of Yarra with a proposal to convert the kerbside parking lane to a dedicated lane for buses and other vehicles carrying at least one passenger. The City of Yarra rejected the proposal because of the financial cost to local shops and businesses from the loss of parking. In addition, loss of parking removes a barrier between pedestrians and cars, making the footpath a much less attractive place to walk. Moreover, allowing all vehicles with at least one passenger in them would have increased the capacity of the road without necessarily giving buses a better run. As an alternative, the City of Yarra proposed that one of the existing through lanes be dedicated as a priority bus lane. This proposal was unacceptable to VicRoads.

In late 2002, VicRoads dropped its transit lane proposal and in May 2003 approached the City of Yarra with several options. Its preferred option was to install a bus lane on the existing kerbside parking lane from Lansdowne Street to Hoddle Street, and introduce a clearway between 4.30 and 7.30 pm Monday to Friday from Lansdowne Street to Cromwell Street. This option would make a continuous bus lane for all of Victoria Parade, enabling faster bus travel and improved patronage, but 64 kerbside parking spaces would be lost.

In November 2005, Mr Cornwall, Managing Director of Ventura National Bus, said on ABC radio that Victoria Parade is still a major problem for bus services. The negotiations between VicRoads and the City of Yarra were at that time unresolved. This is despite the Code of Practice on Clearways which authorises VicRoads to determine whether a clearway should be created, with the Minister for Transport having the final say in case of a dispute between VicRoads and a municipal council.

In early 2006, the City of Yarra consented to the creation of a clearway between Wellington Street and Hoddle Street, nearly half the distance sought by VicRoads, but in an area where the impact on local business of the loss of parking spaces would be small and where buses experience the largest delays. Parking spaces would be protected along about 600 metres of Victoria Parade from Lansdowne Street to Wellington Street, interrupting the dedicated bus lane.

Source: Discussions with the City of Yarra.

A bus operator wishing to change its timetabled services or route must renegotiate its contract with DOI. The process for establishing new routes is outlined in section 4.4.4. If the proposed route change overlaps with another

operator's services it may be prohibited if that operator's contract vests them with an exclusive right to service that route.

All bus services are covered by the Metropolitan Buses Transport Services Agreement (MBTSA). This comprehensive agreement prescribes contract standards covering minimum service levels, quality and customer information provision. The contracts were fixed for 10 years and end in 2007. Neither the MBTSA nor its underpinning legislation specifies how the contracts will be renewed after 10 years. Under the MBTSA, there are two stages in the calculation of Government payments to operators. The first, a transition stage, bases payments on benchmarked operating costs. The contract was then intended to move to a second stage, which incorporated a variable component into the payments. Difficulties, largely but not exclusively related to the reliability of patronage data, have meant that the second stage of the contract has not been activated.

The major exceptions to the MBTSA are the routes operated by the National Bus Company (NBC).[6] NBC won its contract in an open tender for bus services previously operated by the Government owned Met Bus. The National Bus Company Transport Services Agreement (1997) splits payments into fixed and variable components—with the latter linked to patronage. Minimum contract standards and penalties are similar to those under the MBSTA.

The performance monitoring and incentives regime for buses is significantly different than that for trains. Bus contracts include performance criteria requiring operators to ensure:

- minimum coverage and frequency of services
- no timetabled bus services operate early at any point on their routes
- no more than 5 per cent of all services provided on any day or 10 per cent of services provided on any route of any day will operate more than five minutes late at any point on the timetable
- 99 per cent of all scheduled services on any day operate and are completed
- buses are not overloaded
- other standards are met for drivers, service integration and customer service information and facilities.

Operators must keep records of punctuality and reliability for at least 5 per cent of their timetabled services. These records are forwarded monthly to DOI. DOI also randomly audits operators' performance against the targets and service standards. They are also part of the quarterly customer satisfaction surveys. Bus

[6] Other bus services include airport shuttle services and those operated by local government. Local governments operating a regular bus service require DOI approval. Approval is contingent on the service not competing with DOI contracted services.

performance is reported monthly in Track Record. Unlike trams and trains, performance information on buses has not resulted in financial incentives or penalties being paid. The contracts allow for financial penalties, but these have not been triggered primarily because of difficulty in obtaining data on service standards. The Government is now considering the regulatory, contractual and performance monitoring framework that will apply to buses following the expiry of existing bus contracts in 2007.

4.4.2 Coordination between public transport modes

The public transport network is integrated to operate a set of complementary, rather than competing, services. Trains and trams provide radial links joining the suburbs and the city, with buses covering gaps in the network. These provide feeder services for trams and trains, services across-town and in areas without access to trams and trains. Public transport contracts usually provide exclusive rights to specific routes and, among road based services, largely exclude competition from other providers or other modes.

Coordination is important for public transport to deliver a viable, efficient and competitive alternative to car travel and thus reduce congestion. The number of agencies involved in metropolitan public transport, however, makes such coordination a challenge. This was recognised by the Victorian Government when it renegotiated the train and tram contracts. The Government chose to use one train and one tram operator because 'having a large number of operators multiplied the number of interfaces within an already complex industry' (DOI 2005g, p. 19).

Despite the rationalisation in tram and train operators, many agencies are still involved: DOI is responsible for coordination and contract management; VicRoads, Connex and Yarra Trams manage infrastructure; 26 providers, principally bus operators, offer public transport services; and other agencies have specific functions, such as Metlink and the Southern Cross Station Authority. The primary coordination mechanism is through DOI, which can use its roles in transport planning, priority setting and contract management to direct and/or encourage service providers to offer services that work well together and achieve the government's objectives. As DOI makes final decisions on service level and frequency and is responsible for seeking government funding for projects and ongoing subsidies, its approach to service coordination is critical. For road based public transport, VicRoads has developed a planning and operational resource kit. Part 2 of the kit covers traffic and transport integration guidance, though a number of the documents in this kit are still being developed. VicRoads and DOI have recently entered into an interface agreement relating to the SmartBus program.

Coordination among services will be affected by the extent of integration required from a passenger's perspective, arising from specific strategies that target gaps in coordination, and from consultation processes. First, from a passenger's perspective, it is critical that the public transport system is one system with single ticketing, and centrally located information. In Victoria, Metlink is a one-stop-shop for customer information on public transport. Metlink is owned by Connex and Yarra Trams. Its board members represent all three public transport modes, with an independent chair. Metlink has service agreements with the Director of Public Transport and public transport operators (the Bus Association of Victoria represents bus operators). It is responsible for:

- representing tram, train and bus operators across Melbourne
- marketing public transport
- managing the ticketing system's day-to-day operation through the OneLink contract
- providing passenger service information through a web-site and call centre
- collecting patronage, fare evasion and concession travel data
- allocating ticket sales revenue between public transport operators.

Secondly, gaps in coordination are being targeted by programs such as the Connecting Transport Services Program and the new Smartcard ticketing scheme. The Connecting Transport Services Program included 43 metropolitan projects to improve safety and comfort for passengers transferring between public transport modes. It involved, for example:

- constructing new bus interchanges, including reducing the walking distance between bus and train services at some locations
- constructing shelters or covered walkways where passengers are transferring from rail services to a bus interchange, taxi zone, tram or private vehicle.

It is also anticipated that the Smartcard ticketing system, planned for 2007, will help reduce confusion about fare choice and make purchasing a ticket and changing between public transport vehicles easier. It will also expand the patronage information that can be collected (box 4.13).

BOX 4.13 **Smartcard**

Smartcards are rechargeable, durable plastic cards that store credit and travel information. Passengers pass the card across a reader when they start and finish their journey. The card automatically calculates the cheapest fare and debits it from the card's balance. Because the readers record the points where passengers enter and exit the system (accurate exit data is currently difficult to collect), they increase the ability to track passenger movements and coordinate connecting services.

Thirdly, consultation is a requirement of public transport contracts. Train and tram operators must consult with other public transport operators on timetabling and use reasonable endeavours to coordinate services. Tram operators must consult on rolling stock and train operators are required to maintain the compatibility of their rollingstock with other operators. Bus contracts also require operators to use their best endeavours to coordinate their services with other relevant services and operators must conform to the Government's modal coordination guidelines.

For road based public transport, an advisory council was established in 2002 'to provide advice to the Minister for Transport and VicRoads on matters relating to road management for trams, buses and taxis' (VicRoads 2005b, p. 2), including the development, planning, programming, regulation, design and operation of the road and traffic network in Victoria. The committee members represent government departments (including DOI), local government, public transport users, service providers and unions. The group meets quarterly and is chaired by VicRoads.

Overall, the processes for coordinating public transport rely heavily on DOI to:

- maintain a focus on coordination across modes
- encourage the changes in public transport needed to generate coordination where services are contracted to many private operators
- coordinate with VicRoads' responsibilities for road management.

4.4.3 Public transport planning and priority setting processes

The Government's overarching policies guide public transport policy and priority setting in the same way they guide roads. DOI again has overall responsibility for coordinating planning and priority setting. For public transport, however, DOI has greater control over the priority setting process, particularly for rail transport. VicRoads retains a substantial role in road based public transport. To some extent, therefore, the issues about the relationship between DOI and VicRoads are also relevant to public transport planning processes.

Linking Melbourne: Metropolitan transport plan contains priority actions for VicRoads—some of which are shared responsibilities—to improve the reliability and flow of road based public transport, including:

- achieve a 25 per cent reduction in tram travel times, and associated reliability improvements
- implement improvements for trams, initially along targeted high patronage Priority Tram Routes, middle and outer suburban SmartBus cross-town routes, and on the Eastern Freeway–Hoddle Street–Victoria Parade, Johnston Street and other east–west services in the inner north
- improve traffic signal route operation for trams and buses, with innovative signal linking and priority systems
- separate cars from trams and buses, using dedicated full-time and part-time tram and bus lanes
- implement new delineation standards for public transport, such as red pavement for bus-only lanes
- develop Park and Ride facilities at strategically located train stations, and tram and bus interchanges
- provide comparative travel time information to encourage mode shift
- develop an education program for motorists in support of tram priority measures
- review road rules and enforcement measures relating to public transport priority and passenger safety. (VicRoads 2005b, p. 1)

DOI identifies public transport proposals from previous government commitments, input from stakeholders and internally identified needs. Views on potential projects can come from a range of sources—the State Government, local government and existing and potential operators. Each year, DOI receives a significant number of proposals from bus operators to change bus routes. The ability to approve additions and extensions depends of the amount of money that is allocated to the bus services. The process for expanding bus services is set out in box 4.14.

Train and tram operators prepare asset improvement project lists and capital investment proposals that identify priority areas where they consider further investment is needed. These documents are provided to DOI for consideration. They are considered and prioritised against other transport projects with similar objectives, including road projects, to form the transport portfolio's budget bid (discussed in section 4.3.2). The partnership agreements specify the processes for identifying service expansions and the funding arrangements if expansions proceed. Investment still requires Government approval and, therefore, the effectiveness of these processes is dependent on the Government's project approval processes.

BOX 4.14 Priority setting process for bus projects

New bus routes are developed to meet the new and changing needs of the communities of Victoria. They are developed following detailed consultation with potential users and service suppliers. Factors considered in the development of routes include:

- the number of potential users
- the suitability of the road network for the use of buses
- access to the service from homes
- safe stopping locations
- how the bus service can be coordinated with tram, train and other bus services
- what times during the day and how frequently the service will be needed
- how much the service will cost to operate (including whether the Government will need to subsidise the service).

These details may be gathered by either a bus operator or DOI's Public Transport Division. Once the details are assembled, the operator and the Public Transport Division meet to discuss the feasibility of introducing a new service. If there is agreement that the service is likely to be successful without the need for Government funding, a trial service may be introduced. If Government funding is required, a budget submission is prepared identifying the financial, environmental and social costs and benefits of the proposed service. If funding is made available, arrangements are made to introduce the service.

Source: DOI 2006a.

4.4.4 Public transport funding

Public transport is funded primarily through the state budget. The White Paper for the new Commonwealth program, AusLink, clearly stated that public transport is primarily a State and Territory responsibility. About only 10 per cent of AusLink funding for Victoria between 2004-05 and 2008-09 has been allocated to urban rail. Funded projects are freight based, with $110 million earmarked to improve the links between the Dynon intermodal facility and the Port of Melbourne and $40 million to upgrade the Tottenham to West Footscray rail link, which will reduce congestion for rail freight entering and leaving the Dynon rail terminal and the Port of Melbourne.

Developer contributions are a further potential source of public transport infrastructure funding. The Victorian Government intends that development contributions can be levied to fund public transport infrastructure. A Direction by the Minister for Planning clarifies that the infrastructure that can be funded under a DCP includes the acquisition of land for public transport corridors and the construction of public transport infrastructure, including fixed rail

infrastructure, railway stations, bus stops and tram stops (Planning and Environment Act 1987–Section 46M (1)–Development Contribution Plans).

In the past, however, developer contributions have been used primarily for roads. Whittlesea Council, for example, expects that new roads and extensions of existing roads will be largely funded from developer contributions, expected to amount to about $350 million, of which $150 million is set aside for transport, largely upgrading existing roads and new roads. Expansions to the rail network have not been funded through developer contributions, but are dependent instead on State Government funding. The council is contributing through setting aside land for the rail line, stations and related car parks.

The reforms to developer contributions in growth areas envisage that more money will be available for public transport:

> Development Contribution Plans for each growth area will include the above requirements for contributions to public transport, community and environmental infrastructure, alongside the existing requirements for contributions to roads. (Government of Victoria 2005b, p. 13)

Whether this eventuates depends on the way governments choose the projects incorporated into the DCP. In addition, roads are usually constructed and used as soon as residents move into a new area, while public transport may be less closely linked to the development because of lags in construction and fewer local residents using the services. It may be more difficult to demonstrate that the principles of need and nexus (see section 4.3.3) are met, which are mandatory criteria for development contributions.

Train, tram and bus services are funded by a combination of fare revenue and government subsidies. The Government funds ongoing operation of public transport services and capital for new investment. It is estimated that in 2005 government subsidies paid to public transport operators covered about 70 per cent of the cost of rail services, 45 per cent of tram costs and 85 per cent of bus costs. These figures are estimated according to the proportion of fare revenue allocated to each mode compared to the operating and capital costs of that mode (table 4.4).[7] It is not clear whether the proportions are accurate reflections of the actual revenue collected from passengers on that mode because they are based on an allocation formula, not actual passenger numbers (estimated from Track Record figures, DOI 2006e, pp. 9–11).

[7] Amounts reported in *Track Record* include payments to operators for running the services but do not include payments for the majority of capital works. Payments made for other areas, such as SmartBus and safety and asset management payments, are not included in Track Record. It is also important to note that the figures reported in *Track Record* are compiled on a cash basis, not on an accrual accounting basis.

The Government is responsible for setting fares. The partnership agreements provide for annual fare increases in line with inflation. Fare revenue is collected by MetLink and distributed based on a prescribed formula. Connex and Yarra Trams each receive 40 per cent of metropolitan fare revenue. The remaining 20 per cent, attributable to buses, goes to the State Government.

State funding for trains and trams is separated into:

- base contract—the agreed fixed monthly franchise sum set in the franchise contract, including rolling stock maintenance
- fare box—money collected by MetLink and distributed to the train or tram operator
- concession top-up—recognises that concession fares are approximately half the full fare. The top up is 50 per cent of the operators' concession fare revenue, adjusted for the level of concession fraud
- maintenance—includes maintenance of all fixed infrastructure, track, overhead systems and signals
- rolling stock adjustment—covers new rolling stock lease payments
- incentive and penalty—payments made to the franchisee or by the franchisee that are related to performance criteria
- capital projects—includes network extensions and works on track, stations or stops, other than maintenance.

Table 4.4 shows the 2005 funding levels for trams and trains

Table 4.4 **Train and tram funding 2005**

Payment type	*Train ($000)*	*Tram ($000)*
Base contract	142 786	5 398
Farebox	153 654	153 654
Concession top-up	20 618	20 706
Maintenance	84 894	48 283
Rolling stock adjustment	89 182	34 892
Incentive and penalty	-22 591	-79
Capital projects	20 638	16 365
Other	3 080	3 512
Total	486 101	282 731

Source: DOI 2006e pp. 9-10.

Bus funding for metropolitan services was $289 million in 2005. This is not separated into the types of costs the same way as train and tram payments.

4.5 Intermodal planning and management

There are some gaps in the framework for coordinating transport issues at the planning, funding or operational levels. The processes for priority setting and decision making have been discussed in the previous sections. Overall, DOI is responsible for intermodal coordination. The preceding discussion observed that VicRoads has some decision making and funding autonomy, for example for projects funded through the Better Roads Victoria Trust Fund. While both agencies are required to operate consistent with government policy and are aided by the Government articulating its objectives in policy statements such as *Melbourne 2030*, ultimate responsibility for assuring that all projects are integrated and coordinated rests with the Minister, who approves both DOI and VicRoads activities and is the only one with authority over both organisations.

For projects that go through the budget, the process is clearer. As noted previously, road and public transport projects with the same objectives are ranked against each other in identifying priority projects. Within this process there are different assessment methodologies for assessing the costs and benefits of projects. For major roads projects, VicRoads uses the AustRoads cost benefit framework. For major public transport projects, DOI also applies cost benefit analysis, but does not use the AustRoads framework. For minor projects, where a full cost benefit analysis is not warranted, the assessment criteria are more varied.

In January 2006, the Council of Australian Governments agreed that by December 2006 all states would adopt Australian Transport Council-endorsed guidelines for evaluating new public road and non-urban rail infrastructure projects (COAG 2006, p. 6). It is not clear yet whether these guidelines can, or will, be applied to urban public transport projects.

In the case of funding, there are different funding sources for road and public transport projects and separate state budgets for road and public transport expenditure.

Operational coordination is affected by the number of public and private sector organisations involved, and the need for contracts with private operators to be flexible enough to change services to accommodate coordination (see the previous discussion).

A critical area of intermodal coordination is for freight services at ports and airports. Sea and airport efficiency requires infrastructure owners to manage different operators bringing a wide variety of freight into and out of their facilities using a range of transport modes.

Airports are operated by private providers. Melbourne Airport is managed by Australia Pacific Airports Corporation Ltd (APAC). APAC acquired Melbourne Airport in July 1997 under a 50-year lease from the Commonwealth Government, and has an option to lease for a further 49 years. Linfox owns Avalon Airport and a Linfox–Becton joint venture owns Essendon Airport. Melbourne Airport handles over 225 000 tonnes of air freight per annum through cargo terminal operators that include Qantas, Menzies, Patrick's, Australian Air Express and DHL. The 21 dedicated freight services arriving and departing each week are run by carriers such as Australian Air Express, Malaysia Airlines, Cargolux, Polar Air Cargo, Cathay Pacific and Singapore Airlines. Co-ordination is achieved primarily through the commercial relationships between Melbourne Airport and service providers.

In relation to local planning regulations, there are some legislative controls in place that give Melbourne Airport the ability to ensure other land development does not impede the efficiency of the airport. In relation to height issues, around 12 local councils are required to notify Melbourne Airport of any development proposals in their municipalities that may infringe on airspace. This is currently a notification requirement only, so there are no triggers attached for local planning authorities. Melbourne Airport will be working with the State Government and local councils in future to clarify issues around current requirements for consultation on developments that infringe on air space. In relation to noise issues, Melbourne Airport is a referral authority under the Victorian Planning Provisions and, consequently, it is consulted on a variety of development and land use proposals that have the potential to impact on airport operations.

In 1992, the State Government established overlay controls for areas around Melbourne Airport to ensure inappropriate development and residential subdivision would not threaten the airport's curfew-free operation in future. More recently, in May 2003, the Minister for Planning approved the Melbourne Environs Strategy Plan (Strategy Plan) which further strengthened the existing overlay planning provisions. The Strategy Plan recognises the economic importance of ensuring Victoria maintains its 24 hour operating airport by applying planning controls in accordance with the aircraft noise exposure forecast (ANEF) contours. The Strategy Plan is a key step in addressing the interface between airport operations and land management for the airport environs.

Melbourne Airport is a referral authority for four councils under the current overlay controls, namely Hume, Brimbank, Moonee Valley and Melton. The Strategy Plan proposes to include Whittlesea as the fifth council to consult with Melbourne Airport on relevant planning and land use matters. The Strategy Plan proposes that in time Melbourne Airport will cease to be a referral authority for the five councils and prescriptive schedules will require the councils to notify

Melbourne Airport of any relevant development proposals within the ANEF contour areas.

Melbourne Airport has plans to construct a second exit from the airport to the Tullamarine Freeway at some stage in the next four years. Concept plans have been approved by the City of Hume and by VicRoads. The exit road will be fully funded by Melbourne Airport.

The Port of Melbourne Corporation is State Government owned. Its objectives, powers and functions are set out in the Port Services Act 1995. It owns and manages the land and berths in the Port of Melbourne and commercial navigation channels in the port waters. It coordinates commercial shipping vessel movements in the port and Port Phillip Bay and maintains the commercial navigation channels and aids. The corporation undertakes integrated management, planning and development of the land and maritime functions of the port and integrates the port with the broader freight and logistics infrastructure and services. Integration issues arise from the mix of road and rail freight entering the port and the interactions between trucks entering the port and the surrounding road network. A number of strategies/projects are seeking to improve port efficiency, such as channel deepening; grade separation of Footscray Road; new rail alignments; and relocation of the Melbourne Wholesale markets. Some mechanisms have been established to assist consultation on individual projects and to improve coordination between agencies. In this context, Melbourne Port@L was established in June 2004 to draw together government agencies with responsibilities for the port, Dynon rail terminals and associated road links.

4.6 Integrating transport planning and other policy areas

Transport congestion management is also affected by other policies that change transport demand, most significantly land use planning. Planning decisions affect people and businesses and the location and the layout of the urban environment. This flows through to the location and level of congestion. Other policies, such as the location of public buildings (such as schools and hospitals), can also affect congestion. Similarly, some Commonwealth tax policies, such as fringe benefits tax, can influence the demand for car travel and thus congestion.

4.6.1 Urban planning

The objectives of land use planning in Victoria are set out in s.4 of the Planning and Environment Act. They are to ensure the fair, orderly, sustainable and economic use and development of land, having regard to environmental, social, heritage and community interests. Through the use of planning schemes, the Government must balance, integrate and reconcile competing and differing

considerations, having regard to the interests of property owners, net community benefit and sustainable development.

The Act is relevant to traffic congestion in that its procedures must be followed when decisions are made on applications for re-zoning of land and for planning permits on the siting of buildings—places of work, shopping centres, private schools and dwellings, including high-rise dwellings. Such decisions give rise to transport needs as people travel from their homes to school or work or other places. To accommodate these needs, decisions are made on road and public transport infrastructure and services that will be provided, including provisions for parking and delivering goods to businesses. The way transport planning is coordinated with land use planning will affect the availability of current and future alternatives to road based transport. This may include, for example, whether there are reserves for future cycle paths, public transport corridors or capacity for dedicated public transport lanes on roads. It also influences the road system's capacity to manage traffic throughput. Works in Geelong, for example, designed to beautify the streetscape and improve urban amenity, have been one of the factors contributing to congestion affecting trucks and buses through the city centre. DSE has primary responsibility for planning in Victoria, reporting to the Minister for Planning and overseeing the strategic and statutory operation of the system by local councils.

Transport requirements are explicitly recognised in the Victorian Planning Provisions (VPPs) (the framework for all of Victoria's local planning schemes). Clause 18.02 of the VPPs deals with transport access to new developments and requires:

> Consideration should be given to all modes of travel, including walking, cycling, public transport, taxis and private vehicles (passenger and freight) in providing for access to new developments. The integration of public transport services should be encouraged in new development. (cl.18.02-2)

Using the VPPs template, local councils construct a planning scheme for their municipality by inserting a municipal strategic statement (which sets the strategic vision for the municipality) and local policies (which serve to detail and assist decision making for users of planning schemes). Councils may select zones and overlays from the VPPs that are relevant to their municipality, and may add local schedules to reflect strategically justified local requirements.

There are mandatory requirements to consult in the planning framework, including on transport issues. Under section 55 of the Act, a responsible authority, such as a municipal council, consults with other agencies that have an interest in a planning application. The responsible authority must give a copy of an application for a planning permit to referral authorities whose interests may be affected or where they can add value to the decision making process in

accordance with clause 66 of the VPPs. The referral authority may then advise the responsible authority whether it objects to the granting of a planning permit or wishes the planning permit to be subject to certain conditions (s.56). A referral authority can, therefore, influence the outcome of applications for planning permits. VicRoads is a referral authority under the VPPs. DOI and DSE are negotiating for the Director of Public Transport to become a referral authority. These negotiations include discussion of the triggers for referrals (that is what types of planning applications will be referred to DOI). The final amendment to the VPPs will need to be approved by the Minister for Planning.

Integrated transport planning

Melbourne 2030 provides the overarching policy context for integrated planning in Melbourne. The need for integration was reinforced by the strategies and actions in the *Metropolitan transport plan: Managing congestion* (DOI 2005c). Integrated planning strategies are also being developed to apply the high level policies and objectives to regions that share interconnected transport facilities and needs. The strategies are medium to long term (about 20 years) and identify construction, service provision and/or planning projects that are necessary to meet the regions' current and anticipated transport needs. The strategies cover all forms of transport, including walking, cycling and public transport.

Integrated planning strategies are developed with community consultation by DOI in partnership with local councils and other organisations, such as DSE and VicRoads. The strategies commenced or finalised so far are:

- Inner West—Maribyrnong, Hobson Bay and Moonee Valley
- North East—Banyule, Manningham, Whittlesea and Nillumbik
- Outer Western suburbs—Brimbank, Wyndham and Melton
- Whittlesea
- Northern Central City Corridor—Inner northern suburbs.

The Commission is aware of other initiatives intended to encourage a more integrated approach to transport and land use planning between the State and local governments. They are:

- integrated transport plans
- the growth areas authority
- activity centre planning and the transit city program.

Appendix E includes maps of the growth areas and activity centres. The Growth Areas Authority is still being implemented. While integrated transport plans are currently required under the State Planning Framework, DOI is still developing guidelines for the use of the plans.

Traffic congestion is often seen as an issue around private developments. A $200 million expansion of the Chadstone Shopping Centre, for example, was

approved by the Minister for Planning in December 2005. Traffic congestion around the shopping centre was a concern to nearby residents. The Minister said that the Chadstone proposal would minimise the number of car trips by improving walking, cycling and public transport access (Hulls 2005a). There are no existing rail links to the shopping centre and, accordingly, the Stonnington Council lobbied for such links to be established. However, the Minister did not take up the council's proposal for the construction of a rail link (Millar 2005).

Since September 2005, the State Planning Policy Framework requires integrated transport plans to be prepared for all new major residential, commercial and industrial developments. The plans are prepared by developers at the project conception stage and aim to ensure that developments adequately plan for all travel modes and that access and egress to the site are managed appropriately. DOI is consulting with key stakeholders on guidelines for the use of the plans. The Darebin City Council, in conjunction with developers, DOI, DSE and VicTrack is trialling an integrated transport plan in the Preston Central project (redevelopment of the Preston Market and improvement in urban designs for the town hall and Preston Oval). Supporting sustainable and integrated transport planning was set as one of the key principles underlying the development. The parties agreed on a memorandum of understanding prior to funding and the grant of a planning permit. Although significant design changes have been made (such as altering the site to face the railway station to maximise accessibility and mobility), the costs are smaller than if changes were made after construction.

In November 2005, the Government announced it was establishing a Growth Areas Authority. The authority will take over some of the planning roles currently undertaken by councils, providing 'well thought out plans for whole communities'. It is also an advisory body, and will advise government on the coordination of land development, infrastructure needs and service provision in growth areas (DSE undated, p. 1). In addition, it will facilitate development by providing 'a one-stop-shop for councils and developers involved in building new suburbs in growth areas' (Hulls 2005b, p. 1). The Authority is expected to work in partnership with local councils, the community, developers and infrastructure providers to ensure effective coordination of growth area planning, infrastructure and service provision. The details of the resources, procedures and responsibilities of the authority are still being finalised.

Over 100 principal and major activity centres were identified in *Melbourne 2030* (DOI 2002a). Activity centres are places where people shop, work, meet, relax and live. Plans are developed for these centres to define the preferred direction of growth and articulating how change will be managed. This will include building better transport links and increasing public transport to these areas (DSE 2003b, pp. 1–2).

Nine metropolitan and four regional centres have been selected as Transit Cities. It is the Government's intention to develop transport links to these areas so they provide a transport node, either train, light rail or bus terminus, which can be a focus for development. This approach is intended will allow a mix of land uses to be clustered in one area and encourage the use of public transport to access those facilities (DSE 2006).

4.6.2 Other government policies

Major development projects, such as the expansion of shopping centres and the location of government buildings such as hospitals and schools, have transport implications. The Commission expects that the issues around private development will be dealt with through integrated transport plans. There can, however, also be transport issues around government buildings, which can significantly increase the number of people seeking to go to an area. The way cars access such buildings, their integration with public transport and access by pedestrians and cyclists can, combined, affect congestion in local areas. In most cases, the internal government consultation processes on managing the access issues for new developments are, at best, informal and sometimes non-existent.

Government agencies may also be exempt from the processes that help ensure private developers take into account issues such as congestion when planning their projects. Section 16 of the Planning and Environment Act provides that a planning scheme is binding on every Minister, government department, public authority and municipal council except when the Governor in Council, on the recommendation of the Minister, directs by an Order published in the *Victorian Government Gazette*. Under this provision, exceptions have been given to the Ministers for Health and Education (Government of Victoria 1988). As a result, planning schemes are not applicable to State hospitals and schools, even though they may raise significant planning issues. At the time of the exception, the then Premier gave a direction that Department of Health and Department of Education officers were to engage in effective consultations with local municipalities. The direction is still in force.

Commonwealth tax policies

Commonwealth tax policies can affect choices between modes of transport and types of vehicles. They, therefore, affect the Victorian Government's ability to encourage people to shift their travel practices and reduce congestion. The three issues that have been raised in this inquiry are:

- fringe benefits tax and its affect on incentives to include cars, but not public transport, in employees' salary packages
- fuel excise and how it affects road pricing policies and the distributional consequences of moving to congestion charges

- the tariffs on four-wheel drive vehicles, which reduce their cost relative to other imported cars and encourage people to purchase four-wheel drive vehicles.

First, the fringe benefits tax arrangements encourage people to salary package in such a way to substitute salary for a novated lease on a car and to increase the kilometres travelled in that car. Salary packaging involves an employee converting part of their cash salary into other benefits, such as a vehicle. The value of the vehicle is no longer subject to income tax but becomes subject to fringe benefits tax. The fringe benefits tax rate for vehicles, even those with low mileage, is less than the marginal tax rate for someone earning more than $21 600 a year. There is, thus, an incentive for anyone earning more than $21 600 to convert part of their salary to a car. These incentives increase the more kilometres travelled in the car because the fringe benefits tax rate falls (table 4.5). Similar benefits are not available for the cost of public transport.

Table 4.5 **Statutory percentages of fringe benefits tax for vehicle use**

Total kilometres travelled during the year	*Statutory percentage*
Less than 15 000	26
15 000 to 24 999	20
25 000 to 40 000	11
Over 40 000	7

Source: Australian Taxation Office 2006.

The House of Representatives Standing Committee on Environment and Heritage (2005, pp. 75–6) concluded that these concessions have significant effects, citing that '$750 million dollars a year is spent on subsidising car use in Australia' and 'in Sydney, some 50 per cent of car use during peak hour is estimated to be a result of Commonwealth concessional car use'. The Committee recommended that the Commonwealth Government review fringe benefits tax concessions for car use.

Secondly, the Commonwealth Government collects a substantial amount of money through fuel excise and other taxes and charges. In 2001-02 the Commonwealth collected $9.1 billion from road users (excluding GST collected on cars, petrol and related products and services). Nearly all this was petroleum products excise, with $31 million in federal interstate registration charges. The exact amount of revenue contributed by Victorians is unknown, but if the total is prorated based on vehicle kilometres travelled, Victoria's contribution is about

$2.4 billion. The size of such taxes can have implications for the impact of options that consider imposing charges to reflect congestion costs.

Third, the tariff on imported four-wheel drive vehicles is 10 per cent lower than other cars. The House of Representatives Standing Committee (2005, p. 77) noted that this concession was originally designed to assist farmers, but recognised that such vehicles are 'increasingly common on urban roads'. The Committee recommended that the Commonwealth review its tariff policy in this area. The effect on congestion of lower tariffs on four-wheel drive vehicles depends on how many additional four-wheel drive vehicles are purchased as a result of the tariff concession, whether these vehicles are driven on congested roads and how much additional space they take up on the road.

Part B

5 Participants' proposals to address congestion

Chapter 3 outlined the Commission's findings on the extent of congestion, its costs and the causes of the congestion problem. The 92 submissions to the inquiry put forward a number of options for addressing the broader issue of congestion, both in the short and long term, as well as to address specific congestion 'hotspots'.

5.1 Framework for presenting the options

The views expressed in the submissions have been grouped into seven categories covering road demand management approaches (economic and other measures), road supply management, public transport, walking and cycling, travel substitution, and urban land use and planning[1]. Each of these categories includes one or a number of policy approaches, which in turn describe a group of specific congestion management measures.

It should be noted that in many instances participants proposed a combination of measures to address congestion. An example of this is the City of Melbourne's draft transport strategy, which identified opportunities across categories including road demand management, road supply management, alternative travel modes, and urban land use and planning (box 5.1). It is not practical to reflect all possible combinations in this chapter, but the scope to implement a range of approaches should be kept in mind, and is addressed in chapters 7 and 10. Further, in most instances participants did not provide estimates of the costs or benefits associated with the options proposed. Chapter 7 notes that to form a view on cost effectiveness this information will be an important factor in prioritising options for further consideration and implementation.

[1] Participants' views in relation to freight management are presented in chapter 8.

Box 5.1 City of Melbourne draft transport strategy

City of Melbourne released a draft transport strategy in February 2006 for public comment. The council developed the strategy to help it meet future transport needs. The strategy framework is illustrated in figure 5.1.

The draft strategy identifies three aims for transport in the City of Melbourne, to:

- foster growth that is dynamic, community focussed and sustainable
- reduce congestion
- promote, advocate and prioritise public transport.

The draft strategy framework also identifies the following tools and strategies to achieve these aims:

- Planning and urban design
  - Improve pedestrian environment and linkages
  - Integrate transport and land use planning
- Parking and traffic management
  - Review provision of on-street parking and access
  - Improve cycling opportunity
  - Address road congestion
- Access and advocacy for public transport
  - Invest in public transport
  - Prioritise public transport within road space
  - Manage travel demand
  - Improve connections to public transport.

In particular, the draft strategy identifies a number of specific opportunities including:

- containing the provision of new long term commuter parking spaces in the CBD
- calling for reduced off-peak charge on toll roads such as CityLink to spread peak hour demand
- calling for bus only lanes on Queen and Lonsdale Streets
- continued promotion of the successful TravelSmart and Green Travel Plans program
- offering city residents discounted public transport fares in return for relinquishing parking permits
- discounted public transport fares for city shoppers
- calling for infrastructure improvements to the City Loop rail tunnel such as signalling upgrades to improve capacity
- calling for a new Doncaster railway line
- protecting the municipality's northern suburbs from the impact of increased traffic caused by the opening of Eastlink

(continued next page)

Box 5.1 **City of Melbourne draft transport strategy** (continued)

- working with neighbouring councils to ensure integrated transport routes and traffic management measures
- continue to work with transport operators to ensure that major events are well served with public transport services
- creating a city pedestrian network plan and opening up more laneways to pedestrian traffic
- allocating more road space to pedestrians and cyclists by installing wide pavements and bicycle lanes
- more end-of-trip bicycle facilities around the city
- giving trams priority at city intersections and creating tram only road lanes to improve the speed of service
- lowering city speed limits to 40kmh to improve pedestrian safety
- calling on Victoria Police and the State Government for better enforcement of road rules to target the behaviour of both cyclists and drivers
- further improvements to the connectivity of Melbourne's cycling network
- reducing parking congestion in residential areas
- changes to the planning scheme to promote sustainable travel in new buildings and developments
- dedicated freight only rail lines for the of Port Melbourne
- buffer zones around freight handling areas to protect residential amenity
- changes to building regulations to improve noise control.

Source: City of Melbourne 2006a and 2006b

5.2 Road demand management

5.2.1 Road use charging

The concept of managing demand for existing road space through implementing road use charges received significant attention from inquiry participants' submissions. More than one third of participants (33 submissions) commented on potential for road use charging to affect transport congestion in Melbourne, and to a lesser extent Geelong, Ballarat and Bendigo.

There are a number of forms of road use charges that could be used to address transport congestion. Inquiry participants primarily commented on cordon or area charging, differential road use charging and selective toll approaches to address road congestion.

Proposals in favour of road use charging approaches stemmed from the notion that car users do not currently face the full (social/external) costs associated with car travel. Some inquiry participants considered that appropriately targeted road use charging approaches could change the cost of travel and thereby influence users' travel choices. Transurban stated:

> The concept of road pricing offers one of the most direct and effective methods through which demand can be managed, principally because it fundamentally relies on the concept of user-pays. As a result of changing the real cost of travel, users will make choices on where, when and how they travel. With appropriate targeting these choices can be directed to reduce congestion and support specific government objectives. (sub. 67, p. 14)

Harry Clarke and Andrew Hawkins of Latrobe University considered efficient road use charging to be the 'first best' response to congestion and other traffic externalities:

> The existence of congestion and other traffic externalities suggests gains can be realized with active policy interventions. With low enough transaction costs the first-best intervention is to force drivers to internalise all social costs of travel by pricing road use to ensure efficient usage. (sub. 3, p. 9)

Other participants raised doubts about the scope for congestion pricing to address congestion. The Town and Country Planning Association stated that it:

> … suspects that there is less scope than many congestion-pricing advocates assume, to drive changes in the temporal pattern of travel by penalty-pricing congestion. Given the varying levels of travel value, and that most peak congestion time travel occurs then because it has to, it is arguable that the degree of freedom to modify personal travel demand lies in modal substitution or else demand destruction (in use of Internet, etc). (sub. 68, p. 3)

Cordon/area charging

A number of inquiry participants (14 submissions) commented on the scope for cordon or area pricing—whereby charges are levied as vehicles enter or travel within a specified road area (SGS Economics and Planning sub. 2, p. 31)—to address congestion in Melbourne.

Bus Association Victoria considered cordon congestion pricing to be 'highly relevant to Melbourne' as it can be closely targeted to reduce traffic in congested areas and can generate revenue to fund (public) transport improvements (sub. 57, p. 34). The City of Melbourne also considered a 'London style congestion levy or 'City Access' charge could have a place in moderating demand for central city private vehicle access at times of high demand' (City of Melbourne 2006a, p. 41).

Harry Clarke and Andrew Hawkins also proposed implementing cordon pricing to cover the Melbourne CBD:

> Rigorous enforcement of parking restrictions allows Melbourne to operate a periphery cordon, in which drivers are only charged for crossing the cordon boundary. This helps internalize the social costs of trips out of, as well as of multiple trips across, the cordon and thus better reflects social costs of using roads. As no substitute roads exist, the cordon charge can accurately reflect marginal external cost of using city roads. The charge should vary to reflect the social cost of road use depending on time, day, week and vehicle type allowing a more efficient allocation than London's single price. (sub. 3, p. 20)

Harry Clarke and Andrew Hawkins also observed that Melbourne's radial arterial roads were suited to curbside pricing since:

> …their high traffic volumes justify transaction costs involved and alternative roads are, or can be managed to be, imperfect substitutes for free-flowing arterials. The limited number of entry and exit points minimizes the number of costly gantries required for monitoring. Indeed arterials would only require about ten gantry points, many of which could be strung from bridges. (sub. 3, p. 17)

Other participants considered that cordon pricing may have limited effectiveness in addressing congestion across the metropolitan road network. For example, Robert Wilson considered the London congestion charge/cordon pricing scheme to be '… a blunt instrument of limited efficacy when the problem is citywide' (sub. 6, p. 2).

Cordon/area entry restrictions

Cordon/area entry restrictions are an alternative approach to cordon/area charging. This approach did not receive great attention from inquiry participants other than to refer to international experience—see chapter 6.

Other road use charging

Continuous road use charging

Some inquiry participants commented on continuous road use charging schemes, such as Singapore's electronic road pricing system (Paul Davine, sub. 49, p. 2), the 'pay as you go' schemes trialled in Europe and the UK (City of Yarra, sub. 63, p. 14) and the satellite tolls for trucks instituted in Germany and Switzerland (Robert Wilson, sub. 6, p. 2). The relevant international experience is discussed in chapter 6.

Variable charges

Several inquiry participants considered that introducing road charges that vary with the level of congestion and/or the time of day would assist in discouraging peak hour commuter travel and spreading peak demand. For example, the City of Melbourne's draft transport strategy observed that:

> Current CityLink toll pricing does not vary with the level of congestion on CityLink. This limits the potential of CityLink to redistribute vehicle movements and reduce congestion on City access roads. (City of Melbourne 2006a, p. 64)

The City of Melbourne proposed the introduction of variable pricing initiatives, such as variable prices for CityLink, as a means of discouraging peak hour commuter travel, assisting freight flows and spreading peak demand (City of Melbourne 2006a, pp. 41, 101).

Harry Clarke and Andrew Hawkins stated:

> …tolls are inefficient if only because they are set uniformly over the day. They should be higher at peak periods if they are to reflect instantaneous marginal congestion costs. (sub. 3, p. 11)

The City of Yarra proposed 'pay as you go' road pricing schemes:

> This is a recent idea being trialled in parts of Europe and northern England using e-tag type technology and relates to a pay as you go charge to road use. The cost of using stretches of road depends on the time of day and size of vehicle. Peak hours are charged at a premium rate and very quiet hours attract a negligible or no charge. In the same way that it accepted as standard, to pay for utilities (e.g. gas, electric and water) based on use, so it would seem reasonable to expect to pay for road use. Those using roads less and therefore not contributing as much to wear and tear, pollution and congestion, would pay less than frequent users. (sub. 63, p. 14)

Raptour Systems (sub. 21, p. 11) and Paul Davine (sub. 49, p. 2) also discussed time of day charging.

Transurban noted that there are currently differential prices for commercial vehicles using CityLink at different times of the day (sub. 67, p. 14).

HOT lanes

Some participants considered high occupancy toll (HOT) lanes could address congestion. This solution sees drivers pay a toll to gain access to faster flowing high occupancy vehicle (HOV) lanes which they could otherwise not access (SGS Economics and Planning sub. 2, p. 31).

The VACC acknowledged:

> HOT lanes can be applied in different ways for different effects. For example, toll charging can be concentrated in short time frames during peak demand periods, for example from 7am till 9am and 5pm till 7pm during weekdays. This allows road users to become familiar with High Occupancy Tolls and reduces congestion at other times. (sub. 38, p. 13)

Road tolls

There was limited support for general road tolls to address congestion. Bus Association Victoria considered that there was limited evidence that general road tolls (on the entire road as opposed to tolled freight lanes or roads) reduced congestion rather than to diverting congestion to other roads (sub. 57, p. 34). The Association did consider there may be some potential for road tolls to be targeted more closely to address freight requirements for example through the provision of tolled lanes for freight and public transport vehicles (sub. 57, pp. 26, 34).

Conditions

Many inquiry participants suggested that the introduction of any road pricing initiative should be subject to a range of conditions.

For example, Environment Victoria cited the (Canadian) Victorian Transport Policy Institute in identifying the following elements of best practice road pricing to achieve travel demand management (TDM):

- choose pricing methods that are cost effective to implement, convenient to users, and accurately reflect the costs imposed by each trip
- use time-variable tolls, with higher rates during peak periods and lower rates during off-peak periods
- apply congestion pricing on existing roads, not just new facilities
- price individual trips. Avoid significant discounts for frequent users (this contradicts TDM objectives)
- encourage development of travel alternatives, including ridesharing, public transport improvements and bicycle facilities
- integrate pricing with other TDM strategies that increase travel choice and provide additional incentives to use alternative modes in the same area
- ensure that road pricing decisions are transparent and built on public participation and trust
- address equity concerns by ensuring that all groups receive benefits, either through rebates or improved travel choices
- make prices as predictable as possible. (sub. 73, p. 6)

Many participants supporting road use charging considered that any revenue raised through road pricing should be 'hypothecated' into transport improvements such as the provision of safety net transport services, public transport improvements, other transport improvements and improved information services (Committee for Melbourne (sub. 34, p. 14); Raptour Systems (sub. 21, pp. 5-10); Lawrence Seyers (sub. 9, p. 2); Town and Country Planning Association (sub. 68, p. 1); Environment Victoria (sub. 73, p. 6)).

Also a number of participants considered that the success of road pricing initiatives would be strongly influenced by the availability of alternative travel options, and in particular, a viable public transport system (Frankston City Council (sub. 70, p. 4); Public Transport Users Association (sub. 65, p. 30); City of Melbourne 2006a (p. 41)). For example, the Public Transport Users Group stated:

> Road user charges may have to be very high – arguably higher than what is politically acceptable – to shift journeys away from private cars unless the public transport network offers an acceptable level of geographic coverage, speed and comfort. (sub. 65, p. 31)

While the Town and Country Planning Association suggested:

> Road pricing of passenger vehicle traffic should be progressively rated to penalise more heavily short trips in the inner city, which is well served by mass transit: e.g. Port Phillip residents who still drive a car into the CBD for work trips. That is, one dimension of the RPS [road pricing system] $ [dollar] charge would be predicated on the quality of access of travel options via existing public transport in a given precinct. (sub. 68, p. 5)

Some participants suggested public acceptance of road pricing approaches could be increased through pilot or trial programs. For example, the VACC advocated introducing HOT lanes via pilot program to boost public acceptance.

Other participants (for example, Committee for Melbourne, sub. 34; Jackie Fristacky, sub. 58; RACV, sub. 59) suggested that road pricing should only be introduced in the context of broader reforms. The RACV stated:

> A congestion pricing mechanism should only be considered if it was part of a comprehensive reform of the transport user charging system. Any new motoring charges, particularly any congestion charge, must be offset by a reduction in the charges which motorists currently pay, since it is unacceptable that motorists pay twice - once via current charges and taxes, and again via a congestion charge. (sub. 59, p. 4)

5.2.2 Parking pricing and supply restrictions

Parking policies, in particular parking pricing and supply restrictions, are another means through which to manage road demand. The Eastern Regional Integrated Transport Group stated 'Parking controls are very useful tools to combat congestion' (sub. 24, p. 14). A large number of other inquiry participants (40 submissions) also commented on parking measures or the scope for parking policies to address transport congestion.

Participants considered that parking policies were relevant to congestion in two ways. Firstly, the cost and availability of parking influences the attractiveness of car travel. For example, the City of Yarra stated:

> A cheap and accessible supply of parking simply encourages greater car use. Where parking is abundant, then there is little incentive to not drive. (sub. 63, p. 14)

Bus Association Victoria stated:

> Melbourne makes considerable provision for car parking—with 349 parking spaces per 1000 employees in the CBD. This is considerably higher than many other cities, such as Sydney, Toronto, Zurich, Paris, Copenhagen and New York. The quantity of parking spaces is clearly an influence on travel choices. However there is also a direct relationship between parking supply and price, and Melbourne has relatively cheap CBD parking.
>
> Much of this parking is provided at discounted 'early bird' rates, making parking costs less of an issue for people making transport choices. The City of Melbourne has identified a failure to reverse the trend of cheap all day commuter parking, citing State Government granting permits for construction of parking and likely contravention of National Competition Policy. These institutional and regulatory barriers must be tackled to influence transport choices and hence congestion. (sub. 57, p. 19)

Measures which affect the cost and/or availability of parking could influence the timing and/or level of car use. The inter-relationship between these two factors further reinforces the need to consider parking policies from a broad perspective, assessing the impact of all demand and supply measures in aggregate.

Some participants considered that on-street parking can impede traffic flow and contribute to congestion. Measures that restrict or remove on-street parking could free up road space and therefore alleviate congestion.

The approaches proposed by participants would operate in one of four ways:

(1) charging for the existing parking supply
(2) restricting expansion of the parking supply
(3) linking parking with public transport services
(4) reducing the existing parking supply.

Parking charges

More than one quarter of inquiry participants (24) making submissions commented on parking charges, and in particular, the recently announced CBD parking levy. Some participants, including the Eastern Regional Integrated Transport Group (sub. 24, p. 6) and Bus Association Victoria (sub. 57, p. 35) supported the use of parking levies to address congestion in Melbourne. Bus Association Victoria, for example, noted that parking levies act to increase the cost of car travel and thereby increase the attractiveness of alternative travel modes. The Association also stated that parking levies had the benefits of being able to be reasonably well targeted towards commuter trips where there is likely to be a viable public transport alternative, and generate revenue that can be used to fund public transport improvements (sub. 57, p. 35).

The Metropolitan Transport Forum observed that while the supply of off-street parking in the CBD increased by more than 45 per cent between 1995 and 2000, the introduction of a car parking levy in Sydney and Perth in the late 1990s slowed the growth of CBD parking (sub. 12, attachment 1 (Scheurer et al 2005) p. 6).

Other participants did not believe the levy would reduce congestion. The Property Council of Australia (Victorian Division) opposes the introduction of the congestion levy, stating:

> It taxes a destination (ie a car park) rather than the decision to use the motor car. The result is there is a range of motorists who will not have to pay the levy because they drive through Melbourne, but do not park within the levy zone, or they find alternative parking arrangements (ie short term, visitor or exempt parks). (sub. 48, p. 5)

Both the VACC (sub. 38, p. 12) and Wilson Parking (sub. 27, p. 2) referred to work prepared by Access Economics Pty Ltd in supporting their objections to the CBD parking levy. Wilson Parking cited Access Economics in stating '…the car park levy is a blunt, poorly-targeted and discriminatory method of mitigating the costs associated with traffic congestion in the Melbourne CBD' (sub. 27, p. 2). Wilson Parking also referred to the introduction of parking levies in other Australian cities stating 'We have seen firsthand the effects of the introduction of parking levies in Sydney and Perth, and know that despite all of the promises of

reduced congestion and pollution, as a long-term solution they have not worked' (sub. 27, p. 1).

Inquiry participants also commented on other forms of parking pricing. Raptour Systems Pty Ltd considered that current CBD parking pricing policies do not encourage travel outside of peak periods and stated:

> Most parking lot pricing policies used by the larger parking managerial groups usually penalise users after 9am, 9.30am and 10am, and yet this is the times you want passenger vehicles to go to parking lots, after peak hours. The pricing is understandable by the parking companies, as it is levied in line with the certainty of revenue on a daily basis, yet it is hardly conducive to encouraging passenger vehicles to avoid peak hour(s). (sub. 21, p. 6)

The City of Melbourne draft transport strategy identified the wide variation in CBD short term parking rates as presenting an opportunity to reduce congestion and stated:

> "Early Bird" discount parking schemes for all day parking, targeted at city workers, currently range from $8.50-$17.00 per day, with fairly significant levels of competition between parking station operators. By contrast, it appears that short term parking is much less competitive, with rates of $4-13 per hour typically applying throughout the city. More competitive short-term parking may help ease congestion, as motorists no longer feel the need to drive around looking for cheaper on-street parking. (City of Melbourne 2006a, p. 41)

Parking spaces in new developments

A few participants considered that measures to restrict the growth in parking spaces may address congestion by making private car travel a less attractive option. For example, the Public Transport Users Association called for the removal of minimum parking requirements in urban planning regulations (sub. 65, p. 29). The Municipal Association of Victoria noted that such measures were currently being attempted in some local areas:

> Some councils have begun to develop Parking Limitation Policies to seek [to] limit the number of car parks provided in developments (e.g. Cities of Melbourne and Port Phillip) and the use of on-street parking with new development sites (e.g. Cities of Port Phillip, Yarra and Darebin). (sub. 30, p. 6)

Park and ride schemes

Park and ride schemes, with parking facilities connecting to train or shuttle bus services, could address congestion by encouraging some travel to shift from private car to public transport, reducing car traffic in congested areas. About one fifth (17) of participants making submissions to the inquiry considered park and ride facilities had the potential to address congestion.

For example, Harry Clarke and Andrew Hawkins stated:

> Park- and- ride facilities allow travellers to drive to public transport, park and then transfer to public transport. Melbourne already exploits park- and- ride, with over 23,000 car spaces provided near stations in addition to on-street parking (Mees (2000, p. 231)). (sub. 3, p. 17)

Most participants commented on park and ride facilities in terms of their potential to facilitate modal change from car travel to public transport. Metlink (sub. 29, p. 32) and the Committee for Melbourne (sub. 34, p. 48) both identified the provision of commuter car parks in middle and outer suburbs as an element of improving the attractiveness of public transport services. The Department of Infrastructure noted that the *Metropolitan transport plan* identified 'improved modal interchanges and expanded 'park and ride' facilities' as a strategy to address capacity constraints on the public transport system (sub. 55, p. 3).

The Eastern Regional Integrated Transport Group (ERITG) also supported the provision of park and ride facilities and stated:

> … there is a need to develop a plan which creates a series of park and ride facilities around the city where motorists can park and then use shuttle public transport into the CBD, the parking fee being incorporated in the fare. (sub. 24, p. 6)
>
> Car parking at stations should be expanded as a means to increase patronage. Generally park and ride needs to be actively investigated and options associated with the Mitcham to Frankston should be investigated. (sub. 24, p. 8)

In particular, the group was supportive of a Grenda Bus Lines proposal to introduce park and ride facilities at Dandenong:

> Grenda Bus Lines have a proposal before government which proposes to create a park and ride at Dandenong close to the Monash freeway and run express buses into the city on the Monash Freeway using emergency lanes.
>
> … The project caters for the large population in Casey and Cardinia which is rapidly increasing. ERITG strongly support the proposal. (sub. 24, p. 6)

Bus Association Victoria considered park and ride facilities can be effective where quality connecting services are not available or convenient, or for more time sensitive journeys. However, the Association stated that park and ride facilities can be expensive and does not tackle high levels of car ownership (which encourages car usage at other times). The Association also considered that park and ride cannot provide the capacity to greatly increase patronage, particularly on the rail network, and estimated that over 100 000 additional car parking spaces would be required to meet the Government's 20/2020 target by park and ride initiatives alone (sub. 57, p. 28).

Reducing or restricting existing parking supply

On-street parking

The Department of Infrastructure noted that restricting kerbside-parking during peak hours on arterial roads is one of a number of approaches to managing congestion identified in the *Metropolitan transport plan* (sub. 55, p. 21). Other inquiry participants also considered that reducing the current supply of on-street parking could improve traffic flows and therefore assist in addressing congestion.

Tony Robinson MP proposed that the potential benefits of removing parking rights on major arterial roads over a 10-15 year period be investigated and stated:

> I attended a conference some time ago at which the subject of on road parking rights was discussed. The speaker suggested that while this was a long established right, it needed to be reviewed on key arterials where the critical role of the road was the movement of traffic. The speaker recommended that on certain arterial roads the right of adjoining residents to park on the road, even outside peak hours, should be withdrawn over time. This, he suggested, could be done by nominating a date 10-15 years hence when all on-street parking rights along a nominated stretch of arterial road would be removed, and properties sold prior to that date would carry clear advice to this effect as part of the sale process. (sub. 19, p. 3)

Glen Mills also called for parking on arterial roads to be eliminated, noting this had been done in Perth for many decades (sub. 47, p. 2).

The Maroondah City Council proposed that local governments could assist in addressing road congestion by:

> Develop[ing] a strategy/policy in relation to the implementation of parking restrictions on key roads, so that the roads can be reclaimed from parked cars, and dedicated road space can be committed for cars, buses and bikes. (sub. 20, p. 3)

On the other hand, some participants opposed removal of on-street parking as it is considered essential for local businesses' viability and is also a revenue source for councils (MAV sub. 30, p. 6). The City of Yarra also identified the provision of on-street parking as contributing towards giving pedestrians priority in shopping strips and activity centres (sub. 63, p. 17). These divergent views expressed by participants highlight the complexity involved in balancing the competing interests of various groups within the community.

Off-street parking

Some participants also called for reductions in off-street parking supply. John McPherson observed that the City of Melbourne had invested heavily in off street car parking facilities, and that it earns substantial income (approximately

$40 million per annum) through parking charges. He proposed that the city should instead encourage more sustainable transport (including public transport, walking and cycling) and stated that in doing so:

> The City of Melbourne should be moving to the rapid conversion of its offstreet car parking assets to either commercial, residential or community use, not associated with vehicle based transport. Then council policy would be less warped by the necessity to protect the shrinking income stream from its car park assets. (sub. 26, p. 2)

5.2.3 Financial and taxation policies

Approximately one third of inquiry participants making submissions (27) identified financial and taxation policies as also having the potential to influence road demand. The three areas attracting most comment related to car purchase and ownership taxes, fuel taxes and the (tax) treatment of car ownership and parking. These measures typically work by changing the costs of owning and operating a car, with a view to influencing the attractiveness of car travel relative to alternative modes.

Car purchase and ownership taxes

Many participants (17) considered that the current fixed costs of car ownership created a disincentive to shift away from private car to alternative forms of transport. They proposed moving towards variable car ownership costs. SGS Economics and Planning stated:

> A primary issue with automobile ownership is that the fixed costs of vehicle ownership (purchase price, registration and insurance) far outweigh the variable costs (fuel, wear and tear). Such an arrangement implicitly compels drivers to get the most from their vehicles by driving them as much as possible. It is arguable that balancing the costs further towards variable aspects, i.e. through reduced vehicle taxes but heightened fuel or emission taxes, would promote drivers to use public transport or other modes more often. (sub. 2, p. 34)

Some participants proposed introducing variable registration payments to provide choice for vehicle owners as to when they use their car (Tony Robinson MP (sub. 19, p. 3); 3068 Group (sub. 51, p. 1)). Tony Robinson MP proposed that discounted off-peak or weekend registration payments may attract some vehicle owners to use their vehicles outside of peak congestion hours (sub. 19, p. 3). However, submissions did not explore the avenues for enforcement processes and the effectiveness of these.

Other participants, including the VACC (sub. 38), Bus Association Victoria (sub. 57) and the Public Transport Users Association (sub. 65), considered adopting distance based insurance and registration fees to be another means of

moving towards more variable car ownership costs. For example, Bus Association Victoria stated:

> Distance based fees encourage overall reduced use of vehicles. However this reduced use is not targeted to congested areas or times and goes nowhere near reflecting marginal congestion costs.
>
> Distance based fees help ensure the costs of travel on society are better reflected in the price paid by vehicle owners. They reduce the fixed costs and increase the marginal costs of car travel, which should have a stronger bearing on car use.
>
> … We believe distance based fees would be a useful measure for Victoria, in conjunction with other mechanisms. (sub. 57, p. 35)

The VACC expressed some support for distance based registration and insurance fees, but noted that 'the central issue lies in tracking relevant fees to the road user' (sub. 38, p. 10), and recommended further investigation into electronic charging technologies to achieve this.

The Eastern Regional Integrated Transport Group proposed a third approach to variable car ownership costs:

> Road pricing is essential, current fuel excise does not address the costs imposed by all road users. Large vehicles operators do not pay their way for the costs they impose on the transport system. Congestion charges, pollution charges, maintenance charges all need to be properly investigated and a new system introduced after consultation with the community. Registration and insurance needs to relate directly to the class of vehicle and the costs that class has on the transport system. (sub. 24, p. 10)

Treatment of car ownership and parking

Eleven submissions from inquiry participants commented on the incentives for increased car use created by fringe benefits tax concessions for vehicle owners. Participants proposed that removing these incentives could reduce car travel and hence reduce congestion. The Public Transport Users Association stated:

> The Australian tax system provides a range of generous tax deductions and concessions for motor vehicle use that are not available to public transport or active transport. As a result, transport decisions are biased towards motor vehicle use at the expense of more space and energy efficient modes. For example, company cars make up about 40 per cent of peak hour traffic, despite only comprising 16.5 per cent of vehicle sales (Australasian Railway Association 2000). A more rational and economically efficient balance would be achieved by reforming the Fringe Benefits Tax Assessment Act 1986 (Cwth) to eliminate the incentive to drive further under the Statutory Formula (s.9), and remove concessions for the provision of car parking (Div. 10A). (sub. 65, p. 17)

The 3068 Group similarly stated:

> Salary packaging, and tax deductible company cars, petrol and car parks are areas of policy that urgently require a federal review since they exacerbate car dependency in Melbourne while a neutral policy would encourage alternatives. (sub. 51, p. 2)

Other participants to call for a review of, or propose changes to, current arrangements included the VACC (sub. 38, p. 15), Jackie Fristacky (sub. 58, p. 1), Alan Parker Design (sub. 18, p. 7), the Australian Council for Infrastructure Development (sub. 54, p. 2) and the City of Yarra (sub. 63, p. 19).

Other participants proposed that employers instead offer subsidised or discounted public transport tickets to encourage public transport use, and 'reduce dependence on non-essential car salary packaging' (sub. 9, p. 1).

Not all participants, however, considered changing existing arrangements to be a viable option. For example, the Property Council of Australia stated:

> Certain workplaces offer car spaces or company cars as part of the employment package. Revoking these entitlements in lieu of other benefits (eg public transport tickets, cash etc) in our members' experience is almost impossible. It needs to be acknowledged that many services firms use cars in their day to day operations. Suggesting employees switch to public transport may be simply out of the question. (sub. 48, p. 4)

Fuel taxes

Inquiry participants did not consider fuel taxes to offer much promise for addressing congestion. Harry Clarke and Andrew Hawkins observed that a fuel surcharge can internalise (non-congestion related) externalities (including 'pollution, noise, vibration, accident risk and the aesthetic degradation of neighbourhoods' (sub. 3, p. 12)), but considered this to be a 'blunt' approach that 'does not specifically address congestion and creates inefficiencies by leading to under-utilization of road networks at uncongested times and places' (sub. 3, p. 13).

The Eastern Regional Integrated Transport Group stated that the federal government needs to:

> Review fuel excise and move to road charging to collect funds from transport users in proportion to the costs they inflict when using the transport systems. (sub. 24, p. 13)

Bus Association Victoria stated:

> We do not believe increasing fuel levies would be a practical and highly effective means to reduce congestion. However, it would create a revenue stream that the Federal Government could use to support PT [public transport] upgrades. (sub. 57, p. 36)

Other

Some participants proposed the introduction of new taxes as a means of addressing congestion. Frank Fisher proposed the introduction of an annual public transport levy, whereby all income earners would be required to pay an annual amount to support the provision of public transport services free of charge (sub. 69, p. 2).

5.3 Mobility management

Mobility management policies—which focus on changing people's preferences on when, how and with whom they travel—are another means for influencing the demand for car travel and hence road space, at peak times and overall. Around one quarter of inquiry participants (23 submissions) proposed mobility management measures to shift travel behaviour. These proposals are outlined below.

5.3.1 Travel demand modification policies

A number of inquiry participants observed that measures that sought to spread the period of peak demand or shift travel outside of the peak travel period could address congestion at peak periods. In particular, several inquiry participants (seven submissions) commented on the potential for staggered or flexible work or school hours to address transport congestion by spreading demand particularly around the morning peak. Bus Association Victoria stated:

> Flexible working hours can spread the peak period for congestion, and remove overlapping peak periods. Some evidence suggests the morning peak is shorter and more severe than the evening peak – largely attributable to school hours. (sub. 57, p. 36)

The City of Yarra also proposed encouraging employers to adopt flexible working hours (sub. 63, p. 15), while Lawrence Seyers called for city based state government authorities to restructure working hours to spread peak period travel demand (sub. 9, p. 1).

Inquiry participants also proposed changes to school and shopping hours. For example, Bus Association Victoria proposed that consideration be given to school and shopping hours to address congestion relating to 'overlapping peaks' (sub. 57, p. 36). The Eastern Regional Integrated Transport Group proposed a

trial of flexible school hours to measure the effects on transport demand and schools and students (sub. 24, p. 10).

Other participants noted some potential limitations of these measures. The VACC (sub. 38, p. 15), the Property Council of Australia Victorian Division (sub. 48, p. 3) and the Department of Infrastructure (sub. 55, p. 16), noted that such flexibility may not be possible or desirable for some households, schools or businesses. Harry Clarke and Andrew Hawkins commented on the limited impact such measures are likely to have:

> Introducing greater flexibility in working hours reduces travel demands during peak periods but also reduces the coordination benefits that arise from synchronisation of work hours. Triple convergence will offset all but the most extreme flexi-time strategies and such strategies would need to be organized city-wide to significantly reduce congestion. (sub. 3, pp. 16-17)

Ride-sharing policies

Inquiry participants also considered ride sharing policies, and in particular car pooling, had the potential to reduce congestion by increasing the vehicle occupancy rate and thereby removing some vehicles from the road. The Department of Infrastructure commented that the average vehicle occupancy rate in Australia is low and considered that increasing the occupancy rate, through measures such as carpooling, 'would make a marked contribution to easing congestion in peak times' (sub. 55, p. 16).

A number of inquiry participants proposed measures that could increase the attractiveness of ride-sharing/car pooling. Some participants considered that the provision of financial incentives may encourage individuals to participate in carpooling (Paul Yeatman, sub. 14, p. 2; Michael Groves, sub. 45, p. 3) or encourage employers to offer financial incentives to their employees to promote carpooling (VACC sub. 38, p. 15).

Participants also suggested that services that matched persons with similar travel needs, such as the Ozcarpool website, may make carpooling a more attractive travel option (Ozcarpool, sub. 11, p. 2; Michael Groves, sub. 45, p. 3).

The Department of Infrastructure considered that the provision of 'high occupancy vehicle' (HOV) lanes provided 'an incentive for pooling in the form of faster commuting times' (sub. 55, p. 17); however, Harry Clarke and Andrew Hawkins questioned their overall impact on congestion stating 'High occupancy vehicle lanes encourage ride-sharing but also restrict supply, increasing congestion' (sub. 3, p. 16).

The Public Transport Users Association considered that carpooling had limited appeal, and stated 'carpooling's inflexibility will mean that it will only ever be attractive to a diminishing minority of commuters. In contrast, good public transport, with its 'go anytime anywhere' capability, has much broader appeal.' (sub. 65, p. 29)

Travel planning

Travel planning and associated education, information and awareness raising initiatives seek to influence travel behaviour by informing people of their travel options. Inquiry participants' proposals in this area typically focussed on TravelSmart initiatives currently operating in some Victorian communities, educational facilities and workplaces (box 5.2).

BOX 5.2 Travel Smart

Eleven submissions discussed TravelSmart, with most calling for the continuation and extension of these demand management initiatives. For example, Alan Parker Design stated:

> … measures of 'transport mode shift' and 'lifestyle change' can best be made at local government level by the promotion of Travel Smart programs or 'Individualised Marketing' which have already made very significant reductions in car travel rates. … Travel Smart programs for the able bodied need to be applied in the outer suburbs of the capital cities where most single occupant car commutes and driving generally originate to increase walking, cycling, car sharing and the use of public transport. (sub. 18, pp. 38-9)

Yarra Trams commented that *Linking Melbourne: Metropolitan transport plan* flags the intention to extend Travel Smart as follows:

> extend the TravelSmart program further into communities in inner and middle suburbs over the next ten years; and continue the implementation of TravelSmart in schools, universities and workplaces. (sub. 61, p. 6)

Some regional participants also indicated that TravelSmart programs were attractive for regional cities. The City of Greater Bendigo encouraged the use of TravelSmart programs in the Bendigo region stating 'one of the key shortfalls of the current system is a lack of awareness and information about the services' (sub. 42, p. 5).

Regardless of where offered, inquiry participants noted that the success of Travel Smart initiatives will depend on good access to car travel alternatives. The Committee for Melbourne suggested the continuation of TravelSmart (or similar behavioural change programs) in areas with high public transport service levels (sub. 34, p. 49). Bus Association Victoria stated:

> Travel Smart has a key role to play in Melbourne; however its application must be limited to areas that have a high level of public transport service. The majority of areas in Melbourne currently do not have a high quality public transport service. (sub. 57, p. 37).

(continued next page)

Box 5.2 **Travel Smart** (continued)

Alan Parker Design stated that TravelSmart programs would be much more effective in outer urban areas if public transport services were improved, and noted in turn promotion of these services through TravelSmart programs would assist in ensuring high occupancy levels (sub. 18, p. 14).

There is some evidence that TravelSmart programs have been successful in effecting behavioural change in Victoria. For example, the Department of Infrastructure referred to a TravelSmart demonstration project in the City of Darebin that operated between April and October 2004. The department noted that an evaluation revealed that from March 2004 to March 2005 the TravelSmart project resulted in:

> a 2-3 per cent reduction in traffic on streets inside the Darebin study area. Given that on road traffic is a mix of local and through traffic, this is equivalent to an average reduction of five per cent in car travel by Darebin residents in the project area;
>
> a 15 per cent increase in tram ticket validations at route points inside Darebin compared to the average of the metropolitan tram network;
>
> a 15 per cent increase in sales of metcards at retail agents inside Darebin, compared to the average of the metropolitan retail agent sales; and
>
> a three percentage point increase in average customer satisfaction rating for public transport in the Darebin area. (sub. 55, p. 26)

Sources: Alan Parker Design, sub. 18, pp. 38-9; Bus Association Victoria, sub. 57, p. 37; City of Greater Bendigo, sub. 42, p. 5; Committee for Melbourne, sub. 34, p. 49; Department of Infrastructure, sub. 55, p. 26; Yarra Trams, sub. 61, p. 6.

5.4 Road supply management

In addition to measures to manage road demand, participants (57 submissions) also commented on the potential for measures relating to the management of road supply to address congestion. Participants proposed measures that would improve the efficiency of the existing road infrastructure through operational changes or reallocating road space, as well as proposals to increase the road supply.

5.4.1 Road capacity enhancement

Road capacity enhancement policies cover operational measures to improve the efficiency and therefore the capacity of the existing road infrastructure. More than one third of submissions (34) discussed measures to enhance the capacity of the existing road supply. Transurban noted that technology presented a number of options to monitor, control and manage traffic on the road network (see box 5.3).

BOX 5.3 Improving road efficiency: Transurban's views

Transurban's submission to the inquiry stated:

> The concept of efficiency essentially involves better using the road resources that are available. Logically, the maximum traffic flow and therefore utilisation of free-flow roads is achieved when vehicles are travelling at free-flow speeds. …Therefore in order to provide greater efficiency, and avoid congestion and queuing, it is desirable to ensure that free-flow speeds are maintained. This in many cases requires imposing more control, rather than less, over the traffic stream. In the context of daily congestion resulting from demand exceeding capacity ("recurrent" congestion) this is most readily achieved by using technology to monitor, control and manage the network in a dynamic way. While there are many forms this technology may take the most common systems include:
>
> - Ramp metering (CityLink and VicRoads are already deploying this technology at critical congestion locations around Melbourne's free-flow road network).
> - Lane control (such as that used by CityLink in the Burnley and Domain Tunnels).
> - Incident detection and verification.
> - Contraflow and reversible lanes.
> - Dynamic shoulder lane use.
> - Environmental systems (eg warnings of wind, ice, rain, etc and their control, a local example being the ice warning and control system on sections of Victoria's Calder Freeway).
> - Speed control (such as that used by VicRoads on sections of the Western Ring Road and CityLink in the Burnley and Domain Tunnels).
> - Traffic information (eg providing real-time travel time advice, such as the VicRoads DriveTime system).
> - Queue protection.

Source: Transurban, sub. 67, pp. 12-13.

Increasing peak capacity

Participants' proposals regarding increasing peak period road capacity included:

- enhanced signalling arrangements
- intersection design
- ramp metering
- adjustable speed limits
- tidal flow arrangements.

Enhanced traffic signalling

A few inquiry participants considered that changing traffic signal sequencing could improve traffic flows and reduce congestion. Participants' proposals tended to focus on specific congestion hot spots. Andrew Bird suggested improving traffic light sequencing would assist in alleviating traffic congestion on Punt Road (sub. 4, p. 2), while John McPherson proposed that reducing

intersection cycle times in the Melbourne CBD (from 90 seconds to 60 seconds) would improve tram and pedestrian traffic flows (sub. 26, p. 4).

Participants' proposals regarding enhanced signalling were not limited to metropolitan Melbourne. The City of Greater Bendigo stated that synchronisation of traffic signals '…will provide significant improvements to congestion and traffic efficiency' in Bendigo (sub. 42, p. 5).

Intersection design

A number of inquiry participants proposed changes to intersection design which they considered would improve the efficiency of traffic flow and therefore assist in addressing congestion.

Thirteen submissions discussed removing intersections to improve traffic flow, for example through the use of grade separations, where traffic passes at different grades or levels. The VACC endorsed the use of grade separations as a means of 'reducing the number of intersections where vehicles must stop' (sub. 38, p. 6).

Participants also proposed the use of grade separations as a means of addressing road-rail level crossings. Bus Association Victoria observed:

> Eliminating level crossings removes stoppages to traffic due to trains passing. This speeds up all traffic using roads that cross railway lines. (sub. 57, p. 29)

The Eastern Regional Integrated Transport Group stated:

> More needs to be done to remove dangerous and delay inducing level crossings. Options to provide for commercial development at level crossings can offset costs. (sub. 24, p. 8)

Victoria Police stated:

> Engineering solutions such as overpasses are recommended to address the rail crossing issue. (sub. 71, p. 2)

The City of Whitehorse proposed two tunnels to address congestion associated with the intersections of Springvale Road and Whitehorse Road and the Lilydale-Belgrave railway line at Nunawading (sub. 52).

Some participants noted the high costs associated with this option. Tony Robinson (sub. 19), recommended establishing 'a level crossing elimination program with a view of addressing congestion points around Melbourne, where practicable, on a transparent cost/benefit basis' (sub. 19, p. 4).

Linking Melbourne: Metropolitan transport plan (Government of Victoria 2004a, p. 1) stated that the Government has embarked on a program to upgrade safety protection at road-rail level crossings and pedestrian crossings on the rail system (see box C.1, appendix C).

Victorian Police considered choked intersections contributed to road congestion and stated:

> The combination of the following treatments is suggested for consideration to address the choking of intersections:
>
> - painting coloured cross-hatch lines on the intersections to clearly mark them as forbidden for stationary traffic (used in the United Kingdom)
> - safety cameras operating similar to red light cameras installed to detect and prosecute offenders who choke intersections, in combination with
> - a major publicity campaign similar to the current TAC media campaign on level crossing collisions, to engender a public mandate for the enforcement method. (sub. 71, p. 3)

The Motorcycle Riders Association of Australia proposed that the use of advanced stop lines at intersections, whereby motorcycles would move to the front of traffic and utilise intersection space not used by other vehicles would improve both car and motorcycle travel times (sub. 13, p. 2).

Other participants made specific suggestions for the operation of traffic intersections. Jonathon Taylorson suggested moving pedestrian crossings away from intersections, the creation of specified 'turning' lanes at major intersections and the elimination of hook turns to aid the flow of turning traffic (sub. 1, p. 2). On the other hand, Glen Mills called for greater use of hook turns at intersections on tram lines, the elimination of right hand turns at major intersections on roads with median strips (with right hand turning traffic to instead use 'U-turns' beyond the intersection), and that right hand turns be banned (at least at certain times) where the turning traffic cannot be segregated (sub. 47, p. 2).

Ramp metering

Ramp metering involves the installation of traffic lights on ramps to control the rate vehicles enter a freeway. Ramp metering is one of the approaches currently used by VicRoads to manage traffic flows. For example, VicRoads stated:

> Funding has been allocated for 2005/06 for the development of a ramp metering system on the Monash Freeway/West Gate Freeway corridor.
>
> … The provision of a dynamic network-based ramp metering system on the Monash and West Gate Freeways will create the ability to manage traffic over the corridor and enable the coordination of ramp meters to regulate traffic and balance demands along the route so the freeway operates to provide optimum performance. (sub. 50, appendix 7, p. 16)

The VACC supported the use of ramp metering 'as it allows the gradual entry of vehicles into freeways and improves freeway speed during peak time' (sub. 38, p. 7). The RACV also considered ramp metering presented opportunities to

'maximise the capacity/efficiency of the existing road network' and noted 'this is progressively being rolled out across several Melbourne freeways' (sub. 59, pp. 19-20). Transurban also identified ramp metering as having the potential to enhance existing road capacity (box 5.3). The Commission has viewed VicRoads' ramp metering simulation programs and the effectiveness of this measure in managing congested roads.

Adjustable speed limits

The RACV considered the use of variable speed limits presented opportunities to 'achieve optimum capacity on freeways and arterials, as well as to potentially reduce the number of accidents/incidents and thereby reduce congestion' (sub. 59, p. 20). Transurban also considered speed control arrangements presented an opportunity to improve road efficiency (box 5.3).

While not commenting on adjustable speed limits as such, Ian Macmillan suggested that constantly varying speed limits, in particular the 40km/hr school zone speed limits, compressed traffic and contributed to congestion (sub. 46, p. 2).

Tidal flow arrangements

A number of inquiry participants, including the RACV (sub. 59, p. 19) and Transurban (sub. 67, p. 13) considered that tidal flow arrangements, which involves reversing the direction of traffic in one (or more) lane during peak periods, presented opportunities to enhance the capacity of the existing road network. Michael Groves considered that a benefit of tidal flow arrangements is that they 'allow greater flow of peak hour traffic while reducing the cost of constructing a new roadway' (sub. 45, p. 3).

Clearways

While attracting a number of comments (eight submissions commented on clearways), inquiry participants expressed mixed views on the use of clearways to relieve congestion. Some participants called for greater use of clearways, either in terms of increasing provision of clearways, or increasing the hours existing clearways operate. For example, Wilson Parking stated:

> To reduce congestion, the location and availability of these on-street bays should also be looked at more closely. More clearway zones must be provided during peak times and a large number of these spaces should be removed in the busier parts of the levied area to provide more lanes available for the high traffic flow. (sub. 27, p. 4)

Andrew Bird considered that extending the clearways on Punt Road to operate at all hours would improve traffic flow and reduce congestion on Punt Road (sub. 4, p. 2).

In a meeting with Commissioners, the G21 Group highlighted the tension between parking and sustained high traffic roads necessitating clearways was also evident in discussions regarding Latrobe Terrace in Geelong (box 5.4).

BOX 5.4 Insights from the Geelong region

Congestion issues raised in Geelong bore similarities to those in Melbourne, but on a different scale. Moreover, Geelong itself faces some of the costs of Melbourne congestion arising from delays on the Princes Highway and the West Gate Bridge.

The Commission consulted with a range of participants in Geelong, including the G21 Transportation Pillar Group—consisting of private and public sector representatives and covering five shire councils. Insights were also given by K&S Integrated Distribution, Blackneys Refrigerated Transport, Benders Busways and McHarry's Bus Lines.

Geelong's economy is prospering and its population is growing. The Princes Highway upgrade has brought it 'closer' to Melbourne. Demographic changes and other attractions to the Surf Coast has increased local and through traffic. All these factors are combining to increase the incidence of congestion in the Geelong region, and signal further pressures.

Principal concerns relate to the city centre and the Princes Highway through Geelong, mainly around Latrobe Terrace (with local and through traffic). In the city centre, the traffic consequences of tension between beautification objectives, retail operations, residential amenity and vehicle access are in evidence. While some road narrowing is being reversed, bus access, bus timetable reliability and passenger amenity have been adversely affected, and freight operators moving to and from the Bellarine Peninsula still have concerns.

On Latrobe Terrace, coordination of many traffic lights remains an issue, as is parking outside clearway times—when peak periods are expanding. Some relief is in prospect with the building of the Geelong Bypass, but even this is expected to have some knock-on effects—including delays at the Waurn Ponds junction, and potential linkage difficulties for freight traffic from the Bellarine Peninsula seeking to circumvent the city, as well as freight traffic from the north seeking to access the Port of Geelong, where substantial growth of nearly 50 per cent in five years is expected. Freight operators commented on the limited consultation in regards to the Geelong Bypass planning and designated freight routes.

More generally, freight links with Melbourne are being affected by West Gate Bridge congestion. Commuter traffic is also affected, as evidenced by some commuters using the Avalon Airport bus service as a park and ride facility to travel to/from the Melbourne CBD.

Planning issues are also in evidence. New developments on the edge of Geelong may see another 70 000 residents. Major interconnections with the Geelong Bypass, and the more general transport consequences of population growth call for well sequenced coordination between all the different agencies concerned. It is not clear that this is happening.

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Box 5.4 **Insights from the Geelong region** (continued)

At present, public transport solutions significantly lag residential developments. The capacity of public transport (that is, buses) to absorb traffic demand seems limited. Current contracts do not seem to provide worthwhile incentives for patronage growth. Clientele is largely limited to those without cars, and local government's interest seems indirect.

Overall, however, congestion problems and costs are less severe than in Melbourne. Significant efforts driven by local government are being made to identify current and future transport issues and to broker solutions. There is a focus on improving coordination with key agencies in the State Government.

Source: Various meetings in Geelong on 3 March 2006.

Others opposed increasing the use of clearways. For example, Jackie Fristacky stated that clearways are counterproductive and called for them to be phased out as they potentially encourage travel by private vehicle, and also impede access to local activity centres, having adverse effects on their commercial viability (sub. 58, p. 4). The Metropolitan Transport Forum stated:

> Clearways prevent access to activity centres and strip shopping centres and undermine commercial activity in these Centres during peak periods. Four to five hours of trade per day can be severely depressed due to clearways. Apart from reducing access and parking, the presence of a clearway means there are no noise and pollution buffers to pedestrian and other footpath activity in Activity Centres at peak times. They also prevent upgrading of activity centres through tree planting and footpath widening.
>
> We believe that establishing clearways in activity centres and strip shopping centres gives priority to private vehicle commuting which is an inefficient use of roadspace; and is at the expense of access to activity centres and strip shopping centres. (sub. 12, p. 2)

Similar points were raised by the City of Boroondara (sub. 28, p. 2) and the City of Yarra (sub. 63, pp. 11-12).

Intelligent transportation systems

The VACC called for further investigation and research into intelligent transportation systems (ITS), such as SCATS, light systems at intersections (sub. 38, p. 7) and observed that using ITS technologies 'to survey roads and facilitate the removal of accidents via roving service vehicles may be an effective method of removing congestion' (sub. 38, p. 15). Many of the measures discussed elsewhere in this section could also be facilitated through the use of intelligent transport systems.

Incident management

Participants also considered that improved incident management had the potential to improve traffic flow and reduce congestion. Transurban noted that congestion is also caused by 'abnormal' incidents events such as accidents, vehicle breakdowns, debris on the road and major events, can have a significant impact, and stated:

> It is worth noting that these "abnormal events" can be significant in their own right:
>
> - A commonly referred to rule-of-thumb states that a saving of 1 minute of incident time during peak periods saves 5 minutes of congestion (Ruller and McKinzie, undated, TranSafety, 1997).
> - It is recognised that improved incident management also has the ability to reduce secondary accidents, which have been estimated to be approximately 15% of all crashes (Mn DoT, 2002).
>
> It follows that additional efficiency gains can be achieved by improving incident management practices that are aimed at reducing the frequency, duration and/or severity of incidents on the motorways. (sub. 67, p. 13)

BOX 5.5 Emergency vehicle priority

VicRoads commissioned trial of an emergency vehicle priority system at traffic signals on a strategic corridor in the south-east of Melbourne in March 2003. The aims of the trial were to:

- improve public safety at traffic signals
- improve the safety of emergency services personnel
- avoid delays for emergency service vehicles at the trial intersections.

Seven emergency services vehicles (from Victoria Police, the Metropolitan Fire Brigade and the Metropolitan Ambulance Service) were fitted with mobile infrared transmitters (emitters). Key approaches at five intersections on the trial corridor were fitted with receivers. The receivers detect the approach of an activated emitter. Once detected, a call for a special emergency vehicle traffic signal phase is activated through SCATS (Melbourne's traffic signal system).

The trial was considered a success. A qualitative evaluation from an emergency vehicle driver's perspective indicated a high level of support from users of the system, including reports of improved safety and response times.

Following the trial's success, in 2005-06 200 emergency vehicles will have transmitters installed and 50 additional intersections are being fitted with the receivers. The intersections are located on key access routes to the city and adjacent inner city areas. The system will be used during the Commonwealth Games to assist the movement of emergency service vehicles.

Source: Bean & Studwick 2005; VicRoads, pers. comm., 9 March 2006.

The RACV stated:

> Unpredictable congestion, particularly that which results from incidents and accidents on the road network, calls for investment in systems to firstly detect the incident immediately, and secondly to initiate a rapid response. (sub. 59, p. 3)

In addition, participants considered that the provision of relevant information (sub. 50, p. 5; sub. 62, p. 11) and alterative routes (sub. 40, p. 10; sub. 62, p. 11), would assist in improving incident management.

VicRoads implementation of an emergency vehicle pre-emption system is an example of an initiative that would assist incident management (box 5.5).

Information and communications technologies

Ten submissions commented on the merits of improved information provision to road users—both via new and emerging technologies, and in more traditional forms (for example, improved road signage)—could assist drivers make more informed decisions regarding their travel and contribute to reducing congestion.

Driver 'real time information' provision

Participants, including VicRoads (sub. 50, p. 16), the RACV (sub. 59, p. 23) and Transurban (sub. 67, p. 13), considered that the provision of 'real time' information had the potential to influence travel demand and assist in managing congestion. For instance, the RACV stated:

> Better traveller information has the potential to influence the extent and timing of travel demand. For example, advance notice of congestion on a particular stretch of road would influence some drivers to use an alternative route, or perhaps delay their trip. Similarly, realtime information about public transport services, such as the time of arrival of the next service and perhaps information about connecting services, may encourage greater use of the system. An expanded parking information system could have a significant effect on congestion since it would reduce the need for motorists to circulate looking for a parking space. Current technology allows for the display of real-time in-car information, and it will soon be feasible to extend this to allow the motorist to reserve a parking space in advance. … We therefore see that an important part of congestion management is better, real-time information services. (sub. 59, p. 23)

Improving road signage

Other participants considered that information provided through improved signage would also assist in addressing congestion. The Department of Infrastructure stated:

> Road users can alter travel plans if they learn of congested conditions ahead of time. For example, signage warning of forthcoming roadworks gives the option to travellers to use alternative modes or routes, or delay trips to another time.

> Signage or radio reports warning of congestion due to incidents or accidents give people the option of re-considering their travel options. Such simple measures play a significant role in reducing the congestion impacts of road or lane closures due to roadworks and incidents. (sub. 55, p. 17)

Jonathon Taylorson stated:

> There is a lack of signage within metropolitan areas showing through routes, and major venues. It is assumed that all drivers have knowledge of the best route to their destination. This does not cater for travellers to the area, who have limited geographical knowledge. (sub. 1, p. 2)

The Interface Councils submission also proposed effective signage schemes to share local knowledge of alternative routes as a means of addressing occasional congestion associated with large events (sub. 60, p. 2).

5.4.2 Road space reallocation

Participants (20 submissions) also considered there were opportunities to improve the efficiency of the existing road infrastructure through measures focussed on road space reallocation.

Public transport/high occupancy vehicle priority measures

Most participants commenting on road reallocation measures proposed measures that involve providing public transport and/or other high occupancy vehicles priority over other road users.

Comprehensive priority schemes

The Municipal Association of Victoria stated:

> Priority measures (e.g. freeway reserves for public transport, bus and tram priority, dedicated and transit lanes) can be used to improve travel speeds for buses and trams that are increasingly slowed down by congestion traffic on roads. (sub. 30, p. 5)

The Municipal Association of Victoria considered that such priority schemes would improve travel times and the convenience of public transport and would assist public transport services to provide 'benefits that equate to or exceed car travel' (sub. 30, p. 5).

The Public Transport Users Association also considered that 'ensuring trams are not delayed at traffic lights or behind turning motor vehicles' (sub. 65, p. 27) was important to achieve a significant modal shift from cars to trams. The Association considered a comprehensive tram priority scheme, including dynamic signal priority for trams, introduction and enforcement of turning bans on tram routes, and lane separation would improve the efficiency and attractiveness of tram services. Yarra Trams (sub. 61, p. 5) and VECCI (sub. 84,

p. 4) considered that better enforcement of clearways would improve tram (and bus) speeds and frequency.

Bus Association Victoria similarly proposed a comprehensive priority scheme for buses that included 'B-lights at intersections, traffic signal pre-emption, dedicated bus queue jump lanes, transit or bus only lanes on major roads, etc.' to improve the reliability and travel times of bus services affected by road congestion (sub. 57, p. 14). The Eastern Regional Integrated Transport Group also considered '[u]se of transit lanes, bus priority and signals at intersection[s] are essential' (sub. 24, p. 14).

Bus/HOV priority lanes

In addition to those participants proposing transit lanes as part of comprehensive priority schemes, other participants (discussed in nine submissions) considered transit lanes for buses and other high occupancy vehicles had the potential to reduce congestion by improving travel times and the reliability of public transport services or other high occupancy relative to single (or low) occupancy vehicles.

For example, Carlo Carli stated:

> Following a strategy to reduce unpredictability will demand strategic actions to reduce volumes on roads to ensure that the conditions do not vary too dramatically over the day. This might involve measures that will increase average speeds such as road pricing or ones which do little for average speed but can protect specific classes of traffic such as public transport, high occupancy vehicles, passenger vehicles instead of parked vehicles or freight (priority lanes, signalling controls, parking policies). (sub. 64, p. 3)

Environment Victoria stated:

> Huge efficiency gains could be achieved by allocating segregated lanes for buses and trams. (sub. 73, p. 3)

Glen Mills proposed:

> Where a road has three or more lanes in a given direction, create a transit lane in the left lane for buses, taxis and vehicles carrying three or more passengers. (sub. 47, p. 2)

VicRoads (sub. 50, p. 16) and Lawrence Seyers (sub. 9, p. 1) also supported providing high occupancy vehicles with dedicated road space.

In addition to the provision of dedicated priority lanes, participants also commented on removing on-street parking where this is considered to impede public transport services. The Eastern Regional Integrated Transport Group stated:

> Melbourne's trams are icons but they are being strangled by congestion in inner Melbourne and through strip shopping centres. There is a need for strong leadership to protect our trams and remove parking in the problem areas to get trams moving. Clarendon Street needs revisiting. Public transport must win out over local traders even if off street parking needs to be provided. (sub. 24, p. 5)

BOX 5.6 Dynamic signal priority project

VicRoads is developing a system of dynamic signal priority for road-based public transport services. It is expected that the system will be implemented progressively from 2007, initially on SmartBus routes and the tram network, with other bus routes to be addressed in the future as vehicle management technology is rolled out. A simpler, interim system to provide buses with signal priority is being implemented as part of the SmartBus system, and will start with Warrigal Road in mid-2006.

The objectives in providing public transport signal priority are to:

- Optimise person throughput at intersections
- Contribute to achieving travel time improvement targets
- Contribute to improving reliability
- Use these improvements as a basis for adjusting timetables
- Contribute to reducing the environmental impact of transport.

Signal priority will apply to public transport vehicles (subject to technology limitations):

- At all times of day
- In both directions of travel
- For all buses and trams, apart from those running ahead of schedule.

Various levels or types of signal priority may apply, depending on the vehicle's lateness, the route importance and potentially on passenger numbers.

A key element of the Dynamic Signal Priority system is a Priority Request Handler, software which will utilise configurable business rules to determine:

- which priority of any competing requests from public transport vehicles will be granted within a given signal cycle at a particular intersection
- what priority action will be initiated via the SCATS traffic signal system.

The Priority Request handler will also record priority requests and consequent actions, and communicate these to the public transport vehicle management systems (for example, SmartBus).

There is potential for Emergency Vehicle Priority to be provided via the Dynamic Signal Priority system.

Source: VicRoads 2006; VicRoads, pers. comm. , 17 March 2006.

Traffic signal priority schemes

Most participants proposing the introduction of traffic signal priority did so in the context of comprehensive public transport priority schemes. Bus Association Victoria (sub. 57, p. 14) and the Public Transport Users Association (sub. 65, pp. 27-28) considered traffic signal priority for buses and trams as part of a more comprehensive priority scheme which could improve the travel times and reliability of road-based public transport services, therefore increasing the attractiveness of these services. Environment Victoria (sub. 73, p. 5) also supported providing public transport vehicles (buses and trams) priority at intersections. VicRoads is currently developing a system of dynamic signal priority for road based public transport services (box 5.6).

Traffic calming measures

A small number of inquiry participants (six submissions plus City of Melbourne 2006a) commented on the potential for traffic calming measures to contribute to reducing congestion. Harry Clarke and Andrew Hawkins described traffic calming as follows:

> Traffic calming involves slowing down traffic to make streets safer and more useful for pedestrians, cyclists and general residential life. This is achieved by altering road widths, reducing speed limits, building chicanes, neck-downs, speed plateaus and bumps, and by encouraging cautious, slower driving. As well as adding street furniture and vegetation to make the environment visually attractive and less car-oriented, traffic calming reduces external costs of car use and accidents. (sub. 3, p. 16)

Some participants considered traffic calming would act as an indirect measure, supporting more direct road pricing measures, in addressing congestion. Harry Clarke and Andrew Hawkins suggested that indirect measures, such as traffic calming, could be used to minimise boundary problems that could arise from road user charging (sub. 3, p. 17) and stated:

> Importantly, by increasing the user costs faced by motorists, traffic calming reduces local traffic flows and limits spill-overs onto local roads from the pricing of major roads alone. (sub. 3, p. 16)

Other participants considered traffic calming would assist in addressing congestion by encouraging walking over car travel. For example, SGS Economics and Planning stated:

> Similar successes have been experienced elsewhere in terms of promoting walking as an alternative to private vehicle usage. Traffic calming is often key to success here and is well utilised by a large number of Victorian municipalities. (sub. 2, p. 42)

The Public Transport Users Association observed that traffic calming measures implemented with speed enforcement offer large safety benefits by reducing per capita vehicle travel, but increases congestion which increases crash frequency but reduces crash severity (sub. 65, p. 7). Ross Nolan stated that:

> …recent moves at 'traffic calming' by imposing speed humps, chicanes, restrictors and other 'improvements' have contributed to road rage and less efficient vehicular movement, more pollution and wear and noise as well as accidents to other road users such as bicycle riders (as I can testify). (sub. 22, p. 2)

Benders Busways advised Commissioners that the council implemented a beautification program in Malop Street Geelong that involved a reduction in road lanes, increased parking and widened footpaths. This resulted in a significant increase in congestion and reduced the convenience and amenity of local bus transport. Experience of the consequences has lead to some of these measures being reversed.

Pedestrian schemes

A number of inquiry participants (discussed in 15 submissions) proposed measures to promote walking as an alternative form of transport (see section 5.5.2). Fewer referred to pedestrian schemes as a form of road space reallocation. However, one participant, John McPherson stated:

> The CBD should be a pedestrian paradise, with the car firmly put in its place. … Over 10 years the only noticeable increase in pedestrian open space is Federation Square, a state government project be it noted, built over the rail yards and flanked by a 1000 space car park! Little if any reduction in actual road space has been achieved and little expansion in pedestrian space in the main CBD grid. A short extension of the Bourke St Mall is, I note, currently underway. The City of Melbourne should be moving to the rapid conversion of its offstreet car parking assets to either commercial, residential or community use, not associated with vehicle based transport. Then council policy would be less warped by the necessity to protect the shrinking income stream from its car park assets. (sub. 26, p. 2)

Motorcycles

A few participants commented on the potential for allocating road space to motorcycle to reduce congestion. The Motorcycle Riders Association of Australia stated that motorcycles are 'one of the most efficient transport methods' and, as such, should have access to dedicated transit, bus and cycle lanes (sub. 13, p. 2). A similar view was expressed by Griffith Young (sub. 17, p. 2).

Paul Yeatman stated:

> [M]ake the law unambiguous and allow motorcycles to lane split where traffic speed [is] less than 50kph on all roads. Allow motorcycles to use the RHS road shoulder on freeways where traffic [is] congested (technically I think they can, but the status of such shoulders either a road shoulder or an emergency lane needs defining. (sub. 14, p. 2)

5.4.3 Road infrastructure expansion

More than one third of inquiry participants (36 submissions) commented on expanding the existing road infrastructure. Inquiry participants expressed mixed views on the merits of increasing road capacity to address transport congestion. Many participants saw constructing additional road capacity as a means to reduce congestion, particularly in specific locations. Some others, however, considered expansion approaches were at best a temporary fix to congestion problems, and that demand will ultimately increase in response to any benefits of the additional road capacity. This issue is addressed in chapter 7.

Road infrastructure expansion proposals

Many participants (25 submissions) proposed investing in increased road capacity to address congestion in Melbourne, and to a more limited extent, key regional Victorian cities. Describing how road construction could address congestion, Transurban stated:

> Providing capacity is arguably the most effective way to provide congestion relief, which occurs as drivers distribute themselves over all available routes. This results in lower volumes on alternative routes and reduced network congestion. It also provides additional benefits in terms of higher average speeds and time savings. (sub. 67, p. 12)

The discussion in this section focuses on the types of measures proposed by participants. However, it should be noted that participants also proposed measures for specific roads, local areas and congestion 'hot spots'.

The RACV submission provides an indicative representation of participants' road infrastructure expansion proposals (box 5.7). As reflected in the RACV's proposals, themes to emerge from participants' proposals concerned: (i) completing the major road network; (ii) expanding the road infrastructure servicing the outer Melbourne growth areas; and (iii) regional centres.

Box 5.7 RACV road infrastructure expansion proposals

The RACV submission acknowledged that there were probably limited opportunities to expand the road network in Melbourne's inner and middle suburbs. The RACV considered however there was a 'substantial backlog of road and transport needs' particularly in outer metropolitan areas and the rural road network.

Major road projects

In addition, the RACV believes that there are a number of areas where there is a need for significant additional road capacity, or new roads to fulfil a metropolitan-wide function. While some of these are in inner Melbourne, most are in the outer metropolitan area. These projects include:

- Augmentation of the capacity of the West Gate/Monash corridor
- The E6 (Bundoora to Epping)
- Frankton Bypass (Seaford to Baxter)
- Lilydale Bypass
- Northern arterial (Donvale to Chirnside Park)
- Springvale Bypass connected to Monash Freeway
- Road-rail separation on Footscray Road.

Tackling local hot spots

The RACV considered tackling local hot spots would have significant benefits and indicated candidate projects might include:

- Additional capacity to relieve an obvious bottleneck (for example, Monash Freeway outbound, east of Warragul Road)
- Removing weaving sections on freeways where these are not coping with current traffic (for example, on the Westgate Freeway between the Bolte Bridge and Lorimer Street)
- Local grade separations—a solution not currently practised in Melbourne but used with good effect elsewhere (a candidate site might be the Hoddle Street/Victoria Street intersection)
- Abolition of level crossings where these are producing significant delays.

Outer metropolitan road needs

The RACV report *Missing Links: Outer Metropolitan Transport Needs* (2002) demonstrated that there are significant gaps in the transport network, including roads that have outgrown their capacity, or links that do not exist. The report identified 74 projects across these outer metropolitan areas. Thirty two projects commenced in the past three years, 42 projects remain outstanding.

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Box 5.7 **RACV road infrastructure expansion proposals** (continued)

Regional road links

The RACV considered a continuous, connected motorway network to link Victoria's major cities would '…create an environment that facilitates economic growth by supporting trade routes, encouraging regional development, relieving traffic congestion, and reducing death and injury' (sub. 59, p. 17). Priority projects identified are:

- Metropolitan Ring Road-link between Ring Road at Greensborough and Eastern Freeway
- Princess Highway West-completion of duplication between Geelong and Colac
- Western Highway-reconstruction of Anthony's Cutting and completion of duplication between Ballarat and Ararat
- Goulburn Valley Highway-Shepparton Bypass and completion of duplication between Seymour and Shepparton (including Nagambie Bypass)
- Princess Highway East-Completion of duplication between Traralgon and Sale.

Source: RACV, sub. 59, pp. 17-18.

Completing the major road network

Inquiry participants proposed completing the major road network to provide a connected, continuous network and reduce reliance on individual corridors within the network. The Committee for Melbourne stated:

> Significant gaps remain in Melbourne's network, which means that it cannot function as a connected, continuous system. As well as the delays, safety problems and economic disadvantage that this causes, it means that the potential of modern "smart" road management technology cannot be fully realized.
>
> Melbourne is far too reliant on a single corridor – the Westgate/Monash corridor. Experience has shown that even a small incident at a critical time on this corridor can almost bring the whole city to a near-standstill. This is intolerable, and the problem must be addressed urgently. (sub. 34, p. 12)

Several inquiry participants (including the RACV, sub. 59; the VACC, sub. 38, p. 7; the Committee for Melbourne, sub. 34, p. 13; and the Eastern Regional Integrated Transport Group, sub. 24, p. 13) identified a need to provide 'missing' links in the major road network, with some identifying particular links that required investment. The RACV identified a number of priority projects (box 5.7). An additional major road project identified by inquiry participants (including the Committee for Melbourne, sub. 34, p. 13 and the VACC, sub. 38, p. 6) concerned connection of the Eastern Freeway with the Tullamarine Freeway.

A number of inquiry participants, including the Eastern Regional Integrated Transport Group (sub. 24, p. 13), the City of Maribyrnong (sub. 39, p. 1), the Western Transport Alliance (sub. 40, p. 14), Hobson's Bay City, (sub. 56, p. 2), and Wyndham City Council (sub. 62, p. 2) considered that a further crossing on the Yarra and Maribyrnong rivers requires investigation. Participants' proposals in relation to West Gate corridor in particular are presented in box 5.8.

BOX 5.8 Participants' proposals regarding the West Gate corridor

Traffic along the West Gate corridor has increased significantly and growth predictions for the west suggest this growth will continue. Hobson Bay City Council, for example, noted that the West Gate Bridge currently carries 160 000 vehicles per day and that this is projected to increase to nearly 200 000 vehicles per day by 2021 (sub. 56, p. 2). The council considered that congestion on the West Gate Bridge was getting worse and stated that travel times are increasing and that '[r]egular incidents on the bridge both minor and major cause extreme traffic congestion' (sub. 56, p. 2).

Several participants considered the capacity of the West Gate corridor required attention. For example, the Committee for Melbourne identified upgrading the West Gate corridor (including the option of a West Gate Bridge duplication) as one of three major projects that need to be completed by 2015 'to protect Melbourne's competitiveness and preserve the city's lifestyle' (sub. 34, p. 5).

Inquiry participants typically proposed options using multiple approaches to address traffic on the West Gate bridge. For example, the Western Transport Alliance stated that plans to manage the additional travel demand across the Maribyrnong River/Yarra River would involve 'a range of actions including attracting patrons onto public transport , land use initiatives and changes, road network improvements and demand management initiatives' (sub. 40, p. 15). Hobson's Bay City Council expressed similar views (sub. 56, p. 3).

As noted above, the Committee for Melbourne called for upgrading of the West Gate corridor but also stated that the road project 'should include dedicated transit/bus corridors' (sub. 34, p. 5).

John McPherson considered that improved commuter rail services, in particular 'frequent, direct, speedy train services' (sub. 26, p. 8) would reduce congestion on the West Gate Bridge and stated:

> So far the potential for improved commuter rail services on the upgraded Geelong rail line has been ignored in the senior government circles. To embrace a second West Gate bridge/tunnel while congestion on the current bridge only covers a period of about 4 hours in 24, seems a very weak justification. (sub. 26, p. 8)

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Box 5.8 **Participants' proposals regarding the West Gate corridor** (continued)

Bus Association Victoria considered that the 'poor quality and low capacity' of public transport services between the western suburbs and the city was contributing to congestion on the West Gate Bridge (sub. 57, pp. 5-7) and stated:

> We could significantly increase the people moving capacity of the bridge by simply and cheaply reallocating some of the road space to improved public transport and putting in place the service improvements needed to significantly increase the use of such services, especially by existing car users. (sub. 57, p. 6)

Bus Association Victoria estimated that investing in improved bus services would increase capacity at a fraction of the costs of duplicating the West Gate Bridge:

> Current proposals exist to duplicate the existing road crossing of the Yarra River at a cost of up to $10 billion. This is equivalent to about $700 million per annum in perpetuity, in present value terms (at 7% real discount rate). We have established that current bridge person-carrying capacity could be doubled by providing 576 additional bus services on the existing bridge, at an overall average cost of $53m per year (including bus capital and operating costs and assuming each bus makes two crossings per peak period). This equates to around 3 buses crossing the bridge per minute – well within the capabilities of a dedicated bus lane. Not taking into account interest and maintenance costs of the road project, bus services could double the crossing's capacity for over 190 years at the same price as a duplication of the existing bridge. These numbers justify a major effort to increase bus patronage in the West Gate corridor, because the potential capital cost savings of bridge works are massive. (sub. 57, pp. 6-7)

Sources: Bus Association Victoria, sub. 57; Committee for Melbourne, sub. 34; Hobson Bay City Council, sub. 56; John McPherson, sub. 26; Western Transport Alliance, sub. 40.

Expanding the road network in outer metropolitan Melbourne

Inquiry participants, particularly those representing outer suburban council areas, called for upgrades of the roads in outer suburban Melbourne. Participants, including the Municipal Association of Victoria (sub. 30, p. 6), the Mornington Shire Council (sub. 15, pp. 1-2), the Frankston City Council (sub. 70, p. 2) and the Interface Councils[2] (sub. 60, p. 3), observed that roads in these areas originally constructed to service rural areas and are unable to adequately service increased traffic volumes. The Maroondah City Council also proposed improving the local road network, but did not specifically identify the need to upgrade rural roads as the reason for this (sub. 20, p. 2).

Participants supporting expansion of the outer suburban road network were not restricted to local representatives, however. In 2002 the RACV published a report identifying 74 projects (42 of which remain outstanding) to upgrade the arterial road network in Melbourne's outer metropolitan areas (box 5.7 and

[2] The eight Interface Councils–Wyndham, Melton, Hume, Whittlesea, Nillumbik, Yarra Ranges, Cardinia and the Mornington Peninsula—lie at the interface between urban Melbourne and rural Victoria (sub. 60, p. 2).

sub. 59, p. 18). The VACC (sub. 38, p. 6) and DOI (sub. 55, p. 18) also supported investment in road infrastructure for outer metropolitan growth areas. For example, the Department of Infrastructure stated:

> The high rate of vehicle ownership in Australia reflects the low population density of most of the suburbs in the major cities and the dispersed nature of the places where people live and work. These features of Australian cities will not change quickly and it will be necessary for road agencies to continue to ensure that the physical capacity of roads is sufficient to cope with rising vehicle numbers. VicRoads has a major program under way to enhance the capacity of arterial roads in the outer metropolitan growth areas and is constantly taking measures (such as lane widening and longer exit and entry lanes) to increase the carrying capacity of roads in established areas where appropriate. (sub. 55, p. 18)

The Municipal Association of Victoria, however, stated that 'efforts to increase road capacity in the fast growing outer areas need to be carefully balanced to prevent further urban sprawl, in accordance with the State Government policies' (sub. 30, p. 6).

Expanding the road network in regional centres

Representatives of the three regional cities, Geelong, Ballarat and Bendigo, also proposed road infrastructure projects in these cities. The City of Greater Bendigo stated that long term strategies are needed to ensure the road infrastructure caters for future growth and identified a new link connecting the Calder and McIvor highways as requiring further investigation (sub. 42, p. 6).

The City of Ballarat submission identified both local and regional road infrastructure projects. In particular, development of the Ballarat Road Transportation Strategy will investigate a number of road infrastructure works to alleviate congestion, including:

- development of south-west bypass or ring road options for Ballarat West
- development of Yankee Flat Road as an arterial route
- linking Gregory Street West between the Ring Road and Gilles Street (sub. 80, p. 3).

The G21 Geelong Regional Alliance identified a number of congestion hot spots in Geelong and the surrounding area. The Alliance, however, suggested a combination of demand management approaches to managing congestion in the Geelong region. Two exceptions concerned the Barwon River crossings, which it considered to be limited and inadequate, and the need to develop truck by pass routes around the CBD (sub. 85, pp. 7 and 9).

5.5 Public transport, walking and cycling

While private vehicle travel is the dominant transport mode for travel within Melbourne and the key regional cities, many inquiry participants commented on the potential for public transport, walking and cycling to address transport congestion. Participants' proposals to enhance public transport services are presented in section 5.5.1, proposals to enhance walking and cycling are presented in section 5.5.2.

5.5.1 Public transport enhancement

The majority of inquiry participants (53 submissions) commented on the potential for public transport improvements to address transport congestion. Underlying many proposals was the view that creating more viable public transport alternatives to private car travel would attract more travellers to public transport and thereby reduce road congestion. Not surprisingly, given the large number of participants commenting in this area, inquiry participants proposed a number of public transport improvement measures. This section presents participants' proposals in relation to the following themes:

- major service expansions and/or upgrades
- service level improvements
- service quality enhancements
- fares and ticketing
- improved system accessibility
- passenger information marketing.

Some participants' proposals cover a number of these themes. The Metropolitan Transport Forum's statement of priorities for public transport investment, released in 2005, and attached to their submission, is one example of a comprehensive proposal to enhance public transport services (box 5.9). It should be noted, however, that the priorities are likely to reflect other objectives in addition to addressing congestion.

Box 5.9 Metropolitan Transport Forum—six priorities for public transport infrastructure investment

A policy document prepared for the Metropolitan Transport Forum in 2005 (Scheurer et al 2005) identified the following priorities for public transport infrastructure investment:

1. **Increase rail capacity** on congested routes through operational, timetabling and signalling improvements, and duplication of single track lines.
2. **Extend train lines and construct additional stations** to service urban fringe growth areas—Mernda, Aurora, Wyndham Vale, Cranbourne East and Melton—and the Doncaster and Rowville corridors.
3. **Connect all principal, major and specialised activity centres** by train, tram or SmartBus with a minimum 10 minute frequency and with better traffic priority for trams and buses.
4. **Upgrade suburban bus services and frequency** (at least every 15 minutes), as direct services 7 days a week to at least 10pm.
5. **Accelerate delivery of measures to achieve disability compliance** across the system, and access for all by extending services to all Melbourne residents and jobs.
6. **Reform franchising agreements** and re-establish an accountable and integrated public transport planning agency in State Government.

Not a priority: Major new road projects, other than in designated growth areas at the urban fringe.

Source: Scheurer et al 2005, p. 31.

Major service expansions/improvements

Approximately one third of inquiry participants (28 submissions and the City of Melbourne draft transport strategy) proposed options involving major expansions or improvements to public transport services. Their proposals are presented in relation to the various public transport modes. Some proposals covered multiple public transport modes. Another, from Louis Fouvy (sub. 92), promoted the benefits of 'rapid transit'.

Heavy rail

Inquiry participants commented on the efficiency of passenger rail services for passenger mobility and their potential to reduce traffic congestion, observing that one train can remove the equivalent of 5km of cars from roads (City of Yarra (sub. 63, p. 13); Metropolitan Transport Forum (sub. 12, p. 2)). The Metropolitan Transport Forum stated '[f]rom a congestion and efficiency perspective, rapid mass transit requires rail systems along each major transport corridor in Melbourne' (sub. 12, p. 2).

More than one quarter of inquiry participants (24 submissions and the City of Melbourne draft transport strategy) made proposals involving expansion and/or major improvements to heavy rail services. Some participants provided comprehensive proposals, for example the five year priorities identified by the Committee for Melbourne and Melbourne's public transport providers (box 5.10). Other participants focussed on particular aspects of the system. Participants' comments differed in terms of the particular measures proposed and/or the priority with which they were assigned.

Box 5.10 **Five year train initiatives**

The Committee for Melbourne (sub. 34) in conjunction with Melbourne's public transport operators (represented by BusVic, Metlink, Connex and Yarra Trams) identified the following five-year train initiatives to support the development of a greater role for public transport in Melbourne.

1. Improve system capacity and performance

- Tracks
  - Extra tracks on Dandenong, Sunshine and Ringwood corridors
  - Duplication of the most critical single line sections
  - Reinstated platforms and improved operational layout at Flinders Street Station
- Signalling and control
  - City Loop signalling upgrade
  - Signalling upgrade of the Hurstbridge line
  - Modernisation of train control and communications systems
- Other
  - Operating changes such as clockwise operation of Clifton Hill services around City loop
  - Expansion of the train fleet

2. Improve service offering

- Peak
  - Expand services on the busiest lines to reduce overcrowding (for example, Dandenong, Frankston, Sydenham, Broadmeadows, Werribee, Ringwood and Epping lines)
  - Expand services on peak shoulders to promote spreading of peak demand
  - More peak express running for longer lines, following infrastructure upgrades
- Off-peak
  - Improve day time off-peak frequencies to be 15 minutes or better on all lines, following infrastructure upgrades
  - Improve evening frequency to 20 minutes

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Box 5.10 **Five year train initiatives** (continued)

3. Improve attractiveness of the system

- Stations
  - Further modal interchange upgrades
  - Further expansion of commuter car parks in middle and outer suburbs
  - Major improvements to train interchange facilities at North Melbourne and Richmond
  - New stations for established catchments at Coolaroo and Southland
- Safety and accessibility
  - Additional roving patrols by customer staff and Police
  - Ongoing improvements to accessibility and DDA compliance
- Usability
  - Smartcard ticketing system designed to maximise convenience and speed of access to train services
  - Expansion of real time information.

Sources: Committee for Melbourne, sub. 34; Metlink, sub. 29.

Some participants considered that the absence of train services in parts of metropolitan Melbourne meant that many people did not have viable public transport alternatives to private car travel, implying that providing such services would reduce traffic congestion in these areas. A number of participants (11 submissions) proposed expanding train services through extensions of existing lines (including the Epping, Werribee, Broadmeadows/Craigieburn, Cranbourne and Pakenham lines) to service urban fringe growth areas. Also considered was the addition of new lines to service the Doncaster and Rowville corridors (including the Metropolitan Transport Group sub. 12, attachment 1, p. 4; Nillumbik Shire Council sub. 32, p. 2; Public Transport Users Association sub. 65, p. 9; Environment Victoria sub. 73, p. 5, City of Melbourne 2006a, p. 41). Participants (including the Public Transport Users Association (sub. 65, p. 13) and the Eastern Regional Integrated Transport Group (sub. 24, p. 5)) also proposed providing a new rail line along the Tullamarine corridor to service Melbourne Airport.

Participants also proposed major improvements to the existing rail infrastructure in order to provide more frequent and reliable train services to make train travel more attractive to motorists and thereby ease road traffic congestion.

- A number of participants (including Metlink (sub. 29, p. 29), the Committee for Melbourne (sub. 34, p. 45), the Public Transport Users Association (sub. 65, p. 9), Environment Victoria (sub. 73, p. 5) and the Eastern Regional Integrated Transport Group (sub. 24, p. 5)) identified that duplication of the single track sections of the existing rail network would facilitate improvements in the frequency and reliability of train services.

- Other participants, including the Frankston City Council (sub. 70, p. 4) and John McPherson, proposed extending electrified services within the existing network to improve the attractiveness of train services.
- Metlink (sub. 29, p. 29 and box 5.10), the Committee for Melbourne (sub. 34, p. 45 and box 5.10) and the Eastern Regional Integrated Transport Group (sub. 24, p. 5) also identified upgrading signalling and control systems as a means to improve the capacity and performance of the rail system.

Participants expressed mixed views on the extent to which major infrastructure expansions or improvements were necessary to improve rail service frequency and reliability. This is particularly evident in the different views expressed on the merits of proposals to triplicate the Dandenong rail line.

Some participants, including Metlink (sub. 29, p. 29) and the Committee for Melbourne, considered that provision of extra tracks on the Dandenong (and Sunshine and Ringwood) rail corridors would address overcrowding and capacity problems.

Other participants considered that there were alternative options to improving capacity on this line. The Public Transport Users Association considered that provision of a third track to Dandenong would involve 'high costs but relatively little benefit' and instead referred to international examples of cities providing higher service levels using comparable (double-track) infrastructure (sub. 65, pp. 9-12). Other proposals to increase capacity on the Dandenong line included running trains more frequently, operating longer (nine-car trains) direct to Flinders Street station and bypassing the City Loop, and restricting freight trains operating on this line to off-peak and overnight periods (John McPherson, sub. 26, p. 6).

Light rail/tram

Inquiry participants also considered that major expansions and/or improvements to tram services would reduce road congestion by increasing the attractiveness and availability of tram services as an alternative to car travel.

Several inquiry participants[3] observed that road traffic is increasingly affecting trams. Participants, including the Committee for Melbourne and Metlink (sub. 29, p. 6) and the Public Transport Users Association (sub. 65, p. 27), stated that tram operating speed had declined by 8 per cent over the past five years and considered that remedial action is required to prevent further declines. The Committee for Melbourne and Metlink identified a number of initiatives to increase the attractiveness of tram services (box 5.11).

[3] Including the Eastern Regional Integrated Transport Group (sub. 24), Metlink (sub. 29), the Committee for Melbourne (sub. 34), the Public Transport Users Association (sub. 65) and Environment Victoria (sub. 73).

Box 5.11 Five year tram initiatives

The Committee for Melbourne (sub. 34) in conjunction with Melbourne's public transport operators (represented by BusVic, Metlink, Connex and Yarra Trams) identified the following five year tram initiatives to support the development of a greater role for public transport in Melbourne.

1. **Tram priority program**
   - Continue current rollout to all routes
   - Education and enforcement program of tram related road rules
   - Dynamic priority at traffic signals
   - Coordination with bus priority program
   - Overall aim is to improve reliability and reduce end-to-end journey time
2. **Boost peak and off peak services**

   Reinvest time savings from the Tram Priority project into higher service frequencies, including:
   - Additional peak hour services to reduce overcrowding and cater for increased patronage
   - Improve off peak frequencies (particularly evenings and weekends)
3. **Tram fleet upgrade and expansion**
   - Add at least 20 new low floor accessible trams per year from 2009
4. **Accessible tram stops to be rolled out in line with DDA requirements**

The Committee and Metlink also identified the need to design, plan and build extensions to selected activity centres as a priority action commencing within the next five years and continuing forward.

Source: Committee for Melbourne, sub. 34; Metlink, sub. 29.

Tram priority measures were identified by the Committee for Melbourne (sub. 34), Metlink (sub. 29, p. 6) and the Public Transport Users Association (sub. 65, p. 27) as being a priority to improve tram travel times and attract motorists to tram services. The Committee for Melbourne and Metlink noted the Think Tram priority initiative has already reduced tram running times (sub. 34, p. 22; sub. 29, p. 6).

Inquiry participants considered that tram routes should be extended, both to improve connectivity between public transport modes and extend service coverage. The Public Transport Users Association, for example, observed that many routes stop only a few hundred meters short of train stations and stated:

> Undertaking a program of modest tram extensions would enable better integration across modes and allow passengers to permeate across a broader range of routes rather than concentrate in a small number of crowded services. (sub. 65, p. 12)

The Committee for Melbourne and Metlink also considered that a major fleet replacement and expansion program was required to cater for increased patronage and improve accessibility, and that the accessibility of stops should be improved to meet Disability Discrimination Act requirements (sub. 34, p. 22; sub. 29, p. 6).

Bus system

Many participants identified improvements to the bus system as a priority for addressing congestion, particularly in the growth areas of outer metropolitan Melbourne. Most proposals focussed on the need to improve service frequency and operating hours. Some participants considered that major investment was required to deliver the improvements sought. This theme is reflected in the five-year priority initiatives identified by Melbourne's public transport operators (represented by BusVic, Metlink, Connex and Yarra Trams) in conjunction with the Committee for Melbourne (box 5.12). The Committee for Melbourne estimated that 200 new buses would be required by 2011 to meet increased patronage and that the cost to upgrade local bus services over this period would be approximately $70 million per annum (sub. 34, pp. 20, 24).

Box 5.12 Five year bus initiatives

Melbourne's public transport operators, represented by BusVic, Metlink, Connex and Yarra Trams, in conjunction with the Committee for Melbourne (sub. 34) and Metlink (sub. 29) identified the following five year bus initiatives to support the development of a greater role for public transport in Melbourne.

1. Local bus service upgrade program

- Upgrade all local bus services across the city to the following minimum service levels by 2011

	First run starts	*Last run starts*	*Frequency (mins)*
Weekdays	6am	10pm Mon-Thu 12am Friday	30 daytime, 60 after 8pm
Saturdays	7am	12am	60
Sundays	8am	8pm	60

- Provide services to new areas concurrent with residential development

2. Rollout SmartBus network, with bus priority

- Roll out entire Orbital SmartBus bus network
- Complete SmartBus roll-out on 7 other routes
- Employ the following minimum consistent service standards (to be further upgraded beyond 2011)

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Box 5.12 **Five year bus initiatives** (continued)

	First run starts	*Last run starts*	*Frequency (mins)*
Weekdays	5am	12am	10-15 day, 30 evening
Saturdays	6am	12am	20 day, 30 evening
Sundays	7am	10pm	30 day, 30 evening

- Provide bus priority at congested locations on other routes to reduce travel times and increase reliability (Red Spot program)

Other initiatives

- Drop people closer to home after dark and in some low density areas
- Improve service coordination and planning
- Review and optimise route network and frequencies
- Improve passenger information and marketing
- Provide real time information an major stops
- Implement new bus contracts with operational and patronage incentives
- Accelerate driver training
- Modernise vehicle design

Source: Committee for Melbourne, sub. 34; Metlink, sub. 29.

Bus Association Victoria considered that Melbourne's road space is used inefficiently and that a greater mode share for road based public transport, including bus services, would assist in improving the efficiency of road capacity use (sub. 57, pp. 4-5):

> A bus lane could easily increase the people moving capacity of road space by around 500% compared to a lane of car traffic. Of course with more frequent buses and longer (articulated) vehicles, the capacity of a bus lane could be improved even further. In fact, Canadian practice suggests bus rapid transit systems can carry up to 24,000 people per hour with suitable infrastructure. (sub. 57, p. 5)

Bus Association Victoria considered that a combination of on-road priority measures, more frequent bus services and longer hours of operation will increase the people moving capacity of roads (sub. 57, p. 21). Bus Association Victoria indicated that additional buses would be required to attract greater bus patronage in peak periods:

> With regards to bus – there is significant capacity to use vehicles outside peak hours to provide more services at higher frequencies, as some of these vehicles are otherwise stationed at depots. However, at present the bus fleet is close to maximum utilisation in peak times, and additional buses would be required to increase capacity in peak times.

> To bring peak hour bus services in Melbourne to a minimum 30 minute frequency (10 minutes for key SmartBus routes), we estimate around 200-240 additional buses would be required. (sub. 57, p. 21)

Participants (including the Committee for Melbourne and Metlink, sub. 29 and the City of Yarra, sub. 63, p. 13) also proposed accelerated roll out of the SmartBus initiatives, including provision of bus priority measures, to encourage people to shift from car to public transport and thereby contribute to reducing traffic congestion. The Committee for Melbourne and Metlink (sub. 29, p. 5) and the City of Yarra (sub. 63, p. 13) all observed that SmartBus services have been successful in growing bus patronage. The Victorian Government's SmartBus trial is described in box 5.13.

Box 5.13 Case study—SmartBus trial

SmartBus is a Victorian Government initiative to deliver more reliable and efficient bus services in Victoria. The project aims to improve the quality of services for existing users, attract people out of cars that are competing for road space and attract new users who currently have limited transport options. The project is intended to achieve this by improving service levels, reliability, accessibility and coverage through:

- infrastructure changes (such as allocation of road space, signal operations and stop facilities)
- provision of passenger information (such as next bus to arrive and minutes to arrival)
- alignment of routes and coordination with complementary services
- increased route service frequency and expanding hours of service
- travel demand measures (unspecified)
- service promotion (Cadilhac 2000).

Development of the SmartBus program

The SmartBus concept emerged in 1999 when the Department of Infrastructure identified that bus passenger numbers were relatively low compared with train and tram passenger numbers. The Department undertook bus network planning and identified a possible two-tiered approach for Melbourne, including a primary network of bus routes, and secondary routes connecting these. Market research (YCHW 1999) commissioned by the Department found that both existing and potential new users of bus services valued:

- increased frequency of service
- improved reliability

(continued next page)

Box 5.13 **Case study—SmartBus trial** (continued)

- additional night services
- additional weekend services
- improved information content and distribution
- improved connections with other public transport.

Two SmartBus trial routes were subsequently launched in August 2002. These included route 703 along Blackburn Road and route 888/9 along Springvale Road.

What did the SmartBus trial involve?

The SmartBus trial involved a marketing campaign, service improvements, such as increasing service frequency by 22 per cent on route 703 and by 53 per cent on route 888/9, and infrastructure development (SKM 2004, pp. 7, 14).

Infrastructure improvements included physical works, such as fully-indented bus stops, bus priority lanes, and the introduction of Commonwealth Disability Discrimination Act compliance measures at over 150 bus stops. Technology was introduced in 45 buses to enable traffic signal priority for buses and the provision of real time service information at train stations and high patronage bus stops, reaching approximately 75 per cent of passengers (SKM 2004, p. 17). The SmartBus trial involved capital costs of around $3.82 million and $3.13 million respectively. The ongoing operating costs for both routes combined are $1.17 million (SKM 2004, p. 21).

Results of the SmartBus trial

The Department of Infrastructure engaged Sinclair Knight Merz (SKM) to conduct a post implementation review of the SmartBus trial. SKM found that the trial improved service quality for existing users, increased patronage and attracted new users. Service quality had been improved through increased service frequency and connectivity, extended hours of service, improved public awareness, accessibility and provision of information, and through the introduction of priority bus lanes and traffic signal priority (SKM, 2004).

Over the two years of the trial, from August 2002 until August 2004, SKM found that patronage had increased by 22.8 per cent on route 703 and by 36.65 per cent on route 888/9 (derived from SKM 2004, p. 7).[4] For both routes, the increase in full fare passengers was greater than concession passengers, the weekends saw the greatest increase in patronage in per cent terms, while weekdays saw the greatest increase in patronage volume (SKM 2004, p. 8).

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[4] Patronage is measured by annual ticket validations. According to SKM (2004), the Department of Infrastructure has estimated that ticket validations capture 82% of boardings.

Box 5.13 **Case study—SmartBus trial** (continued)

The SmartBus trial also attracted new users. Market research conducted after 12 months of the trial found that 43 per cent of passengers on route 703 and 39 per cent on route 888/9 were new users.[5] The research also found that 20 per cent of new users, and 8.8 per cent of total users, began to use the bus due to factors that can be attributed to the SmartBus trial (TQA 2003, cited in SKM 2004, p. 11). The Department of Infrastructure estimated that 30-35 per cent of new users were previously car users (DOI, pers. comm., 8 Feb 2006).

While the SmartBus trial has improved the quality of service, increased patronage and attracted new users, it is unclear whether the trial has achieved its aims of reducing travel time and increasing reliability. Infrastructure improvements such as priority bus lanes and traffic signalling may have reduced travel time and improved reliability. However, no comparable data is available to examine actual travel time changes or reliability changes since the inception of the SmartBus trial (SKM 2004, p. 15). As new SmartBus and orbital routes are introduced, it is important for reliability and travel time data to be recorded to ensure that the aims of the project are being achieved.

The SmartBus program into the future

The Victorian Government is expanding the SmartBus program on the strengths of the achievements of the SmartBus trial. A SmartBus route along Warrigal Road was introduced in June 2005, and routes are planned for Wellington Road (due at the end of 2006) and Melbourne's outer east, connecting Frankston and Ringwood (late 2007). A number of orbital bus routes are also planned. Press reports (*Sun-Herald* 23 March 2006, p.2) suggest that a number of issues relating to real time information and signalling need to be resolved.

Sources: Cadilhac 2000; SKM 2004; and YCHW 1999.

Public transport pricing

Inquiry participants proposed changes to pricing (and ticketing) policies as a means to address transport congestion.

Fares

A number of participants considered that the current zone fare system contributed directly to local congestion. For example, the Municipal Association of Victoria stated:

> The ticketing structure and pricing are also important factors that affect travel behaviour and use of public transport. Currently, ticketing is based upon a three layer system where price for travel increases with the distance. Councils have expressed concerns that the current ticketing system is inequitable and

[5] New users are defined as those who started using the services in the 12 months since the inception of the trial.

> encourages public transport users, particularly commuters, to board at train stations and tram stops located within lower fare zones, resulting in high traffic volumes, congestion and parking pressures in local areas and nearby streets. (sub. 30, p. 5)

Similar observations were made by the City of Boroondara (sub. 28, p. 2). While the City of Yarra considered that the zone fare structure, and in particular the extent of the difference in fares between the zones, encouraged car travel for outer Melbourne residents (sub. 63, p. 20). Both Maroondah City Council (sub. 20, p. 2) and Michael Groves (sub. 45, p. 2) called for the abolition of fare zones and fares to be lowered.

Several other inquiry participants also commented on the potential for fare discounts or concessions to encourage public transport use, either generally or within specific groups. Again, such policies were considered to influence the attractiveness of public transport as an alternative to private vehicle travel.

The Interface Councils (representing eight outer Melbourne councils) considered, given current service levels, the current fare structure did not encourage outer Melbourne residents to use public transport and stated:

> This system does not provide any incentive for Interface residents to actively become public transport users. Not only is it more expensive and less convenient to use public transport, but residents in the outer suburbs and the Interface feel openly discriminated against when compared to inner city residents. (sub. 60, p. 5)

Phil's Taxis and Limousines suggested lower public transport fares for adults, children and pensioners would encourage use (sub. 66, p. 2). Lawrence Seyers proposed introducing free or heavily discounted public transport fares for those aged under 16, as operates in London and Perth, to increase public transport patronage (sub. 9, p. 2).

J. Toth called for the reintroduction of the short trip fare to encourage occasional short public transport trips (sub. 5. p. 2).

Harry Clarke and Andrew Hawkins, however, considered that the emphasis should be on efficient pricing, calling for public transport pricing to be simultaneously reformed with road pricing and stating 'Only when all urban transport is efficiently priced at social marginal cost will citizens bear the correct cost of their travel choices and thereby travel and locate their residence, workplace and recreational activities efficiently' (sub. 3, p. 14).

Ticketing

In addition, to commenting on the fare structure, a few inquiry participants also commented on the ticketing system more generally. Some participants, for example Metlink (sub. 29, p. 32), Jackie Fristacky (sub. 58, p. 3) and Phil's Taxis

and Limousines (sub. 66, p. 2), considered that improving the convenience of the ticketing system would in turn improve the attractiveness, or usability, of public transport.

Service level improvements

As noted earlier a number of inquiry participants considered that improving the frequency and reliability of public transport services was a key factor influencing the attractiveness of public transport services. One participant's experience of public transport service reliability is presented in box 5.14. Other participants commented on included network structure and the connectivity of services, and the hours of operation.

BOX 5.14 Service reliability: one participant's experience

One participant's experience provides an interesting insight into bus service reliability:

> I was taking a bus home from a meeting. It had wandered around streets I had never seen before, with just four passengers. I needed to ask the driver's advice on where to get off.
>
> "Should I stay on the bus to Box Hill or get off at Blackburn and catch the train?"
>
> "Stay on the bus? Why on earth would you do that? You could get off and catch a train and you're thinking of staying on the bus? You want to punish yourself with 20 more minutes in here for no reason? Get off, as soon as you can."
>
> I sat back in my seat, now the only passenger, as we set off down Blackburn Rd towards the station, still several kilometers away. The road ahead was blocked with traffic. There was an annoyed snort, and we veered suddenly left, off the route and down a side street.
>
> "My God, I didn't know buses were allowed to do a rat run!"
>
> "Well, what's the use of sitting in all that wretched traffic. It's the gates you know, blocks everything. I just can't stand it, mucks up my timetable something terrible"
>
> "What about the route with the bus stops on it? What if there are people waiting there for you?"
>
> "They'll get the next one won't they. I'd be late for others waiting further on if I sat around all day. If they're still there, I'll pick them up on my way back. People know not to wait at those stops during peak hour anyway. They're not stupid."
>
> Amazing potential has the bus, to do its own thing, but as the solution to the road congestion issue? I couldn't see it.

Source: Carolyn Ingvarson, sub. 82, pp. 5-6.

Service frequency

Inquiry participants identified increasing service frequency as being vital to improving the attractiveness of public transport services. The Committee for Melbourne and Metlink identified increasing peak and off-peak service frequencies, including a significant increase in bus service frequency, as being key

to improving the attractiveness of public transport services (sub. 29, p. 18). Elements of this proposal included:

- expanding peak rail services including on peak shoulder periods to promote spreading of peak demand
- improving off-peak frequencies to 15 minutes for day rail services and 20 minutes for evening rail services
- reinvesting savings from the Tram Priority project to improve tram service frequencies
- upgrading local bus services with the aim of offering minimum frequencies of 30 minutes for weekday daytime services, reducing to 60 minutes for services after 8pm weekdays and on weekend (sub. 29, pp. 18, 21, 27, 31).

Participants commented particularly on the need to improve the frequency of bus services. Bus Association Victoria stated that 'Average bus service levels in Melbourne are arguably the worst of any major Australian city—with peak hour average frequencies of just 40 minutes, and the average service finishing before 7pm' and that '[w]ithout adequate bus services that are frequent, reliable and operate evenings and weekends, people are forced to purchase and travel in private cars' (sub. 57, p. 17).

The Eastern Regional Integrated Transport Group also argued that improvements in bus service frequency (and operational hours) is overdue and stated that '[a]ll bus services require improvements to frequencies so that timetables are not required, this together with a spread of operating hours to suit passenger's needs is vital' (sub. 24, p. 9).

The Metropolitan Transport Forum also identified improving bus service frequency as one of six priorities for Melbourne public transport investment (box 5.9). Local councils were among other participants calling for increased public transport service frequencies. Nillumbik Shire Council (sub. 32), Hobson's Bay City (sub. 56, p. 3), and Frankston City Council (sub. 70) called for increased bus service frequencies.

Bus Association Victoria observed that international evidence, and patronage of Melbourne's more frequent train and tram services and existing high frequency bus services indicates that users will choose public transport where it provides services competitive with the car alternative (sub. 57, pp. 8, 18).

Network structure

A number of inquiry participants commented on the importance of integration within the network, calling for improved co-ordination of different modes and services. For example, Bus Association Victoria stated:

> Many motorised journeys require the use of multiple transport services. The necessity of transferring between public transport services has an impact on usability – especially where interchange facilities are poor and transfer times are long. … In many cases Melbourne has very poor timetable coordination. For example, a frequent bus route in the northern suburbs routinely arrives at train stations 2 minutes after trains leave to the city, resulting in an 18 minute connection time. (sub. 57, p. 25)

Bus Association Victoria considered that improving service coordination would ultimately lead to increased public transport use and reduced car dependence (sub. 57, p. 25). SGS Economics and Planning also considered that 'proper transport integration and connectivity' would be a key feature of efforts to reduce the efficiency and pricing gap between public and private transport (sub. 2, p. 25).

The City of Greater Bendigo also noted that failure to coordinate bus and train services in Bendigo left many commuters reliant on car use and contributed to congestion in Bendigo (sub. 42, p. 5) and stated:

> Better coordination between rail and road transport is required. Provision of services to suit demand is required to maximise the use of public transport system. (sub. 42, p. 6)

Participants, including the Eastern Regional Integrated Transport Group (sub. 24, p. 9), the RACV (sub. 59, p. 19), Yarra Trams (sub. 61, p. 6), and Environment Victoria (sub. 73, p. 5), also identified a need to improve connections between public transport services. For example, the RACV stated:

> Good connections between different forms of public transport are vital, particularly in the outer metropolitan area. (sub. 59, p. 19)

The Bus Association Victoria provided the example of Perth where extensive effort was given to maximising the ease and speed of transfer between trains and buses at stations, resulting in 40 per cent of people travelling to train stations by bus compared with nine per cent in Melbourne (sub. 57, p. 25).

Hours of operation

As well as calling for increased service frequencies, inquiry participants also called for expanded hours of operation, particularly for bus services. The City of Yarra considered an enhanced service span was a key requirement for public transport services to be considered a viable alternative to private car use and hence contribute to reducing traffic congestion (sub. 63, p. 13). Other councils,

including Nillumbik Shire Council (sub. 32, p. 2), Hobson's Bay City (sub. 56, p. 3) and Frankston City Council (sub. 70, p. 3), also called for increases in public transport operating hours. Environment Victoria recommended improving rail, tram and bus service frequency to operate every 10 minutes for 18 hours a day, seven days a week (sub. 73, p. 5).

Service quality enhancements

Inquiry participants commented on aspects of public transport service quality and identified areas for improvement (box 5.15). Most participants considered that improving public transport service quality would increase the attractiveness of public transport as an alternative to private vehicle travel. The Commissioners received a large number of direct complaints about service quality on public transport.

BOX 5.15 Some views on public transport service standards

In a recent article in the *Sunday Age* (Birnbauer 2006), a number of readers expressed their dissatisfaction with public transport service standards. A selection of these views is presented below:

> Long time public transport user Cherry Lau said she would rather pay extra for a reliable system than have a free one. 'In the last week alone, I have personally experienced five episodes of severe travel disruption where a 40 minute journey was lengthened to 90 minutes. At Flinders Street Station there were literally hundreds of stranded commuters in peak hour, sweltering on platforms with monitors displaying ever-changing, incorrect, delayed or cancelled train due to arrive.'
>
> Louisa from Glen Waverley wasn't happy either. Passengers on the Glen Waverley line at the Southern Cross Station often faced long waits for delayed trains without any announcements being made. 'We stand on the platform feeling uninformed and unwanted', she said.
>
> Melanie Dooly, who travels on the St Albans line, said she couldn't recall a trip during which passengers were not harassed or abused by trouble makers. 'Quite frankly, the problem is not road or governments—it is people. I would not catch the train even if it was free—I'll take my chances on the roads.'
>
> Justin Lodge said a benefit of free travel would be to get rid of the ticket inspector on Yarra Trams. 'I travel on public transport at least twice a day every working day, and have personally witnessed the most disgusting, condescending, over-bearing and heavy-handed behaviour from the agents of Yarra Trams who think that shouting at a non-English speaking tourist who is evidently very embarrassed and confused about what ticket to buy is appropriate behaviour.'
>
> Those opposed to making public transport free said trains were already over-crowded, and that more services and car parking at stations should be provided first.
>
> 'Already people between Ormond and Malvern (on the Frankston line) have to stand and people from Armadale to South Yarra often can't squeeze onto a peak-hour train. Going home, just cancel one train and there is absolute chaos!' said Brian Jones.

Source: Birnbauer 2006.

Stop facilities

Inquiry participants stated that improved stop, interchange and/or station facilities would improve the attractiveness of public transport. The Department of Infrastructure noted that the *Metropolitan transport plan* identified provision of improved facilities at stations and stops as a means of making public transport more user friendly and thereby contribute to addressing congestion (sub. 55, p. 21).

Bus Association Victoria identified the provision of better interchange facilities as a key determinant of the usability of public transport services and stated '[w]ithout well designed interchanges, public transport will struggle to compete with the car for trips, and congestion caused by car dependence will continue' (sub. 57, p. 25). The Association went on to note that there is scope to improve public transport interchanges, stating '[m]any of Melbourne's public transport interchanges are poor—often with uncovered lengthy poorly signed walking paths' (sub. 57, p. 25).

Maroondah City Council considered that bus improvements appeared to be 'one of the best short term solutions to reduce congestion' (sub. 20, p. 4) and identified bus stop infrastructure as one of five critical transport challenges facing the council. The council suggested municipal councils could assist in addressing this challenge through continuing to improve bus stops and install shelters where needs are identified (sub. 20, p. 4).

Yarra Trams stated that installing platform stops (as part of implementation of the Think Tram program) reduces passenger loading times, improves access and safety and reduces 'dwell times by optimising the location of stops' (sub. 61, p. 7).

Vehicle comfort

Aside from recommending the provision of additional services to reduce overcrowding, few participants commented on options to improve vehicle comfort. One exception concerned a call for all public transport vehicles to be air conditioned (sub. 66, p. 2).

Safety and security enhancements

A number of inquiry participants considered that improved safety and security would increase the attractiveness of public transport services. The Public Transport Users Association stated:

> The fear of violent crime can be a major deterrent to many would-be public transport passengers, particularly women. In order to ensure public transport remains a usable service for as broad a cross-section of society as possible, we

> support increased staffing at railway stations and on trains and trams across all hours of operation to increase safety and security for passengers and staff alike. (sub. 65, p. 28)

Metlink and the Committee for Melbourne identified improved security through more staff and closed circuit television would make public transport more attractive (sub. 29, p. 33; sub. 34, p. 49).

Victoria Police considered that concerns about security at railway station car parks may also act as a disincentive to public transport use and stated:

> Lack of security at railway station car parks for motor vehicles is a further deterrent. Increased security at railway car parks (security patrols, cameras, lighting) will assist ameliorate the aversion many have to leaving their car at a railway station. (sub. 71, p. 3)

Improved system accessibility

Inquiry participants identified the need to improve the accessibility of public transport vehicles and stop/station facilities, particularly in order to meet Disability Discrimination Act (DDA) requirements.

The Metropolitan Transport Forum, for example, identifies achieving disability compliance across the public transport system as one of six priorities for public transport investment (sub. 12, attachment 1, p. 4). Metlink cites the Committee for Melbourne, which identifies an accessible stop program to meet DDA requirements to be a key priority for tram system (sub. 29, p. 6).

Other participants took a broader view of accessibility. Maroondah City Council also identified the provision of accessible public transport as one of five transport challenges facing the council. The council considered accessibility could be improved through making public transport facilities and infrastructure compliant with the DDA, ensuring public transport modes are highly accessible through being well connected and well located, and providing higher levels of security and safety within the public transport system (sub. 20, p. 3).

Phil's Taxis and Limousines proposed that accessibility could be improved by highlighting services providing disabled access in public transport timetables, and scheduling extra time for these services (sub. 66, p. 2).

Passenger information and marketing

Inquiry participants considered improved passenger information and marketing to be an important element of addressing public transport attractiveness. Typically participants recommended that improved information provision support other complementary approaches.

The Department of Infrastructure stated:

> The provision of improved information about the availability of public transport services, especially on a real time basis, encourages people to feel increased confidence in their use of public transport'. (sub. 55, p. 17)

SGS Economics and Planning considered that real time information provision to public transport users could improve congestion by removing barriers to public transport use, such as waiting time and route uncertainty (sub. 2, p. 40). In providing examples of specific measures in this area the submission cites the BTRE and states:

> "Increasingly, public transport operators in Australia and overseas are providing patrons with access to real–time service schedules through telephones, personal computers, mobile phones, pagers, hand–held computers, cable television variable message signs, and information kiosks. Prototypes of public transport information kiosks in London will offer journey planning, timetabling facilities, real–time bus timekeeping, parking space information, local news and free email.
>
> As of June 2000, there were 170 public transport information systems in use in Europe as well as more than 600 Internet web sites providing information for public transport users. Systems such as NextBus system, introduced by the Washington Metropolitan Area Transit Authority in September 2001, uses satellite and global positioning system (GPS) technology to track buses' progress with 95 per cent accuracy" (BTRE 2002; Ch 2:4). (sub. 2, p. 40)

Metlink and the Committee for Melbourne also considered that improved information provision (through traditional media and new technology) and making real time information widely available would improve the attractiveness of the public transport system overall (sub. 29, p. 33).

The Eastern Regional Integrated Transport Group suggested that in addition to improved real time travel information, the use of red pavements to indicate bus transit lanes would inform potential users where bus services operate (sub. 24, p. 9).

5.5.2 Walking and cycling enhancement

Enhancement/promotion of walking and running

A number of inquiry participants identified opportunities to reduce road transport demand, and thereby address road congestion, through encouraging a shift from road to other more sustainable forms of transport. Participants identified opportunities to enhance the attractiveness of walking.

Bayside City Council stated 'an increase in walking as an alternative to private vehicle use has a positive impact on road congestion' (sub. 37, p. 9) and considered that walking could be promoted by:

- incorporating pedestrian needs into all new roads
- planning provisions that seek to create community environments that are not reliant on motor vehicles
- educating and promoting the benefits of walking, through initiatives such as walking school buses (sub. 37, p. 9).

The Public Transport Users Association considered that streets and suburbs should be designed to maximise safety and visibility for pedestrians and cyclists, and stated that features such as 'permeable street layouts, buildings addressing streets, absence of high fences abutting footpaths, well-lit footpaths parallel to roads' should be incorporated in any new development (sub. 65, p. 29). The City of Yarra called for improved pedestrian facilities including priority pedestrian access, wider footpaths, pedestrian crossing points, and protection from road traffic (sub. 63, pp. 12, 15).

A number of inquiry participants supported promoting greater awareness of walking and its associated benefits, including through TravelSmart programs (Alan Parker Design, sub. 18, p. 2 and Jackie Fristacky, sub. 58, p. 2). Bayside City Council noted that TravelSmart trials in primary schools have achieved a significant shift to walking (sub. 37, p. 10). Bus Association Victoria supported extension of the 'walking school bus' programs as a means to reduce car travel associated with journeys to and from schools and reduce congestion in and around schools (sub. 57, p. 37).

Enhancement/promotion of cycling

A number of inquiry participants considered that enhancing cycling facilities and promoting cycling as a transport alternative would assist in addressing congestion.

Bayside City Council considered that increased usage of bicycles would have a positive impact on congestion as they require less road and parking space than cars (sub. 37, p. 9). The council suggested that cycling would be encouraged through:

- improving cycling facilities, by prioritising funding of facilities on the Principal Bicycle Network and the Metropolitan Trail Network, and improving end of trip facilities at public transport nodes and schools
- improved directional signage for on and off road paths
- incorporating the needs of cyclists in all new roads

- planning provisions that seek to create community environments that are not reliant on motor vehicles
- educating and promoting the benefits of cycling
- providing incentives, such as salary packaging, to encourage greater bicycle use[6] (sub. 37, p. 10).

Other participants proposing improvements to cycling infrastructure included Alan Parker Design (sub. 18, p. 15), the Municipal Association of Victoria (sub. 30, p. 4), the Eastern Regional Integrated Transport Group (sub. 24, p. 6) the City of Yarra (sub. 63, p. 15), Hobsons Bay City Council (sub. 56, p. 3), the Public Transport Users Association (sub. 65, p. 29), Frankston City Council (sub. 70, p. 4) and Environment Victoria (sub. 73, p. 5).

A number of inquiry participants proposed that bicycle use for intermodal journeys would be encouraged through the provision of bicycle parking facilities in the vicinity of railway stations and other intermodal connections (Alan Parker Design, sub. 18, p. 5; Frank Fisher, sub. 69, p. 2; and the Municipal Association of Victoria, sub. 30, p. 4) or the provision of facilities for bicycles on trains (City of Yarra, sub. 63, p. 15; Environment Victoria, sub. 73, p. 5; and Ian Macmillan, sub. 46, p. 3).

Inquiry participants also considered that cycling would be encouraged through the provision 'end of trip' facilities, including showers, change rooms and storage facilities be provided at schools, workplaces and public transport interchanges (Bayside City Council, sub. 37, p. 10 and Eastern Regional Integrated Transport Group, sub. 24, p. 6).

A number of inquiry participants considered that education or promotional initiatives, including Travel Smart programs, would encourage greater bicycle use (Alan Parker Design, sub. 18, p. 2; Bayside City Council, sub. 37, p. 10; and Jackie Fristacky, sub. 58, p. 2).

5.6 Travel substitution

5.6.1 Information and communication technologies and travel substitution policies

Travel substitution policies influence congestion through their capacity to reduce the demand for travel. Participants commented on the potential for home-based work, made possible by information and communication technologies, to reduce the demand for travel.

[6] Also supported by Paul Yeatman (sub. 14, p. 2).

The Department of Infrastructure noted that there is some evidence that telecommuting may be significant, with an apparent increase in small, specialist consultancies operating from home offices. The 2001 Census indicated that 108 000 Victorians worked from home on census day, an increase of 0.9 per cent since the 1996 Census (sub. 55, p. 16).

The Public Transport Users Association also referred to the potential for teleworking to reduce vehicle travel (sub. 65, p. 7).

5.7 Urban land use/planning policies

Inquiry participants recognised that transport congestion could also be influenced in significant ways through land use and planning measures. SGS Economics and Planning considered that these measures '…primarily influence the underlying need for transport rather than the transport decisions facing commuters…' and therefore '…should be considered as fundamental tools for developing the city, rather than transport policy instruments' (sub. 2, p. 45).

Strategic urban planning aspects

Development densities

A number of inquiry participants considered increased urban densities would positively impact on transport congestion. For example, Harry Clarke and Andrew Hawkins stated that increasing development densities in areas served by transport corridors reduces travel requirements and increases the potential for public transport patronage. They note, however, that much of Melbourne's new urban growth will occur on the fringe and that densities are unlikely to change (sub. 3, pp. 15-16).

The Department of Infrastructure noted that increasing population density is a fundament element of the Victorian Government's land use policies outlined in Melbourne 2030 (sub. 55, p. 17). The Eastern Regional Integrated Transport Group also stated that 'higher density development at transport nodes is desirable and consistent with Melbourne 2030' but noted that there has been community resistance to these proposals, for example in response to the Mitcham towers proposal (sub. 24, p. 12).

Transit oriented development

A number of inquiry participants—including the Department of Infrastructure (sub. 55, p. 3); the Municipal Association of Victoria (sub. 30, p. 6); Nillumbik Shire Council (sub. 32, p. 2) and Harry Clarke and Andrew Hawkins (sub. 3, p. 16)—considered that development of activity centres in proximity to transport networks could reduce the travel demand, particularly for private car travel. Others, such as the Australian Council for Infrastructure Development

(sub. 54, p. 7) and Transurban (sub. 67, p. 14), suggested that the long term nature of these measures suggested they not be used in isolation.

The Municipal Council of Victoria emphasised the need to integrate land use and transport planning when commencing the development of activity centres (sub. 30, p. 7).

Harry Clarke and Andrew Hawkins noted, however, that the car remains the dominant form of transport in some activity centres (such as Box Hill) and that there has been community opposition to other proposals to create large commercial developments in residential suburbs to reduce traffic pressures (for example, regarding Camberwell station redevelopment) (sub. 3, p. 16).

Developer charging policy

Inquiry participants expressed mixed views on the role of developer charges in funding transport infrastructure. Some, including the Municipal Association of Victoria (sub. 30, p. 8), the Metropolitan Transport Forum (sub. 12, attachment, p. 30), and Environment Victoria (sub. 73, p. 7), supported the use of developer charges/contributions to fund transport infrastructure investment, particularly in public transport. For example, the Municipal Association of Victoria stated:

> There should be the requirement for developers to mitigate against adverse transport impacts and provide services and facilities to support transport access through development permits and developer contributions. Local government can set requirements on development permits to limit parking provision and provide integrated travel plans to accommodate all site users, including pedestrians and cyclists. Developers can also be required to contribute to future infrastructure requirements through developer contributions. (sub. 30, p. 8)

The Metropolitan Transport Forum noted, however, developer contributions have not often been used for this purpose:

> Developer contributions are a common funding tool for infrastructure investment in urban growth and redevelopment areas in Melbourne. The City of Whittlesea, for example, expects to raise $227 m [million] from such contributions in the next 20 years to facilitate the construction of an arterial road network across its growth areas. Unfortunately, there is not much precedent for raising such monies for public transport investments, even though the regulatory environment allows for this. (sub. 12, attachment, p. 30)

In contrast, the Property Council of Australia (Victorian Division) did not support the use of developer contributions on efficiency, equity and capacity grounds (sub. 48, p. 7).

Participants also commented on other measures to finance infrastructure investment. SGS Economics and Planning referred to 'betterment capture' whereby increases in land value associated with infrastructure are taxed to fund

provision of that infrastructure and noted that such schemes have successfully been implemented in a number of US cities, as well as in Japan, London, Manchester, Copenhagen and Spain (sub. 2, pp. 37-8). The Metropolitan Transport Forum referred to the similar notion of 'value capture financing' (sub. 12, attachment, p. 30).

6 Approaches to tackling congestion: international evidence

Chapter 5 discussed options for managing transport congestion raised by inquiry participants. This chapter summarises how effective some of these policy measures have been in practice, when applied in cities in Australia and internationally. It also looks at some innovative approaches that have yielded positive results, and which may be worthy of consideration for Melbourne. This evidence helps inform chapter 7, which considers the relevance of the options for Melbourne.

To assist with the task of collating the international information, the Commission asked Booz Allen Hamilton (BAH) to draw on relevant literature and experience to report on:

- the approaches taken by relevant cities in Australia and overseas to tackle transport congestion (including any methods by which these cities have sought to tackle particular congestion 'hotspots' and to integrate land and transport planning), concentrating on those that are relevant to Melbourne, and, where applicable, Geelong, Ballarat and Bendigo
- the relevant context (such as why the particular approaches were adopted and any information on the nature and extent of the congestion problems being addressed)
- aspects of effectiveness (such as the costs of implementing the approaches, the ease of implementation, whether the approaches have worked or not and the reasons why, and any local concerns about unintended economic, environmental and social effects)
- the major lessons of the overseas experience for efforts to address congestion in Melbourne and the major regional cities.

Booz Allen Hamilton prepared detailed papers addressing these issues for each of the twelve policy approaches that were described in chapter 5. These papers, which are more comprehensive than the examples provided in this chapter, are available on the Commission's website (www.vcec.vic.gov.au).

A wide range of policy options have been identified. For the draft report, the Commission has focused on those examples that provide:

- evidence relevant to those options put forward by participants in chapter 5
- other feasible options for managing congestion that address the specific issues identified in chapter 3
- different approaches to the implementation of measures currently being used to address congestion in Melbourne.

Relevant examples from ten of the twelve policy areas that were discussed in chapter 5 are covered in this chapter. Freight examples are discussed in chapter 8. A discussion of the effectiveness of road infrastructure expansion in managing congestion is contained in chapter 7.

6.1 Road use charging[1]

There are several types of road use pricing, which differ in their objectives and impact, and have varying degrees of complexity (see table 6.1). Fixed-rate toll roads are the most common type of road use pricing, and are used in many countries, including Australia. The primary objective of toll roads in most cases is to raise revenue to finance improvements to the transport network. Although they may also reduce traffic congestion, this is usually a secondary concern. Comprehensive road pricing is not yet in place in any major city, with Singapore being the closest. Some other road pricing policies, including cordon pricing and high occupancy toll lanes, are more explicitly targeted at addressing traffic congestion in a particular region, or improving the efficiency of a congested corridor. These are the focus of this chapter.

Table 6.1 Types of road use pricing

Name	*Description*	*Objectives*
Road toll (fixed rates)	A fixed fee for driving on a particular road	To raise revenue
Congestion pricing (time variable)	A fee that is higher under congested conditions than uncongested conditions, intended to shift some vehicle traffic to other routes, times and modes	To raise revenue and reduce traffic congestion
Cordon fees	Fees charged for driving in a particular area	To reduce congestion in major urban centres
High occupancy toll lanes	A high-occupancy-vehicle (HOV) lane that accommodates lower-occupant vehicles for a fee	To favour HOVs compared with a general-purpose lane, and to raise revenues from single occupancy vehicles using the HOT lanes.
Distance-based fees	A vehicle use fee based on how many miles a vehicle is driven	To raise revenue and reduce impacts of vehicle use
Pay-as-you-drive insurance	Premiums determined by mileage so vehicle insurance becomes a variable cost	To reduce impacts of vehicle use, particularly accidents
Road space rationing	Revenue-neutral credits used to ration peak-period roadway capacity	To reduce congestion on major roadways or urban centres

Source: Victorian Transport Policy Institute undated.

[1] This section draws on the *International Approaches to Tackling Transport Congestion – Paper 1: Area Road Use Charging* report prepared by BAH (2006a) for the Commission.

Several cities (see table 6.2) have implemented direct area charges for road users raised by participants (see chapter 5). They can be broadly classified by:

- *scheme type*—this distinguishes principally between area schemes (charges apply to all vehicles used within an area) and cordon schemes (charges apply when vehicles cross a cordon)
- *primary objective*—this distinguishes between those schemes where the primary objective is financial (that is, to raise revenue, which is then generally used to improve the transport system) or economic (that is, to enhance transport system economic efficiency, through reducing congestion).[2]

Table 6.2 Overview of operational area road use charging schemes[3]

City	*Scheme type*	*Primary objective*	*Implementation date*
London	Area licence scheme	Economic (congestion management)	2003
Singapore	Originally a manual area licence scheme Subsequently an electronic cordon charge, supplemented by charges on main routes	Economic (congestion management)	Original 1975 Subsequent 1998
Bergen	Cordon charge scheme	Financial (revenue for transport system)	1986
Oslo	Cordon charge scheme	Financial (revenue for transport system)	1990
Trondheim	Originally a cordon charge scheme Subsequently a zonal charge scheme	Financial (revenue for transport system)	Original 1991 Subsequent 1998

Source: BAH 2006a.

The London and Singapore schemes, which have objectives relating to congestion management, are the most relevant to this inquiry. In both cases they were introduced where effective public transport networks existed and enhancements were planned.

[2] Some schemes in the latter category may in fact have a primary objective of reducing congestion *per se*, rather than improving economic efficiency. This classification refers to the scheme's primary objective only. In practice there will usually be multiple objectives (for example, a scheme with economic efficiency as its primary objective would generally have a secondary financial objective).

[3] Trial schemes (in Hong Kong and Stuttgart) and other proposed schemes (in Stockholm, the Netherlands, and Edinburgh) are discussed in *International Approaches to Tackling Transport Congestion - Paper 1: Area Road Use Charging* (BAH 2006a).

The London and Singapore road area schemes are both regarded as having resulted in congestion reduction benefits (see box 6.1 and 6.2). In London, the surveys of public attitudes since the introduction of congestion charging found that negative expectations held prior to the scheme's introduction were generally not borne out in practice; a significant proportion of respondents changed their opinions on the impacts of the scheme on themselves and their households, with an increased proportion feeling they had gained from the scheme compared with prior expectations (BAH 2006a, p. 9). For Singapore, very limited evidence is available on public attitudes and perceptions towards the charging scheme. Early market research suggested that most people (75 per cent) thought it fair to charge vehicles for the congestion they cause; but a majority (61 per cent) also thought that the manual area licensing scheme was not convenient (this view may well differ with the electronic road pricing system) (BAH 2006a, p. 9).

BOX 6.1 Road area charging in practice

London

In an attempt to reduce inner-city congestion, an area licence scheme, covering 22 square kilometres of central London[4] was introduced in February 2003. This area contains 370 000 residents and 1.2 million jobs. A daily charge, initially £5 but now £8, applies to vehicles driving in the zone between 7 am and 6.30 pm on business days. Residents in the charged area receive a 90 per cent discount. Over 500 000 charge payments are made per week.

The system is enforced via 700 video cameras which scan the rear licence plate of every vehicle entering the toll zone. These numbers are then cross checked against a database of fee-paying motorists at night to confirm payments and to initiate fines for those who have not paid.

The capital costs of introducing the scheme were around £180 million, of which around half related to associated traffic management measures extending to areas well outside the charging zone. The high recurrent costs—around £92 million per annum —are largely due to the costly camera-based licence plate recognition technology used to enforce the scheme. Total revenue is around £190 million each year. The operating costs of the scheme account for over half of the revenue collected.

The charge has been successful in reducing congestion—traffic volumes have reduced by 15-18 per cent within the charging zone, total travel times by around 19 per cent and 'delay' time by between 30 and 33 per cent. Average car speeds inside the charging zone have increased from 14.3 km/h to 16.7 km/h (Bhakar and Santos, undated) This has also led to significant benefits from reductions in transport accidents and vehicle pollution.

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[4] From February 2007, the scheme charging area is to be extended westwards, to cover a substantial area of inner west London.

Box 6.1 **Road area charging in practice** (continued)

The charge has significantly altered travel behaviour—to the extent that revenues are lower than forecast because more people than expected have decided to avoid the charge. Approximately 35 per cent of car trips into the charging zone have changed since its introduction—55 per cent changed to public transport, 10 per cent to walking or cycling, while the remainder rerouted or retimed their car travel. Average vehicle occupancy slightly increased.

Substantial enhancements to bus services were made prior to the scheme's introduction, in part to accommodate the anticipated additional demand and as part of a wider program of bus network improvements. There has been approximately a 17 per cent increase in the number of bus trips into the charging zone since the introduction of the charge. The attractiveness of travel alternatives is likely to be further enhanced by the legal requirement that, for the first 10 years, the net revenue from the scheme is to be spent on transport within the Greater London area. Around 80 per cent of this is to be allocated for improvements in bus services.

'Boundary area' problems have been less of an issue than expected—there has been no significant change in parking demand in areas just outside the zone, for example. Congestion along the main diversionary route, the Inner Ring Road, has not increased since the introduction of the charging scheme.

Before implementation, there was some concern that the charging scheme would adversely affect businesses and economic activity in central London. Although it is difficult to measure the effect accurately, research failed to identify any evidence of significant effects of the scheme (based on analysis of employment, turnover, business profitability and sales data) and generally concluded that 'congestion charging has had a broadly neutral impact on the economy of central London, and that any impacts on individual business sectors, including retail, are small.' (Transport for London 2005, p. 5) However, the London Chamber of Commerce and Industry dispute this, claiming that since the introduction of the charge, '80 per cent of businesses [in the congested zone] reported a reduction in turnover with more than 50 per cent citing the congestion charge as the sole cause or main cause for the decline.' (VECCI, sub. 84, p. 2)

While there is some debate over the economic success of the London congestion charge (see below), it is widely accepted as a technical success—it is achieving its objective of reducing congestion. One study reports that there are seven key factors underpinning the successful implementation and operation of the scheme—summarised by the acronym COMPASS (Crane 2005):

- **Champion**—Ken Livingstone, the Mayor of London, was elected on a platform that prominently featured introduction of a congestion charge.
- **Objective**—the clear objective of the scheme is to reduce congestion. Related aspects, such as raising revenue, reducing overall travel, and encouraging public transport use were important but clearly secondary to congestion reduction. This unambiguous focus assisted in planning the scheme.

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Box 6.1 **Road area charging in practice** (continued)

- **Money**—the funds to establish the scheme were provided by the national (UK) government. Although charging schemes are expected to raise revenue once fully operational, and are expected to have a positive cost-benefit ratio, money is still required to cover the substantial set-up costs.
- **Problem and powers**—that London had a severe traffic congestion problem and that "something had to be done", was a fact almost universally acknowledged. The institutional arrangements in London also afford the Mayor the powers required to implement the scheme with relatively little need to gain central government approvals and assistance.
- **Alternatives**—London has a range of transport alternatives to paying the charge. There is a reasonable alternative traffic route, the Inner Ring Road, for what would otherwise be through traffic. Public transport is also a viable option, notwithstanding some operational difficulties, for travel into central London.
- **Support—**public support has been relatively high throughout the process. The main factors contributing to this are the hypothecation of revenues to further transport improvements in London, the large number of exemptions and discounts—including to residents and public transport operators, and the concerted effort put into public consultation and engagement.
- **Skills**—the wide range of technical and management skills required to successfully implement the project were present in the project team.

While it has been a technical success, it is not clear that the London scheme has produced net economic benefits. A preliminary economic appraisal by Prud'homme and Bocarejo found that the costs of the scheme (implementation costs plus the additional subsidisation of bus services) outweighed the benefits (reduction in congestion costs, increased speed for bus users and environmental benefits). (Prud'homme & Bocarejo 2005). A subsequent study has contested this finding and found that the scheme is economically justified (Mackie/Transport for London).

Sources: BAH 2006a; Crane 2005; Gans & King 2004; Prud'homme & Bocarejo 2005.

Box 6.2 **Road area charging in practice**

Singapore

Singapore was the world leader both in introducing its original area licensing scheme and converting to a fully electronic scheme.

The original system required drivers to purchase a separate licence for driving access into the central business district during the morning peak. The cost was S$3 for a car with fewer than four people, which was approximately the same as the price for all-day parking. Traffic congestion in the central city area was reduced, but conditions worsened in neighbouring areas as drivers sought to avoid the toll (Gans & King 2004, pp. 103-5).

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Box 6.2 **Road area charging in practice** (continued)

The present electronic cordon charging scheme is a more comprehensive and flexible scheme. It uses short-range radio with receivers mounted on gantries, which detect a radio device that is fitted to the vehicles. Tolls are automatically deducted from an account linked to the vehicle. Technically, the system has worked well from the start, coping with around 280 000 transactions each day with minimal errors. When introduced it was expected that the system would operate for around 10 years, before being replaced by enhanced (global positioning or satellite) technology.

The system is augmented by charges on radial expressways, which limits the earlier problem of congested conditions merely being relocated to other areas of the city. Charges are now levied on a per trip basis, in contrast to the earlier daily licence.

The electronic system has allowed for greater flexibility in the toll rate. Charges apply during the day on weekdays only, with the highest charges applying in peak periods. Tolls now vary from S50 cents to S$3, depending on the time of day and vehicle type. The fees are reviewed every three months. If the monitored speeds in any half-hour period are outside the targeted speed range for a particular road, then the charge rates are adjusted up or down as appropriate.

The flexibility of the Singapore system to adjust the tolls in response to actual traffic conditions appears a useful way of balancing the desire for congestion reduction with that of ensuring the road infrastructure is not under-utilised. Congestion in the central area has been reduced by 40 per cent since the introduction of the electronic system (Gans & King 2004, p.104). Weekday traffic volumes into the restricted zone have reduced by 20-24 per cent and average speeds have increased by 31 per cent, leading to travel time reductions of around 24 per cent (TCRP 2003, cited in BAH 2006a, s. B3.7, p. 8).

The capital costs of introducing the electronic road pricing scheme in Singapore have been estimated at S$200 million. There are no estimates of the costs of operating the scheme. The initial revenue estimate, based on 280 000 transactions per day, was S$70 million per year. This revenue is returned to the government, and unlike the London example, is not hypothecated to any particular projects or programs.

Singapore is an extreme case internationally of a country that has pursued strong and consistent policies towards the development of its urban transport system for over 30 years. Its policies have had a major impact on levels of car ownership use, while providing high quality alternatives and minimising any adverse effects on its economy. Congestion management, including road pricing, has been only one component of its overall transport policies aimed at limiting car use and enhancing overall system efficiency, which also include:

- restraining the rate of growth of car ownership, through a vehicle quota system and additional registration fees
- providing a high-quality public transport system, including extensive bus priority measures, as an attractive alternative to private car use
- land use/development planning policies.

In particular, the restrictions on car ownership are thought to have had a greater impact than area road charges.

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Box 6.2 **Road area charging in practice** (continued)

The Singapore Government introduced road pricing as part of a comprehensive package of traffic restraint measures:

- Parking charges in both public and private parking lots were nearly doubled, with uniform rates replaced by rates which varied by geographical location.
- 15 park-and-ride facilities (providing about 10 000 new parking spaces) were constructed just outside the restricted zone, to ease the switch from private to public transport.
- Premium franchised shuttle bus services were provided to facilitate the transfer from the fringe parking lots to the downtown area.
- Flextime was encouraged by the government as part of a wider public information campaign (BAH 2006a, s. B1.5, p. 2).

Sources: BAH 2006a; Gans & King 2004.

There are alternative pricing schemes to the area-based approach adopted by London and Singapore. Charging for access to designated 'express' lanes is another approach, and has been successfully implemented in several American cities, including San Diego (see box 6.3).

Box 6.3 **High occupancy toll lanes in San Diego**

In 1996 San Diego introduced one of the first high occupancy toll (HOT) lanes along an eight-mile section of the I-15. This allowed single-occupancy vehicles to pay a toll to use an existing, underutilised lane that was previously reserved for HOVs.

The four primary purposes of the project are to:

(1) maximize the use of the existing capacity on the HOV lanes
(2) use congestion pricing to fund transit services throughout the corridor
(3) test whether congestion pricing can help relieve congestion on the main lines
(4) use a market-based approach to set tolls (Supernak 2005).

Initially, solo drivers were able to buy monthly passes which allowed unlimited use of the express lanes. Following the success of this trial, an electronic system was introduced in March 1998. Subscribers to the system, known as FasTrak, are issued an in-vehicle transponder linked to a user account, which is automatically debited each time the express lane is used. The incentives to carpool that existed with the original HOV lanes have been reinforced by allowing vehicles with two or more occupants to travel free.

The 'express' lanes are physically separated from the main lanes and operate only in the direction of peak traffic, depending on the time of day. There is a single entry point and a single exit point at the end of the 8-mile section.

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Box 6.3 **High occupancy toll lanes in San Diego** (continued)

The HOT lane fee can vary, between US50 cents and US$8, although it rarely rises above US$4, depending on the level of congestion (which is continually monitored by a system of microwave transponders). The charge can be adjusted every six minutes in 50-cent intervals to maintain free-flowing traffic on the express lanes. Drivers are informed of the current fee by road-side electronic signs before entering the HOT lane. An advantage of the flexible charges has been the spreading out of the peak periods.

The largest practical challenge is enforcing the system, given that multiple occupancy vehicles are entitled to travel along the HOT lanes without a transponder. In practice, this has meant that California Highway Patrol officers, funded by toll revenues, are stationed at the entrance to the HOT lane to visually inspect the passing vehicles. An electronic monitor tells officers if a solo motorist has paid the toll. When a vehicle that has been registered with the scheme is travelling with multiple occupants, the driver is required to insert their transponder into a silver static bag to prevent the transponder from being read and a toll being charged.

Despite this, overall the HOT lanes on the I-15 have been a success. A considerable number of drivers (more than 20 000 transponders have been issued) have been willing to pay the toll in exchange for an average time saving of around eight minutes. The HOT lane in effect offers 'congestion insurance' for any traveller willing to pay the toll. Around US$2 million a year in toll revenues are collected. This revenue pays for approximately US$750 000 in operating costs and US$60 000 for enforcement provided by the California Highway Patrol. The remainder of the revenue funds transit improvements in the I-15 corridor, including an express bus service.

The concept has been seen as fair, because drivers have the option of not paying the toll and continuing to drive in the more congested conditions. Allowing single-occupancy vehicles to buy their way into the express lanes represents a more efficient use of the road space than the previous HOV lane, which was underutilised.

An analysis of the HOT lane on the I-15 cited several factors that have contributed to its success:

- A clear vision of the project's purpose—to improve transit in the corridor by better utilising the HOV lanes.
- An influential political champion was able to make the idea a reality.
- The project was consistently presented as a win-win solution, because it did not involve 'taking away' any road space.
- Increasing numbers of subscribers became interested in purchasing access to the HOT lanes as 'safety net' type of tool for important trips.
- Technical performance of the system was very reliable—free-flowing travel conditions were delivered 99 per cent of the time.
- The marketing and media coverage helped reinforce the benefits of the scheme.
- High visibility of the project was a catalyst to bring good collaboration among key stakeholders.
- The project was very well managed by the local planning agency (Supernak 2005, p. 12).

Sources: Brownstone *et al*. 2003; Downs 2002; Gans & King 2004; Supernak 2004, 2005; United States Department of Transportation 2003.

6.1.1 Key observations on road use charging

This section has looked at examples where road pricing has been used to reduce urban traffic congestion (London and Singapore) and to improve transport efficiency along a congested road (San Diego). While the problems and circumstances differ between the cities, and have led to different solutions, the examples discussed illustrate some important points that are of broad relevance:

- Pricing can reduce congestion levels and travel times.
- Related measures, such as availability of public transport, are important. This includes capacity and service availability considerations.
- Pricing mechanisms will be most successful when they complement related policies, such as the taxes on car registration in Singapore.
- Flexibility in road pricing assists in directly impacting on congestion levels. As well as varying by time of day, prices can discriminate according to vehicle type (so those contributing most to congestion incur the largest cost) and by the number of occupants.
- Hypothecation of revenues from road pricing to fund transport improvements is an important component of many, but not all, programs.
- Although charging schemes are expected to raise revenue once fully operational, and are expected to have a positive cost-benefit ratio, money is still required to cover the set-up costs, which may be substantial.
- Successful pricing schemes often have a project 'champion' with the authority and credibility to clearly articulate the objectives of a pricing scheme, and with the ability to drive the implementation.
- An issue with HOV lanes can be underutilisation, which can result in inefficient use of the total road space, and increase rather than decrease congestion.

6.2 Parking policy measures[5]

Many cities world-wide (including in Australia) have sought to restrict the availability of parking through regulation or pricing, often in combination, to help alleviate congestion.

The objectives of parking policies generally include one or more of:

- reducing inner city car traffic
- reducing commuter traffic and congestion in peak periods
- reallocating road space away from parking, and towards other purposes such as extra lanes during peak periods, or reversible lanes for public transport vehicles (OECD 2001, p. 110).

[5] This section draws on the report *International Approaches to Tackling Transport Congestion – Paper 2: Review of International Experience* by Booz Allen Hamilton (2006b) for the Commission.

Internationally, many different parking restraint measures have been used. Booz Allen Hamilton list more than 20 in their paper *International Approaches to Tackling Transport Congestion – Paper 2: Review of International Experience* (BAH 2006b). These are summarised in table 6.3.

Table 6.3 **Parking restraint measures**

Parking restraint measure	*Scheme features*	*Locations implemented*
On-street parking		
Parking charges—on-street	Charged on-street parking	Many cities world-wide
Residents parking zones	Residents only parking by permit	London, other UK cities, US cities
Controlled parking zones/ parking concepts	Management of parking in area to balance demand and supply	UK cities, German cities
No long-stay parking in city centre	Time restrictions preventing all-day parking	UK cities
Bus lanes/clearways	Removal of on-street parking during peak periods	London, many UK cities
Pedestrian-only streets	No traffic at all in street	UK cities, European cities
Off-street parking – new developments		
Maximum parking standards	Maximum number of carparks for new development	London, UK cities, US cities
Commuted payment schemes	Developers charged in lieu of providing carparks	London, UK cities, US cities
Parking ceiling	Maximum number of total spaces in city centre	Portland & Boston
Ban parking spaces in new buildings	Parking spaces banned in new buildings in certain parts of city	Zurich
Ability to reduce minimum standards	Minimum parking standards can be reduced if carpool spaces or free public transport passes provided	Seattle
Maximum parking standards tied to public transport provision	Maximum number of carparks—lower maximum where higher level of public transport service	Zurich & Berne

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Table 6.3 **Parking restraint measures** (continued)

Existing private non-residential off-street car parks		
Licensing of off-street parking	Regulation of number of spaces, price, customer type etc.	London
Parking levy on off-street parking	Levy of fixed amount per year on all business district car spaces	Sydney & Perth
Existing publicly available off-street car parks		
Parking reserved for HOVs	Spaces reserved for carpools in public carparks	US cities
Long-stay versus short-stay charges	Long-stay spaces charged a higher rate than short-stay in public carparks	US cities
Parking levy—public carparks		US cities
Park and Ride/Peripheral parking	Parking tax on all publicly available spaces	Oxford, Canterbury
Employer funded parking		
Fringe benefit tax on parking	Tax on employer funding of carparks	Australia, New Zealand
Cashing out	Requires employers to provide employees with the option of receiving the cash equivalent of parking subsidy	California

These options generally raise the price of (short-term or long-term) parking through applying levies, limiting on-street parking either through permits or bans or regulating the supply of parking spaces, with the objective of discouraging car use.

The international experience most relevant to Melbourne, based on the congestion problems identified in chapter 3 and suggestions made by participants for addressing these, covers: [6]

- placing (maximum) restrictions on the total number of spaces in the city centre
- altering the relative costs (including through subsidies) of short-term and long-term parking.

[6] Removing on-street parking during peak periods to create clearways that can be used for bus lanes is discussed in section 6.6 on road space allocation in *International Approaches to Tackling Transport Congestion – Paper 2: Review of International Experience* (BAH 2006b).

Maximum number of total spaces in city centre

The traditional approach to parking supply has been to require a certain minimum provision of (off-street) parking spaces to be provided for every new development. The intention has been to reduce pressures for on-street parking. Recently, there has been a trend towards local authorities specifying parking maximums, with the intent of restraining traffic growth by limiting the number of car parking spaces available, thereby encouraging a shift to alternative forms of transport. Parking maximums have been introduced in London, Zurich and Berne as well as several USA cities. One of the earliest cities to do so was the USA city of Portland, Oregon (see box 6.4). The experience of London (box 6.5) outlines one possible way that maximum parking standards could be implemented across a large city. As well as introducing parking maximums in some areas, Zurich has forbidden provision of spaces in new buildings in certain parts of the city (box 6.6). A common feature of these approaches is the linking of parking standards to the availability and quantity of public transport, in recognition that parking restrictions on cars will be more effective if public transport is readily available.

BOX 6.4 Parking maximums in Portland

In 1975, a city ceiling of off-street and on-street parking spaces was introduced in Portland with the aim of limiting car use. Between 1975 and 1989 the total number of parking spaces was set at approximately 40 000 spaces. This was modified in 1990 to allow for a 3 per cent increase in spaces.

The policy is given effect by specifying maximum parking ratio measures for new office developments. The maximum number of spaces allowed is between 0.7 and 1.0 per 1000 square feet, depending on the type of development and its proximity to public transport. This is significantly lower than typical office developments in the United States that provide about 4 parking spaces per 1000 square feet.

The parking code also precludes new parking facilities being built for existing development, except in the case of major renovation. Minimum parking requirements are still used for residential sites.

Car-pooling is encouraged through the provision of reserved parking spaces in publicly operated parking garages, and in on-street metered spaces.

Although it is difficult to measure the effects of the Portland policy, one estimate found that the total travel reduced due to the policy, in 1995, was between 50 960 and 92,000 miles per day.

Sources: BAH 2006b; United States Environmental Protection Agency 1998.

Box 6.5 London Planning Advisory Authority – Parking Standards Matrix

The London Planning Advisory Committee (LPAC) developed a matrix of parking standards for financial and professional services, and business uses. These uses were chosen because a majority of trips generated by them are to work, most of which are during peak hours. The matrix relates the number of allowed parking spaces to the accessibility to public transport (ranging from low to high). For example, a higher level of demand restraint could be applied in central London, which has good public transport accessibility. The intention is that a lower level of restraint would be applied in outer London, where the level of public transport accessibility is lower. For this approach to be successful, a co-ordinated approach across all London boroughs would be necessary.

The LPAC devised parking matrix has not been implemented to date in London, as consensus has not been reached between the London boroughs. The functions of LPAC have since transferred to the Greater London Authority.

Source: BAH 2006b

Box 6.6 Parking restrictions – Zurich

Rather than minimum parking requirements, Zurich has parking maximums for new developments and redevelopments. The maximum level is based on location and public transport availability. The criteria for offices are particularly strict, with a maximum of one space for 10 employees.

A large number of parking spaces were withdrawn with the creation of new pedestrian areas. In Zurich as a whole, 10 000 parking spaces have been removed in recent years. No long-stay public parking is provided in the city centre and a very high level of public transport service is provided. Residents parking zones have been created, and attempts have been made to get private companies to reduce voluntarily their parking provision. The result has been a very high proportion of peak journeys into the city centre being made by public transport. Only 19 per cent of visitors to the city centre travel by car, while 33 per cent travel by tram or bus and 25 per cent by train.

Sources: BAH 2006b, SGS Economics & Planning, sub. 2.

Parking restraint policies are often opposed by local businesses fearing adverse impacts on the area's economic activity. However, the empirical evidence available is mixed. One study comparing town centre retail activity and parking provision in England found no meaningful relationship between specific elements of parking policy and the economic health of individual centres (Kamali & Potter 1997, cited in BAH 2006b, p.19). Auckland has imposed parking restraint measures in the central business district over the last four years but, according to one study, parking restraint policies have not stopped growth in the central business district. A similar result was found in a study of Zurich (BAH

2006b, p.20). However, some studies, focusing on several small Dutch towns and cities that made their city centre car free, have found that parking restrictions have adversely affected the local economy.

One possible conclusion is that parking restraint is likely to have significant negative economic effects in small centres, but less effect in medium to large cities. This difference could be related to the relationship of the city centre with other centres within the region, and to public transport facilities. In both Zurich and Auckland the city centre is very large by comparison with other regional centres, and has certain features which are not replicated anywhere else. These features create a strong demand for businesses to be located in the city centre, and are much more important than any parking restraints imposed (BAH 2006b, p. 20).

Long stay and short stay charges

Australian cities, including Melbourne and Sydney, have attempted to increase the demand for short-term car parking at the expense of long-term, commuter parking. The intent is to discourage commuters driving to work and parking in the CBD, which contributes significantly to congestion (chapter 3), without reducing the attractiveness of the city centre as a destination for short-term recreational and shopping trips (Hulls 2005).

In the UK the local authorities in Oxford and Canterbury have increased long-stay parking charges at public off-street car parks. This has had a limited effect on mode share, largely because of the private parking alternatives available. In many cities only a small proportion of spaces are under public control, and regulation of other spaces is likely to be more difficult. For example, Canterbury, where 28 per cent of the city parking stock is private non-residential, has achieved better results in terms of displacing long stay parking out of the city centre than Cambridge, where a much higher percentage (65 per cent) of spaces are privately controlled.

The demand for parking spaces can be highly responsive to significant changes in price, although the effect is much greater for long-stay, typically commuter parking, than for short-term parking. Best estimates of parking demand elasticities for CBD areas are that a 100 per cent increase in parking charges will result in a 10 percent decrease in parking demand for people who park for up to two hours, and a 90 percent decrease in demand for long-term (over seven hours) spaces (BAH 2006b, p. 16). The elasticities will, to some extent, depend on who initially pays parking charges; with some charges being paid for by drivers, and some (in the short-term), being paid by employers.

6.2.1 Key observations on parking policy measures

- Replacing minimum parking requirements with maximums can restrain car use. The maximum standards can vary according to the level and quality of public transport serving the area.
- Parking charges are a significant component of overall trip costs. Changes in the cost (including subsidies) or availability of parking can have significant impacts on traffic volumes, especially long-stay (mostly commuter) travel.
- Parking policies will be most effective if they complement the outcomes of the planning system.
- Parking restraint measures are likely to be unsuccessful if they do not also affect commercial parking spaces, especially in the central business district.

6.3 Financial and taxation measures[7]

In a number of countries, employers provide parking or other allowances to employees who car pool or use public transport. Many governments tax vehicle ownership or use, while some provide tax credits to public transport users.

Chapter 5 reported the concerns of several participants that fringe benefits tax concessions for vehicle owners created incentives for increased car use. This issue was discussed in chapter 4.

In countries where commuting expenses are tax-deductible,[8] this deduction generally applies to all travel modes, with car travel costs claimed on a per kilometre basis and public transport costs on an actual cost basis. This approach does not encourage alternative mode travel, and may in fact actually foster car travel depending on the car travel rebate rate. In addition, there is often a minimum journey to work distance, or a minimum annual amount, before commuting expenses can be claimed. This approach tends to encourage people to live longer distances from their workplace, and so contribute to urban sprawl.

However, some countries have adjusted the deduction rules of the taxation system to encourage environmentally-friendly modes. The Netherlands, for example, abolished tax relief for car drivers' commuter expenses in January 2001, while continuing to allow deductions for the expenses of public transport users and cyclists. A preferential regime also exists in Switzerland where public transport commuters can automatically claim actual costs, whereas car travellers have to make a case to be granted tax relief, such as that they live too far from a public transport station, or that the nature of their work requires use of a car.

In several countries where commuting expenses are not tax exempt, special provisions have been introduced to support employer travel plans. In the USA,

[7] This section draws on the *International Approaches to Tackling Transport Congestion – Paper 3: Financial and Taxation Measures* report prepared by Booz Allen Hamilton (2006c) for the Commission.

[8] This group of countries includes France, Denmark, Finland, Luxembourg, Germany, the Netherlands, Switzerland and Norway.

for example, employers can provide employees commuting on public transport with a benefit up to $60 a month, which is tax deductible to the employer and tax free to the employee. This tax exemption has also been extended to cashing out of employer-provided parking (see box 6.7).

BOX 6.7 Cashing-out of employee parking subsidies

In California, certain employers who provide subsidised parking for their employees are required to offer a cash allowance in lieu of a parking space. The intent of the law, introduced in 1992, is to reduce vehicle commute trips and emissions by offering employees the option of cashing out their subsidised parking space, and taking public transport, biking, walking or carpooling to work. For years, negative tax implications limited the implementation of the law, but in 1998 federal legislation was changed.

One criticism of the law is that it applies only narrowly. The law does not apply to all employers or all employees. It applies only to leased parking spaces, for example, those owned directly by employers are exempt. It applies only to employers with over 50 employees, in areas designated as being highly polluted. These employers must offer a parking cash-out program to employees who have subsidised parking available to them. Even when the law applies, there have been complaints that it is not adequately enforced, and that many employers are unaware of their obligations.

Despite these drawbacks, some positive results have been found. A 1997 study examined eight case studies of workplaces where the cash out program was implemented. It found that, on average, solo driving to work fell by 17 per cent and commuter parking demand by 11 per cent. Employee use of carpooling increased by 64 per cent, public transport increased by 50 per cent and walking and cycling increased by 33 per cent after the cashing out scheme was introduced.

The case studies claimed that cashing out of employer-paid parking can benefit employers through assisting in recruiting and retaining staff, as well as the affected employees and the environment.

Voluntary parking cash-out programs have also been promoted in other US cities, including Minneapolis-St. Paul. These have achieved an 11 per cent mode shift away from private use of cars, more modest than the California results. A study found that employers were reluctant to fully cash-out parking subsidies—mainly for equity and financial reasons. For example, employers were unwilling to allow former car users to receive a free bus pass instead of a parking space, without also electing to offer existing bus riders a similar benefit.

Sources: Air Resources Board 1997, 2002, 2005; Carlson undated; Institute of Transportation Studies 2002; Van Hattum undated.

6.3.1 Key observations on financial and taxation measures

- Taxation policy measures will be most effective when there is consistency in approach between different levels of government.
- The impacts on congestion of taxation measures are often a side-effect of policies, whose primary rationale may be unrelated to congestion.
- Some countries have tax systems that favour those who commute by public transport or cycle over those commuting by car. This is not the case in Australia.
- Offering employees the option of cashing-out a subsidised car parking space can lead to reduced car use. However, employers may be reluctant to voluntarily offer this option for equity and financial reasons.

6.4 Mobility management[9]

Mobility management is a broad term covering a range of measures that seek to manage travel demand by changing behaviour. It covers a number of travel demand management measures. Economic and infrastructure-related demand management measures[10] are discussed separately in other sections of this chapter.

One form of mobility management is the use of travel plans. A travel plan, which is most often based around workplaces or schools (but can equally apply to any situation), is a general term for a package of travel demand management measures tailored to the needs of individual sites, and aimed at promoting healthy and sustainable travel choices and reducing use of the private car.

Workplace travel plans originated in the USA and the Netherlands in the late 1980's. The immediate reason for these plans, which were mandated in some areas of the USA,[11] was to address air pollution problems. Workplace travel plans have also become an important part of national transport policy in the UK. All local authorities are required to stimulate these plans as part of their local transport plans, and the UK Government is seeking to encourage widespread voluntary take-up of travel plans (see box 6.8). Workplace travel plans have been trialled in other places (including Australia) but have not been implemented on such a wide scale as in the USA, Netherlands and the UK.

[9] This section draws on *International Approaches to Tackling Transport Congestion – Paper 4: Mobility* Management, prepared by Booz Allen Hamilton (BAH 2006d) for the Commission.

[10] Types of schemes covered by the mobility management umbrella include: workplace and school travel plans; personalised travel planning; travel awareness campaigns; carpooling; shuttle buses; travel demand modification (through staggered work and school hours); and administrative measures.

[11] This regulatory approach met with significant opposition due to the costs imposed on businesses, and the extensive administrative requirements and has now been abandoned at a regional scale in all areas except the Pacific Northwest.

BOX 6.8 Workplace travel planning in Buckinghamshire County Council

Buckinghamshire County Council introduced a travel planning scheme, called 'TravelChoice' for its 2200 staff in March 2000. The program was extended at the end of 2000 to around 11 000 teachers and social services staff. One of the reasons the council introduced the scheme was a desire to lead by example, and demonstrate to other organisations the benefits of travel planning.

The specific measures introduced in the travel plan include:

- **Large discounts for bus and rail travel for council staff**—Bus fares are half price and the cost of rail travel has been reduced by 33 per cent. The rail discount extends to leisure journeys for up to two adults and two children. The council successfully negotiated the discounts with the public transport operators, highlighting that they were 'throwing 13 500 people at them'. Although the public transport operators initially made losses on the scheme, both the bus and rail operators now make a profit as a result of the increased patronage. Interest-free loans are available to staff to purchase 'season tickets', which are paid back through their monthly salary.
- **A county-wide car sharing scheme**—A centrally co-ordinated car-share scheme, aiming to service the whole of Buckinghamshire was introduced. There is a special fund to pay for a guaranteed ride home if required, and the cars used in the scheme are exempt from parking charges.
- **A concerted marketing effort**—'TravelChoice' has been intensively promoted, based around generating a positive image of the scheme and raising awareness of the total costs of car travel.
- **Improved cycle parking**—Involves providing additional and improved cycle parking, new showers for cyclists, and interest free loans for bike purchase.
- **Car park management**—Car parking was originally provided free for all staff. However, this has progressively changed since the early 1990s. Now only 50 per cent of staff have free parking, and new employees are only eligible for a parking permit if they are defined as an essential car user.

The initial target was to reduce the proportion of staff travelling to work by car by 20 per cent between 1998 and 2005. By 2003, only 49 per cent of council employees drove to work, as compared to 71 per cent in 1998. In the year following the introduction of 'TravelChoice' there was a 15 percentage point reduction in the proportion of staff driving to work, with 6 per cent more walking and 5 per cent more taking the bus.

The discounts offered for bus and rail travel have been successful at increasing patronage. The car sharing component, which was intended as a major focus of the package, has been less successful in the initial stages, although there are some signs of greater participation.

The council sees congestion reduction and improved environmental outcomes as the main benefits of the scheme. The set-up cost of the programme was £33 000. Annual costs are £57 per employee.

Sources: Department for Transport (UK) 2002, 2005.

Table 6.4 **Travel impacts of mobility management measures**

Measure	*Travel impacts*
Workplace travel plans (WTP)	The extent of any travel impacts are dependent on the measures included in the travel plan: • Travel plans providing information only have a negligible impact on mode choice • Workplace travel plans that focus on promoting car-pooling average around 5 per cent mode shift amongst targeted employees • Travel plans that incorporate financial incentives to use alternative modes typically have the largest mode shift—on average around 8-10 per cent
School travel plans	Amongst UK schools involved in travel planning, about 60-90 per cent cut some car use. Around 15-40 per cent of schools are expected to cut car use by more than 20 per cent The UK Department for Transport found that a well-developed program of school travel planning across a number of schools might be expected to reduce the amount of school related traffic by between 8 per cent and 15 per cent
Personalised travel planning	Several pilot studies held in Adelaide of 'travel blending', a form of personalised travel planning, reported a 10-15 per cent reduction in car driver trips for participants and a 15-23 per cent increase in public transport use Individualised marketing pilot programs in Perth have generally resulted in 10 per cent reduction in car driver trips for the targeted population
Car sharing	Car clubs have been associated with a reduction of about 5 private cars per car club vehicle Swiss experience indicates that up to 9 per cent of the population are potential members of car clubs
Ridesharing	Difficult to assess impact, due to the often unknown degree of informal ridesharing prior to implementation Ridesharing is often an important part of workplace travel plans, contributing to the car use reduction achieved Carpools and vanpools can have variable impacts, largely depending on the take-up rate. Area-wide rideshare matching and promotion schemes can reduce vehicle kilometres travelled by up to 3 per cent
Modified work hours	Flexible or staggered work hours, when implemented on a large-scale, have significantly reduced peak period traffic Flexible work hours in Ottawa, Canada led to reduced peak traffic volumes by around a half, in both the morning and evening Flexible work hours appear to result in reduced ridesharing (due to the complication of ride matching)

Table 6.4 summarises the results of studies that have assessed the travel impacts of various mobility measures. The observed changes generally refer only to the proportion of the population that is affected by the measure, for example those participating in a work or school travel plan. The impact on overall travel is not measured, but would be expected to be significantly lower than the results reported in table 6.4.

BOX 6.9 **Staggered school hours**

In Northern Ireland, neighbouring schools must stagger their start and finish times so they can share bus services. This has come about historically, as new schools have opened existing bus services have been extended and modified to serve them either before or after 9 am. This seems efficient in transport terms, particularly in facilitating travel to and from school by bus, although the objectives are wider than simply reducing congestion. There are significant drawbacks, however, including:

- late sessions are unpopular with teachers
- it is difficult for working parents to co-ordinate with their children
- pupils can be tired and unable to concentrate on lessons in the late afternoon
- schools with the earliest or latest start times are less attractive and face unfair competition for pupils from other neighbouring establishments with more conventional hours
- there are no resources to reimburse those schools with the most unfavourable session times.

These drawbacks could be offset by local authorities offering schools a financial incentive to change their times—funded out of the potential cost savings.

Similar proposals have been examined in the UK, where journeys to school contribute significantly to congestion in the morning peak.[12] The British Government is encouraging neighbouring schools to consider staggering their starting and finishing times, but does not require them to do so.

The Queensland Council of Parents and Citizens Associations has called on Education Queensland to back a broad trial of staggered starting and finishing times to alleviate the congestion and safety impacts. Schools are already able to implement such a strategy themselves, although there is little evidence this is occurring, which may suggest that schools do not consider such an exercise worthwhile. As stated by the Courier-Mail:

> Given that schools vary enormously in terms of size, available car parking, number of street frontages, availability of trains and buses for children who need to catch them, the age groups of children attending the school, and before and after-school care facilities, no one-size-fits-all solution will suit all schools (Courier Mail 2006).

Sources: Department for Education and Skills and the Department for Transport (UK) 2003; Department for Transport (UK) undated; Guardian Unlimited 2003b; The Courier Mail 2006.

[12] As evidenced by congestion in the morning peak dropping by a fifth during school holidays (Guardian Unlimited 2003a).

Chapter 3 points out that journeys by car to work and school contribute significantly to peak period congestion in Melbourne. Several participants have suggested that work and/or school hours should be staggered to help reduce congestion by spreading out the demand for travel (chapter 5). International experience has demonstrated that flexible working arrangements can offer benefits in reducing congestion, although in some cases there is a countervailing desire to maximise productivity by coordinating work and school hours.[13] There are limited examples available where staggered school hours have been implemented in a way that would have any discernible impact on congestion (box 6.9).

6.4.1 Key observations on mobility management

- Workplace travel plans can be used to reduce car use. Those that incorporate financial incentives have a larger impact than those only providing information.
- Staggered work and school hours can reduce peak period congestion in certain circumstances, but can present coordination challenges.
- Many mobility measures are private sector initiatives. Government's role is generally limited to promotion and encouragement.
- Relative to many other policies, mobility management measures are cost-effective, and can be implemented quickly.

6.5 Traffic management – capacity enhancement[14]

Traffic management measures aim to improve traffic conditions through operational improvements that increase the efficiency, and by extension, the effective capacity of the existing road infrastructure (table 6.5). Two approaches that have received particular attention are ramp-metering and incident management systems.

[13] Booz Allen Hamilton (2006d) outline some of these examples and their results. See particularly Table A.9 (p. 29) for a summary of the evidence.

[14] This section draws on *International Approaches to Tackling Transport Congestion – Paper 9: Traffic Management – Capacity* Enhancement, prepared by Booz Allen Hamilton (2006i) for the Commission.

Table 6.5 **Measures to increase peak capacity**

Measure	*Description*
Lane management	
Road layout reallocation	The creation of an extra lane or lanes by the reallocation of road layout or the use of the hard shoulder during peak periods
Tidal flow/reversible lanes	The switching of lane direction according to the direction of greatest demand during peak periods. This measure is often provided exclusively for use by HOV/HOT vehicles and public transport
Variable speed limits	The varying of speed limits to reflect prevailing traffic conditions. The objective is to increase road throughput and safety, by reducing both the range of speeds and the incidence of lane changing on a congested section of road
Intersection traffic control	
Signal coordination	The coordination of traffic signals to regulate vehicle flow in urban areas and ensure that delays are minimised at intersections
Ramp metering	The use of traffic signals at freeway entrance ramps, to regulate the number of vehicles entering and optimise freeway performance. This is often combined with signal coordination on approach arterial roads
Access management	The limiting of road access points and intersections to smooth traffic flow, direct tailbacks and reduce collision hazards. This may include either temporary or permanent road or freeway entrance ramp closure

6.5.1 Ramp metering

Ramp metering is widely used in many USA cities, with broadly positive results (box 6.10). It involves controlling the flow of traffic entering freeway access ramps. Ramps are used to queue vehicles temporarily, in order to optimise the flow on the freeway itself, and to maintain it below the critical level over which congestion is likely to appear.

A potential drawback of ramp metering is that the queue of vehicles waiting to enter the freeway can backup onto the neighbouring roads. However, this problem can be avoided by ensuring that systems are in place to allow the metering rate to increase if the queues become excessive.

Box 6.10 **Ramp metering**

In the USA city of Atlanta, preliminary results have confirmed that ramp metering can be effective at increasing overall system efficiency if used in the right circumstances—usually in the most congested corridors. Earlier ramp meters that had been installed in relatively uncongested corridors generated only small benefits – and had little public support.

The effectiveness of ramp metering is further illustrated by an experiment conducted in 2000 by the USA twin cities of Minneapolis-St. Paul, which had already installed over 430 individual ramp meters. The experiment involved turning off the ramp meters for a six-week period in order to evaluate how the system operated without them, and how this compared with when the meters were operational.

Turning off the meters meant that cars were able to enter the freeways without being held on the ramps. Bottlenecks were created on the freeways, however, as more cars attempted to enter at the same time, and motorists had difficulty merging into the traffic. Overall, the experiment demonstrated that the time saved by eliminating the wait on the ramp did not compensate for the greater delays caused on the freeway, and so supported the use of ramp metering as an efficiency measure.

The integrated system of ramp metering in Minneapolis-St. Paul was shown to have:

- decreased accidents by 26 per cent
- increased throughput by 14 per cent
- reduced average travel times by 22 percent
- led to more reliable travel times—travel times were observed to be nearly twice as predictable when the ramp metering system was operational.

Other cases in the USA where ramp metering systems have been used to increase the available road capacity include:

- Seattle, where travel times where reduced by 50 per cent while peak traffic volumes increased by 86 per cent (northbound) and 62 per cent (southbound) over the same period
- Milwaukee, where a study of one corridor found that travel speeds in the PM peak had increased by 4-13 per cent
- Long Island, New York, where there was a 20 per cent reduction in travel time
- Portland, where there was a 39 per cent travel time reduction.

A 2005 study of 85 metropolitan areas that have introduced ramp metering found that, combined, delays have been reduced by 102 million person hours—approximately 5 per cent of total delays (Schrank & Lomax 2005, cited in BAH 2006i, p. 16).

Sources: Centrico 2001; National Transportation Operations Coalition 2005; US Department of Transportation undated; VicRoads undated.

6.5.2 Incident management

The intent of traffic incident management is to minimise the extent of disruptions to network capacity caused by collisions and breakdowns. Quickly restoring the capacity of the system can reduce the severity of congestion, as well as reducing the likelihood of secondary crashes occurring. Integrated incident management systems, which combine detection, verification, and the subsequent response to incidents, can have significant benefits in managing congestion (table 6.6). An assessment of 85 metropolitan areas in the USA that employ incident management systems found that, based on modelling estimates, they led to a combined delay reduction of around 7 per cent of total delays (Schrank & Lomax 2005, cited in BAH 2006i, p.16).

Table 6.6 **Incident management measures**

Location	*Nature of scheme*	*Impacts*
Sydney (Aust.)	Incident management systems on a number of major arterials	6-12 per cent travel time reduction
Montgomery County, Maryland	Incident management programme	10-42 per cent travel time reduction
San Antonio, Texas	TransGuide is a system that monitors traffic conditions to provide information to motorists and respond to incidents.	The overall crash rate reduced by 41 per cent Incident response time down 20 per cent Quicker response times reduced delays by an average of 700 vehicle-hours per major incident
Brooklyn, New York	Gowanus Expressway/Prospect Expressway Rehabilitation Incident Detection System	66 per cent reduction in incident clearance time
Philadelphia, Pennsylvania	I95 Traffic and Incident Management System	40 per cent reduction in incidents 55 per cent reduction in freeway closure time

Source: BAH 2006i, p. 16.

6.5.3 Key observations on traffic management capacity enhancement

- Capacity enhancement measures seek to optimise the use of the existing transport infrastructure.
- This objective is to ensure the existing infrastructure operates in an optimal way, utilising spare and effectively unused capacity. For this reason, and in light of the potential impacts, they should be regarded as primary options to alleviate congestion.
- Such measures are most effective if implemented as part of a package, such as integrated network management systems. A network approach also reduces the risk of simply transferring congestion problems from one area to another.

6.6 Traffic management – road space reallocation[15]

Traffic management measures aim to maximise use of the existing road infrastructure by improving the operation of the existing road network.

Traffic management measures can be divided into two main groups:

- measures which aim to improve traffic conditions for all traffic
- measures which give preferential treatment to travel modes such as public transport, HOVs, and cycling.

The previous section discussed measures in the first group. This section focuses on the second group of measures. It also examines the role of traffic calming measures in reducing congestion.

6.6.1 Public transport priority

Chapter 5 reported that several participants considered that HOVs, especially public transport, but also certain private HOVs, should be given greater priority across the road network.[16]

As an example of HOV priority, bus lanes are a common measure, and have been widely implemented overseas. They are often designated for use only during peak congested periods, and are aimed at relieving peak period congestion by allowing buses to bypass congested road sections.

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[15] This section draws on *International Approaches to Tackling Transport Congestion – Paper 10: Traffic Management – Road Space Reallocation*, prepared by BAH (2006j) for the Commission.

[16] What constitutes a HOV can vary. Some applications have given priority to cars with two or more persons, taxis, and commercial vehicles. The impacts of HOV lanes on public transport are generally similar to those of bus lanes, but the schemes may also be effective in reducing single-occupant car use. For instance, a major HOV lane scheme in Madrid reduced the single-occupant car travel mode share from 56 per cent to 24 per cent. However, this reduction is often at the expense of public transport, with some public transport passengers switching to multiple-occupancy car travel.

The extent to which buses are given priority varies. The 'minimalist' approach is to terminate bus lanes prior to critical intersections, so as not to reduce road capacity for other traffic. Providing continuous lanes constitutes a more substantial change, and may be accompanied by signal priority measures. Continuous lanes will reduce the road space available for other vehicles and, depending on the circumstances, may increase overall traffic congestion.

Bus lanes have typically resulted in patronage increases for buses, and sometimes in reduction in car traffic volumes. The priority lanes on key radial corridors in Auckland have led to significant patronage increases. The effects of some bus lane schemes have been more modest, however (box 6.11).

BOX 6.11 **Bus priority in Auckland**

In New Zealand, bus priority lanes (along with traffic signal priority) have been introduced on three key radial routes in Auckland since 1998. The aims of the bus priority initiatives are to:

- achieve travel time savings
- improve service reliability
- protect public transport performance from the effects of growing traffic congestion.

The performance of the bus system is particularly important in Auckland, as it carries 90 per cent of all public transport users.

Following some initial problems with low public awareness and difficulties in enforcing the bus lanes, the dedicated bus lanes were painted green. In addition to reducing the illegal use of bus lanes and raising public awareness, this is intended to convey a sense of permanence and commitment to the priority measures.

The bus priority measures have reduced average bus journey times, as well as making them more predictable. There has been patronage growth along the three routes of around 8-11 per cent per annum (representing 800 000 trips). While the bus priority measures have been an important driver of this patronage growth, concurrent improvements in the bus fleet and greater service frequencies have also contributed. Along one of the arterial routes, Dominion Road, there has been a 10 per cent reduction in peak period car traffic.

Most of the bus priority initiatives used in Auckland have been relatively low cost and quick to implement, and the benefits to bus users have been significant. However, the effects on the transport system overall are not known.

Sources: Auckland Regional Council 2003; BAH 2006j.

Experience has shown that, as might be expected, the degree of modal shift from car to public transport depends on the extent of the time saving achieved by the particular bus lane. Where only minimal time savings are achieved, as has been the case for many schemes, mode changes also tend to be small. The schemes that have generally had the greatest impacts on public transport patronage, mode shares and road traffic volumes have generally involved an integrated package of

public transport 'carrot' measures and some 'stick' measures that have made car travel relatively less attractive, such as increased car parking restrictions or the reallocation of road space.

Bus and tram priority measures are often implemented as part of a wider package of public transport enhancements, such as new low-floor vehicles, increased frequencies, and improved stop facilities (section 6.8). The Dublin Quality Bus Corridors scheme was a suite of measures that included greater priority for the buses. The scheme achieved a significant increase in the mode share of bus travel into the central business district from 42 per cent in 1997 to 61 per cent in 2003 (box 6.12).

Box 6.12 **Dublin Quality Bus Corridors**

The Dublin Quality Bus Corridors scheme was a major component of the 1994 Dublin Transportation Initiative of the Irish Government. The scheme's objectives were to:

- increase bus journey speeds in the selected corridors by a minimum of 25 per cent, and to achieve a minimum speed of 20km/h
- reduce average waiting times for passengers to no more than three minutes in peak periods
- provide high quality waiting facilities including real-time passenger information
- upgrade the bus fleet.

The scheme's core measure was bus priority lanes on each route, together with traffic signal priority to protect the buses from congestion and to provide faster travel times by bus than by car. This was combined with the improved waiting facilities, which include real-time passenger information, an upgraded bus fleet, and restrictions on parking along the priority routes.

Twelve Quality Bus Corridors were defined originally, typically between 10-12 kilometres long. The first nine of these schemes, involving a total of 98 kilometres of bus lanes, were introduced between 1996 and 2001. The results seem impressive. Across these schemes, between 1997 and 2003, for travel into the city centre in the morning peak period the:

- total number of people travelling by car fell by 25.7 per cent
- total number of people travelling by bus increased by 60.6 per cent
- car mode share fell from 58 per cent to 39 per cent
- bus mode share correspondingly rose from 42 per cent to 61 per cent.

The Dublin schemes offer an example of major public transport improvements having a pronounced and sustained effect in reducing car traffic volumes. Although the Quality Bus Corridors originally encountered strong opposition from traders, they are now widely accepted by the public. The corridors have been introduced and extended gradually, which has helped to moderate public opposition toward them and to gain public acceptance.

Sources: BAH 2006g; The Urban Transport Benchmarking Initiative, www.transport benchmarks.org.

6.6.2 Key observations on public transport priority measures

- Allocation of the available road space between competing modes involves trade-offs. Giving road space priority to public transport can improve its performance and increase its share of total travel. However, it may increase car congestion.
- Measures allowing public transport vehicles to jump the general traffic queue can often be implemented relatively easily and cheaply, and provide benefits to public transport users and operators without significant adverse impacts on general traffic.
- More comprehensive measures, which significantly reduce the available road space for general traffic, are more likely to increase some aspects of traffic congestion, although they will also benefit public transport users.
- The overall impacts, including whether congestion will be reduced, will be location specific. However, in general it is apparent that a comprehensive package of measures is likely to be more effective in achieving reduced congestion and modal shift.

6.6.3 Traffic calming

Some participants commented on the potential for traffic calming measures, such as road space narrowing, speed humps, chicanes, street closures, and one-way streets, to contribute to reducing congestion.

Traffic calming practices originated in Europe, but have now been extended to other cities, including Melbourne. In many cases, the emphasis has changed from the calming of individual streets to the adoption of traffic calming/management measures on an area-wide basis.

The impacts of traffic calming measures are very case-specific. However, they have generally been effective in achieving objectives relating to safety, environment and amenity in local streets. When practised on an area-wide basis, in some cases they have displaced significant traffic volumes into the arterial road network, resulting in increased peak period congestion. However, there is also some evidence that reallocating road space away from private cars can lead to some reduction in vehicle traffic (box 6.13). This effect is the opposite of the inducement of traffic caused by capacity expansions (chapter 7).

6.6.4 Key observations on traffic calming

- Traffic calming is not primarily a congestion-reducing measure. Indeed it may result in an increase in road congestion. However, there may be arguments in its favour on other grounds, including safety, environment and local amenity.

Box 6.13 Road space reallocation in Strasbourg

Measures that remove road space for private cars, and allocate this either to other transport modes, or to public space, have been implemented in many cities. The European Commission has published a series of case studies that found that traffic problems resulting from such measures are usually less serious than expected, and that they can lead to overall reductions in traffic volumes.

The French city of Strasbourg has had a policy of removing cars from its city centre to make way for other travel modes—public transport, cycling and walking—since 1992. This was a response to the worsening problems of pollution, accidents and loss of amenity, as well as congestion, experienced by the city in the 1980s.

Strasbourg extended the traffic-free precinct in the city centre, and restricted through-traffic to public transport, taxis, cyclists and pedestrians. Two new tramlines have been built, using road space previously occupied by car traffic.

The reallocation of road space was initially met with strong opposition, particularly by retailers fearing loss of income, and by those predicting traffic chaos in the city centre. However, the success of the scheme has resulted in general public acceptance, and does not appear to have resulted in any significant loss of income for retailers.

Since the reallocation of road space in the city centre away from private vehicles:

- there has been a significant reduction in the number of vehicles entering the city centre—from 1990 to 2000, the number of vehicles in the city centre fell by 16 percent, despite traffic increasing across Strasbourg as a whole
- there has been significant mode shift—the share of trips taken by public transport increased from 11 per cent in 1989 to 30 per cent in 1999
- the number of cycling and park-and-ride trips have increased
- the predicted traffic chaos did not occur—after an initial settling-in period drivers have adjusted to the new road layout.

Source: European Commission Directorate-General for the Environment 2004.

6.7 Walking and cycling[17]

Walking and cycling can substitute for vehicle trips in a number of ways:

- to replace short trips by car entirely
- to replace part of a car journey with a walking/cycling trip
- to supplement other forms of transport, for example, in combination with public transport.

Replacing car travel with walking and cycling trips reduces road congestion by:

- transferring journeys off road to alternative corridors such as footpaths and cycle ways
- taking up less space on the road, in the case of cycling.

[17] This section draws on *International Approaches to Tackling Transport Congestion – Paper 5: Walking and Cycling*, prepared by Booz Allen Hamilton (2006e) for the Commission.

Measures designed to promote walking and cycling can be divided into three types—marketing, infrastructure, and regulatory. However, in practice, programs usually involve a combination of these elements.

Marketing measures are principally 'carrot' measures. They involve the promotion and encouragement of walking and cycling, chiefly through public information and education campaigns that highlight their health, financial and environmental benefits. Examples of this include increased cycle training at schools, and the provision of detailed route guidance for cyclists (box 6.14).

BOX 6.14 **Cycling promotion in Aalborg**

In 2003, the Danish city of Aalborg introduced an internet-based bicycle planner, with information on how best to get from one place to another, and the length of the suggested route.

The system, known as the Cyclist Travel Planner, uses information on all the roads and cycle paths in Aalborg to categorise the available routes for cyclists—roads and paths that are evaluated as less safe are identified.

The route planner is designed to offer cyclists information on the safest routes, taking into account cycle paths and lanes, even though they may be slightly longer. However, it is also possible to use the system to identify the most direct route.

Aalborg further supports cycling through extensive bike tracks and lanes, the majority of which are off-road, as well as ensuring that there is ample cycle parking facilities—for example, the provision of cycle parking in new developments is mandatory.

Like many Scandinavian cities, cycling (and walking) is a common mode of transport in Aalborg. Sixteen per cent of all daily trips in the Aalborg region are cycling trips (walking accounts for an additional 17 per cent) (The Urban Transport Benchmarking Initiative 2005b, p.12).

Sources: Clifford 2006; The Urban Transport Benchmarking Initiative 2005b.

There are several ways in which the infrastructure improvements can increase the attractiveness of cycling and walking. These include dedicated cycling lanes, widening and improving pavements, implementing continuous cycle lanes, and providing secure cycle parking.

The most common regulatory measures in this context are those that seek to promote walking and cycling by making car use less attractive, such as through parking or traffic restrictions. They can be very effective at altering how people travel (box 6.15), although less information is available on the overall effects on the transport system of these measures.

Box 6.15 Walking and cycling – UK case studies

The UK Department for Transport outlined its strategy for increasing active travel in 2004 with the release of 'Walking and cycling: an action plan'. This was accompanied by 50 examples of schemes that achieved significant results by improving local conditions for walking and cycling (see www.dtf.gov.uk). Examples included:

Oxford transport strategy

A six year program was introduced to reduce congestion, improve the urban environment and quality of life. As well as traffic restrictions and bus priority measures, the city cycle route network was improved and 350 additional cycle parking spaces provided. Oxford succeeded in attracting more people into the city—central area pedestrian flows increased by 8.5 per cent between 1998 and 2000, reversing a declining trend. Seventeen percent of journeys to work, and 11 per cent of total trips, are by bicycle.

Reallocation of road space for cyclists, Hull

Cycle lanes were introduced on a large number of major roads in Hull. Generally, these involve the removal of one lane of traffic in each direction, replaced by parking bays and a cycle lane. Advanced stop lines have also been introduced at signalled junctions. The cycle lanes have increased the use of bikes. Of the six sites monitored, one showed an increase of 138 per cent, and three others by between 20 and 30 per cent. The two other lanes appeared to generate no increase in cycle use. The scheme also reported significant safety benefits—a 45 per cent reduction in cycling casualties and an 11 per cent reduction in pedestrian casualties.

Manchester Airport Green Travel Plan

The companies of the Manchester Airport Group introduced a Green Commuter Plan with the aim of switching 25 per cent of the 80 000 daily trips to the airport away from the car.

The plan involves capping the number of staff car-parking spaces, and introducing car share and car club schemes. The airport is integrating cycling and walking with public transport options, and establishing an on-line journey planner. The plan is predicted to lead to a doubling in the number of staff walking and cycling to work, albeit from a low base, one and two per cent respectively.

Source: Department for Transport (UK) 2004.

6.7.1 Key observations on walking and cycling

- Improved personal health, as well as environmental benefits, is the main benefit from measures to promote walking and cycling. Traffic congestion may also be reduced, although this is usually a secondary objective.
- The impact on congestion of walking and cycling measures depends on the current importance of walking and cycling as forms of travel.
- Walking and cycling strategies can be implemented in a relatively short timeframe and can be cost-effective to implement.

- It is important that the potential for walking and cycling is considered during the initial stages of planning integrated transportation strategies.
- Walking and cycling measures can be locally applied and extended incrementally.

6.8 Public transport improvements[18]

Chapter 5 reported that many inquiry participants commented on the potential for public transport improvements to address transport congestion. Essentially their view was that making public transport a more attractive alternative would result in road users shifting to public transport, thus reducing road congestion. These submissions include a number of specific suggestions for improving public transport, including some that are based on the experience of other cities, in Australia and internationally.

The Booz Allen Hamilton review of international experience in public transport improvements, and particularly their effect on inducing a switch from car trips, either in isolation or in combination with measures such as road pricing to discourage car use, is reported in chapter 7. Table 6.7 presents a summary of international evidence on the impact of major public transport improvements on car traffic volumes.

[18] This section draws on *International Approaches to Tackling Transport Congestion – Paper 7: Public transport improvements*, prepared by Booz Allen Hamilton (2006g) for the Commission.

Table 6.7 **Summary of international evidence on the impact of major public transport improvements**

Country	*Public transport scheme*	*Description*	*'Theoretical' impact on car traffic volumes*
Major corridor schemes			
Australia	Adelaide O-Bahn	12.6km guided busway, new interchanges and park and ride facilities	Up to 10 per cent reduction in corridor (am peak)
	Perth northern suburbs railway	29km double track railway	Less than 3 per cent reduction in corridor daily (may be greater in peak)
UK	Manchester Metrolink	30km light rail scheme (converting two existing suburban rail lines)	4 per cent in northern corridor, 8 per cent in southern corridor (am peak)
	Tyne and Wear Metro	Light rail scheme involving conversion/joining of suburban rail lines	2-5 per cent reduction
	Sheffield Supertram	30km light rail scheme	Up to 6 per cent reduction in corridor
	Croydon tramlink		10-15 per cent reduction in Croydon, minimal reduction in Kingston
Germany	Berlin metro extension	Extension of the Berlin U-Bahn to Spandau	5-10 per cent reduction in corridor
Spain	Madrid HOV lane		14 per cent reduction in corridor (car mode share reduced from 56 per cent to 48 per cent)
USA	Various light rail transit schemes	Construction or extension of light rail schemes	Negligible (<0.5 per cent) overall reductions (very small reductions in specific corridors)
Fare schemes			
Switzerland	Basel fare reduction		2-3 per cent reduction over city area
France	Paris fare reduction	Introduction of 'Carte Orange': giving unlimited access to all parts of the public transport system to pass holders	2-4 per cent reduction over Paris area
Australia	Sydney fare increase	Estimated price elasticities for a 10 per cent increase in rail and bus fares	< 0.2 per cent change in traffic volumes overall

Source: BAH 2006g.

6.8.1 Other international experience

Chapter 2 noted the radial nature of Melbourne's tram and train networks, and their limitations for meeting the demand for cross-town travel. It also noted the pattern of growth in Melbourne's population and economic activity that indicates cross-town traffic will become more important in future. In chapter 5, a number of participants highlighted the role that an expanded bus presence could have in meeting the demand for cross-town travel, and in reducing congestion otherwise associated with it.

Against this background, the experience of the large South American cities of Curitiba and Bogota in introducing an expanded bus service is of interest (box 6.16). Their experience suggests that premium bus services could address the gaps in Melbourne's public transport system—the legacy of radial growth in its public transport network. The expanded bus services described in box 6.16 represent a relatively low cost way of improving the quality and flexibility of public transport. The approach described in those cities also has some similarities with the SmartBus concept recently introduced in Victoria.

BOX 6.16 Bus rapid transit in Curitiba and Bogota

Bus rapid transit is a public transport solution that its advocates claim is cheaper than heavy or light rail alternatives, and avoids the negative public image that hampers traditional bus services. It seeks to combine the most popular features of rail with the flexibility and cost advantages of buses. The seven major components of a bus rapid transit system—not all of which feature in every scheme—are:

- dedicated right of ways—unlike rail systems this can be shared with emergency vehicles or with HOVs, providing congestion-free travel
- stations—that can offer a sense of permanence to the system
- improved vehicles
- improved fare collection measures—if fares are collected before boarding, buses' stopping time is significantly reduced
- improved service frequencies
- more flexible route structure
- use of intelligent transportation systems—such as to control traffic signals, update passengers on travel times and the wait time until the next bus.

According to Professor David Hensher of the University of Sydney, advantages of bus rapid transit include:

- it is cheaper than other options, such as light rail, in terms of subsidies per passenger
- its environmental, energy and traffic reduction benefits are likely to be much higher than for light rail—except where corridor volumes are very high

(continued next page)

[19] Curitiba has the second highest number of cars per capita in Brazil, after Brasilia.

Box 6.16 **Bus rapid transit in Curitiba and Bogota** (continued)

- it can offer a more direct service, and avoid the need for time-consuming transfers
- it can be built much faster than alternative infrastructure options, and is more adaptable to possible changes in travel patterns.

The South American cities of Curitiba and Bogota are examples of what can be achieved by bus rapid transit.

Curitiba

The Brazilian city of Curitiba (population around 2.8 million) experienced rapid population growth in the 1950s, 1960s and 1970s which placed significant pressure on its transport infrastructure. In response, the city committed to introducing a range of measures, including encouraging growth along the transport axes of the city rather than the city centre, restricting the supply of parking, and introducing employer public transport subsidies for workers.

Curitiba developed its public transport system around high capacity buses—some carrying up to 330 passengers. It has a single, subsidised fare and has integrated the operations of ten separate private providers.

Curitiba is now recognised as good practice in terms of urban planning, transportation, waste management, environmental management, and cross-sectoral integration. The public transport mode share is 33 per cent in the broader Curitiba area and 75 per cent of commuters travel by bus, despite relatively high car ownership.[19] Peak two-way bus rapid transit loading reaches 35 000 persons per hour.

Bogota

The Colombian capital, Bogota (population around 6 million), has introduced a bus rapid transit system called TransMilenio. The TransMilenio system has achieved time savings of around 32 per cent, and significantly improved the quality and safety of the city's bus system, while fares have increased by only around 6 per cent.

The system's articulated buses have exclusive lines to ensure they can proceed unimpeded by other traffic. There is also substantial supporting infrastructure in the form of passenger access to stations through pedestrian bridges and tunnels as well as improved platforms and waiting bays.

The scheme combines trunk-route services and feeder services, and has both express and ordinary services. The combination of express and ordinary services increases the utilisation of the bus fleet, and maximises the capacity of the system.

Pre-paid smart cards are used to access the TransMilenio stations. Passengers can then board the buses through multiple doors.

An operational control centre monitors passenger movements, and the progress of the buses against the timetables. It uses this information to order operational adjustments as required.

Sources: Breakthrough Technologies Institute undated; Hensher 2006; National Public Radio 2005; Stanley 2006; Transmilenio website (www.transmilenio.gov.co)

Other international experience suggests that programs targeted at increasing public transport use among particular groups could augment policies to improve bus access and increase public transport patronage generally. For example, marketing schemes that reward loyalty to public transport and increase its appeal to young people (such as those that have successfully been used in Paris and Vienna) could be relevant to Melbourne (box 6.17).

BOX 6.17 **Public transport loyalty schemes**

The public transport operators in and around Paris have established a loyalty program, called *Imagine R'*. This is focussed on attracting the 900 000 people aged 10–25 in Paris to public transport. The scheme has achieved a high degree of market penetration—approximately 75 per cent of its targeted market (680 000) are card holders.

The success of the scheme has been attributed to the effort that has gone into branding public transport to make it attractive for younger people, as well as the concession fares (30–50 per cent reductions) and commercial tie-ins, such as with cinema chains, clothes retailers and McDonalds. The annual card also comes with invitations to special events, a magazine, a website and access to an SMS community.

One of the challenges faced by the public transport operators in Paris is to keep people using public transport once they turn 26 and no longer qualify for the reduced fares and promotional offers.

Of course, access to loyalty programs need not be restricted by age. In Vienna, the public transport operator has developed a loyalty program for all regular public transport customers. Annual card holders are afforded access to additional offers such as exclusive discounts for hired cars, theatres and retail outlets.

Source: The Urban Transport Benchmarking Initiative 2005a.

6.8.2 Key observations on public transport improvements

- Public transport improvement schemes by themselves will generally have a marginal effect in shifting motorised trips to public transport, and thus in reducing road congestion.
- Bus rapid transit schemes in some major international cities have added relatively inexpensive capacity to public transport networks and increased the appeal of travelling on public transport.
- Public transport loyalty schemes in large cities overseas have been successful in increasing patronage among targeted groups.

6.9 Information and Communication Technologies[20]

The application of new information and communications technologies (ICT) may be able to contribute to congestion reduction by reducing the necessity to travel. The underlying purpose is that rather than changing the mode by which people travel, ICT can be used to alter the ways in which people access work, shopping and services. This is sometimes referred to as 'virtual mobility'—a term which focuses on the way that activities can be undertaken without being dependent on physical mobility. ICT can be thought of as an indirect solution to congestion reduction, where any effect will be through a reduction in the number of journeys made.[21]

The development of e-work pilots and programs are the most relevant in the context of congestion reduction,[22] as they can reduce commuting travel during the morning and evening peaks. Any impact will be highly dependent on the nature, location and frequency of e-work, and the work that it replaces.

A literature review for the UK Department for Transport (Lake and Cherrett 2002 cited in BAH 2006f) found that teleworkers showed a significant reduction in travel to work, both in terms of person-kilometres and vehicle-kilometres travelled. For home-based teleworking, there is typically a range of 25-80 kilometres saved each time a journey to work is replaced. Telecommuting centres, which involve working from a local office rather than the normal workplace, are popular around Washington and Los Angeles, with people otherwise facing long commuting journeys. These have led to overall travel reductions only slightly lower than for home-based teleworking.

Specific examples of e-work schemes include:

- teleworkers under the *BT Workabout scheme* (UK) (box 6.18), working on average 2-3 days per week from home, saved an average 93 miles per week in car commuting, or 143 miles per week in rail commuting (workers with rail journeys typically travelled further)
- workers at Unisys (US) experienced an average of 20 miles per day travel reduction each time they teleworked

[20] This section draws on *International Approaches to Tackling Transport Congestion – Paper 6: information and communications technologies*, prepared by Booz Allen Hamilton (2006f) for the Commission.

[21] Although travel reduction may be a significant outcome of ICT projects, they are rarely pursued with this as the primary aim. Their impacts on direct business costs, such as reduced office rental expenditures, are usually more important.

[22] Since ICT-related measures are indirect measures (being an alternative to travel) and are dependent on a variety of non-transport factors, the actual impact of these measures on road congestion, modal transfer, the environment and health and safety, is difficult to assess. The impact of the measures is usually reported in terms of reductions in distance travelled.

- The State of California teleworking pilot project found that households of teleworkers undertook 60 per cent fewer peak-hour trips, and chose destinations closer to home for non-work activities such as shopping.

BOX 6.18 **Teleworking – BT**

The British telecommunications company BT (formerly British Telecom) has been cited by the UK Department for Transport as a model of the benefits of teleworking and teleconferencing.

The company has a 'Workabout' scheme, which involves over 7500 registered staff working mainly at home, or splitting their work between home and several BT offices. Staff surveys have found that each employee has reduced their commuting distance by about 193 miles a week on average, even after allowing for some new non-work trips.

The UK Department for Transport also found, based on surveys of BT teleworking employees that:

- staff members are more productive— 81 per cent of employees said they were more productive, produced better work, had a higher total output and were more creative
- employees take less sick leave—teleworkers take 70 per cent fewer days off sick than office-based employees
- staff retention rates are higher, as are rates of return to work after maternity leave. One in ten teleworking employees said that they would not be able to do their current job if they could not telework—either because of responsibilities for children or for ill or disabled family members, or because they were themselves disabled or recovering from illness
- employees had a better quality of life and a better balance between working life and personal life.

Greater use of technology can also reduce the need for business travel, saving money and time. BT estimates that audio-conferencing saves the company about 59 million miles a year of car travel, and the Swedish company Tetrapak estimates that greater use of videoconferencing has enabled it to reduce its business travel by about 10 per cent.

There has been significant debate about whether teleworking actually reduces overall car use (after trips taken during the day and by other family members are accounted for). However, the UK Department for Transport found that 'surveys of teleworkers in many countries seem to show that teleworking does reduce car mileage', by between 15 and 193 miles a week, depending on how often a person teleworks.

Source: Department for Transport (UK) 2005.

6.9.1 Key observations on information and communication technologies

- E-work, and the development of telework centres may reduce congestion by reducing commuting travel during the morning and evening peak periods. However, the impact will be highly dependent on the nature, location and frequency of the e-work, as well as the work it replaces.
- ICT measures are expected to be more effective in contributing to congestion reduction in the longer term, as technologies become more accepted and developed.
- The development and implementation of technologies will be driven by considerations other than reducing congestion.
- ICT trends of this sort will mostly occur naturally as a result of working arrangements in the private sector.

6.10 Land use and urban planning policies[23]

There is a close relationship between where people live, the forms of transport used, and the complexity of trips undertaken. As a consequence there are important implications of land use and urban planning policies for congestion, especially road congestion.

Internationally, a wide range of policy tools has been used to try and reduce overall car travel, with the aim of reducing unnecessary congestion and making cities more liveable:

- *Higher residential densities*. Residential densities can affect the viability of services, including public transport. Mass transit public service will be more viable when there are more residents living in close proximity. In an extensive review of studies Ewing (1997) concluded that, 'doubling urban densities results in a 25-30 per cent reduction in vehicle kilometres travelled, or a slightly smaller reduction when the effects of other variables are controlled.'
- *Location of land uses*. Grouping common and complementary uses together around a public transport node can result in improved pedestrian accessibility, an ability to undertake multi-purpose trips, and a general reduction in travel distances. The approach to land-use planning that is practised in the Netherlands is an example of an attempt to ensure various activities are located in the 'right place' (see box 6.19).

[23] This section draws on *International Approaches to Tackling Transport Congestion – Paper 11: Land use and urban planning policies*, prepared by Booz Allen Hamilton (2006l) for the Commission.

- *Urban design*. There are several aspects of urban design that influence transport mode share and the total distance travelled, including the layout of the transport network, the timing of construction, the design of pedestrian spaces, roads and buildings, and the extent and quality of facilities such as seating and shelter.
- *Urban growth boundaries*. Boundaries on development can be used to curtail growth in transport demand, particularly where limited space is available along key transport corridors. However, there may be unintended consequences of such policies. There is some evidence that the urban growth boundary that has been in place in the British city of Cambridge since 1950 has led to increased land prices. As a consequence new housing has been displaced to villages lying outside the protected Green belt, and the proportion of the working population of Cambridge living outside the city has increased steadily and the approaches to the city have become congested. (Echenique 2006)

Box 6.19 **ABC planning in the Netherlands**

In the Netherlands, land-use policies are used to influence travel behaviour and limit the growth in car use. National authorities set a general framework for planning through guidance and national targets. One of the tools used is the 'ABC policy' which integrates land use and transport planning.

The ABC policy, has been in place since 1991. It aims 'to require businesses and services with a high potential of public transport use by its employees and visitors to be located within easy access to these services.' There are three different types of location under the policy:

A – locations that are easily accessible to local, regional and national public transport. This effectively means they must be located on a public transport junction. The share of commuting by car should be under 10-20 per cent.

B – locations that are easily accessible by local and regional public transport. The share of commuting by car should be under 35 per cent.

C – locations that are easily accessible by car, such as areas along highways. Those locations where the proportion of commuting by car exceeds 35 per cent are classed as C locations.

The planning authorities give all businesses a mobility profile, which depends on the number of employees and visitors and the level of car and freight traffic to the site. Shops are preferably located in A areas, never in C areas. Offices are located in A and B areas, while C areas should only be used for transport activities or land intensive activities. Parking standards are incorporated into the ABC system. In A localities the maximum number is 10 parking spaces per 100 employees and in B locations 20 parking spaces per 100 employees in the four largest cities—in other urban areas, the norm is 20 and 40 respectively.

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Box 6.19 **ABC planning in the Netherlands** (continued)

The national government cannot directly implement the system, however, because land-use planning is a local responsibility. Instead, the national authorities tie national funding to adoption of the policy.

The ABC policy has resulted in 35 per cent of new businesses locating in a prime A location. It has also seen a shift in popularity away from office buildings along highways and towards station locations, which are considered as sites of future value.

The effects of the policy are particularly strong in areas directly controlled by the national government. For example, the Ministry of Housing, Physical Planning and the Environment consolidated a number of offices that were dispersed throughout the country into a single office building directly adjacent to the central railway station in The Hague. As a result, many employees switched from commuting by car to public transport. The commuting mode share of car dropped from 41 per cent to 4 per cent, while that of rail increased from 25 per cent to 57 per cent and the combined bus and tram use from 9 per cent to 20 per cent.

However, the lack of space in some city centres has meant that some businesses continue to locate at "wrong" locations along the highways, even though this means forgoing national economic grants. Also, in practice, the parking restrictions have often proven to be subject to negotiations with companies.

Sources: BAH 2006l; OECD 2001

The relationship between land use, urban design policies and traffic congestion is a complex one, subject to a great number of variables. This makes seeking explicit relationships a difficult and contentious task. The Canadian city of Vancouver is sometimes cited as a model of how to effectively integrate land-use and transport planning (box 6.20).

Box 6.20 **Land-use planning in Vancouver**

The city of Vancouver has a population of around 575 000, and is part of the Greater Vancouver region, which has around 2.2 million people, and is growing by 25 000 a year.

Vancouver has had a major focus on liveability and sustainability since the 1960s—a vision that has been supported by policies and strategic plans across all levels of government. A political consensus was reached over the decision made in the 1960s not to build freeways in the city.

However, by the early 1990s the city faced several planning challenges, including accommodating rapid growth, dealing with ageing infrastructure, and limited revenue sources. A particular problem was the separation of land uses, with most jobs located in the downtown region and housing located in the suburbs. The result of this was high travel costs, which tended to increase as growth occurred. Where there were pockets of higher density, these were largely unconnected by effective transportation services.

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Box 6.20 **Land-use planning in Vancouver** (continued)

These challenges were compounded by the geography of the Vancouver region, which has several transport pinch points where inlet and river crossings require substantial infrastructure to be built and maintained. The most significant of these, the 'Lion's Gate Bridge', represented a serious capacity constraint, and required duplication or replacement to be able to cope with the growth of the city that was projected.

An initial response was the Central Area Plan, prepared in 1991, which integrated land use and transport objectives. The plan involved curtailing future office and commercial development in the central city area in favour of residential developments promoting walking and cycling as a commuter transport mode. New commercial developments were diverted to 'Principal Activity Centres' located along a new heavy rail line.

The integration of land-use and transportation planning was further developed by the *Livable Region Strategic Plan*, adopted by the Greater Vancouver Regional District in 1996. The strategic plan sought to outline a long-term vision for the region, based on four fundamental strategies:

(1) Protecting the Green Zone (including a commitment to the urban growth boundary).
(2) Building complete communities.
(3) Achieving a compact metropolitan region.
(4) Increasing transportation choice.

The transport elements of the plan involve enhancing mobility through transportation investments, while land-use policy is used to pursue greater accessibility. A new regional transportation authority, TransLink, was established to ensure that the planning of transport services is coordinated.

The plan recognises that private cars will continue to be the dominant mode of transport for the foreseeable future, but seeks to use public transport improvements to meet the additional transportation capacity needed to respond to population and economic growth.

The integration of land use and transportation objectives has led to an increase in the residential density of the central Vancouver area, and has been successful at reducing the mode share of private cars. Peak hour private car volumes into the CBD have decreased by 7 per cent over the past decade (Patterson 2006). This has reduced the need to construct additional, extremely expensive, bridge crossings into the CBD. However, beyond the CBD the Greater Vancouver Area remains relatively low density. Although there has been a moderate increase in the share of trips taken by public transport (the share of all daily trips taken by public transport increased from 10 per cent in 1999 to 11 per cent in 2004) this remains below the 17 percent target. The effects may prove to be larger in the longer term, with the strategic plan acknowledging that 'the regional transportation objectives need time, money and patience to become reality.'

Sources: BAH 2006l; Greater Vancouver Regional District 1996; McAfee 2006; OECD 2001; Stanley 2006; The Public Purpose undated.

Changes in planning policies or the addition of major infrastructure such as public transport stations can substantially affect local property values. In some circumstances it may be reasonable for government to recover from developers or property owners some of this increased value. There are two main ways that this is achieved

- developer contributions to infrastructure and service costs
- capturing the value generated by public transport improvements

In the United Kingdom, for example, developers are now expected to make contributions to public transport infrastructure in cash or kind, just as they do for highway infrastructure. Some other cities, such as Toronto, use simple strategies such as purchasing land prior to new infrastructure being committed. This enables the resulting increase in land value to be captured, and can be used to maximise the contribution that future development makes to supporting the public transport services. Table 6.8 provides some examples where value capture tools have been used to fund public transport improvements. Box 6.21 provides an example of the use of betterment capture and developer charges in San Francisco.

Table 6.8 International examples of value capture for public transport improvements

Location	*Description*
New York	Incentive zoning, joint development, system interface connections, and voluntary contributions to fund a complete rebuilding of Times Square Station with private contributions
London	Funding for the construction of the Docklands Light Railway was secured from local developers
	Developers contributed to both the extension of the Jubilee Line of the London Underground from Green Park to Stratford and the building of a new station on the Central Line
Portland, Oregon	The transport authority bought land near to a proposed light rail route and then leased it back to a private developer
France	'Zones d'intervention fonciére' were introduced in 1975 to allow local municipal councils to be informed of property transactions in specified areas and have the first right of refusal to purchase the property at the previous years prices, in an effort to control speculation around new Metro stations
Curitiba, Brazil	When the city first considered introducing a high speed radial public transport network, it purchased enough land at the end termini of the proposed lines to enable construction of 40 000 dwellings. This provided a social benefit (the Council set the dwellings aside for low income housing) at minimal cost.

Booz Allen Hamilton 2006, Land use and urban planning policies, p.32

BOX 6.21 Developer charges and betterment capture in San Francisco

Betterment capture

The Bay Area Rapid Transit (BART) system is a predominantly underground heavy rail network that services San Francisco and other locations in the region. In 1957, the San Francisco District was granted a betterment capture taxing power of five cents per US$100 of assessed property valuation and authorised to levy property taxes to support a general obligation bond issue to finance BART.

This funding approach did not proceed but a study led by Cambridge Systematics Inc. indicates that betterment taxes would have generated significant funding streams if they had been implemented. The study documents that the BART generated some US$225 million in land value increases in station precincts between 1973 and 1993. The key beneficiaries of these increases in land values were central city offices, single family suburban homes and suburban retail and commercial premises which would have been subject to the tax.

Development contributions

During the late 1970s, substantial development in central San Francisco led to higher passenger levels and overcrowding during peak hours on the San Francisco Municipal Railway's light rail transport services. In order to meet the capital and operational costs of upgrading the light rail services, the municipality enacted an ordinance to collect a Transit Impact Development Fee (TIDF) from central office developments.

The TIDF is a one-off fee on office buildings to cover the cost of providing transit services over the building's 45 year useful life. The fee is based on floor area with a cap of US$5 per gross square foot. It is recalculated each year on the basis of the level of new developments, but has remained at the US$5 maximum since its inception.

Other developments, such as retail, personal services and entertainment facilities, are exempt from the TIDF because they are considered to have a relatively minor impact on peak period patronage levels.

Source: sub. 2, pp. 37-39.

6.10.1 Key observations on land use and urban planning policies

- Land-use policies are more likely to impact on the transport network in the longer-term than in the short-term.
- Policies aimed at solving regional problems require a consistent approach between different authorities to be successful.
- Financial incentives can sometimes be used, instead of regulatory provisions, to achieve desired planning outcomes.
- Developers have contributed to public transport improvements as well as roads in other countries.

7 Assessing approaches for managing congestion

7.1 Introduction

Chapters 3, 5 and 6 set out views on causes of congestion in Melbourne and Victoria's main regional centres. They also outlined options for addressing that congestion, and the approaches to the issue, both internationally and in other Australian cities. This chapter analyses the options that the Commission considers relevant and appropriate to address congestion in Melbourne and the regional cities, and draws on suggestions put to the inquiry, and international experience. Options that have not been identified or fully developed in *Linking Melbourne: Metropolitan transport plan* (Government of Victoria 2004a) are particularly highlighted. Some are short-term options, others long-term and a number are inter-related and would need to be implemented in an integrated and coordinated manner.

Although the analysis takes a view on the likely cost effectiveness, none of the options are subjected to cost-benefit analysis, which would be needed before any significant projects proceed. This particularly applies to specific infrastructure expansions. This chapter also discusses 'induced demand', and the important implications it has for decisions on capacity expansion. In analysing each of the suggested options, the Commission also comments on any relevant impacts on other government objectives and distributional issues that need to be taken into account.

Before the options are examined in section 7.3, the next section describes the assessment criteria used by the Commission.

7.2 Criteria for assessing options

The Commission has applied four criteria to assess policy options to manage transport congestion and identify those that warrant more detailed consideration by the Government:

- Does the option address causes of congestion in Melbourne, Geelong, Ballarat and Bendigo (outlined in chapter 3)?
- Is the option likely to be broadly cost effective in addressing these causes of congestion and how difficult would it be to implement?
- What are the impacts on other government objectives?
- Are there significant distributional impacts?

7.2.1 Does the approach address the causes of congestion in Victorian cities?

Chapter 3 identified both the causes of congestion in Melbourne, Geelong, Ballarat and Bendigo and the areas where it is creating the greatest costs. Congestion results from a complex mix of social and economic influences including population and economic growth; the pattern of urban development; social changes in work patterns, education and leisure; the management and supply of transport infrastructure; price signals that are not linked to the cost of using congested roads so that price does not constrain demand; and unexpected incidents.

An important criterion for selecting options for managing congestion is the extent to which they are likely to address the causes of congestion and the areas where the costs of congestion are, or are likely to be in the future, largest. The Commission has drawn on international experience to consider the appropriateness of the measures. Given the combination of underlying and location-specific causes, multiple policy approaches are required. Experimenting with combined approaches and with pilot programs may also be warranted given the lack of specific information about the impacts of congestion on different groups at different places and times and the complexity of behavioural responses.

7.2.2 Is the approach likely to be cost effective?

Ideally, developing significant options to address transport congestion would involve rigorously evaluating the costs and benefits of available options to derive a ranked list of those with net social benefit. However, this information is not generally available. Accordingly, the Commission has reviewed information on the size of the likely impacts on congestion of particular options and, where cost data are available, considered the likely cost-effectiveness of different options in reducing congestion. This type of analysis can indicate whether an option is worth exposing to a full cost-benefit assessment but, because it is more narrowly focussed, should not replace that assessment.[1]

The Commission has been mindful of the need to address congestion in a cost-effective manner and as a consequence has attached a high priority to options that improve the efficiency of the capital stock and involve less capital expenditure, although such options will not always be feasible. In addition, the Commission has considered the ease of implementation from a risk, coordination and resourcing perspective.

[1] For example, the 'costs' that are used to measure cost effectiveness will often be more narrowly defined (possibly as costs to government or over a limited timescale) than full economic costs, while the impacts on congestion will not necessarily be the same as the economic benefits associated with an option.

7.2.3 Are there impacts on other Government objectives?

In addition to improving the efficiency and effectiveness of transport outcomes,[2] the Government has other transport–related objectives, such as a safer transport system, accessibility, reducing greenhouse gas emissions and encouraging modal transfer from private cars to alternative transport modes (public transport, rideshare, walking and cycling). It also has objectives relating to the creation of a fairer society (see Government of Victoria 2005a, *A Fairer Victoria: Creating Opportunity and Addressing Disadvantage*).

Approaches to address congestion may promote these other objectives. For example, an approach that improves traffic flows may reduce the number of accidents. At times, however, there may be conflicts. Building roads to reduce congestion may increase emissions of greenhouse gases if additional trips are encouraged; road pricing may have unwanted distributional effects. Such cases require different objectives to be weighed up, with the preferred outcome depending on the relative importance that the Government attaches to the competing objectives. It is not the Commission's role to make such judgements; rather, it draws attention to these trade-offs where they exist in addressing congestion. The Commission recognises the challenge that the Government needs to manage.

7.2.4 Are there significant distributional effects?

Congestion-reducing policies will affect the distribution of income and wealth in a number of ways (box 7.1). The Commission draws attention to these effects when they are significant, without making judgements about them.

[2] Congestion is not specified as an objective in transport legislation, but it seems appropriate that economic efficiency should be the objective, with excessive congestion evidence that efficiency has not been achieved. The time and location specific nature of congestion prevents meaningful broad targets. Moreover, specifying reducing congestion as an objective could encourage pursuit of lower congestion irrespective of cost. A better objective is to enhance efficient use and investment in transport systems.

Box 7.1 **Distributional effects**

Many transport projects will involve both winners and losers; for example:

- a clearway may reduce road congestion but lower sales for adjacent shops and affect land values
- a new road may reduce congestion but in doing so reduce the amenity of those living close to it
- distributional effects will differ depending on whether infrastructure is funded through tolls or through government borrowing
- there may also be inter-generational winners and losers; for example, the current generation funds through taxes infrastructure that also benefits future generations (as happened with the special property rate levy that was imposed on Melbourne businesses in the central business district (CBD) during the 1970s and 1980s to fund the City Loop)
- reducing mobility can increase monopoly power and prices (of land, goods and services), at increased costs to those on lower incomes.

Given that there will be winners and losers, a project should generate a large enough surplus that there is the potential, after allowing for administration costs, for the winners to compensate the losers. While direct compensation may not occur,[3] governments typically seek to understand how different groups are affected by particular policies or government projects. Victoria's Guide to Regulation requires that groups affected by a proposed regulation are identified, as this will assist in:

- improving understanding about the potential impacts of that measure, including unintended consequences
- gathering information on the costs of the proposed measure (DTF 2005, pp. 5–8).

Different dimensions of distributional effects are likely to be of interest:

- vertical equity: the impacts on people with different levels of income or wealth, especially for pricing options
- horizontal equity: the impacts on people at the same level of income. Governments are likely to be particularly interested in distributional effects across geographic areas.

Source: DTF 2005.

[3] For example, when the costs of measuring gains and losses and administering compensation are prohibitive. Another reason may be that at any time there are multiple changes taking place, each with different impacts, making it difficult to identify winners and losers precisely. In the case of inter-generational effects, future generations can compensate the current generation for its sacrifices if projects are funded through debt.

7.3 Assessing the options

This section applies the criteria outlined in section 7.2 to the categories of policy options described in chapters 5 and 6. It addresses these categories in the following order:

- *road demand management* (road use charging, parking restrictions, other financial/taxation policies, mobility management)
- *road supply management* (road capacity enhancement, road space reallocation, road infrastructure expansion)
- *public transport enhancement*
- *walking/cycling enhancement*
- *information and communication technologies*
- *urban land use/planning policies.*

Options relating to freight—particularly relating to the Port of Melbourne— are discussed in chapter 8. However, many of the options outlined in this chapter would also contribute to freight congestion solutions, given freight movements and associated congestion issues largely coincide with those of other forms of transport.

While the discussion in this section draws mostly on examples based in Melbourne, many of the options could be explored in Ballarat, Bendigo and Geelong. In particular, options which require the involvement of local government might be attractive to those regional cities, whose councils have shown a capacity to focus on the inter-relationships and trade-offs embedded in traffic and congestion issues.

7.3.1 Road demand management

Approaches to road demand management considered here include:

- road use charging
- parking measures
- financial and taxation measures
- mobility management.

Road use charging

Background

Chapter 1 pointed out that the economic definition of road congestion is a situation in which the prices paid for road use, which include government taxes such as fuel excise, are less than the costs caused by road use which then leads to over-crowded roads. Charges for road use which are linked to the costs of

congestion can bridge the gap between costs and prices. As the *Metropolitan transport plan* points out:

> In the future, it will be increasingly important for regulatory structures, including pricing, to reflect the full economic, social and environmental costs of transport (Government of Victoria 2004a, p.34) and
>
> Establishing a closer link between actual and perceived costs is an essential element that requires further investigation. (Government of Victoria 2004a, p. 34)

The principle underlying road charging is that road users pay for the costs they are creating. This encourages efficient road use. Many people regard a user pays approach as fair, although it can have unwanted distributional effects that need to be addressed. The costs that road users already face need to be kept in view when proposals for road pricing are considered, along with the reduced congestion it can deliver. An important issue is whether charging a price to reduce congestion creates net benefits, allowing for the costs associated with implementing it.

Chapter 5 reported that many participants support some form of road pricing in Melbourne, usually on a conditional basis. Chapter 6 reported that road pricing has been used successfully overseas, but has usually been introduced only when there is a significant congestion problem and simultaneously with other measures (for example, upgrading of public transport services).

The impact of pricing on congestion will depend on the responsiveness of the demand for road use to price changes. Responsiveness will be larger if a suitable public transport alternative is available and if travellers can change their travel times, which may depend on factors such as the flexibility of working and school hours. If alternative (unpriced) roads are available, road pricing may have a large impact on the priced road but simply move the problem elsewhere.

International experience with congestion pricing is varied. The electronic cordon charging schemes in Singapore and London have had impacts on congestion. The impacts of the Norwegian schemes have been smaller, reflecting their revenue raising purpose (BAH 2006a, p. 13).

There is not sufficient evidence to indicate that congestion is sufficiently severe and widespread in Melbourne that a move to comprehensive user pays pricing would be beneficial at this time. The costs of implementing such a scheme, if technically feasible, would be large. (The capital cost of implementing London's congestion tax was £180 million, while reducing congestion has only increased average speeds from 14.3 kilometres per hour to 16.3 kilometres per hour within the charging zone.) There is also evidence of adaptation to congestion through peak shifting, off-peak movement of freight, and patronage of public transport in

more heavily congested inner and middle suburbs. The major congestion problems at this time appear to be localised, including the inner and middle suburbs, parts of the freeway system and certain outer suburbs (see chapter 3). Given the options available for improving the utilisation and efficiency of the road and rail networks, outlined below, the immediate priority would seem to lie in this direction.

However, smaller scale 'trials' could look to reduce congestion on particular roads where congestion is currently a problem. They could also provide information about the responsiveness of road use to prices, which could inform policy design and lead to a more informed debate in the community about the advantages and disadvantages of using road pricing to mitigate congestion. CityLink, with its large traffic volumes and pricing already in place—but not on a time of day basis—could be suitable for a more congestion targeted pricing regime. Transurban suggested that:

> The time has come for community debate on whether we should now use road pricing to manage demand, by encouraging people to:
>
> - Make more trips out of peak periods to 'spread' the demand and better utilise existing infrastructure, which is designed for peak demand then relatively under-utilised outside of these peak periods
> - Make fewer trips
> - Make more of their trips by public transport. (sub. 67, p. 14)

Transurban pointed out that any move to variable tolls, depending on time of day or traffic conditions, on CityLink would require agreement between the State and CityLink (sub. 67, p.14). The benefits of time-related pricing for EastLink could also be explored. Clearly any approach to renegotiation would need to be sensitive to the commercial issues involved and mindful of the impact that any renegotiation could have on other parties entering into contracts with the Government.

Small scale applications of congestion pricing would provide information about behavioural responses and the operation of new technologies. There are, however, some tensions here, including:

- pricing selected links within a network is inferior to first-best pricing of the whole network, and may even be inferior to an all-free network (Verhoef & Small 2004)
- if an experiment is seen as temporary, people may react differently than they would to something that is seen as permanent.

These issues suggest that any targeted approaches to congestion pricing need to be carefully designed. Given the potential importance of broadly-based road

pricing in the long term (see section 7.5), some targeted interim approaches—such as on existing major tollways—could be an early option.

Parking restraint measures

While congestion charging imposes a price for travelling on congested roads during peak periods, parking restraint measures may be used to indirectly raise the costs of travelling to particular destinations by affecting the price of parking at the destination. Some measures increase parking charges. Others, such as planning controls on parking or banning kerbside parking during peak periods, restrict the supply of parking, and therefore indirectly increase its cost.

Parking restraint already plays a substantial role in Melbourne. The recently introduced *Congestion Levy Act 2005* has as its purpose 'to impose a levy on long stay parking in the central business district and inner Melbourne to reduce traffic congestion' (s.1). The City of Melbourne's planning scheme limits the number of car spaces in new developments, which indirectly increases the price paid for parking. Clearways on arterial roads essentially increase the cost of kerbside parking in order to reduce congestion on these roads. The Government has indicated that it is reviewing clearway times, considering longer clearway periods and that where it is necessary to remove kerbside parking, special provision may be made for indented parking or other parking facilities (Government of Victoria 2004a, p. 29).

International evidence suggests that parking pricing measures will affect the frequency and duration of parking and the choices between cars and public transport. The size of the impacts depends on factors such as the proportion of parking spaces covered, the level of the charge, the extent to which individuals pay their own parking costs, and the availability and quality of alternative transport (BAH 2006b, p. 18). The impacts are not straightforward:

- Parking fees are a small part of the generalised costs of travel and hence the charges have to be quite high to influence behaviour, especially where modal competition is low. However, high parking fees can also encourage other behaviour—such as encouraging motorists to search for low parking fees and increasing 'chauffeured' traffic—which may increase congestion (sub. 3, p. 14).
- An important point about clearways is that the congestion problem they are used to address is most acute in inner areas where the latent demand for travel is likely to be strong. Clearways may induce additional traffic movement, offsetting the short term congestion alleviation benefits. An additional clearway may therefore not make a big difference to congestion—although it may nevertheless be useful if driving on the additional traffic lanes has a higher social value than parking cars on them during peak hour.

The cost to government of parking restraint policies will often be low, because some policies are regulatory while others generate revenues that should more than offset the costs of enforcement and administration. However, there can be significant costs for those who have to find alternative parking arrangements as well as impacts on local traders, although international evidence on the relationship between parking restraint and local economic impacts is mixed (BAH 2006b, p. 20). There has been much debate in Victoria over whether clearways damage local trading. The Public Transport Users Association (PTUA) has claimed that the congestion levy could lead to a leakage of retail and business activity away from the CBD, to areas less well-serviced by public transport. Local parking restrictions could have a similar damaging effect on local traders, where alternative parking is not available. These effects could be lessened if public transport is enhanced at the same time as parking is made more difficult. On the other hand, any residual impacts on local traders are likely to be ongoing, while the congestion reduction benefits of the parking restraints may diminish over time, as traffic increases.

Consistency of parking policies is important if they are to be effective:

- The effects on congestion of raising charges in car parks, for example through the congestion levy, would be reduced if planning controls required large numbers of parking spaces in new developments. The City of Melbourne argues that the number of off-street parking spaces in the CBD has increased significantly in recent years and that the State Government has waived the Council's parking limitation policies for developments (City of Melbourne 2006a, pp.72–73).
- Similarly, planning processes that require new developments to have minimum numbers of parking spaces encourage car use in developed areas and work against policies to reduce congestion. The Victorian Planning Provisions, which provide the framework for all municipal planning schemes, specify the number of parking spaces to be provided for various developments. For example, two car spaces are required for each dwelling on a lot and five are required for each practitioner in a medical or veterinary centre.
- Parking restraints can shift activity and congestion if implemented on a piecemeal basis.
- Policies to restrain parking may be undermined by taxation policies—such as fringe benefits tax—which favour car use.[4] (Fringe benefits tax was described in chapter 4.) Options for reducing its impact on congestion are discussed in the next section.

[4] As pointed out below, these policies also undermine road pricing.

- Those responsible for parking policy need to be clear about whether their objective is to generate revenue or to manage traffic.[5] One recent approach to this issue has been to combine all groups within a local authority involved in parking, either in a separate organisation (several USA cities have adopted this model) or in a working group (such as in Birmingham, UK) (BAH 2006b, p. 28).

To improve the contribution of parking policies to managing congestion, the Government could:

- monitor the impacts on congestion in the CBD of the congestion levy
- assess the advantages and disadvantages of taking a consistent approach across Melbourne and the regional cities before it implements parking policies
- align the parking components of its planning approval processes with council parking limitation objectives
- review minimum parking requirements in the Victorian Planning Provisions, as proposed by the PTUA (sub. 65, p. 29). This review could consider replacing the current minimum requirements by capping the number of parking spaces allowed. The maximums could be set so as to support a policy objective of encouraging inflow into congested areas of residents who are less likely to own cars. (The approach of the London Planning Authority, described in section 6.2 provides one illustration of how this might be done). Replacing minimum with maximum parking requirements would permit developers to offer packages involving a smaller number of car parking spaces—and a lower price—should this be attractive to buyers.
- encourage councils to make more use of their parking precinct plans, which look at parking requirements over a whole area, rather than to consider parking issues on a development by development basis.

The Government could also consider the use of auctions to encourage the implementation of clearways where they yield the largest net benefits. It might, for example, direct VicRoads to develop an auction under which bidders indicate the payments that would be required in order to 'supply' particular distances of clearways. VicRoads could then compare the bids with its own estimate of the benefits from reduced congestion associated with particular clearway locations, selecting bids with the highest anticipated net benefits. To put in a bid, a council would need to have taken account of the views of locally affected parties.

[5] For example, in many cities those responsible for parking operations are tasked with maximising parking revenues. This can require lower long stay parking rates, which is contrary to the traffic management objective of discouraging inner-city commuter parking.

The potential costs of clearways are often local, and so local governments (individually or in groups) may often be best placed to understand these costs, who is affected by them and how to address them. Options might include doing nothing, phased removal of parking, building indented parking along the side of arterial roads or providing a new car park. If the wider community benefited from having access to an additional lane or part of a lane as a result, it could reasonably be expected to contribute towards funding of an adjacent car park, via government funding. A competitive auction process could provide councils with an incentive to seek the least costly way of delivering clearways. It has the potential to break the impasse which often seems to characterise negotiations over this issue. Complicated design issues would need to be resolved should the Government decide to pursue this approach.

Financial and taxation measures

Options suggested by participants included:

- replacing fixed insurance premiums with variable, distance-related, payments or by payments relating to the class of vehicle and its impact on the transport system
- changes to the level and structure of fuel excise
- modification of taxation provisions relating to commuter travel—including policies for cashing out parking and more equitable taxation treatment across all modes, including changes to the fringe benefits tax (see chapter 5).

These measures have varying degrees of relevance to transport congestion in Victoria. Replacing fixed insurance premiums with payments related to distance travelled or the class of vehicle may discourage some car use, but at all times and places rather than when particular roads are congested. It would also require motorists to report distances travelled, and targeted auditing of these reports, which would be costly to administer. Such measures seem unlikely to be cost-effective in reducing congestion.

Changing the level of fuel excise would not directly affect congestion, as fuel excise is not related to the time or place of use of motor vehicles. However, reform of the fuel tax regime could nevertheless have a substantial indirect impact if it helped to make room for the introduction of charging arrangements more closely related to the costs of vehicle use, including time-related road pricing. While fuel excise is a Commonwealth Government responsibility, a recent review undertaken for the Commonwealth highlights the significance of this issue for transport congestion (box 7.2).

Box 7.2 **Fuel tax inquiry report**

Commissioned by the Commonwealth Government in 2001, the Inquiry 'provided an opportunity to examine the principles, objectives and application of fuel taxation arrangements in Australia' (Fuel Taxation Inquiry Committee 2002, p. 1). Amongst the Inquiry's findings were that:

- there is no clear statement from governments regarding the current objectives of fuel taxation
- fuel taxation is not an appropriate instrument to address most external costs, including congestion, associated with fuel use.

Most of the Inquiry's recommendations were about the structure of fuel taxation. However, it also supported a detailed cost-benefit analysis of the use of electronic road pricing for reducing congestion and urban pollution in major urban areas and for charging for the costs of road maintenance and infrastructure. It also proposed a trial of an advanced electronic road pricing application, deemed to be the most cost beneficial by the cost-benefit study, with a view to promoting and assessing public acceptance.

Source: Fuel Taxation Inquiry Committee 2002.

Fringe benefits taxation arrangements, like fuel excise, work against efforts to reduce congestion. The fringe benefits tax encourages people to use company cars to travel to work, possibly when roads are congested. As with fuel excise, these taxation arrangements are a Commonwealth responsibility and progress towards reform will depend on a range of factors, including congestion, and will need to consider relevant industry impacts.

The *Metropolitan transport plan* noted that priority areas for monitoring, review and investigation include 'possible distortions in existing taxes and charges that may need modification in order to encourage the use of existing modes' (Government of Victoria 2004a, p. 34). The fringe benefits tax may be having an impact on the choice of transport mode, while fuel excise—by encouraging a view that motorists are already paying for road use—may be hindering the development of superior ways of charging for externalities associated with the use of roads.

The Council of Australian Governments has recently announced a review of urban congestion trends, impacts and solutions (COAG 2006). Amongst other things, this review is required to examine charges, levies and taxes and infrastructure and service pricing. It provides an ideal opportunity for the Victorian Government to encourage the review to analyse the way in which taxes and charges, including fuel excise and fringe benefits tax, affect congestion, and the case for reform.

In the meantime, the Government could consider introducing measures to offset the impact of the tax on its own employees, who are likely to constitute a significant group of commuters to the CBD. Ways to achieve this could include increasing the cost to its employees of the parking component of the car 'package'; cashing out the parking component; or subsidising the cost of public transport to those employees who are eligible for government cars. Of course, the Government could implement these measures irrespective of changes to the fringe benefits tax, if it wished to provide a positive inducement to its employees to stop driving to work rather than just to try to offset the effect of the fringe benefits tax.

Mobility management

Mobility management includes many types of schemes, including:

- travel plans[6] (developed for a workplace or educational institution)
- personalised travel planning, involving the use of direct marketing and information techniques to enable or encourage individuals or households to change their travel behaviour
- travel awareness campaigns, to raise public awareness of the effects of traffic growth
- car sharing
- ridesharing (carpooling, vanpooling, shuttle buses)
- more flexible working or school hours.

Several of these measures are already used in Victoria and are supported by participants. The TravelSmart program informs people about the travel choices available to them, and is being implemented at universities, schools and workplaces. Schools are developing travel plans that employ TravelSmart principles (Government of Victoria 2004a, p. 34).

The impact of these measures on congestion will depend on a variety of factors, for example:

- Travel awareness campaigns are most effective when alternative transport of comparable quality is available and there is a gap in awareness of these alternatives.

[6] A travel plan is 'a general term for a package of travel demand management measures tailored to needs of individual sites and aimed at promoting greener, cleaner, travel choices and reducing reliance on the car'. (BAH 2006d, p. 2)

- Car sharing is most likely to be viable when population density is high. However, public transport is also likely to be available in such environments, suggesting that car sharing will attract public transport users as well as those who previously drove.[7]
- More flexible working hours are likely to be most feasible where the nature of work allows for this and where employees value such flexibility.

Such measures could have significant impacts on localised congestion problems; for example, around schools or universities. Their impacts on more general congestion issues—peak hour travel into the CBD—seem unlikely to be large. More flexible working hours could have a larger impact, but as flexitime, which allows for more flexible working hours, has been common practice for many years in workplaces, the gains for congestion may already have been largely achieved. As most of these measures are reliant on many individual organisations, unlike most other measures, the cost and effort of implementation and administration is often not borne by government. However, the Government may seek to fund and support programs implemented by institutions and non-government groups.

A number of participants suggested that the Government should provide financial incentives to encourage car pooling (chapter 5). This is a less direct way of addressing road congestion than moving the prices that consumers pay for roads closer to the costs created by their road use, particularly if car pooling attracts commuters from public transport. Car pooling arrangements have been used for many years, and are encouraged by some workplaces or institutions.[8] There are a number of ways in which the Government could nevertheless make a useful contribution:

- Identifying and removing any unnecessary impediments that it may impose on car pooling. The Commission has not, however, been made aware of any impediments.[9]
- Considering providing and enforcing more high occupancy vehicle lanes, in order to reduce travel times for those who car pool. (However, as is discussed below, other considerations need to be resolved in decisions about high occupancy vehicle lanes.)

[7] 'Ridesharing schemes, particularly carpooling schemes, generally have a negative impact on public transport use as a substantial proportion of new carpoolers were, in most cases, previously public transport users' (BAH 2006d, p. 12).

[8] For example, Monash University offers preferential parking facilities to cars which are pooled.

[9] Section 139 (i) of the *Transport Act 1983* provides that a commercial vehicle, which carries passengers for hire or reward, must be licensed. However, under Section 87 a motor vehicle operating under a vehicle pooling agreement (defined by seven elements, two of which are that the carriage be limited to seven passengers in any one vehicle and the payment of costs does not involve profit to the driver or any other person) is deemed not to be a commercial vehicle. The Commission is not aware of any insurance related barriers to car pooling.

- Promoting car pooling amongst its own employees in order to reduce their car use and to demonstrate to other employers what can be achieved. For example, it might provide an allowance to those employees with government provided cars who agree to car pool, and fund this through any savings to the government from providing fewer parking spaces.
- Publicising, perhaps on the internet, the advantages of car pooling.

A related development is the growth of 'car clubs', permitting short term use of hire cars, which can be dropped off at sites close to the person's destination. Such clubs may provide an alternative to car ownership. This, however, is a very indirect way of reducing congestion and the case for government involvement seems to be limited to identifying and removing any unnecessary government imposed impediments to the growth of car clubs. The review of planning regulations relating to parking, described in the previous section, could make a useful contribution. Current planning requirements encourage developers to provide parking with new housing. If this were changed, incentives for car sharing could be strengthened.

Given that commuting is a major source of transport congestion, changes to work or school hours have some appeal. This is particularly the case in regard to school hours, given the observed reduction in congestion during school holidays. Government guidelines for school hours specify that:

> Generally, instruction is undertaken in schools between 8.30 am and 3.30 pm. The specific times for each school will be determined at the local level taking into account such things as bus schedules, links with other schools and the organisation of the school day. Where changes to the starting and finishing times will result in changes to bus schedules, the approval of the appropriate regional director should be obtained (Government of Victoria 2003, section 4.3.1.1).

However, there are counterbalancing factors:

- Chapter 3 pointed out that about 60 per cent of chauffeured school trips are combined with trips made for other purposes, for example, to work or to the shops. It is possible that changes to school hours could increase the number of trips, with difficult to predict impacts on congestion. This effect might be lessened if staggered school hours were combined with more flexible working hours.
- Schools vary enormously in terms of the availability of public transport and car parking. Also significant is the catchment areas from which they draw students and the availability of before and after care facilities.
- Imposed changes to working or school hours would discourage schools and workplaces from working out solutions that best suit their own needs, and would require those affected to adjust other aspects of their lives to accommodate the changes, with attendant costs.

There are a number of options in the area of mobility management for the Government:

- Continue to expand information programs such as TravelSmart. Participants suggested that TravelSmart could be extended further into the inner and middle suburbs of Melbourne, to Geelong, Ballarat and Bendigo, and in schools, universities and workplaces. Such extensions should be conditional on suitable evaluation of the prospective costs and benefits.
- Request government schools to develop travel plans.
- Remove any unnecessary impediments to the development of other ways to improve mobility management. The proposed review of the Victorian Planning Provisions is one example.
- Explore opportunities to promote more flexible working hours and car pooling amongst government employees and publicise its successes in these areas to make other employers aware of what they might do.

The Government could also consider testing the scope for more flexible school hours by running a trial under which it offered a payment to schools that were willing to alter their hours in exchange for a payment to defray the transaction costs in doing so. VicRoads could be asked to monitor the impacts on congestion. The size of the payments required would indicate the costs involved in changing school hours, while the impacts on congestion would indicate the benefits. Moreover, once the cost of varying school hours had been revealed through this process, the cost could be compared with other possible approaches to addressing this issue, such as improving school bus services.

These approaches seem likely to be consistent with other government objectives and without significant distributional impacts.

7.3.2 Road supply management

Road supply management initiatives can be classified into three broad categories:

- traffic management
- road space reallocation
- capacity enhancement.

While each of these categories is described separately in this section, often the greatest benefit will be achieved from a combination of measures. ARRB (2006b, p. 44) reports the trend towards integrated use of different measures, called active traffic management in the United Kingdom and integrated corridor traffic management in the United States. The aim is to bring together the traffic management tools that may currently be used in isolation to maximise their

benefits. The benefits from integration are likely to vary between cases. According to the United States Department of Transportation (cited in ARRB 2006b, p. 46), 'the unleashing of a large benefit through integration is an area that is only just beginning to be explored'.

Traffic management

This category includes measures that improve traffic conditions to increase the efficiency and therefore the capacity of the existing road infrastructure. It includes measures that:

- increase peak capacity—road layout reallocation, reversible lanes,[10] signal coordination, ramp metering,[11] access management, automated vehicle control
- restore temporary loss of capacity—enhanced flow road management, incident management[12]
- provide users with information about road conditions—traffic information systems, route guidance systems

Measures to improve the capacity of the transport system are most effective when combined into integrated management systems, as opposed to being introduced individually without consideration of broader network effects.

Capacity enhancement measures offer a number of advantages that have been used to justify their implementation internationally, as they:

- tend to be popular with the public as they improve the efficiency of existing networks
- offer a high degree of flexibility—most capacity enhancement systems are dynamic applications that react to problems as they arise
- offer minimum disruption—measures can be implemented on existing networks and within existing patterns of land-use
- can be implemented more quickly, at lower cost, and often with a superior benefit-cost ratio than building or widening roads.

En-route information can be provided in a number of ways,[13] although variable message signs are the most common. VicRoads uses variable message signs across Melbourne's freeways to inform motorists of expected travel times and

[10] Reversible lanes use the under-utilised capacity of lanes in the opposite direction.

[11] The objective of ramp metering is to provide smoother merging of vehicles entering the main road by controlling the number of vehicles that are allowed to enter the road as well as to break up the platoon of vehicles released from an upstream traffic signal. It operates by controlling the incoming traffic flow onto a main road (ARRB 2006b, p. 25).

[12] For example, automatic incident detection on freeways relies on inductive loop sensors at regular intervals on a freeway to detect abnormal changes in traffic parameters. The information is relayed to a control centre, which can execute a plan of action to deal with the incident (ARRB 2006b, p. 33)

[13] These include via commercial radio, mobile phone, or in-vehicle navigational systems.

traffic conditions on the road ahead. VicRoads also provides extensive traffic information on its website (www.vicroads.vic.gov.au). This allows people to:

- monitor point to point travel times along the Eastern, Monash, West Gate and Tullamarine Freeways and the Western Ring Road
- view traffic incidents and tow truck allocations across the Melbourne Metropolitan Area
- investigate all VicRoads road works across Victoria
- read the text on all of the variable message signs on the freeways.

Many of the traffic management measures discussed above are already used in Victoria, including:

- variable speed limits on the Western Ring Road
- ramp metering on the Monash Freeway
- the SCATS (Sydney Coordinated Adaptive Traffic System) signal coordination system
- incident detection and management systems.

Traffic information systems and incident management systems also have positive safety impacts. The main impact of traffic information systems on safety is to warn drivers of impending hazards, allowing evasive action to be taken. Incident management systems reduce not only the travel time disruption of incidents, but the number, seriousness, and response and recovery cost of incidents. The United States Department of Transportation has published a series of reports on the impact of intelligent transport systems (ITS) on the operation of the surface transportation network. A recent report notes that:

> The majority of published evaluations of ITS implementations document positive impacts on the transportation system, and the assessments provided in this report reflect this fact. (United States Department of Transportation 2003, p. 3)

Participants suggested that there is scope for further enhancement of traffic signal sequencing and intersection design, including grade separation at road intersections and the replacement of road-rail level crossings. Other suggestions included greater use of road safety cameras, turning lanes at intersections, and restrictions on turning right into minor roads. Participants also felt that more use could be made of incident management practices and information provision to road users (see chapter 5).

International evidence suggests that such measures can have significant transport impacts, although there is a high degree of variability between applications, depending on the measures applied and location (BAH 2006i, p. 7). Successful implementation requires:

- a network approach to planning and implementation, given that, successful ramp metering on a freeway may worsen congestion on secondary roads
- co-ordination between the various agencies involved in incident management and information dissemination
- continuous assessment of how well the road network is meeting the needs of motorists
- up to date information on what is happening on the road network (BAH 2006i, p. 11).

In the first instance, successful traffic management policies reduce travel times and costs. By doing so, they are likely to attract back some road users who were discouraged from using the road by the previous congestion level. This 'induced demand' will diminish the length of time during which congestion is reduced, although community welfare can still be enhanced if the costs of achieving better usage of road capacity are less than the benefits to those who use it. Induced demand is an issue for all road supply options, in the absence of road pricing, and is discussed further in the section on infrastructure expansion.

It can be more cost-effective to improve the operation of existing infrastructure than to add new infrastructure, although there clearly comes a point at which it is more efficient to build new capacity than to increase the output of existing capacity. Sometimes a combination of expansion and operational improvements may be the best approach, particularly at bottlenecks.

VicRoads is active in introducing traffic management techniques and the Commission does not have the engineering expertise to discuss whether it is choosing the best options at the right time. However, two requirements are important. The first is that the most important options (which may involve a choice between options for addressing network wide issues or location specific problems) are put forward for evaluation at the appropriate time. This issue is discussed in chapter 9. The second requirement is that VicRoads makes its choices based on an approach to project evaluation that does not favour any particular categories of options. It is important that its approach to evaluation takes account of induced demand and network effects. This particularly important issue is discussed in chapters 9 and 10.

Road space reallocation

This includes measures which aim to re-allocate the use of the existing road space to give preferential treatment to particular travel modes other than single-occupant cars. A primary focus is on measures which give priority to on-road public transport (bus/tram) services. These may involve:

- bus/tram dedicated lanes, of various types with-flow lanes, contra-flow lanes, bus/tram only streets, bus/tram gates, clearways
- traffic signal priority measures, including signal priorities, queue relocation, selective vehicle detection
- other traffic control measures, including exclusive turning movements, and priority for bus/tram stop 'boarders'
- other measures may give priority to high-occupancy vehicles (HOVs) as well as public transport vehicles. Various definitions of 'high occupancy' may apply to include cars with two or more persons, taxis and/or commercial vehicles.[14]

Most of these measures are used in Melbourne. The Fairway system employs signal priority measures at four bottlenecks along Toorak Road to assist with tram and car travel (ARRB 2006b, p. 34). As noted in chapter 5, work is underway to develop a dynamic signal priority system and VicRoads is commissioning an emergency vehicle priority system. Many participants proposed expanding the use of such measures.

As well as reducing congestion, the international evidence suggests that some measures, such as bus lanes, reduce the number of accidents. There have been concerns that bus lanes would reduce visits to local businesses, but international experience suggests that, in practice, these impacts have been minimal (BAH 2006j, p. 11).

The *Metropolitan transport plan* has 'making existing roads operate better' as one of its strategies, with actions including:

- establishing a hierarchy of road use including giving public transport priority on designated routes on the Principal Public Transport Network and restrictions on kerbside parking on preferred traffic routes
- implementing and enforcing high occupancy vehicle lanes on major congested routes

[14] Another group of road-space reallocation measures involves 'traffic calming', designed to restrain the volume and speed of traffic in particular streets/local areas and provide improved/safer conditions for pedestrians and cyclists in particular. Measures include: road space narrowing, speed humps, chicanes, street closures and one-way streets. However, while such measures reallocate road space, they usually increase rather than reduce congestion, although there may be strong arguments in their favour on other grounds. They may also discourage diversion to local roads if charging or other congestion management strategies apply to major roads.

- optimising peak traffic flows on major arterial roads through measures such as giving priority to travel time improvements on routes that carry the heaviest volumes, with competing demands managed in accordance with defined principles (Government of Victoria 2004a, pp. 29-30).

Compared with the traffic management measures described in the previous section, measures that reallocate road space are more likely to involve trade-offs between competing uses of roads. While these measures may contribute to reducing congestion, for choices between alternatives to be fully-informed there need to be processes that make transparent the trade-offs.

The trade-offs are not always difficult. 'Minimalist' schemes, which enable buses/trams to jump the general traffic queue, by ensuring that they are not delayed at traffic lights or behind turning motor vehicles, may be implemented relatively easily and cheaply. These measures could provide benefits to public transport users and operators, without significant adverse impacts on general traffic. Such schemes also often perform well in economic and social cost-benefit terms (BAH 2006j).

However, other schemes, which significantly reduce the road capacity for other traffic at critical points, are more controversial. While they may encourage some mode switching from cars to public transport, they are likely to increase general motor vehicle traffic congestion. Decisions on such schemes would therefore involve trade-offs between different transport system objectives:

- The PTUA (sub. 65, p. 27) argues that rising vehicle congestion has seen average tram speeds fall by eight per cent in the past five years and that measures such as dynamic signal priority for trams, introduction and enforcement of turning bans on tram routes and lane separation would achieve a significant modal shift from cars to trams. Some of these measures would delay cars and decisions about them would be more effective if based on information about the relative magnitudes of these effects. The Government has initiated an extensive consultation program to promote improved decision making (box 7.3).
- As pointed out in the earlier discussion of car pooling, on some major routes, HOV measures, such as a dedicated HOV lane can be effective in increasing car occupancy, reducing total traffic volumes and reducing overall congestion. However, whether congestion overall is reduced would depend on whether the benefits of faster travel for those cars in the HOV lane outweigh the costs in terms of increased congestion delays for vehicles in other lanes—each case would need to be assessed on its merits.

BOX 7.3 Case study: road space management and trams

Trams share the road space with many other users, principally motorists, who use the roads for travelling through or within an area, or to park, and commercial vehicles, which use the roads to transport freight. Trams also share road space with pedestrians and cyclists, who may be passing through or accessing nearby premises. Any changes in the allocation of road space can affect all of these groups, but other interests are affected as well, including residents or traders.

If space were clearly defined as property and competitive markets developed, there would be a market price for road space. In such a market, road space would be allocated to those who place the highest value on it. There is no market for road space, however, and non-market methods have to be used to discover the values that road users place on different uses of road space. This would assist in decisions on how to allocate road space between them. One way this is being tested is the Think Tram Program, established by the Victorian Government and designed to achieve efficiency improvements in the tram network, while being cognisant of the other users of road space.

The Think Tram Program is a $30 million partnership between VicRoads, Yarra Trams and the Department of Infrastructure. The main elements are providing priority to trams over other vehicles, both in terms of traffic signal operation and lane allocation, using physical separation of trams from traffic wherever possible and improving tram stops to reduce passenger loading times and facilitate access (sub. 61, p. 7). Yarra Trams estimated that if all the initiatives are implemented, the average tram speed should increase from 16.1 km/h (2004) to 17.1 km/h by 2010 (sub. 61, p. 8).

Tram priority works have already been implemented on Tram Route 19 (North Coburg to CBD) as part of the Think Tram Program. This route has almost 10 million passengers per annum, and a significant portion of Tram Route 19 is shared roadway, lined with strip shopping (sub. 61, p. 8). As a result of changes made to most intersection traffic signals and pedestrian crossings between December 2004 and April 2005, it has been estimated that tram travel time improvements of around five per cent have been achieved (sub. 61, p. 8).

Yarra Trams has noted that 'in order to make significant gains in travel times, treatments that have a greater community impact (such as parking reductions) and are potentially more expensive (such as new and fewer tram stops, low floor trams, increased service frequency) will be required' (sub. 61, p. 8).

The experience with the Tram 109 project, which preceded the Think Tram Program, highlights the challenge of implementing changes with variable community impacts and trade-offs. The project objective has been to develop, with community input, a premium tram service that not only meets reliability and travel time objectives, but also improves urban amenity and provides universal access to trams via platform tram stops. A comprehensive consultation process has been adopted, in order to identify community issues and attitudes, and to allow these to be addressed in the development of options.

(continued next page)

Box 7.3 **Case study: road space management and trams** (continued)

While the consultation process has raised many positive issues, typical negative reactions among the community include:

- questioning the justification for change
- concern about any negative impact on private car travel
- residents opposed to the relocation of tram stops to near their homes
- trader concern about the possible impact on their businesses of the loss of street parking and narrower footpaths
- differences between affected councils, including in transport strategy plans, and with the State Government's transport priorities, an issue exacerbated by the ability of councils to use the planning permit process to impose conditions on a project.

According to VicRoads, the benefits that have resulted from the Tram Route 109 initiatives to date include:

- reduced tram loading times, of around 8 seconds, and increased accessibility and safety at platform tram stops
- reduced tram travel times at Victoria Gardens where trams are separated from car traffic—early estimates by VicRoads indicated that a 20 per cent travel time saving would be achieved
- an increase in tram patronage of between five and six per cent as a result of extending the tram route from Mont Albert to Box Hill. (VicRoads, pers. comm., 6 March 2006 and 10 March 2006)

One useful approach to the consultative process for Tram Route 109 has been the development of an agreement between VicRoads and the City of Boroondara, to establish common principles on consultation and options development. This has included an agreement that any loss of on-street parking in strip shopping areas as a direct result of the project be replaced and funded from the overall project budget. VicRoads can fund car park spaces, but may need to use the Council's powers, as the ultimate owners, to acquire land for the purpose of replacement parking. While this is costly and land for replacement parking is not easily found, this could offset the need for additional road construction, make more road space available for public transport, and generally promote usage that more clearly equates to the market value of the road space.

Claims that traders are disadvantaged by loss of street parking need to be carefully evaluated. Surveys indicate that traders perceive parking spaces to be vital to their business but empirical studies have found that there is little correlation between the number of parking spaces and retail performance (Currie 2005b).

Sources: Yarra Trams, sub. 61; Currie 2005b; and VicRoads, pers. comm., 6 March 2006 and 10 March 2006.

There are many different options for reallocating road space. The Commission agrees with Currie, Sarvi and Young, that:

> Road management authorities have a difficult task juggling competing demands for limited road space and time. This dilemma is highlighted when pressure arises for public transport services. Authorities must balance the need for effective bus and tram priority measures against the impact on all road users. This is a complex traffic engineering task where an understanding of public transport planning and operations is also required. To evaluate priority, authorities must also identify the scale of benefits, costs and impacts. An understanding of the economic and environmental implications of priority is needed. These complex challenges are exacerbated by the lack of tools to assist authorities in undertaking these tasks. (Currie, Sarvi & Young 2005, p. 77)

Currie, Sarvi and Young have developed an approach for evaluating proposals for reallocating road space, which they argue provides an 'objective, transparent and defendable means of addressing the very difficult trade-offs which road management authorities must make in managing finite road space with increasing travel demands' (Currie, Sarvi & Young 2005, p. 92). They provide an example of modelling a full-length kerbside bus lane in a two by two lane mixed traffic road environment. The example illustrates the trade-offs between the benefits to bus users from having faster and more reliable operation against the costs to road users from having to run in a single lane rather than two lanes.[15] The trade-offs appear to be case-specific, varying with factors such as the traffic volumes and bus frequencies. If this is correct, across the board support for particular approaches is not warranted—case by case analysis is needed.

Modelling particular cases can lead to more informed priority setting. The Commission commends VicRoads' support for the development of appropriate modelling techniques. The value of such modelling depends, however, on the quality of the information on which it is based. The Commission has suggested in chapters 2 and 3 that the collection of such information should be improved, and it draws together the types of information required in chapter 9. Given that there can be controversy both about the assumptions in modelling and about the quality of the data, when modelling is used to inform decisions, it should be used in a transparent way which exposes this information and assumptions to scrutiny.

Chapter 9 will argue that decision-making on road space reallocation has been excessively slow and that the Government could accelerate decisions by establishing a clear hierarchy of road use. This would constrain the scope of the options that can be considered in consultations about road space reallocation. If this hierarchy is to guide road use towards more efficient applications, the

[15] Note that cars use the road network and have options in the form of parallel routes while buses are required to stay on the selected road. Hence the impact on cars is less than might at first appear to be the case. An assessment of the impacts of bus lanes should take this into account.

hierarchy itself needs to be developed with the aid of evaluation tools such as that proposed by Currie, Sarvi and Young.

Establishing a hierarchy of road use, based on comparative evaluation of the benefits of alternative uses of particular roads, is an important goal of the *Metropolitan transport plan* (Government of Victoria 2004a). This hierarchy could provide the basis for the development of a corridor by corridor program for integrated road use management. The Commission understands that VicRoads is developing this hierarchy and is using evaluation tools to do so. Generally speaking, the highest priority would appear to be trams and buses on the arterials that are shared with public transport.

Infrastructure expansion

A large scale issue

Chapter 5 reported the views of many participants that road capacity needs to be expanded to support growth in traffic volumes in Melbourne and the regional cities. Participants identified many bottlenecks, while chapter 3 noted that major parts of the road network appear to be approaching capacity. As well, population growth is expected to be strong in some outer metropolitan areas where use of motor vehicles is relatively high, and which are often poorly serviced by roads able to meet the growing demand. There seems to be considerable support for expanding road capacity in the outer suburbs to effectively meet growth expectations. More contentious are proposals to relieve bottlenecks in the inner suburbs such as the West Gate Bridge and linking the Eastern Freeway with CityLink.

Submissions often did not quantify the costs of proposed projects. Many projects would be undertaken at a local government level and are individually small. Others, however, are large. The aggregate costs of projects such as linking the Eastern and Tullamarine freeways, completing the north east link of the Metropolitan Ring Road, upgrading the Monash-West Gate route and a very large number of projects in outer suburban growth corridors, would amount to many billions of dollars. While these projects may have benefits that extend beyond reducing congestion, it is unlikely to be feasible to undertake them all. Rigorous project evaluation is crucial.

Controversy over induced demand

Chapter 5 also reported the disagreement between participants about the effectiveness of providing additional road infrastructure in reducing congestion—a disagreement that is mirrored in the international experience

(BAH 2006h). At one extreme is the view that additional road capacity can reduce congestion significantly. Others disagree. Clarke and Hawkins argue that:

> … supply-side strategies cannot, in themselves, resolve congestion problems over the longer-term. This is demonstrated by the persistence of congestion in large US cities, such as Los Angeles, in the face of considerable supply-side investment. While it is technically possible to increase road supplies to the point where demand never exceeds supply, this is impractical in land-scarce congested cities as it becomes increasingly difficult to scale up road capacity to keep pace with growth in travel demands. Supply measures are at best an expensive form of congestion relief. Their appeal stems from a free-rider externality and the absence, until recently, of cost effective technology to directly charge for road use. Individual motorists derive specific benefits from new roads but, as with public transport, costs are borne by the average taxpayer. Increases in road supply have weak effects on pre-existing congestion because of 'triple convergence' issues: see Downs (1992).[16] The only effective way of avoiding these adverse indirect effects is to treat the congestion directly by charging for external costs imposed. (sub. 3, pp. 12–13)

The induced travel phenomenon has been the subject of numerous studies. The catalyst for several studies was the observed large disparity between traffic projections and actual outcomes in several major projects in the UK. In response the UK Government established an inquiry to investigate induced traffic growth.

The inquiry report (SACTRA 1994) concluded that in the long term (defined as greater than three years), somewhere between 50 and 100 per cent of new road capacity is used up by the resulting induced demand. This means, for example, that a 20 per cent increase in road capacity would ultimately lead to a 10 to 20 per cent increase in traffic volume, offsetting some or all of any initial travel time savings. Several subsequent studies found evidence of induced traffic effects (table 7.1).[17]

[16] Downs argues that peak hour traffic congestion rises to meet maximum capacity because of 'triple convergence'. There is spatial convergence, as drivers who used alternative routes to avoid traffic switch back to routes where congestion has been reduced; time convergence as drivers who previously avoided peak travel switch back to travelling at closer to peak hours and modal convergence as drivers who previously used alternative transport modes return to cars. Increases in supply are further negated by the 'swamping' effect of increased population and increasing levels of vehicle ownership as living standards improve.

[17] In the long term, there may be impacts on land use and form. Road building may encourage car oriented development, creating more car demand. This response is not captured in most transport models.

Table 7.1 **Share of new capacity absorbed by induced traffic**

Author	*Short term per cent*	*Long term (3+ years) per cent*
SACTRA (1994)		50-100
Goodwin (1996)	28	57
Johnson and Ceerla (1996)		60-90
Hansen and Huang (1997)		90
Fulton, *et al.* (2000)	10-40	50-80
Marshall (2000)		76-85
Noland (2001)	20-50	70-100

Source: Litman 2005, p. 8.

These findings, however, are not unchallenged. Other studies have disputed the extent to which induced traffic is responsible for growth in total vehicle traffic. A recent analysis of induced travel in the United States suggests that a highway improvement resulting in a 10 per cent decrease in travel time might result in only a one to four per cent increase in vehicle miles travelled—not nearly enough to offset the travel time savings from the improvement (Cambridge Systematics 2002, p. 13). Notwithstanding this, the report argued that the benefits of strategies to relieve congestion may extend beyond travel time savings. They may also appear in the form of 'greater traveller convenience, greater access to opportunities, or increased economic development'. It also added that 'economic studies that measure traveller benefits comprehensively—not just in terms of travel time saved—show that there is indeed a positive benefit to road users resulting from congestion relief, even when traffic increases as a result of the project' (Cambridge Systematics 2002, p. 16).

After reviewing international evidence for the Commission, Booz Allen Hamilton concluded that in the short term induced traffic will negate a 'modest' proportion of the time savings resulting from capacity enhancement and a larger proportion in the long term. Induced traffic will be greater:

- the more responsive travellers are to changes in travel times
- the more congested is the network
- if the scheme in question results in relatively large changes in travel times and costs (BAH 2006h, p. 9).

They concluded that the fact that there will be induced demand should not rule out selective enhancement of road capacity as a candidate policy measure for addressing road congestion. In addition, any significant scheme should be subject

to a 'triple bottom line' evaluation, that is, including social and environmental considerations, and this evaluation should take account of induced traffic effects, which in many cases will reduce the benefits from travel time savings in many cases. A proper evaluation is particularly important given there will usually be many options for managing congestion bottlenecks, with existing road modification or building a new road not the only option.

Chapter 3 pointed out that the central and inner areas of Melbourne account for nearly 40 per cent of road delay costs and that parts of the major road network are approaching capacity. Travel times can reach three times the estimated free-flow speed on occasions on the Monash, West Gate and Tullamarine freeways during the morning peak periods and twice free-flow times on the Eastern Freeway and Princes Highway (West). There are many options for addressing congestion on these roads. The West Gate Bridge provides an example (box 7.4).

BOX 7.4 Options for addressing congestion on the West Gate Bridge

The Government is undertaking a study of the maintenance and ultimate capacity requirements of the West Gate Bridge to develop maintenance and traffic management strategies (Government of Victoria 2004a, p. 63). The Commission has not seen this study, but there are clearly a number of options for reducing congestion on this crossing, including:

- changing the direction of a lane in the morning and evening peak
- integrated operation of ramp meters on entries and exits
- improved incident management on the Monash/West Gate freeways
- improved bus services combined with increased use of park and ride
- high occupancy vehicle or high occupancy toll lanes
- peak period pricing of all or some lanes
- land use policy: channelling development away from the bridge's 'catchment area'
- increasing the capacity of existing alternative routes
- adding a second deck to the bridge
- road and rail tunnel, potentially funded by tolling[18]
- building a second crossing, probably also funded by tolling.

[18] The Herald Sun newspaper (Tinkler 2006, *Herald Sun*, March 12) reported a proposal for a road and rail tunnel between West Footscray and the Port of Melbourne, that would travel under or over the Maribyrnong River and then beneath Footscray, emerging near West Footscray station to link with Geelong Road and the Sydenham rail line.

An illustration: the West Gate Bridge

Analysing some of the options for addressing congestion on the West Gate Bridge illustrates two points:

- a combination of options is likely to generate more benefits in managing congestion than any one option
- there are a number of short-term options that could delay the need for more substantial capital expenditure, with net economic benefits to the community.

The idea that a new road and rail tunnel to help alleviate congestion on the West Gate Bridge might be funded by tolling also raises the possibility that the bridge could be at least partly tolled. One approach would be to restrict tolling to peak periods, and to provide tolled and untolled lanes to address concerns about distributional issues by providing a free alternative. People who decide to shift their travel time away from the peak would not pay for using the bridge, but may be inconvenienced by the time change. Travellers may question why they should pay for infrastructure that they feel has already been paid for and given that they are continuing to fund road building through fuel excise and other taxes. [19]

There is an argument for tolling the West Gate Bridge prior to a decision on the construction of a road and rail tunnel or a second crossing, which, if combined with other measures, could help to defer a significant investment. Analysis of this option would need to assess whether imposing a peak period toll on the West Gate Bridge would shift congestion to other routes.

In its final report the Commission will also set out a list of options for addressing the bottleneck at the city end of the Eastern Freeway, and invites further comment on these issues.

[19] It would be open to the Government to return to the community the revenue obtained from peak period pricing. The purpose of a charge to manage congestion is to improve the efficiency with which an over-crowded piece of infrastructure is used, rather than to raise revenue. Peak-period pricing is done routinely for other utility services, via peak and off peak charges for telephones, mobile phones and electricity. There are many ways in which the distribution issues associated with road pricing could be addressed, with varying degrees of targeting and associated administrative cost. To offset the distribution impacts of a congestion charge without working against the impact of pricing on congestion, the revenue that it raised could be:

- returned to general taxpayers through tax reductions, which would have the additional benefit of reducing the efficiency costs of these taxes
- returned to motorists (either across Victoria or in selected areas) through lower motor registration fees or tolls on CityLink or EastLink
- returned to people in particular localities through a rate rebate
- used to fund additional public services—possibly public transport.

Specific road congestion locations

It is not the Commission's role to support a particular option for expanding capacity at a number of specific road congestion points. However, it seems likely that the number and cost of projects supported by participants (chapter 5) outstrips the capacity for public funding. Implementing many of these options would involve considerable lead times. However, options that address current problems can defer costly solutions and potentially offer significant benefits. The Commission notes that:

- attention needs to be focussed on alleviating bottlenecks which are imposing the greatest costs
- the process for ensuring that the appropriate options are considered is particularly important (this issue is discussed in chapter 9)
- options for addressing these bottlenecks should be subject to detailed project appraisal, where all options for alleviating the problem and the inter-relationships between them are considered. These options could come from any of the areas described in this chapter, including demand management, traffic management, road space reallocation, road capacity enhancement and more efficient use and expansion of public transport. There will also usually be more than one option for alleviating bottlenecks.
- funding may need to be provided to ensure that the modelling and evaluation procedures used for project appraisal in Victoria are at best practice. Individual projects should then be assessed in line with these procedures (this issue is discussed further in chapter 9)
- post-implementation reviews should be conducted following the completion of large-scale projects to ensure the lessons from large-scale projects inform future projects.

7.3.3 Public transport enhancement

Congestion is not only an issue for private vehicles, but one affecting trams and buses, and is also currently occurring on parts of the rail network. Transport congestion is affecting the efficient operation of public transport, particularly for tram and train services and contributing to capacity problems (chapter 3). Public transport enhancement covers the full range of improvements to public transport services that are designed to increase usage and in particular to accommodate and encourage car drivers switching to public transport. Some measures, such as fares and ticketing and passenger information and marketing,

seek to directly influence demand for public transport. Other measures are designed to enhance public transport services by:

- improving operational efficiency—such as by improved signalling and changes to City Loop operations
- improving service quality—improved information, stop facilities, vehicle design and security measures
- increasing frequency and reliability of service
- adding capacity—adding rolling stock or duplicating rail lines.

The PTUA suggested that: 'As long as car travel remains more attractive than public transport use, the potential of public transport to minimise congestion will not be realised' (sub. 65, p. 22). And further:

> Melbourne does not have a congestion problem on its roads; it has a problem with low vehicle occupancy levels that needs to be addressed by making high capacity vehicles—trains, trams and buses—more attractive to the occupants of private cars. (sub. 65, p. 5)

It highlighted key areas in need of improvement if public transport is to increase its appeal relative to private travel:

> The most common reasons given for not using public transport in Melbourne are the lack of services in the area and the length of travel times. This is consistent with the findings of a report prepared for the Victorian Department of Infrastructure that shows commuters are willing to make the switch from cars to public transport where the services are:
>
> - extensive in coverage
> - frequent
> - reliable
> - well publicised
> - well integrated.
>
> The fact that Melbourne's public transport system meets few, if any, of these criteria is demonstrated by its low patronage among choice passengers. (sub. 65, pp. 23–4)

Chapter 5 indicated that many participants supported expansions to public transport capacity, although there was often disagreement about the priority of specific projects. The Government's strategic framework for moving to the target of 20 per cent of total motorised trips being taken by public transport (outlined in *Melbourne 2030* (DOI 2002a) and augmented by later policy initiatives) recognises that the availability, frequency and reliability of public transport are drivers of modal shift, and targets improvements in these areas.

The Government has developed train, tram and bus plans to provide a comprehensive approach to deliver such improvements, but they have not yet released them. The tram plan sets out detailed measures for improving performance, increasing service levels, updating the tram fleet, expanding the network, and customer service initiatives (DOI 2003b, p. ii). Moreover, the strategic approach and the detailed train, tram and bus plans adopt many of the measures suggested by participants (chapter 5). These measures would improve service levels for existing users of public transport, although their impact on road congestion is more difficult to assess.

Impacts on road congestion

The review of international evidence by Booz Allen Hamilton (BAH 2006g) provides information about the extent to which public transport improvements might induce car travellers to switch to public transport and what additional measures might be needed to assist this goal. That review found the impact of improvements on inducing a switch from car trips to public transport depends on three factors:

(1) the mode shares of public transport passengers and car drivers in the relevant corridor or area
(2) the proportionate increase in public transport trips in the relevant corridor (which depends on the attractiveness of the improvement project)
(3) the 'diversion rate' for car drivers.

The maximum proportionate effect will occur where the public transport base mode share is high, the improvement project is a major and attractive scheme, and the diversion rate is relatively high.

The international review of public transport improvements found that significant change in road traffic volumes occurred in only three of 10 cases examined.

Booz Allen Hamilton noted that:

- major public transport improvement schemes may substantially raise public transport patronage in the corridor/area directly affected by the schemes. An increase of 50 per cent or more may be achieved, but this would be exceptional
- some (but typically a minority) of the new public transport passengers would otherwise have travelled as car drivers, and hence the scheme would reduce car volumes on roads in the corridor. Such reductions, may, in theory, be up to 15 per cent, but more typically are a maximum of 5–10 per cent in city conditions similar to Australia and will dissipate rapidly away from the corridor most directly affected

- in practice, observed reductions in road traffic volumes are much less than this, and in most cases are too small to be identified with any confidence. This arises because, particularly in congested urban situations, any temporary reduction in traffic volumes on selected routes is largely offset by car traveller responses (re-routing, changes in time of travel, trip redistribution, etc), with the result that the final equilibrium position on the road system is little different from the previous equilibrium
- while evidence indicates that the 'carrot' of public transport improvements has on its own only limited effect in reducing congestion, the effectiveness of an integrated 'carrot plus stick' approach may be much greater. This is illustrated in the case of the London congestion charging scheme where the 'stick' of road pricing was accompanied by the 'carrot' of enhanced bus services, resulting in substantial and sustained reductions in congestion levels (BAH 2006g, p. 7).

While the international evidence about the impact of improved public transport services on road congestion is mixed, the impacts could be larger in newly established areas and growth corridors that are poorly served by rail and tram networks. The PTUA, for example, noted:

> Vehicle congestion on Melbourne's road network is frequently most severe where mass transit alternatives are least developed and overall vehicle occupancy rates in the corridor are typically low as a consequence. For example:
>
> - the Eastern Freeway and inner north suffer from excess vehicle movements due to the absence of a heavy rail link to East Doncaster
> - congestion along the Monash corridor is exacerbated by the absence of a heavy rail service to Rowville
> - the Calder and Tullamarine corridors are suffering due to poor service frequencies on existing lines and the absence of suburban rail services to Sunbury. (sub. 65, p. 9)

Furthermore, not addressing the current capacity issues for public transport in Melbourne could result in some current users choosing to switch to cars, further contributing to road congestion.

Rail

As discussed in chapter 3, there is some evidence that passenger crowding on segments of the metropolitan rail system has increased and that some parts of the system are operating at or approaching full capacity. Inquiry participants made numerous suggestions about how these issues should be addressed (chapter 5). The main differences revolved around the degree to which current and emerging capacity shortages can be addressed through better use of the existing network versus major capacity expansions.

In the way that measures to improve the usage of the existing capital stock for roads should be a priority option, the same applies to the rail system. There appears to be a number of potential ways to improve the usage of the current rail infrastructure. The Commission considers that a number of the suggested changes to the operation of the rail system that have been put forward appear to have considerable merit:

- Changes to the operation of the City Loop (such as the counter clockwise running of trains during the morning peak) that could increase the number of train services using it. The Department of Infrastructure advised that three of the four loop tunnels are currently close to or at their limits and that it is currently reviewing this option in conjunction with Connex (DOI 2006c).
- Changing the number of express services during the busiest periods. Depending on the line, an express train can take up as much track capacity as two to four trains stopping all stations. (DOI 2006c). The double track Dandenong line could theoretically carry 22 to 24 trains per hour in each direction. However, due to the number of express trains running on the line (regional and metropolitan) the effective capacity of the line is reduced to around 13 trains per hour (DOI 2006c). Any increase in regional or metropolitan express services along the Dandenong line would further reduce capacity. There may be opportunities to run fewer express trains, particularly on lines with frequent overcrowding and late trains.
- Providing incentives for passengers to travel on the shoulders of the peak rather than during the busiest periods through improved quality of shoulder services or financial incentives such as off-peak fares.
- Introducing additional train services on existing tracks, having regard to headways (the gap between trains) and potential impacts on the speed and reliability of services.
- Adding additional services that run direct to Flinders Street and Southern Cross Stations, rather than through the City Loop. The Department of Infrastructure advised that there is some capacity at these stations to run more direct trains, but that the stations will need to be upgraded progressively to provided for more direct running in the future (DOI 2006c). Improvements to passenger interchanges at a number of other stations, such as North Melbourne and Richmond would also be required (DOI 2006c).
- Implementing operational changes in order to reduce dwell times at stations and minimise late running trains.

Some of these operational changes could be implemented fairly quickly, whilst some are longer term options. Introducing additional City Loop services may require changes to signalling systems in the loop (DOI 2006c). Also, the

introduction of the SmartCard ticketing system (due in 2007) may be a pre-condition for implementing shoulder period pricing.

On some lines, adding services may not be possible in the short term due to infrastructure bottlenecks. Major examples of system bottlenecks include junctions and single track lines. For example, there are several junctions on the metropolitan system where train tracks merge/diverge or cross over, such as Jolimont, North Melbourne, Caulfield and Sunshine. These constrain capacity because time has to be allowed between services to maintain safe operating distances. Similarly single track sections limit the capacity to add services since one track has to allow for services in both directions.

Implementing many of these operational improvements may involve a number of costs to government and would also impact on passengers. The costs to government include addressing infrastructure improvements necessary to enable an increase in services on those lines that are under most pressure, as well as the costs of operating additional (subsidised) services. Implementing such options would, however, defer the need for substantial new expenditure.

The cost to government will also depend on the response from passengers. Operating fewer express trains on some lines, and taking some trains out of the City Loop so that they operate through Southern Cross and Flinders Street Stations, would mean reverting to the original plan for the City Loop. This would, however, delay some passengers by requiring more people to change trains at Flinders Street and Southern Cross Stations, much in the same way as occurs in some major overseas cities such as London, Paris and New York. Total travel times would still be lessened somewhat if congestion is reduced, and the train network operates more reliably as a consequence.

Some participants argued that substantial new infrastructure investment is needed. Connex, for example, identified projects that, in order to cater for anticipated patronage growth and alleviate congestion (overcrowding) on train services on some lines, the train system 'urgently needs':

- triplification from Dandenong to Caulfield, Sunshine to Footscay, and Blackburn to Box Hill
- duplication on the Hurstbridge and Epping lines
- upgraded and modernised signalling on key corridors and the City Loop
- extra platforms at Sandringham and Pakenham
- modern train control and communication systems. (Hughes 2006, p. 11)

In regard to triplification options, these should be the subject of thorough cost-benefit analysis, as is being done for the Dandenong to Caulfield proposal, having particular regard to anticipated long-term trends in patronage. As noted in

chapter 5, some participants argued that the case for some proposed major investments has not been adequately made to date, and specifically in regard to the Dandenong-Caulfield line, that there are other operational options.

Trams

The tram and bus networks, on the other hand, appear to face much less 'lumpy' investments to expand capacity. In their case, it appears expansion is possible with a multitude of relatively small and incremental changes. At a recent presentation, the Chief Executive Officer of Yarra Trams noted that capacity enhancement does not require large projects, but rather a series of many smaller projects across the network (Cliche 2006). Upgrading the tram fleet would require a major financial commitment, but could still be undertaken in an incremental manner. A key issue is whether patronage continues to grow, as this is not currently happening at the same rate as for trains.

Buses

The Committee for Melbourne argued that priorities for the next five years should include:

- upgrading all local bus services, extending the hours of operation and increasing frequencies, at an estimated cost of about $60 million per annum
- implementing selective bus priority measures to reduce the impact of traffic congestion on service speeds and reliability
- accelerating the roll out of the SmartBus network (sub. 34, p. 14).

Another option is the development of a bus rapid transit system, of the type used successfully in a number of countries, with few stops over an extended route (chapter 6). This would be an attractive option for longer cross-town routes in Melbourne and between residential areas and places of employment that are not currently, or are poorly, serviced by public transport. It is more likely to be attractive if combined with bus priority measures.

Participants provided little information about this option, although Mr Louis Fouvy described the advantages of rapid transit travel in general, with the appropriate vehicle for each route (train, light rail, tram, bus) being chosen after passenger loadings have been estimated. He suggested that buses are most appropriate on lines with light loadings (sub. 92, p. 9). At a recent transport conference sponsored by the Municipal Association of Victoria, Professor David Hensher (Director of the Institute of Transport and Logistics Studies at the University of Sydney) and Mr John Stanley of the Bus Association of Victoria strongly advocated such an approach in Melbourne (Hensher 2006; Stanley 2006). An option for the Government would be to develop a trial bus transit route, to test the demand for such an approach.

Park and express bus ride operations on the Eastern Freeway are well patronised. Some modest increases are planned. An option is to expand these operations on that route (especially once the EastLink connection is opened) and to look to expand park and ride activities on the Monash and West Gate freeways. Access and drop-off/pick-up points in the CBD would need to be facilitated.

Efforts to increase public transport use also need to be supported by appropriate contractual arrangements with the service operators. Those arrangements need to provide adequate incentives for public transport operators to increase patronage. Chapter 4 describes the contracts and chapter 9 discusses potential deficiencies in these contracts and how these might be addressed, particularly for bus operators, by strengthening incentives to increase patronage.

Cost to Government

In considering the options it is important to have regard to the issue of costs. As noted in chapter 4, the Government subsidises the ongoing operation of public transport services and capital for new investment. In 2005, these subsidies covered about 70 per cent of the cost of rail services, 45 per cent of tram costs and 85 per cent of bus costs. As noted in chapter 4, these subsidies are significant—payments to train and tram operators (net of farebox receipts but excluding most capital expenditure) in 2005 amounted to $332 million and $129 million respectively, while for bus services this was about $210 million.

Increasing public transport patronage to both reduce road congestion and move towards the target of 20 per cent of motorised trips on public transport by the year 2020 would require major expenditure to expand the capacity of Melbourne's public transport network. The net cost to government would depend on the types of measures implemented. To the extent that patronage could be increased without adding to the capital stock (for example, through operational improvements or greater use of the network at times when there is spare capacity available), the cost should be relatively small. If, and when, capital expenditure is required this is likely to be more expensive, especially if this involves additional rail or tram track routes (or extensions to existing routes). However, if such expenditure results in a substantial mode shift, some of this cost may be offset by a reduction in the level of road funding otherwise required.

It has been put to the inquiry, and argued publicly, that the efficiency of the public transport network needs to be significantly improved, to better manage current levels of demand. A number of the options suggested would help alleviate congestion in the public transport system, especially rail, but need to be combined with other measures to have any significant impact on road congestion.

Integration

The supply of public transport infrastructure needs to be considered from a network-wide, including road, perspective. The physical integration of different modes of public transport should be enhanced, as provided for in the *Metropolitan transport plan* (Government of Victoria 2004a), particularly when new transport developments are being planned. Timetables need to be integrated across the networks and the information readily available, such as through travel plans including TravelSmart (which could be extended to Geelong, Ballarat and Bendigo).

In the case of rail and bus interchanges, a useful option would be the further expansion of public bus services and expanded commuter car parks, especially in middle and outer suburbs, and the promotion of bicycles as an access mode to stations. Many participants pointed to the benefits this can bring.

'Park and ride' facilities are an important example of how to integrate car travel with public transport, and can alleviate congestion in the crowded inner urban areas in particular. Participants proposed increased use of these facilities as an important way to encourage the use of public transport. For example, participants suggested that park and ride options should be explored for the EastLink tollway and could be established at Dandenong, in combination with express buses to run on the Monash Freeway (chapter 5). It was also put to the Commission that the Government could explore the scope for more 'park and ride' facilities using access to racecourse parking at Flemington, Moonee Valley, Caulfield and Sandown. The progressive introduction of more 'park and ride' facilities, where the land that would be used for parking stations does not have higher valued alternative uses, and where there is analysis to demonstrate that park and ride would attract motorists to public transport and not create excessive congestion around the parking stations, seems a worthwhile option.

Pricing

Although the view of the Department of Infrastructure, Connex and Yarra Trams is that service availability and standards are the main issue for current and potential transport users—a view supported by the wide range of public submissions—the level, spatial and time structure of public transport pricing have also have been raised in the inquiry.

Fare levels

Gans and King (2004) suggest public transport fares should be close to zero, with costs met by tolling road travel. They point out that rail travel involves large fixed costs relative to variable costs, and that economically efficient pricing for public transport means that the price should reflect the marginal cost of an extra

passenger, which is small in the case of rail (Gans and King 2004, p. 120).[20] This could improve the efficiency of transport use if the relative prices of road and rail use were set in a way that reflected the marginal social costs of these different transport modes:

> Because the relative user price of public transport is high compared to the zero user charge for road, our current public transport fares are almost certainly inefficiently high. Public transport is used too little, especially given the large investment in fixed costs required to establish railways. (Gans and King 2004, p. 121)

Removing or substantially reducing rail fares would lead to an even greater funding deficiency for public transport, worsened by the fact that capital expenditure to improve services would be needed:

> Nowhere in the world has improving public transport (service or price) had a sustained effect on road congestion. The only thing that has been shown to have lasting effects on road congestion is increasing the costs associated with driving. In Melbourne's case, there is a third argument against free public transport. The train system is already operating very close to capacity. Massive investment would be required before such a plan could be put into place (Carney 2006, *Sunday Age*, 12 March).

While the additional subsidies required for public transport would initially be the marginal cost of operating excess capacity, beyond that point costs would become substantial as new capacity is required. Road space allocation would become more complicated.

Indeed, some travellers may prefer to pay for a more reliable system rather than have a free one (Birnbauer & Starck 2006, *Sunday Age*, 12 March). Under the Gans and King proposal public transport would be free, but paid for by road users through a congestion toll for roads. If congestion tolls were not imposed, the alternatives seem likely to be less spending on other government services (possibly including public transport) or higher taxes—with their attendant distortions. Mr Elliott Fishman (Director of the Institute for Sensible Transport) argues that the cost could be covered by a Medicare-style levy (Fishman 2006, *Sunday Age*, 12 March 2006). Such proposals are likely to be controversial:

> Outer suburban taxpayers without adequate public transport have to use a car and pay private tolls. They should not be made to further subsidise the well-to-do Camberwells and further punished with congestion taxes and parking levies until they get their own rail line, a genuine alternative. (Gotch 2006, *Sunday Age*, 12 March 2006)

[20] Gans and King note that the cost structure for buses is, by contrast, characterised by low fixed costs and high variable costs.

Mr Fishman argues that 'either the tax could depend on the zone people live in, or the system could be improved to cover all areas of Melbourne' (Fishman 2006, *Sunday Age*, 12 March).

Gans and King accept that:

> A zero charge for public transport might be too low. At present, we simply do not know. The optimal public transport fare will depend on how commuters react to the introduction of congestion tolls. At a minimum, however, public transport fares and services need to be considered in tandem with road congestion charges. (2004, p. 122)

Off peak fares

As noted in chapter 3, just under two thirds of all weekday rail trips occur during the morning (7am to 9am) and afternoon (3pm to 6pm) peaks. This is an indicator of the effectiveness of trains in meeting the demand for mass transit to and from work and education. Lower off peak fares for all forms of public transport could reduce crowding during peak periods, although the extent to which off peak fares would shift rail transport demand away from peak hours will depend on the size of the fare differential, service frequency and reliability in off peak periods and, given that commuters are the major contributor to peak demands, the extent to which commuters can vary their school or work hours. These factors would also influence the extent to which off peak public transport pricing encouraged motorists to shift from driving during peak periods to using public transport off peak. Any movement towards time of day pricing for public transport use should ideally be coordinated with time of day pricing of road use, to reduce the risk that it shifts some public transport travellers onto roads, worsening road congestion.

The introduction of the SmartCard ticketing system in 2007 provides an opportunity for more flexible fare structures and should enhance the potential for trials which provide information about the impacts of off peak and other travel options. For example, public transport operators could consider the scope for developing targeted loyalty programs, as are used in Paris (chapter 6).

Zonal pricing

Some participants believe that zonal pricing encourages more congestion closer to the CBD, as people drive to the zone 1 or 2 boundary to take advantage of lower fares (chapter 5). The Commission has not reviewed the structure of public transport fares, as it is set having regard to a variety of financial, equity and other social objectives. There is an argument for having distance-related fares to the extent that some costs of rail and tram transport increase with distance travelled. A potentially more important issue is that the rail system is designed to cope with peak flow, so that arguably the time of travel is as important an influence on costs as distance. That said, the system is not finely

graded as there are only three rail and tram and bus price zones, which implies that the precise location of boundaries is not closely related to changes in costs.

With just three zones and substantial price differences between them, there will always be incentives to join the system at boundaries, if parking is provided free of charge. Incentives to do so will also be affected by the characteristics of stations inside boundaries, such as the availability of parking, shops and other services. Hence changes to the current boundaries, leaving the number of zones unchanged, seem unlikely to solve any problem. Incentives to join the system at zone boundaries would be reduced if the number of zones were increased and price differences reduced. People may still wish to join at a boundary point, but with more points available, the road traffic and parking congestion that this creates would be dispersed.

The Commission was not presented with any strong evidence or international experiences to support options in this area. However, the new SmartCard provides an opportunity to trial a variation in the number and structure of zones.

Data

The new SmartCard ticketing system should provide superior information about travel patterns within the public transport system. This would enable a wider range of options for addressing congestion. Once reliable data has been available for a period of 18 to 24 months, an option for the Government would be to commission an independent review of this data. This review could examine the duration, location and timing of travel and the extent to which trips involve more than one public transport mode. In the event that adjustments were made to prices, the data could assess the impacts of the price changes. The review could also advise on ways in which data classification or collection could be improved. This review may also inform a range of other public transport initiatives.

Of more immediate impact, analysis of the considerable increase in public transport patronage during the Commonwealth Games may suggest some useful lessons for the ongoing operation of the public transport network. The relationship to reduced road congestion needs to take account of school holidays, and efforts to discourage road use during the Commonwealth Games. It is important, however, to learn from such 'real-time opportunities, and the Commission will return to this issue in its final report.

7.3.4 Walking and cycling

Approaches relevant to government, for the encouragement of walking and cycling as substitutes for vehicle travel include:

- marketing and awareness campaigns—provision of information and promotion
- infrastructure provision—cycle and pedestrian zones and facilities
- regulation—prescription of cycle transport/storage facilities, traffic restrictions.

The Commission received many submissions supporting walking and cycling as alternatives to car use. Councils such as the cities of Melbourne and Yarra are proposing a hierarchy of road use favouring cycling and walking. Measures to encourage walking and cycling are unlikely to have a major impact on peak period congestion, when longer distance journeys to work and education trips are particularly common. Nevertheless, international evidence suggests that some measures to encourage walking and cycling can be cost-effective and lead to behavioural change. While benefit-cost analyses are limited, some are highly positive (BAH 2006e, p. 12). However, some measures—such as the creation of bicycle lanes—may increase motor vehicle congestion if the bicycle lane reduces the number of lanes for cars.

As with the other options discussed in this chapter, choices need to be based on a thorough and neutral project evaluation. Walking and cycling options can increase travel times, for the obvious reason that they are a relatively slow way to travel. Justification of these types of projects may therefore depend on other, health and environmental, benefits which need to be included in the analysis.

7.3.5 Information and communication technologies

The development of information and communication technologies (ICT) may change patterns of work and consequently affect the pattern and growth of demand for transport. Policy approaches that could be relevant in this area include measures such as:

- awareness raising—of the travel reduction potential of ICT
- development of e-work pilots and programs
- development of telework centres
- promotion of e-commerce and e-services
- development of 'wired-up communities'.

Information and communication technologies will be developed and applied for reasons that are not related to the specific congestion problems in Melbourne

and the other cities. Nevertheless, these technologies may have some effects on travel patterns and consequently on congestion.

The effects of ICT measures on transport are not yet well understood. Information and communication technology measures are unlikely to have large impacts on congestion in the short term, but may have more significant impact in the longer term, as technologies become more accepted and developed. For example, e-work may have some impact on road congestion by reducing travel in the morning and evening peaks.

An issue for government is whether there is a case for providing direct support for e-work by funding organisations to plan and implement e-work schemes or to support equipment purchases in the not-for-profit sector. However, decisions to implement ICT will most likely be made on the basis of considerations other than transport.

The Commonwealth Government has established the Australian Telework Advisory Committee, one of whose roles is to advise on impediments to the development of e-work in Australia. Governments in Europe and the United States have introduced awareness raising campaigns aimed at reducing commuting through telework (BAH 2006f, p. 9). The case for additional intervention by the State Government does not appear strong.

7.3.6 Land use planning

As discussed in chapter 2, there are many interdependencies between land use planning and transport policy. The location of roads and rail infrastructure, and the way in which they are priced, will be major determinants of the pattern of land use that develops. Working in the other direction, expansions to transport infrastructure will be influenced by current and expected developments in land use.

Melbourne's average residential density is around 10 dwellings per hectare and the indicative density target under *Melbourne 2030* is 15 dwellings per hectare. This implies that there will remain many areas where density is insufficient to support high frequency public transport and where use of cars will remain high. *Melbourne 2030* attempts to address this situation by nominating Principal and Major Activity centres and establishing a Principal Public Transport Network. The policy states that every major activity centre must be on this network. Bus routes will seek to serve centres not connected to the rail network.

It is particularly difficult to evaluate the cost-effectiveness of the congestion impacts of land use planning. Impacts on road traffic and congestion are often small in the short term, although not always. The Commission was told about a new development in Bendigo with streets too narrow to allow normal buses and

a large new development in Geelong without provision to link with the new ring road. In the long term, beyond 20 years, land use planning may have substantial impacts on travel patterns and congestion, and as a consequence economic costs.

Hensher (2006) suggests that one of the main questions in this area is the extent to which spatial planning policy can influence travel behaviour. He questions whether it may be a relatively blunt instrument and whether attention should be focussed on harnessing the power of the market to produce desired outcomes. He argues that incentives are often absent and that the government's role should increasingly be to promote the operation of efficient and equitable markets.

Some options that could help to improve the impact of land use planning on congestion include:

- Promote existing policies that encourage the location of activity in Principal and Major Activity Centres. This will help to focus the development industry on specific locations, provided there are enough such locations to meet overall demand. These locations would need to have a transport capability, and adequate roads and public transport, to manage the greater concentration of population.
- Reinforce and fast-track the *Transit City* program (chapter 4), to establish examples of 'best practice'. There should be a particular to focus on centres which have high levels of public transport access and are amenable to residential and commercial growth, such as Dandenong, Frankston and Footscray.
- Assess whether business zones across Melbourne that are not classified as major activity centres are having a significant impact on congestion, and consider ways to reduce any impacts. This is particularly important along freeway corridors in order to restrain the car use generated by future developments.

7.4 Longer term issues

Chapter 3 pointed out that by 2021, in the absence of new measures and major behavioural adjustment, delays due to congestion are likely to worsen significantly. Much of the projected growth in congestion delay costs is expected to occur in the central and inner suburbs, where road building options are more limited. In addition, as pointed out in chapter 1, the Government's vision for Melbourne is one in which public transport performs a much larger role than it does at present.

In the longer term, with a variety of factors suggesting that use of motor vehicles will remain high, addressing the dual challenges of increasing congestion and achieving higher rates of public transport usage will require more widespread use of demand management options. This should be part of a comprehensive

approach to achieving more efficient use of transport resources and of people's time and other resources. These management options should also endeavour to move transport patterns towards the increased share of public transport in metropolitan travel as envisaged by the Government. Indeed, it is difficult to see how this target could be achieved without charging road users for the costs they create. As the Bus Association Victoria, for example, noted, shifting passenger travel to public transport will involve adjusting 'pricing signals to make road users accountable for the costs their travel choices impose on the wider community' (sub. 57, p. 3).

Morris and Wang in their paper for the Infrastructure Planning Council pointed out that increases in the capacity of public transport would need to accompany pricing measures:

> … modal shift of the size contemplated by current State government policy is unlikely to occur without radical intervention. The type of interventions that are likely to be needed include very significant improvements in the levels and coverage of public transport services available to Melburnians, as well as changes in transport policy (on matters such as pricing and taxation, and parking provisions) (Morris & Wang 2002, p. iv).

At the time that it is considered, a view on the cost effectiveness of congestion pricing will depend not only on the impacts on congestion of a particular scheme, but also on the costs involved in constructing and operating the scheme, which will be influenced by technological developments. Clarke and Hawkins argue that comprehensive pricing is impractical for Melbourne, although technology to do so could be available 'within decades' (sub. 3, p. 10). Gans and King (2004), on the other hand, suggest that technology may develop more rapidly than this. While 'to a significant degree, the lack of urban road pricing has reflected technology', they suggest that global positioning satellite (GPS) technology has made citywide pricing possible, as the technology requires little roadside infrastructure and can track the location of vehicles and charge tolls based on time of day, road used and congestion level. Gans and King note, however, that GPS-based pricing systems are still being developed.

Several issues—some of which have been mentioned earlier in this chapter—would need to be resolved before comprehensive road pricing would deliver its maximum benefits:

- Reform of road pricing would need to be combined with both ensuring that a public transport alternative is available and that it is priced efficiently. Gans' and King's suggestion, that public transport travel be made free and funded through road user charges, has been noted above. Professor Bill Russell has suggested that the Government should hold an inquiry into more flexible pricing for public transport and roads, and that it should look at

options including free travel on trains, trams and buses, and free fares for groups such as students and seniors (Birnbauer 2006, *Sunday Age*, March 12).

- It would be desirable that comprehensive road pricing also be combined with a review of Commonwealth excise arrangements and the fringe benefits tax, as identified earlier in this chapter.
- Consequences for income distribution would need to be understood and, to the extent deemed appropriate by the Government, addressed.

That said, it is evident from the submissions to this inquiry that notwithstanding the Government's desire to increase the role of public transport, there will need to be an ongoing program of road building in the coming years. Some of these roads may be funded through tolls. This will provide an opportunity, even if comprehensive road pricing is not pursued, for tolls on new roads to be structured having regard to the congestion costs at different times of the day. New public private partnerships in the transport area, appropriately structured to operate alongside public transport alternatives, could leave open this possibility and indeed other options necessary for an efficient transport network.

The impacts on several other government objectives of implementing road pricing when the issues discussed above have been addressed, seem likely to be positive:

- Time-of-day pricing can improve resource allocation by allocating road space during peak periods to those who place the highest value on being able to travel at these times. As pointed out above, it can also save resources by delaying the time at which investment in new capacity is needed.
- Increasing the price of road use during peak periods would also encourage the use of public transport during those periods, where it is available.
- Smoother flowing traffic and the switch to public transport should lead to environmental benefits such as reduced emissions of pollutants.

The Government has indicated that monitoring overseas developments in transport pricing and their implications for Melbourne is a priority area (Government of Victoria 2004a, p. 34). As mentioned above, options worth considering in the short term include assessing the scope for time of day pricing on CityLink and EastLink, where prices are already charged or planned, and on the West Gate Bridge, to address the pressing congestion issues there. As well as helping to address existing congestion issues, these options would provide information about the impacts and operation of time of day pricing that would help in assessing the merit of using pricing for managing congestion in the future.

In the longer term, if congestion worsens as some projections indicate (chapter 3), the Commission's view is that a comprehensive approach to road pricing will need to be considered as an option for Melbourne. However, a number of preconditions would need to be satisfied, including:

- the availability of suitable technology to permit pricing to be both administered at low cost and sufficiently flexible to address specific congestion problems by, for example, being responsive to changing traffic conditions
- the availability of adequate public transport alternatives to roads and integration of road and public transport pricing
- mechanisms for addressing any unwanted distributional consequences.

A study into of the feasibility of road pricing in Auckland (box 7.5) has recently been completed. The report may be relevant to some of these issues, and its findings will be reviewed for the final report.

BOX 7.5 **Auckland road pricing evaluation study**

In July 2004, the New Zealand Ministry of Transport commissioned a study to provide advice on the desirability and feasibility of road pricing and parking charges in Auckland. Road pricing, for the purposes of the study, was defined as charging for the use of an existing road, for demand management and to provide revenue for investment in land transport. Options to be studied included cordon charges, area charges, strategic (arterial) network charges, full network charges and parking charges. The evaluation framework included:

- social, environmental and economic impact assessment
- evaluation against other government objectives
- identification of revenue potential, demand management, social and distributional effects, consistency with land use policies, privacy issues, technical feasibility, administrative simplicity, public acceptability, legislative implications
- identification of mitigation proposals (for example, additional public transport services, discounts/exemptions from potential charges.

The study was released publicly as the Commission was finalising its draft report.

Source: New Zealand Ministry of Transport 2004.

8 Freight traffic congestion

As noted in chapter 1, vehicles carrying freight (box 8.1) represent about 12 per cent of total vehicles using Melbourne's roads (these are mostly light commercial vehicles), and time of use profiles show freight traffic tends to avoid the worst of congestion periods, especially the afternoon peak.

Box 8.1 What is freight?

In urban areas, the definition of freight needs to be broadly based. While freight is generally defined as the movement of goods from one location to another as part of a production, collection or distribution chain, urban freight also includes service vehicle trips to destinations that are fundamental to the operation of an urban area as well as ancillary goods (such as stationary or packaging materials that are used within a business). Examples include waste removal services, postal services, equipment servicing, and maintenance services.

Source: VicRoads 2003, p. 20.

But Victoria's freight task is growing and the road freight task in Melbourne is expected to grow faster than economic growth (chapter 2). This growth will put added pressure on the transport network, tending to increase congestion and the costs of that congestion on business (discussed in chapter 3). How this might affect business in aggregate is difficult to determine, as official data on such costs is limited. Moreover, submissions did not quantify such costs or supply examples of the impact of freight traffic congestion on particular firms, nor was this provided by freight and logistics operators, and other businesses with which the Commission met. Available evidence suggests that congestion is causing freight traffic to shift its time of road use to less congested times of day. Moreover, the growth of freight intensive businesses adjacent to the Ring Road in Melbourne's west suggests companies are responding to congestion by relocating their activities to maximise usage of major arterial roads and freeways.

While many of the measures designed to address general traffic congestion will also encompass freight traffic, especially light commercial vehicles, heavy freight traffic raises some specific issues. These relate primarily to traffic growth associated with the Port of Melbourne—and container traffic in particular. It was in this area that the Commission received the bulk of comments regarding freight traffic congestion. The Commission also engaged Booz Allen Hamilton to review international policy approaches to managing congestion. Their findings highlighted a range of freight related options which are outlined below.

8.1 Main areas of freight movement

The Infrastructure Planning Council (IPC) has noted that freight movements are concentrated around several major corridors and areas of metropolitan Melbourne (IPC 2002b, p. 11). Table 8.1 lists the movement of freight into and out of Melbourne by road and rail along major corridors for 1995-96, and demonstrates that, at that time, the Hume and Princes West corridors carried the most freight.

Table 8.1 **Major freight corridors into and out of Melbourne**

Corridor	*Road ktonnes*		*Rail ktonnes*		*Total by corridor*	
	From Melb	*To Melb*	*From Melb*	*To Melb*	*k/tonnes*	*%*
Calder	1 065	2 510	69	891	4 535	12
Hume	5 055	5 374	932	2 145	13 506	37
Princes East	1 302	3 475	22	228	5 027	14
Princes West	1 832	2 935	1 394	1 615	7 776	21
Western	2 195	3 161	26	242	5 624	15
Total	**11 449**	**17 455**	**2 443**	**5 121**	**36 468**	**100**

Source: VicRoads 2003, p. 18.

The IPC also noted the predominant role of road in carrying the Victorian freight task:

> Rail freight has an advantage in long-hauls, but overall rail carries a small proportion of the total freight task.
>
> Rail has about 60 per cent of the Melbourne to Western Australia freight task and about 52 per cent of the Melbourne to South Australia freight task. However, rail's mode share to New South Wales from Melbourne is merely 10 per cent. Overall, rail has captured only about 8 per cent of the Victorian freight task. (IPC 2002b, pp. 12–13)

Table 8.2 highlights this dominance of road transport along the major freight corridors to and from Melbourne.

Table 8.2 **Modal share in major freight corridors**

Corridor	*Road ktonnes*		*Rail ktonnes*	
	Total	*%*	*Total*	*%*
Calder	3 575	79	960	21
Hume	10 429	77	3 077	23
Princes East	4 777	95	250	5
Princes West	4 767	61	3 009	39
Western	5 356	95	268	5
Total	**28 904**	**79**	**7 564**	**21**

Source: Derived from VicRoads 2003, p. 18.

The IPC identified that *within* the Melbourne metropolitan area, freight traffic is concentrated around three main areas:

- the Port of Melbourne …;
- North and North Western Melbourne corridor along the Western Ring Road; and
- South and South Eastern corridor stretching through the suburbs of Moorabbin, Braeside, Dandenong, Bayswater to Clayton. (IPC 2002b, p. 12)

Information supporting the view of the IPC is provided in the draft North Central City Corridor Study, released by the Department of Infrastructure (DOI) in 2003. That study noted that freight traffic is generally not a significant issue in the inner north city area:

> Freight and commercial traffic is not a high proportion of road traffic in the inner north. The volume of freight traffic relates to the commercial development in the area, and in nearby areas served by corridors into the area, with only a relatively small volume of longer distance through traffic (e.g. eastern suburbs to the Dynon rail/port precinct).
>
> The most important freight route in the inner north is the Elliott Avenue-Alexandra Parade east-west route through the area, which carries 2500 trucks a day at its western end, increasing to 5000 at the eastern end. This is a small proportion of total traffic …
>
> Mode shift from Melbourne 2030 initiatives will result in faster growth in public transport than car use, but truck use is expected to increase steadily (and probably faster than car use) as well. The percentage of trucks in the traffic stream will therefore grow. However, they will remain relatively small in number in the inner north, and major cross-town freight routes such as CityLink and Bell Street will continue to spread the load. (DOI 2003a, p. 34)

Inquiry participants highlighted the influence of the Port of Melbourne in generating freight flows and road traffic. The City of Maribyrnong, for example, noted:

> The growth in on-road freight movement will significantly increase traffic congestion in Melbourne, particularly around the Port of Melbourne where we are likely to see an extra two million container truck movements a year in 2025 on current port forecasts. (sub. 38, p. 4)
>
> Port traffic currently contributes around the following percentage to key roads in the inner west:
>
> - Westgate freeway—3.3 per cent of total traffic (estimated)
> - Whitehall St (at Somerville Rd)—39 per cent of trucks
> - Francis St (at Williamstown Rd)—31 per cent of trucks. (sub. 39, p. 4)

A measure of this influence is provided by a DOI-commissioned study that found the port generated over 3.3 million container moves in 2002—90 per cent of which are delivered within the Melbourne metropolitan area (DOI 2002b, p. 3). Moreover, given that about 80 per cent of the freight moved into and out of the port is transported by road, the port's operation has a significant bearing on road traffic and congestion (Port of Melbourne Corporation, sub. 53, p. 7). The Port of Melbourne Corporation has estimated that trade carried into and out of the port results in about 1.2 million truck visits to the port each year (sub. 53, p. 7). On the major arterial intersections adjacent to the port (such as Footscray road/Appleton Dock road), trucks represent about 25 per cent of all vehicle movements (Port of Melbourne Corporation, sub. 53, p. 17).

However, the corporation also noted that the proportion of port related traffic drops very quickly as distance from the port increases (sub. 53, p. 18). Further it noted that the operation of the port contributes only a fraction of the total freight flow on metropolitan Melbourne's road system:

> Daily truck movements to and from the port in November 2004 were:
>
> - 10 012 heavy vehicles, made up of:
> - 7056 container trucks
> - 581 car carriers
> - 2375 non container trucks
>
> This suggests that port related heavy vehicles make approximately 0.16 per cent of motor vehicle trips in Melbourne. (sub. 53, p. 17)

Information provided by VicRoads and the DOI identify existing congestion hot spots and routes (chapter 3). Many of these hot spots and routes that experience congestion generally are also those where freight traffic congestion occurs. Accordingly, measures designed to alleviate congestion generally on those routes—discussed in chapter 7—would also be expected to address congestion

experienced by freight traffic. Moreover, given that passenger motor vehicles constitute the bulk of traffic flow on most routes, and that measures such as those aimed at shifting personal travel to public transport or forms of road pricing would be likely to remove more cars than trucks, freight transport would benefit more. As the Public Transport Users Association has noted:

> Journeys for business purposes (including freight) are vastly outnumbered by personal trips, and outside peak hour (when most workers are travelling to or from home) are relatively unimpeded. The more personal travel is shifted to public transport, the easier it becomes to accommodate any kind of business travel on the existing road network. (PTUA 2005)

Carolyn Ingvarson made the same point when she noted '… were our major road arteries to be freed from 1000s of commuters, freight transport would be the major beneficiary' (sub. 82, p. 3).

Inquiry participants did not identify Melbourne Airport (an intermodal freight hub) as a point of significant congestion.[1] The City of Melbourne, for example, noted that one of the advantages of the airport was that it was relatively uncongested (City of Melbourne undated B, p. 23). General traffic congestion does occur on the Tullamarine Freeway,[2] but freight specific congestion at the airport intermodal hub is less of an issue. As well, measures have been taken to address freight related congestion at the airport:

> A second airport entry road will open off Melbourne's Tullamarine Freeway today. The $3 million project will help to reduce congestion on the existing airport entry road as passenger traffic grows and improve airport access during peak periods. 'This second entrance diverts non-terminal vehicle traffic from the traditional airport entry road, reducing congestion for passengers and other terminal traffic,' Melbourne Airport CEO Chris Barlow said. 'The new road will provide a convenient alternate airport entry-point for freight transport, taxis, buses and airport staff.' (Melbourne Airport News 2005)

In addition, submissions suggested that freight congestion, while problematic in some areas, is not a major problem in Ballarat, Bendigo or Geelong. The City of Greater Bendigo, in this regard, noted:

> Previous traffic and transportation studies have established a hierarchy of routes in and around Bendigo. Over the years the implementation of the recommendations in the studies have seen significant improvements to traffic flows in and around Bendigo. Recently further [progress has] been made

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[1] This is a reflection of the relatively small freight flow involved. For example, in 2000-01, Melbourne Airport handled around 223 000 tonnes of international freight and 123 000 tonnes of domestic freight (VicRoads 2003, p. 22).

[2] A new interchange at Bulla, partly funded by AusLink, is under construction to help alleviate this congestion.

> regarding funding to complete works on the 'inner box'. The 'inner box' is a network of roads that provide a 'ring route' around the CBD of Bendigo. The road hierarchy also provides for an outer box or ring to provide movement around the outer areas of Bendigo. This route overlaps much of the OD Routes throughout Bendigo. An additional route, the East Bendigo Link is also being considered which is aimed at connecting the expanding industrial area to the east of Bendigo with the Midland Highway. (sub. 42, p. 2)

In consultations with stakeholders in Geelong, freight congestion issues were identified, such as access to meet growing Geelong Port demands. These reflect planning and institutional factors and are discussed in chapter 5.

8.2 Addressing freight congestion

The Government has introduced a suite of measures to address freight congestion, both through measures aimed at managing congestion affecting all traffic and measures which primarily have a freight traffic focus. The *Metropolitan transport plan*[3] includes measures relating to improving access to the Port of Melbourne, Melbourne's airports, key freight corridors and major zones of freight activity; and to improving national, regional and cross-town freight connections. The main measures addressing the first of these are:

- improving rail access to the Port of Melbourne (currently the only on-dock rail access is via a single track that crosses the busy Footscray Road)
- the Melbourne Port@L development (to combine the Port of Melbourne and the adjacent Dynon rail terminals into an integrated freight hub) which includes
  - enhancing rail/road access to and between rail and shipping terminals
  - using information technology to improve supply-chain performance
  - facilitating the development of outer metropolitan intermodal terminals servicing the port
  - increasing the Port of Melbourne's capacity (see figure 8.1)
- port development projects such as
  - developing Victoria Dock as a freight terminal, to include on-dock rail connections to allow the transfer of 50 per cent of cargo by rail
  - extending Mackenzie Road and closing part of Coode Road to allow containers to be moved by straddle carriers and forklifts rather than trucks

[3] The plan builds on previous policies which have set the direction for Victoria (*Growing Victoria Together*, *Melbourne 2030*, *arrive alive!* and *Victoria: Leading the way*).

- introducing information and communications technology solutions to reduce freight congestion in and out of the Port of Melbourne (Smart Freight)
- the development and implementation of freight transport plans, strategic land use plans and planning guidelines for major freight places,[4] and identifying land required for transport corridors and access to freight terminals (Government of Victoria 2004a, pp. 59–60).

Figure 8.1 **Melbourne Port@L long term concept**

Source: DOI 2004c, *Victorian Ports: Strategic Framework, November*, p. 11.

[4] Major freight places include the Dynon/Port of Melbourne precinct, the ports of Geelong, Portland and Hastings, Melbourne's airports and sites suitable for the location and/or expansion of intermodal freight terminals such as those at Altona and Somerton.

Among the main measures aimed at improving national, regional and cross-town freight connections are:

- reforming rail access arrangements and providing additional terminal capacity
- upgrading the Sydney-Melbourne rail corridor to reduce travel times between Melbourne and Sydney
- increasing the capacity of the standard-gauge line between Tottenham yards and Dynon, to eliminate rail freight bottlenecks
- addressing bottlenecks on the major road freight corridors between Melbourne and Sydney, Adelaide and regional Victoria, such as the:
  - Deer Park by-pass linking the Western Ring Road and the Western Highway at Caroline Springs
  - Princes Freeway East, through Pakenham
  - Calder Freeway, in Keilor Park and at the Tullamarine Freeway Interchange
  - South Gippsland Highway at Cranbourne
- addressing restrictions on major cross-town routes, with priorities being:
  - the construction of the Mitcham–Frankston project
  - upgrading the Calder Freeway/Tullamarine Freeway interchange at Essendon
  - addressing alternative routes for freight in residential areas near the Port of Melbourne
  - providing a comprehensive network of intelligent transport systems to deliver real time traffic information to drivers and freight operators.

8.3 Participants' views

Inquiry participants who commented on freight congestion mainly focused on the freight traffic associated with the Port of Melbourne. Moreover, that focus related largely to container traffic, which comprises the vast majority of the port's road traffic. Where other comments on freight congestion were received, these mainly dealt with cross-town freight congestion and referred to parts of the network also relevant for freight associated with the Port of Melbourne (e.g. the West Gate Bridge), or to the need to provide in the longer term for container handling facilities outside the Port of Melbourne at other ports such as Hastings.

There is little doubt that container traffic generated by the Port of Melbourne will grow significantly in the next decades. Westgate Ports Pty Ltd noted that in

2003-04 the Port of Melbourne handled 1.72 million TEU[5]. This grew to 1.90 million TEU in 2004-05. By 2020 the port will handle an estimated 4.4 million TEU (sub. 25, p. 9). Westgate Ports Pty Ltd considered these projections should be viewed as conservative:

> From the Port of Melbourne Corporation Annual report 2004-05 the TEU traffic through the port increased by 11 per cent from 2003-04 to 2004-05 and has grown at a rate of 7.8 per cent for the past 14 years … If the growth rate of 7.8 per cent continues by 2020, using a straight line projection, there will be 5.89 million TEU … passing through the port.
>
> For the achievement of the forecasts for TEU used in [its submission], an annual growth rate of about 4.7 per cent is required to reach 4.4 million TEU by 2020. [This is] well below the growth percentages that have been achieved in either the last two years or 14 years. (sub. 25, p. 10)

If rail's market share remains at or close to the current 17 per cent for containers, the number of truck movements is expected to rise by 50–-60 per cent between 2005 and 2010 (BAH 2006k, p. 5).

Inquiry participants' comments on how to manage congestion related to port freight focussed mainly on measures aimed at:

- improving the efficiency of road freight into and out of the port and the immediate area
- increasing the efficiency of rail freight into and out of the port
- facilitating the development of 'inland ports' or intermodal hubs.

Each of these is discussed below (some comparable issues arise with respect to freight access at Geelong Port).

8.3.1 Improving the efficiency of road freight movements

The Port of Melbourne Corporation acknowledged that the projects aimed at improving and upgrading Melbourne's road network would do much to address current and future congestion. Nonetheless, it considered that the main congestion challenges facing the port occur on arterial roads linking the port with suburban areas, country Victoria and interstate highways. It noted areas of greatest concern were:

- Arterial routes to western suburbs (west from Footscray and Dynon Roads)
- Westgate Bridge
- CityLink Bolte Bridge at Westgate Freeway intersection

[5] TEU = Twenty foot Equivalent Unit. This is an internationally recognised measure of shipping container volumes. One 40ft container is equal to two TEUs.

- CityLink southern link and Monash Freeway to south eastern suburbs
- CityLink northern link and Western Ring Road to northern suburbs and Hume and Newell corridors. (sub. 53, p. 8)

The City of Maribyrnong considered that additional infrastructure was needed to address current and future congestion from port-related road freight movements:

> Many trucks accessing the Port use Footscray Road and Dynon Road to travel through the residential suburbs of Footscray and Yarraville to access the major arterials such as West Gate Freeway, Geelong Road, Ballarat Road and Western Ring Road. Much of this port related truck traffic is choosing to travel along these streets to avoid the congestion and other constraints on the freeway network. Improved freeway access to the port or dedicated truck access is needed to cater for the expected truck traffic growth. (sub. 39, p. 5)

The view that existing infrastructure is inadequate to deal with future freight traffic (generated by the Port of Melbourne in particular) was also held by the Western Transport Alliance.[6] It noted that traffic flows across the West Gate Bridge—of which 12–13 per cent are commercial vehicles—are at or close to the traffic capacity of the bridge, and as a consequence there is a need to increase road capacity across the Maribyrnong River (sub. 40, pp. 3 and 8). G21 (the Geelong Region Alliance) also considered congestion associated with accessing the West Gate Bridge seriously impedes the movement of freight to and from Melbourne and Geelong, and specifically to the port areas (sub. 85, p. 5).

CRT Group Pty Ltd noted that addressing congestion generated by the size of the Port of Melbourne freight task requires an improvement in the use of both road and rail. With respect to road, it pointed to the scope for significant reductions in the number of truck movements possible from a better capacity utilisation of trucks (a demand management approach). The scope for improvements in this regard were highlighted by the Port of Melbourne container origin destination study, which found that about 36 per cent of trucks observed were not carrying any containers at all and the average TEUs carried was estimated to be 1.07 TEUs/vehicle against a vehicle TEU capacity of 2.12. This equates to a container vehicle utilisation rate of just less than 51 per cent (sub. 36, p. 6). As the City of Maribyrnong noted, 'If utilisation could be increased to 2 TEU/vehicle it would have a significant impact on future truck traffic growth' (sub. 39, p. 4). The Port of Melbourne Corporation's latest truck utilisation survey (November 2005) indicates that 'there are still significant opportunities for efficiency gains in reducing the incidence of empty and partially loaded truck movements to and from the port' (sub. 53, p. 11).

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[6] The Western Transport Alliance is comprised of the western metropolitan councils, Melbourne City Council, businesses in the west, transport companies, Transport Workers Union and peak transport bodies (sub. 40, p. 2).

P&O Ports Limited noted it already has a booking scheme which aims to reduce truck waiting times and queuing (which add to road congestion):

> … about 10 years ago we introduced a vehicle booking system in Melbourne. The use of a VBS [vehicle booking system] is recognised as the best way to deal with a difficult issue and to avoid random entry peaks and resultant queuing. A random queue is simply unworkable at today's volumes, traffic congestion would be unacceptable to local communities and the carriers themselves would face higher costs resulting from the uncertainty and delay. In 2006, outside of the peak season and with CMR [Customs' new Cargo Management Re-engineering project] bedded in, we intend to switch to the 1-Stop VBS [vehicle booking system] which provides a common platform for accessing each of the stevedores' systems with the aim of simplifying the booking process for carriers. (sub. 41, p. 4)

P&O Ports Limited indicated that such a vehicle booking system could be used to favour carriers which deliver higher truck utilisation. At present, all of its terminals offer equitable access rights to all carriers, however:

> … ultimately we believe that some form of restriction of access to the Port to a lesser number of carriers or groups of carriers which meet Port Community agreed operational and efficiency targets may be the best means of optimising the overall outcome [including reduced congestion] for the broader community. (sub. 41, p. 4)

Demand management measures—under Smart Freight for example (box 8.2)—are in place to improve the efficiency of container truck movements at the Port of Melbourne (reducing truck movements and associated congestion in the process). These have had some success. In discussions with VicRoads, for example, the Commission was told that the Smart Freight projects are improving efficiencies in container movement at the Port of Melbourne.

The Smart Freight initiative augments stevedoring companies' container booking system. However, despite some success, considerable unused container truck capacity remains. On this matter, P&O Ports Limited noted:

> Despite some improvement over the years, the port-road interface remains disappointingly inefficient. Backloading of trucks is only about 10 per cent and the TEU to truck ratio is 1.3, resulting in far more truck trips through the community than are necessary. (sub. 41, p. 3)

Box 8.2 **Smart Freight**

Smart Freight is a Victorian Government initiative seeking to enhance efficient container freight movement and reduce congestion at the Port of Melbourne (PoM) by working with industry to trial and implement ICT [Information and Communication Technology] based solutions. The benefits of this initiative include helping to:

- manage expected increases in PoM container movements over the next 5–10 years
- improve PoM container movements via better information management
- better utilise public infrastructure such as roads, railways and shipping channels
- protect critical PoM infrastructure and maintain appropriate security measures
- provide better governance via open standards and support of regulatory bodies
- improve Victoria's economy and reduce transport congestion.

A Smart Freight Steering Committee of industry and government representatives is currently guiding three ICT projects and one industry awareness project:

(1) **Real Time Travel Information for Fleet Operators and Truck Drivers—** such as travel, queuing and delay information to enable better fleet utilisation and reduce congestion. VicRoads and DOI (in conjunction with the Victorian Transport Association) are currently identifying user requirements, technology options and costs/benefits before short-listing a number of options.

(2) **Container Management Tools—**using IT to share information about the booking, transfer and location of containers—particularly for empty container parks where documentation can be unreliable. This measure will improve efficiency and help reduce truck usage.

(3) **Potential Trade Community Systems for PoM Supply Chains—**seeking to provide, via the Internet, import/export information and a common place to do business (a single window platform). While current ICT trade systems in the PoM supply chain are used mainly by large participants, interface development and subscription costs make it less viable for smaller businesses—who continue to communicate via telephone, fax and courier.

A 'single window' is not intended to replace or compete with the private sector and existing service providers, but rather as a market enabler by rationalising technology directions within the industry and enabling more cost effective e-commerce.

(4) **Industry Awareness and Education using the PoM Supply Chain Map and Model—**describing the individual business interactions required in the import/export supply chain—thereby facilitating problem identification and application of IT solutions. The Model—currently being distributed to industry and educational institutions—offers a unique multi-dimensional view of the PoM supply chain. This Model is a first for Australia.

Source: DOI, pers. comm., 15 March 2006.

Raptour Systems Pty Ltd (sub. 21) suggested that a more interventionist approach by governments was needed to reduce under-utilised container truck movements. It noted that while triangulation might provide marginal efficiency improvements in the transport of containers by road, of more impact would be a rule that only allowed trucks access to the port when a container was being both dropped off and picked up. Unless this was the case, the truck should be required to go to a public logistic terminal and common user rail freight yard (sub. 21, p. 9). It also noted that

> … a port rail shuttle service operating from a PLT [public logistic terminal], adjacent to a rail container yard, with a port rail shuttle, that isn't 1.5 kilometres long, is a new and very powerful port servicing concept. It stops the single trip port movements … (sub. 21, p. 9)[7]

While this form of regulated access to the port could be very effective in improving truck utilisation, it would be relatively insensitive to the individual benefits and costs associated with any particular truck movement. It would also be likely to discriminate most against smaller operators whose ability to obtain matching drop off and pick up business was limited.

Another demand management approach to reduce congestion noted by participants was to extend the hours of work for elements of the supply chain. P&O Ports Limited noted the stevedoring companies at the Port of Melbourne already work on a 24/7 basis, although the majority of carriers still operate from 7am–4pm, Monday to Friday:

> This creates an unnecessary peak burden on road infrastructure. This mismatch in operating hours often of course originates at the warehouse/depot of the importer or exporter. Typically, our terminals provide access to over 200 carriers, each often seeking access at the same time. In our view, this fragmented nature of the transport industry is an impediment to improving efficiencies in the interface and comes at a cost of greater environmental impact and pressure on existing road infrastructure. (sub. 41, p. 4)

Extending the hours of work of supporting agencies (e.g. Customs, AQIS), land-side carriers, container parks and other major supply nodes (such as warehouses) would have the effect of spreading the freight flow more evenly over each day or through the week. Doing so would lessen freight traffic flows onto the road network during peak periods. As the Victorian Freight and Logistics Council (VFLC) noted:

> Policies and strategies that encourage the uptake of evening and night bookings at freight nodes for deliveries and pick ups will encourage greater temporal utilisation of the road space. The VFLC's Business Activity Harmonisation

[7] This concept is discussed in the following sections.

> (BAHS) Implementation Plan is working towards this aim with support from the Victorian Government. (sub. 89, p. 3)

However, the City of Maribyrnong noted that existing truck movements already impose a significant amenity cost to residents along truck routes (sub. 39, p. 5), and extending working hours could exacerbate that cost.

8.3.2 Increasing the efficiency of rail into and out of the port

The Victorian Government has a performance target to increase the share of freight tonnage transported to and from Victoria's commercial ports by rail to 30 per cent by 2010 (Government of Victoria 2004a, p. 68). For the Port of Melbourne this share is currently about 17 per cent. An increased use of rail at major port facilities would reduce congestion and community anxiety about an increasing number of trucks in urban areas (VFLC 2004, p. 77). As the Municipal Association of Victoria noted:

> … the Port of Melbourne has been identified as the most critical transport hub and transfer point between Victoria's freight network and the global transport system. Measures are needed to standardise and upgrade the rail links to the Port of Melbourne to maximise access, ease traffic congestion in nearby suburbs and reduce burden on road infrastructure. (sub. 30, p. 8)

The Port of Melbourne Corporation (PoMC) noted that the rail system servicing the port has historically laboured under major capacity deficiencies—which inhibited rail freight growth and, correspondingly, increased the share of freight carried by road. However, it noted that significant investments in rail facilities within and adjacent to the port have been instituted in recent years, which have particularly enhanced the port's capacity and efficiency in moving containers by rail:

> These developments have significantly increased the capacity for containers to be handled at on-dock rail terminals, eliminating costs of around $50 per TEU for road movements between the port and Dynon rail terminals. (sub. 53, p. 8)

Moreover, the PoMC also noted that significant further improvements are committed (such as the Dynon port rail link project and the Dynon–Tottenham upgrade), and planning for the future (via Melbourne Port@L for example) is in hand (PoMC, sub. 53, p. 3). These committed and planned investments in capacity expansion and the removal of bottlenecks will do much to fix many of the former capacity constraints. Many submissions expressed the view that these projects, when completed, would support an increase in the absolute and relative share of freight carried by rail.

But although measures are in place to address deficiencies in physical access to the Port of Melbourne, participants have expressed concern about their timing. CRT Group Pty Ltd, for example, noted that the Tottenham Loop upgrade is

due to be finished by mid-2007, while the Footscray Road grade separation is planned for completion in 2010, clearly some years away (sub. 36, p. 8). It is evident that the later completion of these major capital works will constrain the ability of the rail network to shoulder a larger share of the port freight task.

The Commission invites comment prior to the final report on whether it is a realistic option to accelerate the timetable for the Footscray Road grade separation project.

Given the current rail share of container traffic (table 8.3), the PoMC considered that the greatest opportunities to increase rail's share are in shorter distance movements—to outer metropolitan and near country areas (sub. 53, p. 9).[8] However, it also noted rail freight terminal facilities in these areas are limited (sub. 53, p. 9) and, by implication, any significant improvement in rail's share of traffic to these areas would require that shortcoming to be rectified.

Table 8.3 **Rail share by container journey length/type 2002**

Journey type and length	*Import containers*	*Export containers*	*All containers*
	%	%	%
Metropolitan	1	1	1
Victorian country < 250km	8	82	53
Victorian country > 250km	24	97	95
Interstate	84	92	90

Source: Melbourne port container origin destination study (PoMC, sub. 53, p. 9).

Despite the initiatives noted above, the PoMC considered that significant opportunities still remain for improving the rail systems' capacity and links with the port (sub. 53, p. 9). Its perceptions of the measures aimed at improving the efficiency of freight movement into and out of the Port of Melbourne, and what remains to be done, is shown in table 8.4.

[8] This issue is discussed in the following section on facilitating the development of inland ports.

Table 8.4 **What is being done and further opportunities**

Location	*Significance to the port*	*Current projects*	*Further opportunities*
Connection to Swanson Dock	High	Dynon Port Rail Link project will improve situation	Further on-dock terminal devt. W track to improve links to Dynon and North Dynon terminals Duplication of Sims St-port rail links
Re-connection of rail to Webb Dock	High	Preservation of easements and assessment of connection routes	Reinstatement of rail link at an appropriate time in the future
Inner Melbourne rail network	High	Investigation of opportunities at Dynon Precinct Dynon-Tottenham upgrade	Major opportunities on nearly every corridor to increase capacity
Outer urban intermodal terminals	High	Distribution hubs at Somerton CRT Westgate Ports	Devt at Dandenong Further devt at Altona-Laverton North and at Somerton-Craigieburn
Intrastate rail network	Medium	Various track upgrade projects for rural fast rail and reintroduction of country passenger services	Many upgrade opportunities exist, but of lower priority from PoMC perspective All new infrastructure to be able to cope with double stacking
Interstate rail network	Medium	Various Australian Rail Track Corporation (ARTC) track upgrade projects underway, some AusLink funded	Many upgrade opportunities exist, but of lower priority from PoMC perspective
Intrastate rail network	Medium		Connection to Victoria Dock
Intrastate rail and strategic opportunities for interstate	Medium		Connection to West Maribyrnong

Source: PoMC, sub. 53, p. 10.

8.3.3 Facilitating the development of 'inland ports'

The role of inland ports is to receive, consolidate and distribute (by road) containers carried by rail to and from a port—in this case, the Port of Melbourne (Westgate Ports Pty Ltd, sub. 25, p. 5).

The PoMC (sub. 53, pp. 4, 19) and VicRoads (2003, p. 23) noted that the development of inland ports offers significant potential to reduce the impact of road freight congestion—particularly container freight—associated with the Port of Melbourne. A recent review of changes needed to facilitate expanded operations at the Port of Botany similarly identified the value of inland ports for handling the container freight task associated with port trade and for avoiding potential road congestion problems (FIAB 2005).

On this matter, Westgate Ports Pty Ltd noted:

> Inland Ports are the freight equivalent of the 'Park and Ride' systems successfully used in cities around the world to reduce road congestion caused by passenger vehicles. (sub. 25, p. 19)

Using the container truck utilisation rates identified in section 8.3.1 (an average of 1.07 TEUs/vehicle), every additional 1070 TEUs railed to or from an inland port would suggest a reduction in 1000 truck movements into or out of the congested port precinct.

Westgate Ports Pty Ltd indicated there was ample scope to increase the share of container freight handled by rail through a greater use of inland ports. It referred to a 2002 study of the origin and destination of containers handled through the port to highlight their potential (sub. 25, p. 11). That study noted that 68 per cent of container destinations are in outer industrial suburbs. Current inland ports at Altona (servicing Altona and Laverton), Somerton (servicing Somerton and Broadmeadows—box 8.3), and Lyndhurst (servicing Dandenong and the south-east) are ideally located to help reduce road traffic congestion in the port environs and adjoining arterial/major roads. Westgate Ports Pty Ltd noted that 36 per cent of export containers moving through the port originate in these outer industrial suburbs and export and import containers from these areas account for 53 per cent of all TEU movements through the port (sub. 25, p. 11). CRT Group Pty Ltd also highlighted the importance of targeting container traffic whose origin or destination was in metropolitan Melbourne:

> … the current rail share of 17 per cent has been achieved to date primarily from interstate and rural traffic—to get to 30 per cent we have to make up the difference from metropolitan freight. (sub. 36, p. 5)

Box 8.3 **Somerton intermodal terminal**

The Somerton intermodal terminal and business park is situated 20 kilometres north of the Port of Melbourne/Dynon Road, and adjacent to the Hume Highway and the main freight rail line between Sydney and Melbourne. It is operated by Austrak Pty Ltd—a group formed in 1998 by private investors seeking to make intermodal rail terminals an integral part of the main supply chain on Australia's eastern seaboard. Somerton is the Melbourne/Victorian component of this strategy. The company is also developing or planning multi-modal freight facilities in Sydney, Adelaide, Brisbane and Perth.

The project, which is a joint venture between Austrak and the General Property Trust (GPT), covers a 120 hectare site which includes:

- a 20 hectare rail terminal (operated by P&O) capable of handling both standard and broad gauge operations
- rail platforms capable of serving trains up to 1.5 kilometres long (by splitting the train in two—and loading/offloading on two platforms)
- a 600 000 TEU capacity container park (also operated by P&O) This may be compared with P&O's 2004 throughput of 723 708 TEU at its West Swanson Terminal at the Port of Melbourne
- a warehouse cluster which has attracted major companies such as Coles Supermarkets and Visy.

Due for completion in 2008, Somerton is a major freight hub and forms part of Victoria's strategy to become Australia's main international trade gateway.

Its strategic location is further enhanced by its proximity to a new suburban passenger rail station at Roxburgh Park (less than 1 km); the proposed new wholesale fruit and vegetable market at Epping (2 km); and Melbourne Airport (12 km via the new Craigieburn Bypass/Hume Highway and the Western Ring Road).

P&O began operating the 20 hectare rail terminal in July 2005 under a 30 year lease—running trains to and from its operations at the Port of Melbourne. In taking on the lease, P&O stated that the key to rail's growth is (i) diverting freight from metropolitan roads dense with passenger vehicle traffic, and (ii) providing a point for interstate and country road freight vehicles to drop off their loads without losing time by having to drive to and from the Port of Melbourne.

Despite P&O's lease, Austrak and GPT continue the management of the whole estate. Austrak have been strong advocates of competition in the rail sector, and to this end, Somerton is a 'common user and common access' operation.

Somerton is a good example of an intermodal facility which is well connected to rail and major arterial roads, and where container freight can be consolidated, stored and transported to customers' facilities or to a port (in this instance the Port of Melbourne). Because land around ports is limited, intermodal terminals in outer metropolitan Melbourne and regional Victoria can play an important role in facilitating the efficient movement and storage of containers burden on the ports and neighbouring areas.

(continued next page)

Box 8.3 **Somerton intermodal terminal** (continued)

'As well as receiving and dispatching freight, the Somerton terminal contains both empty and full container storage parks and a clustering of major national and regional distribution centres. This attracts additional businesses and eliminates unnecessary truck trips,' said Bill Green, the General Manager of Austrak. 'Using the intermodal terminal means real savings for businesses in terms of road congestion and energy consumption,' he added.

Sources: Austrak Pty Ltd, pers. comm., 27 January 2006; NACC 2005; DOI 2005a, p 53; Hopkins 2005.

Despite measures (noted above) to improve the efficiency of rail transport servicing the port, the potential of inland ports is not being realised (sub. 25, p. 6). Inquiry participants highlighted three main impediments which need to be resolved if this potential is to be achieved:

(1) lack of track access as a result of inadequate capacity and poor configuration and (related) restrictions applying to freight train scheduling windows
(2) the operation of the rail access regime
(3) the road/rail cost differential over short distances.

On the first of these, Westgate Ports Pty Ltd noted:

> With current restrictions applying to train scheduling windows, the Victoria Dock rail terminal will only have an operational capacity of 99 840 TEU on its opening in 2007/08. The facility will operate Monday to Saturday for one daytime shift and will despatch one train per day. This is less than 20 per cent of its full capacity. (sub. 25, p. 6)
>
> The potential of the inland ports can only be fully realised if there is unrestricted track access for trains servicing these facilities. (sub. 25, p. 21)

CRT Group expressed a similar view. It noted that inadequate track capacity and poor track configuration means:

- it takes an hour to get to the port from Altona North (22kms)
- the port shuttle has to wait to get a clear run to the port as it can't park on the way
- if the shuttle is to deliver to both stevedores it has to add two hours to the trip as to do so requires the shuttle to return to the Tottenham Loop, move the loco from one end to the other and go back to the port (sub. 36, p. 8).

This same general point was noted by the VFLC in a recent report, where it noted that the mixing of freight and passenger services resulted in limited train paths. Passenger trains take precedence, and freight is consigned to off peak operations which make it difficult to deliver customer requirements (VFLC 2005, p. 46). However, many of the measures outlined in the *Metropolitan transport plan*

noted above are addressing these capacity impediments and, to that extent, should assist the development of inland ports.

With regard to the second impediment, track access (and the terms and conditions under which any access is negotiated) is regulated under the rail access regime specified in the *Rail Corporations Act 1996* (Vic.). This regime has, in the past, proved problematic in facilitating rail access and the development of inland ports. For example, a submission from Rail ReZolve Pty Ltd to DOI in response to its options paper on the (then) access regime noted:

> The Victorian Government announced in April 2001 that its 'open access' regime would be implemented from July 2001. Thirty-eight months later, not one train service has run on the 'open access' network managed by Freight Australia. Freight Australia has, it seems, had the ability and the commercial incentive to discriminate against access seekers. (Rail ReZolve Pty Ltd 2004, p. 7)

Rail ReZolve Pty Ltd also noted 'There is sufficient evidence on the public record that the current access provider has a hostile attitude to the implementation of an "open" access regime (Rail ReZolve Pty Ltd 2004, p. 6).

Some participants considered the access regime does not provide an environment favourable to maximising the use of rail track and thus to the development of intermodal hubs:

> Although the Government announced 'open access' to the network in April 2001, the track manager of the day took a hostile attitude to government and used its position to ensure third parties were denied access. … Effectively, the network has remained 'closed' and limited to a single service provider. In this environment, third parties have deferred intermodal capital development funding until it becomes plain that investment plans will not be thwarted and can be rolled out with confidence. (Westgate Ports Pty Ltd, pers. comm., 7 March 2006)

As the VFLC noted in its recent Freight Forward report, rail access—both physical and commercial—is vital for intermodal terminal facilities (2005, p. 49). The situation described above suggests change was required to achieve a genuinely open and workable access regime.

A new access regime, authorised under the *Rail Corporation (Amendment) Act 2005* (Vic.), came into operation on 1 January 2006. Accordingly, it is premature for the Commission to form a judgement on how successful the amended regime might be in addressing participants' concerns and in facilitating the development of inland ports. However, given the critical role of rail access to the operation of inland ports, it is important that the new regime is closely monitored, with a view to quickly addressing any shortcomings it may still retain. The Essential Services Commission, which is the Government's independent regulator with

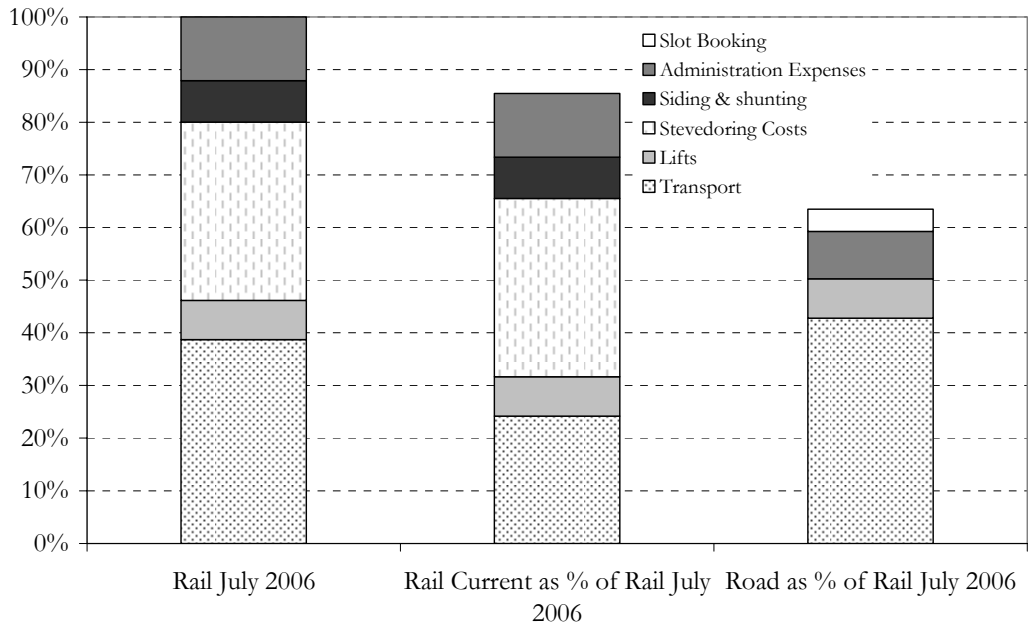
responsibility in this area, could be asked to advise the Government on whether this is still a matter of concern after, say, 12 months.

The third and most fundamental impediment highlighted by participants is the cost of moving freight by rail compared to road over short distances—distances typical of those between the port and inland ports. On this matter, Westgate Ports Pty Ltd noted:

> … depending on the road vehicle used (standard or B-Double) and the type of rail wagon used (14.5 metres or 21 metres) the additional cost of rail over road in the 11–15 kilometre zone (Altona) for a TEU ranges from $51.13 to $60.38 and in the 36–40 kilometre zone (Lyndhurst) ranges from $50.88 to $112.87. One reason for the cost differential is that road must be used at the start and end of each rail journey. However, in general, current pricing understates the amenity, environmental and congestion cost of moving freight by road compared to rail. Westgate has made no allowance for the road cost savings of picking up or delivering a container in the general precinct of its destination or consignment. This saving should be offset against the rail cost. (sub. 25, p. 7)

This cost differential is significant because the transport of containers is highly contestable between road and rail (Meyrick and Associates 2006, p. 9), that is, the demand for rail is highly responsive to changes in the road/rail freight differentials.

Figure 8.2 **Road and rail freight rates between CRT terminal and Port of Melbourne**



Source: CRT Group Pty Ltd, sub. 36, p. 7.

CRT Group Pty Ltd also noted that current market forces/price structures lead to container transport by rail being unviable over short distances (figure 8.2), a situation inimical to developing inland ports and reaching the State's 30 per cent rail freight target (sub. 36, p. 3). It noted that as a consequence of not being able to compete with rates charged by the road freight industry, its port shuttle service has not been able to run at full capacity and operates at a loss (sub. 36, p. 6). As a result the service is likely to be withdrawn.

CRT Group Pty Ltd noted that at December 2005, road freight rates were 26 per cent cheaper than its port shuttle rate, which included no margin for profit. Moreover, rail line-haul increases scheduled to come into effect on 1 January 2006 and on 1 July 2006 (30 per cent increases) will mean road freight rates will be 40 per cent cheaper (sub. 36, p. 7). Aside from the significant impact of stevedore fees, CRT noted that rail freight has to pay rail access fees on each trip versus annual truck registration by road freight, and that rail access fees are constant regardless of train length. This has meant that CRT's 40 TEU 'Cargo Sprinter' is charged at the same rate as trains with 60 TEU capacity (sub. 36, p. 7). Other inquiry participants noted these anomalous charging arrangements, with Raptour Systems Pty Ltd noting:

> Current rail access pricing in some areas is of concern. The ARTC seems to price all trains as if they are a big long train and this has in some cases discouraged the cargo sprinter concept. It has been argued by this author that the access and t/km charges are not well balanced for differing types of train combinations. (sub. 21, p. 10)

The first two impediments to the development of inland ports noted above are important contributors to the cost differential between road and rail noted in figure 8.2 and highlighted by CRT Group Pty Ltd. However, unless this cost differential is addressed, rail is unlikely to increase materially its share of the short haul transport of containers.

Westgate Ports Pty Ltd considered addressing this relative pricing of road and rail was an area requiring government intervention:

> Road pricing is a necessary element of policies to manage travel demand and traffic congestion and encourage a shift to rail. Whatever is done about pricing generally, such as wider application of tolls or congestion charges, specific incentives which encourage the use of rail—'carrots'—and discourage road use to and from the port—'sticks'—should be introduced. (sub. 25, p. 8)

It suggested that the 'carrot' would be to subsidise each TEU and tonne of non-containerised cargo that moved into and out of the port by rail. The 'stick' would be to introduce a congestion tax or charge on all truck movements into and out of the port (sub. 25, p. 17). CRT Group Pty Ltd reached a similar conclusion:

> If the existing high rail costs are not able to be reviewed/reduced sufficiently to allow rail to compete on a level playing field with road based transport (the latter has not been held to account for the true cost of infrastructure to the same extent as rail), the only available solutions are a freight rail subsidy, freight road levy, or a regulatory decision to transfer some port related freight via intermodal freight terminals. (sub. 36, p. 8)

The PoMC similarly noted that rail's lack of competitiveness with road could be addressed with measures that focus on:

> … making rail services more attractive, or road alternatives less attractive. In the former category are assistance with terminal land, developments etc; and in the latter congestion charges, higher charges for road movements to port etc. (sub. 53, p. 19)

These views echo earlier findings of the IPC:

> For freight services the road/rail imbalance has to be addressed. Road and rail are not competing on a level playing field because road transport does not bear its full economic and environmental costs, nor are road and rail investment assessed on the same basis. (IPC 2002b, Chapter 7, pp. 2–3)

With regard to a possible levy on road freight, both Westgate Ports Pty Ltd and CRT Group Pty Ltd suggested the Commission should consider a similar measure to that recommended by the New South Wales Freight Infrastructure Advisory Board. In its report *Railing Port Botany's containers—proposals to ease pressure on Sydney's roads*, the board recommended a charge per TEU on all import and export containers, with the charge fully rebated for containers carried to and from the port by rail and carried by road during designated off-peak times (box 8.4). The VFLC has also noted that increasing rail's share of port freight is unlikely without timely investment in rail infrastructure, and addressing the current gap between road and rail costs for short haul freight (2005, p. 57).

A similar measure could be considered for the Port of Melbourne, although the level of any such charge would be influenced by the scale of the freight task to be shifted from road to rail, and the scale of any associated expenditure on works it would be expected to finance. That in turn would be affected by a number of other factors—such as the impact of measures to improve truck utilisation or of capacity improvements to the rail network servicing the port—that influence the efficiency of the supply chain, and the choice between road and rail as a means of transporting containers through the Port of Melbourne.

Box 8.4 New South Wales container levy proposal

The New South Wales Government recently embarked on a major expansion of Port Botany to allow for a tripling of its capacity to handle container trade (Sartor 2005). To support the efficient working of an expanded port, the New South Wales Government is examining means of increasing rail's share of freight throughput at Port Botany. Rail's share is about 19.5 per cent and is in decline, and the Government wants to increase it to 40 per cent by 2011 (FIAB 2005, p. 8). That objective is broadly akin to the Victorian Government's target of 30 per cent of the freight handled by commercial ports being moved by rail by 2010.

The Freight Infrastructure Advisory Board, as one element of its recent review, recommended a freight infrastructure charge (a charge on containers moved by road to and from Port Botany in peak periods). The charge would operate in a similar manner to the PierPass system implemented at the ports of Los Angeles and Long Beach in California in the United States. The proceeds of the charge would be applied to finance specific capital requirements and other expenditures necessary to help achieve the 40 per cent rail share target (FIAB 2005, pp. 33–34).

The PierPass system aims to provide cost incentives to remove trucks from the road during peak periods and to reduce congestion and pollution. Under the PierPass system, all road cargo entering or exiting the ports will be subject to a Traffic Mitigation Fee. The fee is set at $US40 per loaded TEU and $US80 for larger containers, and returned to terminal operators to offset the extra costs for off peak stevedoring services. The fee is rebated on road cargo which moves through the terminal gates in off peak periods. PierPass represents an innovative solution in changing behaviour in the logistics chain—in this case, breaking down the concentrated periods in which cargo is transferred through the ports.

However, Sydney has the advantage of the rail network servicing the port and the metropolitan area being operated by Rail Corporation, which operates an open access common user network. This situation does not apply in Victoria.

Source: FIAB 2005, *Railing Port Botany's containers—proposals to ease pressure on Sydney's roads*, (the Brereton Report), July.

The suggestion by some participants for a subsidy to influence the choice between road and rail carriage of freight has precedence in the United Kingdom. There, the government intervenes in the transport market via a grant which helps offset the track access charges levied on rail freight operators for use of the rail network. It is effectively an operating subsidy paid to rail freight operators in return for the generation of environmental benefits by a switch of freight traffic from road to rail (MDST undated). Another option with the potential to address the road/rail cost differential (at least in part) is pricing the use of key freight pathways, such as the West Gate Bridge (one of the options put forward in chapter 7 for alleviating congestion on the West Gate Bridge).

The success of any measures to induce additional rail transport of port container freight will be subject to the capacity of the rail system to handle any such increase. As noted, the rail infrastructure servicing the port suffers from a number of physical capacity constraints (such as a single track access that crosses Footscray Road and poorly configured marshalling yards that also do not have the capacity to service efficient length freight trains), although many of these are being addressed. In addition, there are lingering concerns about the ability of the access regime to facilitate the greater use of rail by intermodal operators. Addressing these physical and regulatory constraints should be the primary step towards inducing freight onto rail, and any further government intervention to induce freight onto rail could be relatively light-handed at this stage.

Westgate Ports Pty Ltd considered that inland ports could manage up to 60 per cent of containers going through the port (sub. 25, p. 6). However, it considered that unless the impediments it noted are addressed, achieving the government's 30 per cent target would be unlikely.

At a national level, the issue of the appropriate costs that road and rail users should bear has been considered by COAG. The latest COAG meeting agreed to examine the pricing of road and rail use, and directed the Productivity Commission to report on ways to charge rail and road freight users. The Federal Government subsequently announced:

> … that the Productivity Commission will undertake a public inquiry to review economic costs of freight infrastructure and efficient approaches to transport pricing. …the review will determine the full financial and economic costs of providing road and rail infrastructure and identify the optimal methods and timeframes for introducing efficient road and rail freight infrastructure pricing. This will inform the Government and help to implement efficient pricing of road and rail freight infrastructure through consistent and competitively neutral pricing regimes. (Costello 2006)

These developments advance, on a national basis, the prospect of addressing the rail/road cost differential noted by inquiry participants through, for example, higher registration costs for heavy vehicles or added road use charges. However, any introduction of such higher charges for road transport is likely to be some years away.

8.4 International policy approaches

The Commission engaged Booz Allen Hamilton to review international approaches to address urban congestion. Their review highlighted a number of emerging freight related themes, including:

- the generally greater efficiency, success and sustainability of market-based interventions such as pricing of access, parking and pollution over less market-based solutions including government-funded distribution centres and load consolidation schemes
- the different nature and regulatory needs of the transit freight versus the distribution, waste and service markets—segregation of route is typically the most effective strategy for the former, segregation of time for the latter
- the importance of distributional equity, by not inadvertently or unfairly reducing the competitive position of businesses located within a congested area—this has been a major issue for congestion reduction schemes in London and Dublin (a point highlighted by VECCI, sub. 84, pp. 2–3)
- the need for clarity and simplicity of regulation, particularly in terms of time of day and type of vehicle, so that logistics companies can effectively plan the access requirements of their fleets (BAH 2006k, p. 10).

The key measures identified by the review as being used to decrease congestion (either in place or emerging as increasingly relevant) included:

- loading/parking regulation
- access regulation (routes, areas and times)
- planning and zoning policies
- vehicle capacities and standards
- provision of alternative transport modes and associated development of intermodal logistics centres—primarily in outer-urban areas of major cities
- information technology
- various adaptations of road pricing.

Regulation of loading and parking has tended to concentrate on 'window', time-limited or permit-based loading and unloading. There are often tensions between economic efficiency issues related with time limited regulation of loading and parking and the social/nuisance aspects (BAH 2006k, p. 17).

With regard to the regulation of access, the major strategies for transit freight traffic have been its restriction from central or congested urban areas (often on environmental rather than congestion grounds), separate route provision (in the form of by-passes, ring-roads or toll-roads), and the restriction of transit traffic to particular routes through an urban area—e.g. designated truck routes in the Netherlands—giving the greatest possible homogeneity of flow on each route

(BAH 2006k, p. 14). Regulation of terminating traffic has mostly been aimed at consolidating traffic into fewer—but lighter—vehicles entering and exiting central business districts (BAH 2006k, p. 14).

There are a number of examples across Europe of regulation of city access with a view to consolidating flows, and, potentially, freight loads, entering urban areas. A common issue is the tension between restricting the 'nuisance' of loading and unloading during night hours with the need for clear and consistent rules on access, and effective separation between freight and passenger flows. When this tension is resolved in favour of residents and passengers it can have the perverse effect of requiring more freight movements (BAH 2006k, p. 17).

In addition to rules to restrict traffic by time of day, public authorities have also intervened to encourage segregation of flows, by making it easier to receive goods and dispatch waste out of hours. An example is the use of night safe deposit boxes outside shops, which have been supported by the municipal authorities in Louvain-La-Neuve, Belgium, and a wide range of local rules to speed up waste collection (BAH 2006k, p. 19).

There has been extensive consideration of the more widespread use of alternative modes (rail and water) for city logistics. A differentiation is made here between movements of bulk or containerised freight from intermodal terminals (marshalling yards, container parks etc) on city fringes, and the onward distribution by road, including the use of alternative modes for the 'final mile' within the city. The former pattern is seen in most major European cities where, in a number of cases, rail marshalling yards and container terminals are given the status of 'inland ports' (BAH 2006k, p. 12).

Planning and zoning policy can vary from the relatively limited intervention to provide off-street loading/unloading or to induce greater stockholding/fewer deliveries, to more substantial intervention such as the positive zoning of, or Government support of, distribution centres. In general, the observation from European examples is that distribution centres tend to fail if they are not market-based and ultimately commercial entities (BAH 2006k, p. 18).

In the USA, the prevailing view is that the market will determine optimal outcomes in the freight transport/logistics sector. Accordingly, planning for urban freight movement has generally received relatively little attention. However, the issue of urban freight traffic and its role in congestion is becoming increasingly recognised as an area requiring increased planning and policy focus, particularly in the larger cities (BAH 2006k, p. 21).

The greater use of information technology has been suggested as a means by which freight logistics firms can reduce freight traffic on congested roads. There are projects designed to give logistics companies, and their clients, better information on congestion to enable them to optimise their choices of when and

where to move goods. One example is the Transport for London 'CapitalCams' website, which allows drivers to check traffic levels along their intended route before setting out (BAH 2006k, p. 16).

The review noted two major European road pricing systems: the German truck toll system, a satellite-based system which calculates tolls, for trucks only, on the basis of distance operated on a given network; and the London congestion charge, which applies a flat rate charge to all vehicles (not just goods vehicles) when entering the charge area in the main part of the day. The UK had intended to introduce a national charging scheme for trucks in 2008, with particular emphasis on recouping from foreign hauliers a contribution to UK road network costs. However, this proposal has been deferred.

Many of these initiatives are in one form or another already being implemented in Victoria and, given the growth in urban freight activity expected over the next decade or so, need to be built on. This could include:

- additional road network capacity and consideration of 'heavy truck' corridors, particularly in the off-peak periods on parts of the network
- enhancements to road network performance via ICT initiatives and other measures (such as some of those being explored under the Smart Freight activities and those in place by VicRoads such as 'Alternative Route' and 'Travel Time' signage and real time information)
- increased use of restrictions on access by time of day and specific locations
- increased use of very large trucks (e.g. Super B-Doubles) 'after hours' on urban shuttle operations between peri-urban terminals
- increased focus on consolidation of cargoes, in particular the less-than-full-container-load freight required for distribution within the CBD and other built up commercial areas
- greater emphasis on road pricing options.

The Commission would welcome input on these options from freight and logistics operators, major retailers and other interested parties prior to the completion of its final report.

Any impacts on congestion of measures directed specifically at the freight sector are likely to be small on a metropolitan-wide scale, given the small contribution of freight to peak period traffic, although impacts may be significant on particular routes.

It is worth noting that the review identified that the implications of urban freight transport for congestion are not widely known within the community or Government in many countries and cities. This was in contrast to the effort to develop policies for urban passenger transport. In addition, policy measures for urban freight transport are rarely subject to detailed ex-post evaluation and little

reliable and detailed planning data on current activity is readily available in most major cities (BAH 2006k, p. 22).

8.5 Looking to the future

The volume of trade and freight through the Port of Melbourne will grow significantly over the next decades. Measures to improve the efficiency of road freight into and out of the port, the efficiency of rail links with the Port of Melbourne, and the development of inland ports, will help to alleviate road congestion otherwise associated with that growth.

However, removing physical capacity constraints alone is unlikely to be sufficient to achieve a significant increase in the share of port container freight transported by rail. Information provided to the Commission indicated two key areas—the rail access regime and the road/rail cost differential that currently favours road transport for short haul journeys—need to be addressed if a greater rail share (and a commensurate reduction in road freight traffic) is to occur.

Some participants also considered the growing freight task through the Port of Melbourne would, in the longer term, generate an unacceptable level of traffic and associated congestion. The Hobsons Bay City Council, in commenting on the significant increase in traffic volumes experienced in its precinct, noted:

> Major growth of Port of Melbourne and development of inland ports will only compound the problem even if increased freight movement by rail, road freight movement will continually increase as well (to about three times that of rail). (sub. 56, p. 2)

Forecasts of total container trade of between five and eight million TEUs by 2030 suggest that, even with a greater use of inland ports, there is likely to be a need to develop new container handling facilities outside the Port of Melbourne beyond this time frame.

In this regard, it is Victorian Government policy to develop Hastings as a second major port after 2030, as it considers the Port of Hastings to be the preferred site for future container development, once capacity at the Port of Melbourne is reached. Hastings would supplement rather than replace Melbourne. Hastings has the advantage of natural deep water (more than 14 m), large areas of vacant land, and proximity to the south east of Melbourne—the origin and destination of a significant share of international container flows in Victoria.

However, the development of Hastings to handle international containers would require substantial supporting infrastructure expenditure. A recent VFLC report noted that the port has no dedicated freight rail network in the region and no connection of freight rail with interstate networks (VFLC 2005, p. 46). Westgate Ports Pty Ltd considered that a dedicated freight track for the Port of Hastings is

a necessity (sub. 25, p. 7). The VFLC report suggested that a solution to this could be to provide an orbital route to connect to the interstate network north of Melbourne, with a metropolitan shuttle rail via an intermodal hub located at Dandenong (VFLC 2005, p. 47). It noted, too, that if this is to be possible in future, then the land needed to do so will need to be reserved or protected now (VFLC 2005, p. 50).

Appropriate road and rail connectivity is a fundamental requirement if Hastings is to complement the Port of Melbourne in the longer term, and if it is successfully to handle a significant volume of container traffic that would otherwise pass through the streets of inner Melbourne. An option to address longer term congestion pressures from container freight traffic is to reserve the necessary land corridors to ensure adequate road and rail network connectivity to the Port of Hastings.

9 Institutional reform

Earlier chapters identified that Victoria faces an emerging congestion issue, that there are a number of options for addressing this issue, and that a combination of approaches is likely to be needed. But whether the most efficient and effective options are adopted and managed to secure reductions in congestion depends on the regulatory and institutional framework for decision making and implementation. Chapter 4 describes the current framework. This chapter suggests improvements to that framework.

Designing good institutional structures and processes for managing transport congestion is complex because it involves:

- all levels of government
- public and private sector agencies
- economic, social and environmental considerations
- balancing multiple transport and other governmental objectives.

Moreover, those responsible for policies need to account for:

- long term social, demographic and business trends, and their impacts on transport choices
- diversity of opinions on the right approach. Local governments, for example, may believe they understand their constituents better than the State Government, while the State Government's perspective may be wider, considering consequences beyond local government boundaries
- inadequate information, especially uncertainty about how people respond to policies—such as the extent to which their transport use would change. Institutional arrangements need to allow approaches to be trialled, monitored and improved
- transport strategies often have long lead times and sunk costs. Mistakes can be costly or constrain future options.

Overall, regulation should achieve the Government's objectives without inappropriately impeding people's ability to solve their own problems and make efficient mode and locational choices, including through market responses. Legislation's objectives should be clear, focusing on outcomes that are consistent with government policy. Policy should be coordinated among agencies. The allocation of agencies' roles is important, as is the institutional frameworks' ability to address market failures, capture the benefits of using market forces (where appropriate) and balance economic, equity and social objectives.

9.1 The approach in this chapter

Significant recent reforms have improved Victoria's institutional arrangements:

- passing the Road Management Act and developing memorandums of understanding (MOU) to clarify the roles, responsibilities and processes for road management decisions
- developing and releasing policies, such as the *Metropolitan transport plan*, to guide agencies on the Government's transport policy objectives (chapter 4)
- establishing processes and bodies, such as those in growth areas, to help coordinate land use and transport decisions more effectively
- renegotiating public transport contracts has put them on a more stable financial footing and increase incentives to improve service quality (DOI 2006d, p. 1).

Despite these improvements, submissions raised issues that, combined with the Commission's observations about the way the institutional framework operates, indicate that further improvements are possible. Section 9.2 discusses the institutional problems identified by participants. They broadly fall into three areas:

(1) the risk of road dominance
(2) inadequate coordination between local and state governments
(3) inadequate coordination among state government agencies, and their contracted service providers.

Section 9.3 sets out reform options, drawing on the Commission's analysis of principles that should guide complex institutional coordination, participants' suggestions and examples of good institutional practice. Section 9.4 summarises institutional reforms that would help ensure that Victoria effectively implements the best approaches for managing congestion, outlined in chapters 5 and 6.

9.2 Issues raised by participants

9.2.1 Risk of road dominance

Transport modes can be substitutes (different ways of reaching a destination) or complements (reaching a destination can involve a combination of modes—park and ride, train and walking). Governments are more likely to choose the best options for managing the transport network if these interdependencies are recognised and the selection process treats all modes neutrally. Some, but not all, participants believe that transport priority setting and funding is distorted in favour of roads (box 9.1).

Box 9.1 **Favouring roads?**

The most frequent concerns were that VicRoads has high status in the decision making processes and favours road projects, and that roads received more favourable funding. It was argued that, combined, these factors generate a bias for road solutions to congestion problems over public transport solutions. The Property Council of Australia argued:

> … the seeming lack of funding, presence and influence of the Public Transport Division within the Department of Infrastructure. Compared to a body such as VicRoads, the Department's ability to drive major new investments in public transport appears limited. (sub. 48, p. 8)

Lawrence Seyers' view was typical of comments about VicRoads' status in decision making:

> … with direct access to the Minister, VicRoads has been able to successfully lobby governments of all persuasions to achieve fundamental 'on ground' road infrastructure improvement. The key for its success has been the direct line of authority to the Minister, without the need to traverse myriad lines of bureaucratic authority.
>
> In direct contrast, public transport advocacy still has to work through various layers of bureaucracy before its voice is heard by the Minister. (sub. 9, p. 4)

Environment Victoria agreed, arguing that transport policy is dominated by VicRoads (sub. 73, p. 7). Other submissions argued that VicRoads is biased towards road based solutions, for example:

> … VicRoads is seen by most as very heavily roads orientated and while some staff near the top are talking integrated approaches this view has not filtered through to regional staff. (Eastern Regional Integrated Transport Group, sub. 24, p. 12)
>
> Most of the practical decisions on transport are devolved to a semi-autonomous agency called VicRoads whose raison d'etre is the construction and maintenance of roads and who has a track record of building to projected traffic levels rather than attempting to manage demand. (Public Transport Users Association, sub. 65, pp. 17–18)

Funding was criticised by others. The Bus Association Victoria suggested that:

> It appears the current funding arrangements are geared more towards roads solutions rather than public transport and/or integrated solutions. (sub. 57, p. 40)

Concerns went beyond the allocation of money among road and public transport options. Some, like Alan Parker, argued that non-motorised transport is also neglected (sub. 18, pp. 14–15). Some felt that funding bias is historic and that deficiencies from neglecting public transport have accumulated over time.

> Failure by the State Government over several decades to undertake effective transport planning and investment for rapid mass transit systems, instead encouraging car use. (Councillor Jackie Fristacky, sub. 58, p. 5)

(continued next page)

Box 9.1 **Favouring roads?** (continued)

Not all participants agree that government policies favour roads over public transport. The Department of Infrastructure (DOI) noted that Melbourne's substantial public transport subsidies demonstrate 'the Government's commitment to encouraging public transport use' (sub. 55, p. 17). The RACV, while stressing complementarity among transport modes, believes there is a substantial backlog of justifiable road projects (particularly in outer Melbourne) and is concerned about relatively low funding from the Victorian Government. It claimed that Victoria's per capita road expenditure is about $100 a year less than Queensland and New South Wales (sub. 59, p. 16). The RACV cited an Allen Consulting Group report commissioned by the Australian Automobile Association, which estimated a $3.8 billion backlog of economically justified road projects in Victoria.

Institutional characteristics can raise the risk that congestion policies are biased towards roads projects if, for example:

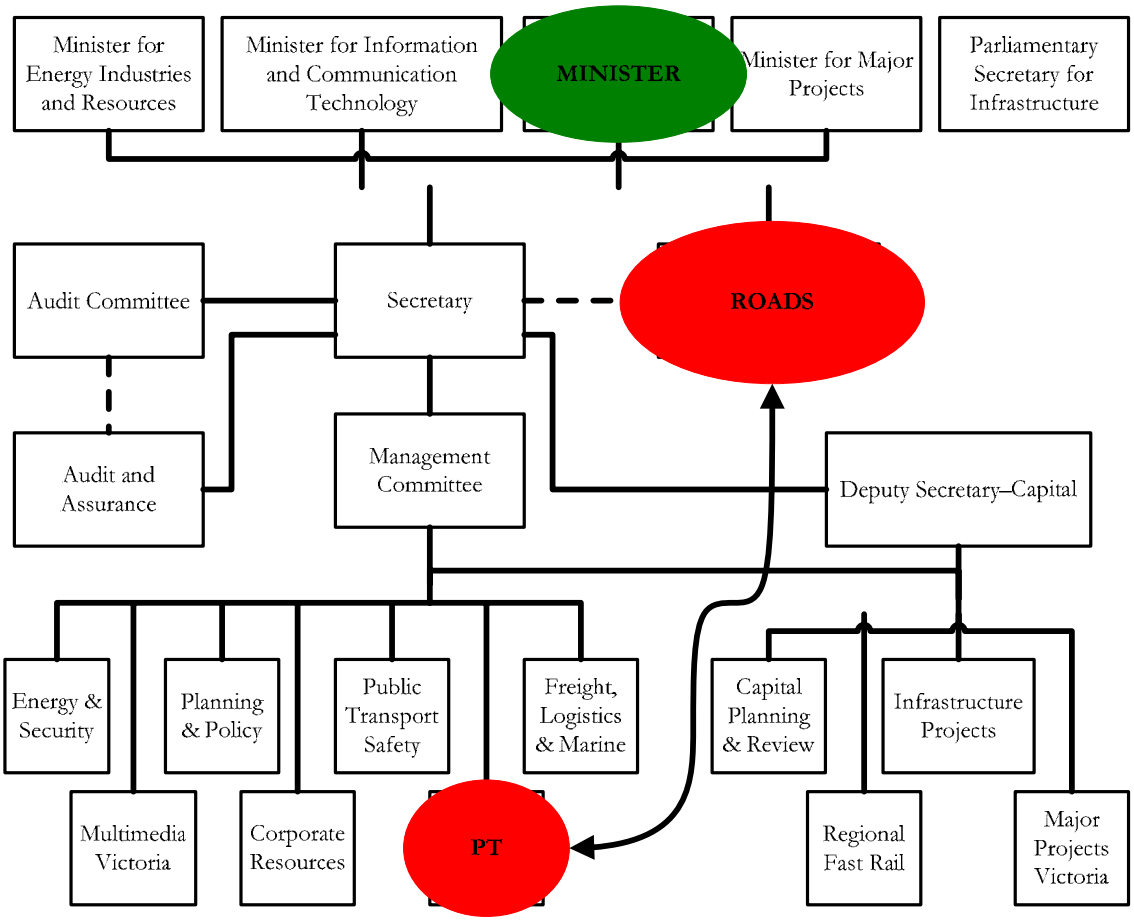
(1) the body responsible for advocating roads projects has more authority in the decision making process than those responsible for public transport and other alternatives
(2) the roads manager is also responsible for developing policy and consciously, or unconsciously, favours projects in its area of interest
(3) funding is more flexible, more accessible or gives greater autonomy to road project managers over project managers for other modes
(4) the project appraisal processes favour road over other modes.

The risks are greater if several of these characteristics occur together.

Organisational structure

VicRoads' position in the organisational hierarchy is clearly different to the Director of Public Transport. The organisational structure, provided by Lawrence Seyers, illustrated this (figure 9.1).

Figure 9.1 **Department of Infrastructure organisational structure, June 2005**



Source: sub. 9, p. 4. as adapted from www.doi.vic.gov.au

Chapter 4 notes that VicRoads reports directly to the Minister, whereas the Director for Public Transport resides within the Department of Infrastructure (DOI) and reports through DOI to the Minister for Transport.

Policy advice

Bodies responsible for policy advice naturally have a significant influence on the direction of transport priorities. Historically, agencies tend to advocate priorities in their areas of expertise—train operators focus on the rail system's needs and road managers recognise potential improvements in the road network. Balance is needed, however, to capture different agencies' expertise without biasing the overall policy position to any particular area of interest.

The RACV was concerned about overlap in DOI and VicRoads' roles, including in transport policy (sub. 59, p. 26). The Public Transport Users Association also

suggested that policy and planning functions should not rest with VicRoads (sub. 65, p. 18).

Under the Transport Act, DOI's high level objects include improving the efficiency and effectiveness of transport facilities and networks to meet the needs of the community (s.4(1)), as discussed in chapter 4. Its functions include developing, improving and coordinating the provision of transport services (s.4(2)). VicRoads has narrower objects. It must make use of available transport resources in ways which are most beneficial to the community and with due regard to the enhancement of the environment and must operate within government policy (Transport Act s.16(3)). It should determine policies and priorities for the construction and maintenance of roads, while having regard for the relevant government policies or objectives (Road Management Act s.38(2)).

It is not clear whether DOI can legitimately exercise its statutory function under the Transport Act to coordinate policies for the whole transport portfolio, including VicRoads. Nor is it clear whether the Road Management Act requires VicRoads to determine its own policies and priorities while having regard to the policies of the Government.

The Commission discussed regulators' roles in developing policy in its report on housing construction. It noted that regulators' input is important to effective policy development but regulators should not be primarily responsible for developing strategic policy. That report argued that the relevant question is not whether regulators should be involved in policy development, but the extent of their involvement and the channels through which their policy advice is provided. That is, should the regulator be allowed to have primary responsibility for policy development or should it contribute to that process through its parent department or another agency?

The relevant questions are the same for service delivery agencies such as VicRoads, though the potential risks and concerns are somewhat different. Service delivery agencies should be consulted on policy development because they understand the industry and how government objectives can be achieved in practice. They also understand the deficiencies, limitations and strengths of the services they manage. But, giving such agencies a primary responsibility for strategic policy can increase the risk that:

- the focus of policies is narrow, concentrating on the interests of the service delivery agency, rather than broader government interests
- there is a greater focus policies on technical aspects of service delivery because of the agency's day-to-day priorities. Consequently, more strategic and innovative solutions, and demand management rather than supply expansion, may be neglected

- accountability is reduced and existing approaches entrenched as a service delivery agency is less likely to question past approaches
- policies may favour the service provider over current and potential competing services.

VicRoads has a Business Operations Division charged with developing policy recommendations and program strategies. Much of this division's work would cover operational issues, such as VicRoads' approach to road management responsibilities. Given DOI's responsibility for overarching policy coordination, it is important that higher level policy options identified by VicRoads are communicated to DOI and incorporated into its policy development processes. There is, however, some risk that this coordination does not occur, given VicRoads' autonomy and lack of clarity in the legislation allocating policy development responsibilities. Coordination relies heavily on effective ongoing consultation between the Minister, VicRoads and DOI.

Funding issues

Of equal importance is the process for approving budgets and allocating funding. Funding processes can affect coordination between modes (discussed later) and the priority given to each mode. Road projects could be favoured over other modes if they are funded independently and are not ranked and evaluated against other modes before they proceed. The current arrangements carry some risks.

First, VicRoads' budget is approved by the Minister, reducing DOI's ability to question whether VicRoads' expenditure is consistent with DOI's function to coordinate transport outcomes. Section 60 of the Transport Act, which requires VicRoads to submit operating and capital works budgets to the Minister, does not include a formal role for DOI, weakening its statutory role in coordinating transport outcomes.

Secondly, chapter 4 notes that at least 34 per cent of VicRoads funding for capital expenditure comes from sources outside Victoria's budget process. Potentially, this gives VicRoads more autonomy and flexibility in accessing project funds and may weaken DOI's coordination role.[1] A significant amount of local government road funding also comes from Commonwealth Government grants, local rates and other revenue that are outside the Victorian Government approval processes. In contrast, nearly all of the funding for metropolitan rail networks is approved through the budget and DOI controls these businesses' priorities through the partnership agreements.

[1] The Transport Act still requires DOI to establish quantitative targets for VicRoads and monitor performance against these targets (s.4(2)).

A particular example of the difficulty in establishing coherent priority setting arises from VicRoads' practice of accepting local government funding contributions to get projects 'over the line'. This occurred, for example, in Bendigo (box 9.2). Such contributions are a sign of the local community's support for the project and they improve the cost–benefit rating from VicRoads' perspective, but from the perspective of the Victorian community overall, the source of funds should not affect the cost–benefit ranking of projects.

Box 9.2 **Insights from Bendigo**

Participants in Bendigo were conscious of congestion issues affecting them, but offered the view that these were likely to be insignificant compared with the scale and scope of costs in Melbourne. Nonetheless, as a matter of good city management, progress was being made on transport infrastructure.

The Commission consulted with: officers of the City of Greater Bendigo; representatives of the regional offices of DOI and VicRoads; Keatings Transport, Christian's Bus Company; Walkers Bus Lines; and the Better Rail Action Group–Bendigo. Participants indicated that the framework for coordinating the different interests and expertise in transport planning and implementation is well established and is serving Bendigo well. The Bendigo 2020 Transportation Study has given coherence to infrastructure development for more than a decade.

Spots of congestion arise in both the inner 'box' and outer 'box' of the road network and on the Calder Highway entering the city. Freight transport and cars are affected, and while delays are short (for example, the time difference in traversing the city—between good and bad conditions—would be around 10-15 minutes), solutions have and are being implemented. By improving flow on the outer 'box', some useful traffic diversion should occur. And the coordination of traffic lights entering Bendigo will benefit from the application of Sydney Coordinated Adaptive Traffic System technology. In the city centre, the challenge of resolving competing interests and objectives (traffic flow, retail operations, public transport and liveability) is on-going, as in other cities.

Public transport—local buses and the new fast rail link to Melbourne—plays a limited role in meeting mobility needs. Buses suffer from occasional spots of congestion, but that does not seem to be the main issue in servicing or expanding public transport use. According to bus companies, local government could be more closely engaged in the community by facilitating bus transport (such as timetable information and placement of bus stops) and planning future needs (for example, providing services to new satellite developments with population growth of 20 000 or more). Participants saw scope for the next round of bus contracts to encourage growth in public transport use. Bus services that link with the fast rail service are incomplete.

Dealing with particular emerging congestion issues, from time to time, has benefited from the local representation of the two key State Government agencies—DOI and VicRoads. This facilitates access to funding and expertise. The City of Bendigo has contributed funds to local VicRoads' projects to secure VicRoads' funding that they would not have received otherwise.

Source: Discussions with the Commission

Developer contributions may also distort decisions between transport modes if this funding is more accessible to one mode. The City of Yarra was concerned about the 'lack of contributions by developers to provide public transport infrastructure' (sub. 63, p. 20). Chapter 4 notes that the new development contribution policy for growth areas is intended to increase the money available to public transport. This policy is still being implemented, so it is too early to determine its impact. The amount of money available for public transport projects will depend on whether a balanced range of projects are included in the developer contribution plan and the process used to calculate developer payments. For other areas, the previous arrangements remain, and historically they have not delivered significant funds for public transport.

Chapter 4 noted that the Government sees developer contributions as a reasonable approach to funding in growth areas, given that rezoning land can generate significant increases in land values. Some submissions have suggested that betterment capture should also be used to collect the increases in land values from improvements in infrastructure. Mr Bruce Evans, for example, argued that the rates paid by large commercial properties should reflect the increase in business value that results from transport infrastructure provision (sub. 86, p. 3). Chapter 6 discusses examples of the use of betterment capture and development contributions overseas.

Thirdly, some argue that road funding has more long term certainty than public transport funding. This is not clear, particularly for trams and trains. Tram and train contracts are for five years and set ongoing Government subsidies, the percentage of fare revenue to be returned to operators, and can accommodate infrastructure expenditure (subject to negotiation with DOI). VicRoads can access the Better Roads Victoria Trust Fund, which automatically receives an agreed funding level each year. While funding differs between modes, the Commission does not have the evidence to conclude that long term certainty in funding is significantly better or worse for any particular mode.

Finally, there are separate road and public transport budgets. Separate budgets further reduce the extent to which public transport and road projects are prioritised against each other, making it more difficult to ensure all modes have equal priority in funding decisions. It also exacerbates concerns that the size of the budget available to each mode favours road over other modes.

Project appraisal

A key issue is whether priority-setting processes favour particular transport modes. The two questions are (1) do the assessment processes comprehensively rank all projects and (2) does the evaluation methodology (cost–benefit analysis) treat all modes equally? Chapter 4 described the priority-setting processes that rank projects. The Commission notes, from chapter 4, that some parts of this

process, such as determining the priority among Government objectives, are not transparent. From the information the Commission has received there appear to be several potential problems.

- As noted previously, not all road projects go through the budget process and, therefore, they are not all assessed by DOI and compared against other projects with similar objectives. For VicRoads' projects outside the budget process there is a risk that they would be funded without adequately considering whether there is a better alternative, e.g. train or cycling based. It also makes it difficult to consider the cumulative impact of projects.
- For projects assessed and ranked by DOI, it considers projects individually and then prioritises them against others with similar objectives (chapter 4). Congestion, however, can be affected by the approach taken to many areas of transport policy, including road safety, managing metropolitan growth and improving the efficiency of freight and commercial traffic. Failure to compare projects across Government objectives may mean that cumulative or unintended effects on congestion are not recognised.
- Local government also makes decisions on local roads in processes that are separate from public transport planning, though integrated transport plans may assist this in the future.

BOX 9.3 Criticisms of project evaluation processes

The Public Transport Users Association claimed that cost–benefit analysis on infrastructure proposals tended to value projected time savings for car occupants at the same level or higher than projected time savings for public transport passengers. It suggested that this is inappropriate (sub. 65, p. 18). Mr John McPherson claimed that:

> Treasury regards road investment as adding to social capital yet applies tougher criteria to rail investment on the spurious basis that the public transport system operates as a 'trading enterprise'. Without common investment assessment criteria with roads, the future for public transport is bleak indeed. (sub. 26, p. 9)

Councillor Fristacky argued that triple bottom line assessment criteria were not used to compare investment in roads and rail transport.

> The $4 billion cost of accidents and similar costs in congestion and ill health through vehicle emissions are usually excluded from comparisons of vehicle and rail costs. (sub. 58, p. 5)

Others suggested that cost–benefit analysis disadvantaged outer suburbs and regional areas because they do not have the population densities to generate the benefits that can be gained from inner Melbourne projects, particularly for public transport (raised by Mornington Peninsula Shire Council, sub. 15, p. 3 and Interface Councils sub. 60, p. 4).

In his work for the Melbourne City Council, Dr Paul Mees referred to comments by Professor Rodger Eade, the chair of the independent panel that evaluated the Environmental Effects Statement for the Scoresby Freeway. Professor Eade expressed a critical view that:

> … by the time of the panel hearings, the Government had committed to building the road, and so it was too late to ask basic questions like whether it was needed, or whether alternative policies (such as improved public transport) would have provided a better outcome. (Mees 2005, p. 2)

The way in which cost–benefit analysis or other project appraisal techniques are applied can also affect the choice between road and public transport projects. Several participants questioned whether each mode is treated equally (box 9.3).

BOX 9.4 Induced travel– project appraisal in Victoria

Induced travel is the additional travel stimulated by reductions in congestion arising from expansions in capacity. As discussed in chapter 7, it is important because even small amounts of induced traffic can have a significant impact on the size of the benefits from congestion reduction projects. There are various approaches to including induced travel in project evaluation in Victoria.

DOI Guidelines on economic cost–benefit analysis—The DOI guidelines do not require modelling an induced travel effect when appraising projects. DOI estimates of future travel demand are informed by historical data and based on population and employment growth forecasts. The guidelines recognise that project impacts differ in magnitude and recommend that 'for relatively large projects, impacts on the road system should be assessed through specific road network modelling, with the outputs of the model also giving the changes in travel time and distance travelled on the road system, which can be valued using the standard values of time and vehicle operating costs.' (DOI 2005a)

Australian Transport Council (ATC)—The National Guidelines for Transport System Management in Australia (compiled by the ATC) discuss the importance of diverted and generated travel resulting from proposed transport capital projects. They detail how costs and benefits should be apportioned, but do not recommend how to calculate the amount of traffic diverted or generated. Such calculations must be tackled through transport network modelling.

Halcrow evaluation tool— The Halcrow evaluation tool is used to prioritise park and ride projects in Melbourne. It includes estimates of the increased local traffic caused by additional trips to and from the car park and ascribes a congestion reduction benefit as traffic is diverted onto public transport, but does not allow for induced or generated traffic. Environmental benefits are also estimated based on the first-order changes, implicitly assuming there is no induced traffic.

Source: DOI 2005a.

There is no overarching consistent project assessment framework that applies to all transport proposals. One example of differences in approach is the treatment of induced travel (box 9.4).

The time frame used when evaluating and comparing projects is also crucial. Although there may be some uncertainty over the extent to which induced demand will absorb the congestion reduction benefits of a particular measure, these benefits will be largest shortly after the project is completed, before diminishing to a greater or lesser extent over time (VTPI 2005, p. 5.5-8).

In addition, project assessments are only as accurate as the data available to make that assessment. Physical infrastructure costs are relatively easy to estimate. However, many other variables are considerably more difficult, such as the environmental benefits of moving from road to public transport or the long term effects of improving public transport on urban structure. There is often also uncertainty about underlying population and travel data. The Victorian Activity Travel Survey on which travel patterns are estimated is now dated and does not cover a large proportion of commercial traffic using the roads.

While the inquiry has not been presented with definitive evidence that road projects are being approved that generate lower benefits to society than alternative public transport projects, aspects of the institutional framework suggest this is a risk. VicRoads has a dominant position in the decision making process, it has a historic interest and experience in road based projects and its thinking would naturally focus on road based solutions. Its funding arrangements enhance its autonomy so it appears that intermodal comparisons of prospective projects are not always carried out. The project prioritisation processes do not guarantee a strongly coordinated framework that would mitigate the risks from VicRoads' position in the decision making process.

Concern about these risks is shared by many participants in this inquiry. Such stakeholder concerns have been evident for some time. In 2002, during its review of infrastructure issues, the Infrastructure Planning Council noted that:

> Concerns were raised many times about the role of VicRoads and its influence in developing road rather than rail solutions. (Infrastructure Planning Council 2002b, p. 49)

The council concluded that VicRoads' history of strong performance was leading to a bias towards road based projects.

> Public transport planning has no comparable champion matching the skill and expertise of VicRoads. In the past, it has been easier to invest in another road than to think through public transport options because VicRoads has long-term priority plans and a strong record of delivery. However, while VicRoads has historically been associated with building and managing road infrastructure catering for the private car, access to the road network for public transport is now vital. (IPC2002a, p. 51)

Lack of an overarching, consistent project evaluation methodology adds to this risk. By its nature, cost-benefit analysis of transport projects is not an exact science. There will always be uncertainty in the data and assumptions underlying the models. Much of this uncertainty is around factors that are often advocated as reasons for investing in public transport—such as its ability to influence urban form, attract passengers off road and overcome the induced travel that often accompanies road expansion. Inaccuracies could thus distort the ranking of projects based on different modes. The Commission will further consider the issue of consistent project evaluation methodology in its final report.

9.2.2 A comprehensive approach to policy consideration

A related risk to road dominance is that the policy options considered focus on particular types of responses. While many participants argued that more investment in transport infrastructure is needed (supply expansion), others felt that policies that reduce transport demand are given insufficient weight. Mr Alan Parker suggested that VicRoads' role should be redefined and the planning capabilities of the public transport group increased:

> The DOI failed to recommend that the State Government change the Transport Act to redefine VicRoads' role in reducing the demand for more roads, encouraging walking, cycling and public transport and enabling bicycles to substitute for short drive alone car trips. (sub. 18, p. 14)

Similarly, Clarke and Hawkins from La Trobe University argued:

> Melbourne, along with most of the world's cities, has consistently favoured supply-side solutions that are theoretically unsound and which impose costs on all taxpayers regardless of their travel decisions. (sub. 3, p. 25)

A review for the City of Melbourne by Dr Scheurer, Prof. Newman and Prof. Kenworthy also argued that:

> The legacy of conventional transport planning has been to focus strongly on supply-side, or capacity-boosting, solutions to traffic congestion. It regarded the development of urban transport infrastructure primarily as a technical task, predicting future traffic volumes and then providing the road capacity these

> appear to require. This approach is now widely discredited among transport experts. It has been understood that it is neither economically possible nor politically or environmentally desirable for cities to 'build their way out of congestion' by supplying sufficient infrastructure to satisfy all demand. (2005, p. 14)

The policy document *Linking Melbourne: Metropolitan transport plan* (Government of Victoria 2004a), for example, incorporates a range of measures. While these measures can be difficult to classify, they seem to be predominantly on the supply side. These measures are listed in appendix D. Of the 37 measures introduced to date from *Linking Melbourne: Metropolitan transport plan*, 27 address supply expansion or improving the attractiveness of public transport, six involve institutional reform, three are not related to congestion and only one (the successful trial of 'TravelSmart' to increase the use of public transport, walking and cycling in the Alamein transport corridor) attempts directly to reduce demand for road based travel.

A prerequisite for a balanced debate about policy options is that the community should have access to relevant and up to date information about the likely impacts of transport policy options. During the inquiry, the Commission has found that the information on which policy development is based is lacking in some key areas or, in others, is scattered and difficult to access. The Commission has identified a number of options for improving the information base and analytical tools used in the development of transport policy and the monitoring of impacts (box 9.5).

Box 9.5 Improving information

The Commission has identified a number of opportunities to improve the information base and analytical tools used in the development of transport policy and the monitoring of impacts. Opportunities to improve the information base exist in relation to freight and commercial distribution, passenger travel on public transport and private motor vehicles, and congestion. The Commission envisages that a lot of this information would be made publicly available to enable a more informed public debate about transport policy issues.

Freight and commercial distribution

Improved data on road freight movements is needed, particularly around:

- freight moved by road and rail, such as the quantity, type and time-sensitivity of freight, as well as information on travel times and variability. This will provide a better context for discussions about the impact of congestion and the benefits and costs of policy options, and a more detailed breakdown of commercial vehicles on different parts of the arterial road network (covering commercial distribution as well as bulk freight)

(continued next page)

Box 9.5 **Improving information** (continued)

- information on the relationship between commercial distribution and inventory management, including the role and importance of light commercial vehicles and factors influencing their usage
- ongoing analysis of Port of Melbourne vehicle movements and the relationship with broader traffic movements on key freeways and arterials
- analysis of the factors influencing freeway performance, including the factors contributing to observed variability of travel times. This would enable an assessment of priorities for improvements in the utilisation of the network.

Passenger travel

Improved data on passenger travel including:

- better understanding of the responsiveness of travel demand to key factors (elasticities), and the values people place on travel time (and variability)
- key drivers of mode choice, including the responsiveness of patronage to changes in fares and the various aspects of service quality (such as crowding, travel times, safety and security, service frequency and reliability)
- factors influencing changes in the performance of public transport, including infrastructure characteristics, the operation of the system and usage patterns
- the basis and techniques for forecasting key factors influencing future travel demand (such as population, employment and land use).

Traffic congestion

More information on congestion patterns and improved analytical tools for modelling the impacts of congestion and transport policy options:

- The Commission notes that VicRoads has a freeway performance management system. It has also undertaken monitoring of arterial road performance for more than a decade, and is gradually extending the nature and extent of its monitoring. Ideally, this would provide continuous information on matters such as vehicle movements for a range of vehicle types (including light commercial vehicles), travel times and variability.
- There is scope to build on current transport models to develop tools that are specifically designed to assess the impact of congestion and to assess the direct and indirect effects of policy options. Existing models do not adequately specify how the demand for travel is determined and do not permit modelling of important benefits from efforts to tackle congestion, including: impacts on overall economic activity; productivity benefits; business (especially freight) and land use impacts; the extent and costs of travel time variability; and the environmental and social amenity impacts of congestion (as distinct from the impacts of motor vehicle usage generally).

9.2.3 Coordination between Local and State Governments

Many submissions criticised the coordination between State and local government, particularly in land use and transport planning and infrastructure management. The Geelong Regional Alliance asserted that there was a lack of:

> Collaboration and clear policy framework on responsibilities of different levels of Government for public transport service provision. (sub. 85, p. 8)

Similarly, Councillor Fristacky noted a:

> Lack of effective integration of transport and planning policies between Federal, State and local governments. (sub. 58, p. 5)

These views are supported by the Infrastructure Planning Council's conclusions in 2002, which noted that:

> … while many local governments are closely involved in the transport planning process in conjunction with the DOI, a framework does not exist for establishing the relationship of local planning with state-wide planning. (IPC 2002b, Ch. 7, p. 57)

In the case of infrastructure management, the Eastern Regional Integrated Transport Group (ERITG) and the RACV argued that:

> The recent Road Management Act has made VicRoads responsible for the road pavement and local government the footpath and nature strips. We need to get a holistic approach to better use of the road space under such conditions. (Eastern Regional Integrated Transport Group sub. 24, p. 11)

> Currently there is an inconsistent and often ad hoc division of responsibility between the State Government (usually represented by VicRoads) and local government. (Royal Automobile Club Victoria sub. 59, p. 25)

Coordination in planning

Failure to coordinate planning processes effectively can reduce their speed and effectiveness. VicRoads claimed that local government permit and consultation requirements:

> … can slow implementation of road based public transport infrastructure improvements, particularly relating to the conflict between on-road parking and tram priority. Although VicRoads has powers over parking on arterial roads, the process for creation of clearways under a code of the Road Management Act is lengthy. (VicRoads sub. 50, p. 13)

There is also concern that poor coordination is reducing the effectiveness of transport policies. Poor coordination between local and State Government can affect the adequacy of transport services in outer urban areas. It can also affect the incorporation of non-motorised transport into planning and decision making

and perceptions that responsibilities for parking on arterial roads are unclear. Alan Parker Design noted one example, arguing that bicycle commuting is discouraged because VicRoads' bike lanes are not linked with local bicycle routes. It argued that there is a need to 'redefine VicRoads' role in creating a close knit arterial bicycle network that links VicRoads bike lanes, local government residential street routes and shared footways provided by local government [and] several other agencies' (sub. 18, p. 15).

Many submissions recognised that problems often arise because coordination is complex. Considerable tension stems from the different priorities of State and local agencies. Local government has a strong focus on the needs of the local community, underpinned by legislation (box 9.6).

BOX 9.6 Local government focus on local priorities

Local government's focus on local communities stems from its legislative and political underpinnings. The *Constitution Act 1975* (Vic.) (s.74A(4)) provides that local government is a distinct and essential tier of government consisting of democratically elected councils with the functions and powers that the Parliament considers are necessary to ensure the peace, order and good government of each municipal district.

As Councillors are elected by their local community they have, as would be expected, strong allegiances to that community. This focus on local interests is reinforced by the *Local Government Act 1989* (Vic). Section 3C(1) provides that the 'primary objective of a Council is to endeavour to achieve the best outcomes for the local community having regard to the long term cumulative effects of decisions'. While s.3D(2)(e) requires councils to account for other interests as their role also includes 'acting as a responsible partner in government by taking into account the needs of other communities', councils were clearly set up with the intention and expectation that local interests would be a priority.

The Municipal Association of Victoria highlighted local government's role in relation to the local community:

> In a broader policy context, local government acts as an advocate on behalf of local communities, raises issues of importance, and conveys community needs and aspirations. It is necessary to deal with congestion in the context of a broad range of issues and policy objectives that have linkages, implications and relevance to congestion. (sub. 30, p. 2)

The State Government focuses on broader transport issues, which can conflict with local priorities. Some councils have views on the relative merits of different road uses, which may be different from the views of the State Government:

> The City of Yarra has identified a hierarchy of transport users. For a sustainable transport future, the City of Yarra places the highest priority on those transport users which provide the least negative impact on our transport environment. This includes priority to pedestrians, cyclists and public transport users. Single

> occupancy car users are given the lowest priority. Given this hierarchy, the City of Yarra would consider that any delay to pedestrians, cyclists or public transport users should be calculated using a much higher value against the cost of congestion than that of a private vehicle occupant. The cost of congestion as currently measured, does not take this into account. (sub. 63, p. 5)

The Municipal Association of Victoria provided an example of how State and local priorities can diverge:

> The minimum statewide requirements for parking provision, associated with change of use or new development, are often in conflict with local integrated transport strategies with sustainability objectives, in particular in and around Melbourne 2030 activity centres and the inner city. Site owners are required under the planning scheme/Rescode to provide the minimum number of car parks (linked to the nature of the use and development), with no obligation to consider alternative travel modes. Some councils have begun to develop Parking Limitation Policies to seek [to] limit the number of car parks provided in developments (e.g. Cities of Melbourne and Port Phillip) and the use of on-street parking with new development sites (e.g. Cities of Port Phillip, Yarra and Darebin) (sub. 30, p. 6).

Ms Toth asserted that 'VicRoads' policies conflict with the policies of inner city councils. VicRoads wants bigger, faster roads. Councils want slower, safer roads.' Taking Johnston Street, Collingwood as an example, Ms Toth argued that VicRoads and the Yarra Council 'appear to have conflicting policies and aims, on the same strip of road.' (sub. 5, p. 2)

Resolving these conflicts is further complicated because councils face different circumstances and issues. The Infrastructure Planning Council gave examples of these differences:

In Boroondara, transport issues are heavily interconnected with what is happening in the surrounding areas as traffic flows into and through Boroondara from outside. In Casey, eighty per cent of movements are within the area. In contrast, a high proportion of Whittlesea's population commutes to the CBD. Alternatively, Mildura operates in isolation from traffic flows with only the most basic provision of public transport services. (IPC 2002b, Ch. 7, pp. 56-57)

The processes governments use to facilitate coordination were discussed in chapter 4. For land use and transport planning they include, for example:

- the Growth Areas Authority
- requirements to prepare integrated transport plans
- the development of integrated planning strategies
- local initiatives in regional areas
- liaison officers and advisory groups to facilitate communication between local government and DOI and VicRoads.

Box 9.7 Expansion in the City of Whittlesea

The City of Whittlesea is on the metropolitan fringe about 20 kilometres north of the Melbourne Central Business District. Approximately 487 square kilometres, it is one of the largest municipalities in metropolitan Melbourne. Its population more than quadrupled from 27 000 in 1969 to 127 000 in 2005, and the Council projects a further doubling in the next 20 years (City of Whittlesea undated).

Whittlesea is one of five growth areas designated in *Melbourne 2030* and Epping is a designated activity centre. Under *Melbourne 2030*, the municipality was encouraged to work with DOI to review its Growth Area Plan, applying a set of defined policies and principles. The government required the review to focus on development phasing, employment potential, public transport provision and opportunities for higher density residential development. The long term opportunity to extend public transport to meet the existing rail corridor at Donnybrook was also considered (DOI 2002c, p. 19). The growth area plan was reviewed by a Smart Growth Committee (including representatives from the council, VicRoads, the Department of Sustainability and the Environment (DSE), DOI, the Department of Industry, Innovation and Regional Development, and the Department of Human Services). The Committee assessed and confirmed the plan's justification for proposed infrastructure and the timing and sequencing for delivery. Its public report endorsed Whittlesea's growth area plan and recognised the list of projects. The State Government recognised these projects but its commitment is subject to the annual planning process.

In addition to growth area plans, *Melbourne 2030* encourages councils to plan the structure of activity centres and 'set the strategic framework for the use and development of land in and around the centre and give clear direction to investors about preferred locations for investment' (DOI 2002a, p. 52). The Council has developed a medium term plan for future population and employment centres and their transport needs. It believes that the plan will help provide certainty for potential investors or residents in Whittlesea. It should reduce timeframes for decisions about infrastructure investment and facilitate efficiency by encouraging developers to consolidate land around proposed infrastructure developments. The plan is also a basis for preparing detailed infrastructure requirements, which are the basis for the Development Contributions Plan.

The cost to the Council of developing its plans has exceeded $2 million. This cost is substantial, particularly given that councils do not control the supply of much of the transport and other infrastructure that is integral to implementing a plan. Indeed, one reason councils may choose to prepare a plan is to strengthen their case to the State Government for infrastructure funding. A council which is less confident that a plan will assist it to secure funding and coordinate the agencies involved in approving and providing infrastructure may devote fewer resources to planning.

Source: DOI 2002a; DOI 2002c; City of Whittlesea website www.whittlesea.vic.gov.au.

It is difficult to assess the adequacy of some of the processes for coordinating planning because most are relatively new and it will take some time before their results are evident. The requirement to develop integrated transport plans for major new residential, commercial and industrial developments was introduced in September 2005. The establishment of the Growth Areas Authority was announced in November 2005, and it is not expected to be operational until July 2006.

The government has recognised that poor coordination has been a problem in the past. Whether these new initiatives will eliminate past problems depends on whether they adequately deliver coordination and cover areas where coordination is an issue. The need for such coordination is evident in the case of Whittlesea (box 9.7), which initiated its own coordinated planning process.

The Growth Areas Authority has the potential to integrate planning processes and provide a framework to integrate the type of planning that was undertaken in Whittlesea. However, it does not cover inner urban areas. In inner areas the Victorian Government has also set goals for planning and transport outcomes but the processes for determining local priorities against those goals and implementing those priorities are less comprehensive. This is illustrated in box 9.8 on integrated land use and transport planning in Carlton.

Box 9.8 Integrated land use and transport planning in Carlton

Carlton, located north of the city centre, is diverse, with a mix of residential, education, cultural, medical, business and retailing activities. Although it covers a small area (2.7 square kilometres), Carlton is one of the City of Melbourne's most populated residential areas (City of Melbourne undated A). Thirty four per cent of residents are students over 18, but there are also many wealthy residents and a large numbers of low income or unemployed residents living in public housing (City of Melbourne undated C). Carlton's population grew by around 25 per cent between 1996 and 2004 to just over 11 000. As people want to live close to the city and places of study, Carlton is forecast to grow by another 6500 people by 2021 (City of Melbourne 2005, p. 9). Workers and visitors to Carlton are also expected to increase (City of Melbourne 2000, p. 5).

Although Carlton has a relatively high coverage and frequency of public transport service, the estimated future demand poses significant challenges for the public transport system, particularly as major student accommodation and public housing developments continue.

(continued next page)

Box 9.8 **Integrated land use and transport planning in Carlton** (continued)

Under *Melbourne 2030*, the Victorian Government aims over the next 30 years to increase the concentration of activities within a network of major activity centres (DOI 2002a, p. 46). Lygon Street is a designated major activity centre. The objectives for activity centres include 'to improve access by walking, cycling and public transport to services and facilities … [and to] reduce the number of private motorised vehicle trips by concentrating activities that generate high numbers of (non-freight) trips in highly accessible locations' (DOI 2002a, p. 46).

While the majority of trips to work and study are made by foot in Carlton (56 per cent) (City of Melbourne undated C), it is unclear whether any studies were conducted on the ability of Carlton's public transport system to cope with the expected increase in trips resulting from the Council's endeavours to meet *Melbourne 2030's* objectives. For example, recent high density housing developments in Carlton place additional pressures on public transport: Melbourne University's Eastern Precinct Development will contain 547 student units and approximately 800 new dwellings are planned in the redevelopment of the Lygon/Rathdown public housing estate.

Councils with areas designated as an activity centre are required to articulate how the area will develop and the actions needed to realise that development through 'structure planning' (DSE 2003b, p.1). DSE has pointed out that 'the provision of … high capacity, reliable public transport services in advance of development is likely to be a necessary prerequisite if the activity centres identified in *Melbourne 2030* are to reach their full potential' (sub. 90, p. 7). However, as public transport planning decisions are made within DOI, often there are gaps between the council's land use and transport strategy, and the implementation process. The City of Melbourne is better placed than other councils as they receive income from the Victorian Government's parking levy to implement their transport strategy.

Sources: City of Melbourne undated A and C; City of Melbourne 2000; DOI 2002a; and DSE 2003b.

Initiatives have also developed in regional areas to coordinate planning and transport issues. Geelong G21 (the Geelong Regional Alliance) is a group of five local governments that seek to promote partnerships and build consensus in dealing with regional issue. The alliance has a transport pillar group, which includes public and private sector representatives that have worked to develop solutions to transport and logistics issues in the region. The strategies used in Ballarat are outlined in box 9.9.

Box 9.9 **Insights from Ballarat**

The Commission met with the City of Ballarat to discuss transport congestion issues. Serious transport congestion is not a challenge the Ballarat community faces in the immediate future (City of Ballarat, pers. comm., 16 Feb. 2006). Despite this, bearing in mind the growing prosperity of Ballarat, the long lead times required for much transport infrastructure development means that planning is required now to ensure that transport congestion does not become an issue in the medium to long term. Currently, the City of Ballarat has outlined a framework for the municipality in strategic planning documents such as Blueprint Ballarat, arguing that any future transport demand that might arise through growth can be managed (City of Ballarat 2004). However, for strategic planning to translate into successful development of transport infrastructure, clear and effective communication and coordination amongst many parties is required. Resource availability is always an issue.

The City of Ballarat highlighted the importance of coordination with State agencies, and explained that this does not always occur. It recently initiated a meeting to discuss transport infrastructure projects that influence Ballarat—participants included DOI, Major Projects Victoria, VicTrack, VicUrban, the City of Ballarat, DSE, V/Line and the Department of Innovation, Industry and Regional Development. The meeting indicated that participants were not always fully aware of the projects of other agencies.

The City of Ballarat argued that the Regional Fast Rail project also illustrates the importance of coordination with State agencies. Challenges include provision of adequate car parking infrastructure near the station and bus linkages (City of Ballarat, pers. comm., 16 Feb. 2006). If the Regional Fast Rail project is successful in providing faster and more frequent train services to Ballarat, then passenger numbers at the Ballarat train station are likely to increase and transport challenges around the station may be exacerbated.

Although communication among the council and State agencies could be improved, the council noted that the new Smartcard ticketing system (chapter 4)—which provides for single ticket travel on rail and bus services in major regional centres and on the Melbourne public transport network within zone 1—is an example of well coordinated transport planning (City of Ballarat, pers. comm. 16 Feb. 2006). The location of a regional representative of DOI in Ballarat assists coordination.

Source: City of Ballarat 2004; meeting with City of Ballarat.

There is also strong local government support for effective consultation processes. For example, the ERITG supported the initiative where:

> DOI has recently appointed a municipal liaison officer to work with local government and provide a two way conduit for information. This is an excellent step to have both levels of government moving in the one direction. (sub. 24, p. 12)

The ERITG was, however, sceptical about the effectiveness of VicRoads' advisory committee:

> VicRoads used to have a similar position but [it was] ditched some years ago, currently relationships with VicRoads and local government are civil but could be improved … VicRoads have its advisory committees to be advised but this is considered to be window dressing rather than commitment. (sub. 24, p. 12)

Coordination in road management

Participants also raised issues about the roles of local and State governments in road management. Chapter 4 points out that under the Road Management Act, VicRoads is the responsible authority for freeways and has primary responsibility for arterial roads, while local governments are the responsible authorities for local roads and have some involvement in road related services, such as parking. Chapter 4 also points to tensions between these roles, in particular where VicRoads' responsibility for through traffic meets local government's responsibility for parts of the road not used for through traffic. Resolving these tensions can be difficult and lengthy, as illustrated by the case study in chapter 4 on the negotiation of a dedicated bus lane on Victoria Parade. That process took about four years and the clearway that allows for the bus lane still only covers parts of the road.

While VicRoads has decision making powers on arterial roads, freeways and clearways, it often attempts to implement change through agreement with the affected local governments. Local governments also have control over planning approvals which can affect the implementation of some of VicRoads' decisions and gives local authorities greater influence over the process than they might have otherwise. Comments from participants indicated that they were often confused about the role and responsibilities of VicRoads and local government, particularly on arterial roads where these responsibilities meet. Several strategies have been implemented to clarify these roles:

- legislation which lays out the roles and responsibilities of different agencies
- codes of practice or guidelines that cover, among other things, operating responsibility for public roads, clearways and declaring controlled access roads
- mandatory consultation processes for decisions on clearways and declaring controlled access roads.

The Commission has reviewed the code of practice for operational responsibility for public roads, which was introduced to clarify past uncertainties. In most cases, it appears to adequately define these responsibilities. There are a few remaining areas where local government is seeking further clarification, such as clause 18 of the code of practice, which deals with bus shelters.

Clearly, coordination between local and State Government is essential. If planning decisions are made independently or road management responsibilities are unclear, there is a real risk that neither government will achieve its objectives because they undermine each other's effectiveness.

In the case of planning, the Growth Areas Authority has the potential to facilitate coordination and establish infrastructure priorities early in the planning process. It does this by analysing and developing local priorities, consistent with the Government's broader policy objectives. But it will be successful only if there are subsequent processes to deliver on those priorities. Given the role and powers of the Growth Areas Authority are not finalised, it is difficult to determine whether effective implementation processes will be available. Overall, their ability to ensure the Government's objectives are delivered in practice will depend on whether:

- there is an agency responsible for driving the plans' implementation
- there is adequate certainty in State funding for local government and business to rely on the guidance in the plans
- implementation is effectively monitored, assessed and adjusted, where necessary, to meet the plan's objectives, and this is a public process.

Given implementation, monitoring processes and funding are not finalised, there is insufficient evidence at this stage to predict the Growth Areas Authority's effectiveness. More time is needed to see the results of these planning processes before it is clear whether further options are necessary.

For inner areas, such as Carlton, there do not appear to be processes in place to ensure overarching objectives are delivered in practice. Future developers are required to prepare integrated transport plans to obtain planning permits for major developments. This is an important first step in identifying the impacts of developments on existing transport modes, but it cannot accommodate more progressive changes and it may not take the combined effects of a range of developments into account—for example, student accommodation and public housing in Carlton. As noted by Mees (2005, p. 4), for integration to be effective it must occur at the policy level, not just for individual projects.

Finally, for more specific issues, the codes of practice do clarify the responsibilities of the agencies that manage roads, although some areas remain uncertain. The concerns about coordination appear to stem from fundamental differences in the priorities of State and local governments that are often difficult or impossible to reconcile. This, combined with consultation processes that are time consuming and local government's responsibility for planning decisions, does not facilitate rapid, unambiguous decision making, and increases the perception of confusion.

9.2.4 Coordination between State Government agencies

It could hardly be suggested that coordination among State agencies has been ignored. Ministers and their advisors have grappled with the challenge for decades.[2] Nevertheless, participants highlighted deficiencies in coordination in three areas:

- between land use and transport planning
- between transport and other policy areas
- among transport modes.

Between land use and transport planning

The previous section discussed the coordination of State and local government planning. Among State agencies, land use planning, designed and implemented by DSE, also needs to be coordinated with DOI's transport planning. Most participants recognise that land use planning decisions affect the location of people, workplaces, schools and social facilities, shaping the demand for transport services. Some also noted that the location of transport services can influence urban development patterns. Further, it was recognised that transport needs to be included in planning decisions, otherwise the most efficient forms of transport will be unavailable, and the risk of adverse consequences, such as high environmental costs, congestion and social isolation, is greater. Participants from the regional cities of Geelong, Ballarat and Bendigo also highlighted the importance of coordination across agencies and that this an area where improvements are possible. There was general consensus among State and local agencies, transport user groups and others that coordination between land use and transport planning is deficient (box 9.10). This was formally recognised by the Victorian Government in the priorities articulated in *Melbourne 2030*:

> Land use planning and transport planning have lacked coordination. The successful interaction of these elements is vital to the success of Melbourne 2030. Unless public transport needs are properly accommodated, the potential of any development cannot be fully realised. (DSE 2005b, p. 5)

[2] Indeed, the challenge is of such long-standing international provenance that it featured in the 'Bed of Nails' episode of 'Yes Minister' when the need for a 'transport supremo' was canvassed (Lynn & Jay 1983, *Yes Minister*).

Box 9.10 Participants' views on coordination between land use and transport planning

Many submissions felt that numerous problems are caused by separating transport and land use planning decisions. The Public Transport Users Association argued that locating planning and transport portfolios in separate departments, under different ministers, with contradictory programs, prevents policy integration that would minimise congestion:

> While the planning portfolio has articulated a vision of vastly improved public transport and a doubling of public transport patronage, the transport portfolio continues to prioritise additions to the capacity of the road network and refuses to commit to extending the rail network to growth areas identified within Melbourne 2030. (sub. 65, p. 17)

The Nillumbik Shire Council stated:

> The lack of integration in transport planning and management is seen as a significant barrier to improved transport outcomes on road, rail and tram networks. (sub. 32, p. 2)

VicRoads also suggested that institutional difficulties arise because land use planning does not provide for transport infrastructure (sub. 50, p. 13). Similarly, the eight 'interface' councils[3] between urban Melbourne and rural Victoria argued that:

> In Melbourne's growth corridors there is an absence of strategic land use planning in relation to public transport. For many housing developments in the Interface, public transport is not even considered until they are fully developed. (sub. 60, p. 5)

There are several Government initiatives designed to improve coordination in DSE's land use planning and DOI's transport planning. Chapter 4 discusses:

- *Melbourne 2030* (DSE 2005a), which provides an overarching framework for coordinated planning
- *Linking Melbourne: Metropolitan transport plan* (Government of Victoria 2004a), which articulates transport priorities within the context of Melbourne 2030
- consideration being given to formally incorporating DOI into the planning process as a referral authority.

Several submissions were supportive of the objectives in Melbourne 2030 and the transport plans. SGS Economics and Planning concluded that:

> Melbourne's current policy framework can therefore be cast as particularly well conceived and, if implemented effectively, is capable of producing an efficient 'talent magnet' underpinned by a highly competitive transportation system. (sub. 2, p. 25)

[3] Wyndham, Melton, Hume, Whittlesea, Nillumbik, Yarra Ranges, Cardinia and the Mornington Peninsula.

For this framework to deliver the results of better coordination, it needs to be effectively implemented. Some participants questioned whether these objectives will be achieved.

- Some argued that the proposed approach is too incremental to generate significant change (Reynolds, sub. 31 p. 7; the Property Council of Australia, sub. 48, p. 8: and McPherson, sub. 26, pp. 7–8).
- Some were critical of a lack of long term commitment to transport programs, particularly for public transport (The Municipal Association of Victoria, sub. 30, p. 7).

Hence, concerns did not focus so much on the objectives in these plans but rather their ability to deliver on those objectives. There are also no ongoing processes, other than consultation between the departments, to coordinate state transport and planning policies.

Coordination is not straight forward. In the case of land use and transport planning, for example:

- both processes are complex
- it is difficult to judge future development directions and the subsequent transport needs. There can be considerable lags between planning decisions and the need for transport services. As recognised by Transurban:

  > Integrated land use and transport planning offers potential to reduce the need for travel by co-locating different activities, and this is an important element of Melbourne 2030. However, these initiatives can have very long lead times as sites are consolidated and redeveloped, and rely quite heavily on strategic and statutory planning controls for success. (sub. 67, p. 14)

- the information base for decision making is incomplete.

Yet the costs associated with shortfalls in coordination are so large that considerable effort to achieve better outcomes is warranted. Coordination between those with responsibility for transport and other Government departments is often neglected. There are many examples of significant developments that have proceeded without considering their effect on transport policy and congestion.

Between transport and other policy areas

Much of the necessary coordination on transport matters takes place through DOI. Moreover, Government-wide decision-making processes—for example, for the annual budget—impose coordination requirements. In addition, ad hoc or project based consultation occurs. Nonetheless, participants were concerned that lack of coordination leads to government departments implementing projects or policies that have transport implications that are not fully accounted

for. The Melbourne City Council argued that site planning for major developments, such as hospitals and other government buildings, often does not account for their transport implications.

The Yarra City Council also pointed to:

- requests by the Planning Minister for more parking spaces in large Central Business District (CBD) developments (such as the Southern Cross, Federation Square, the Children's Hospital and the Casino) than required under the City of Melbourne's planning scheme
- release of land for development on the city fringe without serious consideration for public transport infrastructure (sub. 63, p. 20).

Similarly, in discussion with the Commission, participants have claimed that development of the CityLink overpass at Footscray Road was undertaken without any consideration of freight/traffic implications and has severely restricted rail access to the Port of Melbourne.

In addition, participants claimed that schools are being sited and developed with inadequate consideration of their congestion implications (box 9.11).

Box 9.11 **The impact of schools on traffic congestion**

In Melbourne, most children are driven to and from school each day although, a generation ago this was the case for a minority of students. Typically, around 60 per cent of primary students are driven to school five days a week. This can have a significant impact on traffic congestion since school children are usually dropped off around the time congestion peaks in the metropolitan area. Children being driven to school account for about 17 per cent of all metropolitan trips between 8.30 and 9 am (Morris et al 2001, p. 2).

For proposals to establish or expand private schools, the school authorities must satisfy the local council that adequate parking and traffic arrangements have been made in accordance with the municipal planning scheme. In the event of a dispute, the dispute may be referred to VCAT for determination. An example of where local residents were concerned with a school's impact on local congestion was the development of a new junior campus for Camberwell Girls Grammar School. In a planning application appeal to Victorian Civil and Administrative Tribunal (VCAT), local residents submitted that the car traffic generated by students and teachers would create 'a real prospect of extensive congestion and delay, particularly in the morning peak' (Symons 2005, p. 9). In early 2006, VCAT directed the Boroondara Council to grant a permit for the proposed development, subject to conditions.

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Box 9.11 **The impact of schools on traffic congestion** (continued)

While private schools must address congestion issues through the planning process, this is not the case for the Victorian Department of Education and Training. Section 16 of the Planning and Environment Act provides that a planning scheme is binding on every Minister and Government department unless an exception has been granted by an order made by the Governor in Council. A specific exception was granted to the Minister for Education in 1988. The order was on the basis of a direction given by Premier John Cain that government departments would engage in effective consultation on planning matters that fostered cooperative involvement of local government in state planning. The Premier indicated that effective consultation calls for more than 'mere circulation of proposals' (Cain 1982). The direction is still binding on Ministers and departments, although it is doubtful whether the process is fully effective, particularly in the case of existing schools where the roads cannot cope with the number of children driven to and from school.

The Department of Education and Training advised that there is no formal consultation process with local councils flowing from the exemption granted to the Minister for Education. When funding for a new school is announced, the regional director of education establishes a planning committee to assist in planning the new school. A representative from the appropriate council is invited onto the committee, if available. Other members of the committee include a regional facilities manager, principals and teachers from existing schools likely to be affected by the new school, a fully endorsed union member, a local member of parliament (if available) and two or three parent representatives. The arrangement does not appear to ensure effective consultation with the local council to deal with traffic and parking problems.

Councils in consultation with the department can, however, influence the siting of schools when a developer applies for approval for a subdivision that includes land set aside for a school. The Department has advised that councils routinely seek its views on such applications, although it is not a referral authority. The Department has some interest in student access issues, preferring sites that have three street frontages and provide for indented street parking. It prefers primary schools to be located on collector roads, for student safety, but encourages secondary schools to be located on feeder and arterial roads to improve access to public transport.

Among transport modes

Participants and other experts consistently argued that coordination among those responsible for making decisions on roads and public transport is inadequate. Typical of these views was the Infrastructure Planning Council, which was concerned that separation of the decision making processes and budgets for different forms of transport results in the network operating as a series of modal submarkets:

> It is the Government's role to take a network perspective. The different types of transport services should operate as a network, not as a series of modal

> sub-markets competing with each other for patronage. The current institutional arrangements especially the separate budget for road funding and the separation of VicRoads from the other transport functions within the Department of Infrastructure, have not encouraged such a holistic view. (IPC 2002a, Ch. 7, p. 46)

Similarly, the Bus Association Victoria said:

> Currently there is no central transport planning body publicly accountable for advising on transport priorities for Melbourne. Instead, VicRoads, DOI Public Transport Division, and DOI Freight and Ports Division independently propose projects that are evaluated departmentally and by central government agencies, in most cases without community input or review.
>
> No government agency provides independent objective advice to the community or government on funding allocations between modes, particularly in relation to the ability of the proposed initiatives to tackle congestion. (sub. 57, p. 40)

The Victorian Police argued that a 'lack of synchronisation between bus services and train timetables discourages public transport use' (sub. 71, p. 3). The RACV expressed concern about overlap and duplication of effort and resources in the roles of DOI and VicRoads and other agencies, such as the Southern and Eastern Integrated Transport Authority (sub. 59, p. 26). Various examples illustrate participants' concerns about lack of integration among different transport modes:

- The City of Yarra suggested that the public transport zone fare structure encourages car use by outer urban residents, which local government then has to manage. It noted that buses are not allowed to pick up in High Street Kew in competition with the number 48 tram. Both modes start in different locations and finish in the city, sharing the same route for a short distance. The City of Yarra suggested that the lack of integration and coordination illustrated by this example probably loses passengers for both modes, as 'it is just too hard to try and use public transport' (sub. 63, p.20).
- Scheurer, Kenworthy and Newman argued that Melbourne's public transport system attracts a low proportion of transfer trips, partly due to insufficient physical interconnectivity between trains, trams and buses, and partly due to uncoordinated timetables and the placement and design of interchange facilities (2005, p. 23).
- The Melbourne City Council (in meetings with the Commission) and the Bus Association Victoria (sub. 57, p. 43) argued that the Southern Cross Authority missed an opportunity to build an efficient bus–train interchange in the new station.

- Scheurer, Kenworthy and Newman argued that, while Metlink provides coherent branding and publicity for urban public transport services, because it is owned by Connex and Yarra Trams it is not an accountable public transport agency and cannot independently plan and implement network and service improvements. They concluded, 'as a result, the involvement of the public sector in network and service development across the train and tram operations remains largely passive' (2005, p. 29).

The strategies to achieve coordination are somewhat *ad hoc*:

- Integrated transport strategies (chapter 4) are comprehensive transport plans for regions but only three are complete and two are under development. The effectiveness of these processes also depends on their implementation.
- Coordination has been attempted for some transport corridors such as changes to route 109 under the Think Tram Program. Originally proposed in 2003, negotiations over Think Tram projects have been extensive and protracted, involving state agencies such as DOI and VicRoads, local government and Yarra Trams (chapter 10).
- Special purpose bodies have been used to coordinate some major projects, such as the EastLink Project and the Southern Cross Station redevelopment.
- DOI has been charged with preparing guidelines to integrate transport infrastructure and development (DSE 2005a, p. 13).

While there can be benefits in trialling and evaluating alternative approaches to coordination, the different approaches do not appear to be part of a strategic attempt to systematically improve coordination. Lack of coordination is also exacerbated by the issues discussed previously, including VicRoads' level of autonomy and lack of a single public transport budget and coordinated project approval processes.

Contracted services

Because some services—toll roads, trains, trams and buses—are provided under contract to the Government, these arrangements need to ensure:

- operators' goals and incentives are consistent with reducing congestion
- operators coordinate their activities with each other
- sufficient flexibility to accommodate congestion reduction strategies.

Toll roads

Charging tolls on roads can affect congestion by:

- encouraging traffic onto surrounding roads and exacerbating congestion in other locations
- accommodating congestion pricing and improving congestion management.

Chapters 5 and 7 discuss the role of toll roads in managing congestion. The institutional issue relevant to this chapter is whether toll road contracts can accommodate the changes necessary to address congestion issues. As noted in chapter 4, tolls are set in the contracts and adjusting these tolls would require renegotiation.

Public transport contracts

The Property Council of Australia argued that there are problems with public transport contracts:

> The Property Council observes the current arrangements between public transport franchisees and the Victorian Government appear to be complicated. It is at times unclear who has ultimate responsibility for certain areas of the public transport system. Compounding the issue is a legacy of poor decision making, lack of forward planning and neglected infrastructure. (sub. 48, p. 6)

The City of Yarra was critical of the lack of flexibility in bus contracts:

> State Government bus franchises … are based on historical family rights and ensure family operations [that is] Monday to Friday with early evening finishes often 6.30 pm, very occasional Saturday morning service and virtually no Sunday service. This bears no relationship to the real world and travel demand in 21st Century. (sub. 63, p. 20)

The Bus Association Victoria argued:

> Funding to provide additional services to relieve overcrowding, or extend services into new residential areas usually requires specific budget allocations. These are currently decided only on an annual basis, often lagging demand.
>
> In the case of overcrowding there is a risk that potential public transport passengers will be deterred from using the system. In the case of new development areas, service provision often lags population, with residents forced into entrenched car dependency in the years prior to services being provided. (sub. 57, p. 41)

The Bus Association Victoria also suggested that the approaches to performance monitoring did not necessarily promote cooperation among modes:

> Melbourne's privatised public transport franchisees have various performance criteria, and these sometimes conflict—resulting in inefficiencies through modal bias.
>
> For example, Yarra Trams have a performance incentive for on time running. For buses to share dedicated tram fairways, there is a potential to delay trams—resulting in a direct financial loss for Yarra Trams. Thus it is not necessarily in Yarra Trams financial interests to share road space with buses. As a result buses are forced to endure congested traffic, making bus journeys slow and unreliable. (sub. 57, p. 41)

Public transport operators can reduce congestion by attracting passengers off roads and onto their services. Service contracts can encourage this by rewarding operators for increasing patronage and including conditions that encourage service provision to attract passengers.

The National Bus Company has the only contract with a strong link between patronage and the contract payments. In the original contract, nearly all the contract payment was variable and linked to patronage. In 2003, the variable component was reduced to 30 per cent. For other bus operators, contract payments are independent of patronage. Tram and train operators each receive 40 per cent of total fare revenue. This is a fixed formula and, therefore, operators would share the benefits of any increased patronage they generate.

The Government relies more on expanding patronage through performance assessment, while relying on incentive payments to maintain and improve service quality. Chapter 4 outlines performance standards, monitoring and enforcement. Chapter 3 reports on some aspects of operator performance. Standards should help prevent services deteriorating and patronage falling, as long as the service quality target reflects the issues that drive passenger numbers and the standards are met.

There are considerable gaps in understanding how improvements in public transport service quality affect the use of cars. Current service standard benchmarks measure punctuality, reliability, overcrowding and customer satisfaction. These standards are clearly important but there are likely to be others, including service frequency, the times services commence and cease, and the provision of weekend services, which are also important to passengers but would usually require Government agreement and additional funding before they could be implemented by the operator.

There is clear evidence from existing monitoring that the current standards are not always met. As noted in chapter 4, financial penalties place incentives on train and tram operators to improve their performance. While bus contracts also provide for such penalties, the Commission is not aware of any penalties being imposed. A significant problem is the lack of reliable data on bus performance, though the introduction of Smartcards, planned for 2007, is likely to significantly improve data collection and reliability. While perfect performance should not be expected, there appears to be scope to refine performance indicators, particularly once SmartCards are introduced.

All contracts require operators to use their best endeavours to coordinate with other operators (chapter 4). Bus contracts, for example, identify the services that are expected to connect with that operator's services. These requirements are, however, outside the performance measurement regime and there is no evidence on their effectiveness.

Finally, all contracts allow for the Government and the operator to propose and negotiate service changes. In discussions with the Commission, DOI indicated that a significant number of bus service proposals are developed between bus operators and DOI each year. There is no coordinated process for systematically assessing and ranking these proposals across modes and against other transport initiatives. Given the size of many of these initiatives, they are unlikely to justify a new budget bid on their own and, therefore, must be accommodated within existing budget allocations. In meetings in Geelong, bus operators noted the problems of expanding services, particularly to new areas, arguing that they are always playing catch up and passengers become car dependent before the public transport options are in place.

New service initiatives are also restricted to existing operators because the franchise agreements provide exclusive rights to provide particular services for the life of the contract. This precludes a new operator offering a different type of service, for example demand responsive buses, in competition with an existing operator.

9.3 Options for improving institutional arrangements

The Commission was surprised to find little useful literature on principles for coordinating complex government decision-making. Perhaps each coordination challenge has its own particular characteristics. Or perhaps principles underpinning good coordination are so obvious that they do not need spelling out. Nevertheless, problems have been identified and the Commission has therefore found it useful to set out explicitly a set of principles to guide good coordination. These are summarised in box 9.12

Box 9.12 Best practice principles on coordinating decision-making

Principle 1: Clearly stated high level strategic goals

There should be high level strategic goals, based on the outcomes that the Government wants to achieve (taking account, for example, of passenger and freight traffic and interdependencies between transport modes and between transport and related areas such as land use).

Principle 2: Appropriate allocation of roles and responsibilities

Outcomes will be influenced by the way in which roles and responsibilities are allocated between the three levels of government and the large number of agencies operating in the transport sector. There is not necessarily a 'best' way to allocate these roles, but overlaps should be minimised.

The 'subsidiarity principle',[4] suggests 'assigning governance functions to levels of government most able to deliver functions in pursuit of accepted goals'.

In addition, role allocation should avoid:

- overlap and shared responsibilities between different agencies
- conflicts between the roles performed by different agencies
- conflicts of interest in the roles performed by an agency.

Principle 3: Clearly defined objectives for individual agencies

The extent to which agencies focus on the Government's strategic goals will depend on whether they have clearly defined and non-conflicting objectives that support the higher level goals. The legislation surrounding these agencies should embody these clearly defined objectives, as should any supporting regulation, guidelines and codes of practice. Clearly defined objectives, as well as providing focus, permit the development of performance indicators. Transparent reporting of performance against such indicators enables agencies to be held accountable for their actions.[5]

Principle 4: Transparency

Transparency is a prerequisite for accountability. In addition, transparent airing of transport options gives all of those affected an opportunity to express their views. This facilitates more informed decisions and is also likely to foster community acceptance of those decisions. Providing more information about options makes it harder for narrow interest groups to have a disproportionate impact on decisions.

(continued next page)

[4] The Australian Oxford Dictionary defines subsidiarity as the 'principle that a central authority should have a subsidiary function, performing only those tasks which cannot be performed at a local level' (Oxford University Press 1999, p. 1338).

[5] The Commission's analysis of regulation of housing construction (VCEC 2005, chapters 8–10) provides an example of the contribution that these characteristics can make to the achievement of desired outcomes.

Box 9.12 **Best practice principles on coordinating decision-making** (continued)

Indicators of transparency include:

- publication of performance indicators
- publication of investment plans and underlying benefit–cost or multi-criteria analysis
- external expert assessment of an agency's operations.

Principle 5: Consultation

Consultation can improve decision making by drawing on external sources of information, improving the Government's understanding of practical and implementation issues and increasing voluntary compliance.

The OECD developed 10 guiding principles for good consultation. Broadly they propose that public participation should be undertaken early in the decision making process, be adequately resourced and coordinated, with the objectives and constraints on the process made clear at the outset. There should be strong government commitment to consultation, providing objective public information and encouraging two way discussion. The government should be accountable for its use of the information from consultation and evaluate the policies that result.

Principle 6: An integrated approach

Institutional and organisational arrangements are likely to lead to better outcomes when they provide a framework that encourages appropriate recognition of interdependencies. Evidence that this is happening could be:

- the extent to which agency objectives encourage an integrated approach, where appropriate
- coordinating rules (relating to, for example, budget and regulatory impacts)
- memoranda of understanding specifying, for example, the lead agency, processes for coordinating information flows and decision-making
- transparency of decision making
- removal of impediments to appropriate integration.

Principle 7: Maximise the scope for market decisions

Transport networks need to respond to the varying needs of large numbers of users. In most areas of the economy, markets coordinate the activities of large numbers of market participants to achieve outcomes consistent with consumers' objectives. While markets may not be feasible for some transport decisions, their role can be significant. Commercial incentives can improve performance and innovation. Franchise competition is possible.

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Box 9.12 **Best practice principles on coordinating decision-making** (continued)

The attractiveness of market-oriented approaches may increase as technology reduces their costs, while growing scarcity of transport infrastructure increases the benefits that markets can create. If the institutional framework erects barriers to the emergence of markets, it can impede the search for more efficient ways of resolving transport congestion issues.

Principle 8: Capacity to implement

With many different agencies typically involved in transport decisions, and many interests affected, decisions can be delayed by failure to reach agreement. The challenge is to have a process that encourages timely decisions while those affected are satisfied that their views have been taken into account. A structured consultation process, with well defined and realistic timelines, a clear framework for decision making and an adequate dispute resolution process will help.

The remainder of this section applies these principles to the regulatory and institutional arrangements for transport management, drawing on the issues that have been identified in section 9.2, and suggests options for addressing them. The principle of transparency is closely linked to several of the other principles. Transparency issues are therefore discussed in conjunction with other issues.

9.3.1 Objectives

Having appropriate high level objectives that 'cascade' down into related objectives for each agency is a prerequisite for achieving the Government's outcomes for the transport sector. Chapter 4 pointed out that, while several policies outline the Government's transport objectives, there is not a unifying set of objectives for transport legislation. An option for reform is for the objectives for the Department specified in section 4(1) of the Transport Act (chapter 4) to become the objective of this and related transport legislation, which would then become the responsibility of DOI and other government agencies operating under the Act.

Section 4(1) makes it clear that the Government, through DOI, is seeking outcomes that relate to efficiency, effectiveness, safety and reliability. There may be trade-offs between these outcomes; for example, it would not be efficient for the system to be completely reliable as the costs of achieving this would be prohibitive. However, section 4(1) recognises this tension by specifying that the Department is to seek optimum overall outcomes. These objectives may also need to be balanced with other goals such as access to transport and environmental outcomes. Where this is the case, the Government should provide guidance on how conflicting objectives are to be resolved.

Congestion is not specified in the legislation as a desired outcome. Rather the legislative objectives require agencies to ensure an efficient and effective transport system. Under the Transport Act, for example, one of the objectives of DOI is 'to improve the efficiency and effectiveness of transport facilities and networks to meet the needs of the community' (s.4(1)(a)).[6] The Road Management Act states that road authorities, such as VicRoads and municipal councils, are to ensure that a safe and efficient network of roads is provided primarily for travel and transport (s.20). The principles in the Road Management Act also require road management authorities to avoid or minimise disruption to traffic (s.20(2)(d)). The Rail Corporations Act states, 'the principal objective of Rail Track is to perform its functions in an efficient and commercial manner' (s.10). These broader objectives would include managing the disruption caused by congestion. Moreover, the *Metropolitan transport plan* (Government of Victoria 2004a) identifies managing congestion as one of four outcomes to guide investment in the transport network.[7] This plan provides further guidance on the treatment of congestion within broader transport objectives.

9.3.2 Allocation of roles and responsibilities

A poor allocation of roles and responsibilities can exacerbate nearly all the problems identified in section 9.2. An appropriate allocation of roles can help balance the treatment of the different modes and avoid conflicts of interest, which may otherwise bias that treatment. It also minimises gaps and overlap and ensures clarity about responsibilities, which facilitates coordination. Specifically, there seem likely to be benefits from assigning:

- issues covering more than one transport mode (including policy advice) to an agency that focuses on the transport network as a whole
- service delivery to service providers
- issues consistent with their geographic coverage (for example, issues that relate to a particular local area may be assigned to a local agency).

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[6] Section 4 states the objectives of DOI are:

(a) to improve the efficiency and effectiveness of transport facilities and networks to meet the needs of the community; and

(b) to ensure that a public transport system is provided in Victoria that is efficient, effective, safe and reliable and has due recognition for the needs and interests of the users of that system and the taxpayers of Victoria; and

(c) to ensure the achievement of optimum overall transport outcomes by undertaking integrated transport planning and integrated transport system and service development linked to the overall planning strategies and other policies of the Government.

[7] The other outcomes are providing a safer transport system; managing metropolitan growth; and supporting economic growth by improving the efficiency of freight and commercial transport.

The division of responsibilities among agencies within the Victorian transport sector (chapter 4) is as follows:

- DOI—a central department with information about all transport modes—is responsible for achieving overall transport outcomes through integrated transport planning
- service provision is delegated to public and private service providers
- responsibility for roads is allocated according to whether the roads are primarily local in nature or have wider significance
- DSE is responsible for developing land use planning frameworks, while planning schemes are prepared and administered by local governments.

Such a division results in a large number of diverse agencies involved in transport planning and management. Its success requires sophisticated coordination and accountability to enable DOI to manage the overarching policy framework and coordinate the activities of planning agencies (DOI and DSE) and operators (VicRoads and public transport providers). Many of the problems identified in section 9.2 indicate there are gaps in coordination and accountability, such that the existing structure is not delivering the outcomes the Government is seeking. This problem can be addressed by changing the structure and the allocation of roles and/or improving accountability and coordination. Structural change is considered in this section, accountability and coordination are discussed in later sections.

Road space management

The allocation of responsibilities between State and local government affects who is responsible for planning and road management. As noted in section 9.2, these roles interact and there is some:

- confusion among stakeholders about different agencies' roles
- delay in decision-making processes caused by the consultation mechanisms used.

A solution suggested by some participants was to reallocate roles so that either the State Government or local government has clearer overarching decision-making powers. This could include reallocating the responsibilities for managing transport decisions on or around arterial roads, which is the area with the greatest potential for overlap and protracted processes. The RACV suggested:

> The State Government (not local government) should have planning and operational responsibility for the arterial road network, and this network should be managed to achieve regional or state-wide (or even nationwide) economic, social and environmental outcomes. (sub. 59, p. 4)

Ms Julie Toth, on the other hand, supported a different role allocation:

> Planning and control of the large arterial roads in inner Melbourne should be handed back to local councils (in conjunction with the state transport department) so that they can be integrated into local traffic and streetscape planning. (sub. 5, p. 2)

Allocating responsibility for roads to a single authority with a clear mandate to allocate that space between competing uses could lead to more rapid decisions. Such decisions may, however, be less balanced between community and state priorities. As noted in several submissions (section 9.2), the interests of a local community, for example in the inner city, are not necessarily synonymous with the wider population, those moving through a suburb on their way to other destinations, or the freight industry. It is inescapable that there are tensions between different interests affected by road use.

If the Victorian Government overrides local priorities, transport priorities and congestion management would take precedence over local amenity. State based transport planning processes are not well suited to identifying and accommodating community specific issues. If local government had overarching responsibility for decisions, then local interests would take precedence over through traffic and broader state objectives. This raises problems as transport issues do not fit neatly within local government geographic boundaries.

If it was decided that changing the allocation of responsibilities was appropriate, there are several ways this could be done, some of which are inter-related:

- Legislative change to the Transport Act, the Road Management Act and the Local Government Act to reallocate responsibilities. This could also clarify that all local government decisions about transport related activities should be made consistent with the objectives of the transport legislation, even if the decisions are being made under provisions in the Local Government Act.
- The Victorian Government articulating in other ways its priorities, particularly when transport objectives and local amenity are in conflict. This would set limits on the scope of negotiations about alternative uses of road space and should facilitate more rapid resolution of issues.
- Amend the codes of practice relating to clearways and the management of road works to limit the scope of negotiations, providing more certainty and generating faster decisions.

An option is to clarify roles and responsibilities to minimise confusion and facilitate decision making. The RACV has suggested that resolving the use of road space would be facilitated by an improved planning framework for arterial roads and allocating responsibilities at three levels (sub. 59, pp. 13-15):

- *Strategic planning*, which should produce outcomes including personal mobility, mobility of freight, transport safety and security, and recognition of the relationship between the transport system and urban structure.
- *Tactical planning*, which would provide a framework for resolving 'hard choices' at the regional level where competing choices need to be resolved. Clear objectives would be developed for particular parts of the region, for particular routes, for priority for particular vehicle classes, and for parking strategy. A key issue to be resolved is an appropriate functional hierarchy of roads and streets within a sub-region or corridor.
- *Operational planning*, which needs to be informed by, and seen to achieve, tactical and strategic objectives.

In implementing this proposal the RACV argued that:

> The key decisions need to be made what we have referred to as the tactical or sub-regional level. This is less than the entire metropolitan area, but in many cases may be larger than a single municipality. … RACV is concerned that current planning practice in Victoria does not allow for this sub-regional planning, and more importantly, we do not detect strong acknowledgement of the importance of these key conflicts (or opportunities) at the subregional level. (sub. 59, p. 15)

Correspondingly a further option is to use decision making processes that are a hybrid between state and local interests; that is, regionally based. Existing regional processes, such as integrated transport strategies, focus on planning rather than road management and are advisory. They assist with coordination but do not change decision making responsibilities. The risk with moving from an advisory level to decision making is that the process simply adds another level of bureaucracy and will create further confusion and overlap in roles.

The clarification of roles is discussed in section 9.3.4 on integration.

DOI's and VicRoads' roles

Within the State Government there are two major role allocation issues:

(1) responsibility for integrating transport planning—currently DOI
(2) the role of VicRoads, relative to the state agencies responsible for strategic transport planning and public transport management.

No participants questioned VicRoads' efficiency and effectiveness as a provider of roads. There is a widespread, but not universal, perception, however, that it is

excessively influential in priority setting for transport as a whole. It is difficult to assess whether this is actually distorting the choice of options for managing congestion towards those relating to the supply of roads. However, the Commission's analysis of the institutional framework within which VicRoads operates suggests that this is a risk. There are many options for addressing this risk.

Several participants argued for fundamental change to the institutions involving DOI and VicRoads (box 9.13).

Box 9.13 **Participants' views on structural reform**

On integrated transport planning, the RACV argued there is:

> … a need for an integrated, multi-modal approach to transport policy and planning that recognises the complementary roles of the various modes of transport. (sub. 59, p. 3)

It suggested that:

> Institutional responsibility for transport should be reformed, with a central agency (such as DOI) being responsible for high level policy and legislation, and a single or small number of multi-modal agency(s) (incorporating VicRoads, SEITA and the project arms of DOI) being responsible for system management, planning, development and delivery. (sub. 59, p. 4)

Mr Alan Parker argued that:

> As Professor Peter Newman has recommended, there needs to be a powerful public transport group created to plan the changes that are needed to the public transport system in order to reduce road congestion. (sub. 18, pp. 14-15)

There were different views about whether the transport planning agency should be within a government department or a separate authority. Some, like the PTUA, proposed amalgamating DOI's and DSE's functions, suggesting that the:

> … disconnect between transport and land-use planning must be resolved by merging the planning and transport portfolios into a single department and absorbing all policy functions from VicRoads. (sub. 65, p. 18)

Others argued for a separate agency. The Bus Association Victoria suggested:

> … the government should consider establishing a multi-modal transport planning authority, responsible for objectively analysing the long-term impacts of transport proposals, advising government on transport policy planning that will best tackle increasing congestion in our cities, and other related policy objectives. (sub. 57, p. 3)

Councillor Jackie Fristacky argued that:

> There is need for an Integrated Transport Commission with the direct mandate to plan for and implement an integrated transport system for Victoria. (sub. 58, p. 5)

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Box 9.13 **Participants' views on structural reform** (continued)

Mr Kayak suggested that responsibility for coordination should rest within the central agencies of government, such as the Department of Treasury and Finance:

> Long term sustainable mobility requires some re-allocation of priorities. I submit the case that this can only be achieved through a Treasury based central integrated land use and transport agency. The charter for which balances social, environmental and economic outcomes. (sub. 44, p. 2)

The VACC supported an intergovernmental agency, seeking:

- assurances that integrated actions are supervised by an intergovernmental authority
- intergovernmental authority actions being supported by regular independent assessment of congestion reduction measures. This is required for an open and accountable program of congestion reduction. (sub. 38, p. 2)

Several submissions also argued that VicRoads should have the same position in the organisational structure as those responsible for public transport services. Mr Seyers recommended that there should be a 'similar organisational structure and lines of reporting for public transport improvements that is employed by VicRoads' (sub. 9, p. 4). Ms Julie Toth suggested bringing VicRoads functions within DOI:

> VicRoads should be abolished or amalgamated into the transport department. This would enable transport planning to proceed from a more holistic framework (that is, a framework that is broader than just big roads) than happens currently. (sub. 5, p. 2)

These proposals, while not identical, share the common features of bringing together transport planning and removing strategic policy functions from transport service providers such as VicRoads and combining this role in one organisation.

Structural reform

There are many options for allocating roles and responsibilities to various agencies. Generally, the more decision making power is located in one agency the less the risk of overlap, gaps and conflicts, but the greater the risk of conflicts of interest within the agency and responsibilities being given to an agency that is not well placed to manage those responsibilities and any associated risks. Some of the options at various levels in the decision making process are noted in table 9.1.

Table 9.1 **Options for allocating roles and responsibilities**

Level of decision making	*Options*
a) Ministerial level—responsible for government sign-off on strategic policy and ultimate responsibility for all agencies.	1) Maintain separate Ministers for Transport, Urban planning and Local Government. 2) Combine responsibility for one or all of these functions.
b) Coordinating agencies—responsible for strategic policy and oversight of the implementation of that policy.	1) Maintain separate bodies responsible for transport, land use and local government policy. 2) Combining transport and land use planning in one government department. 3) Centralise planning decisions within a central agency of government, such as the Department of Treasury and Finance. 4) 4. Set up a separate agency responsible for oversighting transport and logistics planning and transport service providers.
c) Operational agencies—delivering government policy.	1) Retain an independent roads manager with public transport managed within a government department. 2) Separate public transport management into an independent agency, similar to VicRoads. 3) Bring VicRoads within a government department. 4) 4. Combine road and public transport service delivery responsibilities into one agency.

a) Ministerial level

At the ministerial level, combining roles would improve coordination by making one Minister responsible for related decisions and would reduce the need for conflict resolution processes, as provided for in the Transport Act for disputes between the roads authority and local government. Combining all the above roles in the one person, however, is likely to be impractical. The range of issues is very broad and a single minister is unlikely to be able to cover all issues effectively.

b) Coordinating agencies

Combining all transport and land-use planning responsibilities, including the state department with responsibility for local government, would be unwieldy. It would either result in an enormous bureaucracy or it would require splitting off other activities that are currently undertaken by these agencies. Issues associated with broader reallocation of functions are beyond the scope of this inquiry. In addition, given the role of local government in Victoria, some level of policy separation between local and state agencies is likely to continue.

Moving transport planning into a central agency of government would not necessarily improve transport outcomes. Central agencies are not well equipped to manage the service delivery necessary to make transport policy effective. It would be better to consider other ways of raising the profile of transport issues.

The most practical options therefore include:

- combining transport and land use planning in one government department
- setting up a separate agency responsible for transport and logistics planning
- strengthening the role of DOI as the coordinator of transport policy.

Some governments combine land use and transport planning. In Vancouver, for example, the Liveable Region Strategic Plan encourages a more compact regional land use pattern and limits growth in areas where access is restricted by bridge crossings. It also supports public transport use by helping focus employment growth closer to where people live, and where public transport services are most available. In addition, it limits new highway infrastructure and increases the supply of public transport services (chapter 6). Similarly, the Western Australian Planning Commission is the peak representative body of land use planning and development in that State. It coordinates activities across all aspects of the State's planning process.

In Victoria, combining land use and transport planning would return to the departmental structure that existed until December 2002 and involve substantial institutional change and cost for the Government and the departments concerned. Moreover, simply combining functions within a department does not guarantee coordination. This option would be worth pursuing only if supported by strong evidence that its benefits would exceed these costs, and the benefits could not be achieved by improvements to coordination discussed in section 4.3.4.

In 2002, the Infrastructure Planning Council (IPC) proposed that essential elements of transport management and planning be brought together. It considered that:

- all transport and logistics functions of the Department of Infrastructure should be brought together in a single and separate organisation, *VicTransport and Logistics*
- the functions of the organisation would include the planning and the overall development of transport infrastructure
- funds should be allocated from a single transport budget
- transport planning should be coordinated and checked against the State's overall strategic plan (the metropolitan strategy is an example of such a plan for at least part of the state), developed elsewhere in government. (Infrastructure Planning Council 2002b, p. 56)

The Government, however, rejected the IPC's recommendations, arguing that a holistic approach to transport planning has already been achieved:

> The Government supports a holistic approach to transport infrastructure planning and delivery and supports the continuing integration of transport and logistics functions within the Department of Infrastructure (DOI). However, the full integration of DOI and VicRoads is not supported. DOI provides a capability for integrated planning and infrastructure delivery not found anywhere else in Australia. The creation of DOI has integrated the transport function and responsibilities under one department, which brings together road, public transport, freight transport, ports and air transport responsibilities. Further, DOI's planning and project development and delivery provides balanced transport outcomes based on needs and priority. This has been evidenced by the significant increase of funding allocation towards public transport infrastructure improvement and rail freight infrastructure investment.
>
> DOI and VicRoads serve different roles but work together in an integrated way. Formal processes have been put in place to improve strategic alignment and the level of integration – for example, establishment of outcome groups and an integrated budget process within DOI. The improved integration of road, rail and intermodal planning functions within DOI align more closely with proposed changes to the Commonwealth's approach to land transport infrastructure funding, as set out in its proposed AusLink framework.
>
> Transport planning is integrated with the Government's strategic directions and polices including Growing Victoria Together, the Metropolitan Strategy, Ports Agenda 2002 and economic development objectives. In addition, the Freight and Logistics Strategy being developed by DOI will establish a framework for integrated planning of freight movements. (Government of Victoria 2002, p. 35)

It is clear that the establishment of DOI with an intermodal focus, and other government strategies, has improved coordination of transport planning and service delivery. Recent experience suggests there is potential for further improvement by either structural reform or better coordination.

If major structural reform is not adopted there are likely to be benefits from strengthening DOI's role in developing policy and overseeing service provision, to ensure transport outcomes are consistent with the government's strategic direction. This could be done by giving DOI responsibility for:

- approving the corporate plans of all transport agencies, including VicRoads, before they are approved by the Minister
- approving the budget of transport agencies, where State Government funding is required, prior to ministerial approval. When there is funding from other sources (such as the Commonwealth Government) DOI should review the allocation of these funds to ensure it is consistent with Government objectives
- providing all transport policy advice to the minister and seeking input from other relevant agencies in the development of that policy.

The advantage of these changes is that they would clarify the primacy of the department in providing advice to the minister about transport policy issues. By doing so, they would strengthen the capacity of the department to provide integrated advice and to achieve neutrality between the different transport modes so that the best solution is sought, irrespective of transport mode. The risk with such changes is that they will only lead to improved outcomes if DOI maintains efficient processes in its engagement with service providers and consults effectively. If DOI is slow, inconsistent or unclear in its dealings with service providers, more authority could impede the ability of other agencies, such as VicRoads, to operate efficiently and respond to changing transport needs.

c) Operational bodies

As noted in section 9.2 there will be a risk of unequal treatment of roads and public transport in terms of input on policy options while the managers of each mode have significantly different positions in the organisational structure and decision making hierarchy. One option is that proposed by Mr Seyers, who suggested a reorganisation that would see the CEO of VicRoads reporting to the Secretary of the Department, as would the Public Transport Division (including the Director of Public Transport), in order to place public transport 'on an equal pegging or increased powers than that offered to VicRoads' (sub. 9, p. 2).

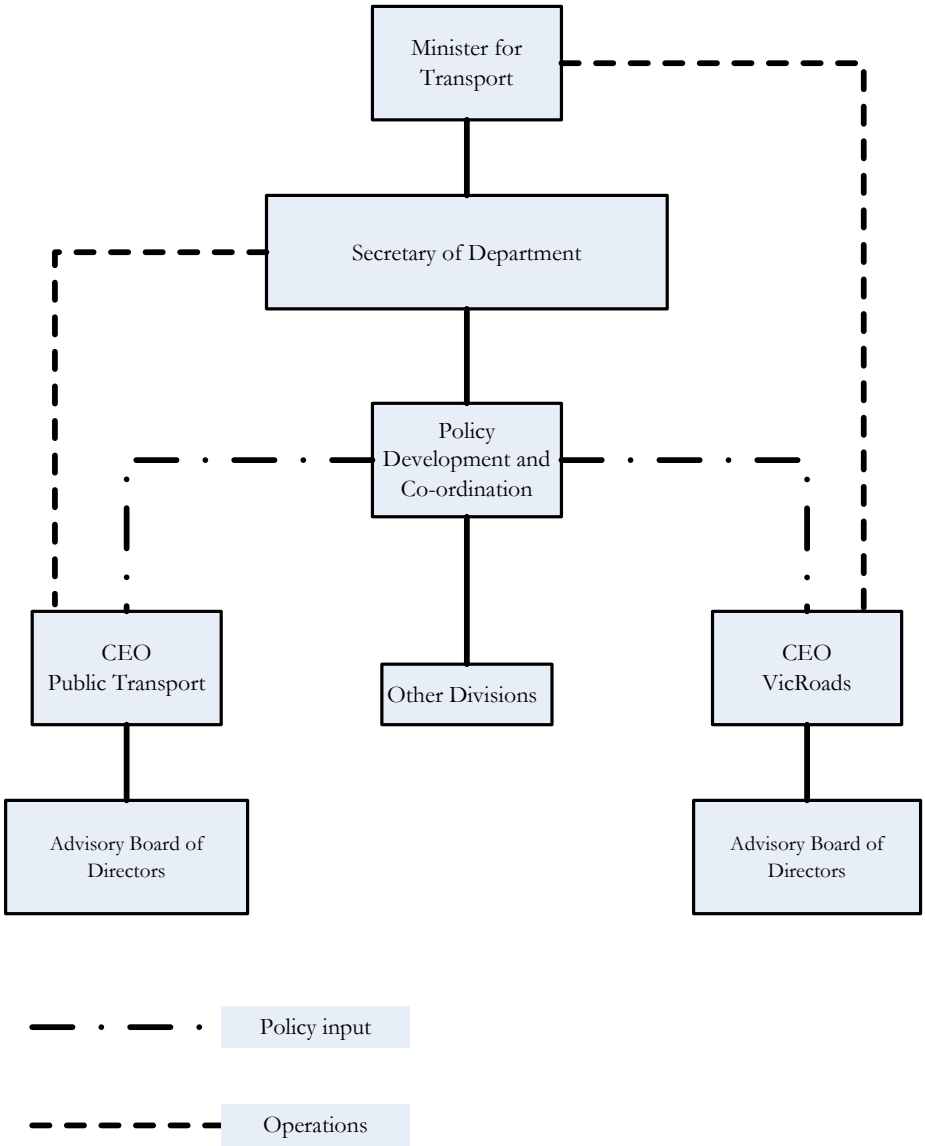
There are two problems with this option. The first is that VicRoads is already a statutory body, reporting to the Minister, with clear operational responsibilities.

While concerns have been expressed elsewhere in this chapter about the policy role it performs, it would weaken the effective administration of the transport system if its operational functions, or its clear accountability in this regard, were constrained. This is not the intention.

The second is that major operational roles in public transport are performed by the service providers—Connex, Yarra Trams, Metlink and the bus operators. While the Public Transport Division in DOI has a key oversighting function, its most important roles are its input into overall transport policy and responsibility for project management resulting from enhancement of the public transport network. In this regard, there is likely to be advantage in having an advisory group for the public transport management group, selected on the basis of skills as well as representation of relevant industry bodies. The same point about the composition of an advisory group applies to VicRoads.

A possible option, illustrated below, sets out how an arrangement which separated out the principal policy role of DOI, and recognised the operational responsibilities of both VicRoads and the Public Transport Division, might work. The Commission is interested in participants' views on this or other options.

Figure 9.2 **Alternative organisational structure for transport services**



Source: sub. 9, p. 5 (modified)

9.3.3 Integration

Section 9.2 pointed out that many participants believe that integration of transport activities is inadequate. Reallocation of roles and responsibilities to one agency would reduce the need for coordination and integration. To the extent, however, that several related agencies remain, integration will be necessary as any effective congestion reduction strategy would need to be multifaceted, involving

a range of policies implemented by different agencies. As recognised by VicRoads:

> There is no 'silver bullet' solution to transport congestion. The approach of major urban areas around the world in tackling congestion is on three fronts. Each front is worked on at the same time and with ongoing effort. The three fronts are:
>
> - continue to provide road, public transport, bicycle and walking infrastructure to serve new urban development or urban re-development
> - get the best out of existing systems …
> - travel demand management. (sub. 50. pp. 15-16)

Integration can involve various levels of formality ranging through:

- information sharing—one agency has responsibility for decisions but it makes its decisions transparent, with sufficient lead times for others to take them into account in their decision making
- consultation in decision making—one agency has responsibility for decisions but in making those decisions it consults with others
- joint priority setting—where agencies agree on overarching priorities but are then free to implement those priorities as they see fit, subject to performance monitoring
- combined performance assessment—taking into account as part of an agency's performance assessment, the comments of other agencies it is required to coordinate or communicate with
- agreed decision making processes—the process for making decisions is agreed between agencies but the agencies with decision making responsibility then manage that process independently
- joint decision making—agencies come together to make decisions that are then binding on all the agencies involved.

Achieving an efficient amount of integration involves facilitating coordination without undermining the legitimate autonomy and incentives of the agencies involved. While this can be a difficult balance there are many options worth considering. The Queensland Government has adopted a more formal approach to coordinating planning and decision making in South East Queensland (box 9.14).

BOX 9.14 South East Queensland – integrated planning

South East Queensland is Australia's fastest growing area, with around 1000 people moving into the area each week. The population is estimated to increase from 2.6 million to 3.7 million in 2026 (Queensland Government 2005b, p. 8). The area shares some of the challenges faced by the urban growth areas in Melbourne, such as maintaining and providing infrastructure in the presence of large population growth, and balancing economic development with environmental protection.

Integration between State and local government – The South East Queensland Regional Plan

Starting in 1990, a number of plans attempted to bring state and local government agencies together to manage rapid population growth sustainably. While these non-statutory regional plans provided some guidance, there was a widely-held view that the voluntary regional planning framework required more resources and more effective implementation to manage ongoing growth pressures effectively (Office of Urban Management 2005). There was concern that the system was 'unable to deliver on a number of significant issues, including protection of environmental and natural resources values in the region' (Beattie 2005).

The Queensland Government responded by assuming greater control over the planning process. It established the Office of Urban Management in April 2004, to coordinate planning in South East Queensland and to guide the region's growth. It also amended the *Integrated Planning Act 1997* to oblige state agencies and local governments to ensure planning or development initiatives consider and reflect the Government's overarching plan for the region, the South East Queensland Regional Plan (Office of Urban Management 2005).

The South East Queensland Regional Plan and the accompanying South East Queensland Infrastructure Plan and Program were introduced in 2005 following wide consultation. They outlined how the growth will be managed between 2005 and 2026. The plans are detailed—for example, the Infrastructure Plan commits the Government to funding key infrastructure to 2016, including transport infrastructure, and predicts infrastructure requirements from 2016 to 2026 (Queensland Government 2005b). The Government intends to use infrastructure investment to shape the development pattern—'In some instances, this means implementation ahead of existing need' (Queensland Government 2005b, p. 4). The Government aims to increase planning process certainty and support and protect regional open spaces and rural production areas (Queensland Government 2005a, p. 6).

Integration between transport and land-use planning

The Queensland Government's intention to integrate transport and land use planning is expressed by the *Transport Planning and Coordination Act 1994*. The aims of Part 2A of the Act are:

- ensuring, as far as practicable, development does not have a significant adverse impact on existing and future public passenger transport

(continued next page)

Box 9.14 **South East Queensland – integrated planning** (continued)

- ensuring, as far as practicable, public passenger transport offers an attractive alternative to private transport in a way that reduces the overall economic, environmental and social costs of transport
- promoting urban development that maximises the use of public passenger transport
- increasing opportunities for people to access public passenger transport, including access by cycling and walking
- ensuring, as far as practicable, the provision of public passenger transport infrastructure to support public passenger transport.

Since September 2005, Queensland Transport has been a concurrence agency under the Integrated Planning Act and can assess and impose conditions on particular development applications using the Integrated Development Assessment System, a step-by-step process for making, assessing and deciding development applications (Queensland Government 2005c, p. 1).

Integration between transport modes

The Transport Planning and Coordination Act also requires development of a transport coordination plan that must:

- include criteria for deciding spending priorities for transport
- provide an adequate framework for coordinated transport planning
- provide a way to achieve effective and efficient land use for transport purposes.

The transport coordination plan is being updated by Queensland Transport. The Government is canvassing potential transport policies via a discussion paper, *Smart Travel Choices for South East Queensland* (Queensland Transport 2005). This will form the basis of a policy White Paper that is scheduled for release by the end of 2006.

The Queensland Government has improved the coordination of public transport services in South East Queensland. TransLink was established in 2003 to create a single integrated public transport network in the South East 'by centrally planning and coordinating all major public transport routes, services, connections and infrastructure' (TransLink 2004, p. 11).

Taken together, these changes are a significant shift towards a more integrated approach, coordinated by the State Government. It is too early, however, to judge whether the new arrangements will lead to improved outcomes.

Sources: Beattie 2005; Queensland Government 2005a, 2005b and 2005c; Office of Urban Management 2005; Queensland Transport 2005; and TransLink 2004.

There are key differences between Queensland's approach to integration and the current approach in Victoria:

- The South East Queensland Regional Plan covers a significant area and places legal constraints on decision making by local government in that area. Victoria's approach is less centralised.
- The Queensland plan is accompanied by a long term commitment to infrastructure funding. Victoria has not committed to long term funding.
- The Queensland department responsible for transport has a formal role in the planning process, which is anticipated, but still being negotiated, in Victoria.

The new processes being implemented in Victoria, such as the establishment of the Growth Areas Authority, are likely to reduce some of these differences, particularly in the growth areas. Victoria will need ongoing monitoring of these processes and should refine and improve its approach, drawing on its own experience and the experience in Queensland and other jurisdictions.

The Queensland approach also recognises that good planning will not guarantee integration between the decisions made by various agencies unless there is certainty that the plans will be implemented. This requires long term funding commitments to back up the plans. Participants in this inquiry also argued that long term commitment to funding is needed. The Bus Association Victoria submitted:

> Without a medium to long term transport plan and funding arrangements, it is not clear how exactly the government plans to tackle congestion. In particular, large scale long-lived infrastructure requires a long term coherent vision of how the transport system will work to meet the government's policy objectives. This is inconsistent with 3-4 year funding cycles and a project based approach. (sub. 57, p. 40)

The Government could consider making forward commitments to funding key transport projects that have been identified as critical to achieving the outcomes in Integrated Transport Strategies or Growth Area Plans.

Between state and local governments

Because state and local government are expected to retain separate areas of responsibility for congestion policy and road management, integration strategies will be important. Integration between state and local governments needs to recognise and minimise potential delays in decisions and conflicting objectives between local communities and the broader group of transport users, including those who travel through a community. Road space management (see section 9.3.2) is a particular issue, where there needs to be clarification of roles and responsibilities. But there is also scope for improved coordination. Such

coordination needs a clear decision making hierarchy and good tools at each point in the decision making process.

The Australian Council for Infrastructure Development argued that a 'whole of government' approach is needed to manage urban congestion and that state and local governments should work towards streamlining planning and regulatory requirements within a consistent framework. In its view, complex regulatory approvals processes are '… in urgent need of attention …', as they can delay infrastructure projects by years (sub. 54, pp. 2, 9).

The solutions that have been proposed to improve coordination between local and state government agencies are diverse. They could include:

- a memorandum of understanding (MOU) between the state and local government
- expanding the use of Growth Area Authorities and Integrated Transport Strategies
- providing more guidance to local government on state policies, including longer term priority setting and funding commitments
- devoting more resources to liaison between state and local government.

Memorandum of understanding between state and local government

The IPC in its 2002 review argued that to improve the relationship between the state and local governments, the State government should develop a memorandum of understanding (MOU) with local government that would:

- acknowledge the prime responsibility of the State for transport outcomes
- be explicit about aligning resource allocation with functions
- acknowledge the role to be played by local governments in a statewide transport planning process
- recognise the diverse role that different local governments play in transport management
- establish a statewide coordination body at the local government level for community transport in order to achieve an integrated approach to service delivery. (Infrastructure Planning Council, 2002b, pp. 58-9)

In its response to this recommendation, the Government recognised the benefits from improving coordination between the Victorian and local governments, but argued that mechanisms to achieve this had already been implemented:

> The Government supports the development of an enhanced State and local government relationship for transport outcomes. To this end, DOI, VicRoads, the Municipal Association of Victoria and the Victorian Local Government Association have commenced a project that will identify ways to better integrate transport planning at the State and local government level. From this project,

> planning principles will be developed for use in future transport studies. DOI is also undertaking with regional councils a series of action plans and strategies that have an integrated transport planning focus.
>
> However, the Government does not support the development of a specific Memorandum of Understanding between the State and local government. The current initiatives with local government will provide greater flexibility for local governments to achieve integrated transport outcomes. From an institutional perspective, the regional services and local government functions within DOI have been recently integrated, resulting in transport outcomes for local areas now being provided by DOI in consultation with local government. (Government of Victoria 2002, p. 36)

The initiatives foreshadowed in 2002 do not appear to have delivered all of the benefits expected by the State Government. Integrated transport planning has not extended to all local government areas and the plans do not appear to have delivered the clarity in decision making responsibilities envisaged in the IPC recommendation. One option is for DOI to approach councils to seek volunteers to trial such an MOU. This would determine the extent to which it adds to existing processes and whether an MOU is the best vehicle for clarifying local/state issues.

Such an MOU could cover any of the integration strategies discussed earlier in this section. An MOU that simply provided for information sharing or consultation, however, would not advance the current level of integration. An MOU with features such as taking account of the comments of other agencies in each agency's performance assessment process, agreeing on decision making processes and/or setting joint priorities, is likely to be more effective.

The option of developing an MOU should be available to urban and rural local governments. Indeed, in the regions, existing decision making frameworks for coordinating different interests and expertise, such as the one operating in Bendigo among local government and regional representatives of state agencies, could provide a sound base from which to develop an MOU.

Expanding the Growth Areas Authority and Integrated Transport Strategies

As pointed out in chapter 4, the Growth Areas Authority and Integrated Transport Strategies are two mechanisms that may improve integration among state and local agencies. Significant differences exist between these processes:

- The Growth Areas Authority is a permanent body charged with coordination. Integrated Transport Strategies are planning processes that are disbanded once the plan is complete. Lack of an ongoing body is likely to make implementation of Integrated Transport Strategies less certain.
- The Growth Areas Authority takes a more holistic approach to planning, whereas the Integrated Transport Strategies focuses on transport issues.

- The Growth Areas Authority process is only available in growth areas. While only a few Integrated Transport Strategies have been prepared they currently have a potentially broader application. It would be possible, however, to expand the Growth Areas Authority model to other regions if the government chose to resource additional bodies.

There is scope to expand both of these processes to cover more regions. As such processes are expensive and time-consuming, they would need to focus on issues that would generate significant benefits. The Commission considers that the broader ongoing process used by the Growth Areas Authority has the greatest potential to improve coordination and deliver the outcomes envisaged in planning processes. One option, therefore, is to review the Growth Areas Authority in three years with a view to improving its operation and identifying whether similar mechanisms would benefit other regions.

More guidance for local government

The Municipal Association of Victoria argued that local government needs more state government direction on long term transport planning and delivery:

> The State Government's policy and strategic plans are generally high level documents and of limited use in detailed local and regional area planning. As a prerequisite, the State Government needs to provide sufficient detail in its long-term transport planning and delivery, including plans for rail and road reservations, to inform local planning.
>
> The State Government should define the principal routes and service levels for different types of development and commit to their delivery. Along key routes, it is necessary to evaluate volumes of different users and establish a priority hierarchy for use in planning. This is particularly critical in the outer metropolitan fringe where large developments and new subdivisions are built with little transport infrastructure, poor connectivity, and limited services and employment. (sub. 30, p. 7)

Clarifying the state government's plans for long term infrastructure development can assist local government with their own planning decisions. It can also assist other government agencies when they make decisions about the location and supporting services for major state government developments. This requires a State commitment to the agreed outcomes and investment plans. As noted in the Whittlesea case study, its growth area plan was reviewed by a committee that included representatives from the council, VicRoads, DSE, DOI and the departments of Industry, Innovation and Regional Development and Human Services. The committee endorsed the plan but did not commit the government to funding identified projects. If, as part of the plan's review, the costs and benefits of key projects were confirmed and Cabinet endorsed a funded implementation strategy that covered some or all of these projects, the certainty

surrounding the outcomes of these planning processes would increase significantly. A similar process could be used for integrated transport strategies.

Councils also suggested more guidance is needed on specific areas of transport infrastructure management. The Maroondah City Council, for example, suggested:

> There is currently very little in the way of uniform state guidelines/policy in relation to Council's role in terms of the placement of bus stops, DDA compliance and bus stop maintenance. A uniform approach to the issue is required and the State Government should provide direction, policy and, if required, funding. (sub. 20, p. 3)

One option is for DOI to issue guidance notes that clarify government policy in key areas subject to negotiation between state government agencies, local government and private transport operators. These could cover public transport priority on roads, allocating bus lanes, restricting parking on arterial roads and improving pedestrian facilities.

Expanded liaison between state and local government

Good consultation is important for integration. This is illustrated by the coordination achieved in Bendigo, where there are close working relationships among local government and the regional representatives of DOI and VicRoads. For Ballarat, however, state government agencies located in Melbourne were not necessarily aware of each agency's projects in the region. Agencies need information about each others' activities and intentions if they are to achieve consistent outcomes. While consultation and information sharing improves integration, given the complexity of integration needed between state and local government agencies, consultation alone is insufficient. More prescriptive mechanisms are also necessary. Consultation is needed in conjunction with other integration options to ensure they work effectively. At a minimum, good information flow requires:

- someone in each agency being given responsibility for ensuring consultation occurs
- a clear point, or points, of contact be established, so others know who to talk to, at least in the first instance
- the initial contact person to have the authority, knowledge and decision making power to provide answers or quickly put the person in contact with someone who can.

The Commission received only a few comments on the effectiveness of information sharing. Several were complimentary about DOI employing a local government liaison officer and regional officers located in non-urban centres. Given the lack of detail about specific problems, the Commission is not in a

position to outline detailed options. It notes, however, that the DOI model of a local government liaison officer could be useful if information flows into and out of other agencies is also identified as a problem.

Between transport modes

A key benefit of adopting the previous options to restructure and clarify the roles and responsibilities of transport agencies would be improved coordination among transport modes. Even after significantly strengthening DOI's ability to integrate the activities of transport agencies and after placing the public transport and roads bodies on an equal footing, other issues need to be addressed:

- Ensuring that the full range of options are identified and considered.
- The budget for transport activities is split between modes, inhibiting a holistic view of funding.
- The lack of an overarching consistent project assessment framework that applies to all transport assessment proposals.

Identifying the full range of options

The need for a multifaceted approach to managing congestion is well recognised:

> Rising levels of road congestion are one of the frustrations of urban living. Increasing road capacity through road building programs alone cannot solve traffic congestion. Instead, the Government is proposing a range of complementary approaches. These include better management of the existing road system, improving the performance of the public transport system, and actively promoting travel by public transport, walking and cycling. (Government of Victoria 2004a, p. 24)

To develop an effective package of reforms it is important that all of the options are identified and considered. One advantage of the options discussed elsewhere in this chapter is that they would help put public transport and roads on a more equal institutional footing and help ensure that all appropriate road and public transport options are considered on their merits. While this would reduce imbalances between any supply-side options from different modes, it may not put supply-side and demand-side options on an equivalent footing. The DOI transport division, supplemented as appropriate by other agencies such as the Department of Treasury and Finance, should continue to have responsibility for ensuring that demand-side options are identified and considered at the same time as supply-side options for addressing transport congestion.

A single transport budget

The previous discussion noted that the public transport and road budgets are currently separate, inhibiting DOI's ability to ensure all modes have equal priority in funding decisions and exacerbating concerns that funding arrangements favour road over other modes. The most significant risk is that

projects would be chosen based on the availability of a source of funding, rather than because they are the best way of achieving the government's transport objectives.

The IPC argued that a single budget is essential to achieving an integrated approach to transport:

> To ensure an inter-modal approach at State level the IPC considered that a one-budget approach is also required. The different types of transport services should operate as a network, not as a series of modal sub-markets competing with each other for patronage and resources. A one-budget approach should achieve neutrality between the different modes so that when a problem or issues presents itself, the best transport solution is sought, be it road or rail, or some combination using the triple bottom line framework. (IPC 2002b, p. 54)

The first stage in integration would be to have a combined state budget where public transport and roads processes are assessed against a single funding pool. Although this would be a possible measure, it would not result in a fully integrated budget.

Firstly, local government roads expenditure is funded separately by the Commonwealth. It is not possible to incorporate this funding pool with the State's transport budget and therefore, coordination between state and local agencies would need to occur at the planning stages using the mechanisms discussed previously.

Secondly, the Better Roads Victoria Trust Fund is a separate allocation and would need to be open to public transport projects, not just VicRoads projects, to achieve integration.

Finally, 23 per cent of VicRoads funding comes from the Commonwealth Government. The Commonwealth mainly funds road projects and focuses on interstate links and national priorities, rather than the broader transport network. Fully integrating Commonwealth funds with the State Government funding, assessment and allocation processes would be very difficult.

Consistent approaches to project assessment

In February 2006 the Council of Australian Governments (COAG) agreed to:

> Strengthen and coordinate transport planning and project appraisal processes to ensure the best use of public investment by adopting Australian Transport Council-endorsed national guidelines for evaluating new public road and road infrastructure projects by December 2006. (COAG 2006, Communique, p. 6)

Victoria has, therefore, committed to the framework it will use to assess road projects. A further issue is how Victoria can adopt a consistent framework for assessing all transport projects, building on this national model without

undermining national consistency. Key issues to address in such a model are allowing for induced demand, the timeframe for evaluating and comparing projects and accounting for the combined effects of projects. As noted previously, the Commission has not had the time or information to fully analyse the different approaches to project assessment. It seeks information and comment in order to be able to cover this more fully in its final report.

The process for evaluating projects also needs to ensure transparency in decision making and that the lessons from previous projects are identified and incorporated into the design and assessment of future projects. For example, this could be achieved by:

- publicly releasing cost-benefit assessments to inform their development and improve the accuracy of the estimates of the costs and benefits
- conducting independent post implementation reviews of projects to identify their strengths and weaknesses and how they, or future projects, could be modified to achieve better outcomes.

Between Commonwealth and State Governments

State governments will be the most important level of government in tackling transport congestion, because congestion occurs largely within urban areas and states are responsible for developing and managing urban transport systems. Nevertheless, the Commonwealth Government is working with state governments on congestion issues. In February 2006 COAG agreed to conduct a review of congestion. This provides an opportunity both for the states to identify changes in Commonwealth policies that would lessen congestion and to share experiences on how to manage congestion (chapter 7).

There is considerable national road based research through Austroads. Austroads is an association of state and territory road transport and traffic authorities, the Department of Transport and Regional Services (DOTARS), the Australian Local Government Association (ALGA), and Transit New Zealand. It is governed by a council of the chief executives, or alternative senior executive officers, of the associated organisations.

> Austroads aims to be the Australasian leader in providing high quality information and advice and fostering research in the road sector. (Austroads 2004a, p. 3)

It achieves this by undertaking strategic research, preparing guides and manuals, supporting the work of the ATC (Australian Transport Council), supporting technical research capacity in road agencies, knowledge sharing and being involved in international forums on road issues. In its 2004-07 strategic plan, Austroads identifies travel demand management as an emerging issue and commits to undertaking research in that area.

There is no equivalent focus on public transport research at the national level, despite this report having identified a range of issues that would be of interest across Australia and where more research is needed. The Victorian Government could consider advocating national research in areas like the role public transport might play in reducing road congestion.

Between transport and land use planning

In addition to coordinating transport and land–use planning locally (discussed in the previous section on local government), coordination is also needed at the state legislative and policy levels, otherwise the frameworks that support local coordination will be ineffective. This involves a regulatory framework that allows for the effective input of transport issues into planning, and strong links between the transport and land use portfolios, to integrate policy development and implementation. Options for improving the regulatory framework include:

- reviewing legislative objectives to ensure they encourage an integrated approach
- changing legislation to include DOI as a referral authority under the Planning and Environment Act
- amending Victorian Planning Provisions to require provisions for adequate roads and public transport in major new developments
- ensuring public transport and roads have equal access to funding from developer contributions.

This would ensure that DOI and congestion issues are formally recognised within the planning framework. As noted previously, DOI's role as a referral authority is under negotiation. The Commission supports this initiative.

There is some debate about whether developer contributions are an efficient way of funding infrastructure (see for example the Committee for Melbourne sub. 34 and the Property Council of Australia, sub. 48, p. 7). The issue for this inquiry, however, is whether the approach to developer contributions is neutral between transport modes and, therefore, does not exacerbate congestion. Historically, these contributions have funded mainly road projects, so that further action may be needed to improve public transport's access to such funds. The outcomes achieved through developer contribution plans in growth areas need to be monitored to ensure that the greater emphasis on public transport (envisaged in that process) eventuates and the process is modified if this is not the case. In regions outside the growth areas, imbalances in the funding of road and rail projects through developer contributions should also be addressed. The Commission is interested in views on whether there are any institutional barriers to this occurring.

In these areas, betterment capture may be another means of funding infrastructure by levying those that receive the greatest benefits from the government's investment in transport services. The practical issues of setting, collecting and administering such charges would need to be addressed if such a policy was being considered. This is a complex issue which overlaps with land tax contributions. The Commission will further consider this matter in its final report and welcomes views from interested parties.

Options that would better integrate the land use planning and transport portfolios include:

- a formal agreement between the Minister for Planning and the Minister for Transport that they will consult on issues when there are implications for both transport and land use
- having a memorandum of understanding between DOI and DSE to ensure that all land use issues are developed with regard to their implications for transport, and vice versa
- rules or guidelines on when and how consultation should occur.

An agreement between the Minister for Planning and the Minister for Transport to consult on issues with linkages between transport and land use could help to facilitate government decisions that account for interdependencies between these areas. Much of the policy development and implementation detail is also undertaken by departments. If transport and land–use planning is not coordinated at the departmental level, coordination by Ministers would be very difficult and less effective. Departmental coordination could be made more formal through an MOU or rules or guidelines on when and where coordination should occur.

A public MOU between DOI and DSE would help to ensure all land use issues are developed with regard to their implications for transport, and vice versa. An MOU is likely to be a complex document, and would be more likely to be effective if:

- there is ministerial support from Ministers with responsibility for both the Department of Sustainability and Environment and the Department of Transport
- there is a high level policy agreement between DSE and DOI, which is then given effect through an MOU
- a deadline is set for negotiating the MOU, with scope for extending the deadline, but only on the basis that the reasons for seeking the extension are made public
- the MOU is released to the public

- there are performance indicators to enable reporting of the usefulness of the MOU in achieving an integrated approach to transport and land use planning. These indicators could be publicly reported
- to take advantage of opportunities for improvement, the MOU should be assessed within five years of the date of its commencement.

This approach could achieve more integration without the organisational upheaval involved in re-structuring. It may take time and resources to negotiate, although it would subsequently save time in consultation and negotiation, and would save the substantial cost of poorly integrated policies. The implementation of an MOU would need to be monitored and reported upon to ensure that once finalised it is subsequently observed. Alternatively, rules or guidelines could outline when and how consultation should occur. They would clarify expectations but carry a greater risk that they may not be observed, unless it is also backed by effective performance monitoring.

In addition, guidelines negotiated between DSE, DOI and local government could provide greater guidance to all agencies on how transport issues should be incorporated into planning decisions, who should be consulted and at what point in the process. The Commission is interested in views on whether there are specific transport related planning issues that would benefit from such guidelines.

Between other state government agencies

The discussion in section 9.2.4 noted that gaps in consultation between departments are resulting in decisions that do not fully account for their transport and congestion implications. To clarify the importance of these issues the Government could announce that it requires all departments to explicitly consider transport access and the impact on congestion of all major developments. Such developments should be consistent with the objective in the Metropolitan transport plan to reduce congestion.

There are particular issues, however, with the exemption that the health, environment and education ministers have from a requirement to comply with a Planning Scheme under the Planning and Environment Act (box 9.11). Even though that exemption requires an effective consultation process to continue, that process has failed to ensure all relevant congestion issues have been taken into account in the planning of these projects. One option is to remove the exemption. While this option would add to the costs faced by these departments in developing new facilities, it would encourage the inclusion of transport costs in option comparisons.

A variation of this option would be to revisit the Order in Council and make compliance with the planning schemes conditional on compliance with a

consultative process that would make these agencies, including state schools, sensitive to traffic issues. This consultative process would need to be defined and agreed as part of the exemption process.

9.3.4 Consultation

Much of the previous discussion on integration has identified ways to improve information flows and coordination between transport agencies, local government and other government departments, to ensure fully informed decision making. Often there is mandatory consultation between these bodies that are involved in service delivery but not with the general community. An important component of a good institutional framework, therefore, is effective consultation between government and other stakeholders, which:

- increases the diversity of views that inform the policy development
- improves peoples' understanding and acceptance of policy and its implementation
- facilitates decision making that is more aware of practical implementation issues and stakeholder concerns.

To a large extent, existing policy implementation processes use local government as a conduit for local interests, with the use of wider consultation on some large specific projects. This occurs because local government is seen as close to the local community and, therefore, aware of local views and it is often difficult to engage local groups in more direct consultation unless it can be focused on a specific project.

Freight is one sector whose interests are not well represented through local government. There are specific initiatives that seek to capture the views of the freight sector. The Victorian Freight and Logistics Council, for example, was formed in 2004 as an advisory group to government, which seeks to consult and understand the needs of freight users and suppliers, and conveys those views to government.

9.3.5 Options to improve opportunities for market solutions

The Commission has identified several areas where a greater use of market forces, incentives and testing different approaches, could expand the tools available to government to reduce congestion. Current bus contracts expire at the end of 2007, the tram and train partnership agreements run until April 2009. This provides an opportunity to improve the incentives in existing agreements, particularly for buses. Other opportunities may arise if the government decided

to contract private operators to build new toll roads. Options could be considered in the areas of:

- the extent of exclusivity in public transport contracts
- the obligations on operators to consult with and coordinate their services with other operators
- the incentives in contracts to increase patronage
- the processes for considering proposals to change or expand public transport services
- the potential for any new toll road operators to consider how public transport might be incorporated into bids for private roads.

Exclusivity

There are elements of exclusivity in all public transport contracts. Bus operators, for example, have an exclusive right to operate buses within their contract area, with minimum overlap with the services offered by surrounding operators. Similarly, buses cannot pick up and set down along tram routes. This recognises that very few services would be financially viable without some government subsidy, so that the restrictions are intended to ensure a comprehensive and coordinated network (which also runs services for access and equity reasons) is provided at the lowest cost to government. However, exclusive rights have several disadvantages.

Firstly, giving one operator a monopoly over a region for an extended period can reduce incentives to improve efficiency. This makes performance monitoring and incentives within the contract crucial. It also raises questions about the appropriate contract period. While the contract should be long enough to give investment security, contracts that are too long reduce performance incentives, restrict the opportunities to improve the contract terms and increase the risk of the contract becoming outdated prior to its expiry. The Commission considers that the five years for the tram and train partnership agreements strike an appropriate balance. The 10 years in existing bus contracts has, however, proven problematic. Despite identifying early in the contract that data was not available to implement the patronage based payments to contractors envisaged in the contract, the interim payment arrangements continued for nine years before the contract provisions could be reconsidered. One option to minimise such problems in the future would be to reduce the bus contract term to five years.

Secondly, exclusive rights reduce new operators' ability to offer differentiated services. Existing bus operators, for example, have already invested in operating a particular type of service. They are less likely to risk initiating a completely new type of service, such as an express bus or a bus with a flexible route that responds to demand, particularly when any risk of competition is excluded by

current contractual arrangements. Consideration could be given to retaining exclusivity for traditional bus services, but allowing new operators to compete if they offer services that differ significantly from the features normally identified with traditional bus services. This would include the bus transit trial, proposed in chapter 7. The Commission is interested in views on the practicality of allowing start up of new differentiated services.

Thirdly, restrictions on buses' rights to pick up and set down in competition with trams, appear to be designed to prevent buses eroding the tram passenger base and thereby increasing the government subsidies needed to make trams viable. This argument breaks down once tram services become overcrowded. Not allowing buses to pick up passengers then constrains the options available to minimise overcrowding. The government could consider removing the restriction on competition for routes and times when tram overcrowding meets a set level. Such competition between public transport services could provide considerable benefits to passengers. Bus stops would need to be clearly marked to reduce passenger confusion about where buses are able to stop.

Consultation between operators

As noted previously, all public transport contracts include obligations to consult with other operators to assist in service coordination. These obligations are, however, relatively general and are not monitored or subject to the performance regime. One option is to bring consultation arrangements within performance assessments. It may be difficult, however, to develop appropriate benchmarks for individual operators. Alternatively, the effectiveness of coordination could be reported and monitored for gaps and potential improvements. The introduction of Smartcard based ticketing should increase available data on the time and location people enter and exit the public transport system and transfer between modes. This data should increase the accuracy of monitoring of coordination between operators.

Increasing patronage

The previous discussion also noted that contractual incentives to increase public transport patronage rely heavily on service quality, as only the National Bus Company's contract has a strong link between patronage and remuneration. In addition, bus contract payments do not separate subsidies for carrying concession passengers from the subsidies for operating unprofitable routes. Again, the data provided by the new Smartcard ticketing should make patronage estimates more accurate and remove any technical barriers to linking contract payments to patronage.

The responsibility for encouraging increased patronage not only rests with bus operators but also DOI in its management of bus contracts and VicRoads in their obligations to facilitate road based public transport; for example, the long term target to increase tram travel speeds. There is still some debate about whether bus operators, in particular, are able to influence patronage significantly and also whether patronage linked payments would undermine the access and equity objectives on routes where patronage is declining. In other areas, however, such as SmartBuses that carry commuters, the scope to promote and grow the service is likely to be greater.

There are likely to be benefits from the option of linking at least some of the contract payment to patronage and separating subsidies for concession passengers and general services. The Government could consider varying the patronage linked part of the operator payment according to mode and/or different types of bus services. There may also be scope to trial different combinations of remuneration to see if they have a significant effect on operators' performance and on patronage. Over time, the Smartcard data could be used to better understand the revenue and subsidies that are attached to individual routes. An independent review of this data would be an important project that could add considerably to DOI's ability to manage the public transport system.

Service changes

All public transport contracts allow for services to be expanded or varied. The processes in the tram and train contracts are more explicit than for buses, but there is likely to be potential to improve all modes. The Government could require DOI to prepare a policy on the process of assessing proposals for variations to public transport contracts, and new proposals, including:

- the information required from operators wishing to change their services
- significant dates, for example, when proposals need to be submitted to be considered within the departments general project assessment processes
- the process for considering the proposal, including key criteria for assessment, and providing feedback
- decision making timeframes.

Toll roads

Currently toll road contracts focus heavily on road services for private transport. In future contracts, consideration could be given to using the bidding process to include proposals on how new infrastructure would enhance the efficiency of all parts of the transport network, including public transport.

10 Key conclusions

10.1 Introduction

It has been argued in this report that while Melbourne's congestion difficulties are not as large as in many major cities, it faces a looming transport congestion problem. There are similar but limited concerns about congestion in Geelong. Ballarat and Bendigo do not suffer congestion of the kind found in Melbourne, although there are transport issues to be managed.

Many of the options for addressing Melbourne's congestion problem—and maintaining or advancing its competitive position and attractiveness as a place to live—have long lead times. Hence, it is important that the causes of transport congestion are understood, and the options for addressing these are fully considered as early as possible. This chapter summarises the key options for managing transport congestion that have been developed in this report. It then discusses some options for improving the institutional arrangements around transport issues, which would help to ensure that the best options for managing congestion are identified and implemented effectively.

10.2 Options for managing congestion: key themes

10.2.1 There is not a single solution

A wide range of options for managing congestion have been put to the Commission. Some would apply across the transport network, while others are location-specific. Those involving expansion of road and rail infrastructure and growth in public transport capacity would be more expensive and take longer to implement, while those involving efficiency improvements to the current capital stock can be done more quickly, and at less expense. The scale and timing of options needs to be related to the scale and timing of issues they are intended to address.

Many options are inter-related, for example:

- congestion is an issue that needs to be addressed in both the rail and road networks, not in isolation (a view widely supported by industry bodies)
- a number of options may work together to reduce congestion at particular bottlenecks, as illustrated by the case study of the West Gate Bridge in chapter 7
- the location of road and rail infrastructure may influence the pattern of land use that develops, while expansions to transport infrastructure will influence developments in land use

- the introduction of pricing arrangements to discourage motor vehicle use in peak periods would require alternative public transport options to be made available, and comparable in terms of reliability and service.

The Commission has looked not only at the options put to it in submissions (chapter 5), but also at relevant international and other Australian experience (chapter 6). It has focussed on options that are relevant to Melbourne and Geelong, Ballarat and Bendigo. In many cases, especially on the supply side, these options have already been canvassed in *Linking Melbourne: Metropolitan transport plan* (Government of Victoria 2004a). (The options in that plan are listed in appendix C). Chapters 7 and 8 reported options that are particularly relevant for managing congestion in Melbourne and the regional cities of Geelong, Ballarat and Bendigo. These options are listed in table 10.1, at the end of this chapter. Also shown in the table are some of the issues that would need to be addressed in implementing these options. In the same way as the causes of congestion are multiple, and the bottlenecks dispersed, the response is likely to require a combination of measures, some short-term and others requiring longer lead times.

Options for addressing congestion are more likely to be effective if:

- based on recognition that options that work on both the supply and demand side of transport markets will be needed
- policy options for expenditure on roads and public transport are assessed at the same time, and the appraisal process for projects is rigorous and neutral between transport modes
- the information base for decision-making is improved
- institutional arrangements are reformed, with particular emphasis on improved inter-agency coordination.

10.2.2 Options that address both supply and demand will be needed

Thus far, more use has been made in Victoria of measures to expand the supply side of transport markets than to manage demand. Supply expansion will no doubt need to continue, but any response to managing congestion should ensure the current network is also used as efficiently as possible.

The Commission has identified a wide range of options for managing congestion. Many of these aim to increase the capacity of transport networks, by:

- increasing the efficiency of existing road and rail infrastructure, for example, by: increasing the use of traffic management techniques, especially on freeways; reallocating road space through measures such as establishing a hierarchy of road use; improving rail signalling and platform interchanges;

and changing some operational arrangements for trains. Significant gains may be possible from measures that seek to use the existing capital stock more efficiently. While these options are not free of cost, they may make less call for large and lumpy expenditures

- focussing additional transport infrastructure on alleviating road and rail bottlenecks which impose the largest costs, or increasing services where they are deficient, as is the case with the bus network.

The Commission has also identified options that aim to reduce congestion by influencing the demand for travel, including:

- parking restraint measures, which effectively increase road travel costs and so discourage road use
- increasing government information programs on the range of travel choices available
- seeking to better control the road movement of containers at the Port of Melbourne
- promoting flexible school or working hours.

Some of these measures are being applied already or were identified in the *Metropolitan transport plan* (Government of Victoria 2004a). Options put forward include expanding their application or implementing a number of them.

A more direct way to manage demand is to allow the price mechanism to operate. The Australian and international evidence suggests that if motorists do not bear the costs of congestion, they will seek the most expedient form of transport and any increase in capacity will be largely absorbed by 'induced demand'. The Government has recognised that road congestion is an issue in its vision of a substantial switch to public transport. It is premature to form a view about whether and when comprehensive road pricing will be warranted. Whether it would generate net benefits depends on factors such as the severity of future congestion problems and the cost of implementing road pricing, which will be influenced by the technology available at the time.[1] The impact on road congestion would also depend in part on the availability of alternative transport options, particularly public transport. Significant equity and distributional issues would need to be considered in such decision.

There may, however, be some short-term scope for location-specific tolls to help improve congestion or defer investment in major new projects. Options identified in the report include adjusting tolls on CityLink and EastLink, and peak-period pricing on one or more lanes on the West Gate Bridge. In the case of the latter, it could be combined with other measures, such as ramp metering.

[1] The capital cost of implementing London's congestion tax was £180 million, while reducing congestion has only increased average speeds from 14.3 km/h to 16.7 km/h within the charging zone.

Such an approach would also need to consider the extent to which the use of tolling simply resulted in congestion being shifted to other roads.

10.2.3 Rigorous project evaluation is vital

A recurring theme in chapter 7 was that there is usually a number of ways to address any congestion problem and whether the best solution is chosen depends on the quality of the project evaluation process. There are many issues to consider, for example:

- forecasting the impacts of implementing different traffic management measures, both in isolation but also in combination with other measures
- how to allow for induced demand. This is important because reductions in congestion levels—which lead to reductions in travel times and operating costs—are often cited as being major components of overall project benefits. Yet '… the economic value of a scheme can be overestimated by the omission of even a small amount of induced traffic'. Induced demand therefore is '… a matter of profound importance to the value-for-money assessment of the road programme' (SACTRA 1994, as quoted in Litman 2005)
- the time frame used when evaluating and comparing projects is also crucial, as discussed in chapter 9.

Box 10.1 outlines some of the issues that need to be considered in road modelling and evaluation.

Box 10.1 Issues that could be considered in road modelling and evaluation

- Traffic estimation and evaluation.
- Ensuring that the full range of alternatives (including pricing options) is considered.
- Ensuring neutrality of procedures between road and public transport projects
- Modelling of network effects (to ensure, for example, that a traffic bottleneck is not moved to another road).
- Modelling induced demand projections.
- Social and environmental impacts—what should be assessed and how should these impacts be valued?

The number of options that exist for addressing each congestion problem indicates the crucial importance of Victoria having a 'best practice' project evaluation process for choosing transport projects. As pointed out in chapter 9, Victoria has committed to adopting Australian Transport Council-endorsed national guidelines for evaluating new public road and rail infrastructure projects. The Commission would welcome comments from inquiry participants about the strengths and weaknesses of the approaches currently used in Victoria for assessing such projects and changes that would be needed to achieve compliance with the national guidelines.

10.2.4 More information is needed

With a large number of possible options, and the inevitability that the available options and the factors that influence choices between them will evolve in unpredictable ways, project evaluation and decisions need to be based on up-to-date information. Throughout the report, the Commission has identified information deficiencies. There is a clear need for better data to inform choices on managing congestion. Opportunities exist to improve the information base in relation to freight and commercial distribution, passenger travel on public transport and private motor vehicles, and congestion. This information would help to quantify congestion costs (especially for the business sector), to understand behavioural responses and land-use impacts and to identify options with long-term network benefits, including in those areas crucial to future economic growth. Improving the information base is an important priority in order to enable a more informed public debate and decision-making about transport issues. Specific information requirements have been described in box 9.5.

With information at such a premium for good policy making, there is much to be gained from mechanisms that encourage the generation of information about how particular policy instruments work and about thresholds for identifying problems that need to be addressed. Research can contribute. As congestion is a national issue, a collaborative approach is needed. Peak industry bodies, including in the freight and logistics area, need to work collaboratively with government to develop improved data to inform decision making. Trialling new approaches is another way to generate information about how policy instruments operate and about how people react to them. The Commission has identified a number of areas where trialling could be useful, including peak-period pricing on existing tollways, a Port of Melbourne peak-period road freight levy, flexibility in school hours, and using auctions to assess the relative value of clearways.

10.3 Institutional issues

An effective institutional framework is essential if transport congestion in Victoria is to be managed effectively. Deficiencies in the current arrangements mean it is not clear that the best approaches to managing congestion are being identified and implemented:

- As noted earlier, policies tend to focus on expanding road capacity or increasing the attractiveness of public transport rather than directly reducing the demand for road use.
- The current arrangements carry a risk that road projects will be favoured over other transport projects.
- Contractual incentives for public transport operators do not encourage them to develop new and innovative or market-based service alternatives or to maximise inter-agency coordination.

The Commission has identified options—reported in table 10.2 at the end of the chapter—which would address these and other deficiencies in the regulatory and institutional framework.

10.3.1 Recognise and respond to interdependencies

A theme throughout this report has been that most congestion problems have neither a common cause nor a single response. Interdependencies are the norm. Many of the options that were explored in chapter 9 were intended to improve the coordination and integration between the many government agencies and the levels of government that are involved in tackling congestion. As far as possible, local problems should be solved locally. Often, however, there are material effects beyond local boundaries, requiring coordination between different levels of government. This challenge was consistently highlighted in the Commission's interactions with metropolitan and regional communities. The current legislative arrangements are confusing and could usefully be clarified.

Chapter 9 reported evidence of inadequate coordination across governments, within the Victorian Government and across modes of transport. Government policies and the agencies charged with delivering them are not necessarily working towards the same objectives. In some cases they undermine the effectiveness of each other's activities. Local government policies to reduce traffic flows in a local area and increase pedestrian access may work in opposition to VicRoads' objectives to increase the rate of through traffic and reduce congestion. The patronage levels for public transport in an area can depend on land-use planning decisions encouraging the density in development necessary to support an effective public transport system. These issues were also apparent in regional cities.

There will be some areas where full integration of decisions that affect transport and congestion is difficult. Local government, for example, is responsible for decision making on local road issues. The Commonwealth Government will also continue to fund local and state roads projects using criteria over which Victoria has only limited control.

The Commission has offered principles to guide complex institutional coordination and has identified a range of options that would significantly improve the levels of integration and coordination, and minimise problems in remaining areas.

A more balanced approach to public transport and road issues could be achieved by:

- clarifying the roles and responsibilities of the Department of Infrastructure (DOI) by strengthening its ability to exercise responsibility for overall policy coordination of the transport network
- putting operational arrangements for public transport and roads on a more equal footing by strengthening the public transport management group within DOI, including through the establishment of an advisory board, and enhancing its project management capabilities.

If these reforms were combined with a single integrated transport budget and a consistent framework for project assessment, most of the concern about unequal treatment between road and rail, and a lack of intermodal coordination, would be removed.

Coordination between state and local government cannot be achieved by structural reform. Instead, mechanisms to facilitate coordination and communication are necessary. The Commission considers that the key options for reform include:

- legislative change to the Transport Act, the Road Management Act and the Local Government Act to clarify that all local government decisions about transport related activities are consistent with the objectives of transport legislation
- these changes to be supported by guidance notes issued by DOI to clarify government policy in key areas, such as decisions on public transport priority on roads, allocating bus lanes, restricted parking on arterial roads and improving facilities for pedestrians
- monitoring the Growth Areas Authority process, to assess its effectiveness and to determine whether it should be extended into other regions
- the Government making forward commitments on long term infrastructure plans, including in some cases making forward commitments to funding for

key transport projects that have been identified, and assessed as critical to the outcomes of growth area plans and integrated transport strategies.

Effective coordination between land-use and transport planning is vital to achieving effective outcomes in both areas of government policy. The consequences of a previous lack of coordination are obvious. Many new developments in outer suburbs and regional centres are car dependant because of a lack of transport alternatives. This is now expensive to address because adequate provision for transport alternatives was not made when the land was sub-divided, and the ability to use public transport to influence development patterns may have been lost.

Coordination arrangements between the Department of Sustainability and Environment and DOI could be developed, which clearly recognises the role of DOI and public transport in planning regulation. This could involve a formal and publicly available Memorandum of Understanding (MOU), finalising negotiations to make the Department a referral body under the Planning and Environment Act and increasing the use of developer contributions to fund public transport projects.

Additional problems have arisen with coordination between transport and other areas of government. To give congestion issues greater priority the government could announce that it expects all major projects (for example, hospitals and schools) to be implemented consistent with the objectives in the *Metropolitan transport plan* and involve, where appropriate, consultation with DOI. Exemptions that some state government departments have from normal planning processes could also be made conditional on effective consultation taking place.

10.3.2 Option identification is crucial

One advantage of the options suggested in section 10.3.1 is that they would help to ensure that all appropriate road and public transport options are considered on their merits. As noted above, there are many options for managing transport congestion and they will be continuously changing and evolving. Options that get to the stage of being developed into specific proposals need to go through rigorous project evaluation, as noted above. The benefits of such a process will be seriously diminished, however, if worthwhile options are not considered in the first place. This is why the Commission considered in detail in chapter 9 the claims of some participants that decision making is biased in favour of roads.

The proposals to put public transport and roads on a more equal organisational footing, and have decisions made within the context of a single transport budget, would help to ensure that worthwhile road and public transport options have an equivalent opportunity to proceed to project evaluation by DOI. The Department, supported as appropriate by other departments such as the

Department of Treasury and Finance, could continue to have responsibility for ensuring that demand-side options are considered at the same time as supply-side options in addressing transport congestion.

10.3.3 Take advantage of incentives

While there is an important role for planning in the transport area, there are opportunities to expand incentives for private sector transport operators.

Opportunities to harness private sector transport operators to contribute to reducing congestion are lost if the terms in their contracts do not maximise incentives to provide efficient and/or innovative services that attract passengers onto public transport. In particular, more flexibility is needed in contracts. This could be achieved by reducing the term of bus contracts from 10 to five years, providing guidelines on the assessment process for proposals to change or add services and allowing buses to compete with trams on routes where tram overcrowding is a problem. Innovation could also be encouraged by allowing new operators to compete with existing bus services if the services they offer have features that differ significantly from those normally identified with traditional bus services. This is particularly the case with the proposed bus rapid transit trial.

The SmartCard ticketing system also provides an opportunity to use enhanced data to improve services. This data could be used to monitor coordination between services and modes, facilitate trials of pricing initiatives, and to link more effectively the remuneration for all public transport providers directly to patronage on their services. If general subsidies and payments for concession passengers were also separately identified, this would assist in transport planning by providing better information on the demand for services, the cost of those services and the categories of customers that use them.

10.3.4 Transparency

This report has stressed that some of the options to improve the efficiency of the transport network and enable it to better respond to the challenges of congestion are being constrained by institutional factors. Consultation is likely to be more effective when the costs and benefits of different solutions to a problem are transparent to all, and the trade-offs can consequently be recognised and addressed. In addition, transparent airing to the public of the costs and benefits of particular projects should provide some protection against the implementation of projects that do not pass a cost–benefit test. Public scrutiny of costs and benefits can also improve the accuracy of estimates of costs and benefits. This process will be considerably strengthened if post-implementation reviews of major projects are also required. Such reviews will have more credibility if not

undertaken by those involved in the project, although they should be able to comment on the review.

10.4 The Government can take the lead

There are opportunities for the Victorian Government to take the lead in both the options for managing congestion and in institutional reform.

The Government could illustrate the benefits of some options to reduce congestion by taking the lead and publicising its successes in, for example, increasing the flexibility of working hours of its own workforce, promoting car pooling amongst its own employees, or neutralising the impact of the fringe benefits tax on its employees' choice of transport mode. It can also explore the scope for more flexible school hours.

Some issues that have an indirect but nevertheless significant impact on congestion, such as the operation of the fringe benefits tax and the fuel excise, are the responsibility of the Commonwealth Government. The Victorian Government could use opportunities such as the forthcoming national review of urban congestion to adopt a national leadership position in arguing the case for reform of these taxes.

On the institutional front, areas in which the Government can take the lead include improving coordination between its own agencies and with local government and ensuring that its own facilities are planned with regard to their congestion impacts.

Tables 10.1 and 10.2 summarise the options described in chapters 7, 8 and 9 and the issues that would be involved in implementing these options. A fuller description and assessment of the options can be found in the chapters.

Table 10.1 **Options for addressing transport congestion**

Reform option	Implementation issues
Road demand management (chapter 7)	
• Peak period pricing of CityLink and EastLink.	• Contractual arrangements may need to be renegotiated with Transurban and ConnectEast, including to achieve revenue neutrality.
• Monitor the impacts of the congestion levy; align the parking components of the Government's planning approval processes with council parking limitation objectives; replace minimum parking requirements in Victorian Planning Provisions with maximum limits; encourage councils to make more use of parking precinct plans.	• Government would need to work with councils (possibly through MAV) to progress options. • Reductions in parking availability, as an incentive to reduce car usage, need to be combined with increased availability of public transport.
• Government to discuss with the Commonwealth in the context of COAG's review of urban congestion options, the progressive replacement of fuel excise by road pricing in a revenue neutral manner, and modification of fringe benefits tax arrangements relating to company cars.	• Would need agreement of Commonwealth and other States. • Significant implementation issues relating to substitution of road pricing for fuel excise. • Increased availability of public transport would need to be implemented in parallel.
• Remove incentives for Victorian Government employees to use cars for commuting.	• Could be undertaken at same time as review of fringe benefits tax arrangements or independently.
• Continue to promote and expand TravelSmart information program, particularly for times of day and locations affected by congestion. Could extend further into Geelong, Ballarat and Bendigo.	• Greater frequency and reliability of public transport will encourage greater interest in information programs such as TravelSmart.
• Promoting awareness of benefits from greater flexibility in working and school hours, and car pooling, recognising that these cannot be mandated; encouraging use of public transport and improved bus services to reduce congestion around schools.	• Planning approval for new schools needs to include provision of parking and public transport access. • Flexibility in school hours with funding incentives could be trialled to assess scope for and interest in changed hours.

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Table 10.1 **Options for addressing transport congestion** (continued)

Road supply management/road space reallocation (chapter 7)	
• Expanded implementation of traffic management measures such as ramp metering, variable speed limits, priority traffic signalling and traffic information.	• Important to trial applications in Victoria and at particular locations and monitor performance. • Coordination between State and local governments, and VicRoads as an implementing road authority. • Information program to promote greater public awareness of links between these measures and congestion.
• Establish clear hierarchy of road use for Melbourne, and supporting measures, for example, traffic signal priorities and queuing for trams and buses, separation of trams, prioritising for bus/tram boarders.	• May increase congestion for cars on some roads. • Information program to promote greater public awareness of links between these measures and congestion. • Local council adoption and consistent application.
• Restrictions on kerbside parking on designated routes; consideration of part funding of alternative commercial parking in adjacent areas.	• Will require consultation with local councils. • Needs to be implemented progressively and outcomes monitored, including impacts on traders.
• High occupancy vehicles lanes on major congested routes, especially buses, trams, commercial vehicles and cars with more than one passenger.	• Will increase congestion for cars. • Regulatory arrangements need to be clear, and restriction on usage enforced.
• Infrastructure investment (roads) focused on major bottlenecks—the Commission has not attempted to include specific infrastructure options for addressing bottlenecks; there will generally be a range of options, as illustrated by the West Gate Bridge.	• Modelling of bottlenecks needs to be robust. • Explore a full range of transport alternatives. Cost-benefit appraisal of options needs to include induced demand, network benefits and long-term trends in usage.
Public transport management (chapter 7)	
• Improve the efficiency of the rail system (North Melbourne and Richmond interchanges; signalling in the City Loop; duplication of single tracks). More substantial additions to rail network, subject to cost-benefit analysis. Change operational arrangements for City Loop.	• Funding implications. • Changes to operational arrangements for City Loop will require greater number of passenger transfers; needs to be linked publicly to capacity enhancement. • May be contractual issues between Government and Connex.

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Table 10.1 **Options for addressing transport congestion** (continued)

• Upgrade local buses; accelerate roll-out of SmartBus; trial bus rapid transit system; expand park and ride.	• Contractual incentives to improve efficiency and increase patronage need to be sharpened. • Issues relating to real-time information and signalling for SmartBus need to be resolved before program is expanded. • Trial arrangements for bus rapid transit should be discussed with the Bus Association Victoria.
• Use opportunity SmartCard provides for more flexible public transport fares, both between times and in relation to distance.	• Monitoring of customer behaviour needs to precede changes to fare structures.
• Strengthen incentive structures for public transport operators.	• Would require discussion with public transport operators and possible contractual changes.
• Public transport operators look at scope for developing targeted loyalty schemes as part of broader branding program (as in Paris).	• Implications for current fare structures. • Allocation of costs and benefits between public transportation operators.
Urban land use policies (chapter 7)	
• Implement existing policies for restricting highest densities to Principal and Major Activity Centres; fast-track the Transit City program; assess ways to reduce congestion impacts of business zones outside major activity centres; improve coordination between relevant agencies.	• Ensure close relationship between policies concentrating land use and availability of adequate transport options.
• Ensure public transport and roads have equal access to developer contributions.	• Requires development of public transport options to be linked to new land sub-divisions and urban consolidation.
Freight (chapter 8)	
• Address the incidence of empty and partially loaded truck movements to and from the Port of Melbourne, including through freight consolidation; monitor the effectiveness of vehicle booking systems.	• Smart Freight programs to monitor and report on progress. • Likely to adversely affect smaller truck operators.

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Table 10.1 **Options for addressing transport congestion** (continued)

• Facilitate the development of inter modal hubs.	• Essential Services Commission to monitor and advise on impacts of new rail access arrangements. • May be difficult to separate issues relating to rail access from commercial considerations.
• In the absence of equitable pricing between road and rail, introduce a levy, initially as a trial, on the road movement of containers at the Port of Melbourne to discourage peak period road traffic.	• Greater knowledge of the congestion costs would assist determination of pricing levels. • Discriminates against port-related road container traffic by excluding other peak period truck movements in the port precinct. • The capacity and layout of the rail system and intermodal hubs needs to be able to handle any displaced container traffic efficiently.
• Reserve corridors to ensure adequate road and rail network connectivity to the Port of Hastings.	• Consultation with relevant local councils required.
Longer-term options (chapter 7)	
• Test expanded use of road pricing.	• Monitoring and evaluation of impact of peak-period tolling. • Develop information base, including equity considerations; monitor technological developments. • Expansion of public transport capacity.

Table 10.2 **Options for institutional reform**

Reform option	Implementation issues
Coordination within the transport portfolio	
• Include overarching and consistent objectives within the Transport Act and related legislation.	• Requires legislative amendment.
• Clarify the roles and responsibilities of the transport portfolio so that DOI has responsibility for policy development and coordination, and the public transport management group is strengthened, with an advisory board and enhanced project management capabilities.	• Need to ensure role of public transport management group in DOI complements contractual arrangements with service providers. • Advisory groups for both VicRoads and the public transport management group should be chosen for skill sets as well as representative functions. • VicRoads would lose its role in policy development relating to roads, though it would be fully consulted on operational implications.
• A single state budget for transport projects.	• Some funds will need to be reallocated from VicRoads into a common pool. • Given VicRoads' diverse funding sources, a fully integrated budget framework is useful for informing strategy and project choice.
• Adopt a consistent framework to assess the costs and benefits of all transport projects.	• Victoria has committed to the national road assessment framework and will need to build on the national model.
• Improve DOI's information base, through enhancement of its modelling capabilities and better understanding of factors influencing transport choices.	• Will require funding.
Coordination between state and local governments	
• Legislative change to the Transport Act, the Road Management Act and the Local Government Act to clarify that all local government decisions about transport related activities are to be consistent with transport legislation.	• Would require legislation, and consultation with councils (possibly through MAV) and public transport operators.
• Supported by guidance notes issued by DOI for decisions on public transport priority on roads, allocating bus lanes, restricting parking on arterial roads and improving pedestrian facilities.	• Would require consultation with councils (possibly through MAV) and public transport operators.

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Table 10.2 **Options for institutional reform** (continued)

• Seek volunteer local councils to develop a MOU on integrated transport planning in local areas.	• This would enable the applicability and usefulness of such a MOU to be trialled. • Financial incentives could be offered to encourage councils to participate.
• Review the Growth Areas Authority process after three years to assess the scope to improve and extend their application to other regions.	• Issues which have resulted in establishment of the Growth Areas Authority have wider application.
• Make forward commitments to funding for key transport projects that have been identified and assessed as critical to the outcomes of growth area plans and integrated transport strategies.	• Would require budget commitment to future projects.
Coordination between land-use and transport planning	
• Negotiate a public MOU between DSE and DOI to ensure land-use planning and transport policies are fully integrated.	• Timeframes should be imposed on the negotiation of such an MOU to ensure the process is not protracted. • The success of the MOU should be monitored.
• Finalise negotiation on DOI's role and a referral authority under section 55 of the Planning and Environment Act.	• Currently under negotiation between DOI and DSE.
Coordination between transport and other state departments	
• Make exemption from the Planning Provisions conditional on demonstrated compliance with an effective consultation process.	• The characteristics of such a process would need to be agreed prior to granting the exemption.
• Government announce that it requires all departments to explicitly consider transport access and congestion for all major projects.	• Projects would need to be monitored to ensure departments comply with this announcement.
Improving market solutions	
• New bus contracts should be negotiated for five rather than 10 years.	• More frequent renegotiation involves additional costs for operators and government that would need to be considered against the benefits of greater flexibility and improved performance.

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Table 10.2 **Options for institutional reform**(continued)

• New operators be allowed to compete with existing bus services if the services they offer have features that differ significantly from those normally identified with traditional bus services. This includes the proposed bus rapid transit trial.	• Adds some risk to bus contracts. • It may be difficult to define what constitutes a service that is significantly different from existing services.
• Allow buses to pick up and set down on tram routes once tram overcrowding reaches a set level.	• May not be possible given the conditions in existing tram contracts and, therefore, may need to be considered in the next renegotiation.
• Coordination between public transport services should be monitored and reported.	• Data limitations mean this is difficult until after SmartCard ticketing is established.
• Create a stronger linkage between patronage and remuneration for all public transport contracts and separate general subsidies and subsidies for concession passengers paid to bus operators.	• These reforms are difficult until after the SmartCard system is introduced. • The proportion of operator payments that should be linked to patronage may vary depending on the type of service.
• Project specifications for new toll roads to include proposals on how new infrastructure would enhance the efficiency of all parts of the transport network, including public transport.	• Could reduce attractiveness of projects to investors.

Appendix A: Consultation

A.1 Introduction

This appendix describes the consultations undertaken by the Commission during the inquiry into managing transport congestion.

In keeping with its charter to conduct extensive consultations during public inquiries, the Commission—following the Treasurer's announcement of the terms of reference on 14 September 2005—advertised the inquiry in the major daily newspapers and published an issues paper in October 2005. The issues paper outlined:

- the scope of the inquiry
- how to make a submission
- the Commission's consultation processes
- the inquiry timetable.

The issues paper invited inquiry participants to make submissions; and the Commission received 92 submissions before the release of this draft report (section A.2). Inquiry participants will also have an opportunity to make new (or further) submissions prior to the presentation of the final report to the government.

As part of the inquiry process, the Commission held a roundtable on 15 December 2005 to discuss issues around defining congestion and identifying international approaches to tackling congestion (section A.3), and held discussions with a wide range of organisations—including targeted consultations in Geelong, Ballarat and Bendigo.

During the inquiry the Commission appointed several consultants to assist with particular aspects of the report:

- The Australian Road Research Board (ARRB Group Ltd) prepared a report on defining transport congestion and previous attempts to quantify congestion in Victoria.
- Booz Allen Hamilton prepared a series of reports on relevant international approaches to tackling transport congestion.

The Commission has made the consultants' reports available on its website (www.vcec.vic.gov.au).

A.2 Submissions

The invitation to make submissions was open to members of the public, community groups, employees, businesses, industry associations, Victorian Government departments and agencies, and local governments. The Commission received 92 submissions from individuals and organisations (table A.1). The submissions are public documents which can be viewed on the Commission's website (www.vcec.vic.gov.au).

Table A.1 **Submissions received**

Participant	*Submission no.*
Jonathan Taylorson	1
SGS Economics and Planning	2
Harry Clarke and Andrew Hawkins	3
Adrian Bird	4
J Toth	5
Robert K Wilson	6
Motorcycle Riders Association of Australia	7
Motorcycle Riders Association of Australia	8
Lawrence Seyers	9
Motorcycle Riders Association of Australia	10
Ozcarpool	11
Metropolitan Transport Forum	12
Motorcycle Riders Association of Australia	13
Paul Yeatman	14
Mornington Peninsula Shire Council	15
Kiro Ivanovski	16
Griffith Young	17
Alan Parker Design	18
Tony Robinson MP	19
Maroondah City Council	20
Raptour Systems Pty Ltd	21
Ross Nolan	22
Golden Plains Shire	23
Eastern Regional Integrated Transport Group	24
Westgate Ports Pty Ltd	25

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Table A.1 **Submissions received** (continued)

Participant	*Submission no.*
John McPherson	26
Wilson Parking	27
City of Boroondara	28
Metlink	29
Municipal Association of Victoria	30
Graeme Reynolds	31
Nillumbik Shire Council	32
Richard Grummet	33
Committee for Melbourne	34
Glenelg Shire Council	35
CRT Group Pty Ltd	36
Bayside City Council	37
Victorian Automobile Chamber of Commerce	38
City of Maribyrnong	39
Western Transport Alliance	40
P & O Ports	41
City of Greater Bendigo	42
A2B Strategies Pty Ltd	43
Horst (Oz) Kayak	44
Michael Groves	45
Ian Macmillan	46
Glen Mills	47
Property Council of Australia	48
Paul Davine	49
VicRoads	50
The 3068 Group	51
City of Whitehorse	52
Port of Melbourne	53
Australian Council for Infrastructure Development	54
Department of Infrastructure	55
Hobsons Bay City	56
Bus Association Victoria	57

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Table A.1 **Submissions received** (continued)

Participant	*Submission no.*
Cr Jackie Fristacky	58
Royal Automobile Club Victoria	59
Interface Councils	60
Yarra Trams	61
Wyndham City Council	62
City of Yarra	63
Carlo Carli MP	64
Public Transport Users Association	65
Phil's Taxis and Limousines	66
Transurban	67
Town and Country Planning Association	68
Frank Fisher	69
Frankston City Council	70
Victoria Police	71
Motorcycle Riders Association of Australia	72
Environment Victoria	73
Bill Saggers	74
Manningham City Council	75
Christopher Boulis	76
Moonee Valley City Council	77
James Guest	78
Better Rail Action Group – Bendigo	79
City of Ballarat	80
Moreland City Council	81
Carolyn Ingvarson	82
Bruce Evans	83
Victorian Employers' Chamber of Commerce and Industry	84
G21 – Geelong Region Alliance	85
Bruce Evans	86
Phil Clark	87
Faith	88
Victorian Freight and Logistics Council	89
Department of Sustainability and Environment	90
Department of Sustainability and Environment	91
C Louis Fouvy	92

A.3 Roundtable

The Commission held a roundtable at 55 Collins Street, Melbourne on Thursday 15 December 2005. The purpose was to discuss definitions of congestion and a framework for identifying international approaches to tackling transport congestion.

Table A.2 **Roundtable participation**

Name	*Representing*
Graham Evans	VCEC
Robert Kerr	VCEC
Alice Williams	VCEC
Richard Clarke	VCEC Secretariat
Dimitris Tsolakis	ARRB Group Ltd
Ian Wallis	Booz Allen Hamilton
Eric Keys	Booz Allen Hamilton
Chris Loader	Bus Association Victoria
Ken Ogden	RACV
Ray Kinnear	Department of Infrastructure
Fotios Spirodonis	Department of Infrastructure
Russell Smith	Department of Infrastructure
Ray Jeffery	Department of Sustainability and Environment
Ted Vincent	VicRoads
Rob Ellison	Connex
Jan Scheurer	RMIT University
Graham Currie	Monash University
Paula Giles	Municipal Association of Victoria
Claire Thomas	Department of Treasury and Finance

A.4 Stakeholder consultations

As part of the inquiry process, and to obtain further information to assist in the analysis of issues relevant to the management of transport congestion in Victoria, the Commission held discussions with a number of organisations and individuals. This included targeted meetings in Geelong, Ballarat and Bendigo. These organisations consulted are listed (table A.3).

Table A.3 **Stakeholder consultations**

Organisation	
ACIL - Tasman	Austrak Pty Ltd
Australian Automobile Association	Australian Bureau of Agricultural and Resource Economics
Australian Pacific Airports Corporation Limited	Benders Busways (Geelong)
Better Rail Action Group - Bendigo	Blackneys Refrigerated Transport Services
Bureau of Transport and Regional Economics (BTRE)	Bus Association Victoria
Christian's Bus Company (Bendigo)	City of Ballarat
City of Greater Bendigo	City of Melbourne
City of Whittlesea	City of Yarra
Committee for Melbourne	Connecteast Group
Connex	Department of Infrastructure
Department of Innovation, Industry and Regional Development	Department of Sustainability and Environment
Department of Transport and Regional Services	Department of Treasury and Finance
Essential Services Commission	G21 – Transportation Pillar Group (Geelong)
Grendas Bus Services	K & S Integrated Distribution (Geelong)
Keatings Transport (Bendigo)	Linfox Airports Pty Ltd
McHarry's Bus Lines (Geelong)	Metlink
Monash University (Professor Graham Currie)	Municipal Association of Victoria
Municipal Association of Victoria – Strategic Transport and Infrastructure Advisory Group	Murdoch University (Professor Peter Newman and Professor Jeff Kenworthy)
National Bus Company	Parliamentary Secretary for Transport (Carlo Carli MP)

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Table A.3 **Stakeholder consultations** (continued)

Organisation	
Patrick Corporation	Port of Melbourne Corporation
Public Transport Users Association	Royal Automobile Club Victoria
RMIT University (Dr. Jan Scheurer)	VicRoads
Victorian Freight and Logistics Council	Victorian Road Freight Advisory Council
Victorian Supply Chain Consultative Group	Victorian Transport Association
Victorian Transport Association – Logistics Managers Group	Walkers Bus Lines (Bendigo)
Wallace, Craig (Mr)	Westgate Ports Pty Ltd
Yarra Trams	

Appendix B: Impacts of congestion

This appendix provides technical information and data in support of chapters 2 and 3. The key issues covered are:

- estimates of transport elasticities for cars and public transport
- results of previous studies examining the costs of congestion
- overview of the Melbourne Integrated Transport Model (MITM)
- freeway performance indicators.

B.1 Estimating elasticities

Chapter 2 noted that estimates of elasticities are vital to understanding the likely behavioural responses to various transport policy options. This section summarises the results of some previous efforts to estimate elasticities for cars and public transport in Australia (including Melbourne).

The responsiveness of travel demand to changes in the user cost of travel is usually expressed as the elasticity of demand—the ratio of the percentage change in travel demand to the percentage change in one of the variables influencing the user cost. It is common to distinguish between short term (say, within one year) and longer term elasticities (within two to three years or more), to reflect the greater ability of people to pursue a broader range of responses to changes in travel costs in the longer term (including moving their place of residence, work or business). However, many studies did not clearly state this distinction.

Personal travel

A number of studies have attempted to estimate transport elasticities in Australian cities for cars and public transport. The tables show the results of relevant empirical studies and for comparative purposes, the range of values used by the Department of Infrastructure as input in evaluating public transport projects are also shown. In developing these recommended values, the department drew on a database of elasticity studies that is maintained by the Bureau of Transport and Regional Economics. [1] In general, the studies show that:

- demand for personal travel for all modes is negatively related to the cost, travel time and access time. This means that if the cost, travel time or access time falls, the demand for travel increases.

[1] Estimates chosen were those that were considered most relevant to Melbourne—Australian, NZ and studies from 'peer' cities were given greater weight (DOI pers. comm., 21 February 2006).

- most elasticity values for each variable are less than one (except Hensher & Ton 1998), suggesting that users are relatively insensitive to changes in price/fares, travel time and petrol prices in the short term[2]
- demand for car travel decreases as the petrol price increases but this effect is more pronounced in the long run as people have time to adjust and reduce their consumption or switch modes (table B.1). Luk and Hepburn (1993, p. 10) suggest that the lack of sensitivity of car use to rising petrol prices may be due to the rising real incomes experienced in the 1980s and that some petrol costs are not directly borne by some drivers (such as company cars).
- demand for public transport is more responsive to changes in travel time than to changes in fares (table B.2). This is not surprising given that travel time costs are usually the largest component of user costs.
- the responsiveness of demand may also vary between peak and off peak periods within a weekday. Public transport travel is more responsive to price changes in the off peak period than the peak period (table B.2). This may be because off peak users have more discretion in their travel choices (with respect to timing and mode).
- the degree of responsiveness varies for each mode. The demand for bus travel is more responsive to access and egress time than the demand for train and train travel (table B.2). This may reflect the relative infrequency of bus services compared to train and tram services.

Some studies of public transport elasticities have found that service quality is a more important determinant of demand than the cost of fares. Brown and Singleton (1980, cited in BTRE Transport Elasticity Database undated) found that dimensions of service quality had a stronger effect on bus and tram patronage in Melbourne (with an elasticity of 0.83) than changes in ticket prices (with an elasticity of -0.37).

The price (fare) of other modes also has an impact on mode choice. For example, Dodgson (1985) found that car travel is weakly responsive to changes in public transport fares in Melbourne (elasticity of 0.0077). The small size reflects the low substitutability between car and public transport travel.

[2] The primary purpose of Hensher and Ton's study was to test the merits of alternative methods for estimating travel demand.

Freight travel

The responsiveness of demand for freight travel to changes in price depends on the type of goods transported, the length of the trip and the availability of alternative modes. In general, stronger competition between modes (road and rail) means higher levels of elasticities for the demand of that mode (Luk & Hepburn 1993, p. 16).

The demand for road transport is also more responsive to changes in GDP than to freight rates, highlighting the strong relationship between growth in the economy and the freight task.

In addition to price and GDP, other important factors in determining the mode of choice for freight transport include reliability of transit time, avoidance of damage or deterioration of goods, capacity and communication with respect to problems (Luk & Hepburn 1993, p. 18).

Table B.1 **Travel cost elasticities—car**

Study	*Location and Method*	*Demand for car travel with respect to*		
		Cost	*Travel time*	*Petrol price*
BAH (2006h)	Melbourne (L)	-	-0.2 to -0.3 (short run) -0.3 to -0.45 (long run)	-
Hensher and Young (1991, cited in IC 1994b, p. 42)	Sydney	-	-	-0.1 (short run) -0.3 (long run)
Taplin, Hensher and Smith (1997)	Sydney (E)	-0.024	-	-

Note: **E** indicates elasticities that have been calculated using econometric techniques and **L** indicates elasticities obtained from a survey of the literature.

Source: VCEC.

Table B.2 **Travel cost elasticities—public transport**

Study	*Location and Method*	*Demand for public transport with respect to*		
		Fares	*Travel time*	*Access and egress time*
Demand for bus				
BAH (2003)	Canberra (S)	-0.18 (peak) -0.22 (off peak)	-0.37	-0.17 (walk time) -0.25 (wait time)
Douglas, Franzmann and Frost (2003)	Brisbane (S, E)	-0.356	-0.688	-
DOI (2005b)	Melbourne (L)	-0.2 to -0.15 (peak) <-1 to -0.45 (off peak)	-0.4 to -0.2 (peak) -0.8 to -0.6 (off peak)	-
Taplin, Hensher and Smith (1997)	Sydney (E)	-0.07	-	-
Demand for train				
Douglas, Franzmann and Frost (2003)	Brisbane (S, E)	-0.382	-0.7	-
DOI (2005b)	Melbourne (L)	-0.15 to -0.1 (peak) <-1 to -0.3 (off peak)	-0.2 to -0.1 (peak)	-
Taplin, Hensher and Smith (1997)	Sydney (E)	-0.156	-	-
Demand for tram				
DOI (2005b)	Melbourne (L)	-0.2 to -0.15 (peak) <-1 (off peak)	-	-

Note: E indicates elasticities that have been calculated using econometric techniques, L indicates elasticities obtained from a survey of the literature and S indicates stated preference survey was used to derive the results.

Source: VCEC.

B.2 Previous studies on congestion in Melbourne

Overview of previous studies

Studies by the Bureau of Transport Economics (BTE) and the Department of Infrastructure (DOI) have attempted to estimate congestion delay costs for Melbourne, with all finding that the costs are large and likely to grow over time (chapter 3). An issue that the Commission has faced in trying to assess the results of previous studies is that methodologies, underlying data and assumptions are often not well documented. Based on the available information, it appears that the previous studies have followed a similar modelling process that involves the following basic steps:

- The number of trips expected to occur during various times of the day (usually morning and afternoon peak periods) is taken as a given or estimated based on population, employment and land use data.
- Pathways across the network for these trips are identified (including in some cases the mode of travel).
- Trips are assigned to particular pathways, based on the assumption that travellers choose the least cost mode and route. The key costs associated with travelling are vehicle operating and time costs, as well as toll costs.

The main outputs of the models are estimates of the quantity of travel (trips) and travel times for the various paths (and modes) available on the network. The speed-flow relationships built into the models are crucial for determining how many cars will choose to travel on a particular route and the speed at which they can travel. Usually, the resulting outputs (trips and speeds) are compared with real world data (such as travel counts on parts of the road network) to enable the model to be adjusted (calibrated) to fit observed behaviour.

The outputs of the model can be used to examine congestion delays. This can be done by comparing the model's predicted travel times, with travel times under free-flow speeds. Free-flow is not the same as travelling at the posted speed limit on a road. The free-flow speed will vary depending on the type of road and is the speed that is achieved when the only constraints are those imposed by the physical characteristics of the transport infrastructure, such as intersections and traffic signals, which prevent drivers from travelling at posted speed limits. This step is crucial because it assumes that freely flowing traffic is the appropriate benchmark for assessing congestion. As discussed in chapter 3, this approach has major implications for interpreting the results.

Bureau of Transport and Communications Economics

A widely cited study on congestion was published by the Bureau of Transport and Communications Economics (BTCE)—now the Bureau of Transport and Regional Economics (BTRE)—in 1996 (BTCE 1996a). The main purpose of the study was to calculate optimal motor vehicle charges for Melbourne and other Australian cities. Estimating the costs of congestion was integral to achieving this main purpose.

Using a strategic model of Melbourne's road network called TRANSTEP, the BTCE estimated that the average cost of congestion delays for Melbourne in 1996 was around $0.92 million per weekday during the morning peak (BTCE 1996a).

Although BTCE did not calculate an average annual total, this figure can be scaled up to give an average annual delay cost. The Commission converted the average daily morning peak figures to an average daily cost using a conversion factor of 7.5. The conversion factor was derived by the Department of Infrastructure to scale up its 2001 estimates of the delay costs of congestion (see below). The average daily figure was then multiplied by the number of working weekdays (250) to yield an average annual delay cost ($0.92 million*7.5*250/1000). Applying this scaling factor yields an estimate of annual delay costs for Melbourne of around $1.725 billion in 2001.

As noted in chapter 3, it is important to understand the relationship between the total costs of congestion delays and the economic costs (deadweight loss) as the latter represents a better measure of the potential gains from efforts to tackle congestion. The BTCE used the results that flowed from using the TRANSTEP model to estimate optimal road tolls to report the economic costs of congestion, reporting that the economic costs of congestion were around 55 per cent of the total congestion delay costs for Melbourne (see chapter 3). The study also reports estimates of the economic costs derived from a different model developed by the Australia Road Research Board (ARRB). The nature of this model, the data and assumptions underlying it are not described in detail in the BTCE report.

Subsequently, the BTE (1999) published a brief information sheet that reported some further estimates of congestion delay costs for Melbourne and other cities for 1995 and 2015, using a similar methodology to their previous study. It reported estimates of congestion delay costs (on an annual basis) for passengers and freight in Melbourne that appear to be higher than the previous figure (around $2.7 billion in 1995). The BTE also projected that these costs would grow to around $8 billion by 2015 (BTE 1999).

The documentation around the BTCE's later study does not permit a detailed assessment of the methodology, underlying data and assumptions. Nevertheless, these numbers have since been widely cited and used in various reports about congestion in Melbourne. The Committee for Melbourne (sub. 34), for example, cited an estimate of the delay cost of congestion for Melbourne which was based on an interpolation between the BTCE's 1995 and 2015 estimates.

Victorian Department of Infrastructure

In some work undertaken for Port Jackson Partners (BCA 2005), the Department of Infrastructure (DOI) attempted to examine congestion delay costs using its own transport network model called the Melbourne Integrated Transport Model (MITM). The model uses a basic methodology that is similar to the BTCE approach but based on a different transport network model and input data.

Using a version of MITM based around Melbourne's road network, vehicle operating costs, and values of other key parameters for 2001, DOI estimated the average delay costs for passenger vehicles in Melbourne (in terms of increased vehicle operating costs and time delays). It estimated that the delay costs were likely to be around $1.8 billion in 2001 growing to around $2.9 billion by 2021, assuming that a range of (unspecified) approved and funded capital works are completed. These results were lower than the BTE estimates of congestion delay costs, due in part to the exclusion of freight from the DOI results and the different transport network model, input data and assumptions. The available documentation makes it difficult to identify the reasons for differences between the BTE and DOI results.

The Australian Road Research Board (2006a) consultancy report on defining congestion summarises the results of DOI's 2001 study in more detail.

B.3 Overview of the Metropolitan Integrated Transport Model

Since the BTCE and DOI undertook their previous studies there have been a number of major changes in the configuration of Melbourne's road network. Key changes (since 1995) include the opening of CityLink, the Western and Northern Ring Roads, the extension to the Eastern Freeway and several other major road projects.

To enable better understanding of how the costs of congestion have been estimated and how they may have changed since the earlier studies, the Commission asked DOI to undertake some modelling of congestion costs using the latest version of the Melbourne Integrated Transport Model (MITM).

Structure of the model

The MITM model is designed to examine how trip patterns and mode choice change in response to changes in transport policies, population and land use. While not specifically designed for the purpose of estimating congestion delays, the model provides a number of outputs (including trip duration and vehicle speeds) that, when combined with information about the carrying capacity of the road transport network, can be used to draw inferences about congestion, including some of the costs.

The MITM relies on a detailed description of Melbourne's road network (freeways, highways, arterials and collector roads), the public transport network (trains, trams and buses) and pedestrian links. The network is divided into 2 272 transport zones and around 35 700 transport links, with each link representing a segment of Melbourne's physical transport infrastructure such as part of a road or a segment of rail track. In total, there are over 12 000 km of roads in the model. There are 17 different types of road links included in the model, with each type having a particular capacity and speed-flow relationship. MITM can model morning (7am to 9am), afternoon (4pm to 6pm) and inter-peak periods. The version of MITM used by DOI for the Commission represents Melbourne's road network as at 2004. It therefore excludes very recent additions such as the Craigieburn Bypass (opened in 2005).

The model follows the broad approach outlined above. That is, it starts by estimating the demand for travel within and between each of the transport zones. This stage uses data on population, household attribute, employment, school enrolment and land use data. Primary sources are the Victorian Activity and Travel Survey (1994 to 1999), and census data from the Australian Bureau of Statistics covering household characteristics, car ownership and journey to work patterns (Victorian Activity and Travel Survey data provided by DOI). The output of this stage is estimates of trips split into one of 8 purposes:

- home to/from work
- home to/from shopping/recreational
- home to/from educational school, pre-school and primary
- home to/from educational, tertiary
- home to/from educational, secondary
- home to/from other
- non-home to/from work
- non-home to/from other.

These trips are then assigned to the available modes (car, walking/cycling, public transport) using a model that assigns a probability of each trip occurring on a particular mode, based on differences in the generalised cost of the trip on each

available mode. The output of this stage is an estimate of trips for each mode, for different purposes.

The model then assigns the trip to the network, using an iterative procedure to find the least cost path across the network, having regard to the number of trips on each transport link and the capacity of the link. Thus if the demands on a particular road link, for example, become excessive, causing vehicles to slow down, then some trips will be re-routed until there is an equilibrium across the road network.

Modelling traffic delay and congestion costs

As noted, the model can be used to provide an indication of some of the broad costs of traffic delays for Melbourne. It can also be used to identify parts of the road network where traffic delays are potentially most severe, and also indicate possible trends in congestion. It cannot be used to examine congestion on public transport (such as passenger crowding) because the model does not limit public transport capacity.

The model's key outputs are traffic volumes and speeds for each of the over 35 000 transport links during the specified period (the morning peak). Comparing these speeds with those achievable under freely flowing conditions provides an indication of the total delays incurred for a given level of travel demand. Under freely flowing traffic conditions, the only constraints are those imposed by the physical characteristics of the transport infrastructure, such as intersections and traffic signals, which prevent drivers from travelling at posted speed limits.

The total delay costs are derived by comparing the total travel costs under the two scenarios. Total travel costs include vehicle operating costs and time delays. The model can also be used to calculate total vehicle emissions but not the extra vehicle emissions that result from congestion (see below).

These costs are not equivalent to the economic costs of congestion, which are significantly lower than the total delay costs (chapter 3).

Key model parameters

The modelling relies on a number of important parameters for key variables such as the value of time delays, vehicle operating costs, public transport fares and the values for other attributes associated with the use of public transport such as time spent waiting for services (which depends on service frequency). The base values of some of the key parameters are summarised in table B.3, along with values used for options in testing the sensitivity of the results, which are described in more detail below.

Table B.3 **Key model parameters**

	Base	*Option 1*	*Option 2*	*Option 3*
Value of time (private)	$10.05	$8.04	$12.06	$10.05
Generalised cost parameters (for vehicle assignment)				
Value of time (per vehicle minute)	$0.36	$0.29	$0.43	$0.36
Vehicle operating cost (per vehicle kilometre)	$0.27	$0.27	$0.27	$0.27
Generalised cost parameters (used in cost skimming)				
Value of time (per vehicle minute)	$0.23	$0.19	$0.28	$0.23
Vehicle operating cost (per vehicle kilometre)	$0.18	$0.18	$0.18	$0.18
Public transport parameters				
Zone 1 fare[a]	$2.29	$2.29	$2.29	$2.29
Zone 2 fare[a]	$3.81	$3.81	$3.81	$3.81
Zone 3 fare[a]	$4.83	$4.83	$4.83	$4.83
Service frequency weight	1.0	1.0	1.0	1.0
Modelled person trips for all modes (millions)	2.31	2.31	2.31	2.54

Note: [a] Fares are weighted taking into account the mix of tickets purchased (such as concession and adult fares).

Source: DOI for the Commission.

To enable future projections using the model, estimates of future travel demands and the future layout of the transport network are needed. The network specifications for 2021 include a number of committed road and public transport network expansions (such as EastLink) as well as forecast demographic and land use data. The modelled network expansions result in the length of roads modelled increasing to over 13 500 km in the 2021 version of the model (an increase of around 13 per cent). Assumptions about the distribution of population and employment in 2004 and 2021 are summarised in table B.2.[3]

[3] Population projections are produced by the Department of Sustainability and Environment (DSE) and published in *Victoria in Future 2004*. The projections in table B.4 differ slightly from the DSE published figures due to small discrepancies in LGA boundaries in MITM (DOI pers. comm. 21 March 2006).

Table B.4 **Population and employment estimates**

Local government area	*Population (2004)*	*Employment (2004)*	*Population (2021)*	*Employment (2021)*
Banyule	118 490	34 233	121 324	42 882
Bayside	89 857	24 754	95 611	29 036
Boroondara	158 597	60 341	163 432	74 911
Brimbank	173 355	41 592	181 464	69 130
Cardinia	54 480	12 488	111 693	26 146
Casey	205 721	35 095	270 164	57 576
Darebin	128 290	40 275	133 397	36 608
Frankston	117 986	32 611	127 932	44 943
Glen Eira	124 040	31 700	136 218	37 019
Greater Dandenong	126 790	72 192	137 602	93 743
Hobsons Bay	84 307	26 837	91 356	31 029
Hume	146 119	60 030	173 164	87 072
Kingston	137 365	73 197	151 160	88 656
Knox	151 160	59 887	157 044	86 948
Manningham	114 884	22 449	124 361	31 175
Maribyrnong	62 518	31 146	74 951	31 016
Maroondah	101 737	38 276	118 275	50 921
Melbourne	60 430	285 394	116 494	350 149
Melton	69 034	8 135	134 290	19 810
Monash	162 834	88 234	175 351	107 296
Moonee Valley	109 885	32 886	114 812	45 901
Moreland	136 771	31 324	146 913	23 681
Mornington P'sula	139 488	36 834	165 354	52 797
Nillumbik	60 753	11 851	62 971	16 713
Port Phillip	83 308	67 938	102 987	99 731
Stonnington	90 977	48 051	100 798	69 301
Whitehorse	146 397	59 938	156 798	77 675
Whittlesea	125 611	30 116	171 888	43 621
Wyndham	105 874	29 925	182 335	54 150
Yarra	70 143	60 206	82 033	78 041
Yarra Ranges	143 401	35 111	145 753	51 191
Total	**3 600 600**	**1 523 047**	**4 227 925**	**2 008 867**

Source: DOI for the Commission.

Employment projections are based on employment to population ratios provided by DSE to DOI in September 2004 (DOI pers. comm., 21 March 2006). DSE has since revised these ratios and these revised estimates by metropolitan region are contained in the DSE submission to the Inquiry (sub. 90, p. 19).

Procedure for calculating congestion delay costs

Congestion delay costs were derived by comparing vehicle operating costs and time delays that passenger vehicles experience under modelled traffic conditions with these same costs under free-flow conditions. Importantly, it is assumed that driving behaviour does not change—costs incurred under free-flow conditions are calculated by assuming vehicles use the same paths across the network that the model estimates for morning peak period conditions.

The key MITM output for calculating congestion delay costs are the estimated time delays and vehicle operating costs for the modelled period (the morning peak) as summarised below. The results for the morning peak are then scaled up to give annual estimates.

Time delays (am peak)

In calculating the costs associated with time delays, it is assumed that all motorists place the same value on a unit of their time and the average vehicle occupancy rate applies to all vehicles. For each road link, the costs associated with time delays are therefore calculated as:

[(estimated vehicle hours) x (value of time)] – [(free flow vehicle hours) x (value of time)]

Value of time (December 2004) = $15.72[4]

Vehicle operating costs (am peak)

The Department of Infrastructure calculated vehicle operating costs under the simulated and free-flow scenarios using the Austroads 'Urban Stop-start' and 'Freeway' Models. The Urban Stop-start model is used for calculating vehicle operating costs for links where the estimated speeds are less than 60 km/h, and the Freeway Model is used for links where estimated speeds are equal to or greater than 60 km/h.

Urban Stop-start Model:	Vehicle operating cost	$= A + B/V$
Freeway Model:	Vehicle operating cost	$= C_0 + C_1V + C_2V^2$
Where	A, B, C_0, C_1, C_2	= Model coefficients
	V	= Vehicle speed (km/h)

[4] Based on Austroads value of time for private motor vehicles of $9.23 for June 2002 (Austroads 2004), adjusted for inflation and average vehicle occupancy rate of 1.6 persons per vehicle by DOI.

These Austroads models can be used to calculate vehicle operating costs for a number of vehicle types. However, as MITM only predicts private passenger vehicle flows, DOI used only those coefficients associated with private (used) vehicles, namely:

$A = 23.22$, $B = 87.89$, $C_0 = 26.04$, $C_1 = -0.062$, $C_2 = 0.00047$

These coefficients are for 30 September 2000 (Austroads 2004b). The Department of Infrastructure adjusted the results for each calculation on each link for inflation so that they are equivalent to vehicle operating costs for December 2004.

Annual scaling factor

As the MITM results are only for a single morning peak period, it is necessary to scale up the estimates so that they can be reported as an annual cost. The Department of Infrastructure performed this by increasing the am peak period estimate to a daily figure using a scaling factor of 7.5, and then to annual figure by multiplying by the number of weekdays (250 days). This figure was chosen by the Commission because it was used by DOI for their earlier modelling of delay costs. Clearly the estimates of annual delay costs are very sensitive to the choice of scaling factor. The background to the use of this scaling factor is not entirely clear and it would be possible to derive a range of numbers.

Modelling results

The key basic outputs of the model under the base case are summarised in table B.5. This shows trip breakdowns, estimates of average vehicle speeds under simulated (actual) and nominal (free-flow) conditions, as well as various congestion indicators.

The nominal and actual travel speed indicators are based on a methodology developed by Austroads for the purpose of establishing consistent national road performance indicators. The nominal travel speed establishes a benchmark level of service under free-flow conditions and the actual travel speed indicator provides an approximation of speeds across the network. The actual travel speed indicator may differ from estimated average speeds because of the way in which this indicator is measured.

Table B.5 **Travel statistics and congestion indicators for Melbourne's road network**

Travel statistics	*am peak 2004*	*am peak 2021*	*Percentage change (2004 to 2021)*
Motor vehicle trips	2 135 749	2 478 682	16.1
Congestion indicators			
Nominal travel speed (km/h) [a]	44.96	45.72	1.6
Actual travel speed	42.84	40.06	-6.5
Actual speed difference from nominal speed (km/h)	-2.12 (-4.7%)	-5.66 (-12.4%)	
Kilometres of congested road (percentage of total road length)[b]	88 kms (0.7%)	385 kms (2.8%)	337.5
Vehicle kilometres (vkt)			
Number (kilometres)	10.5 million	16.1 million	53.3
Congested vkt (percentage of total vkt)	0.23 million (2.3%)	1.60 million (9.9%)	
Vehicle hours			
Total hours of vehicle travel	225 337	429 150	90.4
Congested hours (percentage of total vehicle hours)	13 175 (5.8%)	117 248 (27.3%)	
Average speed (km/hr)[c]	46.5	37.4	-19.6

Notes: [a] The nominal and actual travel speed indicators are based on Austroads methodology. [b] Defined as roads with a volume capacity ratio of one or more, with the results being very sensitive to volume capacity ratio (e.g. reducing the ratio to 0.8 increases kilometres of congested road to 493 in 2004 and 1484 in 2021). [c] Defined as total modelled vehicle kilometres divided by total modelled vehicle hours.

Source: DOI estimates for the Commission.

Estimates of the delay costs for each link type can be grouped into different categories. DOI allocated each link type to a particular local government area (LGA) enabling the Commission to examine the share of congestion delay costs attributable to each LGA. To reflect the different road lengths in each LGA, the total delay costs for each were summed and weighted by their share of the (modelled) road network (table B.6).

Table B.6 Share of weighted delay costs for metropolitan LGAs, 2004 and 2021 (am peak only)

Region	*Share of weighted delay cost (2004)*	*Region*	*Share of weighted delay cost (2021)*
Yarra	9.9	Yarra	12.3
Hume	8.6	Boroondara	7.4
Monash	6.2	Monash	6.8
Whitehorse	5.8	Melbourne	6.2
Boroondara	5.5	Greater Dandenong	6.1
Brimbank	5.5	Casey	5.8
Stonnington	5.1	Manningham	5.7
Banyule	4.0	Stonnington	5.6
Moreland	3.9	Moreland	4.7
Frankston	3.7	Banyule	4.6
Knox	3.4	Kingston	3.8
Casey	3.2	Moonee Valley	3.8
Kingston	3.2	Knox	3.5
Greater Dandenong	3.0	Darebin	3.1
Moonee Valley	2.9	Whitehorse	3.0
Glen Eira	2.9	Nillumbik	2.2
Darebin	2.8	Brimbank	1.8
Yarra Ranges	2.7	Port Phillip	1.7
Melbourne	2.4	Yarra Ranges	1.7
Melton	2.2	Glen Eira	1.7
Whittlesea	2.0	Wyndham	1.3
Port Phillip	1.9	Hobson's Bay	1.1
Manningham	1.9	Whittlesea	1.1
Maroondah	1.8	Hume	1.1
Wyndham	1.4	Maroondah	1.0
Mornington Peninsula	1.1	Frankston	0.9
Hobsons Bay	1.0	Maribyrnong	0.7
Nillumbik	0.8	Mornington Peninsula	0.6
Maribyrnong	0.8	Melton	0.3
Bayside	0.4	Bayside	0.3
Cardinia	0.1	Cardinia	0.2

Source: DOI for the Commission.

Delay costs can also be grouped by the type of road link. Tables B.7 and B.8 summarise the delay cost shares for different road types, grouped into the broad regions of Melbourne for 2004 and 2021.[5] The shares are weighted by each regions share of the modelled road network. It is likely that the cost shares understate the share of delays on the freeways. A feature of MITM is that it does not factor in the turbulence that can occur on roads, particularly on freeways. This turbulence (or flow breakdown) is more likely to occur on congested roads, and can result from a variety of factors, such as driver behaviour, weather conditions, road works and accidents and other incidents.

Table B.7 **Shares of delay costs (weighted) by road type for each region of Melbourne in 2004**

	Central	*East*	*Southern*	*South East*	*West*	*Interface*	*Total*
Freeway	23%	2%	1%	4%	15%	3%	8%
Highway	14%	41%	24%	22%	51%	58%	34%
Arterial	38%	47%	62%	52%	16%	25%	41%
Sub-arterial	22%	7%	10%	17%	16%	10%	14%
Collector	2%	2%	2%	4%	2%	4%	3%
Local	1%	1%	1%	0%	0%	0%	0%

Source: DOI for the Commission.

Table B.8 **Shares of delay costs (weighted) by road type for each region of Melbourne in 2021**

	Central	*East*	*Southern*	*South East*	*West*	*Interface*	*Total*
Freeway	26%	3%	23%	19%	49%	2%	20%
Highway	7%	23%	39%	21%	17%	26%	21%
Arterial	49%	63%	28%	47%	16%	62%	45%
Sub-arterial	15%	8%	4%	11%	15%	8%	10%
Collector	2%	3%	4%	3%	4%	2%	3%
Local	1%	0%	1%	0%	0%	0%	0%

Source: DOI for the Commission.

[5] Central (Darebin, Melbourne, Moreland, Port Phillip, Yarra); East (Banyule, Knox, Manningham, Maroondah, Whitehorse); Southern (Casey, Frankston, Greater Dandenong, Monash); South East (Bayside, Boroondara, Glen Eira, Kingston, Stonnington); West (Brimbank, Hobson's Bay, Maribyrnong, Melton, Moonee Valley, Wyndham); Interface (Cardinia, Hume, Mornington Peninsula, Nillumbik, Whittlesea, Yarra Ranges) (Municipal Association of Victoria, pers. comm., 5 Jan 2006).

Sensitivity test

As discussed in chapter 3, the results of studies into congestion costs can be extremely sensitive to methodologies, data and assumptions. The Commission asked DOI to perform several sensitivity tests on the modelling to enable an assessment of the effects of changes in some key model parameters. Three alternative scenarios were tested:

- *Option 1*: a 20 per cent decrease in the value of time parameters (see table B.3)
- *Option 2*: a 20 per cent increase in the value of time parameters
- *Option 3*: a 10 per cent increase in the base level of demand for travel.

Table B.9 **Sensitivity testing MITM results – am peak 2004**

Travel statistic/Indicator	*Option 1*	*Option 2*	*Option 3*
Motor vehicle trips	2 140 755	2 129 150	2 381 894
Congestion indicator			
Nominal travel speed (km/h) [a]	44.96	44.96	44.96
Actual travel speed (km/h)	42.56	43.17	39.72
Actual speed difference from nominal speed (km/h)	-2.40 (-5.3%)	-1.79 (-3.9%)	-5.24 (-11.7%)
Kilometres of congested road (percentage of total road length)[b]	109 (0.9%)	69 (0.6%)	312 (2.5%)
Vehicle kilometres (vkt)			
Number (kilometres)	10.8 million	10.0 million	13.7 million
Congested vkt (percentage of total vkt)	0.29 million (2.7%)	0.18 million (1.8%)	1.0 million (7.3%)
Vehicle hours			
Total hours of vehicle travel	238 421	209 325	355 849
Congested hours (percentage of total vehicle hours)	16 735 (7.0%)	9 518 (4.6%)	74 546 (20.1%)
Average speed (km/hr)[c]	45.5	47.7	38.5

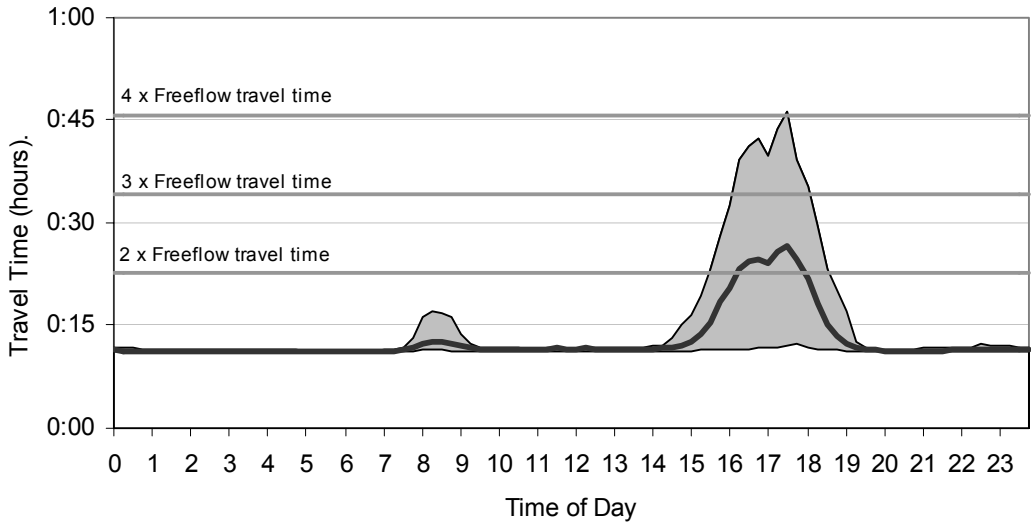
Notes: [a] The nominal and actual travel speed indicators are based on Austroads methodology. [b] Defined as roads with a volume capacity ratio of one or more. [c] Defined as total modelled vehicle kilometres divided by total modelled vehicle hours..

Source: DOI estimates for the Commission.

B.4 Freeway performance indicators

This section contains charts showing average travel times along a number of monitored sections of Melbourne's freeways.

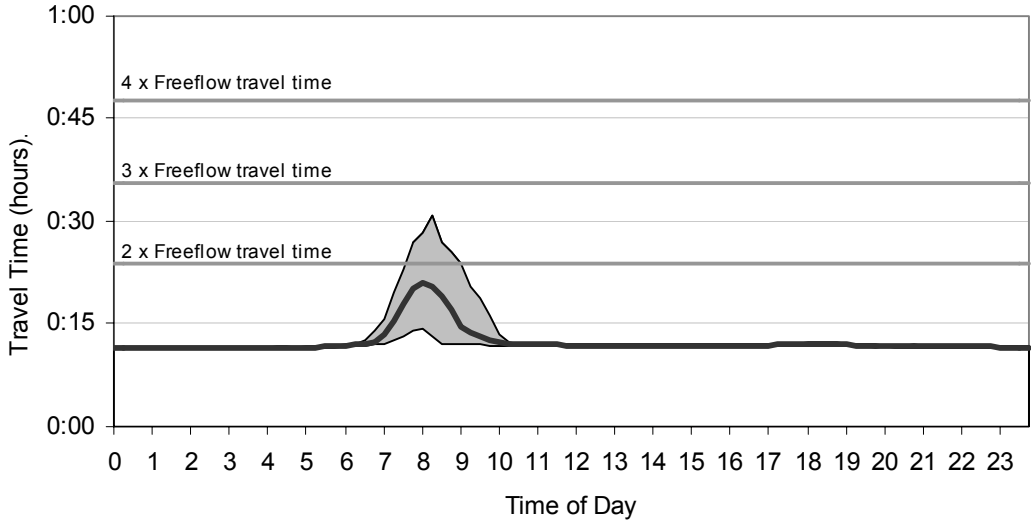
Figure B.1 Travel time on the Monash freeway (out-bound from Toorak Road to Jacksons Road)



Notes: Shows mean (▬), 95th and 5th percentile (▩) travel times from 30 May 2005 to 16 Oct 2005.

Source: VicRoads.

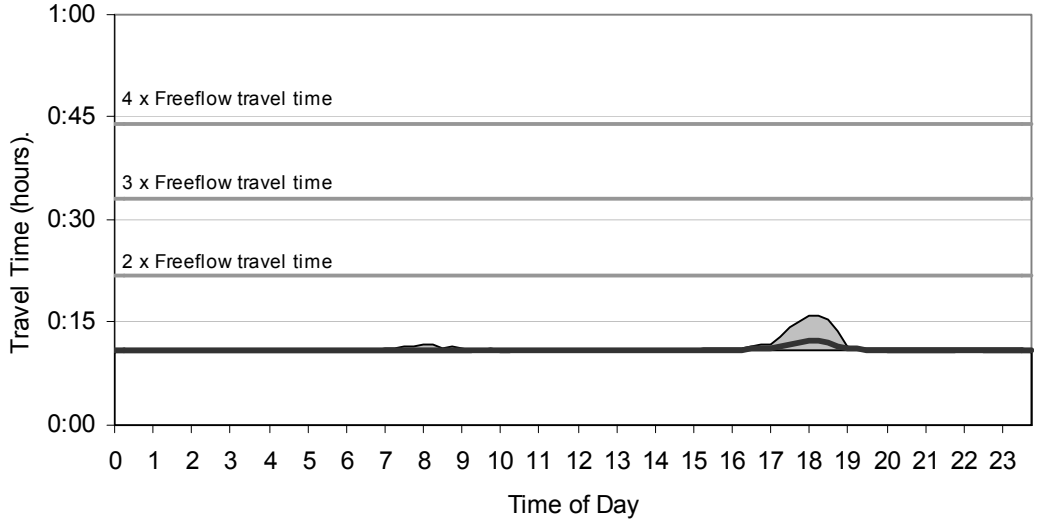
Figure B.2 Travel time on the Eastern Freeway (in-bound from Springvale Road to Hoddle Street)



Notes: Shows mean (▬), 95th and 5th percentile (▩) travel times from 30 May 2005 to 16 Oct 2005.

Source: VicRoads.

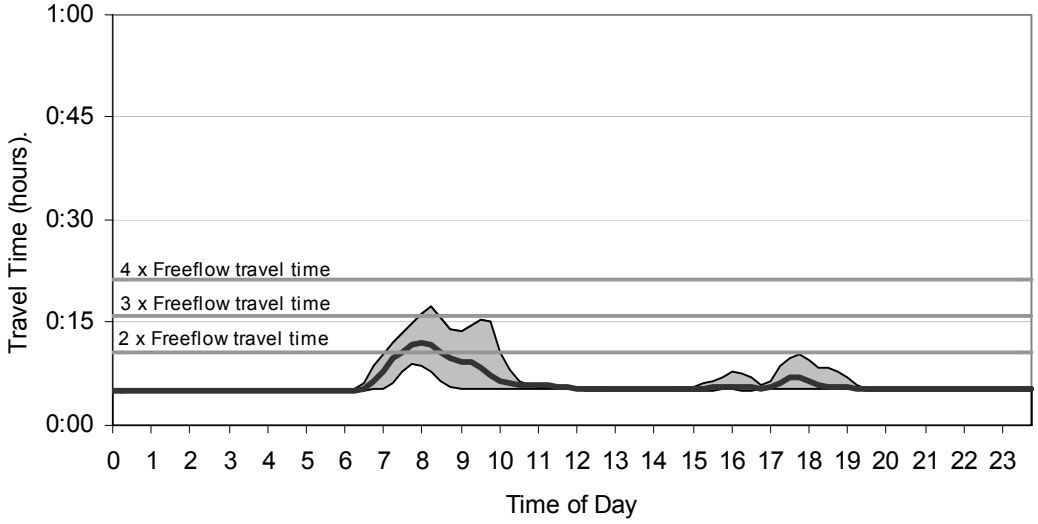
Figure B.3 Travel time on the Eastern Freeway (out-bound from Hoddle Street to Springvale Road)



Notes: Shows mean (—), 95th and 5th percentile ( ) travel times from 30 May 2005 to 16 Oct 2005.

Source: VicRoads.

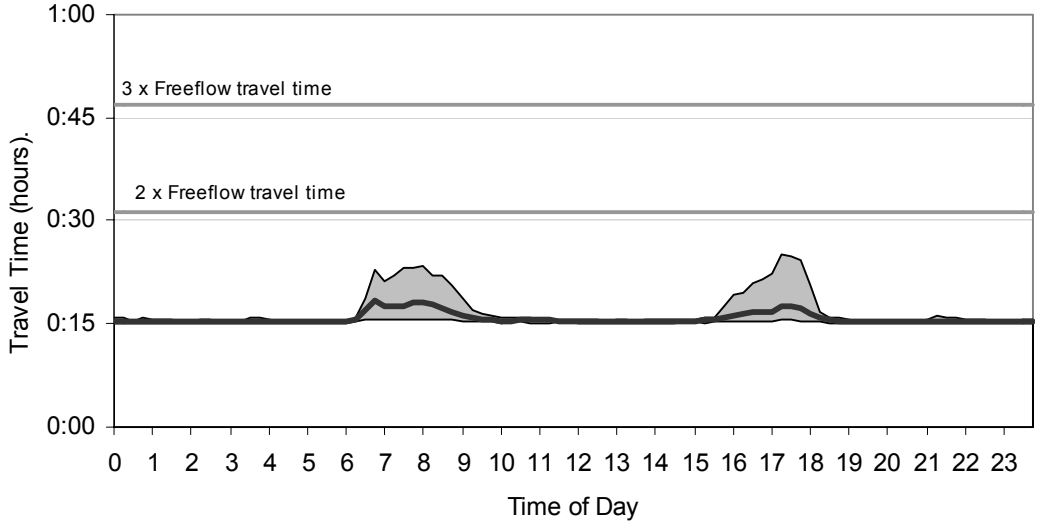
Figure B.4 Travel time on the Tullamarine Freeway (in-bound from Centre Road/Melbourne Drive To Bell Street/Pascoe Vale Road)



Notes: Shows mean (—), 95th and 5th percentile ( ) travel times from 30 May 2005 to 16 Oct 2005.

Source: VicRoads.

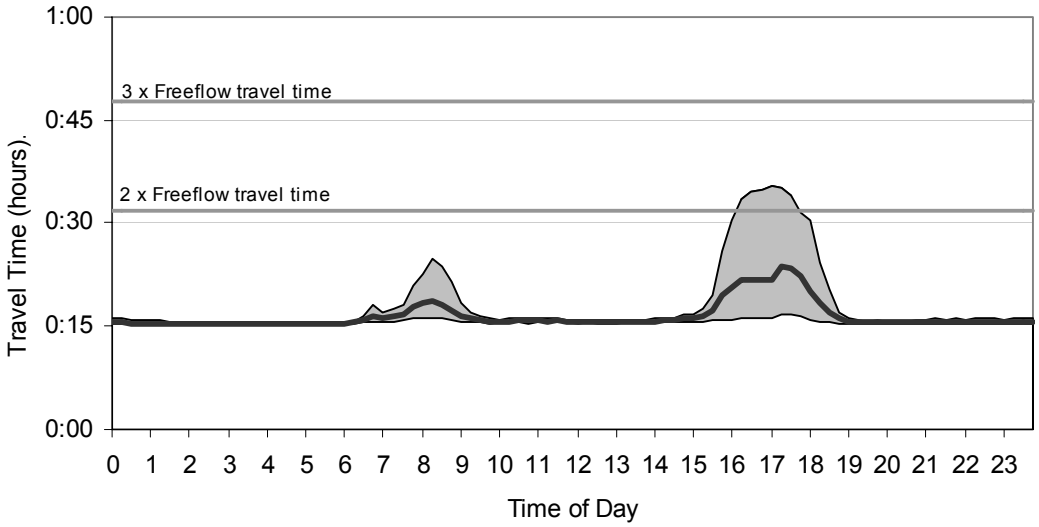
Figure B.5 Travel time on the Western Ring Road (in-bound from Hume Highway to Westgate Freeway)



Notes: Shows mean (—), 95th and 5th percentile ( ) travel times from 30 May 2005 to 16 Oct 2005.

Source: VicRoads.

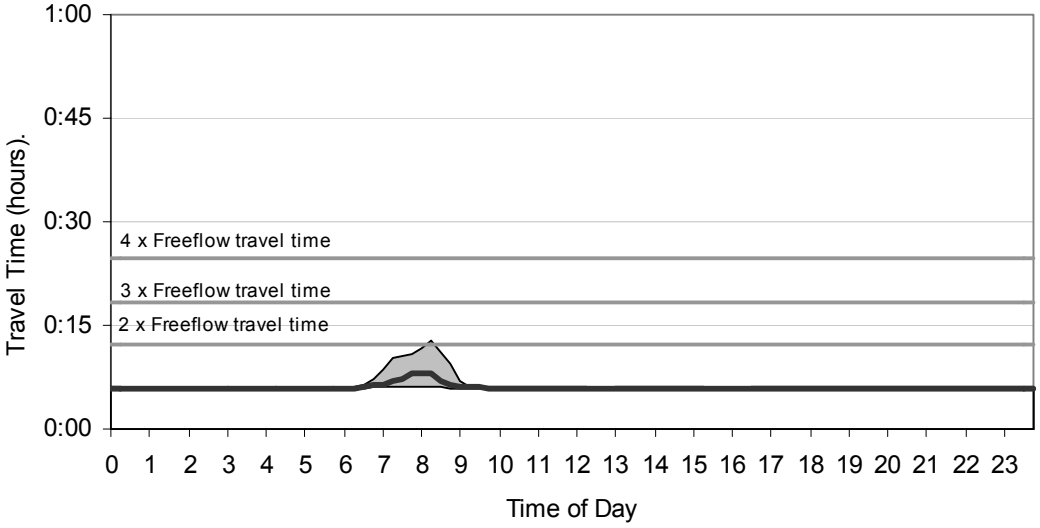
Figure B.6 Travel time on the Western Ring Road (out-bound from Westgate Freeway to Hume Highway)



Notes: Shows mean (—), 95th and 5th percentile ( ) travel times from 30 May 2005 to 16 Oct 2005.

Source: VicRoads.

Figure B.7 **Travel time on the Metropolitan Ring Road (in-bound from Plenty Road to Hume Highway)**



Notes: Shows mean (—), 95th and 5th percentile ( ) travel times from 30 May 2005 to 16 Oct 2005.

Source: VicRoads.

Appendix C: Metropolitan Transport Plan approaches to addressing congestion

The Victorian Government released *Linking Melbourne: Metropolitan transport plan* 'a comprehensive plan for the management and development of Melbourne's transport system' in 2004 (Government of Victoria 2004a, p. 1). The plan listed the Government's progress to date in addressing the challenges facing the metropolitan transport system (box C.1). The plan also outlined the Government's intended direction for the transport system. A section outlined strategies to address rising levels of road congestion through public transport enhancements (box C.2), enhancing existing road capacity (box C.3), improving the integration and coordination of public transport services (box C.4), increasing access through the introduction of cross-town bus services (box. C.5) and promotion of alternatives to car travel (box C.6).

This appendix focuses on those actions identified in the *Metropolitan transport plan* to address congestion. Actions identified in other sections of the document may also have an impact on congestion. Readers interested in obtaining a comprehensive insight into the Government's intended direction for the transport system should refer to this document.

C.1 Progress to date

The *Metropolitan transport plan* (Government of Victoria 2004a) listed the Government's achievements to date in addressing the challenges facing the metropolitan transport system. The Government has been responding to a range of issues in pursuing these actions, although a number are likely to have had an impact on congestion, including at particular hot spots (box C.1).

Box C.1 Addressing transport challenges: progress to date

A safer transport system

- Pursued a targeted campaign of initiatives to reduce the number of road fatalities in Victoria to a 50-year low.
- Introduced 50 km/h speed limit on residential streets.
- Introduced 40 km/h speed zones near schools.
- Substantially increased the number of frontline staff on the tram and train networks.

(continued next page)

Box C.1 **Addressing transport challenges: progress to date** (continued)

- Embarked on a major program to upgrade safety protection at road/rail level crossings and stand-alone pedestrian crossings on the rail system, with 12 crossings upgraded in 2003–04, a further 39 being upgraded in 2004–05, and a further 17 approved for 2005–06.
- Introduced Closed Circuit Television (CCTV) and improved lighting to improve security at railway stations.
- Implemented a $240 million 'Blackspot Program'.
- Introduced safety cameras in taxis.
- Introduced alcohol interlocks for serious and repeat drink drivers.

Facilities for cyclists

- Added more than 750 km to Victoria's networks of arterial bicycle lanes and paths over the past five years.
- Victoria Planning Provisions amended on 6 October 2004 so that 'end of trip' facilities such as secure bicycle parking and shower and change areas are provided for cyclists in new commercial and large residential developments.

Inter-regional and freight

- Completed the Hallam bypass.
- Completed the Geelong Road upgrade.
- Began the construction of the Craigieburn bypass.
- Continuing the upgrade of the Calder Highway with the Carlsruhe, Woodend and Black Forest sections completed.
- Completing the Geelong grain rail loop linking that part of the Port of Geelong to the standard-gauge rail network.
- Placed conditions on the sale of Freight Australia to protect competition and to address issues associated with access to the regional rail network.
- Implemented port reforms, including the establishment of the Port of Melbourne Corporation.
- Completed the rail connection to West Swanson Dock.
- Completed the extension of Dock Link Road to the North Dynon Rail Yard.

Development and management of the arterial road network

- Completed the 42 km Metropolitan Ring Road.
- Entered into contracts for the construction of the $2.5 billion Mitcham–Frankston Project.
- Improved road traffic flows through measures such as regulating freeway on-ramp traffic, improving key intersections and improving traffic signal management.
- Boosted funding for outer metro arterial roads.

(continued next page)

Box C.1 **Addressing transport challenges: progress to date** (continued)

Passenger services to regional Victoria

- Progressing Regional Fast Rail services between Melbourne and Ballarat, Bendigo, Geelong and the Latrobe Valley.
- Restored V/Line passenger train services to Bairnsdale and Ararat.
- Progressing the redevelopment of Spencer Street Station, to be renamed Southern Cross Station upon completion.

Public transport service improvements

- Finalised new partnership agreements with Connex Trains and Yarra Trams to deliver better transport and customer service outcomes.
- Established Metlink to coordinate public transport services and marketing.
- Substantially increased the number of services on train and tram routes.
- Improved the reliability of ticket machines at rail stations.
- Set in place processes for the development of a new Smartcard ticketing system.
- Reduced the price of the Statewide Tertiary Student Concession Card from $126.60 to $75.00 in 2001, with a further reduction in 2005 to be the same price as the Primary/Secondary Concession Card (currently $8.00).
- The Companion Card is now accepted on public transport, providing free travel for carers accompanying disabled passengers.
- All Health Care Card holders will be eligible for concession public transport fares from 1 January 2005. This will assist people who are unemployed or on low incomes, not previously entitled to public transport concessions.
- Created the Public Transport Industry Ombudsman.
- Successfully trialled 'TravelSmart' to increase the use of public transport, walking and cycling in the Alamein transport corridor.

Public transport network development

- Extended the electrified rail system to Watergardens (Sydenham).
- Extended tram route 109 from Mont Albert to Box Hill.
- Extended the tram network into Docklands.
- Oversaw the delivery of new rolling stock including trains and low-floor trams and buses.
- Provided Disability Discrimination Act compliant 'superstops' enabling better access to trams on selected routes.
- Progressing the electrification of the passenger rail network to Craigieburn.
- Progressing the extension of the tram network to Vermont South.
- Introduced SmartBus services along Blackburn Road and Springvale Road, with services on Warrigal Road and Wellington Road committed.
- Delivered the largest boost to bus services in 30 years with over $60 million spent on new and enhanced bus services since 2000.

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Box C.1 **Addressing transport challenges: progress to date** (continued)

Taxi service improvements

- Issued the first additional 100 peak taxi licences of a total of 600 to be progressively released to improve taxi availability, particularly in peak periods and evenings.
- Introduced a customer service charter for taxis and a requirement for the accreditation of taxi operators, depots and networks.
- Overhauled taxi driver training, more than doubling training contact hours.

Source: Government of Victoria 2004a, pp. 8-11.

C.2 Managing congestion: strategies for inner and established suburbs

The *Metropolitan transport plan* stated '[t]he majority of congestion currently occurs in the inner to middle suburbs—within 15 km of the Central Business District' (Government of Victoria 2004a, p. 25). To combat the rising levels of road congestion, the Victorian Government proposed a combination of approaches to make best use of the existing transport infrastructure and achieve the most efficient movement of people and goods, focussing on the inner and middle suburbs. These approaches included:

- provide priority to trams and buses over other traffic, to reduce delays and improve service reliability
- make better use of the limited road space available through more effective control of traffic flow on arterial roads, movements at intersections and kerbside parking
- promote greater use of public transport, particularly in established areas where the supply is relatively good
- promote greater use of walking and cycling for shorter trips
- make the existing public transport system more user friendly through improved coordination of services (for example, bus and train timetables), real-time passenger information, better facilities at stations and stops, and an improved ticketing system in due course
- introduce a high-quality, high-frequency network of cross-town buses for people who do not travel to and from the central area
- provide people with better information about travel options and the associated costs and benefits, to assist their travel decisions. (Government of Victoria 2004a, p. 25)

Each of these broad approaches comprised a range of particular measures (outlined below). Some of these measures will have been progressed since the release of the plan in 2004.

Improve the reliability and flow of road-based public transport

The Victorian Government recognised that the performance of the public transport system needed to increase significantly to achieve the aim of a public transport mode share of 20 per cent. The Government identified priority actions to reduce delays to buses and trams and improve their reliability (box C.2).

Box C.2 Priority actions to improve the reliability and flow of road-based public transport

Trams and buses

- Implement innovative signal systems that give priority to trams and buses at intersections and on approaches under specific circumstances.
- Separate cars from trams and/or buses on road lengths between intersections where possible—for example, by using dynamic priority systems, particularly during peak times, and new delineation standards for dedicated public transport facilities such as red paving for bus-only lanes.
- Implement more effective controls on kerbside parking, particularly at locations where public transport is impeded.
- Roll out the tram priority program across various routes. Route priorities have been determined on the basis of heavy levels of patronage, slow travel speeds and low reliability. Other routes will be upgraded subsequently.
- Achieve a 25 per cent reduction in tram travel time and associated improvements in reliability on the target routes. As these are made, timetables will be adjusted to pass on the benefits to tram users.
- Link the tram operation control centre with VicRoads' traffic management system. This will ultimately allow late trams to make up lost time through real-time changes to traffic priority.
- Implement bus priority principles on cross-town bus routes in middle and outer areas via the SmartBus program.

Education

- Develop an education campaign around priority for trams and buses, to ensure motorists observe fairways, clearways and turn bans. This will include targeted promotion campaigns, better signage and possibly enhanced training as part of the driver licence testing process.
- Review regulations and penalties relating to fairways, clearways and turn bans to ensure the rules are commensurate with the impact on passenger safety and tram operations and on par with other road safety penalties.
- Increase enforcement, including the use of tram-mounted cameras to record offences, particularly where the safety of tram passengers is jeopardised.

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Box C.2 **Priority actions to improve the reliability and flow of road-based public transport** (continued)

Congested corridors

- Develop Park & Ride facilities at strategically located train, bus and tram terminals. High-priority sites will be along heavily travelled routes where there is an efficient peak public transport service.
- Further develop options for the improvement of public transport in the Doncaster corridor.
- Provide comparative travel time information on congested routes that offer efficient public transport alternatives, to encourage a shift in mode.

Source: Government of Victoria 2004a, p. 27.

Make existing roads operate better

There are a number of competing demands for available road space. The Victorian Government identified a number of priority actions to enable the most effective use to be made of the existing arterial roads (box C.3).

Box C.3 **Priority actions to make existing roads operate better**

Establish a hierarchy of use

Priorities for the use of roads will be established for some sections of arterial roads that have differing functions. This will enable the overall arterial network to best meet the needs of all users. In particular, it will improve traffic flow in Melbourne's inner and middle suburbs where there is limited road space available and where the abutting land-use patterns are well established.

These priorities will reflect the following principles:

- Public transport will have first priority on designated routes on the Principal Public Transport Network (PPTN).
- Freight vehicles complying with normal mass and dimension limits will generally have unrestricted access across the arterial road network. Where there are currently restrictions, such as curfews, on particular access roads to major terminals, alternative routes will be developed to enable unrestricted access. Special routes will be designated for over dimensional loads.
- Where there are significant conflicts with abutting land use (such as heavily trafficked arterial roads through strip shopping centres with significant pedestrian activity), alternative routes will be developed where practicable and designated as preferred traffic routes. Peak traffic will be encouraged to use these routes.
- Available road capacity will be fully utilised on preferred traffic routes, with restrictions on kerbside parking as and when required.

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Box C.3 **Priority actions to make existing roads operate better** (continued)

Network priorities will be established on a regional basis in consultation with local government, transport industry representatives, local communities and other key stakeholders.

Establish more effective access controls

An arterial road access management policy will also be established for use by councils and developers. The policy will define a hierarchy of access management categories for arterial roads, taking into account appropriate access requirements for adjacent land.

The policy will provide substantial benefits to the development industry, road agencies and the wider community. It will be implemented by streamlining the planning approval process, to promote a more integrated approach to land use and road management, minimise traffic disruption, improve safety on arterial roads and facilitate safe and adequate access to adjacent land.

The policy will be established in consultation with local government and will apply to proposed future developments only.

Manage kerbside parking

The supply of parking on congested arterial roads will be reviewed and an implementation plan developed to fully utilise available road capacity to facilitate the movement of people and goods, while considering adjacent land-use requirements.

Clearway times will be reviewed for the network to align with travel demand, commencing with the inner area. For high traffic routes, without any pronounced difference between the peaks, longer clearway periods will be considered.

Where it is necessary to remove existing kerbside parking, special provision may be made for indented parking or other parking facilities where appropriate. Changes to kerbside parking will be planned in consultation with local government, key stakeholders and the community.

Optimise peak traffic flows on major arterial roads

Improved traffic flow will reduce the environmental effects of emissions generated by flow breakdown (congestion). Peak demands will be managed and traffic flows optimised on heavily trafficked routes. Travel delays will be monitored on all metropolitan freeways and major arterial roads, in relation to off-peak baseline travel times.

- Priority for travel time improvements will be given to routes that carry the heaviest traffic volumes; that is, the Principal Road Network (PRN) and preferred traffic routes. Competing demands will be managed in accordance with defined principles. Plans will be developed on a route basis to achieve flow improvements.

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Box C.3 **Priority actions to make existing roads operate better** (continued)

- Intelligent transport systems will be adopted as the preferred means of improving traffic flow, to maximise use of available road space.
- On Melbourne's freeway network, which facilitates the movement of up to 20 per cent of the city's road-based travel, improved performance will be achieved through responsive incident management and deployment of intelligent systems. These include dynamic speed control and ramp metering to improve safety and traffic efficiency.
- Investigations will be undertaken to identify potential applications of tidal flow or one-way traffic arrangements.

Improve direction signage and navigation aids

Improved destination signing for significant locations will be implemented for all major metropolitan roads to enable more effective navigation and travel by road users. Information will be provided to map publishers advising on the network hierarchy of use.

Provide real-time information to encourage better travel choice

The Drive Time system currently provides travellers with information to assist them to choose the best route. The system has been installed on the Monash, West Gate, Tullamarine and Eastern freeways. It provides accurate, realtime information on travel times through trip information signs, incidents through variable message signs, and freeway condition and ramp control signs. The information is also accessible through the internet to enable route choices to be made prior to a journey.

The Drive Time system will be extended progressively to other metropolitan freeways and significant routes on Melbourne's PRN.

Comparative travel time information will be provided to users of congested routes with good public transport alternatives, to encourage a shift in mode choice towards public transport.

Improve vehicle occupancy

High-occupancy vehicle lanes will be implemented and enforced on major congested routes to encourage greater vehicle occupancy during congested periods.

Initiatives to promote car-pooling will be developed to increase vehicle occupancy rates.

Source: Government of Victoria 2004a, pp. 29-30.

Improve service coordination, integration and customer interface

The *Metropolitan transport plan* states that the 'Victorian Government aims to make the public transport system more user-friendly through the integration of timetables, more uniform presentation of information and improved ticketing' (Government of Victoria 2004a, p. 31) (box C.4).

Box C.4 Priority actions to improve service coordination, integration and customer interface

Integrating services under the Metlink banner

- Progressively improve timetable coordination across modes; for example, by encouraging train and tram operators to appoint full-time managers to oversee liaison with bus operators.
- Improve facilities for real-time passenger information and trip planning, including online services, SMS-based information services and real-time displays.
- Scope and deliver a further five-year modal interchange upgrade program, building on the success of the Connecting Transport Services program.
- Support and develop the role of Metlink as the integrated face of public transport in Melbourne, including the next stage of Metlink signage roll-out across the network.
- Investigate the opportunity for further Park & Ride facilities at outer railway stations.
- Improve the coordination of taxis with late-night services such as the NightRider bus service.

A new Smartcard ticketing system

The expiry of the contract for the automated Metcard ticketing system in 2007 gives Victoria the opportunity to develop and deliver a world-class ticketing system. The Government is proposing to introduce a new Smartcard system which will offer the customer a faster, easier way to interact with public transport.

To manage the transition to the new system, the Government has created the Transport Ticketing Authority, which will investigate, recommend, deliver and then manage the best ticketing solution for Melbourne and Victoria.

Action will also be taken to improve ticket distribution channels both on and off the system.

Transport fare structures

- Focus fare structures, products and incentives on discounted off-peak travel options.
- Improve the Statewide integration of fare structures across the metropolitan area, the urban fringe, regional centres and regional Victoria.
- In conjunction with the operators, improve enforcement and fare evasion counter-measures through an integrated approach including education, training and facility design—recognising that the majority of passengers who pay are rightly offended by those who do not.

Source: Government of Victoria 2004a, p. 32.

Increase access via cross-town bus services

Linking Melbourne: Metropolitan transport plan stated

> The Victorian Government aims to improve access while reducing car dependence, by providing people with better public transport options in middle and outer suburbs. (Government of Victoria 2004a, p. 45)

The Government stated that the introduction of 'SmartBus services will make public transport a suitable option for many cross-town trips and provide faster long-distance connections around Melbourne' (Government of Victoria 2004a, p. 45). The Government's priority actions for the introduction of SmartBus services are listed in box C.5.

Box C.5 Priority actions to roll out the SmartBus network

- Complete the Red Orbital SmartBus route, including the committed Warrigal Road (Mordialloc to Box Hill) section, and extend to Northland Shopping Centre and then through the northern and western suburbs to Altona.
- Establish a communication technology system to support the operations management of the services, the provision of passenger information and traffic priority capability.
- Develop and deliver the Doncaster to Frankston SmartBus orbital route on arterial roads including Dandenong–Frankston Road and Stud Road to Maroondah Highway.
- Deliver a SmartBus route from Rowville to Caulfield along Wellington Road and the Princes Highway in Melbourne's south-east, providing a connection between Caulfield, Chadstone Shopping Centre, Oakleigh, Monash University and Stud Park.
- Upgrade key existing PPTN bus services to SmartBus standard with a focus on northern and western Melbourne.
- Develop performance-oriented contracts for bus services, with incentives for better service and initiatives to grow patronage.

Source: Government of Victoria 2004a, p. 46.

Promote sustainable travel through better demand management

The *Metropolitan transport plan* stated that the 'Victorian Government aims to encourage people to use public transport, walk or cycle rather than use the car, where this is practicable' (Government of Victoria 2004a, p. 33). This will be achieved through the use of travel demand management measures which aim to modify travel behaviour to reduce or redistribute travel demand. The plan identified TravelSmart and pricing as two key initiatives with the potential to affect travel behaviour change. The travel demand measures have been summarised by the Commission in box C.6.

Box C.6 Demand management initiatives to promote sustainable travel

TravelSmart

The *Metropolitan transport plan* stated:

> The TravelSmart program aims to achieve a sustainable change in personal travel behaviour from single-car occupant to sustainable modes of travel (public transport, walking and cycling), smarter car use (car pooling) and in some cases, travel substitution (teleworking).
>
> TravelSmart employs intensive, customised marketing campaigns conducted within local communities, schools, universities and workplaces, to ensure that people who might be swayed by the benefits of using alternative modes have full information about the choices available to them. (Government of Victoria 2004a, p. 33)

A pilot program was undertaken in 2003 involving 6100 households along the Alamein train line in the City of Boroondara and a full-scale campaign was undertaken during 2004 involving 30 000 households in the City of Darebin. Further large scale TravelSmart projects were to be rolled out in the municipalities of Moonee Valley, Maribyrnong and other communities in the inner and middle suburbs over the following 10 years.

TravelSmart is also being implemented in universities, schools and workplaces.

Investigate pricing arrangements

The *Metropolitan transport plan* stated:

> There is a need to build greater awareness of the full economic, social and environmental costs of travel options. Establishing a closer link between actual and perceived costs is an essential element that requires further investigation.
>
> Priority areas for monitoring, review and investigation include:
>
> - pricing arrangements for private vehicles and public transport, including differentials between peak and off-peak travel
> - possible distortions in existing taxes and charges that may need modification in order to encourage the use of alternative modes
> - overseas developments in transport pricing and their possible implications for Melbourne
> - parking policies. (Government of Victoria 2004a, p. 34)

Source: Government of Victoria 2004a, pp. 33-34.

Appendix D: Codes of practice

The *Road Management Act 2004* (Vic.) allows the Minister of Transport to provide practical guidance to road authorities and works and infrastructure managers by making Codes of Practice (s.28). Five codes have been developed in accordance with the Act's consultative process.

D.1 Operational responsibility for public roads

This Code guides the allocation of responsibility among road authorities for parts of the road reserve and how boundaries between roadways, pathways or shoulders are determined. It also establishes principles for determining the boundary between a roadway, pathway or shoulder in any particular case and which road authority is responsible for road-related infrastructure.

The Code describes the limits of responsibility among VicRoads, municipal councils and state road authorities for freeways, arterial roads, bridges, drainage, lighting and public transport facilities. It states, for example, that VicRoads is not responsible for bus shelters and associated passenger facilities: they are the responsibility of the relevant municipal council, public transport operator, Department of Infrastructure or a private company. Any involvement by VicRoads is by an arrangement between VicRoads and the municipal council (Clause 18).

D.1.1 Clearways on declared arterial roads

The Code guides VicRoads on the processes for establishing, managing and consulting on clearways on arterial roads. It provides that:

- VicRoads must consider specified matters before determining whether to create or alter a clearway, including the effect on traffic congestion and local amenity
- VicRoads must give notice—containing specified information—of any proposal for a clearway to the relevant council and owners and occupiers of abutting properties and undertake appropriate consultation
- VicRoads must consider all submissions it receives before making a decision and advise the council and owners and occupiers of its decision and the reasons for it
- if a council disagrees with VicRoads' decision, it may make a written submission to the Minister for Local Government setting out the grounds for its disagreement

- VicRoads must advise the Minister for Transport of its decision and the matters raised in submissions. It should recommend that the Minister consult with the Minister for Local Government before the Minister endorses or modifies VicRoads' decision
- if a road authority or provider of public transport is aggrieved by VicRoads' decision, it may seek to resolve the matter in accordance with the dispute resolution procedures contained in the Road Management Act.

No time limits are specified in the Code for the completion of different stages of the process.

D.1.2 Road management plans

The Road Management Act provides that responsible road authorities have a statutory duty to inspect, maintain and repair public roads (s.40). The Act allows them to establish a management system and set standards for the inspection, maintenance and repair of roads under their responsibility (s.41). If a road authority chooses to prepare a management plan the Code guides the content and process for making such plans. It provides that plans may contain:

- a description of the types of road infrastructure
- a description of the inspections required for different types of road infrastructure
- the standard to be achieved in the maintenance and repair of different types of road infrastructure
- details of the management system established and implemented by the road authority to discharge its duty to inspect, maintain and repair.

The Schedule to the Code illustrates a management system for inspection, maintenance and repair of road infrastructure that may be adopted to meet the requirements of the Act.

D.1.3 Management of utility and road infrastructure in road reserves

The Code provides practical guidance and identifies benchmarks of good practice for utilities and road authorities to facilitate planning and managing the installation, maintenance and operation of road and non-road infrastructure in road reserves. It relates to:

- the manner in which road works should be carried out
- processes for consultation and exchanging information about future works
- good practice or relevant industry standards in relation to a specified type of infrastructure or works

- processes to facilitate consultation and co-operation among road authorities and utilities responsible for infrastructure on roads
- the interchange and storage of information on road and non-road infrastructure located in road reserves.

The Code is sensitive to the need for avoidance of delays when different authorities work together. It states that coordinating authorities must consent to (or refuse) applications within prescribed time limits and, where they cannot be prescribed, it directs that action should be taken 'promptly' or 'as quickly as possible'.

Where authorities cannot agree, the Code refers to the dispute resolution procedure in the Road Management Act. It recommends steps in the dispute resolution procedure and that each step should be taken as quickly as possible but ideally, not more than ten business days.

D.1.4 Worksite safety—traffic management

This Code aims to provide practical guidance to people conducting road works in Victoria to promote and protect worksite safety by:

- establishing and maintaining a standardised approach to works on roads
- establishing a risk-based assessment of worksite conditions to identify and implement appropriate control measures
- supporting the planning for and management of traffic to pass safely around a worksite
- supporting the engagement of appropriately trained and qualified people to carry out the works or direct traffic.

The Code guides matters such as appropriate speed limits and signage, and safety clothing for road workers.

Table D.1 **Categorisation of measures introduced under the *Metropolitan transport plan***

A safer transport system	*Category*
Pursued a targeted campaign of initiatives to reduce the number of road fatalities in Victoria to a 50-year low.	n.a.
Introduced 50 km/h speed limit on residential streets.	S
Introduced 40 km/h speed zones near schools.	S
Substantially increased the number of frontline staff on the tram and train networks.	S
Embarked on a major program to upgrade safety protection at road/rail level crossings and stand-alone pedestrian crossings on the rail system, with 12 crossings upgraded in 2003–04, a further 39 being upgraded in 2004–05, and a further 17 approved for 2005–06.	S
Introduced Closed Circuit Television (CCTV) and improved lighting to improve security at railway stations	S
Implemented a $240 million 'Blackspot Program'.	n.a.
Introduced safety cameras in taxis.	S
Introduced alcohol interlocks for serious and repeat drink drivers.	n.a.
Facilities for cyclists	
Added more than 750 km to Victoria's networks of arterial bicycle lanes and paths over the past five years.	S
Victoria Planning Provisions amended on 6 October 2004 so that 'end of trip' facilities such as secure bicycle parking and shower and change areas are provided for cyclists in new commercial and large residential developments.	S
Inter-regional and freight	
Completed the Hallam bypass.	S
Completed the Geelong Road upgrade.	S
Began the construction of the Craigieburn bypass.	S
Continuing the upgrade of the Calder Highway with the Carlsruhe, Woodend and Black Forest sections completed.	S
Completing the Geelong grain rail loop linking that part of the Port of Geelong to the standard-gauge rail network.	S
Placed conditions on the sale of Freight Australia to protect competition and to address issues associated with access to the regional rail network.	INST.
Implemented port reforms, including the establishment of the Port of Melbourne Corporation.	INST.
Completed the rail connection to West Swanson Dock.	S
Completed the extension of Dock Link Road to the North Dynon Rail Yard.	S

(continued next page)

Table D.1 **Categorisation of measures introduced under the *Metropolitan transport plan*** (continued)

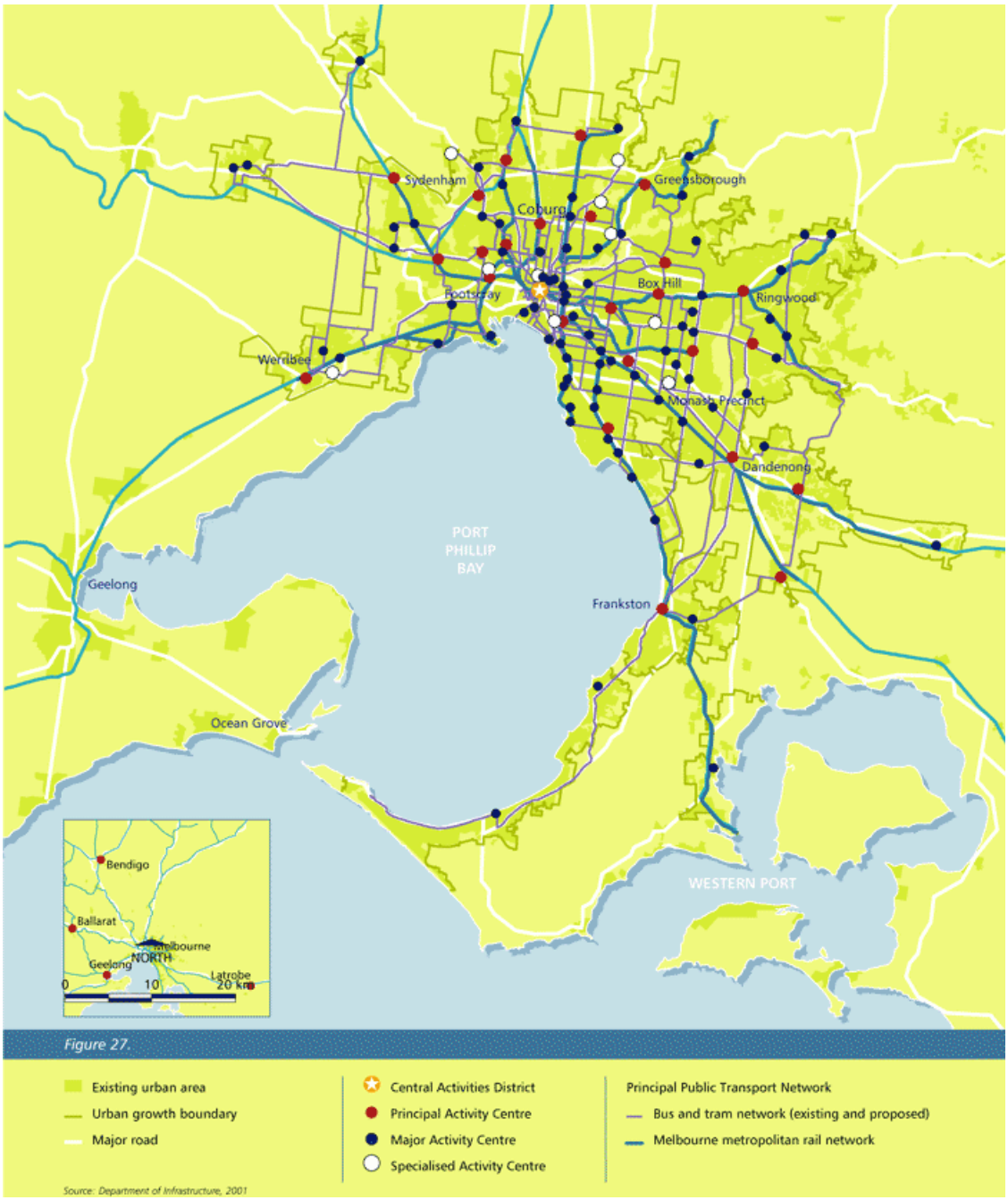
Development and management of the arterial road network	
Completed the 42 km Metropolitan Ring Road.	S
Entered into contracts for the construction of the $2.5 billion Mitcham–Frankston Project.	S
Improved road traffic flows through measures such as regulating freeway on-ramp traffic, improving key intersections and improving traffic signal management.	S
Boosted funding for outer metro arterial roads.	S
Passenger services to regional Victoria	
Progressing Regional Fast Rail services between Melbourne and Ballarat, Bendigo, Geelong and the Latrobe Valley.	S
Restored V/Line passenger train services to Bairnsdale and Ararat.	S
Progressing the redevelopment of Spencer Street Station, to be renamed Southern Cross Station upon completion.	S
Public transport service improvements	
Finalised new partnership agreements with Connex Trains and Yarra Trams to deliver better transport and customer service outcomes.	INST.
Established Metlink to coordinate public transport services and marketing.	INST.
Substantially increased the number of services on train and tram routes.	S
Improved the reliability of ticket machines at rail stations.	S
Set in place processes for the development of a new Smartcard ticketing system.	INST.
Reduced the price of the Statewide Tertiary Student Concession Card from $126.60 to $75.00 in 2001, with a further reduction in 2005 to be the same price as the Primary/Secondary Concession Card (currently $8.00).	S
The Companion Card is now accepted on public transport, providing free travel for carers accompanying disabled passengers.	S
All Health Care Card holders will be eligible for concession public transport fares from 1 January 2005. This will assist people who are unemployed or on low incomes, not previously entitled to public transport concessions.	S
Created the Public Transport Industry Ombudsman.	INST.
Successfully trialled 'TravelSmart' to increase the use of public transport, walking and cycling in the Alamein transport corridor.	D

Note: S denotes supply side measures, D denotes demand side measures, INST. denotes institutional measures.

Source: Government of Victoria 2004a, pp. 7-11.

Appendix E: *Melbourne 2030* maps

Figure E.1 **Network of activity centres**

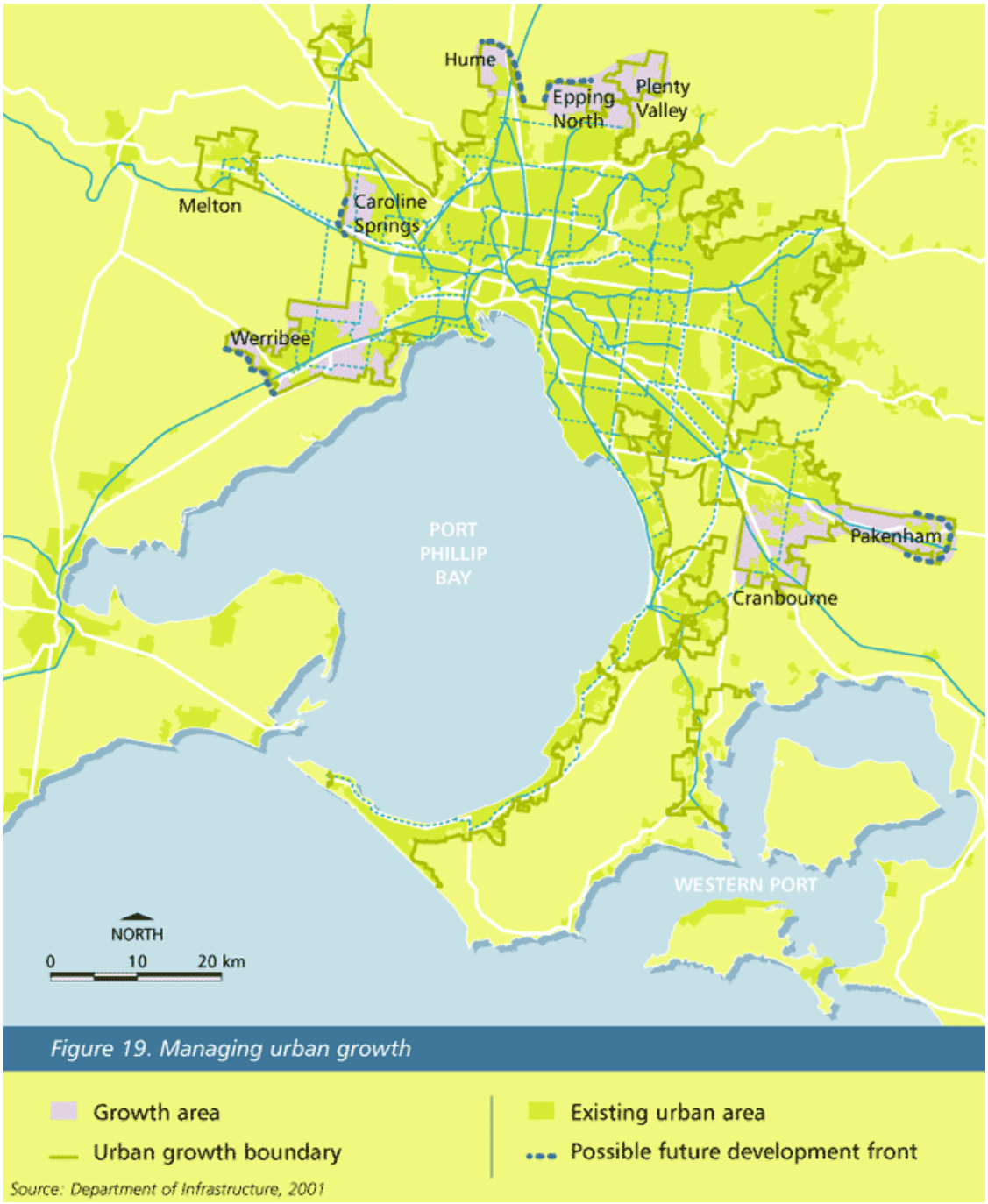


Source: DOI 2002a, p. 50.

Figure E.2 **Plan for revitalising Dandenong**

Source: Revitalising Dandenong 2005.

Figure E.3 **Urban growth**



Source: DOI 2002a, p. 33.

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