

# Inquiry into National Freight and Supply Chain Priorities



# SUPPORTING PAPER NO. 4 ANALYSIS OF CAPITAL CITY KEY FREIGHT ROUTE PERFORMANCE

March 2018



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# 1. Overview: analysis of capital city key freight route performance

## Purpose

The Department of Infrastructure, Regional Development and Cities (the Department) has prepared the following analyses of Key Freight Routes (KFR) within each of Australia's five largest capital cities to support the delivery of the *Inquiry into National Freight and Supply Chain Priorities*. The analyses provide an overview of the freight activity and other pressures on the transport network, and specifically examine road freight movements along the KFR, network capacity and performance on the KFR, and key constraints on the KFR.

The focus of the analyses on KFR connections to critical economic hubs within major cities reflects strong feedback received during the consultation process that the most significant constraints on the land transport network are occurring in capital cities. Key findings are:

- congestion is occurring on KFR in all of the cities
- commercial vehicle volumes vary considerably between cities
- high commercial vehicle volumes are not always associated with high levels of congestion
- commuter traffic is a major cause of urban congestion.

This highlights that despite considerable investment from all governments, freight movements are still likely to be constrained on these networks by 2031.

#### How it was produced

The analyses are informed by publicly available data (for example, from the Australian Bureau of Statistics (ABS) and the Bureau of Infrastructure, Transport and Regional Economics (BITRE)) and strategic transport network modelling undertaken for the Department by Veitch Lister Consulting (VLC). This information informs Australian Government policy and investment decisions to improve the productivity and safety of the network as part of the Government's Infrastructure Investment Program.

The modelling depicts changes in transport infrastructure supply and demand over the 20 years from 2011 to 2031 in the five major capital cities. The base year of 2011 was chosen as it is the last year for which complete ABS Census data is available, and 2031 was chosen as the forecast year because 20 years is a long enough horizon to observe major changes in transport demand, but short enough to assure reasonably reliable forecasts.

The definition of capital cities used in the modelling is based on the ABS Greater Capital Cities Statistical Area, comprising ABS Statistical Area 4 'sub-regions'. The modelling includes three classes of vehicles based on the Austroads Vehicle Classification System: private cars, light commercial vehicles, and heavy commercial vehicles.



The modelling is based on a range of assumptions that were developed by VLC, with input from the Department and SGS Planning and Economics. Key assumptions include:

- Infrastructure Investment: expected changes to the transport network as a result of infrastructure projects under construction, or identified through state strategic planning documents, Australian Government priorities, and other sources, as being planning for future investment prior to 2031.
- Population and employment growth: population and employment growth assumptions are based on ABS Series B population projections, with some adjustments by SGS Planning and Economics for Melbourne, Adelaide and Perth.
- Land use: SGS Planning and Economics reviewed state government land use planning documents to inform where population and employment growth is likely to occur in the future.

The modelling is a point in time analysis, and developments since its commissioning, for instance recent changes to planned infrastructure investments, land use planning policies, and population growth rates, are not reflected in its forecasts. It remains, however, a robust and useful tool for understanding the future capacity and performance of transport networks and possible impacts on users. It is also predominantly a passenger movement model, and as such does not model rail freight movements. The morning peak is used as it is the time of day that network usage is highest, and there is more limited discretion for network users.

The modelling utilises 'level of service' categories from 'A' to 'F\*' (except for Adelaide, which only goes to 'F') to indicate conditions on the road network, with 'A' indicating free-flow traffic without delay, and 'F' indicating severe congestion and delays.

The maps included in the analyses show the movement of traffic on major KFR highways and freeways 'to' and 'from' the major port (air or sea), and movement of traffic on all other highways 'to' and 'from' the closest port (air, sea or land) in the city. Roads other than KFR may experience higher freight loads and congestion, however were out of scope of the analyses.

The modelling has also been used to inform a series of internal network analysis reports within the Department, which have be used in the preparation of the following capital city demand and capacity analyses.

The KFR network used in the analysis was developed by the Council of Australian Governments Transport and Infrastructure Council to show the key road and rail routes that connect the nationally significant places for freight in Australia. They are part of a coordinated initiative by state, territory, and Commonwealth governments, in consultation with industry, to develop a more comprehensive understanding of the national land freight system.



# Sydney

# Background

Sydney is Australia's largest city, with a population of approximately 5.0 million<sup>1</sup>, and is a critical international import and export hub serving Australia's eastern seaboard. Sydney's freight activity has had a strong focus on Port Botany and Sydney Kingsford-Smith Airport in central Sydney, and intermodal terminals in west central and north western Sydney.

Considerable population and employment growth is projected to occur to 2031. This is expected to increase passenger travel associated with economic and social activities, as well as increase freight movements.

Based on ABS forecasts, Greater Sydney's resident population is expected to grow by 35 per cent to around 6.2 million people by 2031.<sup>2</sup> Employment growth in Sydney is expected to outstrip population growth, with a 39 per cent increase in jobs to 3.1 million workers by 2031.<sup>3</sup>

Based on BITRE estimates, Sydney had 12.0 billion tonne-kilometres (tkm) of road freight movement in 2011 — this is forecast to grow to 19.1 billion tkm by 2031.<sup>4</sup> In 2013-14, the value of international air freight through Sydney was estimated to be \$54.3 billion<sup>5</sup> and the value of international sea freight was estimated to be \$60.1 billion.<sup>6</sup>

Containerised trade at Port Botany is expected to grow considerably from 2 million 20-foot equivalent units (TEU) in 2012-13 to 7 million TEUs by 2031.<sup>78</sup> This growth will place considerable pressure on transport links to the port, and the road network throughout Sydney.

# Key freight routes

Sydney's key freight routes (KFR) include:

- Hume Highway (M31): the only intercity motorway connected to the Sydney Motorway • Network (by the M5 and M7). It provides access to a number of intermodal terminals.
- Western Motorway (M4): serves the major centres of Parramatta, Blacktown, Auburn and Strathfield.
- South Western Motorway (M5): runs from the M7 and Hume Motorway interchange near Liverpool, to the Crooks River near Sydney Kingsford-Smith Airport. The King Georges Road to M7 section of the M5 passes through south western Sydney, but as it forms part of the orbital motorway network it also serves Central and Southern Sydney, as well as areas beyond Sydney to the southwest. It also forms part of the route for freight between the port

- <sup>3</sup> Bureau of Transport Statistics (2014), Summary Employment Forecasts 2011-2041, September 2014 Release V2.0. <sup>4</sup> BITRE (2010), Road freight estimates and forecasts in Australia: interstate, capital cities and rest of state.
- https://bitre.gov.au/publications/2010/files/report\_121.pdf

- <sup>6</sup> BITRE (2015), Australian sea freight 2013–14. https://bitre.gov.au/publications/2015/files/asf\_2013\_14.pdf

<sup>&</sup>lt;sup>1</sup> ABS (2017), 3218.0 Regional Population Growth Australia, 2016.

<sup>&</sup>lt;sup>2</sup> ABS (2013), 3222.0 Population Projections, Australia, Table 3. Projected Population, Components of change and summary statistics, Greater Sydney, November 2013

<sup>&</sup>lt;sup>5</sup> BITRE (2014), International Airline Activity 2013-14. https://bitre.gov.au/publications/ongoing/files/International airline activity FY2014.pdf

 <sup>&</sup>lt;sup>6</sup> BITRE (2015), Australian sea neigin 2010, 17, https://www.teresport.action.com/au/sites/default/files/media/documents/2017/NSW\_Freight\_and\_Ports\_Strategy-Full\_Strategy-High\_Resolution\_0.pdf
 <sup>7</sup> NSW Government (2013), NSW Freight and Ports Strategy-Full\_Strategy-High\_Resolution\_0.pdf
 <sup>8</sup> Weight and Ports\_documents/2017/NSW\_Freight\_and\_Ports\_Strategy-Full\_Strategy-High\_Resolution\_0.pdf https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/NSW\_Freight\_and\_Ports\_Strategy-Full\_Strategy-High\_Resolution\_0.pdf <sup>8</sup>NSW Government (2012), NSW Long Term Transport Master Plan <u>https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/nsw-</u> transport-masterplan-final.pdf



area and the freight precincts in the West Central and north western Sydney, although this role is likely to be diminished with the completion of WestConnex.

- King Georges Road (A3): provides a link to the Enfield and Chullora Intermodal Terminal.
- WestLink (M7): a key north-south route.
- Hills Motorway (M2): the northern part of Sydney's orbital motorway. Through its connections to the M1 and M7 motorways, the M2 also serves travellers in western and inner western Sydney. It also forms the route from the Central Coast and beyond, to areas to the west and south of Sydney. This role will be strengthened with the completion on NorthConnex.
- Pacific Motorway (M1): by 2031 the M1 to Newcastle and Brisbane will be connected via NorthConnex.
- Sydney Rail Freight Corridors: a network of dedicated railway lines for freight in Sydney, linking the state's rural and interstate rail network with the city's main yard at Enfield, and to Port Botany. Its primary components are the Southern Sydney Freight Line (from Macarthur to Sefton), the Metropolitan Freight Network (from Sefton to Enfield and Sydenham) and the Botany Rail Line (connecting the Metropolitan Freight Network to Port Botany).<sup>9</sup>
- Northern Sydney Freight Corridor (rail): the rail corridor from North Strathfield, and through Sydney's north, to Broadmeadow (Newcastle) provides the northern urban Sydney section of the interstate rail network link between Sydney and Newcastle.

# Key freight facilities

Key freight facilities in Sydney include:

- Kingsford Smith Airport—curfew operates from 11pm until 6am
- Port Botany
- Western Sydney Airport and Moorebank Intermodal Terminal—currently under construction, but is expected to become an important freight facility in the future (beyond 2031)
- Enfield, Sydney (Chullora), Yennora and Minto-Macarthur Intermodal Terminal.

Key freight precincts in Sydney include.<sup>10</sup>

- Port Botany to Sydney Airport and Sydenham
- Chullora and Enfield to Silverwater
- Western Sydney Employment Area
- Moorebank to Prestons and Minto
- Wetherill Park

 <sup>&</sup>lt;sup>9</sup> ARTC (2015), 2015-2024 Sydney Metropolitan Freight Strategy <u>http://www.artc.com.au/uploads/2015-Sydney-Metro-Strategy-Final.pdf</u>
 <sup>10</sup> NSW Government (2013), NSW Freight and Ports Strategy https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/NSW Freight and Ports Strategy-Full Strategy-High Resolution 0.pdf



- Villawood
- Bankstown
- Blacktown to Seven Hills.

## Network performance

Transport modelling indicates the Hume Motorway (where it connects to the M5 and the M7) and the Pacific Motorway (M1) around Berowra (Maps 1 and 2) are the most heavily utilised KFR roads, by commercial vehicles, in Sydney in 2011, with the trend projected to continue in 2031. The high Hume Motorway usage is likely to be because it is a major gateway from the south with few alternatives. Similarly, the Pacific Motorway (M1) provides the only motorway access from the north, where it splits into the Pacific Highway (A1—for access to the CBD) and Cumberland Highway (A28—for access to the west).

Congestion in Sydney is not particularly associated with high commercial vehicle use—it is more likely to result from commuter traffic due to population increases in growth areas and a lack of public transport capacity. For example, King Georges Road is expected to be severely congested in 2031, and the alternative rail routes (the Illawarra and East Hills lines) also experience crowding, offering little incentive for mode shift from road to rail.

The modelling also shows there is likely to be a decrease in network performance across Sydney overall due to congestion. The most congested KFR roads in Sydney are predicted to be on the Sydney Orbital Route, especially the A28 Cumberland Highway and M2 Hills Motorway, Western Motorway M4 near Greystanes, the A3 King Georges Road (Princes Highway to Greenacre), and M5 (Hume Motorway to Heathcote Road) (Maps 3 and 4).

The modelling commissioned for the Department did not include rail freight. The construction of Inland Rail, however, will provide an alternative to the Sydney rail network for freight trains travelling between Melbourne and Brisbane. This is likely to free some capacity on the Sydney rail network for passenger trains and freight travelling through central Sydney, and may also reduce pressures on Sydney's road network through mode shift from road to rail.

## **Key deficiencies**

Key deficiencies on Sydney's KFRs are expected to include:

- A28 Cumberland Highway and M2 Hills Motorway—caused by commuter traffic and population growth in Liverpool and Parramatta.
- Western Motorway M4 near Greystanes—caused by commuter traffic and population growth in western Sydney, and increased freight flow to the Yennora Intermodal Terminal.
- A3 King Georges Road (Princes Highway to Greenacre)—caused by population growth in south west Sydney, limited bridge crossings and alternative routes for commuters and freight travelling across the Georges River.
- M5 (Hume Motorway to Heathcote Road)—caused by population growth in western Sydney and increasing freight flows between western Sydney and Sydney Kingsford Smith Airport/Port Botany.



# Case Study: M5 (Hume Motorway to Heathcote Road)

The M5 (Hume Motorway to Heathcote Road) is part of the Sydney Orbital Network, which provides a ring road around Sydney and is linked to the arterial network and intercity highways. This section of the M5 is fed by the Hume Motorway, enabling access from the southern highlands (and beyond) and the growth areas of western Sydney (for example, Campbelltown, Camden and Macarthur) to the CBD, Port Botany and Kingsford Smith Airport. It also provides access to the Enfield and Chullora Intermodal Terminals via King Georges Road.

Modelling for the M5 shows that in 2011 there were considerable freight and commuter traffic flows leading to severe congestion along the M5. This is caused by the M5 linking areas of population growth in Western Sydney with employment in the CBD, and increasing freight flows between western Sydney and Sydney Kingsford Smith Airport/Port Botany. Crowded passenger rail conditions and limited public transport alternatives provide little incentive for mode shift from the road to rail network and further exacerbates congestion on the M5.





Map showing forecast level of service on key freight route roads in Sydney in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Port Botany in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Chullora in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.



# Melbourne

# Background

Melbourne provides direct access to key interstate and global markets via major land, air and sea freight and passenger routes. It is expected to grow significantly in the future, with its population forecast to increase from 4.2 million in 2011 to 6.0 million in 2031, and employment expected to increase from 2.0 million jobs in 2011 to 3.1 million jobs in 2031.<sup>11</sup> Increased passenger travel associated with economic and social activities is driven by population and employment growth, while freight movements is forecast to grow due to increased commercial activities.

The Port of Melbourne is pivotal to the city's freight movements, and will handle considerably more shipping containers in the future—with forecasts between 6.4 and 8.0 million TEU in 2031 compared with 2.5 million TEU in 2011.<sup>12</sup> While a large percentage of the freight task is transported by road in Melbourne, rail freight is also significant. The total Victorian freight task (including both road and rail) is approximately 361 million tonnes per annum.<sup>13</sup> Based on BITRE forecasts, the road freight task on Melbourne's transport network is estimated to increase from 12.0 tkm in 2011 to 19.4 billion tkm by 2031.<sup>14</sup>

# Key freight routes

Melbourne's KFR include:

- M1 Princes Freeway: connects Melbourne CBD (via the CityLink), Eastern suburbs, Monash precinct and Dandenong precinct.
- M1 West Gate Freeway: the main route across the Maribyrnong River, connecting Geelong and the Western suburbs to the Melbourne CBD, Port of Melbourne, CityLink and beyond.
- M1 Monash Freeway: connects Melbourne's South East and the inner sub-region.
- M1 Geelong Ring Road: the local freeway linking regional Victoria with Geelong and Melbourne via the Princes Freeway.
- M1 and M2 CityLink: connects Melbourne CBD, M1 Monash Freeway in the South East subregion, M1 West Gate Freeway in the West, and the M2 Tullamarine and M79 Calder Freeways in the North West.
- M2 Tullamarine Freeway: connects Melbourne CBD, Melbourne airport, M80 Ring Road and CityLink.
- M3 Eastern Freeway: connects Melbourne CBD and the Inner South, Inner East and South East sub-regions.
- M3 EastLink: connects M3 Eastern Freeway, M1 Monash Freeway and M11 Peninsula Link.

<sup>&</sup>lt;sup>11</sup> VLC (2016), based on SGS demographic data.

 <sup>&</sup>lt;sup>12</sup> BITRE (2014), Containerised and non-containerised trade through Australian ports to 2032-33. <u>https://bitre.gov.au/publications/2014/files/report\_138.pdf</u>
 <sup>13</sup> Deloitte Touche Tohmatsu (2016), Infrastructure Capability Assessments.

<sup>&</sup>lt;sup>14</sup> BITRE (2010), Road freight estimates and forecasts in Australia: interstate, capital cities and rest of state. <u>https://bitre.gov.au/publications/2010/files/report\_121.pdf</u>



- M8 Western Freeway: connects Melbourne and South Australia.
- M31 Hume Freeway: connects Melbourne and New South Wales.
- M79 Calder Freeway: connects Melbourne, Bendigo, Mildura and New South Wales.
- M80 Ring Road: the key freight corridor that connects the M1 Princes Freeway, M1 West Gate Freeway, M2 Tullamarine Freeway, M8 Western Freeway, M31 Hume Freeway, M79 Calder Freeway and the Greensborough Highway.
- M420 South Gippsland Freeway: connects South East sub-region and the Port of Hasting via the M780 Western Port Highway.
- M780 Western Port Highway: connects South East sub-region and the Port of Hasting via the M420 South Gippsland Freeway.
- A10 Princes Highway: the local connection between Port of Geelong and Melbourne via the Princes Freeway.
- A300 Ballarat Road: the local connection between Ballarat and Geelong.
- Airport Drive: the local connection between Melbourne and Greater Melbourne via the Western Ring Road.

# Key freight facilities

Key freight facilities in Melbourne include:

- Port of Melbourne: Australia's largest container and general cargo port, with over one-third of the nation's containerised trade passing through the facility.
- Port of Hastings and Port of Geelong.
- Two curfew-free international airports: Melbourne and Avalon Airport.
- Intermodal terminals for transfer of freight between road and rail: Altona, Spotswood, Laverton, Dynon, South Dynon, East Swanson Dock, West Swanson Dock, Victoria Dock and Somerton.
- An extensive rail and road transport network.
- Industrial precincts:
  - Altona–Laverton precinct
  - o Monash precinct
  - Fishermans Bend precinct
  - Melbourne Airport–Tullamarine precinct
  - Somerton–Campbellfield precinct

- o Dandenong-Hallam precinct
- o Moorabbin-Braeside industrial precinct
- o Knoxfield industrial precinct
- o Bayswater North-Kilsyth industrial precinct



#### Network performance

According to transport modelling commissioned for the Department, commercial vehicle (CV) volumes are expected to increase across Melbourne's KFR between 2011-2031. CV volumes are highest on the M1 Princes Highway (west), M1 West Gate Freeway, M80 Ring Road, M1 and M2 CityLink, M1 Monash Freeway and M3 Eastlink (Maps 1 to 2). Notable increases are expected along the sections of M1 West Gate Freeway and M1 and M2 CityLink near the Port of Melbourne.

Despite major government investment in transport infrastructure, the modelling shows KFR performance is expected to decline between 2011-2031 in Melbourne due to increased network demand from population and freight growth. The M1 Princes Freeway (west), M1 West Gate Freeway, M8 Western Freeway, M31 Hume Freeway and M79 Calder Freeway will be the most congested (Maps 3 and 4). This is likely to be caused by capacity constraints on these sections of road, as commuters from the outer suburbs drive toward workplaces located in the inner sub-region during the morning peak. Network users will also experience frequent major delays and unpredictable travel times on:

- M1 Monash Freeway
- M1 and M2 CityLink
- M3 Eastern Freeway
- M80 Western Ring Road
- M420 South Gippsland Freeway.

The modelling commissioned for the Department did not include rail freight, however, the construction of Inland Rail between Melbourne and Brisbane is likely to alleviate pressure on Melbourne's road network by encouraging mode shift from road to rail. This is likely to occur as road freight travelling towards Brisbane from the Port of Melbourne and regional Victoria shifts to Inland Rail.

#### Key deficiencies

The key deficiencies on Melbourne's KFR are expected to include:

- M1 Monash Freeway (CityLink to Berwick): caused by commuter traffic and population growth from Casey/Cardinia and increased freight flows between Port of Melbourne, Monash precinct and Dandenong precinct.
- M1 West Gate Freeway (Altona North to CityLink): caused by bottlenecks at the West Gate Bridge, commuter traffic and population growth from Western suburbs, and freight flow seeking access to freight facilities and industrial precincts.
- M80 Ring Road: caused by commuter traffic and population growth from Wyndham, Melton and Whittlesea, combined with increased freight flows due to commercial activity across metropolitan Melbourne.
- M8 Western Freeway (Melton to Derrimut): caused by commuter traffic and population growth from Melton and increased freight flows from commercial activity growth between Melbourne, regional Victoria and South Australia.



- M31 Hume Freeway (Campbellfield to Kalkallo): caused by commuter traffic and population growth from Whittlesea and increased freight flows between Melbourne, NSW and regional Victoria from commercial activities at the Northern Industrial Precinct (Somerton/Campbellfield). This precinct is a major distribution centre for wholesale trades, with a strong presence of manufacturing industries.
- M79 Calder Freeway (Macedon to Niddrie): caused by commuter traffic and population growth from Sydenham, and increased freight flows between Melbourne, Bendigo, Mildura, NSW/SA and regional Victoria due to commercial activity growth.
- M1 Princes Freeway (east and west): caused by commuter traffic and population growth from Werribee, and increased freight flows between Melbourne, NSW and regional Victoria. Increase in freight flows on the M1 Princes Freeway (east) are related to commercial activity growth at the Dandenong and Monash precincts, which have a strong presence in manufacturing and wholesale trade. Increase in freight flows on the M1 Princes Freeway (west) is likely attributed to commercial activity growth between Geelong and Melbourne.

#### Case study: M80 ring road

The M80 Ring Road provides a key orbital route across the west and north of metropolitan Melbourne, linking the M1 West Gate Freeway, M1 Princes Freeway, M2 Tullamarine Freeway, M8 Western Freeway, M3 Hume Freeway, M79 Calder Freeway and the Greensborough Highway.

It attracts users from all across the greater Melbourne metropolitan area and further afield including regional Victoria, and facilitates the distribution of commercial goods across the city from key industrial precincts to the north and west of the city. With considerable population growth expected in outer suburbs located west, north-west and north of the city, demands on the M80 Ring Road will likely increase into the future.

While the M80 Ring Road has had significant investments, considerable freight and commuter traffic flows are concentrated on this key orbital route, causing severe congestion. This congestion is exacerbated by large commuter movements due to lack of public transport connections in the orbital direction, and the absence of alternative routes for freight.





Map showing forecast level of service on key freight route roads in Melbourne in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at the Port of Melbourne in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Altona in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.



# South East Queensland

# Background

South East Queensland (SEQ) is Queensland's main urban centre, and provides direct access to major interstate and global markets via major land, air and sea freight and passenger routes. It is expected to grow significantly in the future, with its population forecast to increase from 3.0 million in 2011 to 4.5 million in 2031, and employment expected to increase from 1.4 million jobs in 2011 to 2.2 million jobs in 2031.<sup>15</sup> This increase in population and employment is expected to increase freight movements.

The containerised trade forecast at the Port of Brisbane is expected to grow considerably from 1,070,000 TEUs in 2012-13 to 3,536,000 TEUs in 2032-33.<sup>16</sup> While a large percentage of the freight task is transported by road in SEQ, rail freight is also significant. In 2010-11 rail freight movement in Queensland was responsible for 251.0 million tonnes of trade (28.8 per cent of the freight task by tonnage hauled).<sup>17</sup> BITRE forecast a 90.7 per cent increase in SEQ's freight activity, from 7.5 billion tkm in 2007 to 14.3 billion tkm in 2030.<sup>18</sup>

# Key freight routes

SEQ's Key Freight Routes (KFR) include:

- Gateway and Pacific Motorways—extending along the coast from NSW to the Sunshine Coast.
- Bruce Highway—between Nambour and Brisbane.
- Warrego Highway—between Ipswich and Morven.
- Cunningham Highway—between western NSW and Ipswich.
- Ipswich Motorway—connecting:
  - the Warrego and Cunningham Highways to the Pacific Motorway (via the Logan Motorway) to provide access to the Gold Coast
  - to the Gateway Motorway (via arterial roads) to provide access to the Port of Brisbane, Brisbane Airport, the Sunshine Coast and beyond.

Although not a designated KFR, the Centenary Highway provides an alternative route to the Ipswich and Gateway Motorways for traffic from Toowoomba and western NSW travelling to north of Brisbane. This route bypasses Brisbane's CBD.

<sup>&</sup>lt;sup>15</sup> VLC (2016), based on SGS demographic data

<sup>&</sup>lt;sup>16</sup> BITRE (2014), Containerised and non-containerised trade through Australian ports to 2032-33 <u>https://bitre.gov.au/publications/2014/files/report\_138.pdf</u> <sup>17</sup> Department of Transport and Main Roads (2013), *Moving Freight* <u>https://www.tmr.qld.gov.au/-/media/busind/Transport-sectors/Freight/Moving-Freight-final/EinalMoving-Freightfull\_actions/2014/files/report\_138.pdf</u> final/EinalMoving-Freightfull\_action\_containerised trade through Australian ports to 2032-33 <u>https://bitre.gov.au/publications/2014/files/report\_138.pdf</u> final/EinalMoving-Freightfull\_action\_containerised trade through Australian ports to 2032-33 <u>https://bitre.gov.au/publications/2014/files/report\_138.pdf</u> final/EinalMoving-Freightfull\_action\_containerised trade through Australian ports to 2032-33 <u>https://bitre.gov.au/publications/2014/files/report\_138.pdf</u> final/EinalMoving-Freightfull\_action\_containerised trade through Australian ports to 2032-33 <u>https://bitre.gov.au/publications/2014/files/report\_138.pdf</u>

final/FinalMovingFreightfull.pdf?la=en

 <sup>18</sup> BITRE (2010), Road freight estimates and forecast in Australia <a href="https://bitre.gov.au/publications/2010/files/report\_121.pdf">https://bitre.gov.au/publications/2010/files/report\_121.pdf</a>



# Key freight facilities

Key freight facilities in SEQ include:

- Port of Brisbane—one of Australia's largest ports, with significant growth potential.
- Four major airports—Brisbane, Gold Coast, Sunshine Coast and Brisbane West Wellcamp, with international connections (none are subject to curfews).
- A network of major roads and rail.
- Intermodal terminals—Acacia Ridge Intermodal Terminal and Toll NQX Tennyson.
- Freight clusters:
  - One cluster exists south west of the CBD, stretching along Ipswich Road from Yeerongpilly to Wacol and along Beaudesert Road from Yeerongpilly to Acacia Ridge. This cluster includes the suburbs of Rocklea, Acacia Ridge, Archerfield, Coopers Plains, Richlands, Carole Park, Heathwood and Larapinta.
  - Another cluster exists north east of the CBD, stretching along the river between Eagle Farm and the Port of Brisbane. This cluster includes the suburbs of Geebung, Eagle Farm, Mararrie, Hemmant, Lytton and Pinkenba.

## Network performance

According to the transport modelling commissioned for the Department<sup>19</sup>, commercial vehicle (CV) volumes are expected to increase across SEQ's KFR between 2011-2031. CV volumes are expected to be highest on the Gateway Motorway between Eagle Farm (north of the Brisbane River) and the Pacific Motorway, and between Loganholme and Beenleigh. Notable increases are expected along the Gateway and Pacific Motorways between North Lakes and Molendinar (Gold Coast), the Bruce Highway between Nambour and Brisbane, and also along the Logan Motorway (Maps 1 and 2).

The modelling also shows that KFR performance is expected to decline between 2011-2031 in Brisbane and the Gold Coast. The Ipswich Motorway is forecast to be the most congested, especially between the Warrego Highway and Logan Motorway (Maps 3 and 4). This is likely to be caused by capacity constraints on this section of road, as traffic from the Warrego and Cunningham Highways is funnelled onto the Ipswich Motorway. Network users are also expected to experience frequent major delays and unpredictable travel times on:

- Gateway Motorway between North Lakes and the Logan Motorway
- Bruce Highway north of Brisbane
- Pacific Motorway between the Gateway Motorway and Tweed Heads
- Cunningham Highway near Yamanto

<sup>&</sup>lt;sup>19</sup> VLC (2017), Zenith model outputs for SEQ's transport network in 2011 and 2031, Unpublished.



• Ipswich Motorway near Rocklea and where the KFR continues along Riawena Road to join to the Gateway Motorway.

The Centenary Highway is also likely to be severely congested, particularly between Springfield and the Logan Motorway, and at the crossing of the Brisbane River.

The modelling commissioned for the Department did not include rail freight, however the construction of Inland Rail between Melbourne and Brisbane is likely to alleviate pressure on SEQ's road network by encouraging mode shift from road to rail. This is likely to occur as road freight between Melbourne and Brisbane, and from resource and agricultural areas in regional Queensland to the Port of Brisbane and Acacia Ridge intermodal terminal, shifts to Inland Rail.

## Key deficiencies

The key deficiencies on SEQ's KFR are expected to include:

- River crossings Brisbane River cuts through Brisbane, separating the Port and Airport. Limited river crossings create bottlenecks for freight and commuters.
- Ipswich Motorway the Warrego and Cunningham Highways converge at the Ipswich Motorway, causing severe congestion.
- Increased commuter traffic population growth in the region is putting pressure on the road network between the Gold Coast and Brisbane.
- Freight rail the Port of Brisbane is not supported by a dedicated freight rail connection, meaning freight must travel on the road network or compete with passenger trains on the rail network.

## Case Study: Ipswich Motorway near Rocklea

The Ipswich Motorway connects northern NSW and south west QLD with the Port of Brisbane. While the Ipswich Motorway has had significant investments, as the Warrego and Cunningham Highways converge on the Ipswich Motorway, considerable freight and commuter traffic flows are concentrated at this bottleneck, causing severe congestion (Map 3).

This congestion is exacerbated by large commuter movements due to a lack of capacity on public transport connections to Ipswich from Brisbane, and the absence of alternative routes for freight. As such, the westbound direction is less congested in the AM peak.





Map showing level of service on key freight route roads in Brisbane in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Port Brisbane in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Acacia Ridge in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.

# Perth

# Background

Perth is central to southern Western Australia's (WA) road freight network. It is a major consumer of freight goods due to its growing population, and is a major gateway to other markets via the Port of Fremantle. It is expected to grow significantly in the future, with its population forecast to increase from 1.8 million in 2011 to 2.9 million in 2031, while employment is expected to increase from 1 million to 1.4 million.<sup>20</sup> This increase in population and employment is expected to increase passenger travel associated with economic and social activities, as well as increase freight movements.

The containerised trade forecast at the Port of Fremantle is expected to grow from 670,000 TEUs in 2012-13 to 2.1 million TEUs in 2032-33.<sup>21</sup> BITRE has forecast an 81.8 per cent increase in Perth's road freight activity, from 5.1 billion tkm in 2007 to 9.3 billion tkm in 2030<sup>22</sup>. Perth's major freight roads connect Perth (and the Port of Fremantle) to surrounding regions, servicing southern WA's mining and agricultural industries. A freight rail network also services south west WA, and connects to South Australia and the Ports of Fremantle, Kwinana, Bunbury, Geraldton, Albany and Esperance.

# Key freight routes

Perth's KFR include:

- Kwinana Freeway which enters Perth from the south.
- Albany Highway to the south-east.
- Brookton Highway to the south-east.
- Great Eastern Highway to the north-east.
- Great Northern Highway to the north.
- Mitchell freeway to the north.
- Reid Highway which runs from the west to the east, north of the Swan River.
- Roe Highway which runs from the west to the east, south of the Swan River.
- Leach Highway which links central Perth to the Port of Fremantle.
- Rockingham Road which links the Port of Fremantle to the Port of Kwinana.

# Key freight facilities

Key freight facilities in Perth include:

- Port of Fremantle
  - o Inner Harbour

<sup>21</sup> BITRE (2014), Containerised and non-containerised trade through Australian ports to 2032-33 <u>https://bitre.gov.au/publications/2014/files/report\_138.pdf</u> <sup>22</sup> BITRE (2010), Road freight estimates and forecast in Australia <u>https://bitre.gov.au/publications/2010/files/report\_121.pdf</u>

<sup>&</sup>lt;sup>20</sup> VLC (2016), based on SGS demographic data



- o Outer Harbour
- Perth Airport
- Kewdale Freight Terminal.

### Network performance

Transport modelling indicates that the KFR most heavily used by commercial vehicles in both 2011 and 2031 are expected to be:

- the Leach Highway
- Roe Highway
- Tonkin Highway
- Abernethy Road.

This is most likely because the Leach Highway and Roe Highway service central Perth and are key connections to the Port of Fremantle from the north and east. The Tonkin Highway and Abernethy Road service the central business district and airport, and also connect to the Roe Highway and other KFRs (Maps 1 and 2).

As well as having a considerable freight task, Perth's road network also services a growing number of commuters. Perth has experienced rapid population growth over the past decade in response to Australia's mining boom, and the city is predicted to continue growing (although at a slower rate) — increasing pressure on the land transport network. In particular, the city will continue to stretch north and south along the coast. The North West and Peel sub-regions will see the greatest increase in their share of total population, while the South East and South West will maintain their share of total population. Areas in Perth City are also expected to absorb an influx of new residents<sup>23</sup>.

Transport modelling indicates that despite major upgrades, Perth's road network performance is expected to decline due to increased freight and commuter demand, with sections of the Kwinana Freeway, Albany Highway, Canning Road, Leach Highway, Tonkin Highway and Reid Highway severely congested by 2031 (Maps 3 and 4). Congestion will most likely be concentrated in central Perth, resulting from increased passenger travel as the population grows.<sup>24</sup> Limited public transport across some outer areas in Perth is expected to force residents to commute by car, constraining roads linking outer suburbs to central Perth.

While road network deficiencies are expected to largely be caused by passenger vehicles, any congestion on freight routes will result in lost productivity and delays for both passenger and commercial vehicles. The following roads will experience the highest commercial vehicle usage by 2031 (Maps 3 and 4):

- Roe Highway
- Kwinana Freeway

 <sup>&</sup>lt;sup>23</sup> Department of Infrastructure, Regional Development and Cities (2016), An Analysis of Perth's Urban Transport Network: 2011-2031, Unpublished.
 <sup>24</sup> VLC (2017), Zenith model outputs for Perth's transport network in 2011 and 2031, Unpublished.



- Tonkin Highway
- Reid Highway
- Leach Highway
- Mitchell Freeway
- Great Eastern Highway
- Rockingham Road/Stock Road
- Abernethy Road.

# Key deficiencies

The key deficiencies on Perth's KFR are expected to include:

- Kwinana Freeway approaching Roe Highway from Armadale Road to the south, and between Leach Highway and Graham Farmer Freeway.
- Canning Road between intersection with Brookton Highway and Glenisla Road.
- Tonkin Highway between intersection with Great Eastern Highway and Reid Highway, and between Roe Highway and Albany Highway.
- Reid Highway between Altone Road and West Swan Road.
- Wanneroo Road between Reid Highway and Flynn Drive.
- Curtin Avenue between Leighton Beach Boulevard and Manning Street.
- Rockingham Road between Mandurah Road and Cockburn Road.
- Nicholson Road between Armadale Road and Ranford Road, and between Bengalla Boulevard and Roe Highway.

The Leach Highway and Roe Highway are also forecast to experience heavy congestion, but to a lesser extent. As discussed above, much of this expected congestion is caused by increased commuter demand. The Leach Highway, Roe Highway, Tonkin Highway and Rockingham Road however, will also likely see substantial increases in commercial vehicle demand, which will contribute to the overall levels of congestion.

#### Case Study: Kwinana Freeway

The Kwinana Freeway enters Perth from the south, connecting the high growth areas of Rockingham, Kwinana and Cockburn to the Perth city. Approximately 70 kilometres of the Kwinana Freeway, from just north of Mandurah to central Perth is expected to be strained to varying degrees by 2031 (Maps 3 and 4). This is largely a result of massive population growth expected in the Rockingham, Kwinana and Cockburn areas.

While most of this pressure on the Kwinana Freeway will result from increased passenger vehicle demand, it will negatively impact freight vehicles travelling on the route. In particular, the section between the Roe Highway and Armadale Road is expected to experience severe congestion — limiting accessibility to the Port of Fremantle for commercial vehicles travelling from the south.





Map showing forecast level of service on key freight route roads in Perth in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Port Fremantle in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Port Kwinana in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.

# Adelaide

# Background

Adelaide is the fifth largest capital city in Australia, home to an estimated population of 1.32 million<sup>25</sup>. The total population of Adelaide and the Greater Adelaide region is projected to increase from approximately 1.26 million in 2011 to just under 1.5 million in 2031, the lowest population growth of the five major Australian capital cities.<sup>26</sup>

Based on existing employment trends, total employment across Greater Adelaide is expected to increase from 670,000 in 2011 to 814,000 in 2031, growing at 1.0 per cent per annum.<sup>27</sup> Adelaide commuters have the highest car dependency of the five major capitals, increasing pressure on the road network and competing with freight movements.

Manufacturing has traditionally been the highest employment industry in South Australia. However, with the decline of the manufacturing industry in the early 2000s, the nature of Adelaide's freight task is predicted to shift towards time-sensitive commodities such as food and consumer goods.<sup>28</sup> This shift in freight task will require the network to be working efficiently in order to provide access to major gateways serving local, national and international markets.<sup>29</sup>

# Key freight routes

Adelaide's KFR include:

- Port Wakefield Highway
- the North-South Corridor (Northern Connector, South Road, and Southern Expressway, which form a 78 kilometre continuous route for freight through Adelaide)
- the Northern Expressway
- Marion Road
- Main North Road
- the South Eastern Freeway.

# **Key Freight Facilities**

Adelaide's Key Freight Facilities include:

- Outer Harbour Port
- Adelaide Airport

<sup>27</sup> Department of Infrastructure, Regional Development and Cities (2016), An Analysis of Adelaide's Urban Transport Network: 2011-2031, Unpublished.

<sup>28</sup> Department of Infrastructure, Regional Development and Cities (2016), An Analysis of Adelaide's Urban Transport Network: 2011-2031, Unpublished.
<sup>29</sup> Department of Infrastructure, Regional Development and Cities (2016), An Analysis of Adelaide's Urban Transport Network: 2011-2031, Unpublished.

<sup>&</sup>lt;sup>25</sup> ABS Estimated Resident Population at 30 June 2016

<sup>&</sup>lt;sup>26</sup> Department of Infrastructure, Regional Development and Cities (2016), An Analysis of Adelaide's Urban Transport Network: 2011-2031, Unpublished

<sup>&</sup>lt;sup>29</sup> Department of Infrastructure, Regional Development and Cities (2016), An Analysis of Adelaide's Urban Transport Network: 2011-2031, Unpublished.



• Gillman, Islington and Penfield intermodal terminals.

#### Network performance

Modelling of Adelaide's KFR for 2031 shows that commercial vehicle volumes are expected to increase moderately along the North-South Corridor and the Southern Expressway (Maps 1 and 2).<sup>30</sup> This is likely to be due to projected growth in Adelaide's food and consumer goods industry, particularly for the North-South Corridor, which enables access to Adelaide Airport, Outer Harbour Port and the intermodal terminals.

Modelling also shows that network performance is expected to worsen by 2031 across the network based on existing travel behaviours, particularly around Adelaide's CBD (e.g. South Road and Marion Road) (Maps 3 and 4).<sup>31</sup> Congestion on KFR is not particularly associated with key freight locations or roads with high commercial vehicle usage, suggesting that the decrease in road performance is due to increased commuter traffic. Commuter driven congestion is likely to be caused by Adelaide's car dependency, limited use/options for public transport, and employment being concentrated in the Adelaide CBD while population growth is occurring in Adelaide's outer northern and southern suburbs (such as Penfield and Salisbury in the north and Aldinga and Seaport in the south). The disconnect between employment and residential growth areas appears to be driving congestion e.g. along Main North Road and the Northern Expressway.

#### Key deficiencies

The key deficiencies on Adelaide's KFR are expected to include:

- South Road (Southern Expressway) between Sir Donald Bradman Drive and Sturt Road
- Marion Road between Sir Donald Bradman Drive and Sturt Road
- Main North Road between Evanston South to the Adelaide CBD
- Princes Highway between Mount Lofty to the Adelaide CBD.

## Case Study: North-South Corridor

The North-South Corridor incorporates a number of major road sections in Adelaide, including the Northern Connector and Main South Road. The North-South Corridor will eventually form a long continuous freight route through Adelaide, providing access to Adelaide Airport, Outer Harbour Port and intermodal terminals.

The level of service along the North-South Corridor is poor with drivers experiencing frequent major delays, both along the corridor and parallel roads. Sections of the North-South Corridor, particularly along South Road, continue to experience delays and long travel times.

Future investments along the North-South Corridor include: upgrades between Regency Road to Pym Street, the River Torrens to Glenelg Tram Overpass and the Glenelg Tram Overpass to Tonsley Boulevard.

<sup>&</sup>lt;sup>30</sup> VLC (2017), Zenith model outputs for Adelaide's transport network in 2011 and 2031, Unpublished.

<sup>&</sup>lt;sup>31</sup> Department of Infrastructure, Regional Development and Cities (2016), An Analysis of Adelaide's Urban Transport Network: 2011-2031, Unpublished.





Map showing forecast level of service on key freight route roads heading towards ports in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Port Adelaide in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.





Map showing forecast level of service on key freight route roads at Adelaide Airport in 2031. Produced by the department using data provided by Veitch Lister Consulting Pty Ltd.

