Infrastructure Capability Assessment
Transport
Infrastructure Victoria
Transport

What this assessment is about
This infrastructure capability assessment is one of a series of supporting documents that Infrastructure Victoria (IV) has used to assist them in developing their paper - Laying the Foundations, Setting objectives and identifying needs for Victoria’s 30-year infrastructure strategy.

This assessment sets out to:

• Identify the major assets in the sector and provide the wider context in which assets operate, including the interconnections between assets, identification of key stakeholders and current industry trends in the sector

• Provide a base of quantitative data as a foundation from which IV can start developing the strategy in relation to asset value, historical and forecast investment, infrastructure performance and current/future capacity in each sector

• Identify the future challenges and opportunities associated with the sector, specifically related to how existing infrastructure can be used to accommodate future demand.

This assessment represents an initial view on infrastructure in the sector and has been prepared based on publicly available information and in consultation with the stakeholders with whom we have engaged to date. Data collection has been based on consolidation of existing and available information as opposed to undertaking new primary research.

This assessment is intended to set the scene for broader discussion and is complemented by a range of other technical documents available at www.infrastructurevictoria.com.au. It is IV’s intention that this work serves as one of the platforms for further engagement and refinement of Victoria’s infrastructure needs as IV progresses its 30 year infrastructure strategy development further.

What this assessment is not about
This assessment did not seek to and does not identify solutions. It does not propose options for meeting Victoria’s infrastructure needs or make recommendations to Infrastructure Victoria.

In preparing the assessment we acknowledge and understand that there is likely to be additional information available that could help influence future thinking. The findings and analysis through this assessment are an initial starting point and may be subject to change as alternate views and information is identified.
The Transport Networks in Melbourne are generally in good condition. Many parts of the Transport Networks are underutilised at the time of writing, acute operational issues are impacting major assets within the Transport Networks include unique critical assets comprising the transport sector should be considered as interconnected Transport Networks facilitating the movement of people and goods between activity centres, residential areas and key economic assets. The performance of our Transport Networks are comparable with other States and, in general, sufficient investment is being undertaken to meet short term requirements. Left unchecked, long term demand will create significant challenges to the ongoing performance of the Transport Networks. For example there is strong forecast population growth in the west of Melbourne, where transport networks are currently underdeveloped. Land use planning, particularly to the west and north of Melbourne, requires an integrated approach as to how this will impact the future design and requirements of our Transport Networks.

Key Findings

1. The assets comprising the transport sector should be considered as interconnected Transport Networks facilitating the movement of people and goods between activity centres, residential areas and key economic assets.
2. The performance of our Transport Networks are comparable with other States and, in general, sufficient investment is being undertaken to meet short term requirements.
3. Left unchecked, long term demand will create significant challenges to the ongoing performance of the Transport Networks. For example there is strong forecast population growth in the west of Melbourne, where transport networks are currently underdeveloped.
4. Land use planning, particularly to the west and north of Melbourne, requires an integrated approach as to how this will impact the future design and requirements of our Transport Networks.

Infrastructure use

- Many parts of the Transport Networks are underutilised outside of peak periods, providing significant opportunities if demand can be managed effectively, although some key locations (Burnley Tunnel, Bolte Bridge) are at capacity across the day.
- Demand is primarily driven by where people live, work and play and activity centres have a large role to play in how demand is both created and developed through strategic land use planning.
- Utilising policy levers such as road pricing, congestion charges and time of day pricing could have significant impacts to peak demand levels and travel patterns generally.
- Allocation of road space will become increasingly important to the capacity, performance and use of the Transport Networks including growth in public transport mode share.
- Increasingly ICT will be used to optimise the use of existing infrastructure.

Operational criticality & resilience

- The Transport Networks are critical to Victoria and although within Melbourne they are generally able to cope with short term incidents (albeit with corresponding short term disruption), they have points of weakness where regular failure or long periods of unavailability materially impact the operation of the city.
- It can be expected that climate change will impact our Transport Networks, such as heat related issues on the Train Network and storm related flooding across the transport networks, with more frequency than in the past.
- Critical assets within the Transport Networks include unique assets with no easily substitutable alternatives (such as the Port of Melbourne and Melbourne Airport), material disrupters (such as Flinders St Station, the West Gate Bridge and the Burnley Tunnel), and key ICT systems (such as the train signalling and road traffic management systems).

Assets, expenditure & governance

- The Transport Networks are governed by complex responsibility matrices that result in coordination challenges (e.g. cycling priority and implementation of clearways on roads) and complex relationships with land use planning.
- Centralised transport planning is critical to ensure that challenges across the Transport Networks are appropriately prioritised and addressed.
- Private sector involvement in the Transport Networks will continue to grow and be a major part of how the sector is funded, financed and operated.
- Opportunities exist with the pending expiry of the Train, Tram and Metropolitan Bus Contracts to align new public transport arrangements with government policy objectives.

Infrastructure service performance

- The Transport Networks are generally performing well, however constraints are beginning to show in some areas.
- As our Road Network becomes more congested, this is having negative impacts to travel times and reliability for all road users, including declining average speeds of our trams.
- Major projects are underway, such as Western Distributor and a programme of level crossing removals to boost capacity and reduce congestion.
- Landside access constraints are some of the biggest threats to the ongoing performance of Melbourne Airport and the Port of Melbourne.
- The Metropolitan Train network is currently capacity constrained in peak periods with new projects such as Melbourne Metro, Signalling Upgrades and New Generation Trains being planned to lift capacity and performance.
- At the time of writing, acute operational issues are impacting regional rail services.

Infrastructure condition

- The Transport Networks in Melbourne are generally in good condition, able to meet current capacity needs and fit for purpose. However, Transport Networks in regional areas are often inadequate (e.g. HPV routes), and some parts of the metropolitan area have problems now and other locations will have issues in the future.
- Some areas of the Transport Networks, in particular Train and Tram, could be considered as not fit for purpose in relation to disability access and train signalling.
- Growing community expectations (such as Wi-Fi on trains, disability access, extended hours of operation) will require significant investment.
- ICT is becoming a major component of our Transport Networks, and will need to respond to future requirements in new areas such as driverless cars and real time information.
## Future challenges and opportunities

The key challenge for the Transport Sector is to ensure that broader community and land use needs are integrated with the planning and development of the sector. Plan Melbourne provides a framework for addressing the transport needs of Melbourne. Transport demand will also be impacted by key city shaping directions, such as the “poly-centric city” and “20 minute neighbourhoods”. Co-ordination of these activities is not as well defined nor centrally planned for Regional Victoria, which may lead to challenges for Regional Transport planning.

<table>
<thead>
<tr>
<th>Sector (including cycling and walking)</th>
<th>Challenges</th>
<th>Opportunities</th>
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</thead>
<tbody>
<tr>
<td>Road (including cycling and walking)</td>
<td>• Improvement in road safety to get to “zero deaths”</td>
<td>• Coordinate road developments with city shaping initiatives</td>
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<tr>
<td></td>
<td>• Addressing congestion at peak times and at bottlenecks</td>
<td>• Manage demand to improve utilisation of existing assets (roads) during off peak periods</td>
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<td></td>
<td>• Managing the environmental impact of road use while catering for increasing demand</td>
<td>• Control traffic movements by leveraging new technologies (such as co-ordinated traffic management systems and real time information for users)</td>
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<td></td>
<td>• Planning of road maintenance and improvements</td>
<td>• Ensure road planning complements other modes of transport (e.g. integration with intermodal hubs for both people and freight)</td>
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<td></td>
<td>• Ensuring efficient and safe use of shared roads (automobiles, trams, bicycles)</td>
<td>• Facilitate more effective road sharing systems for alternative users (e.g. dedicated lanes for trams, cars, bicycles and access for pedestrians)</td>
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<td></td>
<td>• Increased access for heavy vehicles on road network (metro and regional)</td>
<td>• Road space allocation from parking to vehicle use</td>
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<td>• Access to key gateway infrastructure (Port of Melbourne, Melbourne Airport)</td>
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<td>• Access to new growth areas</td>
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<td></td>
<td>• Provision for High Productivity Freight vehicles which require strengthened bridges and in some cases, pavement widening</td>
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<td>• Declining road conditions to meet user needs</td>
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<thead>
<tr>
<th>Heavy Rail (Passenger and Freight)</th>
<th>Challenges</th>
<th>Opportunities</th>
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<tbody>
<tr>
<td></td>
<td>• Congestion on Metro system, ageing rolling stock, meeting DDA requirements</td>
<td>• Manage demand to improve utilisation of existing assets during off peak periods</td>
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<tr>
<td></td>
<td>• Land planning for the future rail network in growth areas in both Melbourne and Regional Victoria and for access to gateways (e.g. Avalon and Melbourne Airport Link)</td>
<td>• Continue to expand and upgrade existing network</td>
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<tr>
<td></td>
<td>• Access to key gateway infrastructure (Port of Melbourne, Melbourne Airport)</td>
<td>• Leverage new technologies to improve train operations and provide real time customer information</td>
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<td></td>
<td>• Maintaining regional rail performance standards</td>
<td>• Dis-aggregate rail lines to implement a metro style system that will improve capacity and reliability</td>
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<td></td>
<td>• Urban growth and development creating issues for freight operators with pressure on noise abatement, dust control, and restrictions on hours of operation</td>
<td>• Co-ordinate land planning to ensure freight precincts are preserved now and for future growth</td>
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<td></td>
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<td>• Improving transfer between modes for both people and freight</td>
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<tr>
<th>Trams and Buses</th>
<th>Challenges</th>
<th>Opportunities</th>
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<tbody>
<tr>
<td></td>
<td>• Declining tram travel speeds (particularly in the CBD and strip shopping areas)</td>
<td>• Connectivity with other modes of Transport</td>
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<td></td>
<td>• Service frequency during peak and non peak times (particularly where there are shared right-of-way)</td>
<td>• Share road planning for tram, bus, bicycles and pedestrians</td>
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<td></td>
<td>• Integration of tram and buses with other modes of transport</td>
<td>• Bus services that continue to be optimised, simplified, easier to use and better integrated with other modes of transport</td>
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<tr>
<td></td>
<td>• Ageing rolling stock</td>
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<td></td>
<td>• Meeting DDA requirements</td>
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<tr>
<th>Ports</th>
<th>Challenges</th>
<th>Opportunities</th>
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<tbody>
<tr>
<td></td>
<td>• Improving interface connectivity between rail, road and ports while protecting the surrounding urban amenity</td>
<td>• Improve landside access to ports including a larger role for rail for both regional and metropolitan freight</td>
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<td></td>
<td>• Ensuring sufficient port capacity to meet Victoria’s long term forecast demand</td>
<td>• Development of regional ports to handle other goods</td>
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<td></td>
<td>• Changes in international shipping that may require significant new infrastructure at Victoria’s ports</td>
<td>• Leverage new technologies to support marine and land side operations (stevedoring, supply chain co-ordination)</td>
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<tr>
<th>Airports</th>
<th>Challenges</th>
<th>Opportunities</th>
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<tr>
<td></td>
<td>• Congestion on landside access (roads) to Melbourne Airport</td>
<td>• Co-ordination of rail and road linkages with Melbourne Airport’s Master Plan</td>
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<td></td>
<td>• Ensuring curfew restrictions are not placed on Melbourne and Avalon Airports</td>
<td>• Increase use of Avalon Airport for both domestic and international services</td>
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<td></td>
<td>• Ensure that airside and landside capacity at Melbourne Airport continues to expand to accommodate growth</td>
<td>• Development of co-located activities e.g. freight precincts</td>
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<td>• Ongoing viability of regional airports in the face of the requirement for new investment to maintain assets</td>
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1.1 Introduction

Section 6 of the Transport Integration Act 2010 (‘Act’) envisages an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible State. This is guided by the Act’s objectives:

- Social and economic inclusion
- Economic prosperity
- Environmental sustainability
- Integration of transport and land use
- Efficiency, coordination and reliability
- Safety and health and wellbeing.

Victoria has well-established transport networks across road, rail, sea and air. These systems are complex, incorporating a number of linked networks and shared infrastructure across modes. Interconnectedness between these networks is critical in generating the best possible performance for transport, enabling more accessible destinations for passengers and reducing the cost of freight for industry. However, the challenge of whole-of-network planning is compounded by the diverse pool of public and private stakeholders in the sector, as well as the separation of ownership, operation and management of assets.

In the next 30 years, the bulk of Victoria’s population growth is expected to occur in the Melbourne region, placing significant pressure on the existing transport network. The purpose of this report is to identify these pressures, and assess the capacity of Victoria’s transport infrastructure to meet future needs. The State’s ability to plan infrastructure investment and network design around these changing transport needs will be critical in ensuring the ongoing world-class liveability of Melbourne.

1.2 Sector Overview

The delivery of transport services and infrastructure in Victoria is governed by a series of complex statutory, government and commercial relationships. Transport in Victoria is primarily overseen by the Department of Economic Development, Jobs, Transport and Resources (DEDJTR) which delegates its authority (along with other Departments) to various agencies and authorities including:

- Roads: VicRoads
- Local Infrastructure: Local Government (particularly in respect of bicycle and pedestrian paths, local roads and regional ports)
- Public Transport: Public Transport Victoria
- Taxis: Taxi Service Commission
- Ports and Shipping Channels: Port of Melbourne Corporation
- Major Transport Projects: Level Crossing Removal Authority

Further, through the Victorian Road Safety Partnership, DEDJTR partners with agencies to deliver a safer transport network which include the Transport Accident Commission, Transport Safety Victoria, Department of Justice and Victoria Police.

Selected assets are privately owned and operated including some regional ports, airports and toll roads such as CityLink and EastLink.

Various franchise agreements and service contracts govern operation of suburban rail, tram and state-wide bus services by private operators. Metro Trains Melbourne, Yarra Trams and V/line (albeit a public entity) operate in accordance with contractual arrangements that specify service requirements and performance levels to be achieved.

DEDJTR retains responsibility for overall planning of passenger and freight movements and works closely with the Department of Environment Land, Water & Planning (DELWP), which now includes the Strategic Land Use Planning group.

All organisations are ultimately governed by the Transport Integration Act (Vic) established in 2010, which requires consideration of land use and intermodal integration in all transport planning and mandates consultation across a range of stakeholders in all projects.

Plan Melbourne, first released in 2014 and refreshed in 2015/16, has been developed to guide the State Government as to the long term blueprint for Melbourne’s future prosperity, liveability and sustainability. The blueprint includes planning for Melbourne’s future transport needs which will be aided by DEDJTR’s ongoing integrated transport planning and further informed by Infrastructure Victoria’s 30 year infrastructure strategy.
1.3 Scope

In order to undertake the Infrastructure Capability Assessment for the Transport Sector, consideration has been given to the complex nature of transport networks and the pattern of use by both people and goods. For this assessment the transport infrastructure has been segmented by asset class. However, as most trips (taken by both people and goods) utilise a number of transport assets in a single journey, each asset must be considered in terms of its interconnectivity with other assets. Further, there is a distinction between the network and its use. Transport occurs on a network of assets, whereas users of the network utilise a passenger or freight “system” to move through the network.

In order to structure the assessment, six distinct asset classes have been identified. These are:
1. Roads
2. Heavy Rail Network
3. Tram Network
4. Ports and Shipping Channels
5. Walking/cycling paths & Point-to-Point
6. Airports.

Within each of these broad asset classes a number of “sub-sets” of assets have been identified and reviewed (these are described in the following table).

Each asset class facilitates one or more “modes” of transport, for example, on road, rail, air, sea and active transport (cycling and walking). Intermodal facilities, such as railway stations, tram stops, ports, airports and freight rail terminals form the connection between the networks and are critical for the successful interchange of people and goods between modes.

All of the networks have multiple “classes” of users for example roads are used for passenger (private and public) transport and freight (light commercial vehicles and trucks). Roads also have “shared” use activities such as cycling and trams. Both public transport and freight utilise the heavy rail network.

This report covers the major transport networks and their assets in Victoria. It also includes above rail and road assets where Government plays a key role in the ownership and operation of these assets (such as passenger rail rolling stock) or where assets provide key public transport services such as metropolitan, inter-regional and local bus infrastructure, taxi and point-to-point services.

Point-to-point services, such as taxis and hire cars, play a critical role in the transport network by connecting users (including those with limited mobility) between, to and from transport modes. It also provides a flexible alternative to other transport modes within the transport network as it isn’t confined to timetables, schedules or fixed routes. Although point to point services are an important component to the transport network, its infrastructure use and requirements are largely dependent on other infrastructure being in place (e.g. roads). Accordingly, it is only referenced within this report where it impacts the transport network e.g. as capacity on roads.

### Asset Class

|----------|-----------------------|-----------------|-----------------------------|------------------------------------------|-------------|
| Roads:  
- Freeways (public)  
- Motorways (private)  
- Arterial (urban areas)  
- Arterial (non urban Areas)  
- Municipal roads | Metro:  
- Rolling stock  
- Track (rail, signalling, power)  
- Stations  
- Stabling and maintenance facilities  
- Communications |  
- Rolling stock  
- Track (rail, signalling, power)  
- Tram stops  
- Depots |  
- Melbourne  
- Hastings  
- Geelong  
- Portland  
- Smaller regional ports (e.g. Gippsland)  
- Port Phillip Bay, Western Port, Portland |  
- Bicycle networks  
- Pedestrian access  
- Taxis and Hire cars  
- Ferries  
- Melbourne Bike Share program  
- Bus Networks |  
- Tullamarine  
- Avalon  
- Essendon  
- Mooroobbin  
- Mildura  
- Portland  
- Hamilton |

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Integrated planning approach to the Transport

Overview

Integrated Transport Planning can be defined as:

“a process to identify current and future access needs – for people, places, goods and services – and inform decision makers on ways to manage the transport system and land-use to best address these needs. It aims to do this in a way that sustains economic growth, conserves the environment and supports the quality of life of current and future generations”

Source: Integrated Transport Planning Framework for Queensland

The Transport Integration Act 2010 provides the regulatory framework for the provision of an integrated and sustainable transport system in Victoria which contributes to an inclusive, prosperous and environmentally responsible State.

As Victoria looks to provide accessible, mobile and efficient linkages throughout the Transport Network, it is important that there is an integrated approach to network planning to:

- Assess the real impact of a transport project on the users and local community
- Define Government Agency delivery responsibilities
- Maximise ancillary benefits beyond the transport requirement
- Ensure transport solutions are sustainable for today and the future
- Incorporate other planning schemes into the approach such as urban, land and travel demand management
- Provide flexibility for the future.

An integrated planning approach should also not be limited to one mode where it should be met with a multi-modal approach to provide the ability to spread demand across the network. For example:

- Transport solutions in one mode may impact the other. i.e. greater road links in Melbourne’s west may reduce the requirement for demand in public transport.
- Corridor solutions may be multi-modal for example the integration of both road and rail links for major ports.

This assessment is not an integrated transport plan. However, it draws on existing planning to consider the state of transport infrastructure. While this analysis primarily focuses on individual assets (road, rail, tram, ports etc.) it is critical that infrastructure capability and network analysis is considered in an integrated way to ensure decision making occurs in accordance with the objectives and principles of the Transport Integration Act 2010.
Assets, expenditure and governance
1. Current major infrastructure assets

Roads

The existing network

About 15 per cent of roads in Victoria are ‘Declared Roads’ (freeways, arterial and non-arterial state roads) with the majority managed by VicRoads. A smaller proportion of non-arterial State roads are managed by the Department of Environment, Land, Water and Planning (DELWP) or municipal councils.

The majority of Victoria’s traffic is carried on freeways and arterial roads. These roads link activity centres in rural and metropolitan areas providing a safe, efficient and integrated road transport system for the economic and social benefit of the community.

The remaining 85 per cent of roads are ‘local roads’ that are mostly managed by municipal councils or other agencies.

A number of tram and key bus services operate on non-arterial roads managed by municipal councils and nonetheless service markets of metropolitan or regional significance.

On Victoria’s roads:

- Almost all goods in the metropolitan area and more than 80 per cent of goods in country Victoria are transported by road.
- Much of the Victorian economy, including tourism, depends on the efficient and effective management of the roads.
- Efficient freight routes and links are essential to reduce the costs of transport to local and overseas markets.
- The 22,500 kilometres of freeways and arterial roads managed by VicRoads are valued at around $44.5 billion (VicRoads).

Road management

VicRoads is responsible for:

- The majority of declared roads including managing contracts with private operators and associated road related assets such as traffic signals, signage and protective barriers
- Inspection, maintenance and repair of through lanes (lanes for through traffic, indicated by straight arrows)
- Operations and coordination of arterial roads and approximately 80,000 ha of roadside in non-urban areas.

Municipal Councils are responsible for:

- Inspection, maintenance and repair of service roads, pathways and roadside maintenance on urban arterial roads
- Local roads.

Note: DELWP is responsible for:

- Non-arterial State roads and Minor roads/tracks.
1. Current major infrastructure assets

Roads

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Description of Assets</th>
<th>Ownership, Management and Concessions</th>
</tr>
</thead>
</table>
| **Freeways (public)** | Hume Freeway – 303 kilometres long  
Princes Freeway – 159 kilometres long  
Western Freeway – 125 kilometres long  
Calder Freeway – 113 kilometres long  
Goulburn Valley Freeway – 42 kilometres long  
Monash Freeway – 34 kilometres long  
Western Ring Road – 29 kilometres long  
Mornington Peninsula Freeway – 27 kilometres long  
Geelong Ring Road – 25 kilometres long  
Eastern Freeway – 18 kilometres long  
West Gate Freeway – 14 kilometres long  
Tullamarine Freeway – 13 kilometres long  
Metropolitan Ring Road – 9 kilometres long  
Frankston Freeway – 7 kilometres long  
South Gippsland Freeway – 6 kilometres long | **Ownership**  
Victoria’s freeways are owned by the State of Victoria (‘State Government’).  
**Management**  
VicRoads is a statutory authority established under the Transport Act 1983 with its primary objectives stated in the Transport Integration Act 2010. It is responsible for the management, maintenance and construction of freeways as well as planning the road system as part of an integrated road system. Freeways funding is provided by the State Government of Victoria, however the Federal Government provide funding contributions for road improvements on the National Road Network. |
| **Motorways (private)** | **CityLink tollway**  
• CityLink is a 22 kilometre motorway connecting three major urban freeways – the West Gate, Tullamarine and Monash.  
**EastLink tollway**  
• EastLink is the 39 kilometre motorway in Melbourne’s east, connecting the Eastern, Monash, Frankston and Peninsula Link Freeways.  
• The 35 kilometre EastLink Trail is a pathway for cyclists, runners and pedestrians.  
**Peninsula Link**  
• Peninsula Link is a toll-free 27 kilometre road link between EastLink at Carrum Downs and the Mornington Peninsula Freeway at Mount Martha.  
• There is a 25 kilometre walking and cycling path from Patterson Lakes to Moorooduc. | **Transurban**  
• Transurban’s current concession to operate the toll road expires in 2034 with ownership reverting back to the state government at this time.  
• With the City Tulla widening project Transurban’s concession period will be extended by one year, from January 2034 to January 2035.  
**ConnectEast Group**  
• ConnectEast Group is a private company dedicated to the financing, design, construction, maintenance and operation of the EastLink tollway in Melbourne’s east  
• Current Concession runs until November 2043.  
**Southern Way**  
• Peninsula Link is provided toll free as an availability PPP.  
• Southern Way has a contract to finance, build, design, operate and maintain the freeway for 25 years.  
• Southern Way contract LendLease to operate and maintain the freeway. |
## 1. Current major infrastructure assets

### Roads

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<tr>
<th>Subgroup</th>
<th>Description of Assets</th>
<th>Ownership, Management and Concessions</th>
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</table>
| Arterial Roads (Urban Areas) | - 11,391 lane-kilometres of urban arterial roads  
- 885 urban bridges | Operational responsibility, such as inspection, maintenance and repair of road infrastructure, including road works and road closures:  
- VicRoads - through traffic lanes  
- Municipal Councils – other roads including service roads, pathways and roadside areas. |
| Arterial Roads (Non Urban Areas) | - 41,480 lane-kilometres of regional arterial roads  
- 2,205 regional bridges | • VicRoads has operational responsibility (not including pathways) and coordination responsibilities. Under the *Planning and Environment Act 1987* VicRoads is the referral authority for the development of adjoining arterial roads. |
| Municipal roads and other roads (non-arterial State roads and minor roads and tracks) | - 129,171 kilometres of which 54,055 kilometres are sealed | **Municipal Roads**  
The Local Municipal Council is responsible for municipal roads located in their jurisdiction.  
**Other Roads (non-arterial State roads and minor roads and tracks)**  
The Department of Environment, Land, Water and Planning together with its agencies, is responsible for non-arterial State roads and minor roads and tracks. |
| Footpaths | There are footpaths associated with the large majority of urban roads and arterial roads in urban areas within Victoria.  
Regional highways and arterials generally do not have footpaths adjacent to the road.  
Freeways do not have footpath access. Adjacent to Freeways (public and private) there are often shared used paths. | Where VicRoads has responsibility for the road (majority of declared roads) they also have responsibility for the associated footpath.  
For all other footpaths it is the responsibility of the Municipal Council to manage the provision of footpaths.  
In the case of shared use paths associated with privately operated freeways it is the responsibility of the private operator to manage the shared use path. |
### 1. Current major infrastructure assets

#### Point-to-point

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<thead>
<tr>
<th>Asset group</th>
<th>Use</th>
<th>Description of Assets</th>
<th>Ownership and concessions</th>
<th>Management</th>
</tr>
</thead>
</table>
| **Taxis / Hire Vehicles / Uber** | Public | The Taxi Services Commission (TSC) regulates the taxi and hire car industry. Data from the TSC is current to December 31 2015.  
Taxis Licences  
• 4,765 Metro licences (incl. 482 wheelchair accessible taxis)  
• 496 Urban licences (incl. 81 wheelchair accessible taxis)  
• 338 regional licences (incl. 74 wheelchair accessible taxis)  
• 162 country licences (incl. 35 wheelchair accessible taxis)  
Hire Vehicles Industry  
• 1,126 Metropolitan hire cars  
• 64 Country hire cars  
• 943 Special purpose vehicles  
• 571 Restricted hire cars  
Uber does not have any publicly available data | TSC own and regulate licences on behalf of Victorian Taxi Association  
• Operators purchase licence off open market, rent off existing licence holder, purchase from TSC  
• Taxi drivers must hold a valid taxi licence and new reforms require drivers to now pass a knowledge test  
• 15,224 active taxi drivers  
• 44,527 accredited drivers (taxi, hire car and bus drivers)  
• Average market value of a metro taxi licence - $240,000  
• Average licence transfer value of a metro hire car - $37,450. | Management structure varies according to operator.  
Compliance is the responsibility of TSC. |
| **Car Share Vehicles** | Member Only/ Public | Two models exist for car sharing:  
• CarNextDoor promotes community sharing where the public offer their vehicle for hire.  
• The private model provides cars that are conveniently located across Melbourne for a membership fee. There are a number of private companies that offer this service with varying fleet capacity.  
• Around 245 shared cars are presently in use (The Age, 2015).  
• Asset class ranges from small to large vehicles. | Private companies purchase on-street parking spaces called ‘pods’ and own and operate the fleet. Major Melbourne car sharing companies include: GoGet, Flexicar and GreenShareCar  
As of September 2015, Melbourne City Council’s amended policy requires car share operators to find one off-street car park for every on-street park provided by the City of Melbourne. | • Managed by operators (private)  
• Managed by individuals (facilitated by private company – Car Next Door)  
Innovative offerings in the supply of point to point transportation services to the public are providing a dynamic and constantly changing market. These offerings are changing the way in which people travel and creates challenges for governments to be able to keep up in terms of regulation and the required infrastructure to meet these new transportation services. Specifically around the supply and access to appropriate car parking spaces whilst allowing fair business competition. |
| **Ferries** | Public | There are three main point to point ferry services which operate in Victoria:  
• Westgate Punt Service - small ferry operating between Spotswood Jetty and West Gate Landing  
• French Island Service – two high speed catamarans with each having 95 passenger capacity operating between Stony point, French Island and Phillip Island  
• Queenscliff to Sorrento service – two ferries operate between Queenscliff and Sorrento. MV Queenscliff has capacity for 700 passengers and 70 vehicles and the MV Sorrento has capacity for 1,400 passengers and 140 vehicles. | Westgate Punt and French Island Service  
These ferry services are overseen by PTV, however with delivery contracted out to private operators.  
Queenscliff – Sorrento Service  
The ferry service is privately owned and operated. | Management structure varies according to operator. |

The graphic above provides an insight into the spread and geographic reach of the private Car Share business, CarNextDoor. This is just one of a number of private businesses offering this service.

Similarly the rise of ride share companies operating in the historical domain of the taxi industry is challenging the way in which governments have controlled the access to public infrastructure in providing point to point transportation services.
VicTrack own the majority of rail assets across Victoria

VicTrack is a state-owned business enterprise that plays a pivotal role in providing public transport outcomes for Victoria. VicTrack own the majority of Victoria’s railway land, infrastructure and, through the Rolling Stock Holdings group of companies, much of its rolling stock. The vast majority of these assets are leased to Victoria’s train and tram operators via Public Transport Victoria (PTV).

Core Functions include:
- Deliver telecommunications to support public transport system
- Custodian of transport land
- Provide civil engineering services to upgrade transport infrastructure
- Support rail freight by managing the open access Dynon Rail Freight Terminal.

ARTC are the only other operator that own and maintain rail infrastructure in Victoria (on the inter-state rail line).

Victorian rail infrastructure assets

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track</td>
<td>$7.1b</td>
</tr>
<tr>
<td>Rolling Stock</td>
<td>$2.9b</td>
</tr>
<tr>
<td>Plant and Equipment (incl. Myki)</td>
<td>$1b</td>
</tr>
<tr>
<td>ICT and Signalling</td>
<td>$3.1b</td>
</tr>
<tr>
<td>Stakes, bridges, buildings</td>
<td>$5.1b</td>
</tr>
<tr>
<td>Other assets</td>
<td>$2.4b</td>
</tr>
<tr>
<td>MURL*</td>
<td>$2.6b</td>
</tr>
</tbody>
</table>


* Melbourne Underground Rail Loop
1. Current major infrastructure assets

### Heavy rail – Metropolitan Passenger

<table>
<thead>
<tr>
<th>Passenger (Broad gauge)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management</strong></td>
<td><strong>Metro Trains Melbourne (MTM)</strong></td>
</tr>
<tr>
<td>It operates above and below rail where PTV sub-leases the assets from Vic Track to MTM. PTV and MTM have entered into a franchise agreement which governs the operational and service requirements for the metro rail services with the contract expiring 2017.</td>
<td></td>
</tr>
<tr>
<td><strong>Lines</strong></td>
<td>4 groups, 18 lines, broad gauge</td>
</tr>
<tr>
<td><strong>Kilometres of track</strong></td>
<td>869 kilometres</td>
</tr>
<tr>
<td>(See appendix for breakdown)</td>
<td></td>
</tr>
<tr>
<td><strong>Stations / Intermodals</strong></td>
<td>218 stations including 82 premium stations (Customer Service Centre)</td>
</tr>
<tr>
<td><strong>Gauge</strong></td>
<td>Broad</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Approximately 60,000 metropolitan train services are timetabled to operate per month</td>
</tr>
<tr>
<td><strong>Fleet</strong></td>
<td>206 x six car fleet:</td>
</tr>
<tr>
<td>• 93 x Comeng (1980s, 536-556 seats, 93 trains)</td>
<td></td>
</tr>
<tr>
<td>• 36 x Siemens (2002, 528 seats, 36 trains)</td>
<td></td>
</tr>
<tr>
<td>• 77 x X'Trapolis (2002/Present, 528 seats, 77 trains)</td>
<td></td>
</tr>
<tr>
<td>• 2 x Sprinter trains on the Stony Point Line</td>
<td></td>
</tr>
</tbody>
</table>

Note: A limited number of freight services utilise the Metro passenger network to transport goods

---

**Metropolitan Passenger Patronage**

Under the Metro Train Melbourne (MTM) agreement with PTV, MTM are responsible for the operation and management of all heavy rail assets across Melbourne.

Today, train is the most common mode of public transport in Victoria with over 227 million trips using MTM in 2015. Trams and Metro buses carried 173 million and 199 million respectively.

Overall patronage has increased by 0.6 per cent over the last 12 months. However, peak growth at cordons (Richmond, Jolimont and North Melbourne) has grown at above 3 per cent per annum.


---

**Metropolitan Rail Network Map**

Source: PTV website
## 1. Current major infrastructure assets

### Heavy rail – Regional passenger

<table>
<thead>
<tr>
<th><strong>Management</strong></th>
<th><strong>Passenger</strong></th>
</tr>
</thead>
</table>
| **V/Line** | PTV sub-leases the assets from Vic Track to V/Line. PTV and V/Line have entered into a franchise agreement which governs the operational and service requirements for the regional rail services.  
**Australian Rail Track Corporation (ARTC)** - Track (Standard gauge) |

<table>
<thead>
<tr>
<th><strong>Lines</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• 8 radial passenger train lines (Leongatha and Mildura lines are not currently used for passengers)</td>
<td></td>
</tr>
<tr>
<td>• 2 Interstate Lines (XPT Melbourne to Sydney operated by NSW Train Link and the Overland to Adelaide operated by Great Southern Rail)</td>
<td></td>
</tr>
</tbody>
</table>

| **Kilometres of track** | 1,600 kilometres of track corridor  
3,420 kilometres of track (broad) |
| **Stations / Intermodals** | 106 stations  
• 88 V/Line Stations (exclusive)  
• 18 Shared with Metro Trains |
| **Gauge** | Broad and Standard |
| **Services** | 13 V/Line routes (5 short haul, 8 long haul) where there were 71,654 train and 65,104 coach services in 2014 – 2015. |
| **Fleet** | • 41 Diesel locomotives  
• 133 Loco-hauled carriages  
• 161 V/Locity carriages  
• 21 Sprinters |

### Regional Passenger Patronage

Under the V/Line agreement with PTV, V/Line are responsible for the operation and management of all heavy rail assets across Regional Victoria and play an important role in transporting patrons to and from regional areas to the Melbourne CBD. ARTC complement V/Line’s regional services with access to their interstate passenger network.

V/Line is Australia’s largest regional public transport operator with services increasing to 71,650 in 2014-2015. This is an increase on the prior year of 5.8%.

In 2014-15, there were more than 15 million train and coach passengers served which is an increase of 3.9 per cent from the previous year. Every week, there were more than 1,400 train services between Melbourne and:

- Geelong and Warrnambool
- Ballarat, Maryborough and Ararat
- Bendigo, Swan Hill and Echuca
- Seymour, Shepparton and Albury
- Traralgon, Sale and Bairnsdale.

The Geelong line had the biggest rise with an extra 225,000 passenger trips, boosted by the opening of Waurn Ponds station in October. The Bendigo line was also boosted with the opening of Epsom Station in October, whilst the Seymour line received a new, early morning train service from Shepparton to Melbourne on weekdays.

Further, the recently completed Regional Rail Link will provide further patronage increases across the regional rail network with dedicated regional lines.

### Commentary:

- Regional passenger patronage has increased steadily from 2010 to 2015 except for the Bendigo line.
- Bendigo passenger patronage decreased as a result of the Sunbury electrification project where almost 650,000 passengers were lost in 2012 (V/Line Annual Report 2013).
1. Current major infrastructure assets

Heavy rail – Regional and Interstate freight

<table>
<thead>
<tr>
<th>Management</th>
<th>V/Line Track (Broad gauge) Australian Rail Track Corporation (ARTC) - Track (Standard gauge)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lines</td>
<td>6 Standard gauge line 11 Broad gauge lines 1 Dual line</td>
</tr>
<tr>
<td>Kilometres of track</td>
<td>1,213 kilometres – Standard (ARTC) 3,278 kilometres – Broad (V/Line) 400 kilometres – Urban Broad (Metro Trains)</td>
</tr>
<tr>
<td>Stations / Intermodals</td>
<td>17 Intermodals (See Intermodals)</td>
</tr>
<tr>
<td>Services</td>
<td>Seasonal</td>
</tr>
<tr>
<td>Gauge</td>
<td>Broad and Standard</td>
</tr>
<tr>
<td>Fleet</td>
<td>• Aurizon (standard)  • Pacific National (broad)  • SCT Logistics (standard)  • QUBE (broad)  • Southern Short haul railroad (broad)</td>
</tr>
<tr>
<td>Axle loads</td>
<td>Commonly, 19 tonne axle loads. However not standardised across the network.</td>
</tr>
</tbody>
</table>

**Freight Management**

The transportation of freight around Victoria by rail occurs on both interstate and intrastate rail lines. Predominantly, the two types of rail lines are broad (intrastate) and standard (interstate) gauge. These make-up 98 per cent of the train line network around Victoria.

On the intrastate rail lines, freight is shared with five Metro and V/Line (broad gauge) rail lines. Although the track is shared, V/Line and MTM are still responsible for the maintenance of the track. Operations and use of track are coordinated to ensure passenger and freight is transported cohesively.

There are also a number of dedicated lines for freight traffic. These lines link the outer suburbs of Melbourne to the various freight terminals in the inner suburbs.

Freight terminals exist throughout the regional and metro rail network to transfer goods between rail and road. The majority of existing intermodal terminals are located on a shared passenger rail line rather than on a dedicated rail line. Freight terminals are leased from VicTrack or owned by private operators.

Freight train services are provided by private operators. The main freight operators are Pacific National, Qube Logistics, Aurizon and SCT Logistics.

Total Victorian freight task (including both road and rail) is approximately 361 million tonnes per annum, of which approximately 40 million tonnes per annum is generated in the regions, 227 million tonnes generated across metropolitan Melbourne, and approximately 94 million tonnes is unable to be allocated to a specific region and includes waste, quarry product or port movements.

Source: Murray Basin Report, 2014
1. Current major infrastructure assets

**Tram Network**

| Management | Yarra Trams  
PTV sub-leases the assets from VicTrack to Yarra Trams. PTV and Yarra Trams have entered into a franchise agreement which governs the operational and service requirements for the metro tram services. This contract expires in 2017. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Routes</td>
<td>24 tram routes (inc. city circle)</td>
</tr>
<tr>
<td>Kilometres of track</td>
<td>250 kilometres of double track</td>
</tr>
<tr>
<td>Stops</td>
<td>1,763 Tram stops across the network</td>
</tr>
<tr>
<td>Services</td>
<td>31,500 tram services are scheduled each week</td>
</tr>
<tr>
<td>Fleet</td>
<td>Approx. 539 and include:</td>
</tr>
<tr>
<td></td>
<td>• A-Class (70 trams)</td>
</tr>
<tr>
<td></td>
<td>• B-Class (132 trams)</td>
</tr>
<tr>
<td></td>
<td>• C1-Class low floor Citadis (36 trams)</td>
</tr>
<tr>
<td></td>
<td>• C2-Class “Bumblebee” low floor Citadis (5 trams)</td>
</tr>
<tr>
<td></td>
<td>• D1-Class low floor Combino (38 trams)</td>
</tr>
<tr>
<td></td>
<td>• D2-Class low floor Combino (21 trams)</td>
</tr>
<tr>
<td></td>
<td>• E-Class low floor (22 trams with 28 on order)</td>
</tr>
<tr>
<td></td>
<td>• W-Class (40 trams)</td>
</tr>
<tr>
<td></td>
<td>• Z-Class (147 trams).</td>
</tr>
<tr>
<td>Depots</td>
<td>8 located in Brunswick, Camberwell, Essendon, Glenhuntly, Kew, Malvern, Preston and Southbank. The Preston depot is run by United Group Limited.</td>
</tr>
</tbody>
</table>

**Tram Network Patronage**

Yarra Trams is responsible for the operation and management of all the tram network assets across Melbourne under their agreement with PTV.

During 2015 Yarra Trams carried 182.1 million patrons on their service. This was an increase of 3.1 per cent in patronage, which is expected in part to be a result of the Free Tram Zone (which boosted CBD boardings by 20 per cent).
1. Current major infrastructure assets

**Bus - Passenger**

**Bus system**

Buses are an important part of Melbourne’s public transport system providing local and cross-town travel and connections to rail and tram networks. They also provide an alternative to travelling by car. Buses are often the only readily accessible form of public transport available for people living in Melbourne’s middle and outer suburbs. Around 82 per cent of Melbourne dwellings are within 400 metres of a bus route compared to around 20 per cent and 30 per cent for trams and trains respectively. As Melbourne’s population and resulting urban development has increased, there has been increasing pressure on the Bus Network footprint. Regional bus services are delivered by V/Line through private operators between regional centres and to Melbourne.

**Metro Contract Re-negotiation**

Public Transport Victoria currently hold 28 contracts with 13 private operators: 27 contracts are held with 12 different operators (accounting for 70 per cent of bus services in metropolitan Melbourne) and the remaining contract is with Melbourne Metro Bus Franchise (Transdev, accounting for 30 per cent of bus services). Most of the contracts are due to expire in 2018. Bus performance data and standards have been seen to vary across Melbourne as all of the bus network is run by privately owned operators. As a result, managing and monitoring the bus network has been a challenge for PTV. Contract re-negotiations in 2018 open up opportunities to standardise performance across the network.

<table>
<thead>
<tr>
<th></th>
<th>Metro Bus Routes</th>
<th>Regional Coaches</th>
<th>Regional Bus</th>
<th>Airport Buses</th>
<th>School Buses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
<td><strong>Metro Bus Services Contract (MBSC)</strong></td>
<td>28 contracts / 13 operators / 1,251 fleet / 28 depots</td>
<td>30 operators</td>
<td><strong>SkyBus (BTI Ltd)</strong></td>
<td>Private operator run school buses in Melbourne and regional centres.</td>
</tr>
<tr>
<td></td>
<td><strong>Melbourne Bus Franchise (Transdev)</strong></td>
<td>1 contract / 1 operator / 511 fleet / 6 depots</td>
<td>69 operators</td>
<td>(Note that private operators also provide transport from regional centres to the airport)</td>
<td><strong>School Bus Program (PTV)</strong> provides free transport to eligible students in rural and regional Victoria.</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Private operators and Transdev</td>
<td>Private operators</td>
<td>Private operators</td>
<td>Operates under a concession granted by PTV</td>
<td>Private operators and PTV</td>
</tr>
<tr>
<td><strong>Routes</strong></td>
<td>346 routes in total (including 9 SmartBus and 13 NightRider)</td>
<td>89</td>
<td>323</td>
<td>1</td>
<td>1,500 (School Bus Program)</td>
</tr>
<tr>
<td><strong>Stops</strong></td>
<td>18,125</td>
<td>7,306</td>
<td>4 (3 at airport terminals)</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td><strong>Fleet</strong></td>
<td>1,753 (1,551 low floor)</td>
<td>103 (71 low floor)</td>
<td>559 (301 low floor)</td>
<td>55 (approximately)</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Depots</strong></td>
<td>34</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
## 1. Current major infrastructure assets

### International Gateway Airports – Passenger and Freight

<table>
<thead>
<tr>
<th>Melbourne</th>
<th>Avalon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
<td>Federal Government (Airports Act 1996) which leased the airport to Australian Pacific Airports Corporation for 50 years (with a further 49 year option) in 1997.</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Australia Pacific Airports (Melbourne) Pty Ltd</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>International and domestic passenger&lt;br&gt;International and domestic corporate passenger base&lt;br&gt;Aircraft heavy maintenance</td>
</tr>
<tr>
<td><strong>Carriers</strong></td>
<td><strong>Passenger:</strong> Jetstar, Qantas, Virgin Australia, Rex (domestic only), Tiger and other international airlines&lt;br&gt;<strong>Freight:</strong> Qantas, DHL, Menzies, Australia Post (international freight carriers include Malaysia, Singapore Airlines and</td>
</tr>
<tr>
<td><strong>Runways</strong></td>
<td>2 runways (2.286 kilometres and 3.657 kilometres)</td>
</tr>
<tr>
<td><strong>Terminals</strong></td>
<td>4 passenger terminals (1 international, 3 domestic)&lt;br&gt;1 corporate passenger jet base terminal&lt;br&gt;5 dedicated freighter parking positions at its Southern Freight Apron (project for expansion of capacity at the apron is underway)</td>
</tr>
<tr>
<td><strong>Car Parking facility</strong></td>
<td>25,500 spaces plus numerous private off-site car parks serving the Airport</td>
</tr>
<tr>
<td><strong>Land</strong></td>
<td>2,457ha (2,367 of leased land &amp; 90 freehold land)</td>
</tr>
<tr>
<td><strong>Apron area</strong></td>
<td>60 hectares (65 aircraft parking bays)</td>
</tr>
<tr>
<td><strong>Year built</strong></td>
<td>1960</td>
</tr>
</tbody>
</table>

### Melbourne Airport Passenger Patronage

Melbourne Airport is Victoria’s main airport for domestic and international passenger and freight movements.

In FY15, Melbourne had 31.9 million passenger movements through the airport. This was the second largest annual activity in Australia behind Sydney with 39.2 million passenger movements (BITRE Airport traffic data: domestic and international).

Avalon Airport is approximately 45 minutes from the Melbourne CBD and is Victoria’s second largest passenger airport with 800,000 passenger movements per year. Avalon Airport has recently committed to offering international services in the near future.

### Freight movement

Melbourne Airport is a national airfreight hub handling 350,000 tonnes of airfreight per annum with 50 freight services monthly. This equates to around 30 per cent of national air freight which is second only to Sydney Airport. Melbourne has five dedicated airfreighter positions which are located on the Southern Freighter Apron. This allows for significant growth in airfreight capacity over the next decade.

Melbourne and Avalon Airports offer a domestic airfreight service for Australia, delivering freight to and from Australian destinations daily. Avalon Airport already manages over 40 freight movements per year, and is looking to increase this over the coming years.

The absence of a night curfew at the Melbourne and Avalon Airports compared to its main air freight competitor, Sydney Airport, provides an important strategic advantage for Victoria and the local airfreight industry.

## 1. Current major infrastructure assets
### Other Metropolitan Airports – Passenger and Freight

<table>
<thead>
<tr>
<th></th>
<th>Essendon</th>
<th>Moorabin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
<td>Federal Government (Airports Act 1996) which leased the airport to Linfox Holdings Pty Ltd for 50 years (with a further 49 year option) in 2001.</td>
<td>Federal Government (Airports Act 1996) which leased the airport to Moorabbin Airport Corporation for 50 years (with a further 49 year option) in 1998.</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Essendon Airport Pty Ltd</td>
<td>Moorabbin Airport Corporation</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Domestic scheduled passenger services</td>
<td>Domestic scheduled and charter passenger services</td>
</tr>
<tr>
<td></td>
<td>Domestic freight</td>
<td>International and domestic charter passenger services</td>
</tr>
<tr>
<td></td>
<td>International and domestic corporate passenger charter services</td>
<td>Aviation training (15 schools/training providers)</td>
</tr>
<tr>
<td></td>
<td>Emergency services air base</td>
<td>Aviation maintenance (light aircraft)</td>
</tr>
<tr>
<td></td>
<td>Aircraft maintenance</td>
<td></td>
</tr>
<tr>
<td><strong>Carriers</strong></td>
<td>Linfox, Toll Par Avion, Alliance, Amber Aviation, Ausnet, Burbank, Sharp Airlines, Vic Police and other private operators.</td>
<td>King Island Airlines, TasFast, Vortex Air</td>
</tr>
<tr>
<td><strong>Runways</strong></td>
<td>2 runways (1.921 kilometres and 1.504 kilometres)</td>
<td>5 runways (.571 kilometres, 1.060 kilometres, 1.150 kilometres, 1.240 kilometres, 1.335 kilometres)</td>
</tr>
<tr>
<td><strong>Terminals</strong></td>
<td>1 passenger terminal</td>
<td>3 passenger terminals</td>
</tr>
<tr>
<td><strong>Car Parking</strong></td>
<td>5,500 spaces</td>
<td>Data unavailable</td>
</tr>
<tr>
<td><strong>Facility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Land</strong></td>
<td>305 hectares</td>
<td>294 hectares</td>
</tr>
<tr>
<td><strong>Apron area</strong></td>
<td>165,000 m²</td>
<td>Data unavailable</td>
</tr>
<tr>
<td><strong>Year built</strong></td>
<td>1919</td>
<td>1949</td>
</tr>
</tbody>
</table>

### Essendon Airport

Essendon Airport is approximately 11 kilometres from the Melbourne CBD and provides facilities to Victoria’s aviation industry, with an emphasis on Police and Emergency Services, flight support, freight and the corporate aviation market who combined undertake more than 50,000 aircraft movements per year. Unlike other Metropolitan Airports, it has curfew with restrictions in place from 11pm to 6am.

Since 1971, Essendon Airport has operated as a general aviation airport. In this role, Essendon Airport provides:

- A base for passengers and light cargo services to regional Victoria and Bass Strait
- A base for emergency service providers including:
  - Air Ambulance Victoria
  - Victorian Police Air Wing
  - The Royal Flying Doctor Service
  - The Erickson Air Crane Helicopter fleet
  - Australian Maritime Search and Rescue Coastal Watch.
- Airport services and facilities to corporate and business aircraft
- A facility for small to medium airfreight operations
- Training bases for domestic operations.

### Moorabbin Airport

Moorabbin Airport is approximately 25 kilometres from the Melbourne CBD and enjoys curfew free status. It currently houses 600 fixed wing and rotary wing aircraft which average 250,000 movements per year. The Airport is capable of landing corporate jets, turbo props, twin engine aircraft and helicopters. Currently some 90 tenants are located within the Airport site including 50 aviation related tenants and 11 flying training organisations.
### 1. Current major infrastructure assets

#### Regional Airports – Passenger and Freight

<table>
<thead>
<tr>
<th></th>
<th>Mildura</th>
<th>Warrnambool</th>
<th>Portland</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
<td>Mildura Rural City Council (Public)</td>
<td>Southern Grampians Shire Council (Public)</td>
<td>Glenelg Shire Council (Public)</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Independent board appointed by the Mildura Rural City Council (Mildura Airport Pty Ltd)</td>
<td>Independent board appointed by the Southern Grampians Shire Council</td>
<td>Glenelg Shire Council</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Adelaide (SA), Broken Hill (NSW), Melbourne (VIC), Sydney (NSW)</td>
<td>Essendon (Melbourne)</td>
<td>Essendon (Melbourne)</td>
</tr>
<tr>
<td><strong>Carriers</strong></td>
<td>Qantas Link, Rex, Virgin Australia, Eastern Australia Airlines, Stewart Aviation</td>
<td>Sharp Airlines</td>
<td>Sharp Airlines</td>
</tr>
<tr>
<td><strong>Runways</strong></td>
<td>2 runways (1.830 kilometres and 1.139 kilometres)</td>
<td>2 runways (1.233 kilometres and 1.404 kilometres)</td>
<td>2 runways (1.616 kilometres and 1.18 kilometres)</td>
</tr>
<tr>
<td><strong>Terminals</strong></td>
<td>1 Terminal</td>
<td>1 Terminal</td>
<td>1 terminal</td>
</tr>
<tr>
<td><strong>Parking facility</strong></td>
<td>194 spaces</td>
<td>60 spaces</td>
<td>On grass</td>
</tr>
<tr>
<td><strong>Land</strong></td>
<td>239 hectares</td>
<td>176 hectares</td>
<td>128 hectares</td>
</tr>
<tr>
<td><strong>Apron Area</strong></td>
<td>No data available</td>
<td>10,150 m²</td>
<td>6,600 m² (4 light aircraft)</td>
</tr>
<tr>
<td><strong>Year Built</strong></td>
<td>No data available</td>
<td>No data available</td>
<td>1982</td>
</tr>
</tbody>
</table>

#### Mildura Airport

Mildura Airport is a curfew free airport located 542 kilometres from the Melbourne CBD and 394 kilometres from the Adelaide CBD. It is the principle Regular Public Transport, General Aviation and Pilot Training Airport in the Sunraysia Region of Victoria with over 208,000 people movement per annum. It is a strategically important airport as it provides gateway access for the region to Melbourne, Sydney and Adelaide.

#### Warrnambool Airport

Warrnambool Airport is a curfew free airport situated 13 kilometres from the Warrnambool CBD offering regular passenger services to Essendon Airport. The airport is home to Ambulance Victoria, Helicopter Emergency Medical Services (HEMS 4). The airport averages about 40 aircraft movements daily with General Aviation Maintenance (Courier Service) and Ambulance Victoria fixed wing aircraft daily users. It does not have any landing or aircraft parking fees.

#### Portland Airport

Portland Airport is located 288 kilometres from the Geelong CBD and provides Regular Passenger Services via Sharp Airlines to Essendon Airport. Further, it provides a broad range of other services including private owners, tourism charter flights, charter flights, freight, Royal Flying Doctor Services, and other commercial business aircraft. It also serves as a base for emergency services.

#### Other Regional Airports

A further 45 or so airports are of state/regional significance, as reflected in Plan Melbourne and the eight Regional Growth Plans. Capital investments at those airports focuses on runway, taxiway and apron areas, lighting and navigational aids as well as on terminal buildings. They predominantly follow a 10 year cycle of runway resealing (i.e. filling cracks in runway pavements) and then a more substantial runway strengthening required around the end of the second 10 years.
1. Current major infrastructure assets

Ports – Metropolitan Freight

<table>
<thead>
<tr>
<th>Port of Melbourne</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Management</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Berths</strong></td>
</tr>
<tr>
<td><strong>Land</strong></td>
</tr>
<tr>
<td><strong>To Melbourne</strong></td>
</tr>
<tr>
<td><strong>Quay line</strong></td>
</tr>
<tr>
<td><strong>Channel info</strong></td>
</tr>
<tr>
<td><strong>Import</strong></td>
</tr>
<tr>
<td><strong>Export</strong></td>
</tr>
<tr>
<td><strong>Value</strong></td>
</tr>
</tbody>
</table>

**Victorian Ports**

Ports act as Victoria's gateways to the world, making efficient and cost effective port infrastructure vital to the viability of our export industries. In Victoria, there are four commercial sea ports: the Port of Melbourne, Geelong, Hastings and Portland. The Port of Melbourne and Port of Hastings are owned by the Victorian Government and are managed on its behalf by the Port of Melbourne Corporation and the Port of Hastings Development Authority respectively. The Port of Geelong and Port of Portland are privately owned and operated.

**Port of Melbourne**

The Port of Melbourne is Australia’s largest international container port and a key strategic asset for Victoria, handling around 35 per cent of the nation’s container trade.

The Port of Melbourne handles international and interstate imports such as paper, furniture, electrical equipment, clothing, machinery, automotive and bulk commodities (such as cement, fuel and chemicals).

Up to 87 per cent of all international containers imported through the Port of Melbourne are destined for a location within the metropolitan area, with nearly all of this freight moved on roads.

Main exports handled by the port include miscellaneous manufactures, cereal grains, paperboards and fruit and vegetables.

**Victoria Regional Channels Authority (VRCA)**

The VRCA have assets including channels, navigational aids, offices and vehicles. Current assets are valued at approx. $12 million with non-current assets valued at $43 million. The VRCA manages the port waters of Geelong and oversees channel operations in the ports of Portland and Hastings. The three main functions are to:

- Manage, dredge and maintain channels in accordance with standards of the Director of Maritime Safety
- Provide general direction and control of the movement of vessels
- Maintain shipping channel depth of 12.3m at all times.

Source: Port of Melbourne Annual Report

Source: Port of Melbourne Corporation, 2013-14 Annual Report
### 1. Current major infrastructure assets

**Ports – Regional Freight**

<table>
<thead>
<tr>
<th>Port of Portland</th>
<th>Port of Geelong</th>
<th>Port of Hastings</th>
<th>Port Anthony</th>
<th>Station Pier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
<td>Port ownership is vested into two infrastructure funds – <strong>Utilities Trust of Australia</strong> (Hastings Fund Management) and <strong>Palisade Ports Pty Ltd</strong> (Palisade Investment Partners), each owning 50% .</td>
<td><strong>GeelongPort</strong> own and operate the port (except for Point Wilson Explosives Pier, which is owned by the Commonwealth Government, Bulk Grain Pier No. 3 Berth, which is owned by GrainCorp and Rippleside and Cunningham Piers owned privately).</td>
<td><strong>Victoria Government</strong></td>
<td><strong>John Anthony</strong> privately owns the port</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>• Port of Portland Ltd &lt;br&gt; • GrainCorp operates the grain terminal &lt;br&gt; • P&amp;O Ports provide stevedoring services &lt;br&gt; • VRCA oversees management of the channel.</td>
<td>• Aside from Point Wilson Explosives Pier, Cunningham Pier and new Bulk Grain Pier, GeelongPort is managed by GeelongPort Pty Ltd., which has owned most of the land-based infrastructure since the port was privatised in July 1996 &lt;br&gt; • Port and Terminal operators include GeelongPort, GrainCorp, Viva energy, Terminal Pty Ltd &lt;br&gt; • All port waters are managed by VRCA.</td>
<td>• Managed by the Port of Hastings Development Authority through the Port Management Agreement with Patrick Ports Hastings &lt;br&gt; • The port has a number of commercial wharves and jetties. The channels and the port waters are managed by port operator Patrick Ports-Hastings &lt;br&gt; • VRCA oversees the management of the channel.</td>
<td>The operations fall within the authority of Gippsland Ports for all ports within Corner inlet</td>
</tr>
<tr>
<td><strong>Berths</strong></td>
<td>6</td>
<td>16</td>
<td>3</td>
<td>1 (200 metres in length, 7metres deep) &lt;br&gt; 4 (220 metres, 223 metres, 185 metres and 305 metres in length)</td>
</tr>
<tr>
<td><strong>Land</strong></td>
<td>65 hectares</td>
<td>226 hectares</td>
<td>Long Island- 6.2 hectares, Crib point – 4.8 hectares, Stony Point-1.9 hectares</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>To Melbourne</strong></td>
<td>Road &amp; Rail (Standard gauge) - 448 kilometres</td>
<td>Road &amp; Rail (Standard and Broad gauge GrainCorp only) - 75 kilometres</td>
<td>Road &amp; Rail (Broad gauge– Stony point line)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Channel info</strong></td>
<td>No data</td>
<td>12.3 metres - access to vessels with 10.3 metre draft</td>
<td>14.8 metres (Western Entrance)</td>
<td>7 metres</td>
</tr>
<tr>
<td><strong>Imports</strong></td>
<td>1,045,723 mass tonnes</td>
<td>7,916,991 mass tonnes</td>
<td>577,306 mass tonnes</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Exports</strong></td>
<td>4,287,989 mass tonnes</td>
<td>4,919,657 mass tonnes</td>
<td>1,427,920 mass tonnes</td>
<td>N/A</td>
</tr>
</tbody>
</table>
## 1. Current major infrastructure assets

### Local Ports and Piers – Tourism, Fishing and Recreational Activities

While the major metropolitan and regional ports are integral to the delivery and shipment of large goods and bulk commodities, the local ports continue to be important economic enablers for the local areas, particularly for tourism, recreational activities and the fishing industry.

<table>
<thead>
<tr>
<th>Owner</th>
<th>Victorian Government</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management</strong></td>
<td></td>
</tr>
<tr>
<td>Gippsland Ports</td>
<td>Gippsland Ports Committee of Management Inc.</td>
</tr>
<tr>
<td>Port Phillip Bay and Western Port, Port Campbell</td>
<td>Parks Victoria</td>
</tr>
<tr>
<td>Port Fairy</td>
<td>Moyne Shire Council</td>
</tr>
<tr>
<td>Apollo Bay</td>
<td>Colac-Otway Shire Council</td>
</tr>
<tr>
<td>Warrnambool</td>
<td>Warrnambool City Council</td>
</tr>
<tr>
<td>Lorne</td>
<td>Great Ocean Road Coast Committee</td>
</tr>
<tr>
<td>Barwon Heads</td>
<td>Barwon Coast Committee of Management Inc.</td>
</tr>
<tr>
<td>Portland Bay</td>
<td>Glenelg Shire Council</td>
</tr>
<tr>
<td><strong>Local Ports and Piers</strong></td>
<td></td>
</tr>
<tr>
<td>- Gippsland Lakes</td>
<td>Includes:</td>
</tr>
<tr>
<td>- Corner Inlet and Port Albert</td>
<td>- Portsea</td>
</tr>
<tr>
<td>- Snowy River</td>
<td>- Sorrento</td>
</tr>
<tr>
<td>- Mallacoota</td>
<td>- Rye</td>
</tr>
<tr>
<td>- Anderson Inlet</td>
<td>- St Kilda</td>
</tr>
<tr>
<td></td>
<td>- Gem Pier</td>
</tr>
<tr>
<td></td>
<td>- Portarlington</td>
</tr>
<tr>
<td></td>
<td>- Queenscliff</td>
</tr>
<tr>
<td></td>
<td>- San Remo</td>
</tr>
<tr>
<td></td>
<td>- Port Campbell</td>
</tr>
<tr>
<td>Port Fairy</td>
<td>Apollo Bay Harbour</td>
</tr>
<tr>
<td></td>
<td>Warrnambool Port</td>
</tr>
<tr>
<td></td>
<td>Point Grey and 37 kilometres of Crown land reserves between Lorne and Torquay</td>
</tr>
<tr>
<td></td>
<td>Barwon Heads local pier</td>
</tr>
<tr>
<td></td>
<td>Local Port of Portland</td>
</tr>
</tbody>
</table>
1. Current major infrastructure assets

**Intermodal Terminals**

<table>
<thead>
<tr>
<th>Intermodal Terminal</th>
<th>Owner</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altona</td>
<td>Aurizon / QUBE Logistics</td>
<td>Aurizon / QUBE Logistics</td>
</tr>
<tr>
<td>Spotswood</td>
<td>Sadleirs Logistics</td>
<td>Sadleirs Logistics</td>
</tr>
<tr>
<td>Laverton</td>
<td>Specialised Container Transport Logistics (SCT)</td>
<td>SCT and subsidiary Specialised Bulk Rail (SBR)</td>
</tr>
<tr>
<td>Dynon</td>
<td>VicTrack</td>
<td>QUBE Logistics (in accordance with VicTrack Access Arrangement)</td>
</tr>
<tr>
<td>South Dynon</td>
<td>VicTrack</td>
<td>Pacific National (In accordance with VicTrack Access Arrangement)</td>
</tr>
<tr>
<td>East Swanston</td>
<td>Port of Melbourne</td>
<td>Patrick</td>
</tr>
<tr>
<td>West Swanston</td>
<td>Port of Melbourne</td>
<td>DP World</td>
</tr>
<tr>
<td>Victoria Dock</td>
<td>Port of Melbourne</td>
<td>QUBE Logistics</td>
</tr>
<tr>
<td>Somerton</td>
<td>Austrak/GPT</td>
<td>QUBE Logistics</td>
</tr>
<tr>
<td>Donald</td>
<td>N/A</td>
<td>Pea Growers Co-operative</td>
</tr>
<tr>
<td>Dooen</td>
<td>N/A</td>
<td>Wimmera Container Lines (SCT Logistics)</td>
</tr>
<tr>
<td>Maryvale</td>
<td>N/A</td>
<td>Australian Paper</td>
</tr>
<tr>
<td>Merbein</td>
<td>N/A</td>
<td>Wakefield Transport</td>
</tr>
<tr>
<td>Hopetoun</td>
<td>N/A</td>
<td>Iluka Resources</td>
</tr>
<tr>
<td>Tocumwal</td>
<td>N/A</td>
<td>Patrick</td>
</tr>
<tr>
<td>Shepparton</td>
<td>N/A</td>
<td>Gray's Container Terminal</td>
</tr>
<tr>
<td>Warrnambool</td>
<td>N/A</td>
<td>WestVic Container Handling</td>
</tr>
</tbody>
</table>

A need for more effective Intermodal Infrastructure
Currently interstate containers bound for distribution in Melbourne are railed to terminals at South Dynon adjacent to the Port, and then trucked to the outer suburbs. The South Dynon terminals have limited space and capacity, and can be difficult to access due to increasing congestion on the inner Melbourne road and rail networks.

**Dynon Rail Freight Terminal**
VicTrack's Dynon Rail Freight Terminal is the only fully open access multi-user terminal in the Port of Melbourne precinct. VicTrack completed a $8.9 million project in 2013 that replaced 23,000 square metres of bitumen pavement at Dynon Rail Freight Terminal. High-strength post-tension concrete aims to improve capacity and efficiency at the terminal.
1. Current major infrastructure assets

**Bicycle**

<table>
<thead>
<tr>
<th>Infrastructure Type</th>
<th>Examples</th>
<th>Land owners/ infrastructure managers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose-built off-road infrastructure</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Bike parking facilities | • 85 Parkiteer facilities at train stations  
• Bike racks on footpaths | • Local government |
| Bike share facilities | • Melbourne Bike Share program comprising of approximately 600 bikes | • RACV  
• Local government |
| Separate cycling and shared use paths | • Off-road paths | • Local government  
• Parks Victoria  
• Melbourne Water  
• Private land holders  
• VicRoads  
• VicTrack  
• Private Road managers (e.g. ConnectEast) |
| **On-road infrastructure** |  |  |
| Protected lanes | • Lanes where vehicles are prevented from entering  
- Latrobe Street, Melbourne  
- Albert Road, East Melbourne | • Local government |
| Dedicated lanes | • Permanent lanes painted  
• Time based lanes painted | • Local government  
• VicRoads |
| Non-separated | • Roads, including sealed verges | • Local government  
• VicRoads |
| Signalling | • Bicycles signalling integrated with traffic lights  
• Dedicated bicycle crossing signals | • VicRoads |

Note: Walking tracks and bike club facilities have been excluded as they are deemed to be recreational.

**Principle Bicycle Network (PBN)**

The PBN is a network connecting major destinations around metropolitan Melbourne, detailed in the adjacent map. Within the PBN, certain routes have been identified as providing priority access for cyclists in a way that supports the VicRoads ‘SmartRoads’ framework (VicRoads, 2015). These paths are known as Bicycle Priority Routes (BPR). Another subset of the PBN includes Strategic Cycling Corridors (SCCs), which are designed to improve cycling to and around major activity and employment centres in metropolitan Melbourne.

**Footpaths**

Footpaths play an integral role in the transport of people and connecting the various other transport modes to each other. Particularly in the inner city of Melbourne there are a number of areas (specifically around the major train stations Flinders Street and Southern Cross) where the current footpath capacity is constrained during peak periods.

---

**Existing bicycle routes in Melbourne area**

Source: Bicycle Plan 2012-2016

The network consists of around 120 kilometres of bicycle routes: 52 kilometres on-road and 68 kilometres separate from the road.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Lanes</td>
<td>130</td>
<td>118</td>
</tr>
<tr>
<td>Off-road cycling lanes</td>
<td>70</td>
<td>66</td>
</tr>
<tr>
<td>On-road cycling lanes</td>
<td>60</td>
<td>51</td>
</tr>
<tr>
<td>Physically-separated lanes</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>On-street bicycle hoops</td>
<td>3175</td>
<td>1,450</td>
</tr>
</tbody>
</table>

Source: Melbourne Bicycle Account – Cycling Census 2013
2. Investment in infrastructure assets

Commonwealth Investment

Australian Government Capital Expenditure

The Australian government has invested significant amount of capital into new state infrastructure. The majority of this capital has been towards the growth and maintenance of roads and rail. There is a strong correlation between the area of the state and population as drivers of transport infrastructure in Victoria and around the nation.

Commonwealth priorities

The Australian Government places a priority on road and rail for their infrastructure investment. For example, in 2014–15 over 78 per cent of all infrastructure expenditure is to be spent on roads. Rail receives approximately 13 per cent.

In 2015–16 road expenditure remains over 78 per cent, while rail expenditure falls to a little over 6 per cent. By 2017–18 rail expenditure is only around 0.5 per cent, while road expenditure increases to over 83 per cent. The remaining expenditure is undetermined or allocated to non-road or rail projects such as Community Infrastructure Grants.


Investment in Rail by the Commonwealth ($Million)

Investment in Road by the Commonwealth ($Million)
2. Investment in infrastructure assets

**State Capital Investment**

The Victorian Government provides funding for various transport infrastructure to build and improve assets within the Transport Network. These investments look to provide better connectivity, throughout capacity and mobility throughout the Transport Network.

The following investment data uses ‘estimated expenditure for the financial year’ relating to the state departments, VicTrack, V/Line, Ticketing Authority and the Ports (Metropolitan and Regional). It is clear that the average spend on transport infrastructure is increasing with larger spending in 2010 and 2014. In 2010 the West Gate–Monash Freeway Improvement Package cost was approximately $400 million and the M80 upgrade cost $125 million. In 2014 there was the East-West Link (Stage 1) spend of $225 million and the Regional Rail Link spend of $1.2 billion.

The majority of infrastructure expenditure is spent on rail and road in Victoria (see below), with approximately 80 per cent of total capital transport expenditure. The remaining expenditure is allocated to other assets within the Transport Network. The State has not recently invested in Airports as this is usually supported by the Federal Government, however it may provide its financial support to carriers, regional airports and enabling infrastructure to the Airports (e.g. roads). Port Investment has increased in 2010 and 2015, with the channel deepening project and port capacity expansion costing $370 million and $327 million respectively. Rail expenditure has also increased. An increase in ICT investment has been undertaken across road and rail assets, indicating better utilisation and capacity management opportunities.
2. Investment in infrastructure assets

State Capital Investment

New vs Existing Infrastructure projects

Each year the state government spends an estimated $2-3.5 billion on transport infrastructure projects. These projects have been broken down into new and existing projects as defined by the Department of Treasury and Finance:

- **New** – Investment has been made to a project that does not already exist.
- **Existing** – Continued investment into a project that started in previous years.

Infrastructure projects, on average, roll over a 2-3 year period, but depending on the size of the project can take as long as five to six years to complete e.g. Geelong Ring Road, ICT infrastructure, channel and waterway capital works.

Major investments in the M80 Upgrade and East-West Link have contributed to the increases in Road investment in 2014 and 2015.

The 2015-2016FY budget is not an accurate representation of total expenditure with major projects like the Level Crossing Removal Program, estimated to cost a total of approximately $5 billion, which only has part funding committed to in the State Capital Budget.

Growth vs Sustain of assets

Through the State Capital Investment Budget, sustain and growth has been allocated to projects based on the following Infrastructure Victoria Criteria:

- **Growth** – investment has a direct impact on increasing capacity and patronage of the transport network, e.g. road management strategies of existing corridors, procurement of rolling stock, new and duplication of roads, new bike and cycling paths.
- **Sustain** – investment maintaining or upgrading existing infrastructure to ensure assets are fit for purpose and safety.

It is clear that the growth of assets has increased over the last two to three years, with external factors such as population growth driving the need for more capacity on transport assets to and from the CBD. Although growth in assets is critical to the sustainability and productivity of Victoria, there needs to be a balance between growth and sustainment of assets. If managed incorrectly, poor maintenance investment can have significant negative impacts on infrastructure causing safety issues and potential shut-down of assets.

(2016 Capital budget data is incomplete)

---

Source: Deloitte Analysis, 2015
Growth assets

It is clear that since 2010, the majority of asset expenditure on transport is for growth purposes. Road and Rail are the only transport assets that have consistent sustainment and maintenance expenditure in place.

The Bus network has experienced a decline in investment since the SmartBus upgrades around Melbourne in 2010-2013.

The State provides some contributions to cycling and bike paths in the form of other road upgrades, however local councils provide the majority of funding for this asset. Their contributions have not been reflected below.

(Please note, 2016 Capital Budget data was incomplete when analysis was completed.)

Source: Deloitte Analysis, 2015
3. Major infrastructure projects currently being planned/implemented

**Road - Metropolitan**

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monash Freeway upgrade</td>
<td>30 kilometres of extra traffic lanes along the Monash Freeway between Chadstone and Pakenham.</td>
<td>Detailed planning stages. Estimated completion in 2018.</td>
<td>$400 million</td>
</tr>
<tr>
<td>Dingley Bypass</td>
<td>The 6.4 kilometre Dingley Bypass will link Warriegal Road at Moorabbin and Westall Road at Dingley Village. The road will be three lanes each way with a shared cycle and pedestrian path running alongside it.</td>
<td>Construction started in mid-2014, expected to be completed by late 2016. As of November 2015, approximately 70% of the new road has been completed.</td>
<td>$156 million</td>
</tr>
<tr>
<td>CityLink Tulla Widening</td>
<td>Addition of new lanes and other measures to improve traffic flows across 24 kilometres of freeway between the CityLink tunnels and Melbourne airport. Benefits include a 30% increase in capacity, travel time and safety improvements.</td>
<td>Construction commenced in October 2015.</td>
<td>$1.28 billion financed by the Federal Government, the Victorian Government and Transurban.</td>
</tr>
</tbody>
</table>
| M80 Ring Road Upgrade            | The M80 Ring Road Upgrade will improve the 38 kilometre M80 Ring Road which extends from the Princes Freeway at Laverton North to the Greensborough Highway at Greensborough. The next priority section is between Sunshine Ave and Calder Freeway.                                                                                                                                  | Progress ongoing. Completed sections include:  
  * Calder Freeway to Sydney Road  
  * Western Highway to Sunshine Avenue  
  * Edgars Road to Plenty Road.                                                                                                                                                                                                                                                                                                                                                                 | $2.25 billion project budget funding from Federal and State Governments on completed priority sections. $300 million is committed for the next priority section.                                                                                                                                                                      |
| Chandler Highway Bridge Duplication | Chandler Highway is currently operating above capacity with approx. 44,000 vehicles each day, resulting in delays and congestion. The Victorian Government has provided funding to upgrade the Chandler Highway between Heidelberg Rd, Alphington and Yarra Boulevard, Kew, to ease congestion, improve reliability and improve road safety for all road users. | Community consultation on a number of design options is currently underway.                                                                                                                                                                                                                                                                                                                                     | $110 million funding is being provided by Victorian Government.                           |
| Level Crossing Removal Project   | Removal of 50 dangerous and congested level crossings across Melbourne.                                                                                                                                                                                                                                                                                                                              | 50 crossings will be removed over eight years, with at least 20 removed by 2018. Construction has commenced at several sites.                                                                                                                                                                                                                                                                                      | $5–6 billion. The Victorian Government has allocated $2.4 billion of the 2015-16 budget toward the project.                                                                                                                                                                                                                                                   |
| Western Distributor              | Market-led proposal to provide an alternative to the congested West Gate Bridge, and to provide direct connectivity between the West Gate Freeway and the growing Port of Melbourne.                                                                                                                                                                                                                                             | The project has been progressed by the State Government and the reference business case has been submitted to the Commonwealth Government for funding consideration. Construction is scheduled to start in 2018.                                                                                                                   | Transurban's estimates is $5–5.5 billion. It proposes to fund the project through tolls and a Federal Government contribution.                                                                                                                                                                                                                          |
| Outer Suburban Roads Fund – Stage 1  | A guaranteed funding commitment by the Labor government for $1 billion towards projects for the continual development and improvement of outer suburban roads.                                                                                                                                                                                                                                                | Committed as part of election funding commitments in 2014.                                                                                                                                                                                                                                                                                                                                                     | $1 billion over 8 years.                                                                  |

Source: VicRoads Website
### 3. Major infrastructure projects currently being planned/implemented

#### Roads – Regional and Rural Victoria

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Western Highway Duplication (A8)</strong></td>
<td>Duplication of the Western Highway between Ballarat and Stawell including construction to Ararat as well as upgrades between Stawell and the South Australian Border including new overtaking lanes, rest areas, bridge upgrades and bypasses for Beaufort and Ararat (see right).</td>
<td>Currently underway with 34 kilometres upgraded and duplicated.</td>
<td>$662.3 million plus $50 million for Stawell to South Australian Border.</td>
</tr>
<tr>
<td><strong>Princes Highway – West duplication</strong></td>
<td>23 kilometres from Geelong to Winchelsea and 37 kilometres from Winchelsea to Colac.</td>
<td>Currently underway.</td>
<td>$171 million (Geelong to Winchelsea) $362 million (Winchelsea to Colac) Jointly funded by Victorian and Australian Governments.</td>
</tr>
<tr>
<td><strong>Princes Highway – Traralgon to Sale</strong></td>
<td>Nine sections of upgrades resulting in 30 kilometres of duplicated highway between Traralgon and Sale.</td>
<td>4 sections complete. 3 sections currently underway. 2 sections in planning/preconstruction.</td>
<td>$260 million Jointly funded by Victorian and Australian Governments.</td>
</tr>
<tr>
<td><strong>Drysdale Bypass</strong></td>
<td>The Drysdale Bypass will be approximately 6 kilometres long, from Jetty Road to north of Whitcombes Road. It will include a shared use path for pedestrians and cyclists. The design of the Drysdale Bypass will be focused on safety and it will be constructed to provide the safest road environment to reduce the risk of crashes.</td>
<td>Detailed design underway. Land acquisition process and construction to begin in FY2017/18. All works to be complete and open to traffic in 2020.</td>
<td>$109 million, including $106 million for the bypass and $3 million to improve safety and traffic flow in High Street, Drysdale.</td>
</tr>
<tr>
<td><strong>Calder Highway</strong></td>
<td>Rebuild the interchange at Ravenswood, Bendigo, including an overpass to replace the stop signs at the intersection on one of the State’s busiest freight corridors.</td>
<td>Planning complete. Construction scheduled to start February 2016.</td>
<td>$86 million Jointly funded by Victorian and Australian Governments.</td>
</tr>
<tr>
<td><strong>Great Ocean Road</strong></td>
<td>Enhance the road and bridges along the full length of the Great Ocean Road from Torquay to Allansford, east of Warrnambool to improve safety.</td>
<td>Upgrade programme currently underway and due to be completed d2017/18.</td>
<td>$50 million</td>
</tr>
<tr>
<td><strong>Pioneer Road Grovedale</strong></td>
<td>Pioneer Road, Grovedale, to be duplicated from Waurn Ponds to Meadowvale Drive to improve capacity, safety and amenity for local residents.</td>
<td>Currently underway.</td>
<td>$13 million</td>
</tr>
</tbody>
</table>

**Regional and Rural Initiatives**

The transport solutions initiative is a road package providing $56 million for a range of projects to improve regional road capacity and safety. Key projects include:
- Beaufort and Ararat – preconstruction work for Western Highway bypasses
- Leongatha – upgrade of the Leongatha heavy vehicle alternative route
- Shepparton east – roundabout widening at Doyle’s Road/Midland Highway – currently underway
- Princes Highway, Murrungowar – rest area improvements.

Source: Budget Information Paper Regional and Rural Victoria 2014/15

**Regional Roads Fund – Stage 1**

- A guaranteed funding commitment by the Labor government for $500 million towards projects for the continual development and improvement of regional roads.
- Funding was committed in 2014 as part of election funding commitments.

Source: Labors Financial Statement 2014
3. Major infrastructure projects currently being planned/implemented

Road – Comparison to other Australian States and International jurisdictions

### Other Australian States

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Connex (NSW)</td>
<td>The 33 kilometre WestConnex tollway will link Sydney’s west with the airport and the Port Botany precinct, and will include the M4 extension and duplication of the M5 East to King Georges Road.</td>
<td>Funding from both the Private and Public (State and Federal Government) funding secured with construction due to end in 2023.</td>
<td>$3.5 billion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Gateway (WA)</td>
<td>The project will improve and modernise the Tonkin and Leach Highway through road interchange and bridge upgrades, noise wall introductions and increasing connectivity for cyclists and pedestrians.</td>
<td>Construction commenced March 2013 and is due to end in December 2016</td>
<td>$1 billion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Road Upgrade (Torrens Road to River Torrens) (SA)</td>
<td>Construction of 3.7 kilometres of the North South Corridor including 1.4 kilometres of lowered non-stop road with three lanes in each direction and a rail overpass for the Outer Harbour Rail line over South Road and Queen Street.</td>
<td>Construction has not commenced, however it is due to be completed in 2018.</td>
<td>$896 million Equally funded by the Australian and South Australian Governments.</td>
</tr>
</tbody>
</table>

### International

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 Northumberland (UK)</td>
<td>Improves the A1 in Northumberland to provide additional capacity and enable greater access to Northumberland and between England and Scotland.</td>
<td>Funding from both the Private and Public (State and Federal Government) funding secured with construction due to end in 2023.</td>
<td>£242 - £344 million</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>George Massey Tunnel Replacement Project (BC, Canada)</td>
<td>A new bridge and related Highway 99 improvements between Bridgeport Road in Richmond and Highway 91 in Delta.</td>
<td>Construction is expected to begin in 2017, with the new bridge completed by 2022. Funding options are still being explored.</td>
<td>$3.5 billion (Canadian dollars)</td>
</tr>
</tbody>
</table>
3. Major infrastructure projects currently being planned/implemented

**Heavy Rail (Metropolitan and Regional) and the Tram Network**

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frankston Station Precinct Transformation</td>
<td>The Frankston Station Precinct Redevelopment Taskforce has recommended a program of significant upgrades to improve Frankston station.</td>
<td>A Master Plan Delivery Board has been announced to oversee the implementation of the recommendations from the Redevelopment Taskforce. Upgrades are expected to take place between 2016-2020.</td>
<td>The Victorian Government has allocated $83 million to the project.</td>
</tr>
<tr>
<td>Regional Rail Link</td>
<td>Regional Rail Link separates the metropolitan and regional services through Melbourne’s west, facilitating future expansion. Key upgrades included:</td>
<td>The project was completed on 21 June 2015. Timetable changes to fully utilise the capacity created by the project are anticipated.</td>
<td>The project was jointly funded by the Australian and Victorian Governments, with $2.7 billion and $931 million invested respectively.</td>
</tr>
<tr>
<td>Mernda Rail Extension</td>
<td>This project will extend the South Morang rail line by eight kilometres to Mernda in northern Melbourne. The extension features a duplicated rail line, full grade separations and a new intermediate station and new station at Mernda.</td>
<td>Victorian Government announced on 28 February 2016 that scoping work is complete and construction is to begin in 2017. The extension will be in operation by 2019.</td>
<td>The 2015-16 State Budget allocated $9 million for planning and further investigation of corridor demand and capacity. The full extension is expected to cost around $600 million.</td>
</tr>
<tr>
<td>Rail station car parking</td>
<td>Upgrading station car parks across the train network.</td>
<td>VicTrack is currently in the process of identifying appropriate sites.</td>
<td>$20 million has been committed.</td>
</tr>
</tbody>
</table>

**Tram Network**

The Tram Procurement Program is an $800 million package of works, including new trams, new infrastructure and other upgrades, to improve the accessibility, capacity and reliability of Melbourne’s tram network.

The Tram Procurement Program includes:

- 50 new E-Class low-floor trams delivered by 2018
- Upgrade Route 96 to become Melbourne’s first fully accessible route (this is also the first route to receive the new trams)
- Redevelop the Preston Workshop and Southbank Depot where the new trams will be stored and maintained
- Power upgrades and accessibility improvements to other low-floor tram routes.

The 2015-16 State Budget included $274 million for 22 additional E-Class trams, taking the total order to 50.

**Regional Rail Link**

The project was completed on 21 June 2015. Timetable changes to fully utilise the capacity created by the project are anticipated.

The project was jointly funded by the Australian and Victorian Governments, with $2.7 billion and $931 million invested respectively.

Source: economicdevelopment.vic.gov.au
3. Major infrastructure projects currently being planned/implemented

**Heavy Rail (Metropolitan and Regional) and the Tram Network - continued**

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Melbourne Metro Rail Project</strong></td>
<td>Construction of two nine kilometre rail tunnels and five underground stations between South Kensington and South Yarra, travelling underneath the CBD.</td>
<td>Planning works will continue until 2017. In 2018 the major construction contract will be awarded and commenced.</td>
<td>$9-11 billion. The Victorian Government allocated $1.5 billion in the 2015-16 budget for commencing the project. The State Government is also seeking federal funding.</td>
</tr>
<tr>
<td><strong>Murray Basin Rail Project</strong></td>
<td>Suite of upgrades for freight lines in the Murray Basin region to improve efficiency and encourage rail freight movements from the region.</td>
<td>Stage one works have commenced. The second stage will commence in late 2016.</td>
<td>$400 million. The Victorian Government allocated $220 million in the 2015-16 budget toward the project. The State Government is also seeking $200 million of federal funding.</td>
</tr>
<tr>
<td><strong>Inland Rail</strong></td>
<td>Construction of a direct, high performance freight rail corridor between Melbourne and Brisbane.</td>
<td>The rail line will take 10 years to construct. The Business Case has been submitted to government and is undergoing review.</td>
<td>$10 billion. The Australian Government has committed $300 million to finalise planning, engineering design and environmental assessments to start construction of Inland Rail.</td>
</tr>
<tr>
<td><strong>Dandenong Corridor Grade Separation and Rail Upgrade Program</strong></td>
<td>Removal of level crossings, purchase of rolling stock and rail infrastructure upgrades on the Cranbourne Pakenham corridor, estimated to increase capacity by up to 42%.</td>
<td>EOIs for the level crossing removals and rolling stock have been released. Works will commence in 2016 and be completed by 2018.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Victorian Rolling Stock Strategy</strong></td>
<td>Ten-year plan for 100 new metropolitan trains, 100 new trams and expansion of the regional train fleet.</td>
<td>The investment will be made over 10 years with it commencing in 2015-16 financial year.</td>
<td>$2 billion allocated in the 2015–2016 Victorian Budget.</td>
</tr>
</tbody>
</table>

**Murray Basin Rail Project (MBRP)**

The MBRP involves upgrading and converting to standard gauge the rail network supporting the Murray Basin region, targeting the bulk export industry agriculture and mining sectors. Key objectives of the project include:

- Enhancing competition between the ports for Victorian exports
- Improving transport efficiency through gauge standardisation and axle load upgrade
- Unlocking private investment in the region’s supply chains
- Minimising conflict between passenger and freight related services.

A number of different investment options were assessed in the development of the project Business Case. A key part of this analysis involved understanding capacity constraints and the ‘tension’ between market requirements and infrastructure capabilities.

The Project will deliver a 15 per cent improvement in rail productivity by increasing the axle loading from 19 to 21 tonne to axle load. Importantly, it will restore and improve rail’s competitive advantage over road for the carriage of bulk freight from the region, thereby reducing the number of truck trips to port by at least 20,000 per annum due to the increased rail capacity generated by the higher axle loading and improved track performance.

The $416 million project will also provide the Port of Portland direct rail access to the Murray Basin freight network for the first time, providing greater competitive tension between the two biggest bulk ports for Victoria. Increased competition between the ports for export commodities across the wider catchments should put downward pressure on port costs.

Finally, the Project should provide the catalyst for further private investment estimated to be in the order of $200 million in the region. Areas signalled for private investment include upgraded port and upcountry storage and handling facilities, new rail loading infrastructure and new rolling stock.
3. Major infrastructure projects currently being planned/implemented

### Bus

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus upgrades</td>
<td>$100 million has been allocated in the 2015-16 budget for improvement of Victorian bus networks over four years with approximately $15 million towards infrastructure. Funds have been allocated for increased routes, more frequent services, restoration of services and increased accessibility. The exact program of works has not been announced. Further, the State Government has allocated funds for capital contributions and Huntingdale Bus exchange.</td>
<td>A Ministerial consultative group will be established to consider and advise on opportunities for allocating the funds.</td>
<td>$100 million of Victorian Government funding $15 million – Bus package (capital component) $5 million – Huntingdale Bus Interchange</td>
</tr>
</tbody>
</table>

### Ports/IMTs

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Port Capacity Project</td>
<td>Infrastructure development in the Port of Melbourne at both Swanson and Webb Dock East, and the creation of an automotive facility at Webb Dock West.</td>
<td>Works have been underway for several months.</td>
<td>$1.6 billion, fully funded by the Port of Melbourne Corporation using existing port revenue streams and private sector contributions.</td>
</tr>
<tr>
<td>Ballarat West Employment Zone (BWEZ)</td>
<td>BWEZ is a staged development of 438 hectares of land adjacent to Ballarat Airport to be used for manufacturing, agribusiness, construction, freight and logistics purposes. An EOI process for the establishment of road, rail and intermodal (Ballarat Freight hub) facilities at the site was due to be released in December 2015.</td>
<td>Stage 1 subdivision works commenced in November 2015 and are targeted for completion mid 2016.</td>
<td>The project budget for BWEZ Stage 1 is $30.2 million. Regional Development Victoria has allocated $25.2 million and the City of Ballarat has delivered $5 million. The Commonwealth Government has contributed $9.1 million for the Ballarat Freight hub.</td>
</tr>
</tbody>
</table>

### Airports

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway Development Program</td>
<td>A proposed third runway for Melbourne Airport and the extension of its existing east-west runway.</td>
<td>Technical studies are underway. Construction is expected to commence in 2017-18 and the runway operational by 2020-22.</td>
<td>$500 million. Part of a program of investment of up to $10 billion over the next 20 years in the growth of Melbourne Airport.</td>
</tr>
<tr>
<td>Avalon Airport Rail Link</td>
<td>Reservation of land along a proposed corridor for development of a rail link connecting Avalon Airport and Melbourne/Geelong.</td>
<td>The corridor has been reserved under Amendment C308 to the Greater Geelong Planning Scheme.</td>
<td>$1.3 million (completed scoping study)</td>
</tr>
<tr>
<td>Melbourne Airport Rail Link</td>
<td>An alignment for a rail link to Melbourne Airport was reserved more than ten years ago, with the alignment revisited in a 2013 PTV study. At this stage there are no confirmed plans to pursue a rail link to Melbourne airport in the near future.</td>
<td>Land has been reserved and a planning study commissioned by PTV in 2013. The Melbourne Airport Masterplan has also made provisions including the reservation of land for the land.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
## 3. Major infrastructure projects currently being planned/implemented

### Cycling and Walking

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Progress to date</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Darebin Bridge</strong></td>
<td>The Darebin Creek Trail is a 1.8 kilometre extension that will link the southern end of the Darebin Creek trail in Alphington with the main Yarra trail in Kew, ultimately connecting it to a 600 kilometre network of off-road trails through the suburbs.</td>
<td>The project has faced challenges in acquiring permission for use of the land for the trail as the proposed route falls under multiple management groups, including Alphington Grammar School, the La Trobe Golf Course and Willsmere Park (managed by Boroondara Council). This has led to stop-start development and the project is unlikely to be finished before end of 2016. Two new bridges were completed in 2015 linking major sections of the pathway.</td>
<td>The Baillieu Government committed $18 million funding for the project in 2012.</td>
</tr>
<tr>
<td><strong>Box Hill to Ringwood Bike Path</strong></td>
<td>Development of a 10 kilometre bike path linking Box Hill to Ringwood, connecting with public transport, community services and recreation facilities along the way. Sections are being coordinated with the Level Crossing Removal projects.</td>
<td>VicRoads has recently presented the proposed path to the public and is currently producing more detailed designs for each section of the path. The path is scheduled to be completed by end of 2017.</td>
<td>In the 2015-16 State Capital Program, Victorian Government funding to be $14.8 million.</td>
</tr>
<tr>
<td><strong>Carrum to Warburton trail, Bayswater to Lilydale link</strong></td>
<td>Construction of a 10.3 kilometre shared use path from Bayswater to Lilydale which will provide the missing link in the 90 kilometre Carrum-Warburton trail. The project encompasses a number of new and upgraded paths and pedestrian signalling.</td>
<td>VicRoads is currently finalising the design of the link. Construction is targeted for completion in 2017.</td>
<td>$7.4 million funded by the Victorian Government.</td>
</tr>
</tbody>
</table>

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**Source:** VicRoads 2015
4/5. Planning, regulatory and pricing schemes

Department of Economic Development, Jobs, Transport and Resources (DEDJTR)

DEDJTR supports nine Ministers with 13 portfolios. It operates in 87 sites across Victoria and 18 offices around the world, working collaboratively with a variety of government and community stakeholders. The department oversees the efficient operations of a wide variety of public entities including public corporations, infrastructure development entities, asset management agencies, regulatory authorities and specialist boards.

The Transport group within DEDJTR coordinates the state’s transport system, including leading strategic policy development and transport reform, integrating network planning, overseeing transport regulation and safety, and coordinating the delivery of transport infrastructure projects. DEDJTR is undertaking integrated planning in partnership with agencies for the transport system, including short to long term priorities and options for the network to meet future performance outcomes. This will be complemented by a Transport Asset Management Strategy, in alignment with the new Department of Treasury and Finance Asset Management Accountability Framework. This will provide a consistent framework to guide the asset strategies of all portfolio agencies.

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### TRANSPORT PORTFOLIO

<table>
<thead>
<tr>
<th>Planning</th>
<th>Integrated transport planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>▪ VicRoads</td>
</tr>
</tbody>
</table>
| Rail (Heavy and Tram) | ▪ Public Transport Victoria  
                        ▪ VicTrack  
                        ▪ V/Line |
| Buses    | ▪ Public Transport Victoria  
                        ▪ VicTrack  
                        ▪ V/Line |
| Ports    | ▪ Port of Melbourne Corporation  
                        ▪ Port of Hastings Development Authority  
                        ▪ Victorian Regional Channels Authority |
| Active transport & Point to Point | ▪ Local Government  
                        ▪ VicRoads  
                        ▪ Bicycle Victoria  
                        ▪ VicTrack  
                        ▪ RACV  
                        ▪ Parkiteer |
| Airports | ▪ Melbourne Airport  
                        ▪ Avalon Airport  
                        ▪ Mildura Airport  
                        ▪ Other Regional Operators |

### Maintenance and Operations

- Tolls, Levies, Parking Levies
- Myki, Access Charges
- Myki, Private operator fees
- Port Charges
- No pricing except for Melbourne Bike share
- Land and Access fees
4/5. Planning, regulatory and pricing schemes

Rods

Planning

VicRoads is a statutory authority responsible for providing, operating and maintaining the road system:
• As part of an integrated transport system
• In a manner which supports a sustainable Victoria
• To contribute to social wellbeing
• To promote economic prosperity
• To improve the safety of the road system.

VicRoads planning responsibilities include:
• Planning for the road system as part of an integrated transport system, through development of feasibility studies under the DEDJTR’s planning framework
• Leading the development and implementation of strategic and operational policies to improve the safety of the road system
• Developing and implementing operational policies and plans
• Protecting future options for the improvement of the transport system including reserving land for future transport corridors
• Developing and implementing effective environmental policies, strategies and management systems
• Responding to development applications which may affect the operation of the road system.

Regulation

Transport Integration Act 2010 is the legislative framework for the entire transport portfolio, aligns corporate planning with the strategic priorities of DEDJTR, ensuring integration and sustainability are core principles of the transport and planning agencies.

Road Management Act 2004 and its regulations establishes a coordinated management system for public roads that will promote safe and efficient State and local public road networks and the responsible use of the road network.

Road Safety Act 1986 provides for the safe, efficient and equitable road use. It sets out general obligations for road users, procedures for vehicle registration, driver licensing and the distribution of costs of road use.

Transport (Compliance and Miscellaneous) Act 1983 is the primary legislation regulating public transport activities in Victoria.


Pricing

Tolled Freeways

EastLink – EastLink is managed by ConnectEast, which is now a privately owned company. Toll pricing is set in accordance with the EastLink Project Act 2004 and the Project Agreement. The State has control over the Act and its contents and therefore any review of the Act is dependent on Parliamentary discretion.

CityLink – CityLink is managed and owned by Transurban, a publically listed company. Toll pricing is set according to the Melbourne City Link Act 1995 and the Project Agreement (or where there is an extension, the Extension Agreement).

Heavy Vehicles

Heavy vehicles are charged an annual registration fee according to load capacity which is managed by VicRoads.

Aside from registration, the National Heavy Vehicle Regulator has assumed control of the majority of regulatory responsibilities for heavy vehicles in Victoria. Load standards and penalties are consistent nationally, outlined in the Heavy Vehicle National Law (HVNL).

The Intelligent Access Program (IAP) is a national program whereby heavy vehicle operators agree to remote tracking of the movement and location of their vehicles. This ensures they are complying with agreed operating conditions, in return for access or less restrictive access to the road network.

Alternative delivery models

Peninsula Link – The Peninsula Link freeway was constructed using a Public Private Partnership (PPP) and managed by the Linking Melbourne Authority (since disbanded) and private sector company Southern Way.

Peninsula Link was constructed on an Availability Model where the State makes quarterly payments in response to payment claims. Payment claims are calculated on the basis of the full availability of the freeway and whether Project Activities (such as operations and maintenance costs) have been fully met. If not met, the State is able to recalculate such payments through the Abatement Regime which is outlined in the Project Deed, stating the consequences of non-conformance (availability of the freeway).

Key Legislation

• Transport Integration Act 2010
• Road Management Act 2004
• Road Management (Works and Infrastructure) Regulations 2015
• Road Safety Act 1986
• Melbourne City Link Act (1995)
• EastLink Project Act (2004)
• Transport Act 1983
• Transport (Compliance and Miscellaneous) Act 1983
4/5. Planning, regulatory and pricing schemes

Heavy Rail and Tram Network

Planning

PTV is a statutory authority responsible for all public transport (metropolitan and regional) and the point of contact for customers on public transport services, fares, tickets and initiatives. PTV is in charge of the following planning responsibilities:

- Coordination between public transport modes
- Facilitating expansions of the network
- Auditing public transport assets
- Promoting use of public transport.

PTV is in the process of preparing network development plans for train, tram, bus and regional transport services. The Network Development Plan (NDP) for metropolitan rail was released in 2012 and is currently being refreshed by PTV.

The Franchise Agreements governing delivery of metropolitan and regional public transport services (heavy and tram) contain the following mechanisms for planning:

1. Network Development Partnership – a strategic forum for the State and the Franchisee to discuss and consider issues associated with the Franchise including strategic issues affecting infrastructure capacity, rolling stock capacity, operational performance, timetabling and passenger demand

2. Strategic Operations Plan – produced by the Franchisee and discussed at the NDP. The objectives of the SOP are to provide the context and strategic direction for operational planning and service delivery, to inform the development and implementation of the Franchisee’s Business Plans and to allow a consistent, coherent and progressive development of the public transport network

3. Business Plan – prepared by the Franchisee to show how the SOP will be implemented.

Maintenance and operations

Metropolitan Rail and Tram Network

The Franchisee is responsible for maintaining all infrastructure required to operate the Franchise as well as all rolling stock leased from the State to a condition which enables the Franchisee to comply with its obligations and safely deliver services. The Franchisee must submit to PTV the following planning documents:

1. Asset Management Plan (AMP)
2. Annual Works Plan
3. ICT Strategy.

The Franchisee is reimbursed for maintenance and renewal works performed to the satisfaction of the State.

Regional

V/Line operates on and maintains the Regional Rail Network (except for interstate rail lines operated by ARTC). The maintenance of the network includes freight infrastructure located on the Regional Rail Network and V/Lines rolling stock.

The delivery of V/Line’s passenger services is governed by its service agreement with PTV and includes their maintenance obligations of their rolling stock fleet. The maintenance obligations include:

1. Rolling stock is maintained in accordance with accreditation where is used for its intended purpose and in a safe manner
2. Rolling Stock Management Plan submitted to PTV
3. A Preventative Maintenance Schedule.

V/Line maintenance obligations for the Regional Rail Network infrastructure is governed by the Regional Infrastructure Lease. This includes:

1. Restoring and maintaining the railway infrastructure
2. Maintain the functionality and capacity of the network
3. Complying with the approved asset management plan.

The freight operators who utilise the Regional Rail Network are responsible for the maintenance of their Rolling Stock fleet and land side assets they own.
4/5. Planning, regulatory and pricing schemes

Heavy Rail and Tram Network

Regulation

Metropolitan Train and Tram Network
The majority of policy and regulation provisions for train operations and network development are outlined in the Franchise Agreements. Key provisions include:

- Ongoing development of planning strategies in collaboration with PTV
- Upkeep of assets through an approved and audited Asset Management Plan
- Distribution of revenue risk and profit sharing
- Performance incentive regime, with minimum performance thresholds following which PTV can intervene in operations
- Compulsory rail safety accreditation
- Accreditation to engage authorised officers
- Obligation to grant access to authorised third party operators
- Licence to transmit, distribute and supply energy.

Regional Train
The majority of policy and regulation provisions for train operations and network development are outlined in the Franchise Agreements. Key provisions include:

- Ongoing development of planning strategies in collaboration with PTV
- Upkeep of assets through an approved and audited Asset Management Plan
- Fares, Ticketing and system integrity deliverables
- Compulsory rail safety accreditation
- Accreditation to engage authorised officers
- Approve and grant access to authorised third party operators (including the 3rd party freight operators).

Freight Train
The majority of policy and regulation provisions for train operations and network development are outlined in the access agreements with Network Managers (e.g. V/Line, VicTrack and ARTC). Key provisions include:

- Access charges
- Conditions of Access including any limitations
- Freight Operator’s obligations in using the Network
- Compulsory Rolling Stock Standards
- Accreditation requirements
- Freight operator’s obligations when connecting with other Networks.

Pricing

Public Transport
The State is responsible for setting both metropolitan and regional public transport fares. Fares are and have been increasing annually in line with escalation in CPI and are published in the Victorian Fares and Ticketing Manual each year (in accordance with the Transport Act 1983). Fares increase with CPI and in some cases above CPI, however Government Policy may cause fares to either increase or decrease. For example, in January 2015, Zone 1+2 fares was significantly discounted to match Zone 1 fares and a free CBD tram zone was introduced. The introduction of Myki also reduced the average fare that customers pay compared to Metcard, due to Myki discounts and best fare calculations.

The arrangements for fare setting and revenue sharing are outlined in the Franchise Agreement between the Victorian Government and public transport operators. The State has control of fare policy. Therefore, where the government adjusts fares below the CPI, the State is obliged to compensate the operator so that the Franchisee is kept to a neutral financial position. The net financial impact is calculated using a methodology outlined in the Franchise Agreement.

The Franchise Agreements also contain a risk sharing mechanism to protect the operator from any unforeseen volatility in revenue and ensure the State and the Franchisee share in the benefits of significant farebox growth.

Interstate Train lines
ARTC leases use of interstate train paths to third party operators using Track Access Agreements. The regulatory framework for negotiating these contracts is the 2008 Interstate Access Undertaking, approved by the ACCC and effective until 2018. The ARTC can adjust access charges at any time within limits based around CPI.

Regional Train freight
Where V/Line holds the track lease, operators can apply to V/Line for access. Maximum price restrictions for access rights were developed in 2007 by the Essential Services Commission (ESC) in the Pricing Principles Order (s. 38J of the Rail Management Act (RMA) 1996). However current prices are far below the regulatory maximums due to market competition with road (DEDJTR, 2015).

VicTrack also leases access to land direct to third parties. VicTrack is also bound by the pricing restrictions in the RMA, and any increased access charges in excess of CPI must be approved by the ESC.
Planning

Many port industry participants undertake planning of business sites and are involved in and affected by port land use planning. At the highest level, planning frameworks include national planning strategies entered into by the State. In addition, state-wide planning frameworks can also include requirements and principles directly relevant to Victorian ports. For example, the Planning and Environment Act 1987 (P&EA) establishes the framework for planning, use and development of land in Victoria, while the Victorian Planning Provisions (VPP), made under the P&EA, require the development of planning schemes by municipalities (including the Port of Melbourne).

State Government documents or statements also can include strategic level planning, encompassing broader transport considerations such as the interrelationship of the port with other elements of the transport system.

At the next level down are the internal port planning documents (port development plans). These documents are not only the outcome of the higher level planning requirements and principles, but also represent the port’s approach to planning. Ports are required to refresh these plans every four years.

The objectives, functions and powers of the port corporations are clearly set out in the Port Services Act 1995 and provide the legal charter within which they must operate. There is some acknowledgement of the importance of connections between the ports and the broader freight and logistics systems and networks of the State through a requirement to coordinate activities with other bodies responsible for those systems and networks. However, there are no specific objectives and functions requiring or empowering the port corporations to actively participate in the development and/or management of these external systems and networks under the Port Services Act 1995. The Transport Integration Act 2010 provides for coordinated activities between the relevant Port bodies and other State Agencies.
4/5. Planning, regulatory and pricing schemes

Ports

Maintenance and operations
The Ports of Melbourne and Hastings are owned by the Victorian Government and managed by the Port of Melbourne Corporation and Port of Hastings Development Authority, respectively.
The Port of Hastings Development Authority has outsourced the operations of the port, through a management agreement with Patrick Ports. This agreement is due to expire in mid 2017.
The Port of Geelong and the Port of Portland were privatised in July 1996 and are now managed by Geelong Port and the Port of Portland Pty Ltd, respectively.

Major stevedores currently operating in Victorian ports include:
- Asciano (Patrick)
- DP World
- Qube Ports

Private terminal operators include:
- GrainCorp
- Emerald Grain
- Viva Energy
- Terminal Pty Ltd

Regulation
- All managers of local and commercial ports must prepare a Safety Management Plan and an Environment Management Plan for audit.
- Port authorities must prepare and submit to government a Port Development Strategy every four years.
- In 2012 planning controls were increased for ports –
  - Introduction of a new ‘Port Zone’
  - Ministerial Direction on land use planning
  - Release of a Planning Practice Note to provide guidance on land use planning around ports.

Pricing
The Essential Services Commission (ESC) is responsible for the economic regulation of Victorian ports under the Port Management Act 1995 (PMA). The ESC has in place a price monitoring regime which covers services within the Port of Melbourne. ESC publishes a review of the port industry every five years which is submitted to the Minister of Finance (ESC, 2014) outlining recommendations and efficiency of the industry.

The ACCC produce an annual Container stevedoring monitoring report which details the competitive forces within the stevedore industry and how competition has influenced pricing and overall efficiency. Reform recommendations tied to landside networks are also detailed.
4/5. Planning, regulatory and pricing schemes

Airports

Planning
The Federal Government’s National Aviation Policy White Paper was released in 2009. A key initiative of the policy was the development of a national land use planning regime for all Australian airports. This initiative led to the development of the National Airport Safeguarding Framework with it being agreed in 2012 by Commonwealth, State and Territory transport ministers. It aims to minimise aircraft noise-sensitive developments near airports and improve safety by ensuring aviation safety requirements are recognised in land use planning and development decisions. The framework applies to all Australian Airports and was approved by the Victorian Minister for Planning on 8 October 2015 to be included in Victoria’s planning strategy.

While many of Victorian Airport masterplan’s (Metropolitan and Regional) incorporate their long planning and environmental strategies, future planning is also subject to State legislation and Planning schemes. Increasingly, future planning by both the State Government and Airport operators will need to consider the implications of airport security.

Maintenance and operations
All Airports Operators (private or local council) are responsible for the operation of their Airport and maintaining its infrastructure in accordance with prescribed standards (e.g. Melbourne Airport’s published engineering standards). Aircraft carrier (passenger and logistics) maintain their aeroplane fleet unless an alternative commercial arrangement is in place with the Airport Operator. The aircraft carriers’ maintenance must comply with that of Civil Aviation Safety Authority (CASA).

Regulation
The Airports are subject to the following regulations:
- Planning and construction provisions and restrictions around airport leases
- Preparation and periodical revision of a 20 year Master Plan for airport development, which must invite public comment and be approved by government
- Restrictions on ownership and control of airport infrastructure, particularly foreign and airline ownership
- The protection of airspace around airports
- Building control
- Environmental management
- Reporting on prices charged for services and facilities, financial statements and quality of service (undertaken by the ACCC).

Pricing
The arrangement of airline charges and services are outlined in the Airport Operator’s Aeronautical Service Agreement (ASA). The ASA is not a compulsory agreement for all users (airlines), however non-signatory parties are charged at higher rates than signed parties. The ASA is revised every five years by APAC and is regulated by the ACCC in accordance with the Commonwealth Airports Act 1996 and the Competition and Consumer Act 2010.

The CASA is an independent statutory authority that oversees all safety aspects in the private and commercial aviation industry in accordance with the Civil Aviation Regulations 1988 and Civil Aviation Safety Regulations 1998.

There are regional airports which do not charge any landing fees (e.g. Warrnambool Airport).
4/5. Planning, regulatory and pricing schemes

Buses

Planning

Planning for the bus network is a partnered approach between VicRoads, PTV and Local Government. As previously mentioned, PTV is in charge of the following planning responsibilities:

- Coordination between public transport modes
- Facilitating expansions of the network
- Auditing public transport assets
- Promoting use of public transport.

As with Heavy Rail and Tram franchisees, some Bus Franchise Agreements contain the following mechanisms for planning:

1. Network Development Partnership – a strategic forum for the State and the Franchisee to discuss and consider issues associated with the Franchise including strategic issues affecting infrastructure capacity, rolling stock capacity, operational performance, timetabling and passenger demand.

2. Strategic Operations Plan – produced by the Franchisee and discussed at the NDP. The objectives of the SOP are to provide the context and strategic direction for operational planning and service delivery, to inform the development and implementation of the Franchisee’s Business Plans and to allow a consistent, coherent and progressive development of the public transport network.

Bus planning is co-ordinated with VicRoads and local councils to ensure roads are maintained to the required standard for bus routes and sufficient space is allocated for bus stops, signage etc.

Maintenance and operations

PTV is responsible for all service agreements and contracts for Victoria’s Metropolitan and Regional Bus network. Metro bus services in Melbourne are run by private operators under 28 contracts. The Metropolitan Bus Services Contracts (MSBC) are operated via 27 separate contracts which represent roughly 70 per cent of the network. The remaining 30 per cent of services are delivered through the Melbourne Metropolitan Bus Franchise (MMBF) contract awarded to Transdev in 2013. The Regional Bus and Coach Services Contracts are operated via 99 separate contracts.

Procuring bus services in Melbourne has been a mixture of negotiations with incumbent operators and competitive tenders of new service routes. Outside of the MBF and its predecessors, the metropolitan bus industry has not been through a complete and transparent competitive process.

The Metropolitan bus operators are responsible for managing bus fleet and ancillary assets they own to deliver their services. Their service agreements impose minimum maintenance standards to ensure the buses are fit for purpose and safe for passengers. Assets such as roads are maintained by either the VicRoads, Municipal Council or other government agencies.

Regulation

Metropolitan

All 28 metropolitan contracts are constructed in accordance with the Transport Integration Act 2010 and the Bus Services Act 1995.

The current contract between PTV and MMBF is a performance-based contract, where financial incentives and penalties are linked to key performance targets, designed to improve services and patronage performance (Victorian Auditor-General, 2015) expiring 2023.

The other 27 contracts under the MSBC are subject to a fee-for-service model and lack performance incentives and penalties. These contracts expire in 2018.

Bus safety legislation applies to certain operators of bus services throughout Victoria and is administered through a system of accreditation and registration under the Bus Safety Act 2009 and Bus Safety Regulations 2010.

Regional

The Regional Coaches and Buses (including V/Line) all operate on the same premise as the Metropolitan Bus Network with the contracts constructed in accordance with the Transport Integration Act 2010 and the Bus Services Act 1995.

SkyBus

SkyBus is a private operator who is contracted by PTV however their contract is separate to the other bus contracts as it is not part of the Myki system or receiving any government subsidies. Although the contract is different, it still imposes minimum service obligations and standards.

Pricing

Metropolitan and Regional Buses

The State sets all public transport fares for buses in accordance with its metropolitan and regional fare policies.
The Victorian taxi industry is segmented into four areas: metro, urban, regional and country. Each has their own fare scheme and licence cost. In 2012 approximately 27 million taxi trips were taken in the Melbourne metropolitan zone and around 32-35 million state-wide (Fels, Allan 2012). The majority of taxi licences are held in the metropolitan region. In 2015 the Taxi Service Commission (TSC) reported a 1.1 per cent increase in trips taken.

In 2014 major industry reform took place in response to the Taxi Industry Inquiry 2012. Recommendations consisted of an increase in fare box earnings for drivers, licensing reform (unlimited number of licences available for issue) and knowledge test requirements.

The reform aimed to increase access to the taxi industry, lowering entry barriers for operators and targeting customer satisfaction through driver competency and vehicle safety.

The has seen a significant increase in issued licences rising 11.73 per cent in the year 2014–2015 (TSC 2014). Compared to the other states, Victorian taxi capabilities are under utilised with a significantly lower passenger per licenced taxi rate.

The emergence of ride sharing services such as Uber X in 2014 provide passengers with a lower cost alternative. Uber is a private American company that promotes ride sharing as a more convenient and low cost option for people. The model is based around drivers who sign up (meeting the standard requirements) and offer their own vehicle and services to people in a specific area. This model removes the cost of licence that taxi operators must pay, and transfer the cost savings to the customer. Currently Uber is only regulated in the ACT.

Uber was legalised in NSW in December 2015 with taxi plate holders to receive cash payments in compensation. WA has also indicated that Uber is to become legal.

In Victoria the taxi licence plate value has reportedly fallen from $500,000 in 2010 to $290,000 in September 2015 (Financial Review, 2015). This is likely to be attributed to the operations of Uber alongside reforms around the number of available licences.

There are several ridesharing platforms available in Australia, including Shareurride, Catchalift, Coseats and Hitch-A-Ride. These apps lack the same amount of users, scale or low cost as the Uber platform. Major international ridesharing platform Lyft has expressed interest in launching in Australia and this will provide additional competition against Uber. Car sharing platforms such as GreenShareCar and Flexicar also exist, alongside peer-to-peer car sharing businesses such as DriveMyCar.

Source: Australian Taxi Industry Association (2014)
4/5. Planning, regulatory and pricing schemes

Cycling and walking

A series of bicycle networks, consisting of a range of existing and proposed bicycle routes, have been defined throughout Melbourne and regional Victoria to guide the planning, prioritisation and implementation of bicycle facilities.

Components of the bicycle networks include:

1. **Principle Bicycle Network (PBN)**

   All proposed bicycle projects are eligible for funding consideration as part of the VicRoads Bicycle Facilities Program; however, Bicycle Priority Routes (BPRs) are considered a higher priority for investment than other PBN routes.

2. **Metropolitan Trail Network (MTN)**

   The MTN provides recreational bicycle and walking paths in metropolitan Melbourne, usually running beside rivers and creeks. Most of the network is made up of off-road shared paths. The provision and maintenance of the MTN lies with a range of land managers.

   Footpath provision is generally associated with road delivery and is the responsibility of either VicRoads or the local government to provide and maintain footpaths where they are deemed to be required.

**Planning**

Planning of bicycle networks in Victoria is driven by both national and State strategies:

- **The National Cycling Strategy 2011-16**, coordinated by the Australian Bicycle Council, provides a broad framework for all States to promote use of bicycle networks
- **The Cycling into the Future 2013-2023** is the Victorian Government strategy to increase accessibility and safety of bicycle networks in Victoria.

   Strategic Cycling Corridors (SCCs) are a recent addition to bicycle network planning in metropolitan Melbourne. A subset of the Principle Bike Network (PBN), they are corridors developed to improve cycling to and around major activity centres in Melbourne. The SCCs will be prioritised on the basis of those corridors that achieve greatest benefits to cyclists and the whole community in order to identifying potential priorities for funding in the form of a targeted investment plan (VicRoads, 2015).

   Footpath planning is tied to the Metropolitan Planning Strategy and local council planning strategies. The Victoria Walks (www.victoriawalks.org.au) organisation has created a Plan for a Walkable Melbourne document aiming to turn Melbourne into a walking city and influence future planning.

**Regulation**

In terms of design standards, all bicycle facilities must be designed and delivered in accordance with the relevant national standards and guidelines. These standards and guidelines are outlined in relevant Australian Standards, Austroads guides and VicRoads’ Cycle Notes.

Similarly footpaths are constructed to the relevant Australian Standards and design codes and requirements as set by the local jurisdiction.

**Pricing**

Commuter cycling infrastructure is generally accessed free of charge in terms of access to routes and pavements. Costs do exist in the use of off road cycling infrastructure such as the Parkiteer bike parking facilities and privately operated amenities.

The main government influence surround pricing of cycling infrastructure and use is through the Melbourne Bike Share scheme which provides subsidised use of the infrastructure to promote uptake and use of the facilities.

Footpaths are generally available and accessible free of charge to the public.
Infrastructure condition
6. Operating expenditure

Roads

Road expenditure is directly related to the size of network that is required to be maintained within each state. The funding for the sector is broken into four key funding streams which are:

- **State General** – Annual allowance from state government for the maintenance and operations of the road network
- **Federal Recurring** – Annual funding from the federal government for the maintenance and operation of the road network.
- **Local Recurring** – local road provision and maintenance funded by local governments
- **Program & Project Specific** – funding allocated on a once off project and/or program of works.

**Maintenance Spend**

- **Pavement Management**: On-going maintenance costs for inspecting roads and managing hazards, replacing road surfaces and pavements, and line marking. Approximately $150 million of the program specific funding has been committed by the State government for road surface replacement and road pavement replacement activities. The Federal funding is for use on the National Land Transport Network (VicRoads, 2015).
- **Electrical/Intelligent Transport Systems**: Management of traffic lights, street lights, and freeway management and access control systems.
- **Structure Management**: Management of bridges, major culverts, retaining walls and noise barriers, and bridge strengthening.
- **Roadside Management**: Managing roadside vegetation, removing graffiti, managing landslides and rock falls and removing litter.

- **Other Activities**: includes activities that are indirectly related to asset management such as the management of the contractual arrangements for CityLink, EastLink and Peninsula Link, the management of properties held for future road projects, and monitoring and reporting on asset condition.

**Operating Spend**

- **Pavement Management**: funding which allows VicRoads to undertake monitoring of the network for the provision of advice relating to road hazards, maintenance issues and traffic and road safety issues.
- **Heavy Vehicle and Tow Truck Operations**: facilitating productivity and efficiency of heavy vehicle and tow truck operations. Includes the regulation of the accident towing industry and the processing and prosecution of breaches of road transport laws detected by VicRoads.
- **Road Network Operations**: effective and efficient operation of the road network. Activities include:
  - Operation and maintenance of the VicRoads Traffic Management Centre to ensure smooth and effective operation of the network
  - Incident management service to minimise traffic delays and minimise the impact of traffic disruptions on the freeway and arterial road network associated with unplanned traffic incidents
  - Planned events management and management of works affecting roads
  - Proactive and responsive adjustments to traffic signals
  - Provision of traveller information across the network
  - Supporting VicPol in traffic management and route planning during major emergencies such as bush fires and floods.

**VicRoads Asset Management Expenditure**

($ millions)

<table>
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<th>Year</th>
<th>Pavement</th>
<th>Structures</th>
<th>Electrical/Intelligent Transport Systems</th>
<th>Roadside</th>
<th>Other</th>
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<td>2015-16</td>
<td>250</td>
<td>100</td>
<td>50</td>
<td>150</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: VicRoads, 2015
6. Operating expenditure

Rail (Heavy and Tram Network)

PTV Operational Expenditure

PTV's largest operational expenditure item is ‘Payments to service providers and transport agencies’. This includes transactions such as grants, subsidies and other transfer payments to operators and franchisees. These payments decreased by 2 per cent from 2012 to 2015, compared to Total Revenue over the same period which increased by 1.3 per cent (Total Revenue includes Receipts from Government and Operators). Supply and Services expenditure has increased by 24.8 per cent over the period with ‘Employee’ expenditure remaining relatively constant.

Source: PTV Annual Report

V/Line Operational Expenditure

As an operator on the heavy rail network, V/line’s largest expenditure items are labour and fleet maintenance which represents approximately 70 per cent of operating expenditure. Over the period, Road Coach and Contract expenditure increased by 46 per cent due to the management of V/line branded coaches transferring from PTV to V/line effective 1 January 2014.

Source: V/Line Annual Reports, 2013-2015

VicTrack Operational Expenditure

VicTrack's largest operating expenditure item is its capital asset charge; however, this is offset by the Capital Asset Charge revenue it receives. Other operating expenditure items incurred include employees, construction and telecommunication which is reflective of its role as the landlord of the rail network.

Source: VicTrack Annual Report

Track Maintenance

Track maintenance is categorised as follows:

- **Routine Maintenance (RM):** Inspections and repairs at generally less than 12 month intervals. It consists of track inspections and vegetation management with some emergency maintenance (failed sleepers and rails), but does not directly contribute to underlying long-term service level maintenance.

- **Major Periodic Maintenance (MPM):** This consists of works to preserve the current condition of the asset and contain the need for RM, generally at greater than 12 month intervals. MPM addresses longer term asset performance and will typically involve major works such as the replacement of typically one in five sleepers along a rail line. MPM also includes maintenance of other major assets such as formation and ballast, bridges and other structures and signalling.

Source: Targeted rail Network business case

Source: PTV Annual Reports, 2013-2015

Source: VicTrack Annual Reports 2013-2015

Source: V/Line Annual Reports, 2013-2015
6. Operating expenditure

Airports – Overview and International Gateway

Overview

Maintenance costs between all major airports have increased at a steady rate however vary between airports based upon scale of operation. Passenger per aircraft landed which indicates plane capacity identified Melbourne Airport better per flight optimisation compared to Sydney. Sydney Airport is able to generate more dollars per passenger than Melbourne with the average Sydney passenger spending $28.32 compared to a Melbourne passenger spending $21.11. This indicates there is room for revenue growth within Melbourne Airport.

The Melbourne Airport terminal expansion is a direct response to an increase in capacity and constraining infrastructure. This can be compared to Sydney’s passenger growth at 8.1 per cent and aircraft movement growth at 6 per cent resulting in a significantly lower amount of capital expenditure in the year 2014 - 2015.

Melbourne Airport

Melbourne Airport at Tullamarine has seen significant growth since 2010, with a 19.5 per cent increase in passenger numbers and a 14.8 per cent increase in aircraft movements. It is anticipated that demand for aircraft maintenance facilities will increase in line with forecast growth in domestic and international traffic.

The maintenance, repair and overhaul of medium and long-haul aircraft typically takes place in Southeast Asia, although these aircraft undergo routine maintenance inspections prior to departing Melbourne Airport. Melbourne Airport accommodates aircraft maintenance service providers that offer a comprehensive engineering and maintenance service to airline operators. The provision of this service is reflected in the high service utility expense below.

Avalon Airport

Avalon Airport commenced commercial operations in 2004. Since 2010, Avalon Airport has repositioned itself away from being a low-cost driven airport, and more towards a convenience and value driven model. As Avalon Airport is privately owned, no operational expenditure is publicly available.
6. Operating expenditure
Airports – Metropolitan and Regional

Metropolitan airports
Essendon Airport is privately owned and there is no publically available information on operational expenditure. More than 50,000 annual aircraft movements are undertaken each year by international and domestic aircraft, air freight, aircraft charter and emergency service providers.

Moorabbin Airport tranships around 4,000 tonnes of air freight annually. It also supports a limited number of flights from and to King Island. There are approximately 350,000 movements in total per year. The Moorabbin Airport Master Plan 2010 does not provide any data on operating expenditure. The Draft 2015 Master Plan has not yet been released.

Regional airports
Mildura Airport is owned by Mildura City Council and operated by Mildura Airport Pty Ltd. It provides regular transport services to Melbourne, Adelaide and Sydney for the Sunraysia region. In FY15, it made a net profit of $609,279 which was a decrease of 45 per cent from the previous year. This is attributable to the state grant which was not provided in FY15, screening staff brought ‘in-house’ and increases in other expenditure items.

Warrnambool Airport is owned and operated by the Warrnambool City Council. Its 16 hangars accommodate both commercial and recreational aircraft. No landing or aircraft parking fees currently apply and the airport averages about 40 aircraft movements daily. In 2014-15, Council’s budgeted expenditure was $0.211 million. In the 2015-16 budget this has increased to $0.264 million (Warrnambool City Council Budget 2015 – 2016).

Portland Airport is owned and operated by Glenelg Shire Council. Total expenditure in the 2013-14 budget was $457,400 and this rose to $508,000 in the 2015-16 budget. It has consistently operated at a loss. The 2009-2013 Portland Airport Master Plan stated that it was serviced by a daily freight plane from Essendon Airport. At the time there were approximately 4 movements per hour, leaving capacity available for additional activity. Most of this movement is generated from the Portland Aero club or visiting aircraft. Three routes originated from Portland (to Hamilton, to Avalon and via Hamilton to Essendon) and low passenger numbers were considered a concern.

It is estimated that as many as 50 per cent of regional airports throughout Australia are operating at a loss (IQPC Regional Airport Development, 2016).
6. Operating expenditure

Ports

Port of Melbourne

In the 2014-15 Annual Report, the Port of Melbourne’s net assets amount to $3.4 billion, an increase of $1.7 billion on the previous year. Asset maintenance expenditure totalled $19.982 million during this period.

The balance sheet comprised:

- Cash assets of $39.6 million consisting of cash on hand and term deposits. Deposits earned a weighted average interest rate of 1.9 per cent at 30 June 2015.
- Infrastructure, property, plant and equipment assets of $4.1 billion including channels, port land, buildings and infrastructure assets. Primarily as a result of the 2014-15 scheduled asset revaluation these assets have increased in value by $1.6 billion compared to 2013-14 as a result of new information influencing the value of these port assets. The key movements were in land ($0.9 billion) and channels ($0.3 billion).

Regional channels

The Victorian Regional Channels Authority have assets including channels, navigation aids, offices and vehicles. Current assets are valued at approximately $12 million and non-current assets are valued at $43 million. Operating expenditure increased from $4.7 million in FY13 to $7.4m in FY14. This is mainly attributable to fund one off items such as Port of Geelong special projects.

Port of Hastings

The Port of Hastings Development Authority (PoHDA) owns around 13 hectares of land at Crib Point, Long Island Point and Stony Point. Some of this is required for access to existing facilities, and the land at Stony Point also accommodates administration and maintenance buildings as well as associated storage and parking areas:

- Long Island Point: PoHDA controls 6.2 hectares of property that provides access by parties other than Esso to the Long Island Point Jetty.
- Crib Point: PoHDA controls 4.8 hectares of property adjacent to the Crib Point jetty.
- Stony Point: PoHDA controls 1.9 hectares of property at Stony Point that contains the administration building, maintenance workshop and parking lot. It further controls a water lot covering 0.8 ha below the existing pier.

The Port of Hastings total assets increased by $23.83 million in 2014/15 to $40.94 million following the purchase of hydrodynamic equipment during the year and the revaluation of property, plant and equipment in line with the Victorian Government’s scheduled revaluation of fixed assets as at 30 June 2015.

Expenditure at the Port of Hastings has markedly increased as a result of the Port of Hastings Development Project which caused increased spending on employees and projects. The Development Project was later cancelled by the State Government.
7. Condition of the infrastructure in the sector
Methodology and overall view of the sector

Methodology
Condition assessment ratings have been determined through assessing the following criteria:

- **Physical Condition** – considers the general condition of assets in the network, likely life remaining in the assets and required investment to maintain full functionality
- **Fit for purpose** – considers whether the infrastructure meets the required service needs of the network, measuring against industry best practices.

The assessment includes consideration of network improvements currently being planned and implemented.

Ratings were assigned to sub-sectors from 1 to 5 where:

- 1 is poor condition that is insufficient to meet current demands and use requirements
- 5 is superior condition that is sufficient to be suitable for future demands and use requirements for the following 30 years.

The assessment of the condition of the assets within the Transport sector has been influenced and limited by the information we have received from the relevant agencies and departments in conjunction with any publicly available resources and should be read within this context.

The sector score is the average of all sub-sectors.

Overall Transport Condition Rating
The aggregated rating of the transport sector is considered to be about 3.5, indicating the condition of the sector is in good condition with sub-sectors generally providing the service for which they are designed. However, in addition to projects currently being planned and implemented, further investment to maintain condition for the next 30 years is needed.

This rating is based on the existing assets as well as currently planning and implemented projects and allows for sufficient capacity to meet the demands of the mid term. Similarly the physical nature of the assets are in a stable condition but can expect to degrade over time if renewal works are neglected. The condition of the current transport network in Victoria generally meets user needs and the majority of community expectations with some localised issues requiring investment for improvement. Population growth and changing technologies mean that although the condition of Victoria’s transport infrastructure is currently good, vigilance in forecasting, planning for the future and further growth investment will be required for the transport network as a whole to maintain this rating going forward.

Further commentary and justification is provided on the following slides.
# 7. Condition of the infrastructure in the sector

## Urban Freeways

### Road condition
- The condition of freeways is good due to the criticality of the assets and daily maintenance regimes undertaken in accordance with VicRoads maintenance plans.
- Privately owned freeways are often in better condition due to prescriptive performance standards.
- Some urban freeways are unable to accommodate High Productivity Freight Vehicles at critical locations, which has the impact of constraining freight movements.

### ICT
- Significant investment has been made into improving investment on ICT infrastructure on urban freeways including travel time information signs, variable speed limits, ramp metering and speed detection systems.
- On-going installation of ICT infrastructure enables good availability of information on roads and through web-based applications. Coverage is good but not extensive.
- Future requirements of the ICT network to cater for future technologies such as driverless vehicles is unknown.

## Urban Arterials

### Road condition
- No information on the condition of urban arterials has been received but it is considered to vary greatly.
- Urban arterials associated with the Principal Freight Network and generally in outer urban areas, are performing well and provide high reliability to drivers.
- Performance of arterial roads that carry tram or bus services, and particularly those in inner urban areas, have reduced reliability.
- Level crossing removal projects will improve reliability and safety performance of affected urban arterial roads.

### ICT and traffic signals
- Melbourne’s road network is well furnished with ICT and traffic signals. On-going installation of new ICT infrastructure enables good availability of information on roads and through web-based applications. Coverage is currently limited generally to around freeway interchanges and a few critical bottlenecks.
- Traffic signals are ubiquitous on the road network and are continually optimised. Outages are rare.

## Rural and Regional Arterials and Highways

### Road condition
- There is limited information on the general condition of rural and regional arterials, but VicRoads Customer Needs Survey shows that people are less satisfied with the condition and performance of these roads compared to the State average.
- Many roads will not cater for high performance freight vehicles because of not being wide enough or bridge structures not being strong enough. The Government has committed funds to strengthening bridges but on-going works will be required.
- Some non-urban declared roads are managed by local councils, particularly in large rural shires, who are experiencing significant challenges in maintaining their road asset base due to budget constraints and resources.

### ICT
- Significant investment has been made into improving investment on ICT infrastructure on urban freeways including travel time information signs, variable speed limits, ramp metering and speed detection systems.
- On-going installation of new ICT infrastructure enables good availability of information on roads and through web-based applications. Coverage is currently limited.
- The requirement of the ICT network to cater for future technologies such as driverless vehicles is uncertain.

## Cycle and Walking Paths

### Network integrity
- The Principal Bicycle Network (PBN) has been developing since 1994 and includes key upgrades such as separate bicycle lanes on inner city streets including Latrobe Street, Melbourne and Albert Road, East Melbourne. New bicycle paths along urban freeways, creeks and rivers also provides an important network backbone.
- There are many points throughout the road network where cyclists are at risk of collision with vehicles including cars, buses, trucks and pedestrians. Continued focus on the integrity and completion of the network will need to be on-going.
- Line-marking at intersections, green pavements and dedicate traffic signals for cyclists increase safety and efficiency of roads catering for multiple modes.
- Footpath condition and quality is heavily dependent on the location and use. High traffic inner urban areas are generally in good condition and well maintained.
- Outer suburban and regional footpaths in non urban areas are generally not as well maintained, though this is heavily influenced by their lower usage levels.
7. Condition of the infrastructure in the sector

**Metropolitan Rail (PTV, 2015)**

**Stations**
- Station upgrades will be required to cater for longer (nine car) trains when these are required to cater for additional capacity (flagged on the future Sunbury-Dandenong corridor).
- Upgrades are required to make stations accessible for people with disabilities.

**Power and signalling**
- Traction power constrains the ability to roll out certain fleet types on some routes.
- The age of signalling infrastructure across the network means there is a higher risk of failure at certain locations. Signalling methods used (colour light block signalling) is less efficient than more modern methods that enable the operation of higher train densities and better recovery from delay.

**Fleet**
- Age of the Comeng fleet is approaching their nominal "life expiry" dates.

**Regional Rail (PTV, 2015)**

- Active protection is generally not provided beyond Regional Fast Rail routes
- Future upgrade of the fleet will likely trigger the need to upgrade level crossings.

**Depots and stabling**
- The current model of co-locating maintenance (depot) and parking (stabling) in a single facility may lead to inefficient operational outcomes in some cases.
- Yarra Trams tries to minimise the number of routes which are served by multiple depots, which represents a risk to the ability to run services if things go wrong.

**Fleet**
- A number of fleet types are approaching their nominal "life expiry" date.

**Power**
- Constrains the ability to roll out certain fleet types on some routes
- Equipping future rolling stock with more efficient equipment (e.g. regenerative breaking) may mitigate some impacts.

**Accessibility**
- Current alignment of low floor fleet and level access stops reduces the accessibility for passengers with disabilities or special needs passengers. Significant investigation is required to increase coverage of accessible tram stop.

**Tracks**
- Single line sections impact on operational performance, though compared to the metro network, regional single lines are less of a capacity constraint (due to lower levels of demand). However, some exception include:
  - Melton/Bacchus Marsh where high future demand may require track duplication
  - Bendigo to Kyneton where single line limits capacity and there is projected growth
  - Geelong to Waurn Ponds where single line limits capacity and future growth.
- Recent Regional Fast Rail upgrades mean majority of the tracks are good quality. However there are issues on some other lines including defects on Echuca line, which restricts tonnage and track speed on some corridors on the freight network.

**Signalling**
- While not considered unsafe, there are potential safety benefits associated with upgrading signalling systems on some lines
- Unsignalised sections on the network where Train Order Working is still in place
- Signalling on the Seymour line is outdated (double line block System)
- Current signalling in Bendigo restricts how Bendigo Metro can operate
- Signalling and available capacity limit frequency on the freight network.

**Fleet**
- Ongoing need to replace life expired fleet
- Rolling-stock faults due to the ageing fleet increasingly cause service disruptions
- Seating layout of new trains will need to consider different requirements of regional passengers (short haul and long haul fleet types).
### 7. Condition of the infrastructure in the sector

#### Airports

**International Gateway Airports**
- Melbourne Airport is an international gateway airport. It is privately owned and operated and is influenced by market conditions and expectations in the supply of infrastructure. There is continued growth in the use of the facilities which has necessitated renewal and maintenance investment.
- Consideration of landside infrastructure shows a key constraint being accessibility of the airport by ground transportation. In line with the masterplan, Melbourne Airport recently opened its Terminal 4 with new parking facilities accessed by a new road from the Tullamarine Freeway or the (also new) Airport Drive. Additional initiatives to increase capacity, improve efficiency and reduce demand have been identified.
- Although the masterplan identified congestion on external roads and lack of rail link as an issue, these were not considered in this condition assessment.
- Based on Melbourne Airport plans to significantly upgrade the airport in the coming years, the condition of Melbourne Airport was considered to be very good.

**Avalon Airport**
- Avalon Airport has capacity for growth in aircraft type and number of services. It also has land available for additional runways if required in the future.

**Moorabbin Airport**
- Moorabbin Airport at times can be one of Australia’s busiest airports. It is not expected to require significant capacity upgrade. Operating systems are generally in good condition and considered fit for purpose.

**Essendon Airport**
- Essendon Airport predominantly services corporate and cargo services, medical and emergency services and charter services. Essendon Airport has sufficient airspace capacity to meet foreseeable future demands and is in good condition.
- It is generally considered that the condition of these facilities is of a good standard. In recent years there has been continued landside development at these facilities changing the land use proposition.

**Regional Airports**
- Major regional airports include Mildura, Warrnambool and Portland. Currently over 80 per cent of passenger movements are at Mildura Airport.
- Analysis by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) shows that since 1984, the number of regional airports in Victoria as well as the number of airlines servicing the State has declined while passengers movements have increased significantly, indicating increased concentration of the industry. At existing airports it is considered that regional airport infrastructure currently meets demand and is fit for their purpose. However, one area of concern is the ongoing viability of smaller regional airports which restraints investment in maintaining or constructing new assets.

### Ports

**Port of Melbourne**
- The Port of Melbourne is Australia’s busiest container port and is large by international standards. It is considered to cater sufficiently for current international shipping requirements and be internationally competitive.
- Recent upgrades at Webb Dock have provided state of the art car freight facilities that will provide long term benefit as the manufacturing industry in Victoria declines.
- Asset management is undertaken by Port of Melbourne Corporation in accordance with good asset management strategy. It is considered that the physical condition of the assets is good.
- The government is currently investigating the option to privatise the Port of Melbourne assets through offering a long term 50 year lease. Should the government succeed in leasing the port the condition of the assets will become the responsibility of the private operator based on contractual conditions.

**Port of Portland**
- The Port of Portland predominately handles forestry and mineral sands product for export.

**Port of Melbourne**
- The Port of Geelong caters for crude oil, petroleum products, grain, fertiliser and dangerous goods. The current infrastructure consists of a mix of new (90s) and old (early 1900s) which is maintained to service current demand.
- The condition of the existing assets are the responsibility of the private owner and operator.

**Port of Hastings**
- The Port of Hastings caters for bulk materials trade including oil, liquid petroleum gas (LPG) and petroleum products and currently services around 60 -100 vessels each year sized up to 100,000 tonnes.
- The Stony Point jetty is also used by the Royal Australian Navy and passenger ferry services.
- The Port’s three separate facilities were constructed in the 1970s and are considered to be in reasonable condition and fit for their current purposes.

**Port of Portland**
- The Port of Portland predominately handles forestry and mineral sands product for export. It is considered to be currently fit for purpose having adequate capacity for current needs.

**Station Pier Passenger Services**
- As well as handling the bulk of freight movements within Victoria, the Port has a passenger terminal for large passenger cruise vessels and the Tasmanian sea ferry providing a vital link to the mainland. This is considered to be in good condition, adequately sized and suitable to meet shipping and passenger needs.
8/9. Maintenance standards, deficits and asset renewal

Rocks

The availability of information and data to gain an appropriate understanding of maintenance undertaken within each of the Transport subsectors has been limited. Existing maintenance deficits and the effort required for their renewal is not readily available which has affected our ability to get a clear picture of the status of the networks as of today.

The responsibility for the maintenance of the road network in Victoria sits with the owner/operator be it private roads, VicRoads or municipal roads. The model of delivery for road maintenance varies depending on the managing body.

VicRoads currently uses a range of metrics to determine the effectiveness of road maintenance expenditure and its prioritisation. The metrics are showing that the rate of pavement deterioration across the road network is increasing and that therefore the condition of roads is getting worse. These metrics are supported by customer service feedback showing that people in regional cities and towns and in rural Victoria are very dissatisfied with the condition of the roads in their communities.

VicRoads (and municipal council road) maintenance historically has utilised annual audit, review and performance information as the basis of prioritising the deployment of road maintenance funding across the network. The process also identifies areas where the road use can be changed or modified to better suit its use (e.g. for heavy vehicles) and is undertaken by a combination of in house and outsourced providers (VicRoads Road Maintenance Plan, April 2014).

There are three key categories of maintenance:

- Routine Maintenance – e.g. hazard identification, management and repair
- Periodic Maintenance – e.g. replacing road surfaces
- Rehabilitation – e.g. reconstruction of roads.

Private roads maintenance is focused more on an outcome delivered approach delivered under performance specified contracts with the managing road owner required to meet their contractual requirements and the life of the assets under the concession agreements.

Although roads are designed for a theoretical life of around 25 years, roads that have been appropriately maintained with routine and periodic works will generally last around 60 to 70 years before they need be reconstructed.

<table>
<thead>
<tr>
<th>Maintenance Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-House</td>
<td>The traditional road maintenance model, employed almost universally until the 1980s. Under these arrangements, each state’s road agency retains complete control over decisions relating to the management of the road network and bears all risks associated with those decisions. Capability to perform road maintenance procedures is limited to the road agency with no incentive for the private sector to develop the capabilities to perform these duties – further increasing the risk on the existing road agency.</td>
</tr>
<tr>
<td>Schedule of Rates</td>
<td>A simple and low-risk entry point to road maintenance outsourcing. The road agency retains control over decision-making, budgets and prioritisation of work, essentially leaving the service provider with a schedule of projects and only bearing the risk on quality control. This model has been widely used across Australia with most state agencies and many local governments employing this procurement model for at least part of their road network.</td>
</tr>
<tr>
<td>Performance Specified Contracts</td>
<td>The service provider plans, programs, designs and delivers work output in order to achieve contractually specified performance outcomes. These outcomes may include certain network management functions such as incident response and information management as well as asset management and maintenance. The shift from activity prescription to performance standards brings a shift in risk ownership to the service provider as well as a loss of control for the road agency.</td>
</tr>
<tr>
<td>Alliance</td>
<td>A very recent trend in maintenance outsourcing, the Alliance model seeks to more evenly share the risks and control between the road agency and one or more service providers. It requires a greater degree of integration between the road agency and service providers and a more complex payment schedule that reflects the risk and control-sharing nature of the relationship.</td>
</tr>
</tbody>
</table>
8/9. Maintenance standards, deficits and asset renewal

Roads

Municipal Roads as well as VicRoads’ B and C roads in regional Victoria are facing the following three main problems (VAGO 2007, still relevant today):

- Maintaining road quality in the face of greater freight volumes. Many municipal roads were not designed for large loads and the amount of tonnage they currently carry, nor do local governments have the ability to fund their maintenance.

- Developing roads that provide acceptable access without encouraging excessive traffic and speed, while providing road access for larger vehicles such as garbage trucks and fire trucks.

- Maintaining bridges. Local governments have responsibility for a large number of timber bridges that are deteriorating. For example, in the Gippsland region there are approximately 599 bridges maintained by local government. Of these bridges, 75 per cent of the total bridge deck area is timber. Timber deck bridges cost approximately double the amount required by concrete bridges to maintain per annum. Maintaining these bridges is very costly for local governments.

Addressing these problems requires greater visibility of asset quality across all local governments, and increased funding.

Key heavy vehicle routes experience higher levels of damage and subsequent maintenance expenditure requirements. Through increased direct heavy vehicle road use charging further revenue can be raised to cover the levels of increased maintenance required on these roads.

In the 15/16 budget a total of $503.5 million (VicRoads, 2015) of funding has been directly committed to the maintenance and asset management of the public owned road network. This consists of pavement management, electrical and intelligent transport systems, structure management, roadside management and other activities.

Shared Paths/Cycling

Shared path and cycling infrastructure which is managed by VicRoads and the municipal councils generally does not have planned programmed maintenance as a priority with the assets commonly maintained through reactionary maintenance to identified issues.

Community expectations in this area have and are changing over time for improved levels of infrastructure requiring a continued focus on planned and preventative maintenance (PPM) over the expected life of the assets. To meet these expectations funding and management of the network will need to improve.

The maintenance responsibilities for on-road bicycle lanes, off-road paths and improvement projects is governed by the Road Management Act (2004) (RMA). Under the RMA, VicRoads is generally responsible for the maintenance of on-road bicycle lanes on arterial roads and off-road paths within freeway reservations (i.e. between the freeway carriageways and the noise walls).

Local Councils are responsible for the maintenance of on-road bicycle lanes on local roads and off-road paths on land that the local Council is responsible for. This includes off-road paths provided between the building line and the back of the kerb on all roads, including arterial roads. It may also include off-road paths along freeways that are not within the freeway reservation.

Parks Victoria and other land owners are responsible for the maintenance of bicycle facilities on land that they are responsible for (VicRoads, 2015).

Heavy Rail

The responsibility for maintenance of the metropolitan heavy rail network is the domain of the franchise operator. A level of maintenance and renewal funding is provided within the contractual agreement with the government which is managed by PTV. Maintenance is generally delivered through an outcome based model with the franchise operators responsible in determining the prioritisation of this funding and allocation to projects. In recent years there has been a large increase in the funding supplied to the franchise operator for maintenance and renewal works with the aim of improving reliability across the network and making up for long periods of under investment in maintenance and renewal works.

State Public Transport (PTV)
- Set maintenance and renewal objectives
- Monitor compliance and performance

Franchise agreement

Primary infrastructure lease

Passenger operations role (Rolling stock)

Infrastruture manager role (Infrastructure)

Reporting
- Key performance indicators
- Financial information
- Status of maintenance and renewal works

Plans
- Asset Management Plans
- Annual Works Plan

Sign-off, monitoring and review
- Maintenance and Review Group (plan and reporting)

Source: Adapted from Victoria Auditor General Office (2007)
8/9. Maintenance standards, deficits and asset renewal

Heavy Rail

Although dated, the 2007 VAGO report provides the greatest insight in to the maintenance of rail assets in Victoria. Since the publishing of this report there has been a change in the franchise operator and investment in maintenance and renewal has increased significantly.

Under the 1999 metropolitan lease, the infrastructure managers, National Express and Connex had to maintain the condition of the infrastructure to meet set targets.

Condition was measured by calculating an index through regular surveys, but this outcome-based approach did not work because its methodology was considered flawed (Department of Infrastructure 2003, Passenger Rail Franchising in Victoria – An Overview, Public).

In 2004, the State and Connex developed a new asset management regime as part of the public transport refranchising. Connex agreed to a five year, input-based regime to achieve the objectives the government had set for the whole-of-life maintenance and renewal of the infrastructure. To pay for the maintenance, renewal and operation of metropolitan rail services, Connex received a proportion of the fare revenue paid by passengers and a subsidy from the state. This model has continued today with the agreement with MTM.

Selected key findings from the VAGO report which are still relevant today with regard to maintenance and renewal works in Victoria’s rail infrastructure were as follows:

- Deficit was evident in parts of the signalling infrastructure which required improved maintenance and renewal
- Improved documentation of maintenance and renewal programs with appropriate KPI’s and long term prioritisation justification is needed.

(VAGO Maintaining Victoria’s Rail Infrastructure)

Where there once was large maintenance deficits identified in the regional heavy rail network a number of these have been alleviated through significant investment over the preceding 10 years. Areas of the network which are relatively underutilised and aged will still require significant works in the future to maintain service provision.

Tram Network

The maintenance standards and programs for the tram network follow the same outline as that for heavy rail with the franchise operator responsible for all maintenance works through an input based model of delivery. The prioritisation of works is the responsibility of the operator based around the need for them to meet the agreed service provisions in their contract.

From the information available there are no large identified maintenance deficits within the tram network. The current operator continues with planned renewal and maintenance works to sustain operation of the network.

Buses

Similarly maintenance within the bus network (fleet and depots) is the responsibility of the private owner/operators dictated by the contractual agreement with the government. There are prescriptive standards required under the bus contracts for operation and the supporting assets with regard to fleet age.

Ports

The Port of Melbourne is operated and managed by the wholly government owned statutory body the Port of Melbourne Corporation. The body is responsible for the management and provision of maintenance at the Port.

The Ports of Portland and Geelong are both privately operated ports and thus they are responsible for the maintenance of their assets to meet the required service provision.

The Port of Hastings has contracted out the operation of the port to Patrick-Asciano. Under this agreement Patrick is required to maintain the condition of the property and infrastructure assets within the Port of Hastings. The current management agreement expires in June 2017. Amendments to the PMA for the final period include additional commitments by Patrick to comprehensive asset maintenance (Port of Hastings annual report).

Airport

Tullamarine airport and the key secondary airports are all privately owned with responsibility of maintenance and renewal works falling to those owners. These assets are maintained around market based expectations and have been assessed as being in good condition with no major maintenance deficits identified.

In some cases regional airports do have ageing infrastructure which if not sustained will degrade relatively quickly. There is currently little funding available for any upgrade works with prioritisation very much based on usage of the facility, which in many regional areas is very low.
Infrastructure service performance
10/11. Infrastructure performance

The performance of transport infrastructure is increasingly being assessed on the outcomes generated by the transport network, such as, the impact on productivity, liveability and connectedness. The State Government is currently developing a Transport Service Outcomes Framework, which will take a whole of network approach rather than assessment of the individual component parts, as is the current practice. The key components of the Framework are outlined below.

Transport Service Outcomes Framework

The outcomes set out in the Transport Service Outcomes Framework identify the impact transport has on three broad themes, productivity, liveability and connectedness (see figure below). It is recognised that the degree of influence transport may have on these outcomes is variable and that they are also influenced by a range of other factors.

The Transport Service Outcomes Framework also identifies more specific objectives for the transport sector, which set out how the transport system will contribute to the outcomes identified. The framework is illustrated opposite.

The framework has been designed to describe performance of the transport system as a whole, rather than focus separately on different networks within the transport system. It aims to measure the performance of all modes of transport for both freight and passenger movements and across road, public transport and gateway networks.

Customer focus is a key component of the Framework as it will identify the outcomes and objectives that make a difference to transport system users and the broader community where it is impacted by the transport system. The outcomes and objectives set out in the framework will be supported by a series of indicators that are used to measure performance of the transport system against the objectives and ultimately the outcomes identified in the framework. These indicators are currently being developed, as such this report relies on mode based performance measures.

The approach has the ability to help define priority projects and those that are going to achieve the best outcomes for the transport network as a whole rather than the individual components.
10/11. Infrastructure performance

Road

VicRoads uses principles from its Benefit Management Framework to set key performance indicators (KPIs) to measure Road Performance. These include (but are not limited to): person throughput, traffic signal availability and traffic and incident management.

VicRoads’ Traffic Monitor provides observational information that measures efficiency across Melbourne’s freeway and arterial road network. It contains indicators including travel time measured in vehicle kilometres travelled (VKT), average travel speed and peak travel period duration. Indicators have been reported on an annual basis since 1994.

In 2014, daily demand graphs clearly show two distinct peaks during weekdays lasting around 2.5 hours in the morning, with the “wide peak” considered to be from 6.45am to 9:15am. In the afternoon, the “wide peak” is considered to be from 3pm to 6.15pm. There is also significant demand during business hours and on weekends in the middle of the day.

In metropolitan Melbourne over the last 10 years, population has increased by 20 per cent while travel on roads, measured as VKT. The increase has almost entirely been on freeways, while travel on arterial roads has remained steady. Furthermore, this impact has mostly affected outer metropolitan areas, while road travel in inner areas has remained fairly constant indicating that inner areas are more likely to be at saturation. As shown below, the comparative performance of inner and outer metro freeways as measured by average travel speeds shows that average speeds have noticeably declined on inner freeways, while they have remained steady on outer freeways.

Other key performance indicators for roads measured by VicRoads include travel time variability and delays on the network. Over the last 10 years, average delays on the monitored network measured in minutes per kilometre travelled, have increased through all time periods. In the AM and PM peaks, average delay increased by 25 per cent and 20 per cent respectively. During off peak hours, average delay increased by 30 per cent. However, travel time variability over the last decade has decreased during the AM peak while staying relatively stable during the afternoon peak and off-peak periods.

VicRoads’ observations shows an increase in modes of transport other than private vehicles within metropolitan Melbourne. Over the past decade, the use of bicycles on roads has approximately doubled and continues an upwards trend.

The VicRoads Traffic Monitor does not provide detailed analysis of the performance of regional roads. VicRoads’ Customer Needs Survey in 2015 showed that generally people in regional and rural areas are less satisfied with the condition of roads than the average Victorian.

Average travel speed in metropolitan freeways (VicRoads, 2015)

Traffic volumes by time of day
(VicRoads, 2015)

Growth in VKT against growth in population
(VicRoads, 2014)
10/11. Infrastructure performance

Road - continued

<table>
<thead>
<tr>
<th>Key Observation</th>
<th>Last 10 Years 2005-2014</th>
<th>2013-2014</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>VKT (total kilometres travelled by vehicles on Melbourne’s freeway and arterial road network)</td>
<td>Entire metro network Freeways Arterial Roads</td>
<td>Increased by 16% Increased by 50% Increased by 2% Increased by 2% Remained consistent</td>
<td></td>
</tr>
<tr>
<td>Average travel time / delay</td>
<td>Increased by around 1.4 minutes per 10 kilometres</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>Average travel speed</td>
<td>Decreased by around 4 kilometres per hour</td>
<td>Decreased by 0.4 kilometres per hour</td>
<td></td>
</tr>
<tr>
<td>Vehicle occupancy (average number of people per car)</td>
<td>Decreased from 1.23 to 1.20</td>
<td>Remained consistent</td>
<td></td>
</tr>
<tr>
<td>Bicycle traffic volume</td>
<td>Between 2006 and 2011, bicycle trips as a method of travel for work across inner and middle Melbourne have increased by more than 50%.</td>
<td>Not available</td>
<td></td>
</tr>
</tbody>
</table>

**Graph based on 2010 to 2014 Year to date data from VicRoads and represent averages at each of the measurement points on the PBN**

### Bicycle as method of travel to work, Inner Zone Councils

<table>
<thead>
<tr>
<th>Inner Zone Councils</th>
<th>2006</th>
<th>2011</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maribyrnong</td>
<td>585</td>
<td>972</td>
<td>66.15</td>
</tr>
<tr>
<td>Melbourne</td>
<td>1,092</td>
<td>1,863</td>
<td>70.6</td>
</tr>
<tr>
<td>Port Phillip</td>
<td>1,578</td>
<td>2,247</td>
<td>42.4</td>
</tr>
<tr>
<td>Yarra</td>
<td>2,443</td>
<td>3,651</td>
<td>49.45</td>
</tr>
<tr>
<td>Stonnington</td>
<td>865</td>
<td>1,213</td>
<td>40.23</td>
</tr>
<tr>
<td>Average</td>
<td>6,563</td>
<td>9,946</td>
<td>51</td>
</tr>
</tbody>
</table>

Source: Bicycle Network Victoria using data from ABS, VicRoads, Department of Transport
10/11. Infrastructure performance

Road Safety

Victoria currently compares well against national averages in safety performance on roads, albeit there is still room for improvement and particularly in the performance of safety on rural roads.

In 2015, Victoria’s road fatality count was 252, broken down as follows:
- By road user: 122 drivers, 57 passengers, 33 pedestrians, 30 motor cyclists, 10 cyclists
- By location: 115 in metropolitan Melbourne, 137 in rural Victoria.

Victoria’s road toll has reduced significantly in the last twenty-five years. In 1989, there were 776 fatalities on Victoria’s roads while in 2010 there were 288 fatalities and this has since remained relatively constant (BITRE, 2016). New South Wales and Victoria have seen similar dramatic declines with a more recent flattening while Queensland, Western Australia and South Australia have been more consistent.

Since 2010, rural road fatalities have been consistently higher than in metropolitan Melbourne (as shown in the figure above right). In 2015, there were 142 fatalities on rural roads, including some that were in the metro area, making these the worst performing road type in the state for safety. Currently, death rates are four times higher on rural roads compared with metropolitan roads and two-thirds of people who die on rural road are country residents.

In 2015, Victoria registered 4.24 fatalities per 100,000 people compared to 4.57 in New South Wales. It performs better per capita than the national average of 5.34, as shown in the graph below right. Further, with Victoria’s population growing while the road toll holds steady, the trend in fatality is improving. However, by combining metropolitan and rural statistics, this figure does not consider the condition of rural roads in terms of safety performance.
Towards Zero

As part of the extensive consultation for its Towards Zero initiative, the Government has stated that road trauma is unacceptable and has set targets to reduce road deaths to under 200 per year by 2020. VicRoads, the Transport Accident Commission, Department of Justice and Regulation and the Department of Health are working to eliminate road trauma to achieve a safe road system, free of deaths and serious injuries.

The key principles underpinning and driving this Safe System approach are that:
- People make mistakes
- People have a limited tolerance to injuries
- Safety is a shared responsibility.

Identified areas for improvement include safer vehicles, road and road side infrastructure, road user behaviour and lower speed limits.

Safe System Road Infrastructure Program

A key Victorian Government strategy to reduce the trauma rate, both on rural and metropolitan roads, is investment in safety upgrades as part of the Safe System Road Infrastructure Program (SSRIP) funded by the TAC and delivered by VicRoads. In early 2015, the State Government committed $24 million to make roads safer, funding 13 new projects across Melbourne and regional Victoria. Proposed upgrades include installing roundabouts, new road barriers, run-off road preventions, tactile ripple strips, wire-rope barriers and digital intersection safety cameras.

SSRIP investments in safety-focussed road upgrades made by VicRoads over the last decade have been analysed by the Monash University Accident Research Centre and found the effectiveness of this program to be significant. In 2014 alone, an estimated 115 lives were saved by the SSRIP program. This showed significant improvements including:
- An average 30 per cent reduction of casualty crashes
- A 35 per cent reduction of intersection crashes
- A 26 per cent reduction in run off road crashes.

Safety Vehicles

As part of the Towards Zero program, the TAC and VicRoads is involved in educating the community about buying safer vehicles, with a particular focus on supporting safe technologies such as airbags, and implementation of mandatory electronic stability control. More recent innovation supported and under investigation by the TAC and VicRoads include Auto Emergency Braking, driver fatigue sensing vehicles, intelligent breath testing that can assess driver blood alcohol limits of drivers vehicles by sensory reading through skin and seatbelt interlocks that prevent vehicles being driven if the driver is not belted. VicRoads trials of Speed Advisory alerting devices with repeat speeders show significant improvements in speed behaviour and promising safety outcomes.

Metropolitan Level Crossing Removals; Regional Level Crossing Improvements

The Government is also committed to removing 50 level crossings from the metropolitan road network. In addition, over 60 level crossings in regional Victoria have been improved with upgraded signalling and barriers. These projects significantly improve safety for pedestrians, vehicles and trains at these notorious conflict points in the network.
10/11. Infrastructure performance

Heavy rail - metropolitan

Passenger

There are several accepted measures of rail infrastructure performance. Some of these are prescriptive requirements, legally defined and enforced in the Franchise Agreements between State and rail operators. Other service delivery measures such as reliability and punctuality can be used to draw conclusions around the performance of the network as a whole, capturing impacts of both infrastructure and operational design.

<table>
<thead>
<tr>
<th>Element</th>
<th>How are performance targets set?</th>
<th>How is infrastructure performing?</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolling stock</td>
<td>The Franchisee is responsible for the maintenance of the rolling stock in accordance with the Technical Management Plan. The plan includes a number of KPIs relating to rolling stock availability and reliability.</td>
<td>The number of yearly incidents relating to rolling stock reported by the train operator has generally decreased over the ten years to 2015.</td>
<td>▲</td>
</tr>
<tr>
<td>Performance of track</td>
<td>There are no specific performance targets for track and signalling. However the Franchise Contracts include and Operational Performance Regime, which sets the operational performance targets. Track and signalling performance are therefore reflected in the punctuality and reliability targets.</td>
<td>The number of yearly incidents relating to infrastructure reported by the train operator has generally increased over the ten years to 2015.</td>
<td>■</td>
</tr>
<tr>
<td>Performance of signalling</td>
<td></td>
<td>The number of yearly incidents relating to operations reported by the train operator appears to be cyclical with an increase in 2015.</td>
<td>■</td>
</tr>
<tr>
<td>Operational Performance Regime</td>
<td>Performance thresholds relating to punctuality and reliability are defined at the commencement of the Franchise and are periodically reviewed. Operators can receive a financial incentive or fine depending on performance levels. These payments are capped at +/- $1 million per month.</td>
<td>Overall reliability and punctuality of metropolitan rail has improved significantly over the last decade. However, there has been a slight drop in reliability of metropolitan trains in recent years. It should be noted that these measures do not isolate performance of infrastructure, but indicate the performance of both structural and operational components of the network.</td>
<td>▲</td>
</tr>
</tbody>
</table>
10/11. Infrastructure performance
Heavy rail, tram network and bus - metropolitan

<table>
<thead>
<tr>
<th>How are performance targets set?</th>
<th>How is infrastructure performing?</th>
<th>Trend</th>
</tr>
</thead>
</table>
| **Load standards**               | A load standard is monitored by PTV through passenger counts. Where a breach of load standards occurs, the State may require the operator to implement changes to address the breach. | The May 2015 PTV load survey identified the following breaches for the month:  
  - Heavy Rail: 77 load breaches (AM Peak, an increase of 6 from the previous survey)  
  - Tram Network: 10 load breaches (overall, a decrease of 16 from the previous survey) |

**Customer Satisfaction**
PTV conducts surveys with a random sample of both users and non-users of public transport to measure whether the operators are providing the quality of service the community expects. Survey results are compiled into quarterly Customer Satisfaction Indexes allowing comparisons between the different modes, operators and aspects of service delivery.

In 2015, PTV developed Customer Experience Standards. These Standards will influence customer service outcomes by introducing monitoring and evaluation methods.

Customer satisfaction is demonstrating an upward trend for metropolitan rail and bus, with satisfaction exceeding 70 per cent on all modes in 2014-15, a new record. It is difficult to compare performance with other jurisdictions, as survey and scaling methodologies differ between States. In Melbourne the highest levels of dissatisfaction relate to Myki ticketing, travel experience and price.

### Metropolitan Services - Customer Satisfaction Survey

**Proportion of Satisfied Users of Metropolitan Services by Quarter**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Met, Tram, Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul-Sep '10</td>
<td>72</td>
</tr>
<tr>
<td>Oct-Dec '10</td>
<td>75</td>
</tr>
<tr>
<td>Jan-Mar '11</td>
<td>77</td>
</tr>
<tr>
<td>Apr-Jun '11</td>
<td>77</td>
</tr>
<tr>
<td>Jul-Sep '11</td>
<td>78</td>
</tr>
<tr>
<td>Oct-Dec '11</td>
<td>76</td>
</tr>
<tr>
<td>Jan-Mar '12</td>
<td>70</td>
</tr>
<tr>
<td>Apr-Jun '12</td>
<td>79</td>
</tr>
<tr>
<td>Jul-Sep '12</td>
<td>76</td>
</tr>
<tr>
<td>Oct-Dec '12</td>
<td>81</td>
</tr>
<tr>
<td>Jan-Mar '13</td>
<td>82</td>
</tr>
<tr>
<td>Apr-Jun '13</td>
<td>84</td>
</tr>
<tr>
<td>Jul-Sep '13</td>
<td>83</td>
</tr>
<tr>
<td>Oct-Dec '13</td>
<td>85</td>
</tr>
<tr>
<td>Jan-Mar '14</td>
<td>85</td>
</tr>
<tr>
<td>Apr-Jun '14</td>
<td>85</td>
</tr>
<tr>
<td>Jul-Sep '14</td>
<td>85</td>
</tr>
<tr>
<td>Oct-Dec '14</td>
<td>85</td>
</tr>
<tr>
<td>Jan-Mar '15</td>
<td>85</td>
</tr>
<tr>
<td>Apr-Jun '15</td>
<td>85</td>
</tr>
</tbody>
</table>

### Tram load Survey: 4 May to 2 June 2015

**Proportion of Services above and below maximum capacity**
For services observed in rolling hours where load was more than 90 per cent of capacity

- **Small Trams (Z & A Class):** 36.43% above maximum capacity
- **Big Trams (B, C & D Class):** 63.57% above maximum capacity

<table>
<thead>
<tr>
<th>Services above maximum capacity</th>
<th>Below maximum capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Trams (Z &amp; A Class)</td>
<td>68.12%</td>
</tr>
<tr>
<td>Big Trams (B, C &amp; D Class)</td>
<td>33.88%</td>
</tr>
</tbody>
</table>

Source: PTV Customer Satisfaction Monitor (July – September 2015)

Source: VICRoad's traffic monitoring report 2012-13


Trams which operate in a mixed land use traffic environment have a slower average travel speed than those that operate in separated tramways. The figure below shows that trams operate at the lowest average travel speeds in the Melbourne CBD followed by strip shopping environments. Trams achieve the highest travel speeds when in a ‘light rail’ environment, where they have full priority over traffic such as on a section of route 109 in Port Melbourne (VicRoads traffic monitoring report, 2013).
10/11. Infrastructure performance

Heavy rail - regional

Passenger

V/Line is a government-owned corporation responsible for operating regional rail and coach services in Victoria. Binding performance requirements for V/Line are outlined in the Services Agreement between V/Line and PTV. Where performance falls below specified levels, the Services Agreement contains provisions for PTV to implement a compulsory management plan to address performance shortfalls. Regional coach payments are made to V/Line, however regional train bonuses and penalties have ceased.

<table>
<thead>
<tr>
<th>How are performance targets set?</th>
<th>How is infrastructure performing?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rolling stock</strong></td>
<td>V/Line must submit a draft annual Rolling Stock Management Plan by 31 March each year, containing key policies for maintaining and planning rolling stock and KPIs measuring performance of rolling stock. Progress against this plan is reported to PTV monthly.</td>
</tr>
<tr>
<td>The number of train faults reported by PTV on a year by year basis have been similar over the last three years, but are substantially less than the number of faults reported in previous periods.</td>
<td></td>
</tr>
<tr>
<td><strong>Performance of track</strong></td>
<td>No information provided.</td>
</tr>
<tr>
<td>No information provided.</td>
<td>The number of incidents reported for infrastructure incidents including track faults has been similar over the last 6 years and performing reasonably.</td>
</tr>
<tr>
<td><strong>Performance of signalling</strong></td>
<td>No information provided.</td>
</tr>
<tr>
<td>No information provided.</td>
<td>The signalling system is mostly a three aspect colour light system and performs reasonably well. Remoteness makes maintenance and control difficult. If passenger numbers increase it is envisaged that significant investment would be required to cater for increased services.</td>
</tr>
<tr>
<td><strong>Operational Performance Regime</strong></td>
<td>The Services Agreement outlines minimum reliability, punctuality and passenger load performance levels. Failure to achieve these minimums enable PTV to 'step in' to implement a management plan. The Total Performance Measure threshold for intervention in 2015-16 is 88%. V/Line is required to regularly provide operational results data to PTV.</td>
</tr>
<tr>
<td><strong>Load standards</strong></td>
<td>The number of yearly incidents relating to overcrowding reported by V/Line has generally increased over the ten years to 2015. Consistently through 2014/15, V/line met its reliability target of 96% but failed to meet the punctuality target of 92%.</td>
</tr>
<tr>
<td><strong>Customer Satisfaction</strong></td>
<td>PTV conducts quarterly Customer Satisfaction Monitor (CSM) surveys to determine the Total Performance Measure, which in turn determines PTV's authority to intervene in service operations. The CSM scores performance against:</td>
</tr>
<tr>
<td>Customer satisfaction for V/Line trains is significantly lower than for V/Line coaches – however, customer satisfaction has shown a positive trend over recent years. Areas of lowest customer satisfaction include myki ticketing, running of services and train stations.</td>
<td></td>
</tr>
<tr>
<td>- Overall Information Services on Trains</td>
<td></td>
</tr>
<tr>
<td>- Number of announcements on Trains</td>
<td></td>
</tr>
<tr>
<td>- Maintenance and cleanliness of Train Carriages</td>
<td></td>
</tr>
<tr>
<td>- General cleanliness of Train Stations</td>
<td></td>
</tr>
<tr>
<td>- Overall Satisfaction with Coaches.</td>
<td></td>
</tr>
</tbody>
</table>

Customer satisfaction with V/Line trains and coaches (%)

*Calculated using customer surveys and a 0-10 satisfaction scale
Source: Track Record Issue 63, Services April > June 2015

Regional train reliability and punctuality* (%)
10/11. Infrastructure performance

Heavy rail - Freight

There are currently no standard KPIs recording the performance of heavy rail infrastructure for freight. However, some key issues related to regional rail infrastructure quality and availability that have been raised by industry stakeholders include:

Pathing constraints and delays – prioritisation of passenger rail over freight

Victoria’s rail network is a shared network where passenger services have priority over freight movements. While this is largely manageable in regional Victoria, once freight trains reach the Metro network, they can only secure paths during off-peak periods. Unlike NSW, there are no duplicated or freight dedicated rail sections, aside from sections on the standard gauge. This is one of the perceived issues facing port rail shuttle services as trains from the outer eastern suburbs seek rail paths through the Metro network into the Port of Melbourne. While some freight trains already successfully pass through these sections (BlueScope’s steel train ex-Hastings and Australian Paper’s train ex-Maryvale), additional port shuttle trains will also need to secure paths outside the peak passenger demand.

Further, track managers will need to start treating freight trains as reliable trains that can pass safely through the network, rather than regard them as high risk services threatening to disrupt the passenger network.

Degraded infrastructure resulting in speed limits and limited axle loading

Rail signalling systems in the regional rail network are very old, with some of the oldest train signalling practices still in operation on some branch lines. While these parts of the rail network do not have to cater for heavy track usage, the current practices only serve to delay trains and ensure the rail service cannot compete effectively with a road network facing no such restrictions. Unless some signalling upgrading is undertaken, rail will not be able to deliver improved travel and service capabilities that could make it competitive with road transport.

Inconsistent gauge

Broad gauge networks are now very limited in Australia, making the Victorian network captive to the present broad gauge rolling stock. While passenger demand will provide the impetus for investment in new, superior performing rolling stock, regional rail freight services are captive on the current network with the ongoing threat of road capturing a larger market share, so there is little incentive to reinvest in new high performance broad gauge rolling stock. The recent Murray Basin Rail Project is an attempt to redress this issue by expanding the Victorian standard gauge network, making it attractive to rail operators to move rolling stock from state to state and investing in new rolling stock where the risk of lower demand due to poor seasonal conditions in one state can be mitigated by shifting rail assets to neighbouring rail networks.

Segmented and unclear allocation of responsibilities

Currently the rail network is managed by multiple operators (V/Line, ARTC and Metro) with train control passing across different operators. By way of example, the Australian Paper train passes through five train control operators (V/Line, Metro, V/Line, ARTC, V/Line) as it moves up from Maryvale and into Dynon, and then into Victoria Dock. Multiple train controllers and network operators do not create an efficient rail system, especially when each has different rules and standards to allow trains to move across their part of the network. Until recently, each operator had different radio systems, thereby requiring locomotives to have multiple radios in order to pass through the network.

High access charges, particularly compared to road

Road network operators are able to operate under a simpler system, with lower regulation and registration costs. Road transport is able to provide a more flexible response to changes in demand and has lower barriers to entry than rail, which has led to an increasing road mode share of freight over the last decade.
## 10/11. Infrastructure performance

### Melbourne Airport

Increased passenger growth and aircraft movements over time have begun to place pressure on existing assets at Melbourne Airport. Demand for airport services are derived from the volume of aircraft movements, and in turn the demand for passenger and freight air transport. Melbourne Airport reported the largest growth in passenger volumes in 2013-14, with total passengers growing by 4 per cent to 31.2 million passengers. This was largely driven by international passenger growth of 9.1 per cent in 2013-14 (ACCC, 2015). Freight is expected to grow from approximately 250,000 tonnes of international freight in 2012 to 303,000 tonnes in 2018 and to 393,000 tonnes by 2033 if exports and imports remain at present levels (Melbourne Airport Master Plan, 2013). Domestic air freight data is not publically available.

Melbourne Airport is privately owned and has made a number of infrastructure investments over recent years to address increasing demand. The most significant pipeline project is the construction of a third runway as part of the Runway Development Program. While the ACCC monitors and annually reports on the pricing and quality of services provided by major airports, there are no binding KPIs for airport performance. Airports adopt internal performance targets – for example, Melbourne Airport’s standard for acceptable delays is an average six-minute delay (Melbourne Airport, 2013). The ACCC monitors aircraft and passenger-related services and facilities of Melbourne Airport through a combination of operational data analysis and stakeholder consultation.

### 1. Passenger services and facilities

Availibility and standard of passenger-related services and facilities has decreased over the last five years. However, both measures still remain in the ‘satisfactory’ range.

### 2. Aircraft services and facilities

Similarly, average ratings for availability and standard of aircraft-related services and facilities have decreased over the same period, but remain at a satisfactory level. The largest decrease has been in runway availability and standard.

### 3. Aircraft parking facilities

Aircraft parking facilities have decreased in availability and standard since 2009. Melbourne Airport has recently expanded its southern air field to create more parking bays.

### 4. Car parking performance

Melbourne Airport has the most car parks of Australian monitored airports (approximately 24,400 in 2013-14) and the largest car parking revenue. It reported a decline in car parking operating margin in real terms for the third consecutive year in 2013-14, largely due to an expansion of car parking spaces. Passenger rating for the standard of the long term car increased from ‘satisfactory’ to ‘good’ during 2013-14.

### 5. Other transportation access

Alternatives to on-airport parking include private car operators, taxis, buses, and off-airport parking operators. Melbourne Airport does not impose a charge on public buses entering the airport. Industry groups have in the past raised concerns about the facilities and service level at the airport, however they acknowledge that recent upgrades have improved conditions.

### 6. Air freight volume and value

International export air freight has increased in both value and volume over the last three years. In contrast, import air freight has slightly decreased in volume but increased in value.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Rating category 2013-14</th>
<th>1-year change</th>
<th>Change since 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft parking</td>
<td>Availability of facilities and bays</td>
<td>Poor</td>
<td>↓</td>
</tr>
<tr>
<td>Standard of facilities and bays</td>
<td>Satisfactory</td>
<td>↑</td>
<td>↑</td>
</tr>
</tbody>
</table>

Source: ACCC Airport Monitoring Report, 2013-14

Source: All performance graphs and commentary - ACCC Airport Monitoring Report, 2013-14

Deloitte Touche Tohmatsu © 2016 - Infrastructure Capability Assessments
10/11. Infrastructure performance

Airports

How Melbourne shapes up

The ACCC has reported a steady declining trend in the quality of service delivery across all major Australian airports. In 2013-14, Brisbane was the only city to achieve a rating of ‘good’ – Melbourne, Perth and Sydney are performing at a satisfactory level.

<table>
<thead>
<tr>
<th>Flights arriving and departing within 15 minutes of schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrivals</td>
</tr>
<tr>
<td>Adelaide</td>
</tr>
<tr>
<td>Brisbane</td>
</tr>
<tr>
<td>Canberra</td>
</tr>
<tr>
<td>Melbourne</td>
</tr>
<tr>
<td>Perth</td>
</tr>
<tr>
<td>Sydney</td>
</tr>
</tbody>
</table>

Source: BITRE, Domestic airline on time performance 2014-15

Regional airports

There are currently three regional airports that receive scheduled flight services: Mildura Airport, Portland Airport and Warrnambool Airport. As of December 2014 Sharp Airlines ceased scheduled services to Hamilton Airport, replacing it with Warrnambool within its scheduled passenger network. The location of Hamilton Airport provides a platform for emergency service access, agricultural aircraft and general aviation. The Shire of Southern Grampians has obtained external funding of $5.1 million to proceed with redevelopment of Hamilton Airport despite Sharp Airlines announcement which indicates the importance of the asset to the Hamilton community.

Mildura is Victoria’s largest regional airport with 208,366 passengers in 2014-2015, servicing Sydney, Melbourne, Adelaide and Broken Hill and providing critical links to this key inland rural city. The airport remains a regional hub for general aviation activities such as flight training and recreational activities. Mildura Airport Pty Ltd (MAPL) successfully obtained $10 million in funding from the Commonwealth in December 2015 towards a $20 million upgrade of runway bitumen overlay. It’s Annual Report 2015 indicates that passenger numbers are reaching capacity with the current services and fleet.

Portland Airport has seen a significant decrease in passengers over the last three years, attributable to Rex pulling out and leaving Sharp Airlines the sole operator. The Portland Airport Master Plan (2009-2013) highlights potential expansion opportunities regarding the freight network and route options however it is ultimately constrained by funding. It provides Gippsland Shire and the surrounding area with economic development, health care and emergency services, business and commerce and tourism.

Metropolitan airports

Essendon Airport federally leased to Linfox Airports, serving the general and corporate aviation industry sectors. It is also the Victorian base for Victoria Police Air Wing, Air Ambulance, Royal Flying Doctor Service and emergency services during the fire season.

Moorabbin Airport is also federally leased to Moorabbin Airport Corporation serving the general aviation and aviation training industry sectors. The current draft 2015 Master Plan identifies opportunities to improve infrastructure performance however no significant runway investments are planned over the 20 year planning period.

Both airports provide services to regional Victoria and Bass Strait islands.

Avalon Airport

Avalon Airport is Victoria’s secondary aviation gateway. It is leased under provisions of the Defence Act 1903 (Cwlth) by the Department of Defence to the Avalon Airport Australia Pty Ltd (leased to Linfox Airports). Linfox Group also owns Essendon Airport.

Avalon Airport serves domestic and international passenger and air freight markets, currently handling significantly less aircraft movements than it did in previous decades when the airport was used extensively for military and training purposes (Avalon Airport 2015). Commercial operations were introduced to the site in 2004.

There are over 1,500 car spaces directly in front of the terminal building and private bus operators transport passengers to Geelong and to Melbourne.

Unlike other airports operating the Airports Act, Avalon Airport is subject to Victorian planning, building and environmental legislation. No published KPIs are available for Avalon Airport to assess service performance in detail. At this time, infrastructure is not constrained and the airport is meeting current demand. The airport has large amounts of available land for expansion. In 2012 the Federal Government approved changes to the Airport’s lease arrangement to permit construction of an international terminal (Avalon Airport 2015). The Avalon Airport Master Plan 2015 also proposes a dedicated air freight terminal within the 20 year planning period.
10/11. Infrastructure performance

Ports

The Port of Melbourne Corporation has an integrated set of KPIs used to assess the operational performance of the port. Key productivity measures include berth utilisation, truck utilisation and vessel delays. Infrastructure performance for the Port of Melbourne over the past three years has been compared with Brisbane and Sydney below.

In 2013-14 the Port of Melbourne Corporation invested $140.2 million into development projects to address capacity issues (Port of Melbourne, 2014). Major works included channel deepening, installation of navigation beacons, road repair, wharf upgrades and the significant Port Capacity Project.

![Net crane rates (containers per hour) – Melbourne, Sydney, Brisbane](image1)

![Average quarterly truck turnaround times - major ports](image2)

![Average container turnaround time on landside of container terminals](image3)

![TEU throughput by container port - whole of port](image4)
10/11. Infrastructure performance
Ports – continued

Port of Geelong

As part of Port of Geelong’s 2013 Development Strategy, a Port Capacity model was developed to test future capacity and understand the potential impacts of future trade volumes on existing port infrastructure. While the port is not currently facing constraints, some future areas for consideration include:

- Increased berth utilisation leading to delays
- Increasing pressure on storage capabilities
- Channel depths limiting ship access as the global trend of larger sized vessels continues
- Increasing congestion from trucks at the port.

The majority of facilities at the Port of Geelong are considered sufficient to meet requirements in the medium term. The Development Strategy indicates a number of long-term development options to ensure that port capacity is not affected in the future.

Port of Hastings

The Port of Hastings is a deep water port located 70 kilometres south east of Melbourne. Currently the port operates as a bulk liquids port with two key users, Esso at Long Island Point and United Petroleum which uses the Crib Point wharf.

BlueScope Steel also has a wharf in the port adjacent to its manufacturing facility. In the past this facility has been used for the transport of steel products, but the wharf is no longer used for this purpose. Port of Hastings as been identified as possible site for a new container port to service the Victorian market.
10/11. Infrastructure performance

**Ports**

The key driver for demand growth at the Port of Portland will be emerging industries in the Green Triangle Region in South West Victoria and South East South Australia. The majority of this growth will be generated by increases in forestry products from the region, in addition to mineral sands exports from northern Victoria and grain from the Murray Basin region. The Green Triangle Region accounts for almost 20 per cent of Australia’s plantation forest and wood processing industry (Port of Portland Pty Ltd, 2009). The most important issue emerging from the Green Triangle Region is the logistics exercise associated with transporting the projected increase in forestry products over the next 5-10 years.

**Key infrastructure issues for the Port of Portland**

<table>
<thead>
<tr>
<th>Port</th>
<th>Road</th>
<th>Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Managing peak periods of loading</td>
<td>• Projected increase in truck movements</td>
<td>• Port rail receival capability for products other than grain</td>
</tr>
<tr>
<td>• The ability to integrate road transport with current and potential increase in rail freight whereby access into the Port for trucks will need to consider rail freight (grain) access requirements</td>
<td>• The existing road transport network needs to be upgraded locally and regionally to accommodate increased truck movements, the size of trucks and to manage the impacts from additional truck activities including noise, interface issues with pedestrian access, school bus movements and other (non-Port) heavy transport use</td>
<td>• If a rail alternative cannot be proven effective for access into the Green Triangle Region that capacity will need to be handled on the road network</td>
</tr>
<tr>
<td>• The potential for the additional non-Port traffic to impede Port traffic in the town and on the by-pass route</td>
<td>• The need to improve roads to the north-west of Portland that provide important connections to the South Australian sector of the Green Triangle Region.</td>
<td></td>
</tr>
<tr>
<td>• Managing potential conflict between the Port and adjacent local roads.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Port Land Use Strategy 2009

The Port has carried out reviews of likely berth utilisation scenarios into the future arising from the new trade expected from the Green Triangle. The proposed strategy for managing this growth will be a focus on **scheduling** and **increased rates** in order to maximise berth utilisation and minimise delays, as opposed to new or upgraded infrastructure investment (Port of Portland Pty Ltd, 2009). A key infrastructure concern however is the deterioration or overutilisation of roads in transporting products from the Green Triangle Region to the Port of Portland. The continued ability of the Port to meet trade demands will rely heavily on high quality road/rail infrastructure and unimpeded access.

**Mineral sands exports**

Astron’s Donald Project located in the Murray Basin is expected to commence mining in 2017. After mining, minerals will be semi-processed at Minyip to recover zircon, rutile, ilmenite and leucoxene. Operations are expected to reach 460,000 - 500,000 tonnes annually, which will move by road from the mine site to a rail head at Minyip, Murtoa or Dooen in transportable, purpose-built containers. From there, product will travel like conventional containers on truck or by rail to the Port of Portland for export as bulk product.
10/11. Infrastructure performance

Cycling

Cycling infrastructure performance can be evaluated by the rider according to comfort and riding conditions. The safety of cyclists is also a major consideration in the planning phase of new infrastructure.

**Reasons for not cycling to work or full-time study, Persons who do not cycle to work or full-time study – 2012, Proportion (%)**

<table>
<thead>
<tr>
<th>Reason</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work/study distance is too far</td>
<td>55.2</td>
</tr>
<tr>
<td>Doesn’t own bicycle/cannot ride bicycle</td>
<td>22.6</td>
</tr>
<tr>
<td>Road safety issues/hazardous</td>
<td>11.7</td>
</tr>
<tr>
<td>Need to carry goods/equipment</td>
<td>6</td>
</tr>
<tr>
<td>Concerned about personal safety</td>
<td>4.8</td>
</tr>
<tr>
<td>Not interested/no reason/has not considered it</td>
<td>6.8</td>
</tr>
<tr>
<td>Health/physical restrictions</td>
<td>5.2</td>
</tr>
<tr>
<td>Climate/weather/seasonal factors</td>
<td>3.7</td>
</tr>
<tr>
<td>Lack of suitable pathways/end of trip facilities</td>
<td>3.8</td>
</tr>
<tr>
<td>Need motor vehicle before/during/after hours</td>
<td>7.6</td>
</tr>
<tr>
<td>Lack of time</td>
<td>7.8</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
</tbody>
</table>


Residents over the age of 15 who had ridden in the City of Melbourne in the last 12 months were asked in the *Melbourne Bicycle Account – Cycling Census 2013* to identify their level of comfort. A component of comfort is the physical separation of bicycle facilities from motor traffic. The majority were comfortable (53 per cent) or very comfortable (16 per cent) which provides indication that the cycling infrastructure is meeting service requirements by user standards.

**Rider Comfort Rating**

- Very comfortable: 20%
- Comfortable: 6%
- Neither: 53%
- Uncomfortable: 16%
- Very uncomfortable: 6%

A key aspect of promoting cycling participation is ensuring a safe riding environment. A significant component of rider safety is associated with the attitude and behaviour of road users in addition to that of the cyclist. Behaviour change campaigns aimed at improving safety have been outlined in the Victoria’s 2012 *Cycling Strategy*, which includes training, education and awareness programs. In a number of states in Australia ‘one metre clear’ rules have been implemented to try and improve safe interaction between cyclists and vehicles on the road.

**Melbourne Bike Share**

A report into the performance of the Melbourne Bike Share (MBS) scheme was completed by SKM consultants in October 2013. Comprising of 51 stations and approximately 600 bikes in 2012 the average rents per day were approximately 400 meaning each bike was only rented 0.6 times per day. This is far below initial forecasts and therefore is not delivering the economic return to the tax payer determined in the feasibility studies. Comparatively cities such as Barcelona and Washington DC average five to seven rents per day.

The key conclusions drawn for the improvement of use of the MBS are colocation of docking stations with existing Public Transport, better location of docking stations on key corridor routes and targeting of locations without access to short trip public transport infrastructure.
12. ICT Infrastructure

Roads

VicRoads is currently considering how to future ready the road network and has identified a large investigation required to achieve this. At present, VicRoads has over $80 million of funded ICT improvements in its pipeline and an additional $200 million of works have also been identified. The key driver is to enable VicRoads to best meet strategic commitments in a cost effective manner, particularly with a focus on road safety, traffic congestion, pollution, accessibility, integrated transport solutions and making best use of existing infrastructure.

<table>
<thead>
<tr>
<th>ICT infrastructure</th>
<th>Description of infrastructure</th>
<th>Challenges and opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic and pedestrian</td>
<td>Traffic and pedestrian signals are controlled via the Sydney Coordinated Adaptive Traffic System (SCATS), a dynamic system that coordinates signals with real-time traffic information. SCATS controls over 3,900 traffic signals in Melbourne, Ballarat, Bendigo, Traralgon, Geelong and Mildura. It takes inputs from in-road detectors, pedestrian crossing buttons, rail detectors at level crossings and tram, bus or bicycle detectors in select locations. The system provides significant benefits to road efficiency and public transport reliability by allowing signals to respond to road conditions that change through the day and to manage incidents.</td>
<td>Improvements to signalling is a continual task with increased number of data collection points and improved connections between networks. The opportunity for arterial and other major roads within the network is to extend additional active management measures (see below) more widely across the network.</td>
</tr>
<tr>
<td>management</td>
<td>Victoria’s freeway network is actively managed with a series of technologies that identify traffic conditions or events and respond with user information to guide drivers, thereby increasing road use efficiency and safety. Technologies improve operational connectivity between freeways and nearby arterial roads, enabling drivers forewarning of congestion or incidents on the freeway. Active management can include:</td>
<td>The desirable qualities are that the system is accurate, consistent, coordinated, providing good coverage, efficient, fault tolerant, integrated, real-time, aligned with regulation and enforcement requirements, reliable and maintainable, robust, safe, seamless, secure and timely.</td>
</tr>
<tr>
<td></td>
<td>- Network monitoring systems collect data on network conditions and events. This includes traffic detectors, CCTV, congestion alarms, and weather monitoring systems. The information provides critical inputs for dynamic optimisation control algorithms supporting calculations of travel times for traveller information, as well as support network performance reporting, which are discussed below.</td>
<td>Driver behavioural responses are key to the effectiveness of the enabling technologies, and human factors must be considered in design and operations. Consistency and reliability of traffic control and information across the network, including across operational boundaries, help to improve driver perceptions and compliance. Emerging layers of active management will add new road user interactions that must be managed carefully.</td>
</tr>
<tr>
<td></td>
<td>- Traffic management and control systems use the collected information and implement interventions. These systems include:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Road optimisation algorithm software (ALINEA / HERO LIVE)</td>
<td>A key challenge is to expand systems to provide better multi-modal travel information such as through providing integrated real-time information on road and public transport conditions that would better inform end to end journeys.</td>
</tr>
<tr>
<td></td>
<td>- Variable message signage (VMS) and dynamic variable speed limits (DVSL)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Lane use management systems (LUMS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Coordinated ramp signals (CRS) and entry ramp management systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Ice warning and deck heating systems in regional and alpine areas</td>
<td></td>
</tr>
<tr>
<td>Driverless</td>
<td>Many car manufacturers, technologies companies and roads research agencies are currently developing and testing new vehicle technologies, including driverless (or autonomous) vehicles. Although such vehicles are on the market, the technology is still in its infancy and the uncertainty in technology makes implementation of suitable ICT on roads difficult. Still, VicRoads is closely following the landscape.</td>
<td>It is likely that many benefits will come from vehicle to vehicle communications, though the importance of integrating active road management systems with new vehicles technologies will be critical. Through better real time information flow between vehicles and with road detection and management systems, the expected benefits to the road network include increased road capacity by reducing lane widths and headway requirements as well as reduced risk of crashes and other safety improvements.</td>
</tr>
<tr>
<td>vehicles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 12. ICT Infrastructure

### Heavy Rail and Trams – metropolitan

There are numerous ICT systems that support, or could support, the operation of the metropolitan rail network and services. A selection of these systems are contained in the table below.

<table>
<thead>
<tr>
<th>ICT infrastructure</th>
<th>Description of infrastructure</th>
<th>Challenges and opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signalling</strong></td>
<td>Interlocks, Relays and CBI forward (vital) and network infrastructure and software applications (non-vital)</td>
<td>The two primary roles of railway signalling systems are to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Maintain a safe separation between trains</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Enable operation of the required throughput of trains in a reliable manner.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New high capacity signalling will maximise the number of trains that can use a section of track, thereby increasing the capacity of the existing network.</td>
</tr>
<tr>
<td><strong>Passenger information services</strong></td>
<td>Informs the passenger of the service. Includes onboard systems, tramTRACKER, Predictor and other web-based services. Drivers also use the PID to work out which train they need to go to when changes occur.</td>
<td>People increasingly have more access to mobile technology which enables them to access real time information on transport network. The challenge will be to further the information provided such that it enables people to evaluate alternate modes and routes.</td>
</tr>
<tr>
<td><strong>Driverless trains</strong></td>
<td>Driverless trains already operate on metro systems in Paris, Singapore and are being planned for use in the London Tube. They will also be introduced in Australia on the North West Rail Link in Sydney once construction is complete around 2019, but there are no plans to introduce driverless trains in Melbourne at this stage.</td>
<td>Driverless trains work well on a captive metro-style system (either tunnel or elevated). In Melbourne the system is a suburban rail system, mostly at grade. Many areas also interact with a mix of rolling stock and services. Were transition to a driverless system considered desirable, there would be significant challenges.</td>
</tr>
<tr>
<td><strong>Mobile coverage along rail networks</strong></td>
<td>$18 million of State funding has been allocated to fixing mobile blackspots along rail lines in regional Victoria. A procurement process for the upgrades will be commenced in 2015 with construction expected to start in mid-2016.</td>
<td>Infrastructure challenges associated with the provision of wifi on trains includes the need for new base towers alongside the train track and/or upgrades to the train carriages.</td>
</tr>
<tr>
<td><strong>Myki ticketing system</strong></td>
<td>The myki ticketing system was introduced in 2007, which comprises of approximately 23,500 operational devices which include card vending and top-up machines, fare payment devices, bus and tram driver consoles, station gates and hand-held devices. The initial myki budget was $998.9 million which was revised to $1.5 billion until 2016.</td>
<td>Management of the myki ticketing system is currently being retendered, offering an opportunity to improve functionality and performance.</td>
</tr>
<tr>
<td><strong>Digital Train Radio System (DTRS)</strong></td>
<td>The DTRS base station infrastructure was completed in 2009, with over 70 new facilities installed around the network. The DTRS replaces the existing Urban Train Radio System (UTRS) which was reaching its end of maintainable life. The DTRS will provide secure, highly functional communications network to help keep Melbourne’s trains running safely and efficiently. The total cost for the DTRS was $152 million. It includes the base stations and handheld radios.</td>
<td>The next stage of the project requires installation of on-train devices which will present further opportunity to improve communication within the network.</td>
</tr>
</tbody>
</table>
## 12. ICT Infrastructure

### Ports

<table>
<thead>
<tr>
<th>ICT infrastructure</th>
<th>Description of infrastructure</th>
<th>Challenges and opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Community System</td>
<td>A neutral and open electronic platform that connects the multiple systems operated by supply chain participants to rapidly and securely exchange information.</td>
<td>The challenge will be the sharing of information between customs, shipping lines, transport operators, stevedores and other supply chain participants given that the industry is highly competitive. The system would streamline processes through the port, lowering the cost of goods for consumers and resulting in higher returns for exports as a result of efficiency gains.</td>
</tr>
<tr>
<td>Automated stevedoring</td>
<td>A new automated terminal will be built at Port of Melbourne. In 2012 over $57 million was spent on 12 automated stacking cranes and 11 automated shuttle carriers for the new port facility. In 2015, a further $21 million will be spent on software systems and integration services.</td>
<td>Automated systems drive performance and operational improvements, but challenges exist relating to industrial relations and associated cultural shifts.</td>
</tr>
</tbody>
</table>

### Airports

<table>
<thead>
<tr>
<th>ICT infrastructure</th>
<th>Description of infrastructure</th>
<th>Challenges and opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiprotocol Label Switching Network (MPLS)</td>
<td>IT services firm the Frame Group has created a plan to enable Melbourne Airport to consolidate ICT services across 150 businesses including airlines and shops.</td>
<td>The system was retained to create the 20-year ICT infrastructure plan following years working with the airport to design and deploy a multi-protocol label switching (MPLS) network as part of its $330 million international terminal upgrade. The new plan covered data centre, network and systems infrastructure, applications and disaster planning.</td>
</tr>
<tr>
<td>Air traffic control services</td>
<td>Airservices is preparing to extend and upgrade its Air Traffic Service Centre at Melbourne Airport. Airservices is an Australian Government owned corporate body that manages and implements air traffic control, air navigation aids and fire fights services at Melbourne Airport. Airservices and the Department of Defence have partnered to deliver the OneSKY program, which will integrate civil and military air traffic control under a single and more advanced Civil-Military Air Traffic System (CMATS). The equipment room at Melbourne airport is required to be completed in 2017 to enable testing of CMAT equipment prior to rollout.</td>
<td>The new CMATS will improve operational performance and safety levels by integrating communications between civil and military aircrafts and enabling great flexibility in use of airspace. The new system is also a response to anticipated growth in air demand and the regulatory burden associated with that growth. The existing air traffic control system (TAAATS) was commissioned in 1998 and has undergone more than 200 incremental system changes since then.</td>
</tr>
<tr>
<td>Land transport access</td>
<td>PTV provides services updates at the Melbourne Airport public transport hub and at SkyBus stops. Additionally, VicRoads provides traffic alerts in car park areas.</td>
<td>The next step will be to provide customers with the information on alternative options to inform their route and mode choices.</td>
</tr>
<tr>
<td>Other</td>
<td>Airport ICT systems have numerous interfaces with other systems, the details of which are often not visible to State Government. Examples include airport operations (airside, landside and freight terminals), airlines (passenger and freight management), border control agencies (customs, quarantine, health and immigration), police and emergency services.</td>
<td></td>
</tr>
</tbody>
</table>
Operational criticality and resilience
13. Operational criticality and resilience

Sector Overview

The operational criticality assessment is measured using two key drivers – the frequency and the impact and is reflected in the relationship between the two.

Frequency

Frequency refers to the probability of a network level failure that renders the serviceability of the network non-operational. The focus is network-wide to consider the impact of failure of the overall network, rather than just an individual or group of assets within the network. In a network with little redundancy or high interdependence, the failure of a single asset could cause a network wide failure, whereas if a network has a good level of redundancy, it would be more resilient to such events.

This assessment assesses redundancy in each network and the potential for each to absorb impacts of network-wide failure that could occur for more than one day.

Impact

Impact considers many different modes of impacts that may occur in the event of a failure. Consideration of the impact was informed by work done in 2014 by the then Department of Transport Planning and Local Infrastructure (now DEDJTR) on Profiling Critical Assets. The Department undertook to review infrastructure assets and develop a critical asset register of individual assets. Considering the impact of network wide failure, this assessment considers those factors that would be most affected in the case of network wide medium to long term failure, including:

- Demand
- Economic impact of failure
- Emergency response function
- Intermodal connectivity
- Risk to the environment.

For each network, the Frequency and Impact assessed has been mapped on this page to depict the overall criticality of each sub-sector network.

The frequency assessment is provided in the table to the right. The Impact Assessment is provided on the following slide.

Frequency and impact measures are defined in Appendix: Criticality Methodology.

### Frequency of network failure of at least 1 day

<table>
<thead>
<tr>
<th>Network</th>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road</td>
<td>Occasional</td>
<td>The road network is generally very robust due to its interconnectivity though has some points with limited redundancy such as West Gate Bridge, Burnley Tunnel, Western Ring Road, Hume Highway and other critical major roads particularly where these are on structure.</td>
</tr>
<tr>
<td>Rail</td>
<td>Probably</td>
<td>The metropolitan rail service is integrally interconnected and has a high reliability on the city loop. There is limited redundancy in regional lines, which have no other alternatives on rail in the case of failure.</td>
</tr>
<tr>
<td>Tram</td>
<td>Occasional</td>
<td>Many tram services have high reliance on the Swanston Street and St Kilda Road corridor. However, network wide failure is mitigated through the ability to bisect lines and run truncated services.</td>
</tr>
<tr>
<td>Bus</td>
<td>Remote</td>
<td>Bus networks are flexible and agile. The major risk of failure would likely be from an emergency event where many buses need to be redeployed. Potential of failure to the road network is considered above.</td>
</tr>
<tr>
<td>Ports</td>
<td>Occasional</td>
<td>The Port of Melbourne represents a single asset with limited redundancy, such that failure would leave limited current alternatives within Victoria.</td>
</tr>
<tr>
<td>Airports</td>
<td>Occasional</td>
<td>While alternatives for Melbourne Airport exist, particularly at Avalon, it would not replace capacity and therefore potential for medium to long-term failure would be heightened.</td>
</tr>
</tbody>
</table>
### 13. Operational criticality and resilience

#### Sector Overview

<table>
<thead>
<tr>
<th>Road: Impact Critical</th>
<th>Rail: Impact Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demand</strong> – Varies around the network, but most critical assets cater for demand that would not be easily absorbed on alternative routes</td>
<td><strong>Demand</strong> – Demand for metropolitan passenger rail services is high and many inner city workers, where the majority of jobs are located, rely on rail to reach work. Demand for freight movement is also high, although the road network could (and does) take up some additional freight volumes that could otherwise travel on rail</td>
</tr>
<tr>
<td><strong>Economic impact</strong> – Key assets with high economic importance include all metropolitan freeways and regional highways, inner city roads servicing the Port of Melbourne. The impact on personal travel and business due to freight and delays to commercial journeys would be significant</td>
<td><strong>Economic impact</strong> – The impact of failure on the inner city businesses would be significant. Furthermore, due to the interconnectivity of the metro services, long term failure on any part of the network would likely impact across Greater Melbourne</td>
</tr>
<tr>
<td><strong>Emergency function</strong> – In the case of failure, emergency vehicles would be more likely than private or public transport vehicles to find alternative routes</td>
<td><strong>Emergency function</strong> – None</td>
</tr>
<tr>
<td><strong>Intermodal connectivity</strong> – Very high due to the many transport modes and services that the road network supports</td>
<td><strong>Intermodal connectivity</strong> – Passenger rail typically provided primary services, with passengers travelling to and from stations on other modes such as bus, tram or car</td>
</tr>
<tr>
<td><strong>Risk to the environment</strong> – Failure would have minimal environmental impact.</td>
<td><strong>Risk to the environment</strong> – Medium to long-term failure would place significant pressure on private vehicle and freight travel.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tram: Impact Marginal</th>
<th>Ports: Impact Catastrophic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demand</strong> – Significant but less than for metropolitan passenger rail</td>
<td><strong>Demand</strong> – Port of Melbourne is Australia’s busiest container port and demand is strong and growing. There is currently no alternative that could absorb the demand for container freight in the event of failure</td>
</tr>
<tr>
<td><strong>Economic impact</strong> – Although trams carry fewer passengers to the city compared to rail and are often relied on for shorter local trips, some personal travel and businesses would be impacted by employees having difficulty travelling to work</td>
<td><strong>Economic impact</strong> – Medium to long term failure would have significant economic impact to both the State and nationally. Notably, ports are critical to fuel supply.</td>
</tr>
<tr>
<td><strong>Emergency function</strong> – None</td>
<td><strong>Emergency function</strong> – Local ports support critical marine safety activity as well as support access to seas and open ocean</td>
</tr>
<tr>
<td><strong>Intermodal connectivity</strong> – Trams have a strong intermodal connectivity function</td>
<td><strong>Intermodal connectivity</strong> – Ports are generally a destination for freight</td>
</tr>
<tr>
<td><strong>Risk to the environment</strong> – Failure would place significant pressure on private vehicle and freight travel.</td>
<td><strong>Risk to the environment</strong> – Medium to long term failure would likely pace additional freight on roads to reach interstate ports where capacity and capability is available.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buses: Impact &gt; Marginal</th>
<th>Airports: Impact Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demand</strong> – Significant but less than for metropolitan passenger rail</td>
<td><strong>Demand</strong> – Demand for interstate and international passenger travel is strong and growing. Demand for air freight is also strong</td>
</tr>
<tr>
<td><strong>Economic impact</strong> – Smart Buses provide an important orbital function often support regional and outer suburb activity centres. They also provide an important public transport function to outer suburban and regional areas that don’t have alternative public transport options. Some personal travel and businesses would be impacted by employees having difficulty travelling to work</td>
<td><strong>Economic impact</strong> – Business and tourism would be significantly affected by any medium to long term failure</td>
</tr>
<tr>
<td><strong>Emergency function</strong> – None</td>
<td><strong>Emergency function</strong> – Airports service emergency services although there is redundancy that can likely cater for emergency air services</td>
</tr>
<tr>
<td><strong>Intermodal connectivity</strong> – Buses have a strong intermodal connectivity function</td>
<td><strong>Intermodal connectivity</strong> – Airports serve as significant hubs for connection to road and bus travel</td>
</tr>
<tr>
<td><strong>Risk to the environment</strong> – Medium to long-term failure would place additional pressure on private vehicle travel.</td>
<td><strong>Risk to the environment</strong> – In the event of failure of Melbourne Airport, many services would likely run from Avalon which would cause significant additional congestion on the West Gate bridge, Western Ring Road and Geelong Freeway.</td>
</tr>
</tbody>
</table>
Infrastructure use
14/15. Victoria’s Future Transport Network

Managing Demand Uncertainty

Victoria’s predicted population of 10 million (7.8 million in Melbourne) by 2051 will pose management challenges and opportunities across the Transport Network. The transport requirements for Victoria will be informed by its broad environmental, social, economic and technological needs.

Transport Infrastructure responses to these needs will require a flexible approach due to the uncertainties that exist in any forecast scenario. One way to address this uncertainty may be to consider the approach set out below in categorising transport investments:

<table>
<thead>
<tr>
<th>Infrastructure Response</th>
<th>Description of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic infrastructure</strong></td>
<td>Strategic infrastructure comprises a relatively limited number of investments, almost exclusively in the transport domain (CityLink, Melbourne Underground Rail Loop, Melbourne Airport, etc.) which have the power to shift relative accessibility across the metropolis. These investments drive the location decisions of households and firms and can create new agglomeration economies thereby boosting productivity and taxation revenues. Strategic transport infrastructure is likely to encompass a relatively small number of projects, as few projects have the capacity to significantly shift accessibility profiles across a metropolitan area.</td>
</tr>
<tr>
<td><strong>Structural infrastructure</strong></td>
<td>Structural infrastructure represents the higher order or ‘trunk’ facilities and networks that provide the skeletal framework for the urban region in question. These include arterial roads, sub-regional sewers and water mains, major water storages, full service and research hospitals, principal university campuses and the like. These items are distinguished by their sub regional service catchments and their cost.</td>
</tr>
<tr>
<td><strong>Follower infrastructure</strong></td>
<td>The third category of infrastructure – ‘follower’ services and facilities – comprises assets whose service catchments tend to be more localised. These items are vital to place making, community wellbeing and business efficiency, but they neither shape the pattern of development nor provide an overarching structure for settlement and industry development. Rather they provide services into a suburb or neighbourhood once the development of these areas has been enabled by investment in higher order infrastructure initiatives.</td>
</tr>
</tbody>
</table>

Source: SGS Economics and Policy – Current and Future state analysis – Part 1, P7

The following slides within this section contain current state trends and central/most likely projections; however, it is important to test thinking against the inherent uncertainty in all forecasts.
14/15. Key demand drivers

The core purpose of the transport system in Victoria is the safe and efficient movement of people and goods.

Demand for transport systems is driven by the volume and the patterns of the movements of people and goods. This in turn is a function of the interaction between land use and transport needs. Land use drives trip origin and destinations (between where people live, work and play). Transport infrastructure also influences land use for example major new roads open up new spaces for commercial and industrial uses (such as the industrial developments adjacent to M80).

Population and economic growth has a direct impact on the number of people and volume of freight moving over the transport network.

To fully understand demand patterns, it is insufficient to consider each class of transport asset in isolation. The efficient movement of people and goods incorporates multiple modes travelling on various networks.

Assessing the capacity of the transport system to meet existing and future demand depends on how these networks interact together to get people and goods where they need to go.

Key drivers of demand volumes and patterns, common to people and goods:

1. Population
2. Land use
3. Economic growth
4. Competitiveness of mode choices

Source: ABS Cat 3150, Victoria in Future

- Victorian Population Growth and GSP
- Victoria's population growth

Source: Deloitte Access Economics
14/15. Key demand drivers – moving people
People utilise all modes and travel for a number of reasons

Surveying undertaken by the Victorian government highlights a number of key attributes about the way Victorians travel within Metropolitan Melbourne and the regional centres of Greater Geelong, Ballarat, Bendigo, Shepparton and Latrobe.

- In 2013 residents of Metropolitan Melbourne made 12.3 million trips on an average weekday, this represents an increase of 6 per cent on 2007-08 levels
- Travel by private vehicle accounted for the vast majority of trips across all regions
- Public transport accounts for a significantly higher proportion of trips in Melbourne compared to the other regions
- Whilst average trip time is longer in Melbourne the average distance travelled is shorter for Melbourne residents compared to the other regions
- For all areas more short trips are made than longer trips (as demonstrated by the median trip distance being lower than the average trip distance).

Where people live influences the way they travel, e.g. the further people live from the Melbourne CBD the more likely they are to use private transport, inner Melbourne residents are more likely to use public transport (13 per cent of trips) and active modes (30 per cent of trips). Residents of the Greater Geelong and Other Regions have a higher proportional use of private vehicles than Melburnians, in these areas active transport accounts for 13-14 per cent of trips.

The top four reasons why people travel is the same in both Melbourne and the regional centres, these are:
- Work
- Social and recreation
- Shopping
- Pickup and drop off.

The fifth most common reason to travel in Melbourne is for Education, whilst in the regional areas, Personal Business is the fifth most common reason and Education the seventh most common reason. In all areas Work and Social/Recreation jointly account for approximately 50 per cent of all trips.

<table>
<thead>
<tr>
<th>Purpose of trip</th>
<th>Metro - Melbourne</th>
<th>Greater Geelong</th>
<th>Other Regional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private vehicles</td>
<td>72%</td>
<td>82%</td>
<td>83%</td>
</tr>
<tr>
<td>Public Transport</td>
<td>9%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Average Trip Time</td>
<td>23 minutes</td>
<td>20 minutes</td>
<td>17 minutes</td>
</tr>
<tr>
<td>Average Trip Distance</td>
<td>8.9 kilometres</td>
<td>11.5 kilometres</td>
<td>9.5 kilometres</td>
</tr>
<tr>
<td>Median Trip Distance</td>
<td>4.2 kilometres</td>
<td>3.6 kilometres</td>
<td>3.0 kilometres</td>
</tr>
<tr>
<td>Median Travel Times</td>
<td>15 minutes</td>
<td>15 minutes</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>

Source: DEDJTR VISTA survey
Population growth is forecast over the next 30 years

Population growth will be a major contributor to increasing demand in Victoria over the next 30 years. Victoria’s population is expected to grow to 10 million people by 2051, with most of this growth (7.8 million) taking place in greater Melbourne (VIF, 2015). Significant growth is forecast in Melbourne’s outer west, north and south-east (PTV, 2012).

Land use: Residential spread

Population growth is currently fastest in Melbourne’s outer suburbs, which are projected to accommodate almost half of metropolitan Melbourne’s new housing requirements over the next decade (Victorian Government, 2015). For people living in peri-urban areas access to employment and tertiary location is almost entirely dependent on travel by private vehicle (DEDJTR).
14/15. Key demand drivers – moving people

**Metropolitan Melbourne**

**Land use: employment patterns and travel to work**

Travel time for employment is projected to remain fairly stable with a median journey time of around 30 minutes to work. However, people spend longer travelling to work by public transport than other modes. People living in growth areas tend to travel further to work (DEDJTR).

Melbourne’s CBD is the largest employment hub in the State.

Melbourne’s central business district is the State’s largest employment hub and people who live close to the city centre, on average, travel the shortest distance to work. Residents in Melbourne’s outer suburbs travel the longest distance to work (the outer east, north and west experience median travel distances of 19.9 kilometres to 28.9 kilometres, depicted as dark red in the image below on the left hand side).

There are also key employment areas outside Melbourne’s CBD

Outside the CBD, employment centres are clustered along key corridors and areas in the suburbs (note the areas of concentration overlaid on the transport network above right). The provision of efficient connectivity between employees and businesses, as well as the connectedness between businesses, are key drivers for business locations, as well as productivity.

Some of the major employment areas, by number of jobs are:
- South East: the Monash precinct, Dandenong and Bayswater
- North: the Northern Industrial Node, Tullamarine airport
- West: Laverton North.
14/15. Key demand drivers – moving people

Metropolitan Melbourne

Competitiveness of mode choice

Convenient access to public transport network and efficient links between origin and destination impact passenger choices between transport modes. Major factors influencing mode choice are (PTV, 2012):

- Total travel time
- Travel costs (including fares, tolls and parking)
- Waiting time for public transport (especially unexpected waiting time)
- Walking time - time spent walking to, from and in-between public transport trips
- Modal preferences
- Reliability and frequency of service
- Amenities, attitude and lifestyle choices.

The majority of commuters in the inner suburbs travel to the central city to work

There is a strong relationship between where people live and where they work. The figure below highlights the fact that the majority of commuters in Melbourne’s inner suburbs travel to the central city.

Share of commuters travelling to the central city

The chart above shows that active transport is mainly utilised for distances between zero and 2.9 kilometres. Private vehicles is the preferred mode of transport over all greater distances.

People who travel to the city to work are more likely to use public transport if they can access it easily and at low cost, and if they live in the outer suburbs

The highest proportion of commuters to the central city using public transport can be found in the outer eastern and south eastern suburbs along rail corridors. In areas such as Box Hill, Clayton, Glen Waverly and Cranbourne more than 70 per cent of commuters to the central city use public transport. In areas without tram and train networks such as Point Cook, Mernda and Doncaster, this number is less than 50 per cent.
14/15. Key demand drivers – moving people

**Metropolitan Melbourne**

The highest demand for public transport is to and from the CBD.

The charts below highlight that commuters using trains and trams to travel to work tend to work in the CBD or inner suburbs. Very low percentages of people catch a train or a tram to work in areas in the outer suburbs or in regions not located on train or tram networks.

On the other hand, there are many regions in Melbourne’s outer suburbs served by the bus network where approximately 5 per cent of people who work there travel by bus. The highest proportion of people taking a bus to work have employment in Chadstone (8.8 per cent) or Doncaster (7.7 per cent).

Fewer than 4 per cent of people working in the city catch a bus as part of their journey to work.

**Train in journey to work (2011)**

**Bus in journey to work (2011)**

**Tram in journey to work (2011)**

**Key - % in journey to work, by place of work**

<table>
<thead>
<tr>
<th>Buses</th>
<th>Trains and trams</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>3.0</td>
<td>6.0</td>
</tr>
<tr>
<td>4.0</td>
<td>8.0</td>
</tr>
<tr>
<td>5.0</td>
<td>10.0</td>
</tr>
<tr>
<td>6.0</td>
<td>12.0</td>
</tr>
<tr>
<td>7.0</td>
<td>15.0</td>
</tr>
<tr>
<td>8.0</td>
<td>20.0</td>
</tr>
<tr>
<td>9.0</td>
<td>30.0</td>
</tr>
<tr>
<td>10.0</td>
<td>40.0</td>
</tr>
</tbody>
</table>

Source: Charting Transport – based on ABS census data
14/15. Key demand drivers – moving people

Regional Victoria

Regional population is also forecast to grow over the next 30 years

Of the forecast 4.5 million growth in population for Victoria, growth in population of 800,000 is likely to take place in Victoria’s regions. Growth and urbanisation is concentrated in large regional centres (for example Geelong, Ballart and Bendigo), this is coupled with population declines in smaller rural towns.

Projected annual average population change by LGA, 2011 to 2031

Source: VIF 2015
14/15. Key demand drivers – moving people

Regional Victoria

There is a strong link between population centres and the demand for transport.

For regional Victoria, the largest proportion of journeys from home to work is to "local" or "nearby" destinations. Between 5 – 8 per cent are for journeys to work from the Regions to Melbourne.

The map shows higher V/line patronage in the larger regional centres. This trend is likely to continue as these areas represent the regions in which population is forecast to grow by greater than 2 per cent per annum between 2011-2031.

If the current trend of working locally continues, this will place greater demand on the local road networks.
14/15. Key demand drivers – moving people

Airports

The demand for airport services is a ‘derived demand’, as it depends largely on the volume of aircraft movements and, in turn, the demand for air transport by passengers and freight movements. Therefore, airports are impacted by the airline market and general economic factors. Drivers include: population growth in Melbourne and Victoria and trade outcomes achieved internationally through Bilateral Air Service Negotiations for air services arrangements between Australia and other countries as well as the licensing of Australian and foreign international carriers.

Melbourne Airport

Melbourne Airport is the “gateway” to Victoria, connecting both Melbourne and regions with the rest of Australia and the world. Melbourne Airport facilitates travel for both business and leisure (tourism) purposes. As Victoria’s economy and population continue to grow, so will the demand for Melbourne Airport. Significant growth in air traffic movement is forecast over the next 20 years, total traffic is forecast to grow by 3.9 per cent per annum and domestic 3.4 per cent per annum (BITRE).

The Airport currently facilitates 29.1 million passenger movements and 210,000 aircraft movements per annum. This includes 7.9 million visitors (1.4 million international and 6.5 million interstate). It is projected that Melbourne Airport will facilitate 64.37 million passengers and 348,000 aircraft annually by 2033. Melbourne Airport currently moves approximately 250,000 tonnes of airfreight a year, this is forecast to increase to over 390,000 tonnes per annum by 2033.

Melbourne Airport, passenger forecasts (millions)

Avalon Airport

Avalon Airport’s geographic location between Melbourne and Geelong means it caters for both the metropolitan and regional markets. It is approximately 45 minutes drive from the Melbourne CBD and 20 minutes from the Geelong CBD.

Avalon Airport competes directly with Melbourne Airport for both passenger and freight movements. However, as a secondary airport it is highly susceptible to fluctuations in market conditions, for example the grounding of Tiger Airways in 2011, bought a significant reduction in passenger movements.

Avalon Airport expects to increase domestic passenger levels to 7.25 million by 2030/31, and the commencement of international services would see approximately 2.19 million international passengers by 2030/31. Aircraft movements would reach 62,000 per annum over the same period.

Avalon Airport passenger forecasts

Essendon Airport

Essendon Airport serves the general aviation/corporate aviation industry sector. The airport is also the Victorian base for the Victoria Police Air Wing, Air Ambulance, Royal Flying Doctor Service and, during the fire season, for the Erickson Air Cranes and Type 3 Air Taxi helicopters deployed by Emergency Management Victoria.

Since the opening of Melbourne Airport in 1971, aviation activity at Essendon has moved towards general aviation with the current trend moving towards increased rotary and charter activities. Over the ten year period between 2002 and 2012, aircraft movements reduced from 68,000 to 54,000 annual movements. Given current trends, it is expected that aircraft movements will plateau between approximately 54,000 – 57,000 movements over the next 20 years (Essendon Airport).

Mildura Airport

Mildura Airport is a key gateway to north-west Victoria, south-west NSW and the Riverland area of South Australia, and is capable of handling Code C jet aircraft (e.g. Boeing 737, Airbus A320). QantasLink, Virgin and Regional Express operate services to Melbourne, Sydney and Broken Hill. The airport is also an alternate airport for aircraft travelling between Sydney and Adelaide.

Mildura is the largest regional airport in Victoria. An estimated 215,000 passengers from 3500 regular services used the airport in 2012. Passengers also utilise approximately 6,200 charter and general aviation services per annum. Traditionally business travellers were the predominant users of the airport, tourism and leisure travellers are increasing and now make up approximately 50 per cent of all passenger movements. Demand is forecast to continue to increase at between 5 – 12 per cent per annum.

Most airfreight is transported by road from the region to either Melbourne or Adelaide for on-forwarding by air. Mildura Airport handles a small quantity of freight mostly comprising courier items (Mildura Airport).

Moorabbin Airport

Moorabbin Airport services the general aviation and aviation training industry sectors.
14/15. Key demand drivers – moving freight

Forecast freight demand

Metropolitan freight accounts for over 60 per cent of the state's freight task on a per tonne basis. The vast majority of this freight is carried by road. As much as 19 per cent of traffic on Melbourne’s roads are commercial vehicles – 11.5 per cent light commercial vehicles and 7.5 per cent heavy vehicles. Consumer goods account for the majority of goods carried (including, general freight (freight moving to supermarkets and shopping centres), manufactured products, food and beverage, and garden supplies). Much of this originates from imports through the Port of Melbourne. While domestic manufacturing continues to be a major generator of freight, this sector is declining and being replaced by imports.

Regional freight volumes tend to be dominated by bulk commodities generated in primary industries, most notably forestry (logs, woodchips) agriculture (grain, livestock, raw milk) and mining (mineral sands, aggregate). Processed (manufactured) agricultural products also account for a significant proportion of regional freight. The following map indicates that while significant volumes of freight moves within regional areas, major freight flows also include the movement of cargo from productive rural regions to Melbourne and to the ports for export.

Rail plays a significant role in moving regional freight, particularly carrying export commodities to port.
Freight movements are linked between production and consumption centres and ports.

Victoria primarily has a radial freight road and rail network, funnelling freight from Regional Victoria (and interstate) to Melbourne and the ports at Geelong and Portland. Complimenting this network are a number of key routes (including the Midland and Henty Highways and the rail links to Portland and Geelong) which provide important orbital freight movements across the state.

The adjacent map demonstrates the density of trucks and freight trains moving over these key freight routes.

The data indicates a concentration of road freight in and around Metropolitan Melbourne, on the key interstate route between Melbourne and Sydney and intra state routes linking Melbourne to Ballarat, Bendigo, Geelong and the La Trobe valley.

High volume rail freight routes include Melbourne – Geelong, the intercity track linking Adelaide (Perth), Melbourne and Sydney.

Source: DEDJTR
14/15. Key demand drivers – moving freight

Ports

Ports are a key intermodal link in the movement of goods to and from Victoria from both international and domestic markets. As with all freight, demand for these cargoes is driven by economic activity (domestic economic activity drives the demand for imports, economic activity by our trading partners drives demand for exports), population, export prices, import prices and exchange rates.

Victoria’s four key ports provide differing services depending on the types of cargo they attract, for example bulk, break bulk, bulk liquids and containerised cargoes.

Port of Melbourne

Port of Melbourne is the largest container port in Australia accounting for 35.1 per cent of Australia’s containerised trade in 2012–13, total containerised trade through the port was 2.5 million twenty foot equivalent unit containers (TEU). Total container trade through the port has grown by 5.9 per cent per annum for the 14 years to 2012–13, and this is expected to increase by 4.8 per cent per annum over the period to 2032–33 to 6.4 million TEU per annum (BITRE).

The main containerised export commodities shipped through the Port of Melbourne in 2012–13 were (by mass):
- Cereal grains, paperboards and fibreboards
- Dairy products, fruit and vegetables
- Pulp and wastepaper
- Miscellaneous manufactures
- Beverages
- Paper and newsprint
- Stockfeed and meat.

The main containerised import commodities (by mass) were (Port of Melbourne, 2014):
- Miscellaneous manufactures
- Furniture
- Electrical equipment
- Fruit and vegetables
- Paper and newsprint
- Clothing
- Machinery
- Metal manufactures
- Motor vehicle parts
- Toys and sporting goods.

The top five export destinations for commodities exported from the Port of Melbourne are China, New Zealand, Japan, the USA and Indonesia whereas the top five origins of commodities imported through the Port of Melbourne are China, the USA, New Zealand, Thailand and Germany (BITRE).

In 2012–13, the volume of non-containerised trade through the Port of Melbourne was 11.8 million tonnes, largely dominated by imports. Imports accounted for 76.4 per cent and exports 23.6 per cent of the total non-containerised trade, respectively. The main non-containerised export commodities, by volume, through the Port of Melbourne in 2012–13 were:
- Grains
- Oil and petroleum
- Steel
- Motor vehicles
- Wool.

The main non-containerised import commodities, by volume, were:
- Crude oil
- Motor vehicles
- Petroleum products
- Cement
- Transport equipment.

Total non-containerised freight through the Port of Melbourne increased 1.5 per cent per annum over the 14 years to 2012–13, this is forecast to increase by 0.6 per cent per annum to 13.2 million tonnes per annum by 2032-33. Imports account for the majority of this volume at 10.3 million tonnes per annum by 2032-33 (BITRE).

Trade forecasts have been provided on the following slide for the ports of Geelong, Portland and Hastings.
14/15. Key demand drivers – moving freight

Ports

Port of Geelong

The Port of Geelong handles bulk and break bulk commodities including export, woodchips, grain, livestock and imported fertiliser, steel and clinker. Bulk liquid product is also shipped through the port to support the Geelong oil refinery. Product is transported to and from the port by road, rail and pipeline. The major dry bulk commodity is grain, forecast volumes are highly dependent of the size of the annual grain harvest. The majority of the dry bulk cargoes are transported to the port by road.

Port of Geelong: Trade forecast by modal split of commodity movements

<table>
<thead>
<tr>
<th>Commodity</th>
<th>2014</th>
<th>2021</th>
<th>2031</th>
<th>2046</th>
<th>2051</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Bulk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodchips</td>
<td>1,400</td>
<td>1,242</td>
<td>1,470</td>
<td>1,784</td>
<td>1,903</td>
</tr>
<tr>
<td>Grain</td>
<td>693</td>
<td>957</td>
<td>720</td>
<td>1,175</td>
<td>1,733</td>
</tr>
<tr>
<td>Livestock</td>
<td>25</td>
<td>26</td>
<td>29</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>Import</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertiliser</td>
<td>1,400</td>
<td>580</td>
<td>758</td>
<td>1,113</td>
<td>1,266</td>
</tr>
<tr>
<td>Steel</td>
<td>250</td>
<td>301</td>
<td>393</td>
<td>578</td>
<td>657</td>
</tr>
<tr>
<td>Clinker</td>
<td>500</td>
<td>536</td>
<td>594</td>
<td>594</td>
<td>594</td>
</tr>
<tr>
<td>Total</td>
<td>4,268</td>
<td>957</td>
<td>3,405</td>
<td>4,977</td>
<td>7,214</td>
</tr>
<tr>
<td>Liquid Bulk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum (export)</td>
<td>2,200</td>
<td>2,500</td>
<td>2,500</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>Crude Oil (import)</td>
<td>4,200</td>
<td>4,500</td>
<td>4,500</td>
<td>4,500</td>
<td>4,500</td>
</tr>
<tr>
<td>Total</td>
<td>6,400</td>
<td>7,000</td>
<td>7,000</td>
<td>7,000</td>
<td>7,000</td>
</tr>
</tbody>
</table>

Source: DEDJTR

Port of Portland

The Port of Portland handles dry, break and liquid bulk cargoes. These include grain, wood chips, logs, and mineral sands. Significant growth is expected in the mineral sands trade, more than doubling over the forecast period to 2051. The vast majority of dry bulk cargoes are transported to the port by road.

Port of Portland: Trade forecast by modal split of commodity movements

<table>
<thead>
<tr>
<th>Commodity</th>
<th>2014</th>
<th>2021</th>
<th>2031</th>
<th>2046</th>
<th>2051</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry</td>
<td>3,566</td>
<td>3,162</td>
<td>3,743</td>
<td>4,543</td>
<td>4,847</td>
</tr>
<tr>
<td>Grain</td>
<td>316</td>
<td>356</td>
<td>293</td>
<td>442</td>
<td>499</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>19</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Livestock</td>
<td>27</td>
<td>28</td>
<td>31</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>Mineral Sands</td>
<td>540</td>
<td>-</td>
<td>1,040</td>
<td>520</td>
<td>520</td>
</tr>
<tr>
<td>Total</td>
<td>4,840</td>
<td>3,919</td>
<td>5,249</td>
<td>7,547</td>
<td>8,044</td>
</tr>
<tr>
<td>Produced at port*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea Freight</td>
<td>235</td>
<td>252</td>
<td>252</td>
<td>252</td>
<td>252</td>
</tr>
<tr>
<td>Smelter (import)</td>
<td>664</td>
<td>715</td>
<td>715</td>
<td>715</td>
<td>715</td>
</tr>
<tr>
<td>Total</td>
<td>899</td>
<td>967</td>
<td>967</td>
<td>967</td>
<td>967</td>
</tr>
</tbody>
</table>

*Portland Aluminium Smelter plant is located at the port. Smelter products are imported and exported by ship.

Source: DEDJTR

Port of Hastings

The Port of Hastings is currently a bulk liquid and gas port. Previously the port has facilitated break bulk steel cargoes to the BlueScope Steel mill at Western Port; however this trade ceased in 2012. The forecast major growth for the port will come from bulk petroleum imports.

Port of Hastings: Trade forecast by modal split of commodity movements

<table>
<thead>
<tr>
<th>Commodity</th>
<th>2014</th>
<th>2021</th>
<th>2031</th>
<th>2046</th>
<th>2051</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrefined oil</td>
<td>-1,019</td>
<td>-1,000</td>
<td>-500</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LPG</td>
<td>-545</td>
<td>-550</td>
<td>-300</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Import</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unleaded petrol</td>
<td>482</td>
<td>580</td>
<td>758</td>
<td>1,113</td>
<td>1,266</td>
</tr>
<tr>
<td>Total</td>
<td>482</td>
<td>1,564</td>
<td>1,550</td>
<td>800</td>
<td>1,113</td>
</tr>
</tbody>
</table>

Source: DEDJTR
16. Current Capacity

Roads

Melbourne’s inner and outer road networks

As discussed previously, Melbourne’s inner and outer road network perform differently, responding to a different set of challenges. Over the past decade, the inner network is showing signs of being at capacity, with average travel speeds declining while kilometres travelled has marginally increased. During the same period, the outer network continued to function reasonably, accommodating a growth in kilometres travelled that match population growth while seeing some reduced travel times on freeways and arterials roads.

This appears to indicate that while the outer network is nearing capacity such that performance impacts are beginning to be experienced, the inner network has been at capacity for sometime and additional road transport demand is now significantly impacting performance.

Scenario modelling undertaken through the use of the Victorian Integrated Transport Model (VITM) show Melbourne’s roads nearing capacity in many areas greatly impacting the performance of the network. The diagrams below show the estimated volume capacity of the freeway network in the AM peak and future projections of when constraints in capacity are forecast to severely impact the network (Dark Purple, ratio >1). The strain on the inner roads is particularly evident as well as the proportion of Melbourne which would be expected to be highly congested based on current infrastructure.

Continued efforts will be required across all transport modes to help improve the capacity of the road network to meet forecast demand and reduce the impact congestion has on the economy.

Current initiatives to increase capacity on arterial roads

Initiatives to improve capacity on arterial roads are focusing on better use of existing infrastructure. These include a focus on Shared Networks, discussed in the question under Tram Networks.

These may reduce the number of vehicles on the road while increasing the number of trips supported on alternative networks that share the road space.

Current initiatives to increase capacity on freeways across Melbourne

Across Melbourne’s freeways, there are a number of projects currently being implemented or planned that particularly address the problem of congestion on the freeway network, focusing both on inner and outer city locations.

- City Tulla Widening, providing a 30 per cent increase in capacity and travel time savings between Melbourne Airport and the West Gate Bridge.
- Western Ring Road (M80) which is aiming to increase capacity to enable more reliability travel times.
- Western Distributor aims to provide an immediate time saving of up to 20 minutes a day by widening the West Gate Freeway between the M80 and Williamstown Road and providing an alternative crossing under the Maribyrnong River.
- Monash Freeway Widening, providing 50 per cent more capacity on the Hallam Bypass and 20 per cent more capacity between EastLink and the South Gippsland Freeway.

Future planned initiatives to increase capacity on freeways in outer areas

VicRoads has reserved land for the greenfield construction of the planned Outer Metropolitan Ring Road, a new six lane 100 kilometre freeway that would link Werribee, Melton, Tullamarine, Craigieburn, Epping and Thomastown. The project would only be construction when transport demand warrants.

In addition, VicRoads commenced a study to also consider linking Melbourne Airport and the Outer Metropolitan Ring, bypassing Bulla, in September 2011.
16. Current Capacity

**Heavy rail**

What is the current capacity?

Demand is already reaching capacity in several parts of the metropolitan rail network, particularly lines that service growth areas in Melbourne’s north, west and south-east (PTV, 2012). Aside from passenger growth, a number of structural constraints are also affecting the system’s performance:

1. **Signalling constraints**

Melbourne’s signalling system is a conventional system using trackside coloured lights to advise the driver of limit of authority and operation. The system has been upgraded in a reactive manner, since it was installed mid last century. Signalling operates at around 15 trains per hour, with a maximum potential capacity of 24 trains per hour (PTV, 2012).

The choice of signalling system is a significant factor in maximising the utilisation of existing track infrastructure.

High capacity signalling, where computers are used to manage headways between trains, has the capability to safely optimise the separation between trains and enable the system to operate up to 30 timetabled trains per hour.

In 2015, $55.6 million of the state budget was provided for Stage 1 of a High Capacity Signalling trial along the Sandringham line.

A whole of system approach needs to be taken to identify the most pressing capacity constraints which may be a combination of signalling, track configuration, power supply or operational requirements. In some instances, the times that trains must wait at stations for passengers to board and alight (the “dwell time”) is a major constraint – particularly as Melbourne’s Network is highly centralised with very large passenger movements at the CBD stations. Due to the current configuration of the Melbourne rail system, even with high capacity and a range of associated upgrades, the number of trains per hour that can reliably be operated may only be in the mid 20’s, rather than the 30 trains per hour realised by other international jurisdictions. (Source: *Melbourne Metro Rail Project Business Case, Appendix 1, p3*)

### Melbourne Metro Rail Project

Upon completion of the Melbourne Metropolitan Rail Project and other current commitments, the upgraded lines are still projected to face capacity challenges over the long term. The table below shows when those lines are next forecast to reach capacity.

<table>
<thead>
<tr>
<th>Line/Corridor</th>
<th>When capacity constraints are likely to occur post delivery of Melbourne Metro Rail Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Werribee</td>
<td>Md 2030s</td>
</tr>
<tr>
<td>Sunbury</td>
<td>Late 2020s</td>
</tr>
<tr>
<td>Craigieburn</td>
<td>Md 2030s</td>
</tr>
<tr>
<td>Upfield</td>
<td>After 2046</td>
</tr>
<tr>
<td>Dandenong</td>
<td>After 2030</td>
</tr>
<tr>
<td>Frankston</td>
<td>After 2046</td>
</tr>
<tr>
<td>Sandringham</td>
<td>After 2046</td>
</tr>
</tbody>
</table>

(Source: *Melbourne Metro Rail Project Business Case, pg 147*)

The table above does not include the fast growing South Morang Line, which will also face capacity challenges.
16. Current Capacity
Heavy rail - Continued

2. Victorian Rolling Stock Strategy
The existing metropolitan rail fleet consists of a variety of rolling stock types. PTV's *Network Development Plan, Metropolitan Rail* (NDP) has indicated that additional fleet will be needed over the next 15 years to meet passenger demand and retire ageing trains. The 2015-16 budget contained $1.3 billion for procurement of 37 high capacity trains for Melbourne.

It is anticipated that the operation of these high capacity trains will enable average train loads of up to 1,100 passengers, compared to the existing 798 standard capacity. These trains also have the ability to be lengthened and carry in excess of 1,600 passengers.

The NDP also investigated use of double deck and 220 metre trains but both options have limitations. Double deck trains were found to increase dwell times at stations due to slower (dis)embarking times for passengers, while many inner-city and suburban stations would required infrastructure upgrades to accommodate 220 metre trains. The current plan has the longer train on the Dandenong/Sunbury corridor for the medium term.

3. Network segregation
While improved signalling and rolling stock infrastructure will increase carrying capacity and reliability, optimisation of infrastructure use depends on the interaction of lines within the broader network. Factors such as line lengths, single or double track, timetables can reduce capacity levels to below levels achieved if the line operated independently.

The Melbourne network is configured so that external branches 'feed' into the central CBD. These branches merge in the inner area, creating a risk that incidents affecting one line can flow onto another.

The NDP also identifies the following network constraints:
- Geographical constraints of long lines
- Existence of single line sections and at-grade conflicts on the network
- Interactions between metropolitan and regional services (this has been alleviated to some degree by the development of the Regional Rail Link).

These issues are addressed in Plan Melbourne’s focus to develop Melbourne’s rail network as a metro style system. Key projects include the Melbourne Metro Project, removal of level crossings, the Cranbourne Pakenham Rail Upgrade and the Mernda Rail Extension.
As with all forms of public transport, the demand for trams has experienced a dramatic increase in since 2005.

**Shared Networks**

Melbourne has one of the largest tram networks in the world with about 80 per cent of the network sharing road space with general traffic, resulting in specific challenges for the network.

Increases in road traffic volumes have a direct impact on tram speeds and as a result the capacity of the system to meet demand. The average operating speeds are fastest where trams operate in separate tram corridors. The slowest operating speeds are in Melbourne’s CBD, where they are also the most crowded.

A number of initiatives are being implemented to address these issues:

- Improved road use – which allocates lanes for specific modes
- Improved technology - to manage traffic flow e.g. giving trams priority at intersections
- Expand the tram network – to increase the proportion of the network where trams operate on a dedicated right-of-way
- Optimise the number and placement of tram stops, and introduce new super stops (which provide easier access to trams without restricting the flow of other traffic).

**Rolling stock improvements**

Tram capacity will also be improved with the introduction of 50 new larger trams for example the new low floor, high capacity E Class trams currently being delivered. These trams have a capacity of 210 passengers and will be able to carry an additional 10,500 people on the tram network at any time.
16. Current Capacity

Melbourne Airport - Airside

Over the next fifteen years, passenger volumes through Melbourne Airport are forecast to grow to 64.37 million (Melbourne Airport, 2013). This rate of increased demand will stress the capacity of the Airport, with estimates that existing airside capacity will become constrained by 2017. Tullamarine airport’s Airside Development Plan is designed to address projected demand and avoid a drop in service performance. A major component of this plan is the construction of a third east-west runway, in conjunction with new apron, taxiway and parking infrastructure.

Melbourne Airport - Landside

As Melbourne Airport grows, congestion from passengers, staff and visitors travelling to and from the airport will create pressure on the roads surrounding and within the airport. While the airport has close proximity to the freeway network, connections with the Tullamarine Freeway are approaching capacity. Growth in residential areas will also increase the traffic volumes coming from the outer northern and western suburbs of metropolitan Melbourne (Melbourne Airport, 2013). SkyBus and taxis are the predominant forms of public transport connecting Tullamarine Airport to the CBD in the absence of a rail connection, contributing to road congestion.

The Airport has developed a Ground Transport Plan which it believes will successfully address landside constraints:

1. Development of a new, high-capacity road system
2. Development of ‘transport hubs’
3. Improved multi-modal access, with particular focus on developing a rail link
4. Create additional road capacity and access points to the Airport.

Specific initiatives include:

- **Passenger terminal precinct** – for covert projects to separate pedestrian and vehicle traffic movements, including consideration of an elevated pedestrian plaza, closure of existing elevated roadway and new elevated road loop to east of multi-level car parks with links to Tullamarine Freeway. Park Royal Hotel extension over existing multi-level car park (2016 proposal).

- **Southern Precinct** – Terminal T4 and associated car park (completed Nov 2015) and Melbourne Airport Cargo precinct.

- **2018 Airport Master Plan** – preparation, exhibition and approval processes (2016-2018). The ground transport plan component to include on-airport road network development plan for the whole airport site.

- **Jet fuel pipeline capacity enhancement** (which is required by 2017).

- **Business Parks** – Melbourne Airport Business Park – freight and logistics (four new distribution/ warehousing proposals for approval in early 2016 and staged development within five years).

- **Melbourne Airport Rail Link (post Melbourne Metro)** – on-airport alignment corridor provided with completion of Airport Drive extension from Sharps Road to passenger terminal precinct. Investment timing, funding and station location are still to be finalised. The airports view is this agreement will be crucial for the 2018 Master Plan. It should be noted that, in addition to any approval processes under Victorian legislation, the on-airport component of the rail link will require Commonwealth Government approval of a Major Development Plan under provisions of the Airports Act 1996.

Avalon Airport

Currently, Avalon Airport is not constrained either airside or landside. The 2015 Master Plan contains a 20 year strategy for future runway developments, to ensure that airside capacity is not limited in the future. Where this planning involves new infrastructure, land is available to support these expansions. The existing terminal facility at Avalon has a capacity of five million passengers. If faced with increased future demand, Avalon has planning permission to construct a new terminal.

Currently, Avalon Airport is primarily accessed via the Princes Freeway. Additional road capacity and access points will be required to facilitate increased traffic movements to/from the airport in the future, if demand increases as per the Airport’s projections. All new access to the site is subject to the design and implementation being approved by VicRoads.

A rail link to Avalon may be required in future, to facilitate this a reservation has been made in the Greater Geelong Planning Scheme amendment (15 June 2015) to ensure a reservation is in place for the rail link. Reserving the corridor will protect the land from inappropriate development and ensure it is available for development of the rail link when required in the future.

Regional Airports

No capacity constraints have been identified at the regional airports.

However, the possible requirement for an airport servicing South Eastern Melbourne has been identified in Plan Melbourne.


16. Current Capacity

Ports

Port of Melbourne

The Port of Melbourne is Australia’s largest container, automotive and general cargo port handling around 35 per cent of the national container trade. The Port of Melbourne’s assets include 510 hectares of port land, 100,000 hectares of port waters and 36 commercial wharves. Currently around 3,000 commercial vessels call at the port each year.

During 2014-15, the Port of Melbourne handled approximately 35 million mass tonnes of cargo. Total trade volume is expected to increase by 0.8 per cent (Port of Melbourne Corporate Plan, 2015).

In 2003-04 the port handled over 1.7 million TEUS. Total container trade is expected to reach 2.55 million TEU for the 2015-16 year.

Land use around the port is changing, becoming more residential and recreational. This impacts port operations via the imposition of environmental regulations (e.g. noise levels and emissions).

It is therefore unlikely that the port will exceed the current 500 hectares as land acquisition opportunities are limited, so the ability to increase capacity to meet demand needs to be focused on maximising the use of existing assets and increasing the efficiency of port operations, e.g. deeper channels for bigger ships, HPVs, access to rail.

In the 2015-16 financial year, the Port of Melbourne Corporation will undertake the Port Capacity Project (the redevelopment of Webb Dock including a new international container terminal with capacity of 1 million TEU and at least 1m motor vehicles as well as expanded container handling capacity at Swanson Dock). This project is the biggest landside port investment in a generation.

As an alternative to the current 100 per cent road based container trade system in Melbourne, an integrated container rail shuttle system between Port of Melbourne and suburban intermodal terminals has been proposed. The port rail shuttle would replace 3,500 container trucks a day with just 28 freight trains, reducing port related road traffic and associated emissions. In September 2015 the Government announced that the project will be postponed until it leases the Port of Melbourne.

Ports of Hastings and Bay West

The Government’s commitment to lease the Port of Melbourne is likely to have implications for the development of a second container port at either the Port of Hastings or Bay West.

The Port of Hastings currently imports and exports non-container related trade such as oil, liquid petroleum gas and unleaded petrol. It also supports associated processing and storage of these products. Between 100 and 150 vessels visit the port each year.

There are currently no facilities at Bay West near Geelong.

Port of Portland

2015 was a record year for the Port of Portland with 6.46 million tonnes passing through the port compared to 6.22 million tonnes the previous year. The main trades are forest products, aluminium and mineral sands.

Although the port is now receiving fewer ships than in the past, they are of a much larger size.

Capacity challenges

Victoria’s commercial ports are all protected by planning zones, which enable the ports secure access to their operations. While this provides the necessary protection for key port activities, there remains increasing pressure on their operation from neighbouring urban development.

It will be vital that land to support current and potential port facilities is reserved to keep Victoria’s options open for future development.

Increasing ship sizes will pose a significant challenge for port stakeholders and Government. Consideration will need to be given to balancing wharf side and landside productivity and efficiency given the limitations imposed by channel depths.
17. Asset utilisation and applicability to sector requirements

Victoria has an extensive, high-quality transport network of roads and rail lines servicing a range of transport needs. For the most part this is a ‘shared network’, with freight users sharing with private cars and public transport users.

Utilisation of the various network assets are highly dependent on the time of day. During the peaks both public transport systems and the road system approach or in some cases exceed maximum utilisation resulting in a reduced service performance. Whilst for the majority of the day these assets could be seen to be underutilised with excess capacity available in the system.

There is potential to improve productivity in:
- Cost policy around price
- Regulatory intervention
- Technological/infrastructure improvements.
- Utilisation of off-peak capacity.

The introduction of new technology has the potential to leverage greater productivity out of the existing networks for all users, including freight.

The Managed Motorways program is a current example of technology being used to successfully increase the carrying capacity of key freeway links. Similarly, new signalling technology offers the potential to achieve greater capacity on existing rail tracks. In the longer term the ability for information to be shared between vehicles, and between vehicles and infrastructure, offers the potential for more substantial gains and improvement in asset utilisation (VicRoads freight and logistics plan).

The extra capacity gained through technology based efficiency improvements is generally much cheaper than the expansion of existing or construction of new assets. Though forecasts in travel demand growth based upon a combination of freight growth and population growth mean that technology based efficiency improvements, while welcome and vital to achieve, will in themselves be insufficient to cater for the projected growth and therefore expansion or construction of new assets will be required at some stage in the future.

### Roads

- The road network generally matches the activities it supports for passenger and freight demands, albeit that congestion can be problematic during peak times.
- Utilisation of the road assets correlates with the socio-economic back ground of the region as well as access to alternative modes of transport such as the rail, tram and bus networks.
- VicRoads previous Traffic Monitor publication has indicated that peak periods on freeways have an average duration of around 2.75 hours in the morning peak and around 3.25 hours in the evening peak. Furthermore, congestion can occur more than twice per weekday, for example, when clearways cease operation on weekdays and on weekends. Some arterial roads also suffer heavy congestion on weekends.
- During these periods of peak demand the assets are over utilised resulting in reduced serviceability in lower average speeds and longer travel times.
- This is currently being addressed by removing level crossings, upgrades to a private freeways, signal optimisation, ramp metering and other ICT initiatives.
- Congestion particularly affects access to ports (for freight) and airports (for passengers), which the largest constraint on these other asset classes.
- Road pricing (congestion or heavy vehicle) has an immediate and significant optimising impact on road usage and utilisation levels.
- Load restrictions caused by infrastructure which is inadequate to carry High Productivity Freight Vehicles influences routes travelled and can unintentionally increase the utilisation of other roads.
- Data from the Traffic Monitor 2013-14 indicates that while the gap between peak and off-peak volumes on freeways is larger (approximately 40 per cent), for arterials, the difference in volumes between peak and off-peak is much smaller (20 per cent). It is suggested that this difference is because freeways are used for longer trips – mainly commuting – so during off peak times they are less used. Arterials are used for shorter trips (going to services, recreation, social) during off-peak so the differences in volumes is much less noticeable.

### Airports

- Melbourne Airport is undergoing a large expansion, adding terminals and a third new runway. Road side access is its largest constraint.
- Utilisation of these assets is the responsibility of the private operators.
- The utilisation of secondary airports such as Avalon and regional airports is very low. There is excess capacity within these assets. Though they are generally meeting the required demand.
- In some regional areas minor airports may be surplus to requirements in the future
- Melbourne Airport capacity (with 4 runways) could be reached around 2060
- Avalon Airport with 3 runways operating would be expected to ensure international airport capacity into the early part of the 22nd Century
- Essendon and Moorabbin airports will have capacity constraints that are determined by the urban environments within which they are located.
17. Asset utilisation and applicability to sector requirements

**Heavy Rail**

- The metropolitan passenger rail network is a fixed, inflexible but high capacity network. Its ability to match passenger needs is dependent on network capacity and intermodal access to stations. The city loop and signalling systems are significant constraints in increasing capacity.
- Lines which have sections of single track in some instances may reduce the utilisation of the line as a whole due to restrictions on train headway. In some instances however this is not the primary constraint.
- Intermodal connectivity is improving with Smart Bus services and improved walking and cycling paths.
- Regional passenger rail has been recently upgraded between Melbourne and selected regional centres. There are currently acute issues of asset availability however under normal operations, other than key peak times, the assets are generally underutilised.
- Network utilisation is heavily dependent on the time of day. The graph opposite shows weekday boardings by line group, which is higher in AM and PM peak than other periods, as would be expected. Regardless of the number of services currently running and expectation that some peak services are overcrowded, this suggests there is excess capacity in the system during off peak times creating large sections of the asset base which are underutilised for large parts of the day.
- There may be opportunity to increase asset utilisation outside of peak demand through variable time of day pricing models, with the potential positive side affect of reducing peak capacity issues.
- Freight rail services are impacted by intermingling with passenger services both in regional and metropolitan areas. This constrains services to the Port of Melbourne. Services to other ports including Hastings or Bayside would not currently support future expansion of either.

**Trams**

- Utilisation of the tram network within the CBD is high. This demand is influenced by free tram travel within the CBD area.
- Similarly to rail, asset utilisation is dependent on time of day. Though due to the propensity for tram travel to be used for more short point to point trips within the metropolitan area the spread in peak and off peak utilisation is not as varied.
- Melbourne's tram network is constrained by headways in central thoroughfares such as Swanston Street. Improvements to tram stops and separation of lines from vehicles is alleviating this, as will the Melbourne Metro Project.

**Ports**

- The Port of Melbourne is the busiest container point in Australia. It is likely that a second container port will be required but the timing is currently unknown.
- The largest constraint for the ports of Melbourne, Hastings and Geelong is land-side access by road and rail freight. The Port of Melbourne and Port of Geelong have channel limitations that will pose a challenge to any future upgrades at these locations.

**Buses**

- The bus network utilisation is impacted by road capacity and access to priority running. Poor frequencies and unreliability have impacted poorly on demand. The introduction of Smart Buses demonstrated the value of real time passenger information systems in increasing utilisation of the assets.
- Bus routes are often indirect means of travel causing trips to be much longer than if a more direct route is taken reducing the utilisation of the assets.
18. Infrastructure charges

Transport charges vary depending on mode. Charges generally only recover costs for those modes which have a dominant commercial use or are privately owned. Charges for modes which have a public service focus are priced to ensure access and utilisation occurs with the State Government funding shortfalls for maintenance, operating expenses, capital asset improvement and acquisitions. PT fares cover approximately 30 per cent of the cost of operating the train, tram and bus services.

<table>
<thead>
<tr>
<th>Roads</th>
<th>Heavy Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria’s road network includes roads which are considered to be public owned, private owned or a combination of both. The user charges are either unilateral or discretionary. Unilateral charges are paid by all road users and are not dependent on road route or use. It includes Federal, State and Local government taxes (e.g. fuel excise tax), vehicle registration and licence fees. Discretionary roads have specific user charges which are paid by users of a specific road or part road. They are discretionary as the user can take an alternative route should they not wish to pay. Privately owned roads recover their cost via toll fees. The toll fees are administered by two road roll operators, Transurban and ConnectEast. Tolls are focussed on financing rather than congestion. For example, tolls have the effect of discouraging some road users from using toll roads, who instead use non-toll roads – adding to congestion. The user charges above are utilised to maintain and improve the existing road network or build new roads. As use and demand for roads increases, other community health impacts from operation of the network (e.g. impacts as a result of traffic noise and exposure to vehicle emissions) may need to be factored into future charges. These non-road costs may include: State economic contribution lost due to congestion during peak times</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The heavy rail network charges are not reflective of total costs to operate, maintain and improve the network. State Government contributions subsidise shortfalls for capital assets, maintenance and operating expenses, current network charges do recover a portion of cost depending on the mode within the network:</td>
</tr>
<tr>
<td></td>
<td>• Metropolitan/ Regional passenger train network: Charges are set by the State Government. PT fares have been growing faster than CPI, to assist in funding PT projects.</td>
</tr>
<tr>
<td></td>
<td>• Freight train network: access charges paid by private operators to move their goods through the network. The access charges are set by the Essential Services Commission and are either paid to the State Owned Entities or Private Operators within the network. Other network charges which assist with recovery of cost include advertising revenue, property lease fees and asset disposals.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tram and bus</th>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>The tram charges are not currently reflective of costs to operate, maintain and improve the network. As with the heavy rail network, State Government contributions support the network with a portion recovered through the farebox revenue system. The bus network charges are not currently reflective of costs to operate, maintain and improve the network. As it utilises roads to deliver its services, road funding for the network is largely supported by Federal, State and Local government with a portion of the cost for operating the network recovered through the farebox revenue. The operators of the network also provide private bus services which assists with recovery of their operating and capital costs.</td>
<td></td>
</tr>
<tr>
<td>Both Public and Private Ports recover their cost through a variety of landside and marine side fees and charges which include channel and wharfage fees, lease income and berthing hire. All Public Port owners are generally profitable, however they may receive capital contributions from State Government which indicates they may only be profitable for recovery of their operational cost.</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Airports</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport charges consist of landing, terminal and air field charges. It also includes property income from leasing retail and commercial spaces. The fixing of fees for arrival, departure or parking of aircraft, a training flight approach by an aircraft and carrying out any directly related activity or service is regulated by the Aerodrome Landing Fees Act 2003. As the fixed assets of the major airports are privately owned, it is difficult to ascertain whether charges are reflective of cost. As an example, Melbourne Airport is currently generating a profit without the need for State or Federal Government contributions. However, it may require Government contributions for enabling assets (e.g. a new public road to the airport.</td>
<td></td>
</tr>
</tbody>
</table>
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Deloitte Touche Tohmatsu © 2016 - Infrastructure Capability Assessments
### Rail Network Specifications

<table>
<thead>
<tr>
<th>Services</th>
<th>Kms (incl shared track)</th>
<th>Built / Completed</th>
<th>Stations</th>
<th>Track</th>
<th>Rolling stock</th>
<th>Connections</th>
<th>Used by</th>
<th>Stabling Facility</th>
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<tbody>
<tr>
<td>Alamein Line</td>
<td>14.9</td>
<td>1948</td>
<td>6</td>
<td>Double track to outside Ashburton, single track beyond</td>
<td>Comeng, X'Trapolis</td>
<td>Belgrave and Lilydale</td>
<td>Metro</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ashburton, single track beyond</td>
<td></td>
<td></td>
<td></td>
<td>Bayswater (repair centre), Upper Ferntree Gully, Belgrave</td>
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<tr>
<td>Belgrave Line</td>
<td>42.9</td>
<td>1889</td>
<td>8 or 10</td>
<td>Double track to Ferntree Gully, single track with crossing loops beyond</td>
<td>Comeng, X'Trapolis</td>
<td>Lilydale and Gembrook</td>
<td>Metro</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Comeng, X'Trapolis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Comeng, X'Trapolis</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Craigieburn Line</td>
<td>27</td>
<td>1872</td>
<td>17</td>
<td>Double track throughout</td>
<td>Comeng, Siemens</td>
<td>Flemington, Albion-Jacana</td>
<td>Metro, V/Line, freight</td>
<td>Broadmeadows, Craigieburn</td>
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<tr>
<td>Cranbourne Line</td>
<td>14</td>
<td>1886</td>
<td>3</td>
<td>Single track with crossing loops</td>
<td>Comeng, Siemens</td>
<td>Pakenham</td>
<td>Metro</td>
<td>Cranbourne</td>
</tr>
<tr>
<td>Showgrounds / Flemington Racecourse</td>
<td>7.8</td>
<td>1886</td>
<td>3</td>
<td>Single track with crossing loops</td>
<td>Comeng, Siemens</td>
<td>Pakenham</td>
<td>Metro</td>
<td>Cranbourne</td>
</tr>
<tr>
<td>Frankston Line</td>
<td>42.7</td>
<td>1882</td>
<td>20</td>
<td>Quadruple to Caulfield, Triple to Moorabbin, double beyond</td>
<td>Comeng, Siemens, X'Trapolis</td>
<td>Sandringham, Pakenham, Cranbourne, Stony point</td>
<td>Metro, freight to Long island</td>
<td>Mordialloc, Carrum, Frankston</td>
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<tr>
<td>Glen Waverley Line</td>
<td>22.2</td>
<td>1930</td>
<td>12</td>
<td>Double</td>
<td>Comeng, X'Trapolis</td>
<td>Alamein, Belgrave, Lilydale</td>
<td>Metro</td>
<td>Burnley, Glen Waverly</td>
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<tr>
<td>Hurstbridge Line</td>
<td>38</td>
<td>1912</td>
<td>23</td>
<td>Double track to Heidelberg, single track to Rosanna, double track to Greensborough, single track with passing loops beyond</td>
<td>Comeng, X'Trapolis</td>
<td>South Morang</td>
<td>Metro</td>
<td>Victoria Park, Macleod, Eltham, Hurstbridge</td>
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<tr>
<td>Lilydale Line</td>
<td>39.9</td>
<td>1882</td>
<td>21</td>
<td>Quadruple Richmond to Burnley, triple to Box Hill, double to Mooroolbark, single to Lilydale</td>
<td>Comeng, X'Trapolis</td>
<td>Glen Waverly, Alamein, Belgrave</td>
<td>Metro</td>
<td>Burnley, Camberwell, Ringwood, Lilydale</td>
</tr>
</tbody>
</table>

*Also used as maintenance and repair facility*
## Appendix

### Rail Network Specifications cont.

<table>
<thead>
<tr>
<th>Services</th>
<th>Kms (incl. shared track)</th>
<th>Built / Completed</th>
<th>Stations</th>
<th>Track</th>
<th>Rolling stock</th>
<th>Connections</th>
<th>Used by</th>
<th>Stabling Facility</th>
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<tbody>
<tr>
<td>Pakenham Line</td>
<td>56.9</td>
<td>1877</td>
<td>29</td>
<td>Quadruple to Caulfield, double beyond</td>
<td>Comeng, Siemans</td>
<td>Frankston, Sandringham, Cranbourne</td>
<td>Metro, V/Line, freight to Gippsland</td>
<td>Caulfield, Oakleigh, Westall*, Dandenong, Pakenham</td>
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<td>1859</td>
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<td>Double</td>
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<td>Metro</td>
<td>Brighton Beach, Sandringham</td>
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<td>1901</td>
<td>21</td>
<td>Double</td>
<td>Comeng, Siemans</td>
<td>Hurstbridge Line</td>
<td>Metro</td>
<td>Epping*</td>
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<td>Stony Point Line</td>
<td>31</td>
<td>1889</td>
<td>10</td>
<td>Single</td>
<td>Sprinter DMU</td>
<td>Frankston, HMAS Cerberus Spur line, Long Island steel works spur line</td>
<td>Metro, V/Line, railcars, freight to Long Island</td>
<td>North Melbourne, St Albans, Watergardens, Sunbury</td>
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<tr>
<td>Sunbury Line</td>
<td>39.5 (commenced)</td>
<td>1859</td>
<td>15</td>
<td>Double</td>
<td>Comeng, Siemans</td>
<td>Ballarat, Bendigo</td>
<td>Metro, V/Line , freight towards Bendigo</td>
<td>Newport*, Werribee</td>
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<td>Upfield Line</td>
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<td>1889</td>
<td>14</td>
<td>Double to Gowrie, single beyond</td>
<td>Comeng, Siemans</td>
<td></td>
<td>Metro</td>
<td>Upfield</td>
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<td>Werribee Line</td>
<td>33</td>
<td>1859</td>
<td>15</td>
<td>Double track throughout except for Altona loop</td>
<td>Comeng, Siemans, X'Trapolis</td>
<td>Sunbury, Williamstown, Geelong</td>
<td>Metro</td>
<td>Newport*</td>
</tr>
<tr>
<td>Williamstown Line</td>
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<td>1859</td>
<td>10</td>
<td>Double (except for terminus)</td>
<td>Comeng, Siemans, X'Trapolis</td>
<td>Werribee Line</td>
<td>Metro</td>
<td>Newport*</td>
</tr>
<tr>
<td>City Loop</td>
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<td>Comeng, Siemans, X'Trapolis</td>
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<td>Metro</td>
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</tr>
</tbody>
</table>

*Also used as maintenance and repair facility*
# Appendix

Summary of the number of bicycle trips to work by LGA for the destination of each trip (2011).

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Melbourne</td>
<td>Central</td>
<td>885</td>
<td>1,413</td>
<td>1,461</td>
<td>1,753</td>
<td>2,565</td>
<td>4,100</td>
<td>7,174</td>
<td>11,604</td>
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<td>Yarra</td>
<td>Central</td>
<td>283</td>
<td>426</td>
<td>395</td>
<td>465</td>
<td>626</td>
<td>1,007</td>
<td>1,672</td>
<td>2,562</td>
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<tr>
<td>Port Phillip</td>
<td>Central</td>
<td>418</td>
<td>520</td>
<td>467</td>
<td>617</td>
<td>543</td>
<td>778</td>
<td>1,331</td>
<td>1,550</td>
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<tr>
<td>Moreland</td>
<td>Inner</td>
<td>591</td>
<td>667</td>
<td>532</td>
<td>457</td>
<td>287</td>
<td>351</td>
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<td>717</td>
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<tr>
<td>Darebin</td>
<td>Inner</td>
<td>150</td>
<td>252</td>
<td>293</td>
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<td>360</td>
<td>336</td>
<td>526</td>
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<td>Stonnington</td>
<td>Inner</td>
<td>215</td>
<td>275</td>
<td>261</td>
<td>332</td>
<td>284</td>
<td>379</td>
<td>537</td>
<td>677</td>
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<tr>
<td>Boroondara</td>
<td>Inner</td>
<td>188</td>
<td>307</td>
<td>306</td>
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<td>529</td>
<td>674</td>
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<td>Monash</td>
<td>Middle</td>
<td>740</td>
<td>931</td>
<td>757</td>
<td>571</td>
<td>573</td>
<td>458</td>
<td>619</td>
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<tr>
<td>Kingston</td>
<td>Middle</td>
<td>670</td>
<td>955</td>
<td>957</td>
<td>774</td>
<td>605</td>
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<td>521</td>
<td>473</td>
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<td>Maribyrnong</td>
<td>Inner</td>
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<td>172</td>
<td>135</td>
<td>173</td>
<td>227</td>
<td>304</td>
<td>406</td>
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<tr>
<td>Glen Eira</td>
<td>Inner</td>
<td>209</td>
<td>286</td>
<td>333</td>
<td>238</td>
<td>282</td>
<td>268</td>
<td>303</td>
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<tr>
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