

# TRANSFORMING PERTH

REGENERATING TRANSPORT CORRIDORS AS  
A NETWORK OF HIGH STREET PRECINCTS

FEBRUARY 2013



# TABLE OF CONTENTS

## REGENERATING TRANSPORT CORRIDORS AS A NETWORK OF HIGH STREET PRECINCTS

<b>03</b>	FORWARD
<b>04</b>	EXECUTIVE SUMMARY
<b>05</b>	INTRODUCTION
<b>06</b>	WHERE ARE WE NOW?
<b>09</b>	CURRENT POLICY SETTINGS
<b>012</b>	EXPLAINING DENSITY
<b>016</b>	BARRIERS
<b>018</b>	BENEFITS OF INFILL AND HIGH STREET REGENERATION
<b>020</b>	DEVELOPMENT POTENTIAL
<b>022</b>	DEVELOPMENT POTENTIAL
<b>024</b>	CALCULATING CAPACITY
<b>026</b>	HELPING LOCAL GOVERNMENT ACHIEVE INFILL TARGETS
<b>028</b>	A VISION FOR PERTH'S FUTURE HIGH STREETS
<b>036</b>	CASE STUDIES AND VISIONS FOR PERTH HIGH STREETS
<b>038</b>	RECOMMENDATIONS

## FOREWORD



### **Professor Rob Adams, Director of City Design, City of Melbourne**

The 'Transformation' of Australian Cities to meet the twin pressures of rapid growth and climate change will only be successful if it can be achieved within a frame work of financial viability, social cohesion and environmental stability. This study and its valuable partnership illustrates a progressive pathway to the future. A pathway that gets greater capacity out of our existing infrastructure, whilst retaining and complimenting the residential, transport and employment opportunities of our existing cities.



### **Joe Lenzo, Executive Director, Property Council of Australia**

Out of an unlikely partnership comes a pioneering report and one which is more than just a demonstration in cross-partisanship. *Transforming Perth* proposes an elegant balance between protecting our suburbs and finding long-term and sustainable solutions for Perth's future. The Property Council's hope is to inspire a new and reasoned conversation about density and one which is focussed on protecting the flavour and integrity of existing suburbs while meeting Perth's growth needs.



### **Senator Scott Ludlam, Australian Greens**

One of the most striking things about city policy in Australia is the divide between good intentions and built reality. We know how to build urban centres that are supportive, sustainable, human-scaled and creative, but for the most part, we don't. This document is an unapologetic attempt to bridge this divide, bringing together urban planners, developers, policy makers and advocates to map out the common ground. It turns out there's a surprising amount of it after all.



### **Dr Anthony Duckworth-Smith, Assistant Professor, Australian Urban Design Research Centre**

AUDRC is committed to informing ways to sustainably develop rapidly urbanising cities such as Perth. Urban design research is a critical element in ensuring that this happens in a successful manner. Urban Activity Corridors have the potential to accommodate substantial numbers of dwellings integrated with public transport access. This form of infill promises to preserve much of the integrity of existing suburbs. They are also however challenging sites for habitation and the design of their residential environments requires careful consideration to safeguard aspects of liveability and ensure they are attractive options for dwelling. It is also currently more expensive to build attached housing than it is to build detached housing and this is an important issue to be considered. The Centre is pleased to share its research into these important aspects and recognises the opportunity that such a settlement pattern could provide to the future prosperity of the city.

## ACKNOWLEDGEMENTS

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*Dr Annie Matan*, Curtin University Sustainability Policy Institute

*Cole Hendrigan*, Curtin University Sustainability Policy Institute

*Rebecca Lewis*, Australian Urban Design Research Centre

## EXECUTIVE SUMMARY

This is a joint study by the Property Council of Australia, the Office of Senator Scott Ludlam and the Australian Urban Design Research Centre.

This report examines the potential number of new dwellings that could be accommodated in medium and high density scenarios in existing and often underutilised areas along Perth's Activity Corridors. The broader purpose was to explore the opportunity to transform (or in many cases return) what are currently congested and car dominated roads into a vibrant series of High Streets and urban villages that are attractive places to live and work.

The Study builds on the ground-breaking *Transforming Australian Cities* report (2009) which found the potential to house an additional 1 – 2.5 million people along Melbourne's existing tram and priority bus lanes, in an area equivalent to only 7% of Melbourne's urban footprint. It also draws on the exemplary city-scale planning, visioning and engagement processes developed under South Australia's Integrated Design Commission.

Perth now stretches 120km along the coast and is experiencing the fastest growth of any Australian city. Our city faces several urban challenges including traffic congestion, lack of housing choice and affordability, and loss of natural habitat. High quality infill development is one of the best options we have to address these pressing urban challenges most directly and sustainably; and to also strengthen - and leave untouched - our existing suburbs.

Seven corridors were selected in this report based on their strategic importance in the Perth Metropolitan

Area and in accordance with their identification as future rapid transit routes in Perth's draft public transport strategy, *Public Transport Plan for Perth in 2031*.

These included Charles Street, Wanneroo Road, Scarborough Beach Road, Great Eastern Highway, South Street, Cockburn Road, Ranford Road, Thomas Street, and Albany Highway. Collectively the seven corridors weave through 19 Local Government Areas and run for more than 86km.

Under the State Government's strategic plan for Perth - *Directions 2031 and Beyond* the government is targeting a 50 percent improvement of current infill trends, which equates to 124,000 new dwellings to be delivered through infill development. It prioritises development in Activity Centres to meet this target.

This report demonstrates that Perth's entire infill target could easily be met through medium density development along the seven corridors. It also found:

- A total developable land supply along seven Activity corridors of 1575 hectares.
- A total potential yield of 94,500 - 252,000 new dwellings at medium to high density scenarios (R60 - R160).
- Medium density (R80) development along the seven corridors would accommodate 100% of Perth's infill target of 124,000 dwellings to 2031.
- Medium-high density development (R100) would account for 126% (157,508 dwellings) of the Directions 2031 infill target of 124,000 dwellings to 2031.

The report also helps local government achieve its infill targets under Directions 2031 with information about potential dwelling yields along corridors at a three different densities.

In many cases an entire local government's Directions 2031 infill target can be achieved through infill along one or two future High Streets alone. Based on the latest Local Government housing targets in *Delivering Directions 2031* (2012),

- 100% of *Delivering Directions 2031* LGA targets could be met in Fremantle, Nedlands, Vincent, Claremont and South Perth through medium density infill.
- Belmont, Stirling and Victoria Park could meet its entire *Delivering Directions 2031* targets at medium-high density infill.
- 50% of *Delivering Directions 2031* LGA targets would be met through medium density in Armadale and Cockburn.

Infill housing development and urban regeneration at the precinct level will deliver significant economic, social and environmental benefits. This report identifies eighteen.

However Perth faces a number of barriers to infill development, including higher construction costs, community concerns about higher density and a lack of major public transport infrastructure.

This report makes fifteen recommendations to overcome these barriers.

Our recommendations provide the institutional circuit breakers needed in our state and federal governance, planning and transport systems and community visioning and engagement processes.

Broadly, we call for a state led vision for precinct scale urban regeneration.

# INTRODUCTION



College Street, Toronto, Ontario.

This is a joint study by the Property Council of Australia, the Office of Senator Scott Ludlam and the Australian Urban Design Research Centre. It investigates the potential to use underutilised land along Perth's key transport routes and transform them into attractive places to live that can accommodate some of Perth's projected population increases to 2031.

The State Government's strategic plan for Perth - *Directions 2031 and Beyond* - proposes that new growth occur in a more balanced manner, focused on neighbourhood centres linked by efficient transport infrastructure, and networks of parks and biodiversity areas. *Directions 2031* identifies a hierarchy of "Activity Centres" and prioritises these areas for future development. It also appoints population and housing targets to each Activity Centre and Local Government Area (LGA). This report will complement these targets.

However, Activity Centres are not the focus of this study. The missing piece in the puzzle is the *Activity Corridors* – that is, the areas along Perth's existing and future transit routes that link Perth's Activity Centres together.

By focusing infill along Activity Corridors we can enhance the public transport connectivity between Perth's Activity Centres and can transform these areas into vibrant High Streets with a mix of housing, employment opportunities, and services.

This report specifically looks at the potential number of new dwellings that could be accommodated in medium and high density scenarios in these existing and often underutilised areas. We also explore the opportunity for precinct-scale urban regeneration of these corridors into attractive, vibrant and liveable High Streets.

A key strength of this concept is that it does not deny Perth residents the choice to live a suburban lifestyle. By focussing development along existing urban corridors it leaves the suburbs not just intact, but improved, since local residents will be within walking or riding distance

to significantly more services along their local High Street. The concept does not change the established urban fabric of our existing suburbs, it strengthens it.

This report is modelled on the groundbreaking *Transforming Australian Cities report* (2009) commissioned by the Victorian Department of Transport and the City of Melbourne, which found the potential to house an additional 1 – 2.5 million people along Melbourne's existing tram and priority bus lanes.

Similar studies on specific localities have also been undertaken by the Property Council of Australia in South Australia (*Redesigning Adelaide 2036*) and by the WA Department of Planning (*the draft Scarborough Beach Road Activity Corridor Framework*)<sup>1</sup>.

Our aim is that this report ignites an important conversation about the significant role and opportunity our Activity Corridors could play in delivering a more liveable, sustainable, vibrant and connected Perth metropolis.

<sup>1</sup>Draft Scarborough Beach Road Activity Corridor Framework; Department of Planning 2012, At <http://www.planning.wa.gov.au/661.asp>



## WHERE ARE WE NOW?

### PERTH'S URBAN CONTEXT

Metropolitan Perth offers an enviable lifestyle. With our exceptional beaches, beautiful Swan River, Mediterranean climate, extensive parklands, unique bushland, coastal habitats and built heritage we are blessed to live in an attractive and liveable city.

As our city grows we must consider how to provide housing that offers people choice, that people can afford, in places where they want to live, near work, services and facilities while also protecting the amenity and enjoyment of existing suburbs.

Metropolitan Perth has doubled in size since the 1970s. With our population predicted to increase by a third to 2031, it's vital to consider how we might accommodate this growth in the smartest and most liveable way, while building in greater resilience in the event these population growth predictions don't come to pass.

Perth now stretches 120km from Mandurah to Yanchep, covering more than 100,000 hectares.

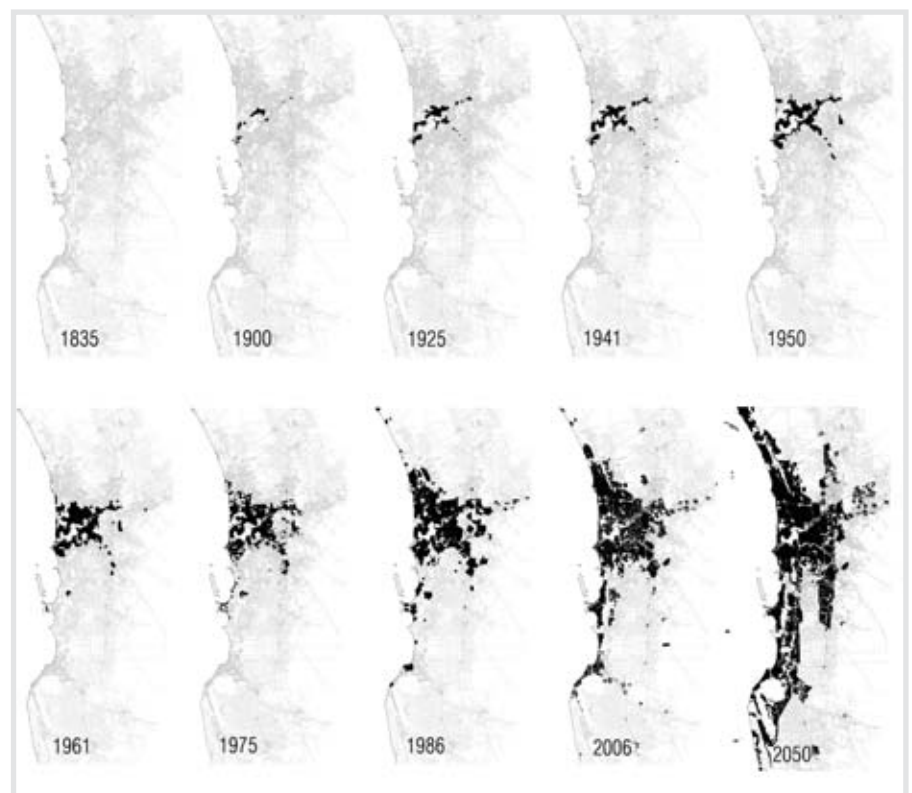


Figure 1: The growth of Perth from 1835-2006 including a 2050 projection if the city continues to grow at current rates<sup>2</sup>.

The Department of Transport acknowledges that the size and shape of our city means residents travel long distances to work and their daily activities<sup>3</sup>. People living long distances from employment and services are especially vulnerable to rising fuel prices.

Transport costs already account for 16% of the average Australian household budget, and if these costs rise the choice to switch to cheaper alternatives such as cycling or public transport will be dependent on people's location and income<sup>4</sup>.

<sup>2</sup> Richard Weller (2008) *Planning by Design - Landscape architectural scenarios for a rapidly growing city*. *Journal of Landscape Architecture* / Autumn 2008. At <http://www.audrc.org/wp-content/uploads/2011/12/WELLER-R.-2008.-Landscape-Architectural-Scenarios-for-a-Rapidly-Growing-City.-Journal-of-Landscape-Architecture-Autumn-08-18-29.pdf>

<sup>3</sup> Department of Transport – *Public Transport for Perth in 2031*. 2011

<sup>4</sup> Or \$193 per week, at Australian Bureau of Statistics. *1301.1 Year Book Australia, 2012: Household Income, Expenditure and Wealth. Table 9.8 Selected Household Expenditure and Characteristics, by equivalised disposable household income quintile groups—2009–10*. At <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1301.0-2012-Main%20Features-Household%20income,%20expenditure%20and%20wealth-193>

Perth is overstretched and under developed. A 2008 study mapped the vulnerability to changing transport, inflation and mortgage prices in Australian cities between the census periods 2001 – 2006 (Figure 2). It showed those living long distances from work, education and services and without close proximity to public transport will be the worst affected by rising fuel and housing costs<sup>5</sup>.

Perth's metropolitan area is now one of the largest cities in the world by land size. Unlike other cities of a similar physical size we are very sparsely settled. Perth's physical size is roughly the same size as Los Angeles and Tokyo, but has only one tenth and one twentieth of their populations<sup>6</sup>.

City	Population	Area Metro
Perth	1.83 million	120km x 50km
Tokyo	48.86 million	90km x 25km

The size of our city and the way its growth has impacted on our natural environment and heritage and is currently the subject of a Strategic Environmental Assessment, due to be released in late 2013. The report will assess the health and status of Perth's ecological communities, threatened species, wetlands of international importance and national heritage places and will identify areas that are appropriate or not for development so that these with the strongest values will be protected<sup>7</sup>. If done well, this will provide certainty to the community and development industry.

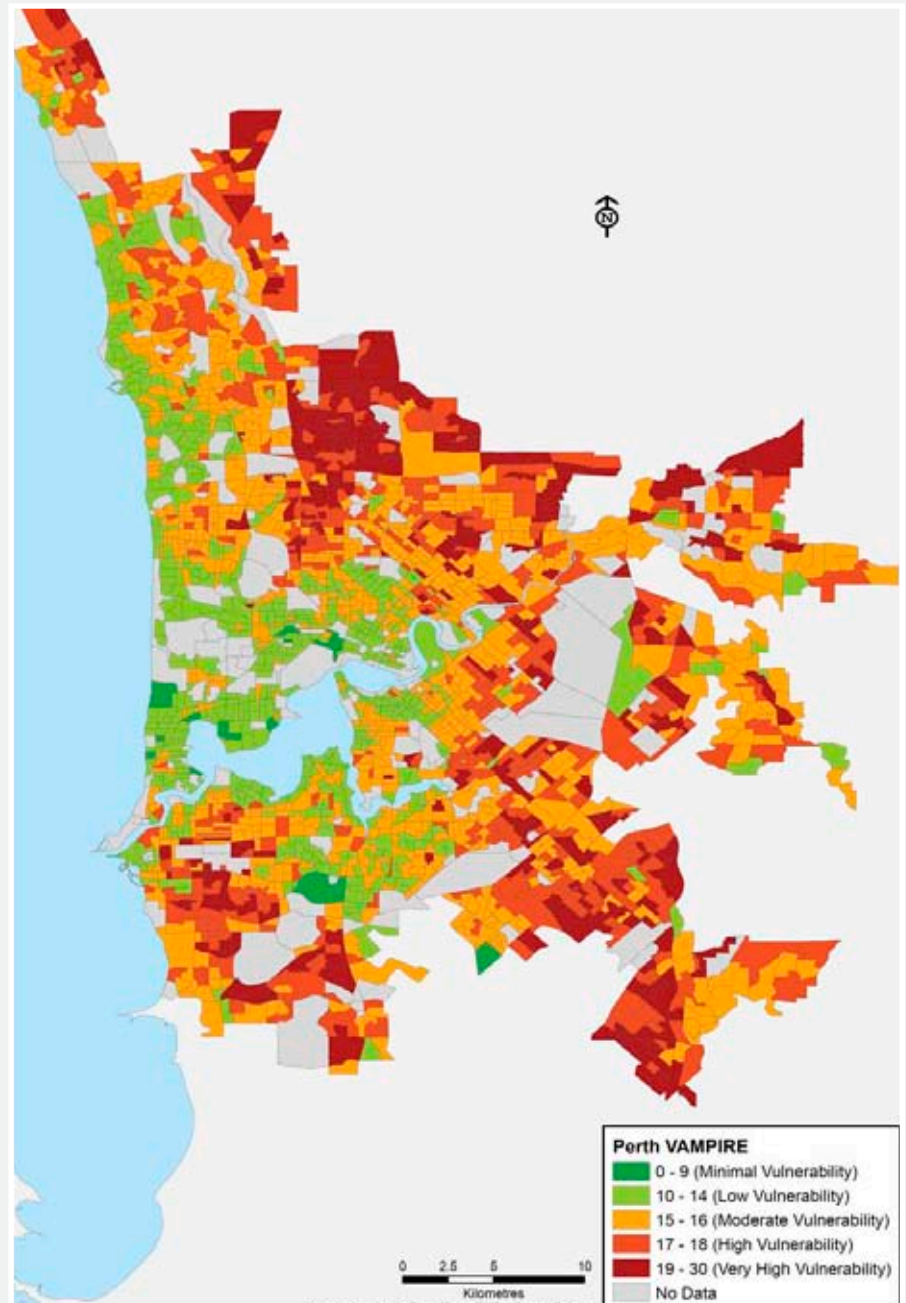


Figure 2: Oil and Mortgage vulnerability in Perth 2006<sup>5</sup>.

<sup>5</sup>Dodson, Jago and Neil Sipe. 2008. *Unsettling Suburbia: The New Landscape of Oil and Mortgage Vulnerability in Australian Cities*. Urban Research Paper 17, Griffith University. [http://www.griffith.edu.au/\\_data/assets/pdf\\_file/0003/88851/urp-rp17-dodson-sipe-2008.pdf](http://www.griffith.edu.au/_data/assets/pdf_file/0003/88851/urp-rp17-dodson-sipe-2008.pdf)

<sup>6</sup>See for example *City footprint maps comparing the size and populations of metropolitan areas around the world*, at van Susteren, *Metropolitan World Atlas*, 101 Publishers, Rotterdam 2007, cited in Weller (2009) *Boomtown 2050* p96

## WHERE ARE WE NOW?

Perth is Australia's fastest growing capital city and this has created major urban growth challenges for the city. The *State of Australia's Cities (2012)* report identified a number of these challenges.

**Perth's key urban challenges are summarized in Table 1.**

**Table 1: Perth's key urban challenges**

Population growth and demographic changes	<ul style="list-style-type: none"> <li>• Highest growth rate of all Australian cities.</li> <li>• Accelerated population growth occurring mostly long distances from the CBD.</li> <li>• Growth mainly occurring long distances from employment, services and amenity.</li> <li>• An ageing population with 27% to be over 65 years by 2050.</li> <li>• Smaller household size and increase in single occupancy households.</li> </ul>
Environmental limits	<ul style="list-style-type: none"> <li>• Accelerated loss of biodiversity and natural habitats.</li> <li>• Water scarcity and reduced rainfall.</li> <li>• Climate change mitigation and adaptation efforts are urgent.</li> </ul>
Economic shifts and urban productivity	<ul style="list-style-type: none"> <li>• Liveability and 'the knowledge economy' now determining the competitiveness of a city.</li> <li>• Productivity depends on reducing congestion and attracting new businesses and provide new employment hubs.</li> </ul>
Housing supply and affordability	<ul style="list-style-type: none"> <li>• Significant housing supply gap and housing affordability at unprecedented levels, with Perth recognised as one of the least affordable markets in the world<sup>8</sup>.</li> <li>• Little choice of housing type and location, with a shortage of semi-detached houses and apartments.</li> <li>• Apartments account for 17% of all new development compared with 30% national average.</li> </ul>
Transport and Infrastructure	<ul style="list-style-type: none"> <li>• Increasing patronage of public transport not matched with sufficient investment in the network.</li> <li>• <i>The Draft Public Transport Plan to 2031</i> was welcomed by industry and other transport and planning stakeholders but there was a view that investment must happen sooner than projected to meet community needs.</li> <li>• The car is still the primary mode of transport, accounting for 90% of all trips taken in Perth.</li> </ul>

### The critical decade

About 1500 people move to WA each week, most of them to Perth. If we are to ensure Perth is a truly liveable city for the 21st century we will need to find new ways of planning our city. Current urban planning approaches and principles are not viable options for Perth's future growth. The way Perth evolves in the next decade will determine whether we can successfully adapt and thrive in response to these challenges.



<sup>7</sup>Australian Government Department of Sustainability, Environment, Water, Population and Communities (2011) at <http://www.environment.gov.au/epbc/Notices/assessments/perth-peel.html>

<sup>8</sup>See for example Australian housing still least affordable in the world despite recent improvements: Fitch Property Observer 10 January 2013 at <http://propertyobserver.us2.list-manage.com/trackclick?u=24bd0766a834290948593f5aa&id=e5c5e89a50&e=806cf44afd>



# CURRENT POLICY SETTINGS

The way cities grow is largely shaped by our state and federal policy settings.

## FEDERAL GOVERNMENT SETTINGS

The Australian government is taking action at the federal level to drive a federal cities and urban policy agenda. It has:

- released a new National Urban Policy (2011) aiming to improve the productivity, sustainability, and liveability of Australian cities
- prepared a National Urban Design Protocol that provides local governments, developers and communities a tool for designing, assessing and implementing better design and construction outcomes for our cities
- reviewed Capital City Planning Systems as part of the COAG Reform Agenda and now requires all states to set strategic plans that meet the National Urban Policy criteria
- completed an annual State of Our Cities report bringing together data across key economic, social and environmental areas to provide a national snapshot of our 17 cities with populations over 100,000
- established a Major Cities Unit in the Department of Infrastructure
- introduced a new federal package of funding and initiatives including \$20m Liveable cities for urban renewal projects, \$45m Suburban Jobs for new employment, manufacturing and innovation precincts, \$10m for sustainability indicators, and \$29m for sustainability plans for high growth centres.

While these have been welcome advancements for better planning and outcomes in our cities, many of the initiatives described lack sufficient funding and long term commitment required to achieve major change at the scale we need.

## STATE GOVERNMENT SETTINGS

The state government has recently released two key strategies for planning and transport.

### *Directions 2031 and Beyond*

This strategic planning framework for urban development in Perth, released in 2010, proposes that new growth occur in a more balanced way around a diverse activity centres network, linked by a robust movement network and supported by a green network of parks, conservation and biodiversity areas. It emphasized we must make more efficient use of land and infrastructure and introduced the following targets:

- 50% improvement in current infill trends, which equates to 124,000 new dwellings delivered through infill development.
- a 50% increase in the current average residential density of 10-dwellings per hectare to 15-dwellings per hectare in greenfields developments.

*“We must prioritise land that is already zoned: we already have a significant supply of land that has been deemed suitable or potentially suitable for new urban development, and has been zoned accordingly under the metropolitan and Peel region schemes. This land will be the first priority for new development.”*

*Directions 2031 and Beyond (2010), p27*



Figure 3: Possible key public transport connections between Activity Centres in *Directions 2031*.

## CURRENT POLICY SETTINGS

Perth is Australia's fastest growing capital city. Despite this Perth has Australia's least ambitious infill development target (Table 2) and a current infill trend of 30-35% of total new dwellings. The city's infill target under *Directions 2031 and Beyond* is less than under Perth's previous metropolitan planning framework, *Draft Network City Framework* (2005). Irrespective of this fact, targets are meaningless numbers without strong and coordinated government support for industry to meet them.

**Table 2: Infill targets for major Australian Cities**

City	Strategic Planning Document	Timeframe	Target no. dwellings	Percentage from infill
Sydney	City of Cities: A Plan for Sydney's Future	2005-31	640,000	60-70
Melbourne	Melbourne 2030: A Planning Update – Melbourne @ 5 Million	2009-30	600,000	53
South-East Queensland	South-East Queensland (SEQ) Regional Plan	2009-31	754,000	50
Adelaide	30-Year Plan for Greater Adelaide	2010-40	258,000	Moving from 50 to 70
Perth	Directions 2031 Spatial Framework for Perth and Peel	2009-31	328,000	47 (moved from 60)

### *Draft Public Transport for Perth in 2031*

The State Government's draft public transport strategy, *Public Transport Plan for Perth in 2031* released in 2011, sets the goal that by 2031 public transport will be the preferred choice of travel to Perth's strategic centres and through growth corridors. The Department of Transport aims to achieve this by upgrading current routes and introducing more bus priority facilities and a new light rail network. The Network Plan also recognises that land use and transit should be integrated to support a denser pattern of future development (now called 'Transit Oriented Development').



Figure 4: High frequency transit routes as identified in the Draft Public Transport for Perth in 2031 plan.

## CASE STUDY: THE INTEGRATED DESIGN COMMISSION, SOUTH AUSTRALIA

### A model in good governance

The Integrated Design Commission in South Australia provided evidence-based advice to the Premier of South Australia and Cabinet in the context of the 30 Year Plan for Greater Adelaide across design, planning and development and delivering on the shared ambition for better design, visionary planning and quality development in South Australia.

The Commission was Australia's first State level cross-government and multidisciplinary design adviser. It provides South Australia with a framework for uniting sustainability, behaviour, material and the built environment in to a whole that satisfies the needs of people, environment and place.

It has delivered for example:

- '5000+' – an Integrated Design Strategy for Inner Adelaide. This is a national pilot that delivers an urban design vision for the City of Adelaide and seven inner council areas. It's community engagement platforms, 'design testing' scenarios, and 'Atlas of Urban Excellence' are easily some of the world's most exemplary resources and visionary scenarios.
- Economic analysis of culture-led renewal in urban centres and how to generate economic benefits through revitalisation of neglected urban spaces
- Environmental leadership through for example the development of Climate Smart Precincts and the first zero carbon house
- Groundbreaking public engagement from a design-led perspective (and publication of a report *Intelligent Engagement by Design*)

The model comprised a Commissioner, Government Architect and design and executive team. It also includes an Advisory Board and Design Review panels that provide independent expert and impartial design advice to assist projects achieve design excellence; and International alliances<sup>9</sup>.



Figure 5: Examples of resources produced by the South Australian Integrated Design Commission.

<sup>9</sup>Integrated Design Commission SA: Improving life through design. Connecting the Dots. April 2012. At [www.integrateddesign.sa.gov.au](http://www.integrateddesign.sa.gov.au)



## EXPLAINING DENSITY

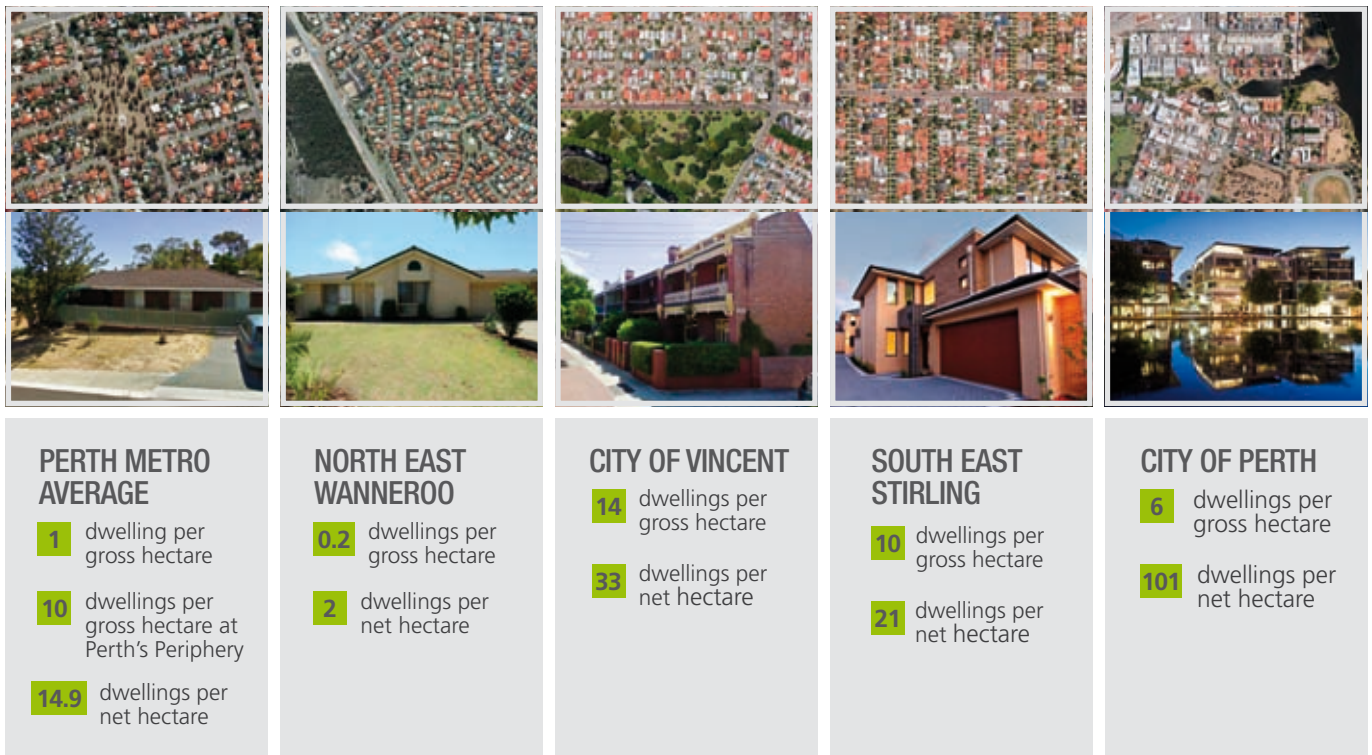
### RESIDENTIAL DENSITY

'Residential density' refers to the number of dwellings within a defined site, suburb or region, and is usually measured in hectares<sup>10</sup>. Net hectares are a measure of dwellings on an area of land with all non residential uses removed. Gross residential density is the total number of dwellings within a defined area<sup>10</sup>.

The most recent *WA State of the Environment Report (2007)* reported Perth's metropolitan average gross residential density was less than one dwelling per hectare<sup>11</sup>, but this varies greatly between suburbs. *Directions 2031 (2010)* reported Perth and Peel are currently achieving an average gross density of 10-dwellings per hectare. This was determined after an assessment of 300 suburbs across the region<sup>12</sup>.

Perth has quite low residential density by national and international standards.

#### Examples of Density



#### Zoning and Residential design codes ('R codes')

Dwelling density in WA is largely determined by the Residential Design Codes of Western Australia (the 'R Codes'), which sets maximum density limits at the site level<sup>13</sup>. The term R20 for example means up to 20 dwellings per hectare may be developed. More than one-third of all developed lots in the Perth metropolitan area are zoned at R20, but a high proportion of these lots are actually subdivided at a much lower net site density - equivalent to 12.5 units per net hectare. Had this land been subdivided in closer conformity to the zoning, an additional 184,300 residential lots could have been accommodated on the same area of land<sup>14</sup>.

More recently there has been a move towards 'Form-based codes' which focus on the type, design and performance of buildings rather than just density. Form based codes regulate development to achieve a specific urban form and have been developed specifically to improve the quality of our built environment and neighbourhoods. An important aspect of Form based codes address the public realm as a whole, treating roads as places and the placement and form of buildings as the 'walls' of the public space for example<sup>15</sup>.




<sup>10</sup>Note: A hectare is 100m x 100m square. Many sports fields have an area that is comparable to a hectare. For example a cricket field is typically 1.25ha, and the area inside the track of an athletics field is typically 1.2ha<sup>10</sup>. Gross residential density is the total number of dwellings within a defined area. Net residential density refers to the total number of dwellings on just the residential-zoned portion of a defined area and excludes land used for other purposes such as roads and public open space Net hectares are a measure of dwellings on an area of land with all non residential uses removed.

<sup>11</sup>Montgomery & Saunders, 2005 cited in State of the Environment Report Western Australia 2007 p198.

<sup>12</sup>WAPC (2012) Delivering Directions 2031 Annual Report Card 2012. p20

This report uses three density scenarios from three cities that are recognised internationally for exemplary medium to high density neighbourhoods. It may come as a surprise that each of the density scenarios we have selected are already represented in Perth. These are shown below.

These density scenarios are used to calculate potential dwelling yields in the seven corridors selected for this study and Local Government Areas in the 'Regeneration Potential' sections of this report.

<p><b>SCENARIO 1</b>  <b>MEDIUM DENSITY</b>            R60 - R80            MELBOURNE</p>	<p><b>SCENARIO 2</b>  <b>MEDIUM - HIGH DENSITY</b>            R100-R120            BARCELONA</p>	<p><b>SCENARIO 3</b>  <b>HIGH DENSITY</b>            R140-R160            LONDON</p>
		
<p><b>NORTH PERTH</b></p>	<p><b>SUBIACO</b></p>	<p><b>NORTHBRIDGE</b></p>
		

## POPULATION DENSITY

Population density refers to the number of people living in a defined area. The average population density in Perth was 17 persons per hectare in 2011. This compares with an average of 21.1 in Melbourne, and 27.6 in Sydney<sup>16</sup>. Perth has the third lowest population density of Australia's capital cities.

Figure 6 shows the way population density is spread in our city<sup>17</sup>. It shows higher densities are not occurring around our transport corridors or railway lines, but that the areas with the highest density are actually our older suburbs and in locations which may be surprising. The suburbs with the highest population densities are Vincent (28 people per hectare) Subiaco (27) and East Fremantle (25); followed by South Perth, Mosman Park, Cottesloe, Stirling (South-Eastern) and Claremont with densities of more than 20 people per hectare<sup>18</sup>.

<sup>13</sup>Western Australian Planning Commission, 2003 cited in Human Settlements. 2007. State of the Environment Report Western Australia 2007. <http://www.soe.wa.gov.au/report/human-settlements/settlement-patterns.html> (accessed September

<sup>14</sup>WAPC 2003 study, cited in Loader, C (2011). See Figure HS1.5. Comparing the residential densities of Australian Cities. <http://chartingtransport.com/2012/10/19/comparing-the-residential-densities-of-australian-cities-2011/>

<sup>15</sup>Parolek, Parolek and Crawford (2008). Form Based Codes. Wiley and Sons, Inc. New Jersey.

<sup>16</sup>Note this is based on Statistical Local areas with at least three persons per hectare; at)Loader, C (2011). Comparing the residential densities of Australian Cities. <http://chartingtransport.com/2012/10/19/comparing-the-residential-densities-of-australian-cities-2011/>

<sup>17</sup>Note density calculated at the ABS Statistical Area 1 category. Loader, C (2011). Comparing the residential densities of Australian Cities. <http://chartingtransport.com/2012/10/19/comparing-the-residential-densities-of-australian-cities-2011/>

<sup>18</sup>ABS 3218.0 - Regional Population Growth, Australia, 2010-11



# EXPLAINING DENSITY

## WHERE IS PERTH'S POPULATION GROWTH OCCURRING?

Between 2001 and 2011 Perth's population increased by 26%, or 380,100 people. This was the fastest growth of all capital cities in Australia<sup>19</sup>. The largest *and* fastest population growth has taken place at the periphery of the Perth Metropolitan Area, largely at very low densities.

The Local Government Areas (LGAs) experiencing the largest population increases were Wanneroo (91% population increase), Serpentine - Jarrahdale (58%), Mandurah (48%), Rockingham (47%), Kwinana (41%), and Cockburn (40%)<sup>20</sup>. Together these LGAs became home to another 239,328 people – or 63% of Perth's total population increase since 2001.

On average, Perth's ten largest growing suburbs were 33km from the CBD and absorbed 32% of Perth's entire population growth - or 119,940 people.

At the same time many of our established middle suburbs appear to be in decline, with a net decrease in population. Residents in Ballajura, Duncraig, Lynwood, Kingsley, Mullaloo, Padbury, and Warnbro decreased between 1 -5%. In Booragoon, Craigie, Sorrento-Marmion, Ferndale- Lynwood, Bull Creek, and Willagee observed a decrease of 5 to 10%<sup>21</sup>.

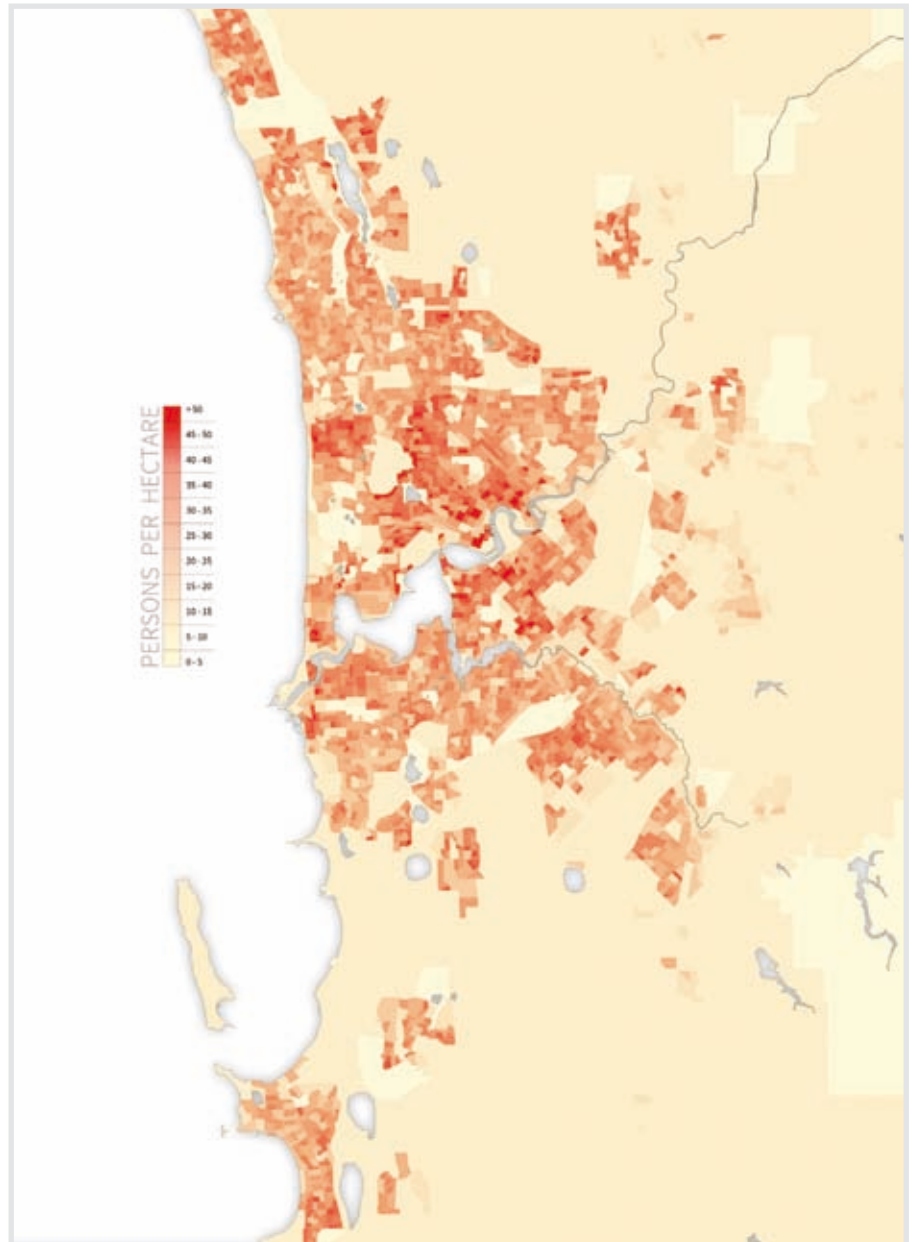


Figure 6: The population density of metropolitan Perth, 2011 (Image Senator Scott Ludlam based on ABS Census Data)

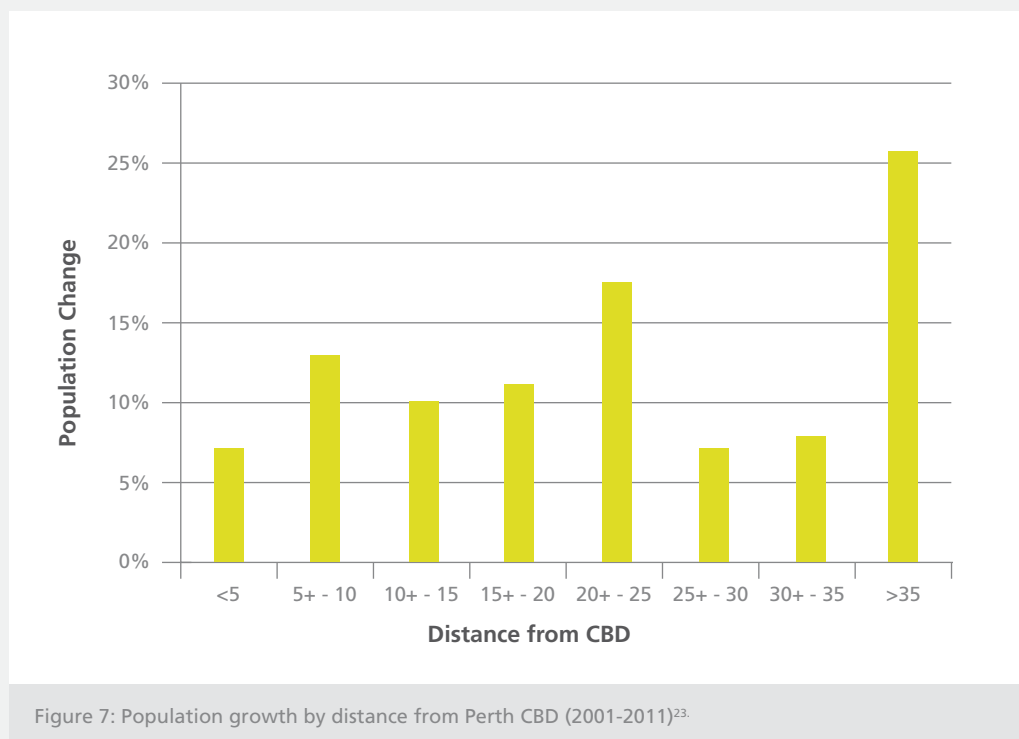
<sup>19</sup>ABS 3218.0 Regional Population Growth, Australia 2011 Published 31/07.2012 <http://www.abs.gov.au/ausstats/abs@.nsf/Products/3218.0~2011~Main+Features~Western+Australia?OpenDocument>

<sup>20</sup>Australian Bureau of Statistics (2012) 3218.0 Regional Population Growth, Australia. Table 5. Estimated Resident Population, Statistical Areas Level 2, Western Australia. Released at 31 July 2012.

<sup>21</sup>Australian Bureau of Statistics (2012) 3218.0 Regional Population Growth, Australia. Table 5. Estimated Resident Population, Statistical Areas Level 2, Western Australia. Released at 31 July 2012.

Figure 7 illustrates the population changes occurring in Perth by distance from the CBD. It shows:

- 20% of our population growth occurred in suburbs less than 10km from the CBD;
- 26% of growth occurred in suburbs greater than 35km from the CBD; and
- 60% of our population growth was in outer suburbs located 20km – 70km from the CBD<sup>23</sup>



Perth has several options for accommodating our growing population. Corridor regeneration with easily accessible public transport, local employment options and a diverse mix of housing types are one of those options.

<sup>22</sup>Calculations based on SLAs for Perth's Source: 3218.0 - Regional Population Growth, Australia, 2011 at <http://www.abs.gov.au/AUSSTATS/labs@.nsf/DetailsPage/3218.02011?OpenDocument>

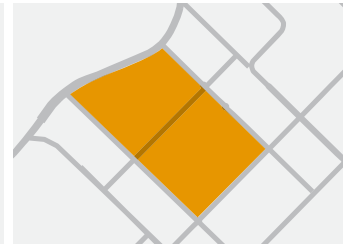
<sup>23</sup>Australian Bureau of Statistics (2012) 3218.0 Regional Population Growth, Australia. Table 5. Estimated Resident Population, Statistical Areas Level 2, Western Australia. Released at 31 July 2012. See also Spatial change in population in Greater Perth ABS (2012) 3218.0 - Regional Population Growth, Australia, 2011 at <http://www.abs.gov.au/ausstats/labs@.nsf/Products/3218.0~2011~Main+Features~Western+Australia?OpenDocument>

## BARRIERS

There are a number of barriers to higher density urban development in Perth. These barriers relate to community concerns, obstacles faced by developers and the public sector, design challenges and costs, specifically:

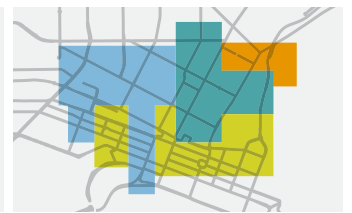
### DEVELOPMENT SITE AVAILABILITY

Infill development is mostly driven by the availability of vacant sites with appropriate zoning that are large enough to accommodate feasible developments. Assembling urban parcels is extremely challenging and requires dealing with multiple landowners, existing neighbours, and a variety of existing land uses.



### PERMITTED SCALE & INTENSITY

Zoning regulations can impose heavy cost and compliance burdens on developers. Clever alignment between zoning regulation and current conditions in the construction and development sectors can deliver better outcomes for the community.



### STRATA LEGISLATION

A large number of low-density strata developments currently line Perth's activity corridors. Approval is needed from effectively 100 per cent of owners to dissolve a strata scheme, making it virtually impossible to achieve change and renewal.



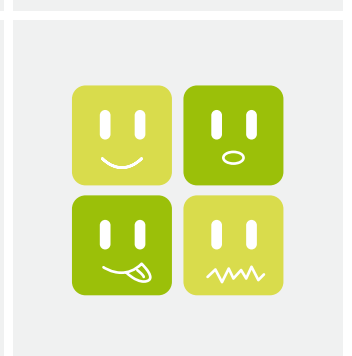
### BLANKET BUILDING HEIGHT RESTRICTIONS

Blanket building height restrictions often produce poor design outcomes because the allowable building volume must be distributed across the lot. This leaves less space for innovative designs, including communal open spaces, that improve the quality of life for residents.



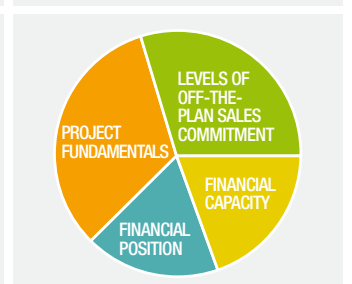
### COMMUNITY ATTITUDES TOWARD HIGH DENSITY AND INFILL DEVELOPMENT

Poor quality infill developments particularly in the 1960s-1980s have caused what Professor Rob Adams describes as a 'breach of trust' with the planning fraternity and resulted in what Professor Richard Weller describes as a 'density hangover' or aversion to density within the community<sup>24</sup>. Poor consultation processes and a lack of vision by successive governments have also contributed. Concerns held in the community over the way higher density may bring increased traffic, impact the character of the neighbourhood, and reduce privacy are valid and can be addressed through better design and deliberative engagement processes.



### FINANCE AVAILABILITY

Without debt funding, even the best projects are not deliverable. Lender reluctance to fund units smaller than 50sqm internal has a significant impact on product mix and price point. In addition, the significant presales now required (usually 100% of debt coverage) often makes it difficult to get projects off the ground. Debt funding availability also impacts major residential infill projects in emerging locations where financiers are still cautious of unproven markets<sup>25</sup>.



<sup>24</sup>Professor Richard Weller is the former director of the Australian Urban Design Research Centre, Professor of Landscape Architecture at UWA, author of "Boomtown 2050", and eminent advocate for transformative urbanism in the debate on how Perth should grow. Rob Adams is a University of Melbourne Professorial Fellow and Director of Design and Culture for the City of Melbourne. Recognised with an Order of Australia in 2007 for his services to urban design, town planning and architecture, and named the Prime Minister's Environmentalist of the Year in 2008.

## PARKING REQUIREMENTS

The cost of providing car parking is a substantial cost burden, particularly at densities where it becomes impossible to accommodate surface parking. Sub-surface parking is extremely costly and demands higher returns which equate to the requirement of substantially higher dwelling yields. Developments that are located on high frequency public transport routes mean that dependence on the private vehicle is reduced. Car free developments or those with car share schemes are becoming more common and also assist affordability.



## CONSTRUCTION COSTS

Construction costs are the largest component of infill developments, accounting for about 58% of the total cost<sup>26</sup>. Perth has the highest construction costs for infill development in Australia's five largest cities and are 5% more per unit than the national average<sup>27</sup>. Construction costs are also higher for apartments than detached houses in Perth: A two-bedroom unit (typically 100sq.m) costs around \$89,000 more than a 3 bedroom house in a green fields setting – a 41% difference. The National Housing Supply Council has reported Perth's higher costs are due to a shortage of skilled labour, a high demand for materials driven by the mining boom, interest costs due to delays in building schedules, and rising fuel prices.<sup>28</sup>



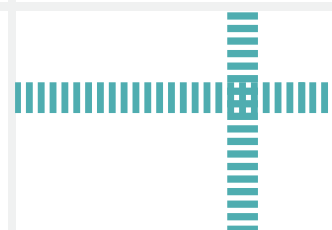
## PROVISION AND FUNDING OF INFRASTRUCTURE

Residential landholdings cannot be developed unless there is sufficient infrastructure in place to service the new residences. Infrastructure charges raise the final sale price, reduce developer margins and/or lower the value of the undeveloped land, all of which can make the process of development less viable.



## NO STATE-LED VISION FOR HIGH STREET REGENERATION

Perth's planning system lacks a policy vision for regeneration of existing urban areas, in particular our future transport corridors which ought to be the strategic priority for large scale regeneration. This makes the important task of coordinating corridor planning between local government areas more difficult.



## UNCERTAINTY ABOUT MAJOR PUBLIC INFRASTRUCTURE ITEMS

Infill developments, particularly large scale developments such as precinct scale corridor regeneration and in Activity Centres, require commitment from government to fund critical public infrastructure items and upgrades. Without certainty about investment in public infrastructure items, the risk involved in development is increased, making some infill projects simply unfeasible. Examples from Perth where uncertainty about major public infrastructure items has stymied infill development include the Stirling Activity Centre and Canning Bridge Activity Centre.



## CORRIDOR DESIGN CHALLENGES

There are specific concerns and challenges associated with living in high streets, such as noise, traffic and air quality and these can affect the attractiveness and quality of life in these locations. It is important that design engages and solves with these specific challenges.



<sup>25</sup>See ongoing study by Australian Housing and Urban Research Institute (Rowley, 2012) "Delivering diverse and affordable infill housing developments" for example.

<sup>26</sup>The National Housing Supply Council's 2010 State of Supply Report Urbis Pty Ltd. 2010. National Dwelling Costs Study - FaHCSIA. Report for the Federal Department of Families, Housing, Community Services and Indigenous Affairs. [http://www.nhsc.org.au/nat\\_dwelling\\_costs/final\\_urbis\\_residential\\_cost\\_analysis\\_report.pdf](http://www.nhsc.org.au/nat_dwelling_costs/final_urbis_residential_cost_analysis_report.pdf) (accessed November 18, 2010).

<sup>27</sup>National Housing Supply Council 2010 State of Supply Report Chapter 6 at [http://www.nhsc.org.au/content/state\\_of\\_supply/2009\\_ssr\\_rpt/sosr\\_ch6.htm](http://www.nhsc.org.au/content/state_of_supply/2009_ssr_rpt/sosr_ch6.htm)

<sup>28</sup>National Housing Supply Council 2010 State of Supply Report – Chapter 6 – At [http://www.nhsc.org.au/content/state\\_of\\_supply/2009\\_ssr\\_rpt/sosr\\_ch6.html](http://www.nhsc.org.au/content/state_of_supply/2009_ssr_rpt/sosr_ch6.html)

# BENEFITS OF INFILL AND HIGH STREET REGENERATION

There are many substantial economic, social and environmental benefits of infill development, particularly when it occurs at the precinct level. High Street regeneration will:

- 1 Protect existing suburbs and bring new services and amenities closer to existing residents.**
- 2 Deliver jobs to local areas.** Perth's major employment sectors are the service industry (52%), construction and manufacturing (19%) and the retail sector (14%)<sup>29</sup> – all supported through the creation of new high street precincts. Very few of our suburbs are in what the ABS describes as approximate job 'self sufficiency' that is, where households have the opportunity to find jobs near their home<sup>30</sup>.
- 3 Make public transport systems more viable.** High quality public transit capable of competing with cars requires coordinated network planning and a critical mass of population density. A study of 33 international cities showed a relationship between minimum densities and effective delivery of public transport, which would be further enhanced if increasing numbers of residents are given the opportunity to live in direct proximity to a rapid transit service<sup>31</sup>.
- 4 Reduce car dependency and traffic congestion.** There were more than 2 million cars on WA roads in September 2009. Another 400,000 cars are expected on our roads in the next 10 years according to the RAC<sup>32</sup>. Journey times have increased by 72% in 10 years<sup>33</sup>. Traffic congestion costs our community \$1 billion a year<sup>34</sup>.
- 5 Make more efficient use of existing infrastructure and services.** Substantial costs can be saved by focussing development in existing urban areas. Savings are derived from lower development costs due to a greater concentration of infrastructure systems and better centralisation of public services.
- 6 Diversify and strengthen local economies.** High streets also contribute to the local economy of the neighbourhood, as more of the revenues stay within the community (the 'money-multiplier effect')<sup>35</sup>.
- 7 Embrace the pressing need to regenerate our middle suburbs.** From a population, housing, employment and productivity perspective our middle suburbs and 'greyfields' need to be revitalised. Much of the residential building stock as well as the energy, water and communications infrastructure is ageing, and bordering on technological obsolescence<sup>36</sup>.
- 8 Improve quality of life.** The proximity of transit infrastructure to homes, jobs, schools, shops, cafes and other daily activities makes everyday travel faster, can reduce the cost of living and can contribute to better health, and quality of life.
- 9 Increase housing affordability and choice, create more vibrant neighbourhoods that accommodate a broader range of lifestyles.** For example, enable young people to move out of home to somewhere that they can afford that also suits their needs and lifestyle or older people to 'down-size' or age in place.
- 10 Reduce the cost of living and make living in Perth more affordable.** Living close to light rail or bus rapid transit can significantly reduce living costs. A study found owning one less car over the period of home ownership or mortgage payments means a household could accumulate an additional \$1 million in superannuation over its working life<sup>37</sup>. Residents in Transit Oriented Developments (TODs) in the USA are twice as likely not to own a car as the general population<sup>38</sup>.
- 11 Increase social inclusion and socio-economic opportunities, and benefit those who can't or choose not to drive.** By creating a network of active and connected centres along High Streets, more travel and social options become available to a much broader population. They also reduce the vulnerability of car-dependent persons driving long distances for work, services and education to rising petrol prices<sup>39</sup>.

<sup>29</sup>Kaipert (2012) citing ABS 2012 data from [www.censusdata.abs.gov.au/webapi/jsp/login.xhtml](http://www.censusdata.abs.gov.au/webapi/jsp/login.xhtml)

<sup>30</sup>See BITRE (2010) Population Growth, Jobs Growth and Community Flows in Perth.

<sup>31</sup>Peter Newman and Jeffrey Kenworthy (2006) "Urban Design to Reduce Automobile Dependence", *Opolis: An International Journal of Suburban and Metropolitan Studies*: Vol. 2: No. 1, Article 3. <http://repositories.cdlib.org/cssdopolis/vol2/iss1/art3>

<sup>32</sup>Adstead, Gary. "Perth will begin to die from congestion". *The West Australian* February 20 2012, p10

<sup>33</sup>Thomas, Beatrice. 2010. "Traffic Gridlock Tightens". *The West Australian*, August 30. <http://au.news.yahoo.com/thewest/al-Inewshome/7843166/traffic-gridlock-tightens/>

<sup>34</sup>Thomas, Beatrice. 2010. "Traffic Gridlock Tightens". *The West Australian*, August 30. <http://au.news.yahoo.com/thewest/al-Inewshome/7843166/traffic-gridlock-tightens/>

<sup>35</sup>Ward and Lewis, 20002, cited in Kaipert, (2012)

<sup>36</sup>Trubka, Newman and Billsborough (2008). "Assessing the Costs of Alternative Development Paths in Australian Cities". Perth: Curtin University Sustainability Policy Institute.

<sup>37</sup>Charter Keck Cramer. 2008. *Urban Economics and Policy Review*, Issue 1: November 2008.

<sup>38</sup>Property Council Adelaide (2011) *Redesigning Adelaide 2036: Transit Oriented Development – A plan for building communities*.



- 12 Have positive impacts on human health.** High streets by their nature are highly walkable, and encourage more active transport such as walking, using public transport and cycling<sup>40</sup>. People who live in higher density, mixed use neighbourhoods have been found to have lower rates of obesity than those that live in lower density residential areas for example<sup>41</sup>. Mental health benefits are also found when land use planning decisions create walkability [compact, active-transport related urban forms]<sup>42</sup>.
- 13 Increase local character and create a stronger sense of place.** High streets by their very nature feature small, local businesses and more diverse residential and commercial building designs. All contribute to a strong local identity and flavour.
- 14 Use less energy and reduce greenhouse gas emissions.** More compact cities use up to 40% less transport energy and can save similar amounts of greenhouse gas emissions from urban transport<sup>43</sup>. Medium density housing is also typically 25% more energy efficient than detached housing<sup>44</sup>. When redeveloped at the precinct scale, the advantages of regeneration can include delivering carbon neutrality or zero carbon status<sup>45</sup>.
- 15 Use less water.** The use of integrated urban water systems that involve water sensitive urban design are best implemented at precinct scale, which enables local water capture, storage, treatment and end-use to be introduced in the most efficient manner.
- 16 Enable preservation of urban bushland and coastal habitats.** Our natural heritage is under significant threat. Prioritising infill development and increased densities can significantly relieve pressures at Perth's urban edges. All development proposed in this report is wholly contained within the existing urban areas of metropolitan Perth.
- 17 Enable preservation of urban farmland and productive agricultural areas.** Food security and local production is becoming increasingly important in a changing climate. Well designed infill developments can also increase opportunities for community local food production for example through the inclusion of rooftop food gardens or one parking lot allocated or converted to a community garden rather than parking.
- 18 Increase contact with nature.** Infill and medium density neighbourhoods, through good design can actually increase our contact with nature. This includes new urban environments which provide green roofs, community gardens, urban farms, waterways, and biodiversity avenues that line each corridor.



A typical high density vista in Copenhagen, Denmark.

<sup>39</sup>Dodson, Jago and Neil Sipe. 2008. *Unsettling Suburbia: The New Landscape of Oil and Mortgage Vulnerability in Australian Cities*. Urban Research Paper 17, Griffith University. [http://www.griffith.edu.au/\\_data/assets/pdf\\_file/0003/88851/urp-rp17-dodson-sipe-2008.pdf](http://www.griffith.edu.au/_data/assets/pdf_file/0003/88851/urp-rp17-dodson-sipe-2008.pdf)

<sup>40</sup>Giles-Corti, B., K Ryan, S Foster (2012) *Increasing density in Australia: Maximising the health benefits and minimising harm*, National Heart Foundation of Australia, March 2012, available at <http://www.heartfoundation.org.au/SiteCollectionDocuments/Increasing-density-in-Australia-Evidence-Review-2012.pdf>

<sup>41</sup>Matan, A., Trubka, R., Newman, P., and S. Vardoulakis (2012) *Review of public health and productivity benefits from different urban transport and related land use options in Australia*, The 5th Healthy Cities: Working Together to Achieve Liveable Cities Conference, Geelong, 6 – 8, June 2012 [Peer reviewed] <http://healthycities.com.au/BOPIPR.pdf>

<sup>42</sup>research summarized in Newman, P., and A. Matan (2012) *Human Health and Human Mobility*, *Current Opinion in Environmental Sustainability*, 4(4): 420–426, available: <http://dx.doi.org/10.1016/j.cosust.2012.08.005>

# DEVELOPMENT POTENTIAL

## BACKGROUND

Seven corridors were selected in this report based on their strategic importance (identified as a future rapid transit route in the draft Public Transport Strategy) and as representative of different regions and corridor typologies across the metropolitan area.

This approach provides for the extrapolation of our findings to other Activity Corridors in Perth.

## KEY FINDINGS

The results of this study into the capacity of Perth's High Streets shows a total potential yield of **94,500 - 252,000** new dwellings at medium to high density scenarios (R60 - R160).

At a medium density of 80 dwellings per hectare, just seven of Metropolitan Perth's future High Streets could accommodate 100% (or 126,007 dwellings) of the *Directions 2031* target of 124,000 dwellings to 2031.

At a medium-high density development (R100) Perth's future High Streets could accommodate 126% (157,508 dwellings) of the *Directions 2031* infill target.

The total developable land supply along seven of Perth's high streets, shown opposite, is 1575 hectares.

At medium density this translates to enough developable space to accommodate 327,618 people based on an assumed average household occupancy of 2.6 persons.

At high density this translates to 655,233 people.

The next section quantifies the potential dwelling yields along the seven corridors in this report.

*"The results of this study into the capacity of Perth's high streets show that at a moderate density of 80-dwellings per hectare, just seven of Metropolitan Perth's high streets could accommodate 126,007 new dwellings."*



## CHARLES ST & WANNEROO RD

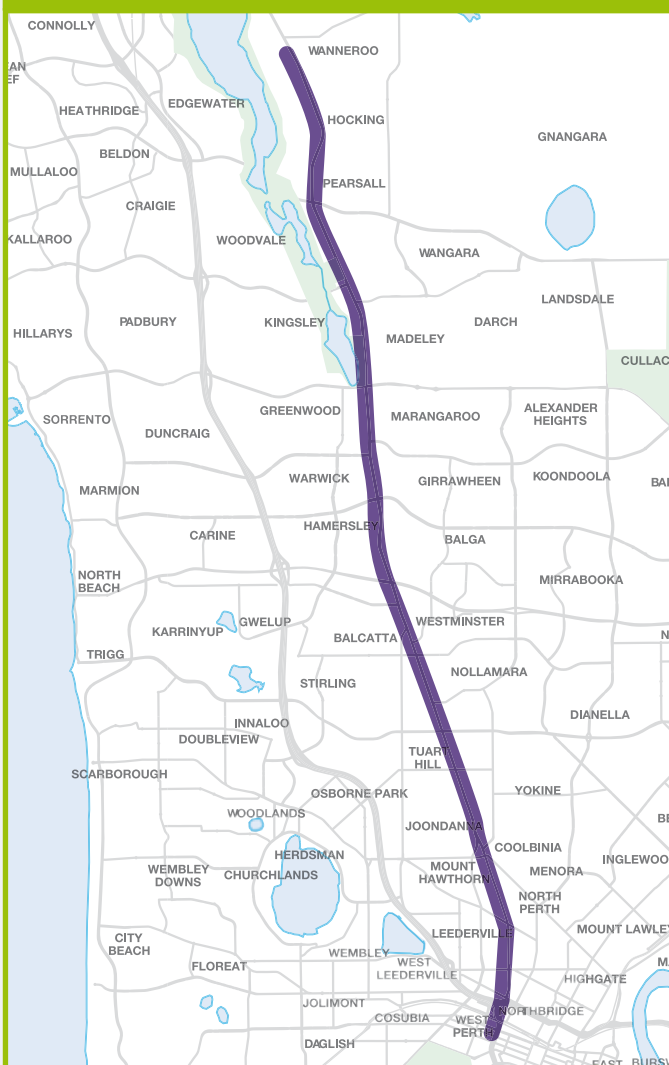
**DEVELOPABLE  
LAND SUPPLY:**  
266 HECTARES

**CORRIDOR TYPE:**  
RADIAL ROUTE

**MEDIUM DENSITY:**  
15,990 - 21,320 DWELLINGS

**MEDIUM-HIGH DENSITY:**  
26,650 - 31,980 DWELLINGS

**HIGH DENSITY:**  
37,310 - 42,640 DWELLINGS



## FITZGERALD ST & ALEXANDER DR

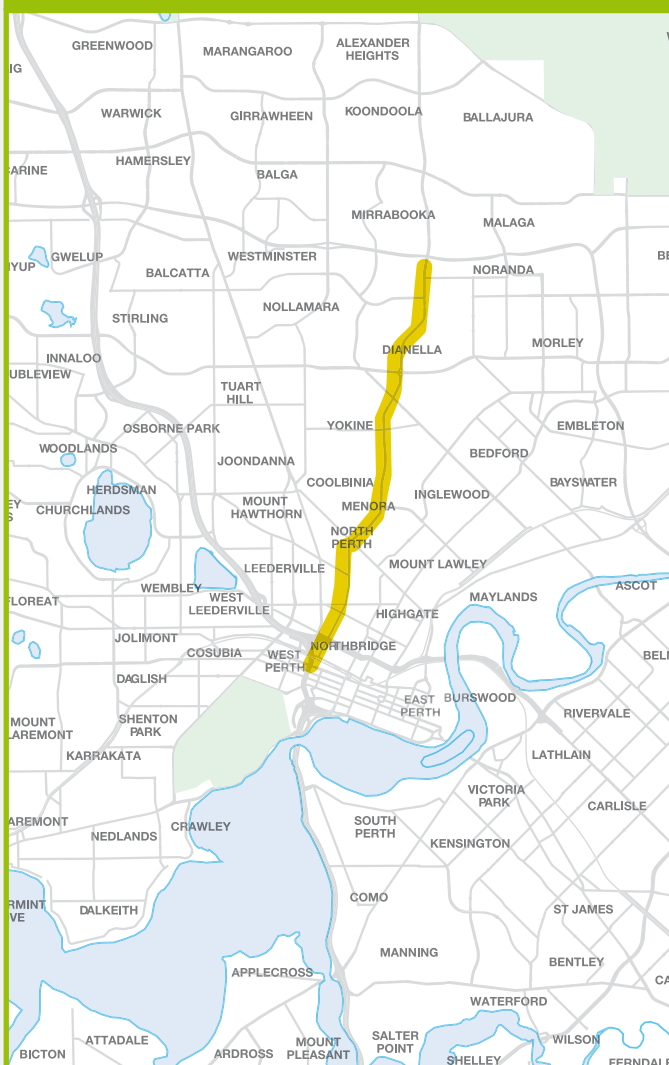
**DEVELOPABLE  
LAND SUPPLY:**  
133 HECTARES

**CORRIDOR TYPE:**  
RADIAL ROUTE

**MEDIUM DENSITY:**  
8,010 - 10,680 DWELLINGS

**MEDIUM-HIGH DENSITY:**  
13,350 - 16,020 DWELLINGS

**HIGH DENSITY:**  
18,690 - 21,360 DWELLINGS



# DEVELOPMENT POTENTIAL



## SCARBOROUGH BEACH ROAD

**DEVELOPABLE LAND SUPPLY:**  
221 HECTARES

**CORRIDOR TYPE:**  
INTER-CITY ROUTE

**MEDIUM DENSITY:**  
13,290 - 17,720 DWELLINGS

**MEDIUM-HIGH DENSITY:**  
22,150 - 26,580 DWELLINGS

**HIGH DENSITY:**  
31,010 - 35,440 DWELLINGS



## GREAT EASTERN HIGHWAY

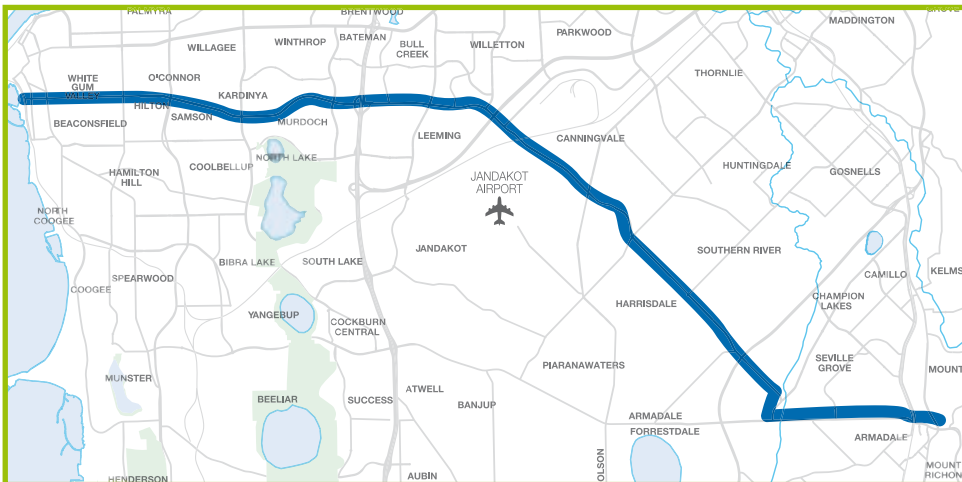
**DEVELOPABLE LAND SUPPLY:**  
87 HECTARES

**CORRIDOR TYPE:**  
INTER-CITY ROUTE

**MEDIUM DENSITY:**  
5,246 - 6,995 DWELLINGS

**MEDIUM-HIGH DENSITY:**  
8,743 - 10,492 DWELLINGS

**HIGH DENSITY:**  
12,240 - 13,989 DWELLINGS



## SOUTH STREET - RANFORD ROAD TO ARMADALE ROAD

**DEVELOPABLE LAND SUPPLY:**  
403 HECTARES

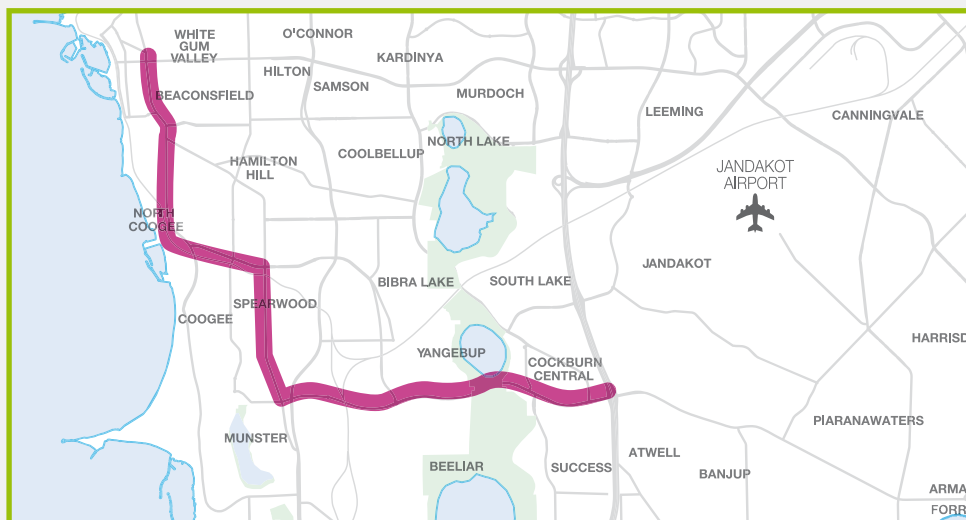
**CORRIDOR TYPE:**  
E-W DISTRIBUTOR

**MEDIUM DENSITY:**  
24,210 - 32,280 DWELLINGS

**MEDIUM-HIGH DENSITY:**  
40,350 - 48,420 DWELLINGS

**HIGH DENSITY:**  
56,490 - 64,560 DWELLINGS





### HAMPTON ROAD - BEELIAS DRIVE

**DEVELOPABLE LAND SUPPLY:**  
222 HECTARES

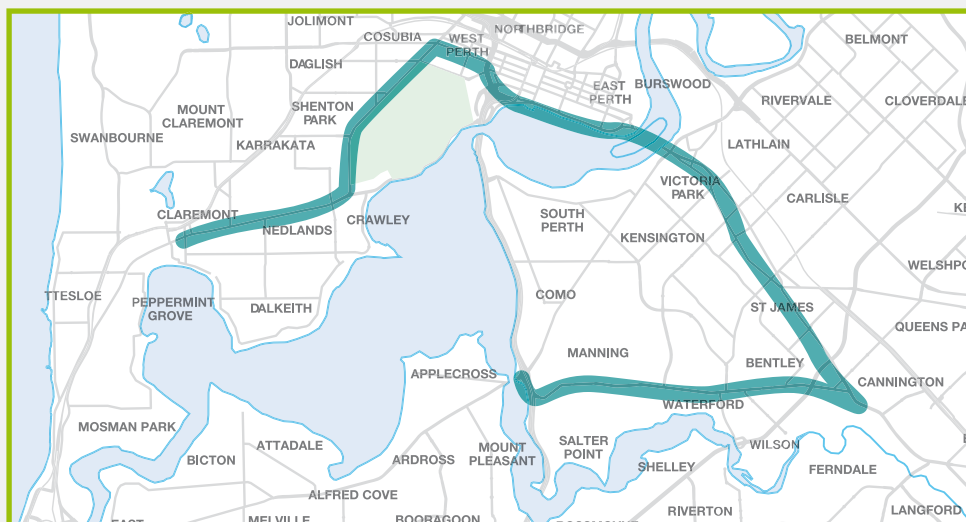
**CORRIDOR TYPE:**  
ORBITAL ROUTE

**MEDIUM DENSITY:**  
13,350 - 17,800 DWELLINGS

**MEDIUM-HIGH DENSITY:**  
22,250 - 26,700 DWELLINGS

**HIGH DENSITY:**  
31,150 - 35,600 DWELLINGS

Includes roads:  
Hampton Road, Cockburn Road, Spearwood  
Avenue, Rockingham Road, Beelias Drive



### MANNING ROAD - STIRLING HIGHWAY

**DEVELOPABLE LAND SUPPLY:**  
240 HECTARES

**CORRIDOR TYPE:**  
ORBITAL ROUTE

**MEDIUM DENSITY:**  
14,430 - 19,240 DWELLINGS

**MEDIUM-HIGH DENSITY:**  
24,050 - 28,860 DWELLINGS

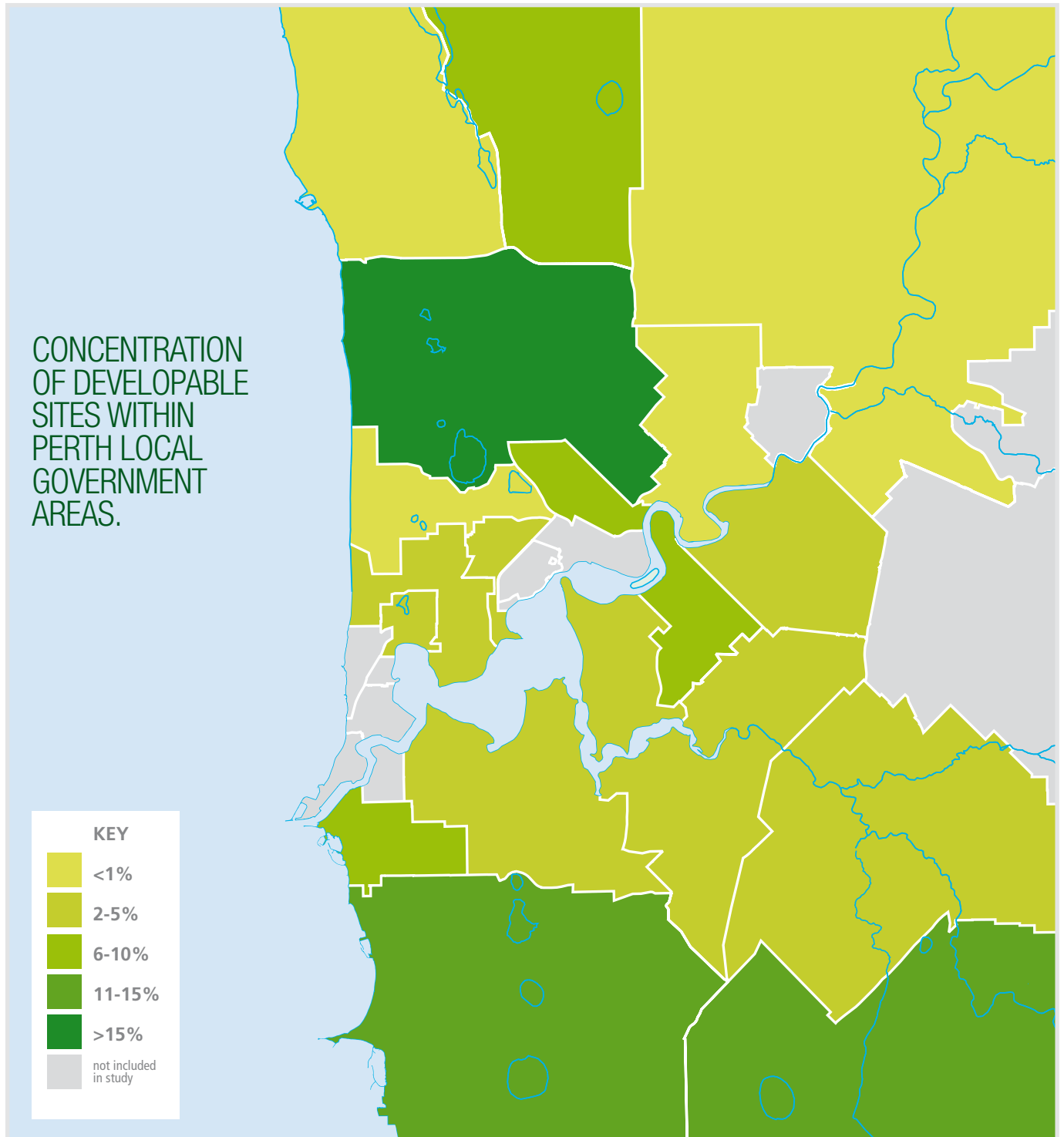
**HIGH DENSITY:**  
33,670 - 38,480 DWELLINGS

Includes roads:  
Manning Road, Albany Highway, Hay Street,  
Thomas Street, Stirling Highway



# HELPING LOCAL GOVERNMENT ACHIEVE INFILL TARGETS

Using Local Government Area boundaries, the development potential of Perth's High Streets has been attributed to local government authorities, below:



NB Local Government areas coloured grey did not have sections of corridors within their Local Government.

The chart below identifies the potential number of new dwellings along each Local Government Authority's portion of the seven Activity Corridors analysed in this study. The chart demonstrates that in many cases an entire Local Government's *Directions 2031* infill target can be achieved along Activity Corridors alone.

Local Government Area	Directions 2031 Dwellings Targets (2012 Annual Report Card)	Developable Land Supply (on corridors)	Potential Dwelling Yields (residential site density)					
			Medium		Medium – High		High	
			R60	R80	R100	R120	R140	R160
Armadale	11,400	195.17 HA	11,710	15,614	19,517	23,421	27,324	31,228
Bayswater	9,230	0.76 HA	46	61	76	91	106	122
Belmont	6,100	73.95 HA	4,437	5,916	7,395	8,874	10,353	11,832
Cambridge	4,000	1.71 HA	103	137	171	205	239	274
Canning	11,440	65.66 HA	3,940	5,253	6,566	7,880	9,193	10,506
Claremont	760	19.61 HA	1,177	1,569	1,961	2,353	2,746	3,138
Cockburn	19,450	205.46 HA	12,328	16,437	20,546	24,655	28,765	32,874
Fremantle	4,120	88.85 HA	5,331	7,109	8,886	10,663	12,440	14,217
Gosnells	17,260	53.06 HA	3,184	4,245	5,307	6,368	7,430	8,491
Joondalup	12,110	8.01 HA	481	641	801	961	1,121	1,282
Melville	10,830	29.90 HA	1,794	2,392	2,990	3,588	4,187	4,785
Nedlands	2,530	46.14 HA	2,768	3,691	4,614	5,537	6,460	7,382
South Perth	4,860	64.85 HA	3,891	5,188	6,485	7,782	9,079	10,376
Stirling	35,350	385.18 HA	23,111	30,814	38,518	46,222	53,925	61,629
Swan	19,970	7.67 HA	461	614	768	921	1,075	1,228
Victoria Park	11,320	99.1 HA	5,946	7,928	9,910	11,892	13,874	15,856
Vincent	6,730	101.61 HA	6,097	8,130	10,162	12,194	14,227	16,259
Wanneroo	27,860	128.34 HA	7,700	10,267	12,834	15,401	17,968	20,534
<b>TOTAL</b>	<b>215,320</b>	<b>1575.082</b>	<b>94,505</b>	<b>126,007</b>	<b>157,508</b>	<b>189,010</b>	<b>220,511</b>	<b>252,013</b>

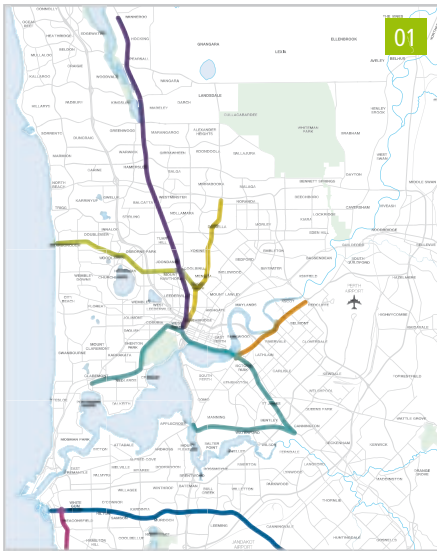
Based on information provided by and with the permission of the Western Australian Land Information Authority (Landgate) (2013). Potential Dwelling Yields calculated by report authors from Landgate data.

These results also reinforce how more intense development along urban corridors can preserve the much-loved character of existing local areas. For example

- 100% of *Delivering Directions 2031* (2012) LGA targets could be met in Fremantle, Nedlands, Vincent, Claremont and South Perth through medium density (r80) infill
- Belmont, Stirling and Victoria Park could meet its entire *Delivering Directions 2031* (2012) targets at medium-high density infill
- 50% of *Delivering Directions 2031* (2012) LGA targets for LGAs would be met through medium density in Armadale and Cockburn.

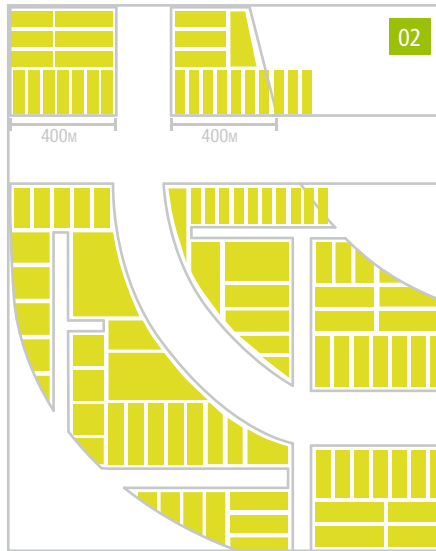
## CALCULATING CAPACITY

The icons below identify the steps that were involved in calculating developable sites along the seven transport corridors selected for this study.



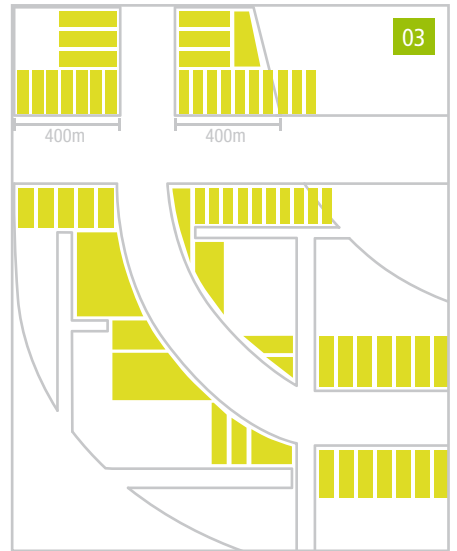
01

SELECT REPRESENTATIVE URBAN CORRIDORS.



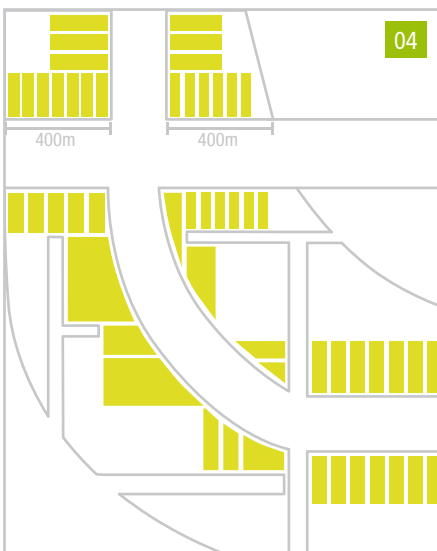
02

IDENTIFY CADASTRAL PARCELS.



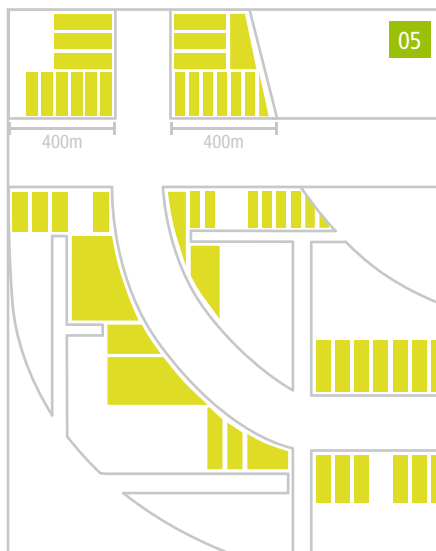
03

EXTRACT PARCELS WITHOUT DIRECT FRONTAGE TO CORRIDOR OR DISTRIBUTOR ROADS.



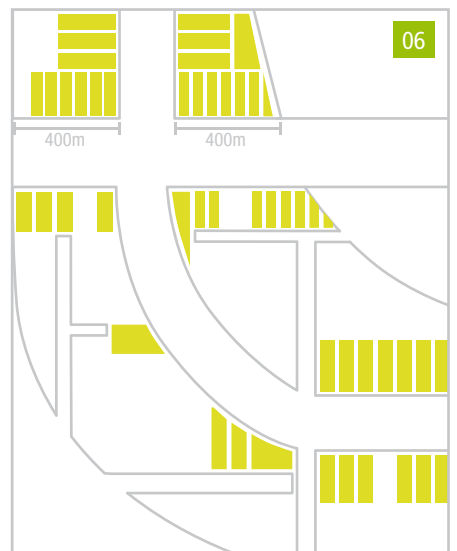
04

EXTRACT PARCELS FARTHER THAN 400M EITHER SIDE OF CORRIDOR OR DISTRIBUTOR ROADS.



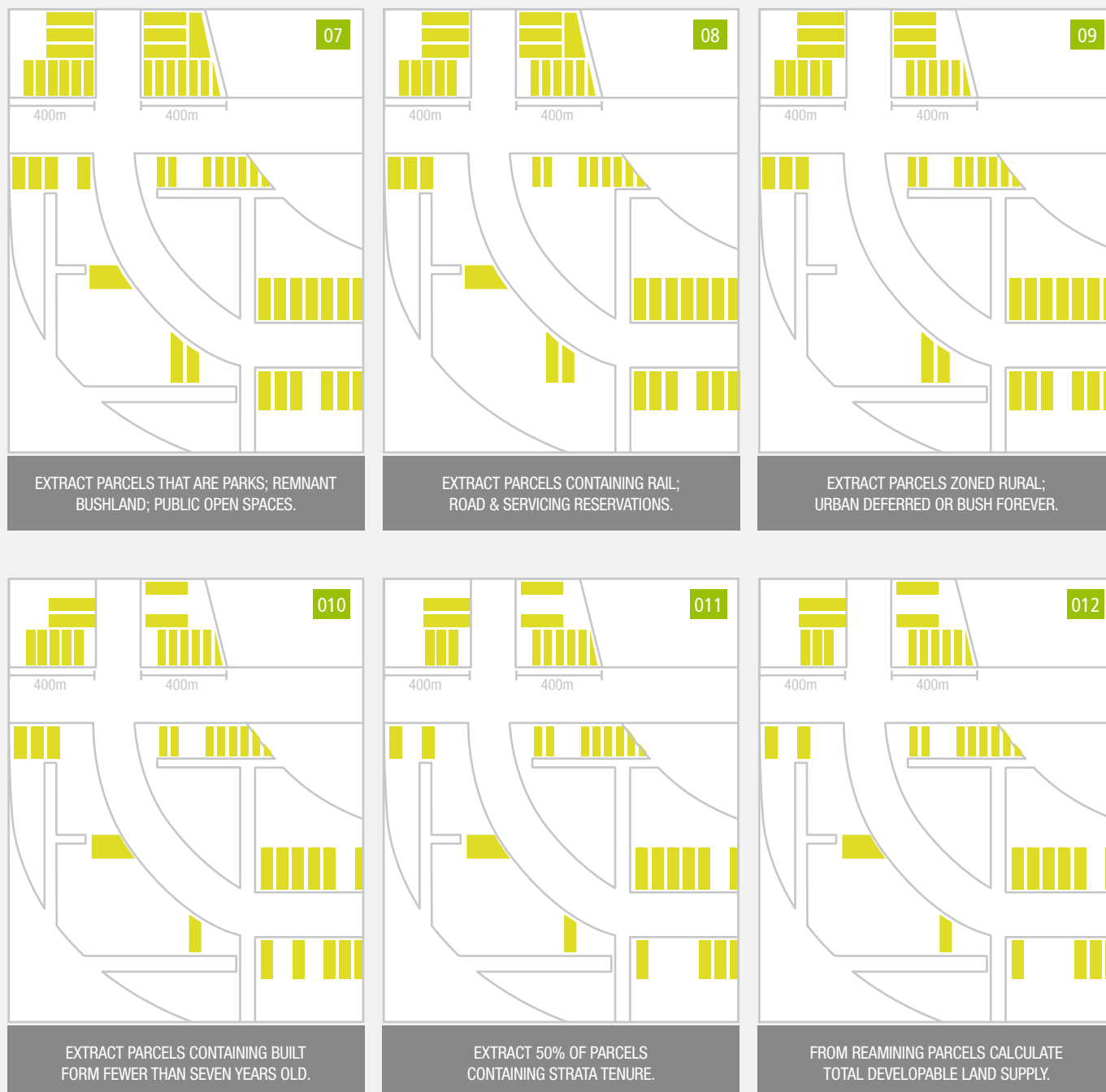
05

EXTRACT PARCELS CONTAINING LOCAL & STATE HERITAGE.



06

EXTRACT PARCELS THAT CONTAIN CIVIC USES EG. SCHOOLS; HOSPITALS; COMMUNITY CENTRES.



Note. A full explanation of the report method and results is provided in Appendix A to this report, available online at: <http://helium.propertyoz.com.au/helium/AssetManager/library/APPENDIX%20A.pdf>

A report prepared to inform the project reference group's choice of seven corridors is provided in Appendix B to this report, available at: <http://helium.propertyoz.com.au/helium/AssetManager/library/APPENDIX%20B.pdf>

A literature review prepared to inform decisions around the methodology adopted in the report is provided in Appendix C to this report, available online at: <http://helium.propertyoz.com.au/helium/AssetManager/library/APPENDIX%20C.pdf>



# A VISION FOR PERTH'S FUTURE HIGH STREETS

The way Activity Corridors are envisioned and designed will impact greatly on their success as livable, attractive, sustainable and vibrant places. This section is in two parts: the first explores design principles and typologies necessary for successful High Streets; the second illustrates case studies and scenarios that visualise how these may look.

## DESIGN PRINCIPLES AND TYPOLOGIES

In order to demonstrate the possibilities for regeneration presented by Activity Corridors, the Australian Urban Design Research Centre has prepared a suite of high-street design typologies. These typologies test the design assumptions captured in this report, including the principles of building more liveable, sustainable, vibrant and connected neighbourhoods.

The designs provide superior levels of amenity, diversity and affordability whilst achieving a relatively high dwelling density. Existing assumptions of built form, as represented by the R-codes are mostly adhered to however the designs challenge some of the expectations regarding development intensity and privacy. This approach has been adopted because Activity Corridors are treated as urban settings and therefore should not be expected to meet the requirements of residential design, which is predicated on a suburban character. Important design elements included in the design typologies to address challenges associated with living in urban corridors include:

- Maximised use of built form envelope
- Boundary wall construction
- Inhabited ceiling space
- Parking capped at one-bay per dwelling and accommodated at ground level
- Ventilating habitable rooms while limiting exposure to road traffic noise
- Two-bedroom configuration matched to current market expectations
- Providing of outdoor living space
- Commercial tenancies incorporated into the ground and first levels

The design typologies include three options for the typically sized single lots found along the Activity Corridors in this report. These are complemented by one further typology for an amalgamated site and an example urban typology demonstrating how the designs work along both the more intense Activity Centre portions of the corridor as well as the less intense residential infill portion of corridors (Figure 8).



An example of innovative high density design and materials used in the Vauban Quarter of Freiburg, Germany

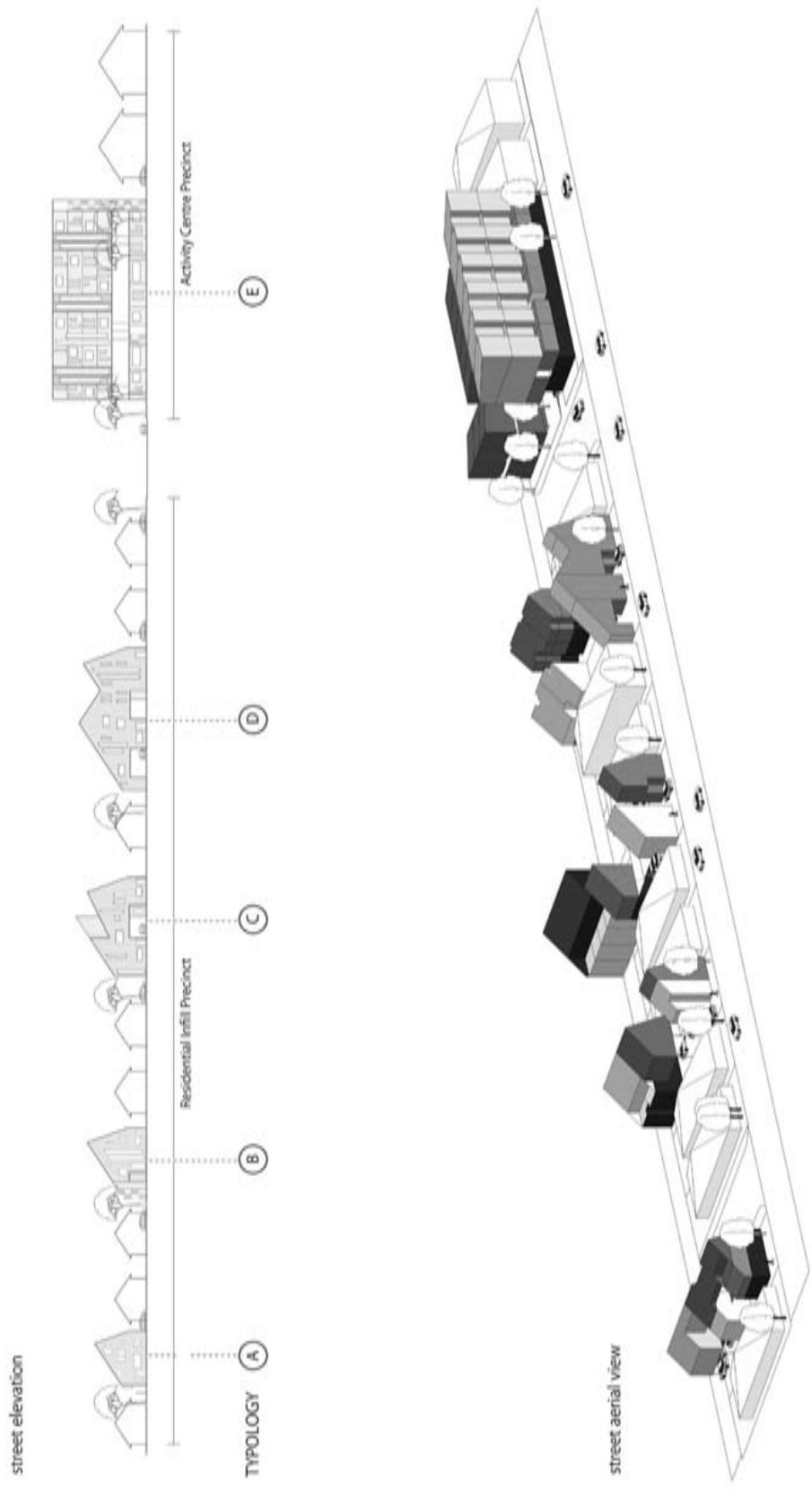


Figure 8: Example building typologies for Activity Corridor regeneration

# A VISION FOR PERTH'S FUTURE HIGH STREETS

A

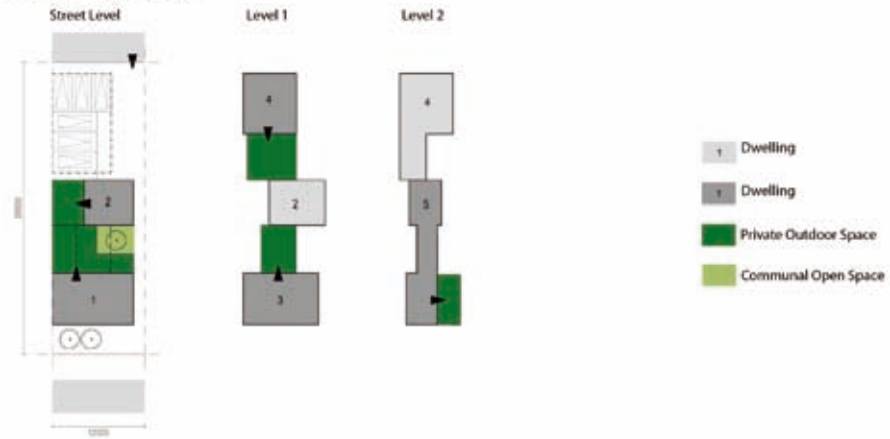
## BIG House

Lot Dimension: 12.5 x 39.5 =494m <sup>2</sup>	# Dwellings: 5	# Pkg: 5 + 1V	G.F.A: 396m <sup>2</sup>	F.A.R: 0.8	S.C: 51%
# Bedrooms: 11	# Ppl: 10 (2/Dw)	Dwellings/Ha: 100			
Uses: Living					

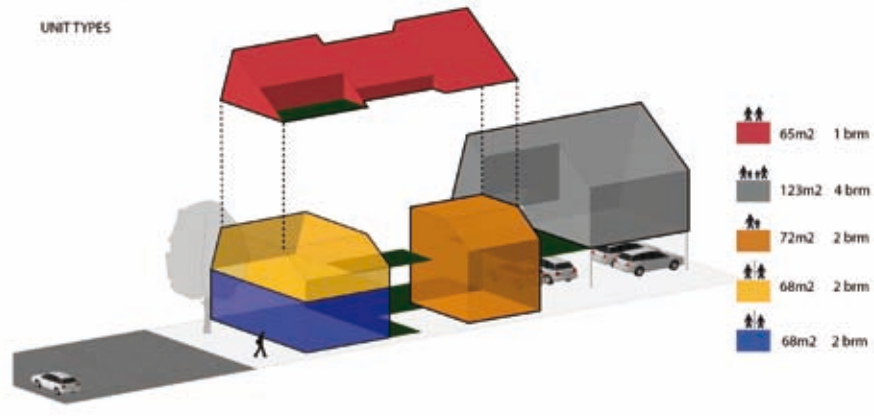
### OVERSHADOWING PROVISION



### DWELLING & OUTDOOR SPACE



### UNIT TYPES



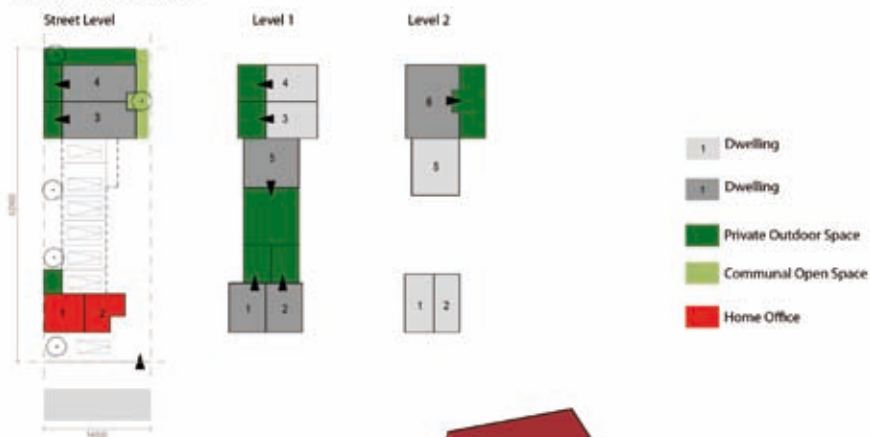
# B BIG House

Lot Dimension: 14.5 x 42.5 =616m <sup>2</sup>	# Dwellings: 6	# Pkg: 6 + 1V	G.F.A: 493m <sup>2</sup>	F.A.R: 0.8	S.C: 50%
# Bedrooms: 12	# Ppl: 12 (2/Dw)	Dwellings/Ha: 100			
Uses: Living Home Office					

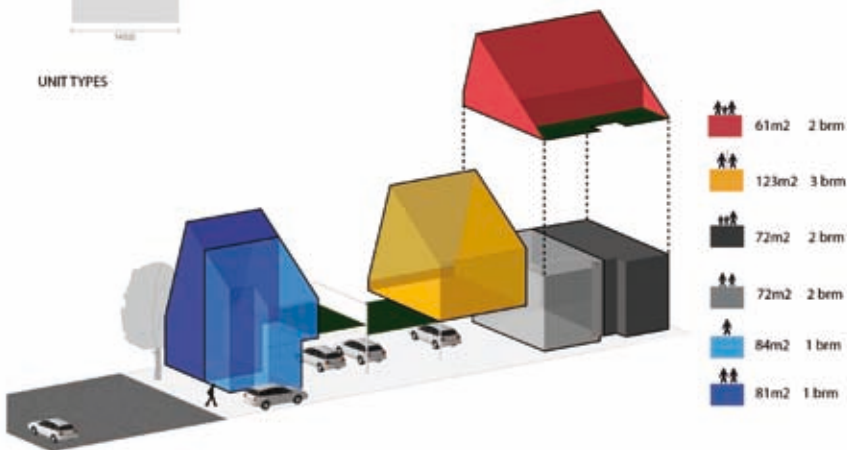
## OVERSHADOWING PROVISION



## DWELLING & OUTDOOR SPACE



## UNIT TYPES





# A VISION FOR PERTH'S FUTURE HIGH STREETS

C

## BIG House

Lot Dimension: 20 x 48 =960m <sup>2</sup>	# Dwellings: 10	# Pkg: 10 + 2 V	G.F.A: 1008m <sup>2</sup>	F.A.R: 0.95	S.C: 53%
# Bedrooms: 12	# Ppt: 20 (2/Dw)	Dwellings/Ha: 100			
Uses: Living Home Office					

### OVERSHADOWING PROVISION

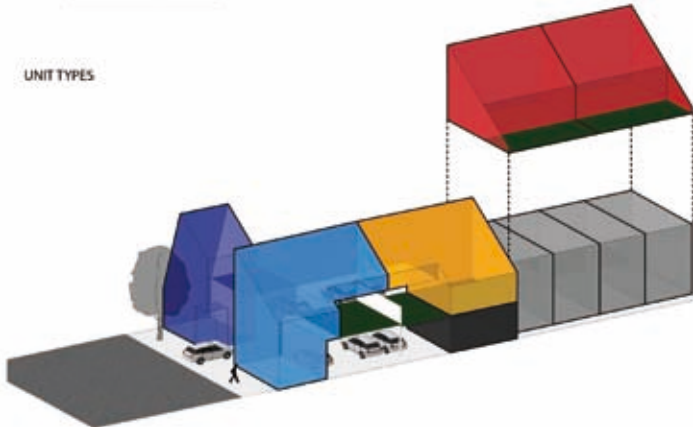


- Dwelling
- Dwelling
- Private Outdoor Space
- Communal Open Space
- Home Office

### DWELLING & OUTDOOR SPACE



### UNIT TYPES



- 65m<sup>2</sup> 2 brm
- 94m<sup>2</sup> 2 brm
- 94m<sup>2</sup> 2 brm
- 38m<sup>2</sup> 1 brm
- 131m<sup>2</sup> 3 brm
- 135m<sup>2</sup> 2 brm

# D BIG House

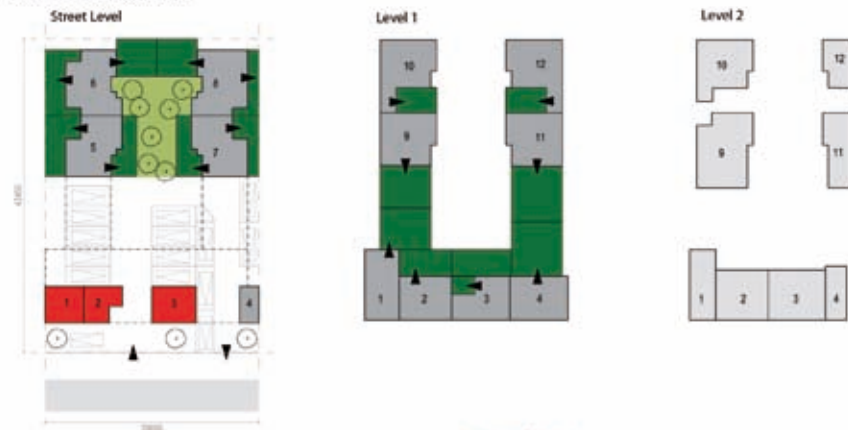
Lot Dimension: 28 x 42 =1176m <sup>2</sup>	# Dwellings: 12	Pkg: 12 + 3V	G.F.A: 731m <sup>2</sup>	F.A.R: 0.6	S.C: 58%
# Bedrooms: 12	# Ppt: 24 (2/Dw)	Dwellings/Ha: 100			
Uses: Living Home Office					

## OVERSHADOWING PROVISION

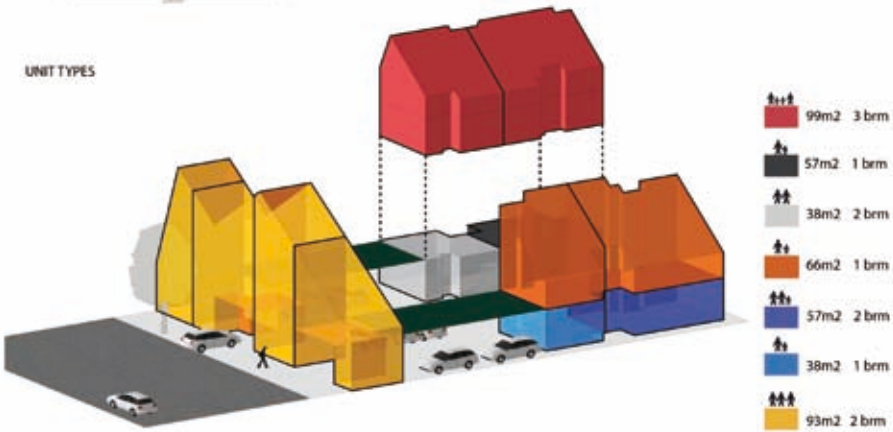


- Dwelling
- Dwelling
- Private Outdoor Space
- Communal Open Space
- Home Office

## DWELLING & OUTDOOR SPACE



## UNIT TYPES



# A VISION FOR PERTH'S FUTURE HIGH STREETS

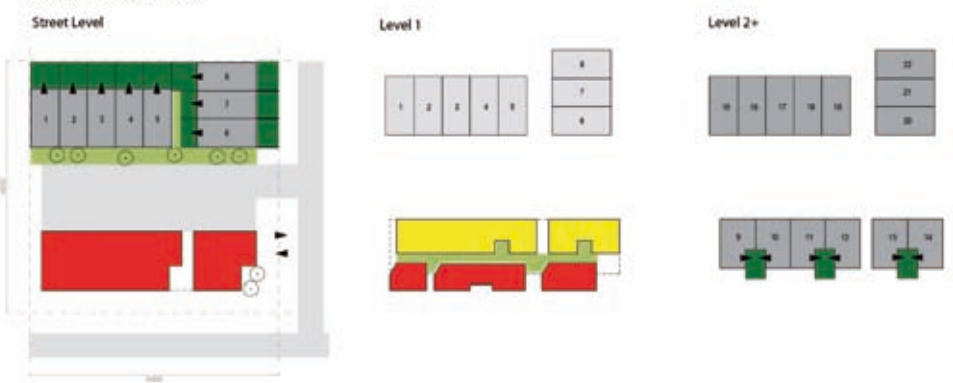
E

## BIG House

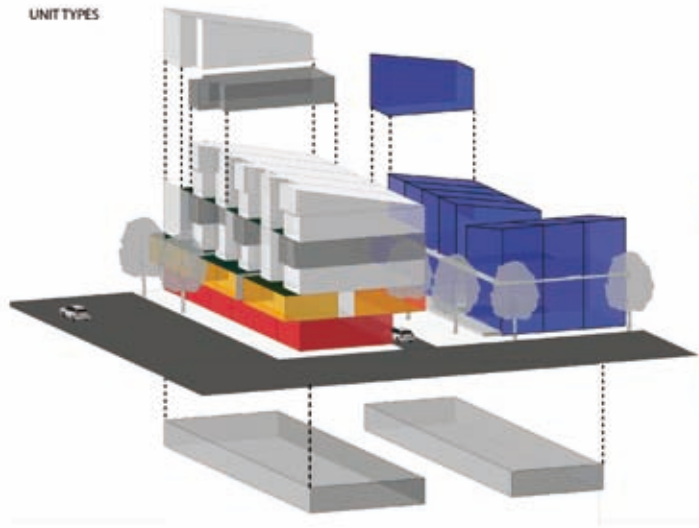
Lot Dimension: 44.5 x 45 =2003m <sup>2</sup>	# Dwellings: 31	# Pkg: 65	G.F.A: 3194m <sup>2</sup>	F.A.R: 1.5	S.C: 50%
# Bedrooms: 50	# Ppl: 62 (2/Dw)	Dwellings/Ha: 150			
Uses:	Living	Retail/Office	Commercial		

- Dwelling
- Dwelling
- Private Outdoor Space
- Communal Open Space
- Office/Retail
- Commercial Adaptable space

### DWELLING & OUTDOOR SPACE



### UNIT TYPES



- 94m<sup>2</sup> 2 brm
- 83m<sup>2</sup> 2 brm
- 43m<sup>2</sup> 1 brm
- 24-31m<sup>2</sup> Commercial (9)
- 54m<sup>2</sup> Retail (7)
- Basement Carpark

# CASE STUDIES AND VISIONS FOR PERTH HIGH STREETS

This chapter provides a vision for how the corridors in this study could be regenerated and includes two case studies that illustrate successful corridor regeneration from Australia and abroad.

The following is a possible vision for Albany Highway in East Victoria Park incorporating the light rail network proposed by State government and new development which could provide activity at street level, greater housing diversity and spaces for new local business.

## ALBANY HIGHWAY, EAST VICTORIA PARK



BEFORE



AFTER



# CASE STUDIES AND VISIONS FOR PERTH HIGH STREETS

## WEST TERRACE, ADELAIDE



“Life on the Edge” was a partnership between the Integrated Design Commission SA and Adelaide City Council which invited three multi-disciplinary design teams to speculate on the possibilities for transforming West Terrace, a 10 lane road with 60,000 cars per day and the most crashes in the city.

The proposals to transform West Terrace presented at the 5000+ Moving City forum and were intended to expand the conversation from ‘addressing the problems of today to imagining mobility in the context of the city of tomorrow’. The process and visions that emerged are best summed up by the Manager of City Design, Adelaide City Council, who explained:

*“The “Life on the Edge” experience tackled a big issue - West Terrace, with equally big vision. Designers are often criticised for creating an unrealistic expectation, pretty pictures that indicate a utopian society, but good design responds to and considers all of the smaller issues, tensions and agendas, without losing sight of a better future for us to experience and enjoy. I can still hear the voice of a lecturer of mine that stressed there is no such thing as constraints only opportunities...”*

*The greatest success for me however, was to see the tensions and conflicts between disciplines allow greater possibilities to be exposed. To see civil and traffic engineers think outside of current standards and traffic counts, but equally to see architects and landscape architects grapple with these issues. This is where the true synergies appear and where alternative, better outcomes are revealed, or in other words; where good design happens.”*

**- David Chick, Manager City Design, Adelaide City Council**

The full report is at [http://5000plus.net.au/blogs/5000plus/articles/5000\\_life\\_on\\_the\\_edge](http://5000plus.net.au/blogs/5000plus/articles/5000_life_on_the_edge)

Images:

Existing and proposed scenarios for West Terrace, Adelaide – HASSELL.  
Courtesy of the Office for Design and Architecture SA



## LANCASTER BOULEVARD, LOS ANGELES



The city of Lancaster is a fast-growing city of 150,000 people, about 112km from downtown Los Angeles. The City's historic downtown area has been in decline since the late 1980s, with most retail and commercial services having migrated to larger commercial centres

The city began a regeneration process in 2008 by adopting a form-based zoning code for the downtown Lancaster Boulevard corridor (Form-based codes encourage walkability by encouraging mixed uses and a pedestrian-friendly streetscape) and employing architects and planners to work together to redesign the boulevard to attract businesses and people. The project has won multiple awards, including the EPA's top national award for smart growth achievement, and the rejuvenated section of downtown is described by the architects as follows;

*"Among the Plan's key elements are wide, pedestrian-friendly sidewalks, awnings and arcades, outdoor dining, single travel lanes, enhanced crosswalks, abundant street trees and shading, and added lighting, gateways and public art. Lancaster Boulevard has been transformed into an attractive shopping destination, a magnet for pedestrian activity and a venue for civic gatherings."*

Since the project was completed the Boulevard has seen:

- 49 new businesses along the boulevard become established, and existing businesses have seen an almost doubling of revenue generated compared to just before the work began
- the creation of 800 new permanent jobs, 1,100 temporary construction jobs, and an estimated \$273 million in economic output
- 800 new and refurbished homes completed, and
- dramatically increased roadway safety, with traffic collisions cut in half and collisions with personal injury cut by 85 per cent.

More broadly, Los Angeles is undergoing transformative actions at the governance level including the creation of the Los Angeles Transit Corridors Cabinet, a central entity to ensure all city departments coordinate, collaborate and communicate their efforts towards a more transit-oriented LA.

Images:

*"The Case for Walkability as an Economic Development Tool", Kaid Benfield Jan 04, 2013 in The Atlantic Cities at <http://www.theatlanticcities.com/design/2013/01/case-walkability-economic-development-tool/4317/>*

# RECOMMENDATIONS

This report advocates for a more urgent consideration of the potential for and urban regeneration along Perth's key transport corridors. Transforming our Activity Corridors into highly liveable and attractive High Streets will require innovation and commitment at many levels.

## GOVERNANCE – STATE LEVEL

1. Establish an Integrated Design Commission attached to the Department of Premier and Cabinet and based on the South Australian model, with responsibility for
  - a. Introducing and managing a 21st Century electronic information and planning platform utilising 3D modelling of potential developments that provides capacity for genuine and interactive stakeholder and community engagement on how we plan for, design, and build our city and communities.
  - b. Resourcing and expertise for the development of local government built-form guidelines and Design Advisory Committees.
  - c. Establishing shared principles through a process of deliberative community and stakeholder forums on the vision for Perth's Activity Centres and Corridors.
  - d. Creating an Integrated Design Strategy for Perth and WA's regions by 2015.
2. Establish an Urban Renewal Commission involving key stakeholders from the government, private sector, academia and the community with responsibility for:
  - a. Coordinating government agency involvement in redevelopment and regeneration Perth's future Activity Corridors and Activity Centres.
  - b. Coordinating infrastructure upgrades, including social infrastructure.
  - c. Identification of land consolidation opportunities.
3. Work with industry to develop a strategy for innovation in design, manufacture and construction of medium and high density developments, with the aim for WA to become a world leader in this field.
4. Re-establish a sustainability policy unit within the Department of Premier and Cabinet, with its first task to revise the abandoned State Sustainability Strategy<sup>47</sup> with a more strategic approach that prioritises transformative actions that lead to sustainable outcomes in decision making processes. Priority should also be given to revising the *Sustainability and Settlements* framework (Chapter 4) which includes growth management, revitalising declining areas, urban design, integrating transport and land use (especially to overcome car dependence), managing freight and regional transport, air quality, waste, water, energy, heritage and buildings.

## GOVERNANCE – FEDERAL LEVEL

1. Reclassify urban regeneration and our current housing challenges as Nation Building activities, with the same priority as infrastructure such as roads and public transport, and establish a federal funding pool within the Department of Infrastructure's Nation Building budget.
2. Develop a long term strategy for regenerating Australia's urban corridors as part of a revised National Urban Policy.
3. Revise performance against states' strategic plans plans and incentivise measures to meet targets.
4. Adopt the model of transport corridor regeneration used in this study as an additional focus for Government strategic metropolitan planning documents.

<sup>47</sup>Western Australia was the first Australian State to undertake a comprehensive assessment of what sustainability means for forty-two areas of government. The State Sustainability Strategy is based on a Sustainability Framework of eleven sustainability principles, six visions for Western Australia and six goals for government. The Strategy is at <http://www.dec.wa.gov.au/our-environment/sustainability/state-sustainability-strategy.html>

## PLANNING

1. Using this study as a basis, conduct further research to estimate the housing yield and capacity for precinct scale regeneration along Perth's Activity corridors.
2. Introduce As-of-Right development mechanisms and incentives, where developments are guaranteed a set approval time and transition through the planning process so long they occur in pre-approved areas and meet certain criteria – both established through deliberative and participatory processes with the communities most directly affected. Criteria would include requirements around:
  - a. preservation of heritage
  - b. high quality design
  - c. provision of affordable and diverse housing
  - d. sustainability and environmental performance
3. Revise the targets set in the *WA Affordable Housing Strategy and Directions 2031 and Beyond* to reflect the potential for dwelling and job yields along Activity Corridors.
4. Introduce incentives in local planning schemes to promote higher-density developments along High Streets. This would include substantive density bonuses for:
  - a. Discontinuance of non-conforming uses
  - b. Heritage protection
  - c. Provision of Affordable housing
  - d. Diversity of housing, including aged or dependent persons dwellings
  - e. Amalgamation of lots
  - f. Meeting high energy efficiency and sustainability criteria
  - g. Incorporating best practice design criteria aimed at improving comfort and quality of life, including noise reduction and privacy measures
5. Develop a 'Liveable High Streets' strategy to compliment the 'Liveable Neighbourhoods' strategy. This would be an instructive reference for local government scheme reviews.

## TRANSPORT

1. Develop more sophisticated descriptions of road-types and road use programming in order to balance the competing demands of different functions along Activity Corridors, and the different priorities of competing government agencies, namely Main Roads, Planning and Transport.
2. Revise the Department of Transport's strategic goals and the *Public Transport Plan for Perth in 2031* in light of the findings from our study and the potential for regeneration along transport corridors.

# TRANSFORMING PERTH

