SGS Economics & Planning

BOX HILL ACTIVITY CENTRE – DEMAND REPORT

FINAL
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Prepared for
MGS and City of Whitehorse

Independent insight.

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EXECUTIVE SUMMARY

Overview

MGS, in collaboration with Tania Quick, Movement & Place and SGS Economics and Planning, has been commissioned to review the planning framework for the Box Hill Activity Centre.

This report outlines population and employment forecasts for the Centre and the demand for additional floor space to accommodate this growth. These forecasts will inform the review of the current planning framework.

Trends and drivers of growth

The Box Hill Activity Centre has the unique distinction of an ongoing designation as a metropolitan activity centre since 1954. The current structure plan for the Centre was adopted in 2007 and sought to encourage investment – in both employment and housing – to underpin future economic growth in Whitehorse.

Over the last 10 years the Centre has experienced strong population growth, growing from 3,800 people in 2006 to 5,100 in 2016 – an average growth rate of 3.0% per annum. Growth of the working age population and tertiary students has been particularly strong.

In the same period growth in employment has grown at a rate of 2.6% per annum. Growth in the health and education industry sectors was particularly strong. These sectors added an estimated 2,400 and 700 jobs respectively between 2006 and 2016 (average growth rates of 5.2% and 5.0%).

Future employment growth is likely to be influenced by the deepening of the knowledge economy, further strengthening of the health and education specialisation, and opportunities for retail growth. The mooted suburban rail route would result in better connectivity between Box Hill to areas to the north and south and further increase the attractiveness of the Centre for firms and households.

Demand forecasts

SGS have prepared population and employment growth forecasts for Box Hill drawing on the Victorian Government's Victoria in the Future (VIF) forecasts from 2016. VIF forecasts are prepared by the State Government at the SA2 level.[1] SGS assigns these employment forecasts to smaller geographies which are referred to as 'travel zones'. A further alignment process was undertaken to refine these travel zone forecasts to include just those areas within the Structure Plan boundary.

Two population and housing forecasts have been provided by SGS. The first reflects the base allocation of the VIF 2016 forecasts for Metropolitan Melbourne to the Centre. The second scenario assumes a slightly slower rate of population growth, on the basis that the high number of recent residential approvals may not be an accurate reflection of latent demand, in the longer term.

Table 1 shows the population and dwelling forecasts under both scenarios in 2036. Taking these two scenarios as a range, the population of the Centre is forecast to grow by between 7,600 and 8,900 people between 2016 and 2036. This growth would translate to demand for between 4,000 and 4,600 additional dwellings.

[1] SA2 = ABS Statistical Area 2 geographies. There are 309 SA2 in Metropolitan Melbourne and 462 across Victoria.

TABLE 1: POPULATION AND HOUSING FORECASTS TO 2036 DERIVED FROM VIF 2016

		Base forecasts			Alternative forecasts		
	2016	2036	2016-36 growth	Growth rate	2036	2016-36 growth	Growth rate
Population (ERP)	5,100	14,000	8,900	5.2%	12,700	7,600	4.7%
Dwellings (SPD)	2,400	7,000	4,600	5.5%	6,400	4,000	5.0%

Source: SGS Economics & Planning, derived using VIF 2016. ERP = Estimated Resident Population; SPD = Structural Private Dwellings.

Employment forecasts for the Centre were derived from total labour force growth estimates for the State and Greater Melbourne assigned to smaller areas by SGS, drawing on data from the ABS Census Journey to Work data and the ABS Labour Force Survey.

Two employment scenarios were considered. The base employment forecasts for the Centre reflects forecasts develop by SGS for the Department of Transport. These forecasts have been divided into seven broad land use categories: office, retail, industrial, education, health, entertainment/recreation, and construction. The alternative employment forecasts assume a slightly higher rate of growth in office, retail, health and education.

Table 2 outlines the employment forecasts by broad land use type for each scenario to 2036. The resulting employment growth forecasts for the 20 year period to 2036 for these two scenarios are 8,100 and 10,900 additional jobs. In both forecasts the largest employment growth is forecast in the health-related employment, followed by office-based employment.

TABLE 2: EMPLOYMENT GROWTH FORECASTS TO 2036 DERIVED FROM VIF 2016

		Base forecasts			Alternative forecast (higher employment growth)		
	2016	2036	2016-36 Growth	Growth rate	2036	2016-36 Growth	Growth rate
Office	7,500	10,000	2,500	1.4%	11,100	3,600	2.0%
Retail	2,800	3,700	900	1.4%	4,100	1,300	1.9%
Industrial	100	100	-	0.0%	100	-	0.0%
Education	1,500	2,400	900	2.4%	2,600	1,100	2.8%
Health	6,200	9,800	3,600	2.3%	10,800	4,700	2.8%
Entertainment/Recreation	100	200	100	3.5%	200	100	3.5%
Construction	300	400	100	1.4%	400	100	1.4%
Total	**18,400**	**26,500**	**8,100**	**1.8%**	**29,300**	**10,900**	**2.4%**

Source: SGS Economics & Planning derived from VIF 2016.

Floorspace demand

These forecasts for dwelling and employment growth have been converted into floorspace demand to understand the additional floor space required in the Centre.

Employment floorspace requirements have been estimated using floorspace to job ratios by land use type. Residential floorspace requirements have been estimated using an average dwelling size assumption. These floor space estimates are for the gross floor area of new buildings, excluding areas for parking. The results are shown in the table below.

Demand for additional employment floor space is in the order of 256,600 and 340,200 square metres. Almost half of this demand is for health floorspace. The forecast demand for office

and education floorspace is also significant. Demand for additional residential floor space is in the order of 391,000 to 454,000 square metres.

Combining the base forecasts for employment and housing growth and the alternative forecasts (higher employment growth and lower residential growth) suggests that the total demand for additional floor space could be between 710,000 and 731,200 square metres.

TABLE 3: FLOORSPACE DEMAND FORECASTS TO 2036 (SQUARE METRES OF GROSS FLOOR SPACE)

		Base forecasts		Alternative forecasts combined	
	2016 Estimate	2036	2016-36 Growth	2036	2016-36 Growth
Office	186,400	249,200	62,900	276,900	90,600
Retail	83,800	111,100	27,300	122,100	38,300
Industrial	7,500	8,300	700	8,300	700
Education	91,700	142,800	51,100	157,400	65,800
Health	184,600	294,600	110,000	324,800	140,100
Entertainment / Recreation	8,400	13,000	4,600	13,000	4,600
All Employment Floorspace	562,400	819,000	256,600	902,600	340,200
Residential Floorspace	239,300	693,300	454,000	630,500	391,000
Total Floorspace	801,700	1,512,300	710,600	1,533,100	731,200

Source: SGS Economics & Planning, derived from VIF 2016. Note: 2016 floorspace estimate is derived from job to floorspace ratios applied to employment estimates in 2016.

Addendum: update for .id 2019 and VIF 2019 forecasts

The population and dwelling forecasts have been prepared by .id in 2017 and similar to the base 2016 VIF-derived forecasts. Updated .id forecasts released in 2019 suggest suggest population growth will be 50% higher growth that the previous forecast and the growth in dwellings is almost 70% higher. This upgrading of the growth forecast is therefore likely to be the result of new development activity since the 2017 forecasts were prepared.

VIF 2019 forecasts were released in July 2019. The revised VIF forecasts suggest that Metropolitan Melbourne will growth by 2.1 million people – an increase of 190,000 on the previous forecast of 1.9 million. This represent an 10% increase in population growth compared to the previous estimate. The forecast for the VIF Small Area that corresponds with the Box Hill Activity Centre (a much broader area than just the Centre) are significantly higher than VIF 2016: one third higher in terms of the population growth and 50% higher for dwelling growth.

The VIF 2016-based forecast for population and dwelling provide similar growth trajectory to the 2017 .id forecasts. Realising this higher rate of growth is not implausible if future planning for the Centre continues to be supportive of residential development, there is sufficient capacity, and strong demand for this type of housing that is being proposed continues in the medium to longer term. The recent slow down of the residential apartment market could impact growth in locations like Box Hill where developers might struggle to achieve sufficient pre-sales of larger development projects to convert existing approvals into realised dwellings.

Discussion

These floor space forecasts are intended to inform future planning for the Centre by providing an indication of the quantum of additional floor space required, the mix of employment and housing, and the mix of different types of employment floor space.

Rather than suggestion any particular forecast as being more accurate or better than any other, we would suggest that the population forecasts based on VIF 2016 can be interpreted as a more conservative position in relation to population growth for Box Hill, while the 2019 id forecasts reflect a more ambitious position.

In relation to employment, given the strategic location of Box Hill with the broader metropolis its existing economics assets, we suggest that a higher employment growth scenario is planned for to ensure there are sufficient opportunities for employment growth and that employment floor space is not displaced by competition from residential development.

Other work streams that are being undertaken as part of this review (urban design, traffic and transport and planning) will need to consider whether these growth forecasts can be supported.

1. INTRODUCTION

1.1 Project background

MGS, in collaboration with Tania Quick, Movement & Place and SGS Economics and Planning, has been commissioned to review the planning framework for the Box Hill Activity Centre.

The project consists of three phases:

- Phase 1: Analysis and Options
- Phase 2: Box Hill refresh (update the vision, structure plan and urban design framework)
- Phase 3: Planning Scheme Amendment

This report includes background demographic and economic analysis for the Phase 1: Analysis and Options report. It addresses the following questions:

- What macro trends will affect the growth and development of the Box Hill Activity Centre?
- What is the likely population and employment growth that the centre might need to accommodate to 2036?
- How much additional floor space is required to accommodate forecast population and employment growth?

1.2 Report structure

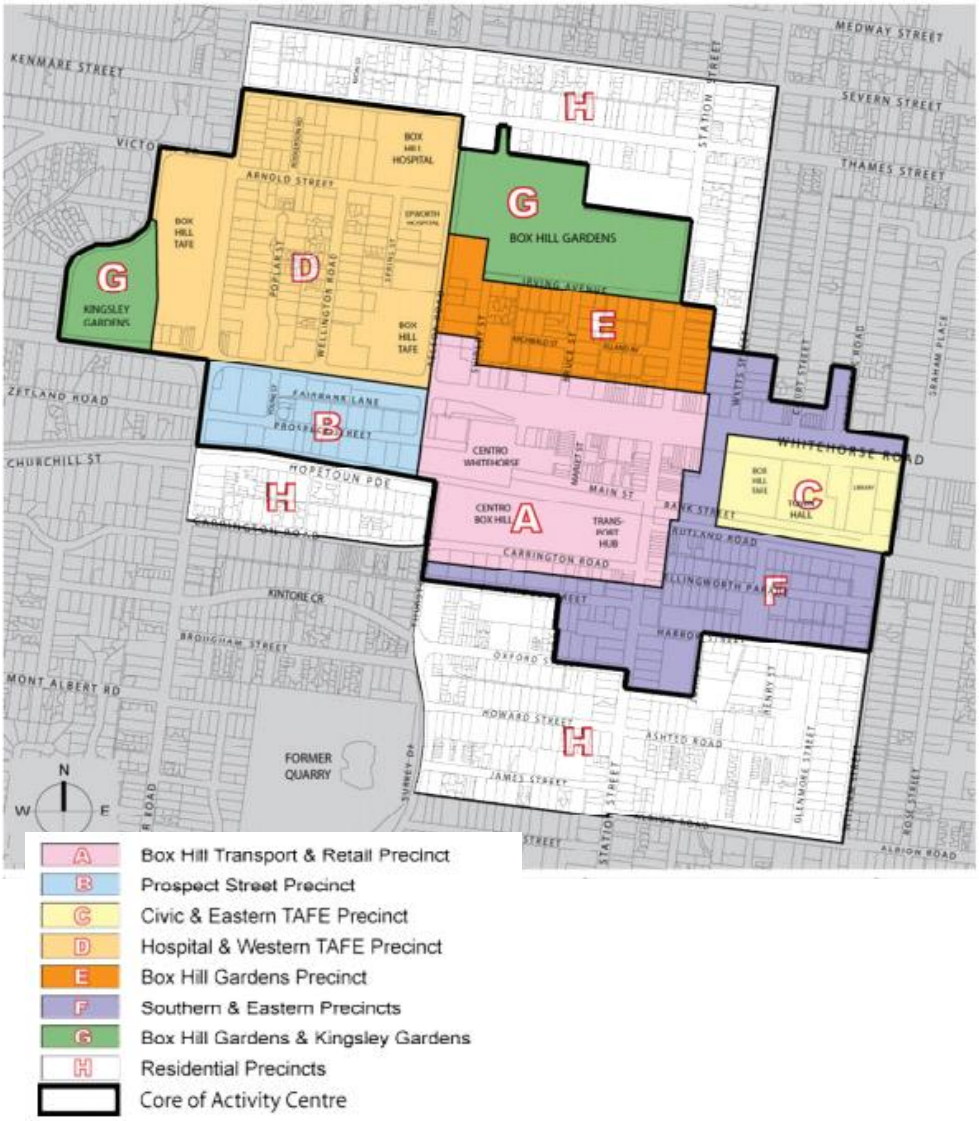
This report is structured as follows:

- Section 2 provides a background information including and current trends and macroeconomic drivers that are influencing the development of the Centre.
- Section 3 outlines the population, employment and floorspace forecasts for Box Hill Activity centre.
- Section 4 will discuss the implications of these forecasts for future planning and will include a discussion of development feasibility and, potentially, a discussion of the economic merits of planning mechanisms designed to influence the future land use mix.

1.3 Study area

The definition of the Box Hill Activity Centre used throughout this report aligns with the definition set out in the Whitehorse Planning Scheme shown in Figure 1 . This includes the Core of Activity Centre (Areas A to G) and the adjacent residential precincts (Area H).

FIGURE 1: BOX HILL ACTIVITY CENTRE



Source: City of Whitehorse Structure Plan 2007

2. BACKGROUND

This section provides a background to recent development in Box Hill and current trends and macroeconomic drivers influencing the centre.

2.1 Context

Box Hill has developed into a successful and thriving centre as a result of coordinated local and state government investment in key industries of health, education and transport, in combination with private sector activity that has led to intensification in the centre.

A range of success factors helped in Box Hill's development, including a long-term designation as a major metropolitan activity centre, the availability of development-ready land, an innovative and proactive Council, and significant investment following deregulation of the banking system.

Planning policy and direction in Melbourne has shifted back and forth over the years, however key some principles have remained consistent throughout Melbourne's history. This includes limiting outward urban expansion, articulated through an urban growth boundary, and the desire to decentralise some activities to regional centres, later known as activity centres.

The most notable difference between Melbourne's various planning documents is the emphasis placed on the central city. Early Melbourne until the 1950s was heavily focused on central Melbourne. The 1950s saw a change in direction, with more intense decentralisation policy the preference, including a focus on Box Hill.

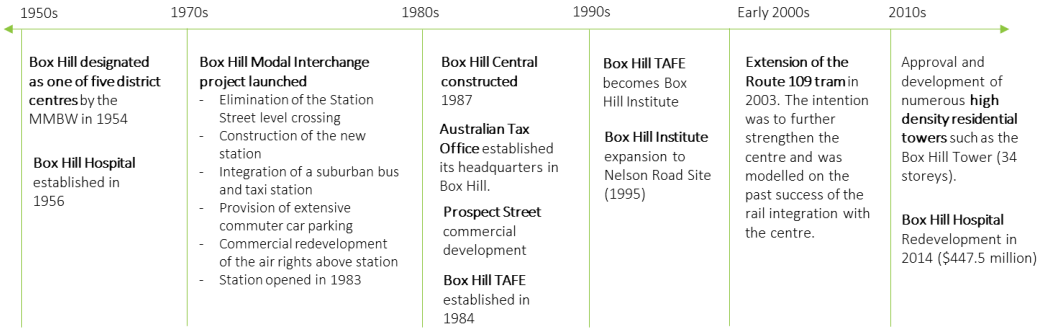
The success of Box Hill as an employment node was strengthened by the decision of the Australian Tax Office locate in the Centre in the late 1980s, coupled with higher frequency train services.

Much of the Centre's growth since 1990 is attributable to the nearby regional education and health facilities, and later in the early 2000s, the extension of the Route 109 tram.

Macroeconomic policy settings and the microeconomic reform agenda carried out by the Commonwealth and State Governments have greatly shaped the economy of broader Melbourne, and provided a fertile economic environment for Box Hill to successfully develop.

Recent planning policy returns the focus to major activity centres in targeted locations that have many opportunities to succeed, including a focus on Box Hill.

FIGURE 2: TIMELINE OF DEVELOPMENT IN BOX HILL



Transit City Structure Plan (2007)

The Box Hill Activity Centre Transit City Structure Plan was adopted in 2007. It identifies Box Hill as the main driver of socio-economic wealth in the City of Whitehorse and outlines the importance of growing key clusters of economic activity within the centre, including health and medical services, education and vocational training, community services and restaurant and cafes.

The Structure Plan suggested there was a need to increase the population of the region as Whitehorse's human capital would be constrained by low population growth. The Plan suggests that demand for medium to high density residential was likely to increase in the next decade and the population in the centre was forecast to more than double from 3,825 people in 2001 to 8,500 over a 10 year period. This total population figure was not realised until 2016. Demand for office space was forecast to increase by 55,000 to 75,000 square metres, which would be added to the estimated 117,251 square metres of existing office floorspace.

2.2 Current trends and issues

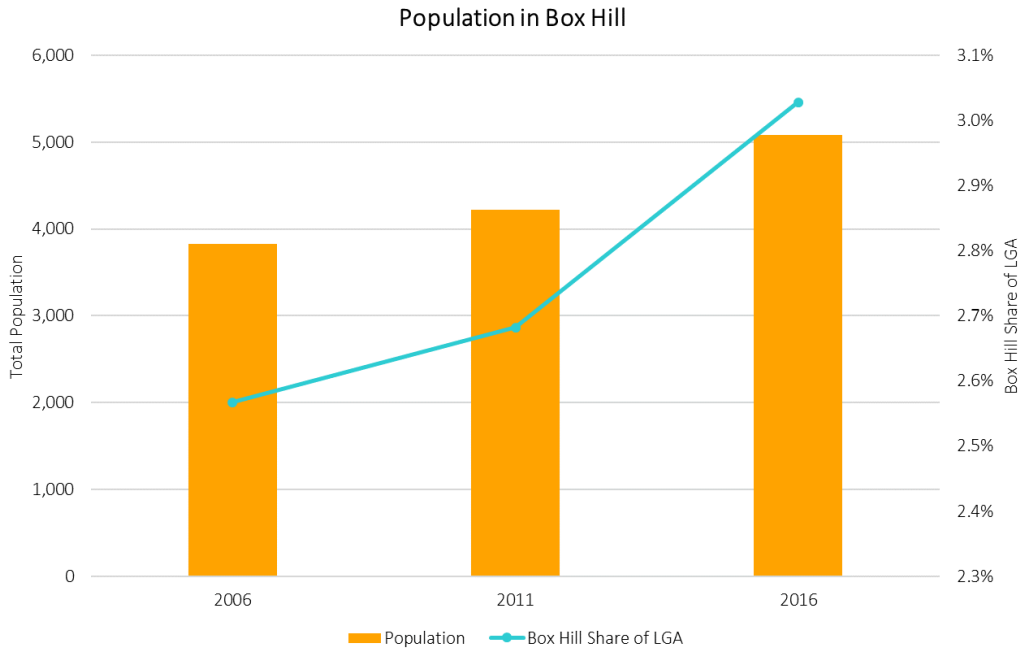
Strong recent population growth

Over the last 10 years, population in the Box Hill Activity Centre has increased at a faster rate than the rest of the LGA, the Eastern region, and Metropolitan Melbourne. The average annual growth rate of population in Box Hill was 2.9%, higher than the Greater Melbourne average of 1.2% (2006-16).

In 2016 there were as estimated 5,100 residents within the Box Hill Activity Centre, comprising 3.0% of the LGA's population. This share has risen from 2.6% in 2006.

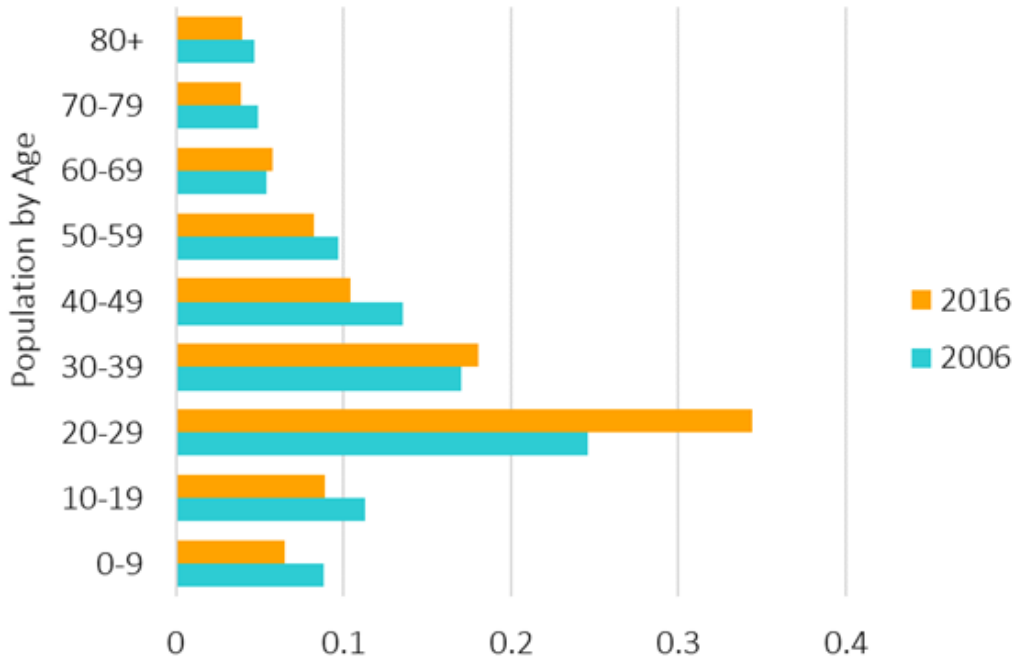
Between 2006 and 2016, the Centre has experienced strong growth in working age population and school aged children. Residents aged 26 to 64 have increased at an average annual growth rate of 4.8%, and those aged between 0 to 17 have grown by 3.5% per annum. The 20-29 year age group contains a large share of the population in 2016, having increased since 2006 (see Figure 4).

FIGURE 3: POPULATION IN BOX HILL



Source: ABS Census 2016

FIGURE 4: POPULATION IN BOX HILL BY AGE GROUP

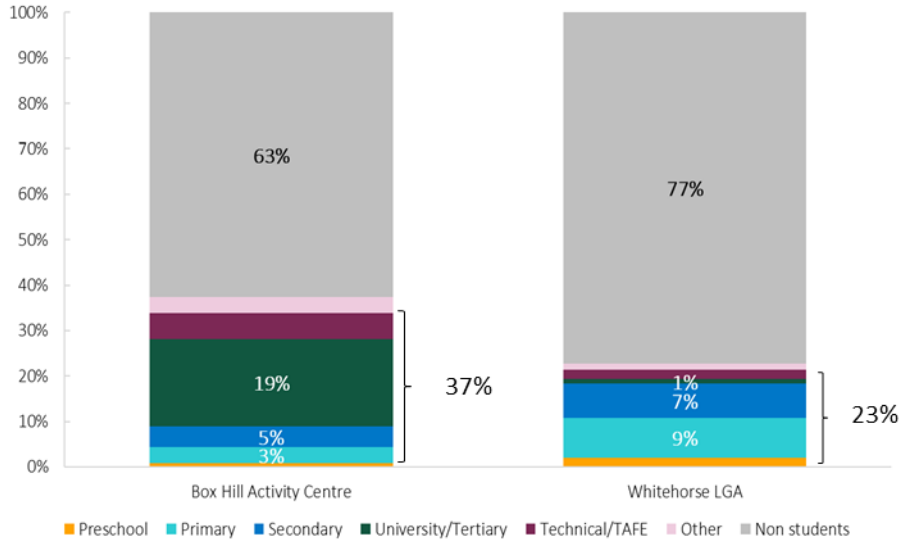


Source: ABS Census 2016

A large student population

The Box Hill Activity centre hosts a large number of students. Approximately 37% of the population living within the Box Hill Activity Centre are undertaking some form of education, and or those, around half are tertiary students (see Figure 5). The tertiary students would most likely be attending the Box Hill Institute (in Box Hill), Deakin University in Burwood and Swinburne University in Hawthorn. Both universities are well connected to Box Hill by bus and rail services. In contrast, the students in the wider Whitehorse LGA precinct are mostly primary and secondary school students living with their families.

FIGURE 5: TYPE OF EDUCATIONAL INSTITUTION ATTENDING, 2016

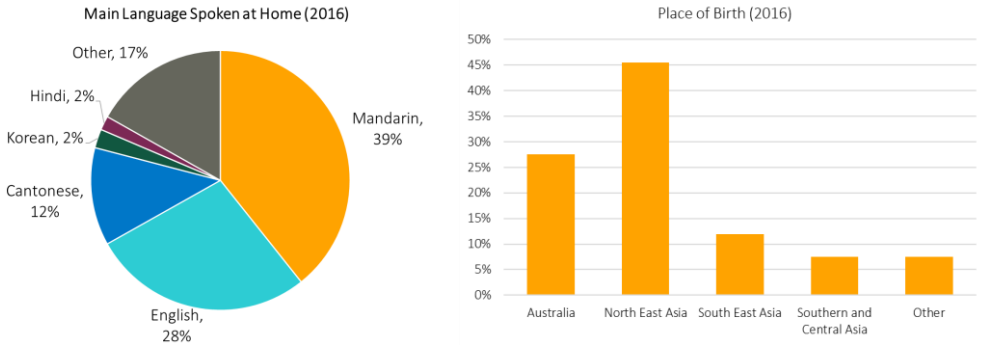


Source: ABS Census 2016

Diverse resident population

Box Hill has a culturally diverse resident population, as shown in Figure 6. 39% of the resident population in Box Hill speak Mandarin at home, 12% speak Cantonese and 28% speak English. Over 45% of the population were born in North East Asia (2016 Census).

FIGURE 6: BOX HILL RESIDENT DEMOGRAPHICS – LANGUAGE AND PLACE OF BIRTH (2016)



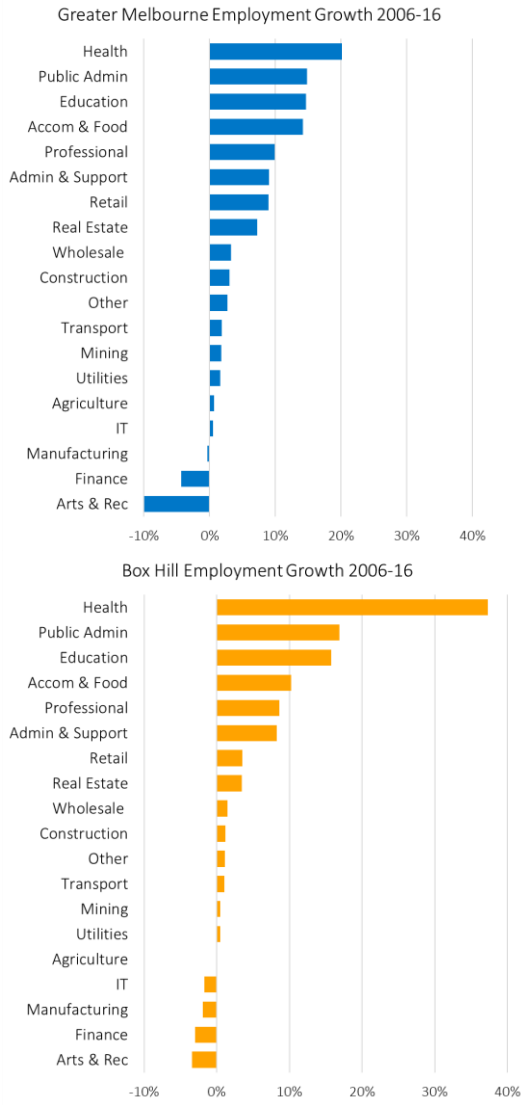
Source: SGS Economics & Planning

Employment growth

Box Hill is the main economic centre within Whitehorse LGA. The Centre hosted 18,400 jobs in 2016 which is around 23% of the 80,000 jobs in Whitehorse. Box Hill has experienced strong employment growth over the last ten years, at 2.6% per year compared to 0.7% across Whitehorse LGA.

Health is a key industry in Box Hill, contributing almost 40% to total employment growth from 2006 to 2016 (see Figure 7). This is higher than the Melbourne average for Health jobs (20% contribution to growth). Other growing industries for Box Hill include Public Admin, Education, Accommodation & Food, Professional Services and Admin & Support.

FIGURE 7: BOX HILL VS GREATER MELBOURNE EMPLOYMENT GROWTH (2006-16)

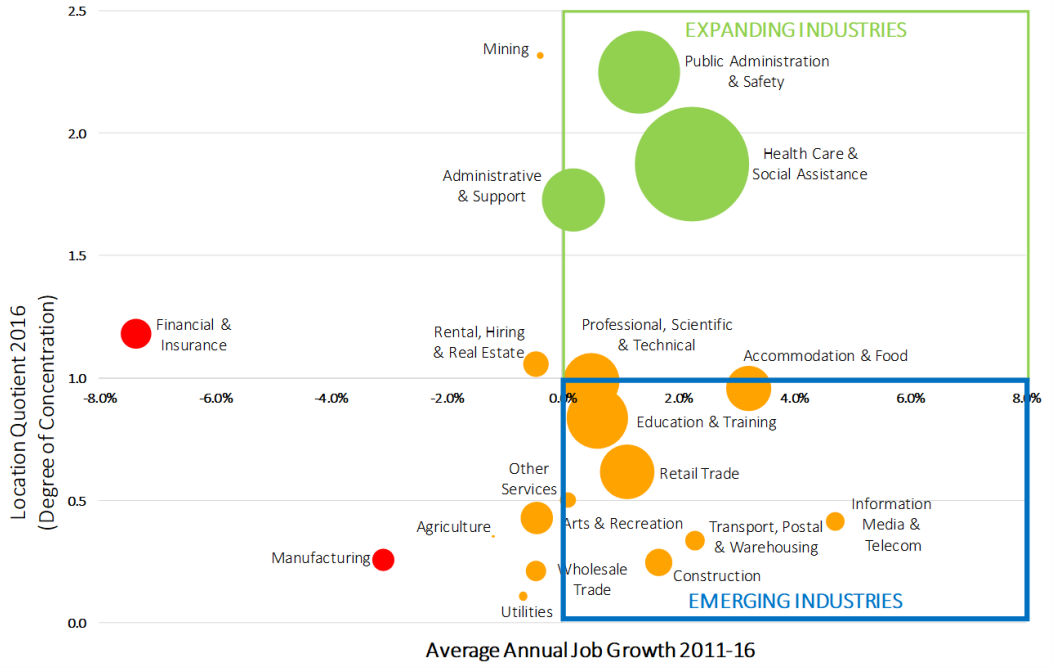


Source: SGS Economics & Planning

Figure 8 highlights those industries that are expanding and those that are emerging in by comparing three metrics key metrics. The 'location quotient' of each industry is shown on the vertical axis. This represents the level of specialisation of that industry in Box Hill as compared to the City of Whitehorse. The average annual growth rate of employment in each industry in Box Hill is shown on the horizontal axis. Finally, the size of the bubble represents the number of jobs in each industry.

Expanding industries in Box Hill and their respective shares of all employment are: health care and social assistance (32%), public administration and safety (16%), administrative and support (10%), and education and training (9%). *Emerging industries* include: professional services, education & training, retail trade, accommodation & food services, information media & telecommunications and transport, postal & warehousing.

FIGURE 8: BOX HILL GROWTH SHARE MATRIX



Source: SGS Economics & Planning

2.3 Macroeconomic drivers

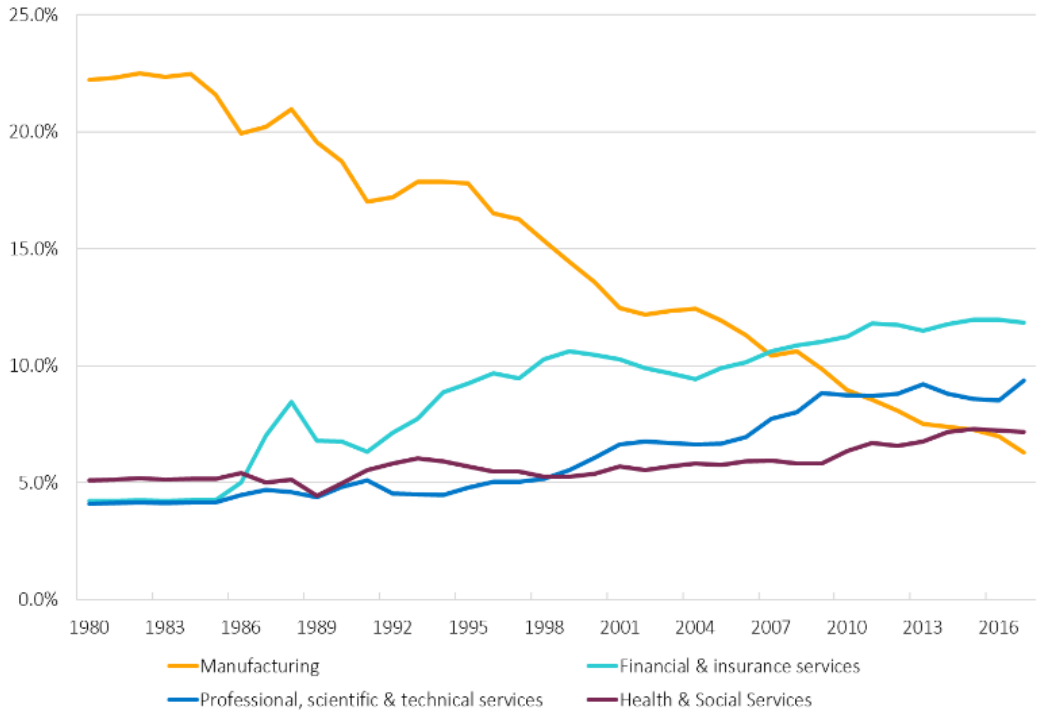
Melbourne's economic transition

Melbourne's economy has undergone significant change over the last 30 years. The recession of the late 1980s and early 1990s affected the Melbourne economy more extensively than the rest of Australia. The industrial heartland of the city contracted sharply as global demand for manufactured goods fell. This had a range of flow on economic effects on the metropolitan economy which has transitioned from an industrial focused economy to one that is rich in knowledge intensive services. In the 1970s and early 1980s Manufacturing produced between 21% and 22.5% of all income generated in Melbourne (see Figure 9). Since then it has been in steady decline and in 2016-17 manufacturing represented just 6.3% of Melbourne's income. Over the same period financial and insurance services increased from around 4% in 1974-75 to 11.8% in 2016-17. Professional services overtook manufacturing in 2010-11 as the second largest industry in Melbourne. It generated 9.3% of all income in Melbourne in 2016-17.

The population of Greater Melbourne has increased from 1.5 million in 1954, to 4.6 million in 2016. The last five years have seen significant population growth in Melbourne, due to increased interstate and international migration of skilled labour. This has seen strong population growth in most parts of Melbourne, particularly in growth areas and within established areas with increasing dwelling densities.

These broader structural changes in the economy have impacted Box Hill's development over the last 30 years, particularly the decline in Manufacturing and shift to knowledge intensive services. As an established migrant community, Box Hill has attracted a large migrant population of students and skilled labour, as it provides a mix of housing types, good transport connections and a retail offer that caters to the needs of these groups.

FIGURE 9: INDUSTRY SHARE OF MELBOURE'S GDP, 1980 – 2017



Source: SGS Economics & Planning

Health and education are likely to continue to be a strength of the centre

Demand for health services will be strong in the future, as the population ages and life expectancies increase.

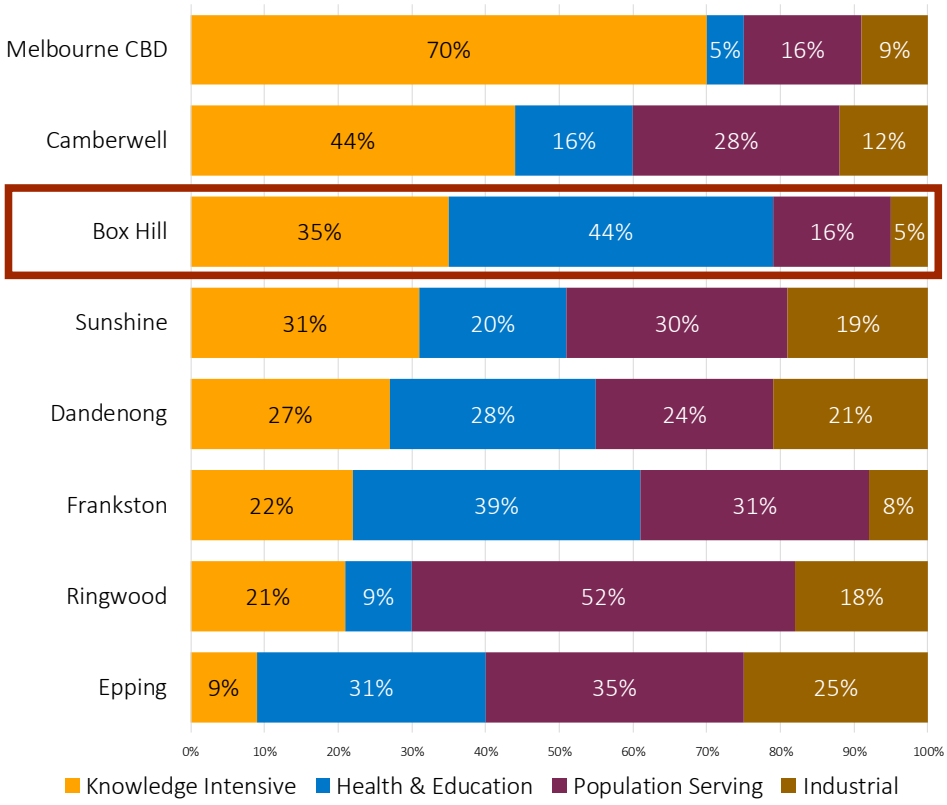
As Figure 10 shows, the mix of jobs and economic activity in Box Hill features a larger share of knowledge, health and education employment than other metropolitan activity centres. In this context, Box Hill can consolidate on its strengths as a major hub for health services and attract health care jobs from elsewhere in the region. Demand for health services and therefore floorspace is likely to be high. Changes in service delivery models and technology will impact how health care services are delivered in the longer term and resulting floorspace requirements in the future may vary to what is required today.

The Epworth Hospital has expansion plans to add a 15-storey building adjacent to the existing hospital building. The development has an estimated construction value of $49 million and will be completed by 2021.[2] It will add 32,000 sqm of floor space.[3]

Education and training have been growing in Box Hill, with strong demand for education evident across Melbourne. The centre is also a hub for student accommodation, as previously identified. These existing strengths present opportunities to grow these industries in the future.

[2] Cordell Connect (2019)
[3] Figure from MGS discussions with Epworth.

FIGURE 10: INDUSTRY COMPOSITION IN ACTIVITY CENTRES (2016)



Source: SGS Economics & Planning

Significant opportunity for retail growth

Box Hill also has a large retail precinct, employing a large number of retail workers in the region. Future plans to redevelop Box Hill Central by Vicinity Centres will impact retail employment and floorspace, but has the potential to enhance the retail, recreation and lifestyle offering in the Centre. Vicinity have suggested they are considering doubling the retail floor space in their centre from the existing 36,000 sqm to at least 72,000 sqm.

Transport improvements

The proposed Suburban Rail Loop (SRL) project seeks to transform Victoria's public transport system, providing an underground rail connection between Melbourne's major employment, health, education and activity precincts outside of the CBD. A station is proposed for Box Hill that will connect it to Burwood, Glen Waverley, Monash/Clayton and Cheltenham in the south east, and to Doncaster, Heidelberg and La Trobe in the north.

If the level of service provided by the Suburban Rail Loop offers comparable travel times to the private car, the South Eastern section from Cheltenham to Box Hill could generate high patronage and offer opportunities for more intensive urban development around each station. The South Eastern section appears to have the most potential, with the Monash – Clayton stations being the primary driver of demand and Box Hill anchoring the northern end.

This South Eastern section has roughly three quarters of the higher education enrolments, half the population, workers and jobs of the whole SRL corridor, but is only a quarter of the track length. The intent to start construction on this section of the SRL project makes sense based on these figures.

Box Hill already has a cluster of residents and workers in the eastern region, and the construction of the SRL will broaden its catchment of jobs, education, health and other services and housing. It will also provide opportunities for other economic hubs with

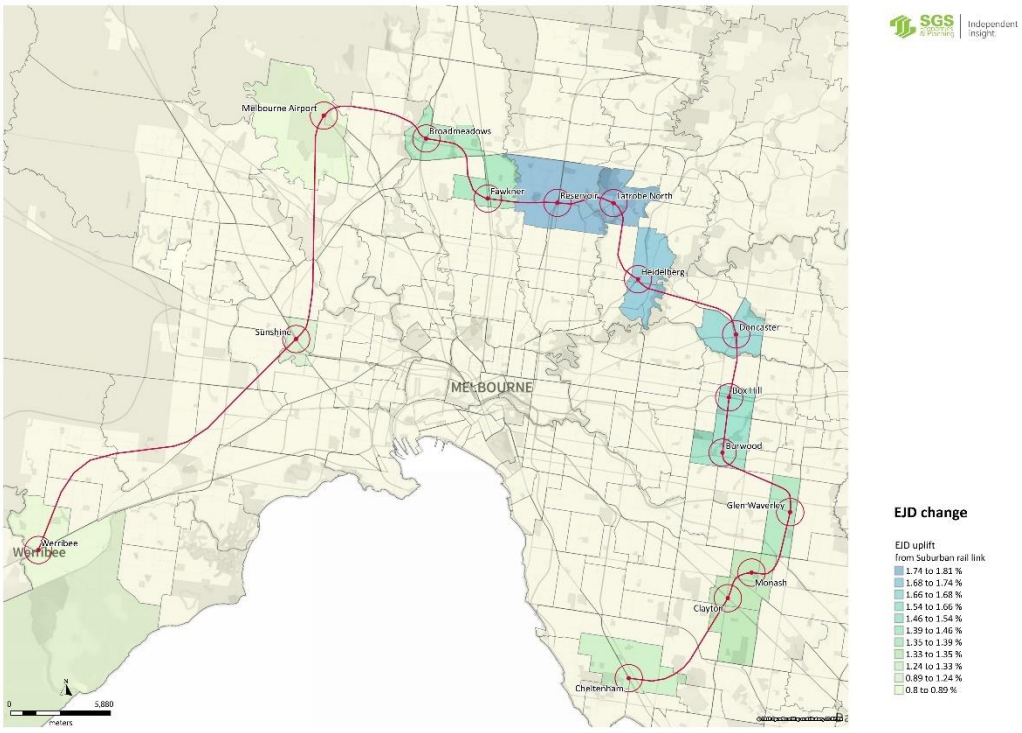
similar industries to connect to Box Hill, such as Burwood and Monash. This provides significant advantages in terms of:

- Residents having greater access to a variety of education and employment opportunities in the south east
- Industry sectors being able to agglomerate making them more efficient and creating a critical mass that makes smaller supplier businesses more viable
- Individual businesses being able to learn from each other and accelerate innovation
- Higher order and more efficient transport networks can be deployed to provide cost effective transport for people between the high intensity areas.

A high level assessment of change in accessibility to jobs (Effective Job Density or EJD), demonstrates that Box Hill and Burwood will have a large uplift in connectivity as a result of the SRL (see Figure 11).

If built, SRL will re-shape how Melbourne functions, redefining land markets, housing markets and labour markets. With further improved accessibility, Box Hill has the potential to become a major employment hub offering CBD-like functions. Firms locate in areas with high accessibility to gain the benefits of agglomeration. As a result, the SRL project could generate greater demand for commercial floorspace in Box Hill in the longer term.

FIGURE 11: ACCESSIBILITY CHANGES FROM SRL PROJECT



Source: SGS Economics & Planning

3. DEMAND FORECASTS

This section outlines the population, employment and floorspace demand forecasts prepared for Box Hill Activity Centre.

3.1 Approach

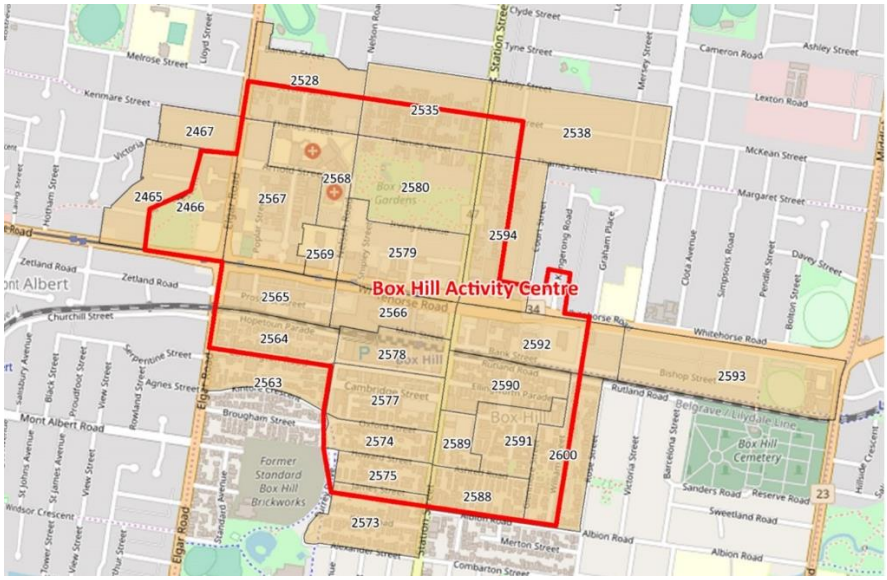
SGS have prepared population and employment forecasts for Box Hill drawing on the Victorian Government's Victoria in the Future (VIF) forecasts from 2016. VIF forecasts are prepared by the State Government at the SA2 level.[4] SGS assigns these forecasts to smaller geographies which are referred to as 'travel zones'. These forecasts do not account for any influence of the Suburban Rail Loop (SRL) project on population or employment growth. The VIF 2019 forecasts are discussed in an addendum at the end of this chapter.

For the population and housing forecasts, this assignment process is based on recent trends in housing development and the capacity for dwellings, derived from a variety of sources (e.g. the Urban Development Program, VPA Precinct Structure Plans, renewal precinct specific information and state and local planning policy documents).

For the employment forecasts, VIF 2016 forecasts are also used at the base data. The distribution of future employment is derived from total labour force growth estimates for the State and Greater Melbourne. These are assigned to travel zones by drawing on data from the ABS Census Journey to Work data, the ABS Labour Force Survey and data from the Australian Bureau of Agricultural & Resource Economics and the Joint Economic Forecasting Group.

A further alignment process was undertaken to identify the areas with the travel zones that fall within the Structure Plan area. The overlap between the travel zones and the Centre boundary is shown in the figure below.

FIGURE 12. ALIGNMENT OF ACTIVITY CENTER BOUNDARY AND TRAVEL ZONES



Source: SGS Economics and Planning, 2019.

[4] SA2 = ABS Statistical Area 2 geographies. There are X SA2 in Metropolitan Melbourne and Y in Victoria.

3.2 Population forecasts

Scenarios

Two population forecasts have been provided. The first is the base allocation of VIF forecasts to travel zones that SGS has prepared for the Department of Transport to estimate population and dwelling growth across Melbourne. The second scenario assumes a slightly slower rate of population growth. This second scenario is designed to consider the possibility that the significant recent development activity in the Centre reflects, in part, land owners seeking speculative planning approvals, rather than having a genuine intention of undertaking the development. If this is the case, the high number of recent residential approvals may not be an accurate reflection of latent demand for housing in the Centre.

Findings

Taking these two scenarios as a range the population of the Centre is forecast to grow by between 7,600 and 8,900 people between 2016 and 2036. This would translate to demand for 4,000 to 4,600 additional dwellings. Table 4 shows the population and dwelling forecasts under both scenarios in 2036. Under the base forecasts scenario, the population of Box Hill Activity Centre is projected to grow at a much faster than it did in the previous 10 years, at a rate of 4.7% per annum to 2036 vs 3.0% per annum from 2006 to 2016 (see Table 5).

As the main residential and commercial centre in the Whitehorse LGA, Box Hill has historically accommodated a significant proportion of new residents and this trend is likely to continue. Box Hill is forecast to have a greater share of the LGA's population in the future, increasing to 6.9% of Whitehorse LGA population in 2036.

Dwellings in Box Hill are forecast to grow at a slightly faster rate than population, indicating a decrease in the average household size. This trend is already evident, with more apartment living and smaller family sizes.

Over the next 20 years to 2036, there is likely to be significant growth in the elderly population aged 65+ years (6.0% per annum) and in the working age population aged 26 to 64 years (5.6% per annum). Strong growth is also forecast for school age children (0 to 17 years) at 5.6% per annum (see Table 6).

TABLE 4: POPULATION AND HOUSING FORECASTS

		Base forecasts			Alternative forecast (lower growth)		
	2016	2036	2016-36 growth	AAGR	2036	2016-36 growth	AAGR
Population (ERP)*	5,100	14,000	8,900	5.2%	12,700	7,600	4.7%
Dwellings (SPD)*	2,400	7,000	4,600	5.5%	6,400	4,000	5.0%

Source: SGS Economics & Planning, derived using VIF 2016. *ERP = Estimated Resident Population; SPD = Structural Private Dwellings.

TABLE 5: HISTORICAL POPULATION AND DWELLING, BOX HILL AND WHITEHORSE LGA

	2006	2011	2016	AAGR
Box Hill				
Population	3,800	4,200	5,100	3.0%
Households (OPD)*	1,600	1,800	2,200	3.2%
Average household size	2.4	2.4	2.3	na
Box Hill Population Share of LGA	2.6%	2.7%	3.0%	na
Whitehorse LGA				
Population	149,000	157,500	168,000	1.2%
Households (OPD)*	57,000	60,800	64,800	1.2%
Average household size	2.6	2.6	2.6	

Source: SGS Economics & Planning, 2019. Note: AAGR = average annual growth rate.

TABLE 6: POPULATION BY AGE FORECAST (VIF FORECAST SCENARIO), BOX HILL

Age Group	2011	2016	2036	AAGR 2016-36
0 – 17 years	500	600	1,800	5.6%
18 – 25 years	900	1,000	1,600	2.4%
26 – 64 years	2,200	2,800	8,300	5.6%
65+ years	600	700	2,300	6.1%
Total	4,200	5,100	14,000	5.2%

Source: SGS Economics & Planning, 2019.

VIF-derived forecasts and .id forecasts compared

The population and dwelling forecasts have been prepared by .id in 2017 and are shown in Table 7 below. The .id forecasts for dwellings are similar to the base VIF-derived forecasts. The .id forecasts for population suggest a slightly higher average annual growth rate of 5.7% to 2036. Both sets of forecasts suggests that population growth in the Centre to 2036 will be in the order of 9,000 residents.

.id forecasts released in 2019 suggest higher growth that the 2017 forecasts. These revised forecasts suggest population growth will be 50% higher growth that the previous forecast and the growth in dwellings is almost 70% higher. The revised forecasts assume:

- Average growth of 342 dwellings per annum from 2017-2041
- Development driven by approximately 40 major development sites in the short term with an average yield of 110 dwellings per site. Longer term development will be driven by future unknown sites within the Activity Centre.
- High level of infill and future unknown sites (55-320 dwellings per annum).[5]

To derive these development assumptions ".id's forecasters worked with Council planners to understand the likely development activity in each small area."

This upgrading of the growth forecast is therefore likely to be the result of recent development activity (dwelling completions, planning approvals and planning applications) that has occurred since the 2017 forecasts were prepared.

[5] https://forecast.id.com.au/whitehorse/residential-development?WebID=300

TABLE 7: COMPARISON OF ID POPULATION FORECASTS

		2016	2036	2016-36	AAGR
VIF forecasts (base)	Population	5,100	14,000	8,900	5.2%
	Dwellings	2,400	7,000	4,600	5.5%
ID forecasts (2017)	Population	4,728	14,379	9,651	5.7%
	Dwellings	2,395	6,964	4,569	5.5%
ID forecasts (2019)	Population	5,597	20,149	14,552	6.6%
	Dwellings	2,715	10,370	7655	6.9%

Source: SGS, 2019; ID Consulting, 2017 and 2019.

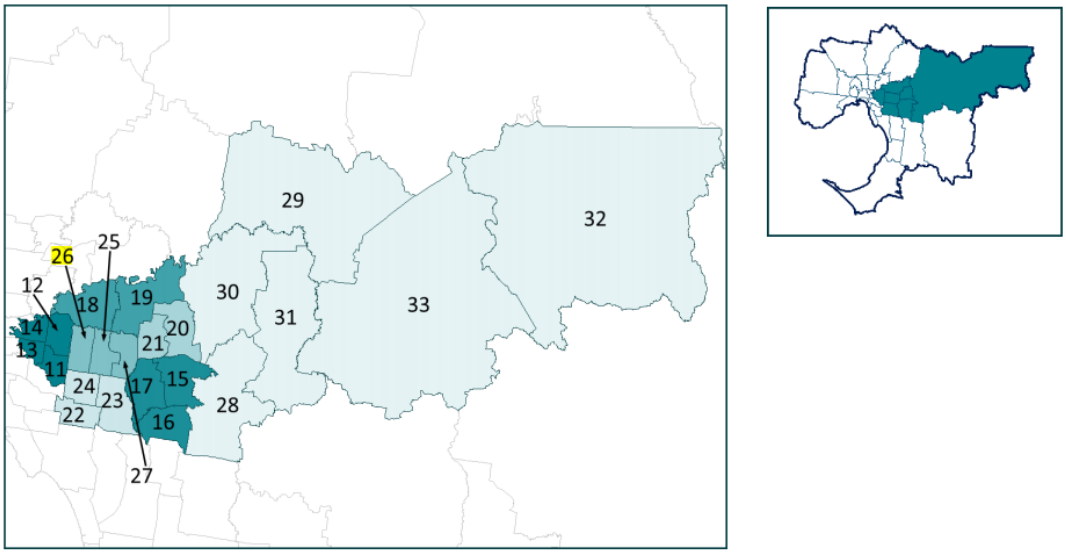
Victoria in the Future 2019 population and dwelling forecasts

VIF 2019 forecasts were released in July 2019. The revised VIF forecasts suggest that Metropolitan Melbourne will growth by 2.1 million people – an increase of 190,000 on the previous forecast of 1.9 million. This represent an 10% increase in population growth compared to the previous estimate.

The public release of this data is at the VIF Small Area (VIFSA) level. The VIFSA that corresponds with the Box Hill Activity Centre is shown on the map below (highlighted as number 26) and covers a much broader area than just the Centre.

SGS has not developed population, dwelling and employment forecasts for smaller geographies from this newer VIF release. It is therefore not possible to provide a direct comparison between the forecasts for the Centre based on VIF 2016 and this new data.

FIGURE 13. VIF SMALL AREAS (VIFSA)



Source: DELWP, 2019.

The 2016 and 2019 VIF population and household growth forecasts for Box Hill District VIFSA are shown in the tables below. The VIF 2019 forecasts are significantly higher than VIF 2016: one third higher in terms of the population growth and 50% higher for dwelling growth.

TABLE 8: VIF 2016 AND VIF 2019 FOR THE BOX HILL DISTRICT

	Population			Dwellings		
	2016	2036	Change	2016	2036	Change
2016 VIF	61,628	80,852	19,223	23,974	30,922	6,948
2019 VIF	62,663	88,249	25,586	23,984	34,628	10,644
Difference	1,035	7,397	6,363	10	3,706	3,696
Change compared to 2016 VIF	1.7%	9.1%	33.1%	0.0%	12.0%	53.2%

Source: VIF 2016 and 2019.

Discussion

The VIF 2016-based forecast for population and dwelling provide similar growth trajectory to the 2017 .id forecasts. The VIF 2019 forecast suggest higher growth across Melbourne than previously forecasts. This has been translated to a 50% increase in the growth of households in the Box Hill District VIFSA when compared to the previous VIF forecasts. The 2019 .id forecast are also a significant upgrade on all previous forecasts, and according to the cited methodology, have been developed with Council's input.

Realising this higher rate of growth is not implausible if future planning for the Centre continues to be supportive of residential development, there is sufficient capacity, and strong demand for this type of housing that is being proposed continues in the medium to longer term. However, the recent slow down of the residential apartment market could impact growth in locations like Box Hill where developers might struggle to achieve sufficient pre-sales of larger development projects to convert existing approvals into realised dwellings.

3.3 Employment forecasts

Scenarios

Two employment scenarios were considered. The base employment forecasts for the Centre is based on forecasts develop by SGS for the Department of Transport. The second assumes slightly higher rate of growth in employment in the office, retail, health and education broad land use categories. This second scenario assumes higher employment demand than the base forecasts with increased employment growth across the retail, health and office categories.

Employment forecasts have been prepared by industry using the Australia and New Zealand Standard Industry Classification (ANZSIC 2006) at the 'one digit' level (see Table 9).

To estimate demand for employment floorspace, growth by industry has been converted to six broad land use types. The types of floorspace required by firms varies by industry and location. In Box Hill, an activity centre with predominantly retail and office floorspace, firms that are classified as being engaged in manufacturing and wholesale trade, are more likely to be found in office and/or retail floorspace instead of industrial floorspace.

To address this complexity, employment forecasts by industry has been converted to the six floor space categories using a 'matrix' approach where the employment by industry is assigned to each of the six floor space categories.

Table 10 shows the conversion of employment industry to floorspace category used for Box Hill. For example, 95% of Manufacturing employment has been allocated to office floorspace and 5% has been allocated to industrial floorspace. This allocations in the matrix are based on a review of similar data from other centres and consideration of 2 ,3, and 4 digit industry classifications.

TABLE 9: BOX HILL EMPLOYMENT BY INDUSTRY

Industry of Employment (ANZSIC)	2006	2011	2016	2036	2016-36 Growth
Agriculture	0	0	0	0	0
Mining	0	0	0	0	0
Manufacturing	300	300	300	300	0
Electricity, Gas, Water & Waste	0	0	0	0	0
Construction	200	200	300	400	100
Wholesale Trade	100	300	400	400	0
Retail Trade	1,300	1,300	1,100	1,600	500
Accommodation & Food	600	700	1,100	1,400	300
Transport, Postal & Warehousing	100	100	100	100	0
Information Media & Telecommunications	200	200	200	200	0
Financial & Insurance	600	500	600	800	200
Rental, Hiring & Real Estate	100	300	400	500	100
Professional, Scientific & Technical	1,100	1,500	1,400	2,300	900
Administrative & Support	1,000	1,200	1,200	1,700	500
Public Administration & Safety	2,800	2,800	2,400	3,000	600
Education & Training	900	1,800	1,500	2,400	900
Health Care & Social Assistance	4,200	5,800	6,800	10,900	4,100
Arts & Recreation	300	100	100	100	0
Other Services	400	400	400	500	100
Total Employment	14,300	17,400	18,400	26,500	8,300

Source: SGS Economics & Planning

TABLE 10: EMPLOYMENT BY INDUSTRY CONVERSION TO FLOORSPACE CATEGORIES

		Broad floorspace category						
		Office	Retail	Industrial	Education	Health	Entertainment & Recreation	Other
Industry of Employment (ANZSIC)	Agriculture	100%						
	Mining	100%						
	Manufacturing	95%		5%				
	Electricity, Gas, Water & Waste			100%				
	Construction							100%
	Wholesale Trade	60%	30%	10%				
	Retail Trade		100%					
	Accommodation & Food		95%				5%	
	Transport, Postal & Warehousing	80%	10%	10%				
	Information Media & Telecommunications	90%	10%					
	Financial & Insurance	90%	10%					
	Rental, Hiring & Real Estate	80%	20%					
	Professional, Scientific & Technical	85%	15%					
	Administrative & Support	100%						
	Public Administration & Safety	95%	5%					
	Education & Training				100%			
	Health Care & Social Assistance	10%				90%		
	Arts & Recreation		10%				90%	
	Other Services	100%						

Source: SGS Economics & Planning, 2019.

Findings

The two employment forecast scenarios, by broad land use type, are shown in Table 11. The forecast employment growth for the 20 year period to 2036 for the two scenarios is 8,100 and 10,900 additional jobs respectively. In both forecasts the largest employment growth is forecast in the health-related employment, followed by office-based employment.

Box Hill is expected to increase its share of LGA employment to 25%, up from 23% in 2016. It is expected to be a key employment hub for the Eastern Region in the future with a broad base of employment services.

Table 12 presents estimates of employment in Box Hill in 2006, 2011 and 2016, highlighting that there has been strong employment growth in the past 10 years of 2.6% per annum. The two employment scenarios estimate an annual employment growth rate between 1.8% to 2.4% per annum, in line with the historical growth rate. Providing the necessary commercial development and opportunities for businesses to locate in Box Hill will be important to the future success of the centre.

TABLE 11: EMPLOYMENT FORECASTS FOR BOX HILL

		Base forecasts			Alternative forecast (higher employment growth)		
	2016	2036	2016-36 Growth	Growth rate	2036	2016-36 Growth	Growth rate
Office	7,500	10,000	2,500	1.4%	11,100	3,600	2.0%
Retail	2,800	3,700	900	1.4%	4,100	1,300	1.9%
Industrial	100	100	-	0.0%	100	-	0.0%
Education	1,500	2,400	900	2.4%	2,600	1,100	2.8%
Health	6,200	9,800	3,600	2.3%	10,800	4,700	2.8%
Entertainment/Recreation	100	200	100	3.5%	200	100	3.5%
Construction	300	400	100	1.4%	400	100	1.4%
Total	**18,400**	**26,500**	**8,100**	**1.8%**	**29,300**	**10,900**	**2.4%**

Source: VIF 2016 and SGS Economics & Planning

TABLE 12: HISTORICAL EMPLOYMENT IN BOX HILL

	2006	2011	2016	AAGR 2006-16
Office	6,700	7,500	7,500	1.1%
Retail	2,300	2,500	2,800	2.0%
Industrial	100	100	100	0.0%
Education	900	1,800	1,500	5.2%
Health	3,800	5,200	6,200	5.0%
Entertainment/Recreation	300	100	100	-10.4%
Construction	200	200	300	4.1%
Total	**14,300**	**17,400**	**18,400**	**2.6%**

Source: SGS Economics & Planning

3.4 Floorspace forecasts

Current floorspace estimates

The current floor space in the Centre has been estimated by multiplying current employment estimates by job to floor area ratios by broad land use industry.

Using this approach the total non-residential floorspace in Box Hill is estimated to be 562,400 square metres in 2016. This is comprised of commercial, retail, health, education and institutional floor space.

The Centre has an estimate 186,400 sqm of commercial office floorspace, spread across large commercial offices including the Australian Tax Office, 990 Whitehorse Road and the DHHS Office. There are also a number of small-scale commercial offices on Prospect Street and in the area surrounding Ellingworth Parade.

Health care floorspace in Box Hill is estimated at 184,600 sqm, with the majority of this at Box Hill Hospital and the Epworth Eastern Hospital. There are also several small-scale medical services and GPs surrounding the two hospitals.

Box Hill has a large amount of education floorspace, estimated at 91,700 sqm currently. The majority of this is made up by the Box Hill Institute across the three campuses on Elgar Rd, Nelson Rd and Whitehorse Rd.

Retail floorspace in Box Hill is estimated at 83,800 sqm, with most of this at Box Hill Central and the surrounding retail precinct.

TABLE 13: BOX HILL CURRENT FLOORSPACE BY LAND USE TYPE

Land use type	2016 Floorspace estimate (sqm)
Office	186,400
Retail	83,800
Industrial	7,500
Education	91,700
Health	184,600
Entertainment / Recreation	8,400
Total Floorspace	562,400

Source: Floorspace estimate - SGS Economics & Planning

To cross check the accuracy of SGS's approach to estimate current floor space we have compared a 2011 estimate to data from the Census of Land Use and Employment (CLUE) survey undertaken in 2011. Table 14 shows the 2011 estimates of floorspace sourced from the 2011 CLUE survey along with the SGS estimates of 2011 floorspace, using the method outline above.

Both sources suggest a similar total quantum of floor space however the composition does vary somewhat. This is like to be the result of differences in data, methodologies and assumptions. The fact that the overall figures are closely aligned suggests that the SGS method provide a reasonably accurate estimate of the total employment floor space in the Centre.

These figures might be verified through analysis of historic Council rates data which will include floor space estimates for most properties. Although this approach would also have the limitation of not including the floor space on non-rateable properties which could be significant if education and health facilities fall into this category.

TABLE 14: BOX HILL 2011 FLOORSPACE BY LAND USE TYPE – SGS AND CLUE

Land use type	2011 Floorspace (sqm) (based on CLUE data)	2011 Floorspace estimate (sqm) (SGS estimate)
Office	152,400	188,300
Retail	63,600	75,600
Industrial	11,100	7,700
Education	85,900	108,600
Health	56,600	155,900
Entertainment / Recreation	27,500	10,600
Unoccupied	9,400	na
Total Floorspace	**406,500**	**546,800**

Source: CLUE Box Hill (2011), Floorspace estimate - SGS Economics & Planning

Forecast floor space demand

These forecasts for dwelling and employment growth have been converted into floorspace demand to understand the additional floor space required in the Centre. Employment floorspace requirements have been estimated using floorspace to job ratios by broad land use type (shown in Table 15). Residential floorspace requirements have been estimated using an average dwelling size assumption. These floor space estimates are for the gross floor area of new buildings, exclude areas for parking.

TABLE 15: BOX HILL EMPLOYMENT TO FLOORSPACE RATIOS BY LAND USE TYPE

Land use type	2016	2036
Office	25 sqm/job	25 sqm/job
Retail	30 sqm/job	30 sqm/job
Industrial	100 sqm/job	100 sqm/job
Education	60 sqm/job	60 sqm/job
Health	30 sqm/job	30 sqm/job
Entertainment / Recreation	80 sqm/job	80 sqm/job

Source: SGS Economics & Planning

Demand for additional employment floor space is in the order of 256,000 to 340,200 square metres. Over half of this demand is for health floorspace. Demand for office and education floorspace is also forecast to be significant. Demand for additional residential floor space is in the order of 391,000 to 454,000 square metres. Combining the VIF base forecasts and the revised forecasts suggests that the total demand for additional floor space could be between 710,600 and 731,200 square metres.

These floor space forecasts are intended to inform future planning for the Centre by providing an indication of the quantum of additional floor space required, the mix of employment and housing, and the mix of different types of employment floor space. They are not intended to be used as a target or absolute limit for growth in the Centre.

TABLE 16: FLOORSPACE DEMAND FORECASTS (SQUARE METRES)

		Base forecasts		Revised forecast (lower population; higher employment)	
	2016 Estimate	2036	2016-36 Growth	2036	2016-36 Growth
Office	186,400	249,200	62,900	276,900	90,600
Retail	83,800	111,100	27,300	122,100	38,300
Industrial	7,500	8,300	700	8,300	700
Education	91,700	142,800	51,100	157,400	65,800
Health	184,600	294,600	110,000	324,800	140,100
Entertainment / Recreation	8,400	13,000	4,600	13,000	4,600
All Employment Floorspace	562,400	819,000	256,600	902,600	340,200
Residential Floorspace	239,300	693,300	454,000	630,500	391,000
Total Floorspace	801,700	1,512,300	710,600	1,533,100	731,200

Source: SGS Economics & Planning, derived from VIF 2016.

Note: the 2016 floorspace estimate is based on job to floorspace ratios applied to employment estimates in 2016, due to data limitations on current floorspace within Box Hill.

3.5 Conclusion

These floor space forecasts are intended to inform future planning for the Centre by providing an indication of the quantum of additional floor space required, the mix of employment and housing, and the mix of different types of employment floor space.

It is difficult to establish with a higher degree of certainty the likely demand for additional development as a result of population and employment growth in a specific area like the Box Hill Activity Centre. A wide range of factors ultimately influence a growth in a location and these cannot all be reliability predicted in advance. In addition to general economic conditions and migration, the relative attractiveness of alternative locations will influence growth in the medium and longer term.

Although recent development activity may provide an indication of demand in the short term, it does not necessarily follow that all developments 'in the pipeline' will be realised, or that the same level of demand will be sustained into the future. Furthermore, investments in appropriate public infrastructure in the Centre are likely to attract growth, while a lack of investment could deter new development.

It is therefore prudent to consider a range of possible futures when undertake a major strategic planning study. Rather than suggestion any particular forecast as being more accurate or better than any other, we would suggest that the population forecasts based on VIF 2016 can be interpreted as a more conservative position in relation to population growth for Box Hill, while the 2019 id forecasts reflect a more ambitious position. We note that a higher rate of population growth in the Box Hill VIF small area is also implied by the recently released VIF 2019 forecasts (relative to the VIF2016 forecasts).

In relation to employment we have provide two scenarios, a base forecast that is a business as usual and a further forecast that contemplate higher employment growth. Given the strategic location of Box Hill with the broader metropolis its existing economics assets, we suggest that a higher employment growth scenario is planned for to ensure there are sufficient opportunities for employment growth and that employment floor space is not displaced by competition from residential development.

Other work streams that are being undertaken as part of this review (urban design, traffic and transport and planning) will need to consider whether these growth forecasts can be supported on the basis of capacity, the appropriateness of the resulting built form outcomes, traffic impacts and congestion, the availability of appropriate community infrastructure or any other constraints. These assessments are a critical underpinning future planning as long term population, dwelling and employment forecasts cited above do not take these issues into account and should therefore be viewed as a guide rather than as a definitive, desirable or preferred outcome.

APPENDIX 1: SGS FORECASTING METHODS

This appendix provides more detail on the dwellings and population forecasting methodology.

Population

First control totals by ABS Statistical Area 2 geographies (SA2) are established – Module 1 (M01). This is based on the Victoria in Future forecasts (VIF16).

Dwellings (i.e. occupied and unoccupied dwellings) is the first variable estimated at a travel zone level - Module 2 (M02).

Dwellings are then systematically disaggregated to occupied private dwellings, population, and age groups. People in non-private dwellings (i.e. nursing homes, jails, hotels, etc) are also estimated and incorporated into the population and population by age projections.

Module 1: SPD to ERP by Age by SA2

Structural Private Dwellings[6] (SPD) for each SA2 from VIF16 is used as the starting point. These were combined with historical data from the Housing Development Data[7] (HDD) and ABS Census data to generate a time series from 1996 out to 2046. Further adjustments are then made using Urban Development Program[8] (UDP) data and Victorian Planning Authority (VPA) and local government planning documents, particularly Precinct Structure Plans (PSPs), where relevant.

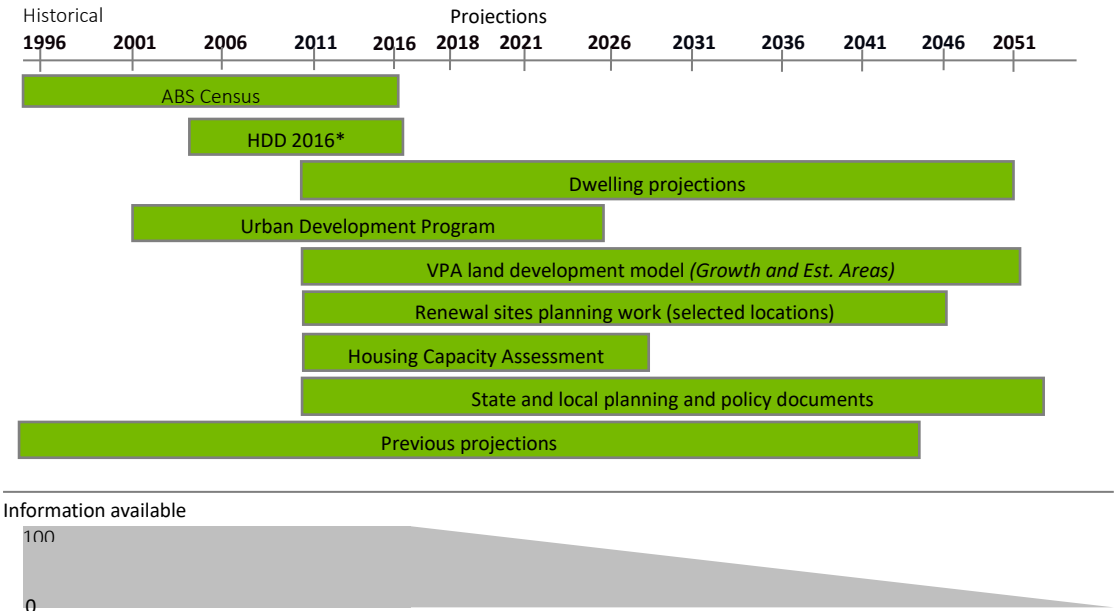
SPD is then broken down to Occupied and Unoccupied Private Dwellings (OPD/UOPD). OPD are translated to Population in OPD and Population in Non-Private Dwellings (NPD) (i.e. college dormitories, jails, nursing homes) and calculated separately. These are combined to represent total Estimated Residential Population (ERP). Data is sourced directly from VIF16 for projection years, ABS ERP and ABS Census data is then aligned to SPD to create a historical dataset.

Module 2: Structural Private Dwellings by Travel Zone

SA2 level projections are then apportioned to the Travel Zone (TZ) level over the entire state. Travel zones are small geographies allowing a detailed understanding of urban development. This apportionment is based on the trends in housing development and capacity for dwellings evident from a variety of sources captured in an *integrated capacity database* constructed by SGS. The datasets captured in this database are summarised in Figure 14. For the base year actual data is usually available. As projections reach further into the future, however, the certainty of the inputs declines. This interaction is depicted at the bottom of the graphic.

[6] A privately owned building or structure that people live in. This may include a house, an apartment, or it may be a mobile dwelling such as a caravan.
[7] Information on the number and location of existing dwellings, vacant residential land and resident residential development. Available for metropolitan Melbourne only
[8] Information on the pipeline of major residential projects in established areas and the supply of greenfield residential land in metropolitan Melbourne and selected regional areas

FIGURE 14. INTEGRATED CAPACITY DATABASE



* HDD data is available for Metropolitan Melbourne only.
^ Urban Development Program 2015 data is available for Metropolitan Melbourne only. 2014 data is used for the rest of Victoria.
# Available for established Melbourne only.

Timing and priority is also captured in the database and allocated into three broad capacity types:

- Priority Capacity by 5 year intervals – Includes more certain and localised development information such as the UDP or information on specific sites from Council engagement.
- Other Capacity by 5 year intervals – This includes other capacity information which has some timing component. This includes Precinct Structure Plan data and incremental infill data from the Housing Capacity Assessments.
- Ultimate Capacity – This includes other untimed capacity data sources and broad density limit assumptions.

Priority and timing is used to sequentially allocate down SA2projected dwelling growth for each 5 year period to TZs. This means various development inputs are effectively treated as a development opportunity (or capacity estimate) and each opportunity is only realised if there is sufficient demand within the LGA. This will result in some development inputs being pushed out or brought forward to ensure alignment with the SA2 control totals.

Module 3: Structural Private Dwellings to Estimated Resident Population by Travel Zone

Upon synthesising SPD for each TZ in Victoria, SGS applied the housing unit method to estimate the number of occupied private dwellings, persons in occupied private dwellings, persons in non-private dwellings and estimated resident population by TZ. This stepped approach results in very robust results which capture a range of issues while still being closely aligned with estimated development patterns. Some issues which this approach will capture include:

- Holiday locations which will have lower occupancy rates
- Growth areas which will have larger household sizes, and
- Inner city areas which have smaller household sizes but are seeing a transition to more family household types.

The following table highlights the key steps and assumptions.

Housing Unit Component	Description
Structural Private Dwelling (SPD)	Developed in Module 2
Occupied Private Dwelling (OPD) = SPD * Occupancy Rate	A historical occupancy rate for each TZ is derived form 1996, 2001, 2006 and 2011 Census data. This is trended forward based on SA2 occupancy rates sourced from VIF16. Trend rates for individual TZs within an LGA are varied based on their life cycle and relationship with other TZs. For example, very new growth area zones with low occupancy rates will be trended back to the LGA average quickly to reflect new families moving in, while other TZs will remain stable.
People in OPD (POPD) = OPD * Household Size	A historical household size for each TZ is derived from 1996, 2001, 2006 and 2011 Census data. This is trended forward based on SA2 household size rates sourced from VIF16. Trend rates for individual TZs within an SA2 are varied based on their life cycle and relationship with other TZs. TZs with apartments and very low household size ratios will not continue to drop below 'unrealistic' rates.
People in Non-Private Dwellings (PNPD)	This includes persons in communal or transitory type accommodation (i.e. prisons, boarding school, hospital, defence establishments). The current distribution of PNPD for each TZ has been derived from the ABS Census. Given this is a small component of the total population, and minimal data on how it may change is available, LGA control totals have simply been allocated down based on the current distribution pattern on a pro-rata basis. Which implies no new facilities will be created and any growth in this population segment will go to existing facility locations.
Estimated Resident Population (ERP) = PNPD + POPD	Total Estimated Resident population simply equals the combination of POPD and PNPD.

During each step results are aligned to VIF16 control totals and individual TZ trends are reviewed to ensure realistic results (i.e. if there is population there must be dwellings).

Employment Forecasts

Melbourne Projections

Employment by industry projections have been developed for the Melbourne economy using a variety of different sources[9]. These projections were developed for the short (2021), long term (2036) and beyond (2046), in the context of the Victoria, Australia and Global economy. This ensures that the projected industry growth can be resourced with the finite level of resources at the disposal of Australia.

Employment growth was capped using future labour force constraints. The labour force was based on the VIF16 and projections for labour force participation for each five year age group. Labour force projections were made separately for men and women to account for observed differences in their participation by age profiles. The Intergenerational Report[10] was used as a guide to workforce participation amongst various age groups into

[9] Including the Australian Bureau of Statistics (ABS), Australian Bureau of Agricultural & Resource Economics and the Joint Economic Forecasting Group.
[10] Treasury, Australian Government, 2015

the future. A projection of unemployment was also made to ensure a coherent picture of the future labour force.

Table 17 is a summary of the employment trends and drivers for each industry.

TABLE 17. INDUSTRY SUMMARY

Industry	Trend/driver
Agriculture	Small industry which are projected to remain current level.
Mining	Small industry which are projected to remain current level.
Manufacturing	Will continue to decline for the next 15 years, but at a slower rate. This is due to a growing population of Melbourne required more locally Manufactured goods.
Utilities	Will grow as the population of Melbourne increases
Construction	Will grow as the population of Melbourne increases
Wholesale Trade	Will grow as the population of Melbourne increases
Retail Trade	Will grow as the population of Melbourne increases
Accom. & Food Services	Will grow as the population of Melbourne increases
Transport & Warehousing	Will grow as the population of Melbourne increases
Information Media & Telecom.	A very diverse industries will many different components (E.g. newspapers and telecommunications) which will remain fairly static in coming years
Financial & Insurance Services	Will grow in line with historical trends
Real Estate Services	Will grow as the population of Melbourne increases
Professional Services	Will grow in line with historical trends
Administrative & Support Services	Will grow in line with historical trends
Public Administration & Safety	Will grow as the population of Melbourne increases
Education & Training	Will grow as the population of Melbourne increases
Health Care & Social Assistance	Will grow as the population of Melbourne grows and ages
Arts & Recreation Services	Will grow as the population of Melbourne increases
Other Services	Will grow as the population of Melbourne increases

SA3 Projections

This set of metropolitan projections were the cap to which the small area employment projections were limited. The Australian Bureau Statistics (ABS) Census Journey to Work data has been used to estimate employment in each SA3 for 1996, 2001, 2006 and 2011. However, due to the undercounting of this dataset, the estimates for Melbourne were benchmarked to annual average employment estimates for each industry from the Labour Force Survey for each year. An adjustment has been made to the Labour Force Survey to account for people who live in Regional Victoria but travel to Melbourne for work. Data from the City of Melbourne Census of Land Use and Employment (CLUE) has been used to adjust the Census Journey to Work data industries shares for the most recent years.

These employment figures were also split into blue collar and white collar employment using Census Journey to Work and Labour Force Survey data.

In projecting future industry employment by SA3 the following process was followed:

- Initially, the 2016-46 projections for each SA3's employment by industry was assumed to follow the growth pattern observed in Melbourne industry share between 1996 and 2011;
- In 2031 and 2046 adjustments were made to this industry to share to account for known information about the development of Melbourne;
- population projections for each SA3 were used to adjust the projections for population serving industries. This was done by observing the trends in population to industry employment between 2001 and 2016;
- A factor analysis of each of Melbourne's SA3 was utilised to appropriately cater for expected changes in employment distribution over time. This factor analysis included an assessment of each SA3s prospects and capacity for growth, transport connections, resident workforce characteristics, employment lands availability and Government spatial policy considerations. Importantly, this factor analysis was undertaken separately for each of major industry and to ensure that the level of granularity appropriately reflected their respective location drivers;
- For the years between 2016 and 2031, the projections were interpolated. That is, the assumed spatial changes at 2031 were progressively introduced; and
- For 2036, 2041 and 2046 the employment projections were extrapolated using the 2031 and 2051 SA3 industries employment shares.

SA2 Projections

The Place of Work estimates by industry and occupation at the SA2 were used to allocate each SA3's total employment to the SA2 in that SA3. Finally, a detailed review of SA2 employment by industry and occupation projections was undertaken and adjustments made as necessary. This included a review of the employment densities and a cross check against background conditions (including known structure plans and the scale of major redevelopments).

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