

ASSIGNMENT 1 – APPLICATION OF GIS

Name: Uvin Abeysinghe

Student ID: 789931

Contents

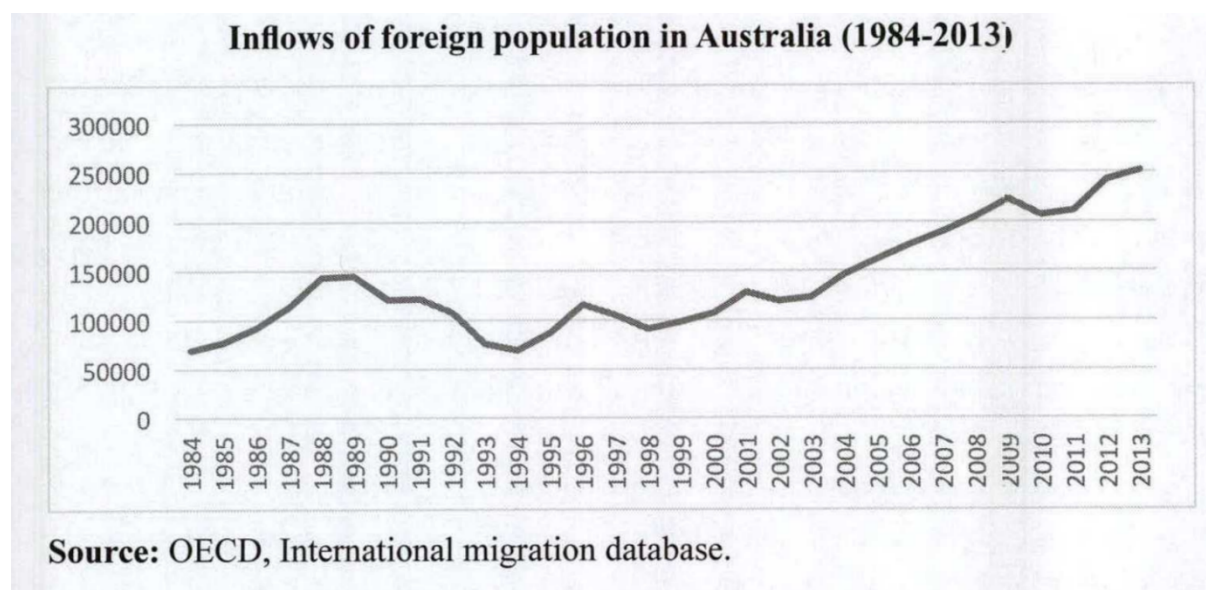
Abstract	2
Introduction.....	2
Methods.....	3
Results.....	4
Discussion/Recommendations.....	16
Conclusion.....	17
Acknowledgement.....	17
References.....	17

Abstract

The government is assessing several proposals for project funds and they requested the use of population growth over the 10-year period (2001, 2006 and 2011 Census) to be analysed to aid the planning of infrastructure projects. The 3 LGAs we selected are Greater Dandenong, Mitchell and Monash. Since foreign population makes up a large part of the total population, we decided to use the CSV file with population divided according to the country they were born. After analysing this data, it was found that most of the Australia born population is moving from rural areas to urban areas but the overseas born population kept increasing everywhere. Taking only the 3 selected LGAs into account we found that, all population increased except for the Australia born population in Monash. Further analysis showed that Monash and Greater Dandenong was 100 times more densely populated than Mitchell in 2011, thus we expect the population in Mitchell to continue increasing. Next, we checked if the number of hospitals and train lines passing through the LGAs is sufficient for the future population predictions. It was discussed that since the overseas born population is increasing in Mitchell, it's better to have few branches of railway lines. Few more schools would be necessary in Mitchell due to increasing population. Plus, this would aid overseas born children with English not as their first language to socialize in English and gain a better English knowledge. Greater Dandenong will be needing a hospital or more in the bottom half of his LGA since all its hospitals are in the top half. On the other hand, when taking Kindergartens, Banks and ATMs into consideration, Monash had an ample amount of these amenities but Greater Dandenong needed more kindergartens and ATMs. There was no data about Kindergartens, Banks and ATMS in Mitchell.

Introduction

Many crisis can be avoided by planning for the future, the following report analyses and aids the government in planning infrastructure projects. This report is compiled using population data over 3 Local Government Areas (LGAs). The LGAs used in this report are Greater Dandenong, Mitchell and Monash.



(Source: THE NEXUS OF IMMIGRATION AND ECONOMIC CONDITIONS IN AUSTRALIA)

In the diagram above we can see that foreign population continues to increase, so since foreign population makes up a large part of the population in Australia we decided to separate Overseas born population and Australia Born population and analyse separately. Methods used and the results obtained are explained below. Using these results, we discuss about what needs to be done for the future.

Methods

The population data was separated according to the country the individual was born. It was used to calculate the percentage increase of individuals born in Australia and individuals born in an overseas country who are living in the whole of Victoria and the 3 aforementioned LGAs between the years 2001, 2006 and 2011. This was done to give us an idea on the population increase to expect in the future for which we will have to prepare.

The percentage increase was calculated using the formula below:

$$\text{Percentage Increase} = 100 * (E - S) / S$$

S: Number of Individuals in the starting year

E: Number of Individuals in the ending year

Afterwards, we calculated the population density to understand how much of free space is left in the LGA. For example, it could be a LGA with a high population increase rate but if it's densely populated it will not increase for long.

The population density was calculated using the following formula:

$$\text{Population density} = P / A$$

P: Number of people in the region

A: Total area in the region in sqkm (Square Kilometres)

Next, we compiled a map of the 3 LGAs, all the Train lines passing through them and all the Hospital locations in them to check if there's any need for more railway roads or Hospitals according to the population increase.

Following it, we used a CSV file with all the schools to check if there's sufficient schools for the increasing population. The CSV file contained a list of all the schools, using this we calculated the number of types of schools for each LGA.

Later on, we compiled a map showing 3 amenities which are needed by the population. They were Kindergartens, Banks and ATMs. Kindergartens will be used by both Australia and Overseas born populations therefore we decided to analyse and check if more kindergartens will be needed in the future. People are using ATMs and bank transfers more often nowadays compared to few years back so we decided to check if there are sufficient banks and ATMs for the future. Bank and ATM locations were analysed especially because overseas born populations may use banks extensively to wire transfer money to their families.

Results

The population data was used to find the number of Individuals who were born in Australia and Overseas countries in all the LGA's in Victoria in the years 2001 and 2011. The percentage population increase was calculated and compiled into maps.

Figure 1.1 shows the map which shows the percentage increase of individuals born in Australia from 2001 to 2011.

Figure 1.2 shows the map which shows the percentage increase of individuals born overseas from 2001 to 2011.

(P.T.O)

% Increase of Australia Born Individuals (2001 to 2011)

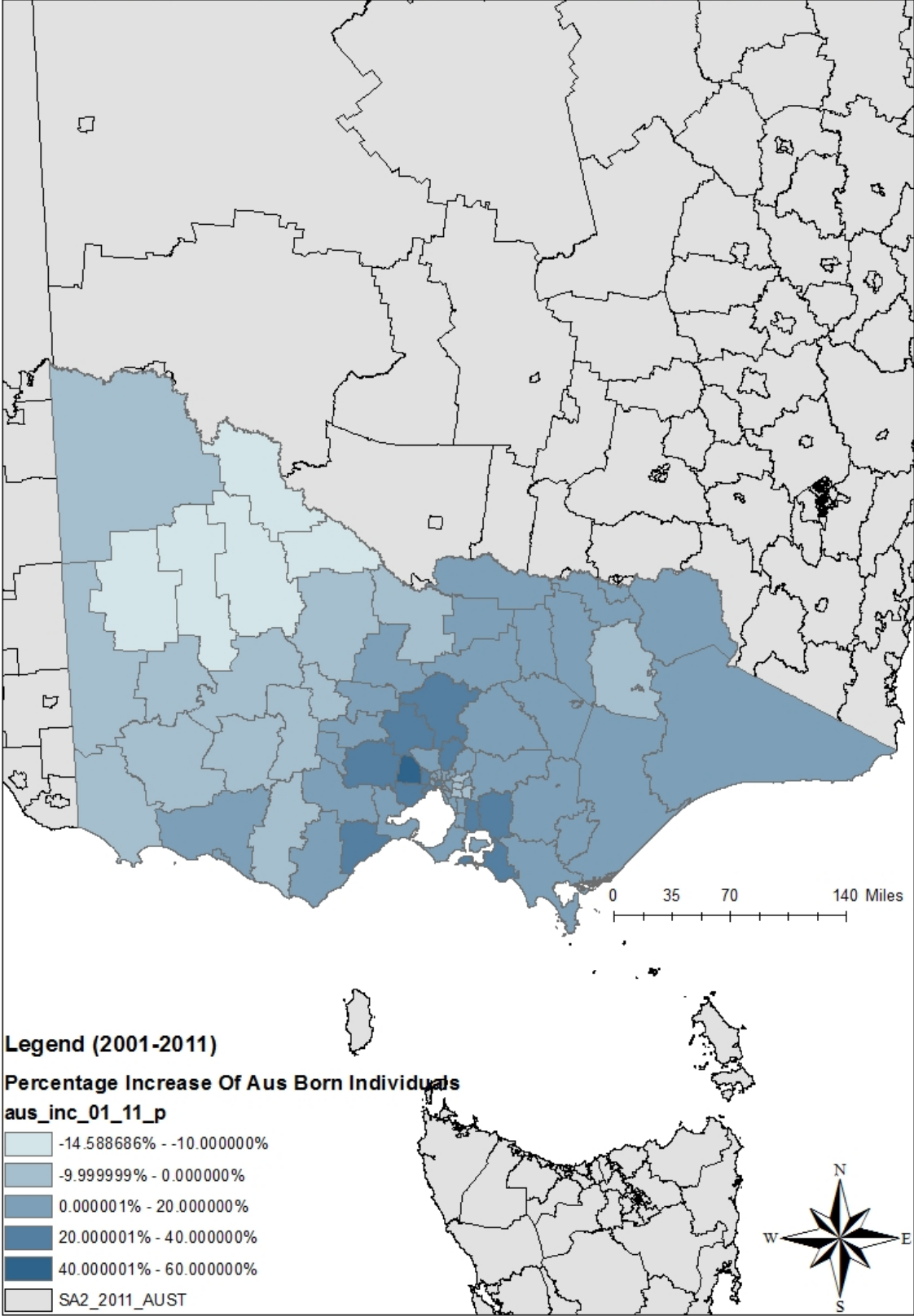


FIGURE 1.1

% Increase of Overseas Born Individuals (2001 to 2011)

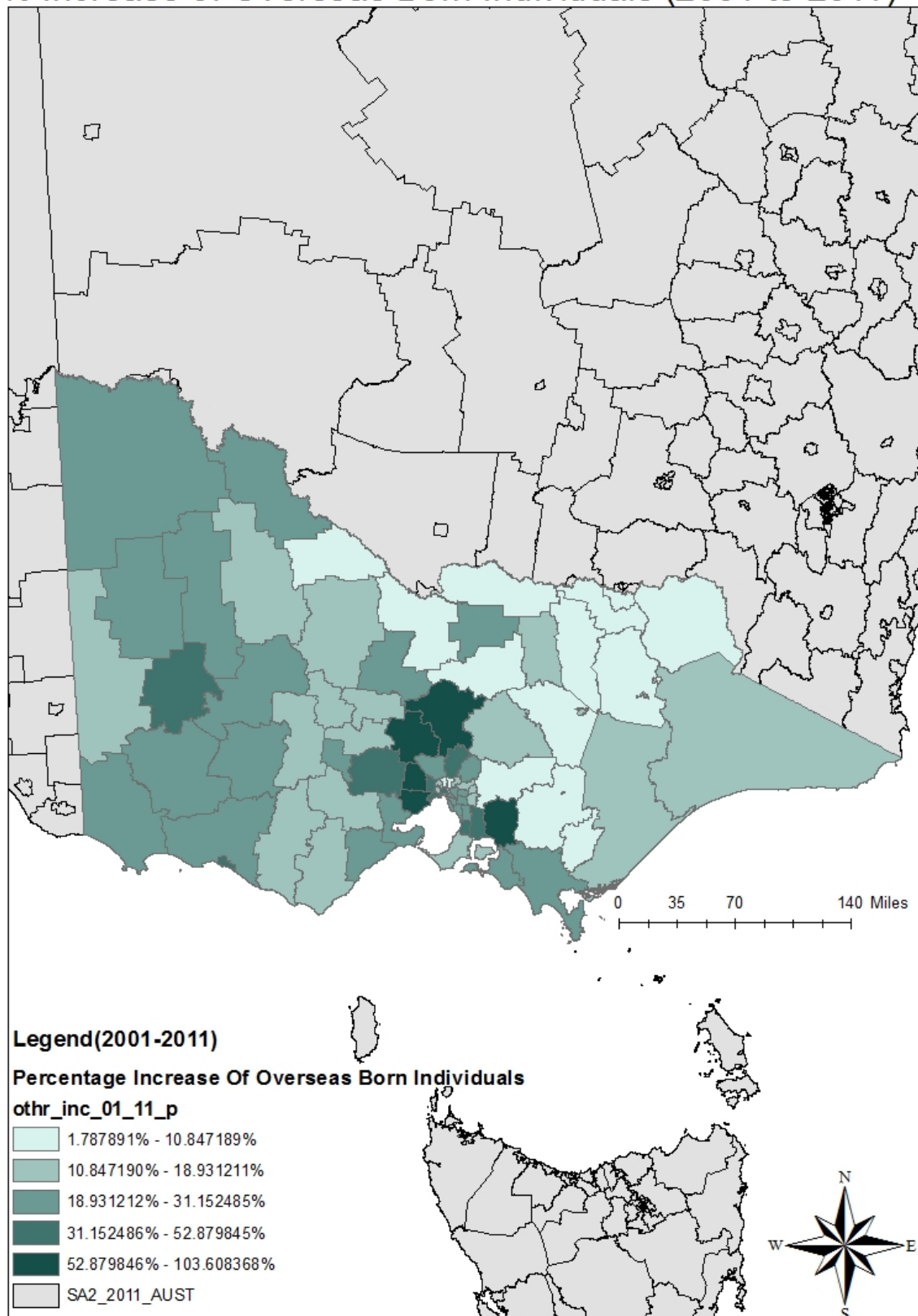


FIGURE 1.2

The map in **Figure 1.1** displays that there has been a decrease of Australia born individuals in few of the rural areas and few of the urban areas. These decreased areas seem to be flocked together. However, the rest of the LGAs have increased its population, specially the LGAs near Melbourne. Probably this was due to residents moving from rural areas to the urban areas for better facilities and services. Only further analysis could determine the exact factors. According to this data, we could only conclude that residents have been moving from rural areas to areas closer to the city thus continuously increasing the population in the urban area.

According to **Figure 1.2**, the number of overseas born individuals have not decreased from 2001 to 2011 in any of the LGAs. There's a dramatic increase of around 100% in the urban area, basically the population has doubled in the 10 years. This will continue to increase due to migration. Bottom line, overseas born individuals settle down in the whole of Victoria but at different rates proportionally to the distance from the urban area.

Below is the population analysis the of the 3 separate LGAs we chose.
The following maps shows the percentage increase of Australia and Overseas born population in the chosen LGAs. (**Figure 2.1, Figure 2.2**)

(P.T.O)

% Increase of Australia Born Individuals (2001 to 2011)

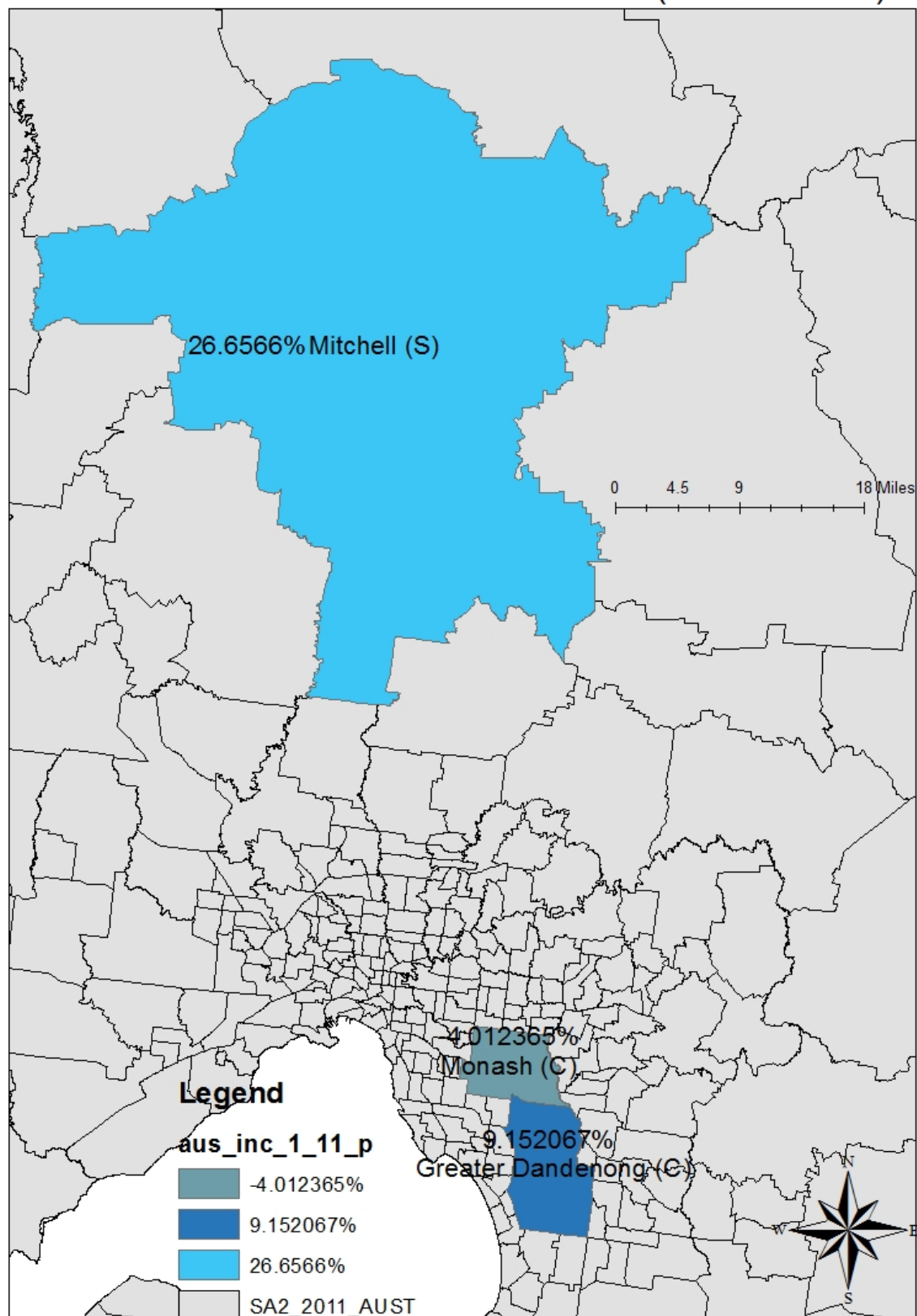


FIGURE 2.1

% Increase of Overseas Born Individuals (2001 to 2011)

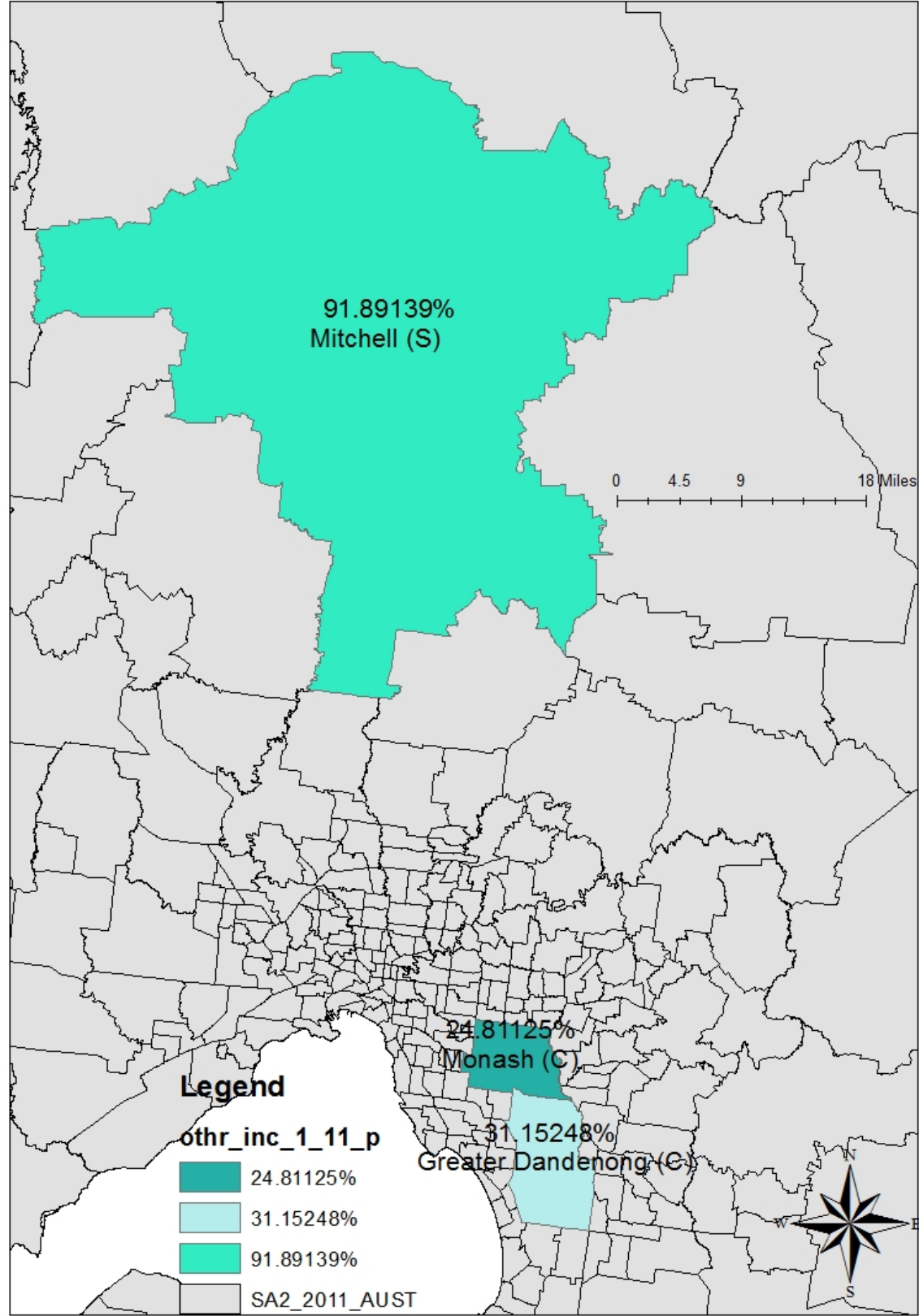


FIGURE 2.2

In the light of **figure 2.1** and **figure 2.2**, the Australia born population in the Monash area has decreased by around 4%. It's quite unusual for a LGA in the urban area to decrease its population, moreover it's the Australian born population that has decreased. This demonstrates that they have moved out of the region into another area. However, the percentage of overseas born individuals have increased by 24.8% due to migration and international students.

In the case of Greater Dandenong and Mitchell, both the populations have increased with overseas born population increasing faster than the Australia born population. Notably, Mitchell has increased both its populations at an extremely high rate.

It is quite clear from the maps that Mitchell is larger compared to Monash and Greater Dandenong in respect of land area. Therefore, we analysed the population density of each LGA to help us understand the situation. The results are below. (**Figure 3**)

(P.T.O)

Population Density in 2011

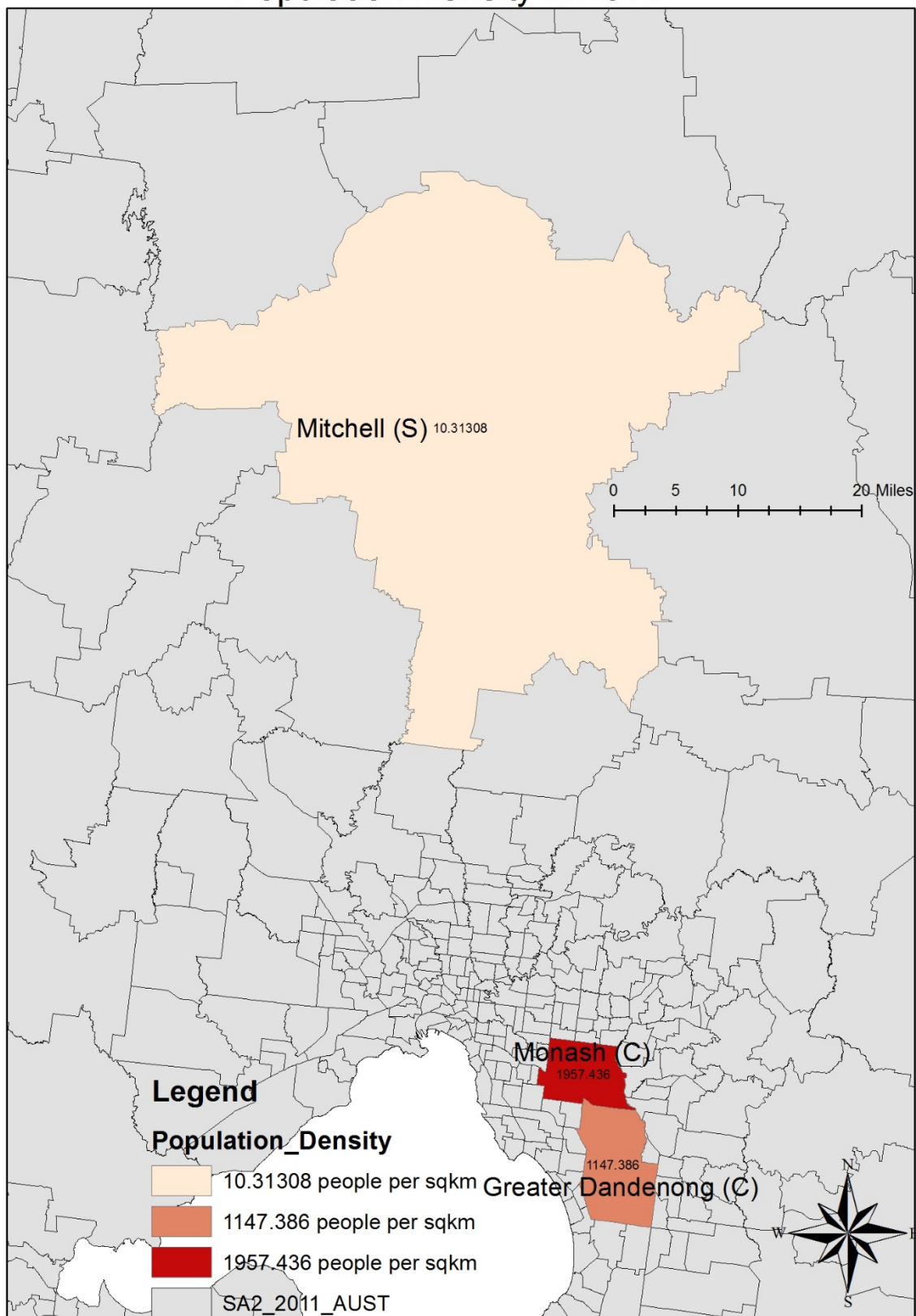


FIGURE 3

The population density map (**Figure 3**) shows that Monash and Greater Dandenong is densely populated 100 times more than Mitchell. Specifically, Monash has a high population density which may answer why the Australia born population decreased between 2001 and 2011 (**Figure 2.1**). On the other hand, the population density of Mitchell is quite low, this will assist the continuation of high population growth in this area.

The following map (**Figure 4**) shows how Hospitals are located and where the train lines pass through.

(P.T.O)

Train Lines and Hospital Locations

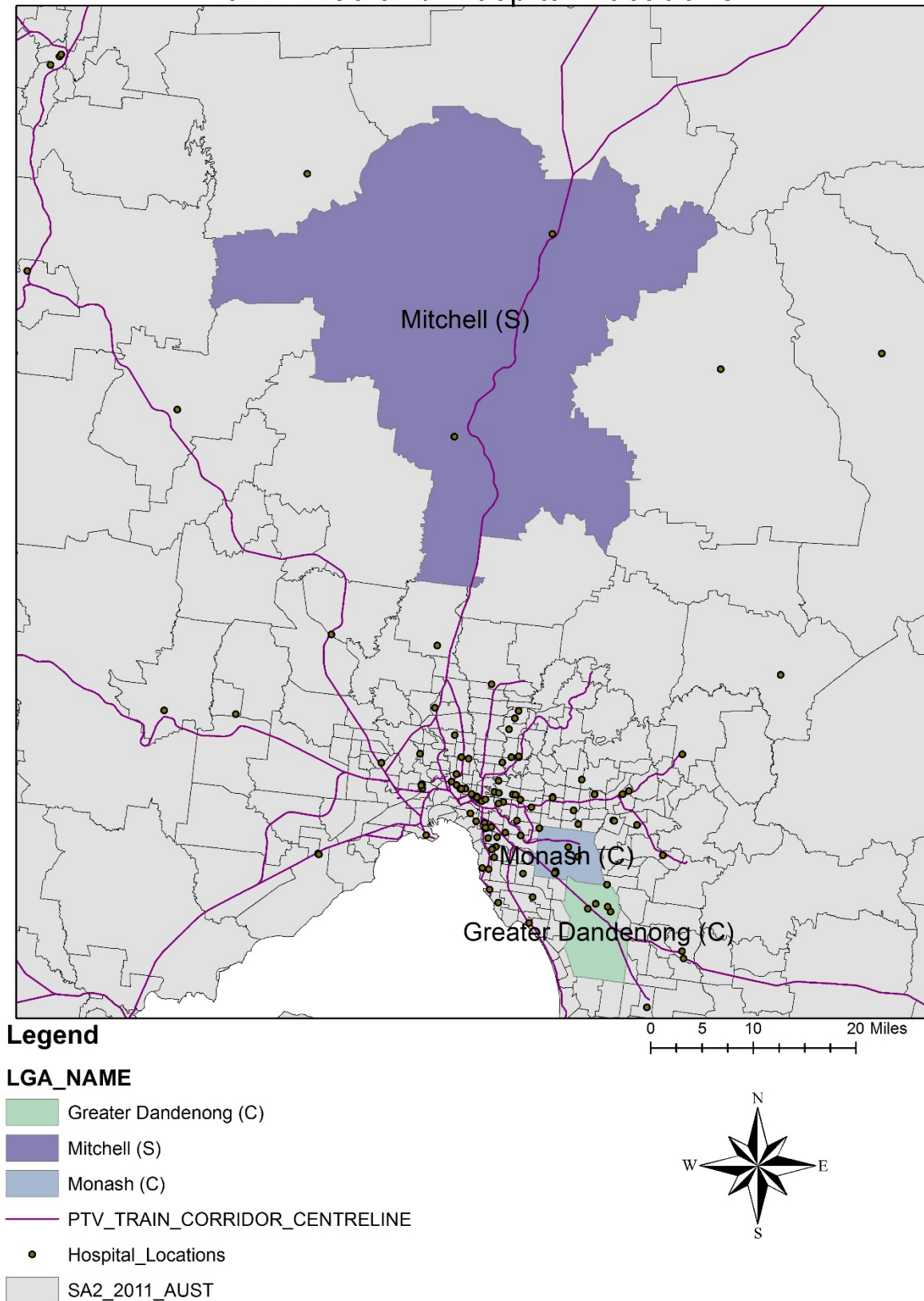


Figure 4

Figure 4 shows us that there are only 2 hospital locations for the whole of Mitchell even though it is a large area compared to other LGAs. Furthermore, both hospital locations are very close to the train line. Monash is having a railway line through it and a railway line to it on the other hand Greater Dandenong has only one railway line through it. Both Greater Dandenong and Monash is having a fair amount of Hospitals.

The following chart (**Figure 5**) shows the number of types of school in the 3 selected LGAs.

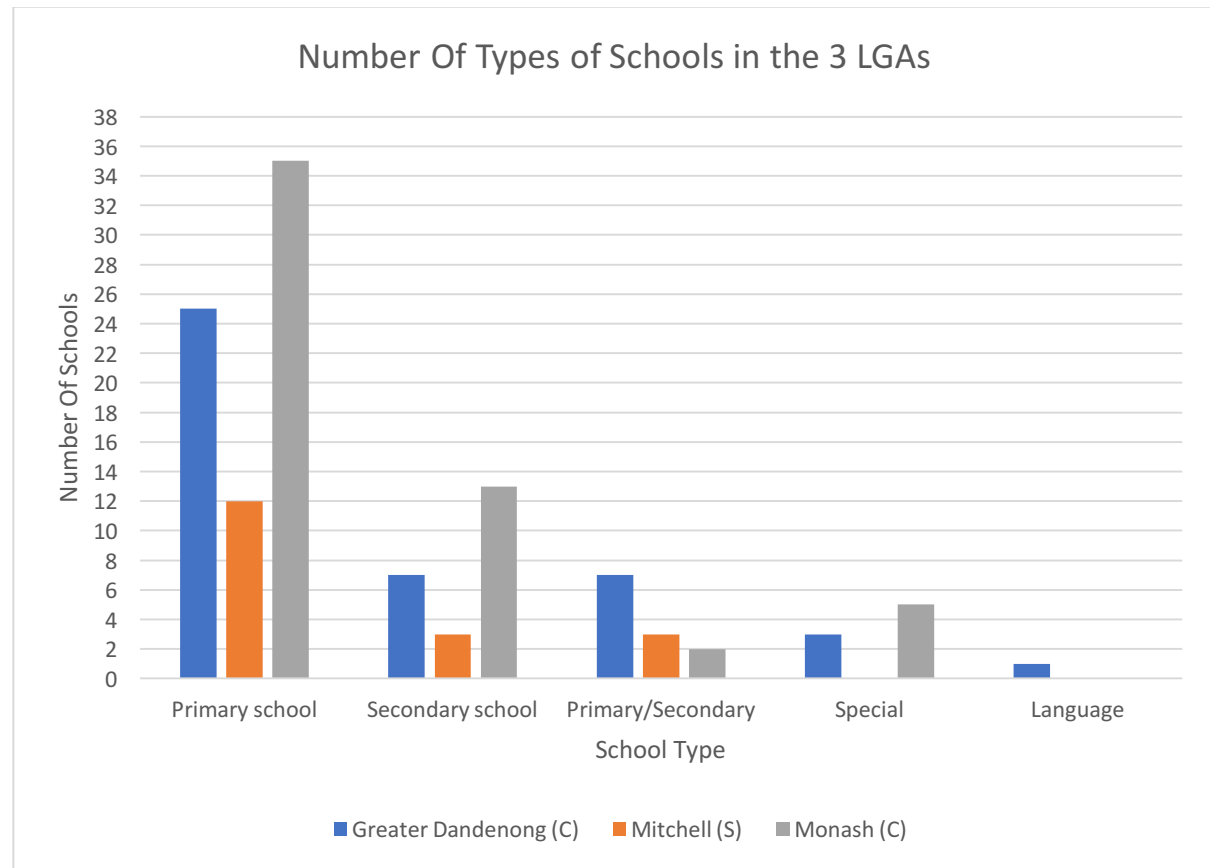


Figure 5

Greater Dandenong has a reasonable amount of schools of every type. However, Mitchell has few schools compared to the rest of the LGAs. Mitchell has only 6 secondary schools (secondary and Primary/Secondary) whereas both Greater Dandenong and Mitchell has more than 10 Secondary schools each. Furthermore, Mitchell lacks a special school and language school whereas Monash lacks a language school.

The following map (**Figure 6**) shows where Kindergartens, Banks and ATMs are in Monash and Greater Dandenong. Unfortunately, data for Mitchell was not available.

Kindergartens, Banks and ATMs

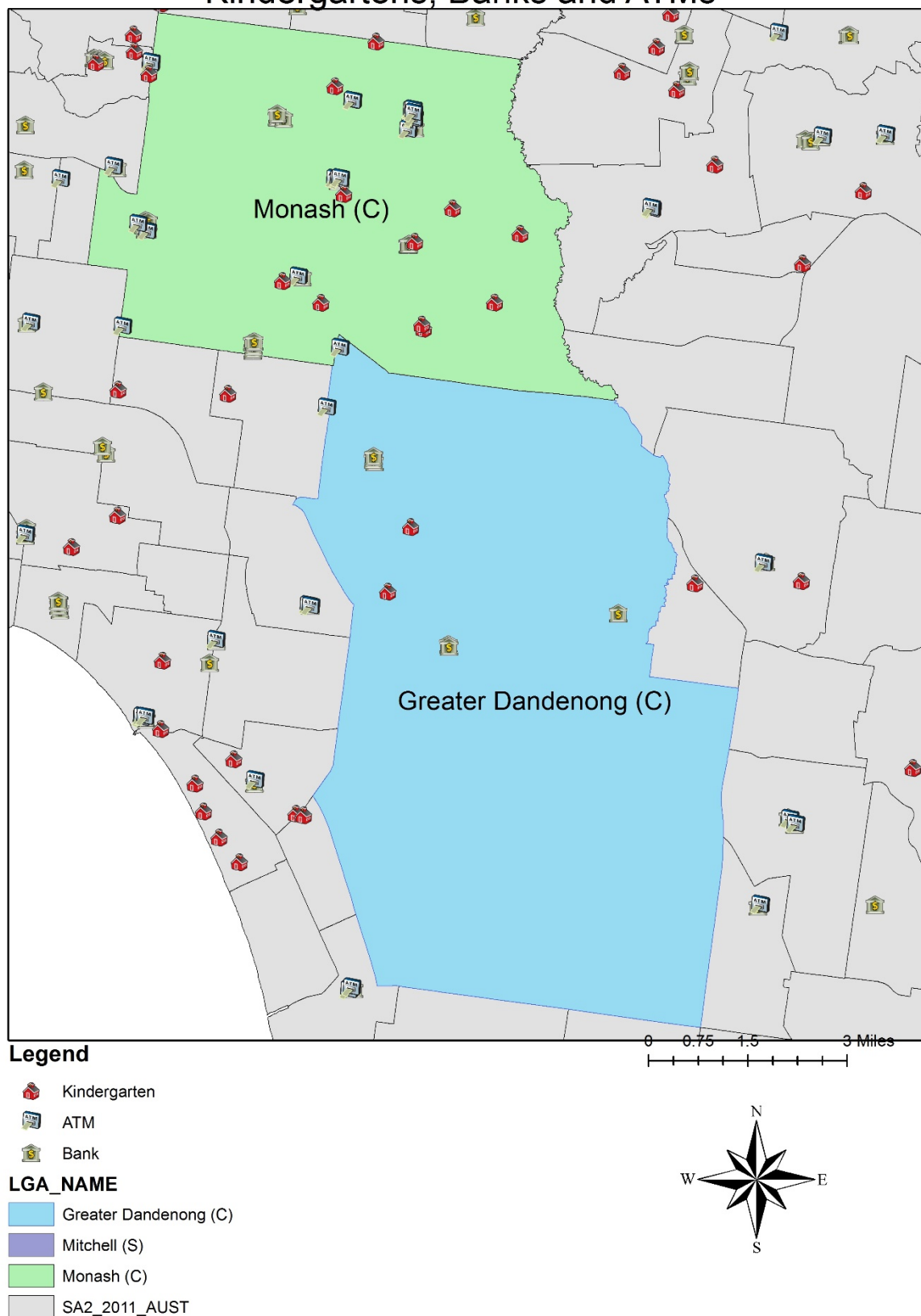


Figure 6

Figure 6 shows us that Monash is having ample number of Kindergartens, banks and ATMs. However Greater Dandenong only has 2 kindergartens, 3 banks and 1 ATM. The ATM is located near the Monash Greater Dandenong border, furthermore bottom half of Greater Dandenong does not have any of the 3 amenities above.

Discussion/Recommendations

Mitchell

It is possible that people who live further away from the train line are facing the difficulty of travelling to a hospital for an emergency in time (Figure 4). The population in Mitchell is rising at a high rate, therefore there will be the need of few more hospitals spread out over Mitchell. Especially it is the Overseas born population which is increasing at a dramatic rate in this region, a substantial proportion of these individuals will not have a personal vehicle so they would depend on Public transport. Train is the fastest way they could get from Mitchell to the city therefore few branches of railway roads will be needed to cater to the increasing population.

Children migrating from Overseas countries will not always have English as their first language, so socializing with other students in schools would help them improve their English knowledge. There are few schools in Mitchell compared to the other 2 LGAs, this quantity would not be enough due to its large area and dramatic population growth in the future. More schools will be needed to be built for the future to create a well-educated generation.

Monash

There won't be a need for more hospitals to be built in this region since Monash is a small LGA in land area size therefore a person living in the Monash LGA can easily get access to an hospital. It might even have hospitals closer in a different LGA than in its own. There won't be a need of more train lines because it already has a line passing through it and a line to it. Monash is having sufficient schools except for a language school but since Greater Dandenong is a neighbouring LGA with a language school, the need for one is trivial. There's ample Kindergartens, Banks and ATMs in Monash.

Greater Dandenong

There is one railway line to Greater Dandenong however since it's a small LGA in terms of area, it will be sufficient for the LGA. However, Greater Dandenong needs a hospital in the bottom area of its region. It is good that Greater Dandenong is having a language school to teach students various languages, this would help students having English as their first language to communicate with Overseas born students with their first language. This LGA lacks Kindergartens and ATMS in the bottom half of its region. There are 3 banks in this region already so installing few ATMs would be sufficient for the future population. 2

Kindergartens will not be enough for the future since the population continues to rise so more kindergartens will be needed.

For all LGAs- Unfortunately no information was found on language learning programs for adults. However, implementing programs like this will benefit the overseas born community.

Conclusion

Limitations – There weren't any records on how many Adult migrant English programs were active in these LGAs. The age of the individuals migrating wasn't considered when recommending more schools and kindergartens to be built. Kindergarten, bank and ATM data was not available for Mitchell.

It is not possible to predict the exact future using trends but it is the closest we can get so that we could prepare for it. The use of GIS has helped many countries to plan their infrastructure and avoid crisis. I hope that this report would aid the government in planning their infrastructure projects.

Acknowledgements

I am very thankful to the website <http://data.gov.au/> for all the data provided to make this report a success. Furthermore, I would like to express my deepest appreciation to our lecturer Dr Graham Brodie and tutor Mr Christopher Lambert for their encouragement and suggestions on this assignment.

References

THE NEXUS OF IMMIGRATION AND ECONOMIC CONDITIONS IN AUSTRALIA, 33(2), 140-141. (n.d.).