Fishermans Bend land Use Scenarios for VITM

Final Report

Fishermans Bend Taskforce
October 2016

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EXECUTIVE SUMMARY

Context

Fishermans Bend is the largest urban renewal area in Australia. Plan Melbourne identifies Fishermans Bend as a key part of an expanded central city. It is expected to be home to up to 80,000 people and up to 60,000 jobs by 2051.

The projected population and employment densities within Fishermans Bend will be associated with significant shifts in transport patterns and increased demand on transport infrastructure. In order to gauge the nature of these changes, the Fishermans Bend Taskforce is undertaking transport modelling in partnership with Transport for Victoria. The land use projections from this study are a key input into this modelling.

In particular, SGS was commissioned by the Fishermans Bend Taskforce to perform three distinct tasks:
1. Revise VITM Transport Zone structure in Fishermans Bend and surrounding areas,
2. Review and revise the 2016 Reference Case land use projections in Fishermans Bend, and
3. Develop a number of employment and population scenarios for transport modelling purposes.

Four land use scenarios for Fishermans Bend

Drawing on policy directions, economic and population trends SGS developed four land use scenarios which present realistic alternative futures for Fishermans Bend.

The *Moderate Intervention* scenario aligns with the 2015 VITM Reference Case land use projections which is used across all state government projects. The others scenarios provide alternatives to this based on more/less government intervention in the precinct. The Vision and Vision plus University are scenarios consistent with the Fishermans Bend Vision released in September 2016.

FISHERMANS BEND LAND USE SCENARIO SUMMARY

	Market Led	Moderate Intervention*	Current Vision	Current Vision plus University
Level of change	Moderate	Moderate	High	Very High
Alignment with Fishermans Bend Vision	Well Below	Below	Consistent	Above
Government Intervention	Low	Moderate	High	High
Transport Interventions	Bus Improvements	Tram/ Smart Bus	Tram/Smart Bus/Heavy Rail	Tram/Smart Bus/Heavy Rail
Population at 2051	75,000	70,000	80,000	80,000
Employment at 2051	40,000	53,000	59,000	60,000
Students at 2051	2,000	2,000	2,000	11,000

* Moderate Intervention aligns with the 2015 Reference Case land use projections.

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Market Led Scenario

This scenario assumes that government takes a hands off approach and effectively lets 'the market' take the lead in the future development of Fishermans Bend.

With minimal government intervention to guide and shape land use within the study area, residential, commercial and industrial land uses will compete for available land through formal property markets. In such a scenario, land uses will generally reflect the <u>highest and best use</u> i.e. the land use that generates the highest level of profitability or value for land owners and property development.

Higher density developments would be anticipated in precincts closer to the Melbourne CBD, where high density residential approvals have already been made. As the precinct developed, and the associated employment role and government investment was not realised, the scale of development would reduce.

This scenario delivers the highest amount of dwellings which comes at the expense of employment, with the lowest number of jobs of the scenarios explored.

Moderate Intervention (Reference Case)

This scenario assumes some degree of investment and policy shift from government. However, for various reasons, it was not fully realised or consistently implemented. This is consistent with the 2016 Reference Case Land Use scenario and 2016 Victoria in Future.

A reference case scenario essentially represents a condition between an aspirational/policy scenario and a pure trend based scenario. It is often referred to as a 'policy evolution' scenario as it largely relies on established trends but does capture to some degree the effect of policy shifts and planned land release/renewal sites/infrastructure projects.

In such a scenario, land uses will largely reflect the <u>highest and best use</u> outcome, while this would be softened as a result of active government investment and strategic level direction. In effect this means that this scenario has many of the same characteristics as the Market Led scenario but it is somewhat moderated by government intervention. This intervention allows stronger employment growth than the Market Led outcome.

Current Vision

The Vision scenario assumes that the current vision being developed by the Fishermans Bend Taskforce is realised to a large extent.

In order to achieve a genuine mixed-used precinct in line with the Fishermans Bend Taskforce's Vision, significant policy intervention will be required in the form of:

− Timely and effective transport infrastructure,
− Planning controls which include, but are not limited to:
  − Height controls that are amended over time in order for the Vision to be realised,
  − Controls implemented to require minimum proportion of office and commercial use in activity centres around public transport nodes, and
  − Land acquisition and tenant attraction to ensure that the Employment Precinct develops in line with the current vision of an education and advanced manufacturing hub.

In addition to the increased number of jobs under this scenario, the productivity of the businesses are expected to be higher than the moderate intervention scenario given the expected improvement in accessibility levels and associated high order employment functions.

Current Vision plus a University

The Vision Plus University scenario has the same policy assumptions as the Vision scenario with the addition of a major university being established in Fishermans Bend.

Intuitively, the presence of a university may change land use patterns around the site, including the development of knowledge intensive clusters and promoting commercial development above and beyond the current vision scenario.

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1 INTRODUCTION

1.1 Project context

Fishermans Bend's evolution

Fishermans Bend is the largest urban renewal area in Australia. Plan Melbourne identifies Fishermans Bend as a key part of an expanded central city. It is expected to be home to 80,000 people and up to 60,000 jobs by 2051. In April 2015, the Victorian Government announced details of the recast of Fishermans Bend, which saw the urban renewal area of Fishermans Bend almost double in size with a large new employment precinct in addition to Fishermans Bend's four distinct mixed use neighbourhoods.

The projected population and employment densities within the study area will be associated with significant shifts transport patterns and increased demand on existing transport infrastructure. In order to gauge the nature of these changes, the Fishermans Bend Taskforce in collaboration with (i) the Department of Economic Development, Jobs, Transport and Resources (DEDJTR); (ii) Public Transport Victoria (PTV); and (iii) VicRoads are undertaking public transport and traffic modelling.

The land use projections from this study are an input into this modelling.

SGS small area land use projections

SGS has worked with the Victorian State Government (PTV, DEDJTR and the Department of Environment Land Water and Planning or DELWP) to develop Small Area Land Use Projections (SALUP) since 2008. The most recent *Rapid Update* was completed in July 2016 and realigned the previous data to the latest 2016 Victoria-in-Future population projections.

The SALUP are primarily developed as an input into the Victorian Integrated Transport Model (VITM) and cover a wide range of attributes (100+). They can also be used for a range of other strategic work completed by the state government, while this should be completed with consideration of the datasets limitation and original objectives.

While travel zone level data is created, the SALUP estimates are developed to **support a strategic view of Victoria** and are calibrated with that state wide view in mind. As a result, further review and refinement at a travel zone level around key project locations is required (such as Fishermans Bend). Caution is always advised when focusing solely on individual zones or variables (particularly away from key project areas) as this is not the intention of the data. For strategic transport models what is critical is that <u>all</u> people/workers/students across the state are allocated down to a (general) location to then create traffic flows, rather than only allocating people/workers/students where certainty/approval is clear.

The population and employment scenarios developed for this report build on the foundation provided by these previous projects and the July 2016 Reference Case dataset specifically.

1.2   Project scope

This project involved three distinct tasks:
1.   Revise VITM Transport Zone structure in Fishermans Bend and surrounding precincts,
2.   Review and revise the 2016 Reference Case land use projections in Fishermans Bend, and
3.   Develop a number of employment and population scenarios for transport modelling purposes.

Along with this report SGS delivered the full suite of VITM land use data inputs. Broadly this includes:
−   100+ population, enrolment and employment attributes,
−   five year time periods from 2011 to 2051, and
−   all travel zones in Metropolitan Melbourne by the revised VITM 2010 (Version f) travel zones.

It should be noted that (consistent with the project brief) while data was provided for the whole of Metropolitan Melbourne refinements and alternative land use scenarios were only make for Fishermans Bend. To ensure consistent Metropolitan Melbourne control totals population/workers/students were then redistributed across a broader geographic catchment including the City of Melbourne and Port Phillip. Outside this area the data is consistent with the 2016 Reference Case dataset.

1.3   The Fishermans Bend study area

Prior to 2015, Fishermans Bend consisted of four distinct precincts: **Lorimer**, **Wirraway**, **Sandridge**, and **Montague**. In 2015, Fishermans Bend was extended to include the **Employment Precinct** to the north of Wirraway. Figure 1 below provides a map of the five current precincts of the study area.

FIGURE 1   FISHERMANS BEND STUDY AREA
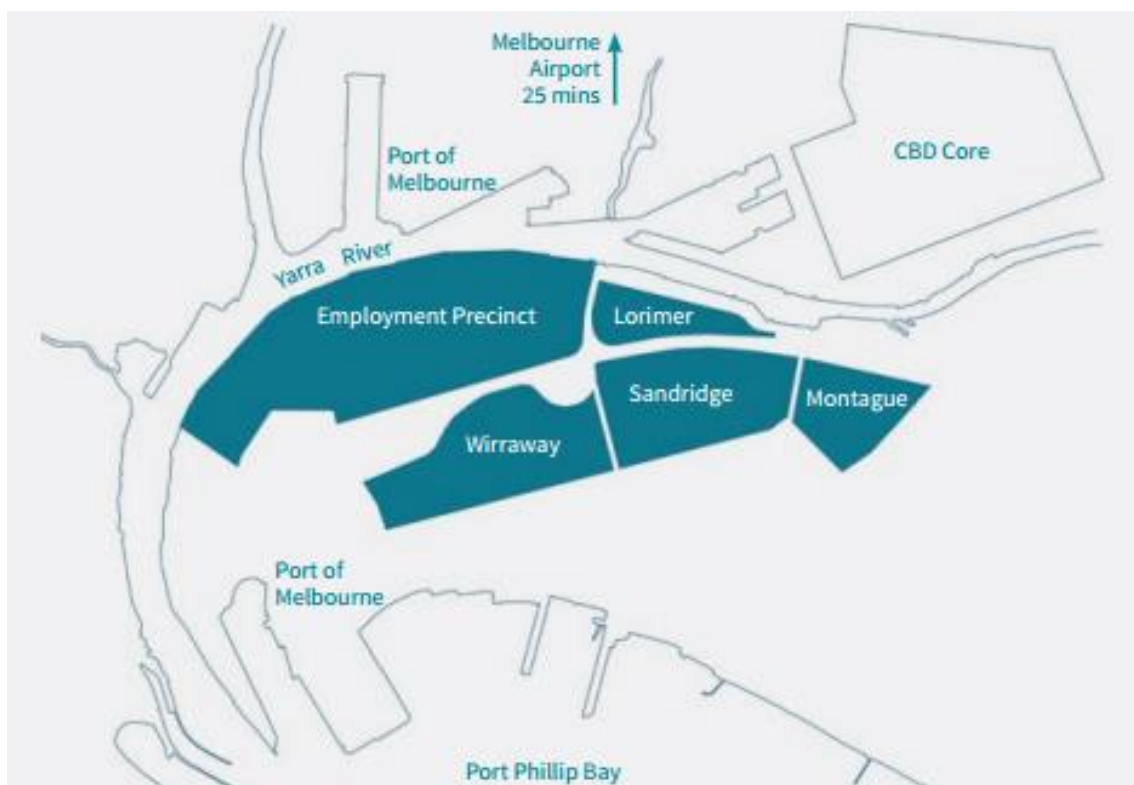
Source: DELWP, 2016, 'Fishermans Bend Recast Vision: the next chapter in Melbourne's growth story – Draft for consultation'

Total zoned land area

Fishermans Bend covers approximately 500 hectares of land. The largest precinct is the newly zoned Employment Precinct covering 200 hectares. Figure 2 and Figure 3 below present the current land use zones across the five current precincts.

The majority of land within the Montague, Sandridge, Lorimer, and Wirraway precincts is zoned Capital City Zone. The Employment precinct is predominately zoned Industrial 1 Zone and Commercial 2 Zone.

FIGURE 2   FISHERMANS BEND PLANNING ZONES[1]
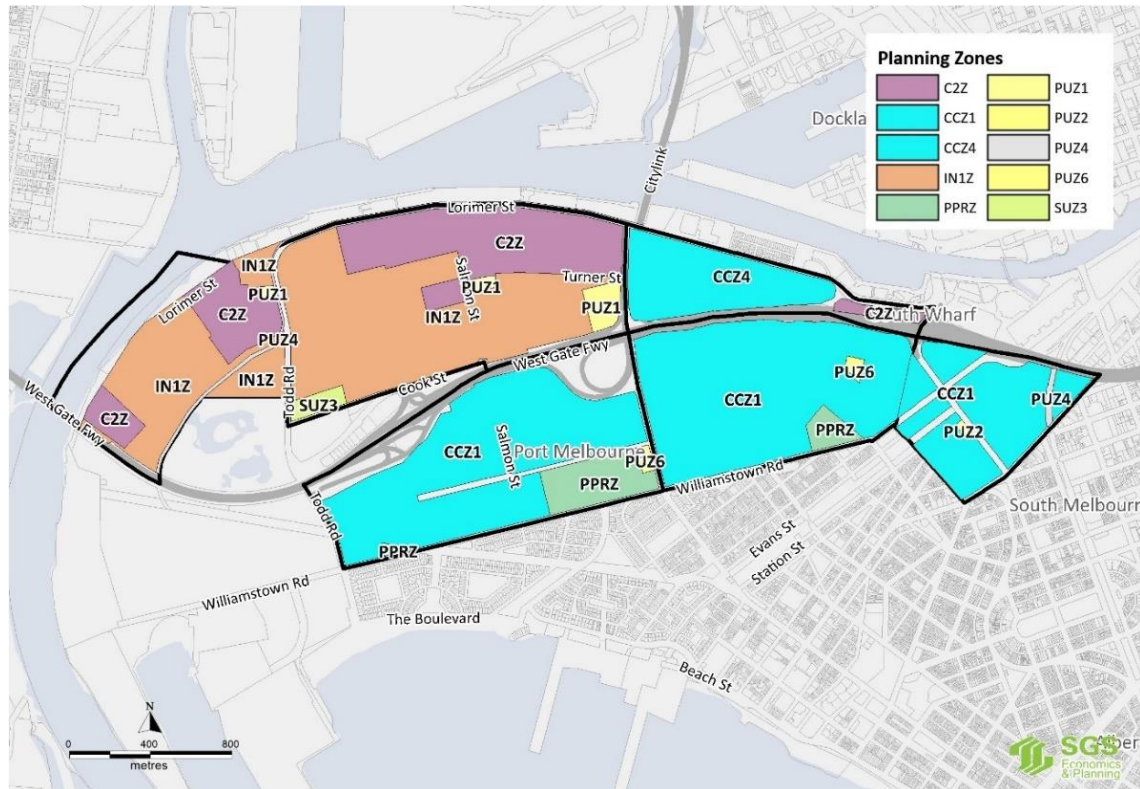
Source: Victorian Planning Provisions
Note: C2Z: Commercial 2 Zone, IN1Z: Industrial 1 Zone, CCZ1: Capital City Zone - Schedule 1, CCZ4: Capital City Zone - Schedule 4, PPRZ: Public Park and Recreation Zone, PUZ1: Public Use Zone - Service And Utility, PUZ2: Public Use Zone – Education, PUZ4: Public Use Zone – Transport, PUZ6: Public Use Zone – Local Government

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[1] CCZ: Capital City Zone; C2Z: Commercial 2 Zone; PUZ: Public Use Zone; SUZ: Special Use Zone; RDZ: Road Zone; PPRZ: Public Park and Recreation Zone.

FIGURE 3   TOTAL AREA BY PLANNING ZONE
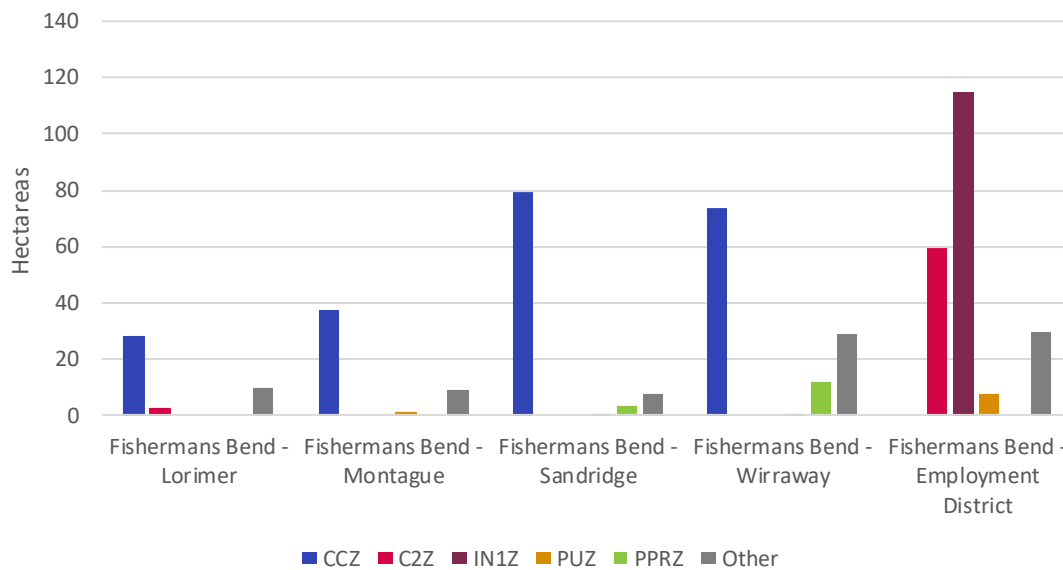
Source: Victorian Planning Provisions
Note CCZ: Capital City Zone, C2Z: Commercial 2 Zone, IN1Z: Industrial 1 Zone, PUZ: Public Use Zone,
PPRZ: Public Park and Recreation Zone
Note Other includes: SUZ: Special Use Zone and RDZ: Road Zone

Net potentially developable land

Measures of total land area does not in itself provide an accurate measure of the amount of developable land within a geographic catchment as it includes assets such as roads, footpaths and parks. Measures of net development land exclude these and other assets that prohibit development.

Drawing on current land parcel data, Table 1 below provides an estimate of the 'net land' across the five precincts. Across all the precincts approximately 70 per cent of the land is 'developable' (noting much of this has already been developed on). Net land is only 50-60 per cent of Lorimer and Montague, which already have an established urban structure. In the Employment Precinct net land is currently at 87 per cent. However, as a finer grain urban structure is established to enable higher value employment uses this is likely to reduce.

TABLE 1   TOTAL AND NET LAND AREA, HECTARES

	Total	Net area	% of land
Lorimer	40	22	54%
Montague	47	27	57%
Sandridge	91	64	70%
Wirraway	115	60	52%
Employment Precinct	200	173	87%
Fishermans Bend	493	345	69%

Source: SGS Economics and Planning

The current discussion paper produced by the Fishermans Bend Taskforce suggests further open space and transport infrastructure will be added to the study area over coming years which will reduce net developable land further over time.

1.4   Travel zone revisions

As part of the revisions made to the land use projections around Fishermans Bend, a new (Version f) Travel Zones geography was created. This is a disaggregation of the pervious (Version e) Travel Zones used in the current 2016 Reference Case land use projections.

The VITM Travel Zones are based off zones originally created in 2010/11 (see Table 2 below). SGS has progressively disaggregated these travel zones to provide improved detail in the SALUP datasets around strategic locations. Historically, Fishermans Bend has not been an area of significant employment or dwellings and thus larger travel zones were appropriate. However, with the new direction for Fishermans Bend which will see strong employment and population grwoth, it is appropriate to disaggregate Travel Zones to get a finer grain understanding of changes to land use.

A further 35 travel zones were created in this project across Fishermans Bend and Docklands.

TABLE 2   ZONE REVISIONS

| Created | 2011 | Feb 2014 | Feb 2015 | May 2015 | May 2016 | July 2016 |
Version:	VITM TZa	VITM TZb	VITM TZc	VITM TZd	VITM TZe	VITM TZf
Mel	2,893	3,098	3,253	3,305	3,386	3,421
RV	2,702	2,702	2,702	2,787	3,258	3,258
# of zones	5,595	5,800	5,955	6,092	6,644	6,679

Source: SGS Economics and Planning

Figure 4 below provides reference numbers for the old VITM Travel Zones (Version e) in red and the new split travel zones (Version f) in blue.

FIGURE 4 TRAVEL ZONE SPLITS, FISHERMANS BEND
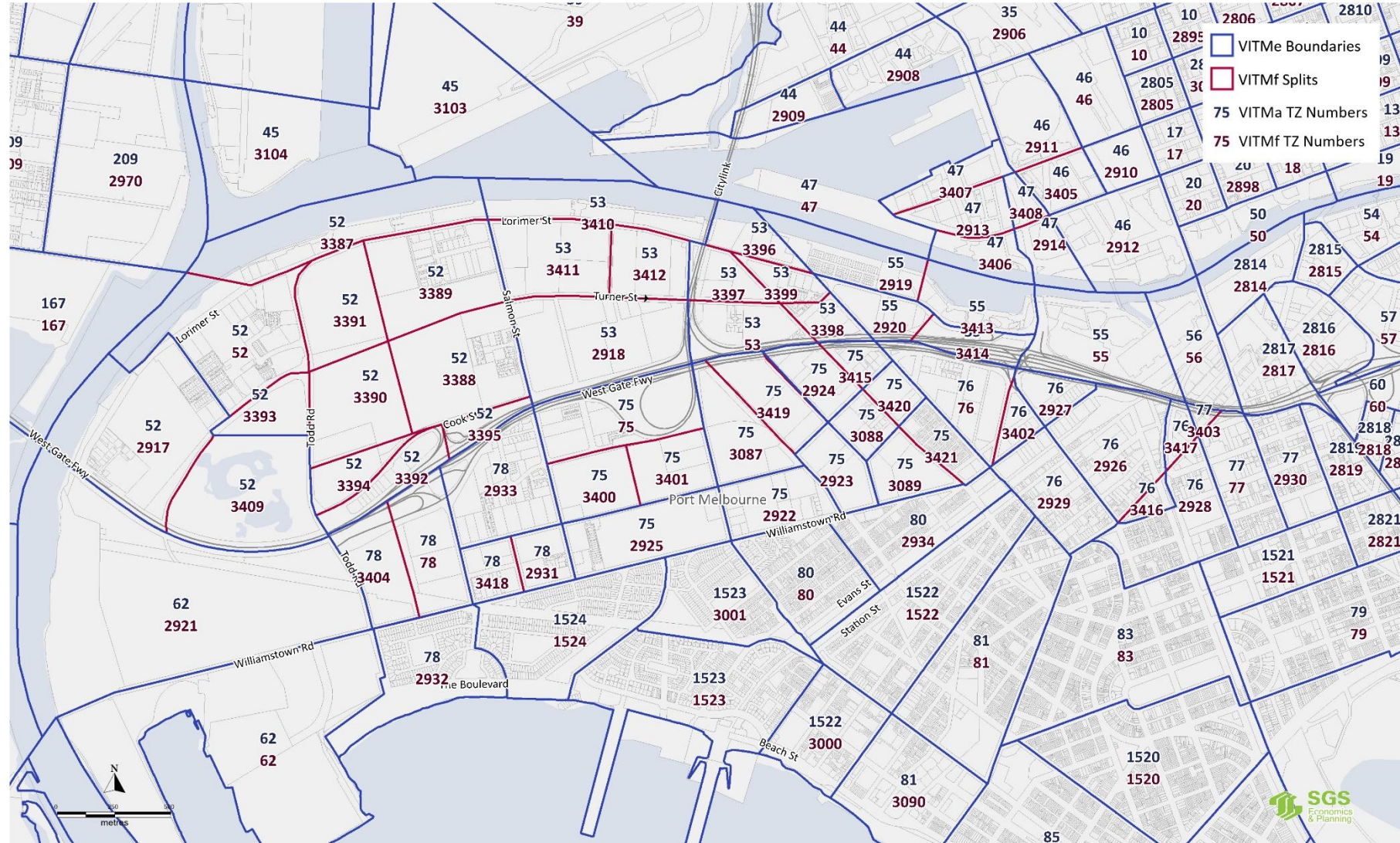
Source: SGS Economics and Planning

2 BROADER ECONOMIC CONTEXT

2.1 Broad economic context

Historical structural change in the broader economy

The Australian Bureau of Statistics (ABS) provides estimates of industry gross value added (GVA; the income generated by each industry) from 1974-75 to the most recent completed financial year. This GVA data, and information from the State Accounts and other industry specific auxiliary data sources has been used to estimate historical industry GVA for Melbourne. Up until the early 1980s manufacturing contributed around 20 per cent of Melbourne's GDP. Over time this contribution has declined significantly, with rises in advanced business services such as financial and insurance services, and professional scientific and technical services. The decline in the manufacturing sector's contribution to the Melbourne economy is also reflected in a drop in the overall number of people employed in this sector over the past two decades, both in Melbourne and nationally.[2] This substantial change in the structure of Melbourne's economy is reflected in the level of annual employment growth witnessed since the 1980s (Figure 5).

FIGURE 5   ECONOMIC STRUCTURAL CHANGE – MELBOURNE 1990-2013, SELECTED INDUSTRIES
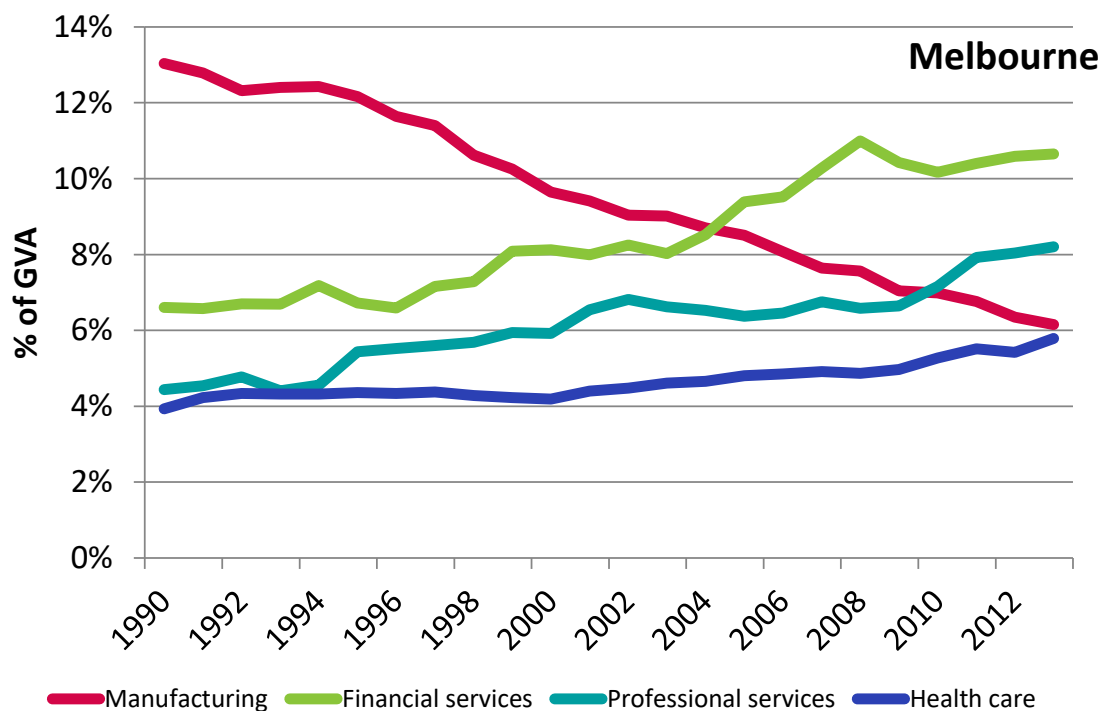
Source: SGS Economics and Planning, 2016

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[2] SGS Economics and Planning using ABS 6291.0.55.003.

The globalisation of the economy in the late 1980s saw the end of a steady period of jobs growth. Victoria entered a period of poor economic performance during the 1990s, resulting in job loses, particularly in manufacturing. While the economy took some time to adjust to macroeconomic structural change, from the mid-1990s employment growth has been relatively high, with sustained growth experienced in advanced business service industries, as well as in the health, education and tourism sectors. In this period of growth Melbourne has added around 40,000 jobs year on year. In addition, firms in goods-producing industries such as manufacturing have progressively outsourced a range of business services to take advantage of the economies of scale generated when these services are pooled together and provided by specialised firms.[3] For the provision of these advanced business services there is a strong need to be located close to pools of skilled labour. Firms that benefit from theses agglomeration economies are pulled toward industry clusters or large cities.

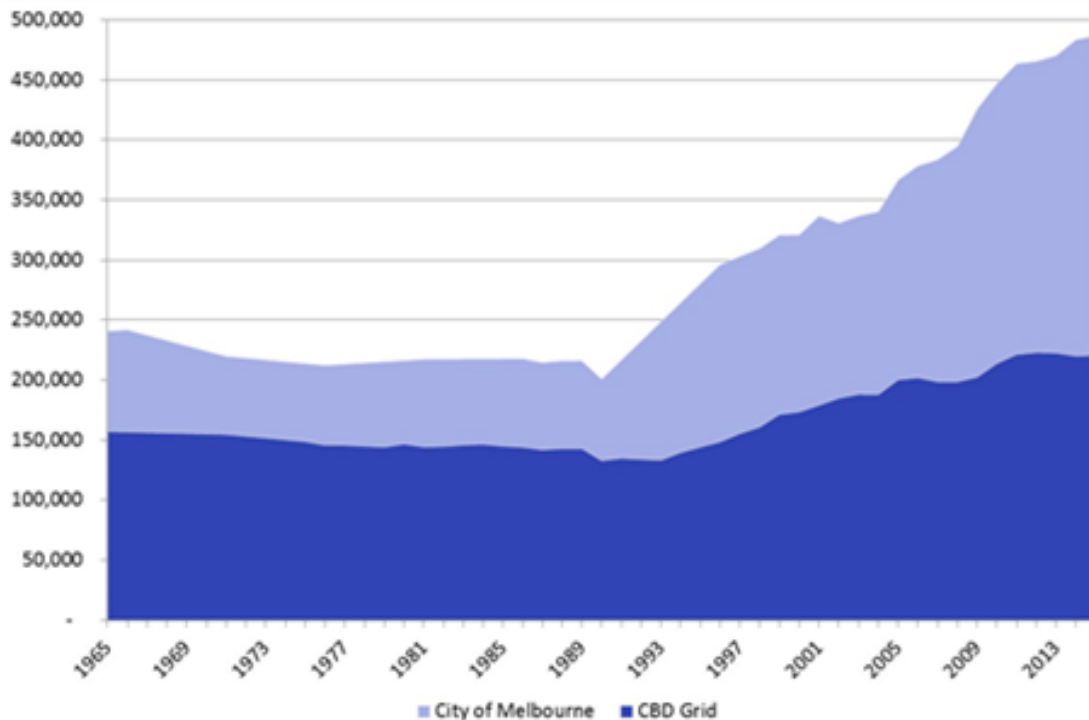## Spatial implications of structural trends in the economy

These changes in the structure of the economy have had significant spatial implications. Melbourne's economic transformation in recent decades has meant the previously dispersed pattern of employment and economic activity is being overlaid with higher concentration, of employment at the city's centre. While manufacturing was distributed throughout Melbourne's inner, middle and outer suburbs, and in large industrial precincts, advanced business services jobs are attracted to the CBD and surrounding inner suburbs because these areas offer competitive advantages through agglomeration economies.

The Government-inspired revitalisation of Southbank and Docklands has provided the CBD with brownfield land to accommodate the growth in these knowledge intensive and office-based service industries. As a result, the CBD and immediate surrounds has grown substantially since the early 1990s, with the City of Melbourne now host to half a million jobs (Figure 6).

In Melbourne, the City of Melbourne has accommodated significant growth as a result of these forces; employment has doubled between 1989 and 2009, following 30 years of relative stagnation. This significant rate of growth has been enabled by the supply of land for urban renewal close to the centre, as well as within the CBD grid itself. Major redevelopment has supported the creation of highly successful, specialised inner city precincts including St Kilda Road, the redevelopment of Southbank, the Education and Health Precinct (in Carlton and Parkville) and Docklands.

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[3] For more information, please see: http://www.rba.gov.au/publications/bulletin/2010/sep/1.html

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FIGURE 6   HISTORICAL EMPLOYMENT IN THE CBD AND CITY OF MELBOURNE

Note: CBD is defined as the 'Hoddle grid' that extends east-west from Spring to Spencer Street, and north-south from Flinders to La Trobe Street. Source: ABS, SGS Economics & Planning

Acknowledging the interplay between the structure of the economy, the distribution of jobs, and the distribution of population, the shift towards centralised advanced business service jobs is likely to continue as there remains significant capacity for growth in Melbourne's highly productive CBD and surrounds. Strategic brownfield sites such as Docklands, Southbank, Fishermans Bend, City North, and Arden Macaulay add considerably to the already large CBD jobs region.

Implications of long-term trends for economic activity in Fishermans Bend

The effects of structural change and the associated decline in manufacturing across Melbourne has impacted the study area over the past decade (Figure 7 and Figure 8). While Fishermans Bend has not attracted a large number professional service businesses the overall number and share of construction, wholesale trade, and administrative services employment has risen solidly, while the share of manufacturing employment has declined. Fishermans Bend has provided businesses in the construction, wholesale trade, and administrative services with:

− available land at affordable prices,
− close proximity to road infrastructure (Port of Melbourne and West Gate Freeway & Citylink),
− proximity to other urban renewal (construction) jobs,
− access to the inner Melbourne construction market, and
− access to the large number of professional service businesses in the CBD.

FIGURE 7   ECONOMIC STRUCTURAL CHANGE — FISHERMANS BEND
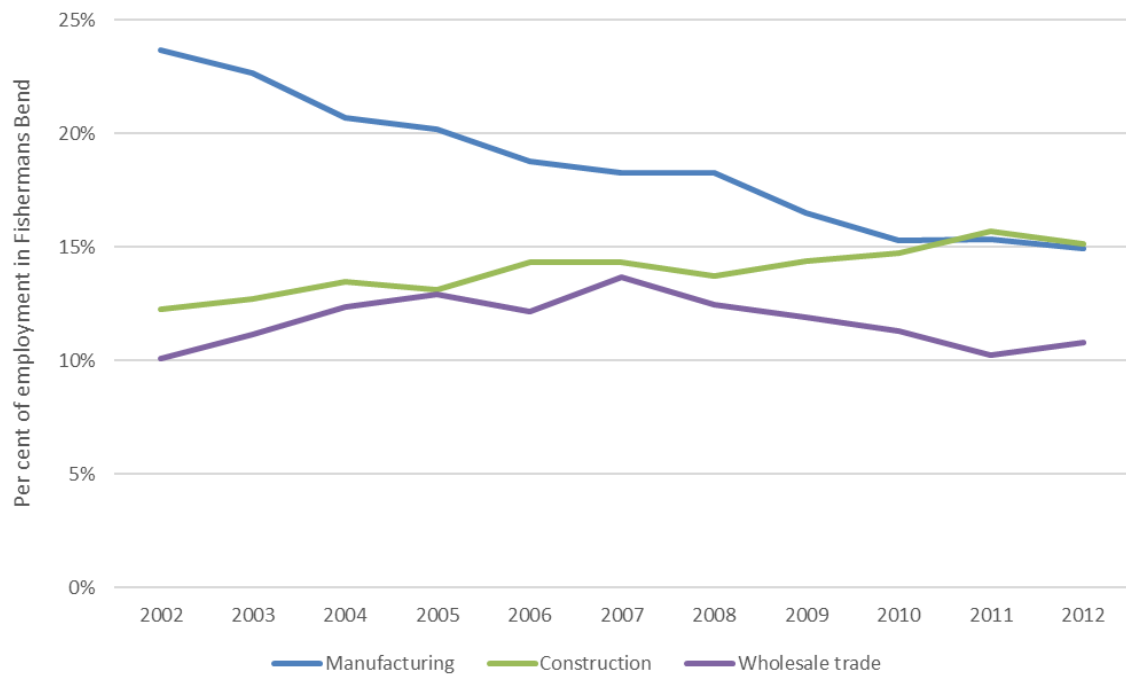
Source: SGS Economics and Planning

Note: Some industries with minimal changes in employment over this period have been excluded.
Source: SGS Economics and Planning

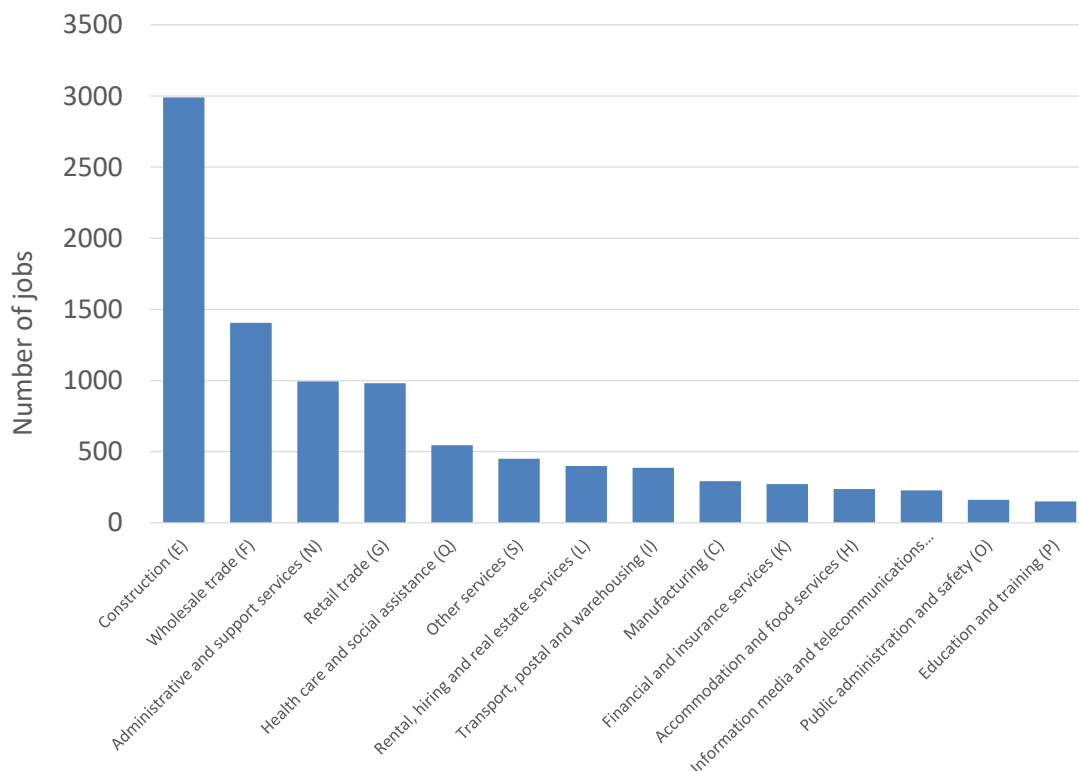## More recent developments in Fishermans Bend

As outlined above, four of the five current precincts within Fishermans Bend were rezoned to the Capital
City Zone (CCZ1) in July 2012. This had the effect of enabling a larger range of land uses within the study
area that were previously prohibited including high-density residential use. The rezoning has had a
significant impact on the number and nature of building approvals for the study area. As at June 2015,
approval for approximately 6 700 dwellings resulting from 15 permits granted for 20 individual towers. A
further 23 applications have been lodged for approval to that date, with potential for another 26 towers
between 20 to 64 storeys equating to 10 900 dwellings.[4]

The rezoning has also been associated with significant land price rises. SGS is unaware of detailed land
value data at a geographical level that is able to specify the Fishermans Bend change, though the real
estate agent Mark Wizel, of CBRE, estimated the value of Fishermans Bend had skyrocketed from
$3.7billion before the rezoning to as much as $15 billion. For sites where developers have won planning
approval for high-rise towers the increase has been even greater.[5]

These developments will in effect 'crowd-out' employment opportunities within Fishermans Bend as the
residential density across the area increases over time.

[4] For more information, please see: haveyoursay.delwp.vic.gov.au/Fishermans-bend/documents/36318/download
[5] For more information, please see: http://www.theage.com.au/victoria/lowend-buyers-shut-out-of-Fishermans-bend-20141101-11fh5p.html

3 FUTURE PROSPECTS FOR EMPLOYMENT

This chapter looks forward to assess the potential of the study area to attract higher employment densities over the coming years as Melbourne continues to expand.

This will reflect the ability of Fishermans Bend to:

1. Compete with other precincts for businesses and jobs as Melbourne expands,
2. Compete with other states and countries, and
3. Ensure that sufficient land is available for employment purposes (as opposed to residential).

These three issues are explored further below.

3.1 Future demand for commercial space in Melbourne

Level and composition of demand

The geographic expansion of Melbourne's commercial core over the past decade to areas such as the Docklands and Southbank has increased the supply of commercial office space and kept commercial rents lower than Sydney's CBD. This has given Melbourne a competitive advantage.

The strong growth in employment within the CBD (i.e. the Hoddle Grid) and immediate surrounds that has been observed over recent years is anticipated to continue, with demand for commercial floorspace in the CBD expected to rise strongly to over the coming decade. In fact, private sector forecasts of demand for CBD office floorspace is larger in Melbourne's CBD than any other CBD in Australia.

As outlined above, Melbourne is undergoing a structural change, with the economic output produced by white collar professional services accelerating, and this output increasingly being produced within Central Melbourne. As a result, the majority of the office spaced planned within the CBD to be occupied by businesses and jobs within the financial, insurance, professional, scientific and technical service sub-sectors.

Implications for Fishermans Bend

The high level of demand for office space within inner Melbourne implied by Figure 9 indicates that Fishermans Bend could be in a unique position given its location to accommodate any excess demand for commercial space if transport infrastructure is improved to boost the area's accessibility.

FIGURE 9   FORECAST DEMAND AND PLANNED CBD OFFICE SPACE 2014-24 (SQM)
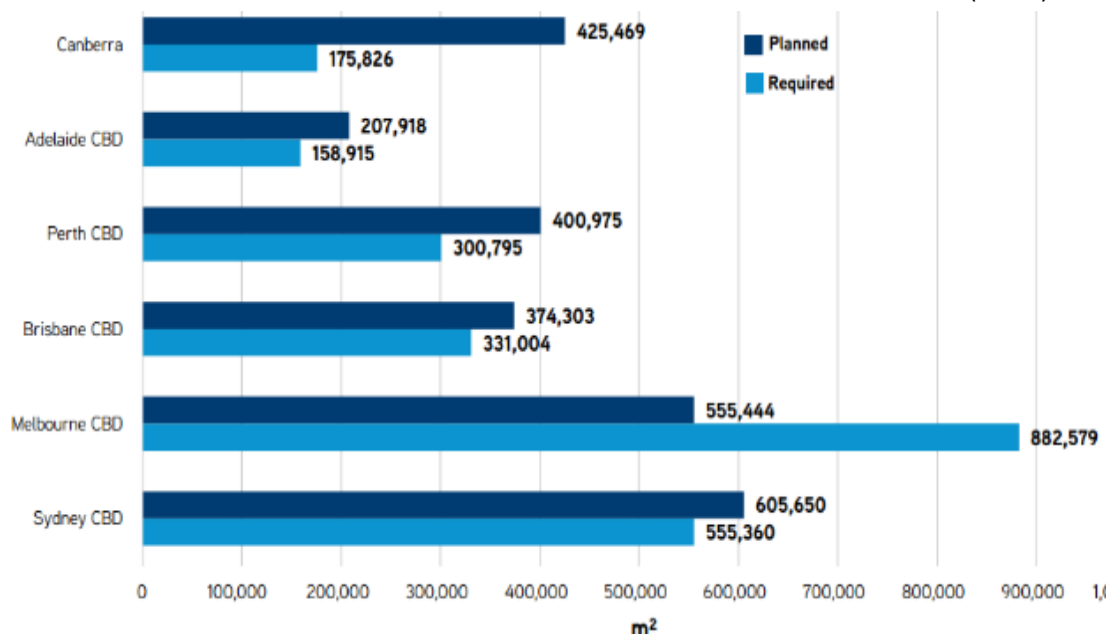
Source: Colliers (2015) Research and Forecast Report – CBD Office – First half of 2015
Note: Figure refers to office space in addition to existing stock. Planned refers to office space which is either under construction or mooted.

3.2   Factors determining development activity

The importance of accessibility

For any individual site, many factors determine commercial viability and potential land uses. These can include, but are not limited to, planning controls, site size and shape, neighbouring uses, development capacity, and so on. Broadly speaking, however, a key factor in determining the viability of different land uses and the intensity of development across infill and greenfield land areas is accessibility. Accessibility reflects the ability of people to travel to a site, with highly accessible sites those that the greatest number of people can easy travel to – measured in travel time.

CBDs are able to support and attract many large office and residential buildings not simply because zoning has allowed such development, but because the CBD is the most accessible location within the entire city. Serviced by an abundance of transport and other infrastructure, CBDs are accessible to a large and wide pool of potential workers, customers and suppliers. This advantage is referred to as the benefits resulting from agglomeration economies. Conversely, new residential development on the fringe of cities generally offers the most affordable entry point into the housing market. These locations have relatively low levels of accessibility, particularly from employment opportunities, and, as such, land values are relatively low. In turn, low land values provide little incentive to develop denser housing, with detached housing dominating.

Measurement of accessibility and current levels

Accessibility is measured by SGS in terms of Effective Job Density (EJD). The EJD for a given suburb or broader area, is calculated by the level of employment in the catchment relative to the time taken to gain access to that employment based on the mode split currently used by employees. EJD can be measured for specific transport modes or for a combination or modes. The EJD across Melbourne for public transport and pedestrians is shown in Figure 10.

The map highlights that EJD is currently relatively low in Fishermans Bend compared to other inner Melbourne precincts, which may result in lower demand for commercial development, at least in the short-term. This reflects the current poor public transport connectivity in Fishermans Bend.

FIGURE 10   EFFECTIVE JOB DENSITY – MELBOURNE 2011
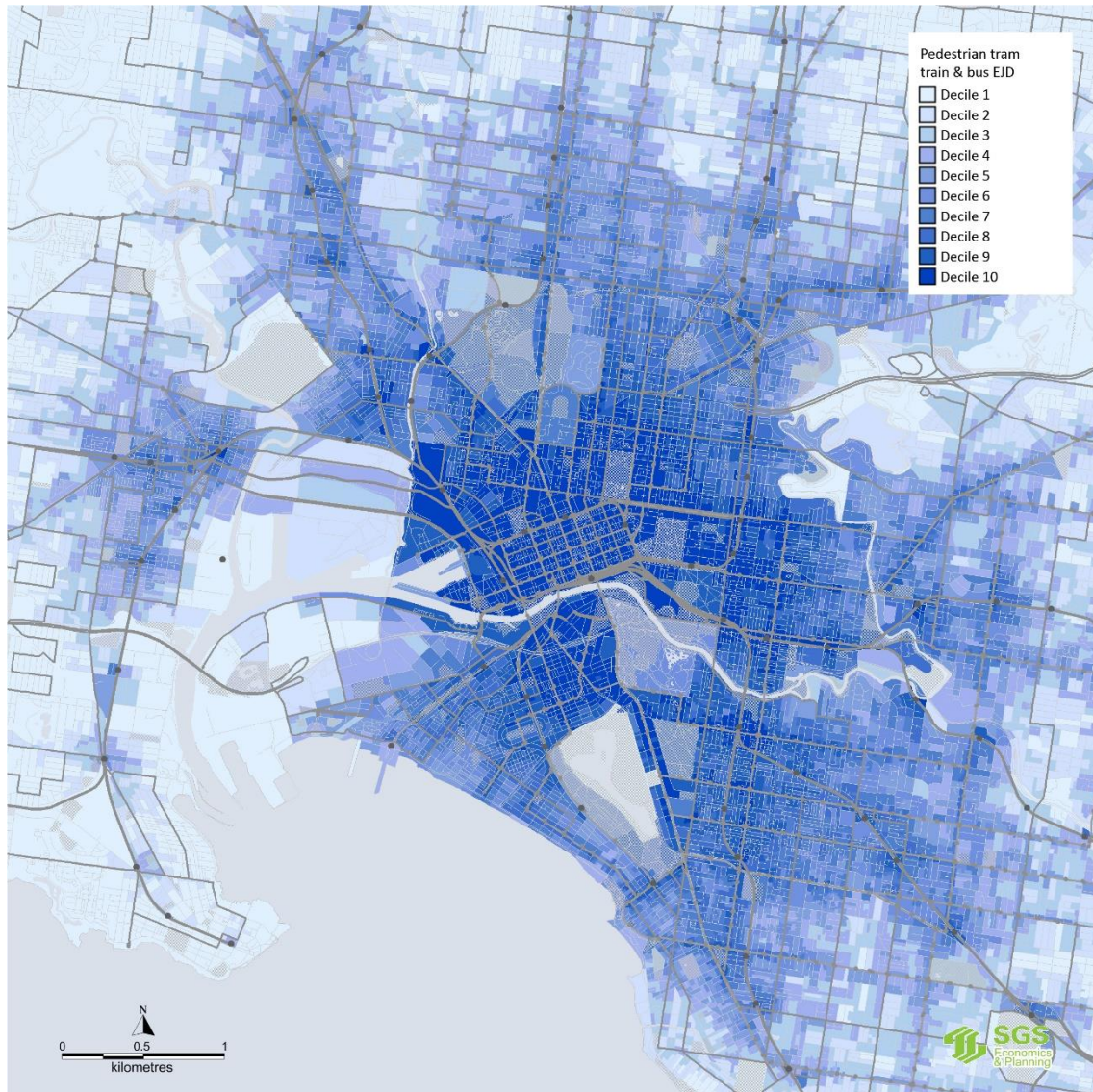
Source: SGS Economics & Planning

3.3   Committed future transport infrastructure

Looking ahead, one of the key pieces of public transport infrastructure that is expected to impact the relative attractiveness of Fishermans Bend is the Melbourne Metro Rail Project.

The project will help to expand the City Loop, which will enable major improvements in capacity, reliability and efficiency of train lines serving Melbourne's growth areas in the north, west and south-east. Moving from left to right across the map provided in Figure 11, the Project will extend from South Kensington to South Yarra and involve the construction of two nine-kilometre rail tunnels, two entry/exist portals, and five new underground stations. The project is proposed to be implemented in stages over a 6 year period with commencement of major construction proposed in 2018.

The construction of the Melbourne Metro Rail Project (MMRP) will impact the accessibility and relative attractiveness of a number of precincts within Melbourne including Arden and Parkville.

Without further investment in public transport infrastructure, the MMRP will reduce the relative attractiveness of Fishermans Bend for both businesses and households.

FIGURE 11   MELBOURNE METRO RAIL PROJECT

Source: http://metrotunnel.vic.gov.au/resources/maps
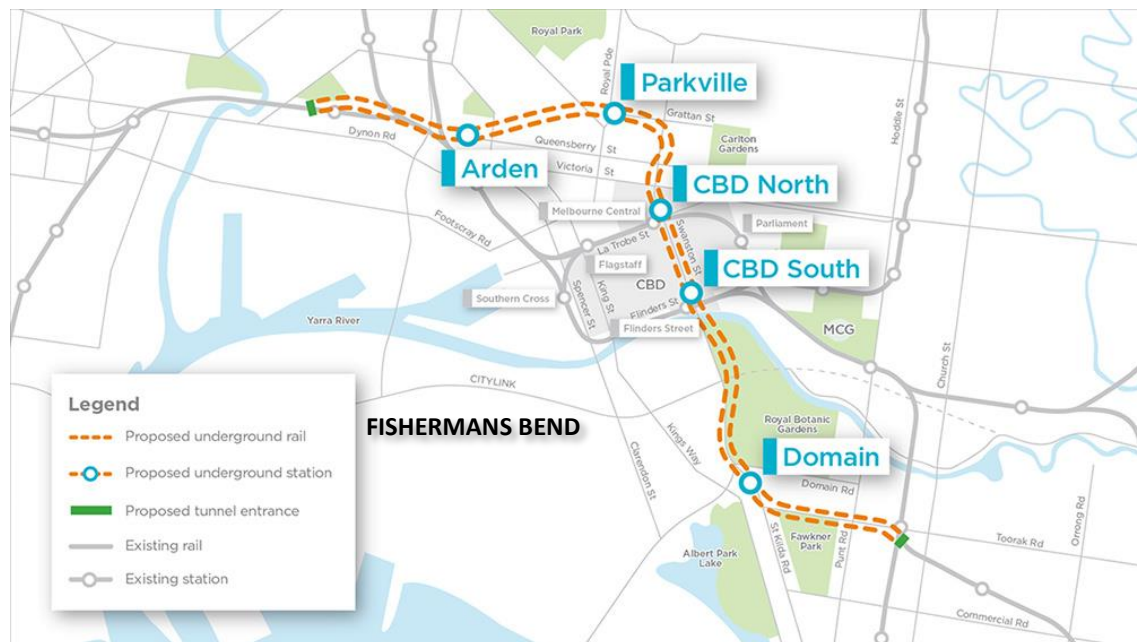
3.4   Competitive context - central city precincts

The central city precincts will in effect be competing for the additional jobs added over the coming decades. In order to gauge Fishermans Bend's relative attractiveness, a summary some key 'competitor precincts' in the Central City is provided below. Figure 12 highlights these various inner city precincts.

While E-Gate and Dynon Road are shown below, there remains some uncertainty surrounding the future development of these precincts. It is likely that development in E-Gate and Dynon will occur following the realisation of Fishermans Bend.

FIGURE 12   INNER CITY PRECINCTS
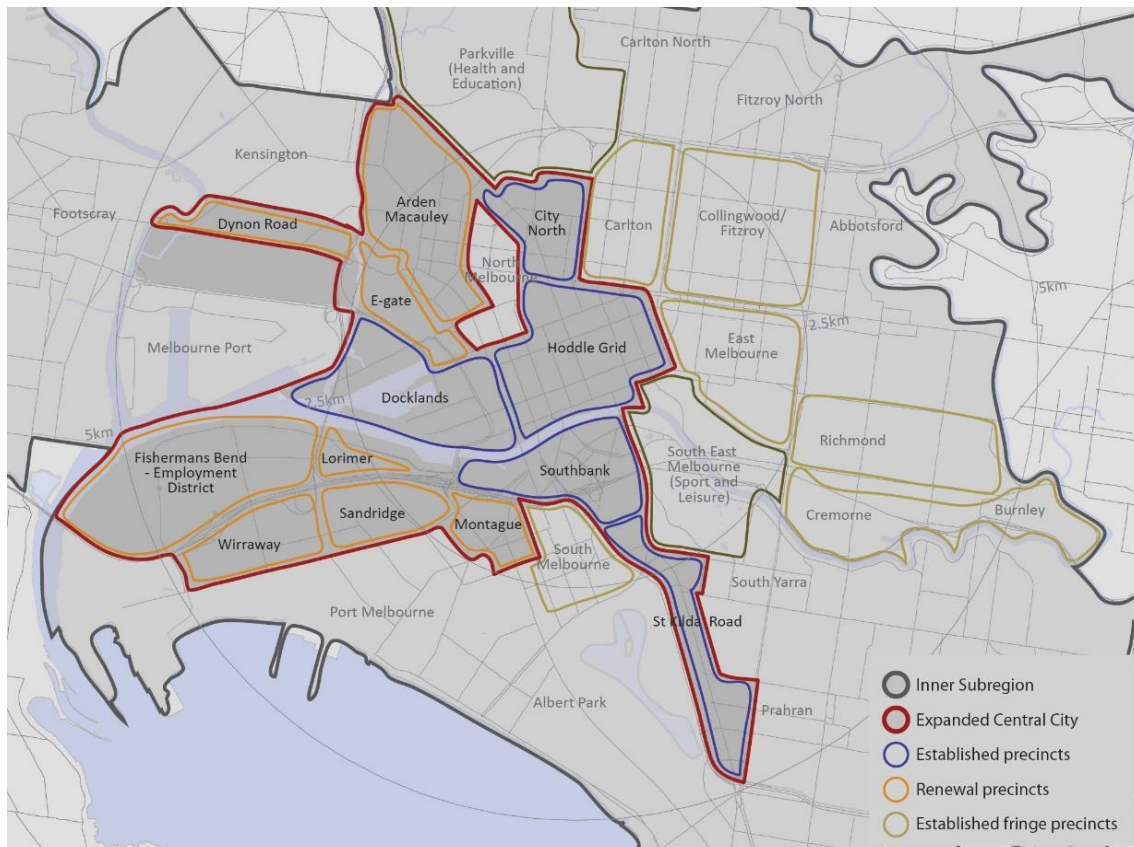
Source: SGS Economics and Planning

Hoddle Grid

The Hoddle Grid acts as the focus for employment in the Central City and Greater Melbourne given its public transport accessibility. Given Melbourne's radial private and public transport network the CBD is by far the most highly accessible and desired location in Melbourne. It has seen rapid growth over recent years and is expected to have capacity to accommodate continued growth in jobs and employment over the coming decades.

Jobs growth is expected to be derived from a further five sources:

− **Increased use of current office capacity**, given all office space is likely not fully occupied at the current average work space ratio;

− **Reduction in work space ratio**, based on City of Melbourne findings that show that work space ratios have been in decline across a number of professional service sectors (see Figure 13) and the

health sector, a trend which is expected to continue (though at a more modest rate). Flexible business practices such as hot-desking are likely to further contribute to this trend;

— **Expansion of current buildings**, stemming from changes in height restrictions;

— **Growth in 'floating' employment** (e.g. support services such as postal workers and ticket inspectors that do not require employment floor space), which is expected to occur to support wider employment growth; and

— **Construction** of new office buildings.

FIGURE 13   REDUCTIONS IN WORK-SPACE RATIOS, MELBOURNE
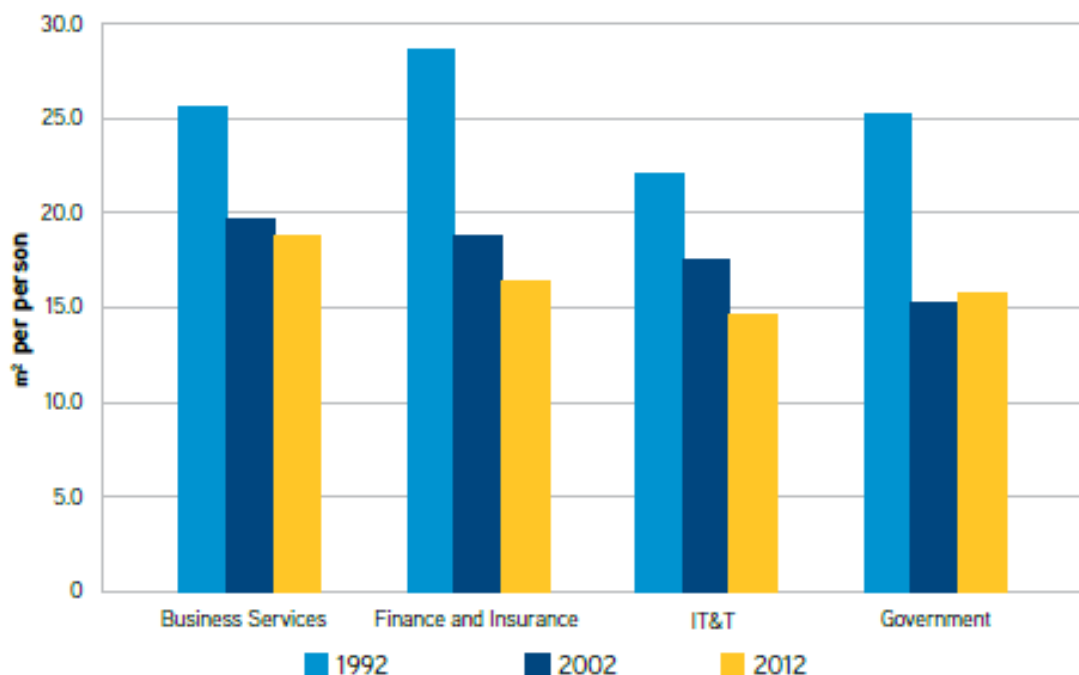
Source: Colliers International, Leading the change, IT&T changing the face of tenant demand, 2015

A large proportion of new jobs are expected to be in the knowledge intensive service industries, which will be attracted to the significant agglomeration benefits derived from a CBD location. Already well-serviced by rail, tram and bus transport, the Hoddle Grid will further benefit from the development of the Melbourne Metro, serving to attract business investment.

Docklands

As an existing redevelopment precinct and a well-located extension of the CBD, Docklands is also expected to continue to draw population and employment growth. While all development areas in Docklands have been contracted to developers, around 40 per cent of the precinct is yet to be developed.

Continued investment in the creation of high quality public realm and community infrastructure is also planned, with the aim to establish an attractive, high-amenity location to attract high-value financial and professional services jobs and residential development.

Arden Macaulay

Arden Macaulay is currently an industrial precinct, though the precinct is expected to see significant net increases in population and employment. The establishment of a new underground station in the Arden district will result in the accessibility of the area increasing and enable residents to easily access key businesses precincts such as the Melbourne CBD and Southbank.

Consistent with the most recent Arden Macaulay Structural Plan, the development of a station is also likely to result in the improvement of other local transport networks (such as buses). This would result in much of Arden having 'CBD like' levels of accessibility to the broader Melbourne labour market and increase the attractiveness of the district to potential businesses, particularly professional services businesses that benefit from agglomeration benefits.

There is expected to be a sharp rise in population and employment given that (i) the cost of land is likely to be significantly less than in Melbourne CBD; and (ii) the district has been designated as an urban renewal area and previously hampered by flood damage. In addition, a structural change in the employment is projected moving from industrial blue collar jobs to white collar jobs.

City North (including Parkville)

City North (including Parkville), for which a new underground railway station is also planned, is also expected to experience significant commercial and residential uplift in coming decades. Employment growth is expected to be seen most strongly across the health precincts, particularly as utilisation of health facilities increases.

Tram and bus upgrades (particularly strengthened east-west connections) are likely to further improve the connectivity and employment potential of the area, along with the continued development of Carlton Connect.

Growth in City North is expected to be more modest than that in Arden, however, for two reasons:
- The level of existing infrastructure is such that the new station will effect a more modest rise in accessibility, and
- A lower level of development opportunities, given that the area is already largely occupied by sizeable institutions (e.g. Melbourne University and the Royal Melbourne Hospital).

3.5 Competition from residential development

Melbourne has recently experienced unprecedented levels of housing development. The level of new supply has been driven by strong growth in population along with changing demographics and housing preferences. Housing supply has been provided in a range of different forms and via a range of development types. Large private developers and private small scale (non-professional[6]) investors have provided supply in a wide range of locations and development forms. However, in the inner city and greenfield markets we have seen development dominated by large scale developers building high rise towers in the city and large greenfield detached housing estates on the fringe of Melbourne (Figure 14).

The pressure for major residential development has largely been focused in other precincts such as CBD, City North, Docklands and South bank. As development opportunities reduce in these other locations we would expect to see an increase in residential development and applications within Fishermans Bend. It will be important to recognise that any zoning that allows residential is very likely to see residential development, often to the maximum possible scale. Controls will need to be put in place to protect character and ensure a diversity of uses.

It is important to note that while there are currently a large number of development applications in Fisherman's bend the current level of construction activity is relatively low.

FIGURE 14. RECENT RESIDENTIAL DEVELOPMENT
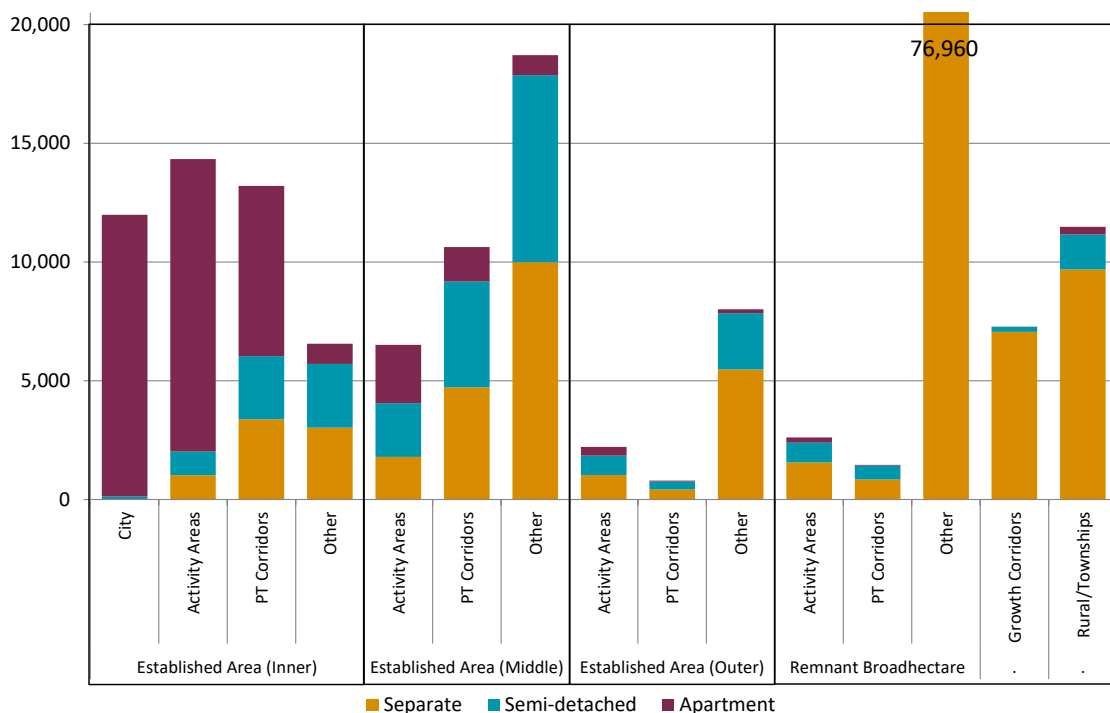
Source: Housing Development Data

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[6] Also referred to as 'mum and dad' type investors, where existing home owners seek to capitalise on their own property. Typically doing one or two opportunistic developments rather than being heavily engaged in the sector on a full time basis.

3.6   Interstate and international competition for jobs and residents

In addition to the inherent competition for jobs and residents that exists across Melbourne precincts, there is also competition for jobs and residents across Australian states and internationally. For example, Melbourne's CBD and surrounding precincts are in constant competition with Sydney for interstate and international jobs and residents. The urban renewal process that is expected to take place across Fishermans Bend may result in both a redistribution of jobs across Melbourne as well as a net increase in the number of jobs located in Melbourne.

Jobs can be classified into (at least) three distinct categories:
−   Jobs that are tied to locations such as CBD locations or specific transport corridors,
−   Population driven jobs which service residents, and
−   Footloose jobs which are not tied to a specific location.

The future form and function of Fishermans Bend will to some degree affect the type of jobs that the study area will be in competition for. For example, if Fisherman Bend develops into an extension of the CBD with a high proportion of white collar professional jobs, then competition will be for jobs that require a CBD location such as corporate headquarters and high value add professional services.
If on the other hand, Fishermans Bend develops into a precinct that has a greater industrial focus on creative and advanced manufacturing employment, then the study area will be largely competing for footloose jobs in industries such as technology and research. However, the scale of employment land available in Fishermans Bend means that there is scope for several different specialisations within Fishermans Bend, just as the Hoddle Grid has different specialisations in different areas within it.

Previous work by SGS suggested that approximately 137,000 new jobs, or around 20 to 25 per cent of total future jobs in Melbourne over the 2006 − 2026 period would be 'footloose'.

4   SCENARIO OVERVIEW

SGS modelled employment and population in Fishermans Bend for a reference case and three realistic alternative scenarios to 2051. Table 3 provides a high-level overview of the scenarios.

TABLE 3   SCENARIO COMPARISON AT 2051

	Market Led	Moderate Intervention*	Current Vision	Current Vision plus University
Level of change	Moderate	Moderate	High	Very High
Alignment with Fishermans Bend Vision	Well Below	Below	Consistent	Above
Government Intervention	Low	Moderate	High	High
Transport Interventions	Bus Improvements	Tram/Smart Bus	Tram/Smart Bus/Heavy Rail	Tram/Smart Bus/Heavy Rail
Population at 2051	75,000	70,000	80,000	80,000
Employment at 2051	40,000	53,000	59,000	60,000
Students at 2051	2,000	2,000	2,000	11,000

* Moderate Intervention aligns with the 2015 Reference Case land use projections.

Market Led

This scenario assumes that government takes a hands off approach and effectively lets 'the market' take the lead in the future development of Fishermans Bend.

Key assumptions:
- Land ownership, zoning, and height controls remain constant, and the only land acquisition is assumed for transport infrastructure Incremental transport improvements such as bus and tram service frequency upgrades.
- Infrastructure would only be provided following development/demand rather than being used as a catalyst for promoting commercial development.
- No heavy rail by 2046.

Moderate Intervention (reference case)

This scenario assumes some degree of investment and policy shift from government. However, for various reasons, it was not fully realised or consistently implemented. This is consistent with the 2016 Reference Case Land Use scenario and 2016 Victoria in Future.

Key assumptions:
- Land ownership, zoning, and height controls remain unchanged and the only land acquisition is assumed for transport infrastructure.
- Tram or equivalent bus on Plummer alignment and Turner corridors via Collins Street Extension, and complementary local bus improvements by 2031.
- No heavy rail by 2046.

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Current Vision

The Vision scenario assumes that the current vision being developed by the Fishermans Bend Taskforce is realised to a large extent.

Key assumptions:
- While land ownership and zoning remain constant, Government uses other policy controls to ensure that a vision of a mixed use precinct is realised.
- Enhanced bus service provisions in the short term. Two high capacity public transport and active transport connections to the CBD fully functional sometime after 2026. Alignment of these routes will possibly be along Tuner Street and Plummer Street.
- Heavy rail to Melbourne's West and CBD operational by 2046.

Current Vision plus University

The Vision Plus University scenario (also referred to as just Vision Plus) has the same policy assumptions as the Vision scenario with the addition of a major university being established in Fishermans Bend.

Key assumptions (in addition to Vision):
- The Government acquires land for an advanced manufacturing precinct,
- The Government facilitates a University anchor tenant, and
- The Government actively manages the tenants of the precinct.

5 MODERATE INTERVENTION

5.1 Scenario description

The Moderate Intervention is consistent with the 2016 Reference Case Land Use dataset. However, travel zone disaggregation and localised refinements have been made to the original dataset.

This reflects that the scenario sits in the middle of the government intervention spectrum; between Market Led and the Vision/Vision Plus scenarios.

A reference case scenario essentially represents a condition between an aspirational/policy scenario and a pure trend based scenario. It is often referred to as a 'policy evolution' scenario as it largely relies on established trends but does capture to some degree the effect of policy shifts and planned land release/renewal sites/infrastructure projects.

In a reference case, the exact nature of future transport infrastructure is not normally specified. For the purpose of this report, however, the Fishermans Bend Taskforce provided the following policy and infrastructure assumptions:

Infrastructure assumptions

Catalytic transport investment occurs reflecting Fishermans Bend being identified as a key urban renewal site. The specific infrastructure assumptions include:
− tram or equivalent bus on Plummer alignment and Turner corridors via Collins Street Extension, and
− complementary local bus improvements by 2031,
− <u>no</u> heavy rail is envisaged by 2046.

Policy assumptions

− Land ownership, zoning, and height controls remain constant, and
− The only land acquisition is assumed for transport infrastructure.

Land use implications

With only moderate government intervention to guide and shape land use within the study area, residential, commercial and industrial land uses will compete for available land through formal property markets. In such a scenario, land uses will largely reflect the highest and best use i.e. the land use that generates the highest level of profitability or value for land owners and property development.

Therefore, in this scenario employment at around 50,000 in 2051 is several thousand lower than the more interventionist Vision and Vision Plus scenarios. There are also slightly less white collar workers (in industries such as Professional, Scientific and Technical Services) as a proportion of the workforce in the Moderate Intervention scenario that Vision and Vision Plus scenarios.

Population in this scenario is also lower at 69,000 in 2051 which is about 10,000 less than the Vision and Vision Plus scenarios. The following map provides a high level summary of the population, enrolments and blue/white collar employment by precinct. Note the map excludes Westgate park a recent inclusion to the Employment Precinct.

Moderate Intervention (2051): Tram/SmartBus Corridor Scenario

E= Enrolments (POI)
P = Population
B = Blue collar workers
W = White collar workers

E:1903
P:0
W:16521
B:4883

E:0
P:12468
W:4721
B:1180

E:0
P:23972
W:8257
B:2064

E:1611
P:15578
W:4570
B:1291

E:1709
P:17020
W:8136
B:1720

Lorimer St
Lorimer St
Salmon St
Turner St
Citylink
Docklands
South Wharf
West Gate Fwy
Cook St
Todd Rd
Port Melbourne
Williamstown Rd
South Melbourne
Todd Rd
Williamstown Rd
The Boulevard
Evans St
Station St
Beach St
Albert P

0   400   800
metres

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& Planning
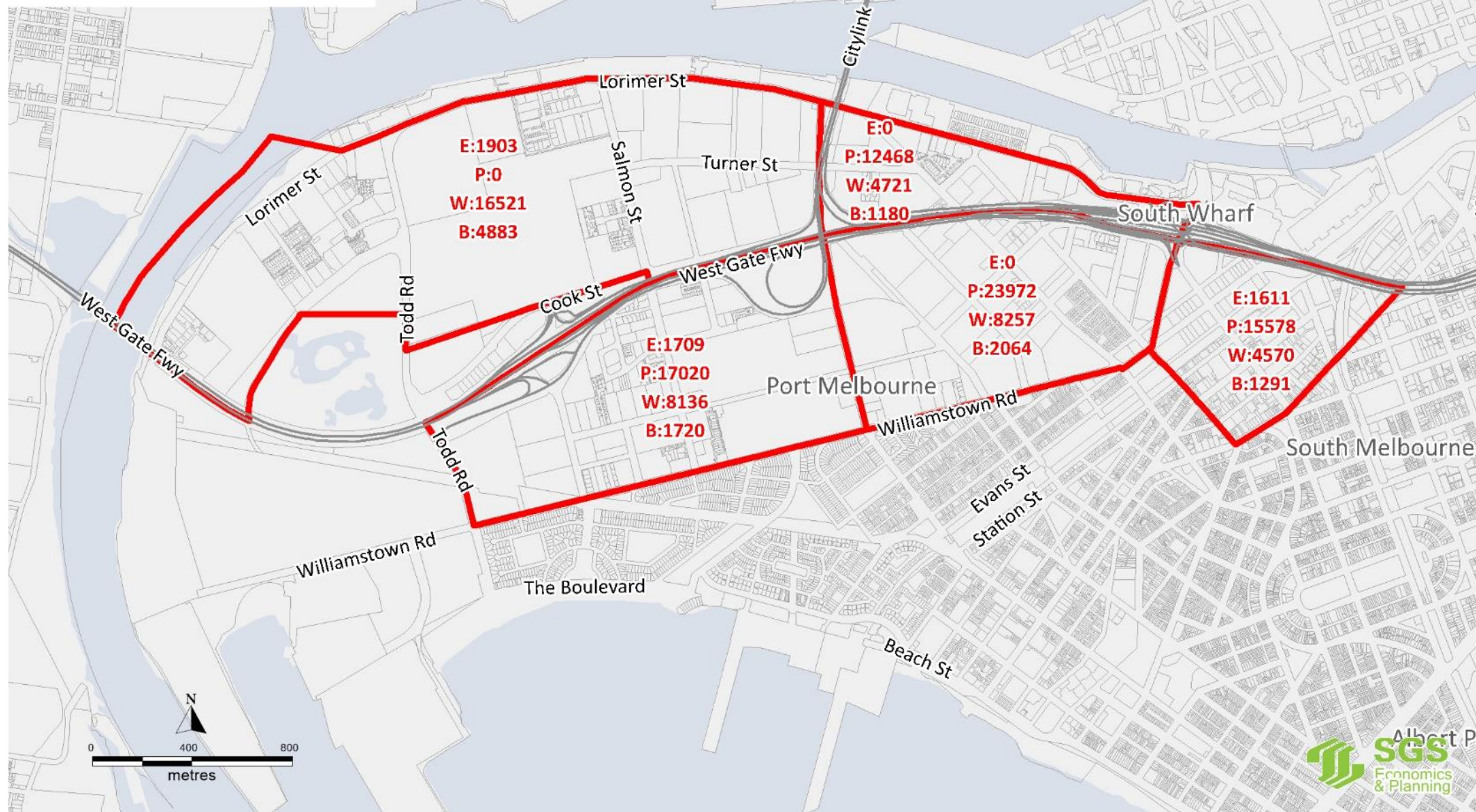
5.2 Employment (place of work)

Under this scenario, employment within Fishermans Bend is expected to increase gradually over the forecast horizon to reach an aggregate employment number of approximately 50 000 at 2051.

In the context of other precincts across the City of Melbourne, Fishermans Bend does not currently hold a competitive advantage in attracting service-oriented employment and jobs that are consistent with the current planning zones. While development is likely to benefit from its inner city location, at present Fishermans Bend does not perform well in terms of connectivity, both within the precinct itself and to others in the Central City, including the Hoddle Grid. This not only limits potential worker and resident accessibility to employment, housing, retail and services within the area, but it also curbs the agglomeration benefits typically experienced in inner city precincts.

As a result, employment growth in Fishermans Bend is expected to initially occur at a slow pace, picking up speed only after other precincts (e.g. the Hoddle Grid, Arden Macaulay, Docklands and City North – all of which have, or will have, heavy rail access) are closer to reaching full build out and/or capacity and catalytic infrastructure for Fishermans Bend has been provided by the Government. The composition of the additional jobs attracted to Fishermans Bend at this point is expected to largely be made up of white collar professional service jobs, with growth focussed around the public transport routes outlined above. This in particular, is expected to result in strong growth in employment along Plummer Street.

Employment by precinct

It may be expected that employment growth and future densities would be highest in Lorimer and Montague given that they are closest to the CBD and other key employment precincts such as Docklands and Southbank. However, employment growth in Lorimer and Montague was projected to be relatively limited due to the following reasons:
- Following the rezoning of the precinct, a high number of residential building approvals for high rise towers have been recorded in precincts with close proximity to the City,
- Without significant policy intervention, it is not clear that there will be a significant amount of land area available for commercial space after transport infrastructure has been supplied.

As a result, the strongest growth in employment is expected to occur in the precincts to the west of the Precinct, including Wirraway and Sandridge (Table 4).

Within the employment precinct, land use is still expected to be largely driven by future trends in the manufacturing and commercial sectors within Melbourne up until the provision of public transport infrastructure by 2031. After this point, demand for commercial and industrial land is expected to rise in line with the level of accessibility. This is expected to result in greater levels of employment density throughout the precinct with a shift towards more commercial white collar professional jobs.

Employment by industry

The proactive provision of high quality public transport infrastructure is expected to help to increase the accessibility of the study area, and in turn improve Fishermans Bend's ability to compete for future white collar professional service jobs. This is expected to assist the study area attract a larger number of professional service jobs after 2031, when public transport infrastructure is fully functional and other inner Melbourne precincts starts to reach full capacity. This is at the expense of more traditional industrial jobs including manufacturing and wholesale and transport.

While the number and industry composition of jobs is expected to shift notably relative to a scenario where no (catalytic) public transport is provided, the precinct is also implicitly assumed to capture jobs

that have higher productivity levels particularly in the professional and financial services sector, given the enhanced levels of accessibility.

Table 4, Figure 15 and Figure 16 provide a summary of the employment results for this scenario.

TABLE 4   MODERATE INTERVENTION: EMPLOYMENT PROJECTIONS

Precinct	2011	2021	2031	2041	2051	2011-51	
						No.	% p.a.
Lorimer	3,041	3,236	3,521	4,228	5,902	2,860	1.7%
Employment Precinct	12,503	13,087	15,480	17,630	21,404	8,901	1.4%
Montague	4,432	4,667	4,688	5,049	5,862	1,430	0.7%
Sandridge	5,663	6,057	6,998	8,598	10,322	4,659	1.6%
Wirraway	4,103	4,527	5,234	7,373	9,856	5,753	2.3%
Total	**29,742**	**31,575**	**35,920**	**42,878**	**53,346**	**23,604**	**1.5%**

Source: SGS Economics and Planning

Note: % represents average annual growth;
        changes in 2011 compared to 2016 Reference Case reflect zone changes.

FIGURE 15   MODERATE INTERVENTION: EMPLOYMENT BY INDUSTRY, 2051 FISHERMANS BEND

Source: SGS Economics and Planning

FIGURE 16

Source: SGS Economics and Planning

5.3 Population and enrolments

Population in this scenario will reach 69,000 in 2051 which is about 10,000 less than the Vision scenario. A modest level of education and enrolment growth is projected in this scenario with enrolments reaching 2,000 students. They will be split between primary, secondary and tertiary students.

As outlined above, residential development is expected to occur in the short-term within precincts located close to the CBD including Montague and Lorimer. With a higher amount of industrial land use in this scenario compared to Vision there is less land available for dwellings and subsequently resident population.
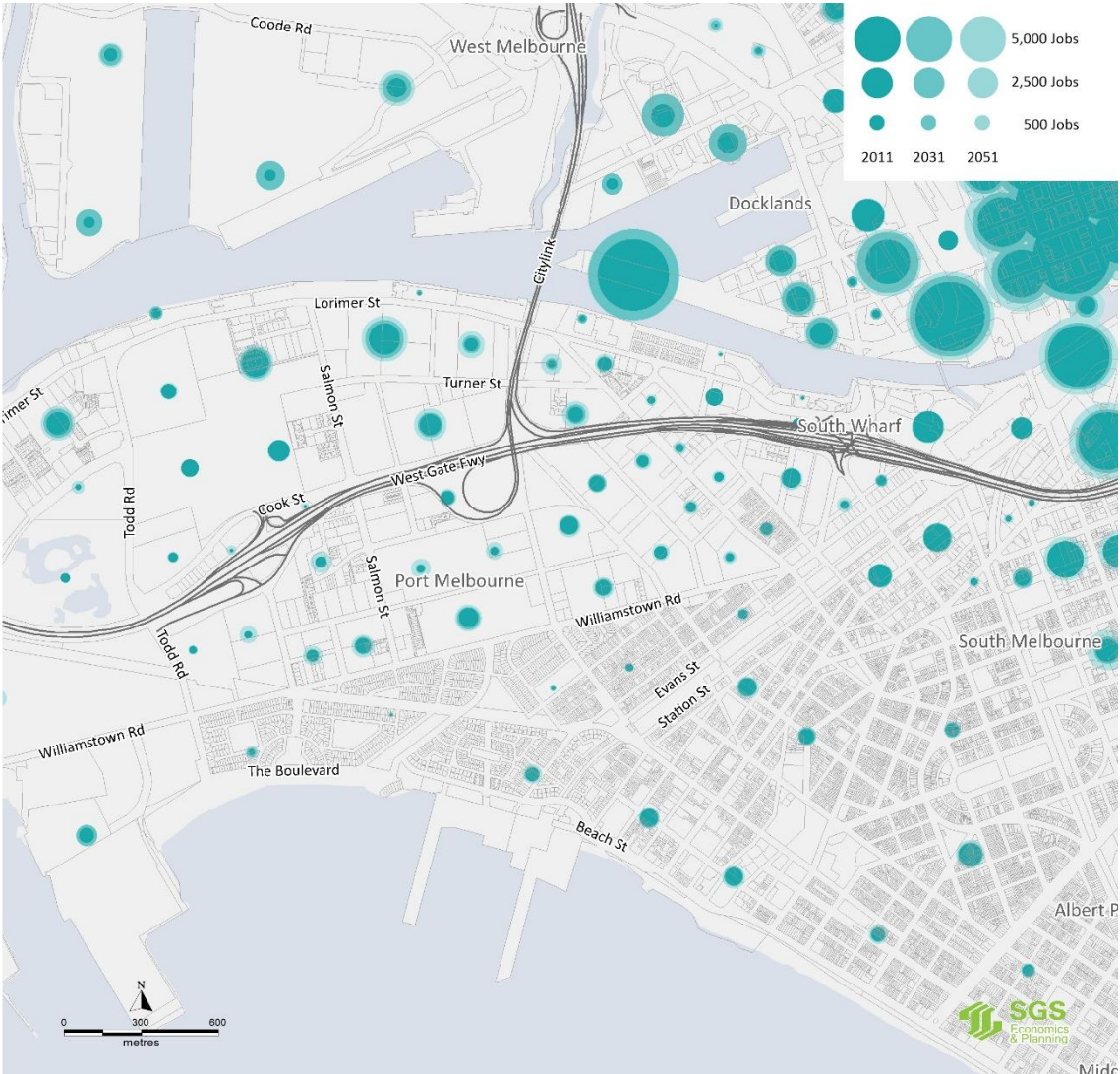
TABLE 5   MODERATE INTERVENTION: POPULATION PROJECTIONS

Precinct	2011	2021	2031	2041	2051	2011-51	
						No.	% p.a.
Lorimer	0	3,343	4,924	7,924	12,468	12,468	-
Employment Precinct	0	0	0	0	0	0	-
Montague	101	7,705	10,887	14,047	15,679	15,578	13.8%
Sandridge	0	4,000	5,461	9,978	23,972	23,972	-
Wirraway	0	248	858	3,147	17,020	17,020	-
Total	**101**	**15,296**	**22,130**	**35,097**	**69,139**	**69,038**	**18.2%**

Source: SGS Economics and Planning

Note: % p.a. represents average annual growth from 2011 to 2051. For precincts with no dwellings in 2011 a growth rate cannot be calculated.

FIGURE 17   MODERATE INTERVENTION: LEVEL OF POPULATION
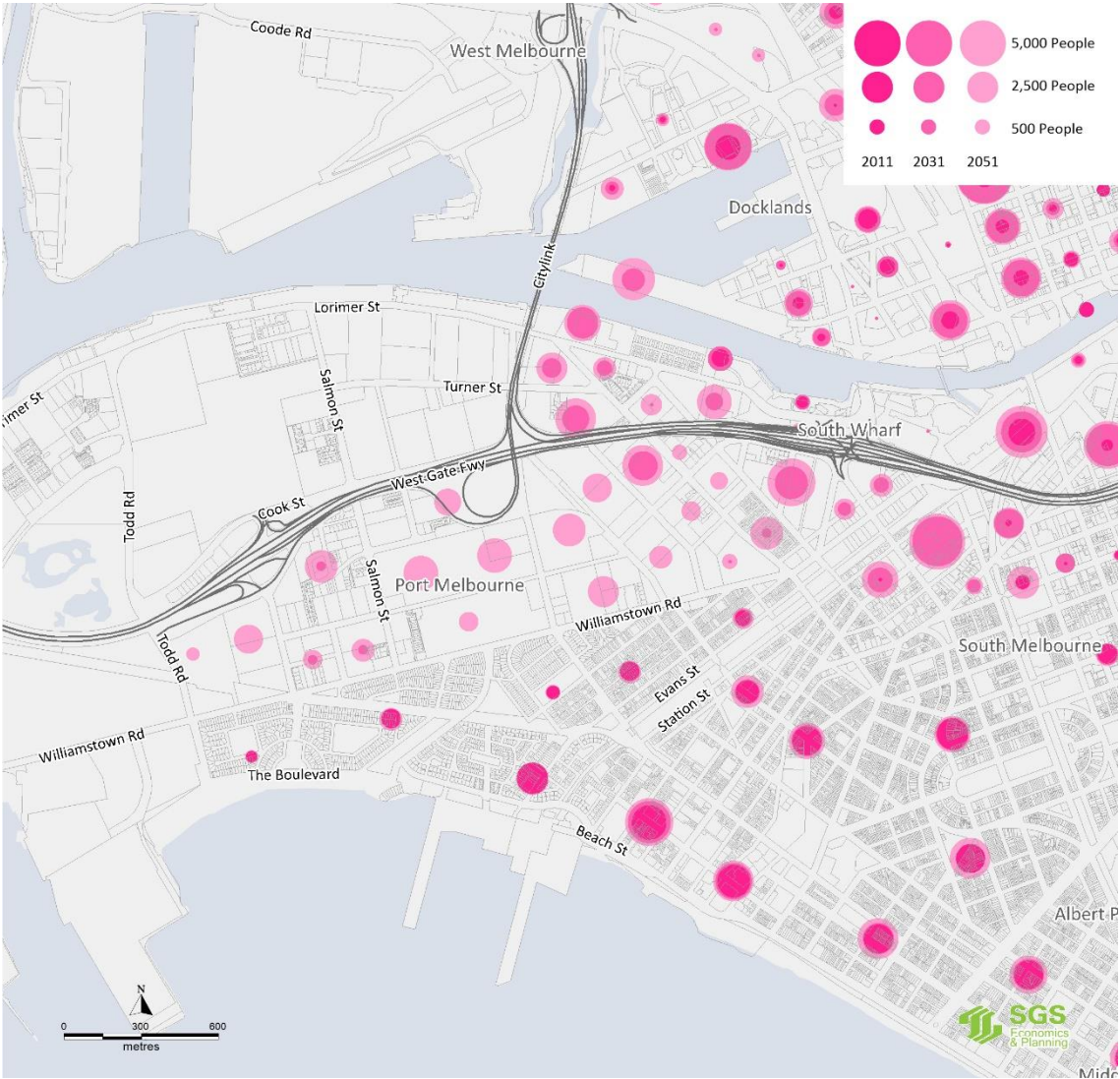
Source: SGS Economics and Planning

6   MARKET LED SCENARIO

6.1   Scenario description

This scenario assumes that government takes a hands off approach and effectively lets 'the market' take the lead in the future development of Fishermans Bend.

The Market Led scenario was conceived as a scenario were the private sector drives development of the study area with all levels of government playing a hands off role with the exception of providing incremental transport improvements over time.

Infrastructure assumptions

‒ Incremental transport improvements such as bus service frequency upgrades, tram service frequency upgrades on routes in the vicinity (109, 96) and also potentially new tram infrastructure (new routes to Fishermans Bend),
‒ Infrastructure would only be provided following development/ demand rather than being used as a catalyst for promoting commercial development,
‒ No heavy rail envisaged by 2046, and
‒ Land ownership structure (i.e. mostly privately owned), zoning, and height controls remain unchanged from current settings.

Policy assumptions

‒ Land ownership, zoning, and height controls remain constant, and
‒ The only land acquisition is assumed for transport infrastructure.

Land use implications

Under a scenario that is assumed to be led by market development, Fishermans Bend is expected to reach an aggregate employment number of around 40 000 at 2051. There are a number of risks that inherently surround these forecasts in both directions:
‒ It is possible that residential development occurs at a rate that means that there are little opportunities for employment growth once transport infrastructure has been supplied. This is seen as a particular risk for Montague and Lorimer, which are both in close proximity to the City.
‒ The projections are conditional on some reactive transport infrastructure provision. Without any infrastructure, or infrastructure that does not serve the needs of the community, the employment projections would be significantly less than those indicated.
‒ On the other hand, capacity estimates may be lower than currently expected, which may mean that there is greater demand for commercial space within the Precinct.

These risks, and the relative low central projection of employment levels within the study area, point to the importance of timely and effective transport infrastructure provision, and the need to clearly assess the policy options available to mitigate the risk of market forces leading to land uses that are inconsistent with the Vision of the precinct.

The following map provides a high level summary of the population, enrolments and blue/white collar employment by precinct. Note the map excludes Westgate park a recent inclusion to the Employment Precinct.

Market Led (2051): Incremental Transport Improvements Scenario

E= Enrolments (POI)
P = Population
B = Blue collar workers
W = White collar workers

E:1903
P:0
W:12383
B:3656

E:0
P:12223
W:3989
B:997

E:0
P:26072
W:6980
B:1745

E:1611
P:20131
W:4382
B:1253

E:1709
P:16573
W:5142
B:1286

Docklands

South Wharf

Port Melbourne

South Melbourne

Lorimer St

Salmon St

Turner St

Citylink

West Gate Fwy

Cook St

Todd Rd

Williamstown Rd

The Boulevard

Beach St

Evans St

Station St

Albert P

N

0   400   800
metres

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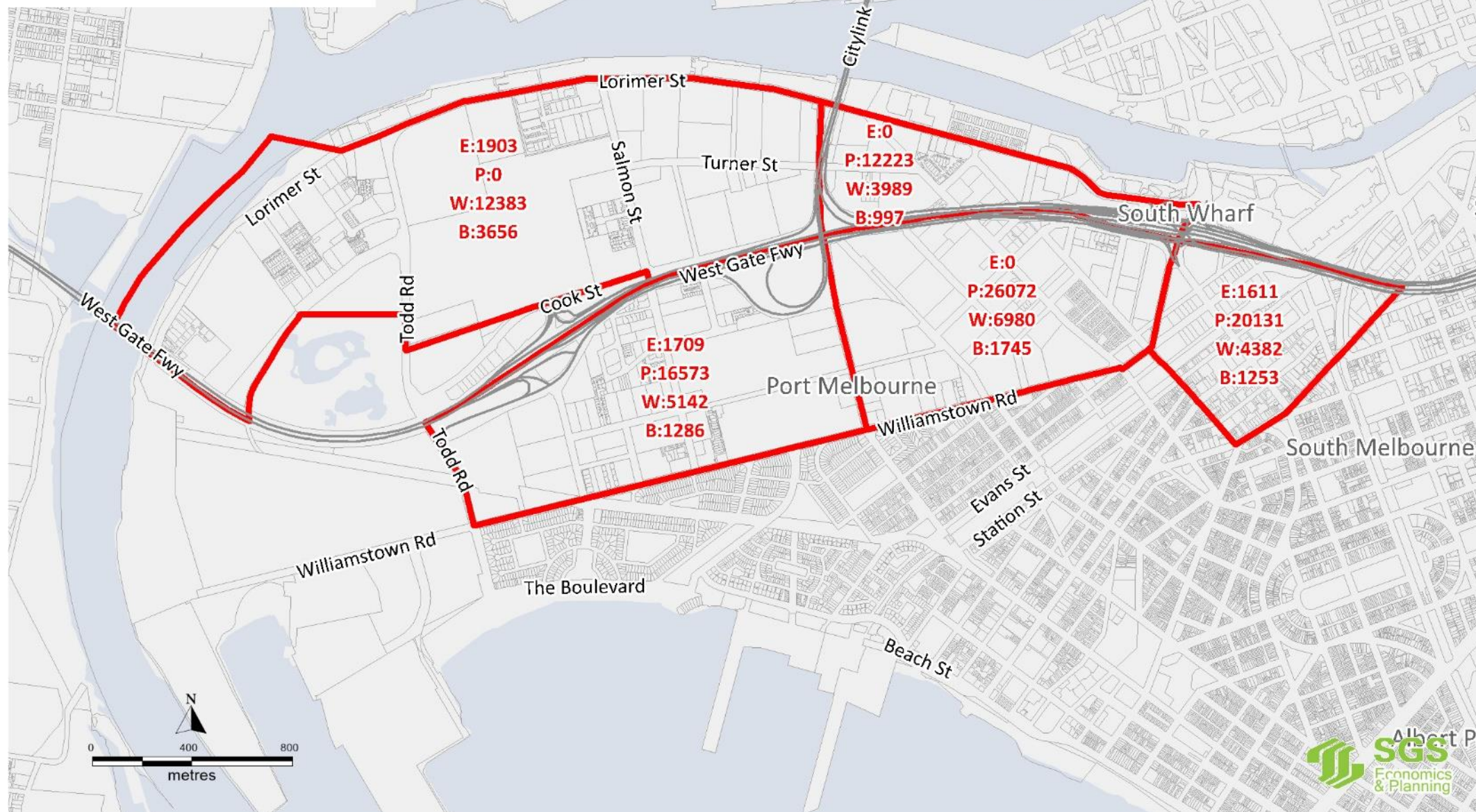
6.2   Employment (place of work)

Under this scenario, employment within Fishermans Bend is expected to increase gradually over the forecast horizon to reach an aggregate employment number of approximately 40 000 at 2051. This is less employment than the Vision scenario.

As outlined above, the highest and best use of vacant land within Fishermans Bend without policy intervention would generally be expected to be for residential development. As a result, employment growth throughout Fishermans Bend is expected to be modest and crowded out by residential development overtime, at least in the short-term. Employment growth may accelerate in future years (i.e. after 2030) as:

- other precincts (e.g. the Hoddle Grid, Arden Macaulay, Docklands and City North) are closer to reaching full build out and/or
- the cumulative impact of transport provisions increases the accessibility or effective job density of the study area.

Employment by precinct

In the Employment Precinct, land use will be largely driven by future trends in the manufacturing and commercial sectors within Melbourne as opposed to any change in land use or infrastructure provision within the rest of Fishermans Bend. This is assumed to lead to a higher share of blue collar industrial jobs relative to the Moderate Intervention.

Similar to the previous scenario, employment growth in Lorimer and Montague was projected to be relatively limited due to the following reasons:

- Following the rezoning of the precinct, a high number of residential building approvals for high rise towers have been recorded in precincts with close proximity to the City,
- Without significant policy intervention, it is not clear that there will be a significant amount of land area available for commercial space after transport infrastructure has been supplied.

As a result, the strongest growth in employment is expected to occur in the precincts to the west of the Precinct, including Wirraway and Sandridge (Table 6).

Employment by industry

Given the high level of residential development expected in the absence of any government intervention, there is expected to be a significant structural change in the industries located in the precinct. In particular, populating service jobs are expected to become more prominent at the expense of traditional blue collar industrial employment as residential development and population levels rise. The new population serving jobs would be expected to be in the industries of retail, professional services, and other health and educational services. Industrial jobs that are crowded-out by residential development are expected to be redistributed across remaining commercial and industrial land within the City of Melbourne (Table 8).

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TABLE 6   MARKET LED: EMPLOYMENT PROJECTIONS

Precinct	2011	2021	2031	2041	2051	2011-51	
						No.	% p.a
Lorimer	3,041	3,236	3,351	3,754	4,986	1,945	1.3%
Employment Precinct	12,503	13,087	14,480	14,454	16,039	3,536	0.6%
Montague	4,432	4,667	4,660	4,916	5,635	1,203	0.6%
Sandridge	5,663	6,057	6,700	7,503	8,725	3,062	1.1%
Wirraway	4,103	4,527	4,720	5,295	6,428	2,325	1.2%
Total	**29,742**	**31,575**	**33,912**	**35,922**	**41,813**	**12,072**	**0.9%**

Source: SGS Economics and Planning

Notes: % represents average annual growth

TABLE 7   MARKET LED: EMPLOYMENT DIFFERENCE TO MODERATE INTERVENTION

Precinct	2011	2031	2051
Lorimer	0	-170	-915
Employment Precinct	0	-999	-5,365
Montague	0	-28	-227
Sandridge	0	-298	-1,597
Wirraway	0	-514	-3,428
Total	**0**	**-2,008**	**-11,532**

Source: SGS Economics and Planning

TABLE 8   MARKET LED: EMPLOYMENT BY INDUSTRY, FISHERMANS BEND
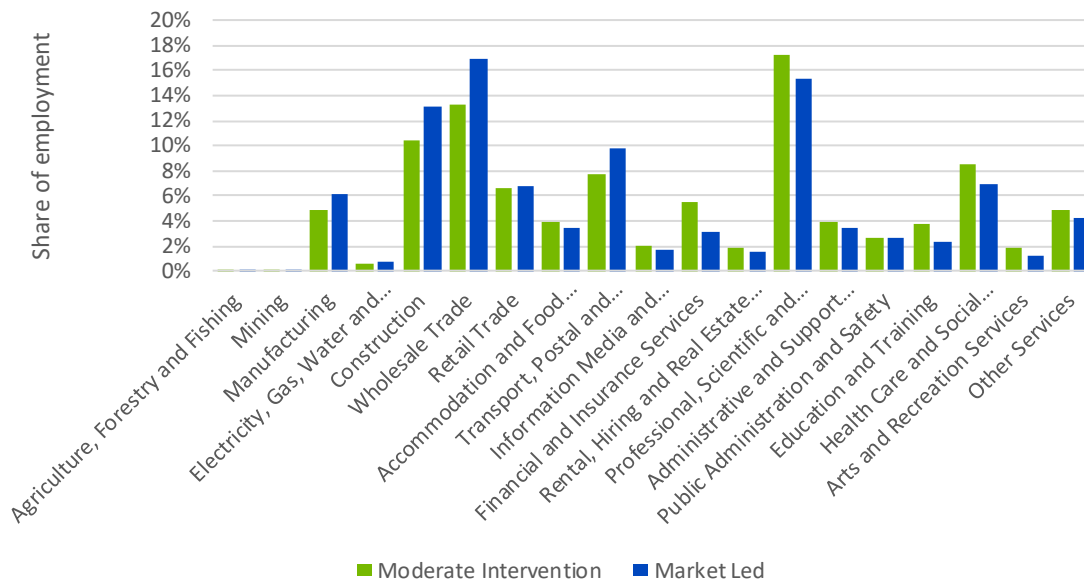
Source: SGS Economics and Planning

FIGURE 18   MARKET LED: LEVEL OF EMPLOYMENT
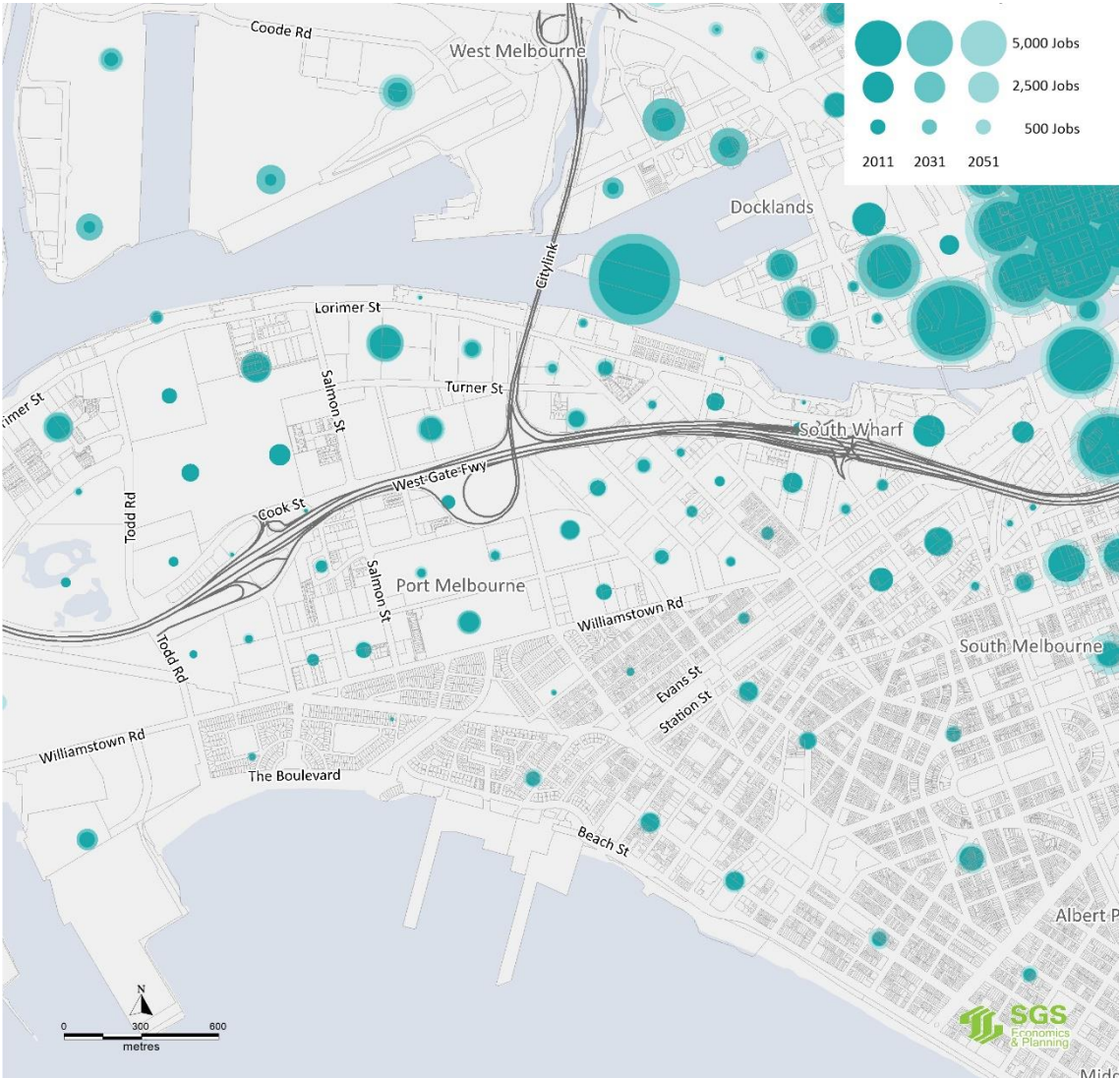
Source: SGS Economics and Planning

6.3 Population and enrolments

Population in this scenario is at around 75,000 in 2051. This is higher than in the reference case but lower than in the Vision and Vision Plus Scenarios.

This is driven by strong market demand for dwellings in city fringe locations in Melbourne. Similar to other scenarios, population is concentrated in the districts closest to the CBD.

TABLE 9   MARKET LED: POPULATION PROJECTIONS

Precinct	2011	2021	2031	2041	2051	2011-51 No.	% p.a
Lorimer	0	1,799	4,842	7,787	12,223	12,223	-
Employment Precinct	0	0	0	0	0	0	-
Montague	107	3,363	11,796	17,636	20,131	20,023	14.4%
Sandridge	0	1,228	5,949	10,913	26,072	26,072	-
Wirraway	0	128	815	3,013	16,573	16,573	-
Total	**107**	**6,519**	**23,403**	**39,349**	**74,998**	**74,891**	**18.3%**

Source: SGS Economics and Planning

Note: % p.a. represents average annual growth from 2011 to 2051. For precincts with no dwellings in 2011 a growth rate cannot be calculated.

TABLE 10   MARKET LED: POPULATION DIFFERENCE TO REFERENCE CASE

Precinct	2011	2031	2051
Lorimer	0	-81	-245
Employment Precinct	0	0	0
Montague	7	909	4,451
Sandridge	0	488	2,100
Wirraway	0	-43	-447
Total	**7**	**1,273**	**5,859**

Source: SGS Economics and Planning

Enrolments in this scenario are consistent with the Reference Case.

7   VISION SCENARIO

7.1   Scenario description

The Vision scenario assumes that the current vision being developed by the Fishermans Bend Taskforce is realised to a large extent. It assumes that there is a Vision, a framework plan and policy interventions intended to realise them. The assumptions defining this scenario are below:

Policy assumptions

Land ownership and zoning remain constant, though other policy controls may be used by the Government to help ensure that a vision of mixed used precinct is realised. This may include:
− Density controls may be amended over time in order for the Vision to be realised, and
− Controls implemented to require minimum proportion of office and commercial use in activity centres around public transport nodes.

While there is broad intention to ensure that the Employment Precinct becomes a collaborative research and advanced manufacturing hub, no policy actions are taken to shape or encourage this development.

Infrastructure assumptions

Transport infrastructure is expected to include:
− Enhanced bus service provision (short term)
− Two high capacity public transport (PT) and active transport (AT) connections to the CBD, fully functional sometime after 2026:
  − CBD – Lorimer, Sandridge, Wirraway (Southern corridor)
  − CBD – Lorimer, Employment Precinct (Northern corridor)
− Heavy rail to Melbourne's West and CBD operational by 2046.

Land use implications

There are a number of risks that inherently surround these forecasts in both directions:
− It is possible that residential development occurs at a rate that means that there are little opportunities for employment growth once transport infrastructure has been supplied. This is seen as a particularly risk for Montague and Lorimer, which are both in close proximity to the City,
− The projections are conditional on timely and effective transport infrastructure provision. Without any infrastructure, or infrastructure that does not serve the needs of the community, the employment projections would be significantly less than those indicated.
− On the other hand, capacity estimates may be lower than currently expected, which may mean that there is greater demand for commercial space within the Precinct.

The development of a clear Vision and Framework Plan are expected to mitigate these risks somewhat, though given the private fragmented land ownership, some further policy measures appear essential. In addition to the increased number of jobs under this scenario, the productivity of the businesses are expected to be higher than the previous scenario given the expected improvement in accessibility levels.

The following map provides a high level summary of the population, enrolments and blue/white collar employment by precinct. Note the map excludes Westgate park a recent inclusion to the Employment Precinct.
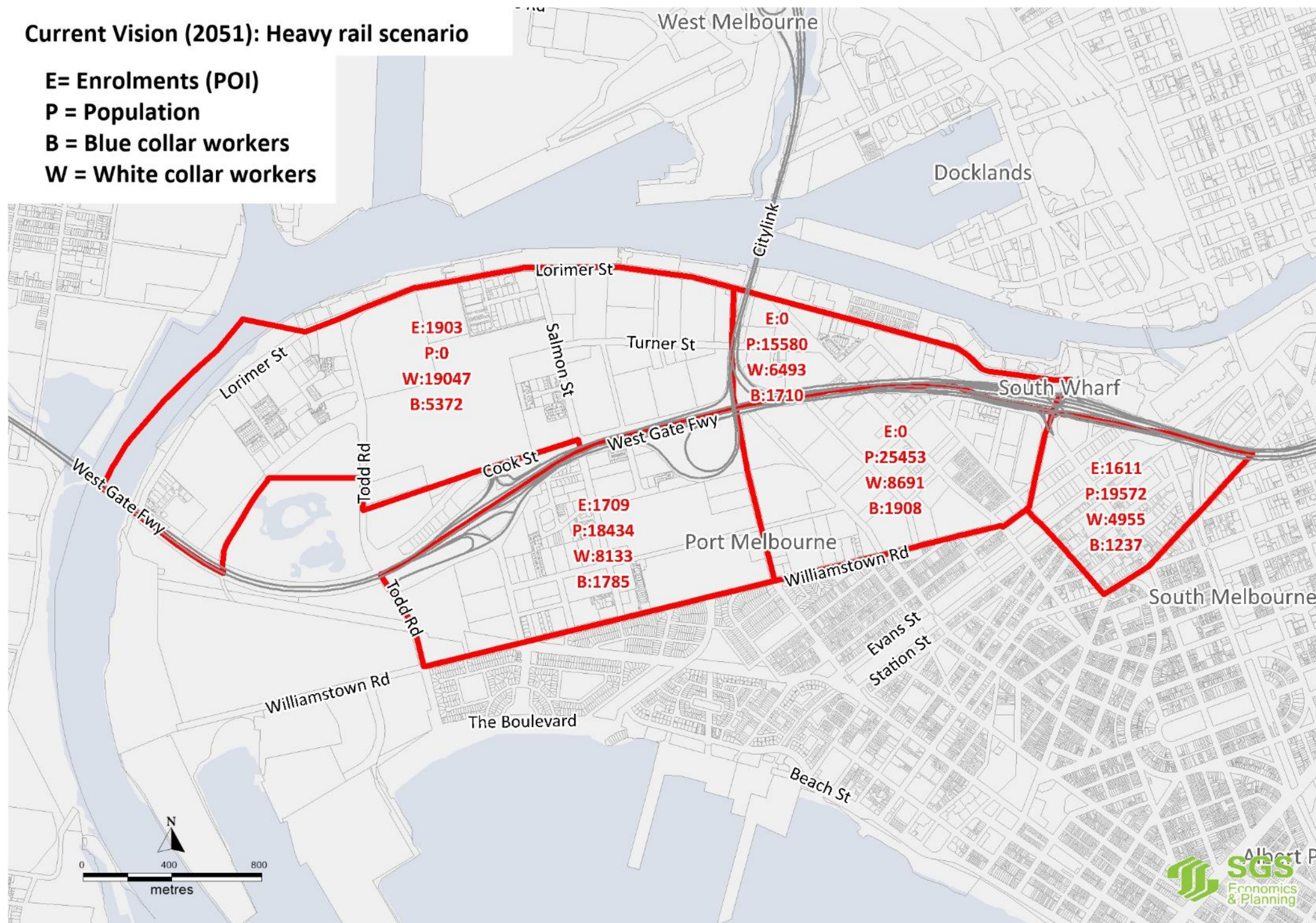
Current Vision (2051): Heavy rail scenario

E= Enrolments (POI)
P = Population
B = Blue collar workers
W = White collar workers

7.2 Employment (place of work)

Under this scenario, Fishermans Bend is expected to reach an aggregate employment number of around 60 000 at 2051. The scenario assumes that the Victorian Government utilises a targeted set of policy tools to support the current Vision. This has been reflected in the projections as a rise in the level of employment throughout the precinct and an acceleration of employment growth. The majority of the additional employment projected relative to the business as usual scenario is made up of white collar professional service jobs. The policy tools also impact the distribution of jobs throughout the precinct, with growth focussed around indicated public transport routes provided by the Fishermans Bend Taskforce. This in particular, resulted in strong growth in employment along Plummer Street.

Employment by precinct

As outlined above, employment growth in Montague was projected to be relatively limited due to the following reasons:

- Following the rezoning of the precinct, a high number of residential building approvals for high rise towers have been recorded in precincts with close proximity to the City,
- Without significant policy intervention, it is not clear that there will be a significant amount of land area available for commercial space after transport infrastructure has been supplied.

On the other hand, while the Lorimer precinct is also located in close proximity, and may therefore be expected to be see greater residential densities in the short-term, policy intervention is assumed to limit this to some extent in order to realise the stated vision for this precinct (Table 11).

As a result, the strongest growth in employment is expected to occur in the precincts to the west of the Precinct, including Wirraway and Sandridge.

Similar to the moderate intervention scenario, within the employment precinct, land use is still expected to be largely driven by future trends in the manufacturing and commercial sectors within Melbourne up until the provision of public transport infrastructure by 2031. After this point, the demand for commercial and industrial land is expected to rise given the increased level of accessibility that is provided by the transport infrastructure. This is expected to result in greater levels of employment density throughout the precinct with a shift towards more commercial white collar professional jobs.

Employment by industry

The proactive provision of high quality public transport infrastructure is expected to help to increase the accessibility of the study area, and Fishermans Bend's ability to compete for future white collar professional service jobs. This, in addition to the land use and height controls implemented, are expected to assist the study area attract a larger number of professional service jobs. This is expected to occur after 2026, when 2 high capacity PT and AT connections to the CBD are fully functional and other inner Melbourne precincts starts to reach full capacity. While the number and industry composition of jobs is expected to shift notably relative to the market led development scenario, the precinct is also implicitly assumed to capture higher productive jobs particularly in the professional and financial services sector, given the enhanced levels of accessibility. This is expected to result in the value of output from within the precinct and in turn the scale of tax collection increase solidly from the market led development scenario above (Table 13).

TABLE 11   VISION: EMPLOYMENT PROJECTIONS

| Precinct | 2011 | 2021 | 2031 | 2041 | 2051 | 2011-51 | |
						No.	% p.a
Lorimer	3,041	3,236	3,890	5,637	8,203	5,162	2.6%
Employment Precinct	12,503	13,087	16,037	19,520	24,419	11,916	1.7%
Montague	4,432	4,667	4,739	5,257	6,193	1,761	0.9%
Sandridge	5,663	6,057	7,046	8,777	10,599	4,937	1.6%
Wirraway	4,103	4,527	5,243	7,409	9,918	5,815	2.3%
Total	**29,742**	**31,575**	**36,955**	**46,599**	**59,332**	**29,590**	**1.8%**

Source: SGS Economics and Planning

Note: % p.a. represents average annual growth from 2011 to 2051. For precincts with no dwellings in 2011 a growth rate cannot be calculated.

TABLE 12   VISION: EMPLOYMENT DIFFERENCE TO REFERENCE CASE

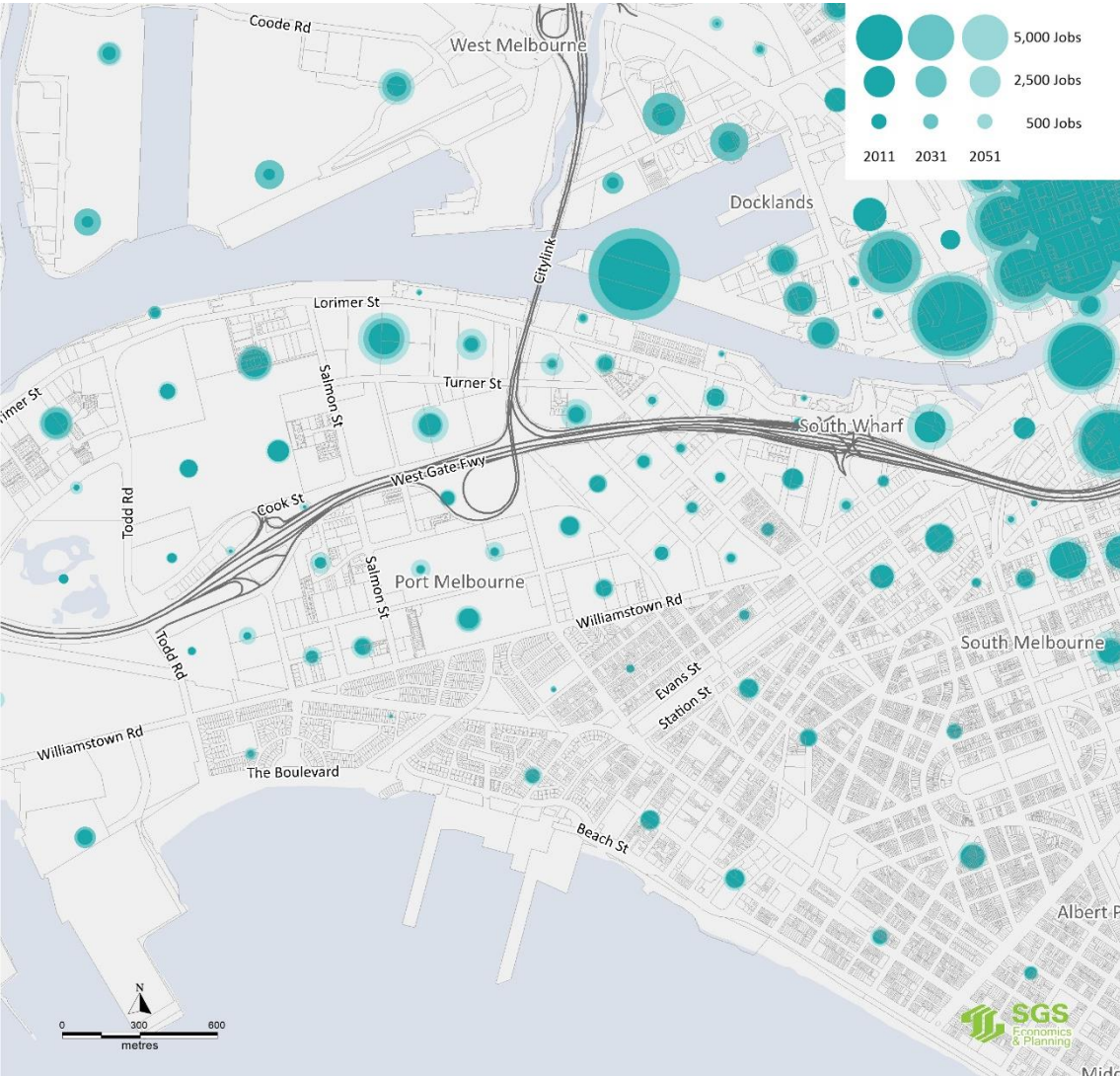| Precinct	2011	2031	2051
Lorimer	0	369	2,301
Employment Precinct	0	557	3,015
Montague	0	51	331
Sandridge	0	47	277
Wirraway	0	9	62
Total	**0**	**1,034**	**5,986**

Source: SGS Economics and Planning

TABLE 13   VISION: EMPLOYMENT LEVELS BY INDUSTRY, FISHERMANS BEND
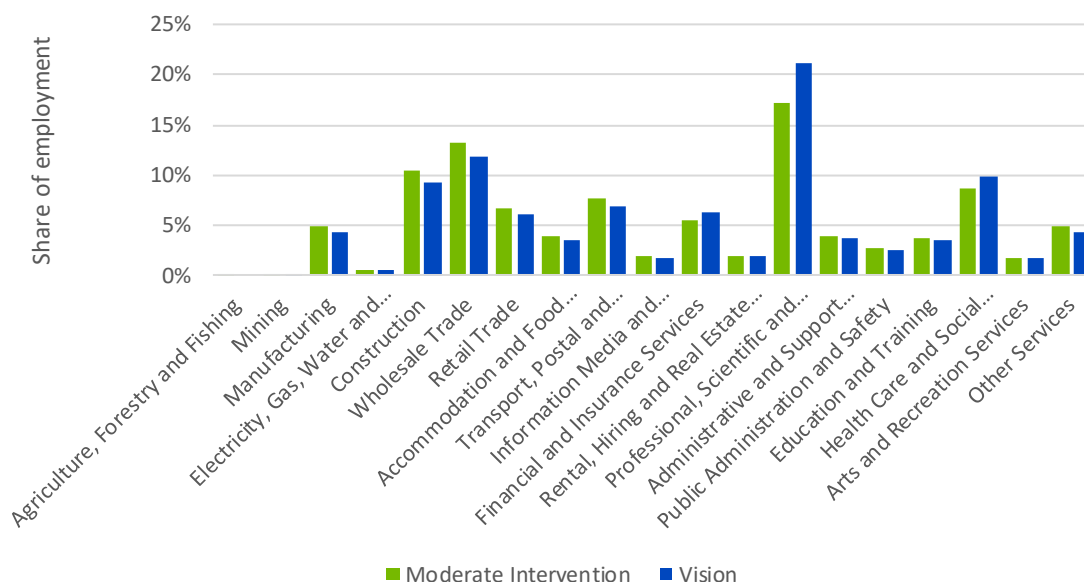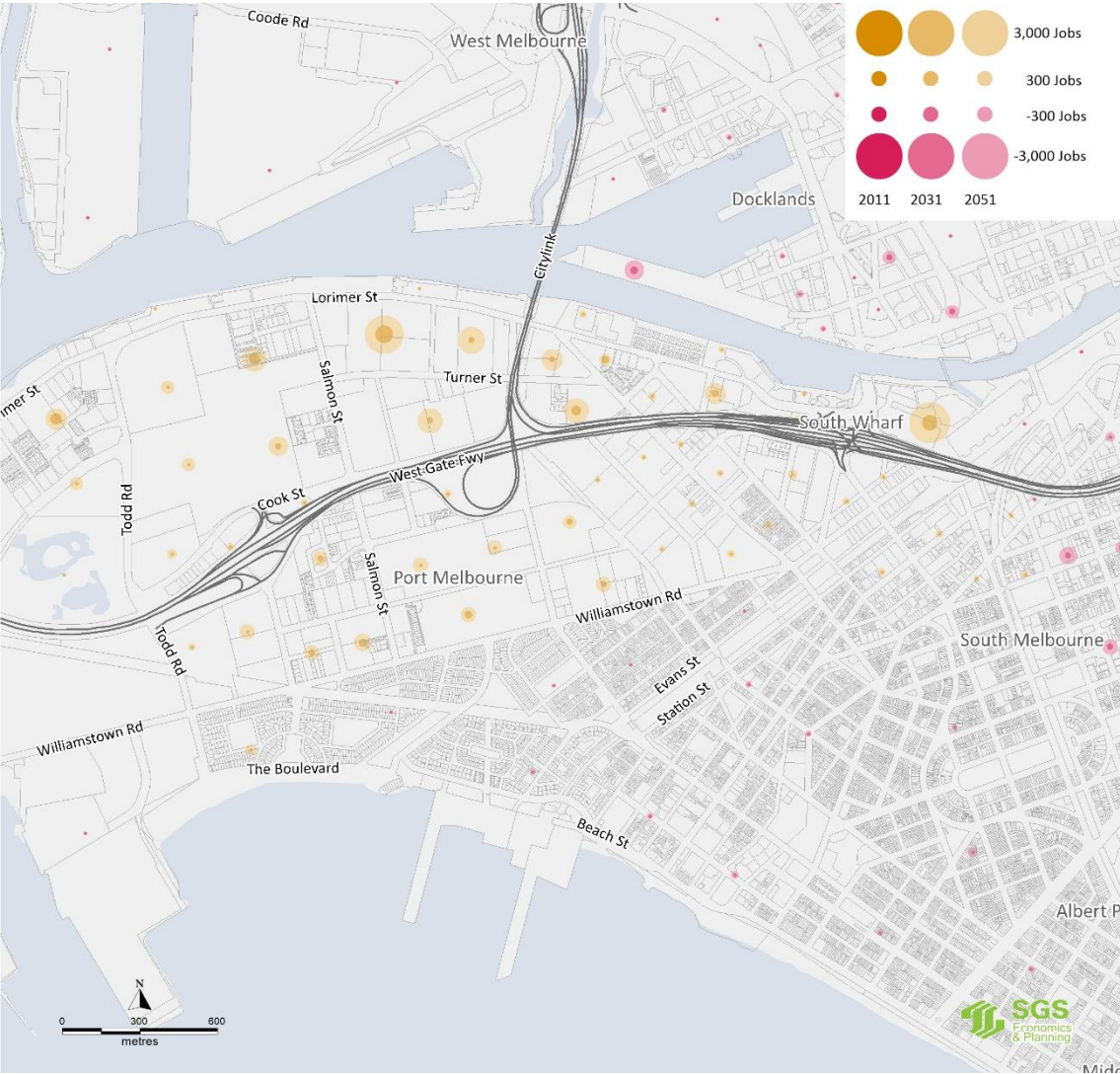

Source: SGS Economics and Planning

FIGURE 19   VISION: LEVEL OF EMPLOYMENT

Source: SGS Economics and Planning

FIGURE 20   VISION: DIFFERENCE IN EMPLOYMENT FROM REFERENCE CASE

Source: SGS Economics and Planning

7.3 Population and enrolments

Population in this scenario is at around 79,000 in 2051. This higher than in Reference Case and Market Led scenarios but the same as Vision Plus Scenario. This higher amount of population is driven by government policy which permits higher density commercial and residential developments over time. At 2051 population in all precincts (besides the Employment Precinct) is higher than that of the Reference Case.

TABLE 14   VISION: POPULATION PROJECTIONS

Precinct	2011	2021	2031	2041	2051	2011-51 No.	% p.a
Lorimer	0	1,910	5,463	13,140	15,580	15,580	-
Employment Precinct	0	0	0	0	0	0	-
Montague	107	3,291	11,573	17,217	19,572	19,465	14.3%
Sandridge	0	1,163	5,799	10,595	25,453	25,453	-
Wirraway	0	136	2,161	9,396	18,434	18,434	-
Total	**107**	**6,500**	**24,996**	**50,348**	**79,039**	**78,932**	**18.5%**

Source: SGS Economics and Planning

Note: % p.a. represents average annual growth from 2011 to 2051. For precincts with no dwellings in 2011 a growth rate cannot be calculated.

TABLE 15 VISION: POPULATION DIFFERENCE TO REFERENCE CASE

Precinct	2011	2031	2051
Lorimer	0	540	3,112
Employment Precinct	0	0	0
Montague	6	686	3,893
Sandridge	0	337	1,481
Wirraway	0	1,302	1,414
Total	**6**	**2,866**	**9,900**

Source: SGS Economics and Planning

Enrolments in this scenario are consistent with the Reference Case.

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8 VISION PLUS UNIVERSITY SCENARIO

8.1 Scenario description

The Vision Plus University scenario (also referred to as just Vision Plus) has the same policy assumptions as the Vision scenario with the addition of a major university being established in Fishermans Bend Employment Precinct.

Policy assumptions

The Vision Plus University scenario (also referred to as just Vision Plus) has the same policy assumptions as the Vision scenario with the addition of:
- The Government acquires land for an advanced manufacturing precinct,
- The Government facilitates / ensures a University anchor tenant, and
- The Government actively manages the tenants of the precinct.

In the Vision scenario, it is assumed that the Government has a broad intention of creating an advanced manufacturing precinct, but doesn't acquire land, facilitate an institutional tenant, or actively manage the composition of tenants.

Information obtained from the Fishermans Bend Taskforce indicated that the university is expected to have the growth profile outlined in below.

TABLE 16   GROWTH PROFILE OF UNIVERSITY FOR EMPLOYMENT PRECINCT

	2021	2031	2051
Students	800	1600	11,000
Staff (white collar)	200	400	800

Source: Fishermans Bend Taskforce

Infrastructure assumptions

The Vision Plus University scenario assumes the same transport infrastructure as the Vision scenario.

Land use implications

Intuitively, the presence of a university may be expected to change land use patterns around the site, including the development of knowledge intensive clusters and promoting commercial development. The academic literature does not however present sufficient evidence for SGS to conclude that this would have a significant impact on land use outcomes and collaboration within the study area without significant government intervention. Recent innovation precincts such as Tonsely in Adelaide, South Australia, should be considered important case studies as it demonstrates how to successfully transition from a traditional manufacturing precinct to an innovation and collaboration precinct, bringing together business, education and government sectors.

Note the map excludes Westgate park a recent inclusion to the Employment Precinct.

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Current Vision plus University (2051): Heavy rail plus University Scenario

E= Enrolments (POI)
P = Population
B = Blue collar workers
W = White collar workers

Docklands

Lorimer St

E:11644
P:0
W:19574
B:4894

Citylink

E:0
P:15580
W:6838
B:1562

Turner St

Salmon St

Lorimer St

South Wharf

West Gate Fwy

Todd Rd

Cook St

West Gate Fwy

E:0
P:25453
W:9009
B:1590

E:1611
P:19572
W:5135
B:1058

West Gate Fwy

E:1709
P:18434
W:8431
B:1488

Port Melbourne

Williamstown Rd

South Melbourne

Todd Rd

Williamstown Rd

Evans St
Station St

The Boulevard

Beach St

N

Albert P

0   400   800
metres

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8.2 Employment profile of the study area

When considering the Vision Plus University scenario, three key questions were considered:
– To what extent can the Government secure tenants in line with the objectives of the precinct?
– To what extent will the establishment of the precinct lead to collaboration and other agglomeration economies that help to boost productivity and output levels?
– will land use in the remaining study area be altered by the employment precinct?
– how will the university and surrounding precinct alter employment densities and the aggregate level of employment within the Employment Precinct?

Previous research conducted by SGS (2013), when developing initial plans for the Tonsley's redevelopment, suggests that:
– innovation precincts can shape the industry and tenant composition, though this requires significant government intervention, and
– collaboration can occur, though needs to be actively facilitated and encouraged. Without this, the agglomeration benefits from within the precinct are expected to be modest.

Based on the assumptions outlined in the previous section, SGS has assumed that the government is able to acquire the industry and tenant mix desired and actively manage the precinct to encourage collaboration of business within the precinct. It is also assumed that this intervention will lead to the Employment Precinct becomes a hybrid between education and industries (research & development activities from design and technology sector). This will require significant investment by the State Government.

In relation to employment densities, the presence of the university and the wider innovation precinct is assumed to have a similar employment density to what would have occurred without this policy intervention. Importantly, however, the nature and productivity of the jobs located in the precinct are expected to increase somewhat, reflecting the agglomeration and productivity benefits of the precinct and the nature of the businesses that are likely to be attracted to the precinct with the presence of a university.

TABLE 17 VISION PLUS: EMPLOYMENT PROJECTIONS

| Precinct	2011	2021	2031	2041	2051	2011-51 No.	% p.a
Lorimer	3,041	3,236	3,971	5,836	8,400	5,359	2.6%
Employment Precinct	12,503	13,087	16,003	19,525	24,468	11,965	1.7%
Montague	4,432	4,634	4,739	5,257	6,193	1,761	0.9%
Sandridge	5,663	6,057	7,046	8,777	10,599	4,937	1.6%
Wirraway	4,103	4,527	5,243	7,409	9,918	5,815	2.3%
Total	**29,742**	**31,542**	**37,001**	**46,804**	**59,578**	**29,836**	**1.8%**

Source: SGS Economics and Planning
Note: % represents average annual growth

TABLE 18   VISION PLUS: EMPLOYMENT DIFFERENCE TO REFERENCE CASE

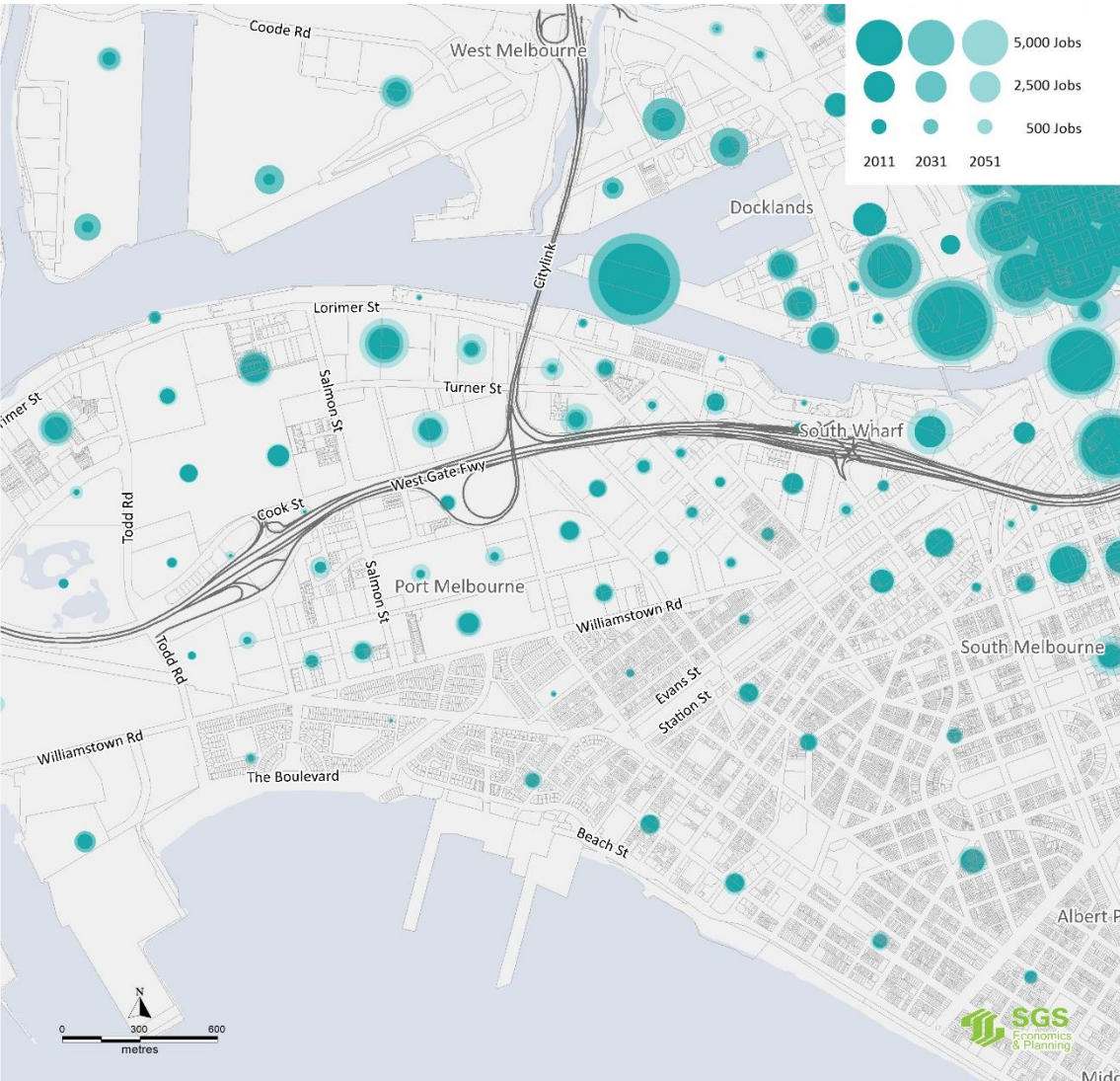| Precinct	2011	2031	2051
Lorimer	0	450	2,498
Employment Precinct	0	523	3,063
Montague	0	51	331
Sandridge	0	47	277
Wirraway	0	9	62
Total	**0**	**1,080**	**6,232**

Source: SGS Economics and Planning

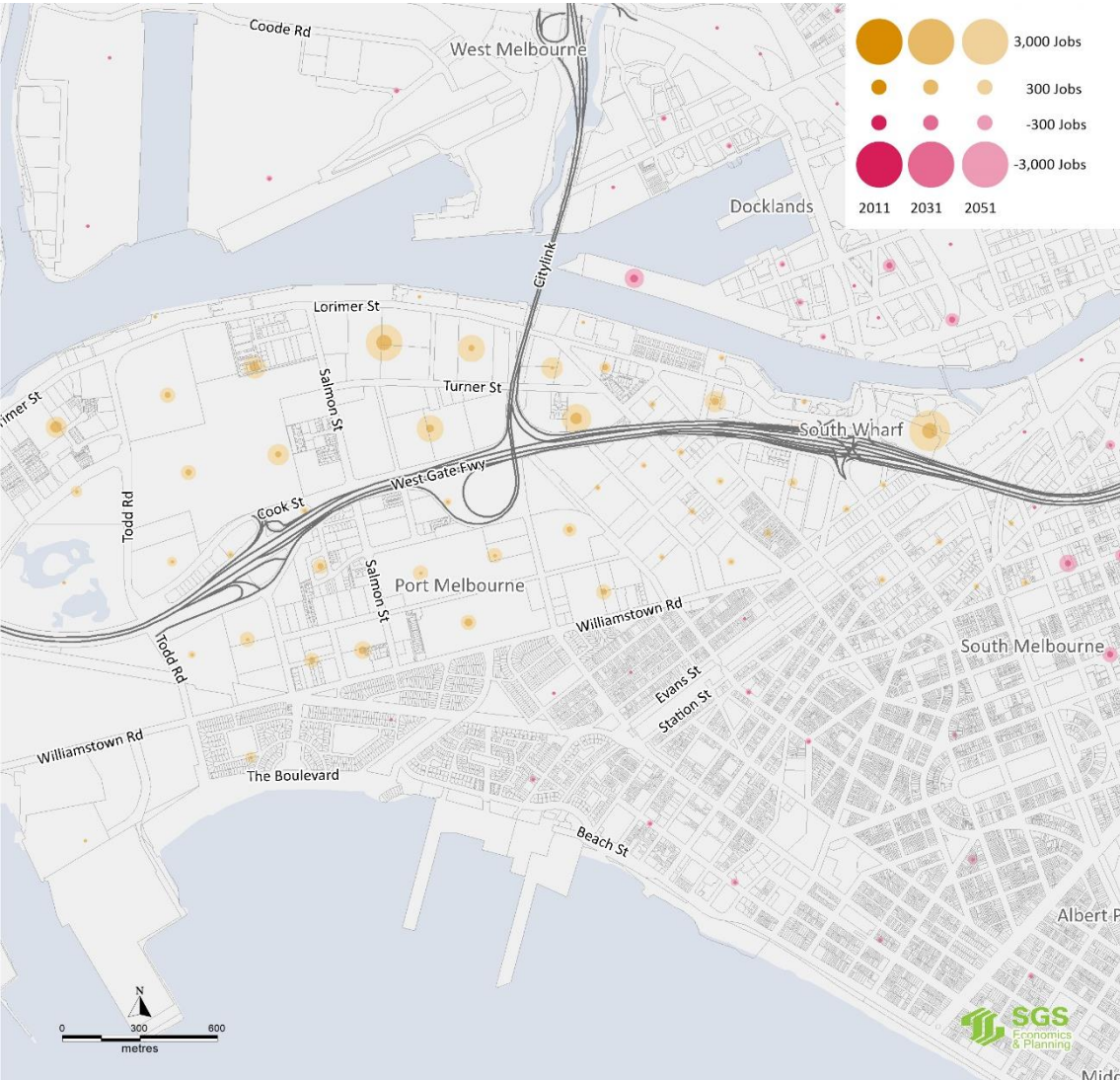FIGURE 21   VISION PLUS: EMPLOYMENT LEVELS, FISHERMANS BEND
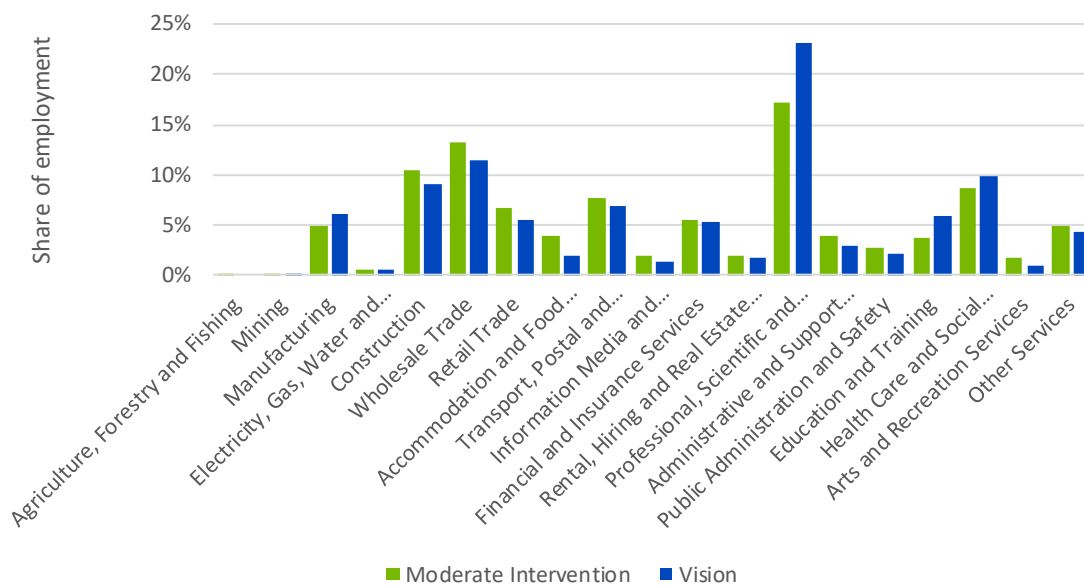
Source: SGS Economics and Planning

FIGURE 22   VISION PLUS: LEVEL OF EMPLOYMENT

Source: SGS Economics and Planning

FIGURE 23 VISION PLUS: EMPLOYMENT CHANGE FROM REFERENCE CASE

Source: SGS Economics and Planning

8.3   Population and enrolments

Population in this scenario is at around 79,000 in 2051. This higher than in Reference Case and Market Led scenarios but the same as Vision Plus Scenario. As with the Vision scenario, this higher amount of population is driven by government policy which permits higher density commercial and residential developments over time.

Consistent with the policy assumptions in this scenario, higher education enrolments in Vision Plus are higher than all other scenarios. Vision Plus sees 11,600 higher education enrolments compared to 1,903 in the other scenarios. This increase in higher education enrolments within Fishermans Bend comes from lower higher education enrolments in other areas of Melbourne. In practice this would likely be a relocation of a university faculty from another campus in Melbourne to Fishermans Bend, rather than the establishment of a new university.

TABLE 19   VISION PLUS: POPULATION PROJECTIONS

Precinct	2011	2021	2031	2041	2051	2011-51 No.	% p.a
Lorimer	0	1,910	5,463	13,140	15,580	15,580	-
Employment Precinct	0	0	0	0	0	0	-
Montague	107	3,291	11,573	17,217	19,572	19,465	14.3%
Sandridge	0	1,163	5,799	10,595	25,453	25,453	-
Wirraway	0	136	2,161	9,396	18,434	18,434	-
Total	**107**	**6,500**	**24,996**	**50,348**	**79,039**	**78,932**	**18.5%**

Source: SGS Economics and Planning

Note: % p.a. represents average annual growth from 2011 to 2051. For precincts with no dwellings in 2011 a growth rate cannot be calculated.

TABLE 20   VISION PLUS: POPULATION DIFFERENCE TO REFERENCE CASE

| Precinct	2011	2031	2051
Lorimer	0	540	3,112
Employment Precinct	0	0	0
Montague	6	686	3,893
Sandridge	0	337	1,481
Wirraway	0	1,302	1,414
Total	**6**	**2,866**	**9,900**

Source: SGS Economics and Planning

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9 APPENDIX – SGS APPROACH SALUP

9.1 Approach Overview

The following figure provides an overview of the four broad areas of the small area land use projections approach developed by SGS. These areas are split by broad themes (or attribute types) and count location (i.e. usual residents, work or institution). There are connections between each broad area to ensure analysis trends from one aspect of the modelling feeds into another. For example, population and the size of the resident labour force will impact on the total number of jobs in Melbourne.

FIGURE 24 SGS SMALL AREA LAND USE PROJECTIONS APPROACH OVERVIEW
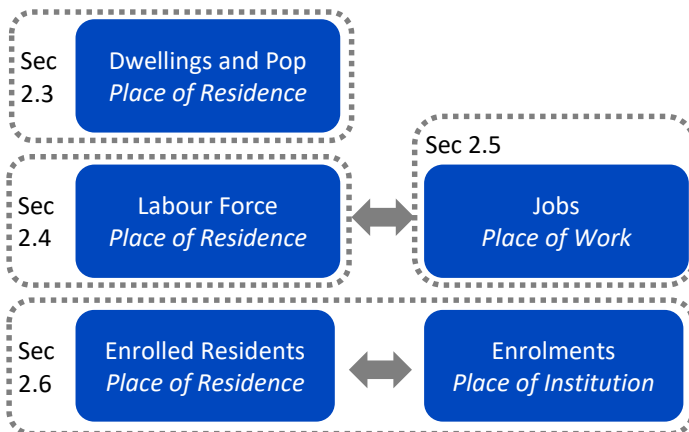
The data output specifications along with the additional details regarding the approach, data inputs and assumptions are outlined in the follow sections. Given the complexity and volume of data produced, each *model area* is broken into a number of *modules* which systematically further disaggregate data from previous modules, drawing in additional data inputs as required.

9.2 Data output specification

The following provides a summary of the extent of data outputs that have be generated. They cover three dimensions: spatial geographies, time periods and data variables (i.e. resident, work and enrolment breakdowns).

Spatial geographies

Results have been generated by the VITM Travel Zones (Version D). There are a total of 6092 zones across Victoria, with 3305 zones across Metropolitan Melbourne and 2787 zones across regional Victoria (See Figure 25 below.). Version D Travel Zones (TZ) are based off the 2010 VITM TZ (2893 zones within Melbourne) and include a number of splits across Metropolitan Melbourne, Geelong/Surf Coast and Moorabool. These zone splits are discussed in detail in Chapter 3.
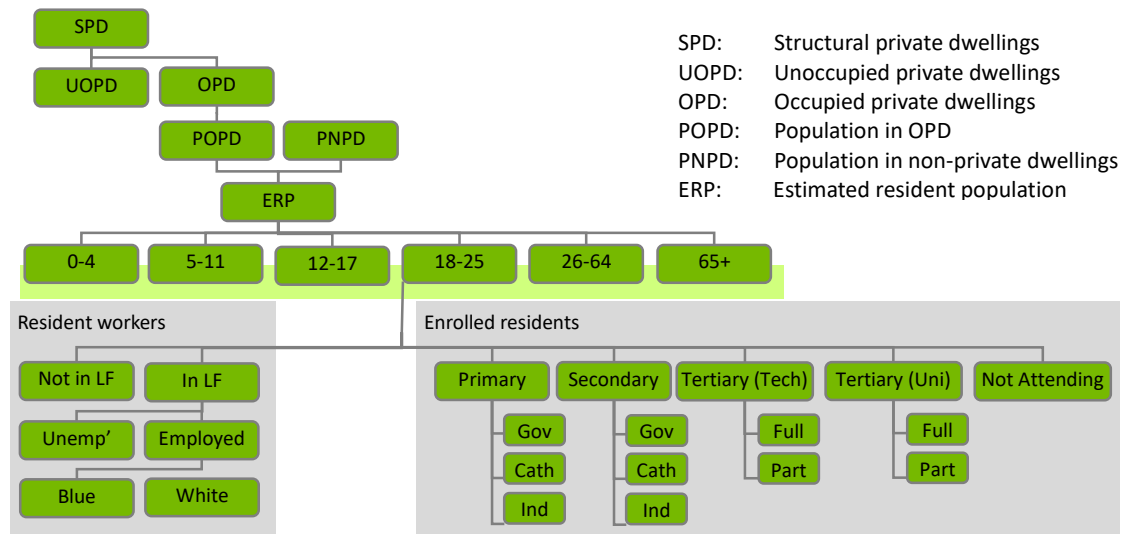
FIGURE 25 VITM VERSION D TRANSPORT ZONES, VICTORIA
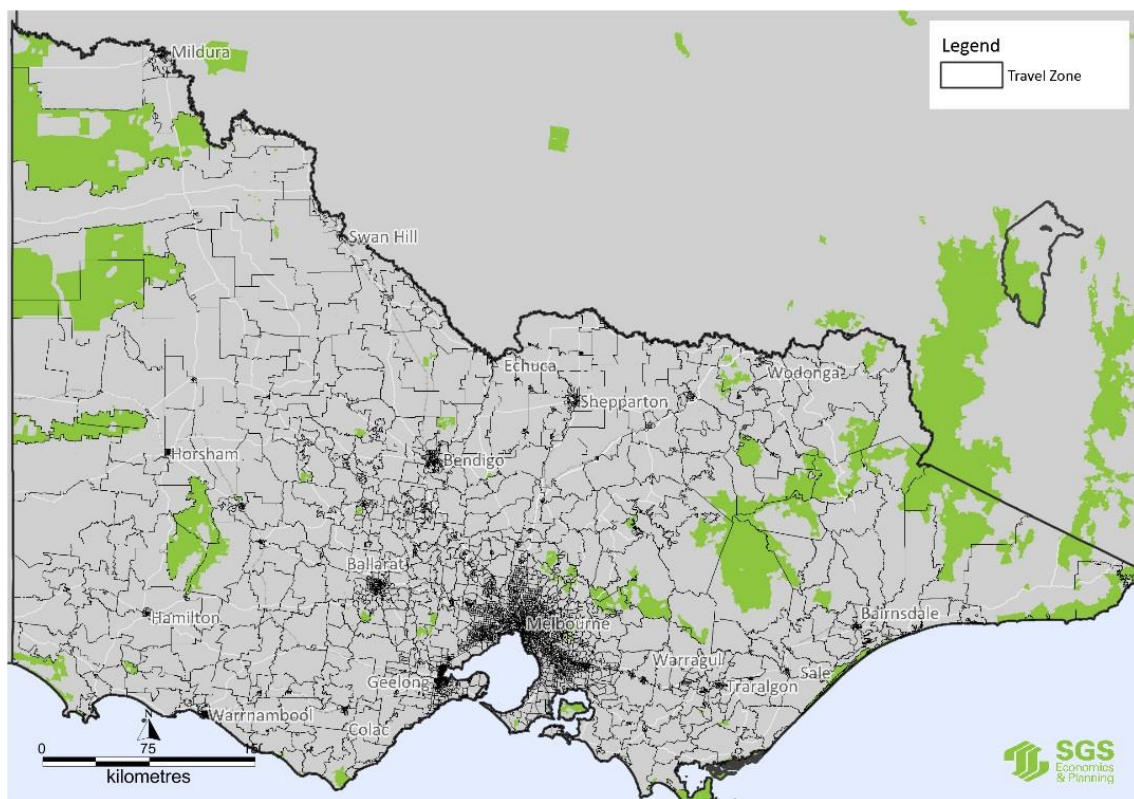
Time periods:

Results have been generated for the following time periods:
2011, 2014, 2016, 2021, 2026, 2031, 2036, 2041, 2046 and 2051

Variable breakdowns

The following population breakdowns have been developed for the usual resident population.

FIGURE 26 OUTPUTS BY PLACE OF RESIDENTS

SPD: Structural private dwellings
UOPD: Unoccupied private dwellings
OPD: Occupied private dwellings
POPD: Population in OPD
PNPD: Population in non-private dwellings
ERP: Estimated resident population

The following employment data by place of work and enrolments data by place of institution has also been developed. It should be noted that:

- **Employed residents does not equal Jobs** - resulting from when people who live outside of Victoria work in Victoria or visa-versa. The net flow is relatively minor overall but may be significant for border towns.
- **Enrolled residents does not equal enrolments** – resulting from people being enrolled in multiple courses.

FIGURE 27 OUTPUTS BY PLACE OF WORK

FIGURE 28 OUTPUTS BY PLACE OF INSTITUTION
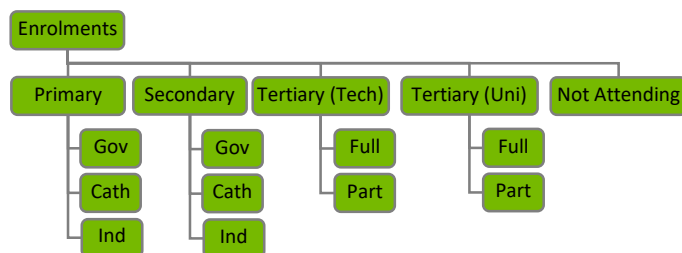
9.3　Dwellings and Population Demographics (by PUR)

The following section details the approach, data inputs and assumptions used to create the small area dwelling and population projections by Place of Usual Residents. Figure 29 presents an overview of the key data inputs and analysis modules.

FIGURE 29　　SGS DWELLING AND POPULATION APPROACH OVERVIEW
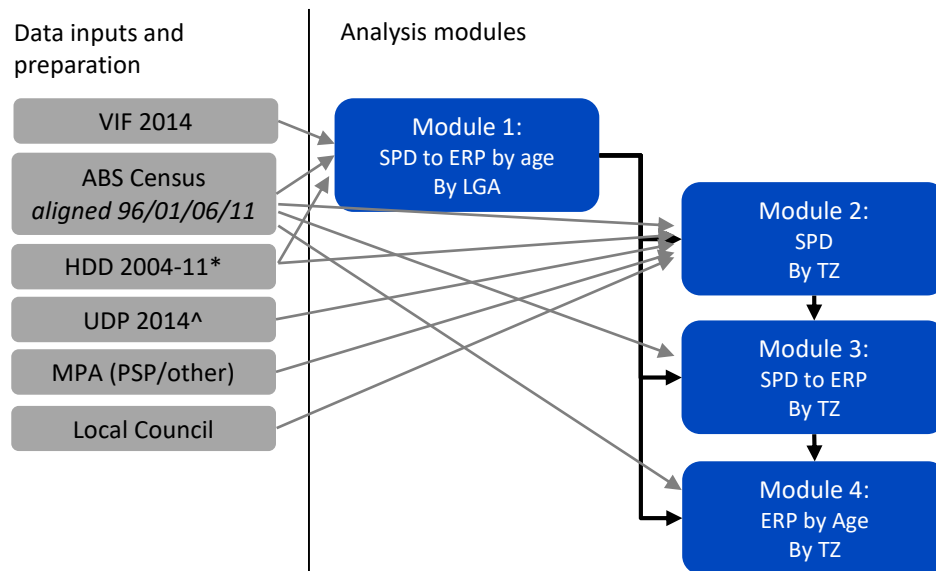
* HDD data is available for Metropolitan Melbourne only.
^ Urban Development Program 2014 data is available for Metropolitan Melbourne only. 2012 data is used for the rest of Victoria.

Module 1: Structural Private Dwellings to Estimated Resident Population by Age by Local Government Area

Victoria in Future 2014 (VIF14) projected Structural Private Dwellings[7] (SPD) for each LGA is used as the starting point. These were combined with historical data from the Housing Development Data[8] (HDD) and ABS Census data to generate a time series from 1996 out to 2051. Adjustments were made to align the different datasets.

As per Figure 26, 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 VIF14 for projection years, ABS ERP and ABS Census data is then aligned to VIF14 and SPD to create a historical dataset.

Finally ERP is broken down to six VITM age groups. Data is sourced directly from VIF14 for this.

Module 2: Structural Private Dwellings by Travel Zone

LGA level projections are then apportioned to the TZ level over the entire state. 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 the figure below.

---

[7] 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.

[8] Available for metropolitan Melbourne only

FIGURE 30   INTEGRATED CAPACITY DATABASE
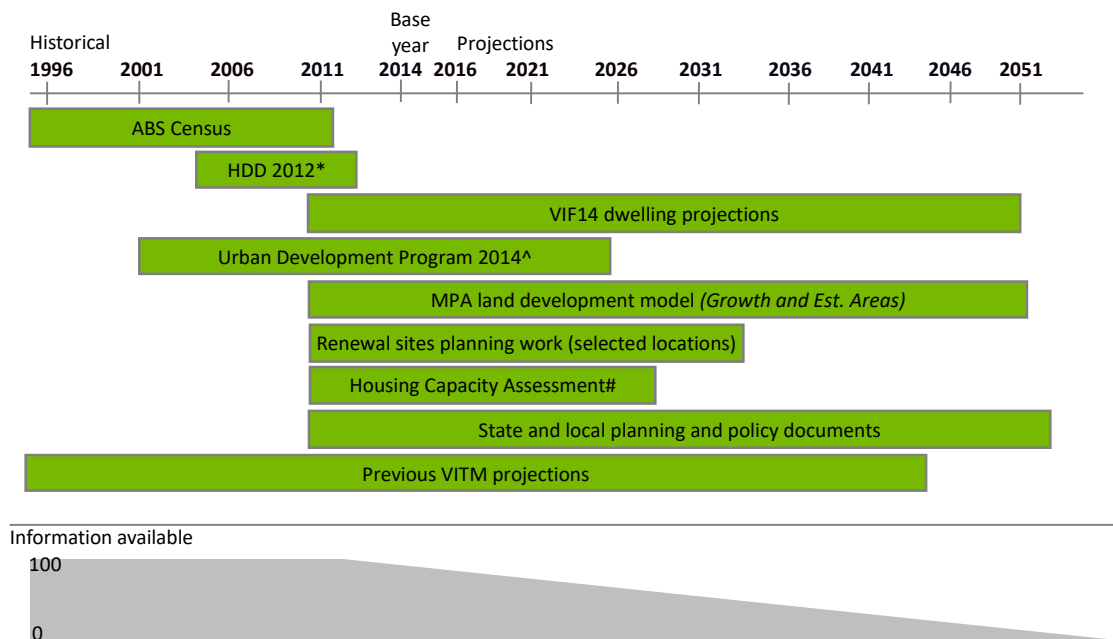
* HDD data is available for Metropolitan Melbourne only.
^ Urban Development Program 2014 data is available for Metropolitan Melbourne only. 2012 data is used for the rest of Victoria.
# Available for established Melbourne only.

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 LGA projected 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 VIF14 LGA 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 LGA occupancy rates sourced from VIF14. 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 form 1996, 2001, 2006 and 2011 Census data. This is trended forward based on LGA household size rates sourced from VIF14. Trend rates for individual TZs within an LGA 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 VIF14 control totals and individual TZ trends are reviewed to ensure realistic results (i.e. if there is population there must be dwellings).

Module 4: Estimated Resident Population by Age Breakdown by Travel Zone

The Residual Allocation System (RAS) (also referred to as iterative proportional fitting) was then used to map total population by TZ into population by age groups that are consistent with VIF14 projected population by age groups by LGAs. This involves aligning the previous period's age structure with the future total population by TZ (From module 3) and the population by age LGA control totals (from module 1). For the first year the distribution is based on ABS Census data aligned to TZs. Adjustments were made to the distribution table to account for new development areas (i.e. locations which currently don't have population but will in the future).

The RAS approach is illustrated below. The approach essentially involves a number of iterations (100s) where the distribution is aligned to row control total and then column control totals.

The result is a detailed breakdown of population by age by TZ which equals the LGA control totals and reflects the historical distribution of the area as much as possible.

9.4 Population Labour Force (by PUR)

The following section details the approach, data inputs and assumptions used to further segment population by age to labour force status and employment by occupation collar by Place of Usual Residents. Figure 31 presents an overview of the key data inputs and analysis modules.

FIGURE 31   SGS POPULATION LABOUR FORCE APPROACH OVERVIEW
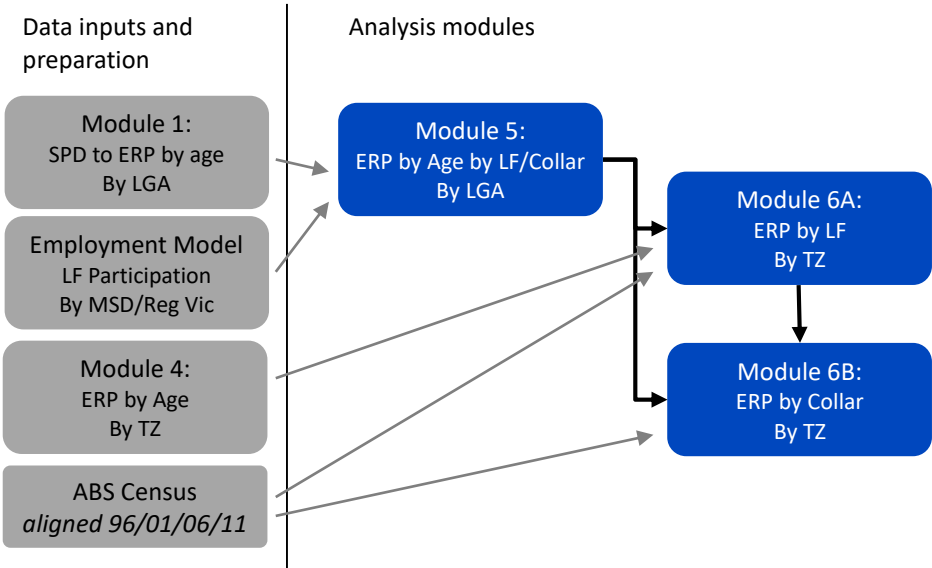
Module 5: Estimated Resident Population by Age by Labour Force Status and Employment Collar by Local Government Area

Historical trends for labour force participation, unemployment and employment collar (blue/white) were derived for each LGA using the 1996, 2001, 2006 and 2011 ABS Census along with the ABS Labour Force Survey. SGS then examined historical labour force participation rates by 5 year age groups and sex for each labour force region in Victoria (defined by the ABS). Each ratio was then projected for individual labour force regions and then LGAs. These were then applied to ERP by age from VIF14 (Module 1) to determine resident workforce by both labour force status and collar of employment. Adjustments to trends were then applied to account for structural employment changes (from jobs Module E1) and to account for change in high level labour force behavioural changes reflected in macro-economic forecasts such as the Intergenerational Report.

Module 6A: Estimated Resident Population by Labour Force Status by Travel Zone

Population by age (estimated in Module 4) was then further segmented into employed, unemployed and not in the labour force for each TZ via the RAS method. Control totals for each LGA (estimated in Module 5) along with TZ population by age (estimated in Module 4) were applied to the previous year distribution to determine the current labour force status by TZ. ABS Census data was used to create the base year distribution. Adjustments were made to account for new development areas. Labour Force Status by age groups were then combined to form total labour force status by TZ.

## Module 6B: Estimated Resident Population by Employment Collar by Travel Zone

Employed population by age (estimated in Module 6A) was then further segmented into blue and white employment collars for each TZ via the RAS method. Control totals for each LGA (estimated in Module 5) along with TZ employed population by age (estimated in Module 6A) were applied to the previous year distribution to determine the current blue and white collar employment split by TZ. ABS Census data was used to create the base year distribution. Adjustments were made to account for new development areas.

Employment collar by age groups were then combined to form total employment by occupation collar by TZ. This approach ensures a detailed small area labour force dataset which aligns with local development patterns, population demographics and broader regional and state employment and labour force trends.

9.5   Employment (by Place of Work)

The following section details the approach, data inputs and assumptions used to create jobs (or employment) by industry and occupation collar[9] by Place of Work. Figure 32 presents an overview of the key data inputs and analysis approach.

FIGURE 32   SGS EMPLOYMENT PROJECTION METHOD
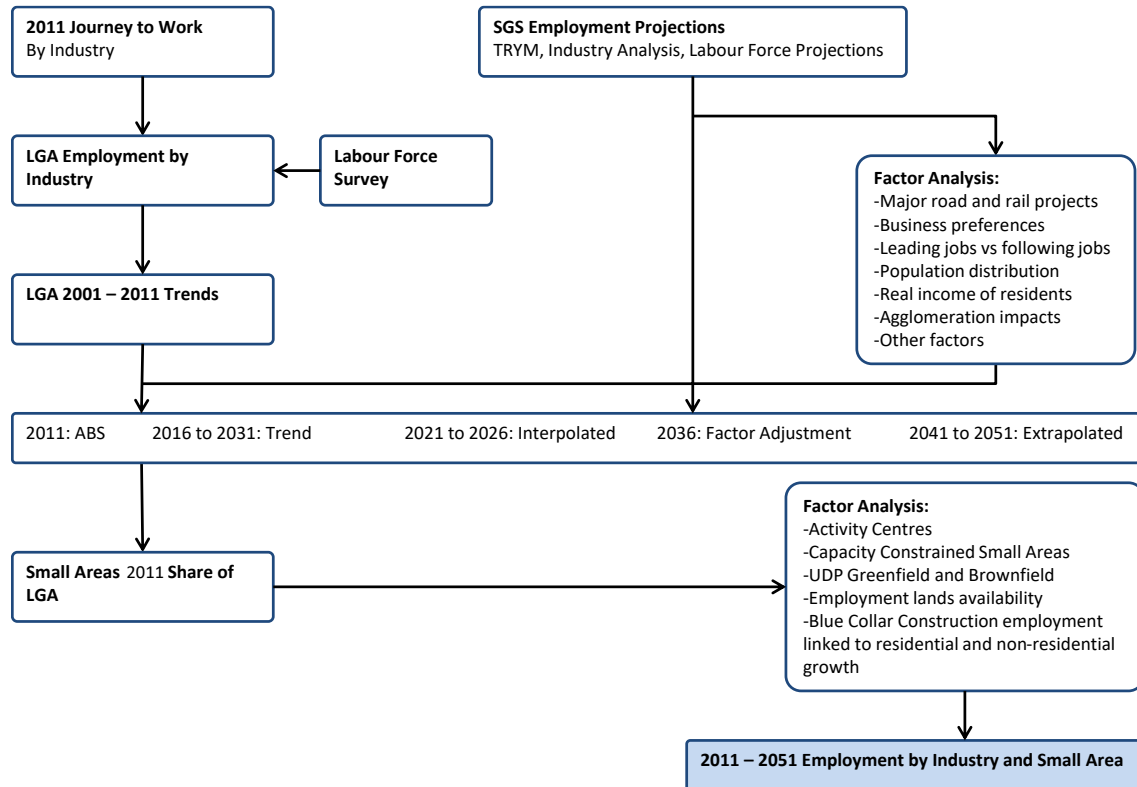
In essence, the Treasury Macroeconomic Model (TRYM) and data obtained from a variety of different sources[10] was used to develop a set of industry projections for the Australian economy. These industry projections, which include gross value added (GVA) and employment projections, were developed for the short (2021), long term (2036) and beyond (2051), with total growth for all industries benchmarked against GDP projections from TRYM. This ensures that the projected industry growth can be resourced with the finite level of resources at the disposal of Australia.

At a state wide level, Victorian estimates were derived from the current state share of GVA and employment for each industry. Projections were made on the future share of each industry in Victoria. Employment projections for Melbourne have been derived from these Melbourne GVA projections and projections of Melbourne's labour productivity growth.

Employment growth was capped using future labour force constraints. The labour force was based on the 2014 Victoria in Future (VIF14) 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[11] was used as a guide to

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[9] A list of ABS occupations used to define Blue and White Collar are presented in the appendix.

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

[11] Treasury, Australian Government, 2010

workforce participation amongst various age groups into the future. A projection of unemployment was also made to ensure a coherent picture of the future labour force.

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 SLA 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. For 2002, 2004, 2006, 2008 and 2010[12], 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 SLA the following process was followed:
- Initially, the 2016-51 projections for each SLA's employment by industry was assumed to follow the growth pattern observed in Melbourne industry share between 1996 and 2011;
- In 2031 and 2051 adjustments were made to this industry to share to account for known information about the development of Melbourne;
- VIF 2014 population projections for each SLA were used to adjust the projections for population serving industries. This was done by observing the trends in population to industry employment between 1996 and 2011;
- A factor analysis of each of Melbourne's SLA was utilised to appropriately cater for expected changes in employment distribution over time. This factor analysis included an assessment of each SLAs 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 SLA industries employment shares.

The 2011 Place of Work estimates by industry and occupation at the ABS Destination Zone were used to allocate each SLA's total employment to the TZ in that SLA. CLUE data for 2008 and 2010 was also used as a data input. Further factor analysis was undertaken at the travel zone level to adjust the 2011 shares for future forecast years. Finally, a detailed review of TZ 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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[12] For 2010 only estimates for Docklands have been released.

9.6   Enrolments (by PUR/PoI)

The following section details the approach, data inputs and assumptions used to further segment population by age to enrolment status by place of residence and then to enrolment numbers by place of institution. Figure 33 presents an overview of the key data inputs and analysis modules.

FIGURE 33   SGS ENROLMENT APPROACH OVERVIEW
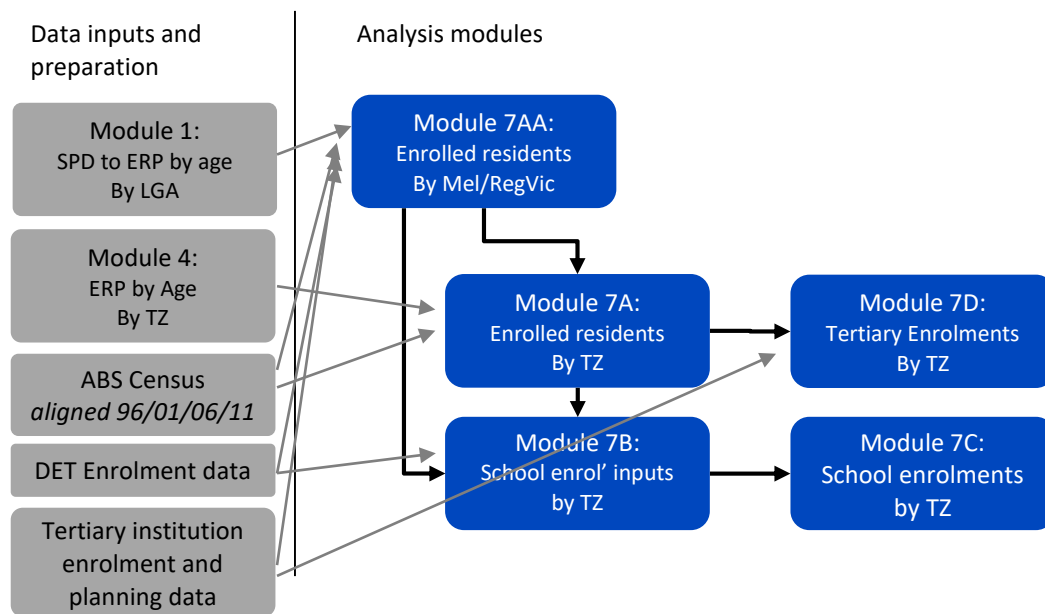
Note that **enrolled residents do not equal enrolments**. Where enrolled residents represent a segmentation of the resident population and enrolments represent the number of enrolments (or students) going to an institution. This is a result of people being enrolled in multiple courses and only affects tertiary enrolments.

Module 7AA: Enrolled residents by Travel Zone
Module 7AA draws together a range of enrolment based datasets to create consistent Melbourne and Regional Victorian control totals which align with other demographic datasets. The totals for Primary and Secondary schools by school type in 2011 to 13 was sourced from the Department of Education and Training and aligned with ABS Census data and EPR by age groups (estimated in Module 1). This includes Government, Catholic and independent school students. The total for TAFE and University enrolled persons was determined through an analysis of Census data, tertiary participation rates by age group, selected enrolment data for university students and population projections (estimated in Module 1).

Module 7AA/A: Enrolled residents by Travel Zone
Module 7A estimate origin enrolled persons for both schools and tertiary institutions by types[13] by travel zone. This was completed using the RAS method. Where ERP by age group by TZ totals (estimated in Module 4) were aligned with regional enrolled resident control totals (estimated in Module 7AA) and applied to the previous period distribution. For the base year the ABS Census distribution was aligned to TZ. Adjustments were made for new development areas in future years.

This ensured the total enrolled persons by school type for each travel zone equalled the population total for that travel zone, and that all the travel zones equalled each school type total.

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[13] Primary and secondary students are split by government, catholic and independent. Tertiary students are split by TAFE full/part time and University full/part time.

Module 7B: School enrolments inputs by Travel Zone

This module collates the two key datasets and allocates a travel zone to each school listed to determine the base year (2014) distribution of enrolments. The current capacity of each school was estimated using assumptions around school type and location, as outlined in Table 21. An analysis of new school requirements in the future was also undertaken based on the differences between the estimated capacity of each school aggregated to broad regions across Melbourne and the future demand for schools.

TABLE 21   SCHOOL CAPACITY ASSUMPTIONS

Type	Sub-Type	Description	Assumption
Special	All		+10%
Primary School	Small	Less than 200 students currently and not in Growth Area	+10%
	Medium	Less than 450 students currently	450
	Large	Greater than 450 students currently	+10%
Secondary School	Small	Less than 450 students currently and not in Growth Area	+10%
	Small-Medium	Less than 800 students currently and not in Growth Area	800
	Medium	Less than 1,100 students	1,100
	Large	Greater than 1,100 students currently	+10%

Module 7C: School enrolments by Travel Zone

This module estimates the small area destination enrolments in each future year out to 2051 using a gravity model. The inputs to this model are:

- **capacity of each school by type**[14] by travel zone into the future, assumptions are made regarding the approximate locations/size of future schools as detailed in Module 7B. This is only a 'capacity' input and students are only allocated to this capacity if there is sufficient demand estimated by the gravity model.
- **origin enrolled persons by school type** by travel zone as detailed in Module 7A
- **travel time matrix** for each travel zone in Victoria and each school travel zone.

A gravity model essentially uses the following conceptual structure estimates the propensity for a student to attend a school. This propensity is calculated from every travel zone to every school.

$$\text{Propensity to attend a school by type} = \frac{\text{Estimated preference}}{\text{Travel time to school}}$$

A different propensity is calculated for each type of student: primary Government, primary Catholic, primary independent, secondary Government, secondary Catholic and secondary independent. The estimated preference is not an input, it is calculated in the base year using actual enrolment origin/destination data. This is then used for the next year. The estimated preference adjusts each year if schools reach capacity to reduce the schools 'pull'. This approach results in students attending the closest school (within capacity constraints) adjusted by known preference behaviours (i.e. more prestigious schools will draw a wider catchment).

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[14] Primary and secondary students are split by government, catholic and independent.

Module 7D: Tertiary Enrolments by Travel Zone

This module estimates tertiary enrolments for the destination of students at both TAFE and University under a Full time and Part time split. First it collates the Tertiary enrolments data and allocates a travel zone(s) to each institution. The total of enrolled persons in 2011 from module 7AA is then compared to the total from the enrolments data to determine an upscale factor. This is then applied to the origin data for each travel zone to determine the number of enrolments by place of residence for each year from 2011 to 2051. This new total was then re-distributed to each travel zone with a tertiary institution using the base data to estimate the final destination enrolments by place of attendance. Shares for institution by type are then adjusted for future periods to reflect planned redevelopments/expansions where information is available.

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