

University of Southern Queensland  
Faculty of Health, Engineering and Sciences

# Assessing spatial mismatch patterns in the Gold Coast

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# ABSTRACT

This research project empirically tests for the presence of *spatial mismatch* in the case study region of the Gold Coast, Australia. Spatial mismatch is defined as the mismatch between where low-income households reside, and suitable job opportunities (Kain 1968). Globally, several large scale empirical studies have identified a causal link between poor employment outcomes of low socio-economic residents, and the commuting distances to employment centres (Andersson et al. 2014; Dodson 2005; Ihlanfeldt 2006; Li, Campbell, & Fernandez 2013). However, to date there has been a lack of empirical analysis of the overlap between spatial dimensions of housing and employment (and the commuting such divisions necessitate) in Australia, and never in the case study region. Thus, empirical testing to identify the presence of spatial mismatch in the case study region, was considered practical in order to address the identified gap in the literature. Using Geographic Information System (GIS) software, secondary data from the 2006 and 2011 Australian Bureau of Statistics (ABS) censuses, at the Statistical Local Area (SLA) unit, was used to spatially identify three low socio-economic/high unemployment case study SLAs in the city. A map of the absolute difference in employment was developed using the ABS data in the five-year period. A buffer of 15.6km (average commuting distance Australians travel to access work (BITRE 2015)), was applied around each of the three case study SLAs; in order to identify if disadvantaged households were able to reach areas of high employment within reasonable commuting times. A secondary part of the research assessed the temporal quality of the public transport in each of the identified case study SLAs, as previous research identified that the key to reducing the effects of spatial mismatch is to improve public transport accessibility (Dodson 2005). The research identified that *spatial mismatch was not considered an issue* in the case study region of the Gold Coast as the number of employment opportunities grew in absolute numbers; however, the growth was mostly in part-time employment. This finding reflects several other studies, which have highlighted Australia's shift in employment patterns towards an increase in part-time/casual employment (Australian Social Inclusion Board 2009; ABS 2016). The ABS data identified that housing affordability was not strongly spatially differentiated, with a high numbers of unemployed/low-income households, residing in inner city areas, which are subsequently close to employment centres. The public transport assessment identified that the highly disadvantaged outer suburban case study area of Nerang, provided the poorest service accessibility relative to the employment centres. This finding was confirmed with ABS (2011) identifying that households in case study areas with good access to public transport (Southport), were nearly twice as likely to not own a car, compared to those with poorer public transport access(Nerang).

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I further certify that the work is original and has not been previously submitted for assessment in any other course or institution, except where specifically stated.

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## TABLE OF CONTENTS

ABSTRACT.....	iii
List of figures.....	x
List of tables.....	xii
Glossary of terms .....	xii
CHAPTER 1- INTRODUCTION.....	1
1.1 Background information for the research .....	1
1.2 Research design goals .....	3
1.3 Aims of the project.....	3
1.4 Research questions.....	4
1.5 Background information on the case study region (Gold Coast).....	4
1.6 Employment centres.....	6
1.7 Employment sectors.....	6
1.8 Household income and housing tenures.....	7
1.9 The structure of the dissertation.....	7
CHAPTER 2- LITERATURE REVIEW.....	10
2.1 Spatial Mismatch Theory.....	10
2.2 Importance of considering spatial mismatch .....	11
2.3 The mechanisms of spatial mismatch .....	11
2.4 Spatial mismatch in Australia .....	12
2.5 Public transport and social exclusion.....	14
2.6 Neighbourhood effects.....	16
2.7 Neighbourhood poverty and inequality .....	17
2.8 Patterns of urban employment .....	18
2.9 Housing affordability.....	20
3.0 Housing occupancy and costs .....	23
3.1 Australia's rental market .....	25
3.2 Literature review's conclusion.....	27
CHAPTER 3 – METHODOLOGY.....	28
3.1 Quantitative research .....	28
3.2 Overview of the research design .....	28
3.3 Case study design.....	31
3.4 Unit of analysis .....	31
3.5 Data collection methods.....	32
3.6 Data presentation .....	33

3.7 Research questions	34
3.8 Methods for responding to research questions	34
CHAPTER 4 – RESULTS AND DISCUSSIONS	43
4.1 Structure of results	42
Part I- Affordable housing, low income and high unemployment SLAs	43
4.1.1 Housing rental expenditure	44
4.1.2 Housing mortgage expenditure	46
4.1.3 Low-income households	47
4.1.4 Social housing spatial concentrations	48
4.1.5 Unemployed residents	51
4.1.6 Identifying three highly disadvantaged SLAs	51
Part II- labour market disadvantage and opportunity	52
4.2.1 Relative change in full-time employment	53
4.2.2 Relative change in part-time employment	55
4.2.3 Relative change in unemployment	56
4.2.4 Absolute change in the employment numbers	58
Part III- Employment growth close to affordable housing	59
4.3.1 Spatial mismatch at the SLA level	60
Part IV- Assessing public transport accessibility in the Gold Coast, Australia	61
4.4.1 Background information on identified disadvantaged areas	66
4.4.2 Discussion of public transport accessibility	66
CHAPTER 5 - CONCLUSION	68
5.1 Discussion of research questions	74
5.2 Implications of research findings	70
5.3 Research recommendations	72
5.4 Future research	74
REFERENCE LIST	75
APPENDIX A- UNEMPLOYMENT AND EMPLOYMENT DATA	82
APPENDIX B- PROJECT SPECIFICATION VERSION 3	87

## List of figures

<b>Figure 1.1:</b> The location of the Gold Coast in relation to the rest of Australia (Infomaps 2012, p.3)...	4
<b>Figure 1.2:</b> Estimated resident population of Gold Coast City from 2005 to 2015 (ABS 2016, p.5) ....	6
<b>Figure 1.3:</b> Lead industry sector by region in the Gold Coast City (SGS Economics and Planning 2013, p. 24). .....	7
<b>Figure 1.4:</b> The factors creating the spatial mismatch urban environment in Australia (Mcmahon 2006, p.14). .....	13
<b>Figure 1.5:</b> Spatial map of unemployment in the city of Brisbane (Queensland Treasury and Trade 2013, p.6). .....	14
<b>Figure 1.6:</b> Gini Coefficient values—international comparison of distribution of individual incomes (Pawson, Davison & Wiesel 2012, p.12).....	16
<b>Figure 1.7:</b> Real house prices by distance from CBD in Australia’s largest cities, in 2009–10 AUD (State of Australian Cities 2013, p.12). .....	21
<b>Figure 1.8:</b> House price to household income ratio in all of Australia’s capital cities, September 1995-September 2010 (HIA Economics Group 2010, p. 4).....	24
<b>Figure 1.9:</b> Australian housing tenure, 1994-95 to 2011-2012 (ABS 2013b, p.1).....	23
<b>Figure 2.0:</b> Research design methodology of the spatial mismatch and transport quality assessment.....	30
<b>Figure 2.1:</b> Number of houses in the Gold Coast region whom are paying less than \$250/week in rental payments.....	45
<b>Figure 2.2:</b> Number of houses in the Gold Coast region whom are paying less than \$600/month mortgage repayments. ....	46
<b>Figure 2.3:</b> Number of houses in the Gold Coast region whom have a household income of less than \$300/week . .....	47
<b>Figure 2.4:</b> Number of houses in the Gold Coast region which are government owned.....	49



<b>Figure 2.5:</b> Total number of unemployed residents by SLA in 2011 (Source: generated 21st April 2016 using data provided by the ABS 2011 Census).....	50
<b>Figure 2.6:</b> SLA relative change in full time employment from the 2006 to the 2011 census (For data see Appendix A).....	55
<b>Figure 2.7:</b> SLA relative change in part time employment from 2006 to 2011 census (For raw data see Appendix A.3).....	55
<b>Figure 2.8:</b> SLA relative change in unemployment values from the 2006-2011 census (For raw data see Appendix A.3).....	57
<b>Figure 2.9:</b> Absolute change in employment values from the 2006-2011 census (For raw data see Appendix A.4).....	58
<b>Figure 3.0:</b> Employment location of residents by SLA. census (For raw data see Appendix A.5).....	60
<b>Figure A.1:</b> Number of people that are considered: unemployed, and employed (part-time, full-time and away from work), and the relative rates for each SLA in the Gold Coast in 2006. ....	82
<b>Figure A.2:</b> Number of people that are considered in unemployed, and employed (part-time, full-time and away from work), and the relative rates for each SLA in the Gold Coast in 2011. ....	83
<b>Figure A.3:</b> Relative change in full time, part-time and unemployment, for each SLA, in the Gold Coast from 2006 to 2011.....	84
<b>Figure A.4:</b> Absolute change in employment numbers (full-time + part-time + away from work) and unemployed residents in each SLA in the Gold Coast from 2006 to 2011. ....	85
<b>Figure A.5:</b> Employment location of residents by SLA in 2011. ....	86

## List of tables

<b>Table 1.1:</b> Incidence of income poverty changes over time (ABS 2013a, p. 16).....	18
<b>Table 1.2:</b> Affordable and available private rental stock for Q1 households by geographic area (Wulff et al. 2011 p.34).....	26
<b>Table 1.3:</b> Public transport accessibility criteria matrix.....	40
<b>Table 1.4:</b> Assessing spatial patterns of disadvantage in the Gold Coast .....	40
<b>Table 1.5:</b> Project planner for the dissertation. ....	42
<b>Table 1.6:</b> Criteria for deciding the low socio-economic SLAs.....	51
<b>Table 1.7:</b> Number of new employment opportunities within a buffer zone of 15.6km from three SLAs which have been identified as disadvantaged. ....	59
<b>Table 1.8:</b> Public transport accessibility criteria matrix.....	63

## **Glossary of terms**

ABS- Australian Bureau of Statistics

AHURI- Australian Housing and Urban Research Institute

AIHW- Australian Institute of Health and Welfare

BITRE- Bureau of Infrastructure, Transport and Regional Economics

CBD- Central Business District

CRA- Commonwealth Rent Assistance

DILGP- Department of Infrastructure, Local Government and Planning

DTMR- Department of Transport and Main Roads

ERP- Estimated Residential Population

EU- European Union

GIS- Geographic Information Systems

HILDA- Household, Income and Labour Dynamics in Australia

IRSD- Index of Relative Socio-Economic Disadvantage

LGA- Local Government Area

OECD- Organisation for Economic Co-operation and Development

PTIM- Public Transport Infrastructure Manual

SD- Statistical Division

SEIFA- Socio-Economic Index for Areas

SEQ- South East Queensland

SLA- Statistical Local Area

SMT- Spatial Mismatch Theory

UK- United Kingdom

US- United States

# CHAPTER 1- INTRODUCTION

This chapter introduces the field of study, and discusses the background for the research, and the development of the research topic. It also discusses the research questions that are investigated. Finally, the formal structure of the dissertation, and its main contents are discussed and presented.

## 1.1 Background information for the research

In the recent decades there has been significant global academic interest concerning the ways in which housing and labour markets affect urban socio-spatial patterns, specifically in terms of their effect on labour market outcomes of low socio-economic communities (Andersson et al. 2014; Gobillon, Selod & Zenou 2003; Kain 1992). Spatial divisions between neighbourhoods, based on socio-economic status, have increasingly been emerging in many large cities all over the world. In Australian context, most urban scholars agree that the spatial divisions are predominantly due to the ongoing restructuring of housing markets, and changes in patterns of urban employment resulting from the effects of globalisation (Dodson 2005; Pawson, Davison & Wiesel 2012). Such that, residential housing markets in Australian cities are forcing low income households into outer-urban areas, which are typically more affordable. However, these areas characteristically contain lower employment opportunities; thereby, creating a *spatial mismatch* of employment to affordable housing (Dodson 2005). The issues surrounding spatial mismatch are further exacerbated in outer suburban areas in Australia, by less frequent, and less accessible public transport (Dodson et al. 2006).

The research reported in this dissertation builds from extensive contemporary academic literature highlighting the issues relating to Spatial Mismatch Theory (SMT). SMT was first defined by Kain (1968, p.9): ‘as a mismatch between where low-income households reside, and suitable job opportunities’. Kain’s (1968) findings suggested that persistent high unemployment in urban black communities, was due to a movement of jobs away from their residences, coupled with the inability (due to housing market mechanisms) for the residents to move closer to employment rich areas. This discovery helped significantly shift United States (US) government policy towards: moving jobs closer to neighbourhoods with high unemployment, and by enhancing transportation links between high unemployment neighbourhoods, and employment centres (Andersson et al. 2014).

Kain’s (1968) paper spawned a large amount of empirical research, testing the theory, which has been summarized by Kain (1992), and Ihlanfeldt and Sjoquist (1998). Although, the summarised articles have been critical of some work, there is nevertheless considerable evidence that poor job accessibility is partially responsible for poor labour market outcomes in the US. However, there still remains considerable disagreement about the magnitude of the spatial mismatch effect, and about which groups of workers are most affected by it (Ihlanfeldt 2006). Recently, Andersson et al. (2014), tried to

overcome these issues by conducting the largest scale investigation to date, on spatial mismatch. The researchers examined employment data from 250,000 poor Americans, living in nine cities in the Midwest of the US. The research, which not only included a large sample size, was also longitudinal, with the authors repeating observations over six years. This large scale research ultimately supported Kain's (1968) SMT, concluding that better job accessibility significantly decreased the duration of joblessness among lower-paid displaced workers (Andersson et al. 2014).

SMT has not just been applied and tested in the US, French urban researchers Gobillon, Selod, & Zenou (2003), identified that neighbourhood segregation, based on socio-economic status, prevented unemployed Parisians from finding work. Furthermore, research conducted in England, identified that individuals who live far from employment centres spend considerably less time (more than 1 month) looking for work, compared to people who live nearby to employment centres (Patacchini & Zenou 2005).

Despite strong urban research interest in spatial mismatch overseas, there has been little contemporary literature on SMT in Australia. Hunter (1995) tested for its presence in every capital city in Australia, and identified that Sydney showed evidence of spatial mismatch. Dodson (2005), applied the theory in Melbourne, and despite not identifying significant evidence of spatial mismatch; the research did identify that poor public transport in outer suburban areas was exacerbating the issues related to SMT. More recently, research by the Queensland Treasury and Trade (2013) identified a significant spatial trend of increasing unemployment (>4 percent) in outer suburban areas relative to inner central areas, in the state's capital, Brisbane.

Identifying spatial mismatch patterns through research is important as it helps urban policy makers make more informed decisions in determining the whereabouts of future employment hubs. This informed decision making helps reduce unemployment rates in SMT affected areas, which inevitably helps reduce the associated social problems relating to high unemployment (Dodson 2005). With spatial patterns of unemployment, set to rise in Australia; due to globalising forces reducing manufacturing employment, and a steady increase in automated employment (State of Australian Cities 2013). Research on spatial mismatch patterns in Australia, and the commuting such divisions necessitate is considered integral in reducing locational disadvantage (Dodson 2005). However, to date, there has never been an empirical analysis, of the overlap between spatial dimensions of affordable housing and employment (and associated commuting divisions) in the city of Gold Coast; thus, the following research was considered practical.

## 1.2 Research design goals

The research in this dissertation comprises a desktop analysis on spatial mismatch and public transport quality in the case study city of the Gold Coast. The goals of the research are threefold; the first goal is to spatially investigate employment opportunity nearby to disadvantaged areas, with the aim to test for the presence of spatial mismatch. The second part of the dissertation investigates whether public transport in disadvantaged areas, provides an '*adequate level of service*' for temporally flexibility in employment. Specifically, with the aim to identify if 'spatial mismatch is evident, does public transport provide adequate services for a person with temporally flexibility in employment?' The third goal of the research was to build on already existing knowledge on spatial mismatch in Australia, which has been developed by other urban scholars (Dodson 2005; Hunter 1995; McMahon 2006).

## 1.3 Aims of the project

The main aim of this research project is to examine the links between spatial labour markets and spatial housing markets in terms of whether there is a spatial mismatch between socio-economically disadvantaged areas and locations of high employment opportunity in the case study region of the Gold Coast. A secondary objective is to assess whether public transport accessibility is adequate to provide high quality access, to temporally flexible employment opportunities, for households in the low socio-economic case study areas. As huge swathes of urban literature identify that highly accessible public transport is integral in bridging the spatial divide between low socio-economic communities and employment rich areas (Dodson et al. 2006; Gleeson & Sipe 2004; Taylor & Ong 1995).

Urban policy planners must ensure affordable housing areas have access to areas of high employment opportunity, either through adequate public transport infrastructure, and by implementing policies which create employment in these areas. However, in order to implement adequate policies, high quality evidence based localised research is fundamental, firstly to identify the relevant issues, and secondly, to implement adequate localised solutions. Due to the uniqueness of urban societies, localised policies are the key to mitigating the long-term problems associated with disadvantaged low socio-economic communities in a region.

Since the mid-1970s, income inequality in Australia has widened, and academic researchers have been documenting an increase in socio-economic segregation and locational disadvantage (Pawson, Davison & Wiesel 2012). By investigating these issues, the project traverses a series of government policy interests, as affordable housing areas typically coincide with high concentrations of households receiving income support payments in Australia (Dodson 2005). Policy makers have a duty to ensure that individuals receiving income support are enabled to access high employment locations; thereby, helping to reduce the burden that these individuals place on government expenditure. Similarly, state governments raise tax revenues from their residents, thus, they also have an interest in ensuring

equitable outcomes from their planning policies. Increasing access to employment in affordable housing areas, does not simply improve the quality of life for the people living in disadvantaged areas, it also been shown to improve a city's overall productivity (Li, Campbell, & Fernandez, 2013). The research questions to be investigated in this research project are discussed in the following section.

## 1.4 Research questions

This project will examine and address a set of four interconnected research questions, focusing on the location of affordable housing, regions of employment, and associated transport issues in the Gold Coast.

1. What are the spatial patterns of housing affordability for different housing tenures (mortgages and renters), low income households, social housing concentrations, and unemployment?
2. What are the spatial patterns of unemployment concentration and employment location in the Gold Coast?
3. Is there evidence of a spatial mismatch in the Gold Coast between the locations of affordable housing and locations of employment opportunity?
4. Does public transport in identified low socio-economic SLAs, provide accessibility for employees with temporally flexible working conditions?

A little background information is provided in the following section for the case study area of the Gold Coast.

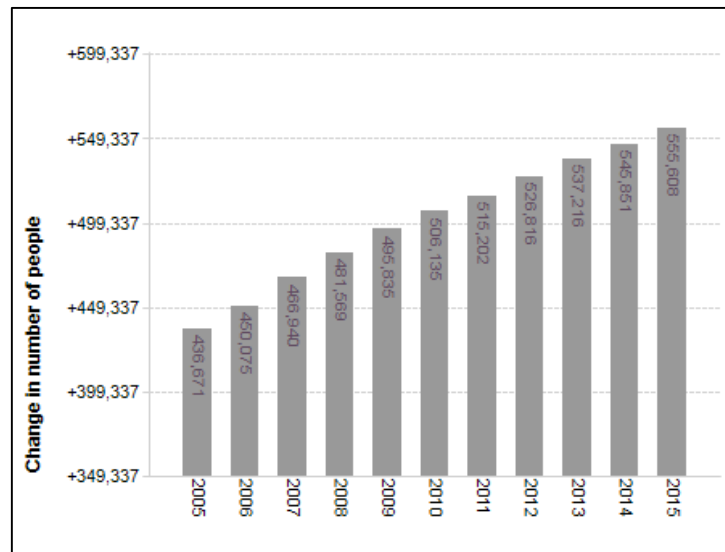
## 1.5 Background information on the case study region (Gold Coast)

The Gold Coast is a coastal city in South-East Queensland (SEQ), which is located east of the Great Dividing Range, it lies just north of the border to New South Wales. It is approximately 66 kilometres southeast of the state capital, Brisbane (Infomaps 2012) (See Figure 1.1).



**Figure 1.1:** The location of the Gold Coast in relation to the rest of Australia (Infomaps 2012, p.3).

The Gold Coast is the second most populous city in the state of Queensland, after the capital, Brisbane. The estimated residential population in the Gold Coast in 2015, was 555,608, which is an increase of 9,757 from the previous year (See Figure 1.2). The study period focused on in this research is between 2006 to 2011; whereby, during this period there was 65,127 new residents in the city of the Gold Coast. The Gold Coast has seen a steady trend of population growth, with the city expected to double to nearly 800,000 by 2031 (SGS Economics and Planning 2013). The city is also Australia’s tourism mecca, with nearly 12 million visitors visiting the region each year (SGS Economics and Planning 2013).



**Figure 1.2:** Estimated resident population of Gold Coast City from 2005 to 2015 (ABS 2016, p.5).

The Gold Coast has a mix of traditional town centres, tourist resort areas, major stand-alone regional shopping facilities, and industrial and commercial precincts. The Central Business District (CBD) of the city is Southport; however, the central tourism district is in the nearby suburb of Surfers Paradise. Industries typical of CBDs, such as government, law and finance, are dispersed outside the principal areas of Southport and Surfers Paradise. The planning document by SGS Economics and Planning (2013), described the urban form on the Gold Coast as a series of linear strips or bands that run parallel to the coast: the beach strip, the high-rise tower/residential coastal strip, the highway strip, the canal estates, the suburbs, and on the western most edge, the semi-rural hinterland.

The city aligns closely with its 57 km coastline, paralleling the north–south oriented Pacific Motorway, and mountain ranges in the hinterland mountain ranges (GCCC, 2005). SGS Economics and Planning (2013) identified the urban form of the city with the distinct high-rise developments along the coastline, and the urban sprawl radiating westerly as unique to the region. In 1986, Australia’s first master-planned resort and gated community, Sanctuary Cove, was established in the region (SGS Economics



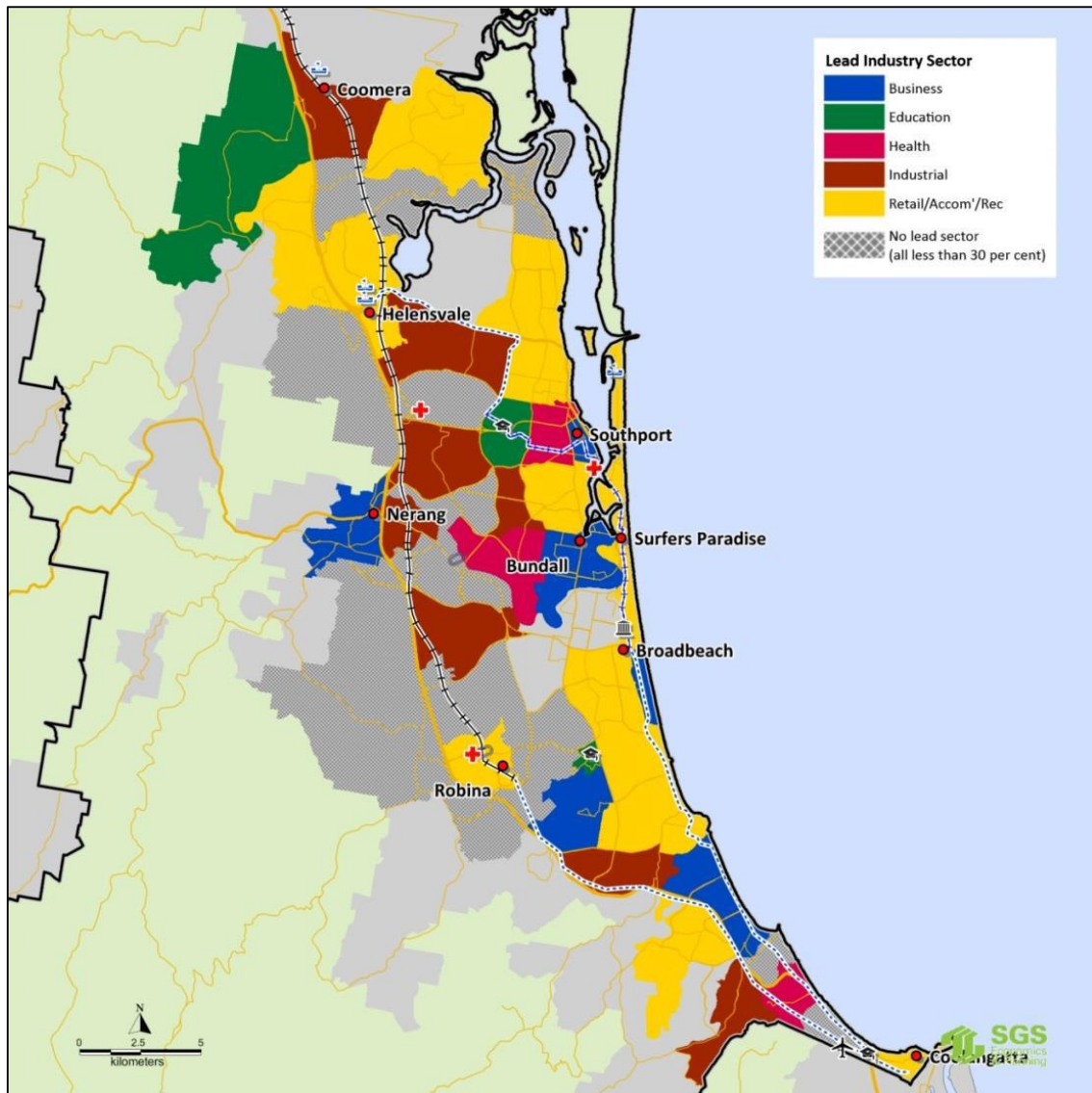
and Planning 2013). The city was also the pioneer of individually saleable strata titled apartments, and home to the first timeshare developments in Australia (SGS Economics and Planning 2013).

## **1.6 Employment centres**

According to the planning document by SGS Economics and Planning (2013), traditional centres accounted for 53 percent of jobs; whereas, employment nodes accounted for 32 percent, with the remaining 27 percent dispersed throughout the region. The same study identified the key regional centres, which are centres with over 250,000 people; located in Surfers Paradise, Southport and Robina. Smaller regional centres, which are between 100,000-250,000 people, are located in Nerang, Broadbeach, Burleigh, Coomera, and Coolangatta. SGS Economics and Planning (2013) document also noted that there is expected to be employment growth in the coastal regions of Mermaid Beach, Helensvale, Miami, Mermaid Waters and Surfer's Paradise in the coming years. Recently, the CBD area of Southport has been recognised as a Priority Development Area (PDA), which has helped drive new investment into the CBD (SGS Economics and Planning 2013). This has rapidly changed the patterns of employment in the city, by helping to focus more employment close to the CBD.

## **1.7 Employment sectors**

The main sector of employment is retail trade, which employs 12.4 percent of residents (ABS 2011). This is followed by construction, health care and social assistance, which employ 11.3 percent and 11.1 percent of the population, respectively (ABS 2011). A large number of residents are also employed in accommodation and food services, which is attributed to the large number of tourist visiting the city each year (ABS 2011). Manufacturing also plays a large role in the labour market, employing 7.6 percent of the population; however, like in many other western cities in the world, this figure is rapidly declining (ABS 2016) (See Figure 1.3).



**Figure 1.3:** Lead industry sector by region in the Gold Coast City (SGS Economics and Planning 2013, p. 24).

## 1.8 Household income and housing tenures

A 2011, analysis of household income levels in Gold Coast City, compared to greater Brisbane shows that there was a smaller proportion of high income households (those earning \$2,500/week or more) and a higher proportion of low income households (those earning less than \$600/week) (SGS Economics and Planning 2013). The median weekly rent was \$350/week and the median household weekly income was \$1,174, which was \$214 below Brisbane’s weekly household income (ABS 2011). In Gold Coast City, 58 percent of households were purchasing or fully owned their home, 31.1 percent were renting privately, and 2.3 percent were in social housing in 2011 (ABS 2011).

## 1.9 The structure of the dissertation

This research dissertation is structured into five chapters, Chapter 1, introduces the field of study, background information on relevant research on spatial mismatch, the main aims of the project, and the research questions to be investigated. It also details some background information on the case study region of the Gold Coast, and provides a concise outline on the structure of the dissertation.

Chapters 2, the literature review, identifies previous research concerning the links between urban labour markets, urban housing markets, social status and transport accessibility. The chapter makes up six major sections: spatial mismatch, public transport and social exclusion, neighbourhood effects, patterns of urban employment, housing affordability, and ultimately a summation of the literature reviews key findings.

Chapter 3, presents and discusses the procedures used to answer the research questions, and the methodology designed for the project. It also includes, the relevant methods of investigation and arguments for why these methods were considered suitable for the circumstances. The chapter also provides a discussion on: the risks involved in the investigation, associated ethical issues, and relevant timelines.

Chapter 4, illustrates and discusses the results of the spatial mismatch analysis, and the transport accessibility matrix. This is broken up into four main sections,

1. Part I- identifies the low socio-economic areas in the Gold Coast, Australia.
2. Part II- analyses the relative changes in full-time, part-time employment and unemployment, and the absolute change in employment, in the Gold Coast from 2006- 2011.
3. Part III- assesses employment growth close to affordable housing for the presence of spatial mismatch.
4. Part IV- assesses public transport accessibility in the Gold Coast, Australia.

Part I, II, III- identifies, analyses, and assesses the socio-spatial links between SLAs where housing is affordable, and where employment opportunities are expanding on the Gold Coast. The analysis uses ABS data on housing costs to identify, which locations housing is most affordable. The analysis also identifies the spatial patterns of unemployment across the Gold Coast, and classifies SLAs that exhibit both low housing cost and high unemployment. Part II concludes with an investigation of the accessibility of employment surrounding the identified SLAs.

Part IV- assesses the relationship between housing affordability and employment accessibility in terms of transportation options. The accessibility of public transport for three chosen case study SLAs is

evaluated, in relation to the frequency, accessibility and availability necessary to provide employment. The report then considers the relative economic burden of different transportation modes on an individuals' capacity to access employment.

Chapter 5- concludes with the key findings and recommendations, to help direct government policy.

## CHAPTER 2- LITERATURE REVIEW

This chapter presents the SMT, and the importance of the consideration of this theory in urban planning. The chapter also discusses relevant literature on the different mechanisms which are associated with spatial mismatch. The chapter concludes with a discussion of the findings of previous spatial mismatch analyses in Australia, and the identification of a gap in spatial mismatch research in the case study area.

### 2.1 Spatial Mismatch Theory

Spatial mismatch is normally defined as unemployment resulting from spatial division between an employee's place of residence and prospective place of employment; however, the mismatch can also be manifested by wages and commuting costs (Gobillon, Selod and Zenou 2003). During the second half of the 20<sup>th</sup> century, the majority of wealthy citizens of the US started leaving inner city regions, and moving to suburban areas. As a result, many businesses started leaving inner city metropolitan areas and moving to these affluent neighbourhoods. This decentralisation of employment led to the development of Kain's (1968) highly influential SMT (Andersson et al. 2014). Kain's (1968) theory argued that a major cause of high unemployment rates of African Americans in US cities was due to the spatial disconnection between inner-city ghettos (where African Americans resided) and the suburbs (where employment had begun to decentralise). According to Kain (1968), this '*spatial mismatch*' of African-American workers relative to employment, was the major cause in entrenching them into a cycle of poverty and high unemployment. Thus, Kain (1968) established that—distance to employment centres is directly correlated with increased unemployment rates. This paper created a flurry of literature on the topic, with many researchers attempting to test, address and refine the theory (Dodson 2005, Holzer 1991; Ihlanfeldt & Sjoquist 1998; Kain 1992 & 2004).

The SMT is not without some critics however, who have criticised the theory on both theoretical and empirical terms. Taylor and Ong (1995) suggesting that spatial mismatch is not the issue, it is an 'automobile' mismatch issue. Whereby, lower income households in the US, have lower rates of private vehicle ownership; thus, are not able to access suburban employment. Moore and Laramore (1990), suggest that the problem is not with spatial mismatch, but more of a skills mismatch; whereby, disadvantaged households do not possess the necessary skills to benefit from available employment opportunities. In this characterisation, spatial mismatch is understood as a mismatch of labour skill resulting from the transition from the old economy to a 'higher order' labour market. Comparatively, research by Sanchez (1999) using modelling for Portland and Atlanta in the US suggests that proximity to public transport is the major factor in determining labour participation for low income households. Despite the criticism, Kain's theory is supported by empirical findings of many other researchers in the US (Jencks & Mayer 1990; Holzer, 1991; Wheeler 1993; Ihlanfeldt & Sjoquist, 1998). Recently,

Andersson et al. (2014), conducted the largest scale investigation to date, on spatial mismatch. The researchers studied employment data from 250,000 poor Americans, living in nine cities in the Midwest of the US. The research, which not only included a large sample size, also repeated observations over six years, with the findings ultimately supporting Kain's (1968) theory.

SMT has also been studied in France, Gobillon, Selod, and Zenou (2003), identified that neighbourhood segregation prevented unemployed Parisians from finding work. Furthermore, research conducted in England, concluded that those who live far from jobs spend less time looking for work than those who live nearby (Patacchini & Zenou 2005). Thus, the weight of evidence suggests that distance to jobs is indeed partially responsible for the adverse labour market outcomes experienced by disadvantaged groups residing in some cities. In the past decade, a growing awareness of the worsening problems of spatial patterns of poverty and unemployment, has rekindled interest in the theory of spatial mismatch.

## **2.2 Importance of considering spatial mismatch**

According to Kain (1992), spatial mismatch between workers and employment is a policy concern for two main reasons. Firstly, labour surplus in lower socio-economic areas contribute to high unemployment in these areas. Secondly, other locations may experience labour shortages which restricts economic growth in the region (Kain 1992). According to Li, Campbell and Fernandez (2013) who analysed data of US metropolitan areas spanning 25 years in several US cities, identified that spatial segregation negatively impacted short and long term economic growth, which further increased over time. A further consideration in the issues relating to spatial mismatch is the longer commutes faced by lower income workers who choose to live where housing is affordable. Longer commuting times by employees, according to Yates (2005), are said to inflict costs on employers: by increased absenteeism, higher staff turnover, prolonged recruitment periods to find replacement staff, and extra costs associated with training of staff.

## **2.3 The mechanisms of spatial mismatch**

Gobillon, Selod and Zenou (2003), in their investigations in France provide several reasons why increased distance to employment impact the labour market outcomes for mismatched communities. Firstly, personnel living far away from employment are subject to reduced frequency and quality of job information. Secondly, employers typically favour locally-based recruiting techniques. Thirdly, financial incentives are often insufficient to motivate distant workers to relocate, because relocation costs and higher rents are often not compensated by earnings. Finally, inadequate and expensive public transport may further exacerbate these issues (Gobillon, Selod & Zenou 2003). The spatial mismatch phenomenon has also been researched in an Australian context.

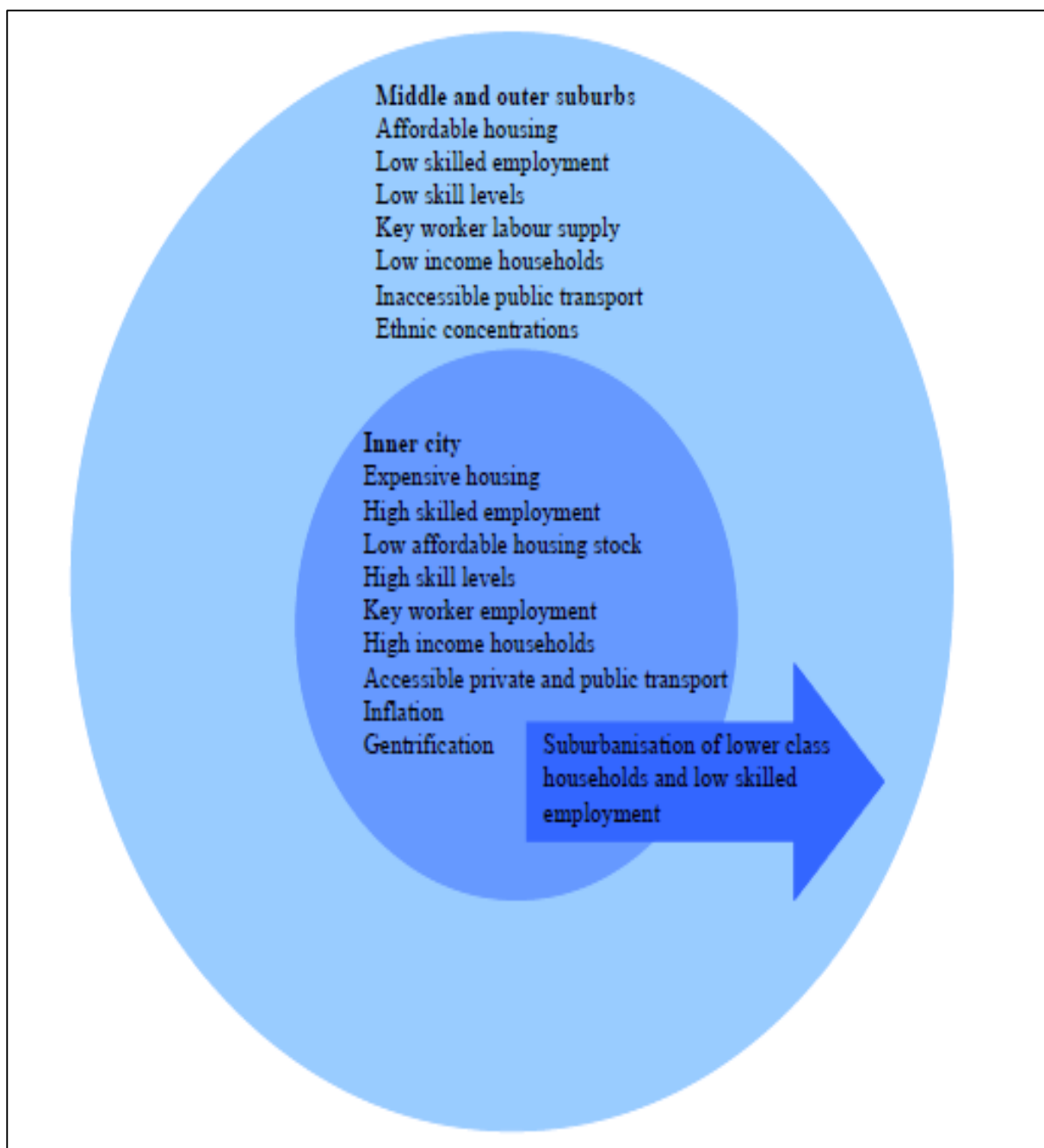
## 2.4 Spatial mismatch in Australia

Contrastingly, to the classic US case, Australia's spatial pattern of disadvantaged neighbourhoods tend to be located in the low rent areas on the edge of the cities, which have relatively poor access to the labour market because of the distances involved (Hunter 1995). Furthermore, certain older, inner suburbs also have concentrations of underprivileged neighbourhoods (Hunter 1995). These suburbs are the closest things that Australia has to inner-city ghettos, which is a well-documented urban phenomenon in many large US cities.

An early Australian study by Hunter (1995) tested for the presence of spatial mismatch in all of Australia's capital cities, using longitudinal ABS data, between 1986 and 1991. The research concluded that, spatial mismatch within or between Australian cities, was not a defining element in determining employment levels in most case study cities; however, there was presence of the phenomenon in Sydney. He also noted that:

‘Even in Sydney spatial mismatch was a very limited part of the explanation of the dispersion of employment–population ratios. Personal characteristics, such as human capital and various demographic variables, explain most of the variation of employment–population ratios in Australia's largest city’ (Hunter 1995, p. 195).

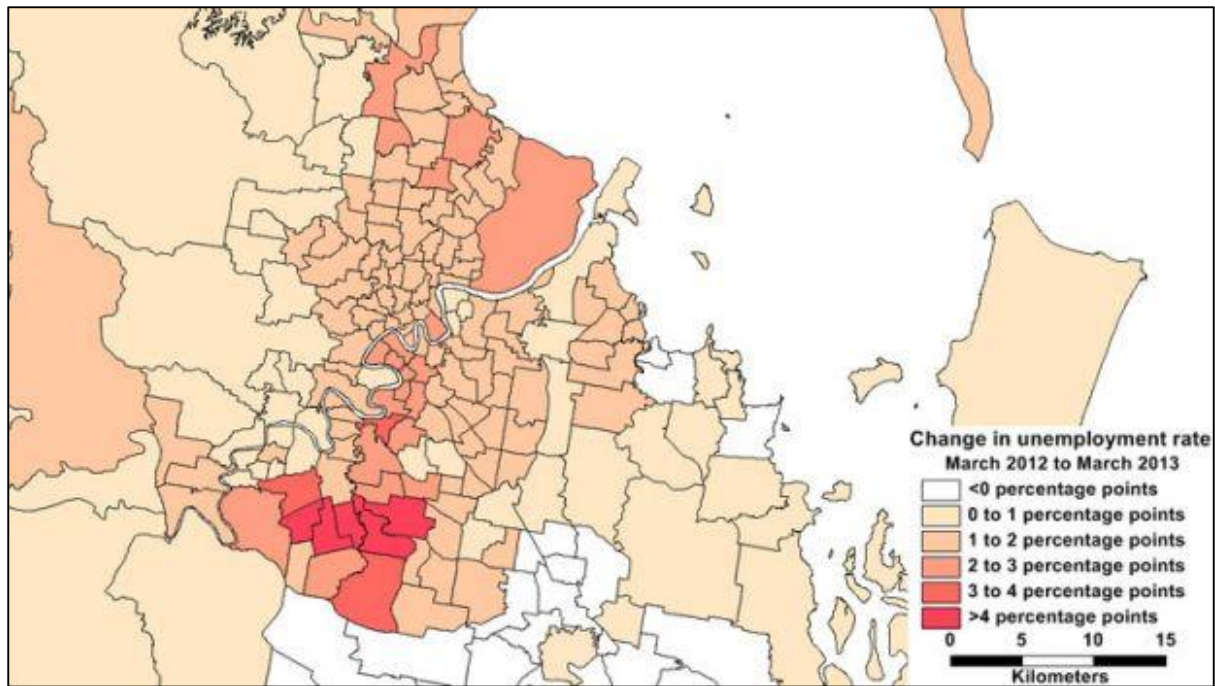
Spatial mismatch has also been researched in Australia's second largest city of Melbourne by Dodson (2005). Dodson (2005), however, did not identify spatial mismatch in the city, as despite the fact that housing markets were forcing low income households into outer suburban areas, the number of corresponding jobs were also increasing in those areas (Dodson 2005). Nevertheless, he noted that, ‘poor public transport services may play a role in obstructing employment accessibility for residents in low socio-economic areas’ (Dodson 2005, p.43). Furthermore, inhabitants of these areas may not possess the skills or qualifications to allow them to gain access to work in these employment growth areas (Dodson 2005). Despite Hunter (1995) and Dodson (2005), both unable to find significant evidence to support the SMT in Australia, there has been more contemporary research on the issue. More recently, a study by McMahon (2006) identified the presence of spatial mismatch in Sydney. The research identified several key integrating factors, which helped create the spatial mismatch urban environment in the city (See Figure 1.4). McMahon (2006) identified that a major cause of spatial mismatch in the city was due to a lack of affordable housing in inner central areas, which inevitably helped push out low income households into outer suburban areas distant from employment areas.



**Figure 1.4:** The factors creating the spatial mismatch urban environment in Australia (McMahon 2006, p.14).

Even more recently, a spatial snapshot was released by the Queensland Treasury and Trade (2013), which used ABS data to map unemployment rates in the Queensland capital of Brisbane. The data shows a clear spatial differentiation between unemployment rates in inner city areas, compared to outer suburban areas (See Figure 1.5). These findings have significant implications on the ensuing research, which tests for the presence of SMT in the case study city of the Gold Coast.





**Figure 1.5:** Spatial map of unemployment in the city of Brisbane (Queensland Treasury and Trade 2013, p.6).

## 2.5 Public transport and social exclusion

According to several studies, the key to reducing spatial disadvantage in urban environments is by making public transport more accessible, especially for disadvantaged communities (Mees 2000; Dodson et al. 2006; Burke & Stone 2014). In the context of increasing inequality and changes in urban employment patterns; research in assessing spatial disadvantage and the underlying mechanisms, such as public transport access, remains an important issue for urban policy planners in Australia. Globally, there is strong empirical evidence on the causal relationship between improving public transport infrastructure, and reducing the effects of locational disadvantage (Murray & Davis 1998; Sanchez 1999; Gleeson & Randolph 2001). Fan et al. (2012) identified that the construction of a light rail line in Minneapolis-Saint Paul (US), increased access to both low-wage and high-wage jobs. Furthermore, Liu (2014) documented a similar positive effect on job accessibility along a new light rail line in Phoenix (US), which was more pronounced for lower income groups.

Households earning low incomes are particularly affected by the factors attributed with locational disadvantage, as these households are forced by housing market mechanism to outer-suburban areas, where housing is more affordable (Dodson 2005). These outer suburban areas in Australia, according to research by Dodson et al. (2006), are typically serviced by less frequent, and less accessible public transport; thereby, creating socially disconnected communities with high levels of motor vehicle dependence. This growth in private vehicle dependence, and a lack of investment in public transport infrastructures, has driven new forms of financial hardship for low socio-economic households (Dodson

et al. 2006). This financial hardship is attributed to the increasing fuel costs, registration fees, insurance, and other miscellaneous costs, which are associated with running a private vehicle. Low income households which cannot meet the associated costs of running a private vehicle, combined with inaccessible public transport, has been proven to increase the deleterious effects of spatial mismatch (Dodson 2005).

## Locational Disadvantage

Locational disadvantage is generally conceived as attributable to residential remoteness from employment and services—for instance dependent on whether the locality is serviced by CBD—connected road or rail links (Burke & Stone 2014). However, locational disadvantage is a multi-scalar concept. Meaning that there are varying degrees of disadvantage even within suburbs, particularly in relation to vehicle less low-income households. This means that residents living beyond walking distance of a station or good bus route will experience another level of locational disadvantage. Poor outcomes along a range of socio-economic dimensions, e.g. health, increased crime rates and unemployment levels; have all been attributed to locational disadvantage (Burke & Stone 2014).

Hunter (1995) states that the key to addressing locational disadvantage is by identifying and eliminating imperfections in the housing market and by improving public transport in low-status neighbourhoods. However, the extent to which different socio-economic groups are able to negotiate urban space to access goods, services and employment opportunities using public transport, remains underdeveloped in the Gold Coast. It is therefore not surprising then that only 2.9 percent of Gold Coast residents use public transport to go to work, which is less than half the rate for Queensland as a whole (6.5 percent) (ABS 2011). Furthermore, the proportion of trips made by Brisbane residents on public transport was more than double that of the Gold Coast in 2009 (Public transport travel 2012). Another study, by Dodson et al. (2006), in the Gold Coast, discovered that lower socio-economic areas typically had poorer access to public transport services compared to more affluent areas. The team also identified that unemployed people and residents under the aged of fifteen had poorer access to public transport as compared to the total population by Dodson et al. (2006). With the current youth unemployment rate sitting at approximately 16.5 percent on the Gold Coast (ABS 2016), these findings by Dodson et al. (2006), despite being ten years old, still have significant implications on the following research on spatial mismatch and public transport accessibility.

Recently, propelled by the globalising effects of economic restructuring and business uncertainty, Australia's labour market has shifted towards more part-time and casual employment; with greater flexibility in working hours, beyond the conventional forty-hour working week (Australian Social Inclusion Board 2009). According to Australian Social Inclusion Board (2009), low socio-economic individuals are more likely to be employed in casual employment, as they typically lack the skills

required to perform complex tasks. Casual work often involves flexible working hours, often early/late shifts, or weekend work (Australian Social Inclusion Board 2009), thus, it is critical that public transport services are capable of providing services with temporal flexibility in order to provide for the needs of casually employed staff. Lack of late night, early morning, and weekend transport services forces low socio-economic households to access a private vehicle, which adds a considerable cost to a household. According to research by the Royal Automobile Club of Queensland Limited (RACQ 2016), the cost of running a medium size car is approximately \$213/week. Comparatively, according to ABS (2013b), the average equivalised household income for a low income household in Australia in 2013, was \$407/week, this amounts to a considerable additional expense for these households. Thus, another significant aim in this research is to identify if public transport in the Gold Coast, provides an ‘adequate level of service’, which allows for temporal flexibility in employment in identified low socio-economic areas.

## 2.6 Neighbourhood effects

In the past two decades a vast body of literature has been published on neighbourhood effects—the idea that living in deprived neighbourhoods has a negative effect on residents’ life chances, above individual characteristics (Atkinson & Kintrea 2000; Holmes-Smith 2006; Galster 2012; Reynolds & Wulff 2005). This section provides evidence on the problems associated with neighbourhood poverty, and the identified negative consequences for individuals growing up in disadvantaged communities. It also offers evidence on the increased widening of the economic divide within Australian society, which is contributing to the problems associated with neighbourhood effects.

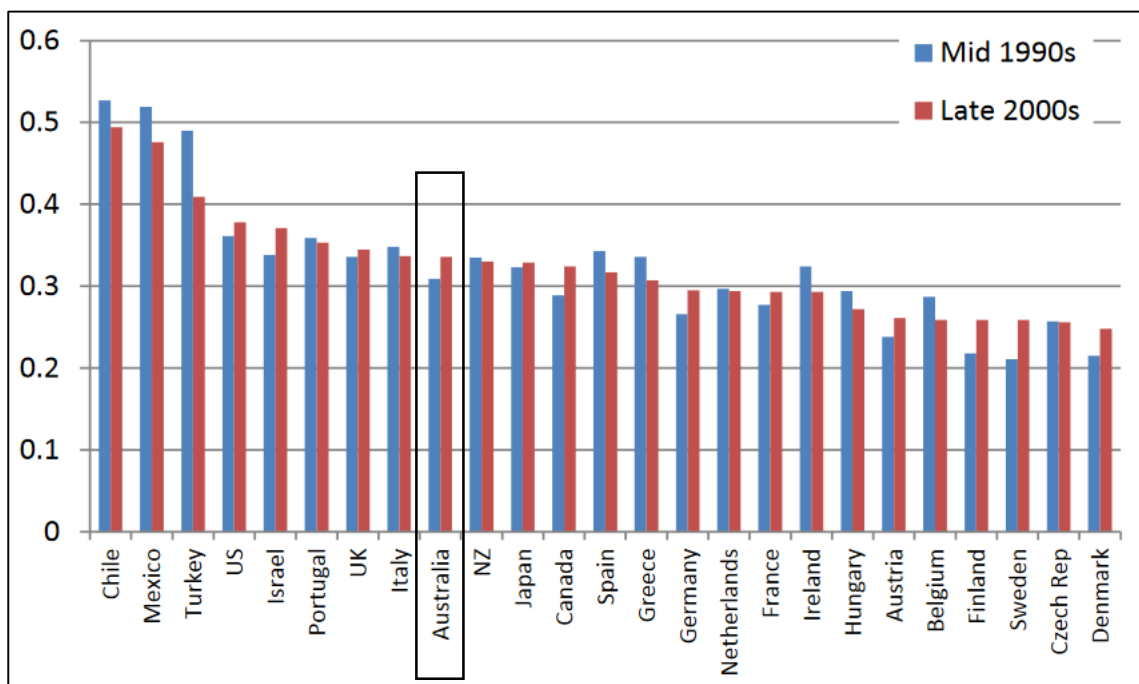
### Neighbourhood effect hypothesis

The ‘neighbourhood effect hypothesis’ refers to the notion that living in a poor neighbourhood can help further compound the impact of poverty and disadvantage affecting an individual (Atkinson & Kintrea 2000). There is evidence that specific locations exhibit poor outcomes along a range of socio-economic indicators over a prolonged period, both in the US and Europe (Galster 2012). In Australia, research by Holmes-Smith (2006) showed that schools with disadvantaged catchment populations, generally recorded lower achievement than national norms. Aspects of the physical environment of neighbourhoods have also been associated with physical activity and obesity in Australian children. Timperio et al. (2005), identified that limited public transport in the neighbourhood has been shown to be a barrier to children’s walking and cycling, and to overall physical activity. Furthermore, Homel and Burns (1989) reported that children with higher levels of worry, fear, anger and unhappiness lived in disadvantaged neighbourhoods. Of particular importance is the influence that neighbourhood effects have on young children, as the first five years of a child’s life are critical for their development (Atkinson & Kintrea 2000). Urban policy makers need to be aware that increases in neighbourhood

segregation based on socio-economic factors does not just affect the families living within the community, it can also impact the rest of a child’s life.

## 2.7 Neighbourhood poverty and inequality

The importance of Australian research evidence on neighbourhood effects is reinforced by the evidence of a growth in income inequality between neighbourhoods in Australia. Compared to European countries, Australia’s score in relation to the main internationally recognised definition of poverty, is somewhat poorer. In the 2005-2006 period, approximately 20 percent of Australians lived with household incomes below 60 percent of the national median income, as compared with 18 percent in the United Kingdom (UK) and 16 percent across the European Union (EU) (Pawson, Davison, & Wiesel 2012). Hunter and Gregory (2001) used aggregated ABS data to demonstrate that, between 1976 and 1991, the average household income increased 23 percent in the 5 percent of neighbourhoods with the highest socio-economic status, and fell 23 percent in the 5 percent of neighbourhoods with the lowest socio-economic status. Comparatively, using the most commonly used measure of inequality, the Gini coefficient, which is the measure of statistical dispersion intended to represent the income distribution of a nation’s residents (Pawson, Davison, & Wiesel 2012). Australia experienced a deterioration in the value of the coefficient between 1995 and 2009 (See Figure 1.6).



**Figure 1.6:** Gini Coefficient values—international comparison of distribution of individual incomes (Pawson, Davison & Wiesel 2012, p.12).

More recent research by the ABS (2013), indicates that poverty level changes over time have remained fairly steady for households experiencing mid-range poverty, with the percentage of houses earning an income below 60 percent of the national median level, only slightly increased during the study period (1995-2009) from 20.8 percent to 21.7 percent (See Table 1.1). However, the cases of *extreme poverty* have significantly increase in this same period, with a percentage increase from 4.9 percent to 7.4 percent of households receiving incomes below 40 percent of the median value (ABS 2013a). This alarming statistic is made more significant by the fact that the majority of the households considered as extremely poor were occupied by young people, who also had higher levels of debt (ABS 2013a).

**Table 1.1:** Incidence of income poverty changes over time (ABS 2013a, p. 16).

<i>Poverty threshold</i>	<i>Poverty rate (% of people) after taxes and transfers</i>			
	<i>Mid-1990s</i>	<i>Around 2000</i>	<i>Mid-2000s</i>	<i>Late 2000s</i>
Forty per cent of the current median income	5.0	5.9	4.9	7.4
Fifty per cent of the current median income	11.4	12.2	13.2	14.6
Sixty per cent of the current median income	20.8	21.2	20.9	21.7

Looking within Australian cities, research on household incomes in Melbourne identified a widening income gap over the ten-year period between 1986-96, which was attributed to ‘a disproportionate increase in the numbers of low income households in the same period’ (Reynolds & Wulff 2005, p. 9). These changes in inequality were largely attributed to an increase in the spatial separation of employment opportunities (Reynolds & Wulff 2005), a finding, which is of particular relevance to this research.

## **2.8 Patterns of urban employment**

Spatial mismatch is defined as a mismatch between low income households and employment (Kain 1968). Thus, an integral component of spatial mismatch is the location of employment in Australia’s urban environment. This section looks at the historic patterns of urban employment in Australia, focusing specifically on the Gold Coast.

### **Patterns of urban employment in Australia**

During recent decades Australia has experienced a number of prominent shifts in the way labour markets operate at an urban scale (Dodson 2005). After World War II, employment growth in Australia moved from the inner city colonial cores to outer suburban growth areas, spurred by an increase in

manufacturing. The manufacturing industry changed the urban form of many of Australia's cities, by locating in outer suburban areas, where rental repayments were more affordable. Typically, manufacturing employees enjoyed long-term, stable jobs and above-average salaries, which helped shift economic prosperity to these outer suburban areas (Welters and Mitchell 2009). In the 1960s, at its peak, manufacturing employed more than a quarter of the workforce, and accounted for 29 percent of GDP (ABS 1961). Nowadays, manufacturing, which once drove jobs growth in the middle and outer suburbs, employs only 8.6 percent of the population and the number is steadily declining (ABS 2013a).

Nowadays, Australia has shifted away from manufacturing, and like many other advanced nations the economy has become more knowledge intensive, more specialised, globally connected, and focused in the inner core CBD areas (Rawnsley, Finney & Szafraneic 2011). Many businesses located in these central areas provide highly specialised services, such as: finance, design, engineering, and international education (Rawnsley, Finney & Szafraneic 2011). This is mainly due to the perceived benefits of agglomeration, a process in which businesses recognise that they can obtain labour market benefits by clustering in a single location (Rawnsley, Finney & Szafraneic 2011). O'Connor & Healy (2002, p. 47) observed that: 'in many respects, the inner suburbs and Central Business District (CBD) of Australia is job and skill rich and housing expensive'.

According to the State of Australian Cities (2013) report the Australian economy is experiencing the effects of economic restructuring, and shifting from manufacturing to an economy dominated by the service sector; however, employment growth in this sector is characteristically concentrated in lower output, lower paying and increasingly casualised jobs. According to Australian Social Inclusion Board (2009), up to 40 percent of the entire workforce now works in some form of non-standard casualised form of employment. This is an alarming trend, as non-standard employees typically have less certainty in terms of the amount of hours they work, less job security, and lower job satisfaction (Buddelmeyer, McVicar & Wooden 2013).

Another trend evident in Australia's labour market is the increasing levels of underemployment, which is particularly an issue for young workers (Denniss 2003). Underemployment generally refers to people in casual or part-time employment who would prefer to work a greater number of hours (Denniss 2003). It is widely acknowledged that the unemployment rate understates the extent to which labour is underutilised (Denniss 2003; Organisation for Economic Co-operation and Development (OECD), Employment Outlook 2015). According to an employment outlook report by the OECD (2015), in 2011, Australia recorded a rate of 7 percent underemployment, which is much higher than the OECD average of five percent. Underemployment, while obviously not as significant as unemployment, can still have long-term consequences for financial and psychological well-being and it disproportionately impact young people in Australia in a similar way to unemployment.

Another significant development in Australia's labour market is the steady rise of youth unemployment. According to Carvalho (2015), despite the overall unemployment rate only increasing by less than 2 percent since 2008, during the same period, youth unemployment nearly doubled. This doubling signifies that approximately 300,000 youth are now unemployed in Australia, accounting for over a third of total unemployment (Carvalho 2015). There is strong empirical evidence on the negative lasting impacts of being unemployed as an adolescent, with research by Buddelmeyer, McVicar and Wooden (2013), identifying that if an adolescent experiences unemployment spells while they are young, they are three times more likely to be unemployed later in life.

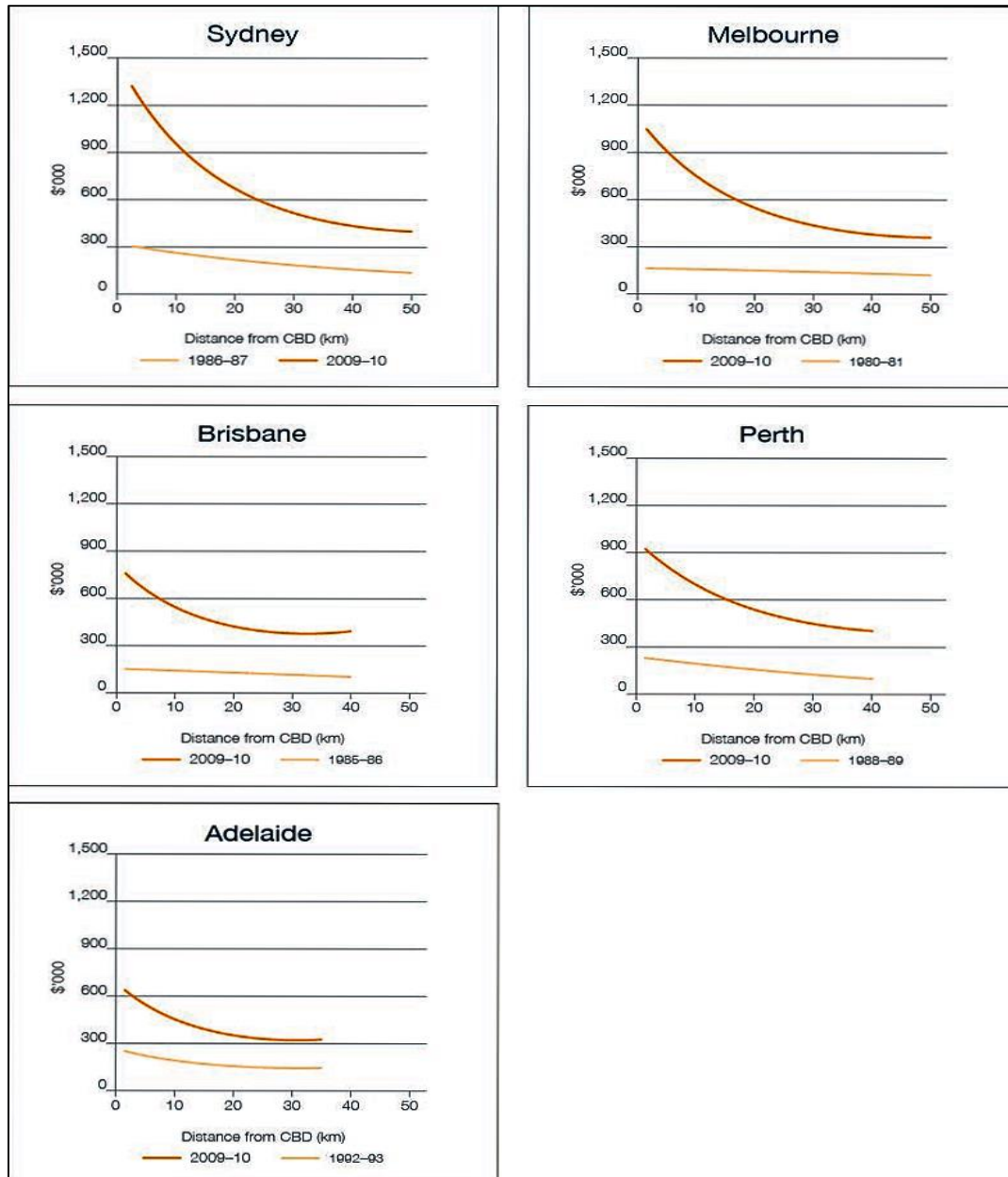
## Patterns of urban employment in the Gold Coast

Over the past four decades the Gold Coast has seen major changes in employment patterns, mainly associated with increased female participation in paid work and increased student participation, which follows the national trend of formal education across the young adult age group (State of the Regions Report 2003). Another development is the number of individuals employed in tourism related industries in the Gold Coast, which is approximately 60 percent greater than the national average (State of the Regions Report 2003). The Gold Coast also has much lower levels of Gross Regional Product (GRP) per person compared to the neighbouring capital of Brisbane, which according to the State of the Regions Report (2003), is attributed to the tourism industry; since accommodation, hospitality services, and recreation, on average yield a low value/worker. Highly skilled *knowledge economy* industries, such as finance and engineering, are also well below national average levels in the Gold Coast (Economic Development Strategy 2013). These industries are predominantly located in the CBD areas of the nearby capital of Brisbane (Economic Development Strategy 2013). However, the city has ambitions to develop the region as a centre for health, education and professional services, which are currently at national average levels (Economic Development Strategy 2013). The focus of this industry growth has been master planned to occur around its identified major CBD of Southport (Economic Development Strategy 2013). Unemployment in the Gold Coast is currently at 5.3 percent, which is below national level of 5.9 percent (ABS 2016).

## 2.9 Housing affordability

Housing market mechanisms are the major factor, which segregates individuals based on income (Dodson 2005). Thus, in order to accurately assess spatial disadvantage based on housing affordability in the Gold Coast, it is necessary to first look at urban housing market patterns in Australia. According to O'Conner and Healy (2002), Australian cities have been affected by two major socio-spatial shifts since the 1980s: the growth of the CBD as a premium employment and housing location, and the steady decline of the middle and outer ring suburbs. However, a major contradiction in Australia's urban

environment is that the core is becoming an increasingly expensive place to live; thereby excluding the vast majority of households from easily accessing this extensive labour market. According to State of Australian Cities (2013), housing prices relative to the distance to the CBD have exhibited unprecedented growth in every major city in Australia (See Figure 1.7).



**Figure 1.7:** Real house prices by distance from CBD in Australia's largest cities, in 2009-10 AUD (State of Australian Cities 2013, p.12).

A lack of affordable housing in central areas allows the mechanisms of housing markets to continue to push low income households into disconnected outer suburban communities (where housing is more affordable), and away from the job-rich opportunities in the CBDs (Dodson 2005). According to the



Bureau of Infrastructure, Transport and Regional Economics (BITRE 2013), in SEQ the inner sector contained 19 percent of employment; however, it housed only 3 percent of its population. Comparatively, the outer sector contained 19 percent of the region's employment, but was home to 29 percent of population. These patterns have consequences for community sustainability, as households located in middle and outer suburban areas are more likely to face long commutes to access employment rich central city areas. Recent research has found that many residents of Australia's largest cities can reach fewer than ten percent of all metropolitan jobs within a reasonable commuting time (Kelly & Mares 2013). Moreover, the jobs they can reach are less likely to be the higher paying, knowledge-intensive jobs, which are typically available in the CBDs (Kelly & Mares 2013).

These developments indicate that the growing remoteness of employment hubs away from outer suburban areas is going to increase the disadvantage experienced by residents living in those areas. This phenomenon is manifested by the presence of a large female economic participation discrepancy. Whereby, according to Kelly and Mares (2013), in 2011, outer Melbourne had female participation rates, which were 20 percent below male participation rates. According to Pocock et al. (2012) this is due to the constraints of childcare responsibilities, which limit women from working long distances from their homes. This unfulfilled potential has a significant impact on the overall economic productivity of Australia's cities.

Many urban policy researchers highlight the need for policies which encourage growth nodes in outer suburban areas; however, little evidence exists on the efficacy of these policies (Kelly & Mares 2013). According to Kelly and Mares (2013), this can be done in two ways, firstly, improving public transport infrastructure. Secondly, increasing the supply and diversity of housing in existing suburbs (Kelly & Mares 2013). Many inner areas of Sydney and Melbourne have been rezoned to allow for high rise apartments; however, these have been skewed towards small 1 to 2 bedroom units, as there are no requirements in these cities to provide a mix of apartment sizes (Birrell & McCloskey 2016). Thus, these apartments are not providing for the needs for lower income families in Australia; thereby driving these families to distant outer suburbs.

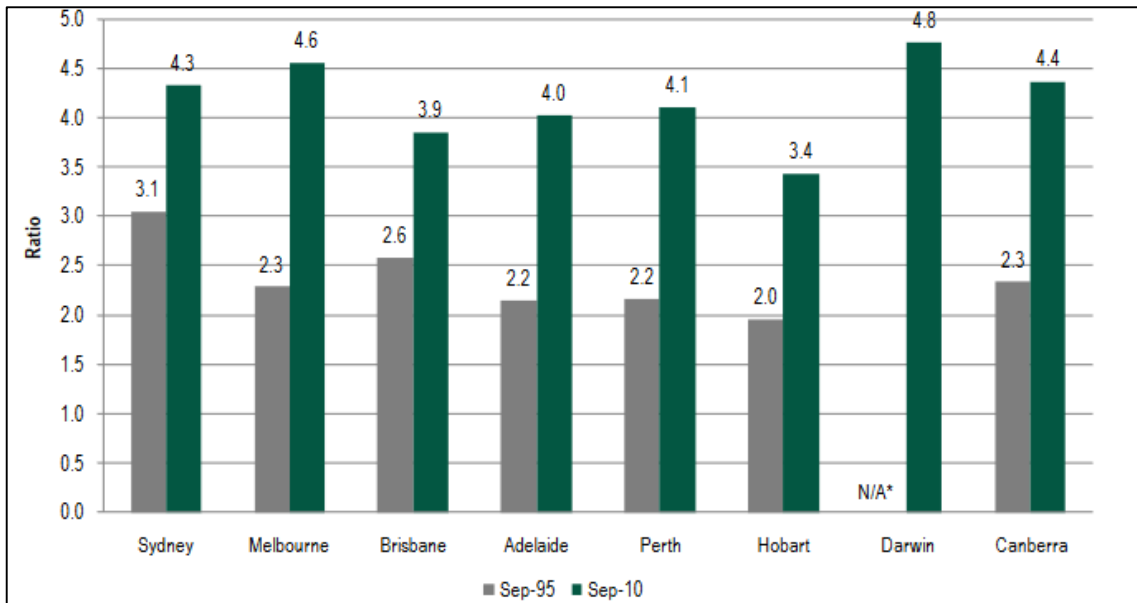
According to Dodson (2005) the spatial distribution of housing affordability is closely connected to the operation of spatial labour markets as the capacity of individuals and households to purchase housing, whether rental or via home ownership, is largely dependent on their income status. Thus, a lack of better paying *new economy* jobs in suburban locations, combined with a lack of affordable housing in central locations creates zones of disadvantage (Dodson 2005). Low socio-economic families are now becoming spatially clustered into middle and outer suburban areas of Australian cities (Dodson 2005). According to research in Sydney by Randolph and Holloway (2005), the suburbs with the most severe concentrations of disadvantaged households were overwhelmingly in the middle and outer suburbs of

the city. Despite considerable government discourse on the issue in Australia; the problem remains increasingly evident.

### **3.0 Housing occupancy and costs**

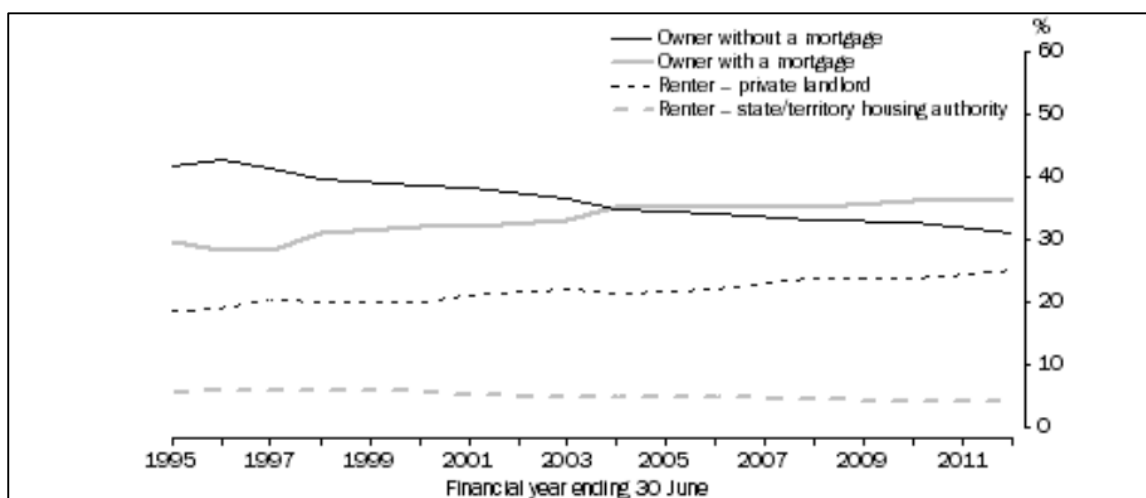
In 2016, housing prices in Australia's two largest cities, Sydney and Melbourne, were amongst the most expensive in the developed world (Birrell & McCloskey 2016). These cities are experiencing an increase in spatial separation of rich and poor, as the rich consolidate in high amenity inner and middle suburbs, while lower income households are forced outwards to access affordable housing, or out of the housing market completely. Increasing housing prices generate greater wealth for city homeowners and landlords; however, they also exacerbate inequities within cities by creating spatial polarisation. Burke and Hayward (2000, p. 23) proposed that: 'the spatial differences in house prices in Australia, indicates that the housing market is helping to strengthen the inequalities arising from the labour market.' Furthermore, property owners residing in the inner suburbs of Australia's capital cities, 'gain not only from access to employment with higher salaries, but also from significant increases in property values' (Burke & Hayward 2000, p.44). Since 2014, the Gold Coast has seen a 9.5 percent increase in the median values of residential units in high density employment rich areas; however, land values in other areas have remained unchanged (State Valuation Service 2015). Similarly, in Brisbane, a report by BIS Shrapnel (2015) states that the cities inner core exhibited a 5.3 percent increase in its median house price, although comparatively the outer region experienced only a 1.6 percent rise in the same period.

Housing affordability in Australia, relative to household income, has also worsened significantly in the past 25 years, with housing now rated among the most unaffordable in the world (Callaghan 2010). Figure 1.8, illustrates the house price to household income ratio in all of Australia's capital cities (HIA Economics Group 2010). This ratio is often used as a trend to measure housing affordability.



**Figure 1.8:** House price to household income ratio in all of Australia's capital cities, September 1995-September 2010 (HIA Economics Group 2010, p. 4).

Causes of the disparity between median income and housing prices is complex and beyond the scope of this research; however, researchers repeatedly identify that strong population growth, financial deregulation, low inflation, housing supply shortages, tax concessions on negative gearing, and capital gains are combining to create the current market conditions in Australia (Callaghan 2010; Sliogeris et al. 2008). These conditions are creating a housing market in Australia, which has a decreasing number of government housing and an increasing number of private renters (See Figure 1.9) (ABS 2013b). In Australia's two largest cities, Sydney and Melbourne, 36 percent of couples aged 30-34 in Melbourne were renting, as were 42 percent in Sydney (Birrell & McCloskey 2016).



**Figure 1.9:** Australian housing tenure, 1994-95 to 2011-2012 (ABS 2013b, p.1).

There is increasing evidence that low-income earners that work and live in inner city areas experience significantly greater housing affordability problems—due to the high cost of housing, compared to those who work in the inner city but live elsewhere (Yates et al. 2005). A lack of suitable affordable housing in central urban centres means many workers either pay a high proportion of their incomes on housing costs, or travel longer distances in order to work in their chosen location. Thus, inner, high-cost regions of the city are typically populated by young renters, and wealthy owners (Yates et al. 2005).

### **3.1 Australia’s rental market**

In many developed countries, including Australia, the effective removal of funding for new social housing over recent decades has further reinforced socio-economic polarisation (Yates et al. 2005). Between 1996 and 2006, there was a reduction of 8 percent in the number of public housing dwellings in Australia; however, in the same period, Australia’s population increased by 13 percent (ABS 2013b). This has helped change the dynamics of social housing in Australia, from supplying affordable properties for rental or home purchase to low and middle income working families, towards providing accommodation on a priority needs basis to households in challenging circumstances, or with special needs. This vulnerability is reflected in the demographic profile of social housing in Australia, which are typically occupied by single people, who are on Disability Support Pension as their main source of income (Australian Institute of Health and Welfare (AIHW) 2010). As a consequence of the lack of available social housing, average wait times have increased considerably, with typical times ranging from: 9.4 months in Queensland, and between 2-10 plus years in New South Wales (NSW), 2.5 years in Western Australia (WA), and 6 years in the Northern Territory, depending on the location (AIHW 2010). This phenomenon has forced many very low income households into the private rental market, competing with households which have better earning potential (AIHW 2010). According to Wulff et al. (2011), between 2001 and 2006 Australia’s private rental market grew by 11 percent; however, only 37 percent of the households in the bottom two income quintiles accessed affordable housing. These figures demonstrate that the private rental stock has increased at the top end; however, it has declined at the bottom end of the rent distribution. The reason for this, according to Wulff et al. (2009, p.16), ‘is due to escalating real house prices in the home purchase sector that has led many *discouraged home purchasers* to seek private rental accommodation; thus, lifting the demand and inevitably the price for private rental housing.’ Moreover, these discouraged home purchasers have better purchasing powers relative to low income households and are able to afford higher rentals. According to research by Wulff et al. (2011), the regional centres in Australia worst affected in terms of affordability are the Gold Coast and the Sunshine Coast, where between 88 and 93 percent of Quantile 1 (Q1: gross household income less than \$422/week), private renter households, miss out on affordable housing (See Table 1.2).

**Table 1.2:** Affordable and available private rental stock for Q1 households by geographic area (Wulff et al. 2011, p.34).

	<i>No. of Q1 households</i>	<i>No. of dwellings affordable to Q1 households</i>	<i>Hypothetical shortage or surplus*</i>	<i>Other income groups using Q1 stock</i>	<i>No. of affordable dwellings actually available**</i>	<i>True shortage# (%)</i>	<i>How many Q1 households miss out?</i>
	1	2	3	4	5	6	7
<b>Australia</b>	268,000	129,000	-138,000	72,000	57,000	-211,000	<b>79</b>
<b>Metropolitan regions</b>	155,000	48,000	-107,000	27,000	21,000	-134,000	<b>87</b>
<b>Non-metro regions</b>	113,000	81,000	-31,000	45,000	36,000	-76,000	<b>68</b>
<b>Capital cities</b>							
Sydney	47,600	7,300	-40,400	4,100	3,200	-44,500	<b>93</b>
Melbourne	46,100	14,400	-31,700	8,500	5,900	-40,200	<b>87</b>
Brisbane	21,900	6,500	-15,400	3,700	2,800	-19,100	<b>87</b>
Adelaide	15,100	7,200	-7,800	4,100	3,100	-11,900	<b>79</b>
Perth	19,500	9,600	-9,900	5,400	4,200	-15,300	<b>79</b>
Hobart	3,100	2,100	-1,000	1,100	1,000	-2,100	<b>68</b>
Darwin <sup>a</sup>	700	400	-300	300	100	-600	<b>81</b>
Canberra <sup>a</sup>	1,300	500	-800	400	100	-1,200	<b>89</b>
<b>Large regional centres</b>							
Newcastle	7,600	3,000	-4,500	1,400	1,600	-5,900	<b>78</b>
Wollongong	4,000	1,400	-2,600	600	800	-3,200	<b>81</b>
Geelong	2,700	1,900	-800	900	1,000	-1,800	<b>64</b>
<b>Gold Coast</b>	<b>8,000</b>	<b>1,200</b>	<b>-6,800</b>	<b>600</b>	<b>600</b>	<b>-7,500</b>	<b>93</b>
Sunshine Coast	4,400	1,000	-3,500	500	500	-3,900	<b>88</b>
Townsville	2,000	900	-1,100	500	400	-1,600	<b>80</b>
Cairns	2,000	700	-1,300	400	300	-1,700	<b>84</b>
Launceston	2,100	1,500	-600	700	800	-1,300	<b>63</b>

Another indicator of the regional distribution of poverty is rental stress. A household is defined to be in housing stress if it spends more than 30 percent of its disposable income on housing expenses, and if it also falls into the bottom 40 percent of the equivalised disposable household income distribution (Phillips et al. 2013). According to research by Phillips et al. (2013), 35 to 58 percent of households in SEQ, comprising Logan, Gold Coast and Sunshine Coast, are experiencing rental stress.

High rental costs are also attributing to socio-spatial polarisation (Dodson 2005). According to Yates et al. (2005) the highest housing costs (as measured by median rents) were found in inner, central, and northern Sydney, as well as parts of inner Melbourne, and the Gold Coast. Low-paid workers are pressured by housing markets to relocate to outer regions, which typically have lower level employment opportunities. The lack of affordable housing in the Gold Coast has received considerable local media attention, with particular focus on impacts on lower paid workers who are essential to the local tourism industry (Weston 2015). However, like in other regions of Australia, the government has been slow to act; recently stalling on a plan on delivering almost 2000 new government homes to the area, which would have helped remove the 1563 people currently on the waiting list (Weston 2015).

Apart from meeting the basic need for shelter, affordable housing also provides a foundation for family and social stability, and contributes to improved health, educational, social, and economic outcomes (Yates 2002). A lack of affordable housing near employment exacerbates social inequalities and constrains the effective operation of labour markets (Burke & Hayward 2000). Thus, attention needs to be directed towards the broader role that housing and home ownership may have in contributing to social and spatial inequality, especially due to the apparent concerns present in Australia's housing market.

### **3.1 Literature review's conclusion**

There is now considerable empirical literature worldwide, which have identified a causal link between poor employment outcomes of low socio-economics households, and the distance needed to travel in order to access employment (Andersson et al. 2104; Gobillon, Selod & Zenou, 2003; McMahon 2006). Despite this, contemporary research in Australia on spatial mismatch and the associated problems of high unemployment and locational disadvantage are sparse. If spatial mismatch between housing and employment does exist in the Gold Coast, moderately paid and low income employees, which are essential to the efficient functioning of the urban economy, may face problems in accessing and retaining employment. However, to date there has been a lack of empirical analysis of the overlap between spatial dimensions of housing and employment (and the commuting such divisions necessitate) in the area.

Dodson (2005) identified in his spatial mismatch research in Melbourne that the key to addressing the effects of spatial mismatch is through adequate affordable public transport services, which provide services for employees with temporal flexibility in employment conditions. Thus, another main goal in this dissertation is to ensure that public transport provides temporal flexibility in its services to low socio-economic neighbourhoods. This will help inform policy makers on the identified inadequacies in the current public transport system in the Gold Coast, and ensure that transport services adequately provide connections between affordable housing areas and locations where employment growth is occurring, particularly for employees with temporal flexibility in employment conditions.

Rises in extreme poverty and socio-economic inequality in Australia have helped create pockets of disadvantage and disconnected citizens (Pawson, Davison & Wiesel 2012; Wulff et al. 2011), which result in the groups being excluded from broader social, economic and employment opportunity. This contributes to multi-generational disadvantage, which has been presented in the research by Holmes-Smith 2006 and Timperio et al. (2005). Holmes-Smith (2006) showed that schools with disadvantaged catchment populations, generally record lower achievement than national norms, and Timperio et al. (2005), identified that limited public transport in the neighbourhood has been shown to be a barrier to a child's overall physical activity. Building neighbourhoods which lack socio-economic divisions will

result in better outcomes for children and their families, especially as these divisions may impact the rest of a child's life.

Currently, according to the HIA Economics Group (2010), Australia is experiencing a crisis in housing affordability, especially in inner central areas of its cities. This considerable increase in housing prices in inner central areas, are forcing low income households to more affordable outer ring suburbs (Dodson 2005). However, these far flung outer suburbs help create disconnected and disadvantaged communities, which are distant from employment centres, which ultimately affects their employment rates (McMahon 2006). Kelly and Mares (2013) identified that many residents of Australia's largest cities can reach fewer than ten percent of all metropolitan jobs within a reasonable commuting time, and these jobs were typically lower paying less specialised types of employment. The research also identified the increase in economic restructuring occurring in Australia, with a reduction of manufacturing work, which once drove outer suburban wealth, to an increase in service based employment (State of Australian Cities 2013). The service sector is typically associated with poorly paid increasingly casualised employment (ABS 2013), which helps entrench the employee into a recurring cycle of poverty.

The issues surrounding the spatial separation of labour and housing markets, and their impact on the socio-economic households is of particular relevance to policy makers, who are concerned with, for example, reducing the number of households receiving income assistance, or ensuring equity of spatial access to employment and services. Poor spatial structures result in increased travel time and congestion for commuters, while lack of affordable housing near employment, exacerbates social inequalities and constrains the effective operation of labour markets. An understanding of the spatial interaction between labour markets and housing markets is critical to help reduce future pressures on low income households in the Gold Coast. Addressing these issues will provide a significant boost to local productivity, because as the economy becomes more knowledge intensive efficient links between firms and workforces become more important.

The literature review has found few empirical or conceptual studies, in Australia, linking housing affordability, employment opportunity, and the availability of public transport on social and economic outcomes in disadvantaged areas, despite this area receiving considerable attention in other parts of the world. Thus, the following research attempts to clarify whether there is spatial mismatch between employment opportunity and housing affordability for low income households in the Gold Coast City. It is critical that research is undertaken to ensure that Australia urban planning environment is meeting the outcomes that are set out in the planning schemes, this can only be done through independent and thorough assessments.

## CHAPTER 3 – METHODOLOGY

This chapter outlines an overview of the research design, unit of analysis, data collection methods, data presentation, research questions, and methods for responding to research questions for this case study. The risk assessment, ethics, resource planning, and important timelines, are also outlined and discussed in this chapter. The research in this case study uses solely quantitative based empirical research, which is discussed in the next section.

### 3.1 Quantitative research

The spatial mismatch and transport quality research outlined in this dissertation uses quantitative research as the base of its methodological design. Quantitative research uses systematic empirical examinations of observable phenomena using mathematical techniques, in order to generate numerical data, so that it can be used in statistics (Given 2008). Quantitative research is common in demographic work, with the researcher hoping to produce unbiased results from the larger population. As mentioned previously, the data for the spatial mismatch phase was obtained from the 2006 and 2011 censuses. While, the data for the second phase on public transport quality was obtained from the Translink (2016) website.

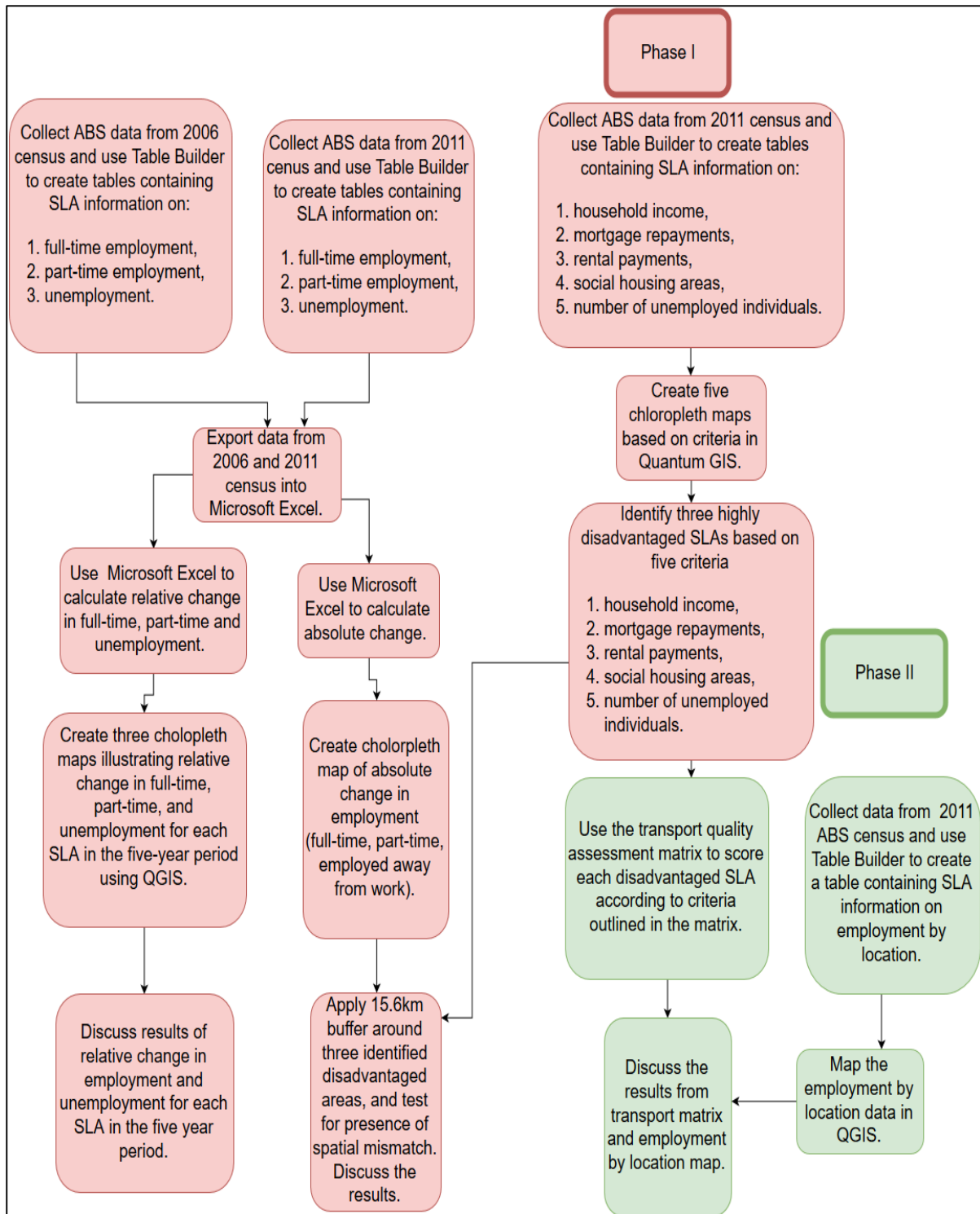
### 3.2 Overview of the research design

The research design consists of two major phases, in Phase I, the SMT will be tested, and in Phase II, public transport quality will be assessed. The methodology designed for each of the two phases is further discussed below, and illustrated in Figure 2.0.

The first phase (Phase I) applies quantitative methods using secondary ABS census data to identify low socio-economic areas in the Gold Coast. Several criteria are used e.g. income, housing costs, unemployment levels to identify the low socio-economic areas. The next step involves analysing employment data from the ABS over a five-year period (2006-2011), in order to determine, if employment has increased within a reasonable commuting distance of the identified low socio-economic areas. The analysis uses GIS software to help identify if urban housing markets in the Gold Coast are forcing low income households, to reside in areas with limited employment opportunities.

The second phase (Phase II) in the dissertation is to investigate and determine, whether the current public transport system in the Gold Coast, provides an *adequate level of service*, for lower socio-economic individuals to access temporally flexible employment. The quality of the service will be assessed using a matrix, which was developed by the author, from a mixture of criteria outlined in Cheal (2003) and Dodson et al. (2006). This matrix was developed as tool to help contribute to the knowledge on public transport accessibility literature in Australia.





**Figure 2.0:** Research design methodology of the spatial mismatch and transport quality assessment.

### **3.3 Case study design**

A case study research design was chosen as it is particularly suitable for analysing a real life situation, it also excels at providing answers to complex localised issues, and adds strength to what is already known through previous research (Monash University 2015). The Gold Coast was chosen as the specific case study, for four main reasons. First, the Gold Coast is Queensland's second largest city, behind Brisbane. This is important as spatial mismatch is more pronounced in larger cities, as housing market mechanisms typically force low income households into outer suburban areas, which are distant from employment centres, which impacts employment rates in these outer areas (Dodson 2005). Second, the region historically suffers from higher unemployment, compared to other capital cities in Australia, especially in youth unemployment rates (ABS 2011). Third, despite there being huge volumes of empirical studies on SMT in the US and Europe (Ihlanfeldt & Sjoquist 1998; Kain 1968; Li, Campbell, & Fernandez 2013; Taylor & Ong 1995; Wheeler 1993), few urban scholars have researched the issue in Australia (Dodson 2005, Hunter 1995; Yates 2002), and none which have empirically tested the theory, using the Gold Coast as a case study. Finally, prior research on public transport in the region has confirmed that 'people not located along major transport routes have difficulty in accessing regular public transport services, especially on weekends' (Dodson et al 2006, p.4). Thus, the region was considered a highly appropriate choice by the author to investigate and assess spatial mismatch, and public transport quality, as the outcomes from this research providing answers to complex localised issues to help inform policy and practice.

### **3.4 Unit of analysis**

The ABS provides data at several different spatial units Statistical Area level (SA) (1,2,3), Statistical Local Area (SLA), Local Government Area (LGA), Statistical Division (SD). The unit of analysis used in the research will be the SLA spatial unit, which is an Australian Standard Geographical Classification (ASGC) defined area that coincides with Local Government Areas (LGAs), or parts thereof (ABS 2011). There were several reasons why the SLA unit was chosen to be the geographic unit for the dissertation:

- There has been very little change in the areas boundaries between the 2006 and 2011 census, thereby, allowing for an accurate comparison between each census.
- The SLA is a general purpose spatial unit.
- SLAs cover the whole of Australia without gaps or overlaps (ABS 2011).

However, the main reason for its use in this research, was that an SLA, which is part of an LGA, will adopt the suburb name; thereby, making it easier for readers to recognise and identify with the data

presented at that spatial unit. This will help the readers of the research more easily relate to the data presented in this dissertation; thereby, help better influence public policy.

It must be noted that boundaries for the SLAs from 2006 to 2011 in the case study region have predominantly remained the same. However, Beenleigh, Bethania-Waterford, Edens Landing-Holmview, Wolffdene-Bahrs Scrub, Mt Warren Park, Eagleby, have been amalgamated with Logan City, and Beaudesert has become part of the Scenic Rim region (DILGP 2016); thus, these SLAs have been omitted from the spatial mismatch analysis of the Gold Coast region.

### **3.6 Data collection methods**

The data collected in the research will be obtained from the 2006, and the 2011, ABS Censuses. The census was used as a secondary data source for several reasons. First, it provides the largest and most comprehensive spatial data available for the *entire population* across a range of demographics in Australia. Second, the census provides longitudinal data at a household and individual level, for every location in Australia, at a researcher defined spatial unit. Third, the service also provides an online self-help tool called Table Builder, which is designed for census users to help build basic or complex tables at any geographic area level (ABS 2016).

Census data is often used by individuals and organisations in the public and private sectors to make informed decisions on policy and planning issues that impact the lives of all Australians. The aim of the census is to accurately collect data on the key characteristics of people in Australia, and the dwellings in which they live. The ABS collates the information and can provide data for small geographic areas (e.g. SLA unit), which is particularly relevant to this research (ABS 2011). However, there are issues with using census data. The main source of error in the census is person non-response, which during the research period had fallen from 4.2 percent of all persons in 2006, to 3.7 percent in 2011 (ABS 2016). With the average SLA household unit containing more than 270 households and individual data containing on average 490 individuals this error was considered negligible for the following research. Another issue with census data is that it is only obtained every five years; thereby, there is potential for a researcher to use data that is theoretically already five years' old. Urban environments are often highly dynamic so they have the ability to change relatively quickly; however, there are few alternative data sets of this magnitude in Australia; thus, these concerns are considered by the author as minor.

#### **Population Data**

The population data used in this dissertation will be the entire household population at the SLA level, from the 2011 census in the Gold Coast for:

- households paying less than \$250/week rental payments,
- mortgages less than \$600/month,
- household income of less than \$300/week, and
- concentrations of social housing areas.

The other populations used in this dissertation will be the entire individual population at the SLA level, from the 2006 and 2011 censuses in the Gold Coast for:

- individual unemployment 2006 and 2011 censuses,
- individual part-time employment 2006 and 2011 censuses,
- individual full-time employment 2006 and 2011 censuses, and
- individual employment by location 2011 census only.

### **3.7 Data presentation**

The research data will be collated and analysed using Table Builder, the data will then be exported to the freely available Geographic Information System (GIS) software, Quantum GIS. GIS software is an important tool in spatial research as it can present basic information such as the spatial coverage of unemployment, or generate sophisticated multivariate analyses (Dodson et al. 2006). The great benefit of GIS is its ability to combine spatial and aspatial data (Dodson et al. 2006), which is an important component of this research.

The census data, once exported into the GIS software, will be presented using a choropleth map. A choropleth map is a thematic map, in which areas are distinctly coloured or shaded, to represent classed values of a particular phenomenon (Robinson et al. 1995). A choropleth map will be used as it is the most easily understood type of map, and it is considered the most appropriate form to present enumerated data (Robinson et al. 1995) The data will be mapped using the conventional technique; whereby, data values are grouped into classes. Each class is symbolized with a unique areal symbol, which are based on equal intervals (5-10). According to Robinson et al (1995), four to six classes is recommended; however, in some of the maps ten classes were used to help better define the areas, and to try reduce confusion among readers. Single hue colour schemes will be used, as according to Robinson et al. (1995) multiple-colour schemes, with arbitrary degrees of darkness, which do not correspond to ordering, helps confuse the reader. Furthermore, dark areas will represent areas of high concentrations, as most map readers tend to assume that dark means more and light means less (McGranaphan 1993). All the spatial maps in the dissertation have been designed with the reader in mind, to help reduce the possibility of confusion.

### **3.8 Research questions**

The research design is focused on attaining and analysing data that will enable the researcher to answer the research questions presented in Chapter 1, which for the sake of clarity are repeated here. The research is specifically designed to address a set of four interconnected research questions, focusing on the location of affordable housing, regions of employment, and associated transport issues in the Gold Coast. Phase I, will answer the first three questions, whereas Phase II will answer the final question.

1. What are the spatial patterns of housing affordability for different housing tenures (mortgages and renters), low income households, social housing concentrations, and unemployment?
2. What are the spatial patterns of unemployment concentration and employment location in the Gold Coast?
3. Is there evidence of a spatial mismatch in the Gold Coast between the locations of affordable housing and locations of employment opportunity?
4. Does public transport in identified low socio-economic SLAs, provide accessibility for employees with temporally flexible working conditions?

### **3.9 Methods for responding to research questions**

#### **Phase I: Application of Spatial Mismatch Theory**

The most common approach to identify for the presence of spatial mismatch is to relate a measure of labour-market outcomes, based on either individual or aggregate data, to another measure of job access, typically some index that captures the distance from residences to centres of employment (Andersson et al. 2014). This approach has been successfully implemented in the assessment of spatial mismatch in Melbourne, by Dodson (2005), using ABS data; thus, an analogous approach was designed to test for spatial mismatch in the case study region of the Gold Coast. Dodson (2005) collected 1996 and 2001, ABS Census data: concerning unemployment rates, housing expenditure, housing tenure, to map the distribution of housing affordability, unemployment concentration and employment location in Melbourne at the SLA scale. Dodson's (2005) research used GIS software to map changes in employment in the five-year period nearby to disadvantaged neighbourhoods. In order to identify if employment had increased or decreased within a commuting distance of 10km from the identified disadvantaged areas. The research also examined the transport modes, which were available to residents within the selected affordable housing areas. Despite the research not finding any evidence of spatial mismatch in the city during the five-year period, it did identify several problems with public transport accessibility, especially in low-income areas. Dodson's (2005) research was well received among urban scholars, with McMahon (2006) applying a similar technique in Sydney. As the method has been

successfully reproduced in the past, the methodology in this dissertation applies a similar technique to Dodson (2005), using GIS mapping of ABS data on employment and socio-economic factors to test for the presence of spatial mismatch in the Gold Coast.

### Answering research question 1

Research question 1 was answered by the analysis of secondary SLA data from the 2011, ABS Census on household data; pertaining to housing expenditure (rental and mortgage), low income housing, social housing, and number of unemployed residents. Quantum Geographic Information System (QGIS) was used to create five separate choropleth maps using enumerated data from the 2011 census:

1. households paying less than \$250/week rental payments,
2. mortgages less than \$600/month,
3. household income of less than \$300/week,
4. concentrations of social housing areas, and
5. number of unemployment residents.

The indices one, two, three, and five were used in Dodson's (2005) spatial mismatch framework to identify low socio-economic/high unemployment SLAs in the city of Melbourne; however, the author of this research also included social housing areas. As according to research by Parkinson et al. (2015) areas with high concentrations of social housing tend to be 'poorer' areas, and also suffer from high unemployment in Australia. These maps were used to highlight the low socio-economic SLAs in the case study region of the Gold Coast. Three SLAs that were present in the top five results, in at least four out of the five criteria outlined above were chosen to form the basis of the spatial mismatch assessment, and the investigation on public transport quality (See Phase II).

### Answering research question 2

Research question 2 was responded to by using secondary SLA data from both the 2006 and 2011, ABS census, concerning: part-time employment, full-time employment, and unemployment. A longitudinal analysis was chosen, as according to Glaeser (1996) cross-section models omit unobserved person characteristics that may be correlated with neighbourhood location as well as employment outcomes. The research question was answered by identifying, which SLAs had the highest employment and unemployment growth/decline. Specifically, determining if employment growth was focused around areas, which were distant from housing affordable regions, which was the fundamental concept behind Kain's (1968) SMT. Employment was divided into part-time, full-time employment, and unemployment, to help illustrate Gold Coast's urban employment patterns.

Spatial data on Australia's increasing casualisation of the workforce was also to be represented; however, as noted by Jordan (2001, p. 3), 'the names or definitions of some statistical categories render them liable to misunderstanding, with casual and self-employment such categories'. Thus, due to this issue, casual employment was omitted from the investigation of employment patterns on the Gold Coast. Another employment market variable which was not included, due to the difficulties in accurately determining their rates from the employment data; is the number of people who have stopped looking for work altogether. If a person is not actively seeking work, they are not included as part of the labour force; thereby, excluding them from the unemployment rate calculation (Jordan 2001).

Using Table Builder secondary data from both the 2006 and 2011, ABS census, was obtained concerning: part-time employment, full-time employment and unemployment. As Table Builder only provides the actual real number of people who fit into each category. The full-time, part-time and unemployment rate had to be determined using Microsoft Excel. Thus, 2006 and 2011 data for each of the three categories (full-time, part-time, unemployed), was exported into Microsoft Excel to calculate their rates.

The unemployment rate and the labour force was calculated using the standard global definitions:

1. Labour force = number of employed (full-time + part-time) + number of unemployed.
2. Part-time employment rate = number of part-time employed/ labour force\*100.
3. Full-time employment rate = number of full-time employed/ labour force\*100.
4. Unemployment rate = number of unemployed/ labour force\*100.

The relative change in employment from 2006 to 2011 will be obtained using the formulas:

1. Part-time employment rate (2011) – part-time employment rate (2006) = percentage change in part-time employment rate.
2. Full-time employment rate (2011) – full-time employment rate (2006) = percentage change in full-time employment rate.
3. Unemployment rate (2011) – unemployment rate (2006) = percentage change in unemployment rate.

Absolute change in employment numbers:

1. (Employed away from work + part-time + full-time employment 2011) – (employed away from work + part-time + full-time employment 2006) = absolute change in employment.

This data was then exported back into QGIS to illustrate which SLAs exhibited the strongest relative growth in: part-time, full-time employment, and unemployment. The absolute change in employment numbers was also determined to help answer research question 3.

### Answering research question 3

Research question 3, was answered by using the three low socio-economic SLAs, which were chosen from the criteria described above (household income of less than \$300/week, mortgages less than \$600/month, households paying less than \$250/week rental payments, concentrations of social housing areas, and numbers of unemployed residents). Using the absolute change in employment numbers map, a buffer of 15.6 km was applied around each of the three low socio-economic SLAs. The 15.6km figure is based on Australia's average commuting distance to work (BITRE 2015). This was used to determine whether there had been employment growth or decline within 15.6km of each low socio-economic SLA. This technique is the same method as outlined in Dodson (2005); however, his research used a buffer of 10km as the acceptable commuting distance. From these three figures an inference was made to determine whether there was significant growth in employment nearby to employment centres; thereby, determining if spatial mismatch exists in the Gold Coast.

### Phase II: Assessing the quality of public transport infrastructure

Quantitative based research was used in the assessment of public transport quality in the Gold Coast. Unfortunately, despite numerous attempts, GIS data could not be attained from Translink (2016); thus, it was determined that the public transport aspect would be assessed using a matrix developed by a series of criteria from urban public transport researchers in Australia (Cheal 2003; Dodson et al. 2006).

Secondary data concerning:

- number of tram stops/km,
- number of bus stops/km,
- number of train stops/km,
- average frequency of transport service, weekday (AM),
- average frequency of transport service, weekday (Interpeak:900-1500),
- average frequency of transport service, weekday (PM),
- number of public transport options available 12am-12pm (weekend), and
- number of public transport options available 12pm-12am (weekend),

will be obtained from the Translink website, which is controlled by the Government of Queensland (Translink 2016). These criteria have been developed from a mix of conditions, outlined in other public transport assessment studies in Australia (Cheal 2003; Dodson et al. 2006). Using these studies as a basis for the research, a public transport assessment matrix was developed by the author (See Table 1.3). Specifically, with the aim to assess whether public transport in the case study provided sufficient accessibility for employees, with temporally flexible working conditions, in each of the three identified low socio-economic case study SLAs.



**Table 1.3:** Public transport accessibility criteria matrix.

SLA: (Area)	Number of train stops/km	Number of bus stops/km	Number of tram stops/km	Average frequency of transport service, weekday (AM)	Average frequency of transport service, weekday (Interpeak:900-1500)	Average frequency of transport service, weekday (PM)	Number of public transport options available 12am-12pm (weekend)	Number of public transport options available 12pm-12am (weekend)	TOTAL
SLA1									
SLA2									
SLA3									

#### Answering research question 4

Research question 4 was responded to by investigating, and determining, whether the current public transport infrastructure system in the Gold Coast provides an ‘adequate level of service’ for residents with temporal flexible working conditions in the identified low socio-economic SLAs. The matrix was

developed as a lack of temporal flexibility in public transport services has been shown to impede employment in disadvantaged neighbourhoods (Dodson 2005).

An adequate level of service was defined by the accessibility criteria matrix, whereby, each criterion was given a score from 1-10.

The scoring standards used in the accessibility matrix for the accessibility of bus transport services:

- 10: at least one bus stop (< 400m<sup>2</sup>);
- 5: at least one bus stop (400m<sup>2</sup> < 2km<sup>2</sup>);
- 1: at least one bus stop (>2km<sup>2</sup>).

The scoring standards used in the accessibility matrix for the accessibility of tram transport services:

- 10: at least one tram stop (< 1km<sup>2</sup>);
- 5: at least one tram stop (1km<sup>2</sup> < 5km<sup>2</sup>);
- 1: at least one tram stop (>5km<sup>2</sup>).

The scoring standards used in the accessibility matrix for the accessibility of train transport services:

- 10: at least one train stop (< 1km<sup>2</sup>);
- 5: at least one train stop (1km<sup>2</sup> < 5km<sup>2</sup>);
- 1: at least one train stop (>5km<sup>2</sup>).

The scoring standards used in the accessibility matrix for the average frequency of transport (bus/train/tram) services at different times throughout the day:

- 10: high frequency services (every 15min);
- 5: low frequency service (every 30min);
- 1: very low frequency service: one hour or above.

A score of ten is considered highest quality, which indicates that the area is serviced, for instance, by two high frequency services (2\*5=10), or three low frequency services and one very low frequency service (3\*3+1=10). On the other end of the scale, a 1 is considered lowest quality of service, which indicates that there is at least one service/hour. The score for each SLA was totalled and assessed, whereby a total score of <40 was considered poor quality, 40-60 was considered sufficient quality, and 60-80 was considered good quality. The quantitative data obtained for this section came from the Government of Queensland website, Translink (State of Queensland 2015). The reasons behind each score was then discussed, to help better identify any relevant public transport policy issues. This assessment matrix was developed as tool to help urban scholars identify with relative ease any temporal

issues in public transport services in an area. Each standard score has been allocated to ensure that no matter who undertakes the assessment the result will be the same; thereby, ensuring consistency in the results. However, an issue identified in applying this tool, was that it may not allow for flexibility in the results.

## Risk assessment

Table 1.4: Assessing spatial patterns of disadvantage in the Gold Coast, dissertation risk assessment.

Hazards	Who might be harmed and how	Property damaged?	Risk assessment	Further action required
Computer may burn from heated base	Assessor, burnt stomach	n/a	moderate	Sit the computer on a desk and not on any part of the body.
Eye problems from staring at screen for too long	Assessor- dry, itchy eyes.	n/a	moderate	Take a break and do eye exercises.
Poor sitting posture	Assessor,	n/a	low	Keep the body in alignment while sitting, get up and walk around
Data changed and use by third party without consent.	Anyone who uses changed data	potentially	moderate	Ensure data encryption before uploading to internet.
Stress	Assessor	potentially	moderate	Practise yoga, work steadily throughout the year, follow timeline.

## Ethics

Codes of ethics provide similar guidelines and structure to their professionals, since they are founded upon a similar concept of morality, i.e. always treating others with respect, and protecting public trust in the profession. However, there are some guidelines which are unique to Geographic Information Systems (GIS) professionals. Thus, the Geographic Information System Professionals Asia Pacific (GISP-AP) Code of Ethics (2007) was considered appropriate for this dissertation. These guidelines are outlined by the GISP-AP (2007) as:

- encouragement to make data and findings widely available,
- to document data and products,
- to be actively involved in data retention and security,
- to show respect for copyright and other intellectual property rights,
- to display concern for the sensitive data about individuals discovered through geospatial or database manipulations.

I acknowledged that I had an ethical responsibility in completing my dissertation. I ensured that I protected the public's interest in the profession, by producing a piece of research, which met my obligations to society. These obligations were: to do the best work possible, contribute to the community, speak out about issues, meet my obligations to my employers, deliver high quality work, be honest in representations, adhere to my obligations to my colleagues, respect the work of others (i.e. cite the work of others), and ultimately contribute to the discipline. Furthermore, as a GIS professional I also strived to adhere to the principal tenets of the code of conduct by performing the following tasks:

- I uploaded my completed dissertation online on the internet for free access to the public.
- I encrypted the data so that it could not be changed without my consent.

By adhering to these guidelines, I ensured that I acted professionally and safeguarded public trust in the discipline. Furthermore, by understanding and agreeing upon the GISP-AP (2007) Code of Ethics the Surveying and Spatial Sciences Institute (SSSI) commission may proceed in investigating my research, and proper action may be taken in receiving proof of violation.

## Resource planning

Need to ensure access of Microsoft Office and good quality internet service.

1. Download free GIS software (Quantum GIS) and ensure functionality. Available at: <<https://www.qgis.org/en/site/forusers/download.html>>.
2. Ensure the personal computer has enough Random Access Memory (RAM), hard drive space and processing speed to adequately run the program.
3. May need to use ArcGIS via University of Southern Queensland (USQ) virtual private network if issues occur with functionality.

### **Critical items:**

- Quantum GIS has been downloaded and is functioning adequately.
- Fully functioning internet connection.
- Microsoft Office has been downloaded as is already fully functioning.
- Gain access to Table Builder program.
- Gain access to public transport spatial data from Translink, if the data is not provided may need to change the type of analysis, i.e. matrix assessment.



## CHAPTER 4 – RESULTS AND DISCUSSIONS

### 4.1 Structure of results

The literature review in this report presented the conceptual issues associated with housing affordability, socio-economic inequality, patterns of employment, and public transport accessibility. This chapter presents the results from the research, which are discussed in the context of the relevant literature and using the SMT as a theoretical underpinning. The research examines the empirical ABS data to ascertain whether there is any evidence of a mismatch between where low income households reside and regions of high employment opportunities in the Gold Coast, Australia.

The results and discussion on the spatial mismatch and transport quality analysis is divided into four main sections:

- Part I- housing affordable, low income households, and high unemployment SLAs;
- Part II- labour market disadvantage and opportunity;
- Part III- links the suburbs between housing and employment opportunity;
- Part IV- assesses the transport quality in the three identified low socio-economic SLAs.

Part I- exhibits the affordable housing, low income and high unemployment areas in the Gold Coast. The primary data used to highlight housing affordable areas comes from the latest ABS census, which was completed in 2011. This data is used to identify three low socio-economic SLAs, according to these criteria.

Part II- of the analysis displays thematic maps based on labour market indicators: part-time employment, full-time employment and unemployment.

Part III- assesses the spatial mismatch by applying a buffer of 15.6km around three SLAs which were routinely identified as affordable housing/low income areas. The geographical distance between the affordable housing areas and employment areas is assessed based on a standardised assumption of commuting distance of 15.6km (BITRE 2015).

Part IV- uses the three identified low socio-economic SLAs to identify if public transport provides adequate accessibility for employment with flexible working hours.

#### **Part I- Affordable housing, low income and high unemployment SLAs**

According to research by Dodson (2005), Australia's housing market mechanisms have pushed low socio-economic households into outer fringe neighbourhoods, which are distant from employment

centres. Thus, an integral part of the research was to identify if similar urban patterns, which are based on socio-economic status, have been created in the Gold Coast.

In this section, secondary data from the ABS 2011 census was exported into QGIS to create five different thematic maps, using a range of socio-economic indicators:

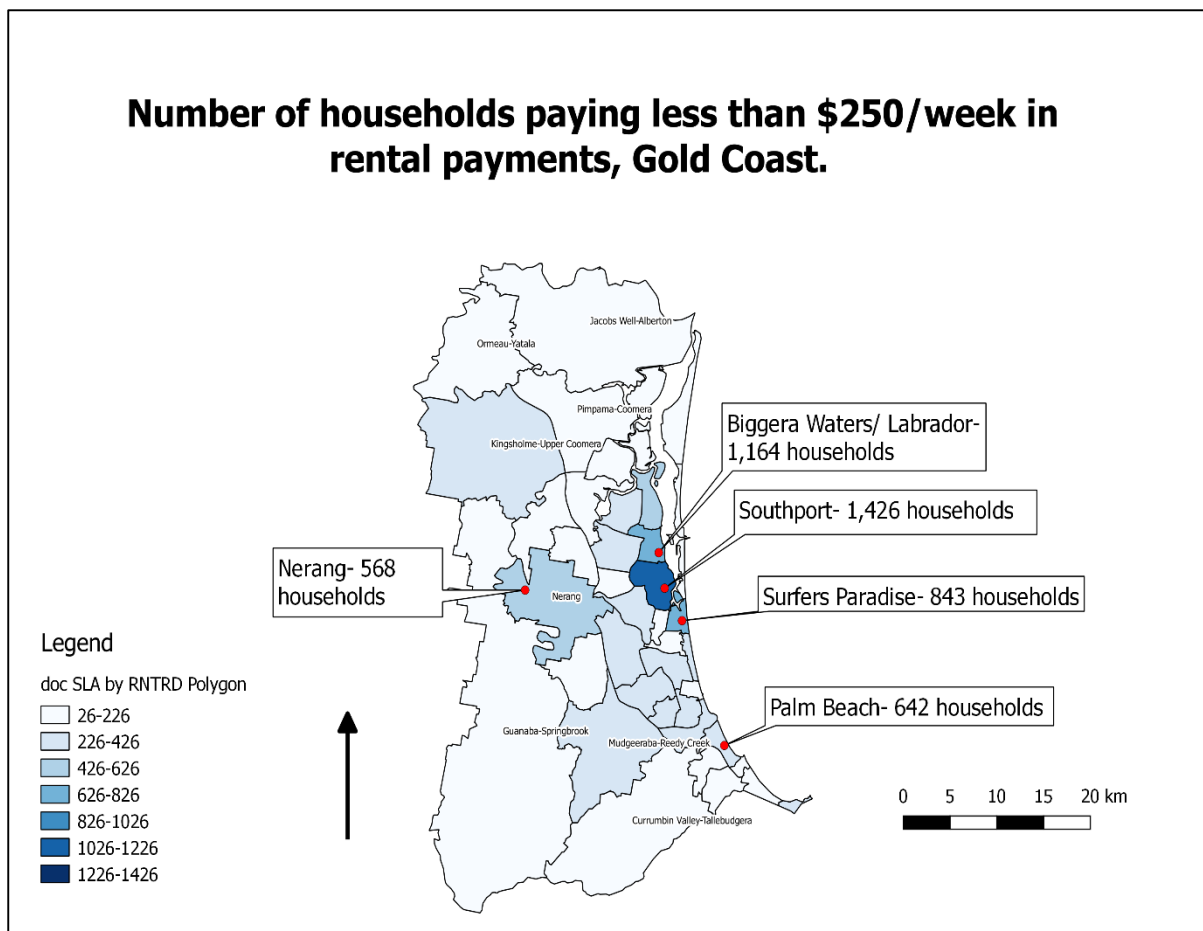
1. Housing rental expenditure: households paying less than \$250/week rent.
2. Housing mortgage expenditure: households paying less than \$600/month in mortgage repayments.
3. Low income households- Households earning less than \$300/week.
4. Social housing concentrations.
5. Number of unemployed residents.

These maps have been developed specifically with the purpose to spatially analyse the residential locations of disadvantaged households; thereby, responding to Research question 1: What are the spatial patterns of housing affordability for different housing tenures (mortgages and renters), low income households, social housing concentrations, and unemployment? The results of the spatial analysis of disadvantage are discussed below.

#### **4.1.1 Housing rental expenditure**

Spatial mismatch is the mismatch between where low-income households are situated and employment opportunities (Kain 1968). Thus, the first step in identifying spatial mismatch within a city, is identifying which areas have high concentrations of low socio-economic households. The first socio-economic indicator sourced in the research was housing costs. The project has mapped two housing cost variables, mortgage and rental repayments, across the Gold Coast metropolitan area, at the SLA level. The first spatial data map produced was: households paying less than \$250/week (See Figure 2.1).

## Number of households paying less than \$250/week in rental payments, Gold Coast.



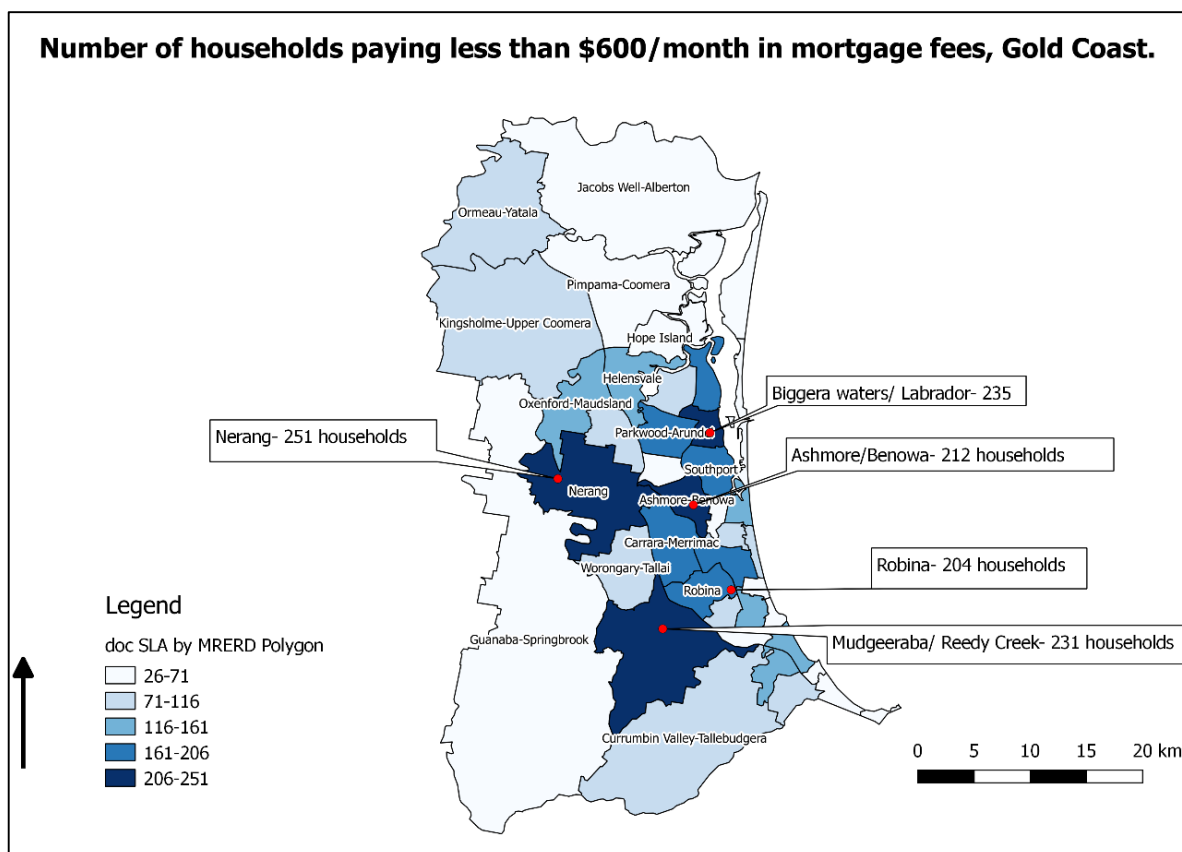
**Figure 2.1:** Number of houses in the Gold Coast region whom are paying less than \$250/week in rental payments (Source: generated 21st April 2016 using data provided by the ABS 2011 Census).

The SLAs which had the highest concentrations of households paying less than \$250/week in rental payments were: Southport (1,426), Biggera Waters/Labrador (1,164), Surfers Paradise (864), Palm Beach (642), Nerang (568). There is a clear spatial pattern of private rental households in the Gold Coast that pay less than \$250/week in rental payments. Interestingly, the highest concentrations of low-cost housing are in the inner-city centralised areas of the Gold Coast, specifically in the CBD area of Southport. Other inner SLAs are also strongly represented: Biggera Waters/Labrador and the tourism CBD of Surfers Paradise. Unusually, this pattern does not align with similar trends in other Australian cities, whereby, according to data from the State of Australian cities (2013, p.19), ‘inner city areas typically exhibit higher rental costs in Australia’. This pattern perhaps shows the lack of gentrification that has occurred in the city, which is increasingly an issue for low income households in many inner suburban areas of other major cities, like Melbourne and Sydney (Badcock 2001). The only outer lying suburb which is well represented in the data is Nerang, which had 568 households paying rent under \$250/week in the 2011 census. Pacific Pines/ Gaven, Currumbin, and Bundall, had the lowest number of households paying less than \$250/week in rent, with 53, 51 and 26 respectively. The next socio-economic indicator mapped and discussed is mortgage repayments.



## 4.1.2 Housing mortgage expenditure

The research in this dissertation also looked at the tenure effects present in the spatial patterns of housing affordability in the Gold Coast. Specifically, to compare the spatial patterns of low rental repayments to low mortgage repayments in the city. Thus, the next indices used to detect disadvantaged SLAs was mortgage costs, specifically targeting houses, which pay less than \$600/month in mortgage repayments (Figure 2.2).



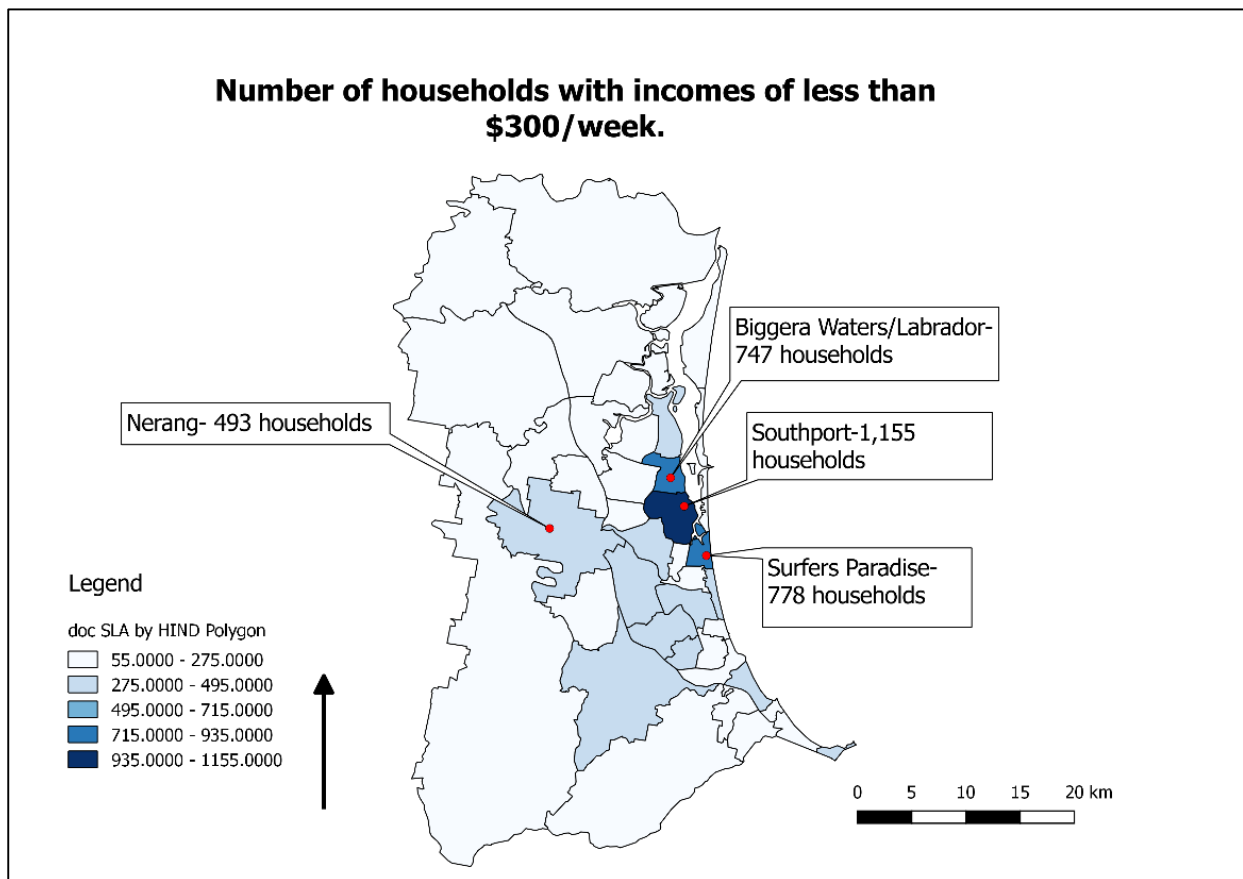
**Figure 2.2:** Number of houses in the Gold Coast region whom are paying less than \$600/month mortgage repayments (Source: generated 21st April 2016 using data provided by the ABS 2011 Census).

The data clearly shows a stronger concentration of low mortgage repayments households in outer suburban SLAs, with Nerang and Mudgeeraba topping the list. It is difficult to create a clear spatial pattern as the outer SLAs have a smaller number of households. For instance, Jacobs Well/ Alberton had 1,390 households in the 2011 ABS census; whereas, Southport and Surfers Paradise had approximately 14,000 households. This helps skew the results towards areas with higher density housing SLAs. So comparing the results, using a relative figure; the outer suburban areas, such as Jacobs Wells (1.9 percent), and Guanaba/Springbrook (2.1 percent) of houses pay under \$600/month in mortgage repayments, whereas, in the high density inner city areas of Southport and Surfers Paradise, the figure is much lower at 0.9 percent and 0.4 percent respectively. This indicates that despite the inner

city SLAs having high concentrations of low rental repayment properties in the area, the cost of buying a property in the SLA is still high. The next indicator mapped and discussed is household with incomes less than \$300/week.

### 4.1.3 Low income households

The next indicator used to identify disadvantaged SLAs in the Gold Coast, was using household income, specifically households earning less than \$300/week. Household income is an integral variable in identifying low socio-economic areas in a region (ABS 2008). The Socio-Economic Index for Areas (SEIFA), a product developed by the ABS, applies household income with the largest loading factor in determining its resultant figures (ABS 2013a). Thus, it was deemed appropriate to also apply it as an indicator to help identify disadvantaged SLAs in this research project (See Figure 2.3). However, it must be noted that all the socio-economic indicators in this research are treated with equal loading.



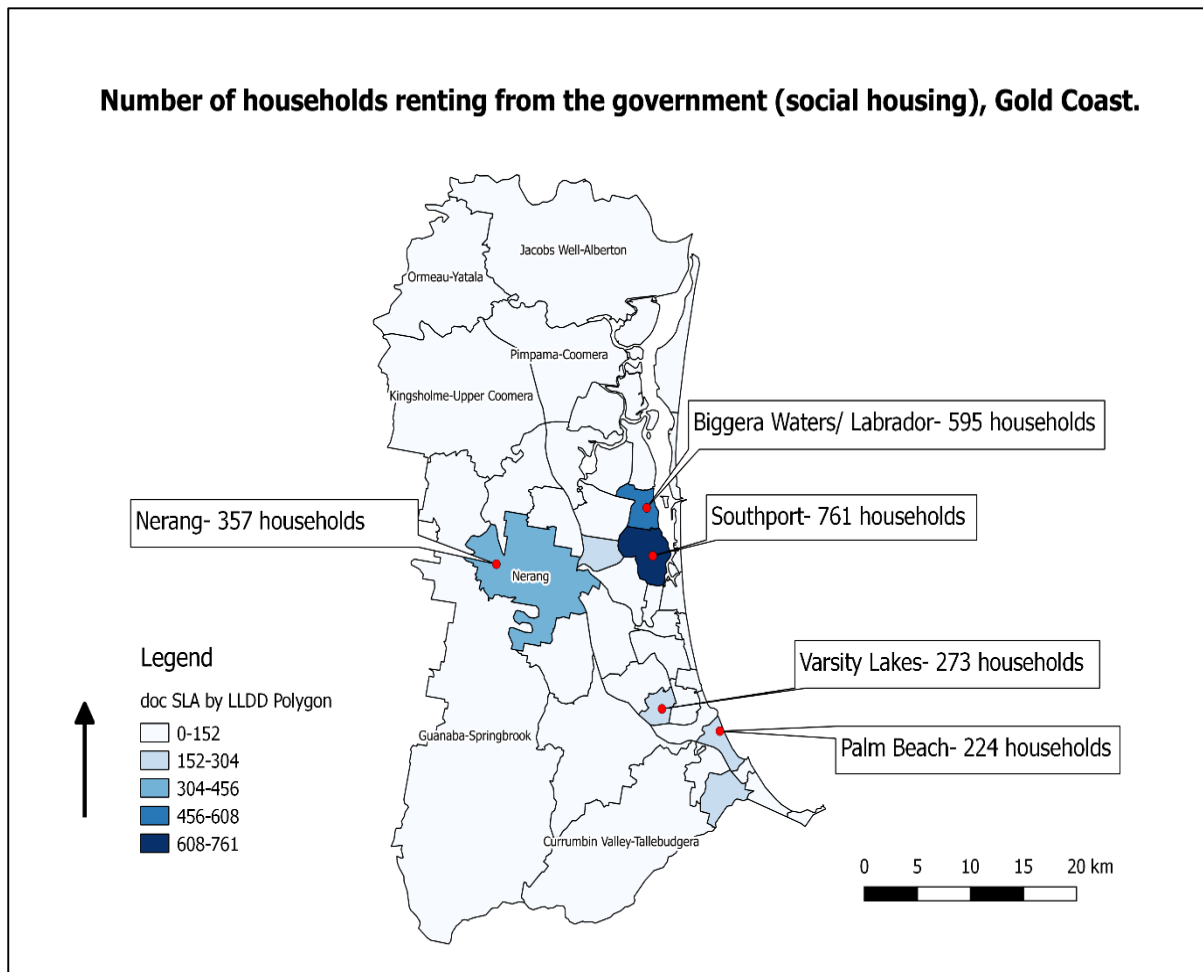
**Figure 2.3:** Number of houses in the Gold Coast region whom have a household income of less than \$300/week (Source: generated 21st April 2016 using data provided by the ABS 2011 Census).

SLAs which had high concentrations of low-income households were Southport (1,155), Biggera Waters/Labrador (747), Surfers Paradise (778). Unsurprisingly, this result practically mirrors the map on low rental repayments in the Gold Coast. Interestingly, once again the inner city areas of the Gold

Coast are again strongly represented in the low socio-economic area analysis. This could indicate that gentrification on the Gold Coast is not yet a strong phenomenon in the inner city areas, unlike other cities in Australia. Gentrification is typically considered an inner-city phenomenon in Australia, whereby, increasing housing market prices displaces low-income families into outer urban areas, which are typically more affordable (Badcock 2001). Comparatively inner city areas of Sydney, despite being densely populated, have considerably lower levels of inner city households earning less than \$300/week, compared to other areas in the city (ABS 2016). The lack of evidence of gentrification may highlight the state of the economy, suggesting that there is a lack of highly skilled, high income professional employment opportunities located in the CBD, which helps push up housing demand and inevitably prices. The next socio-economic indicator discussed and mapped is social housing concentrations.

#### **4.1.4 Social housing spatial concentrations**

The next indicator used to identify disadvantaged SLAs in the Gold Coast, is concentrations of social housing. Social housing in Australia is generally seen by the government, as welfare accommodation for low income receivers, and social security recipients (Parkinson et al. 2015). Research by Hughes (2006) in Australia, found the incidence of jobless households amongst working age adults in public housing had risen from 43 percent in 1981, to 66 percent in 2001. Thus, social housing concentrations was also used as a criterion to help identify disadvantaged SLAs in the Gold Coast region. Using data from the ABS 2011 census, social housing numbers for each SLA in the region was mapped (See Figure 2.4).

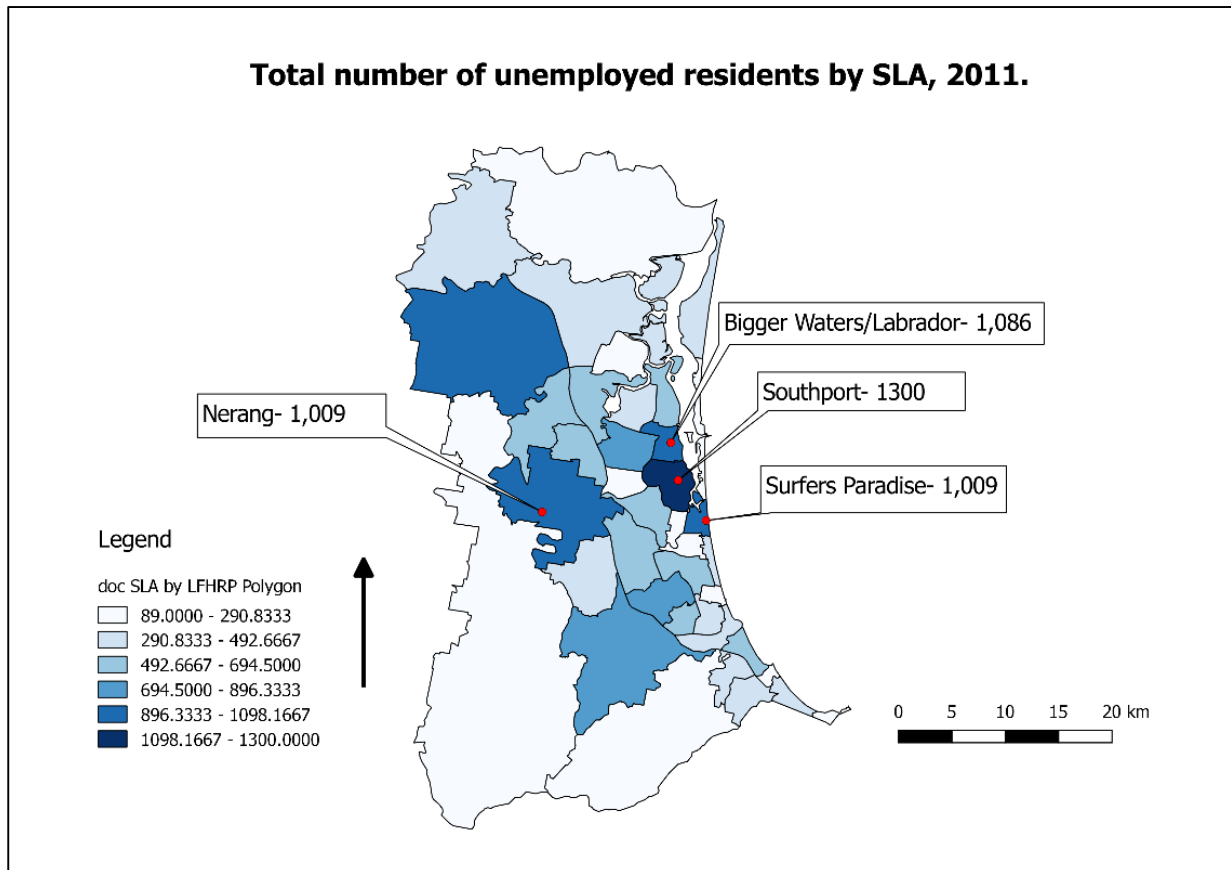


**Figure 2.4:** Number of houses in the Gold Coast region which are government owned (Source: generated 21st April 2016 using data provided by the ABS 2011 Census).

Southport (761) had the highest concentration of public housing in the region, followed by Biggera Waters/Labrador (595) and Nerang (357). These findings almost directly mirrored the low income household's data, this is not surprising as only low income earners are accepted into government housing. Interestingly, Surfers Paradise had very few governments owned houses, this may be due to the fact that government housing in Surfers Paradise has long been sold to developers for high-rise projects, to help boost revenue. Interestingly, however, Surfers Paradise had a high number of households paying less than \$250/week this indicates that the high density buildings in the area provide very cheap private rentals for its occupants. This an important factor as Surfers Paradise is the unofficial CBD of the Gold Coast; thus, these low rental apartments allow low income earners an opportunity to live in the inner city close to employment opportunities; a factor which is critical for spatial mismatch to exist. The next socio-economic factor discussed and mapped is the total population of unemployed residents in each SLA in 2011.

## 4.1.5 Number of unemployed residents

The next criteria used to identify disadvantaged SLAs in the Gold Coast, was the number of unemployed residents. Individual unemployment data was used to map the concentrations for each SLA (See Figure 2.5).



**Figure 2.5:** Total number of unemployed residents by SLA in 2011 Source: generated 21st April 2016 using data provided by the ABS 2011 Census).

The largest number of unemployed residents were found in Southport (1300), Biggera Waters/Labrador (1086), followed by Surfers Paradise (1009) and Nerang (1009). In order for spatial mismatch to exist there needs to be a high number of unemployed individuals distant from employment centres (Kain 1968). However, it can already be seen from this initial analysis that the presence of spatial mismatch is unlikely as: Southport, Surfers Paradise, and Biggera Waters/Labrador are all spatially located in the inner city areas, which are close to employment centres. Nerang is the only outer suburban area, which has a high number of unemployed residents distant from the major employment centres of Southport and Surfers Paradise. The three highly disadvantaged SLAs which were chosen according to these five criteria are discussed in the next section. These three identified disadvantaged SLAs will be used to test for the presence of spatial mismatch, and also be used in the public transport quality assessment.

## 4.1.6 Identifying three highly disadvantaged SLAs

Using ABS SLA data on low rental payments, low mortgage repayments, low income households, concentrations of social housing, and unemployment; patterns begin to emerge; with typically the same SLAs being identified in high concentrations. The patterns demonstrate that typically low income, housing affordable, and high unemployment households, are predominantly concentrated in the inner city regions of the Gold Coast. Interestingly, this pattern is dissimilar to patterns which have been identified in other major cities in Australia, for instance, Melbourne and Sydney, which both typically exhibit high concentrations of low socio-economic households concentrated in outer suburban areas (Dodson 2005; State of Australian Cities 2013). Interestingly, these findings suggest that Gold Coast housing markets are presently not pushing households into outer suburban areas on the basis of income and affordability, a phenomenon which was identified in other major cities in Australia (Dodson 2005).

Using these five indicators, three SLAs were chosen as they were present in the top five results, in at least four out of five, criteria described above. The three SLAs which were identified as highly disadvantaged are identified in Table 1.6.

**Table 1.6:** Criteria for deciding the low socio-economic SLAs.

Disadvantaged SLAs	Criteria
Nerang	<ul style="list-style-type: none"> <li>• Households paying less than \$250/week in rental payments,</li> <li>• social housing,</li> <li>• household income under \$300/week,</li> <li>• mortgage repayments under \$600/month, and</li> <li>• number of unemployed residents.</li> </ul>
Southport	<ul style="list-style-type: none"> <li>• Social housing,</li> <li>• household income under \$300/week,</li> <li>• households paying less than \$250/week in rental payments, and</li> <li>• number of unemployed residents.</li> </ul>
Biggera Waters/Labrador	<ul style="list-style-type: none"> <li>• Social housing,</li> <li>• household income under \$300/week,</li> <li>• mortgage repayments under \$600/month,</li> <li>• households paying less than \$250/week in rental payments, and</li> <li>• number of unemployed residents.</li> </ul>

These three disadvantaged SLAs (Nerang, Southport and Biggera Waters/Labrador) will form the basis for the spatial mismatch and public transport quality assessments. Interestingly, Nerang is the only outer suburban SLA identified using this approach, with both Southport and Biggera Waters/Labrador highly centralised SLAs. Comparatively, the ABS product Socio-Economic Indexes for Areas (SEIFA) index of relative disadvantage, classified these same three SLAs in the bottom quintile for the region in 2011 (ABS 2011).

The fact that low income households are being concentrated in specific locations, is not of direct concern to this research. The major concern is whether housing market patterns place low and modest income households at a subsequent disadvantage in the spatial labour market. Thus, the following section examined spatial patterns of Gold Coast's labour markets, and assessed the extent to which poor labour market opportunity is co-located with areas of disadvantage.

## **Part II- labour market disadvantage and opportunity**

The second part of this research seeks to identify any major pattern changes in the three most commonly used labour market indicators: full-time employment, part-time employment and unemployment, in the Gold Coast. Individual ABS data concerning these three labour market indicators was collected from Table Builder from the 2006 and 2011 censuses. The relative and absolute changes were then mapped at the SLA level in QGIS to identify shifts in patterns in these three key labour market indicators during the five-year study period.

This section responds to Research question 2: What are the spatial patterns of unemployment concentration and employment location in the Gold Coast? The urban literature within which this research project is situated has demonstrated an important link between housing market mechanisms and labour market patterns, particularly for low socio-economic households (Hunter 1995; Dodson 2005). Previous research by Dodson (2005) in Melbourne identified that, while central and inner areas of Melbourne exhibited relatively low unemployment rates, particular outer areas had much higher rates. Thus, part of this research involves looking at the spatial patterns of unemployment in the Gold Coast. Another significant employment pattern identified in the literature was the increasing shift from full-time work to more casualised part-time roles, due to economic restructuring of the economy (State of Australian Cities 2013). Thus, an additional part of this research was to separate the two key major labour market indicators: full-time, and part-time employment, in order to compare the relative growths in each labour market variable. Specifically, to identify if part-time employment had increased in the Gold Coast relative to full-time; thereby, aligning with data from the report by the State of Australian Cities (2013).

Individual labour market data was obtained from the 2006, and 2011 censuses, using Table Builder. The data was exported in Microsoft Excel, in order to calculate the relative changes in the five-year period of the three main labour market indicators: full-time employment, part-time employment, and unemployment. The rates were used so that SLAs with higher concentrations of individual populations was not able to skew the results. The relative rate change in these three indicators were then exported into QGIS to be spatially mapped to identify employment patterns in the region. Four different choropleth maps were developed in Part II to research spatial labour market patterns:

1. relative change in full-time employment rate;
2. relative change in part-time employment rate;
3. relative change in unemployment rate.
1. absolute change in employment.

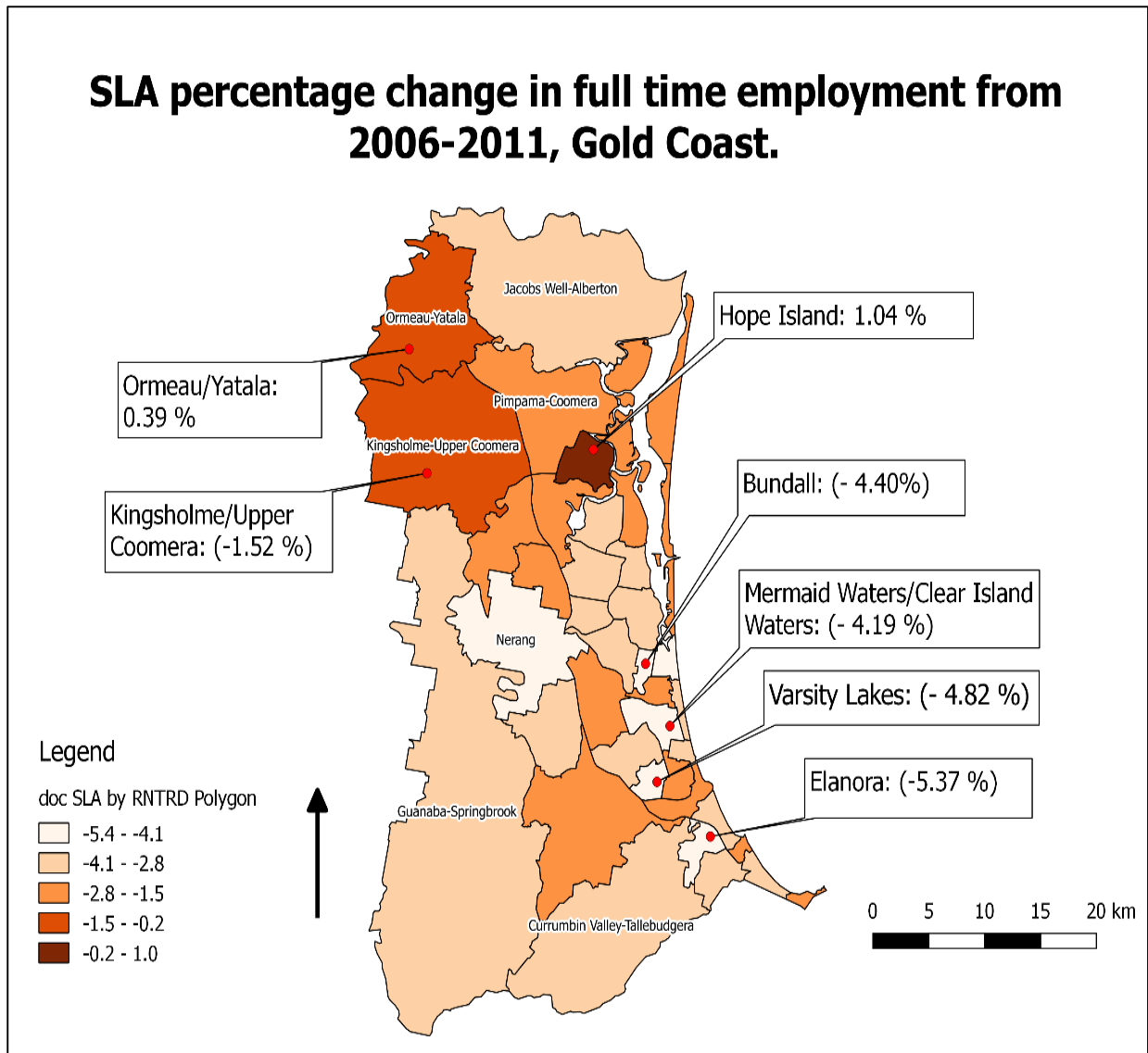
The raw data for each of the four maps map can be obtained in Appendix A (1,2,3,4). The next section explores the relative change in full-time employment for each SLA, during the 2006 to 2011 census.

### **4.2.1 Relative change in full-time employment**

Full-time employment is a very important indicator, as it is the main channel through which working-age Australian's generate income, and it is a key determinant of financial well-being (Hunter 1995). Figure 2.6, illustrates the relative change in full-time employment for each SLA in the five-year period for the case study.



## SLA percentage change in full time employment from 2006-2011, Gold Coast.

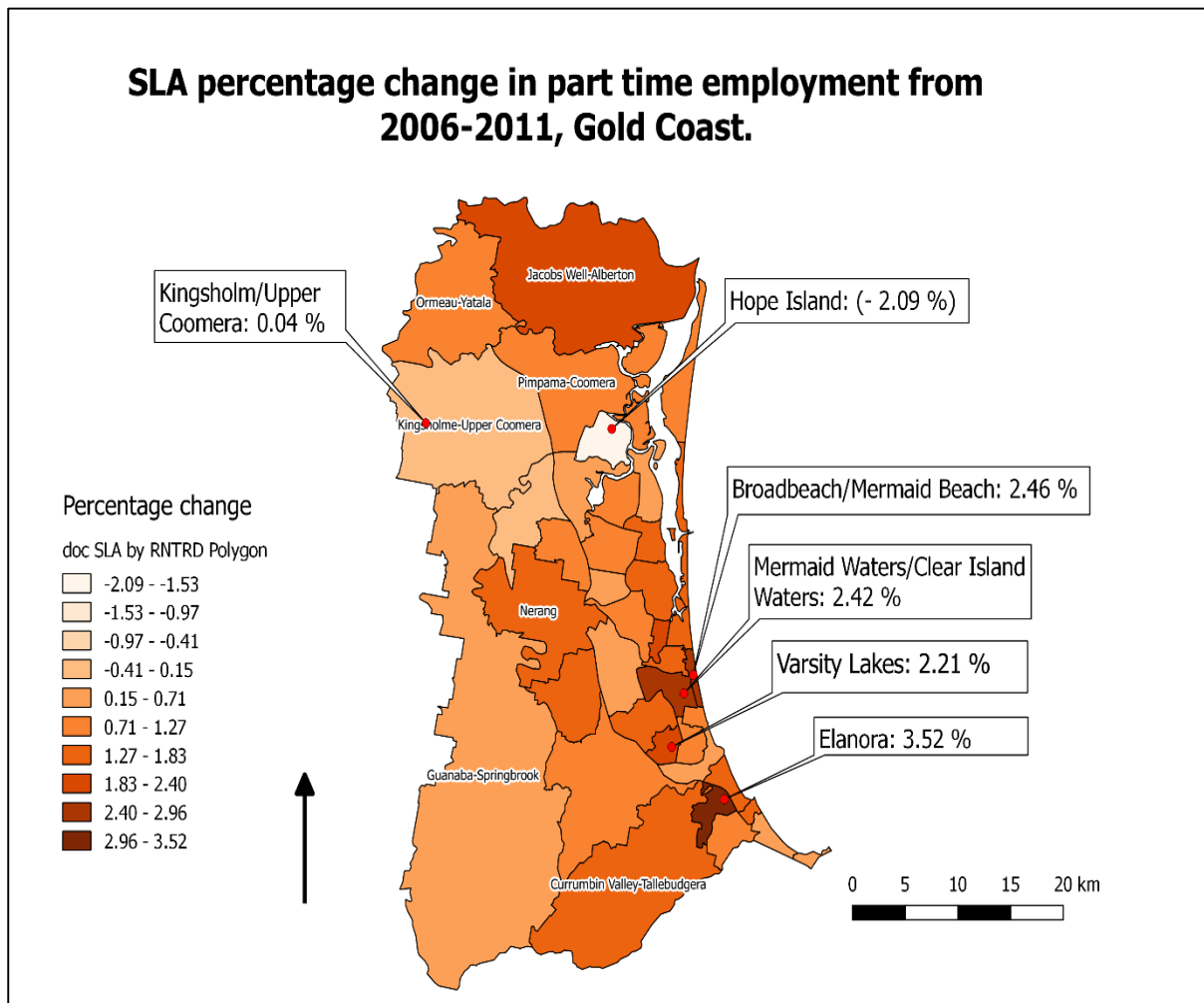


**Figure 2.6:** SLA relative change in full time employment from the 2006 to the 2011 census (For data see Appendix A.3).

Alarminglly, there were relative drops in full-time employment in nearly every SLA during the period, with only Hope Island (1.04 percent), and Ormeau/ Yatala (0.39 percent), exhibiting relative growth in this key labour market indicator. The southern suburb of Elanora, was the worst performing with a drop of 5.37 percent over the period, followed by the central suburbs of Varsity Lakes (-4.82 percent), Bundall (-4.40 percent), and Mermaid Waters/Clear Island Waters (-4.19 percent). The next section analyses the relative change in part-time employment for each SLA, using data from the 2006 to 2011 censuses.

## 4.2.2 Relative change in part-time employment

Part-time employment changes are a good indicator of economic activity as many businesses respond to economic downturns, by shifting workers from full-time employment to a part-time basis, rather than putting them off (ABS 2011). Figure 2.7, illustrates the relative change in part-time employment rate for each SLA in the five-year period.



**Figure 2.7:** SLA relative change in part time employment from 2006 to 2011 census (Source: generated 21st April 2016 using data provided by the ABS 2011 Census) (For raw data see Appendix A.3).

Interestingly, there has been broad growth in part-time employment in the region over the five-year period, with only Hope Island experiencing a relative reduction in part-time employment. The strongest growth suburbs were Elanora (3.52 percent), Broadbeach/Mermaid Beach (2.46 percent) and Mermaid Waters/Clear Island Waters (2.42 percent).

The relative change in part-time employment aligns with data from the State of Australian Cities (2013), on the increase in casual/part-time employment, with nearly all the SLAs exhibiting stronger growth in

part-time versus full-time employment. Due to the difficulties in separating part-time and casual employment in ABS data the two terms in this research are seen as interchangeable.

There are some major differences that need to be acknowledged regarding permanent part-time and casual employees, a permanent part-time worker has access to entitlements, e.g. parental leave, sick leave, annual leave. Whereas, casual employees are employed on an irregular basis, with no set roster or routine, and they have no guarantee of ongoing employment. This can create issues for minimum wage casual employees as they have less reliability in the amount they earn each week, and they can find it much more difficult accessing mortgage loans (Denniss 2003).

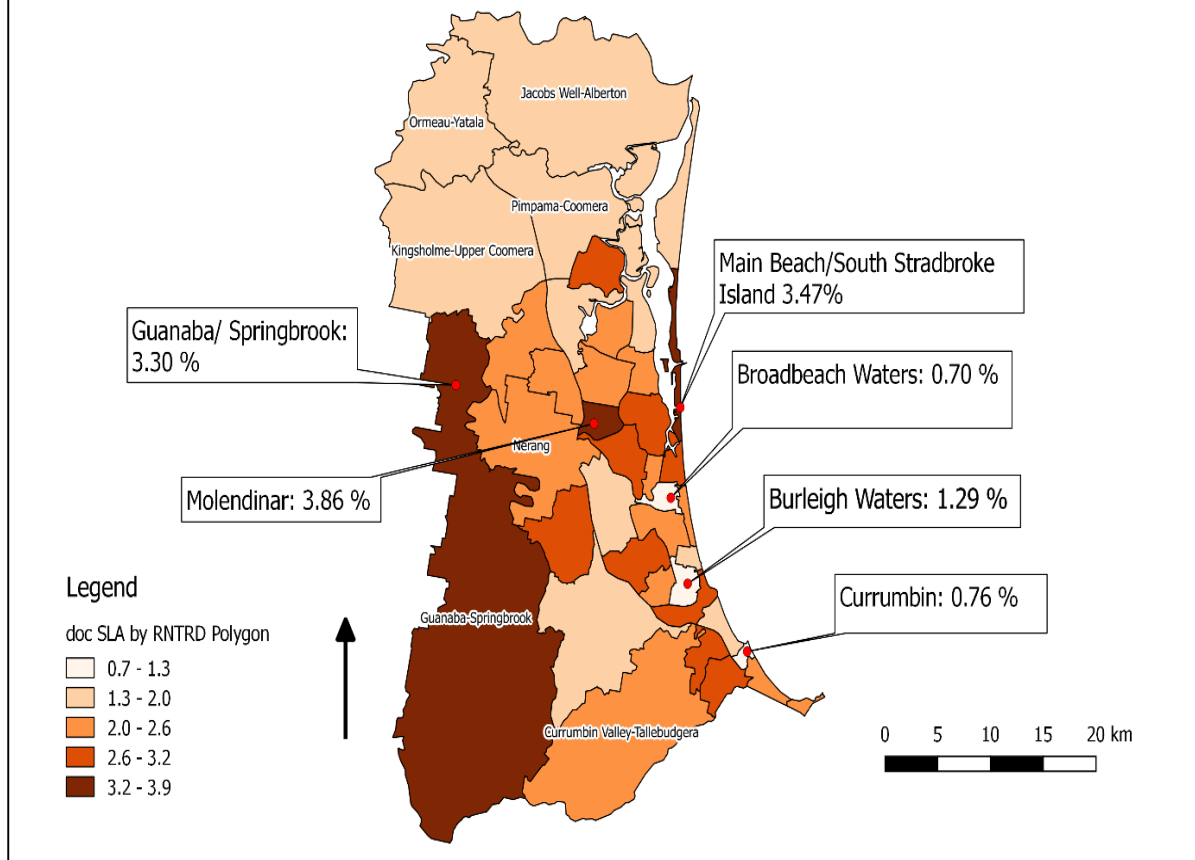
According to ABS (2012) document on employment in the Gold Coast, the strongest employment growth during the period was in health care and social assistance (+5,945), which employees a large portion of its workforce, predominantly women on a part-time basis. Whereas, the biggest drop in employment by sector was in manufacturing (-1,960), which typically employs men on a full-time basis. This has worrying implications for the state of the economy in the region. As the part-time employees are often employed on a casual basis (Denniss 2003). As noted in the literature, casual workers have less entitlements, less reliability in the number of hours they work each week, are the most affected by underemployment and tend to be young, 2 out of 5 of casuals are between 15-24 years of age (Denniss 2003). With youth unemployment rates sitting at 16.5 percent in the Gold Coast (ABS 2016), an increase in only the part-time employment rate on the Gold Coast has worrying implications on the entrenchment of youth into cycles of poverty (Denniss 2003).

The growth in part-time/casual employment is a noteworthy trend, as according Buddelmeyer, McVicar, & Wooden (2013), casual employees predominantly need to be more flexible in their hourly working availability. Often very low income households do not have access to/or limited access to a private vehicle (Buddelmeyer, McVicar, & Wooden 2013). Thus, the question arises of: ‘whether public transport in the region is suitable for employees with temporally flexible working hours?’ Which is answered in the discussion on Research Question 4, in Part IV of this research project. The next section analyses the relative change in unemployment data for each SLA from the 2006 to 2011 census.

### **4.2.3 Relative change in unemployment**

Referring to Figure 2.8, the spatial pattern of unemployment was evenly distributed throughout the region. With some outer urban areas experiencing high growths in unemployment e.g. Guanamba/Springbrook (3.3 percent) and Molendinar (3.86 percent), and some inner urban areas along the coast, also exhibiting strong growth in unemployment, e.g. Main Beach/South Stradbroke Island (3.47 percent) and Burleigh Waters (1.29 percent).

## SLA percentage change in unemployment from 2006-2011, Gold Coast.

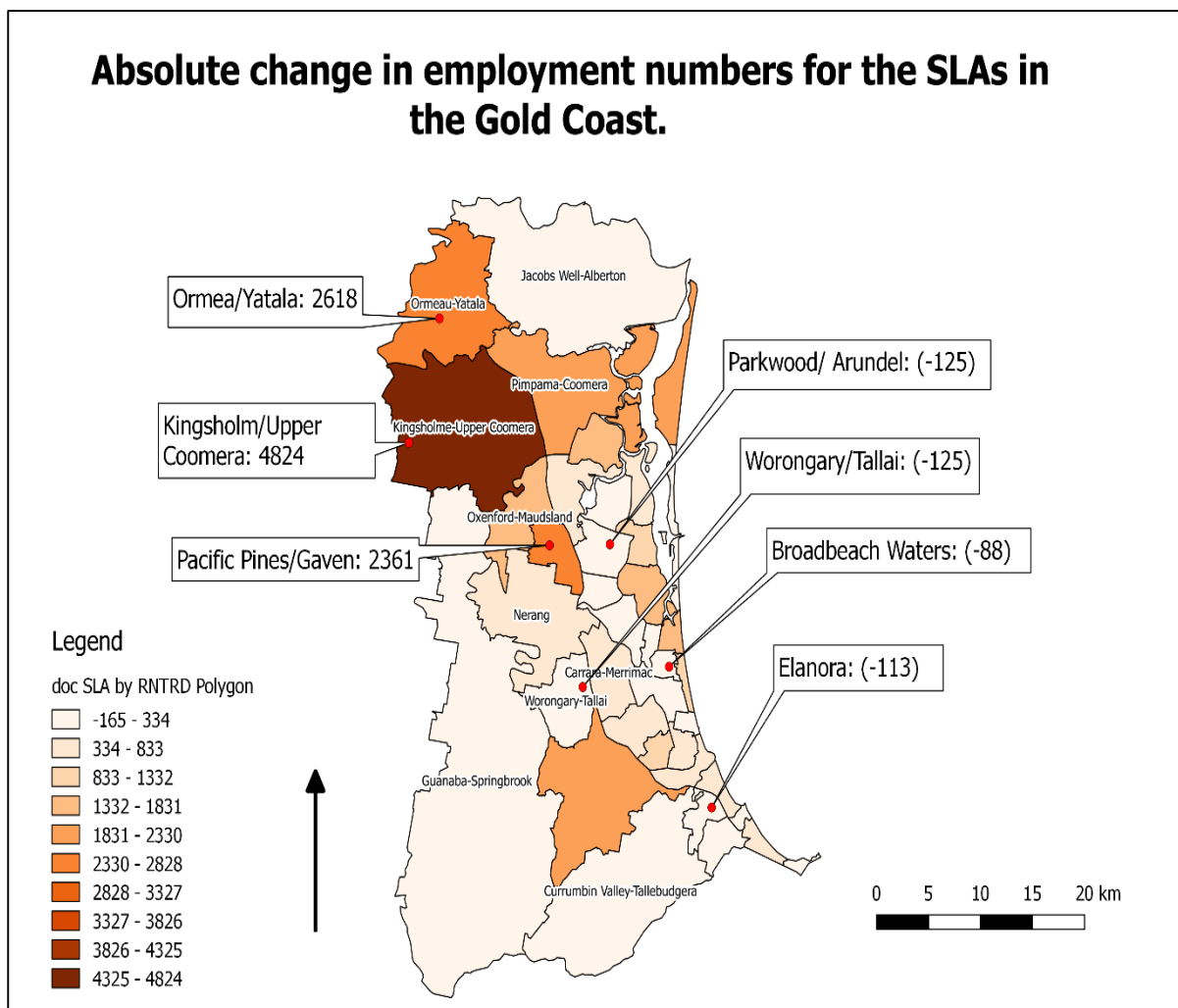


**Figure 2.8:** SLA relative change in unemployment values from the 2006-2011 census (Source: generated 21st April 2016 using data provided by the ABS 2011 Census) (For raw data see Appendix A.3).

Areas which exhibited little growth in unemployment were the suburbs, which exhibited strongest population growth, i.e. the northern corridor of Ormeau/Yatala, Kingsholme/ Upper Coomera, and Pimpama/Coomera. Interestingly, despite these areas experiencing strong population growth, also had strong employment growth, especially in full-time employment. Which probably indicates that people moved to these areas to access work, or to be closer to their workplace. However, according to infrastructure report by Reilly (2007) households in this northern growth corridor are facing very high housing costs, limited access to transport, and a range of identified social problems. The next section discusses the absolute change in employment numbers over the five-year period.

## 4.2.4 Absolute change in the employment numbers

The absolute difference in employment numbers was calculated using data from 2006 and 2011 employment data (full-time, part-time and employed away from work), in order to test for the presence of spatial mismatch. This data was mapped using QGIS, which is shown in Figure 2.9.



**Figure 2.9:** Absolute change in employment values from the 2006-2011 census (Source: generated 21st April 2016 using data provided by the ABS 2011 Census) (For raw data see Appendix A.4).

This map aligns with the earlier spatial maps on employment data for the period with strong employment growth in the northern corridor areas of Ormeau/Yatala (2618), Kingsholme/ Upper Coomera (4824), and Pacific Pines/Gaven (2361). The only SLAs to exhibit losses in their absolute employment numbers was Worongary/Tallai (-165), Parkwood/Arundel (-125), Elanora (-113), and Broadbeach Waters (-88), in the 2006- 2011 study period. It must be noted that despite the reduction in the relative full-time employment rate across the region, there has still been an overall increase in full-time employment (14,953) in absolute numbers; however, these increases were not strong enough to offset the 14.28 percent growth in the population (ABS 2011). The next section uses the data from

Figure 2.9, in order to identify if employment has increased or decreased in absolute terms within a reasonable commuting distance from the identified disadvantaged areas of Southport, Nerang and Biggera Waters.

### **Part III- Employment growth close to affordable housing**

Previously, three SLAs were chosen as they were identified as highly disadvantaged. These SLAs were chosen as they were considered disadvantaged areas, based on the criteria of: low rental payments, low mortgage repayments, low income, high unemployment, and high concentrations of social housing. The three SLAs identified were Southport, Biggera Waters/ Labrador, and Nerang. Using the GIS software, QGIS, a buffer of 15.6km was applied around each identified disadvantaged SLA, using the absolute data in Figure 2.9. The software then calculated how many new individual employment opportunities had been created during the period between 2006-2011. The 15.6km buffer was used as it was considered the average commuting distance for workers to access employment in Australia (BITRE 2015). The absolute growth in individual employment numbers, is shown in Table 1.7.

**Table 1.7:** Number of new employment opportunities within a buffer zone of 15.6km from three SLAs, which were identified as disadvantaged.

<b>Statistical Local Area (SLA)</b>	<b>Absolute change in individual employment numbers (i.e. new jobs)</b>
Southport	9,704
Nerang	14,766
Labrador/ Biggera Waters	11,711

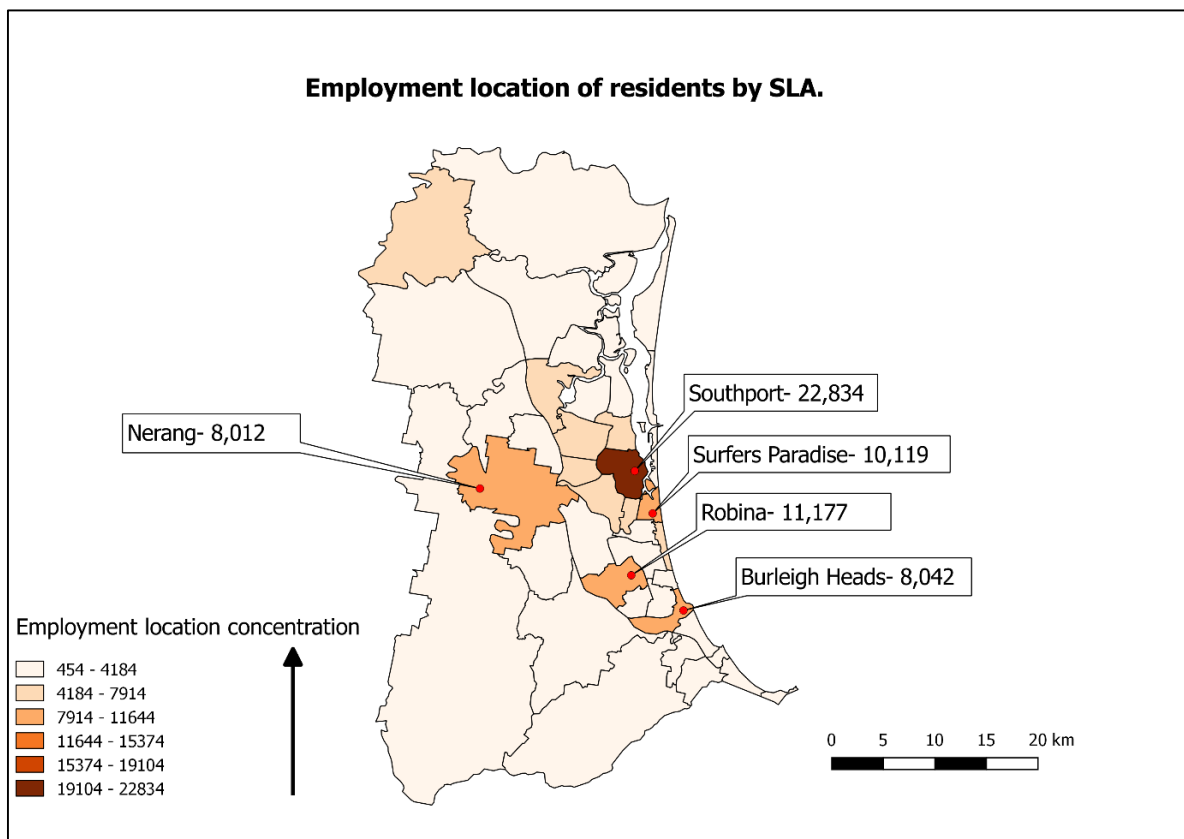
Referring to Table 1.7, it is evident that despite these SLAs experiencing high levels of disadvantage, there have been reasonable levels of employment growth within a practical commuting distance from these areas. All the SLAs attained an approximate growth of 10,000 new jobs during the five-year period, with a reasonable commuting distance of 1.6km. Interestingly, Nerang which was the only outer lying suburb had the greatest growth in employment, which was due to its proximity to the very high employment growth SLAs in the northern corridor of Kingsholme/Upper Coomera and Pimpama/Coomera. Southport and Biggera Waters/Labrador had similar results, albeit slightly worse in the Southport. However, something that was not taken into consideration in this calculation is that during the same five-year period there was 65,127 new residents to the area (ABS 2016); thus, despite

an increase in employment numbers there are also more people competing for those same jobs. Thus, unemployment in absolute numbers actually increased during the period (See Appendix A.4 for raw data). Furthermore, the employment growth in each SLA was predominantly in part-time/casual work.

### 4.3.1 Spatial mismatch at the SLA level

Based on the research presented it is evident that there is *no evidence of spatial mismatch* between disadvantaged areas and employment rich regions in the Gold Coast, at least at the SLA level; as the growth in employment exceeded the number of unemployed persons in the case study SLAs by many times. Full-time growth has been slow; however, there has been steady gains in part-time employment, which are close to disadvantaged areas.

In order to further supplement the evidence on the lack of spatial mismatch in the Gold Coast. A spatial map was produced according to ABS (2011) data on employment by location (See Figure 3.0)



**Figure 3.0:** Employment location of residents by SLA. census (Source: generated 21st April 2016 using data provided by the ABS 2011 Census) (For raw data see Appendix A.5).

Interestingly, the three areas identified as low socio-economic areas (Biggera Waters/Labrador, Southport and Nerang) are also areas that contain high employment concentrations. Such that, low socio-economic households do not need to travel far, if at all, to access employment rich areas.

Residents in Nerang, may need to travel further, to access the employment rich areas of Southport, Surfers Paradise and Robina. However, all these locations, are within Australia's 15.6 km average commuting distance to access employment (BITRE 2015). Thus, locational disadvantage to employment is not considered a significant reason to explain the socio-economic standings of households in the Gold Coast.

This finding clearly diverges from what might have been expected from literature concerning spatial mismatch overseas; however, Dodson's (2005) spatial mismatch assessment of Melbourne produced analogous results to the ones found in this report. Ultimately, the conclusion is that unemployed residents in the Gold Coast have had relatively strong opportunity to access new employment opportunities in their surrounding areas; however, the employment will most likely be part-time/casual. Despite Dodson (2005) not identifying the presence of spatial mismatch in Melbourne the research did identify problems associated with public transport accessibility in Melbourne, especially for worker with temporal flexibility in working conditions (e.g. nights, weekends). Thus, the next section identifies if public transport is sufficient to provide accessibility for employees with temporally flexible working conditions in the three identified disadvantaged SLAs (Nerang, Southport and Biggera Waters/Labrador).

## **Part IV- Assessing public transport accessibility in the Gold Coast, Australia**

Distribution of employment varies across metropolitan regions; thus, it is safe to assume that different geographical locations within cities will have differing levels of access to employment. It has been well recognised that public transportation systems play a pivotal role in reducing locational disadvantage, by facilitating movement between low socio-economic areas and employment rich regions (Dodson et al. 2006; Gleeson & Sipe 2004; Taylor & Ong 1995). A study in the UK found that found that 38 percent of jobseekers cited transport as a barrier to finding work (SEU 2002). Thus, high quality public transport, is the key to reducing the locational disadvantage felt by communities, which are distant from employment centres (Dodson 2005).

It was previously noted that Australia is seeing an unprecedented growth in its part-time/casual workforce, part-time employment is typically associated with increased temporally flexibility in working conditions (State of Australian Cities 2013). Thus, it was important that public transport services within a city, provide temporally flexible services, between employment rich areas and affordable housing regions, to help reduce locational disadvantage. High quality public transport services help disadvantaged communities, overcome access restraints, and reduces the need for owning a private vehicle, which adds a significant financial burden to the household. In order to assess the quality of public transport accessibility in the case study area, a public transport quality assessment



matrix was developed by the author, using a mixture of criteria from Dodson et al. (2006) and Cheal (2003). This was designed to test the quality of public transport in the three identified disadvantaged SLAs (Southport, Nerang, and Biggera Waters/Labrador).

#### **4.4.1 Background information on identified disadvantaged areas**

##### **Nerang**

Nerang is the largest case study SLA in terms of land size (61.32 km<sup>2</sup>), with the lowest population density 3.07 person /hectare, however, the majority of the population reside in the southern area, nearby the train station, as the northern region comprises mostly of the Nerang National Park (Gold Coast labour force capability and futures assessment 2013). The outer urban suburb is characterised by its rural setting, located to the west of Surfers Paradise and proximate to the Pacific Highway. In the 2011 census, Nerang had a population of 16,256 (Gold Coast labour force capability and futures assessment 2013).

##### **Southport**

Southport is the Central Business District of the case study region of the Gold Coast. It is the largest SLA in terms of population, with the 2011 census, counting 28,315 residents, with a density of 19.83 persons/hectare (Gold Coast Labour Force Capability and Futures Assessment 2013). The SLA has the highest density of office space in the city, at 103,818 m<sup>2</sup> (Gold Coast Labour Force Capability and Futures Assessment 2013). The Gold Coast Broadwater marks the eastern boundary of the SLA, bordering the other case study SLA, Biggera Waters/Labrador to the north.

##### **Biggera Waters/Labrador**

These are two neighbouring central northern suburbs in the case study region of the Gold Coast; however, the spatial unit SLA groups them together. At the 2011 census, the population for the SLA was 22,700, with a density of 26.46 persons/hectare (ABS 2011). The SLA overlooks the Gold Coast Broadwater to the east, and borders the SLA of Southport to the south.

## 4.4.2 Discussion and results of public transport assessment matrix

The results of the public transport assessment matrix were used to respond to Research Question 4, which are show in Table 1.8.

**Table 1.8:** Public transport assessment matrix.

SLA: (Area)	Number of tram stops/km	Number of bus stops/km	Number of train stops/km	Average frequency of transport service, weekday (AM)	Average frequency of transport service, weekday (Interpeak:900-1500)	Average frequency of transport service, weekday (PM):	Number of public transport options available 12am-12pm(weekend)	Number of public transport options available 12pm-12am(weekend)	TOTAL
<b>Southport:(Area: 14.28km<sup>2</sup>)</b>	10	10	1	9	7	8	8	7	60
<b>Nerang: (Area: 61.32km<sup>2</sup>)</b>	1	5	10	5	4	5	4	3	37
<b>Biggera Waters/Labrador (Area: 8.16km<sup>2</sup>)</b>	5	10	1	8	7	7	8	5	51

## Number of tram stops/km

Southport is the only disadvantaged SLA in this case study with walkable access to the tram line. The tram line does not run through Biggera Waters/ Labrador or Nerang, so they were given 5 and 1 respectively in the assessment. As the tram line is within a 5km radius of some parts of Biggera Waters/Labrador; however, it is more than a 5km radius from Nerang. The tram line opened in July 2014, which helped significantly boost public transport patronage in the region (Public transport travel 2012). The service runs from 5am to midnight on weekdays, approximately every 15min. Transporting people from Broadbeach in the south to the Griffith University in the north west region of the Gold Coast. There are 7 tram stops in Southport at 0.49 stops/km<sup>2</sup>.

## Number of bus stops/km

Biggera Waters/Labrador and Southport both had bus stops within a 400m radius covering the entire SLA. Nerang did not manage the 400m radius test as the majority of the northern region is national park; thus, requiring no bus access as there are limited residents so it was given a five in the result.

## Number of train stops/km

Nerang is the only low socio-economic SLA in the case study that has walkable access to a train station, with nearly all residents able to access the service within a 700m radius. The train provides a consistent half hourly access to the employment rich regions of Robina to the south, and Brisbane to the north. However, these services run only up to 2400 Mon-Sat, and till 2300 on Sunday. The train station can be accessed via bus transport, from both Biggera Waters/Labrador and Southport approximately every 15min during peak times and every half an hour during off peak times from the main transport hub regions of Scarborough St, Southport, and Harbour Town, Biggera Waters/Labrador.

## Average frequency of transport service, weekday morning peak (AM)

High frequency (every 15min) bus transport, covers the areas of Broadbeach, Surfers Paradise, extending northwards along the edge of Southport and Labrador. A high frequency service that services Helensvale, to the west is also available during this period. Beyond the central core of the region, the outer lying suburb Nerang suffers with bus services only every half an hour during this period, which connects the area with the region's main employment hub of Southport. All of the areas with high population levels are served to some extent at least every 15 min by public transport. Southport has full spatial coverage during this period. While, Biggera Waters/Labrador, has services running every 15min along the Gold Coast Highway.

The train stations, which is located in Nerang, runs every 15min during this period, catering for the increasing numbers of Gold Coast to Brisbane commuters. The tram service runs more frequently, every 7.5min, during this time period. The service operates between Broadbeach in the south, to Griffith University on the eastern fringe of Southport.

### Average frequency of service, weekday inter-peak (0900-1500)

The number of bus services, which run every 15 min, decline significantly during the midday inter-peak period, especially in the outer suburban area of Nerang. With a reduction also in services in the highly populated regions of Southport and Biggera Waters/Labrador. However, the tram still operates its regular services, which run every 7.5 minutes, during the inter-peak period; thereby, significantly improving connectivity between Southport and the employment rich areas, to the west (Griffith University, University Hospital), and to the south, Surfers Paradise and Broadbeach/Mermaid Beach.

### Average frequency of service, weekday peak (PM)

From mid-afternoon to early evening on a weekday public transport is stable in gross terms but increases, slightly in spatial coverage. Afternoon peak services, connecting Southport, Biggera Waters/Labrador to Coolangatta, operate at least every 15 min along the coastal corridor. High frequency bus coverage returns to Nerang during this period, to accommodate for the increase in train service, which bring home Brisbane commuters.

### Weekday evening off-peak (PM)

There is one high frequency bus service, which operates at least every 15 min on the Gold Coast after 1900 on weekday evenings. This service runs from Coolangatta to Southport. Services running at least every 30 min become limited in the east-west direction, however, Nerang does have a service which connects it to the tram station in Broadbeach. The tram continues its high frequency service until 1200. Southport and Biggera Waters/Labrador are connected by high frequency services on the east-west route along the Gold Coast Highway to Helensvale until 1200.

### Number of public transport options available 12am-12pm (weekend)

High frequency bus services connect Helensvale train station, and nearby theme parks with Southport, via Biggera Waters/Labrador, on Saturday mornings. There is also a high frequency service, which connects Nerang to the employment hub, Surfers Paradise. Southport also has a service, which connects it to the train station in Nerang, at service intervals of at least every 30min, Train service continues running to Brisbane at a half hourly basis from Nerang train station. Tram services continue on a high frequency basis, connecting Southport to the employment rich regions of Surfers Paradise and Broadbeach.

## Number of public transport options available 1200-2400 (weekend)

There are only a limited number of transport options for people travelling in the Gold Coast during this period. The train continues until 2249, on Friday and Saturday, and till 2249 on Sunday, connecting Nerang to Brisbane. However, the tram continues its normal services all night during the weekend, catering for the late night revellers. Travelling from Broadbeach to Griffith University, via Southport and Surfers Paradise. The service runs at a lower frequency of 30 min intervals until 0700, at which point, it returns to its high frequency service. As mentioned previously, a bus service which connects Coolangatta with Griffith University, via Southport, travelling along the coast, runs 24 hours a day, seven days a week. The service runs at a moderate frequency, every 30min.

### **4.4.2 Discussion of public transport accessibility**

The public transport analysis in the case study region suggests that public transport routes, in the case of buses are attracted to social disadvantage; and in the case of train stations attracted by social disadvantage and affordable land. Overall the analysis suggests that Southport and Biggera Waters/Labrador do provide sufficient accessibility in terms of temporally flexible employment, to other employment rich SLAs. This is not that surprising as Southport is the region's largest employment by location area, being the CBD of the Gold Coast; thus, public transportation services converge towards the areas providing high levels of connectivity with other employment rich regions on the coast. Biggera Waters/Labrador, is also a highly centralised SLA, which has high concentrations of employees identifying the SLA as their location of employment. Despite not having walkable access to the tram, it still has a high frequency of buses with temporal flexibility, which connect to the tram. Thus, both of these SLAs were scored well in the assessment matrix. Southport scored higher than Biggera Waters due to the accessibility of the tram line, which provides high frequency services to other employment hubs, i.e. Surfers Paradise, Broadbeach/Mermaid Beach. Contrastingly, Nerang, which is an outer lying SLA, achieved the lowest score in the assessment. Nerang was brought together in the 19<sup>th</sup> century by the building of the Gold Coast rail line, which connects the area to the capital city of Brisbane (Public Transport Travel 2012). However, despite its proximity to the train line, it was still assessed as the worst suburb in terms of accessibility to public transport. This outcome aligned with research by Dodson et al. (2006, p.21), whom noted that 'poorer outer lying suburbs, don't just suffer from lower access to services e.g. healthcare, employment; these regions, also typically suffer from poorer access to public transport.'

The majority of Nerang was still found to be adequately serviced by public transport; however, the northern region, which borders the Nerang State Forest, was poorly serviced. Nerang is an undulating suburb, with many roads typically dead end cul-de-sacs, thereby, lacking interconnectivity between areas. This lack of connectivity may have created issues in developing effective public transport

accessibility in the area. Furthermore, the services lack temporal flexibility, compared to the services in Biggera Waters/Labrador and Southport; thus, Nerang workers travelling to the three main tourist employment areas of Surfers Paradise, Southport, and Robina, for an evening shift face major hurdles.

This conclusion is reflected in the fact that only 6.9 percent of households in Nerang in the 2011 census, had no vehicles, compared to 10.7 percent in Biggera Waters/Labrador and 12.9 percent in Southport (ABS 2011). Notably, research by Maher (1994), in his work on locational disadvantage in Australia, suggested that automobiles are a necessary means of transportation for outer-suburban households. Inaccessible public transport forces people on low incomes to gain access to a private vehicle in order to access and/or find work, this places a significant strain on a low income households budget. With research by Badcock (1994), in Sydney, demonstrating that households in outer areas such as Green Valley, Mount Druitt or Penrith incurred work-trip costs up to double the average rate for the metropolitan area.

## CHAPTER 5 - CONCLUSION

This chapter begins by answering the research questions posed at the beginning of this research using the gathered empirical evidence. The next section discusses the importance of considering spatial mismatch as a significant urban planning issues, and finally the chapter concludes with some key recommendations for policy makers, and areas of future research.

### 5.1 Discussion of research questions

This project has investigated the concept of spatial mismatch between disadvantaged locations and employment rich areas in the Gold Coast. This section reviews the research questions that were posed at the beginning of this investigation, and discusses the response to each of these as provided by the empirical analysis undertaken in the research.

1. What are the spatial patterns of housing affordability for different housing tenures (mortgages and renters), low income households, social housing concentrations, and unemployment?

The first part of the analysis focused on identifying the disadvantaged areas in the Gold Coast, based upon five categories: low rental payments, low mortgage repayments, low income, social housing concentrations and unemployment. The analysis identified that in the case study area, high concentrations of disadvantaged households resided in the inner city areas of Southport and Biggera Waters/Labrador, according to data from the 2011 census. The only outer lying suburb that was identified in the data, which satisfied the criteria as disadvantaged was Nerang. Interestingly, this urban pattern is dissimilar to other cities in Australia, e.g. Sydney and Melbourne, with urban researchers typically identifying concentrations of high unemployment and low socio-economic populations residing in outer areas, which are distant from employment centres (Dodson 2005; McMahon 2006). This socio-economic segregation pattern is more similar to the major cities in the US, which typically have high concentrations of poorer households in the centralised areas of its cities (Andersson et al. 2014).

2. What are the spatial patterns of unemployment concentration and employment location in the Gold Coast?

There was a relative drop in the full-time employment rate in nearly every SLA in the five-year period, however, this was offset by an increase in part-time work. These findings align with other research on employment trends in Australia, which have identified significant increases in part-time and casualised employment, compared to full-time work (Abhayaratna et al. 2008). This increase in part-time/casual employment means workers in Australia are losing the benefits received from full-time employment (e.g. annual leave, job security).

### 3. Is there evidence of a spatial mismatch in the Gold Coast between the locations of affordable housing and locations of employment opportunity?

According to BITRE (2015), the average commuting distance for Australian workers is 15.6km, so applying a buffer of this distance around each low socio-economic SLA, showed a positive employment growth around each disadvantaged SLA, during the 2006-2011 period. Thus, the results in this research *does not support the presence of spatial mismatch in the Gold Coast*. Low-socio economic areas were typically located in the inner-central areas of the city, which had relatively good employment growth in the five-year period, and were in commuting distance to other employment hubs.

### 4. Does public transport in identified low socio-economic SLAs, provide accessibility for employees with temporally flexible working conditions?

Public transport in Australia is highly accessible in the dense cores of its big cities; the problem is that typically low socio-economic residents in Australia live in outer suburban areas (Dodson 2005). Interestingly, for the Gold Coast, this is not the case, with large pockets of disadvantaged communities living in centralised areas, i.e. Southport and Biggera Waters /Labrador; thus, unsurprisingly, these two SLAs both scored well in the assessment matrix. This anomaly allows residents living in these two centralised SLAs, the opportunity to access high frequency, highly accessible, public transport options in the Gold Coast. This is especially the case in Southport, with the opening of the new tram service in 2014, which has helped considerably increase public transport patronage in the Gold Coast. The findings from the assessment matrix indicates that low socio-economic individuals in these two SLAs, have good quality transport accessibility in terms of temporal flexibility. Thus, according to the data, public transport in these two SLAs did not impede the residents from accessing employment. Comparatively, in the outer lying suburb of Nerang, the matrix identified that public transport did impede residents from accessing employment. This finding coincides with Dodson (2005), whom identified that outer suburban SLAs in Melbourne had much poorer access to public transport, especially for employees with temporal flexibility in employment. The research in this dissertation, is also supported by data showing that the number of no car households in Nerang was almost double (1.9 times) the number of no car households in Southport (ABS 2011). Suggesting that households which can access high quality temporally accessible public transport, are able to trade off expensive motor vehicle ownership.

## 5.2 Implications of research findings

Globally, empirical research has identified that spatial mismatch contributes to the high unemployment rates in low socio-economic areas, due to the transport barriers that people face in trying to access work. (Kain 1968; Andersson et al. 2014; Gobillon, Selod & Zenou 2003; Dodson 2005). Spatial mismatch helps strengthens the economic and social divide in society by increasing unemployment in low socio-



economic areas, this divide affects all individuals in a society; economically by inhibiting growth, and socially by increasing crime rates; thus, contemporary research in this area is critical for a well-functioning society. However, there have been relatively few empirical studies, which have tested for spatial mismatch in Australia; the most recent comprehensive study over a decade ago by Dodson (2005) in Melbourne, and never has the Gold Coast been used as a case study. Thus, more contemporary research, which investigates spatial mismatch in the city of Gold Coast, and the associated transport issues faced by low socio-economic households, was considered practical; in order to fulfil the identified knowledge gap.

The main aim of this research project was to examine the links between spatial labour markets, and spatial housing markets, in terms of, whether there is a spatial mismatch between socio-economically disadvantaged areas, and employment rich regions of the Gold Coast. A secondary objective was to assess whether public transport accessibility was adequate to provide high quality access, for temporally flexible employment, for households in low socio-economic case study areas.

The research was able to take advantage of the rich individual and household population data obtainable from the ABS regarding: rental prices, mortgage repayments, social housing areas, low income housing areas, and unemployment data; in order to identify three disadvantaged case study SLAs. The three case study SLAs identified were: Southport, Nerang and Biggera Waters/Labrador. The research identified that the gentrifying forces, which are clearly evident in other major Australian cities (Dodson 2005), are not yet pronounced in the city of Gold Coast. This finding is a positive for low-income households residing in these centralised areas, as they still have good quality access to employment and social services. However, it is not a matter of if, but when, housing markets mechanism start driving out low socio-economic households into outer suburban areas in the Gold Coast, a theme so evident in other major Australian cities. Like other major cities in Australia, strong population growth in the Gold Coast will help drive investment in highly paid and skilled professions, such as finance/engineering, which are typically located in the CBD areas of Australian cities. These high income residents will choose to live close to their employment, and inevitability drive up housing prices in these inner central areas, which will force low socio-economic households into outer areas, which are distant from employment centres.

The research also identified a reduction in the full-time employment rate in most of the SLAs, and an increase in part-time employment, this finding is consistent with research from the State of Australian Cities (2013), whom noted an overall increase in part-time employment and a reduction in full-time employment in all of Australia's capital cities. These findings do not bode well for single income families, as part-time jobs typically pay less than full-time positions, forcing the part-timer to seek multiple jobs (Abhayaratna et al. 2008). Recommendations for reversing this phenomenon are complex and go beyond the scope of this research; however, the research has shown potential for using GIS and

freely available ABS data to clearly identify the spatial patterns of unemployment, part-time employment and full-time employment. This information can be used to identify zones of disadvantage, and help urban policy makers make more informed decision regarding the locations of future employment hubs and promote policies, which drive business investment into these areas.

Using ABS data, the research mapped the employment by location in the city, which identified that the highest employment areas were centrally located, close to disadvantaged areas. Furthermore, the disadvantaged areas also exhibited fairly strong absolute employment growth in the five-year period, within a reasonable commuting distance from the disadvantaged region. Thus, based on the empirical findings of this research, *spatial mismatch cannot be attributed to the high unemployment rates of residence in disadvantaged areas in the case study area of the Gold Coast*. However, it must be noted that despite an absolute increase in employment opportunities in the region, there was also an absolute growth in the number of individuals unemployed. Thus, there is now more competition for the jobs which are made available.

Public transport accessibility was identified by Dodson (2005) as the key to bridging the spatial divide between low socio-economic households and employment opportunities. Thus, the second part of the analysis on spatial disadvantage was to develop an assessment matrix, with a set of criteria adapted from the transport accessibility assessments outlined in Dodson et al. (2006) and Cheal (2003). The matrix identified that the outer suburban area of Nerang was the worst performing SLA in terms of access to public transport for temporally flexible employment. This finding was similar to Dodson (2005), whom identified that the outer suburban areas of Melbourne suffered from poorer access to public transport. Furthermore, the number of households in Nerang with no cars was much lower, as compared to public transport rich Southport (ABS 2011). This indicates that the majority of households need access to a private vehicle to reach employment. Households with no cars in Nerang either commute long distances to employment, using infrequent public transport, or they are forced into unemployment. The matrix has the potential to simply and accurately identify regions which are poorly covered by public transport; thus, policy makers must ensure that tools such as the one created by the author are used to identify poorly represented regions. With the increase in part-time employment in Australia more temporally flexibility in public transport options is needed to ensure good quality access. These options need to remain affordable for low socio-economic individuals to ensure that it is not a barrier in accessing work.

A supplementary question that arises from the research is: 'if high concentrations of unemployed residents are located close to employment rich areas, why are the unemployment rates not lower in these areas'? Perhaps, unemployed workers lack the skills to perform the jobs required by employers in these regions, i.e. skills mismatch. Employees which have dedicated years of employment to declining sectors such as manufacturing, may suddenly find themselves lacking the skills required to perform other jobs.

The effects of economic restructuring, is becoming more apparent in many western nations including Australia. Thus, policy makers need to ensure that redundant manufacturing workers are provided with support programs so that they are able to smoothly transition into other forms of work. Australia, like many western nations continues to feel the effects of economic restructuring; however, the gross spatial entrenchment of socio-economic disadvantage is not likely to replicate the severity seen in many large US cities. This is partly due to the fact that Australia's government provides a stronger support network for its low socio-economic communities. However, pockets of disadvantage remain in Australian cities, particularly in areas where manufacturing is integral in providing employment. Urban policy makers must consistently assess spatial employment growth and ensure that transport linkages, between residential and employment areas, contribute to ameliorate the socio-economic disadvantage that exists and potentially persist into the future.

### **5.3 Research recommendations**

Research has identified that spatial mismatch increases unemployment in low socio-economic areas, which ultimately affects economic growth (Li, Campbell & Fernandez 2013) and increases government expenditure through an increase in welfare payments (Dodson 2005). Furthermore, increased unemployment rates in low socio-economic areas further increases social inequality within a society, which increases crime rates (Burke & Stone 2014) and contributes to multi-generational disadvantage (Holmes-Smith 2006). Thus, governments have significant incentives to promote policies which help reduce spatial mismatch, and increase public transport accessibility.

With strong population growth, combined with generous tax subsidies for housing investors, Australian low socio-economic households will continue to suffer from housing affordability issues; thus, there is a pressing need for government intervention. Governments are democratically elected to provide for the needs of all taxpayers not just for the few who have the connections and economic ability to influence decision making. The generous tax subsidies need to be reconsidered to help increase housing affordability in Australia, especially in inner central areas close to employment. Affordable housing is a basic requirement and essential component of an inclusive, dynamic and sustainable city. Urban policy planners need to ensure that planning policies provide a mix of affordable housing close to employment centres, and ensure that enough housing is provided in a timely and efficient manner subject to employment growth, to all of its citizens, not just those that can afford it.

Many households in Australian cities today find it difficult to access affordable accommodation, and the pressure from gentrifications may also mean that they find it difficult to maintain a position in the housing market as a result of the economic and demographic changes in particular neighbourhoods. Spatial mismatch whilst not currently not an issue in the Gold Coast could potentially worsen if there are not effective strategies put into place. Other major cities in Australia, like Melbourne, and more

predominantly Sydney, face significant issues surrounding housing affordability. With huge tracts of high unemployment/ low income households living in distant, disconnected suburbs in the outer fringes of its cities (Dodson 2005). Furthermore, these areas are often poorly connected with inner city areas by public transport, and create long and expensive commutes for its residents to access employment (Dodson 2005). The Gold Coast has the opportunity to learn from the urban planning mistakes of its neighbours, and not make similar mistakes in its urban planning policies. Some policy recommendations the research identified are:

- Ensure a spatial mix of affordable housing with housing tenure diversity and cost variability.
- Reduce the effects of involuntary housing choices in pressured housing markets by increasing the supply of government housing, and a mix of housing option in existing suburbs, which have good access to high skilled employment, transport and education.
- Promote the decentralisation of employment to suburban locations.
- Encourage investment for employment development in suburban locations, i.e. employment hubs.
- Remove income tax subsidies for housing investors.
- Invest in public transport infrastructure, which is safe, clean and affordable for all citizens.
- Ensure low socio-economic outer-suburban areas are adequately serviced by public transport.
- Encourage planning mechanisms, which provide incentives for the provision of affordable housing.
- Introduce more frequent, reliable and inexpensive public transport.
- Provide support for workers suffering from the effects of economic restructuring to help reintegrate them into other forms of employment.

In the context of the increased rate of urban restructuring, resulting from the forces of globalisation, housing market mechanisms and gentrification; urban policy makers must remain knowledgeable on the impact that these changes are having on the urban environment. Research is the key in identifying the causal impact that these forces have on urban landscapes, especially in terms of access to employment. Globally, it is well acknowledged that increasing employment rates is the key to reducing to social inequality in society (Andersson et al. 2014; Dodson 2005; Kain 1992). However, employment opportunities can vary significantly in urban spatial environments; thus, governments must ensure that its citizens can access affordable housing close to employment centres and that they have the ability to easily and affordably navigate through the fabric of the urban space to access work. Identifying issues which help reduce spatial segregation based on socio-economic factors is sensible economic policy. At a microeconomic level, inequality increases poor health, and reduces the educational performance of the poor, which inevitably leads to a reduction in the productive potential of the work force. At a macroeconomic level, inequality reduces government revenue by inhibiting growth, which can lead to

instability in society. GIS have revolutionised the ability for policy makers to identify spatial mismatch issues and help plan more efficient transport routes; thus, there should be no reason why outer lying suburbs continue to be poorly represented in terms of public transport and job accessibility in Australia.

## **5.4 Future research**

The research in this dissertation was a longitudinal study of employment patterns in the case study area of the Gold Coast, specifically to identify for the presence of spatial mismatch. As cities are constantly evolving, changing due to effects of gentrification and globalisation, studying the phenomena a decade into the future, is unlikely to produce analogous results as the ones presented in this research. Future research could assess for the presence of spatial mismatch in other major cities in Australia, e.g. Melbourne, Sydney, Brisbane or Perth. Furthermore, a separate strategic document could be developed which specifically addresses the challenges associated with any identified spatial mismatch

The other topic research topic in this case study concerned public transport accessibility for low socio-economic areas. Public transport has historically been unevenly accounted for in discussions of urban social disadvantage in the UK, European and Australasian context, particularly relative to other dimensions of disadvantage such as housing quality, location and affordability, and labour market status; thus, finding specific strategies to help improve public transport accessibility is also a prospective area for future research.

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# APPENDIX A- UNEMPLOYMENT AND EMPLOYMENT DATA

## Description:

All the data in Appendix A was obtained from the ABS product, Table Builder. The data was from the 2006 and 2011 censuses, at the SLA spatial unit. The excel spreadsheet, Figure A.1, shows the number of people that are considered: unemployed, and employed (part-time, full-time and away from work), for each SLA in 2006. The relative rates for each labour market figure is also shown for each SLA.

2006	Unemployed	Employed, (part-time)	Employed, (full-time)	Employed, (away)	Total	Rate		
						unemployment	part-time	full-time
Statistical Local Area (SLA)								
Ashmore-Benowa	406	2942	5491	505	9344	4.3	31	59
Biggera Waters-Labrador	735	2861	5770	563	9929	7.4	29	58
Bilinga-Tugun	182	910	1594	161	2847	6.4	32	56
Broadbeach Waters	205	1131	2060	224	3620	5.7	31	57
Broadbeach-Mermaid Beach	208	1268	3019	253	4748	4.4	27	64
Bundall	72	619	1292	90	2073	3.5	30	62
Burleigh Heads	171	1127	2133	201	3632	4.7	31	59
Burleigh Waters	284	1910	3363	313	5870	4.8	33	57
Carrara-Merrimac	440	2617	5012	459	8528	5.2	31	59
Coolangatta	192	665	1115	129	2101	9.1	32	53
Coombabah	240	1251	2320	210	4021	6.0	31	58
Currumbin	79	466	791	85	1421	5.6	33	56
Currumbin Valley-Tallebudgera	134	1107	1745	189	3175	4.2	35	55
Currumbin Waters	213	1414	2559	251	4437	4.8	32	58
Elanora	243	1895	3283	343	5764	4.2	33	57
Guanaba-Springbrook	81	671	1160	111	2023	4.0	33	57
Helensvale	334	2267	4503	411	7515	4.4	30	60
Hope Island	108	824	1567	164	2663	4.1	31	59
Jacobs Well-Alberton	55	388	968	98	1509	3.6	26	64
Kingsholme-Upper Coomera	417	1976	4692	381	7466	5.6	26	63
Main Beach-South Stradbroke	50	419	1046	105	1620	3.1	26	65
Mermaid Wtrs-Clear Is. Wtrs	344	2342	4289	417	7392	4.7	32	58
Miami	158	945	1841	175	3119	5.1	30	59
Molendinar	145	912	1729	173	2959	4.9	31	58
Mudgeeraba-Reedy Creek	489	3254	5992	555	10290	4.8	32	58
Nerang	631	3488	6871	634	11624	5.4	30	59
Ormeau-Yatala	203	1341	3474	379	5397	3.8	25	64
Oxenford-Maudsland	271	1732	3725	317	6045	4.5	29	62
Pacific Pines-Gaven	288	1630	3634	337	5889	4.9	28	62
Palm Beach	395	1967	3667	345	6374	6.2	31	58
Paradise Point-Runaway Bay	341	2294	4441	427	7503	4.5	31	59
Parkwood-Arundel	485	2943	5521	493	9442	5.1	31	58
Pimpama-Coomera	162	755	1886	137	2940	5.5	26	64
Robina	475	3016	5530	520	9541	5.0	32	58
Southport	771	3478	6316	656	11221	6.9	31	56
Surfers Paradise	550	2481	4939	434	8404	6.5	30	59
Varsity Lakes	355	1711	3399	263	5728	6.2	30	59
Worongary-Tallai	214	1561	2793	263	4831	4.4	32	58

**Figure A.1:** Number of people that are considered: unemployed, and employed (part-time, full-time and away from work), and the relative rates for each SLA in the Gold Coast in 2006.

## Description:

The excel spreadsheet, Figure A.2, displays the number of people that are considered unemployed, and employed (part-time, full-time and away from work) for each SLA in 2011. The relative rates for each labour market figure is also shown for each SLA.

2011 SLA	Unemployed	Employed (full-time)	Employed, (part-time)	Employed, (away)	Total	Rate		
						unemployment	full time	part-time
Ashmore-Benowa	676	5381	3134	529	9720	7.0	55.4	32
Biggera Waters-Labrador	1091	6074	3415	607	11187	9.8	54.3	31
Bilinga-Tugun	308	1876	1144	202	3530	8.7	53.1	32
Broadbeach Waters	226	1955	1172	200	3553	6.4	55.0	33
Broadbeach-Mermaid Beach	393	3671	1796	297	6157	6.4	59.6	29
Bundall	126	1268	695	100	2189	5.8	57.9	32
Burleigh Heads	310	2330	1307	210	4157	7.5	56.1	31
Burleigh Waters	410	3674	2246	359	6689	6.1	54.9	34
Carrara-Merrimac	634	5254	2896	508	9292	6.8	56.5	31
Coolangatta	259	1188	739	128	2314	11.2	51.3	32
Coombabah	354	2283	1365	231	4233	8.4	53.9	32
Currumbin	97	814	528	97	1536	6.3	53.0	34
Currumbin Valley-Tallebudgera	231	1826	1275	174	3506	6.6	52.1	36
Currumbin Waters	341	2471	1526	267	4605	7.4	53.7	33
Elanora	398	2995	2113	300	5806	6.9	51.6	36
Guanaba-Springbrook	154	1129	707	118	2108	7.3	53.6	34
Helensvale	537	4824	2593	448	8402	6.4	57.4	31
Hope Island	279	2499	1204	191	4173	6.7	59.9	29
Jacobs Well-Alberton	88	1059	480	111	1738	5.1	60.9	28
Kingsholme-Upper Coomera	936	7855	3395	623	12809	7.3	61.3	27
Main Beach-South Stradbroke	116	1100	483	71	1770	6.6	62.1	27
Mermaid Wtrs-Clear Is. Wtrs	520	4141	2623	408	7692	6.8	53.8	34
Miami	230	1874	1060	220	3384	6.8	55.4	31
Molendinar	278	1763	998	136	3175	8.8	55.5	31
Mudgeeraba-Reedy Creek	808	7009	4085	613	12515	6.5	56.0	33
Nerang	1007	6905	3984	672	12568	8.0	54.9	32
Ormeau-Yatala	422	5268	2109	435	8234	5.1	64.0	26
Oxford-Maudsland	562	4759	2291	371	7983	7.0	59.6	29
Pacific Pines-Gaven	616	5097	2470	395	8578	7.2	59.4	29
Palm Beach	565	3813	2306	393	7077	8.0	53.9	33
Paradise Point-Runaway Bay	516	4743	2598	455	8312	6.2	57.1	31
Parkwood-Arundel	720	5302	3048	482	9552	7.5	55.5	32
Pimpama-Coomera	373	3369	1429	240	5411	6.9	62.3	26
Robina	795	5710	3479	514	10498	7.6	54.4	33
Southport	1301	6965	4306	753	13325	9.8	52.3	32
Surfers Paradise	1010	5763	3296	487	10556	9.6	54.6	31
Varsity Lakes	583	3887	2287	372	7129	8.2	54.5	32
Worongary-Tallai	345	2589	1627	236	4797	7.2	54.0	34

**Figure A.2:** Number of people that are considered unemployed, and employed (part-time, full-time and away from work), and the relative rates for each SLA in the Gold Coast in 2011.

## Description:

The excel spreadsheet, Figure A.3, shows the relative change in unemployment, and employment (full-time and part-time) from the 2006 to the 2011 censuses.

Statistical Local Area (SLA)	Relative change from 2006 to 2011		
	part time employment	full time employment	unemployment
Ashmore-Benowa	0.76	-3	2.6
Biggera Waters-Labrador	1.71	-4	2.3
Bilinga-Tugun	0.44	-3	2.3
Broadbeach Waters	1.74	-2	0.7
Broadbeach-Mermaid Beach	2.46	-4	2.0
Bundall	1.89	-4	2.3
Burleigh Heads	0.41	-3	2.7
Burleigh Waters	1.04	-2	1.3
Carrara-Merrimac	0.48	-2	1.7
Coolangatta	0.28	-2	2.1
Coombah	1.13	-4	2.4
Currumbin	1.58	-3	0.8
Currumbin Valley-Tallebudgera	1.50	-3	2.4
Currumbin Waters	1.27	-4	2.6
Elanora	3.52	-5	2.6
Guanaba-Springbrook	0.37	-4	3.3
Helensvale	0.70	-3	1.9
Hope Island	-2.09	1	2.6
Jacobs Well-Alberton	1.91	-3	1.4
Kingsholme-Upper Coomera	0.04	-2	1.7
Main Beach-South Stradbroke	1.42	-2	3.5
Mermaid Wtrs-Clear Is. Wtrs	2.42	-4	2.1
Miami	1.03	-4	1.7
Molendinar	0.61	-3	3.9
Mudgeeraba-Reedy Creek	1.02	-2	1.7
Nerang	1.69	-4	2.6
Ormeau-Yatala	0.77	0	1.4
Oxenford-Maudsland	0.05	-2	2.6
Pacific Pines-Gaven	1.12	-2	2.3
Palm Beach	1.72	-4	1.8
Paradise Point-Runaway Bay	0.68	-2	1.7
Parkwood-Arundel	0.74	-3	2.4
Pimpama-Coomera	0.73	-2	1.4
Robina	1.53	-4	2.6
Southport	1.32	-4	2.9
Surfers Paradise	1.70	-4	3.0
Varsity Lakes	2.21	-5	2.0
Worongary-Tallai	1.60	-4	2.8

**Figure A.3:** Relative change in full time, part-time and unemployment, for each SLA, in the Gold Coast from 2006 to 2011.

## Description:

The excel spreadsheet, Figure A.4, shows the absolute change in employment and unemployment from the 2006 to the 2011 censuses.

	Absolute Totals			
	Employment 2011	Employed 2006	Change in employed person	change in unemployed persons
Ashmore-Benowa	9044	8938	106	270
Biggera Waters-La	10096	9194	902	356
Bilinga-Tugun	3222	2665	557	126
Broadbeach Water	3327	3415	-88	21
Broadbeach-Merm	5764	4540	1224	185
Bundall	2063	2001	62	54
Burleigh Heads	3847	3461	386	139
Burleigh Waters	6279	5586	693	126
Carrara-Merrimac	8658	8088	570	194
Coolangatta	2055	1909	146	67
Coombabah	3879	3781	98	114
Currumbin	1439	1342	97	18
Currumbin Valley-T	3275	3041	234	97
Currumbin Waters	4264	4224	40	128
Elanora	5408	5521	-113	155
Guanaba-Springbro	1954	1942	12	73
Helensvale	7865	7181	684	203
Hope Island	3894	2555	1339	171
Jacobs Well-Alber	1650	1454	196	33
Kingsholme-Upper	11873	7049	4824	519
Main Beach-South	1654	1570	84	66
Mermaid Wtrs-Clea	7172	7048	124	176
Miami	3154	2961	193	72
Molendinar	2897	2814	83	133
Mudgeeraba-Reedy	11707	9801	1906	319
Nerang	11561	10993	568	376
Ormeau-Yatala	7812	5194	2618	219
Oxenford-Maudslar	7421	5774	1647	291
Pacific Pines-Gave	7962	5601	2361	328
Palm Beach	6512	5979	533	170
Paradise Point-Rur	7796	7162	634	175
Parkwood-Arundel	8832	8957	-125	235
Pimpama-Coomera	5038	2778	2260	211
Robina	9703	9066	637	320
Southport	12024	10450	1574	530
Surfers Paradise	9546	7854	1692	460
Varsity Lakes	6546	5373	1173	228
Worongary-Tallai	4452	4617	-165	131

**Figure A.4:** Absolute change in employment numbers (full-time + part-time + away from work) and unemployment in each SLA in the Gold Coast from 2006 to 2011.



## Description:

The excel spreadsheet, Figure A.5, shows the employment location of residents by SLA in 2011.

SLA	Employment location
Southport	22834
Robina	11177
Surfers Paradise	10119
Burleigh Heads	8042
Nerang	8012
Ashmore-Benowa	6854
Ormeau-Yatala	6749
Broadbeach-Mermaid Beach	6670
Molendinar	5702
Biggera Waters-Labrador	5626
Helensvale	5457
Bundall	4920
Parkwood-Arundel	4390
Carrara-Merrimac	4115
Paradise Point-Runaway Bay	3874
Varsity Lakes	3720
Mudgeeraba-Reedy Creek	3645
Kingsholme-Upper Coomera	3237
Broadbeach Waters	3043
Burleigh Waters	2931
Pimpama-Coomera	2754
Oxenford-Maudsland	2595
Bilinga-Tugun	2556
Mermaid Waters-Clear Is. Waters	2286
Main Beach-South Stradbroke	2260
Hope Island	2142
Palm Beach	2080
Miami	1925
Currumbin Waters	1810
Elanora	1766
Pacific Pines-Gaven	1690
Coolangatta	1503
Worongary-Tallai	1106
Currumbin	1034
Currumbin Valley-Tallebudgera	960
Coombabah	803
Jacobs Well-Alberton	619
Guanaba-Springbrook	454

**Figure A.5:** Employment location of residents by SLA in 2011.

# APPENDIX B- PROJECT SPECIFICATION VERSION 3

ENG 4111/ 4112 Research Project

Project Specification Version 3

For: Tari Zador

Title: A spatial mismatch assessment of housing affordability and employment opportunity in the Gold Coast, Australia for low income households.

Major: Surveying

Supervisors: Marita Basson

Sponsorship: University of Southern Queensland

Enrolment: ENG4111 – EXT S1, 2016 ENG4112 – EXT S2, 2016

Project Aim: This dissertation will examine the spatial links between labour markets and housing markets in terms of whether there is a '*spatial mismatch*' between locations of high housing affordability for low-income households and locations of high employment opportunity, in the city of Gold Coast.

Programme: Issue 10<sup>th</sup> April 2016

## **Methods:**

1. Conduct a thorough literature review that discusses:
  - Background on spatial mismatch hypothesis and its relevance in an Australian setting.
  - Importance of addressing spatial mismatch.
  - Discuss Australia's current urban environment: housing affordability, employment opportunity, transport issues and the associated problems.
  - Discuss Gold Coast's urban environment: housing affordability, employment opportunity, transport issues.
2. Use ABS Census data to map the distribution of housing affordability, unemployment concentration and employment location in the Gold Coast at the SLA scale.
3. Map census data to establish the extent to which unemployed and low-income households are concentrated in areas of lower housing cost, for both rental and home-ownership tenures.

4. Select a set of chosen case study SLA's which exhibit both high levels of housing affordability and high levels of unemployment. GIS mapping will then be used to identify the spatial relationship between these locations and areas of metropolitan employment growth. The geographical distance between the affordable housing areas and employment areas is assessed based on a standardised assumption of commuting distance (Bureau of Infrastructure, Transport and Regional Economics see: <[https://bitre.gov.au/publications/2015/files/is\\_073.pdf](https://bitre.gov.au/publications/2015/files/is_073.pdf)>)
5. Examine which transport modes are available to residents within the selected affordable housing SLAs. The project will assess the quality of the public transport available, relative to international public transport service standards, and relative to the need for contemporary flexibility in working hours.
6. Analyse ABS census journey-to-work data for the SLAs with high housing affordability, to assess the modal split in the journey to work. The response to this question will also involve an assessment of the level of household car ownership, relative to the availability of public transport. Further analysis using ABS income data assesses the financial burden of alternative transport modes for households in these locations, based around a standardised calculation of weekly travel costs for individual modes.
7. Use GIS mapping along with the research data to offer viable alternatives to the local government regarding any spatial mismatch issues identified in the research.