Victoria Infrastructure Investment Update 2016
Engineers Australia is the trusted voice of the engineering profession.

We are the global home for engineering professionals renowned as leaders in shaping a sustainable world.
Key Points

Engineers Australia believes the public sector needs to do more to reverse current trends.

OVER THE LAST 25 YEARS SUBSTANTIAL PRESSURE HAS BEEN PLACED ON VICTORIA’S INFRASTRUCTURE ASSETS.

The population has increased 34.5 per cent, and the economy has increased 105.4 per cent. To meet these increasing pressures, engineering construction on infrastructure has increased 113.7 per cent. A vast majority of this construction has come from the private sector.

IN THE LAST FIVE YEARS, ENGINEERING CONSTRUCTION ON INFRASTRUCTURE HAS FALLEN.

Engineering construction on infrastructure fell at an average of 1.2 per cent per year. In 2014-15 this dropped to 24.4 per cent below 2010-11 construction levels. This was most notable in the public sector where construction had dropped to 31 per cent below 2010 levels. When compared to the national averages, Victorian growth numbers are consistently below national averages. This indicates the standard of living for Victorians has been falling, and that more needs to be done to halt this decline.

IN THE LAST FIVE YEARS, STANDARDS OF LIVING HAVE FALLEN.

In that time the average Gross Domestic Product (GDP) growth, and GDP growth per person was significantly less than the 25-year long-term average. State population growth in the same period was higher than the 25-year long-term average, which makes population growth the major contributor to current GDP growth averages.

THE PUBLIC SECTOR WILL BE RESPONSIBLE FOR REVERSING CURRENT ENGINEERING CONSTRUCTION TRENDS.

The state Government has recently signaled a number of projects for future completion; however Engineers Australia is not convinced that will be enough to reverse current trends.

Victoria risks seeing its infrastructure assets fall to a poor or inadequate level that will not meet future needs. Engineers Australia believes that the public sector needs to lead the way through infrastructure investment to promote productivity growth, and improve the standard of living for Victorians.
Introduction

Long term infrastructure planning and development is an enabler of productivity growth and this growth has been responsible for much of the improvements in Australia’s living standards, and this relationship is expected to continue into the future. Without productivity growth, Australian living standards will stagnate and, as the population ages, it is possible that our standard of living could fall.

Since the Global Financial Crisis, Australia’s GDP growth and growth in GDP per capita, have been at comparatively low levels and we’ve seen the nation’s productivity growth fall below historical averages. This is echoed in the state of Victoria, where the state GDP, and GDP per capita have averaged less than the national average consistently for the last 10 years.

This report analyses trends in infrastructure construction in Victoria, and evaluates the current situation of the state’s infrastructure for the different areas of engineering construction. This report uses engineering statistics from the Australian Bureau of Statistics (ABS), as they are reliable indicators of infrastructure development and construction completed on engineering assets. Although these statistics are not ideal for a comprehensive analysis, they are the best available. For almost a decade, Engineers Australia has advocated for governments to publish comprehensive statistics on the nation’s infrastructure to inform community discussions and to provide the basis for new infrastructure decisions.

In the 2010 Victorian Infrastructure Report Card, Engineers Australia acknowledged that a number of large infrastructure projects in the state had been initiated, but expressed concern about significant aspects of Victoria’s infrastructure. Engineers Australia rated Victorian infrastructure as just adequate for current needs, however more needed to be done to address future needs. Major changes were required to enable infrastructure to be fit for its current and anticipated future purposes.

Five years on from that report, Engineers Australia still remains concerned about the ability of infrastructure in Victoria to meet future needs and drive productivity growth, fueled by the fact that engineering construction on infrastructure projects has fallen consistently over the last five years. This is most significant in the public sector; as completions have fallen, so too has the commencement of infrastructure projects, and the amount of construction that is yet to be completed in the system.

PUBLIC INVESTMENT NEEDS TO SET THE PACE

Private sector construction is usually biased toward infrastructure in support of specific private projects which suit the investing company, rather than the general population. For this reason, public sector infrastructure investment is a better gauge on progress.

To add to this, public sector construction on infrastructure has dropped dramatically in the last two years and all infrastructure categories recorded falls in the last year, except for roads. Some may point to the fact that there are still 2.3 years of work left in the system at current rates of completion, but the amount of work still in the system has been falling. Additionally, last year Victoria’s population grew at an average annual rate of just under two per cent, which is above the averages between 1990 and 2005. Population growth increases the pressure on infrastructure, and influences governments’ decisions for future infrastructure projects. More public sector investment in infrastructure will be required to meet the future demands of the increasing population.

Engineers Australia accepts that it is unlikely that infrastructure will ever be perfect, but infrastructure policy should strive to enable productivity and economic growth. Political announcements
often cheer the triumphs of the government’s infrastructure achievements, but this has not been matched by delivery, especially from the public sector in the last five years. The investment necessary to produce positive outcomes for the state requires a higher order of magnitude than has been allowed for in recent budgets and infrastructure announcements.

Greater transparency and community engagement is needed to better inform more coherent discussions around current and future infrastructure projects. Introducing Infrastructure Victoria as a statutory body was an encouraging start, but this body needs to produce real improvements for the state. Accessible infrastructure plays a critical role in a diverse economy, and the public sector needs to step forward and act on falling engineering construction trends as soon as possible.

**Engineers Australia still remains concerned about the ability of infrastructure in Victoria to meet future needs and drive productivity growth.**
The state of infrastructure in Victoria

OUR APPROACH AND RESEARCH DATA

This report puts contemporary developments in Victoria into perspective by looking at ABS data on engineering construction\(^1\). These statistics provide reliable and objective measures for:

- On-the-ground progress of infrastructure projects.
- How much engineering construction has been completed.
- What remains in the system.
- What new work has commenced.

These statistics relate to additions to the current stock of infrastructure through work completed on new infrastructure assets. The period examined in this report is from June 1990 to June 2015.

Historically, governments primarily developed Australia's infrastructure with nearly all work undertaken by public sector agencies. Gradually, more and more work was contracted to private sector businesses for implementation. There is now increasing private sector involvement in the development, ownership and delivery of infrastructure services through new financial arrangements. Some governments have chosen to privatise certain infrastructure assets along with the ongoing responsibility for new investment in these infrastructure assets. This means that it is no longer sufficient to look at only public sector engineering construction.

Unfortunately, ABS statistics do not delineate between cities in each state, so this report will analyse the state of Victoria as a whole. In this report we use Infrastructure Australia’s definition of economic infrastructure. This includes roads, bridges, railways, harbours, the electricity sector, the water and sewerage sector, and telecommunications assets. Changes in engineering construction in heavy industry, recreation facilities, and other uncategorised activities are also analysed briefly, but are separate from economic infrastructure. The asset classes are examined for trends in public and private sector, and all statistics have been deflated and expressed in constant 2012-13 prices.

\(^1\) ABS, Engineering Construction, Australia, Cat No 8762.0, electronic releases, www.abs.gov.au
Victoria: the state in context

Public sector construction on infrastructure, specifically the federal assistance for the now cancelled East West Link, has been a hot topic in recent discussions about Victoria’s infrastructure policy.

The Victorian Government has welcomed discussions with the federal Government to work on infrastructure priorities in the state such as the Melbourne Metro Rail tunnel, the Western Distributor, and the upgrade of the Monash freeway.

In September 2015, the Infrastructure Victoria Bill passed, and the new statutory body Infrastructure Victoria was established. Engineers Australia welcomes the introduction of Infrastructure Victoria and applauds its legislated independence from ministerial control. Engineers Australia encourages this body to uphold its mandate to take short term politics out of infrastructure planning, and thinks it should have a key role in the development of the projects outlined above. The development and release of Infrastructure Victoria’s 30-Year Infrastructure Strategy is crucial to maintaining and improving Victorian economic growth and Victorians’ standard of living.

This report covers the 25 financial years from June 1991 to June 2015. The statistics available make it possible to analyse some significant state trends. They show Victoria’s real GDP grew from $173 billion to $344 billion—a total increase of 105.4 per cent—while its population grew from 4.4 million people to 5.8 million people, increasing 34.5 per cent. However, as the population grew, more people shared the increase in the state’s GDP. During this time Victorians’ standard of living also increased from $39,332 per person to $59,394 per person, increasing by 53.6 per cent.

**Table 1**

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Table 1 shows Victorian average annual growth has fared poorly compared with Australia as a whole. Excluding the 2014-15 financial year, Victorian GDP and Victorian GDP per person has slowed in more recent time periods compared to the longer term averages.

Victoria’s long term average of 3.1 per cent per year for GDP growth is stronger than the 2.4 per cent that has been recorded for the past five year period. The long-term average for Victorian GDP per person was recorded
at an average of 1.8 per cent over the last 25 years, much higher than the annual average of 0.7 per cent for the last five years. Population growth meanwhile has trended to higher percentages in more recent years. Over the 25-year period examined, Victoria’s population grew at an average annual rate of 1.2 per cent, which is below the more recent recorded averages of 1.7 per cent for the past five years.

From this table, it appears that as GDP per person has fallen, the growth in the Victorian population is responsible for a large portion of the current GDP growth. Comparing this to the Australian average, we can see that Victoria trended below the national average annual growth and in GDP per person. Meanwhile, population growth in Victoria has grown at much the same rate as the nation. Victoria makes up 22 per cent of the nation’s GDP and 25 per cent of the nation’s population, indicating that the standard of living for Victorians is not growing as strongly as it is for the rest of the nation.

Population growth in the major capital cities is expected to grow dramatically over the next 40 years, and some projections series at the ABS predict that Melbourne’s population will reach and overtake the population of Sydney at just under eight million people before 2053. These projections demonstrate the pressures developing on the capacity of existing infrastructure to continue to deliver high quality infrastructure services. Good economic policy would recognise these connections and stimulate productivity through innovation policies and through infrastructure development, especially in the larger Victorian cities.

In the five years since the last Victorian Infrastructure Report Card, the State economy expanded by 10.3 per cent in real terms. Furthermore, in the same time frame, the state’s population has increased by 7.3 per cent. Both changes signal that more infrastructure services are needed to simply maintain the status quo. The key question is whether status quo is good enough. When productivity growth is low and infrastructure is just adequate, are the pre-conditions for improved standards of living in place?

More infrastructure services are needed to simply maintain the status quo.
Engineers Australia’s Principles for Infrastructure Development

Engineers Australia is committed to the view that infrastructure is the essential enabler of Australian productivity growth, vital to preserve Australia’s current standard of living.

To be effective, infrastructure must be fit for purpose, and the flow of infrastructure services needs to move ahead of population growth and economic growth. It should also use the best available technology to manage existing infrastructure assets and to develop new ones.

Any new infrastructure development should encompass the following principles:

- **Infrastructure must be managed to advance socio-economic goals, not political ones.**
- **Infrastructure planning without land use planning is not sensible.**
- **Infrastructure planning is not optional – it is an integral role of government.**
- **The private sector is a key player, which means infrastructure is not the exclusive preserve of governments.**
- **Infrastructure must be managed sustainably over its full expected life.**
- **Infrastructure governance must be rigorous and be removed from political agenda.**
- **ICT-enabled infrastructure delivers more value for money, especially in coordinated systems.**
- **Short term acquisition practices should be discarded in favour of whole of life considerations.**
**Trends in engineering construction**

In 1990-91, the public sector undertook the majority of engineering construction with almost $3.4 billion in work completed, compared with $757 million by the private sector, with both figures expressed in real terms. Figure 1 shows cumulative growth for engineering construction for the public and private sectors. The blue line below represents engineering construction completed by the private sector. The gap from the blue line to the red line represents engineering construction completed by the public sector. As demonstrated below, since the mid 1990’s the private sector has been the majority contributor to engineering construction.

**FIGURE 1: CUMULATIVE PRIVATE AND PUBLIC SECTOR ENGINEERING CONSTRUCTION, VICTORIA, 1990-91 TO 2014-15**

Much of what is illustrated in Figure 1 falls within Engineers Australia’s definition of infrastructure. Private sector funding for engineering construction has grown strongly over the 25-year period, while public sector construction showed periods of strong growth after 2007-08. In 2011-12 the private sector hit its peak of $7.6 billion in funding for engineering construction, much higher than the public sector peak, the year before in 2010-11 where it recorded a peak of $4.6 billion.
Figure 2 demonstrates the differences between engineering construction on infrastructure, and engineering construction on recreation, heavy industry, and other engineering construction for the public sector.

Public sector engineering construction is primarily infrastructure. Most of the gap that is shown between the infrastructure and total engineering construction trends is accounted for by engineering construction on recreational facilities. Detailed statistics for public sector engineering construction on the various types of infrastructure assets are shown in Table 2, with the biggest construction years between 2010-11 and 2012-13.
TABLE 2: PUBLIC SECTOR ENGINEERING CONSTRUCTION ON INFRASTRUCTURE, 1990-91 TO 2014-15, $M IN 2012-13 PRICES

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Figure 3 shows private sector construction on infrastructure compared to engineering construction on recreation, heavy industry and other engineering construction. The primary difference between Figure 2 and Figure 3 is the pronounced gap between the trends, especially in the more recent years. Where private engineering construction on infrastructure facilities was specifically needed to support the resources sector facilities, it has been included in the infrastructure tally.
FIGURE 3: TRENDS IN THE MAIN COMPONENTS OF PRIVATE SECTOR ENGINEERING CONSTRUCTION, VICTORIA, 1990-91 TO 2014-15

Infrastructure
Resources & Industry

$M in 2012-13 Prices
Table 3 details private sector engineering construction investment in specific types of infrastructure assets.

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<tr>
<th>Years</th>
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<td>4811.0</td>
</tr>
<tr>
<td>2013-14</td>
<td>647.5</td>
<td>190.7</td>
<td>2248.5</td>
<td>251.9</td>
<td>1207.9</td>
<td>4546.5</td>
</tr>
<tr>
<td>2014-15</td>
<td>1373.7</td>
<td>117.2</td>
<td>1896.5</td>
<td>105.3</td>
<td>1195.1</td>
<td>4687.7</td>
</tr>
</tbody>
</table>
Asset growth rates

It is important to understand how specific asset classes are growing over these time periods.

We will break down the assets described in Tables 1 and 2 and review them individually over the same time periods shown. Growth rates are summarised below in Tables 4 and 5.

Table 4 shows growth in construction on infrastructure assets has dropped dramatically in the last two years, most notably in the public sector. The roads sector is the only area to record significant growth overall, due to strong numbers recorded by the private sector.

<table>
<thead>
<tr>
<th>Period</th>
<th>Roads</th>
<th>Bridges, railways &amp; harbours</th>
<th>Electricity &amp; pipelines</th>
<th>Water &amp; sewerage</th>
<th>Telecommunications</th>
<th>Total infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Private sector</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-91 to 2014-15</td>
<td>17.4</td>
<td>66.0</td>
<td>37.1</td>
<td>28.7</td>
<td>2150.3</td>
<td>16.0</td>
</tr>
<tr>
<td>2005-06 to 2014-15</td>
<td>7.1</td>
<td>0.7</td>
<td>3.4</td>
<td>23.3</td>
<td>16.3</td>
<td>1.9</td>
</tr>
<tr>
<td>2010-11 to 2014-15</td>
<td>18.6</td>
<td>25.9</td>
<td>1.9</td>
<td>-27.6</td>
<td>-0.5</td>
<td>-2.0</td>
</tr>
<tr>
<td>2013-14 to 2014-15</td>
<td>57.3</td>
<td>-18.5</td>
<td>-14.5</td>
<td>-26.7</td>
<td>1.8</td>
<td>-1.2</td>
</tr>
<tr>
<td><strong>Public sector</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-91 to 2014-15</td>
<td>6.7</td>
<td>14.1</td>
<td>38.5</td>
<td>8.2</td>
<td>44.4</td>
<td>0.5</td>
</tr>
<tr>
<td>2005-06 to 2014-15</td>
<td>6.2</td>
<td>13.2</td>
<td>69.6</td>
<td>14.6</td>
<td>108.5</td>
<td>2.8</td>
</tr>
<tr>
<td>2010-11 to 2014-15</td>
<td>7.9</td>
<td>9.0</td>
<td>89.6</td>
<td>-14.8</td>
<td>38.8</td>
<td>0.9</td>
</tr>
<tr>
<td>2013-14 to 2014-15</td>
<td>-13.1</td>
<td>-9.6</td>
<td>-44.4</td>
<td>-15.3</td>
<td>12.3</td>
<td>-16.1</td>
</tr>
<tr>
<td><strong>Both sectors combined</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-91 to 2014-15</td>
<td>9.1</td>
<td>14.5</td>
<td>5.6</td>
<td>9.9</td>
<td>1.8</td>
<td>3.9</td>
</tr>
<tr>
<td>2005-06 to 2014-15</td>
<td>4.2</td>
<td>7.7</td>
<td>3.5</td>
<td>12.4</td>
<td>3.2</td>
<td>2.0</td>
</tr>
<tr>
<td>2010-11 to 2014-15</td>
<td>9.6</td>
<td>9.5</td>
<td>2.3</td>
<td>-20.5</td>
<td>2.6</td>
<td>-1.2</td>
</tr>
<tr>
<td>2013-14 to 2014-15</td>
<td>9.6</td>
<td>-10.8</td>
<td>-17.4</td>
<td>-19.0</td>
<td>3.4</td>
<td>-7.9</td>
</tr>
</tbody>
</table>
Table 5 shows that for non-infrastructure assets (ie. recreation and heavy industry), the majority of growth in the last few years has come from the private sector, which is to be expected. The individual growth rates for these assets is discussed at length below.

**TABLE 5: SUMMARY OF AVERAGE ANNUAL GROWTH RATES - MAIN COMPONENTS OF ENGINEERING CONSTRUCTION BY PRIVATE AND PUBLIC SECTORS (PER CENT)**

<table>
<thead>
<tr>
<th>Period</th>
<th>Infrastructure</th>
<th>Recreation</th>
<th>Heavy industry</th>
<th>Non-engineering Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Private sector</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-91 to 2014-15</td>
<td>16.0</td>
<td>10.8</td>
<td>13.3</td>
<td>10.1</td>
<td>12.1</td>
</tr>
<tr>
<td>2005-06 to 2014-15</td>
<td>1.9</td>
<td>6.5</td>
<td>11.2</td>
<td>8.4</td>
<td>2.6</td>
</tr>
<tr>
<td>2010-11 to 2014-15</td>
<td>-2.0</td>
<td>18.3</td>
<td>2.7</td>
<td>5.4</td>
<td>-1.1</td>
</tr>
<tr>
<td>2013-14 to 2014-15</td>
<td>-1.2</td>
<td>15.5</td>
<td>3.7</td>
<td>5.0</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Public sector</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-91 to 2014-15</td>
<td>0.5</td>
<td>11.6</td>
<td>350.2</td>
<td>10.9</td>
<td>0.5</td>
</tr>
<tr>
<td>2005-06 to 2014-15</td>
<td>2.8</td>
<td>13.5</td>
<td>-30.0</td>
<td>13.5</td>
<td>3.1</td>
</tr>
<tr>
<td>2010-11 to 2014-15</td>
<td>0.9</td>
<td>-8.8</td>
<td>-22.0</td>
<td>-8.7</td>
<td>-0.1</td>
</tr>
<tr>
<td>2013-14 to 2014-15</td>
<td>-16.1</td>
<td>1.7</td>
<td>-54.9</td>
<td>-4.8</td>
<td>-15.7</td>
</tr>
<tr>
<td><strong>Both sectors combined</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-91 to 2014-15</td>
<td>3.9</td>
<td>9.3</td>
<td>13.4</td>
<td>9.0</td>
<td>4.3</td>
</tr>
<tr>
<td>2005-06 to 2014-15</td>
<td>2.0</td>
<td>6.3</td>
<td>11.2</td>
<td>7.9</td>
<td>2.4</td>
</tr>
<tr>
<td>2010-11 to 2014-15</td>
<td>-1.2</td>
<td>7.8</td>
<td>2.6</td>
<td>2.5</td>
<td>-1.2</td>
</tr>
<tr>
<td>2013-14 to 2014-15</td>
<td>-7.9</td>
<td>12.0</td>
<td>2.5</td>
<td>3.3</td>
<td>-5.9</td>
</tr>
</tbody>
</table>
**Roads**

Figure 4 expresses the trends in private and public sector engineering construction on roads, highways and subdivisions in constant 2012-13 prices and covers:

- Parking areas
- Cycle paths
- Airport runways
- Pedestrian and vehicle overpasses
- Traffic lights
- Roundabouts
- Associated road drainage works
- Street and highway lighting
- Road resurfacing
- Kerbing and guttering
- Road tunnels.

**FIGURE 4: TRENDS IN PRIVATE AND PUBLIC SECTOR ENGINEERING CONSTRUCTION ON ROADS IN VICTORIA, 1990-91 TO 2014-15**

In 1990-91 total construction on roads was $718 million and this grew to $2.7 billion in 2014-15. The 2010 Victoria Infrastructure Report Card noted that road infrastructure was under stress or just maintaining their existing quality. Since then, engineering construction on roads has increased at an annual average of 9.6 per cent.
PUBLIC INVESTMENT

Public sector construction on roads has grown from $515 million in 1990-91 to $1.3 billion in 2014-15 at an average increase of 6.7 per cent per year. The biggest increases in construction occurred in 2006-07 with a 43 per cent increase, and in 2010-11 with a 58.1 per cent increase.

PRIVATE INVESTMENT

Private sector construction on roads has grown from $203 million in 1990-91 to $1.4 billion in 2014-15 at an average increase of 17.4 per cent per year, higher than public sector construction.

Two obvious spikes can be seen in the mid 1990s and again in the mid 2000s where there were annual increases of over 50 per cent. The second spike in 2007 could be attributed to the Eastlink urban road project which opened in 2008 and was the largest urban road project constructed in Victoria. This project was part of a private-public sector partnership with a construction cost of $2.5 billion. In 2014-15 roads construction accounted for 21.3 per cent of all private sector construction on infrastructure, which is below the peak of 41.7 per cent recorded in 2006-07.

Public sector construction on roads accounted for 15.1 per cent of all infrastructure construction in 1990-91. This jumped to 41.9 per cent of total infrastructure construction in 2014-15. In that year (and the five years before it), 'roads' was the asset class with the most infrastructure construction by the public sector.
Bridges, railways and harbours

Over the last 25 years investment in bridges, railways and harbours in Victoria has been dominated by the public sector, peaking in 2013-2014.

Figure 5 represents the following types of engineering infrastructure, expressed in in constant 2012-13 prices:

- Bridges that support roads, railways, causeways and elevated highways.
- Railways: tracklaying, overhead power lines and signals, platforms, tramways, tunnels for underground railways and fuel hoppers.
- Harbours: boat and yacht basins, breakwaters, retaining walls, docks and piers, terminals, wharves, dredging works and marinas.

In 1990-91, total engineering construction spent on bridges, railways and harbours was $206 million growing to $994 million in 2014-15.

The 2010 Victoria Infrastructure Report Card rated rail as poor, and its ports as adequate.

PUBLIC INVESTMENT

Public infrastructure construction on bridges, railways and harbours grew from $201 million in 1990-91 to $876 million in 2014-15 at an average annual increase of 14 per cent. In 1990-91 public construction on these assets accounted for 5.9 per cent of total infrastructure construction by the public sector.

Since the 2010 Victoria Infrastructure Report Card, engineering construction grew strongly up to
Engineering construction grew strongly up to 2013-14, before dropping sharply in recent years.

2013-14, before dropping sharply in recent years. Public sector construction has been most prevalent from 2009-10 up until 2013-14 with average annual growth of 17.8 per cent for that period, before falling 10 per cent in the last two years. In 2013-14 construction on these assets made up 34.8 per cent of total infrastructure.

PRIVATE INVESTMENT

Private infrastructure construction on bridges, railways and harbours grew from $4.8 million in 1990-91 to $117 million in 2014-15 at an average annual increase of 66 per cent.

In 1990-91 private construction on these assets accounted for only 0.6 per cent of total infrastructure construction, which has grown to 1.8 per cent in 2014-15. At its peak in 2004-05 it accounted for 7.8 per cent of construction for the private sector.

Growth in private sector construction on these assets was most notable with a spike in construction between 2002-03 and 2004-05, where average annual growth averaged over 100 per cent for this period.

Much of the spike in growth between 2008 and 2012 can be attributed to the Regional Rail Link project which started in 2009 and was completed in 2015 at an estimated cost of $3.65 billion⁴, and the Channel Deepening Project of the Port of Melbourne which was delivered in 2009 at a cost of $717 million⁵.

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Electricity generation, distribution and pipelines

Figure 6 shows trends in private and public sector engineering construction in constant 2012-13 prices and includes:

- Electricity facilities:
  - Power stations
  - Substations
  - Hydro-electric generating plants
  - Associated work for towers
  - Chimneys
  - Transmission and distribution lines.

- Pipelines:
  - Oil and gas pipelines
  - Urban supply mains for gas
  - Pipelines for refined petroleum products, chemicals and foodstuffs.

At its peak in 2012-13, construction on electricity generation, distribution and pipeline assets accounted for 40.6 per cent of all infrastructure completed by the private sector.
In 1990-91, total engineering construction spent on electricity and pipelines was $873 million, which grew to $1.9 billion in 2014-15.

The 2010 Victorian Infrastructure Report Card rated electricity assets as adequate, but major changes were required. Since this report card an increase was seen from both sectors, but in the last two years this number has dropped significantly by 17 per cent.

PUBLIC INVESTMENT

Public sector infrastructure construction on electricity and pipelines has gone from a major contributor of these assets at $828 million in 1990-91, to a minor at $5.3 million in 2014-15.

Construction by the public sector on these assets was most predominant in the early stages of the 1990s. In 1990-91, public sector construction on these assets accounted for 24.2 per cent of total construction, compared to 0.2 per cent in 2014-15. At its peak in 1993-94, construction on these assets made up 30.3 per cent of total infrastructure completions.

PRIVATE INVESTMENT

Private sector infrastructure construction on electricity and pipelines has gone in the opposite direction.

In 1990-91, the private sector spent $45.3 million growing to $1,897 million in 2014-15 and over this period growth has averaged 37.1 per cent per year. In 1990-91 construction on these assets accounted for six per cent of total infrastructure construction, which has grown to 29.5 per cent in 2014-15. At its peak in 2012-13, construction on electricity generation, distribution and pipeline assets accounted for 40.6 per cent of all infrastructure completed by the private sector.
Water, sewerage and drainage facilities

Private and public sector investment in this asset class follow parallel paths, including the peak attributed to the construction of the Victorian Desalination Plant project.

Figure 7 shows trends in water storage and supply, sewerage and drainage construction over the last 25 years at 2012-13 constant prices. This infrastructure includes:

- Water storage and supply
  - Dams, weirs and reservoirs
  - Embankments for water diversion
  - Water pipelines, mains and treatment plants
  - Prevention and erosion
  - Aqueducts and water conduits
  - Systems conveying water to residences, commercial and industrial establishments.

- Sewerage and drainage
  - Sanitary and storm sewers
  - Sewerage treatment plants
  - Storm water drains and drainage systems.

At its peak in 2010-11 construction on water, sewerage and drainage assets accounted for 23.2 per cent of total infrastructure construction for the private sector.
Total engineering construction on water and sewerage grew from $490 million in 1990-91 to $625 million in 2014-15 with a significant peak of $2.8 billion around 2010-11.

**PUBLIC INVESTMENT**

Public sector infrastructure construction on these assets grew from $446 million in 1990-91, to $520 million in 2014-15. Construction by the public sector peaked in 2010-11, spending $1.2 billion. In 1990-91, construction on water and sewerage accounted for 13.1 per cent of all infrastructure construction by the public sector, growing to 16.4 per cent in 2014-15. At its peak in 2010-11, construction on this area accounted for 25.9 per cent of total infrastructure completions.

**PRIVATE INVESTMENT**

Private sector construction on these assets grew from $43.9 million in 1990-91 to $105 million in 2014-15. Construction by the private sector also peaked in 2010-11, along with the public sector with $1.7 billion being spent in that year. At its peak in 2010-11 construction on water, sewerage and drainage assets accounted for 23.2 per cent of total infrastructure construction for the private sector. This spike could be attributed to the Victorian desalination plant project which was completed in 2012 as part of a public private project which was valued at $5.7 billion in 2009[^6]. The 2010 Victorian Infrastructure Report Card noted that the desalination plant would future-proof Melbourne’s water supply, however at a large financial cost which is demonstrated by the spike seen in Figure 7.

[^6]: Department of Treasury and Finance, Infrastructure Delivery Public Private Partnerships, www.dft.vic.gov.au
Telecommunications

Over the past 25 years, the balance of public and private sector telecommunications infrastructure investment has changed, largely due to the privatisation of Telstra. The rollout of the National Broadband Network (NBN) has led to a more recent uplift in public sector engineering construction.

The telecommunications engineering construction covered by Figure 8 (at 2012-13 constant prices) includes:

- Mobile phone, radio, television, microwave and radar transmission towers
- Telephone lines
- Underground cables and coaxial cables.

![FIGURE 8: TRENDS IN PRIVATE AND PUBLIC SECTOR ENGINEERING CONSTRUCTION ON TELECOMMUNICATIONS IN VICTORIA, 1990-91 TO 2014-15](image-url)
In 1990-91, total engineering construction on telecommunications was $1.3 billion, which grew to $1.5 billion in 2014-15.

Over this time period, growth fell in the early part of the 1990s before lifting again in the late 1990s. The average growth recorded over this period was 1.8 per cent per year.

The Federal Government’s privatisation of Telstra, 31 per cent of which was in 2006\(^7\), explains the significant changes in private and public sector construction outlined below.

**PUBLIC INVESTMENT**

Public sector infrastructure construction on these assets fell from $1.3 billion in 1990-91, to $255 million in 2014-15. Construction by the public sector was reasonably steady through the 1990s and the early 2000s, before a dramatic fall in 2007-2008 where public construction on these assets dropped to extremely low levels. In 1990-91 construction on telecommunications accounted for 38.2 per cent of all public sector infrastructure construction, which dropped to only 8.1 per cent of construction in 2014-15.

**PRIVATE INVESTMENT**

Private sector construction on these assets grew dramatically from no construction in 1990-91 to $1.2 billion in 2014-15. Private sector construction on telecommunications was at low levels until strong growth occurred from 2005-06 to 2007-08, which coincided with the drop in public sector construction. Since then, the private sector has been responsible for the majority of telecommunications construction, recording high construction numbers over the last seven years.

In 1990-91 telecommunications didn’t account for any private sector construction on engineering infrastructure, but by 2014-15 it accounted for 18.6 per cent.

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\(^7\): Telstra, The Telstra Story, www.telstra.com.au
Non-infrastructure engineering construction

There are some elements of engineering construction that fall outside our definition of infrastructure. It is debatable whether recreational facilities should be included in infrastructure or not, but as these areas contribute to economic growth we believe it is worth discussing these construction trends.

HEAVY INDUSTRY

Figure 9 shows trends in public and private sector engineering construction in heavy industry in the last 25 years, in 2012-13 constant prices. This includes:

- Construction and production of oil, gas, coal, bauxite, alumina (and other materials)
- Storage and distribution facilities
- Refineries, pumping stations and mines
- Chemical plants
- Blast furnaces
- Steel mills and other industrial processing plants and ovens.
In 1990-91, total engineering construction on heavy industry grew from $389 million to $1.1 billion in 2014-15. Over this time period, construction on these assets grew at an average rate of 13.4 per cent per year.

**PUBLIC INVESTMENT**

Public sector construction on heavy industry has fallen from $39.7 million in 1990-91 to $5.9 million in 2014-15. The peak time for public sector construction on heavy industry infrastructure was in 1998-99 when construction reached $149 million. The public sector has consistently recorded very low levels of construction on heavy industry. In 1990-91 public sector construction of heavy industry accounted for 1.2 per cent of total infrastructure construction and that number fell to 0.2 per cent in 2014-15.

**PRIVATE INVESTMENT**

As you would expect, the private sector is responsible for the majority of construction on heavy industry, and this has been evident for the last 25 years.

Private sector construction on heavy industry has grown from $349 million in 1990-91 to $1.1 billion in 2014-15. The biggest growth period for private sector construction on heavy industry occurred between 2002-03 and 2005-06. Although there has been strong growth in this sector, the percentage of construction in this area has fallen. In 1990-91 private sector construction on heavy industry made up 46 per cent of all infrastructure construction, but that has dropped to 16.4 per cent in 2014-15.

*As you would expect, the private sector is responsible for the majority of construction on heavy industry, and this has been evident for the last 25 years.*
Non-infrastructure engineering construction

This class of engineering construction includes:

- Golf courses
- Playing fields and stadiums
- Racecourses
- Swimming pools
- Landscaping and park construction.

FIGURE 10: TRENDS IN PUBLIC AND PRIVATE SECTOR ENGINEERING CONSTRUCTION ON RECREATION FACILITIES IN VICTORIA, 1990-91 TO 2014-15

PUBLIC INVESTMENT

Public sector construction on recreation facilities has grown from $83 million in 1990-91 to $177 million in 2014-15. The height of public sector construction on these assets was in 2009-10 when construction reached $316 million, matching private sector construction in that year. Recreation facilities have not made up a large percentage of public sector construction over the last 25 years. It made up 3.6 per cent of total infrastructure construction in 1990-91 and grew only slightly to 5.8 per cent in 2014-15.

PRIVATE INVESTMENT

The private sector has been responsible for the majority of construction on recreation facilities and other construction over the past 25 years. In 1990-91, private sector construction for these assets was $112 million, which grew to $690 million in 2014-15. In 1990-91 construction on recreation facilities made up 14.8 per cent of all private sector infrastructure construction, falling away to 10.7 per cent in 2014-15.

As you would expect, the private sector is responsible for the majority of construction on heavy industry, and this has been evident for the last 25 years.
Looking forward

Having reviewed infrastructure and engineering construction in Victoria over the last 25 years, we now need to look towards the future. By their nature these are long running projects with lengthy periods of planning and design, negotiation, approval, financing and then the build process itself. The data discussed so far only details engineering construction completed; so what is now in the pipeline?

NEW PROJECTS

We are using statistics which provide insight into how much construction work is still in the system as work not yet completed, and other infrastructure projects that have just commenced.

We cannot be certain all these projects will eventually reach completion, which is worth noting for subsequent reports as uncompleted work will not necessarily convert into completion statistics.

Unfortunately, we are unable to report on projects that are still in the planning phase and have not yet commenced.

FIGURE 11: THE INFRASTRUCTURE PIPELINE IN VICTORIA, PUBLIC AND PRIVATE SECTORS

Commencements  Completed  Yet to Finish
Figure 11 shows trends for infrastructure projects in Victoria, comparing projects that have commenced, that are yet to be completed, and that have been completed. Consistent with Figure 1 completed work has been following a downward trend in the last five years, projecting concerns for future infrastructure construction projects in Victoria. Commencements closely follow the trend seen in statistics for work completed, with a fall of 33.4 per cent compared to 2009-10 peak levels.

The red line represents work which is still in the system and is yet to be completed (note this may include cost variations during construction). As of 30 June 2015 there was $17.7 billion in infrastructure which was uncompleted. This compares to $7.7 billion in work which was completed in 2014-15.

At the present rate of infrastructure completion there is work outstanding for the next 2.3 years.

Although this seems like a sufficient amount of work, this work has also been falling at a larger rate. Work completed has fallen 25.4 per cent in the last five years, while the work that is yet to be completed has fallen by 39.4 per cent, indicating that this gap is starting to close. Figures 12 and 13 compare public and private sector investment in the Victorian infrastructure pipeline.
For each section there is a large overhang of work yet to be completed, which is represented by the red line. Looking at Figure 13 the spikes in work that is yet to be completed closely follows the spikes in commencements. Every time there is a spike in commencements, there is a build-up of work to be completed.

At the current rate of completion there is 2.4 years of work that is still to be completed for the public sector, while there is 2.3 years of work for the private sector.

Perhaps most telling, the private sector is where the amount of uncompleted work is increasing, while for the public sector work that is uncompleted is falling along with completions and commencements. There was a high period of uncompleted work in the public sector around five years ago, but this number has slowly diminished, and commencements and completions have fallen at the same time.

<table>
<thead>
<tr>
<th>Component</th>
<th>Commencements</th>
<th>Completed</th>
<th>Yet to Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
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<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Bridges etc</td>
<td>↓</td>
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<td>↓</td>
</tr>
<tr>
<td>Electricity etc</td>
<td>↓</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Water &amp; Sewerage</td>
<td>↓</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>≡</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>↑</td>
<td>↓</td>
<td>↑</td>
</tr>
</tbody>
</table>
Looking at the 2014-15 trend directions for the components of infrastructure construction in Table 6, we can see only one section of infrastructure construction—roads—improved over the last 12 months.

For construction yet to finish, total infrastructure improved. However, this is only on the back of strong numbers recorded for the roads section. Every other section recorded a fall and this was the same for commencements numbers. This gives us an indication that currently in Victoria engineering construction on roads is the only reason that infrastructure commencements, and work yet to finish, has recorded improved numbers in the last 12 months.

Figure 14 shows the trends in non-infrastructure components of engineering construction, principally the resource and heavy industry sectors and recreation facilities. Figure 14 shows how construction completions in these areas have been steady over the last decade. Five years ago, there was not much work that was yet to be completed in the system, however this work has since boomed and there is now over $4.2 billion worth of construction to be completed.

At the current rate of completion for non-infrastructure engineering construction, there is still 2.2 years’ worth of work in the system. It is obvious to see that during the past decade, engineering construction in non-infrastructure components closely mirrored the resources boom.

Figure 14 also shows that commencements in 2014-15 are less than the equivalent of a year’s work at the present rate of completions. This suggests that it will not be too long before work in the system is completed and it could be possible that non-infrastructure components of Victorian engineering construction fall back to the lower levels seen before the resources boom.
Conclusion

Since 1990-91, the population in Victoria has increased 34.5 per cent and the size of the state’s economy has increased by 105.4 per cent. These two large expansions are the main sources of the pressure being put on the state’s infrastructure.

At the same time, combined annual public and private sector engineering construction on infrastructure has increased by 113.7 per cent. When you add non-engineering infrastructure components, that increases to 130 per cent.

However, if we look closely at how much the construction has improved since the last Engineers Australia Infrastructure Report Card in 2010, the last five years’ of engineering construction on infrastructure averaged a fall of 1.2 per cent per year.

In 2010-11 engineering construction on infrastructure was $10.3 billion, which dropped to $9.7 billion the next year. By 2014-15 this figure had dropped to $7.7 billion, which is 24.4 per cent below 2010 construction levels. In 2014-15 the private sector engineering construction on infrastructure was 21.4 per cent less than in 2010-11, and the public sector was 31 per cent less.

At the time when both population growth and economic growth have continued to increase at strong levels, engineering construction has fallen dramatically.

The public sector has seen such a large decrease in construction on infrastructure in the last few years that it has now fallen below 1990-91 construction levels. Additionally, infrastructure construction completed by the private sector includes work which is in support of specific projects, and not for general access. This is not a very promising outlook for the state of infrastructure in Victoria, though it can be turned around, especially if bodies like Infrastructure Victoria are used well.

When we include the work that is commencing and the work that is yet to be completed, we see they have also fallen over the last five years. The private sector has recovered somewhat in 2014-15, and the majority of this fall seems to be as a result of public sector construction. Additionally, only engineering construction on roads infrastructure appears to be recording growth in the last year, as every other infrastructure sector recorded falls.

Over the past five years there have been institutional changes, but construction figures indicate that not enough has been done to fulfill the recommendations made in the 2010 Victorian Infrastructure Report Card.

Engineers Australia welcomes the introduction of Infrastructure Victoria, and encourages the new body to provide a pipeline of projects for the Victorian government to stem the current tide of falling public engineering construction on infrastructure.

In 2010, the Victorian Infrastructure Report Card rated infrastructure in Victoria as just adequate and, because engineering construction on infrastructure has fallen since then, Victoria is at risk of having its infrastructure assets slip to a poor or inadequate state.

The state Government has recently signaled a number of projects for future completion, but it may not be enough to reverse the current trend in infrastructure construction to meet the state’s future needs. The public sector needs to lead the way through infrastructure investment to promote productivity growth, and improve the standard of living for Victoria.

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