

Building Communities, Connecting People Northern Horizons 2020

Evidence report



NORTHERN HORIZONS 2020

EVIDENCE REPORT

A report for the Northern Metropolitan Partnership
Project managed by NORTH Link

Prepared by the
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While the National Institute endeavours to provide reliable forecasts and believes the material is accurate, it will not be liable for any claim by any party acting on such information.

Photographs throughout the document courtesy of Andrea Hylands.

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I would like to recognise a number of key people and organisations that have been crucial to the compilation of this report.

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In particular, I would like to thank Peter Brain, Peter Hylands, John Stanley, Nick Marinopoulos, Brad Vakulczyk and their colleagues from the National Institute of Economic and Industry Research who were able to comprehensively and professionally update the regional analysis of future infrastructure requirements for the next 50 years from previous iterations of Northern Horizons prepared in 2014 and 2016.

Thank you also to:

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- key Victorian Government departments and agencies for providing policy information and data that assisted the key stakeholders to understand the Victorian Government's priorities.

I would also like to acknowledge the support and work of all members of the Project Steering Group:

- Terry Larkins: Chair, Northern Metropolitan Partnership
- Chris James: Project Manager/ Executive Director, NORTH Link
- Tony Coppola: Deputy Executive Director, NORTH Link
- Susan Davies: former Director, Engagement, La Trobe University
- Kai Streicher: Senior Investment Manager, Department of Jobs, Precincts and Regions
- Jessica Boyle: former Program Coordinator, Metropolitan Partnerships.

The extensive consultation and collaboration by the above stakeholders on this update ensures it is an accurate and agreed representation of the short, medium and long term infrastructure needs of the region.

The infrastructure investment needs outlined in this report are crucial in assisting Melbourne's north to not only manage continued rapid population growth, but also to support economic recovery amid the current COVID-19 pandemic crisis. Prioritised investment will also enable uptake of new economic opportunities, ensuring the region shares in the success of a growing and liveable Melbourne.



Domenic Isola

Chief Executive Officer, Hume City Council

Chair, Northern Horizons Project Steering Group

We acknowledge the Traditional Owners of the land, the Wurundjeri people, and we pay our respects to Elders past, present and emerging.

FOREWORD

In 2014, the seven municipalities in Melbourne's north, together with the Northern Melbourne RDA Committee, La Trobe University and NORTH Link, published the landmark strategic infrastructure report, *Northern Horizons – 50 Year Infrastructure Strategy for Melbourne's North* (Northern Horizons).

Representing a comprehensive regional analysis of future infrastructure requirements for the next 50 years, Northern Horizons quantified the current level of social, transport, utility, economic and environmental infrastructure provision and performance that informed the identification of short (to 2024), medium (to 2032) and long term (2033 and beyond) priority infrastructure programs and projects for Melbourne's north.

The *Northern Horizons Update 2016* (Northern Horizons Update) was prepared to ensure the original short, medium and long term infrastructure priorities were a true representation of the needs of the region. Additionally the Northern Horizons Update responded to and incorporated existing Commonwealth and Victorian governance arrangements, infrastructure commitments and priorities, projected demand for infrastructure and observed and projected population growth.

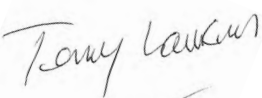
This report and update, *Building Communities, Connecting People: Northern Horizons 2020* is critical to ensure the continued value of Northern Horizons as a consolidated and agreed view of the infrastructure priorities for Melbourne's north. To ensure this, progress on implementation of the regional priorities over the previous six years has been documented and, together with additional sources of available data and information such as population projections, combined to provide an updated list of priorities. In preparing this report, the opportunity has also been taken to include priorities that have emerged over the previous four years.

The impact of the COVID-19 pandemic crisis has had a significant negative impact on both the economy and jobs in Melbourne's north. This report identifies the priority infrastructure projects that will generate the biggest return on investment in terms of economic growth, new jobs and stimulating the economic recovery.

Melbourne's north is dealing with unprecedented population growth, with recent government data showing that it will become home to more than 500,000 additional residents by 2036. The scale of this growth is most challenging at a time when global and local economies are also being impacted by increasing competition, a fluctuating Australian dollar and rapid technological advancement.

The region's historic dependence on the manufacturing sector has resulted in significant job losses with the shift of mass production jobs overseas. The closure of automotive manufacturing in October 2016 at Ford in Broadmeadows had a significant impact in terms of job losses at both the company and related supply chains. There is therefore an urgent need for major initiatives and the removal of blockages in order to create local jobs for our new and existing residents. The fast tracking of infrastructure investment to address current and future needs and drive economic benefits, productivity and jobs growth is critical to the region's future.

We are pleased to make this report available and look forward to urgent and immediate action on funding for the infrastructure priorities it identifies for Melbourne's north that are critical to driving productivity, growth and liveability for the Melbourne and Victorian economies.



Terry Larkins PSM
Chair, Northern Metropolitan Partnership

INTRODUCTION

This report, *Building Communities, Connecting People: Northern Horizons 2020*, comprises an update of the original *Northern Horizons – 50 Year Infrastructure Strategy for Melbourne’s North* (Northern Horizons) report which was published in 2014 and the *Northern Horizons Update 2016*.

The report outlines the latest data and priorities of relevance for transport, social, economic, utilities, environment and economic infrastructure within the geographic region encompassing the seven councils of Melbourne’s north (Banyule City Council, City of Darebin, Hume City Council, Mitchell Shire Council, Moreland City Council, Nillumbik Shire Council and City of Whittlesea).

Extensive consultation has been undertaken with key stakeholders and organisations across the region together with relevant government representatives to inform the infrastructure prioritisation process.

The *Building Communities, Connecting People: Northern Horizons 2020* report is available in two parts. In addition to this document, the *Building Communities, Connecting People: Northern Horizons 2020 Evidence Report* is available separately and is a much larger and comprehensive document that contains the evidence and data that supports the information and recommendations contained in this report.

NOTE: It is too early to ascertain the lasting impacts of COVID-19 but it is acknowledged that the importance of some types of infrastructure, such as commuter cycling trails, may be further elevated in the short-to-medium term, if not the longer term, as social distancing is either enforced and/or sought.

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1. Context

1.1 This report

NIEIR has been commissioned by NORTH Link to undertake the Northern Horizons Strategy Update study. Building on the 2014 and 2016 versions of the Northern Horizons Strategy, and in collaboration with the existing and former Northern Horizons working group members, the new report is to provide an updated set of strategic directions for the region. This is to be done by building on the region's competitive advantages and priority infrastructure projects, which NIEIR understands in detail through its previous research in the region and its extensive databases and regional modelling. In the short-term the updated strategy can be used to inform the Northern Metropolitan Partnership's priority pathways.

The NIEIR report was to be presented in two parts.

- PART 1:** Evaluation report to reflect on how the Northern Horizon Strategy 2014 and its subsequent 2016 update have assisted the Northern Region's local councils and other partners to plan and deliver their infrastructure priorities. Based on consultations with all the LGAs in the region, as well as other key stakeholders, part one of the 2020 update report will identify new elements or differences when compared to the most recent update in 2016.
- PART 2:** The objective of the second part is to develop an update on the infrastructure gap (report card) identified in the earlier reports. The new report will provide the latest data and priorities of relevance for transport, social, utilities, environment and economic infrastructure within the Northern Melbourne Region. The new report will also provide an update on how Future Directions have changed over the last five years and will comment on the differences, if any, of the priorities that are included and Infrastructure Australia's Priorities.

Subsequent conduct of the study has suggested that the Part 1 report should form a section of the Part 2 report. This document is the Part 2 report. It provides the region with a structured list of projects, grouped according to regional development themes that have emerged from the study. These themes derive from a focus on enhancing the region's competitive strengths and mitigating any significant competitive weaknesses. The Request for Quotation issued by NORTH Link raises the infrastructure needs of the arts and tourism sectors as specific matters to be considered and this report includes these matters.

NIEIR, with Stanley & Co, has recently completed a study for the Municipal Association of Victoria, examining some key economic and social consequences of Melbourne's rapid population growth (NIEIR and Stanley & Co 2019). That report flagged a few particular areas that need close attention if Melbourne's growth is to not accentuate inequalities, such as the accessibility of the National Employment and Innovation Clusters (NEICs) and giving greater focus to developing Melbourne as a series of 20-minute neighbourhoods, both major themes in *Plan Melbourne 2017-2050* (Victorian Government 2017). This brings in issues such as local transport opportunities and the availability of open space, particularly given the *Plan Melbourne* focus on Melbourne becoming a more compact and greener city. These matters form key components of the current report.

1.2 Report structure

This Evidence Report is structured as follows. It begins with the *Building Communities, Connecting People: Northern Horizons 2020* (Update) report and subsequent chapters then provide supporting documentation to complement much of the material in that report. Chapter 2 provides infrastructure updates on the previous Northern Horizons Reports, which form the platform for development of the current report. It also provides information about how past reports have been used and includes some recommendations to improve such use. Chapter 2 also includes commentary on important infrastructure reports from Infrastructure Victoria and Infrastructure Australia, commentary on *Plan Melbourne* and on budget allocations for infrastructure from both the Federal and Victorian Governments.

Chapter 3 describes some of the regional characteristics, including population and population growth, GRP and employment by industry, competitive strengths and weaknesses. The latter provide the central basis for identifying a regional vision and goals. Future infrastructure, and some associated service, enhancements should be tested against how well they support achievement of this vision and goals. This section also includes a series of infrastructure investment heat maps covering Melbourne Metro, so regional patterns of investment in infrastructure can be compared.

Chapter 4 develops themes that have emerged from consultations undertaken during preparation of this report. These themes provide an integrated and finer grained way of thinking about the region's future developmental directions and priorities, to enhance regional competitive strengths and/or mitigate weaknesses. The themes are:

- developing the La Trobe NEIC and other leading regional clusters;
- an innovative north;
- a greener north;
- a well-educated, skilled north;
- a healthy and engaged north;
- a well-connected north; and
- a fairer north.

Chapter 5 sets out the updated infrastructure plan and Chapter 6 analyses the broad regional economic impacts projected to be associated with key elements of the infrastructure. The report also includes a small number of Appendices that provide more detailed supporting evidence to strengthen the argument developed in the body of the report.



2. Past Northern Horizons reports

2.1 Scope and main findings

The *Northern Horizons – 50 Year Infrastructure Strategy for Melbourne’s North* (Northern Horizons) was a report published in 2014 that developed an infrastructure strategy for Melbourne’s Northern Region over the next fifty years (NORTH Link and Arup 2014). The report identified a set of infrastructure priorities that covered programs and specific infrastructure projects across transport, social, utilities, and economic dimensions, while also recognising the importance of environmental infrastructure. That Future Directions section was updated in *Northern Horizons Update 2016* by tracking the progress of initiatives and identifying new infrastructure that will benefit the North.

The strategy was developed in consultation with the seven councils of Melbourne’s North:

- Banyule City Council;
- Darebin City Council;
- Hume City Council;
- Mitchell Shire Council;
- Moreland City Council;
- Nillumbik Shire Council; and
- Whittlesea City Council.

The infrastructure priorities over the next 50 years were segmented into three phases:

- short-term 2020-2024;
- medium-term from 2025-2032; and
- long-term from 2033 and beyond.

The 2016 report introduced two new priorities, while updating progress on the previously identified priorities. The 2016 infrastructure priorities for the Northern Region are summarised in the following three tables. Individual infrastructure priorities might geographically impact the Northern Region as a whole, or only a select number of the seven councils. However, the implementation of the programs and projects will typically have spill-over effects that will benefit the north more broadly as a region.

Project/program	Infrastructure Sector	Component	Project type	Priority in 2014 Report	Priority in 2016 Report
Access to high speed broadband	Utilities	Telecommunications	Opportunity	Y	Y
Aged care facilities	Social	Aged care (High and Low)	Address gap/ Future proof	Y	Y
Bicycle network	Transport	Bike	Opportunity	Y	Y
Bus network coordinated	Transport	Rail, bus and road congestion	Transformative	Y	Y
Car parking at selected stations increased	Transport	Rail/Road	Opportunistic	Y	Y
Childcare and kindergarten facilities	Social	Childcare	Address gap/ Future proof	Y	Y
Community centres and sports facilities	Social	Community centres and sports facilities	Address gap	Y	Y
Food and beverage industry park	Economic		Opportunity	N	Y
Grade separations	Transport	Rail, road congestion	Transformative	Y	Y
Health Precincts implemented	Social	GPs, Allied Health, Dental	Address gap	Y	Y
Hospital Beds (1,500 new) in existing health facilities	Social	Health	Address gap	Y	Y
La Trobe National Employment Cluster	Economic		Transformative	Y	Y
Local routes in the North- East improved	Transport	Road	Address gap	Y	Y
Local routes in the North- West Region improved	Social	Road	Address gap	Y	Y
North East Link	Social	Road	Transformative	Y	Y
Northern Regional Trail Strategy	Economic	Walking and cycling	Opportunity	Y	Y
Primary Schools	Social	Education	Future proof	Y	Y
Public Transport Victoria Network Development Plan- Metropolitan Rails Stage 2	Transport	Rail	Address gap	Y	Y
Secondary schools	Social	Education	Address gap	N	Y
Somerton Freight Terminal	Economic, Transport	Road	Opportunity	Y	Y
Tram operations improved	Transport	Tram	Address gap	Y	Y
Tullamarine Freeway and Sunbury Road corridor improvements	Transport	Road	Address gap	Y	Y
Improved Yarra River Crossings	Transport	Road		Y	Y

Source: Northern Horizons – 50 Year Infrastructure Strategy for Melbourne's North – Update 2016, NORTH Link (2016) and Northern Horizons – 50 Year Infrastructure Strategy for Melbourne's North, NORTH Link (2014).

Table 2.2 Medium-term (2025-2032) infrastructure priorities for Melbourne's North					
Project/program	Infrastructure Sector	Component	Project type	Priority in 2014 Report	Priority in 2016 Report
Aged care facilities	Health	Health	Address gap/ Future proof	Y	Y
Bus network upgraded	Bus	Bus	Future proof	Y	Y
Childcare and kindergarten facilities	Early learning and childcare	Early learning and childcare	Future proof	Y	Y
Community centres	Community centres	Community centres	Future proof	Y	Y
Developing road network for new developments in the outer North	Road	Road	Address gap	Y	Y
E6 – Hume Freeway to the Metropolitan Ring Road	Road	Road	Transformative	Y	Y
Hospital beds (new) and new hospital in the outer North	Health	Health	Future proof	Y	Y
Local arterial road network in the inner North improved	Road	Road	Address gap	Y	Y
Local arterial road network in the outer North improved	Road	Road	Address gap	Y	Y
Primary and secondary schools	Education	Education	Address gap	Y	Y
Project Upfield line and land corridor to integrate a potential future east coast High Speed Rail	Rail	Rail	Transformative	Y	Y
Public Transport Victoria Network Development Plan – Metropolitan Rail Stage 3	Rail	Rail	Transformative	Y	Y
Tram network extended	Tram	Tram	Opportunity	Y	Y
Improving local routes in the Outer North	Road			Y	N

Source: Northern Horizons – 50 Year Infrastructure Strategy for Melbourne's North – Update 2016, NORTH Link (2016) and Northern Horizons – 50 Year Infrastructure Strategy for Melbourne's North, NORTH Link (2014).

Table 2.3 Long-term (2032+) infrastructure priorities for Melbourne's North					
Project/program	Infrastructure Sector	Component	Project type	Priority in 2014 Report	Priority in 2016 Report
Beveridge Intermodal Freight Terminal	Economic, transport			Y	Y
Outer Metropolitan Ring Freeway	Transport	Road, Rail	Transformative	Y	Y
Public Transport Victoria Network Development Plan – Metropolitan Rail Stage 4	Transport	Rail	Transformative	Y	Y

Source: Northern Horizons – 50 Year Infrastructure Strategy for Melbourne's North – Update 2016, NORTH Link (2016) and Northern Horizons – 50 Year Infrastructure Strategy for Melbourne's North, NORTH Link (2014).

2.2 Progress on programs and specific projects

The following progress has been made to the short-term priorities listed in the Northern Horizons 2016 update.

- **Access to high speed broadband:** Most areas within the North now have access to the National Broadband Network (NBN), with remaining gaps expected to obtain access by mid-2020 (however, concerns remain about the suitability of technology for businesses that require substantial bandwidth; there are also reports of continued mobile blackspot issues).
- **Aged care facilities:** Over the short-term to 2021, it was estimated that the Northern Region will require a minimum total of 8,780 aged care places, with an estimated shortfall across all councils of 554 places. As of 2019, the total number of aged care places available in the North is around 7,503. On previous estimates this would require a further 1,277 places to be made available over the next two years.
- **Airport Rail Link:** commitment to business case (state and federal governments).
- **Bicycle Network:** In general, infrastructure for bicycles has improved since the 2016 update, including on-road and shared path space. There are still significant gaps in connecting town centres and providing safe bicycle infrastructure. Road duplications are now more likely to include bike lanes (e.g. Plenty Road).
- **Broadmeadows Revitalisation:** infrastructure commitments
- **Bus network coordinated:** Significant gaps in service routes and frequency still remain in the Northern bus network. Specific projects have not been implemented.
- **Car parking at selected stations increased:** A number of train stations in the outer north have expanded adjacent car parking facilities for park and ride commuters.
- **Childcare and kindergarten facilities:** The roll out of child-care and kindergarten facilities has exceeded the short-term targets set out in *Northern Horizons Update 2016*. The Mitchell Shire Council was the only council identified to have a shortfall of available facilities in the short-term, while other councils had been identified as being near capacity. New facilities have been built or are planned to be built in the short-term in Darebin, Moreland, Hume, Whittlesea and Mitchell. New facilities and upgrades to existing facilities are getting funded under the State Government's Children's Facilities Capital Program.
- **Community centres and sports facilities:** A shortfall of 26 community centres was identified by 2021 with at least 6 new community centres built since 2016. There have also been upgrades to sporting facilities including aquatics and sporting fields but performance has generally been under target for provision of community centres and sports facilities.
- **Grade separations:** Four level crossings have been removed in the North, while a further four that were previously unfunded are now planned to be removed in coming years.
- **Health precincts implemented:** Reservation for health precincts in Northern growth area is generally lacking in precinct structure plans.
- **Hospital beds in existing facilities:** The number of beds in existing facilities has not improved sufficiently and a significant service shortfall still exists. Northern Hospital is undergoing an expansion to be complete by 2021, which will deliver 96 new beds.
- **La Trobe National Employment Cluster:** La Trobe University's *City of the Future* plan was released in 2018. A Health and Wellbeing Hub and Sports precinct are planned, with the first stage of the Sports precinct opened in 2018.
- **Northern Roads Upgrade and local routes in the North-East improved:** The Victorian Government has committed to the Northern Roads Upgrade and several arterial roads in the

outer North-East have been improved. These include Yan Yean Road – Diamond Creek Road to Bridge Inn Road, Diamond Creek Road – Improvements between M80 and Diamond Creek (to intersection with Yan Yean Road), Plenty Road – McKimmies Road to Bridge Inn Road. The remaining roads have received a commitment from the Victorian Government to be built, excepting for a new arterial road connecting O’Herns Road to Craigieburn Road East.

- **Local routes in the North-West improved:** Neither of Aitken Boulevard nor Mickleham Road have been funded in the Victorian Government’s major roads upgrades.
- **Melbourne Market expansion:** feasibility funding has been committed.
- **North East Link – Greensborough to Eastern Freeway:** The corridor for the North East Link has been chosen to run alongside Greensborough road and tunnel underneath the Yarra River. Planning, design and preliminary drilling works are underway.
- **Northern Regional Trails Strategy:** There has been limited progress on implementing the priority trails identified within the Northern Regional Trails strategy, with some progress made in outer councils. Most priority trails are not implemented. The State Government recently allocated \$10 million over four years to the strategy, however this is not enough to build the top priority trails.
- **Primary schools:** New primary schools have been built in the outer north with more planned over the next few years, especially in Hume and Whittlesea. No new primary schools are planned for Mitchell or have been built; however, several primary schools are getting upgraded within the region, which will improve capacity.
- **Public Transport Victorian Network Development Plan:** Melbourne Metro 1 is under construction, with completion estimated by 2025. South Morang line has been extended to Mernda. The Hurstbridge line (Stage 1) has been upgraded, including level crossing removals at Grange Road and Lower Plenty road and track duplication between Heidelberg and Rosanna. Hurstbridge Line Stage 2 upgrades are commencing. Sunbury Rail Upgrade contracts let.
- **Secondary schools:** Two new secondary schools have opened in Whittlesea and there is a new (reopened) high school at Preston. In addition, a new secondary school is set to open in Hume in 2020. Many existing secondary schools have also received funding for upgrades.
- **Somerton Freight Terminal:** The Somerton Freight Terminal has received \$16.2 million in government funding under the Port Rail Shuttle program, to connect to the Port of Melbourne by rail.
- **Tram operations improved:** No firm commitment has been made to any of the proposed extensions or upgrades. There have been some improvements to accessibility with more e-class trams on routes.
- **Tullamarine Freeway and Sunbury Road corridor improvements:** The Tullamarine widening project has been completed. Complementary projects, including widening Sunbury Road and the Bulla Bypass, are still ongoing. Sunbury Road will be duplicated between Powlett Street and Bulla-Diggers Rest Road, but there are no current plans to duplicate further down to the Airport or for Bulla Bypass.
- **Yarra River crossings improved:** The upgrade to Chandler Highway is complete. All new lanes are open to traffic and there is bicycle and pedestrian access across the bridge. However, there have been no improvements to public transport across Chandler Highway.

Table 2.4 gives an overview of the various stages that each of the priorities have achieved as of September 2019. The relevant stages have been highlighted in the table for proposed, committed, planning, design, under construction and complete.

In some cases there are multiple projects or targets underneath each priority that are in different stages of completion. In this case all the relevant cells within the table have been highlighted.

	Proposed	Committed	Planning	Design	Under construction	Complete
Access to high speed broadband						
Aged care facilities						
Bicycle Network						
Bus network coordinated						
Car parking at selected stations increased						
Childcare and kindergarten facilities						
Community centres and sports facilities						
Food and beverage industry park						
Grade separations						
Health Precincts implemented						
Hospital Beds (1,500 new) in existing health facilities						
La Trobe National Employment Cluster						
Local routes in the North-East improved						
Local routes in the North-West Region improved						
North East Link						
Northern Regional Trail Strategy						
Primary Schools						
Public Transport Victoria Network Development Plan-Metropolitan Rails Stage 2						
Secondary schools						
Somerton Freight Terminal						
Tram operations improved						
Tullamarine Freeway and Sunbury Road corridor improvements						
Improved Yarra River Crossings						

Note: Progress to October, 2019.

Source: NIEIR and J. Stanley & Co.

2.3 Use of past reports

Because of changes in staff, particularly in the region's local governments, many of those attending the research meetings for this update were not familiar with how the report has been used in the past. There were, however, some contributors to the research who did have a longer-term engagement with the reports. Two key recommendations emerged.

1. The reports should be updateable, so that users are informed about project completions. A new web page linked to the report, listing projects and updates, was suggested.
2. Improve flexibility of response to the timing of infrastructure rollout, particularly because of rapid changes in population. Councils need more flexibility in relation to timing of infrastructure projects and banding of projects within a given period makes it more difficult to argue for a project that had been initially identified as a long-term project, to be brought forward because it was now urgent, due to growth beyond expectations. This issue has now been addressed in the new priority listings in Chapter 5 of this report.

2.4 Recent significant reports related to infrastructure

2.4.1 Purpose

This section looks at reports of significance to infrastructure planning and delivery that have been released since the publication of the *Northern Horizons Strategy Update 2016* and at governmental commitments that have been made since that time, to identify potential implications for infrastructure prioritisation in Melbourne's Northern Region. The reports in question are mainly from Infrastructure Victoria and Infrastructure Australia, while the governmental commitments are those that have been made in the last three Victorian State and Federal Budgets, together with promises made in the recent federal election, relevant to Melbourne's Northern Region. Plan Melbourne 2017-2050 is also discussed, the release of which was after the 2016 Update.

2.4.2 Infrastructure Victoria: *Victoria's 30-Year Infrastructure Strategy* – December 2016

One of the most significant documents published since the release of the Northern Horizons Strategy Update 2016 was Infrastructure Victoria's *30-Year Infrastructure Strategy* (IV 2016) for Victoria. Infrastructure Victoria (IV) is a governmental agency set up to provide arm's length independent advice to the Victorian State Government on infrastructure development priorities. The 2016 strategy was framed taking account of seven guiding principles developed by IV, which were essentially concerned with how the strategy would be put together (IV 2016, p. 12):

- consult and collaborate;
- drive improved outcomes;
- integrate land use and infrastructure planning;
- draw on compelling evidence;
- consider non-build options first;
- promote responsible funding and financing; and
- be open to change.

Ten objectives were adopted for the Strategy (IV 2016, p. 13):

1. prepare for population change;
2. foster healthy, safe and inclusive societies;
3. reduce disadvantage;
4. enable workforce participation;
5. lift productivity;
6. drive Victoria's changing, globally integrated economy;
7. promote sustainable production and consumption;
8. protect and enhance natural environments;
9. advance climate change mitigation and adaptation; and
10. build resilience to shocks.

The Strategy identified 19 needs that shaped its detailed recommendations to government. We do not repeat the full list here but note the 16 needs that we believe relate most directly to potential infrastructure needs in, or for the benefit of, parts of Melbourne's Northern Region (from IV 2016).

1. Address infrastructure demands in areas with high population growth.
2. Address infrastructure challenges in areas negative population growth.
3. Respond to increasing pressures on health infrastructure, particularly due to ageing.
4. Enable physical activity and participation.
5. Provide spaces where communities can come together.
6. Improve accessibility for people with mobility challenges.
7. Provide better access to housing for the most vulnerable Victorians.
9. Provide access to high-quality education infrastructure to support lifelong learning.
10. Meet growing demand for access to economic activity in central Melbourne.
11. Improve access to middle and outer metropolitan major employment centres.
12. Improve access to jobs and services for people in regional and rural areas.
13. Improve the efficiency of freight supply chains.
15. Manage pressures on landfill and waste recovery facilities.
16. Help preserve natural environments and minimise biodiversity loss.
17. Improve the health of waterways and coastal areas.
18. Transition to lower carbon energy supply and use.

The top three recommendations in Infrastructure Victoria's 2016 Strategy were about (IV 2016, p. 43):

1. increasing densities in established areas and around employment centres to make better use of existing infrastructure;
2. introducing a comprehensive and fair transport network pricing regime to manage demands on the network; and
3. investing in social housing and other forms of affordable housing for vulnerable Victorians to significantly increase supply.

The first of these recommendations reflects the land use development direction that has been embedded in *Plan Melbourne* (DTPLI 2014) and *Plan Melbourne 2017-2050* (Victorian Government 2017), although the current rate of fringe growth in Melbourne suggests that there is a long way to go for a more compact city to result (NIEIR and Stanley and Co 2019).

Some of the recommendations of the Strategy involve specific infrastructure priorities and dates for implementation. Most, however, are more generic, lacking specifics in terms of locations and projects, reflecting the relatively short time that was available to Infrastructure Victoria to prepare the strategy (from the date of its establishment). A listing of the Strategy's infrastructure initiatives that seem particularly relevant to Melbourne's North is put together in Table 2.5, which lists the initiative, the needs to which it is related by IV and the recommended timing. It is noteworthy that very few of these initiatives have a specific tag to the North, or to any other part of Melbourne. Those that are spatially specific tend to be major transport projects, such as the North-East Link, Outer Metropolitan Ring Road and rail upgrades (e.g. Melbourne airport rail, most of which is not in the Northern Region but the benefits from which will be substantial for the region; and Wallan rail electrification).

The listing is also noteworthy for the support it provides for initiatives that assist:

- growth of Plan Melbourne's National Employment and Innovation Clusters, such as the Latrobe Cluster;
- local and trunk bus services, including SmartBus and the airport bus;
- active travel;
- environmental initiatives;
- affordable housing;
- place making; and
- shared infrastructure.

Infrastructure Victoria is due to update its Plan in 2020, so these generic types of initiatives can be expected to be further elaborated in the Plan update, adding detail that was lacking in the first version of the Plan. The updated infrastructure priorities for the Northern Region, outlined in the present report, gives close attention to these priority areas, identifying some specific regional initiatives that would meet the needs targeted by IV.

2.4.3 Infrastructure Victoria: *Reforming water sector governance* – October 2019

This paper presents opportunities to change water governance arrangements to facilitate more efficient use of all available water resources, building on the recommendations in Victoria's 30-Year Infrastructure Strategy from 2016 (IV 2019).

The reports identified three areas for reform:

1. better use of existing infrastructure and more efficient use of all water sources;
2. more integrated and adaptive planning processes; and
3. the need for community involvement in decision-making.

Initiative	Need 1	Need 2	Need 3	Need 4	Need 5	Need 6	Need 7	Need 9	Need 10	Need 11	Need 12	Need 13	Need 15	Need 16	Need 17	Need 18
Development in established areas	Y 0-5								Y 0-5							
Development in/around employment centres	Y 0-5								Y 0-5	Y 0-5						
Growth area local buses	Y 0-15									Y 0-15						
SmartBus Network	Y 0-15									Y 0-15						
Outer metropolitan arterial roads	Y 5-15									Y 5-15						
Wallan rail electrification	Y 15+								Y 15+							
Wollert transport links	Y 0-5; S								Y 0-5; S							
Public libraries	Y 0 +				Y 0+			Y 0+								
Green infrastructure	Y 0+			Y 0+								Y 0+				
Schools as community facilities	Y 5+	Y 5+			Y 5+			Y 5+								
Regional highways		Y 0-5; S														
Regional coaches		Y 0-10									Y 0-10					
On-demand transport services		Y 0-15				Y 0-15					Y 0-15					
Regional road maintenance		Y 5+									Y 5+	Y 5+				
Education delivery through technology		Y 0-10						Y 0-10			Y 0-10					
Health care delivery through technology		Y 5-10	Y 5-10								Y 10-15					
Health care ICT systems			Y 0-10								Y 0-10					
Acute/sub-acute health facilities			Y 5-15; S													
Integrated community health hubs			Y 5+								Y 5+					
Major Hospitals			Y 10-15													
Forensic mental health facilities			Y 5-10													

Initiative	Need 1	Need 2	Need 3	Need 4	Need 5	Need 6	Need 7	Need 9	Need 10	Need 11	Need 12	Need 13	Need 15	Need 16	Need 17	Need 18
Mental health/AOD facilities			Y 5+													
Cycling end-of-trip facilities				Y 0-5												
Cycling corridors/walking improvements				Y 0-15					Y 0-15							
Major cultural/sporting infrastructure				Y 0-5; S	Y 0-5; S											
Community sport/recreation facilities				Y 0-5; S												
Community cultural facilities					Y 0-5; S											
Transport interchanges						Y 0-5; S			Y 0-5; S	Y 0-5; S						
Public transport accessibility						Y 0-5										
Driverless vehicles						Y 0+			Y 0+							
Crisis accommodation and supportive housing							Y 0-5									
Affordable housing provision							Y 0+									
School investment pipeline								Y 0-5; S								
Metropolitan rail upgrades									Y 0-5; S							
Metropolitan bus network									Y 0-15	Y 0-10						
Metropolitan rail stations									Y 5+							
High capacity signalling									Y 5+							
10-car metropolitan trains									Y 10-15							
Traffic management systems									Y 0-10			Y 0-10				
Melbourne airport bus									Y 0-10	Y 0-10						
Melbourne airport rail link									Y 15+	Y 15+						
Melbourne metro future stages									Y 0-5; S							

Initiative	Need 1	Need 2	Need 3	Need 4	Need 5	Need 6	Need 7	Need 9	Need 10	Need 11	Need 12	Need 13	Need 15	Need 16	Need 17	Need 18
Level crossing removals										Y 0-5; S						
Employment centre arterial roads										Y 0-5; S						
Employment centre mass transit										Y 0-15						
North East Link										Y 10-15		Y 10-15				
Outer Metropolitan Ring Road										Y 15+		Y 15+				
Eastern Freeway-CityLink-Western Ring Road										Y 0-5; S		Y 0-5; S				
Communications infrastructure											Y 0-15					
Regional city local buses											Y 0-10					
Long distance rail services											Y 0-10					
Driverless freight vehicles												Y 0-15				
High productivity freight vehicles												Y 5-15				
Recycled materials in construction													Y 0-5			
Organic waste													Y 0-10			
Waste management sites													Y 0-5			
Habitat corridors														Y 5+		
Environmental water delivery														Y 15+	Y 15+	
Riparian fencing															Y 10+	
Stormwater harvesting															Y 5+	
Energy efficiency of existing public buildings																Y 0-10
Small-scale solar																Y 0-5

Note: *; Y = year or years; S = study or planning work.

Source: NIEIR and J. Stanley & Co.

2.5 Infrastructure Australia: Outer Urban Public Transport – Improving accessibility in lower density urban areas, October 2018

This report is part of Infrastructure Australia’s reform series. It undertakes comparative analysis of public transport service levels across Australian mainland capital cities, looking at service coverage and frequency, a key finding being that *Outer urban areas of our cities are being left behind* (IA 2018, p. 4). The report finds that:

Public transport disadvantage in outer suburbs is significant. Access to public transport services and service frequencies are lower, while travel times and distances to major employment centres are longer in outer suburbs. (IA 2018, p.1)

The comparative analysis shows Melbourne’s urban public transport service levels in poor light, relative to other major cities, particularly in what IA defines as outer areas (loosely defined as areas that are >20 kilometres from the CBD). IA finds that about 1.4 million people in Melbourne’s outer suburbs *are not within walking distance of reasonable quality public transport* (IA 2018, p.4), comprising a high 62 per cent of the resident population of these areas. This Melbourne resident population number is 400,000 more than in each of Sydney and Brisbane, which ranked equal second worst in terms of outer urban walkable access to reasonable quality PT services. *Reasonable quality public transport* is regarded as a medium- to high-frequency service within the following walking distances (IA 2018, p. 26, in a Note to Figure 9):

A medium- to high-frequency service is defined as four or more services during weekday AM peak, while walking distance is defined as 800 metres for heavy rail stations and 400 metres for all other services.

In the light of this Infrastructure Australia finding on service deficiencies, it is no surprise that improved public transport service levels emerged as a high priority for outer urban growth areas in the current study.

In the middle suburbs (generally 10-20 kilometres from the CBD, although Dandenong to the south-east is part of middle Melbourne as defined), Infrastructure Australia indicated that Melbourne has 400,000 people residing beyond walking access to reasonable quality PT, or 21 per cent. This number was only exceeded by Perth with 500,000. Sydney had only 200,000. The Melbourne inner area figure was 11,000, better than Sydney, Brisbane and Perth.

In short, Melbourne has the worst public transport service availability of all the capital cities in terms of walking access to reasonable quality services, particularly for outer urban residents (and visitors) but also for those living in or visiting middle suburbs. Some services will be available in many of these outer suburbs but low frequencies would exclude them from being assessed as of reasonable quality, as per the IA definition.

IA maps showing the results of service frequency analysis, covering morning weekday peak and weekend lunchtime peak frequencies, suggest that it is service coverage and frequency on currently low frequency services that probably needs most attention in the outer north. This matter is addressed in the present report.

Infrastructure Australia (2018) made seven recommendations about how to improve service opportunities and availabilities, as follows.

1. While progress is being made in most jurisdictions, state and territory Governments should prioritise the seamless integration of services for users by co-ordinating service planning, fare policy, digital tools and operation.
2. Australian governments should embrace new transport modes, such as on-demand services, which are well suited to low-density areas.
3. State and territory governments should implement a co-ordinated policy approach to encourage interchanging within an integrated transport network.
4. State, territory and local governments should improve the physical integration of the public transport network with private, active and emerging transport modes.
5. Australian governments should openly embrace technological innovation in transport, working with third party operators to improve the user experience.
6. Australian governments should undertake integrated land use and transport planning to examine opportunities for employment and residential densification at key sites adjacent to public transport.
7. Australian governments should support the development and growth of suburban and outer urban employment centres to improve job accessibility.

Recommendations about service integration are obvious and should have been done years ago. The recommendation regarding demand-responsive services has a superficial appeal but needs to remember that most demand-responsive transport is not cheap, on a per trip basis, and that we have had demand responsive transport in outer suburbs for decades, in form of taxis and Telebus services, yet the extent of transport disadvantage has continued to increase. Step increases in opportunities in this regard seem likely to depend on the availability of driverless on-demand transport, which is still many years away. In the short to medium-term, attention needs to focus on providing reasonable quality public transport that builds on and enhances existing route service models, including adding a greater degree of demand-responsiveness (e.g. greater flexibility), while being readily available, accessible and affordable, to support social inclusion. The recommendations in the current report have been shaped to achieve this intent.

Some of the other IA recommendations will take time to affect service economics, for reasons such as the relatively slow rate of change in opportunity to increase densities in established areas and jobs in outer areas. In the short to medium-term, the reality is that we will need to see increases in PT largely as we know it in outer suburbs if transport disadvantage is to be reduced in those areas, albeit that smarter ways should be sought to deliver such services (e.g. perhaps involving what Stanley et. al. 2019 call shared mobility contracts).

As is usual of such governmental reports, individual jurisdictions are not highlighted in the recommendations. However, a reasonable person might conclude, on the basis of the evidence presented, that as Melbourne fares worst by some margin in terms of population coverage by reasonable quality public transport services, particularly in its outer areas, a significant increase in PT service levels in outer Melbourne should be an early national priority, with IA recommendations 1 to 7 being taken into account in prioritising just how such a service increase can be most efficiently and effectively provided. The Outer North, where population increase has been rapid, will form a significant part of the areas that should expect major improvements in PT service availabilities (coverage, frequency and span of hours). Public transport service improvement priorities in the outer north, particularly service coverage at a reasonable frequency, and to a lesser extent in the middle north, thus form an important priority for this NORTH Link Infrastructure Update.

2.6 Infrastructure Australia: Infrastructure Priority List. Australian Infrastructure Plan. Projects and Initiatives Summaries. February 2019

This report provides an update on IA's national infrastructure priority list, where the focus is on nationally significant infrastructure having a project threshold cut-off of at least \$30 million per annum of net material benefits for inclusion, taking potential unquantified quality of life considerations into account (IA 2019). Essentially this means that only big infrastructure projects get considered, risking a bias against programs of small initiatives that, combined, could generate large benefits. By implication, State and local governments and the private sector need to look at opportunities at the small end, as well as contributing (in some cases) to big projects.

IA classifies proposals into either:

- **projects**, which are advanced proposals that have gone through a full Business Case assessment by IA and meet its national significance tests. Projects that address major problems or opportunities of national significance, and that are expected to deliver substantial economic, social and environmental value in so doing, relative to cost, are highlighted as *High Priority*, or *Priority* if the national significance is less; and
- **initiatives**, which are proposals that have the potential to meet nationally significant problems or opportunities but need further development and assessment to judge their merits in so doing.

In the February 2019 update, there are only three Victorian projects categorised as *High Priority Projects*, these being:

- **M80 Ring Road Upgrade:** a near term (0-5 years) congestion relief project. This project involves work on three segments – Sydney Road/Edgars Road (4 kilometres); Plenty Road/Greensborough Highway (2.4 kilometres); and Princes Freeway to Western Highway (7.9 kilometres). The first two of these segments are highly relevant to Melbourne's North. Late 2021 is suggested as the expected completion date. Project cost figures are shown as \$690 million (in 2015), with an expected benefit-cost ratio (BCR) of a solid 2.0;
- **Monash Freeway Upgrade Stage 2:** another near term (0-5 years) congestion relief project; and
- **North East Link:** a medium-term (5-10 years) congestion relief project. This project is indicated as being 11 kilometres in length and including 10.6 kilometres of new bus lanes, with an expected benefit-cost ratio (BCR) of 1.3 and a project NPV (net present value of benefits) of \$2.2billion. The project capital cost is indicated as being an estimated \$15.79 billion in 2018.

Two of the three IA High Priority projects will benefit Melbourne's North, a better result than for other parts of the city, perhaps indicating the scale of the backlog confronting the north!

It is illuminating that all Victorian *High Priority Projects* are road projects intended to do something about congestion relief, contrary to thinking that says you cannot build your way out of road traffic congestion, only price your way out (a view reflected in the Infrastructure Victoria priority accorded to road pricing and in the leading academic literature on the topic, such as Duranton and Taylor 2010). There is a delicate balance required in using road upgrading to reduce road congestion levels, without providing incentives for further traffic growth, which may eventually erode all the intended congestion relief. This is the usual experience, additional urban sprawl being one result, underlining the importance of also including congestion pricing solutions within the policy mix.

There is only one *Priority Project* for Victoria, this being Ballarat Line upgrade, which has little relevance to Melbourne's North.

High Priority Initiatives in Victoria are:

- improve the connection between the Eastern Freeway and City Link, a project that the current Victorian Government has strongly opposed. This is seen as a near term (0-5 years) congestion relief project;
- Melbourne rail network capacity (enhancement), a medium-term project (5-10 years) aimed at relieving congestion. The northern corridor through Preston is one of three corridors flagged; and
- preserve corridor for Melbourne Outer Metropolitan Ring Road/E6, a near term (0-5 years) corridor preservation initiative.

The OMR corridor preservation initiative is relevant to the north, as is the rail network enhancement.

There are ten *Priority Initiatives* for Victoria listed by IA.

1. Melbourne level crossing removal, described as a near term project (0-5 years) aimed at Melbourne urban road network congestion. Five potential locations are noted on northern lines.
2. Melbourne Airport to the CBD public transport capacity, urban congestion again being the project rationale (5-10 years).
3. Melton Rail Line Upgrade (5-10 years).
4. Public transport access to Fishermans Bend (5-10 years).
5. Cranbourne Line capacity (5-10 years).
6. Hurstbridge Line Capacity (5-10 years).
7. Melbourne outer northern suburbs to CBD capacity upgrade (10-15 years). This initiative includes both road and public transport considerations, IA suggesting (for example) that, in the absence of capacity improvements, the Craigieburn Line will be the most congested in Melbourne by 2031.
8. Melbourne Airport third runway (0-5 years).
9. Melbourne container terminal capacity and land transport access.
10. Melbourne-Geelong rail capacity enhancement (10-15 years).

Items 1, 2, 4, 6, 7 and 8 are relevant to Melbourne's North, with container terminal capacity also relevant, albeit not located in the north, given the importance of freight to the north.

The IA project listing is one indicator of ways that state governments, who submit projects to IA, are thinking about priorities. It is interesting and a little surprising, therefore, in the IA projects listings, that Sydney seems to have a greater focus on delivering some of the key land use development directions of *Plan Melbourne* than Melbourne does, such as delivering accessible neighbourhoods and accessibility to non-central jobs clusters. For example, active transport and PT access to Parramatta CBD feature among the NSW Priority Initiatives but there are no such specific initiatives amongst the Victorian projects. Delivering 20-minute neighbourhoods and improving access to urban clusters, particularly the Latrobe NEIC in the case of Melbourne's North, should be a priority, as they are in Infrastructure Victoria's priorities

IA also lists a small number of priority projects/initiatives that it classifies as *national*, rather than state-based, presumably because their benefits are expected to flow to more than a single state or territory. There are no *High Priority Projects* classified as national and only one *Priority Project*, Inland Rail, Melbourne to Brisbane via inland NSW. This project would essentially rely on existing track in Victoria, with some upgrading of standard gauge track but with most upgrading is required in NSW

and Queensland. The project is relevant to Melbourne's North, because it should help to ease some future pressures on road traffic volumes through the northern freight corridor.

IA has eight *High Priority Initiatives*, which include some generic programs (e.g. road network safety improvements; road network optimisation; national freight and supply chain strategy), which are relevant to Northern Melbourne and most other places too. The High Priority Initiative, Preserve corridor for East Coast High Speed Rail, seems most relevant to Melbourne's North, but has no timeline beyond corridor preservation (near term). There are three *Priority Initiatives* in the IA 2019 listing, with Advanced Train Management System implementation on the interstate rail network appearing to be the most relevant to the north, in an indirect way.

2.6.1 Infrastructure Australia: An Assessment of Australia's Future Infrastructure Needs – the Australian infrastructure audit 2019

In complete contrast with the 2019 Infrastructure Priority List, there is not one single project mentioned in the latest audit report from Infrastructure Australia. This report is instead primarily methodological. Even so, the independent statutory authority which produces these reports cannot get away from lists, and in this report has replaced its project lists with a list of 50 opportunities and 130 challenges which might be addressed by infrastructure investments. The opportunities and challenges are divided into 37 which are general in nature and 143 which are specific to an economic sector. Following established project classifications, five sectors are identified: transport, social, energy, telecommunications and water. The implication is that, when Infrastructure Australia returns to the task of project assessment, it will assess each project with respect to the general challenges and opportunities plus those of the sector to which the project is classified.

The report begins by emphasising the uncertainties which surround Australia's economic and social future. Not everybody will agree with the listing of uncertainties and the emphasis given to each, but the main point stands: in the presence of uncertainty, the previous methodology of project assessment, contrasting a business-as-usual projection with a with-project projection, to calculate a Direct Economic Contribution as a major criterion for project assessment. This is to be discontinued. Henceforth the key concept is to be Strategic Foresight, with an emphasis on infrastructure investments which are robust to a range of possible futures.

This said, the report does not pursue the uncertainties. There are no grand world scenarios, simply lists of challenges and opportunities as seen by current infrastructure managements – including, to broaden the scope from previous reports, the management of education, health, welfare and related services. A second broadening lies in increased attention to the coherence of investment programs at the regional level. Northern Melbourne falls squarely under heading of rapidly growing cities.

The message is that, in arguing for investment priority, regional advocates should be able to place proposed investments in the context of agreed and coherent visions of the regional future and should also be able to show that the investment is robust to such uncertainties as climate change (both amelioration and adaptation), technological advance and demographic change. The arguments should address regional and global interconnections and should also recognise divergent stakeholder interests. These include countering trends towards increased economic and social inequality. As a starting point, advocates could do worse than refer to Infrastructure Australia's lists of challenges and opportunities, showing how proposed investments fit into this scheme, but remembering that the challenge and opportunity list is provisional.

While it does not refer to Infrastructure Australia's specific opportunities and challenges (the IA report became available only when the present report was due), the general spirit of the discussion in the present report is very much consonant with the approach now recommended by IA.

2.7 Victorian State Budget commitments

This section focuses on the major projects and minor projects detailed in the Victorian state budgets over the previous three year period, with a particular focus on the 2019-20 Victorian State Budget and the projects and programs that directly impact Melbourne's Northern Region, as well as major projects in other regions that will indirectly affect Melbourne's Northern Region, and broader Victorian programs funded in the State budget.

2.7.1 Victorian 2019-20 State Budget

The Victorian 2019-20 State Budget, released in May 2019, is the first budget since the Victorian Labour Party retained office for a second term, following its 2018 state election win. As a result, the scope of the budget is greater than in previous years, as it seeks to include major election promises made in 2018. The 2019-20 State budget maintains the Victorian State Government's large infrastructure agenda, by continuing infrastructure builds that will improve Greater Melbourne's road and rail networks. The rate of infrastructure spending over the 2019-20 to 2022-23 period is estimated at \$13.4 billion annually, compared to \$4.9 billion over the 2005-06 to 2014-15 period and approximately \$10.9 billion from 2015-16 to 2018-19 (Victorian Government 2019), a very substantial rate of increase.

The largest flagship infrastructure project over the short-term is the \$15.8 billion North-East Link, which will link the end of the Western Ring Road at Greensborough to the Eastern Freeway and complete Melbourne's Ring Road. The funding also includes improvements to the Eastern Freeway that include widening the freeway to 20 lanes in spots (22 including on-ramps), including provision for some bus lanes. In the medium to long-term, the Victorian Government has announced plans to build the Melbourne Airport rail link that will connect to the suburban network through Sunshine. This will ultimately feed into the Victorian Government's plan to build a 'Suburban Rail Loop', which will connect all of Melbourne's major rail lines. That Loop is noted again in Section 4.3 below.

Since it first took office in 2014 the Victorian State Government has prioritised improvements to Melbourne rail network, including line improvements to increase capacity, new railway stations and removing level crossings from Melbourne's busiest intersections to reduce congestion. The 2019-20 State budget includes funding to remove a further 6 level crossings within the Northern Region. These, and other funded level crossing removal projects, are:

- Cramer Street, Preston;
- Munro Street, Coburg;
- Murray Road, Preston;
- Oakover Road, Preston;
- Reynard Street, Coburg;
- Station Street/Gap Road, Sunbury;
- Bell Street, Preston;
- Bell Street, Coburg; and
- Moreland Road, Brunswick.

The government has also provided \$547 million funding towards the next stage of the Hurstbridge line upgrade, that will duplicate 4.5 km of track (allow for higher frequency services) and provide new train stations at Greensborough and Montmorency. Government has also provided funding to increase the number of train services within the Metropolitan network more broadly.

Capital funding listed in the budget for tram, bus and cycling improvements is very small, compared to future provision of around \$30-40 billion for metropolitan heavy rail¹, depending on what part of the level crossing removal funding is attributed to rail, with a prospective additional \$50 billion for the Suburban Rail Loop (over many years). Budget capital funding for tram service improvements, including new trams, and new bus and cycling/walking initiatives totals only about 1 per cent of this heavy rail capital commitment, being broadly similar in scale to the provision for planning the Suburban Rail Loop (\$300 million). Consultations held during preparation of this report underlined that the regional modal shares and broader regional significance of tram, bus and active travel for Melbourne's Northern Region are much greater than is suggested by this metro wide budget relativity to rail.

Major budget investments into creative industries are largely focused within the inner Melbourne regions and will fund exhibitions and programs at the National Gallery and Museums. The Victorian Government is also planning on starting *Victorian Live*. This is intended to be a Victoria-wide live music festival, analogous to the *Melbourne International Comedy Festival*, although most of the action will likely be centred on inner Melbourne.

Other initiatives that are likely to strengthen and support local communities include funding for sports facilities and open spaces in suburban Melbourne. There is also a small amount of funding that will go towards revitalising the Broadmeadows town centre.

The Victorian State Government has also allocated funding for additional education and health initiatives. In the Northern Region this includes improvements to the Northern Hospital and improvements to four local community hospitals. Three new primary schools and one new secondary school are getting constructed in the outer North. Funding is also flagged for upgrades to nine existing schools (mostly secondary) and has been allocated for the planning process to upgrade more schools.

Broader education and health programs include free dental for public primary and secondary school students, and further support for mental health programs. More action on mental health may be a result of the Victorian Government's Royal Commission into mental health, aiming to improve outcomes for those experiencing mental illness. Victoria will also fully fund 15 hours of 3-year-old kindergartens which will likely create additional demand for pre-school staff and pre-school places.

There are other initiatives presented in the Victorian state budget that aim to attract investment in the Victorian economy including:

- increasing access and support to priority TAFE and pre-apprenticeship courses; and
- Victorian Jobs and Investment Fund – government investment into growing the economy, attracting large business investors, and encouraging innovation to transition to high growth industries.

¹ Main components are: Melbourne Metro Tunnel \$10.9 billion; level crossing removal \$13.3 billion; Airport Rail Link \$10 billion, half of which will be state funded; Sunbury line \$2.1 billion; high capacity trains \$2.3 billion; metro network modernisation \$1.4 billion.

Table 2.6 Victorian State Budget 2019-20 – select major project commitments				
Project/Program	Infrastructure sector	Component	Funding (\$m)	Comment
North East Link	Transport		15,800	
Level crossing removals	Transport	Road/Rail	6,600	Remove a further 25 level crossings. Northern region includes 6 level crossing removals.
Suburban Train Network	Transport	Rail	3,400	Works to Sunbury, Hurstbridge and Cranbourne Lines.
Solar Homes	Energy	Solar	1,300	Subsidies for rooftop solar panels, solar hot water and batteries.
Local suburban roads	Transport	Road	608	Intersection at Gaffney Street and Sussex Street, Coburg North. Pedestrian crossing signals at Livingstone Street, Ivanhoe.
Extra train services	Transport	Rail	195	
Extra car parks at train stations	Transport	Rail	150	
New and upgraded trams	Transport	Tram	163	
Improved bus network	Transport	Bus	50	Includes services around Northland
Bike and pedestrian paths	Transport	Bike	45	Between Heidelberg and Rosanna station, Upfield bike path lighting improvements.
Melbourne Airport Rail	Transport	Rail	12,300	Sunshine to Melbourne Airport.
The Suburban Rail Loop	Transport	Rail	Included above	90 km rail that connects major lines and includes 12 new stations.
Western Rail	Transport	Rail	Included above	Rail improvements in Western Suburbs.
New schools and upgraded schools	Social	Education	862	Northern region – 4 new schools and 9 upgraded schools in short-term. Further planning for 9 other school upgrades.
Fully funded 3-year-old kindergarten	Social	Education	882	
Rebuild suburban hospitals	Social	Health	1,500	Children's emergency department at Northern Hospital. Community hospitals at Craigieburn, Sunbury, Eltham and Whittlesea.
Free dental at primary and secondary schools	Social	Health	322	
Ambulance services	Social	Health	191	New vehicles, paramedics.
Mental Health Funding	Social	Health	173	Includes Royal Commission, improved.
Open Spaces			154	Create 6,500 hectares of suburban parkland.
Sports and Recreation	Social	Sports facilities	232	
Broadmeadows Town Centre and Frankston's station precinct	Social	Community centres	3.5	

Note: Listed projects are those that are relevant to Melbourne's Northern Region. Government funding figures are state totals.

Source: NIEIR and J. Stanley & Co.

2.7.2 Victorian 2018-19 State Budget

The 2018-19 budget has a strong health and education component, while continuing to implement major road and rail infrastructure priorities. The most substantial investment in roads is through the Suburban Roads Upgrade, which heavily benefits the Northern Region and south-east Melbourne, through upgrades to local arterial roads. Many of the upgrades to the arterial roads have been completed as of June, 2019. The budget also includes a planning and design provision for the North East Link and \$712 million for Monash Freeway upgrades (Victorian Government 2018).

The Victorian Government provided \$1.9 billion towards improving public transport, most of which went towards regional public transport lines and the duplication of Cranbourne and Pakenham lines. The extension from South Morang to Mernda was funded and additional services scheduled on the Mernda and Hurstbridge lines, both of which have now been implemented. Additional funding was allocated for more car spaces at train stations and small amounts for some improvements to bus services.

Education funding included the construction and upgrade of primary and secondary schools. The budget included funding for four new schools within the Northern Region, including Beveridge West Primary School, Craigieburn South Secondary School, Preston High School (additional stage), and Yarrambat Primary School (additional stage).

The 2018-19 budget provided funding for six new mental health crisis hubs that aim to divert patients suffering from mental health issues away from traditional emergency departments. All six hubs funded within the 2018-19 budget fall outside of the Northern Region. However, a drug rehabilitation centre was funded, to be constructed within Hume. General Health funding was allocated to renew the main block and five wards at the Austin Hospital in Banyule.

Project/Program	Infrastructure sector	Component	Funding (\$m)	Comment
Suburban roads upgrades	Transport	Road	2,200.0	Northern region and south-east region.
Cranbourne and Pakenham lines	Transport	Rail	572.0	Allows high capacity trains to Sunbury.
North-East Link	Transport	Road	110.0	Planning and design.
Mernda extension and additional train services	Transport	Rail	89.4	Hurstbridge, Mernda and Dandenong lines.
More car spaces at suburban stations	Transport	Rail	60.0	
Improvements to bus services	Transport	Bus	55.7	Includes services around Northland
Geelong fast train planning	Transport	Rail	50.0	With ability to link to Melbourne Airport.
Skills and training	Social	Education	645.8	TAFE places, and free TAFE for priority places.
New and planned schools	Social	Education	836.0	New Schools – Beveridge West Primary School, Craigieburn South Secondary School, Preston High School (additional stage), Yarrambat Primary School (additional stage).
Austin Hospital infrastructure renewal	Social	Health	69.5	Main block and five wards.
Mental health	Social	Health	705.0	Large program. Includes drug rehabilitation in Hume.
Sports facilities			231.0	Major venues and local grounds upgrades. Major investment in increasing female participation.
Growing Suburbs Fund	Economic		50.0	Additional funding on top of 150 to support fast growing suburbs.

Note: Listed projects are those that are relevant to Melbourne's Northern Region. Government funding figures are state totals.

Source: NIEIR and J. Stanley & Co.

2.7.3 Victorian 2017-18 State Budget

The 2017-18 Victorian state budget was delivered in a period of significant increases in dwelling prices and, as such, many important major initiatives were aimed at housing affordability. This includes social housing and policies for first home buyers that are likely to be concentrated in outer urban greenfield developments. Increased health and education funding were provided for more health services and new and upgraded schools.

The Victorian State Government committed \$700 million to upgrading the M80 ring road, while also providing funding for improved public transport. Regional road networks benefit from \$556.4 million in funding to upgrade, maintain and build road projects (Victorian Government 2017).

Table 2.8 Victorian State Budget 2017-18 – select major project commitments

Project/Program	Infrastructure sector	Component	Funding (\$m)	Comment
Final upgrade to M80 Ring Road	Transport	Road	700	
Improved Public Transport Services	Transport	Bus	62.5	Includes improved bus services in Craigieburn, Sunbury and Broadmeadows.
New trams and tram infrastructure	Transport	Tram	218.1	
Planning for second stage of Hurstbridge Upgrade	Transport	Train	5	
Road maintenance	Transport	Road	343	
Maintenance on West Gate Bridge	Transport	Road	58.6	
Yan Yean Road upgrades	Transport	Road	96.6	
NORTH East Link planning	Transport	Road	100	
New and upgraded schools	Social	Education	685	New schools include Preston High School, Yarrambat Park.
Victorian State Emergency Services	Social		34.3	New vehicles, equipment and 6 new headquarters, including Craigieburn North.
Northern Hospital upgrades	Social	Health	162.7	
Austin and Royal Melbourne Hospital upgrades	Social	Health	69.8	
Funding for increased hospital demand	Social	Health	1,300	Additional 41,000 admissions and 38,000 emergency treatments in 2017-18.
Boosted access to mental health services	Social	Health	406.7	
State First Home Owner schemes	Social	Housing	901	
Social Housing Growth Fund	Social	Housing	1000	2,200 new social housing places over five years.

Source: NIEIR and J. Stanley & Co.

2.8 Federal budget commitments

2.8.1 Federal 2019-20 Budget

The Federal 2019-20 Budget was delivered in April 2019, just prior to the 2019 election, and was viewed as an unofficial campaign launch for the Coalition's election campaign (Commonwealth of Australia 2019). The main promises made within the budget pertain to the Coalition's reform of personal income taxes, which are to be legislated and implemented over the next five years in three stages. There are also tax cuts for businesses earning under \$50 million in revenue per annum and an extension of the government's instant asset write off.

Outside of the budget, the Coalition ran a simple campaign, with few further election promises announced during the official campaign. Notable exceptions include policy to lower the deposit required for a mortgage for first home buyers, which may help to strengthen housing demand in outer Melbourne.

The Federal Government has announced a commitment to a North West Melbourne City Deal, although details at this stage are limited, including the boundaries in the city deal.

The Federal Government is investing in numerous infrastructure projects around Australia. This includes developing business cases for fast rail between Melbourne and Albury-Wodonga, Melbourne to Traralgon and Melbourne to Shepparton (already underway).

The Federal Government has provided \$282 million funding to allow retirees to stay at home longer, rather than enter an aged care facility. The package includes places for 10,000 home care packages. They are also providing funding for an additional 13,500 aged care places across Australia.

The Urban Congestion Fund will provide funding to upgrade train station car parks (\$500 million) and improve local roads and intersections. No train station car parks in Melbourne's North are marked for funding. Road projects under the fund in Melbourne's North include:

- Fitzsimmons Lane and Main Road Corridor, Eltham²;
- Hume Freeway – Lithgow Street to the M80 Ring Road; and
- Calder Freeway – Gap Road to the M80 Ring Road.

The Federal Government has also provided additional funding to local roads through the \$2.2 billion Local and State Government Road Safety Package. Local governments are allocated funding to improve local roads.

The Federal Coalition has promised \$4 billion in funding for the East-West Link to the Victorian State Government. Although the funding is promised, the East-West Link remains one of the most divisive Victorian major projects, with the Victorian Labor Government famously cancelling the project at a cost of \$1 billion, once it obtained office. The Victorian Labor Government's position remains that it will not build the tollway, so it is very unlikely to be built in the short-term. The East-West Link Road remains on Infrastructure Australia's priority list.

² **Note:** project removed a bus lane on Fitzsimmons Lane and replaced it with single lane traffic.

2.8.2 Federal 2018-19 Budget

The Federal 2018-19 Budget introduced a plan to decrease personal income taxes (and therefore offset the impacts of taxation bracket creep). The plan cut the marginal rate of taxation for low, middle- and higher-income Australians, while increasing the thresholds at which marginal rates are applied. The Federal Government is also focusing on modernising services, through information technology type programs.

The Federal Government announced \$24.5 billion of new major transport projects, which is included in the \$75 billion over 10 years that was marked in the previous year's budget. The *Roads of Strategic Importance* initiative is mostly targeted at Northern Australia. Notably, none of the announced projects within this initiative are within Victoria. However, there are \$7.8 billion of major transport projects that have been announced for Victoria within this budget. Those that are of most importance to Melbourne's North include (Commonwealth of Australia 2018):

- Melbourne Airport Rail Link (\$5 billion);
- North East Link (\$1.8 billion); and
- Victorian congestion package (\$140 million).

Social services of importance include:

- \$1.6 billion to fund aged care for 14,000 high level home care packages;
- Increased health care funding including continued increases to the scope of the PBS scheme;
- National Disability Insurance Scheme; and
- Community sports engagement programs (\$143 million).

2.8.3 Federal 2017-18 Budget

In the 2017-18 Federal budget the Government committed \$75 billion funding for major road and rail projects across Australia over the 10 years from 2017-18 to 2026-27. This includes an additional \$8.4 billion equity investment into the National Melbourne to Brisbane Inland rail project and \$500 million for the M80 Ring Road upgrade. In this budget the Government aimed to strengthen the nation's rail networks by establishing a \$10 billion *National Rail Program*. For Victoria this includes funding for the Melbourne Airport rail link, Geelong Rail line and North East Rail line. Other than the M80 Ring Road project, there is little within the budget that will directly impact infrastructure within the Northern Region, but there are adjacent projects that will improve interconnectivity within Greater Melbourne and regional Victoria.

Other main themes of the 2017-18 budget include tackling cost of living pressures with a range of programs to increase housing affordability, reducing tax for small business and increasing workforce participation. National economic and social programs funded in this budget include (Commonwealth of Australia 2017):

- National Disability Insurance Scheme;
- extension to the small business immediate tax deduction for assets below \$20,000;
- cuts to small business tax for businesses with revenue under \$20,000;
- programs to support workforce participation for disadvantaged Australians (Parents Next, Youth Jobs Path program);

- ability for first home buyers to save a deposit inside superannuation;
- non-concessions contribution into superannuation for downsizing older Australians; and
- \$375 million over three years for front line services for homeless.

2.9 Plan Melbourne 2017-2050

Updating *Plan Melbourne 2017-2050* (Victorian Government 2017) was an early initiative of the Andrews Government, building on and extending the previous Government's *Plan Melbourne* (DTPLI 2014). *Plan Melbourne 2017-2050* is:

... a 35-year blueprint to ensure Melbourne grows more sustainable, productive and liveable as its population approaches 8 million. (Victorian Government 2017, p. 6)

The Plan sets the long-term strategy for supporting jobs, housing and transport across Greater Melbourne and Victoria more broadly, while recognising the importance of building on Melbourne's legacies of distinctiveness, liveability and sustainability, which form three key elements of Melbourne's competitive advantage and urban brand. The importance of good connectivity is recognised in several of the Plan's strategic directions.

The core underlying land use development direction in *Plan Melbourne 2017-2050* is that the city should become a more compact city, with the relative proportion of development that takes place in established areas being intended to increase. Thus, for example, 70 per cent of new housing being infill is an aspirational target set out in *Plan Melbourne 2017-2050* (see page 47 of the Plan).

The Plan is based on *nine principles*, is directed at *seven key outcomes* and sets out *thirty-two directions/policies* to support outcome achievement. The nine principles are:

1. a distinctive Melbourne;
2. a globally connected and competitive city;
3. a city of centres linked to regional Victoria;
4. environmental resilience and sustainability;
5. living locally – 20-minute neighbourhoods;
6. social and economic participation;
7. strong and healthy communities;
8. infrastructure investment that supports balanced city growth; and
9. leadership and partnership.

Two particular focus areas of the Plan set it apart in international terms as an urban land use plan (Stanley, Stanley and Hansen 2017). Those two directions are:

- designation of a small number of hi-tech/knowledge-based economic clusters, called **National Employment and Innovation Clusters (NEICs)**, across the city. The NEICs are intended to provide increasing opportunities outside the CBD for agglomeration (productivity) economies, within employment reach of the fast growing outer suburbs and complementing the lead role of the CBD in hi-tech/knowledge-based economic activities. These economic activities are fast growing employment activities and the foundation for regional exports, providing high multiplier impacts. Their inclusion in both versions of Plan Melbourne arose from research conducted by NIEIR for the Plan Melbourne Ministerial Advisory Committee; and

- shaping Melbourne’s suburbs so that the city can increasingly develop as a series of **20-minute neighbourhoods**, where most of the requirements for a good life are accessible within 20-minutes by public or active transport. This idea provides a bottom-up view of urban strategic planning, to complement the more usual top down approach. It is a key part of ensuring that the benefits of a productive, liveable and sustainable Melbourne are widely shared.

These initiatives emerge in several of the Plan Outcome areas and associated Directions/Policies that are intended to support achievement. They are central to the future development of public transport services in Melbourne in general, and bus services in particular, as elaborated in what follows.

2.9.1 Living locally—20-minute neighbourhoods

As noted, *Plan Melbourne 2017-2050* is based on 9 principles that underpin a long-term vision for Melbourne (Victorian Government 2017, p. 4). The innovative Principle 5 is *Living locally— 20-minute neighbourhoods*, which *Plan Melbourne 2017-2050* describes as follows (Victorian Government 2017, p. 14):

Creating accessible, safe and attractive local areas where people can access most of their everyday needs within a 20-minute walk, cycle or local public transport trip, will make Melbourne healthier and more inclusive. Due to the specialised and diverse nature of work, many people will still need to travel outside of this 20-minute neighbourhood for their jobs.

Within the various policy Directions set out in Plan Melbourne, a number are particularly relevant to 20-minute neighbourhoods: Direction 3.2: Improve transport in Melbourne’s outer suburbs; Direction 3.3: Improve local travel options to support 20-minute neighbourhoods; and, Direction 5.1: Create a city of 20-minute neighbourhoods. The latter points out that (Victorian Government 2017, p. 114):

A 20-minute neighbourhood must:

- *be safe, accessible and well-connected for pedestrians and cyclists to optimise active transport*
- *offer high-quality public realm and open space*
- *provide services and destinations that support local living*
- *facilitate access to quality public transport that connects people to jobs and higher-order services*
- *deliver housing/population at densities that make local services and transport viable*
- *facilitate thriving local economies.*

The 20-minute neighbourhood is all about ‘living locally’—giving people the ability to meet most of their everyday needs within a 20-minute walk, cycle or local public transport trip of their home.

This discussion is particularly relevant to local active and public transport service development. The idea of 20-minute neighbourhoods has a clear focus on strengthening local (i.e., broadly speaking, within neighbourhood) access opportunities, by active and public transport, and a recognition of the particular needs of outer suburbs, needs which are growing very rapidly with the fast rate of outer urban population growth. Social inclusion, an important policy intent, is noted in discussion of some of the policy actions to support improved local access opportunities (e.g. *Policy 3.3.3: Improve local travel choices*) and has been central to the development of the idea of 20-minute neighbourhoods.

The expected benefits of delivering Melbourne as a series of 20-minute neighbourhoods are substantial (Victorian Government 2017, p. 114):

A 20-minute neighbourhood can create a more cohesive and inclusive community with a vibrant local economy—reducing social exclusion, improving health and wellbeing, promoting a sense of place, reducing travel costs and traffic congestion, and reducing carbon emissions across the city as a whole.

Development of strong and vibrant local activity centres, including health and educational precincts, together with local greening, are central to 20-minute neighbourhoods, including social and community infrastructure and local place making. Such initiatives should form key components of infrastructure plans to support delivery and some are included in the Northern Horizons Strategy 2020 Update.

Most of Melbourne's inner suburbs are already 20-minute neighbourhoods, as are parts of middle Melbourne. In Melbourne's outer suburbs, improved public transport is central to delivering on 20-minute neighbourhoods, while also ensuring that trunk (i.e. out-of-neighbourhood) access to services and other wants/needs that are not available within the 20-minute neighbourhood remains high quality (e.g. most jobs, high end medical services). This requires ensuring that land use development and local public transport integrates with high-quality trunk public transport, with planning and delivery of high-quality public transport timed to accord with the rate of development in outer areas, rather than years later. It further requires good local public and active travel options, which *Plan Melbourne 2017-2050* recognises may require new options (Victorian Government 2017, p. 92):

Improving local transport choices will help people meet most of their everyday needs within their local neighbourhoods. In the process, this policy helps create more inclusive communities. Initiatives include supporting safe, more innovative, flexible and demand-responsive forms of transport, particularly in locations with specific social needs or which are not connected by traditional bus services.

In terms of implementing *Plan Melbourne 2017-2050*, there were 112 Action Items identified. Recognising the early development stage of the 20-minute neighbourhood concept, one Action Item explicitly targeted this initiative. Action Item 75 reads as follows³:

Embed the 20-minute neighbourhood concept as a key goal across government. Key steps are to:

- *identify and undertake flagship 20-minute neighbourhood projects with the metropolitan regions and the private sector to focus planning and implementation work*
- *provide guidance to local government on embedding the 20-minute neighbourhood concept into local planning schemes*
- *build community partnerships to help deliver 20-minute neighbourhoods*
- *improve information and research to be shared with local government.*

Case studies have recently been undertaken under this Action and it is apparent from the Departmental website's listing of initiatives that have emerged from the case study work that a narrower concept of 20-minute neighbourhoods is being pursued than was intended in *Plan Melbourne 2017-2050*. Walking (for journeys of 800 metres or less) seems to have become the focus, rather than allowing the 20-minute neighbourhood to include local public transport travel and cycling, as was intended in *Plan Melbourne 2017-2050*. Including cycling and local public transport creates a larger 'neighbourhood', greater opportunity for living locally and introduces the opportunity for improving health, inclusion and environmental outcomes by replacing some 'local'

³ https://www.planmelbourne.vic.gov.au/__data/assets/pdf_file/0007/377125/Plan_Melbourne_2017_Implementation_Actions.pdf. Action Item 75.

car trips by cycling and/or public transport travel. Future 20-minute neighbourhood roll-out should include cycling and local public transport that will best support delivery of the goals of 20-minute neighbourhoods. Walking is important but it is not sufficient for delivery of the full range of intended benefits from 20-minute neighbourhoods.

2.9.2 National Employment and Innovation Clusters and the La Trobe cluster

Plan Melbourne (DTPLI 2014) and *Plan Melbourne 2017-2050* (Victorian Government 2017) both included the concept of a future Melbourne containing a small number of hi-tech/knowledge-based economic clusters, which will provide increased opportunities for locating high productivity jobs throughout the urban area, with good access to the fast growing outer suburbs. As noted, this concept was developed through work by NIEIR with the Ministerial Advisory Committee that advised the Liberal and Labor State Governments on their respective versions of *Plan Melbourne*. There are now seven National Employment and Innovation Clusters, two of which are in the inner area (Parkville and Fishermans Bend), four in the middle suburbs (Monash, La Trobe, Dandenong and Sunshine), plus one in the outer suburbs (East Werribee). The Victorian Planning Authority is preparing development strategies for four of these NEICs, including La Trobe, although some northern regional stakeholders have expressed the frustration that locals seem to have been left to get on with delivering the NEIC, without much state leadership.

The NEICs are intended to form the key land use foundation for a more productive, compact poly-centric Melbourne. While 20-minute neighbourhoods are essentially a bottom-up lens through which to approach urban land use planning, the seven National Employment and Innovation Clusters (NEICs) are essentially a top down approach to land use development planning, intended to support urban productivity growth and better sharing of the benefits of this growth among residents across the wider city. The NEICs are a primary policy direction in *Plan Melbourne 2017-2050* to support achievement of Outcome 1 in the Plan. That Outcome is *Melbourne is a productive city that attracts investment, supports innovation and creates jobs* (Victorian Government 2017, p. 22), with Policy 1.1.3 being *Facilitate the development of national employment and innovation clusters*. Discussion of that Policy in the Plan includes the following (Victorian Government 2017, p. 29):

The national employment and innovation clusters are focused on knowledge-based businesses that locate close to each other for knowledge and resource sharing. The clusters are distributed throughout Melbourne and along high-capacity transport networks to provide greater access to high-productivity jobs.

... There are some common requirements. Each cluster will need high levels of amenity to attract businesses and workers—including public transport, and walking and cycling paths...

High quality public and active transport is very important to NEIC development, being central to supporting the effective density on which clusters depend. Accessibility to other key activity nodes across the city is also important to support growth in jobs closer to where people live.

2.10 Conclusions

This section has summarised the priorities listed in the two previous versions of the Northern Horizons Strategy and those detailed by Infrastructure Victoria and Infrastructure Australia. It has also outlined recent Victorian and Federal Government Budget commitments, with a focus on matters relevant to Melbourne's North, and highlighted some important *Plan Melbourne 2017-2050* directions that are relevant to renewing the Northern Horizons Strategy.

The last few years has seen progress on tackling many of the initiatives set out in the Northern Horizons 2014 Strategy and 2016 Update but, given the Region's continuing rapid population growth (as discussed in Section 3.1 below), particularly in outer LGAs but increasingly in some inner LGAs that are densifying, infrastructure needs continue to accumulate.

In terms of progress in implementation of the initiatives in the Strategy, access to high speed broadband is progressing, but with some areas of concern, and aged care, child care and kindergarten facility roll-outs seem to be performing well, albeit that new State Government promises on 3-year-old kindergartens will add to requirements in that sector. Four rail level crossings have been completed in the Region, the Mernda railway line has been extended from South Morang to Mernda and there has been improvement of a number of arterial roads, together with duplication of Chandler Highway Bridge. Delivery of priorities such as bus service development and roll-out of bicycle infrastructure, however, is clearly lagging, even though most of the initiatives in these areas would be relatively low cost, compared to other initiatives. Continuing shortfalls in provision of community centres and sports facilities are also notable and there remains a significant shortfall in hospital beds. The La Trobe NEIC, the Region's dominant activity cluster, has seen progress in the health and wellbeing hub and in sports precinct development.

Infrastructure Victoria's innovative 30-Year Strategy, released in 2016, mainly sets out initiatives that are generic, rather than being explicitly place-based. The priorities embedded in IV strategy mirrors Plan Melbourne's intent that Melbourne becomes a more compact city. Backlog needs in the fast growing outer LGAs, however, necessarily compete with initiatives that might help drive that more compact urban form. The most notable specific initiatives supported in the IV strategy, so far as the north is concerned, are the NE Link, Outer Metropolitan Ring Road and Airport Rail link, albeit that the latter was put in the 15-30 years' timeframe. More broadly, however, the IV Strategy is very supportive of the Plan Melbourne NEICs, which includes La Trobe NEIC, trunk and local bus service improvements, active travel, environmental initiatives, affordable housing, place making and shared initiatives. Some of these areas are not major foci of the current Northern Horizons Strategy but should be part of future versions thereof.

Infrastructure Australia has recently drawn attention to shortfalls in public transport service levels in the fast growing outer suburbs of Melbourne, in particular, but the highest priorities in that organisation's infrastructure priority listing focuses instead on a small number of large road projects, a couple of which are in Melbourne's North (North-East Link and M80 Ring Road upgrade). Heavy and light rail initiatives, several of which will benefit Melbourne's North, are noted in IA's second level priority category but lower cost bus and active travel initiatives do not appear in the IA priorities for Melbourne, possibly a function of the high project cost thresholds that IA uses to define national priorities but also suggesting relatively low State Government priority to these areas.

The most recent Victorian and Federal Governments have tended to focus on delivering a small number of high-cost projects, particularly road and heavy rail projects. This focus inevitably limits the opportunity to tackle large numbers of small needs, which are distributed more widely but typically show high returns, relative to their cost. The balance between big projects and small, high value initiatives continually requires attention but particularly when growth pressures are intense.

Plan Melbourne 2017-2050, has underlined the importance of the (now) seven National Employment and innovation clusters in Melbourne's future urban development, together with the importance of 20-minute neighbourhoods for shifting the planning focus to where people live most of their lives. These planning constructs are important things to consider in updating the Northern Horizons Strategy.

The Northern Horizons 2016 Update was heavily weighted toward transport projects/initiatives. Of the 40 short-, medium- and long-term initiatives set out in that Strategy, 26 are transport/travel initiatives. This dwarfs other initiatives, with health (including aged care and child-care) at 6 and education/early childhood at 4 the next most frequently listed needs. This simple categorisation says

nothing about the scale of individual needs but some of the transport projects are high capital cost, most probably reinforcing the heavy orientation to that sector. Looking at the priorities reflected in work by Infrastructure Victoria, and research undertaken for Infrastructure Australia, and at the Plan Melbourne focus on NEICs and 20-minute neighbourhoods, there are good reasons to:

- put increased emphasis on supporting the role of major urban clusters as growth poles, particularly the La Trobe NEIC in the Northern region;
- broaden somewhat the scope of the initiatives embedded in the Northern Horizons Strategy, with greening/environmental initiatives one obvious target area;
- think about the balance between big and small projects (including programs of small projects) within the Strategy, including a need for greater focus on tram, bus and active travel opportunities; and
- update the priorities already set out in the Strategy.

At the same time, it is important to recognise Infrastructure Australia's focus on Strategic Foresight, which includes a preference for initiatives that will be robust to a range of futures. This has been taken into account in assembling the initiatives in this update.

2.11 The main differences between this 2020 update and the 2014 NHS

The region's population growth rate has been higher than was forecast, which suggests that needs are accelerating. The region is now forecast to add 500,000 residents from 2016 to 2036, one-third more than previously forecast. This is partly because growth rates are increasing in Moreland and Darebin, changing the pattern of need by adding the challenges of coping with **increasing densification** to those of **fast outer area growth**.

This NHS refresh is moving more towards being a regional development strategy. In this vein, it suggests a vision and goals for the region, based partly on an assessment of regional competitive strengths and weaknesses. Initiatives are identified and structured according to themes that support the achievement of the vision and goals, mainly by enhancing competitive strengths or mitigating weaknesses. Greater emphasis is being placed on integration for multiple goal-achievement to support regional development.

The core emphasis in this Update is on **local activity generation**. This has a jobs and skills focus, pursued in large part through an emphasis on **cluster development and improved connectivity**. Clusters encompass both spatial clusters and key regional industry clusters. High quality inter- and intra-regional connectivity is fundamental to successful cluster development and to equitable sharing of the benefits that flow therefrom, while also supporting wider beneficial economic and social outcomes. This emphasis aligns with key policy directions in *Plan Melbourne 2017-2050* (Victorian Government 2017). **Improved circumferential public transport connectivity** and the **future development of La Trobe National Employment and Innovation Cluster** are the two most important specific initiative areas proposed in this Update.

Importantly, in terms of the balance of emphasis, there is now a greater focus at the local level (e.g. canopy cover; arts and culture; community health; actions consistent with 20-minute neighbourhoods). These changes increase the relative significance of non-transport initiatives.



3. The region and its competitive strengths and weaknesses

In this report, Melbourne's North comprises seven LGAs located radially outwards from the Melbourne CBD: an inner tier (Moreland, Darebin and Banyule), a middle tier (Hume, Whittlesea and Nillumbik) and an outer tier (Mitchell).

The North so defined is far from homogeneous. The terrain includes basalt plains, narrow creek valleys incised into the plains and several extinct volcanic cones arising from the plains. To the east and north the gentle basalt slopes give way to picturesque hills.

Superimposed on these landscapes, the suburbs grew by rings of accretion centred on Melbourne. As one moves outward, the houses become larger and the blocks of flats fewer. The street patterns shift from horse-and-cart to those of the motoring age. Strip shopping centres give way to malls and vast car parks. Yet each ring has its variations. In the nineteenth century Heidelberg attracted artists and Brunswick brickmakers – the North was from the beginning a social and occupational patchwork. The current social and economic variation of the region is detailed in the later parts of Chapter 4. To provide a quick introduction to the socio-economic variations within the region, Table 3.1 homes in on incomes.

Table 3.1 Northern Melbourne LGAs: Incidence of low and high incomes – 2016 (per cent)			
LGA	Adults with income less than the minimum wage	Households with very low equivalised incomes	Households with very high equivalised incomes
Banyule	47.1	6.6	11.9
Darebin	50.6	9.1	10.4
Hume	56.4	11.7	4.0
Mitchell	51.2	8.1	5.1
Moreland	49.1	8.6	10.8
Nillumbik	45.1	4.5	13.7
Whittlesea	53.4	9.1	4.0

Source: ABS Census 2016. Adults: all residents aged 15 and over. Households: excludes groups living in non-private dwellings. Equivalised incomes: total household income adjusted for household size by the ABS. Very low equivalised incomes: incomes below the 10th percentile of household equivalised incomes nationally, excluding zero and negative incomes households. Very high equivalised incomes: incomes within the top 10 per cent of equivalised household incomes nationally.

In Table 3.1 adults are defined broadly as all residents aged 15 and over. Across Australia roughly half of all adults so defined have personal incomes less than the minimum wage. These low-income adults include nearly all social security recipients plus many part-time employees and people dependent on within-household transfers – nowadays mainly students, since most housewives now have at least a part-time job. Given that most pensioners have personal incomes below the minimum wage, one might expect that the older suburbs would have high proportions of residents with such incomes, but this was not the case in 2016. Though the proportion was lowest in Nillumbik, it was highest in Hume – both of which are in the middle tier of LGAs. It was just below national average in Moreland, thanks to relatively high earnings rates by that LGA's women.

Standards of living are conventionally measured by incomes in relation to household size. These are known as equivalised incomes. Nation-wide, when households are sorted according to equivalised income, the bottom 10 per cent include households dependent on Newstart and other low-rate social security payments, plus some dependent on poorly-paid work. Importantly, age pensioners have equivalised incomes above the 10th percentile. The estimates in Table 3.1 exclude households with zero or negative income, and nationally relate to 8.2 per cent of households. By this measure, in 2016 the incidence of very low standards of living was a little over national average in the inner LGAs (Moreland and Darebin) and very close to average in Mitchell, on the outer fringe. The incidence was well above national average in Hume and Whittlesea, and well below in Nillumbik and Banyule. The proportion across the region as a whole was 8.8 per cent, a little above the national average of 8.2 per cent. Despite the differences between the region's constituent LGAs, all parts of the region had their very low-income households – households with incomes too low to afford motoring. The inner-urban low-income households would include many students while the outer urban would mainly be suffering from unemployment.

The top 10 per cent of households by equivalised income would not regard themselves as rich – a couple without children would just about make the cut if one of them works for double average weekly earnings and the other for plain average weekly earnings – but at this level of income household budgets can typically accommodate two cars and a mortgage. As in Australia generally, in 2016 such comfortable-income households were more concentrated in particular places than the very low-income households. In Moreland and Darebin the proportion of households with high standards of living was around national average, in Banyule and (especially) Nillumbik it was above and in Whittlesea and Hume well below. Mitchell deviated from the pattern in that, though it had an average proportion of households with very low standards of living, it had well below the national proportion of high-flying households. In the region, 8.2 per cent of households reported high equivalised incomes, somewhat under the national average of 10 per cent.

This quick scan of regional geography and regional incomes is simply to acknowledge that the region is not homogeneous, one implication being the importance of carefully tailoring individual initiatives and initiative packages to particular places and target populations. That level of refinement is beyond what is possible in a regional overview report like this but the report recognises, in principle, the need for fine detail to guide implementation.

3.1 Population and population growth

Melbourne's Northern Region had a population of around 950,000 (possibly understated) in 2016, which was 27.8 per cent higher than a decade earlier. Over the same period, the population of Greater Melbourne (including Mitchell for consistency) grew about three percentage points slower than that of the Northern Region. By implication, infrastructure and service provision pressures associated with population growth can be expected to have increased more quickly for Northern Region than for the city as a whole over the decade.

About half of the Northern Region's total population in 2016 was in the outer LGAs of Hume, Whittlesea and Mitchell. Not surprisingly, the fastest population growth rates in the Northern Region over the 2006-2016 decade were in these Outer LGAs, particularly Whittlesea (+74.2 per cent), but with Hume (33.6 per cent) and Mitchell (32.3 per cent) also growing very strongly. Infrastructure and service priorities in these outer areas can be expected to be heavily associated with catering for their rapid rates of population growth.

In contrast, Nillumbik (+2.5 per cent) and Banyule (+6.1 per cent) had low population growth rates over the 2006-16 decade, suggesting that their infrastructure and service delivery pressures are relatively more likely to be associated with catering for an ageing population and managing travel demand pressures associated with travel patterns of residents from their fast growing neighbouring municipalities and cross-town areas. Moreland (+19.7 per cent) and Darebin (+14.6 per cent) were mid-range in terms of regional population growth rate over the 2006-16 decade, both being slower than for Melbourne as a whole. Their emerging infrastructure and service delivery pressures were likely to thus be similar to those of the slower growing LGAs but with the added complexity of catering for infrastructure and services pressures associated with increasing population densities, in line with the intent of *Plan Melbourne 2017-2050* (Victorian Government 2017). Open space availability, canopy cover and active travel, for example, can be expected to figure more prominently among priorities for such areas.

Since 2016 strong population growth has continued with the Northern region growing by 2.9 per cent and 2.7 per cent over 2017 and 2018 respectively, with around 55,000 new residents living within the North since 2016. By comparison the Northern Region had an average annual population growth rate of 2.5 per cent over the 2006 to 2016 decade.

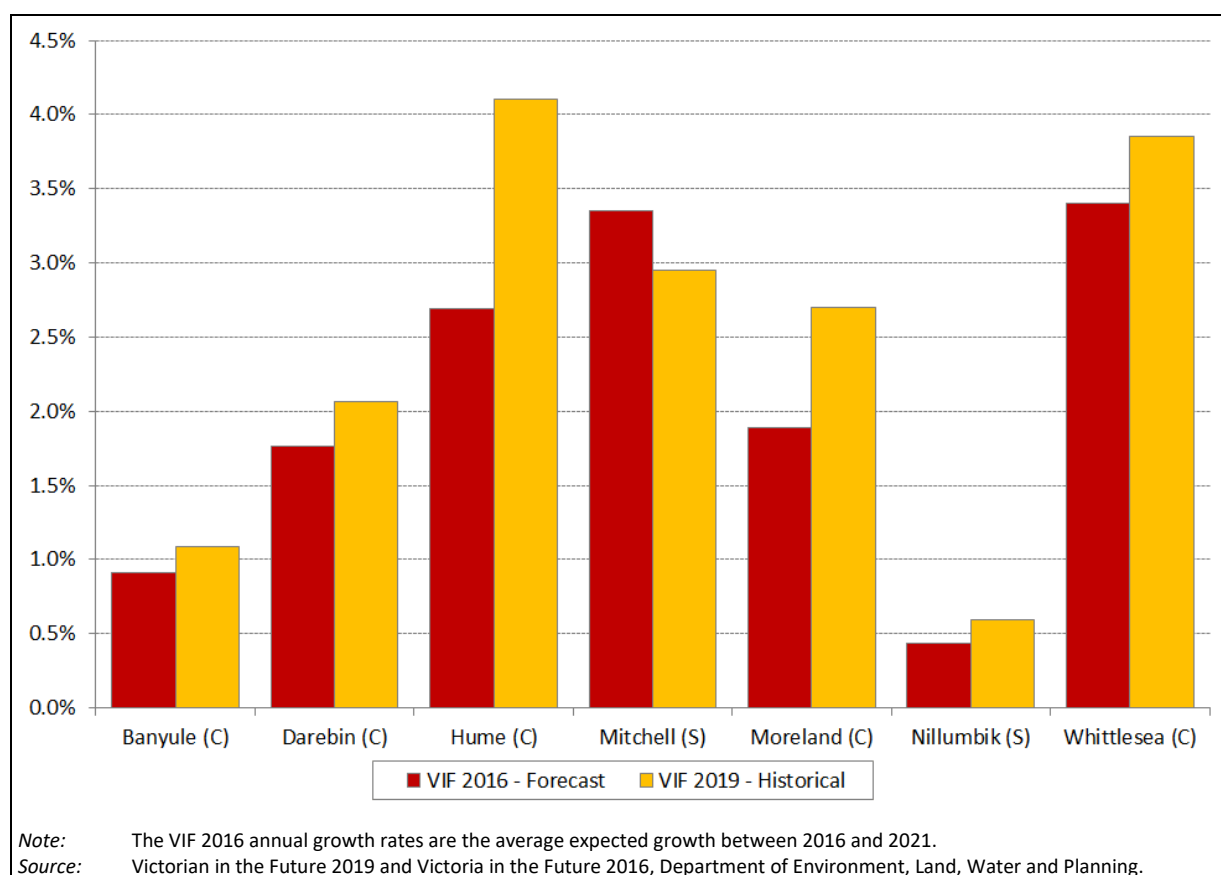
Strong population growth has again been led by the outer regions of Hume and Whittlesea, with annual growth rates of around 4 per cent per annum. Hume and Whittlesea are the largest populated regions within the North and have continued to expand their suburban borders with new housing developments. Mitchell has also been growing strongly at just under 3 per cent per annum, and is forecast to boom from the early to mid-2020s.

The inner regions of Moreland and Darebin have also been growing very strongly over these recent years, with population growth of between 2.5 and 3 per cent. This is the result of urban renewal and higher density residential developments, accentuating infrastructure and service demands associated with this development pattern.

The strong population growth for the Northern Region has been above and beyond what has previously been forecast. The Victoria in Future 2016 (VIF 2016) and Victoria in Future 2019 (VIF 2019) population forecasts are compared for each council in Figure 3.1 over the 2016 to 2018 period (DELWP 2016 and DELWP 2019). This shows the difference between what was forecast in 2016 compared to the most recently released population numbers in the VIF 2019 publication.

The Northern Region has grown by an additional approximately 30,000 residents above what had previously been forecast (in 2016). Part of this difference is likely to be due to the improved accuracy of the 2016 numbers with the incorporation of the census findings. The remainder is the result of the Northern Region growing more quickly than expected, with Hume and Whittlesea, in particular, outpacing population projections and together making up two-thirds of the difference between the two VIF publications. The inner regions of Moreland and, to a lesser extent, Darebin have also developed at a quicker pace than what was expected in total number of residents. In growth terms, Banyule, Mitchell and Nillumbik growth to 2019 was quite close to projected growth from VIF 2016, although Mitchell 2016 total population was under forecast in VIF 2016. This disadvantages service planning and provision in the Shire. Northern Council internal planning forecasts generally exceed what has been published in VIF 2019, so population-based estimates using VIF 2019 may be conservative in some instances and population growth should continue to be monitored to ensure that infrastructure provision does not fall behind in growth areas.

Figure 3.1: Victoria in future population projections – 2016 to 2018



The *Victoria in the Future* publication is used by government planners to forecast state infrastructure needs. This includes transport infrastructure such as roads and public transport, and social infrastructure such as schools and health facilities. Investment decisions to build new infrastructure projects need to be made years in advance.

As the Northern Region has been growing at such a fast and generally accelerating pace, the current population in the North has placed additional strain on the current infrastructure and created a lag between the need for infrastructure and the investment and delivery of infrastructure. This means that new infrastructure that was not previously planned may be needed, or that infrastructure that has been planned for future delivery may need to be brought forward in timing. For example, in the outer growth regions access to public transport such as bus routes often lags well behind the need for services, with people moving into estates prior to infrastructure availability, car ownership levels and use increasing accordingly, which adds to the subsequent challenge of increasing public transport use.

The *Victoria in the Future* 2019 population forecasts are summarised in Tables 3.2 and 3.3 for each Northern Local Government Area in number and average growth over five-year spans. From 2018 to 2036 it is expected that the Northern Region will add another 448,000 residents, of which just over half the growth will be within the Hume and Whittlesea LGAs. Around 50,000 residents are expected to be added to each of Darebin, Mitchell and Moreland. Banyule and Nillumbik are expected to have the slowest growth, adding 20,000 and 5,000 residents respectively.

In terms of the rate of growth, Hume and Whittlesea are expected to have diminishing growth rates over the next 18 years as these areas become more established. Mitchell is projected to have the highest average annual rate of growth, at over 4.5 per cent during the 2020s decade, as developments such as Wallan expand. Population in Mitchell is expected to double over the forecast period, albeit off a relatively low base.

Region	2016	2017	2018	2021	2026	2031	2036
Banyule (C)	127,447	129,115	130,237	133,602	139,080	144,679	150,761
Darebin (C)	155,126	158,751	161,609	169,052	182,406	196,028	210,649
Hume (C)	207,041	215,238	224,394	250,522	286,532	316,240	343,989
Mitchell (S)	41,795	42,903	44,299	50,071	62,423	78,766	97,688
Moreland (C)	172,294	176,974	181,725	193,619	209,081	224,995	241,544
Nillumbik (S)	64,174	64,618	64,941	65,370	66,760	68,410	70,314
Whittlesea (C)	207,058	215,686	223,322	246,011	285,917	327,471	364,453
Northern Region	974,935	1,003,285	1,030,527	1,108,247	1,232,198	1,356,589	1,479,399

Note: Population as at June 30th for each year.

Source: Victoria in Future 2019, Department of Environment, Land, Water and Planning.

Region	2018 to 2021	2021 to 2026	2026 to 2031	2031 to 2036
Banyule (C)	0.9	0.8	0.8	0.8
Darebin (C)	1.5	1.5	1.5	1.4
Hume (C)	3.7	2.7	2.0	1.7
Mitchell (S)	4.2	4.5	4.8	4.4
Moreland (C)	2.1	1.5	1.5	1.4
Nillumbik (S)	0.2	0.4	0.5	0.6
Whittlesea (C)	3.3	3.1	2.8	2.2
Northern Region	2.5	2.1	1.9	1.7

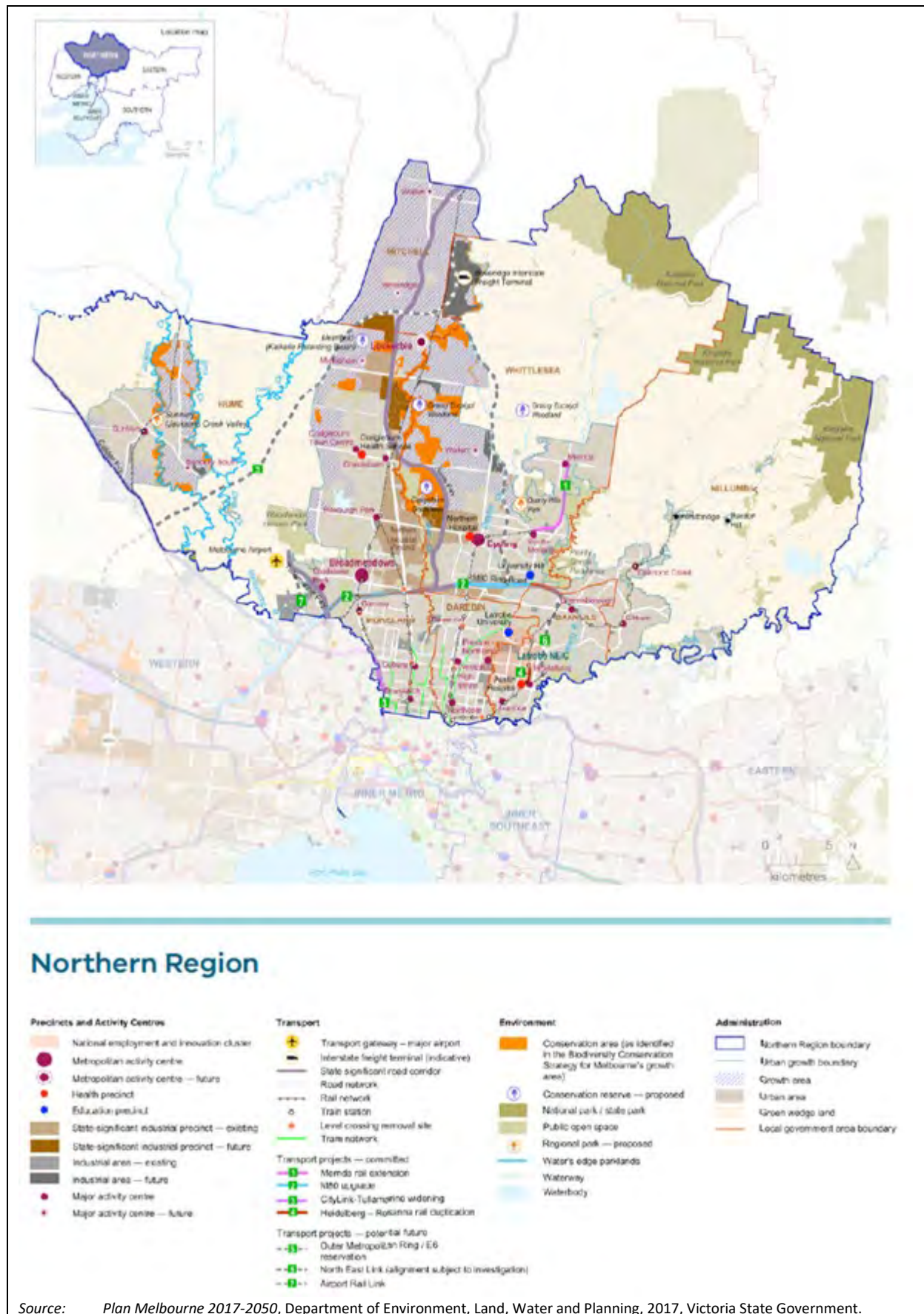
Source: NIEIR calculations from Victoria in Future 2019, Department of Environment, Land, Water and Planning

3.2 Key regional land use features

Figure 3.2, from *Plan Melbourne 2017-2050* (Victorian Government 2017), shows key land use features of the Northern Region that are significant for *Plan Melbourne 2017-2050*. Many of these land use elements represent or reflect regional competitive strengths. The map thus identifies such important regional locations as the La Trobe National Employment and Innovation Cluster (NEIC), Melbourne Airport, the Hume corridor, Metropolitan Activity Centres at Broadmeadows and Epping (and Lockerbie – future), a State significant industrial precinct (the Northern Industrial precinct) and education/health precincts. These are foundational in terms of future regional development.

Melbourne's North is experiencing increasing levels of dynamism through residential growth, the increasing awareness of the importance of education among its residents), infrastructure provision, strong business development activities (particularly in Hume), cultural diversity and amenity.

Figure 3.2: Melbourne's Northern Region (excluding most of Mitchell)



There has been a significant growth in employment at Melbourne Airport with employment rising from around 12,500 jobs at the time of the GFC to some 20,000 jobs in 2019. The relocation of the Melbourne Wholesale Fruit and Vegetable Market provides an opportunity to develop a world-class food and beverage hub engaging manufacturers, distributors, education and research with the opportunity to develop a near city horticulture industry within reasonable distance of the Wholesale Fruit and Vegetable Market. Importantly, the La Trobe National Employment Cluster and the opportunities the cluster provides are critical in building a 21st century knowledge economy that will increase the resilience and global connectedness of the region.

3.3 Melbourne's North: aggregate data

Table 3.4 Melbourne's North compared				
Series	2006	2011	2016	2018
Population	760,407	847,034	963,558	1,019,914
Share of Victoria's population	15.1%	15.4%	15.8%	15.9 %
Share of Australia's population	3.7%	3.8%	4.0%	4.1%
Sales (\$ 000's)	63,296	70,325	77,700	80,650
Share of Victoria's sales	10.0%	10.3%	10.4%	10.2%
Share of Australia's sales	2.4%	2.4%	2.4%	2.4%
GDP (\$ value added)	27,433	31,541	36,464	38,221
Share of Victoria's GDP	9.7%	10.0%	10.3%	10.1%
Share of Australia's GDP	2.4%	2.4%	2.4%	2.4%
Jobs (JTW Employment)	276,497	313,818	345,657	372,558
Share of Victoria's jobs	11.2%	11.2%	11.4%	11.5%
Share of Australia's jobs	2.8%	2.8%	2.9%	3.0%

Source: NIEIR's database.

As the region's population grows, in some places it has grown even faster than forecast, but the absolute number of jobs available in Melbourne's North continues to lag far behind the demand for employment from the people that live in the region. This means a high level of commuting to access employment outside the region, particularly the CBD (Figure 3.3 and Table 3.5). This in turn means that the *Twenty Minute Neighbourhood* ideal, so central to *Plan Melbourne*, is currently out of reach for many in the outer north in particular. If growth in local employment lags behind population growth this means that the stress on transport infrastructure will continue to grow. A key message of this report is thus to aim for the creation of more jobs that are based in the region, for residents.

The key question then becomes, how can infrastructure provision enable the growth of jobs in Melbourne's North? One important answer is to better connect the Metropolitan Activity Centres, NEICs and State significant industrial precincts with new transport initiative, at the same time as investing in development in these places of current and future economic significance and, by doing so, attracting new business and helping existing businesses to grow.

The benefits that accrue from the provision of transport infrastructure for households in Melbourne's North include increased travel range, lower transport costs, improved workforce opportunities, access to higher real incomes and safety benefits provided by modern transport infrastructure, particularly improved design of roads, cycle paths and pedestrian walkways. For industry, benefits include reduced costs per vehicle kilometre, improved access to product markets, reduced freight costs, a wider labour catchment, higher productivity from employees, quicker times

to market, higher margins or lower pricing opportunities, attraction of new firms and consolidation of industry cluster opportunities and greater supply chain efficiency. Regional outcomes from transport infrastructure investments include emissions reduction and a greater likelihood of greenhouse gas reductions per capita, greater efficiency in land use outcomes and improved competitiveness, improved workforce integration and skills matching and greater equity in terms of labour market access.

As indicated, population growth in Melbourne’s North has resulted in a growing shortfall of jobs available to residents. While the two things do not correlate directly, because of the occupation mix and industry location, the comparison is still worth noting. Table 3.5 shows that, in 1999 the difference between the numbers of jobs available in Melbourne’s North and the number of residents in the workforce was 64,650 (excluding the Yarra). By 2019 the shortfall in jobs had risen to 153,500. This means a very large number of additional trips to more distant employment locations each day, increasing congestion on transport networks and reducing time available to spend with loved ones.

Figure 3.3: Percentage of people that live in Melbourne's North that work in the CBD by Melbourne region compared – 2019

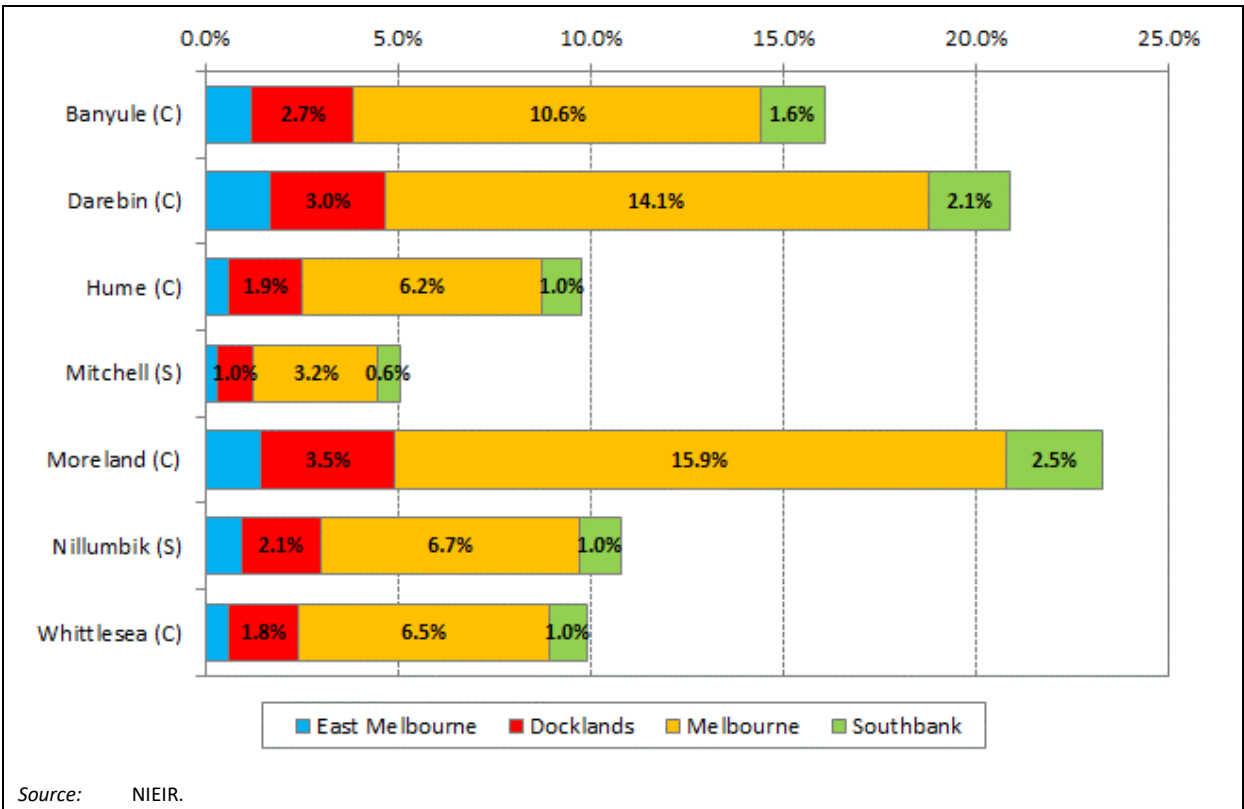


Figure 3.4: Percentage of people that live in Melbourne Metro that work in the CBD by Melbourne region compared – 2019

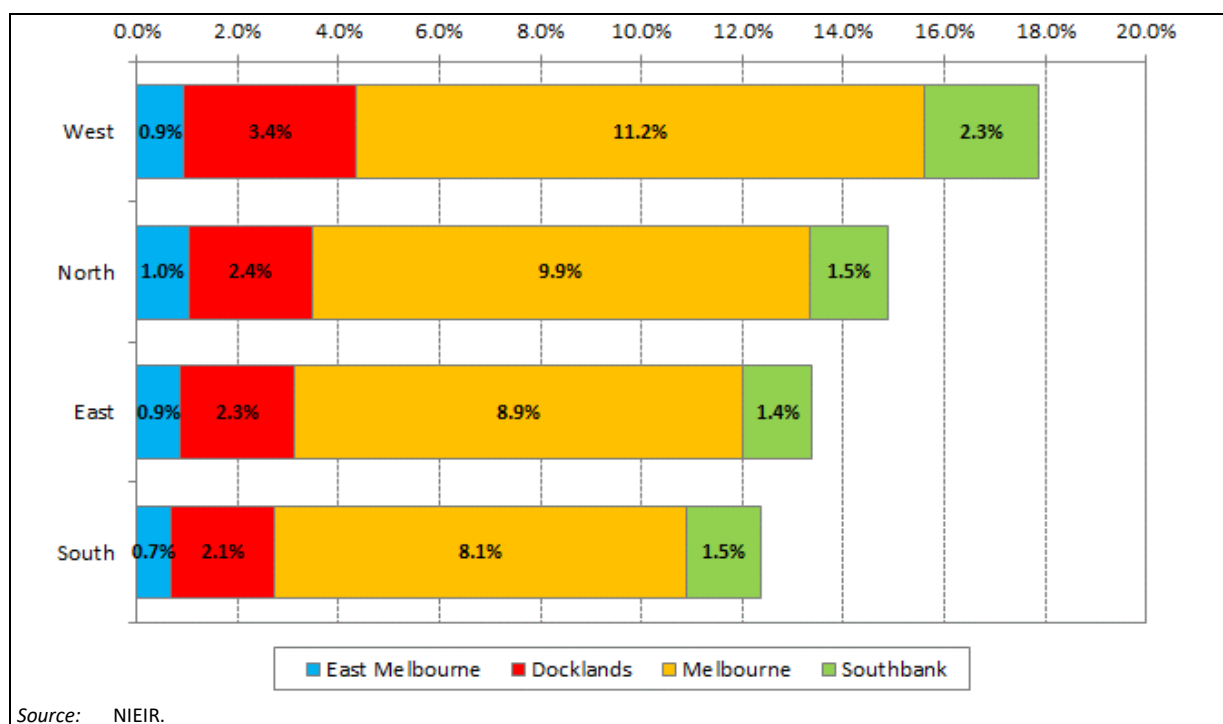


Table 3.5 Place of residence and place of work employment by industry groups in Melbourne's North (number employed)

	Industry groups	Place of Residence (UR) employment					Place of Work (POW) Employment				
		1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
A	Agriculture, Forestry & Fishing	2712	2284	2090	2321	3194	2563	2149	1976	2279	3236
B	Mining	539	499	741	1417	1208	428	387	566	813	602
C	Manufacturing	56126	52488	47313	42073	49571	58772	55143	49172	42680	48746
D	Electricity, Gas, Water & Waste Services	2151	2541	3864	4714	6213	1270	1500	2231	2830	3301
E	Construction	20963	26112	34659	41112	45501	18301	24597	31394	35300	43413
F	Wholesale Trade	16178	16691	18234	17058	17243	14449	14590	15423	14036	14537
G	Retail Trade	35191	39392	41965	45456	58235	29380	31764	33574	35975	43362
H	Accommodation & Food Services	17184	19567	23335	28206	33546	12180	13381	16106	19933	22319
I	Transport, Postal & Warehousing	18152	19621	24595	27880	36486	18728	19900	25176	28201	35202
J	Information Media & Telecoms	8462	8989	9791	10595	12655	2670	2649	2717	2840	3248
K	Financial & Insurance Services	13885	14714	16998	18362	23623	3736	3473	3738	3860	4786
L	Rental, Hiring & Real Estate Services	3626	4435	5375	6148	6800	2717	3210	3774	4119	4326
M	Prof, Scientific & Technical Services	20945	23147	28603	34748	36248	9036	9045	10650	12739	13557
N	Administrative & Support Services	10327	12960	13958	16121	15839	6097	7299	7894	9838	9498
O	Public Administration & Safety	16717	19136	25104	28423	38760	11206	11994	14794	16636	22075
P	Education & Training	24400	27527	33679	40967	51232	21851	23400	26963	31721	38343
Q	Health Care & Social Assistance	33209	35433	44313	55127	68507	28291	29146	35042	43680	51972
R	Arts & Recreation Services	5259	5685	8087	9246	9679	2789	2997	4139	4797	5057
S	Other Services	14490	14268	15448	16978	24316	11398	10821	11723	12879	17938
Z1	Hi Tech	39153	40746	44189	47644	49353	28609	28360	27548	26128	25921
Z2	Hi Income	40899	45101	54054	62958	69958	15716	15744	18181	21429	23249
Z3	Infrastructure Services	62868	68645	86080	105339	129418	52930	55543	66144	80198	95372
Z	TOTAL	320517	345488	398154	446950	538856	255862	267444	297053	325156	385517

Source: NIEIR, State of the Regions data.

Figures 3.5 and 3.6 provide data on employment growth by industry for the period 2014-2018, for Melbourne's North and Australia as a whole. The industries that have grown employment in Melbourne's North over the period include: Construction; Retail Trade; Accommodation and Food Services; Transport, Postal and Warehousing; Professional, Scientific and Technical Services; Public Administration and Safety; Education and Training; Health Care and Social Assistance and Other Services. The contribution to employment growth from the Education and Training and Health Care and Social Assistance sectors is notable in both Melbourne's North and for Australia as a whole.

The benefit to be gained by a region working together, something Melbourne's North does well, is demonstrated by how the region coped with the departure of the automotive manufacturing industry, a significant contributor to the region's GDP, skilled employment and the efficiency and complexity of its supply chains. The plan, which had been developed over several years, to grow the food processing and beverage manufacturing sector, is offsetting at least some of the economic and employment difficulties that might have otherwise resulted from the automotive manufacturing sector's departure. This means the region retains a manufacturing sector of note (contributing a share of 14.5 per cent to the region's GRP), served by the skills of its residents and doing so in a sector that is forecast to grow.

Figure 3.5: Employment growth by industry – Melbourne's North

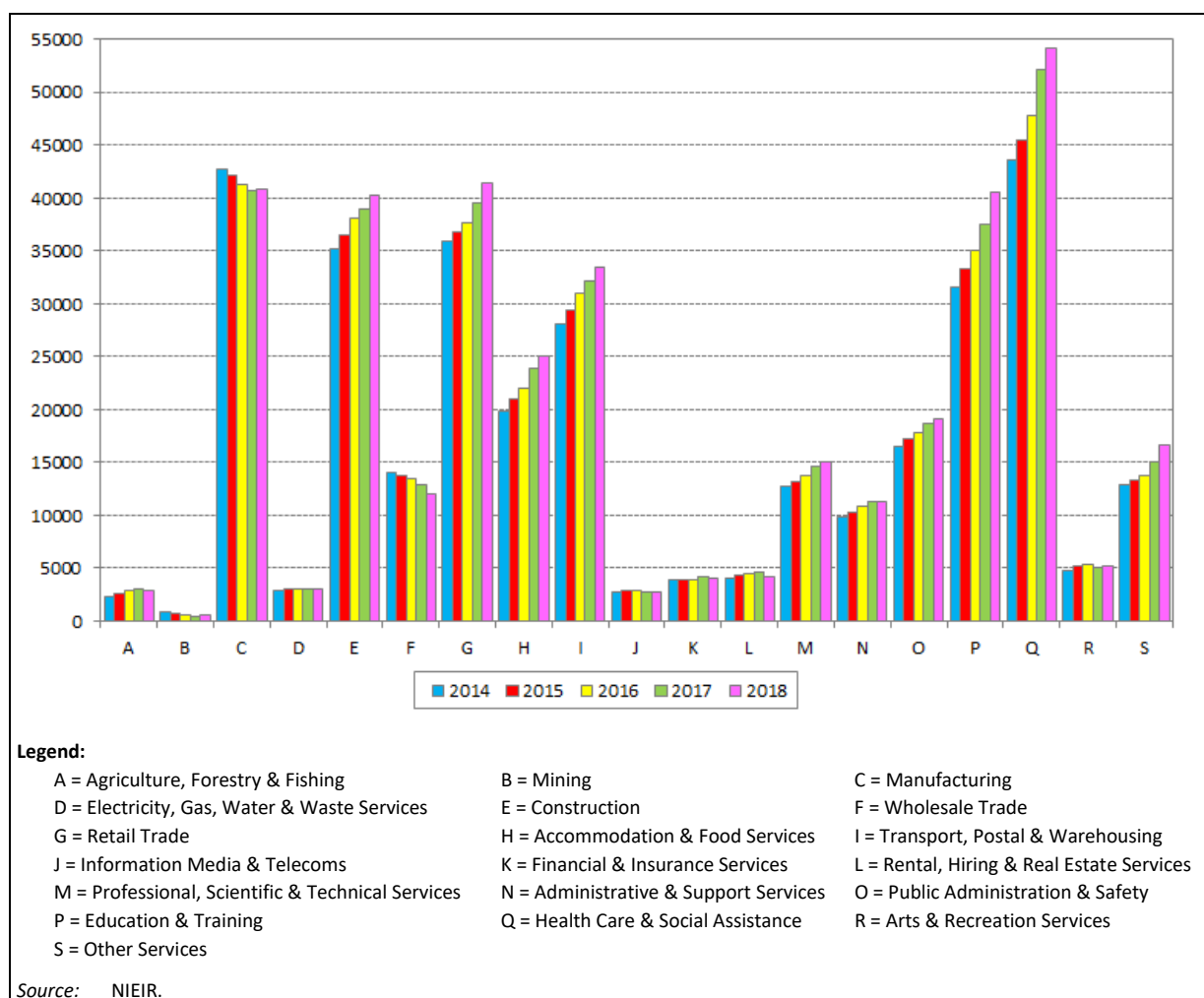
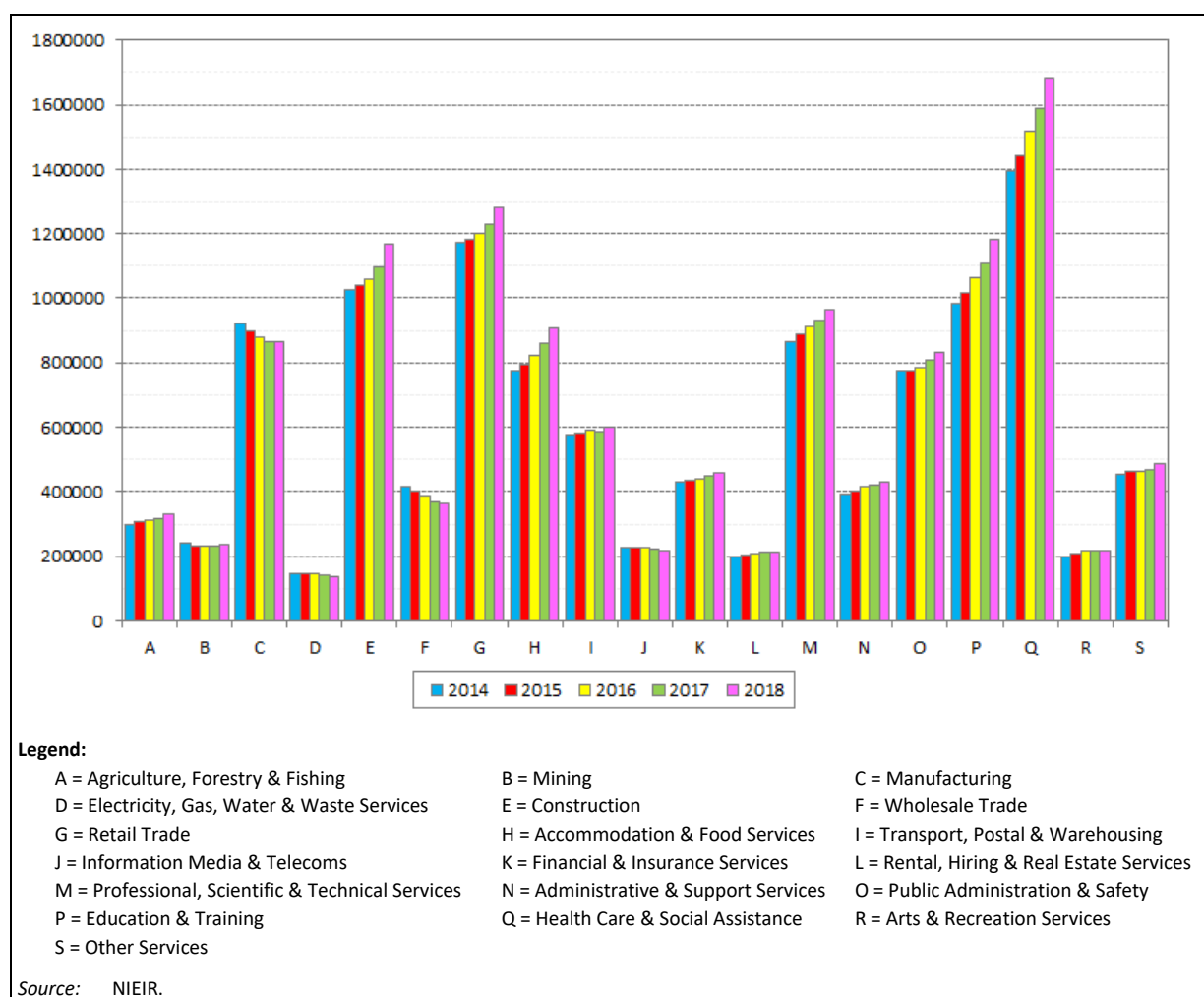


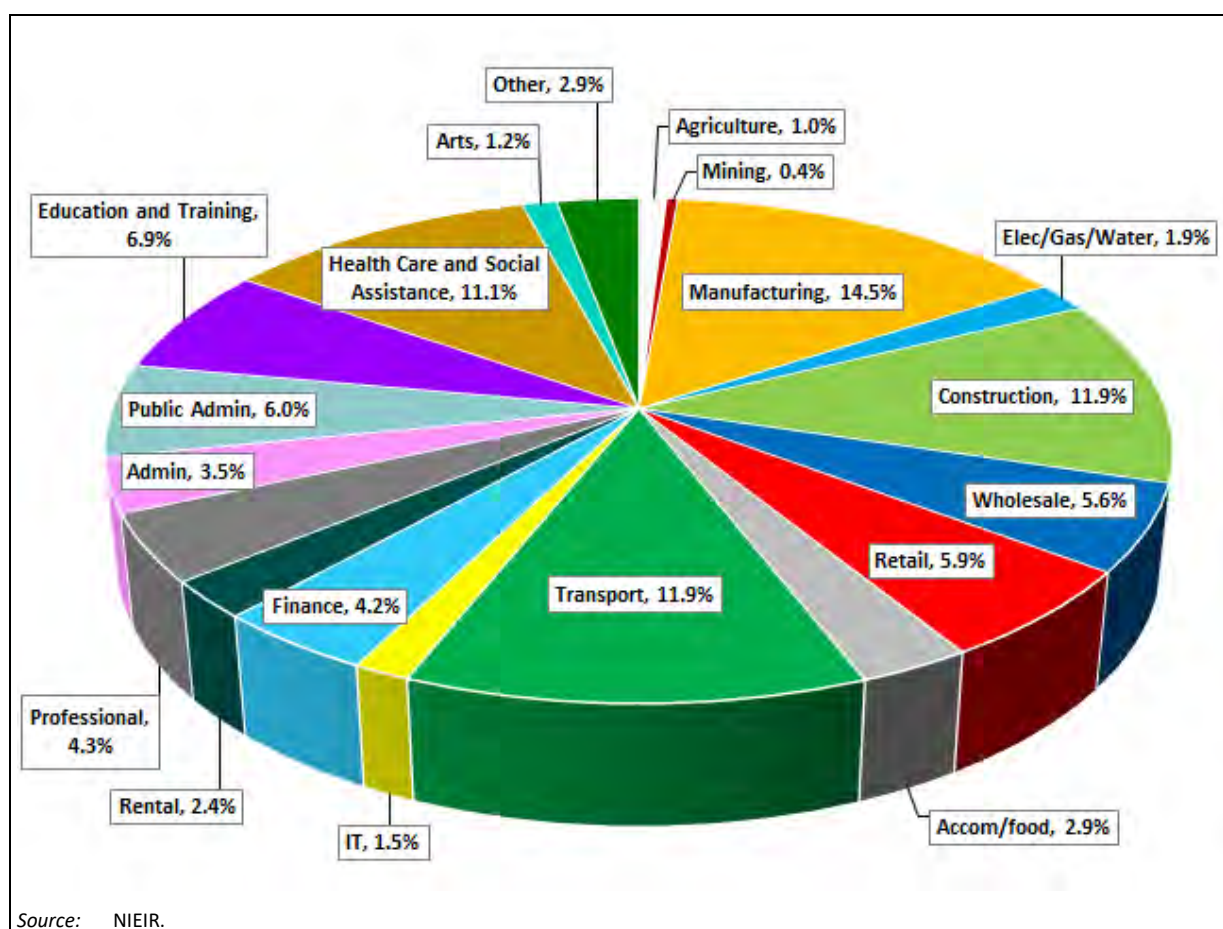
Figure 3.6: Employment growth by industry – Australia



3.4 Share of GRP by industry sector in Melbourne's North

Figure 3.7 shows the industry sector share of gross domestic product (GRP) in Melbourne's North. In 2019 the Manufacturing, Health Care and Social Assistance, Transport and Construction sectors were the largest contributors to the region's GRP formation.

Figure 3.7: Northern Region GRP share – 2019



3.5 Employment by industry sector in Melbourne's North

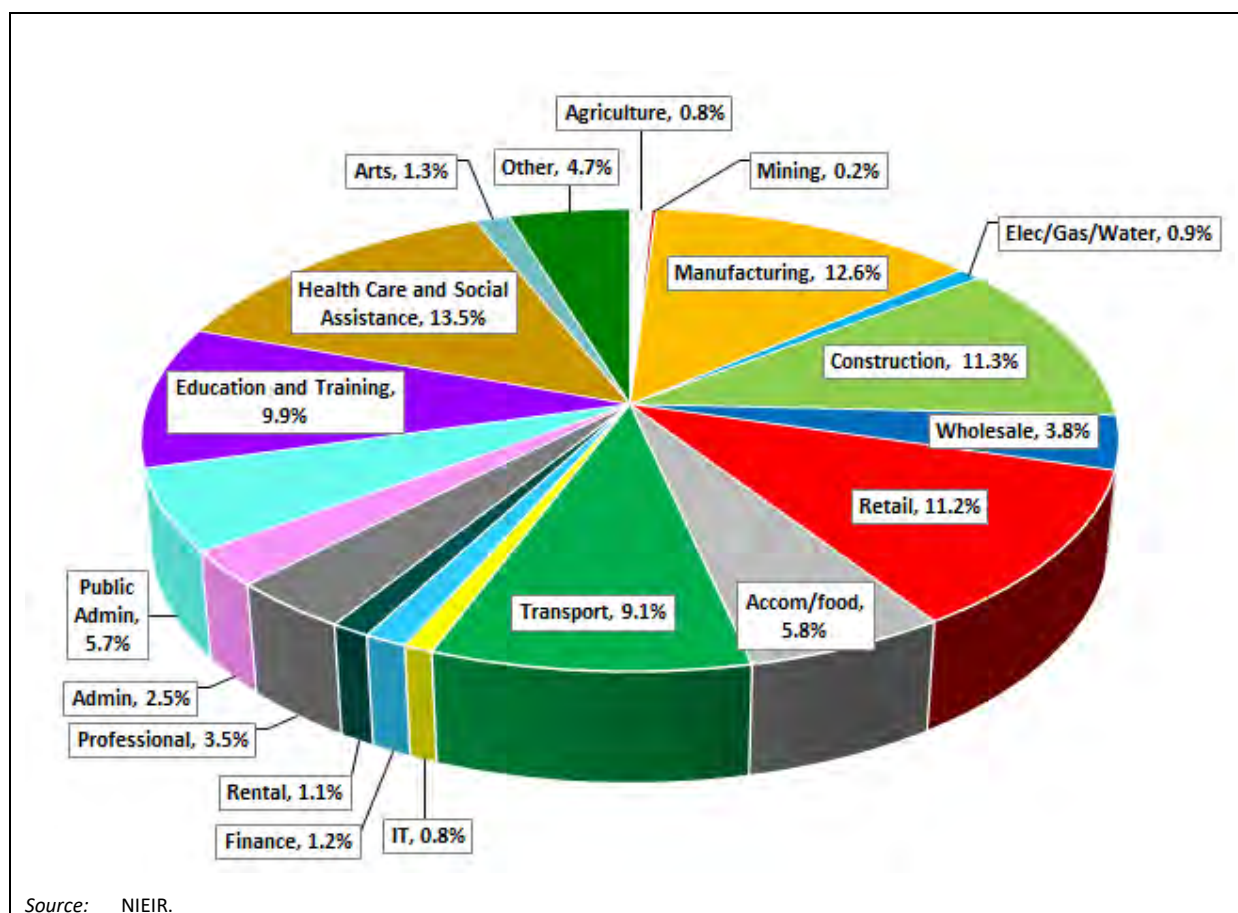
3.5.1 Jobs within the region

For Australia in 2019, the Health Care and Social Assistance sector is the largest employer of Australian workers, employing 12.5 per cent of the total workforce. The Retail sector, its share of total employment declining, remains the second largest employer of Australian workers in 2019 with a share of 10.5 per cent. Then follows Construction with a share of 9.5 per cent of the total workforce, Education with a share of 8.9 per cent of the total workforce, both sectors increasing their share of employment. Next comes the Manufacturing sector with a steep decline in total share of employment from 10.7 per cent in 2006 to 7.6 per cent in 2019.

When the years 2006 and 2019 are compared, the changing shares of industry employment for Australia over the period show that the largest increase in the share of total employment occurred in the Health Care and Social Assistance sector. The significant decline in the share of manufacturing sector employment is a concern because it suggests declining opportunity for knowledge diffusion activities across Australian industries at a time when technologies are changing rapidly across a range of industry sectors, automotive technologies being just one.

Figure 3.8 shows the industry sector share in employment for Melbourne's North, the Health Care and Social Assistance sector is the largest employer, manufacturing employment remains strong at 12.6 per cent of all industry employment in the region, clearly identifying a competitive advantage for the region as manufacturing employment nationally declines its share. The importance of Health Care and Social Assistance is also notable, as an indicator of a potential competitive strength.

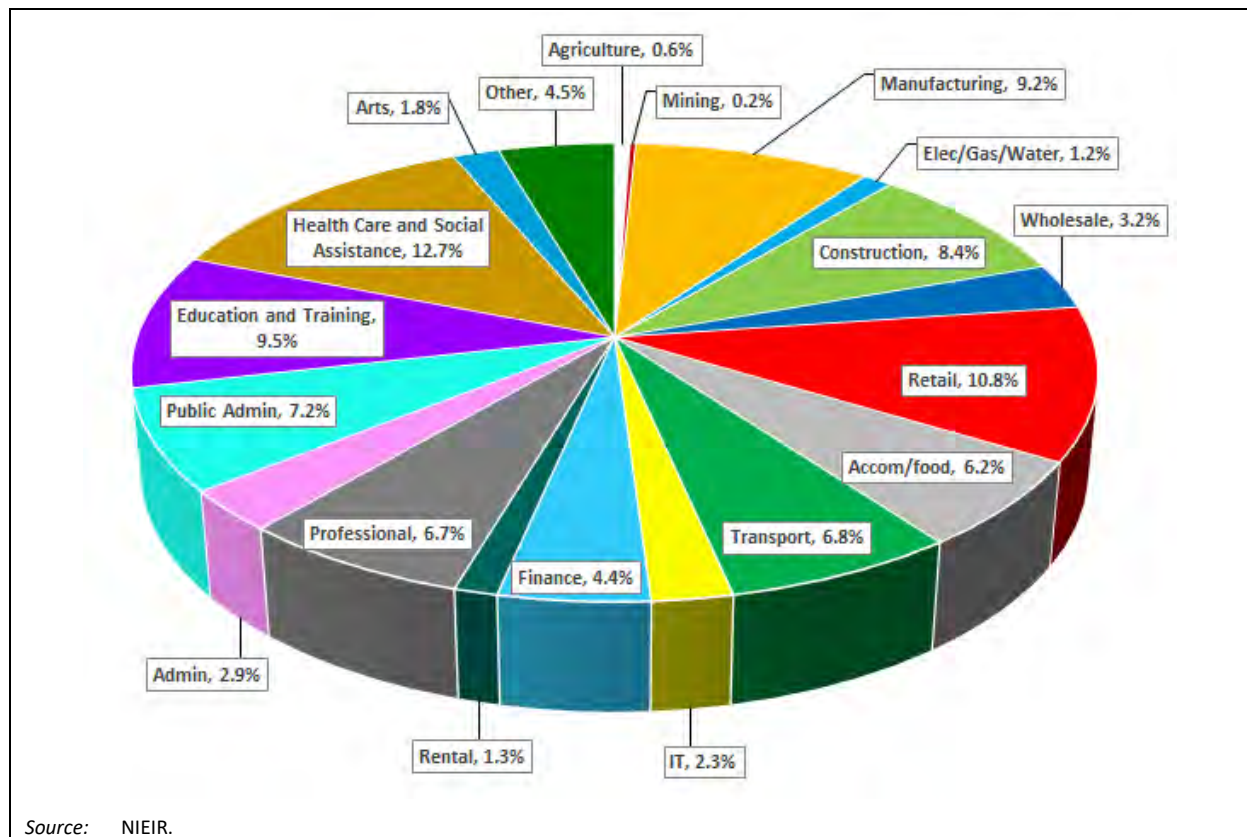
Figure 3.8: Northern Region industry employment share – 2019



3.5.2 Sectors in which Melbourne's North residents are employed

Figure 3.9 shows the share of resident employment in Melbourne's North by industry sector. Notably, as the number of professionals living in Melbourne's North grows, local industry is not absorbing the professional talent available to the region. Rectifying this gap should be an important focus on a regional economic development strategy.

Figure 3.9: Northern Region resident employment share – 2019



3.6 Regional competitive strengths and weaknesses

Identifying the *specific characteristics* of a region that set it apart from others in terms of its capacity to generate regional exports is a critical element in regional strategic planning, since these characteristics provide the foundation for regional distinctiveness, regional growth and employment outcomes. These characteristics might relate, for example, to the region's natural resource base, the talents of its people, its location and accessibility, its historic legacy or, more likely, some combination of such characteristics. NORTH Link and Arup (2018) have identified several regional competitive advantages, with our brief comments thereon included.

- **Growing population** – this is a desirable characteristic but is not a unique competitive advantage of Melbourne's North, since other regions are also growing and, unless adequately resourced, rapid population growth in low density settings can create problems for regions and their residents. Population growth needs to be in the right place, which we believe means more compact, and properly funded in terms of infrastructure and service requirements.
- **Freight and logistics networks** – These constitute a very important regional competitive advantage that needs to be sustained. Key elements include key nodes, such as Melbourne Airport, and access to/from Melbourne Airport, the Hume Corridor and the ports.
- **Proximity to the CBD** – This is desirable in terms of regional integration but the region is not uniquely placed here. The inner parts of the region are well-connected but this has not been converted to distinctive regional strength in knowledge-intensive economic activities in these areas. The rapidly growing fringe is not particularly well-connected to the CBD.
- **Land availability and affordability** – An advantage for industrial development, linked also to the freight/logistics advantage. Residential land prices are not seen as such an advantage because they probably reflect relatively poor accessibility but availability is important.
- **La Trobe National Employment Cluster (and other nationally/state significant clusters)** – A key competitive advantage in the knowledge economy and strengthening the La Trobe NEIC is critical for future regional economic development. It should be made a Victorian Government Priority Precinct. La Trobe University has flagged its core unique research strengths, which should be nurtured and developed. Poor circumferential access by public transport, however, is a major issue requiring attention.
- **Growing food and beverage industry** – The region has established strengths here, from research to distribution. Population diversity is an opportunity here too, as is apparent in many parts of the region already. The multi-faceted approach that is being taken at a regional level to support and enhance this strength is impressive.
- **Melbourne Airport** – The Airport is unique and is clearly a very important regional strength, albeit that it is located towards the edge of the region. Maintaining good quality connectivity is important, with the Airport Rail link one key element therein.
- **Working as a region** – The region has been a leader here for a long time and such relationships do not develop overnight. That suggests an early adopter advantage.
- **Workforce skills and education** – The region possesses two world-class universities (La Trobe and RMIT) and has particular skill advantages, such as in advanced manufacturing, which is supportive of future development. However, it also faces some challenges. For example, the relative lack of private schooling opportunities is seen by some as a barrier to local industry development and attraction of professional personnel, as is the poor access to tertiary institutes.

- **Advanced manufacturing⁴** –The region has a history in advanced manufacturing and possesses skills advantages and the opportunities to align with tertiary institutions and research activities in the region. Strengths include the food sector, spin offs from automotive manufacture such as caravans, prefabrication in the construction industry and bespoke manufacturing, that is, short run and highly specialised product manufactures.
- **Health** – The health sector is closely aligned with the higher education system because it requires specialist-training activities for its graduates over many occupations that need high levels of skill and knowledge. The education system also relies on hospitals to provide opportunities for students to gain clinical experience. Melbourne’s North already has strong links between the education and health sectors and these can be developed to increase the region’s competitive advantage in the sector. The region’s health services are experienced in providing the medical needs of a culturally and ethnically diverse community, staffing reflects this diversity.⁵
- **Cultural diversity** – Melbourne’s North is culturally diverse but a question here is does Melbourne’s North make the best advantage of its diverse populations and the skills and international connections that now exist in the region’s diverse population.
- **River corridors** – Melbourne’s North is rich in river corridors and Yarra Valley Water provides a progressive approach to the management of the increasingly precious water resource. River corridors are evolving and are actively used by the community for recreation of various kinds. Proposals for improving Merri Creek Regional Parkland and Jacksons Creek are important. An opportunity exists to assist Victoria’s biodiversity, including wildlife, to have a sustainable future, by connecting places of natural habitat.
- **Tourism** – The experience economy can be broadly described as tourism and events. In the case of Melbourne’s North, there is scope to develop food, art and culture related visits and events of a smaller scale. Melbourne’s North has a growing food processing and manufacturing sector and its outer LGAs have opportunities to build food tourism. The restaurant and café sector in the inner parts of the north flourish in their diversity. The region’s river corridors provide an opportunity for visitors from outside the region to enjoy nature in a city-based environment. Recreation activities include cycling, with an exciting Trails Plan. The region’s industrial past and cultural diversity each provide opportunities to build a tourist experience economy through events, galleries and museums.

The stand-out competitive strengths to us, in terms of clearly setting the North apart from elsewhere in Melbourne (not in any particular order), are the La Trobe NEIC, Melbourne Airport, the food connection, freight and logistics, cultural diversity, two world-class universities and working as a region. The working as a region strength is particularly important among the above set. This capacity provides a real opportunity to generate synergies and productivity gains, including cross-sectoral gains, as is being evidenced (for example) from developments in the food area and the level of development of the infrastructure priority list. More broadly, the key investment opportunities

⁴ Advanced manufacturing is a knowledge intensive industry covering a range of products that require high levels of research and development, advanced materials, advanced processes and high levels of design within a complex and often global supply chain. The complexity of advanced manufacturing operations requires highly skilled workers and close relationships between providers of education and training and companies in the sector. The impact of digital technologies is pronounced, with great changes to the product development cycle compared with traditional processes of design, engineering, planning, manufacturing and services blending. These changes mean greater flexibility and greater opportunities for innovation. Advanced manufacturing is precisely the type of industry that requires strong links with universities and their research and development expertise. Innovation and collaboration are critical to the success of this type of manufacturing.

⁵ For example Northern Health looks after patients who have cultural backgrounds from 167 different countries, 100 languages and nearly 90 different religions. For Melbourne’s North firms there may be particular opportunities in assisting public hospitals to improve supply chain management efficiency by helping to introduce lean techniques and just-in-time supply chain management. Opportunities may exist in warehousing and logistics, holding and distributing stock, cross-servicing and consolidated distribution hubs.

overviewed in the NORTH Link and Arup *Investment Attraction Strategy* appear to align well with the listed competitive advantages.

Regional development also requires attention to any regional weaknesses that may form important impediments to the realisation of development opportunities. Weaknesses identified from NIEIR research in Melbourne's North that still apply include the following.

- A shortage of major activity clusters.
- Poor circumferential trunk public transport.
- The perception that the region is one of low socio-economic status (SEIFA) and has a low-income, low-skill population. This perception arose when the present Moreland and Darebin were branded as industrial suburbs and fails to take account of the gentrification of these suburbs, not to speak of the rise of high-status suburbs within the region. As noted in Chapter 3, though the region overall still has a slightly lower proportion of high-income households than national average, parts of the region are well above national average in this respect.
- Reflecting its history of low socio-economic status, the region lacks prestigious private schools. None of the eleven Associated Public Schools of Victoria lie in the region, though it can claim two of the nine Associated Grammar Schools. However, it has a number of aspirational private schools.
- A lack of tourism assets and hotels.
- A shortage of open space in inner areas and quality of open space in some outer areas.
- Inefficient and ineffective transport links reducing household capacity for mobility in some parts of the region, including sparse road, rail, tram and bus links within some of its employment catchments. This is particularly serious in the catchments of its major employment nodes and in outer parts of the region where suburban development has only just begun.
- A relatively high proportion of unskilled and de-skilled workers and an imbalance between the skills demand of local industry when compared to resident skills. This is a critical policy issue and will drive local economic outcomes and resident wellbeing for the former manufacturing zones within the region. Issues of skills imbalance also go beyond the boundaries of the region. The region's household skills mix now increasingly includes residents with the capacity to access knowledge type employment in the CBD. The need is to improve business services to local industries, to enable highly qualified residents to switch from CBD employment to local employment.
- Relatively poor linkages between local enterprises and catchment resources, including other businesses and industry services within the catchment, resulting in relatively poor use of catchment skills. This is a communications issue requiring improved business and employment networks with improved links between businesses and industries. The Melbourne's North Food Group provides an example of what is possible for other industry sectors in the region.
- Strategic drivers of regional productivity form supply chains oriented outside the catchment or are highly capital intensive with low value-added ratios accruing to catchment residents. This requires more activity at a local level that generates local investment in research and innovation to create greater value adding opportunities and the capacity to retain profits in the region, rather than exporting them.

Perception and branding – it is important to remind everyone that the region is changing rapidly in terms of its amenity and its capacity to provide local employment in a developing and diverse set of industries. Broadmeadows and surrounds is a classic example of this paradox.

Previous NIEIR reports investigating the economic circumstances of Melbourne's North have identified relatively poor linkages between local enterprises and catchment enterprises and catchment industries making relatively poor use of catchment skills. The sometimes relatively low value added ratios accruing to Melbourne's North catchment residents requires more activity at a local level that generates local investment in research and innovation, to create greater value adding opportunities and the capacity to retain profits in the region, rather than exporting them. This is a knowledge economy and information-based issue also requiring improved business and employment networks with improved communications and links between activity centres and national employment clusters. Building up the region's key clusters is a key element in tackling these challenges.

In some parts of Melbourne's North it is likely that a mismatch between the demand for skills required by local industry, particularly the newer parts of the region's industry base, when compared to the skills of its residents, will remain a weakness requiring special attention. An imbalance of skills demand and availability in a region creates a series of problems. This issue has an impact on infrastructure in various ways and, for example, the *Twenty Minute Neighbourhood* will not perform to its full potential if workers from outside the region are commuting into the region to work. Local TAFEs and Universities have a role to play in providing courses that deal with lifelong learning education and retraining of the resident workforce. For example, there is an ongoing underutilisation of resident skills for the group of workers educated overseas when their qualifications are not recognised in Victoria. This appears to be a problematic issue in both the northern and western regions of Melbourne.

3.7 Regional vision and goals

Consultations held during preparation of this report raised the suggestion that the Northern Horizons Strategy should include a vision for the region and regional goals, as is usual in urban planning strategies, such as *Plan Melbourne 2017-2050*. This is a useful suggestion for NORTH Link's consideration and, to assist such thinking, NIEIR includes some relevant suggestions.

Location (not just proximity to the CBD) is not listed as a competitive strength of Melbourne's North at present but NIEIR believes that it is the best way to approach the spatial characteristic. The Northern Region is the gateway to/from Melbourne by air and to/from the north by land, particularly the very important Hume corridor to Sydney and beyond. This also places it close to the food bowl areas in central Victoria (e.g. Shepparton). With Mitchell included, the region should think of itself as being centrally located, in the sense that it is positioned pretty much at the geographic centre of the state, including both urban and regional settings and opening up to/from the north-west, north and north-east of the state and beyond. This invokes ideas like vibrancy, health, connectivity and inclusion. In comparison, neither the east nor the west of Melbourne can claim such a location advantage, albeit that it comes with accessibility challenges for the north. Dealing with such challenges is the stuff of infrastructure plans.

Recognising the central role that location plays in realising the potential of Melbourne's north, the connectivity challenges that need to be confronted to maximise the potential that this advantage offers and the region's commitment to fully engaging and working with its diverse communities, we suggest that the regional vision, towards the achievement of which the Northern Horizons Strategy is directed, could be something like: ***Melbourne's Northern Region – Building Communities, connecting people.***

Specific regional goals that would support pursuit of this vision will typically be common to those that are set by most cities, as discussed by Stanley et al. (2017):

1. increase economic productivity – where several of the regional competitive strengths are critical. Issues such as reducing traffic congestion, on roads and public transport at peak times, are primarily about this goal but may also have an impact on other goals;

2. reduce environmental footprint and meet critical environmental constraints – e.g. GHG emissions; air quality;
3. increase social inclusion, reduce inequality and provide a decent base level of capabilities for all;
4. improve health and safety outcomes; and
5. engage communities widely.

NIEIR recommends that the Northern Region adopt such goals, to provide a goals or outcomes-based focus for the Northern Horizons Strategy Update 2020. Initiatives that are included in the Northern Horizons Strategy then need to be firmly linked to achievement of one or more of these goals/outcomes, which provide an indication of the ultimate purpose of the initiatives and a foundation for evaluating performance. Themes developed in Chapter 4 are proposed as the way of achieving this linkage.

3.8 Chapter overview

This chapter has indicated how quickly the population of Melbourne's Northern Region has been growing, particularly in outer growth suburbs but, more recently also in inner areas. Infrastructure challenges thus relate to keeping up with growth pressures on the rapidly expanding fringe, while also now responding to increasingly faster growth, at higher densities, in inner areas. This population growth has not been accompanied by comparable growth rates in the kinds of jobs suited to the skills of Northern Region residents, with increasing commuter flows one result and associated increases in congested roads and public transport. Evidence suggests that infrastructure funding in the north has generally lagged its population requirements.

To respond to such pressure aggregate infrastructure investment needs to grow and the region needs to focus on doing what it can do best, while preparing for future change. Regional competitive strengths and weaknesses have been identified. The stand out competitive strengths in terms of clearly setting the North apart from elsewhere in Melbourne (not in any particular order), are the La Trobe NEIC, Melbourne Airport, the food connection, freight and logistics, cultural diversity and working as a region and the region's central location within Victoria. Future development needs to focus on enhancing such strengths and mitigating regional weaknesses, if Northern Region residents are to share equitably in the benefits of future growth.



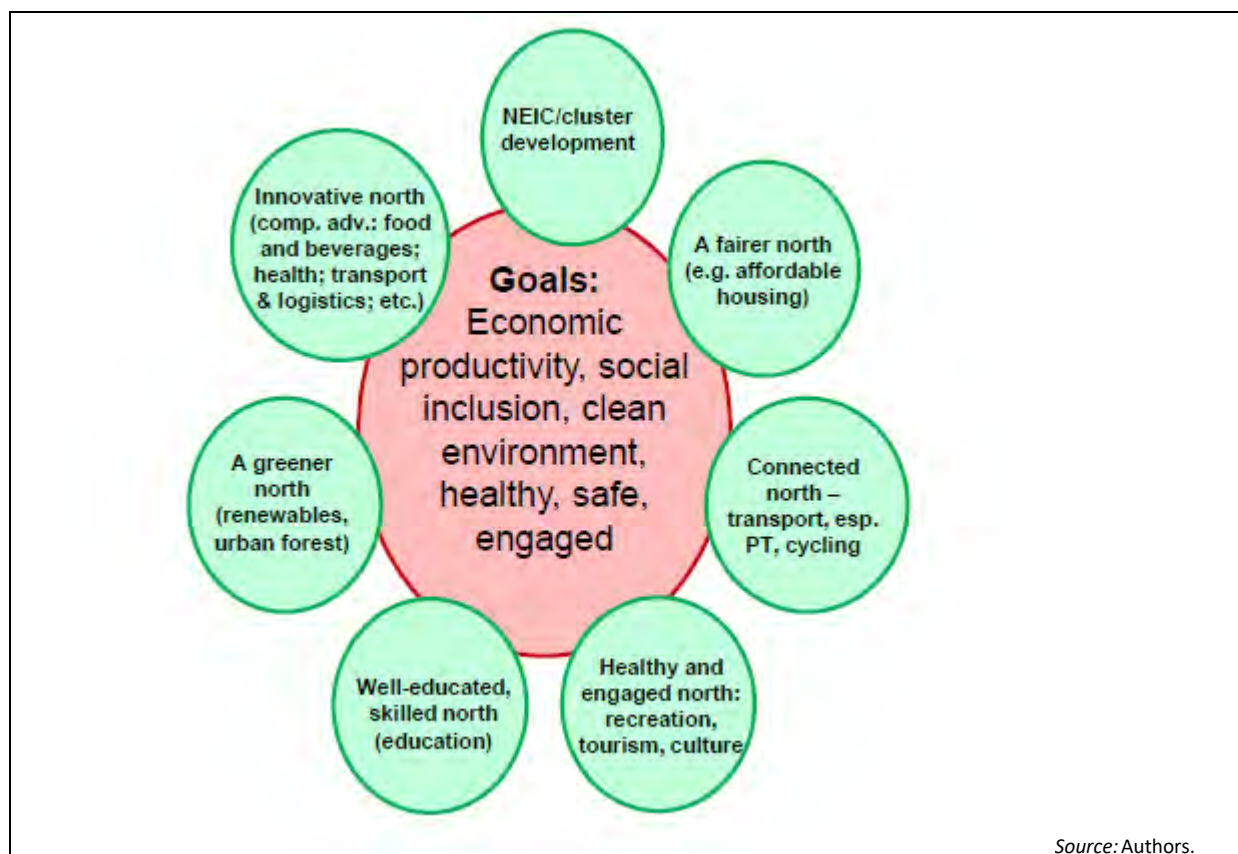
4. Themes for update

4.1 Context

Consultations during preparation of this report raised a number of recurring themes, which can form a basis for structuring the Northern Horizons Strategy Update, with the ultimate intent being to support better achievement of the suggested regional goals set out in Section 3.6. The themes are seen as the major action areas to support regional goal achievement and most of their focus is about enhancing competitive strengths or mitigating competitive weaknesses. Figure 4.1 shows the main themes that NIEIR has identified from the consultations, showing the high level societal goals towards which the Strategy is directed, through work on these themes, at the core. In summary, the key themes are based around:

1. the La Trobe NEIC and other leading regional clusters;
2. an innovative north;
3. a greener north;
4. a well-educated, skilled north;
5. a healthy and engaged north;
6. a well-connected north; and
7. a fairer north.

Figure 4.1: Northern Horizons Strategy Update 2020: Main themes



The two most pressing areas that the consultations identified as requiring attention were the development of the La Trobe NEIC, as a regional development focus, and improving regional connectivity, to wider parts of Melbourne but also within the region, particularly circumferential connectivity by public transport.

Many of the infrastructure priorities that are included in this Strategy are relevant to more than one of the above themes, underlining the importance of taking an integrated approach to planning and prioritisation of initiatives. Individual initiatives are generally included under the theme that is judged as most directly relevant to that initiative, which sees (for example) regional cycling trails included under the *healthy north* theme, with improved health being the major expected benefit from implementation, rather than under a *well-connected north*. Cycling trails are, of course, relevant to both, and to a fairer north and greener north – an indication of the importance of this initiative for the region and its residents and visitors. The high level assessment that is undertaken of the various initiatives set out in Chapter 5 of this report takes this multi-pronged benefit opportunity into account and also recognises a higher weighting to initiative areas that support pursuit of the two initiative areas that were flagged in the preceding paragraph as the most significant: the La Trobe NEIC (and other Metropolitan Activity Centres) and circumferential connectivity.

4.2 The La Trobe NEIC and other key northern clusters

4.2.1 Significance

The La Trobe National Employment and Innovation Cluster (NEIC) is the highest-level activity centre for knowledge-based activity in the north, one of only a small number of such centres in Melbourne. This makes the Cluster crucial for regional productivity and employment growth. *Plan Melbourne* (DTPLI 2014) and *Plan Melbourne 2017-2050* (Victorian Government 2017) developed the innovative land use planning concept of a future Melbourne that contains a small number of hi-tech/knowledge-based economic clusters, the NEICs, which are intended to provide increased opportunities for high productivity jobs more widely within the urban area, with good access to the fast growing outer suburbs. The latter adds an equity flavour to the NEIC rationale. As explained in Section 2.9 above, the NEICs are a primary policy direction in *Plan Melbourne 2017-2050* to support achievement of the Plan's *Outcome 1: Melbourne is a productive city that attracts investment, supports innovation and creates jobs* (Victorian Government 2017, p. 22), with Policy 1.1.3 in *Plan Melbourne 2017-2050* being to *Facilitate the development of national employment and innovation clusters*. There are now seven NEICs, two of which are in the inner area (Parkville and Fishermans Bend), four in the middle suburbs (Monash, La Trobe, Dandenong and Sunshine), and one in the outer metropolitan area (East Werribee). The La Trobe NEIC is anchored by La Trobe University and the Heidelberg medical precinct, the two key hi-tech/knowledge-based cores in the Cluster (Northland and East Preston industrial precinct are also part of the NEIC).

Discussion of Policy 1.1.3 in *Plan Melbourne 2017-2050* includes the following (Victorian Government 2017, p. 29):

The national employment and innovation clusters are focused on knowledge-based businesses that locate close to each other for knowledge and resource sharing. The clusters are distributed throughout Melbourne and along high-capacity transport networks to provide greater access to high-productivity jobs... There are some common requirements. Each cluster will need high levels of amenity to attract businesses and workers—including public transport, and walking and cycling paths...

High quality public and active transport is very important to NEIC development, being central to supporting the effective density on which clusters depend. Accessibility to other key activity nodes across the city and to labour catchments is also important, to support growth in jobs closer to where people live.

Mathematician and well-respected Melbourne transport blogger Chris Loader (Charting Transport) has analysed the location of middle urban clusters across Australia's major cities. All of his identified clusters within metropolitan Melbourne are in the city's east/south-east, except for Heidelberg. The Monash cluster in Clayton is Melbourne's largest in the middle suburbs. The La Trobe University part of the La Trobe NEIC falls just below Loader's threshold for a cluster but is a critical part of the broader La Trobe NEIC. Loader's analysis underlines the importance of a strong developmental pathway for the La Trobe NEIC, to both promote Northern Region resident participation in future growth opportunities associated with development of hi-tech/knowledge-based activities but also to help ensure that Melbourne's North is able to participate equitably in the benefits from growth in the knowledge economy in Melbourne. Consultations for the Northern Horizons Strategy 2020 distinguished two key strategic components for future development of the La Trobe NEIC:

1. building on the key competitive strengths of the La Trobe NEIC; and
2. improving its accessibility.

4.2.2 Key strengths of the cluster

University City of the Future

La Trobe University is the anchor tenant of the La Trobe National Employment and Innovation Cluster (NEIC) and the single largest employer in Melbourne's north. At 235 hectares, it is **the largest university campus in Australia**. La Trobe University educates around 28,000 students per year at its Bundoora campus (9,000 international) and employs over 3,000 staff across its campuses, spending around \$70 million per annum on research. La Trobe's operations extend from Bundoora out through regional Victoria, to Bendigo, Shepparton, Wodonga and Mildura. The University's courses and research activities provide economic benefit far beyond Melbourne's North.

La Trobe University is ranked in the top 1.2 per cent of universities worldwide (QS World Rankings 2019)⁶, with nationally significant research in agricultural production, sustainable food solutions and cyber and digital technology. The first two of these areas are important elements in the region's food and beverages competitive strength, while the cyber and digital technology strength is a key regional opportunity.

La Trobe University's ambitious '*University City of the Future*' vision will fundamentally change the Bundoora campus. This change will create many opportunities for Melbourne's North, but it requires the connecting infrastructure to ensure the north can maximise the opportunities presented.

The *University City of the Future* seeks to create a healthy, liveable and sustainable city, with 12,000 residents and an increase in student numbers to around 40,000. This La Trobe University development will provide a new hub for Melbourne's North and its NEIC, with accommodation, retail space, health services. Improved transport connections will be critical to realisation. The vision fulfilled will mean investment of \$5 billion in capital expenditure and this investment is a significant economic generator in its own right.

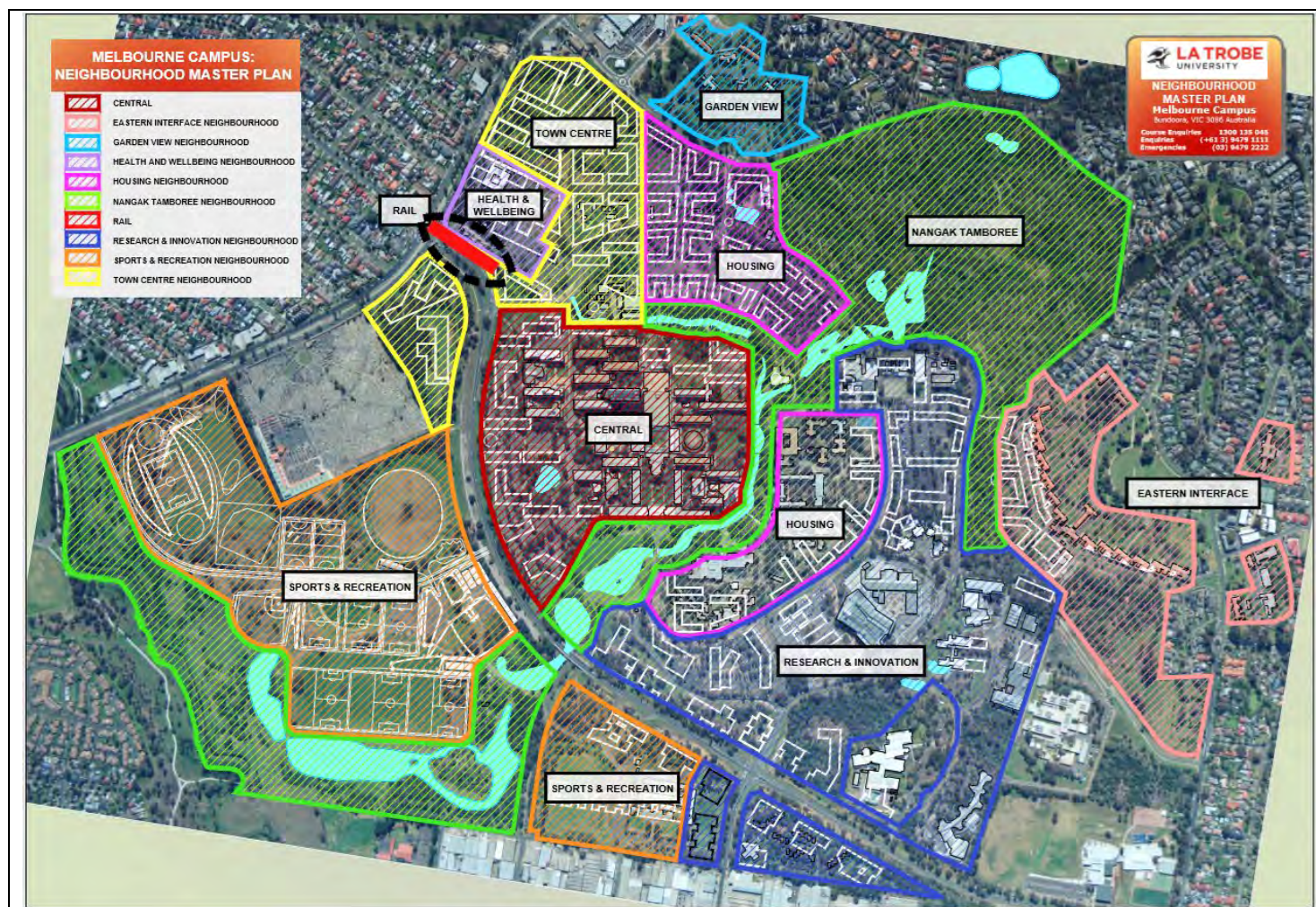
Works are already underway to develop \$150 million sporting facilities for teaching, learning, research and playing. Around 10,000 members of the community will be visiting and using the facilities each week.

The Health and Wellbeing Hub, within the *University City of the Future*, will provide the region with a new private, sub-acute hospital, a primary health care centre, aged care facilities, and additional childcare, creating over 500 health-care jobs. An MOU to develop stage one of this new hospital precinct has been signed with Healthscope.

⁶ <https://www.topuniversities.com/university-rankings/world-university-rankings/2019>.

The La Trobe Research and Innovation (R&I) Precinct is to be expanded, supporting growth of the NEIC. The focus of activity will centre on the *University City of the Future*, driving jobs growth and regeneration across the NEIC including the Banyule Business Park. By building a growing ecosystem, the precinct will drive growth through industry collaboration and joint investment in research, creating new courses to address industry needs.

Figure 4.2: La Trobe University Melbourne Campus – Master Plan



Health care and social assistance

The *Health care and social assistance* sector represents one of the largest and fastest growing sectors of the Australian economy currently employing 1.69 million workers and the sector is projected to grow by another 15 per cent by mid-2023. In the 20 years to 2018, the sector grew its share of total Australian employment from 8 per cent to 13 per cent. The sector comprises a diverse range of services that provide human health care and social assistance. It includes hospitals, psychiatric services, GPs, specialists, pathology and diagnostic services, allied health services (dentists, optometrists, physiotherapists, chiropractors, osteopaths etc.) and services such as ambulances and the blood bank. The sector also includes residential care services (aged, disability, palliative), child care and social support services.

The continuing growth of health clusters in Melbourne's North will assist the expansion in specialist services and increase the depth of services available locally, while consolidating the practice specialisation of its major hospitals. Training and ongoing education is also an important part of the mix, as is the opportunity for increased integration with education providers in Melbourne's North.

The La Trobe NEIC includes the Austin Health cluster in Heidelberg. The Austin Hospital, an internationally recognised centre of excellence in hospital-based research, is now housed in one of two hospital towers and shares its site with the Mercy Hospital for Women. Austin LifeSciences brings together almost 1,000 researchers and a number of research institutes in partnership with University of Melbourne, La Trobe University and the Mercy Hospital for Women. Specialists work in disciplines that include cancer research, infectious diseases, obesity, sleep medicine, intensive care medicine, neurology, endocrinology, mental health and rehabilitation. The Austin Hospital is the largest Victorian provider of training for specialist physicians and surgeons. Austin Health also includes the Heidelberg Repatriation Hospital and the Royal Talbot Rehabilitation Centre.

For the Medical technologies and pharmaceuticals sector there are opportunities for Melbourne's North firms in specialist medical manufactures and ICT systems development. Health is an ideal sector for creating high value projects, co-developed between universities, existing and new firms entering the region and venture capital. The Health Sector as a whole will remain a strong employer in Melbourne's North, contributing strongly to the development of the region's skills base.

Digital innovation is essential to improve the Health Sector's productivity and to reduce costs. Key factors driving cost increases include issues relating to workforce supply and issues surrounding job specifications (which may not be optimal across different occupations), the increasing costs of medical technologies, growing patient expectations, and the ageing population and consequent increase in chronic disease. Again these features will benefit from a close relationship with universities and related research facilities. For educational institutions, opportunities also include teaching about quality systems and standards, which are far more complex in the Health Sector and ongoing training of the Health Sector's non-clinical workforce across a range of service occupations to improve the health sector capabilities of its workforce overall. Opportunities for collaboration across the La Trobe NEIC will continue to benefit growth of the NEIC.

The health sector and affordable housing

The clinical workforce is diverse and includes professions and other disciplines that require registration to practice. The NRAS commenced on 1 July 2010 and provides a national standard for the setting and management of registration and accreditation standards for health professions. The aims of NRAS include protecting the public by ensuring that only suitably trained and qualified practitioners are registered, facilitating workforce mobility, and enabling the development of a flexible, responsive and sustainable health workforce.

Nursing and midwifery jobs (registered and enrolled nurses, assistants and carers) make up around 55 per cent of all employment of health professionals, medical professionals around 12 per cent and allied health workers around 9 per cent. In Australia these are the three largest occupational groups.

Apart from the clinical occupations, the delivery of a healthcare system requires a diverse range of occupations and skills essential to supporting the core delivery of health services and these include:

- information technology;
- catering;
- cleaning;
- equipment procurement and maintenance;
- legal advice;
- management and administration;
- record management;
- human resource management; and
- financial management.

As the cost of accommodation in Melbourne's North continues to increase there are essential occupations within the health sector that are potentially at risk, given the lack of affordable housing in the region. It is noteworthy that several LGAs flagged a need for additional affordable housing as an important component of their infrastructure priorities. Future development of the La Trobe NEIC must ensure that provision of affordable housing is a core component in planning, including for key workers.

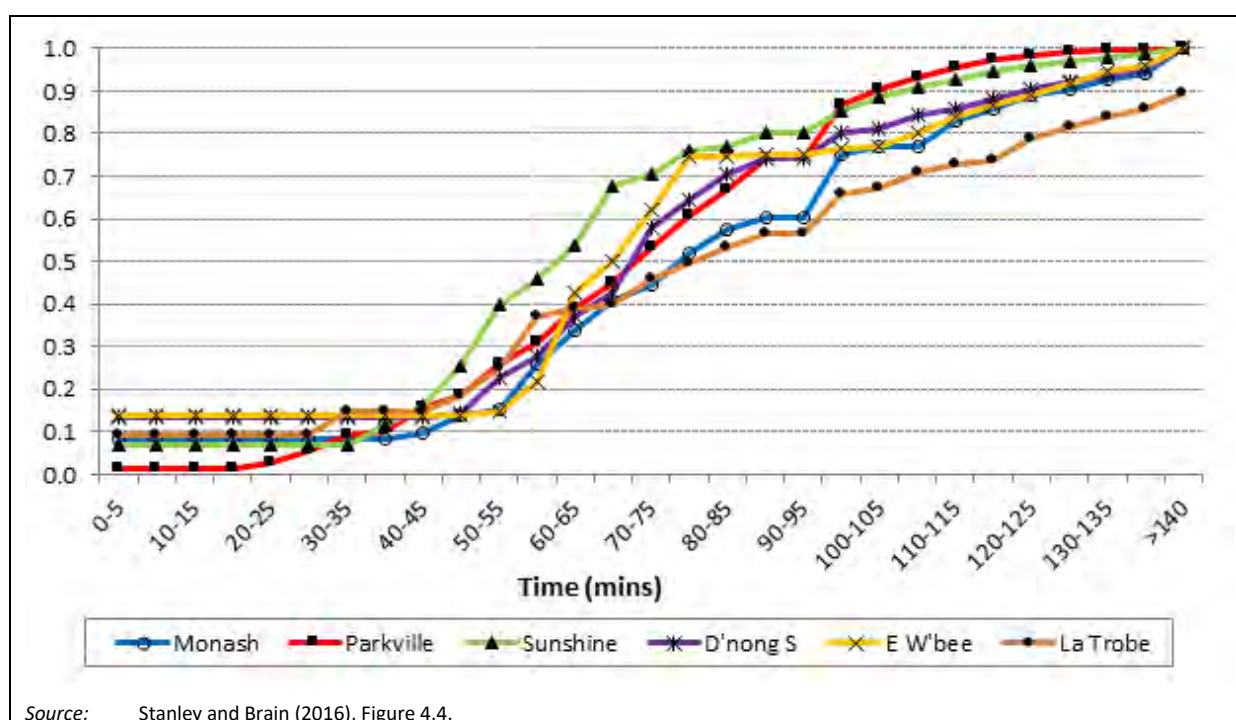
4.2.3 Accessibility of the La Trobe NEIC

Detailed analysis by Loader (Charting Transport) shows the private transport mode share for journeys to work in Melbourne's urban clusters (and those of other cities). The Northern Region's Heidelberg cluster stands out as having the highest private transport mode share for a centre with its job density. In fact, Loader finds that Heidelberg has the highest car use density of all the centres he identifies.

To inform development of its 30-Year Infrastructure Strategy, Infrastructure Victoria commissioned Professor John Stanley and Dr Peter Brain to review the performance of the (then six) *Plan Melbourne* NEICs and suggest improvement priorities⁷. Stanley and Brain (2016) concluded, inter alia, that Monash and La Trobe probably had the most pressing needs of the NEICs in an infrastructure sense, with potential for significant gains in Gross Regional Product and productivity by reducing travel times to/from these clusters, particularly public transport travel times. Importantly, based on analysis of cumulative travel time (by car and public transport) distributions for each NEIC, a key finding of that research by Stanley and Brain was that La Trobe NEIC has the poorest public transport accessibility of the NEICs, with a 90th percentile public transport travel time of beyond 2 hours and a 50th percentile travel time of about 80 minutes. Figure 4.3 shows the various cumulative travel time distributions, the lower curves having the poorest PT accessibility, with La Trobe the worst across most of the distribution. It is little surprise, then, that the public transport mode share to the cluster is low and car dependence high. This is inequitable for the Northern Region and adversely affects NEIC development opportunities, not only directly by limiting the accessibility of the precinct from suburbs at medium distance from it but by pre-empting much of the site for car parking and so hindering its development as a pedestrian-friendly precinct.

⁷ Fishermans Bend has been added since.

Figure 4.3: Cumulative travel time curves for NEIC morning peak trips by PT (proportion of trips)



Stanley and Brain (2016) concluded that, unless there are major transport improvements in the La Trobe catchment, around half the increase in Gross Regional Product that the La Trobe NEIC might be expected to achieve to 2031, from increased scale and density as the region grows, will be lost as the effective catchment diminishes, due to falling road speeds brought about by congestion. The scale of adverse impact of poor travel times on GRP growth for La Trobe NEIC was larger than for any of the other NEICs, underlining the scale of the access challenge confronting the La Trobe Cluster.

North East Link is the major transport investment currently committed for Melbourne's North. However, it is primarily designed for through traffic and is of little direct relevance to the La Trobe NEIC. At best, it will relieve pressure on some of the arterial roads serving the NEIC of some of their through traffic. To the extent that this increases motor traffic into the cluster it will further increase the demand for car parking, which is difficult to accommodate in a high-activity area. Though it is currently the main means of transport to and within the cluster, motoring has limited potential to cater to expansion.

Within the roads sector, promising investments for the cluster include cycle path and walking path improvements. Pleasant, short-distance walking is essential to the coherence of the cluster, while cycle paths are low cost, have high capacity and low parking requirements. They are ideally suited to increase connectivity both within the NEIC and to suburbs within five kilometres or so, consistent with thinking behind *20-minute Neighbourhoods*.

Given the limits to growth in motor traffic and the local nature of active transport, public transport will have to step in to support the La Trobe NEIC. The major project opportunity here is the Suburban Rail Loop, envisaged as an underground railway from Cheltenham via Monash, Box Hill and Doncaster to Heidelberg and La Trobe, thence to Reservoir, Fawkner, Broadmeadows and Melbourne Airport, continuing via the already-committed Melbourne Airport rail connection to Sunshine and then via existing tracks to Wyndham Vale and Werribee. The authority which is in place to deliver this project hopes to begin construction in 2022 on the section serving Monash. This will assist future development of the Monash Cluster, with Deakin University benefitting from the work to the north

of Monash, but will also worsen the relative access disadvantages of the La Trobe Cluster, particularly La Trobe University relative to Monash and Deakin Universities (and Melbourne University, which is benefitting from the Melbourne Metro 1 tunnel). The construction authority has indicated that the section through La Trobe may not be completed till 2050. This emphasises the importance of substantially improving circumferential public transport access to the La Trobe NEIC, and particularly to La Trobe University, in the near future. As La Trobe University argues, *“The best opportunity to leverage value capture and creation of the SRL in Melbourne’s north is through early delivery”*.⁸ This will support future development of the La Trobe NEIC, not only by increasing accessibility from suburbs to the east and west of the university but by tying the Heidelberg and La Trobe ends of the NEIC more closely together.

Stanley and Brain undertook an assessment of the prospective productivity benefits of reduced travel times to each of the six NEICs.⁹ La Trobe NEIC was projected to gain the largest relative increase from improved travel times, both public and private transport, a very positive outcome in terms of proposing improved trunk public transport services. These findings suggest that improved public transport services to the La Trobe NEIC should be a priority on productivity grounds. The priority can also be supported on equity grounds, since many of the suburbs which would gain improved access to the cluster are ethnically diverse and of relatively low socio-economic status.

Among those advocating improved circumferential public transport for Melbourne, the high cost and long construction time of the proposed underground railway have led to a search for alternatives. Darebin City Council has suggested that the route should be elevated, which favours light rail since it can be built on viaducts at lower cost than heavy suburban rail. The Rail Futures Institute (2018, 2019) has suggested that improved circumferential transport for the La Trobe NEIC should take the form of medium-capacity transit. This would have its own right-of-way, fully segregated from road traffic, which might be underground for short sections but which would be largely on the surface or elevated, and hence cheaper than a fully-underground line. To find such a right-of-way, the line westwards from La Trobe would follow a route via Bundoora, Keon Park and Campbellfield to Broadmeadows and thence to Gladstone Park, where it would join with an extension of the Airport West tram line to Melbourne Airport. In the south-easterly direction from La Trobe it would, like the proposed Suburban Rail Loop, run via Heidelberg, Doncaster and Box Hill to Monash. This reserved track corridor would, in part, take advantage of space on major arterial roads made available by traffic diversion onto the Metropolitan Ring Road and North East link. The Rail Futures Institute suggests that this route should be complemented by extension of the West Preston tram line via Reservoir to La Trobe University.

A reserved-track service on the lines suggested by the Rail Futures Institute would be quicker to build than an underground line. Services would be a little slower than an underground line (partly because it would be possible to have more stations) but would be much quicker than the existing orbital bus routes, which lack on-road priority. Similarly capacity would be less than that of an underground railway, but well within likely demand. The reserved track service could be by light rail, similar to the St Kilda and Port Melbourne services already in operation, or by busway (Bus Rapid Transit), as operating in Brisbane.

⁸ La Trobe University (n.d.), A University City of the Future for Melbourne’s North, Powerpoint presentation.

⁹ Stanley and Brain assumed that travel times for each NEC catchment are improved by 3 per cent in each of the next two decades, against a base case projection, and then estimated how this would affect NEIC catchment productivity. Such travel time improvements could come from road upgrades and/or public transport service improvements, with the productivity benefits from PT upgrades that Stanley and Brain (2016) identified in their analysis suggesting the importance of a strong PT focus.

Lack of funds and difficulties in finding a proper corridor should not deter improvements, even if in the short run these are likely to take the form of improved bus services running on public roads. This was the most frequently mentioned public transport improvement need identified in consultations for the Northern Horizons 2020 update, particularly improved circumferential services. Appendix A to this report identifies specific improvements in this regard and outlines their intent. La Trobe University summarised the most immediate needs as:

1. a bus from Box Hill to La Trobe University connecting Doncaster Shoppingtown, Heidelberg Station and Bulleen, which it costed at \$9.4 million per annum plus \$2 million capital cost. This is the highest priority;
2. a bus from La Trobe University to Broadmeadows connecting Reservoir, Fawkner/Campbellfield (replacing the 301), with an estimated annual cost of \$3.5 million plus \$1 million capex. This service could perhaps extend to Melbourne Airport; and
3. a bus from La Trobe University to Swinburne Hawthorn, which would connect to the Hurstbridge line, Belgrave/Lilydale lines and Kew Schools. Estimated cost equals \$2.8 million per annum plus \$1 million capex.

These services need to operate at a suitable frequency for trunk services to a NEIC, which should be 10 minutes on weekdays at most times but aligning with rail where routes meet, as far as possible. The first and second of these priorities would, in time, be replaced by the SRL, which this report argues should initially be developed as medium capacity transit in Melbourne's north, as proposed by the Rail Futures Institute.

In addition to these priorities the following trunk PT priorities for the NEIC were identified.

- Reservoir Station to La Trobe requires a high frequency shuttle bus service over extended hours and operating days, or as suggested above a tram service connecting from West Preston. Darebin City Council gives this high priority and Banyule City Council proposes that the route be extended to Heidelberg Station, to enhance connections with the Hurstbridge line. This would be a second transfer point on that line to La Trobe University, additional to the primary Heidelberg interchange.
- The Whittlesea City Council suggests that connections between La Trobe University and its northern catchment area would be improved by the extension of the Route 86 tram to a reconstructed interchange at South Morang, where it would connect with the train from Mernda and with buses from other parts of the northern catchment.

Within the La Trobe NEIC, improved bus services between the University, Heidelberg Station (connected to the Repatriation Hospital) and Northland at East Preston would help to increase the integration of the Cluster, as would an express bus link from Macleod Station to the University. More broadly, bus and tram priority measures (e.g. bus lanes; B-lights), to improve run times and fleet productivity, are important elements of such initiatives (e.g. a Bell Street bus lane). More broadly, Appendix A suggests that weekday SmartBus (trunk) service levels in the north need to increase by 10-20 per cent to fully integrate with train services, with an increase of around 50 per cent needed on weekend SmartBus services.

4.2.4 Melbourne Airport

Melbourne Airport is owned and operated by Australia Pacific Airports Corporation Ltd, which is in turn owned largely by various superannuation funds. The Corporation holds a long-term lease from the Federal Government and the airport estate is not subject to state planning laws, though cooperative arrangements are in place. The airport serves the whole of Victoria.

Melbourne Airport now has around 37 million passenger movements each year, with a substantial growth in international travellers recorded in the recent period. There are around 250,000 aircraft

movements per annum. Freight and logistics services provided at the airport provide a significant benefit and opportunities for businesses located in Melbourne's North. The airport estate of 2,663 hectares includes 40 kilometres of airport roads, which are an important part of the local road network, carrying around 120,000 vehicles each day. There are 6,500 taxi pickups each day and approximately 10,000 SkyBus boardings per day. Employment opportunities at the Melbourne Airport cluster continue to grow and the cluster provides major opportunities for economic development in the region, particularly areas immediately outside the airport estate. Many of the activities in and surrounding the cluster are knowledge intensive and stimulate innovation, research and education.

Within the greater airport cluster, employment opportunities continue to grow, particularly in the following sectors: aviation, air traffic control, airport management, security and air transport generally; retail; logistics and road transport; and hospitality.

In 2015-16 economic activity within the airport estate contributed \$7 billion to the Victorian economy. An updated precinct strategy was released in 2018 and provided for continued growth in the airport's prime business of air traffic but also recognised four precincts within the airport estate, in addition to the airport proper, its car parks and its access roads. Of these, the Forefront, the Hive and Elite Park are reserved for hospitality and office activity related to air traffic while the much larger Melbourne Airport Business Park is largely devoted to airport-related logistics.

Infrastructure and the Melbourne Airport cluster

It is critical that Melbourne Airport continues to grow without the restrictions of a curfew. In the plans adopted in the 1950s, flight paths were protected, mainly by green wedges, thus providing an important competitive advantage over other major airports and contributing to the significant growth achieved over the past 60 years. It is important that any developments under the flight paths (including the flight paths for future runways) should not endanger the curfew-free status of the airport. Effectively this means that the flight paths are unavailable for residential development, but may be suitable for logistics and other commercial development.

The Airport Corporation envisages that the airport estate will continue to specialise in activities closely related to air transport. The same is likely to be true of the privately-owned land in the vicinity which provides alternatives to airport-owned sites. These activities are road-intensive and it is unlikely that a high-amenity employment cluster will develop other than adjacent to the terminals, Forefront, Hive and Elite Park. This said, the Airport Corporation sees a need to improve amenity, particularly for the benefit of the 20,000 or so people who come to work at the airport every day.

On the air side, Melbourne Airport was planned to eventually have four runways. Design work is under way for the construction of a third and North-South runway, which will require additional terminal capacity to match and additional cargo handling capacity. There are also opportunities for the development of a second large-scale retail and hospitality facility at the international terminal, increasing the terminal's footprint by around 15,000 square meters, and for the construction of a new hotel with 464 rooms, to be located in The Hive, Terminal 4. In the business park there are at least 350 hectares of land still available for expansion and there are also nearby sites outside the airport estate. In the short-term, 0-5 years, development is most likely to be around logistics. The 410 hectare business park provides a freight interface between the airport and the road transport system, particularly the Western Ring Road. In the long-term it is also important that it should be connected to the Outer Ring Road. The Airport Corporation is half way through the development of the business park and the site houses around 15 of the world's top logistic companies, including big retailers which were historically located in the west.

As a transport interchange, Melbourne Airport is critically dependent on land-side transport. The airport was designed on the assumption that road transport would fulfil that role, and the Tullamarine Freeway was built to provide the necessary capacity to and from inner Melbourne. Parking and ground access provide a little over 20 per cent of the Airport Corporation's revenue and the airport estate has room to maintain or increase this percentage as traffic grows. Similarly the logistics function of the airport is served wholly by truck, and again there is room to provide the internal road-space which the growth of trucking will require. Emerging infrastructure needs related to the airport arise mainly outside the airport estate itself.

A major problem is that, at many hours of the day, the Tullamarine Freeway is running at capacity, caused not so much by increasing airport traffic as by general traffic between the north and inner Melbourne. In the short-term, the need for guaranteed fast passenger transport between inner Melbourne and the Airport requires a dedicated lane for SkyBus (which might carry other high-capacity or premium-toll traffic to the extent that this does not diminish speed). In the longer term the real need is for the increased capacity which only a rail line can provide. Subject to statutory approvals, construction of this link is expected to commence in 2022. The Federal and Victorian Governments have committed up to \$5 billion each to fund a new rail link between Melbourne CBD and Melbourne Airport via Sunshine. Costs of this project are estimated at between \$8 billion and \$13 billion, depending on whether the track accesses the CBD via a dedicated track or via existing tracks, the problem here being that the existing tracks will be running close to capacity even after completion of the Melbourne Metro project. There are opportunities for a private investor to join the consortium.

The Airport rail link is designed to convey air passengers from the Airport to inner Melbourne and beyond. It will not be used by many Northern Melbourne residents, who will continue to rely on cross-town transport to access the Airport. Its benefits to Northern Melbourne will be indirect, in that it will support the continued growth of employment at the Airport. Similarly a reserved lane on the Tullamarine Freeway for SkyBus will not directly benefit Northern Melbourne residents. However, after the completion of the Airport rail link, this lane could be repurposed to provide an express bus service from a bus interchange at a location to be determined within Hume.

A second land-side transport imperative for Melbourne Airport is maintaining road access for freight logistics businesses. The main action required here is the reservation of the land required to connect the Airport to the new Outer Ring Road, when it is built.

Unlike La Trobe University, which believes that pre-emption of land for car parking inhibits its development as an employment and innovation cluster, Melbourne Airport believes that it has enough room on its estate to accommodate all cars whose drivers are willing to pay its car-parking fees. Even so, motoring costs are a deterrent to employee recruitment. The Corporation believes that improved cycle paths to neighbouring suburbs would benefit airport employees and has also planned a bus service hub outside Terminal 4. However, the reserved-track circumferential public transport route which is high on the priorities of La Trobe University and the Melbourne's North councils appears to be low on the Airport agenda. Similarly the Airport management appears to give low priority to the proposal to extend the Route 59 tram to the airport.

From a Northern Melbourne point of view, an enhanced route bus service from Sunbury to Melbourne Airport is a priority, as is the circumferential link to Broadmeadows and onwards across Melbourne's North to La Trobe and beyond. The Melbourne Airport terminal building is now around 650 metres long which means that it is not conveniently served by a single bus stop.

4.2.5 Melbourne Market

The Melbourne Wholesale Fruit, Vegetable and Flower Market relocated to Epping in Melbourne's North in August 2015. The original Melbourne Wholesale Market was opened in 1969. More than

5,000 businesses use the Market as a base, buying and selling fresh produce in the early hours of the morning for distribution across Victoria and Australia.

The new 70-hectare Epping site has more than 120,000 square metres of warehousing space. Importantly, a separate but adjoining 60-hectare site means that there is space to develop a 21st century food cluster adjacent to the Melbourne Market, a huge opportunity to enhance a key regional competitive strength.

The Melbourne Market Authority (MMA) is landlord for the Melbourne Market at Epping. Estimated annual turnover of product through the market is \$2 billion, with over 3,000 vehicles accessing the site annually. The **Growing food and beverage industry** has been identified as a distinctive regional competitive strength of the Northern Region (NORTH Link and Arup 2018). Market relocation from West Melbourne was a contentious issue for some but the MMA notes that well over half the product coming into the site comes from further north, the Epping location reducing traffic flows through the city. This, the business opportunities provided by a much larger site and room for growth, together with the nearby freeway network are important location considerations, among others.

Several important points emerged from the research for this report. First, the Authority is actively pursuing strengthening of the region's competitive strengths in food/beverages, recognising that this will benefit not only the Northern Region but also Victoria and Australia more broadly, partly because of the opportunities to promote synergies in the sector, which will help drive export growth opportunities. In this regard, the Authority's proposal for a future Melbourne Food Hub, which could be developed on vacant state-owned land immediately to the east of the Market, is a major opportunity. The Authority's Vision for the site is (MMA 2018 n.p.):

A coordinated food and beverage industry cluster of sufficient scale to be internationally significant. Complementing and adding value to the Melbourne Market, and the food and beverage supply chain, driving economic growth for Melbourne's North.

Six Guiding Principles have been established for this initiative (MMA 2018, n.p.):

1. complement the market;
2. facilitate food and beverage industry cluster;
3. create value with a commercial incubator;
4. establish integrated education, research and business development supporting infrastructure;
5. invest in enabling infrastructure; and
6. adopt a co-ordinated development approach.

These principles appropriately recognise the importance of the sector and of taking a co-ordinated approach to site development to assist industry development. The strong food/beverage industry networks in the North, including links to the Airport, education and logistics/distribution, are significant positives in terms of realising such an opportunity. The State should fast track pursuit of this initiative, under MMA leadership. Construction of the missing length of Edgar's Road, between about Rockfield Street and Willandra Drive, and implementation of a new bus service along this route to Epping Station, would support such a development (and provide other benefits), because of the labour catchment it would help unlock in the Aurora estate area and surrounds. Edgar's Road forms the eastern boundary of the proposed Melbourne Food Hub site

The second important point emerging from the research was the importance of North East Link to the Market and its various stakeholders, and particularly those from Melbourne's east and south-east. Accessibility is crucial to the success of the Market and the early morning commute from the north has effectively capped the trading times at the market to 3.30am to 7.00am, with most wanting to be gone from the site by about 6.00am. This has meant that the market has needed to

open about an hour and a half earlier than at the previous site. This potentially reduces the quality of life of some who need to start work that much earlier, and increases business costs. North East Link is expected to sort this timing problem, because of the easier access to/from the east/southeast that it will facilitate.

A third important point from the research concerned the cost of motorway tolls (largely Transurban) incurred by those travelling to/from the market by tollway. Issues were the toll level and rate of increase in tolls (faster than inflation). Trucks find this a significant impost but many incur the cost to save travel time. Any opportunities for reduced tolls would assist business at the site and in the region more broadly). Toll reductions may be very hard to achieve, given contractual arrangements between the operator and State Government.

Fourth, the meeting noted the high reliance on motor vehicles to access the site. This is inevitably 100 per cent (by truck) for product movement, given the lack of rail to the site. Rail access was not mentioned as a need. Person movement to/from the site (e.g. staff) is also very heavily car-based. Although the Route 901 bus passes the site, along Cooper Street, it was suggested that few use this service to get to/from the site. The large amount of free on-site car parking also supports car use. Completion of the Edgars Road link and provision of a new bus service between Epping Station and Aurora, via Edgars Road, would encourage staff to use bus to intermediate destinations, such as the Market and proposed Food Hub sites. In the short to medium-term, such a service would probably be more about access between Aurora, the station and rail destinations beyond, than about access between Aurora and intermediate stops, such as a potential Melbourne Food Hub. Possible future extension of the railway line to Wollert, if implemented, would ultimately meet many personal travel needs between Aurora and Epping station and beyond. However, a bus service along Edgar's Road can be implemented sooner and provide on-going benefits as a local service, when (and if) rail is developed to Wollert.

Finally, the importance of building a larger skilled young labour force was discussed, to take up future employment opportunities in the growing food and beverage sector, and allied activities (e.g. transport, logistics). The Authority sees huge potential for employment growth and is very keen for a large part of this to be taken up locally. The MMA is working with Northern Melbourne Polytechnic on this challenge.

Action required: A focus on developing the food cluster is now required to get this important initiative underway. Explore if there is an opportunity for the Melbourne Market and the Melbourne's North Food Group (a NORTH Link managed initiative discussed further in Section 4.3.2) to jointly promote the cluster to attract food and beverage sector companies and related businesses and organisations to the site. Funding could be sought from the Victorian Government to progress the development work of attracting firms.

4.2.6 Other metropolitan activity centres

In addition to the La Trobe NEIC and Melbourne Airport, *Plan Melbourne* identifies two existing Metropolitan Activity Centres in the Northern Region, Broadmeadows and Epping. Infrastructure priorities for the NEIC, these MACs, and for smaller but sub-regionally significant activity centres like Greensborough, Preston and Coburg, need to encompass both place-based initiatives and improved connectivity.

Place-based initiatives

Though both Epping and Broadmeadows are the major middle-suburban stop on their respective radial rail lines, both suffer from design inheritances which hinder their diversification. Both are bisected by major roads, with the main retail precinct and car parks on one side and the train station and bus interchange on the other. Of the two, Broadmeadows is currently the stronger, with a strong

portfolio of retail and educational facilities and also the head office of Hume City Council. Further development will require the addition of office space and additional educational facilities. As indicated in Section 4.5 below, the Hume corridor is in need of an additional public hospital. This could advantageously be located in Broadmeadows, both to add to the strength of the employment cluster and to ensure that hospital patients and visitors have convenient public transport access.

Epping draws strength from the Northern Hospital as well as its shopping mall and has brownfield sites awaiting redevelopment. However, it has a strong nearby rival at South Morang, which the Whittlesea City Council has selected as its headquarters. The chief advantage of Epping over South Morang is that it is more central to the developing outer suburbs round Wollert, while still being moderately accessible from Doreen and Mernda. Further development will require the addition of office space and perhaps educational facilities. It will also depend on re-planning the site for greater pedestrian convenience and on strategic thinking about broader priorities for development of the cluster.

Improved public transport, including bus, services to other clusters

The following public transport service improvements would support development of the two MACs and improve access to opportunities for nearby residents. Smaller clusters such as Greensborough, Preston and Coburg, and State Significant Employment Areas, also need high quality accessibility, including by public and active transport, to support their future development.

■ Broadmeadows

Currently road design in Pascoe Vale Road separates the train station from the rest of the cluster. Grade separation will be required to overcome this barrier, and in the process the station should be upgraded along similar lines to Frankston and a much-improved bus interchange provided, including interchange with circumferential reserved-track services to La Trobe University and Melbourne Airport as discussed in Section 4.2.3 above. Broadmeadows is also proposed as the terminus for two bus rapid transit services serving new suburbs to the north. An Aitken Boulevard service would provide a western route from Broadmeadows to Craigieburn with eventual extension to Wollert and, as suburbs develop, a Mickleham Road service would extend from Broadmeadows towards Wallan.

■ Epping

When the Aurora estate was first developed a rail service was foreshadowed but current state policy is against the bifurcation of suburban rail lines at their outer ends. In lieu, a bus rapid transit service is proposed from Epping to Wollert along Cooper St and Edgars Road, requiring the completion of Edgars Road and the construction of reserved bus lanes. As noted in Section 4.8.3 below, this might be converted to rail after additional capacity is created on the Mernda line by the completion of the Metro 2 project. Epping is considered by some in government to be too far north to lie on the proposed circumferential service linking La Trobe and Broadmeadows. Consideration should be given to reserving an east-west public transport right of way through Epping, particularly to the west or north-west. Future development of the land adjacent to the Melbourne Market, for purposes such as advancing the region's competitive strength in food and beverages, is a huge opportunity to further develop the Epping Metropolitan Activity Centre. Such development should be framed to maximise the developmental benefits for the wider Centre. This initiative provides a good segue to the theme of an Innovative North.

The Epping Metropolitan Activity Centre requires better connectivity to public transport, access to educational institutions, an innovation hub to ensure the area continues to be considered a food hub of international significance and development as a health precinct. Investment into the health precinct around the Northern Hospital could include Research and

Development opportunities (such as Biotech) and private hospitals. More commercial land is required to provide local employment opportunities and for cluster development in Epping.

4.3 Innovative North

The Future Workforce: Melbourne North's Report published in late 2015 discussed the need to expand the knowledge economy characteristics of the inner North to the outer regions of Melbourne's North, so that the outer region's business mix includes hi-tech companies and highly skilled households with opportunities for local employment. Universities have a major role to play in the process of knowledge intensification, as does the health sector, particularly major hospitals.

Innovation systems are critically important and continual improvements are required in the way that industry, education and research are connected. This starts at school level with careers guidance linked strategically to local tertiary education and industry. For the universities and their associated research organisations, and this was embraced by senior members of La Trobe and the RMIT, the task is to integrate more closely with local industry and industry strengths, creating better connections throughout the region.

In Melbourne's North, industry clusters that are strong and have potential for significant growth should each have a standing committee or industry body to manage innovation processes and business development, these sectors include:

- The food sector including the strengths in bioscience and food science at La Trobe and the RMIT, linked to local industry and developments at and surrounding the Melbourne Wholesale Fruit Vegetable and Flower Market. Melbourne's North Food Advocacy Group has recently been asked to develop thinking around design in food, this means applying high quality design standards throughout the manufacturing cycle, right through to packaging, to create regional competitive advantage.
- In Melbourne's North, the manufacturing sector has been a strong contributor to growth and manufacturing skills remain. Advanced manufacturing will continue to develop and may be linked to such sectors as food and transport or assistive technologies linked to the health sector and the NDIS.
- Health is already important and has potential to grow significantly, particularly in areas of specialisation and research.

So these are key industries and sectors in Melbourne's North where innovation systems can be concentrated. The best way of encouraging innovation practices is to ensure the region's organisations work together and that, particularly the large organisations, have internal structures that facilitate better connections and innovation practise, rather than frustrate them. Networks between education and training providers and industry need to be active and responsive and systems to create this interaction need to be established. The Melbourne's North Food Group is one such example. Placement of undergraduates with industry should be encouraged as part of this process.

Out of region exports are critical to economic and employment growth for the region. The added complexity of exporting goods and services adds to the range of skills and expertise required in a region, particularly when building international exports, knowledge of international markets and cultures are among the many skills required.

NIEIR has developed estimates of productivity at LGA level, measured as Gross Regional Product per hour worked, for Victorian municipalities. Figure 4.4 shows the resulting values for LGAs in Greater Melbourne plus Mitchell, with Northern Region LGAs shown in capital letters on the horizontal axis. While no Northern LGA is in the top 11 of the 32 LGAs shown, 5 sit between 12th and 20th position, suggesting that the North generally holds its own in productivity terms. The fastest growing outer suburbs of Whittlesea and Hume are at 24th and 25th respectively. Work undertaken by NIEIR

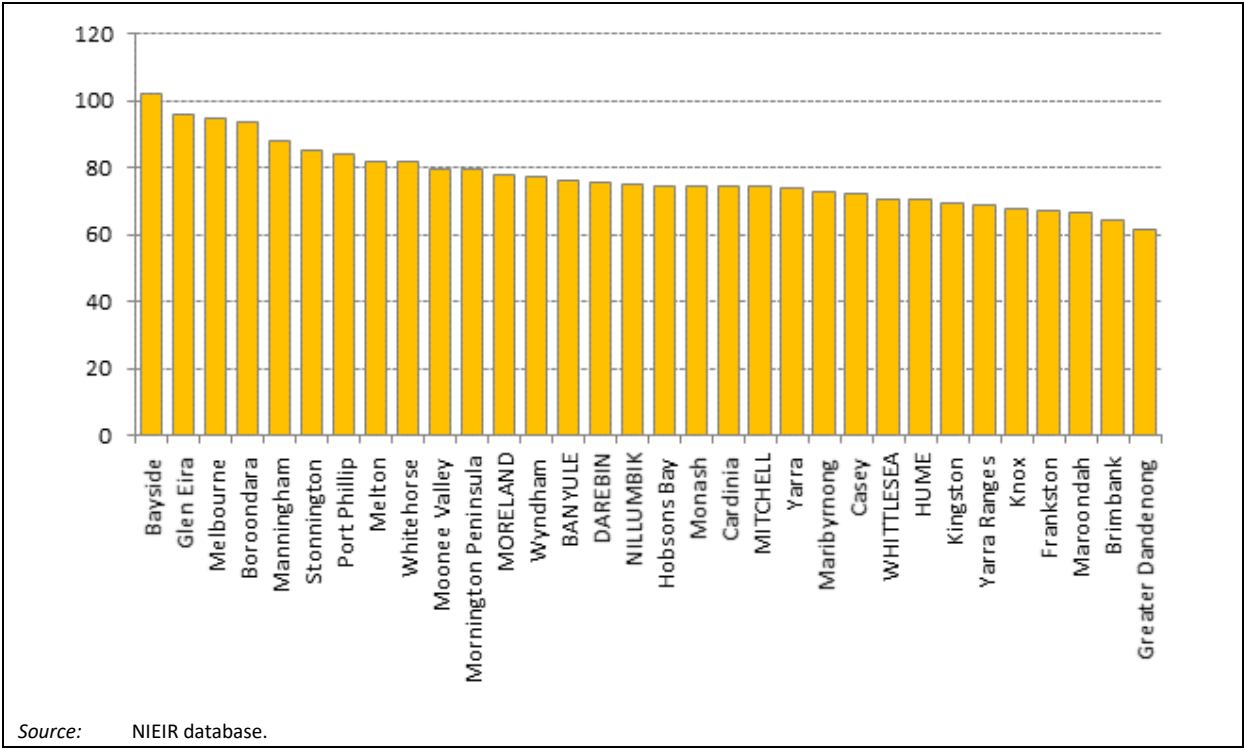
suggests that lags in infrastructure provision in the fast-growing fringe will be a contributory factor to the positioning of the latter 2 LGAs, underlining the importance of overcoming infrastructure backlogs.

While Melbourne’s North is mid-range in terms of productivity performance, judged at LGA level, such aggregate data hides details that demonstrate high productivity and highly innovative business operation.

La Trobe University make the point that in order to be a leader in innovation, highly specialised equipment and facilities will need to be purchased or constructed. La Trobe University has undertaken some early examinations of what might be required. Given these plans are somewhat in the infancy, a plan should be developed reflecting the vision for innovation and jobs growth across Melbourne’s North. This will require broad consultation and engagement across education, industry and government. Once this is clear, an understanding of research equipment and infrastructure will be better understood.

With the Commonwealth Government announcing a North West City Deal, the timing is right to develop a plan for innovation so that it can be considered for funding as part of the City Deal.

Figure 4.4: GRP per hour worked



The North West Data Analytics Hub

The North West Data Analytics Hub gives businesses an opportunity to harness student skills, analyse the data the businesses collect and use that data to build business capability.

The University and TAFE students matched to local businesses and organisations assist their innovation process, which may include providing the analysis to enable a new product or service, the need for which is described by the data analysis. The Hub is managed by NORTH Link with the site co-located at the R&I Precinct at La Trobe University. Project partners include the Victorian

Government, La Trobe University, RMIT University, Victoria University, Kangan Institute, Melbourne Polytechnic and the City of Moonee Valley.

Industrial land

The North has around 5,000 hectares of zoned land set aside for industrial use with around 3,720 hectares currently occupied, and 1,280 hectares is currently vacant. A further 2,075 hectares of land has been marked for future development, but not yet rezoned (DELWP 2019b).

The Northern region includes the Northern State Significant Industrial Precinct (SSIP) which covers the industrial areas around Campbellfield, Thomastown and Somerton. The Northern SSIP has good access to transport infrastructure which includes interstate rail connections, the Hume Freeway, and the Metropolitan Ring Road. In order for the Northern SSIP to continue to develop, improved interchanges with the Hume are required. Eventually, the Northern SSIP will also be well placed to take advantage of the future Outer Metropolitan Ring Road.

The North requires more land to be developed to encourage local employment opportunities. There is a particular lack of large industrial sites within the inner regions that constrain the expansion of existing industrial businesses. More industrial land, particular large sites, are required to develop industrial businesses. Demand for industrial sites could be met by the development of greenfield opportunities or the redevelopment and modernisation of existing sites.

There are a number of significant industrial opportunities in the North including redevelopments at the site of the old Ford factory (ASSEMBLY Broadmeadows). The Ford factory site includes 162 hectares of land (including the existing buildings). This will be developed into a purpose-built business facility where technology and manufacturing businesses can thrive and develop¹⁰. There is also a 51 hectare land site adjacent to the Melbourne Wholesale Market which represents a significant opportunity for Food and related industries. Future industrial land locations of significance include Wollert (160 hectares), the proposed Beverage Intermodal Freight Terminal (1000 hectares), Shenstone Park (94 hectares), and Sunbury South (60 hectares).

4.3.1 La Trobe: Innovation and entrepreneurialism for Melbourne's North

La Trobe is embedding innovation and entrepreneurship across all facets of the University. The University recognises the critical role of innovation in addressing global challenges and in creating and translating new technologies, knowledge and information that are emerging as the cornerstone of high growth industries.

The global economy is changing with digital and other new technologies disrupting industries and potentially displacing both high and low skilled jobs. In response, La Trobe is actively co-locating industry on campus to inform both teaching and research to create a strong, seamless innovation framework and culture. This approach goes beyond knowledge transfer and is being integrated with learning, teaching, employability and research to become a community asset and flagship for University engagement and the productive growth of the northern Melbourne economy. Ensuring the transition to a knowledge economy will provide the jobs of tomorrow and will provide better and stronger services to our local and wider Victorian economy.

La Trobe University, along with partners in the region, will play a crucial role in the transformation and growth of businesses in Melbourne's north in delivering research and innovation and in training an agile workforce to support and enable this transformation. The University is engaging with local firms to provide the knowledge and mechanisms for these businesses to understand and maximise the opportunities from a digitally connected economy.

¹⁰ See <https://assemblybroadmeadows.com/>.

La Trobe – Partner of choice

One of the core objectives of La Trobe University is to be recognised as the unrivalled partner of choice. As the third university established in Victoria, La Trobe is well known for its strong values of:

- inclusiveness, diversity, equity and social justice;
- pursuing excellence and sustainability in everything we do;
- championing our local communities in Melbourne's north and regional Victoria; and
- being willing to innovate and disrupt the traditional way of doing things.

La Trobe University is a connected network of campuses and communities throughout and beyond Victoria, brought together by the idea of 'one university, many communities.' This connects students, staff, industry and communities through teaching and research activities, and through serving the workforce and entrepreneurial needs of connected economies from Melbourne's North through to central and Northern Victoria. The university is connected locally, regionally, nationally and globally through our networks of research, industry and innovation partners connects with a range of industry organisations from starts ups through to global corporation.

With the Bundoora campus located in Melbourne's North, La Trobe University along with Heidelberg Medical Precinct, is an anchor tenant of the La Trobe National Employment and Innovation Cluster (NEIC) an important connection for driving growth and productivity in the North. With a transition away from traditional manufacturing to food, beverage and advanced manufacturing, innovation is seen as a key factor enabling growth and economic development for Melbourne's North.

La Trobe's Research and Innovation Precinct: A space for connection, and access to research, innovation and resources to support business growth

While La Trobe's research strengths are extensive, the University is building on its deep expertise and capability in agriculture and food, health and wellbeing, and digital capability by attracting innovative industry partners aligned to these disciplines. The R&I Precinct aims to promote economic and jobs growth through industry collaboration, joint investment and programs that support collaboration between small and large enterprises. The R&I Precinct will be globally recognised as an exciting ecosystem for start-ups, entrepreneurs, researchers and industry leaders, and will facilitate the creation of new postgraduate courses in response to industry needs. It will foster the application of new technologies and research to regional circumstances, and it will include industry sponsored PhD programs and research designed to address local issues, support social enterprises, and encourage collaboration with community-focussed not-for-profit groups through our metropolitan and regional campuses.

The R&I Precinct is a place where businesses can access research, innovation, talent and talent development and infrastructure to support business growth and transformation. The R&I Precinct also provides opportunities for co-working, office, meeting, conference, event and lab space to support business and innovation activity. A range of flexible spaces are available to match the size and stage of businesses from shared co-worker spaces through to the opportunity for companies to build on campus. The R&I Precinct is the home of our innovation and entrepreneurship activity and a place for our partners in the areas of agri-food, health and wellbeing and digital transformation. The University is also building close connections to the Heidelberg West Business Park to create opportunities to share and apply capability and expertise for mutual benefit.

La Trobe Accelerator Program (LTAP): Since 2017, LTAP has fostered innovation and entrepreneurship and supported the growth of businesses from Melbourne and regional Victoria. The LTAP equips teams with an identifiably modern, globally relevant hands-on knowledge, and

recognised as a safe fail environment and destination for start-ups to access the mentors, training and networks to help them build a sustainable businesses.

Innovation & Entrepreneurship Program: La Trobe is planning to expand on the success of its LTAP and develop and deliver an Innovation & Entrepreneurship program that supports the growth of new businesses and industry partners from start up to going global. La Trobe is uniquely placed, working with its innovation partners, to provide programs and resources to support ideas from early concept through to commercialisation; and become a one-stop solution centre for real world industry problems.

With the expansion of the program La Trobe is working with our partners to deliver a program that provides education, mentorship, services and funding to support sustainable growth of businesses from start up to scale up to going global.

Global Markets Accelerator Program: In Nov 2019, the Department of Industry, Innovation and Science announced \$337,800 in Incubator Support funding to La Trobe University for the development and delivery of a Global Accelerator Program, which aims to develop entrepreneurial talent and introduce regional businesses to national and international markets. The program focuses on four industry domains – Health and Wellbeing, Agri-Food, Cybersecurity, and Information and Communications Technology. La Trobe has collaborated with three international accelerators – imec.istart (Belgium), Singtel Innov8 (Singapore), and SKALA (Indonesia) – to deliver the Global Markets Accelerator Program. This two-year program is aimed to start from March 2020 onwards.

Connections with regional accelerators and incubators: Extending this further with the opportunity to connect with other existing incubators within the Northern region will further strengthen the support provided to businesses along the business lifecycle.

Digital transformation hub: La Trobe is developing a digital innovation hub that will engage businesses to determine and validate their problems and co-create solutions that can be developed together or with others. Utilising extensive networks with University and corporate partners, including the Bundoora campus becoming the Victorian headquarters for Cisco's Innovation Central model, La Trobe will connect Melbourne's North to Cisco's worldwide innovation network¹¹ establishing La Trobe University with a Cisco Co-innovation Centre presence, which will offer unique access to world-class tools and global networks for Victorian small-to-medium enterprises and large corporates in search of innovative solutions to real-world business problems. Researchers will collaborate with business to understand how to best utilise technology and research to achieve efficiencies, create new innovative opportunities and solve industry problems in areas that may include agriculture technology, smart cities and IoT. The Co-Innovation Centre presence at La Trobe University will offer unique access to Cisco's global innovation network and brings together a diverse partner ecosystem to co-innovate new solutions for today.

¹¹ <https://www.latrobe.edu.au/news/articles/2019/release/la-trobe-brings-cisco-on-campus>.

Makerspace: With our partners we intend to create a makerspace which will be open to students and community. This will engage our students to help them, the broader northern community and industry to create new products that bring new possibilities for a sustainable future and improve our quality and life. A dedicated ‘makerspace’ will be supported by Industry collaboration.

Business incubator and co-working space: Our plan is to create a safe co-working space for start-ups in Melbourne’s North and create links to similar facilities (or nodes) and industry translation opportunities with participation of our researchers and students. As part of this plan we intend to provide access to a suite of innovation support services, such as incubation programs, ideation and innovation methodologies, mentorship, specialist advice and innovation and links to our partner investment funds and venture capital, to support research and development, prototyping and commercialisation.

Space to match the stage and growth of a business: As identified in the report, once business graduate from an accelerator program they can have a growth phase where they establish their own office or factory. La Trobe is uniquely positioned with the ability to potentially accommodate such requirements within the University City of the Future and broader NEIC and region.

Connected ecosystem: Our plan is to hold regular R&I Precinct events for those businesses in our Precinct and within the Northern region. These can be held in conjunction with our partner businesses and associations in the northern region to support networking, mentoring and collaboration across the region.

Promoting global thinking: We will promote international exposure and global thinking to connect ideas and industry to local, national and global opportunities, including through our Global Accelerator Program and Retail Innovation Program, which is customised to support small-to-medium business across sectors like food and beverage, hospitality, and services. Through our international partnerships and connections, we can promote international exchanges, connect businesses into an international network of mentors and ventures, and partner with internationally recognised innovation and entrepreneurial institutions.

La Trobe Acceleration Program (LTAP)

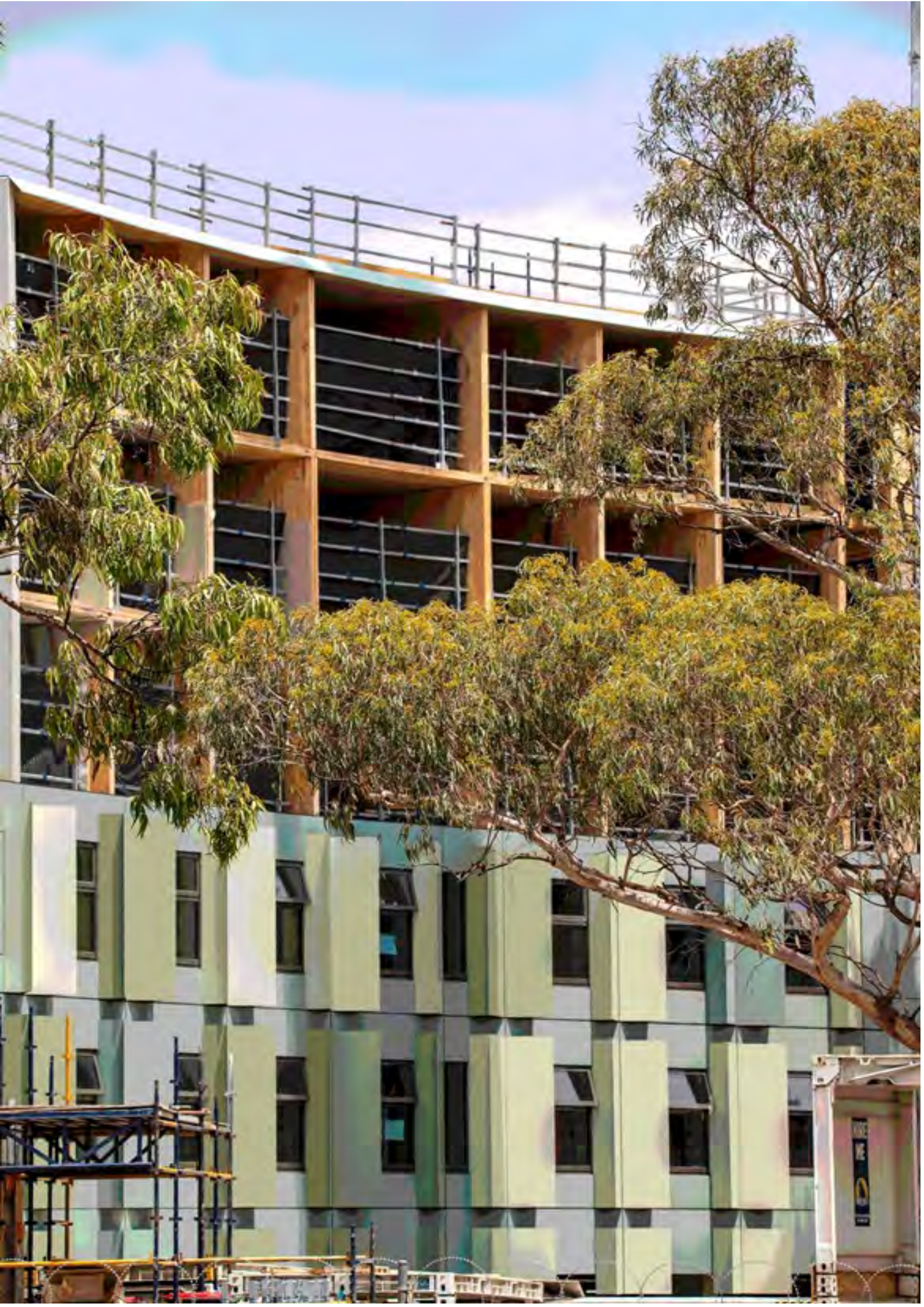
La Trobe Accelerator Program (LTAP) is a university-led accelerator program that helps to transform good ideas into viable businesses. LTAP promotes and supports the development of start-ups arising from within the broader regional community of Victoria and La Trobe University, driven by our students, staff and alumni groups. The program offers resources such as equity-free funding, business acumen and tailored, dedicated support to help entrepreneurs, tech-innovators and start-ups to pursue their goals and ventures.

Since its inception in 2017, La Trobe Accelerator Program (LTAP) has received more than 220 applications and has directly impacted 111 start-ups through its Primer program. From the four cohorts to date, LTAP has accelerated 57 start-ups through its 12-week core program.

In recognition of its efforts to support and fund entrepreneurial innovation, LTAP won the 2018 Australian Financial Review (AFR) Higher Education Awards for Community Engagement.

In Nov 2019, the Department of Industry, Innovation and Science announced \$337,800 in Incubator Support funding to La Trobe University for the development and delivery of a Global Accelerator Program, which aims to develop entrepreneurial talent and introduce regional businesses to national and international markets. The program focuses on four industry domains – Health and Wellbeing, Agri-Food, Cybersecurity, and Information and Communications Technology. La Trobe has collaborated with three international accelerators – imec.istart (Belgium), Singtel Innov8 (Singapore), and SKALA (Indonesia) – to deliver the Global Markets Accelerator Program. This two-year program is aimed to start from March 2020 onwards.

(La Trobe University)



4.3.2 Melbourne's North food processing cluster

To offset the decline in manufacturing, particularly the departure from the region of the automotive manufacturing sector, regional partners commissioned independent and comprehensive research that identified substantial opportunities in targeting growth in the food and beverage product manufacturing sector, which was already growing in the region. The need was to replace the automotive manufacturing sector and its employment with equivalent, sophisticated and export facing business activities.

The food and beverage product manufacturing sector creates value adding processes to agricultural production and includes processes such as grading, sorting, packaging, food processing and manufactures, including baking and prepacked meals.

Food process manufacturing is now helping to replace the skilled manufacturing and related services employment opportunities that were lost when the major car companies withdrew their manufacturing operations. Establishing the food group was a deliberate strategy to build jobs in a growing sector of the economy.

Melbourne's North Food Group builds on the foundations created by the Plenty Food Group, which was established in 2003 and was co-funded by the Hume City Council and Whittlesea City Council, who led the idea of developing a regional food group in Melbourne's North at that time.

Food processing companies are attracted to the region because they can immediately tap into the growing food cluster infrastructure and the proximity of the wholesale markets at Epping and the nearby Melbourne Airport. Today there is an immediate benefit, because of the resources available, from locating to Melbourne's North. Benefits include a large industry skills base, the opportunity to engage with and benefit from market specific research activities with the region's Universities, production inputs which include fresh and safe foods, transport and distribution infrastructure and relative ease of access to markets, packaging companies and cold storage facilities. Food product manufacturing industry networks are also growing and include suppliers, manufactures and customers. These things continue to build supply chain strength within the region and links to Australian and international markets.

The food and beverage manufacturing cluster in Melbourne's North now adds \$2.6 billion in gross domestic product (at factor cost) to the region's economy each year and the cluster continues to grow. The cluster in Melbourne's North is made up of over 400 companies including national and international businesses.

NORTH Link (the regional partnership of industry, education and government in Melbourne's North, established in 1995) estimates that it is likely that the food and beverage product manufacturing cluster will double in size and create an additional 7,000 jobs over the next ten years. The opportunities are significant and, as the regional food cluster develops, the available skills to employers in Melbourne's North continue to grow.

The value added products created by the cluster are consumed locally, in other parts of Australia and exported internationally. Important markets for firms located in the Melbourne's North food and beverage manufacturing cluster include China and Japan. For China in particular, food safety has become a significant issue and in China the food and beverage manufactures from Melbourne's North are recognised for their quality and safety.

Adding significant strength to the cluster, in 2015 the Melbourne Wholesale Fruit, Vegetable and Flower Market relocated to a 70-hectare site and a modern purpose built facility at Epping in Melbourne's North. Investment of around \$460 million was required to create the new facility. The wholesale market's operations continue to grow and \$2 billion of produce is traded at the market each year. There are more than 5,000 businesses using the market for daily trading activities. What is

particularly important is the adjoining food and beverage precinct, which has already attracted a range of food and beverage companies and their service suppliers.

The strength of the food and beverage manufacturing cluster also enables the growth, scale and scope of a series of complementary businesses which include logistics, packaging, links to education, training and research at local TAFEs and universities, specialist commercial services and the opportunity to encourage the growth of new businesses and start-ups in the sector using the incubator model. To achieve strong growth in an industry cluster, access to highly skilled labour and research capacity are key drivers of opportunity, productivity and growth. Melbourne's North is richly supplied with tertiary institutions with aligned food and beverage manufacturing education and research activities. These include RMIT's Food Research and Innovation Centre, La Trobe University's Centre for Agri-Biosciences, La Trobe Institute for Agribusiness and Food (LIAF), Research Hub for Medicinal Agriculture, Melbourne Polytechnic and Bendigo Kangan Institute.

Agricultural production in the northern section of the region helps to drive growth in the region's established food and beverage manufacturing businesses.

In turn the cluster and its strong and efficient supply chains make Melbourne's North an increasingly attractive location for companies who see the advantages in cluster strength and wish to relocate to the region.

A key recommendation in NORTH Link's Food and Beverage Growth Plan was to create an influential regional industry body, the Melbourne's North Food Group, to provide vision and leadership for the regional food process manufacturing and beverage manufacturing sectors. The food group covers the whole Melbourne North region.

4.3.3 Agribusiness in Melbourne's North: Peri-urban agriculture and land planning

One aspect of agribusiness that touches directly on land planning issues in the region is that of peri-urban agricultural production. Internationally peri-urban food production has gained popularity because of its contribution to food security, better supply chain access to markets (effectively local markets), reduced carbon footprint, limited storage and freshness of produce and less food waste. Water security may also be less of an issue and this is going to become increasingly important as a land planning consideration. Peri-urban farms often have the most fertile soils producing a range, particularly horticulture, of high quality, high value produce. Peri-urban agriculture also provides the opportunity to utilise organic waste generated by local consumers.

Agriculture in peri-urban Melbourne is an important direct and indirect employer and makes a significant economic contribution. Added to this is the tremendous appeal as a tourist destination, revolving around food and wine and the ambience of the rural landscapes.

Inquiry into sustainable development of agribusiness in outer suburban Melbourne
(Outer Suburban/Interface Services and Development Committee 2010)

In the past planners may have prioritised urban development over peri-urban agricultural activities, but today the pressures of climate change shape a different set of priorities and support for peri-urban agricultural production is growing around the world.

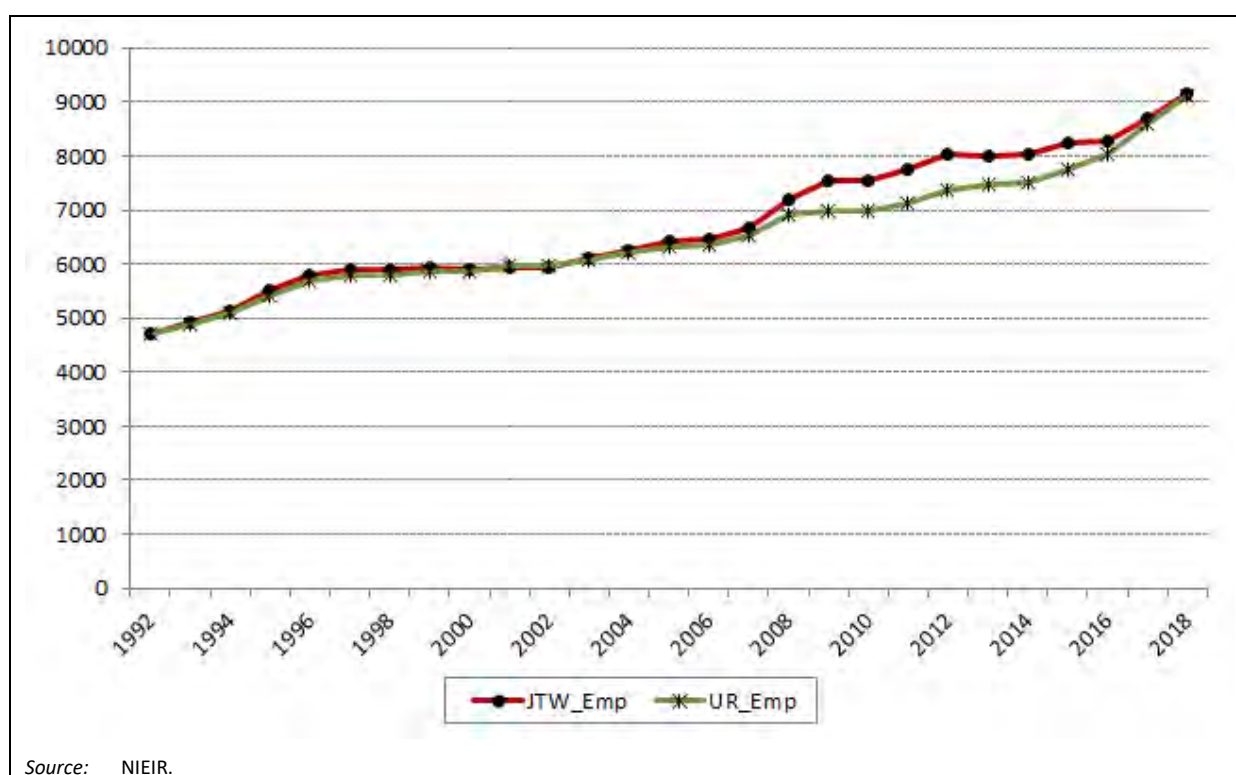
Nillumbik Shire Council pointed out that in the shire, tourism opportunities are limited because of planning issues and Victorian Government restrictions on the use of agricultural land. While the green wedge constrains economic development and tourism, plots are generally too small to sustain agricultural activities.

There are two dimensions to be considered here, one is a clear understanding by planners of the current and future benefits of peri-urban food production and the need for policy development that clearly describes a strategy for the future of peri-urban farming surrounding Melbourne.

4.3.4 Employment in the food and beverage manufacturing cluster in Melbourne's North

Figure 4.5 shows that there is a strong correlation between industry and resident employment in the food and beverage manufacturing cluster in Melbourne's North. If current trends continue, growth of the cluster will therefore continue to benefit the region's households by providing jobs within reasonable travelling distances.

Figure 4.5: Melbourne's North: Food and beverage product manufacturing: Industry (JTW) and Resident (UR) employment



4.3.5 Business incubators in Melbourne's North

Business incubators are now very much part of the global innovation system and their presence within the regional economy is vital to ensure that opportunities for contemporary economic growth and innovation are maximised at a regional level. The incubator assists growing businesses to achieve their full potential, as well as to develop innovative relationships with regional universities who understand the importance of developing entrepreneurial skills in their students. Incubators are important places graduates can develop their ideas and grow their entrepreneurial skills.

As opportunities in business development change, because of changes in demand or in technology, incubators provide a more sophisticated way for start-up businesses and SMEs to keep pace with changes in markets and technologies. Incubators contribute to keeping businesses going in their early

phase of their development. The incubated businesses may go on to become significant contributors to local economic performance because of the support provided during the early and difficult stages of business development.

During this period of rapid changes in technology and disruption to existing business models, accelerators and incubators play a key role in assisting businesses navigate this journey by providing a support network of knowledge and information as well as the opportunity to share experiences with other firms participating in the accelerator process.

One key aspect here is the process of technology diffusion activities so important in helping companies to improve productivity, profitability and rate of sales growth. These improvements are enabled because accelerator participating firms are positioned to benefit from technology acquisition, skills development, sourcing capital through innovation networks and research and development activities.

Through these processes accelerator/incubator innovation systems significantly enhance opportunities to improve such things as:

- management and business practices;
- skills and training;
- product design;
- process technology and ICT systems;
- quality control;
- plant layout;
- material handling; and
- accounting and finance.

Established incubators in Melbourne's North include:

- the Melbourne Innovation Centre; with locations in Alphington (general purpose business incubator), Northcote (digital arts incubator and co-working) and Greensborough (business incubator and co-working);
- 420 Victoria Street, Brunswick;
- La Trobe University's Accelerator Programme (see Section 4.3.1); and
- the newly opened StartNorth Coworking Space in the Hume City Council.

The Melbourne Innovation Centre is the oldest incubator network in Victoria, based at Alphington. Its Alphington site is an old Council depot and urgently needs capital works to make it fit for purpose.

Moreland City Council is transforming the site at 420 Victoria St, Brunswick to unlock nearly 5,000sq. mts of lettable space for co-working, incubation, maker spaces and a range of accelerator and enterprise development activity.

In 2016 NIEIR after a series of studies concerning incubators, found that firms that have participated in an accelerator/incubator program will typically report two noticeable and distinct phases of growth, the first as they establish their position within the program and a second growth phase following their graduation from the program as they establish their own office or factory. These businesses also typically report that the accelerator/incubator program was important in aiding business survival, particularly through periods of market disruption and in assisting firms to manage growth.

NIEIR modelling results at that time showed that the annual total value-added contribution to Victorian Gross Regional Product created by the Melbourne Innovation Centre and its firms in the latest year, that is, current tenants and graduating firms, was \$66.1 million. For the Victorian economy the number of full-time and part-time jobs attributed to the economic development benefit provided by the Melbourne Innovation Centre are assessed to be 887 employment positions.

Food and beverage sector kitchen incubator

Given the work of the Melbourne's North Food Group and the location of the Wholesale Fruit, Vegetable and Flower Market at Epping a possible location for a food kitchen incubator is on the land adjacent to the market and this would appear a useful addition to the food and beverage sector regional growth plans. A kitchen incubator assists small businesses by renting commercial kitchen facilities providing flexibility for small food companies to fulfil large orders.

Incubators: Summary of actions

1. Accelerating start-up companies through the Incubator system is a complex task. The key strategy here is to keep a strong market focus and to encourage firms that build on existing regional strengths and where the skills base is already strong or developing. The food sector is just one of those.
2. Commercial kitchens and innovation spaces that link local firms to education and the Melbourne Market are going to be increasingly important as a way of providing growth opportunities for local firms.
3. Invest \$14 million to upgrade Melbourne's Innovation Centre at Alphington.

4.3.6 The Internet and Melbourne's North

As the rollout of the NBN in its various forms nears completion across the region the issue becomes one of quality and how the NBN will perform as data requirements for industry, education, health, entertainment, energy and transport systems, and the Internet of things more generally, exponentially expand the need for data transfer.

The issue regarding Internet speeds and reliability are both broad and strategic in nature. The Heidelberg West Business Park, which is currently being connected to the NBN, describes the dilemma facing businesses in the region. Shortcomings in relation to the provision of high quality broadband in the recent past have disadvantaged businesses in the region, creating a dampening effect on the Internet economy – that is businesses not being developed or invested in despite the new global opportunities the Internet provides and existing businesses generally not using the Internet at a high level to manage production, build markets, sales and new types of products.

This dampening effect means fewer jobs in new types of businesses and fewer Internet based jobs in legacy companies. This in turn means lower demand for skills in this area and lower demand for training – this in turn reducing the likelihood of locally based Internet entrepreneurship. The situation is not helpful to young people in a region where there are ongoing problems of youth unemployment.

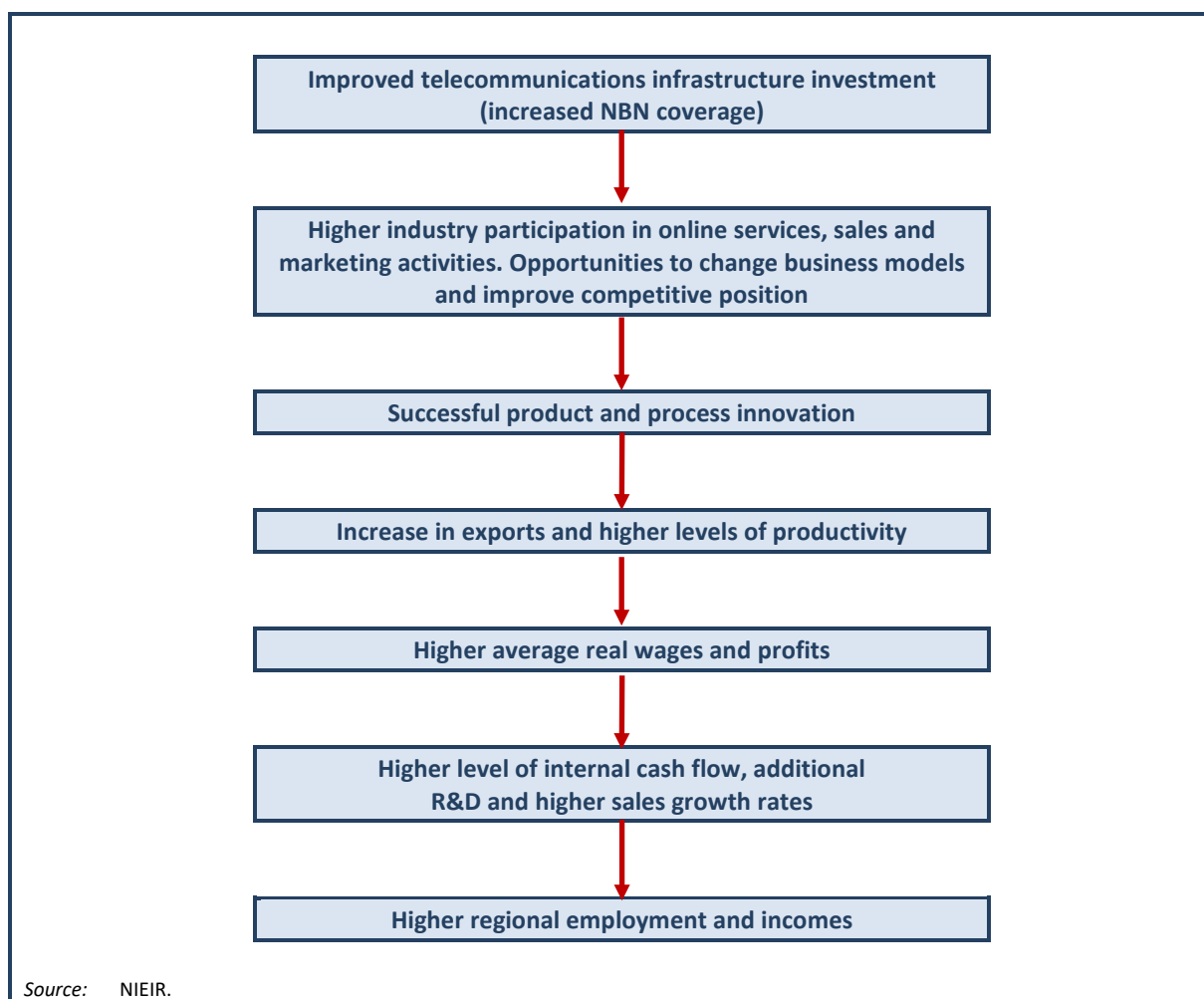
Information and communication technologies (ICTs) and the internet have become key drivers of innovation, growth and labour productivity, brought new business and employment opportunities and have changed the ways our societies communicate, learn and live. People with the high-end skills needed to invent and apply ICTs are in high demand the world over. At the same time, the portfolio of basic skills needed to navigate ICT-rich environments and function effectively in our connected societies has expanded.

(OECD, Skills for the digital economy)

The Future Workforce: Melbourne's North (NORTH Link and NIEIR 2015) found that high quality broadband, that means world best practice, is essential to industry, research and education and is critical to the future of Australia's knowledge based industries. Investment in knowledge infrastructure should be accompanied by the reciprocal obligation that research and education sectors improve commercial outcomes and networks with industry to retain benefits of local investment within Melbourne's North.

It is clear from the numerous discussions during the research phase of developing this Northern Horizons update report that the quality of broadband services differs in different parts of Melbourne's North. Darebin City Council, for example, report that there had been a rise in hi-tech businesses moving into the areas in Darebin, which had an early NBN rollout, while in other parts of the city, where the NBN was not available, businesses were relocating elsewhere to access higher connection speeds. Darebin City Council also made the point that creative industries were very dependent on high quality broadband on which to build their digital platforms. Around 4 per cent of jobs based in Darebin were in the creative sector.

Figure 4.6: The NBN and higher industry employment



The Hume City Council reported that most residential and commercial sites were connected and that council was not aware of speeds currently available being a barrier to business in the city. Mitchell Shire Council stated that there was no evidence that the NBN, which had been rolled out to most towns in the shire with mixed reports of quality, was bringing new businesses to the shire. The council reported that there are many black spots with no connectivity within the shire.

Moreland City Council made the point that telecommunications cabling was never deep enough in the ground and documentation as to location was poor. This creates problems for council and telcos are not responsive to the issue.

Whittlesea City Council reported that NBN rollout across the municipality had been slow and patchy, Thomastown, a major employment precinct, will receive its NBN rollout at the end of 2019. Council state that the NBN rollout is critical in terms of the jobs of the future and that, the lack of an NBN inhibits business growth, especially for SMEs.

The strategy for Melbourne's North will be to ensure that there is a process of continual improvement in relation to the quality and capacity of the Internet. This will require ongoing investment in the system with a focus on the needs of industry, education, health and research.

Nillumbik Shire Council reported that high speed broadband was particularly important for emergency management in rural areas and for small businesses in the shire (57 per cent of which are home based). There are black spots in the shire, which also impact mobile phone coverage. The

council has contributed to the problem by refusing planning permits for telecommunications infrastructure.

Telecoms: Summary of actions

1. Ensure program of continual improvement of NBN infrastructure, by location, technology and connection type.
2. What is lacking from the region is a mature Internet economy. Assist managers to understand the possibilities the Internet provides for enhancing productivity and markets by developing knowledge sessions (seminars and conferences), training and improved links between businesses and education sector regarding this.
3. Assist the Mitchell Shire Council and its businesses to better develop the life style opportunities available because of the NBN rollout, for example consider the possibility of promoting the idea of a small knowledge based cluster of businesses located in places where NBN is working well, this could include editorial services, design services, planning services and so on.
4. Mobile phone black spots in places of bushfire danger, particularly in Mitchell and Nillumbik require prompt action to resolve the current problems. The councils are aware of the dangerous situation because it may endanger some households in the event of a serious bushfire, which is increasingly likely, given the changing patterns of fire driven by climate change.

4.4 Yarra Valley Water

Yarra Valley Water (YVW) has long-term plans for the northern growth corridor that stretch to 2040. Its goal is to develop appropriate infrastructure and stay ahead of the rapid growth that the region is experiencing.

Plans include a recycled strategy for the whole corridor, which stretches from Epping/Somerton to Wallan. This includes a pilot where stormwater will be treated and then reused via the existing Class A Recycled Water network. This water will be treated to a drinking water standard with the ultimate aim of integrating the water into the drinking water supply. Introduction of recycling in the corridor will drought-proof the area and provide cost savings to residents and businesses.

Traditionally, YVW has directed its operations at water and sewerage, but now is looking at stormwater as well, in partnership with the respective organisations.



Innovation in water

The Upper Merri Creek IWM pilot project is actively engaging existing and emerging communities to create a Vision and deliver on aligned strategic goals through the integrated planning and delivery of water infrastructure and services.

(See www.uppermerricreek.com.au)

Wurundjeri Woi-Wurrung Cultural Heritage Aboriginal Corporation, Hume City Council, City of Whittlesea, Mitchell Shire Council, Yarra Valley Water, Melbourne Water and the Victorian Planning Authority are working together to develop and implement an IWM plan for the Upper Merri Creek sub-catchment which includes the Northern Growth Area. A cultural flows assessment and community engagement are fundamental to the ongoing, iterative process.

The Upper Merri Creek Catchment will generate 60 to 90 Megalitres of surplus water that could be put to productive use and if this water is not diverted is expected to impact waterway health.

The Upper Merri Creek pilot project is demonstrating Best Practice IWM (place-based) planning process for:

- real collaboration between partnering organisations;
- embedding Traditional Custodians in water resources planning and management; and
- accountability and transparency with communities and customers.

Key elements of this process include:

- understanding the key issues and opportunities in this sub-catchment from a broad range of perspectives;
- balancing a range of statutory and community expectations;
- harnessing new technologies/creating new products (e.g. urban form, housing and commercial buildings);
- understanding our roles/exploring new approaches for services delivery; and
- evidence based decisions driving optimised community and customer outcomes.

Councils and other stakeholders will often say that “the business case for alternative use of waste doesn’t stack up”. Even when it is proven that recycled water can supply parks and ovals all year round, there is dissention because it means additional mowing is required (and so additional cost).

The Hume City Council, Whittlesea City Council, Mitchell Shire Council, the Victorian Planning Authority and YVW are looking at scenario planning for the next 50 years. It is a rigorous process involving key stakeholder engagement. It is hoped that this will change planning requirements, put additional conditions on development and result in mutually beneficial outcomes.

Community consultations are taking place testing willingness to pay in specific locations for additional benefits. Developers have a baseline position that involves not reducing their lot yield. That is why Precinct Structure Plans (PSPs) are important.

Also important is bringing the ecology of waterways into planning discussions. Urban ecology has significant social benefits and can provide an environment for local flora and fauna to return to.

Stormwater

There needs to be a significant increase in storage capability across the North to harvest stormwater (which may involve public open spaces). There is a need for an open water body to deal with significant volumes of water. Melbourne Water does not support this type of project but where there is such a facility, it has become a highly valued community asset. But this type of facility is expensive to establish and maintain. There is potential for it to link in to other initiatives, such as social enterprises involving Indigenous people, to maximise opportunities and mitigate the cost. There is plenty of stormwater and there is a need to explore how to put it to use and maximise the benefits.

Flooding

There is a fear among inner north councils that growth in the outer north will cause flooding in their areas. La Trobe University sees a need to invest in flood prevention. Increasing the cost and doing things differently in the outer areas can also send benefits downstream.

Urban forest

YVW is advocating for tree canopy cover to be written into PSPs to ensure tree planting and canopy cover.

Sewerage in Nillumbik

Given a lack of mains sewerage in some parts of Nillumbik, YVW is taking a nuanced approach rather than a blanket decision to get rid of septic tanks. Instead, YVW are looking at water quality issues in different areas and responding accordingly, aiming for best use of available funds. Around 400 properties in Eltham South will be connected to the sewerage system soon.

Indigenous

In lieu of formal (legislated) recognition of the inherent rights of Traditional Custodians, a framework for embedding Registered Aboriginal Parties into Planning processes is required. In the Upper Merri Creek the Traditional Owners, the Wurundjeri Woi-Wurrung Cultural Heritage Aboriginal Corporation, requested a Partnership Statement from all partnering organisations to recognise their inherent rights and acknowledge their equal place with government agencies in the process. A Cultural Flows Assessment was undertaken as key input to the process. This is applying the methodology developed by the National Cultural Flows Research Project.

While the growth boundary is ever-expanding, there is a need to grow food relatively close to where people live. Food miles are important, as is the link between horticulture and tourism for the north. Initiatives such as community farms provide education and social benefits. YVW is working with Melbourne Polytechnic and others on establishing a community farm near a water treatment facility.

Opportunities to improve growth area planning process

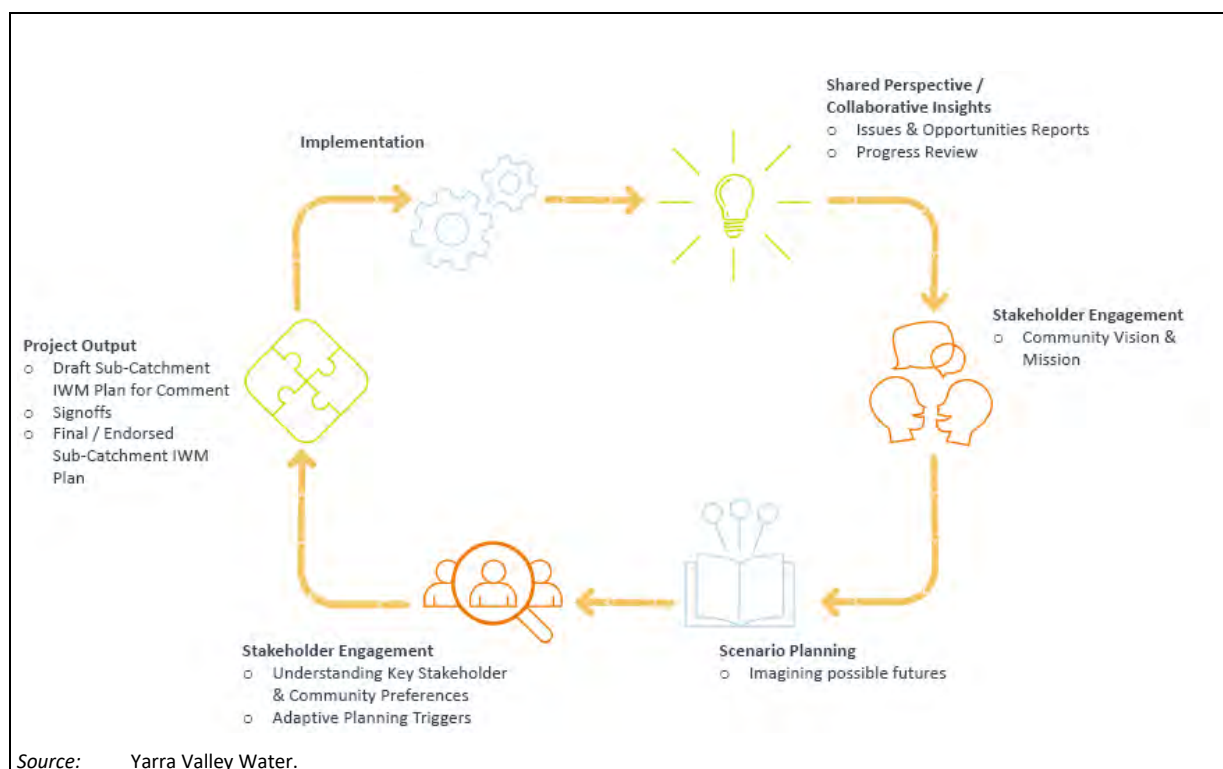
The Infrastructure Victoria paper, *Reforming water sector governance* – October 2019 (IV 2019), presents opportunities to change water governance arrangements to facilitate more efficient use of all available water resources, building on the recommendations in Victoria's 30-Year Infrastructure Strategy from 2016.

Three areas for reform are identified as:

1. better use of existing infrastructure and more efficient use of all water sources;
2. more integrated and adaptive planning processes; and
3. the need for community involvement in decision-making.

At a catchment and sub-catchment level, there are multiple organisations with some overlapping roles and responsibilities related to water, but all with an interest in making best use of water resources to deliver public value. By undertaking integrated water management planning together, organisations can identify diverse but interconnected issues at scale and then develop optimised approaches and investments to deliver economic, social and environmental outcomes. Planning at a sub-catchment level also helps to better identify placement of infrastructure investments and position partnering organisations to engage in a proactive way which informs consistent inputs to existing precinct structure and planning processes for new and infill urban developments by having common upfront planning. Figure 4.7 provides an overview of the ongoing iterative approach to integrated water management planning being piloted in the Upper Merri Creek sub-catchment which incorporates Melbourne's northern growth area. This process is proposed to be both flexible and adaptable for other sub-catchments.

Figure 4.7: Integrated water management planning process



As a water retailer, YVW have well-prepared long-term plans for water, sewer and recycling infrastructure. Our infrastructure is typically built to last approximately 80 to 100 years and needs to be operational for the first dwellings of any new greenfield development.

Suggested improvement is developing the north of Melbourne with greater coordination of overall planning and delivery, that means a more overall coordinated approach for all aspects of a vibrant community, including environmental and climate resilience; rather than what has been applied in recent decades.

Yarra Valley Water would like to see:

1. an overall vision for the total area of the North;
2. key measures to enable delivery of that vision; and
3. a framework and clear accountability for all parties to complete their coordinated component. YVW would obviously be willing to do our part within that partnership framework.

Action: Build community and public/commercial sector support for YVW's innovation practices, which include capturing stormwater for environmental and wellbeing benefits. The need is to move away from the baseline position imposed across a range of agencies by additional costs to better understand the value of the benefits of innovative practices. The discussion is a broad one but needs to encompass how best innovation opportunities can be taken forward rather than falling by the wayside; and

Innovation practices can be extended to include development of wetlands (open water bodies) from captured stormwater, links between modern city fringe horticulture and water management and conservation activities for Victorian wildlife, bring the Bandicoot back etc. These processes open up opportunities for tourism, community engagement, volunteerism, new types of employment, education and further innovation and improve community outcomes in terms of health and wellbeing.

Yarra Valley Water – Case study

Background

Yarra Valley Water (YVW) is the largest water corporation in Melbourne. They provide water and sewerage services to 1.9 million people and more than 50,000 businesses, over a 4,000-kilometre area (from Wallan in the north to Warburton in the east). YVW own and maintain over 9,000 kilometres of water mains and over 9,000 kilometres of sewer mains.

YVW buy bulk water from Melbourne Water for distribution to their customers. They also remove and treat sewage. Most sewage is transferred to Melbourne Water's treatment plants. The rest is treated at YVW's ten regional plants, where they also recycle water for use in homes, sports fields and public spaces.¹

Most of the Yarra Valley Water business is a regulated business with investment regulated by government. However, the waste to energy facility is a non-regulated business which provides commercial returns to Yarra Valley Water.

Food waste issue

Climate change and Melbourne's growing population are placing greater strains on finite resources such as water and energy.² In addition there are increasing amounts of commercial food waste. Landfill charges have risen steadily over time and are an expensive way to

To respond to this changing environment, YVW understands that they need to adopt sustainable practices which make use of natural resources.

Solution

YVW built ReWaste, a purpose built facility converts organic waste which would otherwise be found for landfill into renewable energy.³



The development of the facility required a significant amount of commercial analysis to confirm it was financially sustainable before YVW undertook any investment. In addition the facility required a number of planning and environmental approvals before it could be constructed.

The capital cost of the facility was \$27 million. These costs included preliminary and detailed design, construction, fitout and equipment (including digestors) and final commissioning.

Waste producers, such as markets or food manufacturers, deliver the equivalent of 33,000 tonnes of commercial food waste to the ReWaste facility each year. Each of the waste producers pays for transport of their waste to the facility and pay a gate fee to YVW. The facility can accept commercial

Stage 1 – Receiving the waste

Commercial food waste is transported to the site in trucks. Food wasters pay a gate fee to YVW. Food waste is then fed into a sealed tank called a 'digester'.

Stage 2 – Processing the waste to make biogas

food waste from many sources, including:

- Fats, oil and grease;
- Fruit and vegetable wastes;
- Waste from animal processing facilities;
- Restaurant and catering food wastes; and
- Brewery and dairy wastes.⁵

Bacteria in the digester causes the waste to break down. As the food waste breaks down, it generates biogas. Biogas is a mixture of gases, but is mostly methane (the same gas used in the natural gas network). The biogas is cleaned to remove odours and impurities.

Stage 3 – Burning the biogas to make energy

YVW burn the biogas in a combined heat and power engine to generate electricity. The electricity can be used to power infrastructure, or can be exported to the power grid.⁴

The facilities gates fees are based on the volume and type of organic waste, and are below the landfill fees, making it both a competitive and environmentally sustainable alternative.

The facility sits next to YVW's Aurora sewage treatment plant (near Craigieburn), and generates enough energy to power the facility and the adjoining sewage treatment plant. Excess energy is exported to the electricity grid.

YVW has negotiated a deal with their power company which allows them to offset excess energy exported to the grid against their power usage across all of their sites. This has resulted in them obtaining a far higher return on the energy produced at the facility. The business case assumed an average \$35 per MWh, but in peak times such as January 2019 with extreme power use rates have increased as high as \$250 per MWh. At full capacity, the plant produces 25 per cent of Yarra Valley Water's electricity needs across all of its sites, or four of its largest treatment plants.

In addition to the above financial benefits YVW is also entitled to one large generation certificate (LGC) from the Clean Energy Regulator for each megawatt hour (MWh) of electricity generated. Registered LGCs can be sold or transferred to entities with liabilities under the Renewable Energy Target or other companies looking to voluntarily surrender LGCs. The value of these was originally estimated at \$38 per MWh, but was as high as \$84 per MWh during the 2017-18 financial year.

Financial ROI

A breakdown of the costs and benefits for the ReWaste facility are outlined below. The assets have a life of 25 years and YVW have undertaken their appraisal over 10 years.

Financial costs of benefits to YVW for the ReWaste facility

Costs	Benefits
Capital costs <ul style="list-style-type: none"> ■ Initial capital cost (including preliminary and detailed design, construction, fitout and equipment (including digesters) and final commissioning). ■ Management time to plan ReWaste (various staff at different times equating to 1 FTE). Ongoing operating and maintenance <ul style="list-style-type: none"> ■ Staff costs to operating and maintain the facility (4 staff). ■ Maintenance costs. 	<ul style="list-style-type: none"> ■ Gate revenue from receipt of waste. ■ Avoided cost of powering the sewerage treatment plant adjoining and the food to waste facility through the energy produced by ReWaste. ■ Revenue from the sale of energy back into the grid from the facility at purchase prices. ■ Creation and sale of Large Generation Certificates.
<p>For every \$1 invested YVW realised \$1.1⁶ of financial benefit over a 10 year period</p>	

Broader environment, social and other benefits

The following broader social and environmental benefits were identified.

- Turning food waste into energy benefits Victoria by helping to reduce food going to landfill.
- By reducing YVW energy costs, the ReWaste facility helps to keep water bills lower for its customers.
- By preventing 33,000 tonnes of food waste going to landfill, YVW are saving 62,700,000 CO₂-e (kg) emissions per year.⁷
- Establishing the facility at Wollert has resulted in reduced truck movements for some waste management companies reducing emissions and creating additional capacity at other processing facilities further avoiding waste going to landfill.
- Helping commercial customers economically through reduced waste costs and achieve environmental sustainability goals.

Notes:

1. Yarra Valley Water, available at: <https://www.yvw.com.au/help-advice/waste-energy>, accessed: 09.04.2019.
2. Ibid.
3. Ibid.
4. Ibid.
5. Ibid.
6. YVW has undertaken their own ROI calculations and has not shared these with EY because of their commercial nature, however discussions with YVW have demonstrated YVW have a clear approach and the necessary financial detail to undertake the ROI calculations.
7. Food Waste Greenhouse Gas Calculator, available at: <https://watchmywaste.com.au/food-waste-greenhouse-gas-calculator/>, accessed on 09.04.2019.

Source: Yarra Valley Water.

4.5 A greener North

4.5.1 Urban greening

Urban greening here refers to both addition of green cover or green space and to wider measures that improve the environment, particularly measures that help to reduce Australia's high carbon footprint. Both aspects were important discussion points in the Update of this Strategy. Section 4.5.1 discusses green cover, while Section 4.5.2 considers greenhouse gas emission reduction measures.

The term 'green cover' or 'green space' is used here to refer to the greening of space within or very close to urban areas, which can include trees along streets, parks and gardens, sports/recreation grounds, areas of indigenous/natural vegetation, waterways and highway verges. Urban greening is increasingly recognised as beneficial on several fronts, from physical and mental health, to social inclusion, economic productivity and biodiversity conservation. For example, Braubach et al. (2017, p. 187), argue that:

Urban green space, such as parks, playgrounds, and residential greenery, can promote mental and physical health and reduce morbidity and mortality in urban residents by providing psychological relaxation and stress alleviation, stimulating social cohesion, supporting physical activity, and reducing exposure to air pollutants, noise and excessive heat.

Plan Melbourne identified benefits of making Melbourne a greener city, listing cooling to reduce heat and UV impacts, reduced air pollution and energy costs, enhanced liveability, improved physical and mental wellbeing, protected biodiversity and enhanced visitor appeal (DTPLI 2014). *Plan Melbourne 2017-2050* then included Action 91, a whole-of-government approach to cooling and greening Melbourne, aiming to create urban forests throughout the metropolitan area (Victorian Government 2017). *Infrastructure Victoria* (2016, p. 165) expands the list of benefits of urban greening to include:

- creating space for physical activity to address obesity and diabetes rates and reduced fitness, particularly in young children;
- creating inclusive community spaces to address social exclusion, noting the ageing population and the increasing importance of positive mental health;
- opportunities for walking and cycling for transport;
- providing shade to mitigate the 'heat island effect' to address the challenges of climate change, heat-related death and increasing urban densities;
- protecting and enhancing natural environments and supporting biodiversity by providing the critical connections within and between ecosystems;
- reducing emissions and addressing air quality, including acting as a carbon sink;
- providing a more efficient and effective means of managing stormwater to protect against flooding; and
- delivering energy savings through natural temperature regulation.

Melbourne's North benefits from the regional presence of some significant waterway corridors, such as the Yarra River, Plenty River, Darebin Creek and Merri Creek, together with substantial areas of green wedge in Whittlesea, Hume and Nillumbik. The eco-corridor and wildlife sanctuary around La Trobe University is also an important urban green asset, and the University also plays a role in reducing flood risk in neighbouring residential areas.

The existence of urban forest strategies adopted by a number of northern LGAs provides an important basis for progressing the greening of Melbourne's North and the benefits that will flow there-from.

The recent *Living Melbourne Strategy* (Resilient Melbourne and The Nature Conservancy 2019a,b), which builds on *Plan Melbourne 2017-2050* (Victorian Government 2017) thinking about a Melbourne urban forest, provides detailed information on canopy and vegetation cover by LGA and region across Melbourne. Data set out in the Technical Report that accompanies the Strategy (Resilient Melbourne and The Nature Conservancy 2019b) indicates that canopy cover (trees of 3 metres or more) in the Northern Region is 12.10 per cent, which is lower than for all other regions except the west at 4.20 per cent, as shown in Table 4.1. For the total metropolitan area, the figure is 15.40 per cent, about one-quarter higher than the Northern Region proportion. This relatively low rate of canopy cover is an impediment to physical and mental wellbeing in the north and a program to systematically increase canopy cover, possibly via the medium of a Northern Region Urban Forest Strategy, should form part of the Regional Infrastructure Plan.

Table 4.1 shows that Nillumbik has a much larger relative area of canopy cover than all other Northern Region LGAs, at 44.60 per cent, whereas Mitchell, Hume, Moreland and Darebin are all below 10 percentage points. The *Living Melbourne Strategy* generally sets targets for canopy cover across Melbourne of 30 per cent by 2050 but puts its target for Northern Region at a lower 27 per cent, recognising the low starting point, with a 2030 target of 22 per cent. The 2030 target is almost double the 2015 figure and the 2050 target is a further 5 percentage points higher. These targets should form a foundation for the proposed Northern Urban Forest Strategy.

Table 4.1 Percentage canopy and vegetation cover – 2015 (per cent)		
LGA/Region	Canopy cover = 3-15+ metres height	Total vegetation cover
Banyule	24.00	53.90
Darebin	9.50	37.40
Hume	4.60	31.90
Mitchell	0.10	18.30
Moreland	7.30	31.10
Nillumbik	44.60	67.10
Whittlesea	3.90	30.20
Northern Region	12.10	38.70
Eastern Region	25.20	57.20
Inner Metro	12.50	30.80
Inner South East	21.70	47.80
Southern	16.40	55.00
Western	4.20	34.50
Grand Total	15.40	46.80

Source: From Resilient Melbourne and The Nature Conservancy (2019b), Table 16.

In terms of identifying the relative availability of public ‘natural’ areas in metropolitan Melbourne, data from the Victorian Planning Authority’s data portal has been used, encompassing details on ‘conservation reserves’ plus ‘natural and semi-natural areas’. Figure 4.8 shows availability of conservation areas plus natural and semi-natural areas, in terms of hectares per 1000 residents. Yarra Ranges has around 1000 ha of land under these uses per 1000 residents, or 1m² per capita, which is about five times the level of availability of the second highest ranked LGA, Cardinia. In Melbourne’s North, Nillumbik has a high 143ha/1000 residents and Whittlesea (50ha/1000). Lowest availabilities of conservation, natural and semi-natural area per 1000 residents are in Glen Eira (0), Stonnington (0.2ha/1000 residents and Yarra (1.2ha/1000). In the Northern Region, Moreland

(1.25ha/1000) and Darebin (1.6ha/1000) have the lowest availabilities of such areas. All the inner LGAs within Northern Region have less than 5 ha of conservation, natural and semi-natural area per 1000 residents, as do most inner metro LGAs. An Urban Forest Strategy is particularly relevant to these areas, as well as to the outer LGAs (for example, migratory bird species are not aware of LGA boundaries!).

This analysis indicates that adding canopy cover should form an important focus for Melbourne's Northern Region in coming years, for improved mental and physical health and wellbeing, better environmental outcomes, and spill-over to improved productivity. Such matters are relevant in both inner areas, where absolute availability of natural areas is lower, and in growth suburbs, where smaller lot sizes are reducing available canopy cover. It is time that the urban forest was thought of as urban infrastructure, just like roads and rail, reflecting thinking by agencies such as Infrastructure Victoria (2016) on the importance of urban greening. Development of a Northern Region Urban Forest Strategy should thus now form one important and new component of the Northern Horizons Strategy Update. Such an initiative should seek access for all regional residents within reasonable walking, cycling or public transport distance, in line with the 20-minute neighbourhood philosophy of *Plan Melbourne 2017-2050*, and use the *Living Melbourne* benchmarks and targets for increased canopy cover. Restarting 20 Million Trees program funding would be of significant benefit here.

Figure 4.8: Access to natural areas



4.5.2 Reducing greenhouse gas emissions

Australia has one of the highest per capita carbon footprints of any country. Pressures to very substantially lower this footprint will only increase in coming years, as the world struggles to meet the aim of keeping global temperature increases to 1.5 degrees Centigrade above pre-industrial levels. The State Government is showing solid leadership in this area and Council Officer Consultations held for this project revealed widespread interest in activities that would reduce carbon emissions. The idea of a regional renewable energy initiative, for example, received wide support. More specific local initiatives are also important. For example, provision of electric vehicle charging facilities would assist in reducing road transport GHG emissions. Also, rooftops are a prospective source of renewable energy and opportunities such as the proximity of La Trobe University to roof space at the West Heidelberg Business Park should be explored.

The Australian economy is required to decarbonise to address the ongoing risks of climate change. Australian electricity generation is by far the largest source of carbon emissions in our country, followed by the transport sector. These two sectors combined contribute to over half of Australia's annual carbon emissions. Victoria's electricity grid is particularly carbon intensive, because of the high proportion of brown coal generation. However renewable energy generation is increasing quickly, with around 18 per cent of total generation coming from renewable sources in 2018-19.

Transitioning the electricity sector toward more renewable electricity and away from traditional fossil fuel sources of generation is one of the easiest and most cost-effective means to reduce Australia's overall annual emissions. As a result, over the past 20 years there has been a concerted effort from Federal, State and Local Governments to create incentives to increase the supply of renewable energy and increase energy efficiency. This includes the use of subsidies and renewable energy targets for small and large generators.

Electricity consumption (and therefore carbon emissions) can be reduced by pursuing energy efficiency programs. Energy efficiency can be improved (not limited to) by replacing inefficiency appliances and equipment with new, high efficiency equipment or considering energy efficient building design and improvement.

The Victorian State Government has various targets and programs that help address climate change by reducing electricity-sourced carbon emissions. These include:

- Renewable Energy Target of 50 per cent by 2030;
- net zero emissions by 2050;
- the Victorian Energy Upgrades Program which subsidises energy efficiency technologies; and
- the Solar Home Program which provides subsidies for small-scale solar, solar hot water and battery systems linked to a solar system over the next 10 years.

Practical measures that can be pursued at the regional level to reduce electricity source emissions include:

- continuing to roll out roof top solar installations on government owned buildings such as schools and council buildings, which usually have large roof areas;
- supporting and purchasing renewable energy from a large-scale renewable energy plant (such as wind or solar) through a power purchasing agreement (PPA);
- improving building energy efficiency and appliance/equipment efficiency; and
- increasing the share of personal travel undertaken by low emission modes, particularly active and public transport, as considered under the connectivity discussion (Section 4.9)

There are a number of local initiatives that are aiming to reduce greenhouse emissions and some councils and Northern organisations are working toward the goal of net zero emissions. La Trobe University, for example, have announced a \$75 million Carbon Net Zero strategy which will be complete by 2020.

Increasing the share of renewable energy in the Victorian electricity grid is a pre-condition for facilitating a low-carbon transport fleet. Currently, because of the higher proportion of brown coal within Victoria's electricity grid, plug-in electric vehicles that are charged purely from grid electricity lead to a net increase in emissions when compared to a similar size petrol car. Public charging stations linked to large solar installations or home-based chargers at a residence with a solar PV system can mitigate this effect. As can mode shift away from cars - which is the quickest, easiest and most cost-effective solution to reducing emissions in the transport sector (currently the fastest-growing GHG emissions sector).

In addition, higher renewable energy penetrations will also help decarbonise the public transport sector including trains and trams which run off electricity. Trials of public buses should also be considered. Encouraging public transport and bicycle network travel will also reduce carbon emissions.

Green infrastructure initiatives, such as a regional urban forest and greener building standards, can also help to reduce carbon emissions, improve air quality and/or capture and store carbon.

Waste minimisation and management, including recycling, is a major state-wide issue, requiring culture change, market development and significant investment in facilities. Landfill levies generate significant revenue streams for the State Government that should be used more extensively for purposes such as these. This could support (for example) waste minimising behaviours and development of significant infrastructure projects in recycling. GHG emission reduction should form an important co-benefit from improved waste minimisation.

There is concern about climate change and its impact on heat and water security. Consideration should be given to water security for Melbourne's north in the overall context of the Port Phillip Catchment. And transition to a zero-carbon emitting transport system brings forth the need for understand of required infrastructure, for example electric vehicle charging.

Figure 4.9: Victorian electricity generation 2018-19 (financial year)

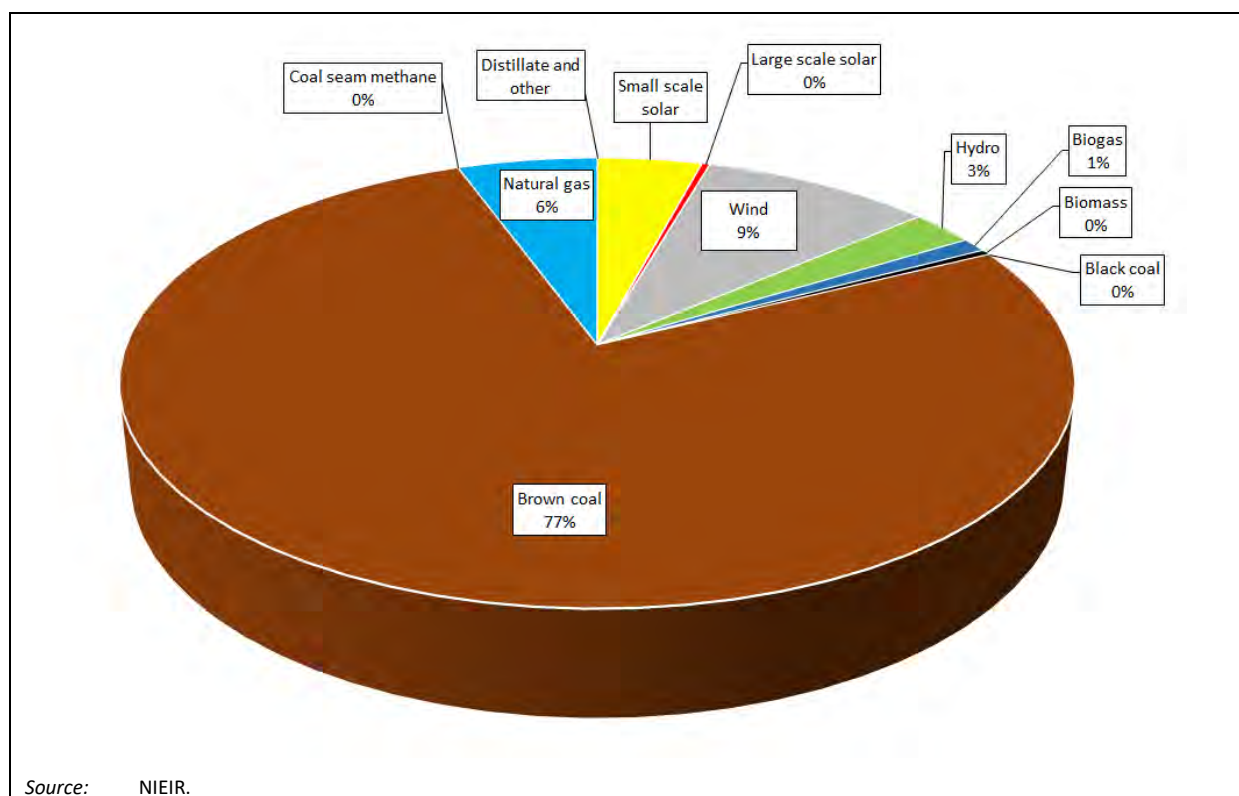


Figure 4.10: Small-scale PV installations per household (per cent)

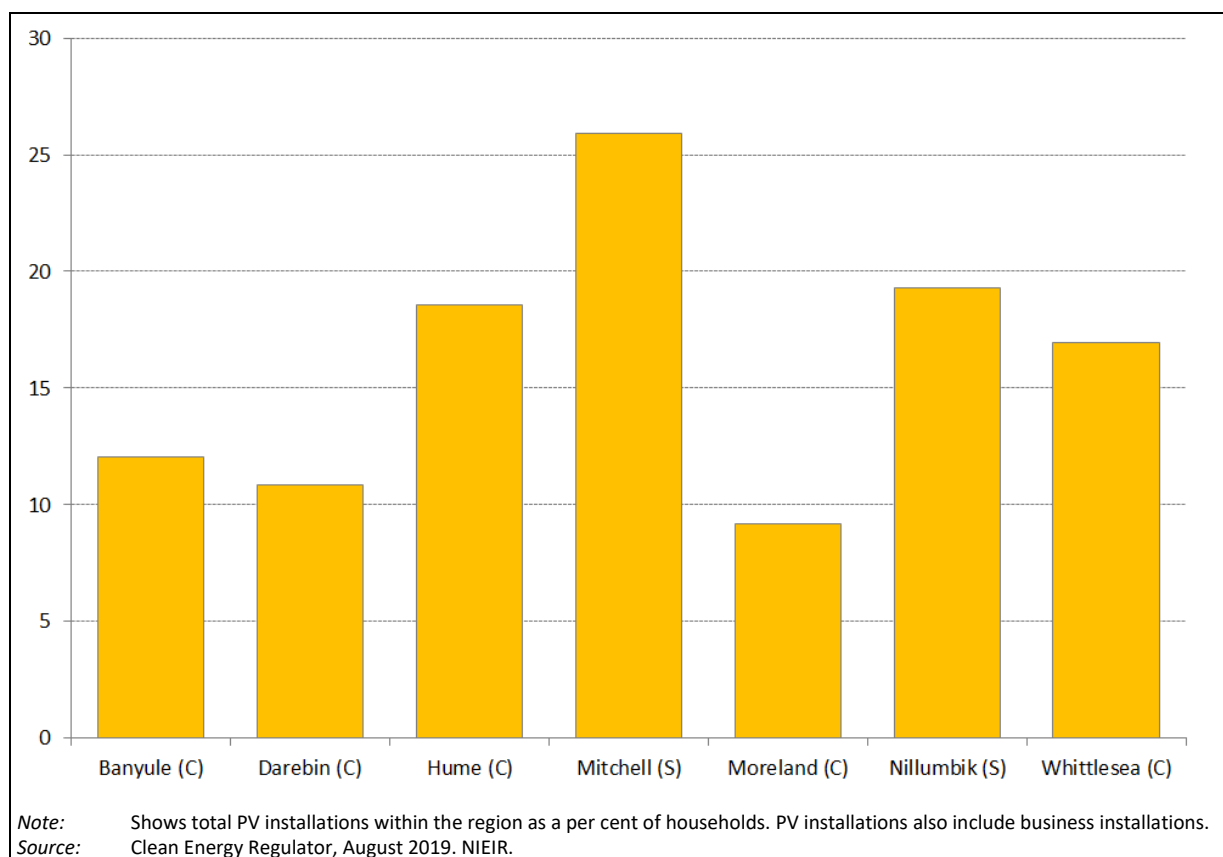


Table 4.2 Small-scale photovoltaic installations by Local Government Area		
LGA	Installations (no.)	Capacity (MW)
Banyule (C)	5,717	21.3
Darebin (C)	6,628	23.2
Hume (C)	13,294	59.9
Mitchell (S)	4,219	17.2
Moreland (C)	6,341	24.2
Nillumbik (S)	3,996	16.5
Whittlesea (C)	12,491	50.7

Source: Clean Energy Regulator, August 2019. NIEIR.

CASE STUDY: 2013-2014 CSIRO study of new 5-star houses (Melbourne, Brisbane and Adelaide)

The study undertook rigorous inspection post construction by:

- thermography for insulation installation; and
- air leakage by blower door testing.

It showed 60 per cent of houses did not comply with the 5-star code due to:

- inadequate insulation installation (for example, in walls and around downlights in ceilings); and
- only one of 20 houses tested met the air leakage guideline.

Implications of CSIRO study findings

Occupants of new 5 (and probably in now 6) star houses have higher space heating and cooling bills and GHG emissions than if their houses were code compliant.

Skills requirements

- Improved training of builders, and insulation/air sealing installers.
- Improved training and auditing of building inspectors.
- Training and certification of independent building thermal performance auditors.

In Australia insufficient attention is paid to thermal bridging, not mentioned in CSIRO's 5-star evaluation report. Improvements in the installation of, and advice on, renewable energy using photovoltaic and wind systems and storage (particularly batteries) can be based on sound training in these areas.

Source: The Future Workforce: Melbourne's North (NORTH Link/NIEIR et. al. 2015).

4.5.3 Protecting and enhancing biodiversity in Melbourne's North

The web of life is the most important infrastructure of all, sustaining all life including that of humans. The natural world contributes enormous richness to peoples' lives and is critical to the wellbeing and health of human populations. Biodiversity is under threat from development, climate change, poor levels of education relating to Australian species and their treatment and a raft of other factors. The Victorian Government, along with local government, has a key role to play in turning around the trend of significant biodiversity loss in Melbourne, regional Victoria and beyond.

Australia is among the very top group of nations when it comes to biodiversity loss, leading the world in mammal extinctions in the last 250 years. Perversely, as biodiversity loss accelerates in regional Australia, because of government policies, climate change, extensive land clearing and deforestation, cities now offer shelter for wildlife and the survival of species. There are currently places in Melbourne's North, including several waterways (e.g. Merri and Darebin Creeks), where conservation of rare native animals could and should occur. Victoria's precious wildlife should be assisted, and not exterminated, as is currently the predominant culture in the state. Equally, development of initiatives proposed in this report should not be done in such a way that leads to stranding of wildlife populations or destruction of habitat corridors. Development of Melbourne as an urban forest is important in this regard.

Local governments and major institutions in Melbourne's North have a significant role to play in offsetting biodiversity loss. The region's schools and tertiary institutions have a key role in educating local populations to appreciate native plants and wildlife. Thriving areas of biodiversity also bring tourism and recreational benefits to a region. The proposed regional Urban Forest Strategy should include an important focus on biodiversity conservation.

4.6 A healthy North

4.6.1 Indicators and some background

NORTH Link and its stakeholders believe that the state of a person's health should not be dependent on where, within a city, the person lives. Unfortunately, that is not the case in Melbourne. People reporting obesity and heart disease are two indicators of population health. Population health survey data is available for these indicators at LGA level, as in Figures 4.11 and 4.12. Of the 32 LGAs that comprise Greater Melbourne plus Mitchell, Melbourne's Northern Region LGAs tend to have relatively high rates of obesity reporting. Six of the seven Regional LGAs are in the highest 15/32, with four (Mitchell, Hume, Whittlesea and Banyule) having amongst the ten highest reporting rates. For reporting of heart disease, outcomes for those living in Melbourne's North are more in line with those elsewhere across the city. Whittlesea has a high rate but five of the seven Northern Region LGAs are mid-range in terms of reporting heart disease.

Both indicators suggest a need to focus on preventative health measures but perhaps targeting obesity most urgently. NIEIR and Stanley & Co (2019), in a recent study for the MAV, found that increased rates of obesity reporting were strongly correlated with distance from the CBD, which is difficult to change (!), and with higher levels of car use, suggesting a lack of physical exercise as one contributory factor. Improved public and active transport opportunities should be of assistance here, as discussed in Section 4.8 of this report. Section 4.6.3 discusses availability of public open space as one key resource that can assist with activities that support better health. The discussion in Section 4.4 about access to natural areas, is also relevant for improved health outcomes.

Figure 4.11: People reporting being obese (per cent)

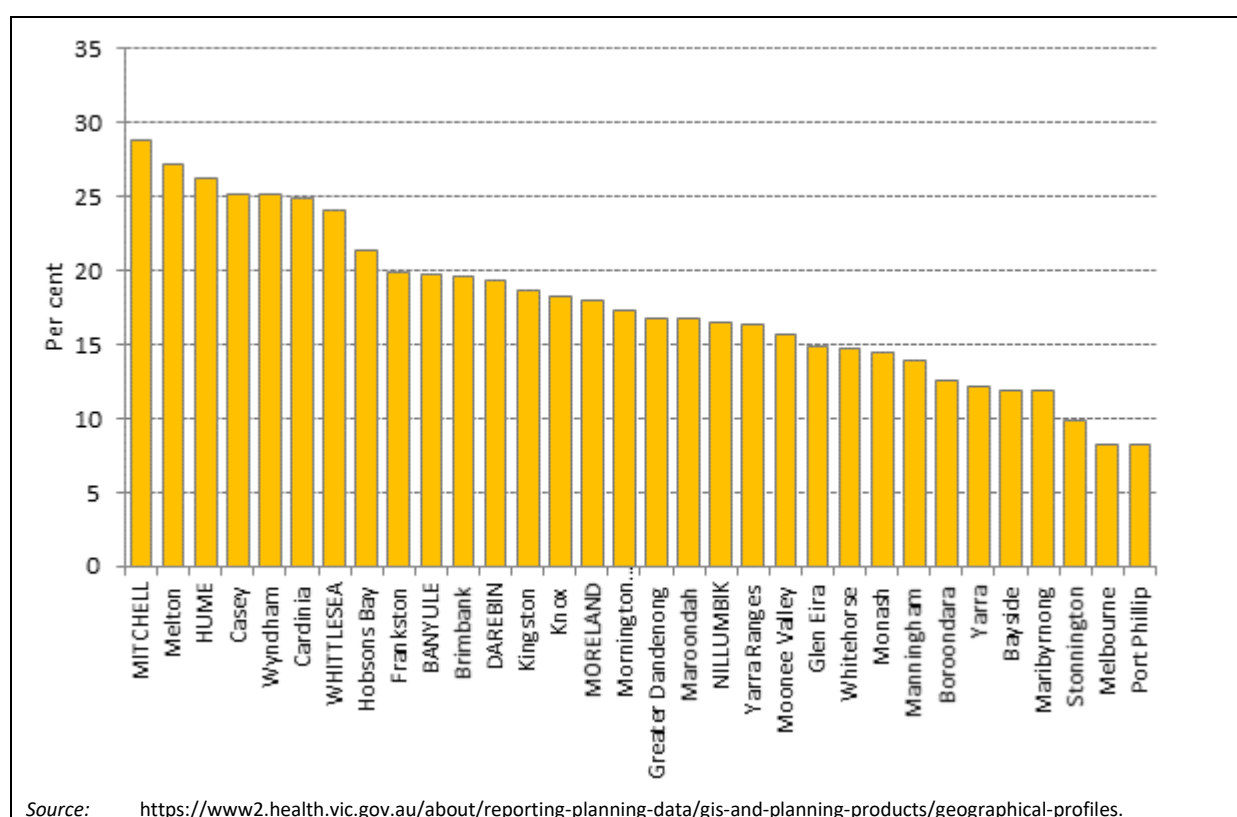
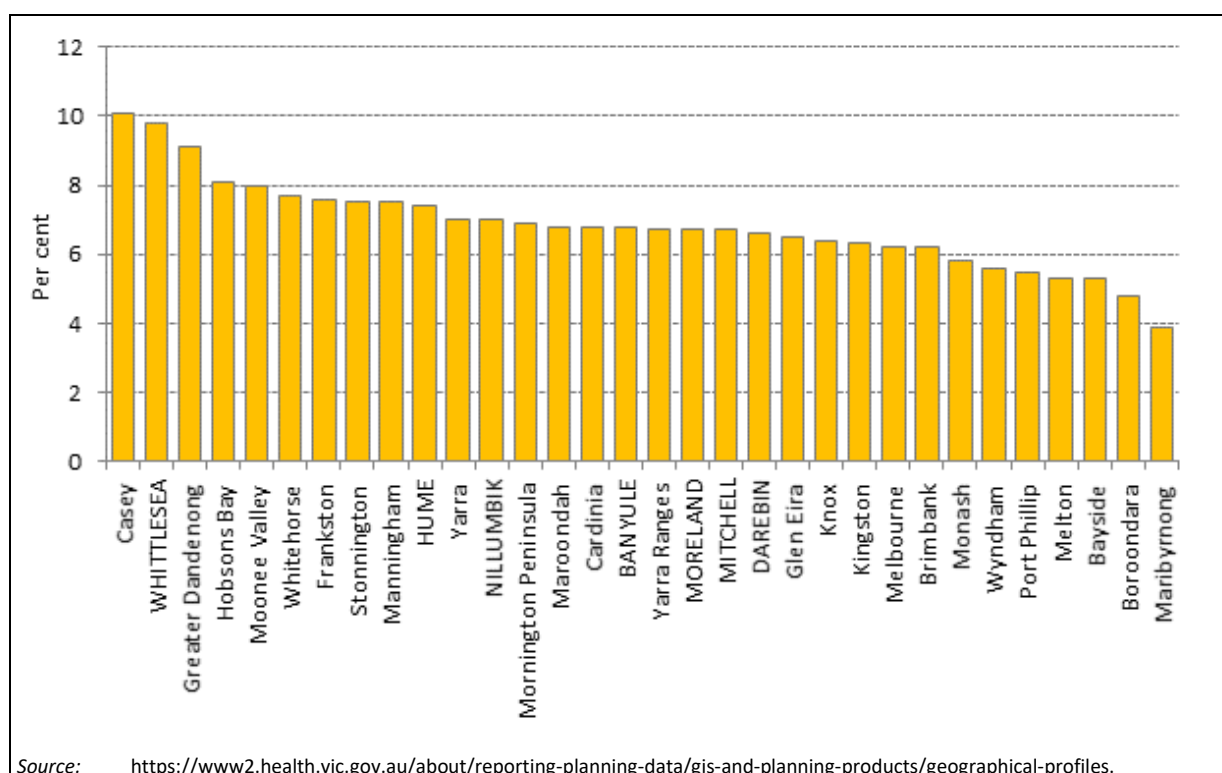


Figure 4.12: People reporting heart disease (per cent)



The Northern Corridor Health Plan was published three years ago. A major factor currently influencing the demand for public health is that a significant number of people are leaving private health insurance and this has a big impact on the provision of public health.

Currently planning work is being undertaken in relation to sub-acute and aged care needs in Melbourne's North.

Hospitals

This year, Northern Hospital will deal with over 100,000 emergency incidents, more than any other hospital in Melbourne. The Department of Health and Human Services (DHHS) is aware of the need for planning for a second hospital in the north to serve the Hume corridor as current facilities are at capacity. Recent planning by Northern Health suggests a substantial shortfall of hospital beds in the northern area and that this shortfall will continue to grow into the future (Appendix C). This is consistent with shortfalls in hospital beds found by NIEIR (Appendix B).

The upgrade of Footscray Hospital will cost \$1.6 billion. A new hospital in Melbourne's North could cost as much as \$1.6 billion, but construction would be staged. Land acquisition for hospitals is not done in the same way as it is for schools, and this is a major issue. The importance of 'land banking' for health facilities needs to be understood and a new policy should be developed, that includes spaces and places for health facilities in newly planned and developing regions in Victoria.

The Victorian Health and Human Services Building Authority designs hospitals, with DHHS as the client. They undertake the service planning, master plans, functional briefs and designs, and contracts to build, working with specialist architects.

Developing a new hospital in an outer area of Melbourne is not just a construction issue; these kinds of developments are also very difficult from a staffing perspective. While younger doctors are willing to travel wherever the work is, the staffing issue is problematic with higher-level staff, who are mostly reluctant to work in the outer areas of the city. The clinical workforce is dominated by nursing, then allied health.

There is evidence that if people train in an outer area they are more likely to work in that area in the future. This means that links with the region's universities are very important.

Ramsay Health is looking at building a private hospital next to Northern Hospital. This would make a difference to attracting and retaining clinicians. While there are plans for additional beds at the Austin and Northern Hospital, there is no funding available at this stage. The Austin is currently looking at provision across its three sites, to see if consolidation of some services on the same site is viable.

The Victorian Government has recently allocated \$675 million for provision of 10 community hospitals (no overnight beds). In the north, these will be a new community hospital in the City of Whittlesea, redevelopment of Craigieburn Hospital, a facility in Eltham and bringing after-hours primary care to Sunbury Hospital.

There is potential for community hospitals to provide support and link in with a range of other community services including Orange Door (Family Safety Victoria), safety hubs, Early Parenting Centres and school mental health services.

Partnerships in health innovation

The health cluster at Heidelberg includes the significantly important Austin Health, comprising the Austin Hospital, Heidelberg Repatriation Hospital, Royal Talbot Rehabilitation Centre and the Olivia Newton-John Cancer Wellness & Research Centre. Specialisation and innovation in health, centre around cancer, infectious diseases, obesity, sleep medicine, intensive care medicine, neurology, endocrinology, mental health and rehabilitation. The cluster is the largest Victorian trainer of specialist physicians and surgeons and provides state-wide services covering a range of specialities including the Victorian Spinal Cord Service and the Acquired Brain Injury Unit. Austin LifeSciences partners with La Trobe University, Melbourne University, the Mercy Hospital for Women and other research institutes, bringing together 1,000 researchers.

The Mercy Hospital for Women, located at Heidelberg, is a renowned public hospital providing services, which include maternity, neonatology and paediatrics, perioperative, gynaecology and other women's health services.

Allied health

There is an issue around how to fund and support allied health and how to identify who gets the funding. Allied health cuts across acute, sub-acute and rehabilitation, and community, all are areas of health with differing needs.

There is an absolute need for low cost or bulk-billing GP services in the outer areas of the north. Finding psychiatrists to work in the public system is very difficult and worse in outer areas.

There is need for establishment of integrated primary care hubs delivering a range of public and private general practice, specialist medical, mental health, counselling, dental, paediatric, allied health, NDIS, social support, pathology and medical imaging services. Ideally the hubs would also include a café and childcare offer and be located in high traffic areas near schools, train stations or shopping centres.

Some catchments in the region see a higher occurrence of children experiencing developmental delays and learning challenges. There is a need for early intervention service hubs, ideally co-located with kindergartens and primary school precincts.

Community health services

Community health services are either integrated or independent. In the south east they are integrated, run by Monash. In the north all community health services are independent. They include DPV Health, Merri Health, Banyule Community Health, Darebin Community Health and Sunbury Community Health. They offer a range of services, with funding coming from many different sources.

These facilities pick up a lot of allied health services and some also include bulk-billing GPs, social services such as financial help and youth services. The focus is on helping vulnerable people.

Indigenous health

With Indigenous health there is a big focus on self-determination. The Victorian Aboriginal Health Service has sites in Preston and Fitzroy, and recently opened a new facility in Epping. Anything developed in this space needs to be led and endorsed by the community.

Mental health

With regard to mental health, the Northern Region comes under the banner of North Western Mental Health, based at the Royal Melbourne Hospital and with sites across the north and west. Boundaries for provision of mental health services differ from those used for health. This makes collection of data difficult.

Mental Health issues are a concern for most councils, and for example, in the City of Hume there have been no new beds for mental health patients when there is a need for more. Youth mental health is an issue for the region, and of particular concern for Mitchell Shire Council and the City of Whittlesea. Metropolitan Partnerships is currently working on a project around this issue. It is noted that 30 mental health beds opened at Brunswick Private Hospital in February 2020.

The NDIS rollout overlaps with mental health and aged care. Because some services that previously came under health are now NDIS, DHHS is now a step away from these services and no longer has data nor a deep understanding of what is happening in that space.

Victoria's mental health sector is currently the subject of a Royal Commission launched by the Victorian Government. The Victorian Government has already committed to implementing all of the recommendations that will come out of the Royal Commission (before receiving the recommendations). These recommendations are guided by the terms of reference (Royal Commission into Victoria's Mental Health System 2019).

1. How to most effectively prevent mental illness and suicide, and support people to recover from mental illness, early in life, early in illness and early in episode, through Victoria's mental health system, and in close partnership with other services.
2. How to deliver the best mental health outcomes and improve access to and the navigation of Victoria's mental health system for people of all ages.
3. How to best support the needs of family members and carers of people living with mental illness.
4. How to improve mental health outcomes, taking into account best practice and person-centred treatment and care models, for those in the Victorian community, especially those at greater risk of experiencing poor mental health.

5. How to best support those in the Victorian community who are living with both mental illness and problematic alcohol and drug use, including through evidence-based harm minimisation approaches.

Early Parenting Centres

Early Parenting Centres offer a range of specialised support, counselling and advice services aimed at supporting parents who need additional support to care for their child. At present there are three sites (none in the north). In the 2019/20 State Victorian budget, the State government allocated \$123 million to roll out another seven Early Parenting Centres across Melbourne including one in the City of Whittlesea (Victorian Government 2019). These centres are led by maternal child health nurses (triple qualified). There is currently a strong focus on doing more in the early years.

Cultural diversity

Cultural diversity has an impact on health. Not far short of half the households in Hume and Whittlesea speak a language other than English at home. In Hume 8 per cent of residents speak Arabic at home, 7 per cent Turkish and 6 per cent one or other version of Aramaic. The health services rely heavily on interpreters in the delivery of services to some of these language groups.

Poverty

As discussed in the introduction to Chapter 3, no part of Northern Melbourne lacks households which are poor in the sense of having very low incomes in relation to household size. Poor households are particularly common in the Hume LGA.

What initiatives would help to improve health outcomes in the north?

- Provision of accessible health services. There is a particular need for an additional general hospital in the Hume corridor, which we suggest would be most accessible if located at Broadmeadows.
- Having the industry settings right for OHS.
- Provision of employment options which minimise excess hours and manage unavoidable stresses.
- Encouragement for activities which engender a positive sense of community, be they sporting, cultural or social.
- Holistic planning, including urban forests.
- Cutting commute to work times and increasing the proportion of such trips that are made by active and public transport.
- Targeted provision, for example, people suffering from PTSD from 2009 Black Saturday bushfires.

Arts and recreation

Activities in the arts and recreation space are important for community health and wellbeing and can also be significant sources of community innovation. The discussion in this report has been included under 'A healthy north'.

Banyule City Council

Banyule City Council is building a new library and culture hub, including an art space, at Ivanhoe. Another is earmarked for development in Bellfield as part of the Bellfield Master Plan.

The whole region will benefit from substantial investment in the La Trobe University sports complex – all levels of government, including all councils, should contribute. Banyule City Council does not have sufficient sporting facilities to meet current needs, although there are small pockets of underuse. Existing facilities are often old and tired. Refurbishment of Olympic Park and Ford Park is a priority. These projects have attracted some funding, but more is required.

Sports associations in the municipality are getting bigger, with growing numbers of participants, so require additional facilities. The popularity of women's football has meant a need to upgrade many facilities, so that they are female-friendly.

The Banyule City Council is trying to be smarter around using joint facilities with schools; for example, it has just signed an agreement with Greensborough Secondary College, which is having a \$10 million sports facility upgrade. This is due to the North East Link requiring use of some ovals in Banyule for a period of 7 years, and as compensation they are contributing to upgrades of local facilities.

Employment

There are around 700 jobs in the Arts and Recreation sector that are located in the Banyule LGA and the number of jobs continues to grow. Some 1,500 Banyule residents work in the sector.

Darebin City Council

The Darebin City Council has developed a Creative and Cultural Infrastructure Framework to ensure the needs of the local creative industry continue to be a key focus as the city changes over time. It looks at maximising existing assets and the investment and resources needed to deliver Council's vision. Darebin has a significant number of live music venues. A creative strategy should be attached to master plans for future infrastructure developments (as was done for Peninsula link).

The Darebin City Council has state-based and community level facilities. Victorian Government funding should be sought to develop and maintain expensive and elite facilities that service the state. The Darebin City Council has sufficient larger recreation facilities, with the Reservoir and Northcote Leisure Centres are undergoing refurbishment. The Darebin City Council is currently refurbishing the Northcote Aquatic Sports and Recreational Centre (NARC) and the redevelopment of the Reservoir Leisure Centre (RLC). The development of a Multi-sports stadium at John Cain Memorial Park, a premier facility for women's sport, is also a priority. A funding package with a mix of Council, State and Federal support is essential.

The role of libraries is changing and they are becoming more flexible spaces, meeting a range of needs. In particular, they provide digital facilities for disadvantaged people. Libraries will need to expand to meet the needs of a growing population. Facilities should be flexible and multi-use. Older people will be utilising these centres frequently and this will affect accessibility requirements and other design factors. These library developments are important in establishing 20-minute neighbourhoods.

Employment

There are around 960 jobs in the Arts and Recreation sector that are located in the Darebin LGA and the number of jobs continues to grow. Around 2,000 Darebin residents work in the sector.

Hume City Council

Gee Lee-Wik Doleen Gallery is the Hume City Council's dedicated visual arts venue, located at the Hume Global Learning Centre in Craigieburn. Exhibitions that support the Hume City Council's principles of social justice are supported, ensuring a high level of participation and accessibility, particularly from under-represented sectors of the community. The Hume Global Learning Centre Broadmeadows exhibition space has been hosting exhibitions since 2016, providing an additional space to showcase the talent of local artists.

The Hume City Council is meeting its obligations well in supplying and maintaining recreation facilities. The Victorian Government has announced establishment of two new regional parks in growth areas. Council provides regional indoor sports centres.

The Hume City Council's list of future requirements includes a stadium-scale sporting facility at Cloverton and a world-class sports precinct – something like the Albert Park sports precinct for the north. The region is already the home base of Melbourne Storm. While building might be some years away, land needs to be preserved now.

There was some discussion/planning some years ago about the potential for a 'boutique stadium' in the north, on land that is currently owned by Melbourne Water next to Merrifield Estate being developed by MAB Corporation. There was considerable cost required on the land to deal with storm water and the current flood plain area, so no entity was keen to fund this as a regional project. The State Government showed no interest and Council's position was that it would not and could not afford the cost of works to make the large site functional. More recently early discussions have been held with third parties regarding a similar concept for a GMHBA type stadium in the Cloverton Estate, being developed by Stockland. Cost remains the key issue.

Employment

There are around 1,000 jobs in the Arts and Recreation sector that are located in the Hume LGA and the number of jobs continues to grow. Around 1,400 Hume residents work in the sector.

Mitchell Shire Council

Mitchell Shire's residents are in need of new and improved arts and recreation centres. The Kilmore Library Community Precinct is being redeveloped, and the Seymour revitalisation project with 2 nodes – education/learning and health – will also have a positive impact. There are no cultural facilities in the Mitchell LGA – no theatre or performing arts. A Military Tank Museum is planned for Puckapunyal.

There are around 160 jobs in the Arts and Recreation sector that are located in the Mitchell LGA and the number of jobs has declined. Some 270 Mitchell residents work in the sector.

Moreland City Council

Moreland City Council recognises the critical role arts infrastructure plays in the ongoing livelihood of the arts sector and the health of the creative ecology of our cities. Moreland City Council has invested significant resources investigating and supporting the role of Arts Infrastructure in the creative ecology. The conditions that have made Moreland an attractive place for artists to establish and thrive include affordable rents, small-scale premises and disused industrial spaces, but these conditions are vulnerable to significant change, as the inner urban areas of Melbourne continue to gentrify. This gentrification risks permanently displacing the arts community from the inner city LGAs of Melbourne. In looking to address this issue, Moreland City Council commissioned an extensive Arts Infrastructure Plan in 2018 to support and deliver arts infrastructure in Moreland.

The following initiatives are recommended to address these needs:

- take a pro-active role in maximising the opportunities for retention of existing arts spaces and the creation of new spaces;
- contribute to the ongoing success of the Brunswick arts cluster by leveraging off the concentration of Council-owned buildings in the Brunswick Civic and Cultural Precinct;
- protect existing arts uses and enhance opportunities for the emerging Coburg North Arts Hub to grow;
- introduce an arts leadership program focused on mentoring new arts sector leaders and improving opportunities for less-advantaged and minority groups to participate in the arts;
- design and deliver new infrastructure in the public realm to support outdoor performances; and
- include artists in the delivery of significant Council funded infrastructure projects.

Initiatives such as these will also support development of the regional tourism offering.

Brunswick Design District

The Brunswick Design District cluster of private and public infrastructure currently supports nearly 2000 creative workers. The partnership between Moreland City Council, RMIT University and Creative Victoria supporting the pipeline of RMIT students and the range of design related activities in this precinct has the capacity to grow the number of jobs significantly.

Wheatsheaf Community Hub

The Wheatsheaf Community Hub Project will provide the Glenroy community with a welcoming, nature-inspired environment in which to learn, grow, celebrate and heal. The Wheatsheaf Community Hub will become the new home of the Glenroy Library, the Glenroy Memorial Kindergarten and include maternal child health, a community health provider, neighbourhood learning and childcare services.

The Project will also include a new community garden and an upgrade to the Bridget Shortell Reserve. Council will be seeking community input on these developments.

Libraries

Moreland's libraries are highly valued by the community and change lives in many compelling ways, from supporting early literacy outcomes for preschool children to digital literacy training for older residents at risk of becoming isolated in an increasingly digital work. They foster social connectedness, lifelong learning, creativity, wellbeing and literacy – and serve the community from cradle to grave. As third spaces for the community after work then home, Moreland's libraries have an increasingly important role to play in providing opportunities for social connection as the trend of single person households in Moreland grows and the risks of social isolation are increased.

An independent report by SGS Economics and planning, *Libraries Work! The Socio-Economic value of public libraries to Victorian*, found that every dollar invested in Victorian Public Libraries generates \$4.30 of benefits to the local community. In the case of Moreland, the return in benefit to the local community jumps to \$5.70, compelling evidence of the value of libraries.

However, Moreland's ageing library buildings do not meet community expectations or industry standards which constrain the services that they should offer. With a total of 2,693sqm of public floorspace, Moreland's libraries provide 2,022sqm less than the industry standard. Although a much needed new and contemporary library will feature in the Wheatsheaf Hub development that will replace the existing library in Glenroy, without significant investment to improve Moreland's other

libraries, they will continue to fail to meet expectations and drop further behind expected standards. Moreland hopes to develop and resource a Library Infrastructure Plan to address this.

Siteworks

Siteworks is a former primary school in the heart of Brunswick, owned by Council and now open for community and creative uses. Siteworks is managed as a temporary community and creative facility by *These Are The Projects We Do Together*, who are contracted by Council to manage the site. The site contains a public open space, a heritage house, the former school and a stables building. Blak Dot Gallery operates from the stables building, and the rest of the site is available for short-term and long-term bookings, workshops and events and as co-working and meeting spaces.

Other facilities include Brunswick Town Hall and the Brunswick Mechanics Institute. The Brunswick Mechanics Institute is Council's key performing arts venue. There is also an obligation on one of the Pentridge developers to establish a museum.

Recreation

Moreland City Council is a leader in encouraging women's participation in sport. If a club is allocated land or facilities, it must have female teams, female leaders and female board members. This has led to the overuse of sporting facilities across the Moreland LGA.

There are around 1,050 jobs in the Arts and Recreation sector that are located in the Moreland LGA and the number of jobs has increased. Some 2,450 Moreland residents work in the sector.

Nillumbik Shire Council

Nillumbik Shire Council is an active partner in the Yarra Plenty Regional Library service. There are libraries at Diamond Valley and Eltham, and an urgent need for a library at Diamond Creek as part of the redevelopment happening there.

Recreation

Significant increases in female participation in sport have impacted on use and maintenance of sporting activities. There is a need for lighting (to expand hours of use) and upgrading of underground assets (sprinklers, sand etc.). Previously, the Nillumbik Shire Council put a lot into traditional sports such as football, netball and cricket. There is a move to invest in other sports, and Council is now doing an Equine Recreation Plan. Cost per unit to build sporting infrastructure is very expensive, due to issues such as ground levelling, flooding, cutting trees etc. Under the Yarra Strategic Plan, Council will have extra considerations when seeking to make improvements at Eltham Lower Park, which is home to playgrounds, Diamond Valley Railway and sporting facilities. This may make economic development and tourism opportunities in the Yarra River Corridor more challenging to realise.

There are around 600 jobs in the Arts and Recreation sector that are located in the Nillumbik LGA. Some 875 Nillumbik residents work in the sector.

Whittlesea City Council

Whittlesea has the Plenty Valley Arts and Convention Centre, which is primarily a venue for hire. The Whittlesea City Council is looking at establishment of a community arts centre in Mernda, potentially linked to a library.

Recreation

There is need for an indoor stadium in Whittlesea. Currently funding is not provided for regional infrastructure of this type, just for land. There may be an opportunity to collaborate with an educational facility on a project such as this in the future.

There are around 600 jobs in the Arts and Recreation sector that are located in the Whittlesea LGA. Some 1,250 Whittlesea residents work in the sector.

Arts and recreation: Conclusion

Design museum

The preceding overview of regional arts and recreation facilities indicates broad availability but the absence of a city-scale leading facility. Given its industrial links to both past and present, Melbourne's North would benefit from the development of a new and significant cultural institution, a Design Museum. The new museum could feature all aspects of design, from automotive to architecture to digital and so on including issues of sustainability. The benefits would be to increase recognition of Melbourne's North as a destination. As well as tourism benefits there would be educational benefits and the museum would benefit the region's industries, by connecting creative design and technologies to local production, encouraging innovation, excellence in design and sustainability standards.

Design Museum London; Vitra Design Museum, Weil am Rhein; Red Dot Museums, Singapore, Essen and Taipei; Cooper Hewitt, Smithsonian Design Museum, New York City; Design Exchange, Toronto and the Bauhaus Archiv, Berlin are just some examples of many of this type of facility.

The Melbourne's Future North Workforce Master Plan report (NORTH Link and NIEIR 2015) found that:

For Melbourne's North opportunities exist to develop more artists' workspaces, smaller scale arts festivals and arts infrastructure such as new public gallery spaces. Given the region's strengths in manufacturing and product creation and Melbourne's lack of a Design Museum, a strong case could be made for such a major investment in Melbourne's North. Such a development, apart from the impact on the region's cultural amenity, would also enhance the design capacity and reputation of the firms in Melbourne's North and encourage excellence in design.

Museum Case Study: teamLab Borderless

In its first year after opening in mid-2018, teamLab Borderless has attracted 2.3 million visitors from 160 countries. The visitor profile is heavily international, surveys show that 50 per cent of visitors to the new museum were from overseas and 50 per cent of those visitors had come to Tokyo specifically to visit the museum. So from an economic benefit point of view that represents 575,000 in-scope visitors (visitors that bring a direct benefit to the economy that would not have existed if the museum was not there) in just one year. A significant achievement embodied by contemporary thinking about economic development.

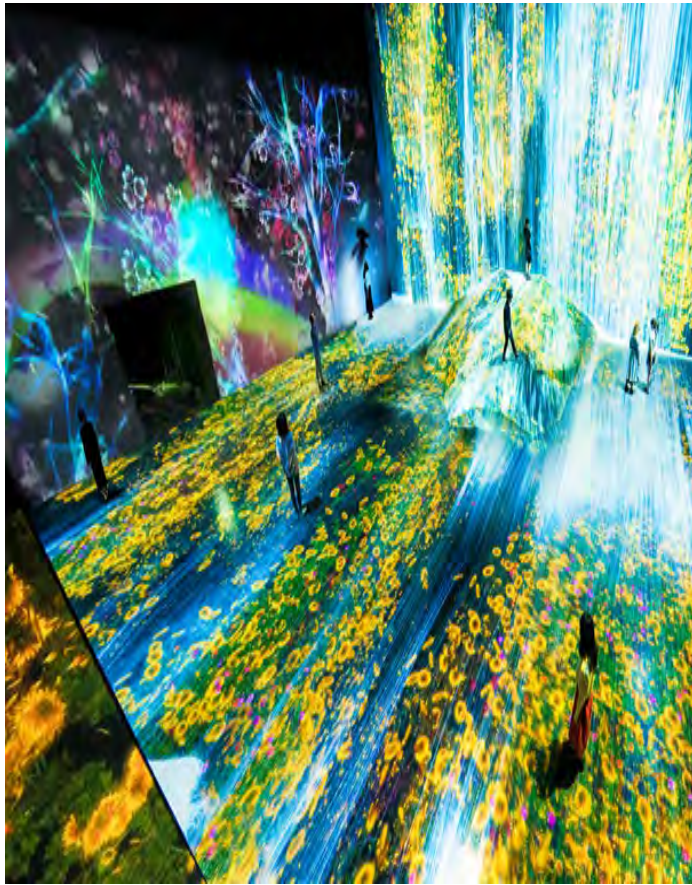
The teamLab Borderless museum has also invigorated its surrounding water-front area. Since the launch of the museum, Aomi Station, the nearest railway station to the museum has seen a 50 per cent increase in passenger numbers. VenusFort, the adjacent retail complex, has reported its visitor numbers have increased by 20 per cent compared to the previous year.



The last time Peter Hylands spoke to teamLab in Tokyo the company had over 500 highly skilled workers. The number of people engaged in teamLab's innovations is growing rapidly.

No longer limited to physical media, digital technology has made it possible for artworks to expand physically. Since digital art can easily expand. It provides us with a greater degree of autonomy within the space. We are now able to manipulate and use much larger spaces, and viewers are able to experience the artwork more directly.

Secure in its own 10,000 square metre space, MORI Building DIGITAL ART MUSEUM: teamLab Borderless will begin to answer some of the questions about the historical context and future place of digital art and is the most significant step so far in the remarkable evolution of teamLab since the beginning in 2001. What the new museum does is to blur the borders between individual works of art, between the visitor and the art and between all of us as we interact and influence what is created here. In this experience we are immersed and become as art ourselves.



What is reflected in the development of teamLab as a collective of artists, computer programmers and animators, engineers, mathematicians and architects and the digital art that happens here, is a mirror of a transforming world of technology and convergence. What is demonstrated here is that the very process of convergence, the blurring of the boundaries between art, and design, technology and science, the natural world and so much more, can lead to new and unexpected journeys in the world of art and creativity.

On another plain, the convergence of Mori Building, the famous urban development company with its long history of association with contemporary art, and teamLab tells us an immediate story about the increasing importance of contemporary art in defining modern cities and societies.

Community building

Optimising the mix of arts and recreation type developments, including sports infrastructure, across Melbourne's North will have a number of impacts and these include:

- **Libraries and learning centres** – *Benefit, Community, education and wellbeing* - hubs for young people and newly arrived migrants, providing the infrastructure in which lifelong learning practices can be enhanced, providing opportunities to meet people, general assistance including job applications, access to computers and so on.
- **Sporting facilities including adding major citywide facilities** – *Benefit, Health, experience, community, skills, connecting Melbourne, brand and wellbeing* – providing equity for women's sporting activities through infrastructure enhancements, enhancing opportunities to build community and social inclusion, providing general health benefit to those participating in sport, opportunities to promote sporting activities to those people currently not participating in sporting activities.
- **Local arts facilities** – *Benefit, Creative education, skills, community, brand, experience and wellbeing* – Spaces for local artists and performers to work and present, stimulates dialogue and interest in the region in an intellectual sense, connects with learning centres, political discourse and community engagement.
- **Urban forests** – *Benefit, health, community, nature experience, brand, conservation, education and wellbeing* – Connecting places, natural corridors, cycle paths, places to engage with the natural world, encouraging healthy behaviours, opportunities to assist and engage in conservation activities.

4.6.2 The experience economy

Opportunities to develop tourist related activities in Melbourne's North are centred on the region's food culture, its industrial and cultural heritage, diversity and related events, sport and environmental assets, which include river corridors, cycle paths and places of nature in the outer parts of the city. We should also remember that capturing local expenditures of residents locally is of benefit to the regional economy and its businesses. So by creating improved amenity and experiences, two things can be achieved: attracting visitors from outside the region, and keeping residents in the region for recreational activities, more frequently than may previously have been the case. New top end assets, such as a Design Museum, would help to attract visitors from far and wide.

Japan is an example of what can be achieved by strategic marketing and provision of tourist assets and experiences. Over the last two decades, Japan has focussed on developing its tourism industry and has been successful in doing so, quadrupling incoming visitation over the last decade to 30 million visitors per annum. In an ageing society, tourism has been helpful in providing the critical mass to pay for the upkeep and continued development of public transport systems, accommodation and other high quality infrastructure used by tourists and the Japanese public alike. Japanese tourism surveys show that key reasons for visiting Japan are food (in this case Japanese food), shopping, nature sightseeing and visiting places within towns and cities, in that order. The task in Japan over the most recent period has been to diversify the places tourists visit by promoting places other than the usual tourism hotspots of places like Tokyo, Kyoto and Nara, to more regional places like Yamagata and Gifu. The point here is that places in Japan that did not really have a tourist economy in the past are now visited by people from all over the world, with benefits flowing to the arts, local retail, restaurants, accommodation and so on, as well as to the local population.

The numbers of tourists visiting Australia from overseas is also increasing and the relatively low value of the dollar has the effect of keeping more Australians in Australia. The international trade accounts show a rising level of 'travel' exports, and there is no doubt that there is also substantial interregional trade due to travel and tourism.

In Australia international tourists do not seem to get far from the major international airports and in 2015 the State of the Regions report (ALGA/NIEIR) found that between 45 and 50 per cent of tourist earnings in Sydney, Melbourne and Brisbane came from international tourists, followed by around 38 per cent in Perth and 30 per cent in Adelaide. Outside the five metropolitan areas, SEQ Gold Coast had the largest exports followed by Qld Far North Torres. Though these regions had international air services, the international share in their tourism exports was lower than in the capital cities. Elsewhere the international share went very low – right down to 2 per cent in NSW South Coast. Northern Melbourne should be able to capture some of this near-airport activity but does not as yet do so. The region has the necessary labour resources. Tourism is a labour-intensive industry and it requires access to a workforce with experience in delivering services such as food and accommodation, transport and information based services, tour guides and so on. The industry is a source of employment opportunities for the young. Tourism marketing increasingly involves social media.

Tourism can assist a region in developing a brand and sometimes this is helpful in rebranding or reworking a region's image away from past perceptions. There are plenty of interesting places to visit in Melbourne's North, providing that you know they are there. Montsalvat in Eltham is just one of those places. Established in the 1930s, Montsalvat is Australia's longest running 'active artists' community. There are exhibitions, events including the annual Montsalvat Arts Festival, education activities, international visiting artists, artist in residence program, book launches, all of which provide a rich visitor experience.

During discussions as part of the research for this report the Caravan Industry Association suggested that facilities could be provided to allow caravan tourists the opportunity to prop and stop, by

providing facilities for shorter trips. The caravan manufacturing industry, much of which is based in Melbourne's North, is itself a major contributor to tourism in Australia by providing a growing number of high quality caravans into the Australian market and, increasingly, the North American market.

4.6.3 Access to 'other open space'

Availability of open space has been shown to encourage use of such space, with the opportunity for improved health outcomes. Data at LGA level on hectares of public open space (other than conservation, natural and semi-natural areas, which was considered in Section 4.5.1) is called 'other open space' in this report. This is mainly parks and gardens plus sports fields and recreational open space. Total availability across the 31 Greater Melbourne LGAs (excluding Mitchell) is 15,300 ha, much smaller than the total 'conservation, natural and semi-natural' land area.

Open space availability has traditionally been considered in terms of standards, commonly described in terms of availability per 1000 population. Veal (2013) shows the lack of a scientific basis for such standards but recognises their persistent application. Open space planning standards per 1000 population have been common in Australia and we use that measure herein. Veal (2013) notes the long-standing British (National Playing Fields Association, now Fields in Trust) standard of 2.43ha/1000 population and US (National Recreation Association, now National Recreation and Parks Association) figure of 4ha/1000 population, with the Australian 'standard' being 2.83ha/1000 population. Demand/need based standards are now commonly argued to be a preferred approach but the preceding standards can usually be argued to be loosely derived on interpretations of need, albeit that these may sometimes have been set in another time.

Figure 4.13 shows that Yarra Ranges has the highest level of availability of other open space per 1000 residents, at 9.2ha/1000, almost three times the Greater Melbourne average availability level of 3.3ha/1000. In the Northern Region, Nillumbik (5.6ha/1000) is solidly above the average availability level. Public open space is in relatively short supply per 1000 residents in Stonnington and Glen Eira (both around 1.1ha/1000) and, in the Northern Region, in Moreland at 1.8ha/1000 residents. Some 15 inner/middle urban LGAs, out of a total of 31 in Greater Melbourne, are below the indicated 2.83ha/1000 standard or benchmark, these LGAs having a total population of 2.1 million in 2016, before considering any future population increase. The other Northern Region LGA that does not currently meet a 2.83ha/1000 residents standard is Darebin (2.61ha/1000) (data not available for Mitchell), with Hume being marginally above the standard at 2.89ha/1000. However, Table 4.3 shows that, taking account of the *Victoria in Future 2016* Population Projections to 2031 (DELWP 2016), every Northern Region LGA except Nillumbik would fall below the 2.83ha/1000 standard by 2031, unless additional open space is provided. That table also shows the additional open space requirement for the five Northern Region metropolitan Melbourne LGAs at 2031, if the 2.83 standard is accepted, these requirements summing to over 800 hectares, with Moreland having a major shortfall of around 300 hectares and Hume over 200. Urban infill in LGAs towards the lower end of the range clearly needs to recognise the importance and challenge of adding to open space availability. There is also an issue with quality of open space in some of the outer areas, particularly space that is state managed.

Figure 4.13: Availability of other open space (ha/1000 population)

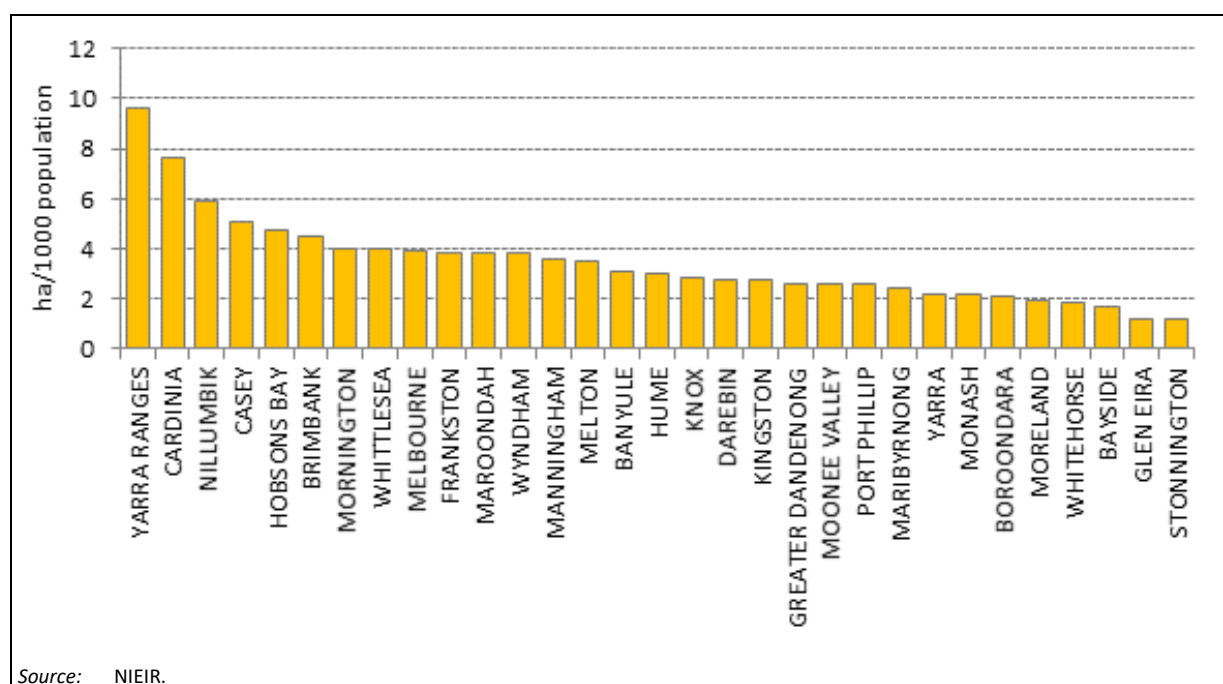


Table 4.3 Projected requirement for additional open space by 2031, against a standard of 2.83ha/1000 population – Northern Region LGAs

LGA	Projected 2031 open space ha/1000 population*	Shortfall against 2.83/ha/1000 standard	Projected 2031 population **	Additional hectares required to meet standard
Banyule	2.59	0.24	145,036	34
Darebin	2.11	0.72	191,938	137
Hume	2.04	0.79	293,895	232
Moreland	1.43	1.40	216,299	302
Nillumbik	5.31	0	67,600	0
Whittlesea	2.49	0.34	313,959	107
Total	2.38	n.a.	1,228,787	812

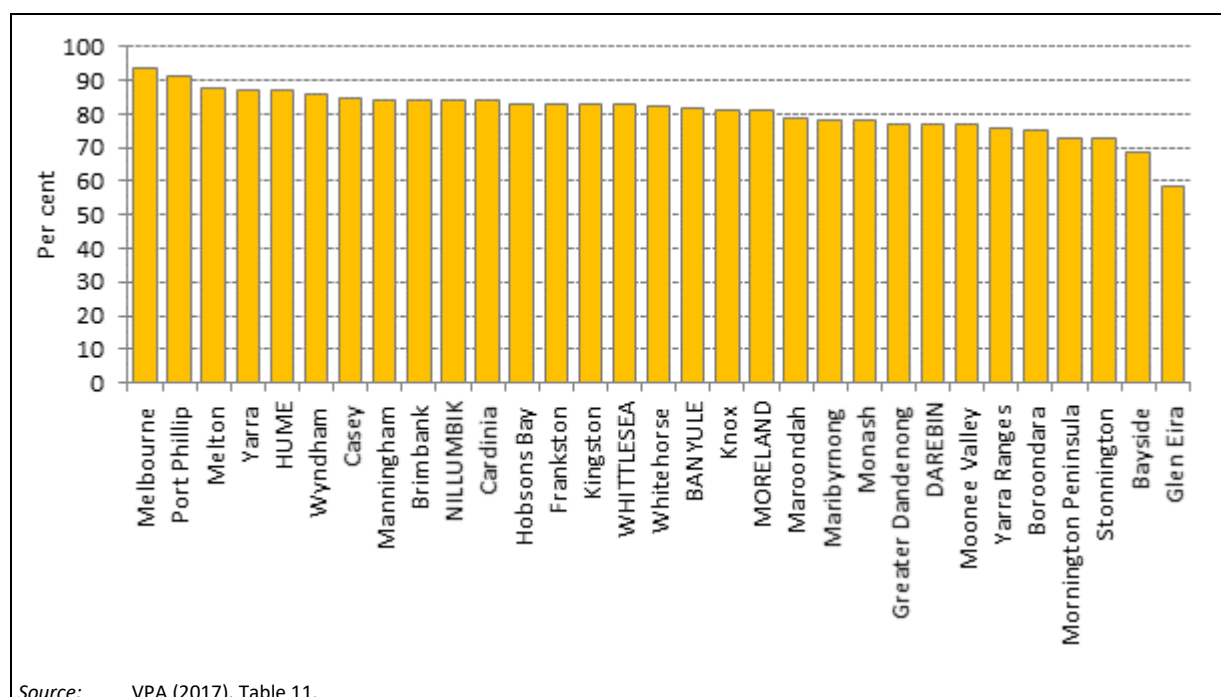
Notes: * = Assumes no additional provision to 2031.

** = Sourced from Victoria in Future one page profiles, 2016.

Source: <https://www.planning.vic.gov.au/land-use-and-population-research/victoria-in-future-2016/victoria-in-future-one-page-profiles>.

As another indicator of access to open space, Figure 4.14 shows the proportion of each LGA's population living within a 400 metre walk of public open space. Numbers around 80+ per cent are usual. Darebin has the lowest proportion in the Northern Region, at 76.8 per cent, while Banyule (81.5 per cent) and Moreland (81 per cent) are in the lower half of the LGAs in Greater Melbourne but not markedly low. All metro Melbourne Northern Region LGAs have between about one in eight and one in four of their residents not living within 400 metres walking distance of public open space.

Figure 4.14: Population within 400 metres walkable distance of public open space (POS) per municipality (excluding Mitchell)



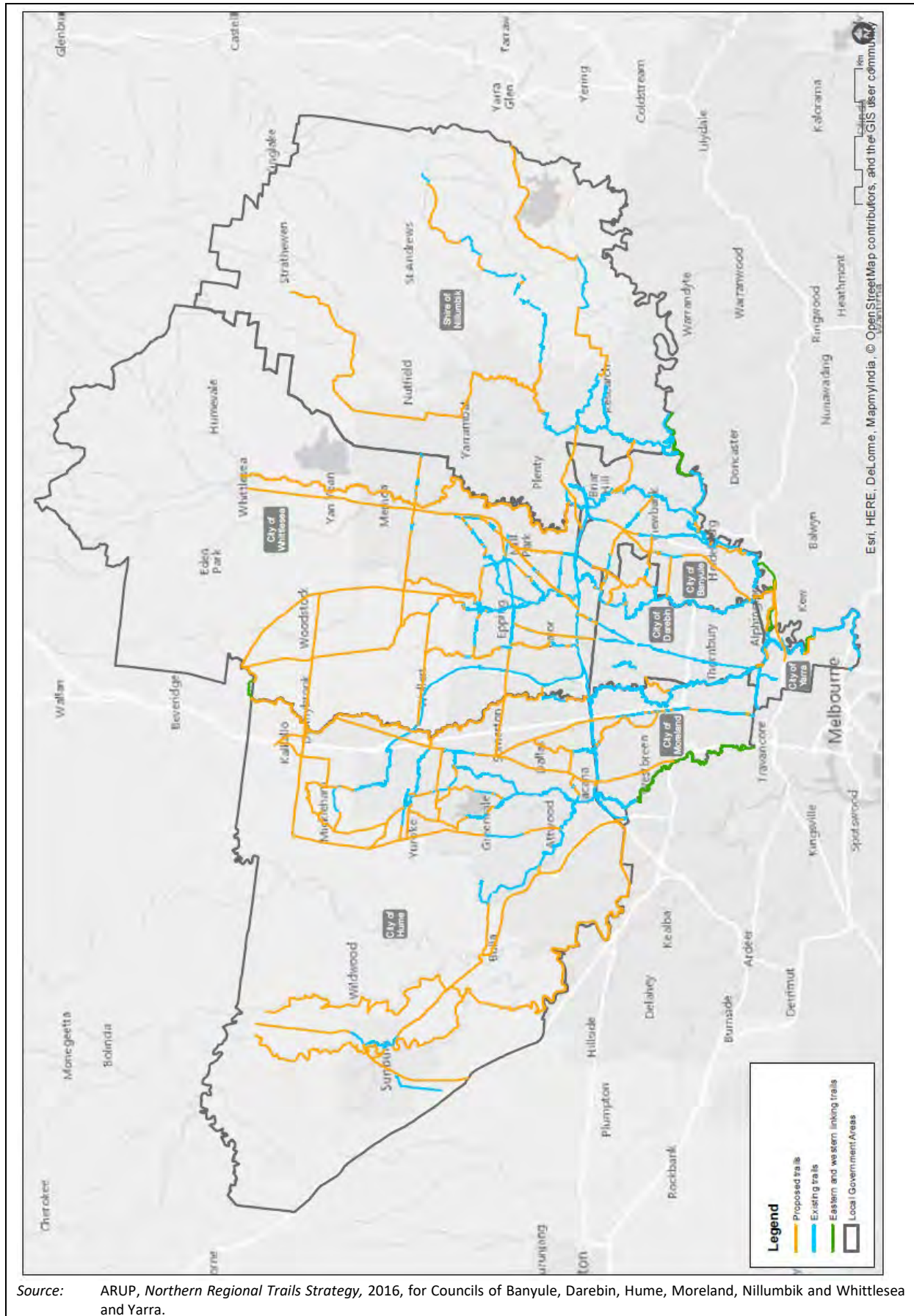
These numbers, however gross, and those set out earlier about open space per 1000 population, suggest that public open space provision should be an important focus of the Northern Horizons 2020 Strategy Update, particularly when future population growth is taken into account. The numbers suggest a pressing short-term need in Moreland and Darebin, with the need becoming more urgent in other LGAs over the coming decade. Better health outcomes are one major expected result. Future provision of open space could be one component of the proposed Northern Region Urban Forest Strategy, since there are opportunities to integrate the two to achieve synergies.

4.6.4 The regional cycling trails strategy

Pedal cycles to more or less current designs were introduced in Melbourne in the 1890s and for decades were a major means of transport for regular daily travel. The first motor vehicles arrived in Melbourne after the first pedal-and-chain bicycles and, because of their considerably greater expense, took longer to become an established transport mode. However, after World War I motor cycles became popular and after World War II cars and trucks drove the push bikes off the roads. As incomes rose, motor vehicles became affordable and their speed, comfort and privacy was heavily advertised. They were guaranteed to come off best in any collision with a cyclist (or pedestrian) and cycling came to be seen as downright dangerous.

More recently there has been a revival in cycling. Though the Heart Foundation, in its promotion of the fitness benefits of cycling, cannot match the advertising budgets of the motor industry, the open-air pleasures and health benefits of cycling are now widely acknowledged. The revival of cycling has taken two forms: first, an increase in the use of cycles for regular transport: and, second, an increase in recreational cycling.

Figure 4.15: Northern Regional Trails Strategy



The increase in regular cycling is most noticeable in the inner parts of Melbourne's North. At the 2016 Census 12 per cent of journeys to work by Brunswick residents were by cycle, though the proportion fell away rapidly in suburbs further out. The inner-suburban revival was in part a response to traffic congestion and the high cost of car parking but was assisted by the provision of cycle paths and cycle lanes. To allow cycling to match motoring and public transport speeds, it is desirable that cycle paths should be direct and easily-graded. On-road cycling infrastructure and Strategic Cycling Corridors, such as dedicated bicycle lanes, are also important to promote connectivity for cyclists between activity centres. In Sections 4.2 (above) and 4.8 (below) the potential role of cycling in daily transport is further covered, including such topics as the need for safe cycling access to major activity centres such as La Trobe University and the scope for greater use of cycling to access train stations.

It should be noted that the Regional Cycling Trails initiative has an important subset, that is, Cultural Trails. The trails have the potential to connect important cultural assets such as Heide Museum of Modern Art, Montsalvat, the Heidelberg School historic sites, Bundoora Homestead, La Trobe University Sculpture Park and benefit any new cultural developments in Melbourne's North East and beyond and in doing so benefit the themes of a Healthier North and an Innovative North. We should also remember that Melbourne's North is unique in the world and visitor economy marketing needs to focus on those assets that are particular to the region.

Unlike cycling with the object of getting from a trip origin to a destination, in recreational cycling the object is the journey itself – though the journey may be further enhanced by having a recreational destination such as the La Trobe Wildlife Sanctuary. Recreation cycle trails need not be as direct or as evenly-graded as regular-transport trails, since their users value scenery more than speed – consider the contrast between the Upfield trail and the Merri Creek trail.

In 2018, the Councils of Northern Melbourne (excluding Mitchell Shire Council) completed a Northern Regional Trails Strategy (ARUP 2016), covering primarily paths for cycling but including bridle paths and footpaths which cyclists might also use. The aim was to develop a regional system of paths without regard for municipal boundaries, primarily for recreational use though benefits for regular transport were acknowledged. The main benefits were expected to be better health for regional residents plus tourism benefits, as much by encouraging residents to spend their recreational time within their own region as by attracting cyclists from other regions. Again, many of the proposed paths connect and extend existing paths and much of their benefit lies in system-building, which increases the usefulness of the existing paths. Since cycle paths are much cheaper to build than traffic-bearing roads, and given that the proposed new paths are largely to be built on land already in public ownership, Arup as consultants to the Northern Region councils argued that a one-year investment in cycle paths of the order of \$300-400 million would yield benefits of similar order within a year or two of building. The benefits would be ongoing and would far outweigh maintenance costs so that the benefit/cost ratio over 30 years would be \$12 benefit for every \$1 invested – with most of the benefits accruing to the ratepayers who, along with their families, use the paths.

The strategy was jointly developed by Banyule City Council, Darebin City Council, Hume City Council, Moreland City Council, Nillumbik Shire Council and Whittlesea City Council, and is endorsed by all six and also by the State Government. Given the high projected rate of return, widespread implementation should be a high regional priority and supportive funding should be sought from higher levels of government, given the expected range of benefits associated with increased cycling activity.

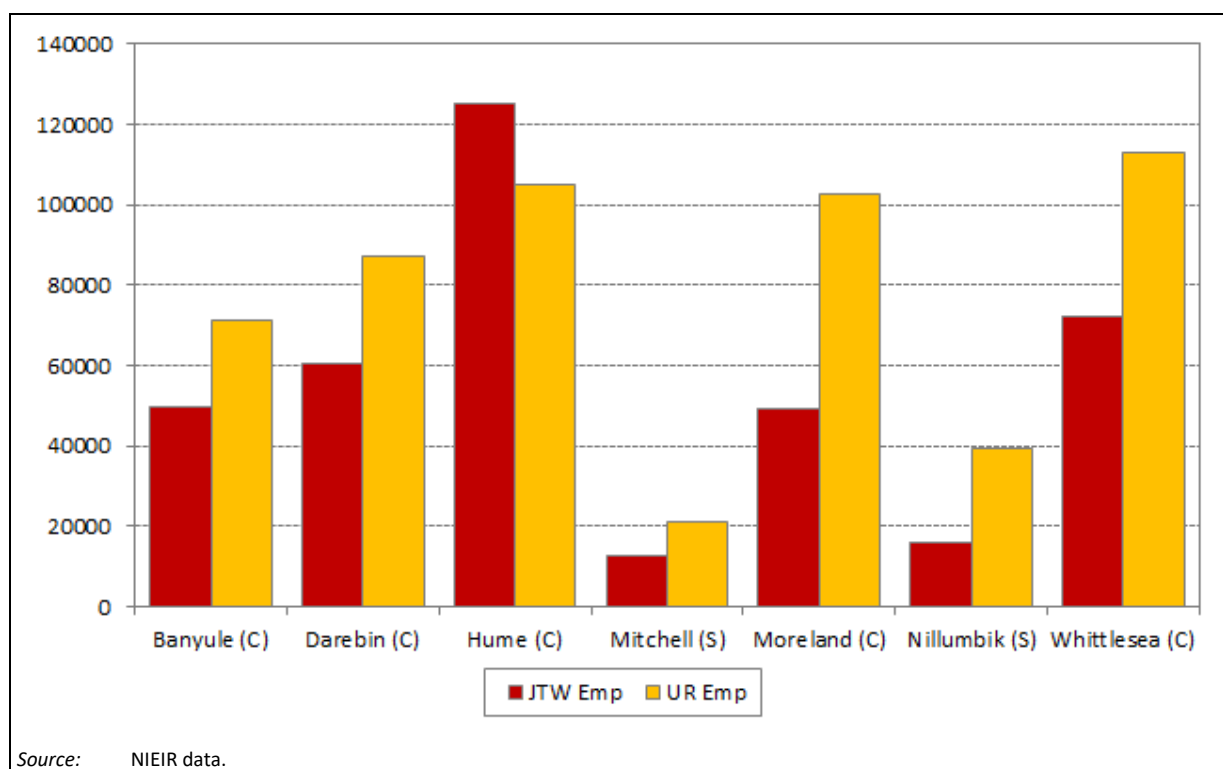
Regional Tourism Board

It is recommended that, given the potential of tourism in Melbourne's North, that the idea of establishing a Regional Tourist Board be investigated further. The benefit will be to leverage this potential to build a mature tourism sector in the region. Establishing a Regional Tourist Board will also offset the problems created, including the loss of accumulated industry investments in programs, marketing approaches and intellectual property.

4.7 A fairer North

Melbourne's North demonstrates the conundrum of a rapidly growing but diverse region. The inner north, through its process of gentrification and using former employment lands for dwellings, and those parts of the outer north with their rapid population growth and high levels of residential construction, are not keeping pace with the demand for jobs in their local communities. This places a great deal of pressure on the *Twenty Minute Neighbourhood* strategy that is so central to *Plan Melbourne*. The exception is Hume, where the number of jobs exceeds the resident workforce.

Figure 4.16: Industry (JTW) versus Resident (UR) employment by LGAs – 2019



We can draw two conclusions given the current state of affairs: first, strengthening the clusters in Melbourne's North is both an important and urgent task that requires focus; and, second, there is a need for continual improvement of transport systems, particularly those serving the northern clusters, in order to maintain productivity and economic growth and widen access to the benefits there-from.

Melbourne's North is not short of strategic assets and ideas, which, with investment, particularly around infrastructure improvements, can be leveraged to create greater levels of employment throughout the region. These include Melbourne Airport, the La Trobe NEIC, Broadmeadows and the

Wholesale markets. The markets and adjoining development land are important assets given the significant work being done through the *Melbourne's North Food Group*.

Similarly to health, NORTH Link and its various stakeholders strongly believe that residents of Melbourne's North have a right to expect access to opportunities of a similar standard as are available to any other Melbourne residents. This is a matter of equity or fairness. The opportunities for a resident to live a good life should not be systematically prejudiced by location. A number of indicators can be used to suggest areas for attention in this regard, in addition to those already set out above (e.g. such as access to natural areas and public open space) or discussed elsewhere in the report (e.g. early childhood development vulnerability, discussed in Section 4.8.1). We use job availability and the SEIFA index to shed light on urban equity as it relates to Melbourne's North.

Figure 4.17 shows the number of jobs in an LGA per 1000 residents, a useful measure of local job availability. Six of the seven Northern Region LGAs fall into the bottom half of LGAs in Greater Melbourne plus Mitchell, in terms of the number of jobs per 1000 residents. As stated elsewhere in this report, Hume has the strongest rate of local job availability of all Northern Region LGAs, at a solid 572/1000. Nillumbik has a low 262 jobs per 1000 residents, Moreland 289/1000 and Mitchell 299/1000. The Moreland figure is somewhat unexpectedly low, given its location relative to Melbourne's CBD and the spillover effect that is increasingly being seen among creative sector jobs and professional services in inner suburbs, particularly to the east. Section 4.8.3 includes further discussion relevant to this point. In terms of equitable access to employment opportunities, Melbourne's Northern Region LGAs and other levels of government clearly need to focus on both improving the rate of local job generation and on improving access to jobs elsewhere in Melbourne, which links to the case for better connectivity (discussed in Section 4.8).

Figure 4.17: Jobs per 1000 population

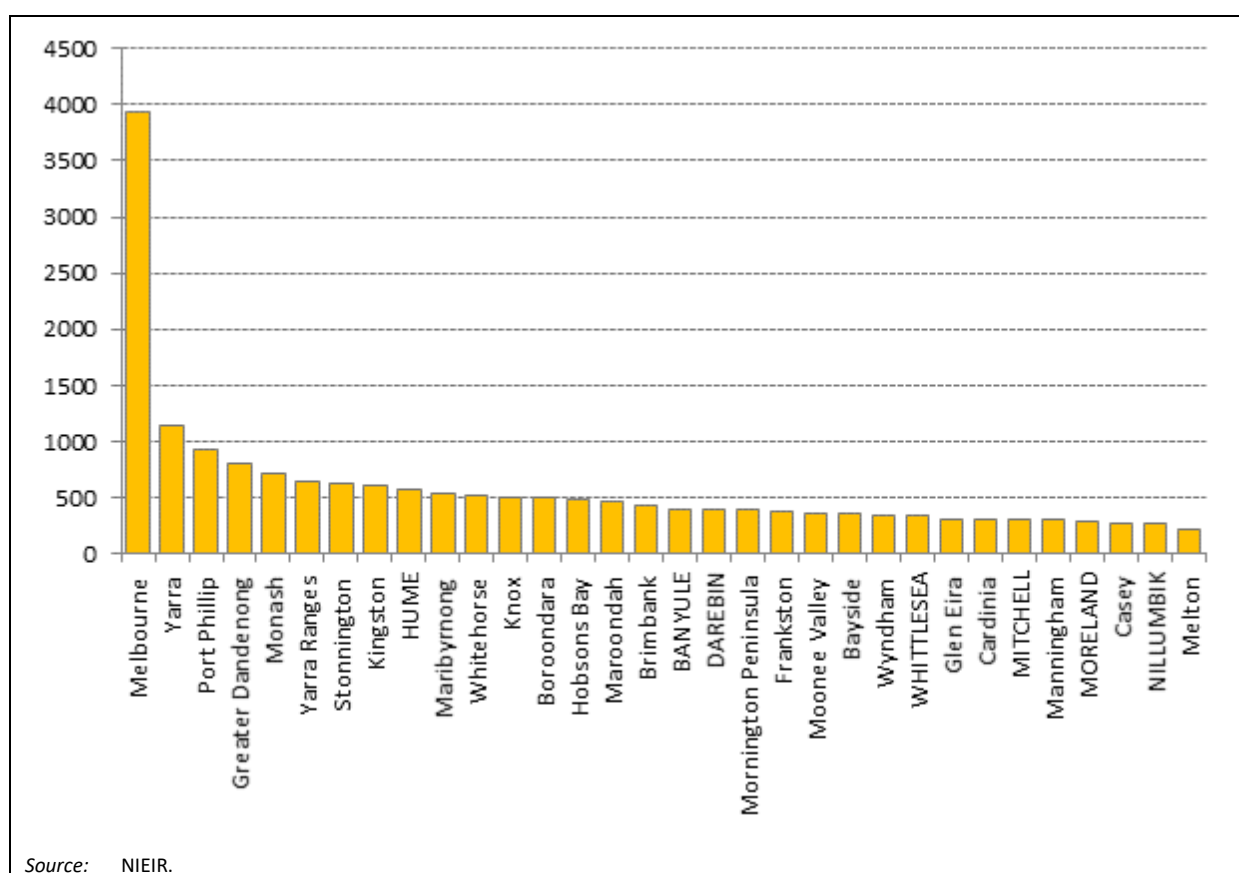


Figure 4.18 sets out the SEIFA¹² Index of Relative Socio-Economic Disadvantage (IRSD) for each LGA in Greater Melbourne and Mitchell. This shows five of the seven Northern Region LGAs in the bottom 9 LGAs and 2 (Nillumbik and Banyule) in the top 10, with Nillumbik having the highest rating of any LGA. The five low ratings suggest that the Northern Region has a strong case for priority in government programs that can improve urban equity. No other region is so heavily weighted to the low end of the SEIFA IRSD scale. In terms of infrastructure provision, suitable programs to improve equity include transport (PT and roads, but particularly PT given a focus on disadvantage), social and community infrastructure.

Figure 4.18: Index of Relative Socio-Economic Disadvantage (IRSD)

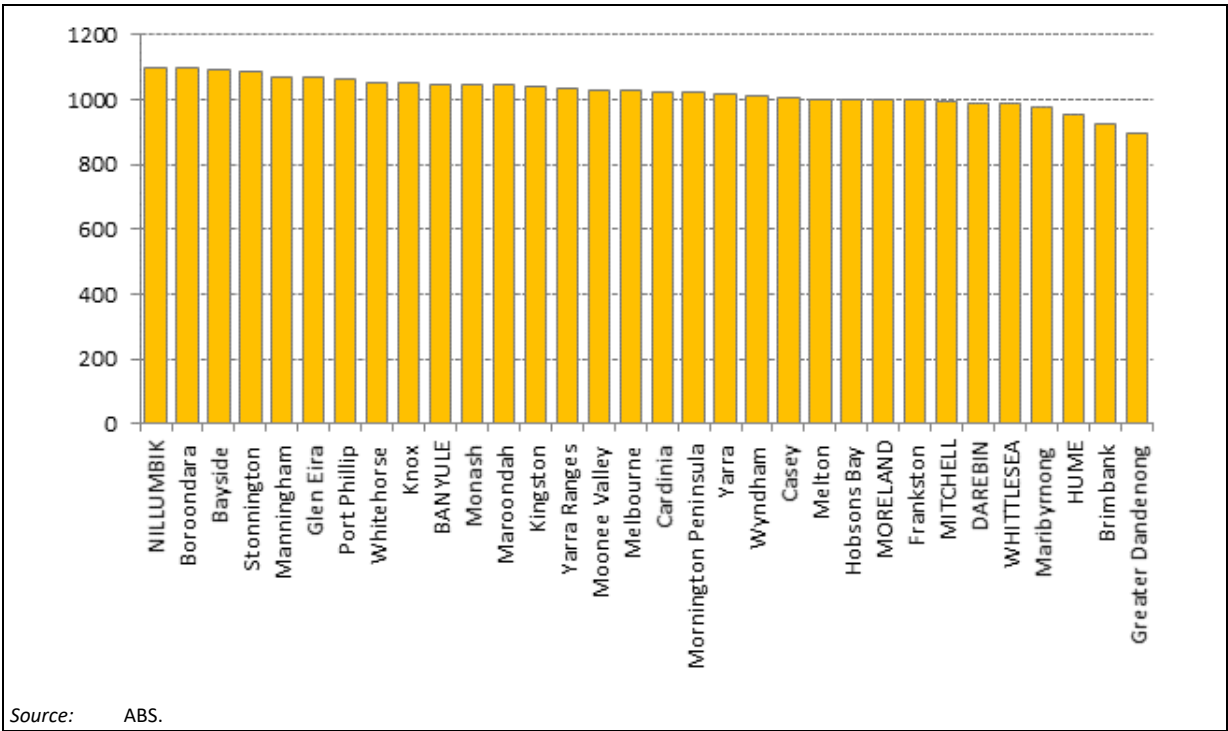


Figure 3.10 and 3.11 showed the infrastructure investment gap in Melbourne’s North and the scale of additional spending needed to close that gap. Equity as between Melbourne’s regions demands that this matter be tackled, with a range of candidate projects identified in this report, some of which deal with intraregional gaps.

Affordable housing

Housing costs comprise a substantial part of the household budget and, in highly desirable cities such as Melbourne, London, New York and Vancouver, there is a widening gap between household income and the cost of housing to buy or rent (Stanley et al. 2017). Associated with this emerging gap are patterns of spatial disadvantage and inequality. Infrastructure Victoria’s 30-Year Strategy (REF NEEDED) lists investing in social housing and other forms of affordable housing for vulnerable Victorians as one of its top three most important actions in the short to medium term. Similarly, housing affordability and living affordably is a significant issue for Melbourne’s North, as identified

¹² SEIFA = Socio-Economic Indices for Areas.

through Northern Metropolitan Partnership consultations. Other forms of housing should also be developed to align with medical tourism and the visitor economy.

The importance of increasing the supply of affordable housing is increasingly recognised as both important for reducing disadvantage and inequality but also, as evidenced in London, as important for ensuring a sustainable economy. A particular focus in the consideration of affordable housing is availability for key workers, such as teachers, police and health care workers, in reasonable proximity to employment. In the local context, *Plan Melbourne 2017 – 2050* (Victorian Government 2017) and the State Government’s Homes for Victorians policy¹³ acknowledge the role of planning mechanisms in contributing to the supply of social and affordable housing in Victoria.

Increasing the diversity of housing supply is an important part of the response, since it reflects the reality of changing population demographics but also the importance of achieving an overall increase in urban densities, as intended by *Plan Melbourne 2017-2050*. Major urban nodes and transit corridors across Melbourne’s North, which are highlighted in this report as crucial for future regional development, are an ideal location for boosting the supply of affordable housing, with attention to increasing the diversity of offerings. The Planning and Environment Act 1987 (the Act) was amended in June 2018 to include a new objective ‘to facilitate the provision of affordable housing in Victoria.’ This will enable Councils to use voluntary agreements between with and proponents for the provision of affordable housing.

Planning mechanisms such as inclusionary zoning are increasingly being used to support an increase in the supply of affordable housing but have had little application in Victoria at this time. The State Government has announced its intent to trial such provisions.¹⁴ Removing minimum parking requirements for new multi-unit developments in highly accessible locations, such as near railway stations, will also help improve housing affordability, with parking permits used to support parking opportunities for existing residents.

One part of a response to tackling housing affordability is to increase the supply of social housing, with the State announcing the intent to develop around 6,000 social housing homes and apartments. This initiative needs to be extended. Urban nodes and transit corridors in the north are again an ideal location for such developments: non car-based accessibility will be improving in such locations if the proposals in this report are adopted, which will support affordable and available public (and active) transport for those in social housing in such locations.

Housing affordability and living affordably is a significant issue for the North. Through Northern Metropolitan Partnership consultations high priority was given to housing affordability. *Plan Melbourne 2017 – 2050* (Victorian Government 2017) and Homes for Victorians¹⁵ acknowledge the role of planning mechanisms in contributing to the supply of social and affordable housing in Victoria. The Planning and Environment Act 1987 (the Act) was amended in June 2018 to include a new objective “to facilitate the provision of affordable housing in Victoria”.

Infrastructure Victoria in its 30-Year Strategy states as one of its top three most important actions in the short to medium term is Investing in social housing and other forms of affordable housing for vulnerable Victorians to significantly increase supply.

This issue is outside the scope of the current report but should be a priority of a regional development strategy which could include initiatives such as:

- incorporating universal design principles and features to ensure housing better meets the needs of those with a disability and the elderly, ensuring people can truly age in place;

¹³ <https://www.housing.vic.gov.au/homes-victorians>.

¹⁴ <https://www.planning.vic.gov.au/policy-and-strategy/housing-strategy>.

¹⁵ <https://www.housing.vic.gov.au/homes-victorians>.

- policies and incentives which encourage the delivery of social and affordable housing in the Northern Corridor growth areas.
- State Government (DTF, DELWP, DHHS and the VPA) to develop mandatory frameworks and capital funding programs to ensure the delivery of social and affordable housing outcomes or funding streams through changes to the State Planning Policy, Precinct Structure Plan (PSP) planning policy, development contributions policy frameworks, focusing on affordable rental housing and not just public housing;
- mandating the provision of social and affordable housing dwellings in appropriate locations such as transport nodes in Melbourne's North. Mandatory inclusionary zoning has been successfully introduced in various parts of the world; and
- voluntary agreements between councils and proponents for the provision of affordable housing to be mandated.

4.8 A well-educated and skilled North

4.8.1 Early childhood developmental vulnerability

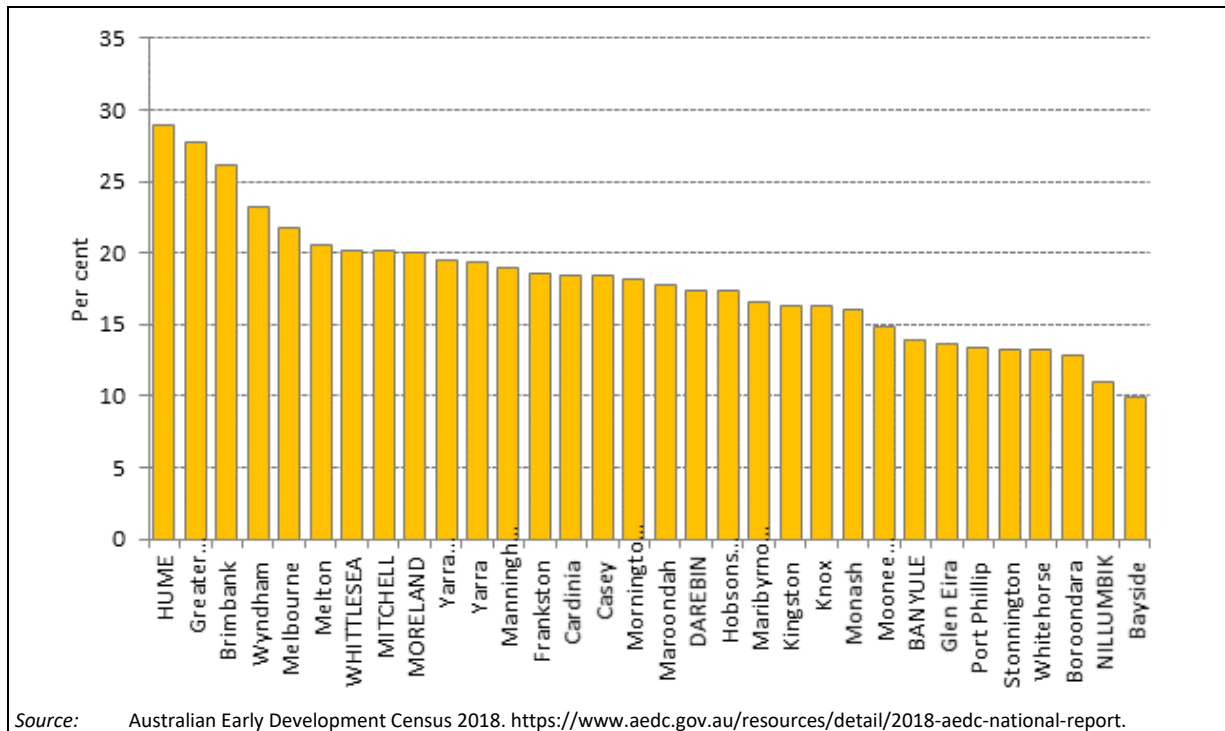
A good education and the acquisition of contemporary skills are critical for participation in society and for employment opportunities. Three indicators are used here to benchmark Melbourne's North in terms of educational achievement. The educational indicators are early childhood development vulnerability, Year 9 literacy and numeracy levels and the proportion of residents aged 15 or more with a bachelor's degree.

The Australian Early Development Census (Australian Government 2019) reports the percentage of children who, on school entry, have reached the developmental milestones of: physical health and well-being; social competence; emotional maturity; language and cognitive skills; and communication skills and general knowledge. The Australian average sits at 21.7 per cent of children having one or more developmental delays on reaching school age, the comparable Victorian rate being 19.9 per cent in 2018. Figure 4.19 shows the proportion of children with one or more developmental vulnerabilities in each Greater Melbourne LGA plus Mitchell. Three significant industrial areas (Greater Dandenong, Brimbank and Hume) have the highest proportions, all exceeding 25 per cent. A number of rapidly growing outer growth areas are close behind: Hume, Wyndham, Casey, Melton, Whittlesea and Cardinia, all exceeding the state average, suggesting lags in service provision under growth pressures, probably exacerbated by multiple disadvantages experienced by some residents. In total, Melbourne's Northern Region has four LGAs among the nine with the highest proportion developmentally vulnerable on one or more indicators. These four were among the five Northern Region that rated in the lowest nine LGAs on the SEIFA IRSD index in Figure 4.18, emphasising the urgency of tackling regional equity differentials. Nillumbik and Banyule are among the LGAs having the lowest proportions vulnerable on one or more domains and also rated highest in the Region on the SEIFA IRSD index.

As many catchments in Melbourne's North see a higher occurrence of children experiencing early development delays and learning challenges, it is recommended that early intervention service hubs (comprising allied health and autism programs) are co-located with kindergartens and primary school precincts.

A commitment to equitable infrastructure development is important. For example, Reservoir West has had a low investment in early years infrastructure and depends on profit-making services to fill the gap.

Figure 4.19: Children developmentally vulnerable in one or more domains – 2018 (per cent)



4.8.2 Year 9 numeracy and literacy

State Government Geographic profiles¹⁶ include literacy and numeracy ratings for Year 9 students in each LGA. Figure 4.20 shows the numeracy ratings and Figure 4.21 the literacy ratings. It is noteworthy that 6 of the 7 Northern Region LGAs are in the bottom 14 of the 32 LGAs in Greater Melbourne plus Mitchell for numeracy, with Moreland and Hume particularly low. On literacy, 5/7 Northern Region LGAs are in the bottom half of LGAs and 4 are in the bottom 7. It is beyond the scope of the current report to suggest reasons for this apparently poor performance but NIEIR suggests that the matter should be an important focus for NORTH Link and its stakeholders, because of the implications for life chances.

¹⁶ <https://www2.health.vic.gov.au/about/reporting-planning-data/gis-and-planning-products/geographical-profiles>.

Figure 4.20: Numeracy

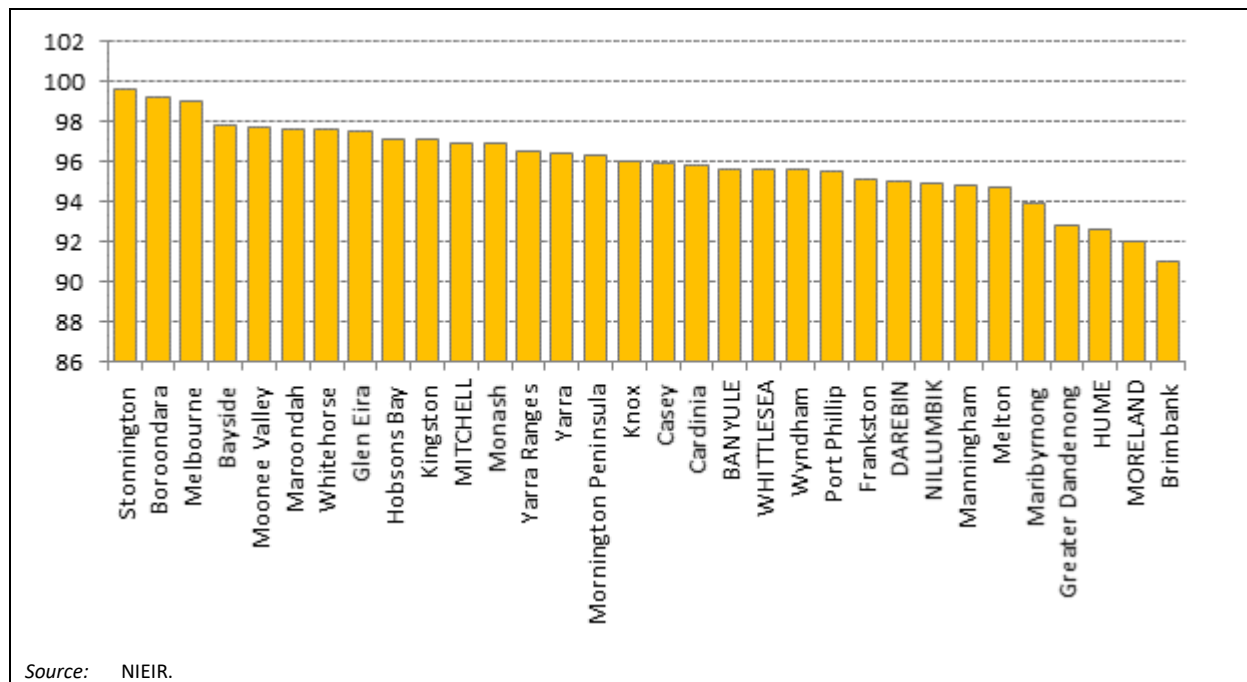
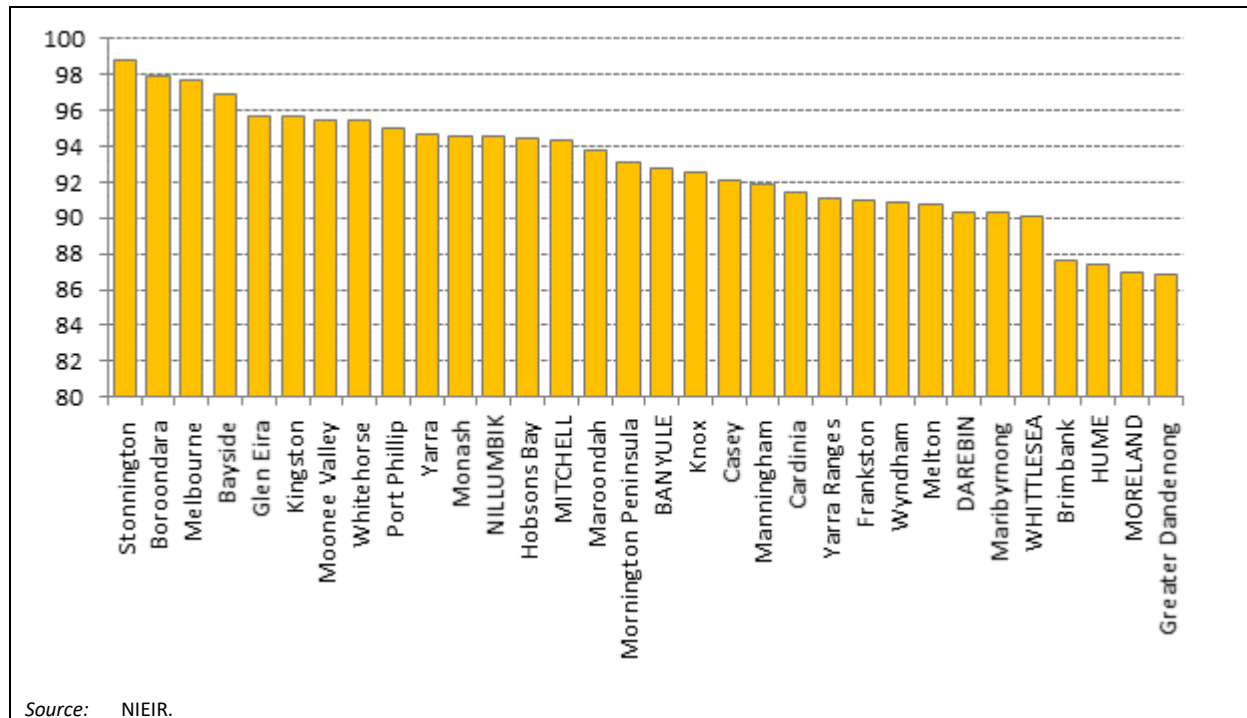


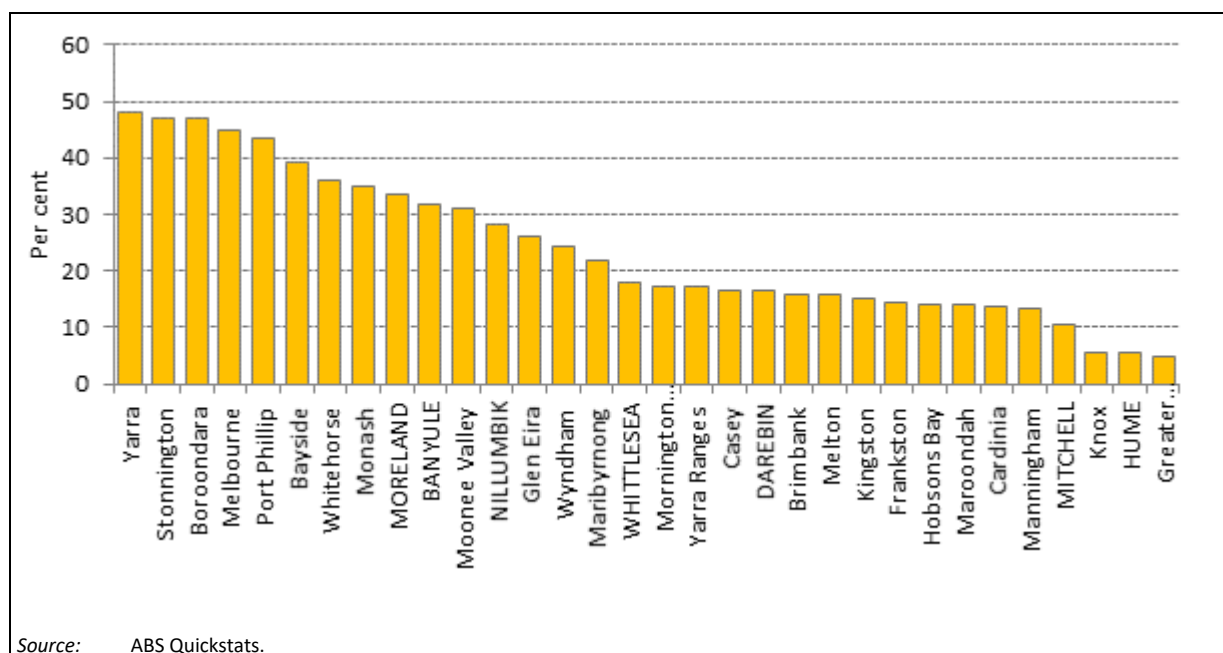
Figure 4.21: Literacy



4.8.3 Bachelor's degrees

At the other end of the educational scale are those who have completed a bachelor's degree. Looking at the 32 LGAs in Greater Melbourne plus Mitchell, the Northern Region has 2 LGAs in the top 11, 3 in the next 10 and 2 in the bottom 11, suggesting a distribution that is broadly reflective of Melbourne LGAs as whole and supportive of the solid outcome reported in Section 4.3 on regional productivity. The only notable difference is that there is no Northern Region LGA in the top 8 LGAs, most of which are inner and middle eastern/south-eastern LGAs. This suggests that lifting the profile of La Trobe University, the Northern Region's anchor tertiary institution, should be a priority, to further increase the density of tertiary educated folk in the region. Building up the profile and significance of RMIT at Bundoora is also important in this regard. Many of the initiatives included in this report will assist in raising the profile of the Northern Region's tertiary institutions, which should produce flow-on benefits in terms of the penetration of tertiary level qualifications among the regional workforce.

Figure 4.22: People aged over 15 who have completed a Bachelor's Degree (per cent)



4.8.4 Some perspectives on skills

While patterns are changing because of migration of skilled households and higher levels of engagement with education, for many decades the inner and middle regions of cities have had the highest concentrations of tertiary-qualified households and the highest rate of growth of tertiary-qualified households. In contrast, since the 1950s, manufacturing based regions located in the outer suburbs have had the highest concentration of low-skilled households and the slowest rate of decline in low-skilled households. This is now beginning to change. The clustering effect, however, still remains evident.

Figure 4.23 gives the percentage of residents with Bachelor Degrees or higher by Melbourne's North LGAs for 2006, 2011 and 2016. An increase of residents with Bachelor Degrees or higher occurred in all the LGAs with the exception of Mitchell. Moreland, Darebin and Banyule have the highest percentage of residents with these qualifications. The share of residents in Hume and Whittlesea with Bachelor Degrees or higher continues to grow.

Figure 4.23: Bachelor Degrees and higher

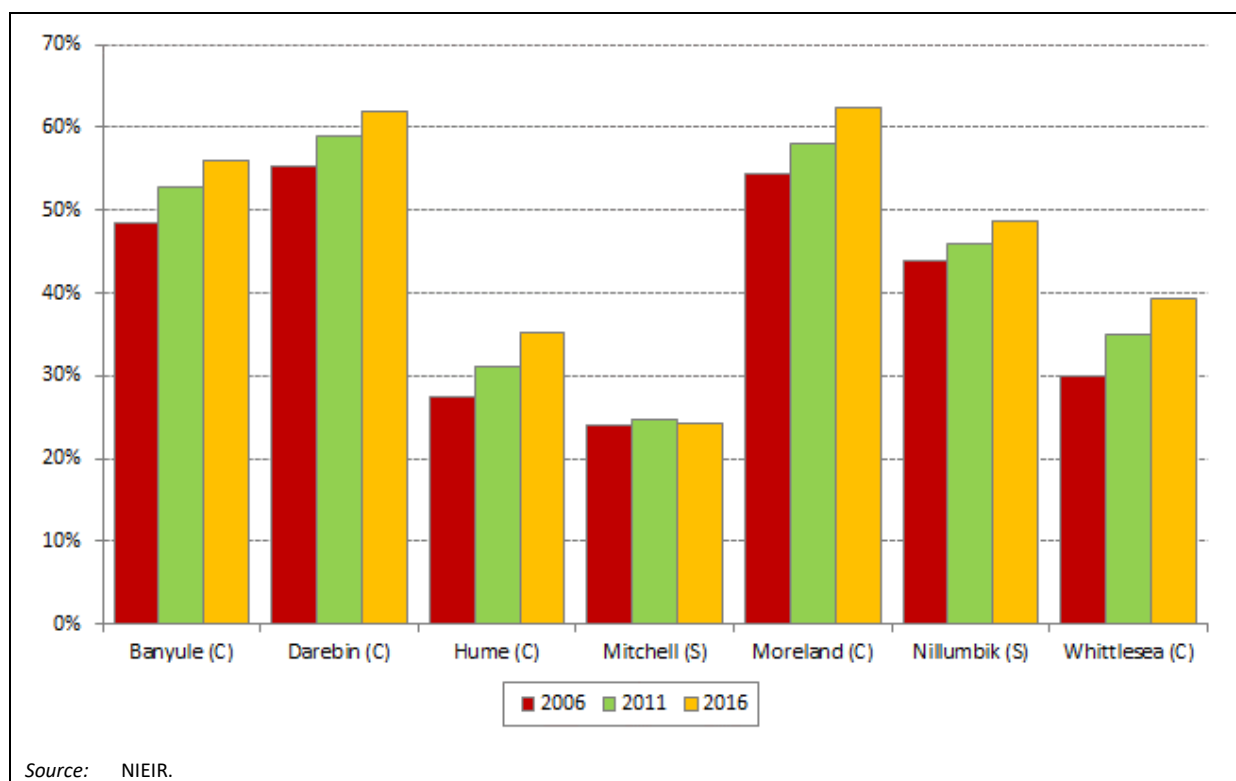
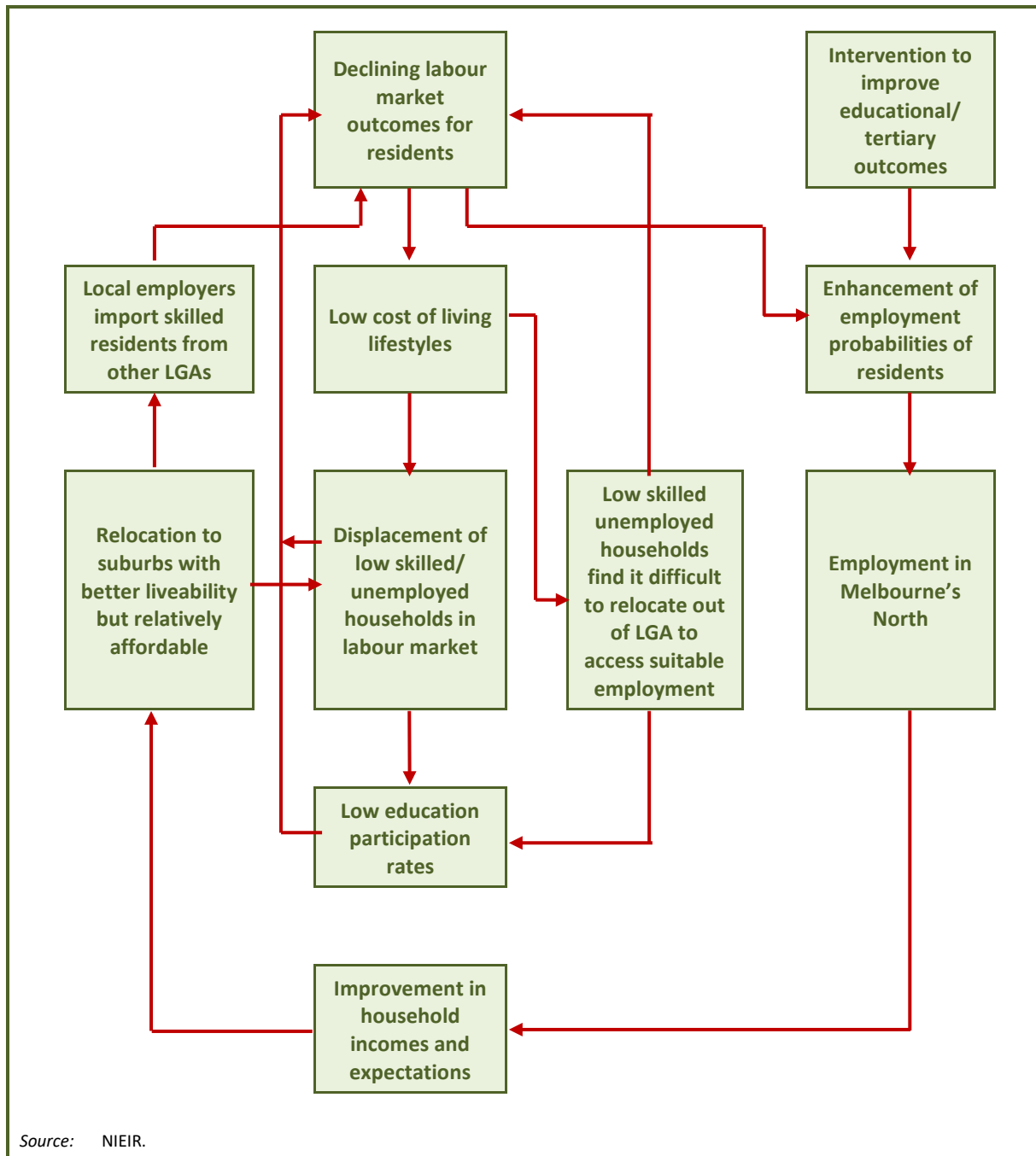


Figure 4.24 shows the vicious cycle of low skilled resident labour market outcomes. In doing so, this chart describes the importance of education and training as a pathway for individuals to change their circumstances, particularly in relation to finding secure employment. From the region's perspective the goal is to create local employment opportunities, which are enhanced if residents have the skills that match the requirements of the employers and industries in their local areas.

The need is to continually improve the skills composition of Melbourne's North households. Skills are central to the success of any region and the skills available in households within a region's employment catchment are one of the core drivers of the region's economic performance.

Figure 4.24: The cycle of low skilled resident labour market outcomes



Future skills formation

- Skills and knowhow regarding the digital economy;
- STEM workers will need to be more flexible and entrepreneurial in their thinking and learn both creative and technical skills;
- These types of workers are required when building international markets;
- Professional services are likely to grow further and hopefully to the outer regions of Melbourne's North, improving the regions skills and knowledge base;
- VET skills are also important and attention should continue to focus on assisting the TAFE sector to rebuild and rebrand, following the policy disasters of the last decade or more; and
- Because of the changes to industry and employment, individuals will increasingly need to take a lifecycle approach to their education and training needs. How receptive education and training providers are to industry change and shifts in skill requirements will have a significant impact on regional outcomes for employment. The region does not need a stranded workforce.

Research conducted for *The Future Workforce: Melbourne's North, 2015*, NIEIR/NORTH Link et al, using surveys by NIEIR and the Higher Education and Skills Group, Department of Education and Training, Victorian Government skills survey for Melbourne's North, engaging more than 800 businesses across all major industry sectors in the region, identified the following:

- 10 per cent of companies in Melbourne's North report skills shortages in their business;
- the concern regarding skills shortages increased in line with expected technological changes over the next five years, with 38 per cent of firms that expect technological change concerned about the impact of skills shortages on future growth; and
- of those firms currently recruiting, 64 per cent had some level of difficulty in recruiting the staff they needed. The latter finding (given the discussions with industry and the survey analysis for this project) relates to lack of relevant experience or qualifications, and the lack of foundation skills (particularly literacy and numeracy skills) and job ready skills.

Lifelong learning practices will become more and more important because of changes to industry structure and technology. During a working lifetime the kinds of skills an individual will need will change dramatically. Building that capacity for change and the ability to adapt skills to changing industry demand is a life skill that needs to be taught at school and beyond. The groups of skills required are:

- foundation skills that are also employability skills;
- skills that apply to a particular task within a particular occupation and industry sector;
- industry generic skills that require, for example, a particular knowledge of computer programs, relevant to all industries; and
- global knowledge skills that allow an individual to grow their career based on their knowledge of industry sectors and markets, languages, creativity and so on.

Literacy and numeracy skills are a foundation requirement for most jobs in the economy. Occupations that do not require a reasonable standard in these skills are declining rapidly. Literacy and numeracy skills are core to future employment prospects.

Hi-tech jobs are particularly important for future regional development and employment opportunities. In Melbourne's North, while the number of residents engaged in hi-tech employment is growing, the share of hi-tech jobs among all resident jobs is declining and the number of hi-tech industry jobs in the region is declining in both number and share (Figures 4.24 and 4.25). This is much to do with the end of automotive manufacturing in Melbourne's North. The trend, which is not a positive one, points to the strategy of strengthening the region's clusters, particularly the La Trobe NEICs and the continual improvement of broadband services. *The Future Workforce: Melbourne's North* found that:

The need to strengthen cluster types: clusters of industry types are immensely important in developing a contemporary economic system because attraction of contemporary high-value-adding business requires the intensification of knowledge; so co-location within industry types is likely to be more important than ever before. Once properly developed, these clusters will provide education and training organisations with the critical mass to deliver education and training for each industry.

Figure 4.25: Percentage of hi-tech industry employment, Melbourne regions (excluding CBD)

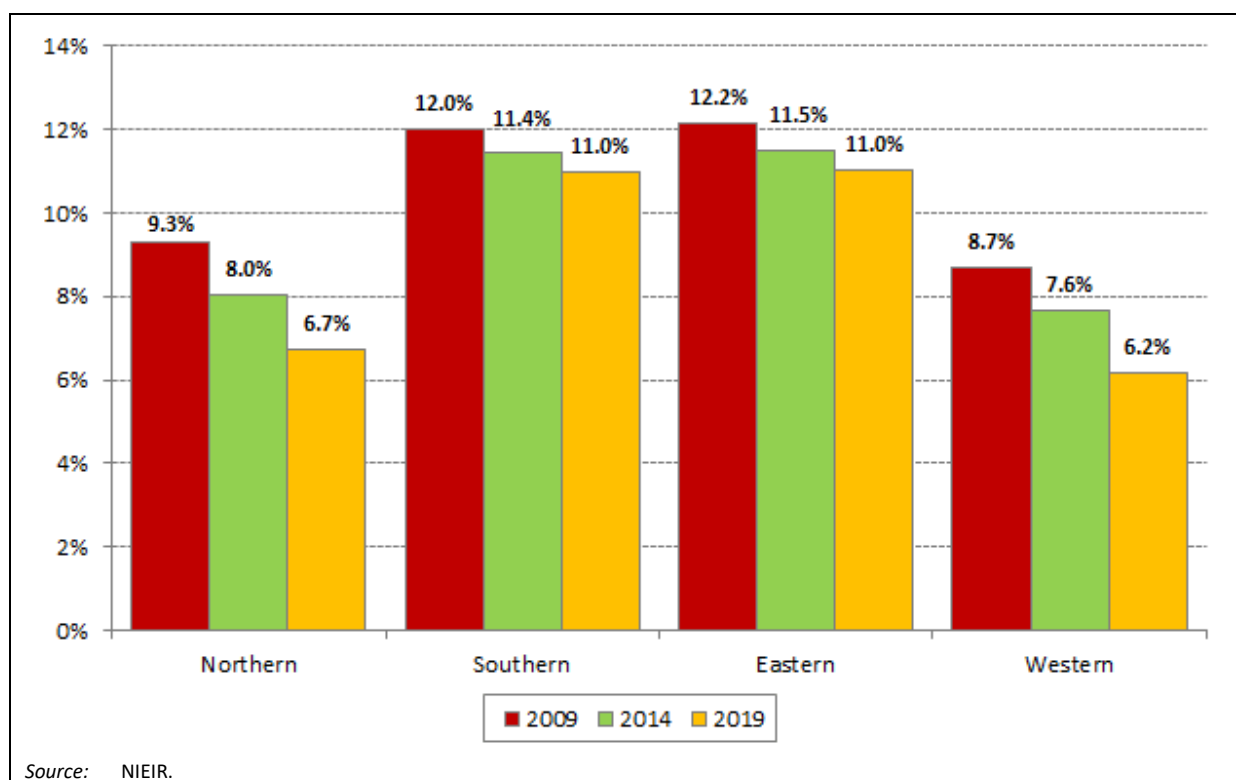
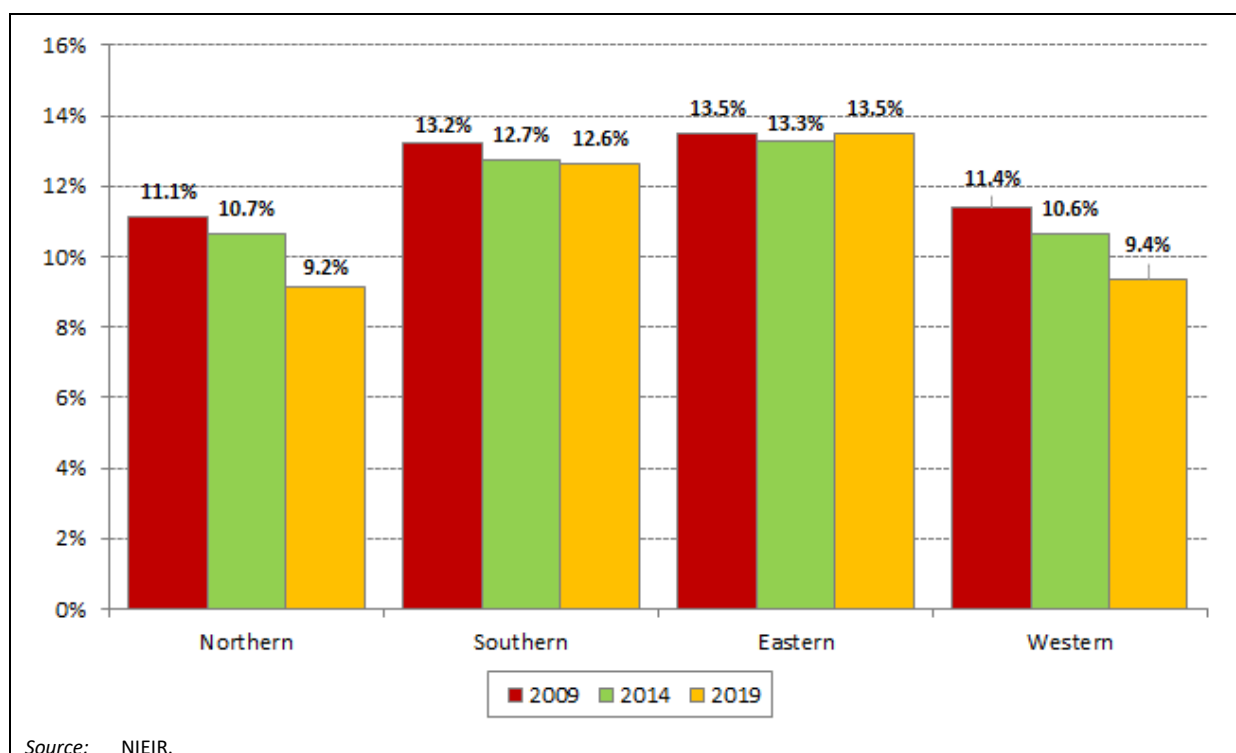


Figure 4.26: Percentage of hi-tech resident employment, Melbourne regions (excluding CBD)



Occupations in Melbourne's North

There are eight major occupation groups as defined by the Australian and New Zealand Standard Classification of Occupations (ANZSCO), Appendix C giving LGA indicators that show the occupational profile of each LGA in Melbourne's North.

Currently in Australia, the largest numbers of jobs by occupation group are:

- Professionals – 3 million plus and growing representing 39 per cent of all new jobs in the previous year;
- Technicians and Trades Workers – 1.8 million; and
- Clerical and Administrative Workers – 1.8 million

The specific occupations with the most jobs are:

- General Sales Assistants (529,700);
- General Clerks (281,800);
- Registered Nurses (278,900).

Figures 4.26 and 4.27 give occupations by place of work and place of residence as a percentage of the workforce. The composition of occupations in a region describes both industry structure and skills within the region. For residents these charts provide some understanding about household skills in the region. When the occupation charts are compared we can also begin to identify any mismatch between the skills of residents and the skills requirements of industry.

Occupations by place of work

Business, Human Resource and Marketing Professionals is a group of occupations, which are under-represented in businesses in Melbourne's North with less than half of the Melbourne Metro average. Specialist Managers, ICT Professionals, Hospitality Workers, Office Managers and Program Administrators and Numerical Clerks are all professions that are under-represented in Melbourne's North industry profile. The shortfall of ICT Professionals is of particular concern.

The demand for Education and Health Professionals in Melbourne's North is strong, as is the demand for Construction Trade Workers, Automotive and Engineering Trade Workers, Carers and Aides, Sales Assistants and Sales Persons, Mobile Plant Operators, Road and Rail Drivers, Factory Process Workers, Food Preparation Assistants and various Labourers.

Occupations by resident

The share of residents in Melbourne's North employed as Business, Human Resource and Marketing Professionals and Specialist Managers is below that of Melbourne Metro as a whole but to some extent reflects industry employment.

Figure 4.27: Melbourne's North occupations by place of work

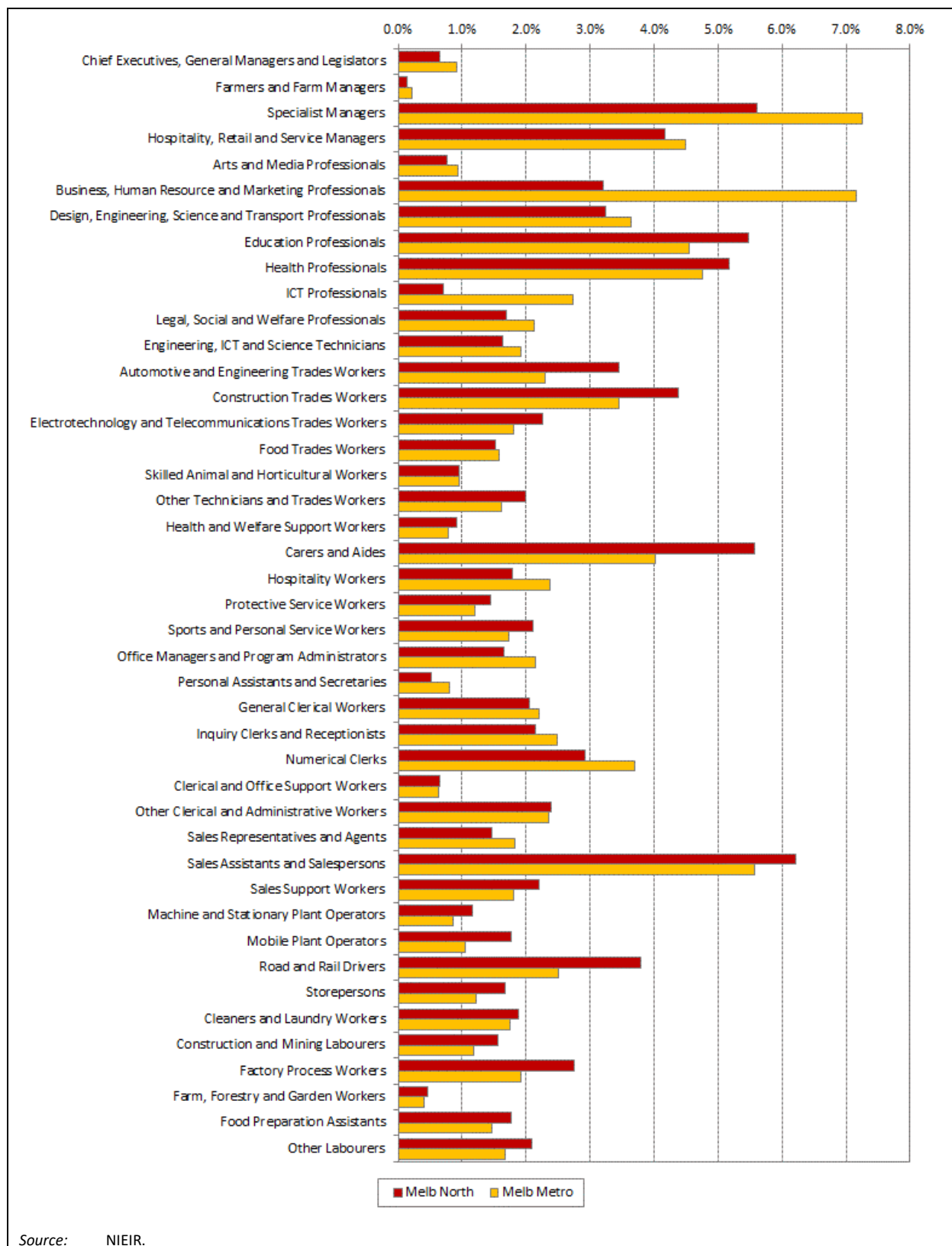
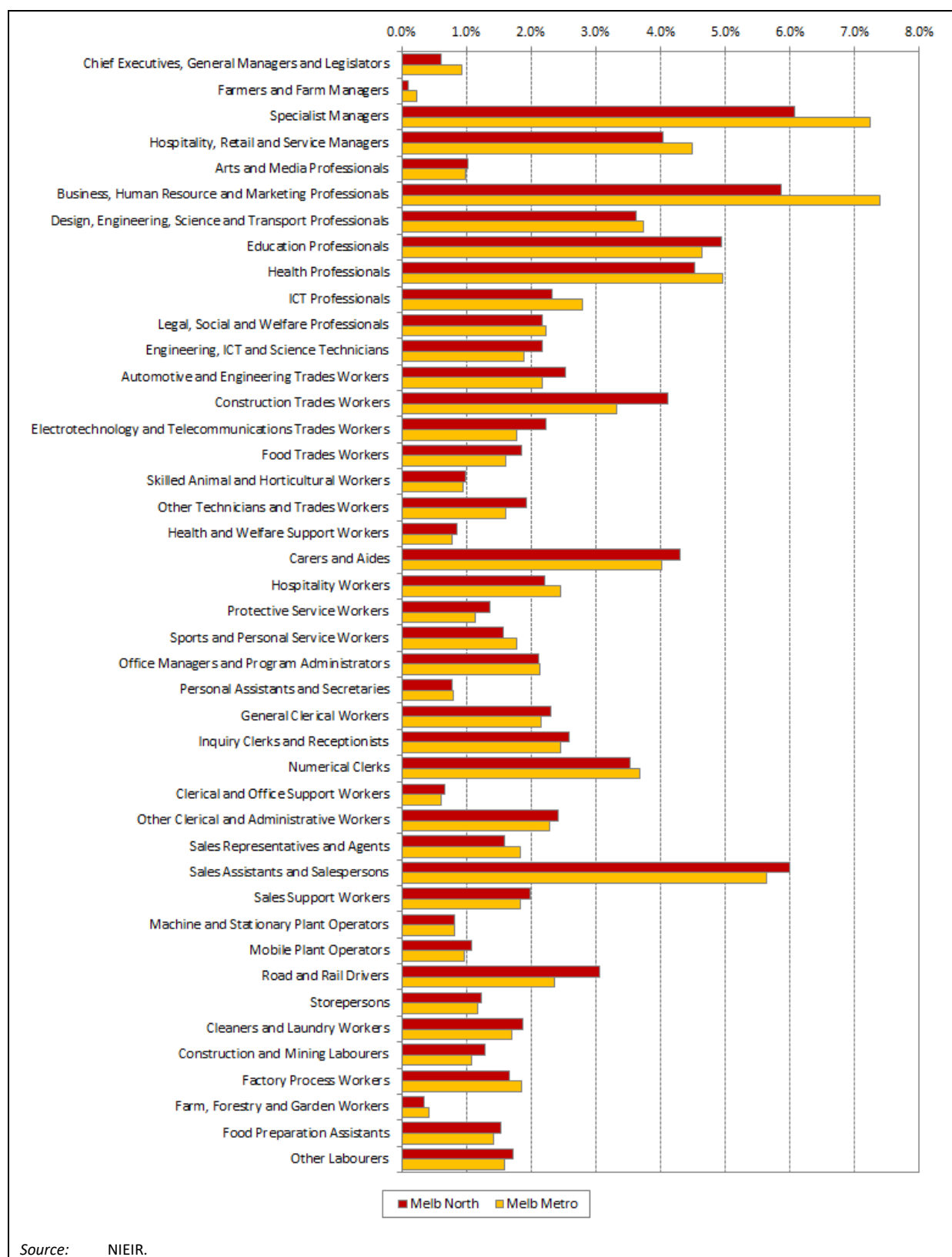


Figure 4.28: Melbourne's North occupations by usual residence



Schools and kindergarten

Over the last 2 years, the Department of Education and Training has increased its focus to include schools in established areas and kindergarten provision as well as new school developments. Work in established areas is more difficult as there are no Precinct Structure Planning Guidelines (PSPs) to provide guidance.

Announcements have been made for schools that will be opening in 2021 and 2022. In a couple of cases, roads are not built in these areas as yet. An advantage of early announcement is that planning is definite, while disadvantages include the fact that land may not be ready in time.

New secondary schools usually open with just one cohort (Year 7), while new primary schools open with all classes operating. It is very important not to open a secondary school too early, because if it is unable to offer a full range of subjects, it might not be viable.

PSPs ensure that schools are built close to public transport (planned) and community centres. New PSPs for the Beveridge area include 'walkable catchments', and the department unofficially (but encouragingly) uses the 20-minute neighbourhood as a guide to where schools should be located.

New school builds have a strong focus on delivering contemporary learning environments and supporting schools to teach in that space; very different to old-style 'chalk and talk'. Architects now look at the full spectrum of learning delivery and design according to the needs of each existing school community. This is more difficult for new schools.

In general schools are designed with more flexible spaces, with children working in big or small groups and teachers moving in between these spaces. This happens more often in primary schools where teaching can be project-based. There are restrictions in secondary schools such as curriculum/VCE and timetable issues.

Design also considers elements that will minimise bullying, for example avoiding nooks and crannies in outside areas and devolving staff rooms to maximise opportunities for surveillance.

Originally the Victorian Planning Authority predicted that there would be 15 homes per hectare built in new areas. This is now 18 homes, with more people living in them than previously predicted. This has an effect on long-term planning for schools.

Relocatables are used to deal with peaks in school enrolments. The new relocatables are good quality and well designed. When architects are planning a school, they include plans for relocatables on site, that are linked to permanent buildings and situated in groups.

The Victorian school system is strongly underpinned by choice and there has been no change to enrolment policy. Currently schools must take students in their area and, if there is room, can take additional students from anywhere. This can lead to uneven demand and difficulty with departmental responses. For example, there may be an under-utilised school surrounded by schools that are overcrowded.

Find My School (www.findmyschool.vic.gov.au/) is a new website that helps parents to locate their local primary and secondary schools. The department is waiting to see if this affects enrolments. With the current system it is not possible to force people to go to local schools. Finding ways to ensure that lower-utilised schools are more attractive is a challenge. The department's Navigator Program (www.education.vic.gov.au/about/programs/Pages/navigator.aspx) supports young people aged 12–17 years who are not connected to schools at all or are at risk of disengaging.

Regarding non-government schools, the department makes assumptions based on current market share in the area, assuming the same division will apply. Anecdotally, popularity of government schools in the inner suburbs is on the rise, while a shift to private schools is still apparent in outer areas.

Inclusion

The department has an inclusion agenda, with a swing away from stand-alone special schools. This is a complex space. It means that new schools are designed to be disability access compliant. Schools can apply for funding to pay for modifications which improve access for students, staff or visitors with disability. This is called the Accessible Buildings Program.

Tech schools

Melbourne's North has 2 Tech Schools – Banyule and Nillumbik (in Greensborough) and Whittlesea (in Epping). Tech Schools are well regarded and valuable assets to the region.

Tech Schools provide access to technologies that schools cannot afford individually. They also have specialist staff. Schools can look at programs and choose what is most suitable for their students.

Programs are aligned with curriculum and focus on employment opportunities in their specific areas. Offerings respond to the interests of young people, keep them local, make the transition to university easier and allow them to find out more about real-world careers.

3-year-old kindergarten

Most councils will need to effectively double their kindergarten infrastructure over the next 20 years, which is a big impost.

The Department of Education and Training recently met with the Hume City Council and Whittlesea City Council, and will meet with Mitchell Shire Council soon, as these are the fastest growing areas in the region and will have very rapid growth in demand for 3-year-old and 4-year-old kindergarten provision. The department is still working on how to manage pipeline infrastructure investment in this area.

Currently funding is focused on early rollout areas and this will be ramped up as time goes on. The process will be based on individual applications for funding from councils, not-for-profits and other service providers to the department.

From 2021, kindergartens will be co-located with new primary schools. This is a continuation and strengthening of what already happens in most cases. The rationale is that it will avoid double drop-off for parents, make transition from kindergarten to school easier, and involve disadvantaged families in the school community easier (which may lead to them being able to access other co-located services such as early health interventions). Key issues in co-locating kindergarten facilities in new schools are funding, implementation of 3-year-old and 4-year-old kindergarten programs and whether there is enough space at the designated school sites.

All other elements being equal, infrastructure rollout will regard disadvantaged areas and rural communities as a priority.

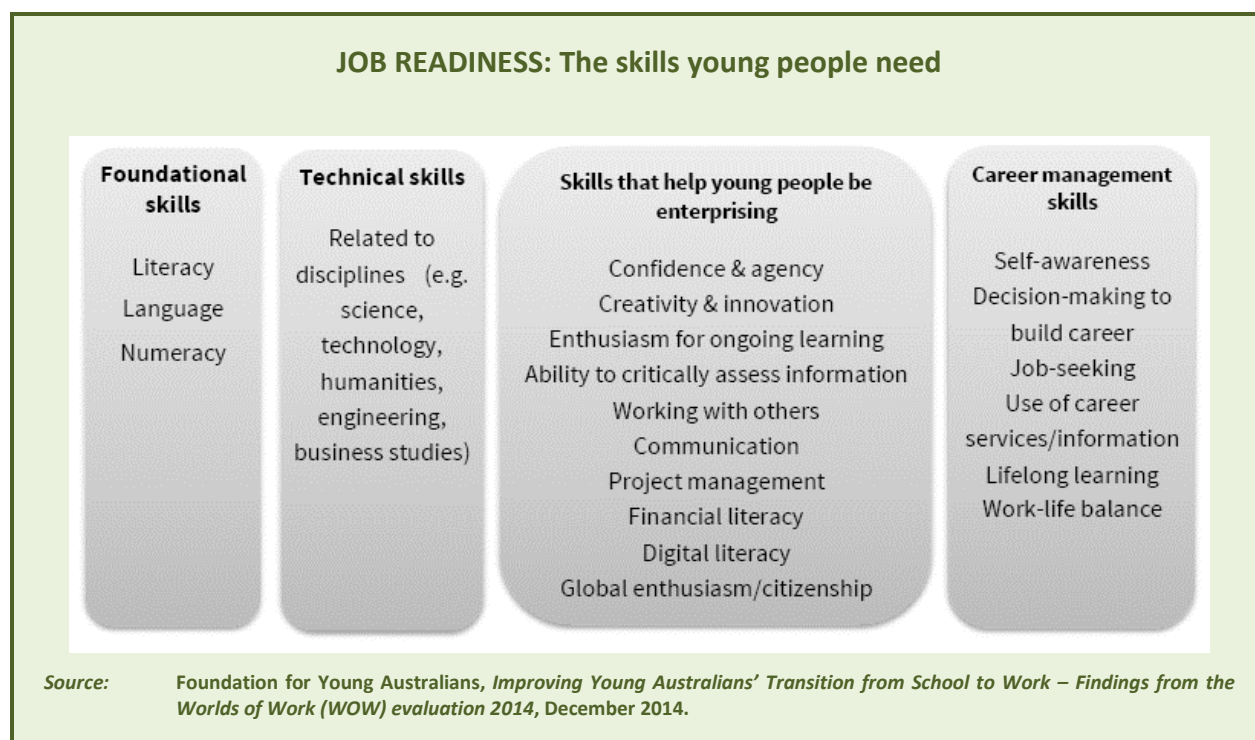
The department currently funds a 3-year-old kindergarten program for disadvantaged children. Some higher socio-economic areas already have 3-year-old kindergarten but these programs have limited hours as there are no government subsidies.

Environmental aspects

The department has established standards for new school buildings and upgrades, along with sustainable guidelines that architects and builders must meet. The preference is for rectangular buildings that can be angled on site to maximise light and environmental sustainability.

Vocational Education (TAFE)

It would be reasonable to suggest that the TAFE system is in a recovery phase, given some misguided policies of the last few years. This is not just a problem facing Melbourne's North. TAFEs are now regarded as the preferred provider for VET training. The opening up of VET training to private providers, inappropriate industrial type infrastructure, low completion rates and the underinvestment in public sector VET now require attention to ensure that the region's young people and workers who want to retrain to establish a new career have access to a stable and well-resourced VET system.



4.8.5 Conclusions: Investing in education and skills in Melbourne's North

Educational/skill outcomes are affected by many things, including the quantity and quality of associated infrastructure and services and the timeliness in their delivery. The report has noted a positive story in terms of the presence of people with bachelor's degrees in Melbourne's Northern Region but has also raised some concerns about Year 9 literacy and numeracy results and early childhood developmental vulnerabilities. Given the spatial distribution of outcomes on childhood vulnerability, it seems likely that the timeliness of availability is a significant factor here. For Year 9 literacy results and numeracy results, the concerns are more widely distributed across the Region, which suggests the need for a comprehensive assessment of reasons why. That is beyond the scope of the present report but should be a priority for regional stakeholders, on social equity grounds.

To provide a greater range of school level education options for the residents of Melbourne's North, a program to attract private schools to the region is encouraged. This is not in any way to discourage the ongoing investment in public schools, which is vital, but to increase the diversity of opportunity for education and amenity for local communities. The broader the range of educational offerings the stronger the region's foundations in attracting highly skilled households, including medical practitioners and other professionals, who want to call the region home.

Many of the issues surrounding education and training in Melbourne's North remain similar to those described in *The Future Workforce: Melbourne's North* report (NIEIR 2015). Continual improvement in educational achievement and skills composition, are central to the region's future economic prospects. The skills available in households within a region's employment catchment are one of the core drivers of the region's economic performance.

1. Youth unemployment remains problematic in Melbourne's North. Providing opportunities for young people to work is vitally important for their personal well-being and in developing the future workforce and skills formation. Proactive measures continue to be required, including the task of connecting the region's businesses with young people, schools and higher education. The LLENS are performing an important role in connecting the pathway to employment with education and industry. Their importance should not be underestimated.
2. Long-term unemployment, particularly at a time when technological changes are rapid, means that, without lifelong learning strategies, skills rust and employment prospects suffer.
3. Food process manufacturing provides a significant opportunity for Melbourne's North. These opportunities are detailed in Northern Melbourne RDA/NORTH Link's *Food and Beverage Growth Plan*. The food and beverage sector should be integrated into school education and activities, which would link through to tertiary education initiatives in the region.
4. Strategies should be developed to improve the hi-tech capacity of firms, particularly in the outer north, and to engage more of the region's highly skilled households to participate in employment locally, rather than having to travel to the Melbourne CBD for employment.
5. Links and collaborations between industry, industry organisations and tertiary institutions are becoming even more important as the knowledge economy continues to develop.
6. Capacity of SMEs in Melbourne's North to engage with research and development activities is often limited by their scale and financial capacity.
7. Hi-tech and other industry clusters are crucially important as a way to strengthen the Melbourne's North economy and encouraging specialist industry skills and hi-tech innovations and inventions.
8. The region as a whole should be proactive in ensuring local area hot-spots of long-term unemployment by location, occupation and industry are dealt with quickly by targeted programs. Disadvantaged households under-invest in education and training.
9. Research confirms relatively poor links between education providers and industry in Melbourne's North.
10. Careers guidance suffers from limited funding and is underinvested, resulting in a disjointed system and in particularly low levels of completion of apprenticeships and other courses. These are both expensive and wasteful.
11. The whole educational system needs to be far more cohesive, with employability as a key goal throughout the system.
12. Individuals must take responsibility for lifelong learning practices and this idea must be taught. For the residents of Melbourne's North who are over 25 years of age, lifelong learning activities need to be actively encouraged.

13. Low levels of foreign language teaching are creating a monolingual business culture, despite the rich cultural composition of the population. Particularly, there is a lack of Asian language skills in the non-Asian community and this is bad for business development and exports.
14. The VET sector is still problematic but is of high importance – what should be a contemporary learning experience is often located in industrial type buildings unsuited to responding to major shifts in the delivery of training.
15. The physical presence of tertiary institutions and their campuses will grow in importance and are crucial in building clusters of excellence in hi-tech and knowledge economy employment.
16. NIEIR research consistently shows that leaving school early can be a lifelong impediment to finding secure employment.
17. As Melbourne's North has gentrified, the culture of education has grown, with many migrant families keen to see their children attend university. This process has strengthened the region's capacity to deal with change in industry and occupational demand, making the future workforce more adaptable.
18. Despite the power of the macro influences, regional levers do exist to improve the employment outlook and employment distribution in Melbourne's North. Strategic investment in infrastructure including schools, is one such lever. Melbourne's North is well placed to benefit from these investments.
19. There are relatively few private schools in Melbourne's North. To be precise, only 2 out of 20 schools in Melbourne are affiliated with either Associated Public Schools of Victoria (APSV) or Associated Grammar Schools of Victoria (AGSV). Research for this report suggests that the low level of private schools in the region makes it harder to attract professionals, such as those in senior medical positions, to come and live in the region.
20. **Planning to accommodate private schools:** Consultations highlighted the rapid growth in school age children that is expected in the outer north, with numbers in Hume and Mitchell growth suburbs, for example, projected to more than triple over the 2020-2040 period (growth >40,000). Sustaining a diverse range of schooling offerings for residents, encompassing the government, Catholic and Independent sectors, will mean that the requirement is to ensure that sufficient land is available, with good proximity to target age groups and at a price that is sustainable for fee paying schools.
21. Sufficient investment in public libraries will continue to be critical with their focus on life-long learning, including delivery of both early years and adult literacy programs as well as digital literacy programs and upskilling. They are one of the few egalitarian and free institutions in this educational and life-long learning arena.



4.9 A well-connected North

4.9.1 Context

The quality of connectivity in any part of a city will be heavily influenced by local availability of the kinds of activities demanded by residents, such as employment, and the quality of transport links to such activities, and others, across the wider city. Accessibility planning recognises these two elements should be integrated: land use/activity distribution and mobility. A useful indicator of connectivity is provided by the percentage of an LGA's workers who have a commute of two hours or more. A commute of this length significantly intrudes on the time available for other personal/household activities, such as spending time with family and friends. Across Melbourne as a whole, Stonnington (3.4 per cent) has the lowest percentage of its workers with a 2 hour commute, while Wyndham (26.2 per cent) has the highest proportion. Of some concern for the Northern Region is that five of the seven LGAs in the Region are in the highest 14/32 LGAs (in Greater Melbourne plus Mitchell) in terms of the percentage of workers with a 2 hour commute. The highest proportions in the Region are in Banyule (20.6 per cent), Whittlesea (17.8 per cent), Nillumbik (16.5 per cent) and Mitchell (15.4 per cent), where both the shortage of local jobs and shortcomings in the transport system to jobs elsewhere will be significant contributory factors.

In contrast, Moreland (7.1 per cent) and Hume (8.4 per cent) have the lowest proportions of their workers having 2 hour commutes. In Hume's case, the relatively high rate of job availability in the LGA will be an important contributory factor towards this good result. In Moreland this is more about relatively good local connectivity and the substantial availability of jobs in the CBD and surrounds, since Section 4.7 showed that Moreland had a low rate of local job availability (as measured by jobs per 1000 residents).

Transport system and service improvements were high priorities in all the consultations held during the course of preparation of this Update. While not all priorities were agreed by all stakeholders, commonly supported priorities ranged from major city-scale road and rail improvements that have now been committed, such as North East Link and Melbourne Airport Rail Link, to new rail extensions (e.g. Upfield line and Melbourne Metro 2) and new/improved bus services, both trunk and local. The key trunk bus, or Medium Capacity Transit, service improvements that have been identified were discussed in Section 4.2, in relation to improving connectivity of the main regional clusters. This section focuses on other bus service improvements and on road improvements. Cycling improvements are also very important to improving connectivity in the North and regional strategies were discussed under a healthier north above (Section 4.6.4). In the fast growing outer suburbs, not surprisingly, provision of better quality arterial roads was a priority.

The benefits that accrue from the provision of transport infrastructure for households in Melbourne's North include increased travel range, lower transport costs, improved workforce opportunities, access to higher real incomes and safety benefits provided by modern transport infrastructure, particularly improved design of roads, cycle paths and pedestrian walkways. For industry, benefits include reduced costs per vehicle kilometre, improved access to product markets, reduced freight costs, higher productivity from employees, quicker times to market, higher margins or lower pricing opportunities, attraction of new firms and consolidation of industry cluster opportunities and greater supply chain efficiency. Regional outcomes from transport infrastructure investments include emissions reduction and a greater likelihood of greenhouse gas reductions per capita, greater efficiency in land use outcomes and improved competitiveness, improved workforce integration and skills matching, and greater equity in terms of labour market access.

4.9.2 Road priorities

Infrastructure Australia recently released its 2019 Infrastructure Audit (Infrastructure Australia 2019). The audit projected that road congestion costs would be \$38.8 billion in 2031, which is high, but some \$14.6 billion lower than earlier IA estimates of these costs at 2031, partly due to the increased spending on roads in recent years. The report also estimates crowding costs on public transport of a much smaller, yet significant, \$837 million in 2031.

In a technical report to IA, Veitch Lister Consulting (2019) has analysed current and projected road and public transport conditions in Melbourne, identifying the most congested links and corridors now and in 2031. Their analysis included a substantial set of post-2016 network improvements, either delivered or expected in coming years, including NE Link, M80 Upgrade, Melbourne Metro, Mernda Rail Extension, Airport Rail Link, CityLink Tulla widening, together with a number of smaller initiatives. Only modest upgrade to bus networks was assumed, with slower increases in service kilometres than for other modes. The largest increases in road traffic to 2031 were projected to be in outer areas, including on the M80 (approximately 60 per cent increase) and Hume Freeway, which is expected to be the most congested road in Melbourne by 2031 (approximately 80 per cent increase). Northern arterials running parallel to the Hume Freeway are projected to be congested, as are growth area roads feeding major links. Whittlesea-Wallan is projected to experience the largest increases in average car travel times to 2031. In the Northern Region, the most heavily congested corridors in the 2031 morning peak were projected to be Western/Metropolitan Ring Road, Hume Freeway Corridor and the Outer Metropolitan Ring Road corridor. At a link/corridor level in the morning peak, the most congested Northern Region road locations in 2031 (based on user/motorist delays) included Tullamarine Freeway (Airport Corridor), Greensborough Road/Rosanna Road, North-South Arterial Northern Suburbs (St George's Road/High Street). The Hurstbridge and Mernda rail lines were projected to be among the most congested rail corridors in 2031.

Population-weighted travel times to child care facilities, primary and secondary schools, plus public hospitals were projected to 2031. It is interesting to assess these against a 20-minute neighbourhood benchmark. At that time, the following Northern Region LGAs would not meet a 20-minute target in the morning peak by car or PT, as indicated:

- child-care = Nillumbik-Kinglake (PT), Tullamarine-Broadmeadows (PT), Whittlesea-Wallan (PT);
- primary school = Nillumbik-Kinglake (PT), Tullamarine-Broadmeadows (PT), Whittlesea-Wallan (PT);
- secondary school = Banyule (PT), Darebin north and south (PT), Moreland north (PT), Nillumbik-Kinglake (PT), Tullamarine-Broadmeadows (PT), Whittlesea-Wallan (PT); and
- public hospitals = Banyule (PT), Darebin north and south (PT), Moreland north (PT), Nillumbik-Kinglake (PT and car), Tullamarine Broadmeadows (PT), Whittlesea-Wallan (PT and car).

These listings underline the need for a car to meet key elements of a 20-minute neighbourhood, whereas the government policy intent is clearly that public and active transport should be sufficient for this purpose. This emphasises the importance of improved public and active transport opportunities in Melbourne's North.

There are a number of roads within the North that need to be upgraded to handle increasing road volumes. In particular, the outer northern LGAs of Hume and Whittlesea have experienced significant increases in traffic volumes over the past 10 years. The increases in congestion are exacerbated by the outer north's reliance on private car travel for making trips. Infrastructure programs – such as the rail extension to Mernda – have acted to relieve reliance on private car travel, but car volumes will continue to increase as Melbourne's Northern fringe continues to grow.

The inner northern LGAs of Darebin, Moreland and Banyule are limited in their capacity to upgrade existing arterial road, which are already within developed areas. The priority for these regions is to encourage private car users to seek alternative modes of travel – such as public transport and active travel. However, as the outer north continues to grow, one problem is that more road traffic will be passing through these inner LGAs to get to work.

There are a number of single lane arterial roads in the outer north that were once suitable for rural traffic, but require programs of upgrade works to duplicate and bring up to a suburban standard. This is in addition to recent arterial road upgrades, such as to Yan Yean Road and Plenty Road. These road upgrades will improve trip times for local residents and local freight networks. Integration with bus and bicycle infrastructure is needed when upgrading arterial roads, to provide a more complete and balanced set of transport solutions. Rural-type roads are often upgraded in stages – first to bring the road up to an urban standard, and in a second stage to duplicate the road to cater to increased volumes. There may be efficiency gains in implementing both stages to upgrade some projects at the same time, considering the rate of population growth in the outer areas.

The Northern Roads Upgrade package has funded the upgrade of 6 arterial roads in the outer north over 2020 to 2025. They are shown in Figure 4.29. These arterial roads are:

- Bridge Inn Road from Plenty Road to Yan Yean Road, Doreen;
- Childs Road from Beaumont Crescent to Prince of Wales Avenue, Mill Park;
- Craigieburn Road from Mickleham Road to the Hume Highway, Craigieburn;
- Epping Road from Craigieburn Road East to Memorial Avenue, Epping;
- Fitzsimons Lane intersection upgrades in Eltham and Templestowe, and Leane Drive in Eltham; and
- Sunbury Road from Bulla-Diggers Rest Road to Powlett Street, Sunbury.

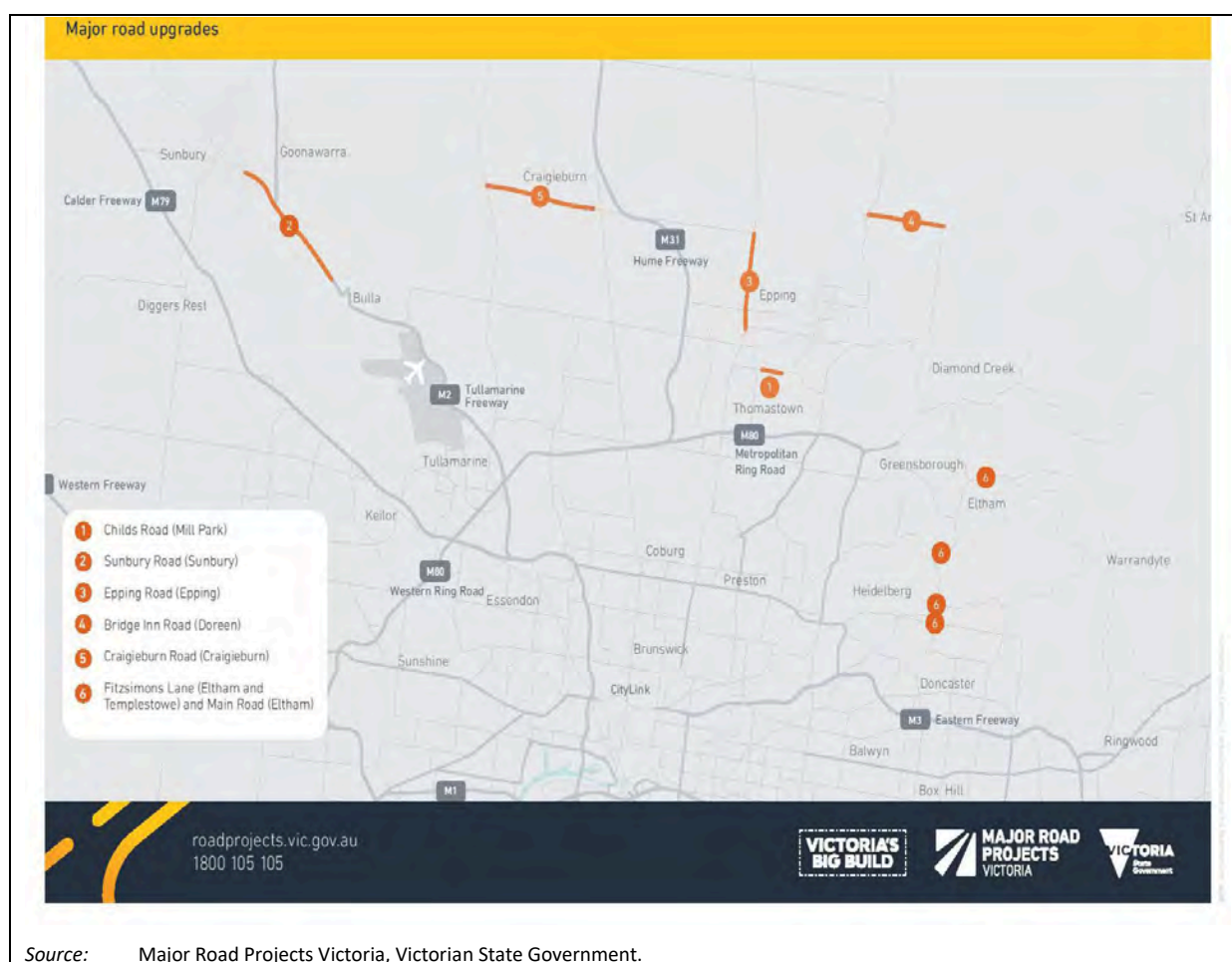
In addition, Stage 2 of the O’Herns Road upgrade has started, which will improve connections with the Hume Freeway and add new lanes.

There are several other upgrades that are required to improve the road network in the outer north, including Aitken Boulevard, Johnstone Street, Southern Link and Jackson’s Hill Link (Sunbury), Northern Highway, and Donnybrook Road. The Bulla Bypass is also required to improve traffic flows around Sunbury, as traffic is currently reliant on a single lane blue stone bridge.

Improved interchanges between the Hume Freeway and major arterial roads will be a catalyst to unlock significant development within the Northern Urban growth boundary, improving residential accessibility. Diamond interchanges at Watson Street, Camerons Lane and Gunns Gully Road are priorities for Mitchell Shire. A new Hume Freeway interchange at English Street will unlock the land in approved Craigieburn North Employment PSP and future employment land to the west.

The North has a competitive advantage in freight and logistics, and has the highest proportion of truck traffic on roads out of all the regions around Melbourne, with good access to the Hume and Melbourne Airport. As the Northern growth corridor develops, it is important to maintain and build upon the North’s freight advantage by providing suitable major road additions. This includes North-East Link, the E6, and later the Outer Metropolitan Ring Road. North-East Link will ensure that businesses that wish to establish in the outer north will remain competitive with other major industrial areas such as Dandenong. The North’s freight advantage will also be strengthened by improving the Somerton Freight Terminal and, building the Beveridge Intermodal Freight Terminal.

Figure 4.29: Northern Roads Upgrade – Major road upgrades



Source: Major Road Projects Victoria, Victorian State Government.

4.9.3 Radial transport

The Northern Horizons strategy emphasises the creation of high-productivity jobs within Melbourne's North for the people of Melbourne's North, with particular emphasis on job growth at the La Trobe NEIC, at Broadmeadows and Epping and at Melbourne Airport. To underpin this growth it is essential that the accessibility of these centres should be improved, hence the emphasis in Section 4.2 above on a new circumferential medium-capacity transit link in an arc from Monash through Box Hill and Doncaster to Heidelberg, La Trobe, Broadmeadows and Melbourne Airport – and preferably on to Sunshine and Wyndham. While this is a priority, it does not obviate the need for improvements to radial transport.

Radial travellers within Melbourne's North fall into three broad groups:

1. inner suburban residents heading to the CBD and other inner suburbs such as Parkville and Fitzroy;
2. outer suburban residents heading inner urban destinations; and,
3. outer suburban residents heading to middle-suburban destinations such as La Trobe, Epping and Broadmeadows.

The first group travel relatively short distances, for which cycling can be a possibility. As to public transport, they require frequent and convenient but not necessarily high-speed services. The second group, on the other hand, demand speed, in order to fit their long journeys into a reasonable travel time budget. The third group will generally use the same services as the second, but for shorter journeys. The Northern Horizons strategy recommends development of local employment, to reduce the need for commuter travel in all areas, together with development of middle-suburban employment nodes, to provide contra-flow traffic from the inner suburbs, convert some of the outer suburban journeys of type 2 to type 3 and to shorten a proportion of trips.

In the days before gentrification, most residents of the inner northern suburbs of Melbourne worked locally in manufacturing and allied industries, though some worked in the CBD, perhaps in retailing, warehousing or as cleaners. The collapse of manufacturing considerably reduced local employment in Brunswick and Northcote, with the result that residents increasingly found work in the CBD, Parkville and parts of Yarra. The number of people travelling from the inner north to the CBD and other inner suburbs has been growing, due to the switch from local to inner-area employment, supported by the construction of additional housing in the inner north, mainly flats, many of which have been built on former industrial sites but some of which are redevelopments of former residential areas. There are still sites available and further construction is anticipated, generating yet more passenger movements. It is expected that demand for type 1 travel will continue to increase.

In most circumstances, private motoring is the speediest means of travel within Melbourne and would hence be preferred for most travel of type 2. However, road capacity for this type of travel is limited. The only major addition to road capacity between outer Northern Melbourne and the CBD since the original nineteenth-century surveys was the Tullamarine Freeway, construction of which involved sacrifice of the Moonee Ponds Creek Valley. (Similar proposals for the Merri Creek Valley were thwarted.) The capacity of the freeway is to some extent managed by tolls and its width has recently been expanded to fully utilise the land available. Any further additions to north-south road capacity through Melbourne's North will have to be by tunnel.

It has been claimed that autonomous vehicles will support an increase in private vehicle commuting into the city centre, by increasing effective road capacity and by ensuring the self-parking of vehicles surplus to requirements during the inter-peak. These hopes are not necessarily consistent – self-parking vehicles will add to inner urban road congestion, not relieve it. A more likely use for autonomous vehicles will be to provide taxi-type service, including for transport disadvantaged people.

Assuming that Silicon Valley cannot solve the problem of CBD accessibility, the high costs of expanding private vehicle transport capacity into inner Melbourne direct attention towards the role of active and public transport, both of which are far more efficient than cars in their utilisation of land. From this point of view, five priorities address increased demand for commuting to the Melbourne CBD from the North:

- providing safe, straight paths for commuting cyclists, most of whom will originate in the inner north;
- raising tram and bus speeds, again mainly for commuters originating in the inner north;
- providing train capacity for passengers joining at inner and middle-suburban stations;
- providing express train services for passengers joining at outer suburban stations, including stations in the Mitchell LGA; and,
- providing for station access by middle and outer suburban residents, including feeder buses, cycle and car parking and in future (perhaps) autonomous vehicles.

In the inner North, creating space for cyclists and raising tram and bus speeds is likely to involve reducing space for private vehicles, be they cars or trucks. Within Melbourne's North, this creates a perceived conflict of interest between residents of the inner municipalities of Moreland and Darebin and the outer municipalities, in that the north-south arterial roads through the inner municipalities provide direct connections between the outer North and the Melbourne city centre. Attempts to improve local amenity along these arterial roads (many of which are strip shopping centres), further restricts their already limited capacity for through traffic. The experiment in Sydney Road Brunswick, foreshadowed by the Moreland City Council, will be watched with interest. However, to some extent the conflict over inner urban road capacity is more apparent than real, in that the city centre has reached (many would say over-reached) its capacity to handle private cars.

The Northern Horizons strategy emphasises greater local self-containment in the North, centred on the major northern clusters. This is expected to limit growth in the demand for transport through the inner North. However, the demand for passenger transport between the Outer North and the inner areas is likely to continue to grow, even if growth is moderated by the rise of local employment and middle-suburban employment clusters.

- The inner Melbourne employment clusters depend on the bringing together of a wide variety of skills, including skills possessed by residents of the outer north. Much of this will be on a regular commuting basis, though some will involve consultancy and liaison visits.
- Outer Northern residents will continue to visit the entertainment, educational and high-order health service facilities located in the inner areas.

Suburban rail lines, with their high capacity per track lane, are ideally suited to this task. Much of the increase in demand for travel between the outer Northern suburbs and the city centre has been accommodated by utilising hitherto spare capacity on the suburban rail lines and by extending suburban electric train services to Sunbury, Craigieburn and Mernda. There is limited scope for further increasing capacity by re-signalling the existing tracks but the time comes when additional tracks are required, particularly when it is desired to run express and local services on the same corridor.

Five radial lines connect the North with central Melbourne, though admittedly the Sunbury service is routed to the city centre through Brimbank and Maribyrnong. A major constraint on radial rail capacity in Melbourne generally is that eleven major services converge on five sets of tracks through the city centre, the effective capacity of which is further reduced by looping many services so that they traverse the CBD twice. The metro project currently under way will provide an additional pair of tracks through the CBD, on which services will be through-routed from Sunbury and various western

suburbs to the south-eastern growth area. Though Sunbury will benefit, most of the increased capacity will be utilised in providing services to the Western and South Eastern suburbs. This said, the investment will release one pair of tracks through North Melbourne, which will allow increased services on the Craigieburn and Upfield lines. Moreland City Council, Hume City Council and Mitchell Shire Council strongly suggested that a relatively small investment in connecting the Upfield line to Roxburgh Park would allow full utilisation of the Upfield tracks, which could carry V/line services and become the major corridor for suburban services originating in Wallan. The main drawback to this scheme is that outer suburban residents benefit considerably if their trains can run express over the 15 km or so into the city centre, as is now provided for trains from Tarneit and Melton. If the present dozen or so middle and inner suburban stations along the Upfield line are retained, express services will inevitably be caught behind local services.

North of Roxburgh Park a single railway line provides the public transport spine through to Seymour. Electric suburban services currently terminate at Craigieburn, north of which V/line provides a regional service of 17 trains per weekday. These services are used not only to and from inner Melbourne, but for intra-regional travel including to and from the Broadmeadows Metropolitan Activity Centre. There are proposals to extend electrification to Cloverton and eventually to Wallan, for new stations at Lockerbie and Beveridge, for upgrading of stations and for enhanced local bus connections – the stations at Wallan and Kilmore East are not particularly convenient to the established town centres. Improved public transport is important in Mitchell, since many of its new residents are relatively low income two-worker families paying high mortgages, who would greatly benefit from provisions which avoid the need for a second car.

The current metro project offers no prospect of increased services on the Mernda and Hurstbridge lines, which converge at Clifton Hill and use a single pair of tracks to the city loop. The Darebin City Council, Banyule City Council, Whittlesea City Council and Nillumbik Shire Council strongly support the Metro2 proposal, involving construction of a second metro tunnel connecting Northcote and Newport. This would be used by Mernda trains, leaving the existing tracks via Clifton Hill to the Hurstbridge line. It must create sufficient capacity to allow the construction of a line to serve Wollert.

The Nillumbik Shire Council has developed as a green wedge residential area, heavily dependent on employment outside the Shire. The Hurstbridge train line is highly valued as a commuter link to inner Melbourne, but the Shire suggests that a bus-way south from Eltham to Doncaster would also be very helpful. Unlike much of Melbourne's North, Nillumbik has a generally high-income population, but the population is ageing, particularly in the outer parts of the Shire, and improved bus services are particularly relevant for this group. A suggested service would connect Hurstbridge with St Andrews.

The State Government has lately invested heavily in a program of level crossing removal. The major works have so far taken place in the eastern and south eastern suburbs, though level crossings have been removed in Hume, Darebin and Banyule – one each. The current work program increases activity in Melbourne's North, with one crossing to be eliminated at Sunbury (assisting with the development of Sunbury town centre), one at Glenroy, five where the Mernda line passes through Darebin and a further five where the Upfield line passes through Moreland. After these eliminations, eleven level crossings will remain on the Mernda line and eighteen on the Upfield line. There are no proposals for Nillumbik, though the Nillumbik Shire Council would like the level crossings at Diamond Creek and Hurstbridge eliminated.

The direct benefits of level crossing elimination, whether measured as time savings or increases in road capacity, accrue to road traffic, but rail passengers may benefit indirectly in so far as the elimination permits increased rail service frequencies. (In this respect the large number of untreated crossings remaining on the Upfield and Mernda lines will continue to constrain rail services.) The rail operator benefits from lengths of new track and new stations which, unfortunately, increase operating costs due to lifts and escalators, though there is an offset in reduced level crossing operating costs. Theoretically there would be a clear benefit to rail passengers if the level crossing

elimination works on the Upfield and Mernda lines were combined with the provision of express tracks, though this widens the overhead structure required and, in the Upfield case, would require property acquisition. Despite pressing need, this was not done on the Caulfield-Dandenong works, which reinforces the observation that the main intended beneficiaries were road users. The particular road users benefited are mostly engaged in short-distance travel and include cyclists and local bus passengers. In Melbourne's North the program will help to integrate east and west Preston and will contribute to the redevelopment of the Coburg town centre.

As radial rail services splay out into the outer suburbs, they inevitably become further apart. In the interest of speed, the distance between stations is also generally increased. To access stations, outer suburban residents rely on the same means of transport as they use for intra-suburban journeys, chiefly cars and local buses, which means that stations become transport interchanges.

Serious problems can arise in providing commuter car parking at stations. Car parking competes with other land uses for proximity to stations and sometimes pre-empts the development of higher-value uses. Possible solutions include investment in multi-storey car parks, the restriction of commuter car parking to purpose-built stations and the provision of competitive station access by local bus services. Car parking at stations was of special concern to the Mitchell Shire Council and Nillumbik Shire Council, many of whose residents live on semi-rural properties where densities are too low to support regular bus services.

If local buses are to be competitive with cars for station access, as indeed if they are to be competitive for general local travel, attention is required to interchange design. Interchanges, be they bus-bus or bus-rail, are high points of public transport accessibility and are inevitably also places where people pause in their journeys. They should accordingly double as meeting places; pleasant places with shelter and refreshments available. Melbourne's North has too many wind-swept interchanges, located hundreds of metres from the nearest coffee shop and all the worse when they are mere adjuncts to a car park. A major excuse for the windswept designs – dispersion of vehicle exhausts – will be overcome as the bus fleet transitions from diesel to electric or hydrogen power. A second problem will remain – the particulates generated at the interface between tyres and roads – but should be manageable with good interchange design. Making the interchange the social centre of each cluster is, of course, a major change from current designs centred on encouraging retail spend, rather than the sociable networking on which clusters depend for their vibrancy.

As an example, the Banyule City Council is particularly concerned about interchange design at Greensborough. A number of bus routes converge on Greensborough, conveying commuters to and from the station and local travellers to and from the commercial and retail centre. Buses currently terminate at various points round the commercial centre and council is anxious to integrate them into one attractive interchange located beside – possibly above – a redeveloped train station. Redevelopment of the station is also a priority in view of its present poor disabled access.

4.9.4 Local public transport

General service standards

As foreshadowed elsewhere in this report, and as reflected in the analysis of Veitch Lister for Infrastructure Australia, public and active transport service levels need attention. This is required if the *Plan Melbourne 2017-2050* intent that Melbourne becomes a city of 20-minute neighbourhoods is to be achieved. Active transport, particularly cycling, was discussed in Section 4.6.4. As pointed out in Section 4.9.3, the inner north benefits from frequent tram services to the CBD. However, cross-town transport is provided by bus and the inner urban bus routes exhibit many of the shortcomings of those in the middle and outer suburbs, including high operating costs and poor service standards due to traffic congestion. However, poor services are to some extent ameliorated by short journey distances, because the density of service provision in the inner suburbs is higher than further out.

In the middle and outer suburbs bus services have an important role to play in supporting delivery of *20-minute neighbourhoods*, which *Plan Melbourne 2017-2050* describes as follows (Victorian Government 2017, p. 14):

Creating accessible, safe and attractive local areas where people can access most of their everyday needs within a 20-minute walk, cycle or local public transport trip, will make Melbourne healthier and more inclusive. Due to the specialised and diverse nature of work, many people will still need to travel outside of this 20-minute neighbourhood for their jobs.

Within the various policy Directions set out in *Plan Melbourne*, a number are particularly relevant to 20-minute neighbourhoods: Direction 3.2: Improve transport in Melbourne's outer suburbs; Direction 3.3: Improve local travel options to support 20-minute neighbourhoods; and, Direction 5.1: Create a city of 20-minute neighbourhoods. The latter points out that (Victorian Government 2017, p. 114):

A 20-minute neighbourhood must:

- *be safe, accessible and well-connected for pedestrians and cyclists to optimise active transport;*
- *offer high-quality public realm and open space;*
- *provide services and destinations that support local living;*
- *facilitate access to quality public transport that connects people to jobs and higher-order services;*
- *deliver housing/population at densities that make local services and transport viable; and*
- *facilitate thriving local economies.*

The 20-minute neighbourhood is all about 'living locally'—giving people the ability to meet most of their everyday needs within a 20-minute walk, cycle or local public transport trip of their home.

These aims are relevant not only to the location of service delivery points, but to local bus service development, since buses provide local public transport for most outer and middle Melbourne residents. The idea of 20-minute neighbourhoods has a clear focus on strengthening local access opportunities, by active and public transport, and a recognition of the particular needs of outer suburbs, needs which are growing very rapidly with the fast rate of outer urban population growth. Social inclusion, as an important policy intent, is noted in discussion of some of the policy actions to support improved local access opportunities (e.g. Policy 3.3.3: Improve local travel choices) and has been central to the development of the idea of 20-minute neighbourhoods.

The expected benefits of delivering Melbourne as a series of 20-minute neighbourhoods are substantial (Victorian Government 2017, p. 114):

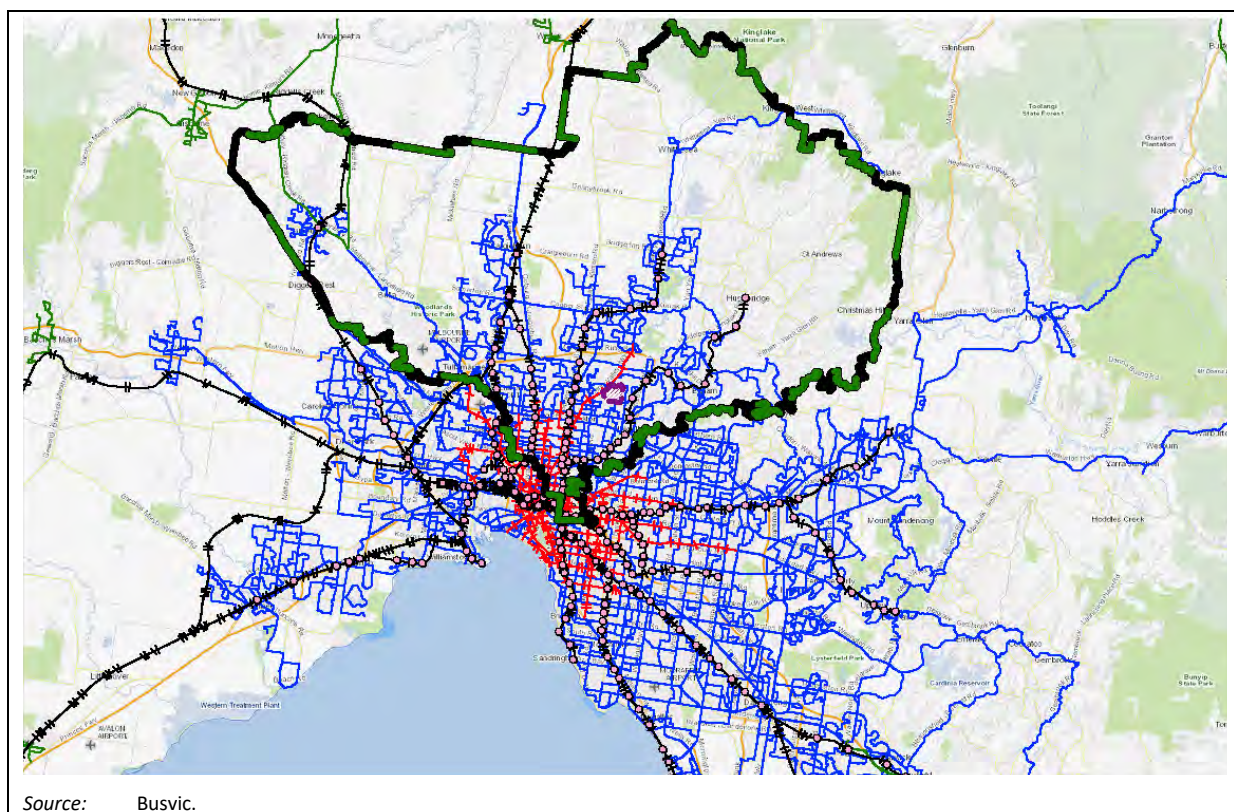
A 20-minute neighbourhood can create a more cohesive and inclusive community with a vibrant local economy—reducing social exclusion, improving health and wellbeing, promoting a sense of place, reducing travel costs and traffic congestion, and reducing carbon emissions across the city as a whole.

Most of Melbourne's inner suburbs are already 20-minute neighbourhoods, as are parts of middle Melbourne. In Melbourne's outer suburbs, improved public transport is central to delivering on 20-minute neighbourhoods, as reflected in the Veitch Lister findings outlined in Section 4.9.2, while also ensuring that access to services and other wants/needs that are not available within the 20-minute neighbourhood remains high quality (e.g. most jobs, high end medical services). This requires ensuring that land use development and local public transport integrates with high-quality trunk public transport, with planning and delivery of high-quality public transport timed to accord with the

rate of development in outer areas, rather than years later (when household second cars are already in place).

Across much of Northern Melbourne, buses are the only available form of public transport within reasonable walking distance of people's homes. Figure 4.30 shows the current bus routes across the north. Gaps in coverage in outer northern corridors are apparent, such as between Hurstbridge and St Andrews.

Figure 4.30: Melbourne's route bus services

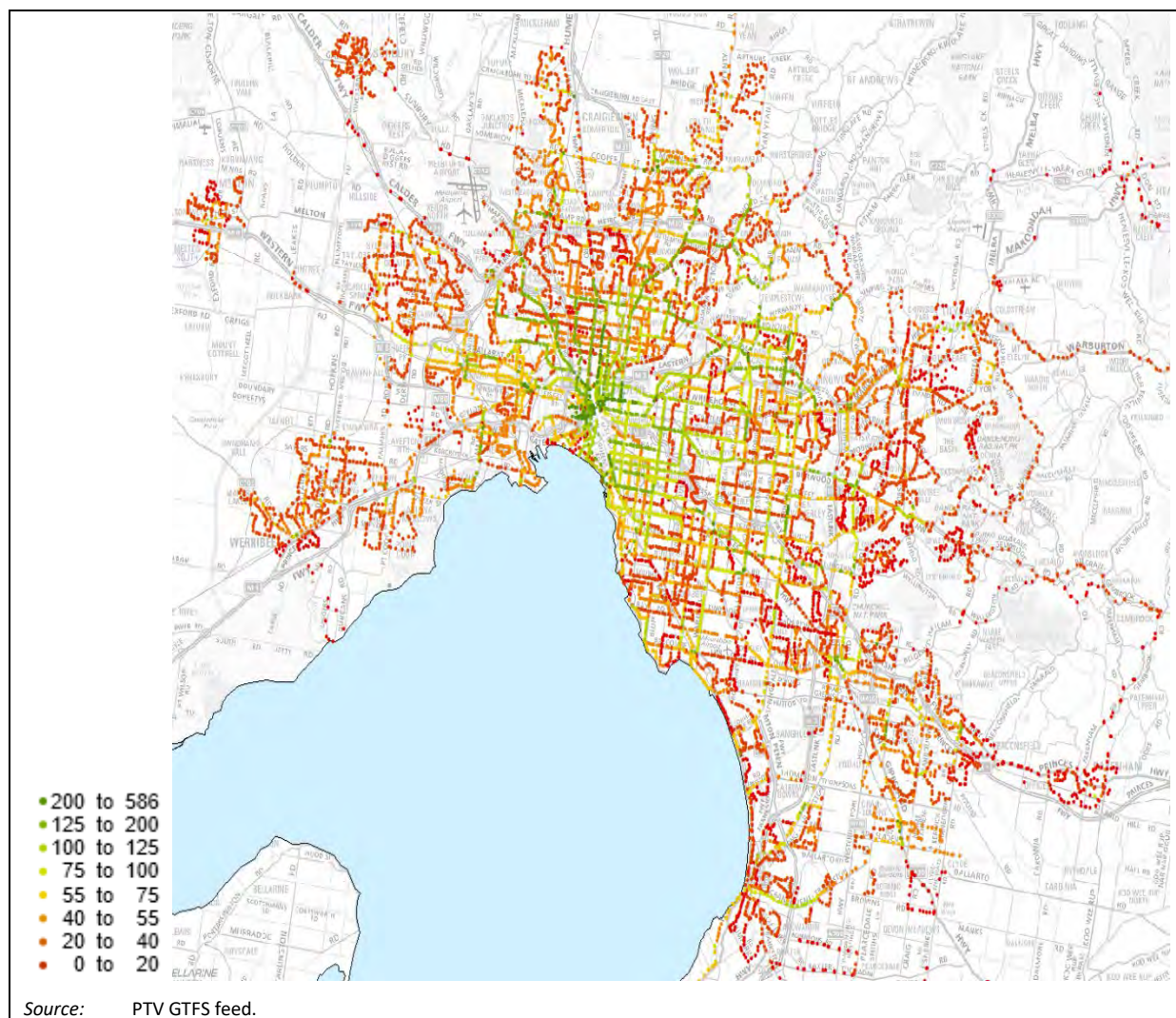


Maps of bus routes do not say anything about the level of service that is actually provided along the route for those living nearby or visiting. To get an idea of service provision in outer growth areas, which are recognised as being under population growth pressures, service data was examined for all train and bus services to Craigieburn and Mernda Rail stations. Appendix A of this report sets out the detailed findings.

Analysis of the bus and train spans of service hours and headways in Appendix A, together with the policy intent of delivering 20-minute neighbourhoods, suggests that, for improved public transport service integration, weekday buses on local routes which serve a train station, should preferably operate with at least 20-minute headways from about 5:00 am to 11:00 pm, unless rail timetables do not align with this headway. At any stop along a route, 20-minute headways over these operating hours implies a minimum of approximately 55 services a day. The number is marginally less if, for example, late evening train headways are 30 minutes and the bus service aligns with this headway; however, 30 minute train headways are not likely to be sustainable for long in a growing city. Trunk bus routes would be expected to have higher peak frequencies (shorter headways), with headways aligned with train service headways, lifting minimum daily services to well above 60.

Figure 4.31 shows the number of bus (plus tram) one-way stops/day along each route, the lowest three categories not meeting a 55 services/day benchmark. The figure, and analysis in Appendix A, suggests that service increases of around 50 per cent would be needed to meet these *minimum service standards* on local bus routes in the outer north growth areas, and elsewhere.

Figure 4.31: Melbourne’s route bus and tram services: services on a typical weekday (each direction)



Bringing this discussion together, NORTH Link proposes that planning and provision of Melbourne’s route bus network in coming years should reflect the following service standard criteria.

1. Bus services should be provided within reasonable walking distance (400m) of all Melbourne urban residences. To reduce the need for multiple household vehicle ownership in growth areas, residential populations should be based on expected numbers/locations in three years’ time, with services provided ahead of development to ease concern about a lack of mobility options.
2. Service destinations should primarily be activity centres, including rail stations, and timetables for bus services that stop at rail stations should fully align with rail service timetables.

3. Bus services whose main purpose is local social inclusion (social transit or local transit) should aim for at least 20-minute weekday headways, from around 5:00 am until around 11:00 pm, provided average route service boarding rates are at least 6 passengers/service hour (the justification for this threshold is detailed in Appendix A). If this average boarding rate cannot be achieved on a route with a scheduled service, alternative means of providing mobility options need to be explored (which could include partnering with a taxi/Uber type provider for some local services). Both Nillumbik Shire Council and Mitchell Shire Council are concerned for the provision of mobility to the ageing residents of small towns on Melbourne's semi-rural fringes.
4. These service headways on social transit services might increase to 30 minutes on weekends and public holidays and for later evening services, if that aligns with train service headways on services met by the bus service.
5. Bus services that are primarily trunk in purpose (*mass or trunk transit*), including SmartBus, should operate at peak headways that align with train headways where services interchange. Higher peak frequencies on parts of some trunk routes might sometimes be achieved by supplementing peak schedules on local transit routes.
6. Weekend service levels on SmartBus services should be aligned with train service timetables, aiming to meet all trains (rather than about one in two).

Appendix A shows that the application of these service standards would probably imply the need to increase service kilometres on existing local bus routes by around half in outer areas, on both weekdays and weekends.

Trunk bus service timetables should be augmented to fully align with rail (including SmartBus), which will mean a 10 to 20 per cent increase in weekday service levels and approximately 50 per cent increase in weekend service levels, given current rail service levels. Those rail service levels, in turn, should also be increased, since (for example) headways on the Craigieburn and Mernda lines between 9:30 am and 3:00 pm only average around 20-minutes, which is modest in rapid growth corridors. As rail headways serving growth corridors are improved, service levels on intersecting trunk bus/tram services need to be increased, to maintain integrated connectivity.

New trunk services are also needed to keep up with rapid population growth. Table 4.4 shows proposed trunk public transport improvement corridors, which will probably be Bus Rapid Transit initially, in most cases. Improvements in interchange design are desirable to ensure that interchanges become attractive meeting places. To maintain service speed, greater on-road priority is needed for both trunk bus and tram services (particularly in the inner areas). In the immediate future, detailed system design work should be a priority for the proposed trunk PT (BRT) routes, to establish key elements, such as route locations, route-of-way solutions, stop spacings and service standards (headways, operating spans), with Aitken Boulevard a good starting place, given previous work on this corridor and its catchment.

What might service increases of this order mean for bus patronage? Appendix A suggests a service elasticity of around 0.7 might be relevant for these service changes, which implies patronage increases of about 70 per cent of the equivalent relative increase in service kilometres, a solid result, with relatively stronger growth expected on trunk routes (based on experience with development of Melbourne's SmartBus network, where initial service elasticities were closer to 2, based on research at the time by Chris Loader and John Stanley at BusVic).

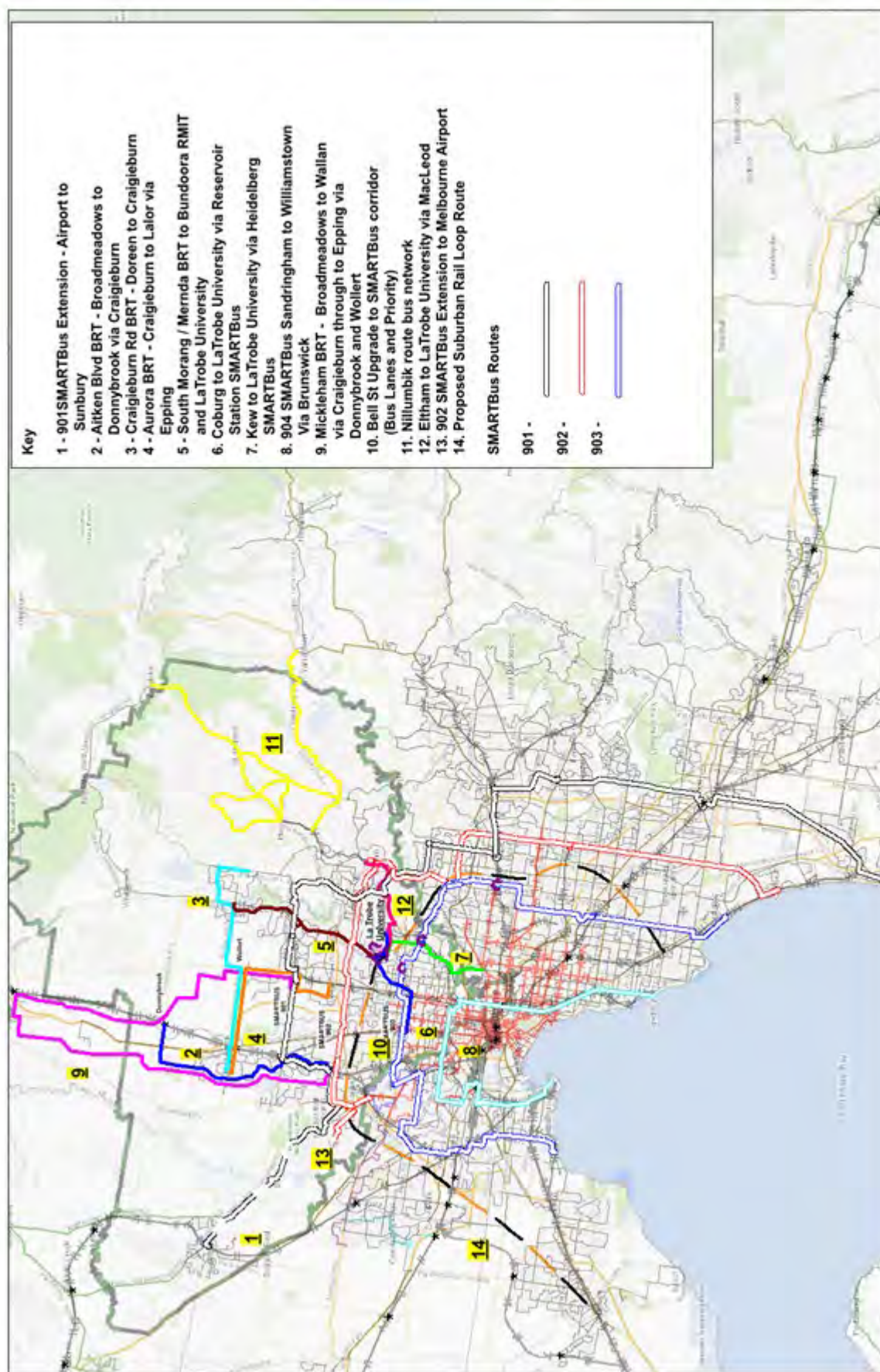
Bus service improvements

In summary, Table 4.4 sets out the Smart Bus/Bus Rapid Transit Services that were well supported in the consultations for Northern Horizons 2020. These include services to support the La Trobe NEIC or other major clusters, and/or serve residential growth areas. Figure 4.32 shows the trunk bus/Medium Capacity Transit route proposals.

Table 4.4 Bus and Bus Rapid Transit initiatives for Melbourne's Northern Region	
Northern Horizons 2016 BRT initiatives	2020 priorities
SmartBus Route 901 extension from Melbourne Airport to Sunbury (Initiative 1 in Figure 4.32).	Yes (Short-term)
Heidelberg (Austin Hospital) – La Trobe University – Bundoora RMIT – Mernda Bus Rapid Transit (Initiative 5).	Yes (ST)
Coburg Station – Reservoir Station – La Trobe University – possibly extending then to Heidelberg Station as a SmartBus (Initiative 6).	Yes (ST)
Dedicated SmartBus lanes and priority on Bell Street (Initiative 10).	Yes (ST)
Nillumbik – public bus network in rural areas (Initiative 11).	Yes (ST), including Hurstbridge to St Andrews
Aitken Boulevard Bus Rapid Transit (Craigieburn – Broadmeadows) (Initiative 2).	Yes (ST) but extend to Donnybrook Station until such time as northern extension warranted
Aurora Bus Rapid Transit (Epping – Craigieburn and Lalor – Wollert/Craigieburn Road/Edgar's Road; an interim measure pending the extension of rail to Wollert – needs Melbourne Metro 2) (Initiative 4).	Yes (ST)
Reintroduction of Route 904 SmartBus from Sandringham to Williamstown via Brunswick, stopping at La Trobe University (Initiative 8).	Yes (MT)
All arterial road widening projects should consider Bus Rapid Transit (not link specific).	Yes (ST)
Mickleham Road Bus Rapid Transit – Broadmeadows – Wallan – Epping (Initiative 9).	MT
Craigieburn Road Bus Rapid Transit (Doreen – Craigieburn) Initiative 3).	MT
New 2020 bus service initiatives or revisions to Northern Horizons 2016 initiatives	
Extend local bus service weekday operating hours to approximately 5:00 am until 11:00 pm start of last run (with maximum headways of 20-minutes).	Yes (ST)
Extend SmartBus service weekday operating hours to ~4.00am to midnight, or the latest connecting train time (headways aligning with connecting trains).	Yes (ST)
Increase weekend SmartBus service levels to equate with connecting rail headways.	Yes (ST)
La Trobe NEIC/University to Box Hill, via Heidelberg and Doncaster (part of the Suburban Rail Loop corridor and (separately) to Broadmeadows. These services should start immediately with a high frequency (minimum 10 minutes), limited stop service and, as soon as possible, become Medium Capacity Transit.	Yes (ST-MT, given scale)
La Trobe University to Hawthorn and Kew via Heidelberg (Initiative 7).	Yes (ST)
Eltham to La Trobe NEIC/University (Initiative 12).	Yes (ST)
902 SmartBus extension to Melbourne Airport (Initiative 13).	Yes (ST)

Source: J. Stanley & Co

Figure 4.32: Northern Horizons Future High Capacity Services Network



Funding

Application of bus service standards as suggested in this paper will obviously increase the budget cost for providing bus services. Assuming application Melbourne-wide of the proposed standards, the extra operating funding required will probably be around one-third. Victorian Budget Paper No. 3, *Victorian Budget 19/20: Service Delivery* (Victorian Government 2019b), indicates that metropolitan bus service provision in 2019-20 will cost the state an estimated \$741.8 million (excluding fare revenue, which probably covers about 20 per cent of costs). If this was to increase by one-third, it would become \$988.8 million, an increase of \$247 million (again excluding increased fare revenue). These costs are recurrent and, in present value terms at a 7 per cent real discount rate, this stream of annual costs is equivalent to a capital sum of \$3.5 billion additional spending on Melbourne's bus services, with an additional sum for infrastructure works to provide priority operation along congested segments of the identified trunk routes.

This is a significant sum but pales into insignificance when compared to the current and committed growth in spending on Melbourne rail services. Dealing with the backlog in metropolitan train services, and catering for future growth, is vital for Melbourne and major commitments have been made to support system/service expansion. The 2019-20 Budget lists initiatives such as:

- 75 level crossing removals (\$13.3 billion total spend, much of which will benefit road traffic);
- Sunbury line \$2.1 billion;
- Cranbourne line \$750 million;
- Hurstbridge line \$530 million;
- planning for the Suburban Rail Loop \$300 million;
- Melbourne Airport Rail \$10 billion (half State funded);
- Metro Tunnel \$10.9 billion;
- high capacity trains \$2.34 billion; and
- Metro network modernisation \$1.4 billion.

Total cost of these is around \$30-40 billion, depending on what share of the level crossing removal cost is attributed to rail. Subsequent development of a Suburban Rail Loop could add a further estimated \$50 billion, while the annual payments for metropolitan train services add a further \$1.1 billion. Given that trains currently carry only twice the number of passengers carried by bus, the suggestion that an additional \$3.53 billion be spent on bus, in capitalised terms, plus an allowance for infrastructure works to improve operating speeds (e.g. bus lanes, B-lights), is very modest relative to the commitments being made in rail. Tram could make an equally strong argument for additional funding, relative to train, given the relative passenger loads carried and small capital program in hand for trams (hundreds of millions rather than billions).

4.9.5 Motor vehicle developments

Advances in motor vehicle technology over the last century brought about significant changes in infrastructure to sustain the increasing use of private cars, including tyre and repair services, expansion of vehicle dealership premises, proliferation in the number of petrol stations – and then the contraction in their numbers as car fuel economy rose and fuel tanks increased in size – and so on.

In different ways changing vehicle technology will bring about changes of a different nature in the future, with implications for business and community facilities.

The epic changes which are looming between now and 2040 are:

- the adoption of electric vehicles – probably largely battery driven; and
- the introduction of automated vehicles.

Electric vehicles

Battery electric vehicles (BEVs) will need recharging points and the location of these will be:

- at home, probably significantly using household solar generated power;
- at workplaces, also likely from solar power; and
- in public places and especially for fast charging of vehicles “on the run”.

The scope of public charging facilities is yet to be seriously considered:

- in Europe, where adoption of BEVs has advanced most, many do not have off-street parking and, therefore, street side charging facilities have become common, but the need for this is likely to be less in Australia;
- petrol stations in Australia have morphed into convenience stores and, as the demand for fuel pumps decline, fast charging systems are likely to appear in their place. Shopping and other commercial centres are also likely to provide charging points in order to attract customers; and
- in all, there will be commercial opportunities to provide the charging infrastructure, perhaps with some public provision needed or facilities developed by electricity providers.

Obviously this change in technology will provide new development opportunities for business at the same time that some aspects of current automotive business become obsolete. These might include:

- expanded battery maintenance, reconditioning and recycling services;
- manufacture and installation of charging equipment;
- expanded opportunities for household and business solar systems; and
- new training will be required for servicing electric cars, as the need for traditional skills decline.

There is a common view that electric cars will need less maintenance than petrol/diesel cars and, therefore, dealer service employment will decline.

It is difficult to predict the timing of a significant transition from petrol/diesel vehicles to fully battery operated vehicles, but the following points are relevant.

- At this stage purchase of an electric vehicle cannot be financially justified, mainly because of their high purchase price, which typically approaches double the purchase price of an equivalent petrol car.
- Unlike elsewhere, Australian governments have not shown enthusiasm for subsidising the purchase of electric cars – some countries with ready access to hydrocarbon free electricity, which Australia does not, have boosted BEV sales with subsidies.
- Driving distance is another barrier to purchase of a BEV in Australia, because larger batteries are needed for comfortable long distance travel and batteries are the major cost component in BEVs.

In order for electric cars to become sensibly affordable in Australia, battery costs will need to fall significantly and production of electric models will need to scale up and achieve the economies of scale that petrol/diesel cars currently have. Pricing of greenhouse gas emissions would assist, provided vehicle electricity is sourced from renewable rather than, in Victoria's case, brown coal.

Electric cars will gradually increase their sales in Australia over the next 5 years, but relatively widespread adoption is likely to be 10 years away – however the pace of progress in battery technology is unpredictable.

Automated vehicles

Automated vehicles are under development, with the intent of eventually having vehicles that will be able to drive themselves without any human intervention.

At present the technology is in its infancy and experimental vehicles can only drive themselves under very controlled conditions on public roads, and will require human intervention when the technology cannot cope – a somewhat unsatisfactory compromise. Eventually it is proposed that such cars will be able to truly and safely drive themselves, with significantly reduced accidents and road injuries and deaths, as well as increasing the capacity of existing roads to carry traffic, because vehicles will be able to travel in a more coordinated way.

Based on currently known technology, fully automated vehicles will be BEVs because “refuelling” will be simpler.

While fully automated vehicles will be a long-term coming – probably about another 20 years – they will create somewhat of a revelation in travel. Briefly, vehicles will probably become self-driving taxis or delivery vans, controlled by computers and owned by large corporations, possibly including vehicle manufacturers.

The fully automated road vehicle will have major implications for road usage and public transport:

- users will be able to call up automated vehicles at any time of day and then travel to work, shopping, to meet friends, to visit hospital etc. in door to door comfort and at reduced cost compared with taxis and perhaps car ownership and without the stress of self-drive or hassle of waiting for a bus, train or tram; and
- large buses with infrequent services could be replaced by frequent and neighbourly services by mini buses to key railway stations, to the CBD and perhaps other key destinations such as airports and regional shopping complexes.

The implications of fully automated vehicles would include:

- that roads are likely to have much denser use, all day around, than at present, with road congestion increasing in high-use areas unless road pricing mechanisms seek to ensure this does not happen;
- because automated vehicles will be driving for much of their time and dropping off passengers, the need for roadside parking will diminish, as will the need for off-road parking
- on-road or nearby charging pads will be required for the vehicles;
- the capacity to work or rest in the vehicle is likely to encourage urban sprawl, unless pricing or other disincentives are introduced;

- the need to redesign urban bus and perhaps tram services will be essential to compete with the automated car service, while high speed express trains from key stations to the CBD and other popular destinations will be necessary to entice customers to use trains for all or most of each journey; and
- from a business point of view there will be some very significant outcomes, such as:
 - because automated vehicles are likely to be owned by large corporates, including car companies, sales of vehicles to private buyers and companies will fall and many dealerships will close;
 - fewer service stations as we know them will be required, so many will close;
 - new services will emerge because of the automated cars, especially major facilities to clean and check cars daily, or more frequently as required, as well as facilities that can undertake express repairs – perhaps overnight; and
 - travel by automated vehicles may well shift the shopping, medical, recreational, dining etc. destinations of people.

As indicated above, it is difficult to estimate when fully automated cars will be capable and safe enough to replace the self-driven car, but once they are then a revolution in private and public transport will occur. The best guess is that around 2030 the future and timing of such vehicles will become clearer, but road, public transport and associated services and facilities will need to be in the planning stage ahead of the transition. Therefore consideration should be given to electrification of the bus fleet.

4.10 Concluding comments

This scan across the themes that have emerged as foci for further development of the Northern Horizons Strategy underlines some commonalities of issues across the Northern Region and some important differences. Some of the important commonalities that have emerged are:

- the importance of developing major activity clusters in the Region, particularly the La Trobe NEIC, to provide an important foundation for future development of regional knowledge-based exports;
- the key role of improving connectivity, particularly circumferential trunk public transport connectivity and shorter distance local public transport and active travel opportunities (including regional cycling trails), if benefits from regional development are to be equitably shared;
- a need to increase the rate of canopy cover, as a way of contributing to improved mental and physical health, partly associated with climate adaptation strategy, the Northern Region being relatively poorly provided with canopy cover compared to Melbourne as a whole;
- the need to improve Year 9 literacy and numeracy levels in many LGAs within the region;
- closing the gap between the North and other parts of Melbourne in terms of access to the opportunities provided by our society; and
- a regional desire to lead in the development of renewable energy and climate action.

Some important differences that have emerged include those between:

- the Region's outer urban growth municipalities which are struggling to keep up with the infrastructure and services demands, and consequences associated therewith, associated with rapid population growth (e.g. childhood vulnerability, levels of social capital, long commutes, obesity concerns), compared to the challenges confronting those inner LGAs where population growth is accelerating and pressures of increasing population density are relatively more significant (e.g. provision of open space, managing the movement versus place demands on road space);
- LGAs where local job availability is relatively strong, particularly Hume, and those where it is low (e.g. Moreland and Nillumbik); and
- partly associated with the preceding point, differences in priorities between LGAs where industrial type land is an important part of the economic base and those that are primarily residential.

The detailed infrastructure priorities set out in the following chapter reflect both the commonalities and the differences.



5. Infrastructure priorities

5.1 Introduction and overview

There is a significant opportunity to improve the infrastructure in Melbourne's North. New programs of infrastructure will address gaps in the current provision of infrastructure and create new opportunities to transform the region and build upon the North's strengths.

Infrastructure priorities have been identified across several different categories of infrastructure, with just under half of the priorities related to the transport network. By comparison with the current version of the Northern Horizons Strategy (NORTH Link and ARUP 2016), this 2020 Update has a broader set of social, environmental and other economic infrastructure priorities, reflecting the growing importance of providing community assets and green infrastructure, such as urban forests and open space.

In consultation with the councils and other stakeholders, we have identified a number of new infrastructure priorities that are included in the Northern Horizons report for the first time in 2020.

New transport priorities include:

- re-focusing bus network improvements separately around trunk services and local services;
- decarbonising transport; and
- suburban rail loop as Medium Capacity Transport.

New social, environmental or other economic priorities include:

- mobile network coverage;
- tertiary education;
- community hospitals;
- renewable energy;
- urban forest and open space;
- improved storm water recycling infrastructure;
- assistive technology industry development; and
- affordable housing.

Continuing to develop the La Trobe NEIC and other Metropolitan Activity Centres is critical in attracting local employment to the North. The North has a substantial shortfall in jobs, with large numbers travelling outside the region to work. As such, we have placed a greater emphasis on initiatives that will help develop clusters within the North.

While some progress has been made in improving transport connectivity within the region, much more needs to be done. This includes addressing gaps in circumferential transport (East-West public transport routes). We have placed an increased emphasis on improving public transport services, particularly trunk and local bus services. This can deliver early regional gains across large parts of the region and at relatively low cost, as compared to heavy rail. Heavy rail is already undergoing substantial and much needed improvement.



Table 5.1 Northern Horizons 2020 Infrastructure Priorities – Transport Category				
Priority number	Category	Priority/Program	Priority type	Physical location
5.2.1	Transport	Bus network – Trunk	Address Gap/Transformative	All municipalities across Melbourne’s North
5.2.2	Transport	Bus network – Local	Address Gap	All municipalities across Melbourne’s North
5.2.3	Transport	Tram network	Address Gap	Darebin, Hume, Moreland, Whittlesea
5.2.4	Transport	Bicycle and pedestrian network	Opportunity	All municipalities across Melbourne’s North
5.2.5	Transport	Car parking at train stations in outer north	Future proof	All municipalities across Melbourne’s North
5.2.6	Transport	Decarbonise transport	Opportunity/Future Proof	All municipalities across Melbourne’s North
5.2.7	Transport	Metropolitan rail improvements	Future proof	All municipalities across Melbourne’s North
5.2.8	Transport	Grade separations	Future proof	All municipalities across Melbourne’s North
5.2.9	Transport	Electrification to Wallan and Regional Rail	Future proof/Address Gap	Hume, Mitchell, Whittlesea
5.2.10	Transport	Melbourne Metro 2	Future proof	Banyule, Darebin, Nillumbik, Whittlesea
5.2.11	Transport	Suburban rail loop/medium capacity transit	Transformative	Banyule, Darebin, Hume, Moreland
5.2.12	Transport	Arterial roads in the outer North improved	Future proof	Hume, Mitchell, Nillumbik, Whittlesea
5.2.13	Transport	Interstate and Regional Rail	Transformative	Mitchell, Hume
5.2.14	Transport	Somerton Freight Terminal	Opportunity	Hume
5.2.15	Transport	Beveridge Intermodal Freight Terminal	Opportunity	Whittlesea, Mitchell
5.2.16	Transport	North-East Link	Transformative	Banyule, Nillumbik
5.2.17	Transport	Outer Metropolitan Ring Road and E6 Freeway	Transformative	Whittlesea, Hume
5.2.18	Transport	Melbourne Airport Access	Address Gap	Hume

Source: J. Stanley & Co.

Table 5.2 Northern Horizons 2020 Infrastructure Priorities – Other Categories				
Priority number	Category	Priority/Program	Priority type	Physical location
5.3.1	Communications	Access to high speed broadband	Address Gap	All municipalities across Melbourne's North
5.3.2	Communications	Mobile network coverage	Address Gap	Mitchell, Nillumbik, Whittlesea
5.4.1	Arts and Culture	Arts and cultural facilities	Opportunity	All municipalities across Melbourne's North
5.5.1	Education	Childcare and kindergarten facilities	Future proof/address gap	All municipalities across Melbourne's North
5.5.2	Education	Primary schools	Future proof/address gap	Banyule, Darebin, Hume, Mitchell, Moreland, Whittlesea
5.5.3	Education	Secondary schools	Future proof/address gap	Banyule, Darebin, Hume, Mitchell, Moreland, Whittlesea
5.5.4	Education	Tertiary education	Future proof/address gap	All municipalities across Melbourne's North
5.6.1	Health	Community hospitals and integrated primary care hubs	Future proof	Whittlesea, Hume, Nillumbik
5.6.2	Health	Increase hospital beds in existing facilities	Address gap	Whittlesea, Banyule
5.6.3	Health	New major public hospital in Outer North	Address gap	Hume, Whittlesea, Mitchell
5.6.4	Health	Increase mental health support	Opportunity	All municipalities across Melbourne's North
5.6.5	Health	Aged care facilities	Address gap	All municipalities across Melbourne's North
5.6.6	Health	Hospital in the home	Address gap	All municipalities across Melbourne's North
5.7.1	Energy and Environment	Renewable energy	Opportunity	All municipalities across Melbourne's North
5.7.2	Energy and Environment	Urban forest and open space	Opportunity	All municipalities across Melbourne's North
5.7.3	Energy and Environment	Improve storm water recycling infrastructure	Opportunity	All municipalities across Melbourne's North
5.7.4	Energy and Environment	Waste management and minimisation	Opportunity/Address gap	All municipalities across Melbourne's North
5.8.1	Industry	Food and beverage industry park	Opportunity	Whittlesea
5.8.2	Industry	Assistive technology	Opportunity	All municipalities across Melbourne's North
5.8.3	Industry	North West Melbourne Data Analytics Hub	Opportunity/Address gap	All municipalities across Melbourne's North
5.8.4	Industry	Infrastructure Skills Roundtable	Opportunity/Address gap	All municipalities across Melbourne's North
5.9.1	Sports and Recreation	Sporting facilities	Future proof/Address gap	All municipalities across Melbourne's North

Table 5.2 Northern Horizons 2020 Infrastructure Priorities – Other Categories (continued)				
Priority number	Category	Priority/Program	Priority type	Physical location
5.9.2	Sports and Recreation	Community centres	Address gap	All municipalities across Melbourne's North
5.10.1	Clusters and Activity Centres	Metropolitan Activity Centres	Future proof	Whittlesea, Hume
5.10.2	Clusters and Activity Centres	Increase commercial and industrial space	Address gap	All municipalities across Melbourne's North
5.10.3	Clusters and Activity Centres	La Trobe National Employment and Innovation Cluster (NEIC)	Opportunity	Banyule and Darebin
5.11.1	Housing	Affordable housing	Future proof/Address Gap	All municipalities across Melbourne's North
5.12.1	Indigenous Health and Wellbeing	Indigenous Health and Wellbeing	Address Gap	All municipalities across Melbourne's North

Source: J. Stanley & Co.

5.2 Transport

5.2.1 Bus network – Trunk network

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address gap/Transformative	
Category	Transport	
Priority description		
Brief	SmartBus/Bus Rapid Transit routes are required to establish a faster and better-connected public transport network within the North. In particular, priority should be placed on rapid transit routes to the outer regions which lack public transport options and to better align with train timetables. Rapid transit routes could be established within the same corridor as the proposed Suburban rail loop to offer a short-term solution for the need to increase east-west public transport connections.	
Specific projects or targets	<ul style="list-style-type: none">■ Extend SmartBus service weekday service hours of 4:00 am to 12:00 pm, or latest connecting train time.■ Align weekday and weekend bus services with train timetables where services interchange.■ Increase weekday SmartBus trunk services by 10-20 per cent and ~50 per cent for weekend services.■ Priority traffic light access.■ All arterial road widening projects should consider Bus Rapid Transit.■ Routes that are accessible within 400m of all residences (local and trunk combined standard).■ Medium Capacity Transit in the Suburban Rail Loop corridor – La Trobe to Box Hill, Reservoir Station to La Trobe, Heidelberg/La Trobe to Broadmeadows and Melbourne Airport.■ 902 SmartBus Extensions to Melbourne Airport.■ Aitken Boulevard Bus Rapid Transit (Wallan to Broadmeadows).■ SmartBus Route 901 extension from Melbourne Airport to Sunbury.	<ul style="list-style-type: none">■ Heidelberg (Austin Hospital) – La Trobe University – Bundoora RMIT – Mernda Bus Rapid Transit.■ Dedicated SmartBus lanes and priority on Bell Street.■ Nillumbik – public bus network in rural areas including Hurstbridge to St. Andrews.■ Aurora Bus Rapid Transit (Epping – Craigieburn and Lalor – Wollert/ Craigieburn Road; an interim measure pending the extension of rail).■ Mickleham Road Bus Rapid Transit – Broadmeadows – Wallan – Epping.■ Craigieburn Road Bus Rapid Transit (Doreen – Craigieburn).■ La Trobe NEIC/University to Box Hill, via Heidelberg and Doncaster.■ La Trobe University to Kew via Heidelberg.■ Eltham to La Trobe NEIC/University via Macleod■ Provide high frequency bus services on North East Link to link Watsonia and Greensborough to Ringwood and Dandenong.
Benefits	<ul style="list-style-type: none">■ Improved connectivity to Metropolitan Activity Centres and clusters.■ Cost-effective option to improve public transport access and improve changeovers with the train network.■ Improved cluster development.	

5.2.2 Bus network – Local network

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address gap/Transformative	
Category	Transport	
Priority description		
Brief	<p>The bus network is the most accessible public transport network within the North with most residents living within reasonable walking distance to a bus stop. However the bus network is overall underutilised and services need to be improved in frequency, travel times, connectivity with other modes of transport and connectivity with activity centres, employment and education, to improve their value to residents. The local bus network serves an important purpose for local social inclusion. It is important for connecting at risk demographics to services, such as providing a transport option for youth and older persons. Access to services is especially required in the outer north, there are large gaps in bus service in the growth areas in the City of Whittlesea and City of Hume</p> <p>There are areas of Nillumbik and Mitchell that have no access to public transport and where a local bus network could fill the gaps, as an early priority.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Local network – minimum 3 buses per hour (unless poorly used).■ Local network – align with train timetables on weekdays and weekends.■ Extend local bus weekday service hours of 5:00 am to 11:00 pm.■ Increase local bus route services kilometres in outer areas by around 50 per cent on weekdays and weekends.■ Routes that are accessible within 400m of all residences (local and trunk combined standard), as estates are developed (not after).■ Priority traffic light access.■ Increase bus frequency service span across newly upgraded Chandler Highway and consider route realignment■ Bus service required – Northland Urban Renewal Precinct (NURP) to La Trobe University and Preston to NURP.■ Bus service required – North of Somerton Road.	<ul style="list-style-type: none">■ Bus service required – Sunbury to Broadmeadows.■ Bus service required – Craigieburn-Mickleham-Kalkallo Service.■ Bus services required – Epping North, Wollert.■ Mitchell – Inter-town bus services.■ Nillumbik – Establish public bus network (Hurstbridge to St. Andrews).■ Increased bus frequency and hours of operation – Northern areas of Moreland.■ Upgrade existing east-west bus routes including 504, 506, 508, 510 and services improvements to 551.■ Weekend and public holiday services to Kilmore Train Station.■ More frequent services, and larger service areas in Wallan, Seymour and Kilmore.■ Extending the service to other large and growing communities in Mitchell Shire including, but not limited to, Beveridge and Broadford.
Benefits	<ul style="list-style-type: none">■ Improved connectivity to major activity centres and clusters.■ Improved access for transport disadvantaged people.■ Cost-effective option to improve public transport links.	

5.2.3 Tram network

Physical Location	Darebin, Hume, Moreland, Whittlesea	
Priority Type	Address gap	
Category	Transport	
Priority description		
Brief	Darebin and Moreland are well served by Melbourne’s tram network and the 86 tram reaches up to RMIT Bundoora campus in Whittlesea. The tram network serves Melbourne’s inner suburbs and provides passengers with connecting services to rail. Improvements to the current tram network have been identified for Nicholson Street, Sydney Road and Plenty Road. There is also the opportunity to increase the coverage of the tram network within the inner suburbs, particularly to connect with the La Trobe National Employment and Innovation Cluster. The tram network should also be extended along Plenty Road (Route 86) and the Route 59 tram needs to be extended to Melbourne Airport (59) for commuters.	
Specific projects or targets	<ul style="list-style-type: none">■ Greater customer accessibility and safety by increasing number of low floor trams (e-class trams).■ Segregation of trams from traffic.■ Priority measures through intersections.■ Improve frequency of services, particularly over weekends.■ Route 11 extension to Reservoir Station.	<ul style="list-style-type: none">■ Increased frequency – Nicholson Street route.■ Extend and Upgrade 86 (Stages 2 and 3).■ Extend 59 tram to Melbourne Airport.■ Tram route to Northland Urban Renewal Precinct.
Benefits	<ul style="list-style-type: none">■ Safety improvements for all customers and improving access to the network for those with mobility issues.■ La Trobe cluster access and development.	

5.2.4 Bicycle and pedestrian network

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity	
Category	Transport	
Priority description		
Brief	<p>The Northern Region has a strong bicycle network with one of the highest proportion of users (especially within the inner regions). The North has the advantage of being able to use creek and river corridors to provide off-road cycling opportunities for recreational and commuter users. However, there remains significant gaps in the network for dedicated space for cyclists.</p> <p>All the priority bike paths as listed in the Northern Regional Trails Strategy should be built, as well as the proposed routes as identified within the future Principal Bicycle Network. Several bike paths as identified in consultation with councils have been listed below (non-exhaustive). The bicycle network serves both commuters and recreational users and should provide trails for both uses. Gaps in the network need to be filled and segregated lanes need to be in place along major arterial roads, for safety and to shorten commute times and encourage commuters off recreational tracks. The bicycle network should continue to be strengthened and be an integral part of the transport network over the long-term.</p> <p>Roll out of 20-minute neighbourhoods requires attention to active transport for local access. Walkability needs to be a major focus for all councils, with state support. Safe walking access to local activity centres should be the starting place.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Principal bicycle network should provide connections between activity centres and other town centres.■ All town centres should have continuous bicycle lanes and include secure parking facilities.■ New and upgraded arterial roads should have bike lanes.■ Implement the Northern Regional Trail Strategy.■ Segregated Lanes.■ Bike path – Merri Creek – Bendigo to Fitzroy/CBD.■ Implement Strategic Cycling Corridors.■ Bike path – Diamond Creek to Hurstbridge Trail.	<ul style="list-style-type: none">■ Bike path – Wattle Glen and Hurstbridge.■ Bike path – Wallan to Heathcote Path.■ Bike path – Darebin Creek Trail.■ Increased pedestrian friendly crossings in major activity centres.■ Pedestrian overpass over rail line in Diamond Creek.■ Safe walking paths to local activity centres.■ Pedestrian friendly footpaths and bus/tram stops (universal access).■ North South route through Ivanhoe, Heidelberg Heights and West Heidelberg.■ Complete shared user path from Plenty Road to the Plenty River Trail.
Benefits	<ul style="list-style-type: none">■ Improved health outcomes such as reduced obesity, and improved cardiovascular health.■ Environmentally friendly form of transport.■ Low cost to build and maintain.■ Improved connectivity between town centres, employment and education.■ Reduces congestion on roads.	

5.2.5 Car parking at train stations

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Future proof	
Category	Transport	
Priority description		
Brief	<p>To encourage greater use of Melbourne’s railway network, transport links between railway stations and residential areas need to be strengthened. The majority of train patrons walk to the station, followed by catching either a tram or bus, private car travel and then bicycle.</p> <p>Car spaces at train stations are heavily used when they are available, with places filling up quickly during the morning peak indicating a high latent demand. Greater availability of car parking at train stations encourages commuters without adequate public transport links to take the train.</p> <p>The need for increased car parking at train stations should be balanced against the opportunity cost of increasing capacity and investment in other forms of active transport. Land may be better utilised for other purposes, especially within the inner suburbs, but programs of sealing currently unsealed car parks may be beneficial to the inner suburbs to better utilise the current space available. The Outer Northern regions are heavily car dependent and less space constrained, and may benefit from additional car parking spaces.</p> <p>The best way to encourage greater use of the railway network is to increase other feeder traffic to train stations such as improvements to the bus network and providing secure bicycle storage facilities. Bus and tram links should be designed to align with the train timetable to minimise changeover times.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ More space for car parking in the middle to outer regions.■ Craigieburn Line – Glenroy Station.■ Upfield Line – Merlynston Station.■ Improve accessibility of train stations for disabled and special needs.■ Improve pedestrian access.	<ul style="list-style-type: none">■ Bicycle storage facilities at all train stations.■ Higher frequency bus services to train stations.■ Bus service timetable alignment to train service timetable.
Benefits	<ul style="list-style-type: none">■ Reduces north-south car traffic in morning and afternoon peaks.■ Encourage use of less carbon intensive transport.■ Improves access and connectivity within the region.	

5.2.6 Decarbonise transport

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity/Future Proof	
Category	Transport	
Priority description		
Brief	<p>The transport sector is the highest carbon emitting sector behind electricity generation. In the long-term the transport sector needs to significantly reduce its reliance on fossil fuels if Australia is to meet the commonly stated goal of net-zero emissions by 2050.</p> <p>Means of reducing transport emissions include encouraging public transport use or active travel, moving to electric vehicle technologies over internal combustion engine vehicles, increasing efficiency in freight (address congestion, use rail).</p> <p>Currently, the business case for owning an electric vehicle is better for vehicle types that have higher annual travel requirements, due to savings on fuel and maintenance (distance-based costs). Electric buses and trucks should be considered and trialled.</p> <p>Private ownership of plug-in electric vehicles remains very low in Australia. There are steps that the Northern Region can take to assist in promoting plug-in electric vehicle ownership and use. This includes better access and availability for fast charging infrastructure; and converting council fleet vehicles to electric, which will promote use and help to establish a second hand market for electric vehicles.</p> <p>In order to reduce emissions, plug-in electric vehicles need to be charged from a low carbon intensive source of electricity. The Victorian electricity grid is heavily reliant on brown coal power generation. The proportion of renewable energy needs to increase to reduce total lifecycle emissions; alternatively, promoting local renewable energy projects and rooftop solar will offset emissions.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Trial electric buses.■ Trial electric trucks.■ Roll-out electric vehicle fast charging stations.	<ul style="list-style-type: none">■ Support greater uptake of renewable energy in transport (primarily state and national level matter).■ Encouraging use of public transport over private vehicle use.
Benefits	<ul style="list-style-type: none">■ Lower maintenance costs and reduces reliance on foreign oil imports.■ Reduction of total lifecycle emissions including tailpipe emissions and emissions from energy source (if a high proportion of renewables).■ Air quality improvements.	

5.2.7 Metropolitan rail improvements

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Future proof	
Category	Transport	
Priority description		
Brief	<p>Patronage of the metropolitan train network continues to increase and capacity constraints are required to be addressed to future proof the network. In addition to the program of level crossing removals, there are related works that will improve the network. This includes upgrades to train stations along the Craigieburn, Upfield and Hurstbridge Lines. Across all municipalities, upgrades to train stations should be considered, including to improve universal access and service.</p> <p>There are bottlenecks within the network, where sections of single line track need to be duplicated. This includes sections of the Hurstbridge, Craigieburn and Upfield lines. The Melbourne Metro 1 tunnel will also free up capacity on the Craigieburn and Sunbury lines, which is under construction and expected to be completed by 2025.</p> <p>An extension that creates a fork at Lalor and builds rail service to Wollert will be needed as a priority. A shorter term option is to build a BRT route along the reserved corridor.</p>	
Specific projects or targets	<p>Train station upgrades:</p> <ul style="list-style-type: none">■ Craigieburn Line – Broadmeadows station upgrade.■ Upfield Line – Coburg Station upgrade.■ Upfield Line – Moreland Station upgrade.■ Hurstbridge Line – Greensborough Station upgrade (with significant bus interchange).■ Hurstbridge Line – upgrade outer stations in Nillumbik.■ Mernda Line - Ruthven Station upgrade.■ Improve accessibility at train stations.	<p>Train line capacity improvements:</p> <ul style="list-style-type: none">■ Improved V/Line services.■ Duplicate train line to Craigieburn.■ Mernda Line – Extension from Lalor to Wollert.■ Hurstbridge Line Duplication Stage 2 (Greensborough to Eltham and Diamond Creek to Wattle Glen).■ Melbourne Metro 1 tunnel.
Benefits	<ul style="list-style-type: none">■ Capacity improvements along northern rail lines.■ More frequent services.	

5.2.8 Grade separations

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Future proof	
Category	Transport	
Priority description		
Brief	<p>The Victorian State Government has been removing level crossings across Melbourne’s metropolitan rail network. Many of the major level crossings have already been removed in Melbourne’s North; and in conjunction with the level crossing removal program, there have been train station upgrades and track improvements to increase network capacity.</p> <p>There are still many level crossings that need to be removed to improve rail and road traffic. The Upfield line in particular has a high number of level crossings that need to be removed. Four out of the ten Upfield line crossing listed below are being planned for removal by the Victorian State Government. Other level crossings that need to be removed are located on the Hurstbridge, Sunbury, Mernda and Craigieburn metropolitan lines. There is also an increasing need to remove level crossings on the regional track around Wallan and Beveridge.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Include shared paths and pedestrian bridges in design.■ Hurstbridge Line – Ivanhoe.■ Hurstbridge Line – Main Hurstbridge Road, Diamond Creek.■ Shepparton/Albury Line – Minton Street, Beveridge.■ Shepparton/Albury Line – Watson Street, Wallan.■ Craigieburn Line – Glenroy Road, Glenroy.■ Upfield Line – Albert Street, Brunswick.■ Mernda Line – Oakover Road, Preston.■ Mernda Line – High Street, Reservoir.■ Upfield Line – Albion Street, Brunswick.■ Upfield Line – Bell Street, Coburg.	<ul style="list-style-type: none">■ Upfield Line – Dawson Street, Brunswick.■ Upfield Line – Hope Street, Brunswick.■ Upfield Line – Moreland Road, Brunswick.■ Upfield Line – Munro Street, Coburg.■ Upfield Line – Reynard Street, Coburg.■ Upfield Line – Union Street, Brunswick.■ Upfield Line – Victoria Street, Brunswick.■ Mernda Line – Bell Street, Preston.■ Mernda Line – Cramer Street, Preston.■ Mernda Line – Murray Road, Preston.■ Sunbury Line – Gap Road, Sunbury.
Benefits	<ul style="list-style-type: none">■ Reduces congestion for road networks.■ Allows higher frequency of train services.	

5.2.9 Electrification to Wallan and Regional Rail

Physical Location	Hume, Mitchell, Whittlesea	
Priority Type	Address Gap	
Category	Transport	
Priority description		
Brief	<p>The townships in the Northern Growth Corridor are expected to undergo significant population growth in the future. Currently, there are V/Line services to Donnybrook and Wallan that are heavily patronised by the growing communities, to commute into the city. The current V/Line services from Wallan are inadequate for the growing community, with peak hour services at capacity.</p> <p>Wallan needs to be brought into the metropolitan network and receive metropolitan level services. Prior to electrification, works need to be done to increase capacity and extend the Upfield line to Somerton. This link will dramatically improve public transport network benefits and enable residents of Roxburgh Park, Craigieburn and Mitchell Shire to easily access destinations, family, friends and jobs in inner and middle Melbourne.</p> <p>Scheduled level crossing removals along the Upfield line will also help free up capacity on the line and facilitate more express services. Donnybrook and Wallan stations are already undergoing redevelopment with completion expected in early 2020.</p> <p>V/Line services originating from Victoria’s north east need improvement. Heathcote Junction station requires redevelopment to accommodate longer trains. Service standards in frequency and capacity need to be improved, such as on the Seymour Line.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Increase V/Line services in the interim.■ Upfield line duplication.■ Extension of Upfield line.■ Donnybrook station redevelopment.	<ul style="list-style-type: none">■ Electrification to Donnybrook.■ Electrification to Wallan.■ Heathcote Junction station redevelopment.
Benefits	<ul style="list-style-type: none">■ Improved travel times and access to the city for residents in the outer north.	

5.2.10 Melbourne Metro 2

Physical Location	Banyule, Darebin, Nillumbik, Whittlesea	
Priority Type	Future proof	
Category	Transport	
Priority description		
Brief	<p>The Melbourne Metro 2 tunnel is an underground rail track that is proposed to link Newport and Clifton Hill to Newport. The tunnel is also currently proposed to link to stations at Southern Cross, Flagstaff, Parkville and Fitzroy.</p> <p>The Melbourne Metro 2 tunnel will add capacity to the Mernda and Hurstbridge lines which will facilitate more frequent services, and make full use of track duplication works along the Hurstbridge line. Added capacity is required along both of these lines to cater for future population growth and use. The Melbourne Metro 2 tunnel will also make the Lalor to Wollert rail extension more possible.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Melbourne Metro 2.	
Benefits	<ul style="list-style-type: none">■ Improve access to health, education and employment opportunities for Northern residents to the inner north, CBD and Western suburbs.■ Increase train line capacities for Hurstbridge and Mernda Lines.	

5.2.11 Suburban rail loop/Medium capacity transport

Physical Location	Banyule, Darebin, Hume, Moreland	
Priority Type	Transformative	
Category	Transport	
Priority description		
Brief	<p>The Suburban Rail Loop will build a heavy rail line that runs through the middle suburbs that starts in the South-East and travels through the north to the West. In the North there will be a fully underground East-West rail line that connects Heidelberg, Bundoora, Reservoir, Fawkner, Broadmeadows and provide an alternative rail connection to the Melbourne Airport from the North-East direction.</p> <p>The Suburban rail loop will connect all of the train lines across the north (Hurstbridge, Mernda, Upfield, Craigieburn and Sunbury).</p> <p>It is currently expected that construction of the Suburban Rail Loop will commence in the south-east. Priority access and roll out of the suburban rail loop, or an alternative such as Medium Capacity Transit, is required to address long-standing gaps in the quality of circumferential trunk public transport network in the North. The deficiency needs to be addressed now. A short-term solution could involve implemented medium capacity transport solutions, such as BRT or providing a light rail solution in the SRL corridor, which can be upgraded to SRL standard in the long-term, as corridor densities increase. The medium capacity solution may allow for more frequent stops that could, for example, improve connectivity within the La Trobe NEIC between La Trobe University, Northland and the Austin Hospital.</p> <p>The MCT path could include raising the track above ground in some sections.</p> <p>The SRL should include additional stations to ensure good access to La Trobe University, Northland Shopping Centre and the Austin Repatriation Hospital.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Medium Capacity Transition the short-term (Bus Rapid Transit or Light rail).■ Suburban Rail Loop in the long-term.	<ul style="list-style-type: none">■ Airport Rail Link (Sunshine to Melbourne Airport).
Benefits	<p>The Suburban rail loop/MCT will address many of the public transport issues that have been identified in the North including:</p> <ul style="list-style-type: none">■ improving East-West public transport connections;■ providing improved public transport connections to La Trobe NEIC and RMIT;■ provide equitable access to public transport for the middle suburbs; and■ decentralising travel away from in and out of the CBD. <p>The MCT/Suburban Rail Loop development will also aid the development of Metropolitan Activity Centres and clusters, including the development of La Trobe National Employment and Innovation Cluster (Heidelberg Major Activity Centre, Northland Employment Precinct, Heidelberg West Industrial Precinct, La Trobe University), Broadmeadows and Epping MACs with expected value capture opportunities.</p>	

5.2.12 Arterial roads in the outer north improved/diamond interchanges constructed

Physical Location	Hume, Mitchell, Nillumbik, Whittlesea	
Priority Type	Future proof	
Category	Transport	
Priority description		
Brief	<p>The outer regions of the North are heavily reliant on private car travel when compared to the inner regions of Melbourne. There have also been significant increases in traffic volumes and congestion over the past five years which will continue to worsen as the fringes continue to develop. The arterial road network in the outer north needs to be improved to increase capacity for private car travel and to improve access for local freight. This includes widening existing roads and other improvements.</p> <p>Several of these road projects have been funded as a part of the Northern Roads Upgrades and are due to be completed by the end of 2025.</p> <p>Any widening or works on arterial roads should cater for buses and bicycles, to help reduce reliance on private car travel. This could mean shared pedestrian and bike paths; dedicated bus lanes and/or priority access through traffic intersections.</p> <p>Arterial connections to the Hume Freeway are particularly important to improve outer urban road connectivity.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Aitken Boulevard – Somerton Road to Mount Ridley Road (widening to 4-6 lanes).■ Bulla Bypass (new).■ Sunbury Road from Bulla-Diggers Rest Road to Powlett Street, Sunbury.■ Craigieburn Road – Mickleham Road to Hume Highway.■ Johnstone Street – Mickleham Road to Aitken Boulevard (widening to 4 lanes).■ Mickleham Road – Somerton Road to Mount Ridley Road (widening to 4-6 lanes).■ Southern Link and Jackson’s Hill Link, Sunbury (widening to 2 lanes).■ Fitzsimmons Lane and Main Road (Eltham).■ Old Sydney Road Upgrade.■ All new road projects and upgrades consider bus and tram priority, lanes and infrastructure.■ Kilmore Bypass (new).	<ul style="list-style-type: none">■ Northern Highway upgrade – duplication.■ Old Sydney Road.■ Watson Street, Wallan upgrade.■ Epping Road – Memorial Avenue to Craigieburn Road (widening to 4-6 lanes).■ Donnybrook Road (widening to 4 lanes).■ O’Herns Road (widening to 4 lanes).■ Bridge Inn Road – Duplication between Yan Yean Road and Epping Road.■ Yan Yean Road – Kurrak Road to Bridge Inn Road (widening to 4-6 lanes).■ Watson Street – Hume Freeway Diamond Interchange.■ Camerons Lane – Hume Freeway Interchange.■ Gunns Gully Road – Hume Freeway Interchange.■ English Street – Hume Freeway Interchange.■ All new road projects and upgrades consider bike lanes and shared paths.
Benefits	<ul style="list-style-type: none">■ Reduces congestion and improves travel times in the outer north.■ If major road projects include bicycle and bus infrastructure this will reduce reliance on private car travel which will have environmental and health benefits.■ Improves access to activity centres and employment opportunities.■ Improvements to arterial roads and interchanges with the Hume highway will improve the freight network, and continue to develop the Northern Industrial Precinct (a State Significant Industrial Area).	

5.2.13 Interstate and regional rail

Physical Location	Mitchell, Hume	
Priority Type	Transformative	
Category	Transport	
Priority description		
Brief	<p>The Inland rail project is a National project that will connect Brisbane to Melbourne via freight train. The project will build new tracks and improve on existing tracks.</p> <p>The Victorian leg of the inland rail project is expected to improve 305 kilometres of the existing rail that runs through the North-East Victoria from Albury and connects to Tottenham in Melbourne. The Victorian leg of the project is expected to be operational by 2025, while the national project is expected to be completed within 10 years.</p> <p>High speed rail connecting regional cities to Melbourne, and ultimately Melbourne to other capital cities (such as Sydney) will help to develop regional Victoria and greatly improve travel times between regions and Melbourne providing access to employment opportunities and expand the available work force. Specifically, a high-speed rail link between Melbourne and Greater Shepparton should be a priority.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Inland rail (Upgrade existing regional rail).■ High speed rail connecting Melbourne to Shepparton.	<ul style="list-style-type: none">■ High speed rail connecting Melbourne to Sydney.
Benefits	<ul style="list-style-type: none">■ Increases capacity of freight entering Melbourne.■ Improves freight productivity.■ Improves business case for the Beveridge Intermodal Freight Terminal (BIFT) project.■ High-speed rail will unlock employment and regional development opportunities.	

5.2.14 Somerton Freight Terminal

Physical Location	Hume	
Priority Type	Opportunity	
Category	Transport	
Priority description		
Brief	<p>The Somerton Freight Terminal forms a key part of the Northern Region’s freight network. Improvements to the Somerton Freight Terminal will increase the Northern Region’s key advantage in transport and logistics and help drive economic growth and employment opportunities especially within key industrial areas of Hume and Whittlesea.</p> <p>In late 2018, the Somerton Freight Terminal received Commonwealth and state funding to connect to the Port of Melbourne by rail (Port Rail Shuttle Network).</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Somerton Freight Terminal rail connection to Port of Melbourne.	
Benefits	<ul style="list-style-type: none">■ Remove freight trucks from arterial road network to rail will ease congestion.■ Freight cost and productivity savings.■ Fuel savings compared to freight trucks which improves environmental outcomes and reduces reliance on oil imports.■ Supports operation of inland rail.	

5.2.15 Beveridge Intermodal Freight Terminal

Physical Location	Whittlesea, Mitchell	
Priority Type	Opportunity	
Category	Transport	
Priority description		
Brief	<p>The Beveridge Intermodal Freight Terminal (BIFT) is a major intermodal freight terminal that is proposed to be built in Beveridge on an 80-hectare site. The site is located in Whittlesea and bordering on Mitchell. The BIFT will create greater freight connections between road, rail and Melbourne’s ports and interstate freight. The BIFT will divert freight traffic that currently passes through metropolitan Melbourne. The BIFT is a major infrastructure project which has the potential to benefit Mitchell Shire’s existing and emerging communities, along with communities in Whittlesea, Hume and other northern municipalities. Alongside the Merrifield employment precinct, it is the other opportunity for a major catalytic job generator for the Northern Growth Corridor. Mitchell Shire believes that, in the Northern Growth corridor, the BIFT land is by far the most significant area designated for employment purposes.</p> <p>The BIFT will also provide freight opportunities and linkages to the inland rail project. If the BIFT is to form a critical piece of the freight network and make best use of the inland rail, it should be considered at the same time as inland rail, which is due to be completed within 10 years. However, there will be substantial benefits from implementing the BIFT with or without the inland rail.</p> <p>While the site for the BIFT has been preserved, master planning and design needs to happen in the short-term. This includes a commitment to a timeframe for the project to become active. This will give more certainty to current planners to plan the infrastructure and employment land surrounding the site.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Beveridge Intermodal Freight Terminal.	<ul style="list-style-type: none">■ Requires planning and design in the short-term.
Benefits	<ul style="list-style-type: none">■ Productivity improvements in freight.■ Key project that will support the viability of the Commonwealth Government’s inland rail project (Brisbane to Melbourne).	

5.2.16 North-East Link

Physical Location	Banyule, Nillumbik	
Priority Type	Transformative	
Category	Transport	
Priority description		
Brief	<p>The North-East Link will complete the metropolitan ring road by building a major connection between the M80 Ring Road at Greensborough and the Eastern Freeway. The road will be built adjacent to the Greensborough Bypass, before tunnelling underneath the Yarra River to connect to the Eastern Freeway.</p> <p>The North-East Link will improve freight connections between the north and east and south-east. This will be particularly beneficial for the proposed Beveridge Intermodal Freight Terminal and Melbourne Wholesale Market. The North-East Link will ensure that freight and distribution links remain competitive in order to attract national businesses to new business parks (such as in Merrifield).</p> <p>The North-East Link will relieve congestion on several main arterial roads in the north-east, including Rosanna Road, Plenty Road and Fitzsimmons Lane.</p> <p>While North-East Link will improve private car and freight travel, the final design should consider improving public transport and bicycle links. Improved public transport links are critical for La Trobe University and RMIT. Routes between the proposed North-East Link and La Trobe are currently lacking. The final design of the project should also minimise impact on local communities, improve green space and local connections.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ North-East Link.	
Benefits	<ul style="list-style-type: none">■ Increases the competitiveness of the north for freight.■ Ease congestion on local arterial roads.■ Improved regional connectivity.■ Improved access to La Trobe Employment Cluster, BIFT and Melbourne Wholesale Market.	

5.2.17 Outer Metropolitan Ring Road and E6 Freeway

Physical Location	Whittlesea, Hume	
Priority Type	Transformative	
Category	Transport	
Priority description		
Brief	<p>The Outer Metropolitan Ring Road (OMR) will be built in the outer northern regions and connect the north to the west, providing a high-speed transport link for people and freight and a ‘hard edge’ to much of metro Melbourne. The transport corridor includes space for four lanes of road traffic in either direction and four railway tracks for freight and high-speed passenger travel, with opportunities to improve fast rail through to Sydney.</p> <p>The OMR will link Werribee, Melton, Tullamarine, Craigieburn and Epping which will help develop these activity centres and provide employment opportunities in the outer north.</p> <p>The E6 Freeway will connect the Metropolitan Ring Road to the Hume Freeway from Bundoora to Kalkallo (around 23 kilometres), travelling through Whittlesea and providing significant benefits to residents and businesses in Mitchell Shire. The E6 Freeway will meet the future Outer Metropolitan Ring Road at the Hume Freeway.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Outer Metropolitan Ring Road.■ Upgrade Hume Freeway around Kalkallo.	<ul style="list-style-type: none">■ E6 Freeway.
Benefits	<ul style="list-style-type: none">■ Relieve congestion on other northern arterial roads.■ Improve connectivity within the region, in particular for the Northern Growth Corridor and outer growth suburbs. Better access to tertiary education in Bundoora.■ The E6 will provide a freeway for freight.■ Develop Epping, Thomastown, Craigieburn and Tullamarine.■ Freight and high speed travel between west and north.	

5.2.18 Melbourne Airport access

Physical Location	Hume	
Priority Type	Address Gap	
Category	Transport	
Priority description		
Brief	<p>Melbourne Airport continues to grow at a substantial rate, with strong growth in international travellers, and more traffic is expected to flow in and out of the airport in the future. The main mode of travel into the airport is current car travel (private and taxi), with SkyBus services running to/from the CBD and limited local bus services. Over the next 20 years Melbourne Airport is expecting to receive significant increases in passenger movements, freight, flights and car trips.</p> <p>Transport infrastructure serves two main purposes:</p> <p>(i) passenger travel; and</p> <p>(ii) commuter travel.</p> <p>Improved/new tram and bus services are required to reduce reliance on car travel from commuters. Reliable local bus service from the major activity centres to the Melbourne Airport is minimal, with the exception of Sunbury. This needs to be improved, including for workers.</p> <p>Melbourne Airport is expected to receive a rail link, that will start construction from 2022 and be complete by the early 2030'. This will cater to both passenger and commuter travel.</p> <p>Recent upgrades to the external road network around Melbourne Airport include the CityLink Tullamarine widening project that has eased congestion.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Airport Rail Link.■ Bus Rapid Transit – SmartBus Route 901 extensions from Melbourne Airport to Sunbury.	<ul style="list-style-type: none">■ Extend 59 Tram to Melbourne Airport.■ Improve bus connectivity with surrounding activity centres for workers (including shift workers).
Benefits	<ul style="list-style-type: none">■ Public transport links will ease road congestion caused by car travel.	

5.3 Communications

5.3.1 Access to high speed broadband

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address Gap	
Category	Communications	
Priority description		
Brief	<p>The rollout of the National Broadband Network (NBN) is almost complete around Australia, with a targeted completion by 2020. Spatial coverage and access within the North are widespread, but notable gaps in access still remain. There are several commercial and industrial areas that lack access to a high speed, quality broadband service but these gaps are expected to be filled by mid-2020.</p> <p>Around 55 per cent of premises that have access to NBN have purchased a plan through a provider. The commercial and industrial sector should be encouraged to connect early to the network, to modernise practice and remain competitive.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Complete roll out of NBN network.	<ul style="list-style-type: none">■ Priority access for businesses and education sector.
Benefits	<p>Access to high speed broadband will help:</p> <ul style="list-style-type: none">■ develop the knowledge economy through universities and ICT related businesses;■ improve the global competitiveness of Australian businesses such as the manufacturing industry in the north; and■ more remote working opportunities which will encourage employment and decrease the number of people commuting to work.	

5.3.2 Mobile network coverage

Physical Location	Mitchell, Nillumbik, Whittlesea	
Priority Type	Address Gap	
Category	Communications	
Priority description		
Brief	<p>Australia has wide access to 3G and 4G networks, which are focused on providing coverage to the populated areas, rather than full geographic coverage. Australia has three mobile network providers – Telstra, Optus and Vodafone. All three networks report access to just under 100 per cent of the population, but there are geographical gaps within coverage for Melbourne’s North that need to be addressed. There are some black spots reported in the less populated rural areas and developing areas of the North such as within Nillumbik and Mitchell.</p> <p>Network capacity is also constrained in some areas of new higher density developments.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Improve capacity of current network around higher density developments.■ Black spots in Mitchell.	<ul style="list-style-type: none">■ Black spots in Nillumbik.■ Black spots in Whittlesea (University Hill notable).
Benefits	<ul style="list-style-type: none">■ Enhance ability to provide emergency alerts to residents of bush fire prone areas.■ Improve equity of access to the network for rural and semi-rural areas.	

5.4 Arts and culture

5.4.1 Arts and cultural facilities

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity	
Category	Arts and culture	
Priority description		
Brief	<p>Arts and cultural facilities, such as art galleries and museums, in Melbourne’s North are generally lacking in the outer regions. This shortfall has a provision of galleries and museums of 10.4 per million compared to a Greater Melbourne average of 15.4. The introduction of state level museums and/or art galleries would be beneficial to the North, examples of potential projects are listed below. It is also important to continue to improve levels of investment and support for existing galleries and museums.</p> <p>The North currently lags behind other Melbourne regions in the provision of Libraries. Over the next five years the North requires at least another 4 Libraries, to receive the same provision of service as the other regions of Melbourne.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Upgrade and modernise libraries.■ Build new libraries in the short-term (potential sites include Diamond Creek and Mernda).■ Major Design Museum in the north.	<ul style="list-style-type: none">■ Performing arts centre in urban areas of Mitchell.■ Museum as a part of Pentridge redevelopment.■ Wheatsheaf Hub in Glenroy (includes a new and contemporary library).
Benefits	<ul style="list-style-type: none">■ Improvements to culture.■ Community engagement.■ Provide tourism opportunities for the North.■ Life-long learning opportunities.■ Increased community connectedness.■ Enhanced opportunities for creativity.	

5.5 Education

5.5.1 Childcare and kindergarten facilities

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Future Proof/Address Gap	
Category	Education	
Priority description		
Brief	<p>The Victorian State Government has announced a roll out of funded 3-year-old kindergarten, which is to be introduced from 2022 at 5 hours per week and increasing to 15 hours per week by 2029. This will lead to an increase in demand for kindergarten rooms across the north.</p> <p>The outer regions will have to invest the most in expanding places available for 3 and 4-year-old kindergarten (Hume, Whittlesea, Mitchell), as they have the fastest growing populations, youngest demographic and many facilities are already close to capacity. Banyule may require a program of upgrading and expanding current facilities; similarly, Nillumbik may require to expand a small number of facilities. Moreland and Darebin will also require a program of expansions, upgrades and new facilities to meet growing demand. Funding for the new kindergarten infrastructure is critical to ensure the timely roll out of the expanded 3-year-old kindergarten program.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Increase number of kindergarten rooms available for 3- and 4-year-old program either by new facility or expansion.	
Benefits	<ul style="list-style-type: none">■ Additional year of kindergarten supports children’s learning and development.■ State funded kindergarten will help reach more vulnerable and disadvantaged children.	

5.5.2 Primary schools

Physical Location	Banyule, Darebin, Hume, Mitchell, Moreland, Whittlesea	
Priority Type	Future Proof/Address Gap	
Category	Education	
Priority description		
Brief	<p>New primary schools are required to address population growth. The population of 5 to 12 year olds is expected to grow significantly over the next 20 years in the outer areas of Hume, Whittlesea and Mitchell. Moderate growth is expected in Darebin and Moreland, as the result of population growth and higher density developments. Areas that have an aging population, such as within Nillumbik, have less capacity pressure on existing facilities, with the population of primary school aged children falling. The number of primary school aged children in Banyule will remain steady.</p> <p>New schools may be required in service gap areas, such as within new precincts that do not have close access to a local primary school. Access to local primary schools within a reasonable distance to residential areas seems to be particularly lacking within existing areas of Whittlesea.</p> <p>Increasing demand can be partially met by upgrades to current schools, or encouraging prospective students to attend underutilised primary schools. These strategies are most important to areas that are already developed, as land availability is limited. Accessibility and integration for special needs students could also be improved in existing and new schools.</p> <p>Planned primary schools over the next 5 years are shown in the left box. New primary schools over the next 15 years in the right box are additional to the short-term requirements. The medium-term requirements are estimates based on population forecasts and benchmark provision.</p>	
Specific projects or targets	<p>Over the next 0 to 5 years:</p> <ul style="list-style-type: none">■ Hume – 4 new primary schools;■ Mitchell – 2 new primary school; and■ Whittlesea – 5 new primary schools.	<p>Over the next 0 to 15 years:</p> <ul style="list-style-type: none">■ Darebin – 1 new primary schools;■ Hume – 8 new primary schools;■ Mitchell – 10 new primary schools;■ Moreland – 1 new primary schools; and■ Whittlesea – 4 new primary schools.
Benefits	<ul style="list-style-type: none">■ Long-term educational benefits.■ Equitable benefits for the provision of education services to areas that previously had little access.	

5.5.3 Secondary schools

Physical Location	Banyule, Darebin, Hume, Mitchell, Moreland, Whittlesea	
Priority Type	Future Proof/Address Gap	
Category	Education	
Priority description		
Brief	<p>New secondary schools are required over the short and medium-term to provide education services to secondary school aged students (13 to 18). New schools are especially needed in the outer northern growth regions, to deal with population growth and provide access to growing regions that have no local school. Gaps in coverage are anticipated to emerge especially within the Northern growth corridor (e.g. Merrifield). Whittlesea and Hume are expected to have significantly more students over the next 15 years, while Mitchell is expected to have strong growth from the mid-2020s. Darebin and Moreland will grow moderately while Banyule and Nillumbik are stable.</p> <p>Increasing demand can be partially met by upgrades to current schools, or encouraging prospective students to attend underutilised secondary schools. These strategies are most important to areas that are already developed as land availability is limited. Accessibility and integration for special needs students could also be improved in existing and new schools.</p> <p>Planned secondary schools over the next 5 years are shown in the left box. New secondary schools over the next 15 years in the right box are additional to the short-term requirements. The medium-term requirements are estimates based on population forecasts and benchmark provision.</p>	
Specific projects or targets	<p>Over the next 0 to 5 years:</p> <ul style="list-style-type: none">■ Darebin – 1 new secondary school.■ Hume – 2 new secondary schools.■ Whittlesea – 2 new secondary schools.	<p>Over the next 0 to 15 years:</p> <ul style="list-style-type: none">■ Hume – 2 new secondary schools.■ Mitchell – 6 new secondary schools.■ Moreland – 1 new secondary schools.■ Whittlesea – 2 new secondary schools.
Benefits	<ul style="list-style-type: none">■ Long-term educational benefits.■ Equitable benefits for the provision of education services to areas that previously had little access.	

5.5.4 Tertiary education

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Future Proof/Address Gap	
Category	Education	
Priority description		
Brief	<p>Melbourne’s North contains three University campuses and a number of TAFE facilities.</p> <p>Access to tertiary education opportunities needs improvement, especially in the outer northern areas. Access can be improved by building better transport links to the tertiary institutions, particularly public and active transport.</p> <p>RMIT and La Trobe University Bundoora campuses are poorly served by public transport. The Universities lack adequate public transport links; from many surrounding areas, it takes too long to reach the Universities by public transport and car is required for access.</p> <p>Lack of access represents a barrier for potential students to get to university and it also represents a barrier for development for universities, who are unable to attract students.</p> <p>The TAFE institutions are somewhat better served by public transport. In addition, their students are often more localised than the Universities. Gaps in access to TAFE may grow in the outer north, as Melbourne’s fringe continues to grow. A new campus in the outer north, or improved transport links to Broadmeadows and Epping, may help.</p> <p>The TAFE sector also requires significant investment to modernise its campuses and equipment to better align with future industry.</p> <p>Tertiary education is also required in Mitchell Shire as the area continues its rapid population growth.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Increase provision of TAFE in the outer north.■ Revitalise aging TAFE and vocational education infrastructure facilities.	<ul style="list-style-type: none">■ Increase access to tertiary education by public transport.
Benefits	<ul style="list-style-type: none">■ Long-term educational benefits.■ Upskilling for business.	

5.6 Health

5.6.1 Community hospitals and integrated primary care hubs

Physical Location	Whittlesea, Hume, Nillumbik	
Priority Type	Future proof	
Category	Health	
Priority description		
Brief	<p>Community hospitals and integrated primary care hubs are (amongst other things) intended to relieve demand on outpatient services in the major hospitals. These services sit somewhere between a major hospital and a community health centre. Integrated primary care hubs deliver a range of public and private general practice, specialist medical, mental health, counselling, dental, paediatric, allied health, NDIS, social support, pathology and medical imaging services. Ideally the hubs will also include a café and childcare offer and located in high traffic areas near schools, train stations or shopping centres.</p> <p>The Victorian State Government has funded the construction and upgrade of four community hospitals across Melbourne’s North included in the funding for 10 community hospitals across Melbourne’s North.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ City of Whittlesea Hospital.■ Craigieburn Hospital.■ Eltham Hospital.	<ul style="list-style-type: none">■ Sunbury Hospital.■ Regional strategy for integrated primary care hubs in the North.
Benefits	<ul style="list-style-type: none">■ Improved health outcomes.	

5.6.2 Increase hospital beds in existing facilities

Physical Location	Whittlesea, Banyule	
Priority Type	Address gap	
Category	Health	
Priority description		
Brief	<p>To receive the same access to hospital beds as the best provisioned regions in Melbourne, over the next five years the Northern Region requires an additional 1,700 public and private beds in total. This is to address a shortfall in provision of both public beds, and private hospitals, and to address the needs of continued population growth in the North.</p> <p>This shortfall in beds in current facilities could be partly met by diverting demand away from the current major public hospitals by:</p> <ul style="list-style-type: none">■ building a new hospital in the outer north;■ attracting private hospitals to areas that lack access;■ building community hospitals; and/or■ implement virtual health consultations through proposed ‘Hospital in the Home’ program. <p>If the short-term short fall is met (0 to 5), then approximately an additional 400 beds will be required in the medium-term (0 to 15).</p>	
Specific projects or targets	<p>Increase number of beds available in the Northern region 0 to 5 years:</p> <ul style="list-style-type: none">■ 1,700 total beds.	<p>Increase number of beds available in the Northern region 0 to 15 years:</p> <ul style="list-style-type: none">■ 400 total beds.
Benefits	<ul style="list-style-type: none">■ Improved health outcomes.	

5.6.3 New major public hospital in outer north

Physical Location	Hume, Whittlesea, Mitchell	
Priority Type	Address Gap	
Category	Health	
Priority description		
Brief	<p>The major public hospitals within the north (Northern Hospital in Epping and Austin/Mercy in Heidelberg) are at capacity. The Northern Hospital in particular is undergoing pressure from the continued population growth in the outer northern regions. The public and private hospital beds available to residents of the north are well below the standards of provision for the east and south.</p> <p>A new major public hospital is required in the short-term to address high demand in the outer north. A new hospital needs to be able to attract a qualified workforce. Attracting more private hospitals to the north may appeal to experienced staff. Private hospitals are also lacking in the north.</p> <p>Further health education and training opportunities are required in the outer north, to supply a workforce for the proposed hospital.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ New major public hospital in outer north.	
Benefits	<ul style="list-style-type: none">■ Improved wait times, bed availability and health outcomes for residents.	

5.6.4 Increase mental health support

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity	
Category	Health	
Priority description		
Brief	<p>Mental Health is a significant issue in Melbourne’s north. Northern Metropolitan Partnership. In 2017, the Partnership's advice to government identified health and well-being as a key priority specifically ‘investigating gaps in youth mental health services in the outer north.’</p> <p>The provision of mental health services in Victoria is currently the subject of Royal Commission. The Royal Commission findings are to be delivered in an interim report in November 2019, with a final report due in October 2020. The North should advocate for local funding for mental health services and implement the recommendations of the Royal commission. This initiative needs further development before being rated.</p>	
Specific projects or targets	■ Increased access to services.	
Benefits	■ Improve health outcomes.	

5.6.5 Aged care facilities

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address Gap	
Category	Aged care	
Priority description		
Brief	Over the next 20 years, the population of those over 70 years old is expected to grow at twice the rate of overall population growth in Melbourne’s North. In some areas of Melbourne’s North, demand is outpacing supply of places in residential aged care. More aged care places are going to be required in Melbourne’s North to meet growing demand. There may be benefits in increasing aged care densities closer to major health districts, such as in Heidelberg and Epping, to increase amenities within walking distance for residents.	
Specific projects or targets	■ Create an additional 1,400 places within the next 5 years.	■ Create an additional 3,400 places in 5 to 15 years.
Benefits	■ Health of residents over 70 years old and Aboriginal/Torres Strait islander residents over 50 years old.	

5.6.6 Hospital in the home

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address Gap	
Category	Industry	
Priority description		
Brief	<p>Northern health provides health services within an area undergoing very strong population growth. Demand for health services has been lagging behind the provision of beds, services and related infrastructure. The Northern hospital contains one of the busiest emergency departments in the state.</p> <p>Currently, there is a shortfall in the number of hospital beds within the Northern Melbourne region when compared to other Melbourne regions. This could be addressed by either closing the gap and building more beds; or alternatively by reducing demand on major hospitals.</p> <p>Northern Health has proposed to implement a program that will reduce demand on busy emergency departments by facilitating virtual consultations by using telehealth methods. For example, remote consultations could be facilitated by use of video conferencing between patients and medical professionals. This will help reduce avoidable or non-urgent presentations to emergency departments.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Hospital in the Home.	
Benefits	<ul style="list-style-type: none">■ Improve health literacy of residents.■ Reduce demand on busy emergency departments, which may reduce or delay the need to invest in physical assets.■ New health employment opportunities.■ Increases technology driven innovation within the health sector.	

5.7 Energy and environment

5.7.1 Renewable energy

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity	
Category	Energy	
Priority description		
Brief	<p>There is an ongoing need to increase the amount of renewable energy produced, to replace an ageing stock of coal plants and reduce electricity sourced carbon emissions. Local action on renewable energy will go toward supporting the Victorian state target of 50 per cent renewable energy by 2030.</p> <p>The Northern Region should investigate installing a large-scale solar plant in an undeveloped area in the outer region. This could be directly supported by Northern groups through a power purchasing agreement between the North and an electricity wholesaler. The large-scale renewable plant may also be located outside of the region, with a PPA in place to purchase the output of the plant. Weather patterns and economics need to be considered.</p> <p>Councils should also continue to support the roll out of large rooftop solar installations on government owned buildings.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Continue to roll out roof-top solar on large government buildings such as schools and council owned buildings.	<ul style="list-style-type: none">■ Large-scale renewable plant in outer North; or PPA for renewable energy outside the region.
Benefits	<ul style="list-style-type: none">■ The cost to build solar and wind is more economical than building coal or gas plants which will reduce wholesale and retail electricity prices.■ Meet carbon emission reduction and renewable energy targets.■ Other environmental benefits such as air quality improvement which also improves health.■ Decarbonisation of electricity grid is an essential step in improving the environmental benefits of plug-in electric vehicles.	

5.7.2 Urban forest and open space

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity	
Category	Environment	
Priority description		
Brief	<p>Melbourne’s North benefits from the regional presence of some significant waterway corridors, such as the Yarra River, Plenty River, Darebin Creek and Merri Creek, together with substantial areas of green wedge in Whittlesea and Nillumbik. However, the Northern Region trails behind most other Melbourne regions in the amount of canopy and vegetation cover. The north should work toward increases in canopy cover and vegetation, especially within the inner regions in the near future.</p> <p>There is also a need to develop other areas of open space. Moreland and Darebin in particular are on the lower end of per capita availability of public open space. There is also a need for quality open space in the outer areas.</p> <p>At a regional level, there is a significant opportunity for revegetation of the Quarry Hills Bushland Park in Whittlesea.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Improve river/creek corridors.■ Improve tree canopy on new developments.■ Increase green space/open space. Urban forest strategy.■ Quarry Hills Bushland Park.	<ul style="list-style-type: none">■ Jacksons Creek Regional Park.■ Merri Creek Regional Park.■ Increase tree canopy cover to 22 per cent by 2030, and 30 per cent by 2050.■ Revive 20 Million Trees program.
Benefits	<ul style="list-style-type: none">■ Improves physical and mental health.■ Reduces carbon emissions, heat island effect and improves air quality.■ Protects environment and supports biodiversity by providing links between ecosystems.■ Helps to manage stormwater.	

5.7.3 Improve storm water recycling infrastructure

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity	
Category	Water	
Priority description		
Brief	<p>Flood mitigation works are required in some areas to deal with excess stormwater and higher density developments; in particular, for inner areas of Moreland, Darebin and areas around La Trobe University. Higher density developments and urbanisation increase the amount of stormwater run-off and the burden on water infrastructure.</p> <p>There is an opportunity for alternative uses of water within the Upper Merri Creek catchment, which has around 60 to 90 megalitres of surplus water available. This could be recycled and used to improve greenery and parklands.</p> <p>Open spaces could be developed which include waterways, such as man-made lakes and wetlands, and could be used to harvest and store stormwater.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Flood prevention. Improve infrastructure to cope with increased density and concrete cover.■ Improve infrastructure to harvest and recycle.	<ul style="list-style-type: none">■ Increase open spaces such as wetlands to store stormwater.■ Develop the Upper Merri Creek catchment area so that it can become a net exporter of water.
Benefits	<ul style="list-style-type: none">■ Prevents damage caused by flooding.■ More efficient use of water to mitigate impacts of drought.■ Improvements to open space have environmental and health benefits.	

5.7.4 Waste management and minimisation

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity/Address Gap	
Category	Waste	
Priority description		
Brief	Waste minimisation and management, including recycling, is a major state-wide issue, requiring culture change, market development and significant investment in facilities. Landfill levies generate significant revenue streams for the State Government that should be used more extensively for purposes such as these. This could support (for example) waste minimising behaviours and development of significant infrastructure projects in recycling. GHG emission reduction should form an important co-benefit from improved waste minimisation.	
Specific projects or targets	<ul style="list-style-type: none">■ Recycling infrastructure.	
Benefits	<ul style="list-style-type: none">■ Landfill waste reduction.■ Greenhouse gas emissions reduction.	

5.8 Industry

5.8.1 Food and beverage industry park

Physical Location	Whittlesea	
Priority Type	Opportunity	
Category	Food industry	
Priority description		
Brief	There is a significant opportunity to build upon the Northern Region’s competitive advantage within the food industry by developing the 51 hectare site adjacent to the Melbourne Wholesale Market. The site could provide multiple food industry opportunities, including manufacturing, education, research and training, and distribution.	
Specific projects or targets	■ Food and beverage industry park.	
Benefits	■ Increase employment opportunities within the outer north. ■ Promote innovation and sustainability within the food industry. ■ Potential to research climate change mitigation in food industry.	

5.8.2 Assistive technology

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity	
Category	Industry	
Priority description		
Brief	<p>There is currently a gap in the market for quality and fit-for-purpose assistive technology (AT) manufacturing. Demand for assistive technology is expected to grow as the population ages and the people under the NDIS increases. The current market is largely made up of generic old technology imports that do not match individual requirements.</p> <p>The formation of a new regional NDIS cluster will be able to build upon key strengths in the north in healthcare, education and manufacturing. The three sectors are currently operating in relative isolation to meet growing needs for the NDIS. A new NDIS cluster alongside other initiatives will help bring these industries together. This will help drive employment within each sector with the need to train a larger workforce to meet requirements in the aged care and disability sectors.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Establish a regional NDIS cluster in Melbourne’s North.■ Run a series of co-design projects to encourage industry innovation and collaboration.	<ul style="list-style-type: none">■ Establish an AT Innovation Hub in Hume.
Benefits	<ul style="list-style-type: none">■ Increase employment in health, education and manufacturing industries.■ Opportunity to provide higher quality assistive technology to the market which will improve health outcomes for aged care, disabled and/or special needs (local and export markets).	

5.8.3 North and West Melbourne Data Analytics Hub

Physical Location	Darebin/All municipalities across Melbourne’s North	
Priority Type	Opportunity/Address Gap	
Category	Industry/Education	
Priority description		
Brief	<p>The North West Melbourne Data Analytics Hub (“The Hub”) has been established to introduce greater use of data analytics within industry – particularly for the manufacturing and health sectors. The Hub is managed by NORTH Link with the site co-located at the R&I Precinct at La Trobe University.</p> <p>Currently, there is a data analytics skills gap within business. As a result, businesses often collect large amounts of data that remain unused. There is an opportunity to improve innovation in business process, planning, and the development of new products and services through greater use of business data.</p> <p>The current cohort of tertiary students are increasingly studying in areas of data analytics as this is widely seen as an area of future career growth. These students are developing the skills of the future that businesses could use today.</p> <p>The Hub has been created as a link between tertiary students (undergraduate to PhD) and industry that gives students the opportunity to demonstrate their capability to business, while business receives the benefit of new skills to improve their operations.</p> <p>Businesses in the North or West that sign up to the program may employ students as interns to undertake the following types of programs:</p> <p>(i) Business audits – a diagnostic project for students to advise how businesses can use their data; and/or</p> <p>(ii) Major industry project – a more in depth project that address a business problem and adds real value. This is an extension of the business audits.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ The North West Melbourne Data Analytics Hub.	
Benefits	<ul style="list-style-type: none">■ Innovation and productivity improvements to businesses.■ Relatively risk-free exposure to modern/future data analytics skills for business.■ Assists northern business to remain competitive and resilient.■ Creates opportunity for manufacturers to move from traditional methods to advance manufacturing methods.■ Develops links between the tertiary sector and industry.■ Improves career prospects of students with real business experience.	

5.8.4 Infrastructure Skills Roundtable

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Opportunity/Address Gap	
Category	Industry/Education	
Priority description		
Brief	<p>The Northern region would benefit from creating an education, training and job placement group that can help coordinate the skills and training required for key upcoming infrastructure projects.</p> <p>Partner organisations could include tertiary education, industry and Northern representative groups, state departments, recruitment/job networks and representatives from infrastructure projects.</p> <p>The roundtable will act as a mechanism to:</p> <ul style="list-style-type: none">■ ensure skills and training are available for upcoming infrastructure projects;■ promote local procurement; and■ attract domestic and international investment.	
Specific projects or targets	<ul style="list-style-type: none">■ Infrastructure Skills Roundtable.	
Benefits	<ul style="list-style-type: none">■ Increase economic benefits to Melbourne’s North from infrastructure projects during the investment and construction phase.■ Increase employment, training and education opportunities for Melbourne’s North.	

5.9 Sport and recreation

5.9.1 Sporting facilities

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address gap/Future proof	
Category	Sport and recreation	
Priority description		
Brief	The Northern Region has the lowest relative accessibility to sporting facilities within Melbourne. This includes total sporting facilities and outdoor ovals. While almost 90 per cent of the north is within reasonable distance of a sporting facility, other regions rate better. However, much of the north has very good access to swimming pools and aquatics centres, compared to other regions, however there are significant gaps. Currently Mitchell Shire’s largest town, Wallan, does not have a pool or aquatic facility; this situation will only worsen as other towns within the Urban Growth Boundary develop, including Beveridge. Wollert and Mernda also lack access to aquatic centres.	
Specific projects or targets	<ul style="list-style-type: none">■ Access to sporting facilities.■ Increase capacity and facilities for increased female participation in sports.■ Ivanhoe Aquatic.■ Macleod Recreation and Leisure Centre.■ Olympic Park.	<ul style="list-style-type: none">■ Northcote Leisure Centre.■ Reservoir Leisure Centre.■ Stadium/national sporting precinct.■ Indoor stadium sought in Whittlesea.■ New aquatic facilities in growth suburbs.
Benefits	<ul style="list-style-type: none">■ Community engagement with youth.■ Positive physical and mental health outcomes such as addressing obesity and chronic health conditions.■ Social engagement.	

5.9.2 Community centres

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address gap	
Category	Sports and recreation	
Priority description		
Brief	Community centres provide community services to the local region. They vary in scale, significance and services provided. The following requirements have been estimated for community centres over the short (0 to 5 years) and medium-term (0 to 15 years). The medium-term requirements are additional to the short-term requirements. These are indicative requirements only, based on population forecasts, and will ensure that localities meet benchmark requirements.	
Specific projects or targets	Over the next 0 to 5 years: <ul style="list-style-type: none">■ Banyule – 1 new community centres;■ Darebin – 7 new community centres;■ Hume – 6 new community centres;■ Mitchell – 2 new community centres;■ Moreland – 5 new community centres; and■ Whittlesea – 6 new community centres.	Over the next 0 to 15 years: <ul style="list-style-type: none">■ Banyule – 2 new community centres;■ Darebin – 4 new community centres;■ Hume – 7 new community centres;■ Mitchell – 10 new community centres;■ Moreland – 4 new community centres;■ Nillumbik – 1 new community centres; and■ Whittlesea – 9 new community centres.
Benefits	<ul style="list-style-type: none">■ Encourage community social engagement.■ Important to provide services to youth and other vulnerable demographics.	

5.10 Clusters and activity centres

5.10.1 Metropolitan Activity Centres and Major Activity Centres

Physical Location	All Northern Councils	
Priority Type	Future proof	
Category	Clusters and activity centres	
Priority description		
Brief	<p>Metropolitan Activity Centres at Broadmeadows and Epping should continue to be developed, to encourage investment and create employment opportunities outside of the CBD.</p> <p>The Broadmeadows Metropolitan Activity Centre requires better public transport connections, including to and from Sunbury and La Trobe University. The Broadmeadows train station also requires redevelopment and more work needs to be done to provide tertiary education opportunities at Broadmeadows.</p> <p>The Epping Metropolitan Activity Centre requires better connectivity to public transport, access to educational institutions, an innovation hub to ensure the area continues to be considered a food hub of international significance and development as a health precinct. In the medium-term Cloverton (Lockerbie) will be a metropolitan activity centre, similar to Epping. Planning for future job growth in this area should be a priority.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Increase density/activity around major hubs.■ New metropolitan activity centre at Cloverton (Lockerbie).	<ul style="list-style-type: none">■ Broadmeadows redevelopment.■ Epping.■ Heidelberg.■ Merrifield City Centre.■ Greensborough.■ Brunswick.■ Coburg.■ Preston.■ Sunbury.■ Craigieburn.■ Reservoir.■ Eltham.
Benefits	<ul style="list-style-type: none">■ Create more employment opportunities.■ Decentralise activity away from the CBD, easing congestion and traffic in the middle suburbs.	

5.10.2 Increase commercial and industrial space

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address gap	
Category	Clusters and activity centres	
Priority description		
Brief	<p>Recent developments have been focused on increasing the number of residential sites available, while generally lagging behind in providing commercial and industrial zones to increase employment opportunities. Melbourne’s North has a deficit of jobs, with more people working outside of the region than there are jobs available for residents. This places additional congestion strain on transport networks that could be reduced if more employment opportunities were available locally.</p> <p>The north could also benefit for more “incubator” space, to encourage entrepreneurial activities and innovation. Developers should also factor in more land for employment alongside residential developments. Gaps in employment land are prevalent in the new precincts developing in the outer north. Further commitment to business incubator space will help drive employment. DELWP (2019b) predicts that an additional 1,691,000 m² of commercial floorspace will be required by 2031 compared to 2016.</p> <p>The North also has the opportunity to redevelop existing and new industrial land with around 2,075 hectares planned (but not yet zoned) for industrial use (DELWP 2019b).</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Increase the space available for employment land.■ Encourage the redevelopment of existing industrial sites, and development of new industrial land.	<ul style="list-style-type: none">■ Increase commercial space and/or incubator space.■ Upgrade Melbourne’s Innovation Centre at Alphington.
Benefits	<ul style="list-style-type: none">■ Increase employment.■ Reduce road and public transport congestion.■ Encourage innovation.■ Supports 20-minute neighbourhoods.	

5.10.3 La Trobe National Employment and Innovation Cluster (NEIC)

Physical Location	Banyule and Darebin	
Priority Type	Opportunity	
Category	Clusters and activity centres	
Priority description		
Brief	<p>The La Trobe National Employment Cluster (La Trobe Cluster) is a significant economic area within Melbourne’s North, with strengths in (for example) health and education. The La Trobe NEIC is currently being planned to enhance employment opportunities, improve transport connections within the cluster, improve communal and open space areas and support employment and industrial growth in key industries.</p> <p>The La Trobe cluster includes the following areas of significance:</p> <ul style="list-style-type: none">■ La Trobe University Bundoora Campus;■ Northland Urban Renewal Precinct;■ Heidelberg West Business Park;■ Northland Activity Centre;■ Heidelberg Activity Centre; and■ Austin Hospital/Mercy Hospital. <p>Key to the La Trobe Cluster is La Trobe University’s <i>City of the Future</i> plan. The <i>City of the Future</i> plan will involve significant investment over the next 10 years that includes education facilities, health facilities, housing, a new town centre, sports park, research and innovation precinct and better transport links. The plan is expected to create 20,000 new jobs.</p> <p>La Trobe NEIC should be made a Victorian Government Priority Precinct.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ La Trobe City of the Future.	<ul style="list-style-type: none">■ La Trobe National Employment and Innovation Cluster Draft Framework Plan (VPA).
Benefits	<ul style="list-style-type: none">■ Employment growth (in particular for health, education and research).■ Plans for more open space and related health and social benefits.■ Environmental and health benefits from increased pedestrian, cycling and public transport options.	

5.11 Housing

5.11.1 Affordable housing

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Future proof/Address Gap	
Category	Housing	
Priority description		
Brief	<p>Over the past ten years housing affordability has continued to deteriorate as access to cheap credit, strong demand for housing and a lag in the supply of housing has increased prices for ownership and rental of dwellings (among other factors).</p> <p>The proportion of social housing within the dwelling stock has also fallen, from a low starting point, with reports of significant wait lists for access. Social housing provides cheap short and long-term rental properties for vulnerable low income earning sections of the community such as homeless, domestic violence victims, and people with other special needs.</p> <p>The stock of affordable social housing needs to increase within the north to provide access to shelter and stability for vulnerable sections of the community so that they can get access to employment, education and other community services. More projects such as the social housing project in Bellfield are needed. Affordable housing will be particularly important in cluster development, to help ensure housing availability for key workers.</p>	
Specific projects or targets	<ul style="list-style-type: none">■ Increase the supply of social housing stock.	
Benefits	<ul style="list-style-type: none">■ Provide access to housing for disadvantaged demographics.	

5.12 Indigenous health and wellbeing

5.12.1 Indigenous health and wellbeing

Physical Location	All municipalities across Melbourne’s North	
Priority Type	Address Gap	
Category	Indigenous health and wellbeing	
Priority description		
Brief	The Northern Region has Melbourne’s largest Aboriginal and Torres Strait population. The Northern Metropolitan Partnership supports several important initiatives to support their health and wellbeing and promote reconciliation, ranging from advancing the treaty process, through indigenous cultural recognition to the development of a Centre for Excellence for Indigenous Sport, Culture and Wellbeing within the region. Such initiatives are of national significance.	
Specific projects or targets	■ Centre for Excellence for Indigenous Sport, Culture and wellbeing.	
Benefits	■ Community health and wellbeing.	



6. Regional economic impact

6.1 Forecasting and modelling scenarios

Trends for Melbourne's North without the significant infrastructure investments recommended in the *Northern Horizons* report are lower GRP growth than for Melbourne metro and, because of a higher rate of population growth than for Melbourne metro as a whole, this means a growing gap between the size of the resident workforce and the actual jobs available in Melbourne's North, which is what is occurring. This is because of a slower rate of growth in industry employment in Melbourne's North than is the case for Melbourne metro as a whole.

The research finds that the Melbourne's North economy would benefit from the development of a hi-tech industry cluster to the north of the La Trobe campus and its knowledge economy developments. A possible location for such a hi-tech cluster would be in Whittlesea, particularly as it has a growing number of high skilled households.

Table 6.1 Benefits of transport infrastructure investment	
A. Households	
(i)	Increased travel range
(ii)	Lower transport costs – increased consumption in other areas
(iii)	Increased workforce commitment/higher real incomes
(iv)	Improved workforce opportunities/higher real incomes
(v)	Reduced accident costs (repair/injury/loss of life)
B. Industry	
(i)	Reduced costs per vehicle – km
(ii)	Better access to markets – improved competitive position
(iii)	Reduced freight costs – increased investment potential
(iv)	Increased workforce commitment and productivity from employees
(v)	Increased profitability and/or reduced prices
(vi)	Increased investment and output from both existing and new firms attracted to the region
(vii)	Industry cluster consolidation
C. Regional outcomes	
(i)	Emission enhancement/reduction
(ii)	Structural consolidation and improved competitiveness (more efficient land use outcomes)
(iii)	Workforce integration and efficient skill matching
(iv)	Improved equality of opportunity from better labour market access

Source: NIEIR research.

The benefits of fast track infrastructure development in Melbourne's North are clear. The reasons why Melbourne's North is a priority for location for infrastructure investment include:

- to accommodate more effectively and more productively a rapidly growing population;

- to help offset the impact of a decline in employment because of a contraction in manufacturing employment in some sectors, including automotive;

- to help offset the growing gap between the scale of the resident workforce and the number of jobs available in Melbourne's North (a consequence of the points above). NIEIR's modelling for this report indicates the gap between resident employment and industry employment will continue to grow;
- to ease the growing pressure on transport systems as the population grows and more and more people travel outside the region to employment. The danger here is also the possibility that transport issues, already a problem in Melbourne's North, will mean greater difficulties for the industry in the region; and
- facilitate the growth of clusters such as a hi-tech cluster in the outer north, the Melbourne Airport cluster, medical precincts, a hi-tech cluster around La Trobe and RMIT Universities, and a food and logistics cluster around the Melbourne wholesale markets.

6.2 Closing the investment gap in the North

NIEIR has identified an investment shortfall within the Northern Region over the past five years within a range of \$393 million to \$1,081 million, as compared to the average investment rate of the other regions within Greater Melbourne. The gap was identified on a per capita basis and a population growth basis, where the latter is derived from analysing the level of investment for every new person between the regions over the past five years. The results are discussed in more detail in Chapter 3 with the investment gap reproduced in Table 6.2 below.

This section empirically estimates the short-term lost opportunity for economic activity as the result of the regional shortfall in investment over the past five years. The econometric equations that were estimated within this section give an indication of the short-term benefits of major project investment. The impacts are not derived from project specific initiatives, but are intended to give a broad indication of the average benefits of capital invested for GRP (under the assumption that the investment gap is closed with a similar mix of major projects as have occurred over the past five years). The GRP gains from such increased infrastructure investment will extend beyond the short term, implying higher long term returns than are shown for the short-term.

Table 6.2 Implied investment surplus or deficit by region – 2015 to 2019 (\$ million)		
	Per capita basis	Population growth basis
Evaluated at average rate of investment for Southern, Eastern and Western regions		
Northern	-501	-1,081
Southern	1,222	1,016
Eastern	-1,568	-231
Western	431	-558
Evaluated at average rate of investment for Northern, Southern, Eastern and Western regions		
Northern	-393	-813
Southern	1,387	1,375
Eastern	-1,449	-87
Western	528	-281

Notes: 1. Melbourne City Council and Yarra City Council excluded from calculations.
 2. Represents total amount of under or over investment over the entire five year period.
 Source: NIEIR.

NIEIR has modelled the impacts on GRP that major investment projects have had over the past five years within the Greater Melbourne region. This was achieved by estimating the relationship between the annual GRP growth for each year across 2015 to 2019 against major project spending within these years. All of the economic variables were at the LGA level on a per capita basis, while the benefits for major project spending were split into those located within the region and those located within the specific LGA. A set of other economic variables was also used to control for impacts on GRP outside of major project spending.

In Chapter 3 NIEIR identified an investment deficit per person, and per new person over the past five years. On a per capita basis, the Northern Region had an investment level of \$2.41 million per 1000 population while the remaining regions of Melbourne (Southern, Eastern, and Western) had an investment level of \$2.91 million per 1000 new population.

The potential economic benefit of equalised investment in the North was estimated by refitting the LGA level equations on the assumption that the investment gap is closed, with the North receiving the same level of investment as the remaining Melbourne regions on a per capita basis. The results are set out in Table 6.3. Had investment levels been equalised within the North compared to all the other regions within Greater Melbourne outside of the CBD, Northern GRP would have increased by around \$164 to \$208 million per annum over the 2015 to 2019 period. This represents the ‘most likely’ estimate for the economic benefits to the region, the potential benefits over a 95 per cent confidence interval having a much wider suggested range. The annual benefit translates to a total GRP impact of around \$818 to \$1,040 million over the 2015 to 2019 period, which would be greater than this over a longer period (once GRP gains beyond 2019 are counted).

Table 6.3 Gross Regional Product – Average annual impact from equalised major project investment (2015 to 2019)				
	Gross Regional Product (\$2018 million)		Employment (number)	
	Greater Melbourne	Greater Melbourne excluding Northern	Greater Melbourne	Greater Melbourne excluding Northern
Northern	164	208	1,424	1,809
Southern	-292	-224	-2,347	-1,799
Eastern	290	340	2,267	2,658
Western	-176	-136	-1,523	-1,180

Note: 1. Melbourne City Council and Yarra City Council excluded from calculations.

Source: NIEIR.

6.3 La Trobe NEIC catchment

The Plan Melbourne reports of 2014 and 2017 include the concept of a future Melbourne containing a small number of hi-tech/knowledge-based clusters, which will provide more wide-spread access to high-productivity economic opportunities that have good access to/from the outer regions. These are known as National Employment and Innovation Clusters (NEICs). Seven NEICs have been identified, with the La Trobe NEIC of critical economic importance to Melbourne’s Northern Region. The remaining NEICs are Parkville, Fisherman’s Bend, Monash, Dandenong, Sunshine and East Werribee.

The La Trobe NEIC is the focus of this section, with Northern Horizon transport initiatives considered within the context of improving access to the La Trobe NEIC catchment. Access to the La Trobe NEIC

catchment has been defined through trip and travel time data, with the effect of set of projects and initiatives that improve these metrics, above and beyond a base case transport network, being assessed, in terms of improved economic outcomes for the region.

6.3.1 Base case

NIEIR has previously received information from Infrastructure Victoria that sets out a list of projects that are to be completed by 2031 from an initial network at 2011. This data includes origin-destination matrices for AM peak travel and travel times for both cars and public transport for each time at the SA2 level. This data set forms the *base case* for the current analysis.

Table 6.4 sets out the projected AM peak trip volumes to the La Trobe NEIC. Base case total AM peak trips to the La Trobe NEIC are forecast to increase by 50 per cent from 2011 to 2031. This gives an indication of the forecast growth of the La Trobe NEIC over this time period. In NIEIR's opinion, the base case represents only modest growth potential for the La Trobe NEIC. As the La Trobe NEIC is critical for the Northern Region, it needs to play a more prominent role than what is implied within the base case.

Table 6.4 Projected morning peak trip volumes to La Trobe NEICs and mode shares: 2011 and 2031	
Indicator	La Trobe
Car trips 2011	11,717
PT trips 2011	1,107
PT mode share 2011	8.6 per cent
Car trips 2031	16,565
PT trips 2031	2,698
PT mode share 2031	14 per cent
Inc. in total trips 2011-31	50.2 per cent

Source: Derived from trip tables provided through IV.

Car trips with the morning peak are expected to increase by around 4,850, while public transport trips are expected to increase by only around 1,600 to the La Trobe NEIC. The 2031 network implies that the share of car travel will be around 86 per cent, which underscores the La Trobe NEIC's reliance on private car travel and poor access by public transport. The share of PT morning peak trips is expected to increase between 2011 and 2031, from 8.6 per cent in 2011 to 14 per cent in 2031. However, increasing the share of public transport trips to and from the La Trobe NEIC, beyond the base case is required to support stronger catchment productivity growth.

NIEIR has estimated how changes in development density and trip times over 2011 to 2031 period, within the base case, will impact NEIC GRP and productivity estimates as at 2031. These results are shown in Table 6.5. Increases in density include factors such as employment and population growth that affect the scale of the NEIC. Increased density within the La Trobe NEIC is expected to increase GRP by around 48 per cent, but this is offset by increases in catchment travel times, which are expected to nearly halve the projected increase in GRP. In 2031 this translates to a GRP gain from density of around \$5.1 billion but with an offsetting loss of around \$2.3 billion from poorer travel times, for a net gain of around \$2.8 billion. The GRP impacts in 2031 are undiscounted, but could be multiplied by around 10 to give a rough net present value which translates to around \$51 billion gain for increased density, \$23 billion loss for longer travel times and a combined impact of \$28 billion gain.

The associated loss due to travel time to the La Trobe NEIC is particularly high when compared to the other NEICs in the base case. This implies that improvements to transport infrastructure within the La Trobe NEIC catchment have great potential to improve economic outcomes.

Table 6.5 Estimated impact of 'scale/density' and travel time changes on La Trobe NEIC economic outcomes to 2031		
	Density	Travel time
Catchment GRP change (per cent)	48	-24
Catchment productivity increase by 2031 (per cent)	6.7	-3.1
GRP gain in \$ billion in 2031 (\$2018)	5.1	-2.3

Source: NIEIR.

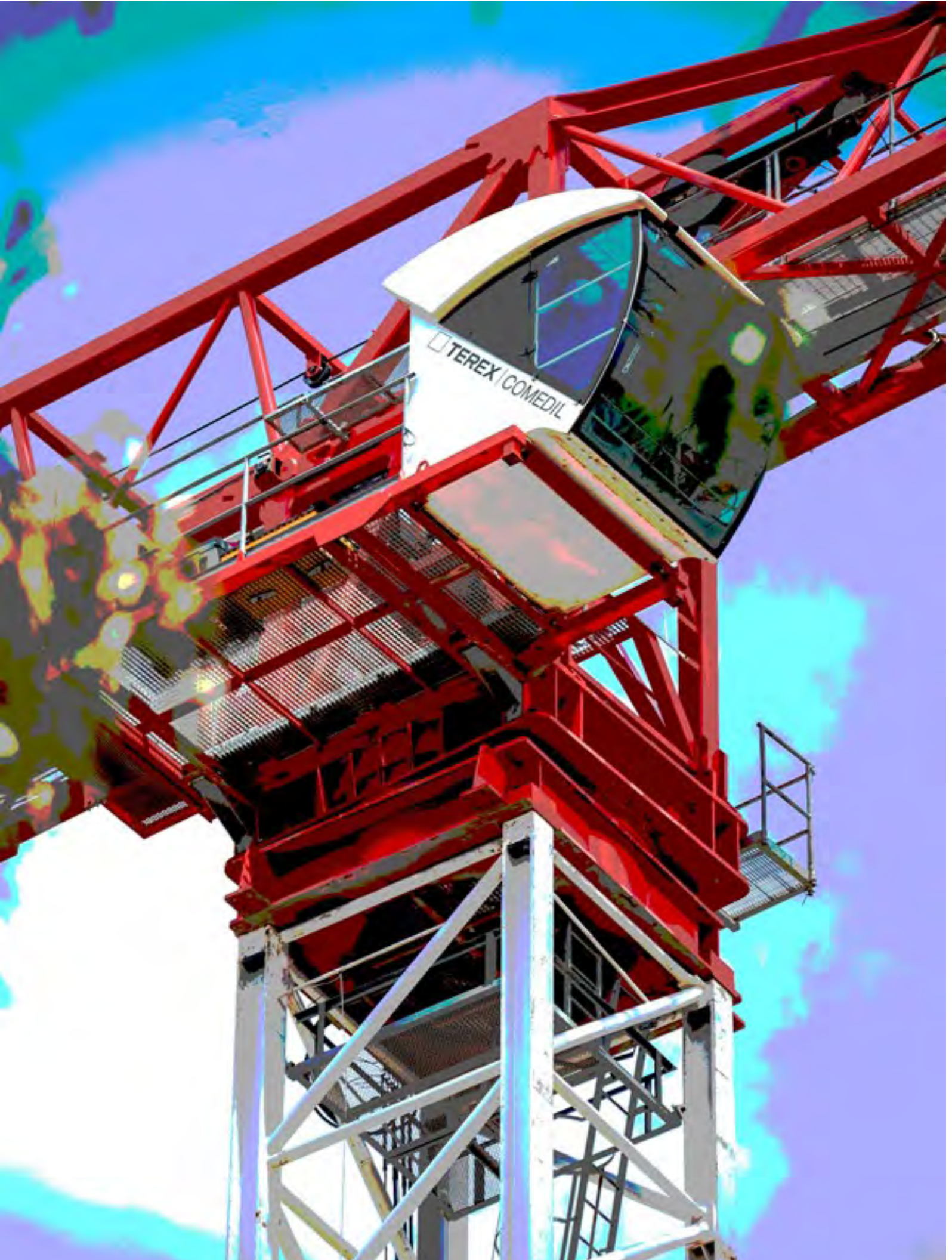
6.3.2 Accessibility improvements through reducing travel times

NIEIR has tested the economic impact on the La Trobe NEIC catchment of improving catchment travel times, through improved transport access to/from the La Trobe NIEC, with a particular focus on improvements in public transport links. This includes increased frequencies of service, longer operating hours and faster travel times, due to the greater availability of priority lanes and lights. These improvements are assumed to be the equivalent of delivering a 10 per cent improvement in travel speeds over the two decades from 2011 to 2031.

La Trobe receives a strong projected growth in NEIC catchment GRP from an assumed 10 per cent trip time improvement, of 17.4 per cent. The gain in GRP in 2031, from a 10 per cent trip time improvement, as compared to the base case, is around \$1.3 billion in 2018 dollars, or around \$13 billion in present value terms. This is very significant, showing the benefits of improving access to/from the cluster, particularly by public transport. It has been argued elsewhere in the report that circumferential trunk PT improvements, in particular, should have high priority in terms of expanding labour and product market catchments of the La Trobe Cluster.

Table 6.6 Impacts of an assumed 10 per cent improvement in La Trobe catchment travel times	
Indicator	La Trobe
Catchment GRP change in 2031 (per cent)	17.4
Catchment productivity increase by 2031 (per cent)	2.1
GRP gain in \$ billion in 2031 (\$2018)	1.3

Source: NIEIR.



Stakeholder consultations

2019

Melbourne Polytechnic (TAFE)	Yarra Valley Water (Utility)
Department of Jobs, Precincts and Regions (Victorian Government)	Office of Suburban Development & State Development (Victorian Government)
Melbourne Airport (Airport)	Northern Councils Alliance (Association)
DPV Health (Health Services)	City of Whittlesea (Council)
Mitchell Shire Council (Council)	Nillumbik Shire Council (Council)
RMIT University (University)	Bendigo Kangan Institute (TAFE)
City of Darebin (Council)	MAB (Developer)
National Growth Areas Alliance (Authority)	Banyule City Council (Council)
Melbourne Market Authority (Authority)	La Trobe University (University)
Hume City Council (Council)	Moreland City Council (Council)
Department of Transport (Victorian Government)	Department of Education and Training (Victorian Government)
Infrastructure Victoria (Victorian Government)	Northern Health (Health Services)
Department of Health and Human Services, Policy and Planning, Health and Wellbeing Division (Victorian Government)	Caravan Industry Association (Industry Association)
NORTH Link	Dysons (Industry)
	Melbourne's North Food Group

2014

Moreland City Council (Council)	Whittlesea City Council (Council)
Yarra City Council (Council)	Hume City Council (Council)
Darebin City Council (Council)	Banyule City Council (Council)
Mitchell Shire Council (Council)	Nillumbik Shire Council (Council)
Kangan Institute (TAFE)	NMIT (TAFE)
RMIT University (University)	La Trobe University (University)
MAB (Developer)	Austin Hospital (Health)
Stockland (Developer)	Winslow (Construction)
Committee for Melbourne (Industry Association)	Infrastructure Partnerships Australia (Industry Association)
RACV (Association)	

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APPENDICES

Appendix A: Bus service development

A.1 Purpose of this paper

This Appendix provides supporting content to the material on bus service development in the main body of this report. It sets out the high level policy context against which bus service development should be assessed and includes most of the detail on particular services that is needed to back up some of the generalisations that are drawn in the main body of the report.

A.2 Policy context

A.2.1 Plan Melbourne 2017-2050

Updating *Plan Melbourne 2017-2050* (Victorian Government 2017) was an early initiative of the Andrews Labor Government, which included some updating of the previous Government's *Plan Melbourne* (DTPLI 2014). *Plan Melbourne 2017-2050* is:

... a 35-year blueprint to ensure Melbourne grows more sustainable, productive and liveable as its population approaches 8 million. (Victorian Government 2017, p. 6)

The Plan sets the long term strategy for supporting jobs, housing and transport across Greater Melbourne and Victoria more broadly, while recognising the importance of building on Melbourne's legacies of distinctiveness, liveability and sustainability, which form three key elements of Melbourne's competitive advantage and urban brand. The importance of good connectivity is recognised in several of the Plan's strategic directions.

The core underlying land use development direction in *Plan Melbourne 2017-2050* is that the city should become a more compact city, with the relative proportion of development that takes place in established areas being intended to increase. Thus, for example, 70 per cent of new housing being infill is an aspirational target set out in *Plan Melbourne 2017-2050* (see page 47 of the Plan).

The Plan is based on *nine principles*, is directed at *seven key outcomes* and sets out *thirty-two directions/policies* to support outcome achievement. The nine principles are:

- A distinctive Melbourne;
- A globally connected and competitive city;
- A city of centres linked to regional Victoria;
- Environmental resilience and sustainability;
- Living locally – 20-minute neighbourhoods;
- Social and economic participation;

- Strong and healthy communities;
- Infrastructure investment that supports balanced city growth; and
- Leadership and partnership

Two particular focus areas of the Plan set it apart in international terms as an urban land use plan (Stanley, Stanley and Hansen 2017). These two focus areas are key new urban land use development directions that were proposed by the Ministerial Advisory Committee, which advised the respective Planning Ministers on both *Plan Melbourne* and *Plan Melbourne 2017-2050*¹. Those two directions are:

- designation of a small number of hi-tech/knowledge-based economic clusters, called **National Employment and Innovation Clusters (NEICs)**, across the city. The NEICs are intended to provide increasing opportunities for agglomeration (productivity) economies within employment reach of the fast growing outer suburbs, complementing the lead role of the CBD in hi-tech/knowledge-based economic activities. These economic activities are fast growing employment activities and the foundation for regional exports, providing high multiplier impacts. Their inclusion in both versions of Plan Melbourne arose from research conducted by NIEIR for the Plan Melbourne MAC; and
- shaping Melbourne's suburbs so that the city can increasingly develop as a series of **20-minute neighbourhoods**, where most of the requirements for a good life are accessible within a 20 minute trip by public or active transport. This idea provides a bottom-up view of urban strategic planning, to complement the more usual top down approach. It is a key part of ensuring that the benefits of a productive, liveable and sustainable Melbourne are widely shared.

These initiatives emerge in several of the Plan Outcome areas and associated Directions/Policies that are intended to support achievement. They are central to the future development of public transport services in Melbourne in general, and bus services in particular, as elaborated in what follows.

A.2.2 Living locally – 20-minute neighbourhoods

As noted, *Plan Melbourne 2017-2050* is based on 9 principles that underpin a long-term vision for Melbourne (Victorian Government 2017, p. 4). The innovative Principle 5 is *Living locally – 20-minute neighbourhoods*, which Plan Melbourne 2017-2050 describes as follows (Victorian Government 2017, p. 14):

Creating accessible, safe and attractive local areas where people can access most of their everyday needs within a 20-minute walk, cycle or local public transport trip, will make Melbourne healthier and more inclusive. Due to the specialised and diverse nature of work, many people will still need to travel outside of this 20-minute neighbourhood for their jobs.

Within the various policy Directions set out in Plan Melbourne, a number are particularly relevant to 20-minute neighbourhoods: Direction 3.2: Improve transport in Melbourne's outer suburbs; Direction 3.3: Improve local travel options to support 20-minute neighbourhoods; and, Direction 5.1: Create a city of 20-minute neighbourhoods. The latter points out that (Victorian Government 2017, p. 114):

¹ Professor John Stanley, lead author of this Appendix, was a member of both MACs.

A 20-minute neighbourhood must:

- *be safe, accessible and well connected for pedestrians and cyclists to optimise active transport*
- *offer high-quality public realm and open space*
- *provide services and destinations that support local living*
- *facilitate access to quality public transport that connects people to jobs and higher-order services*
- *deliver housing/population at densities that make local services and transport viable*
- *facilitate thriving local economies.*

The 20-minute neighbourhood is all about ‘living locally’—giving people the ability to meet most of their everyday needs within a 20-minute walk, cycle or local public transport trip of their home.

This discussion is particularly relevant to local bus service development, since bus is the most proximate public transport mode to most outer and middle Melbourne residents. The idea of 20-minute neighbourhoods has a clear focus on strengthening local (i.e., broadly speaking, within neighbourhood) access opportunities, by active and public transport, and a recognition of the particular needs of outer suburbs, needs which are growing very rapidly with the fast rate of outer urban population growth. Social inclusion, an important policy intent, is noted in discussion of some of the policy actions to support improved local access opportunities (e.g. *Policy 3.3.3: Improve local travel choices*) and has been central to the development of the idea of 20-minute neighbourhoods.

The expected benefits of delivering Melbourne as a series of 20-minute neighbourhoods are substantial (Victorian Government 2017, p. 114):

A 20-minute neighbourhood can create a more cohesive and inclusive community with a vibrant local economy—reducing social exclusion, improving health and wellbeing, promoting a sense of place, reducing travel costs and traffic congestion, and reducing carbon emissions across the city as a whole.

Development of strong and vibrant local activity centres, including health and educational precincts, together with local greening, are central to 20-minute neighbourhoods, including social and community infrastructure and local place making. Such initiatives should form key components of infrastructure plans to support delivery and some are included in the Northern Horizons Strategy 2020 Update.

Most of Melbourne’s inner suburbs are already 20-minute neighbourhoods, as are parts of middle Melbourne. In Melbourne’s outer suburbs, improved public transport is central to delivering on 20-minute neighbourhoods, while also ensuring that trunk (i.e. out-of-neighbourhood) access to services and other wants/needs that are not available within the 20-minute neighbourhood remains high quality (e.g. most jobs, high end medical services). This requires ensuring that land use development and local public transport integrates with high-quality trunk public transport, with planning and delivery of high-quality public transport timed to accord with the rate of development in outer areas, rather than years later. It further requires good local public and active travel options, which *Plan Melbourne 2017-2050* recognises may require new options (Victorian Government 2017, p. 92):

Improving local transport choices will help people meet most of their everyday needs within their local neighbourhoods. In the process, this policy helps create more inclusive communities. Initiatives include supporting safe, more innovative, flexible and demand-responsive forms of

transport, particularly in locations with specific social needs or which are not connected by traditional bus services.

In terms of implementing *Plan Melbourne 2017-2050*, there were 112 Action Items identified. Recognising the early development stage of the 20-minute neighbourhood concept, one Action Item explicitly targeted this initiative. Action Item 75 reads as follows²:

Embed the 20-minute neighbourhood concept as a key goal across government. Key steps are to:

- *identify and undertake flagship 20-minute neighbourhood projects with the metropolitan regions and the private sector to focus planning and implementation work*
- *provide guidance to local government on embedding the 20-minute neighbourhood concept into local planning schemes*
- *build community partnerships to help deliver 20-minute neighbourhoods*
- *improve information and research to be shared with local government.*

Case studies have been undertaken under this Action and it is apparent from the Departmental website's listing of initiatives that have emerged from the case study work that **a narrower concept of 20-minute neighbourhoods is being pursued than was intended in *Plan Melbourne 2017-2050***. In particular, walking (for journeys of 800 metres or less) seems to have become the focus, rather than allowing the 20-minute neighbourhood to include local public transport travel and cycling, as was intended in *Plan Melbourne 2017-2050*. Including cycling and local public transport creates a larger 'neighbourhood', greater opportunity for living locally and introduces the opportunity for improving health, inclusion and environmental outcomes by replacing some 'local' car trips by cycling and/or public transport travel. Future 20-minute neighbourhood roll-out should include cycling and local public transport that will best support delivery of the goals of 20-minute neighbourhoods. This does not mean that walking is not important but it is not sufficient for delivery of the full range of intended benefits from 20-minute neighbourhoods.

A.2.3 National Employment and Innovation Clusters and the La Trobe Cluster

Plan Melbourne (DTPLI 2014) and *Plan Melbourne 2017-2050* (Victorian Government 2017) both included the concept of a future Melbourne containing a small number of hi-tech/knowledge-based economic clusters, which will provide increased opportunities for locating high productivity jobs throughout the urban area, with good access to the fast growing outer suburbs. This concept was developed through work by NIEIR with the Ministerial Advisory Committee that advised the Liberal and Labor State Governments on their respective versions of *Plan Melbourne*. There are now seven National Employment and Innovation Clusters, two of which are in the inner area (Parkville and Fishermans Bend), four in the middle suburbs (Monash, La Trobe, Dandenong and Sunshine), plus one in the outer suburbs (East Werribee). The Victorian Planning Authority is preparing development strategies for four of these NEICs, including La Trobe, although some northern regional stakeholders expressed the frustration that locals seem to have been left to get on with delivering the NEIC, without much state leadership.

² https://www.planmelbourne.vic.gov.au/__data/assets/pdf_file/0007/377125/Plan_Melbourne_2017_Implementation_Actions.pdf. Action Item 75.

The NEICs are intended to form the key land use foundation for a more productive, compact poly-centric Melbourne. While 20-minute neighbourhoods are essentially a bottom-up lens through which to approach urban land use planning, the seven National Employment and Innovation Clusters (NEICs) are essentially a top down approach to land use development planning, intended to support urban productivity growth and better sharing of the benefits of this growth among residents across the wider city. The NEICs are a primary policy direction in Plan Melbourne 2017-2050 to support achievement of Outcome 1 in the Plan. That Outcome is *Melbourne is a productive city that attracts investment, supports innovation and creates jobs* (Victorian Government 2017, p. 22), with Policy 1.1.3 being *Facilitate the development of national employment and innovation clusters*. Discussion of that Policy in the Plan includes the following (Victorian Government 2017, p. 29):

The national employment and innovation clusters are focused on knowledge-based businesses that locate close to each other for knowledge and resource sharing. The clusters are distributed throughout Melbourne and along high-capacity transport networks to provide greater access to high-productivity jobs.

... There are some common requirements. Each cluster will need high levels of amenity to attract businesses and workers—including public transport, and walking and cycling paths...

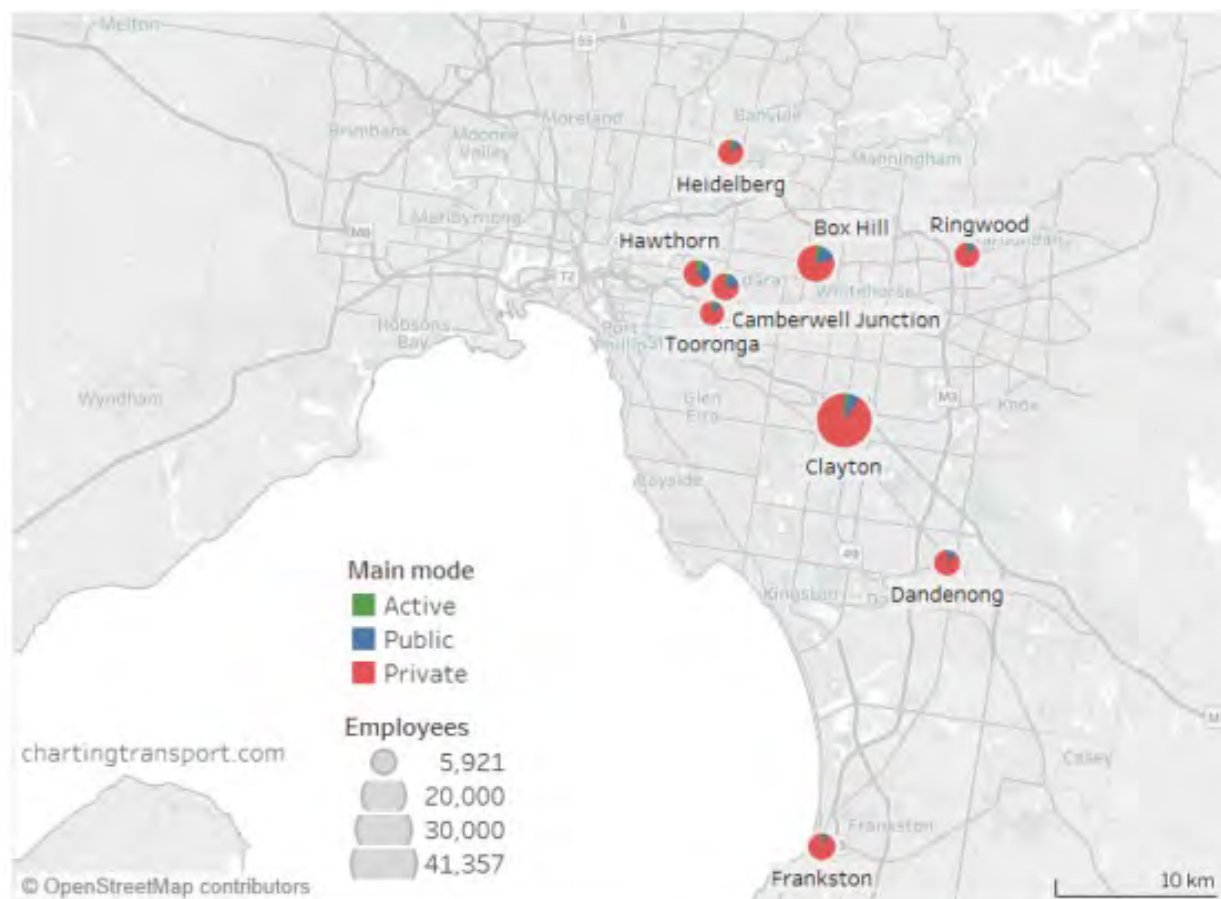
High quality public transport is very important to NEIC development, being central to supporting the effective density on which clusters depend. Accessibility to other key activity nodes across the city is also important to support growth in jobs closer to where people live.

Well respected Melbourne transport blogger Chris Loader (Charting Transport) has analysed the location of middle urban clusters across Australia's major cities. Recognising that designation of a cluster is ultimately arbitrary, Loader used the following criteria: the cluster contained at least 40 employees per hectare in 2011 or 2016, was more than 4km from the city's main CBD, and achieved at least around 6,000 employees travelling on census day in 2016. Map A.1 is the resulting set of identified clusters within metropolitan Melbourne, **all of which are in the city's east/southeast, except for Heidelberg**. The Monash cluster in Clayton is the largest.

Loader notes that places just missing out on his cluster criteria include parts of the Tullamarine industrial area (5,271 jobs at 55 jobs/ha), Doncaster (around 5,000 jobs at 40+ jobs/ha), Chadstone Shopping Centre (5,375 jobs at 105 jobs/ha), and La Trobe (around 7,700 jobs but low density). Loader's analysis underlines the importance of the Heidelberg/La Trobe University precincts functioning well, if the Northern Region's residents are to share more equitably in the benefits of Melbourne's future economic development. Consultations undertaken for the Northern Horizons 2020 Update indicated that public transport accessibility is critical here, as a means of supporting the effective density on which hi-tech/knowledge-based clusters depend.

Map A.1: Melbourne clusters

Dense employment clusters more than 4 km from CBD by size and journey to work mode split, Melbourne, 2016



Source: Charting transport.

Loader presents data on the private transport mode share for journeys to work in the urban clusters that he identifies. The Northern Region's Heidelberg cluster stands out as having the highest private transport mode share (basically car driver or passenger) for a centre with its job density. In fact, Loader finds that Heidelberg has the highest car use density of all the Australian clusters that he identifies and a high job density (but that it isn't a large centre, relative to some others in Australian cities). His analysis suggests that public transport travel opportunities to the Heidelberg(/La Trobe) need attention (improvement). Loader notes, however, that the Heidelberg cluster is relatively small and is dominated by hospitals, which typically employ many shift workers. Travel by such people is often at times when public transport frequencies are low or non-existent, which would help to explain the relatively high private transport mode share. He points out that Heidelberg is located on a train line, and is also served by several relatively frequent bus routes, including one "SmartBus" route, although such bus services are by no means rapid-transit, given the lack of bus priority lanes. It may also be that there are a large number of parking opportunities in the cluster, which would encourage car use. Importantly, however, analytical evidence set out in research by Stanley and Brain for Infrastructure Victoria (Stanley and Brain 2016), suggests that public transport travel times to the La Trobe NEIC are, in relative terms, the poorest

of all the Melbourne NEICs, which is likely to be a significant contributor to the low public transport mode share. We return to that analysis in Section A.4.3 below.

Given the expected importance of growth in hi-tech/knowledge-based activities for Melbourne's future prosperity, an inescapable conclusion is that the Victorian Government and Melbourne's north needs to devote considerable effort to promoting the future development of its La Trobe NEIC, encompassing the Heidelberg and La Trobe components plus Northland and Heidelberg West employment areas, as the only current major activity cluster within the Northern Region. Development of strong activity centres that sit at a lower level is also important. Improved trunk public transport, particularly non-radial transport needs attention here, particularly serving the La Trobe NEIC, given the findings of the Stanley and Brain (2016) analysis for Infrastructure Victoria.

The Victorian Government's proposed new Suburban Rail Loop, from Cheltenham to Werribee, includes La Trobe NEIC as one of its key stopping points (Heidelberg). The idea on which the proposed Loop is based, of substantially improving circumferential public transport access to a large number of middle urban employment, educational, health, service and retail hubs, is strongly in line with the urban development intent of *Plan Melbourne 2017-2050* and with the more specific developmental needs for the La Trobe NEIC. Such improved circumferential trunk public transport should help to boost development in middle Melbourne and improve access to higher paying jobs for residents of outer growth suburbs.

The Strategic Assessment document (Victorian Government 2019) that the State Government has released on the Suburban Rail Loop lists a number of cities that have such rail links. It is notable that those cities have densities that are much higher than Melbourne, which means passenger loading expectations will be much lower in Melbourne. For example, Singapore is about 6 times as dense as Melbourne and London 3-4 times as dense. The Business Case that is to be undertaken on the project should shed light on whether prospective patronage levels, and supportive developmental impacts, are sufficient as to warrant the project's cost. Identification of ways of reducing project cost are also important, perhaps such as elevated rail over increased parts of the length.

Whatever the results of that Business Case, consultations undertaken for this Northern Horizons 2020 Update indicate strongly that circumferential trunk public transport in Melbourne's north, to support growth in the La Trobe NEIC, will need to rely on alternative solutions for the next one to two decades, or so, given that the Loop (if built) is planned to start at the southern end and have a three or so decade construction time. The recent very good report from the Rail Futures Institute, *The Melbourne Rail Plan 2019-2050* (RFI 2019) provides some useful ideas here. That report proposes Medium Capacity Transit for improving Melbourne's circumferential trunk public transport through the corridors put forward in the Suburban Rail Loop (excluding the Airport Rail Link). Medium Capacity Transit is defined as encompassing *rail-based technology such as Light Rail, road-based systems such as "Bus Rapid Transit", metro operations e.g. Paris metro and London Docklands Light Rail, or more recent developments such as very large guided buses in France and China* (RFI 2019, n.p.) but excluding heavy rail. Corridors serving residents of Melbourne's North that are listed by RFI are: Melbourne Airport-La Trobe University via Broadmeadows and Bundoora; La Trobe University – Doncaster via Heidelberg; Doncaster – Monash University via Box Hill and Mt Waverley. High capacity bus (e.g. BRT, with priority) and/or Light Rail solutions are likely to be the way forward for Melbourne's North for the next two or so decades. Suggested high priority improvements along these lines are set out later in this report (Section A.4.3), which would not prejudice possible subsequent development of the Suburban Rail Loop.

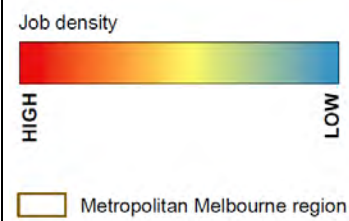
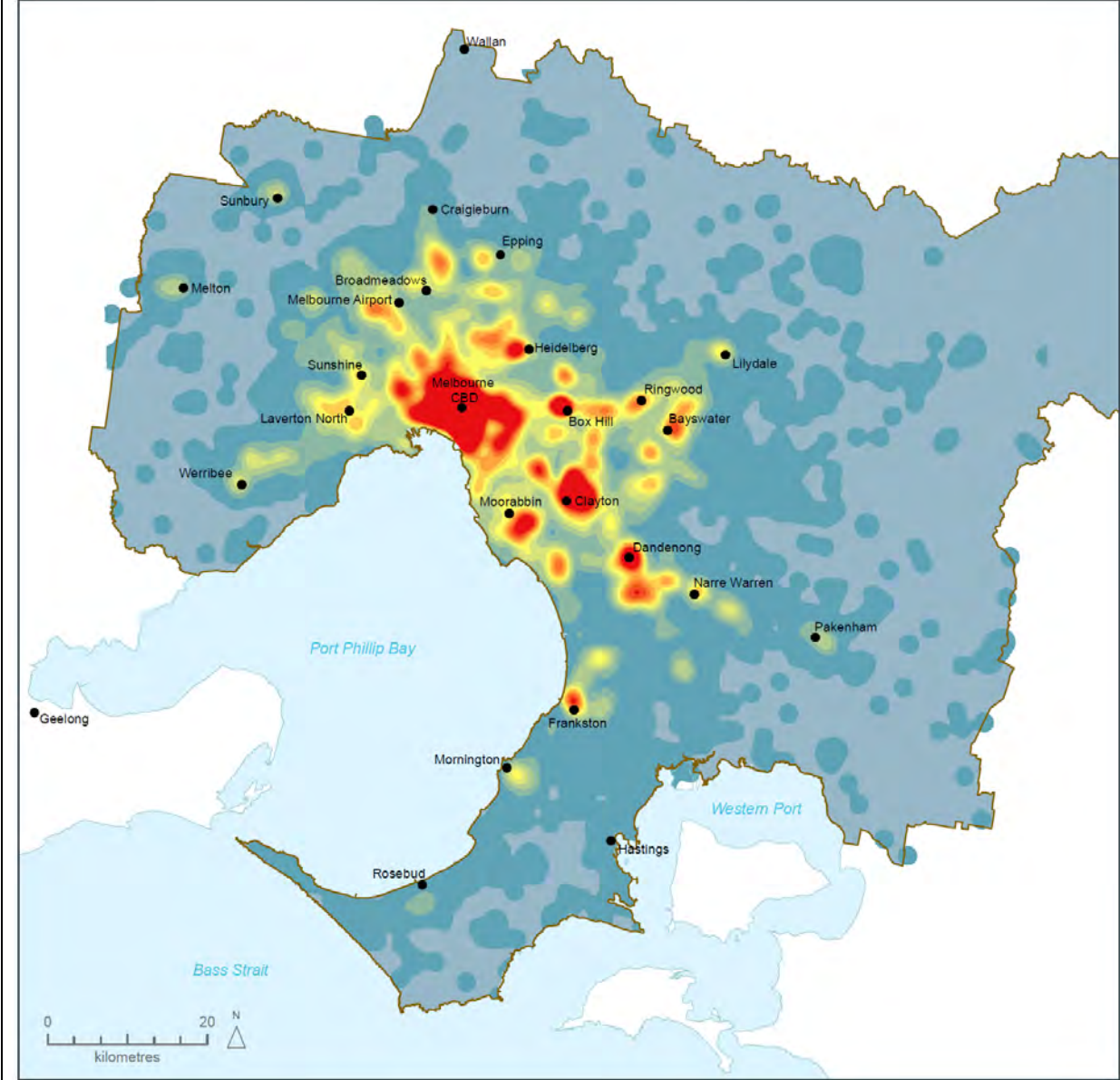
A.2.4 Other activity clusters

Plan Melbourne 2017-2050 recognises the importance of supporting job growth across the wider city, not just in the NEICs. It draws particular attention, for example, to health and education clusters (Policy 1.1.4), noting that *Planning for the growth of these precincts will need to focus on improving access—particularly via public transport—and diversifying job choices* (Victorian Government 2017, p. 44). More broadly, *Plan Melbourne 2017-2050* indicates its intent to *Support the development of a network of activity centres linked by transport* (Victorian Government 2017, p. 48. Policy 1.2.1).

More broadly, Map A.2, which is Map 12 in *Plan Melbourne 2017-2050*, shows job densities by location across Melbourne. In the Northern Region, two major east-west bands stand out, the La Trobe Cluster area in the south-east of the region and a band, or two semi-bands, across the northern area, the western part of which extends to the airport. These east-west semi-bands are broadly the locations of SmartBus routes 901 and 903. Connectivity between Heidelberg and the south-east, towards Kew and Box Hill, stands out as a priority corridor for improvement in labour market effective density for the north, and more particularly for the La Trobe Cluster. It should also be a priority for improving Northern residents' access to jobs in the east, in line with *Plan Melbourne Policy 3.1.2: Provide high-quality public transport access to job-rich areas*. The North-East Link is likely to assist road access in this direction but public transport service levels, including road priority, also need attention, to reduce car dependence., in line with *Plan Melbourne 2017-2050 Policy 3.1.2*.

A number of specific Northern Region activity clusters are noted in *Plan Melbourne 2017-2050*, additional to La Trobe NEIC: University Hill (including RMIT Bundoora campuses), Melbourne Airport, Beveridge Interstate Freight Terminal, Northern Industrial Precinct, a number of Metropolitan Activity Centres (Broadmeadows, Epping, Lockersbie – future), a number of Major Activity Centres (Brunswick, Coburg, Craigieburn, Craigieburn Town Centre, Eltham, Glenroy, Greensborough, Heidelberg, Ivanhoe, Mernda, Northcote, Preston – High Street, Preston – Northland (part of La Trobe NEIC), Reservoir, Roxburgh Park, South Morang, Sunbury), together with some Future Activity Centres (Beveridge, Mickleham, Sunbury South, Wallan, Wollert). All these activity clusters, and future clusters, should expect good quality public transport services, both radial (mainly rail) and circumferential (mainly bus-based in outer suburbs, tram in inner suburbs and tram or bus in middle suburbs). Only some of the circumferential public transport needs will be met by improvements in the Suburban Rail Loop corridors and then often not for some time.

Map A.2: Jobs across Melbourne



Source: Victorian Government (2017), Map 12.

A.2.5 The need for integration

Plan Melbourne 2017-2050 emphasises the importance of integrated transport service planning and provision. Outcome 3 intended from the Plan is as follows (Victorian Government 2017, p. 81): *Melbourne has an integrated transport system that connects people to jobs and services and goods to market.*

Explaining the intent, the Plan says (Victorian Government 2017, p. 81):

For Melbourne to continue to be a globally connected and competitive city with strong and healthy communities and higher social and economic participation, the share of trips by public transport, as well as active transport modes such as walking and cycling, must increase.

Melbourne needs one reliable, connected transport network where services are regular and easy to use, timetables are integrated, and major interchanges work better.

That means land use and transport needs to support and encourage convenient trip options so that more people can meet most of their needs locally and be less reliant on private vehicles.

This sends a clear message on the intent that modal integration is a priority and reinforces the living locally focus of 20-minute neighbourhoods. The importance of integrated public transport services for well-performing bus services is noted, as is the impact of such better services on patronage levels (Victorian Government 2017, p. 86):

The best performing services are typically those where buses connect as part of an integrated public transport network. Where improvements to bus networks have already been delivered, there have been substantial increases in patronage. This approach will continue as the city develops and demand grows.

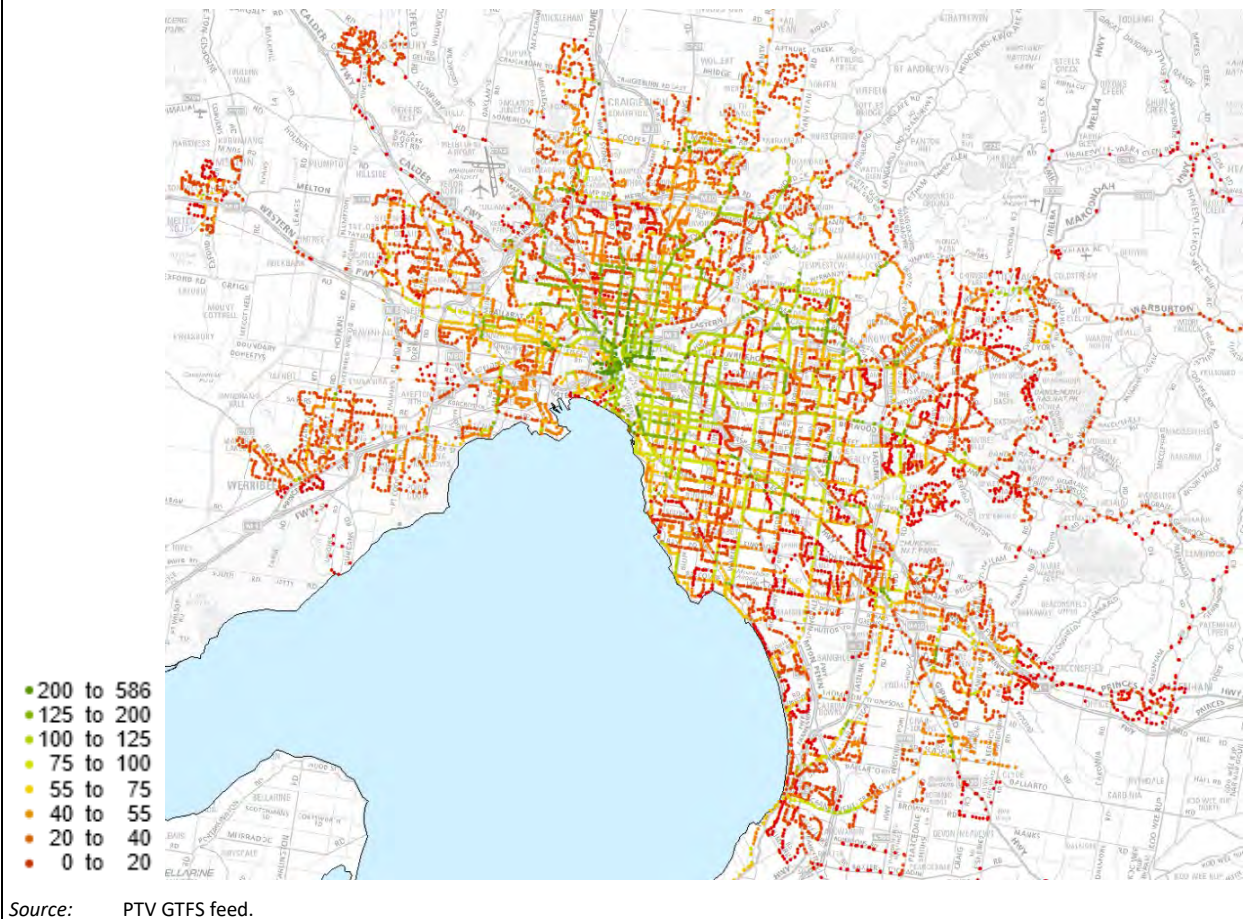
This draws attention to the importance of timetable integration across PT modes, as well as integrated marketing and service information and network planning.

A.3 Bus services

A.3.1 Current service levels in Melbourne's North

Across much of northern Melbourne, buses are the only available form of public transport within reasonable walking distance of people's homes. Map A.3 shows the current bus and tram routes across the north. Gaps in coverage in outer northern corridors are apparent, such as north-east of Hurstbridge, including between Hurstbridge and St Andrews.

Map A.3: Melbourne's route bus and tram services – services on a typical weekday (each direction)



Maps of bus routes do not say anything about the *level of service* that is actually provided along the route, for those living nearby or visiting. To get an idea of service provision in the north, including outer growth areas which are recognised as being under population growth pressure, service frequency and span of operating hours need to be considered along individual bus routes. Data on the number of times a day that a bus stops at a particular stop brings these two factors together. The Northern Horizons Strategy currently indicates a minimum of 3 buses an hour, which accords with the idea of 20-minute neighbourhoods (three buses an hour implies 20 minute headways). If that frequency is assumed to apply from approximately 5:00 am until 11:00 pm to integrate with train times, then 55 stops a day would be expected in each direction. Figure 4.15 shows this information for a typical Wednesday. The red and dark orange colours are under 40/services a day and are the norm in the outer north, well below the indicated benchmark of 55 services/day. Some east-west routes in the inner north have considerably higher frequencies. The data suggests there is a large bus service level deficit in the region, particularly in the outer areas.

To explore this issue in more specific detail, service data on all train and bus services to Craigieburn and Mernda Rail stations was examined. Table A.1 summarises data on service numbers and on headways, by time of day, for all the bus routes and compares them to rail service levels.

Some 73 trains leave Craigieburn station and 76 leave Mernda station on a typical weekday, with the first train out being at 4:03 am from Mernda and 4:31 am from Craigieburn. Six trains leave Mernda station before 6:00 am, with around 20 minute average headways, and five leave Craigieburn station before this time (16 minute average headways) but there are few buses that arrive at either station before 6:00 am to meet those trains: only one in the case of Craigieburn station but services on six bus routes arrive at Mernda station before 6:00 am, the first arriving at 5:17 am, but most arriving just before 6:00 am. In other words, there is virtually no integration between bus and rail for early morning services, which means most early morning rail users need to drive to the station, get dropped off, walk, cycle or use a taxi/Uber service. Car ownership and use, with clearly evident pressure on station car parking facilities, is encouraged by this lack of integration. Adding car parking simply compounds car dependence. Buses need to start an hour or so earlier serving both stations, at headways/frequencies that align with train frequencies.

In the morning peak, assumed to be from 6:10 am until 9:30 am in Table A.1, average train headways are 9 minutes on each line. No bus service has a headway that is anywhere near this. To Craigieburn station, average morning peak bus headways range from 19-42 minutes, and from 18-41 minutes in the case of services to Mernda station. Integrating bus and train timetables, given the existing train service level, would basically require a doubling of bus services, or more, over this morning peak period.

Between 9:30 am and 3:00 pm, average train headways are 18 minutes from Mernda station and 21 minutes from Craigieburn station. In contrast, average bus headways are 37-41 minutes at Mernda station and 30-41 minutes at Craigieburn station. At best, buses might meet every second train.

Moving to the afternoon shoulder period, from 3:01 pm to 5:00 pm, train headways are 12 minutes from Craigieburn station and 11 minutes from Mernda. In contrast, average bus headways range from 24-40 minutes arriving at Craigieburn station and a somewhat better 20-30 minutes at Mernda station. Yet again, however, buses can do no better than meet every second train, or worse.

Buses do somewhat better in the evening peak, from 5:01 pm to 7:30 pm, relative to the rest of the day. Average train departure headways over this period are 15 minutes from Craigieburn and 17 minutes from Mernda. Bus headways at Craigieburn station range between 19 and 30 minutes, while they are mainly at 21 minutes at Mernda Station. This is better alignment than at earlier times of day.

In the evening (after 7:30 pm), train and bus headways are better aligned again. Train headways average 30 minutes from each station and bus headways are the same or a little longer. However, trains operate for about 2 hours longer than buses, which further encourages increased car ownership and use.

If reducing risks of mobility-related social exclusion, reducing pressures on car ownership and use in growth suburbs and supporting development of 20-minute neighbourhoods are policy goals, as is clearly intended in *Plan Melbourne 2017-2050* (Victorian Government 2017), then bus and train operating hours and service headways should align more closely. Overall, peak bus headways (average) are around 20 minutes on each set of routes, drifting out to 40 or so minutes off-peak. Off-peak headways should be 20 minutes, given the Plan Melbourne focus on achieving 20-minute neighbourhoods. The Northern Horizons Strategy already reflects this thinking, with its short term bus service standard being 3 buses an hour (which equates to a 20 minute average headway). Peak bus headways should align with the more frequent train service levels. Closer to stations, these improved headways could sometimes be met by different bus services operating on part of the same road. They should not require a doubling of bus service kilometres on all routes.

More generally, all bus service timings on routes that serve train stations should align with train timetables, for customer convenience. Examination of the timetables at Craigieburn and Mernda suggests that, in both settings, weekday buses need to start an hour or so earlier in the morning and finish 2 hours later, and have increased frequencies during the day, aligning again with train headways, which may drift out to 30 minutes after 7:30 pm. Section A.4.2 undertakes a similar analysis for train and bus services to La Trobe University.

A.3.2 Toward service standards

Ideas like this can be embedded in service standards. Analysis of the bus and train spans of service hours and headways in the preceding section, together with the policy direction of 20-minute neighbourhoods, suggests that, for improved PT service integration, buses should preferably operate with 20 minute average headways from about 5:00 am to 11:00 pm start of last run. It is nonsense to talk of 20-minute neighbourhoods if bus service headways are longer than this. At any stop along a route, 20 minute headways over these operating hours imply a minimum of ~55 services a day. This would not mean a fully integrated service offering, given current train headways, but it would be a higher level of integration than is currently achieved. For example, Table A.1 shows that trains leaving Craigieburn (73/weekday) and Mernda (76/weekday) stations currently each have about one-third more services than this, so the 55 services a day is not overly generous, although Table A.1 indicates that 55 is about half as high again as current bus service levels across the day. If the bus service level after 7:30 pm was reduced to 30 minutes, to align with train, the 55 services a day would reduce marginally (by about 3), which should be considered a **minimum average service level** on a **local** outer urban collector (non-trunk) bus route serving a station, although **meeting every train** is needed for full integration. **Trunk bus routes** would be expected to have higher peak frequencies, with headways fully aligned with train service headways (shorter than 20 minutes), lifting minimum daily bus services to well above 60. Looking at the current service levels in Table A.1, and allowing for some opportunity for increased services to particular stops as bus services approach a station, it seems likely that service increases of around 50 per cent would be needed to meet these local service standards in the outer north growth areas considered.

The expectation that **trunk bus routes** might be expected to have higher numbers of daily services than local bus routes is appropriately reflected in the current SmartBus timetable. For example, in Melbourne's north, circumferential SmartBus Route 901 has a daily weekday average of 66 departures from Epping Station to Melbourne Airport, with the first service departing west from Epping Station at 4:49 am and the last at 11:42 pm (to Broadmeadows). This is approaching, but still less than, the number of weekday train services (around 81 heading to the city). However, there is only one SmartBus service arriving at Epping Station just before 5:00 am, whereas three trains leave that station before that time. At the other end of the weekday, the last train arriving at Epping Station from the city does so at 11:47 pm, which is just after the last SmartBus leaves, such that anyone needing to catch a late SmartBus would need to arrive on an earlier train. This suggests there is a need for one or two earlier and later 901 services through Epping if service integration is to be improved.

SmartBus services on Saturdays and Sundays are well down on the weekday numbers, at 37 and 30 respectively for Route 901 over the route segment indicated. First and last departures are at 5:50 am and 11:32 pm respectively on Saturday and 6:43 am and 9:59 pm on Sundays. These are roughly 30 minute headways over spans of hours that look reasonable but could be extended on weekends. By comparison, there are 56 train services on a Saturday and 46 on a Sunday and public holiday, with good operating spans of hours. Average headways are around 25 minutes across long operating hours on both days, with higher peak frequencies and lower frequencies overnight. These weekend train numbers are

around 50 per cent higher than comparable weekend SmartBus frequencies, suggesting that bus passengers are travelling second class, even on these premium bus routes, a criticism that is much harder to levy on weekday SmartBus service levels.

This comparison suggests that, for **integrated train and trunk route bus services**, there is a need to increase SmartBus weekend service levels by a substantial margin on the 901 between Epping Station and the Airport but that weekday service levels mainly need small increases, including at either end of the day. Should train headways get shorter, as is expected with increasingly congested services associated with population growth, particularly once Melbourne Metro 2 is developed, then bus service levels would need to be increased in line, to sustain integrated service offerings.

As a second exploration of SmartBus service standards, Route 903 from Heidelberg Station to Coburg Station was considered, being part of the middle section of the 903 Route that extends from Mordialloc to Altona. This section of Route 903 offers 69 weekday services, the first leaving Heidelberg Station heading west at 5:23 am and the last at 11:24 pm. Some 75 Hurstbridge line trains depart from Heidelberg station heading for the city on a typical weekday, with the first train down leaving at 4:59 am, 30 or so minutes before the first SmartBus service. The last train from the city arrives at Heidelberg Station at 11:48 pm, which is around half an hour later than the last SmartBus departure. As with the 901 service, an additional early morning and late evening service would improve service integration.

Also like the 901 service, service levels on the 903 route drop on weekends, to 37 services on Saturday (first 6:10 am and last 11:36 pm) and to 29 on Sundays (first 7:16 am and last 8:03 pm). In contrast, there are 58 trains timetabled at Heidelberg on Saturdays (extending through to Sunday morning) and 50 on Sunday, much higher than the SmartBus service levels. Again a need for a significant increase in weekend SmartBus service levels emerges, for train/bus service integration, with relatively smaller increases in weekday SmartBus service levels, mainly for early and late services.

This comparison suggests that weekday SmartBus service levels are perhaps 10 to 20 per cent or so poorer than on rail services that the buses meet but that weekend SmartBus service levels are only about two-thirds those of rail. Train-bus integration requires SmartBus service increases of about 10 to 20 per cent on weekday services and about half on weekend services. It is argued elsewhere in this paper (Section A.4.3) that there also is a need for new SmartBus services in Melbourne's north serving key activity clusters and operating at improved frequencies, particularly to/from the La Trobe NEIC.

Table A.1 Some Melbourne Northern PT timetable comparisons – weekdays									
Service	Total services/ day	Average headways							
		4:31-6:00 am	6:01-9:30 am	9:30 am-3:00 pm	3:01-5:00 pm	5:01-7:30 pm	7:30 pm+	First departure arrives stn	Last departure leaves stn
Craigieburn Station train and bus lines: Bus in/train out – service numbers and average headways									
Train	73	16	9	21	12	15	30		11:30 pm
528 bus: Craigieburn Stn to Craigieburn Sth	32	0	30	30	30	30	30	6:03 am	9:13 pm
529 bus: Craigieburn Stn to Craigieburn Nth	39	0	19	33	24	19	30	6:01 am	9:30 pm
532 bus: Broadmeadows Stn to Craigieburn Stn	36	0	23	30	24	21	38	6:14 am	8:59 pm
533 bus: Craigieburn Stn to Craigieburn Nth	39	1	19	38	24	19	30	5:55 am	9:30 pm
537 bus: Craigieburn Stn to Craigieburn West	25	1	42	41	40	30	38	9:00 am	9:57 pm
544 bus: Craigieburn Stn to Roxburgh Park	31	0	30	30	30	30	30	6:05 am	9:38 pm
Service	Total services/ day	Average headways							
		4:00-6:00 am	6:01-9:30 am	9:30 am-3:00 pm	3:01-5:00 pm	5:01-7:30 pm	7:30 pm+	First departure arrives stn	Last departure leaves stn
Mernda Station train and bus lines: Bus in/train out – service numbers and average headways									
Train	76	20	9	18	11	17	30		11:16 pm
381 bus: Diamond Ck Stn to Mernda Stn	32	1	26	41	24	21	40	5:53 am	8:43 pm
382 bus: Whittlesea to Mernda Stn (to Northland)	25	2	38	41	30	50	34	5:17 am	9:30 pm
386 bus: RMIT to Mernda Stn	37	1	21	37	24	21	25	5:54 am	8:44 pm
387 bus: RMIT to Mernda Stn	37	1	21	41	20	21	30	5:58 am	9:04 pm
388 bus: Mernda Stn anticlockwise loop via Doreen	37	1	21	41	20	21	36	5:51 am	9:53 pm
389 bus: Mernda Stn clockwise loop via Doreen	37	1	21	37	24	21	36	5:48 am	9:37 pm

A.3.3 Some comparisons with Vancouver's bus services

Vancouver has long been one of Melbourne's main global competitors for the title of most liveable city. It is also a city that has a high, and growing, level of transit use. For example, Vancouver transit usage in 2017 grew faster than that in any other major North American metropolitan area. Total transit boardings in Metro Vancouver in that year were 407 million, of which 247 m were bus, the most heavily patronised transit mode in Greater Vancouver. This equates to around 100 bus trips per capita per annum, with total transit boardings of around 170 per capita per annum. By contrast, Melbourne's annual per capita transit boardings are only about 70 per cent of the Vancouver level and bus boardings are only one quarter the Vancouver number. In drawing this comparison, however, it needs to be recognised that Vancouver has no trams and its bus services also perform many trunk passenger services that are performed by rail in Melbourne. Also, Vancouver has been growing up rather than out, its densities being higher (by over half)³ than those in Melbourne, which supports transit use. However, the good performance of Vancouver in terms of attracting bus patronage suggests Melbourne might be able to learn something from looking at Vancouver's experience.

To help think about bus service provision in Melbourne's northern region, data on some bus services in middle and outer Vancouver was assembled, together with some data on three inner trunk routes. The middle/outer services were those whose service numbers were in the 500+, 600+ and 700+ ranges, totalling 32 services from within the total of 217 route bus services in Vancouver. For example, the various 700 services are in the Maple Ridge/Pit Meadows area, about 40 kilometres to the east of the downtown, an outer area that has been growing relatively strongly (at just under 2 per cent per annum, which is a lot slower than many of Melbourne's northern outer growth suburbs have achieved, reflecting the success of the infill development strategy in Vancouver). The three inner city routes are all trunk routes serving the University of British Columbia (UBC), which makes them of interest in terms of possible SmartBus services to the Latrobe NEIC. The three inner routes include the most heavily patronised bus route in the city, the 99 B-Line along Broadway to University of British Columbia.

Data was gathered on route, length, route population and employment catchments, boardings, boardings per revenue hour, cost per boarding, total cost and numbers of weekday services. That data is not shown in this paper. Given the fast population growth in Melbourne's outer north, it is interesting to look at implicit patronage expectations that appear to be built into the Vancouver bus services. Across the 32 middle/outer routes, the lowest average boarding rate per revenue hour was 3, with a number of other services averaging 6-7 boardings per revenue hour. About half a dozen services, from those examined, average boarding rates around this level across the city as a whole (based on the rankings of routes by average boarding rate, out of 217). It is notable that all the services with low average boarding rates use mini-buses for service provision and all have average costs per boarding of around \$C10 or higher, with the highest rate being \$C22.35 for route 609. These are typically Community Shuttle services, which operate at hourly headways. These Shuttles tend to start relatively early (e.g. around 5:00 am in the case of several 700 series services) and finish early in the evening, although some finish after 10:00 pm. Services per day on the 700+ series are generally well under 30 return trips, whereas trunk routes operate at high frequencies (e.g. 103 return services/weekday on Route 591; 77 on Route 701; 66 on Route 601). Starting times on most services are typically before 6.00am and trunk services often run until after midnight (e.g. 1:52 am on route 99).

These numbers provide some insights into minimum service and boarding levels that are seen as desirable to support **social inclusion** in Vancouver. Average weekday boarding rates of 6-7 per

³ Demographia World Urban Areas (2019), Table 2. Available at <http://www.demographia.com/db-worldua.pdf>.

revenue hour seem to be the floor for such services. Bus service frequencies/spans of hours on Community Shuttle services are typically less than those for local services indicated in Table A.1 for Melbourne's North (serving the Craigieburn and Mernda stations). In terms of public transport planning, Translink in Vancouver, like many cities, has put increasing emphasis on adding service on high frequency trunk routes, with less focus on services whose main intent is social inclusion. Melbourne service levels seem to be higher than those in Vancouver at the lower patronage end, reflecting a stronger focus on social inclusion.

In terms of service standards on high end trunk middle/outer urban bus routes, Melbourne service levels lag those in Vancouver. SmartBus services should be more reflective of Vancouver trunk frequencies. Looking at the top end of the trunk bus service market, Vancouver's Route 99 operates at around 250 return services per weekday. This particular number of services is probably well above what might be needed in Melbourne, given our larger train and tram networks, but a number of Vancouver trunk services have over 100 return services a weekday, which is well above Melbourne's SmartBus service levels, apart from University shuttles.

It is interesting to compare these Vancouver social inclusion implicit *service standards* with the findings of recent Australian research on the value of mobility, as a means of reducing risk of social exclusion. That research found the following (Stanley et al. 2019, pp. 9-10):

The provision of core PT services, and associated flexible mobility options, should form important elements of a package of measures to reduce regional risks of mobility-related social exclusion. The trip values derived in this paper can be used to suggest public transport boarding rates required for a service to break-even in terms of the monetary value of reducing risk of social exclusion. The \$A12.81 value of an additional regional trip, calculated in Table 7 in 2008 prices, can be updated to shed light on this matter, resulting in a figure of \$A15.40 in 2016 prices (updated by the increase in Victorian Average Weekly Ordinary Time Earnings from 2008-16⁴). The unit trip values shown in Figure 1 indicate higher marginal trip values to persons from lower income households, with public transport users generally having lower household incomes than the community at large. Assuming average household incomes for regional route bus users some 20% below the combined sample average in Table 3 (which results in a figure that is still higher than the special survey sample average household income) implies a unit trip value of \$A18.50 (rounded), in 2016 prices. If a regional town route bus service costs about \$A120 an hour to provide, the boarding rate needed to break-even in terms of user social inclusion benefits is thus about 6.5 passengers per service hour. Such services would recover only a small proportion of their direct service cost, in financial terms, but are of significant social value, to both users at risk of exclusion and the wider society in terms of savings in flow-on costs, such as crime, unemployment, adverse health outcomes, etc. Lower costs of service provision would warrant lower break-even boarding rates for socially viable services.

In short, the minimum boarding rates per revenue hour that appear to be embedded within the Vancouver service standards are very much in accord with what has been proposed by Australian research on the value of mobility for reducing risk of social exclusion, at around 6-7 average boardings per service hour. We propose that this be adopted as one of the criteria for defining minimum service levels in route bus service planning in Melbourne and other major Australian cities. Section 3.4 discusses such service standards

The Vancouver 500-700 series route data was assessed to see if boarding rates are related to service levels, as would be expected. A number of regression models were estimated to explore this relationship, including additional potential explanatory variables in some models. A simple log model, which explored the association between the log of annual boardings per capita and the log of weekday service kilometres, produced a high R^2 value of 0.816 (i.e. over 80 per cent of the variation

⁴ <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6302.0May%202012?OpenDocument>.

on annual boardings per capita is explained by variations in weekday service kilometres provided). Interestingly, the co-efficient on service kilometres in this model is 1.08, suggesting that doubling weekday service kilometres will lead to an increase of 108 per cent in boardings per capita – provide it and they will come! This is a strong value, probably in part reflective of Vancouver’s public transport culture.

As an aside on these matters, joint venture partners MAB and GPC generously provided data on boarding numbers and distances run by its Merrifield Connect local bus service. This service was set up by MAB as a service for early movers into the Merrifield Estate, with a focus on peak travel times. Weekly boardings averaged ~175 over the first half of 2018, increasing to 270 over the second half of 2018 and to 455 in 2019 to early August. The last ten weeks of this period, the weekly boarding rate exceeded 500. Given that the service runs for about 40 hours a week, the boarding rate is now implicitly running at about 13/service hour, well above the suggested minimum boarding rate (of 6-7 per service hour) for social inclusion services for a route bus service. This shows that patronage numbers can build quickly, suggesting that service provision early in an estate’s life cycle should be a government priority, particularly since this can reduce the need for multiple vehicle ownership per household.

A.3.4 Infrastructure Australia: Outer Urban Public Transport – Improving accessibility in lower density urban areas, October 2018

More broadly, a service standards approach recently taken by Infrastructure Australia highlights the general scale of the improvement task that is needed, particularly for Melbourne, including its north (IA 2018). The report undertakes comparative analysis of public transport service levels across Australian mainland capital cities, looking at service coverage and frequency as its indicators of service standard. A key finding is that *Outer urban areas of our cities are being left behind* (IA 2018, p. 4). The report finds that:

Public transport disadvantage in outer suburbs is significant. Access to public transport services and service frequencies are lower, while travel times and distances to major employment centres are longer in outer suburbs. (IA 2018, p.1)

The IA comparative analysis shows Melbourne’s urban public transport service levels in poor light, particularly in what IA defines as outer areas (loosely defined as areas that are >20 kilometres from the CBD). IA finds that about 1.4 million people in Melbourne’s outer suburbs *are not within walking distance of reasonable quality public transport* (IA 2018,p.4), comprising a high 62 per cent of the resident population of these areas. This large Melbourne resident population without access to reasonable quality public transport is 400,000 more than in each of Sydney and Brisbane, which ranked equal second worst in terms of outer urban walkable access to reasonable quality PT services. *Reasonable quality public transport* is defined as a medium- to high-frequency service (four or more services during weekday AM) peak within 800 metres for heavy rail stations and 400 metres for all other services (from IA 2018, p. 26, in a Note to Figure 9).

In the middle suburbs (generally 10-20 kilometres from the CBD, although Dandenong to the south-east is part of middle Melbourne as defined by IA), Melbourne has 400,000 people residing beyond walking access to reasonable quality PT, or 21 per cent. This number was only exceeded by Perth with 500,000. Sydney had only 200,000. The Melbourne inner area figure was 11,000, better than Sydney, Brisbane and Perth.

In short, Melbourne has relatively poor public transport service availability, in terms of walking access to reasonable quality services in outer and middle suburbs. Some services will be available in many of these outer suburbs, as illustrated in Section A.3.2 above, but low frequencies would exclude them from being assessed as of reasonable quality, as per the IA definition. IA maps showing

the results of service frequency analysis, covering morning weekday peak and weekend lunchtime peak frequencies, suggest that **it is service coverage and frequency on currently low frequency services that needs attention to improve service availability in the outer north.**

On the basis of the evidence presented, it is reasonable to conclude that, that as Melbourne fares worst by some margin in terms of population coverage by reasonable quality public transport services, particularly in its outer areas, a significant increase in PT service levels in outer Melbourne should be an early national transport priority. The Outer North, where population increase has been rapid, will form a significant part of the areas that should expect major improvements in PT service availabilities (coverage, frequency and span of hours). Public transport service improvement priorities in the outer north, particularly service coverage at a reasonable frequency, and to a lesser extent in the middle north, form a priority for the NORTH Link Infrastructure Update and should be part of a City Deal for the north.

A.3.5 Bus service standards: general standards

Bringing this discussion together, it is proposed that planning and provision of Melbourne's route bus network in coming years should reflect the following service standard criteria.

1. Bus services should be provided within reasonable walking distance (400m) of all Melbourne urban residences. To reduce the need for multiple household vehicle ownership in growth areas, 'population' should be based on expected numbers/locations in three years' time, with services provided ahead of this development to ease concern about a lack of mobility options.
2. Service destinations should primarily be activity centres, including rail stations, and timetables for bus services that stop at rail stations should fully align with rail service timetables.
3. Bus services whose main purpose is local social inclusion (*social transit* or *local transit*) should aim for at least 20 minute weekday headways, from around 5:00 am until around 11:00 pm start of last run, provided average route service boarding rates in areas where there is significant risk of mobility-related social exclusion are at least six passengers/service hour. If this average boarding rate cannot be achieved on a route with a scheduled service, alternative means of providing mobility options need to be explored (which could include partnering with a taxi/Uber type provider for some services).
4. These service headways on social transit services might increase to 30 minutes on weekends and public holidays and for later evening services, if that aligns with train service headways on services met by the bus service.
5. Bus services that are primarily trunk in purpose (*mass* or *trunk transit*), including SmartBus, should operate at peak headways that align with train headways where services integrate. Higher peak frequencies on parts of some trunk routes might sometimes be achieved by supplementing peak schedules on local transit routes.
6. Weekend service levels on SmartBus services should be aligned with train service timetables, aiming to meet all trains (rather than about one in two).

Without considering the need for new services, which are discussed below, analysis in this Appendix suggests that the application of these service standards would probably imply the need to increase service kilometres on existing local bus routes by around half in outer areas, on both weekdays and weekends, and SmartBus service kilometres by around 10-20 per cent on weekdays but by about half on weekends, in terms of integrating with current train service levels.

What might service increases of this order mean for bus patronage? The Vancouver bus service data cited above implied that, for service increases in that city, patronage can be expected to grow around proportionally with service kilometres, or a little faster than relative service growth. To explore this

matter further, data from the Canadian Urban Transit Association and the US Transit Database was assembled for fourteen Canadian and US cities with populations of between 1 and 4 million, to test associations between bus trips (unlinked but trips) and variables such as service density (service kilometres per capita), population, population density, jobs density and vehicle age. A number of multiple regression models were estimated, with the strength of service density being notable. On its own, this variable accounted for over 70 per cent of the variation in unlinked trips per capita across the 15 cities (adjusted $R^2 = 0.74$). In a number of log models, the implied elasticity of unlinked trips per capita with respect to service density was around 0.7, suggesting that doubling service density (service kilometres per capita) would increase unlinked bus trips per capita by about 70 per cent. This is encouraging in terms of adding extra service levels.⁵

A.4 Some specific bus service improvement initiatives in Melbourne's Northern Region

A.4.1 Bus service improvements in Northern Horizons 2016

The following proposed *short term* bus service improvements were set out in Northern Horizons 2016.

- Three buses/hr during (weekday) peak periods (defined as 6:00 am to 9:00 pm).
- Minimum frequency of 2 buses/hr on weekends.
- Routes that are accessible within 400 metres of all residences.
- Specific Bus Rapid Transit initiatives:
 - SmartBus Route 901 extension from Melbourne Airport to Sunbury;
 - Heidelberg (Austin Hospital) – La Trobe University – Bundoora RMIT – Mernda Bus Rapid Transit;
 - Coburg Station – Reservoir Station – La Trobe University – Macleod Station Bus Rapid Transit;
 - dedicated SmartBus lanes and priority on Bell Street;
 - Nillumbik – public bus network in rural areas;
 - Aitken Boulevard Bus Rapid Transit (Craigieburn – Broadmeadows);
 - Aurora Bus Rapid Transit (Epping – Craigieburn and Lalor – Wollert/Craigieburn Road; an interim measure pending the extension of rail);
 - reintroduction of Route 904 SmartBus from Sandringham to Williamstown via Brunswick; and
 - all arterial road widening projects should consider Bus Rapid Transit.
- Orbital east-west routes – focus on better integration with rail.

Medium term bus priorities were listed as:

⁵ In the Vancouver analysis cited in Section 3.3, it was *service kilometres* rather than *service density* that was most strongly associated with patronage growth. However, service levels and service density are related concepts and highly correlated in the Vancouver data set. The higher (service) elasticity value for Vancouver, than for the 15 cities (1.08, compared to 0.7), probably reflects the inclusion of 9 US cities within the data set for the second analysis, US cities typically having less notable public transport cultures than Canadian cities in general and Vancouver in particular. Vancouver's transport strategy aims for 50 per cent of urban trips in that city to be by public or active transport by 2045, from a base of 27 per cent in 2011.

- four buses/hr in (weekday) peaks (6:00 am to 9:00 pm);
- minimum frequency of 3 buses/hr on weekends;
- segregated buses (as on-road demand from private vehicle crowds out buses);
- light rail – Upgrade segregated busways to light rail if demand is there; and
- specific BRT initiatives:
 - Mickleham Road Bus Rapid Transit – Broadmeadows – Wallan – Epping; and
 - Craigieburn Road Bus Rapid Transit (Doreen – Craigieburn).

There were no long term bus initiatives listed in Northern Horizons 2016, indicating the urgency of doing something to improve bus service levels.

A.4.2 2020 update: General bus service standards

The discussion in Sections A.2 and A.3 of this paper is strongly supportive of a service standard for both trunk and local bus services based on access within 400 metres of residences and minimum weekday headways of 20 minutes at peaks and in the inter-peak period. What extra services are needed for 400m coverage?

Section A.3.4 argued for a longer service span for local bus services, from 5:00 am until at least to 11:00 pm start of last run, to align with rail services. Service headways before 6:00 am and after 7:30 pm should align with rail headways, if the bus service stops at a rail station. Trunk and local bus services that serve rail stations should generally be expected to have operating times that align with connecting train services and to operate at headways that align with connecting train services. For example, this may indicate a need for 10 minute peak trunk SmartBus services. Northern Horizons 2020 should reflect these small amendments in the proposed bus service standards, particularly separating trunk (SmartBus/BRT) from local services.

Weekend service headways of 30 minutes should be a maximum in the short term, as set out in Northern Horizons 2016, reducing to 20 minutes maximum in the medium term. Service spans should align with rail operating times. Failure to achieve such alignment simply discourages public transport use and may mean that some people cannot access desired activities, because of the lack of a bus service.

A.4.3 Improved trunk (SmartBus) services, including Bus Rapid Transit

Services for La Trobe NEIC

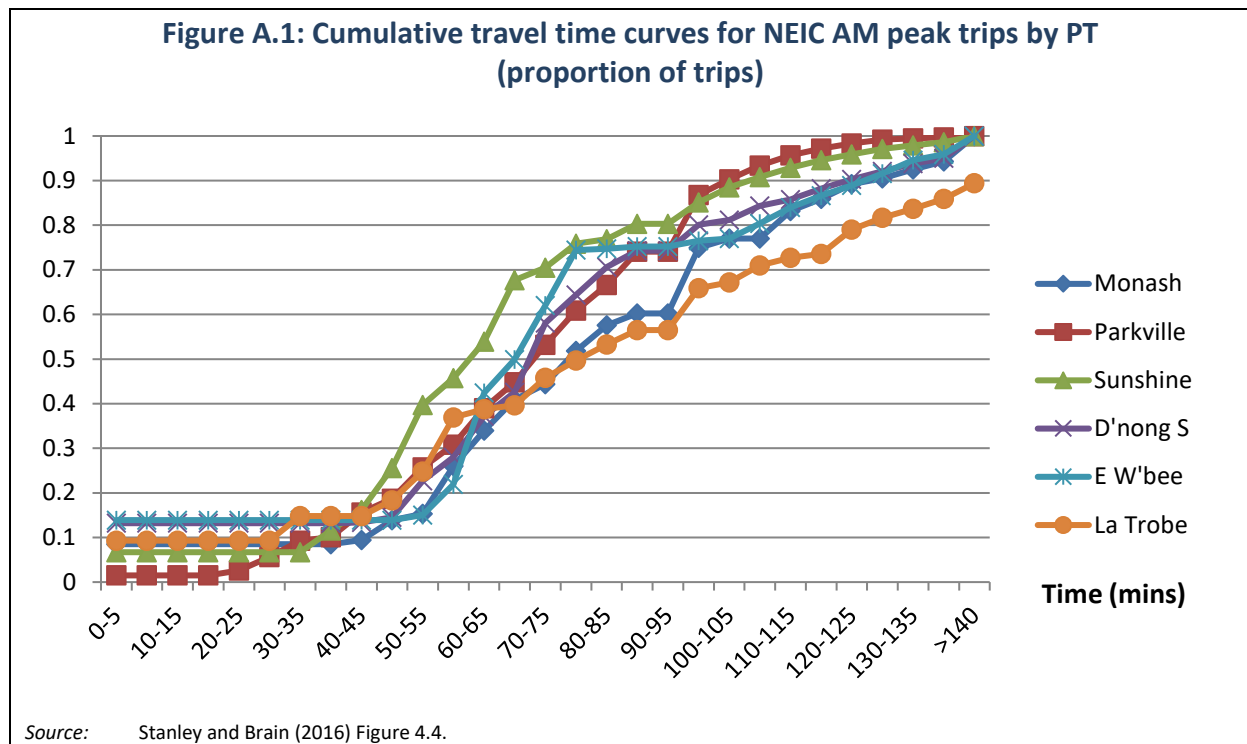
Section A.2.3 of this paper discussed Plan Melbourne’s National Employment and Innovation Clusters and noted, more broadly, that the north fares relatively poorly in terms of the regional presence of major activity clusters. Given the expected importance of growth in hi-tech/knowledge-based activities for Melbourne’s future prosperity, an inescapable conclusion is that Melbourne’s north needs to devote considerable effort to promoting the future development of its La Trobe NEIC, encompassing the Heidelberg and La Trobe components plus Northland and Heidelberg West employment area, as the only current major cluster within the Northern Region.

The help inform its Infrastructure Strategy, Infrastructure Victoria commissioned Professor John Stanley and Dr Peter Brain to review the performance of the (then) six Plan Melbourne NEICs and

suggest improvement priorities⁶. Stanley and Brain (2016) concluded, inter alia, that Monash and La Trobe probably had the most pressing needs of these NEICs in an infrastructure sense, with potential for significant gains in Gross Regional Product and productivity from lowering travel times to/from the clusters, particularly public transport travel times. Based on analysis of cumulative travel time (by car and public transport) distributions for each NEIC, a key finding of that research was that La Trobe NEIC has the poorest public transport accessibility of the NEICs, with a 90th percentile public transport travel time of beyond 2 hours and a 50th percentile of about 80 minutes. Figure A.1 shows the various cumulative travel time distributions, the lower curves having the poorest PT accessibility, with La Trobe the worst across most of the distribution. It is little surprise, then, that the public transport mode share to the cluster is low and car dependence high. This is inequitable for the northern NEIC and suggests that improved public transport services to the La Trobe NEIC should be a priority, to help facilitate development of the cluster. This PT improvement priority was the most frequently raised public transport priority in consultations for the Northern Horizons 2020 update.

Stanley and Brain (2016) concluded that around half the increase in Gross Regional Product that La Trobe NEIC might be expected to achieve to 2031 from increased scale/density will be lost by increases in travel time in the cluster catchment, unless there are major transport improvements in that catchment. Improvements such as NorthEast Link are vital in this regard, but so too are public transport improvements directed at the La Trobe NEIC. Public transport improvements were shown to help support productivity increases. The scale of adverse impact on GRP growth for La Trobe NEIC was larger than for each of the other NEICs, underlining the scale of the access challenge confronting the La Trobe Cluster. Importantly, Stanley and Brain also undertook an assessment of the prospective productivity benefits of reduced travel times to each of the six NEICs, by assuming that travel times for each NEIC catchment are improved by 3 per cent in each of the next two decades, against a base case projection, and then estimating how this would affect NEIC catchment productivity. Such travel time improvements could come from road upgrades and/or public transport service improvements, with the productivity benefits from PT upgrades that Stanley and Brain (2016) identified in their analysis suggesting the importance of a strong PT focus. La Trobe NEIC was projected to gain the largest relative increase from improved travel times, both public and private transport, an encouraging outcome in terms of proposing improved trunk public transport services.

⁶ Fishermans Bend has been added since.



Long term, the State Government’s proposed Suburban Rail Loop may be the best solution to improving PT access to/from the La Trobe Cluster. However, until such time as that initiative can be delivered, La Trobe will need to rely on trunk bus and/or tram (light rail) improvements. In consultations for the Northern Horizons 2020 Update, the most frequently mentioned trunk bus service improvements for the La Trobe NEIC were between the University/Heidelberg and:

- Reservoir Station;
- Doncaster/Box Hill; and
- Broadmeadows.

At present, routes 301 and 561 operate a shuttle type of service between Reservoir Station and the University, while 561 also extends on to Macleod Station to the east and to Pascoe Vale Station to the west. Over the section between the University and Reservoir Station, there is a combined weekday frequency of approximately nine services an hour for up to 16 hours (120 services a day across the two services), or an average headway of around 6.77 minutes, between approximately 6:15 am and 10:15 pm (561) and approximately 7:00 am and 7:00 pm on 301 for 301.

This service level compares poorly to the 601 Monash shuttle service between Huntingdale Station and the Monash Clayton campus, which has an average headway of 4 minutes from approximately 7:00 am until 9:40 pm during semester and every 12 minutes during semester breaks. The 401 shuttle between North Melbourne Station and University of Melbourne also has an average 4 minute headway, between approximately 6:30 am and 10:00 pm.⁷ Monash is also served by a number of other bus routes and Melbourne University has numerous tram services. La Trobe University depends mainly on the 301/561, but the Heidelberg part of the cluster also has the benefit of the rail line. These relative service levels reflect poorly on La Trobe University, in particular, and are inequitable in terms of the relative socio-economic status of respective university catchments.

⁷ Route 301 has no weekend services and 501 has 23 services over 15 hours on a Saturday and 20 over 12 hours on a Sunday. Neither the 601 nor 401 shuttles operate at weekends.

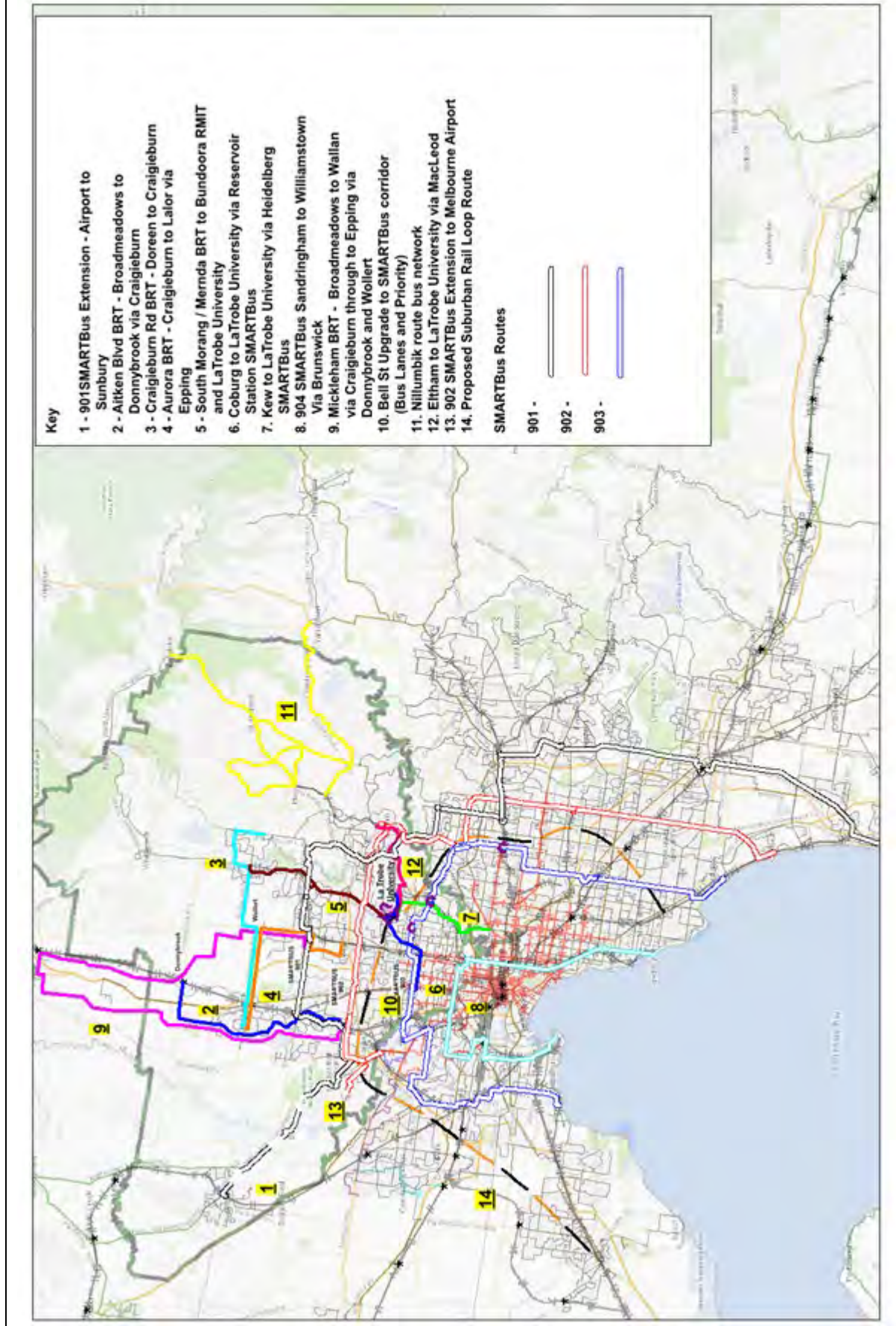
The frequency of the shuttle bus service between Reservoir Station and La Trobe University should be improved to a 5 minute headway between approximately 7:00 am and 9:00 pm, which would require an increase from 120 to approximately 168 services a day (approximately 30 per cent increase) across the two routes (301 and 561).

Accessing students and staff to the south-east of the La Trobe cluster is a challenge for the University, given the lack of public transport services. For example, neither the 901 nor 903 circumferential SmartBus routes serve the University. A fast service from the University through Doncaster to Box Hill would replicate the intent of this segment of the Suburban Rail.

Table A.2 and Map A.4 set out the new/improved Medium Capacity Transit/Smart Bus/Bus Rapid Transit Services that were well supported in the consultations for Northern Horizons 2020.

Table A.2 Bus and Bus Rapid Transit initiatives for Melbourne's Northern region	
Northern Horizons 2016 BRT initiatives	2020 priorities
SmartBus Route 901 extension from Melbourne Airport to Sunbury (Initiative 1 in Figure 4.21)	Yes (Short term)
Heidelberg (Austin Hospital) – La Trobe University – Bundoora RMIT – Mernda Bus Rapid Transit (Initiative 5)	Yes (ST)
Coburg Station – Reservoir Station – La Trobe University – Macleod Station Bus Rapid Transit (Initiative 6)	
Dedicated SmartBus lanes and priority on Bell Street (Initiative 10)	Yes (ST)
Nillumbik – public bus network in rural areas (Initiative 11)	Yes (ST), including Hurstbridge to St Andrews
Aitken Boulevard Bus Rapid Transit (Craigieburn – Broadmeadows) (Initiative 2)	Yes (ST) but extend to Donnybrook Station until such time as northern extension warranted
Aurora Bus Rapid Transit (Epping – Craigieburn and Lalor – Wollert/Craigieburn Road; an interim measure pending the extension of rail) (Initiative 4)	Yes (ST)
Reintroduction of Route 904 SmartBus from Sandringham to Williamstown via Brunswick (Initiative 8)	
All arterial road widening projects should consider Bus Rapid Transit (not link specific)	Yes (ST)
Mickleham Road Bus Rapid Transit – Broadmeadows – Wallan – Epping (Initiative 9)	MT
Craigieburn Road Bus Rapid Transit (Doreen – Craigieburn) Initiative 3)	MT
New 2020 bus service initiatives or revisions to Northern Horizons 2016 initiatives	
Extend local bus service weekday operating hours to ~5:00 am until 11:00 pm start of last run (with maximum headways of 20 minutes)	ST
Extend SmartBus service weekday operating hours to ~4:00 am to midnight, or the latest connecting train time (headways aligning with connecting trains).	ST
Increase weekend SmartBus service levels to equate with connecting rail headways	ST
La Trobe NEIC/University to Box Hill, via Heidelberg and Doncaster (part of the Suburban Rail Loop corridor) Shown currently as part of Initiative 5)	ST
La Trobe University to Kew via Heidelberg (Initiative 7)	ST
Eltham to La Trobe NEIC/University (Initiative 12)	ST
902 SmartBus extension to Melbourne Airport (Initiative 13)	ST

Map A.4: Northern Horizons Future High Capacity Services Network



A.5 Bus services funding

Application of bus service standards as suggested in this Appendix will obviously increase the budget cost for providing bus services. Assuming application Melbourne-wide of standards, the extra annual funding required will probably be around one-third. Victorian Budget Paper No. 3, *Victorian Budget 19/20: Service Delivery* (Victorian Government 2019), indicates that metropolitan bus service provision in 2019-20 will cost the state an estimated \$741.8 million (excluding fare revenue, which probably covers about 20 per cent of costs). If this was to increase by one-third, it would become \$988.8 million, an increase of \$247 million (again excluding increased fare revenue). These costs are recurrent and, in present value terms at a 7 per cent real discount rate, this stream of annual costs is equivalent to a capital sum of \$3.53 billion additional spending on Melbourne's bus services.

This is a significant sum but pales into insignificance when compared to the current and committed growth in spending on Melbourne rail services. Dealing with the backlog in metropolitan train services, and catering for future growth, is vital for Melbourne and major commitments have been made to support system/service expansion. The 2019-20 Budget lists initiatives such as:

- 75 level crossing removals (\$13.3 billion total spend, much of which will benefit road traffic);
- Sunbury line \$2.1 billion;
- Cranbourne line \$750 million;
- Hurstbridge line \$530 million;
- planning for the Suburban Rail Loop \$300 million;
- Melbourne Airport Rail \$10 billion (half State funded);
- Metro Tunnel \$10.9 billion;
- high capacity trains \$2.34 billion; and
- Metro network modernisation \$1.4 billion.

Total cost of these improvements is around \$30-40 billion, depending on whether all or about ¾ of the level crossing removal cost is attributed to rail. Subsequent development of a Suburban Rail Loop could add a further estimated \$50 billion, while the annual payments for metropolitan train services add a further \$1.1 billion annually. Given that trains currently carry only twice the number of passengers carried by bus, the suggestion that an additional \$3.53 billion should be spent on bus, in capitalised terms, is very small relative to the huge commitments being made in rail. Tram could make an equally strong argument for additional funding, relative to train, given the relative passenger loads carried and small capital program in hand for trams (hundreds of millions rather than billions).

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Appendix B: Infrastructure scorecard

B.1 Introduction

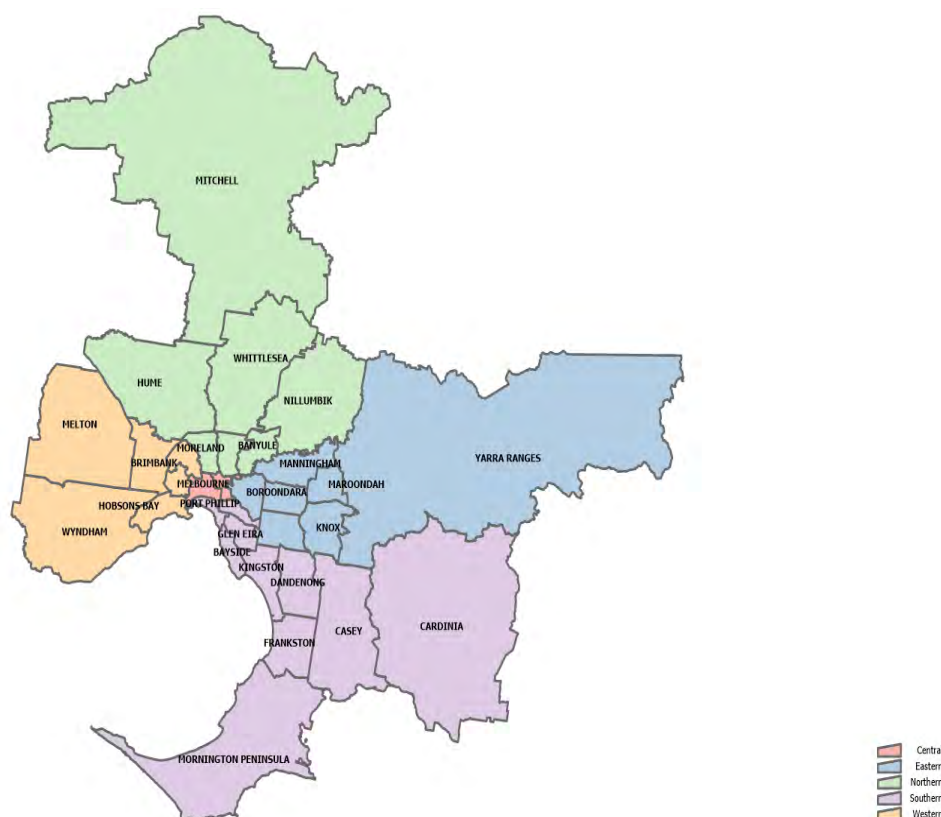
An infrastructure scorecard for 2020 has been developed for each category of major infrastructure within Melbourne's North. The following sections benchmark the provision of infrastructure within Melbourne's North against three other greater regions of Melbourne - East, West and Southern. Benchmarks have also been developed for Greater Melbourne which includes all of the four regions plus the Central region (Cities of Melbourne and Yarra).

The categorisation of regions is consistent with the 2014 Northern Horizons report with the exception of the City of Yarra, which has been reallocated from the North to the Central region. The City of Yarra is well provisioned by infrastructure in many aspects including access to transport, education and health. The exclusion of the LGA has had an adverse impact on some of the North benchmarks so when an indicator has gone backwards in the past five years it does not necessarily show a deterioration in services.

The Northern region is compared against each of the Greater Melbourne regions to identify areas in which the North is lacking. Further discussion about the interregional LGA provision of infrastructure is included within the comments.

A map of Greater Melbourne is shown in Map B.1.

Map B.1: Greater Melbourne regions



B.2 Transport

Table B.1 Travel to work by Local Government Area and region (2016)						
	Car	Bicycle	Train	Tram	Bus	Walked only
Local Government Area						
Banyule (C)	78	2	17	2	4	3
Darebin (C)	64	6	19	10	4	3
Hume (C)	88	0	10	1	3	1
Mitchell (S)	90	0	6	1	1	3
Moreland (C)	61	7	17	15	3	3
Nillumbik (S)	88	1	11	1	2	1
Whittlesea (C)	88	0	11	1	3	1
Region						
Northern	78	3	14	5	3	2
Southern	80	1	12	4	3	3
Eastern	82	1	13	3	5	2
Western	80	1	16	3	4	2
Central	34	8	13	23	3	23
Greater Melbourne	78	2	13	5	3	3
Total Victoria	80	2	11	4	3	4

Note: Expressed as a proportion of those that did travel to work. Travel to work that includes at least one leg of the trip involving the mode of transport. As a result, the columns will not reconcile to 100.

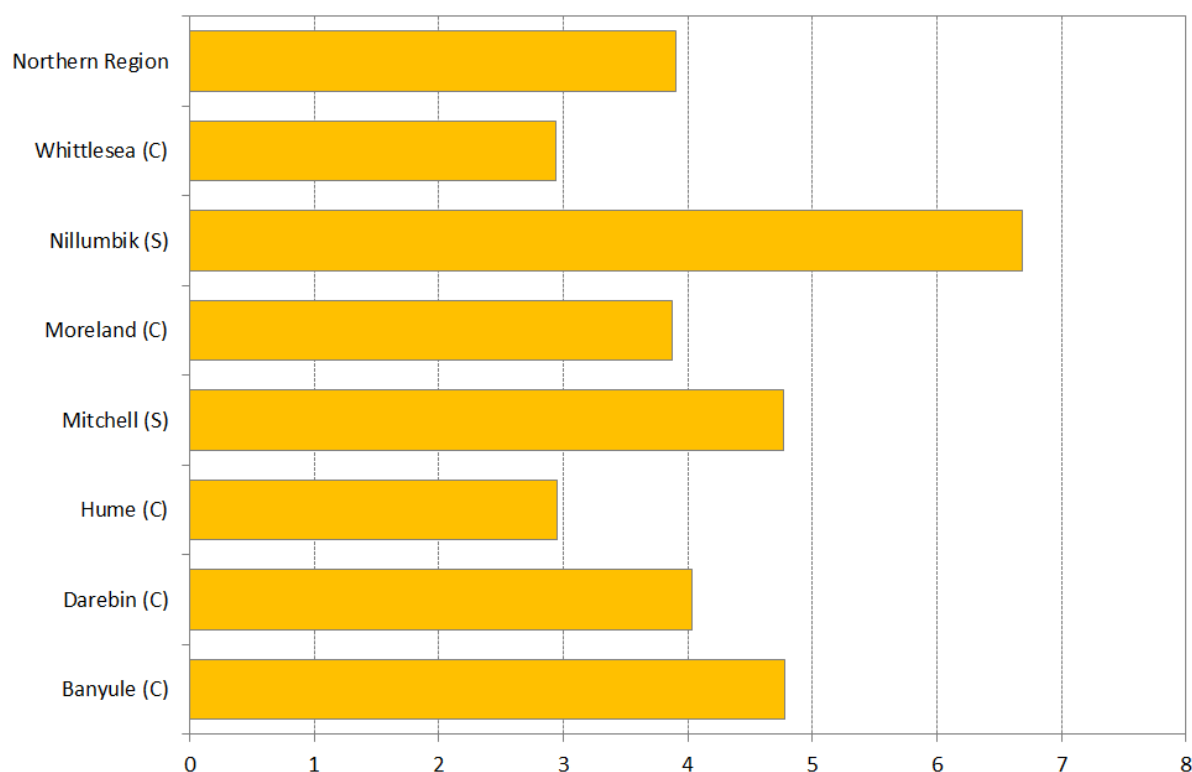
Source: ABS Census of Population and Housing (2016).

Table B.1 summarises the how people in Melbourne's North travel to work and how this compares with other regions within Greater Melbourne. In all regions, private car travel is the most used form of transport which reinforces the critical role of Melbourne's road network. In particular for Melbourne's North there exists a divide between the outer and inner LGAs with the outer regions more reliant on private car travel (close to 90 per cent of workers). While the inner areas of Banyule, Darebin and Moreland have better access and use of public transport. Good access to the tram network for Moreland and Darebin contributes to the relatively low incidence of private car travel to work. As many of the employment opportunities are centred around the CBD and inner suburbs, high dependency on private car travel in the outer regions usually means that there is heavier use of the arterial road network within the inner regions.

Interestingly, almost as many people in Melbourne's North used a bicycle to get to work as took a bus to work. Besides Central Melbourne, the North has the highest proportion of bicycle travel to work.

There is also a large number of workers who work from home. Figure B.1 shows the percentage of those who worked on the census day that chose to work from home rather than travel into work. Nillumbik in particular has a high proportion of its workforce that stay home to work at close to 7 per cent, followed by Banyule and Mitchell at just under 5 per cent. However, as a region the North is one of the lowest percentage regions for people working from home.

Figure B.1: Workers that work from home (per cent)



Source: ABS Census of Population and Housing (2016).

B.2.1 Roads

Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
10 year change in total vehicle kilometres travelled (2007 to 2017)	Per cent	22.6	17.0	4.5	26.0	15.7
5 year change in total vehicle kilometres travelled (2014 to 2019)	Per cent	13.5	4.8	4.8	8.5	6.7
10 year change in total vehicle kilometres travelled per capita (2007 to 2017)	Per cent	-4.7	-6.0	-6.3	-9.9	-8.3
5 year change in total vehicle kilometres travelled per capita (2014 to 2019)	Per cent	0.1	-6.1	-1.4	-6.1	-5.0
Modal split of car as method of travel to work	Per cent	77.7	80.4	81.6	80.3	77.5

Traffic volumes in Melbourne's Northern region continue to grow rapidly with total volumes rising 13.5 per cent from 2014 to 2019. This is the highest rate of growth out of all of Melbourne's regions and can be attributed to strong population growth in the outer regions of Hume, Whittlesea and Mitchell. Traffic volumes have also increased significantly in Nillumbik, but this is likely due to commuters from new residential developments in Whittlesea using Nillumbik's arterial road network.

Over the past five years the North of Melbourne is the only region to have registered an increase in per capita road traffic volume. This implies that reliance on private car road travel is static when other regions of Melbourne have reduced their reliance (per capita) on private car road travel. Alternatively, increased traffic could also come from increases in freight movements.

Reliance on private car travel in the outer north and increases in traffic congestion highlight the need to build upon and future proof the arterial road network in Melbourne's outer north.

Table B.3 Road condition						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Roads with Good roughness rating (for <3.4 IRI)	Per cent	73.7	81.5	67.0	72.0	73.8
Roads with Fair roughness rating (for 3.4 IRI to < 4.2 IRI)	Per cent	14.2	10.4	16.7	14.5	13.8
Roads with Poor roughness rating (for 4.2 IRI to < 5.3 IRI)	Per cent	8.6	5.7	10.8	9.3	8.5
Roads with Very Poor roughness rating (for >= 5.3 IRI)	Per cent	3.4	2.3	5.5	4.2	3.9
Serious road injuries per 100 million vehicle kilometres travelled	Number	9.6	11.5	9.1	8.0	9.4

The condition of roads are commonly measured by the International Roughness Index (IRI), where a rating of below 4.2 generally signals that the road is in good condition. The indicators above segment road quality into good, fair, poor and very poor bands.

Overall, Melbourne's North road condition sits at around the Greater Melbourne average with slightly better roads than either the Eastern or Western regions but lags behind the Southern region. Eighty eight per cent of roads in Melbourne's North have either a good or fair rating.

However, the number of fatalities or series road injuries runs at a slightly higher rate on the roads networks in better condition including within Melbourne's North. While the North compares slightly worse to other Melbourne regions it should be noted that there has been a lessening of fatalities and serious road injuries per kilometres travelled since 2014.

Table B.4 Freight						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Road volumes made up of trucks	Per cent	9.8	7.8	6.2	9.3	8.1

Melbourne's North also has the highest proportion of traffic volumes made up of truck travel at just under 10 per cent. This is facilitated by good access to the Hume corridor and highlights a competitive strength in transport.

B.2.2 Passenger rail

Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Population within 800 metres of a rail station	Per cent	22.8	22.2	16.7	16.1	21.8
Services below benchmark capacity (am peak)	Per cent	90	93	92	90	92
Services below benchmark capacity (pm peak)	Per cent	95	94	92	97	95
Train services delivered on time	Per cent	91.4	90.2	89.9	90.4	90.9
Train timetable delivered	Per cent	98.5	98.2	98.4	98.4	98.4
Daily capacity of metro train services per capita	Persons capacity per day	0.54	0.31	0.49	0.50	0.75
Daily frequency of metro train services	Services per day	635	693	746	537	1991
Modal split of train as method of travel to work	Per cent	13.8	11.8	12.6	16.3	13.3

Melbourne's North has good access to the rail network with multiple rail lines facilitating north-south travel in and out of the CBD. The capacity of train services available to residents of the north rates well, while the frequency of services could be improvement. The North has the best walkable access to train stations with 22.8 per cent of the population within 800 metres of a train station. The North also has a high quality of service with services delivered on time and proportion of the timetable delivered.

There is signs that there are problems with capacity constraints on the network, in particular for the morning peak services.

The metropolitan regions of Mitchell lacks access to the metropolitan train network and instead is reliant on V/Line services. The outer LGAs also lag behind the inner regions for population within walkable distance to a train stop.

B.2.3 Tram network

Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Population within 600 metres of tram stop	Per cent	16.0	16.8	13.4	9.3	18.2
Tram services delivered on time	Per cent	84.5	84.3	78.1	86.0	83.0
Tram timetable delivered	Per cent	98.6	98.5	98.4	98.5	98.5
Daily tram frequency of services (per 1000 persons)	Number per day	4.7	7.1	3.3	1.7	12.6
Modal split of tram as method of travel to work	Per cent	5.2	3.8	2.7	2.9	4.8

Melbourne's North has relatively good access to the tram network. Darebin and Moreland are particularly well served and contribute to Melbourne's North having the highest proportion of commuters using trams to get to work.

Melbourne's tram network is largely concentrated within the inner regions. With the exception of the 86 tram entering the southern end of Whittlesea, there is little access available to the outer regions.

Punctuality of services has greatly improved over the past five years with a higher proportion of services running on time and now exceeding benchmark punctuality (77 per cent).

B.2.4 Bus network

Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Population within 400 metres of a bus stop	Per cent	81.7	78.4	79.6	84.1	80.2
Population within 400 metres of a night bus stop	Per cent	5.9	6.3	5.8	11.0	8.1
Modal split of bus as method of travel to work	Per cent	3.2	2.6	4.7	3.8	3.5

The majority of Melbourne has access to a bus stop within a reasonable distance of their home with around 80 per cent of Greater Melbourne with close links to the bus network. Melbourne's North has 81.7 per cent of the population within 400 metres of a bus stop. Despite reasonably good access, patronage from commuters is generally low within Melbourne's North. This may indicate that better links are needed between residential areas and areas of employment.

Banyule, Darebin, Moreland and Whittlesea all have access above 80 per cent while Nillumbik lags significantly behind at only 55 per cent with access to a bus stop. Notably, there are no public services beyond Hurstbridge. Similar, bus services are severely lacking in Mitchell with only 4 per cent of the population with access to a bus stop.

The North also lags behind other regions for access to night bus services.

B.2.5 Bicycle and pedestrian network

Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Proposed bicycle network that is implemented	Per cent	na	na	na	na	64.9
Modal split of cycling as method of travel to work	Per cent	2.7	1.5	1.0	1.3	1.9
Modal split of walking as method of travel to work	Per cent	2.0	3.0	2.3	1.6	3.5

Melbourne's North has the greatest proportion of commuters using their bike to travel to work at close to 3 per cent of workers. This is more than double the rate of bike commuter travel than either Eastern or Western regions and much larger proportion than the Southern region. Residents of Moreland and Darebin use bicycle travel the most at 7.2 and 6.0 per cent of commuter travel respectively. The outer LGAs have significantly less use of on and off road bike trails for travelling to work.

The Melbourne bicycle network has many proposed routes that are yet to be implemented with only around 65 per cent of the total network currently implemented. The North is well served by access to creek and river trails that allow for convenient off road north-south travel. There remain gaps in the network that still need to be implemented.

There are only a small number of Northern residents who walk the entire way to work, falling short of eastern and southern regions. The highest concentration of walking to work is within the inner LGAs (Banyule, Darebin, Moreland), while the outer regions have a lower incidence of walking.

B.2.6 Airports

Table B.9 Freight						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Proportion of commercial and industrial zone areas within 10 km of a major Airport	Per cent	7.0	na	na	na	na

The North region (and the West) have excellent access to the Melbourne Airport, which is a key advantaged of the region for commercial and industrial activity.

B.3 Social

B.3.1 Childcare and early childhood education

Table B.10 Early learning and childcare centres						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Early learning/childcare centres per 1000 population	Per cent	0.25	0.26	0.25	0.22	0.24
Early learning/childcare centres per 1000 eligible population (0 to 5 years)	Per cent	2.97	3.41	3.86	2.43	3.21
Population within 600 metres of childcare centre	Per cent	47.6	52.3	46.7	53.2	52.1
Max capacity of kindergarten and long day care places per 1000 eligible population	Number	262	288	301	245	278

Provision and access to early learning and childcare facilities is generally lagging behind demand for services within Melbourne's North. More childcare centres and more availability of places are required if service provision is to be comparable to Southern and Eastern regions. This divide is exacerbated by the current large cohort of young children in Melbourne's North. Darebin, Hume and Whittlesea are especially constrained by lack of capacity for childcare.

Melbourne's North also scores low on access to childcare centres with a lesser proportion of the population within benchmark distance of a centre than other regions.

Table B.11 Kindergarten and preschool						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Kindergarten capacity (places) per 1000 population aged 3 to 5	Number	205	256	269	152	217
Kindergartens/pre-schools per 1000 population (total)	Number	0.17	0.18	0.22	0.13	0.16
Kindergartens/pre-schools per 1000 eligible population (3 to 5 years)	Number	3.9	4.7	6.7	2.9	4.4
Population within 600 metres of kindergarten/preschools	Per cent	42.8	44.1	47.7	40.4	43.2

The Northern region has poorer access to kindergarten facilities than the Southern and Eastern regions which follows on from a general shortfall for early childhood infrastructure. The Northern region lags behind other regions in terms of facilities and places available for children. Darebin and Hume have the least places available for population of children aged 3 to 5.

Kindergartens in Nillumbik and Mitchell are not as well located as councils with smaller proportions of the population within walking distance. Whittlesea is also below standard, but not to the same degree.

B.3.2 Primary school and secondary school

Table B.12 Primary school						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Primary schools per 1000 population aged 5-12 (includes p-12 schools)	Number	2.15	1.99	1.86	1.48	1.95
Primary schools per 1000 population total (includes p-12 schools)	Number	0.22	0.20	0.17	0.16	0.19
Public primary schools per 1000 population aged 5-12 (includes p-12 schools)	Number	1.39	1.25	1.69	1.06	1.34
Public primary schools per 1000 population total (includes p-12 schools)	Number	0.14	0.12	0.16	0.12	0.13
Private primary schools per 1000 population aged 5-12 (includes p-12 schools)	Number	0.80	0.77	0.92	0.71	0.81
Private primary schools per 1000 population total (includes p-12 schools)	Number	0.08	0.08	0.09	0.08	0.08
Population within 800 metres of a primary schools (total)	Per cent	70.5	66.3	69.1	69.3	68.2
Population within 800 metres of a primary schools (public)	Per cent	59.2	53.6	56.0	55.8	56.0
Population within 800 metres of a primary schools (private)	Per cent	36.7	31.9	31.7	38.3	34.2

The North is particularly well served by primary schools when compared to other regions with a greater availability of both public and private primary schools for the target population. The only exception is the South, which has a greater proportion of private schools to its target population.

Hume and Whittlesea lag behind the other councils in provision of primary schools. Moreland lacks access to public primary schools but makes up for it by some degree with access to private primary schools. Moreland also has more of the target population within walking distance to primary schools than any other region. In contrast, Nillumbik and Mitchell have schools less ideally located to the population partly reflecting lower densities. Hume and Whittlesea are also lagging behind on this measure as well reinforcing the need for more schools within the growth areas.

Table B.13 Secondary school						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Secondary schools (all) per 1000 population aged 13-18 (includes p-12 schools)	Number	1.12	1.08	1.19	1.11	1.16
Secondary schools (all) per 1000 population total (includes p-12 schools)	Number	0.07	0.07	0.08	0.08	0.08
Public secondary schools (all) per 1000 population aged 13-18 (includes p-12 schools)	Number	0.63	0.50	0.57	0.70	0.60
Public secondary schools (all) per 1000 population total (includes p-12 schools)	Number	0.04	0.03	0.04	0.05	0.04
Private secondary schools (all) per 1000 population aged 13-18 (includes p-12 schools)	Number	0.49	0.58	0.61	0.41	0.56
Private secondary schools (all) per 1000 population total (includes p-12 schools)	Number	0.03	0.04	0.04	0.03	0.04
Population within 1200 metres of secondary school (total)	Per cent	55.7	53.6	54.9	56.7	57.0
Population within 1200 metres of public secondary school	Per cent	40.6	35.7	37.0	43.0	39.9
Population within 1200 metres of private secondary school	Per cent	23.8	28.3	28.4	27.1	28.6

The Northern region is well served by public secondary schools. When compared to other regions and Melbourne as a whole it sits at a similar level of provisions. This includes number and population within 1.2 km of a secondary school.

There are some interregional differences with both Hume and Whittlesea falling behind other regions in the roll out of secondary schools to meet population growth. In some measures Nillumbik is also worse than the remaining regions within the North.

The Northern region is well behind the Eastern and Southern regions for access to private secondary schools.

B.3.3 Tertiary education

Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Number of universities per 1,000,000 population	Number	2.91	3.17	6.23	9.64	8.11
Number of TAFEs per 1,000,000 population	Number	8.74	6.98	10.68	13.92	10.75
Population within 10km of a university	Per cent	70.6	73.3	65.9	99.4	91.5
Population within 10km a TAFE	Per cent	86.0	86.3	95.6	99.4	91.5

The North is generally lacking in the number of tertiary education institutions located in the north when compared to other regions of Melbourne. The North has three university campuses with two in Bundoora and one in Brunswick. Students can also easily travel to the CBD to access tertiary education which they may choose to do over studying locally. Every other region has more universities given its population than they north does.

Similarly, the number of TAFE facilities in the North lags behind the Eastern and Western regions with only the Southern region below the North.

B.3.4 Health

Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
General practitioners per 1000 population	Number	1.1	na	na	na	na
General practice clinics per 1000 population	Number	0.3	na	na	na	na
Allied health sites per 1000 population	Number	0.7	na	na	na	na
Dentist sites per 1000 population	Number	0.2	na	na	na	na
Total hospital beds per 1000 population	Number	1.9	3.1	3.4	1.6	3.3
Private hospital beds per 1000 population	Number	0.5	1.7	1.5	0.1	1.3
Public hospital beds per 1000 population	Number	1.4	1.4	2.0	1.5	2.0

Provision of hospital beds has largely gone unchanged in Melbourne's North since the 2014 report despite a large increase in population. Provision of hospital beds to serve the population has therefore worsened on a per capita basis and there is an ongoing need to increase hospital bed availability.

Public hospital beds are low when compared to the other regions, but private hospital bed availability falls significantly short of both the Southern and Eastern regions which places more pressure on the public system.

Provision of local GP clinics meets standards within the north in total at around 0.3 clinics per 1000 persons. While Hume, Whittlesea and Nillumbik may require more practices to serve the population. Similarly, these three councils are on the lower end of provision of allied health services while provision of dental services is similar across the North.

B.3.5 Emergency services

Table B.16 Emergency services						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Population within 5 km of a public hospital emergency department	Per cent	32.0	48.0	50.9	54.6	49.2
Population within 5 km of police, ambulance and fire stations	Per cent	99.4	99.7	100.0	99.8	99.7

Access to public hospital emergency departments is significantly lacking in Melbourne's North when compared to other regions. The problem of access to emergency care has worsened over the past five years as populations spread out along Melbourne's fringe suburbs. While access to police, ambulance and fire stations remains at close to 100 per cent.

B.3.6 Aged care

Table B.17 Aged care						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Aged care residential places per 1000 eligible population	Number	73.7	75.1	81.3	68.1	75.1

The Northern region is comparable in provision of aged care to other regions. The Eastern region leads with over 80 places in a thousand for the target population.

Hume and Mitchell are particular lacking in residential aged care facilities with places falling well below national averages with about 50 places in a thousand for both council areas.

B.3.7 Recreation and sport

Table B.18 Recreational reserves						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Recreation reserves per 1000 population	Number	3.1	2.8	2.5	2.6	2.7
Playgrounds per 1000 population	Number	0.64	0.59	0.82	0.68	0.65
Population within 400 metres of recreation areas of public open space	Per cent	87.2	82.7	85.9	90.3	86.1

The Northern region has good access to recreational reserves when compared to other regions. This includes access to local parks, gardens and national park areas. The proportion of the population within walking distance to a recreational reserve is generally at level with the rest of Melbourne.

Moreland and Darebin are particular lacking in recreational reserve areas to service the population while other LGAs have better access.

Table B.19 Sports facilities						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Sports facilities per 1000 population	Number	0.74	0.82	0.88	0.74	0.79
Population within 1200 metres of a sports facility	Per cent	89.9	90.6	95.2	94.7	92.5
Swimming pools per 1000 population	Number	0.045	0.024	0.039	0.033	0.034
Outdoor sports ovals per 1000 population	Number	0.40	0.41	0.49	0.44	0.43

The provision of sporting facilities is below that of other regions in number available and access within 1.2 kilometres. The North does not compare well with either the Southern or Eastern areas with less sporting facilities. This includes a lack of outdoor sporting facilities such as ovals. However, the North is particularly strong in the availability of swimming pools and aquatic centres.

B.3.8 Arts and culture

Table B.20 Arts and culture						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
No. of libraries per 1000 population	Number	24.6	27.3	26.4	28.1	27.9
Arts and cultural facilities per 1,000,000 population	Number	10.4	12.4	9.7	12.5	15.2

The Northern region requires several new libraries to be brought up to a level that is consistent with the other three regions and Melbourne as a whole. Hume and Whittlesea have the worse provision of library facilities out of the northern councils.

The North also lags behind other regions in providing arts and cultural facilities with a number of councils lacking any major arts or cultural facility such as an art gallery or museum.

B.3.9 Other community facilities

Table B.21 Community centres						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Community centres per 1000 population	Number	0.05	0.03	0.03	0.07	0.04
Community venues per 1000 population	Number	0.16	0.17	0.18	0.11	0.16

The provision of community centres in Melbourne's North falls short of benchmark levels. Hume and Whittlesea have better access to community centres than the other council areas within the North with the exception of Mitchell (all).

Provisions of community venues in total (such as halls, community centres and neighbourhood houses) are generally weaker in Melbourne's North especially when compared to Southern and Eastern areas.

Table B.22 Other significant community infrastructure						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Places of worship per 1000 population	Number	0.096	0.185	0.186	0.050	0.145
Court facilities per 1,000,000 population	Number	3.78	3.72	0.88	3.12	4.55

Places of worship fall behind Southern and Eastern Regions, but are greater in provision than the west. The North falls short of the Greater Melbourne average.

B.4 Energy and environment

B.4.1 Open space

Table B.23 Open space						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Recreation reserves per 1000 population	Number	3.1	2.8	2.5	2.6	2.7
Population within 400 metres of recreation areas of public open space	Per cent	87.2	82.7	85.9	90.3	86.1

B.4.2 Renewable energy

Table B.24 Renewable energy						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Solar PV installations per household	per cent	14.6	14.8	13.8	16.4	14.0
Solar PV capacity per household	kW	0.59	0.60	0.53	0.64	0.56
Solar hot water systems per household	Per cent	21.5	14.7	6.9	32.9	16.8

The Northern region has an average rate of installations for the Greater Melbourne region when the Central region is excluded (high number of apartments which are unsuitable for roof top PV). The installations and capacity of solar PV for each region are inclusive of all small-scale installations under 100kW which includes both business and residential systems. Hume, Mitchell, Whittlesea and Nillumbik have a particular high rate of rooftop PV installations while the inner regions have a lesser rate of installations per household.

Solar hot water system installations are particularly high in both the Northern and Western regions. Solar hot water systems are installed at a high rate in new developments within growth areas. Within the Hume, Mitchell, Whittlesea and Nillumbik have a higher proportion of solar hot water households.

B.5 Economic

B.5.1 Commercial and industrial land

Table B.25 Commercial and industrial land						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Hectares of commercial zoned land per 1,000 people	Number	1.37	1.26	1.21	1.01	1.24
Hectares of industrial zoned land per 1,000 people	Number	3.77	3.56	1.73	6.35	3.59

B.5.2 Activity centres and places of State significance

Table B.26 Other significant community infrastructure						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Proportion of population within 10km of an Activity Centre	Per cent	96	na	na	na	na

B.5.3 Housing

Table B.27 Housing						
Indicator	Units	Northern	Southern	Eastern	Western	Greater Melbourne
Houses with 2 bedrooms or less	Number	23.9	29.3	21.1	19.1	27.3
New dwellings per capita increase in population (2014 to 2019)	Number	0.35	0.37	0.41	0.32	0.37

Appendix C: A note on clusters

The concept of clusters of economic activity goes back to the nineteenth century. In the classic English economics text book of 1890 it appears as 'external economies' resulting in 'the localisation of industry'. 'External economies' means increases in the profitability of a business derived from outside the business, and may be divided into those sourced from 'the whole civilised world' (as when the business buys equipment which embodies new technology) and localised economies which result from concentrations of businesses in particular places. Apart from the local availability of raw materials, the chief reasons why businesses were attracted to congregate in particular towns were mainly to do with the ready availability of the specialised skilled workers required in a particular industry or group of industries. The argument was circular, for as soon as a town had a concentration of employers demanding specialised skills, workers with those skills would be attracted to live there.

The concept of localised external economies was developed to explain the concentration of the various manufacturing industries in particular British towns but can be invoked to explain parts of the history of Melbourne's North, for example the concentration of textile manufacture in Brunswick in the 1930s. However, as motor vehicles became affordable for virtually all full-time workers it became the accepted wisdom that manufacturers could set up anywhere in Melbourne's North and recruit workers from anywhere in the northern suburbs. This realisation affected not only manufacturers but wholesalers and during the post-war decades such manufacturing and warehousing as was left in the Melbourne CBD shifted to the suburbs, much of it to the north. The resulting loss of city-centre jobs led many to predict that the CBD would soon cease to exist as a major employment centre. Such thinking was expressed in opposition to investment in public transport, particularly the Underground Rail Loop.

Unfortunately for those opposed to investment in public transport, the CBD failed to fade away and indeed became a centre for highly-paid employment. Two accounts can be given for this late 20th Century development. The first, hostile, account attributes high earnings in the city centre to a concentration of corporate executives who have awarded themselves large remuneration packages, plus a band wagon of well-paid public sector managers and such associated groups as corporate lawyers. This account sees no particular virtue in the city centre.

The second, much more positive, account modernises the older concept of localised external economies under the new name of 'economies of agglomeration'. In its role as the location which is readily accessible from the whole metropolitan area, particularly by high-capacity public transport, the city centre is:

- (a) the preferred location for facilities which draw patrons from the whole of the metropolitan area (whether they draw the large crowds which only public transport can handle, or they draw small but highly specialised audiences);
- (b) the preferred location for employers who wish to draw on the skills available in the whole metropolitan area; and
- (c) a place where highly specialised personnel come together and both compete and cooperate in learning and innovation.

This emphasis on innovation reflects recent findings that technological change is a major driver of economic growth.

Not all innovation is of overall social benefit. The Royal Commission into Banking revealed innovations in finance sector crime which were as much a product of city-centre agglomeration as the breakthroughs in fields ranging from health care to industrial design. It is possible that the innovation benefits of agglomeration are net negative, but the knowledge-economy hypothesis is that they are strongly positive on balance, and that indeed the city centres are the drivers of a prosperous country. They have indeed been major providers of services to their hinterlands and increasingly (mainly through education and tourism) to international export markets.

It is generally calculated that the benefits of agglomeration are concentrated in the city centres and increase with metropolitan size. The bigger the metropolitan area, the higher the incomes generated in its city centre and the greater the number of people contributing to those incomes. These contributors include both city-centre residents, who trade job-accessibility against generally cramped and/or costly living conditions, and fringe-metropolitan residents, who enjoy house-and-garden living conditions at the cost of long commute times. In between comes a gradient of city-centre commuters with different trade-offs between commute time and income. The trade-offs are complicated by history – there are plenty of inner-suburban residents who bought their houses when the trade-off was less limiting than it is now, and of course there is the option of suburban living supported by a suburban job. This suits many suburban residents, but there aren't enough suburban jobs to go round and, on average, they don't pay as well as city-centre jobs. This is not to deny the existence of high-paying suburban jobs, including high-paying jobs in export-oriented industries. Indeed, in the past manufacturing supplied a large number of such jobs in Melbourne's North. There is still work to be done in fostering such jobs – witness the job-generation possibilities generated by the new Melbourne market – but given recent trends it would be unwise to rely solely on this. There should be room to bring some of the economies of agglomeration to Melbourne's North other than by commuting.

In promoting this move, the chief resource available is the potential workers who don't have the time available to undertake lengthy commutes. Many of them are married to other workers who either sacrifice time to long-distance commuting or who have skills which fit them more easily into the local labour market. The under-employed spouses and other partners may stay at home, or work at suburban jobs that do not utilise their skill potential, or perhaps work short hours. They represent a significant under-utilised resource.

The current federal policy of running a 5 per cent unemployment rate doesn't help, since it reduces the incentive of employers to locate close to their potential workforce. This said, the economies of agglomeration, including access to a diverse workforce, continue to restrict much employment to the central area. There has been no lack of effort to decentralise these jobs, and the suburban universities and teaching hospitals attest to the success of these efforts in parts of the public sector. However, there has not been equivalent success in creating precincts which attract private sector businesses which benefit from the economies of agglomeration.

One diagnosis for this failure is that the various Melbourne plans have identified so many potential centres that none has crossed the threshold of significant agglomeration. An allied diagnosis is that attempts to create significant suburban job agglomerations have fallen foul of car-parking requirements. As soon as a centre accumulates sufficient jobs to begin to make a name for itself as a potential agglomeration, it falls apart in an expanse of car parks and access roads. In Melbourne there has been no attempt to support the decentralisation of employment with investment in public transport.

In nominating centres with potential to achieve economies of agglomeration, it would be wise to begin with existing centres which combine a kernel of such activities already under way, plus land for further development. The characteristics of under-employed residents of the labour catchment of the centre are also relevant. For this calculation, the public transport catchment is of primary relevance, as augmented by proposed investments – the potential catchment by private transport is less relevant, due to the problems of accommodating vehicles at destination. There is no need to attempt to replicate the complete range of city-centre activities; indeed, it would be better to do without those city-centre activities which are strongly associated with white-collar crime. Provided it can achieve greater internal coherence, and provided it becomes the focus of improved public transport, the La Trobe-Heidelberg cluster fulfils the requirement of ready access from a large catchment with a diverse and potentially highly productive under-employed population.

Appendix D: Northern Health Horizon Statement

Northern Health appreciates the opportunity to provide input into the Northern Horizons report.

Northern Health is an evolving health service, providing vital public health care to residents of Melbourne's outer northern suburbs and the surrounding regional communities. Established as a secondary-level provider of acute hospital services, the health service provides a strong profile of generalist medical, surgical, obstetric and paediatric services.

Subspecialist services at Northern Health have grown in recent years, in response to increasing demand and patient acuity, and ongoing and expected increases in service capability. With these changes, Northern Health is now the major provider of acute, maternity, sub-acute and ambulatory specialist services in Melbourne's north.

A broad range of services are provided from Northern Health's four sites, including:

- Emergency, Cardiology and Intensive Care;
- acute medical, surgical and maternity services;
- subacute, palliative care and aged care; and
- specialist clinics and community-based services.

Northern Health has formal and informal arrangements with a range of tertiary service providers to ensure timely access to care for specialist (tertiary) services not provided by Northern Health.

Northern Health's primary catchment is recognised as one of Melbourne's key growth areas; that is the Northern Growth Corridor. This area is flagged for the development of new suburbs (incorporating housing, transport, employment and 'town centre' infrastructure) and industrial precincts as part of a state-wide strategy to support significant population growth across greater Melbourne⁸. The estimated residential population of the Northern Growth Corridor was 406,000 in 2016⁹. By 2036, the population is expected to increase to 742,000, equating to 83 per cent growth or compounded annual growth of 3.1 per cent per annum. Victoria will observe a growth rate of 1.7 per cent per annum over the same period.

Northern Health faces a number of challenges in opportunities in coming years. These include:

- **continued high demand for services:** Activity at Northern Health has grown considerably recently with 8 per cent per annum Emergency Department growth and 11 per cent inpatient admission growth. These trends are expected to continue;
- **increasing patient acuity:** Increasing patient acuity, combined with a range of other factors, is also driving increased patient complexity at Northern Health. Patients are presenting with a more complex and diverse range of health and psychosocial issues. Increasing patient complexity has been observed by Northern Health staff across acute, subacute and community settings. The impacts of this trend include: patients needing longer consultation times, an increased number of referrals to other agencies, or additional support with coordinating their care. A multi-pronged approach will be needed to ensure ongoing responsiveness to this issue;

⁸ Growth Areas Authority (2012), Growth Corridor Plans – Managing Melbourne's Growth.

⁹ State of Victoria, Department of Environment, Land, Water and Planning, Victoria in Future 2019.

- **progression of transition from generalist to specialist service provision:** Northern Health has commenced a transition from a generalist (secondary-level) health service to a specialist service provider. As patient numbers have increased, so has the demand for subspecialty services, requiring Northern Health to develop a broader range of clinical specialties over time. Northern Health will continue this transition in order to meet the service demands of our catchment;
- **key infrastructure and patient flow considerations:** Capital development works are currently underway at Northern Hospital. Upon completion of these works in 2021, the delivery of an additional 96 beds will relieve some of the demand pressures across the Northern Health system. However, it is not expected that this additional infrastructure will provide a lasting improvement in self-sufficiency for the Northern Growth Corridor catchment. Northern Health will continue to work with the Department of Health and Human Services to explore capital and model of care options to increase available capacity over time; and
- **exploring different ways of working and a focus on ‘staying well’:** To ensure we can meet community demand, Northern Health will continue implementation of targeted initiatives to assist our patients to remain well at home; contributing to overall greater community wellness.

Recent planning by Northern Health aligns to Northern Horizon planning indicating there is a substantial shortfall of hospital beds in the northern area and that this shortfall will grow into the future.

Northern Health planning indicates that a significant number of additional multiday hospital beds will be required in the Northern Growth Corridor by 2032 to enable the majority of local residents to access the care they need locally.

Northern Health will continue to collaborate with our partners and the Department of Health and Human Services, the Victorian Health Services Building Authority and Government to advocate for and where possible implement strategies to ensure the health needs of the people of the north are met. These strategies include:

- advocating for a new multiday acute campus in the centre of the northern growth corridor, with a preference for this campus to be easily accessible for staff and patients (for example, located close to the Hume Highway);
- substantially growing services at Northern Hospital;
- maintaining Broadmeadows Hospital as an elective surgery and rehabilitation centre;
- developing services and infrastructure at the Craigieburn Centre in alignment with the Community Hospitals Program;
- establishment of a Community Hospital in Whittlesea; and
- significantly expanding the profile of community services to provide additional ‘virtual bed’ capacity and support.

Appendix E: LGA data reports

E.1 Banyule (C)

LABOUR FORCE													
	Number ('000s)						Percentage Change					% p.a. growth	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
Population	125.1	126.1	127.4	129.1	130.2	130.6	0.8%	1.1%	1.3%	0.9%	0.3%	1.1%	0.6%
No. Households	45.2	45.5	46.0	46.7	47.1	47.5	0.6%	1.2%	1.5%	0.9%	0.8%	1.1%	0.9%
NIEIR Workforce	69.0	70.1	70.2	72.2	73.4	74.5	1.6%	0.1%	2.8%	1.7%	1.4%	1.5%	1.6%
NIEIR Employment	64.3	65.1	65.9	68.2	69.5	71.0	1.2%	1.3%	3.5%	1.9%	2.2%	2.0%	2.1%
NIEIR Unemployment	4.7	5.0	4.3	4.0	4.0	3.4	6.3%	-14.3%	-6.8%	-1.5%	-13.4%	-5.3%	-7.6%

UNEMPLOYMENT AND UNDER EMPLOYMENT													
	Percentage						Percentage Point Change					Average % Point Change p.a.	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
NIEIR U/E Rate	6.9%	7.2%	6.2%	5.6%	5.4%	4.6%	0.3	-1.0	-0.6	-0.2	-0.8	-0.4	-0.5
Headline U/E Rate	4.7%	5.3%	4.4%	4.1%	4.0%	3.3%	0.6	-0.9	-0.3	-0.1	-0.7	-0.2	-0.4
NIEIR Structural U/E Rate	7.3%	7.2%	6.8%	6.6%	6.4%	6.1%	-0.1	-0.4	-0.2	-0.2	-0.3	-0.2	-0.2
Social Security Take-up	9.1%	9.1%	8.6%	8.3%	7.9%	7.5%	0.0	-0.5	-0.4	-0.3	-0.4	-0.3	-0.4
Hours Per Week ⁽¹⁾	24.5	24.5	24.8	25.4	25.5	25.9	0.1	0.2	0.6	0.1	0.3	0.3	0.2
Not Employed Share ⁽¹⁾	21.6%	20.9%	20.3%	18.2%	17.2%	14.7%	-0.7	-0.6	-2.1	-1.0	-2.5	-1.1	-1.7
Not In Employment ⁽¹⁾	35.6%	35.4%	34.8%	33.2%	32.8%	31.9%	-0.2	-0.6	-1.6	-0.4	-0.9	-0.8	-0.6

Note: (1) Relative to Working Age Population, Not in Employment is based on FTE.

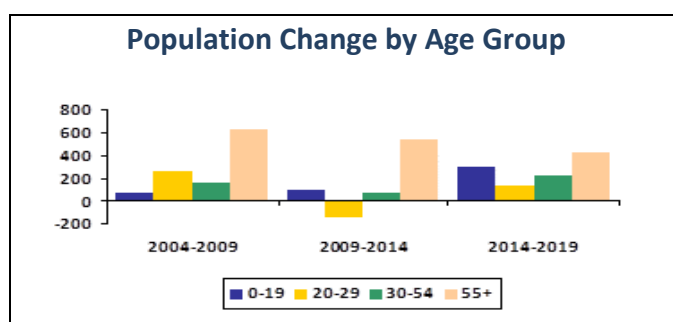
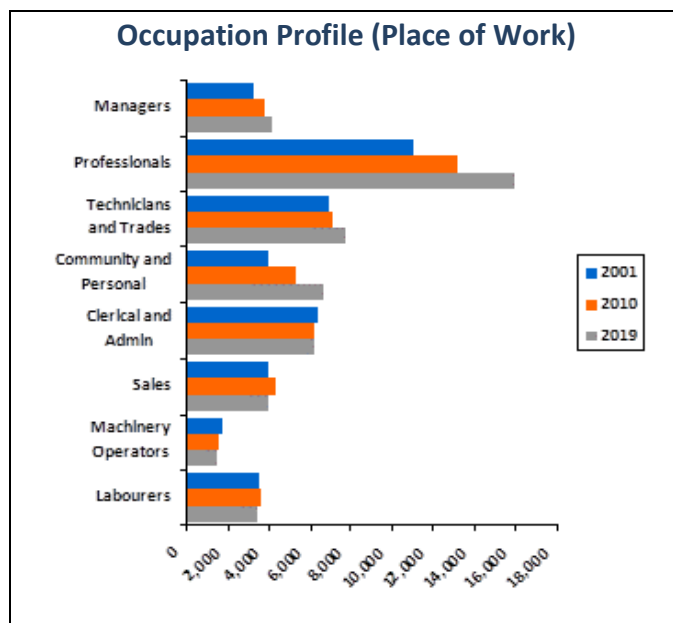
INCOME FLOWS & PRODUCTIVITY														
	Level \$m cvm						Per Capita \$cvm						% p.a. Growth of Level	
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014 -2017	2017 -2019
Wages/Salaries	3,843	3,894	3,960	4,175	4,299	4,442	30,717	30,879	31,070	32,335	33,012	34,016	2.8%	3.1%
Taxes Paid	1,036	1,140	1,166	1,239	1,301	1,425	8,279	9,044	9,152	9,593	9,989	10,910	6.1%	7.2%
Benefits	736	737	710	676	667	652	5,884	5,848	5,571	5,236	5,120	4,989	-2.8%	-1.8%
Business Income	703	694	600	576	569	573	5,616	5,503	4,711	4,461	4,370	4,392	-6.4%	-0.2%
Interest Paid	437	429	404	401	392	400	3,492	3,400	3,171	3,103	3,011	3,066	-2.8%	0.0%
Property Income	896	929	923	906	911	922	7,164	7,365	7,246	7,015	6,999	7,062	0.3%	0.9%
Disposable Income	5,886	5,900	5,850	5,952	6,017	6,084	47,048	46,795	45,904	46,102	46,203	46,593	0.4%	1.1%
Rank	64	64	68	64	65	66	274	308	330	326	310	285		
Resident GRP (Local)	6,596	6,514	6,345	6,415	6,413	5,577	145,697	143,891	137,312	131,302	129,398	112,694	-0.9%	-6.8%
Rank	68	70	68	63	63	64	99	95	93	102	98	86		
Industry GRP (Local)	4,676	4,618	4,552	4,640	4,645	3,762	103,280	102,008	98,510	94,968	93,721	76,017	-0.3%	-10.0%
Rank	75	76	75	72	71	72	197	195	196	231	205	203		
Headline GRP	5,128	5,188	5,396	5,602	5,603	5,814	113,280	114,594	116,769	114,656	113,052	117,489	3.0%	1.9%

- Notes:
- (1) All years stated above are fiscal year ending.
 - Figures for wages/salaries include superannuation supplements.
 - Figures for disposable income (less depreciation expense) include imputed income from ownership of dwellings.
 - Figures for Resident GRP (Local) are per working age population and figures for Industry GRP (Local) are per industry employee. Both are at Factor Cost.
 - \$m cvm = \$ million chain volume measure, which is flows of constant 2016-2017 value converted from current values by the ABS using their chain volume methodology.

SOCIAL SECURITY		
	% Pop	Australian Average
Youth Allowance – Other (share of 16-21 years)	2.0%	4.6%
Youth Allowance – Student/Apprentice (share of 16-21 years)	11.8%	9.1%
Newstart Allowance (share of 22-64 years)	3.1%	4.9%
Age pension (share of 65+)	53.4%	59.8%

Cash Benefits Share of Disposable Income	Share	Rank
2019	10.7	356
2018	11.1	351
2017	11.4	342
2016	12.1	331
2015	12.5	333
2014	12.5	332
2013	12.6	320
2012	12.3	306
2011	12.4	313

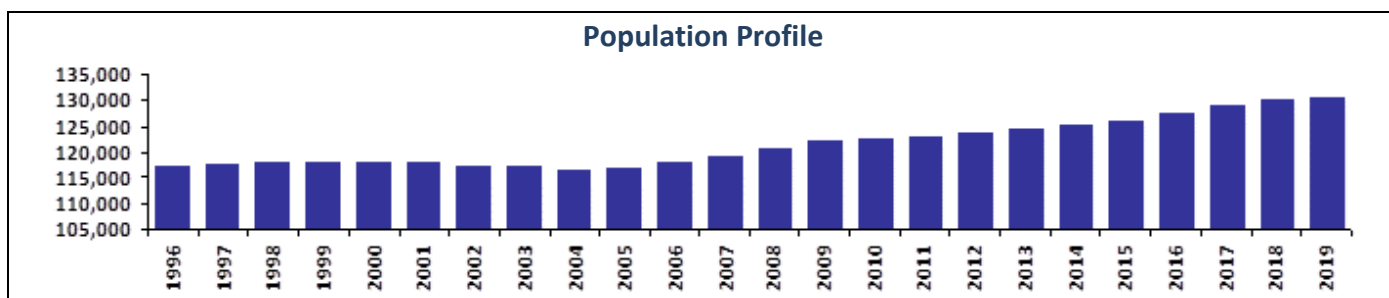
POPULATION CHANGE				
	2004	2009	2014	2019
Age 0-19	24.7%	23.8%	23.7%	23.9%
Age 20-29	14.0%	14.4%	13.5%	13.5%
Age 30-54	35.9%	34.9%	34.4%	33.8%
Age 55+	25.5%	26.8%	28.4%	28.8%
Age 0-19		69	102	302
Age 20-29		263	-135	140
Age 30-54		161	71	227
Age 55+		624	535	426
Average Annual Growth		0.9%	0.5%	0.9%



TEMPERATURE AND RAINFALL											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Temperature (Average (C))	15	16	14	15	15	15	14	16	14	11	7
Rank	419	411	439	439	442	436	453	436	470	535	534
Rainfall (mm)	480	645	934	826	646	570	521	551	817	568	445
Rank	323	229	217	221	206	281	260	294	162	242	317

Note: Temperature is the average minimum and maximum for each day in the year.

POPULATION																				
	Number ('000s)																			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Population	118	118	118	117	117	117	118	119	121	122	123	123	124	124	125	126	127	129	130	131



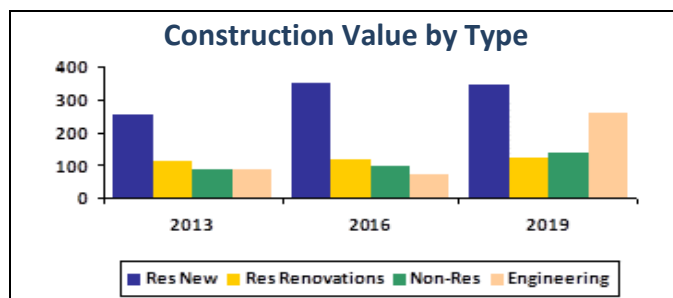
HOUSEHOLD WEALTH & DEBT									
Indicator	Year			Rank			%Rank 1		
	2011	2016	2019	2011	2016	2019	2011	2016	2019
Wealth per Household (\$cvm '000s)	989	1,047	1,075	64	59	62	18.2%	23.4%	23.6%
Value of Property and Unincorporated Business	801	910	956	57	47	50	19.2%	31.1%	31.5%
Value of Financial Assets	418	389	383	127	118	134	16.3%	16.2%	10.7%
Value of Household Liabilities	230	252	264	106	110	121	17.7%	26.0%	25.9%
Disposable Income after Debt Service Costs	127	127	128	259	298	243	26.7%	14.6%	11.6%
Household Debt Service Ratio	19%	18%	18%	117	106	136	33.1%	35.7%	33.4%
Household Debt to Gross Income Ratio	1.50	1.67	1.73	118	112	163	33.6%	35.1%	34.1%

HOUSING										
Housing Indicator	1991.3	1996.3	2001.3	2006.3	2011.2	2016.2	2019.2	2006.3 Rank	2019.2 Rank	Annual Growth 2006-2019
Average established dwelling price (\$cvm '000s)	232.56	210.35	348.52	446.81	626.10	715.10	779.64	87	50	4.46%
Average adjusted household income per occupied dwelling	76,587	82,338	91,523	104,796	124,033	117,990	118,841	302	269	0.99%
Ratio of adjusted dwelling price to adjusted average household disposable income	3.04	2.55	3.81	4.26	5.05	6.06	6.56	112	52	3.44%
Average household income from labour market catchment	49,196	55,939	60,364	75,134	83,291	75,821	73,302	223	169	-0.19%
Ratio of average mortgage costs on established dwellings to average household catchment income	49.8%	31.1%	37.2%	42.5%	54.1%	51.6%	57.9%	136	50	2.47%
Ratio of average mortgage costs on new dwellings to average household catchment income	66.5%	46.0%	41.5%	46.0%	48.8%	36.8%	42.8%	218	186	-0.56%
Ratio of new construction cost to established dwelling	104.3%	116.3%	91.2%	86.7%	72.2%	58.5%	64.2%	463	500	-2.32%
Share of flats in dwelling stock	6.2%	9.1%	7.6%	8.8%	9.3%	11.5%	14.1%	146	104	3.79%
Ratio of houses in new dwelling approvals	n/a	65.4%	56.7%	65.1%	49.3%	28.9%	38.7%	435	515	-4.00%
Adults per occupied dwelling	2.28	2.21	2.18	2.14	2.17	2.17	2.15	127	132	0.06%

CONSTRUCTION									
	2010 -2012	2013	2014	2015	2016	2017	2018	2019	Percentage Increase 2014-2016 to 2017-2019
Value \$m cvm per annum									
Residential New Construction	217	253	293	289	352	526	372	347	33%
Residential Renovations	118	117	122	117	120	132	122	127	6%
Non Residential	149	89	86	86	100	125	145	140	50%
Engineering	89	90	79	70	77	88	110	262	104%
Total	572	549	580	562	650	872	748	876	39%
Value per capita \$cvm									
Residential New Construction	1,765	2,036	2,343	2,293	2,762	4,073	2,855	2,656	30%
Residential Renovations	955	939	971	925	945	1,024	939	972	3%
Non Residential	1,207	718	690	685	787	970	1,110	1,071	46%
Engineering	721	724	628	555	605	682	842	2,006	97%
Total	4,649	4,416	4,633	4,459	5,099	6,750	5,745	6,705	35%
Rank (value per capita)									
Residential New Construction	253	190	156	164	134	56	124	139	
Residential Renovations	414	344	349	398	449	379	421	429	
Non Residential	221	275	278	306	265	210	193	201	
Engineering	491	505	498	502	488	475	467	270	
Total	456	455	432	433	366	243	347	250	

Note: (1) Percentage increase represents the increase (or decrease) of the last three years average when compared to the average of the three years prior to those.

LOCAL GOVERNMENT RATES AND GRANTS			
	Region (2018)	Australia (2018)	Rank
Rates (\$m cvm)	87.65	17831.1	66
General Purpose Grants (\$m cvm)	2.93	1635.6	203
Roads Grants (\$m cvm)	0.92	714.0	286
All Grants to Rates Ratio	0.044	0.132	458
Rates per Population	671.26	704.1	374
General Purpose Grants per Population	22.41	64.6	430
Roads Grants per Population	7.08	28.2	508



EMPLOYED, HOURS WORKED AND INCOME (UR=Place of Residence, POW=Place of Work)										
Indicator	Year					Rank				
	1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
UR Employment	58,979	59,758	64,039	64,281	71,018	40	46	52	56	62
UR Hours (1000 hours)	102,847	101,287	103,919	104,406	115,428	42	47	54	60	63
UR Income (\$m cvm)	3,610	3,935	4,616	4,981	4,696	45	49	53	66	65
POW Employment	40,525	41,945	44,599	45,271	49,489	58	62	66	74	73
POW Hours (1000 hours)	68,826	69,397	70,433	70,230	75,858	62	64	69	76	75
POW Income (\$m cvm)	2,202	2,453	2,880	3,061	2,881	61	66	65	78	76
UR Average Weekly Hours/Employment	33.5	32.6	31.2	31.2	31.3	412	426	484	451	375
UR Average Hourly Rate/Employment (\$cvm)	35.1	38.9	44.4	47.7	40.7	267	271	155	148	170
POW Average Weekly Hours/Employment	32.7	31.8	30.4	29.8	29.5	457	438	474	472	469
POW Average Hourly Rate/Employment (\$cvm)	32.0	35.4	40.9	43.6	38.0	348	369	221	213	232

INDUSTRY GROUPS											
		Place of Residence (UR) Employment					Place of Work (POW) Employment				
		1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
A	Agriculture, Forestry & Fishing	245	191	177	192	304	99	68	71	85	108
B	Mining	103	91	144	295	205	0	0	3	55	34
C	Manufacturing	7,170	6,742	5,622	4,705	5,186	4,981	4,570	3,799	2,955	3,078
D	Electricity, Gas, Water & Waste Services	412	437	514	586	672	66	70	108	132	118
E	Construction	3,846	4,444	5,360	5,533	6,167	2,479	3,931	3,932	3,774	4,447
F	Wholesale Trade	2,924	2,775	2,903	2,541	2,191	1,384	1,333	1,339	1,047	909
G	Retail Trade	6,445	6,524	6,410	5,989	6,619	5,313	5,492	5,310	4,767	5,033
H	Accommodation & Food Services	2,912	2,922	3,152	3,205	3,433	2,086	2,121	2,427	2,583	2,604
I	Transport, Postal & Warehousing	2,184	2,213	2,510	2,452	3,001	712	700	762	777	929
J	Information Media & Telecoms	1,625	1,621	1,685	1,634	1,795	326	311	349	349	372
K	Financial & Insurance Services	2,927	2,901	3,057	2,990	3,685	866	820	778	606	665
L	Rental, Hiring & Real Estate Services	764	864	973	1,005	1,102	468	538	584	554	518
M	Prof, Scientific & Technical Services	4,883	5,042	5,779	6,350	6,405	2,135	2,110	2,401	2,638	2,591
N	Administrative & Support Services	1,702	2,019	1,986	1,992	1,805	1,011	1,153	1,159	1,268	1,160
O	Public Administration & Safety	3,496	3,734	4,490	4,534	5,455	2,095	2,130	2,472	2,510	2,925
P	Education & Training	5,866	6,090	6,803	7,145	8,472	3,581	3,834	4,322	4,773	5,616
Q	Health Care & Social Assistance	7,945	7,788	8,920	9,488	10,278	10,590	10,520	12,397	13,992	15,538
R	Arts & Recreation Services	1,023	991	1,192	1,457	1,478	369	378	505	641	708
S	Other Services	2,507	2,366	2,363	2,190	2,762	1,966	1,865	1,881	1,764	2,133
Z	TOTAL	58,979	59,758	64,039	64,281	71,018	40,525	41,945	44,599	45,271	49,489
Z1	Hi Tech	7,378	7,387	7,695	7,857	7,928	4,133	3,964	3,782	3,471	3,385
Z2	Hi Income	8,904	9,262	10,198	10,796	11,393	3,497	3,492	3,745	3,880	3,847
Z3	Infrastructure Services	14,834	14,870	16,915	18,089	20,228	14,539	14,732	17,223	19,406	21,862

SHIFT SHARE DECOMPOSITION OF RESIDENT EMPLOYMENT, HOURS AND INCOME												
Indicator	2003-2011				2011-2019				Change in shift 2011-2019 : 2003-2011			
	Per cent				Per cent				Per cent			
	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change
Hourly Rate	2.5	0.1	-0.1	2.6	-1.2	0.1	-0.3	-1.4	-3.7	-0.1	-0.3	-4.0
Hours Worked per annum	0.0	-0.1	-0.3	0.1	0.5	0.1	0.5	0.8	0.5	0.2	0.7	0.7
Income per annum	2.3	0.0	-0.2	2.7	-0.8	0.3	0.0	-0.7	-3.0	0.3	0.2	-3.4

CONSUMPTION														
Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth
Consumption (\$m cvm)	3,976	3,857	3,815	3,863	4,007	4,472	4,563	4,629	4,570	4,693	5,808	6,232	6,306	3.9%
– Per Cap (\$cvm)	33,709	32,313	31,637	31,598	32,634	36,366	36,926	37,239	36,528	37,218	45,570	48,265	48,421	3.1%
– Per Cap Rank	387	436	459	442	432	358	366	352	368	377	274	263	266	0

E.2 Darebin (C)

LABOUR FORCE													
	Number ('000s)						Percentage Change					% p.a. growth	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
Population	149.5	152.0	155.1	158.8	161.6	162.8	1.6%	2.1%	2.3%	1.8%	0.7%	2.0%	1.3%
No. Households	56.0	57.0	58.3	59.4	60.2	61.0	1.8%	2.3%	1.8%	1.4%	1.3%	2.0%	1.4%
NIEIR Workforce	79.3	82.6	84.1	87.5	90.5	92.2	4.1%	1.9%	4.0%	3.3%	2.0%	3.3%	2.7%
NIEIR Employment	73.2	75.8	78.2	82.0	84.7	87.1	3.6%	3.2%	4.8%	3.3%	2.9%	3.8%	3.1%
NIEIR Unemployment	6.1	6.7	5.9	5.6	5.8	5.1	9.7%	-12.1%	-5.9%	4.3%	-11.4%	-3.2%	-3.9%

UNEMPLOYMENT AND UNDER EMPLOYMENT													
	Percentage						Percentage Point Change					Average % Point Change p.a.	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
NIEIR U/E Rate	7.7%	8.1%	7.0%	6.3%	6.4%	5.6%	0.4	-1.1	-0.7	0.1	-0.8	-0.5	-0.4
Headline U/E Rate	7.6%	8.0%	6.8%	6.2%	6.2%	5.4%	0.4	-1.2	-0.6	0.0	-0.8	-0.5	-0.4
NIEIR Structural U/E Rate	9.9%	9.7%	9.0%	8.4%	8.1%	7.7%	-0.3	-0.7	-0.6	-0.3	-0.4	-0.5	-0.3
Social Security Take-up	11.9%	11.6%	11.0%	10.1%	9.7%	9.1%	-0.2	-0.6	-1.0	-0.4	-0.6	-0.6	-0.5
Hours Per Week ⁽¹⁾	22.2	22.2	22.5	22.9	22.9	23.1	0.1	0.3	0.4	0.0	0.2	0.2	0.1
Not Employed Share ⁽¹⁾	29.7%	28.6%	27.9%	26.5%	25.3%	23.1%	-1.1	-0.6	-1.4	-1.2	-2.3	-1.0	-1.7
Not In Employment ⁽¹⁾	41.7%	41.5%	40.8%	39.8%	39.7%	39.1%	-0.2	-0.7	-1.0	-0.1	-0.7	-0.6	-0.4

Note: (1) Relative to Working Age Population, Not in Employment is based on FTE.

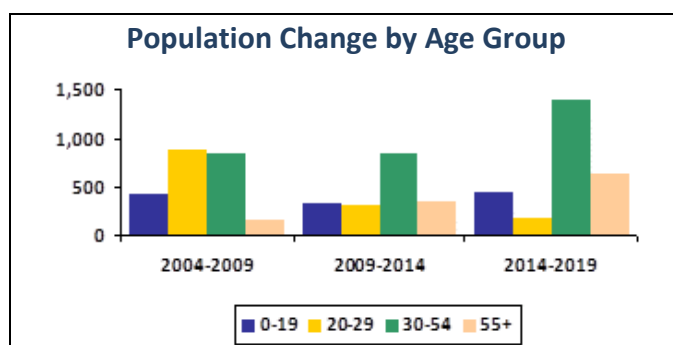
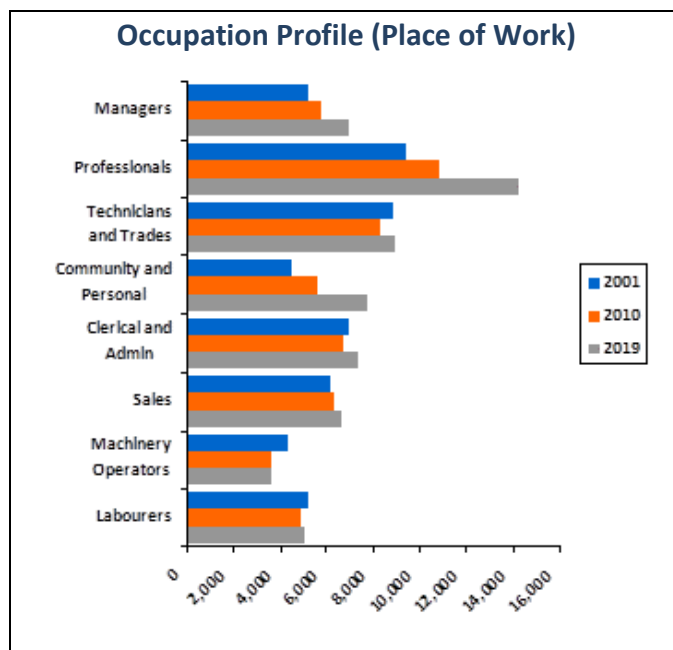
INCOME FLOWS & PRODUCTIVITY														
	Level \$m cvm						Per Capita \$cvm						% p.a. Growth of Level	
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014 -2017	2017 -2019
Wages/Salaries	4,004	4,130	4,275	4,522	4,728	4,895	26,778	27,174	27,557	28,483	29,257	30,062	4.1%	4.0%
Taxes Paid	996	1,120	1,130	1,276	1,359	1,497	6,663	7,370	7,286	8,039	8,410	9,192	8.6%	8.3%
Benefits	622	654	617	592	584	571	4,158	4,302	3,978	3,732	3,616	3,507	-1.6%	-1.8%
Business Income	705	711	412	649	649	652	4,714	4,678	2,656	4,089	4,015	4,004	-2.7%	0.2%
Interest Paid	531	503	484	477	485	495	3,548	3,312	3,118	3,005	3,000	3,040	-3.5%	1.9%
Property Income	907	959	932	955	976	996	6,068	6,313	6,010	6,016	6,038	6,118	1.7%	2.1%
Disposable Income	5,935	6,111	5,879	6,321	6,472	6,563	39,693	40,211	37,897	39,818	40,048	40,306	2.1%	1.9%
Rank	62	61	67	57	57	57	426	442	476	447	439	421		
Resident GRP (Local)	7,258	7,273	7,079	7,264	7,354	6,460	136,526	133,279	125,716	124,700	123,826	106,958	0.0%	-5.7%
Rank	51	49	52	50	50	50	109	105	113	115	110	94		
Industry GRP (Local)	5,631	5,610	5,513	5,644	5,661	4,711	105,911	102,819	97,909	96,887	95,313	77,999	0.1%	-8.6%
Rank	62	62	62	60	60	58	181	189	206	208	183	177		
Headline GRP	6,472	6,715	6,861	7,126	7,261	7,312	121,736	123,058	121,847	122,328	122,262	121,076	3.3%	1.3%

- Notes:
- (1) All years stated above are fiscal year ending.
 - (2) Figures for wages/salaries include superannuation supplements.
 - (3) Figures for disposable income (less depreciation expense) include imputed income from ownership of dwellings.
 - (4) Figures for Resident GRP (Local) are per working age population and figures for Industry GRP (Local) are per industry employee. Both are at Factor Cost.
 - (5) \$m cvm = \$ million chain volume measure, which is flows of constant 2016-2017 value converted from current values by the ABS using their chain volume methodology.

SOCIAL SECURITY		
	% Pop	Australian Average
Youth Allowance – Other (share of 16-21 years)	3.3%	4.6%
Youth Allowance – Student/Apprentice (share of 16-21 years)	23.5%	9.1%
Newstart Allowance (share of 22-64 years)	4.0%	4.9%
Age pension (share of 65+)	67.9%	59.8%

Cash Benefits Share of Disposable Income	Share	Rank
2019	8.7	407
2018	9.0	403
2017	9.4	390
2016	10.5	369
2015	10.7	373
2014	10.5	387
2013	10.4	383
2012	10.7	354
2011	10.8	359

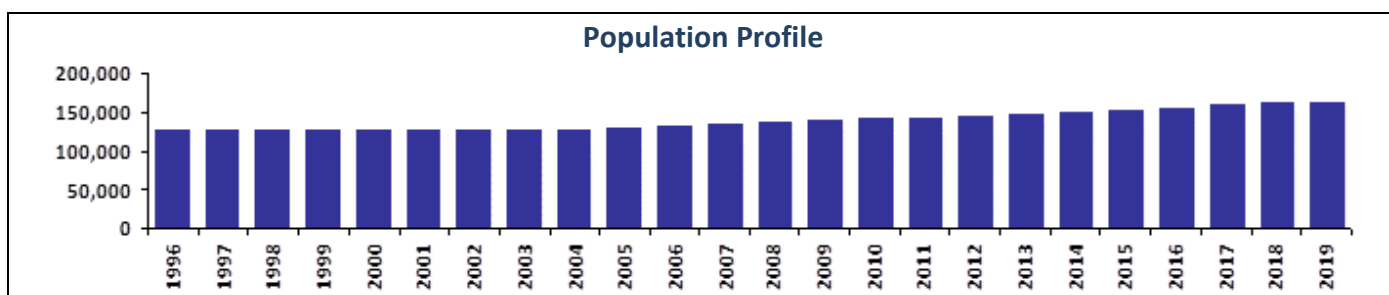
POPULATION CHANGE				
	2004	2009	2014	2019
Age 0-19	21.4%	21.1%	21.0%	20.6%
Age 20-29	16.3%	18.1%	18.0%	17.1%
Age 30-54	37.6%	37.5%	38.0%	39.1%
Age 55+	24.8%	23.4%	23.1%	23.1%
Age 0-19		423	344	447
Age 20-29		874	315	190
Age 30-54		839	838	1,393
Age 55+		174	348	632
Average Annual Growth		1.7%	1.3%	1.7%



TEMPERATURE AND RAINFALL											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Temperature (Average (C))	15	16	15	15	16	16	15	16	15	16	16
Rank	396	374	403	404	404	401	402	404	384	394	406
Rainfall (mm)	558	732	1,100	886	587	579	473	497	747	635	555
Rank	259	171	152	164	235	266	304	331	220	199	227

Note: Temperature is the average minimum and maximum for each day in the year.

POPULATION																				
	Number ('000s)																			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Population	127	127	127	128	129	130	132	135	138	140	142	143	145	147	150	152	155	159	162	163



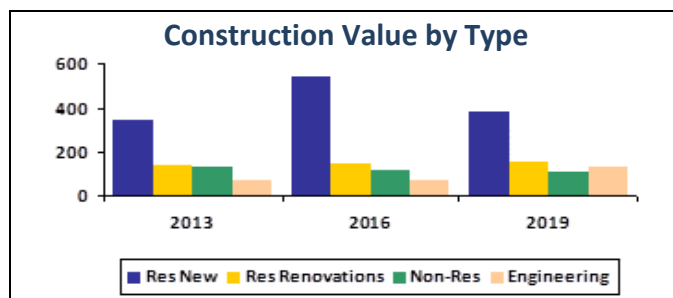
HOUSEHOLD WEALTH & DEBT									
Indicator	Year			Rank			%Rank 1		
	2011	2016	2019	2011	2016	2019	2011	2016	2019
Wealth per Household (\$cvm '000s)	892	909	930	83	72	82	16.4%	20.3%	20.4%
Value of Property and Unincorporated Business	829	898	928	45	49	51	19.8%	30.7%	30.6%
Value of Financial Assets	268	245	247	388	390	352	10.4%	10.2%	6.9%
Value of Household Liabilities	205	233	245	174	141	150	15.7%	24.0%	24.0%
Disposable Income after Debt Service Costs	101	101	108	478	476	412	21.2%	11.6%	9.8%
Household Debt Service Ratio	22%	20%	20%	33	24	53	37.3%	41.4%	37.3%
Household Debt to Gross Income Ratio	1.65	1.93	1.91	48	25	75	36.8%	40.5%	37.7%

HOUSING										
Housing Indicator	1991.3	1996.3	2001.3	2006.3	2011.2	2016.2	2019.2	2006.3 Rank	2019.2 Rank	Annual Growth 2006-2019
Average established dwelling price (\$cvm '000s)	192.94	188.11	355.80	437.89	647.40	713.55	759.07	95	53	4.41%
Average adjusted household income per occupied dwelling	57,289	62,167	70,506	84,545	96,434	92,807	98,843	482	432	1.23%
Ratio of adjusted dwelling price to adjusted average household disposable income	3.37	3.03	5.05	5.18	6.71	7.69	7.68	58	31	3.14%
Average household income from labour market catchment	51,220	58,480	63,445	79,033	87,211	78,876	76,234	186	141	-0.28%
Ratio of average mortgage costs on established dwellings to average household catchment income	39.7%	26.6%	36.1%	39.6%	53.4%	49.5%	54.2%	164	70	2.51%
Ratio of average mortgage costs on new dwellings to average household catchment income	57.3%	39.5%	37.2%	39.1%	38.6%	29.8%	34.3%	331	339	-1.02%
Ratio of new construction cost to established dwelling	113.4%	116.2%	84.6%	80.9%	58.9%	49.1%	49.6%	495	527	-3.76%
Share of flats in dwelling stock	18.5%	21.1%	20.8%	20.9%	21.1%	26.0%	28.5%	48	36	2.45%
Ratio of houses in new dwelling approvals	n/a	50.2%	49.7%	54.6%	32.1%	19.7%	19.5%	476	548	-7.74%
Adults per occupied dwelling	2.24	2.16	2.11	2.10	2.15	2.17	2.17	169	124	0.27%

CONSTRUCTION									
	2010 -2012	2013	2014	2015	2016	2017	2018	2019	Percentage Increase 2014-2016 to 2017-2019
Value \$m cvm per annum									
Residential New Construction	342	346	375	455	539	466	432	385	-6%
Residential Renovations	141	142	149	145	149	165	153	160	8%
Non Residential	141	135	102	107	122	140	121	113	13%
Engineering	87	76	69	63	72	88	165	136	90%
Total	711	699	696	770	883	858	871	794	7%
Value per capita \$cvm									
Residential New Construction	2,389	2,350	2,510	2,995	3,475	2,936	2,672	2,365	-11%
Residential Renovations	986	961	998	955	963	1,038	948	982	2%
Non Residential	986	919	685	703	788	880	749	696	7%
Engineering	605	518	461	417	465	553	1,021	836	79%
Total	4,965	4,748	4,654	5,070	5,691	5,407	5,390	4,879	2%
Rank (value per capita)									
Residential New Construction	163	147	137	108	82	106	144	163	
Residential Renovations	388	329	336	376	438	367	416	419	
Non Residential	301	211	281	299	264	231	301	312	
Engineering	506	521	511	516	500	494	448	451	
Total	436	436	430	388	320	340	374	391	

Note: (1) Percentage increase represents the increase (or decrease) of the last three years average when compared to the average of the three years prior to those.

LOCAL GOVERNMENT RATES AND GRANTS			
	Region (2018)	Australia (2018)	Rank
Rates (\$m cvm)	109.76	17831.1	38
General Purpose Grants (\$m cvm)	3.28	1635.6	170
Roads Grants (\$m cvm)	0.87	714.0	306
All Grants to Rates Ratio	0.038	0.132	480
Rates per Population	674.12	704.1	371
General Purpose Grants per Population	20.13	64.6	472
Roads Grants per Population	5.33	28.2	530



EMPLOYED, HOURS WORKED AND INCOME (UR=Place of Residence, POW=Place of Work)										
Indicator	Year					Rank				
	1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
UR Employment	54,300	57,712	66,956	73,219	87,111	47	49	50	50	42
UR Hours (1000 hours)	96,790	99,048	110,096	119,444	139,755	47	50	51	51	49
UR Income (\$m cvm)	2,965	3,495	4,557	5,412	5,355	56	58	57	56	51
POW Employment	50,675	50,008	51,502	53,163	60,395	46	48	55	58	57
POW Hours (1000 hours)	90,422	86,392	85,520	87,920	96,311	45	48	55	57	58
POW Income (\$m cvm)	3,153	3,251	3,492	3,784	3,606	43	49	56	61	61
UR Average Weekly Hours/Employment	34.3	33.0	31.6	31.4	30.9	335	376	447	437	422
UR Average Hourly Rate/Employment (\$cvm)	30.6	35.3	41.4	45.3	38.3	429	389	228	180	238
POW Average Weekly Hours/Employment	34.3	33.2	31.9	31.8	30.7	319	325	372	339	366
POW Average Hourly Rate/Employment (\$cvm)	34.9	37.6	40.8	43.0	37.4	250	287	223	230	239

INDUSTRY GROUPS											
		Place of Residence (UR) Employment					Place of Work (POW) Employment				
		1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
A	Agriculture, Forestry & Fishing	170	175	192	262	387	93	78	78	125	202
B	Mining	83	84	113	244	129	174	159	273	433	192
C	Manufacturing	9,174	7,639	6,488	5,455	6,043	10,789	9,181	7,354	5,851	6,355
D	Electricity, Gas, Water & Waste Services	302	366	539	698	929	84	79	101	166	273
E	Construction	3,188	3,606	4,314	4,734	5,610	3,156	4,282	4,657	4,418	4,693
F	Wholesale Trade	2,530	2,603	2,870	2,468	2,325	3,171	3,114	3,220	2,791	2,594
G	Retail Trade	5,395	5,970	6,546	7,031	8,947	7,115	7,180	7,136	7,175	8,574
H	Accommodation & Food Services	3,294	3,747	4,646	5,521	6,634	2,423	2,492	2,891	3,508	3,925
I	Transport, Postal & Warehousing	2,512	2,535	3,051	3,019	3,776	1,874	1,774	1,857	1,789	2,197
J	Information Media & Telecoms	1,801	2,079	2,333	2,302	2,808	954	906	828	710	744
K	Financial & Insurance Services	2,306	2,656	3,205	3,371	4,576	954	851	862	884	1,112
L	Rental, Hiring & Real Estate Services	549	625	849	968	1,170	516	573	655	750	860
M	Prof, Scientific & Technical Services	3,964	4,622	6,070	7,442	7,148	2,045	2,028	2,266	2,625	2,832
N	Administrative & Support Services	2,055	2,445	2,632	2,804	2,642	1,249	1,392	1,371	1,573	1,513
O	Public Administration & Safety	2,806	3,318	4,427	4,852	6,534	2,119	2,223	2,668	2,928	3,940
P	Education & Training	4,450	5,133	6,464	7,808	9,835	5,945	5,936	6,644	7,452	8,654
Q	Health Care & Social Assistance	6,325	6,693	8,080	9,717	12,151	4,777	4,737	5,296	6,511	7,544
R	Arts & Recreation Services	1,008	1,145	1,651	1,946	1,978	675	705	980	1,054	961
S	Other Services	2,387	2,272	2,488	2,577	3,492	2,563	2,318	2,365	2,419	3,229
Z	TOTAL	54,300	57,712	66,956	73,219	87,111	50,675	50,008	51,502	53,163	60,395
Z1	Hi Tech	6,443	6,766	7,968	8,881	8,434	4,406	4,120	3,995	3,892	4,084
Z2	Hi Income	7,441	8,751	10,907	12,577	13,308	3,601	3,509	3,880	4,536	4,826
Z3	Infrastructure Services	11,784	12,971	16,195	19,470	23,964	11,397	11,378	12,920	15,017	17,159

SHIFT SHARE DECOMPOSITION OF RESIDENT EMPLOYMENT, HOURS AND INCOME												
Indicator	2003-2011				2011-2019				Change in shift 2011-2019 : 2003-2011			
	Per cent				Per cent				Per cent			
	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change
Hourly Rate	2.5	0.0	0.6	3.1	-1.2	0.1	-0.3	-1.4	-3.7	0.1	-0.9	-4.5
Hours Worked per annum	0.0	0.0	0.0	0.4	0.5	0.0	0.3	0.6	0.5	0.0	0.3	0.2
Income per annum	2.3	-0.1	0.7	3.5	-0.8	0.2	-0.1	-0.9	-3.0	0.2	-0.8	-4.4

CONSUMPTION														
Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth
Consumption (\$m cvm)	4,619	4,636	4,321	4,113	4,385	4,417	4,556	4,564	4,872	5,190	4,756	5,285	6,157	2.4%
– Per Cap (\$cvm)	34,914	34,407	31,420	29,316	30,930	30,899	31,426	30,988	32,584	34,149	30,658	33,291	38,101	0.7%
– Per Cap Rank	357	382	463	499	472	481	475	493	465	439	500	467	401	0

E.3 Hume (C)

LABOUR FORCE													
	Number ('000s)						Percentage Change					% p.a. growth	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
Population	191.3	198.2	207.0	215.2	224.4	233.1	3.6%	4.5%	4.0%	4.3%	3.9%	4.0%	4.1%
No. Households	58.7	60.6	62.8	65.3	68.3	71.5	3.2%	3.6%	4.1%	4.6%	4.7%	3.6%	4.6%
NIEIR Workforce	95.4	98.5	101.2	108.0	112.9	117.6	3.3%	2.7%	6.7%	4.6%	4.1%	4.2%	4.3%
NIEIR Employment	83.5	86.2	89.6	95.3	99.9	104.9	3.3%	3.9%	6.4%	4.9%	5.0%	4.5%	4.9%
NIEIR Unemployment	11.9	12.3	11.7	12.8	13.0	12.7	3.2%	-5.2%	9.4%	1.9%	-2.4%	2.3%	-0.3%

UNEMPLOYMENT AND UNDER EMPLOYMENT													
	Percentage						Percentage Point Change					Average % Point Change p.a.	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
NIEIR U/E Rate	12.5%	12.5%	11.5%	11.8%	11.5%	10.8%	0.0	-1.0	0.3	-0.3	-0.7	-0.2	-0.5
Headline U/E Rate	9.1%	9.6%	9.1%	10.1%	10.0%	9.7%	0.5	-0.5	1.0	-0.1	-0.3	0.3	-0.2
NIEIR Structural U/E Rate	11.6%	11.4%	10.6%	10.1%	9.7%	9.1%	-0.2	-0.8	-0.6	-0.4	-0.6	-0.5	-0.5
Social Security Take-up	15.3%	15.1%	14.5%	14.3%	13.8%	12.7%	-0.3	-0.6	-0.2	-0.5	-1.1	-0.3	-0.8
Hours Per Week ⁽¹⁾	20.2	20.2	20.2	20.5	20.4	20.1	0.0	0.1	0.3	-0.1	-0.4	0.1	-0.2
Not Employed Share ⁽¹⁾	35.9%	35.9%	36.0%	34.4%	33.9%	32.7%	0.0	0.1	-1.6	-0.5	-1.2	-0.5	-0.8
Not In Employment ⁽¹⁾	47.0%	47.0%	46.7%	46.0%	46.2%	47.2%	0.0	-0.2	-0.8	0.2	1.0	-0.3	0.6

Note: (1) Relative to Working Age Population, Not in Employment is based on FTE.

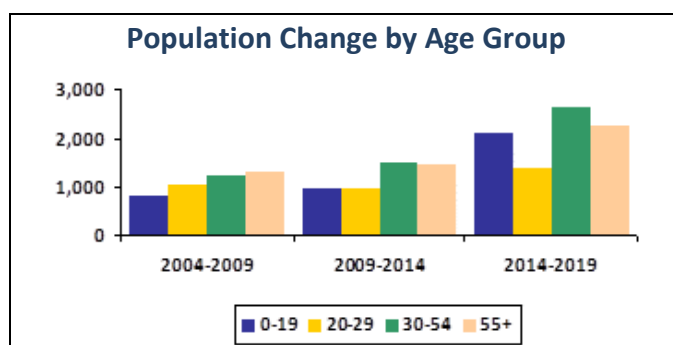
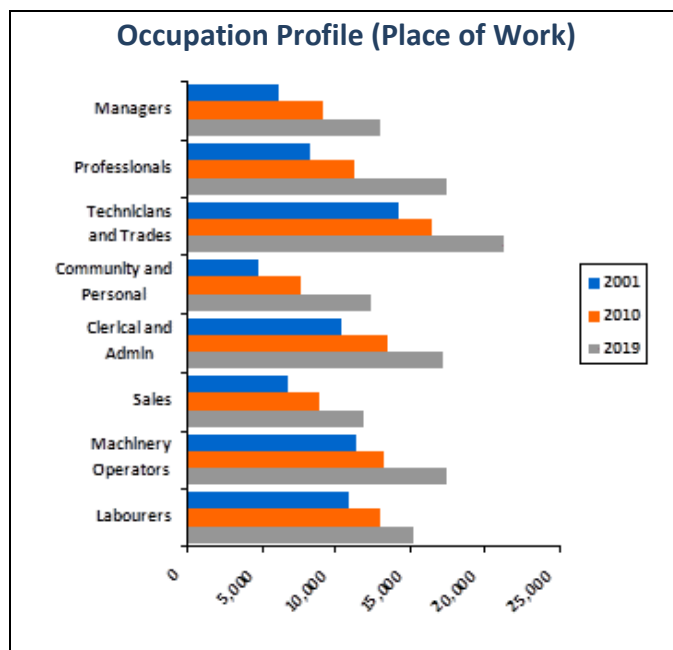
INCOME FLOWS & PRODUCTIVITY														
	Level \$m cvm						Per Capita \$cvm						% p.a. Growth of Level	
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014 -2017	2017 -2019
Wages/Salaries	4,325	4,410	4,522	4,767	5,051	5,263	22,611	22,252	21,841	22,146	22,511	22,577	3.3%	5.1%
Taxes Paid	955	1,048	1,076	1,204	1,282	1,401	4,995	5,287	5,198	5,592	5,712	6,012	8.0%	7.9%
Benefits	825	852	852	874	862	842	4,315	4,297	4,113	4,061	3,843	3,614	1.9%	-1.8%
Business Income	632	619	338	623	631	646	3,302	3,125	1,633	2,895	2,813	2,771	-0.4%	1.8%
Interest Paid	557	529	487	472	516	527	2,913	2,670	2,351	2,193	2,299	2,259	-5.4%	5.6%
Property Income	803	846	834	852	883	902	4,198	4,269	4,028	3,957	3,935	3,871	2.0%	2.9%
Disposable Income	6,281	6,423	6,235	6,811	7,056	7,260	32,836	32,411	30,113	31,645	31,444	31,145	2.7%	3.2%
Rank	55	57	58	48	46	46	506	510	518	512	510	509		
Resident GRP (Local)	6,645	6,609	6,481	6,652	6,798	6,290	65,642	62,332	59,495	59,264	57,979	50,174	0.0%	-2.8%
Rank	66	65	64	59	58	53	482	485	484	475	474	440		
Industry GRP (Local)	8,348	8,487	8,331	8,291	8,385	7,808	82,461	80,038	76,483	73,863	71,517	62,285	-0.2%	-3.0%
Rank	34	31	32	35	35	34	448	464	456	460	448	362		
Headline GRP	11,212	12,186	12,704	13,260	13,660	13,962	110,758	114,923	116,630	118,134	116,509	111,380	5.7%	2.6%

- Notes:
- (1) All years stated above are fiscal year ending.
 - (2) Figures for wages/salaries include superannuation supplements.
 - (3) Figures for disposable income (less depreciation expense) include imputed income from ownership of dwellings.
 - (4) Figures for Resident GRP (Local) are per working age population and figures for Industry GRP (Local) are per industry employee. Both are at Factor Cost.
 - (5) \$m cvm = \$ million chain volume measure, which is flows of constant 2016-2017 value converted from current values by the ABS using their chain volume methodology.

SOCIAL SECURITY		
	% Pop	Australian Average
Youth Allowance – Other (share of 16-21 years)	4.4%	4.6%
Youth Allowance – Student/Apprentice (share of 16-21 years)	12.6%	9.1%
Newstart Allowance (share of 22-64 years)	6.6%	4.9%
Age pension (share of 65+)	67.1%	59.8%

Cash Benefits Share of Disposable Income	Share	Rank
2019	11.6	330
2018	12.2	322
2017	12.8	299
2016	13.7	286
2015	13.3	316
2014	13.1	316
2013	12.6	318
2012	12.5	301
2011	12.8	305

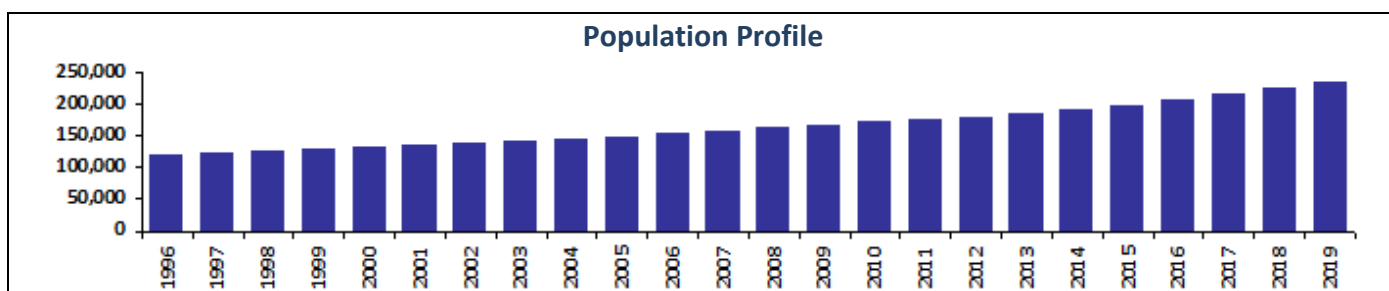
POPULATION CHANGE				
	2004	2009	2014	2019
Age 0-19	32.8%	31.0%	29.6%	28.7%
Age 20-29	14.1%	15.4%	15.9%	16.1%
Age 30-54	37.0%	35.8%	35.1%	34.4%
Age 55+	16.1%	17.9%	19.4%	20.8%
Age 0-19		835	990	2,085
Age 20-29		1,058	962	1,398
Age 30-54		1,238	1,488	2,622
Age 55+		1,305	1,470	2,264
Average Annual Growth		2.9%	2.8%	4.0%



TEMPERATURE AND RAINFALL											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Temperature (Average (C))	15	16	14	15	15	16	15	16	15	16	16
Rank	420	408	427	436	424	428	428	424	410	423	419
Rainfall (mm)	361	538	799	660	467	450	402	453	619	536	459
Rank	401	325	257	322	321	370	372	369	312	268	308

Note: Temperature is the average minimum and maximum for each day in the year.

POPULATION																				
	Number ('000s)																			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Population	131	135	138	141	145	149	153	158	162	167	171	174	179	185	191	198	207	215	224	233



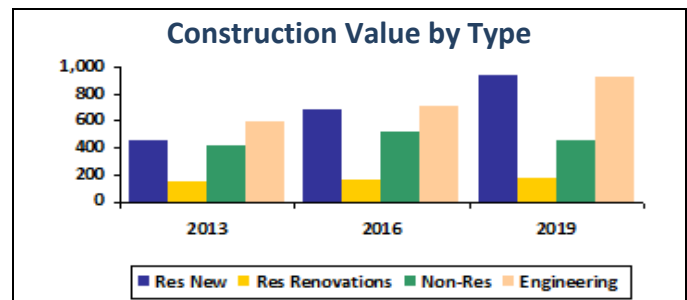
HOUSEHOLD WEALTH & DEBT									
Indicator	Year			Rank			%Rank 1		
	2011	2016	2019	2011	2016	2019	2011	2016	2019
Wealth per Household (\$cvm '000s)	524	465	602	296	355	200	9.6%	10.4%	13.2%
Value of Property and Unincorporated Business	520	492	645	152	165	113	12.4%	16.9%	21.3%
Value of Financial Assets	217	194	186	487	481	470	8.4%	8.1%	5.2%
Value of Household Liabilities	213	222	230	158	166	183	16.3%	22.9%	22.5%
Disposable Income after Debt Service Costs	104	99	102	457	483	445	22.0%	11.4%	9.3%
Household Debt Service Ratio	22%	20%	20%	19	26	57	38.4%	41.1%	37.2%
Household Debt to Gross Income Ratio	1.69	1.92	1.92	34	27	68	37.7%	40.4%	37.8%

HOUSING										
Housing Indicator	1991.3	1996.3	2001.3	2006.3	2011.2	2016.2	2019.2	2006.3 Rank	2019.2 Rank	Annual Growth 2006-2019
Average established dwelling price (\$cvm '000s)	184.14	166.03	241.27	309.66	406.93	396.91	528.99	212	110	4.29%
Average adjusted household income per occupied dwelling	90,508	82,861	88,360	99,335	107,808	99,330	98,307	354	435	-0.08%
Ratio of adjusted dwelling price to adjusted average household disposable income	2.03	2.00	2.73	3.12	3.77	4.00	5.38	208	78	4.37%
Average household income from labour market catchment	53,213	60,098	63,592	79,542	86,208	77,164	74,066	182	160	-0.56%
Ratio of average mortgage costs on established dwellings to average household catchment income	36.4%	22.9%	24.4%	27.8%	34.0%	28.1%	38.9%	301	164	2.67%
Ratio of average mortgage costs on new dwellings to average household catchment income	55.5%	38.6%	30.9%	33.3%	35.7%	29.9%	40.6%	423	214	1.58%
Ratio of new construction cost to established dwelling	123.1%	138.6%	98.6%	95.0%	89.2%	89.9%	90.4%	390	443	-0.39%
Share of flats in dwelling stock	3.5%	4.4%	4.4%	4.4%	4.3%	6.4%	7.3%	292	220	4.07%
Ratio of houses in new dwelling approvals	n/a	91.4%	92.0%	88.3%	78.7%	79.5%	83.1%	273	440	-0.48%
Adults per occupied dwelling	2.50	2.31	2.38	2.30	2.36	2.42	2.42	65	51	0.41%

CONSTRUCTION									
	2010 -2012	2013	2014	2015	2016	2017	2018	2019	Percentage Increase 2014-2016 to 2017-2019
Value \$m cvm per annum									
Residential New Construction	420	456	473	548	675	796	928	935	57%
Residential Renovations	138	143	152	150	155	175	166	178	14%
Non Residential	357	410	534	664	511	406	396	455	-26%
Engineering	684	596	591	650	706	819	1,027	918	42%
Total	1,599	1,605	1,749	2,011	2,047	2,196	2,517	2,486	24%
Value per capita \$cvm									
Residential New Construction	2,408	2,466	2,472	2,764	3,262	3,698	4,135	4,012	39%
Residential Renovations	788	771	797	756	750	812	742	765	1%
Non Residential	2,046	2,219	2,790	3,352	2,467	1,885	1,765	1,952	-35%
Engineering	3,911	3,226	3,087	3,278	3,408	3,807	4,575	3,937	26%
Total	9,153	8,682	9,146	10,149	9,888	10,203	11,217	10,666	10%
Rank (value per capita)									
Residential New Construction	160	136	139	126	97	69	57	59	
Residential Renovations	492	444	465	499	504	491	506	507	
Non Residential	99	71	45	31	55	83	100	97	
Engineering	190	271	256	232	197	163	151	151	
Total	182	206	188	151	141	98	99	95	

Note: (1) Percentage increase represents the increase (or decrease) of the last three years average when compared to the average of the three years prior to those.

LOCAL GOVERNMENT RATES AND GRANTS			
	Region (2018)	Australia (2018)	Rank
Rates (\$m cvm)	131.13	17831.1	24
General Purpose Grants (\$m cvm)	12.22	1635.6	16
Roads Grants (\$m cvm)	2.26	714.0	75
All Grants to Rates Ratio	0.110	0.132	366
Rates per Population	562.51	704.1	442
General Purpose Grants per Population	52.43	64.6	395
Roads Grants per Population	9.69	28.2	483



EMPLOYED, HOURS WORKED AND INCOME (UR=Place of Residence, POW=Place of Work)										
Indicator	Year					Rank				
	1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
UR Employment	54,808	61,818	73,373	83,514	104,897	46	42	41	33	24
UR Hours (1000 hours)	98,986	108,077	122,839	137,123	170,985	46	43	42	36	26
UR Income (\$m cvm)	3,135	3,723	4,544	5,277	5,464	52	52	58	60	50
POW Employment	69,728	77,380	89,924	101,232	125,357	26	25	20	17	14
POW Hours (1000 hours)	128,496	138,497	156,927	173,418	210,360	21	23	17	16	14
POW Income (\$m cvm)	4,240	5,145	6,135	6,979	6,983	25	24	25	25	26
UR Average Weekly Hours/Employment	34.7	33.6	32.2	31.6	31.3	278	315	398	417	362
UR Average Hourly Rate/Employment (\$cvm)	31.7	34.4	37.0	38.5	32.0	385	413	384	363	368
POW Average Weekly Hours/Employment	35.4	34.4	33.6	32.9	32.3	232	214	267	267	213
POW Average Hourly Rate/Employment (\$cvm)	33.0	37.1	39.1	40.2	33.2	306	304	287	308	341

INDUSTRY GROUPS											
		Place of Residence (UR) Employment					Place of Work (POW) Employment				
		1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
A	Agriculture, Forestry & Fishing	398	326	271	345	468	404	351	305	450	771
B	Mining	100	63	93	143	252	52	48	83	113	148
C	Manufacturing	12,605	12,448	11,812	10,296	12,710	22,639	23,025	21,408	19,298	23,332
D	Electricity, Gas, Water & Waste Services	404	465	884	901	1,306	491	601	1,057	1,477	1,740
E	Construction	3,463	4,728	6,911	8,657	8,191	4,159	6,250	9,553	12,842	15,974
F	Wholesale Trade	2,957	3,232	3,442	3,291	3,794	4,590	4,757	5,140	4,917	5,262
G	Retail Trade	6,244	7,789	8,284	9,210	13,045	5,567	6,719	7,356	8,362	10,953
H	Accommodation & Food Services	2,941	3,618	4,382	5,308	5,742	2,964	3,586	4,362	5,307	5,739
I	Transport, Postal & Warehousing	5,263	6,029	7,766	8,959	11,774	13,085	14,103	18,427	20,669	25,811
J	Information Media & Telecoms	1,080	1,078	1,237	1,521	1,596	704	747	760	720	863
K	Financial & Insurance Services	2,115	2,238	2,666	2,980	3,831	539	544	700	829	1,029
L	Rental, Hiring & Real Estate Services	624	864	1,055	1,233	1,012	713	907	1,151	1,285	1,293
M	Prof, Scientific & Technical Services	2,377	2,520	3,044	3,852	4,967	1,167	1,234	1,548	1,994	2,272
N	Administrative & Support Services	1,750	2,123	2,632	3,252	3,432	1,563	1,999	2,335	3,180	3,277
O	Public Administration & Safety	2,582	3,022	4,093	4,739	7,051	2,570	2,949	3,928	4,767	6,955
P	Education & Training	2,647	3,204	4,200	5,586	7,016	3,696	4,255	5,102	6,282	7,539
Q	Health Care & Social Assistance	3,962	4,668	6,283	8,722	11,847	2,466	2,851	3,655	5,044	6,648
R	Arts & Recreation Services	761	785	1,424	1,131	1,395	352	386	604	678	990
S	Other Services	2,533	2,615	2,893	3,387	5,469	2,010	2,068	2,451	3,019	4,762
Z	TOTAL	54,808	61,818	73,373	83,514	104,897	69,728	77,380	89,924	101,232	125,357
Z1	Hi Tech	7,017	7,242	7,243	7,158	7,921	11,598	12,177	11,227	9,799	9,085
Z2	Hi Income	5,502	5,833	7,095	8,483	10,990	2,515	2,698	3,400	4,382	5,141
Z3	Infrastructure Services	7,370	8,657	11,908	15,439	20,258	6,514	7,492	9,360	12,004	15,177

SHIFT SHARE DECOMPOSITION OF RESIDENT EMPLOYMENT, HOURS AND INCOME												
Indicator	2003-2011				2011-2019				Change in shift 2011-2019 : 2003-2011			
	Per cent				Per cent				Per cent			
	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change
Hourly Rate	2.5	-0.4	-0.5	1.7	-1.2	0.0	-0.7	-1.8	-3.7	0.4	-0.2	-3.5
Hours Worked per annum	0.0	0.0	-0.4	0.0	0.5	-0.2	-0.1	0.0	0.5	-0.2	0.4	0.0
Income per annum	2.3	-0.4	-0.9	1.6	-0.8	0.0	-0.9	-1.8	-3.0	0.5	0.0	-3.4

CONSUMPTION														
Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth
Consumption (\$m cvm)	4,034	4,196	4,760	5,203	5,150	4,918	5,152	5,640	5,858	6,107	5,694	6,138	5,887	3.2%
– Per Cap (\$cvm)	26,402	26,636	29,405	31,208	30,123	28,218	28,749	30,505	30,627	30,815	27,500	28,518	26,236	-0.1%
– Per Cap Rank	528	535	515	455	493	525	516	499	495	501	520	516	527	0

E.4 Mitchell (S)

LABOUR FORCE													
	Number ('000s)						Percentage Change					% p.a. growth	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
Population	39.1	40.3	41.8	42.9	44.3	46.0	3.0%	3.8%	2.7%	3.3%	3.8%	3.2%	3.5%
No. Households	13.8	14.2	14.7	15.1	15.6	16.3	3.2%	3.0%	3.2%	3.4%	4.1%	3.1%	3.8%
NIEIR Workforce	20.6	21.5	22.3	22.8	23.1	22.9	4.4%	3.7%	2.1%	1.5%	-0.7%	3.4%	0.4%
NIEIR Employment	18.4	19.1	19.9	20.6	21.1	21.0	3.4%	4.1%	3.6%	2.6%	-0.3%	3.7%	1.1%
NIEIR Unemployment	2.1	2.4	2.4	2.2	2.0	1.9	13.1%	0.2%	-10.0%	-8.8%	-5.6%	0.7%	-7.2%

UNEMPLOYMENT AND UNDER EMPLOYMENT													
	Percentage						Percentage Point Change					Average % Point Change p.a.	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
NIEIR U/E Rate	10.4%	11.3%	10.9%	9.6%	8.6%	8.2%	0.9	-0.4	-1.3	-1.0	-0.4	-0.3	-0.7
Headline U/E Rate	6.2%	7.1%	6.9%	5.8%	4.9%	4.7%	0.9	-0.2	-1.1	-0.9	-0.2	-0.1	-0.6
NIEIR Structural U/E Rate	9.9%	10.0%	9.5%	9.1%	8.9%	8.5%	0.2	-0.5	-0.4	-0.2	-0.3	-0.2	-0.3
Social Security Take-up	13.3%	13.8%	13.3%	12.8%	12.3%	11.7%	0.4	-0.4	-0.6	-0.5	-0.6	-0.2	-0.6
Hours Per Week ⁽¹⁾	23.1	23.2	23.4	23.3	23.0	20.9	0.1	0.2	-0.1	-0.3	-2.1	0.1	-1.2
Not Employed Share ⁽¹⁾	28.2%	27.5%	27.1%	26.3%	26.8%	29.1%	-0.6	-0.4	-0.8	0.5	2.3	-0.6	1.4
Not In Employment ⁽¹⁾	39.3%	39.0%	38.5%	38.8%	39.5%	45.0%	-0.3	-0.5	0.2	0.8	5.5	-0.2	3.1

Note: (1) Relative to Working Age Population, Not in Employment is based on FTE.

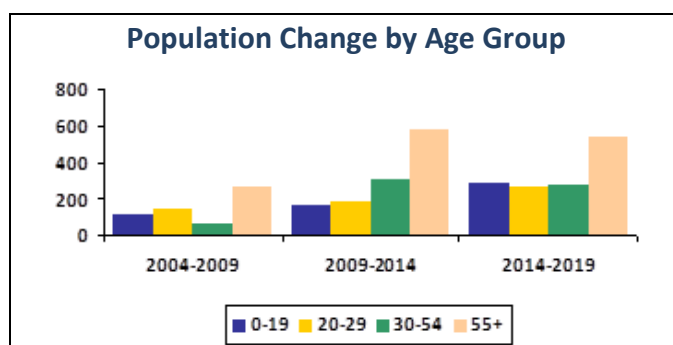
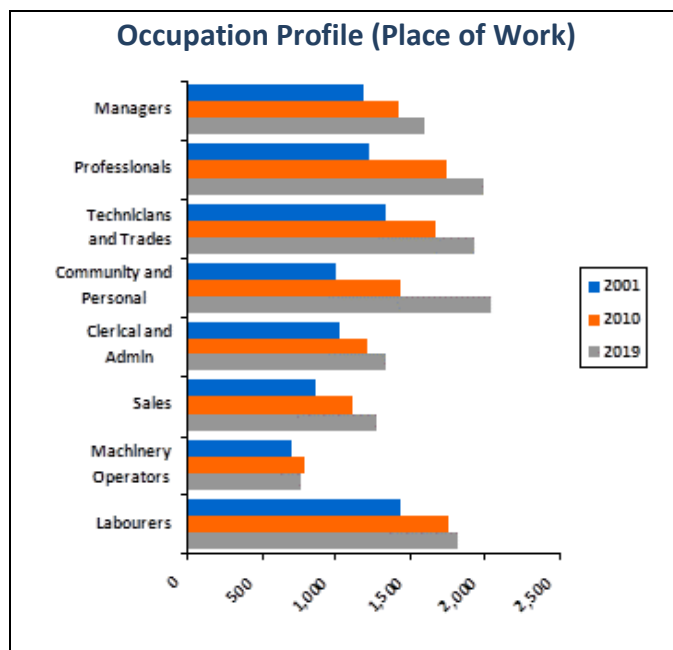
INCOME FLOWS & PRODUCTIVITY														
	Level \$m cvm						Per Capita \$cvm						% p.a. Growth of Level	
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014 -2017	2017 -2019
Wages/Salaries	959	993	1,040	1,074	1,108	1,098	24,530	24,652	24,886	25,037	25,023	23,881	3.9%	1.1%
Taxes Paid	218	241	255	274	287	293	5,576	5,996	6,101	6,389	6,489	6,370	7.9%	3.4%
Benefits	220	239	241	270	267	261	5,638	5,938	5,760	6,304	6,022	5,668	7.1%	-1.8%
Business Income	148	143	94	130	141	123	3,778	3,551	2,258	3,021	3,180	2,675	-4.3%	-2.6%
Interest Paid	119	111	102	96	102	104	3,035	2,767	2,442	2,247	2,293	2,255	-6.7%	3.7%
Property Income	185	197	196	199	203	207	4,725	4,889	4,700	4,628	4,576	4,510	2.4%	2.2%
Disposable Income	1,444	1,506	1,506	1,608	1,643	1,615	36,952	37,401	36,040	37,490	37,079	35,114	3.7%	0.2%
Rank	177	178	179	171	170	170	475	482	489	478	479	489		
Resident GRP (Local)	1,555	1,552	1,526	1,500	1,503	1,300	129,035	130,520	125,432	121,332	118,260	102,364	-1.2%	-6.9%
Rank	173	170	168	169	166	166	134	115	116	122	124	102		
Industry GRP (Local)	1,077	1,045	1,013	974	979	792	89,425	87,854	83,292	78,816	77,012	62,367	-3.3%	-9.8%
Rank	195	199	199	198	197	197	367	374	380	414	388	360		
Headline GRP	1,403	1,372	1,375	1,365	1,411	1,472	116,423	115,362	113,030	110,440	111,031	115,955	-0.9%	3.8%

- Notes:
- (1) All years stated above are fiscal year ending.
 - (2) Figures for wages/salaries include superannuation supplements.
 - (3) Figures for disposable income (less depreciation expense) include imputed income from ownership of dwellings.
 - (4) Figures for Resident GRP (Local) are per working age population and figures for Industry GRP (Local) are per industry employee. Both are at Factor Cost.
 - (5) \$m cvm = \$ million chain volume measure, which is flows of constant 2016-2017 value converted from current values by the ABS using their chain volume methodology.

SOCIAL SECURITY		
	% Pop	Australian Average
Youth Allowance – Other (share of 16-21 years)	3.2%	4.6%
Youth Allowance – Student/Apprentice (share of 16-21 years)	5.3%	9.1%
Newstart Allowance (share of 22-64 years)	5.1%	4.9%
Age pension (share of 65+)	62.1%	59.8%

Cash Benefits Share of Disposable Income	Share	Rank
2019	16.1	190
2018	16.2	193
2017	16.8	176
2016	16.0	209
2015	15.9	231
2014	15.3	255
2013	15.3	226
2012	16.0	201
2011	14.9	236

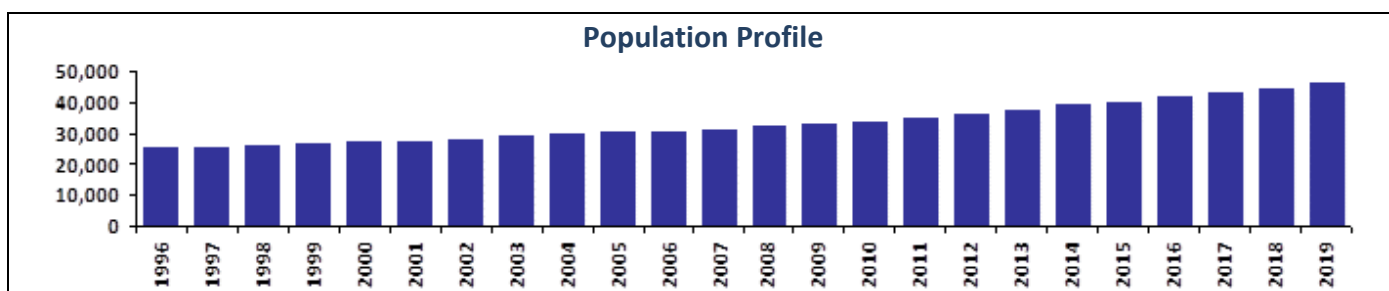
POPULATION CHANGE				
	2004	2009	2014	2019
Age 0-19	32.8%	31.5%	28.6%	27.5%
Age 20-29	11.0%	12.3%	12.7%	13.7%
Age 30-54	38.3%	35.8%	34.0%	32.0%
Age 55+	18.0%	20.4%	24.6%	26.7%
Age 0-19		116	166	292
Age 20-29		152	187	269
Age 30-54		67	305	283
Age 55+		272	579	536
Average Annual Growth		2.0%	3.5%	3.3%



TEMPERATURE AND RAINFALL											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Temperature (Average (C))	13	13	12	12	13	13	13	14	13	13	13
Rank	492	502	516	512	494	505	501	506	508	499	500
Rainfall (mm)	476	797	1,115	891	614	678	503	605	738	713	464
Rank	326	144	144	161	216	209	281	254	234	154	304

Note: Temperature is the average minimum and maximum for each day in the year.

POPULATION																				
	Number ('000s)																			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Population	27	28	28	29	30	30	31	32	32	33	34	35	36	38	39	40	42	43	44	46



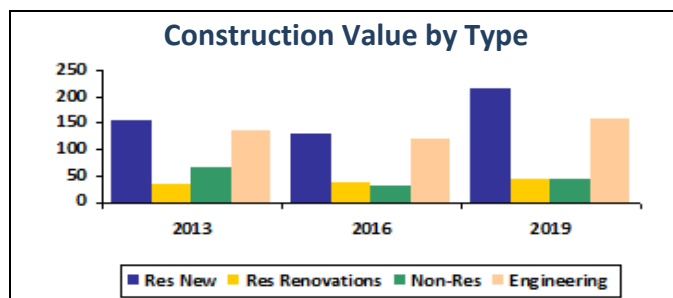
HOUSEHOLD WEALTH & DEBT									
Indicator	Year			Rank			%Rank 1		
	2011	2016	2019	2011	2016	2019	2011	2016	2019
Wealth per Household (\$cvm '000s)	480	424	524	363	408	254	8.8%	9.5%	11.5%
Value of Property and Unincorporated Business	439	419	532	233	240	168	10.5%	14.3%	17.5%
Value of Financial Assets	236	213	220	451	451	415	9.2%	8.9%	6.1%
Value of Household Liabilities	195	208	228	195	184	185	15.0%	21.4%	22.3%
Disposable Income after Debt Service Costs	107	103	100	439	463	460	22.5%	11.8%	9.1%
Household Debt Service Ratio	20%	18%	19%	91	80	66	34.2%	37.3%	36.6%
Household Debt to Gross Income Ratio	1.56	1.77	1.97	92	62	54	34.9%	37.3%	38.7%

HOUSING										
Housing Indicator	1991.3	1996.3	2001.3	2006.3	2011.2	2016.2	2019.2	2006.3 Rank	2019.2 Rank	Annual Growth 2006-2019
Average established dwelling price (\$cvm '000s)	144.17	130.70	180.23	284.66	323.83	322.96	421.50	246	150	3.13%
Average adjusted household income per occupied dwelling	74,498	74,693	82,023	93,946	110,511	103,073	95,906	405	452	0.16%
Ratio of adjusted dwelling price to adjusted average household disposable income	1.94	1.75	2.20	3.03	2.93	3.13	4.39	222	127	2.96%
Average household income from labour market catchment	41,711	41,414	40,731	44,104	46,802	39,341	34,519	520	525	-1.90%
Ratio of average mortgage costs on established dwellings to average household catchment income	36.4%	26.1%	28.5%	46.1%	49.8%	44.9%	66.5%	116	27	2.92%
Ratio of average mortgage costs on new dwellings to average household catchment income	71.7%	56.8%	47.6%	57.6%	58.8%	53.8%	73.1%	99	28	1.88%
Ratio of new construction cost to established dwelling	165.8%	187.0%	135.6%	97.7%	96.6%	98.3%	96.2%	356	418	-0.12%
Share of flats in dwelling stock	4.8%	4.3%	3.4%	4.4%	4.1%	4.7%	4.7%	286	337	0.39%
Ratio of houses in new dwelling approvals	n/a	98.8%	96.2%	94.0%	93.0%	95.9%	92.4%	201	395	-0.13%
Adults per occupied dwelling	2.23	2.08	2.10	2.03	2.09	2.12	2.15	261	135	0.45%

CONSTRUCTION									
	2010 -2012	2013	2014	2015	2016	2017	2018	2019	Percentage Increase 2014-2016 to 2017-2019
Value \$m cvm per annum									
Residential New Construction	147	155	141	121	130	134	167	216	32%
Residential Renovations	33	35	37	37	38	42	40	42	10%
Non Residential	57	66	79	39	32	35	42	43	-19%
Engineering	128	136	124	111	119	131	164	156	28%
Total	365	391	381	307	319	343	413	458	20%
Value per capita \$cvm									
Residential New Construction	4,183	4,090	3,611	3,002	3,100	3,123	3,777	4,697	19%
Residential Renovations	935	916	950	911	917	983	893	910	0%
Non Residential	1,634	1,757	2,019	972	768	827	953	946	-27%
Engineering	3,629	3,593	3,165	2,749	2,857	3,054	3,710	3,398	16%
Total	10,380	10,356	9,744	7,634	7,641	7,987	9,333	9,951	9%
Rank (value per capita)									
Residential New Construction	51	48	69	104	110	92	67	39	
Residential Renovations	428	351	358	418	470	412	454	459	
Non Residential	143	90	75	209	272	248	232	230	
Engineering	203	252	252	250	221	188	178	173	
Total	149	163	175	228	220	173	151	110	

Note: (1) Percentage increase represents the increase (or decrease) of the last three years average when compared to the average of the three years prior to those.

LOCAL GOVERNMENT RATES AND GRANTS			
	Region (2018)	Australia (2018)	Rank
Rates (\$m cvm)	34.10	17831.1	153
General Purpose Grants (\$m cvm)	5.17	1635.6	76
Roads Grants (\$m cvm)	1.72	714.0	137
All Grants to Rates Ratio	0.202	0.132	300
Rates per Population	741.58	704.1	326
General Purpose Grants per Population	112.49	64.6	314
Roads Grants per Population	37.50	28.2	344



EMPLOYED, HOURS WORKED AND INCOME (UR=Place of Residence, POW=Place of Work)										
Indicator	Year					Rank				
	1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
UR Employment	11,520	13,608	15,677	18,450	21,046	177	169	167	153	140
UR Hours (1000 hours)	20,620	23,449	26,120	30,818	34,677	176	168	172	156	142
UR Income (\$m cvm)	724	903	1,036	1,253	1,149	169	167	176	166	162
POW Employment	8,451	9,431	10,451	12,049	12,696	199	195	197	191	190
POW Hours (1000 hours)	14,479	15,214	15,896	18,470	19,170	205	202	211	198	197
POW Income (\$m cvm)	530	585	647	776	641	197	199	205	200	199
UR Average Weekly Hours/Employment	34.4	33.1	32.0	32.1	31.7	312	362	408	366	321
UR Average Hourly Rate/Employment (\$cvm)	35.1	38.5	39.7	40.7	33.1	269	282	288	287	337
POW Average Weekly Hours/Employment	32.9	31.0	29.3	29.5	29.0	425	491	509	487	489
POW Average Hourly Rate/Employment (\$cvm)	36.6	38.5	40.7	42.0	33.4	199	257	228	258	335

INDUSTRY GROUPS											
		Place of Residence (UR) Employment					Place of Work (POW) Employment				
		1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
A	Agriculture, Forestry & Fishing	621	650	653	584	685	663	654	640	575	627
B	Mining	59	63	80	104	149	70	64	72	64	61
C	Manufacturing	1,793	2,010	2,032	2,053	2,271	718	776	779	678	668
D	Electricity, Gas, Water & Waste Services	102	110	157	251	295	63	55	71	106	85
E	Construction	822	1,236	1,712	2,328	2,451	607	901	826	1,521	1,748
F	Wholesale Trade	526	534	590	619	750	164	173	176	180	238
G	Retail Trade	1,176	1,497	1,629	1,757	2,075	1,046	1,264	1,318	1,255	1,398
H	Accommodation & Food Services	551	725	866	1,095	1,407	512	651	823	1,108	1,291
I	Transport, Postal & Warehousing	781	938	1,160	1,439	1,863	397	418	497	512	540
J	Information Media & Telecoms	152	175	178	187	215	75	81	75	63	56
K	Financial & Insurance Services	257	259	286	351	438	112	94	95	110	135
L	Rental, Hiring & Real Estate Services	112	153	188	216	237	87	106	130	119	89
M	Prof, Scientific & Technical Services	373	449	518	670	720	217	235	287	359	332
N	Administrative & Support Services	273	382	414	565	564	182	239	270	357	307
O	Public Administration & Safety	1,332	1,483	1,741	1,963	2,326	1,324	1,289	1,490	1,641	1,745
P	Education & Training	811	934	1,058	1,335	1,382	841	941	1,074	1,300	1,318
Q	Health Care & Social Assistance	1,000	1,176	1,478	1,897	1,980	825	923	1,193	1,480	1,436
R	Arts & Recreation Services	214	235	260	264	266	146	180	235	217	157
S	Other Services	565	599	677	773	973	400	389	400	405	465
Z	TOTAL	11,520	13,608	15,677	18,450	21,046	8,451	9,431	10,451	12,049	12,696
Z1	Hi Tech	845	1,014	1,141	1,284	1,401	320	338	413	465	393
Z2	Hi Income	818	947	1,061	1,372	1,599	459	462	521	634	639
Z3	Infrastructure Services	2,026	2,345	2,796	3,496	3,628	1,813	2,044	2,502	2,997	2,911

SHIFT SHARE DECOMPOSITION OF RESIDENT EMPLOYMENT, HOURS AND INCOME												
Indicator	2003-2011				2011-2019				Change in shift 2011-2019 : 2003-2011			
	Per cent				Per cent				Per cent			
	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change
Hourly Rate	2.5	-0.1	-1.4	1.0	-1.2	0.0	-0.7	-2.0	-3.7	0.1	0.7	-2.9
Hours Worked per annum	0.0	0.1	0.1	0.6	0.5	0.0	-0.8	-0.6	0.5	-0.1	-0.9	-1.2
Income per annum	2.3	-0.2	-1.3	1.4	-0.8	0.0	-1.8	-2.8	-3.0	0.2	-0.5	-4.2

CONSUMPTION														
Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth
Consumption (\$m cvm)	0,916	0,919	1,093	1,116	1,181	1,194	1,209	1,241	1,288	1,359	1,358	1,338	1,339	3.2%
– Per Cap (\$cvm)	29,805	29,143	33,840	33,923	34,844	34,003	33,218	32,843	32,961	33,759	32,502	31,195	30,219	0.1%
– Per Cap Rank	491	512	401	386	378	423	444	457	455	447	473	496	507	0

E.5 Moreland (C)

LABOUR FORCE													
	Number ('000s)						Percentage Change					% p.a. growth	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
Population	164.1	167.9	172.3	177.0	181.7	184.5	2.3%	2.6%	2.7%	2.7%	1.6%	2.5%	2.1%
No. Households	61.2	62.6	64.4	66.0	67.7	69.1	2.3%	2.9%	2.5%	2.5%	2.2%	2.6%	2.3%
NIEIR Workforce	89.5	93.5	96.2	100.7	104.6	109.8	4.5%	2.9%	4.7%	3.9%	5.0%	4.0%	4.4%
NIEIR Employment	82.7	86.3	89.7	94.2	97.8	102.5	4.4%	3.9%	5.1%	3.8%	4.7%	4.5%	4.3%
NIEIR Unemployment	6.8	7.1	6.5	6.5	6.8	7.4	4.9%	-9.4%	-0.1%	4.9%	8.6%	-1.7%	6.7%

UNEMPLOYMENT AND UNDER EMPLOYMENT													
	Percentage						Percentage Point Change					Average % Point Change p.a.	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
NIEIR U/E Rate	7.6%	7.6%	6.7%	6.4%	6.5%	6.7%	0.0	-0.9	-0.3	0.1	0.2	-0.4	0.1
Headline U/E Rate	7.4%	7.5%	6.6%	6.4%	6.4%	6.7%	0.1	-0.9	-0.2	0.0	0.3	-0.3	0.2
NIEIR Structural U/E Rate	8.6%	8.4%	7.7%	7.1%	6.7%	6.3%	-0.3	-0.7	-0.5	-0.4	-0.4	-0.5	-0.4
Social Security Take-up	10.8%	10.5%	9.8%	9.1%	8.5%	7.9%	-0.3	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6
Hours Per Week ⁽¹⁾	23.0	23.1	23.4	23.7	23.7	24.2	0.1	0.3	0.3	-0.1	0.6	0.3	0.3
Not Employed Share ⁽¹⁾	27.9%	26.7%	26.2%	24.8%	23.7%	20.5%	-1.2	-0.6	-1.4	-1.0	-3.2	-1.1	-2.1
Not In Employment ⁽¹⁾	39.6%	39.2%	38.4%	37.5%	37.7%	36.2%	-0.3	-0.8	-0.9	0.2	-1.5	-0.7	-0.7

Note: (1) Relative to Working Age Population, Not in Employment is based on FTE.

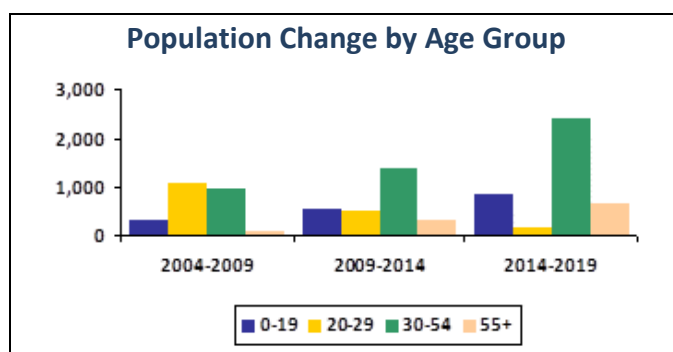
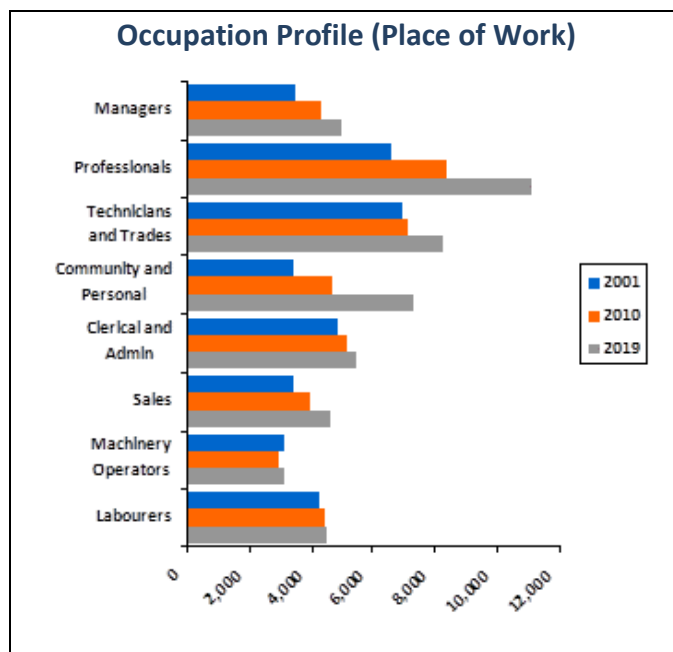
INCOME FLOWS & PRODUCTIVITY														
	Level \$m cvm						Per Capita \$cvm						% p.a. Growth of Level	
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014 -2017	2017 -2019
Wages/Salaries	4,556	4,730	4,914	5,187	5,471	5,782	27,766	28,179	28,522	29,309	30,108	31,333	4.4%	5.6%
Taxes Paid	1,099	1,240	1,260	1,424	1,531	1,720	6,695	7,384	7,312	8,048	8,427	9,319	9.0%	9.9%
Benefits	676	689	646	623	615	601	4,119	4,102	3,747	3,522	3,383	3,255	-2.7%	-1.8%
Business Income	703	713	358	636	639	659	4,282	4,246	2,076	3,593	3,517	3,569	-3.3%	1.8%
Interest Paid	558	531	502	502	517	528	3,398	3,165	2,914	2,839	2,846	2,861	-3.4%	2.5%
Property Income	989	1,062	1,037	1,062	1,097	1,126	6,025	6,326	6,016	6,004	6,036	6,100	2.4%	2.9%
Disposable Income	6,624	6,859	6,601	7,104	7,335	7,591	40,363	40,858	38,311	40,141	40,363	41,136	2.4%	3.4%
Rank	47	45	49	44	42	39	416	427	465	441	432	404		
Resident GRP (Local)	8,166	8,288	8,140	8,337	8,485	7,603	190,249	189,646	179,886	177,180	177,334	154,624	0.7%	-4.5%
Rank	40	41	39	39	39	37	51	50	48	43	39	32		
Industry GRP (Local)	4,775	4,789	4,692	4,804	4,864	3,924	111,244	109,572	103,702	102,085	101,666	79,799	0.2%	-9.6%
Rank	73	72	71	70	70	69	145	144	146	158	132	157		
Headline GRP	5,327	5,452	5,607	5,793	5,903	6,056	124,102	124,757	123,917	123,114	123,365	123,161	2.8%	2.2%

- Notes:
- (1) All years stated above are fiscal year ending.
 - (2) Figures for wages/salaries include superannuation supplements.
 - (3) Figures for disposable income (less depreciation expense) include imputed income from ownership of dwellings.
 - (4) Figures for Resident GRP (Local) are per working age population and figures for Industry GRP (Local) are per industry employee. Both are at Factor Cost.
 - (5) \$m cvm = \$ million chain volume measure, which is flows of constant 2016-2017 value converted from current values by the ABS using their chain volume methodology.

SOCIAL SECURITY		
	% Pop	Australian Average
Youth Allowance – Other (share of 16-21 years)	3.5%	4.6%
Youth Allowance – Student/Apprentice (share of 16-21 years)	23.0%	9.1%
Newstart Allowance (share of 22-64 years)	3.6%	4.9%
Age pension (share of 65+)	68.3%	59.8%

Cash Benefits Share of Disposable Income	Share	Rank
2019	7.9	425
2018	8.4	419
2017	8.8	405
2016	9.8	393
2015	10.0	401
2014	10.2	398
2013	10.3	387
2012	10.5	362
2011	11.0	354

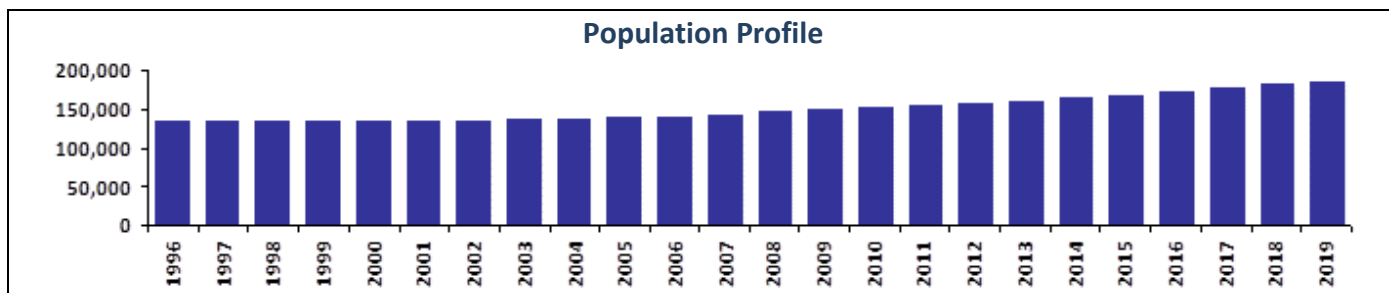
POPULATION CHANGE				
	2004	2009	2014	2019
Age 0-19	21.7%	21.0%	20.9%	20.9%
Age 20-29	17.2%	19.3%	19.3%	17.6%
Age 30-54	36.2%	36.4%	37.6%	39.9%
Age 55+	24.9%	23.2%	22.3%	21.6%
Age 0-19		330	544	858
Age 20-29		1,076	517	173
Age 30-54		977	1,392	2,401
Age 55+		111	344	657
Average Annual Growth		1.7%	1.8%	2.4%



TEMPERATURE AND RAINFALL											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Temperature (Average (C))	15	16	15	15	16	16	15	16	16	16	16
Rank	389	383	414	413	400	410	413	397	377	389	383
Rainfall (mm)	344	523	801	671	472	512	451	467	627	520	431
Rank	419	334	254	319	315	321	328	362	304	281	324

Note: Temperature is the average minimum and maximum for each day in the year.

POPULATION																				
	Number ('000s)																			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Population	135	136	136	137	138	139	141	144	146	150	152	154	157	160	164	168	172	177	182	185



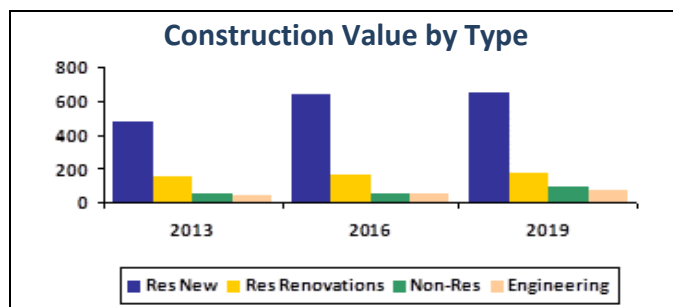
HOUSEHOLD WEALTH & DEBT									
Indicator	Year			Rank			%Rank 1		
	2011	2016	2019	2011	2016	2019	2011	2016	2019
Wealth per Household (\$cvm '000s)	838	821	896	95	89	91	15.4%	18.3%	19.7%
Value of Property and Unincorporated Business	796	816	889	59	60	60	19.0%	27.9%	29.3%
Value of Financial Assets	248	237	245	429	407	360	9.6%	9.9%	6.8%
Value of Household Liabilities	206	232	237	171	142	166	15.8%	23.9%	23.3%
Disposable Income after Debt Service Costs	102	102	110	474	465	397	21.4%	11.8%	9.9%
Household Debt Service Ratio	21%	20%	19%	38	35	89	37.0%	40.3%	35.6%
Household Debt to Gross Income Ratio	1.65	1.91	1.84	47	32	102	36.8%	40.2%	36.3%

HOUSING										
Housing Indicator	1991.3	1996.3	2001.3	2006.3	2011.2	2016.2	2019.2	2006.3 Rank	2019.2 Rank	Annual Growth 2006-2019
Average established dwelling price (\$cvm '000s)	193.62	185.77	360.35	426.65	619.78	643.46	721.49	104	60	4.21%
Average adjusted household income per occupied dwelling	56,253	62,002	69,982	85,409	98,396	95,737	101,616	473	419	1.37%
Ratio of adjusted dwelling price to adjusted average household disposable income	3.44	3.00	5.15	5.00	6.30	6.72	7.10	70	38	2.80%
Average household income from labour market catchment	53,611	60,833	66,391	83,404	91,533	82,096	79,348	159	125	-0.39%
Ratio of average mortgage costs on established dwellings to average household catchment income	38.0%	25.3%	34.9%	36.5%	48.7%	42.9%	49.5%	191	94	2.42%
Ratio of average mortgage costs on new dwellings to average household catchment income	55.5%	38.5%	34.6%	33.3%	35.9%	27.4%	28.6%	422	427	-1.17%
Ratio of new construction cost to established dwelling	114.6%	120.0%	81.4%	75.0%	61.5%	52.8%	54.0%	508	521	-2.54%
Share of flats in dwelling stock	17.5%	18.2%	17.7%	19.1%	18.9%	25.1%	29.6%	54	34	3.50%
Ratio of houses in new dwelling approvals	n/a	49.4%	45.6%	42.1%	34.1%	21.3%	25.0%	500	537	-4.02%
Adults per occupied dwelling	2.19	2.15	2.10	2.09	2.15	2.18	2.15	183	136	0.24%

CONSTRUCTION									
	2010 -2012	2013	2014	2015	2016	2017	2018	2019	Percentage Increase 2014-2016 to 2017-2019
Value \$m cvm per annum									
Residential New Construction	384	476	499	516	640	662	631	655	18%
Residential Renovations	153	155	164	161	166	184	173	182	10%
Non Residential	94	63	57	58	63	66	89	103	45%
Engineering	47	52	51	51	62	75	95	84	56%
Total	678	746	771	785	931	987	988	1,024	21%
Value per capita \$cvm									
Residential New Construction	2,486	2,973	3,039	3,072	3,714	3,741	3,470	3,549	10%
Residential Renovations	989	968	1,002	957	962	1,041	950	985	2%
Non Residential	611	390	347	345	367	371	491	559	34%
Engineering	302	326	310	301	359	426	524	454	45%
Total	4,388	4,656	4,697	4,675	5,402	5,578	5,434	5,547	12%
Rank (value per capita)									
Residential New Construction	154	97	102	97	73	66	86	79	
Residential Renovations	384	323	331	373	439	360	415	417	
Non Residential	447	422	418	415	434	439	400	362	
Engineering	527	532	529	528	520	511	504	502	
Total	474	442	423	420	346	332	371	337	

Note: (1) Percentage increase represents the increase (or decrease) of the last three years average when compared to the average of the three years prior to those.

LOCAL GOVERNMENT RATES AND GRANTS			
	Region (2018)	Australia (2018)	Rank
Rates (\$m cvm)	124.08	17831.1	27
General Purpose Grants (\$m cvm)	4.39	1635.6	99
Roads Grants (\$m cvm)	0.92	714.0	288
All Grants to Rates Ratio	0.043	0.132	464
Rates per Population	672.37	704.1	373
General Purpose Grants per Population	23.79	64.6	429
Roads Grants per Population	4.97	28.2	534



EMPLOYED, HOURS WORKED AND INCOME (UR=Place of Residence, POW=Place of Work)										
Indicator	Year					Rank				
	1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
UR Employment	57,488	61,326	72,660	82,691	102,455	44	45	43	35	28
UR Hours (1000 hours)	102,219	105,819	120,842	136,418	166,584	43	45	46	37	29
UR Income (\$m cvm)	3,114	3,711	4,975	6,232	6,446	53	53	45	38	36
POW Employment	35,765	36,669	40,306	42,924	49,173	69	73	77	76	74
POW Hours (1000 hours)	63,613	63,157	66,287	69,956	78,689	68	72	76	77	70
POW Income (\$m cvm)	1,894	2,159	2,510	2,841	2,766	74	74	83	85	80
UR Average Weekly Hours/Employment	34.2	33.2	32.0	31.7	31.3	342	355	415	401	374
UR Average Hourly Rate/Employment (\$cvm)	30.5	35.1	41.2	45.7	38.7	435	394	237	176	229
POW Average Weekly Hours/Employment	34.2	33.1	31.6	31.3	30.8	328	337	398	373	358
POW Average Hourly Rate/Employment (\$cvm)	29.8	34.2	37.9	40.6	35.2	441	413	329	295	284

INDUSTRY GROUPS											
		Place of Residence (UR) Employment					Place of Work (POW) Employment				
		1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
A	Agriculture, Forestry & Fishing	166	131	131	183	196	82	74	64	75	64
B	Mining	74	89	117	206	103	9	12	13	13	3
C	Manufacturing	8,828	7,358	6,741	5,639	6,975	8,673	7,352	6,288	4,892	4,991
D	Electricity, Gas, Water & Waste Services	309	385	690	795	1,076	75	83	107	116	179
E	Construction	3,177	3,735	4,868	5,685	6,190	2,288	3,188	4,137	4,086	4,716
F	Wholesale Trade	2,733	2,838	3,023	2,684	2,973	2,399	2,466	2,475	1,924	1,738
G	Retail Trade	6,046	6,397	6,790	7,439	10,359	4,324	4,562	4,785	5,000	5,980
H	Accommodation & Food Services	3,622	4,018	5,006	6,436	8,155	1,658	1,781	2,241	2,992	3,385
I	Transport, Postal & Warehousing	3,154	3,229	3,952	4,181	5,140	1,149	1,263	1,511	1,576	1,809
J	Information Media & Telecoms	1,862	2,060	2,299	2,628	3,395	261	282	330	474	619
K	Financial & Insurance Services	2,717	3,051	3,702	4,018	4,970	585	553	579	522	561
L	Rental, Hiring & Real Estate Services	652	798	941	1,032	1,250	395	476	552	585	630
M	Prof, Scientific & Technical Services	4,363	5,145	6,815	8,758	8,813	1,561	1,626	1,970	2,370	2,538
N	Administrative & Support Services	2,102	2,937	2,791	3,130	3,060	806	1,008	1,005	1,191	1,043
O	Public Administration & Safety	3,136	3,518	4,823	5,562	8,281	1,651	1,783	2,154	2,288	2,991
P	Education & Training	4,949	5,751	7,313	9,111	11,602	2,864	3,118	3,624	4,391	5,215
Q	Health Care & Social Assistance	5,771	6,111	7,951	9,806	13,041	4,321	4,545	5,529	7,071	8,292
R	Arts & Recreation Services	1,123	1,289	1,995	2,382	2,453	483	512	747	929	1,032
S	Other Services	2,703	2,487	2,710	3,016	4,424	2,180	1,985	2,198	2,430	3,387
Z	TOTAL	57,488	61,326	72,660	82,691	102,455	35,765	36,669	40,306	42,924	49,173
Z1	Hi Tech	7,240	7,495	8,792	10,312	10,380	3,039	2,950	3,111	3,182	3,271
Z2	Hi Income	8,364	9,709	12,380	14,817	15,740	2,495	2,564	2,994	3,399	3,570
Z3	Infrastructure Services	11,843	13,152	17,259	21,299	27,096	7,667	8,175	9,899	12,391	14,540

SHIFT SHARE DECOMPOSITION OF RESIDENT EMPLOYMENT, HOURS AND INCOME												
Indicator	2003-2011				2011-2019				Change in shift 2011-2019 : 2003-2011			
	Per cent				Per cent				Per cent			
	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change
Hourly Rate	2.5	0.1	0.5	3.1	-1.2	0.1	-0.1	-1.2	-3.7	0.0	-0.6	-4.3
Hours Worked per annum	0.0	-0.1	0.3	0.7	0.5	0.0	0.5	0.8	0.5	0.1	0.2	0.1
Income per annum	2.3	0.0	0.9	3.8	-0.8	0.2	0.2	-0.5	-3.0	0.2	-0.6	-4.3

CONSUMPTION														
Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth
Consumption (\$m cvm)	4,929	4,976	4,742	4,541	4,750	4,774	5,007	5,238	5,404	5,409	5,137	5,407	5,689	1.2%
– Per Cap (\$cvm)	34,990	34,627	32,377	30,250	31,198	30,948	31,896	32,680	32,934	32,222	29,815	30,550	31,305	-0.9%
– Per Cap Rank	354	379	432	475	463	480	469	460	456	477	504	504	497	0

E.6 Nillumbik (S)

LABOUR FORCE													
	Number ('000s)						Percentage Change					% p.a. growth	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
Population	63.4	63.7	64.2	64.6	64.9	65.1	0.4%	0.8%	0.7%	0.5%	0.2%	0.6%	0.3%
No. Households	20.1	20.2	20.3	20.5	20.6	20.7	0.6%	0.6%	0.7%	0.6%	0.5%	0.6%	0.6%
NIEIR Workforce	37.9	38.1	38.1	39.0	39.6	40.4	0.5%	-0.1%	2.5%	1.4%	2.0%	1.0%	1.7%
NIEIR Employment	36.4	36.4	36.7	37.7	38.2	39.1	0.1%	0.6%	2.8%	1.5%	2.4%	1.2%	1.9%
NIEIR Unemployment	1.5	1.7	1.4	1.4	1.3	1.2	8.7%	-14.3%	-3.7%	-1.6%	-9.4%	-3.5%	-5.6%

UNEMPLOYMENT AND UNDER EMPLOYMENT													
	Percentage						Percentage Point Change					Average % Point Change p.a.	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
NIEIR U/E Rate	4.0%	4.4%	3.7%	3.5%	3.4%	3.0%	0.3	-0.6	-0.2	-0.1	-0.4	-0.2	-0.2
Headline U/E Rate	2.6%	3.0%	2.5%	2.4%	2.4%	2.0%	0.4	-0.5	-0.1	0.0	-0.4	-0.1	-0.2
NIEIR Structural U/E Rate	3.6%	3.7%	3.5%	3.4%	3.3%	3.2%	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1
Social Security Take-up	5.0%	5.1%	4.8%	4.6%	4.4%	4.2%	0.1	-0.3	-0.2	-0.2	-0.2	-0.1	-0.2
Hours Per Week ⁽¹⁾	25.9	26.0	26.2	26.9	27.1	27.3	0.1	0.2	0.7	0.2	0.2	0.4	0.2
Not Employed Share ⁽¹⁾	16.3%	15.8%	15.2%	12.8%	12.1%	9.8%	-0.5	-0.6	-2.4	-0.7	-2.3	-1.2	-1.5
Not In Employment ⁽¹⁾	31.9%	31.6%	31.0%	29.1%	28.6%	28.1%	-0.3	-0.6	-1.9	-0.5	-0.5	-0.9	-0.5

Note: (1) Relative to Working Age Population, Not in Employment is based on FTE.

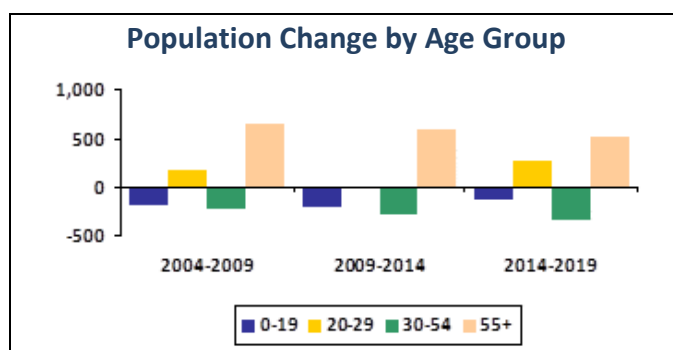
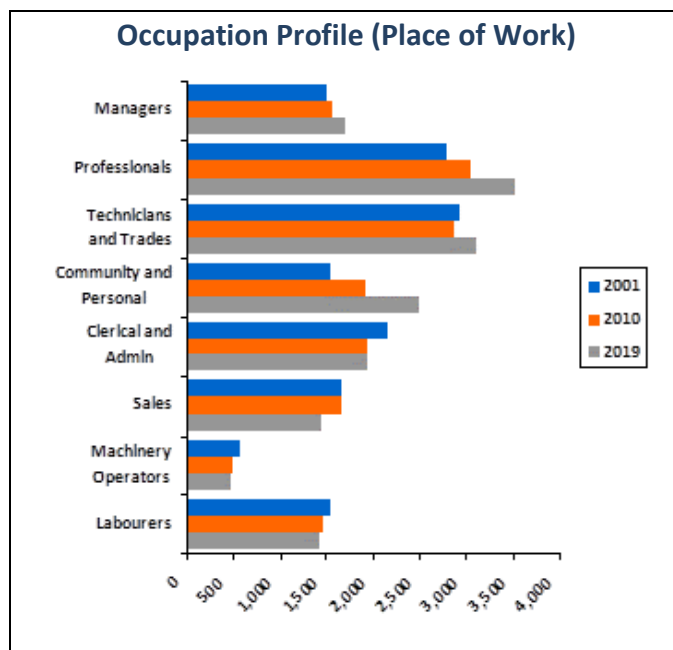
INCOME FLOWS & PRODUCTIVITY														
	Level \$m cvm						Per Capita \$cvm						% p.a. Growth of Level	
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014 -2017	2017 -2019
Wages/Salaries	2,162	2,158	2,204	2,294	2,355	2,436	34,091	33,897	34,339	35,506	36,262	37,439	2.0%	3.0%
Taxes Paid	573	608	671	681	707	772	9,030	9,554	10,459	10,539	10,894	11,862	5.9%	6.5%
Benefits	312	314	312	281	277	271	4,912	4,930	4,858	4,353	4,273	4,167	-3.4%	-1.8%
Business Income	352	331	393	301	299	297	5,543	5,191	6,116	4,651	4,599	4,562	-5.1%	-0.6%
Interest Paid	224	210	190	185	189	193	3,535	3,302	2,963	2,856	2,911	2,966	-6.3%	2.3%
Property Income	461	464	482	468	469	474	7,275	7,290	7,506	7,241	7,229	7,285	0.5%	0.6%
Disposable Income	3,136	3,103	3,214	3,160	3,190	3,232	49,445	48,727	50,088	48,905	49,129	49,683	0.3%	1.1%
Rank	107	111	108	110	109	108	232	267	259	263	247	231		
Resident GRP (Local)	3,623	3,536	3,443	3,461	3,449	3,021	237,245	232,722	221,833	215,560	211,159	188,258	-1.5%	-6.6%
Rank	102	103	104	102	102	99	16	17	20	20	19	15		
Industry GRP (Local)	1,763	1,724	1,711	1,733	1,749	1,280	115,409	113,438	110,230	107,919	107,050	79,780	-0.6%	-14.0%
Rank	157	160	154	149	149	161	125	124	105	109	88	158		
Headline GRP	1,714	1,799	1,818	1,859	1,915	1,949	112,250	118,423	117,130	115,780	117,219	121,435	2.7%	2.4%

- Notes:
- (1) All years stated above are fiscal year ending.
 - (2) Figures for wages/salaries include superannuation supplements.
 - (3) Figures for disposable income (less depreciation expense) include imputed income from ownership of dwellings.
 - (4) Figures for Resident GRP (Local) are per working age population and figures for Industry GRP (Local) are per industry employee. Both are at Factor Cost.
 - (5) \$m cvm = \$ million chain volume measure, which is flows of constant 2016-2017 value converted from current values by the ABS using their chain volume methodology.

SOCIAL SECURITY		
	% Pop	Australian Average
Youth Allowance – Other (share of 16-21 years)	0.9%	4.6%
Youth Allowance – Student/Apprentice (share of 16-21 years)	5.2%	9.1%
Newstart Allowance (share of 22-64 years)	1.9%	4.9%
Age pension (share of 65+)	43.4%	59.8%

Cash Benefits Share of Disposable Income	Share	Rank
2019	8.4	413
2018	8.7	410
2017	8.9	400
2016	9.7	396
2015	10.1	398
2014	9.9	415
2013	9.6	411
2012	9.4	398
2011	8.9	422

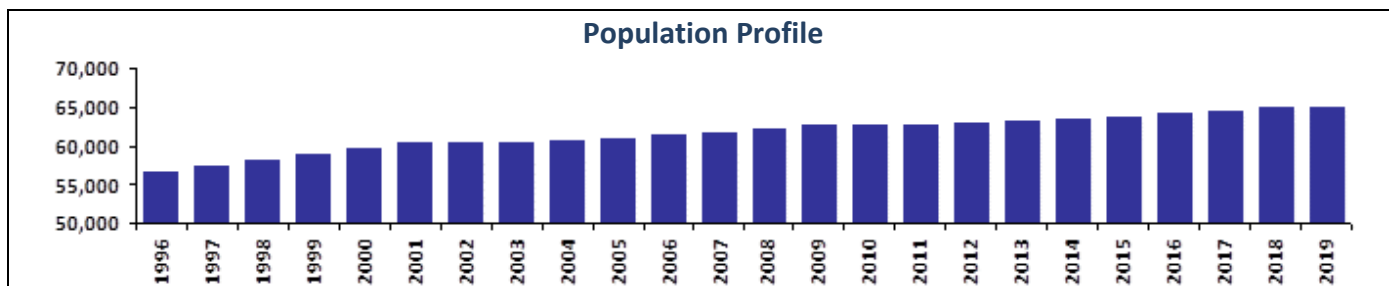
POPULATION CHANGE				
	2004	2009	2014	2019
Age 0-19	32.0%	29.4%	27.6%	26.0%
Age 20-29	11.2%	12.2%	12.1%	13.8%
Age 30-54	40.4%	37.4%	34.8%	31.4%
Age 55+	16.4%	20.9%	25.4%	28.7%
Age 0-19		-181	-192	-123
Age 20-29		176	3	264
Age 30-54		-212	-279	-327
Age 55+		638	597	511
Average Annual Growth		0.7%	0.2%	0.5%



TEMPERATURE AND RAINFALL											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Temperature (Average (C))	14	15	14	14	14	15	14	15	14	15	15
Rank	465	449	455	457	463	457	467	465	460	454	458
Rainfall (mm)	541	823	1,222	973	615	720	626	682	746	778	664
Rank	281	133	100	146	214	189	224	213	229	131	168

Note: Temperature is the average minimum and maximum for each day in the year.

POPULATION																				
	Number ('000s)																			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Population	60	60	61	60	61	61	62	62	62	63	63	63	63	63	63	64	64	65	65	65



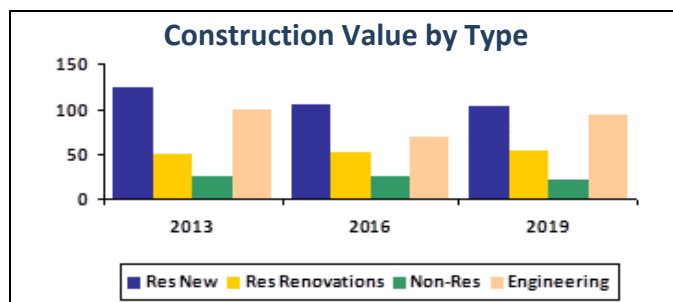
HOUSEHOLD WEALTH & DEBT									
Indicator	Year			Rank			%Rank 1		
	2011	2016	2019	2011	2016	2019	2011	2016	2019
Wealth per Household (\$cvm '000s)	1,053	1,043	1,166	50	60	49	19.3%	23.3%	25.6%
Value of Property and Unincorporated Business	841	866	981	41	55	46	20.1%	29.6%	32.3%
Value of Financial Assets	508	494	509	75	65	66	19.8%	20.6%	14.2%
Value of Household Liabilities	297	317	324	44	46	47	22.7%	32.7%	31.8%
Disposable Income after Debt Service Costs	156	158	156	106	163	139	32.8%	18.2%	14.2%
Household Debt Service Ratio	19%	17%	17%	106	124	160	33.6%	34.7%	32.7%
Household Debt to Gross Income Ratio	1.58	1.71	1.75	81	91	149	35.3%	36.0%	34.5%

HOUSING										
Housing Indicator	1991.3	1996.3	2001.3	2006.3	2011.2	2016.2	2019.2	2006.3 Rank	2019.2 Rank	Annual Growth 2006-2019
Average established dwelling price (\$cvm '000s)	270.60	277.99	409.39	522.06	654.30	684.44	813.14	53	43	3.54%
Average adjusted household income per occupied dwelling	107,117	106,217	118,410	133,531	154,961	149,207	148,308	141	139	0.83%
Ratio of adjusted dwelling price to adjusted average household disposable income	2.53	2.62	3.46	3.91	4.22	4.59	5.48	136	77	2.69%
Average household income from labour market catchment	44,730	50,889	54,085	66,839	74,262	68,039	65,743	280	232	-0.13%
Ratio of average mortgage costs on established dwellings to average household catchment income	63.7%	45.2%	48.7%	55.8%	63.4%	55.0%	67.4%	60	26	1.49%
Ratio of average mortgage costs on new dwellings to average household catchment income	84.8%	58.7%	60.2%	63.8%	67.0%	54.7%	57.6%	64	66	-0.80%
Ratio of new construction cost to established dwelling	102.9%	100.1%	100.6%	94.9%	85.8%	81.2%	63.4%	391	501	-3.11%
Share of flats in dwelling stock	1.0%	2.8%	4.6%	2.2%	2.0%	2.9%	3.3%	431	407	3.22%
Ratio of houses in new dwelling approvals	n/a	92.0%	97.8%	87.4%	73.9%	66.5%	37.3%	285	517	-6.46%
Adults per occupied dwelling	2.38	2.31	2.34	2.34	2.37	2.38	2.43	58	48	0.29%

CONSTRUCTION									
	2010 -2012	2013	2014	2015	2016	2017	2018	2019	Percentage Increase 2014-2016 to 2017-2019
Value \$m cvm per annum									
Residential New Construction	121	124	113	96	105	116	117	103	7%
Residential Renovations	51	51	53	50	53	58	53	55	6%
Non Residential	37	27	22	26	26	30	30	23	12%
Engineering	82	99	86	81	70	70	96	94	9%
Total	291	300	274	253	253	274	296	275	8%
Value per capita \$cvm									
Residential New Construction	1,926	1,961	1,779	1,505	1,633	1,803	1,804	1,587	6%
Residential Renovations	814	803	832	792	823	893	820	848	5%
Non Residential	585	420	347	402	400	459	456	346	10%
Engineering	1,306	1,570	1,362	1,280	1,092	1,079	1,478	1,444	7%
Total	4,630	4,754	4,319	3,979	3,947	4,234	4,558	4,225	6%
Rank (value per capita)									
Residential New Construction	222	198	232	294	257	217	233	240	
Residential Renovations	483	428	442	482	494	451	474	482	
Non Residential	451	408	417	398	421	393	411	442	
Engineering	421	407	406	399	417	414	376	352	
Total	454	435	454	465	460	441	442	432	

Note: (1) Percentage increase represents the increase (or decrease) of the last three years average when compared to the average of the three years prior to those.

LOCAL GOVERNMENT RATES AND GRANTS			
	Region (2018)	Australia (2018)	Rank
Rates (\$m cvm)	57.14	17831.1	99
General Purpose Grants (\$m cvm)	1.93	1635.6	294
Roads Grants (\$m cvm)	1.12	714.0	248
All Grants to Rates Ratio	0.053	0.132	432
Rates per Population	878.28	704.1	269
General Purpose Grants per Population	29.60	64.6	418
Roads Grants per Population	17.25	28.2	414



EMPLOYED, HOURS WORKED AND INCOME (UR=Place of Residence, POW=Place of Work)										
Indicator	Year					Rank				
	1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
UR Employment	32,258	34,602	36,415	36,398	39,139	82	87	90	96	95
UR Hours (1000 hours)	55,654	57,999	58,410	58,710	64,193	85	88	95	101	96
UR Income (\$m cvm)	2,120	2,360	2,627	2,839	2,631	76	86	91	98	100
POW Employment	14,895	14,103	14,528	15,272	16,050	138	153	165	169	167
POW Hours (1000 hours)	24,689	22,466	21,810	22,934	24,396	147	161	175	172	175
POW Income (\$m cvm)	799	781	853	978	890	148	166	179	175	177
UR Average Weekly Hours/Employment	33.2	32.2	30.8	31.0	31.5	445	461	508	466	339
UR Average Hourly Rate/Employment (\$cvm)	38.1	40.7	45.0	48.4	41.0	193	231	144	139	154
POW Average Weekly Hours/Employment	31.9	30.6	28.9	28.9	29.2	503	507	522	514	481
POW Average Hourly Rate/Employment (\$cvm)	32.4	34.8	39.1	42.6	36.5	324	398	285	239	257

INDUSTRY GROUPS											
		Place of Residence (UR) Employment					Place of Work (POW) Employment				
		1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
A	Agriculture, Forestry & Fishing	458	310	242	239	335	454	283	228	203	250
B	Mining	63	64	104	207	171	0	0	12	19	8
C	Manufacturing	4,067	4,187	3,497	2,943	3,127	969	839	680	565	561
D	Electricity, Gas, Water & Waste Services	238	280	319	364	438	62	64	87	112	79
E	Construction	2,844	3,539	4,324	4,586	4,973	2,318	2,310	2,140	2,453	2,594
F	Wholesale Trade	1,751	1,744	1,858	1,652	1,287	379	326	376	320	223
G	Retail Trade	3,575	3,908	3,776	3,451	3,744	2,068	1,998	1,916	1,742	1,737
H	Accommodation & Food Services	1,297	1,506	1,585	1,614	1,817	1,054	1,039	1,146	1,285	1,420
I	Transport, Postal & Warehousing	1,168	1,222	1,359	1,317	1,599	338	297	318	337	379
J	Information Media & Telecoms	840	857	798	766	863	126	104	114	139	133
K	Financial & Insurance Services	1,422	1,408	1,419	1,349	1,608	263	222	222	205	231
L	Rental, Hiring & Real Estate Services	426	476	497	531	563	268	268	257	242	229
M	Prof, Scientific & Technical Services	2,736	2,945	3,178	3,228	3,026	1,152	1,025	1,160	1,245	1,151
N	Administrative & Support Services	950	1,100	1,070	1,096	942	495	516	503	531	435
O	Public Administration & Safety	1,382	1,636	2,027	2,133	2,622	421	438	563	642	733
P	Education & Training	3,372	3,573	3,881	4,083	4,656	1,826	1,815	2,010	2,157	2,393
Q	Health Care & Social Assistance	3,671	3,853	4,351	4,563	4,731	1,456	1,415	1,543	1,694	1,892
R	Arts & Recreation Services	566	591	727	882	873	405	405	493	578	599
S	Other Services	1,434	1,403	1,402	1,394	1,764	842	740	760	803	1,000
Z	TOTAL	32,258	34,602	36,415	36,398	39,139	14,895	14,103	14,528	15,272	16,050
Z1	Hi Tech	4,209	4,435	4,365	4,230	4,101	1,389	1,224	1,314	1,351	1,234
Z2	Hi Income	4,784	5,062	5,294	5,381	5,336	1,559	1,388	1,525	1,633	1,552
Z3	Infrastructure Services	7,608	8,017	8,959	9,528	10,260	3,687	3,635	4,046	4,428	4,885

SHIFT SHARE DECOMPOSITION OF RESIDENT EMPLOYMENT, HOURS AND INCOME												
Indicator	2003-2011				2011-2019				Change in shift 2011-2019 : 2003-2011			
	Per cent				Per cent				Per cent			
	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change
Hourly Rate	2.5	0.1	-0.6	2.0	-1.2	0.1	-0.3	-1.4	-3.7	-0.1	0.3	-3.4
Hours Worked per annum	0.0	-0.1	-0.2	0.1	0.5	0.0	0.7	0.9	0.5	0.1	0.9	0.8
Income per annum	2.3	-0.1	-0.7	2.1	-0.8	0.1	0.2	-0.6	-3.0	0.2	0.9	-2.7

CONSUMPTION														
Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth
Consumption (\$m cvm)	1,888	1,929	1,912	1,935	2,077	2,995	2,758	2,179	2,218	3,162	3,569	3,941	3,913	6.3%
– Per Cap (\$cvm)	30,689	31,177	30,661	30,821	33,051	47,756	43,823	34,488	34,971	49,664	55,617	60,982	60,253	5.8%
– Per Cap Rank	464	469	478	461	422	206	256	419	400	210	181	158	173	0

E.7 Whittlesea (C)

LABOUR FORCE													
	Number ('000s)						Percentage Change					% p.a. growth	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
Population	187.9	196.8	207.1	215.7	223.3	229.7	4.8%	5.2%	4.2%	3.5%	2.9%	4.7%	3.2%
No. Households	60.5	63.4	66.4	69.0	71.3	73.7	4.9%	4.8%	3.8%	3.3%	3.4%	4.5%	3.4%
NIEIR Workforce	97.7	102.9	106.7	113.2	117.7	120.6	5.4%	3.6%	6.1%	4.0%	2.4%	5.1%	3.2%
NIEIR Employment	88.4	92.6	97.6	104.5	109.0	113.2	4.8%	5.4%	7.0%	4.4%	3.8%	5.7%	4.1%
NIEIR Unemployment	9.3	10.3	9.1	8.7	8.7	7.4	11.4%	-12.0%	-3.6%	-0.7%	-14.7%	-1.9%	-7.9%

UNEMPLOYMENT AND UNDER EMPLOYMENT													
	Percentage						Percentage Point Change					Average % Point Change p.a.	
	2014	2015	2016	2017	2018	2019	2014 to 2015	2015 to 2016	2016 to 2017	2017 to 2018	2018 to 2019	2014 -2017	2017 -2019
NIEIR U/E Rate	9.5%	10.0%	8.5%	7.7%	7.4%	6.1%	0.5	-1.5	-0.8	-0.3	-1.2	-0.6	-0.8
Headline U/E Rate	7.1%	8.2%	7.1%	6.7%	6.5%	5.5%	1.1	-1.1	-0.4	-0.2	-1.0	-0.1	-0.6
NIEIR Structural U/E Rate	9.4%	9.2%	8.5%	8.0%	7.6%	7.2%	-0.2	-0.7	-0.5	-0.4	-0.4	-0.5	-0.4
Social Security Take-up	12.1%	12.1%	11.5%	10.9%	10.3%	9.6%	0.0	-0.6	-0.6	-0.6	-0.7	-0.4	-0.7
Hours Per Week ⁽¹⁾	21.8	21.9	22.1	22.6	22.6	22.4	0.1	0.2	0.5	0.0	-0.2	0.3	-0.1
Not Employed Share ⁽¹⁾	30.8%	30.3%	29.7%	27.6%	26.7%	25.2%	-0.4	-0.6	-2.2	-0.9	-1.5	-1.1	-1.2
Not In Employment ⁽¹⁾	42.6%	42.3%	41.8%	40.5%	40.5%	41.1%	-0.3	-0.5	-1.3	0.0	0.6	-0.7	0.3

Note: (1) Relative to Working Age Population, Not in Employment is based on FTE.

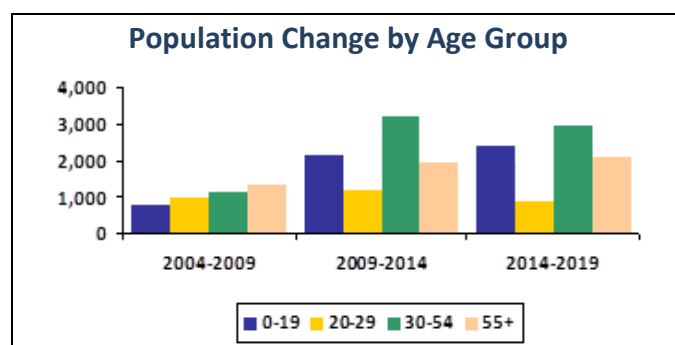
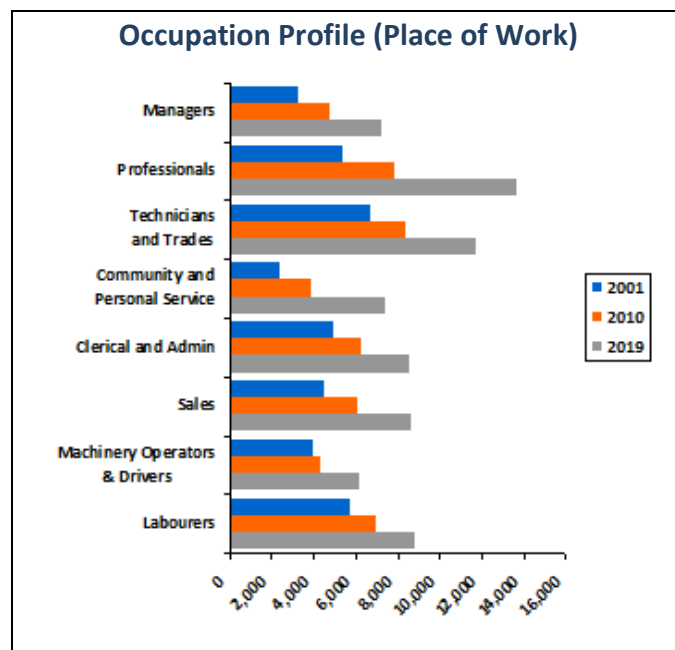
INCOME FLOWS & PRODUCTIVITY														
	Level \$m cvm						Per Capita \$cvm						% p.a. Growth of Level	
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	2014 -2017	2017 -2019
Wages/Salaries	4,597	4,804	5,013	5,347	5,599	5,801	24,465	24,407	24,211	24,789	25,072	25,249	5.2%	4.2%
Taxes Paid	1,006	1,139	1,164	1,327	1,406	1,533	5,355	5,785	5,623	6,151	6,298	6,674	9.7%	7.5%
Benefits	758	806	866	900	888	868	4,035	4,092	4,184	4,174	3,976	3,776	5.9%	-1.8%
Business Income	681	680	354	640	663	647	3,627	3,452	1,708	2,965	2,970	2,815	-2.1%	0.6%
Interest Paid	525	503	475	473	507	518	2,795	2,558	2,292	2,191	2,272	2,255	-3.5%	4.7%
Property Income	861	931	919	954	983	1,013	4,582	4,732	4,439	4,424	4,404	4,408	3.5%	3.0%
Disposable Income	6,689	6,999	6,929	7,596	7,823	7,975	35,601	35,555	33,466	35,219	35,029	34,714	4.3%	2.5%
Rank	44	42	46	37	37	36	488	494	503	499	497	494		
Resident GRP (Local)	7,113	7,188	7,114	7,375	7,592	6,828	128,751	122,175	113,672	111,297	110,078	94,359	1.2%	-3.8%
Rank	52	52	50	48	47	46	136	151	160	151	142	135		
Industry GRP (Local)	4,982	5,115	5,118	5,291	5,451	4,698	90,178	86,939	81,774	79,848	79,036	64,927	2.0%	-5.8%
Rank	68	69	68	66	64	60	359	379	409	399	367	334		
Headline GRP	6,339	6,764	7,087	7,374	7,627	7,876	114,750	114,968	113,246	111,275	110,591	108,848	5.2%	3.4%

- Notes:
- (1) All years stated above are fiscal year ending.
 - (2) Figures for wages/salaries include superannuation supplements.
 - (3) Figures for disposable income (less depreciation expense) include imputed income from ownership of dwellings.
 - (4) Figures for Resident GRP (Local) are per working age population and figures for Industry GRP (Local) are per industry employee. Both are at Factor Cost.
 - (5) \$m cvm = \$ million chain volume measure, which is flows of constant 2016-2017 value converted from current values by the ABS using their chain volume methodology.

SOCIAL SECURITY		
	% Pop	Australian Average
Youth Allowance – Other (share of 16-21 years)	3.1%	4.6%
Youth Allowance – Student/Apprentice (share of 16-21 years)	13.8%	9.1%
Newstart Allowance (share of 22-64 years)	4.3%	4.9%
Age pension (share of 65+)	68.6%	59.8%

Cash Benefits Share of Disposable Income	Share	Rank
2019	10.9	350
2018	11.4	341
2017	11.9	319
2016	12.5	317
2015	11.5	354
2014	11.3	359
2013	10.9	361
2012	11.2	335
2011	11.5	336

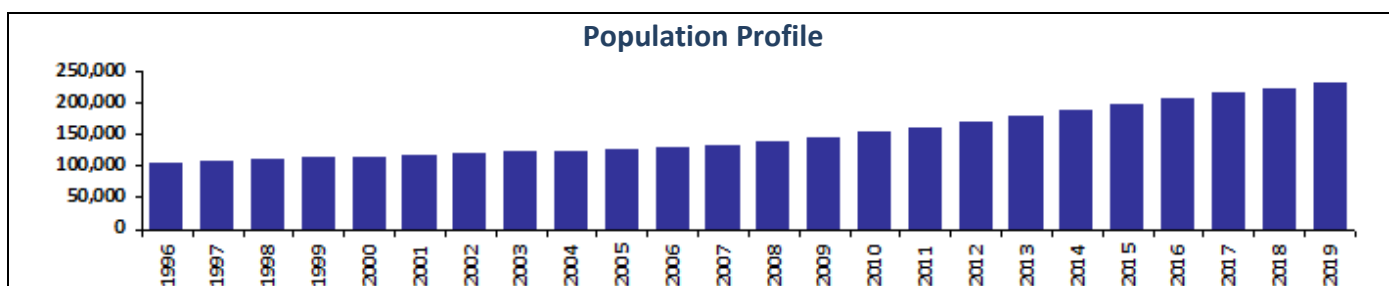
POPULATION CHANGE				
	2004	2009	2014	2019
Age 0-19	29.2%	27.6%	27.2%	27.5%
Age 20-29	15.0%	16.3%	15.8%	14.9%
Age 30-54	37.4%	35.8%	36.2%	36.0%
Age 55+	18.4%	20.3%	20.9%	21.6%
Age 0-19		812	2,169	2,411
Age 20-29		1,012	1,209	917
Age 30-54		1,173	3,175	2,960
Age 55+		1,345	1,938	2,082
Average Annual Growth		3.3%	5.3%	4.1%



TEMPERATURE AND RAINFALL											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Temperature (Average (C))	13	13	12	12	13	13	13	14	13	13	13
Rank	492	502	516	512	494	505	501	506	508	499	500
Rainfall (mm)	476	797	1,115	891	614	678	503	605	738	713	464
Rank	326	144	144	161	216	209	281	254	234	154	304

Note: Temperature is the average minimum and maximum for each day in the year.

POPULATION																				
	Number ('000s)																			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Population	114	117	120	122	124	126	128	133	138	145	153	161	170	179	188	197	207	216	223	230



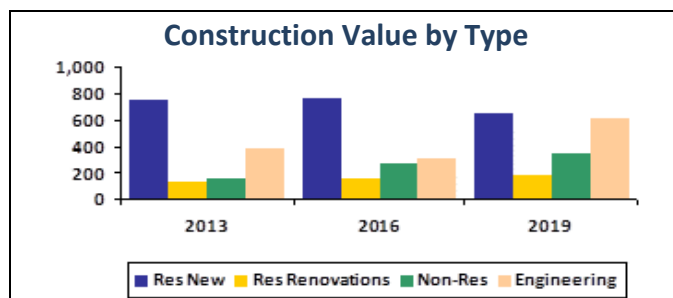
HOUSEHOLD WEALTH & DEBT									
Indicator	Year			Rank			%Rank 1		
	2011	2016	2019	2011	2016	2019	2011	2016	2019
Wealth per Household (\$cvm '000s)	608	541	668	200	254	156	11.2%	12.1%	14.7%
Value of Property and Unincorporated Business	577	554	688	114	128	97	13.8%	19.0%	22.7%
Value of Financial Assets	228	188	187	470	488	468	8.9%	7.8%	5.2%
Value of Household Liabilities	197	202	207	191	195	218	15.1%	20.8%	20.3%
Disposable Income after Debt Service Costs	111	104	109	417	454	408	23.3%	12.0%	9.8%
Household Debt Service Ratio	20%	18%	17%	98	102	169	33.8%	35.8%	32.2%
Household Debt to Gross Income Ratio	1.49	1.67	1.63	129	115	204	33.2%	35.1%	32.2%

HOUSING										
Housing Indicator	1991.3	1996.3	2001.3	2006.3	2011.2	2016.2	2019.2	2006.3 Rank	2019.2 Rank	Annual Growth 2006-2019
Average established dwelling price (\$cvm '000s)	193.76	173.52	260.58	345.73	450.10	446.44	568.28	165	98	3.97%
Average adjusted household income per occupied dwelling	90,146	86,716	92,445	100,559	113,528	102,928	103,588	341	404	0.23%
Ratio of adjusted dwelling price to adjusted average household disposable income	2.15	2.00	2.82	3.44	3.96	4.34	5.49	175	76	3.73%
Average household income from labour market catchment	47,522	53,389	56,735	70,638	77,164	69,126	66,656	251	227	-0.45%
Ratio of average mortgage costs on established dwellings to average household catchment income	42.9%	26.9%	29.6%	34.9%	42.0%	35.3%	46.4%	212	117	2.26%
Ratio of average mortgage costs on new dwellings to average household catchment income	61.7%	43.2%	36.0%	40.4%	44.5%	36.8%	46.5%	306	137	1.11%
Ratio of new construction cost to established dwelling	115.4%	130.9%	96.4%	93.2%	91.5%	89.6%	89.0%	417	450	-0.36%
Share of flats in dwelling stock	2.8%	3.9%	3.5%	4.6%	4.1%	8.0%	9.6%	275	153	5.95%
Ratio of houses in new dwelling approvals	n/a	88.2%	88.2%	84.9%	84.0%	79.8%	80.1%	309	446	-0.45%
Adults per occupied dwelling	2.49	2.41	2.47	2.35	2.36	2.34	2.34	56	68	-0.03%

CONSTRUCTION									
	2010 -2012	2013	2014	2015	2016	2017	2018	2019	Percentage Increase 2014-2016 to 2017-2019
Value \$m cvm per annum									
Residential New Construction	871	752	638	770	766	666	607	650	-12%
Residential Renovations	131	143	155	155	163	185	174	185	15%
Non Residential	279	161	163	205	276	325	337	351	58%
Engineering	381	382	277	264	317	397	593	611	86%
Total	1,662	1,438	1,233	1,394	1,523	1,572	1,712	1,796	22%
Value per capita \$cvm									
Residential New Construction	5,427	4,193	3,397	3,910	3,700	3,086	2,719	2,828	-22%
Residential Renovations	811	799	826	789	789	856	780	804	1%
Non Residential	1,727	899	865	1,039	1,334	1,506	1,511	1,529	40%
Engineering	2,358	2,131	1,475	1,342	1,533	1,843	2,655	2,657	64%
Total	10,323	8,021	6,563	7,081	7,356	7,291	7,665	7,818	8%
Rank (value per capita)									
Residential New Construction	27	46	80	56	74	95	140	126	
Residential Renovations	484	429	446	486	497	469	491	500	
Non Residential	129	221	231	199	132	113	126	132	
Engineering	295	352	388	385	347	307	241	213	
Total	149	224	294	253	236	210	205	178	

Note: (1) Percentage increase represents the increase (or decrease) of the last three years average when compared to the average of the three years prior to those.

LOCAL GOVERNMENT RATES AND GRANTS			
	Region (2018)	Australia (2018)	Rank
Rates (\$m cvm)	122.91	17831.1	28
General Purpose Grants (\$m cvm)	12.39	1635.6	15
Roads Grants (\$m cvm)	2.11	714.0	93
All Grants to Rates Ratio	0.118	0.132	359
Rates per Population	534.98	704.1	461
General Purpose Grants per Population	53.94	64.6	391
Roads Grants per Population	9.19	28.2	492



EMPLOYED, HOURS WORKED AND INCOME (UR=Place of Residence, POW=Place of Work)										
Indicator	Year					Rank				
	1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
UR Employment	51,164	56,665	69,034	88,397	113,190	54	51	48	27	20
UR Hours (1000 hours)	92,916	99,654	116,328	145,814	183,802	50	48	49	29	20
UR Income (\$m cvm)	2,768	3,243	4,197	5,617	5,887	64	63	64	48	47
POW Employment	35,823	37,907	45,742	55,244	72,358	68	71	63	54	49
POW Hours (1000 hours)	64,879	65,729	75,898	89,268	113,360	65	67	61	56	50
POW Income (\$m cvm)	1,991	2,181	2,793	3,486	3,757	70	72	69	67	58
UR Average Weekly Hours/Employment	34.9	33.8	32.4	31.7	31.2	261	280	383	402	380
UR Average Hourly Rate/Employment (\$cvm)	29.8	32.5	36.1	38.5	32.0	451	476	428	361	365
POW Average Weekly Hours/Employment	34.8	33.3	31.9	31.1	30.1	276	316	373	390	423
POW Average Hourly Rate/Employment (\$cvm)	30.7	33.2	36.8	39.0	33.1	407	450	383	348	342

INDUSTRY GROUPS											
		Place of Residence (UR) Employment					Place of Work (POW) Employment				
		1999	2004	2009	2014	2019	1999	2004	2009	2014	2019
A	Agriculture, Forestry & Fishing	654	500	424	514	820	769	642	592	767	1,213
B	Mining	57	45	91	217	199	123	104	110	115	155
C	Manufacturing	12,488	12,105	11,122	10,981	13,258	10,004	9,400	8,864	8,441	9,761
D	Electricity, Gas, Water & Waste Services	385	498	762	1,118	1,498	430	547	699	720	827
E	Construction	3,624	4,824	7,170	9,590	11,919	3,293	3,736	6,148	6,206	9,241
F	Wholesale Trade	2,756	2,966	3,547	3,803	3,922	2,363	2,421	2,697	2,857	3,572
G	Retail Trade	6,309	7,306	8,529	10,579	13,446	3,948	4,550	5,754	7,674	9,686
H	Accommodation & Food Services	2,567	3,032	3,699	5,027	6,358	1,483	1,710	2,216	3,150	3,954
I	Transport, Postal & Warehousing	3,091	3,454	4,797	6,513	9,334	1,174	1,345	1,804	2,541	3,536
J	Information Media & Telecoms	1,102	1,118	1,261	1,557	1,983	225	218	262	386	461
K	Financial & Insurance Services	2,141	2,200	2,663	3,303	4,516	418	388	503	704	1,053
L	Rental, Hiring & Real Estate Services	499	655	873	1,163	1,465	269	342	445	584	707
M	Prof, Scientific & Technical Services	2,250	2,423	3,199	4,449	5,168	758	787	1,018	1,508	1,842
N	Administrative & Support Services	1,495	1,954	2,433	3,282	3,394	791	992	1,251	1,738	1,762
O	Public Administration & Safety	1,984	2,424	3,504	4,641	6,491	1,027	1,182	1,519	1,861	2,786
P	Education & Training	2,304	2,842	3,960	5,898	8,268	3,098	3,501	4,188	5,365	7,608
Q	Health Care & Social Assistance	4,536	5,142	7,249	10,936	14,480	3,855	4,156	5,429	7,889	10,621
R	Arts & Recreation Services	564	650	839	1,185	1,237	359	431	576	701	609
S	Other Services	2,361	2,526	2,913	3,640	5,432	1,436	1,457	1,667	2,038	2,962
Z	TOTAL	51,164	56,665	69,034	88,397	113,190	35,823	37,907	45,742	55,244	72,358
Z1	Hi Tech	6,020	6,406	6,984	7,921	9,187	3,723	3,587	3,706	3,968	4,468
Z2	Hi Income	5,085	5,538	7,119	9,532	11,592	1,591	1,632	2,115	2,964	3,674
Z3	Infrastructure Services	7,403	8,634	12,048	18,019	23,985	7,312	8,089	10,193	13,954	18,839

SHIFT SHARE DECOMPOSITION OF RESIDENT EMPLOYMENT, HOURS AND INCOME												
Indicator	2003-2011				2011-2019				Change in shift 2011-2019 : 2003-2011			
	Per cent				Per cent				Per cent			
	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change	National Shift	Industry Shift	Regional Shift	Total Change
Hourly Rate	2.5	-0.5	0.1	2.1	-1.2	0.0	-0.5	-1.7	-3.7	0.5	-0.6	-3.8
Hours Worked per annum	0.0	0.2	-0.3	0.2	0.5	-0.2	0.3	0.4	0.5	-0.4	0.6	0.1
Income per annum	2.3	-0.4	-0.2	2.3	-0.8	0.0	-0.4	-1.3	-3.0	0.4	-0.2	-3.6

CONSUMPTION														
Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth
Consumption (\$m cvm)	3,355	3,888	4,303	4,306	4,591	4,619	4,802	5,278	5,375	5,701	5,912	6,152	6,034	5.0%
– Per Cap (\$cvm)	26,112	29,246	31,081	29,606	30,065	28,727	28,248	29,442	28,608	28,961	28,554	28,522	27,018	0.3%
– Per Cap Rank	530	507	467	491	495	519	518	512	516	513	516	515	524	0

COMPARISON OF SELECTED SOR INDICATORS FOR MELBOURNE'S NORTH – 2019

(UR = Place of Residence, POW = Place of Work)

Indicator	Banyule	Darebin	Hume	Mitchell	Moreland	Nillumbik	Whittlesea	Melbourne Metro
Population	130.6	162.8	233.1	46	184.5	65.1	229.7	4975
Population % p.a. Growth (2017-2019)	0.6%	1.3%	4.1%	3.5%	2.1%	0.3%	3.2%	2.1%
NIEIR Employment	71	87.1	104.9	21	102.5	39.1	113.2	2591
NIEIR Unemployment	3.4	5.1	12.7	1.9	7.4	1.2	7.4	183.6
Disposable Income Per Capita \$cvm	46,593	40,306	31,145	35,114	41,136	49,683	34,714	41,836
Resident GRP (Local) Per Capita \$cvm	112,694	106,958	50174	102,364	154,624	188,258	94,359	73,470
Headline GRP Per Capita \$cvm	117,489	121,076	111,380	115,955	123,161	121,435	108,848	131,705
Cash benefits share of disposable income (%)	10.7	8.7	11.6	16.1	7.9	8.4	10.9	10.3
Wealth per Household (\$cvm '000s)	1075	930	602	524	896	1166	668	1023
Average established dwelling price (\$cvm '000s)	779.64	759.07	528.99	421.5	721.49	813.14	568.28	764.14
Average adjusted household income per occupied dwelling	118,841	98,843	98,307	95,906	101,616	148,308	103,588	110,025
Ratio of average mortgage costs on established dwellings to average household catchment income	57.9%	54.2%	38.9%	66.5%	49.5%	67.4%	46.4%	56.2%
Ratio of average mortgage costs on new dwellings to average household catchment income	42.8%	34.3%	40.6%	73.1%	28.6%	57.6%	46.5%	44.0%
Ratio of new construction cost to established dwelling	64.0%	49.6%	90.4%	96.2%	54.0%	63.4%	89.0%	67.8%
Share of flats in dwelling stock	14.1%	28.5%	7.3%	4.7%	29.6%	3.3%	9.6%	22.5%
UR Employment	71,018	87,111	104,897	21,046	102,455	39,139	113,190	2,591,469
POW Employment	49,489	60,395	125,357	12,696	49,173	16,050	72,358	2,668,543
UR Employment ('000)								
A Agriculture, Forestry & Fishing	304	387	468	685	196	335	820	18,815
B Mining	205	129	252	149	103	171	199	6,438
C Manufacturing	5,186	6,043	12,710	2,271	6,975	3,127	13,258	244,981
D Electricity, Gas, Water & Waste Services	672	929	1,306	295	1,076	438	1,498	29,324
E Construction	6,167	5,610	8,191	2,451	6,190	4,973	11,919	209,398
F Wholesale Trade	2,191	2,325	3,794	750	2,973	1,287	3,922	100,797
G Retail Trade	6,619	8,947	13,045	2,075	10,359	3,744	13,446	294,529
H Accommodation & Food Services	3,433	6,634	5,742	1,407	8,155	1,817	6,358	156,317
I Transport, Postal & Warehousing	3,001	3,776	11,774	1,863	5,140	1,599	9,334	143,794
J Information Media & Telecoms	1,795	2,808	1,596	215	3,395	863	1,983	65,311
K Financial & Insurance Services	3,685	4,576	3,831	438	4,970	1,608	4,516	133,789
L Rental, Hiring & Real Estate Services	1,102	1,170	1,012	237	1,250	563	1,465	46,070
M Prof, Scientific & Technical Services	6,405	7,148	4,967	720	8,813	3,026	5,168	230,732
N Administrative & Support Services	1,805	2,642	3,432	564	3,060	942	3,394	78,265
O Public Administration & Safety	5,455	6,534	7,051	2,326	8,281	2,622	6,491	149,429
P Education & Training	8,472	9,835	7,016	1,382	11,602	4,656	8,268	222,917
Q Health Care & Social Assistance	10,278	12,151	11,847	1,980	13,041	4,731	14,480	306,198
R Arts & Recreation Services	1,478	1,978	1,395	266	2,453	873	1,237	47,295
S Other Services	2,762	3,492	5,469	973	4,424	1,764	5,432	107,070
Z TOTAL	71,018	87,111	104,897	21,046	102,455	39,139	113,190	2,591,469
Z1 Hi Tech	7,928	8,434	7,921	1,401	10,380	4,101	9,187	303,672
Z2 Hi Income	11,393	13,308	10,990	1,599	15,740	5,336	11,592	415,196
Z3 Infrastructure Services	20,228	23,964	20,258	3,628	27,096	10,260	23,985	576,410

COMPARISON OF SELECTED SOR INDICATORS FOR MELBOURNE'S NORTH – 2019 (continued)

(UR = Place of Residence, POW = Place of Work)

Indicator	Banyule	Darebin	Hume	Mitchell	Moreland	Nillumbik	Whittlesea	Melbourne Metro
POW Employment ('000)								
A Agriculture, Forestry & Fishing	108	202	771	627	64	250	1,213	18,972
B Mining	34	192	148	61	3	8	155	6,063
C Manufacturing	3,078	6,355	23,332	668	4,991	561	9,761	245,310
D Electricity, Gas, Water & Waste Services	118	273	1,740	85	179	79	827	30,685
E Construction	4,447	4,693	15,974	1,748	4,716	2,594	9,241	258,032
F Wholesale Trade	909	2,594	5,262	238	1,738	223	3,572	103,960
G Retail Trade	5,033	8,574	10,953	1,398	5,980	1,737	9,686	294,591
H Accommodation & Food Services	2,604	3,925	5,739	1,291	3,385	1,420	3,954	157,521
I Transport, Postal & Warehousing	929	2,197	25,811	540	1,809	379	3,536	148,369
J Information Media & Telecoms	372	744	863	56	619	133	461	66,887
K Financial & Insurance Services	665	1,112	1,029	135	561	231	1,053	134,873
L Rental, Hiring & Real Estate Services	518	860	1,293	89	630	229	707	45,390
M Prof, Scientific & Technical Services	2,591	2,832	2,272	332	2,538	1,151	1,842	236,164
N Administrative & Support Services	1,160	1,513	3,277	307	1,043	435	1,762	78,323
O Public Administration & Safety	2,925	3,940	6,955	1,745	2,991	733	2,786	156,648
P Education & Training	5,616	8,654	7,539	1,318	5,215	2,393	7,608	225,064
Q Health Care & Social Assistance	15,538	7,544	6,648	1,436	8,292	1,892	10,621	304,159
R Arts & Recreation Services	708	961	990	157	1,032	599	609	48,413
S Other Services	2,133	3,229	4,762	465	3,387	1,000	2,962	109,118
Z TOTAL	49,489	60,395	125,357	12,696	49,173	16,050	72,358	2,668,543
Z1 Hi Tech	3,385	4,084	9,085	393	3,271	1,234	4,468	308,039
Z2 Hi Income	3,847	4,826	5,141	639	3,570	1,552	3,674	420,982
Z3 Infrastructure Services	21,862	17,159	15,177	2,911	14,540	4,885	18,839	577,636
Consumption Per Cap (\$cvm)	48,421	38,101	26,236	30,219	31,305	60,253	27,018	39,903
Value per capita \$cvm								
Residential New Construction	2,656	2,365	4,012	4,697	3,549	1,587	2,828	4,052
Residential Renovations	972	982	765	910	985	848	804	935
Non Residential	1,071	696	1,952	946	559	346	1,529	2,229
Engineering	2,006	836	3,937	3,398	454	1,444	2,657	2,693
Total	6,705	4,879	10,666	9,951	5,547	4,225	7,818	9,909

E.8 Indicator explanations

Regional indicators

Population

Residential population by region is taken from the *ABS estimated resident population* (ERP) series. The 2019 population was derived from household growth for 2017-19 and constrained to 2019 state population growth. The 2019 household total was derived, by increasing the 2018 household total, by the number of dwelling approvals.

Number of households

The number of households per region uses the *ABS Censuses* for 2011 and 2016. From the 2016 benchmark, new residential building approvals data is used to grow the stock of houses in a region. This data is provided by the ABS and reported quarterly. If however, the new building approvals data is added to the stock in 2016 an over estimation will occur, due to the demolition of old houses. Therefore, National Economics uses estimated demolition rates to ensure no double counting occurs.

Workforce

Before 2015 the workforce was based on NIEIR's unemployment level, plus employment based on the tax statistics. This is driven forward using a measure of the labour force adjusted for the movement of people from the workforce to Disability Support Pensions (DSP). The labour force estimates are produced by the *Department of Jobs and Small Business*. The information is contained in the *Small Area Labour Markets* publication that is produced quarterly. The labour force is defined as the yearly average level for 2009 to 2019. The average *Department of Jobs and Small Business* figure is added to the excess movement to disability support pensions. Excess movement is defined as any growth in excess of the rate of growth in the general population. It is therefore assumed that there is a natural level of people (expressed as a percentage of the population) who need to access the DSP. The DSP data is ascertained from the Department of Social Security. The rationale for adding in people who move from unemployment benefits to disability support is to measure the real labour force. If a person is receiving unemployment benefits, they are counted as part of the labour force: however, when people move from unemployment benefits to the DSP they are excluded. This impacts on the unemployment rate, which is defined as the number of unemployed divided by the labour force.

Employment

Before 2015 this was based on the tax statistics adjusted to NIEIR definitions. This National Economics' measure of employment is the adjusted labour force as defined above, minus the estimated National Economics unemployment level. This means that since some unemployed people will be working a small number of hours; the NIEIR employment estimates exclude those employees who are on benefits while working a small number of hours.

NIEIR unemployment

This is derived from unemployment numbers from the *Department of Jobs and Small Business* and the excess disability figure discussed above; it combines the official definitions of unemployed with an adjustment for any excess shift to DSP.

Social security take-up

This is a National Economics' measure derived from social security data. It includes all people aged 16 to 64 years receiving Newstart Allowance, DSP, Parenting Payment – Single, and Youth Allowance for non-students/apprentices. It is expressed as a percentage of the population aged 16 to 64 years.

Headline unemployment

This is the unemployment rate produced by the *Department of Jobs and Small Business*. Their *Small Area Labour Markets* publication contains estimates of employment, labour force participation, unemployment and the unemployment rate by Statistical Local Areas (SLAs). NIEIR makes additional adjustments to the data to smooth the series. Hence, it is designated the headline unemployment rate to denote that it is not exactly equal to the *Department of Jobs and Small Business* series.

NIEIR structural unemployment

This is a measure of the level of long-term unemployed as a percentage of the NIEIR workforce. It includes all those classified as long-term unemployed, those receiving disability support pensions, 50 per cent of people from a non-English speaking background receiving Newstart allowance, 50 per cent of people receiving single parents' benefits and all people receiving the mature age allowance. This measure excludes people on short-term Newstart allowance and anyone receiving youth allowance. It therefore assumes that none of the youth are structurally unemployed.

Hours per week per working age population

This is a measure of the amount of work available relative to the number of people available to work. In effect it is a measure of underemployment in that a low ratio indicates that the adult population is under-utilised in an employment sense.

Not-employed share of working age population

This is a simple measure of those not in employment, as per the NIEIR Employment definition, as a proportion of the working age population.

Not in employment share of working age population (Full Time Equivalent)

This is similar to the above measure but the employment definition is adjusted to Full Time Equivalent and hence adjusts, over time, for shifts in the part-time/full-time balance.

Income flows and productivity

Source: ATO Taxation Statistics, National Accounts Data

This data uses National Accounts definitions. All state totals are reconciled to the household accounts in the Australian Bureau of Statistics' *"State Accounts"*.

The household disposable income indicator for each region is household disposable income from wages and salaries (including supplements, e.g. superannuation contributions) plus benefits and business income (adjusted to gross operating surplus basis consistent with the State Accounts) and interest and dividends received (including superannuation accrued earnings) and rent income less direct taxes, interest paid and depreciation expenses. The ABS 'other income' is treated as a balancing item. All data are in real dollars, which for this year are in 2016-17 prices.

To 2015-16 all data was derived from the postcode tax statistics. The data is estimated for subsequent years using the following series:

- wages/salaries;
- taxes paid;
- benefits;
- business income; and
- property income.

Wages/salaries

The following dot points outline the calculation of the non-farm components of wages and salaries income:

- recent growth in income from taxation records provides the trend in income per person that can be expected in each region. This measure is required due to the very large differences in wage growth at the regional level;
- growth in employment at the local area level is combined with growth in income per employee and the base levels of income from Taxation Statistics to produce updates of income at the regional level;
- state and national account control totals are then used to balance wages and income growth; and
- as with all information collected from Taxation Statistics the data is converted from postcode definitions to ABS regions using the postcode to Local Government Area concordance derived from the latest available census.

Again, farm income is estimated using rainfall data as a proxy for the impact of drought on regional incomes. The change in rainfall from long-term average is used as a basis for allocating farm income on a regional basis. Farm income cannot be derived from declared taxable income from primary production due to problems of declaration and the transfer of losses between tax years. Instead, the NIEIR estimate is based on the most recent measure of gross agricultural output converted to a realised income measure consistent with the national accounts. This process accounts for differences in the relative income-generating capacity of various agricultural activities. By varying the incomes derived by our estimate of the impact of drought we obtain a reasonably accurate distribution of incomes.

Taxes paid

This total income tax paid is the net tax paid after deductions and rebates. It includes the Medicare levy as well as the additional Medicare levy for high-income taxpayers. The 2018 and 2019 figures have been estimated using 2017 state control totals and the estimates of income created earlier.

Benefits

This figure is an estimate of the total amount of government benefits as defined in the National Accounts, received at the local level. The Local Area distribution of the National Accounts data is estimated utilising the postcode distribution of Commonwealth benefits sourced from the Australian Taxation Office publication *Taxation Statistics* and a population component to capture those not required to submit tax returns.

Business income

The business income for a region is effectively based on the value of the businesses that operate in the region and the relative performance of the economy as a whole. Unfortunately net business income as reported in *Taxation Statistics* does not adequately capture the total impact of business income. National Economics utilises small area micro-simulation of the value of unincorporated businesses based on realised cash flows. Using state control totals and the estimated value of business assets the destination of business income can be adequately measured. The changes in business income reflect both the evolution of business values through time as well as the macro-economic trends captured in economy-wide reported values of business income.

Interest paid

The amount of interest paid by the household sector is a function of the stock of debt, the nature of the debt and interest rates applied. In order to keep abreast of the impacts that the rising level of household debt in the late 1990's National Economics developed a Household Debt Model which estimates the impact of debt at the local level. One of the measures derived from this model is the amount of interest paid by the household sector on debt. The debts incurred in running unincorporated businesses are not included but are used in estimating net business income as presented in the table. The debt included covers housing, personal finance and credit card debt. These model estimates are balanced to state and national control totals automatically.

Property income

Net property income is derived from Taxation Statistics and balanced to state control totals. This small measure cannot be updated at the local level and hence National Economics relies on state trends to derive the recent year estimates.

Household disposable income

The household disposable income estimates are benchmarked to the ABS net (that is after depreciation) household disposable income estimates in ABS State Accounts.

This means an estimate for superannuation supplements is added to wages. Also required (other than what has been outlined above) are estimates for:

- imputed owner occupier rental income; and
- depreciation.

Imputed owner occupier rental income is based on the value of owner occupied property in a region. State totals for the depreciation of household assets are allocated to LGAs on the basis of a weighted average of the replacement value of the dwelling stock by LGA and the market value of the dwelling stock, and aggregated to regions.

Resident GRP (local)

Gross regional product or value added (GRP) comprises wages and salaries plus business income. Local GRP excludes the gross surplus of companies, since this is difficult to allocate to any small geographic area. This estimate is on a residential basis and hence represents value added by the businesses in which the residents work rather than value added by businesses located in the region.

Place of work (industry) GRP (local)

Resident GRP is here re-allocated to the region of each resident's workplace according to the commuting patterns documented in the 2016 Census Journey to Work tables.

Headline Gross Regional Product

Headline Gross Regional Product (GRP) is a measure of size or net wealth generated by the region's economy. Changes in this figure over time can represent changes in employment, productivity or the types of industries in the area. This figure is benchmarked to the National Accounts as produced by the ABS. NIEIR's methodology establishes GRP levels based on the strength of JTW income by industry for the region. The methodology allocates much of the mining activity to the production region and limits head office activity to professional service GRP rates when they are away from the production regions. Similar rules apply to Construction and Tourism related industries.

Social Security

Source: Department of Social Services

Summarised from data published by the Department of Social Services.

Cash Benefits Share of Disposable Income

This is simply benefits as a percentage of disposable income. Both components are parts of the Income Flows Table data discussed above.

Population change

Source: ABS Census

Based on ABS Census and on National Economics' population and migration modelling program called PopInfo.

Temperature

Source: Commonwealth Bureau of Meteorology, National, Climate Centre.

Numbers given are the average minimum and maximum daily temperature for meteorological stations in the region. NB: as with all other series in this report, averages are for financial years.

Rainfall

Source: Commonwealth Bureau of Meteorology, National, Climate Centre, Australian Monthly Rainfall.

Specially requested monthly rainfall data from each available Australian weather station is assigned into the appropriate region and then totalled and averaged to generate the average annual rainfall for each region. As for all other series in this report, rainfall is for financial years.

Population

Source: ABS Estimated regional population

The ABS publication provides regional and state estimates to 2017. Figures for 2018 and 2019 are NIEIR estimates.

Household wealth and debt

All wealth and debt estimates are benchmarked back to the ABS Australian National Accounts – Financial Accounts and National ABS estimates for dwelling stock and value of unincorporated business assets.

National financial assets are divided into two types, namely direct income generating financial assets and financial assets on which an imputed income is added to household income, namely superannuation assets for working households. Direct financial assets are allocated to LGAs on the basis of the Taxation Statistics' interest received data.

Imputed financial assets are allocated to LGAs using micro-simulation modelling based on the ABS Household Income Survey (HES) unit record data. The same procedure is adopted for allocating household total liabilities. For the benchmark years, e.g. 2016, a key Census variable in the micro-simulation modelling is household mortgage debt service costs.

The value of unincorporated business assets is derived from the SOR LGA business income estimates, which in turn are based on the Taxation Statistics and ABS State Income Accounts. The value of housing is based on property values outlined below and Census benchmarks for average rent paid by renters. The rental property is allocated back to the LGA of the owners based on rental income estimates, which in turn is derived from Tax Statistics.

The wealth indicator in the tables is equal to value of dwellings owned by residents of an LGA plus holdings of financial assets less stock of household liabilities.

The household debt service ratio equals interest paid on debt plus 0.07 of the outstanding stock of liabilities to allow for repayments divided by disposable income.

The household income measure used for the debt to income ratio is household disposable income plus depreciation plus interest paid.

Engineering and residential renovation, new residential and, non-residential construction

Source: ABS publication 8731.0 – Building Approvals Australia

Building approvals data is converted to constant price values. Forecasts are derived using National Economics construction models.

Shift share decomposition of resident employment and local gross product – resident

The aggregate national effect measures the change in an industry indicator at the regional level on the assumption that this indicator grew at the same rate as the national indicator when aggregated across all industries.

The national industry shift measures the change in the industry indicator for a region on the basis of the differential growth between the industry indicator at the national level and the overall aggregate growth for the indicator (that is across all industries) at the national level. If the national industry growth of the indicator is less than the overall growth of the indicator then the effect at the regional level will be negative.

The regional competitive shift measures the change in the indicator at the regional level due to the differential growth between the industry growth for the region and the industry growth at the national level. If the last term is positive, it means that the growth of the indicator at the regional level for industry *i* is greater than the national growth of the indicator for industry *i*. That is, the region is exhibiting (for whatever reason) greater competitiveness in growing the industry compared to the national average industry growth benchmark.

Consumption

Consumption is defined as in the ABS National Accounts, state accounts. NIEIR has allocated state consumption, as estimated by the ABS, to regions according to regional population characteristics and incomes, using micro-simulation methodology based on the Household Expenditure Survey.

Housing

Source: RP Data; various derived statistics on dwellings and income.

The average value of dwellings is the average value of dwellings sold in the region (both houses and flats) as reported by RP Data. The data has been deflated by the National Accounts consumption deflator.

The ratio of average dwelling price to household income is calculated using average household disposable income for the region, plus interest paid less the surplus from dwelling ownership.

The mortgage burden on average dwelling purchase is derived from the ratio of average dwelling price to average cash household income less direct tax by assuming that a household purchases a dwelling at the average regional price financed by a mortgage at the current mortgage interest rate with a deposit of 25 per cent of value. The mortgage thus calculated is reported as a percentage of average household income for the region.

Greenfield construction costs have been calculated separately for houses and apartments from approvals data at the LGA level, in both cases with the addition of allowance for land costs. Apartment and house costs are averaged using weights, which reflect the prominence of each in the approvals data. The average cost so calculated is divided by the RESI average value of all dwellings sold in the region.

The mortgage burden on new construction is derived from greenfield construction costs using the same methodology as for the ratio of mortgage payments to disposable income for the average house purchase.

Adult population per dwelling derives from the ABS Estimated regional populations, projected by NIEIR to 2019.

Resident and place of work employment and income

For sources for resident employment see above. Place of work employment is modelled using the journey to work matrix derived from the 2016 Census. Please note that UR is place of residence, and POW is place of work.

Hours and dollars per hour

The starting point for estimating hours and dollars per hour is the estimation of hours and dollars per hour at the 1-digit ANZSIC 2006 level at the state/territory level. This is done by deriving total hours worked per quarter, by industry and state/territory from the ABS Labour Force Bulletin. The wages and salaries plus mixed income series are tables from the ABS Annual State Accounts Bulletin, converted to \$/hour by dividing by the estimates of total hours worked by industry. The annual series have then been converted to quarterly series by ensuring that the total industry quarterly estimates sum to state wages and salaries plus mixed income series from the ABS Quarterly State Accounts.

Hours of work by industry and dollars per hours at the LGA level for usual residents were estimated from a countrywide calculation, per quarter, where the LGA hours and \$/hour column income constraints were derived as outlined above. The row constraints were the state industry totals as outlined above. There were also group LGA constraints imposed at the 1-digit industry level derived from the quarterly regional estimates from the ABS Labour Force Bulletin.

The base matrix was derived for 2016.3 from the Census.

Industry estimates of employment hours of work and \$/hour by employment location were obtained by projecting workplace employment from the 2016.3 Census benchmark. Floor-space completion estimates by building type and by LGA were used to update the 2016.3 matrix of employment by location by industry. The employment location estimates were then estimated by 'back engineering' via the updated journey to work matrix based on usual residents, employment, hours and dollars per hour.

Finally, because of the erratic nature of the Labour Force data, five and seven quarter moving averages were passed through the data.

Industry groups

Source: ABS Census data analysed and projected by NIEIR

Industry groups are defined in ANZSIC. Hi tech industries are defined as above. Hi income industries comprise groups B, K, M and N and part of group C (fabricated metals, transport equipment and machinery and equipment). Infrastructure services comprise groups P, Q and R – that is, they cover social infrastructure (health, education and culture) and exclude public administration and physical infrastructure.

UR = usual place of residence as recorded at the Census, as distinct from the location where the person may be recorded (e.g. while on holiday).

POW = usual place of work, i.e. the location of jobs (imputed sign-on points in the case of mobile jobs)

Local government finance

Rate collections were sourced as follows.

NSW: From the Office of Local Government website rate collections for 2017-18.

VIC: Victoria Grants Commission annual report (adjusting the three year average rate revenue to the state control total provided in the ABS government finance statistics).

QLD: Queensland Grants Commission annual report and Queensland Department of Infrastructure, Local Government and Planning.

SA: SA Local Government Grants Commission annual report data for 2017-18.

WA: WA Local Government Grants Commission, "*Balanced Budget*" spreadsheet (adjusting the three year average rate revenue to the state control total provided in the ABS government finance statistics).

TAS: Tasmanian Grants Commission data for 2017-18.

NT: NT Grants Commission annual report, including both municipal and shire rates though the latter are not imposed on property values, data for 2017-18.

ACT: ABS government finance statistics.

In all cases rates were general rates as defined in the sources, including compulsory garbage charges.

Financial assistance grants were sourced from local government grants commission annual reports and/or websites.

Roads to recovery: information on the distribution of Roads to Recovery entitlements by LGA was obtained from the Commonwealth *Department of Infrastructure, Regional Development and Cities* website and pro-rated to the published national total of Roads to Recovery grants.

Regional indicators and data – more indicators and at LGA level

The full online SOR report available from the ALGA website (alga.asn.au) contains a four page indicator set for each SOR region, selected metropolitan cities, Australia and Northern Australia. A similar set of indicator data is also available at LGA level from National Economics (www.nieir.com.au). Enquiries for LGA level data should be directed to Nick Marinopoulos at National Economics. Phone 03 9488 8444 or email nickm@nieir.com.au.

