



An Evaluation of the Proposed Residential Development at South Jerrabomberra

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Report by Access Economics Pty Limited for
Village Building Co

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Glossary

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ACT-QCC	The geographical and economic region defined by the boundaries of the ACT and the QCC local government area.
ANEF	Australian Noise Exposure Forecast
CPRS	Carbon Pollution Reduction Scheme
GRP	Gross Regional Product (for the ACT plus QCC local govt area)
LDA	Land Development Agency (an ACT government agency)
NSW	New South Wales
QCC	Queanbeyan City Council
SJ	South Jerrabomberra

Executive Summary

Residential development at South Jerrabomberra (SJ) and curfew-free aviation operations at Canberra Airport are not mutually exclusive. The two can coexist.

Using the Airport's own worst-case noise forecasts, the residential components of the SJ development are located in zones defined as 'acceptable' and 'conditionally acceptable' for aircraft noise intrusion under the current Australian Standard, which is one of the most stringent aircraft noise Standards in the world. It is also more stringent than NSW Planning's draft guidelines for noise attenuation near major roads and railways.

For houses in the 'conditionally acceptable' zone of SJ, the proposed noise attenuation measures ensure that the conditions are met for these houses to be 'acceptable'.

Furthermore, this worst-case noise exposure is highly unlikely to ever be generated. Expected improvements in aircraft and air navigation technologies, and a future where there is a price on carbon, will combine to ensure that noise from other suburban sources *other than aircraft* will predominate over aircraft noise for people living at SJ.

In the absence of residential development at SJ, there is expected to be a shortage of affordable housing in the ACT-Queanbeyan region – and particularly in the south-eastern part of that region – over the coming decade.

Median new house prices in the region are estimated to be \$40,000 lower over the coming decade (in today's dollars) if residential development goes ahead at SJ, than if it does not. Without SJ, it could add \$100,462 in mortgage repayments and mortgage insurance over a 30 year loan, for the median house buyer in the region.

If SJ does not proceed, the resulting constraint on population growth in the region is expected to trim \$1.25 billion per annum from Gross Regional Product by 2020.

If the proposed residential development at SJ does proceed, the associated construction activity is expected to generate 3,300 person-years of additional full time employment over the coming decade.

SJ also has other advantages over the alternatives: it achieves a more compact urban form; it provides a major new land release in the south-eastern part of the region, to balance the heavily north-west focus of upcoming ACT land releases; it utilises existing underground services; it reduces overall commuting time, vehicle kilometres and carbon emissions; and, it can do this without impinging on operations at Canberra Airport.

If purchasers of land at SJ are (prior to purchase) fully informed that they will experience aircraft noise, there is a negligible likelihood of the SJ community being able to later successfully lobby for operational restrictions to be placed on the airport.

Access Economics recommends that South Jerrabomberra be rezoned for residential development, with appropriate measures taken to ensure the purchasers of land at SJ are aware (prior to purchase) that SJ experiences aircraft noise.

Summary Report

The Queanbeyan City Council and NSW Department of Planning are soon to decide whether to rezone South Jerrabomberra (SJ) for residential development. This development would provide an important supply of affordable land in the decade ahead for the ACT-QCC region. If SJ do not go ahead, it would create a significant monopoly on land release for the ACT's Land Development Agency. While the ACT LDA has released some affordable land in northern Canberra, these are now mostly sold or over subscribed. The upcoming land releases in the ACT in areas such as Molonglo are likely to have insufficient affordable lots to meet demand.

The impact on house prices could be significant. If residential development at SJ does not go ahead, the resulting lack of supply, competition and variety in land sales, could see median new house prices \$40,000 higher than they need to be. This will severely constrain the growth of the ACT-QCC economy and negatively impact on the standard of living of those people looking to enter the housing market over the next decade.

Extracting higher prices for the sale of crown land in the ACT certainly benefits rate payers, at the expense of low income households and first home owners, but it is a highly regressive revenue source.¹ It is questionable whether first home owners and low income households buying in outer suburbs should pay more so that rate payers in inner suburbs can pay less to fund overall ACT Government services.

With the First Home Owners Bonus being wound back and lack of affordable housing lots being released in the ACT-QCC region, 2010 to 2020 is looming as a decade of expensive housing and slow growth for the ACT-QCC economy. SJ is a key part of the solution to affordability issues.

The choices faced by home buyers seeking new house and land packages in reasonable proximity to employment opportunities in the ACT-QCC region, as new land releases become substantially more costly over the next decade, are:

- Borrow more money (if they can), resulting in more 'dead money' spent on higher interest payments and mortgage insurance, or
- Delay their entry into the property market, resulting in more years of 'dead money' spent on rent until they can save the higher deposit needed – all the more difficult as land prices continue to accrue capital gains, so their savings target keeps growing while they are renting, or
- Live further out (if a suitable house can be found further out), thereby going against the principles of holistic urban area planning, incurring greater servicing costs, longer commuting costs, higher vehicle running costs, and higher carbon emissions, or
- Decide to settle in another city where housing is more affordable. Even though the ACT-QCC region may still offer 'cheaper' housing in an absolute sense compared to the inner areas of larger metropolitan cities, the relationship between the housing prices in an area and the opportunities afforded by that area – a major determinant to where people live – will be detrimentally affected when house prices rise only because of housing

¹ While the ACT Government has recently adopted the proper accounting treatment used in the rest of Australia – where land sales are (strictly speaking) a balance sheet item rather than a revenue item – in practice, land sales still generate cash flow for the Government and contribute to the funding of recurrent expenditures.

supply shortage. While Canberra has a relatively high *average* household income, it is important to consider the *median* and bottom *quartile* of household incomes when assessing housing affordability – the majority of households in the ACT-QCC region earn less than the *average* income.

The costs imposed on a low income or first home owner household from having to pay \$40,000 more for the median new house than they should have, due to a lack of competition in land supply and a lack of affordable housing over the next decade, are:

- \$273.68 more per month in mortgage repayments, for the life of a 30 year loan at an average interest rate of 7.28% – a total of \$58,525 in bank interest plus \$40,000 paid in monopoly profits to the ACT Government over the life of the loan. That is, \$40,000 extra up front ends up costing \$98,525 over the life of the loan.
- And, pay mortgage insurance at the rate of around \$1,937 per annum for around an additional twelve months (because it takes longer for equity to build up to 20% of the property's value), a total impost of \$100,462 over the life of the loan.

Or, if the household does not have the capacity to borrow the additional \$40,000, they may have to pursue some other options available in the face of less affordable housing:

- Rent for longer to save the required deposit. For a typical household saving for a home, it could take around 18 months, or nearly \$30,000 of 'dead money' spent on rent, before the higher deposit needed (ie \$4,000, being 10% of \$40,000) can be saved. This is on top of the \$100,462 in additional mortgage payments and mortgage insurance once they are in the house, as noted above. The total additional outlay for this household to purchase a home is around \$130,000 over the 31.5 year timeframe for renting then paying off their mortgage.
- Live further out – assuming a suitable property can be found further out – resulting in 54 hours, worth \$2,355 per annum, in additional commuting costs (including the cost of fuel, time and carbon emitted), given the proximity of other affordable land releases to employment areas, relative to SJ.
- Move away from the ACT-QCC region to a region with more competitive land supply and more affordable housing.

The last of the options in the above box is the most concerning for the broader community and the economic prosperity of the ACT-QCC region.

If residential development at SJ does not go ahead, BIS Shrapnel estimates that population growth in the ACT-QCC region would be 0.4% per annum slower and that employment growth would be 0.5% per annum slower, across the decade 2010 to 2020. Access Economics has reviewed the BIS Shrapnel analysis and concurs with its findings. Running the BIS Shrapnel results through Access Economics' General Equilibrium Model shows that the gross regional product (GRP) of the ACT-QCC area would be around 3.6% lower by 2020 if SJ does not go ahead, compared with a scenario where residential development at SJ does go ahead. In

today's dollars, constraining the release of affordable housing over the next decade could cause a loss of GRP in the ACT-QCC region of around \$1.25 billion per annum by 2020.

The scale of construction at SJ – some half a billion over the next decade – would take away the Cotter Dam Enlargement's title as the biggest project since New Parliament House. The person-years of employment created by SJ would be 3,300 over the coming decade.

The proposed development at SJ has other important benefits in:

- bringing about competition in land supply to reduce the ACT LDA monopoly on land release in the ACT-QCC region,
- providing a greater variety of land in more locations in the ACT-QCC region, other than just northern Gungahlin and Molonglo, and
- ensuring the QCC local area is not constrained in its growth.

In addition to these benefits, the proposed development at SJ makes a sense from a holistic planning perspective. It is:

- close to existing road networks, underground services and employment areas,
- close to community facilities, shops and schools, and
- a density-increasing infill between Jerrabomberra in NSW and Chisholm/Gilmore in the ACT (rather than further sprawl on outer edges of the ACT-QCC regions).

With those factors in its favour, approval of the rezoning of SJ would appear to be straightforward. However, the NSW Planning and QCC rezoning process for SJ – now into its eighth year – has been the subject of numerous delays and reviews due to a single issue: aircraft noise.

Canberra Airport is concerned that residential development at SJ will result in operational restrictions on its business and the wider aviation industry, such as a curfew. Interestingly, the imposition of a curfew is unlikely to ever pass a cost-benefit analysis test. Even though the impact of a curfew on the aviation industry would be small in net present value terms (due to the distant horizon for when the airport's traffic forecasts will be achieved), the noise impacts on residents at SJ are also expected to be small (due to the worst-case assumptions used by the Airport in the creation of the ANEF contours being unlikely to be achieved in practice). The ability of SJ residents to lobby for a curfew is further diminished because the airport pre-dates development at SJ. So, while the Airport's fears (of SJ causing a curfew) seem unfounded, it has pursued a long running and colourful campaign against residential development at SJ.

The residential component of the development at SJ is more than 10km from the airport and are in zones deemed 'acceptable' and 'conditionally acceptable' by the current Australian Standard for noise intrusion by aircraft (AS2021-2000). The first tranche of SJ development, at South Tralee, is largely in the zone deemed 'acceptable', with only a small component in the 'conditionally acceptable' zone. The noise attenuation measures proposed for houses in SJ ensure that houses in the 'conditionally acceptable' areas meet the conditions required to be 'acceptable'. According to the current standard, homes in SJ will be located in an area where *'noise from other sources other than aircraft tends to predominate over aircraft noise'* – or in other words, passing motor vehicles and other normal suburban noise are likely to be more

noticeable than aircraft noise for people living in SJ, based on Canberra Airport's own (and hence worst-case) projection.

The Australia Standard for aircraft noise is already one of the more stringent in the world. The relevant standards in Canada, the United States, France and much of Germany (among others) allow residential development in higher noise contours than the proposed SJ development.

The level of noise attenuation required for aircraft noise is also greater than the applicable draft guidelines by NSW Planning for noise attenuation in houses located near major roads and railways.²

Society builds houses near infrastructure all the time even where that infrastructure imposes some negative externality cost on nearby residents, be it though impacts such as noise, shading, radiation or negative aesthetic impacts. There are many houses in Australia that are near a main road, railway, power line or pipeline. Provided the buffer zones for these are clearly defined and the property rights of the infrastructure owner are clear, a family choosing to move into a house near such infrastructure knows that the encumbrance exists and that it will not be moved.

In the case of airports, the relevant buffer zone is defined by the Australian Noise Exposure Forecast (ANEF) system as defined in the Australian Standard AS2021-2000. While the ANEF system ensures that aircraft noise is taken into account in the design and location of buildings near airports, Canberra Airport is concerned that people buying land in SJ will later exert pressure on politicians to have flight paths altered or for a curfew to be imposed.

This concern about the lack of permanency of its flight paths and curfew-free operations has resulted in Canberra Airport objecting to residential development at SJ and proposals from Canberra Airport to prevent residential development in an even larger area, which it refers to as the 'High Noise Corridor'.

Rather than moving away from the well-established and scientifically-based ANEF system, the crux of the issue and the core of Canberra Airport's concerns can be addressed by ensuring that purchasers of land at SJ are fully informed (prior to purchase) of the ANEF contours, the noise attenuation requirements and the airport's operations.

If SJ residents are aware of aircraft noise issues and noise attenuation requirements prior to purchase, there is a negligible likelihood of the SJ community later successfully lobbying for changes to aircraft flight paths or curfews. More drastic solutions – such as Canberra Airport's proposal to prevent residential development in its 'High Noise Corridor' – are excessive, given that a more nuanced and targeted solution to this issue is available.

Even with these measures in place, decision makers could still be motivated to disallow development at SJ, due to a desire to 'protect' people from aircraft noise. Any such paternalistic concerns can be put to rest for the following reasons:

- As noted above, SJ will result in more affordable housing, in an attractive location – far outweighing any negatives from aircraft noise intrusion.
- The Airport's estimates of noise exposure at SJ are a worse-case scenario of noise in the year 2050 to 2060 based on year 2000 technology. There is a

² Based on advice from Wilkinson Murray, a firm of acoustic specialists, dated 2 November 2009.

very high likelihood that aircraft construction, navigation and air traffic control technologies over the next four decades will ensure actual noise is much lower than the Airport's worst case modelling.

- Much of the noise exposure is driven by the Airport's night freight hub proposal and Sydney overflow aspirations. There is considerable doubt that the Airport's aspirations of a five-fold increase in large aircraft movements will ever be achieved. Even if the Airport is successful in achieving these, the noise exposure at SJ remains in the 'acceptable' and 'conditionally acceptable' zones under the current Standard for buildings subject to aircraft noise.
- By 2050 there will be a carbon price (of some form) in the Australian economy. The air traffic projections by the Airport do not factor in a carbon price or a realistic world oil price. Only in a cheap-oil, free-carbon world will the Airport's aspirations be achieved.

As a result, potential home buyers at SJ can sign a sale contract – fully aware of the airport's flight paths and curfew-free operations – safe in the knowledge that there is a very low probability of noise ever being a significant concern for residents at SJ. There is no need for a paternalistic policy approach in relation to SJ. While there are some people in the community that may have a heightened sensitivity to noise, provided the issues are clearly spelt out in advance, those people can make a well-informed decision about whether living at SJ is right for them. For a good many people, the noise issue is unlikely to have much impact on their decision to live in SJ, nor their quality of life once there. Few people are fortunate enough to buy into an area where every conceivable attribute is perfect, and, in reality, most locational decision making involves trade-offs reflecting people's judgements. That is, people can 'self select' whether the various benefits of living at SJ (and living with some aircraft noise) is the right package for them.

The aviation industry is an important part of the economy, but is also something that has to be balanced with issues of affordability and economic growth in the rest of the economy, to decide whether rezoning of SJ is for the greater good.

Canberra Airport's less flexible proposal – that residential development should not occur anywhere in its self-proclaimed 'High Noise Corridor' – has no scientific basis or verification by an independent source. This proposal doesn't balance the issue of aircraft noise with the many other issues relevant to land use decisions.

The Commonwealth Department for Infrastructure, Transport, Regional Services and Local Government in its paper 'Safeguards for Airports and the communities around them', have proposed its Minister should have a veto over development near airports. This approach would not pass a cost-benefit test, particularly when other avenues are available to protect and entrench the rights of aircraft to use the southern approach to Canberra Airport, free from operational restrictions, while still creating competition in the market for land supply and thus more affordable housing in the ACT-QCC region. If this proposed policy was consistently applied elsewhere around Australia, it would see vast tracts of urban Sydney, Brisbane, Perth, Adelaide and Melbourne ruled out for any further greenfield development, infill or density increase. If similar aircraft noise standards were applied to the noise generated by major roads and railways, an even larger amount of land would become unavailable for residential development. The inconsistent approach to policy in relation to noise intrusion appears to treat SJ more severely than developments near any other airports, main roads or railways.

There are few alternatives available to the Queanbeyan City Council for large scale new residential development that is as well located as SJ. As well as providing large new tracts of residential land, the SJ development also provides employment land, recreational land and a high school. A blanket ban on development in the Airport's 'High Noise Corridor' would sterilise a vast area of well-located land within the QCC boundaries. To have a wholesale ban on development in this area would cause thousands of people to live further from work, spend more on interest payments and mortgage insurance, or simply move away from the ACT-QCC region. In particular, preventing SJ from being developed would severely constrain the growth of Queanbeyan and the wider ACT-QCC region.

The immense cost and economic impact of not allowing development in the Airport's 'High Noise Corridor' would far outweigh any impacts on the aviation industry – particularly if those impacts can be avoided by ensuring purchasers of land at SJ are informed of aircraft noise issues in advance.

Conclusion

There are significant negative economic consequences for the ACT-QCC region if development at South Jerrabomberra does not proceed. There is scope for the development at SJ to occur without impacting on the right of aircraft to use existing flight paths, as embodied in Canberra Airport's 2008 ANEF contours. Canberra Airport and South Jerrabomberra can coexist, and it would be for the greater good. After all, the Airport has found a way for an on-airport child care centre located on the ANEF 30 contour to coexist with airport operations, so residential developments some 10 kilometres away, and outside the ANEF 25 contour, should be able to coexist with the airport.

A blanket ban on residential development in areas south of Canberra Airport is an excessive response to the issues at hand. Access Economics recommends that Queanbeyan City Council and the NSW Department of Planning approve the rezoning of South Jerrabomberra for residential development, and ensure purchasers of land are fully informed of aircraft noise issues prior to purchase.

Access Economics, December 2009

1 Background

The Village Building Company commissioned Access Economics to evaluate the proposed rezoning of South Jerrabomberra for residential development.

The NSW Department of Planning and the Queanbeyan City Council are soon to decide on this rezoning. This is an important decision in the context of the future growth and prosperity of Queanbeyan. The decision also has consequences for the amount of competition in land release and the volume of affordable land release in the broad ACT-QCC region. The proposed development also includes employment land, recreational facilities and a high school.

Access Economics has no financial interest – and no success fee or the like – in the rezoning outcome. This report is our independent assessment of the impacts of the rezoning and related issues.

In recent years Access Economics has worked for:

- Canberra Airport on issues of airport pricing calculations and the regulatory framework for airport pricing.
- ACT Tourism on the scope for direct flights between Canberra and Singapore.
- Village Building Co on issues relating to South Jerrabomberra, including cross-border fiscal impacts, airport traffic and Canberra Airport's Master Plan.
- The Commonwealth Department for Infrastructure, Transport, Regional Services and Local Government in relation to the Sydney Airport Master Plan.

In working on different issues in the past for all sides of this current debate we have strived to provide independent rigorous analysis, and always on a fee-for-service basis. Access Economics is not on any on-going retainer or commission-type arrangement with any organisation involved in the debate surrounding South Jerrabomberra.

2 Affordable housing

This section explores the potential impacts of the South Jerrabomberra development on affordable housing in the Australian Capital Territory and Queanbeyan City Council (ACT-QCC) region. For further detail on methodology and model assumptions, please refer to Appendix A. Ensuring competition in the supply of land in the ACT-QCC region is of crucial importance, not only to maintain a healthy discipline on the land release policies of the ACT Government, but to increase the amount and variety of land for sale and to provide additional flexibility in responding to fluctuations over time in the demand for new land releases.

In the absence of residential development at South Jerrabomberra (SJ), the ACT Government will have a virtual monopoly on well-located residential land release in the ACT-QCC region. The existing residential zoned land at Jerrabomberra (in NSW) is now built out, but during the 1990s Jerrabomberra was an important competitor to the highly priced and scarce new land offerings in the ACT. The same impact can be expected through the release of residential land in SJ. Most planned land releases in the ACT over the next decade are in the northern and western parts of the ACT – SJ and Googong provide choice in the south eastern parts of the ACT-QCC region. Googong (alone) would not supply a sufficient volume of affordable lots to meet demand, so Googong is not a substitute or replacement for SJ. Googong and SJ are complementary and both of these development fronts are needed to ensure adequate affordable housing over the coming decade.

More recently, median house prices in the ACT have increased by 85 percent over the 6 years to December 2008 (ABS 6416.0). The sheer size of mortgage repayments in a typical household budget creates a direct link between competitive land release and the living standards achieved over a family's lifecycle.

2.1 Housing affordability

Housing affordability is a crucial factor in life-time home attainment and living standard outcomes for low income households. The availability of affordable housing allows low income households to enter the housing market sooner and at lower cost. These ideas have been explored through an analysis of a typical household looking to purchase a home in the 'affordable housing' segment of the real estate market.

This analysis draws on the work by BIS Shrapnel on measuring the impact of SJ on median land prices in the ACT-QCC region. BIS Shrapnel found that the median land price would be \$40,000 lower over the period 2010 to 2020 (in today's dollars) if SJ goes ahead, than if it does not. Access Economics has reviewed the analysis by BIS Shrapnel and agrees that it is a reasonable representation of the likely impact of less competition in the supply of land (and hence house-and-land packages) and a lower overall volume of affordable land releases.

With SJ Scenario – in a competitive market for affordable housing, median new house prices in the ACT-QCC region would be around \$410,000 over the period 2010 to 2020 in today's dollars.

Without SJ Scenario – in a less competitive market for affordable new housing, median new house prices would be around \$450,000 from 2010 to 2020 in today's dollars.

The question analysed here is: if SJ does not go ahead, how would a household respond when faced with the additional \$40,000 cost to buy a median-priced new house?

Response 1 - the household could respond by borrowing \$40,000 more (if they have the capacity to do so) to enter the real estate market when a lack of affordable land releases pushes up median house prices. As well as borrowing more, the household would also have to carry mortgage insurance for a longer period. Mortgage insurance is typically required until the amount of equity in the home rises to 20%. It takes longer to build up to 20% equity when the amount borrowed is \$40,000 higher, resulting in more 'dead money' spent on mortgage insurance, as well as bank interest.

Response 2 - the household could respond by renting for a longer period in order to save the higher deposit needed to enter the more expensive real estate market. The standard 10% deposit required to enter the housing market (plus fees and stamp duty) rises by \$4,000, ie from \$41,000 to \$45,000, in the ACT-QCC region if SJ does not go ahead.

Response 3 - the household could respond by purchasing a house lower down the cost curve (such as a home further away from employment zones), provided a suitable house further out can be found. This results in higher commuting costs due to living further out.

Response 4 - the household could respond by moving elsewhere, to a different city where housing is more affordable. An exodus of households from the ACT-QCC due to a lack of affordable land releases over the period 2010 to 2020 would result in slower population growth and slower overall economic growth in the ACT-QCC region.

2.2 The impacts on a typical household

As shown above, a typical household has some options of how they respond to this cost impost. However, none of these options are particularly palatable, and have serious impacts on the living standards of that household and the broader region.

In reality, we are likely to see a combination of all these responses as the various households make different decisions of how to cope with the lack of affordable land releases.

Impact of response 1 ('borrow more and pay mortgage insurance for longer')

At an average future mortgage interest rate of 7.28%, the household would pay \$273.68 more per month in mortgage repayments, for the life of a 30 year loan - a total of \$58,525 in bank interest plus \$40,000 paid in monopoly profits to the ACT Government over the life of the loan. That is, \$40,000 extra up front ends up costing \$98,525 over the life of the loan.

And, pay mortgage insurance at the rate of around \$1,937 per annum for around an additional twelve months (because it takes longer for equity to build up to 20% of the property's value).

To avoid mortgage stress (defined as when repayments account for 30% or more of household income), the repayment increase of \$435 per month inclusive of mortgage insurance would require \$1,450 more in income to service it. This increase would put housing out of the reach of many low income households, or place them into a situation of mortgage stress.

The impact on overall lifetime living standards for a low to middle income family from paying an estimated \$100,462 more in mortgage repayments and mortgage insurance is clearly

significant. Due to the impact of compounding mortgage interest, \$40,000 more up front turns into \$100,462 over the life of the loan.

Impact of response 2 ('rent for longer')

For a typical low to middle income household saving for a home, it may not be possible to borrow more, so they may also need to continue renting and saving for the larger deposit required. Our estimates suggest it could take around 18 months, or nearly \$30,000 of 'dead money' spent on rent, before the higher deposit needed (ie \$4,000, being 10% of \$40,000) can be saved for a typical household facing typical income and living costs.

The household would still need to also borrow the extra funds and mortgage insurance described in 'Response 1'. As a result, a household that needs to rent for longer before entering the real estate market could pay a total of around \$130,000 more than it needs to over the life of a 30 year loan.

Impact of response 3 ('live further out')

Live further out – assuming a suitable property can be found further out – resulting in 54 hours, worth \$2,355 per annum, in additional commuting costs (including the cost of fuel, time and carbon emitted), given the proximity of other affordable land releases to employment areas, relative to SJ.

There will also be knock-on effects on the prices of houses further out – in new land releases in northern Canberra – if SJ does not go ahead, adding to the commuting costs.

Impact of response 4 ('moving away from ACT-QCC')

This scenario has more wide-reaching impacts on the entire ACT-QCC regional economy. If residential development at SJ does not go ahead, BIS Shrapnel estimates that population growth in the ACT-QCC region would be 0.4% per annum slower and that employment growth would be 0.5% per annum slower, across the decade 2010 to 2020. Access Economics has reviewed the BIS Shrapnel analysis and concurs with its findings. Running the BIS Shrapnel results through Access Economics' General Equilibrium Model shows that the gross regional product (GRP) of the ACT-QCC area would be around 3.6% lower by 2020 if SJ does not go ahead, compared with a scenario where residential development at SJ does go ahead. In today's dollars, constraining the release of affordable housing over the next decade could cause a loss of GRP in the ACT-QCC region of around \$1.25 billion per annum by 2020.

Due to the high import content in the ACT economy, the \$1.25 billion impact on production is accompanied by a significantly higher impact on final demand (as reported by BIS Shrapnel). The various data sources and parameters used in this analysis are described in Appendix A.

2.3 Economic and social impact of South Jerrabomberra development

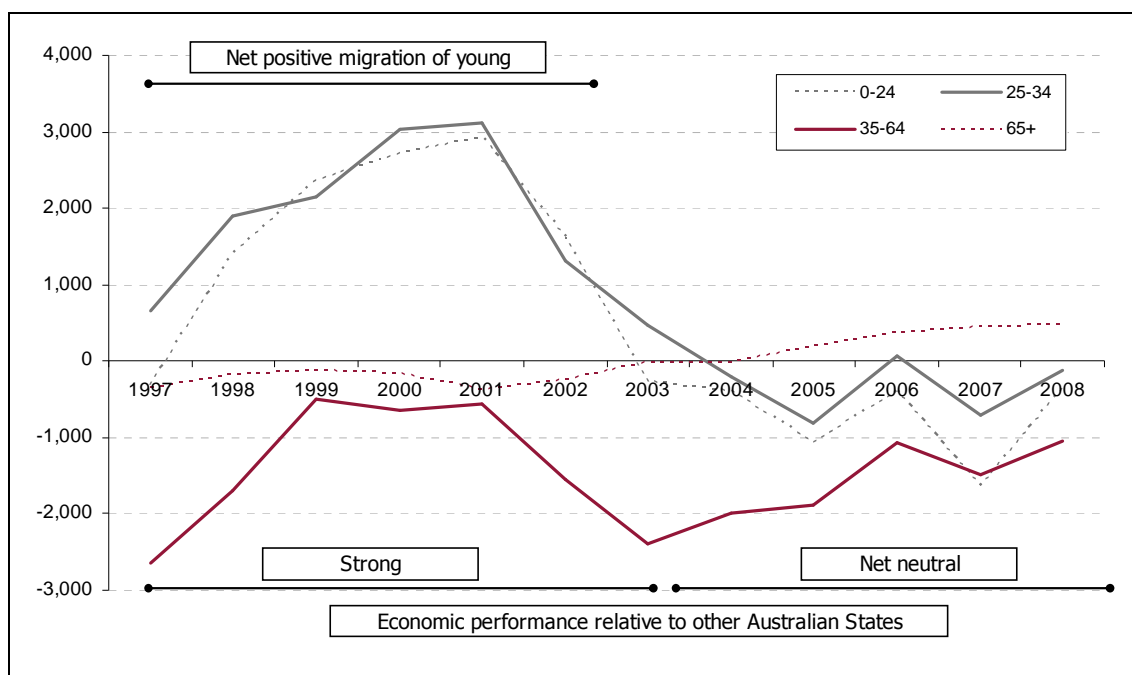
Additional to the improvements on household home attainment, lifestyle and associated costs, there are broader economic and social impact issues involved in releasing more affordable housing developments (and, more specifically, releasing the development in South Jerrabomberra). From a whole-of-economy point of view, increased employment opportunities during the construction phase, strong sustainable population growth

management, and improved social standing/inclusion are all positive impacts of wider housing choices. While there may be some negative influences, for example environmental or ecological damage, these would be expected to be minimised to the greatest extent possible during the planning process.

The sheer volume of construction activity at SJ over the next decade is likely to be the equivalent of five to six times the amount of construction activity of the Cotter Dam enlargement – around half a billion dollars of construction spread over a decade. While the Cotter Dam enlargement has been billed as the largest building project in the region since the New Parliament House, in fact, SJ would take that title by a considerable margin. The SJ construction activity is estimated to generate 3,300 person-years of full time employment over the coming decade.

The release of new affordable housing developments is not only beneficial to managing and sustaining underlying population growth, but also to stabilising interstate population migration trends. While economic performance (and, ultimately employment opportunities) relative to other Australian states tends to be the most common impetus for working age interstate migration, a secondary cause is the availability of affordable housing options. If the development in South Jerrabomberra is allowed to proceed, this can be expected to attract to some degree of permanent interstate arrivals.

Chart 2.1: Net interstate migration by Age, Victoria



The combined impact of these factors on net migration in Victoria is shown in Chart 2.1. From 2000, the Victorian government proactively implemented affordable housing initiatives. With other factors also in the mix, it is impossible to measure the precise impact of those initiatives on net interstate migration, but it is indicative of housing affordability programs boosting net interstate movements in Victoria over the last few years.

3 Attributes of the proposed residential development at South Jerrabomberra

This section examines the attributes of the proposed South Jerrabomberra (SJ) residential development from a holistic planning perspective.

A great deal of the focus in the ongoing debate between Canberra Airport and the proponents of residential development at SJ (to date) has focussed on the issue of aircraft noise, in particular the nuisance problems caused by aircraft noise at certain hours and nearby residential areas. Clearly this is an issue, as it is with any land (or air) use that creates loud noises in the vicinity of residential developments. We discuss later how this particular issue can be managed better.

Our key interest in this Section is to highlight that noise is only one issue when it comes to land use planning, and there are many other attributes of SJ that make it suited to a residential development from a more holistic urban planning perspective, rather than the single issue (noise) perspective that has dominated the debate thus far. Any residential location faces trade-offs in attributes, and it is exceedingly rare to find a location that is perfectly suited to residential dwellings in every way. The presence of one particular type of negative externality (in this case aircraft noise) in an area should not mean the area is deemed unsuitable for residential development, if the mix of other attributes is superior to other sites for development.

In several ways the development is more consistent with holistic urban planning principles than alternative sites for Greenfield developments around Canberra, including the very objectives articulated by the Canberra Spatial Plan. We focus in particular on two of those attributes: housing affordability and proximity to employment and services (and hence commuting mode and time) elsewhere in this report, but in summary those principles, and how the SJ development is consistent with them, include:

- **Create a more compact city** – the development at SJ is located closer to the existing urban fringe than most alternative greenfield development sites surrounding Canberra, including Googong. The Canberra Spatial plan states that “Canberra will be a city where growth has been largely contained within a 15 kilometre radius of the city centre”. The proposed development sits approximately on or within this 15km radius (see Figure 3.1), and between the existing urban boundaries of southern Canberra (approximately 1km) and Queanbeyan (approximately 3km). Conversely, a development at Googong, which is approximately 20km from the Canberra CBD, will push the effective urban boundary of the overall Canberra-Queanbeyan urban area significantly further south-east away from the CBD than it currently is. The Googong site is approximately 8km to the southern urban fringe of Canberra. In some metropolitan areas this growth corridor-like expansion to the urban fringe is justified on the grounds of development around key transport or infrastructure links, especially the desire to develop around key public transport corridors in more contemporary times, but this does not hold true for Googong which is not located on any existing transport corridors of note.
- **Arterial road access** – the proposed development is located just over 1km from the Monaro Highway, one of Canberra’s main arterial roads to the south with existing bus

public transport infrastructure. Conversely, Googong is over 8km from that same highway, its closest major arterial road.

- Proximity to employment (total) – based on 2006 census data, there are approximately 2,600 existing employment positions within 7km of the proposed South Jerrabomberra development, significantly more than the same figure within 7km of Googong (which is largely rural). Not only does employment within this range lead to lower private vehicular commuting times, but it also opens up the possibility of non private vehicular modes of transport, most notably cycling and walking. Once this range is extended to 11km the employment positions increases to over 40,000 surrounding the South Jerrabomberra development, largely through the regional employment hubs of centres of Woden, Phillip, Hume, Fyshwick and Greenway. There are no equivalently close existing employment opportunities as close to Googong.
- Proximity to range of proximate employment options. Within the same 7km radius defined above, there is a mix of employment options, with the area proportionately strong (relative to the economic mix in the total economy) in Education and Training (comprising 26.25 % of the regional employment, versus the equivalent national figure of 7.94%), health care (15.02%) and retail trade (12%).
- Proximity to shopping, schools and health care facilities. The fact that these three industries above (retail trade, education and training and health care) are the largest proportional employers within close proximity to the development are significant in an urban planning context, for they are the indicate close proximity of facilities and services required on a day to day basis, most notably shops, schools and health care facilities. Local shopping opportunities are mostly provided in the retail centres of Jerrabomberra, Calwell and Chisholm Village.
- A range of affordable housing options – see Section 2.
- SJ provides an option for households looking for affordable housing in southern and eastern parts of the ACT-QCC region. The other planned land releases in this region over the next decade are all in the northern and western parts of the region, with very little on offer for households looking for new, affordable land releases near the southern employment zones of Tuggeranong Town Centre and Hume.

Figure 3.1: Location of South Jerrabomberra



Note: Spatial boundaries ©Commonwealth of Australia

4 Airport traffic and freight hub

Prior to discussing the details of future traffic and freight at Canberra Airport, it is important to put to rest some claims by Canberra Airport management, which have said in media reports that Access Economics has misconstrued figures relating to the airport's noise forecasts. This is not the case. Rather, it reflects the manner in which the Airport has created and presented its forecasts:

- Canberra Airport has produced a noise forecast based on the 'Practical Ultimate Capacity' of the airport. (Though 'practical' in this case does not, in our view, adequately factor in some practical considerations such as fog or bad weather.)
- Canberra Airport has also said in its Master Plan that it expects this level of traffic to be reached 'between 2050 and 2060'. Hence, Canberra Airport has attempted to link its assessment of ultimate capacity with its expectations of demand.
- At other public hearings and forums, Airport management have distanced themselves from the 'Practical Ultimate Capacity', by saying it is a measure of capacity and not a level of traffic they expect to achieve in the foreseeable future and certainly not in the life of the current 20 year Master Plan. As such, Canberra Airport changes its view – depending on the context and the audience – as to whether its noise forecasts will ever be achieved or are achievable, or whether it relates to capacity versus demand.
- In reality, the noise forecasts produced by the airport are a theoretical construction that will never be achieved in practice. The contours are the outer envelope of three sets of noise contours – based on three different aircraft navigation patterns – of which only one can be true at any one time.
- While the guidelines for producing noise forecast do raise the option of using a 'Practical Ultimate Capacity' forecast, the guidelines appear to intend this in the context of the capacity of a new major development (such the noise generated once a new parallel runway was built and traffic ramped up to a mature level), and was presumably not envisaged to be a far-reaching forecast beyond 2050 for an existing runway.
- The noise projections have only been assessed for technical accuracy (ie that the computations were correct) by Airservices Australia. The underlying assumptions in the noise forecasts have never been independently reviewed and endorsed to the usual professional standards that would apply in any normal peer review process. It was assessed against a 'legal bare minimum' standard, not against professional norms.

Due to the complexity of these issues of demand versus capacity versus 2029 Master Plan versus post-2050 demand levels, it can be confusing to a lay reader to determine what the noise forecasts in the Canberra Airport Master plan actually relate to and how to interpret these.

Access Economics has called for greater clarity in the following areas:

- A noise forecast should be produced for 2029 so that it matches the timescale of the Master Plan. A noise forecast that will not be reached until after 2050 is too far into the future and too uncertain to be a useful tool for decision making.
- The noise forecasts should be independently assessed by a competent organisation. The current noise forecasts are implausible and are based on many dubious assumptions.

- The noise forecasts should be based on reasonable expectations of future aircraft technologies and aircraft types.

Access Economics has a deep appreciation of the various definitions and assumptions used by Canberra Airport in creating its noise forecasts. Claims by the management of Canberra Airport that Access Economics has ‘misconstrued’ their noise forecasts is only an attempt to dismiss the valid criticisms by Access Economics of Canberra Airport’s approach to informing the community in relation to when, where and to what extent future noise exposures will occur.

4.1 Airport traffic

As discussed above, the proposed development at SJ and the Canberra Airport can coexist. People living in SJ will experience aircraft noise intrusion that is ‘acceptable’ or ‘conditionally acceptable’ according to the current Australian Standard (AS2021-2000) and the Airport’s own (and hence worst-case) forecasts. The proposed noise attenuation measures for housing in SJ will ensure the conditions are met to make housing in the ‘conditionally acceptable’ zone become ‘acceptable’. By ‘acceptable’ the Standard explains that other sources of suburban noise would predominate over aircraft noise.

The first tranche of SJ development at South Tralee is largely inside the ‘acceptable’ zone with a small component in the ‘conditionally acceptable’ zone.

That noted, there are several reasons why the level of noise experienced in SJ will be lower than projected by Canberra Airport.

Firstly, in accepting the Airport’s master plan, the Commonwealth Minister for Infrastructure, Transport, Regional Development and Local Government specifically noted that Canberra Airport’s aspirations to be an overflow for Sydney Airport was not accepted and would be the subject of a subsequent review and decision by the Minister.

The Freight Hub component of the Airport’s aspirations has a low probability of occurring. Canberra is far from a natural location for an air freight hub (Brisbane or Melbourne would be more likely, as Sydney hits capacity). There are insufficient locally-originating exports, or locally-destined imports, for Canberra to be a logical location for a major freight facility.

Freight Hub proposals are far from unique in inland NSW and the ACT. Virtually every inland town in NSW has aspirations to be a freight hub. The list of aspiring freight hubs include: Parkes; Dubbo; Wagga Wagga; Gunnegah, Tamworth, Glen Innes and Albury. Like Canberra Airport’s master plan, all of these towns claim to be the natural hub location at the centre of spokes to Melbourne, Sydney, Adelaide and Brisbane.

The freight hub proposal by Canberra Airport fails to explain why bringing a lot of freight to Canberra, unloading it, reloading and flying it back out to somewhere else will be a cheaper way of getting that freight to where it needs to go. Rather, flying the freight directly from Point A to Point B is almost always the cheapest way of getting it there. Detouring via Canberra is rarely going to be a cheaper way of moving freight from Point A to Point B (regardless of where those end points are located).

The most expensive part of aircraft operations are the takeoff, landing, unloading and reloading. Once in the air, cruising is very economical. Compared with flying direct, hubbing through Canberra will require an additional landing, unloading, reloading and takeoff for each aircraft full of freight. This is not only true of non-talking cargo, but as Qantas, Virgin Blue and JetStar have shown in the case of their talking cargo, flying direct is always best. The number of new hub-busting routes that bypass Sydney (like Canberra-Perth, Brisbane-LA, Adelaide-Auckland, Canberra-Gold Coast and many more) are clear proof that as the aviation industry matures – generating sufficient demand for direct services – that indirect (or ‘hubbing’) services tend to reduce as a proportion of total traffic.

Hubbing was a transitory phase in the aviation industry. It was a necessary ‘second-best’ solution when there was not enough demand to support direct services, so transiting through Sydney was necessary to aggregate demand into a viable service. As the industry has grown, connecting traffic has declined as a share of total traffic and direct services have increased as a share of total traffic. Whenever demand is sufficient to support direct services, point-to-point services are the ‘first-best’ outcome, from the perspective of cost, carbon emissions and total time-in-transit. ACT-QCC residents have been major beneficiaries of the growth in direct services, which has lessened the proportion of times they have to connect through Sydney, compared with a few decades ago.

As such, the Freight Hub aspirations should be heavily discounted in any rigorous evaluation of development at SJ. It has a very low probability of succeeding. And even if an inland air freight hub does develop (against the odds) it could be at Parkes, or elsewhere, rather than at Canberra Airport.

For the people of the Canberra region, it is future direct (or ‘point-to-point’) flights like Canberra-Singapore and Canberra-Auckland that will generate the most benefit to the local community. There is little to be gained by the local community from handling large volumes of connecting traffic.

Even if the Airport’s freight hub proposal and Sydney overflow proposal proceed, it takes 50 years for the full noise impacts to be reached and even then, SJ is still located in the ‘acceptable’ and ‘conditionally acceptable’ noise zones according to the already stringent Australian Standard.

The Australia Standard for aircraft noise is already one of the more stringent in the world. The relevant standards in Canada, the United States, France and much of Germany (among others) currently allow residential development much closer to airports (as measured by higher ANEF contours) than the current Australian Standard.³ So, by the Standards of other developed nations, let alone Australia’s own Standard, SJ houses (with attenuation measures in place in the conditionally acceptable parts of SJ) are well within an acceptable zone for residential development.

Additionally, the noise standard for aircraft noise intrusion is more stringent than the relevant NSW Planning draft guidelines for buildings subject to noise intrusion from roads and railways. That is, a lower degree of noise attenuation is required for houses located near roads and railways, than for an equally ‘noisy’ house located near an airport.

³ See for example http://www.infrastructure.gov.au/aviation/nap/files/GILLESPIE_D.pdf

As shown in Section 2, the employment benefits from the construction activity at SJ are significant and outweigh the likely employment benefits of any night time freight operations, which would have local employment impacts in the tens or hundreds, not thousands. The cost to the economy of not proceeding with SJ amounts to \$1.25 billion per annum in Gross Regional Product. If the development goes ahead, the associated construction activity would generate 3,300 person-years of full time employment. Missing out on these benefits of SJ is also unnecessary, because SJ and the Freight Hub can coexist.

5 Review of approval process

The Queanbeyan City Council (QCC) and NSW Department of Planning are currently processing the rezoning application for SJ. This type of rezoning would normally be uncontroversial and straightforward, were it not for objections by Canberra Airport. The Commonwealth Government has also intervened, proposing a (constitutionally uncertain, and possibly paternalistic) Commonwealth veto over new residential developments near aircraft flight paths. The debate about SJ has been colourful – from the Airport’s mail out of earplugs, billboards, ACT government objections about water and the fiscal impacts of NSW residents using ACT services. The decision about rezoning SJ is now into its eighth year. It is now time for an evidence-based decision to be made, based on a dispassionate, objective review of the facts.

At the core of the debate is Canberra Airport's concern that the SJ development would result in a curfew or other such operational restrictions on the airport's growth. The proposed residential component of the development is located in an area 10 to 12 kilometres from the airport and is in an area defined as 'acceptable' and 'conditionally acceptable' under the current Australia Standard for aircraft noise intrusion and attenuation. As discussed in Section 4, the actual noise exposure is likely to be considerably smaller than the worst-case projections of Canberra Airport. Provided the new residents of SJ are fully informed in advance of the potential noise impacts and noise attenuation requirements, they can judge for themselves whether living in SJ will be right for them.

For example, the ACT Government recently released new land at East O’Malley, close to the Hindmarsh Drive road corridor – a busy six-lane main road in Canberra. Noise attenuation requirements were specified in the development conditions for some houses on Wallangara Street (the O’Malley street closest to Hindmarsh Drive). Development was able to proceed and the new houses now coexist with Hindmarsh Drive.

5.1 Insecure property rights and the political process

The lack of security over property rights, and inconsistent processes for how issues of noise externalities from aircraft are dealt with in planning law, are the main underlying reasons behind the ongoing tension between Canberra Airport and the proposed development at SJ.

The debate over aircraft noise is often clouded by emotion and unjustified fears, however the actual underlying problem with aircraft noise over residential areas is simply one of negative externalities, of which there are many equivalent examples throughout urban land use. A range of infrastructure assets generate negative externalities, including roads, railways and power lines. Buyers of land near such infrastructure know the infrastructure exists and that it cannot be moved through political lobbying, either at the time of buying or in the future. Depending on their personal preferences, their willingness to pay for that land may change accordingly and, aggregated across the preferences of many potential buyers and sellers, the value of the land may be lower. Sympathetic development can occur nearby, but the infrastructure remains. This gives both the property owner and the infrastructure owner certainty.

Most importantly, the planning principle of ‘agent of change’ should remain firm in the case of SJ. In summary, this principle applied to residential housing states that the responsibility for removing negative externalities on residential housing only rests with those who cause it if they move to an area where residential housing already occurs (as was the case with the parallel runway at Sydney Airport – the new runway came *after* the surrounding residential development, hence a curfew was imposed). The owners of the residential housing have no claim to compensation or the externality being removed (or removed without adequate compensation to the infrastructure owner) if they move in to an area already subject to that externality, rather than the externality being imposed on them after they moved in.

Canberra Airport’s fear is that these normal planning processes, and the principle of ‘agent of change’ won’t hold in perpetuity in the case of a residential development at SJ. In short, the airports sole fear of residential development at SJ is that what is essentially their rights to the airspace and flight paths as embodied in their 2008 ANEF zones are not secure – that if residential development occurs now at SJ, residents at some point in the future will seek to use political power to change the rules over which the airlines and airport has to operate (and reverse the normal planning principle, where the ‘agent of change’ pays the cost). To avoid this future potential, they (the Airport) seek to prevent any residential development occurring in the flight paths now, at great cost to others and with a significant negative economic impact on the ACT-QCC region.

With Canberra Airport’s flight paths and operations already embodied in the contours generated by the ANEF system, and provided buyers of land at SJ are fully informed of this prior to purchase, there appears to be an extremely remote probability that development at SJ could ever impact on the Airport’s operations.

By ensuring all parties are fully informed prior to purchase, and by ensuring the ‘agent of change’ principle holds firm, the Airport and SJ can coexist.

5.2 Issues with the process

The above discussion has highlighted problems with the process for rezoning land near airports for residential development – and some possible solutions.

There are other issues with process: the current system provides no incentives for airports and airlines to invest in better technology to reduce their noise impacts. Rather, they are allowed to continue emitting noise without any target path or incentive for noise emission reduction. Would enforceable targets for reducing noise emissions per passenger carried by (say) 20% by 2020 result in a better outcome for society as a whole?

In a society where people are trying to reduce their carbon emissions, reduce their water usage, increase their recycling and so forth, it is curious that the aviation industry is able to not only emit noise unabated, but have carte blanche over the amount of noise it will emit in the future. Of course, any such reduction policies need to be carefully assessed and evidence-based, as the Productivity Commission noted in its critique of ‘Zero Waste’ initiatives. If the evidence supports it, there may be a need for the aviation industry to face incentives to improve (and possibly penalties if it does not improve) its noise emission performance, just as every other industry faces – or will face over coming decades – incentives to improve (and penalties if they do not improve) their performance in relation to carbon emissions, water usage and the like.

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Appendix A: Model assumptions and data

Table A.1: Housing affordability and commuting costs model assumptions

Variable	Model Input	Basis	Source
Indexing (per annum):			
Nominal discount rate	5.51%	10 year government bond, 40 day average	Reserve Bank of Australia (www.rba.gov.au)
Average inflation rate	2.36%	10 year government linked bond, 40 day average	Reserve Bank of Australia (www.rba.gov.au)
Average mortgage interest rate	7.28%	RBA standard bank variable home loan rate, 10 year average to July 2009	Reserve Bank of Australia (www.rba.gov.au)
Real capital growth rates (per annum):			
Inner suburbs	1.00%	Assumption	
Urban fringe	0.50%	Assumption	
Loan parameters:			
Term length (years)	30	Assumption	
Typical min deposit, excl fees & duty (% of capital value)	10%	Minimum deposit required	http://www.loanmarket.com.au/home-loans/deposit/
Min equity (% of capital value) to avoid mortgage insurance	20%	Minimum equity required to avoid mortgage insurance	http://www.loanmarket.com.au/home-loans/deposit/
Savings as at 1-Dec-09	\$41,000	Assumption (10% deposit on assumed value of 'affordable' house in urban fringe)	
Legal fees	\$800	Standard fees	www.allhomes.com.au
Loan application fees	\$655	Standard fees	www.allhomes.com.au
Capital (property) values:			
Competitive market, urban fringe	\$410,000	Assumption relative to uncompetitive market	BIS Shrapnel, www.allhomes.com.au
Uncompetitive market, urban fringe	\$450,000	Low end price of house and land package in Casey (new Gungahlin estate)	www.allhomes.com.au
Inner suburbs	\$572,000	Median non-unit property price in Curtin, 2009	www.allhomes.com.au
Rental costs (\$/week):			
2 bedroom house	\$340	Median rent in Kambah (central suburb), 2009	www.allhomes.com.au
3 bedroom house	\$380	Median rent in Kambah (central suburb), 2009	www.allhomes.com.au
Household income and expense:			
Minimum wage (\$/hr)	\$14.31	2009 federal minimum wage	Australian Fair Pay Commission (http://www.fairpay.gov.au/)
Hours worked per week	38	Standard full time worker assumption	
Hours worked per week - part time worker with dependent children, eldest 5 to 14	25	Assumption	
Hours worked per week - part time worker with dependent children, eldest under 5	15	Assumption	
Weekly expenses		Variable dependent on family composition	ABS Cat. No. 6530.0 Household Expenditure Survey, 2003-04
Mean equivalised disposable income		Variable dependent on family composition	ABS Cat No. 6523.0, Household Income and Income Distribution, 2007-08
Travel time related assumptions:			
Commuting costs (\$/km)	\$0.74	Average maintenance costs for ordinary car - 1.6L to 2.6L - 2008-09 tax year	Australian Taxation Office (http://www.ato.gov.au/individuals/content.asp?doc=/content/33874.htm)
Carbon cost (\$/km)	\$0.012	Cost of carbon-equivalent emissions based on current CPRS targets	Australian Greenhouse Office, AE modelling of carbon cost in 2030 of \$50/t
Value of travel time savings (\$/hr)	\$23.54	60% of male total average weekly earnings - excludes part-timers, includes overtime	Refer Appendix B (VTTS literature)

Table A.2: Stamp duty schedule

Value of Property		Base payment	Duty Rate (% property value)	Minimum
Minimum	Maximum			
	\$0		2.00%	\$20
\$100,001	\$200,000	\$2,000	3.50%	
\$200,001	\$300,000	\$5,500	4.00%	
\$300,001	\$500,000	\$9,500	5.50%	
\$500,001	\$1,000,000	\$20,500	5.75%	
\$1,000,001		\$49,250	6.75%	

Source: ACT revenue office - http://www.revenue.act.gov.au/duties/land_and_improvements

Table A.3: Home buyer concession

Dutiable Value		Duty Rate (% property value)	Minimum
Minimum	Maximum		
	\$0		\$20
\$339,501	\$415,000	20.95%	\$20

Dependent children	Income Threshold
0	\$120,000
1	\$123,330
2	\$126,660
3	\$129,990
4	\$133,320
5 or more	\$136,650

Source:http://www.revenue.act.gov.au/home_buyer_assistance/home_buyer_duty_concession/1_july_2009_-_31_december_2009

The home buyer concession is applicable to households whose combined income over the one year time period prior to the home buyer concession grant date is below the relevant income threshold and whose property value is within the dutiable value thresholds

Access Economics in-house forecasting models

Forecast data on key income series, and interest and inflation rate indices are taken from Access Economics in house macroeconomic forecasting model (AEM). The model is based on historical ABS data and forecasts Australian macroeconomic quarterly indicators to June 2020. Average long term rates, as presented in the assumptions table are used to expand the series thereafter.

Value of Time Travel Savings (VTTS)

The VTTS has been extensively researched and documented over the past 30 years. Over this time, a range of quantitative theories and empirical ideas have entered the debate. Most studies, however, that develop estimates of the VTTS for car travel assume that a mean VTTS relating to the driver of the vehicle is the relevant measure of the worth of time savings.

A study conducted at the University of Sydney (ITLS 2006) found that the overall mean VTTS varies with the number of passengers (from \$19.99 to \$13.22 per person hour), declining as the number of passengers increases. Although passengers may well value their own time

savings, the evidence and quantitative analysis for this is limited. Another arm of the debate is the idea that people value consistent time savings more highly than variable time savings. In other words, if the time spent travelling from point A to point B tends to have large deviations either side of the mean then travel time saved is valued less as the individual would still have to leave home at the same time to ensure on-time arrival.

A study at the Queensland University of Technology (QUT 2002), reviewed a wide range of the existing literature on VTTS. The results suggested 40% to 50% of average wage rates seems to be widely accepted for non-business trips (where 'business' trips are those made during employers' time, thus driving to and from work is technically a non-business trip). Business trips tend to be valued more highly at 80% to 100% of the wage rate. The Transport model used by the University for the analysis uses a single value of time of \$12/hr (significantly lower than the ITLS study).

For the purposes of this cost analysis, Access Economics has assumed that the value of travel time savings is 60% of the Male Total Average Weekly Earnings (MTAWE – a commonly accepted estimate for full-time wages) or \$23.54/hr in 2009 dollars.

Commuting Costs

Calculated commuting costs are a function of annual (additional and/or total) distance travelled and time taken driving between the workplace and home, and the assumed unit cost for each measure, indexed over time.

$$Distance\ Costs_t = D \times UC_t \times (1 + f)^t$$

Where, t = time index ($t = 0$ at 2009)

D = distance travelled per annum (kms)

UC = Unit Cost of distance travelled (\$/km)

f = inflation rate per annum

And

$$Travel\ Time\ Costs_t = TT \times UC_t \times (1 + f)^t$$

Where, t = time index ($t = 0$ at 2009)

TT = Travel time per annum (hours)

UC = Unit Cost of time spent travelling (\$/hr)

f = inflation rate per annum

Commuting – carbon costs

The carbon cost added to the direct cost of operating a car is based on the amount of carbon equivalent emissions (ie carbon, nitrous oxide and methane), using the methods in the Australian Greenhouse Office *National Greenhouse Accounts (NGA) Factors*.

The data shows that a car releases around 2.3kg of CO_{2-e} per litre of petrol consumed. For an average car using 10 litres per 100km, that is 230 grams of CO_{2-e} per kilometre. Access Economics modelling of carbon costs in 2030 based on the current Carbon Pollution Reduction Scheme is a cost of \$50 per tonne of CO_{2-e}.

Hence, a car emits \$0.012 per kilometre worth of carbon-equivalents.

Appendix B: Review of Canberra Airport Master Plan

The attached document provides a detailed review of the issues with the Canberra Airport Master Plan and the reasons why the noise levels experienced by residents of South Jerrabomberra are likely to be lower than predicted in the ANEF maps in the Canberra Airport Master Plan.

That noted, even if aircraft noise is similar to the worst case scenario provided by Canberra Airport, the development at SJ is still in the zones considered 'acceptable' and 'conditionally acceptable' under the current Australian Standard for buildings subject to aircraft noise intrusion (AS2021-2000). The proposed noise attenuation measures for houses in SJ ensure the conditions in the Standard are met for houses in the 'conditionally acceptable' zone to be deemed 'acceptable'.

Review of Canberra Airport Preliminary Draft Master Plan and the 'High Noise Corridor' Concept

Report by Access Economics Pty Limited for the
Village Building Co

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GLOSSARY

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ACTPLA	ACT Planning and Land Authority
ANEC	Australian Noise Exposure Concept
ANEF	Australian Noise Exposure Forecast
ANEI	Australian Noise Exposure Index
AQIS	Australian Quarantine and Inspection Service
AS	Australian Standard
CBA	Cost Benefit Analysis
CIA	Canberra International Airport
COAG	Council of Australian Governments
BITRE	Bureau of Infrastructure Transport and Regional Economics (a DoTaRS agency)
DITRDLG	Commonwealth Department of Infrastructure, Transport, Regional Development and Local Government
GA	General Aviation
NPV	Net Present Value
PDMP	Preliminary Draft Master Plan
PUC	Practical Ultimate Capacity
RNP	Required Navigation Performance
RPT	Regular Public Transport (commercial aircraft)
VIP	Aircraft carrying Very Important Persons (eg foreign dignitaries)

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SUMMARY

Canberra International Airport has released a Preliminary Draft Master Plan (PDMP, February 2009) for public comment. Key deficiencies in the PDMP include:

- ❑ The revised PDMP does not adequately address the reasons why the Minister for Infrastructure, Transport, Regional Development and Local Government rejected the previous draft master plan last year. It lacks detail and has many inconsistencies.
- ❑ The noise contours in the PDMP are inconsistent with the air traffic forecasts in the PDMP and are based on many more larger noisier jet aircraft. The noise contours also assume that noisier out-of-production aircraft will still be operating after 2050 and do not allow for recent and expected future technological improvements in the acoustic performance of aircraft.
- ❑ The noise contours in the PDMP relate to the traffic expected 'between 2050 and 2060'. This wide and distant timeframe is not suitably accurate to inform land use and planning decisions. The distant timeframe also reduces accountability – the noise forecast by the airport cannot be compared against actual outcomes until after 2050. ANEF contours for a specific year, eg 2029/30 – and consistent with the traffic forecasts in the PDMP – would better inform land use and planning decisions, and enhance accountability.
- ❑ The airport has advised that they have not undertaken economic analysis or costings to support the projections for night freight operations or that a freight hub will result in lower emissions. The master plan assumes the number freighter jets per night will be 5 in 5 years and 15 in 20 years, resulting in 30 movements at night. This is inconsistent with the noise contours in the master plan which assume 56 freighter jet movements per night including 4 jumbo jet movements. Canberra Airport's projections appear unachievable when compared to Sydney which has 20 freight flights per day.
- ❑ Canberra Airport has existing (and proposes additional) child care centres within ANEF 30, which has unacceptable levels of aircraft noise according to the Australian Standard (AS-2021-2000). Children in child care within ANEF 30 on-airport should be receiving the same standard of care (as specified in AS-2021-2000) as children in child care off-airport. The proposed development at Tralee is compatible with AS-2021-2000. The airport is also proposing a hotel/motel and other public buildings within ANEF 30 which has unacceptable levels of aircraft noise.
- ❑ For land use and planning decisions, a 'High Noise Corridor' concept is proposed by Canberra Airport in place of the current Australian Standard (AS-2021-2000, which uses the ANEF concept). The 'High Noise Corridor' concept was created by Canberra Airport, is not in common use around Australia and is not based on any science. The current Australian Standard is based on decades of scientific and socioeconomic research.
- ❑ The noise contours in the PDMP rely on closing down the general aviation industry at Canberra Airport. Rather, Canberra's GA industry should be protected with a ring fence of 50,000 movements per annum until a suitable alternative GA aerodrome can be developed in close proximity to Canberra. The PDMP and associated noise contours should reflect this GA ring fence until a suitable alternative aerodrome can be established for the GA industry.
- ❑ Due to the substantial changes in the plans for the airport since the runway extension was approved, a fresh Environmental Impact Statement should be prepared before allowing the relocation of the southern runway threshold 450m further to the south.

PART 1: REVIEW OF PDMP

Introduction

The Village Building Co commissioned Access Economics to peer review the Canberra International Airport (CIA) Preliminary Draft Master Plan (PDMP) and the use of the Practical Ultimate Capacity (PUC) concept to generate an Australian Noise Exposure Forecast (ANEF), which in turn is loosely extrapolated into a 'High Noise Corridor'. Part 1 of this review examines the PDMP and Part 2 reviews the PUC traffic assumptions and the 'High Noise Corridor' concept.

Airport traffic – inconsistencies between the 2007 ANEF and the 2009 PDMP

The *Airports Act 1996* stipulates a master planning period of 20 years in s72 and the requirement to produce an ANEF in s71(2)(d). Taken together, this suggests the ANEF should relate to the 20 year planning period (namely 2029/30) rather than the wide and distant timeframe used in the PDMP, where the traffic underpinning the ANEF is reached 'between 2050 and 2060'. A timeframe of four to five decades into the future is not a suitably accurate basis for planning and land use decisions.

Furthermore, the assumptions, business plans and forecasts in the CIA 2009 PDMP are no longer consistent with the assumptions, business plans and forecasts that underpin the 2007 ANEF developed by Rehbein-AOS.¹ Consistency between these reports is essential to ensure land use and planning decisions in surrounding areas are compatible with the 20 year master plan. If the 2007 ANEF is not consistent with the 2009 PDMP, it could result in incorrect decisions being made regarding land uses around CIA.

The inconsistencies are as follows:

- ❑ The plan for General Aviation in Chapter 7 of the 2009 PDMP is inconsistent with the assumptions about GA used by Rehbein-AOS to generate the 2007 ANEF for CIA. The PDMP forecasts a 'significant increase in General Aviation operations'.² Rehbein-AOS assumed GA operations (currently nearly 50,000 movements per annum) would decline to only 1,892 movements per annum in their ultimate capacity ANEF.³ The Rehbein-AOS ANEF assumes the vast majority of aircraft operating at CIA are large jets, which is not consistent with the 2009 PDMP. GA aircraft have a smaller noise footprint than jet aircraft.
- ❑ The passenger forecasts in the 2009 PDMP (Table 5.5), when divided by the aircraft forecasts (Table 5.6) show that in the mid range forecast, there were **77.8 passengers per aircraft** in 2007/08 (ie $2,850,016 \div 36,639$). It remains the nearly the same, at **77.2 passengers per aircraft** in 2029/30 (ie $6,860,566 \div 88,864$), and similarly for the high range and low range forecasts. The mid range forecast for international flights in 2029/30 has an average of only 153.4 passengers per aircraft. Hence, the 2009 traffic forecast in the PDMP is inconsistent with the PUC traffic assumptions used in the 2007 ANEF by Rehbein-AOS (Table 5), which assumes much larger aircraft.

¹ Rehbein-AOS (2007) *Canberra International Airport Practical Ultimate Capacity ANEF* and attachments

² PDMP (2009) page 86

³ Rehbein-AOS (2007) Table 5, page 14

- ❑ The mid range forecast of 2,493 international flights per annum by 2029/30 in the 2009 PDMP is inconsistent with the ultimate capacity forecast of 25,106 international flights used by Rehbein-AOS in the 2007 ANEF. CIA expect to reach the PUC level of traffic 'between 2050 and 2060'. It would require compounding growth in international flights of more than 12% per annum from 2029/30 to 2049/50 in order to achieve this. By way of comparison, BITRE data shows international aircraft movements at all Australian airports averaged growth of 2.7% per annum over the decade 1997/98 to 2007/08.
- ❑ The sum of all non-RPT aircraft movements (GA, freight, military, etc) in the Rehbein-AOS report has 32,280 non-RPT aircraft movements per annum, which CIA expects to reach between 2050 and 2060. This is inconsistent with the mid-range forecast of 65,308 non-RPT flights per annum in 2029/30 in Table 5.6 of the PDMP. In other words, the PDMP forecasts a growing GA / non-RPT industry at CIA, whereas the 2007 ANEF assumes a declining GA / non-RPT industry at CIA.
- ❑ The overnight freight concept in the PDMP (Table 6.3) places a figure of 15 jet aircraft per night in 20 years. This would equate to 10,950 movements per annum (ie $15 \times 2 \times 365$), compared with the Rehbein-AOS assumption of 20,574 night time freight jet movements. This large discrepancy in night time movements is further compounded by the high weight given to night time movements in creating the noise exposure contours.
- ❑ The timeframe for the PUC, expected 'between 2050 and 2060', is no longer sufficiently accurate or specific to meet the Airservices guidelines of producing an ANEF "for a particular year" or "progressive stages in the development of an airport within a definite time horizon".⁴ As such, Airservices Australia should be asked to confirm whether the endorsement given in 2008 still stands, due to the changes in the underlying plans, assumptions and timeframes in the 2009 PDMP.
- ❑ Access Economics has noted in the past (and is cited in the PDMP) that CIA could attract services to a select number of destinations, such as Singapore and Auckland. However, the development of a large number of international routes remains unlikely. As such, any impression that Access Economics agrees with its international flight forecasts in the PDMP is not correct.
- ❑ Rather than allow for the trend of newer, quieter aircraft, the ANEF contours produced by Rehbein-AOS, and in turn the 'High Noise Corridor', assumes a range of old aircraft, such as B757-200 and MD-11, will be operating at night. The PDMP expects the PUC to be reached 'between 2050 and 2060'. Production of the B757-200 ceased in 2005 and production of the MD-11 ceased in 2000, so the aircraft assumed by Rehbein would be more than fifty years old by the time the PUC is reached. A more plausible ANEF would use more modern aircraft that are still in production and thus more likely to be still in service in several decades.
- ❑ The achievement of the level of traffic underpinning the ANEF relies heavily on the relocation of the main runway threshold to 450m south of its current location. Due to the substantial changes in the plans for the airport since the runway extension was approved (with the Conditions of Approval at the time) a new Environment Impact Statement (EIS) should be required prior to relocating the runway threshold.

While Airservices Australia may have endorsed the 2007 ANEF used in the rejected 2008 PDMP, the 2009 PDMP has made several changes to the timelines and interim forecasts,

⁴ http://www.airservicesaustralia.com/aviationenvironment/noise/docs/aus_noise_contours.pdf

such that the assumptions underlying the 2007 ANEF developed by Rehbein-AOS is no longer consistent with the content of the 2009 PDMP.

Recommendation: a new ANEF should be prepared for CIA, for the year 2029/30 using a mix of jet and turbo prop traffic that is consistent with the GA, freight and RPT forecasts in the PDMP. Only newer aircraft that are still in production should be used to calculate the ANEF contours in 2029/30 and beyond.

Recommendation: the Minister should ring fence 50,000 GA movements at CIA until a suitable alternative GA aerodrome is developed in close proximity to Canberra, to prevent the planned decline in GA movements to 1,892, as forecast in the PDMP ANEF.

Recommendation: due to substantial changes in the plans for the airport, the Minister (in conjunction with the Minister for the Environment) should seek a new EIS before allowing the southern runway threshold to be relocated.

Recommendation: the Minister should issue regulations (as allowed for in s71(2)(d) but currently not in place) to clarify that an ANEF should relate to the 20 year *planning period* (ie currently 2029/30 in the case of CIA) and that the ANEF should be consistent with the 20 year business plans and forecasts contained in the master plan.

Recommendation: the Minister should implement a process that draws on the skills of both BITRE and Airservices Australia to independently assess the reasonableness and plausibility of the traffic forecasts and modelling that underpin the ANEF and the consistency of those forecasts with the contents and planning period of the master plan, prior to approving the master plan. Airservices Australia should be asked whether the 2008 endorsement still stands, given the revised plans and timelines in the PDMP.

Other issues identified in the CIA PDMP

The proposed development at Tralee is consistent with the ANEF contours in the PDMP, as required in Australian Standard 2021-2000. That noted, the PDMP proposes further restrictions on a larger geographical area based on a new concept of a 'High Noise Corridor'. The 'High Noise Corridor' is a concept created by CIA, which is not in common use and is not defined in any Australian Standard. Any move away from the current Australian Standard 2021-2000 should be the subject of a rigorous regulatory impact statement and cost benefit analysis.

With one company seeking to impose an encumbrance on an asset of another company (beyond the current standards in AS-2021-2000), the master plan process allows the Minister to adjudicate as to whether society as a whole is better off as a result of the additional encumbrance, and presumably any compensation required due to the imposition of the additional encumbrance – and in the same way that a favourable rezoning results in a 'betterment levy', an unfavourable rezoning should result in compensation.

- ❑ In weighing the competing interests, the PUC level of traffic that generates the ANEF contours (and the wider area in the 'High Noise Corridor') in the PDMP is expected by CIA to be reached between 2050 and 2060. In net present value terms, this would be heavily discounted. However, the encumbrance on Tralee is having a current and ongoing impact. The trade off between distant benefits versus actual current costs needs to be made with care.

- ❑ Indeed, s71(2)(e) in the *Airports Act 1996* suggests the onus is on the airport lessee company to manage and mitigate noise intrusion.
- ❑ The PMDP provides a range of alternative uses for each precinct, which makes it difficult to assess which developments CIA intends for each precinct. The PDMP does not appear to have the level of detail required in section 5.02(2) of the *Airports Regulations (1997)*.
- ❑ The PDMP states that the proposed development at Tralee would lead to 'noise sharing' over suburbs of Queanbeyan and Canberra. This is inconsistent with Airservices Australia's principles for noise sharing.⁵ Airservices Australia's principles and procedures are a pragmatic response to the difficult political and socioeconomic issues surrounding aircraft noise. Principle 11 states:

In deciding between mutually exclusive, but otherwise equivalent options, involving

(i) the overflight of an area which has previously been exposed to aircraft noise for a considerable period of time (and which a large proportion of residents would therefore have been aware of the noise before moving in); or

(ii) a newly exposed area,

option (i) should be chosen.

This Principle makes it very clear that residents moving into Tralee would not be able to achieve noise sharing over areas that are not currently subject to aircraft noise. Hence, Figure 14.2 in the PDMP (which shows noise sharing over newly exposed areas in Tuggeranong, Queanbeyan and North Canberra as a result of the development at Tralee) is inconsistent with Airservices Australia's Principles for noise sharing, which would clearly chose overflight option (i), namely Tralee. As such, Figure 14.2 in the PDMP is invalid.

Freight hub and Sydney overflow concepts

The CIA PDMP contains proposals for a freight hub and for CIA to act as an overflow airport for Sydney. A range of issues with these concepts are listed below.

- ❑ The development of a freight hub at CIA could result in stranded assets at other airports. Australians (mainly through their super funds) have invested considerable sums in specialised freight facilities at various airports around Australia. Government support of the CIA hub proposal (while generating investment in the Canberra region) could result in wasteful duplication of existing infrastructure, causing assets elsewhere in Australia to become redundant. Furthermore, any jobs created at the CIA hub may simply displace jobs lost at other freight facilities, rather than creating 'new' jobs. The hub may also cause an unnecessary duplication of existing Government infrastructure (such as AQIS and Customs facilities). There may also be costs associated with relocating AQIS and Customs staff to Canberra.
- ❑ The PDMP asserts that a freight hub would be more efficient and generate lower emissions than a 'network-based' system. No evidence, costing or modelling is provided to support this conclusion. To the contrary, the most efficient method of

⁵ Airservices Australia (1997, revised 2002) *Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise*, and as detailed in Wilkinson Murray (2003) *The Tralee Development and "Noise Sharing" at Canberra International Airport*

transporting people and freight is almost always to fly point-to-point (as low-cost carriers have demonstrated). Hubs only generate efficiencies where there is insufficient demand to fill an aircraft – in this case, a hub creates efficiencies by aggregating demand on uneconomic routes into a minimum efficient scale. Other than in circumstances where this ‘demand aggregation’ benefit exists (which does not appear to be the case for the CIA freight hub proposal), a hub-based model would be expected to increase fuel consumption and emissions compared with flying point-to-point. Thus, the claims of lower emissions in the PDMP should be heavily discounted.

- ❑ The PDMP asserts that a high speed rail link would cost less than building a new airport elsewhere. This assumption is not supported by any evidence or modelling, and runs counter to previous costs estimates of building a high speed train between Canberra and Sydney. Furthermore, the actual construction costs of recent conventional railways, such as the Alice-Darwin railway and the Victorian regional fast rail projects, were very expensive compared with the cost of the new terminal at Adelaide Airport and the estimated cost of the new parallel runway at Brisbane Airport. The land acquisition cost of a railway corridor is also likely to be high. Hence, it is likely that a new terminal at (say) Goulburn could be built at lower cost than a high speed rail link to Canberra.
- ❑ Sydney Airport has considerable scope to accommodate the needs of Sydney for the foreseeable future. Many routes in and out of Sydney use relatively small aircraft (such as B737), which can increase over time to larger aircraft types in order to accommodate more passengers. Sydney still has a large amount of transit/transfer traffic (such as passengers flying MEL-SYD-LAX). Over time, as Sydney becomes more congested, it will increasingly serve origin-destination traffic (such as SYD-LAX) rather than transit/transfer traffic, resulting in more direct flights to those locations that are currently transiting through Sydney (such as MEL-LAX), which in turn frees up space on the SYD-LAX flight for origin-destination traffic. The drop in travel demand due to the global financial crisis may also push back the timeframes for when Sydney becomes ‘full’.
- ❑ To the extent that CIA initiatives such a freight hub or a second Sydney airport occur naturally through airlines and passengers voting with their feet (and wallets), then those market forces should be allowed to play out. The government should not distort the market with government funding or government declarations of support, without a thorough and independent feasibility study into these proposals. The detail in the PDMP is inadequate for deciding whether a Sydney overflow or national freight hub at CIA is in the national interest.
- ❑ A greater recognition of the uncertainties around demand forecasting would be appropriate, given the difficulty of the task. For example, the Brindabella Business Park website⁶ indicates there is 23,725m² of vacant office space available for lease, with a further 34,000m² under construction and available from June 2009. The Majura Park precinct has a further 36,376m² of vacant space available now or soon to be completed and the Fairbairn precinct has 8,334m² of vacant space. In total there is 102,435m² of vacant office space currently listed at CIA. This apparent over-supply raises questions about the ability of the lessee company to forecast the needs or demands for developments on the airport site.

Objective 2 of the PDMP is to “*Develop Canberra International Airport as a multi-modal transport hub for passenger and freight connections*”. Objective 7 is “*Being in a position to*

⁶ <http://www.brindabellabusinesspark.com.au>, as at 4 March 2009

meet the needs of Sydney Airport users, including overflow domestic and international passenger and freight services". The development plans are large-scale with significant potential impacts for the ACT and its region.

Airports are a crucial part of the infrastructure of a modern economy. The primary economic function and wider social importance of airports is to facilitate the efficient movement of people and freight in and out of the region it serves.

A balance needs to be struck between the aviation services needed by the local community and the implications of developments for planning, infrastructure provision, traffic congestion and aircraft noise. The main economic value of the airport to the ACT community is the availability of convenient direct flights to a range of destinations. Over time, the airport is likely to attract direct flights to more Australian cities and some selected international destinations such as Auckland and Singapore. This will be of considerable benefit to residents of the Canberra region.

However, the development of a large amount of transit/transfer traffic (which is what characterises a 'hub'), is of little benefit to the Canberra region.

Recommendation: if a national freight hub or Sydney overflow develops at CIA naturally, through market forces, then so be it. However, a far more rigorous feasibility study is required before the Government should intervene to help achieve, promote or declare support for a national freight hub or Sydney overflow at CIA. As such, the PDMP cannot be endorsed in its current form.

Recommendation: the priority of CIA should be on serving the Canberra region with a wide range of convenient direct flights. Attracting transit/transfer (ie hubbing) traffic generates few benefits (and a lot of noise) for the Canberra region, so should be given a low priority.

Other issues with the PDMP

- ❑ Chapter 10 of the PDMP proposes child care, hotel/motel developments and other public buildings which appear to be in precincts that are inside the ANEF 30 contour in Chapter 14. As noted above, the ANEF needs redoing, but if the revised ANEF showed a similar noise level in those precincts, those developments would be deemed as 'unacceptable' based on AS 2021 - 2000. Children in the existing and planned child care facilities on-airport should received the same protection under AS-2021-2000 as children in child care off-airport.
- ❑ The PDMP has many overlapping proposals, with each precinct being marked for several alternative developments. For example, at various places in the PDMP, the Fairbairn apron is proposed for freight, GA or VIP operations. It is unclear from the PDMP what developments will ultimately occur where. Regulation 5.02(2) requires the master plan to have *"the detail equivalent to that required by ... the State or Territory in which the airport is located"*. As such, the views of ACTPLA should be sought to confirm the CIA PDMP indeed contains the level of detail required by ACTPLA (being the relevant body for planning in the ACT).
- ❑ The PDMP proposes an In Bond / Tax Free Zone. Approval of this is beyond the Ministers powers under the *Airports Act 1996*, as it would require approvals from the Commonwealth (for income tax and excise), the ACT Government (for payroll tax) and COAG (for the GST). Such approvals are highly unlikely, as it would allow businesses to operate in a location where they benefit from the national security, infrastructure,

political stability and skilled workforce available in Australia, without contributing to the cost of providing those benefits.

Recommendation: the Minister should not approve a plan that includes hotel/motel and child care facilities within ANEF 30. Children in care on-airport should receive the same protections as children in care off-airport, as provided in AS-2021-2000. The Minister should seek the views of ACTPLA in relation to the level of detail required in regulation 5.02(2). The Minister does not have the powers to approve a PDMP that includes an In Bond / Tax Free Zone.

PART 2: REVIEW OF THE 'HIGH NOISE CORRIDOR'

Part 2 of this review examines in detail the appropriateness of the Practical Ultimate Capacity (PUC) traffic assumptions,⁷ the resulting Australian Noise Exposure Forecast (ANEF) for Canberra International Airport (CIA), and the 'High Noise Corridor' proposed by CIA as the basis for land use and planning decisions.

As noted in Part 1, the traffic forecasts underpinning the 2007 PUC are no longer consistent with the traffic forecasts in the 2009 PDMP. Even so, the proposed development at Tralee (also known as South Jerrabomberra) has been amended to ensure it is consistent with the PUC ANEF contours as described in the Australia Standard 2021-2000.

The PDMP then goes further than the current Australian Standard, proposing additional restrictions on a larger geographical area based on the concept of a 'High Noise Corridor'. This raises the question of whether the 'High Noise Corridor' concept is more appropriate than the current Australian Standard for land use and planning in the vicinity of licensed airports.

Summary

The provision of airport infrastructure uses a considerable amount of society's resources – large amounts of land, earthworks, concrete and so forth – in order to provide services to airlines. Long term planning is important to ensure long-lived assets on the airport site are developed in a logic and efficient manner. Planning is further complicated by local, state, territory and commonwealth governments all having an interest in the decisions made.

The living standards of society tend to be higher when people make decisions based on the true and full costs and benefits to society of their decisions. Access Economics has previously argued that airline passengers should pay prices that reflect the full opportunity cost of the resources required to provide airport services (including the opportunity cost of airport land).⁸ CIA has suggested that land in the 'High Noise Corridor' be reserved for land uses such as agricultural and light industrial land uses. The 'High Noise Corridor' covers a larger area than the ANEF 20 contour and is more onerous than the current Australian Standard (AS-2021-2000). If more land is required for airport operations, markets exist that allow land to be purchased and reserved for aviation purposes, with the costs passed on to airline passengers and airfreight consignors at its opportunity cost.

Rather than CIA just buying up the land it claims it needs to support its future development, the government has been asked to consider intervening to restrict residential land release at Tralee beyond the existing ANEF contours as specified in AS-2021-2000. Any such proposal should be tested for validity and subjected to a rigorous cost benefit analysis (CBA). The 'High Noise Corridor' is not the correct tool for informing decisions on how to best maximise the wellbeing of society – CBA, when done properly and based on valid assumptions is the correct tool. AS-2021-2000 is based on decades of scientific and socioeconomic research and development, whereas the 'High Noise Corridor' has no scientific rigor.

⁷ Rehbein AOS (2007) *Canberra International Airport Practical Ultimate Capacity ANEF*

⁸ Access Economics (2005) *The Value of Airport Land*, and Access Economics (2006) *Implementing an Opportunity Cost Valuation of Airport Land*

The results of the CBA would then feed into a full regulatory impact statement before a change to the current Australian Standard could be made. The changes proposed by CIA (to change AS-2021-2000 to use the 'High Noise Corridor' concept rather than ANEF contours) would have to be subject to a full regulatory impact statement and signed off by the Office of Best Practice Regulation before the Minister could approve the PDMP as it currently stands.

Specific issues with the 'High Noise Corridor'

The 'High Noise Corridor' is an irregular geographical area, loosely based on the ANEF 20 contour, which in turn is generated from the PUC traffic assumptions. That is, a series of extrapolations are needed to arrive at the 'High Noise Corridor'. The 'High Noise Corridor' does not appear to be based on any scientific method and is not used at any other airports. The 'High Noise Corridor' has unusually straight lines and square corners – it does not appear to follow undulations in terrain nor aircraft flight paths.

Canberra currently has 88,942 fixed wing aircraft movements per annum, of which 39,629 per annum are RPT aircraft movements.⁹ The rest (49,313 per annum) are mostly GA aircraft (below 7 tonnes), with a few thousand military and VIP movements. RPT aircraft movements at CIA have been flat, at between 35,000 and 40,000 for the past seven years.

The level of fixed wing movements in the CIA PUC (282,120 movements a year)¹⁰ is similar to the current level of fixed wing traffic at Sydney Airport (295,768 in the 2008 calendar year).¹¹ The CIA PUC of 282,120 aircraft movements is comprised of 274,292 RPT and dedicated freighter movements. This suggests only 7,828 GA, military, VIP and training flights will be accommodated when CIA reaches its PUC, a significant reduction on current levels for those sectors of the aviation industry. It is unclear where this displaced activity will be relocated. The costs of this relocation should be included in any CBA. The seven-fold increase in RPT and freight movements may take a very long time to achieve, making the associated benefits small in NPV terms. Even the CIA forecast of 'between 2050 and 2060' requires four decades of uninterrupted economic growth (the Australian Bureau of Statistics recently reported that the ACT economy was in recession in the second half of 2008). The forecasts also seem to ignore the introduction of the Carbon Pollution Reduction Scheme and the impact of this on airfares.

Against this, there are immediate constraints on the development of new residential land releases. The proposed development at Tralee is close to major urban centres and major transport corridors. The housing affordability issues in the ACT region are a more immediate and pressing issue, and have been extensively documented.¹²

Other issues with the PUC ANEF are as follows:

- ❑ The recent extension and strengthening of the main runway to accommodate VIP and military aircraft at CIA required a large subsidy from the previous Government. This presumably meant the extension was unviable under the normal method of airlines paying airport charges to generate a fair return on airport infrastructure. The claim by

⁹ Airservices Australia *Movements at Australian Airports 2008* for total movements and BTRE *Airport Traffic* data 2007-08 for RPT movements.

¹⁰ *Canberra International Airport Practical Ultimate Capacity ANEF*, Rehbein AOS, 28 May 2007

¹¹ *Movements at Australian Airports*, Airservices Australia, Canberra, 28 Jan 2009

¹² Access Economics (October 2006) *Residential and industrial Land Demand Forecast: Canberra and Queanbeyan*

CIA that there is now sufficient traffic to prevent the development at Tralee is difficult to reconcile with the lack of traffic that made the extension unviable without a subsidy.

- ❑ The Brisbane Airport EIS for the new parallel runway concluded a PUC of around 256,000 in the do nothing scenario of not building the parallel runway. While it is difficult to compare across airports, Brisbane Airport is currently broadly similar to CIA (with one main runway and a cross runway). The CIA PUC is similar to the current level of traffic at Sydney Airport (which has three runways). CIA also has fog issues.
- ❑ The Rehbein-AOS methodology for calculating the PUC ANEF uses the AS-2021 definition of 'night' as 7pm to 7am, with a multiplier of 4.0 is used on 'night' movements (ie the noise from a 'night' movement generates four times more noise impact than a 'day' movement). The traffic forecasts have a large number of flights between 6am to 7am. By assuming a large number of flights at this time, it allows those flights to have 4 times greater weight. A sensitivity analysis, where the morning peak occurs instead between 7am to 8am, would be useful to ensure the traffic assumptions have not been 'gamed' to place as much traffic as possible into the highly weighted 'night' period.
- ❑ The ANEF is the combination of three underlying ANEC plots. Rather than using a weighted average to combine these ANEC plots, the ANEF contour is the outer envelope of all three ANEC plots: $ANEF = \text{MAX}(ANEC_1, ANEC_2, ANEC_3)$. This causes the area within the ANEF contours to be larger than (rather than an average of) the underlying ANEC contours, thus maximising the size of the ANEF. The 'High Noise Contour' then goes further by adding additional land to this already outer envelope.
- ❑ According to CIA, the PUC level of traffic will take around four decades to occur. Aircraft technology is rapidly evolving. The noise of jets has improved considerably compared with several decades ago and significant research is being done on improving the noise output of the next generation of aircraft.
- ❑ The PUC has a large number of wide-body aircraft arriving at night. This is at odds with typical daily distributions at other non-curfew airports such as Brisbane.
- ❑ The number of dedicated freighters in the CIA PUC is around four times higher than the current number of dedicated freighters at Sydney.
- ❑ Concerns surrounding the CIA forecasting methodology have been raised on several occasions in the past.¹³
- ❑ An independent review of the forecasts (focusing on demand rather than capacity) and the CBA of residential land release would be beneficial. Airservices Australia has strong expertise in a range of aviation areas and noise modelling, but in the case of traffic forecasting and CBA, a more appropriate agency to be tasked to review these would be the BITRE.

¹³ See for example Access Economics (2003) *Review of Canberra Airport Traffic Forecasts*

CONTEXT AND CURRENT TRAFFIC

CIA is an important part of the transport system for Canberra and the surrounding region. It provides services to leisure, business and government travellers to a number of destinations. There are currently direct flights between Sydney, Melbourne, Brisbane, Adelaide, Perth, Newcastle and Albury. The airlines serving CIA are Qantas, QantasLink, Virgin Blue and Brindabella Airlines. Tiger Airways has recently commenced services to CIA. JetStar does not currently operate to CIA.

CIA has scope to attract direct flights to some international destinations,¹⁴ though currently does not have any regular international flights. The airport has also developed a business park – which has provided an alternative to Canberra’s traditional town centres, particularly for aviation-related businesses – and retail space with the opening of Brand Depot. The airport also plans to grow its aviation business, by undertaking capital upgrades to the airport terminal and associated infrastructure.

The main runway at CIA was recently extended and strengthened to accommodate large VIP and military aircraft. This upgrade was subsidised by the Commonwealth Government to ensure the airport can accommodate the aircraft of official visitors, such as Air Force One. The PUC assumes total VIP/Military movements of 2,776 per annum, of which 238 per annum would be by VIPs using Boeing 747 aircraft. There are not enough foreign dignitaries with a B747 to make this number plausible. The President of the United States only visits Canberra around once a decade.

The government subsidy for the runway upgrade was required (presumably) because it was not commercially viable for CIA to fund the upgrade based on the traffic growth expectations at the time (as recently as 2005). That is, the upgrade would not have occurred if it was left to the normal market mechanism¹⁵ of airlines (and other visiting aircraft) paying airport charges to ensure a fair return on investments in airport infrastructure.

Importantly, the runway extension has not changed the physical location of the runway for GA and RPT aircraft – the extension is not used as part of normal operations. The PUC ANEF is based on RPT aircraft utilising a part of the runway which is not currently approved for RPT use. Due to the significant changes in plans for the airport, the 450m southern relocation of the runway threshold should be subject to a new EIS. In any case, existing approvals may have lapsed.

CIA now has plans to make the airport a freight and tourism hub, using its newly extended runway to act as an overflow for Sydney Airport. There are similar overflow aspirations at airports such as Bankstown, Goulbourn, Newcastle and Wollongong.

In recent years, CIA has worked with its major users (Qantas and Virgin Blue) to develop the Required Navigation Performance (RNP) to move flights from directly over Jerrabomberra. Aircraft noise issues have caused a delay in the development of residential lands west of Jerrabomberra, including the site at Tralee.

¹⁴ Access Economics (2005) *The Potential Demand for Direct International Flights between Canberra and Singapore*

¹⁵ See, for example, Productivity Commission (2007) *Review of Price Regulation of Airport Services* and ACCC Decisions relating to Canberra Airport at www.accc.gov.au

The divisions west of Jerrabomberra also include Environa and Poplars and in total constitute just under 5,000 potential dwellings. These are complimented with the land division of Googong south of Queanbeyan.¹⁶ The Googong development has the potential of about 5,500 dwellings¹⁷ and is in less conflict with the current and projected flight paths of the airport, though is further from major transport corridors, such as the Monaro Highway, and is further from the employment areas of Civic, Woden and Tuggeranong. In any case, around 1,900 dwellings per annum are required in the ACT region to support population growth over the next few decades¹⁸ so fully developing all of these sites equates to just under 6 years of land supply for the region.

Currently 65%¹⁹ of the residents of Queanbeyan and Jerrabomberra commute to Canberra for work, with the Monaro Highway, Canberra Avenue and Pialligo Avenue acting as the main arterial roads into Canberra. The agricultural land around the Monaro Highway through Symonston and into Molonglo Gorge offer a natural buffer to aircraft noise in the flight path. The ACT government (and previous planners) have sought to use these lands for industrial purposes that include Fyshwick and Hume, the SouthCare helicopter base and the Canberra jail. Farther from the airport the residential area of Jerrabomberra sits near the current flight path. The Tralee site is between 8km and 12km south of the end of the main runway.

The ANEF contours based on the practical ultimate capacity (PUC) of the airport is one metric in a series of measures that have been developed to determine the environmental impact of an airport on adjacent lands. The ANEF assessment based on PUC sits in the context of an array of measures implemented by the Australian Government after the sub-optimal measures used for the Sydney Airport extension of the late 1980s. The system was adopted from the Noise Measurement Index (NMI) used by the United States Federal Aviation Authority. The suit of measures adopted by Airservices Australia include,

- Australian Noise Exposure Forecast (ANEF);
- Australian Noise Exposure Index (ANEI); and,
- Australian Noise Exposure Concept (ANEC).

The output of the measures is a series of 'contours' designed to give an insight into the noise impact of aircraft. Of most interest is the ANEF based on the PUC and for a particular year into the future. ANEF contours can be produced by converting ANEC data into ANEF information. Beyond these contours, CIA has added a 'High Noise Corridor', loosely based on the PUC ANEF.

SPECIFIC ISSUES WITH THE 'HIGH NOISE CORRIDOR'

The PUC, on which the 'High Noise Corridor' is loosely based, is a measure of capacity, rather than demand. It measures the number of aircraft that could theoretically take off or land every hour. The key parameters are 36.47 movements per hour for the 19 hours between 5am and midnight, and an arbitrary 80 movements during the 5-hour period from midnight to 5am. This is grossed up to an annual figure by multiplying by 365. Hence, the PUC of 282,120 is derived from the following formula (numbers are rounded):

¹⁶ NSW Department of Planning (2007) *Queanbeyan City Council Residential and Economic Strategy 2031* and the subsequent *Addendum Report* (December 2008).

¹⁷ Ibid

¹⁸ Access Economics (2006) *Residential and Industrial Land Demand Forecast: Canberra and Queanbeyan*

¹⁹ NSW Department of Planning (2007 and 2008).

$$\text{PUC} = 282,120 = (\{ 36.47 \text{ movements} \times 19 \text{ hours} \} + 80 \text{ movements}) \times 365$$

The Rehbein-AOS report says nothing about whether there will ever be sufficient demand for air travel and airfreight to make this many flights commercially viable, nor the timeframe for demand to reach capacity. The PDMP expects this level of traffic to be reached in a wide and distant timeframe of 'between 2050 and 2060', however, no economic modelling is provided to support this demand projection.

The CIA PUC of 282,120 fixed wing movements a year, plus 2,920 rotary movements a year, is a very large amount of traffic for an airport with one main runway and a small cross runway. Gatwick Airport, near London, is one of the busiest single-runway airports in the world, with 32.7 million passengers on 261,274 aircraft movements.²⁰ Gatwick is one of several airports serving the London metropolitan area, which has a population of around 14 million people (depending on the definition of 'London').

In the 2006 calendar year, Airservices reported 167,244 movements at Brisbane airport (including 1,332 helicopters). Brisbane is nearing full capacity and is planning a parallel runway. The Environmental Impact Statement for the New Parallel Runway at Brisbane Airport estimated a PUC of its existing runway system of 256,000.²¹ While it is difficult to compare airports, as every airport has unique weather patterns and mix of aircraft, that noted, Brisbane Airport's currently runway system is broadly similar to CIA.

The PUC of CIA's two runway system is similar to the current level of traffic using Sydney Airport's three runway system. In the 2008 calendar year, Sydney Airport had 295,768 fixed wing and 5,984 rotary movements (301,752 aircraft movements in total), so CIA's PUC has more fixed-wing movements than Sydney currently attracts. Rotary movements are not as relevant for runway capacity and noise (though they do add to congestion in the surrounding airspace).

The large number of wide-body aircraft arriving at night is different to the pattern at other non-curfew airports such as Brisbane. The daily profile of aircraft arrivals and departures at Brisbane shows that virtually all movements each day occur between 6am and 9pm, due to the passenger demand for travelling at these times and other operational issues.²²

The number of dedicated freighter movements in the CIA PUC is more than three times higher (at 24,452 in the Rehbein-AOS report) than the number of dedicated freighters per annum currently operating at Sydney Airport (7,475).²³ The NSW Department of Planning notes:

Given that Canberra Airport currently operates under a single runway for jet operations it is hard to see how the airport can practically achieve the growth projected. This would, for example, involve 24 hour operations with approximately 2 minute gaps – whereas Sydney Airport, with 2 runways in operation has a 6 minute gap and a shorter flight window.²⁴

²⁰ Gatwick Airport (2006) *Interim Master Plan*

²¹ See Table 2.6g on page A2-62 in A2.pdf at <http://www.newparallelrunway.com.au>

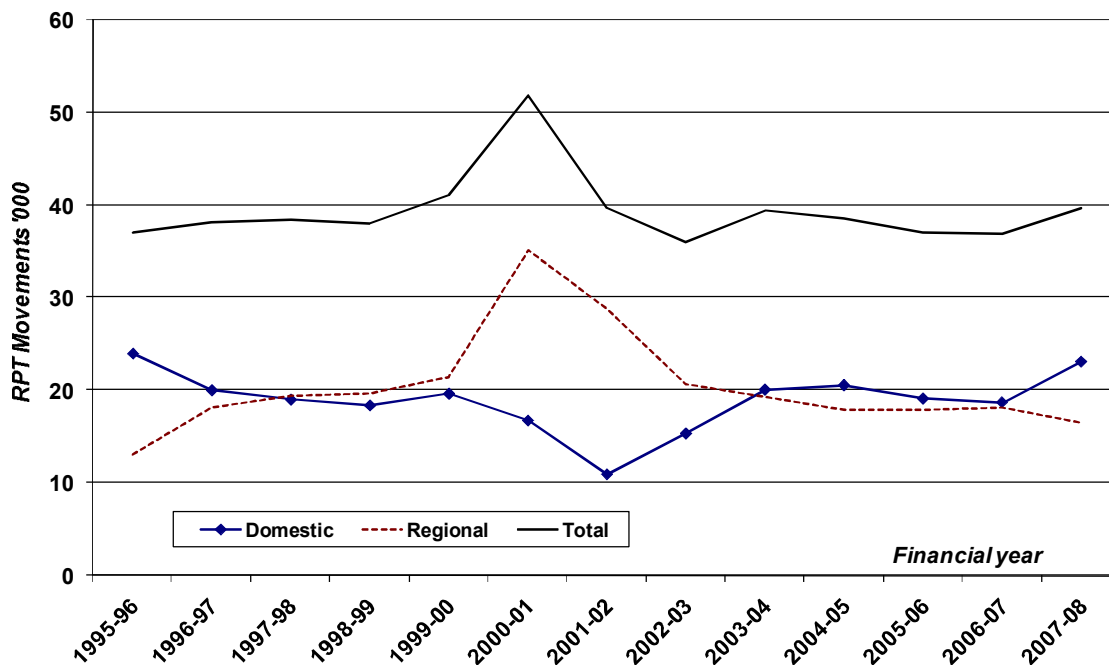
²² See figure 2.5f on page A2-57 in A2.pdf at <http://www.newparallelrunway.com.au>

²³ See fact sheets at <http://www.sydneyairport.com.au>

²⁴ NSW Department of Planning (2007) *Queanbeyan City Council Residential and Economic Strategy 2031*

Figure 1 outlines the use of the airport in the previous 12 years from 1995-96 to 2007-08. Aside from the one-off effect of the Sydney Olympics, the airport has shown little growth, with total commercial (RPT) aircraft movements relatively flat, remaining between 35,000 and 40,000 over the past seven years.

FIGURE 1: MOVEMENTS AT CANBERRA INTERNATIONAL AIRPORT



Source: BITRE

Future outlook

It would require compound growth in movements of more than 10% per annum for demand to reach PUC in two decades. At a more moderate growth rate (though still rapid compared with the past decade) of 5% per annum, it would take more than four decades of continuous economic growth for demand to reach PUC.

The population of Sydney is currently around 4.3 million and Brisbane is around 1.9 million. The ACT has a population of 330,000 (with around 380,000 in the wider ACT-Queanbeyan region) and is projected to grow to about 380,000 over the next 20 years (446,000 including Queanbeyan).

Sydney Airport has around 33 million passenger movements on its 295,768 fixed wing aircraft movements.²⁵ The Rehbein-AOS PUC report does not mention passengers, though to fill the PUC aircraft movements at CIA (even after allowing for movements by dedicated freight aircraft) would require in the order of 25 million to 30 million passengers per annum originating from or destined for the Canberra region. Some of this traffic could be connecting (transit/transfer) traffic, but given the preferences of passengers for direct flights, a large proportion of connecting flights hubbing through Canberra may be difficult to attract. The hub-and-spoke model of full service airlines is unlikely to be the source of most future

²⁵ MAp airport traffic ASX releases and movement data from Airservices Australia

growth, with the point-to-point model of low cost carriers such as Virgin Blue, JetStar and Tiger Airways, likely to be the main source of future growth.

COST BENEFIT ANALYSIS AND THE 'HIGH NOISE CORRIDOR'

The 'High Noise Corridor', based loosely on the outer extremities of the PUC ANEF 20 contour, is being put forward as the basis for determining residential land release. The Tralee development is consistent with AS-2021-2000 guidelines on acceptable developments within the ANEF contours in the PDMP, but is within the area that CIA refers to as the 'High Noise Corridor'.

The adoption of the new 'High Noise Corridor' concept, rather than the accepted standards in AS-2021-2000, requires careful consideration.

Cost benefit analysis (CBA), when done properly, allows policy makers to balance the costs imposed and the benefits that flow to the community from a policy decision or a change in regulations, relative to a 'do nothing' scenario (in this case, the existing system in AS-2021-2000). Using the 'High Noise Corridor' as the metric for determining land release is unlikely to result in an optimal outcome. The 'High Noise Corridor' is not the correct tool for informing decisions on how to best maximise the wellbeing of society – CBA (done properly) is the correct tool to guide any decision to move away from AS-2021-2000.

Changing Technology

A rigorous CBA would need to take into account changing technology. Aircraft noise has been reducing at a steady rate from the early inception of jet aircraft (see Appendix). Boeing and some of its partners have joined the effort to make a quieter aircraft in their Quiet Technology Demonstrator (QTD) program and follow-up initiative QTD2. To reduce noise QTD and QTD2 have focused on improving technology in the;

- Engine (includes larger, slower fans);
- Nacelle (cowling that houses the engine);
- Chevrons (saw cut panels aft of the engine designed to direct air); and,
- Airframe (include the wings and landing gear).²⁶

Improvements are also being made in aerodynamics and the measurements used. Boeing research now includes the ability to pinpoint where the design flaws are and actively change design to reduce environmental impact; this process is called phased array.²⁷ While testing the 777, using the phased array technology, Boeing discovered an element on the wing was making a "whistling sound". Boeing were able to design another element that did not make the whistling sound, thus reducing the noise impact.

Future aircraft may also benefit from current research being undertaken – again using phased array technology – in active chevron design and join-less nacelle liner, the former designed to augment airflow and the latter designed to increase the noise retarding abilities of the engine cover.²⁸

²⁶ Boeing (2007) *Backgrounder Boeing Quiet Noise Technology Initiatives*
<http://www.boeing.com/commercial/environment/pdf/qtd.pdf>

²⁷ Ibid

²⁸ Ibid

NASA research has found larger slower moving fans can be used to reduce engine noise and the understanding of exhaust noise has been increasing.²⁹

Boeing claim that use of technology outlined above has decreased the noise footprint of the recently launched 787 Dreamliner by 60% of that of similar aircraft in use today.³⁰

Given the effort being put into aircraft noise technology and the improvements already attained in the past few decades, it may be reasonable to expect further evolution in technology, particularly when assessing a PUC that may take more several decades to fully utilised.

Rather than allow for the trend of newer, quieter aircraft, the ANEF contours produced by Rehbein-AOS, and in turn the 'High Noise Corridor', assumes a range of old aircraft, such as B757-200 and MD-11, will be operating at night. The PDMP expects the PUC to be reached 'between 2050 and 2060'. Production of the B757-200 ceased in 2005 and production of the MD-11 ceased in 2000, so the aircraft assumed by Rehbein would be more than fifty years old by the time the PUC is reached. A more plausible ANEF would use more modern aircraft that are still in production and thus more likely to be still in service in several decades.

²⁹ Glenn Research Centre (1999) *Making Future Commercial Aircraft Quieter, Glenn Effort will Reduce Engine Noise NASA Facts*, (FS-1999-07-003-GRC), Cleveland Ohio

³⁰ Boeing (2007) *Backgrounder Boeing 787 Dreamliner Being Designed for Environmental Performance*

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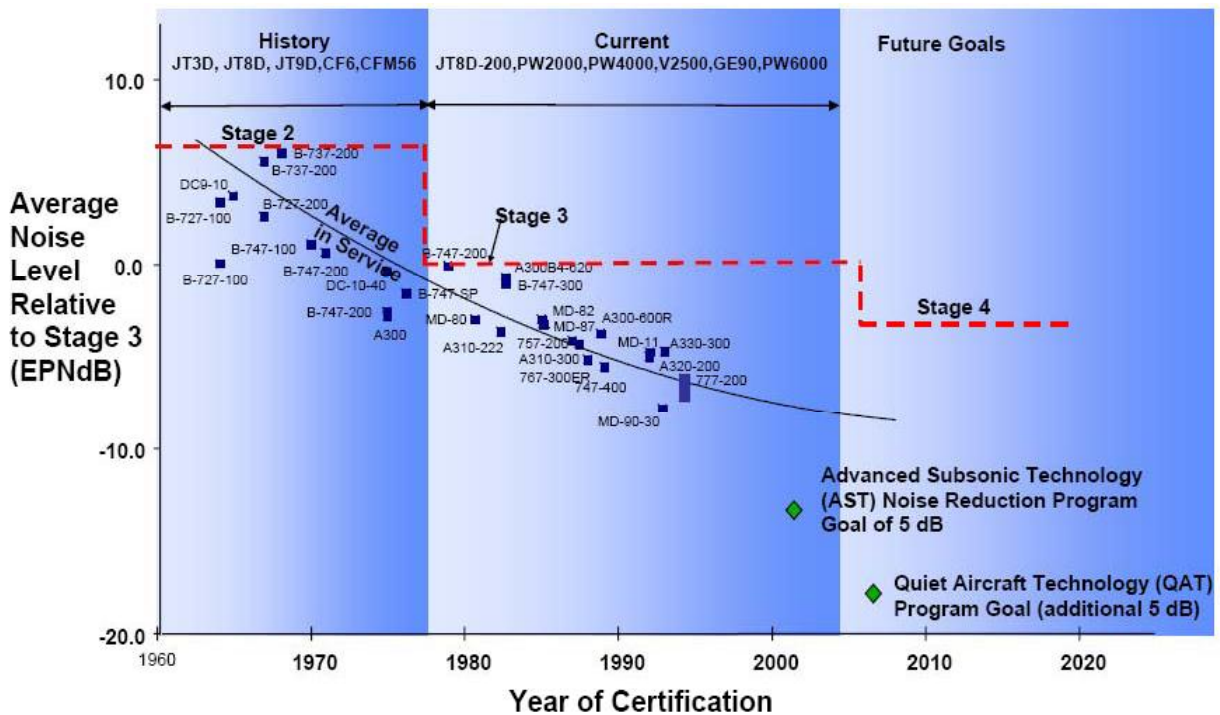
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APPENDIX – DEVELOPMENTS IN AIRCRAFT NOISE



Source: Dennis Huff NASA Cleveland Ohio, *Technologies for Turbofan Noise reduction*, as presented to the 10th AIAA/CEAS Aerocoustics Conference Manchester, United Kingdom May 11, 2004

ADDENDUM

This addendum documents concerns with the Canberra Airport Preliminary Draft Master Plan (PDMP), in addition to the concerns raised in the Access Economics report of 23 March 2009, titled Review of Canberra Airport Preliminary Draft Master Plan and the 'High Noise Corridor' Concept. We acknowledge the contribution of Geoff Willans to the detection of these additional concerns with the PDMP.

Section 5.1.4 in the PDMP states 'In 2007/08, Canberra Airport saw 39,629 domestic and regional Regular Public Transport (RPT) aircraft movements'. Table 5.6 of the PDMP reports a different total of 36,629 domestic/regional RPT movements.

The figures in Table 5.6 appear to have been incorrectly transcribed. As a result, the domestic/regional aircraft movements for 2007/08 of 36,629 and 'other' movements of 48,947 do not sum to the 2007/08 total of 88,576. The total of 88,576 aircraft movements aligns with Airservices Australia statistics.

Further to the transcription error, the growth rate of 3.4% stated in the PDMP text is incorrect. Using the correct base year figure of 39,629, the compound annual growth rate to 2029/30 is 3.7%, or using the figures that appear in Table 5.6, the growth rate is 4.1%.

The same aircraft movement forecasts as reported in Table 5.7 of the rejected 2008 PDMP have been used in the 2009 PDMP. In doing so, the base year for the forecasts has been moved forward by two years (from 2005/06 to 2007/08) without updating the resulting forecasts. This is in spite of domestic/regional traffic declining slightly from 39,832 movements in 2005/06 to 39,629 in 2007/08.

By maintaining the same forecast level of domestic/regional aircraft movements (48,681 in 2011/12 and 83,116 in 2027/28) while the actual movements have declined slightly and have remained below 40,000 for the past several years, now implies implausible compound annual growth rates between 2007/08 and 2001/12 of 5.4%, or 7.4% using the figures reported in Table 5.6 of the PDMP. The two additional years of historical actuals do not appear to have been used to update the forecasts, with the forecasts for 2011/12 and beyond remaining the same as in the rejected 2008 PDMP. The additional two years of actuals suggest that the point at which the 'practical ultimate capacity' may be reached is further into the future (and hence more uncertain to ever be reached) than previously thought.

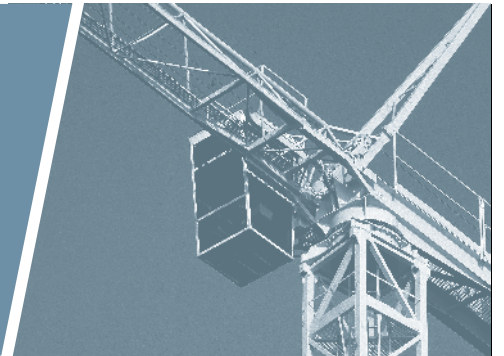
Aircraft movement forecasts are central to understanding noise impacts and for decisions regarding land use. The forecasts presented by Canberra Airport in the PDMP contain several errors and inconsistencies, hence are not sufficiently reliable to use for airport planning or land use decisions.

Access Economics, 28 April 2009



Economic Impact of Residential Development in South Jerrabomberra

Prepared for The Village Building Co Ltd



NOVEMBER 2009

BUILDING AND CONSTRUCTION

*BIS Shrapnel welcomes any feedback concerning the forecasts
or methodology used in this report as well as any suggestions
for future improvement.*

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Note: Although great care has been taken to ensure accuracy and completeness in this project, no legal responsibility can be accepted by BIS Shrapnel Pty Limited for the information and opinions expressed in this report.

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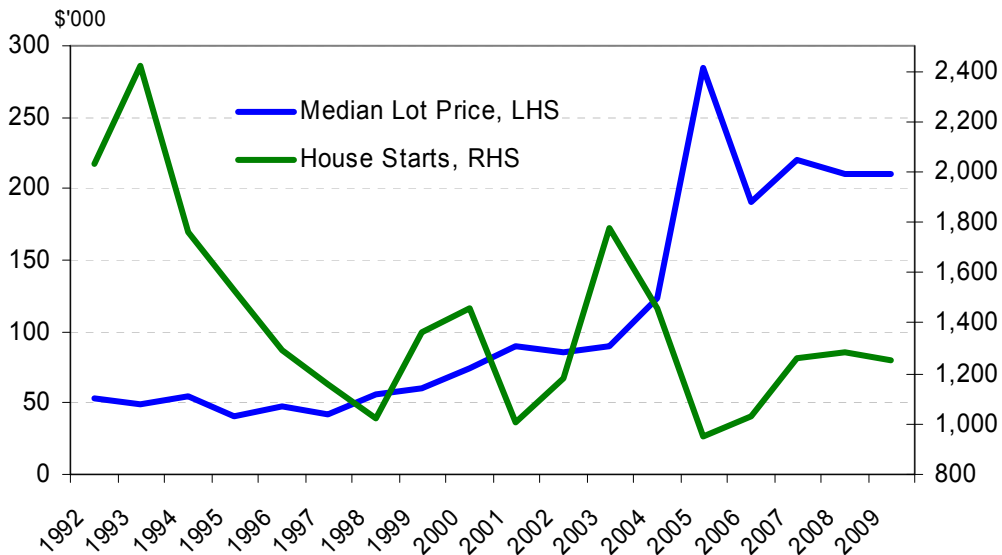
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EXECUTIVE SUMMARY

Residential land affordability sets the potential for economic growth in many parts of Australia. At present, relatively low rates of unemployment exist across the nation, so there is substantial choice available as to where to live and work. Overseas migration is running at record highs, and migrants are more flexible in where they choose to live. In addition, housing affordability is challenging in all cities, so the availability of reasonably priced residential lots makes a considerable difference to potential population growth.

Canberra has already briefly experienced the wider economic implications of poor land affordability. Residential lot prices surged over the first few years of this decade, and the median land price pushed up to \$250,000. There were a limited number of affordable lots priced at or below \$200,000. The consequences were immediate and severe. Population growth slowed to an average of 0.9% p.a. from 2002/03 to 2005/06. Due to weak population growth, there were low rates of growth in employment and household spending.

Chart I: Land price and detached house starts, A.C.T.

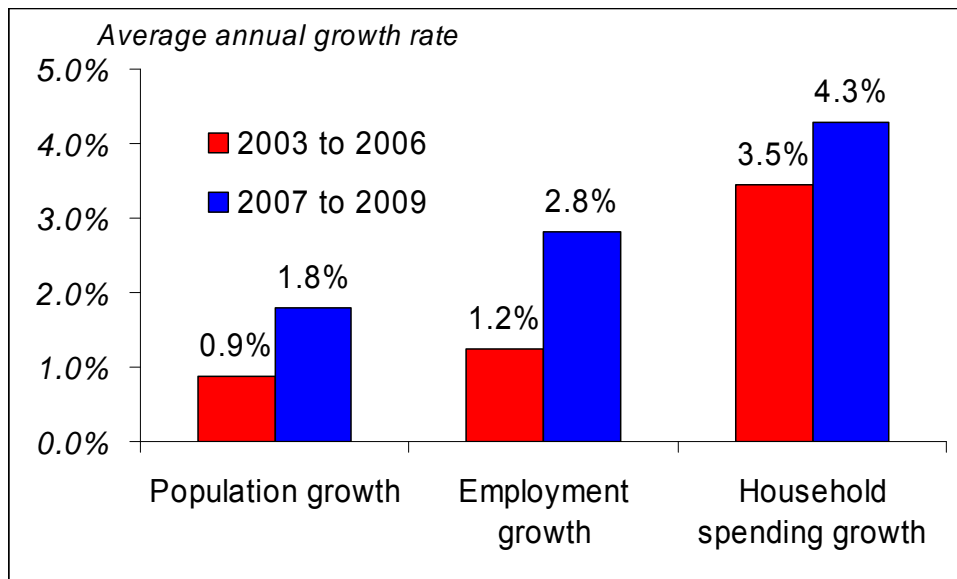


Source: Residex, BIS Shrapnel

The spike in residential land prices was due to a reduction in the number of development fronts in the Canberra economic region, which incorporates the A.C.T. and Queanbeyan. There were only two fronts in north Canberra, and lot production in Queanbeyan dipped sharply – previously, there were at least four or five development fronts operating simultaneously. The decline in competition led to high land prices.

Fortunately, the decrease in competition within the A.C.T. was short-lived, and median lot prices declined from 2007 to 2009, moving down towards \$200,000. Population growth revived, and brought with it a return to strong economic conditions. However, land supply in Queanbeyan remained limited. The overall rate of new housing construction has recovered, but it remains moderate by historical standards.

Chart II: Improvement in economic performance as residential land affordability improved



Source: ABS, BIS Shrapnel

The A.C.T. was not alone in suffering the impacts from poor residential land affordability. Sydney's situation was worse, and has persisted for much longer, stretching from 2002 to 2009. New South Wales has lost considerable share of net overseas migration, most noticeably to Victoria and South Australia. This trend has developed because residential land affordability is far better in Melbourne and Adelaide when compared to other capital cities. Weakening population growth in New South Wales has led to far lower economic growth in that state, when compared to Victoria and South Australia.

The experience in New South Wales underlines the fact that adverse land prices can make a deep and long lasting impact on the overall economic conditions within a region. These impacts are more pronounced in an environment of relatively low unemployment, because the economic growth potential cannot be met from local people who are unemployed – it has to be met by people moving to a region and adding to the workforce. Land affordability defines how easy it is to create housing stock which is required to enable this population growth.

Looking forward, we find that there are four key development fronts in the Canberra economic region. One is the remaining subdivisions planned for north Canberra, but this will begin to wind back again to north Gunghalin, and we expect that land prices will tend to move back towards and above \$250,000 over the next five years, as the future supply continues to dwindle.

Land releases at Molonglo have begun, and this area promises to be a key source of residential development. Unfortunately, this region is unlikely to generate predominantly affordable lots, as reflected in the initial sales of land at North Weston. Due to its prime location, median lot prices of about \$250,000 would be expected to be generated at Molonglo.

South Jerrabomberra and Googong, both located in Queanbeyan, represent the likely sources of affordable lots, priced at or below \$200,000 (in today's dollars). Competition amongst these two development fronts will generate the lion's share of affordable land to enable population growth over the next decade. It is likely that South Jerrabomberra will deliver the most affordable residential lots over the next decade, given that infrastructure costs are likely to be lower at South Jerrabomberra than at Googong.

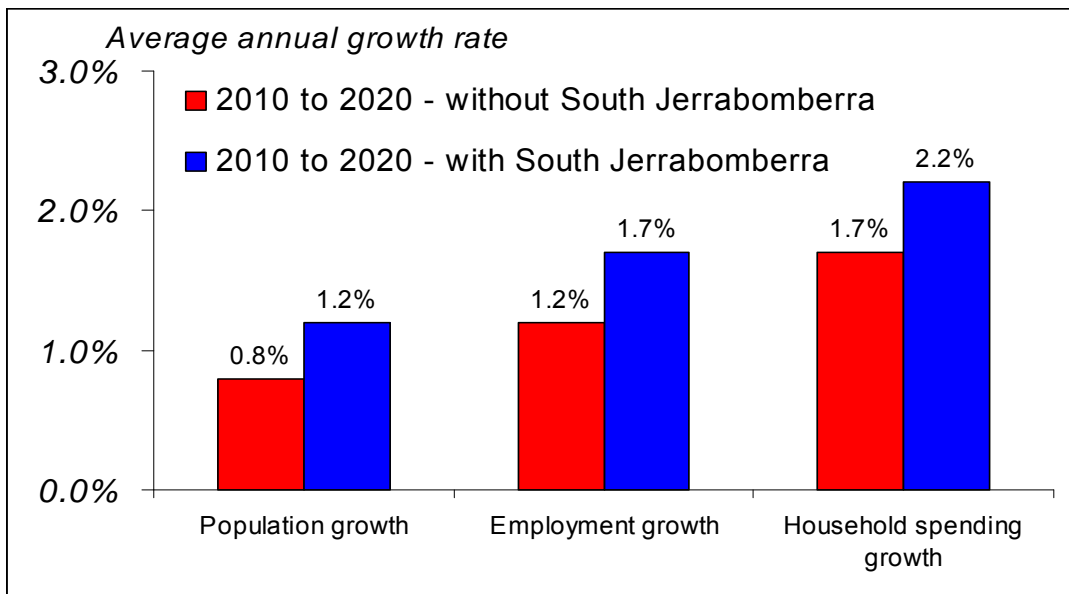
We project that the supply of new land below the threshold value of \$200,000 is imperative if the Canberra economic region wishes to maintain its current rate of population and economic growth over the short-term future.

In the absence of either South Jerrabomberra or Googong, there would be affordable lots being produced, but the potential volume of affordable lots would be sharply reduced. With fewer affordable lots available for sale, the potential population gain would be reduced accordingly – demand would not shift towards lots in north Canberra or Molonglo, rather the migration movements would become less favourable. In addition, the level of competition would be substantially reduced, so prices would tend to be higher, and this would also reduce migration gains.

In the absence of either South Jerrabomberra or Googong, we find that:

- Population growth would be 0.8% per annum, which would be 0.4% below potential.
- Employment growth in the Canberra economic region would be 0.5% lower each year from 2010 to 2020, resulting in 10,000 fewer jobs as at 2020.
- Economic growth would be 0.5% lower each year from 2010 to 2020.

Chart III: Future economic performance determined by competition in land supply



Source: ABS, BIS Shrapnel

Looking out beyond 2020, it seems clear that there are geographic limitations to the rate of residential development in the A.C.T. If the current rate of population growth in the A.C.T. is maintained into the future, then we estimate that there is lot supply for only 30 years worth of population gain. Population growth would slow to be well below the national average rate.

In this environment, it would become increasingly more difficult over time to service Commonwealth government needs out of the Canberra economic region. As the cost of housing moved out of the reach of most households, relatively higher incomes would be needed to attract workers to the Canberra economic region. This trend has been recently evident in other cities - the office workforce in Melbourne has increased far more rapidly than in Sydney, as the overall cost of living has been far easier in Melbourne.

This point is important, because the Commonwealth public service represents the roots of economic activity in the Canberra economic region. In the event that the Canberra economic region evolves to principally offer 'elite' housing options, then it seems likely that some of the labour-intensive services will migrate towards more affordable locations in Australia.

1. CANBERRA ECONOMIC REGION

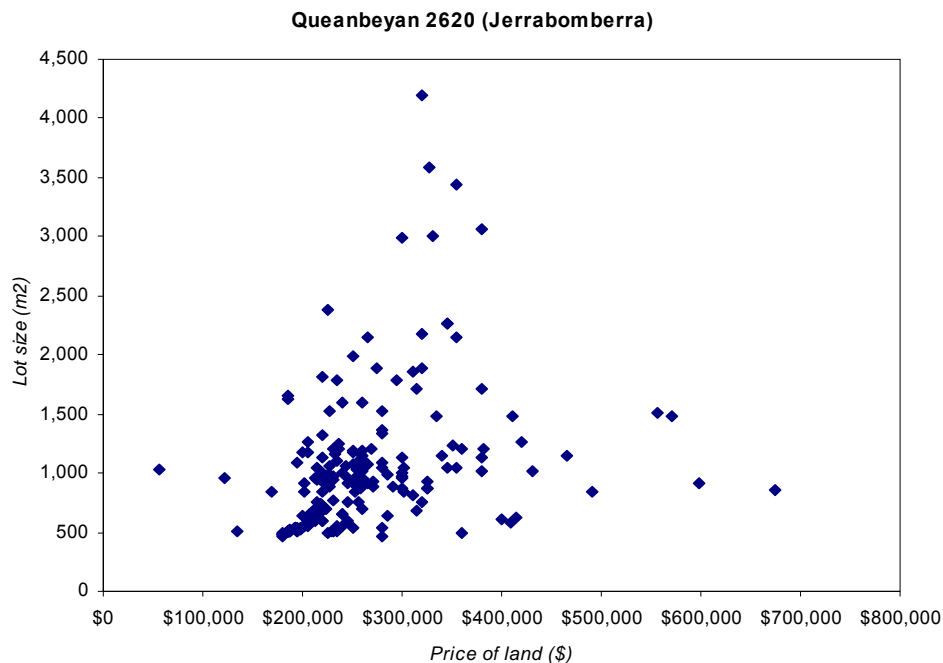
The A.C.T. and Queanbeyan are closely integrated communities. Many people living in Queanbeyan are employed in the A.C.T., and use services and products generated in Canberra.

Population growth in Queanbeyan is complementary to that in the A.C.T. In this respect, we can treat the combined populace as the Canberra economic region.

Population growth in Queanbeyan has tended to be higher than that in the A.C.T. Over the decade to 2007/08, population growth in Queanbeyan averaged 2.6%, compared to 1.1% for the A.C.T. Relative land prices have been a key difference. Residential land affordability has tended to be better in Queanbeyan.

However, residential lot development in Queanbeyan has declined sharply over the past five years. Subdivisions that existed five years ago have been largely exhausted. With little supply left, prices have tended to be very high.

Chart 1: Residential lot prices in Queanbeyan



Source: Residex, BIS Shrapnel

The current high cost of land has meant that Queanbeyan has missed out on the release of pent-up demand from first home buyers. Detached house approvals in 2008/09 were extremely low at just 62.

New subdivisions at South Jerrabomberra and Googong will allow population growth in the Canberra economic region to remain strong over the next decade.

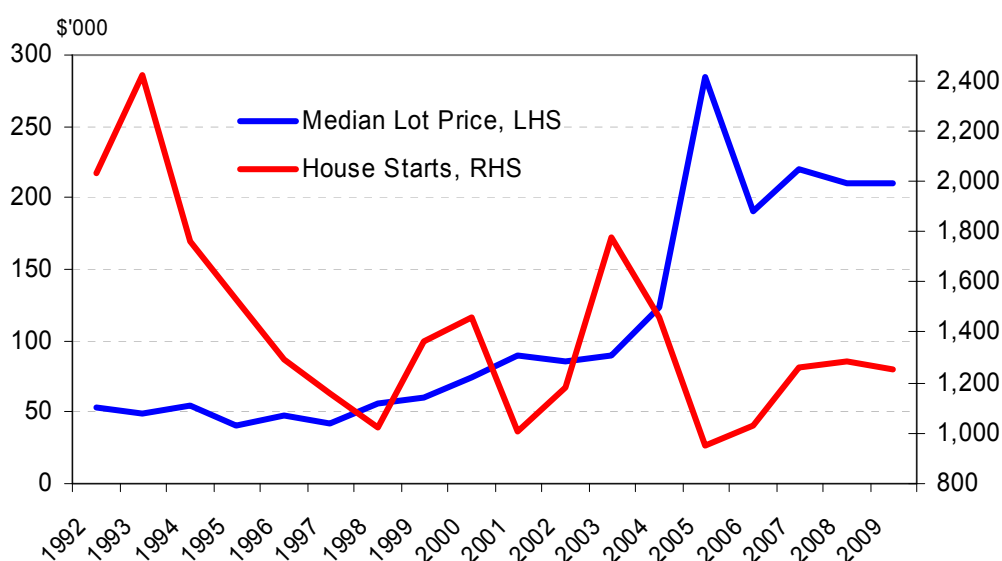
Separate data on economic trends in Queanbeyan are not readily available with a history suitable for analysis. We focus on figures for employment and economic activity that is available for the A.C.T. as a guide to the Canberra economic region. Given that the A.C.T. accounts for about 90% of the population of the Canberra economic region, this will be a reliable guide to overall economic trends.

1.1 Residential land affordability has recovered

Our view is that achieving relatively affordable residential land is vital to enabling population growth. In turn, higher population growth will lead to greater demand for services and local produce, and thereby generate jobs.

Supply conditions can shift quickly, particularly in relation to the degree of competition amongst developers. The A.C.T. experienced a very large rise in residential land prices a few years ago, when there were only a small number of development fronts. The median land price in Canberra surged in 2004/05 and 2005/06, rising to about \$250,000. Not surprisingly, demand for new houses fell to record lows in 2004/05 and 2005/06.

Chart 2: Land price and detached house starts, A.C.T.



Source: ABS, Residex, BIS Shrapnel

Over the same period, land shortages resulted in a rapid deterioration in land affordability in Queanbeyan. Median lot prices pushed up above \$200,000 in 2002/03, and have remained above \$250,000 since 2004/05.

Population growth responds rapidly to movements in land prices. The deterioration in residential land affordability resulted in a sharp slowing of population inflow to both the A.C.T. and Queanbeyan.

This region is subject to large shifts in migration flows, in the form of both interstate and overseas migration. When land affordability is very high, fewer people are buying new houses, and with fewer additions to the housing stock, there are only a limited number of properties available to house people from other states or from overseas.

Population growth in the ACT averaged 1.33% p.a. over the 20 years to 2001. Over the five years to June 2006, average annual population growth was just 0.9% — and particularly weak in 2003/04 (0.5%) and 2004/05 (0.8%), due to the sharp rise in land prices.

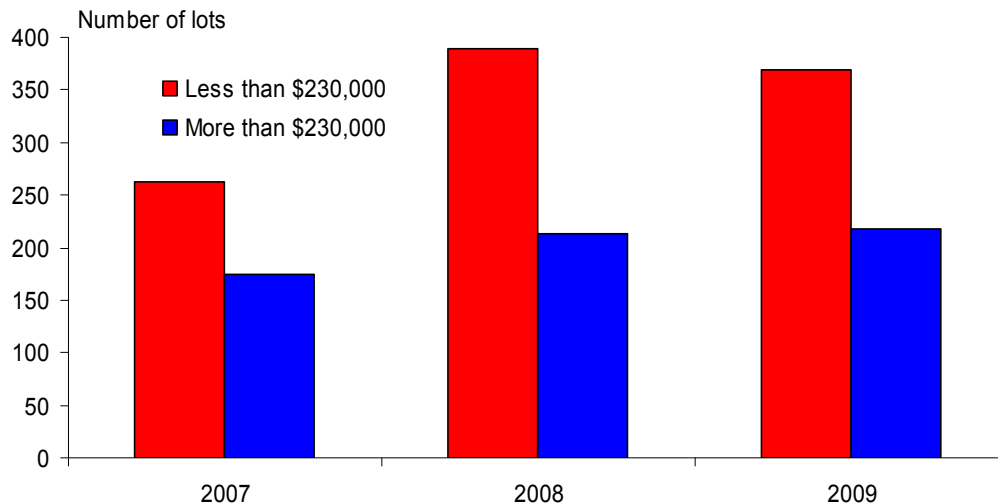
Population growth in Queanbeyan also slowed substantially. Population growth averaged 3.0% over the decade to 2002/03. Strong growth occurred in 2001/02 (3.1%) and 2002/03 (3.3%), but then slowed sharply in 2003/04 (1.6%) and 2004/05 (2.6%).

Fortunately, residential land affordability in Canberra has improved substantially over the past three years. Population growth in the ACT rebounded strongly in 2006/07 (2.1%) and 2007/08 (1.3%).

We go through the detail on this strong rebound in population growth in Section 1.4. The bottom line is that the improvement in affordability has proved to be a great attraction for first home buyers, with particular impact on the movement of overseas migrants to Canberra. Improvement in Canberra's residential offering has encouraged more young households to move to (or remain in) the ACT.

From 2007 to 2009, there was a much greater competition in supply of affordable residential lots. Affordable lots can be defined as those priced below \$230,000. Chart 3 shows the distribution of lot sales, split between those more than or less than \$230,000. The recovery in demand has been due to more lots becoming available at a price below \$230,000 – and in many cases, below \$200,000. As a result, the median lot price has fallen, moving down to about \$210,000.

Chart 3: Distribution of residential lot sales in the A.C.T.



Source: Residex, BIS Shrapnel

The decrease in the median lot price from 2007 to 2009 was partly the result of a drop in the average price of residential land – due to greater competition from several development fronts, developers have 'met the market' by reducing their profit per lot. The decrease has resulted in the sale of some land parcels at lower englobo values, which have enabled developers to produce a larger number of lots valued at around \$200,000 or less.

A key part of this process has been greater competition amongst developers, with multiple development fronts in existence across north Canberra. Suburbs such as Dunlop, Harrison and MacGregor have tended to deliver more affordable lots, with median prices below \$200,000.

As lot prices diminished, demand rose substantially during 2008, even though interest rates were reaching relatively high levels. This trend reflects the importance of affordable land, and the fact that migration movements can be heavily influenced by the price of land.

Chart 3 shows that there has not been an increase in demand for lots priced above \$250,000 — sales rate was flat in 2007/08, and showed only a small increase in 2008/09. This pattern reflects the predominance of demand from younger households living in an older property, or overseas migrants.

Sustaining solid population growth will be dependent on sufficient supply of affordable residential lots. Based on the experience of the past decade, the level of supply of lots priced below \$200,000 (in current prices) is critical.

Rather than suggesting that there has been a shift in the demand profile of households in the A.C.T., we believe that the lack of supply to this element of the market from 2003/04 to 2005/06 resulted in the recent surge in sales for land priced below \$230,000.

1.2 Competition across development fronts

Aided by strong house price growth, residential construction in the Australian Capital Territory peaked in 2002/03. The rise in price in the established market enticed a large volume of new house construction, which was met by demand from owner-occupiers, investors and property speculators. There were at least three development fronts in the decade up to 2002, and in most years, there were four. In Table 1, we have shaded each of the respective SLAs associated with these development fronts.

However, the demand from owner-occupiers slumped as land prices rose sharply. By 2004/05, the number of house approvals in the Australian Capital Territory contracted below 1,000 approvals.

**Table 1: Development fronts in north Canberra and Queanbeyan
(numbers are detached house approvals)**

	<i>Ngunnawal</i>	<i>Amaroo</i>	<i>Nicholls</i>	<i>Gunghalin</i>	<i>Dunlop</i>	<i>Harrison</i>	<i>Macgregor</i>	<i>Franklin</i>	<i>Forde</i>	<i>Queanbeyan</i>
1996	-	-	-	-	90	-	0	-	-	178
1997	436	134	192	-	85	-	0	-	-	218
1998	346	134	159	-	78	-	0	-	-	239
1999	224	170	348	-	149	-	0	-	-	317
2000	85	264	321	-	224	-	0	-	-	557
2001	67	233	86	-	120	-	0	-	-	458
2002	23	118	104	169	294	-	0	-	-	512
2003	10	376	194	315	343	-	0	-	-	441
2004	6	32	40	387	196	-	0	-	-	328
2005	20	17	24	269	165	-	0	-	-	253
2006	3	7	11	525	128	-	1	-	-	215
2007	2	4	8	13	45	557	0	-	-	225
2008	1	10	5	408	34	153	71	-	-	127
2009	2	0	49	12	111	37	351	389	192	62

Source: ABS, BIS Shrapnel

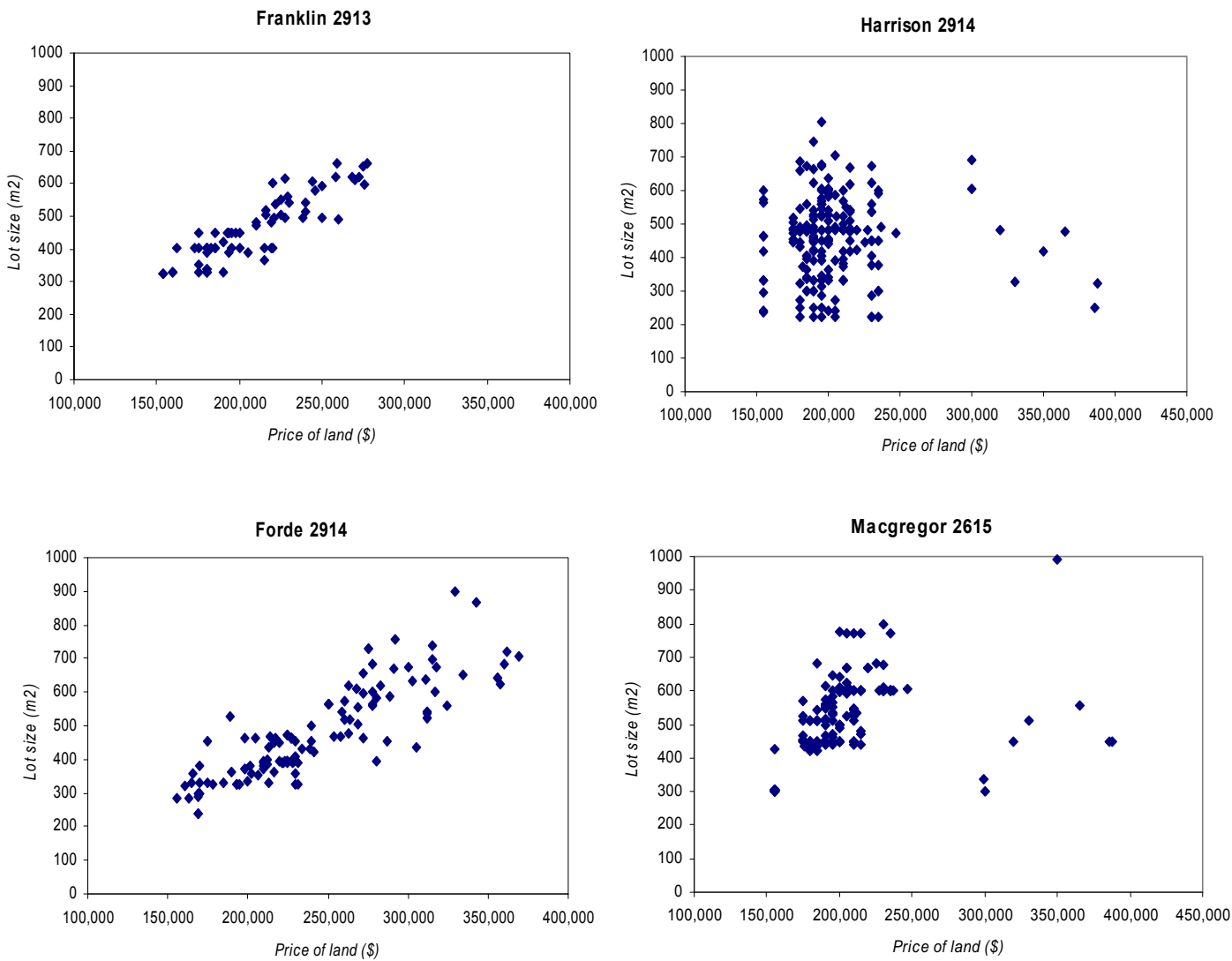
There was a lack of competition in residential land development. For three years, there were only two development fronts – Gunghalin and Dunlop. Not surprisingly, this was the period when land prices reached a peak, and affordability and population growth slumped.

From 2007 to 2009, competition in residential development increased again. Gunghalin and Dunlop have been joined by Harrison, Franklin, Macgregor and Forde. The degree of competition has clearly increased substantially, and it is probably at the most intense level for more than twenty years.

Scatter plots of land prices against lot size are show below. The data relate to land sales from June 2007 to June 2009.

The reduction in the median lot prices has been led by Macgregor, where the majority of lot prices have been below \$200,000. Affordability was also attractive in Harrison, with the median price being about \$200,000. The range of prices has been broader at Franklin and Forde.

Chart 4: Land price against lot size (scatterplots show individual land sales data)



Source: ABS, BIS Shrapnel

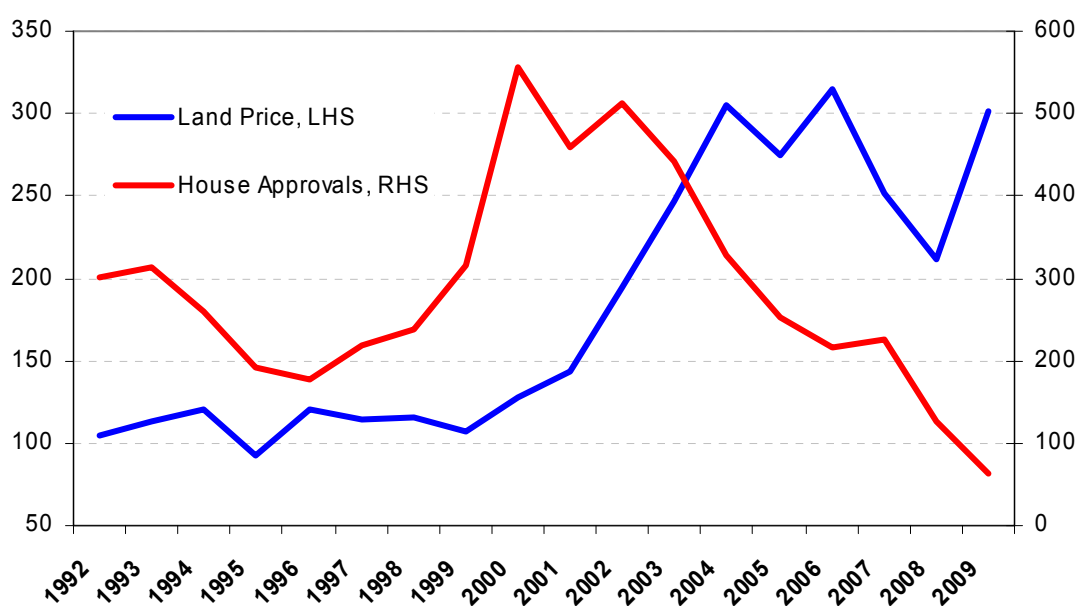
1.3 Land affordability remains very adverse in Queanbeyan

At the turn of the century, Queanbeyan SSD experienced rapid population growth, underscoring a historically robust level of population growth in the Australian Capital Territory. This high level of population growth in Queanbeyan was facilitated by the availability of affordable land lots in the Queanbeyan. As a result, residential approval numbers accelerated in 1997/98, and peaked in 1999/2000 at 557 house dwellings. A high level of house construction was sustained over the next three years (averaging 470 per annum), aiding continued population growth.

A nationwide phenomenon of strong price growth in the residential property market precipitated in Queanbeyan, which caused the price of land in Queanbeyan to soar. In addition, strong subdivision activity in the past ten years had exhausted Queanbeyan's land stock, resulting in further price appreciation. This immediately impacted separate dwelling construction in the Queanbeyan and the Australian Capital Territory – during the most recent peak, house approvals in Queanbeyan represented over 40% of total activity in the Australian Capital Territory.

Since this rapid contraction in activity, separate dwelling approvals in Queanbeyan have slumped to just 62 in 2008/09. As a result, population growth has slowed to a crawl, increasing by just 700 persons in 2008/09. We believe that the sharp deterioration in the two above mentioned indicators was caused by the rapid growth in land price in Queanbeyan, with \$250,000 representing the threshold value.

Chart 5: Queanbeyan starts vs land price



Source: ABS, Residex, BIS Shrapnel

1.4 Land affordability effect on the Canberra Economic Region

For the past 30 years, population growth in the A.C.T. tended to be close to, or better than, the national rate of increase.

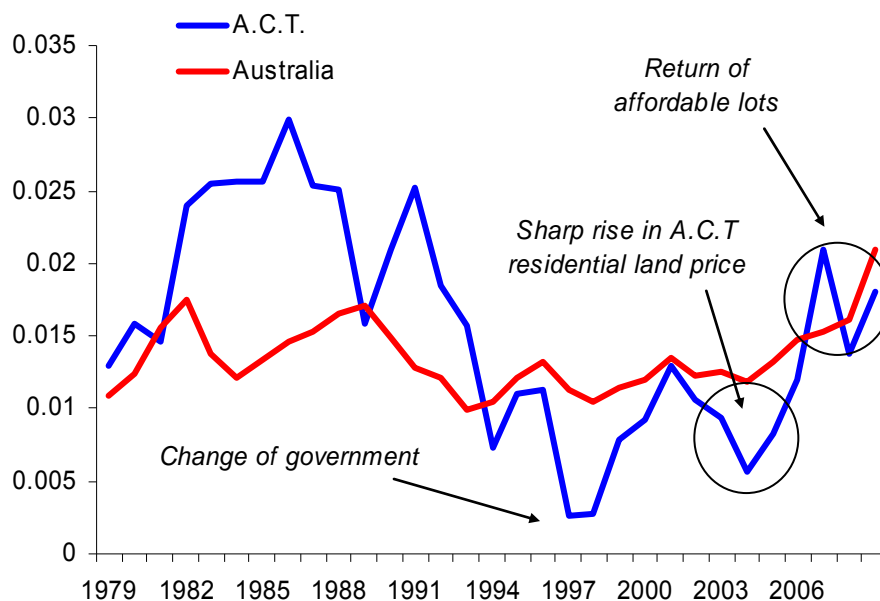
There were two periods where population growth in the A.C.T. was substantially below the national average:

In 1996/97 and 1997/98: a change of government occurred, and the public service was substantially scaled back. There was a large movement of households to other states in these years.

From 2002/03 to 2005/06: the surge in residential land prices led to a plunge in demand for new dwellings, and with a smaller rate of supply, population inflow to the A.C.T. was clearly curtailed.

As competition in lot production gradually increased again, the population slump was then arrested. From 2006/07 to 2008/09, there has been a substantial increase in the supply of affordable residential lots, leading to resurgence in demand for new dwellings, and a strong rebound in population growth.

Chart 6: Population growth in the A.C.T and Australia



Source: ABS, BIS Shrapnel

Fleet of foot - migration flows drive population growth

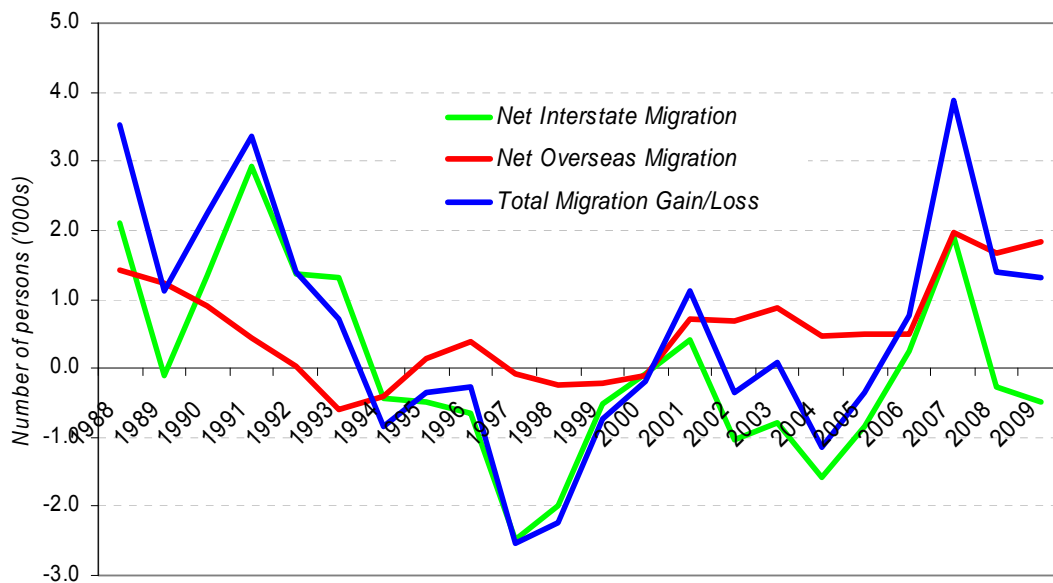
Traditionally, population growth in the Australian Capital Territory has relied heavily on the state of public sector employment. The resultant inflows and outflows have also been less pronounced than that registered across the other eastern seaboard states.

However we have witnessed that the drivers behind population growth, and more importantly, the dynamic of the population participating in movements in and out of Australian Capital Territory have varied considerably, and not because of public sector employment.

Over the entire time series, the natural increase component of population growth contributed on average 3,000 persons per annum. Given the steady nature of this component of population growth, the focus of the analysis will be on the fluctuation provided by net interstate and net overseas migration.

Chart 7 illustrates the contribution to migration by both components over time. Over the five years to 1992/93, an influx of interstate migration ensured that the population growth remained over 5,000 persons per annum. Over this period, strong land price growth and thus expensive land releases in surrounding states (e.g. New South Wales, Victoria and Queensland) made the Australian Capital Territory an attractive destination.

Chart 7: Population and components of population change, 1988–2009



Source: ABS, BIS Shrapnel

Over the next three year period (to 1995/96), population growth was influenced by a constant outflow of Australian Capital Territory residents to other states. This level of outflow was underscored by superior employment opportunities presented in the other eastern seaboard states. In addition, recent land price growth caused new lot values to climb above affordable threshold levels. Over the two years to 1998/99, this outflow intensified – 2,470 and 1,980 persons respectively – reducing overall population growth throughout the Australian Capital Territory to below 1,000 for each year.

Despite the one small inflow in 2000/01, interstate migration remained as a detriment to population growth. In contrast, a strong overseas migration inflow precipitated, boosting population growth in the Australian Capital Territory – to a high of nearly 7,000 persons in 2006/07.

The underlying strength of inbound overseas migration is testimony to the state of housing and new land affordability in other states. The A.C.T. also bore witness to strong house price growth, but has managed to provide a constant supply of new land releases below the threshold of \$230,000 in recent years. Land below the threshold level provided sufficiently cheap land for new house formation by younger households – typically first home buyers. In addition, the development of private business investment and strong growth in the private

component of state product has aided a score of employment opportunities, inducing an influx of inbound overseas migrants – who traditionally have a greater tendency to populate a city that contains cheaper housing (land) and a sustainable level of employment growth.

Table 2: Net Overseas by Age Cohort, State and Australia, 2005–2008

	Net Overseas by age cohort			Total Overseas Migration	
	20-39	50-59	60+	A.C.T.	Australia
2005	346	-30	-2	486	123,763
2006	486	38	36	501	146,753
2007	887	-21	57	1,967	232,824
2008	789	16	51	1,669	213,715

Source: ABS, BIS Shrapnel

The rate of population growth in Australia has recently been underscored by a surge in inbound overseas migration. The emergence of a skills shortage in the labour market and a thriving resources sector facilitated the large number of overseas migrants over the last three years. Although the Australian Capital Territory does not benefit directly from the resources boom, strong growth in the private component of state demand, a tight labour market, cheaper housing/land alternatives and robust consumer sentiment in the Australian Capital Territory have all facilitated the relatively large inflow of international migrants.

It has been our experience in the past that economic prosperity and employment growth are two crucial incubators of population growth throughout Australia. But since the last housing price boom in Australia (2003/04), we have witnessed that the price of new land (which is a large element of the total housing cost) has evolved as one of the main reasons for settlement, particularly given that economic and employment conditions throughout Australia were robust up until mid 2008.

This argument is evident in the Australian Capital Territory. It is clear that the largest contribution to net overseas migration has recently stemmed from the 20–39 age cohort. Members in this group are traditionally first home buyers who are usually constrained by tighter (housing) budgets, and therefore more inclined to opt for cheaper housing alternatives. The boost in numbers within this age group in 2006/07 and 2007/08 coincides with the large number of sub-division lots issued and sold below the median threshold of \$230,000 (Macgregor, Dunlop, and Franklin), which backs our observation.

1.5 Net interstate migration by age cohort

Table 3: Net interstate migration by age cohort

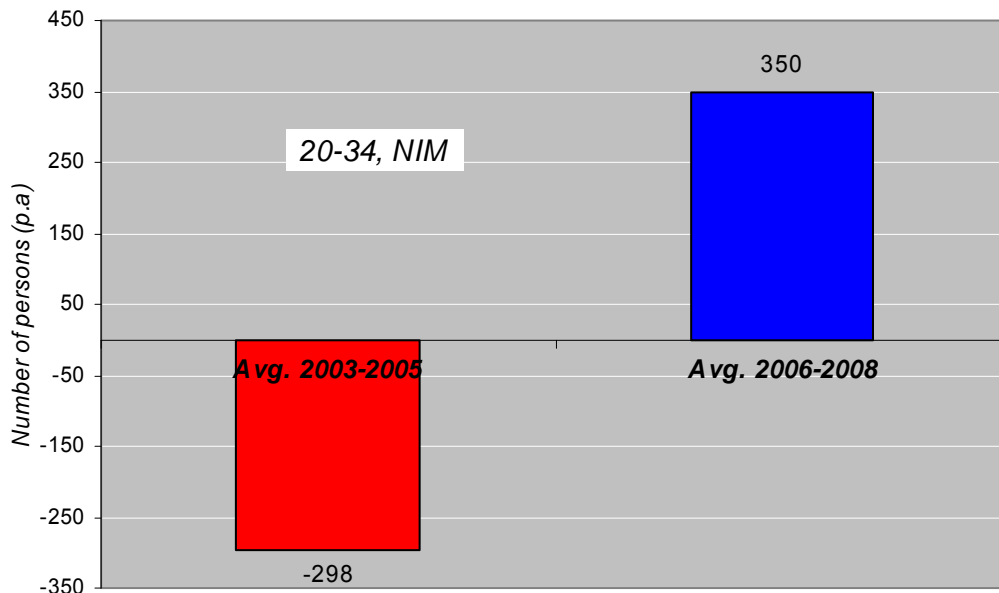
	Net Interstate Migration ('000s)					
	20-24	25-29	30-34	20-34	55-69	A.C.T.
1999	-170	-168	-87	-425	-404	-506
2000	-	-103	-55	-158	-341	-91
2001	294	-6	-89	199	-418	407
2002	-82	-35	-30	-147	-529	-1,044
2003	35	-92	-179	-236	-659	-802
2004	-103	-75	-252	-430	-710	-1,586
2005	-71	-20	-136	-227	-564	-842
2006	186	-82	5	109	-479	258
2007	448	411	134	993	-535	1,921
2008	-61	-121	129	-53	-625	-265

Source: ABS, BIS Shrapnel

Over the 1999–2005 period, the Australian Capital Territory typically registered a net interstate outflow. With the exception of 2000/01, superior employment opportunities and economic prosperity (derived from the resources boom) within other states attracted residents out of the Australian Capital Territory.

Under this macro-level explanation, we have observed that net interstate migration figures by age cohort convey a different message, with a turnaround in the younger household forming age groups.

Chart 8: Net Interstate Migration flows for the 20–34 age cohort



Source: ABS, BIS Shrapnel

Summarised by the 20–34 age group, it is evident that there has been a clear shift from an interstate loss to a considerable gain since 2005/06 – from an outflow of 298 persons per annum over the 2003–2005 period, to an inflow of 350 persons per annum over the three years to 2007/08. This too coincides with a surge in sub-\$230,000 new land releases in Macgregor, Dunlop, Franklin and early stages of Gungahlin, which have facilitated younger population growth via the provision of affordable housing alternatives for a group that is traditionally highly sensitive to higher housing (land) costs.

BIS Shrapnel believes that an element of this gain is sourced from inbound overseas migrants that had originally chosen New South Wales, Victoria or Queensland as their first destination.

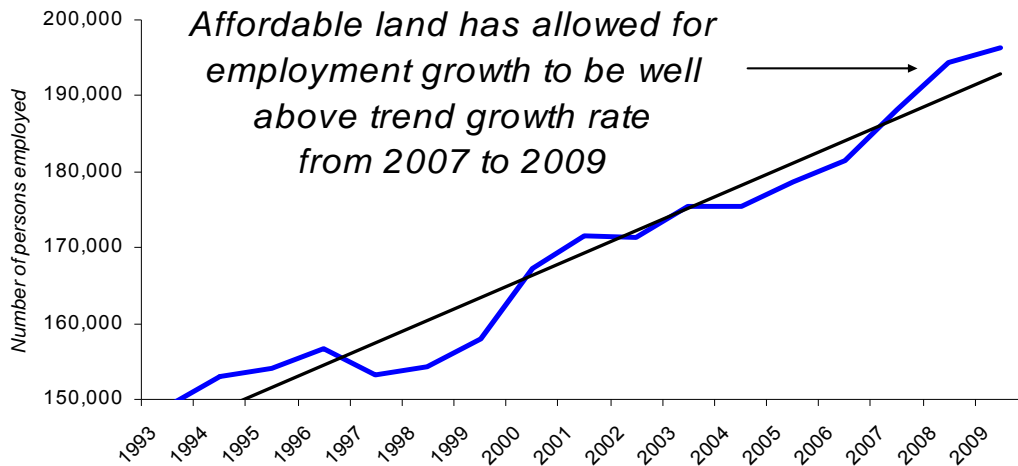
1.6 Population growth drives economic growth

The pick up in population growth has enabled a clear improvement in employment growth.

Employment growth was just 1.1% per annum over the four years to 2004/05, as the deterioration in residential land affordability choked off population growth.

Employment growth then jumped to an annual average of 2.5% over the years from 2005/06 to 2008/09. More people moved to the A.C.T. and fewer people left, due to the improvement in land affordability. This experience is consistent with the patterns in Victoria and South Australia, where superior land affordability has enabled faster population growth and thereby sustained higher employment growth.

Chart 9: A.C.T. level of total employment against trend



Source: ABS, BIS Shrapnel

The improvement in population and employment growth resulted in acceleration of overall economic activity. Household spending is a key element of overall activity, and movements tend to drive patterns in overall economic activity. Household spending growth improved as population growth recovered. As measured by Final Consumption Expenditure (FCE), household spending growth averaged 3.7% over the years from 2000/01 to 2004/05. Then from 2005/06 to 2007/08, FCE growth rose to 4.5% per annum. This rise represented an average annual improvement of 0.8% in FCE.

1.7 When land affordability goes bad – the experience of Sydney

The A.C.T. has avoided a long-term deterioration in residential land affordability, and the economy has reaped the benefits of a recovery in population growth. The trends in the A.C.T. reflect the need for greater attention to the economics of land development.

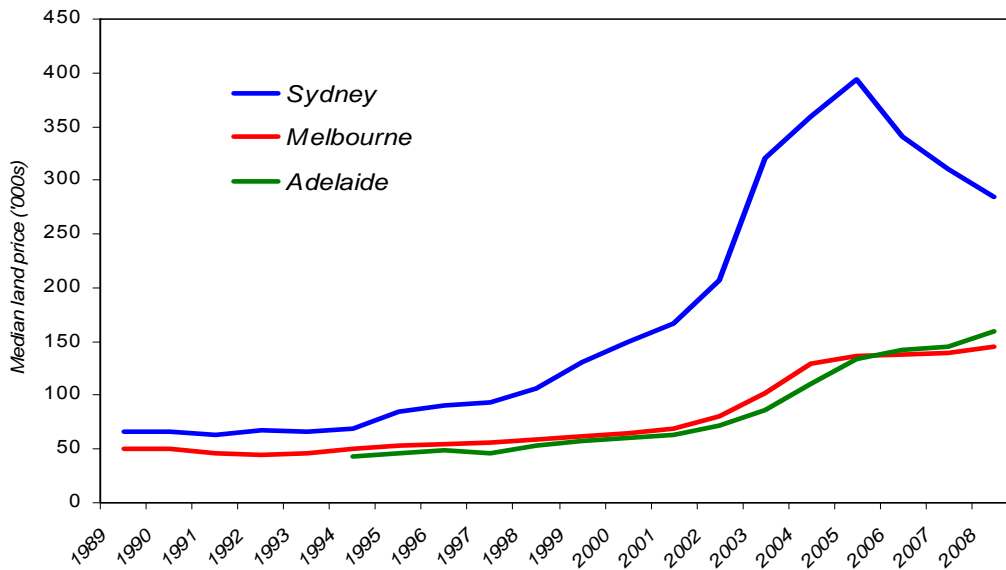
We can show that New South Wales has not been so fortunate. The experience of New South Wales over the past decade demonstrates that residential land prices can have a substantial and long-lived effect on the rate of population growth. This relationship occurs because new residential lots are required to provide additional dwellings for households.

Australia's population growth is heavily dependent on net overseas migration. Much of this movement to Australia is undertaken by long-term visitors. Long-term visitors include workers who have skilled migrant visas and overseas students.

To a large extent, overseas migrants can be flexible in where they choose to live within Australia. Over the past decade, there has been an increasing shortage of workers across Australian cities, which has allowed migrant workers choice in terms of where they work and live.

We observe that residential land affordability have played a major part in influencing migration movements in Australia over the past decade. A huge gap emerged between land prices in Sydney compared to both Melbourne and Adelaide.

Chart 10: Median land price in Sydney, Melbourne and Adelaide, 1989–2008



Source: ABS, BIS Shrapnel

Apart from overseas migrants, interstate movements were also affected by high Sydney land prices. A large number of families moved from Sydney to South East Queensland over the 2002–2006 period. Clearly, Victoria and South Australia were not beneficiaries of these movements — but it did contribute to the dramatic slowing of New South Wales population growth.

Most recently, residential land prices in Sydney receded in 2007 and 2008 — but they remain very high relative to the 1990s experience. As south-east Queensland land prices have also risen, the net interstate migration outflow from New South Wales to Queensland has diminished, leading to some improvement in New South Wales's population growth.

However, residential land affordability in Melbourne and Adelaide remains relatively attractive, as reflected in further rises in population growth during FY2007 and FY2008. Rising NIM has been driving the very strong population growth.

In fact, Victoria's population growth has been remarkable, given the fact that the state did not benefit directly from the mining/commodities cycle boom that was evident in Queensland and Western Australia over the FY2007 and FY2009. Rather, Victoria has benefited as a provider of services sector (wholesale trade/finance and business services). Also, population growth itself generates economic growth, through demand for goods and services — it is the foundation of all economic growth.

There is a clear relationship between the improvement in Victoria and South Australia population growth, and the consequent impact on employment and overall economic growth.'

Over the 1997–2001 period, employment growth in New South Wales was on par with Victoria, far superior to South Australia. Over the 2002–2008 period, employment growth in New South Wales has been well below both Victoria (an average of 0.5% lower per annum) and South Australia (an average of 0.4% lower per annum).

From 2001 to 2005, the median land price in Sydney surged from about \$150,000 to a peak of close to \$400,000.

Over the same period, median land prices in Melbourne and Adelaide rose from about \$65,000 to about \$135,000.

So land prices in all three cities showed very strong growth, but the magnitude of the rise in Sydney was far greater (more than 3 times) that in Melbourne and Adelaide.

Chart 11: Median land price ratios, 1989–2008



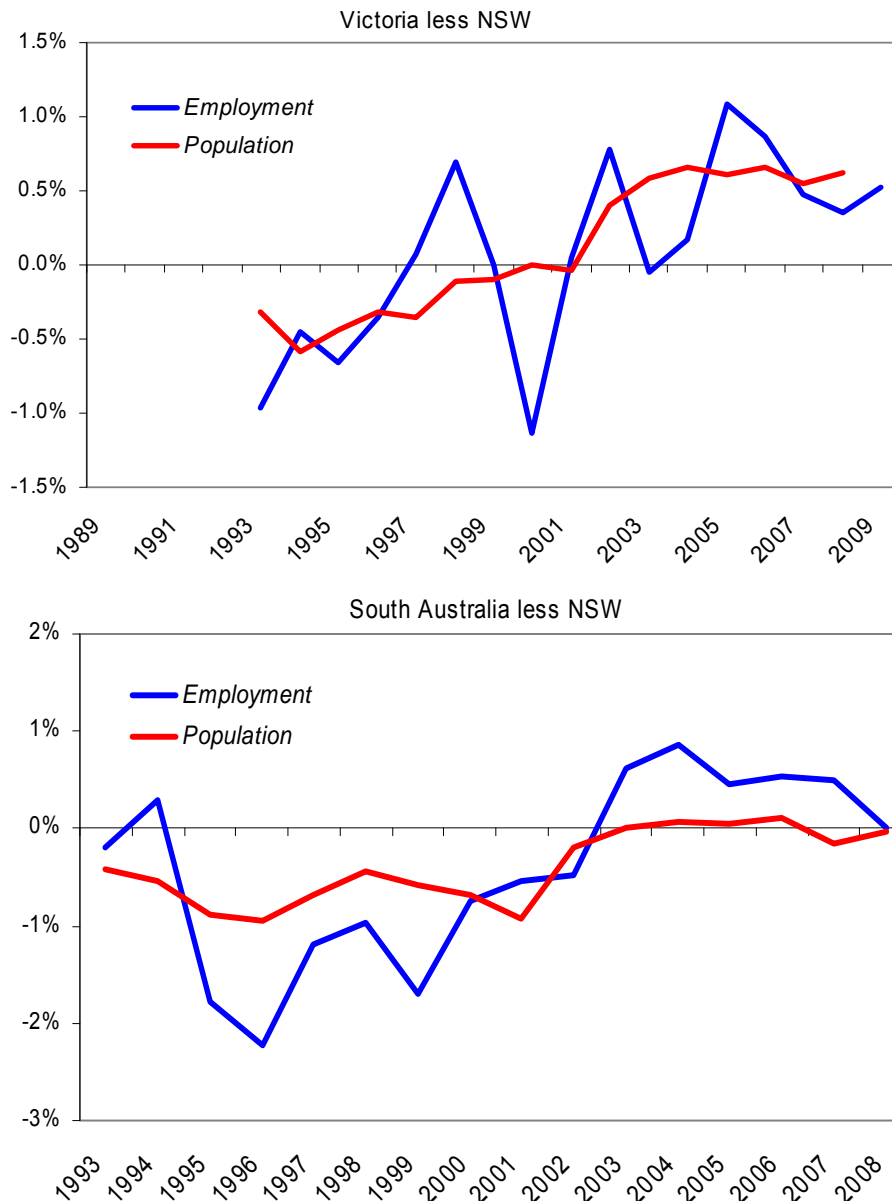
Source: ABS, BIS Shrapnel

We find that the sharp deterioration in Sydney's relative land affordability resulted in a dramatic change in population growth in New South Wales.

Population growth in New South Wales averaged 1.2% per annum over the five years to 2001 (1997–2001). Population growth then slowed sharply, to an average of 0.7% per annum over the 2002–2006 period. So, average population growth fell by 0.5% per annum. The 2002–2006 period marked the lowest population growth since the 1991–1993 period.

While population growth in New South Wales slowed, there was a rise in population growth observed in Victoria and South Australia. In Victoria, population growth picked up from 1.1% (1997–2001) to 1.3% (2002–2006). In South Australia, population growth picked up from 0.5% (1997–2001) to 0.7% (2002–2006).

Chart 12: New South Wales growth rates below Victoria and South Australia



Source: ABS, BIS Shrapnel

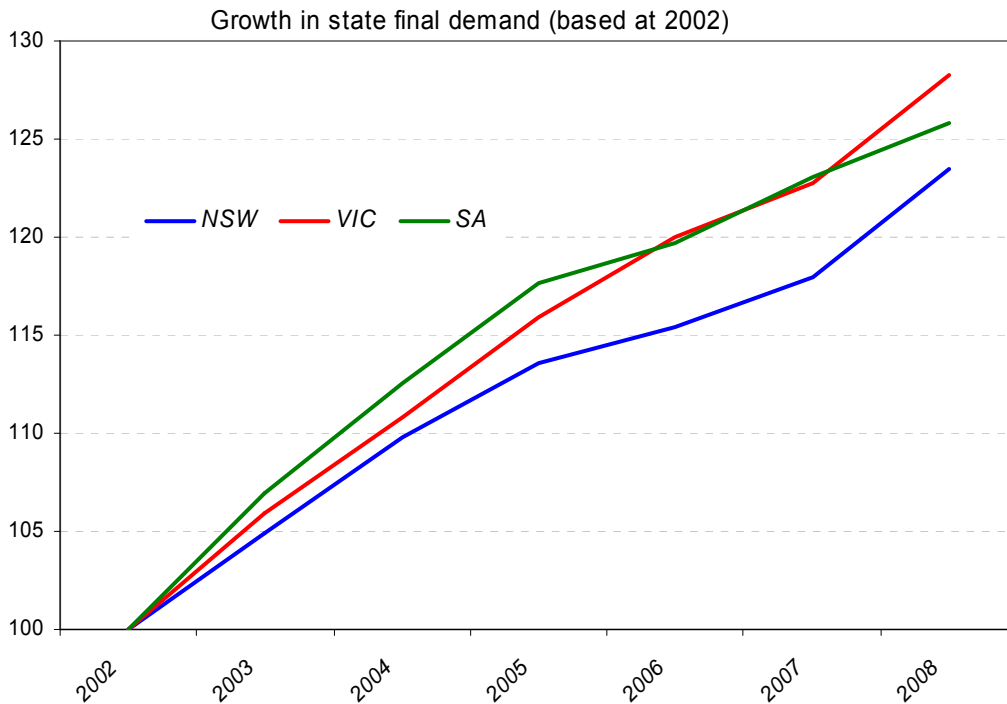
Superior residential land affordability was the key reason that Victoria and South Australia were able to absorb a rising share of net overseas migration. Also, the sharp deterioration in new land affordability in Sydney made it increasingly difficult for locals to afford a new house in outer Sydney — so there was a slump in upgrader demand, and fewer older properties being vacated, and freed up for overseas migrants to occupy.

The superior growth in employment for Victoria and South Australia are also reflected in overall economic activity.

Growth in state final demand was substantially higher in Victoria and South Australia than New South Wales over the 2002–2008 period.

By the state final demand measure, Victoria's economy expanded by 28% over the 2002–2008 period (4.5%) — but the New South Wales economy increased by 23%. So Victoria increased by 4% more — or an average of 0.7% per annum higher. This measure of out performance accords with the fact that Victoria's population growth was 0.5% higher (average per annum).

Chart 13: State Final Demand, 2002–2008



Source: ABS, BIS Shrapnel

Similarly, South Australia's economic growth tended to outperform New South Wales. South Australia's economy expanded by 26% over the 2002–2008 period — an average of 4.3% per annum, or 0.5% per annum higher than New South Wales. Again, this accords with South Australia's population growth being 0.4% higher over this period.

In light of this evidence, it seems that there is a reasonably direct translation from the superior trend growth in population into both employment and overall economic growth. This relationship will tend to be stronger when the unemployment rate is low (because there are fewer locals to enter the workforce and enable a rise in activity).

1.8 Future direction for land affordability in the Canberra economic region

The A.C.T. economy has been booming for the past three years. This upturn has been founded on the recovery of population growth. In turn, higher population growth has been due to improvement in land affordability from 2007 to 2009, driven by the greater competition by developers in land releases across north Canberra.

The problem going forward is that the number of development fronts in north Canberra is set to dwindle again. Land sales will soon be completed at Macgregor, Franklin and Forde.

There are new subdivisions underway or scheduled at north Gunghalin, extending on from Forde. Bonner is currently at the sales phase. Beyond that, there are subdivisions planned at

Crace and North Jacka. We estimate that the remaining potential at north Gunghalin will produce about 600 lots per annum over the next five years to 2013/14.

As the available tracts of land in north Canberra continues to diminish, there will again be upward pressure on lot prices. Forde is located in North Gunghalin, and pricing there will be indicative of the future land releases remaining in north Canberra. It seems likely that the number of development fronts in this region will again move back to a low number, and this will result in less competition, and a return to median lot prices of \$250,000.

Future population growth will be dependent on development at three regions:

- Molonglo, located in the western part of the A.C.T.
- Googong and South Jerrabomberra, located in the Queanbeyan region

Molonglo

With the pipeline of development in north Canberra set to thin over the next five years, attention turns to Molonglo.

Molonglo represents a major development front in western A.C.T., emerging in the aftermath of bushfires during 2003. Molonglo has a prime location in the A.C.T. and is likely to be priced accordingly. The lot prices will probably tend to be higher than those being struck at Gunghalin, given the prime location.

The first tract of land in the Molonglo region, known as North Weston, was sold earlier this year. Given the sale price, it is likely that lots will be sold at a fairly high price, equivalent to about \$250,000 to \$300,000 each. This pricing has occurred even with the strong competition amongst residential developers which is currently evident.

North Weston has now set a precedent for the future profile of land prices in the Molonglo region. It appears that Molonglo will not tend to deliver the affordable profile of land prices that have emerged in parts of north Canberra over the past three years.

Googong

Googong is planned as the location for 10,000 residential lots.

Pricing at this development front is uncertain, as no sales have yet taken place.

A key feature of the site is the likelihood of higher infrastructure costs. These costs relate to roads that are required to connect the new subdivisions with the Queanbeyan road network. It is estimated that the additional infrastructure cost will increase the average cost of development by about \$15,000. A higher development cost is important, given the sensitivity of demand to modest shifts in lot price.

South Jerrabomberra

South Jerrabomberra will deliver a large volume of affordable residential lots.

This supply of affordable lots will provide a pipeline of residential land that will satisfy demand over a period of 8 to 10 years. South Jerrabomberra will provide housing for about 15,000 people, or 1,500 to 2,000 people each year.

This level of population gain would be equivalent to growth of 0.4% to 0.5% in the population of the Canberra economic region (A.C.T. and Queanbeyan combined).

1.9 Need to maintain competing development fronts

Tables 4(a) & 4(b) – Number and median lot prices for future development fronts with (a) and without (b) South Jerrabomberra development front

	Median lot price (\$)	Number		Median lot price (\$)	Number
South Jerrabomberra	180,000	500	Googong	\$ 220,000	400
Googong	200,000	300	North Gunghalin	\$ 260,000	300
North Gunghalin	230,000	350	Molonglo	\$ 280,000	300
Molonglo	250,000	350	Total Region	\$ 250,000	1,000
Total Region	210,000	1,500			

South Jerrabomberra and Googong will be the primary sources of affordable residential lots in the region. Complementing the affordable lots at South Jerrabomberra (+500 lots) and Googong (+300 lots), there will be adequate supply of lots priced at \$250,000 and above from North Gunghalin (+350 lots) and Molonglo (+350 lots).

This set of land releases will enable the A.C.T. to sustain the solid population growth of recent years, when affordable lot supply increased substantially. If there is adequate supply of lots priced at or below \$200,000, then the Canberra economic region will be able to maintain population growth at a similar rate to that achieved from 2006/07 to 2008/09, an average rate of 1.5% per annum

The outlook changes fundamentally if there are fewer competing land development fronts. In particular, competition between South Jerrabomberra and Googong will be critical. These locations are fairly proximate to each other, and are at a considerable distance from Molonglo. It is very likely that land values at Molonglo will be substantially higher than at South Jerrabomberra and Googong.

From Table 4a (the outlook where South Jerrabomberra is developed), we can see that the number of lots supplied below the \$200,000 threshold will be approximately 800, whilst under Table 4b, that **no** lots will be available at or below the threshold of \$200,000. This suggests that without the competition provided by the South Jerrabomberra development front that the lack of price competition will cause the total market in second scenario to be priced at or above \$220,000.

The recent experience in north Canberra indicates that fairly small variations in price have a large effect on the volume of demand. For middle to lower income earners, demand for a new house is very price elastic, and many households would not be in a position to buy land at Molonglo. Affordable lots will be primarily clustered in South Jerrabomberra and Googong.

This environment means that if residential development at South Jerrabomberra does not proceed, then there will be far less competition in the supply of affordable land for the Canberra economic region. Googong and Molonglo would be the dominant regions for lot production, and each would tend to supply separate market segments. Googong would be the primary source of affordable land, despite its considerable distance from the business districts in Canberra.

With limited competition, the price of lots at the lower end of the market will tend to be higher, and that will reduce demand and lead to slower population growth, as observed from 2004/05 to 2005/06.

In the next section, we set out our forecasts for population growth given that South Jerrabomberra proceeds – and the impact on population growth and economic trends, in the event that South Jerrabomberra does not proceed.

1.10 New medium and high density housing

Supply of new units were running at high level during 2007/08 and 2008/09. On the surface, it is possible that greater volume of medium and high density housing will compensate if the price of new lots moves back towards/above \$250,000.

However, most of the new units purchased in FY2008 and FY2009 are located on parcels at Bruce — well located but also affordable land.

It will be difficult to create similar sites in the future so supply will tend to come from more expensive locations in close proximity to business districts (Civic, Belconnen, Woden).

Supply of medium and high density housing has been underscored by development in just a few SLAs within the Australian Capital Territory. Since 2005/06, Bruce has constituted the dominant other dwelling development front, registering 252, 398, 74 and 198 approvals respectively.

Given that there were just a limited number of medium and high density approvals in the A.C.T., Bruce has underwritten other dwelling construction within the region over the last three years. Given that resources in Bruce have been exhausted, future development will need to be underscored by other SLAs in the A.C.T.

Looking forward, there seems to be a lull in the number of affordable fronts that could sustain future other dwelling construction in Canberra. The benefit of Bruce was that it had already incubated the necessary infrastructure for development, and was earmarked not suitable for separate dwelling construction. Of the possible fronts awaiting dwelling development, they tend to be subject to higher prices (therefore service a more affluent element of the market) and/or have been allocated to separate dwelling construction. It is this limitation that will inhibit a surge in other dwelling construction within the A.C.T. for a while yet.

1.11 Expectations for growth with South Jerrabomberra

Solid economic growth will continue in the Canberra economic region if affordable land supply can be sustained at a similar rate to that observed over the past three years.

Residential lot supply from South Jerrabomberra, Googong and Molonglo will ensure that there is a substantial pipeline of affordable lots available in the Canberra region over the long term. The pipeline should be sustained over the next ten years, from 2010 to 2020.

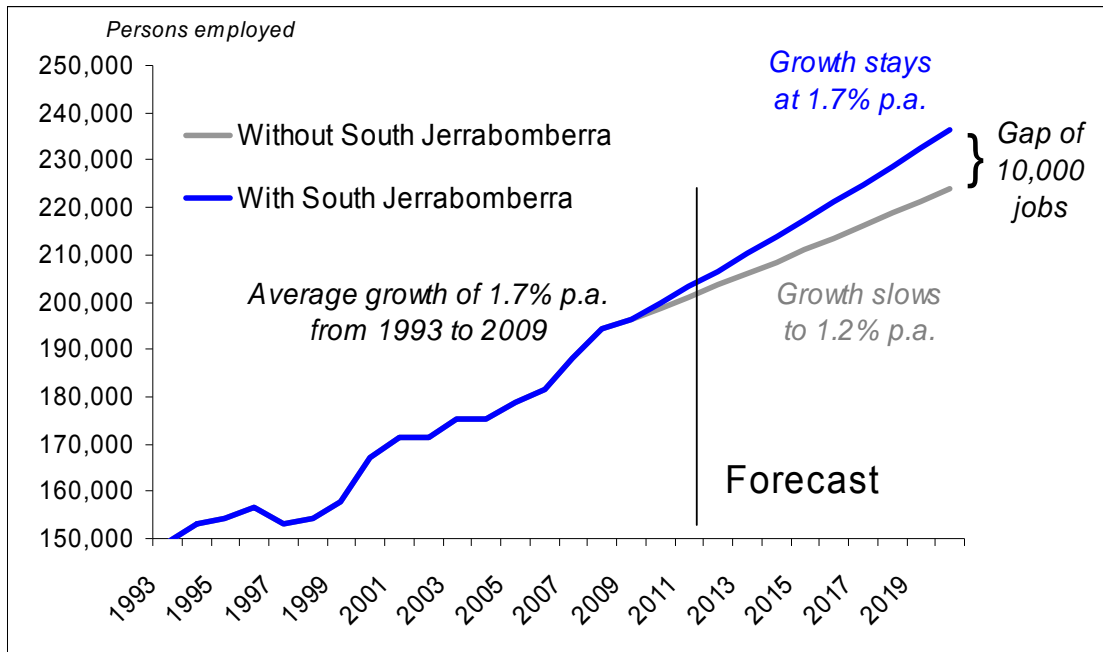
In this event we forecast that population growth will be sustained at an average of 1.2% per annum over the next ten years. The key drivers for population growth will be a net migration gain of 1,300 persons:

- Net overseas migration sustained at an average gain of 1,300 persons p.a.
- Net interstate migration sustained at zero population impact each year.
- Natural increase remains at 3,200 average each year.

Population growth of 1.2% will provide the foundation for employment growth in the region. We forecast that employment growth will average 1.7% per annum over the 2010 to 2020 period.

Economic growth, as measured by state final demand, is forecast to be sustained at 2.7% over the 2010 to 2020 period.

Chart 14: Forecast employment growth



Source: BIS Shrapnel, ABS

1.12 Expectations for growth without South Jerrabomberra

In the absence of South Jerrabomberra, it is likely that affordable residential lots will be produced at a considerably lower rate in the Canberra region.

We expect that population growth will be substantially slower, at 0.8% per annum, comparable to be rate observed from 2003/04 to 2005/06. Slow population growth would be due to a shift in the net migration position to a net loss of 200 persons each year.

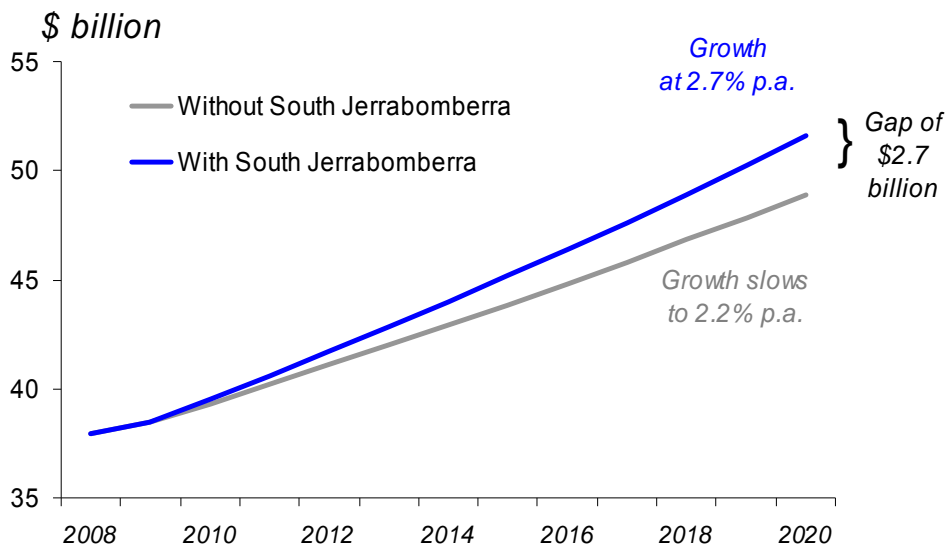
- Net interstate migration would weaken to a net outflow of 500 persons each year.
- Net overseas migration gain would drop to 300 average each year.
- Natural increase remains at 3,200 average each year.

Weaker population growth would lead to slower expansion in economic activity. Average annual employment growth would moderate to just 1.0%. With fewer people moving to the region, there would be a lower level of demand for services, and less need to expand capacity through construction activity.

The slower population growth would mean that over the ten years to 2020, there would be 10,000 fewer jobs created in the wider Canberra region.

Economic growth would be considerably slower. We forecast that economic growth (as measured by state final demand) would be expected to be 2.2% over the ten years to 2020, or 0.5% per annum lower than the outlook with South Jerrabomberra proceeding. As at 2020, the size of the A.C.T. economy would be reduced by about \$2.7 billion.

Chart 15: Canberra regional economy outlook
 (\$ billion, measured by state final demand in volume measures)



Source: BIS Shrapnel, ABS

Slower economic growth leads to softer property prices

Residential property prices are driven by household income. Over the long-term, trend growth in residential property prices has tended to be similar to the rate of household income growth. This relationship makes sense, because household income defines the affordability of house prices.

Household income growth is determined by the rate of economic growth. If land affordability defines the scope for economic growth, then it will also set the potential for increases in house prices over time.

We expect that house price growth over the next decade will average 5.2% per annum. This rate of growth comprises general C.P.I. inflation of 2.5% per annum, and real growth in household income of 2.7% per annum.

If South Jerrabomberra does not proceed, then we project that economic growth in the Canberra economic region will be about 0.5% lower per annum over the next ten years. As a result, the expected house price growth would be reduced to 4.7% per annum.

1.13 Long-term outlook without South Jerrabomberra

There are fundamental limitations on population growth within the A.C.T. due to geographic boundaries with New South Wales. In this respect, it is important to project how quickly the remaining opportunities for greenfields housing are taken up.

Sydney is comparable to the A.C.T., in that there are physical limitations to the rate of greenfields development. The experience in Sydney has shown that the rate of population growth will eventually be governed by the availability of affordable lots.

If we take an optimistic view, and assume that the current rate of population growth in the A.C.T. is maintained into the future, then we estimate that the available land in the North Gunghalin and Molonglo regions can supply enough lots for only 30 years worth of population gain.

This outlook assumes that there are about 45,000 greenfield lots made available from North Gunghalin, Molonglo and other regions in Canberra, with a take-up rate of 1,500 lots per annum. This outlook also assumes that the level of urban consolidation around the town centres continues at recent trend rates.

If population growth in the A.C.T. continues at about 1% per annum, then Canberra's population would reach a maximum of about 500,000 people by around 2040.

Land economics will most likely prevent this outcome. As residential lots become increasingly scarce, the value of land will show strong growth and this will discourage households from moving to the A.C.T. Population growth would slow accordingly, and place a major constraint on the rate of economic growth in the region. Net migration to the A.C.T. would slow to about 1,500 persons per annum. This rate of net migration is the same as that used by the ABS in its projection of population growth (under the medium assumption case as defined by the ABS). Population growth would slow to an average of about 0.6% p.a.

Lower population growth would extend the number of years over which the projected 45,000 residential lots are sold. We would estimate that it would take 45 years, rather than 30 years, to exhaust a stock of 45,000 residential lots.

So we project that the exhaustion of the A.C.T. residential land stock will be achieved somewhere between 30 and 45 years. At that point, the rate of population growth in the A.C.T. will decline further, shifting below 0.5% per annum.

In this environment, it would become increasingly more difficult over time to service Commonwealth government needs out of the Canberra economic region. As the cost of housing moved out of the reach of most households, relatively higher incomes would be needed to attract workers to the Canberra economic region. This trend has been recently evident in Sydney, as the office workforces in Melbourne has increased far more rapidly, as the overall cost of living has become far superior in Melbourne.

This point is important, because the Commonwealth public service represents the roots of economic activity in the Canberra economic region. In the event that the Canberra economic region evolves to principally offer 'elite' housing options, then it seems likely that some of the labour-intensive services will migrate towards more affordable locations in Australia.

Data sources

For the purpose of this report, land sales data was purchased from Residex, covering a selected range of postcodes in the Australian Capital Territory – for financial years 2007, 2008 and 2009. Postcodes with significant land subdivisions and sales over the three years to 2008/09 were included in the sample.

Postcodes included: 2602, 2615, 2618, 2619, 2620, 2913 and 2914.