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ECONOMIC, SOCIAL AND ENVIRONMENTAL PROFILE: SOUTHERN METRO REGION

APRIL 2019

PREPARED FOR:
INFRASTRUCTURE VICTORIA

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ABBREVIATIONS

Abbreviation	Description
AAGR	Average annual growth rate
ABS	Australian Bureau of Statistics
ACSC	Ambulatory Care Sensitive Conditions
AEDC	Australian Early Development Census
ANZSCO	Australian and New Zealand Standard Classification of Occupations
ANZSIC	Australian and New Zealand Standard Industrial Classification
ARI	Annual Recurrence Interval
ASR	Age Standardised Rate
BMO	Bushfire Management Overlay
CBD	Central Business District
CMA	Catchment Management Authority
DBSCAN	Density-based spatial clustering of applications with noise
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DELWP	Department of Environment, Land, Water and Planning
DHHS	Department of Health and Human Services
DOTE	Dropping off the Edge (Jesuit Social Services Report)
DPH	Density Per Hectare
EJD	Economic Jobs Density
EPA	Environmental Protection Agency
ESE	Economic, Social and Environmental
FER	Functional Economic Region
GP	General Practitioner (Medical doctor)
GRP	Gross Regional Product
GVA	Gross Value Added
HA	Hectare
HACC	Home and Community Care Services
HEX	SGS 30-hectare grid model
IT	Information Technology
IV	Infrastructure Victoria
LGA	Local Government Area
LQ	Location Quotient
MAC	Metropolitan Activity Centre
MVCC	Moonee Valley City Council
NEIC	National Economic and Innovation Cluster
NIEIR	National Institute of Economic and industry Research
POW	Place of Work
PSP	Precinct Structure Plan
PTV	Public Transport Victoria
PUR	Place of Usual Residence
SA	Statistical Area
SEIFA	Social and Economic Index for Areas
SSIP	State Significant Industrial Precinct
UGB	Urban Growth Boundary
VIF	Victoria in Future Report
VLUIS	Victorian Land Use Information System
VPA	Victorian Planning Authority
WHO	World Health Organisation

EXECUTIVE SUMMARY

Context

Infrastructure Victoria (IV) is building its understanding of the regional and local trends that influence metropolitan Melbourne's regions. This will:

- inform the 2020 update of the 30-year infrastructure strategy, including IV's ability to spatially target infrastructure investment
- build on the analysis of regional Victoria completed earlier in 2018.

This **Southern Metro Region Economic, Social and Environmental** (ESE) report is one of six for each region of Melbourne, supported by an Inter-regional ESE report and a Functional Economic Region (FER) report that looks beyond administrative boundaries to analyse how Melbourne, as a whole, functions as an economic region.

REPORT PACKAGE

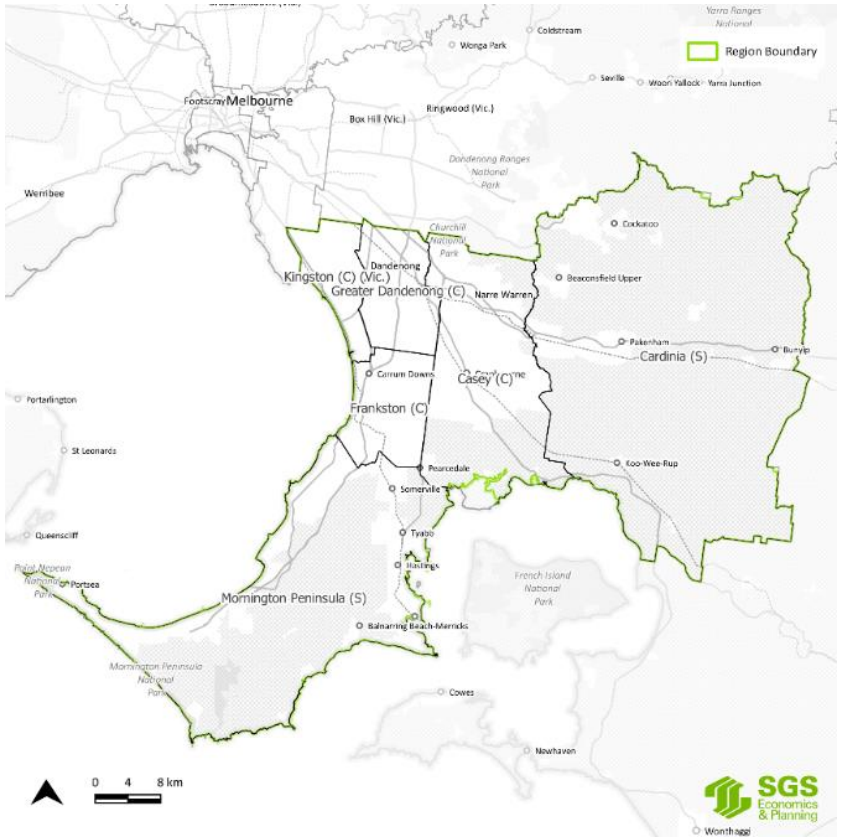
This ESE report looks at overarching drivers of change and how they affect the Southern Metro Region. It measures performance against a range of indicators at varying geographic scales and identifies key characteristics, trends, challenges and opportunities within and across the region. It does not investigate nor provide recommendations on investments or solutions to address these matters.

Southern Metro Region

The Southern Metro Region comprises six local government areas (LGAs): Casey, Frankston, Greater Dandenong, Kingston, Cardinia and Mornington Peninsula.

The region extends from established suburbs of Moorabbin, Springvale and Dandenong, to metropolitan rural areas such as Portsea and Bunyip.

SOUTHERN METRO REGION CONTEXT MAP



Southern Metro Region Summary

HEADLINE STATISTICS		
	Number	%
Population	**1031,000**	**100%**
0-14	207,000	20%
15-39	354,000	34%
40-64	320,000	31%
65+	150,000	15%
Jobs	**412,000**	**100%**
Knowledge	63,000	15%
Health&Edu	82,000	20%
Population	149,000	36%
Industrial	118,000	29%
Land (ha)	**274,000**	**100%**
Residential	42,000	15%
Employment	7,000	3%
Park/Rural	174,000	64%
Other	51,000	19%

Attributes

- The Southern Metro Region features three State significant industrial precincts (SSIPs), the Southern SSIP, Hastings SSIP and the Officer/Pakenham SSIP along with industrial areas around Frankston and Moorabbin Airport - Braeside Industrial Area.
- The region also contains the Dandenong National Innovation and Employment Cluster (NEIC), which has a diverse mix of businesses and emerging strengths in knowledge-intensive and health and education industries.
- The region has a diverse economic base, featuring employment in agriculture, forestry and fishing; manufacturing; wholesale trade; retail trade; health and education; and other services.
- The region contains one of the largest concentrations of employment outside Melbourne CBD, accommodating 123,000 jobs between Dandenong South, Dandenong, Fountain Gate-Narre Warren and Moorabbin Airport. These locations provide employment for many of the region's residents, as well as for residents of the adjoining peri-urban LGAs of Bass Coast and Baw Baw.
- The region contains key transport gateways – the Port of Hastings provides important connections for regional and metropolitan businesses to domestic and international markets while Moorabbin Airport supports more limited passenger and freight movements. Both are within access of the region's primary employment precincts.
- The region includes the South Eastern Growth Corridor, which encompasses large sections of Casey and Cardinia LGAs, and is forecast to continue to accommodate a significant proportion of population growth.
- Existing activity centres at Cheltenham, Moorabbin, Frankston, Cranbourne, Pakenham, Dandenong, Springvale and Keysborough also contain large concentrations of residential areas.
- The region's public transport network is dominated by bus services. Two train lines provide access to and from the Melbourne CBD to Frankston and Dandenong metropolitan activity centres and beyond the Southern Metro Region into Melbourne Metropolitan Rural Areas and the adjoining peri-urban region LGAs.
- The landscape character of the Southern Metro Region is defined by bayside settlements around Port Phillip Bay and the richly fertile soils of the Casey and Cardinia LGAs. In some locations, the quality of the soil (for example, Koo Wee Rup) is of State significance and despite residential encroachment, this region has substantial rural areas.
- Environmentally and culturally significant landscapes abound, from the sought-after beachside towns along the Mornington Peninsula on Port Phillip and Westernport Bay to the Cranbourne Gardens, Bunyip State Park, Emerald hinterland, Cape Schanck, Arthurs Seat and the rolling agricultural lands of Red Hill.
- Key tourist destinations include the beaches of Port Phillip Bay and Westernport Bay, Cranbourne Botanic Garden, McCelland Sculpture Park and Gallery, Myuna Farm, Arthurs Seat, Heronswood and the wineries of the Mornington Peninsula.

Strengths

- Major industrial areas, including the three SSIPs, that contribute to employment and economic activity in the region.
- The Dandenong NEIC, along with the Monash NEIC along the southern boundary of the Eastern Metro Region, provide opportunities for knowledge-intensive jobs.
- People living in Kingston and Greater Dandenong LGAs have access to employment at the Cheltenham-Southland major activity centre, Dandenong NEIC and SSIP, and connections to Melbourne CBD.
- People living in Casey and Cardinia LGAs can access jobs at the Fountain Gate-Narre Warren Metropolitan Activity Centre.
- Gateway transport infrastructure such as Moorabbin Airport and the Port of Hastings.
- Access to significant coastal and inland environmental assets, including those in metropolitan Melbourne's rural areas, as well as peri-urban areas beyond.
- Land available for future urban, industrial and employment uses, particularly in Cardinia and Casey LGAs.

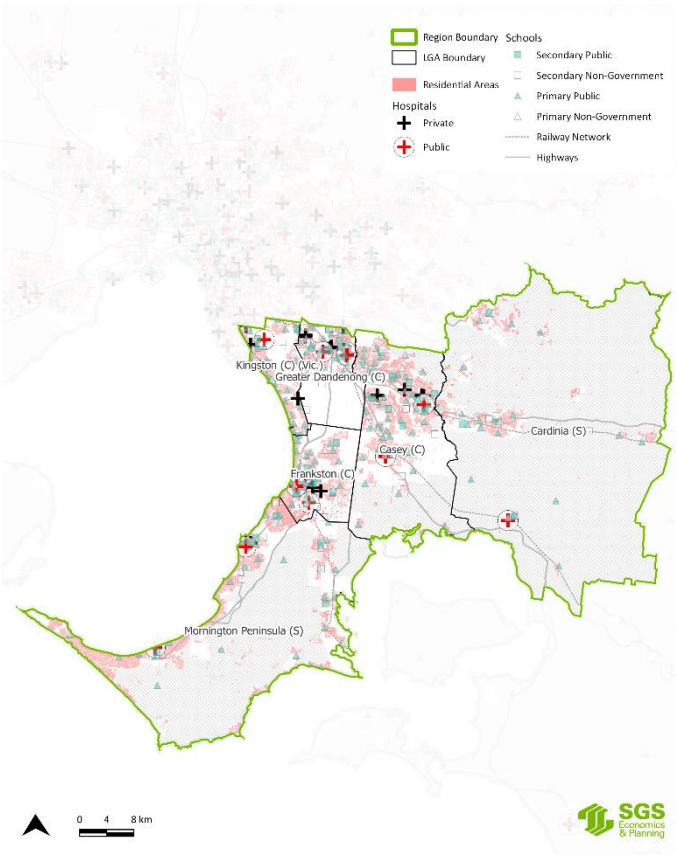
Challenges

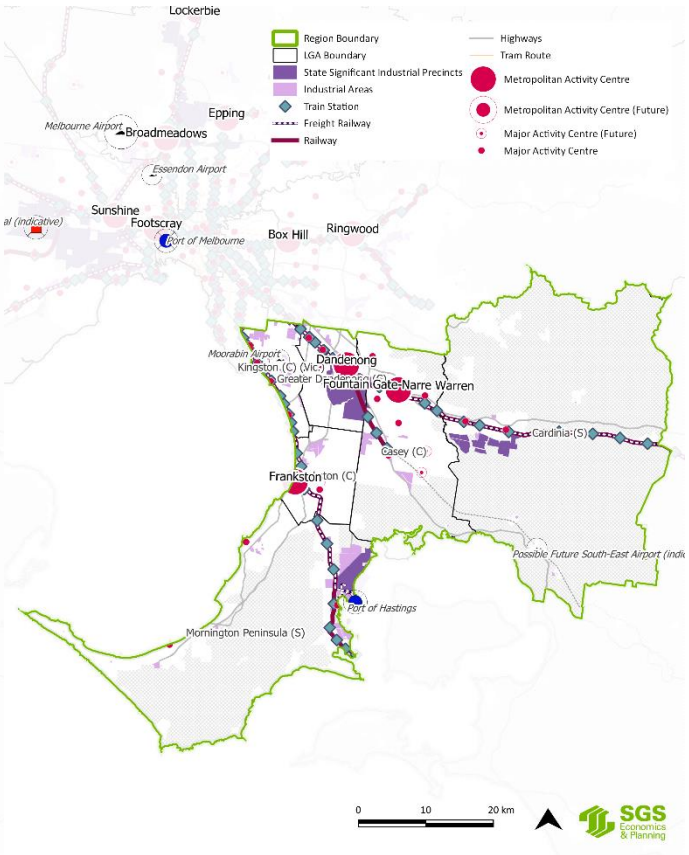
- Vulnerability of workforce in disadvantaged areas due to relatively high unemployment, low skill levels, high youth disengagement, and a low high-school completion rate
- Beyond Kingston and Greater Dandenong LGAs, there is relatively poor accessibility to diverse employment opportunities, especially to knowledge-intensive sectors and particularly in locations away from the Frankston or Cranbourne-Pakenham train lines.
- Poor east-west transport connectivity and limited public transport services to outer suburbs and New Growth Areas such as Cranbourne, Clyde and Clyde North.
- Heavy dependence on buses, with limited access in New Growth Areas
- Poor access to public transport limits accessibility to community and health care services.
- High incidence of housing stress in the City of Greater Dandenong and central parts of the City of Casey.
- Severe socio-economic disadvantage in parts of the region contributing to poor health outcomes and higher rates of mental health issues and drug and alcohol abuse, particularly in Frankston and Greater Dandenong LGAs.
- Limiting risk and impacts of hazards associated with climate change such as fire hazard (Cardinia and Mornington Peninsula LGAs), sea level rise (along Western Port), flood (low lying areas in Greater Dandenong LGA) and heat vulnerability.
- Maintaining and/or improving asset condition including tree canopy cover, waterway health, and atmosphere pollution.
- Managing the impact that economic activity has on the environment, including contaminated sites.
- The presence of open landfills near Springvale and Narre Warren, as well as a concentration of EPA priority sites in the inner areas of the region.

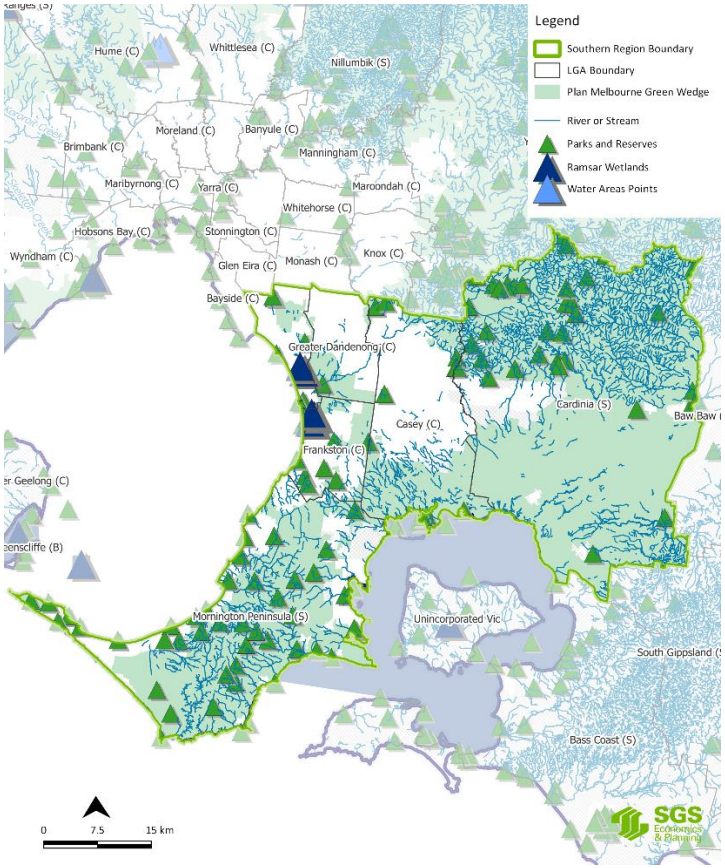
Insights

- The region has a diverse population with New Growth Areas attracting younger families and coastal areas attracting older people and retirees.
- The City of Greater Dandenong has shown strong economic performance with an increase in employment, output and exports.
- Parts of the outer south east of the region are more rural than urban and share the challenges of regional Victoria around infrastructure, access to services and risk management for dispersed population and the environment in natural disasters.
- There are areas with social outcomes around unemployment and skills, and health and wellbeing below the metropolitan average.
- While the region has a historic industrial strength, the growing sectors are low skilled population-serving industries, and health and education jobs.
- There is unequal access to employment choice across the region, with Dandenong, Dandenong South, Moorabbin Airport – Braeside, Cheltenham-Southland and neighbouring Monash the primary employment locations.
- Population growth and poor public transport connectivity in outer suburbs and New Growth Areas will compound dependence on private vehicles and high rates of car ownership.
- Future urban development land areas have limited access to employment and other services.
- A diverse range of open space should be protected to meet the region's growing population and their changing needs.

URBAN, ECONOMIC AND ENVIRONMENTAL STRUCTURE







Southern Metro Region Economic, Social and Environmental profile summary

Indicator	Likely impact of drivers of change	Description
ECONOMIC		
Economic performance	Mixed	The LGAs of Greater Dandenong and Casey saw the greatest growth in employment over the past two decades, driven by growth in the industrial and population-serving sectors. The region has an uneven profile with respect to accessibility to employment choice and services. LGAs such as Kingston and Greater Dandenong have good access to employment, fostering large employment centres such as Cheltenham-Southland and Dandenong NEIC, and with good connections to Melbourne CBD and Monash NEIC. However, the remainder of the region has relatively poor accessibility, especially to knowledge-intensive jobs. Capital investment has been rising steadily, with the largest share flowing to equipment in the City of Greater Dandenong. This reflects the traditional industrial specialisation of the region. Exports from the region largely come from the City of Greater Dandenong and City of Kingston, which contains Moorabbin Airport. The region also has a relatively large workforce that will keep growing. However, labour productivity remains lower than the metropolitan Melbourne average. This reflects the dominance of the industrial sector and low-skill population-serving industries.

Indicator	Likely impact of drivers of change	Description
Economic wellbeing	Adverse	Household incomes are comparable to the metropolitan Melbourne average, except in the City of Greater Dandenong where income levels are lower. This is likely driven by the relatively poor workforce outcomes of the LGA which, along with Frankston LGA, has a higher unemployment rate than the rest of the region. Transport is dominated by private vehicle travel, with high and rising rates of car ownership in all LGAs. While the Frankston and Cranbourne-Pakenham train lines provide access to and from the coastal suburbs of the Mornington Peninsula, the Port of Hastings and Dandenong, and buses provide some orbital connectivity, public transport services and frequency across the region are poor – particularly in New Growth Areas. Population growth and the lack of transport options will likely compound dependence on private vehicles.
Employment and skills	Adverse	Workforce skill levels in the Southern Metro Region are varied. Kingston and Mornington Peninsula LGAs reflect the metropolitan average, with approximately 40 per cent of workers above Skill Level 2 (skill levels are described in section 4.4 Employment and skills). The remaining LGAs have a lower proportion of workers with higher qualifications and are dominated by Skill Levels 4 and 5 jobs. While the share of higher skill workers in these areas has increased, this shift has been slow compared to metropolitan Melbourne. The composition of the region's employment is related to the prevailing trends in skill levels. Historically, the industrial sector has been dominant, with a greater share of employment than the knowledge-intensive and health and education sectors combined in 1996. The following 20 years saw a slow but consistent shift towards population-serving industries, driven by the development of greenfield areas and the rise of the health and education sector. However, this shift has not kept pace with metropolitan Melbourne, as the location quotient of every sector remained relatively unchanged between 2006 and 2011. The Southern Metro Region remains underrepresented in knowledge-intensive and health and education employment. The proximity of Monash NEIC will provide access to higher-skill, knowledge-intensive employment opportunities.

Indicator	Likely impact of drivers of change	Description
SOCIAL		
Population demographics	Favourable	The Southern Metro Region has experienced population growth at a rate faster than the metropolitan Melbourne average. Further development of greenfield areas in the LGAs of Casey and Cardinia, and intensification of housing in existing suburbs, will continue this trend. Recent growth is primarily driven by migration from overseas and within Victoria. Overseas migrants tend to locate in the more multicultural LGAs of Greater Dandenong and Casey. The region has a high proportion of children and working-age adults. The exception to this is the Shire of Mornington Peninsula where people aged over 65 comprise a larger proportion of the total population. These trends are expected to continue as growth areas attract younger families while the coastal areas are preferred by older residents seeking lifestyle locations that are still closely connected to Melbourne.
Housing diversity	Favourable	Separate houses are the dominant housing type in the Southern Metro Region. The exception to this trend is the innermost LGA of Kingston, where townhouses form a relatively large share of the total dwelling stock. Recent development trends in the Southern Metro Region indicate that separate houses continue to be the preferred form in the New Growth Area LGAs of Casey and Cardinia, driven by the abundant supply of residential land and relatively low housing prices. Separate housing in these areas is typically in medium densities, between 30 and 60 dwelling per hectare. Established urban areas such as Kingston, Greater Dandenong and Frankston LGAs are shifting to higher density forms, providing a greater number of flats and townhouses.
Housing stress	Adverse	Housing stress in the Southern Metro Region is a complex issue. Property prices are relatively low; however, low household incomes among renters has led to high rates of rental stress. Severe mortgage stress is present in the City of Greater Dandenong. As a relatively high-income municipality, the City of Kingston exhibits the lowest incidence of housing stress, at a rate below the metropolitan average.

Indicator	Likely impact of drivers of change	Description
Disadvantage	Adverse	Patterns of disadvantage and advantage vary. Severe disadvantage is experienced by residents in the suburbs of Dandenong, Cranbourne, Pakenham, Frankston, Mornington, Dromana and Rosebud, and particularly in and surrounding activity centres within these suburbs. The City of Greater Dandenong shows the highest and most consistent rate of disadvantage in the region. Conversely, there are many areas of extreme advantage, including large areas of the City of Kingston and areas along the Mornington Peninsula including Sorrento and Mount Martha.
Youth engagement	Adverse	Excluding the City of Kingston, youth engagement outcomes within the Southern Metro Region are relatively poor. Rates of high school qualification are below the metropolitan Melbourne average, particularly in Cardinia, Frankston and Mornington Peninsula LGAs. Youth engagement in both work and study is also lower than the metropolitan average. This is most pronounced in Greater Dandenong and Frankston LGAs and is related to disadvantage and high unemployment rates. However, both indicators have shown improvement between 2011 and 2016, consistent with metropolitan Melbourne trends.

Indicator	Likely impact of drivers of change	Description
Population health	Adverse	The quality of health outcomes of varies depending on the measure. Utilisation of hospital services and preventable hospitalisations are relatively high in all Southern Metro Region LGAs compared to metropolitan Melbourne. The Shire of Mornington Peninsula has the highest observed rates, likely driven by the older demographic. The number of mental health clients correlate with drug and alcohol clients. Rates in the Casey and Cardinia LGAs are below the metropolitan Melbourne average, whereas rates in Greater Dandenong and Frankston LGAs are higher than the metropolitan Melbourne average. Access to general practitioners is poor, particularly in Kingston and Cardinia LGAs. However, access to community health care services is higher and closer to the metropolitan Melbourne average. The prevalence of Type 2 diabetes is higher than the metropolitan Melbourne average in Greater Dandenong, Frankston, Casey and Mornington Peninsula LGAs. The Greater Dandenong and Mornington Peninsula LGAs experienced an increase between 2011 and 2015. Life expectancy for males is lower than the metropolitan average in the cities of Greater Dandenong and Frankston, while that of females is lower than the metropolitan average for all LGAs. This may be a symptom of the high disadvantage and lack of transport options for accessing employment, and community and health services.
Early childhood outcomes	Favourable	The Southern Metro Region has varied early childhood outcomes. Baby birth weights and child immunisation rates are consistent with metropolitan averages. However, the region performs poorly with respect to development vulnerability (except for the City of Kingston). The same is true for child protection substantiations, with most LGAs reporting rates significantly higher than the metropolitan average, particularly in Frankston and Greater Dandenong LGAs.
Crime	Mixed	Greater Dandenong and Frankston LGAs have the highest offence rates in the region and exceed the metropolitan Melbourne average. All other LGAs display rates below the metropolitan Melbourne average, with the lowest observed in Casey and Cardinia LGAs.

Indicator	Likely impact of drivers of change	Description
Wellbeing	Mixed	Consistent with the outcomes of other social indicators, Greater Dandenong and Frankston LGAs have a subjective wellbeing score below the Victorian average. The sense of safety walking alone after dark scores are also low in these areas, corresponding to high crime offence rates. Kingston and Mornington Peninsula LGAs have the best aggregate performance within the region, exceeding the metropolitan Melbourne average across both indicators.
ENVIRONMENTAL		
Environmental assets	Adverse	The Shire of Cardinia has the largest total area of open space in the region. The City of Casey and the Shire of Mornington Peninsula also offer significant areas of open space. Frankston, Greater Dandenong and Kingston LGAs all have a similar area of open space. A very high proportion of open space assets in the Shire of Cardinia is green space. The Casey and Mornington Peninsula LGAs also have a high share of green open space. Open space is spread more evenly across both mixed and green open space in Kingston, Frankston and Greater Dandenong LGAs. The largest types of open space in the Southern Metro Region are conservation reserves, and natural and semi-natural open space. Land use is largely dominated by primary production and residential in the shires of Cardinia and Mornington Peninsula and the City of Casey. Some of the land is zoned as green wedge. Land use in Frankston, Greater Dandenong and Kingston LGAs is predominately residential. There are significant shares of industrial land in Greater Dandenong and Kingston LGAs. In New Growth Areas, land is transitioning from primary production to residential. The area of land for primary production and residential purposes is relatively stable in rural areas. The area designated as conservation reserves increased between 2006 and 2010.

Indicator	Likely impact of drivers of change	Description
Environmental condition	Adverse	The proportion of tree canopy cover in the City of Frankston and the shires of Mornington Peninsula and Cardinia is higher than the metropolitan average. The proportion of tree canopy cover in Casey, Kingston and Greater Dandenong LGAs is below the metropolitan average. A low proportion of river reaches (section of river between a beginning and ending point) are in good/excellent condition. The proportion of river reaches in good/excellent condition in the Bunyip Basin is below the metropolitan average. The proportion of reaches in good/excellent condition is declining over time.
Environmental risks and hazards	Adverse	Conservation reserves are most at risk of flood during a 1 in 100-year rainfall event. These areas are located near waterways in low-lying areas in the cities of Greater Dandenong and Casey. Areas in Kingston, and Cardinia LGAs are at most risk of sea level rise and storm surge. Land for residential purposes and primary production is at most risk. Large areas of the shires of Cardinia and Mornington Peninsula are at risk of bushfire. This poses risks for elderly residents and tourists during peak summer periods. Some areas in the cities of Frankston and Casey are also at risk. Conservation areas, agricultural land and some residential land is at risk. All LGAs have urban heat islands; however, no large areas are exposed to a high urban heat island effect. Areas in the City of Casey are vulnerable to heat. The cities of Kingston and Greater Dandenong have concentrations of EPA priority sites and contaminated groundwater sites, likely to be linked to industrial land use.

Indicator	Likely impact of drivers of change	Description
Environmental flows	Adverse	Most populated areas in the region have access to a range of open space types. Residents in Kingston and Mornington Peninsula LGAs visit green space more than residents in the other LGAs. South East Water consider multiple scenarios when forecasting supply and demand of water. In the worst-case scenario, augmentations to the system will be needed to service the region in the next 10-15 years. Some areas in the cities of Casey and Frankston have a high number of small-scale solar installations since 2001 relative to the other LGAs. There are 10 open landfills in the region. Some are located near residential areas such as those in Clayton South. Total volumes of kerbside garbage are largest the City of Casey. There is an increasing trend in the quantity of kerbside garbage in the region since 2002.

1. INTRODUCTION

To support the update of Infrastructure Victoria's 30-year Infrastructure Strategy this report overviews the economic, social and environmental characteristics of the Southern Metro Region.

1.1 Project purpose

This project will help Infrastructure Victoria:

Prepare for the 2020 Strategy update and provide a rich economic, social and environmental evidence-base at a regional level within Metropolitan Melbourne. This will assist IV to understand relative regional strengths and challenges across the metropolitan area and (combined with the existing work done by others) across the state.

This report is one of six regional economic, social and environmental (ESE) profiles that will "identify the ESE strengths and challenges of Melbourne's regions on a geographical basis."

As well as the six regional profiles, the project also includes:

- A metropolitan Functional Economic Region (FER) profile, highlighting the strengths and challenges of metropolitan Melbourne's economy as a network.
- A metropolitan inter-regional summary report that provides regional indicators against IV's 10 objectives to identify relative strengths and challenges within the metropolitan area.

FIGURE 1: REPORT PACKAGE:

1.2 Report structure and approach

The report covers ESE domains, which reflect Infrastructure Victoria's 10 objectives:

1. Prepare for population change (Social)
2. Foster healthy, safe and inclusive communities (Social)
3. Reduce disadvantage (Social)
4. Enable workforce participation (Economic)
5. Lift productivity (Economic)
6. Drive Victoria's changing globally integrated economy (Economic)
7. Promote sustainable production and consumption (Environmental)
8. Protect and enhance natural environments (Environmental)
9. Advance climate change mitigation and adaption (Environmental)
10. Build resilience to shocks (Environmental, Social and Economic)

The report is structured as follows:

- Chapter 2: The various geographies used for the project
- Chapter 3: The major drivers of change that affect Australian cities and regions, and which will impact Melbourne's and the Southern Metro Region's growth and development
- Chapters 4-6: Economic, social and environmental indicators for the Southern Metro Region

1.3 Southern Metro Region

The Southern Metro Region comprises six local government areas (LGAs): Casey, Frankston, Greater Dandenong, Cardinia and Mornington Peninsula, and accounts for 31 per cent of the total land area of metropolitan Melbourne.

The region includes established suburbs, greenfield areas and several coastal and inland towns. It extends from established suburbs of Moorabbin, Springvale and Dandenong, to towns in the metropolitan rural areas such as Portsea and Bunyip. The Southern Metro Region is within easy access of the peri-urban shires of Baw Baw and the Bass Coast.

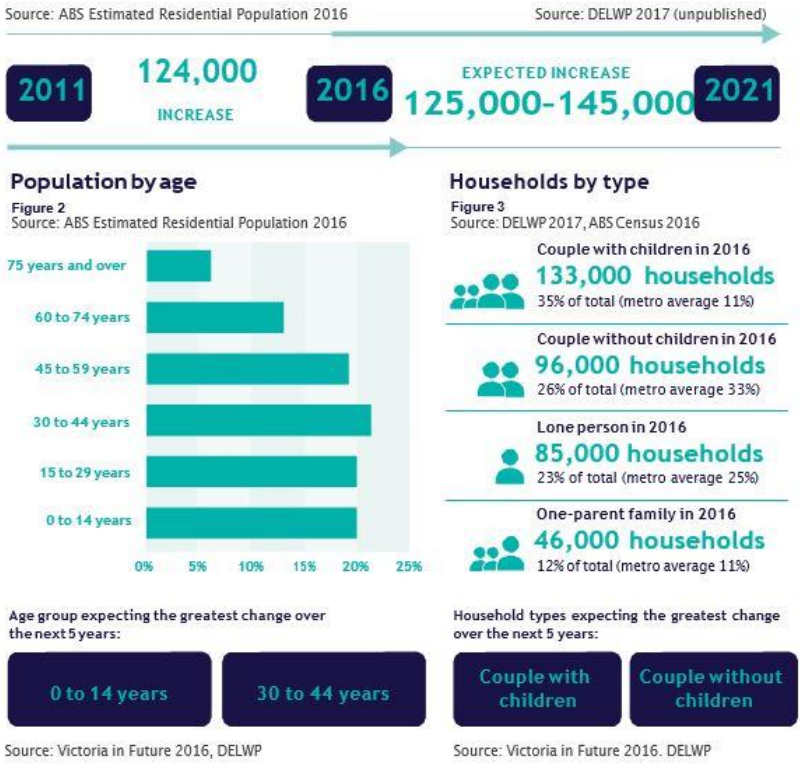
The region's suburbs provide a variety of housing, employment and lifestyle opportunities. These range from the established suburbs such as Moorabbin, Mentone, Springvale, Dandenong, and Chelsea, to growth area communities stretching from Clyde in the City of Casey to Pakenham in the Shire of Cardinia, and to coastal towns including Rosebud, Dromana and Portsea.

The region is home to more than 1,030,000 people (approximately 22 per cent of metropolitan Melbourne's total). Since 2011, the City of Casey has absorbed the largest share of population growth at 42 per cent. Over the five years to 2021, the region's population is forecast to grow at a slower rate than the recent past, with a projected population growth rate of approximately 2.4 per cent per annum (compared with a metropolitan Melbourne average of 2.5 per cent).

Population growth is not expected to be equally distributed, with the New Growth Areas, including Cranbourne East, Clyde, Officer and Pakenham East, housing much of the region's future population. Established areas, such as those in Greater Dandenong and Frankston LGAs, are also expected to intensify and renew.

The Southern Metro Region has a range of employment. It contained approximately 412,000 jobs in 2016, or 17 per cent of metropolitan Melbourne's total employment.

FIGURE 2: POPULATION OVERVIEW (2016)



Source: Five Year Plan for Jobs, Services and Infrastructure 2017-2021 (Initial Investment Report), State Government of Victoria (2017).

FIGURE 3: SOUTHERN METRO REGION CONTEXT MAP

Source: *Plan Melbourne* - State Government of Victoria (2017)

2. GEOGRAPHIES AND CATEGORIES

A range of reporting geographies is used to help understand how the Southern Metro Region functions.

Urban areas contain a mix of residential, economic, industrial, recreation, education, health and other spaces. The distribution of activity within these spaces, and the way people move within and between them, contributes to the demand for various types of infrastructure.

While standard local government and ABS defined areas are useful, consideration of different types of areas, and the activities they accommodate can provide a more nuanced understanding of an area.

2.1 Key reporting geographies

Analysis against a range of geographies, as presented in Table 1, use definitions based on SGS's knowledge of urban development patterns.

The analysis has primarily been based around LGAs (due to data limitations) and location typologies.

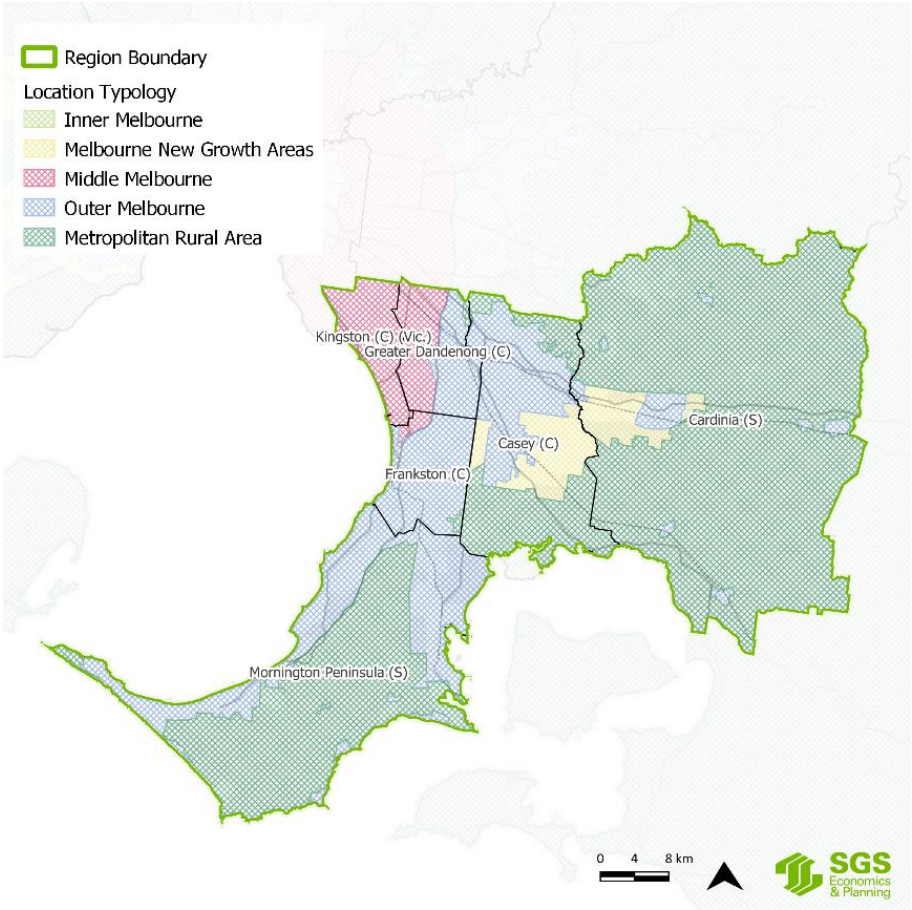
Different economic regions are used in the FER report.

TABLE 1: SUMMARY OF REPORTING GEOGRAPHIES

Region	Approach to defining
Planning subregions	*Plan Melbourne* regions: groups of LGAs
Location typology (Figure 4)	▪ Inner: combination of tram network coverage, and 8km from CBD (e.g. does not include full extent of 86 tram to Bundoora, and extends further in to west where there is limited tram network) ▪ Middle: areas within the Western Ring Road, and other areas between Outer and Inner ▪ Outer: established outer suburbs within the urban growth boundary (UGB) ▪ Melbourne New Growth Areas: areas covered by Precinct Structure Plans (PSPs) ▪ Metropolitan Rural Areas: non-PSP areas within metropolitan Melbourne
Current planning areas	The current defined planning and other geographies, including activity centres, NEIC boundaries and SSIPs as per *Plan Melbourne*
Economic locations	Based on current planning areas plus cluster analysis, includes economic nodes not yet designated (e.g. Moorabbin, Bayswater) and areas already designated, with limited employment (i.e. future planned centres). Draws on: ▪ existing employment land- based on ABS Mesh Block Land Use Categories: Commercial, Hospital/Medical, Industrial ▪ job density for 2016 by four broad industries classifications ▪ clustering analysis based on DBSCAN algorithm
Standard ABS geographies	▪ LGAs: local government areas (Figure 4) ▪ SA2: areas that represent a community that interacts socially and economically (generally 3,000-25,000 people) ▪ SA3: areas with similar regional characteristics, administrative boundaries or labour markets (generally 30,000-130,000 people) ▪ SA4: Used for output of labour force survey data, reflect labour markets within each State/Territory (generally 100,000+ people, sometimes 300,000-500,000 people in metropolitan areas)
SGS HEX Grid	▪ 30ha grid

Source: SGS Economics and Planning, 2018

FIGURE 4: SOUTHERN METRO REGION LGAS AND LOCATION TYPOLOGIES



Source: SGS Economics and Planning, 2018.

2.2 Economic classifications

The 19 ANZSIC (1 digit) industry classifications have been aggregated into four broad industry classifications in this report with creative industries classified as knowledge-intensive. The tourism industry straddles several standard industry classifications. The contribution of tourism is often indirect, generating output and creating jobs in sectors such as retail trade, arts and recreation services, accommodation and food services in particular.

TABLE 2: BROAD INDUSTRY CLASSIFICATIONS

Classification	ANZSIC 2006 1 digit industry
Knowledge-intensive	▪ Information media and telecommunications ▪ Financial and insurance services ▪ Rental, hiring and real estate services ▪ Professional, scientific and technical services ▪ Administrative and support services ▪ Public administration and safety
Health and education	▪ Education ▪ Health care and social assistance
Population-serving	▪ Retail trade ▪ Accommodation and food services ▪ Arts and recreation services ▪ Construction ▪ Other services
Industrial	▪ Agriculture, forestry and fishing ▪ Mining ▪ Manufacturing ▪ Electricity, gas, water and waste services ▪ Wholesale trade ▪ Transport, postal and warehousing

3. DRIVERS OF CHANGE

3.1 Overview

A series of global megatrends are shifting the way people live and work, with implications for business and life in metropolitan Melbourne and in the Southern Metro Region.

There are three key drivers of change:

- **Economic structural change:** The metropolitan economy is continuing to shift towards creative and services-led sectors, and these sectors are consolidating in and around Melbourne CBD and major economic nodes. Technology is influencing the way people work, changing all types of jobs. As metropolitan Melbourne rebalances around the CBD, it presents a real challenge for the industrial and dispersed urban areas of the Southern Metro Region, due to its focus on the traditional aspects of today's economy. However, the rapidly expanding population within the region can facilitate a structural change that enables the regional economy to better adapt and become more resilient to change.
- **Rapid urbanisation**: Australian population growth continues to be concentrated in existing major urban centres, particularly in Melbourne and Sydney. This sustained level of high population growth has resulted in rapid levels of urban expansion and infill development, especially in the inner parts of the Southern Metro Region, such as Dandenong. However, most recent growth occurred in the growth areas of the City of Casey and Shire of Cardinia. This South Eastern Growth Corridor is forecast to be one of the fastest growing in regions of metropolitan Melbourne and will accommodate a high proportion of new households. This scale of growth and change is a defining feature of the region.
- **Impacts of climate changes:** The impacts of climate change are being felt across the city in a range of ways. As rapid urbanisation continues, the effects of urban heat islands, decreasing tree canopy cover and scarce water resources will be felt by many residents across the region. Access to resources such as water, land and energy will affect how and where businesses and people locate and operate.

3.2 Economic structural change

Growth in new jobs

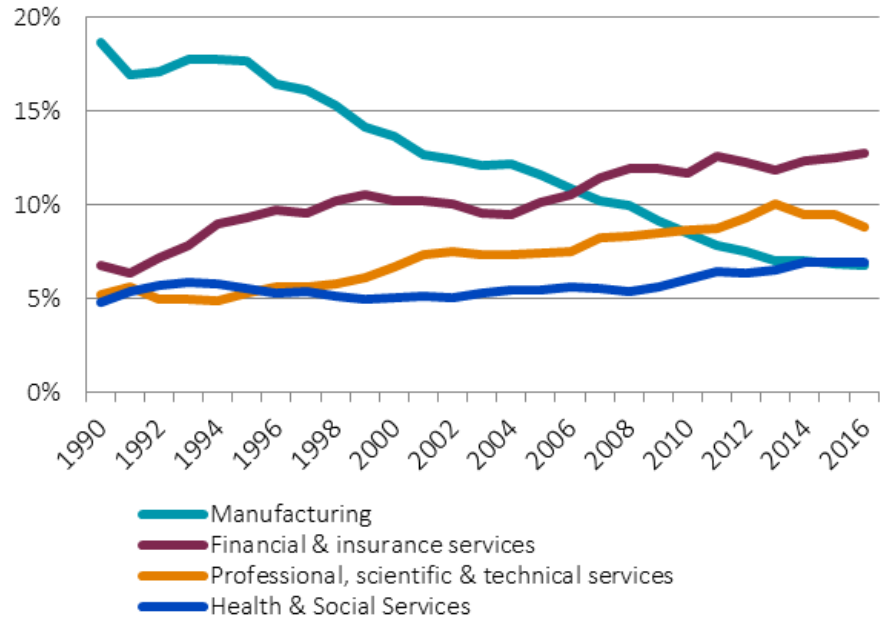
Melbourne's economy, like that of many other cities, has undergone significant change over the past few decades. Previously dominated by manufacturing and industrial activities, it has been transformed into one more reliant on knowledge-intensive activities and services (Figure 5). These professional services include a range of business functions involving finance, design, engineering, architecture, IT, marketing, law, accounting, universities and research and development institutions.

Despite this, manufacturing and other primary industries will remain and must be highly innovative to prosper. This will demand, directly or indirectly, heavy involvement by professional services. Likewise, population-serving sectors like retail, health and hospitality will require access to analytical and creative services if they are to boost productivity and continue to innovate.

Knowledge-intensive activities require access to diverse skills and client bases to enable them to specialise and build resilience. They also need to attract and retain highly skilled/specialised labour. For these reasons they typically locate (or agglomerate) in highly accessible, high amenity and diverse environments.

The massing and clustering of professional services improves businesses' ability to innovate, boosting their productivity and, in turn, that of their customers. Agglomeration benefits are one of the main attractions for the growing professional services industries to locate in central city areas and near major institutional and economic nodes.

FIGURE 5: SHARE OF MELBOURNE'S GDP, SELECTED INDUSTRIES (1990-2016)



Source: SGS Economics and Planning

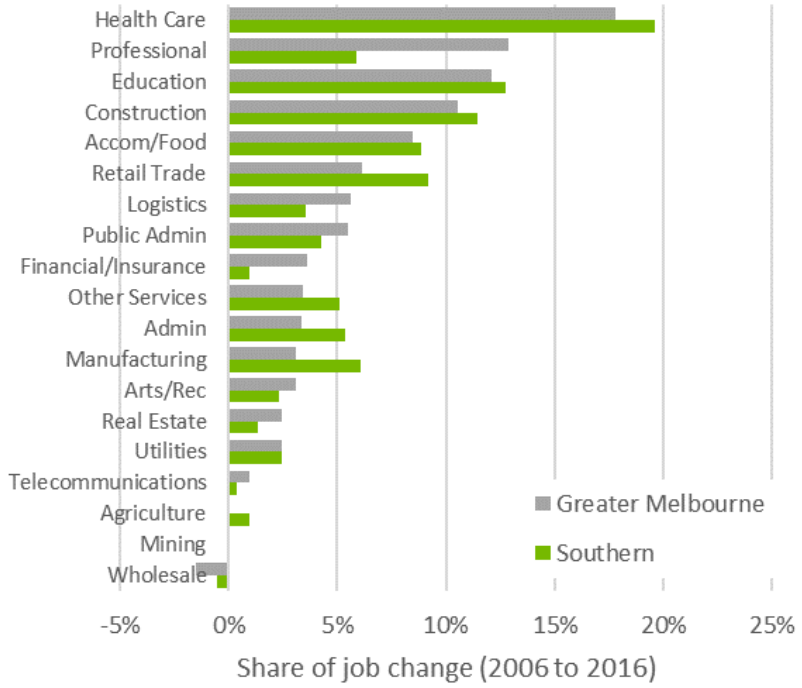
The Southern Metro Region contained 412,000 jobs in 2016 and added 144,000 jobs over the last two decades. This represents 17 per cent of Melbourne's employment growth over that period.

Figure 6 presents the share of jobs growth over the last decade by industry for the Southern Metro Region and metropolitan Melbourne. This illustrates the structural change occurring in the economy where many of the top industries are service-based – health care, professional, education, retail, accommodation and food and public administration.

The industry growth profile of the Southern Metro Region is broadly consistent with metropolitan trends. Population growth led to a large share of new jobs in some service sectors. However, the professional services and finance/insurance industries were both lower than the metropolitan average growth shares,

highlighting the Southern Metro Region is yet to fully engage with this new knowledge-led economy (Figure 6).

FIGURE 6: SHARE OF EMPLOYMENT GROWTH (2006-2016)

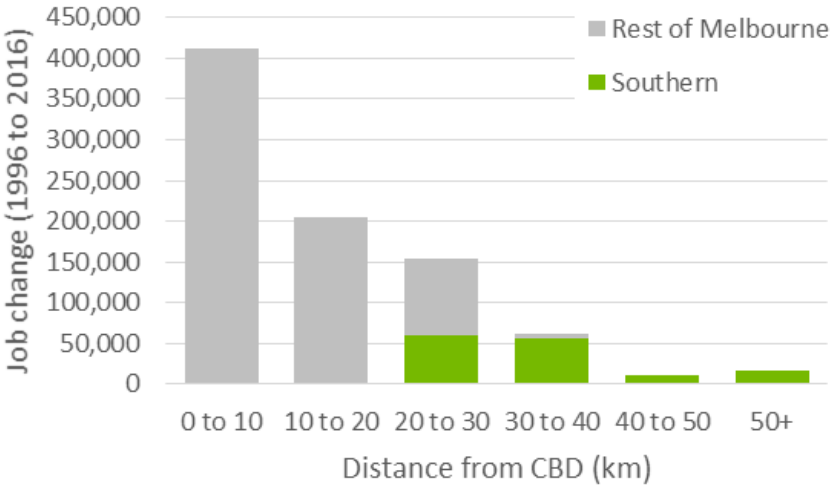


Source: Source: SGS Economics and Planning, derived from NIEIR (2018)

The changing industry structure has a direct spatial implication for Melbourne and the Southern Metro Region. Figure 7 provides a high-level overview, presenting the change in jobs (1996 to 2016) by distance to the CBD. Employment location is further investigated in Section 4.2

Figure 7 illustrates that employment growth in the Southern Metro Region has been geographically diverse. This reflects population-serving employment, which has contributed to growth in growth areas furthest from Melbourne CBD, and industrial and knowledge-based employment which has located in existing centres in Greater Dandenong and Kingston LGAs.

FIGURE 7: EMPLOYMENT GROWTH BY DISTANCE TO CBD



Source: SGS Economics and Planning, derived from NIEIR (2018)

Automation and the changing nature of work

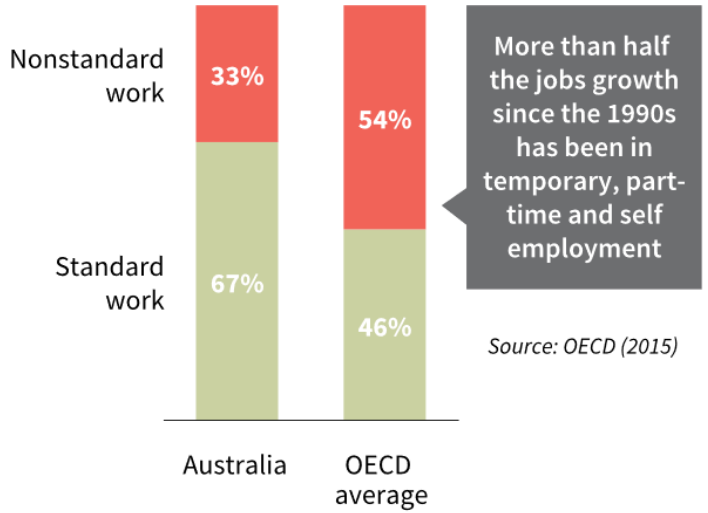
Technology is changing all types of jobs and how people work. Automation is an ongoing process with continual technological development that will impact all sectors of the economy.

Jobs that will be difficult to automate include those that require human thinking, creativity and problem solving and high levels of skills training, as well as those that require human touch and highly developed vocational skills. The next wave of jobs likely to be automated are not necessarily lower-skilled manufacturing, but routine white-collar jobs such as call centre workers, legal clerks, accountants and retail workers.

'Task-biased technical change' is the leading framework for analysing the impact of technology on work.[1] It is used to measure the intensity of *abstract*, *routine* and *manual* tasks across different occupations. While abstract and manual tasks are hard to automate, routine tasks can be easily broken down and codified into a computer program because they follow precise, well-understood procedures. These trends cannot be neatly aligned to the structural shifts in the industry composition of metropolitan Melbourne's economy. These issues are further investigated in the FER report.

There has been a gradual increase in non-standard or alternative working arrangements (see Figure 8) such as self-employment, temporary agency work, seasonal work, independent contracting, fixed term contracts and on call work *(Independent Inquiry into Insecure Work*, 2012). Increasingly people are also piecing their incomes together from a portfolio of activities, including platforms like Air Tasker, Freelancer, Uber, WeWork, Deliveroo and Airbnb.[2]

FIGURE 8: PERCENTAGE OF JOBS GROWTH IN NON-STANDARD AND STANDARD WORK (1990-2015)



Source: FYA, 2015.

For the Southern Metro Region the relatively high numbers of low-skill workers, especially in industrial sectors, will pose the greatest risk. However, there will continue to be opportunities for hands-on sectors including construction trades, health care services and education, particularly in the growth areas. Developing the skills required to participate in this innovative new economy will also provide opportunities to expand health and education precincts such as those in Cranbourne, Berwick, Monash and Frankston.

[1] TBTC first proposed by Autor, et al. (2003) and further by Goos and Manning (2007), Autor, Katz and Kearney (2006, 2008), and Acemoglu and Autor (2011).

[2] McKinsey and Company (2016), Independent Work: Choice, necessity, and the gig economy. Accessed 23 October from: https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Employment%20and%20Growth/Independent%20work%20Choice%20necessity%20and%20the%20gig%20economy/Independent-Work-Choice-necessity-and-the-gig-economy-Executive-Summary.ashx

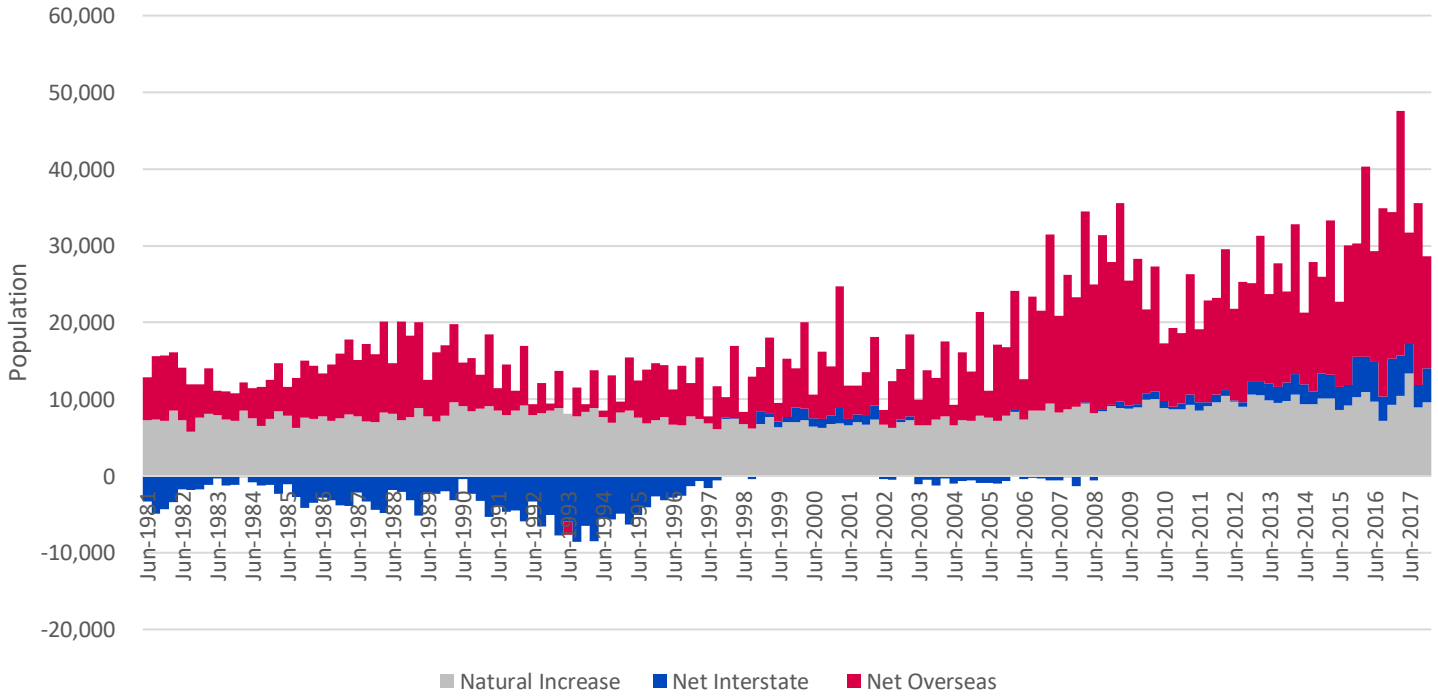
3.3 Rapid urbanisation and demographic shifts

People are choosing to live in urban environments to access jobs and a higher standard of living. Australia is one of the most urbanised countries in the world and population growth is expected to continue in the capital cities (PWC, 2015).

In terms of population growth, Melbourne has been the fastest growing capital city in Australia since 2012. Factors driving the population boom include strong economic growth, a high standard of living, high amenity lifestyle and good infrastructure.

Figure 9 presents the components of population growth for Victoria over the last three decades. While natural increases in population have remained stable, both net overseas and net interstate migration have increased. In the 1980s and 90s, Victoria experienced a net outflow of interstate migrants, largely to Queensland and Western Australia. This trend has since reversed largely driven by strong economic opportunities available in Melbourne and Sydney. Over this period, there has also been a rise in overseas migration driven by the above factors and increases in national intake level.

FIGURE 9: COMPONENTS OF POPULATION GROWTH, VICTORIA



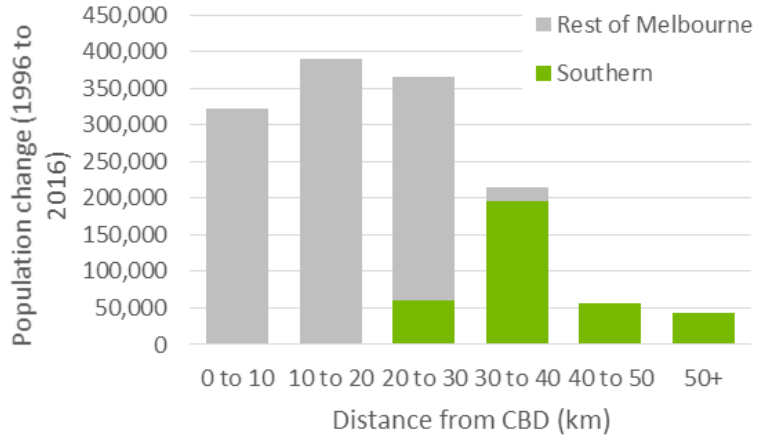
Source: ABS Regional Population Growth (Cat. 3218.0)

Population growth has been accommodated in growth areas around the fringe of metropolitan Melbourne, as well as the renewal of established parts of the city. Figure 10 shows a more dispersed pattern of residential settlement than in the case of employment growth (seen in Figure 7 earlier).

The Southern Metro Region was home to 1,031,000 people in 2016 and grew up 356,000 people over the last two decades. This represents 25 per cent of Melbourne's population growth over that period.

Much of the population growth to date has been accommodated in new suburbs on the fringe of the urban area (within 30 to 40 kilometres of Melbourne CBD). There has been moderate growth beyond this distance, highlighting the distance of the extremities of the Southern Metro Region from Melbourne CBD. This trend will continue as growth areas develop. Infill development in centres such as Dandenong are expected to increase the rate of change between 20-30 kilometres from Melbourne's CBD.

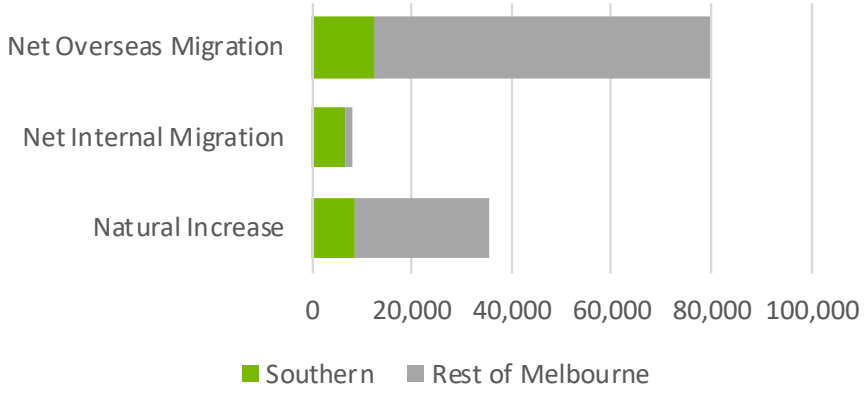
FIGURE 10: POPULATION GROWTH BY DISTANCE TO CBD (1996-2016)



Source: SGS based on ABS Census, 2016.

Population growth has significant implications for the demographic profile of a region. Figure 11 presents the components of population growth for Melbourne and the Southern Metro Region in 2017. It illustrates the significant impact net overseas migration has had on demographic change. The Southern Metro Region had 15 per cent of Melbourne's overseas migration and 24 per cent of the natural increase. The Southern Metro Region has attracted many overseas migrants in the past. However, the spatial distribution is not uniform, resulting in a diverse multicultural population in relatively few locations (further detailed in Section 5.2).

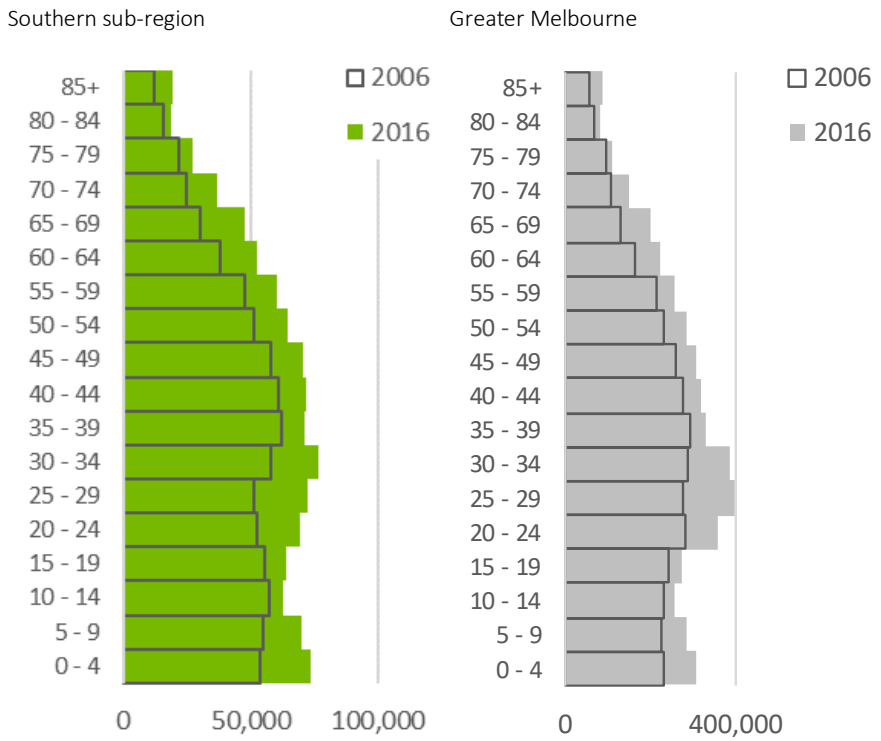
FIGURE 11: COMPONENTS OF POPULATION GROWTH (2017)



Source: ABS Regional Population Growth (Cat. 3218.0)

presents a population pyramid for the Southern Metro Region and metropolitan Melbourne over the period between 2006 and 2016. It shows that growth has occurred across all age groups in Southern Metro Region. However, there are larger increases for young adults (people aged 20-34) and young children (aged 0-9), which correlates with the number of new detached houses that have been developed over the same period, predominantly in New Growth Areas (see Section 4.3).

Figure 12: population age structure (2006 and 2016)

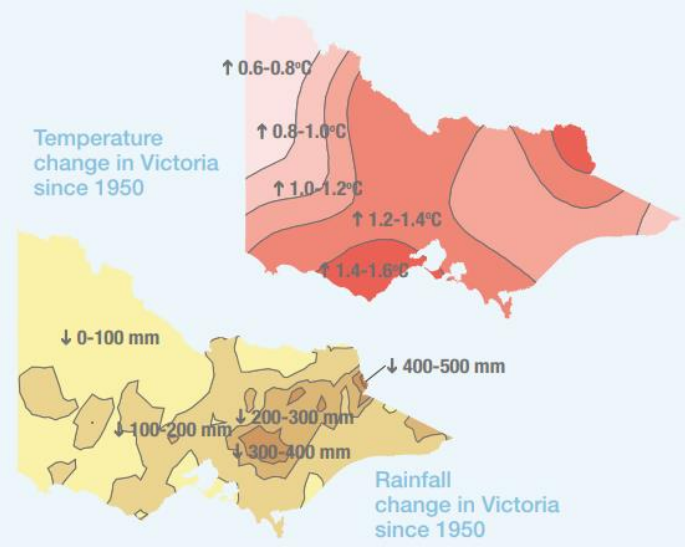


3.4 Climate change

Climate change has resulted from decades of unsustainable human activity. Its effects are largely attributed to emissions from the use of non-renewable energy sources. As most people now live in urban centres, cities and urban activities are the greatest contributors to climate change.

Consequently, global climates are becoming increasingly volatile and extreme, and the impacts of climate change are felt in all areas. Climate change in Australia manifests as temperature rises, and increased incidences and intensity of extreme weather events. In other instances, it manifests as higher incidences of nuisance flooding, or unpredictable bushfire behaviour. For Victoria this includes heatwaves, fires, droughts, storms and floods. Historical temperature and rainfall changes, as illustrated in Figure 13, show the influence of climate change in Victoria.

FIGURE 13: TEMPERATURE AND RAINFALL CHANGE (1950-2015)



Source: Climate Ready Victoria 2015

This has consequences for the natural environment, including a decrease in species diversity and abundance, vegetation structure and genetic loss. Climate change also has implications on the safety and livelihoods of communities. This includes risks for infrastructure as well as primary production, tourism, health and the community (Climate Ready Victoria, 2015).

Key risks to infrastructure from climate change include increasing sea levels, fire weather, flooding, hot days, heat waves and storm surges. These damage infrastructure, increase maintenance costs and disrupt services (Climate Ready Victoria 2015).

Extreme temperatures increase the likelihood of damage or loss of energy infrastructure which could limit supply of energy, or further exacerbate capacity issues during peak times. Heatwaves may also degrade structures, buckle train tracks or cause overheating at water purification plants.

Droughts may result in faster degradation of bridges, roads and tunnels from changing groundwater levels, shifting foundations of buildings or cracking of underground pipes. While increasing water insecurity may have implications for the integrity of ecological systems and biodiversity, economic production and consumption, and the health and wellbeing of communities.

Infrastructure near the coast may be impacted by sea level rises and coastal erosion, causing corrosion of pipes through salt water intrusion, roads to be washed away, ports flooded and degraded, flooding of exchange stations, sub stations, manholes and underground pits (Commissioner of Environmental Sustainability Victoria, 2013).

For the Southern Metro Region, this will mean:

- increased risks due to extreme heat, due to the region's vegetation profile
- risks to vulnerable population, particularly in areas with limited vegetation and relief from heat
- risks to coastal areas from sea level rise and inundation.

4. ECONOMIC

ECONOMIC INDICATORS

The Infrastructure Victoria economic indicators that underpin this section are:

- Employment location
- Economic location
- GRP
- GVA by industry
- Exports
- Business formation
- Effective job density
- Capital investment
- Labour productivity
- Participation rate
- Unemployment
- Change in working age population
- Household income
- Public transport
- Travel origins and destinations
- Freight and road networks
- Freight and business trips
- Households with vehicles
- Access to internet
- Skill levels
- Employment concentration of industries
- Location quotient

REGIONAL OVERVIEW

The Southern Metro Region's economic profile is characterised by:

- middle areas of established residential suburbs, mixed-use activity centres, Dandenong NEIC and industrial employment
- outer areas subject to recent and rapid population growth with employment dominated by the population-serving and health and education sectors
- traditional rural areas with core agriculture and rural activities
- strategic locations adjacent to Monash NEIC and serving fast growing peri-urban LGAs of Baw Baw and Bass Coast.

ECONOMIC STRENGTHS

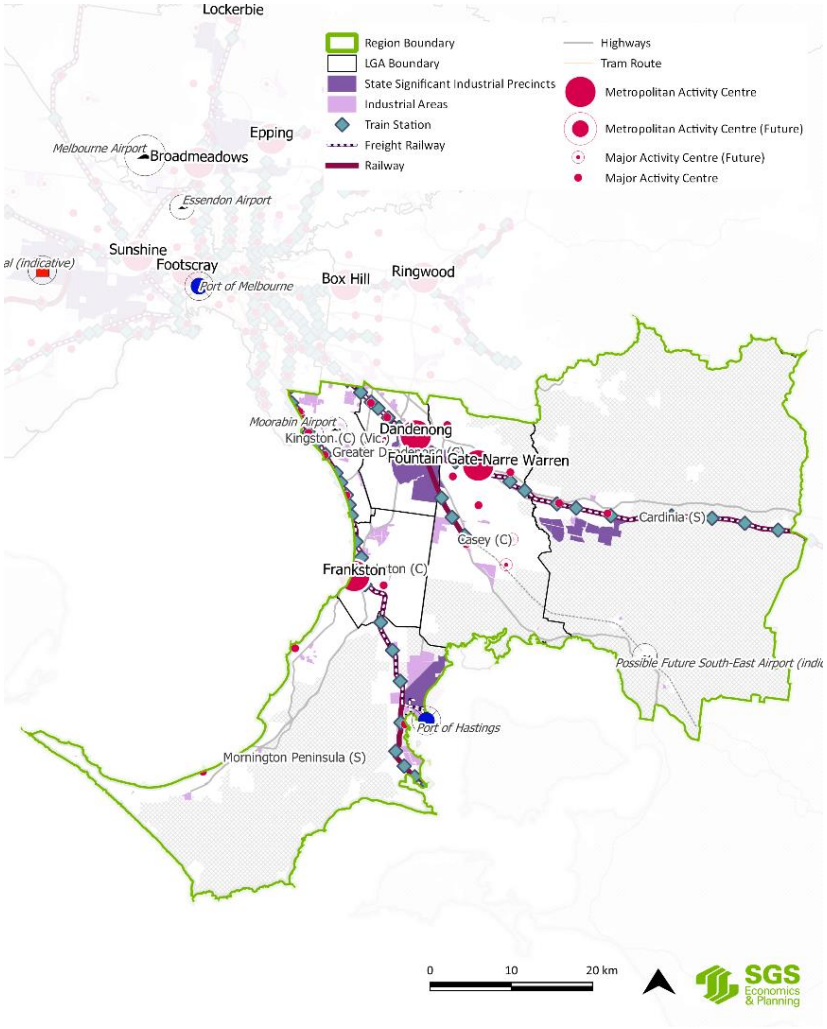
- An increasingly diverse economy in Kingston and Greater Dandenong LGAs and growing health and education precincts in Frankston, Berwick and adjacent to Monash NEIC.
- Major industrial areas including the Dandenong SSIP.
- A strong visitor economy linked to the Mornington Peninsula.
- Gateway transport infrastructure including the Port of Hastings and Moorabbin Airport.

ECONOMIC CHALLENGES

- Limited employment and services choice, particularly in outer areas.
- Relatively high unemployment and lower skill levels in some parts.
- Low labour productivity compared Victorian average.

4.1 Overview and key economic features

FIGURE 14: KEY ECONOMIC FEATURES



Source: SGS Economics and Planning, 2018

The Southern Metro Region has strengths in advanced manufacturing, health, education, wholesale trade, retail and transport, postal services and warehousing. It is home to the Dandenong NEIC and Dandenong SSIP.

Major road networks include the Princes/Monash and South Gippsland freeways, which connect to the central city from the south east of the region, and EastLink, Western Port Highway and Mornington Peninsula Freeway, which provide north-south links. The Nepean and Princes highways are also important north-east to south-west connections.

The rail network in the Southern Metro Region includes:

- Metro passenger services to Frankston/Stony Point, Cranbourne and Pakenham (plus sections of the Craigieburn Line)
- regional passenger services to Gippsland and beyond to Bairnsdale (shared with freight)
- freight services on the Stony Point line to the Long Island Terminal and the Gippsland line to the Maryvale paper mill.

Growing health and education precincts and clusters are located at the Frankston Hospital and Monash University Precinct (Frankston), Casey Hospital and Monash University Precinct (Berwick), Dandenong Hospital and Chisholm TAFE Precinct.

SSIPs include Dandenong South Industrial Precinct, Port of Hastings Industrial Precinct, and Officer-Pakenham Industrial Precinct, which have capacity for additional growth in the coming decades.

Supporting these areas are links to major transport hubs and freight routes, including Moorabbin Airport and Port of Hastings. Potential future transport projects include the Western Port Highway Upgrade.

Metropolitan activity centres (MACs) identified in *Plan Melbourne* include Dandenong, Frankston and Fountain Gate–Narre Warren. These higher order centres are intended to provide a diverse range of jobs, activities and housing.

4.2 Economic performance

Table 3 along with Figure 15 and Figure 16 presents current and recent growth in employment.

- The outer Southern Metro Region absorbed the highest amount of total metropolitan growth in employment (64 per cent) between 1996 and 2016.
- Greater Dandenong and Casey LGAs had the greatest growth between 1996 and 2016, absorbing 29 per cent and 27 per cent of the increase in total employment respectively.
- Melbourne's New Growth Areas grew fastest – reflecting population-driven demand for retail and other services. The high growth rate of these areas is also reflective of the low starting number of jobs.
- Despite accommodating a large share of population growth, the Shire of Cardinia has accommodated the lowest share of employment growth within the Southern Metro Region.

Change in employment density between 2011 and 2016 is illustrated in Figure 16.

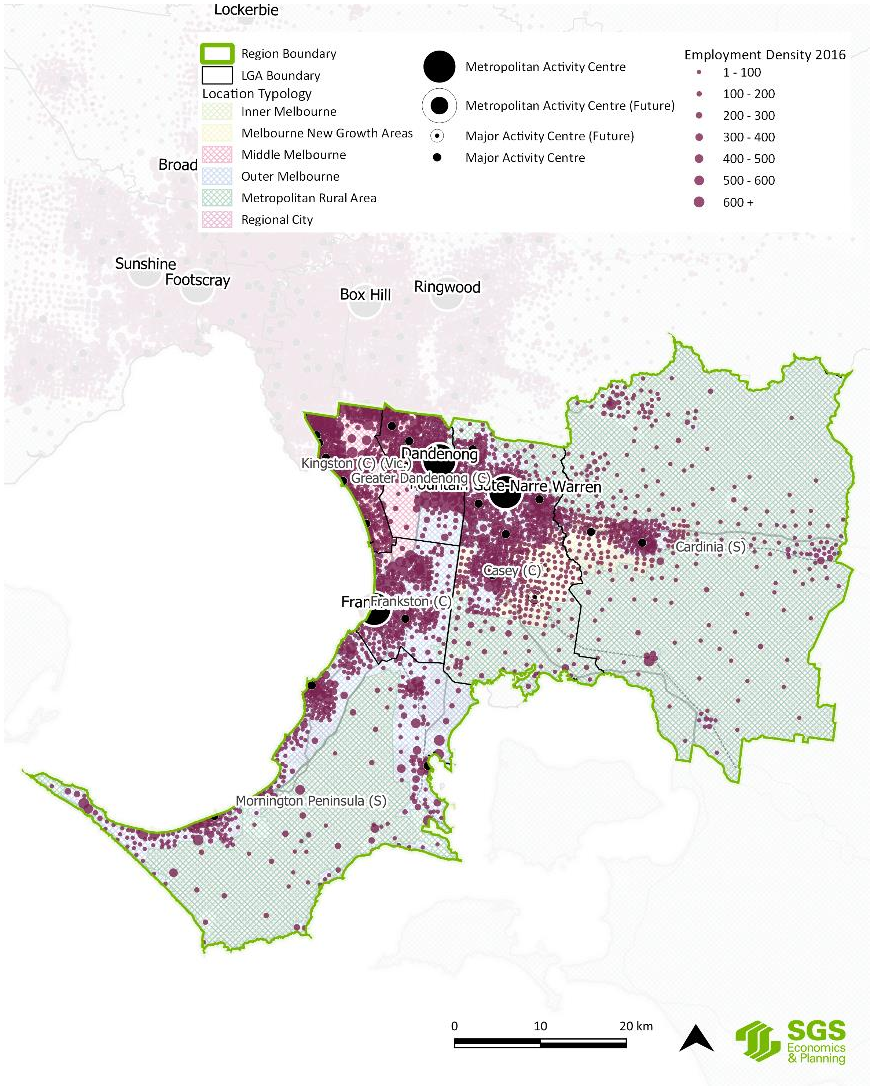
Figure 17 shows employment by industry sector for 2016. As noted earlier, the tourism sector straddles a number of standard industry classifications. Rural activity (agriculture, forestry and fishing) is covered by the industrial classification

TABLE 3: EMPLOYMENT BY LGA AND LOCATION TYPOLOGY (1996-2016)

	1996	2016	1996-2016		
			Change	% of regional	AAGR
					LGA
Cardinia	15,825	27,147	11,322	7.9%	2.7%
Casey	36,648	74,821	38,173	26.5%	3.6%
Frankston	31,584	49,463	17,880	12.4%	2.3%
Greater Dandenong	74,246	115,327	41,081	28.5%	2.2%
Kingston	69,192	88,250	19,057	13.2%	1.2%
Mornington Peninsula	41,008	57,482	16,474	11.4%	1.7%
Southern Metro Region	268,503	412,491	143,988	100%	2.2%
					LOCATION TYPOLOGY
Middle Melbourne	96,695	120,646	23,952	16.6%	1.1%
Outer Melbourne	152,670	261,411	108,741	75.5%	2.7%
Melbourne New Growth Areas	2,589	11,301	8,712	6.1%	7.6%
Metropolitan Rural Areas	16,485	19,039	2,553	1.8%	0.7%
Southern Metro Region	268,438	412,396	143,958	100%	1.2%
Victoria	2,045,773	3,032,148	986,375	-	2.0%

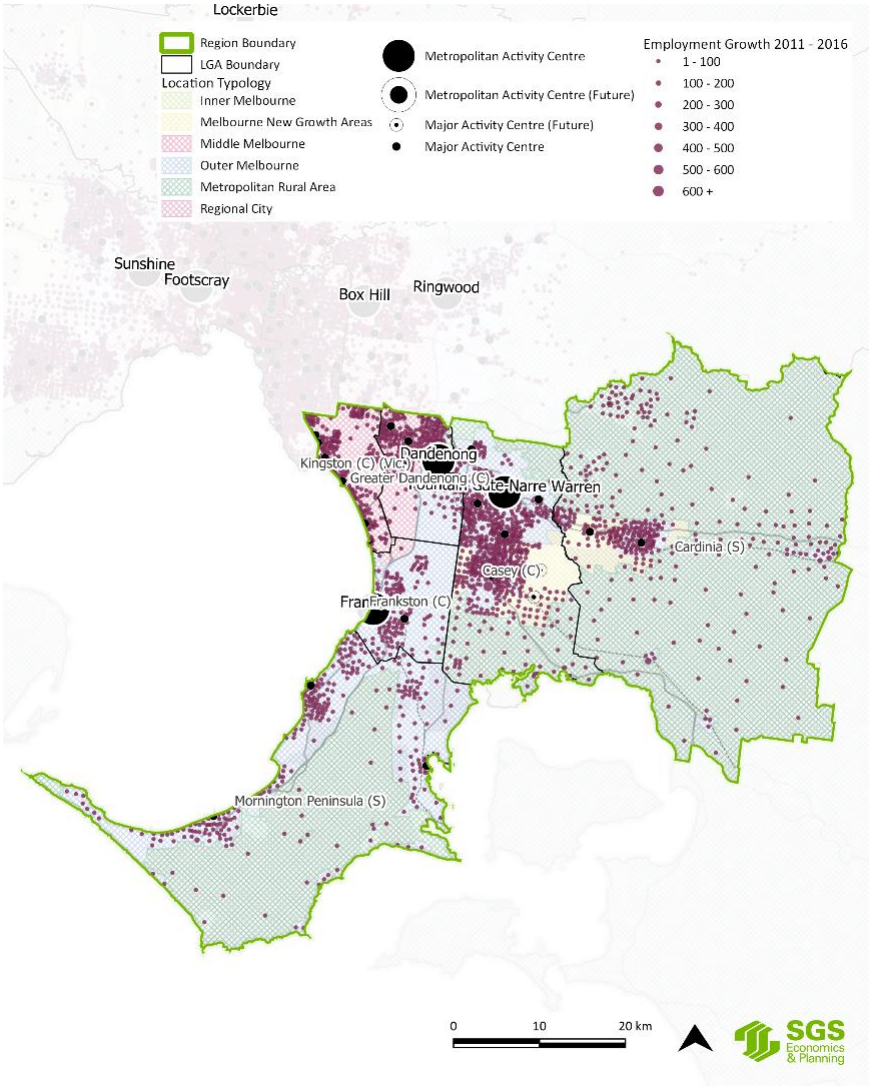
Source: SGS Economics and Planning, 2018

FIGURE 15: EMPLOYMENT DENSITY (2016)



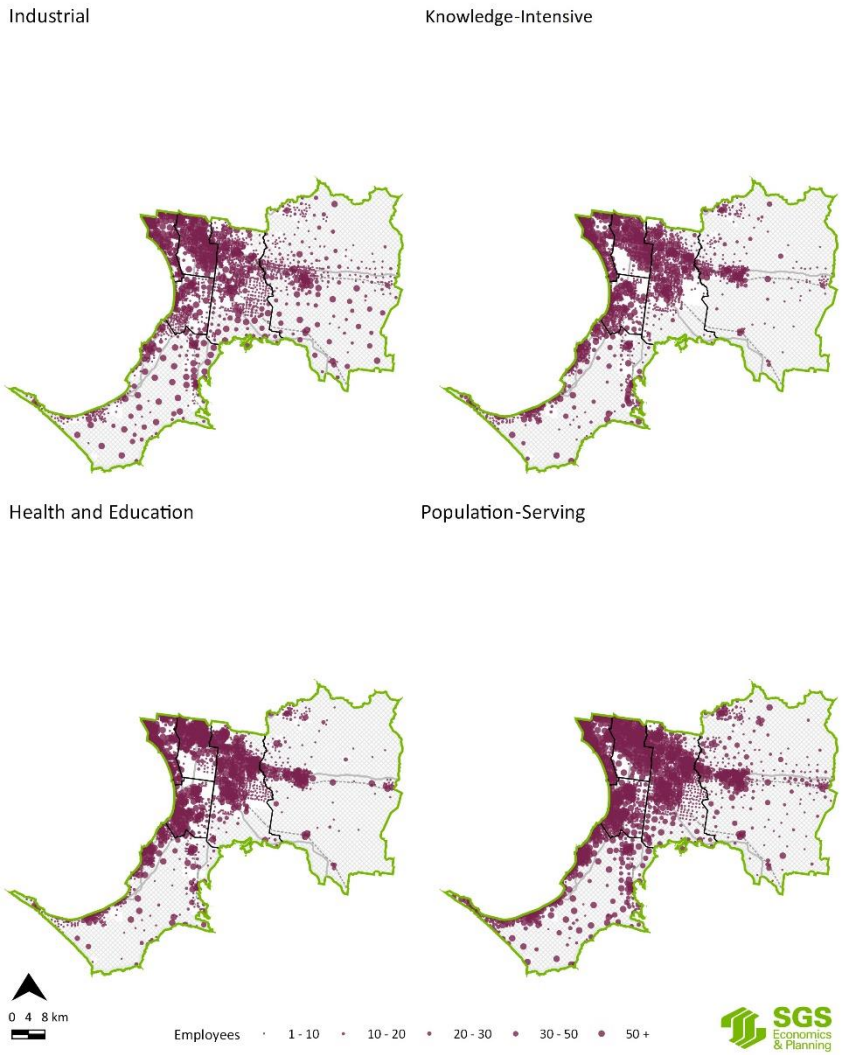
Source: SGS Economics and Planning, 2018

FIGURE 16: EMPLOYMENT GROWTH (2011-2016)



Source: SGS Economics and Planning, 2018

FIGURE 17: EMPLOYMENT BY INDUSTRY SECTOR (2016)



Source: SGS Economics and Planning, 2018

Economic locations

Economic locations are areas with a dense cluster of economic and employment activity. These clusters have unique economic profiles, which reflect the attributes and endowments of their catchment area workforces and historic legacy, and different levels of development maturity. The locations capture many places of state significance identified in *Plan Melbourne* (2017), including NEICs, SSIPs and MACs. While they do overlap with the *Plan Melbourne* locations, the boundaries are not identical. They also capture clusters that are not in *Plan Melbourne*.

Economic locations are employment clusters with a minimum of 5,000 jobs within a one-kilometre radius. See Table 1 for further information.

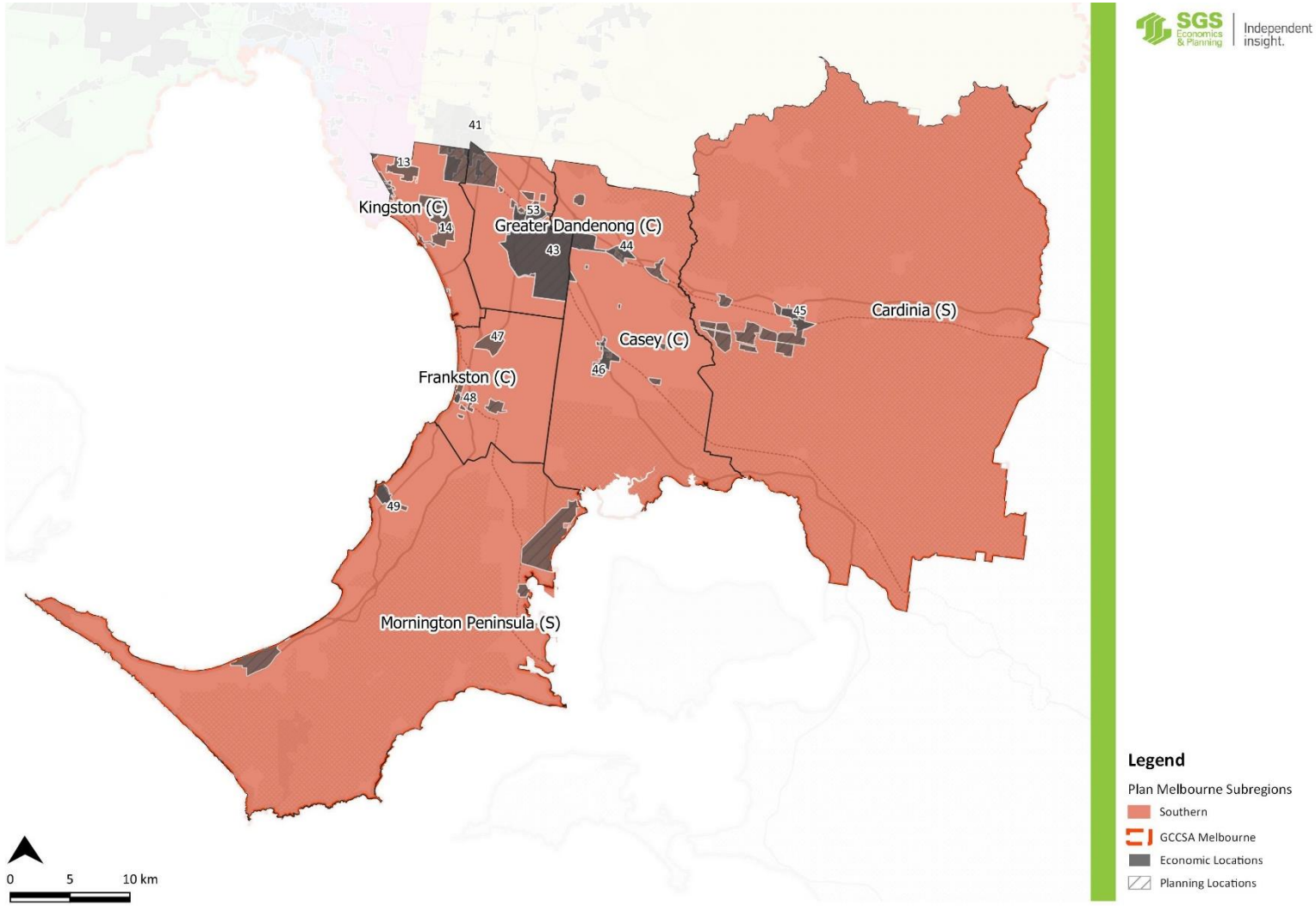
The economic locations driving production and employment in the Western Metro Region are shown in Figure 18. Table 4 lists the number of jobs and industry breakdowns for each economic location.

Dandenong South (cluster ID 43) is by far the largest cluster of employment, supporting over 70,000 jobs, followed by Dandenong (cluster ID 53) and Clayton (cluster ID 413). Dandenong South and Clayton each have a higher share of industrial activity, while Dandenong shows greater employment diversity.

Figure 18 shows where economic locations overlap with *Plan Melbourne* locations. Clusters not identified in *Plan Melbourne* include the Moorabbin Airport and the adjoining Braeside Industrial Cluster and the Frankston North Industrial Precinct.

Economic locations that are also places of State significance identified in *Plan Melbourne* include the Dandenong South NEIC, SSIPs (Officer-Pakenham, Narre Warren-Fountain Gate, Port of Hastings and Moorabbin Airport), MACs (Fountain Gate-Narre Warren, Dandenong and Frankston) and major activity centres.

FIGURE 18: ECONOMIC LOCATIONS



Source: SGS Economics and Planning, 2018

TABLE 4: ECONOMIC LOCATIONS BY INDUSTRY (2016)

Cluster id	Economic locations	LGA	Knowledge Intensive	Industrial	Population Serving	Health & Education	Total jobs
13	Cheltenham-Southland	Kingston	19%	35%	38%	9%	22,406
14	Moorabbin Airport and Braeside Industrial Area	Kingston	10%	58%	30%	2%	19,747
41	Clayton	Kington/ Greater Dandenong	20%	33%	24%	23%	23,196
43	Dandenong South	Greater Dandenong	9%	64%	26%	2%	70,268
44	Fountain Gate-Narre Warren	Casey	23%	5%	63%	9%	10,454
45	Pakenham	Cardinia	13%	27%	42%	17%	5,511
46	Cranbourne	Casey	15%	9%	50%	27%	5,923
47	Frankston North Industrial	Frankston	12%	45%	42%	1%	7,952
48	Frankston	Frankston	22%	8%	31%	39%	13,928
49	Mornington	Mornington Peninsula	18%	10%	51%	21%	8,344
53	Dandenong	Greater Dandenong	27%	20%	24%	28%	23,497

Source: SGS Economics and Planning, 2018

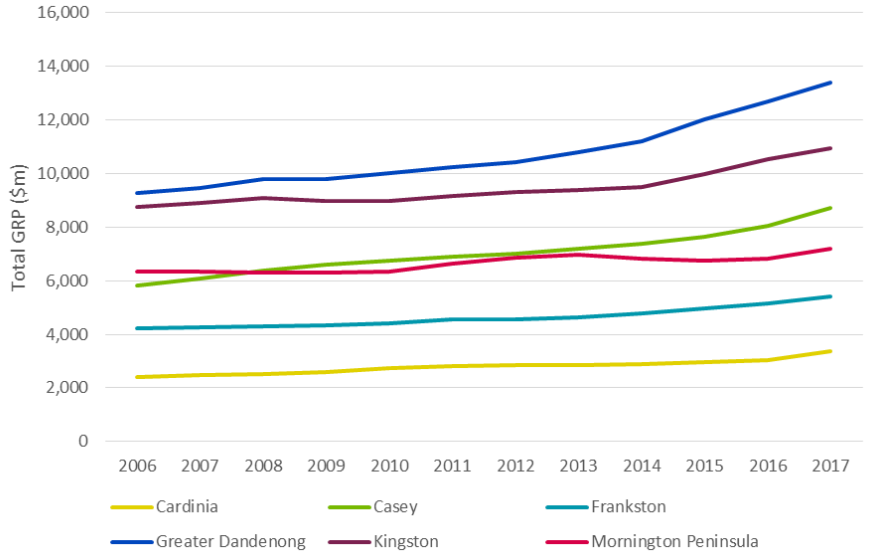
Gross regional product (GRP)

Gross regional product (GRP) measures the total quantity of economic production (goods and services in dollar terms) within a region. The GRP of a metropolitan area is a good measure of the size of its economic output, but not necessarily its value added or productivity (gross value added (GVA) and labour productivity are discussed separately in this chapter). This section discusses GRP measured at place of work by LGA.

Figure 19 shows total GRP between 2006 and 2016.

- From 2006 to 2017, the City of Greater Dandenong reported the highest GRP for the region. Its strong economy is supported by Dandenong NEIC and employment areas in the suburbs of Braeside, Carrum Downs, Pakenham and Knox Bayswater.
- Mornington Peninsula, Frankston, and Cardinia LGAs have had relatively low growth in GRP from 2006 to 2017.
- The City of Casey has grown at a faster rate, particularly since 2013.
- The Shire of Cardinia contributes the least to GRP in the Southern Metro Region. This is consistent with its relatively low level of employment.

FIGURE 19: TOTAL GRP (2006 -2016)



Source: NIEIR 2018

Gross value added (GVA) by industry

Gross value added (GVA) represents the total value added for all goods and services produced within a region. The difference between GRP and GVA is similar to the difference between the sales revenue and profits of a single firm. For example, a region may have a high level of output (GRP) but low value added (GVA), meaning that a large quantity of resources was used in the production process. Figure 20 illustrates the total GVA across the Southern Metro Region.

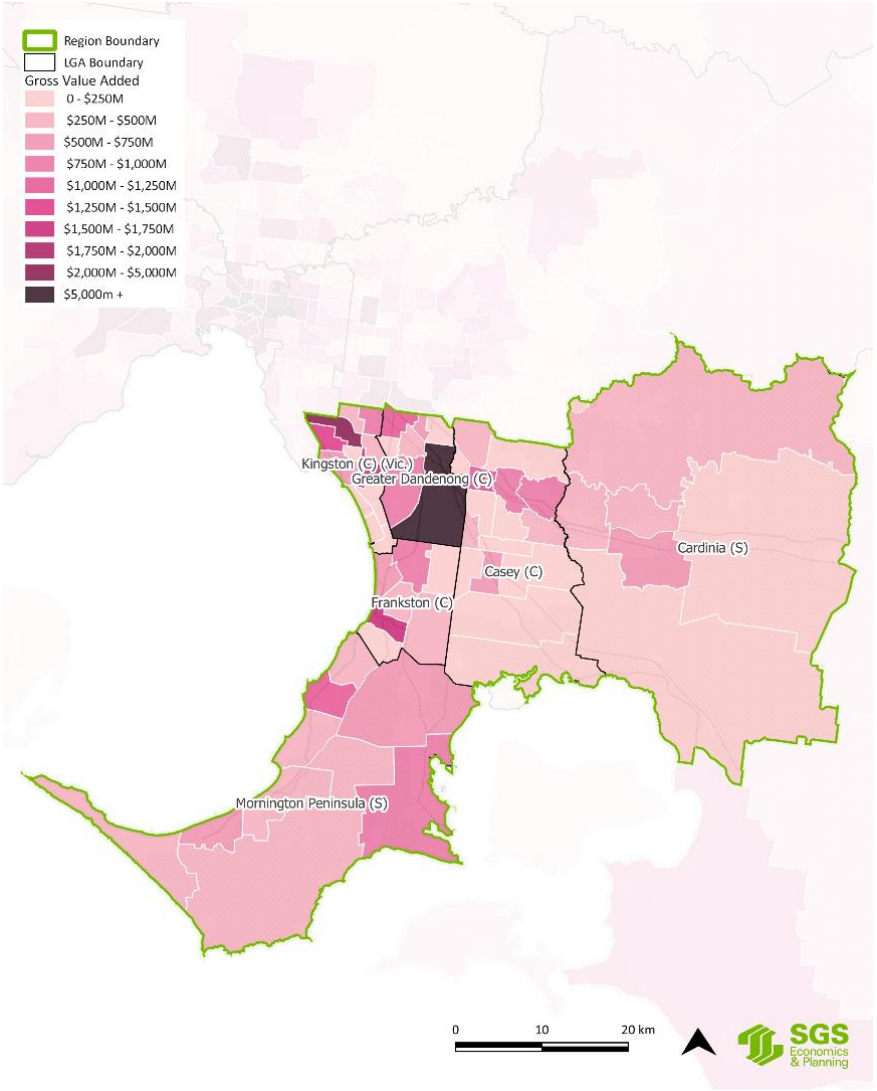
- Areas with the highest GVA are found in the City of Greater Dandenong around the Dandenong NEIC, and in industrial areas such as Moorabbin Airport and the Port of Hastings that are linked to freight, logistics and manufacturing activities.
- The Frankston and Mornington Peninsula LGAs also have areas with high GVA, such as the Frankston Hospital and Monash University Precinct and the Officer/Pakenham SSIP.

Key industries across the Southern Metro Region are:

- **Health and education**: Dandenong NEIC (Dandenong Hospital and Chisholm TAFE Precinct); Casey Hospital and Monash University Precinct (Berwick); Frankston Hospital and Monash University Precinct.
- **Industry**: Port of Hastings Industrial Precinct; Moorabbin Airport; Dandenong South Industrial Precinct; Officer-Pakenham Industrial Precinct.

See section 2.2 for a description of industry classifications.

FIGURE 20: TOTAL GVA (2016)

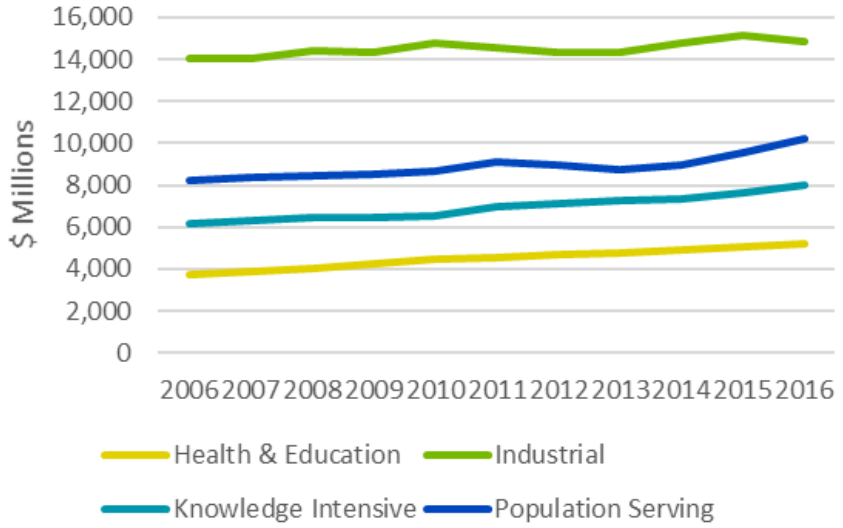


Source: SGS Economics and Planning, derived from various ABS datasets

Figure 21 presents the breakdown of historic GVA by four industry classifications in the Southern Metro Region.

- GVA in the industrial sector is higher than other sectors, while the health and education sector has the lowest GVA.
- GVA in all sectors has increased marginally between 2006 and 2016.

FIGURE 21: GVA BREAKDOWN BY INDUSTRY CLASSIFICATION (2006-2016)



Source: NIEIR 2018

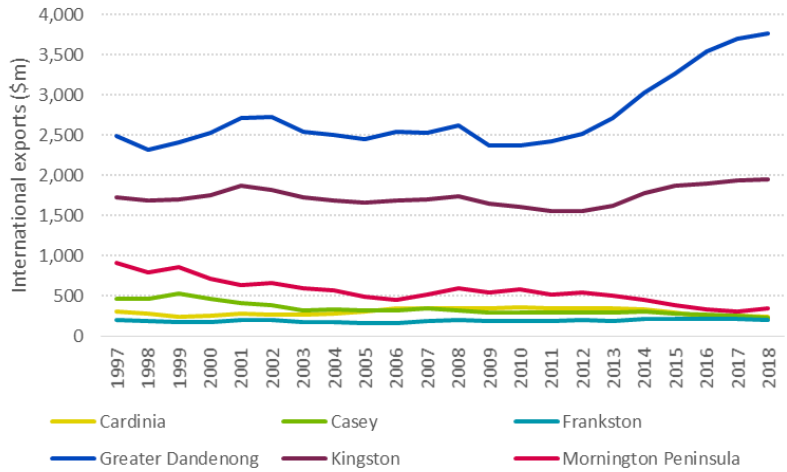
Exports

Exports are goods transferred between countries and are essential to a country's economy. High international exports contribute to the growth of a region and help boost employment.

Figure 22 shows international exports for each of the Southern Metro Region LGAs, while Figure 23 shows exports by industry sector:

- The Greater Dandenong and Kingston LGAs currently have the highest international exports for the Southern Metro Region.
- The Shire of Mornington Peninsula has seen a steady decrease in international exports since 1997, with a slight increase in 2017 and 2018.
- Frankston, Casey and Cardinia LGAs all have lower international exports, below $500m annually, and generally flat rates suggest this is not a large component of local economic activities.
- Manufacturing produces by far the largest amount of exports in the Southern Metro Region, with the total value of exports increasing over time.
- The value of exports in in transport postal and warehousing industries are decreasing.

FIGURE 22: INTERNATIONAL EXPORTS BY LGA (1997-2018)



Source: NIER 2018

FIGURE 23: TOP 10 INTERNATIONAL EXPORTS INDUSTRY (1997-2018)

Source: NIEIR 2018

Business formation

Business formation is the registration and de-registration of businesses by different industries. To measure the growth of business in the Southern Metro Region, industries are grouped into the four industry classifications.

- The highest growth is seen in health and education sector in every LGA in the Southern Metro Region, consistent with Victorian trends. Population increase, and a growing number of international students, drive demand for services in this sector.
- Business formation in the knowledge-Intensive sector also grew in the Southern Metro Region, particularly in Casey and Cardinia LGAs, indicating the shift from an industrial-based economy to a knowledge-based economy.
- In Frankston and Mornington Peninsula LGAs, industrial business formation dropped by four per cent and 10.8 per cent respectively.
- Growth in Casey and Cardinia LGAs exceeded the State average for all sectors. This high growth rate may be due to an initially low base in these Growth Area LGAs.

TABLE 5: BUSINESS FORMATION (GROWTH RATE) BY INDUSTRY (2009-2017)

LGA	Health and education	Industrial	Knowledge intensive	Population serving
Cardinia	57.1%	4.2%	44.1%	33.2%
Casey	77.4%	22.9%	39.3%	25.2%
Frankston	25.7%	-4.0%	15.4%	8.1%
Greater Dandenong	37.9%	20.0%	24.5%	26.9%
Kingston	43.1%	-4.1%	15.5%	9.7%
Mornington Peninsula	21.9%	-10.8%	25.4%	7.6%
Metro Melbourne	45.3%	6.1%	25.4%	18.9%
Victoria	42.2%	1.2%	24.3%	15.2%

Source: ABS Counts of Australian Businesses, including Entries and Exits 2009 and 2017

TABLE 6: BUSINESS FORMATION (COUNT) BY INDUSTRY (2009-2017)

LGA	Health & education	Industrial	Knowledge-intensive	Population-serving
2009				
Cardinia	197	1982	1394	2514
Casey	605	4036	4090	6459
Frankston	486	1863	2830	3901
Greater Dandenong	470	4052	3088	3817
Kingston	662	3815	5090	5054
Mornington Peninsula	781	2502	4240	5790
2017				
Cardinia	309	2066	2010	3348
Casey	1073	4959	5699	8085
Frankston	611	1789	3265	4216
Greater Dandenong	648	4863	3846	4842
Kingston	947	3658	5880	5543
Mornington Peninsula	952	2231	5317	6229

Source: ABS Counts of Australian Businesses, including Entries and Exits 2009 and 2017

Effective job density

Effective job density (EJD) is a measure of a location's concentration of jobs based on their accessibility, which is closely linked to the transport networks and infrastructure. High EJD can be a result of having a large pool of employment nearby or being well connected to more distant employment.

This indicator helps to understand how accessible a city is, how employment is distributed, and whether residents enjoy a range of employment opportunities. People who live in areas with higher EJD have a greater chance of matching their skills and aspirations to available jobs, leading to benefits including opportunities for increased skill development and job satisfaction.

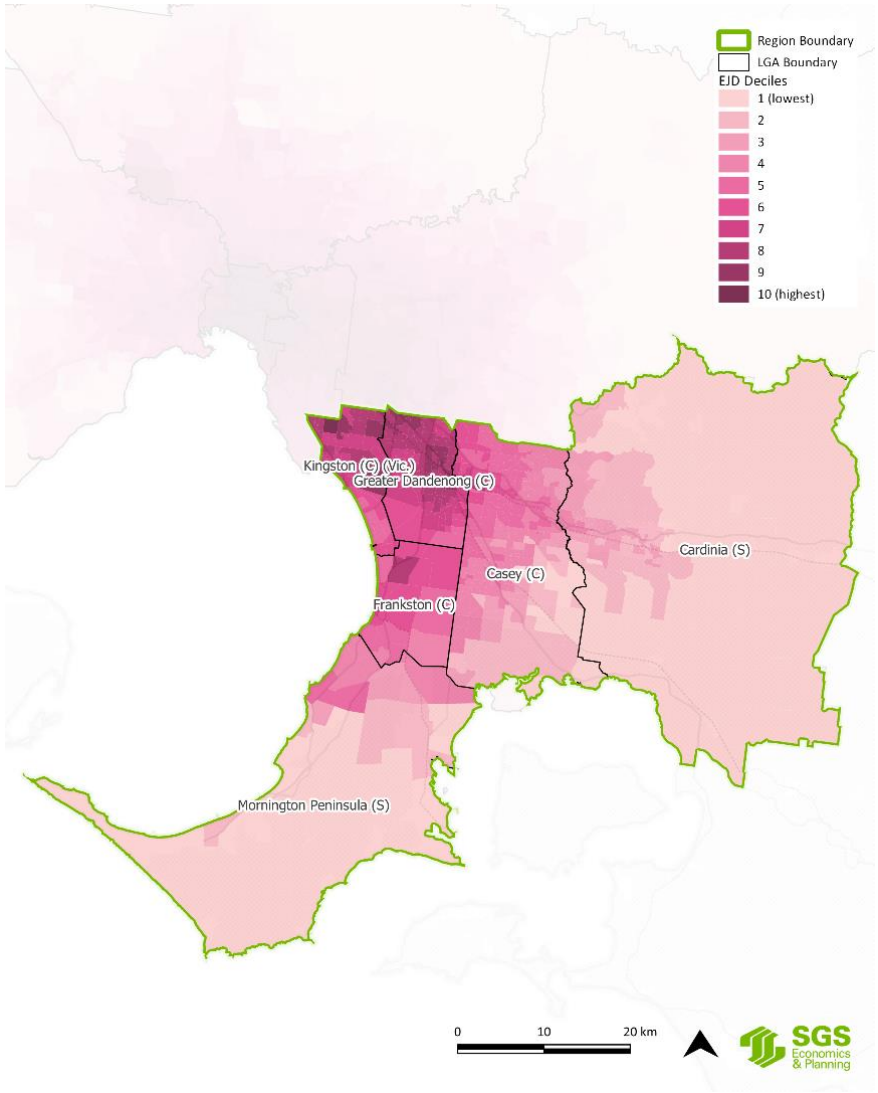
An area with fewer jobs can also have high EJD by locating near another area with high EJD.

Higher EJD is also an indicator of increased agglomeration, which is the economic benefit caused by interaction and technical spill overs between firms. This is particularly relevant to knowledge-Intensive industries.

Figure 24 and Figure 25 show EJD as of 2016 and by sector.

- The Greater Dandenong and Kingston LGAs have relatively high levels of EJD, particularly with respect to industrial and knowledge-Intensive industries. This is driven by proximity to the Dandenong and Monash NEICs and good access to the rail network connecting to the Melbourne CBD.
- The Frankston and Casey LGAs have moderate levels of EJD while the Cardinia and Mornington Peninsula LGAs have low levels due to relatively low employment and poorer transport connections.
- The spatial distribution of EJD levels for the population-serving sector shows the least variation, as these jobs are more dispersed across the region.

FIGURE 24: EFFECTIVE JOB DENSITY (2018)



Source: SGS Economics and Planning, 2018.

FIGURE 25: EFFECTIVE JOB DENSITY BY SECTOR (2018)

Source: SGS Economics and Planning, 2018.

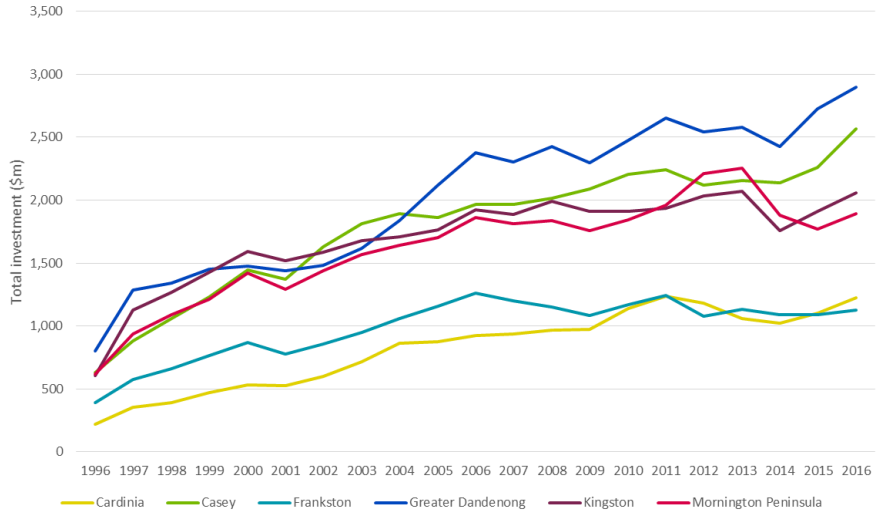
Capital investment

Capital Investment refers to funds invested in enterprise. High levels of investment indicate a growing economy as firms allocate more funds to their businesses.

Figure 20 shows total capital investment for the Southern Metro Region LGAs.

- Capital investment in the City of Greater Dandenong has been the highest within the Southern Metro Region for almost every year between 1996 and 2016.
- The City of Casey has attracted increasing levels of investment each year, likely driven by the construction boom. Conversely, the Shire of Cardinia, also a growth area, has not outpaced the regional trend.
- Growth in capital investment has stagnated in the City of Frankston, which had the lowest level in the Southern Metro Region in 2016.

FIGURE 26: TOTAL INVESTMENT (1996-2016)

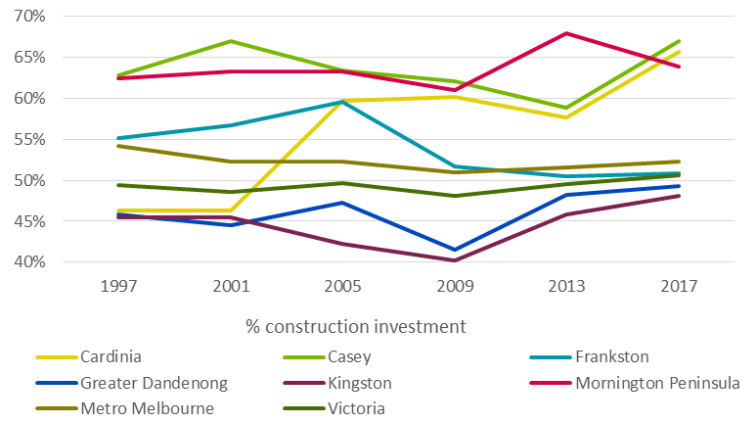


Source: NIEIR 2018

Figure 27 and Figure 28 show the share of total investment that is comprised of construction investment and equipment investment respectively.

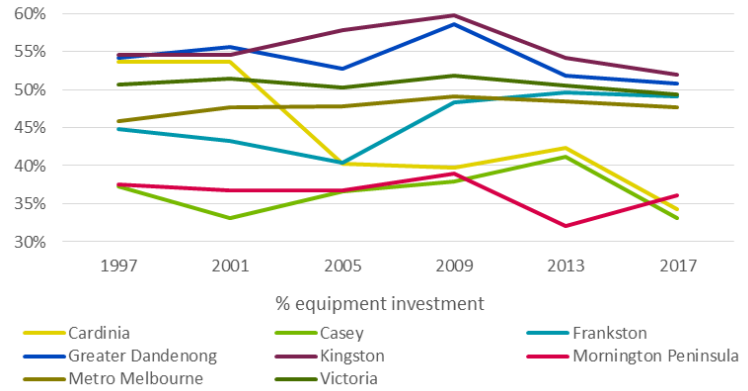
- Relative levels have remained stable across all LGAs in the Southern Metro Region between 1996 and 2017.
- LGAs with economic strengths, such as Greater Dandenong and Kingston, have a high proportion of investment in equipment (above the Victorian average).
- The New Growth Area LGAs of the City of Casey and the Shire of Cardinia have a high proportion of construction investment.
- The Shire of Mornington Peninsula also has a high share of construction investment. This is due to residential construction, driven by migration to the coast or tourist accommodation.

FIGURE 27: CONSTRUCTION INVESTMENT (1996-2017)



Source: NIEIR 2018

FIGURE 28: EQUIPMENT INVESTMENT (1996-2017)



Source: NIEIR 2018

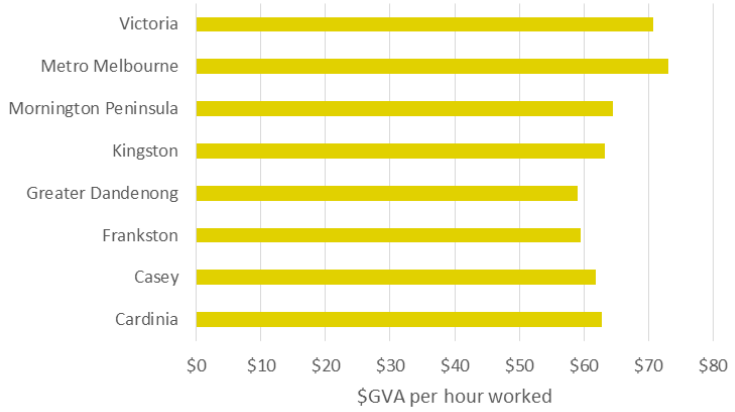
Labour productivity

Labour productivity is a measure of efficiency of labour, expressed as the GVA generated per hour worked. Variations in labour productivity can be due to factors such as worker skills, quality of capital, infrastructure available, and adoption of technology

A location's productivity helps to understand how efficient and effective its workers are at producing goods and services.

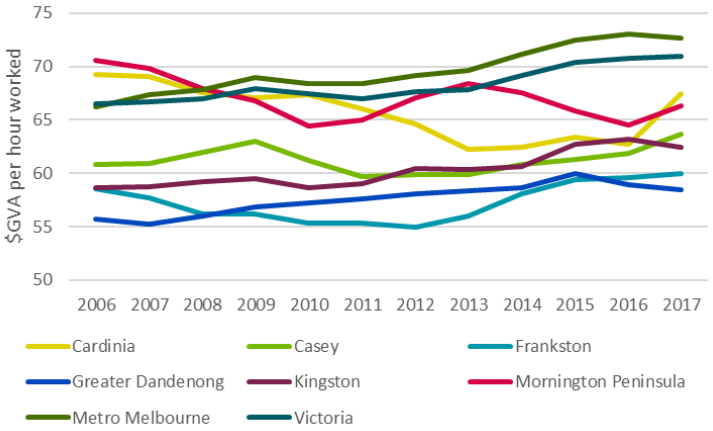
- Productivity in the Southern Metro Region is lower than both the metropolitan and Victorian averages.
- The City of Greater Dandenong exhibits the lowest labour productivity of the region. This is likely a result of the concentration of industrial employment in the area, which is typically less productive than the knowledge-intensive or health and education sectors.
- Labour productivity in the Southern Metro Region has not kept pace with metropolitan and Victorian growth, with many LGAs stagnating or becoming less productive.
- As illustrated in Figure 29, the most productive areas of the region are in the Frankston LGA, around the Frankston Hospital and Monash University Peninsula Campus.

FIGURE 29: LABOUR PRODUCTIVITY BY LGA (2016)



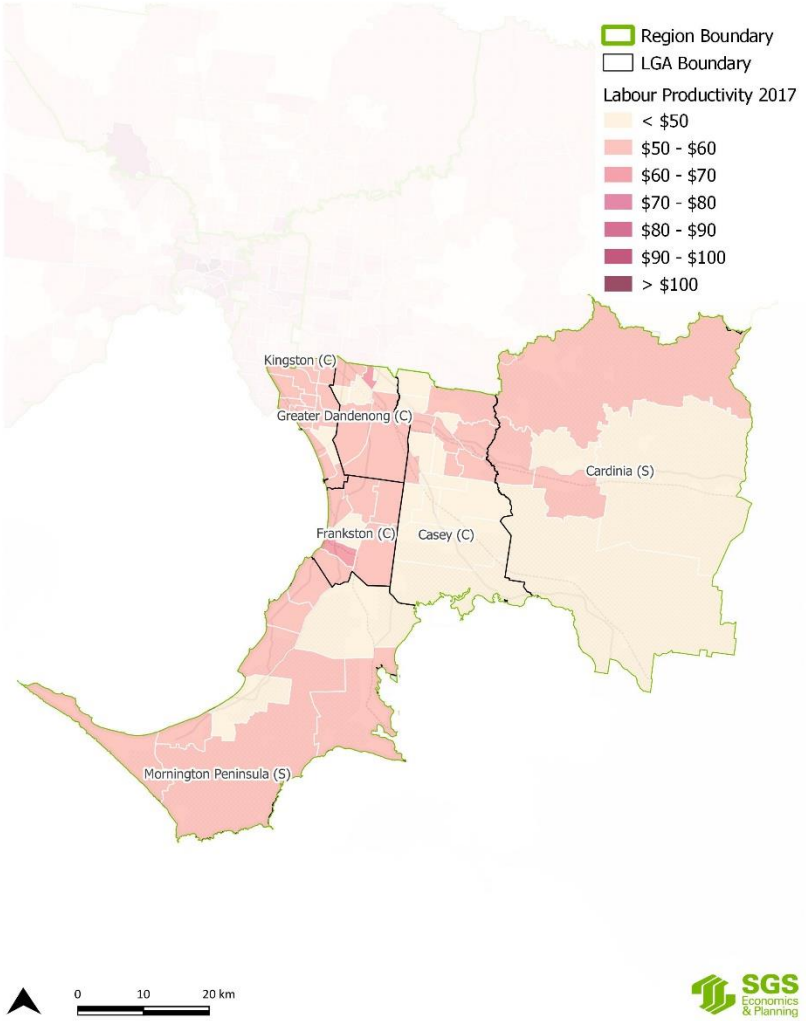
Source: ABS Census 2016

FIGURE 30: LABOUR PRODUCTIVITY (2006-2017)



Source: NIEIR 2018

FIGURE 31: LABOUR PRODUCTIVITY (2016)



Source: ABS Census 2016

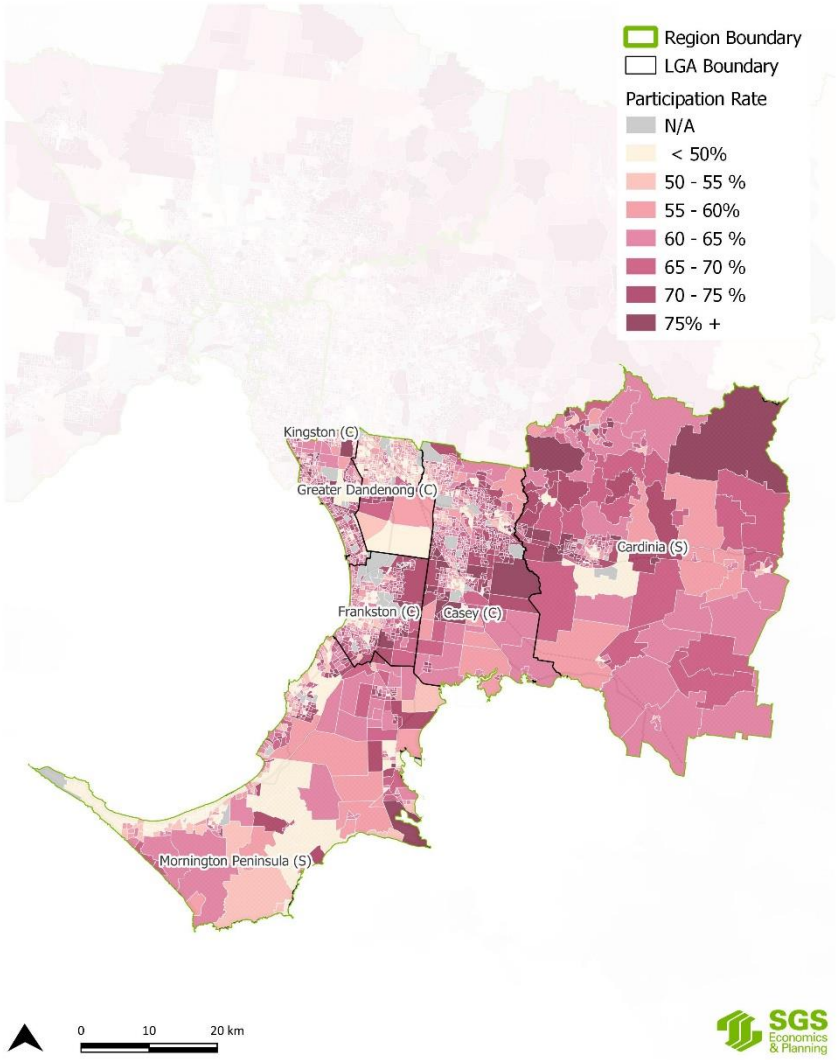
Participation rate

The participation rate is a measure of the portion of the population that is active in the economy's labour force. It refers to the proportion of the total working age population that is either employed or are actively looking for work. The participation rate helps to understand labour utilisation and dependency, and the strength of the local workforce.

Figure 32 shows the participation rate by SA1 in 2016. As a benchmark, the participation rate of Victoria and metropolitan Melbourne is 56 per cent and 62 per cent respectively.

- Participation rates are highly varied across the LGAs, highest in the residential areas around metropolitan and major activity centres (for example, Cranbourne and Narre Warren-Fountain Gate).
- The participation rate in the Shire of Mornington Peninsula is relatively low, reflecting the older demographic of the area.

FIGURE 32: PARTICIPATION RATE BY SA1 (2016)



Source: ABS Census 2016

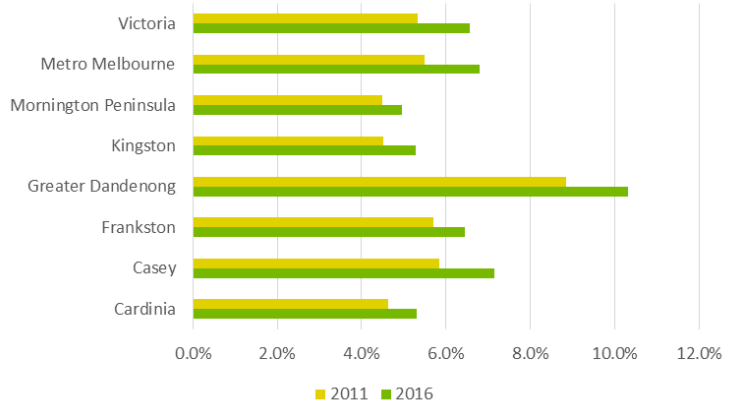
Unemployment

The unemployment rate is a measure of the people in the labour force actively looking for work. In the Southern Metro Region, employment and skills levels have been gradually increasing in line with the metropolitan Melbourne and Victorian trends (see Figure 6).

Figure 33 shows the change in the unemployment rate from 2011 to 2016, while Figure 34 shows the spatial distribution of unemployment rates in 2016.

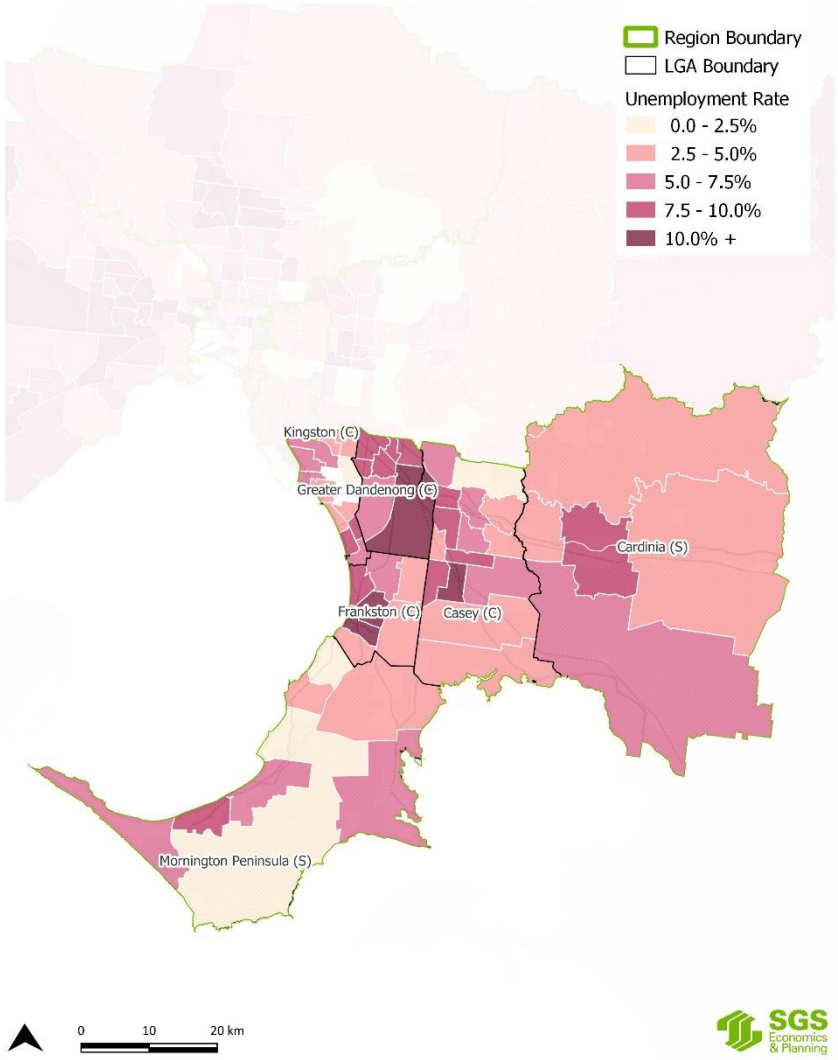
- The rate of unemployment has increased in all LGAs across the Southern Metro Region between 2011 and 2016, in line with broader trends across Victoria.
- The most significant growth in the unemployment rate was seen in Greater Dandenong and Casey LGAs, with Greater Dandenong LGA having the highest rate of unemployment.
- Mornington Peninsula, Kingston and Cardinia LGAs have the lowest rates of unemployment, and are below the metropolitan average.

FIGURE 33: UNEMPLOYMENT RATE BY LGA (2011 AND 2016)



Source: ABS Census 2011 and 2016.

FIGURE 34: UNEMPLOYMENT RATE (2016)



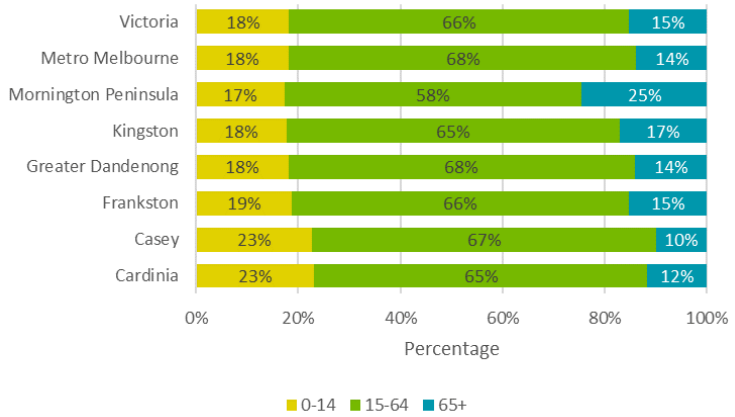
Source: Australian Government, Department of Jobs and Small Business 2018

Change in working age population

Working age population is defined as the population aged between 15 and 64. The proportion of working age population in an area provides an insight into its labour force composition. Figure 35 shows the age distribution in 2016, while Figure 36 presents the share of change (between 2011 and 2016) driven by each age group.

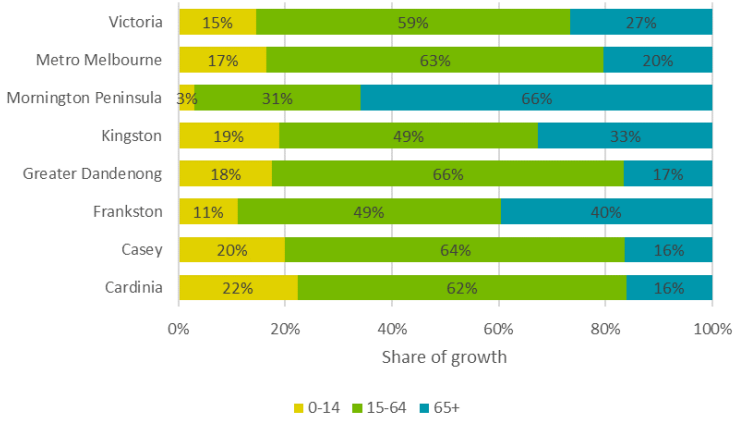
- LGAs in the Southern Metro Region, except the City of Greater Dandenong, have a lower share of working age population compared to the metropolitan average.
- The Shire of Mornington Peninsula has the lowest share of its population within the working age group.
- Between 2011 and 2016, the share of growth in the number of people of working age exceeded the metropolitan average, within Greater Dandenong and Casey LGAs having the highest growth in this age group.
- Interpreting the data by working age has some limitations in that it does not include people aged over 65 who are still in the workforce.

FIGURE 35: AGE GROUP POPULATION DISTRIBUTION (2016)



Source: ABS Census 2016, SGS Economics and Planning, 2018

FIGURE 36: SHARE OF POPULATION CHANGE BY AGE (2011-2016)



Source: ABS Census 2011 and 2016, SGS Economics and Planning, 2018

4.3 Economic wellbeing of residents

Household income

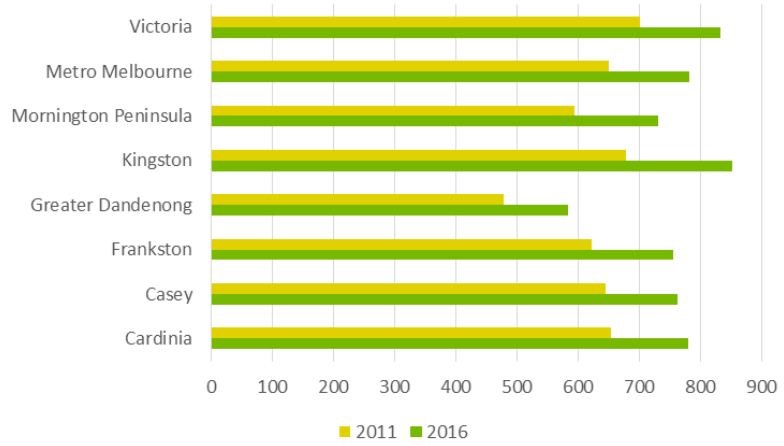
Figure 36 and Figure 38 show the change in equivalised[3] total weekly household income by LGA in the Southern Metro Region between 2011 and 2016.

Household income is an essential indicator to understand the economy of a region. Equivalised total weekly household income is used to analyse the income changes of residents in the Southern Metro Region between 2011 and 2016.

- The equivalised total weekly income in the Southern Metro Region increased between 2011 and 2016 in line with metropolitan Melbourne and Victoria.
- As shown in Figure 38, household income is lower in the LGAs of Greater Dandenong, Mornington Peninsula and Frankston than other LGAs in the Southern Metro Region.
- Except for the City of Casey, LGAs in the Southern Metro Region saw a growth rate in household income that exceeded the metropolitan average.
- City of Kingston experienced the greatest percentage change in total household income from 2011 to 2016 and is the only LGA in the region with a household income above the metropolitan average in 2016.

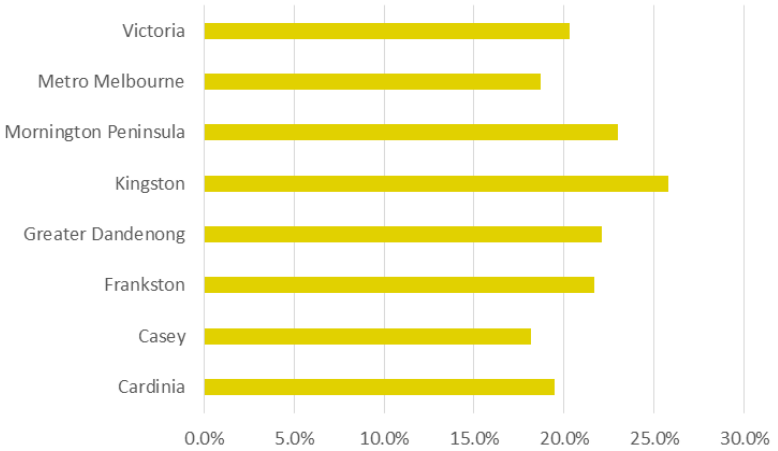
[3] Equivalised total household income is household income adjusted to facilitate comparison of income levels between households of differing size and composition, reflecting that a larger household would normally need more income than a smaller household to achieve the same standard of living.

FIGURE 37: MEDIAN TOTAL WEEKLY HOUSEHOLD INCOME (EQUIVALISED) (2011-2016)



Source: ABS Census 2011 and 2016

FIGURE 38: CHANGE MEDIAN TOTAL WEEKLY HOUSEHOLD INCOME (EQUIVALISED) (2011-2016)



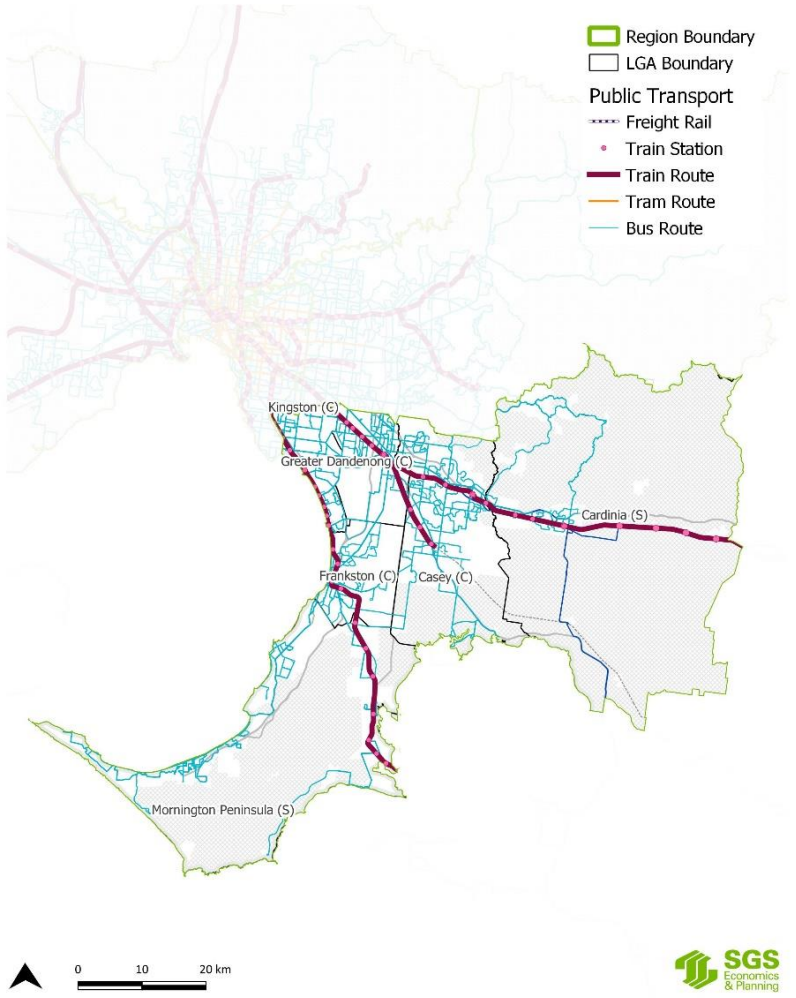
Source: ABS Census 2011 and 2016

Public transport

Figure 39 illustrates the public transport routes that service the Southern Metro Region.

- The inner areas of the Kingston, Greater Dandenong and Cardinia LGAs are connected by train.
- The Frankston/Stony Point and Cranbourne-Pakenham train lines form important radial linkages into the CBD and inner Melbourne.
- Regional rail services provide access to Gippsland and beyond, to Bairnsdale and from V/Line stations in the east of the region to inner Melbourne. Public transport hubs in the suburbs of Dandenong and Pakenham provide connections between regional and metro services.
- There are no tram services in this region.
- The coverage of the bus network indicates a relatively even spread of services; however, there is less coverage from east to west which connect activity centres and lack of interconnecting services with rail corridors.
- A number of SmartBus services operate in the region including Mordialloc-Altona, Chelsea-Airport West and Frankston-Melbourne Airport.
-

FIGURE 39: PUBLIC TRANSPORT ROUTES (2017)



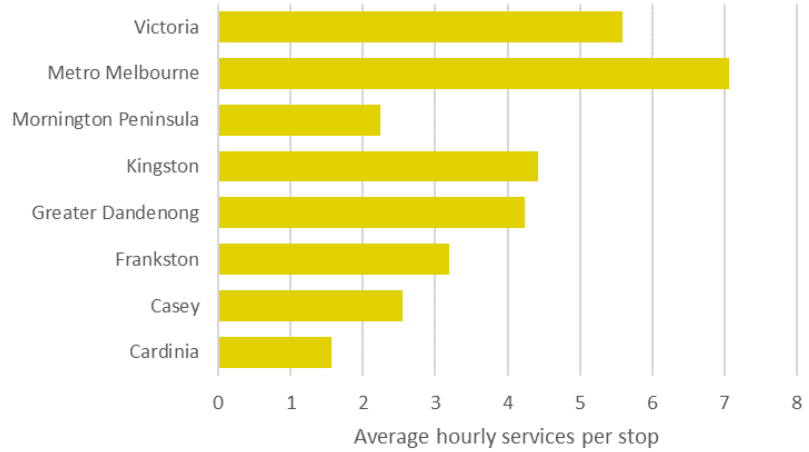
Source: Public Transport Victoria

Note: The Stony Point rail line, which runs from Stony Point to Frankston,, is not electrified and does not provide the same level of service as the Frankston train line.

Figure 41 illustrates the public transport service levels, reflecting service frequency and effective access the transport service provides.

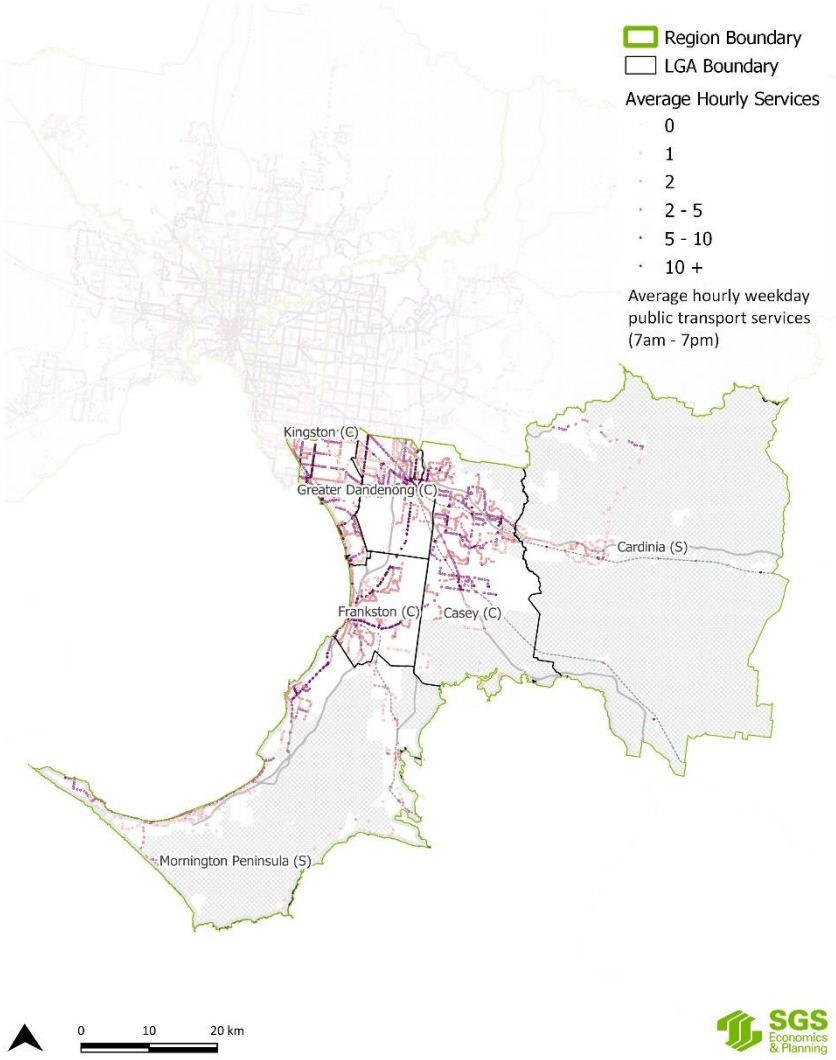
- The Cardinia and Mornington LGAs have the lowest frequency and coverage of public transport services.
- The Kingston, Greater Dandenong and Frankston LGAs have the highest frequency of public transport services, reflecting their position closer to Melbourne CBD.
- Higher frequency services are typically those connecting the Melbourne CBD, with few high-frequency services connecting orbitally.
- Areas serviced by heavy rail have higher public transport frequencies.

FIGURE 40: AVERAGE HOURLY SERVICES PER STOP (2017)



Source: Public Transport Victoria 2017

FIGURE 41: PUBLIC TRANSPORT SERVICE LEVELS (2017)



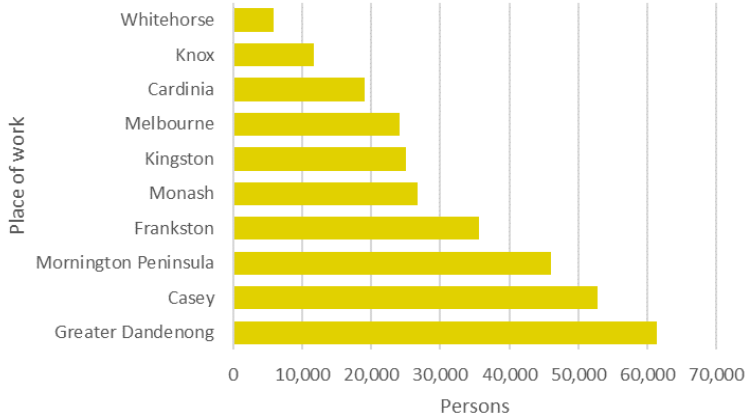
Source: Public Transport Victoria

Travel origins and destinations

Travel origins and destinations refer to the journey-to-work origins and destinations. Figure 42 and Figure 43 illustrate the most common work destinations and origins for residents in the Southern Metro Region, respectively.

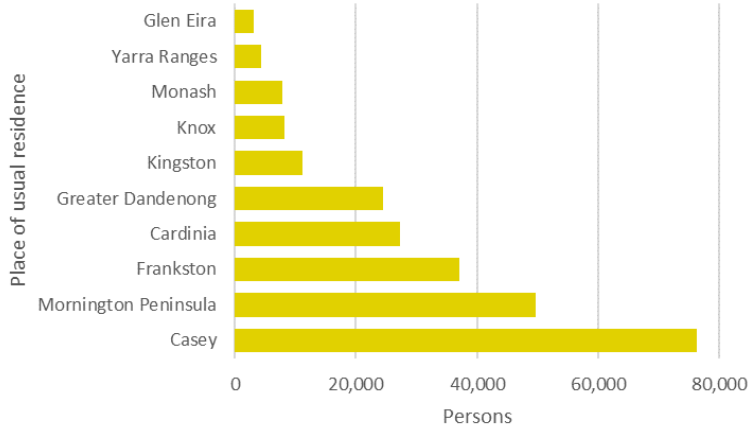
- Greater Dandenong, Casey and Mornington Peninsula LGAs are the most common work destinations for Southern Metro residents.
- Kingston and Cardinia LGAs are less common destinations, with more residents travelling out of the Southern Metro Region to Monash LGA (which contains the Monash NEIC).
- Many residents travel to the City of Melbourne, while the Knox and Whitehorse LGAs are also in the top-10 work destinations.
- The top three residential locations for people who work in the Southern Metro Region are Casey, Mornington Peninsula and Frankston LGAs.
- A substantial number of workers also travel from outside the region from areas such as the Knox, Monash, Yarra Ranges and Glen Eira LGAs.

FIGURE 42: TOP 10 WORK DESTINATION (PLACE OF WORK) BY LGA (2016)



Source: ABS Census 2016

FIGURE 43: TOP 10 WORKER ORIGINS BY LGA (2016)

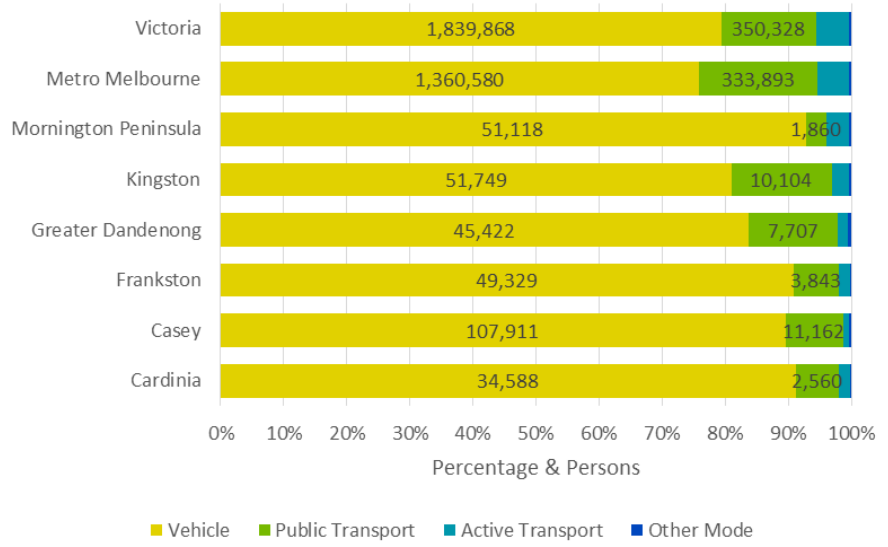


Source: ABS Census 2016

Figure 44 shows the modes of journey to work of residents in the Southern Metro Region.

- Vehicles were the dominate form of transport for journey to work in all LGAs and at higher rates than the metropolitan Melbourne and Victorian average.

FIGURE 44: MODES OF JOURNEY TO WORK (2016)



Source: ABS Census 2016

Freight and road networks

The rail and road network of arterial roads and freeways is the supporting infrastructure for the local, regional, interstate and overseas movement of goods.

Figure 45 shows the freight and road network in the Southern Metro Region. There is a lack of orbital higher order arterial roads linking key radial connections that originate in Melbourne CBD.

Areas along the Mornington Peninsula are better connected by freight and road networks, while inland areas to the east have relatively poor connectivity.

FIGURE 45: FREIGHT AND ROAD NETWORKS

Source: SGS Economics and Planning 2018

Freight and business trips

Table 7 illustrates the origins and destinations of freight and business trips by LGA.

- In 2015, business and freight trips to and from the City of Greater Dandenong (particularly Dandenong NEIC and Dandenong South SSIP) far exceeded the number of trips to and from other LGAs in the Southern Metro Region.
- City of Kingston also has many business and freight trip origin and destination journeys as it is home to Moorabbin Airport.
- The Greater Dandenong and Kingston LGAs have a higher number of trip origins than destinations, likely reflecting the higher value of exports from these LGAs. The Shire of Mornington is a key freight and business trip destination due to the location of the Port of Hastings.

TABLE 7: ORIGINS AND DESTINATIONS OF TRIPS BY TYPE AND LGA (2015)

	Freight		Business	
LGA	2015 Origin	2015 Destination	2015 Origin	2015 Destination
Cardinia	3,275	4,458	3,370	5,661
Casey	7,643	12,588	7,533	10,840
Frankston	6,281	12,304	6,327	9,832
Greater Dandenong	28,557	17,176	28,948	22,660
Kingston	18,729	14,268	18,722	12,420
Mornington Peninsula	1,901	21,016	1,844	24,400

Source: MABM (KMPG) 2018* Please note there is no data available for Kingston.

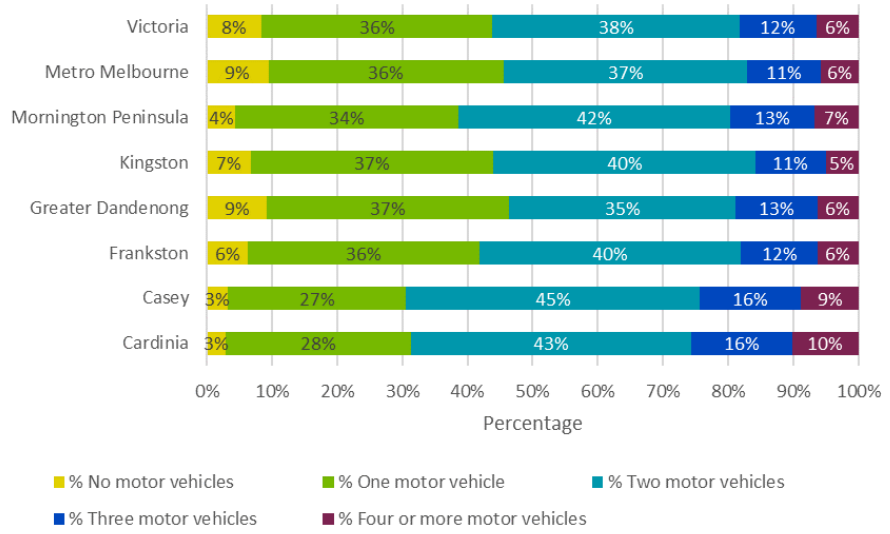
Households with vehicles

The average number of vehicles households own closely correlates with the diversity of transport modes available in an area. Households in areas with fewer transport options tend to own more motor vehicles.

Figure 46 shows the percentage of households with motor vehicles for each LGA in 2016. For the additional households in each LGA (between 2011 and 2016), Figure 47 presents the share of change captured by each ownership group

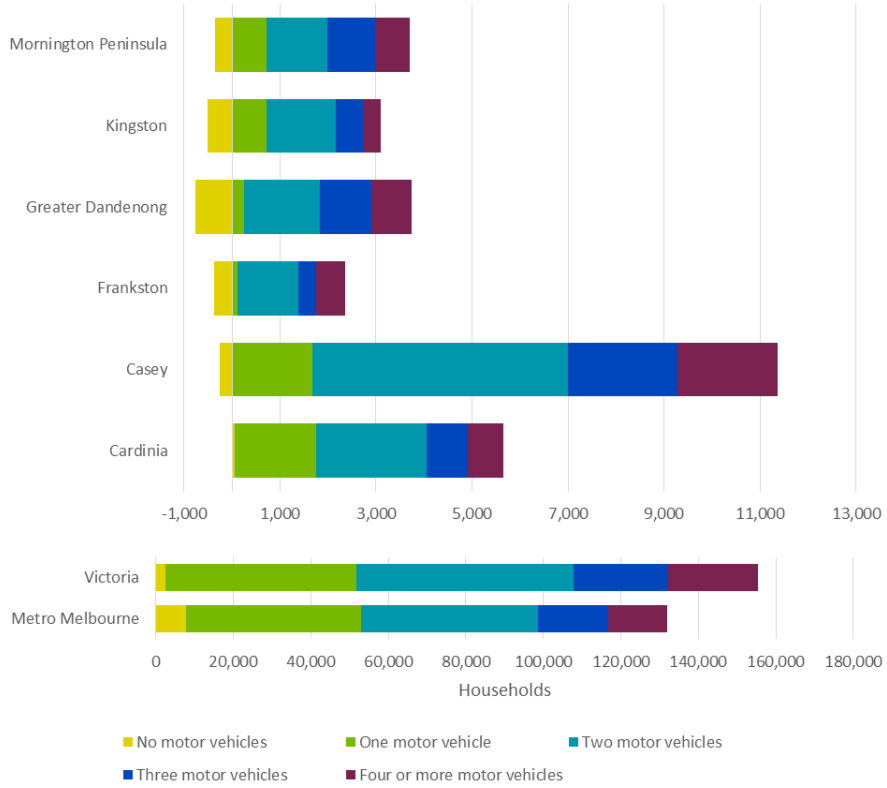
- All LGAs in the Southern Metro Region have higher percentages of households with motor vehicles than the metropolitan average.
- Between 2011 and 2016, all LGAs except the Shire of Cardinia saw car ownership (of at least one car) exceed household growth. Negative shares indicate that the number of households that did not own a motor vehicle decreased, even as the total number of households increased.
- Car dependency in the Southern Metro Region is significantly higher than the metropolitan average.

FIGURE 46: PERCENTAGE OF HOUSEHOLDS WITH MOTOR VEHICLES (2016)



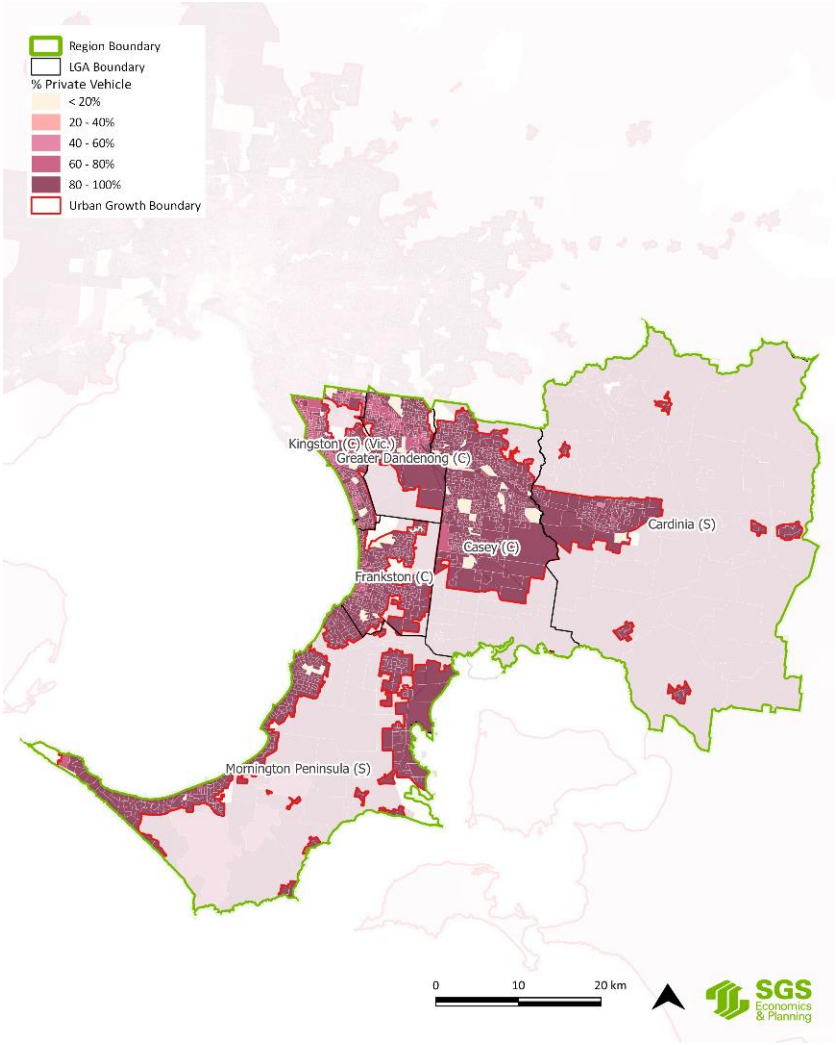
Source: ABS Census 2016.

FIGURE 47: CHANGE IN HOUSEHOLD MOTOR VEHICLE OWNERSHIP (2011-2016)



Source: ABS Census 2016

FIGURE 48: JOURNEY TO WORK BY PRIVATE VEHICLES (2016)



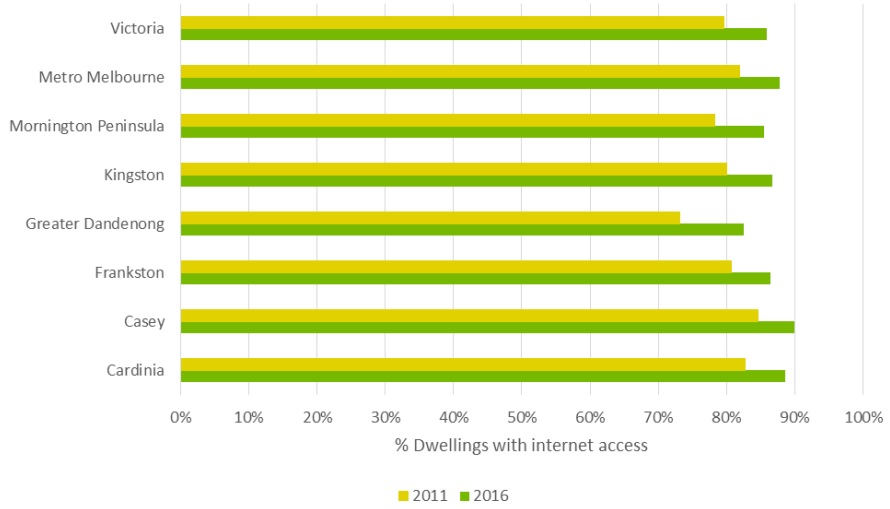
Source: ABS Census 2016

Access to internet

Access to internet suggests level of access to and engagement with digital media and communication of households, as well as the level of access of households to online services, including health and education.

- There is little difference in the percentage of households with access to the internet between metropolitan Melbourne and Southern Metro Region.
- The percentage of dwellings with internet access has generally increased from 2011 to 2016 across the Southern Metro Region.
- There was a notable increase in access to the internet in the City of Greater Dandenong. However, it still exhibits the lowest rate of access.

FIGURE 49: DWELLINGS WITH INTERNET ACCESS (2011-2016)



Source: ABS Census 2011 and 2016

4.4 Employment and skills

Skill levels

The Australian and New Zealand Standard Classification of Occupations (ANZSCO) classifies employment skill levels into 5 categories, with Skill Level 1 being the highest level of skill and 5 being the lowest. These are summarised in Table 8.

TABLE 8: SKILL LEVEL DESCRIPTIONS

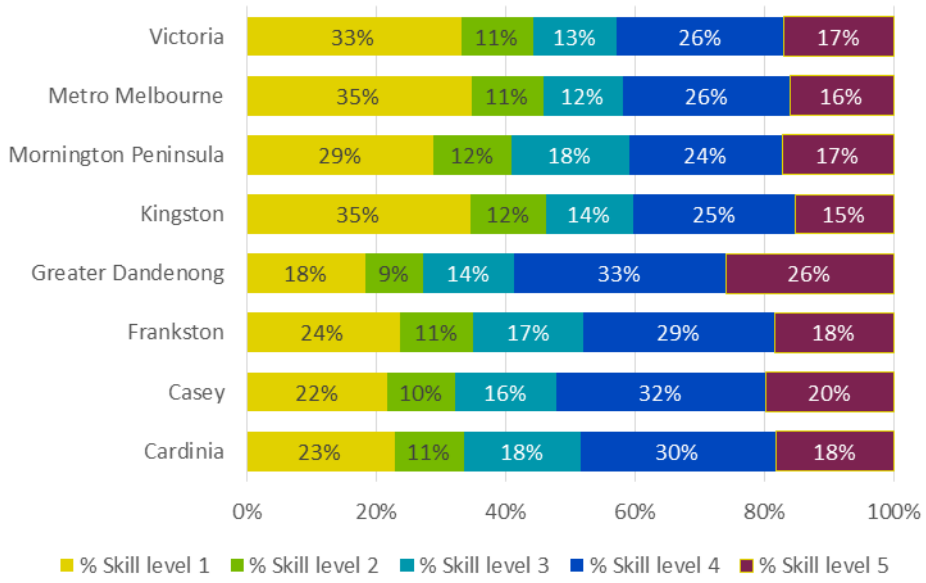
Skill Level	Skill Level Description
Skill Level 1	Occupations at Skill Level 1 have a level of skill commensurate with a bachelor's degree or higher qualification. At least five years of relevant experience may substitute for the formal qualification.
Skill Level 2	Occupations at Skill Level 2 have a level of skill commensurate with either an Associate Degree, Advanced Diploma or Diploma. At least three years of relevant experience may substitute for the formal qualifications listed above.
Skill Level 3	Occupations at Skill Level 3 have a level of skill commensurate with a Certificate IV or Certificate III including at least two years of on-the-job training. At least three years of relevant experience may substitute for the formal qualifications listed above.
Skill Level 4	Occupations at Skill Level 4 have a level of skill commensurate with Certificate II or III. At least one year of relevant experience may substitute for the formal qualifications listed above.
Skill Level 5	Occupations at Skill Level 5 have a level of skill commensurate with Certificate I or compulsory secondary education. In some instances, no formal qualification or on-the-job training may be required.

Source: ANZSCO

Figure 50 shows the percentage of resident workers with each skill level for each of the LGAs in the Southern Metro Region in 2016. Figure 51 presents the share of change captured by each skill level between 2011 and 2016.

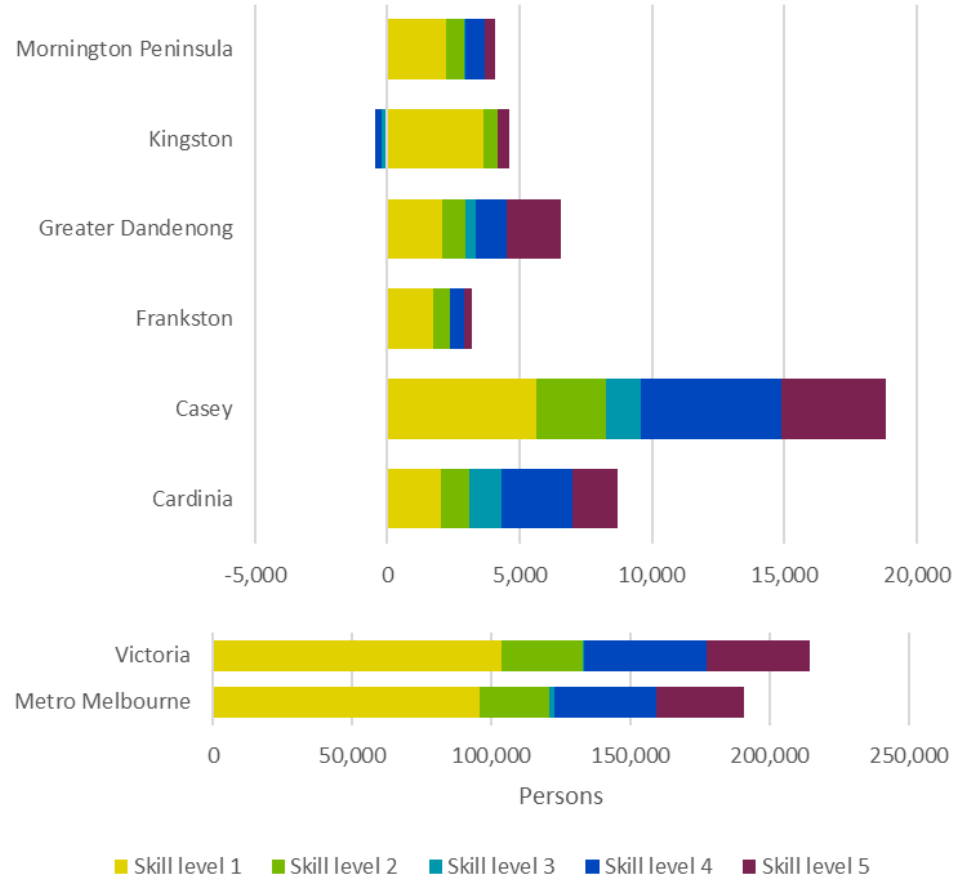
- The LGAs of Kingston, Mornington Peninsula and Frankston had the highest share of their population employed in Skill Level 1 jobs in 2016.
- City of Kingston is the only LGA with an equivalent share of Skill Level 1 residents compared to the metropolitan average.
- The City of Greater Dandenong had a higher share of population employed in Skill Level 4 and 5 jobs in 2016, reflecting the larger proportion of industrial and manufacturing employment available in this LGA.
- Skill Level 1 jobs constituted the largest share of worker growth in every LGA in the Southern Metro Region between 2011 and 2016, consistent with metropolitan trends. This can be partly explained by Australian immigration policy which is increasingly focused on attracting skilled migration.
- The Kingston and Frankston LGAs both saw a decrease in the absolute number of people with Skill Levels 3 and 4. This coincided with a large share of growth being driven by Skill Levels 1 and 2 workers.

FIGURE 50: SKILL LEVELS AS A PERCENTAGE OF TOTAL WORKING POPULATION (PLACE OF USUAL RESIDENCE) (2016)



Source: ABS Census 2016

FIGURE 51: SHARE OF CHANGE IN SKILL LEVELS (PLACE OF USUAL RESIDENCE) (2011-2016)



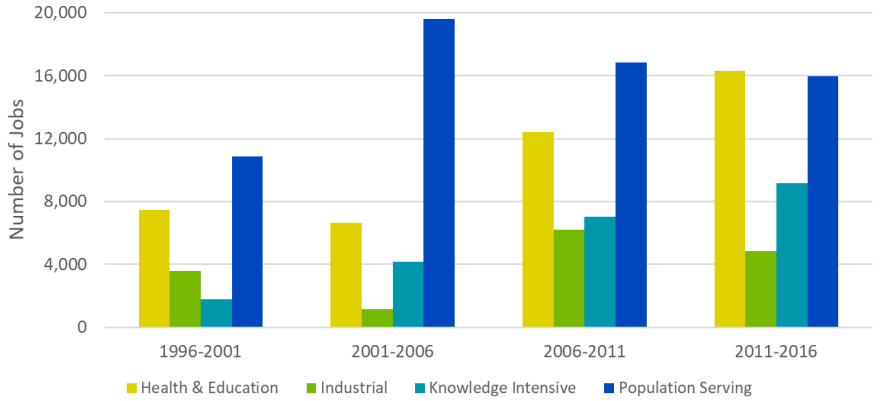
Source: ABS Census 2011 and 2016

Employment concentration

Figure 52 shows the historic change in the number of jobs by the four industrial classifications. Figure 53 illustrates the changes in the share of each sector in the Southern Metro Region between 1996 and 2016.

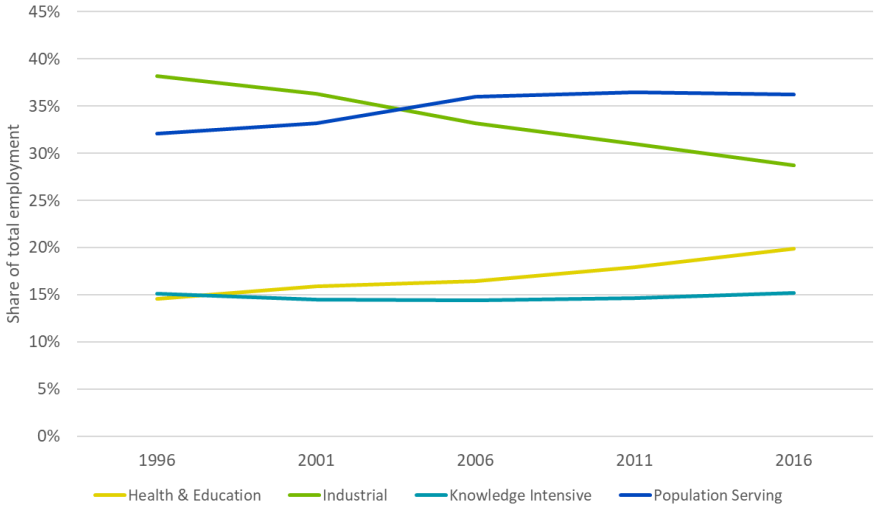
- Since 2001, growth in the industrial sector has been weakest, consistent with structural economic changes and metropolitan trends. This has seen its share of employment in the Southern Metro Region decline steadily since 1996, by almost 10 per cent.
- Despite decreases, the industrial sector holds the second highest share of employment in the Southern Metro Region, double the number of knowledge-intensive jobs in 2016.
- Population-serving industries have contributed the greatest number of new jobs to the Southern Metro Region. This has been driven by the rapid residential expansion of the South Eastern Growth Corridor over the past two decades.
- Consistent with metropolitan trends, the health and education sector has grown significantly, adding the most jobs of the four classifications to total employment between 2011 and 2016.

FIGURE 52: CHANGE IN NUMBER OF JOBS BY INDUSTRY CLASSIFICATION (1996-2016)



Source: SGS Economics and Planning, 2018.

FIGURE 53: INDUSTRY SHARE OF EMPLOYMENT IN SOUTHERN METRO REGION (1996-2016)



Source: SGS Economics and Planning, 2018.

Location quotient

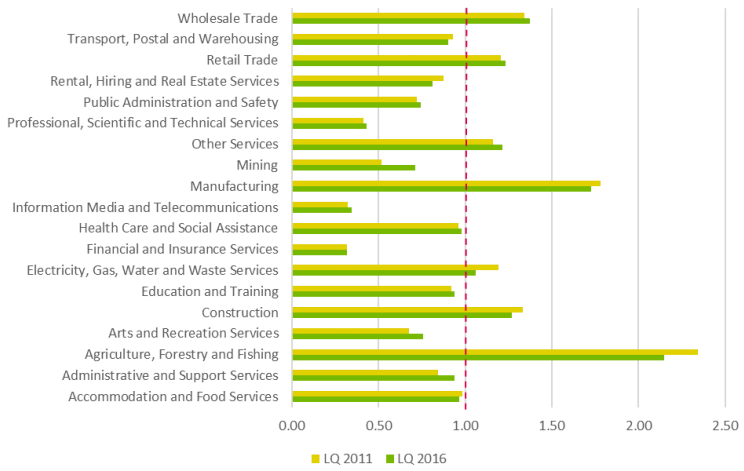
Location quotient (LQ) is used to measure the relative concentration of industries in an area compared to a benchmark region. In this report, metropolitan Melbourne is the benchmark against which the Southern Metro Region is compared.

An LQ of less than 1 means an industry is underrepresented in the Southern Metro Region compared to metropolitan Melbourne. An LQ greater than 1 means that the Southern Metro Region has a higher concentration of that industry compared to metropolitan Melbourne. LQs in the Southern Metro Region are broken down into 19 industries, presented in Figure 54.

Figure 55 presents the LQ for the broad industry categories within the Southern Metro region.

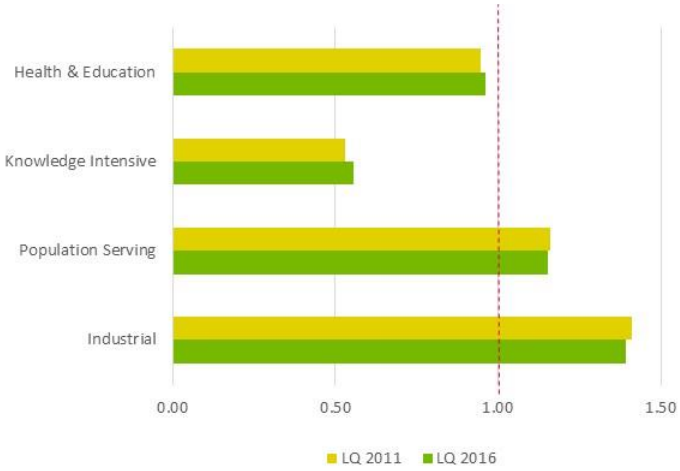
- The Southern Metro Region is underrepresented in knowledge-intensive sector, particularly in professional services; finance and insurance services; information media and technology; and arts and recreation services.
- Industrial sectors, such as manufacturing and wholesale trade, are more concentrated in the Southern Metro Region (i.e. LQs greater than 1). Significant industrial precincts such as the Dandenong SSIP contribute to this specialisation.
- Despite their overrepresentation (compared to metropolitan Melbourne), the LQ of the industry sector in the Southern Metro Region slightly decreased over the same period as residential development attracted a greater number of health and education jobs.
- Despite a recent decrease, the region has a strong specialisation in the agriculture, forestry and fishing industry, with an LQ over 2.
- The LQ for health and education sector in the Southern Metro Region increased between 2011 and 2016 to almost 1. This is also reflected in the region's business formation trend, where health and education has made up the largest proportion between 2009 and 2017 in business formation growth.

FIGURE 54: LOCATION QUOTIENT BY INDUSTRY (2011-2016)



Source: SGS Economics and Planning, 2018

FIGURE 55: LOCATION QUOTIENT BY SECTOR (2011-2016)



Source: SGS Economics and Planning, 2018.

5. SOCIAL

SOCIAL INDICATORS

The Infrastructure Victoria social indicators that underpin this section are:

- Recent population growth
- Population by age group over time
- Age dependency
- Migration
- Cultural mix
- Housing price
- Housing typology
- SEIFA – Index of Relative Socio-Economic Disadvantage
- DOTE Index
- Education levels
- Engagement with work or study
- Hospital inpatient separations
- Access to Community Care Services
- Mental health and drug use
- Home and Community Care Services
- Ambulatory Care Sensitive Conditions
- Access to general practitioners
- Type 2 diabetes
- Life expectancy at birth
- Birth weight
- Immunisation
- Child protection substantiations
- Development vulnerability
- Crime
- Wellbeing

REGIONAL OVERVIEW

- Significant population growth in the New Growth Area LGAs of Casey and Cardinia, supported largely by detached housing at medium densities.
- A diverse, multicultural population in the City of Greater Dandenong.
- Newly-developed greenfield areas are home to relatively young residents.

SOCIAL STRENGTHS

- Relatively low housing costs, rental and property prices in outer areas and New Growth Areas.
- Increasing housing choice in Kingston and Dandenong LGAs.

SOCIAL CHALLENGES

- Areas of extreme socio-economic disadvantage in Dandenong, Casey and Mornington Peninsula LGAs.
- Rural areas including small towns in Cardinia and Mornington Peninsula shires share some of the characteristics of regional Victoria with higher rates of disadvantage, less diversity and fewer young people more likely to enter full time work than engage in further education.
- Relatively low rates of high school completion and youth engagement
- Poor mental and physical health outcomes, particularly in Frankston and Greater Dandenong LGAs.
- Poor early childhood outcomes in Frankston and Greater Dandenong LGAs.
- Older populations in Mornington Peninsula and Frankston LGAs.

5.1 Overview and key features

The Bunurong and Wurundjeri people of the Kulin Nation are the Traditional Owners of the lands that now make up the Southern Metro Region of Melbourne.

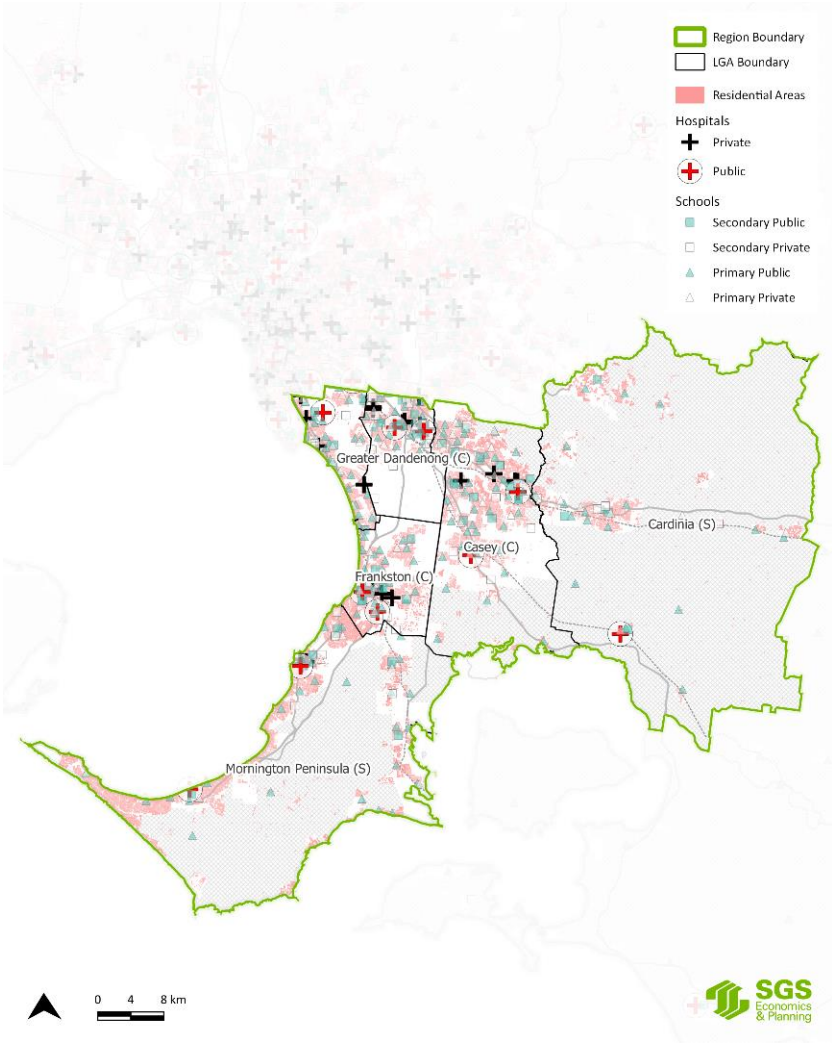
The coastal areas of the region were one of the richest available resource zones and were important to the pre-contact population of the region – providing an abundance of plant and animal materials. The deeply incised creeks and valleys provided the most advantageous settlement localities for Aboriginal people.

Today, the Southern Metro Region encompasses a range of communities, with settlement sprawling linearly along the coastline and eastwards along the Monash Freeway and Princes Highway.

A marked contrast exists between established and newly developing areas in the region. In the south are the relatively stable, yet ageing, seaside populations of Mornington Peninsula and Frankston LGAs. In northern areas, infill development around Dandenong MAC and large new residential subdivisions in Cranbourne and Packenham cater to the working-age population and new families.

The Southern Metro Region's levels of socio-economic disadvantage and advantage vary from areas of extreme disadvantage – such as much of the City of Greater Dandenong, pockets of Casey LGA and places like Hastings and Rosebud in Mornington Peninsula LGA – to large areas of Kingston and Mornington Peninsula LGAs that are very advantaged.

FIGURE 56: URBAN STRUCTURE



Source: Source: SGS Economics and Planning, 2018

5.2 Population demographics

Recent population growth

Current population and recent growth (2011 and 2016) are shown in Table 9.

- The City of Casey supported the largest population in the region in 2016.
- Casey and Cardinia LGAs, which contain Melbourne's south eastern growth corridor (both past and present), exhibited the most growth between 2011 and 2016. This accounted for 60 per cent of the region's total growth.
- The City of Greater Dandenong's population increased by almost 19,000 residents between 2011 and 2016, representing 15.1 per cent of total regional growth.
- The Frankston, Kingston, and Mornington Peninsula LGAs experienced lower growth of approximately 1.5 per cent annually
- These trends are reflected in the distribution of population growth across the location typologies.
- New Growth Areas presented the highest annual average growth rate, 27 per cent, with further growth in these locations planned. Middle and Outer Melbourne areas experienced more sustained rates of growth of approximately two per cent per annum.

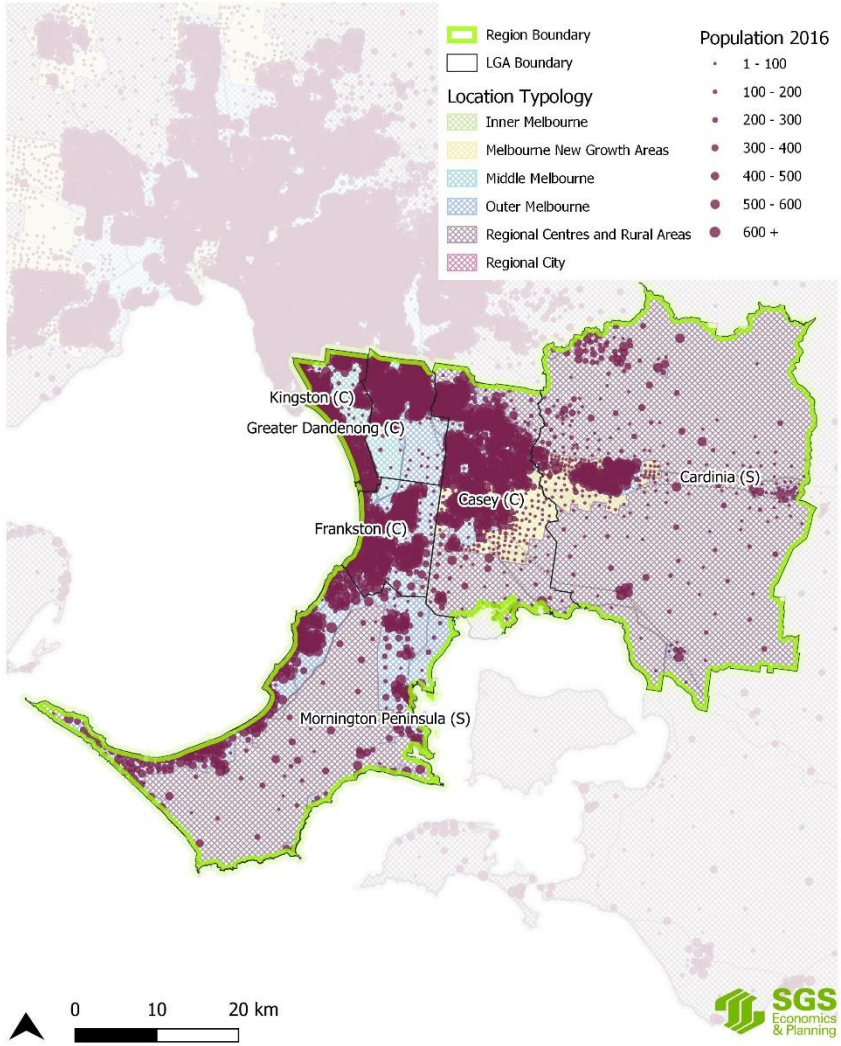
Figure 57 and Figure 58, overleaf, show existing and projected population density.

TABLE 9: POPULATION (2011 AND 2016)

	2011	2016	2011-16		
			AAGR	Change	% Regional
LGAs					
Cardinia	75,859	97,648	5.2%	21,789	17.5%
Casey	261,282	313,521	3.7%	52,239	42.0%
Frankston	130,350	139,511	1.4%	9,161	7.4%
Greater Dandenong	142,167	160,952	2.5%	18,785	15.1%
Kingston	148,304	159,023	1.4%	10,719	8.6%
Mornington Peninsula	149,271	160,862	1.5%	11,591	9.3%
Southern Metro Region	907,233	1,031,517	2.6%	124,284	100.0%
Location Typology					
Middle Melbourne	243,238	266,678	1.9%	23,440	18.9%
Outer Melbourne	599,700	661,258	2.0%	61,558	49.5%
Melbourne New Growth Areas	16,354	54,042	27.0%	37,688	30.3%
Metropolitan Rural Areas	47,783	49,378	0.7%	1,596	1.3%
Southern Metro Region	907,075	1,031,356	2.7%	124,281	100.0%
Metro Melbourne	**4,108,837**	**4,653,078**	**2.5%**	**544,241**	-
Victoria	**5,537,817**	**6,179,249**	**2.2%**	**641,432**	-

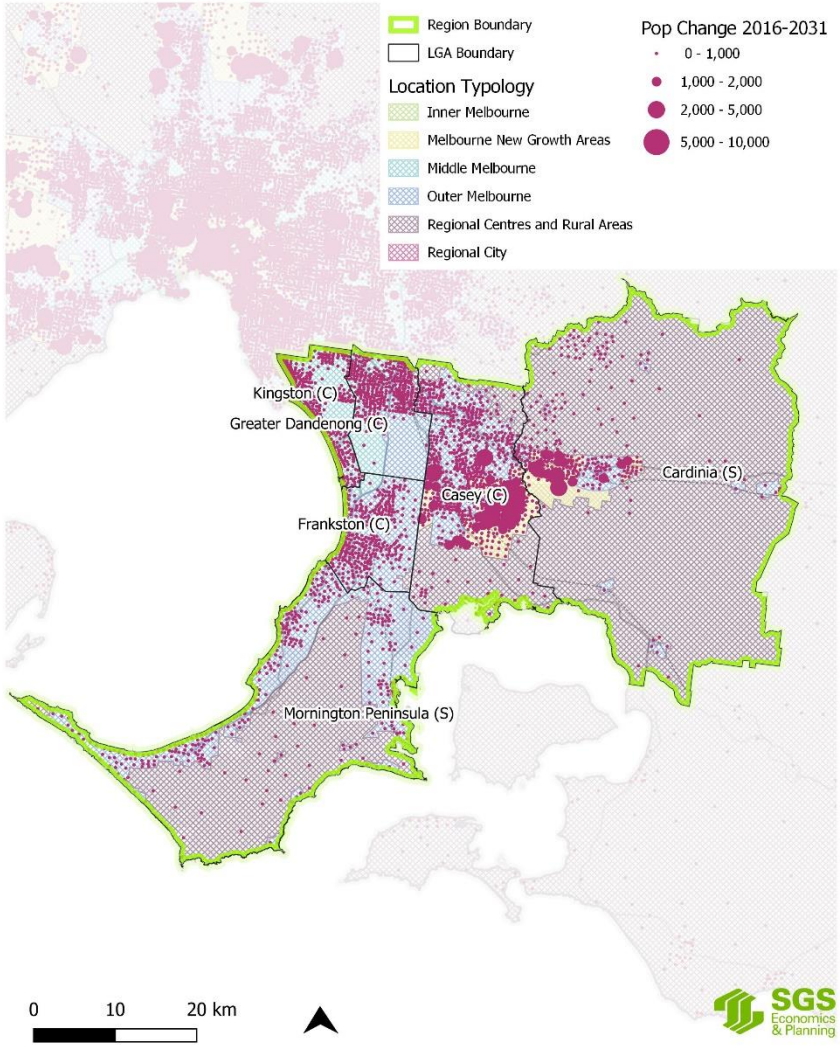
Source: SGS Economics and Planning, 2018 Note: The difference between the region totals of location typology and LGAs reflect different data grouping techniques to group small area data into target geographies

FIGURE 57: POPULATION DENSITY (2016)



Source: SGS Economics and Planning, based on Victoria in Future 2016 and SALUP17, TfV

FIGURE 58: PROJECTED POPULATION CHANGE (2016-2031)



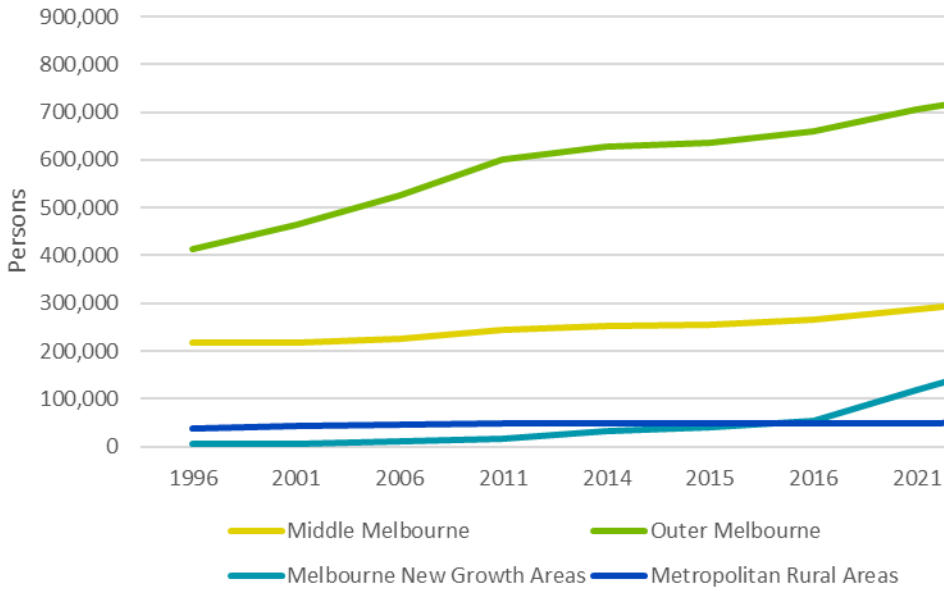
Source: SGS Economics and Planning, based on Victoria in Future 2016 and SALUP17, TfV

Forecast population growth

Figure 59 presents recent and forecast population growth by location typology.

- New Growth Areas are forecast to experience rapid growth between 2016 and 2031.
- The outer areas of the region will experience strong growth, while the middle areas are expected to show moderate growth consistent with recent trends.
- The population outside the Urban Growth Boundary (metropolitan rural areas) will remain stable to 2031.

FIGURE 59: FORECAST POPULATION CHANGE (1996-2031)



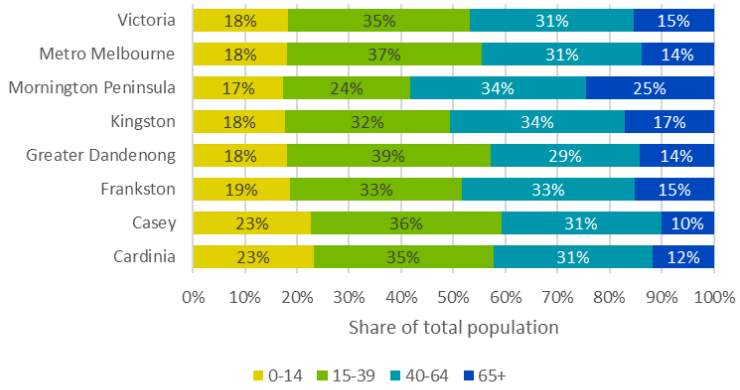
Source: SGS Economics and Planning, based on Victoria in Future 2018 and ABS (cat. 3218.0)

Population by age groups over time

Population by age group is presented in Figure 60.

- The Shire of Mornington Peninsula has the highest proportion of residents 65 and over, and the lowest proportion of children.
- New Growth Area LGAs, Casey and Cardinia, have the highest proportion of children, exceeding the metropolitan and State average.

FIGURE 60: PROPORTION OF POPULATION BY AGE GROUP (2016)

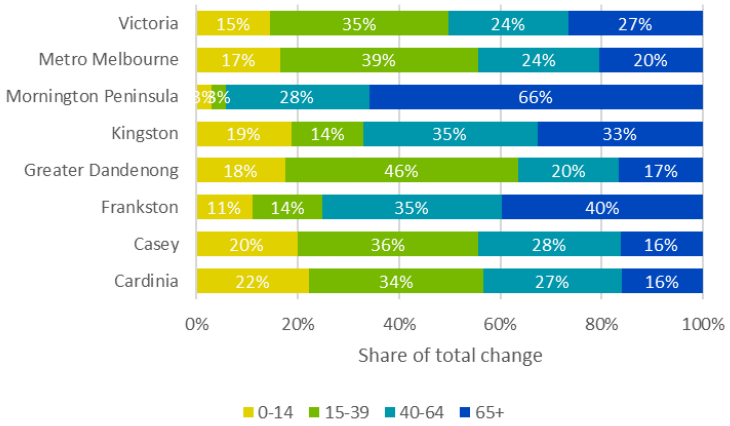


Source: ABS Census 2011 and 2016

Figure 61 shows the change in population by age group between 2011 and 2016.

- Population in each age group in the Southern Metro Region increased between 2011 and 2016. High growth in the number of older people represents broader, national demographic trends.
- People aged 65+ formed the largest share of growth in Mornington Peninsula and Frankston LGAs (66 per cent and 40 per cent respectively). Increases in the number of children contributed little to overall population growth.

FIGURE 61: SHARE OF POPULATION CHANGE BY AGE (2011-2016)



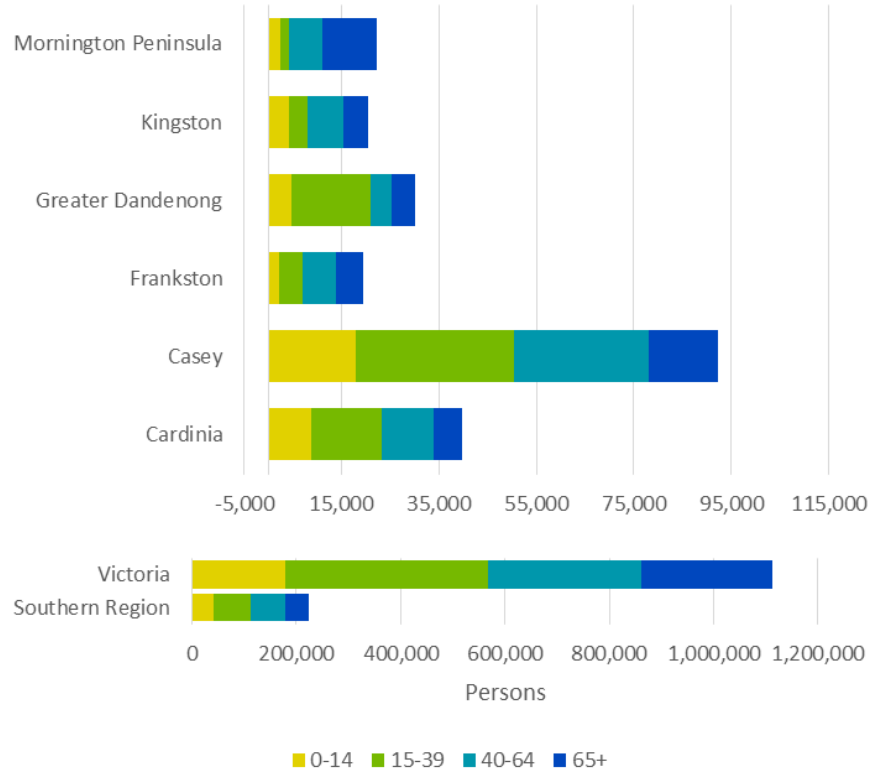
Source: ABS Census 2011 and 2016

TABLE 10: AVERAGE ANNUAL POPULATION GROWTH RATES BY AGE GROUPS OVER TIME 2006–2016)

	2016				AAGR 2006-2016			
LGA	0-14	15-39	40-64	65+	0-14	15-39	40-64	65+
Cardinia	22,841	34,319	29,243	11,170	6.2%	7.3%	5.9%	7.2%
Casey	71,333	116,070	94,156	31,230	3.4%	3.9%	4.2%	6.2%
Frankston	26,403	46,988	45,345	20,766	0.9%	1.1%	1.8%	3.1%
Greater Dandenong	29,047	63,656	45,068	22,451	2.0%	3.4%	1.1%	2.4%
Kingston	28,455	51,595	52,415	26,476	1.7%	0.8%	1.7%	7.2%
Mornington Peninsula	28,519	40,879	53,758	38,372	1.0%	0.4%	1.5%	4.1%
Southern Metro Region	206,598	353,507	319,985	150,465	2.4%	2.6%	2.5%	4.4%
Victoria	1,140,064	2,200,757	1,903,876	928,475	1.9%	2.2%	1.8%	3.7%

Source: ABS ERP 2006 and 2016

FIGURE 62: POPULATION GROWTH BY AGE GROUPS (2006–2016)



Source: ABS ERP 2006 and 2016

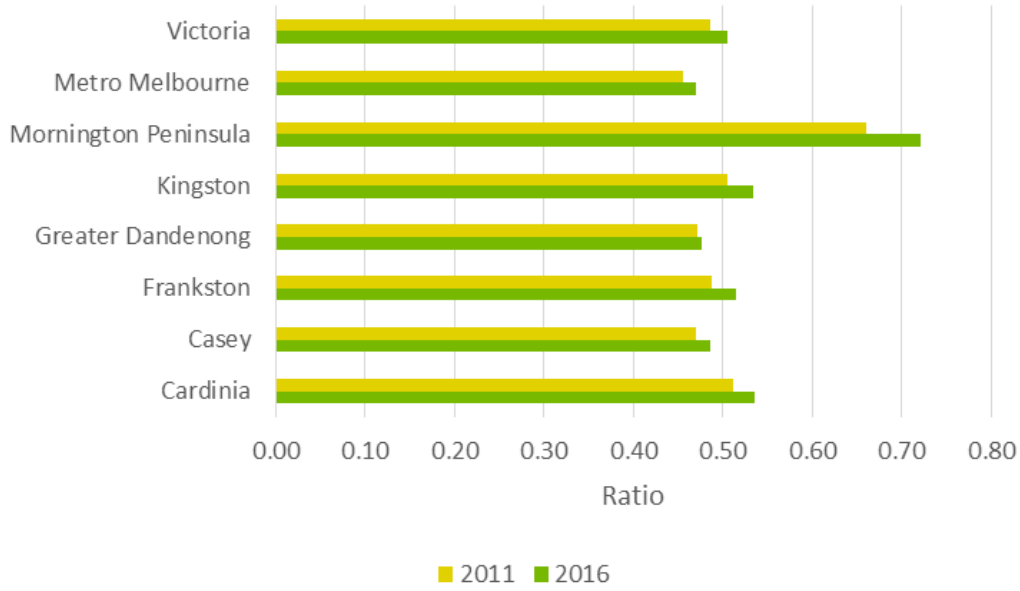
Age dependency ratio

Age dependency is the ratio between the population not in the labour force (typically between age group 0-14 and over 65) and the population in the labour force (aged 15 to 64). A lower dependency ratio means there is less reliance on each working age person.

The age dependency ratio helps to understand a location's economic potential as well as its welfare and service needs.

- Consistent with broader trends of an ageing population, the age dependency ratio increased in every LGA in the Southern Metro Region between 2011 and 2016.
- The most pronounced increase was seen in the Shire of Mornington Peninsula, followed by the City of Kingston.
- The increasing ratio in the New Growth Area LGAs of Casey and Cardinia are also driven by an increase in the number of children moving into these new areas.

FIGURE 63: AGE DEPENDENCY RATIO (2011 AND 2016)



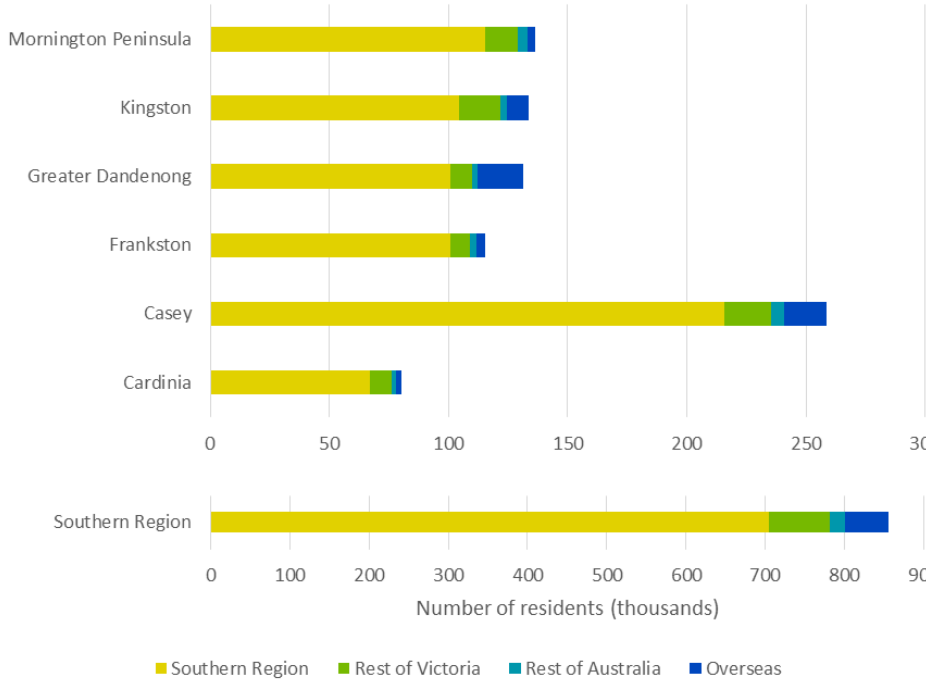
Source: ABS Census 2011 and 2016

Population migration flow

Figure 64 shows the place of origin of residents who moved to the Southern Metro Region between 2011 and 2016.

- Most residents in the Southern Metro Region in 2016 also lived there in 2011.
- Migrants from within the rest of Victoria form the second largest component of inward migration, with the greatest number of migrants residing in the LGAs of Casey, Kingston, and Mornington Peninsula.
- Greater Dandenong and Casey LGAs have the greatest number of residents who have moved from overseas within the past five years.

FIGURE 64: REGION OF ORIGIN FOR CURRENT RESIDENTS BY LGA (2016)



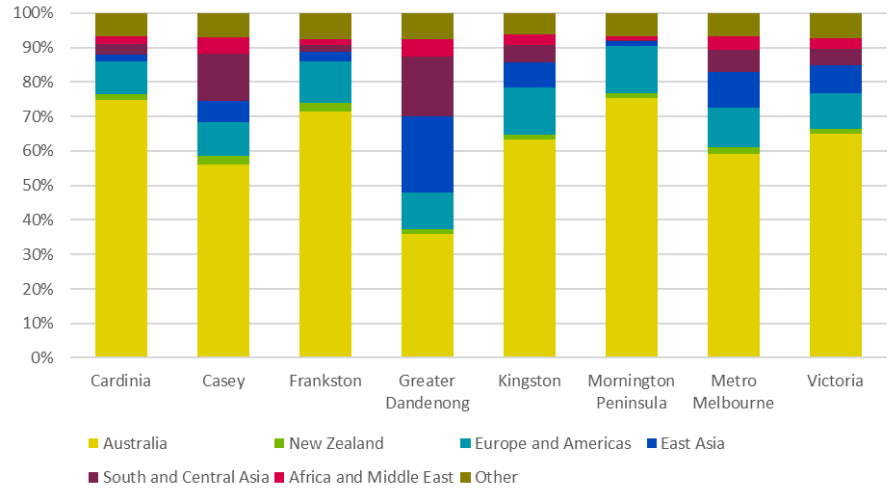
Source: ABS Census 2016

Cultural mix

Cultural mix is measured by the place of birth of the population as presented in Figure 65. Figure 66 (overleaf) provides a further breakdown of place of birth

- Most LGAs in the Southern Metro Region have over 60 per cent of their population born in Australia, which is above the metropolitan average.
- The City of Greater Dandenong is the most multicultural area with over 60 per cent of the population born overseas.
- East Asia and South and Central Asia are the most common places of birth for those born overseas.
- Cardinia, Frankston, and Mornington Peninsula LGAs are the least multicultural, with approximately 75 per cent of residents born in Australia.

FIGURE 65: PLACE OF BIRTH, PERCENTAGE OF TOTAL POPULATION (2016)



Source: ABS Census 2016

FIGURE 66 PLACE OF BIRTH (2016)

Source: ABS 2016 Census

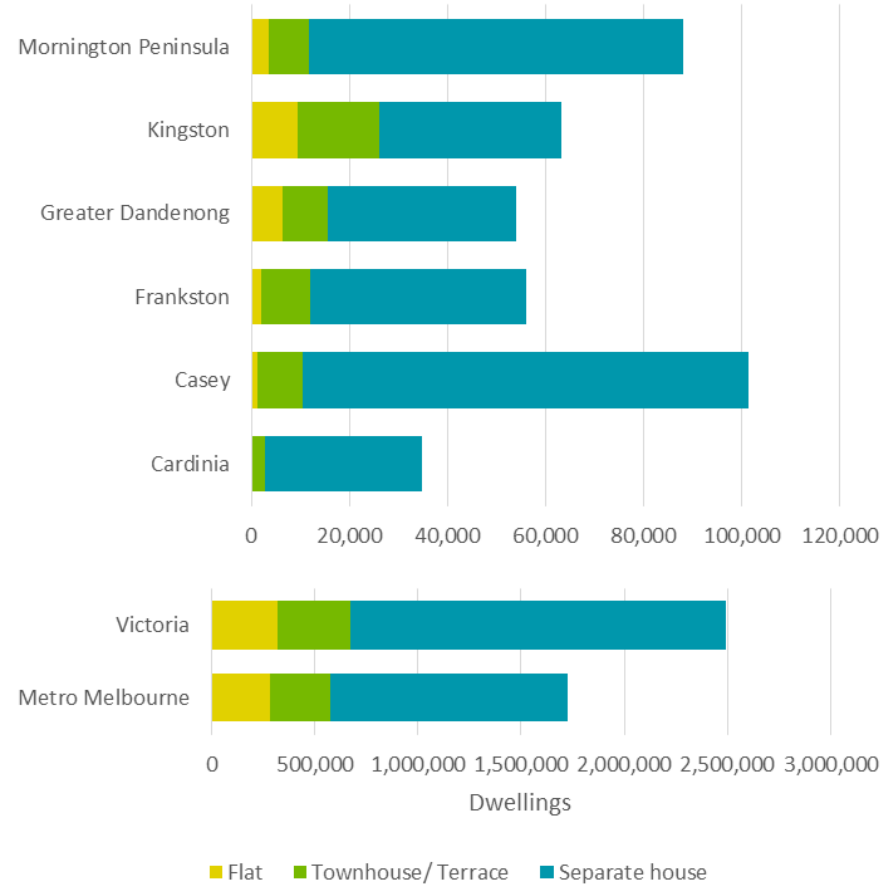
5.3 Housing diversity

Dwelling typology and activity

A greater diversity of housing in a location provides greater choice to households. It is influenced by changes in the property market, land available for residential development, and housing policy and regulations.

- The dominant dwelling type in every LGA in the region is separate house.
- The Kingston and Greater Dandenong LGAs have a relatively high proportion of townhouse/terrace and flats/apartments, providing a more diverse dwelling profile than other parts of the Southern Metro Region.
- The New Growth Area LGAs of Cardinia and Casey have an extremely low provision of flats/apartments and below average share of townhouses.
- Dwelling growth in Mornington Peninsula, Casey and Cardinia LGAs have been largely underpinned by growth in the number of separate houses.

FIGURE 67: DWELLING TYPE BY LGA (2016)



Source: ABS 2016

Site density is one measure of housing diversity. It is derived from DELWP's Housing Development Data and is different to a gross or net density measure. It is based on the land (or lot) associated with each newly constructed dwelling only and does not include surrounding open space, roads, footpaths or other land required to support that residential use. While site density can provide some indication of the types of dwellings in an area, different dwelling types have overlapping site density ranges – for example a detached house on a small lot could have a higher site density than a development of large townhouses.

Site density is grouped in three broad ranges:

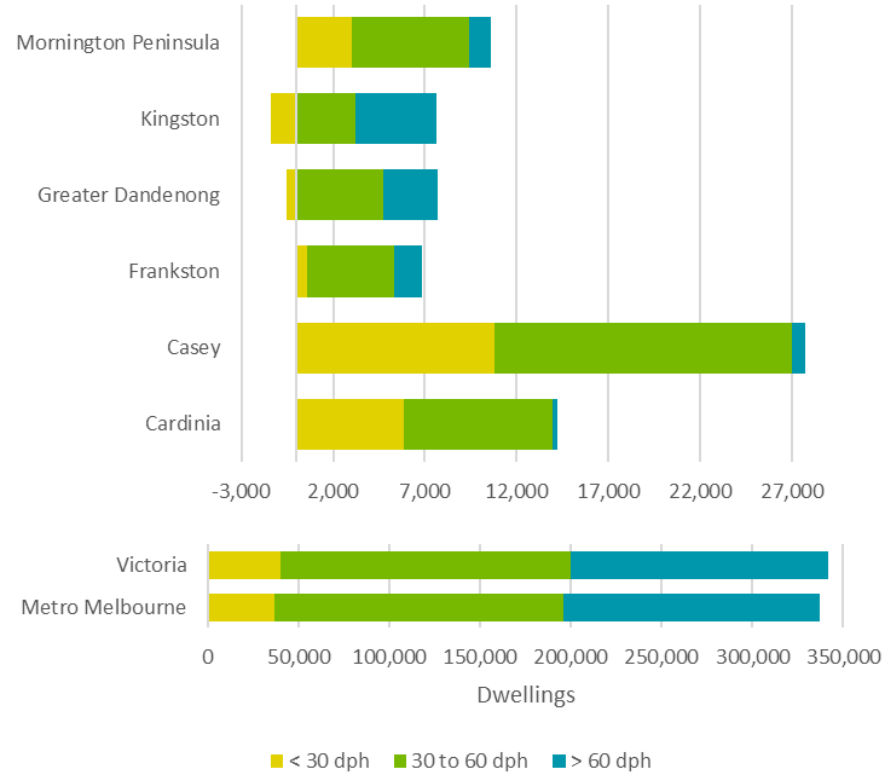
- **High site density** - greater than 60 dwellings per hectare (DPH)
- **Medium site density** - between 30 and 60 dwellings per hectare
- **Low site density** - less than 30 dwellings per hectare

Figure 68 shows the net change in site density between 2005 and 2015. A negative number indicates there were fewer dwellings at a certain site density range in 2015 compared to 2005, possibly because a dwelling has been demolished or a site was subdivided or redeveloped to a higher density. For example, if one lower density dwelling is replaced by four higher density townhouses this would be measured as a reduction in lower site density and an increase in higher site density.

In the Southern Metro Region:

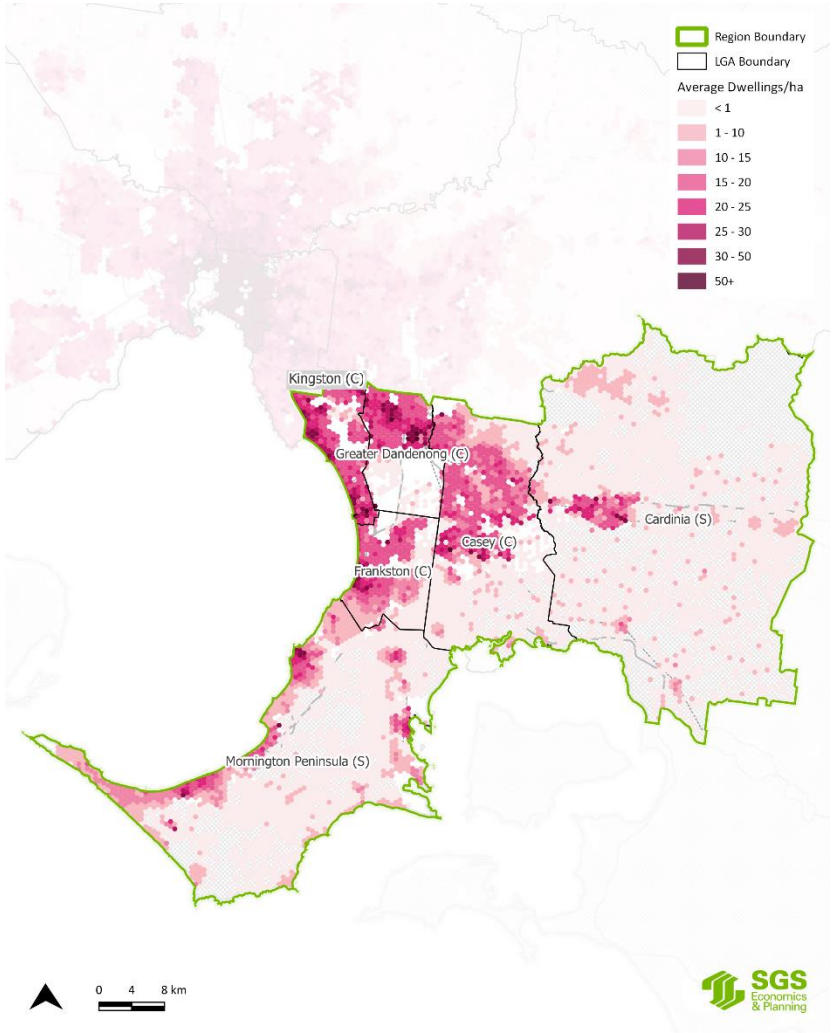
- There were a lower share of high density dwellings built between 2011 and 2016 in all LGAs compared to metropolitan Melbourne and Victoria.
- The New Growth Area LGAs of Casey and Cardinia had the highest number of additional dwellings, and most of these were medium density dwellings. Few high density dwellings were constructed in these areas.
- A greater share of high density dwellings was constructed in Kingston and Greater Dandenong LGAs. These LGAs also experienced a decrease in the total number of low density dwelling stock due to demolition.

FIGURE 68: CHANGE IN DWELLINGS BY SITE DENSITY (2005-2015)



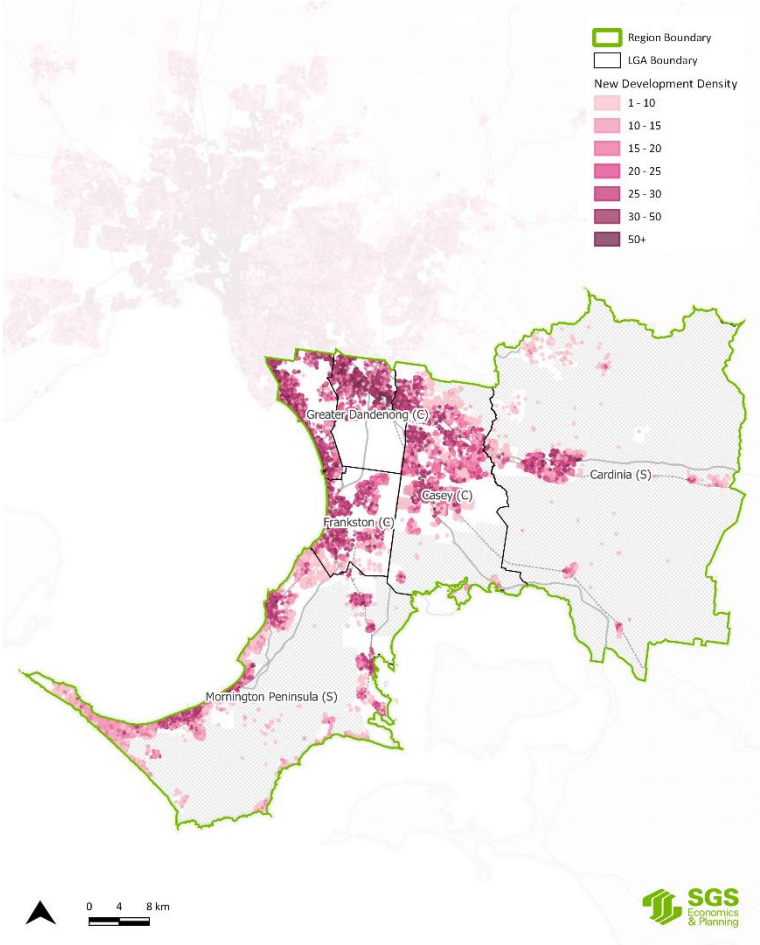
Source: DELWP Housing Development Data 2006 and 2016

FIGURE 69: AVERAGE DWELLINGS PER HECTARE (2016)



Source: DELWP Housing Development Data 2016

FIGURE 70: DEVELOPMENT DENSITY OF NEW PROJECTS (2005-2016)

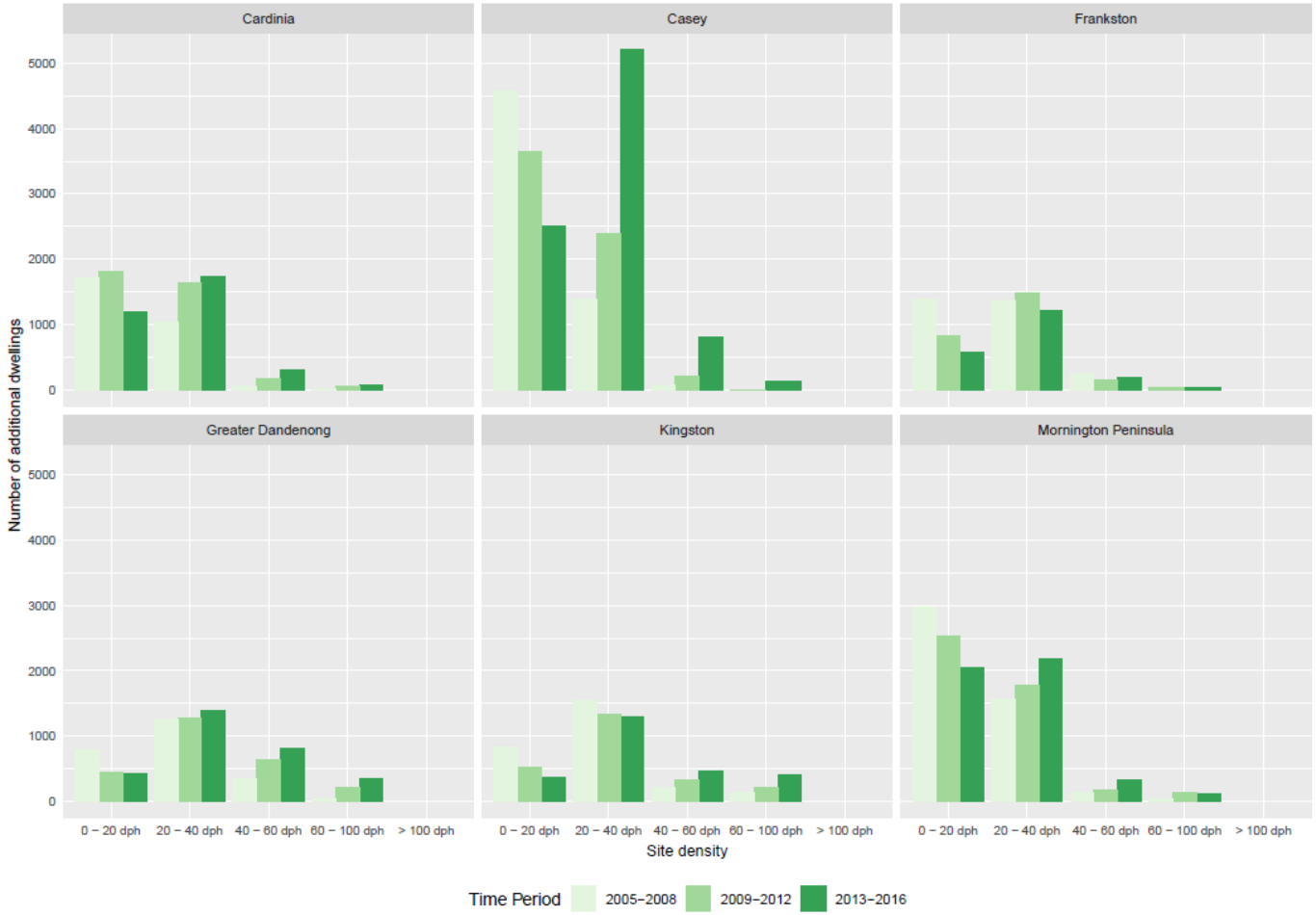


Source: DELWP Housing Development Data 2006 and 2016

Figure 71 shows the site densities for new dwellings in each LGA between 2005 and 2008; 2009 and 2012; and 2013 and 2016.

- With the higher number of new dwellings in the City of Casey, a shift can be seen from predominantly under 20 DPH between 2005-2008 to 20 to 40 DPH in later years.
- Greater Dandenong and Kingston LGAs appear to have a greater diversity of new housing stock.

FIGURE 71: DENSITY PROFILE OF NEW DWELLINGS (2005-2016)



Source: Housing development data 2005-16

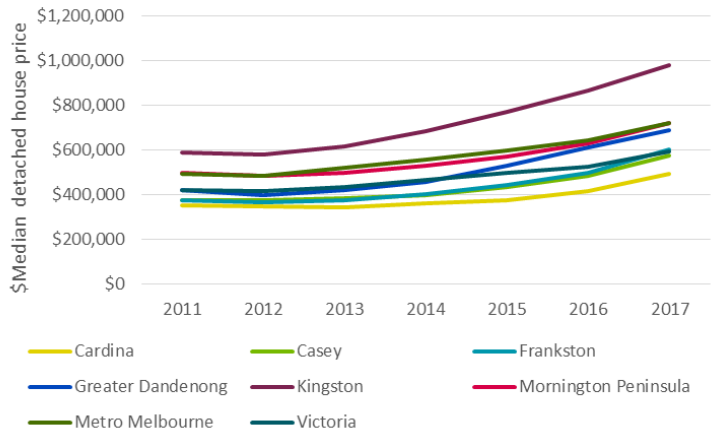
5.4 Housing price and stress

Housing price

Figure 72 and Figure 73 show recent house price trends.

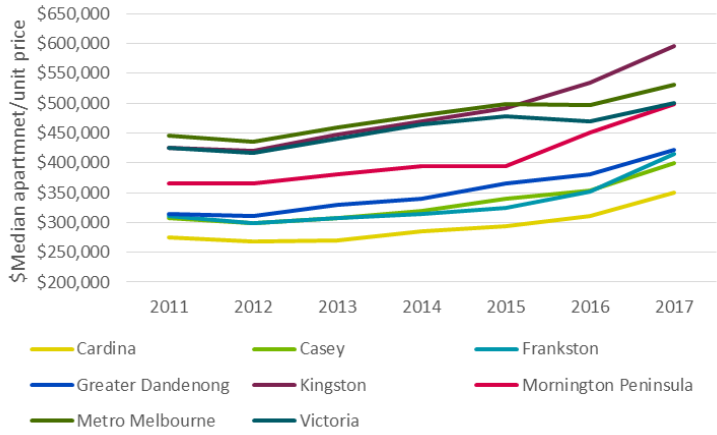
- The median price of detached houses in the Southern Metro Region was stable from 2011 to 2013, followed by more rapid increases to 2017.
- Median apartment prices are significantly lower than detached houses but followed the same growth profile between 2011 and 2017.
- For both detached houses and apartments, City of Kingston has the highest median price in the Southern Metro Region. This was more pronounced in 2016 and 2017.

FIGURE 72: MEDIAN DETACHED HOUSE PRICE (2011-2017)



Source: DELWP, 2017

FIGURE 73: MEDIAN APARTMENT/UNIT PRICE (2011-2017)



Source: DELWP, 2017

Housing stress

Housing stress measures the balance between household income and housing expenditure. It can present as either rental stress or mortgage stress.

Households in rental stress are those which:

- are low income, defined as falling within the bottom 40th percentile of the household income distribution of Victoria
- spend at least 30 per cent of their household income on rent.

Households in mortgage stress are those which:

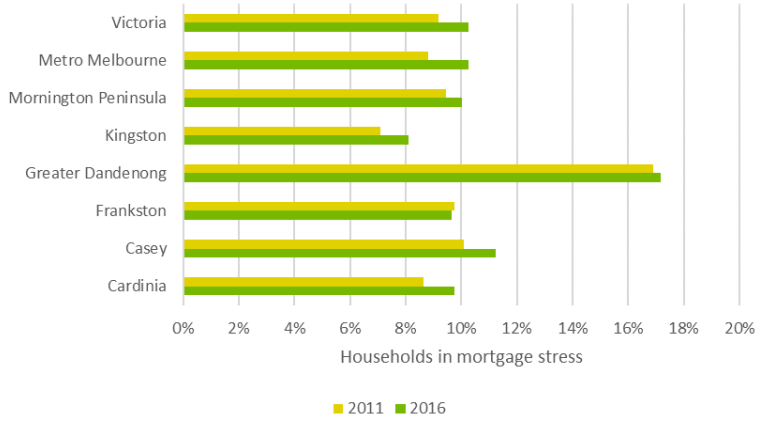
- are low income, defined as falling within the bottom 40th percentile of the household income distribution of Victoria
- spend at least 30 per cent of their household income on mortgage payments.

Figure 74 and Figure 75 present mortgage and housing stress by municipality

Figure 76 and Figure 77 illustrate the distribution of households with mortgage stress and rental stress in the Southern Metro Region.

- Mortgage stress levels are particularly pronounced in Greater Dandenong LGA, and in Casey LGA to a lesser extent. Both exceed the metropolitan and State average. High rent and mortgage stress in these LGAs is due to the extreme socio-economic disadvantage in the City of Greater Dandenong and parts of the City of Casey, such as the suburbs of Doveton, Hampton Park, Cranbourne and Botanic Ridge.
- Despite having the highest property prices, the City of Kingston had the lowest incidence of mortgage stress in the region, which indicates higher income levels.
- Between 2011 and 2016, the proportion of households in mortgage stress increased across the Southern Metro Region (although it decreased in Frankston LGA). For the New Growth Areas, this likely reflects the high volume of recent development and home purchases.
- Rates of rental stress in Mornington Peninsula, Greater Dandenong, Frankston, Casey and Cardinia LGAs were higher than metropolitan Melbourne averages.

FIGURE 74: LOW INCOME HOUSEHOLDS IN MORTGAGE STRESS (PERCENTAGE OF TOTAL HOUSEHOLDS WITH MORTGAGE) (2011-2016)

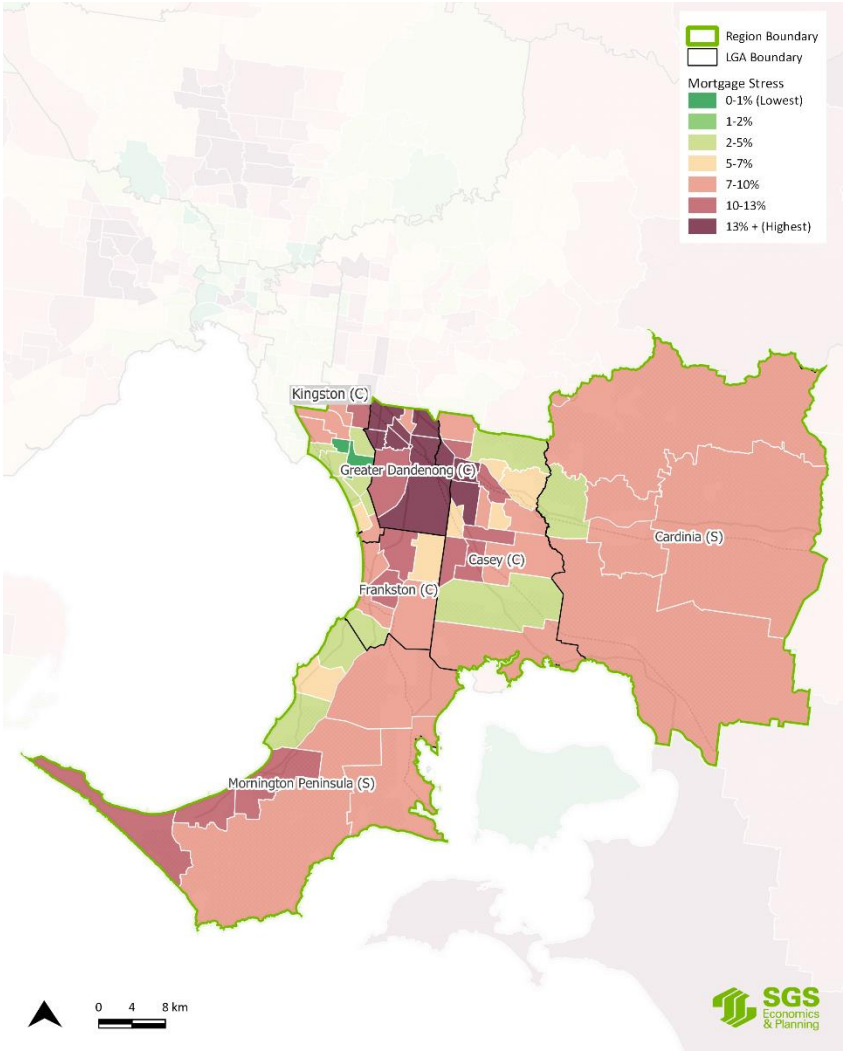


Source: ABS Census 2011 and 2016

FIGURE 75: LOW INCOME HOUSEHOLDS IN RENTAL STRESS (PERCENTAGE OF TOTAL HOUSEHOLDS RENTING) (2011-2016)

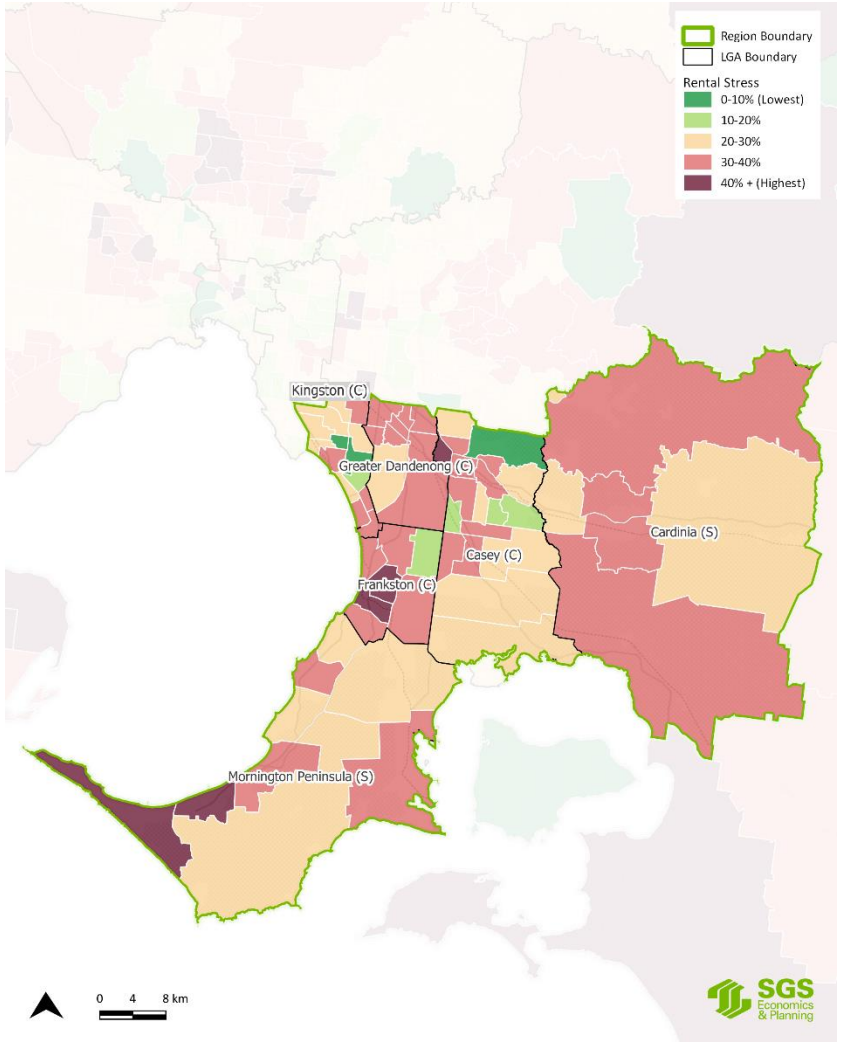
Source: ABS Census 2011 and 2016

FIGURE 76: HOUSEHOLDS IN MORTGAGE STRESS (PERCENTAGE OF TOTAL HOUSEHOLDS WITH MORTGAGE) (2016)



Source: ABS C ensus 2016

FIGURE 77: HOUSEHOLDS IN RENTAL STRESS (PERCENTAGE OF TOTAL HOUSEHOLDS RENTING) (2016)

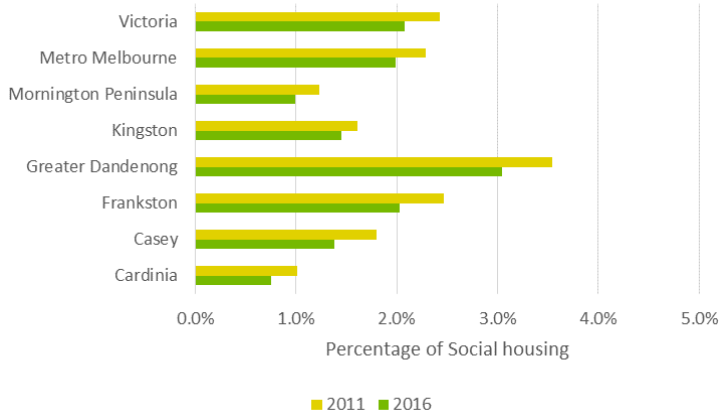


Source: ABS Census 2016

Figure 78 shows recent trends in social housing (as a proportion of total dwellings) and Figure 79 shows homelessness (as a proportion of the total population)[4].

- The City of Greater Dandenong has the highest proportion of social housing, despite a drop in the last five years.
- With the exception of Greater Dandenong and Frankston LGAs, all LGAs have a significantly lower proportion of social housing than the metropolitan average.
- The proportion of social housing decreased in all parts of the Southern Metro Region between 2011 and 2016, likely due to high rates of construction of private dwellings. This is consistent with Victorian and metropolitan trends.
- The City of Greater Dandenong has a significantly higher proportion of homeless residents than all other LGAs in the Southern Metro Region, as well as metropolitan Melbourne.
- The proportion of homeless residents has increased within all LGAs of the Southern Metro Region. This increase has exceeded the metropolitan average.

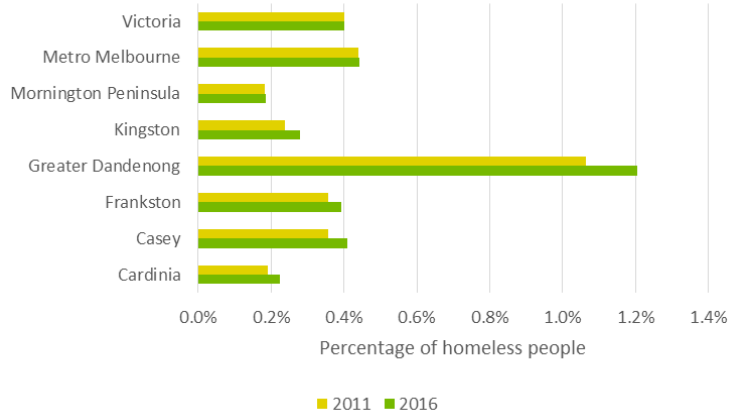
FIGURE 78: SOCIAL HOUSING (PERCENTAGE OF TOTAL DWELLINGS) (2011 AND 2016)



Source: ABS Census 2011 and 2016

[4] Homelessness is defined as living in an inadequate dwelling, having no tenure, when initial tenure is short and not extendable or tenure does not allow people to have control of, and access to, space for social relations. ABS 2012

FIGURE 79: HOMELESS PEOPLE (PERCENTAGE OF TOTAL POPULATION) (2011 AND 2016)



Source: ABS Census 2011 and 2016

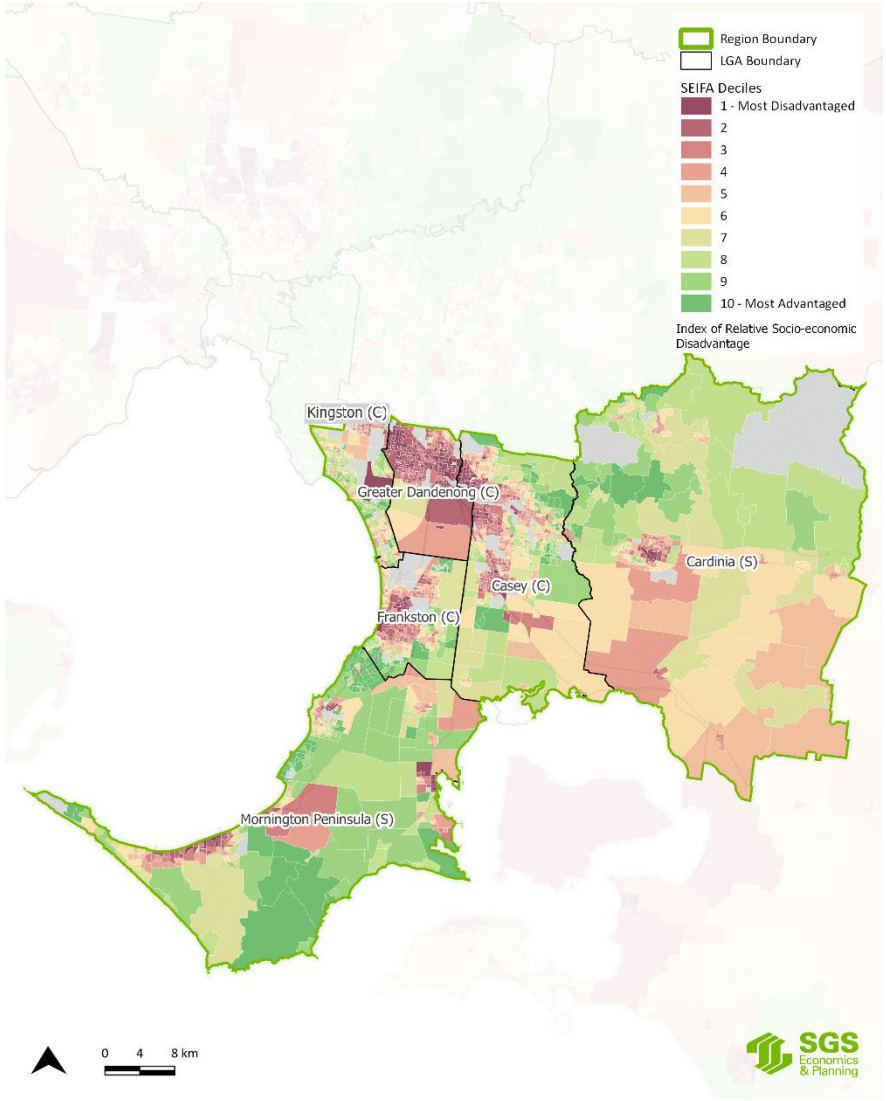
5.5 Disadvantage

SEIFA - Index of Relative Socio-Economic Disadvantage

Figure 80 shows the SEIFA Index of Relative Socio-Economic Disadvantage across the Southern Metro Region. It illustrates the rate of advantage and disadvantage relative to the national average, and considers occupation, education, housing, health status, English language proficiency, marital status, health and disability status, household composition, internet access and household income.

- Disadvantage is widespread in urban areas of the Southern Metro Region.
- The most severe disadvantage is within the City of Greater Dandenong.
- Suburbs that suffer extreme levels of disadvantage include Doveton, Cranbourne, Junction Village, Hampton Park and Eumemmerring (Casey LGA); Springvale, Springvale South, Noble Park, Dandenong, Dandenong North, Dandenong South and Bangholme (Greater Dandenong LGA); and Tootgarook, Braeside, Frankston North, Hastings and Rosebud (Mornington Peninsula LGA).
- The City of Kingston contains the least disadvantaged areas of the Southern Metro Region, consistent with the lower levels of housing stress and homelessness.

FIGURE 80: SEIFA INDEX OF RELATIVE SOCIO-ECONOMIC DISADVANTAGE (2016)



Source: ABS Census 2016

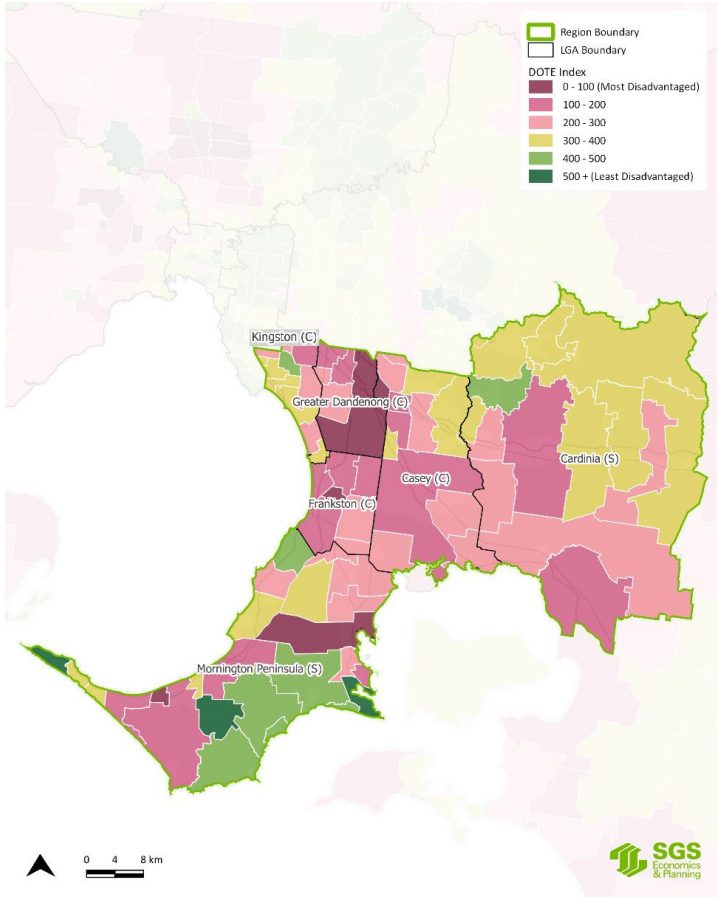
DOTE index

Jesuit Social Services and Catholic Social Services Australia have developed the Dropping Off the Edge (DOTE) Index to measure disadvantage levels.

The indicators utilised in the DOTE Index overlap with some (income, educational attainment, job type and employment status) used in SEIFA. The DOTE Index differs in its utilisation of indicators that measure specific aspects of disadvantage rather than variables that reflect disadvantage. In addition to several SEIFA variables, the DOTE Index also includes indicators relating to child maltreatment, prison admissions, criminal court convictions, domestic/family violence and psychiatric hospital admissions.[5]

- The DOTE index reveals widespread disadvantage across the Southern Metro Region. Consistent with SEIFA, the most disadvantaged areas are in Greater Dandenong, Casey and Frankston LGAs.
- The western parts of the City of Kingston are among the least disadvantaged urban areas of the Southern Metro Region.

FIGURE 81: AVERAGE RANK DOTE INDEX (2015)



Source: Jesuit Social Services and the Catholic Social Services Australia 2015 (note that 2015 data is latest available)

[5] Catholic Social Services Australia (2015), Dropping Off the Edge: Persistent Communal Disadvantage in Australia, pp.10. Accessed 6 September 2018 from: http://k46cs13u1432b9asz49wnhcx-wpengine.netdna-ssl.com/wp-content/uploads/0001_dote_2015.pdf

5.6 Youth engagement with work or study

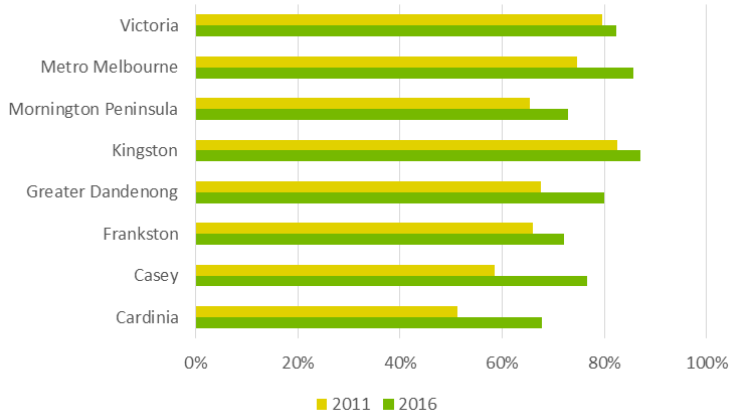
Education levels

Education levels correlate to skill level, especially for people in younger working-age groups. The On Track survey by Department of Education shows the study or work plans of high school completers six months after they finish high school.

Figure 82 presents the proportion of residents aged between 20 and 24 who have a minimum of a Year 12 qualification (referred to as school qualified youth for the remainder of this section). For those who completed Year 12 in 2017, Figure 83 presents the distribution of destinations (for example, study or work)

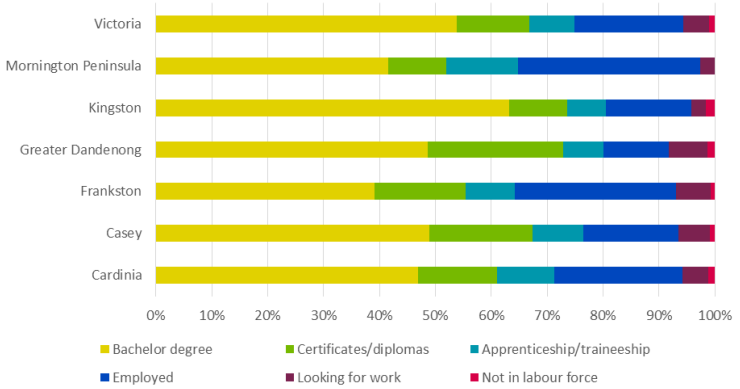
- The City of Kingston is the only LGA in the Southern Metro Region that exceeds the metropolitan proportion of school qualified youth.
- The proportion of school qualified youth increased in all LGAs between 2011 and 2016. This was most prominent in Casey, Cardinia and Greater Dandenong LGAs.
- Most Year 12 completers in the Southern Metro Region have gone on to further education.
- Year 12 completers in the Kingston LGA were more likely to pursue a bachelor's degree, while those in the Frankston or Mornington Peninsula LGAs are were most likely to enter the workforce.
- Year 12 completers in the City of Greater Dandenong had the highest rate of studying a certificate or diploma, which was above the Victorian average.

FIGURE 82: PERCENTAGE OF PEOPLE AGED 20-24 WITH YEAR 12 OR HIGHER QUALIFICATION (2011 AND 2016)



Source: ABS Census 2011 and 2016

FIGURE 83: DESTINATIONS OF 2017 YEAR 12 OR EQUIVALENT COMPLETERS (2017)



Source: On Track, Department of Education, 2017

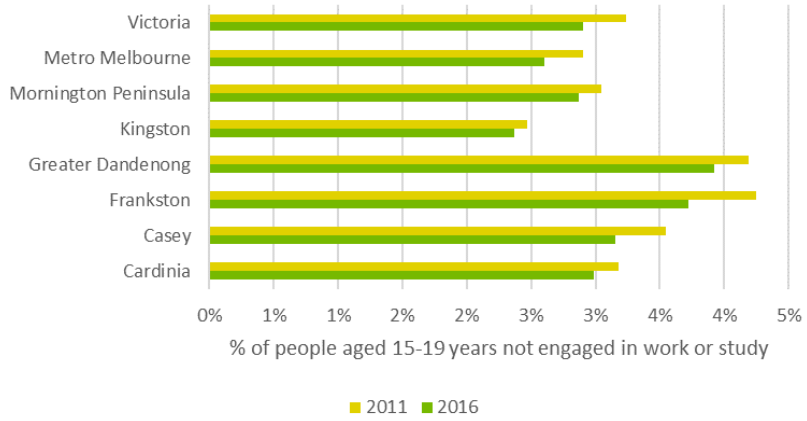
Engagement with work or study

Youth engagement rate in work or study can signify an area's level of education resources and the level of skills generally required to be employed in local job markets.

Youth disengagement with work or study can stem from taking time off from studies, travel, illness and disability, or family commitments. The youth disengagement rate can also inform investments in education and professional training services.

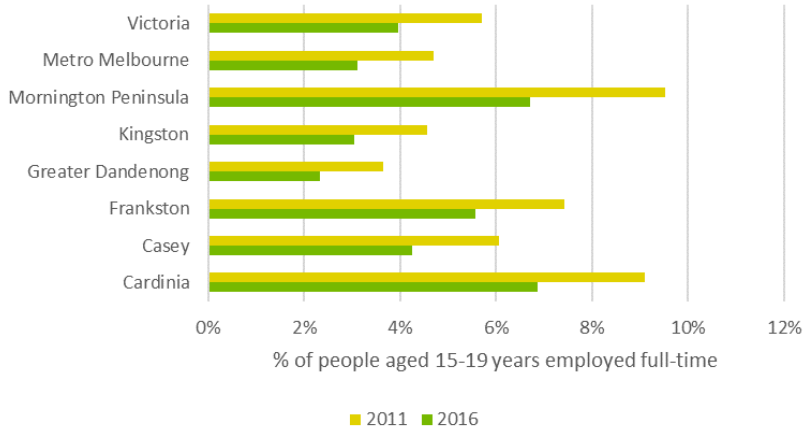
- Youth disengagement decreased from 2011 to 2016 across all LGAs in the Southern Metro Region (Figure 84).
- Youth participation in full-time work (Figure 85) decreased across the Southern Metro Region, metropolitan Melbourne and Victoria from 2011 to 2016, particularly in Cardinia and Mornington Peninsula LGAs.
- This corresponds to the results from the On Track survey (Figure 83), which shows that participation rates in post-Year 12 qualifications is above 60 per cent in almost all LGAs in the Southern Metro Region.
- Mornington Peninsula and Cardinia LGAs have higher than average proportion of people aged 15 to 19 who are employed full time, compared to metropolitan Melbourne and Victoria. This is reflected in the higher rates of employment in Figure 83.

FIGURE 84: YOUTH DISENGAGEMENT (2011 AND 2016)



Source: ABS Census 2011 and 2016

FIGURE 85: YOUTH LABOUR PARTICIPATION (2011 AND 2016)



Source: ABS Census 2011 and 2016

5.7 Population health

Hospital inpatient separations

Inpatient separations are a measure of the number of instances a patient leaves a hospital because of death, discharge, sign-out against medical advice or transfer. It is a common measure of the utilisation rate of hospital services.

- The rate of in-patient separations is higher within the Southern Metro Region than the metropolitan average. This may be a result of the relative disadvantage of the region.
- The Shire of Mornington Peninsula has a particularly high rate of inpatient separations, possibly due to the older demographic.
- The New Growth Area LGAs of Casey and Cardinia experienced the most growth in the rate of inpatient separations between 2011 and 2016. However, they are still the lowest of all Southern Metro Region LGAs.

FIGURE 86: INPATIENT SEPARATIONS PER 1000 POPULATION (2011 AND 2015)

Source: DHHS Local Government Area Statistical Profiles, 2011 and 2015 (note that 2015 data is latest available)

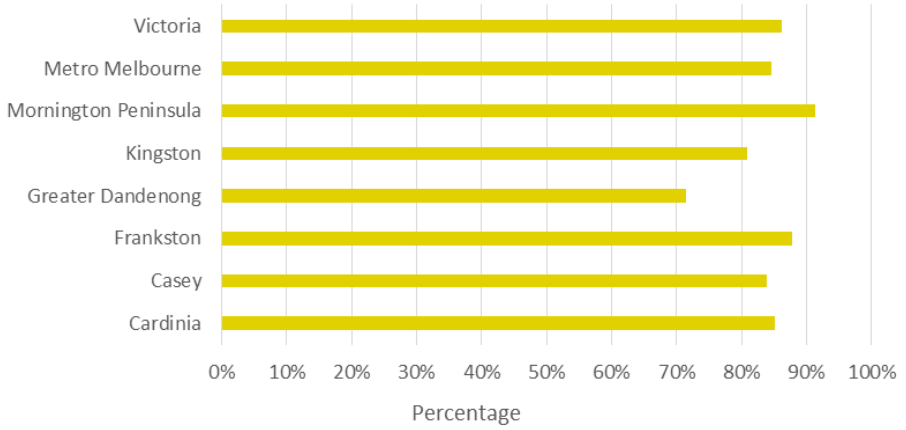
Access to community and health care services

Community health services are provided to the community alongside general health practitioners and are privately funded services that support the primary health services in Victoria.

The scope of community health services can also include human services such as drug and alcohol rehabilitation, post-acute care and disability care. The level of access to community and health care services indicates a region's social advantages and disadvantages.

- Residents of the Southern Metro Region have a similar level of access to community services compared to the metropolitan average.
- The City of Greater Dandenong has the lowest percentage of people with access, which may contribute to the higher level of disadvantage, as measured by SEIFA and DOTE.
- Despite being relatively advantaged, the City of Kingston has slightly less access to community services than the metropolitan average.
- The Shire of Mornington Peninsula has the highest level of access.

FIGURE 87: PERCENTAGE OF PEOPLE WHO COULD DEFINITELY ACCESS COMMUNITY SERVICES AND RESOURCES BY LGA (2015)



Source: DHHS Local Government Area Statistical Profiles, 2015 (note that 2015 data is latest available)

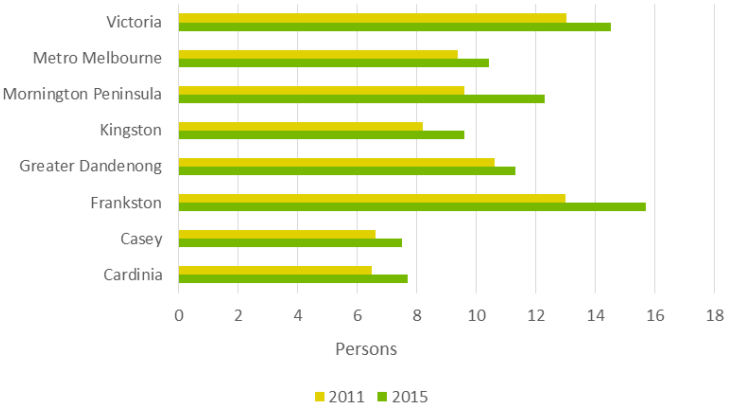
Mental health and drug and alcohol use

Drug and alcohol use and/or poor mental health can lead to adverse health and wellbeing outcomes.

There are limitations to this data. A shortage of services may hide the extent of true demand and the dataset only includes public patients. More affluent areas are likely to have mental health and drug and alcohol patients seeking private care; conversely, the availability of more services may mean higher demand. High utilisation of services might also reflect the availability of a service, a high quality service, and/or a highly accessible service.

- Mornington Peninsula, Greater Dandenong and Frankston LGAs have higher rates of mental health clients than the metropolitan average.
- The New Growth Area LGAs of Casey and Cardinia have lower rates of mental health clients, as does the relatively advantaged Kingston LGA.
- The City of Frankston's increase in the rate of mental health clients between 2011 and 2016 takes it above the Victorian average.
- The City of Frankston also has the largest number of drug and alcohol clients per 1,000 people followed by the City of Greater Dandenong. Both exceed the Victorian and metropolitan averages. However, both LGAs saw the rates decrease between 2011 and 2015.
- The City of Kingston exhibits the lowest rate of drug and alcohol clients in the Southern Metro Region.
- Contrary to metropolitan trends, the New Growth Area LGAs of Casey and Cardinia recorded an increase in the rate of drug and alcohol clients between 2011 and 2015.

FIGURE 88: REGISTERED MENTAL HEALTH CLIENTS PER 1,000 PEOPLE BY LGA (2011 AND 2015)



Source: DHHS Local Government Area Profiles Statistical 2011 and 2015 (note that 2015 data is latest available)

FIGURE 89: DRUGS AND ALCOHOL CLIENTS PER 1,000 PEOPLE (2011 AND 2015)

Source: DHHS Local Government Area Profiles Statistical 2011 and 2015 (note that 2015 data is latest available)

Home and Community Care Services (HACC)[6]

Home and Community Care (HACC) services provide outreach services to allow older people aged 65 and over and people with a disability to live in their communities for longer. Services may include centre-based day respite, transport, basic in-home services and social support.

The HACC 'target population' indicates the number of people eligible to receive services from a HACC program (funded by the Victorian or Australian Government and usually delivered by local government). To determine service levels, a needs assistance measure examines the proportion of 'older and frail people with moderate, severe or profound disabilities'. The size and location of the target population in Victoria is estimated from responses to Census questions on 'need for assistance' with self-care, mobility or communication, counted at an LGA geography.[7]

The rate per 1,000 indicates a relative need of service provision in different LGAs, and is use to compare the relative extent of HACC provision in each LGA compared to the population. Because of the multiple occasions of service, a given LGA may show more people receiving a HACC service in a year than the count of individuals in the HACC target population.[8]

- In the Southern Metro Region, the Mornington Peninsula LGA has the highest rate of HACC clients, while Casey and Greater Dandenong LGAs have the lowest. This reflects the age structure of these areas.
- Comparing the rate of HACC clients to the metropolitan average, there is a relatively high need within Mornington Peninsula, Kingston and Frankston LGAs.

TABLE 11: HACC CLIENTS (2015)

Municipality	HACC client aged 65+/1,000 head 2015
Cardinia	675.4
Casey	368.9
Frankston	868.1
Greater Dandenong	439.1
Kingston	787.0
Mornington Peninsula	1071.1
Metro Melbourne	688.5
Victoria	973.3

Source: DHHS Local Government Area Profiles Statistical 2011 (note that 2015 data is latest available)

[6] On 1 July 2016 funding and management of HACC services for older people were replaced by Commonwealth Home Support Programme (CHSP) and by HACC Program for Younger People (HACC PYP). The use of former HACC data will therefore not set a future benchmark to measure progress.

[7] The target population is adjusted by removing those living in residential aged care or DVA card holders.

[8] Department of Health and Human Services, *Data item definitions: 2015 local government area profiles*, 'Home and Community Care (HACC) clients', November 2015.

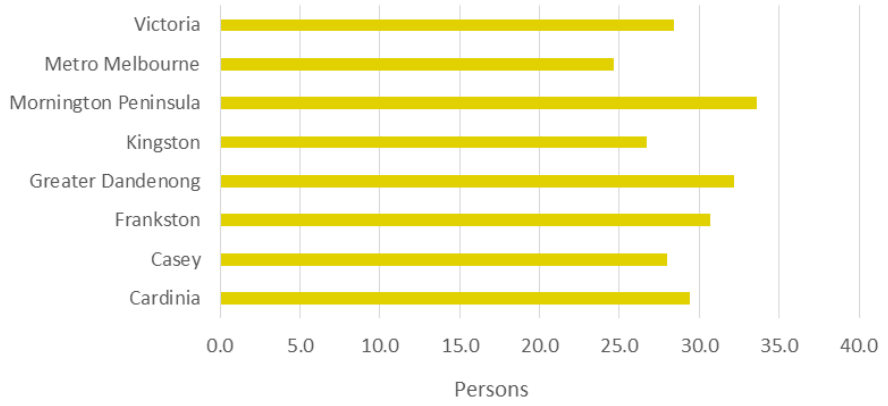
Ambulatory Care Sensitive Conditions (ACSC)

Ambulatory Care Sensitive Conditions (ACSC) describe conditions for which hospitalisation could be avoided through public health interventions and early disease management, usually delivered in an ambulatory setting such as primary care.

High rates of hospital admissions for ACSCs may provide indirect evidence of problems with patient access to primary healthcare, inadequate skills and resources, or disconnection with specialist services.[9]

- The rate of ACSC is higher than the metropolitan average across the Southern Metro Region, particularly in Mornington Peninsula and Greater Dandenong LGAs.
- This may reflect the urban structure (physically harder to access services), disconnection with specialists or inadequate skills and resources in these locations.
-

FIGURE 90: ACSC (PPH) SEPARATIONS FOR ALL CONDITIONS PER 1,000 POPULATION (2015)



Source: DHHS Local Government Area Profiles Statistical 2015 (note that 2015 data is latest available)

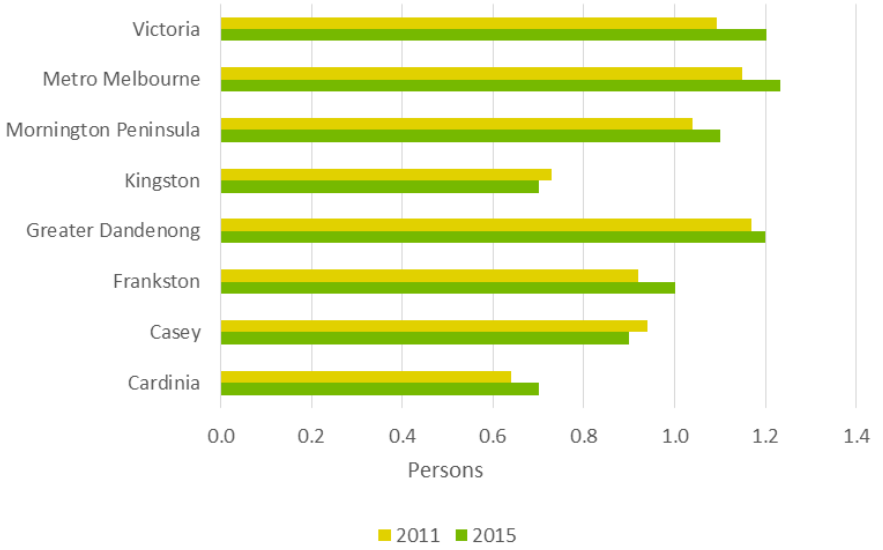
[9] Source: Victorian Admitted Episode Dataset (VAED), Department of Health and Human Services; Estimated Resident Population (ERP, Australian Bureau of Statistics (ABS).

Access to general practitioners (GPs)

Access to general practitioners (GPs) contributes partly to a region's community services and resident wellbeing. It also helps describe an area's level of healthcare resources. Figure 91 presents the number of GPs per 1,000 people in each municipality of the Southern Metro Region

- The per capita provision of GPs is lower than the metropolitan average for all LGAs within the Southern Metro Region.
- The City of Greater Dandenong has the highest provision of GPs per 1,000 people in the region.
- Provision of GPs is particularly low in Kingston and Cardinia LGAs.
- Excluding the City of Kingston, the rate of provision increased in all LGAs between 2011 and 2015.

FIGURE 91: NUMBER OF GENERAL PRACTITIONERS PER 1,000 PEOPLE BY LGA (2011 AND 2015)



Source: DHHS Local Government Area Profiles Statistical 2015 (note that 2015 data is latest available)

Type 2 diabetes

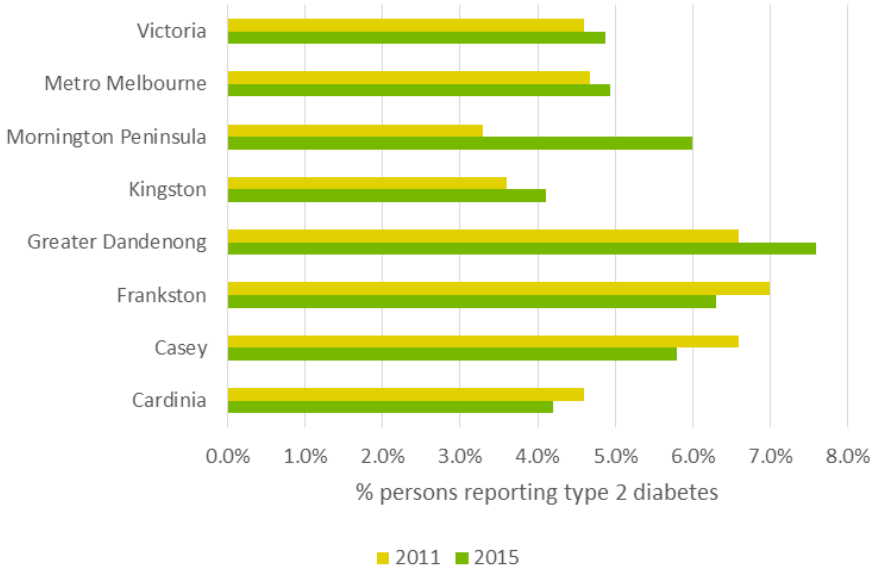
People with diabetes are at greater risk of chronic health conditions and its occurrence is closely linked with the prevalence of obesity. The number of diabetes cases in the population indicates a higher risk of chronic health conditions, including cardiovascular disease, blindness, amputation, kidney disease and depression.

People from the most socioeconomically disadvantaged areas are more likely to have Type 2 diabetes. Males in the lowest socioeconomic group were almost twice as likely to report Type 2 diabetes as those in the highest socioeconomic group. For females, the rate in the lowest socioeconomic group is 2.5 times that in the highest socioeconomic group.[10].

The number of new cases of diabetes helps to predict future needs for health services and to evaluate the effectiveness of prevention programs.

- The prevalence of Type 2 diabetes is particularly pronounced in the City of Greater Dandenong, following an increase in incidence between 2011 and 2015. This aligns with this LGA being one of the most disadvantaged in the region.
- The Shire of Mornington Peninsula saw the greatest increase in prevalence between 2011 and 2015, while the rates decreased in Frankston, Casey and Cardinia LGAs.
- Kingston and Cardinia LGAs both have low rates of Type 2 diabetes and are below the metropolitan average. In Kingston LGA this is likely due to the relative socio-economic advantage of the municipality, whereas in Cardinia this may be the result of a larger proportion of younger people.
-

FIGURE 92: INCIDENCE OF TYPE 2 DIABETES BY LGA (2011 AND 2016)



Source: DHHS Local Government Area Profiles Statistical 2011 and 2015 (note that 2015 data is latest available)

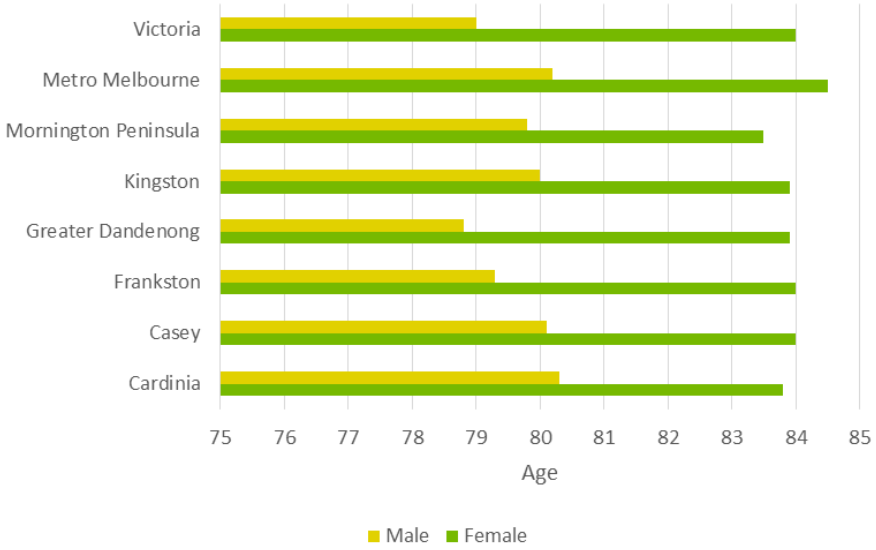
[10] AIHW 2002

Life expectancy at birth

Life expectancy at birth is an indicator of living standards, lifestyle and education factors, as well as access to quality health services.

- Across the region, life expectancy at birth is higher for females than males – consistent with the metropolitan Melbourne and Victorian averages.
- Life expectancy for males is lower than the metropolitan average in the Greater Dandenong and Frankston LGAs. This may be a symptom of the high disadvantage in these areas.
- Life expectancy for females is lower than the metropolitan average for all LGAs within the Southern Metro Region.

FIGURE 93: LIFE EXPECTANCY AT BIRTH (2015)



Source: DHHS Local Government Area Profiles Statistical 2015 (note that 2015 data is latest available)

5.8 Early childhood outcomes

The importance of the early years of childhood development is clear, with early life experiences affecting lifelong health and wellbeing in several ways.

Birth weight and immunisation

Birth weight is the bodyweight of a newborn at birth. It can be affected by the mother's health during pregnancy, pharmaceutical consumption or lifestyle. Birth weight has also been theorised to correlate to obesity and diabetes.

The Australian Childhood Immunisation Register (ACIR) provides information about vaccine coverage at 12 months, 24 months and six years of age. The immunisation rate is measured as children who have received all the standard immunisations appropriate to their age.

- The percentage of babies born with low birth weight is low in the region and relatively consistent with the State and metropolitan averages – between five and seven per cent.
- The incidence of low birth weight is slightly higher in the City of Greater Dandenong.
- The proportion of children fully immunised by the age of 24 months decreased at a rate that was largely consistent across the region, although slightly lower in the City of Greater Dandenong.

TABLE 12: LOW BIRTH WEIGHT AND IMMUNISATION RATE BY LGA (2015)

	% low birth weight babies 2012-14	% children fully immunised at 12 months 2015	% children fully immunised at 24 months 2015
Cardinia	6.1%	92.6%	89.3%
Casey	6.4%	91.9%	89.5%
Frankston	6.4%	92.5%	91.0%
Greater Dandenong	6.9%	89.5%	87.9%
Kingston	5.9%	92.0%	89.7%
Mornington Peninsula	5.5%	92.4%	89.3%
Metropolitan Melbourne	6.3%	92.0%	89.5%
Victoria	6.3%	92.2%	89.7%

Source: Social Health Atlases, 2015 (note that 2015 data is latest available

Child protection substantiations

Child protection substantiations refer to children who receive child protection services, including those that subject to an investigation of notification, on a care and protection order, and/or are in out-of-home care.

- The rate of child protection substantiations is relatively high across the Southern Metro Region, with only the City of Kingston falling below the metropolitan average.
- Frankston and Greater Dandenong LGAs have the highest ratio of child protection substantiations, both more than double the rate of metropolitan Melbourne.
- Rate of substantiations appear to be linked to geographic location and level of disadvantage.

TABLE 13: CHILD PROTECTION SUBSTANTIATIONS (2015)

	Child protection substantiations/1,000
Cardinia	15
Casey	17
Frankston	24
Greater Dandenong	20
Kingston	7
Mornington Peninsula	15
Metro Melbourne	9
Victoria	12

Source: Social Health Atlases, 2015 (note that 2015 data is latest available)

Developmental vulnerability

The Australian Early Development Centre (AEDC) identifies five domains of early childhood development, measured at the commencement of primary school:

- physical health and wellbeing
- social competence
- emotional maturity
- language and cognitive skills (school-based)
- communication skills and general knowledge.

Patterns of childhood vulnerability according to the AEDC domains largely follow the rate of child protections (Table 13).

In the Southern Metro Region:

- Early childhood outcomes are poor when considering the AEDC domains. Other than the City of Kingston, all LGAs have a higher percentage of children recorded as being developmentally vulnerable across two or more domains, or who are vulnerable in the emotional domain compared with the metropolitan average.
- The rate of child vulnerability is substantially lower than the metropolitan average in the City of Kingston, which is likely a result of the relative socio-economic advantage.

TABLE 14: PERCENTAGE OF DEVELOPMENTALLY VULNERABLE CHILDREN (2015)

	% Children developmentally vulnerable in two or more domains	% Children developmentally vulnerable in emotional domain
Cardinia	10.0%	10.0%
Casey	11.9%	8.8%
Frankston	9.9%	9.3%
Greater Dandenong	14.2%	8.2%
Kingston	6.3%	5.5%
Mornington Peninsula	9.8%	8.0%
Metro Melbourne	9.5%	7.6%
Victoria	9.9%	8%

Source: Social Health Atlases, 2015 (note that 2015 data is latest available)

5.9 Crime

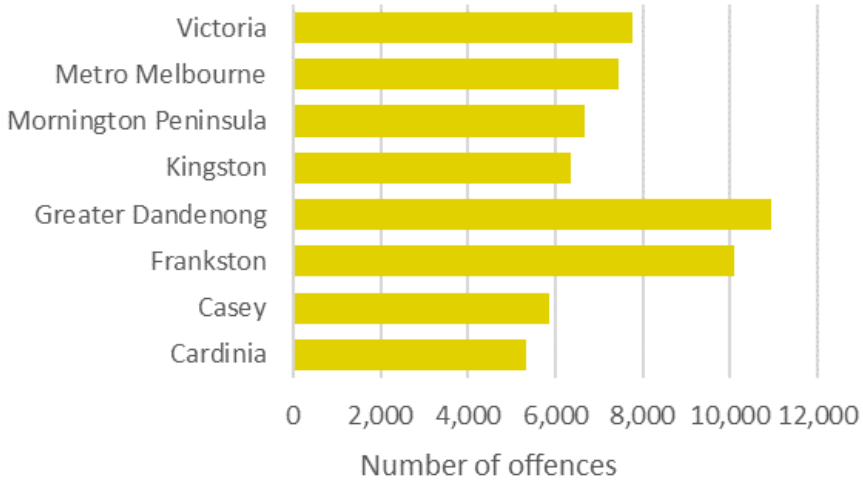
The rate of crime in an area may correlate with its level of socio-economic disadvantage, where a higher crime rate is usually associated with higher socio-economic disadvantage and vice versa. Understanding an area's crime rate allows policymakers to allocate policing resources or evaluate other measures that might help to reduce crime rates.

There is a discrepancy between publicly-perceived crime rates and recorded crime statistics. Crime rate incorporates myriad offence types, which could mean varying growth trends between different offences. For instance, the increasing rate of a certain offence can co-exist with an overall dropping crime rate.

The Crime and Statistics Agency provides data on crime statistics. Offence rates are often measured with offence counts per 100,000 head of population during a given period.

- Greater Dandenong and Frankston LGAs have the highest offence rates in the Southern Metro Region and are the only LGAs within the region with rates that exceed the metropolitan average.
- The Shire of Cardinia had the lowest crime offence rate, followed by the City of Casey.

FIGURE 94: OFFENCE RATES PER 100,000 POPULATION (2018)



Source: Crime Statistics Agency, 2018

5.10 Wellbeing

The Self-Reported Personal Wellbeing Index, or Subjective Wellbeing Index, is published in the VicHealth Indicators Survey. It measures not only illness but people's mental health and their perceptions about their lives.

According to the Victorian Health Promotion Foundation, higher scores on the Subjective Wellbeing Index indicate better mental and physical health, higher productivity and stress-coping abilities, as well as higher engagement in social and humanitarian activities.

'Sense of safety walking alone after dark' is an indicator published by Social Health Atlases to understand how people feel about their community at night time. The level of sense of safety walking alone after dark can inform the provision of infrastructure, such as street lights and emergency reporting systems. It can also encourage Crime Prevention Through Environmental Design in areas with lower indexes.

Note both datasets have limitations as they are subjective measurements based on self reporting.

- Only Greater Dandenong and Frankston LGAs score below the Victorian average on the subjective wellbeing index (Table 15). This may be due to the relative socio-economic disadvantage in that area.
- The sense of safety walking alone after dark index (Table 16) shows that the Southern Metro Region performs relatively poorly. Kingston and Mornington Peninsula LGAs are the only areas that score above the Victorian average.
- Greater Dandenong, Casey, and Frankston LGAs receive particularly low safety scores.

TABLE 15: SUBJECTIVE WELLBEING INDEX

LGA	Subjective wellbeing index
Cardinia	78.2
Casey	77.1
Frankston	75.7
Greater Dandenong	74.9
Kingston	77.5
Mornington Peninsula	78.9
Victoria	77.3

Source: VicHealth Indicators Survey, 2015 (note that 2015 data is latest available

TABLE 16: SENSE OF SAFETY WALKING ALONE AFTER DARK

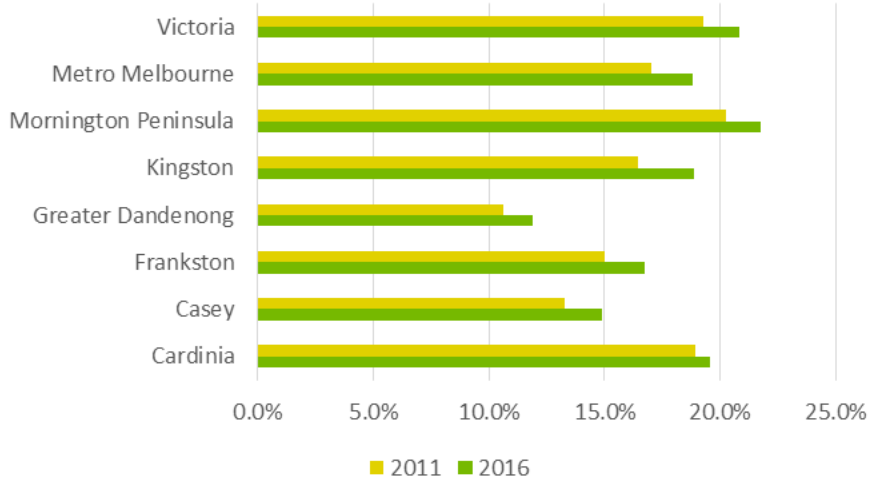
LGA	ASR per 100 (Age standardised rate)
Cardinia	47.6
Casey	41.8
Frankston	43.6
Greater Dandenong	35.7
Kingston	55.0
Mornington Peninsula	57.2
Metro Melbourne	51.9
Victoria	53.0

Source: Social Health Atlases, 2018

Volunteering rate reflects an area's level of participation in volunteer work. It is calculated based on the number of people who volunteer among the total population.

- The percentage of people volunteering in these areas is increasing across the region in line with broader trends (Figure 95) The Shire of Mornington Peninsula has the highest rate of volunteering, which may be driven by its older demographic.
- The City of Greater Dandenong exhibits the lowest volunteering rates.

FIGURE 95: PERCENTAGE OF POPULATION VOLUNTEERING (2011 AND 2016)



Source: ABS Census 2011 and 2016

6. ENVIRONMENTAL

ENVIRONMENTAL INDICATORS

The Infrastructure Victoria environmental indicators that underpin this section are:

- Open space, including green space
- Land
- Water assets
- Canopy cover
- Stream condition
- Coastal and bay health
- Air quality
- Flood risk
- Sea level rise
- Bush fire
- Urban heat island effect and heat risk
- Contaminated groundwater and other sites
- Access and use of green space
- Visitation to parks
- Water security
- Renewable energy
- Extractives industry
- Waste

REGIONAL OVERVIEW

The environmental profile of the Southern Metro Region is characterised by:

- a diverse stock of environmental assets including concentrations of green space in the north east, coastal areas (Port Phillip and Western Port) and Ramsar wetlands
- a large amount of agricultural land – especially in the middle to outer areas of the region – with characteristics similar to regional land
- several operating landfill sites.

ENVIRONMENTAL STRENGTHS

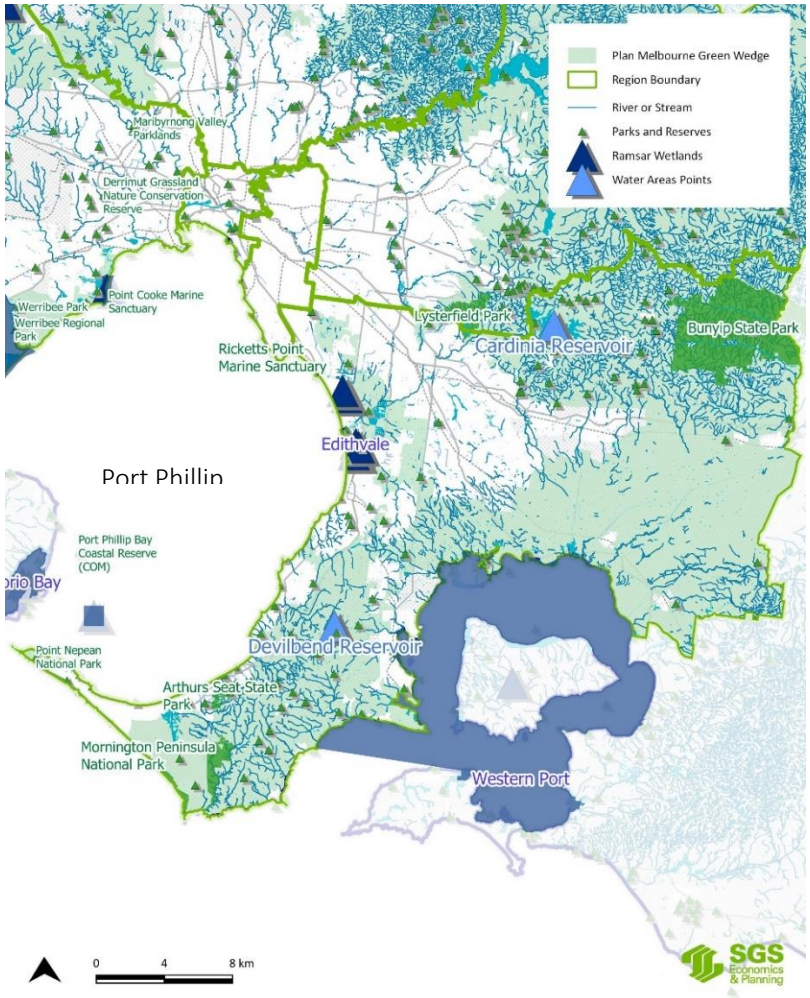
- Land available for urban development
- A large proportion of residents within the UGB (excluding New Growth Areas) have access to at least one type of open space.

ENVIRONMENTAL CHALLENGES

- Limiting risk and impacts of hazards associated with climate change such as bushfire, sea level rise, flood and heat vulnerability
- Maintaining and/or improving asset condition including tree canopy cover, waterway health and atmosphere pollution.
- Managing the impact that economic activity has on the environment, including contaminated sites, waste water and physical waste.
- Managing dependent relationships with the environment to ensure water and climate security.

6.1 Overview and key environmental features

FIGURE 96: KEY ENVIRONMENTAL FEATURES, SOUTHERN METRO REGION



Source: (Department of Environment, Land, Water and Planning, 2018a) *Map does not cover full portfolio of key environmental assets

Prior to European settlement, the Southern Metro Region was ecologically diverse, including sands, forests, plains, wetlands and swamps.

Through the early colonial period, the region developed as a centre of pastureland and forestry. Now it is a mix of residential and agricultural land.

Figure 96 shows key environmental terrestrial assets in and outside the Southern Metro Region. The region is home to several parks and reserves including coastal ecosystems. Key natural assets in the region include Bunyip State Park, Arthurs Seat State Park and Mornington Peninsula National Park.

Outside of the region, natural areas that are accessible to residents include Lysterfield Park and Phillip Island.

In addition to these landmarks, substantial tracts of land in the region is zoned as green wedge. Generally, these non-urban areas that lie outside the UGB perform important environmental functions and may contain endangered ecosystems.

The region is also home to water assets including:

- Bunyip and Lang Lang Rivers
- Western Port and Port Phillip Bay
- Devilbend and Cardinia Reservoir
- Western Port and Edithvale wetlands (Ramsar listed).

6.2 Environmental Assets

The Southern Metro Region's stock of environmental assets underpins its capacity to provide ecosystem services that benefit the metropolitan population.

Open space and green space

The Southern Metro Region includes 45,920 hectares of land defined as open space,[11] of which approximately 80 per cent can be classified as green space (Victorian Planning Authority, 2017c).[12] Out of the regions in metropolitan Melbourne, it has the second lowest share (17 per cent) of open space.

The Victorian Planning Authority (VPA) open space dataset defines open space across 13 categories. A typology of green, mixed and built open space has been applied across the 13 open space categories (see Figure 98 for the groupings of categories into the typology).[13]

Figure 97 and Figure 98 show the different types of open space existing across the region in 2017. Accessibility to open space is discussed in Section 6.5. Key points include:

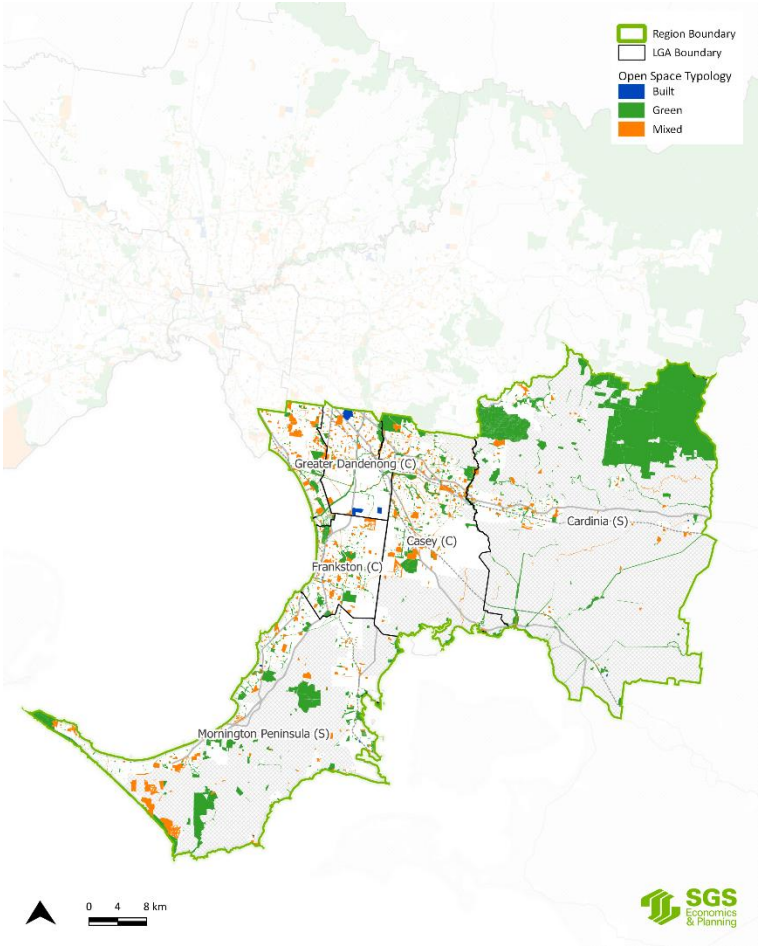
- There is a diverse range of green space and mixed space along populated areas such as those adjacent to the bay and in inland areas in the cities of Greater Dandenong and Casey.
- Conservation reserves, and natural and semi-natural reserves are the largest green space classes.
- There is a large amount of mixed assets in the form of sports fields and organised recreation.
- There are large areas where there is no open space; however, this is likely due to low population and/or agricultural land use.
- The City of Kingston is among the 10 highest metropolitan LGAs with respect to the percentage of open space relative to total land area.
- Casey, Frankston, Kingston and Mornington Peninsula LGAs are among the 10 lowest metropolitan LGAs with respect to the percentage of open space relative to total land area.

[11] Open space is any piece of land that is provides some natural or cultural benefit. Green wedge zones that are primarily used for agriculture are not considered as open space because of the potential disamenity arising from agricultural activity.

[12] The interpretation of green space in this report relates to a vegetated variant of open space. Urban vegetation in the form of house gardens/yards and agriculture was not considered to be open space.

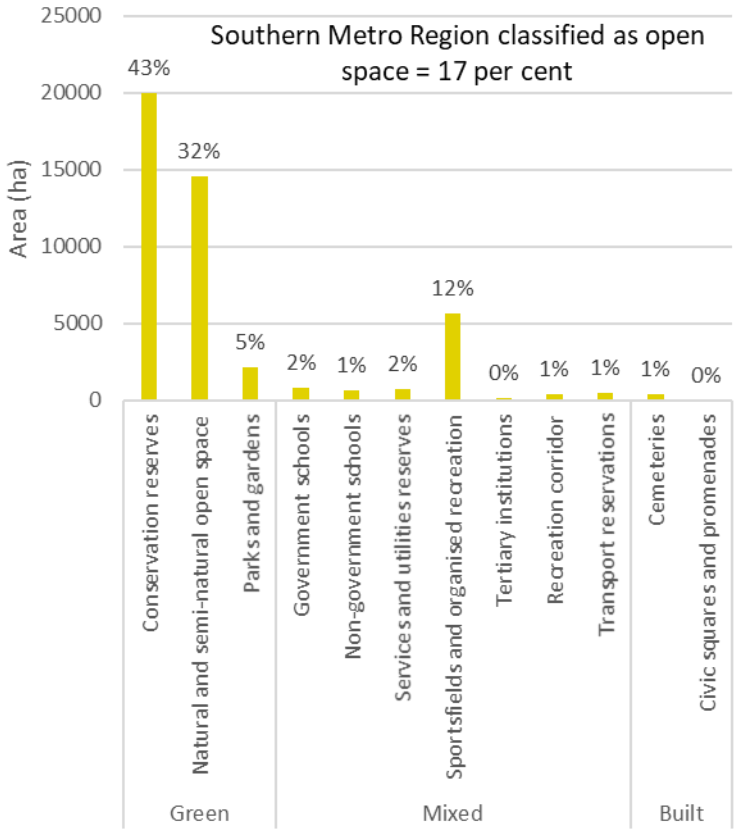
[13] Green space refers to areas that are predominately natural and contain little built infrastructure, mixed space refers to areas that have been altered from their natural state for economic purposes but still contain areas of green space, and built space refers to areas that contain predominately built infrastructure.

FIGURE 97: OPEN SPACE CATEGORIES (2017)



Source: (Department of Environment, Land, Water and Planning, 2018a)

FIGURE 98: EXISTING OPEN SPACE TYPES (2017)



Source: (Department of Environment, Land, Water and Planning, 2018a) *Note that this graph does not consider proposed open space. Share of total green space in the region is provided on top of the green space type bars.

Table 17 and Figure 99 illustrate the VPA open space data by LGA. Table 17 shows the area, in hectares, of open space in each LGA, while Figure 99 shows the share of open space in each LGA that can be attributed to green, mixed and built open space.

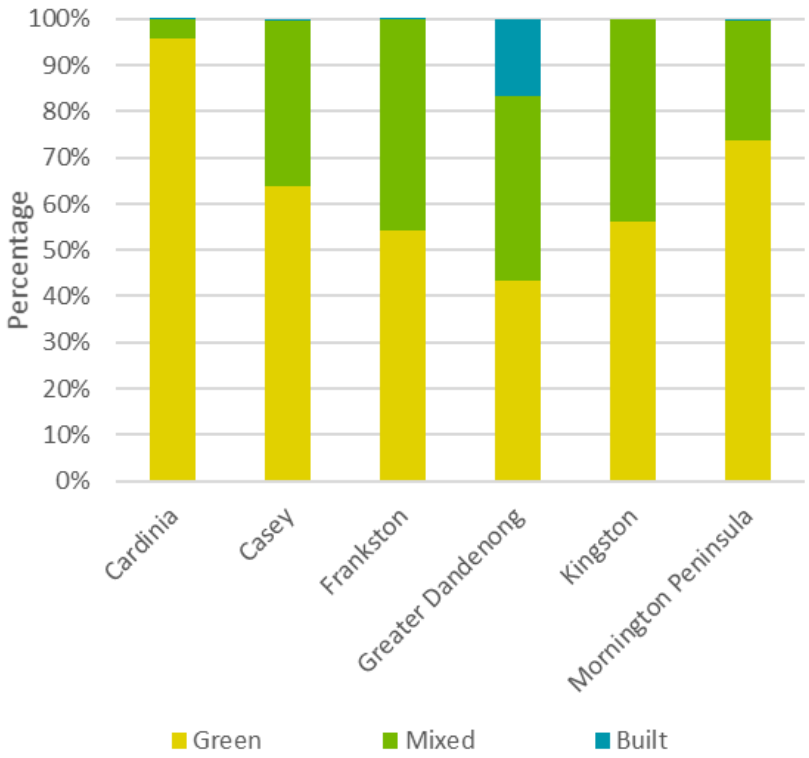
- Green open space is the dominant category in all LGAs except the City of Greater Dandenong.
- A considerable percentage of open space in the City of Greater Dandenong is built.
- The Shires of Mornington Peninsula and Cardinia have a particularly high amount of open/green space compared to other LGAs.
- Assessment of trends over time would highlight the extent to which the share of open space is changing with respect to residential development.

TABLE 17: OPEN SPACE TYPE (HA) BY LGA (2017)

LGA	Green	Mixed	Built	Total
Cardinia	22,966	1,024	16	24,006
Casey	3,473	1,969	11	5,453
Frankston	1,311	1,106	2	2,419
Greater Dandenong	861	791	328	1,980
Kingston	1,287	1,007	-	2,294
Mornington Peninsula	7,195	2,544	29	9,768

Source: (Victorian Planning Authority, 2017c) *This table does not consider proposed open space.

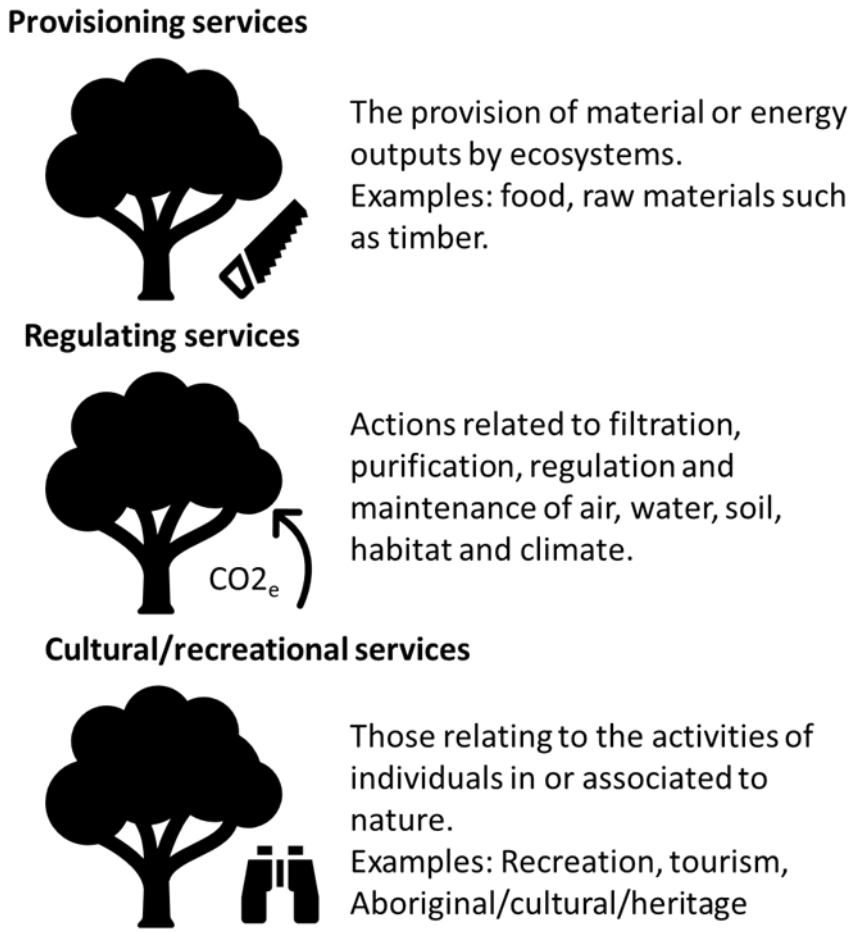
FIGURE 99: OPEN SPACE TYPE BY LGA (2017)



Source: (Department of Environment, Land, Water and Planning, 2018a) *This graph does not consider proposed open space.

The provision of ecosystem services, as defined in Figure 100, varies by environmental asset type and depends on the extent (size) and condition of the asset.

FIGURE 100: ECOSYSTEM SERVICE CLASSIFICATION



Source: IDEEA Group

For example, green open space is likely to provide a range of ecosystem services including provisioning services, regulating services (such as mitigation of urban heat island effects) and cultural/recreation services, while mixed open space is likely to be mainly concentrated on cultural/recreation services which have positive effects on health and wellbeing, and built open space is even more likely to be concentrated on cultural or recreation services.

The capacity of the environmental assets to provide ecosystem services can be affected by barriers such as accessibility, human activity and degradation. Additional benefits can be realised if assets are made more accessible by those that manage them.

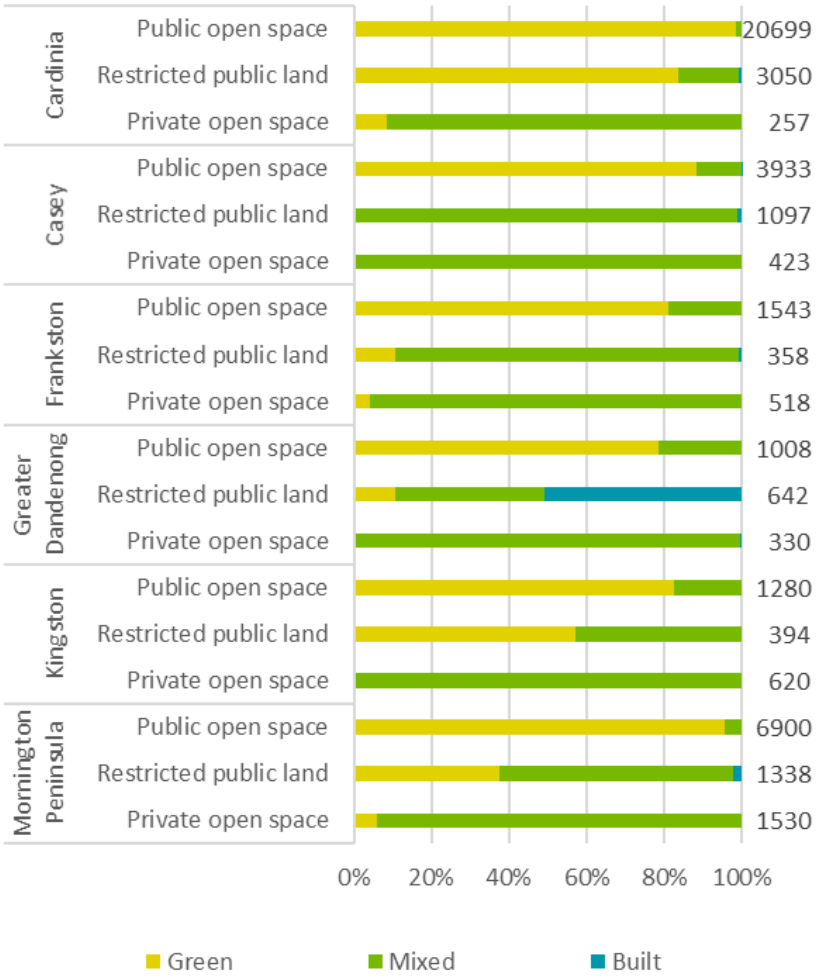
Demand for ecosystem services will continue to rise with population growth. Land is fixed in supply, meaning that under-utilised assets (which can include government and non-government school ovals outside of school hours, as well as other government and some private land) are a source of supply to meet this demand.

Figure 101 illustrates the percentage of open space assets in the region that are either private, restricted public land or public. The spatial distribution of public, restricted public, and private land is shown in Figure 102.

- A large share of green space is public.
- Built and mixed space is spread across public, private and restricted land.

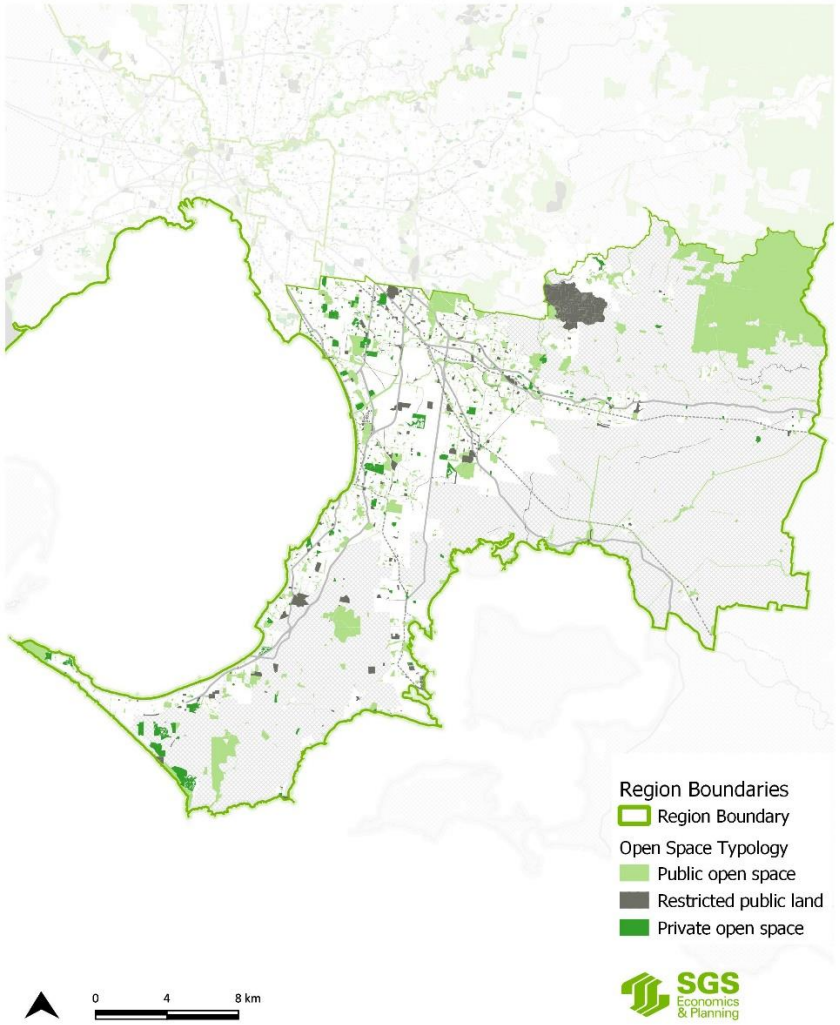
Respectively, Figure 103 and Figure 104 indicate the locations of private and restricted open space in the region. Government and non-government schools are both accessible to populated areas.

FIGURE 101: OPEN SPACE TYPE BY OWNERSHIP AND LGA (2017)



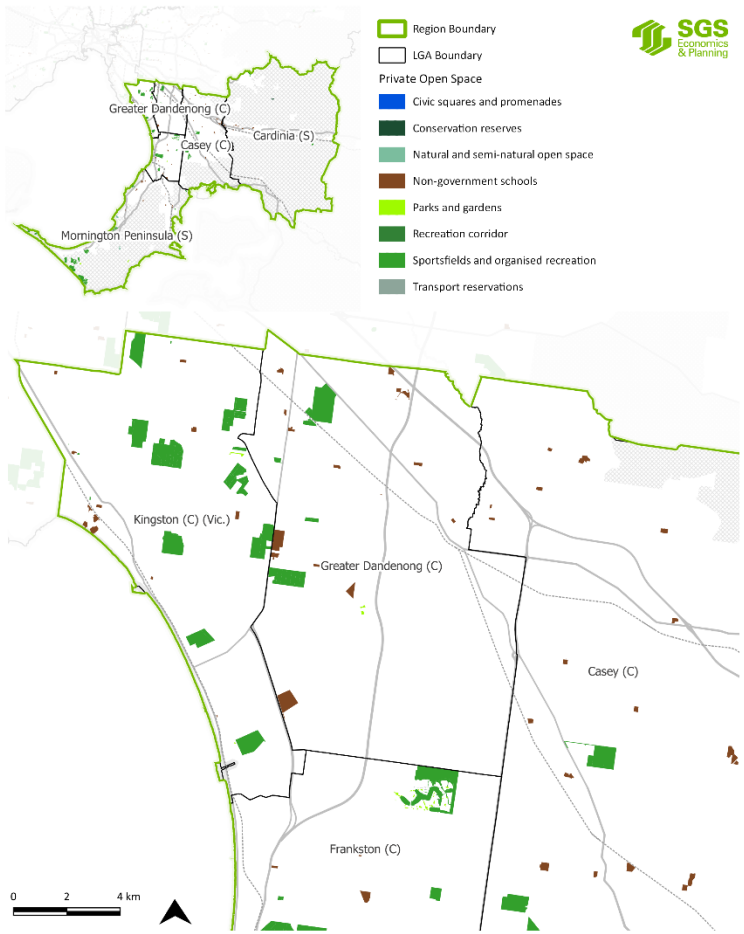
Source: (Department of Environment, Land, Water and Planning, 2018a). *Numbers to the right of bars are hectares

FIGURE 102: OPEN SPACE BY OWNERSHIP



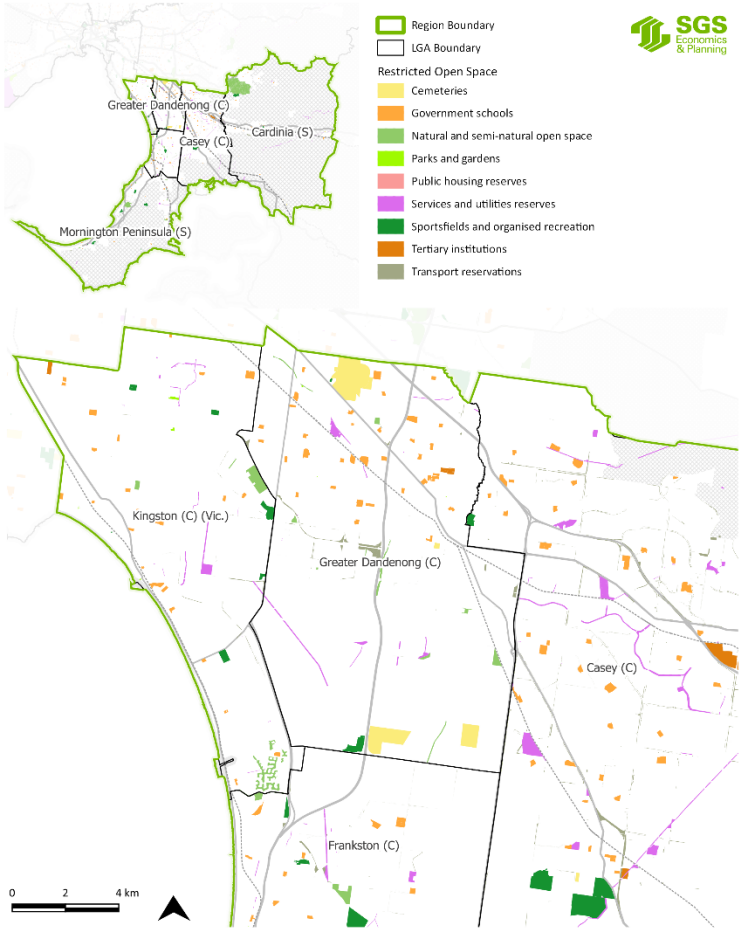
Source: (Department of Environment, Land, Water and Planning, 2018a)

FIGURE 103: LOCATIONS OF PRIVATE OPEN SPACE BY TYPE (2017)



Source: (Department of Environment, Land, Water and Planning, 2018a)

FIGURE 104: LOCATIONS OF RESTRICTED OPEN SPACE BY TYPE (2017)



Source: (Department of Environment, Land, Water and Planning, 2018a)

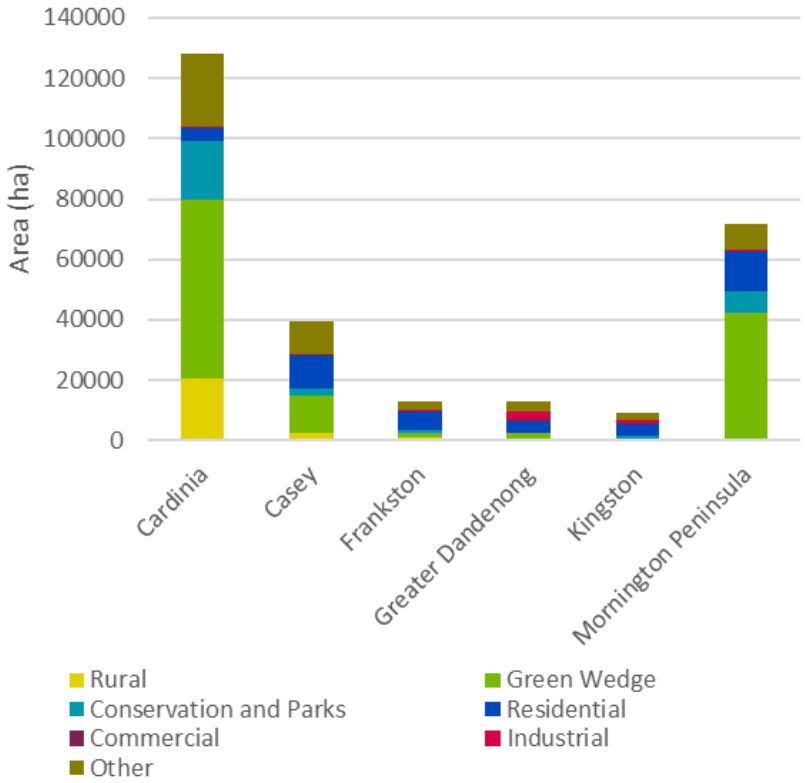
Land use

Land use has been characterised using planning zone data. This data is preferred to Victorian Land Use Information System (VLUIS) data as the VLUIS data does not have spatial specificity for inner metropolitan areas. However, the zoning data does have limitations as it represents preferred land use rather than actual land use and is not as specific in rural areas.

Figure 105, Table 18 and Figure 106 show the distribution of planning zones across the Southern Metro Region. The planning data shows:

- A large proportion of land in the inner LGAs is residential.
- A large proportion of land in the outer LGAs is either green wedge, rural or conservation and parks.
- Large areas of industrial land in the City of Greater Dandenong abuts green wedge areas.

FIGURE 105: PLANNING ZONES BY LGA (2016)



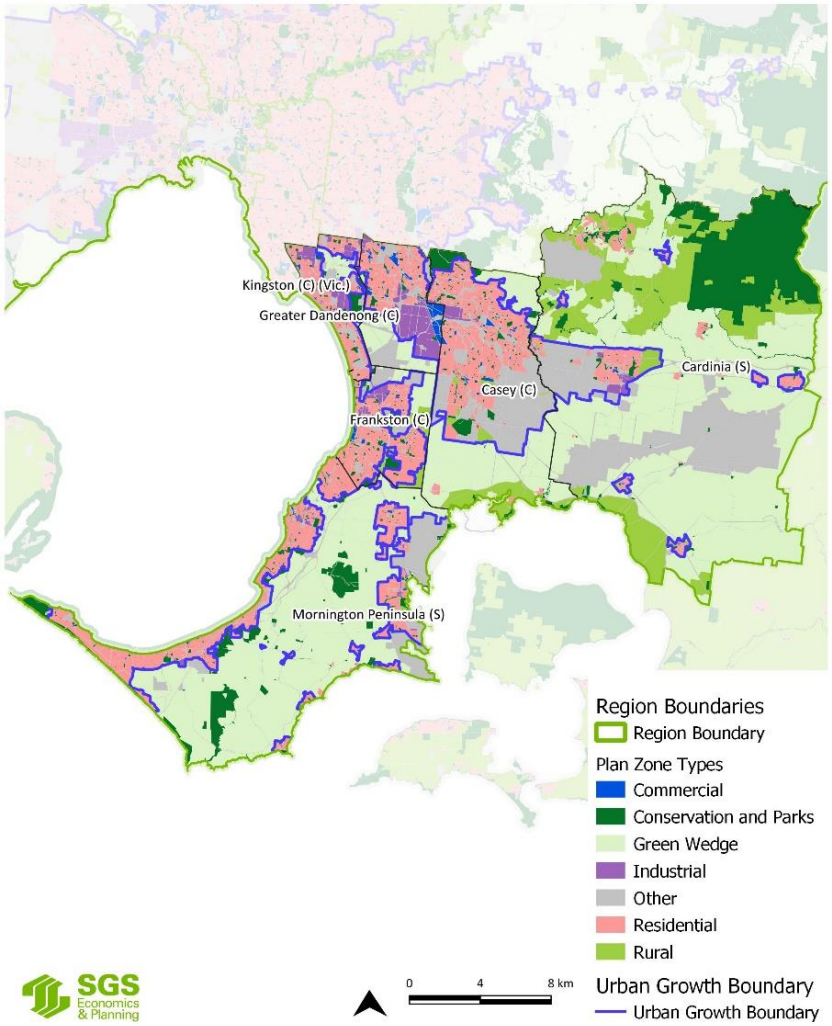
Source: (Department of Environment, Land, Water and Planning, 2018b) *Other includes both special purpose zones and public land zones (excluding parks and conservation). Examples of special purpose zones are activity centre zones and capital city zones. Examples of public land are education zones and health and community zones.

TABLE 18: SHARE OF TOTAL AREA BY DIFFERENT PLANNING ZONE TYPES (2016)

	Cardinia	Casey	Frankston	Greater Dandenong	Kingston	Mornington Peninsula
Commercial	0%	1%	1%	5%	2%	0%
Conservation and Parks	15%	7%	9%	3%	8%	10%
Green Wedge	46%	31%	10%	18%	9%	59%
Industrial	0%	1%	4%	20%	14%	1%
Other	19%	27%	20%	25%	23%	12%
Residential	3%	27%	47%	29%	44%	19%
Rural	16%	7%	9%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%

Source: (Department of Environment, Land, Water and Planning, 2018b) *Other includes both special purpose zones and public land zones (excluding parks and conservation). Examples of special purpose zones are activity centre zones and capital city zones. Examples of public land are education zones and health and community zones.

FIGURE 106: PLANNING ZONES (2016)



Source: (Department of Environment, Land, Water and Planning, 2018b) *Other includes both special purpose zones and public land zones (excluding parks and conservation). Examples of special purpose zones are activity centre zones and capital city zones. Examples of public land are education zones and health and community zones.

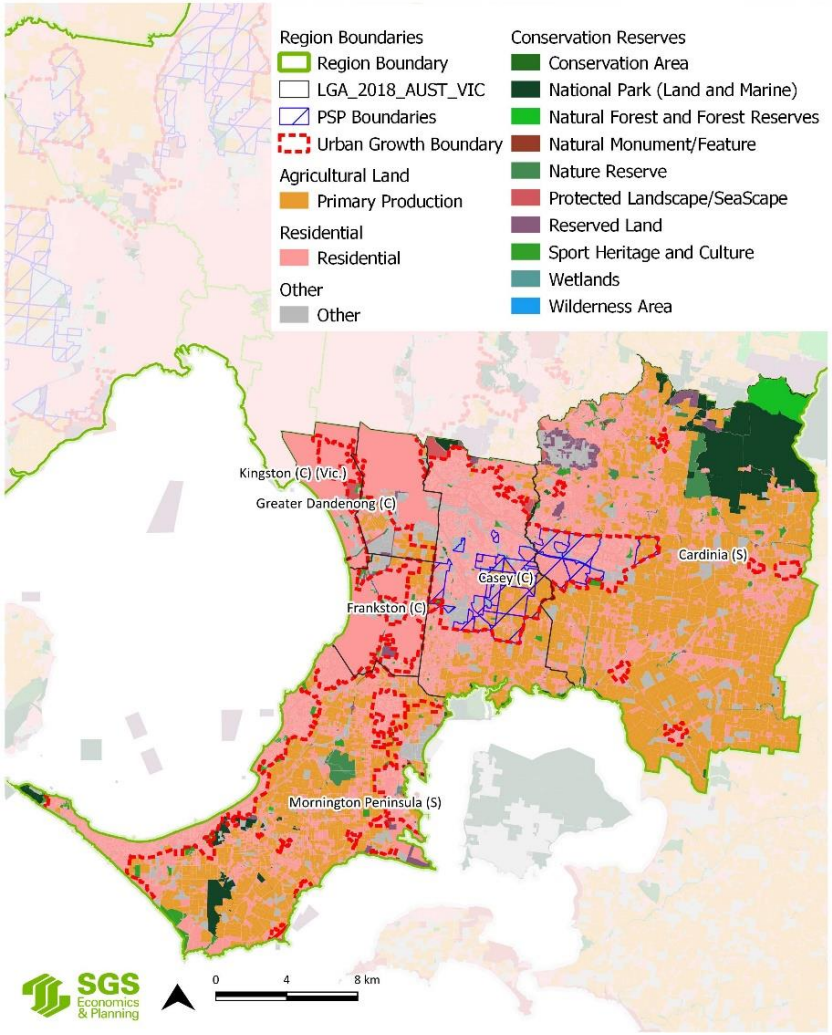
The economic/social profiles show that high rates of population growth and urbanisation are occurring in the Southern Metro Region. Of the 274,289 hectares of total land in the region, 63,898 are within the UGB, of which 13,063 are also in New Growth Areas (Victorian Planning Authority, 2017a). The remaining 197,318 hectares form the Melbourne Metropolitan Rural Areas.

Figure 107 shows the distribution of VLUIS land use types across the UGB, New Growth Areas and rural areas. The VLUIS data set has been used here as it provides greater insight into the types of conservation areas in the region. Table 19 presents this information numerically. It also overlays the open space data with the VLUIS data to better describe sensitive areas not recorded in the inner areas of Melbourne using the VLUIS data.

Figure 107 and Table 19 show that:

- The share of land used for primary production and conservation purposes is higher in rural areas compared to urban areas.
- There is a significant percentage of land classified as primary production in New Growth Areas and rural areas.
- Green Wedge Zone sometimes corresponds to the other class in the VLUIS data meaning it may not have an environmental function.
- Large areas of primary production suggest that the rural areas of the Southern Metro Region are aligned with the rural areas described in the regional profiles.

FIGURE 107: LAND USE (2016)



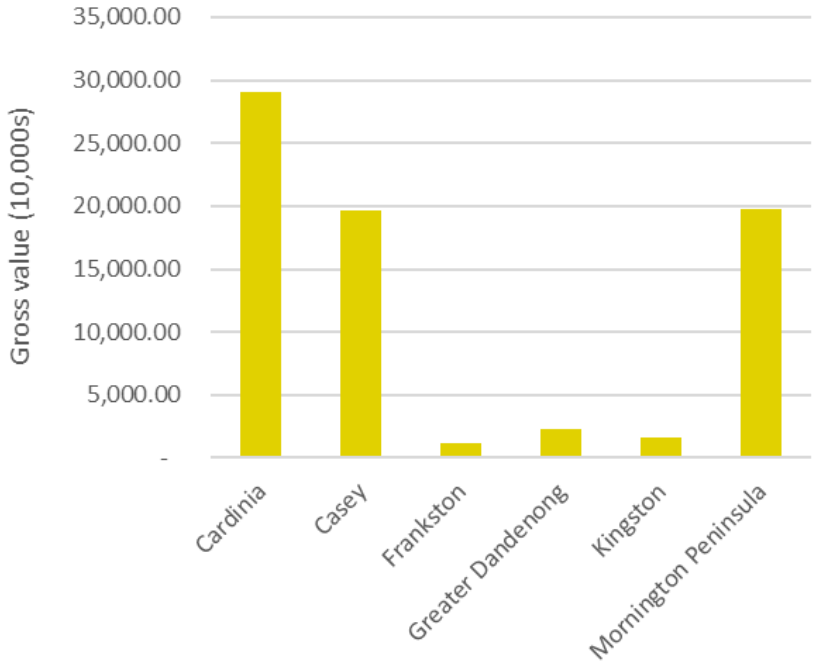
Source: (Agriculture Victoria, 2018). Note that the Other class refers to all other classifications under VLUIS

TABLE 19: LAND USE SHARES (2016)

VLUIS types	Inside UGB (excl New Growth Areas)	New Growth Areas	Rural
Residential	74%	54%	29%
Primary Production	3%	29%	45%
Conservation Reserves	1%	0%	14%
Open Space	16%	3%	5%
Other	6%	13%	7%
Grand Total	100%	100%	100%

Source: (Agriculture Victoria, 2018)

FIGURE 108: VALUE OF AGRICULTURAL PRODUCTS BY LGA ($10,000)



Source: (ABS, Value of Agricultural Commodities Produced, 2016-2017)

Figure 108 shows the value of agricultural production in 2015-16. The Shire of Cardinia generates the highest gross value followed by Mornington Peninsula and Casey LGAs. Cardinia and Mornington Peninsula LGAs have large areas of agricultural land compared to the City of Casey.

Table 20 shows the share of value contributed by different agricultural products for each LGA. For the Shire of Cardinia, a large share of this is livestock and vegetables. This is also true for Casey and Mornington Peninsula LGAs, although Casey LGA has a higher share of vegetables than the shires of Mornington Peninsula and Cardinia.

TABLE 20: SHARE OF TOTAL VALUE, BY AGRICULTURAL COMMODITY AND LGA (2016-17)

	Cardinia	Casey	Frankston	Greater Dandenong	Kingston	Mornington Peninsula	Metro	Victoria
Broadacre crops	0%	0%	0%	0%	0%	0%	1%	9%
Fruit and nuts (excluding grapes)	3%	3%	0%	0%	0%	10%	10%	10%
Hay	12%	0%	0%	0%	0%	0%	3%	4%
Livestock products	20%	9%	5%	25%	14%	0%	9%	29%
Livestock slaughtered and other disposals	36%	10%	9%	11%	8%	52%	26%	37%
Nurseries, cut flowers or cultivated turf	6%	29%	79%	43%	52%	8%	19%	4%
Vegetables for human consumption	23%	48%	8%	21%	26%	30%	32%	8%
Total	100%	100%	100%	100%	100%	100%	100%	100%

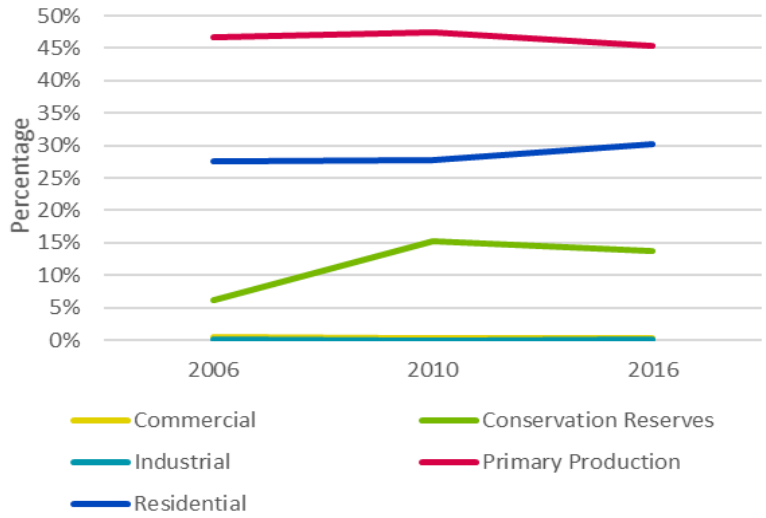
Source: (ABS, Value of Agricultural Commodities Produced, 2016-2017)

The rate at which land use is changing over time can better describe the reality of urban population growth and any related pressure on land use on the fringes of the UGB and New Growth Areas.

Figure 109 shows the trend in several VLUIS classes over time for rural areas. Note that the estimates are indicative only and should be interpreted with caution. The data suggests that:

- Primary production has remained stable since 2006.
- Residential land increased between 2010 and 2016.
- Conservation reserves increased between 2006 and 2010.
- Commercial and industrial land remained low.

FIGURE 109: LAND USE, RURAL AREAS (2006-2016)

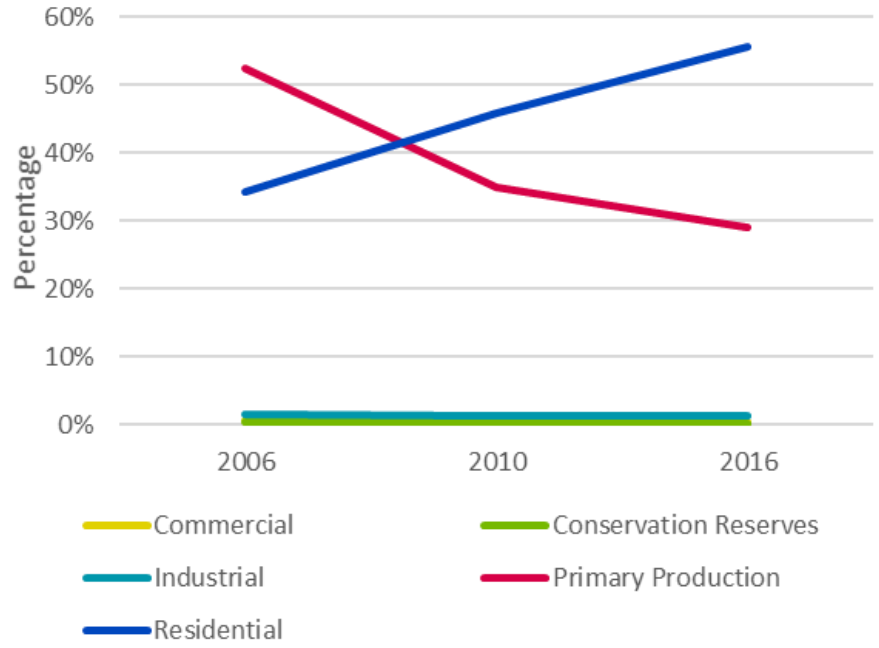


Source: (Agriculture Victoria, 2018)

Figure 110 shows the trend in several VLUIS classes over time for land inside the New Growth Areas. Note that the estimates are indicative only and should be interpreted with caution. The data suggests that:

- Primary production has decreased sharply.
- Residential land is increasing sharply.
- Conservation reserves, commercial and industrial land has remained low.

FIGURE 110: LAND USE, NEW GROWTH AREAS (2006-2016)



Source: (Agriculture Victoria, 2018)

Water and wetlands

Lakes/reservoirs, rivers, wetlands, and marine areas contribute to metropolitan Melbourne's economy and provide space for amenity and recreation.

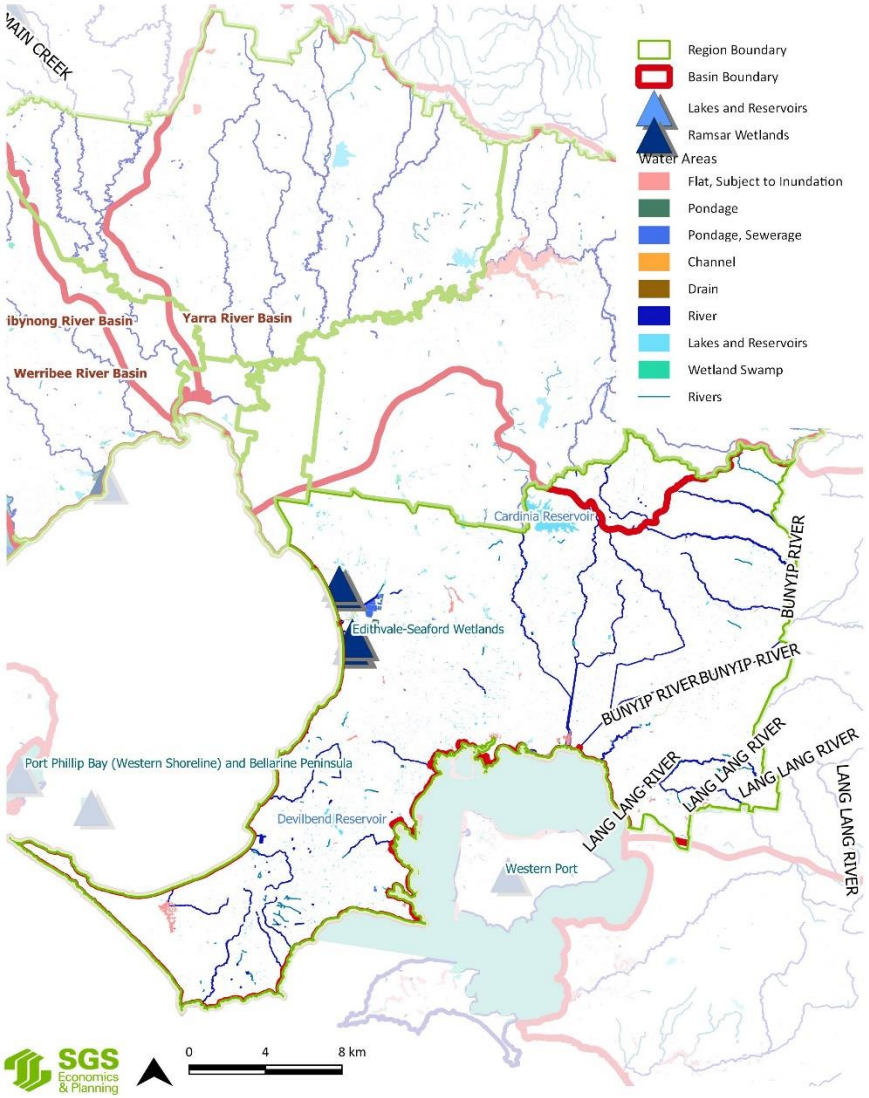
There are some significant water assets in the region and numerous access points to both Port Phillip and Western Port Bay. The key assets are shown in Figure 111

There are three main river systems in the region: the Bunyip River, Lang Lang River and Main Creek.

The Edithvale-Seaford Wetlands are Ramsar wetlands in the cities of Frankston and Greater Dandenong. There are multiple locations for these wetlands. There are also Ramsar wetlands adjacent to the region, surrounding French Island.

Reservoirs in the shires of Cardinia and Mornington Peninsula, are named the Cardinia and Devilbend reservoir respectively. Boating clubs located in Mornington and Frankston support the marine and local economies.

FIGURE 111: WATER AND WETLANDS (2016)



Source: (Department of Environment, Land, Water and Planning, 2018c; Department of the Environment, 2015) *Streams not shown to ensure legibility of labels.

6.3 Environmental conditions

The capacity of environmental assets to provide environmental benefits is related to asset condition. Environmental assets that have a higher condition relative to other assets have the capacity to provide a higher quantity of ecosystem services.

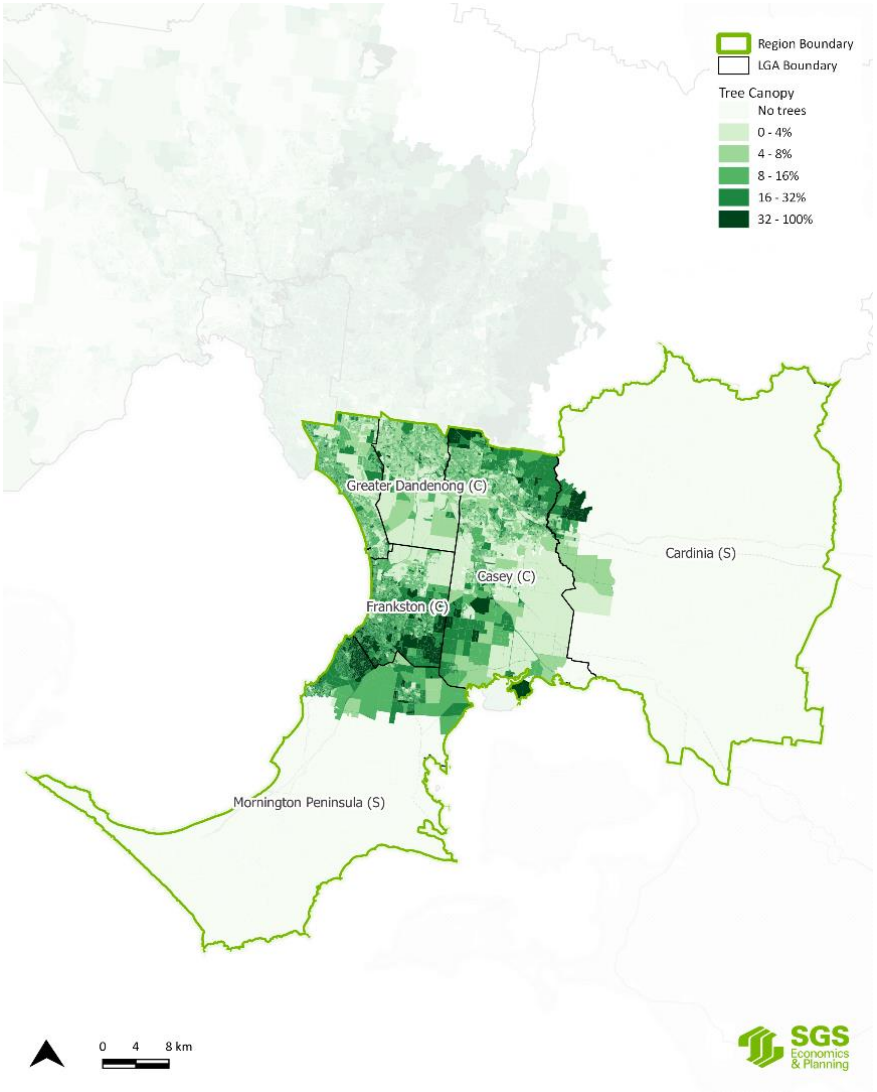
Canopy cover

Canopy cover is a measure of the condition of terrestrial ecosystems that is related to connectivity, shade, mature ecosystems, and higher biodiversity. Canopy cover affects the capacity of the ecosystem to provide benefits related to regulating services (for example, urban heat island mitigation) and cultural services (for example, recreation).

Figure 112 shows the areas of the Southern Metro Region that include measurements of canopy cover. Note that there are large areas of Cardinia and Mornington Peninsula LGAs for which there is no data.

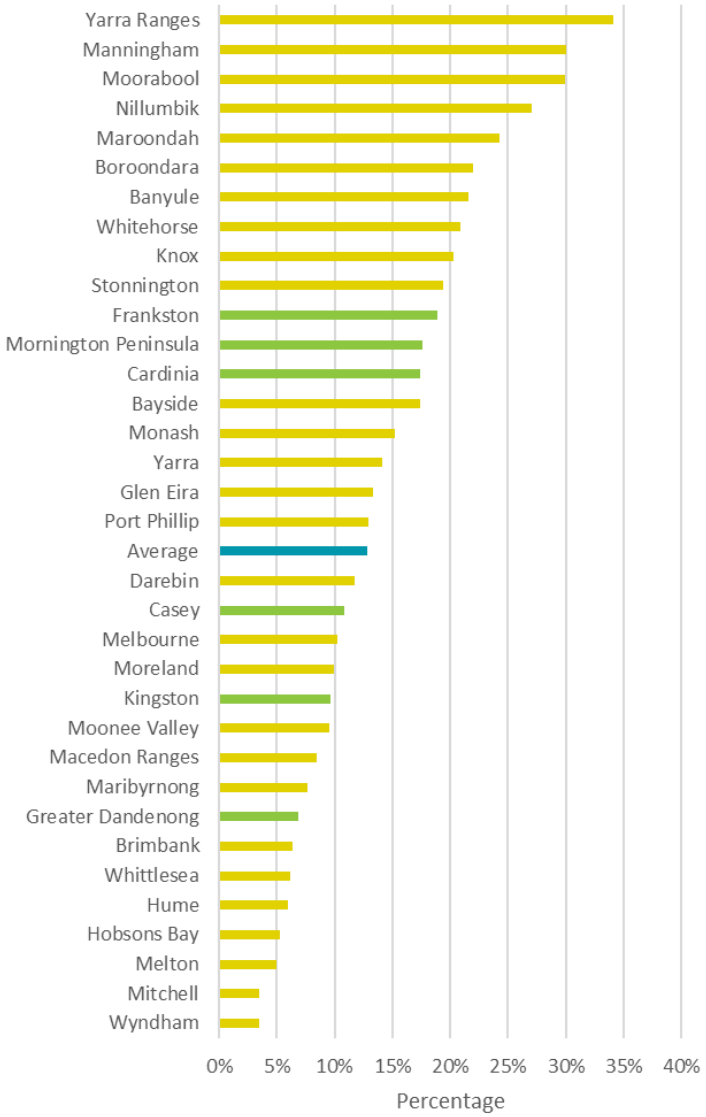
- A large percentage of the City of Casey has low canopy cover.
- Some areas in the City of Frankston have high levels of canopy cover relative to the rest of the region.
- The LGAs are varied in the amount of tree canopy cover. Three are above the average and three are below (Figure 113).

FIGURE 112: TREE CANOPY OVER (2014)



Source: (Clean Air and Urban Landscapes Hub, 2018)

FIGURE 113: TREE CANOPY COVER BY LGA (%), ALL METRO LGAS (2014)

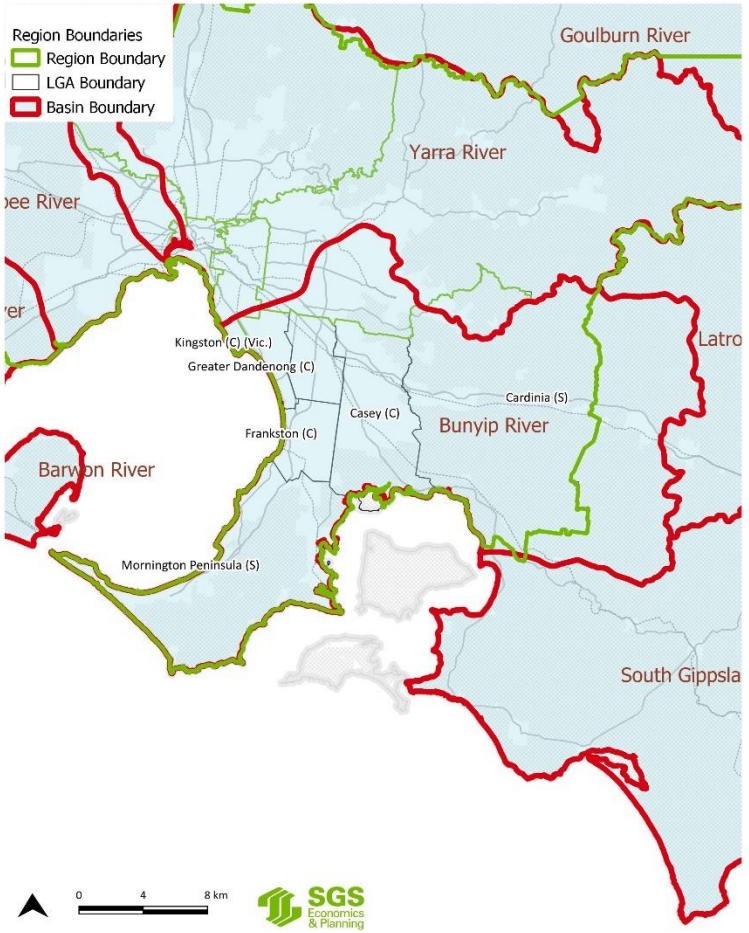


Source: (Clean Air and Urban Landscapes Hub, 2018)

Stream condition

There is one distinct basin in the Southern Metro region – the Bunyip River Basin. The Yarra River Basin also intersects the region. Figure 114 describes the extent of the basins.

FIGURE 114: KEY BASINS (2016)



Source: (Department of economic development, jobs, transport and resources, 2015)

The condition of key reaches in each of Victoria's basins is measured using the index of stream condition (Department of Environment, Land, Water and Planning, n.d.). The composite measure considers scores of hydrology, physical form, streamside zone, water quality and aquatic life. Data exists for 1999 to 2010.

The number and percentage of reaches where the index of stream condition for the Bunyip River Basin is good or excellent is shown in Table 21 and Figure 115 respectively.

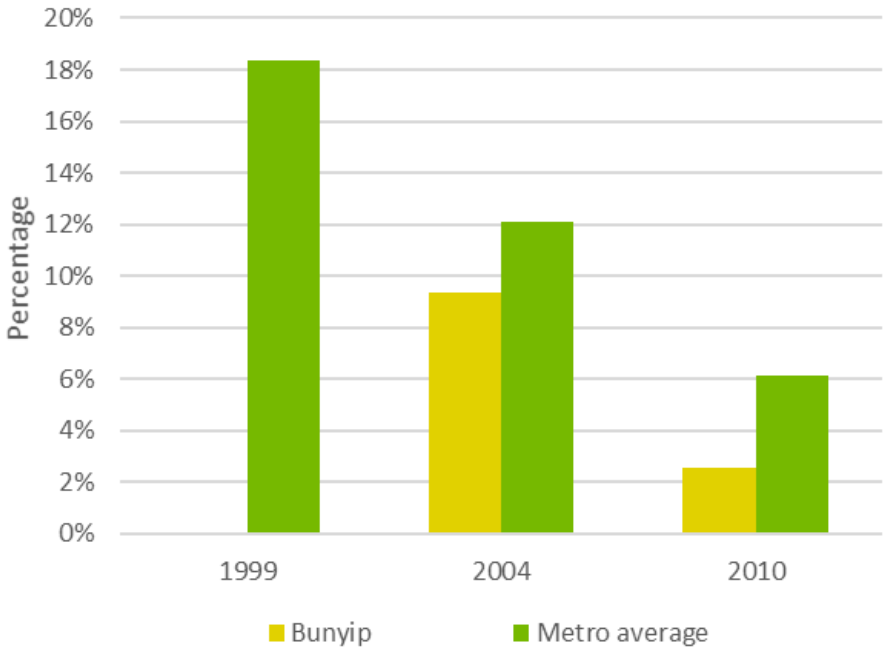
- Good/excellent stream condition is relatively rare in the Bunyip River - most observations are in range of very poor to moderate.
- The Bunyip reaches are in worse condition than the metropolitan average.
- There is a decreasing trend in the percentage of reaches classified as being in good or excellent condition.

TABLE 21: NUMBER OF REACHES IN GOOD/EXCELLENT CONDITION (1999-2010)

Year	Bunyip	Metro average
1999	0.00	3.82
2004	3.00	3.50
2010	1.00	2.01

Source: (Department of Environment, Land, Water and Planning, 2014) *Reaches with an environmental condition greater than 70 percent are deemed to be in excellent condition, while reaches with an environmental condition between 51-70% are deemed to be in good condition.

FIGURE 115: PERCENTAGE OF REACHES IN GOOD/EXCELLENT CONDITION (1999-2010)



Source: (Department of Environment, Land, Water and Planning, 2014) *Reaches with an environmental condition greater than 70 percent are deemed to be in excellent condition, while reaches with an environmental condition between 51-70% are deemed to be in good condition.

Coastal and bay health

Bay health can be affected by upstream pollution, which is often elevated during periods of heavy rain. Estuarine and bay systems such as Port Phillip Bay, Western Port and the Gippsland Lakes are subject to reduced water quality, which usually occurs after extreme weather events when high pollutant levels are discharged from rivers and drains. In the past, this has resulted in algal blooms, high turbidity, fish kills and elevated bacteria levels.

The Port Phillip Bay and Western Port generally demonstrate healthy systems. Several indicators were used to assess the bay, as outlined in the State of the Bays 2016 report (Commissioner for Environmental Sustainability Victoria, 2016). For example:

- nitrogen cycle
- water quality
- intertidal habitat
- seagrass
- reef habitat and dependent species
- fish
- marine dependent birds.

There is one major difference in condition of the Port Phillip Bay and Western Port Bay. Water clarity and algae are considered poor in Western Port Bay but good in Port Phillip Bay.

There are some concerning trends in levels of intertidal vegetation and the status of birds in both bays. The condition of Sand Flathead in the Port Phillip Bay is also poor.

Despite generally good quality (97 per cent of the time) in the 36 beaches monitored, of which 16 are in the Southern Metro Region, there were two swim advisories issued during the 2016-17 season including:

- 14 December 2016, Rye Beach
- 22 February 2017, Carrum Beach.

Pollution alerts were also issued for sewerage spills in Frankston and Mount Martha.

Air quality

The atmosphere is integral to human health. By burning a range of materials in the production process, economic activity can impact the condition of the atmosphere. Numerous variables can be used to measure air quality including:

- particulate matter 2.5 (PM2.5) – small particles that can be breathed deep into the lungs
- particulate matter 10 (PM10) – larger particles that can irritate the eyes and throat, and affect symptoms for those with existing heart and/or lung conditions
- carbon monoxide (CO) – a colourless gas found in smoke that displaces oxygen in the blood
- nitrogen dioxide (NO2) and sulphur dioxide (SO2) – which can affect the throat and lungs.

Safe thresholds vary across the variables and by the length of exposure (that is, daily thresholds and yearly thresholds). The World Health Organisation air quality guidelines suggest an annual mean of 20ug/m^3 and a daily mean of 50 ug/m^3 as long and short-term thresholds for PM10. The notes below Figure 116 provide information on other thresholds. Annual levels of pollution are presented graphically in this section while daily levels are only discussed in the text.

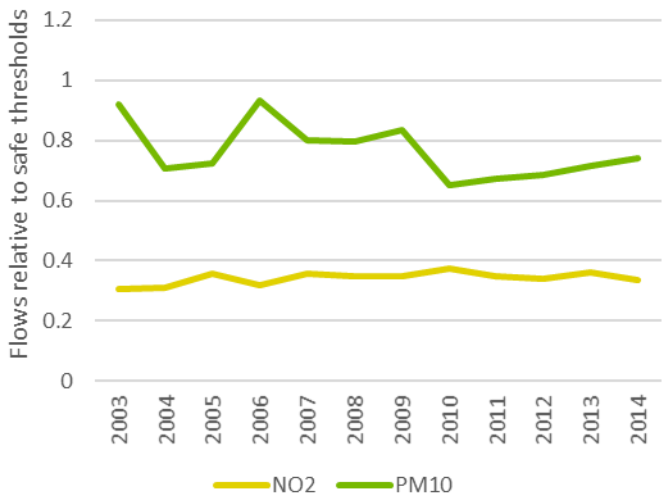
In the years from 2003 to 2014, air quality was monitored by the EPA at Dandenong only. Data is only available for some of the variables. As a result, the data presented in this report is not comprehensive and care should be taken. Further, air quality is measured at a point location and there may be variation in air quality across the geography.

Since the beginning of 2003, daily thresholds for PM10 have been exceeded at Dandenong. However, the number of daily exceedances has decreased since 2010.

Trends in pollution relative to safe annual thresholds for Dandenong is shown in Figure 116. Note that the level of the variable relative to safe thresholds is shown on the y-axis. A value less than 1 means that flows are less than the safe threshold, a value of 1 means that flows are equal to the safe threshold, and a value greater than 1 means that flows have exceeded the safe threshold. The figures also show the variability in the data collected at each site, with numerous variables missing.

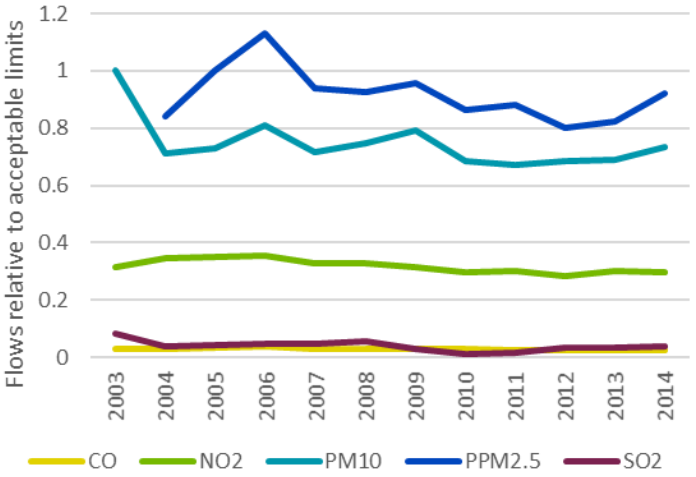
Levels of air quality for PM10 have been close to the safe long-term threshold at Dandenong. NO2 levels have been moderately safe. No concerning trend exists and air quality at Dandenong is similar to the metropolitan average (see Figure 117).

FIGURE 116: LONG TERM AIR QUALITY THRESHOLD, DANDENONG (2003-2014)



Source: (EPA Victoria, 2014), safe threshold is exceeded if PM2.5>8, PM10>25, O>9, NO2>30, SO2>20

FIGURE 117: LONG TERM AIR QUALITY THRESHOLD, METROPOLITAN AVERAGE (2003-2014)



Source: (EPA Victoria, 2014), safe threshold is exceeded if PM2.5>8, PM10>25, O>9, NO2>30, SO2>20

6.4 Environmental risks and hazards

The Southern Metro Region has been hit by a flood or storm most years since 2009 (Commonwealth of Australia, 2018). With climate change occurring, it is likely that this trend will continue, and the frequency of such events might rise.

Flood

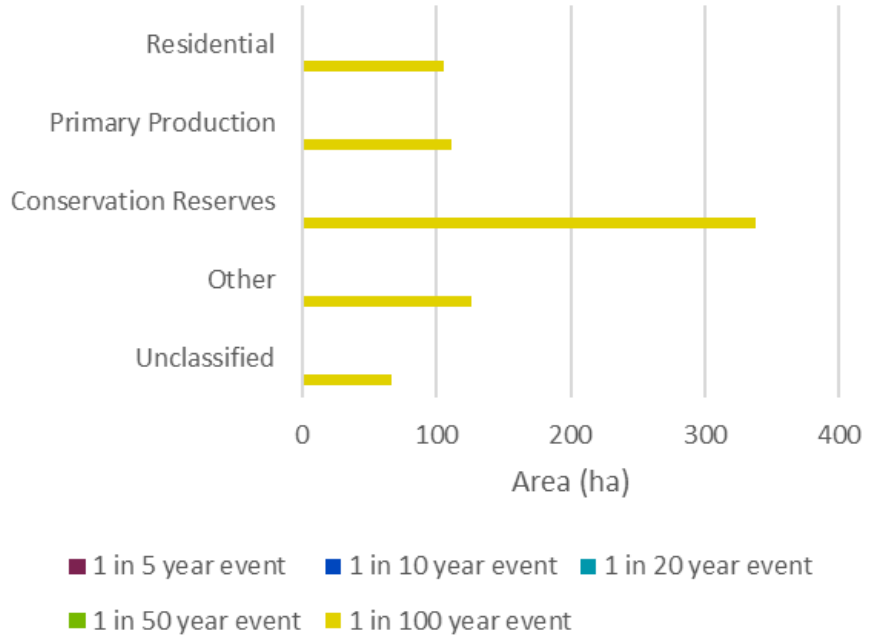
As the effects of climate change increase, areas are at increased risk of flooding because of more extreme weather events.

Figure 118, Figure 119 and Figure 120 show the projected flood extent for several different probabilistic events. For example, a five-year Average Recurrence Interval (ARI) refers to a one in five-year event, a 10-year ARI refers to a 1 in 10-year event, and so on.

- There is no area at risk of a one in five year, to a 1 in 50-year event.
- In the event of a 1 in 100-year flood, the largest area of land affected is conservation reserves. Smaller amounts of residential, primary production and other land will also be affected.
- Affected areas are in low lying areas and connect with similar areas in the Knox LGA.
- When compared to other metropolitan regions, the Southern Metro Region is one of the least affected by flood.
- ARIs are based on historical events; therefore, there is an increasing chance of such events occurring associated with climate change.

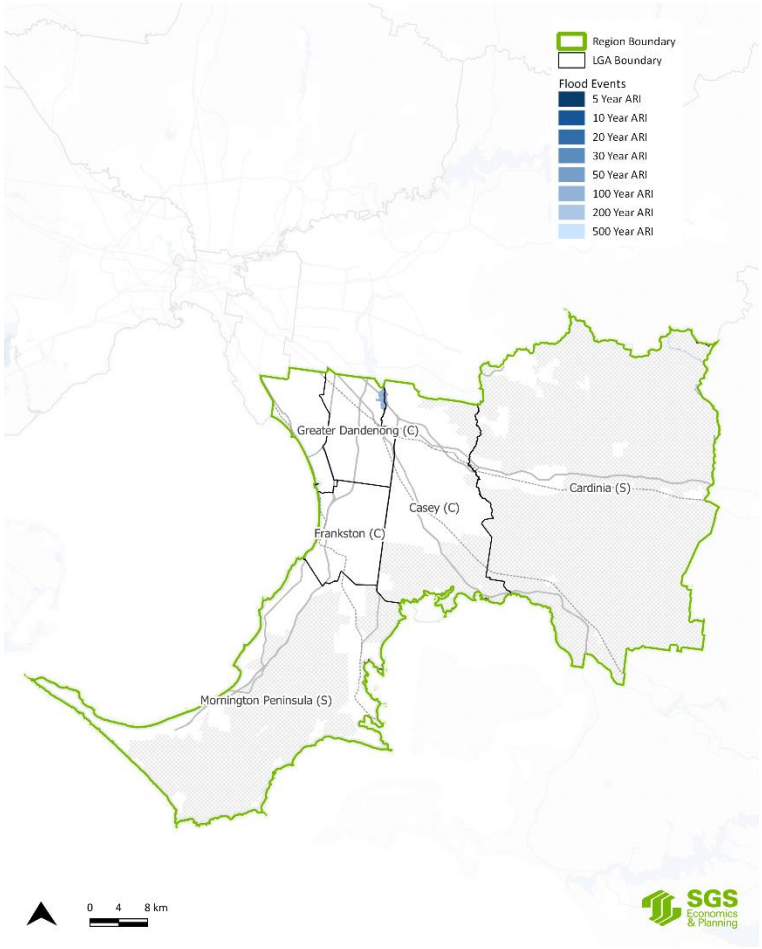
Building applications for properties likely affected by flooding are referred to Melbourne Water, which sets conditions on proposed development.

FIGURE 118: LAND AT RISK OF FLOOD (HA), MODELLED, BY LAND USE TYPE (2009)



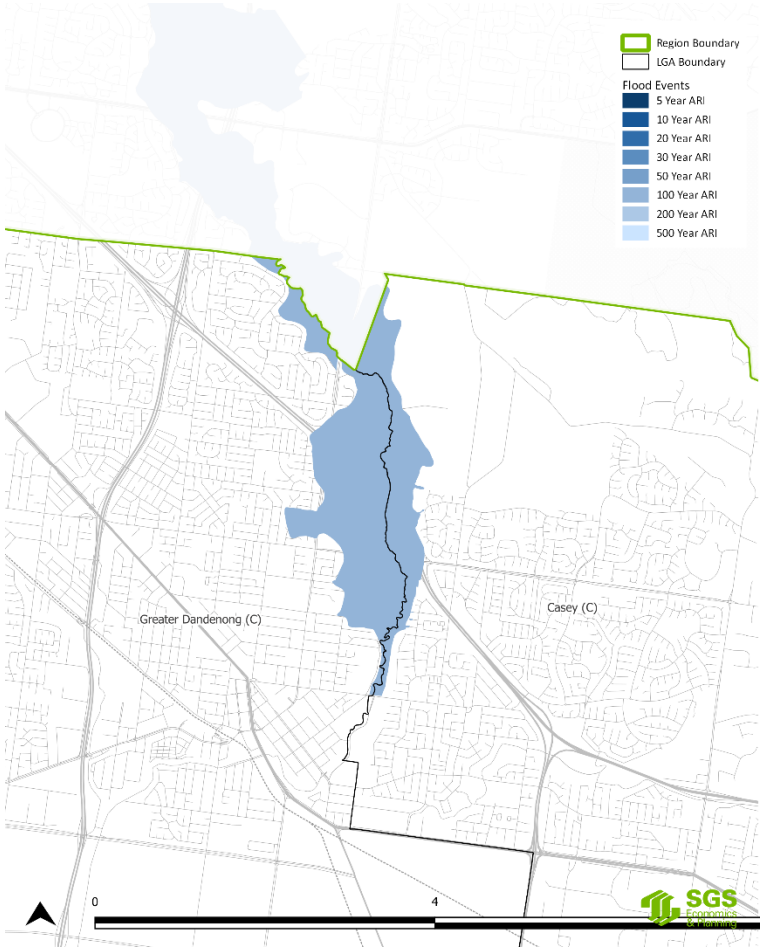
Source: (Department of Environment, Land, Water and Planning, 2018d) *VLUIS data has been used as hazards are primarily in the outer areas of the region (where the VLUIS data better describes land use). Other includes Extractive industries, Community Services, Sport, Heritage and Culture, and Infrastructure and Utilities. Unclassified is land not requiring an active assessment or record for rate, tax or levy purposes. Data used is considered to the latest public dataset available. Nuisance and localised flooding may extend beyond what is shown by the data.

FIGURE 119: MODELLED FLOOD EXTENT (2009)



Source: (Department of Environment, Land, Water and Planning, 2018d) *Data used is considered to the latest public dataset available. Nuisance and localised flooding may extend beyond what is shown by the data.

FIGURE 120 MODELLED FLOOD EXTENT, ZOOM, (2009)

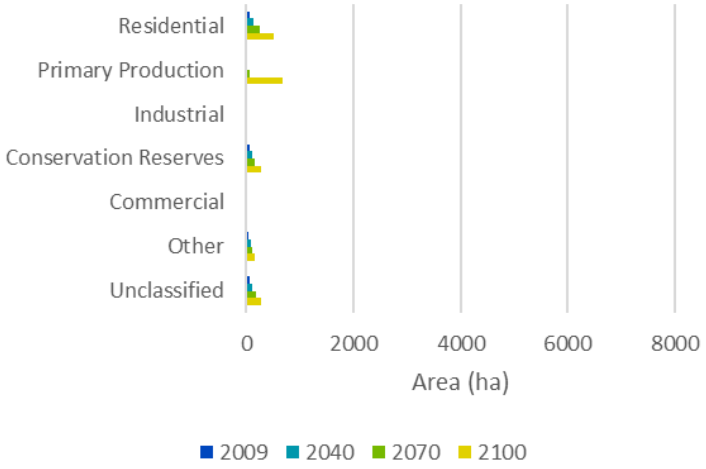


Source: (Department of Environment, Land, Water and Planning, 2018d) *Data used is considered to the latest public dataset available. Nuisance and localised flooding may extend beyond what is shown by the data.

Sea level rise

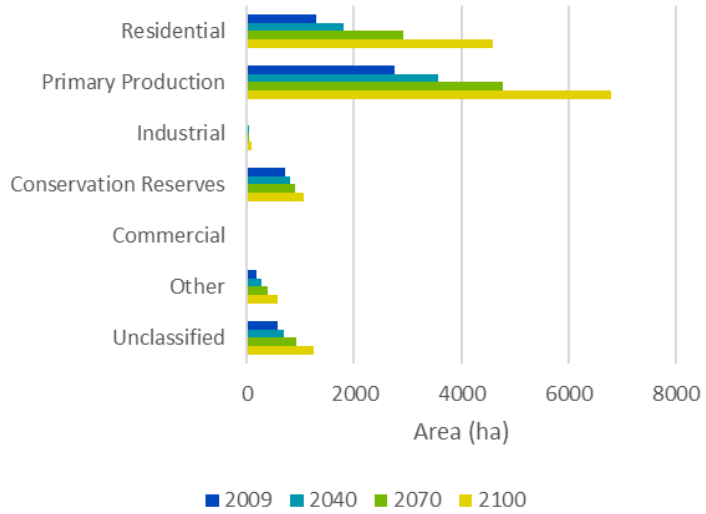
- Sea level rise is another consequence of global warming. Sea level rise has the potential to significantly impact coastal areas in the Southern Metro Region. This impact is also more threatening when considering storm surges. Storm surges are 1 in 100-year events and add to the underlying projection of areas inundated by sea level rise. Figure 121, Figure 122, Figure 123 and Figure 124 show that:
- There is a considerable area of residential and primary production areas that may be affected by sea level rise and storm surge.
- There is a much larger area of land at risk of storm surge.
- Areas at risk of storm surge include Patterson Lakes and areas along the coast of Western Port

FIGURE 121: PROJECTED AREAS INUNDATED, SEA LEVEL RISE (2009-2100)



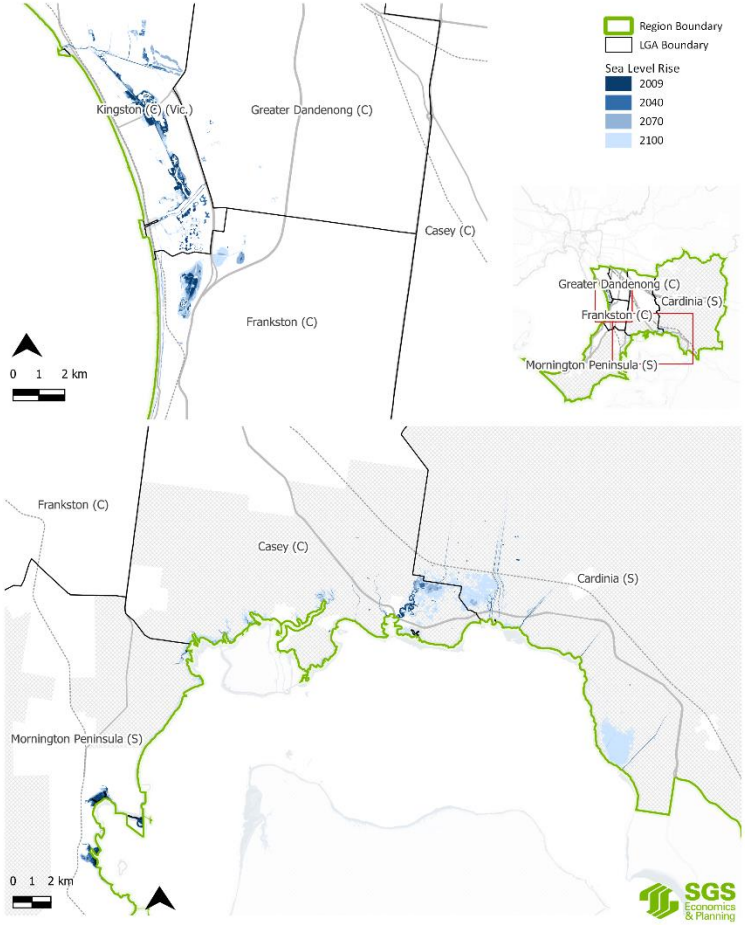
Source: (Department of Environment, Land, Water and Planning, 2018e) *VLUIS data has been used as hazards are primarily in the outer areas of the region (where the VLUIS data better describes land use).. Other includes Extractive industries, Community Services, Sport, Heritage and Culture, and Infrastructure and Utilities. Unclassified is land not requiring an active assessment or record for rate, tax or levy purposes. Data used is considered to the latest public dataset available. Nuisance and localised sea level rise may extend beyond what is shown by the data.

FIGURE 122: PROJECTED AREAS INUNDATED, SEA LEVEL RISE WITH STORM SURGE (2009-2100)



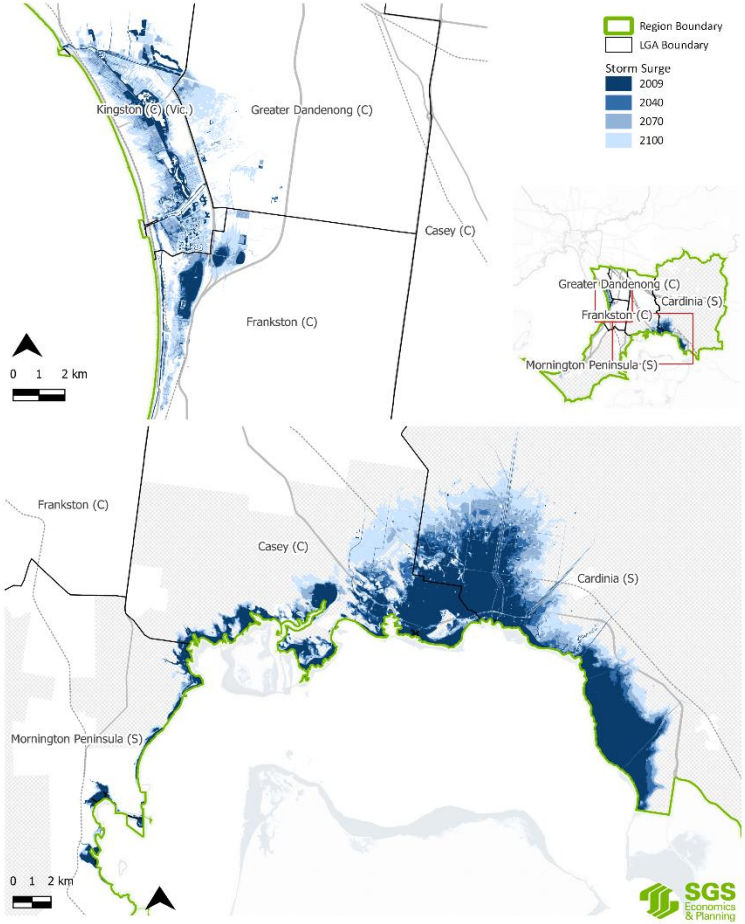
Source: (Department of Environment, Land, Water and Planning, 2018e) *VLUIS data has been used as hazards are primarily in the outer areas of the region (where the VLUIS data better describes land use).. Other includes Extractive industries, Community Services, Sport, Heritage and Culture, and Infrastructure and Utilities. Unclassified is land not requiring an active assessment or record for rate, tax or levy purposes. Data used is considered to the latest public dataset available. Nuisance and localised sea level rise may extend beyond what is shown by the data.

FIGURE 123: AREA AFFECTED BY PROJECTED SEA LEVEL RISE (2009-2100)



Source: (Department of Environment, Land, Water and Planning, 2018e) *Data used is considered to the latest public dataset available. Nuisance and localised sea level rise may extend beyond what is shown by the data.

FIGURE 124: AREA AFFECTED BY PROJECTED STORM SURGE (2009-2100)



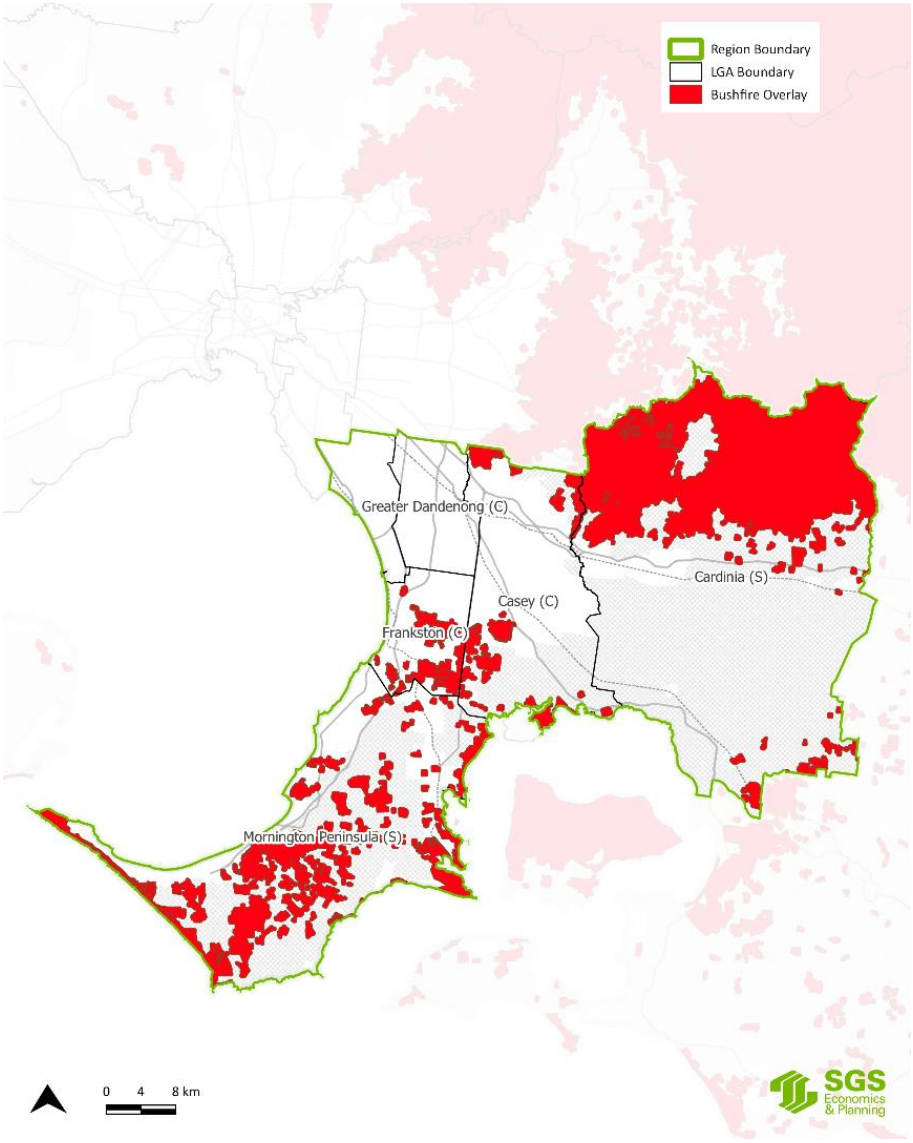
Source: (Department of Environment, Land, Water and Planning, 2018e) *Data used is considered to the latest public dataset available. Nuisance and localised sea level rise may extend beyond what is shown by the data.

Bushfire

Bushfire risk is extremely relevant for parts of Melbourne. There are greater risks for areas of vegetation that burns more easily. The Bushfire Management Overlay is a planning control applied to land with the potential to be affected by extreme bushfires. It does not specify which areas are at more risk although it is expected that highlighted areas will be at more risk as climate change occurs.

Figure 125 shows the area at risk of bushfire in the Southern Metro Region. Areas at risk of bushfire include areas of agriculture and conservation reserves. The Mornington Peninsula is also popular holiday destination during summer when bushfires are prone to occur.

FIGURE 125: BUSHFIRE RISK OVERLAY (2016)



Source: (Department of Environment, Land, Water and Planning, 2018b)

Urban heat island effect and heat risk

Rising average temperatures and more extreme heat are some of the impacts felt by humans because of global warming. Further, as infrastructure is built and natural environments removed, heat is absorbed and land temperatures rise.

The urban heat island effect (UHI) – a measure of the deviation of urban temperature relative to a non-urban baseline (Sun et al., 2018) – is one example of changing conditions. Urban heat islands can affect the longevity of infrastructure, energy demand, health and water quality. Figure 126 shows the distribution of UHI in the region in 2014. It illustrates:

- large areas where no analysis has been conducted
- most areas experience the urban heat island effect
- variation in the severity of the effect – some severe areas in the east of the region.

Work completed by Sun et al. (2018) correlates vegetation (including tree canopy data) to UHI. They find that tree cover structure is a useful predictor of variation in UHI. Grass and shrub vegetation are poor predictors of UHI.

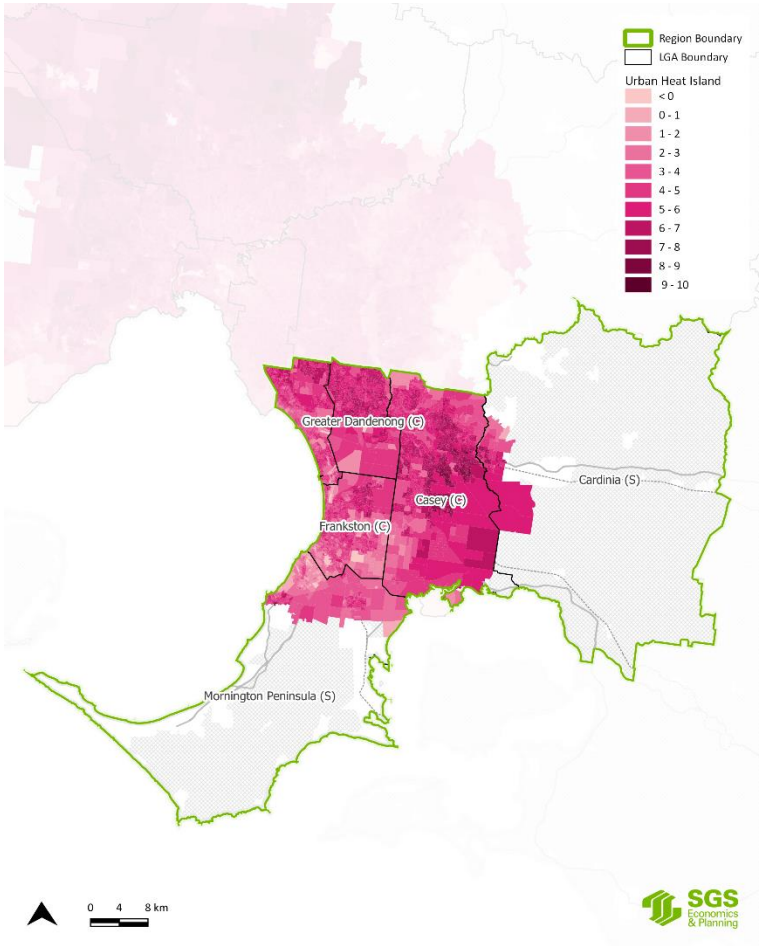
The impacts of heat increases, such as that posed by UHI, can be described by a heat vulnerability index (HVI). The HVI consists of three input layers: heat exposure, sensitivity to heat, and adaptive capability (Sun et al., 2018). Figure 127 shows the spatial variation of the HVI in the region. It illustrates:

- large areas of vulnerability in the City of Casey
- large areas of low vulnerability throughout the region
- the HVI does not always overlap high UHI areas because other components of the HVI such as sensitivity to heat and adaptive capability can offset urban heat islands (and heat exposure).

Separate to work completed by Sun et al. (2018), Loughlan et al. (2013), describe areas that are vulnerable and how this is related to ambulance call outs on hot days. Loughlan used several environmental, health and demographic variables to develop the vulnerability index for heat stress by post code.

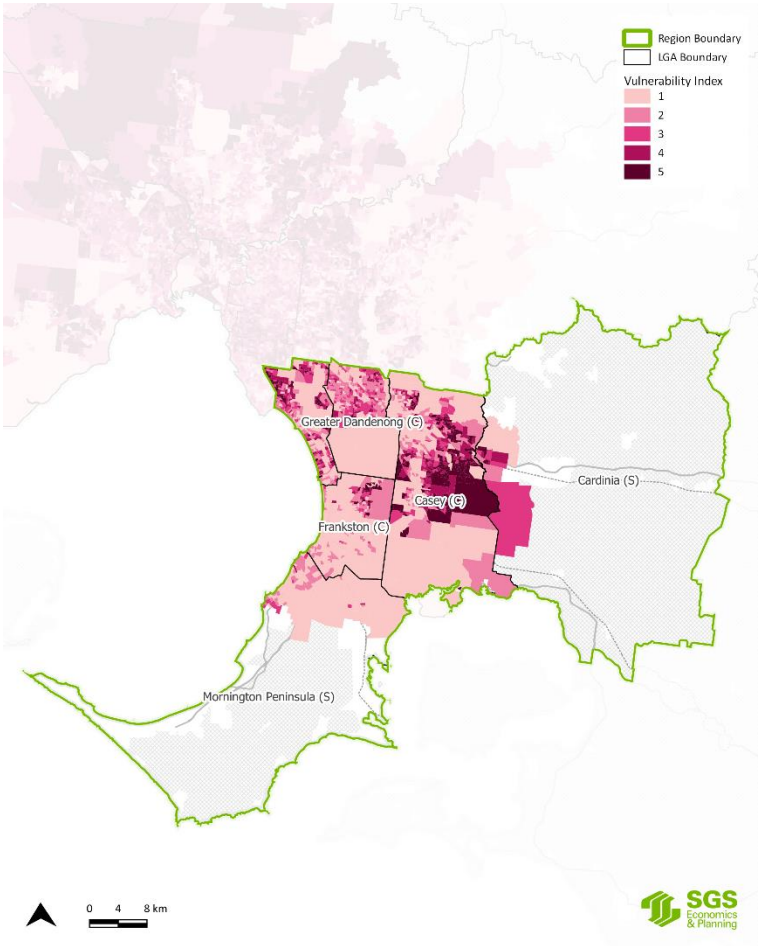
Analysis showed that heat vulnerability correlates with ambulance call outs on extreme heat days. It also shows that ambulance call outs are high in some coastal locations, which could be related to visitor numbers during hot periods.

FIGURE 126: URBAN HEAT ISLAND EFFECT (2014)



Source: (Sun et al., 2018) * Mean UHI in degrees Celsius shown in legend

FIGURE 127: HEAT VULNERABILITY INDEX (2014)



Source: (Sun et al., 2018)

Contaminated ground water and other sites

The EPA monitors sites for contamination and other risks, particularly in light of the potential impacts on health. At the time of writing this report there were 48 sites listed on the EPA priority register in the region.[14] Key reasons for being on the register include:

- former and current industrial sites that require management and or clean up
- former landfill sites that require clean up
- current service station that requires ongoing management
- illegal dumping that requires clean up.

The data shown in Figure 128 is a snapshot of contamination in the Southern Metro Region. The available data does not include all sites known or likely to be contaminated

Collection of EPA priority site data over time may show areas that are more inclined to be contaminated and the time taken to manage them to reasonable levels.

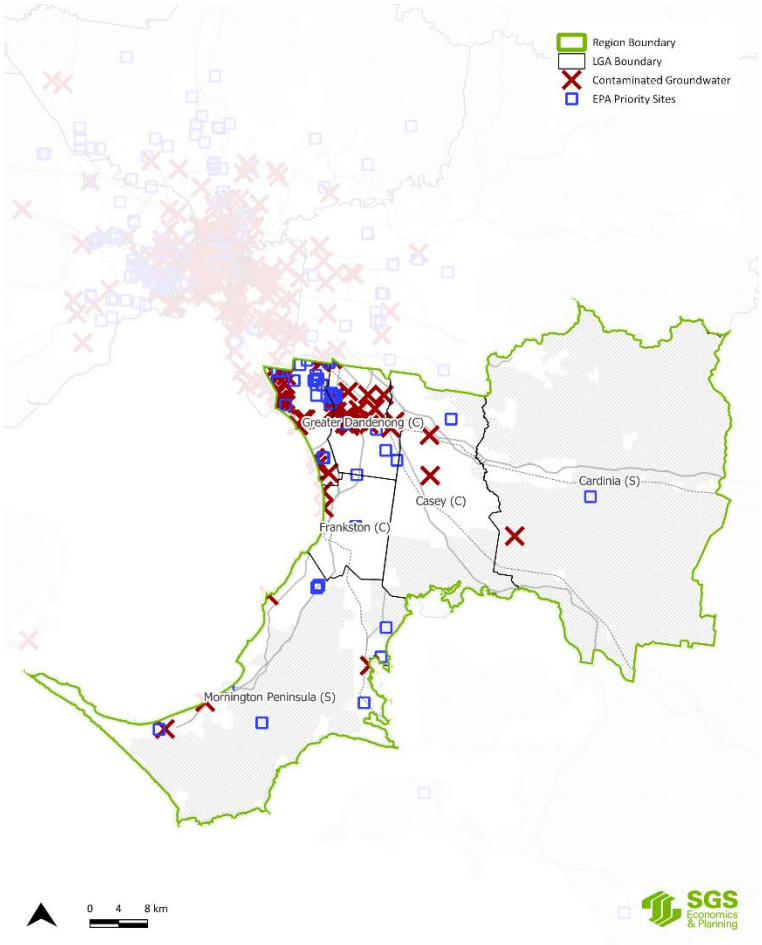
Concentration of contaminated groundwater sites (also shown in Figure 129) can be important for understanding how economic activity is associated with the health of the environment.[15] Together, the spatial data shows that contaminated sites are in the inner areas of the region and are likely to be where industry has previously operated.

Soil and groundwater contamination is required to be addressed and remediated to acceptable levels before land can be changed to more sensitive uses such as residential from industrial.

[14] http://www.vvg.org.au/

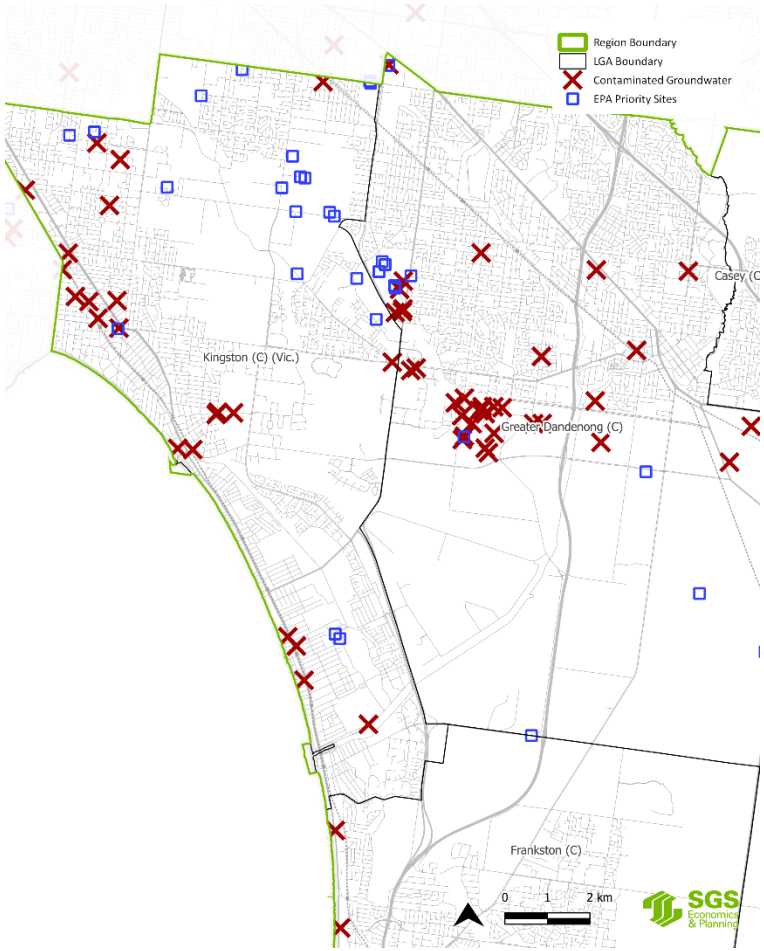
[15] Groundwater quality restricted use zones data used

FIGURE 128 EPA PRIORITY SITES AND CONTAMINATED GROUNDWATER SITES (2018)



Source: (EPA Victoria, 2018a, 2018c)

FIGURE 129 EPA PRIORITY SITES AND CONTAMINATED GROUNDWATER SITES, ZOOM, (2018)



Source: (EPA Victoria, 2018a, 2018c)

6.5 Environmental flows

From an economic perspective, much activity relies on natural capital along with human and physical capital to produce goods and services. For example, materials such as coal, timber and gas are essential in generating energy for almost any economic activity. Other basic needs such as food, water and shelter, all rely on the environment.

Further, the environment provides a host of other services, not recognised as being a part of the economy, that affect human wellbeing. This includes:

- provisioning services – likely covered as an input into economic activity
- regulating services – including carbon sequestration and flood regulation
- recreational and cultural services – including spiritual experiences and a sense of belonging.

Such services are often difficult to measure. They are sometimes not incorporated into decision-making and when they are, they may not be represented accurately.

Economic activity generates residuals such as waste, wastewater, air pollution, greenhouse gas emissions, and the environment is typically a sink for these flows. For example, effluent/wastewater is typically discharged into other water bodies, and carbon flows to the atmosphere. The environment can actively or passively process these residuals. Water waste is processed by the next ecosystem to some extent, while solid waste can consume space. The management of residuals and areas tasked with dealing with them can affect the condition of environmental assets and their capacity to provide services that humans benefit from.

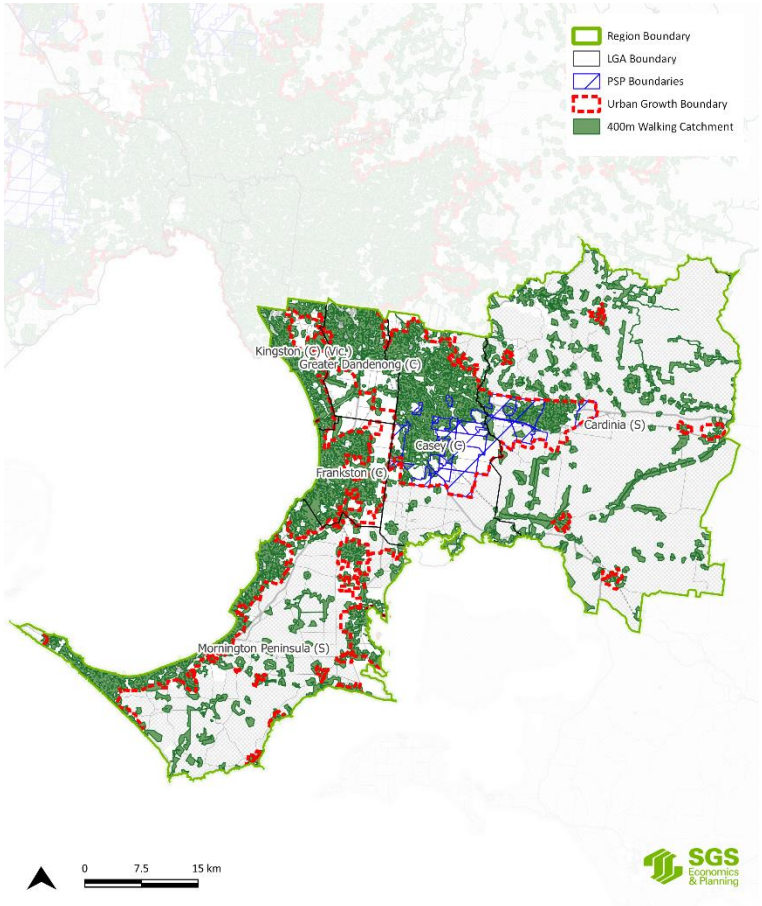
Access/use of green space

Green space and parks contribute to health, liveability and biodiversity outcomes. Figure 130 shows the area within metropolitan Melbourne that are within 400 metres of a public open space feature. Note that this is a sub-section of the data presented in Figure 97.

A large percentage of populated areas have walking access to open space; while there are large gaps in accessibility in New Growth Areas, planned open space is not represented in the data set.

Care, however, should be taken when interpreting the results. The data is mainly relevant for urban areas, where there are higher populations and walking paths to access open space

FIGURE 130: 400 METRE WALKING CATCHMENTS (2017)



Source: (Victorian Planning Authority, 2017b)

Further, the diversity of open space can provide the population with greater choice and benefits. Table 22 shows the percentage of households with access to public and restricted open space types. There are six different types of open space in the table, with private open space removed from the classes described earlier in the report as it is already inaccessible. Approximately 38 per cent of the Southern Metro Region had one type of green space accessible within 400 metres.[16]

- There are considerable differences across the rural areas, New Growth Areas and UGB locations.
- The region is one of the poorest in terms of accessibility to at least one type of open space within the UGB.
- Access to open space is low in the New Growth Areas. However, the data does not consider planned areas of open space. These areas must be delivered and managed so the growing population can benefit.

Figure 131 further shows how the diversity of accessibility to the six types of open space varies across the Southern Metro Region. Access is relatively diverse in each of the LGAs.

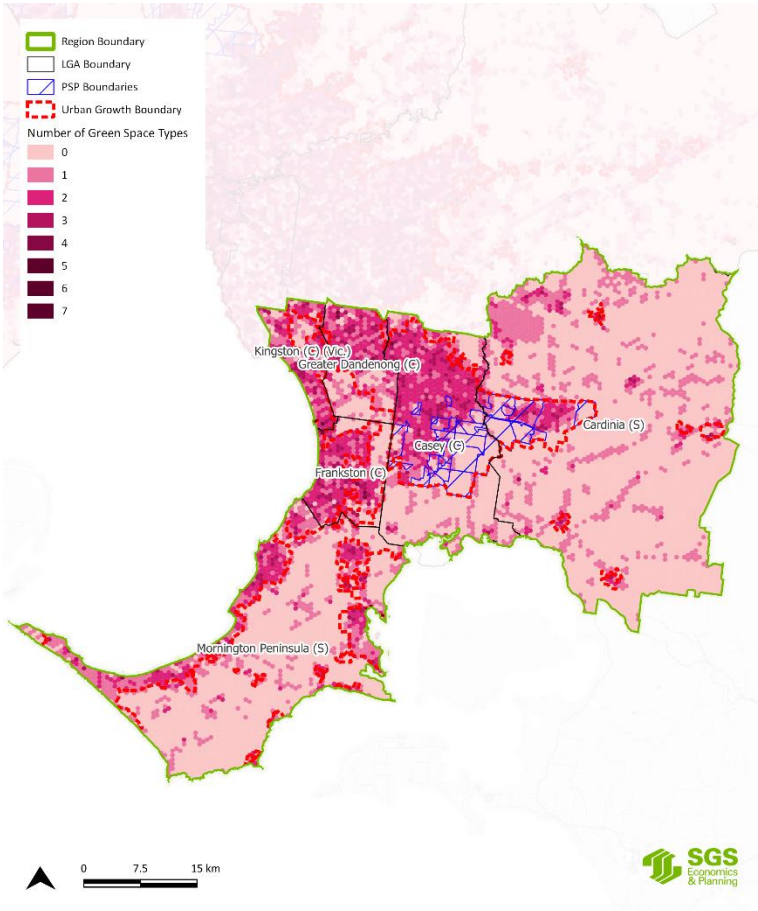
[16] The SGS Hex Pixel uses a small-scale hexagonal grid to represent spatial data. Hex centroids refer to the centre point of each SGS Hex Pixel. Distance has been measured from hex centroid to each of different types of VPA open space (not restricted to the west)

TABLE 22: PERCENTAGE OF REGION WITH GREEN SPACE WITHIN 400M, BY GREEN SPACE TYPE (2017)

Open space Typology	Rural	New Growth Areas	UGB (excluding New Growth Areas)	All
Public and Built	0%	0%	0%	0%
Public and Green	14%	31%	73%	31%
Public and Mixed	1%	4%	16%	6%
Restricted and Built	0%	0%	1%	0%
Restricted and Green	2%	0%	6%	3%
Restricted and Mixed	4%	20%	46%	17%
Total with access to at least 1 category	19%	37%	83%	38%
No access to any category	81%	63%	17%	62%
Total	100%	100%	100%	100%

Source: (Victorian Planning Authority, 2017c) Note: open space definitions are the same as those used in figure 99. Note that sum of each open space typology does not equate to the row named total with access to at least 1 category field. This is because one hex could have access to two of the open space types. Therefore, it does not equal the sum of its parts. Also note: the data used to measure New Growth Areas represents 119 precincts of declared growth areas – see https://data-planvic.opendata.arcgis.com/datasets/psp-boundaries

FIGURE 131: NUMBER OF DIFFERENT GREEN SPACE TYPES ACCESSIBLE WITHIN 400M (2017)



Source: (Victorian Planning Authority, 2017c)

6.6 Visitation to parks

Accessibility can help to alleviate barriers associated with public health benefits. Accessibility does not, however, mean that public benefits will be achieved. For instance, human behaviour and time are other barriers to public health benefits.

Figure 132 shows the percentage of the population in each of the LGA that visits green space at least one time a week.

- A relatively low percentage of residents in the City of Greater Dandenong visit green space at least once a week.
- A relatively high percentage of residents in the City of Kingston visit green space at least once a week.

Concurrent analysis of the accessibility map and visitation map shows that despite having similar accessibility, a lower percentage of residents in the City of Greater Dandenong visit green space at least once a week.

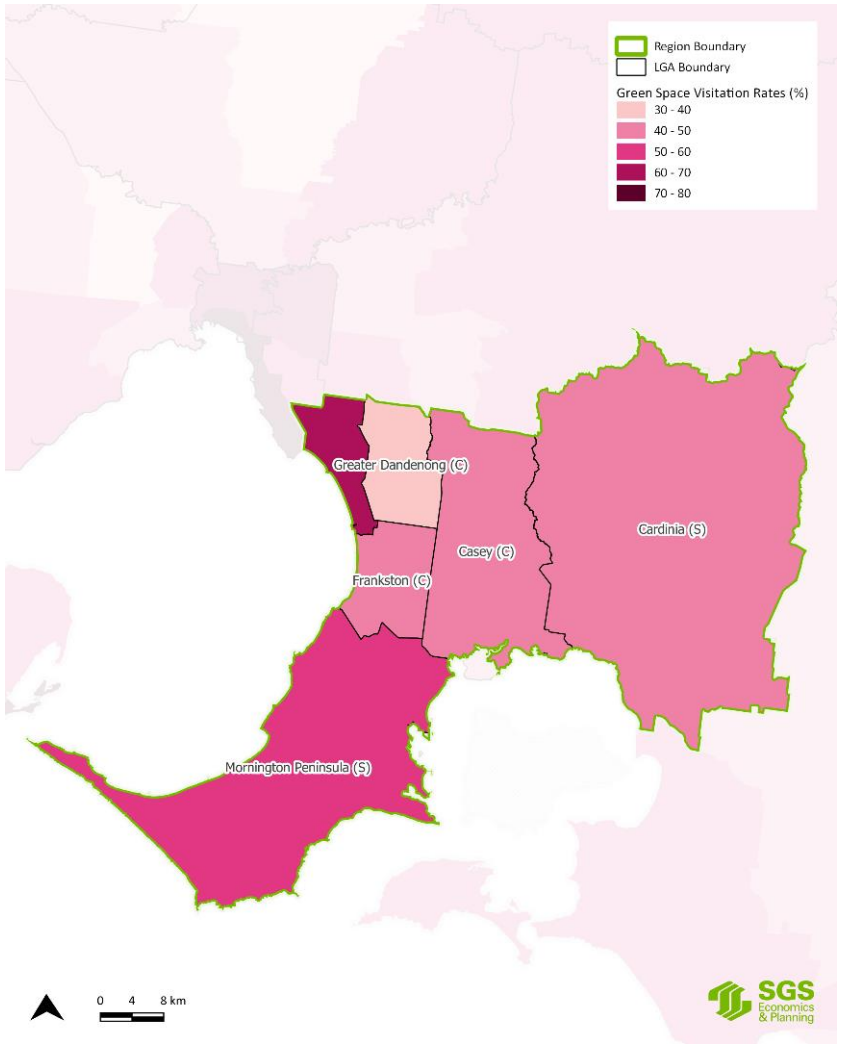
This could be due to the quality and attributes of parks and perceptions of safety. Further research is required to determine the factors that contribute to this difference.

Several Parks Victoria parks in and just outside the Southern Metro Region boundary receive many visitors annually:

- Braeside Park receives 309,000 annual visitors.
- Mornington Peninsula and Point Nepean national parks are also popular destinations (2,500,000 and 295,000 annual visitors respectively).

Further research is required to understand the users of these parks, where they originate from and future visitation patterns. This data does not give a full description of visitation of in the Southern Metro Region as it is only for Parks Victoria data.

FIGURE 132: % OF RESIDENTS VISITING GREEN SPACE (1+ TIMES A WEEK) (2011)

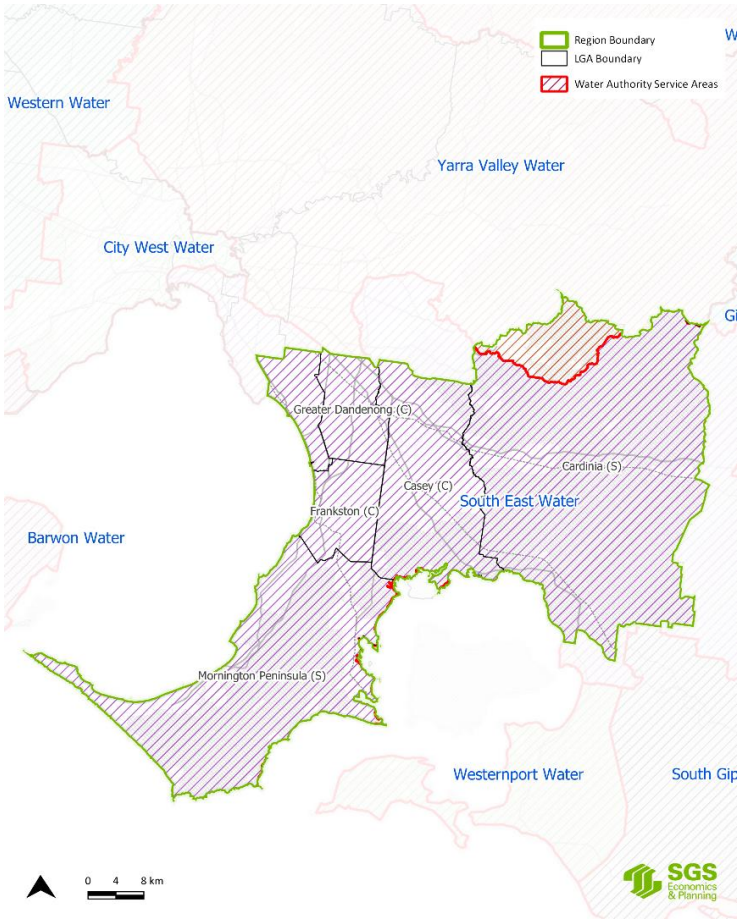


Source: (Victorian Health Promotion Foundation 2011 - 2014, n.d.)

Water security

Urban water supply across the Southern Metro Region is managed by South East Water, Yarra Valley Water (see the Eastern Metro Region report for a detailed discussion) and Melbourne Water (see Figure 133).

FIGURE 133: URBAN RETAIL AND REGIONAL WATER AUTHORITY SERVICE AREAS (2016)



Source: (Bureau of Meteorology, 2015)

Most of the drinking water supplied to South East Water customers (currently around 156 GL per year) comes from the forested catchments of the Yarra and Thomson rivers via Cardinia Reservoir. Other water will soon be supplied from the Victorian Desalination Project.

Businesses such as agricultural producers rely on water as an input into their value-add process. Such businesses are at risk of extreme weather conditions such as drought and flood. This characteristic again shows how some of the LGAs in the region share characteristics with regional Victoria.

There are multiple scenarios that water authorities consider when forecasting demand and supply of water. Under a high climate change and high demand scenario, South East Water estimates that water supplies will be secure for the next 10-15 years. Under a medium climate change and medium demand scenario water supplies will be secure until 2047. A low demand, low climate change scenario results in no shortfall by 2065. Factors affecting these scenarios include population growth, climate change and efficiency.

Future large-scale investments in water supply infrastructure are likely to occur in the region to sustainably and cost-effectively service expected growth.

Renewable energy

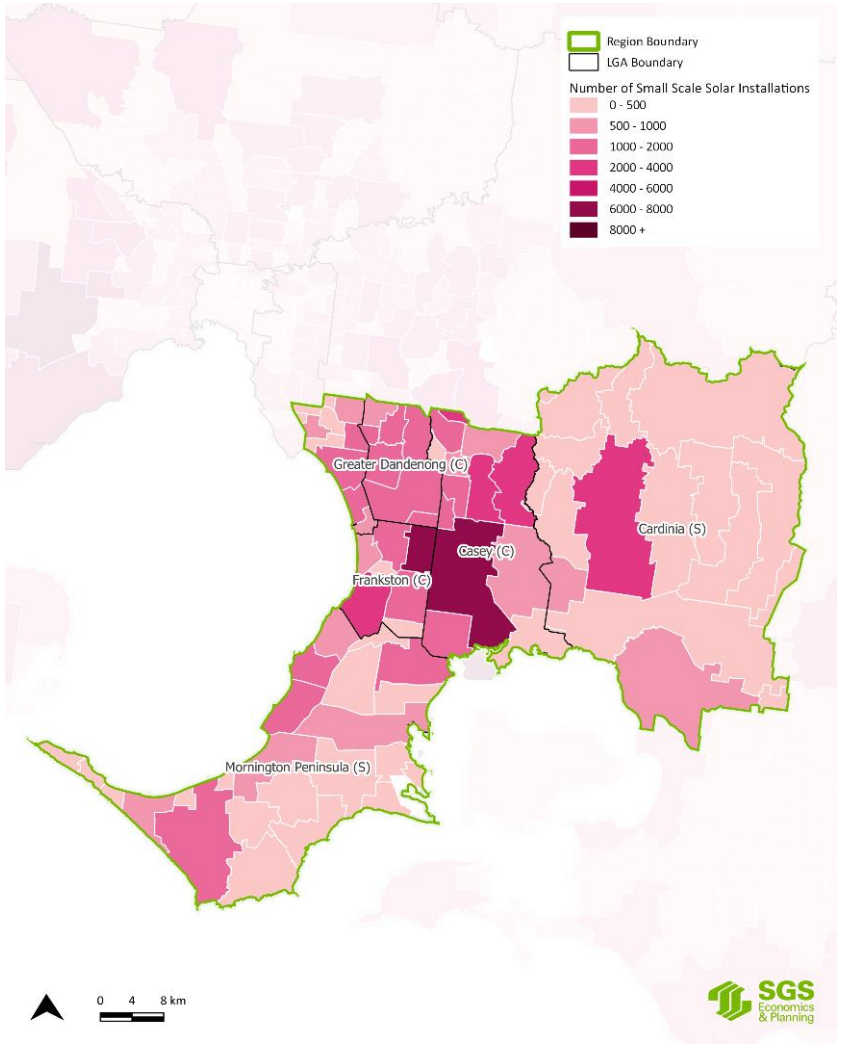
Renewable energy will emerge as traditional resources are depleted and the impacts of climate change increase. Figure 134 shows the number of small-scale solar installations from 2001 to 2016.

- There are areas in the Shire of Cardinia and the City of Casey where a significant number of small-scale installations have occurred since 2001.
- Relatively small levels of installations have occurred in the inner and more populated regions.

Extractive industry

While spatial data for the extractives industry is available for metropolitan Melbourne, it does not identify quarries that are actively producing materials and the quantities produced. For this reason, the analysis has been left out of the report.

FIGURE 134: SMALL SCALE SOLAR INSTALLATIONS (2001-2016)



Source: (Clean Energy Regulator, 2018)

Waste

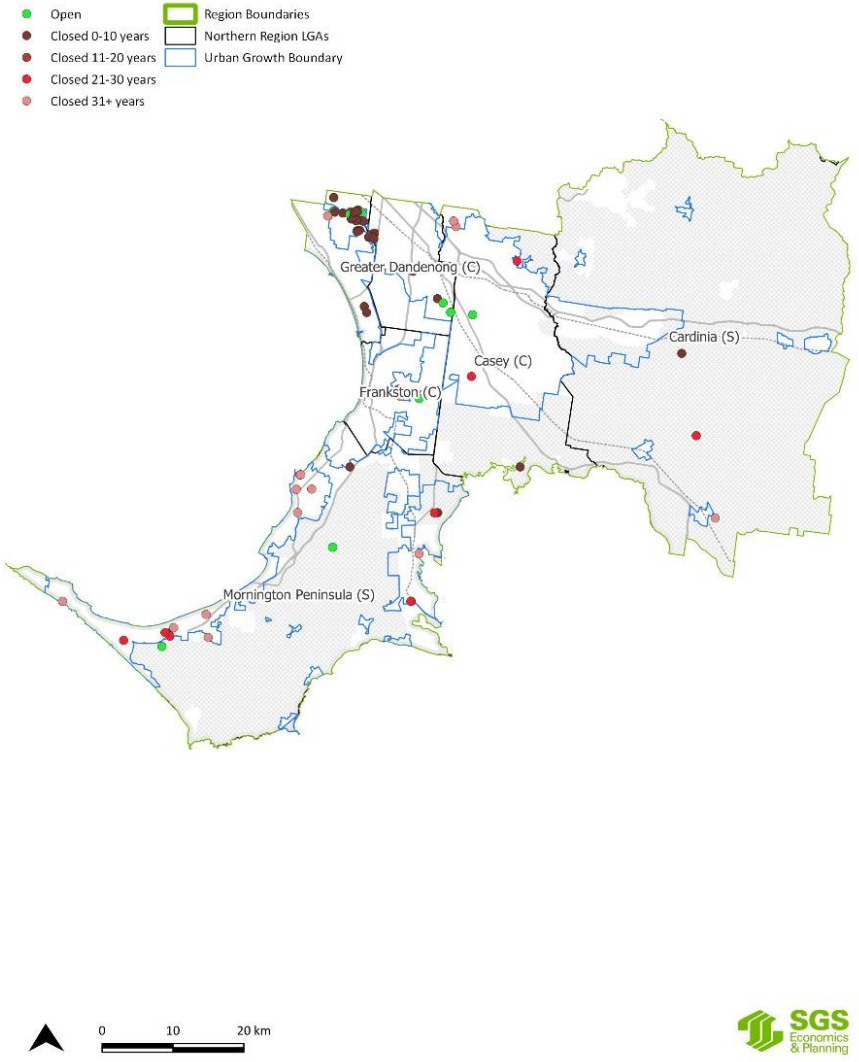
There are multiple waste management locations across the Southern Metro Region that require continued management. Waste sites can cause odours and contaminate water supplies if not managed properly. Figure 135 and Figure 136 indicates that:

- Ten landfill sites are open, making it the region with the most open landfill sites.
- Many landfill sites are within the UGB.

Kerbside garbage is one indication of the quantity of flows from the economy to the environment and the requirement on the environment to process the waste. Figure 137 and Figure 138 shows that:

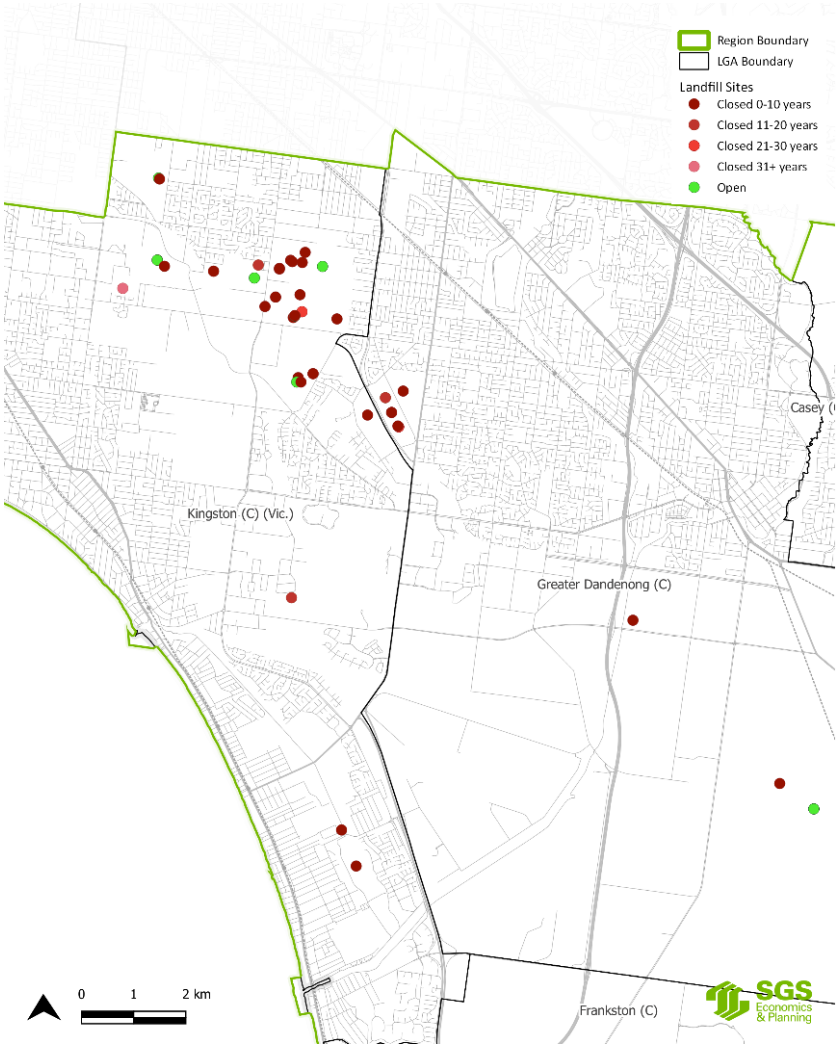
- Aggregate waste is increasing in the region.
- The City of Casey is the largest aggregate contributor to waste in the region.
- There is variation in the amount of kerbside garbage per capita, with the City of Kingston the largest contributor and the Shire of Mornington Peninsula the lowest contributor in 2017.

FIGURE 135: LANDFILL SITES (2018)



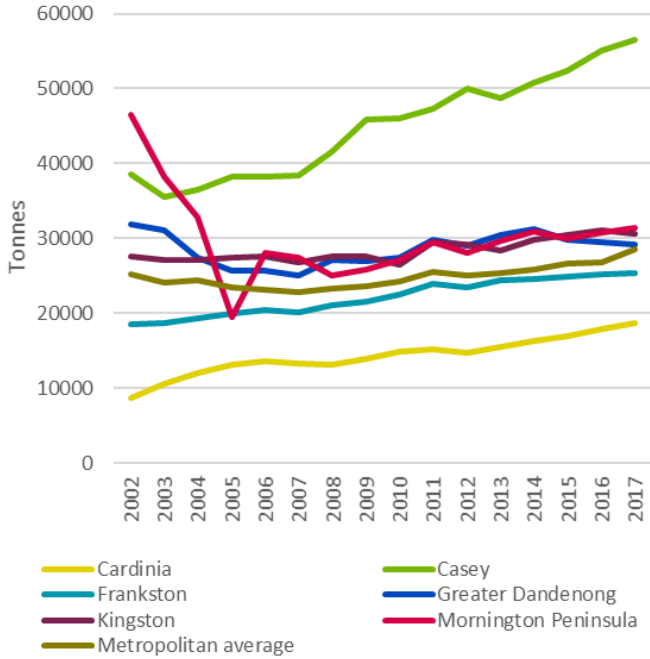
Source: (EPA Victoria, 2018b)

FIGURE 136: LANDFILL SITES, ZOOM (2018)



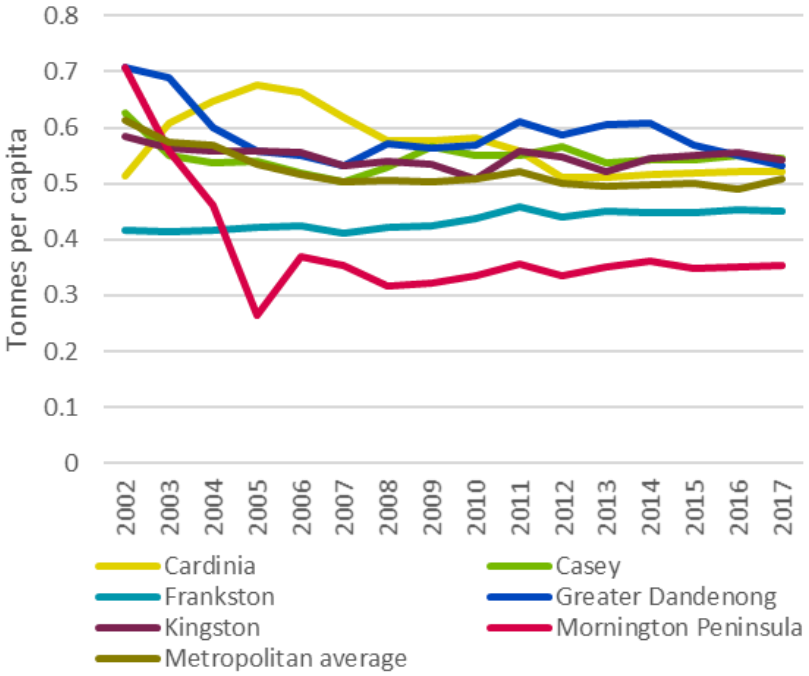
Source: (EPA Victoria, 2018b)

FIGURE 137: KERBSIDE GARBAGE (2002-2017)



Source: Based on data – Sustainability Victoria

FIGURE 138: KERBSIDE GARBAGE PER CAPITA (2002-2017)



Source: Based on data – Sustainability Victoria

Wastewater

Discharge of wastewater from treatment plants is a significant contributor to the environmental footprint of the Southern Metro Region. The condition of assets such as the Port Phillip Bay are affected by the flow of wastewater.

South East Water currently removes around 121 GL of wastewater per year. Eighty-eight per cent of this is treated at the Eastern Treatment Plant (located near Patterson Lakes) and Western Treatment Plant. Both plants are operated by Melbourne Water. The remaining 12 per cent of waste water is treated at South East Water's eight water recycling plants.

There was 130 GL of sewerage treated at the Eastern Treatment Plant in 2017 (see the Western Metro Region report for information on discharge from the Western Treatment Plant). Five GL of recycled water were delivered to customers from the Eastern Treatment Plant. Following treatment, the wastewater is either used as recycled water or discharged in the Bass Straight near Boags Rocks. To remove and treat wastewater, the network comprises more than 10,000 kilometres of wastewater mains and 261 wastewater pump stations. Both the recycled water and the water discharged into the ocean is of the same Class A quality.

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