Housing Implementation Plan – Action 1.1 Demography

A Report for the Office of the Commissioner for Kangaroo Island

Prepared by Planning and Development Division, Department of Planning, Transport and Infrastructure, Government of South Australian

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Purpose

The Office of the Commissioner for Kangaroo Island (the Commissioner) is developing a Housing Implementation Plan for Kangaroo Island. The Department of Planning, Transport and Infrastructure (DPTI) has been requested to provide population projections, demographic trends, and associated dwelling requirements for Kangaroo Island for the period 2017 to 2030, based on assumptions regarding future economic and infrastructure projects on the Island.

Background

It is anticipated that population, tourism and economic activity will increase on Kangaroo Island over coming years.[1] The South Australian Centre for Economic Studies (SACES) has produced a range of scenarios for job creation on Kangaroo Island based on assumptions of increased tourist visitation, and major announced and proposed economic and infrastructure projects.

The objective of this current demographic analysis is to provide an informed assessment of the potential impacts of these economic and infrastructure projects on the future population, demographic structure and dwelling requirements for Kangaroo Island.

A key assumption underpinning the projections in this report is that tourist visitation will increase; the major announced and proposed projects will eventuate; and that job creation will be toward the upper end of SACES' scenarios.[2]

Scope

This work addresses the demographic change and associated dwelling requirements that may eventuate from the announced and proposed economic and infrastructure projects on, and the assumed increased tourist visitation to, Kangaroo Island. It does not address the

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[1] South Australian Centre for Economic Studies, June 2016, "Kangaroo Island: Initial Assessment of Economic Impacts of the Transformation Project", Report prepared by the South Australian Centre for Economic Studies, University of Adelaide for the Office of the Commissioner for Kangaroo Island.

[2] Ibid., p 4

issue of unoccupied dwellings, such as second homes and holiday rentals. Although second homes and holiday rentals are linked to tourist visitation, only the direct impact of tourism related employment is considered in this work.

The impact of possible demographic and dwelling increases on infrastructure and service demand is not within the scope of this work.

Methodology

The Cohort-Component Method (CCM) is a widely used and flexible approach to producing population projections.[3] The CCM uses the components of demographic change – births, deaths and migration – to project population growth by age group and sex. One limitation of the CCM is that it is data intensive and more suited to larger populations with more reliable data.

The Hamilton-Perry Method is a simplified version of the cohort-component method in which the effects of net migration and mortality are combined into cohort-change ratios (CCR) calculated over the time interval of the two most recent ABS Censuses of Population and Housing (Censuses).[4] This approach requires less data than the CCM but still provides a wide range of characteristics, such as population size, growth and age composition. One of the benefits of the CCR approach is that the net effects of migration for different age groups is embedded in the cohort-change ratios. In this way, school leavers that leave Kangaroo Island, and the proportion of the young, working age population that leave Kangaroo Island for study, work opportunities or lifestyle, are captured in the historical cohort-change ratios from the most recent two Censuses.

Of particular importance for this project, the CCR approach can be used to create scenarios[5] of possible population futures for Kangaroo Island, based around the likely employment impact of the announced and proposed economic and infrastructure projects for the Island, and an assumed increase in tourist visitations.

In addition, the population projection outcomes can be used to estimate the likely impact on household formation, and on future dwelling requirements.

Two scenarios are produced in this work. A Business as Usual (BAU) scenario assumes that recent demographic trends will continue over the projection period. The second, Economic Growth (EG) scenario, assumes that the economic and infrastructure projects and increased visitation provide an economic and population boost for Kangaroo Island. The assumptions used for both scenarios are discussed below.

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[3] Smith SK, Tayman J and Swanson DA 2001, State and Local Population Projections Methodology and Analysis, p43, Kluwer Academic/Plenum Publishers, New York

[4] Hamilton C and Perry J 1962, A short method for projecting population by age from one decennial census to another, *Social Forces*, 41, pp 163-170

[5] Although population projections and scenarios are conceptually different, a population projection approach is used in this work to facilitate the production of population scenarios.

The projections in this work are for five year age groups over five year projection periods. The launch year and projection intervals are for Census years 2016, 2021, 2026 and 2031. This is necessary, as the CCRs are based on the two most recent Censuses.

Demographic and economic data for this work has been sourced from the 2011 and 2016 Censuses, the Department of Education and Child Development, and from the Kangaroo Island Community Education (KICE) 2016 Annual Report.[6]

Limitations

Any projection of the future has associated risks and uncertainties attached. Although the assumptions around births, deaths and migration embedded in CCRs are based on recent trends, there is substantial judgement used to determine the likely age-specific levels of these demographic factors. This judgement can include possible and likely economic, social, political and environmental futures.

Assumptions around household formation and future dwelling requirements can be particularly uncertain, as future living arrangements are heavily influenced by economic conditions and social behaviour. They also inherit the risks and uncertainties associated with the population projections upon which they are based.

The use of scenarios provides a means of exploring possible population and dwelling futures. The scenario assumptions are guided by a given outcome, such as the eventuation of the economic and infrastructure projects for Kangaroo Island. It says nothing about the likelihood of these projects eventuating.

The primary data used to develop assumptions for the two scenarios are sourced from the 2016 Census. Definitions in relation to the Census count of population, households, and dwellings are specific to the Census and create distortions in calculated outcomes for metrics, such as Average Household Size (AHS) used to determine dwelling requirements for each scenario. This is unavoidable.

Due to small population numbers, projections for the future number of households and additional dwelling requirements are highly sensitive to the assumptions for AHS. Projections for the future number of additional dwellings are, therefore, only indicative.

Assumptions

Estimated Resident Populations (ERP) for five year age groups by sex from the 2011 and 2016 Censuses are used as the base for developing cohort-change ratios in this work. Due to the small populations within each of these cohorts, adjustments have been made to some ratios to achieve feasible population distributions for each projection interval.

The number of additional jobs, and the timing of these jobs, has been estimated using data and information from the initial assessment of economic impacts paper prepared by the

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[6] Government of South Australia, Kangaroo Island Community Education2016 Annual Report to the School Community, Department for Education and Child Development, http://docs.decd.sa.gov.au/Sites/AnnualReports/1882_AnnualReport.pdf, viewed 18 September 2017.

South Australian Centre for Economic Studies (SACES) referred to earlier, and other related sources.[7] The SACES job estimates relating to increased tourist visitation are for the period 2015 to 2021. For this work, these job estimates are spread over a longer period from 2016 to 2026, and then tapered to 2031. The new job estimates in the SACES report have also been discounted to reflect a commitment to use local contractors and labour where possible.[8] Given Kangaroo Island's relatively low unemployment rate, it is assumed that 80% of new jobs will be filled by in–migrants to Kangaroo Island. An assumption is then made that half of the construction phase employees and their families will leave the Island by 2021; and the in-migration associated with economic and infrastructure projects in 2026-2031 will be half of the previous ten years.

Assumptions for tourism related jobs are based on SACES Scenario 3, with the 3rd quartile between the high and low assumptions taken as the additional employment (approximately 435 jobs). This increase in tourism related jobs is spread evenly over the projection period.

Project related jobs are estimated to be 300 over the next 3 to 5 years. These project related jobs have been spread over the next two five year periods, with a heavier weighting for the first five years.

The total population increase associated with the increase in jobs is factored up by the assumed AHS for new workers of 2.0.

Both scenarios retain their respective, adjusted cohort-change ratios for each projection interval.

Average Household Size (AHS) is used to calculate future dwelling requirements. The AHS derived from the 2016 Census is 2.4 persons per household. Although the additional workers required for the Economic Growth scenario are assumed to come from all working age groups, there is an assumption that the age profile of these in-migrants is younger than the existing workforce (young singles and young couples with no children households). For this reason, AHS has been reduced to 2.0 for these new workers, resulting in a greater number of additional dwellings.

Household composition is held constant at the 2016 Census level. That is, the proportion of family households, lone person households and group households for each projection interval is the same as for 2016.

The number of dwellings required is calculated by dividing the total resident population by the appropriate AHS. In the BAU scenario, the AHS is maintained at the 2016 level of 2.4 persons per household.[9] In the EG scenario, a smaller AHS of 2.0 is applied, on the assumption that in-migration will have a disproportionate number of lone person

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[7] These resources include: Government of South Australia June 2016, "The Kangaroo Island Economic Development Outlook", Office for the Commissioner for Kangaroo Island; and the Commissioner's "KI Developments" website, http://kangarooislandcommissioner.sa.gov.au/resources/ki_developments, viewed 18 September 2017.

[8] South Australian Centre for Economic Studies *Op. Cit.*, p2

[9] This AHS differs from that published in the 2016 Census. AHS for this work is an estimate based on ERP and an adjusted number of Occupied Private Dwellings.

households and couple without children households. This AHS is applied to the additional population generated in the EG scenario.

Results

Figure 1 shows the projected total population for the two scenarios. The BAU scenario results in continued growth based on recent trend growth. The growth rate declines from 2021 due to the ageing of the local population and an associated reduction in natural increase (births minus deaths).

In contrast, the EG scenario shows a sharp increase in population growth from 2016 to 2021 due to the assumed increase in jobs in the construction phase of the announced and proposed economic and infrastructure projects. Jobs associated with assumed increased tourism visitation also underpins this population growth. Between 2021 and 2026, the population continues to grow due to increased economic activity, but at a lower rate. This lower rate is due to an assumed out-migration of 50% of those that migrated to the Island during the construction phase. From 2026, population growth once again increases due to the assumed continued increases in economic activity, with the losses associated with the construction phase now ceased.

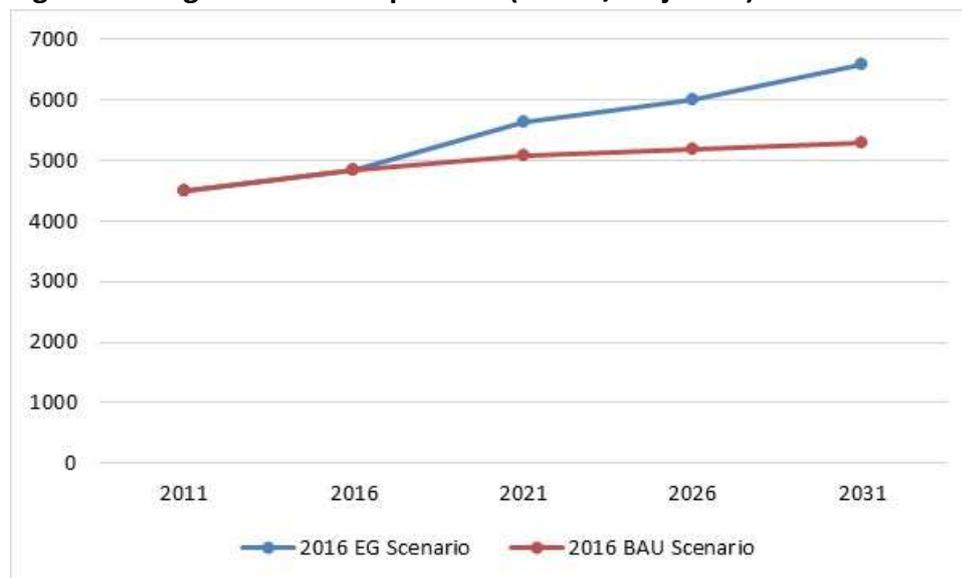**Figure 1: Kangaroo Island Population (Actual/Projected)**

Table 1 shows the actual and projected population for each scenario. Over the projection period, the BAU scenario results in a total growth in population of 437 people. The EG scenario results in a total growth of 1,746 people – a difference of 1,309 people.

Table 1: Population Scenarios

	Actual		Projected			Growth
	2011	2016	2021	2026	2031	2016-31
BAU Scenario	4513	4852	5086	5187	5289	437
EG Scenario	4513	4852	5641	6010	6598	1746
Difference (EG - BAU)	-	-	555	823	1309	-

Table 2 shows the projected five yearly growth for each of the scenarios. Population growth for the BAU scenario declines over the period, mainly due to a decline in natural increase. The increased population growth in the EG scenario compared with the BAU scenario is dramatic, particularly between 2016-21 and 2026-31.

Table 2: Population Scenarios – Five Yearly Growth [a]

	Actual	Projected		
	2011-16	2016-21	2021-26	2026-31
BAU Scenario	339	234	100	102
EG Scenario	339	789	368	589
Difference (EG - BAU)	-	555	268	486

(a) Differences in totals/growth between tables is due to rounding

Tables 3 and 4 show the increase in the number of households between 2016 and 2031 based on the population growth for each scenario. The propensities to form households[10] by each type of household are maintained at 2016 levels. There is a dramatic increase in both family and lone person households between the BAU and the EG scenarios. This is a feasible outcome, given that many job-based in-migrants are likely to be younger, lone person households or younger families.

Table 3: Additional Households by Type BAU Scenario 2016-31

Family households	117
Single (or lone) person households	60
Group households	5
Total	182

Table 4: Additional Households by Type EG Scenario 2016-31

Family households	540
Single (or lone) person households	274
Group households	23
Total	837

Table 5 shows the additional Occupied Private Dwellings (OPDs)[11] required for the population increase over the projection period. The number of Occupied Private Dwellings is greater than the increase in the number of households due to an assumed natural vacancy

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[10] The number of households in a population is estimated using propensities (proportions) for people to belong to different living arrangement types (e.g. lone person households) which are then converted to households.
[11] The term additional OPDs is used here as a surrogate for all current and future dwellings used by the local community, and to differentiate from second homes and holiday homes.

rate of 6%.[12] Over the period 2016 to 2031, there is an increase of 193 dwellings for the BAU scenario. Over the same period, there is an increase of 890 dwellings for the EG scenario.

The number of additional dwellings required follows the same pattern as population growth. In the BAU scenario, falling natural increase due to increasing deaths, and the elderly moving into retirement or nursing homes, leads to a reduction of additional dwellings required over the projection periods, as existing houses become vacant.

Table 5: Additional Occupied Private Dwellings

	Estimated	Projected			Total
	2011-16	2016-21	2021-26	2026-31	2016-31
BAU Scenario	141	103	44	45	193
EG Scenario	141	398	187	305	890

An interesting outcome of the EG scenario is a major improvement in the implied elderly dependency ratio[13] as illustrated in Tables 6 and 7. The additional working aged population slows the relative ageing of the population dramatically, with the proportion of over 65 year olds in 2031 falling from almost a third of the population in the BAU scenario, to a quarter in the EG scenario.

Table 6: Age Group Proportions BAU Scenario

Age Group	2016	2021	2026	2031
0-14	17%	17%	17%	17%
15-64	61%	56%	53%	51%
65+	22%	26%	30%	32%
Total	100%	100%	100%	100%

Table 7: Age Group Proportions EG Scenario

Age Group	2016	2021	2026	2031
0-14	17%	18%	18%	19%
15-64	61%	58%	56%	56%
65+	22%	24%	26%	25%
Total	100%	100%	100%	100%

Figure 2 shows the changing age-sex structure for Kangaroo Island under the BAU scenario. Kangaroo Island's current and projected age structure for the BAU scenario resembles other regional and rural areas with a growing aged population, and a loss of younger adults. Notwithstanding these losses, the young and working aged population profiles remain relatively stable over the projection period. Even under the BAU scenario, in-migration and retention of the working age is required to maintain equilibrium in the job market. As the older workforce retires, opportunities become available for younger local and in-migrating job seekers.

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[12] The natural vacancy rate is the vacancy rate at which there is neither excess demand nor excess supply, and relates to the length of time a property is on the market.
[13] The elderly dependency ratio is a ratio of the population age 65 plus to the working aged population, usually expressed as a percentage.
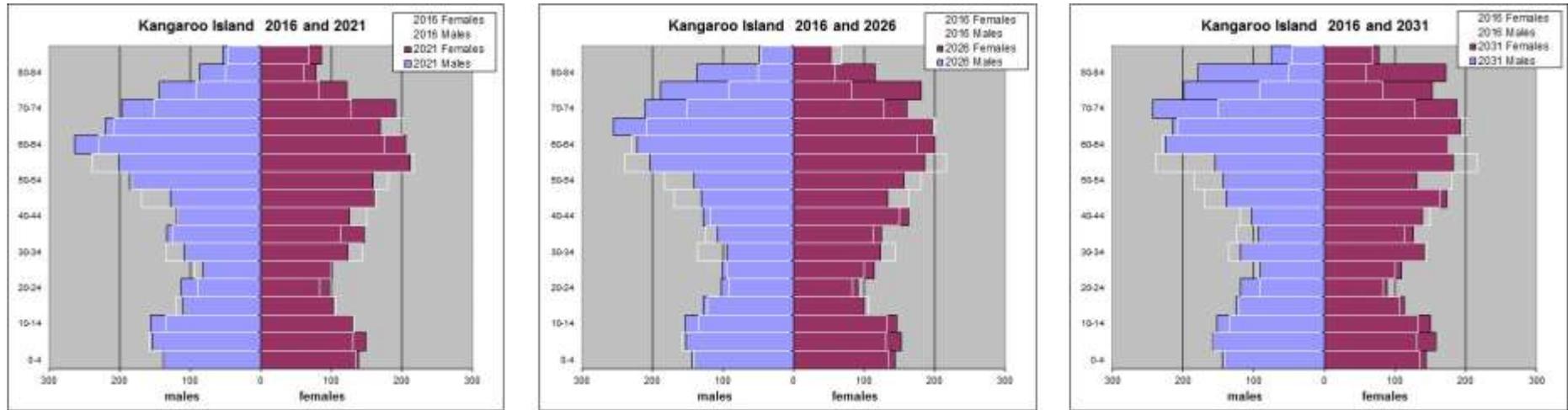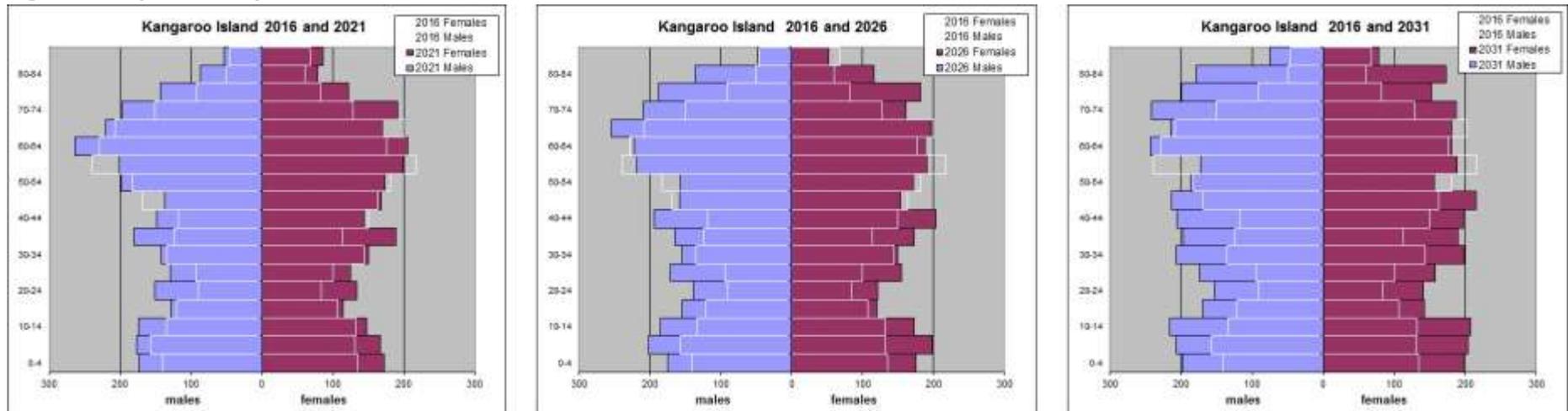
Figure 2: Population Pyramids BAU Scenario

Kangaroo Island 2016 and 2021

Kangaroo Island 2016 and 2026

Kangaroo Island 2016 and 2031

Figure 3: Population Pyramids EG Scenario

Kangaroo Island 2016 and 2021

Kangaroo Island 2016 and 2026

Kangaroo Island 2016 and 2031

As in many regions, the elderly currently exist in the population, and it is likely that many will remain in the region. The natural process of ageing will continue, with the older cohorts mushrooming within the age structure.

Figure 3 shows the changing age-sex structure under the EG scenario. Strong in-migration of the working age and their families, leads to a thickening of the working age and younger age groups within the age structure. The outcome is a much more resilient population structure, and an improvement in the aged dependency, as discussed above. It is this younger, working aged growth that underpins the increased need for additional dwellings.

The Spatial Distribution of Occupied and Unoccupied Private Dwellings

Although this work does not address the issue of Unoccupied Private Dwellings, to provide some insight into the possible location of future Occupied Private Dwellings (OPD), it is necessary to separate those areas on the Island where dwellings are predominantly occupied, and those that are predominantly unoccupied.

Kangaroo Island has a concentration of Occupied Private Dwellings in the coastal town of Kingscote, with almost 40 per cent of the Island's population residing in the town. Other major centres with high concentrations of OPD are Nepean Bay, Vivonne Bay, Island Beach and Penneshaw.[14] Table 7 illustrates the number and percentage of OPDs on the Island.

Table 7: Spatial Distribution of Occupied and Unoccupied dwellings [a]

	Residents	Dwellings			
		Occupied	Unoccupied	Total	%Occupied
Places where most people live permanently					
Nepean Bay	560	211	109	320	66%
Kingscote (UC&L) [b]	1,763	764	205	969	79%
Pardana (SS) [c]	142	52	16	68	76%
Places dominated by second homes					
Emu Bay [d]	60	15	68	83	18%
Island Beach (SS)	319	130	200	330	39%
American River (SS)	215	90	126	216	42%
Penneshaw (SS)	276	113	134	247	46%
Vivonne Bay (SS)	407	144	150	294	49%
Kangaroo Island (LGA total)	*4,417*	*1,783*	*1,110*	*2,893*	*62%*

    (a) *Ibid*. p.73, This table has been adapted for this work. Data is from the ABS 2011 Census of Population and Housing.
    (b) Urban Centres and Localities (UC&L) are part of the ABS Australian Statistical Geographic Standard.
    (c) State Suburbs (SS) are ABS approximations of localities gazetted by the Geographical Place Names Authority.
    (d) Emu Bay equated to the Kingscote SS, excluding Kingscote.

Figure 4 shows the 2016 distribution of Occupied Private Dwellings across Kangaroo Island. Due to the low density of dwellings, the spatial resolution is coarse for much of the Island.

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[14] Paris, C and Thredgold C, 2014, "Second homes and changing populations – Impacts and implications for local government in South Australia", Centre for Housing, Urban and Regional Planning, the University of Adelaide, p73.
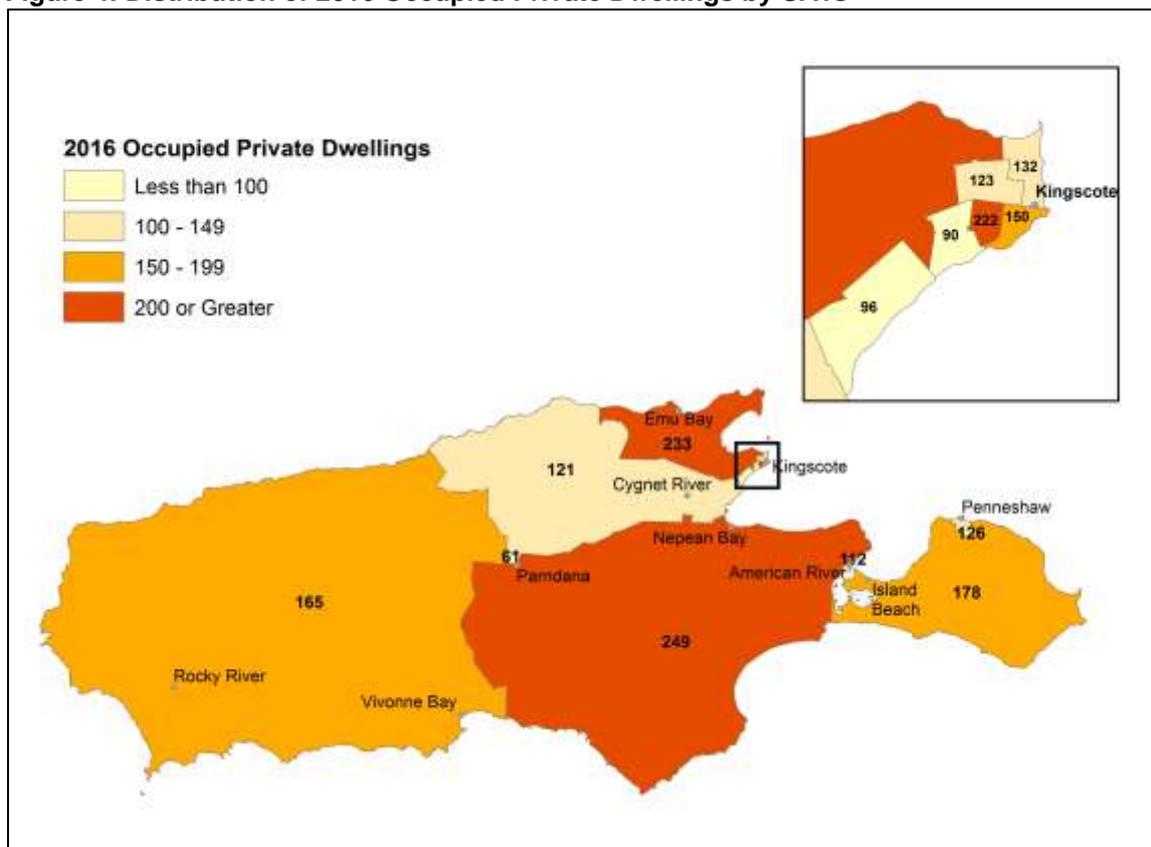
Figure 5 shows the distribution of Unoccupied Private Dwellings across the Island, with the predictable corollary outcome compared with the distribution of occupied dwellings.

Table 8 is derived from Table 7. Townships with relatively large numbers of Occupied Private Dwellings are used to produce a percentage distribution of OPDs across those townships. Assuming that future growth will occur around current urban centres, this distribution provides some insight into the possible location of future dwellings.

**Table 8: Percent Distribution of OPD across Major Townships**

	OPD	%
Nepean Bay	211	15%
Kingscote (UC&L)	764	53%
Island Beach (SS)	130	9%
American River (SS)	90	6%
Penneshaw (SS)	113	8%
Vivonne Bay (SS)	144	10%
Total	*1452*	*100%*

Figure 4: Distribution of 2016 Occupied Private Dwellings by SA1s[15]

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[15] Statistical Areas Level 1 of the ABS Australian Standard Statistical Geography

Figure 5: Distribution of 2016 Unoccupied Private Dwellings by SA1s
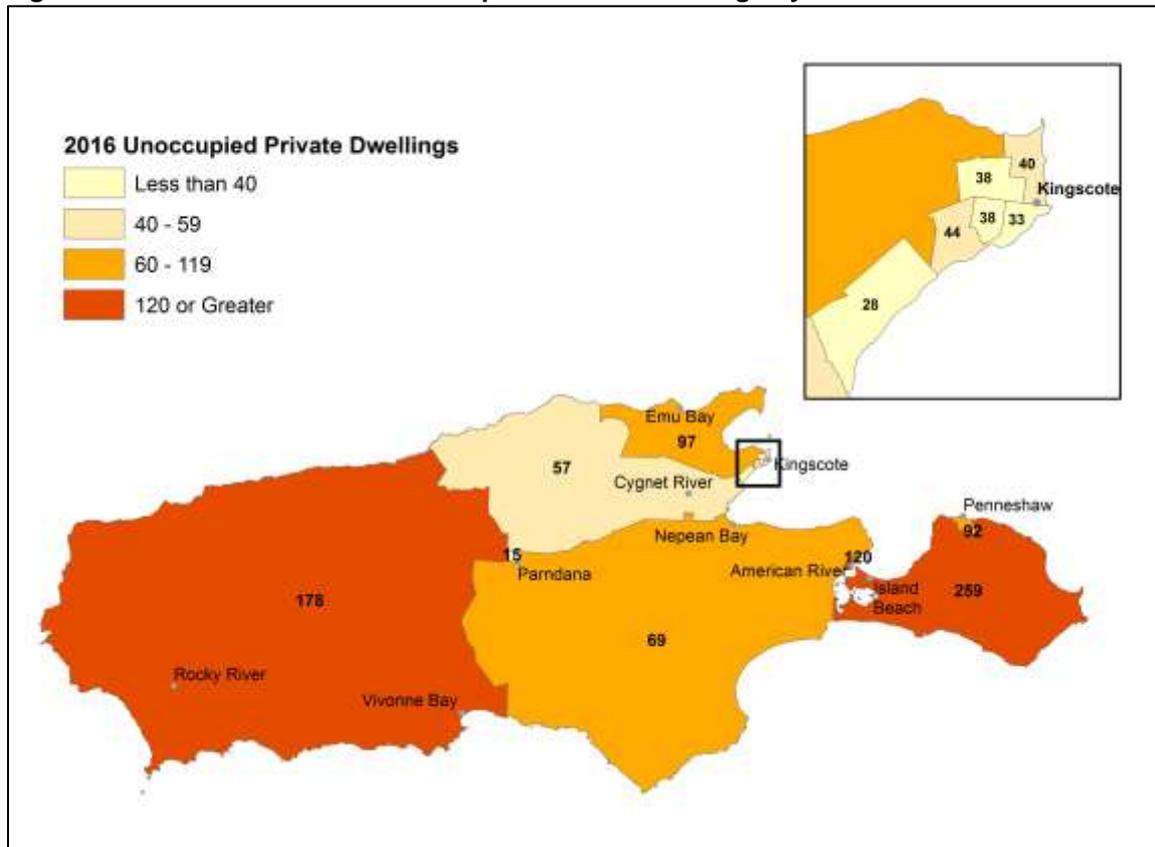
Conclusions

Kangaroo Island is anticipating an increase in economic activity over coming years. This work looks at the possible impact of this economic activity on future populations and associated dwelling requirements. The approach taken is to produce two scenarios that illustrate two possible demographic futures; a Business As Usual scenario that assumes a continuation of recent demographic trends, and an Economic Growth scenario that assumes the announced and proposed economic and infrastructure projects proceed; and increased tourist visitation will occur.

The EG scenario results in an additional 1,746 people from 2016 to 2031, which is 1,309 more people than the BAU scenario. This translates into an additional 837 households; 655 more households than the BAU scenario. The majority of these additional households are families and lone persons under both scenarios.

An additional 890 additional dwellings would be required to house these additional households; 697 more dwellings than the BAU scenario.

One of the major outcomes of the EG scenario is a substantial decrease in the proportion of over 65 year olds in the population, leading to an implied improvement in the older dependency ratio for Kangaroo Island.

Although the BAU scenario maintains an age-sex profile similar to its current structure, the EG scenario produces a demographic structure that could be considered more resilient than the BAU, due to both greater population numbers and a greater proportion of working age and school age cohorts.

The future spatial distribution of OPDs is likely to follow the existing distribution to some degree, for both scenarios. The EG scenario may result in a more dispersed distribution of OPDs, depending on the location of future economic and infrastructure projects, and the travel behaviour of job related in-migrants and their families (how far they are willing to drive for work, education and other amenities). This issue is possibly better addressed at a local government level.