

4.0 Greater Sydney

Key points

Greater Sydney is where most Sydneysiders (over three million people) live. This suburban region stretches across Western and Southern Sydney in an arc to the Northern beaches and Central Coast. It is bounded in the West and split in the North by the Hawkesbury Nepean Valley which represents a significant natural flooding risk.

Greater Sydney is home to a diversity of industries that are essential to NSW's success. It is the NSW manufacturing heartland which, despite pressures, remains one of the most significant sectors in the NSW economy.

The logistics sector is increasingly important to the West and South-West, supported by Greater Sydney's freight transport networks.

The success of Greater Sydney and Global Sydney are intertwined, with many of Global Sydney's employees commuting in each day from Greater Sydney.

The service sector in Greater Sydney is growing in importance. Parramatta has been significant to NSW's fortunes since the earliest days of European settlement. Today it continues to grow as a key administrative and commercial centre, with more than 20 percent of Australia's Top 500 companies now present in the Parramatta CBD¹.

Greater Sydney's Business Parks such as Norwest, provide highly skilled job opportunities in Greater Sydney. Health, education and other essential public services are also major employers.

The attractiveness of the region means a further 1.1 million people expect to call Greater Sydney home over the next 20 years.

Most of these new residents will be housed in existing urban areas. These new Sydneysiders, just like today's residents, will work at jobs across the metropolitan region. While public transport will be important for some, cars will remain, for most people, the only practical option for their daily travel needs.

Infrastructure NSW has identified five infrastructure priorities to support this rapidly growing region:

- local infrastructure for new houses
- good roads for commuter, community and freight traffic
- better public transport into key employment centres
- new schools and hospitals in growing suburbs
- flood protection for the Hawkesbury Nepean Valley.

4.1 Introduction

Greater Sydney (as described in this section) is all of the Sydney Metropolitan Area other than the inner urban areas of Global Sydney.

It comprises the diverse suburban communities that ring Global Sydney from Campbelltown in the South to the Northern suburbs, Gosford and the Central Coast in the North and Penrith in the West.

It also encompasses the economic, administrative and social hubs of Parramatta, Liverpool, Campbelltown, Penrith, Blacktown, Sutherland and Hornsby.

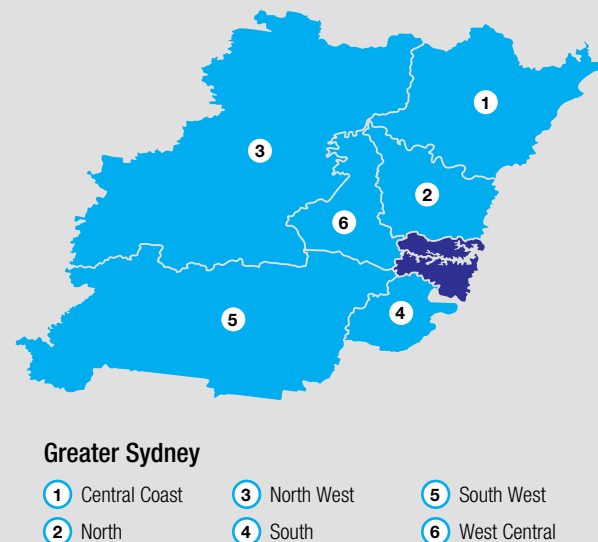
The Greater Sydney sub-regions (see Figure 4.1) covered in this section are:

- South (Kogarah, Hurstville, Canterbury, Rockdale, Sutherland)
- North (Hornsby, Ku-ring-gai, Pittwater, Warringah)
- West Central (Auburn, Blacktown, Hills Shire, Holroyd, Parramatta)
- North West (Baulkham Hills, Blacktown, Blue Mountains, Hawkesbury, Penrith)
- South West (Bankstown, Fairfield, Wollondilly, Camden, Campbelltown, Liverpool)
- Central Coast (Gosford and Wyong).

Greater Sydney accounts for some 46 percent of NSW's population and is home to nearly 3.3 million people.

¹ Parramatta City Council, <http://www.mynewworkcity.com.au>

Figure 4.1 Regions of Greater Sydney



Source: Department of Planning and Infrastructure.

It includes some of the fastest growing urban areas in Australia as well as and more established suburbs. Greater Sydney accounts for around 36 percent of NSW employment (56 percent of Sydney employment), or 1.3 million jobs in 2011, and 34 percent of NSW's economic output (45 percent of Sydney's output), worth about \$140 billion in 2011.

To illustrate the significance of this growth, it is worth considering that within the lifetimes of many Sydneysiders, much of Greater Sydney's regional

employment centres and business parks were semi-rural. In the past 20 years since 1991, over 70 percent of Sydney's population growth (over 600,000 people) has been accommodated in Greater Sydney.

The economic and demographic projections for Greater Sydney for the next 20 years have forecast that the growth story of Greater Sydney is set to continue:

- The population is expected to grow by 1.3 percent per annum (an additional 1.1 million people) to more than 4.4 million people. This is the fastest rate of growth of any region of NSW. This means that by 2031 Greater Sydney will account for nearly half NSW's population
- GSP is expected to grow at 3.0 percent per annum, the same rate as Global Sydney. This means that by 2031 Greater Sydney will contribute 35 percent of NSW's economic output, about \$250 billion²
- Employment is forecast to grow by 1.0 percent per annum, (or around 300,000 jobs) to 1.6 million jobs.

What these figures show is that while Global Sydney is the engine room of the NSW economy, Greater Sydney is where most Sydneysiders live and work.

4.2 Greater Sydney today

Greater Sydney is a complex and diverse amalgamation of communities spread over a vast urban footprint. The Sydney metropolitan area is one of the largest cities in the world in terms of area. Spread across 4,000 square kilometres, it is equal in size to London and almost double that of New York City³.

The metropolitan area mixes suburbs that date back more than 200 years, such as Parramatta and the Macquarie Towns, with other areas like the North West where the population has grown rapidly within the past 20 years.

The population density of Greater Sydney's suburbs varies but is generally lower in density than in Global Sydney as Figure 4.2 shows. These suburbs have the attraction of land prices much lower than in Global Sydney, making it a more affordable option for many families.

The economy of Greater Sydney is similarly diverse. While the economy of Global Sydney is dominated by financial services and knowledge-based sectors, Greater Sydney has a broader industrial base⁴.

- Most of Sydney's manufacturing output is produced in Greater Sydney, particularly in West Central and South Western Sydney.
- Sydney's logistics industry has increasingly located away from the relatively expensive lands around Port Botany and towards major transportation corridors such as the M7 motorway in Greater Sydney.

³ City of Sydney, City of Sydney – A Snapshot.

⁴ Department Planning and Infrastructure 2012, Sydney Over the Next Twenty Years: A Discussion Paper.

² Deloitte Access Economics 2012, Infrastructure and the NSW Economy.

- The construction industry is a major employer across Greater Sydney.
- As most Sydneysiders live in Greater Sydney, a major focus is in sectors serving local population needs such as in healthcare, education and retail.

This industrial mix means Greater Sydney's employment patterns are much more dispersed than in Global Sydney, where most activity is focused on a small number of high-density centres that are clustered closely together, with the CBD paramount.

Sectors such as manufacturing, logistics and construction do not benefit from close proximity (the 'economies of agglomeration' noted in section 3) in the way that many service sectors do. Preference is given instead to less dense areas which generally bring lower land, labour and transportation costs.

While Greater Sydney contains important regional centres such as Parramatta, Liverpool and Penrith, these account for a much smaller proportion of employment in the region, and these centres are also relatively distant from each other. Most employment is spread across the region. This is shown in Figure 4.3.

The residential and employment patterns of the metropolitan area have implications for infrastructure investment in Greater Sydney, particularly for transport infrastructure. The concentration of jobs in Global Sydney means many Greater Sydney residents commute into the region each day, often by public transport.

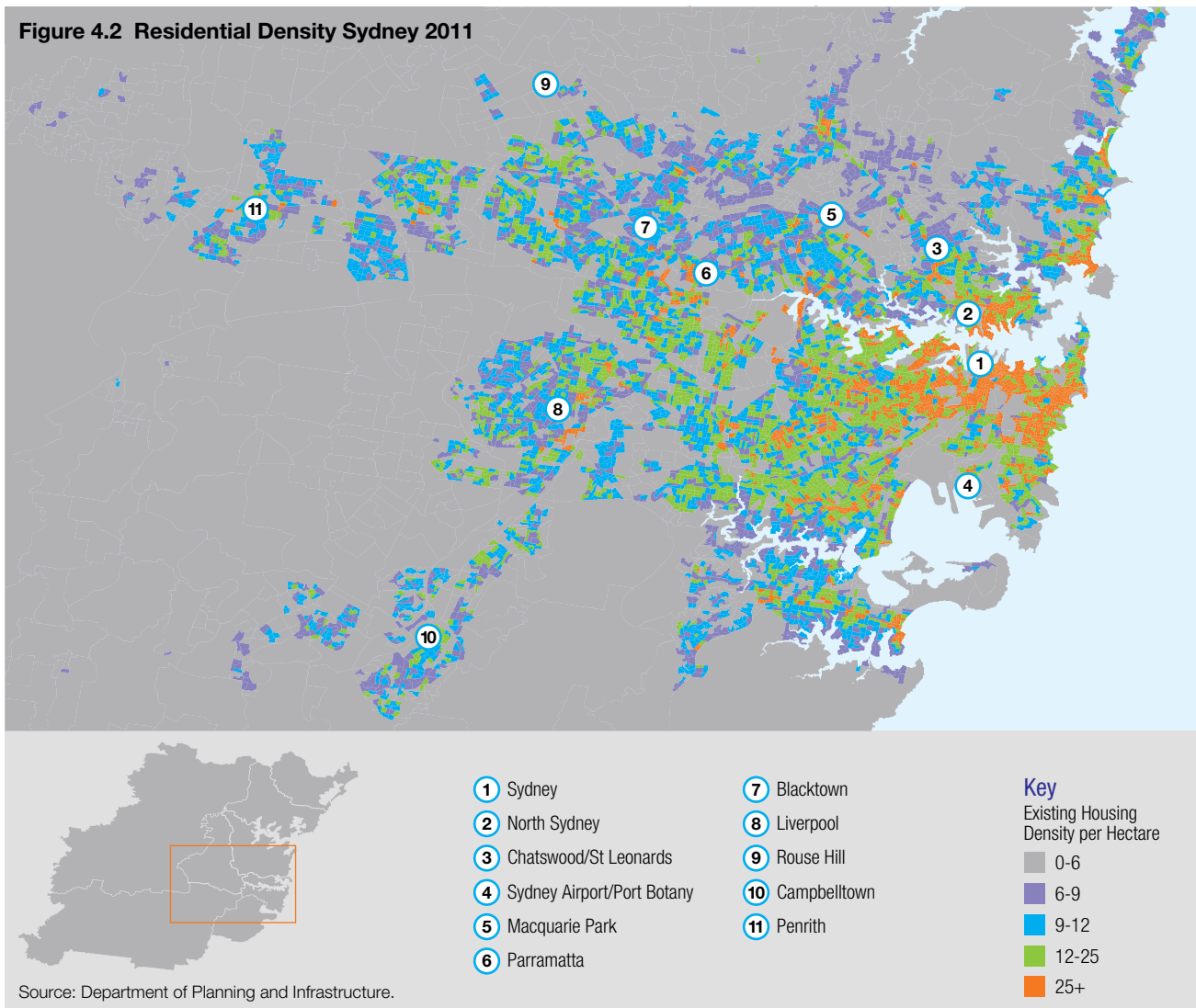
The majority of Greater Sydney residents work within the region however and rely on their cars to get to work. Congestion is a daily issue therefore for many lives across Greater Sydney. These issues are discussed in section 4.4.3.

The infrastructure issues facing Greater Sydney are not uniform, there are major differences between its different sub-regions. Through the capability assessment process described in section 2, Infrastructure NSW has looked at the economic and demographic composition of each sub-region and its current infrastructure deficiencies, shown in Table 4.1.

Table 4.1 Infrastructure Deficiencies by Sub-Region in Greater Sydney

Greater Sydney Sub-Region	Population 2011	Major Industries	Infrastructure Deficiencies
South	650,000	Finance and Services, Logistics	Road congestion, i.e. Princes Highway, adding to freight costs and commute times
North	500,000	Business Services, Technology, Education	Inadequate connectivity to F3 Freeway access to Global Sydney from Northern Beaches and school capacity
West Central	680,000	Secondary CBD – Finance and Insurance Services, Health, Education (UWS), Manufacturing	Access to Parramatta and Global Sydney, inadequate road links, school capacity
North West	760,000	Health, Education (UWS), Construction	Flooding risks, road congestion, i.e. M4 Motorway access to Parramatta and Global Sydney
South West	410,000	Logistics, Manufacturing, Construction	Road congestion, i.e. M5 Motorway, adding to freight costs and commute times, school capacity
Central Coast	300,000	Technology, Health, Manufacturing	Access to Global Sydney, inadequate road connectivity

Figure 4.2 Residential Density Sydney 2011



Source: Department of Planning and Infrastructure.

Where and how people will live and work are the greatest drivers of infrastructure demand. As noted, over the next 20 years an additional 1.1 million people will call the region home, and around 300,000 new jobs will be created. To put this in context, this is double the population growth of Greater Sydney in the 20 years from 1991 to 2011.

It is not possible to have any certainty as to how Sydney will develop at the micro level, given the complexity of the many private decisions that will influence where Sydney's growth will occur.

Analysis developed by Deloitte Access Economics for this Strategy indicates the following high level findings:

- As in recent years, housing growth is expected to come primarily through densification of existing urban areas. Over the past five years, only 15 percent of development has been in greenfield areas and over 80 percent of new homes have been built in multi-unit dwellings⁵. Most greenfield housing development is expected to be located in the North West and South West Growth Centres.
- Large numbers of people will continue to commute into Global Sydney from Greater Sydney each day.
- Over the next 20 years, the economy of Greater Sydney is expected to become more services based, with a reduction in manufacturing. This will present challenges in particular for the West Central and South West sub-regions, which have a particular focus in this sector of the economy.
- Service-based employment will grow in centres across the metropolitan area. Parramatta will

⁵ Department of Planning and Infrastructure 2012, Growth Infrastructure Plan.

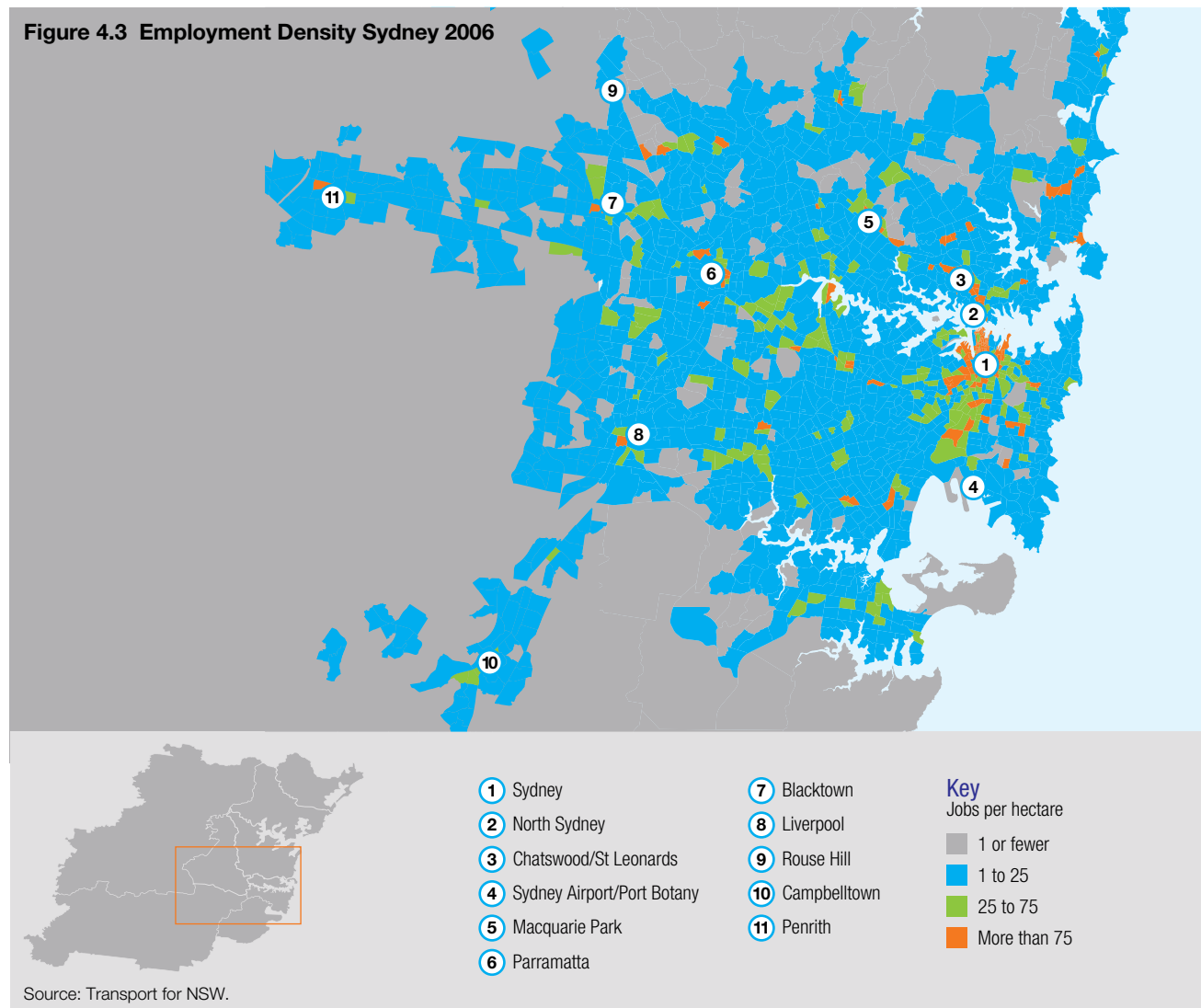
continue its strengths in financial and insurance services. The healthcare clusters at Westmead and Liverpool will grow substantially. The education precinct centred around the University of Western Sydney at Rydalmere and Greater Sydney's business parks, such as Norwest and Frenchs Forest will also grow.

These findings imply Greater Sydney in 2031 will be a higher density region, with a greater proportion of its jobs located in its burgeoning employment centres.

Targets for the distribution of housing and employment are to be finalised by the Department of Planning and Infrastructure in the Metropolitan Strategy for Sydney.

The level of change should not be overstated however. The stock of existing houses is three times greater than those expected to be built over this period. The economies of agglomeration that benefit Global Sydney (and attract commuters from Greater Sydney) are expected to remain as strong as today. Much employment in Greater Sydney, particularly in locally facing roles, is expected to continue to be dispersed across the metropolitan area.

Figure 4.3 Employment Density Sydney 2006



4.4 Greater Sydney Infrastructure priorities

4.4.1 Overview

The key infrastructure priorities that emerge from Infrastructure NSW's capability assessment of today's infrastructure deficiencies and Greater Sydney's forecast population and employment growth are:

- **Housing.** Houses need to be built at a much faster rate than during the last decade. Improving the co-ordination of the utility and local transport infrastructure networks that are needed to enable this will be a major infrastructure challenge. Enabling residential development in those areas most accessible to employment is critical.
- **Transport.** Greater Sydney's new residents will work across the metropolitan area. As today, some will work locally, some will work elsewhere in Greater Sydney, and some will travel into Global Sydney. Sydney needs flexible transport networks that can support this complexity of journey patterns. Ensuring efficient freight movements within and through Greater Sydney is also essential to the economy.
- **Social Infrastructure.** Investment in schools and healthcare facilities will be required in the fastest growing areas. In the health sector, new models of care are needed to ensure affordability as Sydney ages.

Parts of Greater Sydney also lie in the Hawkesbury Nepean Valley and are exposed to flood risk. Protecting people and the economy in this region is vital.

4.4.2 Infrastructure for Housing

Sydney's lack of housing supply is one of the most significant economic issues facing NSW and drives the ongoing problem of housing affordability. It is estimated that the construction of an additional 8,000 dwellings per annum in New South Wales over the last decade would have directly increased GSP by 0.5-0.6 percent, or \$2 billion per annum⁶.

Undersupply of housing in Greater Sydney in the past decade is reportedly due to lack of land supply in greenfield areas arising from the 'Sydney is full' approach, high cost of land, planning complexity and higher construction costs; the lack of on time delivery of lead-in infrastructure; and localised opposition to in-fill development⁷.

Like any market, house prices are subject to the laws of supply and demand. In Greater Sydney demand is growing, supply is constrained and hence prices are high.

There is a reported housing supply shortage in Greater Sydney of around 100,000 homes⁸. Addressing this and accommodating population growth means around 600,000 additional homes need to be built over the next 20 years.

Co-ordination of utility and transport infrastructure is essential to unlocking housing development, particularly in greenfield areas. The Government is introducing a series of reforms to improve the co-ordination of local infrastructure, including:

- increasing the release of land in growth areas zoned for residential development
- introducing new Growth Infrastructure Plans to link spatial planning with infrastructure planning and provision in high growth areas
- mandating a contestable lead-in infrastructure (water and roads) market
- creating the Housing Acceleration Fund to directly fund critical local infrastructure in high growth areas.

Infrastructure NSW supports these measures. Barriers still exist to greenfield development, however. Sydney's vast size means that many greenfield developments can be a long way from major employment centres.

The North West and South West Rail Links will help connect Sydney's two growth centres to employment opportunities, particularly in Global Sydney. There will also be a need for road investment to improve the connectivity of these growth centres to the existing urban area.

The majority of housing growth is taking place in existing residential areas. In-fill development leverages existing transport, utility and social infrastructure systems at a lower cost, helping to increase housing affordability.

The location of in-fill development is important. The Department of Planning and Infrastructure has examined the relative costs of different in-fill scenarios. Of the cost drivers, transport congestion, crowding and social impacts from transport are most important and a balanced approach, where residential growth is focussed on local and strategic centres, achieved lowest costs⁹. Infrastructure NSW supports this approach.

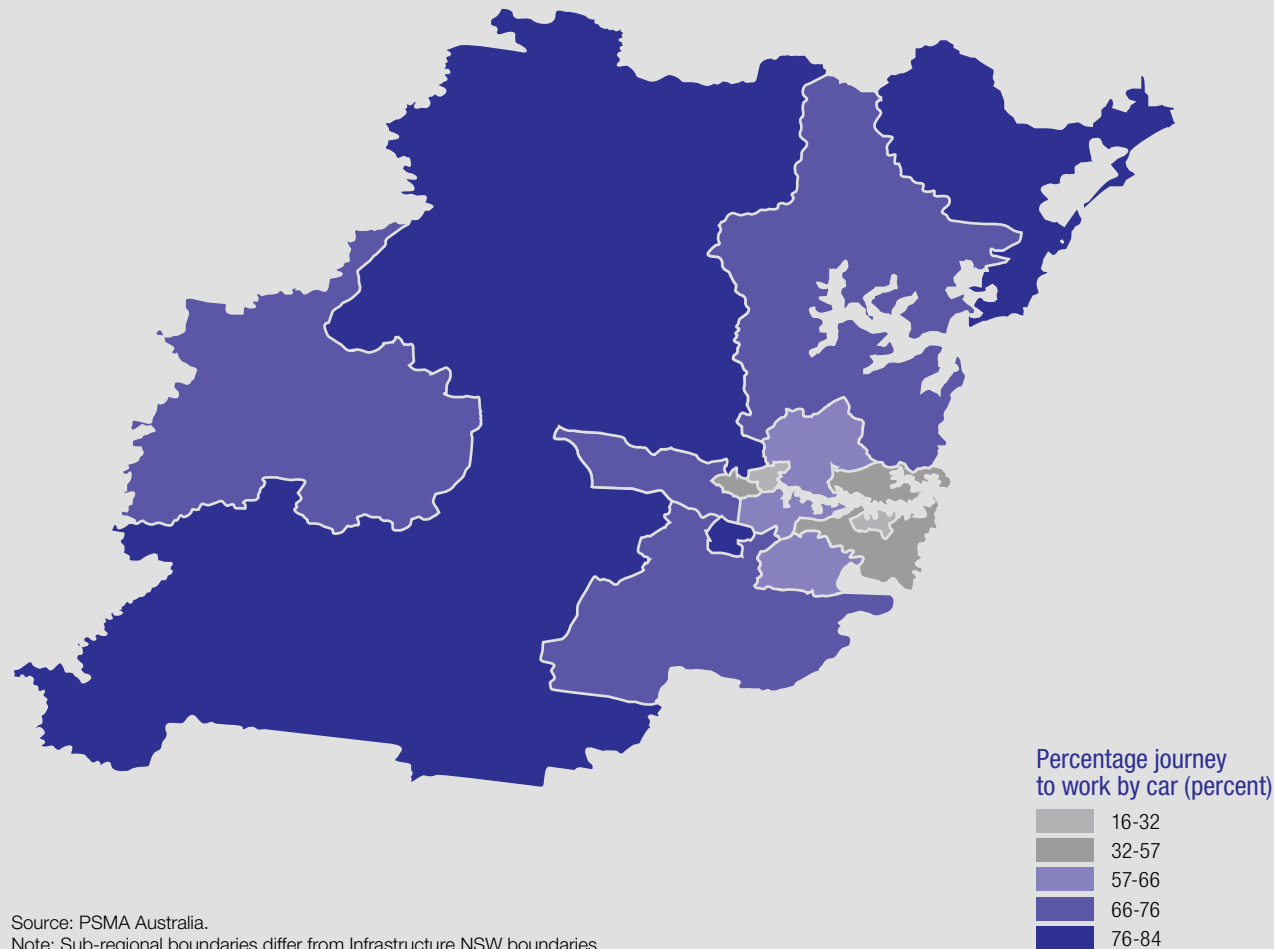
⁶ BIS Shrapnel and Urban Taskforce 2010, Going Nowhere.

⁷ Department of Planning and Infrastructure 2012, Growth Infrastructure Plan.

⁸ BIS Shrapnel.

⁹ Centre for International Economics 2012, Costs and benefits of alternative strategies for Sydney's growth, Draft report.

Figure 4.4 Journeys to Work by Car – percentage of all people



Source: PSMA Australia.
 Note: Sub-regional boundaries differ from Infrastructure NSW boundaries.

4.4.3 Transport Infrastructure

Infrastructure NSW has taken a mode neutral approach to its assessment of transport infrastructure options in this strategy. This approach recognises that road and rail networks are mostly complementary to each other, rather than in competition.

The travel flows and transport infrastructure demands created by the dispersed housing and employment patterns of Greater Sydney are complex. Historic assumptions about Sydneysiders commuting to a single central business district by mass transit do not reflect the current position. While the travel flows into Global Sydney from across Greater Sydney are significant, intra-suburban and cross-suburban commuting flows are even greater.

Private vehicles are better suited to this diffuse orbital travel than public transport, which needs relatively high demand along a given corridor to be viable. Over 80 per cent of non walking journeys in the metropolitan area on weekdays are by car¹⁰. More than 70 percent of Greater Sydney residents choose to drive to work each day (compared with around 20 percent by public transport), as shown in Figure 4.4¹¹.

These journey patterns are not unique to Sydney. In Vancouver for example, despite an average population density more than two and a half times that of Sydney, 67 percent of journeys to work are by private vehicles¹².

¹⁰ NSW Bureau of Transport Statistics 2011, Household Travel Survey.

¹¹ Australian Bureau of Statistics, 2006 Census.

¹² Statistics Canada, 2006 Census.

What this tells us is that in complex metropolitan areas with a multiplicity of journey origins and destinations, there is often no realistic alternative to the car for many journeys. The evidence suggests that the expected densification of Greater Sydney discussed in this section is unlikely to change journey patterns significantly.

Conversely, radial journeys into Global Sydney or Greater Sydney's major employment centres (such as Parramatta) are clearly best served by mass transit, which can transport higher numbers along a given transport corridor more reliably than car travel.

Over the next 20 years, Infrastructure NSW expects the car will remain the dominant mode of transport in Greater Sydney. Investment is needed to ensure sufficient road capacity is available and is utilised effectively, particularly along the motorway network. These issues are discussed further in Section 6.

For major employment centres, action will be needed to enable a higher proportion of journeys to be made by public transport as these centres grow. Public transport in Sydney is discussed in Sections 7 and 8.

Plans will need to account for freight journeys to, from and within Greater Sydney as well. Most freight journeys are expected to continue to be undertaken by road, due to the cost, flexibility and reliability of road freight. Freight issues in Sydney are discussed in Section 9.

Parramatta The Heart of Greater Sydney

Within Greater Sydney, the largest economic and employment cluster occurs around Parramatta, NSW's second oldest settlement and the sixth largest business district in Australia.

Almost 50,000 people already work in the Parramatta CBD¹³. The wider area around Parramatta (including the Westmead Hospital precinct, Sydney Olympic Park and the University of Western Sydney Campus at Rydalmere) employs many more.

Parramatta benefits from good transport connections, space for office development and attractive urban amenities, such as cafes, parkland and the river. These attributes will support growth and attract infrastructure investment.

Parramatta's comparative advantage is its position at the geographic heart of Sydney. Its future as an important business centre is assured, with a particular focus on Government services and the rapidly growing residential areas of Greater Sydney.

Parramatta will offer, even more than it does already, access to the highest quality healthcare, education and cultural services. Parramatta will continue to act as a major regional business and service centre with strong connections to Global Sydney.

A major priority to achieve these goals is substantial improvement in transport to and around Parramatta and the corridor between Epping and Parramatta, and improving the connectivity of Parramatta to Global Sydney. Options to improve transport serving Parramatta are set out in Sections 6, 7 and 8.

Sensible planning also requires the identification and preservation of potential road and rail corridors and sites for major infrastructure facilities (such as freight intermodal terminals) within Greater Sydney. The value of corridor preservation can be seen in roads such as the M7 Motorway, which was able to be delivered affordably and without significant disruption to existing communities.

4.4.4 Health Infrastructure

Around 70 percent of all NSW health assets are in Greater Sydney, including Westmead, St George, Liverpool, Bankstown and Concord Tier one hospitals. The development some 30 years ago of the health precinct around Westmead, which includes the State's leading children's hospital, was a direct response to the westward expansion of Sydney's population. These trends are expected to continue over the next 20 years.

Demand for health care is forecast to grow around 17 percent over the next 10 years in Greater Sydney¹⁴. The proportion of the economy in the health and social services industry sector is expected to grow by 10 per cent in the next 20 years (from 6.6 percent to 7.3 percent)¹⁵. Importantly, public and private hospitals have created health precincts in Kogarah, Westmead, Hornsby, Campbelltown and Liverpool.

Each region's utilisation of hospitals forecast growth in demand and major works proposed by the NSW Government are summarised in table 4.2.

¹³ NSW Bureau of Transport Statistics 2011, Employment Forecasts.

¹⁴ NSW Department of Health 2012.

¹⁵ Deloitte Access Economics 2012, Infrastructure and the NSW Economy.

Table 4.2 Healthcare in Metropolitan Sydney

Regional Action Plan Area	Average Available Beds [*]	Bed Occupancy Rate	Forecast Increase in Demand for Acute Care	Proposed Major Works
South	1.9	94%	17%	St George Redevelopment
North	1.8	80%	16%	Hornsby Ku-ring-gai stage 1 Northern Beaches
West Central	1.7	90%	24%	Blacktown / Mt Druitt / Westmead
North West	0.8	95%	20%	Nepean Stage 4
South West	2	80%	16%	Liverpool / Campbelltown / Leppington
Central Coast	1.8	90%	7%	Gosford / Wyong

Source: PwC.

*Beds per 1000 head of population.

Table 4.3 Education in Metropolitan Sydney

Regional Action Plan Area	Primary enrolments – growth in next ten years	Secondary Growth	Proposed Major Works
North	16%	15%	Lindfield; major expansions
West Central	14%	13%	Auburn primary school and high school
North West	16%	15%	The Ponds – 3 schools, Riverstone, Riverstone East, North Kellyville, Schofields, Glenmore Park, Blue Mtns, Penrith SSP
South and South West	15%	9%	Wentworth Point, Spring Farm, Edmondson Park, Oran Park, Rockdale, Leppington, Gregory Hill
Central Coast	8%	2%	Wyong, Lake Macquarie

Source: NSW Department of Education and Communities. Note: Boundary of South and South West Combine.

As with other parts of NSW, affordability will remain a challenge as an ageing population and new healthcare technologies increase healthcare spending. Getting the most out of the existing asset base (both public and private) through new models of care will be essential to manage these pressures.

Infrastructure NSW's Health Infrastructure Strategy is set out in Section 13.

4.4.5 Education

School populations in Greater Sydney are growing at twice the rate of the rest of NSW, reflecting high levels of population growth as shown in Table 4.3. Parts of the Greater Sydney area are experiencing very high capacity utilisation in primary schools including the Northern region (110 percent), West Central region (104.5 percent), and South West (103 percent)¹⁶.

A large program of work to expand the capacity of existing schools is planned, in addition to new schools across the metropolitan area.

Sydney's education infrastructure needs are discussed in more detail in Section 14.

4.4.6 Protecting People and the Economy

The recent experience in Queensland with the controversy over operating rules for Wivenhoe Dam during the 2011 floods, raises issues about the level of flood mitigation capability provided by major storages such as Warragamba Dam in NSW.

¹⁶ NSW Department of Education analysis, 2012.

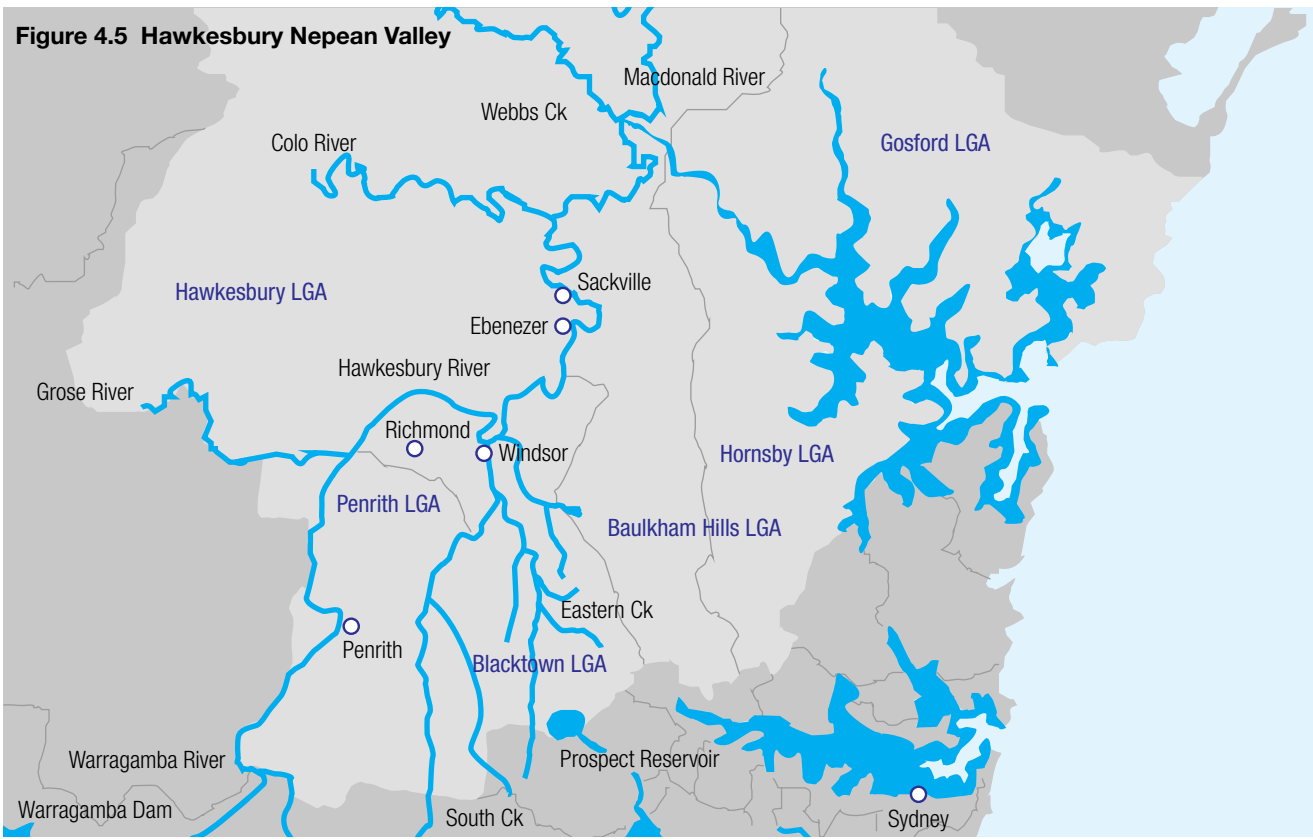


Figure 4.5 Hawkesbury Nepean Valley

The Hawkesbury Nepean Valley (HNV) (illustrated in Figure 4.5) is one of the most heavily developed and at risk flood plains in Australia.

The flooding history in the HNV can be traced back to the very early years of European settlement. As early as 1817, a proclamation from Governor Lachlan Macquarie expressed "concern and regret for the recent calamities in which the unfortunate settlers on the banks of the Nepean and Hawkesbury have been once more involved, by the late dreadful inundations of those rivers"¹⁷.

The largest flood recorded in the Valley occurred in 1867. Despite proclamations as far back as the early 1800s to avoid living in flood affected areas in the Valley, significant development of homes and businesses has occurred. As more development has occurred, NSW has continued to invest millions in supporting infrastructure, which is also at risk.

During the 1980s and 1990s evidence emerged that floods significantly larger than any yet recorded could occur in the Valley¹⁸. This eventually led in the late 1990s to major upgrades of Warragamba Dam to prevent dam break during major flooding events to protect Sydney's water supply. This decision only dealt with dam safety issues and ignored the major risk to the people and businesses in the HNV and the NSW economy as a whole.

In reviewing the decision on dam safety, the extent of flood risk to people living and working in the HNV was revealed. The HNV has a unique flooding topography in Australia where a narrow gorge at Sackville restricts the rivers flow.

¹⁷ Governor Macquarie 1817, General Orders.
¹⁸ Sydney Water, 1995.

In heavy rains the water level rises quickly and incremental flood depths are very large compared to other flood plains. The water level at Windsor is normally at sea level. A repeat of the flood on record would see this rise to almost 20 metres high.

The NSW Government of the day not only wanted appropriate emergency plans for the HNV, it also wanted to substantially alleviate flood losses. An Environmental Impact Statement (EIS) was developed which looked at all the possible options.

The EIS reached the conclusion that raising the Warragamba Dam wall by 23 metres to temporarily store flood waters not only made the dam wall safe from the probable maximum flood but would also reduce flood losses in the Valley. The largest environmental impact of this option was the temporary inundation, upstream of the dam, to the undisturbed bushland.

At the time, it was considered that these biophysical costs would not outweigh the social and economic benefits to be gained from raising the dam wall.

A change in the NSW Government in 1995 saw a change in view where upstream biophysical costs were considered to be sufficient to outweigh the social and economic benefits as a whole¹⁹.

The previous NSW Government, in rejecting raising the wall of the dam, decided to mitigate the impact of flooding downstream through focused town and emergency planning. This included upgrading of

evacuation routes to provide more time for the people in the HNV to escape rising floods.

None of these actions comprehensively deal with the potential for homes to be flooded and destroyed and the significant economic and personal loss which could occur²⁰.

Despite these measures, development has continued in the HNV in areas that would be significantly impacted by a flood on record. The economic and social risks still exist and are considerably greater than they were 20 years ago²¹.

Infrastructure NSW commissioned new modelling to provide up to date data on flooding impact from both a damages and economic impact perspective so that it could provide advice to Government as part of the Strategy. The findings and the recommendations are set out in Section 12.

¹⁹ Molino Stewart 2012, Hawkesbury Nepean Flood Damages Assessment: Final Report.

²⁰ Molino Stewart 2012, Hawkesbury Nepean Flood Damages Assessment: Final Report.

²¹ Molino Stewart 2012, Hawkesbury Nepean Flood Damages Assessment: Final Report.