

NWGGA Employment land

Version 2: Final Report

City of Greater Geelong

December 2017



Independent insight.



This report has been prepared for the City of Greater Geelong. SGS Economics and Planning has taken all due care in the preparation of this report. However, SGS and its associated consultants are not liable to any person or entity for any damage or loss that has occurred, or may occur, in relation to that person or entity taking or not taking action in respect of any representation, statement, opinion or advice referred to herein.

SGS Economics and Planning Pty Ltd
ACN 007 437 729
www.sgsep.com.au
Offices in Canberra, Hobart, Melbourne and Sydney

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Background	1
1.2	Approach to Employment Land Analysis	1
1.3	Report Structure	1
2	'COMPETING' LOCATIONS FOR EMPLOYMENT FLOORSPACE	3
2.1	Existing Employment Floorspace: Audit Data	3
2.2	Geelong wide segmentation of strategic/district and local employment land.	5
2.3	Candidate locations for strategic and district employment growth	10
	Existing and Proposed Strategic Clusters	10
	Spatial Analysis of Accessibility of Employment Clusters	10
	Access to Arterial Roads	11
	Access to Public transport (rail network)	12
	Access to Population	13
	Access to Employment	14
2.4	Suitability of candidate locations for strategic and district employment growth	15
3	BENCHMARK AREAS	18
3.1	Benchmark Studies	18
	Characteristics of the benchmark areas	19
	Jobs to resident workforce ratio in benchmark areas	20
	Key employment industries	20
	Employment Land Types	21
3.2	Benchmark Areas Discussion	22
4	WORKFORCE PROFILE AND REQUIRED LAND	23
4.1	Resident workforce projections for Growth Areas	23
	Comparison with benchmark areas	24
4.2	Employment land forecasts	25
	Broad land use categories	25
	Scenario 1: All employment land demand met within Growth Areas	26
	Scenario 2: District and local employment land demand met within Growth Areas	26
	Scenario 3: Part district and all local employment land demand met within NWGGAs	27
5	CONCLUSION: KEY FINDINGS	29
5.1	Job to resident workforce principle	29
	Job to resident workforce outcomes in the Growth Areas	29
	Job leakage and accessibility from the Growth Areas	30
5.2	'Closing the gap'	32
5.3	Areas and principles for the location of employment precincts	33

6	APPENDIX 1	35
6.1	Employment land forecasts	35
	Broad land use categories	35
	Broad Land use Categories	35
	Floorspace demand	36
7	APPENDIX 2	38
7.1	Conversion table: ANZIC to employment land type	38
8	APPENDIX 3	39
8.1	Details of PWC employment forecasts	39

LIST OF FIGURES

FIGURE 1. TOTAL FLOORSPACE IN EMPLOYMENT PRECINCTS	5
FIGURE 2. STRATEGIC LEVEL FLOORSPACE IN EMPLOYMENT PRECINCTS	6
FIGURE 3. DISTRICT LEVEL FLOORSPACE IN EMPLOYMENT PRECINCTS	7
FIGURE 4. LOCAL LEVEL FLOORSPACE IN EMPLOYMENT PRECINCTS	8
FIGURE 5. VACANT FLOORSPACE IN EMPLOYMENT PRECINCTS	9
FIGURE 6. ACCESS TO ARTERIAL ROADS	11
FIGURE 7. ACCESS TO RAIL NETWORK	12
FIGURE 8. PROXIMITY TO POPULATION	13
FIGURE 9. PROXIMITY TO EMPLOYMENT	14
FIGURE 10. BENCHMARK AREAS	19
FIGURE 11. JOB ACCESSIBILITY AND SCENARIO 3 'LEAKAGE' FROM NGGA	30
FIGURE 12. JOB ACCESSIBILITY AND LEAKAGE FROM WGGA	31
FIGURE 13. EMPLOYMENT INDUSTRY BY BROAD LAND USE TYPE	36
FIGURE 14. FLOOR SPACE PER JOB AND PLOT RATIOS APPLIED	37

LIST OF TABLES

TABLE 1. SEGMENTATION OF EMPLOYMENT BY INDUSTRY FLOORSPACE	4
TABLE 2. LOCATIONAL ATTRIBUTES FOR STRATEGIC EMPLOYMENT CLUSTERS	15
TABLE 3. RATING OF STRATEGIC PRECINCTS AGAINST ATTRIBUTES	15
TABLE 4. ATTRACTIVENESS OF PRECINCTS FOR STRATEGIC&DISTRICT EMPLOYMENT	17
TABLE 5. EMPLOYMENT PROJECTIONS AND EMPLOYMENT RATIOS BY SUBURB	20
TABLE 6. WORKFORCE BY BENCHMARK AREA 2016	21
TABLE 7. BENCHMARK EMPLOYMENT DISTRIBUTION BY EMP LAND TYPE (2016)	21
TABLE 8. RESIDENT WORKFORCE PROJECTIONS FOR GROWTH AREAS (JOBS)	24
TABLE 9. RESIDENT WORKFORCE PROJECTIONS FOR GROWTH AREAS (JOBS)	24
TABLE 10. TOTAL DEMAND FOR EMPLOYMENT LAND IN NWGGA (HA)	26
TABLE 11. DISTRICT & LOCAL DEMAND FOR EMPLOYMENT LAND IN NWGGA (HA)	26
TABLE 12. DISTRICT EMPLOYMENT LEAKAGE ASSUMPTIONS FOR GROWTH AREAS	27
TABLE 13. PROPORTION OF DISTRICT & LOCAL DEMAND IN GROWTH AREAS	28
TABLE 14. NGGA JOBS ACCESSIBILITY AND WORKFORCE RATIO	32
TABLE 15. WGGA JOBS ACCESSIBILITY AND WORKFORCE RATIO	32
TABLE 14. AREAS AND PRINCIPLES FOR EMPLOYMENT LAND IN GROWTH AREAS	34

1 INTRODUCTION

1.1 Background

The City of Greater Geelong is in the process of preparing framework plans for two new Growth Areas that is, the Northern Geelong Growth Area (NGGA) and the Western Geelong Growth Area (WGGA). An employment land assessment is required to inform the preparation of these framework plans.

SGS was asked by the City of Geelong to undertake an analysis of the demand for employment land in response to the ultimate development for each growth area based on the anticipated dwelling and population yields for each growth area. A specific reference was the consideration of the principle of providing one job per household for each growth area in the context of broader municipal employment land availability. The brief also required the identification of the potential format and size of future employment precincts based on the type of employment land required.

A City of Geelong wide Employment Land Study (ELS) is currently underway. This report was prepared in the absence of this study. It is acknowledged that the Employment Land Study will have a vital role in shaping the future distribution of employment land. This report will remain as a 'final draft' until the ELS is at a stage where its relevant findings can be incorporated.

1.2 Approach to Employment Land Analysis

The analysis of employment lands in this report is underpinned by the fact that employment tends to cluster in hierarchies. In this report we define the following clusters:

'Strategic' economic activities (or the land that they use) serve city wide or metropolitan, and at times state or national markets. Industrial activities in this category could be major manufacturing, warehousing or freight related and typically cover large land areas. Employment land hosting CBD office development and retailing, major hospital clusters and major university campuses would also be considered 'strategic'.

'District' level economic activities serve a regional or district market and may be less specialised, that is they could be located amongst strategic or local activities. 'Typical' industrial clusters, with a mix of warehousing, fabrication, small scale manufacturing, storage, suburban distribution centres, waste depots, concrete batching and ancillary office development, along with sub-regional retail centres, suburban civic complexes, suburban office clusters and TAFE colleges might be considered district level activities.

'Local' economic activities are dispersed, and are closely tied to meeting the needs of local populations. Light industrial areas with auto repairs, domestic storage and recreation centres, plus local retailing, local services, and local primary schools are considered 'local' activities.

1.3 Report Structure

The report is structured as follows:

- **Chapter 1** (this chapter) provides an outline of the approach to the employment land analysis, and introduces the employment hierarchy framework.

- **Chapter 2** identifies ‘competing’ locations for employment floor space across Geelong, and includes an analysis of existing employment floor space and the segmentation of existing floor space into strategic, district and local employment uses. It then reviews the candidate locations for district and strategic employment growth, which might not be accommodated in the Growth Areas for ‘good’ reasons including efficient clustering of activities in areas with a relative advantage (including in comparison to sites within the Growth Areas).
- **Chapter 3** analyses three areas in Geelong which might be considered benchmarks for the Growth Areas given their populations, and documents their employment characteristics, jobs to resident workforce rates (as an appropriate proxy for the jobs to households ratio) and employment land types. This represents a key reference for identifying what a realistic employment lands outcome might be for each of the Growth Areas.
- **Chapter 4** includes an analysis of the workforce profile in each growth area and the potential amount of employment land associated with this workforce. Based on this ‘gross’ potential three employment land provision scenarios for each growth area are suggested, drawing on the findings of Chapters 2 and 3.
- **Chapter 5** concludes the analysis by addressing the key items of Council’s brief including the jobs per household principle, and broad strategies to ‘address the gap’, and an identification of the amount of land required to meet employment needs in the Growth Areas, along with a series of principles to guide precinct locations.

2 'COMPETING' LOCATIONS FOR EMPLOYMENT FLOORSPACE

This chapter presents the results of an analysis of employment floorspace across Greater Geelong and segments it into strategic, district and local level employment. Vacant floorspace across the municipality is also identified. The intention is to identify strong employment clusters or precincts, outside of the Growth Areas, which might be candidates to host some of the future workforce of the Growth Areas.

The characteristics and attributes of the identified employment precincts are considered, relative to the attributes of the Growth Areas.

While the aspiration for one job per resident workforce in the Growth Areas is explicit, it should be understood that competing employment locations exist, each with their own critical mass and attributes for different high level activities. Understanding this Geelong wide 'landscape' for employment is critical.

2.1 Existing Employment Floorspace: Audit Data

Table 1 summarises the results of three separate sources of floorspace data provided by the City of Greater Geelong. This includes:

- Audit of Industrial Land Precincts
- Audit of Central Geelong (VicCLUE data)
- Audit of Health and Education buildings (Using building footprint and roof height data)

The audit data was converted into strategic, district and local employment floorspace. Appendix 2 identifies how 2 digit ANZSIC codes were converted to strategic, district and local employment.

The employment industries which occupy the greatest amount of floorspace in Geelong are Manufacturing, Education and Training, Health Care and Social Assistance. There is also significant employment floorspace used for Wholesale and Retail Trade, as well as Transport, Postal and Warehousing.

The main strategic land uses are Manufacturing and Wholesale Trade, while the main district employment land uses are Education and Training and Healthcare Assistance.

Data Coverage

It is worth noting that there are gaps in this dataset. Small distributed employment floorspace that is not found within Central Geelong or the 14 Industrial precincts, and is not associated with health and education, is not included in this dataset. Employment floorspace not included in this analysis would mostly be in the 'local' category. This is likely to primarily include Retail Trade and Arts and Recreation Services.

TABLE 1. SEGMENTATION OF EMPLOYMENT BY INDUSTRY FLOORSPACE TO STRATEGIC, DISTRICT AND LOCAL CATEGORIES

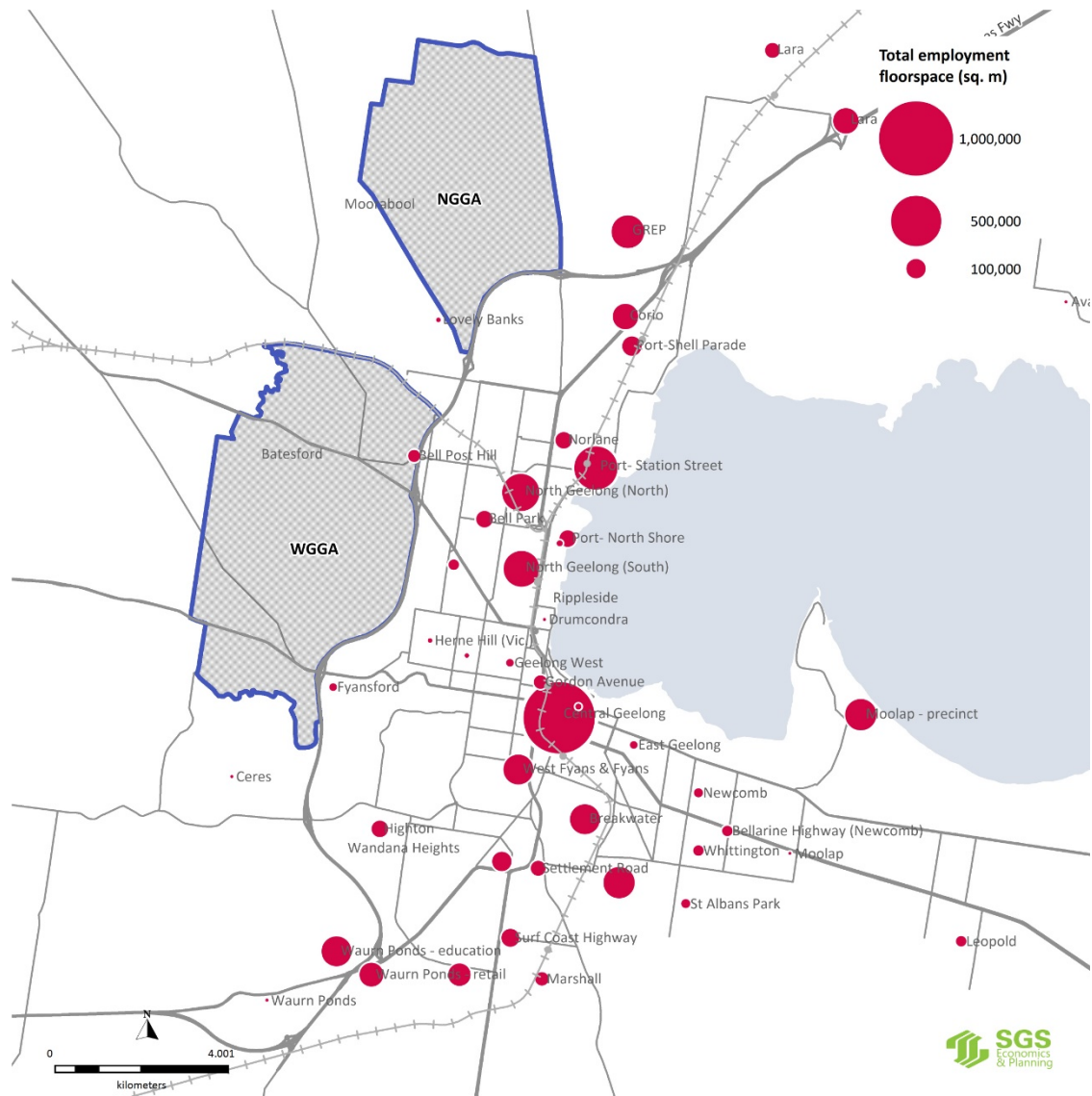
Combined Audit Results	Strategic	District	Local
Accommodation & Food Services	0	68,000	53,800
Admin & Support Services	0	25,800	16,800
Agriculture Forestry & Fishing	0	6,800	0
Arts & Recreation Services	17,400	42,400	34,900
Construction	24,600	156,200	11,500
Education & Training	168,900	463,100	371,500
Electricity Gas Water & Waste Services	65,300	37,100	3,400
Financial & Insurance Services	9,900	19,400	3,700
Health Care & Social Assistance	66,600	431,600	275,100
Information Media & Telecommunications	18,500	11,000	0
Manufacturing	664,400	225,800	11,900
Mining	9,500	0	0
Other Services	17,800	21,500	241,100
Professional Scientific & Tech Services	16,600	31,000	22,400
Public Administration & Safety	35,700	44,200	9,500
Rental Hiring & Real Estate Services	600	3,000	49,300
Residential	0	300	41,900
Retail Trade	3,500	345,400	198,500
Transport Postal and Warehousing	122,400	327,700	13,000
Wholesale Trade	356,200	72,400	9,300
Under Construction	0	0	0
Unknown	4,700	7,800	11,000
Vacant	1,900	4,200	2,600
Total	1,604,500	2,344,700	1,381,200

Source: City of Geelong audit data, SGS Economics and Planning, 2017

2.2 Geelong wide segmentation of strategic/district and local employment land.

Figure 1 to Figure 4 illustrate the distribution of employment floorspace across the City of Geelong, firstly the distribution of total employment floorspace, then the distribution of strategic, district and employment floor space respectively.

FIGURE 1. TOTAL FLOORSPACE IN EMPLOYMENT PRECINCTS



Source: SGS Economics and Planning, 2017

Employment floorspace is distributed across Greater Geelong, with tendencies to cluster in key precincts mostly along the Princes Highway corridor. The largest supply of employment floor space is found within Central Geelong. There is also significant amounts of employment floor space in the North Geelong corridor, which has to date been associated with manufacturing and other industrial land uses.

More recently, Waurn Ponds has seen an increase in its supply of employment floor space, associated with the expanding Deakin University campus, the recently developed Epworth Hospital, and the expanded Waurn Ponds Shopping Centre. Other significant clusters of employment floor space exist in South Geelong, Moolap (associated with the now vacant Alcoa aluminium processing site) and the Geelong Ring Road Employment Precinct (GREP)

FIGURE 2. STRATEGIC LEVEL FLOORSPACE IN EMPLOYMENT PRECINCTS



Source: SGS Economics and Planning, 2017

Figure 2 shows the distribution of strategic level employment. There is over 300,000 square metres of strategic level floor space in both Central Geelong and Geelong Port, (the employment precinct immediately east of Station St). GREP is also home to a substantial supply of strategic floor space of more than 200,000 square metres. There are also a number of smaller strategic employment clusters, including Waurn Ponds (Health and Education) Breakwater, South Geelong and a number of precincts within the North Geelong corridor.

Strategic employment particularly in industrial areas benefits from clustering and tends to require larger floor plates and may require distance from residential land uses. Both the Western Geelong Growth Area (WGGA) and Northern Geelong Growth Areas (NGGA) have good access to strategic employment land in the North Geelong corridor and Geelong CBD. The NGGA and WGGA are both in close proximity to GREP, and the Waurn Ponds health and education cluster.

FIGURE 3. DISTRICT LEVEL FLOORSPACE IN EMPLOYMENT PRECINCTS

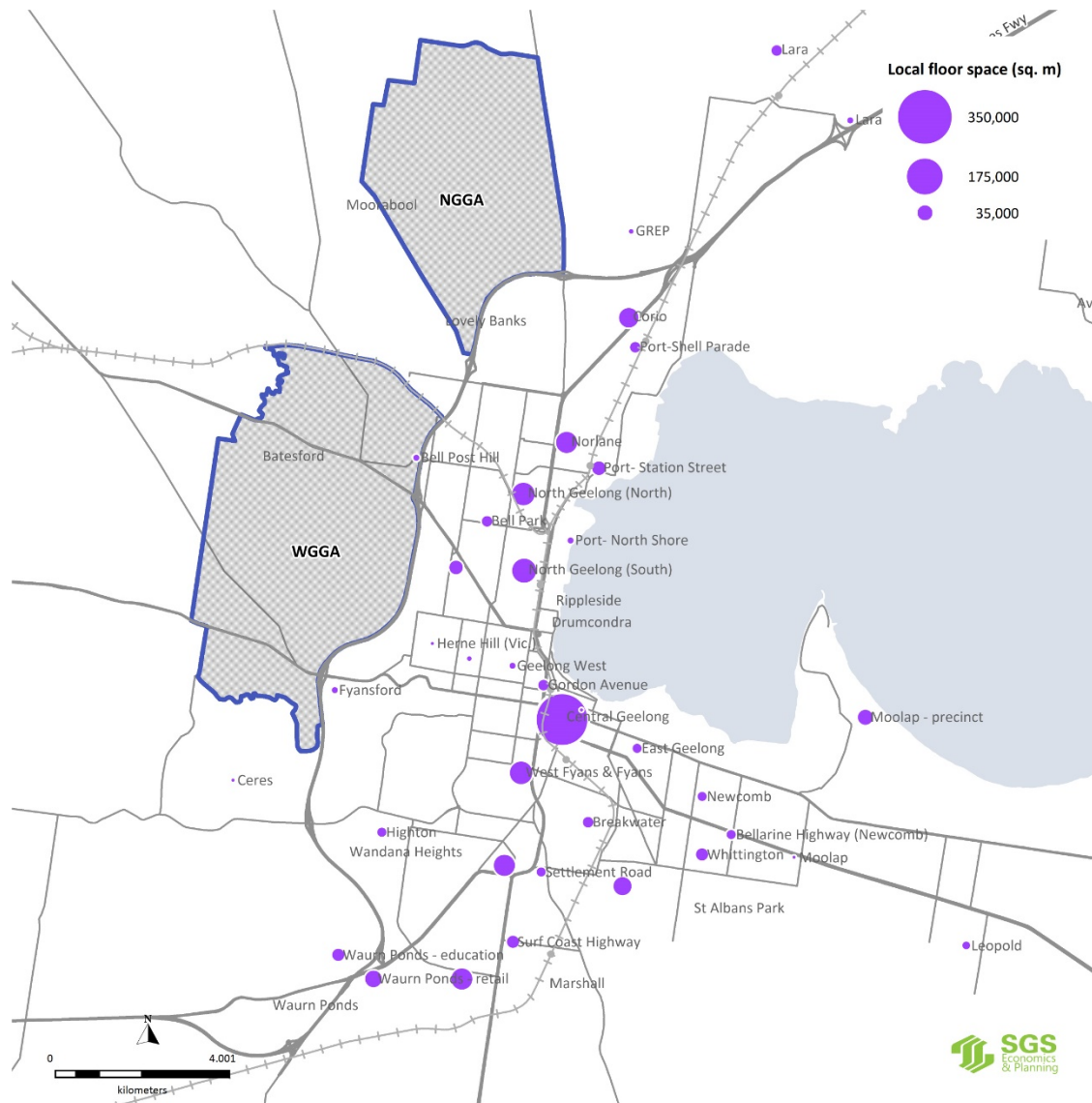


Source: SGS Economics and Planning, 2017

District employment floor space serves broader districts, and is therefore more dispersed than strategic employment floor space. Figure 3 shows that Central Geelong is also home to the greatest concentration of district employment floor space. There is also a considerable quantity of district employment floor space in the North Geelong corridor, with smaller precincts found distributed across Geelong’s south east.

The NGGA is located in close proximity to the GREP, Corio, Lara and Shell Parade district employment clusters, as well as key clusters in North Geelong. The WGGGA is in close proximity to a far greater supply of district employment clusters, including the North Geelong corridor, Waurn Ponds, and importantly, the large concentration of district employment within the CBD.

FIGURE 4. LOCAL LEVEL FLOORSPACE IN EMPLOYMENT PRECINCTS



Source: SGS Economics and Planning, 2017

Figure 4 illustrates the distribution of local level employment floorspace. The primary function of local floor space is to serve local populations, and as expected, its distribution is effectively aligned with Geelong’s population distribution.

It is important to note that there is a greater distribution of local floor space than is represented in this figure, as local floor space that is outside of employment precincts and not associated with health or education were not included in the employment floor space audits. It can be assumed that there are a number of additional small local employment floor space clusters associated with minor shopping strips, service stations and other distributed local employment land uses.

For the NGGA and WGGA it is expected that all local floor space will be accommodated within the growth area in order to cater to the needs of their future resident populations.

FIGURE 5. VACANT FLOORSPACE IN EMPLOYMENT PRECINCTS



Source: SGS Economics and Planning, 2017

*Vacant floorspace is only shown for the industrial employment precincts and central Geelong. Floorspace vacancy in the Waurn Ponds health and education precinct is unknown.

Figure 5 illustrates the distribution of vacant floor space, and shows vacancy is concentrated in Moolap, the CBD, and to a lesser extent, four precincts in the North Geelong corridor.

There is more than 170,000 square metres of vacant floorspace in Moolap, equivalent to 40 per cent of its total floor space. This high vacancy is associated with the closure of Alcoa’s smelting plant in 2014. There is more than 120,000 square metres of vacant floor space in the CBD (representing a vacancy rate of 11 per cent), and 30,000 square metres of vacant floor space in North Shore (representing a vacancy rate of 34 per cent), including that associated with the closure of the Ford manufacturing plant.

Vacant floorspace affords an opportunity to absorb employment growth, and also potentially transition to a new employment land use. The considerable supply of vacant floor space in the North Geelong corridor that is located in close proximity to the CBD and rail and road network presents a potential opportunity to transition previous industrial precincts into mixed business precincts with combinations of industrial, commercial and office floorspace.

2.3 Candidate locations for strategic and district employment growth

In order to establish the likely locations for strategic and district employment growth, key strategic and/or district employment precincts need to be assessed for their suitability to absorb growth.

Existing and Proposed Strategic Clusters

Ten employment precincts were identified as strategic based on their land use and supply of existing district and strategic floor space. These precincts can be categorised into three main types of strategic centres:

- Commercial/Office,
- Health & Education; and
- Industrial.

The location and type of the 10 employment precincts identified are listed below, and include the Armstrong Creek West and North East emerging industrial precincts.

- Geelong CBD: Commercial/ Office and Health & Education
- Waurm Ponds: Health and education
- GREP: Major industrial
- North Geelong (North and South): Major industrial
- Geelong Port: Major industrial
- Breakwater: Major industrial
- South Geelong: Major industrial
- Moolap: Major industrial
- Armstrong Creek West Precinct: emerging industrial precinct
- Armstrong Creek North East Precinct (Keystone): emerging industrial precinct

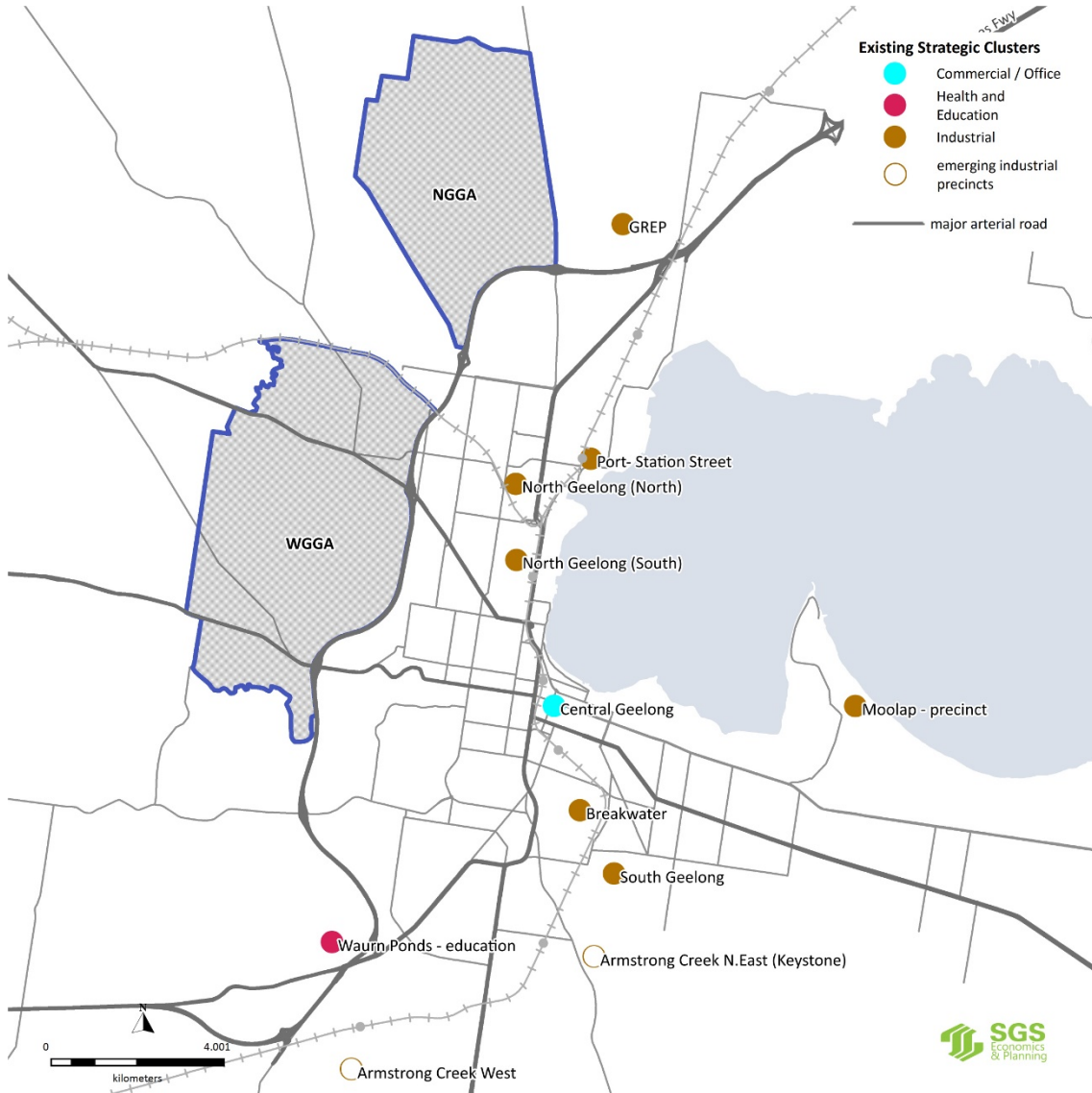
Spatial Analysis of Accessibility of Employment Clusters

The following series of maps analyse different aspects of 'accessibility' across the City of Greater Geelong and the location of existing strategic employment clusters, the identified emerging strategic centres (Armstrong Creek West Precinct and Armstrong Creek North East Precinct (Keystone)) and the location of the new Growth Areas. Access to arterial roads, the rail network, population and employment were mapped to identify the characteristics of candidate locations for each type of employment land.

Access to Arterial Roads

Strategic Industrial Precincts and Commercial/Office precincts benefit from good access to arterial roads. This is perhaps less important for strategic health and education clusters. Figure 6 illustrates the proximity of the 11 existing strategic precincts and the two Growth Areas to arterial roads.

FIGURE 6. ACCESS TO ARTERIAL ROADS

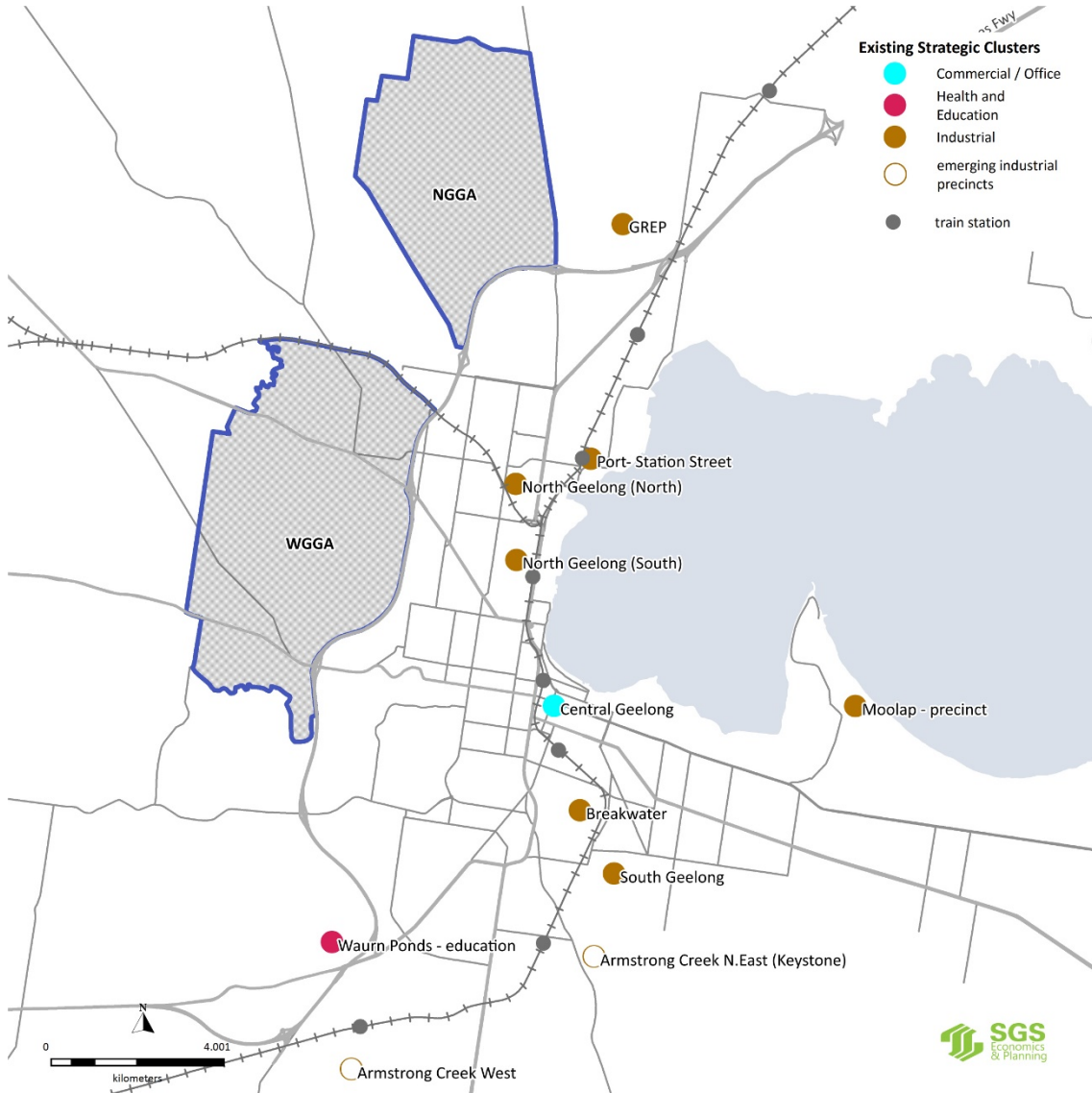


Source: SGS Economics and Planning-

Access to Public transport (rail network)

Commercial/Office and Health & Education Precincts benefit from good access to public transport and in particular fixed rail. This is less important for strategic industrial precincts. Figure 7 illustrates the proximity of the 11 strategic precincts and the two Growth Areas to the public transport rail network. The map also shows the freight line from North Geelong to the west, past the WGGA; this is not currently a public transport service. If this line was able to be activated for public transport between the WGGA and the Geelong CBD it might enhance the potential of the growth area to host higher order employment in district level health, education, office and commercial activities.

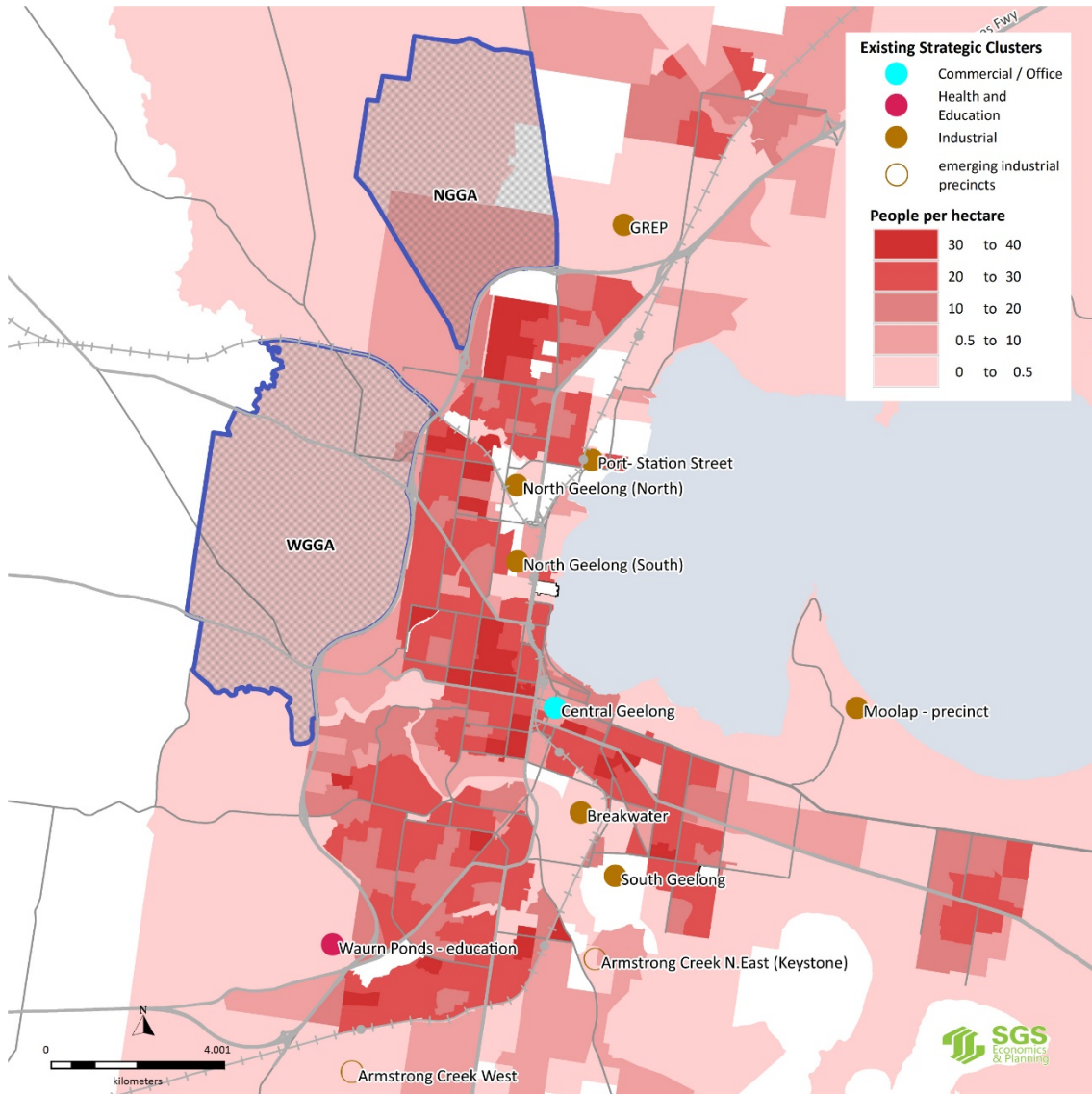
FIGURE 7. ACCESS TO RAIL NETWORK



Access to Population

Commercial/Office and Health & Education Precincts are ideally located in close proximity to where people reside, giving access to a labour force but also to a diversity of activities which enhances the amenity and attractiveness of them as employment locations. In contrast, strategic industrial precincts are preferably located away from residential areas, to minimise land use conflict. Figure 6 shows the 11 existing strategic precincts and the two Growth Areas relative to the existing population, illustrated as population density.

FIGURE 8. PROXIMITY TO POPULATION

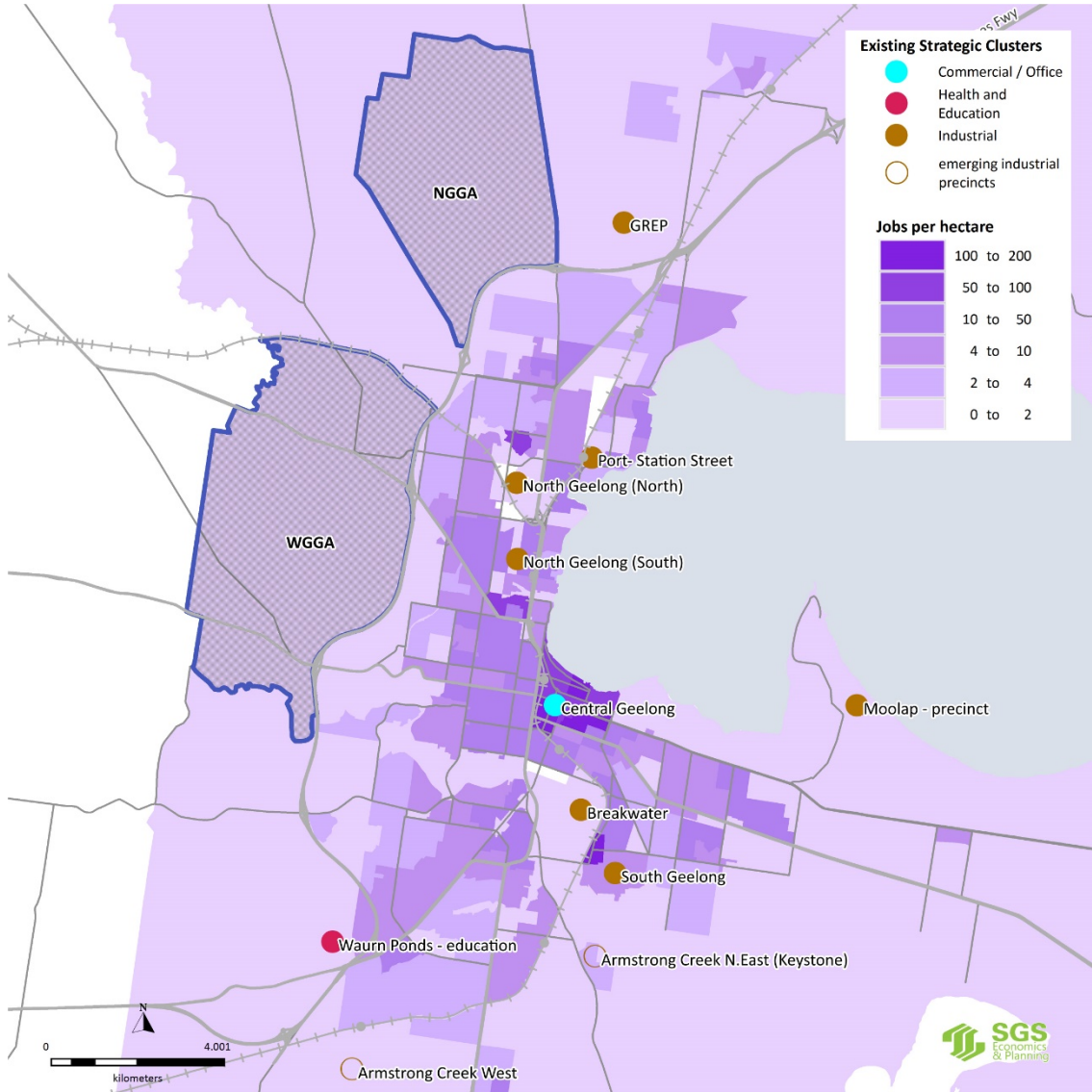


Source: SGS Small Area Land Use Projections, 2017

Access to Employment

Major Commercial and Health & Education Precincts in particular are ideally located in areas where there is already significant employment, to underpin productivity enhancing agglomeration activities. Figure 9 shows the 11 existing strategic precincts and the two Growth Areas relative to existing population, illustrated as employment density.

FIGURE 9. PROXIMITY TO EMPLOYMENT



Source: SGS Small Area Land Use Projections, 2017

2.4 Suitability of candidate locations for strategic and district employment growth

Table 2 shows the strategic employment types and the relative importance to each of the locational attributes. For example, major industrial precincts have a high dependence on arterial road access and a medium dependence on access to public transport and proximate alternative employment clusters. Immediate proximity to population is not important (in fact best avoided, though of course a workforce needs to be able to access industrial precincts, via the arterial road network or public transport).

TABLE 2. IMPORTANCE OF LOCATIONAL ATTRIBUTES FOR STRATEGIC EMPLOYMENT CLUSTERS

Strategic employment type	Locational attributes			
	Arterial Rd Access	PT Access	Population Access	Jobs Access
Health and education	Medium	High	High	Medium
Major industrial	High	Medium	Low- best avoided	Medium
Commercial/ Office	High	High	High	High

Source: SGS Economics and Planning 2017

In order to better understand the capacity for the strategic employment precincts to attract further growth, and the extent to which they might attract workers from the two Growth Areas, their relative 'suitability' can be assessed. Table 3 summarises an assessment of the 11 existing precincts and the two Growth Areas against the current locational attributes.

TABLE 3. RATING OF STRATEGIC PRECINCTS AGAINST ATTRIBUTES

Precinct name	Arterial Rd Access	PT Access	Population Access	Jobs Access	Vacancy (floorspace)	Vacant land (supply)
Waurin Ponds: Health and education	High	Medium	Medium	Medium	unknown	Low
GREP: Major industrial	High	Low	Low	Low	Low	High
North Geelong (North and South) Major industrial	High	High	Low- Medium	Low	High	Low
Geelong Port : Major industrial	Medium	Medium	Low	Low	High	Low
Breakwater: Major industrial	Medium	Low	Low	Low	Low	Medium
South Geelong: Major industrial	Medium	Low	Low	Medium	Low	Low
Moolap: Major industrial	Low	Low	Low	Low	High	Medium
Armstrong Creek West: emerging industrial precinct	High	Medium	Low	Low	Not applicable	High
Armstrong Creek North East (Keystone) emerging industrial precinct	Low	Medium	Medium	Medium	Not applicable	High
Geelong CBD: Commercial/ Office and Health & Education	High	High	High	High	High	Low
Northern Geelong Growth Area	Medium	Low	Low	Low	n/a	n/a
Western Geelong Growth Area	High	Low	Low	Low	n/a	n/a

Source: SGS Economics and Planning 2017

For the emerging Armstrong Creek West Precinct and Armstrong Creek North East Precinct (Keystone) industrial precincts, their level of access is likely to shift into the future. Access to arterial roads will be substantially improved with the anticipated construction of major new infrastructure, including Geelong Ring Road Bellarine Link and Barwon Heads Road. At the same time, the level of population access is also

likely to improve in these areas in the future, with major residential growth areas such as Armstrong Creek, Grovedale and Charlemont.

Table 4 summarises the results of the analysis for suitable candidate locations for employment growth. It shows that the North Geelong corridor precincts and the Armstrong Creek West emerging industrial precinct are all well suited to absorb future employment growth. Employment growth in health and education is most suited to Waurn Ponds and Geelong CBD. The Moolap Coastal Strategic Framework Plan is currently under development by the State Government and is proposing a significant alternative land use for a large part of the Moolap precinct. Despite the high levels of vacant floorspace in Moolap, this area may not be a candidate for major future employment growth, at least until the framework plan is finalised.

TABLE 4. ATTRACTIVENESS OF PRECINCTS FOR STRATEGIC AND DISTRICT EMPLOYMENT

Precinct name	Health and Education	Major Industrial	Commercial / Office	Comment
Waurm Ponds: Health and education	High	Low	Low	Emerging and successful precinct, likely to grow as a health and education cluster
GREP: Major industrial	Low	High	Low	Well located industrial precinct with significant growth potential
North Geelong: Major industrial	Medium	High	Medium	Area in transition- good access to public transport and jobs. Remains well suited to major industrial. Could transition to a freight and distribution centre or to accommodate other large land users.
Geelong Port (Station St) : Major industrial	Low	High	Medium	Area in transition- good access to public transport and jobs. Remains well suited to major industrial. Could transition to more mixed business activities, however significant areas of Industrial 2 zoned land restricts potential for education and health.
Breakwater: Major industrial	Low	Medium	Low	Moderate access to arterial roads, separation from residential land use and reasonable access to jobs and the CBD suggests a 'medium' rating for an industrial cluster
South Geelong: Major industrial	Low	Medium	Medium	Moderate access to arterial roads, separation from residential land use and reasonable access to jobs and the CBD suggests a 'medium' rating for an industrial cluster
Moolap: Major industrial	Low	High	Low	Poor accessibility, relative isolation and large vacancy mean that Moolap is well suited to heavy industrial use. (NB: Moolap Coastal Strategic Framework Plan is currently being prepared which will provide guidance on future employment prospects.)
Armstrong Creek West: emerging industrial precinct	Medium	High	Low	Arterial road access and relative isolation from population concentrations suggest good prospect as an industrial cluster
Armstrong Creek North East (Keystone) emerging industrial precinct	Low	Medium	Low	Growing residential population and poor access to arterial roads and other employment means that Keystone is unlikely to become a major cluster
Geelong CBD: Commercial/ Office and Health & Education	High	Low	High	Existing successful health & education and commercial precinct
Northern Growth Area	Medium	Low	Medium	In the future the NGGA will have good access to population and enjoys good arterial road access. Growing residential population and competition from nearby major industrial clusters means that NGGA may not be suited to hosting a major industrial precinct. The significant distance from existing health and education clusters means that the NGGA has some potential for district level health and education clusters and/or district commercial and office precincts though it lacks rail based public transport potential.
Western Growth Area	Low	Low	Medium	In the future the WGGA will have good access to population and enjoys good arterial road access. Close proximity to existing major and emerging industrial clusters with good potential, as well as a growing health and education cluster reduces prospects for these operations in WGGA. District level commercial/office activities are more suited.

Source: SGS Economics and Planning 2017
Source: SGS Economics and Planning 2017

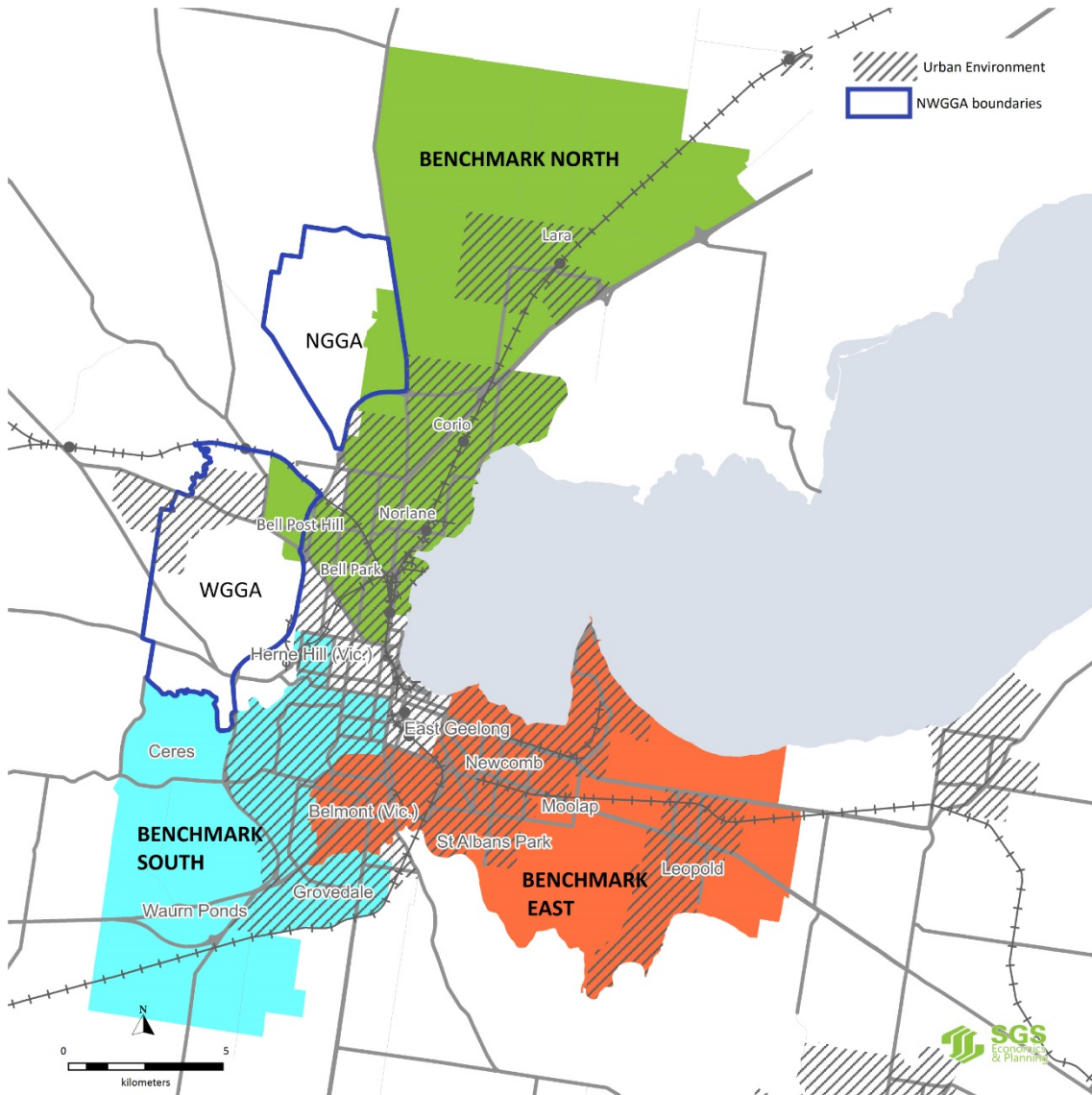
3 BENCHMARK AREAS

3.1 Benchmark Studies

In order to provide a reference for the employment land findings for each of the Growth Areas, three benchmark areas based on the established suburbs of Geelong (and not including the Geelong CBD) were analysed. They were analysed for their employment land use mix, resident workforce, and jobs to resident workforce ratios.

These benchmark areas were identified as they all have an existing population which is similar to the population forecast to occupy each of the Growth Areas, at full build out. Figure 10 also shows the location of the benchmark areas, as well as the amount of these areas that are considered urban, using the ABS classification of urban concentration locations. It shows that across all three benchmark areas, there are significant tracts of non urban space. This is typically farm land.

FIGURE 10. BENCHMARK AREAS



Characteristics of the benchmark areas

The three benchmark areas differ in various ways that need to be considered in the context of each Growth Area.

Benchmark North

- Includes the GREP strategic employment cluster.
- Also includes significant North Geelong employment precincts which are home to large amounts of strategic industrial floorspace and land.
- Due to recent transitions in the manufacturing sector, the vacancy rate in North Geelong and around the Port, including the Ford Manufacturing Plant, is high (as illustrated in Figure 5).
- Home to significant district level employment including light industrial health and education, including Geelong Grammar, Northern Bay College, Kardinia International College and Barwon Health.

Benchmark South

- Contains a mix of established suburbs and recently developed housing on the fringe.

- Includes a significant retail and related services cluster at Waurm Ponds plus the Waurm Ponds Health and Education strategic employment cluster, which is home to Deakin University, Epworth Hospital and Marcus Oldham College.
- West industrial precinct on Ghazeeopore Road is a planned as a future employment area with significant potential.

Benchmark East

- The closure of the Alcoa site in Moolap has created substantial floorspace vacancy in this area (the jobs on this site, now departed, are included in the data which follows).
- Includes Breakwater, South Geelong and Moolap all of which is home to some level of strategic level employment.

Jobs to resident workforce ratio in benchmark areas

Table 5 summarises the population, resident workforce, local jobs and jobs to resident workforce ratio for each benchmark. The eastern area has the highest jobs to resident workforce ratio at 0.83. This high rate can be attributed to the number of industrial precincts that are located in the south east of Geelong, including South Geelong, Moolap (now partially vacant), Breakwater and Fyans/West Fyans. In contrast, the southern benchmark area has the lowest jobs to resident workforce ratio of 0.5. Though it encompasses the growing Waurm Ponds health and education cluster, the Waurm Ponds retail cluster and Grovedale, it also contains newer suburbs yet to develop a mature industry base.

TABLE 5. EMPLOYMENT PROJECTIONS AND EMPLOYMENT RATIOS BY SUBURB

	Population	Resident workforce	Local jobs	Jobs to resident workforce ratio
Benchmark Area: South	56,197	32,754	16,527	0.50
Benchmark Area: North	50,103	25,317	18,353	0.72
Benchmark Area: East	47,046	25,879	21,481	0.83

Source: SGS, SGS Economics and Planning- Small Area Land Use Projections, 2017

Key employment industries

Table 6 summarises the number and proportion of jobs by employment industry for each of the benchmark areas. Benchmark South has a high proportion of Health and Education jobs, associated with the Deakin University, Epworth Hospital and Marcus Oldham College. The Benchmark North area has a broad mix of employment land uses including greater proportions of manufacturing and transport, postal and warehousing associated with the North Geelong industrial corridor,. Benchmark East is the most strongly associated with manufacturing and construction.

All benchmark areas show similar proportions of Retail Trade, Public Administration, Administration and Health Care and Assistance, indicating well established and moderately self-contained employment districts.

TABLE 6. WORKFORCE BY BENCHMARK AREA 2016

Industry categories	Benchmark Area: South		Benchmark Area: North		Benchmark Area: East		2016 All Geelong	
	No.	%	No.	%	No.	%	No.	%
Agriculture	77	0%	103	1%	208	1%	1,069	1%
Mining	10	0%	2	0%	35	0%	139	0%
Manufacturing	755	5%	2,823	15%	4,575	21%	13,109	11%
Utilities	34	0%	252	1%	255	1%	1,682	1%
Construction	1,938	12%	1,602	9%	3,130	15%	10,634	9%
Wholesale Trade	242	1%	596	3%	799	4%	3,098	3%
Retail Trade	2,422	15%	2,815	15%	2,442	11%	15,921	14%
Accom & Food	1,347	8%	756	4%	1,405	7%	7,679	7%
Transport, Postal and Warehousing	461	3%	1,614	9%	1,179	5%	5,678	5%
Information Media and Tele	189	1%	42	0%	92	0%	1,123	1%
Financial and Insurance Services	111	1%	105	1%	159	1%	2,371	2%
Rental and Real Estate Services	190	1%	99	1%	186	1%	1,165	1%
Professional Services	767	5%	418	2%	352	2%	4,183	4%
Admin Services	888	5%	1,055	6%	774	4%	5,647	5%
Public Administration	482	3%	662	4%	382	2%	5,333	5%
Education and Training	3,390	21%	1,667	9%	1,046	5%	9,168	8%
Health Care and Assistance	1,871	11%	2,762	15%	2,720	13%	18,393	16%
Arts and Recreation Services	540	3%	174	1%	450	2%	2,870	3%
Other Services	811	5%	806	4%	1,291	6%	5,516	5%
Total	16,527	100%	18,353	100%	21,481	100%	114,780	100%

Source: SGS Economics and Planning- Small Area Land Use Projections, 2017

Employment Land Types

The three benchmark areas contain slightly different distributions of employment land. Benchmark South has the lowest proportion of strategic land, while Benchmark East has the highest. Despite the presence of Deakin University, Epworth Hospital and Marcus Oldham College, Benchmark South still has only 15.6 per cent strategic level jobs (it lacks the presence of a major Strategic level industrial area).

TABLE 7. BENCHMARK EMPLOYMENT DISTRIBUTION BY EMPLOYMENT LAND TYPE (2016)

Benchmark Area	Strategic	District	Local	Total
Benchmark South	2,581	8,675	5,271	16,527
	15.6%	52.5%	31.9%	100%
Benchmark North	4,395	9,323	4,635	18,353
	23.9%	50.8%	25.3%	100%
Benchmark East	5,858	10,530	5,093	21,481
	27.3%	49.0%	23.7%	100%

Source: SGS Economics and Planning- Small Area Land Use Projections, 2017

3.2 Benchmark Areas Discussion

The significant supply of well established strategic employment land found in the northern and eastern benchmark areas may not be replicated in the NGGA or WGGA, particularly if considering a 'bottom up' demand perspective. This suggests that a realistic jobs to resident workforce ratio would be closer to the jobs ratio found in the south, which is 0.5.

To achieve a jobs to resident workforce ratio of at least 0.5, each benchmark area is home to some district and strategic employment land. For Benchmark East and North, it is manufacturing, while for benchmark south it is health and education. For the Growth Areas to reach jobs to resident workforce ratios that exceed 0.5, it will be important that opportunities are explored for attracting district employment land uses as a minimum. There may be areas suited to hosting strategic level activities, for example a freight and logistics cluster, but this would require further analysis of prospects in these sectors, and a better understanding of the capability of the competing locations.

4 WORKFORCE PROFILE AND REQUIRED LAND

4.1 Resident workforce projections for Growth Areas

Employment projections¹ for each growth area were developed based on the employment to population rate observed across urban Geelong, and based on the upper estimated population forecasts for each Growth Area. This defined the number of jobs forecast by ANZSIC code. The total employment numbers were based on the assumption of 1 job per household.

Retail job figures were excluded from these projections as at that time the retail activity centre assessments were being drafted.

Key inputs

NGGA

Population of the NGGA at full development: 50,400 people

Employment of the NGGA at full development: 17,330 employees (excluding retail)

WGGA

Population of the WGGA at full development: 61,600 people

Employment of the WGGA at full development: 21,181 employees (excluding retail)

¹ Employment forecasts were developed by PWC. See Appendix for further detail

Table 8 summarises the workforce projections for each Growth Area. The job projections are based on the same proportions of jobs by industry for each Growth Area. For both Growth Areas, the largest proportion of jobs is anticipated to be in Health Care and Social Assistance, Education and Training and Manufacturing.

TABLE 8. RESIDENT WORKFORCE PROJECTIONS FOR GROWTH AREAS (JOBS)

2016 jobs	Estimated employment at full development - Northern area	Estimated employment at full development - Western area
Agriculture Forestry & Fishing	61	74
Mining	21	26
Manufacturing	2,315	2,830
Electricity Gas Water & Waste Services	273	334
Construction	1,315	1,607
Wholesale Trade	561	685
Accommodation & Food Services	1,301	1,590
Transport Postal and Warehousing	716	875
Information Media & Telecommunications	161	197
Financial & Insurance Services	754	921
Rental Hiring & Real Estate Services	253	309
Professional Scientific & Tech Services	1,022	1,249
Admin & Support Services	383	469
Public Administration & Safety	1,127	1,378
Education & Training	2,317	2,832
Health Care & Social Assistance	3,701	4,523
Arts & Recreation Services	287	351
Other Services	762	931
Total (excl. Retail)	17,330	21,181

The workforce projections were converted into strategic, district and local employment floorspace for this report, see Table 9. Appendix 2 identifies how 2 digit ANZSIC codes were converted to strategic, district and local employment.

TABLE 9. RESIDENT WORKFORCE PROJECTIONS FOR GROWTH AREAS (JOBS)

	Northern Growth Area		Western Growth Area	
	Total	%	Total	%
Strategic	4,541	26%	5,550	26%
District	8,211	47%	10,036	47%
Local	4,578	26%	5,595	26%
Total	17,330	100%	21,181	100%

Source: SGS Economics and Planning. These numbers exclude retail trade jobs

Comparison with benchmark areas

Adapting and allocating the projections suggests that 26 per cent of jobs within each growth area will be strategic, while 47 per cent will be district and 26 per cent will be local jobs. The proportions of strategic and district jobs are comparable to the proportions of jobs found in Benchmark East, which has the highest jobs to resident workforce ratio of the benchmark areas. There is (or was prior to the Alcoa closure) a significantly higher proportion of strategic and district level jobs in the East than is observed in Benchmark South.

As previously observed, Benchmark East is home to a larger number of well established strategic industrial precincts than the other benchmark areas which contributes to a high jobs to resident workforce ratio. It is unrealistic to assume that 26 per cent of jobs within each growth area could be at a strategic level. Given the jobs to resident workforce ratio observed in Benchmark North and South of

0.72 and 0.5 respectively, it is also unlikely that all the district level jobs projected would be provided within each growth area.

4.2 Employment land forecasts

Broad land use categories

SGS has converted the employment by industry projections for the workforce in the Growth Areas into a gross requirement for employment land using a series of assumptions. The assumptions are based on detailed research and a sample audit of employment lands across Greater Dandenong. Without the benefit of detailed and comparable Geelong data, it was considered appropriate to translate the workforce by industry projections into SGS's broad land use categories² using the same ratios that were observed in Greater Dandenong, with appropriate adjustments applied given our knowledge of likely differences in the Geelong context.

Figures included in the Urban Enterprise Retail and Essential Economics Activity Centre Technical Reports were used to identify retail employment land requirements. This includes all retail-big box and bulky goods land requirements and a substantial proportion of retail main street requirements. (The 'Retail Main Street' Broad Land Use Category (BLC) used by SGS to convert job figures to land requirements also includes employment activities other than retail, such as local professional services which are found in main streets). Identified land requirements do not include allowances for public spaces, such as roads and footpaths.

Appendix 1 provides a detailed description of the method used to convert employment projections into land area requirements.

The following tables present the results of the employment land demand for each Growth Area as three scenarios. One where all employment land that is demanded is met within the Growth Areas; a second where only district and local employment land is met within the Growth Areas and a third where a proportion of district and all local employment land is met within the Growth Areas.

Analysis sensitivity

The analysis is highly sensitive to assumptions about plot ratios and the floorspace required per employee. Small adjustments to either of these have significant impacts on the land demand requirements.

The analysis is also sensitive to the assumptions on the conversion of 1 and 2 digit ANZSIC codes to strategic, district and local land uses.

² SGS uses relevant categories for land use planning to describe land used for different types of employment. These are as follows: Business / Office Parks, Office, Retail – Big Box, Bulky Goods retail, Retail – Main Street, Short-term Accommodation, Dispersed Activities, Local light industrial and urban support, Manufacturing – light, Manufacturing – Heavy, Freight and Logistics, Urban Services

Scenario 1: All employment land demand met within Growth Areas

Table 10 shows the total demand for employment land generated by residents within each Growth Area, representing the land requirements to meet 100 per cent of resident workforce jobs (not including the 'leakage' of floorspace and jobs to higher order retail centres).

TABLE 10. TOTAL DEMAND FOR EMPLOYMENT LAND IN NWGGA (HA)

Broad Land Use	Northern Growth Area				Western Growth Area			
	Strategic	District	Local	Total	Strategic	District	Local	Total
Business / Office Parks	6	5	5	16	8	6	6	20
Office	2	5	4	12	2	7	5	14
Retail - Big Box*	0	2	2	4	0	4	3	7
Bulky Goods Retail*	0	3	3	6	0	3	3	6
Retail - Main Street*	0	3	4	7	0	5	5	11
Short-term Accommodation	0	1	0	1	0	1	1	1
Dispersed Activities	2	8	10	20	3	9	12	24
Special Activities	10	32	23	65	12	40	29	80
Local light industrial and urban support	3	11	5	18	3	13	6	22
Manufacturing - Light	14	7	0	21	17	8	0	25
Manufacturing - Heavy	17	6	0	23	21	7	0	28
Freight and Logistics	42	36	2	81	52	44	2	99
Urban Services	38	38	4	79	46	46	4	97
Total	134	156	62	352	164	194	77	434

Source: SGS Economics and Planning, 2017 * figures derived from Urban Enterprise/Essential Economics retail assessment figures.

Scenario 2: District and local employment land demand met within Growth Areas

Table 11 presents the amount of land required if the demand for all district and all local employment land is met within the Growth Areas. This scenario is based on the assumption that demand for strategic employment land will be met within the existing strategic employment clusters found across Geelong. In particular, the GREP, the North Geelong industrial precincts and Central Geelong (CBD). However, all district and local employment clusters would be found within each growth area, which would include district scale health and education activity and district level industrial activity.

If all district and local employment land demand is met within Growth Areas this would mean that a jobs to resident workforce ratio of 0.72 would be achieved within the Northern Growth Area and a jobs to resident workforce ratio of 0.72 would be met within the Western Growth Area.

TABLE 11. DISTRICT AND LOCAL DEMAND FOR EMPLOYMENT LAND IN NWGGA (HA)

Broad Land Use	Northern Growth Area				Western Growth Area			
	Strategic	District	Local	Total	Strategic	District	Local	Total
Business / Office Parks	0	5	5	10	0	6	6	12
Office	0	5	4	10	0	7	5	12
Retail - Big Box*	0	2	2	4	0	4	3	7
Bulky Goods Retail*	0	3	3	6	0	3	3	6
Retail - Main Street*	0	3	4	7	0	5	5	11
Short-term Accommodation	0	1	0	1	0	1	1	1
Dispersed Activities	0	8	10	17	0	9	12	21
Special Activities	0	32	23	56	0	40	29	68
Local light industrial and urban support	0	11	5	16	0	13	6	19
Manufacturing - Light	0	7	0	7	0	8	0	8
Manufacturing - Heavy	0	6	0	6	0	7	0	7
Freight and Logistics	0	36	2	38	0	44	2	47
Urban Services	0	38	4	41	0	46	4	50
Total	0	156	62	219	0	194	77	271

Source: SGS Economics and Planning, 2017 * figures derived from the Urban Enterprise/Essential Economics retail assessment.

Scenario 3: Part district and all local employment land demand met within NWGGAs

This scenario is based on the reasonable assumption that demand for strategic employment land will be met within the existing strategic employment clusters found across Geelong. In particular, the GREP, the North Geelong industrial precincts and Central Geelong (CBD), while some of the demand for district employment land, including health and education (special activities) and urban services will also be met by existing employment precincts. Commentary regarding the employment leakage is also provided. The employment leakage has been determined based on the analysis of candidate locations that was included in Section 2.3. Table 12 identifies the assumed employment leakage for each broad land use type.

This scenario is derived from what is observed in the benchmark areas where despite the presence of healthy strategic employment clusters, which also attract district employment uses, the jobs to resident workforce ratio in the areas ranges from 0.5 to 0.83. Given that there is not anticipated to be any major clusters of strategic employment land in the Growth Areas³, it is anticipated that the jobs to resident workforce ratio is likely to be lower than what is found in the benchmark areas.

TABLE 12. DISTRICT EMPLOYMENT LEAKAGE ASSUMPTIONS FOR GROWTH AREAS

Broad Land Use	Comment
Business / Office Parks	50 % leakage: existing Waurm Ponds emerges as a major district cluster- attracts related commercial and office activities, Geelong CBD and transitioning industrial precincts in North Geelong continue to be attractive
Office	50 % leakage: existing Waurm Ponds emerges as a major district cluster- attract related commercial and office activities, Geelong CBD and transitioning industrial precincts in North Geelong continue to be attractive
Retail - Big Box*	Leakage already accounted for by Urban Enterprise/Essential Economics analysis
Bulky Goods Retail*	Leakage already accounted for by Urban Enterprise/Essential Economics analysis
Retail - Main Street*	Retail accounted for by Urban Enterprise analysis; 30% leakage of Main Street related services into Geelong CBD retail
Short-term Accommodation	10% leakage into Geelong CBD and established town centres
Dispersed Activities	10% leakage into established areas
Special Activities	50% leakage of health and education jobs into Waurm Ponds health and education cluster and Geelong CBD. Potential for district education (e.g. TAFE) and health in a district level centre.
Local light industrial and urban support	30% leakage into West industrial precinct, North Geelong, adjacent existing industrial areas and vacant land in South Geelong
Manufacturing Light	40% leakage due to proximity to North Geelong industrial precincts , as well as new West industrial precinct that will compete for district industrial jobs
Manufacturing Heavy	100% leakage due to proximity to GREP, North Geelong industrial precincts, as well as new West industrial precinct that will compete for district industrial jobs. Also due to incompatibility with residential land use.
Freight and Logistics	60% leakage-Local distribution centres and retail wholesaling could be accommodated. Could accommodate strategic precincts for this activity that should be identified as part of a wider employment land study
Urban Services	30% leakage into employment precincts in Lara, North Geelong, Geelong Port, West industrial precinct, GREP and vacant land in south Geelong

Source: SGS Economics and Planning, 2017

Table 13 presents the amount of land required if the demand for a proportion of district and all local employment land is met within the Growth Areas. Under this scenario, the Northern Growth area would have a jobs to resident workforce ratio of approximately 0.55, while the Western Growth Area would have a jobs to resident workforce ratio of 0.55.

³ As assumed in this review; a more detailed LGA wide employment lands analysis might identify a shortage of land supply that might be satisfied in one of the Growth Areas (though other locations would also be considered in such an analysis).

TABLE 13. PROPORTION OF DISTRICT AND LOCAL DEMAND FOR EMPLOYMENT LAND IN GROWTH AREAS (HECTARES)

Broad Land Use	Northern Growth Area				Western Growth Area			
	Strategic	District	Local	Total	Strategic	District	Local	Total
Business / Office Parks	0	2	5	7	0	3	6	9
Office	0	3	4	7	0	3	5	9
Retail - Big Box*	0	2	2	4	0	4	3	7
Bulky Goods Retail*	0	3	3	6	0	3	3	6
Retail - Main Street*	0	2	4	6	0	4	5	9
Short-term Accommodation	0	1	0	1	0	1	1	1
Dispersed Activities	0	7	10	16	0	8	12	20
Special Activities	0	16	23	40	0	20	29	48
Local light industrial and urban support	0	8	5	12	0	9	6	15
Manufacturing - Light	0	4	0	4	0	5	0	5
Manufacturing - Heavy	0	0	0	0	0	0	0	0
Freight and Logistics	0	15	2	17	0	18	2	20
Urban Services	0	26	4	30	0	32	4	37
Total	0	88	62	151	0	110	77	187

Source: SGS Economics and Planning ,2017 * figures derived from the Urban Enterprise/Essential Economics retail assessment.

5 CONCLUSION: KEY FINDINGS

5.1 Job to resident workforce principle

Job to resident workforce outcomes in the Growth Areas

An explicit principle of providing one job per household has been identified as an input to the planning for the Growth Areas. From the three scenarios outlined in section 4 an employment outcome which falls within the range suggested by scenario 2 and scenario 3 is the most likely for the growth areas in SGS's view. The range reflects the difference between only a share of required district level employment land being provided within the growth areas, and all required district level employment land being provided within growth areas.

This implies the range of jobs to resident workforce ratios shown in Table 14 (on the reasonable assumption that the resident workforce and household numbers are similar). While we suggest that the lower end of the range is a more likely outcome, prudent early planning might make provision for land able to accommodate additional employment and an increase in the ultimate number of jobs and the jobs to resident workforce ratios.

TABLE 14. POTENTIAL JOBS TO RESIDENT WORKFORCE RATIOS IN THE GROWTH AREAS

	NGGA	WGGA
Number of jobs	11,000-14,000	14,000-18,000
Resident workforce (proxy for households)	19,884 (17,330* plus an estimated 2,554 retail jobs)	24,864 (21,181* plus an estimated 3,683 retail jobs)
Job ratio	0.55-0.72	0.55-0.72

- Retail estimates based on Urban Enterprise/Essential Economics retail floorspace requirement assessments

The lower end of this range of ratios is above that observed in a benchmark area in the south of Geelong but not as high as those observed in a benchmark area in the east of Geelong (where the ratio was calculated in the latter case on job figures from when the Alcoa plant at Moolap was still open; the ratio will have declined since).

These outcomes assume that demand for strategic employment land will be largely met within the existing strategic employment clusters found across Geelong. In particular, the GREP, the North Geelong industrial precincts and Central Geelong (CBD) are anticipated to accommodate future strategic level employment. Suggesting a range of jobs however also makes provision for some strategic level jobs to emerge in the Growth Areas. While the high level analysis in this report has discounted the likelihood of major strategic level employment locating in the Growth Areas it is inevitable that some will emerge. It is assumed that some of the demand for district employment land, including health and education (special activities) and urban services will be met by existing employment precincts (in the WGGA the Waurm Ponds health and education activities are a particular 'attractor' for district level employment).

While the one to one jobs to resident workforce ratio or one job per household principle is not satisfied, the range suggested here is a realistic outcome given the economic geography of urban regions. It is expected that most strategic and some district level jobs will cluster outside of fringe growth areas based on agglomeration economies and efficiencies gained from concentrating activities. In a relatively small

urban area like Geelong it can be seen that a large share of jobs is nevertheless accessible within a short distance.

Job leakage and accessibility from the Growth Areas

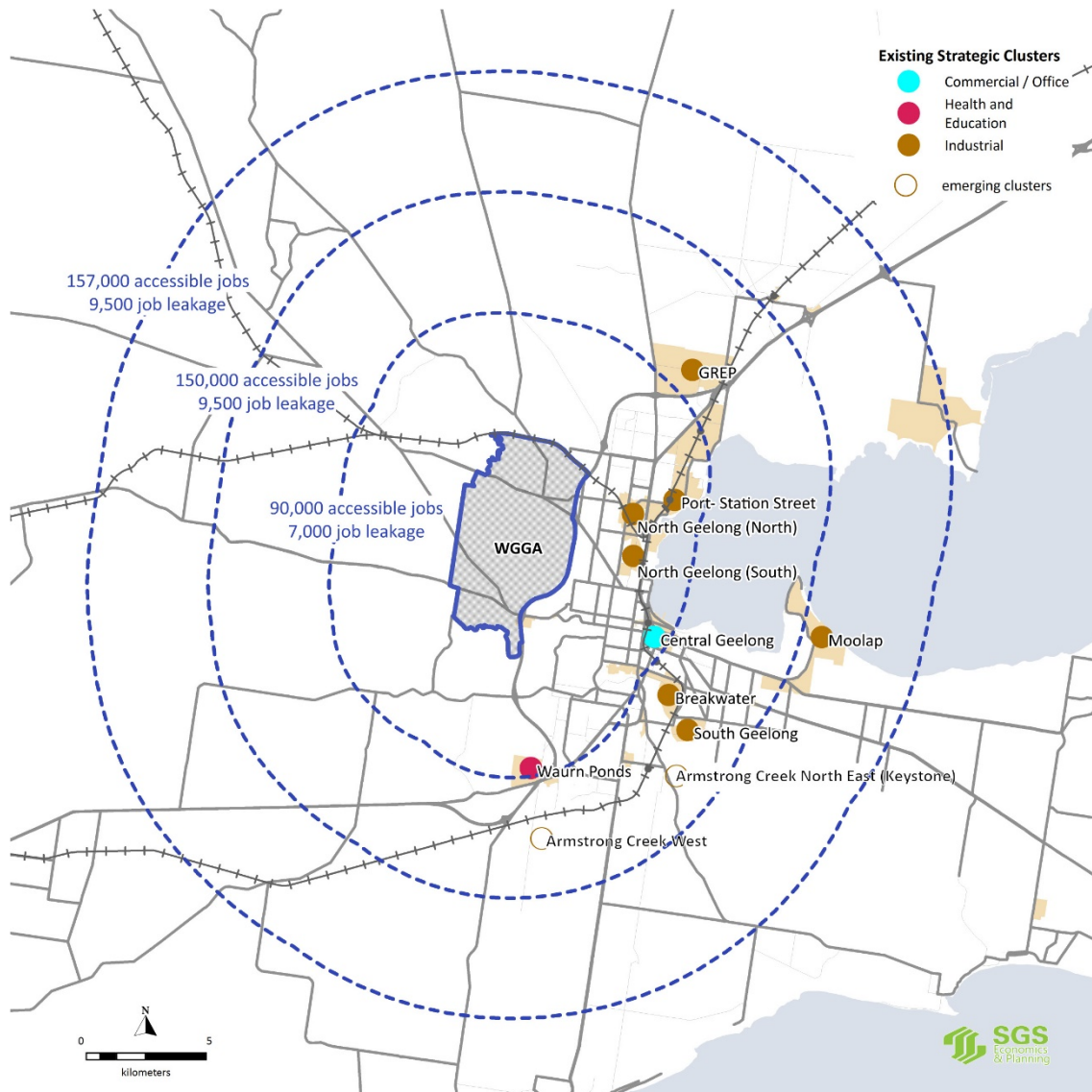
Figure 11 and Figure 12 illustrate the projected number of jobs accessible within 5km, 10km and 15km of each growth area at 2041 under Scenario 3. It also includes an indicative number of jobs that are anticipated to have leaked from each growth area into nearby employment precincts (the resident workforce jobs in the Growth Areas have been added to the 2041 employment projections).

FIGURE 11. JOB ACCESSIBILITY AND SCENARIO 3 'LEAKAGE' FROM NGGA



It is suggested that about 4,000 of the jobs associated with the new labour force of the NGGA will be provided within 5km of the border of the NGGA, with around 38,000 overall in this range. These jobs will be largely associated with Manufacturing as well as Freight and Logistics and Urban Services, and are associated with GREP and the North Geelong Corridor. Within 10km, there will be an additional leakage of approximately 3,250, and these will be health and education jobs and commercial/office jobs associated with Geelong CBD.

FIGURE 12. JOB ACCESSIBILITY AND SCENARIO 3 LEAKAGE FROM WGGa



Source: SGS Economics and Planning, 2017

The WGGa has access to a far greater number of jobs within 5km of its borders, approximately 90,000 jobs which includes leakage of 7,000 from the WGGa. Within 5km of the WGGa are all the North Geelong corridor precincts, Central Geelong and the Waurin Ponds health and education precinct. This proximity to jobs and established precincts will drive the job leakage anticipated in the WGGa. The types of jobs leaking out of the WGGa within 5km range from commercial/office to Manufacturing and health and education jobs. Within 10km there will be a further leakage of approximately 2,500 jobs, which will primarily leak into the industrial precincts of South Geelong, Breakwater and the two emerging industrial precincts. Some leakage of jobs into Melbourne is also anticipated.

Table 14 and Table 15 summarise these estimates. The key point here is that while the 1 to 1 jobs to resident workforce ratio is not achieved within the Growth Areas it is quickly surpassed within 5 km (i.e. a 10 to 15 minute drive, even in peak hour).

TABLE 15. NGGA JOBS ACCESSIBILITY AND WORKFORCE RATIO

	Inside NGGA	Within 5km	Within 10km	Within 15km
Number of jobs	10,120	38,260	111,160	145,260
Job ratio	0.55-7.2*	2.2	6.4	8.4

Nb. includes retail job estimates

TABLE 16. WGGA JOBS ACCESSIBILITY AND WORKFORCE RATIO

	Inside WGGA	Within 5km	Within 10km	Within 15km
Number of jobs	11,570	88,880	150,670	157,180
Job ratio*	0.55-0.72	4.2	7.1	7.4

*Nb. includes retail job estimates

While a good range of high quality local jobs is important, the strength of the regional economy overall and the health of key employment clusters and concentrations, and access to them, is particularly critical to underpin a full range of employment options for new residents in growth areas.

5.2 'Closing the gap'

The strict adoption of the one job per household or one job per resident worker principle may be seen as a measure to strengthen employment opportunities in Greater Geelong in general, but as implied by the above discussion it may actually weaken overall prospects by constraining the employment clusters outside of the Growth Areas from reaching their potential to develop critical mass and compounding economic strengths.

Three approaches are therefore suggested **where appropriate** to 'close the employment gap' for local resident workers.

- The first is certainly to ensure that local jobs, meeting population driven needs, are maximised. This means creating high amenity, well positioned precincts for weekly to monthly retailing, leisure and recreation activities, local and secondary education, and local health services, as well as including areas for light industry and service activities as part of the development. These opportunities need to be 'planned in' in neighbourhood and local centres. The range of employment land suggested for each Growth Area will accommodate these activities. In addition to the provision of employment land the local economy can be strengthened by innovations such as community gardens, trade centres and promotions for services to be provided locally and community centres which provide incubators or enterprise spaces for business start-ups. The aim is to maximise prospects for the circulation and 'recycling' of local wealth and expenditure.
- The second is to selectively provide for district level functions as well as some local activities in a town centre setting. In addition to retailing, second floor office space may attract service enterprises, education campuses which combine secondary schools with training institutions and community health precincts will maximise prospects in this regard. Comprehensive structure planning is required to avoid the car dominated, pedestrian unfriendly environments which tend to emerge in district level centres in some new release areas (the Waurm Ponds centre, dominated by at-grade car parking and fragmented and divided by arterial roads, could be considered an example to be avoided). An integrated, intimate design based around a mixed use, main street core is desirable. The key district centre in each Growth Area should be provided where trunk public transport corridors are planned.
- The third is to act to strengthen rather than dilute key economic clusters outside of the Growth Areas and connect these with high quality access corridors including with public transport. This requires effective Geelong wide retail and commercial floorspace planning which prioritises the CBD as the dominant centre in the urban area, directs tertiary level health and education expenditure to existing clusters and plans for renewed and new industrial precincts which build on locational

advantages. It could be that a Geelong wide assessment of the need for the latter identifies a precinct which could locate in or near the Growth Centres. This would be in addition to the areas identified in this report and would require additional analysis.

5.3 Areas and principles for the location of employment precincts

The NWGGA context report has identified potential locations for future activity centres and industrial precincts. We have not evaluated the suitability of the identified locations in this report, but have created a series of principles to provide guidance on planning for future employment land uses.

Table 16 identifies four distinct precinct types: health and education; industrial; business/office, and retail and related services. For each precinct type, a series of location principles are provided which can be used to guide the siting of future employment precincts in the growth areas.

A range for the provision of employment land by precinct type is also provided for each Growth Area. The range of employment land proposed reflects the results from both Scenario 2 and Scenario 3. The upper end of the range assumes all district employment is accommodated, while the lower end of the range assumes only a share of district employment being accommodated. While this report suggests that the lower end is the most likely outcome, prudent early planning shouldn't preclude the possibility of accommodating more district level, and indeed some strategic level, employment. The possibility for some strategic level employment land is embedded in each of the ranges⁴.

⁴ The employment hosting land area identified is based on plot ratios. Therefore it does not include public space such as roads and footpaths. The upper range would therefore be more appropriate to sufficiently cover the total land required for each precinct type.

TABLE 17. AREAS AND PRINCIPLES FOR EMPLOYMENT LAND IN GROWTH AREAS

Precinct Type	Northern Growth Area	Western Growth Area	Location Principles
<p>Health and Education Special Activities: <i>e.g. health services, hospitals, medical centres, schools and TAFES</i></p>	50 - 55 hectares	50 - 70 hectares	<ul style="list-style-type: none"> – In addition to dispersed provision for primary schools, a secondary school could be part of an education ‘campus’ integrated with a district centre – Community and private medical services should be clustered in a district centre – Locate where new and existing population can readily access – Locate on road networks that are served by existing/future bus/rail network – Avoid interface area with existing industrial clusters
<p>Industrial Service Industry and Urban Support: <i>e.g. Car service and repair; joinery, construction and building supplies; domestic storage,</i> Light Manufacturing: <i>e.g. printing works, clothing manufacturing, boat building, light engineering activities.</i> Freight and Logistics: <i>e.g., warehousing and distribution activities</i> Urban Services: <i>e.g. concrete batching plants, bus depots, defence activities</i></p>	55 - 110 hectares	70 - 135 hectares	<ul style="list-style-type: none"> – Could be one large (e.g. 60% of total) and two smaller ‘service’ precincts (e.g. 40% of total) – Large precinct with larger lot sizes (e.g. 0.5 to 4 ha) would need a location in close proximity to the Geelong Ring Road to maximise arterial road accessibility. – Appropriate buffering to residential development required, particularly for larger area – Smaller precincts with smaller lot sizes (e.g. a mix up to 0.5 ha) could be ‘at the back’ of or near a retail or district centre to get local employment synergies.
<p>Business / Office Business Parks: <i>e.g. Ancillary administration office to manufacturing/ warehousing/ distribution facility.</i> Office: <i>e.g. finance, engineering, architectural services.</i></p>	15 - 20 hectares	17 – 25 hectares	<ul style="list-style-type: none"> – Locate adjacent to or integrated with district activity centre to provide a ‘back office’ function – Smaller stand-alone, first floor and podium formats preferred – Locate within walking distance of roads that are served by existing/ future bus/rail network
<p>Retail and related services Bulky Goods Retail: <i>e.g. Homemaker centres, hardware supplies,</i> Big Box Retail: <i>e.g. shopping centres typically anchored by supermarkets, and sometimes department stores with other grocery stores and specialty shops etc.</i> Main Street Retail: <i>e.g. clothes stores, newsagents, butchers, post offices, convenience stores and grocery stores</i> Dispersed Activities: <i>e.g. Childcare Centres, Service Stations, Churches, gymnasiums</i></p>	30 – 35 hectares	45-50 hectares	<ul style="list-style-type: none"> – Dispersed according to the planned internal retail hierarchy
Total employment land	155-200 hectares	190-270 hectares	

6 APPENDIX 1

6.1 Employment land forecasts

Broad land use categories

SGS has translated these detailed employment by industry projections for Greater Geelong into requirements for employment land using a series of detailed and robust assumptions regarding employment land use propensities. The assumptions are transparent, based on robust research and industry tested data and further refined after undertaking a detailed sample audit of employment lands across Greater Dandenong. It was considered appropriate to translate the Greater Geelong industry projections into broad land use categories using the same ratios that were observed in Greater Dandenong.

The first step involves translating employment by industry classifications into employment by broad land use categories.

Figure 13 below presents the observed breakdown of employment for each industry from the land use audits. These breakdown ratios are based on an analysis of detailed sub-industry classifications (3 digit ANZSIC) for Greater Dandenong and from extensive land use audits completed by SGS around Australia.

This approach captures the requirements of all employment, rather than simply focusing on a selection of key sub-industries. This ensures a holistic understanding of the land use needs in Greater Geelong is developed. For example, Wholesaling continues to be predominantly a Freight and Logistics land use, but some components of their operations (e.g. the head office) may be located in business/office parks. Indeed, both components may well exist on the one site. Such issues are considered for all industries.

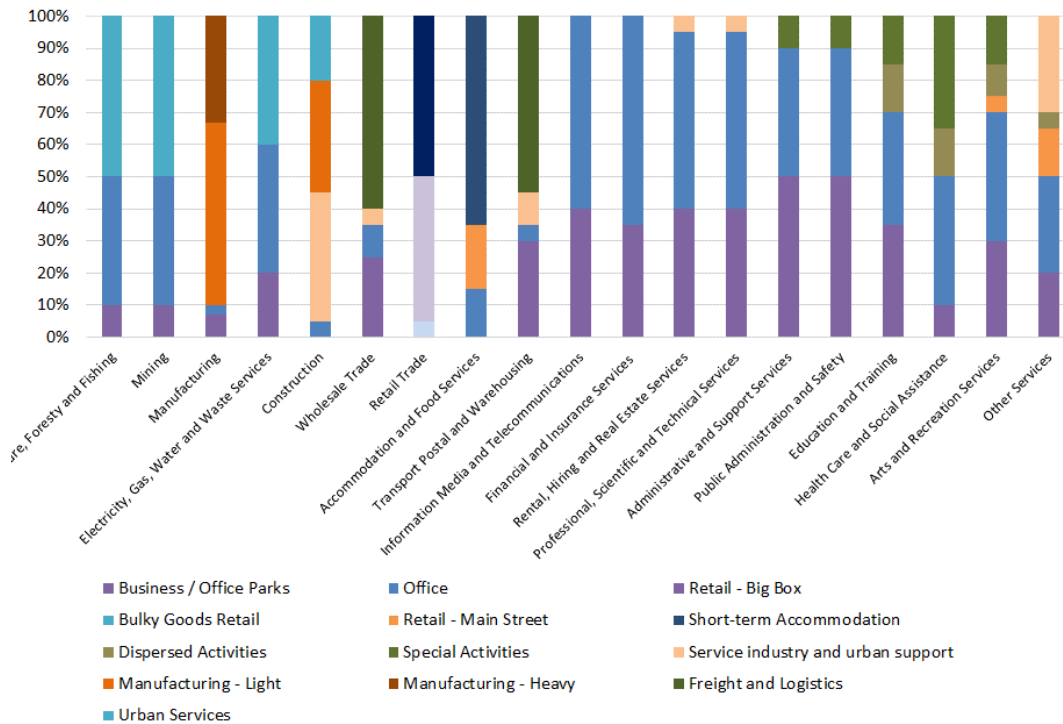
Broad Land use Categories

The general definitions for each Broad Land Use Category is summarised below

- **Business / Office Parks;** Integrated warehouse, storage, R&D, 'back-room' management and administration with up to 40% office component. Example uses: Generally ancillary administration office to a manufacturing/warehousing/distribution facility.
- **Office;** Office buildings that are independent (i.e. are not ancillary to another use on site) and likely to accommodate a significant number of administration staff. Example uses: finance, engineering, architectural services.
- **Big Box Retail;** shopping centres typically anchored by supermarkets, and sometimes department stores and/or discount department stores, with other grocery stores and specialty shops etc
-
- **Bulky Goods Retail;** Typically large, one-storey buildings surrounded by car-parking. Example uses: Homemaker centres, Harvey Norman
- **Retail - Main Street;** Main Street Retail involves small scale and local retailing activities, traditionally found on the main street of an area. Example uses: Newsagents, butcher, osh office, cafes, convenience stores, some specialty shops.
- **Short-term Accommodation;** Hotels, motels, bed and breakfast. Example uses: hotels, motels.
- **Dispersed Activities;** Social and community services, trades construction, other 'nomads' including service stations. Example uses: childcare centres, churches.

- **Special Activities;** Public sector administration, health services, police services. Example uses: hospitals, police stations.
- **Service Industry and urban support;** Car service and repair; joinery, construction and building supplies; and domestic storage. Typically does not interfere with the amenity of the neighbourhood via pollution. Example uses: auto repairs, building supplies.
- **Manufacturing – Light;** Small scale production with lower noise and emission levels than heavy manufacturing. Example uses: printing works, clothing manufacturing, boat building, light engineering activities.
- **Manufacturing – Heavy;** Large scale production activity. Likely to be characterised by high noise emission; emission stacks; use of heavy machinery; and frequency of large trucks. Example uses: chemical manufacturing, meat processing, iron/steel manufacturing.
- **Freight and Logistics;** Warehousing and distribution activities. Includes buildings with a number of docking facilities; ‘hardstand’ areas with trucks or goods awaiting distribution; and large storage facilities. Example uses: postal depots, distribution centres, container terminals.
- **Urban Services;** Concrete batching, waste recycling and transfer, construction and local and state government depots, sewerage, water supply, electricity, construction yards. Example uses: concrete batching plants, bus depots, defence activities.

FIGURE 13 EMPLOYMENT INDUSTRY BY BROAD LAND USE TYPE



Source: SGS Economics and Planning

By applying the ratios shown in Figure 13 to SGS’s employment projections by industry, we are able to categorise projected employment in terms of broad land use category for each growth area.

Floorspace demand

From here, separate employment to floorspace ratios can be applied to each broad land use type to determine a total floorspace requirement across Greater Geelong (Figure 14). Plot ratios (also known as floorspace to land area ratios or proportion of a site occupied by a building) have then been applied to the floorspace numbers to arrive at estimates of land area demand

We have used floor space per job and plot ratios based on Greater Dandenong. However we have adopted more land consumptive ratios for retail uses because the Dandenong figures are distorted by a high density Dandenong city centre. We have also chosen to adopt an urban services land consumption ratio which is lower than the Dandenong ratio as the Dandenong figures include major sewerage treatment plants and high land using activities unlikely to appear in the Geelong Growth Areas. For this latter figure we have adopted a ratio of land consumption for urban services observed in middle ring suburbs.

FIGURE 14 FLOOR SPACE PER JOB AND PLOT RATIOS APPLIED

Broad land use category	Floorspace per job	Plot ratios
Business / Office Parks	50	2.00
Office	25	1.67
Bulky Goods Retail	65	1.60
Retail - Main Street	35	2.20
Short-term Accommodation	35	1.40
Dispersed Activities	35	0.63
Special Activities	70	3.33
Service Industry and urban support	70	2.50
Manufacturing - Light	100	2.00
Manufacturing - Heavy	75	2.00
Freight and Logistics	100	3.33
Urban Services	220	5.00

Source: SGS Economics and Planning, 2017

7 APPENDIX 2

7.1 Conversion table: ANZIC to employment land type

The table below summarises the distribution of employment land by each 1 digit ANZIC code. Employment land was categorised as strategic, district or local based on the 2 digit ANZIC code. This was then aggregated to 1 digit ANZIC code to allow analysis of employment forecasts.

Combined Audits	Strategic	District	Local
Wholesale Trade	81%	17%	2%
Retail Trade	1%	63%	36%
Education & Training	17%	46%	37%
Arts & Recreation Services	18%	45%	37%
Accommodation & Food Services	0%	56%	44%
Agriculture Forestry & Fishing	0%	100%	0%
Manufacturing	74%	25%	1%
Electricity Gas Water & Waste Services	62%	35%	3%
Construction	13%	81%	6%
Transport Postal and Warehousing	26%	71%	3%
Information Media & Telecommunications	63%	37%	0%
Rental Hiring & Real Estate Services	1%	6%	93%
Professional Scientific & Tech Services	24%	44%	32%
Admin & Support Services	0%	61%	39%
Other Services	6%	8%	86%
Unknown	20%	33%	47%
Health Care & Social Assistance	9%	56%	36%
Residential	0%	1%	99%
Public Administration & Safety	40%	49%	11%
Vacant	22%	48%	30%
Under Construction	0%	0%	0%
Financial & Insurance Services	30%	59%	11%
Mining	100%	0%	0%
Total	30%	38%	26%

8 APPENDIX 3

8.1 Details of PWC employment forecasts

Memorandum

About this memorandum

This memorandum describes the approach adopted by PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) in developing estimates of the City of Greater Geelong's future industry employment profile within the Northern and Western Geelong Growth Areas out to 2036.

Disclaimer

We prepared this memorandum solely for the CoGG's use and benefit in accordance with and for the purpose set out in our engagement letter dated 26 September 2016.

The information, statements, statistics, material and commentary (together the 'Information') contained in this memorandum have been prepared by PwC from publicly available material, materials provided from, and discussions held with, CoGG and utilising PwC's proprietary Geospatial Economic Model (GEM). PwC has relied upon the accuracy, currency and completeness of the Information provided to it by CoGG and takes no responsibility for the accuracy, currency, reliability or correctness of the Information and acknowledges that changes in circumstances after the time of publication may impact on the accuracy of the Information.

We accept no responsibility, duty or liability:

- to anyone other than the CoGG in connection with this memorandum
- to the CoGG for the consequences of using or relying on it for a purpose other than that referred to above.

We make no representation concerning the appropriateness of this memorandum for anyone other than the CoGG. If anyone other than the CoGG chooses to use or rely on it they do so at their own risk.

This disclaimer applies:

- to the maximum extent permitted by law and, without limitation, to liability arising in negligence or under statute; and
- even if we consent to anyone other than the CoGG receiving or using this memorandum.

Liability limited by a scheme approved under Professional Standards legislation.

Approach

Table 1 below details industry employment projections for urban areas of the CoGG Local Government Area (LGA). The estimates described in Table 1 were prepared as follows:

1. Industry employment projections to 2031 for the CoGG LGA were provided to PwC by the CoGG in the form of a REMPLAN report titled *Economic Development Strategy: Employment Forecasts to 2031, Final Draft, February 2016*.
2. Using PwC's Geospatial Economic Model (GEM), the REMPLAN employment data (2011 and 2031) were distributed among the SA2s within the CoGG LGA. This distribution relies on GEM estimates of industry employment by SA2 in the year ended 30 June 2015.
3. Industry employment projections by SA2 for the 2015 and 2036 years were estimated based on the growth rates identified between 2011 and 2031 in the REMPLAN estimates.
4. SA2s within the CoGG LGA with a predominantly urban character (based on existing planning zones) were identified and agreed by PwC and the CoGG.¹
5. The SA2 industry employment projections were aggregated across those SA2s selected in step 4 and summarised in Table 1 for the 2015, 2031 and 2036 years.

Table 1: Greater Geelong industry employment profile

industry id	industry name	Employees - Urban SA2s in Greater Geelong only			Profile - Urban SA2s
		2015	2031	2036	Industry proportion of total employment, 2036
A	Agriculture, Forestry and Fishing	226	475	500	0.5%
B	Mining	78	298	346	0.3%
C	Manufacturing	8,610	9,634	9,591	9.1%
D	Electricity, Gas, Water and Waste Services	1,015	2,124	2,432	2.3%
E	Construction	4,890	8,358	9,342	8.9%
F	Wholesale Trade	2,085	2,095	2,071	2.0%
G	Retail Trade	10,231	12,264	12,796	12.2%
H	Accommodation and Food Services	4,838	6,045	6,453	6.1%
I	Transport, Postal and Warehousing	2,663	2,180	2,084	2.0%
J	Information Media and Telecommunications	600	1,306	1,446	1.4%
K	Financial and Insurance Services	2,802	2,835	2,986	2.8%
L	Rental, Hiring and Real Estate Services	939	1,095	1,137	1.1%
M	Professional, Scientific and Technical Services	3,800	6,981	7,865	7.5%
N	Administrative and Support Services	1,426	2,122	2,250	2.1%
O	Public Administration and Safety	4,192	5,510	5,988	5.7%
P	Education and Training	8,615	13,918	15,485	14.7%
Q	Health Care and Social Assistance	13,762	15,823	16,865	16.1%
R	Arts and Recreation Services	1,067	1,674	1,862	1.8%
S	Other Services	2,834	3,399	3,577	3.4%

Source: PwC's GEM, REMPLAN

¹ SA2s identified as urban include Corio – Norlane, Grovedale, Newcomb – Moolap, Leopold, Highton, Geelong, Lara, North Geelong - Bell Park, Belmont, Geelong West - Hamlyn Heights and Newtown (Vic.)

Contact us

CANBERRA

Level 2, 28-36 Ainslie Place
Canberra ACT 2601

+61 2 6257 4525
sgsact@sgsep.com.au

HOBART

PO Box 123
Franklin TAS 7113

+61 421 372 940
sgstas@sgsep.com.au

MELBOURNE

Level 14, 222 Exhibition Street
Melbourne VIC 3000

+61 3 8616 0331
sgsvic@sgsep.com.au

SYDNEY

209/50 Holt Street
Surry Hills NSW 2010

+61 2 8307 0121
sgsnsw@sgsep.com.au

PARRAMATTA

Level 7, 91 Phillip Street
Parramatta NSW 2150

+61 2 8307 0121
sgsnsw@sgsep.com.au

