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*Making Cities Liveable*

Conference Proceedings



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# Conference Proceedings

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# **Growth and liveability in the Australian regional towns: A Case Study of Mackay, Queensland**

**(PEER REVIEWED)**

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## **ABSTRACT**

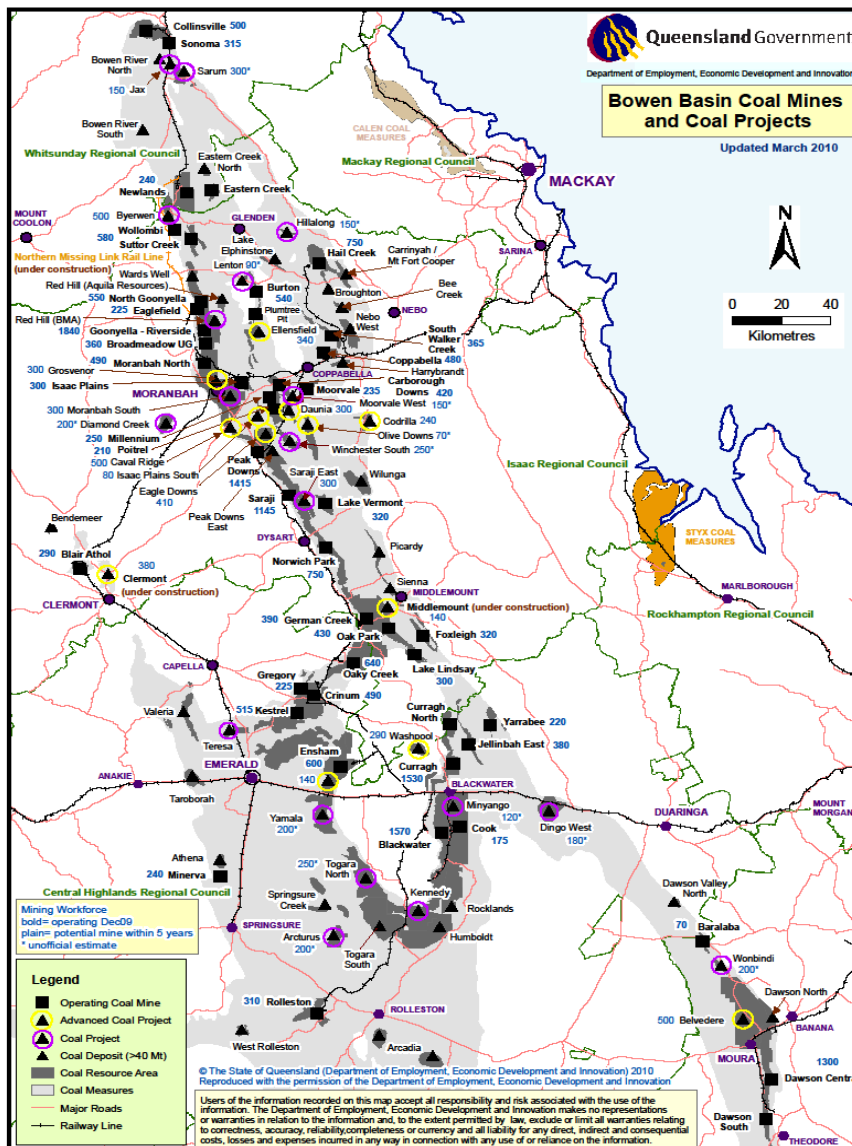
*The main driver behind the growth of Australian regional towns, especially of those in Queensland and Western Australia, is the continuous development of resources such as coal industry boom. This study undertook three growth indicators such as population trend, labour force movement and gross state products to characterise the growth of a regional city in Queensland, Mackay, which has been affected by coal mining boom in the central Queensland region since 2000. Then the study undertook a large scale survey to understand the regional liveability, including the liveability of Mackay.*

*The study found that the liveability of Mackay did not match with the level of growth in and around the city, and the condition of economic and environmental capitals is better than that of human and social capitals. Therefore, the priority areas to increase the liveability within this city are to increase the human development services such as education, training and health facilities and to improve social cohesion and community empowerment. The findings from this study are replicable to other similar regional towns in Australia or internationally where the city has a mix of mining services, agricultural trading and tourism activities.*

**Keywords:** Australia, Mackay, Mining, Growth, Liveability

## **1.0. INTRODUCTION**

The main driver behind the growth of Australian regional towns, especially of those in Queensland and Western Australia, is the continuous development of resources such as coal industry boom. The characterisation of these regional towns is important for planning and development of respective region. Mackay is one of the regional towns in Queensland, which has been affected by the resource booms in the northern Bowen Basin region (Figure 1). The purpose of this paper is to present a growth scenario of Mackay and relate this scenario with the regional liveability.



**Figure 1: Regional location of Mackay and its hinterland's coal mines**

Source: <http://chdc.com.au/documents/Reports/Bowen%20Basin%20mines%20and%20staff%20A3%20March10.pdf>

The paper has been organised as follows: Section 2 describes data and methodology; and Section 3 gives a brief background of Mackay and its growth indicators. Section 4 provides a short summary of liveability of Mackay. The paper concludes in section 6 with discussions and conclusions.

## 2.0. METHODOLOGY

This section first explains the sources of data used in this study. It then explains the case study data collection techniques followed by a description of the case study data analysis techniques.

### 2.1. Literature Review and Data Collection

The study involved a literature review of the national and international studies and published papers with an aim to build a framework of measuring growth and liveability. Secondary data of selected liveability variables were collected from Australian Bureau of Statistics and the

Office of Economic and Statistical Research. Some survey data were taken from Greer et al. (2008) study on the 'Liveability Audit of Mackay-Whitsunday-Isaac' region. In this study (Greet et al., 2008), A questionnaire for household survey was developed to collect information about those liveability indicators which are not available from valid secondary sources, especially on the subjective indicators of each liveability domain.

The sample frame was bound by the local government areas of Mackay, Whitsunday and Isaac regional councils. A sample size of 1200 was calculated based on two stage random sampling techniques, of which 525 are from Mackay. The sample was randomly selected by random digit dialling (RDD).

## **2.2. Descriptive Analysis**

Data given from the secondary sources and the household survey was primarily analysed by using Excel and STATISTICA softwares. The descriptive analyses included the calculation of frequencies, mean, and cross-tabulations. In the majority of cases scales used in the survey were five point likert scales organised from negative to positive with one equating to less liveability and five to better liveability.

## **2.3. Liveability Index**

The methodology for the liveability index involved indicator selection and the standardising of indicator values, the weighting and aggregation of the standardised values are the three steps for modelling the liveability index by weighted average (WA) (Chhetri et al., 2007). First, standardising all indicators values into a unique value limit i.e., between 0 and 1. Second, applying weights to every variable according to the importance of membership within the group. Third, aggregating all values by using the following formula:

$$U = y_1x_1 + y_2x_2 + \dots + y_nx_n$$

Where  $X_n$  is the  $n$ th indicator, and  $Y_n$  its corresponding weight. This is a linear aggregation method. Here, where applicable, the 0 and 1 values have been replaced with minimum and maximum membership values.

## **3.0. Mackay City: People and the Economy**

This section first describes population trend and socio-economic medians of Mackay. It then explains the Mackay regional economic growth and its drivers.

### **3.1. Population Trend**

Mackay is the major regional centre in the Mackay Statistical Division (SD). Mackay City is comprised of two statistical local areas; one is primarily urban, and other is primarily rural. Historically, it was established as a sugar producing centre and then as a port city. The population of Mackay was 66,873 persons in 2006; this is an increase of 9,224 persons over a five-year period (ABS 2008; ABS 2002). This represents 3.2% population growth per year between the last two census periods, which is much faster than the Australian average. This is one of the fastest growing cities in Queensland and the current high growth experienced by Mackay is currently predicted to continue over the next 20 years (MCC, 2007). It is estimated that population will nearly double by 2036 (Table 1).

**Table 1: Mackay: Population trend and demographic characteristics (in persons)**

	2006*	2011	2016	2021	2026	2031	2036	Change
Population	66,873	88,040	95,879	103,717	111,556	111,556	111,556	44,683
Couple family with children	30,676	36,415	33,937	35,607	37,926	37,926	37,926	7,250
Couple family without children	12,965	20,124	25,591	28,227	30,644	30,644	30,644	17,679
One parent family	7,111	8,836	9,695	10,953	11,891	11,891	11,891	4,779
Other family	473	597	635	713	784	784	784	311
Unrelated individual living in family household	808	1,446	1,761	1,940	2,114	2,114	2,114	1,305
Group household member	4,892	7,506	8,570	9,410	10,215	10,215	10,215	5,323
Lone person	5,222	6,411	7,422	7,933	8,415	8,415	8,415	3,193
Non-resident population	4,725	6,706	8,268	8,935	9,567	9,567	9,567	4,843

Source: Based on ABS 2008; DLGPSR, 2007; PIFU 2006, 2007; ABS 2002

To apply the impacts more clearly, the population projections have been disaggregated across classes in a population model. It is estimated, based on labour force projections given by the Department of Mines and Energy, the ABS and PIFU data that the number of couple families with children in Mackay will be increasing over time (30,676 persons in 2006 to 37,926 in 2036). Also, the number of couple families without children and single parent families will be increasing (20,076 persons in 2006 to 42,535 persons in 2036) (Table 1). There will be an increase in all family types as Mackay develops further into a large regional city. This will generate increasing demands for housing and community services.

### 3.2. Socio-economic Medians

Median age has increased by one year and median household income in Mackay has increased by \$389 between the last two census periods (Table 2). Both these indicators are considered with two common trends that are occurring in regional Australia. The first is that high salaries from mine employees are impacting on locations close to resource developments and the second is that Australia's population is ageing.

**Table 2: Selected socio-economic medians of Mackay**

Year	Median age of persons	Median individual income (\$/weekly)	Median family income (\$/weekly)	Median household income (\$/weekly)	Median housing loan repayment (\$/monthly)	Median rent (\$/weekly)	Average number of persons / bedroom	Average household size
2001	34	350	850	750	850	125	--	3.3
2006	35	530	1325	1139	1300	352a	1.1	2.7
Change	1	180	475	389	450	227	--	-0.6

Source: Source: ABS, 2008; ABS, 2002.

### 3.3. Population Migration

In 2006, the majority of the population had lived in Mackay for the preceding five years, with over 13,000 people (i.e. about 20% of the total population) migrating to the city over the previous five years. In 2001 and 2006 most people (66%) migrating to Mackay had come from other parts of Queensland, followed by New South Wales (11%) and overseas (10%) in 2001 and overseas (13%) and New South Wales (10%) in 2006 (ABS, 2008).

### 3.4. Labour Force

Total employment in the Mackay region in 2008/09 was reported by MWREDC (2010) at 72,767 workers. This is 43.4% of the total estimated population in the region. The distribution of the labour force across industry sectors is shown in Table 3. This reveals that the percentage of the labour force employed in Mining is much higher in the Mackay region compared to the State (11.7% compared to 1.7%). There are lower rates in the sectors of Manufacturing, Health and Social Assistance, Education and Training, Public Administration and Safety, Professional Scientific and Technical Services, and Finance and Insurance.

**Table 3: Employment by Industry in the Mackay Regional Area**

	Mackay Region	Mackay Region	QLD
	Number	%	%
Mining	8,495	11.7	1.7
Retail trade	7,878	10.8	11.6
Construction	6,970	9.6	9.0
Accommodation and food services	6,014	8.3	7.0
Manufacturing	5,860	8.1	9.9
Health and social assistance	5,083	7.0	10.2
Agriculture, forestry and fishing	4,883	6.7	3.4
Transport and storage	4,373	6.0	5.1
Education and training	4,288	5.9	7.6
Other services	2,981	4.1	3.7
Wholesale trade	2,813	3.9	3.9
Public administration and safety	2,700	3.7	6.7
Professional, scientific and technical services	2,693	3.7	5.6
Administration and support services	1,774	2.4	3.1
Rental, hiring and real estate services	1,312	1.8	2.1
Finance and insurance	1,102	1.5	2.9
Electricity, gas, water and waste services	605	0.8	1.0
Information, media and telecommunication	492	0.7	1.4
Arts and recreational services	435	0.6	1.3
Total Labour Force	72,767		

Source: MWREDC, 2010

The employment structure in the Mackay regional economy is heavily weighted to the mining industry, and to a lesser extent, to the Agricultural sector. This suggests that the Mackay regional economy is largely driven by the resources sector, and is very dependent on overseas markets and favourable trading conditions. Unemployment in Mackay was estimated at 3.5%, lower than the State average of 4.4%. Some of its hinterland (Nebo, Belyando and Broadsound areas) had very lower unemployment rates (1.0%). These very low rates of unemployment in the mining-focus shires indicate the level of competition for labour in those areas (Table 4).

**Table 4: Unemployment rates in the Mackay Statistical Division – June 2009**

Local government area	Unemployment (smoothed) number	Unemployment rate (smoothed) %	Labour force (smoothed) number
Belyando (S)	71	1.0	7,133
Bowen (S)	508	7.3	6,977
Broadsound (S)	44	1.0	4,213
<b>Mackay (C)</b>	<b>1,593</b>	<b>3.5</b>	<b>45,349</b>
Mirani (S)	93	3.0	3,056
Nebo (S)	18	1.1	1,596
Sarina (S)	266	4.3	6,224
Whitsunday (S)	490	4.2	11,565
Mackay SD	3,083	3.2	86,113
<b>Queensland</b>	<b>102,700</b>	<b>4.4</b>	<b>2,329,900</b>

Source: DEEWR, 2009

### 3.5. Gross Regional Product

The Mackay region, incorporating the Mackay, Isaac and Whitsunday local government areas, is a major contributor to the Queensland economy. The region produces a substantial amount of the State's sugar, approximately half of the State's coal production, and more than half of the State's coal exports (MWREDC, 2010). A total of 104.1 Million tonnes of coal was exported from the region in 2008/09, up 6.7% on the previous year.

There has been substantial growth in the regional economy in 2008/09, largely driven by an increase in the value of coal exports. There has been some growth (2.5%) in regional population, up to 167,666 people, but unemployment rose from 2.8% to 3.8% in the year to September 2009 (MWREDC, 2010). The region accounted for 7.1% of the Queensland economy in 2008/09, slightly more than either the Fitzroy or Northern regions (Table 5). The Mackay region has been one of the fastest growing areas of the State since 2001, recording an average annual growth of 18.9% between 2000/01 and 2005/06 (OESR, 2008). The Mining sector has been the key sector in this growth, increasing its share of the regional economy from 34.6% in 2000-01 to 50.1% in 2008/09.

**Table 5: Gross Regional Product Mackay-Whitsunday-Isaac Region**

	Level (\$m)	% of total	Level (\$m)	Annual % change
	2008/09		2007/08	
Mining	8,665.2	50.1	6,695.1	29.4
Manufacturing	669.7	3.9	642.0	4.3
Transport and storage	557.4	3.2	533.0	4.6
Construction	541.0	3.1	512.0	5.7
Wholesale trade	525.8	3.0	445.7	18.0
Retail trade	464.4	2.7	410.9	13.0
Health and social assistance	364.5	2.1	340.6	7.0
Finance and insurance	345.8	2.0	318.2	8.7
Agriculture, forestry and fishing	342.2	2.0	308.6	10.9
Accommodation and food services	319.9	1.9	296.5	7.9
Public administration and safety	312.3	1.8	276.0	13.1
Education and training	268.3	1.6	254.4	5.4
Professional, scientific and technical services	253.4	1.5	246.6	4.4
Rental, hiring and real estate services	225.6	1.3	206.8	9.1
Other services	188.9	1.1	169.1	11.7

Administration and support services	129.4	0.7	114.0	13.5
Electricity, gas, water and waste services	125.2	0.7	123.2	1.6
Information, media and telecommunication	82.7	0.5	58.9	40.4
Arts and recreational services	20.8	0.1	17.5	18.9
Non-classifiable industry	97.4	0.6	87.5	11.2
Total Industry value added	14,499.6	83.9	12,052.6	20.3
Ownership of dwellings	1,339.0	7.7	1,038.9	28.9
GDP at factor cost	15,838.7	91.6	13,091.5	21.0
Taxes less subsidies on production and inputs	1,118.7	6.5	1,010.7	10.7
Statistical discrepancy	326.9	0.1	0	
Gross Regional Product (\$m)	17,284.2	100	14,102.3	22.6
GRP Fitzroy region	16,203.1		14,290.4	13.4
GRP Northern region	10,855.7		9,623.8	12.8
GRP Queensland	243,829.0		223,450.0	9.1
GRP Australia	1,253,121.0		1,181,750.0	6.0

Source: MWREDC, 2010

Examination of the sectors contributing to Gross Regional Product (Table 5) allows several patterns to be distinguished. Mining accounted for half of the Gross Regional Product, demonstrating its importance to the regional economy. The 29.4% growth in mining over the previous year underpinned the 22.6% growth in the regional economy. While Mining dominates the regional economy, the four next biggest sectors of Manufacturing, Transport & Storage, Construction and Wholesale Trade are primary input sectors into the mining industry. The size of these sectors confirms the size of flow-on impacts that the mining sector is having into the regional economy. There is evidence of substantial flow-on effects in terms of personal expenditure and wealth, with Ownership of Dwellings up 28.9%, Information, Media and Telecommunications up 40.4%, Arts and Recreational Services up 18.9%, and Retail Trade up 13%.

### 3.6. Economic Diversity

MWREDC (2010) report the level of economic diversity in the Mackay regional area compared to both State and National statistics (Table 6). Regions that have an index value close to 1 are considered to be more diversified. The low values for the Mackay regional area compared to both the Australian and Queensland economy confirm that it is very specialised. Key industry sectors that are much larger than the State average are Mining, Agriculture Forestry and Fishing, Accommodation and Food Services, Transport Postal and Warehousing, Construction, Other Services, and Rental Hiring & Real Estate Services (MWREDC, 2010).

**Table 6: Index of economic diversity**



	Diversity Index (Australia)	Diversity Index (Queensland)
Mackay-Whitsunday-Isaac region	0.23	0.44
Fitzroy	0.43	0.64
Northern	0.78	0.78
Brisbane	0.96	0.94
Queensland	0.99	

Source: MWREDC, 2010

#### 4.0. REGIONAL LIVEABILITY

Liveability and well being are important factors in the development of a region. In relation to the present study understanding regional liveability is important. There is very limited data on liveability and the lifestyle of the region. However, a brief account of the liveability of the region has been drawn from Greer et al (2008) study as mentioned below.

Liveability of a place or a region is an important indicator of real life progress that is being achieved in not only the provision of built infrastructure but also soft infrastructure. This study used some findings of the liveability of Mackay, Whitsunday and Isaac regions from a study conducted by Greer et al in 2008. That study has categorised the liveability indicators into four groups: economic, environmental, human and social. The average liveability rating across the all capitals except human capital for Mackay is slightly higher than that of the average of Mackay-Whitsunday-Isaac (MWI) region (Table 7). This indicates that challenge of addressing liveability deficiencies in Mackay would appear to be in the area of human capital. Here human capital includes a focus on education and training to build capability and on health to increase the opportunity for productive work.

**Table 7: Liveability of the regions and performance of the capitals (in % of ideal condition)**

Region	Economic	Environmental	Human	Social	Liveability index
Whitsunday	55.72	59.87	50.88	50.75	54.31
<b>Mackay</b>	56.03	55.76	50.61	54.99	54.35
Isaac	55.03	51.61	56.50	56.55	54.92
Average (MWI)	55.59	55.75	52.66	54.10	54.53

Source: Greer et al, 2008.

Greer et al. (2008) also indicated that the average current liveability of the region is 54.53% and the expectation is 69.76%. This presents a liveability gap according to the respondents which can be interpreted as indicating a need across all dimensions of a 17.45% improvement to meet expectations. This requires planning and leadership from all sectors of the community, industry and government and provides an opportunity for entities involved in the economic development of the region to show leadership and engage in this area. The ability to mobilise resource to increase the regions capacity to increase the human capital should be recognised. Here human capital includes a focus on education and training to build capability and on health to increase the opportunity for productive work.

#### 5.0. DISCUSSIONS AND CONCLUSIONS

The Mackay is one of the fastest growing regions in Queensland, driven largely by growth in the mining sector. There are constraints on labour availability in the local and regional economies. The unemployment rate is low compared to state average, which indicates there are shortages in skilled professionals and trades people in the region. The local businesses (other than mine or mine services) have been facing difficulties in recruiting and retaining labour as mine companies have attracted them with higher salaries and facilities. Lower income employees have been facing difficulties with access to affordable housing and daily commodities, which makes it hard for businesses in other sectors to emerge. Accesses to skilled labour and housing availability for employees are key issues in improving the diversification of the local and regional economies.

About twenty new mines and expansion projects are planned in the Mackay's hinterland over the next five years. In considering with the significant developments of these projects, the economic challenge is to use these developments and the increased population and business expenditure to flow from them to develop a stronger and more diversified local economy and to expand the business base.

Overall liveability in Mackay as reported by the respondents has been at an average level, while the population and economic growth rate is much higher than the state level. People usually report relatively low level of satisfaction with the human capitals in Mackay and high level of satisfaction with economic and environmental capital. The challenge of addressing regional liveability deficiencies largely depends on the capacity of the regions leaders to plan and develop better human and social infrastructures. The priority areas for Mackay from the human capital dimension are: increasing the availability of trades people and improving the standard of workmanship; evaluating the number of education facilities; better delivery of specialist services to the region; improvements to allied health services; and coordination of better career pathways. Also one of the key concerns guiding government intervention to enhance liveability is social equity and ensuring access to basic community rights such as housing, health care and education for disadvantaged groups within the community.

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**Urban green space: Stakeholders' and visitors' perception in  
Kuala Lumpur Malaysia  
(PEER REVIEWED)**

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**Abstract**

*Planning, development and maintenance of urban green space is among the key elements of sustainable urban development. Acknowledging and participating in the conservation and enhancement of the urban green space can improve the environment and provide huge benefits to city dwellers. The aim of this paper is to investigate the stakeholders' and visitors' understanding of their responsibility and responsiveness towards urban green spaces in Kuala Lumpur.*

*Stakeholders and people understanding and responsibilities were investigated using interview method. Visitors to various urban parks in Kuala Lumpur and representatives of the National Landscape Department (JLN) and the City Hall of Kuala Lumpur (CHKL) were interviewed to capture the view of stakeholders and visitors. The study found that most visitors are concerned with the quality of the physical development and social necessities as their preferences for 'sustainable city'. The survey also indicates that the government should initiate enhancement of urban green space and promote awareness of conservation through gazettes and information campaign to preserve urban green space. Thus, stakeholders such as NGOs, developers, professionals should play their role in realizing the visions of local authorities and the nation. Research demonstrated that there is need to have high awareness towards environmental attitude which could be enhanced to encourage preservation and conservation of nature and their associated benefits.*

**Key words:** Urban planning, Urban green space, Urban environment, Social benefits.

## Introduction

During the last decade, the idea of healthy city has received global attention especially among academics, professionals and citizens. These concerns aim to address the issues related rapid development of cities and population growth around the world. Growth of cities is seen as positive for city residents particularly in terms of jobs opportunities, investments and property ownerships. However, economic and urban development has negatively impacted on social health, natural instability such as limited green spaces for socializing, urban heat islands, deteriorating air quality and climate change. More recently, issues such as population, health, sustainability, transport, affordable housing, urban design, green spaces and climate change have generated debates among public commentators and academia. Approaches to sustainability have received wider interest among the built environments professionals. Currently cities are encouraged to promote sustainability and healthy living environment. For example, a recent study in Malaysia is aimed at improving the sustainable tropical garden city in Kuala Lumpur by 2020 (CHKL 2003). Malaysia and other developing countries are struggling with issues such as healthy city, demographic, economic, and environmental and health transitions (Pugh 1997). Contemporary Asian cities still are faced with enormous problems related to over population, pollution, urban poverty and chaotic urban living environment (Pugh 1997; Sivam 2002; Ting 2007). It could be argued that the Asian countries will continue to experience sustainability issues for a longer period of time.

Meanwhile, developed countries such as United States of America, Canada and the countries of the European Union experienced overwhelming urban population where almost 80% of their urban populations live in the cities. This contributes to high land consumption and global warming. Recent literature encourages alternative approaches to sustainability, urban planning and design (Beatley 2000).

Beatley (2000) describes sustainability activities in urban planning and design developments as: "supporting regional ecosystems and designing multipurpose, varied sized open spaces meeting needs for respite, recreation, aquifer protection, storm water management, flood control and urban agriculture". Brenda and David (2002, cited in (Omar 2009) have outlined key arguments in regard to principles of sustainable urban planning and design. The authors went further to agree with Omar's (2009) suggestion that providing open space, parks and green space could promote clean air, recreation facilities and quality of urban habitat.

The availability of accessible, safe and attractive green spaces is an integral part of urban quality of life (Van Herzele & Wiedemann 2003). The green areas are part of most human settlements regardless of differences cultural background and geographical location (Jim & Chen 2006). Jim and Chen argue that 'green space provision is probably as old as settlements' (Jim and Chen 2006 p1). Human desire for open space is often articulated as appreciation of quality of life and connection with nature (Miller 1997, Chiesura 2004)). Green spaces, is a key element to create sustainable development, environmental quality, quality of life, and citizen health. The availability of quality green space is an integral part of quality of life of urban citizen (Van Herzele & Wiedemann 2003).

As cities grow rapidly and population density increases in both formal and informal settlements, healthy space such as green space become small and less accessible. Urban growth has contributed to high competition in land use. As a result, the limitation in access to land is identified as contributing factors facing the urban green spaces in modern cities. For example, the city of Kuala Lumpur is currently seeking alternative approach to urban planning and design in order to increase its urban green spaces.

Chiesura (2004) argues that there is very less concerns are paid by international organization to preserve and improve the benefit of the open space at city level where people live and work. City sustainability generally consider built environment rather than the natural components and green space (Chiesura 2004), Thus, the purpose of this paper is to discuss the stakeholders and visitors understanding of their responsibility and responsiveness towards urban green spaces in Kuala Lumpur. The paper focuses on the participants' particularly in regard to urban green space development, conservation, maintenance and management.

## **Background**

The study selected Kuala Lumpur urban green space as a case study for this research. Kuala Lumpur is a capital city of Malaysia and it has the largest metropolitan areas and it is seen as role model for other small cities in Malaysia particularly when it comes to development and urban planning. Furthermore, Kuala Lumpur has demonstrated its capabilities in ensuring healthy environment and urban sustainability. This has encouraged other states to forward in advancing their ability and commitment towards healthy environment.

Kuala Lumpur as a former colony state, still practice urban planning concepts that are influence by colonial administration (Rakodi 2001). For example, urban green space concept was originally introduced by British and adapted in Malaysia's parklands such as Perdana Lake Garden which is located in the heart of Kuala Lumpur city centre. This green open space is one of the most beautiful and historical parklands in Kuala Lumpur. However, the concept of "green belt" as one of dominant planning concept has not adapted in Malaysia's planning regulation as it has been in Britain ( Hirt & Jassen 2009).

After the independence the development of urban green space were overlooked in the planning discipline due to special emphasis on economical development. Also the urban green spaces declined due to the physical development such as commercial and housing areas between independent period and 1990s. Since independent the country has practiced comprehensive development plan system in planning discipline. The Structure Plan System was introduced in 1976. Same time 1976 the Town and Country Planning Act was introduced (Act 172) which currently plays an important role in providing guideline and planning framework for the nation (Maruthaveeran 2004). In 1984 the city of Kuala Lumpur adapted Structure Plan which outlined framework and direction for planning unstructured city to well plan and prosperous city. Despite designed framework and development at states' levels, the federal government has authority and powers to approve the development plans. For example, in 1987, the Former Prime Minister of Malaysia Tun Dr Mahathir Mohammed decided to personally monitor Kuala Lumpur city planning through his directives by the Prime Minister Department (Bunnell, Barter & Morshidi 2002). The Kuala Lumpur's Structure Plan 2020 was proposed and written in 2002 which is stated to be encouraging 'Sustainable Tropical Garden City" and it put emphasis on social and environmental developments. The Kuala Lumpur's Structure Plan 2020 is a world-class city plan that supports world class working environment, a world-class living environment, a world-class business environments and world-class governance (CHKL 2003).

Table 1 provides the details of the seven urban green parks in Kuala Lumpur.

Urban Parks	Location/ District	Size	Categories	Description
Perdana Lake Garden	CBD	70 hec	City Park	Establish since 18 <sup>th</sup> century, green lung for Kuala Lumpur and famous tourist destination divided to sub-garden such as Hibiscus Garden, Bird parks, National Monuments and Lake garden
Kepong Metropolitan Parks	North/ Sentul – Manjalara	127 hec	District Park	Historically as mining land, develop to be District park with modern facilities. Playing kite activities as main attraction among local Citizens.
Batu Metropolitan Park	North/ Sentul – Manjalara	24 hec	District Park	Man Made Lake, adjunction to nearest mining area. Less accessible to the public due to limited entrance to the parks.
Titiwangsa Lake Garden	West/ Wangsa Maju - Maluri	46 hec	District Park	Located closed to the city centre and surrounded by strategic tourist attraction such as National Library, Art Museum National Theatre (Istana Budaya) etc.
Pudu Lake Garden	South West/ Bandar Tun Razak - Sg Besi	26 hec	District Park	New park for Cheras, open to public in 2007. Expected to serve residents surrounding in the neighbourhood. It has been Gazette as a park by City Hall.
Permaisuri Lake Garden	South West/ Bandar Tun Razak - Sg Besi	50 hec	District Park	Green lung of Cheras, officially open in 1989. Man made lake and design such represent The Royal Malay Garden, with attractive tropical flower terrace garden known as 'Laman Puteri'
Bukit Jalil Park	Southern/ Bukit Jalil - Seputeh	22 hec	District Park	The park and Bukit Jalil development was establish as sports centre during the Commonwealth game in 1998. The park provides recreation facilities and many attractions such as man made lake and theme gardens.

## Methods

Urban green space have significant contribution for the 'Healthy City' whereby it can enhance the sustainability of the social, economy and environmental qualities for the cities and encourage healthy living environment such as promoting green infrastructure, efficient use of energy, recycling and healthy place which provides clean air and water.

To address the aim of the research, interview was conducted to both visitors' to the park and local authorities such as City Hall of Kuala Lumpur (CHKL) and National Landscape Department (JLN). The research has adopted the triangulation method where by the interview as qualitative to investigate general opinions and followed by questionnaire as quantitative to investigate possible variables attitudes on urban green spaces such as knowledge, participations and others. However, the paper will discuss first stage of the



research, which is the interview with stakeholders and visitors in Kuala Lumpur and the second stages survey will be conducted end of year 2010.

Stakeholders responsible for provision and management of open space were selected mainly from the City Hall of Kuala Lumpur and the National Landscape Department. The study has interviewed three officers from the City Hall of Kuala Lumpur from the department of Cleaning and Landscape, which are responsible to manage and maintain the urban green spaces in Kuala Lumpur. The interview also has been organized with officers from the National Landscape Department (JLN), which are responsible for greening the nation, provides guideline, policies and funds.

Many urban green spaces around Kuala Lumpur have been selected as case studies to conduct the interview. The green space has been selected from the district division of the Kuala Lumpur city plan which is Center of Business District (CBD and Strategic Zone such as 1) Wangsa Maju – Maluri, 2) Sentul – Manjalara, 3) Damansara – Penchala, 4) Bukit Jalil-Seputeh and 5) Bandar Tun Razak – Sungai Besi. As result seven district parks has been selected including City Park such as Perdana Lake Garden, Kepong Metropolitan Parks , Batu Metropolitan Parks , Titiwangsa Lake Garden , Pudu Lake Garden, Permaisuri Lake Garden and Bukit Jalil Parks ( Refer Table 1).

A questionnaire interview/survey was designed based on similar studies conducted other places to investigate visitors and stakeholders opinions. 10 respondents were selected to represent each parks and it was randomly interviewed. The result shows that (N=47) respondents were willing to participate in the research interview. The interview concern general perception and personal opinion of local urban green space and it has conducted for around 20 minutes. The data has been analyzed and coding using qualitative software Nvivo8. The software provides facilities to transcribe from the audio to the text forms and store the main data that can be utilized for analyzing purposed. The Nvivo8 provide opportunities to design coding, stored, summaries result and develop the graph accordingly. The paper highlights the opinion from the two stakeholders CHKL and JLN which agree that urban green space development have huge benefits towards the 'Healthy City'. The paper also present the opinion from the visitors related to their local urban green space, which addressed huge concern of the conservation and development of urban green space in Kuala Lumpur.

## **Result**

Interview was conducted for both visitors and stakeholders to obtain their views. The following sections will present results of stakeholders and visitors.

### **Stakeholders' perception**

Stakeholders were interviewed to capture general understanding on urban green space planning and development in Kuala Lumpur. Representative from the Department of Landscaping and Urban Cleaning Control (City Hall of Kuala Lumpur) and National Landscape Department (JLN) through Ministry of Housing and Local Government (KPKT) has been interviewed to capture information about their roles and visions.

The stakeholder interview provided a platform for discussion of urban green space planning issues and future options for Kuala Lumpur. Stakeholder concerns were that to achieve Healthy Cities the key elements are healthy environment and sustainable society. Stakeholder's opinion identified through interview is listed in Table 2.

Table 2 'Sustainable city' opinion by stakeholders

Sustainability means balance between built and natural environment, which covers all aspects such as physical development, social satisfaction, environmentally viable and economically feasible.

Integrated and Multidisciplinary approach in planning the cities – participation by local authorities, developer, agencies and the citizens.

Sustainable Society - Quality lifestyle and environment

Livable city - safety ,harmonious , beauty

Stakeholders agreed that the sustainable city should consider the balance between built environment and natural environment. This concern has been translated as vision for Kuala Lumpur in next year 2020. According to Mr Nik Adlin, Landscape Architect at CHKL *“mentions that the department aim is to realize concept of tropical garden city, which will transfer Kuala Lumpur to have sustainable urban green. This vision has been translated in the structure plan and landscape master plan of Kuala Lumpur”.*

According to Deputy Director National Landscape Department (JLN) Hj Mohd Taib *“climax of sustainability is livable city which have safety character, harmonious and beauty”.*

What are concerns from the list that multidisciplinary professional commitment and the participation of citizens, NGOs and others is essentials in ensure that the city is livable. The stakeholders are progressing providing framework towards Healthy City that has stated in the Kuala Lumpur Structure Plan 2020. Mr Shahbudin expressed that *“it is important that guideline and planning development apply and implement by all parties and play their roles to ensure the vision of the government can be achieved”.*

Finally, the Kuala Lumpur citizens should have social quality and awareness towards healthy environment. The citizens should not only participating and supporting the government aim but the citizens it self become the dominance factors in creating livable city. Thus, Sustainability is a process, it requires greater efforts of all parties and it should be integrated from the beginning of planning, implementation, preservation and conservation.

Urban green space development can improve healthy city environment. Compact cities such Kuala Lumpur require essentials comprehensive green strategies. The city has rapidly developed. Commercial and housing demands are crucially stressful especially for the low and middle income citizens. Urban green space developments become more and more importance for the citizens to have greenery space for relaxation and recreations. It also provides protection for flora and fauna from distinct and balances the ecosystem and climate of the city.

The study has identified some key issues from the interview with stakeholders related to urban green space development which listed in Table 3.

Table 3 Key urban green space issues addressed by stakeholders

Open space and green space definition used in planning	Open space is broad definition including green space, utilities such as oxidation pond, sewerage etc.
Land status	The need of gazette the land
Maintenance and Management of green space	Huge amount of money to spend.
Converted the green space to development	Development pressure, Weak enforcement, Existing act need to be strengthen
Approach and planning the green space	Planning, develop and maintain
Public awareness	Pressure group, NGO participation

There are many issues pertaining urban green space development in Kuala Lumpur. Comprehensive understanding and communication between departments in the local authorities can be the beginning in planning process. For examples definition and interpretation of open space in planning are still broad and different according to each department. Thus, some issues such implementation, land status, maintenance and management is overlapping or overlook.

Hj Mohd Taib has address that *“Open space and green space are not clearly define in planning and unfortunately in Malaysia they are determine inside the utilities spaces. Thus in planning development the open space will be provided all utilities facilities including green areas”*. Thus, many urban green spaces are still facing pressure by development because it not protected by any act and gazette especially local and neighborhood parks. Due to this the spaces have been converted to community facilities such as community hall, kindergarten and others uses. However, fortunately there are some areas have been gazettes which are the forest reserve.

Mrs Mazifah Simis, Director of research and conservation (JLN) mention that *“ .... The basic issues of urban green conservation ...is land status, because in urban area the status was changing over the time. Thus, due to development pressure some time the land can be easily converted to any development land use, which is more valuable in economic term”*.

She also agrees that there are not clear regulations and enforcement towards green space preservation and conservation. She also stated that *“..... The main issues are the green area is not gazette especially the lower hierarchy of green spaces such as local play area and neighborhood parks”*.

Thus, urban green space are still facing greater challenges, such issues need to be comprehended in the structure and local plan.

Stakeholders have suggested some strategies towards strengthen the urban green space planning, which are listed in Table 4.

Table 4 Enhancing urban green space in urban planning and design

Green Network – link major and isolated green spaces, enhance strategic corridors such as river, road, railway and utilities reserve.

Horizontal and Vertical green – There is need to incorporate vertical open space concept within planning frame work as planning norms and regulation similar to horizontal open space. Currently planning strategy has imposed 10% open space for any type of development.

Density and population – green space allocation should shift towards density and population oriented rather than concentrate by area.

Strengthens associated development Act – Currently is only compulsory for large development. Stake holder suggested to strengthen the open space regulation there is need to undertake Environmental Impact Assessment (EIA) for each projects.

Conservation concern – Gazette potential green space and corridors.

Many opinions have been thrown out during the interviews. Green network are among intention by the Kuala Lumpur. It is huge challenge for Kuala Lumpur to ensure the program can be realize, this is due to some issues such as land status, informal settlement and many more.

Green network will support and link between green spaces. New development need to address it relationship with broad concept of green strategies. Mr Nik Adlin mentioned *that “.....in Development Order (DO) have determined strait guideline for any scale of new development need to provide green spaces. The green space should be providing according to the percentage of development. They also need to provide with proposal for the green spaces facilities such as plants material, playground and landscape furniture”.*

Mrs Mazifah, however was optimist with the challenge had by the urban green space. She strongly believed and states that *“.....Historically the development of urban green strategies can be trace back since 70<sup>th</sup> with garden city program.... during the era street planting have given huge intention. Since 80<sup>th</sup> urban park have been developed and in 90<sup>th</sup> more pocket park have been introduce with in the city..... preserving numbers of older urban park can be consider as victory for Kuala Lumpur and 20<sup>th</sup> and 21<sup>st</sup> century are more challenging where the focus are more on developing infrastructure”.*

Thus, there are exciting journey for urban green spaces to be recognize as among important factor that contribute for healthy city development. Kuala Lumpur structure Plan 2020 portrays the privileged intention to be world class city by adopting sustainability trough its development.

### **Opinion of Kuala Lumpur urban green space visitors**

The study involved participation with local visitors in their local urban green space. The objective of the interview was to investigate general experience and perception about their local urban green space. There were 47 respondents interviewed across seven urban green spaces surrounding Kuala Lumpur. Majority of respondents were Malays residents aged between 30 to 50 years old. The research found that majority of the respondents recognized the concept of sustainability is important to achieve healthy city environment. The understanding of sustainability as listed in the Table 5.

Table 5 'Sustainable city' opinion by visitors

Physical Development - Facilities and Amenities, Plan city, Architecture, Infrastructure
Social – Recreation, Community and population, Clean and Beautiful, Attitude, Safety
Environment - Park and landscape, Green conservation
Economy- Tourism, Economy, Development

Most of them expressed that physical development and the social requirements were the most important elements for sustainable city. The table also illustrates that environment and economy is other elements that contribute to the sustainability of the city. Physical development has been address as important by the visitors. Respondents believed that the city with have strong character of physical development are sustainable where it provide all necessity such as facilities and amenities, architecture and infrastructure. Most of them agree that facilities and services is importance and citizens can used it with comfort and easily. For examples one respondent expressed that” *The meaning of the development for city is; the developments have to provide all factors which are needed by the citizens. Thus, all the facilities can be used comfort, easily by the citizens*”.

Secondly, Respondents expressed that social sustainability is important in sustainable city. They agree that social factor is the key component in sustainable city such as the recreation area, community development, beautification, attitudes/behaviors, and safety. Recreation and community development was two significant attribute in social needs. Among the visitors claim that recreations demand such as: *“From my opinion the meaning of sustainable development is, the place which have development and in the development it has allocated and provided recreation space for the community to have exercise and relaxation”*. Environment and economy attribute also have been identified as elements in sustainable city development by the respondents in Kuala Lumpur urban parks. Parks, landscapes and green conservation has been highlight to be important elements in the urban environments.

The interview also has opportunities to discover people experience and the important of urban green space to the visitors. Table 6, has listed visitor’s opinion about the important of urban green space development in Kuala Lumpur.

Table 6. Importance of urban green space to the visitors

Planning - Recreation space, Urban policy, Conservation, Balance development
Environment - Air quality, Urban heat, Beautification, Wildlife
Health - Rest and Relaxation, Reduce stress

Respondents in Kuala Lumpur urban parks expressed that the elements of planning of the green space such as recreation space, urban policy, conservation and balance development is importance to enhance healthy environment. They also expressed that environmental experience among the important element such as the needs to have air quality, reduce urban heat, city beautification and habitat for wildlife. Urban green space can contribute as therapy for health for examples people can have relaxation, resting while reduce some stress. One of the respondent express that *“I think it is important to have green space because nowadays it is rapid development, thus if there is no green space the space could be feel compact and not convenience to people. Whereby, if they provide some green space it can be a space for relaxation, recreations and others”*.

Table 7. Key urban green space issues addressed by visitors

Park management & maintenance Maintenance , security and safety, services and facilities
Attitude & behavior Vandalism, Braking of religious and moral law and making rubbish
Awareness Taking care the environment, environmental education

The issues of the urban parks can be identified such as Park management and maintenance, attitude and behavior and awareness. The issue of maintenance is the biggest concern in park and management. Respondents agree that security and safety, services and facilities provided also have opportunities to be improved.

The issues of attitude have been address and sometimes it is become worries to the visitors because vandalism is uncontrolled and it will make facilities not in good condition and less attractive. Among the Malays, which have strong culture and religious practice worries attitude towards breaking religious and moral laws are increasing around public spaces such as urban parks. Beside that the awareness of the people also need to be enhance and to be encourage to take care of their environment.

### Discussion and conclusion

After 16 years the establishment of National Landscape Department (JLN) through the Ministry of Housing and Local Government (KPKT) have served and ensure landscape planning and development have been implemented around the country. The department functions to provide urban green spaces planning and design, training and research and law and enforcement. Many programs have been introduced to educate and promote Healthy living environment for Malaysian citizens.

### Participation and Commitment

National Landscape Day have establish since 1998. It has been celebrated every year on 3<sup>rd</sup> of May for a month and all local state are encourage to participate and encourage citizens to celebrate and enhance their knowledge towards healthy environment. There are also landscape campaigns, garden festival and conferences have been organized during the Landscape Day (Ting 2001). The serious commitment from the Ministry KPKT and JLN can be acknowledge where they manage to promote it every year until present.

Through the theme listed, it can be conclude that the government has enthusiasm aiming Malaysia to be the Garden Nation. Thus, it also can encourage the awareness among the Malaysian citizens to shift and practice high environmental attitude. This theme imposed by government could promote multidisciplinary and commitment among citizens towards achieving Healthy living environment.

Listed below theme of National Landscape Day:

2001	To Love Our Landscape and Heritage
2002 - 2003	Beautiful the Nation and Prospering Malaysian citizens'
2006	Culturally Malaysian and Preserving landscape
2007	Landscape as Industry

## Law and enforcement

National Landscape Policy (Dasar Landskap Negara) is crucially needed to provide detail framework and guideline for the Nation to move forwards Garden City. The policy will focuses on sustainability between urban development and urban green space planning. The National Landscape Policy is the platform for developing Landscape Act. The act can provide law and enforcement of the landscape development and conservation particularly in urban green space development (Ting 2001).

Ministry of Housing and Local government have promised to support the landscape planning and development and ensure that it will be implemented throughout any physical development within current Act 172. This enthusiasm can be seen through the National Budget – National Plan 7 (RMK 7) RM 195 million has been provided for green strategies development and maintenance (Ting 2001) and RM 200 million in RMK 8 and RMK 9. These action of government reflects their commitment towards urban green space.

Furthermore, existing guideline, policy and Act such as National Landscape Guideline, Open Spaces and Recreation Guideline, Tree Preservation Order and Environmental Impact Assessment (EIA) need to be strengthen and meanwhile the most important is the implementation and enforcement of any framework and guideline should be efficient and effective by all built environment practitioners.

Moreover, Landscape Master Plan is important instrument to translate and details these guidelines, policies and acts in its proposals. Thus, Kuala Lumpur Landscape Master Plan will be the major reference on the urban green space planning and design in ensure balance development of urban built environment.

## Green strategies

Green network shall to link major and isolated green spaces and to utilize corridor network such as river, road, railway and other utilities reserve. The network also shall connect Kuala Lumpur City to outer forest around Klang Valley. The network can enhance biodiversity of the urban wildlife habitat and provide educational, recreational space for citizens and function to be water retention for the city. McKinney (2002, cited in (Bryant 2006) outline two major potential of Green Network such as *“serving as a stimulus for preservation and restoration of urban habitats and serving as means of environmental education for visitors to conserved areas.*

Green strategies have been outline in the KLSP 2020 through Urban Design and Landscape Policies (UD), Environmental Policies (EN) for examples *“UD 11: CHKL shall provide a continues green network of open spaces, EN1: CHKL Shall Promote beautification programs in residential, commercial and industrial areas, EN 2: CHKL shall intensify the programs of roadside and street side planting and landscaping of open spaces and recreational areas, EN 3: CHKL Shall ensure the landscaping of rivers and the rehabilitation of ex-mining lands”* (CHKL 2003). Furthermore, the policy and guideline have potentiality to be enhancing with help and cooperation from all agencies.

This paper has highlighted the perception of stakeholders and visitors towards urban green space planning in Kuala Lumpur. The paper concludes that stakeholders and visitors think that urban green spaces planning and development is vital for Kuala Lumpur to promote healthy city. Urban green space provides many benefits for it users in terms of recreational, social, health and educational benefits. Comprehensive urban green strategies need to be layout in the structural plan, local plan and detail guideline and proposal to be illustrated in Landscape Master Plan for Kuala Lumpur.



Another point emerged from the research that the citizens need to have high awareness towards environmental attitude so they could participate in decision making and could pressurize for preservation and conservation benefits. Beatley (2000) agree that be achieved green city the environment should provide “*clean air and water, pleasant streets and parks*”. While, citizens should have “*strong green behavioral habit such practicing recycling and water conservation and using renewal able energy*”. Finally study concluded that urban green space development strategy would enhance opportunities for citizens to contact and participate with nature and finally promote environmental awareness.

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# The Role of Community Values in Achieving Liveability: A Review of Eagleby Urban Planning Processes 1998-2009 (PEER REVIEWED)

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## Abstract

*A community's continuing purchase into participatory urban planning processes is contingent on progress towards their vision of liveability. This paper constructs a theoretical model and employs discourse analysis to explore a values-led intergovernmental planning process.*

*To commence, Godschalk's 'Sustainability / Liveability Prism' is located within Stolovich's notion of an 'Axiosphere' to establish an axiological of liveability. The model is a tools to conceptualise values in relation to liveability. Next, examining the local area planning process for the suburb of Eagleby, South East Queensland as a case study, the fortune of environmental values expressed by the community during plan formulation processes are traced from plan content through implementation, to on-ground outcomes. Values are then mapped within the axiology of liveability. The paper concludes with observations on lessons for planning practice.*

**Keywords:** community, sustainability, liveability, values, urban planning, health

## Introduction

Values inform liveability aspirations. They also underpin pursuit of, and progress toward liveability (de Chazal<sup>1</sup>, 2010; Özcan<sup>2</sup> et al, 1998). Unfortunately, understanding of the relationship between values and liveability is complicated by the diversity of values held by the community and visions of liveability that community's values tend to project. This paper attempts make sense of this relationship. It commences by constructing an 'axiology of liveability' model by placing Godschalk's 'Sustainability / Liveability Prism' within Stolovich's notion of an 'axiosphere'. Next, using an extract from a larger discourse analysis, values in documents produced during the local area planning process for the suburb of Eagleby, South East Queensland are presented. The analysis traced the fortunes of values elicited during the plan formulation process through plan content and implementation processes, with a focus on environmental values held by the community that transpire as on-ground realities at Eagleby Wetlands. The values are interpreted in relation to Inglehart's and Rokeach's value theories. Model and analysis are then brought together to ground the model in the findings from the analysis, and map values within the axiology of liveability. This exercise provides means to project whether the values are likely to progress toward liveability. The paper concludes by identifying strengths and limitations of the model, and by noting lessons for planning practice.

## An Axiology of Liveability

Values, evaluations and judgements permeate urban planning (Thomas<sup>3</sup>, 1994; Sandercock<sup>4</sup>, 2003; Cambell<sup>5</sup>, 2002; Campbell<sup>6</sup>, 1996; Godschalk<sup>7</sup>, 2004; Ratner<sup>8</sup>, 2004; Upton<sup>9</sup>, 2002). Axiology is the study of the nature, types, and governing criteria of values, evaluations, and value judgments. Hence, it makes sense, when exploring the relationship between values and liveability, to devise an axiological heuristic to gain insight into the nature and role of values held and espoused by a community in pursuit of liveability.

### *The Planner's Triangle*

David Godschalk<sup>10</sup>, (2004) introduced the notion of a 'Sustainability/Liveability Prism'. He expanded Scott Campbell's<sup>11</sup> (1996) simple but incisive 'Planner's Triangle' (see Figure 1). The triangle portrays tensions inherent in sustainable development's divergent social, economic and ecological priorities. Campbell<sup>12</sup> (1996) depicted these priorities as polemic value positions. Each value is located at a different corner of the triangle. Axes between the corners are continuums along which three discrete, but equally important, value conflicts arise. The 'property conflict' lies along the axis between social and economic values. It represents planning's attempt to reconcile social equity with growth. The 'resource conflict' lies between economic and environmental values. It epitomises the entrepreneurial conundrum wherein the propensity to immediately maximise profit through consumption of natural resources is pitted against the need to conserve nature for its future consumption. Completing the triangle's trio of conflicts, the 'development conflict' lies along the axis between environmental and social values. Campbell<sup>13</sup> (1996) presents this conflict as a struggle to balance environment preservation with social equity. In Australia the 'development conflict' emerges in both national and localised debates over, for example, construction jobs versus preservation of koala habitat. Sustainable development lies at the centre of the Planner's Triangle. Gravitating toward the centre of the triangle implies progress toward sustainable development, and implies equilibrium among all three value priorities. Whilst Campbell<sup>14</sup> (1996) employed the image of a triangle to graphically stress conflicts among economic growth, environmental protection, and social justice, he argues that "no point [in the triangle] can exist alone. The nature of the three axial conflicts is mutual dependence based not only on opposition, but also on collaboration." Campbell<sup>15</sup> (1996:300).

### *The Sustainability/Livability Prism*

Godschalk (2004) added a third, liveability dimension to turn Campbell's<sup>16</sup> (1996) triangle into a 'Sustainability/Liveability Prism' (see Figure 2). At its triangular base, the prism retains the social/economic/ecology value dimensions inherent in sustainable development. Liveability is depicted at the prism's apex, perched perpendicularly above the centre of the base triangle. Sustainability is cast as an abstract notion in relation to liveability as reality. Liveability represents the manifestation of sustainable development values in the everyday physical environment. Godschalk<sup>17</sup> (2004) describes the transition from sustainable development aspirations to liveability in keeping with Campbell's (2004) use of axes. Godschalk<sup>18</sup> (2004) plots the route from sustainability to liveability along three diagonal axes. Each axis is anchored at one of the value priorities at the base triangle's corners. The three diagonal axes converge at the liveability apex. Value conflicts arise along the diagonal axes during deliberations over, and delivery of parkland, transport systems and built environment. Debates surrounding the primacy of built and natural environments transpire as tensions between competing liveability and ecology values to produce the 'green cities conflict' (Godschalk<sup>19</sup>, 2004:8). Tensions between economic and liveability values generate the 'growth management conflict'. The 'gentrification conflict' lies on the diagonal axis between social equity and liveability values. As with sustainability, progress toward liveability necessitates balancing all three social, environmental, and economic values through to meet liveability values in everyday reality.

### *The Axiosphere*

Stolovich's<sup>20</sup> (1998) notion of axiosphere completes an evocative and instructive geometric heuristic for interpreting value conflicts in Godschalk's Sustainability/Liveability Prism. The axiosphere is similar to the notion of an atmosphere (sphere of gases surrounding the Earth), and Suess' notion of a biosphere (sphere of life and

life systems). Kagan describes the axiosphere as the “sum total” of values that represent “...the system of concrete forms of value relationship of man to the world...” (Kagan quoted in Lebedko<sup>21</sup>, 2003:p179). According to Stolovitch’s<sup>22</sup> (1998) thesis, prior to their conception values exist objectively as potential values. As cognitive constructs, values do not 'exist' in an absolute sense. They incubate in the axiosphere until defined into existence (Hofstede<sup>23</sup>, 1998). The Axiosphere is restrictive: its composition excludes non-values. It is also internally diverse and dynamic. Values constantly emerge (Grünberg, 2000). They emerge from “the subjective world of value ideas, estimations and all diverse manifestations of value consciousness” (Stolovitch, 1998). Once invoked, emergent values join the sum total of values in society that populate the axiosphere.

#### *An Axiology of Liveability*

Godschalk’s<sup>24</sup>, (2004) ‘Sustainability / Livability Prism’ is depicted within Stolovitch’s<sup>25</sup> (1998) notion of axiosphere to produce the ‘axiology of liveability’ model presented in Figure 3. Only social, ecological and economic values that contribute to sustainability and liveability reside within the prism. All other values reside outside the prism. Two temporal dimensions, implicit in this geometric model, are worth noting. First, sustainability’s intergenerational dimension invokes tensions between maintenance of values held in the past, and projection of values that will underpin and are instrumental to aspirations for the future. This tension is evident in conflict over preservation of heritage values versus redevelopment, which occurs during the process of gentrification in the ‘gentrification conflict’. Second, values in the present, everyday dimension of liveability are unlikely to balance with sustainability values. Two spatial dimensions are also worth considering. First, values that underpin Eagleby’s vision of liveability may not be transferable between communities in different areas. Second, values progress toward liveability inside the whole prism, and not just along its axes.

### **Local Area Planning in Eagleby**

#### *Background*

The suburb of Eagleby lies approximately midway between the Southport and Brisbane CBDs in the south east corner of the Australian state of Queensland. Perceptions of Eagleby commonly reduce the suburb to two defining characteristics. The first is Eagleby’s abundant open space attributes. In addition to multiple local parks, a greenbelt runs contiguous with the Albert and Logan rivers around the northern, eastern, and western periphery of Eagleby. The second is Eagleby’s unenviable, consistently low socio-economic status (GIC<sup>26</sup> et al, 2001). Approximately 60% of housing is public rental stock (Sarkissian<sup>27</sup>, 2005). Private property values remain relatively low (PDR<sup>28</sup>, 2007), and the suburb’s unemployment rate compares with some of Queensland’s highest (ABS<sup>29</sup>, 1996). Locally, Eagleby is just as likely to be besmirched for its low socio-economic disadvantage as admired for its abundance of beautiful riverside open spaces.

Eagleby’s relative disadvantage prompted the state government to invest funds and resources under Queensland’s Crime Prevention Strategy in the Eagleby community and its physical infrastructure. In 1998, the Queensland Department of Housing (QDH), Queensland Health (QH), and Gold Coast City Council (GCCC) commenced planning to renew Eagleby. The three bureaucracies planned in concert with local residents. QDH was undertaking complementary Community Renewal (CRP) and Urban Renewal (URP) programs. The CRP aimed to strengthen and raise the confidence in Eagleby’s disadvantaged community (GCCC<sup>30</sup>, 1999), while the URP focussed on the renewal of Eagleby’s public spaces and social infrastructure. QH was piloting a Supportive Environments for Physical Activity in Queensland (SEPA-

Q) project, the focus of which was increasing opportunities for Eagleby resident's participation in physical activity (GCCC<sup>31</sup>, 2000). GCCC was preparing a Local Area Plan (LAP) incorporating a Community Action Plan (CAP) for Eagleby. A LAP is a statutory planning instrument intended to guide land uses within a specific local area. In the context of the CRP, a CAP provides a process to identify crime and unemployment related issues and to coordinate state and local government activities to achieve the desired changes in a particular local community (GCCC<sup>32</sup>, 1999; GCCC<sup>33</sup>, 1999). Planning for Eagleby revolved around urban planning, social and public health agendas. The Eagleby LAP provided a framework to coordinate and integrate all three planning projects, and opportunity for Eagleby residents to reorientate Eagleby's future. By mid-1999 around a dozen professional consultants worked on various planning projects to improve life in Eagleby (Sarkissian<sup>34</sup>, 2005).

#### *Plan Formulation*

The plan formulation process integrated multiple creative and innovative community engagement and data gathering initiatives across Eagleby over a two years period. Commencing in August 1998, activities included a community 'Speakout' at the inaugural *Spirit of Eagleby* festival, emancipatory *Stories in a Park*, and its more youthful incarnation *Secret Children's Business* projects, burning of a Stigma sculpture ceremony, a Search Conference with a 60 seater bus full of bureaucrats and locals, a *Council of Beings* (deep ecology ritual), and formulation of a visual diary. Values held by the community and interest groups were elicited at these and other engagement activities.

There was no shortage of values influencing plan formulation. Themes emerged from analysis of vast amounts of data recorded on file about the Eagleby community. Themes included identity and image, environment and open space, heritage, connectivity, social interaction and facilities, health and safety. Perhaps unsurprisingly, given Eagleby's defining open space attributes and stigmatic socio-economic circumstances, the community expressed post-material values (Inglehart<sup>35</sup>, 1977; Inglehart<sup>36</sup>, 1997; Inglehart & Abramson<sup>37</sup>, 1999; Inglehart<sup>38</sup> & Abramson, 1994; Inglehart<sup>39</sup> & Welzel, 2005). The community valued the opportunity to effect change of perceptions of Eagleby, improved access to the rivers, improvements to parks, and protection of the natural environment.

Broad values themes are also evident from a discourse analysis of letters, reports, and other communications authored by the bureaucracies' that are stored in GCCC's files. Value themes in GCCC's urban planning communications aligned with sustainable development's social and environmental priorities. Not surprisingly, given their pursuit of a socio-ecological model of public health, QH communications shared the same social and environmental value themes. QDH favoured social housing values over environmental values. Whilst altruistic in their pursuits, budgetary practicalities for all three bureaucracies positioned finances as basic metrics of values. Money was used to measure optimal or 'best' value (return on expenditure). Its role was cast as instrumental (motivator and purchase) to achieving outcomes. In short, the bureaucracies' written communications reveal the role of values as instrumental, and outcome orientated (terminal) (Rokeach, 1968<sup>40</sup>; Rokeach<sup>41</sup> 1973).

Values espoused by the Eagleby community during the plan formulation process were intended as mechanisms for progressing the community's liveability aspirations in two ways. One means was through collaborative projects involving all three bureaucracies. The other was through statutory planing processes.

### *Eagleby Local Area Plan Content*

The community's values were converted into planning measures and incorporated into the content of the Eagleby LAP. Values are mentioned eight times in total: ecological values four times, scenic values twice, indigenous cultural heritage values twice, and habitat values once. Each mention of 'values' is made in relation to spatial references and desired outcomes, and each is stated in the context of instrumentality to themes perused through specific projects undertaken as part of the plan formulation process. For example, evoking an unexplained values-based hierarchy, ecological values (environment theme) were used both instrumentally as a benchmark in the Rural sub-precinct against which the appropriateness of other potential land uses is measured, and as an outcome to be retained,

*Development in this [Rural] sub-precinct is to....(h) retain the potential productive use of identified areas of Good Quality Agricultural Land, unless these areas have ecological values or where a higher value suitable alternative land use can be demonstrated to be more appropriate;*

Implementation of the content of the Eagleby LAP, as a component of GCCC's inaugural *Our Living City* planning scheme, commenced in August 2003.

### *Plan Implementation*

Around the time that final drafting of the planning scheme occurred, GCCC secured state funding to engage a consultant to undertake a SWOT analysis to guide investment in Eagleby. In concert with the community, environmental, heritage, scenic, linkage, and recreation values were key considerations in determining Olivers Sports Complex best suited site for investment. Eventually, the SWOT led to drafting of a master plan, again with considerable community input, for works in a public open space now known as the Eagleby Wetlands. Community input into the design of the Eagleby Wetlands Development Concept Plan combined multiple themes of values, but particularly environmental values. It also responded to corporate agendas, and provided opportunities to value-add to multi-million dollars of investments in the wetlands through training schemes and community planting initiatives. Development in accordance with the concept plan commenced in 2003.

In 2004 GCCC received a private developer's proposal to subdivide the allotment adjacent to the north of the Eagleby Wetlands. With reference to the Wetlands concept plan, GCCC required dedication from the developer of 8.7 hectares of land to expand Eagleby Wetlands.

### *On-ground outcomes*

By 2009 the majority of the Eagleby Wetlands Development Concept Plan was implemented, including dedication of the addition parcel to the north. Values elicited during the plan formulation process are observable as tangible realities. As envisaged by the community, the river is more easily accessed, wetlands are protected, which also enhances scenic amenity, paths guide residents into and around the park, the park is more highly embellished, and large tracts of previously unused park are safer and as a result, and more regularly visited. Intangible realities include up-skilling of trainees, sense of pride and achievement, and repositioning of Eagleby's ecological credentials, particularly among Australia's ornithologists.

## **Grounding the Axiology of Liveability**

Research suggests that open space values tend to positively contribute to liveability (Betanzo<sup>42</sup>, 2009; Jones<sup>43</sup> & West, 2009; Low Choy<sup>44</sup> & Prineas, 2006).

Government interventions into socio-economically disadvantaged areas aim to improve liveability. Figure 4 maps the fortunes of values elicited during the plan formulation process through plan content and implementation processes, to on-ground realities at Eagleby Wetlands. It depicts values employed in two ways to progress from broad sustainability values to liveability. The first route is outcome orientated. It is depicted as urban planning's and health's broad social and environmental values, and broad social housing values moving within the prism toward the community's liveability aspirations. The second is the instrumental use of economic values to fund works that will progress toward liveability aspirations.

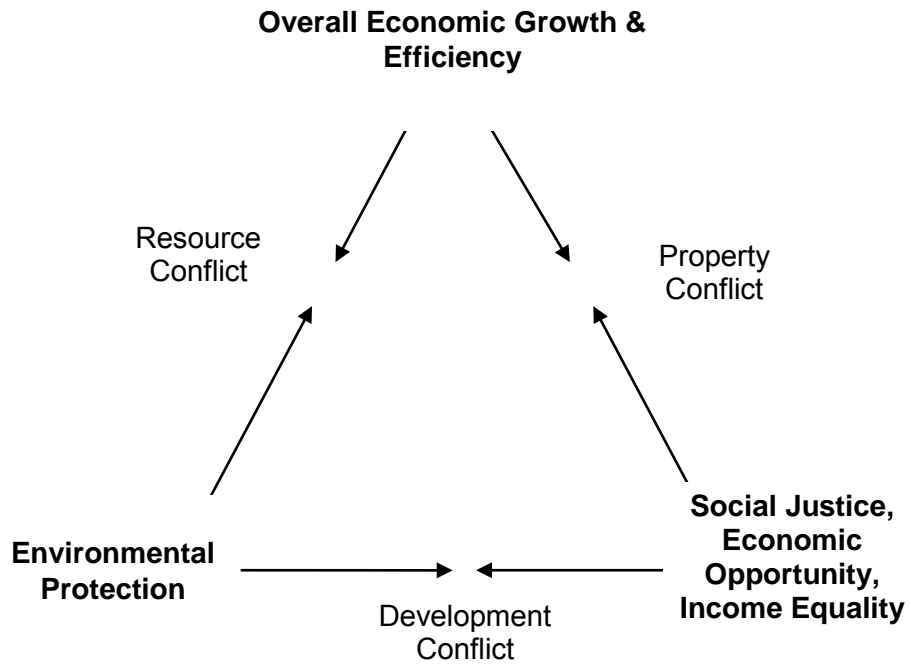
## **Lessons Learned**

The axiology of liveability model is intended as a heuristic. Although simple, the model presents opportunity to gain insight into the nature and role of values employed in pursuit of liveability. Due to its construction, the model also gives insight into the relationship between sustainable development and liveability. But the axiology of liveability model is not without limitations. No claims are made for its utility or accuracy. As with all geometric constructs, creativity in portrayal of the dynamic nuances of reality is restricted by the rules of geometry. Focussing on the model itself, temporal dimensions are implicit, and not yet fully understood. Beyond the depiction of values as omnipresent in the axiosphere, the relationship between values within and outside of the prism remains unclear. Fortunately, further research and contemplation may alleviate these latter limitations.

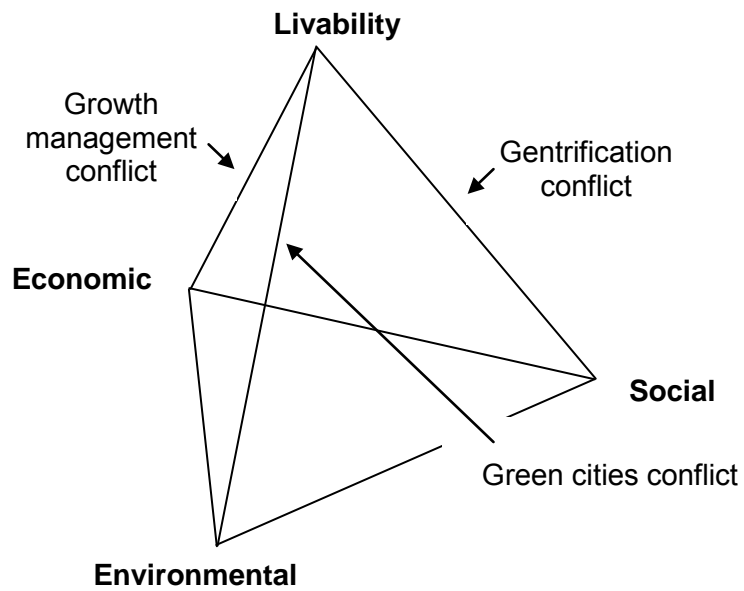
As a heuristic, the model aids understanding of planning practice, particularly when the exercise of grounding values in the model is undertaken as presented in this paper. Overall, that exercise, although employing only an extract from a larger discourse analysis, highlighted how environmental values held by the community can inform liveability aspirations, and how values underpin pursuit of, and progress toward on-ground realities of liveability. Tracing the fortune of values from plan formulation through to on-ground outcomes exemplified the potency of the Eagleby LAP process. The area-based approach proved suitable for coordinating multiple planning projects around, and as a vehicle around which the Eagleby community re-orientated their future.

Given planning processes are recognised as value laden, familiarity with values theory and research would benefit planner's dealings with community in their relationship with bureaucracies. For example, Inglehart's material / post-material values theory and research guides understanding and projection of values likely to be articulated among members of a community in the vision of liveability, and removes the potential for a professional to patronise a disadvantaged community as aspiring to previously satisfied materialistic values (basic sustenance, shelter), that are removed from the community's liveability aspirations. Likewise, applied to values underpinning a community's liveability aspirations, Rokeach's values systems theory suggests that planners should attempt to identify desired outcomes (terminal values), and which values might be instrumental to achieving those outcomes. Conversely, planners should be aware how bureaucratic systems set finances as instrumental value metrics to achieve corporate agendas.

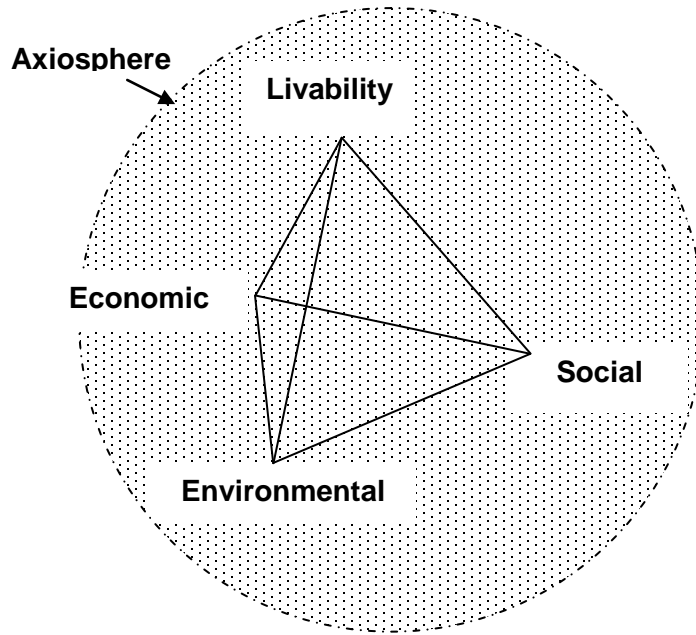




**Figure 1** Triangle of Conflicting Goals for Planning  
**Source:** Campbell (1996:298)

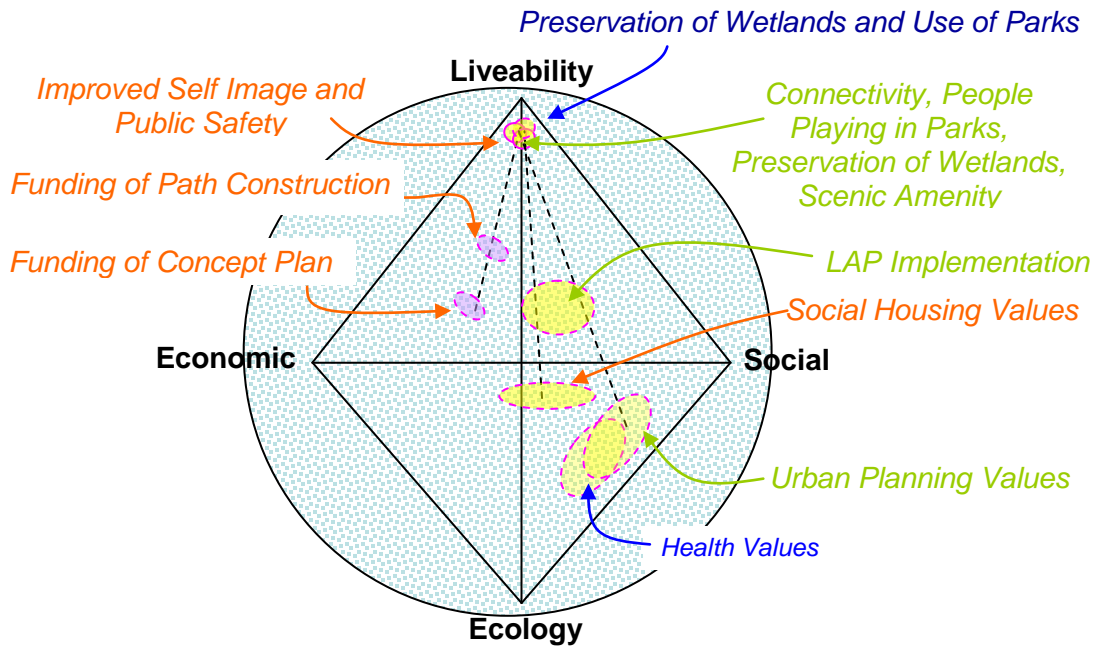


**Figure 2** The Sustainability/Liveability Prism  
**Source:** Godschalk (2004:9)



**Figure 3** Axiology of Liveability Model

**Source:** After Godschalk (2004:9) and Stolovich (1998)



**Figure 4** Grounding Values in the Axiology of Liveability

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# Bringing Child Friendly by Design to the Heart of Liveable Cities – the Illawarra Experience (PEER REVIEWED)

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## ABSTRACT

*The Child Friendly by Design (CFbD) Project, conducted by Healthy Cities Illawarra (HCI), in conjunction with Griffith University's Urban Research Program (URP) has involved children, young people and families in the design and redesign of public open spaces in Shellharbour, a fast developing city in the Illawarra region of NSW.*

*Many conventional town planning processes do little to give children and young people a 'voice' on what is important about the places that surround them. The CFbD project has developed engagement tools, created participatory forums and linked closely with local government's planning processes. CFbD has placed children at the 'heart' of the planning and design process and has facilitated links between Council, developers, local business, families and the community sector.*

## Keywords:

child-friendly, participatory design, community development

## PAPER

The Child-Friendly by Design (CFbD) Project based in the Illawarra region of New South Wales, Australia commenced in 2008 as part of Communities for Children (CfC) Shellharbour, which is supported by the Australian Government Department of Families and Housing, Community Services and Indigenous Affairs (FaHCSIA) Families and Communities Strategy, now the Family Support Program. Hosted by lead applicant agency Healthy Cities Illawarra (HCI), the CFbD idea emerged somewhat serendipitously when CfC Shellharbour called for expressions of interest in 2007 and HCI were able to capitalise on considerable work already underway with children and young people coupled with their significant investment in the World Health Organisation's 'Healthy Cities' initiative. Griffith University's Urban Research Program (URP) had also just completed a literature review on child-friendly community indicators for the NSW Commission for Children & Young People (Woolcock & Steele 2008) and were invited to provide research, design and evaluation expertise to the CFbD project, specifically drawing on the services of a skilled designer/architect and the services of an international expert in play space function and design.

From the outset, the CFbD Project sought to actively target key community sectors involved in the development and maintenance of built and natural environments utilised by children and young people, whilst also celebrating and promoting child and family friendly places and spaces that currently exist in Shellharbour. In its rationale, the CFbD Project moved beyond the task of defining what makes a child friendly space or place and pursued the actual

implementation of such places, through the planning, design and creation of liveable places and communities.

## **CFbD Rationale**

### *A. Child Friendly Community Frameworks*

Perhaps most influential in the formative parts of the CFbD Project has been the growing literature focusing on child friendly environments. The Australian Research Alliance for Children and Youth (ARACY 2006) has defined a child friendly community as one that relates to the following two broad principles: i) a community where children are valued, supported, respected, provided for and actively included and ii) is based on the United Nations Children's Fund (UNICEF) charter, informed by the United Nations Convention on the Rights of a Child, which guarantees various rights of every young citizen (see Malone 2006).

More specifically, compelling findings about the oversight and ignorance of children's needs highlighted in the NSW Parliamentary Inquiry (NSW Parliament 2006) into Children, Young People and the Built Environment provided further legitimacy for establishing a project aiming to actively involve children and young people in the adaptation and creation of child-friendly built environments. The NSW Commission for Children & Young People continued advocacy and research on this issue after the Inquiry, culminating in the publication, *Built for Kids* (NSW CCYP 2009).

### *B. Built Environment and Children*

Literature on the impact of the built and natural environments on childhood continues to escalate, fuelled by rising rates of obesity and mental health problems. Scholarly research and popular interest in children's health has continued into the twenty-first century, focusing particularly on the incidence of childhood obesity and the associated decrease in children's physical activity (see Gill 2007 and Louv 2009 for two of the most popular examples of these concerns). Responding to concern about childhood obesity, a growing range of studies has examined the links between children's physical activity patterns and built environment form (eg Richardson & Prior 2005; Davison and Lawson 2006; Cutumisu and Spence 2008; American Academy of Pediatrics 2009). Other investigations have pointed to an alarming rise in mental health disorders among children in countries such as the United States, the United Kingdom and Australia (UNICEF 2007).

While there have been important tributary streams of interest in children in urban scholarship - including, for example, the work of Tranter and Sharpe (2007) on children's rights, Malone (2007) on residential living and Walsh (2006) on play environments - this renewed focus on children's well-being and the relationship to the built environment is not well served by a developed urban understanding (see Gleeson & Sipe 2006).

It is only recently that the built environment has been recognised as an alternative intervention point for improving health and well being. For children and young people, outdoor environments are not just the typical places to play, but also provide a place to socialise, be physically active, explore, have fun, 'hang out', be in contact with nature, escape from indoors, or just be free from the encumbrances of an increasingly adult world. What the CFbD Project found to be unfortunate but true was that the vast majority of both the creation and adaptation of built environments occurs with a complete absence of children and young people's voice (Nordstrom 2010). This crucial background literature formed the basis for the establishment of the CFbD Project in the Shellharbour region.

## **CFbD Strategies**

The CFbD Project undertook a range of strategies to ascertain how to best influence more child-friendly environments in the Shellharbour region, and thereby work towards making a more liveable city.

### *A. Business Breakfast and Community Forums*

The concept of a child friendly place or space was a new one to most people in the Shellharbour LGA at the beginning of the CFbD Project. In order to raise awareness of what makes a place or space child friendly and harness the interest of key stakeholders for possible involvement in the CFbD Project, a Business Breakfast was held, targeting key decision makers from relevant sections of Shellharbour City Council (SCC), local developers, local members of government, Chambers of Commerce, local media, emergency services and health, and relevant government departments such as housing, community services, education and training.

Keynote speakers presented child friendly strategies and projects on an international and national scale, and proved to be a successful strategy in engaging decision makers from SCC, developers, the police service, Chamber of Commerce, and community and youth services, in gaining commitment and approval for people to become involved in the CFbD Project.

Following the Business Breakfast, CfC Shellharbour and SCC co-hosted a Local Government Planning and Design Forum, as well as a Community Forum, both with a CFbD Project focus. Each event successfully worked towards raising awareness of what makes a child friendly place or space with the progression to ways and strategies that could be adopted to practically achieve a more child friendly Shellharbour. This set a strong platform for the CFbD Project in not only establishing commitment and involvement of key stakeholders, but also in confirming project direction.

### *B. Regional CFbD Workshop*

In order to take advantage of the momentum gained through the Business Breakfast and Forums, a Regional Workshop targeting representatives and students from local schools, developers, SCC staff, community agencies and services was conducted. The 'Creating a Child Friendly Shellharbour Regional Workshop' was a practical, 'hands-on' day where students worked alongside developers, Council staff and youth workers to assess what makes a place or space child friendly. Children and young people were given a 'voice' during the program to give play spaces currently in Shellharbour a rating of child friendliness, using location photos and a PLACE assessment tool (see Project for Public Spaces 2008). Workshop participants also had the opportunity to physically assess a play area at the workshop venue, thereby putting the theory into practice. Participants were also invited to join the CFbD Advisory Group, to assist in the selection of sites.

### *C. CFbD Advisory Group*

The purpose of establishing a CFbD Advisory Group was to further the process of involving children, young people, community agencies and businesses, and community members in the planning and design of public spaces. Together with this rationale, the CFbD Advisory Group was to serve in the selection process of sites chosen for design and redesign in the Shellharbour area. In establishing the Advisory Group, it was essential that it be

representative of the Shellharbour community, so that a balanced assessment of nominated sites could be ensured.

Once established, CFbD Advisory Group members were invited to take a disposable camera diary of places or spaces in the Shellharbour area that should be considered for either greenfield design or redesign, using child friendly design principles. On presentation to the Advisory Group, each site was discussed on its merits, with a short list of possible sites resulting.

At this point, a CFbD Checklist was developed to allow each Advisory Group member to assess short listed sites based on a set of child friendly criteria, developed by the Griffith University team, using a simple three option (Strong/Medium/Weak) response sheet based on a range of criteria for each location. The CFbD Project team also met with SCC to discuss each of the short listed options in terms of viability, possible funding availability, and long term suitability to Councils management plan, to ensure that the Advisory Group could make an informed decision on the selection of the two sites.

Community consultation was also an important part of this process. Local primary and high schools were given the opportunity to voice their opinions on some of the possible sites, and the potential that redesigning these areas would have. Community members view points were extensively sought on what places they felt would be important to undergo a child friendly redesign, including the use of disposable cameras, distributed with instructions to take pictures and snapshots of the place or space as they perceived it, and to make some short notes to explain the shots captured. These photo diaries then became a valuable resource to be used in the discussion, assessment and planning for the future direction of the selected place or space. Information received through this process also helped in fine tuning the CFbD Checklist used to assess places and spaces.

The developer Australand offered two pilot site options, as part of their Shell Cove development, for consideration for the child friendly by design greenfield site. One of these sites, The Knoll, was selected, the highest elevated area of the development and with a stunning vista looking north and south of the Pacific coastline. In choosing this site, Australand confirmed that they would proceed with the site's development until completion.

The site for redesign, after much deliberation, was the Albion Park Community Precinct area. Many issues were identified at this site, part of an old manufacturing area of the Shellharbour region some five kilometres inland from the ocean. Together with a history of attempts to improve its suitability for the community, the Albion Park Precinct became the CFbD Project's most immediate challenge.

#### *D. CFbD Working Groups*

With the aim of giving children and families in the community surrounding each of the selected sites a 'voice' on what is important about these places and spaces, a CFbD Working Group was established for each pilot site area. People from a range of backgrounds, including children and young people from primary and high school age, who had an interest in making Shellharbour truly child friendly were invited to join the Working Groups.

The role of the Working Group was to provide input into the child friendly elements to be included in the site plan, offer constructive feedback, and act as a representative of their local community, consult and engage with people on what design features would make the site child friendly, and continue to update their respective part of the community as the design progressed.



A key factor of each of the Working Groups was the appointment of a chairperson from the local community, as opposed to one of the CFbD team members taking on the role. The Albion Park CFbD Working Group Chairperson was the manager of the local youth service, based in the Albion Park Community Centre, situated in the community precinct itself. The chairperson of the Shell Cove CFbD Working Group was the Project Manager of the Shell Cove Australand development, also a resident of the local community surrounding The Knoll site. Both these chairpersons had an existing identity and presence within their local community, had a working knowledge of the needs and relevant issues, and a valuable network to utilise for further consultation and communication of the progress of the Working Group.

Throughout the design process, the CFbD Working Groups became the ideas and engine room of the design and planning process. Children sat around the table with architects, council workers and residents and helped create a child friendly design for each of the two sites. This proved to be an extremely valuable and rewarding process for all involved, and ensured that the resulting designs and concepts reflected the views and opinions of the immediate community.

Once the site concept plans for the Albion Park Community Precinct were at the Concept Analysis stage, they were presented to Council at a CFbD Council Workshop. The workshop was attended by representatives from key Council departments including Community Development, Strategic Planning, Future Planning, Risk Management, Youth Services, together with the chairperson of the Albion Park CFbD Working Group, and the CFbD team and Healthy Cities Illawarra.

#### *E. CFbD Vision Workshops*

Running parallel to the CFbD Working Groups were CFbD Vision Workshops, conducted in local primary and high schools, as well as community based youth groups and other select community groups. The purpose of the workshops was to continue to give children and young people a 'voice' about the design of the places and spaces surrounding them, in particular, the Albion Park Community Precinct and The Knoll, at Shell Cove.

The format of the Vision Workshops provided an opportunity for direct comment and feedback on important aspects of the 'child friendly by design' capacity of each site. With no limit on what could be designed, a wide array of ideas and concepts were illustrated. Many practical suggestions, changes and additions were made in regards to the already existing Albion Park Community Precinct. These designs were then passed onto each of the respective CFbD Working Groups to discuss with the architect, and then translate into child friendly design features. This practice was extremely valuable for the architects involved, and provided them with a new practical, hands-on method of designing a child and family friendly public space.

#### *F. CFbD Community Consultations*

Throughout the CFbD Project, many different initiatives were used to consult with all parts of the Shellharbour community. Some of the strategies used were dependent on the type of group involved, so as to ensure that the feedback and ideas collected were accurate and representative. Consulting with parents of 0 to 5 year olds at the children's festival Kidsfest Shellharbour was an example of designing the strategy to suit the target group, involving the CFbD Project team asking parents and carers of young children what they thought made a child friendly place or space. Adults were asked to indicate on a map of the Shellharbour LGA what public places they often used, and why those particular parks and spaces were more child friendly than others. Young children were also involved by being invited to draw a

picture of a place they liked to play in or go to. Over two hundred adults were consulted and enabled a significant amount of information and feedback to be collected.

The Shellharbourkids website, [www.shellharbourkids.org](http://www.shellharbourkids.org) another project of CfC Shellharbour, was also utilised as an opportunity for community members to give feedback on creating child friendly places and spaces in Shellharbour. General feedback, such as what makes a place or space child friendly, was sought, together with the opportunity to comment on each of the CFbD pilot sites. Utilising this medium for consultation was a strategy that ensured we were attempting to reach all members of the Shellharbour community.

## CONCLUSION

At the time of writing, the CFbD Project awaits confirmation of further funding from the current allocation of CfC Shellharbour to press ahead with staged implementation of the Concept Plans designed for both the greenfield (The Knoll) and brownfield (Albion Park Community Precinct) sites. Several budgetary contingencies outside the influence of this CFbD project will impact on the feasibility of the full plans proceeding on a staged basis. Nonetheless, the fact that the CFbD Project has managed to reach a stage which in the words of the CfC evaluators has “gone well beyond expectations” is testament to the rigour and authenticity that has been placed in implementing participatory design principles.

The CFbD Project’s next phase will also be dedicated to producing a Resource Toolkit highlighting the strategies and tools employed through the CFbD Project to plan, design and look to create child friendly places and spaces in Shellharbour for other local areas to utilise. It is this Resource that will be arguably be one of the project’s most significant contributions, by demonstrating that it is possible to create a whole-of-community process in designing child-friendly spaces and places. The CFbD team believes that for our communities to become more liveable, they need to represent all parts of a community – especially those who ‘voices’ are not often recognised. Committing to multi-layered processes of community engagement cannot be emphasised enough and enable real children’s voices to be heard like nine year old Hannah’s:

*“I like a place that you want to be in, .where you can have fun, play on things for all different ages...investigate...meet other families...where people can see you and you can see them...you can just have fun and be a kid...”*

## ACKNOWLEDGEMENT

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# How Does Your Community Garden Grow? Cooma Community Gardens: A Case Study

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## **ABSTRACT**

*A grass roots community development project with no initial funding leads to the establishment of partnerships in a small community providing opportunities to achieve converging goals created by a place-based approach including combating childhood obesity, education for endangered species and promoting the natural assets of a community including its unique biodiversity and vision for sustainable development of the town.*

## **Keywords:**

Healthy cities, Community engagement, Health promotion

## **ONCE UPON A TIME**

A small community group consisting of local residents, Librarian, Dietitian, and Health Development Officer, grasped an idea presented by Sue Bailey at a “Big Ideas” Community Forum in 2008 and embarked on journey to establish a community garden in Cooma.

The NSW Population Health Survey 2007-2008 Report on Child Health<sup>i</sup> states that only “one-quarter of children aged 5-15 years (25.0 percent) met the criteria for adequate physical activity<sup>1</sup>”, which is at least 60 minutes of moderate to vigorous physical activity every day outside of school hours.

The Report also states that just under one-half of children aged 5-15 years (47.2 per cent) used electronic media for entertainment at home for more than the recommended maximum of 2 hours a day... There was no significant difference between urban and rural health areas.<sup>2</sup>”

<sup>1</sup> P 98

<sup>2</sup> Pg 99

The Cooma Unlimited group adopted a Healthy Community approach to development:

**Mission Statement**

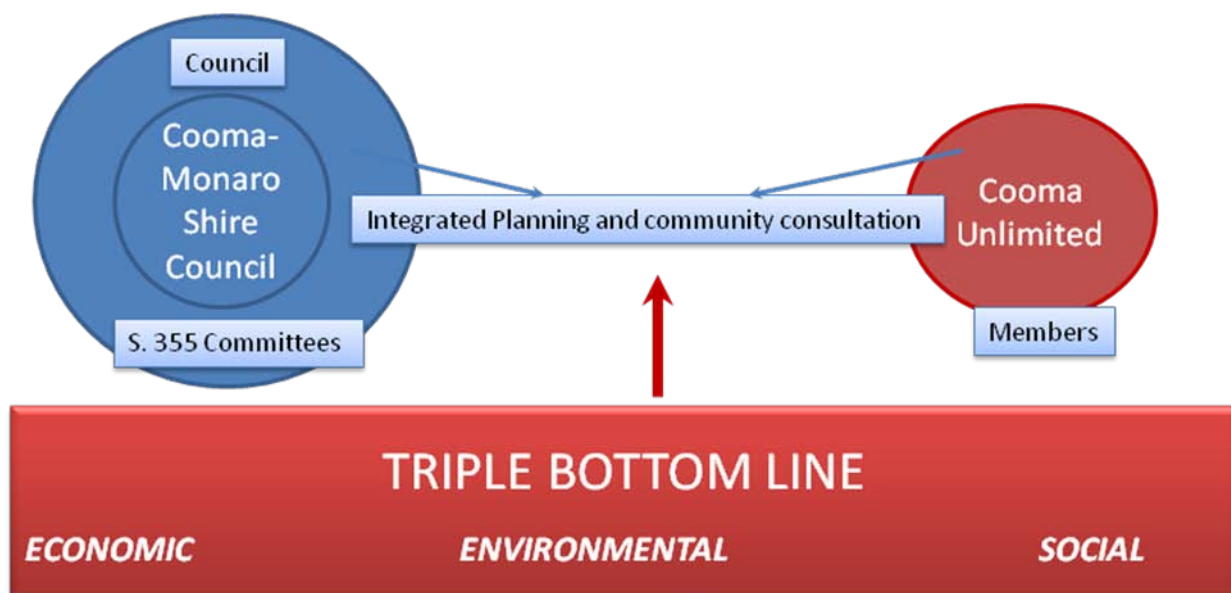
Cooma Unlimited is committed to working in partnership for the sustainable development of the Snowy Monaro region.

**Vision**

- A vibrant and sustainable economy
- Development of a fine looking country town, for the enjoyment of visitors and residents
- Cooma as the service and professional centre of the Snowy Monaro region
- A community that respects the views of its residents.
- Inclusive community consultation around decisions affecting its members – eg urban redevelopment, community spaces and tree plantings, heritage and cultural spaces, social inclusion.

Cultural heritage and social development are important to creating a healthy community – a place to visit, live and work.

At the local level Cooma Unlimited would advocate for healthy community outcomes as well as sustainable development.



## **AND EVERY DAY**

This group worked out how they could:

- Find some land or find a willing landlord
- Reinvigorate the connection for Cooma residents with where their food comes from
- Establish a 'third' place for people to come together "A common ground, for the Cooma community".
- Work with the community to learn how to grow vegetables in the harsh Monaro climate.
- Provide learning and celebration around growing and sharing food "Grow Learn Share Cook Have Fun".



## **AND THEN ONE DAY**

The Uniting Church of Cooma and Cooma Unlimited signed a Memorandum of Understanding with the Community Garden Group defining what activities would happen at the garden, how changes could be made at the site, and what the exit strategy would be should the garden close down.

The first Spring series of workshops was held for adults in September 2009, followed by very successful Children's Holiday workshops in partnership with the Monaro Regional Libraries in the school holidays from January 2010.

## **AND BECAUSE OF THAT**

The Cooma Community Garden attracted new members and was the recipient of an Australian Open Garden Scheme community grant of \$1,200. The community and local businesses donated equipment to the garden and supported the workshops.

The disused 'back yard' at the Uniting Church Manse was transformed into a sustainable, no-dig garden with raised beds, seating and a bird feeder. An activity focal point for people to meet, learn how to grow food in the harsh Monaro climate, and celebrate food was established.

The importance of the Healthy Cities frame work as expressed in the Regional Guidelines for the Western Pacific was promoted to the local government Cooma-Monaro Shire Council during 2009 and 2010:

The Healthy Cities initiatives address priority urban health determinants, many of which are not under the direct control of medical and health services. Solutions to urban health problems require the effective involvement of non-health sectors (e.g. industry, transport, labour, education, commerce/trade, municipal utilities and services, urban planning, etc.), as well as nongovernmental organizations, the private sector, and the community.

The overall strategy employed by the Healthy Cities initiatives is to generate intersectoral action and community participation to integrate health protection and health promotion activities and transform health determinants for the better.

## **AND BECAUSE OF THAT**

A Permablitz group was established, which partnered with the Cooma Lambie Street Preschool, to create a sustainable garden based on permaculture principles, to establish an environment for young children to explore and encourage active play.

A community partnership was established to pursue Council-owned "community" land. The aim for this site evolved in response to the need for a learning site for Monaro natives, endangered species and biodiversity, weeds control, Aboriginal Cultural Heritage and the

incidence of adult and child overweight and obesity – the concept of a Children’s adventure park was conceived.

The aim for the Adventure Park is to create a link, or trail, to existing natural assets that Cooma has, such as the Lambie Gorge, Lambie Street and Lambie walk. Also linking the Cooma Creek walk/cycle way, Norris and Centennial Park by way of the promoting more physical activity. In addition the opportunity presented led to the promotion of other sites such as the Old Cooma Common, Gladstone Hill and North Ridge – all sites are showcases of the Monaro environment and natural features.

It is envisaged that this park will have a two-fold effect; enticing children outside to use the walk/cycle way, utilise the nearby enhanced Swimming Pool and act as a learning site for biodiversity and conservation, via establishing a Monaro Riparian interpretive landscape with potential to develop an Australian native “adventure playground” for children.

Partners emerged such as the Rural Education division (Horticulture) of Cooma Technical and Further Education Institute who wished to establish a “home” for their propagation elements for the Horticulture course. The course had had a resurgence of interest and for the first time in 6 years had been viable.

Workability, a local Job Search NGO for people with a disability expressed a wish to establish a sensory garden and propagation place.

The Friends of Grasslands, a voluntary organisation already operating on local land to protect endangered species saw the benefits for this park, satisfying its needs to educate the community about biodiversity and endangered species, attracting more volunteers to their group, and the emerging attraction to combating childhood obesity in a natural parkland that consisted of native Australian species appropriate to the site, including features indigenous to the Monaro.

### **AND EVER SINCE THAT DAY**

The “Sowing the Seeds of Literacy” information night was held at the Cooma Lambie Street Preschool in June 2010 to launch the Permablitz project and engage with parents on the importance of childhood literacy, and promoting healthy food choices, and the Australian dietary guidelines.

The initial resistance from the local Council dissipated following a Mayoral change. Following the changing political will amongst the Councillors, it is anticipated that Council will pursue the “park” concept as presented to Council meeting in June 2010. The establishment of an Australian native biodiversity learning and adventure site will be led by Cooma Unlimited whose aims are for the economic development of Cooma, but also to work towards healthy community outcomes.

By achieving an intersectoral partnership between the Technical and Further Education Institute, the Friends of Grasslands, and willingness by the local High School and Catchment Management Authority Officer to become involved should the land be given for this purpose, coupled with demonstrating the success of community participation through the establishment of the Community Garden, it is hoped that the changing culture of Council following new leadership will lead to the adoption of the Healthy Cities framework in real terms by improving Council’s ability to engage with and listen to their community.

This project has been a grass-roots-led initiative for fundamental cultural change within the local Council. The vision for a better place to live, demonstrating success with good-will and a willingness to work together, a wish for a community that respects a diversity of its residents, the need for its decision-makers to listen to the demand for change, and the

imperative under the Local Government directive for developing a Strategic Plan builds upon a groundswell of reasons to pursue healthy alternatives and innovation in the challenge to combat childhood and adult obesity.

It is hoped that this project will add to the evidence base for ecological and systems-based perspectives for settings-based approach to health promotion, in light of the converging agendas, as well as the competition for resources, of health promotion and ecosystem management.

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# Urban Planning and Public Health – a comparison among US, Swedish and Spanish practices and outcomes

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## ABSTRACT

*Public Health research has identified strong relationships between the built environment and costly epidemics such as obesity and its co-morbid conditions. This research has also identified the critical deficiency of a consistent and reliable way of documenting and measuring the form of built environments to enable more meaningful characteristics of place to be captured and linked with demographic, economic, health care data. Despite language about sustainability and human scale, many regulations governing the form and location of human habitats are outdated and remain at odds with much of the public health research findings. A comparison of urban policies in Sweden, Spain and the United States illustrates regulatory changes needed to improve the social, cultural and economic viability of our human habitats.*

## Keywords:

Public Health, Habitat, Regulation, USA, Spain, Sweden

## PAPER

### Introduction

Ask any wildlife biologist what makes for a successful species and they will tell you all the time – Habitat. Yet in many cities in the US and elsewhere, we have turned over responsibility for the very places that shelter us and nurture our society and cultures to individuals and corporations whose sole aim is to make the largest possible profits in the shortest time. Concerns about the rapid expansion of US suburbs, for example, and the effects they have on culture and community go as far back as the early 1950s<sup>i,ii</sup>. The results speak for themselves and we know them only too well in the United States; blighted neighbourhoods, 8-lane suburban highways, sidewalks no-one wants to be on, no-one on the streets, dangerous if not impossible bike routes for kids to get to school on, and no corner shops any more – they've all been put out of business by big-box stores or actually prohibited by local land use zoning and planning ordinances. Many Americans vacation abroad. When you ask Americans about their vacations in Europe or Scandinavia, for example, they speak about the great places they can walk around in or just hang out in at sidewalk cafes. What they talk about as enjoyable places that seem to resonate with them are very difficult to find in many cities in the United States. Even though today millions of Americans are asking why their cities have to be the way they are and what they will be like in 100 years when we've added another 100 million or so to our population, we seem to have hit a creativity barrier on the heels of the real estate boom that gave us so much of the suburban sprawl we now have to live with. There are of course no simple answers but laws and regulations lie at the heart of much of what we have done, are doing today and will do in the future to meet our population, food, water and energy needs. By conducting a comparison of city-scapes in Spain and Sweden - to use just two examples - that Americans say they enjoy being part of, we might be able to illustrate some of the changes that need to occur in US regulatory structures in order to enable more humane, healthier and sustainable habitats to be developed.

## Shaping Who We Are: Regulating Land Use and Built Forms in the United States

When it comes to what and where we build, the act of creating places where people live, work and play shapes in large part, who we are and what we do. As Sir Winston Churchill once observed “We shape our buildings; thereafter they shape us” In many ways, the act of building turns out to be an endeavour that impacts our culture, our society and our economy – its not just about Pritzker Prize-winning architecture or award-winning urban planning projects. Even though some of us live in regions that we assume are fairly free from unwanted government interventions, we actually aren’t as completely free to shape our world exactly as we might think. There are vast bodies of laws and regulations that govern how and where we build, what we can build and what we can’t, what we can put adjacent to a house or school and what we can’t and how wide our streets and sidewalks must be and how far back from the sidewalk houses and offices must be. The amount of detailed prescriptions for what shall be done by anyone wanting to create new or repair old environments suggests that there exists a strong body of scientific evidence that doing what the regulations say we must will have beneficial results for everyone occupying or using those environments. It doesn’t take very long to conclude that aside from risk reduction (such as mitigating vehicle collisions and pedestrian injuries or keeping buildings from falling down or poisoning occupants) there is scant evidence linking beneficial outcomes for people to many of the planning or land use regulations in force today.

A troubling side effect of these regulations is that they tend to create formulas for designing human habitats and land use patterns. These formulas are based mostly on accommodating road traffic flow, the convenience of drivers and perceptions of what is appropriate for how close or far apart buildings ought to be or how far away from the street buildings or houses ought to be. Thus many critical aspects of human habitats that have been developed over many generations – patterns of building, placement and design of things like boundary walls, front porches, walls, gathering places and so on - get relegated to the bottom of the list of the average developer or builder’s concerns. Compare what the average small town streetscape was in 1940 with what we have today and we can easily see stark reminders of what happens when regulatory formulas take precedence over designing for culture and community (figures 1 and 2). More prominent on builders’ and developers lists of priorities are adhering to the strictly-enforced rules governing set-backs, turning radii for fire trucks and automobiles, distances between garage doors and sidewalks, number of parking spots for a given set of commercial, social, educational or cultural activities, road widths and numbers of lanes for anticipated vehicular traffic, security walls between housing and commercial strips etc.

The huge number of permutations and combinations of just these aspects of building something for human beings to occupy that the average builder and developer has to deal with underscores why there are few if any reasons for taking on the regulatory status quo let alone the volumes of equally prescriptive construction codes of how things shall be built. Sadly, the end results tend to be predictable and look about as bland as most other tract developments - many sporting larger than life houses (starter castles, McMansions and so on<sup>iii</sup>) these days as well as other gargantuan structures adorned with fake architectural features from somewhere else on the planet or from some former epoch presumably to beguile the owners into believing that they are in fact somewhere else.

## Comparing US cities with practices in Spain and Sweden

An example of the impact and reach of habitat regulation as well as what can go wrong can be seen in the metropolitan region where the cities of Phoenix and Tempe form the centre, especially when we compare this region with cities in Spain and Sweden. While Tempe has embarked on a program of smart urbanization, as has the City of Phoenix, the average visitor unfamiliar with this region is likely to conclude few such policies have been implemented. This region is roughly on the same latitude as Cairo, and yet Phoenix has been developed as if this region were simply a sunnier Minnesota or a Disneyfied “Tuscany” lookalike to somewhere in Italy. The gaping holes in downtown areas and the 8-lane highways that divide neighbourhood after neighbourhood can be compared to similar downtown places in Sweden and Spain.

In the Phoenix metropolitan region, it's clear that the way urban forms have been developed pay scant attention to the fact that the Phoenix metropolitan region exists in a hot, dry desert – albeit a greener one than most. Barcelona, for example, has seen huge upheavals in its history – far more than any city in the United States has ever experienced. The Catalans love their cars and there are plenty of them in the city. Yet they have not turned their cities and towns into parking lots or demolished buildings to create set backs, wider streets or accommodate nose-in parking for automobile-bound visitors. So too the Swedes love to walk about in their cities. In Lund, for example, the way that sidewalks and roads merge as well as the materials that are used give a wide range of visual and auditory clues to drivers that they are temporarily encroaching on pedestrian space. As a result, almost the whole of downtown Lund is walkable and bikeable – but it is also drivable. It's clear that while Swedish regulations certainly exist to control development and accommodate a wide variety of transportation modes, they allow for a far greater degree of creativity and accommodation than the obligatory set-backs and parking requirements built into US city and suburban codes.

Cheap energy and suburban expansion over the past half century have inadvertently eviscerated many communities and created places devoid of the very things that for this part of the world as well as other desert cities make for pleasant, liveable and walkable places - shade, breezes and water. This isn't to assign blame to builders or developers - they have all been working within policy, taxation and regulatory frameworks that evolved during the 20th century to protect health and welfare and later on accommodate the ubiquitous automobile - to the virtual exclusion of pedestrians and other forms of transportation. Other cities in the United States have fared better through deliberate public policies to enact laws and regulations that limit sprawl, encourage inner city rehabilitation and create multiple options for getting about. Portland, Oregon is one such place. It clearly has not allowed its city centre to be flattened for parking – in fact it has many elements Americans go abroad to enjoy on their vacations. If only it were sunnier.

Generally, builders and developers have simply been following the letter of the law and the regulations with which their projects have to comply. In other words they have been benignly carrying out their work and running their businesses that have until recently made substantial profits from providing commercial and residential facilities for others to occupy. While some of the more enlightened developers and builders have been and remain extremely concerned about the quality of the places their projects create, the featureless suburban sprawl that has occurred over the past 50 years in the United States is dominated by tracts of style-du-jour homes and malls that to so many of us - particularly our children, are devoid of magic, a feeling of place. Even for a country with plenty of historic places still in existence, speaking about St. Pancras in London, for example, Simon Schiama in his talk about “A Crisis Too Good To Waste” at Columbia University, said:

*.....In other words, places and spaces that somehow can be given a transfusion of new social energy, multi-generational social energy, while preserving economic viability. St Pancras is an absolute triumph in that respect. Not just because it's a beautiful station, and works, and is light. But because of the gentle Piazza Navona-like social commotion in that glorious shed. That's what we should be hunting for.*

*Old buildings, or buildings that might turn into derelict skeletons like Flushing Meadows, are worth having a vision for. Not just because it might be cheaper, or because people somehow have a shared sense of what might be.*

*(And here it's Schama the historian talking, bitter and furious about history dying in schools). It's my deep, instinctive belief that all children are wired for memory and narrative. Children want to be part of buildings that talk about where they have come from. They want to walk and live in those kind of places. And take their own children to them.<sup>iv</sup>*

Wringing out as much profit as possible from the process of building bigger and bigger houses and larger and larger shopping malls with ever larger surface parking lots has left the United States with hundreds of thousands of acres of new construction whose life expectancy may well turn out to be less than a decade or two, maybe three, rather than centuries or more. Housing development as well as building other structures speculatively is not a 20th century phenomenon – it was rife in Roman times and the social degradation and fire dangers brought about by the ubiquitous “insulae” run by first century slumlords would have easily been recognized by Charles Dickens. But in the late 19th and 20th centuries, we also began creating a substantial body of knowledge about the public health, environmental, economic, technological and social issues associated public and private housing and other types of commercial and industrial facilities. Over the past 30 years or more, rather than recognizing and respecting the strong cultural roles played by the buildings, streets, parks and other landscapes that make up the urban fabric that people live and work in and around, we have tended – certainly in many parts of the United States – to treat the quality of place as a secondary element in a broad and increasingly virtual financial environment of real estate. Real estate had become no longer *real* despite the significant body of knowledge developed over the past half century that to this day informs us that our regulatory model for providing one of the most basic human needs (shelter and home) is upside down or at least out of balance.

### **City Development as a Public Health Endeavour: Searching for Better Descriptive and Analytical Data**

On the one hand we have fairly prescriptive regulations, which end up determining in very big ways the character of our human habitats, but on the other we have a rapidly growing body of evidence that many of our built environments often have a discernible but negative impact on our culture, social life and wellbeing. This body of research, particularly in the public health field, links the built environment to major diseases such as obesity. A very large body of research has been done with tremendous support from the Robert Wood Johnson Foundation's “Active Living Research” program<sup>v</sup>. The work by Frank and Andreson<sup>vi</sup>, for example, investigated obesity relationships with community design, physical activity, and time spent in cars. Their research found that each additional hour spent in a car per day was associated with a 6% increase in the likelihood of obesity and also found that each additional kilometre walked per day was associated with a 4.8% reduction in the likelihood of obesity. However, this same body of research has experienced great difficulty in accessing reliable sources of data that describe the wide variation in the physical form and characteristics of built environments that can be found in any city anywhere on earth.

It is therefore not surprising that several public health researchers seeking to establish actionable linkages between diseases like obesity and the built environment have complained about the absence of reliable tools and methods for capturing and analysing salient characteristics of the urban forms we create<sup>vii</sup>. Thankfully, some reliable methods and tools are beginning to emerge such as the work of Otto Clemente and Reid Ewing et.al.<sup>viii</sup> but most researchers have been forced to rely on aggregated spatial data (e.g. net square feet per person) or US census data on housing and vacancies. These aggregations do not provide sufficient details about the things we build or the things we leave out that characterize the places we inhabit. However, if such details were more readily available, we might be able to illustrate more clearly the things that urban designers and policy-makers should concentrate on to enable better, more humane places to be built or retrofitted.

In the City of Scottsdale, Arizona, I saw in the planning office a large print of Van Gough's Café Terrace at Night and asked the planning officer overseeing a particular regulatory process what he thought about it (figure 3). He said that he and everyone in the office loved it and in fact he said that many people wished that Scottsdale could be more like that kind of place. When I asked him why not he pointed to a display of what a successful (i.e. fast approval) planning application would entail. It was a two story concrete block of a building with nose in parking surrounded by four-lane highways – a project that met all of the setback and parking rules contained in the city's planning regulations but there wasn't a person in sight (figure 4). So we have the regulators themselves wanting something different to what the codes will ensure happens. Clearly something needs to be done to change this state of affairs.

Can we regulate for niceness or humaneness or sustainability? Probably not plus it would potentially create yet another set of prescriptive codes for harried builders and developers to deal with. What descriptive quantitative data about our built and natural environments could do is to highlight much of what we've given up in our built environments and what we need to be building back into existing as well as new places meant for human habitation.

### **The Choices before Us**

When we compare urban development practices in the United States with just those in Spain and Sweden, with are presented with stark reminders of how upside down our world has become in many regions across the country. The "see-through" strip malls – all newly-built for today's fewer shoppers, and slowly emptying shopping malls provide stark evidence of how, when our economic growth and consumption model fails, important parts of the fabric of society we once valued unravel and decay before our eyes. The spatial voids created, where activity used to be and that today the average person would rather steer clear of, probably magnify the sense of desolation and alienation for most passers-by whose loss of confidence in our economic system may well be compounded by the emptiness and lifelessness they see. If values are changing out of necessity because we are searching for a more sustainable, less virtual and more diverse socio-economic model for the future, then we need to begin exploring new patterns of human settlement and land use stewardship that achieve a much broader set of goals in addition to financial ones.

We have a choice in front of us. We can either hope that the heady days of quarter-on-quarter profit growth at the expense of our environment return, or we can forge another more balanced pathway forward and learn from what other countries have been doing for decades. Achieving a new balance, however, will not be easy given the complex nature of our urban creations and the obvious need for greater collaborations among different disciplines as well as with the regulatory bodies themselves. The long and very controversial debate about health care in the United States has focused on many initiatives designed to provide more universal coverage at more affordable prices. What has been missing though in these debates is the role that our built environment could play in reducing

a significant portion of the costs associated with lifestyle-based diseases like obesity and depression; diseases which disable and impoverish so many. While there is no magic bullet for solving these problems, what might we be able to do if many of the regulations that govern what, how and where we build were changed from prescriptive “how-tos” into performance based guidelines that recognize and encourage far more than risk mitigation or the convenience of street traffic flow. Perhaps we could achieve a long sought-after and broader balance among commerce, culture, transportation and environment in the habitats we design and build for our species. Perhaps our built environment would become better understood as the not so invisible hand that shapes so much of who we are.

LIST OF FIGURES

"Sunday Afternoon on the Porch: Reflections of a Small Town in Iowa, 1939-1942."



Figure 1: "Sunday Afternoon on the Porch: Reflections of a Small Town in Iowa, 1939-1942"  
Everett 'Scoop' Kunst



Figure 2: 'Sunday Afternoon in Suburbia: North Dallas, Texas, 2003. Philip D, Allsopp





Figure 3: Vincent van Gogh – Café Terrace at Night, 1888 – print on the wall of the City of Scottsdale, Arizona, City Planning Office



Figure 4: Example of a successful planning application – City of Scottsdale Planning Office, Arizona



## END NOTES

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# The Classification of a Low Carbon Zone

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## ABSTRACT

*The climate is changing rapidly. This climate change a threat to ecosystem, and human being. More aggressive strategies for reducing greenhouse gas must be made and implemented. Various technologies and methods have been suggested to reduce greenhouse gas, but implementation in cities is limited. Therefore, it is required to take 'zone'-based approaches for low carbon industrial strategy targeting the core cities. Low carbon zone is the strategy intended to specify low carbon strategies to a certain district and conduct pilot projects. This research aims to classify LCZ strategies applicable to cities. We classified strategies into five categories land use, green transportation, natural ecology, energy efficiency, and resource management, and explained specifically.*

**Keywords :** Climate change, Low carbon zone

## 1. INTRODUCTION

Climate changes draw worldwide attention, encouraging many countries around the world to make more effort to reduce GHGs<sup>i</sup> causing climate change. The United Nations Framework Convention on Climate Change (UNFCCC) uses the term 'climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'. Beyond certain thresholds, some impacts could be irreversible (Simin Davoudi et al, 2009). The government has set the goal to reduce GHG emissions by 21~30% by 2020, relative to the BAU(Business as usual). This means that more aggressive strategies for reducing GHG must be made and implemented. GHGs are caused by economic activities which mainly occur in cities, absolutely requiring city-wide efforts against climate changes. Various technologies and methods have been suggested to reduce GHG, but implementation in cities is limited and constrained with its infrastructures and many buildings. Moreover, it is impossible to apply many strategies to one area. Therefore, it is required to

take 'zone'-based approaches for low carbon industrial strategy targeting the core cities. It is an alternative method to specify and apply the low carbon industrial strategy depending on characteristics of each city. Focusing on districts in many cities selected for low carbon green city, various projects have been conducted. Pilot projects are mainly conducted to change the entire city through creation of new towns, redevelopment, reconstruction and so on for the purpose of achieving great results by applying as many as low carbon elements. Unfortunately, however, various challenges including costs prevent low carbon elements from being applied to all development areas. Korea's mid- and long-term objectives of reducing GHG require many effective and efficient strategies and the existing strategies for low carbon green city. Low carbon zone is the strategy intended to specify low carbon strategies to a certain district and conduct pilot projects. This research aims to classify low carbon zone strategies applicable to cities.

## **2. Climate Change and Low Carbon Zone**

The world, well aware of the seriousness of climate change, has been vigorously seeking ways to slow and even stop it. In a combined effort to address the challenge, the 15th United Nations Climate Change Conference, commonly known as the Copenhagen Summit, was held in Copenhagen, Denmark in December of 2009. There national leaders strove to strike a successor agreement to the Kyoto Protocol, which contains GHGs emission reduction targets. However, the Copenhagen Summit failed to produce any kind of binding agreement to reduce targets due to differing interests among participant countries. But all countries did however vow to be more committed to curbing climate change. In line with this global trend, Korea has set for itself amid-term GHGs reduction goal in 2009. To accomplish this goal, progressive and proactive strategies for GHGs emission reduction are required. Fossil fuels currently supply 86% of the world's energy needs, of which 75% are consumed within urban areas. For this reason, it is more urgent to establish strategies to reduce GHGs emissions for urban areas. A low-carbon city means a city that keeps atmospheric CO<sub>2</sub>, the chief culprit in global warming, at the lowest level possible while working toward ultimately eliminating GHGs emission totally. Many technologies and ideas have been presented and suggested to save energy and reduce CO<sub>2</sub> emission, but some of them can not be practically applied.

There are essentially two response strategies to cope with climate change, which are mitigation<sup>ii</sup> and adaptation<sup>iii</sup> however, these two approaches sometimes contradict each other (McEvoy, D et al, 2006). Therefore, the strategies for climate change must be selected and intensively applied appropriately to the zones that best suits them. A 'low-carbon zone'

is a concept that applies a specific low-carbon strategy to an area that has consistent characteristics in terms of space, form, land use and geography. A newly developed city, for example, can be designated as a development zone for multiple purposes, while a region overusing energy can be guided to replace lighting with energy-efficient systems, such as LED lamps. A 'Green zone' can be secured as much as necessary by keeping an area from being developed or by designating more land as a greenbelt zone. To successfully realize a sustainable low carbon zone, therefore, the target area must be studied thoroughly in advance.

### **3. Classification of Low Carbon Zone**

The form that a city takes on is closely related to its use of energy. Compact development is discussed as an energy-efficient city form. As a city develops to be more compact, travel and commuting distances get shorter, fuel consumption and gas emission are reduced, land destroyed by development decreases and city spaces and facilities can be more efficiently used. Compact development is a characteristic of highly residential areas and features a mixture of land uses, multimodal transportation and high degrees of street connectivity, including sidewalks and bicycle lanes (Neuman, 2005). In Korea, however, direct application of this concept is hard to achieve although it is a viable alternative for energy saving. In the U.S or European countries, suburbs have spread out on the outskirts of cities to avoid urban congestion, which is followed by a hollowing out of the urban areas resulting in many problems. In Korea, however, the phenomenon of urban sprawl is happening in a different manner. Instead, new cities are developed by completely demolishing and then rebuilding existing cities, or systematically enlarging urban cores. The sprawling of the Seoul metropolitan area has now become a major national problem. For this reason, to realize low-carbon zones Korea should pursue compact development when redeveloping old cities, thus avoiding the creation of new cities in undeveloped areas, and thereby securing open space in other areas as much as possible. Development should be guided to establish a harmonious mixture of city functions, such as residential and commercial uses, by loosening the zoning laws and regulations for land use. The central business area of subway stations is a transit-oriented area for high-density mixed-use development.

Taken together automobiles are the biggest emitters of carbon dioxide, so the use of fossil fuels can be reduced by discouraging or limiting their use. Recently, the concept of 'green transportation' has been introduced, which refers to alternative means of transportation to reduce dependency upon automobiles. Some ideas include eco-friendly

fuels, trains, bicycles and pedestrian walkways. Strategies for realizing low-carbon green transportation include implementation of pedestrian zones, bike paths and right-of-ways and a common automobile zone. The pedestrian zone should be able to provide space for pedestrians to walk safely. The entry of automobiles into this zone may be completely restricted, or the zone may provide only enough space so that automobiles can run only at a very slow speed. There may even be spots that prohibit the use of automobiles. The payment of a congestion fee or imposition of green taxes can be ideas for limiting the use of automobiles. The bicycle is an excellent green transportation vehicle. To encourage the use of bicycles, infrastructure such as bike lanes, racks for parking, and perhaps subways cars designated for bicycle use should be prepared to provide more convenient bicycle transit. Carpooling is an old idea that can contribute to solving parking, congestion and pollution problems by helping to decrease the number of automobiles on the roads.

A green zone can serve as an inhaler of GHGs and part of a larger climate change adaption strategy solving the 'heat island' phenomenon. Therefore, wide swaths of greenbelts must be secured in urban areas, and green spaces should be linked. An indirect green network, such as green roofs and green walls, is also important. As green belts (forests) become larger, the inhalation of GHGs gets higher. Particularly, multi-layer greenbelts and broad leaf trees are the most excellent inhalers of carbon dioxide. Green roofs and green walls lower the heat island effect, which consequently reduces energy used for heating and cooling. It is necessary to expand the designation of park and green space zones in order to have more parks and wider green spaces in urban areas.

If fossil fuels are the chief culprit in producing GHGs emissions, then the most effective way to eliminate them is to not use them. Renewable energy sources, such as solar energy, wind power, geothermal and small hydropower stations are all harmless to the environment and infinitely usable, so they can be used as alternatives to reduce GHGs emissions.

Countries typically put more effort into developing new energy sources and technologies such as bio-fuels and hydrogen cells. These alternative energy sources, however, have production restrictions because they can be generated only in limited areas. Since renewable energy is produced in such areas that have good sunlight, tides, or ample wind, zones using renewable energy must be selected by considering many environmental restrictions. Energy is mostly consumed for daily activities in urban areas, but cities are more restricted in their facilitation of renewable energy. According to the IEA(2008), 36% of total energy is consumed in residential and commercial areas, with houses using about 55% of their total energy use for heating. For energy saving in cities, therefore, it is more efficient to guide consumers to decrease their energy consumption than to use renewable energy. They must be encouraged to use better insulating materials, such as energy-efficient appliances,

thick floor finishing materials, energy efficient wall finishing material and triple-pane window systems, etc.

The resources management sector is aimed at increasing efficiency of limited resources. This sector is further divided into water management and waste management. The biggest risk factor to climate change is related to water. As the temperature rises, more ice at the poles melts, resulting in increased sea levels that can eventually threaten low lying coastal areas with flooding. Also, higher temperatures lead to an increase in rain. Recently heavy rainfalls have occurred more frequently due to climate change. Between 2000~2004, Korea's annual average rainfall was over 1,500mm, much higher than the average rainfall of 1,283mm(Muyoung Han, 2004). The volume of GHG emissions should be reduced to mitigate the rise in temperature. Water should be managed better to minimize damage from water-related disasters. Gray infrastructure may lead to flooding if the rainwater it captures begins to leak or overflow if rainfall is too high. For this reason, rainwater should be funneled into the ground through a green infrastructure. Rainwater itself is a water resource. The use of rainwater requires less energy than the use of pipe water. The water supply rate and water circulation should be improved by creating zones equipped with the rainwater storage and filtration facilities for active use of rainwater.

These days, modern society conserves resources by actively restricting the flow of materials or energy and better managing and recycling waste. Also, more consideration is paid to how handle waste that cannot be recycled. Waste should be recycled as much as possible, rather than disposed of. Korea's recycling rate of household waste is estimated to be about 56.3%(as of 2005), with citizens directly separating recyclable items. The recycling rate of industrial waste is about 68.5%, 36% for disposed wood and 20~30% for general construction waste. In general, Korea's recycling rate is comparatively low. To increase the recycling rate, it is more important to implement an effective recycling system although it is necessary to encourage individuals to recycle their used items. Recyclable waste should be collected and linked to the sectors where it can be reused. A resource recycling zone is an area designed for recycling many resources in a zone by implementing a waste recollection system and simplifying the recycling route.

Table. 1 Classification of LCZ

Fields	Low Carbon Zone
Land Use	Mixed-Use Development Zone
	Railroad Station areas Development Zone
Green Transportation	Pedestrian Zone

		Bicycle Zone
		Carpool / Car sharing Zone
	Natural Ecology	Park / Green Zone
	Energy Efficiency	New Energy Zone
		Renewable Energy Zone
		Energy Conservation Building Zone
		High Efficiency Equipment Zone
Resource Management	Water resource	Rainwater utilization Zone
		Water Saving Zone
	Waste	Resource Recycling Zone

#### 4. Concluding Remarks

The goal of responding to climate change is the most important and urgent issue. This goal cannot be accomplished by the activities of a single entity alone. A low carbon zone requires operation of a comprehensive low-carbon strategy covering all regions and possibilities region to accomplish the goal of mitigating GHG emissions. A low carbon zone can be an alternative to solving the limitations shared by existing cities. To facilitate low-carbon zone projects, an institutional foundation must be prepared to delegate its design and operation. Appropriate standards must be also prepared that take into consideration local characteristics. In addition, the concept of a low-carbon zone must be established from the very beginning of the city renewal initiative, so it can be applied at the city design, planning and implementation stages.

A low carbon zone project requires high expenses. The standards regarding these expenses must also be presented for equal sharing of them. The public site cannot be expected pay the full amount, but handing it over to the private sector is not desirable either. To encourage participation of the private sector, it is important to provide administrative and financial incentives.

Such a project cannot be implemented without the understanding of the residents even though infrastructure and financial assistance are provided. Accordingly, the most important thing is to create a system that inspires active self-motivated participation among residents in the implementation of the project for effective realization of a low carbon zone. To fully implement such a zone, residents need to be encouraged to strive for fighting climate

change by changing their attitude toward the environment and putting what they have to do for a clean environment into practice.

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<sup>i</sup> Greenhouse gases(GHGs) are the natural and anthropogenic gaseous components of the atmosphere which absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, atmosphere and clouds. This causes the GHGs effect and gradual warming of the Earth. The primary GHGs are : CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>, O<sub>3</sub>. In addition, the Kyoto Protocol considers SF<sub>6</sub>, HFCs, PFCs as GHGs(Simin Davoudi et al, 2009).

<sup>ii</sup> A strategy aimed at reducing the problem of global warming over the long term (Clisabeth M.



Hamia et al. 2009)

iii The process of lowering vulnerability in order to minimize the impacts of ongoing climate and environmental change. The process of increasing the responsive capacity against extreme climate change.

## Reporting for Remote Arid Planning Duty

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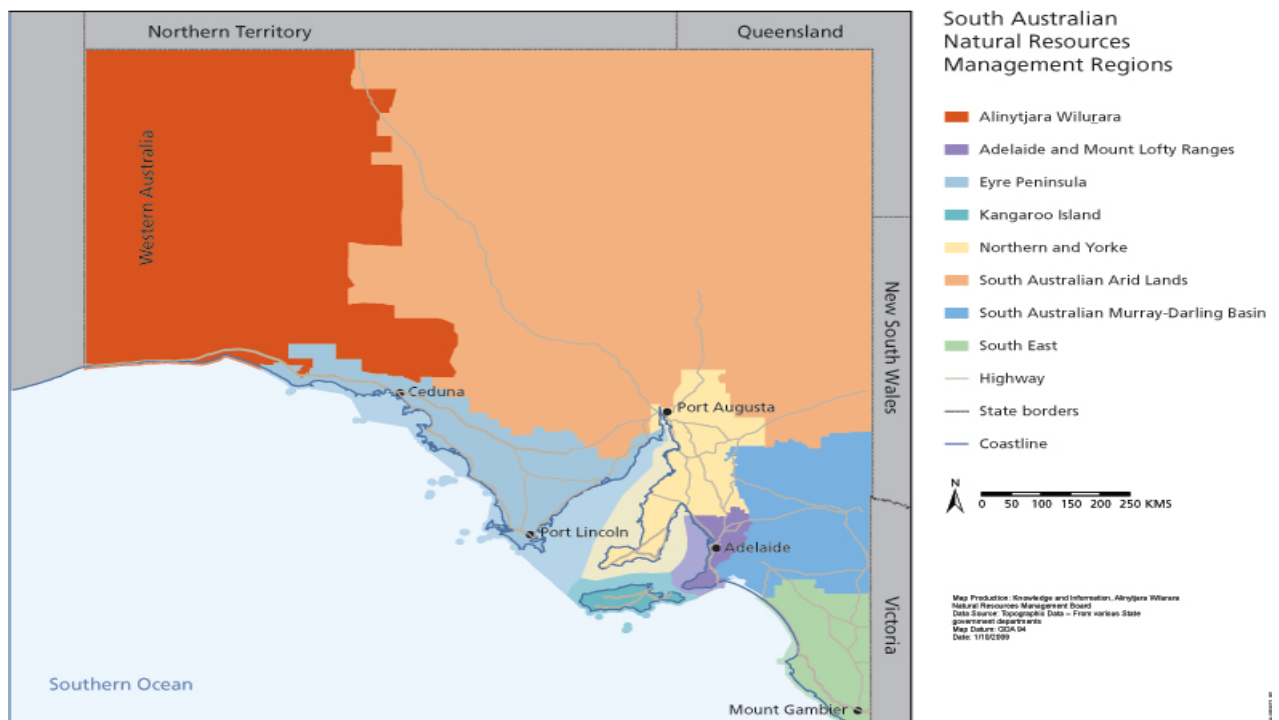
### **Abstract**

*The Alinytjara Wilurara Natural Resources Management (AW NRM) Region is probably as far from most cities as one could get in Australia, covering 250,000 square kilometres of Aboriginal lands and dedicated conservation areas in the far west and north-west of South Australia, from the Great Australian Bight north to the Northern Territory border. However, like many other NRM bodies in more urban areas, the Alinytjara Wilurara NRM Board has developed a regional strategic plan endeavouring to meet multiple needs – to meet legislative planning requirements; to speak to an audience with English as a second language; to provide an overview and introduction to a broader audience with limited knowledge of the region; to explain NRM free of jargon and ‘government-speak’; to highlight the health, trend and stewardship of the region’s natural resources; to succinctly cover the range of issues and challenges facing a remote, arid and Aboriginal region; and to provide a straightforward plan for future NRM in the region.*

*In order to meet this tall order, several approaches were used - using plain English and visual aids; simplifying NRM to only three categories or themes – people, country and water; using a report card format to report on the region’s landscapes; and making use of program theory in formulating the strategic plan.*

*The final planning challenge has been engagement and consultation. Not unique to this region, many stakeholders suffer from plan fatigue, wanting to see the outcomes and money flowing from planning rather than embracing the planning itself.*

**Keywords:** Resource Management



## Introduction to the Alinytjara Wilurara Region

In Pitjantjatjara, alinytjara means 'north' and wilurara means 'west'. The Alinytjara Wilurara Natural Resources Management (AW NRM) Region covers the northwest quarter of South Australia, a quarter of a million square kilometres. It is one of eight NRM regions formed in South Australia under the Natural Resources Management Act 2004, and is overseen by a Board with eight Aboriginal voting members. The region incorporates the remote Aboriginal Lands in the north-west (Yalata, Anangu Pitjantjatjara Yankunytjatjara (APY) Lands and Maralinga Tjarutja Lands) and surrounding State legislated conservation areas.

According to the 2006 Australian Census data, the Region has a population of approximately 2000 people with almost 90% of the population speaking Pitjantjatjara or Yankunytjatjara at home. Throughout the Region, people have a degree of cultural connection to, and traditional ownership of country, although there are still native title claims over the southern part of the region to be determined.

The Alinytjara Wilurara NRM Region is rich and diverse in its flora, fauna and cultural heritage. Major threats include a lack of traditional and contemporary management, camels, weeds particularly buffel grass, and the impacts of climate change. It is thought that some of the region's plants and animals may be particularly vulnerable to a changing climate, as many are at the extremes of their current distribution. For interest, in a report prepared for the NRM regions in South Australia (Suppiah et al 2006), the AW NRM region is predicted to have increases in temperature of between 0.5 and 1.5°C by 2030. Variable rainfall between decades in the arid parts of South Australia makes the trend for rainfall more difficult to predict with models showing increases and decreases of between 9% and +1% by 2030, but with decreases dominating.

## NRM Planning in South Australia

The South Australian Natural Resources Management Act 2004 (NRM Act) requires the AW NRM Board to complete a comprehensive plan for the region and describes the detailed formal requirements of what needs to be included - a review of information regarding natural resources, their condition, and factors affecting their sustainability. This includes the natural resources and their state and condition; environmental, social, economic and practical

considerations relating to their use, management, conservation, protection, improvement and where relevant their rehabilitation; land management of pest species of animals and plants; the Board's goals and how they will be implemented, including the involvement of aboriginal communities and other bodies; how the Board will monitor the state and condition of natural resources and related trends; a ten-year strategic plan; a three-year business plan including the staff, physical and financial resources needed by the Board in order to implement the NRM Plan; demonstration of consistency with the State NRM Plan; and, as far as possible, demonstrate consistency with a range of plans under other legislation or government policies. The draft plan must undergo formal public consultation and be reviewed by several committees prior to Ministerial approval and finalisation.

### **Challenges for the Alinytjara Wilurara NRM Plan**

Planning for NRM in the Alinytjara Wilurara region was always going to be challenging given the influencing factors - a long list of legislated inclusions (described in the previous paragraph); the region being large and remote with a lack of collated or available information; and the necessity to balance the needs of a regional audience with English as a second language who have a connection with country going back thousands of years, with an entirely different audience of government departmental staff, non-government organisations and the broader public who often knew little about the region, its NRM values or issues.

The AW NRM Board were very supportive of innovative approaches to planning and strong in their desire to see a draft plan that was free of jargon and 'Government speak', written in plain English with some translation into Pitjantjatjara, succinct and colourfully illustrated to showcase their region. The resultant plan is a fusion blending the desires of the Board with the mandated requirements. The choices made and lessons learnt along the way are applicable to other areas of NRM and planning, even in urban areas.

### **Choices and Lessons Learnt**

#### **1. In-house or contract out?**

The AW NRM Board chose to employ a planner, instead of contracting the collation of information and/or plan writing out to consultants.

Challenge: Balancing dual roles – the planner was also the program manager, and program management proved to be a dominating role for a period of time.

Opportunity: Planning 'on the inside' means a plan should demonstrate good insight into a region's natural resources, problems in the region and the 'culture' of both the region and organisation.

Lesson learnt: Planning can be achieved in-house but dedicated time is required for the staff member.

#### **2. How to develop a simple structure?**

The plan was structured with a minimalist approach in mind. For comparison, the draft AWNRM plan came in under 200 pages including appendices, with most other regional NRM plans in South Australia over 400 pages long in several separate volumes.

Challenge: To have sufficient wording to meet the minimal requirements, cover all the issues and have maximum impact.

Opportunity: The plan was developed to include the critical elements required, paring down wording and sections wherever possible and maintain a logical flow through the document. The plan was produced in one document with four parts:

1. Introduction – provides an introduction to the region, NRM and the planning process.
2. State of the Region report – uses three themes - people, country and water to report on the state of the region describing the health, trend and stewardship of the region. Other plans have categorised natural resources management into more theme areas.
3. Ten-year Strategic Plan - sets desired outcomes for improving or maintaining the natural resources of the region and the management and actions required to achieve these outcomes.
4. Three-year Business Plan - explains how the Board will invest over the next three years to achieve the desired outcomes in the Strategic Plan. (The Business Plan is reviewed annually through an Annual Business Plan.)

Lesson learnt: Draft, cut, bold review and tight revision repeated resulted in a pared down document.

### 3. Jargon or Plain English?

The Board’s desire was to have the plan written in plain English and avoid jargon and ‘government speak’.

Challenge: To demystify and simplify NRM terminologies and jargon without losing meaning,

Opportunity: Writing in plain English provides the opportunity to closely examine and evaluate the real meaning in complicated sentence structures and choice of wording and can potentially result in a better plan. The first draft of the plan was written simply and presented to the Board. The Board’s opinion was sought on the strategic part of the plan and wording



used. The Board spent time reviewing and revising the guiding principles, vision and goals into wording that was meaningful to them. As an example one goal of the South Australian State NRM Plan is “Prosperous

communities and industries using and managing natural resources within ecologically sustainable limits”, the Board’s interpretation “The land and sea to sustain the people and the people to sustain the land and sea. The Region should stay rich in culture with people working and employed to care for country” and the Pitjantjatjara translation “*Utilanku ngapartji ngapartji atunymanama kapi, uru pulka, manta, anangu. Munulanku uti irititja tjuta kututungku atunytju kanyinma*”.

Board changes were incorporated then the plan was provided to a professional editor, with no background in NRM, for review and revision. The draft then went through a second iteration of planner-Board-planner-editor to ensure the original intent of the wording had not been ‘lost in translation’.

Lesson learnt: Using a professional editor without a background in the plan’s subject matter is invaluable and well worth considering for all important documents. Allow ample time for several iterations. Complicated wording is not necessary and can impede the transfer of knowledge and understanding to everyone.

### 4. How to accommodate an ESL audience?

Providing some translation in the plan was considered essential by the Board, particularly for the draft going to consultation.

Challenge: To meet the needs of a regional population, the majority of whom spoke English as their second language and meet the needs of other stakeholders.

*Ka plan nyanganku utilpai ngura winkitja: ngura wiru, ka  
uru wiru, munu nyanga tjananya kuralpai tjuta ngurkantananyi.*

Opportunity: A translator was used to translate the plain English version into Pitjantjatjara, the language understood by the majority of Aboriginal people in the region. Illustrations and short translations scrolling over the tops of the pages were also used to keep the audience interested and give them the gist of the page's content. Most of the community summary was translated to get an overview of the plan and particularly targeting that of most interest to people, employment in the region in NRM.

Lesson learnt: Find a suitable translator who can turn around the translations with a minimum of fuss in the required timeframe. Allow enough time for speakers of that language to see if the translation is readable for them.

#### 5. Should the draft plan look like a draft?

With the Board's requirements for the plan to be illustrated, translated in parts and easy-to-read for the regional audience, the draft plan was unlikely to follow the path of other draft plans and be released for public consultation as a text-only plan.

Challenge: To go to public consultation with a draft plan that looked like a final plan and ensure the audience understood there was a sincere desire to review and revise the plan based on feedback.

Opportunity: The plan was edited, formally laid out, illustrated with diagrams, drawings and photographs providing an opportunity for the plan to appeal more and possibly encourage more people to read the plan and make comment on it. The plan was well-received in this format with many comments about the draft plan being visually appealing and easy to view.

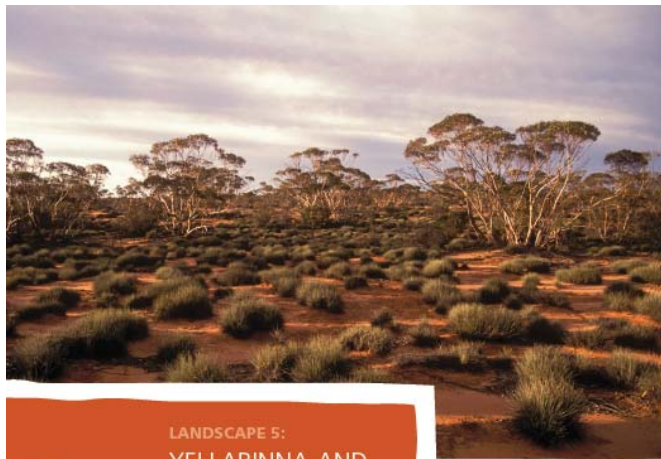
Lesson learnt: It is worth going to the trouble and expense of 'dressing up' a draft plan, even knowing that wording will need to be revised, deleted or added. Allowing a large amount of 'white space' on every page can facilitate this without having to significantly change the page layouts. This assumes the plan's structure is acceptable.

#### 6. Should we try something new?

Challenge: Within the constraints of legislated planning, find a new and meaningful way of presenting information, particularly discussing the region and the state of the region at several scales.

Opportunity: An illustration was commissioned to allow people to get an idea of the size of the region, gain some perspective and highlight some of the region's natural values and is used in the plan's introduction. This illustration was developed early and has been invaluable in promoting and discussing the region, as well as being used in the plan.

In order to allow a meaningful report on health, trend and stewardship, the region was divided into nine landscapes and a report card produced, based on the Gippsland Health Card. Simple rating systems were used for health – A excellent, B good, C reasonable, D poor. Trend was rated as declining ▼, stable ▬, improving ▲. Stewardship was represented by hands – four hands excellent, three hands good, two hands reasonable, one hand room for improvement. An option was also available across all for not rating. To assist in rating health, trend and stewardship, criteria were developed for each. The report card and landscape approach was generally well received (the feedback being incorporated into changes to the final plan) while the criteria used in the report card are forming the foundation for monitoring health, trend and stewardship into the future.



**LANDSCAPE 5:  
YELLABINNA AND  
YUMBARRA**

Photo: Peter Conry

**TREND** (checkmark icon)  
**HEALTH** (letter B icon)  
**HELPING HAND** (hands icon)

**SUMMARY**

The Yellabinna and Yumbarra landscape is pristine, remote and wild. Part of it is a recognised Wilderness Area and the remainder is conserved in parks, however mining also takes place. Landscapes include sparsely vegetated red sand dunes in the north, joining the Great Victoria Desert and extensive mallee (DGH).

**Notable attributes of the Yellabinna and Yumbarra Landscape include:**

- recognised and formally declared Wilderness Areas
- recognised corridor linking the Great Victoria Desert to the northern Eyre Peninsula mallee (as identified in East meets West Naturalists Plan)
- granite rockholes
- a group of salt lakes, known as Googs Lakes, of which the largest is about 1 km by 14 km.

**Lesson learnt:** Seeking alternative approaches can have real benefits in delivering planning to meet your needs as well as having products that can be used again. ‘Looking over the fence’ at what other people have done is a good starting point while looking outside the subject area can provide further inspiration. Be prepared to ‘market’ the idea. Be prepared to adapt and adjust from the initial ideas.

#### 7. How to consult?

**Challenge:** To get good attendance by a cross-section of stakeholders at the formal public consultation meetings, particularly given that remote Aboriginal communities suffer from ‘plan fatigue’ and the timing of consultation was not ideal, occurring over twelve weeks in Summer, to be completed prior to the election period.

**Opportunity:** A considerable amount of successful plan consultation was undertaken prior to the plan being drafted often done as part of other

communications. During formal consultation, local meetings were planned to engage regional and remote communities as well as meetings in regional centres where Aboriginal people with connections to the region reside, a meeting in Adelaide hosted by a peak environment body and meetings with government agencies. The most successful meeting was the Adelaide meeting and a meeting held in the government’s aboriginal affairs area. Community meetings were cancelled due to a number of reasons while the regional centre meetings were very poorly attended.



Lesson Learnt: It remains a challenge to engage people during the formal public consultation phase of planning.

### Progress on the Plan

The plan is currently being revised based on the feedback received. Interestingly there were few comments on the ratings in the report card and no revisions required to structure. Most feedback was reasonable and been recommended for inclusion by the Board. The plan with suggested amendments is then forwarded to the Minister for final comment and approval to



finalise the plan.

Suppiah, R, Preston, B, Whetton, PH, McInnes, KL, Jones, RN, Macadam, I, Bathols, J Kirono, 2006, *Climate change under enhanced greenhouse conditions in South Australia: An updated report on assessment of climate change, impacts and risk management strategies relevant to South Australia June 2006*, Climate Impacts and Risk Group, CSIRO Marine and Atmospheric Research and Department for Environment and Heritage, Adelaide.



## FEASIBLE PATHS: Connecting Visions to Results

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### ABSTRACT

*To manage natural resources sustainably, or more generally to build healthy cities, stakeholders need to align their plans, policies and work programs with the necessary capacities – people, powers and purses.*

*The main underlying causes of environmental decline are fragmented accountability and fragmented knowledge. Specialisations in government and science foster technical expertise but reinforce the ‘silo effect’. Yet cities inevitably are managed not as disciplines but as places.*

*One commonly looks in vain to find any entity resourced with the five necessary capacities: a coordinating body with organisational authority; legal authority; competent personnel; data and interpreted information; and funds.*

*An effective coordinating body will set out a vision and map feasible paths for achieving it.*

**Keywords:** natural resource management, implementing policy

**Disclaimer:** This paper is written in a private capacity. No criticism is implied or can be inferred of any position, policy or action of the Queensland State Government.

**Definitions:** Landholder – the person or body entitled to be in occupation and to construct works on a parcel of land; and who is responsible for its maintenance. Includes individuals, corporations or public authorities.

NRM – the planning and management of natural resources (land, water, vegetation, minerals). Includes the environment.

Study area – a spatially bounded district for engagement by governments, communities and place managers for managing a landscape or a city.

The paper is focused on how to implement NRM in Australia, but the model can be tweaked to apply to cities and to other countries.

The inspiration of Russell Holland and Richard Sanders is acknowledged.

*\* From 1991-2006 Geoff Edwards was Manager Land and Regional Planning in Queensland's Department of Lands/Natural Resources. From January 2007–June 2008 he was Chief Executive Officer of South West NRM Ltd, the accredited regional NRM body, based at Charleville, Queensland. In the 1980s, he was a local government councillor and parks manager. In 2008 Dr Edwards was awarded his PhD in public policy from Griffith University for an analysis of the concept of the ‘public interest’.*

## ESTABLISHING A FOUNDATION: THREE OBSERVATIONS

“Sydney has lost its way”, declared urban planner Jim Colman early in July in an opinion piece on [www.inside.org.au](http://www.inside.org.au). “The reality is a fiendishly complex array of ministries, departments, authorities, commissions and other units of government – not one of which can claim a leadership role.”

Disaggregated governance crops up repeatedly in various forms across Australia. Is it possible to design for successful governance of natural resources and cities, or are the ingredients completely random? To ground an analysis, three fundamental observations are presented.

### 1. ***There is an environmental crisis***

Year after year, most headline indicators of condition and trend in Australia’s natural resources continue to worsen, as shown by various State of Environment reports and globally, the Millennium Ecosystem Assessment. Scientific knowledge about the distress that farming and natural systems are facing is multidisciplinary and more or less unanimous. Science has been signposting deteriorating environmental condition for four decades. Yet science – or the environmental movement which articulates their warnings – is routinely ignored or ridiculed. Witness *The Australian’s* tirades against greenies.

### 2. ***The lofty aspirations of plans are routinely not achieved***

Year after year, civic leaders endorse plans and announce initiatives that will fix NRM problems and deliver healthy cities – but problems continue to worsen. (This is a generalisation, overlooking numerous successful initiatives, as demonstrated in this conference). Why don’t we do better?

Urban and regional planning strategies so often sunnily assume that we can have it all: economic growth, speedy transport, viable farms – all with an idyllic environment, clean energy and a liveable lifestyle. Plans proclaim inconsistent ideals such as the oxymoronic “sustainable growth” but without any feasible paths to deliver them, leaving under-resourced, disempowered street-level operatives struggling to make sense of things. Development assessment planners at the council’s front counter are at the sharp edge of these tensions and frequently burn out or lose idealism.

Almost 30 years after the birth of Landcare, there are still no stable institutional arrangements capable of rejuvenating the nation’s natural systems and the productive enterprises which depend on them. The NRM sector suffers from staff turnover and burnout, insecure and inadequate funding contracts and repeated organisational restructures.

### 3. ***Landholders are sovereign***

Landholders have wide powers to manage their properties and it is they who decide whether or not to develop them. A landholder enjoys possession (subject to native title), is entitled to peaceable enjoyment and can eject trespassers. Other parties rarely have rights to enter a property and repair degradation or construct improvements or works. This fundamental autonomy in managing has its roots in common law. However, it is not absolute. Regulation and custom overlay various *positive* obligations to undertake certain activities, such as controlling noxious weeds; and *negative* obligations to refrain from certain activities, such as clearing native vegetation.

This sovereignty means that successful NRM requires empowered landholders. Landholders generally cannot be forced to carry out works (such as fencing watercourses) against their wishes (unless as a condition of lease or development approval). So tangible incentives may be necessary to persuade landholders of their merits. Also, improvement works must be negotiated one by one; no single spokesperson can bind every landholder; they are all independent proprietors.

In rural areas, the landholder’s role is pivotal, for land condition depends upon management of properties. In cities, the private homeowner is less influential for implementing NRM, but the

centrality of the local government's role is based on its role as the largest landholder (including roads and creeks), not only its powers as town planner and infrastructure funder.

## DIAGNOSIS AND SIMPLIFIED SUMMARY OF THE MODEL

The model presented here builds on a diagnosis of three common reasons why strategies for NRM are so often ineffectively implemented: a philosophical one, *absence of robust theory*; and two eminently practical ones: *fragmented accountability* and *fragmented knowledge*. The model can be applied at the scale of a region or a metropolis; or just within a neighbourhood. It can be applied to an entire bureaucracy, or within a single organisation.

An effective strategy will:

1. Set out a realistic *vision*, an aspiration, a sense of purpose.
2. Be based upon a foundation of coherent *theory* linking causes and effects and explaining the forces at work, by drawing insights from many disciplines and sources of expertise.
3. Map effective *feasible paths* for achieving the vision and for overcoming fragmentation of accountability and of knowledge.

Visions are important, for they reflect the world views of opinion leaders and the strategy's authors. But they won't be explored in this paper, which aims to explain why visions aren't implemented. Time and again this is because of the absence of coherent theories and feasible paths.

## OPTIONAL THEORIES

Every person's world view is, by definition, unique. However, four nodal perspectives towards NRM can be identified. These can be termed *theories*, *lenses* or *ethics*, depending on context.

1. ***Yeoman pioneer***: respects the practical judgement of the common person. Typical family farmers are proud of their role in feeding and clothing the nation, of their sturdy self-reliance and practical know-how, and of their stewardship. They hold a strong antipathy for academics and bureaucrats who pontificate on rural affairs and hand down regulation from the comfort of the big cities. In this, the rural pioneer-centred outlook bears many similarities with the urban populist world view held by talk-back Australia.

Farmers carry a strong ethic of stewardship, which they define as passing their productive property "in good condition" to the next generation. But their view of stewardship is centred on the *production systems* and is less attuned to the subtleties of the underpinning *ecological systems*.

2. ***Market rationalism***: respects markets. The Commonwealth and all States since 1983 have pursued rationalist and micro-economic reform, a program derived from neoclassical economics, neoliberal political philosophy and managerialist theories of public administration. Four features of this agenda warrant attention here.

The first is the imposition of market discipline on public authorities. This agenda has introduced the language of government incompetence and the view that governments need to be starved to prevent profligacy. Public services have been commercialised or privatised. Cost-cutting has obliged departments to retreat to their irreducible statutory duties and to prune their extension and research functions. But collective problems require collective responses, notably via government.

The second feature is that by definition, markets do not recognise un-priced environmental or community services or natural capital outside the arena of exchange. By definition therefore, they can only awkwardly enhance the health of the environment or social glue in a city. Becoming "more efficient" means stripping out the public good functions, which include the ecosystem services central to NRM and the community services central to cities. The problem is

that there is no ongoing scheme for reimbursing landholders or anyone else to produce the public goods.

The third is a managerialist separation of regulation and policy from operations and a shift to project funding and casual contracts to get things done rather than reliance on baseline funds and long-term staff. This contractual rather than cooperative approach leads to short-termism, loss of corporate memory, under-investment in training and, in short, fragmentation of knowledge.

The fourth is that markets accentuate inequality because they deliver resources to those with greatest purchasing power.

**3. Sustainable development:** respects scientifically informed balanced decision-making. The foundational 1992 *National Strategy for Ecologically Sustainable Development* (NSES) included a paragraph that is inconsistent with its logic:

“No objective or principle should predominate over the others. A balanced approach is required that takes into account all these objectives and principles to pursue the goal of ESD.”

This qualifier is commonly translated into “striking a balance between the social, the economic and the ecological”. No wonder “sustainability” is regarded as ambiguous! The diagram showing three overlapping circles representing these sectors, commonly replicated in textbooks, is nonsense. There is no part of an economy that is not a social construct. There are no economic agents who are not 100% dependent upon clean water, fresh air and food from the natural environment. The only sensible diagram consists of concentric circles, all embraced within the biosphere.

More seriously, the economic imperative never allows any “balance” to remain in equilibrium. Economic development reflects an ethos of expansion not balance. Given that the starting point for each proposed development is the canvas at that time, not some pristine one, “balance” presides over continuing intensification and does not recognise limits to the earth’s natural systems. “Balance” subtly disparages alternative outlooks such as conservation as being “unbalanced” or “extreme”. It too easily reduces to balancing *interests*, or the noisiest applicants.

“Balance” does not envisage refusal of an application for development. Horrible proposals can be justified by declaring that they satisfy all three limbs – in part. The economic limb is appeased by allowing the project to proceed; the sociological limb by the associated creation of jobs and the environmental limb by painting the structure green or planting a few grevilleas.

The language of balance is popular as it allows the inherent tensions between liveability and economic expansion to be papered over – while development proceeds inexorably. NSES articulated an incoherent theory that is not capable of implementation. It has misdirected the good faith endeavours of its advocates for 18 years.

**4. Stewardship:** respects the land and humans’ dependence on it. Stewardship is the custodianship of an asset on behalf of its ultimate owners. Stewardship responsibilities certainly require sustainability, but also embrace a duty of care to the land, an economic responsibility not to waste the productive asset, a responsibility to act ethically in all dealings and a respect for the stake that others, including the Indigenous spokespeople, have in the well-being of the natural assets. The State’s role is to act as custodian of the community’s inheritance of biophysical resources and to rein in private capture of resources in order to maintain essential ecological processes.

The ingredients of stewardship have been articulated in a departmental paper\*. Stewardship is not yet widely accepted, but is the only way to go.

## FEASIBLE PATHS

Governance of Australia's natural resources is dis-coordinated. Those who manage the land lack the funds to make sustainability happen. Scientists, design professionals, planners and sociologists who understand how to manage places and communities tend to shy away from involvement in politics. Those who hold the power and the budgetary levers are preoccupied with other problems, or are busy promoting economic growth. In looking around, one is impressed by the number and earnestness of capable people labouring in NRM, but one commonly looks in vain to find any entity which is properly resourced with the five capacities within its area.

### ***The five capacities***

For any function to be discharged adequately, five capacities are necessary, within the one locus of activity or jurisdiction – say, one study area:

- a **stable coordinating body** or *forum* with accepted *organisational authority*: to motivate the stakeholders and assemble the other ingredients; and charged with implementing a strategy to transition from the present to the envisioned future; in short, someone in charge;
- *legal authority* or delegated authority: statutory power (for tenure and regulation); permission of the landholder (for outdoor works);
- *skills*: competent personnel;
- *knowledge*: data, information and interpreted or “translated” information;
- *funds*: a budget or revenue-raising capacity.

Appended are charts depicting these ingredients in two layouts, showing that achievement of a strategy requires resourcing at the roots. Though committed operatives will always try to make the best of their circumstances, the absence of any one or more of these capacities renders much other capacity impotent. The irreplaceable ingredient is the legitimacy of the coordinating body, because it can muster the other capacities if any are missing. It can identify the best tools and persuade their administrators to bring them into service of the strategy. It is not essential that it hold all the powers – yearning for a single benevolent authority is futile – control over the tools will always reside in different bodies – institutional boundaries have to be drawn somewhere.

Within the Australian federation, separation of the guardians of the public purse from the operatives who really know and care about the problems requiring remedy and are charged with delivery is endemic. According to the phone book, federal Treasury does not even have an office in Brisbane.

The value of a well resourced coordinator is best demonstrated by example. The former Melbourne and Metropolitan Board of Works was just such a body. There is a strong argument that it was a primary foundation of the liveability of Melbourne, previously designated as the most liveable city in the world. However, it fell victim to repeated managerialist restructuring in the 1980s and 1990s and its powers have now been dispersed.

In Queensland, Brisbane City Council enjoys a comparable role with a wide range of powers, but has lately poured its discretionary resources into road infrastructure, overlooking even its own peak oil analysis. Not just organisational capacity but theory matters!

## THREE OF THE ESSENTIAL FUNCTIONS OF A COORDINATOR

### ***Set boundaries***

A great deal of energy is wasted through mismatch of boundaries. An effective coordinating body will encourage existing stakeholders to align their own planning and budget processes to serve the shared task of implementing the vision. This will often mean aligning boundaries of planning exercises, even if as a subset or superset. A coordinator should regularise meeting schedules and provide clearing house services, to ensure that actions are followed through.

The catchment-based boundaries of NRM bodies is suitable for NRM – but city administrations need to be aligned with community of interest, access and infrastructure.

### ***Translate information between discipline and place***

Portfolios in government and academe are divided along functional and disciplinary lines. This allows disciplinary technical expertise to flourish and like-skilled people to reinforce each other's skills. Then within organisations, roles are commonly separated along science-policy-operations lines. However, these demarcations – the “silo effect” – have a significant defect. Natural resources and cities inevitably are managed locally as *places*, so information from disciplinary specialists must be continually translated into place-based format.

How complicated is this? Fairly complicated, but more to the point, it requires a *long-term* commitment to do it by a body which embraces that as its mission. This is one activity that is not amenable to delivery through short-term projects. The translator must:

- *bridge disciplines* and *coordinate* and meld disparate information from various sources;
- *change scale*, zooming in from a broader scale to the property scale, or zooming out to feed intelligence back to the centre; and
- *interpret* information, tracing cause and effect, articulating a theory to explain what is happening, identifying remedies for the problems uncovered, explaining the implications.

Politicians, scientists, farmers, policy officers, journalists and business all have different styles for communicating, different outlets and different jargons. *Within* their communication circles, they are drowning in communication; but *between* them, insight-sharing is weak. The ABC and CSIRO endeavour to bridge the gaps, but this is poorly funded public good activity. Conferences help.

People accept information readily only from sources that they trust. Trust takes time to build and one cannot contract to supply trust.

### ***Clarify roles of levels of government***

The fundamental ingredients of healthy cities require collective action. If we want them solved, we must resource a collective agent. Governments are central because they alone can levy taxes.

Governments sometimes stumble over each other not because there are too many levels of government, but when some simple principles of governance are overlooked. Can you imagine that the Commonwealth decided to administer grants to insulate houses, more or less ignoring the 563 local governments who exercise building control and are staffed with building inspectors who know the credentials of the contractors in their areas.

There is no established theory of centralisation/decentralisation indicating which scale of government should oversee NRM or cities. However, only the State can establish or legitimise a workable regime, for under the Australian Constitution, the management of natural resources and land development were retained unambiguously by the States. None of the Commonwealth's domestic heads of power provides a mandate for the Commonwealth to become involved in routine NRM or city management. Any involvement is additive to or superimposed upon the States' responsibilities (except for powers surrendered recently over the Murray Darling Basin).

The High Court in the April 2009 Pape judgement ruled in effect that the Commonwealth does not have a general power to tax and spend directly in relation to just any aspect of the general welfare. This decision places in doubt the ability of the Commonwealth to make direct grants for local landcare, for example. By s.96, however, it has a general power to make payments *to the States*.

Any Commonwealth involvement in a State function invites cost shifting, adds exponentially to the transaction costs and reduces the States' accountability. State Treasuries are able to declare that the function is funded by the feds, so they prune the budgets of their local departments further. When the Commonwealth later tightens the fiscal screws or alters the

funding criteria, good projects are jettisoned and good people leave, but the States may not make good the shortfall, as their departments would then each have to beg their own Treasuries for brand new initiative funds.

For NRM, regional non-government NRM bodies (catchment management authorities/councils in the other States) constitute the most prominent network of organisations which are actively crossing disciplinary boundaries in land, water, vegetation, minerals and heritage; coordinating NRM planning; monitoring resource condition and trend; facilitating on-ground works and operations; crossing geographical boundaries between property and national scales; and coordinating between governments, between science, policy and operations and between farming and conservation. The funding available is woefully inadequate and in some States the mandate is ambiguous. In an earlier era, this coordination was seen as a function of government.

Regional NRM bodies are well placed to build trust relationships between governments and the managers of natural resources – especially landholders – and so to broker knowledge. In managing a city on the other hand, local government has numerous roles in its own right and can take the initiative itself. What is lacking is a commitment by the three levels of government to support a model towards which existing efforts at coordination can incrementally migrate. Functions will gravitate towards the coordinating body if it is **secure** in constitution and funding. And the stop-start inefficiencies of funding action by project grants can be partly ameliorated if there is an enduring institutional infrastructure that has already assembled the other capacities and simply awaits budget provision.

For both NRM and cities, economies-of-scale indicate that the State is best to coordinate the capture of foundation data on resource assessment, regulatory coherence, science and research.

## **SOME REMEDIES**

This paper does not present an ideal structure or prescriptive model. The principles need to be interpreted to suit the institutional arrangements in each location. The formula applied must recognise that throughout the NRM and city sectors, there are capable and honourable people beavering away in the public interest and whose capacities need to be liberated.

### ***Remedies for inadequate theory***

First, we must imbue the present and future generations of leaders with some basic knowledge of natural science, sociology, public policy and systems dynamics. At present, the people who have most influence in shaping our cities tend to be recruited from engineering, law, economics and commerce, all rationalist disciplines. Many have received nil education in biology since grade 10.

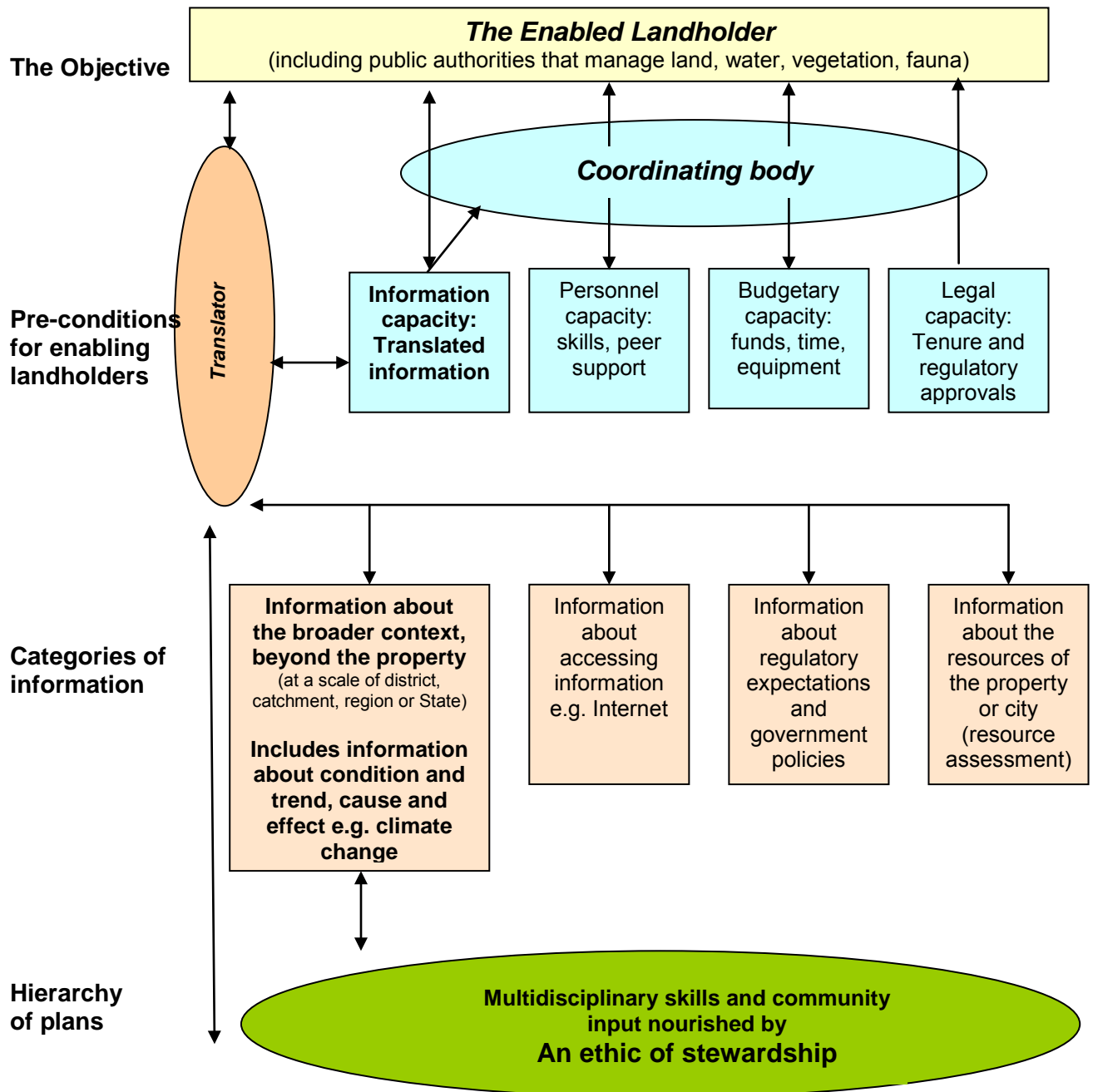
Second, we must establish a stewardship ethic. We must moderate the orthodoxy of economic growth, which requires an unending, exponential expansion of throughput of materials and energy. This shortcoming on a finite planet cannot be solved from within its conceptual framework.

### ***Remedies for fragmented accountability and knowledge***

First, for each function or study area the State or local government needs to be persuaded to sponsor a co-ordinating body or forum (perhaps an arm of itself) with powers to steer the potential capacities of stakeholders into a purposeful direction. There may be an existing entity that simply needs reinforcing. But don't just multiply stakeholder advisory panels without the tools to act.

Second, every effort should be made to involve decision-makers and opinion-leaders in visiting the coalface to see at first hand the degree of need and the circumstances about which they daily make strategic and influential decisions. So long as the central decision-making groups pursue disserviceable world views based on economic growth and have a sceptical approach to the seriousness of the ecological crisis, don't expect anything much to change.

## PRECONDITIONS OF SUCCESSFUL NRM



The aqua coloured boxes indicate the five capacities. The tan coloured boxes indicate processes.



# PRECONDITIONS OF SUCCESSFUL NRM

*Vision:* HEALTHY ENVIRONMENT, PROSPERITY, VIBRANT COMMUNITIES

Coordinating forum with acknowledged authority

**Strategy including:** a vision, a coherent theory, feasible paths

*Preconditions for an effective strategy:*

**Legal authority over tools**

- tenure allocation
- regulation
- development
- advice and extension

**Legal authority over land**

- custodial mgt

*Preconditions for applying the tools:*

Policy analysis	Resource assessment	Condition & trend reporting	Planning studies	Consultation
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*Preconditions for the activities:*

Funds	Skilled personnel	Knowledge
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*Precondition for reducing stress on natural systems and human societies*

An ethic of stewardship

## Comment

The aqua boxes to the five capacities; the tan coloured boxes refer to processes.

There is an element of circularity in these two optional depictions of the model. A serviceable theory or ethic must underpin any action. This theory must shape the strategy. The strategy may appear at almost any level in the chart. Indeed, planning and strategy-formulation are continual activities. Skills are required at every level.

## Reference

\* [http://www.derm.qld.gov.au/services\\_resources/item\\_details.php?item\\_id=100201](http://www.derm.qld.gov.au/services_resources/item_details.php?item_id=100201)

## The subcultures behind the cultural ascension of cycling

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### ABSTRACT

*From the premise that cyclists seek what Bourdieu terms "Cultural Capital", the paper examines the connection between cyclists' motivations and messages conveyed through their choice of equipment. As a prosthesis, fashion statement and emblem of taste, bicycles are replacing cars as symbols of status, now that cars are seen as polluting and greedy. Cultural aspirations, pretensions, and tribal affiliations can be relayed by what one commutes on, be it a fixie, Dutch bike, road bike, training bike, mountain bike (further divided by degrees of suspension), utility bike, or a bike from the emerging minimalist art niche. Understanding these choices, is key to understanding how cycling subcultures might be fostered and grown.*

### Keywords:

Cycling, cultural capital, hyperreality, Sigmund Freud

From studies into the physical factors effecting bicycle commuting, we know cities with comparable terrain, density, bicycling infrastructure and deterrents to driving, nonetheless can have varying numbers of cyclists. Given cultural factors must be at play, what social advantage belongs to that tiny fraction of commuters, who by choice cycle, when they could easily drive?

The topic cannot be approached from the hegemonic standpoints of environmentalists, health policy makers, traffic engineers or others with agendas extrinsic to those of actual cyclists. That is because cyclists cannot be presumed to care for the planet, morbid illness, or the fact they are abating congestion for drivers. Neither can the topic be understood by studying cycling culture in atypical cities like Amsterdam, where retrofitting for driving proved difficult, and cycling thus flourished. Likewise, reasons why the poor cycle, have little bearing—so long as a boon to cycling is not being planned by casting more into poverty.

As an academic whose PhD and subsequent research has been in the field of architectural history and theory, I am struck by similarities between the messages cyclists convey with their bikes, and the messages architects attempt to convey for their clients when designing their buildings. High end bicycles and works of architecture, like fashion, prestige cars, art, and various other symbols of status, embody what the sociologist Pierre Bourdieu calls cultural capital<sup>1</sup>. Key to Bourdieu's thinking, is the way cultural capital can be exchanged for economic capital, and visa versa. A familiar example in my field, is the sophisticated well spoken architect, perhaps with publications and awards to his or her credit, exchanging their cultural capital for fees from a client, who may have money but no sophistication, aside from what they can buy through being a patron.

Bianchi is a bicycle brand with a great deal of cache, which they are able to translate into high prices and a high volume of sales. Thanks to clever ventures like teaming with a fashion label to make the Emporio Armani Sportbike, and sponsoring the champion climber Marco Pantani, for whom a light weight bike was essential to win,

Bianchi can produce bikes that to buyers connote qualities that are quite remote from most of their range. Bianchi's Milano Cafe Racer, for example, is a Taiwanese made town bike, with low end Japanese made components. Yet Bianchi decals and the company's trademark turquoise (or "bianchi green", as it is called) mean these bikes retail for \$800 in Australia, where a comparable Mongoose or Giant would sell for \$500. \$300 buys the sense that this bike rolled from the factory that helped Pantani to victory, when in fact the closest a Milano Cafe Racer purchased from a bicycle store in Australia, has ever been to Italy, is actually Taiwan, where it was made.

Are we to be critical of this though, if the end result is more people cycling? If allusions to an Italian fashion label, and the glamour of The Tour de France conferred on a Taiwanese piece of aluminium tubing, motivates a few people to take trips with their bikes, that they otherwise might have taken by car, then surely we shouldn't object, even if, for some of us, leftist suspicions are piqued. The danger though, is that ideologues among us would use our political power, and access to funding for research, to promote a narrow vision of cycling, and in the process make cycling even less attractive to those who will continue to drive, while ever driving continues to serve their pride more.

This leads to a key point I would like to make with this essay, and that is that cycling stands to be hindered by researchers coming at the subject with ideological or political agendas extrinsic to cyclists' own motivations. Sure, some people cycle out of a concern for the planet. Some people cycle to fend off morbid illness. (Nobody cycles to relieve congestion for drivers). However, cyclists who stay at it long term in Australia, tend to be the ones who find the cycling itself, in some way, rewarding. The cultural capital embodied in their expensive equipment, for many cyclists, is integral to that enjoyment.

A guiding principle for historians, comes from poststructuralism, and tells us to be leery of the influence of hegemonies when doing research. While environmentalists, health policy makers and planners might find it frustrating that their advice is not always heeded, these groups are nonetheless better organized to secure funding, convene conferences, and influence policy makers, than are cycling commuters. In car dependent cities as we find in Australia, less than 2% of all trips are taken by bicycle<sup>ii</sup>. The even smaller percentage who choose to cycle, when they could afford to be driving, are further divided into tribes with horizontal rivalries.

Cyclists are the epitome of a voiceless minority. Their concerns can easily be buried beneath those of groups whose interest in cycling, is purely to do with what cyclists can be doing for them: relieving congestion, reducing morbidity, saving the planet, etcetera. Researchers with these kinds of agendas are prone to forget that cyclists themselves may feel no personal debt to global warming or public health, and certainly not to the problem of congestion as it effects drivers of cars.

So what *does* motivate cyclists? Taking clipboards to the street and asking people on bikes would be methodologically fraught. Cyclists are all too aware of the polarizing debates the media asks them to take sides on. Should they ride slow or fast? Sit up or lean forward? Where lycra or jeans? Always wear helmets? Be licensed? Pay road tax? Often debates of this kind have such gravity that new lines of inquiry get drawn in and subsumed. Just knowing they are speaking to an interviewer, and that these debates are still being contested, could easily skew cyclists' responses.

My approach with this paper has been to examine the market niches represented in specialist bike stores, and accompanying advertising material, and use that as my

primary data. An unaffected and clear picture of numerous motivations to cycle, quickly emerges.

The picture can't be seen though, until a few prejudices and debates are pushed to the side. First, the idea that certain styles of cycling do not classify as commuting, needs to be jettisoned from our thinking entirely. A rider kitted up as though for a downhill mountain bike world record attempt, if he or she is riding to work, or to pick up some groceries, is making a trip they might otherwise have made using a car. On the main bicycling corridor into my city (Honeysuckle Drive, Newcastle), every style of bike is represented in the rush hour procession—save perhaps trick bikes and trials bikes. As well as upright city bikes with components ideal for city commuting, I see people on mountain bikes, road bikes, fixies, beach cruisers, and so on, essentially doing the same thing: pedaling a pushbike to work.

On many fronts the motivations for cycling would be the same for all of these people. All of them are saving considerable money, especially if their decision to cycle means their household can own one less car than it otherwise might. Any of them with an interest in fitness, is saving time in their day, by marrying their exercise time with time they would have needed to spend getting to work. Most are enjoying the invigoration that comes with being outdoors. What the multitude of bike styles is telling us though, is that many too are indulging a mental image they have of themselves.

Some probity can be gained here by referring to the concept of hyperreality, as the sociologist Jean Baudrillard has explained it<sup>ii</sup>. As Baudrillard sees it, the physical world from which our ancestors reaped crops, or walked in the rain, has been so thoroughly overlain with media images and associated fantasies, that the sensorial world of our ancestors is barely perceived. Ontologically, it is the hyperreal world that we inhabit. To be sure, cyclists' bodies are quite often accosted by nature, their physical legs feel real aches, and they skirt very real dangers that really could kill them. Yet an argument can be made for a hyperreal dimension to what cyclists are doing.

We can start with the example above, of The Bianchi Milano Cafe Racer, and how it can sell for \$300 more than a comparable bike with a different brand name displayed on the down tube. The \$300 is the value of associations with The Tour of France, the romance of Italy, and, for those who know of the link, the fashion designer Giorgio Armani. Someone riding along a suburban street in Australia, can imagine they are riding in some place exotic, in Europe, on such a bike. For \$15000, the price of a Bianchi 928 with top of the range components and wheels, they might imagine they are racing on the pro circuit.

In some respects, the mechanics of branding and evocation I'm describing are as straight forward as Michael Jordan being paid to wear Nike. And like Nike, the three main manufacturers of race worthy components, SRAM, Shimano and Campagnolo, pay pro teams to use group sets designed to a price point. Components that sell for thousands less, perform just as well. The ranges only exist because one sector of the recreational market is prepared to pay triple for components they saw on TV, another double for penultimate gear, and the remainder a sensible price for components fit for the task. The beauty of the top of the range gear, for the rider who is immersed in a hyperreal world, is its ability to transform their daily commute into a stage winning breakaway. The hill between their home and work, can be a peak somewhere in the French Alps.

Granting them their fantasy, even fostering it, is consistent with our overall aim of encouraging cycling. Below I will offer suggestions as to how cyclists' fantasies could

be fostered in a sports loving country such as Australia. First though, I need to expand my discussion of cyclists' various motivations, beyond those Baudrillard might have observed, and the obvious ones I have mentioned, like the desire to keep fit, or to save money.

Sigmund Freud identified at least three profound motivating forces for humans, that I will argue roughly correspond to three modes of cycling. He related each to a figure from Greek mythology: *Eros* emblemises the drive to have sex; *Thanatos* stands for our death wish; and *Narcissus* represents our love of ourselves.

A study of advertising images used to sell European town bikes, suggests a strong connection between this style of bike, and *Eros*. Observers of body language know that when a person walks past someone on the street who they find attractive, they will stand taller with their shoulders back and chest out. Upright bikes encourage this pose. Images used to advertise town bikes focus as much on attractive riders and their clothes (or lack thereof)<sup>iv</sup> as on the bikes being sold. Traditional geometries and detailing betrays sensibilities more commonly associated with haute couture. One can even indulge a leather fetish with certain town bikes. Velorbis, for example, makes bikes with leather seats, grips, mud flaps, optional leather coat guards and a hook to secure ones leather brief case! Bells with novel tones, for eliciting smiles and for flirting, are standard inclusions. The fact that upright bikes do not go as fast isn't an issue, as the purpose of riding them is to go slow enough to be seen.

Advertising used to sell mountain bikes appeals to what Freud called our death drive, related to *Thanatos*. Photographs of riders freewheeling down very steep tracks, or flying through the air after jumps, are commonly used to extol the advantages of the latest drive train technology. Yet the riders in these kinds of photos are being captured at moments when drive trains are most often inactive. A rider would not be pedaling, or changing gears, while in the air or free falling down some embankment. The advertisers' aim though, is not so much to explain the equipment, but to show how close that equipment can bring riders to the precipice between life and death.

I would not be the first to say that cyclists who shave their legs and wear lycra, are narcissistic, though I would like to take the charge a step further. Magazines and advertising targeting road racers show just how obsessed recreational road riders can be with looking back at they bodies. They keep training diaries, review data collected with heart rate monitors, consult sports physicians and massage therapists, and can talk about their red blood cells using medical jargon. On the one hand their aim is to make that state of being "in form" coincide with particular races they are aiming to win. On the other, the obsession with bio feedback from whatever source possible, is an end in itself, an end that like leg shaving, or putting on lycra nicks with no underpants, has much to do with self love.

A case could be made to support public expenditure aimed toward gratifying all the above pleasures of cycling. Any strategy that encourages people who would otherwise drive, to ride bikes instead, serves the community as a whole. That is not just because cycling reduces energy needs and greenhouse gasses, and frees up hospital beds and space on our roads, but because cycling brings joy to people who take it up as a means of commuting.

To date, initiatives designed to get more people cycling, have mostly been aimed at reducing physical impediments, danger for instance. Some of these initiatives have been very successful.

For example, in Amsterdam, “no fault” laws for cyclists mean drivers are automatically liable should they collide with a bike. A similar law in Manhattan, in that case protecting pedestrians, has had a similar effect: drivers slow down in built up areas. This is only fitting, in the sense that built up areas were developed before cars were invented. Our ancestors could never have imagined the streets they were planning, being overrun by machines capable of outrunning a horse.

Secure bicycle parking stations, with shower facilities, lockers and bicycle shops, are becoming a common response to physical impediments facing cyclists at the end of their trips. These make particular sense in low density cities, where longer commutes call for bicycles that are too expensive to simply chain to a pole, and also leave riders in need of a shower when they arrive. It behooves cyclists too, that such facilities are winning architectural awards. The Royal Brisbane Women's Hospital Cycle Centre, designed by architects Bligh Voller Nield, is an excellent example. Another, that looks more like a contemporary museum than a bike shed, beside Union Station in Washington D.C., is even more ennobling for cyclists. The inspiration for its structure comes from a wheel rim and spokes. Much has changed since the architectural historian Nikolaus Pevsner could say bicycle sheds were mere buildings, not works of architecture.<sup>v</sup>

Architect designed bicycle stations, infused with cultural capital, elevate cycling in a way that makes it appealing to middle class commuters. Granted, people who cycle because they are poor, are unlikely to pay a few hundred dollars for a yearly subscription to use such a station. However, no one is planning to promote cycling by swelling the ranks of the poor! The point of architect designed bicycle parking stations, with showers, club memberships, fresh towels and so forth, is to make cycling more appealing to middle class commuters, who might otherwise drive.

Cycle paths, shared paths, and safer on-road conditions, plus secure parking and showers, address cyclists' physical needs. Suggestions I will conclude with, address the cultural and psychological motivations for cycling that I have been discussing thus far. My recommendations are in the grain of motivators evidenced by advertising material produced by the bicycle industry, where it is freely acknowledged that cycling can be prestigious, hyperreal, sexy, thrilling and narcissistic—excesses, I should add, that car buyers may freely indulge, without raising an eyebrow<sup>vi</sup>.

One of the joys of riding European style city bikes, is that these bikes give riders an opportunity to sit up, and display themselves, sexually. It follows that owners of bikes of this kind would be happiest riding beside alfresco dining areas, along waterfront promenades, through pedestrian malls, or any place where people might see them. From one stage-set to the next, they would no doubt appreciate a fast cycle lane, but when they reach the next populated zone, they would want to slow down. Neither would they be bothered if bollards were placed in their way, forcing them to ride closer to walking pace when among pedestrians, who might be likely to admire them while passing.

For the mountain bike enthusiast, the opportunity to take in some trails between home and work, could be relished. While expediency would see many use sealed routes where available, jumps, berms, drops, water challenges, and other thrills could be offered to commuters on mountain bikes as side routes, to be taken purely for fun. A network of mountain bike specific cycleways, through gullies, providing shortcuts and/or excitement, could increase the uptake of cycle commuting by mountain bike. The risk to life posed, is no greater than the risk mountain bike riders would seek on their weekends regardless.

Increasing the number of people who race road bikes on the weekend, and who would thus want to commute rather than drive, to keep themselves race-fit, could be as simple as providing public support for the sport. At present, virtually no assistance is given to bicycle road racing clubs, beyond granting them permission to use semi-redundant public roads for their races. One kilometer bitumen loops are all such clubs need to run criterion races. Existing public sports ovals could have such loops, wrapped around the outside. More substantial loops could be built on crown land and large public parks. Government funds could help chambers of commerce host early morning criterion races along main shopping streets. Universities could be rewarded, via funding, for hosting weekend bike races on roads on their campuses. Every new rider attracted to the sport by these measures, is a person who will now seriously consider commuting by bike.

Bicycle polo is proving popular, especially among riders of fixies, but finding suitable hard courts to play on can be impossible. BMX circuits have appealed, to young riders especially, for thirty years now, though very few exist, and fewer still exist that aren't fenced. Secure bike parking at pools would give recreational triathletes opportunities to swim, cycle and run all in the same training session. In all these cases, it is fair to assume that public funds spent to support sporting uses for bikes, would translate into more people commuting by bike. More people would have bikes to commute on, more would want to stay race fit, and more would have the fitness required to commute via bike.

That few of these recommendations will ever be rolled out *en masse*, should not be discouraging, given the vastness of the bicycling playgrounds being built, right now, in post industrial cities all over the world. I am talking about the harbour fronts, high lines, carriage yards, skip lines and other spaces which cities no longer need in their post industrial phase, that are being turned into parks. These are parks that are sometimes too vast, and almost always too long, to be enjoyed terribly well by pedestrians; the doctrine that public space should not be over-developed commercially, guarantees pedestrians lonely times in these parks that voters demand. The undoubted winners are cyclists, the de facto heirs to spaces not intimate enough for pedestrians, not open to cars, but just right for a leisurely ride. A further step in exploring this topic, would be a study of spaces like these, as they are understood and experienced by cyclists, along the lines of Iain Borden's study of urban space as used by riders of skateboards<sup>vii</sup>.

## Notes

<sup>i</sup> Pierre Bourdieu, *Distinction: A Social Critique of the Judgement of Taste*, Cambridge, Massachusetts: Harvard University Press, 1984.

<sup>ii</sup> In a study that speaks to a typical Australian commuting scenario, Jennifer Bonham and Barbara Koth found that 1.4% of trips into the Mawson Lakes Campus of the University of South Australia were taken by bike. Jennifer Bonham and Barbara Koth, "Universities and Cycling", in *Transportation Research Part D: Transport and Environment* 15(2), 2010. pp.94-102.

<sup>iii</sup> Jean Baudrillard, "Simulacra and Simulations," in *Jean Baudrillard: Selected Writings*, Mark Poster, ed. Stanford: Stanford University Press, 1988, pp. 166-184.

<sup>iv</sup> The catalogue produced by the Danish bicycle manufacturer, Velorbis, gives most of each photo frame to attractive models, with bicycles being semi cropped from images. The Kronan bike is a Swedish design icon, first issued to WW2 soldiers. Understanding the sex appeal of their bike, Kronan have since launched their own brand of practical plain white underwear. Catalogue images feature young Nordic blond models sitting on Kronan bicycles.

<sup>v</sup> Nikolaus Pevsner, *An Outline of European Architecture*, Harmondsworth: Penguin Books, 1943.

<sup>vi</sup> As is the case with persecuted minorities generally, higher moral standards are expected of cyclists than drivers. Cyclists who flout road rules are often accused of "not helping their cause", a specific charge that is not leveled at miscreant drivers. Criminals on bicycles tarnish cycling, in a way criminals using cars, to ram raid banks for example, do not tarnish driving. Falicitous assumptions about them are another tell tale sign that cyclists are a persecuted minority. Because some cyclists are environmentalists, does not mean all are, or that cyclists cannot tie plastic shopping bags to their panniers and not be betraying some cause. It would be a fallacy likewise to presume cyclists don't smoke. One need only look to Denmark, where large numbers do both.

<sup>vii</sup> Iain Borden, *Skateboarding, Space and the City: Architecture and the Body*, Oxford: Berg Publishers, 2001



# Rubber Coated Playgrounds? Strategies for a fall zone free playspace

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## ABSTRACT

*Does everything in a playspace really need to be rubber coated?*

*A common misconception is that playgrounds must have safety surfacing to provide experiential, learning opportunities for children such as climbing and jumping activities. We all know those playspaces, surrounded by an expanse of rubber - far removed from the natural environment.*

*Current research has demonstrated that children need to be engaged with the natural environment for healthy development and wellbeing. Natural playspaces are the perfect forum to offer experiences with nature, particularly for those children who reside in built up areas in urban centres.*

*This paper will explore a variety of practical ideas for creative, purposeful play items that do not require safety surfacing, yet comply with all Australian Standards for playground safety. All of these creative options are appropriate to include within a natural playspace design.*

**Keywords:** Natural playspaces; children; playground surfacing; fall zones; challenge

## Introduction

Playspace design and construction is a journey that is most rewarding for children, parents and the whole community. All projects endeavour to provide wonderful playspaces for children to learn and challenge themselves in a natural environment.

Many playspace designers believe that tested playground surfacing must be in every playspace that includes experiential, learning opportunities such as running, climbing and jumping. It is true that the current Australian and New Zealand Standard 4422:1996 requires tested surfacing beneath equipment that measures over 500mm above ground level or playing surface level. However, does this mean that everything within sight of the playspace needs to be coated in rubber?

## Rubber Coated Playgrounds

Everyone knows a playground that consists of primary coloured plastic equipment set in the centre of an immense expanse of rubber surfacing, where trees and garden beds have been neglected as part of the playspace development. Rubber surfacing can be a very useful product within playspaces particularly for bike tracks, pathways, playground surfacing and erosion control on embankments. However, it is important to use rubber in moderation!

Rubber coated playspaces can become uncomfortably hot in summer. *Kidsafe NSW* has received consistent complaints each summer regarding children who have burned their feet on rubber surfacing. The rubber compound, particularly the darker colours and if exposed to the sun, absorbs and retains solar heat. The retention of the heat also contributes to the overall ambient heat of the playspace, making it uncomfortable for children, families and carers to spend any time in the playspace.

Rubber coated playspaces offer a reduced opportunity to recreate the natural environment within a playspace. Rubber coated playspaces, if not balanced with garden beds, can seem like another planet, devoid of trees, grass, flowers, birds, lizards and bugs. Mulch may be an excellent recommendation for playground surfacing in a natural playspace, however, it requires regular maintenance in order to meet the safety standards for playground surfacing.

Rubber coated playspaces are very expensive, and considering the increase in available information that encourages children to interact with the natural environment, one wonders whether that purchase is money well spent.

### **Nurturing our Children's Connection with Nature**

In recent years there has been a large amount of research released that sets out to demonstrate the benefits of human interaction with the natural environment, especially for children. It has been stated that children who have access to the natural environment display less challenging behaviours and are generally more calm, emotionally stable and resourceful. Most would be familiar with Richard Louv's work titled *The Last Child in the Woods* and the tongue in cheek diagnosis of Nature Deficit Disorder. This 'disorder' (not yet in the Diagnostic and Statistical Manual) highlights the condition of children who engage minimally with the natural environment as unfit, unaware, unmotivated and ill equipped for survival.

Furthermore, Earth is in crisis due to the lack of political attention and commitment to care and nurture for Earth. In order for our planet to 'make it' the next generations must be raised with an understanding of the responsibility and obligation to rehabilitate Earth. Our children must become ambassadors for the health of Earth, and cannot undertake these duties until they have developed a deep respect and comprehension of this complex planet and all its intricate life systems.

The trend towards natural playspaces has certainly commenced as a direct response to Louv's and others' published works. Some playspace designers consider the planting schemes and arrangements just as important as the playground equipment for installation. The advocacy for natural play environments has started to strengthen in Australia. Some Australian capital cities and regional centres have recognised increasing amounts of children residing in high density areas with minimal access to natural environmental and little opportunity to explore.

The use of natural materials and planting in a playspace not only invites the local families but also the local fauna seeking habitats, providing an exclusive opportunity to learn and appreciate the local plant and fauna communities as part of overall human habitats and networks. Natural playspace environments provide excellent challenge and appeal for children who are seeking to test their abilities. The natural

environment stimulates the imagination and offers limitless creative play moments. With just the right balance the natural playspace becomes much more than that: a community space for children, carers, plants and animals.

This leads to a common enquiry for *Kidsafe NSW*:

*How can natural playspaces comply with all of the Australian Standards?*

### **Recommendations for Natural Playspaces**

What follows is a list of inclusions that can be incorporated into natural playspaces with minimal need for tested surfacing. Therefore, many of these suggestions are inexpensive, can be incorporated amongst trees and implemented as soon as possible in any sector (eg. children's services, school, public spaces, etc). All recommendations may comply with the current Australian Standard for playground safety, however ensure that you gain the correct advice from a playspace expert.

#### ***Bridges***

Clatter bridges and wobble bridges promote movement and jumping, which is critical for children's brain development of understanding the body's position in space. Some examples of bridges include Burmeeze bridges, clatter bridges and wobble bridges. Ensure that the bridges are installed to measure less than 500mm from ground level and the bridge may be installed to pass over a dry creek bed created with rocks and plantings. Additionally, ensure that the handrails on each side are positioned so that they do not present an added fall height.

Another activity that promotes jumping is the accordion/whistle tyres that are installed flat on the ground and create sound as you jump on the 'skin'. Children and adults may create beautiful music whilst they jump to the rhythm, or instead create a dance with your friend. These games are a good challenge to developing coordination skills to 'get it just right'.

#### ***Tunnels***

Tunnels promote over/under/through movement which in turn is a challenge to orientation skills. The crawl through activity is terrific for upper body strengthening and pressure on the large joints to develop awareness body movement and position. Tunnels may be created as crawl tunnels, arbours, or tee pees. Those who wish to install tunnels must be aware of the potential fall heights, if there is possible access by children to the top of the tunnel. In this case, fall zones and playground surfacing must be provided.

#### ***Low Scramble Nets***

Scramble nets installed at ground level or on an embankment can offer the same upper body and trunk strengthening opportunities as regular climbing equipment. Ensure that the scramble nets are installed at less than 500mm from ground level and provide a soft surface beneath the nets. Prefabricated scramble nets are available, or many manufacturer's can now custom design to your needs. Some playspace providers have designed embankments with connection points for the

scramble nets which allow playspace providers to alternate between cargo climbers, Jacobs ladders and other agility items such as abseiling ropes.

### ***Platforms***

Platforms are a very flexible item in playspaces and well worth their value in money. Platforms, with the right props, have the potential to become a cubby, performance stage, relaxation area or reading area. Platforms do not have to be square, therefore, experiment with organic shapes. Many platforms with four posts are helpful for draping colourful curtains or flags around the area. Other equipment items may be attached to platforms such as jouncing boards, which may then transform the platform and board to a pirate ship where prisoners must walk the plank! Ensure that the platforms measure less than 500mm from ground level to avoid the necessity for playground surfacing.

### ***Balance Beams***

Balance beams are a fantastic way to promote the development of balance, coordination and awareness of body movement and position. Many children are innately drawn to balancing activities and consider it a challenge to master. Most Balance beams are static however, some wobble for extra challenge and delight as they are attached at either end by chain links. Balance beams do not have to be straight, so introduce some twists and turns and weave through a grove of trees. Ensure that the balancing items measure less than 500mm from ground level and provide a soft surface beneath the activity.

### ***Embankments***

Embankments are terrific for challenge and mastery and provide for endless play. Climbing/scrambling at ground level on embankments promotes both lower and upper body fitness and strengthening. Simply rolling down a turfed embankment is important to develop the skills to cross the midline of your body. Many playground designers now install equipment items onto embankments to take advantage of providing ground level activities that are also challenging such as slides, rock climbing walls and amphitheatres. A point to consider is that embankment slides do require playground surfacing extending at least 2000mm from the end of the slide, otherwise not required elsewhere on the embankment.

### ***Labyrinths and Mazes***

The healing qualities of labyrinths are well documented. A labyrinth is a course that does not present choices and the labyrinth user simply follows the pathway to the destination. On the other hand, mazes present a series of pathways that require the maze user to make choices of the pathways to follow, which may mean arriving at a dead end. Mazes provide a different quality to labyrinths and should be selected with the intended communities in mind, including children's playspaces.

Labyrinths and mazes are easily implemented into a playspace to promote cognitive functioning, executive decision making and contemplation and relaxation. Labyrinths and mazes may be planted, paved, walled, your imagination is the only limitation.

### ***Boulders and Rocks***

The appeal of natural playspaces is really accentuated by the use of beautiful boulders and rocks for aesthetics but more importantly to challenge children and adults. Boulders and rocks may be used to imitate a dry creek bed, create a dry rock pond, or provide extra challenge to clamber up the embankment. Boulders and rocks do need to be sensibly arranged in order to reduce the potential for foot and leg entrapment, and boulders must be stabilised. Rocks can become transient objects within the playspace to build, create or carry to another corner of the playspace. The introduction of rocks and boulders into a playspace will most certainly invite the local fauna to create habitats, another opportunity for children to learn about life cycles with the right amount of adult interaction and supervision.

### **Summing up the Potential for Playspaces**

Rubber surfacing is a very useful surface in playspaces for pathways, playground surfacing and erosion control on embankments. However, it must be used in moderation and balanced with the natural environment to avoid creating an uncomfortable and limiting playspace.

In order to take advantage of natural playspace provisions, consider activities that measure below 500mm from ground level to avoid the use of playground surfacing. It must be noted that climbing and balancing activities will require a soft surface beneath the equipment.

Playspace designers and providers can achieve amazing natural playspaces that invites the local communities – humans, plants and fauna – to the space. Ensure you gain the correct advice regarding playspace design to be able to develop truly beautiful and satisfying playspaces for everybody. Playspace development is only limited by one's imagination and creativity, and the natural environment provides many moments for learning, exploration, discovery and marvel.

Good luck with the playspace adventure!

## **Wasted Spaces in Cities: Brisbane CBD vs West End**

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### **ABSTRACT**

*This paper investigates the current urban condition of inner Brisbane, Queensland, particularly the relationship between West End and the Central Business District (CBD). Its purpose is to compare and analyse the current figure-ground composition and discuss the suitability of this existing fabric and the density within the realm.*

**Keywords:** City, Urban Design, Brisbane, Space, Figure-Ground, Mapping.

### **PAPER**

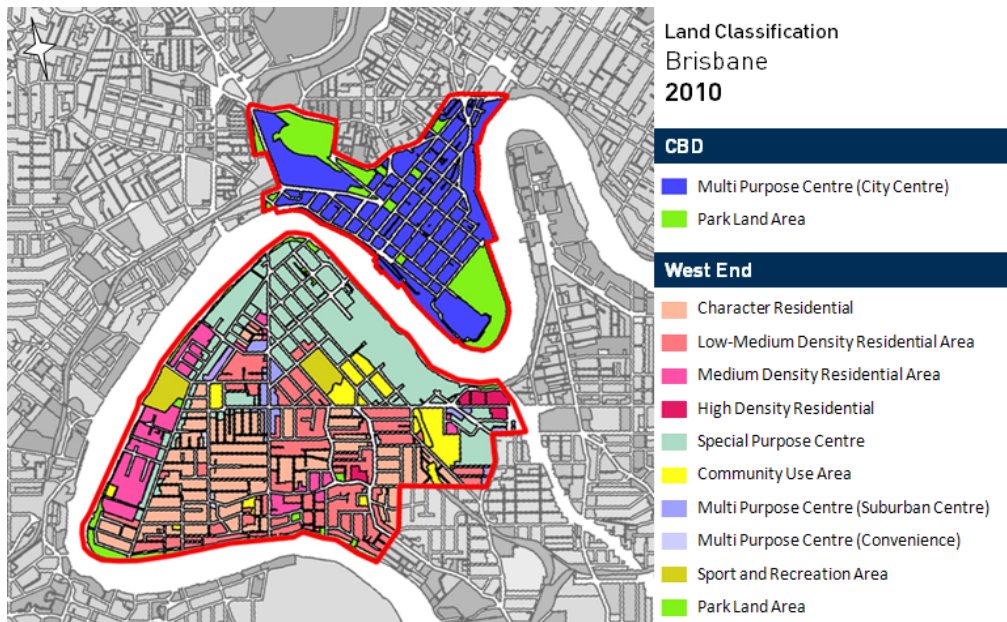
As cities expand to be more populated and the notion of urban design becomes more widely accepted, the existing city fabric is offering greater opportunities for increasing its density and encouraging healthier lifestyles of its inhabitants. As the value of land increases, wasted spaces within our cities are becoming the focus of many design interventions, both in terms of aesthetic quality and functionality. As an Urban Designer working for THG in Brisbane, understanding our local area has motivated this research to be undertaken.

West End in Brisbane, Queensland, has the potential to re-evaluate its current condition in such a way as mentioned above, with the proximity to the CBD providing the perfect opportunity to embrace population growth and the demand for higher density. It can be seen from historic recordings of inner Brisbane (see Figure 1 below) that the city was originally designed in a manner which features a Central Business District on each side of the Brisbane River, as crossing the river would have been more challenging in times before bridges and regular CityCat ferry services. The importance of the centralisation of the inner city around the river is apparent from this historic plan, which the city has supported and enhanced since its conception, creating the strong identity of Brisbane being the 'The River City'.



**Figure 1:** *Street Map of Brisbane from 1878.*

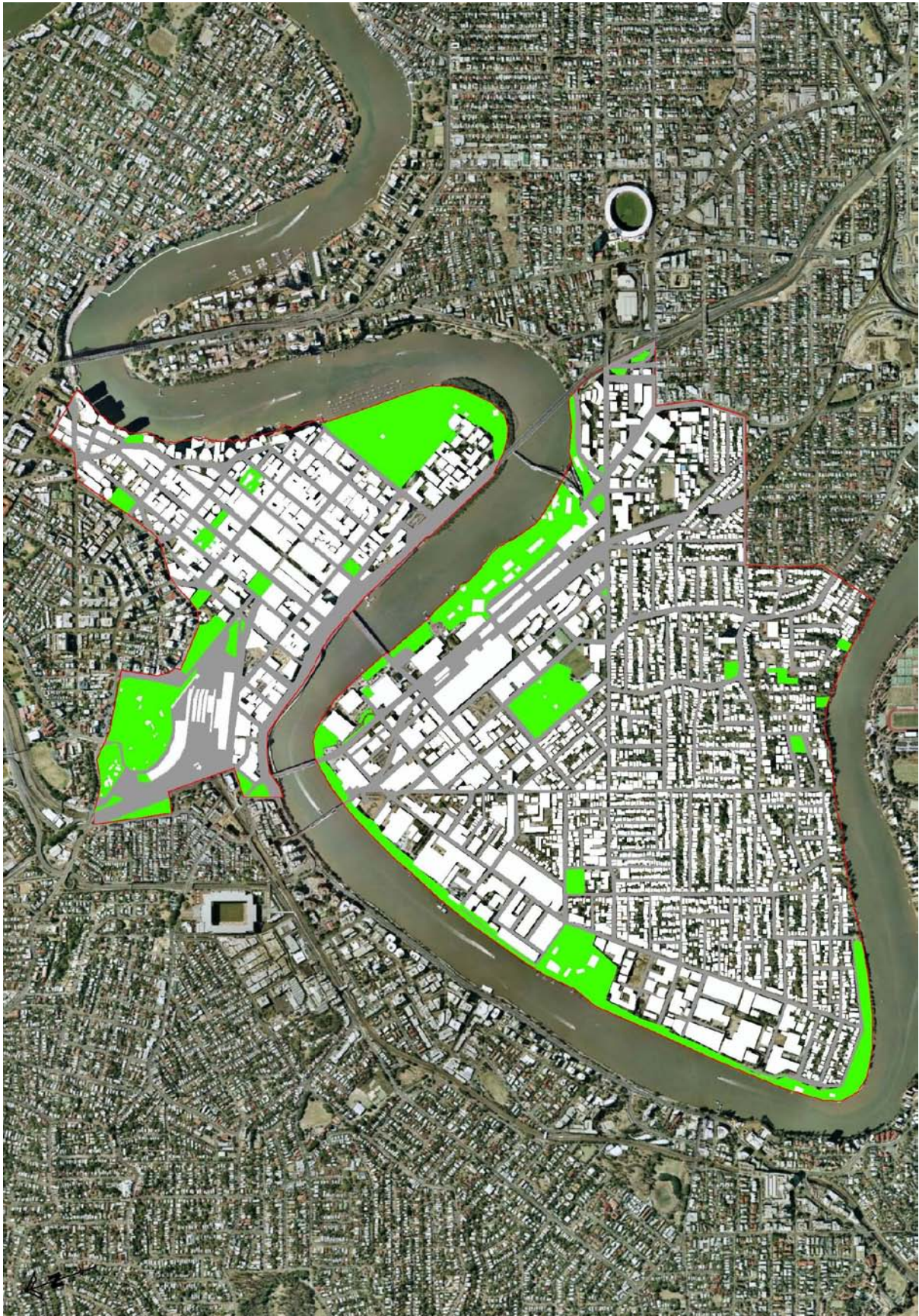
The land use classification of the CBD and West End contrasts this depiction above, with the categories not mirroring the opposite side of the river (see Figure 2). The CBD has just two land classifications, whereas West End contains a range of uses from character residential to high density to suburban and convenience centres.



**Figure 2:** *Current Land Use Classifications for Brisbane CBD and West End.*  
(Source: Ebimap, 2010)

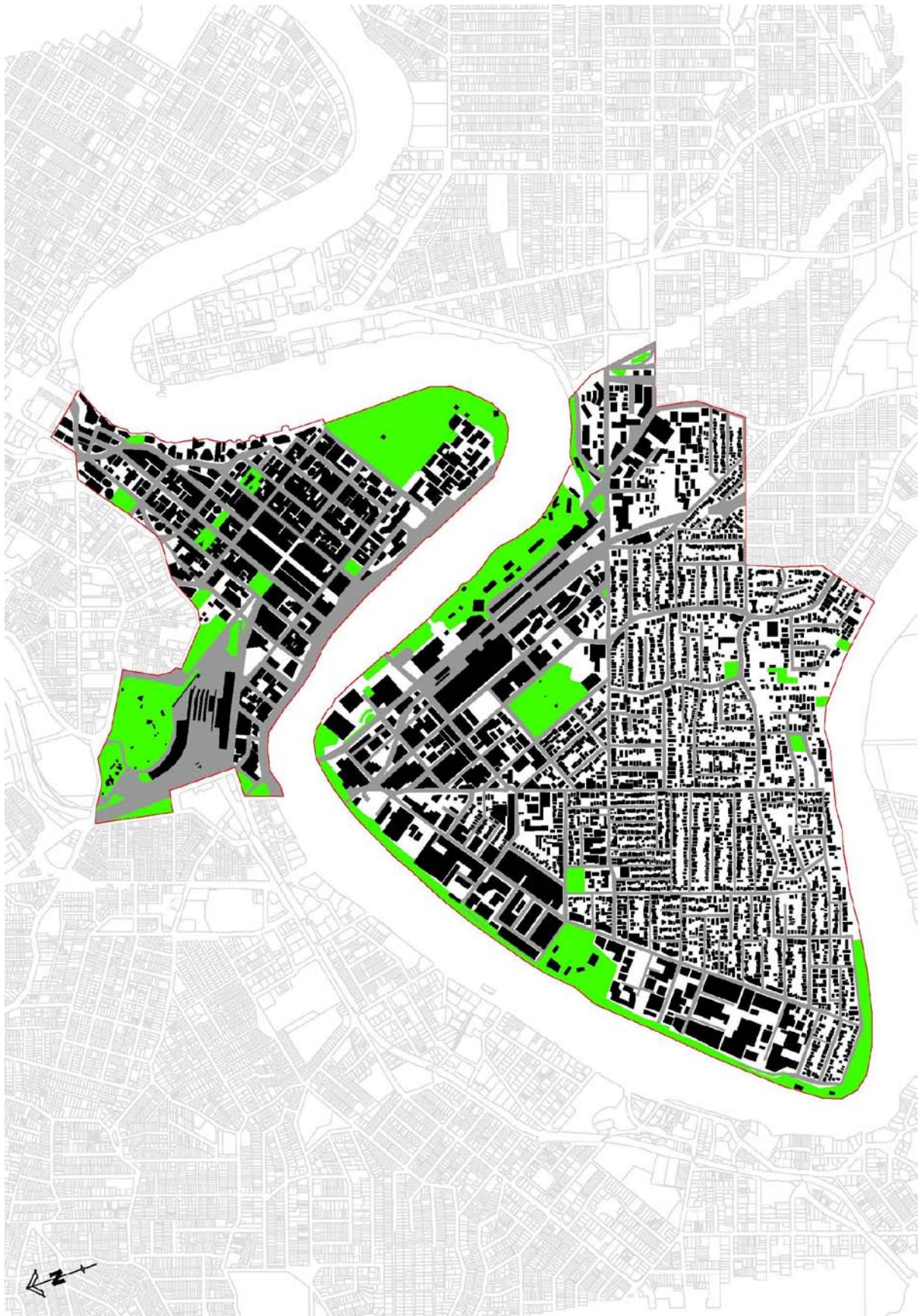
When mapping the figure-ground elements of both West End and the CBD, a striking contrast between built-form and voids as well as density is illustrated (see Figures 3-5).





**Figure 3:** *Figure-ground analysis for Brisbane CBD and West End with aerial.*  
(Source: Author, 2008)





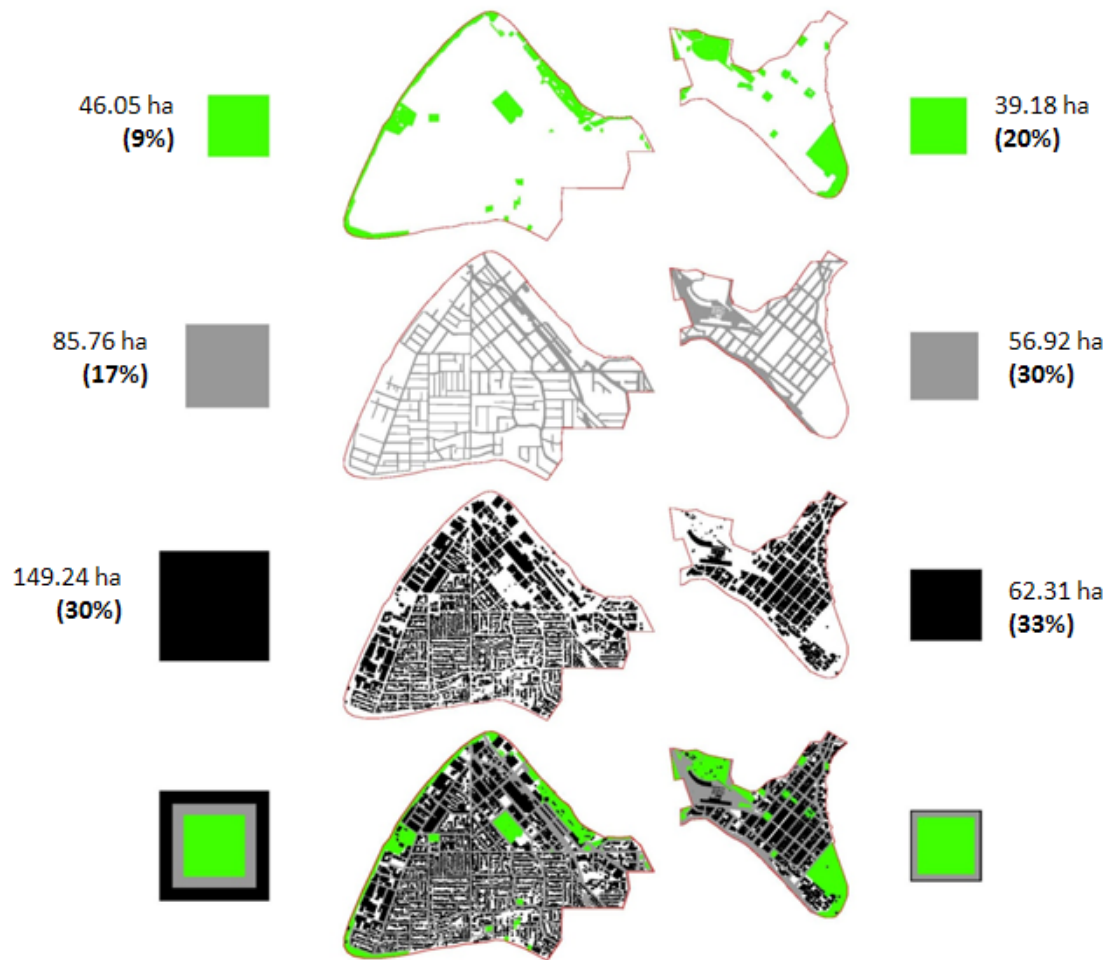
**Figure 4:** *Figure-ground analysis for Brisbane CBD and West End.*  
(Source: Author, 2008)





**Figure 5:** *Built-Form and void analysis for Brisbane CBD and West End.*  
(Source: Author, 2008)

Figure 6 illustrates the comparison of each element in this figure-ground analysis. It highlights the scale of each component in the two areas. The total area of each element (built-form, transportation or public space) has been compressed into a single squared shape which is to scale against the size of the subject area.

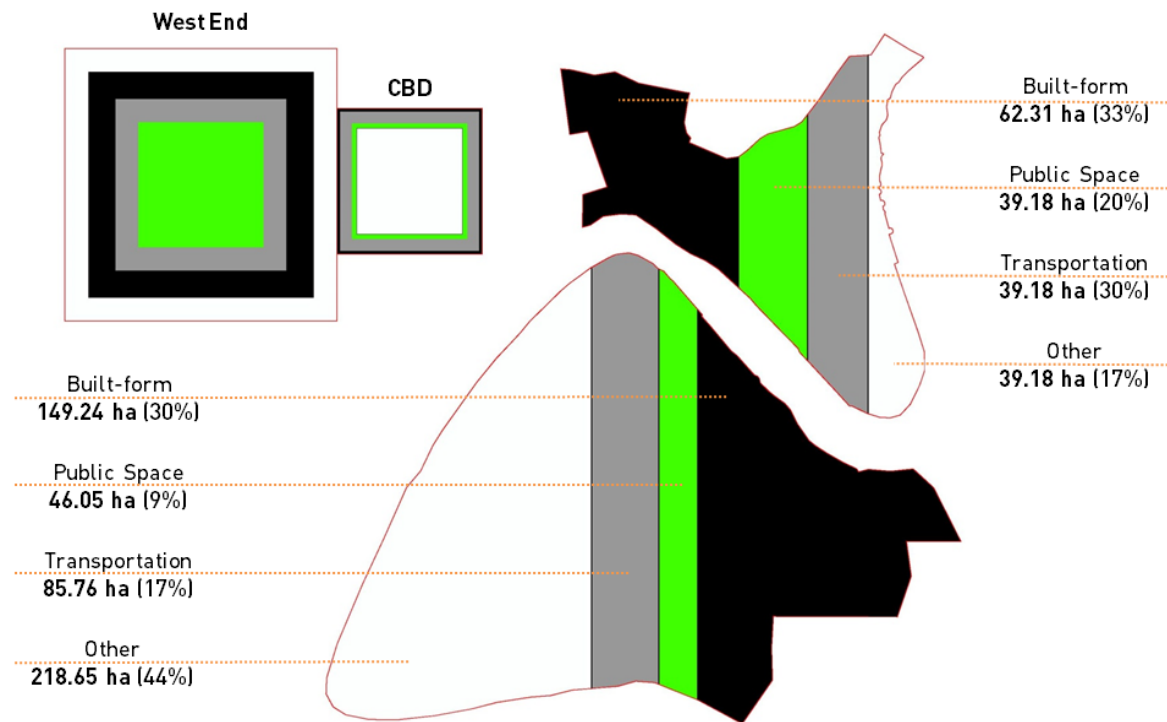


**Figure 6:** *Built-Form and void analysis and comparison for Brisbane CBD and West End.*  
(Source: Author, 2008)

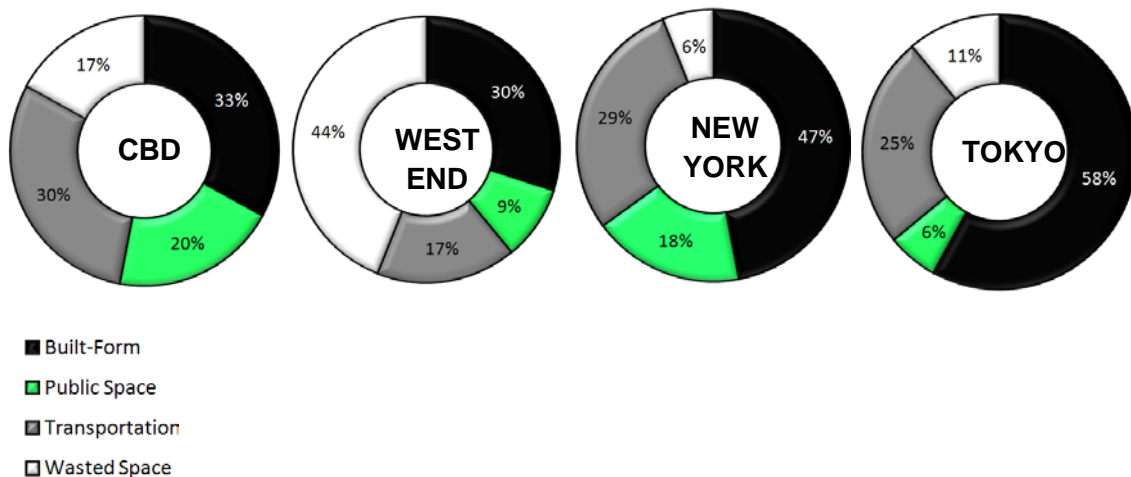
After performing this comparison, the wasted space within each subject area becomes visible. These areas are spaces such as car parking lots, undeveloped land and private backyards. Figure 7 demonstrates this analysis. With this data, the comparison can be made between the wasted space in both West End and the CBD. This highlights the substantial amount of underutilised land in West End, with the highest percentage of land being wasted space. In fact, the 'other' space (wasted space) is 14% higher than the amount of built-form in the area; a total of 44%. This is significant to note, as the CBD's wasted space is only 17%, and the least dominant surface land use.

Also interesting to recognise is the amount of public space in each area. 20% of the CBD contains public spaces including squares, parkland and other pedestrian-oriented areas.

Even though the subject area of West End is almost twice the size, only 9% of the area can be classified as being a public space.



**Figure 7:** Built-Form and void analysis and comparison for Brisbane CBD and West End. (Source: Author, 2008)



**Figure 8:** Figure-ground comparison between Brisbane CBD, West End, New York and Tokyo.

(Source: Author, 2008 & Mid-Tokyo Maps)

To increase the awareness of the condition of Brisbane’s CBD and neighbour suburb of West End, this figure-ground information can be compared to other cities of the world, such as New York and Tokyo, seen in Figure 8. Both New York and Tokyo can be seen to contain little wasted space, with roughly the same amount of road, with New York having 12% more public space than Tokyo.

To better understand the significance of wasted spaces within cities, THG's Economics, Strategy and Research business unit has analysed the current situation and the highlights the value of what could be.

THG has determined the average proportion of built form, road space, park/open space and other space from the data for West End, Brisbane CBD, New York and Tokyo. The averages are illustrated in Table 1 below.

**Table 1**

	Built Form	Road Space	Park/Open Space	Other Space
West End	30%	17%	9%	44%
Brisbane CBD	33%	30%	20%	17%
New York	47%	29%	18%	6%
Tokyo	58%	25%	6%	11%
Brisbane , Tokyo, New York ave	46%	28%	15%	11%

This is applied the averages to the West End data to determine what areas for each use could be achieved. Through the application of the average proportions we were able to determine that if West End moved towards a distribution of land uses more in line with the major metropolitan centres, decreasing the amount of wasted space, it will result in an additional 81 hectares of built form and an additional 29 hectares of Park and Open Space as per Table 2 below.

**Table 2**

	Built Form	Road Space	Park/Open Space	Other Space
West End %	30%	17%	9%	44%
West End area	150	86	46	219
West End ideal %	46%	28%	15%	11%
West End ideal area	230	140	75	55
Change in area	81	54	29	-164

Indicative town planning criteria was then applied to the 81 hectares to determine what the built form yield could be. To this figure we then applied a 50% contingency for all the unknowns. This analysis revealed a potential yield of an additional 4,232,655m<sup>2</sup> of floor space, as per Table 3 below.

**Table 3**

Additional Areas (ha)	806,220
Site Cover	60% - 80%
Indicative Heights	15 stories
Potential Yield (ha)	8,465,310
Contingency	50%
Potential Yield (ha)	4,232,655

Various economic variables were then applied to the data to determine the number of dwellings which could be yielded if half the built form was residential. To this figure we applied the West End average household size of 2.2 people per dwelling to determine the number of people these additional dwellings could accommodate, revealing enough accommodation for 31,039 people.

We also determined that if the other 50% of space was allocated to offices, at a space allocation of 20m<sup>2</sup> per employee there would be enough space for an additional 105,816 workers in West End.

We then applied an average per metre value of \$4,000 for the commercial space and \$5,000 to the residential space to determine an indicative capital value for the additional built form as per Table 4 below. We were then able to apply an employment multiplier to determine the number of construction jobs which could be created via the development of this additional built form.

**Table 4**

	Commercial 50%	Residential 50%
Total Areas (m <sup>2</sup> )	2,116,328	2,116,328
Average Size	20 m <sup>2</sup> per employee	150 m <sup>2</sup> dwellings
Number of Dwellings		14,109
People Accommodated	105,816	31,039
Price / m <sup>2</sup>	\$4,000	\$5,000
Total Value	\$8,465,310,000	\$10,581,637,500
FTE Construction Jobs	93,118	116,398

This analysis reveals the direct economic outcomes which can be achieved through the maximisation of West End's wasted space. The majority of these outcomes though have a direct positive social outcome as well, such as the increased supply of residential accommodation and an increased supply of parks and open space.

A healthy city is one which maximises its liveability. Partners for Livable Communities Australia, of which THG is a foundation member, identify the seven key elements of liveability as:

1. Economy
2. Quality of Life
3. Environmental Sustainability
4. Health and Wellness
5. Equity
6. Education and Learning
7. Leadership

A liveable community is one which maximises each of these elements for the betterment of the community.



Wasted space in an inner city location is defined as space which is neither parks nor dedicated public space, transportation space or built form. Wasted space:

- means that the resources within an area have not been allocated efficiently, adversely impacting the Economy of the area.
- means that the area allocated to parks and dedicated public open space has not been maximised adversely impacting Quality of Life, Environmental Sustainability and Health and Wellness.
- results in the supply of residential dwellings within a residential community not being optimised which adversely impacts Health and Wellness and Equity.

Efficiently and effectively reducing the wasted space within a community will directly increase the liveability of that community. West End has enormous potential to increase its density and liveability for the future, and this research has highlighted the current condition of the area and the future that could be. By successfully implementing design interventions and urban renewal of wasted spaces or precincts, the opportunities for inner Brisbane to grow and become healthier, safer and more vibrant provide a crucial path for the future of The River City.

## REFERENCES

Figure 1: Street Map of Brisbane 1878.

<http://www.chapelhill.homeip.net/FamilyHistory/Photos/Christ-Church-Anglican-memorial-reserve-Milton-Brisbane/index.php?image=Brisbane1878.jpg&d=d.html>

# How can a Council Encourage Walking? The Glen Eira Experience

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## **ABSTRACT**

*The main thrust to encourage walking in Glen Eira is to improve safety for pedestrians with programs such as:*

*a) Safety Audits for schools - up to 4 schools each year are audited to improve safety and access in terms of walking.*

*b) Safety Audits for shopping centres - a large strip shopping centre is audited each year to improve safety and access in and around the shopping centres*

*c) Automatic Activation of Pedestrian Phases - religious observance prevents orthodox Jewish pedestrians from pressing the push button to activate the walk phases at signals during Shabbat. To address this, traffic signals have been reprogrammed to provide automatic pedestrian activation (green walk time every cycle).*

*d) Star rating project for school crossing points - various crossing points are inspected and a star rating is provided to assist parents in determining walking routes to school.*

**Keywords:** Walking, Road Safety, Active Transport

## **Acknowledgements**

The author acknowledges Emma Donnelly, O'Brien Traffic / City of Glen Eira for co-authoring the section relating to Automatic Activation for Pedestrian Phases.

## **Introduction**

The City of Glen Eira is located 7 kilometres south-east of the Melbourne CBD. The municipality covers 38.7 square kilometres and includes 14 suburbs.

Currently Glen Eira does not have a formal walking strategy, however, Council's Community Plan seeks to minimise traffic congestion and promote cycling and walking as alternatives to motor vehicle use to further reduce carbon emissions in the community.

The Australian Bureau of Statistics indicates that 2.4% of Glen Eira's working population used walking solely to travel to work in 2006 (compared to 57.6% using a car). The number of residents walking to work (in 2006) represented an increase of 0.5% since the 2001 Census while the number driving decreased by 1.2%.

Whilst the number of residents walking has slightly increased, it is also noted that the trend for reported casualty crashes associated with pedestrians has decreased. VicRoads, the State Road Authority, records details of reported road casualty crashes. The VicRoads' Crashstats database indicates that in the last 10 years of available data (i.e. January 1999 - December 2008), the total number of reported pedestrian casualty crashes has reduced as indicated in Figure 1.



The main thrust to encourage walking in Glen Eira continues to be improving safety for pedestrians with programs such as:

- Safety Audits for Schools;
- Safety Audits for Shopping Centres;
- Automatic Activation of Pedestrian Phases; and
- Star Rating System for Pedestrian Walking Routes.

### **Safety Audits for Schools**

Glen Eira has a total of 46 schools (34 primary schools and 12 secondary schools). Data from the 2006 Victorian Child Health and Wellbeing Survey prepared by the Department of Human Services (2007) indicate that, for Victorian children aged 5 to under 13 years, 64.1% of trips to and from school are via car, 22.7% of trips are by walking, 9.3% of trips by public transport and 3.5% of trips by cycling. These figures correlate to the experience in Glen Eira.

Reasons for the high use of car travel include perceived security concerns for children, time constraints for parents to accompany their children, increased loads for children to carry (i.e. laptops, musical instruments) and road safety. The experience in Glen Eira is that concerns for road safety rates amongst the highest for parents.

A number of years ago, Council committed to a program of safety audits for primary and secondary schools in the municipality. At least two schools are audited each year (six schools have been audited in the last financial year).

A Road Safety Audit is a formalised process to:

- identify potential safety problems for road users and others; and
- ensure that measures to eliminate or reduce the problems are fully considered.

The following process is adopted:

1. Identify which schools are to be audited. Reported casualty crashes around schools in Glen Eira are either low or non-existent therefore perceived safety issues are used to prioritise schools. A database noting every safety concern relating to schools is maintained within the Traffic Engineering Department. Each year, the schools that have received the highest number of concerns are investigated.
2. An independent road safety auditor is engaged. Concerns that have been raised by residents and parents are provided to the auditor so that they can be considered during the audit.
3. The school is advised that an audit will be undertaken.
4. The auditor meets with the school principal, the school crossing supervisor and concerned parents to discuss safety issues.
5. The audit is undertaken (morning and afternoon peak periods).
6. The audit is provided to the Traffic Engineering Department to review and respond. Any capital works required are programmed.
7. The outcomes are reported to the school.

The issues and recommendations that are generally raised in the safety audits are summarised in Table 1.

The safety audits have provided positive outcomes by way of:

- The construction / installation of physical treatments. Although the treatments are generally low cost, it clearly communicates that safety for pedestrians around schools is vital and a high priority for Council; and
- Confirming that schools can play a large part in safety by partnering in road safety programs and communications.

## **Safety Audits for Shopping Centres**

Council's Road Safety Strategy 2007 – 2012 identified that Glen Eira's larger strip shopping centres are overrepresented in pedestrian crashes.

Again, Council committed to a program of safety audits for shopping centres in the municipality. One shopping centre is audited each year. A similar process outlined above is adopted.

The issues and recommendations that are generally raised in the safety audits are summarised in Table 2.

Again, the majority of recommendations can be implemented at a relatively low cost, however providing physical changes is communicating that safety for pedestrians around shopping centres is vital.

## **Automatic Activation of Pedestrian Phases**

### Background

Australian Bureau of Statistics data from the 2006 Census of Population and Housing indicates that 17.8% of residents living in the City of Glen Eira nominated Judaism as their religious affiliation (see Figure 2). This proportion is significantly greater than for the wider Melbourne area (Melbourne Statistical Division) where the 2006 Census data indicates that 1.1% of residents nominated Judaism as their religious affiliation.

Within the City of Glen Eira, St Kilda East is the suburb with the highest Jewish population, with 51.7% nominating Judaism as their religious affiliation in the 2006 Census. Judaism experienced the largest change in the religious affiliation of the population in the City of Glen Eira between the 2001 and 2006 Census of Population and Housing. This represented an increase of 1,915 persons reporting Judaism as their religious affiliation (see Figure 3).

### Orthodox Jewish Beliefs

Religious observance of the Sabbath (Shabbat) begins at sunset on Friday evening and ends Saturday night when three stars are visible in the sky. During this observance, Jewish law identifies thirty-nine categories of activity that are prohibited known as the thirty-nine Melakhot.

The use of electricity is prohibited during Shabbat as it either constitutes work by completing a circuit (i.e. building) or that the spark created within the switch is akin to lighting a fire. Both of these actions are prohibited under the 39 Melakhot.

Due to the restrictions of Melakhot observant Jews must live within walking distance of a synagogue, which leads to clustering of the community. As pedestrians, observant Jews refrain from pressing push buttons to activate the walk phases at signals during Shabbat and Holy days. This creates a situation where Jewish pedestrians may cross the road while a red man is displayed, which has obvious consequences for road safety, enforcement and pedestrian access.

### Issues for Orthodox Jewish Pedestrians

#### *Road Safety Issue*

Orthodox Judaism requires men and women to practice modesty of dress. Generally observant Jewish men wear long black coats with black hats and women are attired with modest dresses and covered hair (refer Photo 1).

The dark black attire of many Jewish pedestrians makes conspicuity an issue especially during the evening.

The VicRoads' Crashstats database was reviewed for the five year period between 1 January 2003 to 31 December 2007 with the following query:

- *Location* – within 2 km of synagogue within Glen Eira and the adjacent municipality of Port Phillip;
- *DCA Codes* – only pedestrian related codes (DCA 100-109), however, excluding pedestrian crashes involving pedestrians struck while boarding or alighting vehicle (DCA 108);
- *Time* – 4:30 to 10:30pm
- *Days* – Friday only

The database indicates that a total of 27 pedestrians were involved in casualty crashes within 2 kilometres of a synagogue between 4:30 and 10:30pm on Friday evenings for the last five years of available data (refer Figure 4). The details of the 27 recorded casualty crashes do not provide adequate information to determine whether all of the 27 reported casualty crashes involved pedestrians observing Shabbat. However, given the time of the crashes, proximity to synagogues, and the low conspicuity of Jewish pedestrians, there is a likelihood that a proportion of the casualty crashes involved Jewish pedestrians.

#### *Enforcement Issue*

Victoria Road Rule 231 states that *“If the pedestrian lights show a red pedestrian light and the pedestrian has not already started crossing the intersection or road, the pedestrian must not start to cross until the pedestrian lights change to green.”*

Intersection traffic signals or pedestrian operated signals in metropolitan Melbourne generally require pedestrians to press the push button to activate the walk phases to provide a green light. As the religious observance of Shabbat prevents orthodox Jewish pedestrians from pressing the push button, the pedestrian phase is only activated when a non-orthodox pedestrian is present. A number of orthodox Jewish pedestrians inevitably cross the road when a red pedestrian light is displayed which may result in an infringement being issued by the Police.

In October of 2008, a number of Jewish pedestrians were issued infringement tickets of \$57 by Victoria Police for crossing signalised intersections when a red pedestrian light was displayed. These incidents resulted in the Jewish Community calling for more wide spread implementation of the automatic pedestrian activation at signalised intersections.

#### *Access Issue*

It is clear that poor pedestrian access is afforded to an orthodox Jewish pedestrian if they choose not to cross at a signalised pedestrian crossing while a red pedestrian light is displayed (and is required to wait until a non-orthodox pedestrian arrives to push the button).

#### How have these issues been addressed?

To improve safety and access, automatic activation of the pedestrian phases during the Jewish Shabbat for 15 traffic signal sites within Glen Eira have been provided. This means that between the hours of 4:30pm and 9:30pm on Fridays and between 7am to 10pm on Saturdays, the pedestrian phases on every leg of an intersection are activated every cycle. This can be achieved by programming the intersection traffic signals with a ‘flag’ that controls the pedestrian group operation via a simple algorithm (refer Figure 5). The reprogramming costs in the order of \$ 2,500.

#### Traffic Impact of Automatic Activation of Pedestrian Phases

Automatic activation of pedestrian phases provides a cost efficient solution to improve safety and access for the orthodox Jewish community with minimal impacts on other road users for intersections with moderate traffic volumes and relatively short distances for pedestrians to cross.

## Star Rating System for Pedestrian Walking Routes

Council assisted in a pilot program for the *Star Rating System for Pedestrian Walking Routes* that was undertaken by Caulfield Community Health Service (CCHS) and Monash University Accident Research Centre (MUARC).

Active travel (walking, cycling) is promoted and encouraged in primary schools however CCHS found that one of the key barriers to achieving higher participation in active travel was parental concern regarding pedestrian safety in the vicinity of schools.

The Star Rating system uses parents, students, CCHS and MUARC staff and experts to fill out a data collection form at various crossing points in the vicinity of schools. The system uses subjective questions such as “how safe would you feel crossing the road at this location.” The system also uses objective observations such as the speed limit, traffic volumes, road width, the number of conflicting traffic directions and whether there is a formal crossing facility which are influential in determining the risk to pedestrians.

The objective data is analysed by way of a mathematical procedure and results in a star rating (i.e. 1 – 5 stars) for the crossing points with 5 stars being the highest rating. The star rating tool allows parents / school communities to make informed choices regarding routes for walking / cycling to and from schools and also advocate for improvements.

The following schools participated in the pilot program:

- Coatesville Primary School, Bentleigh East
- St Peters Primary School, Bentleigh East
- Tucker Road Primary School, Bentleigh
- St Aloysius Primary School, Caulfield North

A report prepared by Corben *et al* (2010) that evaluated the system noted that “the majority of participants found the star rating tool to be user-friendly and either easy or somewhat easy to use. The majority of parents also reported that the availability of safety information calculated by the star-rating tool would have an influential nature on their decision regarding their child walking to and from school although there were other important key issues highlighted in terms of their decision making process.”

## Conclusion

Glen Eira has used pedestrian programs with a strong emphasis on safety to encourage walking within the municipality.

The programs outlined in this paper generally do not require a significant funding commitment however the outcomes clearly communicate that pedestrian safety is vital and walking is a legitimate form of transport in Glen Eira.

## Figures

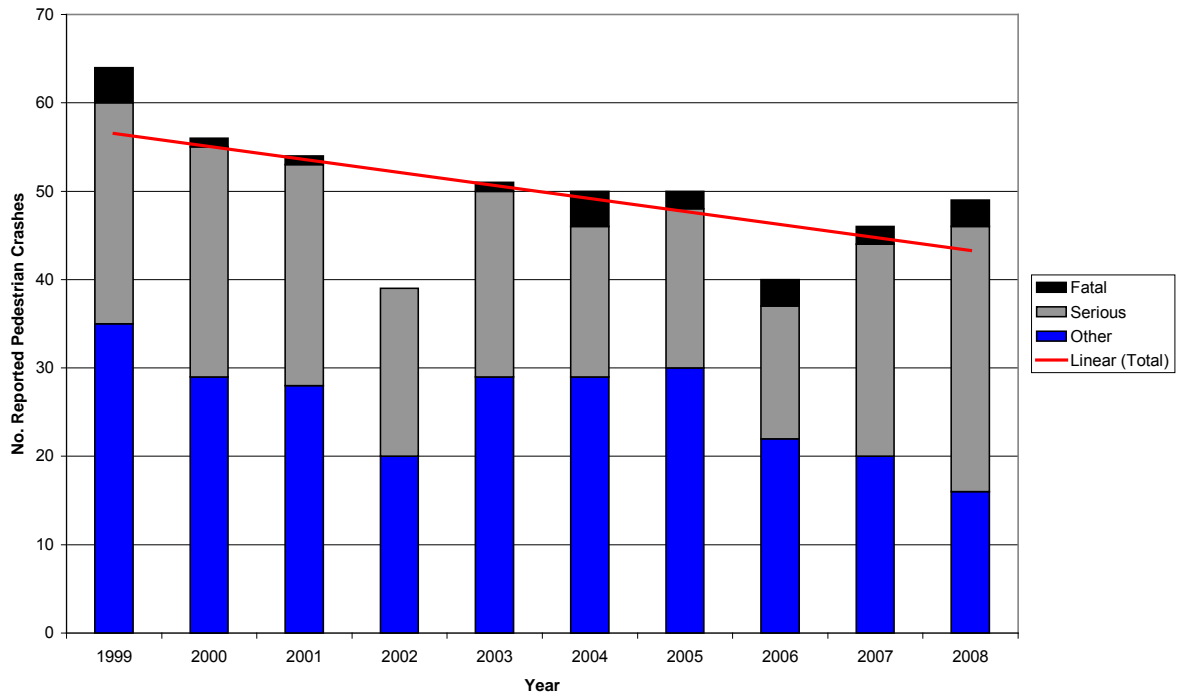
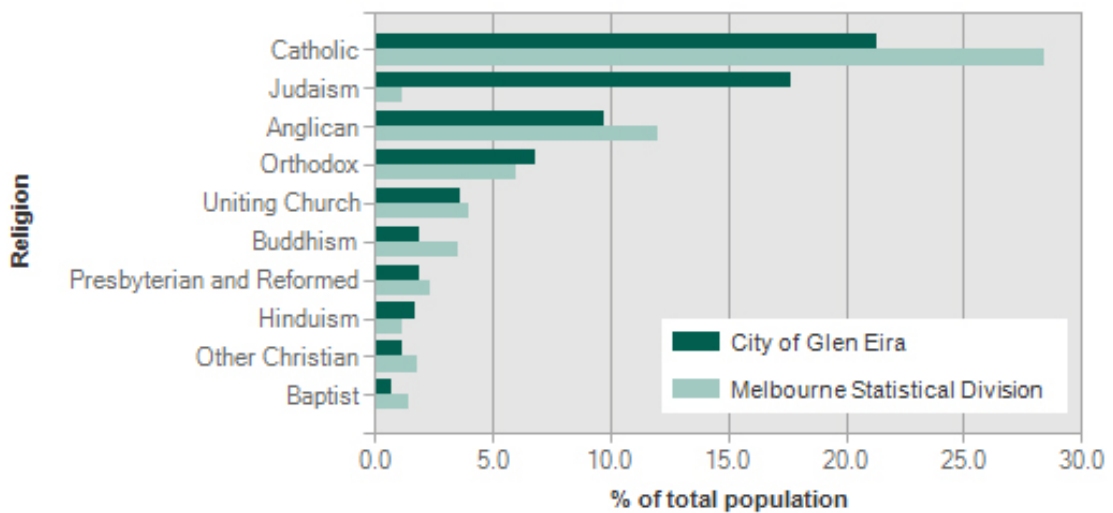
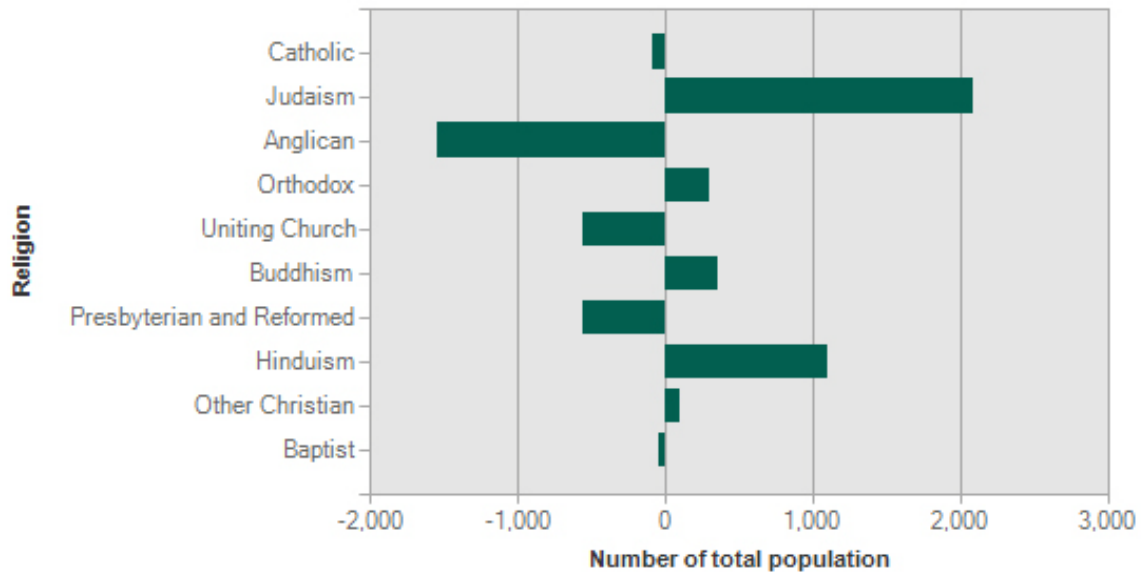


Figure 1: Reported Pedestrian Casualty Crashes in Glen Eira (1999 – 2008)



Source: Australian Bureau of Statistics, 2006 Census of Population and Housing (Enumerated)

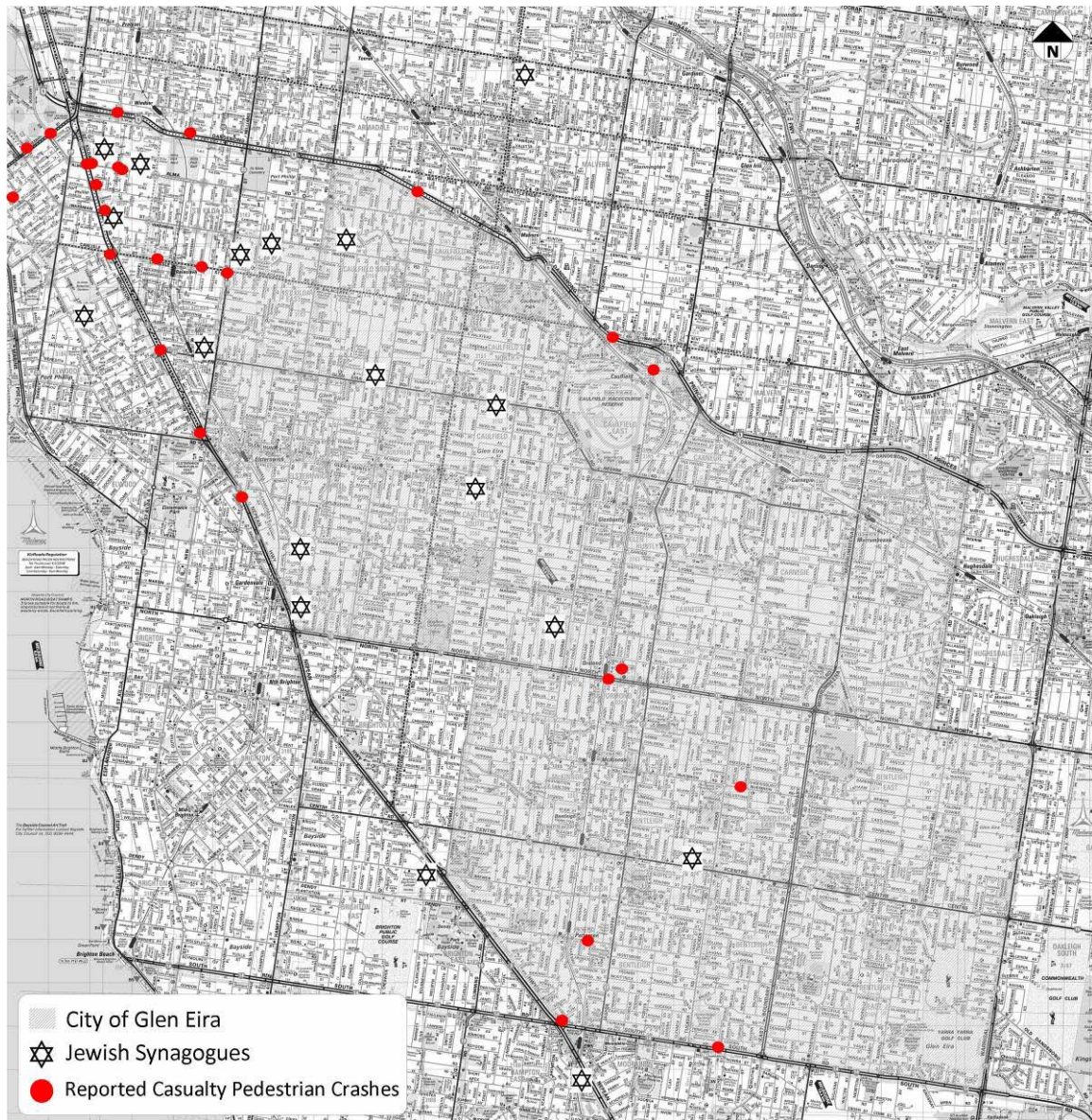
Figure 2: Nominated Religion - City of Glen Eira and Melbourne Statistical Division



Source: Australian Bureau of Statistics, 2006 and 2001 Census of Population and Housing (Enumerated)

**Figure 3: Change in Nominated Religion - City of Glen Eira**





**Figure 4: Reported Casualty Crashes within 2km of a synagogue  
4:30 to 10:30pm Fridays (1 January 2003 to 31 December 2007)**

### **PEDESTRIAN GROUP OPERATION**

#### **Pedestrian 1**

- P1 calls AØ.
- P1 can introduce at the start of AØ.
- P1 walk time is substituted with Special Purpose Timesetting No. 9 when XSF1 is set (*Flexilink*).
- P1 auto introduces at the start of AØ when XSF2 is set (*On-Line*).
- If Friday and time  $\geq 16:30$ , P1 auto introduces at the start of AØ (*Off-Line*).
- If Friday and time  $\geq 21:30$ , P1 introduces only at the start of AØ if demanded via P1 push button (*Off-Line*).
- If Saturday and time  $\geq 07:00$ , P1 auto introduces at the start of AØ (*Off-Line*).
- If Saturday and time  $\geq 22:00$ , P1 introduces only at the start of AØ if demanded via P1 push button (*Off-Line*).

**Figure 5: Flag Algorithm**

## Tables

Issue	Recommendation Examples
Poor Driver Behaviour (unfortunately they are generally parents)	<p>Communicate road safety messages via newsletters.</p> <p>Provide support to schools to make maximum use of the available resources and programs within Council and State Government agencies.</p> <p>Install No U-turn restrictions near schools.</p>
Illegal parking near school crossings	<p>Liaise with traffic officers to ensure enforcement is targeted.</p> <p>Communicate safety issues related to illegal parking via local media.</p> <p>Signage to raise awareness of appropriate parking locations.</p>
Location of crossing points	<p>Relocate school crossings.</p> <p>Raise awareness of crossing points.</p>
Improve existing crossing points	<p>Install kerb outstands to narrow traffic lanes (and therefore speeds) and improve visibility of pedestrians waiting to cross.</p> <p>Install new crossing facilities such as pedestrian refuges, pedestrian operated signals and painted central medians.</p> <p>Install pram crossings, upgrade linemarking and upgrade signage.</p>
Speed	<p>Implement traffic management treatments to reinforce the 40km/h speed limit around schools such as road humps and roundabouts.</p>

**Table 1: Issues and Recommendations for School Safety Audits**



Issue	Recommendation Examples
Speed	Reduce speed limit to 40km/h.
Landscaping obstructing visibility of pedestrians	Trim / remove vegetation.
Illegal parking	<p>Liaise with traffic officers to ensure enforcement is targeted.</p> <p>Communicate safety issues related to illegal parking via local media.</p> <p>Signage to raise awareness of appropriate parking locations.</p>
Poor Driver Behaviour	<p>Communicate road safety messages via local media.</p> <p>Install No U-turn restrictions.</p>
Improve existing crossing points	<p>Install new crossing facilities such as pedestrian refuges, zebra crossings and painted central medians.</p> <p>Install pram crossings, upgrade linemarking and upgrade signage.</p> <p>Review signal timing to ensure delays to pedestrians are minimised / removed.</p> <p>Improve street lighting.</p>
Obstruction of pedestrian access	<p>Ensure enforcement takes place so that signage and merchandise associated with businesses do not block pedestrian access.</p> <p>Consider strategies / policies to encourage new developments to provide improved pedestrian links.</p> <p>Relocate street furniture away from crossing points and pram crossings.</p> <p>Trim vegetation to ensure pedestrian access is not obstructed.</p>

**Table 2: Issues and Recommendations for Shopping Centre Safety Audits**

## Photos



**Photo 1: Example of Traditional Jewish Attire**

## References

Corben, K., Goy, J., Corben, B., Logan, D., Liu, L., Oxley, J. (2010). Star Rating System for Pedestrian Walking Routes, *Caulfield Community Health Service and Monash University Accident Research Centre Report*, Melbourne, Australia.

Department of Human Services (2007). *2006 Victorian Child Health and Wellbeing Survey Technical Report*. Melbourne, Australia.

# All the Small Things: How the Accumulation of Minor Factors Discourages Walking

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## ABSTRACT:

*Pedestrians are at the bottom of the planning food chain. There is an assumption that because people can walk anywhere, they will. Instead people walk the easiest and most pleasant routes.*

*If routes are not pleasant and other options available, people will find other means of transport or not take the journey. With increasing levels of obesity, heart disease, pollution and social dislocation, this is bad planning.*

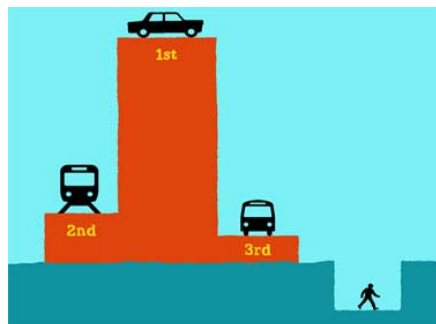
*This paper catalogues the accumulation of factors that frustrate pedestrians, deterring them from being more active. They include obstructions, a lack of priority at road crossings, and the incremental takeover of public spaces.*

*This paper explores how this gradual accumulation occurs, and proposes measures to prevent these trends, and provide planning that encourages activity along our streets.*

## Introduction

*"I'm not a car hater. I've no idea how the things work, but I enjoy driving mine outside of town. Yet I think we lose perspective on quite how they, and cars and lorries, dominate urban terrains." - Dave Hill*

This paper presents an analysis of factors affecting the pedestrian environment that accumulate to deter people from using our cities as they should be entitled to.



Though small, the accretion of these factors give the impression to people that the local environment is not designed to accommodate them, and puts them on a lower tier, below that of cars. They also convey that whatever walking trip you're taking is best done quickly as possible, so you can get back into the safety of your office, home, or car where you have a feeling of control over your environment.

Before going further, I would like to say that I'm not anti-car. I'm just pro-walking (and pro-cycling). What I often find in my walking environment is that what hinders and annoys me as a pedestrian is often cars, infrastructure for cars, and car-centred planning.

This paper suggests that we need to restore some balance; that people on foot are not just as important, but can and should be more important than people in cars. People on streets and footpaths should be expected and encouraged.

We often hear talk of the efficient movement of traffic, but it's inevitably about cars, trucks, and sometimes buses. It is very rarely about people as pedestrians.

## **Why Encourage Walking?**

*“For the poor, the only alternative to television for their leisure time is the public space. For this reason, high- quality public pedestrian space, and parks in particular, are evidence of a true democracy at work.” - Enrique Peñalosa (former mayor of Bogotá)*

Given the title of this conference, I shouldn't have to explain this in great detail. But many studies have made it clear that increased walking increases the level of health in our population. According to The Heart Foundation, there were over 13,000 deaths in 2003 attributed to inactivity. That's 37 deaths each day.

The Cycling Promotion Fund has estimated that heart disease costs more than \$370 million each year and obesity at least \$2.4 billion. While walking will not solve all of these problems, this demonstrates the immense scale of both the need and potential benefits. It's not just the physical health benefits that are important; it has been noted that walking in natural environments can improve mental health.

Walking is also healthy for social welfare: those who cannot drive (because they are too young, too old, infirm, disabled, cannot afford) are excluded from a major part of the transport system. Providing a safe and welcoming walking environment – even if it's just 5 or 10 minutes to the shop or train station enables these people to participate more in our society.

Finally, there is a social aspect of walking. When walking, there is always the possibility that you can stop and chat with friends or even strangers – or at least, acknowledge each other as you pass; an aspect not possible with driving.

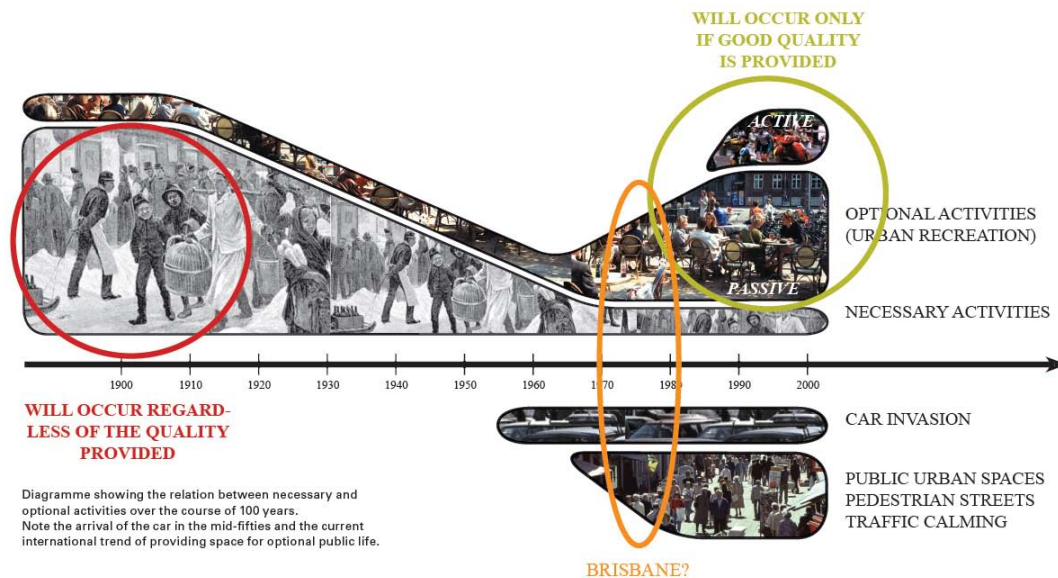
More people using streets, especially in the evenings also reduces the possibility of crime and other anti-social behaviour. People walking and sitting provide a level of surveillance that no CCTV camera can provide.

Each day in Australia 2.4 million car trips less than 1km are made, almost all of which could easily be substituted by a 10 minute walk. This demonstrates the capacity for significant changes in trips from car to foot.

## **Why Is the Streetscape Important?**

*“The street environment is a crucible for effective civic engagement and that poor street environments hinder a range of neighbouring and trust-building activities. ... Community members literally have no common ground and no place to effectively engage with neighbours.” - Sherry Ryan & Lawrence F. Frank*

Some transport planners seem to think that because people can walk anywhere, we will. The below diagram, from Jan Gehl illustrates difference between necessary and optional walking. During the 20th century people have retreated from the street in most cities and towns, largely because of the car (both as an alternative and a deterrent). This is except for essential walking; that which cannot be avoided. Gehl suggests that a welcoming street environment encourages optional walking, whether that is exercise, strolling (or promenading).



As mentioned, the ability of a streetscape to increase a sense of community is just as important as its ability to encourage physical activity. People living in “walkable” neighbourhoods are more likely to know their neighbours, to participate politically, to trust others, and to be involved socially.

### Pedestrian Desires

There is one important aspect of pedestrian behaviour that it appears a lot of planners (especially traffic planners) have either forgotten or perhaps were never taught. That is that people are essentially lazy and have strong desire lines. People will walk across busy roads rather than use underpasses or overpasses. People will climb fences rather than walk out of their way to a signalised intersection. People will walk against the lights rather than wait ten seconds for a light to change. The things I’m going to talk about are examples of when designers neglect the needs and desires of people in the planning process.

### The Small Things: Applying to Cross the Road

*“Jaywalking crackdowns tend to be hard to enforce, lower the public opinion of the police, reinforce the idea of car dominance on city streets, and, most importantly, do not provide an effective bang for the buck. Indeed, the Netherlands, which has essentially legalized jaywalking, has an enviable pedestrian safety record.” - Tom Vanderbilt*

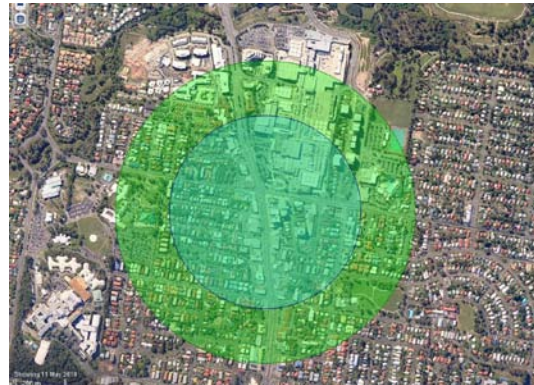
How many times have you come to an intersection just as the light has gone green, but no one has been there to press the walk button? You find yourself standing there for a whole phase of lights, perhaps (if you’re a law-abiding citizen) fuming about a late appointment when you can’t see a car coming for the length of the street, or deciding to chance it and cross anyway.

Earlier this year, the Queensland Premier raised the idea of “15-minute suburbs” in which everything we need “to live, work and play” is within a 15 minute walk. While a great idea, barriers such as waiting to cross busy roads can significantly reduce this catchment, resulting in longer walking time to reach shops and services.

15 minute walking catchment (1200m)



Waiting 5 minutes reduces this to 800 metres.



This raises an important question of why should pedestrians have to apply to cross the road at all? When visiting Japan recently, I noted that all walk signals turned green along with the traffic signals. This, what I call the *Presumption of the Pedestrian* is a completely different way of considering mobility. There is an assumption that people are waiting to cross the road. And if they aren't, it doesn't hinder traffic anyway. This very simple change to our traffic lights would significantly change the way that we perceive the importance of people on foot rather than people in cars.

In addition, the green walk signal remained on for almost the entire phase, allowing people a long opportunity to walk, and not have to be waiting at the corner. This compares to most traffic lights in Brisbane, where pedestrians get a few seconds to start crossing before the signal flashes red, leaving motorised traffic 20-30 seconds to travel through the intersection. People arriving late are required to wait, even when there is often plenty of time for them to cross safely. This is another example of how people in cars are given more importance than people on foot.

Some cities now use "countdown" traffic signals, which give those at the kerb an indication of how long they're likely to wait. These take the presence and desires of pedestrians seriously, have been found to reduce jaywalking and accidents.

Some intersections require two phases of signal to cross, leaving people standing on a ("caged") traffic island, in the sun or rain, inhaling traffic fumes while waiting.

### **Corners and footpaths**

*"The erosion of cities by automobiles proceeds as a kind of nibbling. Small nibbles at first but eventually hefty bites. A street is widened here, another is straightened there, a wide avenue is converted to one way flow and more land goes into parking. No one step in this process is in itself crucial but cumulatively the effect is enormous."* - Jane Jacobs

Designed for buses and trucks (and efficient movement of traffic) large radial corners allow cars to travel faster, often requiring pedestrians to step back from the edge of kerbs in order to feel safe. Similarly, mountable kerbs require pedestrians to stand back when vehicles take cut corners. What was once considered a safe area for pedestrians to be in is now an in-between area – perhaps a no-man's land.

Recently, I've seen painted yellow lines about 30cm from the kerb, presumably warning people to keep back. Perhaps one might ask why these lines aren't painted on the road rather than the footpath, keeping cars away from people rather than the reverse.

Kerbing truly designed to preserve pedestrian space uses corners with a small radius, requiring cars to slow down to navigate. It similarly provides strict delineations between car space and people space.



The pavement surface also gives people the impression whether they're welcome or not. Cracked and broken pavers, badly mended footpaths, uneven surfaces (creating puddles) and unkempt paths discourage optional walking.

### **Barriers**

Erecting fences to prevent people crossing roads tends to antagonise people, and they will often climb over them or walk around them. While it's both possible and desirable to physically separate cars from people along freeways where cars travel at high speeds in high volumes, there are few reasons that people should be prevented from crossing most urban roads.

If there is a need to discourage people and cars interacting in suburban areas, there are better ways to do this, such as gardens and planters and other street furniture.

### **Street Clutter**

Street furniture such as seats, rubbish bins, poles, advertising hoardings, street art, and bus stops can cause congestion and get in the way of walking. Solutions to this include:

- place these in the same area of the footpath, creating a clear walking area
- combine items (streets lighting, signs, bin) onto one pole
- attach some things (lights) to the wall

Inner-city walking can also be frustrated by people either waiting for buses (sitting or standing) or waling slowly. Either the footpaths are too narrow, or this is, perhaps a sign of a quality walking environment; a place where people want to be.

### **Intrusion of Cafes**

We all love outdoor dining, which is ideal in Brisbane's sub-tropical climate. We like being able to enjoy the sun, observe and even interact with passers-by. However, these have sometimes been allowed to extend or intrude into areas that should be left for walking. Many also enlarge their boundaries (some intentionally) by placing their tables, chairs and advertising boards in areas outside the designated markers.

It is easy to say that no-one actually walks in that small area, but that's because people do not walk in those spaces right next to things, giving themselves a comfortable buffer zone. Effectively the buffer zone is pushed out, and pedestrian space reduced.

### **Intrusion of Shops and other Items**

Have you ever noticed in your local shopping centre that they've found space for a new shop, in what was once a walking or seating area, or perhaps tucked up into a corner or against a wall? I'm not suggesting that businesses shouldn't make good use of space, but it seems this sometimes goes a little too far.

In my local suburb, a café incorporated into a medical centre provides a great service, bringing life to the area, as well as providing tasty coffee and ice-cream. But they've expanded tables into and placed hoardings around a walking route, making people take the long way around. Similarly, the local shopping expanded their storage for shopping trolleys in a walkway, narrowing the space available for shoppers, and insufficiently wide for wheelchairs.

### **Lack of Shade**

European settlers came to Queensland more than 150 years ago, and we've long known the link between sun exposure and skin cancer. You'd think we'd have long realised the need for shade in streetscapes. Too often the case is obviously not. I'm not talking just about King George Square, but new footpaths on Roma Street, Logan Road (Woolloongabba) Brisbane Square (Brisbane Bare), and the new park at

Kangaroo Point. However, shade structures have been incorporated on the Goodwill, Kurilpa and Go-Between Bridges.

This is particularly important around major attractor, such as train stations, which encourage walking rather than driving.

### **Car Parks & Driveways**

*"We had to build a city not for businesses or automobiles, but for children and thus for people. Instead of building highways, we restricted car use. ... We invested in high-quality sidewalks, pedestrian streets, parks, bicycle paths, libraries; we got rid of thousands of cluttering commercial signs and planted trees. ... All our everyday efforts have one objective: Happiness."*  
- Enrique Peñalosa (former mayor of Bogotá,)

An area where human and car interaction is high invariably brings about a car-centred environment. Regardless of whether they arrive by foot or car, people are expected to walk through a "car-zone" to get to shops. Rarely are footpaths or "safe areas" provided, and where they have been, cars often infringe the space.

Driveways provide a similar example, where drivers often feel they have right of way, which many driveways do nothing to discourage. Contrary to traffic regulations drivers sometimes intimidate people into giving way. Service lanes in inner cities are often equipped with alarms and flashing lights to warn people of impending peril. Ensuring a significant change in grade and/or treatment could reinforce the idea that this is a people space, in which cars should defer to people.

### **People-Oriented Buildings**

While strictly architecture, many buildings rarely consider pedestrians when it come to access to and from. I'll briefly mention the Brisbane Convention and Exhibition Centre, which was built in perhaps an ideal location for a building which attracts a lot of visitors – close to the city and public transport.

However, the design has neglected people, notably when it comes to pedestrian access. People arriving from the train and bus station are provided with a continual inactive wall before arriving at a nondescript and understated entrance. The main entrance is faces east on Merivale Street, away from the direction that cars travel (as Merivale Street had been bi-directional, but is now one-way). The main entrance isn't even welcoming for drivers, as they park underneath the centre, and take lifts directly to the interior, entirely missing the feeling of arriving.

### **The Big Things**

It is important to note that while these small things are important, there are also much larger issues that have significant long-term effects on the walking environment. If these are initially done badly, retrofits can be difficult and expensive, and the small things can have a limited effect. They include

- Land use planning; the layout and permeability of streetscapes, the location of attractors such as schools and shopping centres, zoning regulations that allow /encourage big box shopping centres that require cars for access.
- Streets that allow and invite traffic to travel at high speeds and volumes.
- Large barriers – freeways, wide and heavily used roads
- Policies and regulations that encourage car-use (subsidised parking)

### **What Makes a Good Walking Environment?**

Safety: people want to be able to walk freely without feeling endangered by vehicles or other people.

Comfort: a surface that is easy to walk on and doesn't threaten ankle injuries, along with protection from the sun, wind and rain.



Convenience: people want major attractors such as schools and shops within a convenient distance.

Interest: people are much more likely to walk if their surroundings provide mental stimulation, whether that is street art, interesting building and street design.

Consideration: taking care of the above will show people that they have been considered in the planning process.

## **Solutions**

*“The importance of pedestrian public spaces cannot be measured, but most other important things in life cannot be measured either: Friendship, beauty, love and loyalty are examples. Parks and other pedestrian places are essential to a city’s happiness.” - Enrique Peñalosa (former mayor of Bogotá, Colombia)*

I’ve tried not to be too critical in this assessment, as our streetscapes have been improving over the years. But, as I’ve noted, many planners don’t appear to realise the importance of the streetscape in encouraging people to walk, nor the needs and desires of those on foot.

English urban designer, Ben Hamilton-Baillie talks about visiting a US university and not meeting any traffic engineers along with the other urban planners, architects, and engineers. This demonstrates a disconnect between those planning for cars and those planning for people. Many of the things I’ve mentioned should be self-evident to planners, but it’s clear that either people’s needs are not clear, or are disregarded.

I’m not certain it would be useful to add more regulations to planning codes, as most of these already include useful intentions and words. Perhaps it is up to us as planners to involve people in our planning, observing and asking their opinions, so that we can create better plans, scrutinise the work of others, critiquing where necessary, and addressing problems when they arise.

## **Further Reading**

- Jan Gehl Architects
  - *New City Life*
  - *Places for People*
  - *Public Spaces Public Life*
- Enrique Peñalosa
- David Engwicht
- Ben Hamilton-Baillie
- Hans Mondeman
- Billie Giles Corti (UWA)

## Healthy Cities – Sustainable Health Infrastructure

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### **ABSTRACT**

*Sustainable buildings have a key role to play in the future of our cities. Environmental rating tools are delivering excellence in sustainable design for new office buildings and also “relifed” buildings. To reduce environmental impact and make our cities more sustainable, there is a need to extend environmental ratings to the full range of city built infrastructure.*

*This paper examines sustainable design of hospitals and health infrastructure. New technologies and sustainable design strategies are influencing design of these healthy facilities.*

*This paper addresses many of the opportunities and challenges in delivery of healthy cities. The critical role of sustainable health infrastructure is of particular relevance for a sustainable future.*

**Keywords:**

Healthy cities  
Sustainability  
Health

**PAPER TEXT**

**Introduction**

In recent years we have seen a wave of sustainable office buildings in Australia designed to the Green Building Council of Australia's "Green Star" environmental rating system. [3]

GBCA has now released environmental rating tools for other building types including Healthcare buildings. [2]

These rating systems are making a significant contribution to our cities, and have the potential to improve the quality and sustainability of our built environment. The use of rating systems are part of a framework of activities that will lead to more sustainable cities. [4]

A key factor in the application of Green Star rating tools to commercial office buildings has been the market acceptance of the business case for sustainable design. [4] It has also been supported by strong community acceptance of the need for more sustainable work environments in our cities.

Hospitals and health care campuses also have an interesting story to tell. In many cities around the world major tertiary hospitals are an integral part of the central city infrastructure. Indeed here in Brisbane we have multiple major tertiary hospitals in or adjacent to the central city business district. Recent development of tertiary hospital

campuses has particularly identified the benefits of an integrated and co-located approach to healthcare, education, and research aspects. For example, the Gold Coast University Hospital and Royal Brisbane and Women's Hospitals have a significant engagement with education and research.

As with office buildings, hospitals are the workplaces for a significant proportion of our city population and associated healthcare spaces.



**Centre for Clinical Research UQ Herston**  
Architects: Jackson Architecture



**Gold Coast University Hospital**

Architect: **GCUH ARCHITECTURE**  
PDT + STH + HASSELL

Engineers: **GCUH ENGINEERING**  
aurecon SKM SF



**Royal Brisbane and Women's Hospitals, Herston**  
Architect: Jackson Architecture

This paper highlights some examples of sustainable design strategies that are currently being applied to major hospitals. There are opportunities for improved outcomes in both health campus design and also in broader healthy city infrastructure.

### **Sustainable Hospital Design**

The Green Building Council of Australia Healthcare Version 1 environmental rating tool addresses a broad range of sustainable design principles. [2]

The Green Star rating system applies credits for initiatives across the following environmental impact categories:

- Management
- Indoor Environment Quality
- Energy
- Transport
- Water
- Materials
- Land Use and Ecology
- Emissions
- Innovation

For this reason the areas that I particularly wish to highlight in this paper are those that directly impact on greenhouse gas emissions:

- Energy
- Materials
- Water



It is critical that the engineering design of major buildings (including hospitals) must address sustainability and in particular the reduction in greenhouse gas emissions, at an early stage. It is important to consider the big picture, looking for synergy in energy generation efficiencies in central plant, and including flexibility and expansion for the future.

From the perspective of the engineering design of hospital campuses, there are a number of key design strategies that require to be considered.

I will briefly touch on each of these areas to provide an insight into the opportunities and the critical importance of issues involved.

- Reduction of Energy Use
- Efficient Planning Design
- Building Thermal Performance
- Reduced Use of Materials
- Cogeneration
- Photovoltaic (PV) Generation
- Efficient Use of Water

## Reduction of Energy Use

Clearly the best way to reduce the global footprint of our cities is to reduce the overall energy use of our city buildings, regardless of use (offices, residential, education, hospitals, etc).

It is significant that approximately 23% of greenhouse gas emissions have been attributed to the construction and use of the built environment. [5]

It is within our control to minimise the extent of energy use through appropriate building engineering design optimisation.

Major leading hospitals / health campuses include energy saving initiatives such as:

- Central Energy Plant (leading to highly efficient cooling systems)
- New Generation Lighting and Control (efficient, controlled lighting, tailored to task and time of use)
- Climate Specific Air Comfort Conditions (variable, personalised, efficient systems specific to occupant)
- Alternative Comfort Control Systems (mixed mode systems, natural ventilation, chilled beams, etc)
- Control and Metering (enabling fine tuning and monitoring)

**Gold Coast University Hospital Central Energy Plant**

**Architect:**  PDT + STH + HASSELL

**Engineers:**  aurecon SKM SF

The opportunities to reduce capital and recurrent costs for infrastructure through clever and energy efficient building services are significant. In some cases a moderate capital investment will lead to long term recurrent cost savings.

These initiatives may also lead to:

- Reduced emissions from energy generation and distribution
- Peak demand reductions in city infrastructure

As major hospitals are typically owned and operated, the incentive is there for full life cycle cost analysis of appropriate long term investments in reduction of energy use.

Imagine if the same central plant strategies applied to all of the built infrastructure in our healthy city precincts (with reduced energy use as the primary goal).



## Efficient Planning Design

Design of healthy cities is all about people. The opportunities to plan city infrastructure to integrate services and meet community expectations are significant.

Health campus design has provided an important opportunity to provide leading examples for health care professionals and the public to work and live in an efficient and well planned environment.

There are numerous examples of integrated planning in health facilities, moving away from the institutional single function solutions of the past. An example of this is the integration of tertiary education “university” hospitals as a key feature of the world’s leading campus designs.



**Gold Coast University Hospital**

**GCUH ARCHITECTURE**  
PDT + STH + HASSELL

**Architect:**

**GCUH ENGINEERING**  
aurecon SKM SP

**Engineers:**

## Building Thermal Performance

From a building design professional viewpoint, the orientation of buildings and the design of the building envelope or thermal skin is critical. New generation hospital and office buildings are targeting high efficiency façade design as a key element in energy efficiency and indoor environment comfort for occupants.

To enable the building façade design to be optimised, engineering teams typically undertake thermal modelling to simulate solar shading and thermal performance. This enables optimisation of the façade investment and also influences the design of building services such as air conditioning.



**South Australian Health and Medical Research Institute (SAHMRI)**

**Architects: Woods Bagot**

## Reduced Use of Materials

Our cities need to target and embrace reduced impact in the environment by including in-design:

- Recycling
- Reuse of materials
- Minimum embodied energy
- Environmental waste management
- Design for flexibility and reuse

The most obvious opportunity exists in the “reliving” of existing buildings, improving the overall energy performance of these buildings without the demolition of the existing structure and waste.

A recent series of seminars undertaken by the RAIA have focussed on opportunities to recycle existing building stock in this way.

Health projects are an example of very specialised facilities. Few of the older generation buildings have been able to be recycled. Notwithstanding, we are seeing far more flexible designs being included in the new designs to enable long term flexible use of these facilities.

One area that the health care sector could benefit from is wider acceptance of open plan office environments were practical. Following the lead of sustainable offices, the resultant work environment uses far less materials and is very flexible.

## Cogeneration

Having done all we can to reduce energy consumption and materials use, we then focus on the opportunities to supply that energy in a more environmentally friendly manner.

An exciting development is the recent trend to cogeneration plant in building projects. Cogeneration refers to the operation of plant that generates electricity and simultaneously allows recovery of energy for building cooling and heating in a highly efficient process.

These systems are beginning to be common in sustainable office buildings and have also been implemented in hospital projects. A number have been introduced into hospitals in Queensland.

Ultimately the use of natural gas for these systems substantially reduces the greenhouse gas emissions for buildings. It is envisaged that a carbon tax (when implemented) will improve the operational cost benefit for cogeneration plant significantly.



**Zencorp**  
**40 Albert Road South Melbourne**  
**Architect: SBP**  
**ESD: Aurecon and ECS**  
**6 star Greenstar Office Design**  
**5 star NABERS Energy**  
**5 star NABERS Water**



™green building council australia



### Photovoltaic (PV) Generation

There is strong community support for inclusion of alternative energy power solutions including photovoltaic PV cell technologies in projects.

The availability of integrated cell technologies included in façade design is an example of how healthy cities may have some local energy generation in the future to reduce the extent of conventional solutions.



**Kelvin Grove Urban Village**  
Architect: HASSELL

### Efficient Use of Water

The need for conservation of water resources is well recognised in the context of health cities. Australia clearly is resource constrained in potable water. [6]

One consequence of our consumption of water has been the development of alternative water supply schemes (including desalination plant) with capital cost and recurrent energy costs to meet demand.

Recent experience in hospital projects has included extensive use of treated recycled waste water, in addition to rainwater harvesting and water efficient design.



### Summary

Healthy cities include hospitals and health care facilities as a significant component of the built environment. There are strong trends to integrate these developments, with tertiary hospitals / universities / accommodation offices being combined in city precincts.

New hospital campus designs are beginning to embrace sustainable design planning tools and are expected to follow the lead of office buildings in utilising Green Star environmental rating system designs.

It is the view of the author that sustainable design solutions must be applied in a holistic manner to all of the built infrastructure if we are to successfully reduce our global footprint.

A vision for healthy cities would be to also learn from the long term experience and successful use of energy efficient central energy designs for major tertiary hospitals, reducing greenhouse gas emissions and the global footprint further across the city infrastructure.



**Santos House**  
6 star Green Star  
Architects: Donovan Hill



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**NAWIC**  
**International Women's Day Scholarship**

**“The Sustainability of Affordable Housing in Australia –Lessons  
Learnt from Studies in Brazil”**

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**ABSTRACT**

*In the context of the current shortage of affordable housing in Australian cities, this paper aims to generate ideas on how the Australian Construction Industry can improve both the physical and social sustainability of much needed new affordable housing developments.*

*The paper details a brief history of housing issues in both Brazil and Australia, followed by an investigation into two examples of affordable housing in each country, one which highlights the importance of socially responsive design and one which demonstrates environmentally sustainable building features.*

*The exercise of investigating and assessing the design features of socially responsive and environmentally sustainable affordable housing projects was carried out to highlight the importance of the people using them. The outcome of this study is a recommendation to the Australian Construction industry to be mindful of three major elements in any affordable housing design process. Firstly, that the needs and aspirations of residents should be investigated in a participatory manner and documented at an early stage of the design, to act as a guide for the design team. Secondly that environmentally sustainable design features are most successful when linked to the aspirations of the residents. Thirdly if we cannot be certain of our target market, or the changing needs of future generations, we need to ensure that design features incorporate flexibility that will not hinder residents from achieving the things they themselves find important. By prioritising these elements of a design process we can improve both the social and physical sustainability of affordable housing developments in Australian cities.*

**Keywords:** sustainable housing, affordable housing, socially responsive design, Brazil affordable housing, Australian affordable housing, community consultation

# 1. Foreword

In March 2009 I was jointly awarded the Inaugural International Women's Day Scholarship by the Australian National Association for Women in Construction (NAWIC). The annual scholarship is intended to provide female professionals with an opportunity to develop a white paper that would become a positive instrument of change in the Australian Construction Industry.

My submission proposed to look at affordable housing in Australia and investigate methods of improving its sustainability. Considering the economic downturn in early 2009 and accompanying predictions of rising unemployment, combined with the existing shortage of affordable housing in Australia, this topic struck me as one of great importance to our country at the present time.

The scholarship required an international component to broaden the source of ideas and information. My proposal included a trip to Brazil in mid April 2009, to meet with local architects and academics in Rio de Janeiro and Sao Paulo, as well as attend a two week workshop in Salvador da Bahia. This workshop, entitled "Building Communities – strategies when building houses for the urban poor" was developed by Architecture Sans Frontieres - UK (ASF-UK) and brought together a group of 25 architects, engineers, planners and sociologists from 10 different countries. This workshop aimed to explore housing strategies for the urban poor in Salvador Da Bahia, Brazil and centred on two local case studies.

Based on this trip to Brazil and further research carried out here in Australia I have compiled this paper looking at the issues surrounding affordable housing in Australia by investigating both socially responsible and environmentally sustainable case studies. The paper is intended to assist the Australian Construction Industry with the sustainable design and delivery of affordable housing developments in our cities.

My professional background is in the field of Structural Engineering as well as experience in international development work. My proposal to research the topic of affordable housing in Australia stemmed from a personal interest in this subject which I see as a huge challenge to our country's sustainable development. As such, this paper describes my views, not the views of my employer.

I would like to gratefully acknowledge the immense support and encouragement I have received from NAWIC, in particular NAWIC NSW President Letitia Turnbull and Vice-President Davina Rooney. I would also like to thank my mentor Emma Synott for her guidance as well as Deborah Dearing for her invaluable feedback in reviewing this paper. I am also extremely grateful to the following people for assisting me in my research over the past year, Dr Alex Frediani, Melissa Kinnear, Peter Valilis, Ananda.Ganeshan, Vinicius Andrade and my employer Arup for supporting me through this process.

## 2. Executive Summary

In the context of the current shortage of affordable housing in Australian cities, this paper aims to generate ideas on how the Australian Construction Industry can improve both the physical and social sustainability of much needed new affordable housing developments. The paper draws on lessons learnt from studying urban housing developments in Brazil in April 2009.

The paper defines sustainable development as housing which meets the needs of current residents without adversely affecting the needs of future generations. Affordable housing is defined broadly as any housing which is affordable for low or

even middle income earners which could be owner-occupied or rental housing owned by government, community groups, corporations or individuals.

The paper briefly outlines the challenges faced by both Brazil and Australia in providing appropriate low cost housing in urban environments. It details a brief history of housing issues followed by a description of the current state of affordable housing in each country.

The next section of the paper investigates two examples of affordable housing developments, one in Brazil and one in Australia, which highlight the importance of socially responsive design. The first project discussed is a government housing intervention in Salvador da Bahia. The paper recounts an assessment carried out to determine the aspirations of residents and how these were affected by housing features. This section details Amartyr Sen's Capability Approach which is an assessment method based on people and their aspirations. The second project detailed in this section is the Pemulwuy Project in Redfern, NSW which is a great example of participatory planning. The design process is described, showing how the Aboriginal Housing Company determined the aspirations of residents and how these were ultimately incorporated into the design of the proposed development.

The final section of the paper investigates two award winning examples of environmentally sustainable affordable housing projects in both Brazilian and Australian cities. The first project is the design of a commercial housing development in Recife, Brazil which was awarded the international "Living Steel Award". The paper finally investigates the K2 Apartments, a multi-award winning Victorian Government public housing project in Melbourne, Australia. The highly sustainable design features are described and assessed using post-occupancy data.

The exercise of investigating and assessing the design features of socially responsive and environmentally sustainable affordable housing projects in Brazil and Australia was carried out to highlight the importance of the people using them. The outcome of this study is a recommendation to the Australian Construction industry to be mindful of three major elements in any affordable housing design process. Firstly that the needs and aspirations of residents should be investigated in a participatory manner and documented at an early stage of the design, to act as a guide for the design team. Secondly that environmentally sustainable design features are most successful when linked to the aspirations of the residents. Thirdly if we cannot be certain of our target market, or the changing needs of future generations, we need to ensure that design features incorporate flexibility that will not hinder residents from achieving the things they themselves find important. By prioritising these elements of a design process we can improve both the social and physical sustainability of affordable housing developments in Australian cities.

### **3. Introduction**

This paper investigates the sustainability of affordable housing in Australian cities. It will draw on lessons learnt from the study of urban housing developments in Brazil.

Australia's major cities are currently facing a keen shortage of affordable housing. Key worker groups including teachers, fire-fighters, nurses, police and ambulance officers are among those Australians struggling to find affordable housing in our cities. A recent study by Bank West <sup>1</sup> has shown that in 2007 "81% of local government areas in capital cities are unaffordable for key workers"- an increase of 28% from 2002. Current reports by the Australian Institute of Health and Welfare<sup>2</sup> have found that more than 170,000 Australian households are on waiting lists for public rental housing across the country.

According to a Homelessness White Paper written in December 2008<sup>3</sup> around 105,000 people are homeless on a given night in Australia. This shortage of housing, available to low income earners, is a problem which has developed due to various factors including gentrification of our cities, high land costs and taxes, land shortages and a surge in the Australian urban population. This paper will investigate government policy and social attitudes which may have contributed to this housing crisis.

In an attempt to address this housing shortage the current Federal Government included \$6.6 billion in its 'economic stimulus package' for the construction of 20,000 new homes and the upgrade of a further 2500 vacant homes to be used as public housing. In the light of this push for new affordable housing in Australian cities, it is important for the Australian Construction Industry to ensure the new housing is sustainable as well as affordable.

The concept of 'sustainability' is a multi-dimensional one which is well used in many aspects of our current lives. In this paper, the notion of sustainable development is based on the Brundtland Commission's definition<sup>4</sup>, namely "forms of progress that meet the needs of the present without compromising the ability of future generations to meet their needs." This definition contains two important parts. Firstly progress should meet the needs of the present. This paper will explore the idea that without meeting the needs of the individual end user, sustainability measures - however technically innovative - will not be successful. The second part of the definition requires that progress be mindful of not limiting the choices and opportunities of our future generations.

When applied to the topic of affordable housing, sustainable development has both a physical and a social component. Physically, it promotes the efficient use of materials and energy in order to limit the waste of our depleting global supply of resources. Currently residential housing contributes 9.1% to the total carbon emissions in Australia, having risen by 24.8% since 1990<sup>5</sup>. Socially it inspires the development of productive communities which promote the aspirations of lower income earners and therefore enable them and their children to thrive.

The definition of affordable housing used in many Australian studies of 'housing stress' is housing that costs less than 30% of income for the bottom 40% of income earners<sup>6</sup>. This paper however applies a more general notion as defined by Julian Disney of UNSW<sup>7</sup> which considers any housing which is affordable for low or even middle income earners. These housing developments could be owner-occupied or rental housing owned by government, community groups, corporations or individuals.

Brazilian Government housing schemes officially target citizens who earn 0 to 3 times the Government set minimum wage per month (approx AUD\$300 as of Feb 2009), 'social' housing is for those who earn 3 to 5 times the minimum wage per month and 'affordable' housing is for those who earn 5 to 10 times the minimum wage per month. These definitions were not applied in this study and the broader definition of affordable housing as described above was also applied to studies of urban housing in Brazil.

Compared to Australia, housing deficit has been a long-standing problem in Brazil due to historical and political events. Brazil has experienced rapid urbanisation over the past 70 years with 85% of the total population of almost 200 million people currently living in urban areas<sup>8</sup>. These large numbers combined with approximately 8% national unemployment<sup>9</sup> have resulted in more than 35% of the urban population living in slums known as 'favelas'<sup>10</sup>. The condition of these informal housing settlements vary from long-standing, consolidated sites to those lacking even basic infrastructure. The study of affordable housing developments in Brazil ranged from

private industry driven projects, government housing interventions to illegal occupations.

This paper will investigate the design features of recent sustainable housing projects, two of which address the social sustainability of affordable housing and the importance of providing residents with an environment which will promote, not hinder their aspirations. The other two project studied are recent examples of award winning environmentally sustainable affordable housing designs. The success of these features, as well as the resultant benefits to the residents is assessed.

This paper aims to provoke thought on how the Australian Construction Industry, in designing and delivering affordable housing in Australian cities, can promote both social and physical sustainability.

## **4. Housing Challenges in Brazil**

### **4.1 Brief History**

Brazil has a rich history which extends long before the arrival of the Portuguese in the 1500's and the creation of Salvador da Bahia as the first capital in 1549. Prior to this the indigenous Indians of Brazil had inhabited the land for as many as 50,000 years. However, Portuguese colonisation particularly the trade and slavery accompanying it, did much to shape the demographic of modern day Brazil.

Slavery was officially abolished in 1888 at which point 800,000 freed African slaves who mostly worked on sugar, tobacco and coffee plantations in rural areas, flooded urban centres looking to set up new homes. There was limited infrastructure in place for this sudden influx of population and most were unemployed due to lack of education and literacy. Most joined the first informal housing settlements known as 'favelas'. The favelas continued to grow through the end of the 19<sup>th</sup> Century until today. Brazil's second largest city – Rio de Janeiro – currently has an estimated 1million favela residents.

Politics, as in most countries, has had a huge impact on housing policy in Brazil. Unlike Australia, Brazil has experienced the extremes of government from a fascist dictator in the 1930's and a right wing Military government in the 1960's to the current left-wing government headed by President Lula who was part of the socialist workers' movement in the 1970's. Accompanying these changes in the rule of government were differing policies on housing and how to deal with the favelas.

### **4.2 Current Situation**

The current population of Brazil is just less than 200 million, it is the third largest country by land mass with 8 different climate zones. The Brazilian Government's General-Co-ordinator of climate change, Jose Domingos Miguez stated that Brazil contributes to only 3% of global greenhouse gas emissions with three quarters of these emissions attributed to deforestation. Brazil runs primarily on hydro-power and 80-90% of its car fleet can run on ethanol.

A study in 2003<sup>11</sup> stated Brazil's housing deficit to be approximately 7 million units, mostly in the southeast and northeast regions and it has been identified that 84% of the housing deficit in Brazil is concentrated on families earning less than three times the government set minimum wage.

In a response to the Global Economic Crisis in late 2008 the current President Lula of Brazil announced a new housing program in early 2009 called "Minha casa Minha

Vida” which translates as “My House, My Life”. This program promises to provide 1million houses, 80% of which will be provided in the State of Bahia. The government has not committed to a timeframe for the completion of this housing program, however the first stage is set to be finished within 2 years and consultation with industry has already started. Under this program the government will provide low interest loans directly to the construction industry, who will in turn sell the housing units to low income earners who are also eligible for low interest loans from the Government bank CAIXA.

The Government released a set of guidelines for these new houses, including minimum dimensions for different dwelling types and standard requirements similar to building code guidelines. There are unfortunately no sustainability features included in these guidelines. This can be seen as a missed opportunity to enforce sustainable design features such as improved passive thermal control achieved through dwelling orientation, cross ventilation and increased ceiling height.

Many Brazilians fall outside of the Government housing system due to the fact that their income comes from informal employment such as fishing or labouring. Many of these people find themselves living in the favelas in the major cities. The prevalence of these urban slums in Brazil, despite varying forms of government opposition and intervention since their creation, is a good indication of the priorities of low income earners.

In many cases the favelas have inadequate stormwater or sewage services and consist of only temporary dwellings. Physically, therefore they do not offer much security or opportunity. What the favelas do provide is an opportunity for individuals to pursue their aspirations of attaining work in the cities, being close to services and occupying a piece of land which they aspire to one day own. This will provide them with economic security and an asset which will provide them and their children with more choices in their lives. Despite often high crime levels, residents see the favelas as places of opportunity and choice, where they can take control of their housing needs, without having to rely on an inadequate government system to allocate them accommodation.

## **5. Housing Challenges in Australia**

### **5.1 Brief History**

The prominence of housing as an issue in Australian society has been influenced by changing political and historical events over the past hundred years. Government policy has reacted to changing needs over the years, driven not only by political agenda but also by economic climate and public opinion. Consequently, its form and emphasis has been one of the major factors which have shaped the current housing situation.

Governments in Australia provide a range of support and assistance for housing but the two main programs over the last century have been the Commonwealth-State Housing Agreement (CSHA) and Rent Assistance (RA).

In addition to the two main programs, the CSHA and RA, the Commonwealth Government has also provided other specific housing assistance programs for high need groups such as aged care, disabled care and housing for Aboriginal and Torres Strait Islanders.

Housing assistance has prioritised different aspects of affordable housing over the last century. Housing policy in the first half of the century was primarily focused on providing workers with basic housing to protect them from the elements. In the

1900's – slums had formed in Australian cities, particularly in seaside areas<sup>12</sup>. Politically, there was pressure to redevelop these central metropolitan areas to make way for profitable wharf space. Public opinion was also concerned by overcrowded areas with poor sanitation - particularly after the bubonic plague outbreak in the Rocks in Sydney in 1900. At the same time, trade unions saw potential new work for construction industry in the creation of new inner city housing. The Government therefore became involved in providing housing for workers in Australian cities.

During the early decades of the century, due to the Depression and the First and Second World Wars private house building slowed due to lack of funds, labour and materials. The Government focused on meeting the housing shortage of the time by quickly providing as much housing as possible. The answer to this strategy at the end of WWII was to import pre-fabricated dwellings from Europe<sup>13</sup>. Housing was concentrated in large estates on the outskirts of major cities. These developments initiated significant urban sprawl as well as creating the “Great Australian Dream” of owning a single dwelling on its own block of land.

The modest appearance of the dwellings was an important factor in the public housing process of the time since it ensured that tenants moved on from these houses as their financial prospects improved. This facilitated the ‘revolving tenant scenario’ and would take pressure off the erection of more public housing estates<sup>14</sup>.

As time went by - although public rental housing was still important for low income households - the CSHA soon began to encourage more home ownership<sup>15</sup>. This was facilitated via the provision of low interest loans to home builders and the sale of houses on highly concessional terms. This can be seen as recognition of low income residents’ needs for security of tenure as a base from which to build their future lives, helping them to improve their economic status and resulting in a more sustainable outcome.

In the latter half of the century, housing needs shifted from primarily nuclear families to single parent households or people living alone such as the elderly. Affordable housing developments began to take different forms to the large estate developments of the past, with more unit blocks and attached houses being introduced to meet the new demographics. Soon after, Government policy began to recognise the importance of understanding the needs of residents and developed more partnerships with not-for-profit organisations to manage the housing stock as well as the residents<sup>26</sup>.

## **5.2 Current Situation**

House prices in urban areas have risen in the last decade due various factors. Firstly the varied demographic of the residents of our cities , which include from young professionals as well as retiring ‘Baby Boomers’ has created increased competition for inner-city housing. Gentrification of older residential and former industrial urban areas has further reduced the amount of affordable inner-city housing. The above-mentioned Commonwealth Government’s emphasis on Rent Assistance and the subsequent reliance on the private housing market to provide accommodation for those in need, has also contributed to the urban housing shortage. Aspects of recent Government policy may also have constrained the private sector from generating a sufficient supply of affordable housing in our cities.

Urban populations have been consistently rising in Australia and are predicted to continue to do so. According to the United Nations Common Database, the percentage of urban population in Australia has risen from 75% in 1950 to almost 93% in 2005. There has been a consistent decrease in the supply of urban land



available for new housing. The cost of land, as a proportion of an average house and land package has risen from 33% in 1973 to 78% in 2003<sup>16</sup>.

The Property Council of Australia has criticised the Government for not better planning land releases to accommodate the construction of more urban housing<sup>17</sup>. They also claim that State Government property taxes and development charges, high revenue earners for the Government, have been a major constraint on the provision of affordable housing by the private sector. A report in early 2006 by the Residential Development Council<sup>18</sup> found that on average, a quarter of the money Australians paid for a new home or unit was spent on Government taxes and compliance costs, this was more than the cost of the land itself.

With rising property prices in our cities<sup>19</sup> the maximum rate of Commonwealth Rent Assistance is well below the level required to make private rents affordable for low-income people in most capital cities. There are also a large number of low to middle income earners “caught in the middle” i.e. those who earn too much to be eligible for public housing or rent assistance, yet who cannot afford to buy or rent privately in the city. This group has been forced to move to the outer suburbs to find cheaper housing, giving them less access to employment and other services.

In early 2009, the Government replaced the CSHA with the National Affordable Housing Agreement (NAHA). This joint agreement between Commonwealth Government, State Governments and Local Governments aims to “ensure all Australians have access to affordable, safe and sustainable housing that contributes to social and economic participation”<sup>20</sup>. The new funding arrangements will be measured on key outcomes set in the performance framework of the agreement. The agreement provides for various incentive schemes for private industry to construct affordable housing.

This puts the Australian Construction Industry (ACI) in a primary role to influence the form and success of Australia’s solution to its affordable housing problem. In its endeavour to provide affordable housing, the ACI should aim to become a world leader in designing and delivering sustainable developments. With the changing economic and environmental climate it is vital that the ACI does not revert to methods of the past, but innovate to meet the needs of low income Australians so that they produce developments that are successful now and do not impact on the choices of future generations. Sustainable affordable housing is housing which is so successful it not only meets the immediate needs of the resident i.e. shelter, health, protection but provides opportunities for residents to achieve their aspirations and improve their lives.

## **6. Socially Responsive Design – Case Studies**

This section of the paper will document two different case studies of affordable housing projects which demonstrate how socially responsive designs can promote sustainability. The first project describes the process of investigating the aspirations of residents using Amartyr Sen’s Capability Approach. The second project is an example of an affordable housing development which utilised a unique process to ensure the social sustainability of the ultimate design.

### **6.1 Novos Alagados, Salvador da Bahia**

#### **6.1.1 Introduction;**

Salvador da Bahia - now Brazil’s third largest city - was Brazil’s first capital city under Portuguese rule and an important port for the export of sugar and tobacco. As the

entry port for the majority of Brazil's African slaves, over 80% of Salvador's current population of 3 million has Black African ancestry.

The area of Alagados, whose name means 'flooded' in Portuguese, is in the northwest of Salvador. It was first settled in 1946 on swampy, unused land along the shore of Tanheiros Cove<sup>21</sup>. The initial settlement consisted of houses called 'palafitas' which were basically stilt houses. The houses were built from timber and supported on a forest of timber stakes which were bedded in the sea floor. The floor area of these houses ranged from 16m<sup>2</sup> to 100m<sup>2</sup> with, often precarious, narrow bridges linking the houses with the shore. There was no formal connection to water or electricity however this type of housing was attractive for various reasons, the major one being that the palafitas were under the jurisdiction of the navy who was not as vigilant in their policing of the sea as the army was of the land.

Despite some attempts by the government to destroy the settlement in Alagados, it continued to grow into the 1970's. It was mainly populated by inner-city migrants who saw the palafitas as an opportunity to acquire a permanent place to live close to employment, services and city life. The low lying, swampy land beneath the palafitas was gradually in-filled by residents and the municipal government with rubbish and waste. The land around the palafitas was eventually reclaimed and the houses consolidated, providing the residents with a much sought after asset which they could invest in and improve.

Novos Alagados was first settled in 1977, in the adjacent cove to Alagados. By 2000 there were approximately 15,000 people living in this settlement which covered approximately 18 hectares. There have been different interventions in areas of the settlement by both government and international Non Government Organisations (NGOs). Novos Alagados has been treated by many as a place to experiment with different types of affordable housing solutions.

This housing development was visited and studied as part of an Architecture Sans Frontieres - UK (ASF UK) Workshop. This part of the workshop was developed in conjunction Dr Alex Frediani of the Development Planning Unit (DPU) of University College London (UCL). The first week of workshop focused on a study of Amartyr Sen's Capability Approach and how it applied to the Novos Alagados housing settlement. This area had been studied by Dr Frediani as part of his doctorate paper in 2007 "Housing Freedom, The World Bank and Poverty Alleviation – Squatter Settlement Upgrading in Salvador da Bahia, Brazil".

Dr Frediani assessed the World Bank intervention in this area using Amartyr Sen's Capability Approach to Development as an appropriate method of determining the true success and impact of the World Bank intervention on the residents of Novos Alagados<sup>22</sup>. This analysis of the intervention highlighted issues raised by residents which had not been picked up in the World Bank's own assessment of the housing program<sup>23</sup>.

### 6.1.2 Amartyr Sen's Capability Approach:

The capability approach was presented at the ASF UK workshop by Dr Alex Frediani. This section is a very brief introduction to the concepts of the Capability Approach and its origins.

Amartyr Sen is an Indian born, Nobel prize winning economist. His book "Development as Freedom" was published in 1999 and outlines what is known as the "Capabilities Approach". Sen had been working on this approach since the 1980's. In collaboration with other economists he helped to form an alternative to the traditional economic model for dealing with poverty and human development. "Over the last decade Amartyr Sen's Capability Approach has emerged as a leading economic

framework for thinking about poverty, inequality and human development generally.”<sup>24</sup>

This method of assessing welfare looks at what humans need to flourish<sup>25</sup> and advocates that people living in poverty be provided with the possibility to not only function but to have the capability and freedom to function in areas of life that are important to them.

The approach focuses on positive freedoms rather than negative freedoms. A negative freedom is the absence of undesirable conditions, for example - the freedom from cold, or exposure. A positive freedom is a person's ability to be or do something, for example - freedom to attain income and therefore improve their economic situation<sup>26</sup>. When applied to housing, this method means providing residents with capabilities through housing to achieve the things they most value, for example income, social networks or security.

“This approach is people centred and is concerned with what people value, their aspirations and their freedom to achieve them. While people are perceived as drivers of change, the Capability Approach aims at strengthening the enabling environment for the realisation of people's aspirations.”<sup>27</sup> The “Capability Approach” analyses not what things are, but rather what things do. A house for example, is not just a shelter from the weather but a home which can support a resident's need for safety, security or even pride.

### 6.1.2 Aspirations:

Through close interaction with residents, the ASF workshop group was able to assess the social as well as physical impact of the different interventions using the Capability Approach. My group was assigned a coastal area known as Litoral to interview nine households. A government intervention had taken place here in the 1980's when the land around the palafitas was infilled and the residents given legal title of their land. The government provided infrastructure for the area in the form of water, sewage, stormwater, electricity and rubbish collection. They also offered to construct new brick homes for the residents. After the completion of two of these houses, the remaining residents declined the offer stating they preferred to build their own houses.

In order to explore the process of the Capability Approach, this section looks at the aspirations impacted by the construction of a solid brick house on the site of the old timber palafita homes. This analysis breaks down the reason *why* a brick house is something that is needed by the residents of Litoral. By looking at what things do, not what they are we can apply this process to other situations and may find that what is needed is actually contrary to our assumptions. In our interviews, the following aspirations surfaced as of primary importance;

Local individuals aspired to;

- a) Attain Income/Prosper
- b) Live in Safety
- c) Be Healthy
- d) Participate in a Social Network
- e) Expand/Improve their Living Conditions (security of tenure)
- f) Individualise

In the hot tropical climate of Salvador, there were certainly benefits to the timber palafitas homes. The structures had low thermal mass and good cross ventilation, improving air temperature and quality. However these reasons were strongly outweighed by more important aspirations of the local residents as described below;

- a) Attain Income/Prosper

This aspiration was a strong one, which was evident in all conversations with residents. Most of the original residents living in Novos Alagados, had moved there with the intent to improve their access to employment and services provided in the city. The residents unanimously felt that the consolidation of the houses from timber palafitas to brick structures positively impacted their financial security and therefore prosperity for several reasons.

Many residents felt that they would only feel confident to invest in the structure of their homes if they had legal tenure of their land. Once the structures were constructed out of brick they no longer required as much maintenance and therefore were less of a burden on time and finances.

We visited one resident who lived in her original timber palafita structure, now on solid ground since land had been infilled around the timber piles. This was the only one remaining in the area. The resident very much aspired to having a 'solid' home made from bricks so that she would have less maintenance requirements and since her husband had recently died, it would reduce her reliance on others in the community to help her maintain the cladding on her home.

b) Live in Safety

The ability to live in safety is a major consideration for Brazilians, especially those living in the favelas. The favelas are notoriously influenced by drug gangs and can be dangerous places to live. The battles between drug gangs often take place in the streets of the favelas leaving law abiding residents of the areas vulnerable to this violence. The first family we interviewed had lost their husband/father to a stray bullet, not only devastating the family but leaving them without their main income earner. Although residents feel that the passive thermal conditions of the timber/palafita houses are more comfortable in the hot temperatures, one of the reasons residents aspire to a brick house with limited windows for the reason that they are solid and would stop a bullet from entering their house.

c) Be Healthy

This aspiration is linked with attaining income since if the main income earner in a family is sick, it affects the opportunity for the family to prosper. Although the palafitas provided a healthy, well ventilated internal environment, the houses perched over the shallow water into which waste was dumped, were not a healthy place to live. The open sewage in the lagoon resulted in disease for its inhabitants and the stagnant water was perfect breeding ground for mosquitos carrying diseases such as dengue and malaria.

d) Participate in a Social Network

Our interviews revealed that this aspiration was actually better served by the communal environment provided by the palafitas. Since the houses have been consolidated and more secure brick walls constructed, people were seen to be less interactive with neighbours. Due to the increased value of the brick homes - some of the residents have subsequently sold their houses and moved to other areas, resulting in the break-up of the old community.

e) Expand/Improve their Living Conditions

The residents of Litoral expressed a strong aspiration to expand and improve their homes. It is easy to see how a brick house offers much more possibility for expansion than the timber palafitas. The brick walls are much stronger and more easily accommodate an additional floor when residents save the required funds and as the family grows. The brick houses built in Novos Alagados are very similar to many low cost houses in Brazil and are constructed from a minimal concrete frame with brick wall infill. The floors are a form of ribbed slab with tiles used to minimise the amount of concrete (Photo#). Columns starter bars can be seen in most of the brick houses, in anticipation of the next floor being built in the future.

The two brick houses built by the government in Litoral (Photo#) were intended to be small core houses, consisting of just one room and a bathroom with the expectation that they could be extended to accommodate growing family needs as funds became available. However, vertical expansion was not incorporated into the design of the roof which has a mono-sloped pitch supported by angled walls. This made an additional of an extra floor above complicated for the residents who are not trained builders. Horizontal expansion was also limited due to the location of underground septic tanks directly adjacent to the building - residents were wary of enclosing the space in case it became contaminated by tank overflow in high tides and rain.

f) Individualise

This aspiration was evident from the exterior of the houses in Novos Alagados . The different choices of external paint, tiling and even the security mesh on the windows revealed the residents' aspiration to individualise their homes.

### 6.1.3 Summary of Findings:

The study of the Novos Alagados housing intervention using Amartyr Sen's Capability Approach highlighted the less than obvious aspirations of residents and what a substantial impact housing design features can have on the lives of residents. It was only through discussion and consultation with the community that we fully understood their needs. Once these aspirations were identified, it was clearer to us as designers how certain design features – such as a timber or brick façade - could promote or hinder the residents' aspirations. Had the local Government or other NGO's involved in this housing intervention taken the time to investigate these needs prior to design and construction of the housing units, the current economic, social and even physical state of the residents might be quite different today.

## **6.2 Pemulwuy Project, The Block, Redfern NSW**

### 6.2.1 Introduction and History of the Block

The Block is approximately 8000 square metres of land in Redfern, bordered by four streets of Everleigh, Caroline, Hugo and Hudson, rich in history and controversy, and recently described by Timeout Sydney as “Urban slum, Aboriginal icon or real-estate goldmine?”.

As described on the AHC website, the Redfern area has long been home to Aboriginal people. The traditional owners of Redfern are the Gadigal people (also known as the Eora people) who had lived in Redfern and the surrounding areas of Sydney for more than 40,000 years before the landing of the British in 1788. The Gadigal population was virtually wiped out due to a small pox epidemic within the first three years of European settlement as well as violent clashes fighting against the invasion of their land. Their resistance was led by the Eora leader named Pemulwuy (meaning “Earth” in Bidjigal language) after whom the housing project is aptly named, symbolising the continuation of the struggle of the indigenous people of the area.

There was a large migration of Aboriginals to Redfern throughout the 1900s due to the possibility of regular work in the nearby railway yards and perceived education and housing opportunities. The Aboriginal population surged after the 1967 National Referendum which gave citizenship rights to Indigenous people for the first time along with the promise of better access to services in the cities. This migration continued to such a great extent that in the early 1970s a serious overcrowding and homelessness crisis had developed in Redfern.

There were large numbers of Aboriginal people in Redfern without permanent or adequate housing. As a consequence, a group of Aboriginals took up squatter

residence in some of the empty terraces in Louis Street. These squatters organised themselves and ultimately formed the Aboriginal Housing Company (AHC) in 1973. Initially, with funds from a government grant, the AHC purchased and restored six terrace houses in the vicinity of the Block. The Aboriginal population of Redfern tripled between 1976 and 1981 primarily as a result of increased housing opportunities.

Having received varying levels of support and funding from changing governments throughout the 1980s and early 1990s, the AHC finally purchased the last house on The Block in 1994. However, in the early 1990s heroin had begun to infiltrate the community and the violence in and around the Block meant that very few people other than residents ventured into the area. This isolation meant that drug and criminal activities were more likely to occur due to the lack of public exposure. Many of the terraces around the Block were empty and derelict, making them a perfect location for drug dealers to congregate and conduct their business. In an attempt to expel these criminals from the neighbourhood, in 1997 the AHC demolished some of these empty houses. There are currently only about 20 indigenous households left on the Block. AHC intends to build a new, more sustainable housing development on this significant site and have named it the Pemulwuy Project.

The AHC and the residents of The Block have encountered varying levels of opposition to their project over the past ten years. Public perception of the Block suffered from the media reports of a 2004 riot and negative reports of the violence in the area. In the same year, Cabinet papers were leaked to the Sydney Morning Herald which detailed the Government's ambitious plans for redeveloping the Redfern Waterloo Area. The report highlighted that the State Government owned approximately one third of the land in Redfern and Waterloo and valued it at up to \$5 billion. The report also claimed that the value of the land would increase if Aboriginals were not living in Redfern

"There is no way that Redfern is going to be that commercial mini-centre with Aboriginal housing and The Block still in place," Ken Morrison, executive director of the NSW Property Council told the Australian Financial Review: "We need to sort that out."

Regardless of this varying support from the Government, the AHC continued their design process for the Pemulwuy Project and is now rightly proud of the design scheme which was finally given planning approval by the Government in July 2009.

### 6.2.2 The Design Process

The Design Process undertaken by the AHC for the Pemulwuy Project is an excellent example of a participatory planning process with the intent to fully understand the needs and aspirations of the residents. It has helped those involved in the project to fully understand the cultural and social values of the residents and how they relate to housing on the Block.

The initial step in the design process of the Pemulwuy project was to commission a Community Social Plan for the site. The Social Plan was intended to document the current social situation on the Block and the most appropriate ways to address existing social issues. It aimed to investigate the aspirations of the residents of The Block by identifying twelve principles<sup>28</sup> which were to be considered during any design and decision-making processes on the project;

1. Reconciliation and Social Harmony
2. Appropriate and Affordable Housing
3. Culturally Appropriate Service and Facility Needs
4. Community Safety
5. Supporting Families, Women and Children

6. Aboriginal Health
7. Aboriginal Identity, Culture and Spirituality
8. Training, Skills Development and Employment
9. Ownership and Management
10. Aboriginal Enterprise
11. Ecological and Environmental Sustainability
12. Contact with Nature

These principles not only provided guidance for the design process, but also formed the basis of evaluation criteria. A scoring system<sup>29</sup> was developed to measure the performance of the design against various aspects of the twelve principles. This scoring could be used by planners, architects, landscape architects, engineers and builders in their work to ensure the final development reflects the expectations of the Aboriginal community on the Block.

The Social Plan won a National Award for Excellence in Community Housing in 2001. In 2004 the Social Plan received an international Crime Prevention Through Environmental Design (CPTED) Innovation Award from the International Security Management and Crime Prevention Institute and the International CPTED Association.

The next step of AHC's design process for the Pemulwuy Project was a series of consultation workshops run by the AHC's Planning Team. The purpose of the workshop was to help decide on the physical form of the new development. The workshops were an important way to involve as many experts and indigenous community leaders as possible. Topics discussed in the workshops ranged from urban planning to community and public domain safety to environmental sustainability.

Further to this process of consultation, the top twelve final year architect students at Sydney University participated in a design exercise called "Dreaming of the Block". The students each produced a prototype design for a new house on the Block and their models were displayed at the AHC offices. The community were encouraged to assess the different models and provide feedback. This demonstrated a very successful way of helping the residents understand the design issues. Instead of having to visualise design features described in reports or drawings the physical model of the house prototypes helped the residents to understand how certain design aspects might have positive or negative impacts on their lives. Feedback from this process was collated and a 'working model' produced which was used as a stimulus for more consultation and discussion.

In addition to the social plan, the AHC commissioned Merrima (Aboriginal Design Unit at the NSW Government Architect's Office) to create a Cultural Brief to establish the cultural identity of the project and which elements of the project could be used to express those cultural values. Four areas were identified as landscaping, public art, engagement of the community and RED Square – a large public space proposed as the main entrance to the development.

This planning process therefore resulted in a comprehensive set of guidelines on the aspirations of the local residents, which the design team used to complete the scheme design to submit for Development Approval. The Pemulwuy Project current design is a mixed-use development including 62 family homes, a business college, a hostel, a sports centre, a spiritual elder's area, a civic square, a retail office building and Aboriginal artist markets.

### 6.2.3 Aspirations of Residents and the Subsequent Design Features



The aspirations of the residents of the Block, are well summed up by Mr Dick Blair, one of the 11 original directors of the AHC;  
"The whole aim of the project is to bring Aboriginal people together so that we can live in the way we want to live and share what we have with one another. Many of us are now living in slums and pigsties because we cannot afford the high rents. It is difficult to get jobs because we have no skills and because white people don't want to employ us. We can't be proud to live in these conditions. But when we are living together we will be able to help each other to learn skills and to get jobs and, most importantly, we will be proud of our houses and proud of our community. Our children will be able to grow up with more opportunities than we had and they too will be proud of their community and proud of themselves. All we ask is that we be given a chance to prove that it can work".

The information provided in the social plan, particularly the twelve principles can be interpreted to represent the following aspirations of the present and future residents of the Block.

#### a) Community Pride

Redeveloping the Block with a new sustainable, mix-use, landmark development would help the Aboriginal residents of Redfern regain the respect of the wider community they feel they have lost through the degradation of the Block. Currently, the negative image of the Block as a hub of criminals and drug dealers has damaged the image of the Aboriginal people in Redfern in the eyes of the surrounding community. The indigenous community would like non-Aboriginals to be equally proud of the Block for its history and culture and recognise the many achievements of this Aboriginal community.

The fact that the local community is part of the decision making process allows them to ensure that the final development is something that they will be proud of, a development which will showcase values that they themselves consider to be the most important.

Aside from the perceptions of the surrounding non-Aboriginal community, the community on the Block see the land as one of spiritual significance. The significance is not only of the tradition Gadigal land and their fight which ended in the first urban Aboriginal land purchase but also in the fact that the Block in Redfern has become a meeting place "like a traditional Koori watering hole" (Mick Mundine, Chief Executive Officer of the AHC). The Block redevelopment will directly allow for this interaction of Indigenous people from other areas, since 42 of the new 62 houses will be filled by new residents to the Block. It is therefore important to the residents that the design of the Block achieves a 'Sense of Place' or connection to Aboriginal spirituality.

#### b) The Right to Choose (*Health and Amenity*)

The AHC felt that the previous design of housing in the area, consisting mainly of old terrace houses, was inappropriate for the local residents. The buildings were dark and dingy, with high maintenance requirements. The interlacing laneways became places ideal for drug dealing and crime.

The Aboriginal community want to live in housing which is appropriate to their values, and only they can decide what this means. The new housing development aims to provide healthy, comfortable yet affordable homes with minimal maintenance. Due to the transient nature of traditional Aboriginal lifestyles, maintenance of housing has not traditionally been of high priority in the values of the indigenous people. The design consists of six three-storey multi-apartment units. The vertical transport design is such that 80% of the units can be accessed without the use of lifts, and the remainder rely on hydraulic lifts which have minimal maintenance requirements.

Outdoor living and interaction with nature is also an important value for the Aboriginal residents of the block. Thus the floorplates of the units are stepped, to ensure open, north facing, balconies on each floor. The external space of each unit is actually equal in size to the internal space thus providing an appropriate, urban response to this need.

#### c. Safety

The Block has become a place notorious for crime and in particular drug dealing. The local residents hope that the new development will eradicate these negative elements in the community and restore a healthy safe environment in which their children can live.

As mentioned previously, the project has won an international award for Crime Prevention Through Environmental Design (CPTED). CPTED is a method of assessing the relationship between crime prevention and physical design, and the management and planning of facilities and public areas.

“The design concept for the Pemulwuy project aims to remove areas of seclusion and emptiness, where crime and violence can occur un-noticed.”<sup>30</sup> The openness of the site layout, minimising laneways or hidden corners aims to ensure openness and public surveillance which will assist in crime prevention.

#### d. Prosperity

Many of the previous aspirations link into the aspiration of prosperity and success of the residents and their families. The local residents believe that reduction in crime on the Block and the development of a cherished Aboriginal precinct in Redfern will help to minimise the racial discrimination of urban Indigenous Australians and thus improve their opportunities for education and employment. Employment and training is also a major goal of the actual construction of the project, where local labour is intended to be a priority. Aside for this the proposed development consists of equal areas of residential and commercial development, providing local job opportunities.

Being so close to university and Tafe campuses, the new rental housing on the block should provide housing for youths from other parts of the country, giving them the opportunity to improve their education and future employment potential.

### 6.2.4 Summary of Findings;

The Aboriginal Housing Company did an exemplary job at investigating the needs and values of the residents in designing the Pemulwuy housing project. They have come to appreciate the importance of appropriate housing, through the devastating impact of mistakes made in the past. The AHC has seen the Aboriginal community on the Block suffer from crime and unemployment and has remained determined to provide a housing development that will not only provide shelter but nurture a community back to health. The AHC has focused on the needs of the urban Indigenous community living in Redfern. This group, although varied, is more homogeneous than a typical inner city affordable housing project, either government or private, which could be home to residents of varying cultures and backgrounds. Nevertheless, it is important to take the time to investigate the potential resident of any housing development and help to promote their common needs and aspirations.

## 7. Environmentally Sustainable Design - Case Studies

This section of the paper will document two different case studies of affordable housing projects which have focused on environmentally sustainable design. Both projects have won international awards for these design features. These are described and assessed in terms of how they impact on a resident's needs and aspirations.

### 7.1 Recife Affordable Housing Design

#### 7.1.1 Introduction

Geographically, Recife (the Portuguese word for Reef) is a coastal city located in a humid tropical climate zone which is characterised by intense solar radiation, high humidity and rainfall accompanied by high constant temperatures. The city's land is very low lying, intersected by waterways and prone to flooding. Recife city is home to just over 1.5million people and notable in that it has the highest murder rate of any Brazilian state capital. The city has vast socioeconomic inequalities with approximately 55% of the urban population living in favelas<sup>31</sup> which are interspersed throughout the city, often bordering affluent neighbourhoods characterised by luxury apartments.

This section of the paper will look at an affordable housing design created by Brazilian architects Andrade Morettin Arquitetos Associados Ltda (AMAA) based in Sao Paulo. The design was completed for a site in a city called Recife – the capital city of the State of Pernambuco in the North East of Brazil. This design was awarded the Living Steel award in the 2<sup>nd</sup> International Architecture Competition for Sustainable Housing. Living Steel is a campaign which was developed by the World Steel Association to help improve the quality of live for growing urban populations. It was designed to stimulate innovative and sustainable housing design and construction in steel.

In 2007, AMAA submitted and won this competition with their prefabricated steel, four-storey urban housing design for Recife. The architects focused on the essentials of comfortable living which they term "Essential Architecture". This "embraces basic minimalist construction with an economic use of materials for a light structure". The buildings incorporate elements which promote both physical and social sustainability relevant to the local context. As part of the design brief, the Client provided a report written by sociologists describing the local demographic and social environment to ensure that the design was appropriate.

The low-rise apartment building designed by AMAA, consists of no more than four storeys thus providing the required density without the need for motorized vertical transport. While the design aims to respond sustainability concerns through reduction of materials and energy use, this chapter will look at how this impacts its performance in providing residents with a means to achieve the things they value.

This housing development will be analysed in the context of how the design meets the needs of residents in the area. The project has not progressed to construction; therefore no post-occupancy data is available. The paper will therefore consider how the design features have accommodated potential needs of residents.

#### 7.1.2 Design Features:

##### a) Inner city location

The housing development was designed to be located in an Inner city location with good access to work and services, as opposed to fringes of city. The design therefore offers residents the opportunity to be close to employment and services. This not only reduces the need for private transport, for young residents or families this can provide the capability to attain income and prosper, while for elderly residents this provides peace of mind, knowing that good medical care and services are in close proximity to their homes.

b) Steel construction

While steel is more expensive – the design was based on the assumption that prefabricated elements would be quicker to construct and the lightness of the structure meant less excavation and complex foundation engineering in a weak, sandy soil, making it more viable. Incidentally, this has not turned out to be the case as the cost of steel has risen so much that the client no longer considered the project to be feasible.

The cost of construction was important in this project, since any elevated costs in construction would be passed onto the resident. The system for providing affordable housing in Brazil is that the bank provides capital for developers at low interest rates to build the housing after which citizens purchase these units on the open market with money also borrowed from the same government banks at low interest rates. The low construction cost and subsequent low purchase price for good quality housing aligns with residents' aspirations to attain wealth and invest in their future. Money can be spent on education or enterprise, rather than housing costs. Steel construction in this coastal environment however would need to be highly corrosion resistant to ensure durability of the structure and subsequent low maintenance costs.

The opportunity to purchase a home at a reasonable cost as opposed to renting could also align with a resident's aspiration to attain an asset which can generate profit through sale and allow them the choice to expand or the choice move to other locations perhaps to be closer to family.

c) Passive thermal conditions

The design has some excellent features which allow for low-cost passive thermal control of the units. The design of the superstructure includes a large roof and balcony over-hangs which act like 'umbrellas' to ensure protection from the rain and direct sun. In line with the design philosophy of material reduction as well as this intent to enhance passive thermal performance, this design does not include heavy brick wall construction. This reduces the weight on the steel structure and provides a low thermal mass to avoid accumulation of heat in a climate where the nights are as equally hot as the day. The reduction of heat build-up provides thermal comfort for residents who cannot afford the cost of mechanical cooling systems. The design was also conceived with bright colours to minimise absorption by solar radiation.

Excellent cross-ventilation is also a key design feature and contributes to the passive solution of the units. The unit buildings were located on the site so as to line up with prevailing winds and allow maximum airflow. For these same reasons, the balcony facades are designed without glass but consist of user controlled, openable light-weight shutters which block the intense sun, yet do not block ventilation. The façade facing the common walkway is polycarbonate cladding within lightweight steel frame.

These features are likely to align with a resident's aspiration to live in a healthy, comfortable internal environment without any particular changes in living habits. However, also to be considered is that Recife is one of the most dangerous cities in Brazil, more than twice as deadly as Rio de Janeiro with an estimated 2617 people murdered in the metropolitan area in 2007<sup>32</sup>. Safety is therefore a major issue in the lives of residents.

Affordable housing needs to provide residents with a secure environment therefore, considering the local context the lightweight façade is a potential clash with the resident's need to live in safety. There are considerable numbers of Brazilians killed by stray bullets passing through windows and lightweight construction. According to police figures there were 16 people killed by stray bullets and 220 were injured in Rio de Janeiro throughout 2008<sup>33</sup>. This is therefore a highly sustainable feature which may end up hindering rather than promoting the residents aspirations for themselves and their families to live in safety.

#### d) Minimal Energy Consumption and Reuse of Resources

The design of the multi-unit building includes several features which reduce the impact of the development on the environment. These include the possibility of including solar hot water heating or even photovoltaic panels on the roof of the structure and the collection and reuse of rainwater from a large gutter in the centre of the roof.

These features are not only beneficial to the environment but would reduce the on-going costs of the residents. If the building itself could contribute to the monthly requirement of power and water, there would be a reduction in bills and therefore generate savings for residents. This would obviously align with the aspiration of residents to attain wealth. Other aspirations to consider may be concerns over hygiene of recycled water, reliance and maintenance of technologies. Disruption of services or cause of illness can impact on the residents' ability to carry out their everyday lives including caring for others and attaining income.

#### e) Spatial Design and Layout

The internal layout of the units consists of either one or two large rooms which open onto the balcony, with ablutions along one wall. Kitchen facilities form part of the main room, also aligned with the front façade. The large space is not partitioned by fixed walls but is intended to be divided by lightweight partitions as required.

The large open space as well as the connected balcony allows for flexibility to suit the occupant's needs. For example it is common in the locality to sleep in hammocks rather than fixed beds. The space can be used as a sleeping quarters, with hammocks going up during the night and being removed in the morning to make space for daily activities. This flexibility means changes in the family can be easily accommodated, aligning with residents' potential aspirations to expand, as well as to individualise by being able to control the interior arrangement of space. "Intervention in space by user is not only allowed, but in fact encouraged: The participation in the definition of the space stimulates the feeling of belonging, which besides adding to the wellbeing of the community also improves the involvement and responsibility regarding the preservation of the place - a fundamental factor for the sustainability of the complex"<sup>34</sup>.

This is an ideal design for locations where the residents may come from various cultural and social backgrounds where privacy can be viewed differently. For those residents who aspire to privacy in their home, partitions will allow them to achieve this separation, while those who do not value privacy as much have the freedom to disregard enclosed living quarters.

Balconies and horizontal circulation provide space for meetings and daily interaction with the community – "These common spaces are the spine of the building's dynamics and may become the backbone of the community as well"<sup>23</sup>. Provided these areas are safe they may provide the resident with a chance to participate in a social network and feel part of a community thereby generating personal, social and economic benefits of the housing development.

### 6.2.2 Summary of Findings:

As members of the Construction Industry we often impose our own assumptions of a resident's needs, these assumptions may not be applicable to the circumstances of the individuals. Ideally, a study should be commissioned as part of a housing development brief, which clearly identifies the target market and their needs and aspirations, as was the case in the Recife Affordable Housing project. In assessing the design features of this housing design, it became evident that putting time and effort into the investigation of resident's aspirations before we proceed with design is important in order to deliver an appropriate housing development which will be well used, long standing and therefore sustainable.

## **7.2 K2 Public Housing Windsor Vic**

### 7.2.1 Introduction:

The K2 Housing development was commissioned in 2000 by the Victorian Government's Office of Housing (OoH) to be an "Environmentally sustainable and socially responsible design"<sup>35</sup>. K2 is a 96 unit, medium density apartment complex in the south east of Melbourne City. The OoH was not only the Client for this building development but also took on the role of project managers. Design Inc's winning architectural design was completed and residents began occupancy in March 2007. Since completion the K2 development has won many awards for sustainable and socially responsible design, including most recently the 2009 United Nations award for "Best Sustainable Residential Complex – World Environment Day Award".

Due to the innovative design of the residential units, OoH realised that tenant education would play a critical part in the success of the housing development. Occupants of this social housing complex are generally low income earners or those with illness or disability. The demographic mix at K2 consists of elderly residents, middle aged and young adults, some of whom are disabled or infirm and therefore benefit from the close proximity to hospital services. The development is not designed to cater for families with young children.

A Tenant's Education Kit was developed and handed out to residents upon their arrival and information boards remain on display in front of the entrance and in the common spaces of the development. There have been ongoing education sessions held for the tenants, to further educate them on how to most efficiently use the building.

The final design aimed to reduce gas, electricity and water usage based on a typical development of this kind. OoH undertook to meter the usage carefully and carry out post-occupancy surveys to analyse the success of the features. The next section will look at the sustainable design features and their successes based on the post-occupancy metering and how this may be linked to aspirations of the residents. For the purpose of this assessment possible aspirations of residents are considered since no interviews have been carried out with occupants.

### 7.2.2 Features including post-occupancy assessment:

#### a) Site Plan including "Green" Spine

The 4800 square metre site consists of four connected buildings which are oriented on the east west axis. Two of the buildings are 8 storeys, with the remaining two 4 and 5 storey height. The buildings are staggered and spaced to allow maximum solar access to each of the buildings north façade and to allow communal courtyard areas between the buildings.

Adjacent to the 'Green Spine' are shared, common landscaped areas. These areas are intended to promote social interaction as well as increase awareness of the sustainable functions of the building, containing water tanks and landscaping features.

Approximately 20% of the site layout is dedicated to landscaping. The layout of the common courtyards consists predominantly of paving and 'water smart' gardens planted with durable species which can survive the dry local climate. The benches placed in this area seem appropriate for the elderly or infirm who can use this space for social interaction. This feature does therefore appear to align with the needs and aspirations of the intended demographic.

#### b) Passive Design

Various design features of the units contribute to the internal, passive thermal conditions. No electric heating was provided, in its place a central gas fired hydronic natural convector system was installed. Combined with passive design features and because gas has much lower green house gas emissions than typical electric heating systems, the emission of CO<sup>2</sup> generated by heating demands in the K2 apartments was predicted to be 88% less than a standard apartment development.

The results of the post-occupancy analysis of meter readings from February 2008 to January 2009 show a much greater use of energy for heating and hot water combined. The actual gas meter readings were consistently higher than the predicted targets, with a total excess for the year of 230%. The target values aimed at a 0MWh usage of gas for heating purposes from the months of October until the end of April. In these months the excess above the target was as much as 1000%. The post-occupancy data does however show the success of the greenhouse gas emissions – dropping 27% below the target for the project, which is 69% below the predicted emissions of a standard apartment building.

It is interesting to consider the reasons for the larger than predicted energy usage for heating, especially in the summer, spring and autumn months. In order for the passive heating features to operate as designed, the residents must be mindful of when they should and shouldn't open windows or operate fans – as outlined in the Tenant Education Kit. Therefore, this discrepancy may be an issue of more education and learning on the part of the tenant. However, since this energy consumption is linked to the behaviour of the tenants, it may be that some of the residents' particular needs and aspirations are driving these figures.

Looking at the demographic of the housing development there is a large percentage of the residents who are elderly or infirm. It may be that this group of residents prefer a higher ambient temperature in their apartments, due to their poor physical state. The higher than normal needs of these residents would need to be taken into account in the design and predicted performance of the building. A way of determining if this is actually true would be to plot the demographic of each unit's occupants with their actual energy use to determine whether there is a common link. Depending on the priority, there are two ways of considering this relationship. It may either be that the building performs better under the occupancy of a different demographic of resident or it may be that due to the specific needs of the residents in this building, its performance will not be as good as a theoretical target could be.

#### c) Reduction in Water Usage

Water conservation is another important design feature of the K2 development. Rain water is collected from all the roofs and stored in water storage tanks in the central courtyard. This water is pumped to gas powered domestic hot water plants, reducing

the use of mains water. The collection of rain water also reduces the amount of stormwater drainage entering the council system.

Grey-water is collected from sinks and showers in the two larger apartment buildings and is treated for re-use in toilet flushing and garden watering. The Tenant Education Kit advises residents what can and can't be put down their sinks to ensure the water is not contaminated. Currently, the amount of grey-water being collected is much less than predicted. The OoH believes this discrepancy is due to the reduction of resident's water usage further to the success of their tenant education campaigns.

The K2 design predicted a 53% reduction in water usage when compared with a standard apartment development. Water efficient fittings contributed 28%, 8% from rainwater collection and a further 17% from recycled grey water. Further to the results of the post-occupancy metering, this targeted amount of water use is being met, assuming that each unit is home to 1.5people. Even if this varies slightly, it is considerably less than a standard apartment building. The reduction is due to the inclusion of sustainable design features which do not impact the residents' use of the water but rather the treatment of it after use.

### 7.2.3 Summary of Findings:

The K2 apartments are an excellent example of an affordable housing project which has attempted ground-breaking reductions in energy and material usage. The OoH has been dedicated to the achievement of a housing development which could set standards for sustainable construction into the future. In researching this project, the emphasis on the building itself has become very evident. The designers recognised early on that the success of some of the sustainable design features such as recycling grey-water and passive thermal heating would require the collaboration of the residents. Therefore, there has been and continues to be a large amount of effort spent on educating the residents on the needs of the buildings instead of the other way around. Alternatively, the needs and aspirations of residents allocated by the public housing system to this inner city development, close to medical services could have been initially investigated and the building features designed to suit them.

From the assessment of the post-occupancy data, the building has been partially successful in its actual reductions of energy, but definitely successful in its aim to raise awareness of the issues and trial new design features which have the potential to reduce the environmental footprint of residential developments. If these design features could be linked to the needs and aspirations of the residents, they could be even more successful.

## **8 Conclusions**

The exercise of assessing the impact of design features in various affordable housing projects in Brazil and Australia was carried out to highlight the importance of the people using them. Without consideration of the resident's values and aspirations, highly sustainable, technical features can be left redundant or not used to their full potential. By promoting this consideration the Australian Construction Industry can not only support physical environmental sustainability which can be achieved through building features, but also support social sustainability and the improvement of the lives of citizens struggling with housing needs.

In an ideal world, our aspirations would align with the needs of our physical environment. Unfortunately, this is not always the case and people's values are sometimes opposed to it. In order to introduce successful sustainability initiatives, we must work with these aspirations in order to succeed. Therefore, in designing



affordable housing we should prioritise the investigation and understanding of the target market.

This ideas presented in study Amartyr Sen's Capability Approach can be extended to the broader question of what minimum standards should be provided for Australians in relation to housing. The Universal Declaration of Human Rights<sup>36</sup> states that the right to adequate housing is essential. The right to housing is also recognised and supported in Australia's National Action Plan on Human Rights which states that all Australians should have access to affordable, adequate and appropriate housing. Both of these documents however seem to be geared to providing capacities or negative freedoms as opposed to capabilities or positive freedoms to improve their lives.

Australia, being a prosperous, developed country is in a position to do better than just alleviating the negative freedoms of shelter for low income earners and should be aiming to provide affordable housing which promotes positive freedoms, enabling lower income earners to flourish and improve their lives.

To do this the Australian Construction Industry should focus on this research in the early stages of the design process and make the findings available to all members of the project team. It is essential that residents themselves participate in this process, so that false assumptions are not made. The design features then need to be selected and incorporated in accordance with these aspirations. This will ensure their success and therefore the social and physical sustainability of the housing development. Since residents can change as can values and aspirations of different generations, an amount of flexibility should be incorporated into the design and delivery of affordable housing developments to ensure that residents themselves are given some control in the use of their homes.

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## **Amazing Labyrinths: The value of including a labyrinth in a playspace**

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### **ABSTRACT**

*Adults are often serious in the labyrinth. Children most often run in and out as fast as they can in a playful manner. The labyrinth has its own energy that calls to children and asks them to run and shout. The joy of the labyrinth is contagious. The meandering path of a labyrinth is one of intuition and faith, always involves risk and is full of creativity and surprise.*

*Participants will be provided with an opportunity to experience a labyrinth, draw a simple labyrinth and discuss how to include a labyrinth in playspaces. Participants will be made aware of or take away an appreciation of the value of labyrinths to provide play opportunities for children and special places for the community.*

**Keywords:** Labyrinth, maze, playgrounds, playspaces, children, leisure

### **What is a labyrinth?**

A labyrinth is a pathway, twisting and curving that leads to the centre, or the goal, it consists of a single meandering pathway which leads from the entrance to the centre, and back out again. There are no dead ends, tricks, or choices to make. It is not a puzzle (maze) to transverse. Simply follow the path and you will arrive at the centre of the labyrinth.

The labyrinth is designed through systematic geometry. Many patterns are based on spirals from nature. The path leads you on a circuitous route to the centre & out again.

You may pause at the centre, for a little while, or longer. The way out follows the same path as the way in for nearly all labyrinths.

There are some labyrinth forms that have a direct way out—or two ways in and out—they usually are used for long processional celebrations, still, the way is obvious, there is no trick being played or decision to make.

### **My Experience**

My first experience of the Labyrinth occurred when I was working in a children's service. At the time, I was not aware of the significance or value of the labyrinth and how it assisted in the children's development. The centre had a double finger labyrinth. I recall it being a popular item and it was permanently on the puzzle shelf.

### **Dylan's Story**

Dylan commenced at the centre at 4½ years of age. His attention span was limited. He was not toilet trained and his vocabulary consisted of mostly swear words. He was a very aggressive little boy. The program we developed for him included a quiet area (one child activity) where Dylan could escape if he was feeling angry or anxious. Dylan often chose the finger labyrinth as his quiet activity. Within weeks of commencing at the centre, Dylan was more cooperative and social, his language had improved, and he wore spiderman undies

with pride. He would still get angry at times but was able to deal with his emotions more readily. By the end of the year, Dylan was ready for school.

11 years on, Dylan is doing well at school, is involved with the local youth group and has a casual job at the local café. He often greets me with a warm smile and will have a chat (as best as a 16 year old can)! I now believe that the labyrinth assisted Dylan to find himself.

### **More Recently**

In 2009, I attended an information session at The Children's Hospital Westmead where Robert Ferré from Labyrinth Enterprises (USA) presented information on labyrinths. I immediately became intrigued! The labyrinth hunter in me emerged and my research began. Upon recalling the effects of the labyrinth on children from my early childhood days, I was excited to explore the value of the inclusion of labyrinths in playspaces.

### **Synopsis of the movie: part 1**

Sarah is stuck babysitting her brother Toby and tries to quiet his screaming by telling him the story from her favourite book - *Labyrinth*. As she ends the story and turns out the light, she says, "I wish the goblins would come and take you away, right now." Suddenly, Toby's crying subsides, and Sarah enters his room to find Goblins have stolen away with him.

Jareth, the Goblin King, gives Sarah 13 hours to find Toby before he is turned into a goblin. She must find her way to the centre of a fantastic labyrinth riddled with logic puzzles and tests, to get Toby back.

### **Labyrinth History**

Dating back at least 3,500 years, the labyrinth has been found in various cultures, traditions, and religions around our world although its origins are still mysterious. A classical simple seven-circuit labyrinth appears as a design on cave walls and ceramic vases. There are Cretan, Native American, Greek, Turkish, Celtic and other ancient labyrinth designs.

In Greek mythology, the Labyrinth was an elaborate structure constructed for King Minos of Crete to hold the Minotaur, a creature that was half man and half bull and which was eventually killed by the Athenian hero Theseus. Theseus was aided by Ariadne, who provided him with a fateful thread to wind his way back again, a clue to the single path of the labyrinth.

The labyrinth is found in churches and cathedrals, the most popular being the labyrinth built into the floor of Notre Dame d'Chartres Cathedral (built around 1200 AD.) and became one of those prayer forms that Christian churches adopted because of its spiritual value.

In our own day the labyrinth is being rediscovered as a spiritual tool with a wide variety of interpretations. It is still a metaphor for an individual spiritual journey. Over the past ten years labyrinths have undergone a dramatic revival, beginning in churches, hospitals, health care facilities, spas and retreat centres, schools and universities, public parks, memorials and healing gardens.

### **Types of Labyrinths**

Based on a pattern first documented on a clay tablet from Pylos, Greece (circa 1200 BCE) labyrinths are easily constructed using a seed pattern.

- Classical
- Contemporary
- Concentric

Walking Labyrinths are large enough to literally be walked and can be either permanent or temporary constructions and either indoor or outdoor.

Personal Finger Labyrinths offer a different, yet equally rewarding experience, and have the added benefit of convenience and portability. They can be made from a variety of materials, in a variety of designs and sizes.

### **Walking a Labyrinth**

The labyrinth has a myriad of uses and each of us will find our own way of walking it and using it. Walking the labyrinth can bring up many different emotions. Some people feel completely elated; others are overcome with emotions. Whatever your response may be, just go with it rather than trying to fight it. Each of us needs, and finds, our own particular, satisfying path.

No matter what size or style of the labyrinth, the space in it provides a strong, safe place for us to experience our ups and downs. As we walk this sacred space, we can be reminded of the twists and turns of our life as well. It reminds us that even though we may seem to be on a path to nowhere, if we look deep inside ourselves, we'll come to the centre of our being and that's where all the answers lay.

Almost always people express feeling more content, grounded, or empowered after walking a labyrinth.

### **Benefits of a Labyrinth**

- Stress reduction
- Quieting your mind
- Enhancing feeling of well-being
- Focusing
- Problem-solving
- Spiritual reflection

### **Value to Children**

On discovering a labyrinth for the first time children will often race around the circuits, take short cuts, jump from path to path and generally do their own thing in a rather more exuberant and energetic spirit than adult walkers.

It is perfectly ok for children and teens (or adults) to run the labyrinth. Let children play, skip, hop, or even dribble a soccer ball if not disturbing others using the labyrinth.

A sense of fun can be reflected in the design of the labyrinth by use of bright elementary colours and exciting patterns that can be incorporated into a variety of shapes including animals.

For those children who are unable to walk or run, the scale of the labyrinth is such that the whole pattern can be seen in its entirety and the different paths followed by eye.

Labyrinths provide a powerful means of introducing restful movement into children's playspaces/playgrounds. Walking a labyrinth is a right brain activity requiring a passive and relaxing mindset.

Labyrinths can be designed in many ways and with different materials as long as there is a single path to follow.

Benefits include calming, improved creativity, conflict resolution, problem solving, dealing with loss and life-limiting conditions. Labyrinths can be a lot of fun!

Children naturally know how to use a labyrinth. We can learn from them that approaching a labyrinth is simple. Let it be. Don't have expectations.

### **Labyrinths in Playspaces**

- Active – walking, running, balancing
- Quiet - able to be alone, observing, reading
- Creative – inclusion of activity stations
- Social/Imaginary – walking or playing games with friends

### **Plan the Labyrinth**

- Location
- Size
- Type
- Easily accessible
- Reasonably quiet

### **Synopsis of the movie: part 2**

Once in the labyrinth, Sarah meets an ancient looking dwarf with a feisty attitude named Hoggle. She found Ludo, a furry giant beast and a gentle creature despite his massive size and Sir Didymus, a fox knight with a sheepdog as his steed.

With their help, Sarah was able to navigate the hazards and tests of the labyrinth to get to the Goblin City. After a battle with the goblin inhabitants, they eventually make it through the chaos to the castle.

Inside the castle, Sarah finds Jareth and Toby within a labyrinth (based on the MC Escher painting) and desperately tries to reach her baby brother. Jareth offers her all her worldly dreams as his Queen to forget Toby and her human life. With only moments to spare, Sarah remembers the words from the book “you have no power over me”. The labyrinth disintegrates and Sarah finds herself and Toby back in their home. The defeated Goblin King is banished to live in an owl form forever.

Is “Labyrinth” the correct title for the movie? Not really. But then it does sound more exciting than “Maze”!

### **Children’s Reflections**

- *“When I walked the Labyrinth I felt relaxed and comfortable. I felt small – kind of in not out. It was very peaceful and quiet”*
- *“It makes you feel happy when you walk around it”*
- *“I figured out a way to talk to people and get their attention. It is better to talk than to grab someone’s neck when they are bugging you”*
- *“I thought about lies I have told. I am really sorry about lies I have told my friends”*
- *“I decided to go home and say sorry to my sister”*
- *“It helps you feel better when you are mad”*

### **Sources**

*Flight of the Hawks* is taken from the CD *Pangea Percussion and Winds: Everything Spins*. For more information go to [timelessproductions.com](http://timelessproductions.com)

*“Part 1 - Manual” of the Kids on the Path - School Labyrinth Guide* Marge McCarthy 2007.

*Idea Book* Robert Ferré Labyrinth Enterprises 2002

Labyrinth Link Australia: [labyrinthlinkaustralia.org](http://labyrinthlinkaustralia.org)  
Labyrinth Enterprises: [labyrinth-enterprises.com](http://labyrinth-enterprises.com)  
The Labyrinth Resource Group: [labyrinthresourcegroup.org](http://labyrinthresourcegroup.org)  
The Labyrinth Society: [labyrinthssociety.org](http://labyrinthssociety.org)  
Timeless Labyrinths: [timelesslabyrinths.com](http://timelesslabyrinths.com)  
Labyrinthos: [labyrinthos.net](http://labyrinthos.net)

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**Additional Resources**

*108 Ways to Use Labyrinths in Schools* Gael Hancock Labyrinthos, Thundersley, England, 2004 - An ideal introduction for labyrinth use in schools, with 108 suggested labyrinth-related activities for kids of all ages, with anecdotes and diagrams.

*Ancient Labyrinths of the World* Jeff Seward, 2001

*Schools With Spirit, Nurturing the Inner Lives of Children and Teachers* Beacon Press, Boston, 2001 - A beautiful collection of articles that encourages schools to be "soulfull places of learning where the spiritual dimension is welcomed." The separation of church and state is discussed.

*Let's Have a Labyrinth Party* Lani Rosetta Leihuna Enterprises, 2002 – includes photographs, drawings, local labyrinths, art, poems.

*Labyrinths for Kids* Lani Rosetta Leihuna Enterprises, 2001, 2002 - Exploring the Construction and Use of Labyrinths as a Tool for Increasing Fine Motor, Visual Perceptual and Gross Motor Skills in the Classroom

**The Ipswich Study:  
Understanding the relationships between people, places and health over time**

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**ABSTRACT**

Place-related issues have long been linked to health and well-being particularly with respect to socioeconomic status (SES). Australian and international data consistently reveal relationships between SES and health (Warr et al. 2007). Indeed it is very clear from the evidence that stratification of health by place is deep and pervasive (Massey 1996).

However, although social inequalities in health are persistent, the magnitudes of differences vary over time and within places (Berkman 2009). Furthermore, the reasons underpinning these relationships are not well understood. In part this may be due to the lack of research which examines people and places over time. Although there is increasingly strong evidence linking a range of health outcomes with aspects of the environment, and there is also much research which examines people and their health over the life-course, research which follows both people and places over time is lacking. Such research should however be a priority because it would enable insights into how relationships between places and health develop and emerge, help identify causal pathways, and provide opportunities for interventions and assessment of outcomes.

This paper outlines the approach being taken in such a program of research entitled 'The Ipswich Study'. The Study will help advance understanding of how different environments and circumstances interact with different individuals, groups and communities to influence their health and well-being outcomes over time. Discussion is contextualised within contemporary debates in the field and highlights knowledge gaps where the study could advance understanding.

**Keywords:** Longitudinal, Place-based, Life-course, Health, Ipswich, Ecological



## Introduction

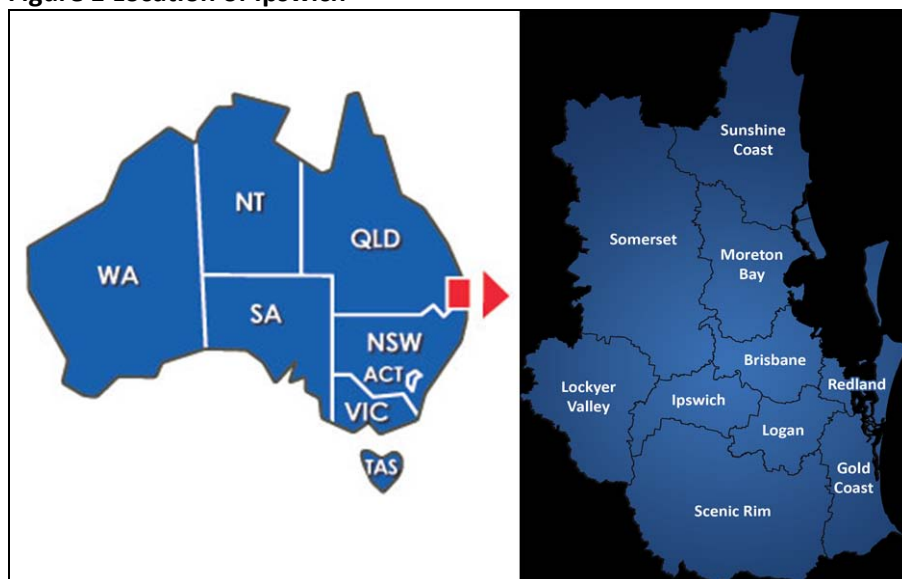
This paper outlines aspects of a proposed longitudinal research study entitled 'The Ipswich Study'. The project is based in the South East Queensland city of Ipswich and will focus on how people and communities build and maintain health over time. In particular, the study will examine relationships between places-based factors, health outcomes and health-related behaviours. The central objective of this particular paper is to highlight the major underpinning agendas, guiding principles and proposed methodological approaches which have influenced the development of the study to date. A special focus will be on the place-based methodology and discussion around why such a study in Ipswich has great potential to address important health and wellbeing research questions.

## Background

The Ipswich Study is being developed in the Healthy Communities Research Centre (HCRC) at the Ipswich Campus of the University of Queensland. The HCRC was established in 2008 as a joint initiative of the Ipswich Hospital Foundation and the Faculty of Health Sciences at the University. The primary objective of the HCRC is to conduct research with and in communities which can enhance the development of health in those communities. In particular, research with Ipswich region communities is expected to be a major focus. Aside from the logistical benefits of conducting research in the local area in which the HCRC is based, the extremely diverse population in terms of socioeconomic status, demographics and culture provides an excellent environment in which to conduct important research into how communities develop and maintain health and wellbeing.

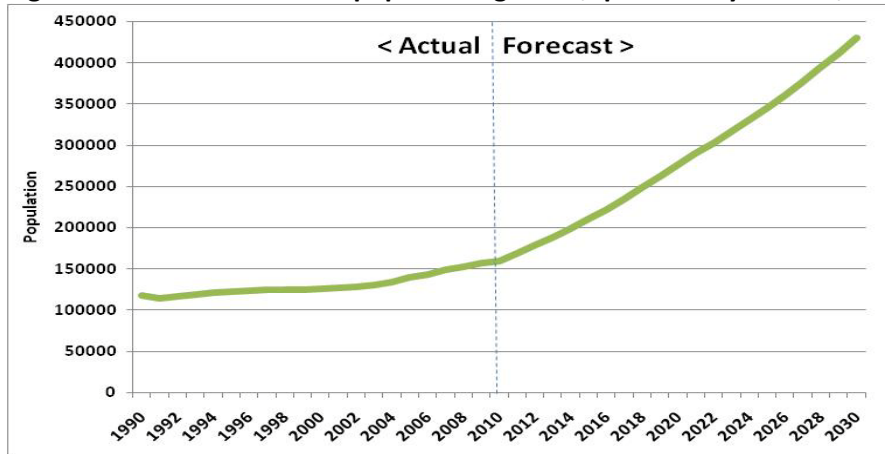
As Figure 1 indicates, Ipswich is located in South East Queensland approximately 40km west of Brisbane. Its current population is in the vicinity of 160,000 persons. Although it is a part of the wider Brisbane metropolitan area, it also has a long and distinct history as an independent centre built on mining.

**Figure 1 Location of Ipswich**



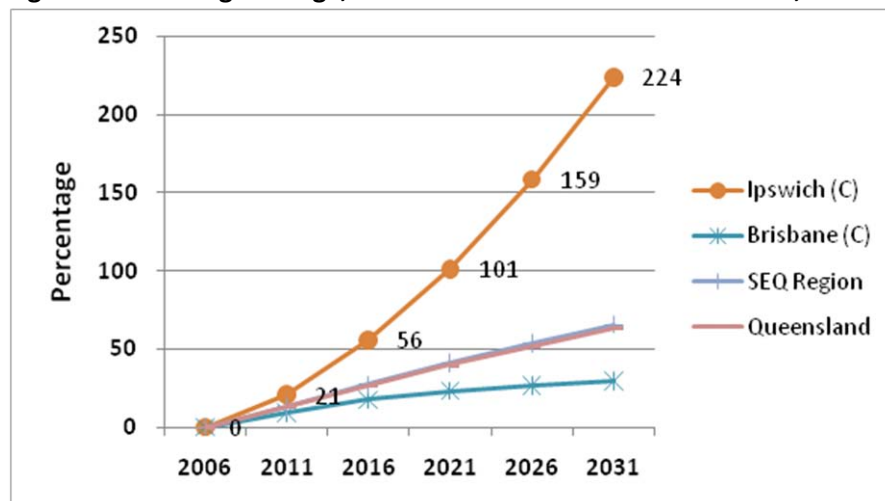
Ipswich is also located within one of the fastest growing regions of Australia. As Figure 2 indicates, population growth has been steady during the two decades until 2010 but is forecast to increase rapidly in the next twenty years. The number of independent households in the City is expected to increase by 224% during that period, a figure well in excess of forecast growth in either Brisbane, South East Queensland or the State overall (Figure 3).

**Figure 2 Actual and forecast population growth, Ipswich City Council, 1990-2030.**



Source: The State of Queensland 2009a; 2009b.

**Figure 3 Percentage change, number of households 2010 to 2030, selected Queensland regions.**



Source: The State of Queensland 2010.

Accompanying the population growth will be dramatic changes to the social, economic and physical environment. This includes the relocation of state public servants to Ipswich, upgrading and building of motorways, fast-tracking of train line extensions and continued expansion of operations at the Amberley air force base. There are also a number of major master-planned communities being developed including Springfield and Ripley Valley. With such developments there is an important opportunity emerging to better understand how such changes are manifest and experienced with respect to community health.

With such changes forecast in the region over the coming years, there is an excellent opportunity to monitor and record how the forecast changes impact upon the health and wellbeing of the region's current and future residents. To approach such issues, The Ipswich Study is proposed as a longitudinal research project. The study will thus recruit and follow a large cohort of Ipswich residents over time. The participants will be interviewed at regular intervals about aspects of their health, their lives and the places they live.

### Longitudinal Research

Longitudinal research as an approach has a long history in health, social and cultural research. Such studies have enormous potential to address a wide range of issues that cannot be tackled with cross-sectional approaches. Because the same people are involved in the study over a potentially long period of time, it becomes possible to generate a picture

of how of their health changes over time, and what factors have influenced that health at different points of their life. As such, they are able to:

- Describe patterns of change over time;
- Monitor the magnitude of change over time;
- Identify flows and pathways into or out of certain conditions;
- Analyse the duration of phenomena;
- Establish indications of causal relationships;
- Identify sleeper effects (connections between exposure and later outcomes); and
- Monitor the effectiveness of interventions.

However, despite their many uses, such studies are relatively rare, perhaps due to their complicated and costly nature. When done properly however they can be particularly rewarding in terms of research results. As Byles et al. (2007) observe 'Like the making of fine wine, longitudinal studies need careful planning and management in the groundwork stages and will not produce their best results for many years'.

Perhaps the most well known example of a longitudinal project is in the realm of popular culture. The 'Seven-up' series, as it has become known, involves a cohort of 14 British children recruited at age seven in 1964 and who feature in a documentary made then and every seven years since. Well known academic longitudinal projects include:

- The Framingham Study (USA): run since 1948 and which has provided insights into many areas of health including advances in the areas of smoking and heart disease;
- The Dunedin Study (NZ): which is a birth cohort commenced in 1972 and has provided a wealth of knowledge on development and social functioning; and
- The Busselton Study (Western Australia): which has been running since 1966 and has produced data mostly focussed on cardiovascular related issues;
- LSAC: Longitudinal Survey of Australian Children;
- LSAY: Longitudinal Survey of Australian Youth;
- HILDA: Household, Income and Labour Dynamics in Australia; and
- Mater Mothers: A cohort of mothers and their babies recruited at the Mater Hospital in Brisbane in the 1970s and followed-up since then.

### **The Ipswich Study – A Longitudinal Study of People and Place**

Although The Ipswich Study is adopting a well recognised methodological approach to help further understanding of some well known contemporary health issues, it is taking a slightly different course by incorporating as a key focus, the role of place as a determinant of health outcomes over time. As such, The Ipswich Study will follow over time the cohort recruited to the study, but also will monitor the places in which they live and the changes that are occurring with a view to understanding the relationships between place-based variables and health outcomes over time.

This focus has emerged as health outcomes are increasingly being recognised as intrinsically related to place. As Massey (1996) noted over a decade ago, it is very clear from the evidence available that stratification of health status by place is deep and pervasive. As such, place-related factors have long been thought to provide important clues on the factors which support health and well-being (Auchincloss and Diez-Roux 2008). There has thus developed a burgeoning literature exploring and identifying relationships between a wide range of place-based factors and health-related behaviours and outcomes (Leyland and Næss 2009; Macintyre and Ellaway 2003; Warr et al. 2007) and with that has emerged increasing evidence and acceptance that area of residence influences health outcomes, either in addition to or in interaction with, the characteristics of the population (Macintyre and Ellaway 2003).

Findings in a range of public health issues reflect these sentiments with a growing body of research addressing the relationship between neighbourhood context of living and health risk behaviours (Cornaz et al. 2009). For example,

- obesity has been linked to the availability of fast-foods (e.g. Reidpath et al. 2002);
- excessive alcohol consumption has had the availability of the product highlighted as a risk factor (e.g. Gruenwald et al. 2002; Weitzman et al. 2003; Livingston, 2008); and
- there is evidence to suggest that recent settlement patterns and developments in new suburbs have an impact on health (e.g. as large shopping centres replace local stores which encourages driving rather than walking) (Yeboah 2005).

However, the reasons for the apparent relationships between places and health outcomes and the mechanisms by which they manifest are not well understood. In many respects, these limitations are due to methodologies which for one reason or another do not adequately address the full complexity and dynamic nature of the relationships between people, places and their health. It is thus critical to better understand these issues because identification of causal effects of neighbourhoods and places on health outcomes would have important implications around a vast range of policies related to urban planning, transportation, community development and so forth (Auchincloss and Diez-Roux 2008). To develop this fuller understanding of health and its relationship with place will necessitate the use of studies that incorporate awareness of the dynamic nature of places, the specificity of context, as well as consideration of the pathways by which changes in context affect health over time (Galea et al. 2005). Such research questions necessitate the use of longitudinal rather than cross-sectional studies.

Furthermore, as a number of authors have recently highlighted, there is a need to examine the relationships between health status, health determinants, and individual processes at the local level more carefully through longitudinal designs. This will further help to tease out the indirect pathways, both individual and neighbourhood through which environments operate to affect health at their interface (Browning and Cagney 2003; Wilson et al. 2009). Longitudinal studies of such variables would examine chains of causation between environments and health and how features of the environment influence behaviour and subsequently affect health (Macintyre and Ellaway 2003). It is within these boundaries that 'The Ipswich Study' has the capacity to establish an important research program.

The Ipswich Study will thus endeavour to fill this void through a long-term detailed examination of the relationships between people, their health and health-related behaviours, and the places in which they live and work over time. Such a study will need to encompass many scales of place including the household, community, suburb, and regional level as well as factoring in many dimensions of those places. Importantly however, for a longitudinal study to most effectively utilise its potential, there should be an element of change occurring either to the persons involved or the places in which they live, and which can be measured. While people are constantly changing in measurable ways (the most obvious being ageing) this is not always the case with places. While change does constantly occur in places, it is not always rapid or dramatic and thus may be difficult detect and/or measure. Ipswich is thus an ideal place in which to conduct a study such as this because it is known in advance that major changes will be occurring soon.

In effect, the approach being taken for the Ipswich Study merges two well recognised methods in health research – the life-course approach and the ecological approach. As Cornaz et al. (2009) point out, understanding the life-course of social determinants as well as the ecological dimensions of health risk behaviours is essential when setting up a public health program. The life-course frameworks acknowledge that the pathways, encounters and exposures through life to risk and protective factors have a major bearing on individual and

population health and its development over time (Berkman 2009; Lynch and Davey-Smith 2005; Yu 2006). The ecological approach recognises the important role that places and contexts have in shaping the pathways and experiences which influence health as well as influencing how health-related behaviours and conditions are manifest and experienced. Where someone lives and works thus has a major bearing on their current and future health. Using this approach, and collecting data from a large cohort(s) of Ipswich residents about themselves and the places they live, The Ipswich Study will over time seek to examine the interface between various determinants of health and health related behaviours and outcomes with a view to:

- Giving insight into health differences across Ipswich and between communities reflecting different characteristics;
- Better understanding of environmental influences on health outcomes;
- Assessing how changes to the wider community manifest, and are experienced;
- Monitoring the effectiveness of interventions and changes in terms of their health outcomes; and ultimately
- Provide useful insights into some of the persistent health issues facing the world today - e.g. chronic disease development, the social health gradient, health literacy.

### **Data Needs**

To achieve the objectives outlined above, two distinct datasets will be needed. The first is a comprehensive set of data about the research participants, their health and lifestyles, and the places they live and work. This data will be collected from the participants themselves. The second is an independently compiled dataset about the places (neighbourhoods) in which the participants live and the changes that are occurring to those places over time.

On the people side of the equation, the range of data collected from participants will include:

- Background information (e.g. education, socioeconomics, family history, health);
- Current circumstances (e.g. employment, family, health status, socio-demographics);
- Health-related knowledge (e.g. Health literacy, opinions, experiences); and
- Health-related behaviour (e.g. Physical activity, diet, community engagement).

This information will be gathered using standard population research approaches such as questionnaire surveys, interviews and similar repeat monitoring approaches. However, rather than utilising a single data collection instrument, it is expected that multiple methods will be employed to ensure that the method employed most closely matches the circumstances of the participant. When possible, to ensure accuracy and cost effectiveness, electronic data collection methods will be employed.

The other dataset which needs compiling is the place-based variables. These can encompass a vast range of possibilities including physical natural features like weather and natural environment, built features such as transport infrastructure and housing, economic and social factors like employment and service opportunities, cultural elements such as local religions or social norms, and non-tangible factors such as reputation or history of a region (Moon et al. 2005; Curtis et al. 2004; Braubach 2007). As such, the range of possible variables of interest to the study is enormous. However, the selection of key variables for analysis will be refined to identify those of most relevance within three key categories recognised in the literature:

- Compositional factors (Socioeconomic and demographic characteristics of the place);
- Contextual factors (Built, natural and social environment); and
- Community factors (Social norms, social capital and other collective dimensions).

To assist with the place-based data collection, external datasets will be utilised when possible, but these will need to be supplemented with primary data collection to secure information on variables which are not routinely recorded at the necessary spatial scale. This is likely to require the use of intensive field techniques such as systematic social observation

(see Sampson and Raudenbush 1999 or Schaefer-McDaniel et al. 2010 for discussions of this approach). All such data will be linked to collected data and when possible global positioning systems will be utilised to establish accurate location-based information. Such geo-coded data will enable complex analysis using geographical information systems (GIS).

### Dynamic Relationships

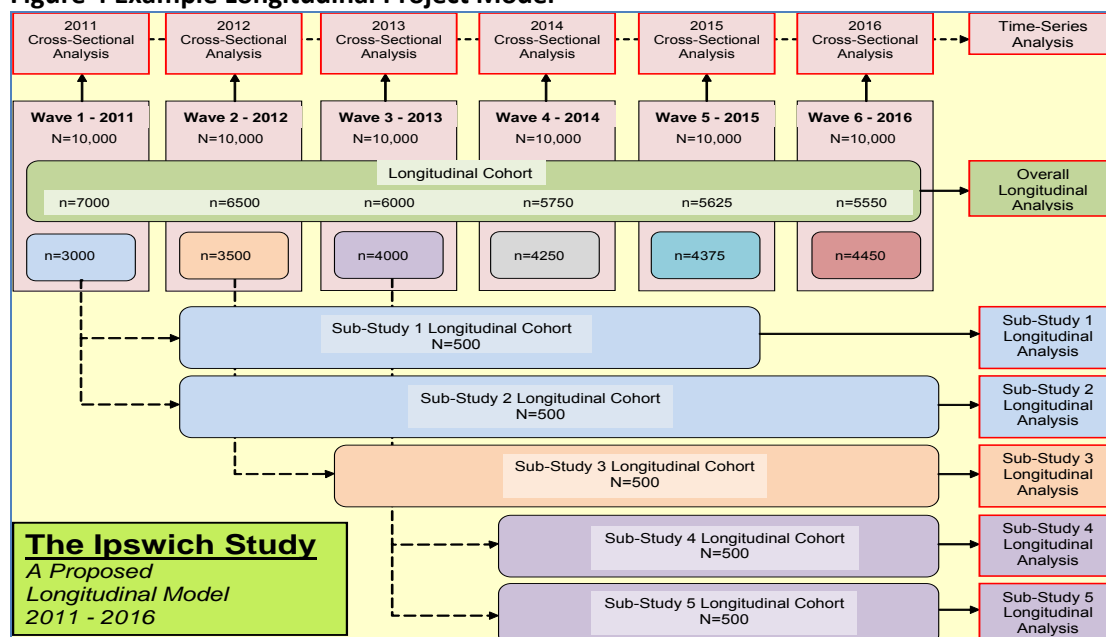
Given that a major objective of The Ipswich Study is to further understanding of the emergence of relationships between places and the health of residents in places, a further factor which needs recognition in the study is the dynamic nature of such relationships. This is because many of the relationships between health, lifestyles, socioeconomic status, place and the life-course are recognised as dynamic and inter-related rather than static and passive. As acknowledged by Marmot (2003), a full understanding of how health and disease are distributed in society thus requires an investigation of social processes. This is because relationships between people, and between people and places are two way. People influence places and places simultaneously influence people in many ways. This is a critical issue for longitudinal research because over time the behaviours of the research participants may be influencing the independent variables which are being measured. The Ipswich Study will be measuring elements of both people and their places over time and thus it needs to be aware of how they influence each other over time.

To better understand these relationships, it is likely that qualitative data will be needed to identify the decision-making processes which influence these relationships and the adaptations people make in response to local changes. This may help provide insights to the mechanisms which influence the relationships between places and the health of people living in them rather than just identifying the relationships themselves.

### Methodological Framework

From a macro-level perspective, the methodological framework being proposed is a split-panel design with sub-studies (Figure 4). Although the proposed model in Figure 4 is simply an example of how such a framework might look, rather than a definitive proposal, it does provide an indication of how the various elements of the design can function together.

**Figure 4 Example Longitudinal Project Model**



At the heart of the split panel is a core longitudinal cohort which will be recruited and retained over a long period of time. Initially, the data collected from this group will be wide-

ranging but less detailed - around a broad range of issues and agendas but which does not delve into great depth on any one of them. It will provide broad indicator data. The other component of the split panel is an annual recruitment of new participants each year. This group would supplement the core cohort by:

- Providing an opportunity to recruit participants who are under-represented in the main cohort (e.g. new migrant groups and those living in newly developed areas);
- Enabling a greater opportunity for accurate cross-sectional estimates over time; and
- Providing a pool of persons from whom participants for sub-studies can be sought (rather than approaching those in the longitudinal cohort).

The sub-studies are perhaps the most critical aspect of this design. Rather than being tacked on afterthoughts, sub-studies in this design are central to achieving the overall objectives of the study. This is because they provide an important avenue through which specific research questions and issues can be explored in far greater detail than is possible in the main longitudinal cohort. In this way, the different components of The Ipswich Study – namely the longitudinal, cross-sectional and sub-studies – would work together by feeding information to and from each other. Findings from the longitudinal cohort would provide insights into issues which warrant further and deeper examination in a sub-study and results from sub-studies can help inform the development of indicators and questions for the main cohort. Sub-studies can thus be designed to focus on specific groups (e.g. young people, smokers, new migrants), different issues (e.g. drug use, obesity, physical activity) and could be either qualitative or quantitative, or cross-sectional or longitudinal.

Although the approach outlined here will be slightly more complicated than if all resources were committed only to a larger longitudinal cohort, it is expected that over time, such an approach will provide the study with a richer and more useful set of data than could be achieved just with a single larger cohort. In particular, a major benefit of this approach is that the number of sub-studies conducted will not be limited by a need to minimise burden on the longitudinal cohort which is an ongoing problem for longitudinal studies which use their participants for sub-studies. With increased burden comes the ever-present possibility of participant attrition. In contrast, the approach proposed here will have a new pool of participants available at every wave from which to recruit sub-study participants.

### **Participant Recruitment**

Given that The Ipswich Study is seeking a wide range of information about places and how they relate to people's lives at quite a detailed level, there is a need to ensure resources are available to collect and analyse data at a sufficiently detailed level. As such, it is proposed not to attempt to cover the whole of Ipswich with the study but to strategically select a number of 'places' for intensive detailed research. To this end, it is proposed that no more than ten neighbourhoods within Ipswich would be encompassed by the study in which a sample of participants would be recruited from each. Aside from enabling the deployment of resources more strategically in limited places, this approach will also provide sufficient sample sizes in each neighbourhood (i.e. at least 1000) to conduct robust statistical analysis which may not be possible if the sample was scattered across a wider area. Furthermore, the neighbourhoods would not be randomly selected but carefully chosen to ensure a mixture of suburbs encompassing old, new, wealthy, disadvantaged and mixed neighbourhoods, among others.

In terms of participants themselves, although a largely representative sample of Ipswich residents will be sought recruitment will take place at a household level with households selected randomly but stratified into four distinct groups:

- Households containing children under five years of age;
- Households containing teenagers and young adults (15-24);
- Households containing adults in mid life (35-49 and without children); and

- Households containing older residents (60 or older).

It is expected that this approach will provide a total sample which reflects Ipswich overall, whilst simultaneously ensuring sufficient sample sizes from each type of household (approximately 2500) with which detailed analysis can be conducted at a household level. Stratification by households ensures that a diverse mixture of household types will be represented in the study, an outcome which could not be guaranteed if a purely random approach were taken.

### Conclusion

The Ipswich Study will ultimately offer enormous potential to better understand how places – specifically urban places – influence health over time. Given the enormous changes which are forecast to occur in Ipswich, an unprecedented opportunity currently exists in this place and at this point in time, to monitor and seek understanding of how major social, economic and environmental changes impact upon the health and wellbeing of the population, both as they are occurring and into the future.

If the project is successful, the understandings will have application well beyond Ipswich, potentially providing major insights into how environments in general and the changes that take place over time – both positive and negative – impact the health of different groups in different ways. This will provide ongoing evidence for how better to plan, develop and manage cities and suburbs with health outcomes in mind – not just in Ipswich but anywhere that places are developing and changing.

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## **Building Community Resilience The Gold Coast Model**

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### **Abstract**

*This paper explores the work being undertaken by the Gold Coast City Council to increase community resilience. In particular it focuses on a new training and exercise model designed to increase a community's ability to positively respond and recover from the adverse affects of a disaster. This new model builds the expertise and confidence of local combatant agencies involved in the provision of welfare services at emergency shelters and evacuation centres. Unlike previous training and exercise models it has been designed to test systems and standard operating procedures rather than the people involved. It therefore fosters an environment of learning where members of local combatant agencies can work together with one common goal; to provide for the welfare needs of disaster affected residents and visitors to the Gold Coast.*

**Keywords:** Disaster, Training, Exercises, Community, Resilience, Planning.

### **Introduction**

*"The Commonwealth Department of Families, Housing, Community Services (2009) defines Community resilience as the capacity of groups to withstand, recover from, and respond positively to crisis or adversity. Community resilience is often described as having three properties: resistance, recovery and creativity."*

With noticeable changes already occurring to the global climate there is becoming an ever increasing need for authorities to consider these potential adverse impacts on their local communities. With its sprawling waterways and kilometres of picturesque beaches there is no other location in Australia that has as much to lose as that of the Gold Coast. Every year more and more people are calling the Gold Coast home. Over the past three decades this idyllic City has grown from a large beachside town of 50,000 people to one of Australia's largest cities now having a population of over 500,000 and growing by the day. With more and more people moving to the Gold Coast the risk of a major event having serious to catastrophic consequences only gets higher. In an attempt to mitigate this risk the Gold Coast City Council has employed specialist Environmental Health Officers who through a process of careful planning, training and exercises are over time building a strong and resilient community capable of providing for their welfare needs immediately following a major disaster / incident.

This paper explores the work being undertaken by the Gold Coast City Council in particular a new focus in the training and exercises for members of the local combatant agencies involved in providing welfare services at emergency shelters

and evacuation centres. It will explore the processes leading up to the development of this model and how through its implementation it is building up the resilience of the Gold Coast community.

## **Background**

In Australia each state operates under different disaster management structures. This paper is based on the Queensland Disaster Management Structure. The Queensland Disaster Management Act 2003 requires each local authority to plan and prepare for disasters within its locality including the formation of a Local Disaster Management Group. The system operates on a process of escalations where a Local Disaster Management Group can put forward requests for assistance to their respective Disaster District Management Group who in turn can make requests for assistance from the State Group. Ultimately the responsibility for managing disasters remains with each Local Disaster Management Group. Annex 1 contains a pictorial representation of the Queensland Disaster Management Structure.<sup>ii</sup>

## **Identify Welfare Needs**

We began with a comprehensive study of the Gold Coast's demographics to identify the diversity of the City's population. At the same time the immediate welfare needs following a disaster were also established. The demographic study identified that the Gold Coast has a large diverse population consisting of young families, 79 different ethnic groups, self-funded retirees, temporary residents and holidaymakers.<sup>iii</sup> In general the welfare needs of the Gold Coast residents could be summarised as follows –

- Emergency shelters, being facilities where residents can safely evacuate;
- Need to register evacuees to allow for families and friends to know that they are safe;
- Having someone that they can connect with, to provide personal care and support;
- First aid;
- Food and water;
- Clothing, blankets, beds and sheets;
- Mental health first aid; this is not full on counselling but an intermediate step that can help someone in distress and support them until professional counselling services can be provided;
- People treat their pets as members of the family, when they evacuate most will bring their animals with them. Provisions to care for the welfare of animals is therefore also crucial;
- Some people will not be able to return to their homes when the event ends due to the damage caused by the disaster / incident making their premises unfit for human habitation. Therefore there will be a need to provide temporary accommodation (3 – 4 days) for some residents.

## **Who looks after what?**

Once the demographics and welfare needs of the City were identified it was then necessary to establish who were the key government and non-government agencies under the State's Disaster Management arrangements that were responsible for meeting these needs.

In Queensland the following agencies are responsible for meeting these welfare needs –

- Australian Red Cross – Emergency shelter management, personal support and on behalf of the Queensland Police Service the administration of the National Registration and Identification System (NRIS);
- St John Ambulance – Provide First Aid support on behalf of the Queensland Ambulance;
- Salvation Army – Provide food and catering services;
- St Vincent de Paul Society – Provide blankets and clothing;
- Adventist Development and Relief Agency (ADRA) – Assist with the location of temporary accommodation;
- Local Authority’s Animal Management Units, assisted by the Royal Society for the Protection of Cruelty to Animals (RSPCA) and Animal Welfare League (AWL) – Provide animal welfare services;
- Local Authority’s – Locate and activate facilities to be used as emergency shelters;
- Queensland Health (Mental Health Unit), supported by Lifeline – Provide counselling services as required.

### **Identify Local Key Agencies**

On the Gold Coast all of the agencies noted have a large representation, however this is not always the case in some smaller local authorities. It is therefore important to determine the capacity and presence of the agencies within your local government area.

While the State Disaster Management arrangements specify the roles and responsibilities to particular agencies, it may be necessary to have back up or support agencies made up by other local community groups. This will enable an immediate response until additional services from the designated lead agencies can be brought in from outside of the local authorities boundaries.

### **Meetings and Capacity**

Once the existence of the government and non-government agencies was established, meetings were held with the managers and CEOs of the agencies. The purpose of the meetings was to determine the capacity of the respective agencies to respond to a disaster and whether they needed any additional support to undertake their designated role(s).

The meetings assisted in identifying the need for additional stores of material resources along with a need for training and exercises. Regular meetings of the Welfare Subcommittee of Gold Coast City Local Disaster Management Group were re-established (Welfare Subcommittee).

### **Document**

Amendments were made to the Gold Coast City Disaster Management Plan - Welfare Sub-plan. A web style interactive database was also created which contained details on available material resources and potential facilities that could be used as emergency shelters.

## **Warning – Do Not Stop Here!**

Unfortunately most Local Disaster Management Group's sadly stop here. While all of the work undertaken is essential, the processes noted will not by themselves build community resilience.

The Gold Coast model for building community resilience, while reliant on having a solid platform to work from, is based on a consultative process. Consultation occurs between the staff and volunteers of non-government and government agencies. This assists in building a framework of training and exercises that are designed to increase the capacity of the agencies involved in providing disaster management welfare services at emergency shelters. It is this consultative process that is the key element to the overall success of building a strong and resilient community.

## **Training and Exercises Case Study “Carrara Shelter Exercise”**

Before starting any training and exercise program it is essential that goals, objectives and deliverables are clearly identified. Without having a strong technical brief at the beginning of the process that clearly outlines the course that the training and exercises are to take the program can get bogged down in planning and quickly lose direction. The brief provides a guide to establish the timing of meetings, training days and ultimately the exercise itself.

From the beginning the technical brief and all subsequent meetings with key agency representatives and the consultants detailed that all training and exercises must be designed to test systems and standard operating procedures and not the people involved. They were aimed to build the confidence of the staff and volunteers of the agencies involved, identify shortfalls in procedures and if there was a need for additional material resources.

During the Carrara Shelter Exercise a working group was established at the outset of the project. This group was made up of two consultants, the Gold Coast City Council's Senior Environmental Health Officer (Disaster Welfare/EH) and its Disaster Welfare Officer (Operations and Project Support). From this group the consultative process was initialised.

Emails were sent to all of the non-government and government agency representatives that were involved in the delivery of disaster management welfare services at emergency shelters. The purpose was to determine a list of serial topics that each agency wanted to utilise to test their internal operating procedures. The replies to the emails were compiled into a serial spreadsheet. This spreadsheet contained a summary of the exercise serials, their timings and the agencies involved.

The first training day was in the form of a consultative workshop / tabletop exercise. The goal was to provide an opportunity for all of the agencies to meet and be consulted collectively on the serials for the upcoming exercise. This aided in the establishment of cross agency responsibilities for serials and assisted in identifying further internal and group training needs for the Welfare Subcommittee, prior to the mock shelter exercise. Observer mentors from each of the agencies were also identified.

The conceptual idea of observer mentors was an extension of the consultative process. These were members of the non-government and government agencies involved in the operation of the welfare subcommittee that had a good understanding of their agencies roles and responsibilities. Observer mentors were responsible for

enabling the training of personnel within the agencies. During the exercise the observer mentors were responsible for assisting their staff and volunteers to undertake their roles. They were also responsible for collecting information on what worked and what did not work. One key role that observer mentors had was to ensure that correct procedures were followed and that bad habits were not reinforced.

Manuals were created for the observer mentors and participants to assist planning and internal agency training for the exercise. These manuals detailed what the exercise was about, the exercise serials and contained participant / observer mentor feedback forms. The serials were provided up front to ensure that correct practices could be exercised, rather than testing the people working in the emergency shelter. This process builds confidence and reinforces the correct standard operating procedures.

In addition to training days being organised for the collective agencies that make up the Welfare Subcommittee, each of the agencies implemented specific training for their staff and volunteers to meet the shortfalls identified from the consultative workshop. This included an additional workshop that was held at the Carrara Community Centre, which was the site of the mock exercise. The day was organised to permit all of the observer mentors from the respective agencies to look at the layout plans proposed for full mock set up of the facility. Prior to this workshop copies of the plans were circulated for comment, even with this occurring further modifications were made following consultation with the agency representatives and observer mentors.

The day prior to the mock shelter exercise the material resources such as beds, partitions, children's toys, blankets, pillows and disposable sheets were moved from where they were being stored to the Carrara Community Centre. Facility team members from the Gold Coast City Council were present to assist with the unloading of the truck and the set up of the emergency shelter. This set up process also included the relocation of tables and chairs that were in storage in the community centre. Also an invitation was sent to the member agencies of the Welfare Subcommittee to attend. The purpose being for them to provide comment on the set up prior to the exercise.

On the day of the mock shelter exercise, over 120 participants turned up from the various agencies involved in the operation of the Welfare Subcommittee. Due to the training and consultative process the agencies were well informed of their roles and responsibilities. The exercise showed that because of the collective consultative process the agencies were well aware of each other's roles, which encouraged a team environment where evacuees were able to flow seamlessly through the evacuation process. Having the observer mentors enabled internal processes from the various agencies to be tested, bad habits were corrected and a record of what worked and where improvements could be made was established.

A hot debrief was undertaken on the day of the exercise, the agencies were also consulted post exercise to enable them time to reflect on the lessons learnt. From the information collected, an issues register was created containing actionable items for all of the agencies represented on the Welfare Subcommittee. The register established the necessary modifications of standard operating procedures and formed the basis for future training and exercise programs.<sup>iv</sup>

### **How does this build community resilience?**

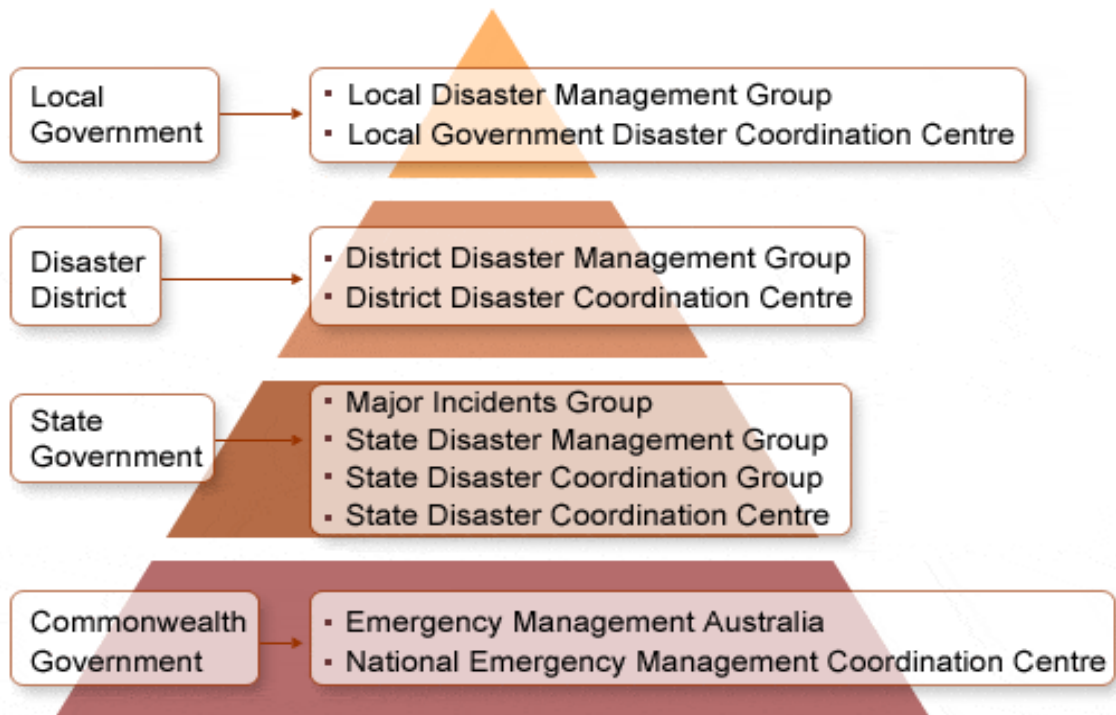
The consultative process enables the community representatives of the non-government and government agencies to gain ownership of the training and exercises. This process builds the confidence of the community representatives not only in the performance of their duties but also expanding the overall capacity of the Welfare Subcommittee.

Having regular consultative training and exercise programs eliminates apathy and builds interest. The training programs undertaken by the Gold Coast City Council not only creates excitement within the community representatives of the agencies involved on the Welfare Subcommittee but also sparks the interest of other members of the community not previously involved in disaster management welfare services. This resulted in an increase in membership within the agencies and a subsequent increase in the knowledge base of the community, making them more resilient and capable to respond and recover from disasters.

### **Conclusion**

The process of building community resilience is ongoing. It commences and ends with community consultation. Without this crucial communication process it is impossible to build a strong and resilient community. In summary using a consultative process you prepare for an exercise, conduct the exercise, capture the lessons learnt, and modify the systems. The process then recommences with the preparation for the next exercise. This builds the knowledge and skill base of the community members that make up the non-government and government agencies involved in providing disaster management welfare services, ultimately creating an environment of learning that attracts others to join thus building the community's resilience to respond and recover from disasters.

Annex 1 – Queensland Disaster Management Structure<sup>2</sup>





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# A Study on Cultural Regeneration of Aging Facilities in Urban Central Areas -Focused on Jung-Gu, Incheon-

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## ABSTRACT

*South Korea has become a rapidly urban development. Korea has become an urban development focused on new city. On the other hand, old urban center is a declassé city. The cities have become the problem of unbalanced development. The old urban center was a center role of the city. Currently, this is not the function of the city. The old urban center should be urban regeneration. And urban regeneration should be the culture activation. Jung-Gu, Incheon was formed urban center until the 1980s. And this has been preserved a historical and cultural buildings. Currently, It was aging historical, economical, and physical features. Central role of the city is difficult to state. But, historical and cultural resources on Jung-Gu, Incheon has very high and his own value. Cultural regeneration of old center would be a direct factor that is how to utilize and conserve. This study is derived plan of Cultural regeneration. Cultural regeneration is focused on Jung-Gu, Incheon. And this is intended to present improvement. This can be proposed strategies of cultural regeneration.*

**Keywords** : Cultural regeneration, Outdated facility, Cultural Function, Jung-Gu, Incheon

## 1. Introduction

After 1960s, Korea is proceeding rapid urbanization for 40 years. Cities were growing after being implemented with country-led economic growth policies in 1960s. Urbanization began in 1960s after country-led economic growth policies were implemented, and cities began to grow. Due to these policies, urbanization rate increased from 37.1% in 1960s to 81.9% in 2005, and it is expected to reach 83.1% in 2015. According to UN statistics, urbanization speed appeared to be world's highest level.

Urbanization started based on large cities. Large cities were developed based on new cities, so old cities are being declined not just by the physical factors, but also by livelihood, culture, and environmental factors. However, this caused imbalance between new cities and old cities. Imbalance problem not only caused old cities' physical, economic, and social problems, but it is overall loss for the country.

In order to solve problems of old cities, city restoration is being realized based on economic logics. This restoration of the cities are insisting for the improvement of physical facilities and development profits, so it is not reflecting identity of existing old cities. Therefore, future city restoration should be cultural city restoration that reflects sustainable city development and local identity.

Culture educates people and increases cohesion of local society, plus substantially contributes strength of local economy as well. In addition, high quality and diversified culture give vibrant city image. Since the level of cultural activities enhances quality of life, cultural factors in the city restoration plays very important role. Cultural restoration is very important factor to decide quality of life and is a source of competitiveness of cities.

Also, since it contains characteristics and history of cities, it becomes very important resource to shape its unique city image and identity from this viewpoint, there is necessity for the cultural approach for the city restoration. Also, from current situation where city restoration is being progressed in rather sporadic way, it is necessary to propose strategies and improvement plans that can lead the plan or business processing.

This research will search to find methods to bring up aged cultural facilities into more efficient and healthy ways. Therefore, it aims to bring vitality and competitiveness of cities and quality improvement of residents.

## **II . Theoretical studies**

City restoration is to heal physical, social, and economic problems that preexisting cities possess, and is a concept that cover redevelopment, revitalization, and renewal of cities. With the city restoration, it can restrain thoughtless external diffusion of large cities. This is to promote declining population of city areas, regression of the industries, and to seek reactivation. Declining city areas can introduce and generate new features, plus reactivate physically, economically, and culturally.

Until now, city restoration was established based on the housing redevelopment, reconstruction, three dimensional complex development, and focusing on the successive development areas. However, the government is recently restoring cities based on cultural policies. In other words, there are active movements to fill-in empty spaces and facilities with cultural spaces.

In case of Tate Modern Museum in UK, it was culturally restored from plant building into modern art gallery. This place became the symbol for the cultural industry and cultural center in London at the same time. Further, shift into cultural region affected recognition for the city restoration. Korea also has Seoul Museum of Art where it was culturally restored. Seoul Museum of Art was renovated from old supreme court building into a museum or art. This place can be said as cultural restoration method which brought the identity of Seoul by utilizing modernity and history. This cultural city restoration is being continued into city activation by retaining identity and economic power of cities.

Reflecting this, report from Korea Culture and Tourism Policy Institute in 2005 saw that cultural level can be used as the indicator to find the level of social development. Also, it proposed where the culture can become the driving force to develop the society. After social development, it was recognized that the culture can be developed. However, now is the era where social development is planned through the culture and there cannot be social development without cultural development. It can be said that cultural development makes close relationship with social development.

In this research, cultural city restoration is recreated by placing cultural function into aged facilities. Therefore, it can be defined that reactivation plan of cities can be reflected by reflecting identity and economic power to the cities.

Cultural facilities are being utilized by cultural base facilities, and contains various meanings.

Cultural facilities can be defined as the following.

First, cultural facilities are the chapter for the creation, development, and supply of cultures. Also, it is utilized to promote cultural needs and work as resting place of life. Due to this, it

can enhance involvement recognition on the creation of culture and creation, plus interest on the culture and involvement.

Second, cultural facility is the communication space to unite artist, enjoyment and for local residents. Further, it is a space for lifelong training for personal and society's development. Therefore, it functions as a chapter to enhance the quality of life, to socially interact and educate among city residents.

Third, cultural facilities are the places that bring industrial values on cultural product and space. Culture works as the reason to enhance quality level of economy and development of industries. In addition it brings vividness to economic life.

According to Ministry of Culture and Arts Promotion Act, chapter 1, section2, cultural facilities are the facilities that are continuously utilized in cultural art activities such as performances, exhibitions, cultural diffusions, and transmission.

As for the types of cultural facilities, there are performing art center, exhibition facilities, book facilities, local cultural and welfare facilities, cultural diffusion transfer facilities and other cultural facilities. Cultural facilities are the spaces where they base cultural life of residents, and where art performance activities are established. This works as an important role for the development of cultures and arts. In addition, cultural attractions, events, and festivals are activated.

In this research, cultural facilities represent spaces for traditional or modern exhibitions and cultural activities, or where they can express facilities or spaces, plus they also have the meaning of spaces for the culture. This cultural facilities have the function to smoothly make complex activities of cities, social interaction, and activation of the economy. Through this, it will maximize potential of city's culture and enhance quality of life for the city and residents.

### III. Analysis frameworks

This research will analyze cultural function of aged facilities based on the policies and current information of Jung-gu, Incheon. Based on theoretical studies, function of cultural facilities were classified into culture and arts, economy industry, and social education. Through this, it tried to draw cultural city restoration methods.

Cultural Fuction	Condition Analysis	Cultural Facilities and Contents
<b>culture and arts</b>	-Incheon Art Platform	-exhibition hall, communal studio, theater, multi-purpose room
<b>economy industry</b>	-Incheon Art Platform -Incheon Branch of Japanese Bank No.18 -Incheon Branch of Japanese Bank No.1 -Gonghwachun -Chemulpo Club	-exhibition hall, Theme museum - Art shop, antique Shop -Jajangmyeon Festival, Manguk Park Festival - Traveling on Foot
<b>social education</b>	-Incheon Art Platform -Incheon city historical data office	-Education facilities, data office -historical exhibition, conference, culture-art program

## IV. Analysis result

### 1. Current status of cultural restoration

There were major differences in gap between old cities and new cities due to the city expansion in Jung-gu, Incheon. In order to solve this problem, the restoration project of Jung-gu focuses on preserving modern construction building, maintenance of surrounding area, and district planning for the modern building concentrated area.

### 2. Problem and improvement plan

#### 1) Cultural and artistic function

Incheon Art Platform is multi-cultural facility space where it establishes creating activities of artists to the cultural activities of residents. However, various cultural activities are not vividly made and it is in the situation of viewing oriented operation. In order to solve operational problems, it needs to retain professional resources and autonomy facility operation. In other words, facility operation should be made by professional planners and curators to become a successful cultural facility. This will enable specialized program operation and enable to operate program utilizing excellent exhibitions and performances. It should recognize maximum autonomous on the program operation by giving independencies on the facility management and programs operation.

Even Incheon Art Platform retains art creating spaces, but it is inactive situation for the artists moved in live. This shows limitation on space creation for natural form of arts and cultures. It should aid to form natural cultures through the support programs for the moved in artists such as move in condition and tax relief.

#### 2) Economic and industrial function

Jung-gu, Incheon is focused on Culture and Arts Promotion Business based on cultural tourism industry and Incheon Art Platform around open ports. However, there is no significant changes on local economy and improvement image of the city. Modern architecture exhibition and modern early history museum only contain open port buildings and information of pictures, but it lacks cultural product that can induce consumption. For the development of cultural products, it should connect local artists and find a way to foster cultural art industry. Cultural product can increase local income and retain culture and art industry.

#### 3) Social educational function

Due to the development of tourism and art industry, Jung-gu, Incheon almost does not possess cultural facilities for the local residents. Expansion of rest area will improve image of the city and become a space that carry locative value. This place has some distance with history cultural resources and historic cultural street, so it can expand the involvement of residents due to spontaneous changes and opportunities for the interaction.

Currently, Art Platform educational program contains only art educational program for the children. It needs to retain cultural art program for variety of age groups. Program is the space for local residents, so it should operate the program based on local population and industries. Through this, it can fulfill cultural needs for the local residents and plan social interaction and identity. In addition, it will form settling space for Jung-gu, Incheon.

## **V. Conclusion**

Urbanization started based on large cities. Large cities were developed based on new cities, so old cities are being declined not just by the physical factors, but also by livelihood, culture, and environmental factors. However, this caused imbalance between new cities and old cities. Imbalance problem not only caused old cities' physical, economic, and social problems, but it is overall loss for the country.

In order to solve problems of old cities, city restoration is being realized based on economic logics. This restoration of the cities are insisting for the improvement of physical facilities and development profits, so it is not reflecting identity of existing old cities. Therefore, future city restoration should be cultural city restoration that reflects sustainable city development and local identity.

Culture educates people and increases cohesion of local society, plus substantially contributes strength of local economy as well. In addition, high quality and diversified culture give vibrant city image. Since the level of cultural activities enhances quality of life, cultural factors in the city restoration plays very important role. Cultural restoration is very important factor to decide quality of life and is a source of competitiveness of cities.

Also, since it contains characteristics and history of cities, it becomes very important resource to shape its unique city image and identity from this viewpoint, there is necessity for the cultural approach for the city restoration. Also, from current situation where city restoration is being progressed in rather sporadic way, it is necessary to propose strategies and improvement plans that can lead the plan or business processing.

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# **A Regional NRM Board's Role in Creating and Maintaining a Healthy City**

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## **Abstract**

*This paper explores the role of the Adelaide Mount Lofty Ranges Natural Resources Management (NRM) Board in managing the natural resources of a region which contains an Australian Capital City and a major metropolitan area with a population exceeding one million people, to help create and maintain a healthy city. The Adelaide and Mount Lofty Ranges NRM Board is a State Government Instrumentality established under the Natural Resources Management Act 2004, the Act provides the Board with a range of roles and instruments to manage natural resources within the region.*

## **Introduction**

This paper considers the role of a Natural Resources Management Board in creating and maintaining a healthy city and particularly the role of the Adelaide and Mt Lofty Ranges Natural Resources Management Board (the Board) within the Adelaide region.

It is proposed to first provide some contextual information about the Board and the region and then use the regional targets in the Natural Resources Management Plan (NRM Plan) to provide examples of how the Board assists in creating and maintaining a healthy city.

## **Background**

The Adelaide and Mt Lofty Ranges NRM Board is one of 56 Boards across Australia and one of 8 in South Australia.

The Board is established under State Government legislation, the *Natural Resources Management Act 2004* (the Act). The Act sets out the membership of the Board, its functions and roles and responsibilities. The Board reports to the South Australian Minister for Environment and Conservation.

One of the key functions of the Board is to develop the NRM Plan for the region. The purpose of the Plan is to set the direction for all NRM activities within the region that are undertaken under the Act.

The regional NRM Plan was adopted by the South Australian State Government in May 2008, the third year of implementation of the Plan has recently commenced.



The NRM Plan is a plan intended to be implemented by all bodies within the region and the Board recognises that to achieve successful implementation of the Plan, a strong partnership approach, with all levels of Government (Federal, State and Local), Non Government Organisations (NGO's), industry and the community is required.

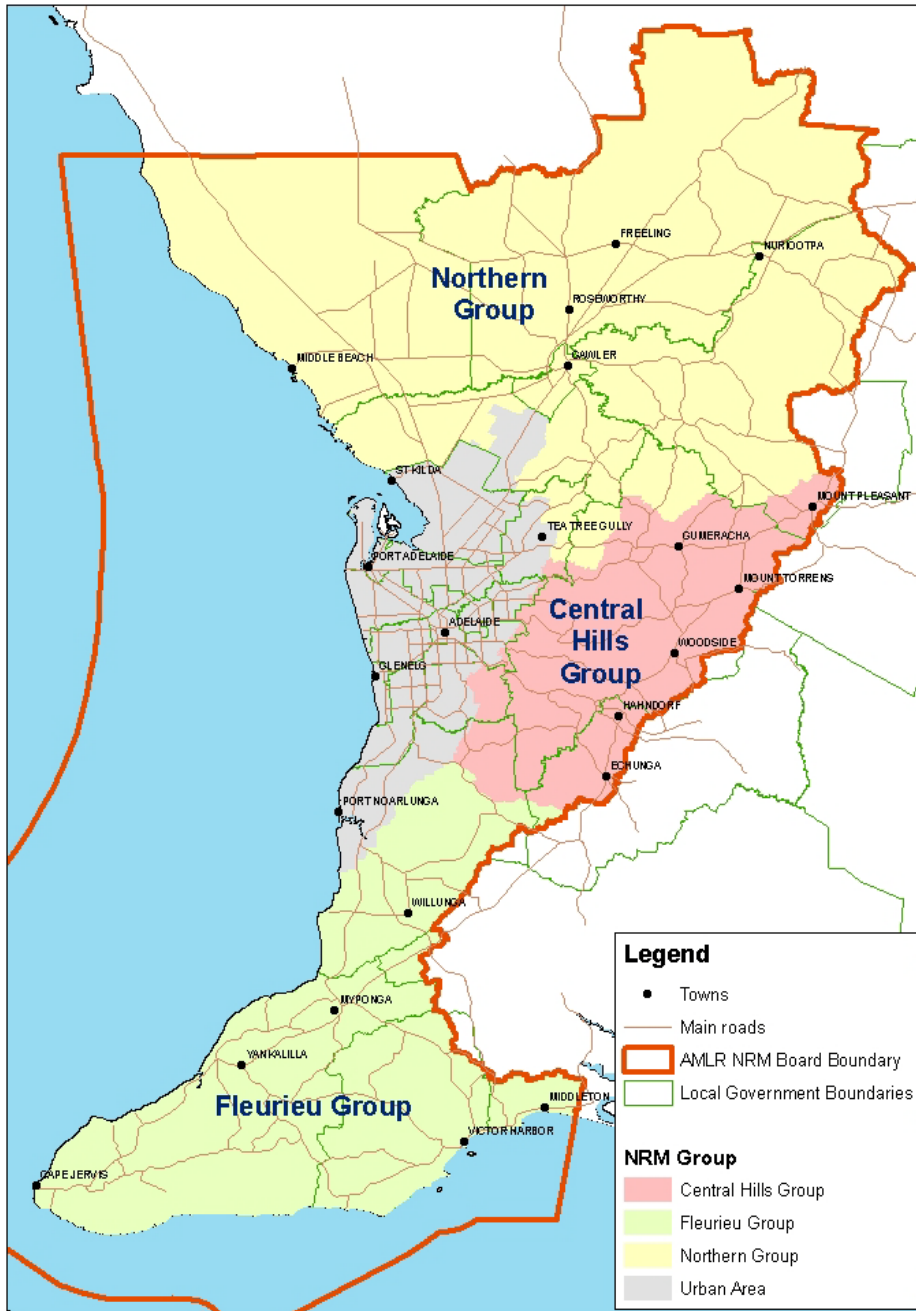
The Adelaide and Mt Lofty Ranges Region (figure 1) covers an area of approximately 1 million hectares, of which 45% is within the marine environment. Within this region, 1.2 million people reside, which is around 80% of South Australia's population, the City of Adelaide and metropolitan Adelaide is located within the region.

A few additional facts to help with context setting:

- Today only 14% of pre-European vegetation cover remains in the region, of which only 29% of this is protected under dedicated conservation tenure.
- The region has 8 reservoirs, which during an average year provide 60% of metropolitan Adelaide's water needs. Unlike catchments within other States of Australia, 90% of the catchments are privately owned and used for a variety of activities including urban and primary production use.
- The coastline within the region extends for 440 kilometres.
- The region is the most biologically diverse region in South Australia, being home to half of the State's species of native plants and three quarters of its native animals.
- The region contains some of the States most productive primary industry, supplying local, national and international markets.



## Adelaide and Mount Lofty Ranges NRM Board NRM Groups



**Figure 1: Adelaide and Mount Lofty Ranges Region**

## What Role Does the Board Play in Making Adelaide a Healthy City?

How do we therefore maintain a balance between economic development and urban growth and managing and maintaining the natural resources of the region to maintain a healthy city?

When developing the NRM plan the Board established 13 Regional Targets (appendix 1) to assist in establishing this balance within the region. These targets, which describe the desired conditions of natural resources in 20 years are ambitious and will stretch our resources. However, if they can be achieved the Board believes that the vision for the region will be achieved.

### Thriving Communities Caring for Our Hills, Plains and Seas

This paper will examine each of the regional targets and suggest how the achievements of these targets help create a healthy city.

#### Target T1: Stormwater and Waste Water Used

- 75% of stormwater used
- 100% of waste water reused

This is an ambitious but achievable target in two parts:

Stormwater – The Board and its predecessors (Catchment Water Management Boards) in conjunction with all three tiers of Government and the private sector have been active participants in stormwater re-use and particularly, aquifer storage and recovery (ASR) schemes. A target of 75% equates to a volume of approximately 45GL. To date, 10% of this target has been achieved.

Why will achieving this target help make a healthy city?

- It will provide for an alternative source of water therefore:
  - reducing reliance on the River Murray and reservoir catchments, and
  - reducing pressure on stressed groundwater systems
- It will reduce pollution levels into the marine environments
- It will reduce pressure on stormwater systems and reduce the impact of minor flooding.
- It will enable green spaces to be maintained. Four of the Boards pilot ASR projects funded through National Water Commission grant funds have been with golf clubs and the horse racing industry.

The reason a 100% stormwater target cannot be achieved is due to:-

- base flows needing to be maintained in rivers to the sea for ecological benefits, and
- a recognition that space is not available within the Adelaide Plains to capture and treat all stormwater before it enters the sea during storm events.

As with stormwater, the outcome for wastewater re-use is ambitious. State Government and industry have developed a number of successful wastewater re-use schemes where treated wastewater is provided for irrigation and recreational purposes.

The following are two examples, where treated wastewater is being re-used:-

1. Within the McLaren Vale wine region, a partnership between local growers and SA Water has resulted in up to 100% of summer treated wastewater being used for irrigation purposes. Trials are currently being undertaken to store winter wastewater in the aquifer for summer use. This has enabled the industry to expand and reduce pressure on groundwater supplies.
2. The State and Federal governments have recently funded a pipeline to transfer wastewater from the Glenelg Waste Water Treatment Plant into the City of Adelaide for use in maintaining the parklands system that surrounds Adelaide.

Why will achieving this target result in a healthy city?

- It will provide for an alternative source of water therefore:
  - reducing reliance on the River Murray and reservoir catchments, and
  - Reducing pressure on stressed groundwater systems.
- It will result in reduced pollution loads to the sea.
- It will result in alternative water resources being provided to maintain primary production land within close proximity of the city.
- It will result in alternative water resources being provided to maintain green spaces.

#### **Target T2: Surface Water and Ground Water Quality**

- All water resources meet water quality guidelines to protect defined environmental values

#### **Target T12: Coast Estuarine and Marine Water Quality**

- All water resources meet water quality guidelines to protect defined environmental values

Targets T2 and T12 have the same desired outcome, in that all water resources meet water quality guidelines to protect defined environmental values.

The region's groundwater, surface water and marine waters have been placed under considerable stress through inappropriate use, which has resulted in detrimental water quality outcomes. Many of our urban water courses currently fail to meet established water quality guidelines.

The Board in partnership with the Environment Protection Authority and the community, has established a comprehensive surface water quality network to monitor water quality within the region. In addition, the Board in conjunction with Local Government, community groups and private landholders, undertakes various activities to improve water quality through:

- fencing off of watercourses to keep farm animals out,
- revegetation of riparian areas with native vegetation to stabilise banks and also to capture sediments and pollutants before they enter the water course, and
- construction of gross pollutant traps, to enable capture and removal of pollutants.

Why will achieving this target make a healthy city?

- Improved water quality will enhance the ecological and recreational value of water courses and coastal waters.
- It will result in reduced pollution and sediment loads to coastal waters,
- The community will be more actively involved in natural resources management.

### **Target T3: Water Resources Managed Within Sustainable Limits**

- All water resources used within sustainable yields

One of the key roles of the Board is to develop Water Allocation Plans to enable the sustainable management of surface, watercourse and groundwater resources within the region.

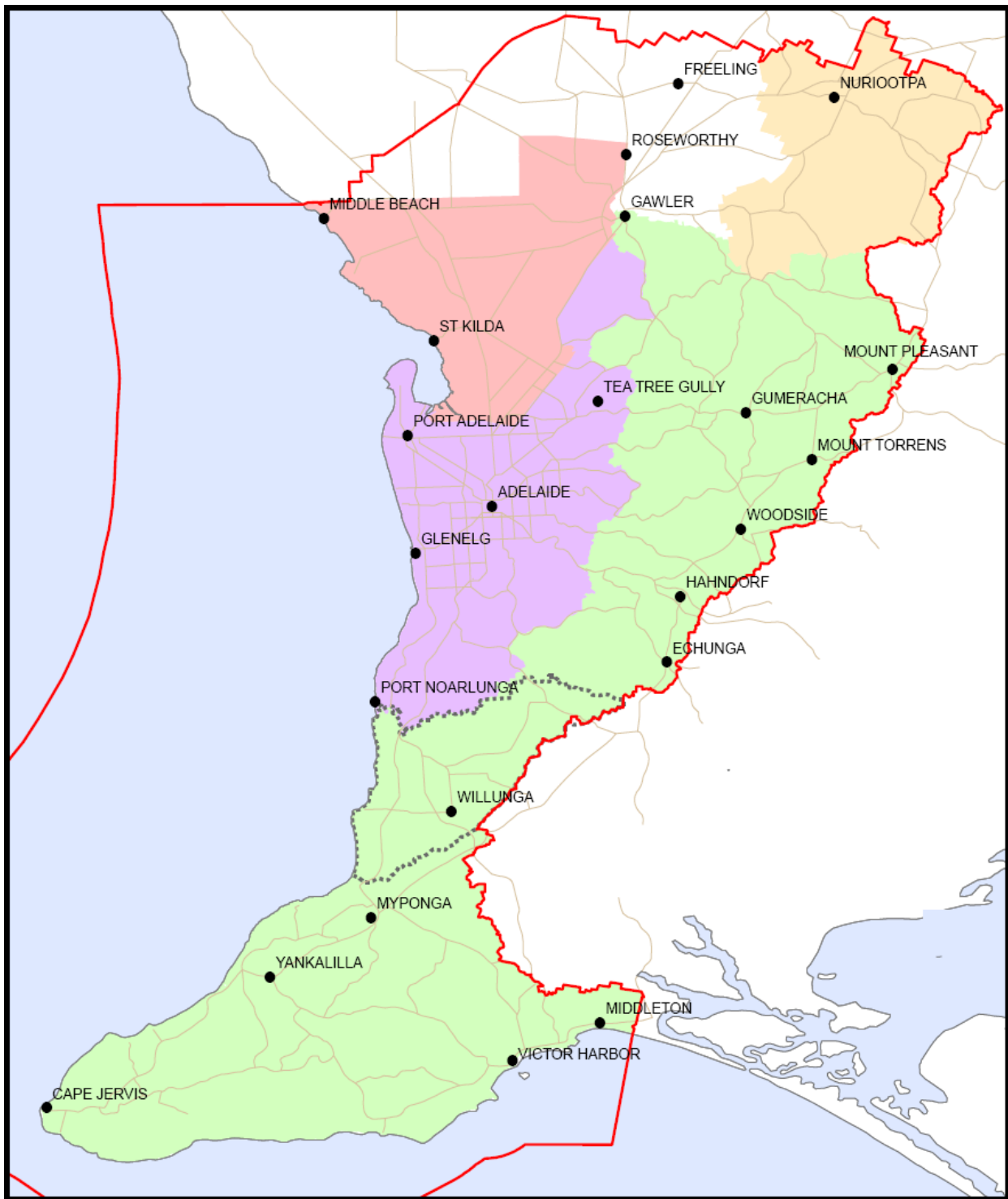
The implementation of these plans help protect surface, watercourse and groundwater assets in the region to enable sustainable long term use of these important assets for social, environmental and economic benefits.

Within the Board's region there are five prescribed resource areas as shown in Figure 2. Of these, three have an adopted water allocation plan and two areas currently have a water allocation plan under development. These plans provide the policy framework to enable the sustainable management and use of the water resources,

These plans are based on the best available science and are developed in consultation with the community. The development of water allocation plans is perhaps one of the most difficult tasks the Board is required to undertake, as developing policy which determines how water resources will be used can impact on the social fabric and economic wellbeing of communities and individuals.

Why will achieving this target make a healthy city?

- It will enable a sustainably managed, local water supply into the future for:
  - human consumption,
  - agricultural use, and
  - the environment.
- It will enable key natural ecosystems to be protected and sustained.
- It will enable primary production to be maintained close to the city.



- Legend**
- AMLR NRM Board Boundary
  - Barossa Prescribed Water Resources Area
  - Northern Adelaide Plains Prescribed Wells Area
  - Central Adelaide Prescribed Wells Area
  - Western Mount Lofty Ranges Prescribed Water Resources Area
  - McLaren Vale Prescribed Wells Area

Figure 2: Prescribed Areas within the Adelaide and Mount Lofty Ranges Region

#### **Target T4: Flood Damage**

- Reduce average annual cost of flood damage

Parts of metropolitan Adelaide are located on flood plains and are subject to inundation. The inundation of these areas has the potential to increase with sea level rise and storm events as a result of climate change.

Whilst the Board does not have a role of building or managing infrastructure to manage flood risk, it works with Federal, State and Local Government to map those areas at risk and assists Councils in developing Stormwater Master Plans to manage and minimise flood risk.

These activities will become more important, not only as a result of the need to mitigate against the risks of climate change, but also as the density of metropolitan Adelaide increases through the implementation of the 30 Year Plan for Adelaide. The 30 Year Plan for Adelaide proposes that 70% of the cities population growth will occur within the existing urban boundary of metropolitan Adelaide. Increased densities have the potential to increase stormwater run-off, therefore increasing the flood risk. The urban design and planning for these areas of higher density will need to take into account and make provision for flood risk, through open space corridors, flood detention and retention, stormwater capture and re-use.

Why will achieving this target make a healthy city?

- It will lead to a reduction in flood damage and potential loss of property and life, resulting in a safer city.
- Built assets will be protected.
- It will ensure that the city is able to function during a flood event.

#### **Target T5: Productive Capacity of Agriculture**

- Maintain current capacity at current levels

#### **Target T6: Land Condition for Primary Production**

- Improve land condition by 15%

Healthy soils are a fundamental component of a healthy landscape. Both directly and indirectly, healthy soils support primary production and a healthy, functional and bio-diverse environment.

Primary production within the region is diverse and includes cropping and grazing, wine grape production, market gardening, dairying and forestry. It is worth around one billion dollars annually to the regional economy.

However, primary production is threatened by both natural and human activity including, soil acidity, salinity, wind and water erosion, drought, invasive pest animals and plants, unsustainable resource consumption, unsustainable land management practices and urban encroachment.

The Board works with the rural sector on various activities including animal and plant control, property planning and training courses in an endeavour to manage the threats to primary production. The Board also uses various mechanisms including incentives, engagement and compliance to manage the threats.

To support landholders in understanding and meeting their duty of care responsibilities in managing their land, the Board has developed a model to assist with communicating the concept and components of duty of care. This model has three components:

1. Policy position that guides the Board in determining duty of care.
2. Resource condition standards that identify the minimum condition the Board will accept of the resource, and
3. The identification of current recommended practices to achieve the desired resource condition.

It is hoped that the introduction and acceptance of the concept of duty of care will lead to improved natural resource management outcomes.

Why will achieving this target make a healthy city?

1. It will enable primary production to be maintained close to the city, thereby reducing transportation costs and enabling higher quality fresh food to be available.
2. It will enable by-products of the city (waste water) to be put to productive use.
3. The impacts of poor land management practices such as soil erosion will be reduced leading to improved water quality outcomes as a consequence of reduced sediment flows entering watercourses.

#### **Target T9: Conservation Status of Native Species**

- No decline in conservation status from current levels

#### **Target T7 : Condition and Function of Ecosystems**

- Recover from current levels

#### **Target T8: Extent of Functional Ecosystems**

- Increase extent to 30% of the region

These targets are extremely challenging given the size of the targets and the resources available to achieve them.

As previously mentioned this region is the most biologically diverse region in South Australia. However, the terrestrial landscape and ecosystems have been dramatically altered and today only 14% of pre-European vegetation remains and less than a third of this is protected.

The impact on the region's ecosystems has not been random with some being targeted because of economic value. For example much of the open woodland system has been cleared for agricultural production and subsequent urban development.



The clearance, isolation and on-going degradation of the landscape and ecosystems has also resulted in a loss and on-going decline of wildlife. This decline has been compounded as a result of additional threats such as inappropriate fire regimes, the introduction of pest and diseases, and pollution.

The Board is working towards these targets through the first three years of the Plan by:

1. managing 7000ha of degraded vegetation to reduce the likelihood of further threats',
2. seeking to place more land under formal protection status, and
3. reconstructing 440 hectares of ecosystems in priority areas.

These activities are being delivered through education, incentives and compliance and through working with NGO's such as the Conservation Council and Trees for Life, State Government Agencies and Local Government.

Why will achieving this target make a healthy city?

- The services provided by terrestrial biodiversity support cities through:
  - recycling nutrients and providing and maintaining habitats,
  - cycling water, thereby making it suitable for various users and uses,
  - generating oxygen and removing carbon dioxide thereby becoming the lungs of the city,
  - regulating climate, and
  - supporting cultural heritage, tourism, lifestyle and human endeavours.

#### **Target T10: Land Based Impacts on Coastal, Estuarine and Marine Habitats**

- Impacts reduced from current levels

#### **Target T11: Seagrass, Reef, Estuarine and Marine Habitats**

- Halt in the decline of habitat and a trend towards

The coast and marine environment is a significant component of the Board's region, with over 440 kilometres of coastline and the marine waters making up approximately 45% of the Board's total area.

The coast, estuarine and marine ecosystems are highly productive and diverse, comprising many species of flora and fauna found nowhere else in the world. Economically, marine based commercial fisheries are valued at around \$7 million annually, with recreational fishing also contributing significantly. The region's coastal beaches and reefs are used for recreational pursuits and are one of Adelaide's most significant natural assets.

Coastal habitats, seagrasses and reefs are under increasing threat from land based sources of pollution (waste water and stormwater), loss of habitat and invasion of pest species.

The Board, in conjunction with other government agencies, Local Government and the community, is working to reduce these threats and improving the coast and marine environment through:

1. improved land management practices to reduce sediment loads,
2. capture and re-use of urban stormwater,
3. re-use of treated waste water,
4. capture of gross pollutants,



5. trialling techniques to re-establish sea grasses,
6. stabilising the remaining coastal dune system through revegetation, and
7. undertaking pest animal and plant control within the marine and coastal environment.

Why will achieving this target make a healthy city?

- It will result in a clean, healthy recreational environment close to the city.
- It will result in commercial and recreational fishing to be maintained.
- It will result in the maintenance of a healthy environment.

**Target T13: Improve the Capacity of People in the Community, Institutions and Regional Organisations to Sustainably Manage our Natural Resources**

- Increase capacity by 20%

Informed communities are the key to effective natural resources management. Without their investment and commitment, in both the short and long term, the twelve preceding targets cannot be achieved and we will burden future generations with greater environmental challenges.

Our communities are diverse and have the capacity to impact both negatively and positively on our natural resources through the way they view and use them. Community behaviour that includes sustainable living as part of everyday life is an important part of ensuring that we leave a healthy environment for future generations.

The Board's work with the community aims to:

1. raise awareness of the need for natural resources management,
2. change community behaviours in order to improve our natural resources,
3. ensure that the next generation has the necessary skills to protect and manage the environment and natural resources it contains, and
4. support volunteers in their work to protect, manage and maintain our natural resources.

Why will achieving this target make a healthy city?

- Communities will recognise that they have an important role and responsibility in natural resource management.
- Communities will take action to manage natural resources more responsibly.

## Conclusion

The development and implementation of the NRM Plan has enabled organisations to work in a more integrated way to achieve landscape scale change. As a result of this integrated cooperative approach early indications would suggest that positive change is being achieved.

The Board has established Report Cards to regularly report to the community on progress towards achieving the Regional Targets. These are available on the Boards website [www.amlnrm.sa.gov.au](http://www.amlnrm.sa.gov.au).

It is recognised that as we work towards achieving the targets the region will face challenges. However, by maintaining cooperative partnerships the targets can be achieved and the Board would have assisted in making Adelaide a healthy city.

## Appendix 1

Target		T	Target Explanation	Indicators
T1	<p><b>Stormwater and waste water used</b></p> <ul style="list-style-type: none"> <li>• 75% of stormwater used</li> <li>• 100% of waste water reused</li> </ul>	P	<p>Projects such as stormwater wetlands and harvesting systems are being developed in the Region and the stormwater target is intended to be ambitious reflecting community desires.</p> <p>100% wastewater reuse is ambitious and this figure relates specifically to the reuse of water from the major wastewater treatment plants, including STED Plants.</p>	<p>Volume of stormwater or waste water generated and used;</p> <p>Volume of stormwater or waste water discharged to coast or marine environment.</p>
T2	<p><b>Surface water and groundwater quality</b></p> <ul style="list-style-type: none"> <li>• All water resources meet water quality guidelines to protect defined environmental values</li> </ul>	S	<p>“Defined environmental values” refers to the process for stakeholder agreement to a set of environmental values and water quality objectives under the Environment Protection (Water Quality) Policy.</p> <p>Long-term monitoring of water quality is vital to protecting environmental values. Of course, it is not possible to monitor everything so key water quality parameters will be monitored across the Region.</p>	<p>Exceedence of specified water quality parameters (e.g. turbidity, nutrients, salinity, pH).</p>
T3	<p><b>Water resources managed within sustainable limits</b></p> <ul style="list-style-type: none"> <li>• All water resources used within sustainable yield (allowing for variability)</li> </ul>	R	<p>This target is about ensuring that the long term use of water in the Region is sustainable, that is that the use of water for a range of purposes does not have an unacceptable impact on the environment. This target includes “allowing for variability” in recognition of future changes to water supply as a result of climate change impacts.</p>	<p>Volume of water allocated and used;</p> <p>Groundwater level;</p> <p>Surface water flow;</p> <p>Water required for the environment compared to water provided for the environment.</p>
T4	<p><b>Flood damage</b></p> <ul style="list-style-type: none"> <li>• Reduce average annual cost of flood damage</li> </ul>	P	<p>This target is about increasing the level of flood protection in metropolitan and rural urban areas in order to mitigate damage to structures and creeks, and protect life and properties.</p>	<p>Properties affected by flood damage;</p> <p>Cost of flood damage.</p>
T5	<p><b>Productive capacity of agriculture</b></p> <ul style="list-style-type: none"> <li>• Maintain productive capacity at current levels</li> </ul>	P	<p>Increasing urbanisation will result in a reduction in the extent of productive land available for agriculture. Recognising that primary production is a significant contributor to economic, social and environmental outcomes for the Region, this target aims to support and promote innovative solutions which maintain the productive output of the Region, whilst continuing to support sustainable natural resource management.</p>	<p>Productive output.</p>
T6	<p><b>Land condition for primary production</b></p> <ul style="list-style-type: none"> <li>• Improve land condition by 15%</li> </ul>	S	<p>Land condition for primary production relates to the physical, chemical and biological status of soils and the impact of land management practices on soil health (e.g. vegetation cover, cultivation activities, livestock management). Improvements in land condition will have a follow-on effect on adjacent waterways and the marine environment.</p>	<p>Catchment sediment loads;</p> <p>Soil health (e.g. acidity, soil erosion, soil carbon content);</p> <p>Vegetation cover.</p>

T(Type): P=pressure, S=state, R=response

Target		T	Target Explanation	Indicators
T7	<p><b>Condition and function of ecosystems (terrestrial, riparian)</b></p> <ul style="list-style-type: none"> <li>Recover from current levels</li> </ul>	S	Although some native vegetation remains in the Region, it is not fully functional, because of degradation due to edge effects, fragmentation, weed invasion, grazing and inappropriate fire regimes. This means it does not provide the appropriate ecosystem services and habitat it might once have done. This target is about ensuring that the condition, structure and function of our remnant vegetation is improved.	Condition of native vegetation (terrestrial, riparian, water dependent ecosystems).
T8	<p><b>Extent of functional ecosystems (coastal, estuarine, terrestrial, riparian)</b></p> <ul style="list-style-type: none"> <li>Increase extent to 30% of the Region (excluding urban areas)</li> </ul>	S	For the Region to retain ecosystem function and to prevent further decline of native species, large-scale restoration of native ecosystems is required. Restored ecosystems need to be carefully planned and designed (according to restoration priorities) so that they will provide equivalent structure, function and habitat features to that which would have occurred in the local area.	Distribution of native vegetation; Area of native vegetation.
T9	<p><b>Conservation status of native species (terrestrial, marine, aquatic)</b></p> <ul style="list-style-type: none"> <li>No decline in conservation status from current levels</li> </ul>	S	Around 77 of the animal species and 224 of the plant species in the Region have formal conservation status under state or federal legislation. However, there are vast numbers of species which do not, but may also be in decline. This target does not just relate to species listed in legislation, but aims to prevent the decline of all native species in the Region.	Populations of conservation listed species; Number of species or ecological communities with conservation status.
T10	<p><b>Land based impacts on coastal, estuarine and marine processes</b></p> <ul style="list-style-type: none"> <li>Impacts reduced from current levels</li> </ul>	P	The Adelaide Coastal Waters Study identified turbidity, from high levels of suspended solids related to stormwater and wastewater, as a contributing factor to seagrass loss and a major cause of poor recreational water quality. ACWS technical reports have established some relevant current baselines for evaluation of targets.	Catchment sediment load; Stormwater discharged to coast or marine systems.
T11	<p><b>Seagrass, reef and other coast, estuarine and marine habitats</b></p> <ul style="list-style-type: none"> <li>Halt in the decline of habitat and a trend towards restoration</li> </ul>	S	Land based impacts are a key threat to marine habitats. This target aims to reduce impacts from current levels, based on understanding from recent baseline marine mapping, coastal seagrass mapping, reef health assessments and coastal conservation assessments and the Adelaide Coastal Waters Study.	Distribution and condition of marine habitats.
T12	<p><b>Coast, estuarine and marine water quality</b></p> <ul style="list-style-type: none"> <li>All waters meet water quality guidelines to protect defined environmental values</li> </ul>	S	Water quality objectives will set specific targets to protect the agreed environmental value for an area. Environmental values will be established, with community consultation, to set water quality guidelines for the Region's waters. Separate marine water quality targets relate to the need to assess impacts to marine habitats likely to be impacted by poor water quality such as reefs and seagrass.	Exceedence of specified marine water quality parameters (e.g. turbidity, dissolved oxygen, nutrients, heavy metals).
T13	<p><b>Improve the capacity of people in the community, institutions and regional organisations to sustainably manage our natural resources</b></p> <ul style="list-style-type: none"> <li>Increase capacity by 20%</li> </ul>	R	This target will measure community awareness of NRM, knowledge of good NRM practices, pre-disposition to follow best practice and the undertaking of actual behaviour change.	Percentage increases in awareness, predisposition for and uptake of positive behaviours, in sustainable natural resources management practices.

## **Remedies For Obese-City**

Presentation prepared by Caroline Stalker, based on project work, research and collaboration with John Hockings and Jim Gall

### **Introduction**

In Australia since World War II we have made obese-cities. They are obese-cities because they are excessive in their consumption of resources. They are obese-cities because, like the condition of obesity, excessive consumption is now linked to poor health and well being of the urban populations and the environment they inhabit.

Within planning schemes around Australia the concern about unsustainable urban development has been responded to with the implementation of more compact Transit-oriented Development. While as a general regional planning approach linking population density to public transport makes sense, the examples of TOD we have seen appear to create as many environmental problems as they solve, and have not been able to lure Australians from their backyards in droves as first hoped, as in the most part they offer poor quality living environments.

At Architectus over several years we have explored through research, project work and collaborative workshops ways in which to create more sustainable urban environments in our region which are also desirable places to live, and support health and well-being, as remedies for 'obese-city'. Each time we come back to the fundamental importance of holistic, considered design which integrates urban landscape. The paper presents principles for what we call Landscape-Oriented Development, or 'LOD' as well showing examples of projects where this approach has prevailed.

### **Obese-cities**

It is difficult to characterise Australian city-making over the last 60 years in a bright, sun-shiney way, all the facts seem to tell us that we have been profligate with our resources. Our major cities around Australia expanded greatly from their historic cores following World War II. This stage of our city making has embraced models of development which are dependant upon the private car, dormitory low density suburbs, and growth by expansion rather than consolidation. We have expanded our settlements ever outward, consuming not just land, but resources to service dispersed settlements. Strip development and big box shopping centres serviced exclusively by private motor vehicles has been a dominant development form in peri-urban areas in our region throughout the 70s and 80s, supported by a seemingly infinite supply of land, petrol and growing household incomes. And still we build bigger houses, larger suburban shopping centres, the standard median price home offering levels of luxury which were inconceivable for our grandparents.

Cities and city form are agents of our consumption of energy, water, food, and materials. Alarmingly our consumption rates of these key resources have continued to out-strip our population growth in Australia. Dr Peter Newton, Research Professor at Swinburne University of Technology in the Centre for Regional Development and the Institute for Social Research and former Chief Research Scientist at CSIRO, has assembled research from comparative State of Environment: Human Settlements Reports from 2001 and 2006 which demonstrates that rates of increase of consumption of water, energy, waste generation, kilometers traveled by private vehicle, CO2 generation, and floor

area of new dwellings over those 5 years were all well above the rate of Australia's population growth.<sup>1</sup> Newton has argued for the critical importance of winding back the unsustainable ecological footprint of our major cities in Australia, which is about 8 hectares per capita, 3-4 times the global average, or equivalent to three-planet-living<sup>2</sup>. Australian cities are amongst the worst in the world in terms of our consumption of key resources per capita, and consequently our 'ecological footprint' (or the measure of the relationship between our consumption patterns and the capacity of the earth's resources to support them, expressed as a theoretical area of land/resources).

While it is common knowledge that our environmental health indicators continue to worsen: increasing greenhouse gas emissions, water shortages, more deforestation, degraded land, and more species threatened, the way we have made cities has curiously reinforced a disconnect between our understanding of the environmental impacts of our city consumption and city-making. Tim Flannery, in his book "Future Eaters" describes this condition of disconnect from the natural world in our cities as part of a general a cultural 'maladaptation' to the Australian environment; our lack of understanding of the environmental systems within which we operate means we continue to over-exploit them. Flannery observes:

*Urban consolidation is removing bushland and even gardens from much of our immediate habitats. These areas give most young Australians their first chance to learn about their environment.*<sup>3</sup>

Today's suburban lifestyles (75% of us live in suburbs in Australia) are characterised by long drives in air-conditioned cars from large air-conditioned homes to air-conditioned workplaces, shopping in air-conditioned centres without natural daylight. We consume food so transformed by industrial processes that some of it is barely recognisable as food! Perhaps not surprisingly obesity caused by lack of exercise and over consumption has overtaken smoking as the leading cause of premature death and illness in Australia.<sup>4</sup> In doing this we have ended up building our cities to insulate ourselves from the very natural systems that make life possible – and our daily experience has become a kind of ecological disconnect. As Peter Newton observes in the preface to his book "Transitions"

<sup>1</sup> • Per capita water use at 115 KL/year (2000-1; 3.2% per year increase over 1996/7 level).  
• Per capita energy use at 266 GJ/year (2003-4; with a forecast increase of 2.2% per year to 2019)  
• Per capita waste generation of approximately 1 tonne/year  
• Per capita mobility by car of 8000km/year (and vehicle kilometres travelled are forecast to be one third higher by 2020 in capital cities than in 2002).  
• Per capita CO2 generation of 27.5 tonnes/year  
• Floor area of new dwellings has increased at a rate of 2.2% per year over the 10 year period to 2003-4 (where the average was 239 square metres).

In all instances, annual rates of change in per capita consumption are above the rate of Australia's population change (which is 1.2%/year, twice the OECD average) and in combination these twin factors are driving growth in Australia's total consumption.

<http://www.sisr.net/publications/07newton2.pdf>

<sup>2</sup> <http://www.sisr.net/publications/07newton2.pdf>

<sup>3</sup> p404 Flannery, Dr. Tim *The Future Eaters* 2000 Reed New Holland Australia

<sup>4</sup> <http://www.lismore.lemlink.com.au/clinical/medicine/medicine1.html>

*There is almost a complete disconnect from the city-dweller's consumption of manufactured products and an understanding of the environmental impacts associated with the lifecycle of these products<sup>5</sup>*

### **The Problem with TOD**

In the early 80s there seemed to be a glimmer of sunshine on the horizon – Transit-Oriented Development was widely touted as a way of creating a more sustainable settlement pattern in Australian cities. TOD is now enshrined as method for the delivery of more resource efficient cities in planning schemes around Australia. In our region of South East Queensland TOD underpins both regional and local-plan making, and we are now starting to see built examples around our cities.

The problem with TOD is that we have uncritically digested models suited to other climates and locations. The Milton and Buranda TODs which are currently the subject of new Development Applications demonstrate these problems very clearly.

In always adapting the New Urbanist 'concentric circle of density intensity' principle, we have tended to put denser developments on major road corridors or on railway lines. The most dense development ends up within the most hostile urban environments, meaning the buildings are air-conditioned, reinforcing high energy consumption and a disconnect from the natural environment. We seem to make TOD environments where the design drivers are maximizing density within a small concentrated area, at the expense of creating high amenity urban environments. The Milton TOD puts the higher density apartments on the railway, without any concessions to making good living environments. The Buranda TOD comprises two towers in a carpark!

As it's practiced, TOD doesn't seem to significantly reduce car dependence for trip other than into the CBD, (developers and local planners continue to demand 2 units per car in Brisbane) nor does it create living environments that demand less energy. As the ACF greenhouse gas emission maps show, there is a much stronger relationship between income/consumption patterns and greenhouse gas emissions than density and relationship to public transport.

The TODs we have seen being designed do not necessarily reduce our consumption of water, electricity or our production of waste.

The TODs we are making don't support sub-tropical lifestyles, which place a high value on openness, outdoor living and a relationship to landscape.<sup>6</sup> These inward-turning developed-to-the-max apartment buildings near railway stations or busway corridors reinforce a real concern in the broader community that a more compact settlement pattern leads to a loss of amenity. It is hard to see how the kinds of 'TODs' we have seen being built in our region will lure us away in droves from our suburban backyards.

This is not to say more compact development supported by good public transport is irrelevant. However the TODs we are making don't create either sustainable or desirable environments.

<sup>5</sup> Transitions: Pathways Towards Sustainable Urban Development, Peter W Newton ed CSIRO publishing 2008

<sup>6</sup> Research undertaken by the Centre for Subtropical Design has demonstrated that key environmental values of South East Queenslanders are openness and a relationship to landscape.

## **Landscape-Oriented Development**

Our design research, project work and design workshops at Architectus have led us to conclude that instead of TOD, we need to make what John Hockings, Brisbane Design Director, has called 'LOD', or landscape-oriented development. Creating a stronger relationship between denser living places and urban landscape is a way of creating more resource efficient settlement patterns, while making desirable environments that support well-being and create stronger preconditions for sustainability.

From a natural environment perspective, urban landscape has the following key potential values:

- Conservation/regenerative value
- Productive capacity – food/timber
- Supporting natural hydrology
- Creating biological connections
- Assisting with local water management
- Assisting in ameliorating Climate Change impacts
- Creates the preconditions for more sustainable buildings – buildings which can be naturally ventilated and cooled

From a social and cultural perspective, relating denser urban settlement patterns to urban landscape

- Reconnects urban populations with the ecological processes that support life
- Makes green space positive community space with natural surveillance

From a health perspective, relating denser settlements to urban landscape:

- Offers multiple opportunities for walking, riding and making exercise part of daily life
- Is simply good for us! Medical research has demonstrated that people in hospitals heal faster when they have a view of a garden or a landscape<sup>7</sup>. Our relationship to natural light, fresh air and green spaces is fundamental to our well-being.

## **Principles of LOD**

Landscape oriented development relates more compact settlement patterns to landscape at all scales, in the following ways:

### **LOD Cities**

- Utilising and consolidating the escarpments, watercourses and flood prone lands as key open space spines and structuring elements of our settlement pattern, providing landscape amenity and ecological resources for populations living at higher densities

<sup>7</sup> In her book "Healing Spaces, The Science of Place and Well Being" Esther M. Sternberg, M.D. explores medical research that links places and physical well-being. Sternberg's conclusion is that our connections to places in nature are of critical importance in healing and health.

- Creating networks of green places which help us deal with Climate Change, through assisting in micro-climatic management or urban precincts, flood and water management

#### LOD Neighbourhoods

- Locating greater residential density where it has the potential to have a strong relationship to landscape – outlook, breezes, access to urban green space
- Structuring new development around landscape networks and green urban spaces to set the parameters for denser developments

#### LOD Streets

- 'Re-calibrating urban streets' as useable public and urban landscape resources

#### LOD Cities

There are landscape resources within our urban areas that are unbuildable – the escarpments, flood plains and creek corridors. To date all our TOD planning is based on relating density to public transport. Instead we need to relate density to *landscape* and public transport. This enables us to create more compact communities where we can retain fundamental values of openness and a relationship to landscape, while making more of our potential water management, recreation, and resources.

Instead of concentric TODs we can create linear LODs, where the edges to parkland can be dealt with in a variety of ways ranging from a more passive 'edge' relationship to the creation of a more active mixed use community along the edge of green space.

We have tested an example of what could be achieved if our Regional Plan supported LOD through project work in the Caboolture/Morayfield Principal Activity Centre, where we are working with Parsons Brinkerhoff. This project is an example of the LOD thinking at a strategic scale.

Caboolture/Morayfield is a very typical peri-urban sprawl area. It grew from a farming community; in the early 1980s King St was a country town high street with views to farmlands beyond. The gardens, lakes and parklands to the south of the town centre have long been a strong marker of arrival and entry into the traditional town centre and a source of civic pride. These parklands are located in an east-west riparian corridor, which is also within the flood plain. The parklands as the marker of arrival into the town centre has been eclipsed by strip development to the south. The newer development to the south has supported large areas of car-based retail, and the consequently the economic and social role of the traditional town centre has been considerably weakened.

Our proposal for this centre is to reinforce the traditional centre and it's east-west orientation with a linear TOD formation along the edge of the parklands. This strategy has a number of advantages:

- It reinforces the primacy of the traditional town centre, but does so in a way that creates a re-orientation towards the centres key remaining asset – its parklands.
- It creates sites for open, permeable low energy building design
- It provides more activation of the parkland
- It facilitates a re-focussing on the ecological values of the flood plain



## **LOD Neighbourhoods**

In Brisbane we seem to have decided that all our density should be poured into a few key locations at high intensity. This has substantial flaws: firstly, there is not promise that these high intensity environments will make sustainable or desirable places to live (in fact the evidence is to the contrary) and it still leaves the vastness of our metropolitan area unviable for servicing by public transport, let alone being able to support good local services, facilities and employment.

We need to be considering ‘urban acupuncture’ – sensitive insertions of density to increase overall densities throughout the metropolitan area. This will enhance suburban neighbourhoods’ capacity to support viable public transport and a greater range of local services and facilities, including some local employment.

We tested this principle of ‘urban acupuncture’ by exploring opportunities in a ‘typical’ Brisbane middle/outer suburb comprising a main road on a ridge line, with an existing shopping centre, existing low density ‘character’ housing, a creek corridor, a single potentially ‘large’ redevelopment site and some small parks. We found that if we moved away from the preconception that denser development had to be on the transport corridor (in this case the road), but stayed with the idea of denser development in walking distance of the transport corridor, we could effectively create landscape-oriented development which offered residents a green outlook, the potential for natural ventilation and outdoor living, as well as enhancing the use of green spaces for recreation, in three different ways.

The opportunities were as follows:

1. Thin ‘slivers’ of new housing over looking creek corridors.
2. At the **ends** of existing rectilinear blocks, but not in the middle, where there is the potential to create a relationship with ‘borrowed’ landscape established in other people’s backyards rather than in the back of blocks – the corridor of mature trees that often exists in the continuum of backyards in the rectilinear blocks should be kept as a community resource.
3. On larger sites where the potential exists to create openness and relationship to landscape

## **LOD Streets**

Where there is less land available for the private individual, the quality of our shared urban places becomes even more important. Making more compact cities has to go hand in hand with creating better urban amenity. This means we need to re-calibrate urban streets to better support their role as landscape and pedestrian places, not just car places. Our work ‘retrofitting’ a coastal town main street is an example of reworking a street to achieve a much better balance between people and cars, while consolidating the street as a key landscape corridor and pedestrian space.

To start the project off we did extensive community consultation and found out the following:

- People wanted to improve the walkability of the precinct, including across the street itself
- Re-establishing a much stronger temporal and actual physical

connection with the beach was critical – many people felt that the street had lost its relationship to the beach

- Keeping and improving upon the existing shade tree canopy was critical
- People wanted to use the street as a series of casual landscape 'outdoor rooms' - where it's OK to drink coffee in your togs

To respond to these needs we created a series of 6 shared zones along the street, placed where beach linkages occur, to make these connections more legible, direct and functional. The shared zones also provide places to sit, gather, see music, cross the road, and orient yourself of the street. The existing canopy of shade is further reinforced along the street to consolidate the sense of a vegetated room close to the beach. In this project, the street is not so much a conduit for cars as a long shady subtropical urban room which links landscapes.

Thinking about the broader ecological role of landscape is also a useful city-making strategy for creating cities that are more resilient to Climate Change. At an Architectus' Think Tank held last year entitled "Retrofitting Cities for Climate Change", one of our workshop groups, led by Kerry Clare, explored the idea of what could be achieved by retrofitting a city block in Melbourne. In anticipating hotter days and more severe weather events in our cities, the group posited that increasing areas of landscaping can reduce heat island effects and increase carbon capture throughout urban areas. Planting can be used strategically also to mitigate thermal loads on buildings throughout the city, as well as assisting in bio-filtration. Water cleansed through bio-filtration in urban landscape areas can then be stored to mitigate impacts of drier climates. Treed streets also encourage walking and reduce 'heat island' effect from roads. These principles can apply to both urban spaces and urban street networks throughout cities.

### **A Model of Sustainable Urbanism**

We have recently completed a master plan for James Cook University where an holistic model of sustainable urbanism has been very deliberately sought by the client. Again 'LOD thinking' has provided a useful framework.

JCU's vision for a new community of 5000 residents at their Townsville Campus is:

*The creation of a university town with a distinctively Australian tropical ambience which will incorporate energetic academic, social, artistic and commercial environments. It will be an integrated community of living and learning that will set a new benchmark in sustainability.*

As the creation of the town around the university will happen over 20 years or more, the key to the successful delivery of JCU's ambition to create a sustainable Tropical town will be placing emphasis on the creation of a compact town set in landscape.

We were fortunate to have an underlying structure for the master planning of this campus that started with landscape. Birrell's 1964 master plan was organized around key landscape elements or axes: Magnetic Island view axis, the Mt Stuart view axis and the amphitheatre of hills axis. By today's standards of urban design the Birrell master plan could have been reduced on the photocopier by 50%! The campus is very disbursed and people drive between lectures. Our aim was to build on the existing landscape structure but

'retrofit' the compactness and walkability.

For the master plan we developed a spatial structuring that is defined by the key 'connectors' in the town, which build upon the original Birrell axes, while adding one more. These connectors link the core to the edge, creating the integration and blurring the edges between the JCU campus and its town, create the underlying structure for land use, public space, building edges, hubs, pedestrian paths and roads.

Overlaid on the landscape connectors are:

- The public space network – incorporating the central green spine, and east-west linkages comprising streets, squares and lanes
- Ground level activation (e.g. retail)– to create lively places along the connectors
- Density - the highest residential densities are focused along these connectors
- Pedestrian and bicycle paths which converge on the connectors as well as provide permeability throughout the town
- The vehicular network supports the connectors as well as permeability throughout the town

In a dry tropics environment such as Townsville, it can be a challenge to get people out of their cars and turn off the air conditioning! Again it was important to be clear about the qualities of the overall environment that would encourage walking and reliance on passive cooling, and a focus on landscape was considered vital in achieving this. This translated to an urbanism with the following characteristics:

The Fragmented/Perforated Perimeter Block;

The perimeter block is the optimal urban form for defining urban spaces and creating activity along edges. However walled urbanism in Townsville creates heat islands. Fragmenting the perimeter block to facilitate air movement and the planting of large shade trees will avoid the creation of heat islands.

Shady Edges

Buildings edges can provide important refuges from hot sun particularly as colonnades and shaded building recesses.

A Combination of Built and Planted Shade

Shade plays an important role in creating an inviting urban environment in Townsville. Due to the low rainfall regime for many months of the year we adopted a strategy to combine built with planted shade to create a shady network of streets and squares.

Density, Landscape and Orientation

It's important to locate denser housing forms where there is the possibility to create openness for penetration of cooling breezes into the dwelling, provide appropriate solar orientation, and offer outlook over a benign environment. This means orienting residences to the north over east-west streets with good shade and along green corridor edges where possible. This strategy in turn creates safe east-west streets and green spaces through natural surveillance.

JCU was keen to create a new benchmark in sustainability, and in doing so we needed to provide them with a framework that would assist them to go beyond current industry accreditation systems for urban development. Sustainable development is not achieved solely by single isolated initiatives such as low

energy housing or low impact land development, but the integrated consideration of all impacts of development decisions. For this to occur all development decisions needs to be considered through the framework of a conceptual network or matrix of all environmental impacts. Jim Gall prepared a sustainability framework to assists JCU with all subsequent planning and design. The framework requires all decisions at all scales to be considered within a network of biophysical impacts relating to land, energy, materials, water, agriculture, and waste, as well as social/cultural impacts.

What JCU envisions will take many years to put into place, and this framework provides them with a roadmap for sustainable development of their campus. A recent implementation workshop held in Townsville brought together advisors in finance, land development, construction management and statutory planning to clarify a path for the University to deliver on these high ambitions. JCU is now undertaking preparatory work on governance structures to ensure that the key objectives of the project are delivered.

### **Conclusion**

All of the examples described here seek to re-establish a fundamental relationship with our natural environment, so we can better understand it, enjoy it, adapt to it, and utilise it in a more sustainable way. We have made obese-cities, but we can choose to unmake them. Our work demonstrates that Landscape-Oriented Development can create compelling and sustainable living places.

The need to retro-fit cities to deal with environmental and population pressures is urgent. However we must engage careful, considered holistic design rather than clumsy planning formulas to do it, so we can create frameworks for sustainable development whilst creating desirable living environments. Landscape-oriented development has much to offer in this regard. Policy makers, planners, developers need to work with designers as problem solvers in creating remedies for obese-cities – design is an instrumental tool in solving our urban sustainability problems that have been created through a lack of considered design.

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# The Future Australian City: Implementing The Rhetoric Using 3D Spatial Scanning and 'Defragmented' Digital Design Techniques

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## **ABSTRACT**

*This paper discusses a recent urban design proposition investigating the future of Australian cities, produced for the Australian Pavilion in the 2010 Venice Biennale. The research involves new analysis and design techniques for increasing density near public transit and public open spaces whilst maintaining or improving solar amenity.*

*This paper speaks to the potential of digital city modelling using 3D terrestrial and emerging photogrammetry technology along with 'defragmented' digital design techniques. New development envelopes can be created which increase building density whilst maintaining sunlight penetration into public spaces.*

*The project visualises one possible direction for the future Australian city that address issues of population growth and increasing density without compromising amenity.*

**Keywords:** urban design; solar amenity preservation; digital modelling, pedestrian connectivity

## **Introduction:**

City design has splintered into increasingly narrow specialist disciplines since the mid Twentieth Century. Each discipline makes specific but isolated contributions to urban design, documenting their positions predominantly through text and two dimensional representations with limited interaction with other disciplines.

*There appeared separate programs for clean air, clean water, endangered species, coasts, flood zones, waste, etcetera... As planning became segmented into sub-disciplines, working on housing, transport, urban design, land-use, environment, community development, economic development became separated. Specialists carved out niches, generated jargon, and ventured little past the walls they had erected (Neuman 1998 p.211).*

This two dimensional, 'fragmented' (Conklin 2006) and sequential design approach is inadequate in addressing contemporary urban design issues, particularly in light of increasing fears of an imminent environmental crisis and peak oil, concerns for health, amenity and accommodation of an increasingly urbanised population.

'Implementing the Rhetoric' is an urban design proposition for the future of Australian cities to be exhibited at the Australian Pavilion in the 2010 Venice Biennale that speculates that by the year 2100 politicians and planning authorities will have the power and political conviction to act decisively, allowing city designers to break down the disciplinary silos and to realise holistic or 'defragmented'<sup>1</sup> (White 2009) design strategies that address critical issues for sustainable urbanism.

'Implementing the Rhetoric' is the outcome of digital procedural modelling techniques specifically designed for addressing today's urban issues. These techniques were simultaneously applied to a portion of the inner western suburbs of Melbourne, Australia.

In this paper I describe a design proposal that investigated the potential of digital city modelling using 3D terrestrial scanning (a technology primarily used in the mining industry) and emerging photogrammetry technology to create a base model to test numerous 'defragmented' digital design techniques. I discuss the initial scanning process and three specific design techniques applied simultaneously in the parametric model:

- 'Ped-Catch' — an animated pedestrian catchment analysis technique
- 'DDS' (density distribution surface) — a technique for linking pedestrian connectivity to density distribution
- 'Subtracto-Sun' — a technique for preserving solar amenity of public open spaces.

## **Modelling using 3D terrestrial scanning and aerial photography:**

The project proposes the densification of the well-serviced Melbourne suburb of Footscray. The design process began with the production of a digital 3D base model created from a mix of GIS data, 3D terrestrial scanning (see Figure 1 LHS) and emerging photogrammetry technology (using digital photographs from differing views to calculate 3D forms) (see Figure 1 RHS).

<sup>1</sup> The term 'defragment' is a neologism that surfaced in the mid 70s but became more readily used when Microsoft™ Windows NT Version 4™ was released (1996) with in-built computer optimisation software which included 'Disk Defragmenter'. The defragmentation process looks at the whole of the computers hard drive and reorganises the small fragments of data into more efficient contiguous parcels, this minimises disk head movements (seeks), which in turn makes the computer run 'faster and better'.

The GIS data available for the Footscray area was limited to block boundaries, street network and contour information. This data was extracted and imported into Autodesk 3DS Max™ to create a topographic surface with block definitions. Aerial photography was captured from Google Earth™ and mapped onto the topography.

To model the existing buildings for Footscray, an experimental comparison was conducted between the Leica™ 3D Terrestrial laser scanner and a variety of photogrammetry software. This investigation is ongoing and clear results have not yet been measured in terms of accuracy, but by far the quickest method of modelling existing buildings on a large scale was using Google's Building Maker™ software. Each building took less than 2 minutes to model with raster images mapped onto façades (see Figure 1 RHS). Other methods were considerably more complex (Gruen 2003), registering point cloud data and converting it into polygon meshes took at least an hour per building and then required optimisation due to the overly complex information.

Google's Building Maker™ was also by far the cheapest method, with the software being available for free and able to be used within common internet browsers such as Firefox or Internet Explorer with the free Google Earth plug-in installed (Strynatka 2009).

Though the accuracy of this method remains untested, it was quite suitable for the highly speculative Venice Biennale project, which did not demand a high degree of accuracy. If this method were to be used on real projects, closer investigation into the level of accuracy would need to be undertaken.

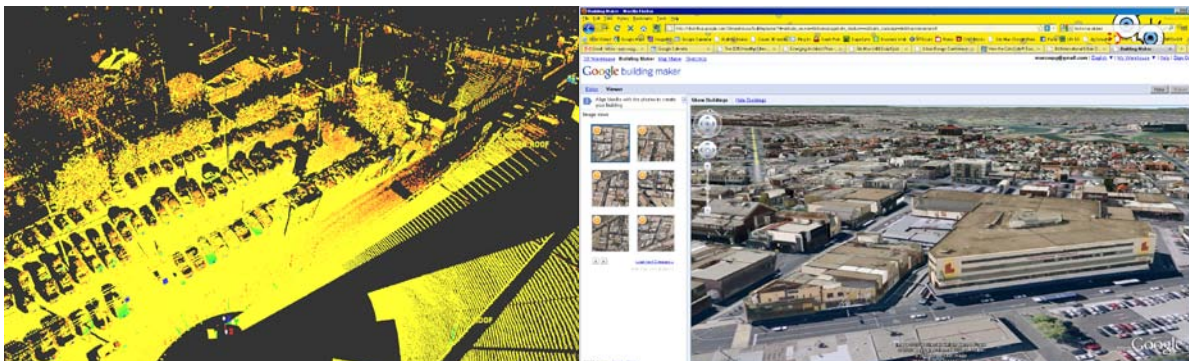


Figure 1: LHS screen grab from Leica Geosystem's Cyclone™ software of point cloud data gathered using Leica 3D Terrestrial laser scanner. Point cloud data needed to be converted 3D polygon or NURB surfaces to be of use in this project. RHS screen grab from Firefox internet browser whilst modelling using Google's Building Maker™ software.

### ***Ped catch — connectivity of street layouts:***

Transit oriented development (TOD) is essential for combating urban sprawl and carbon emissions from transport (Newman 1999). The TOD strategy is a common theme within planning rhetoric; for example *Melbourne 2030 Planning for Sustainable Growth* (DOI 2002) proposes urban consolidation by increasing density within existing transport node catchments (walking distance from railway stations).

Though human movement is extremely difficult to predict with movement generally occurring from 'everywhere to everywhere else' (Hillier 1996 p.120), calculations of catchments do not predict movement, but assess the potential for movement to transport nodes (Ewing 1999, p.5). Radii commonly used for catchment analysis are 400m and 800m, which represent five and ten minutes walking distance at average walking speed of 1.33 metres per second — the amounts of time people are willing to walk to shops and transport respectively (Pushkarev & Zupan 1975 pp.25, 47). The 'circular catchment method' does not take into account street layout (White 2007b).



In response to this limitation I developed a technique for catchment analysis more akin to GIS Ped-Shed analysis called 'Ped-Catch' which uses animated 'agents' that navigate street layouts to more accurately represent catchments for public transport nodes (White 2007c). This technique also allows comparison studies with different grid types (see Figure 3) and manipulation of existing networks to increase walkable catchments. In the case of the 'Implementing the Rhetoric' project, a hexagonal pedestrian overlay was adopted which was superimposed over the existing street layout creating a higher level of pedestrian connectivity (see Figure 5) and greater catchment area for each railway station.

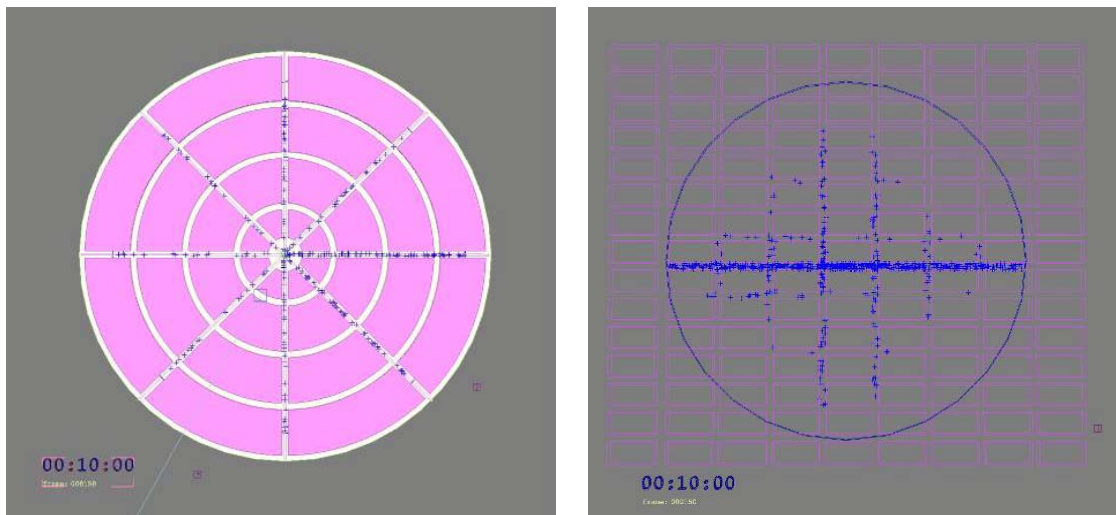


Figure 2: LHS Screen grabs of *Ped-Catch* calculating 5 and 10 minute catchments for a radial street grid (800 metres as expected). RHS Screen grabs of *Ped-Catch* calculating 5 and 10 minute catchments for a rectilinear street grid.

***'DDS' (density distribution surface) — Linking density distribution to pedestrian catchments:***

The agent-based technique for pedestrian catchment analysis also provided the opportunity for linking pedestrian movement to density distribution. Using a concentric volcano population density distribution model (see Figure 3), a 'density distribution surface' informed by access to public transport was modelled using animated virtual-pedestrians to determine areas suitable for increased urban intensity. Areas close to railway stations have high density which reduces as walking distance from the station increases. The digital model was then used to simulate potential urban form that was restricted to the density described in the DDS (Figure 4).

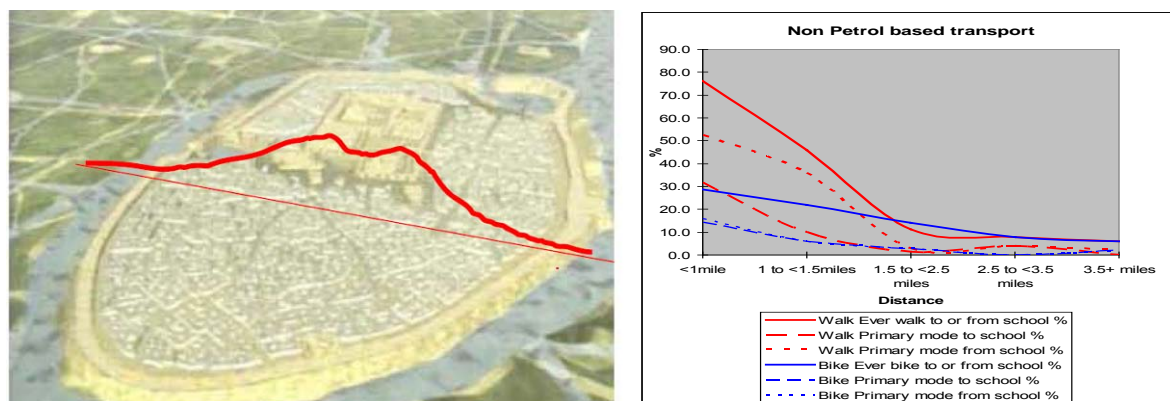


Figure 3: LHS — Concentric Volcano population density distribution model, Sumerian Ur in southern Mesopotamia (modern day Iraq), Image source (Chase-Dunn 2005) section overlay by M White. RHS — Non fossil fuel based transport : Graph by Marcus White using data from Schollberg, M. Greene, J. Phillips, P. Johnson, B. & Parker, B, 2006, 'School Trips: Effects of Urban Form and Distance on Travel Mode'.

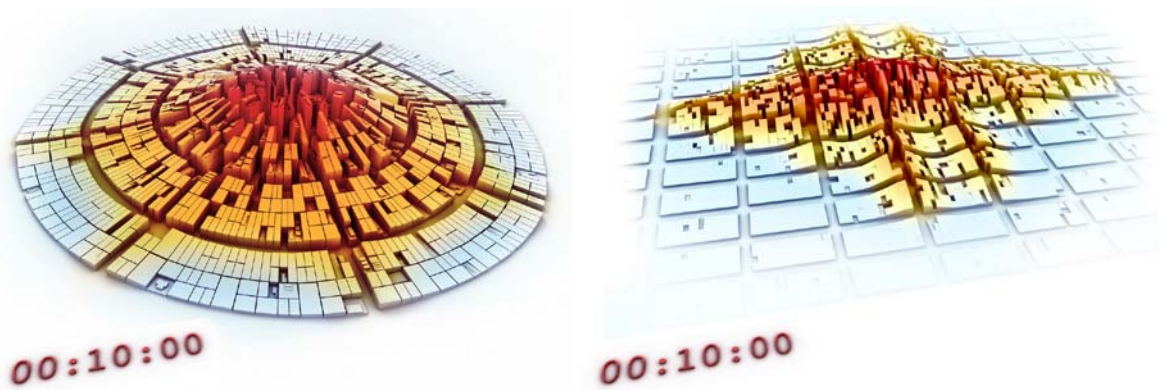


Figure 4: rendering of *Ped-Catch* linked to a *density distribution surface* for a radial street grid (LHS) and rectilinear street grid (RHS).



Figure 5: TOD rhetoric suggests density should be maximised within walking distance of sustainable transport. The implementation involves making a direct link between density and pedestrian connectivity using a density distribution surface based on animated ped-shed modelling. A hexagonal pedestrian overlay increases the level of connectivity and thus increases the potential density.

### ***‘Subtracto-Sun’ — preserving the solar amenity of public open spaces.***

Much contemporary urban design rhetoric centres around the need for increased population density in inner suburbs with the intention of limiting sprawl and encouraging more focused sustainable development. Whilst the general aspiration to adopt environmentally sustainable planning guidelines is accepted (DOI 2002), opposition to densification policies has come from resident groups, who argue that this will result in a loss of amenity — particularly solar amenity (Cotton 2008).

There are other important reasons for preservation of solar amenity, such as: to improve access to daylight for footpaths to contribute to a more pedestrian friendly environment encouraging walking over driving, to improve natural light into buildings (therefore lowering carbon emissions) and to improve health through greater access to vitamin D. According to medical academic Professor Michael Holick from the Boston University Medical Centre:



*Up to 25 per cent of Australians could be Vitamin D deficient. The cause is something that's been known for nearly a century, a lack of sunshine. There now seems to be a connection between breast, colon and prostate cancer and a lack of Vitamin D (Kelly 2003).*

In response to the conflicting desire for densification whilst maintaining solar amenity, I developed the 'Subtracto-Sun', a subtractive solar modelling technique designed for preserving solar amenity for public spaces through accurate solar ray casting over time, which can be used to sculpt maximum permissible building envelopes, adjacent plazas and parks.

'Subtracto Sun' utilises parametrically linked variables of digital sun systems (time and location), and real-time boolean operations. The technique creates permissible development envelopes by subtracting a solid negative 'shadow' object derived from angles of the sun during a given period (Figure 6). This results in a development envelope within which any building can be built without casting a shadow onto an adjacent public space within the designated time range, for example, no overshadowing between 9am and 4pm (Figure 7).

This process creates forms reminiscent of pyramidal forms of Teotihuacán of pre-Hispanic Mexico or the renderings of New York maximum permissible envelopes by Hugh Ferriss in the 1920s (Figure 8 LHS).

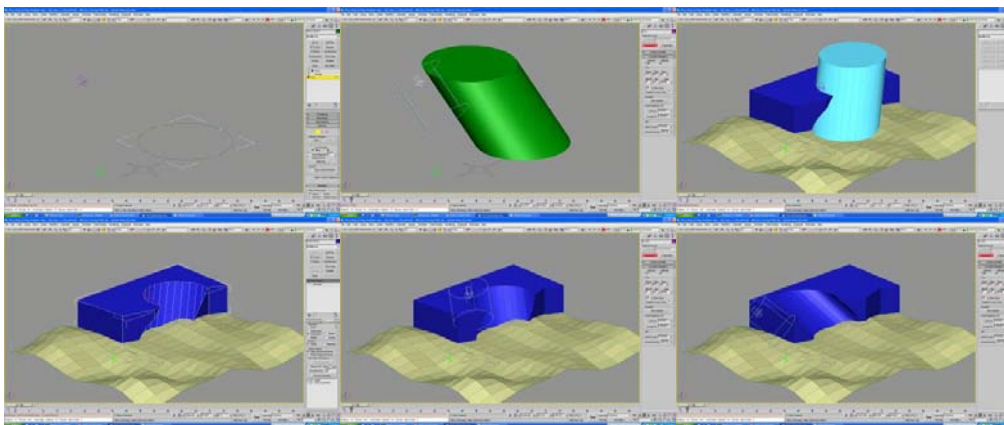


Figure 6: Explanatory diagrams of 'Subtracto-Sun' — Parameters of an extruded plaza outline (circle shape) are linked to the angle of the sun, making a 'solid shadow' which is then subtracted from adjacent building envelopes (White 2007a). The subtraction is then repeated for a specified range of times.

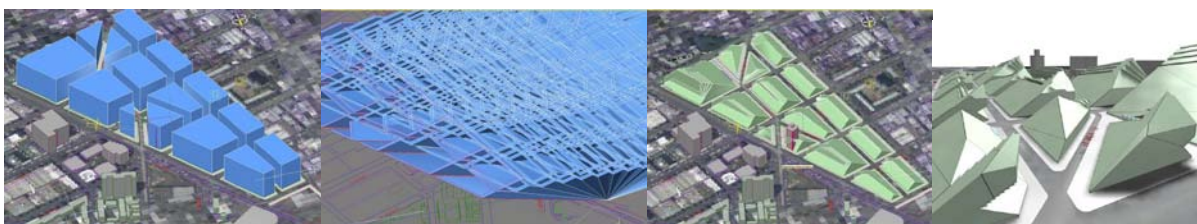


Figure 7: Example of Subtracto-Sun applied on residential streets to preserve solar amenity to footpaths. Left to right: extrusion of site boundaries as solid mass (A); extrusions of east, west and north footpaths tapered to match the angle of the sun at different times of the day (B); resulting 'Subtracto-Sun' forms (A minus B); perspective view of permissible building envelopes.



Figure 8: Hugh Ferriss' 1929 renderings of New York City maximum envelopes (LHS) and indicative potential building forms (RHS).

For the Footscray site, I applied the Subtracto-Sun to both existing and proposed parks and plazas throughout the Footscray area, carving the surrounding urban form so it would not overshadow these public spaces (see Figure 9). Due to the flexible nature of the digital model, this technique could be applied at the same time as the 'density distribution surface' linked to pedestrian catchments technique. This concurrent process created maximum envelopes which could then be 'filled in' with indicative building masses not unlike the Ferriss visualisations of New York City (Figure 8 RHS). The model then was rendered so as to clearly visualise the resulting urban form (Figure 10 & Figure 11).

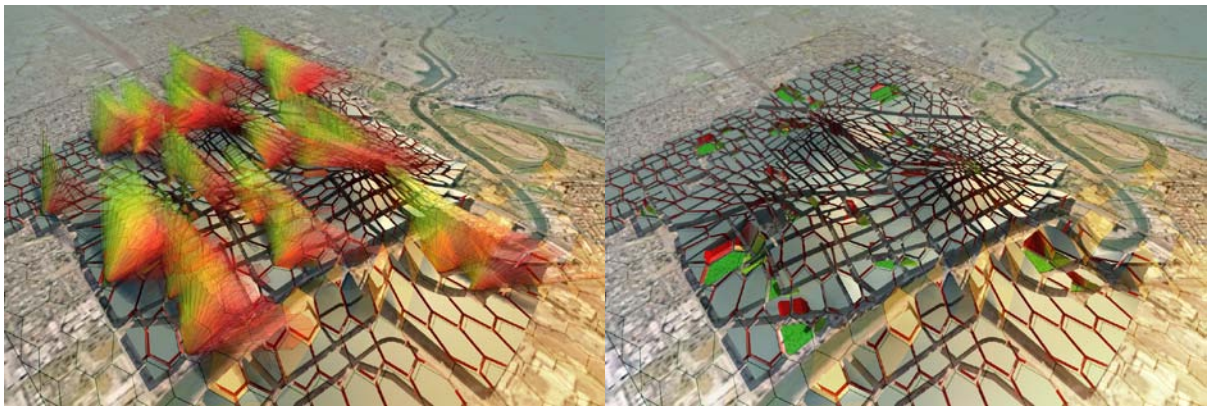


Figure 9: Planning rhetoric suggests density increase without the loss of solar amenity to public open space. The implementation involves the use of a solar amenity preservation technique called 'Subtracto-Sun'. Subtracto-Sun extrudes open space boundaries, tapered to match the azimuth and altitude of the sun throughout the day (LHS). The extrusions are subtracted from surrounding potential urban form to guarantee full solar penetration (RHS).

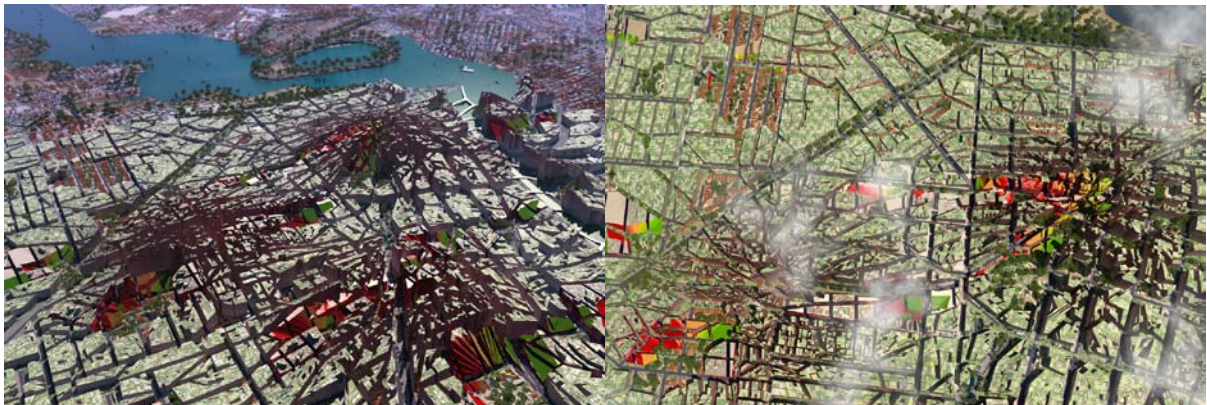


Figure 10: LHS aerial perspective view showing urban intensification with respect to proximity to transit and subtracted forms adjacent public open space. RHS Perspective roof plan showing hexagonal pedestrian network overlay.



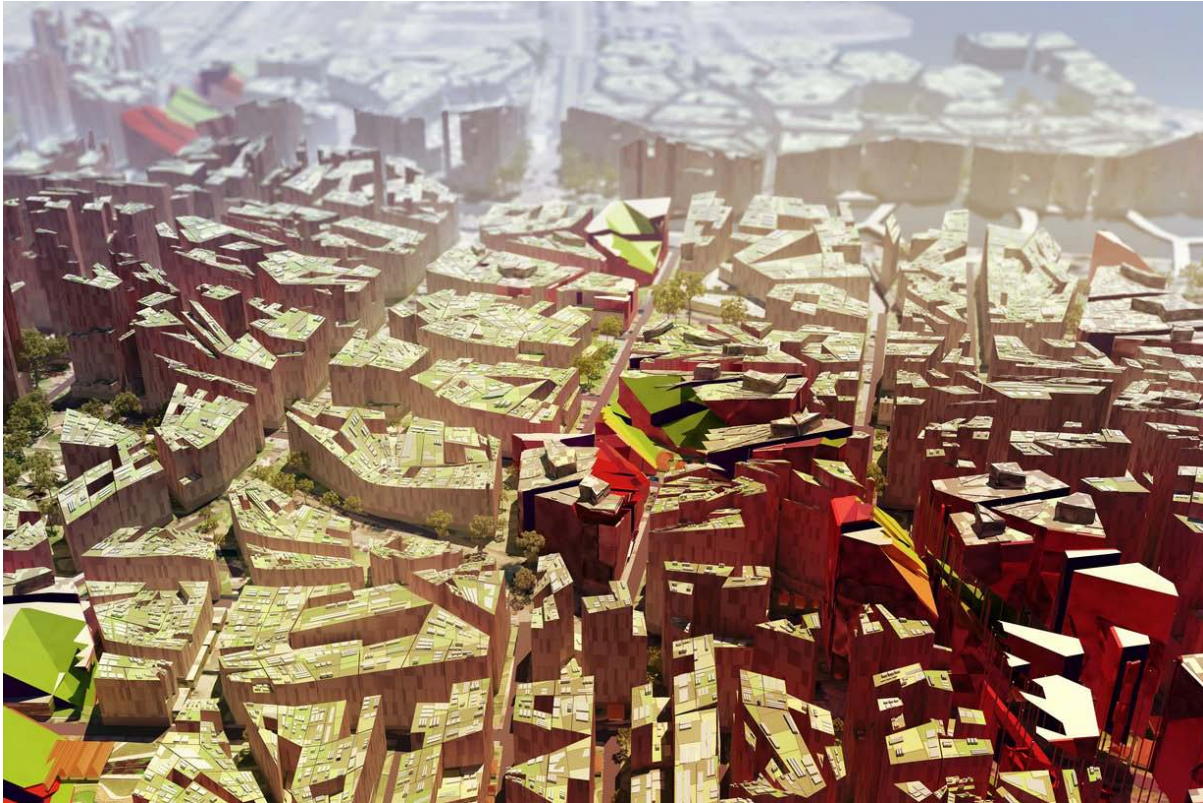


Figure 11: Aerial perspective view showing urban intensification with grid overlaid with hexagonal pedestrian network, building masses sculpted to maximise light into public spaces and roof gardens for additional open space and water collection.

### ***Conclusion:***

In this paper I have touched on the potential of digital urban modelling using both high-level accuracy (3D terrestrial scanning) and low-level Google Building Maker aerial photographic modelling. In this instance, the low-level use of the free Building Maker had more than enough accuracy for this speculative project.

I have described the 3D digital modelling and non-sequential application of pedestrian catchments analysis, density distribution surfaces and solar amenity protection techniques with resulting forms rendered to give an idea of the resulting spaces and forms.

The project demonstrates that a number of key urban agendas such as pedestrian connectivity, walkability, densification, solar amenity and visual composition can all be tested concurrently in a non-fragmented manner.

In this proposition an extreme alteration to the existing fabric of the suburb of Footscray with a massive long-term increase in population density has been illustrated, but I suggest that a similar process should be used on a more humble scale in Footscray and similar suburbs if we are serious about developing more sustainable cities.

### ***Acknowledgement:***

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Figures: Figure 4, Figure 5, Figure 9, Figure 10 and Figure 11 have been re-rendered by Flood Slicer using 3D digital models supplied by Marcus White.

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## Peak Oil – A Positive Place-Making Tool

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### ABSTRACT

*Hubbert's curve describes oil production growth, peak and decline, predicting 1960's global discovery peak, 1970's USA production peak and the recent global peak of "conventional" oil. We anticipate price volatility, sudden supply disruptions, and/or progressive decline in supply increasingly impacting our oil-dependent economy and lifestyle. Substitutes are insufficient. Depletion also requires bringing people and destinations closer, sourcing goods and services closer to markets, and less oil-vulnerable means of exchange. These characteristics also address contemporary urban place-making: reducing travel and energy requirements, encouraging physical activity, providing more equitable access to goods and services, and optimising human contact and exchange. Instead of dreading peak oil, or seeking technological fixes, let's use peak oil to realise many place-making objectives, achieving better community outcomes.*

**Keywords:** City design–urban futures, Resource management, Healthy Cities, Transportation, Renewable energy

### The Peak Oil Challenge

Oil is a finite resource. And peak oil is not a new phenomenon. I grew up in a post-peak oil community. Although we didn't call it by that name, I experienced the impact of peak oil 55 years ago with the closure of my first primary school. The Turner Valley oil field in Alberta, Canada where I grew up was, in its heyday, the most productive oil and gas field in the entire British Empire. But it peaked in 1940, and the district was already depopulating by the time I started school. Peaking does not mean running out of oil. That field, 70 years after its peak, is still producing, albeit in far lesser volumes and at far greater unit cost.

In 1956, the year after my first school closed, Marion King Hubbert described a bell curve of oil production growth, peak and decline. His predictions of the 1960's global discovery peak, and of the 1970's USA production peak, were uncannily accurate. As he also predicted, global "conventional" oil already peaked in 2005. By applying more aggressive production techniques, and by including increasingly expensive, energy consuming, polluting and risky "unconventional" sources from heavy oil, deepwater oil, polar oil, oil sands and oil shales, gas to liquids, coal to liquids, and bio-fuels, total liquid fuel production may yet exceed July 2008's 87.84 million barrels per day, the highest rate so far recorded (Fig 1). Although the world's cumulative capacity is understood to be in the order of 90 million barrels per day, the International Energy Agency (IEA) has reported that world production of all liquid fuels decreased from April to May of 2010 to 86.31 million barrels per day (Peak Oil News 2010).

It is of concern that the more we "force" production in an attempt to delay peaking, the less utility we will gain as a ratio of the utility invested and, post-peak, the steeper the decline will be. At peak, there may still be approximately half of the global oil reserves remaining for

more prudent future use. Post-peak, production will decline and the cost of extraction including energy cost, environmental cost (witness the Deepwater Horizon catastrophe in the Gulf of Mexico) and opportunity cost, as well as the level of financial expenditure, will increase. The era of cheap oil is over.

At the same time as oil production is peaking, oil demand would be expected to increase with the industrialisation and motorisation of the likes of India and China as well as the increased consumption by oil producing countries, resulting in them having less to export. Only a small gap between supply and demand can have huge impacts on price as we observed in the latter half of 2007 and the first half of 2008. That violent price rise would have exacerbated other factors triggering the global financial crisis, leading to a destruction of demand and a consequent global collapse in price.

Three likely “risk” events for Australia associated with peak oil include a potential sudden interruption in supply, the increased volatility in price and in supply reliability we are already experiencing, and the almost certain progressive decline in access to supply coupled with increasing prices. These events will impact on oil-dependent transport, construction, agriculture and production processes, increasingly affecting our economy and our lifestyle.

### **Managing the Post-Peak Decline**

As 70 % of Australia’s oil is used for transport and 90% of Australia’s transport is dependent on oil, our greatest opportunity to minimise and manage those risks will be to better manage the transport task. Won’t bio-fuels and electric cars save us? Electrifying some transport and exploiting oil substitutes will assist, but unfortunately, only scratch the surface. Oil has long been the most convenient, energy-dense and portable fuel, and our western industrial development is hugely dependent on those characteristics. Invariably, the available substitutes are less energy-dense, less portable, more difficult to handle or are expensive in terms of capital infrastructure required and/or energy input. In any case, no substitute can be scaled up quickly enough to replace oil as a transport fuel or as an industrial feedstock.

The Hirsch report (US Department of energy 2005) identified that, to avoid fuel shortfalls and substantially increased costs, a crash program would have to be initiated 20 years before peak oil to restructure our entire economic system to enable it to transition to alternatives. We did not initiate such a program two decades ago. Instead, we now have to respond to oil depletion by changing our growth paradigm to use progressively less oil and to wean ourselves from the most oil-vulnerable activities and patterns. Rather than simply striving to make transport more oil-efficient (which might inadvertently entice us to travel even further) we need to meet our needs whilst actually reducing our travel and transport demands.

Addressing the oil vulnerability risks through reducing travel and transport will necessarily entail bringing people closer to their destinations, sourcing goods and services closer to markets, and harnessing less oil-vulnerable means of human exchange. This shift takes us back to the very essence of cities. From time immemorial, humans have gathered in villages, towns and cities primarily to facilitate exchange. David Engwicht (2005) has argued that “...cities are an invention to maximise exchange and minimise travel. These exchanges are economic, social and personal....The city deliberately concentrates a wide diversity of exchange opportunities into a bounded area in order to increase the efficiency with which these exchanges are transacted. The further these exchange opportunities are scattered, the further we must travel for each one, therefore the fewer we can enjoy.” He further



argues that *“Early city builders used the...logic [of] streets as ‘outdoor living rooms’ in which a wide range of economic, social and cultural exchanges could be transacted ...becoming the borderlands ...in which movement and exchange came together. And a new kind exchange evolved ...the spontaneous exchange ...often of a higher value than the original purpose for which we began the journey.”*

The utility of streets as dynamic and vibrant “borderlands” is dependent on an ambience that encourages human exchange, rather than streets being dominated by the single purpose of moving vehicles. By giving spaces single, rationalised functions, modern planners have made the city less efficient by reducing the opportunity for spontaneous exchanges, and by putting more and faster traffic on the streets.

David’s arguments reinforce the desirability of co-location of a rich diversity of uses in close proximity and of using the public realm as a combination of movement and exchange. Those arguments also support the great benefit of living within walking distance of opportunities for day-to-day exchange. It is primarily on foot that spontaneous exchange is optimised. The focus of walkable catchments on local mixed-use centres will allow a greater proportion of exchange to be achieved without resorting to motorised transport, a significant step in breaking the habit of car-dependence and vulnerability to oil depletion. The extent and range of goods and services offered at the local centre will be reflected by opportunities for local enterprise and employment. This, in turn, will be further reinforced by the number of residents within the centre and within its walkable catchment.

Similarly, the next higher-order exchanges are facilitated by more intensive district level mixed use centres as the focus of cycling and 5-minute flexible transit catchments. Again, such relationships will be another step in reducing car-dependence and oil vulnerability. Again the extent and range of goods and services offered will support local enterprise and employment, bringing people closer to potential jobs, services and social opportunities.

Linking these district level centres by high quality, frequent transit services to sub-regional centres and ultimately to the central business district will allow the primacy of central place functions in those higher-order centres without reliance on commuting by car. By reducing the reliance of access by car and, by association, the proportion of area taken up accommodating cars, these higher-order centres can be characterised by an intense and vibrant mix of uses relating to the sort of public realm conducive to spontaneous exchange, impossible in our currently car-based retail-dominated regional centres. If our major sub-regional centres include a high proportion of residential accommodation, and are highly accessible to the wider catchment by quality transit from the catchments of nearby local and district centres, no one needs to be disadvantaged by reducing their reliance on private car travel. Vulnerability to oil depletion will be dramatically reduced.

Similar principles apply to transport associated with goods production and distribution, and to the “feedstock” of agriculture and industrial processes which are typically high consumers of oil, gas and other hydrocarbons. We need to find ways of sourcing goods and services closer to markets, and explore less oil-vulnerable means of production and exchange. This concept sits hand-in-hand with the localisation of personal travel and of personal access to goods and services, to jobs and to opportunities for all manner of exchange.

Much is said about “food miles” where produce, sourced from broad-hectare monocultures, cultivated by heavy machinery and fed on industrial fertilisers, is transported long distances through complex supply chains across and even between continents. While the logistics of this process is designed to optimise choice across the seasons and to minimise prices on supermarket shelves, it is highly vulnerable to oil depletion. At the moment, the transport component of the food chain is a minor part of the overall cost, but substantially increased costs of transport fuel will change that equation. Even more critically, any disruption to the supply of oil will make long-distance logistics unreliable. Ultimately, it will be in everyone’s interests to source food as locally as practicable, including from primary producers within our own regions, and from our own neighbourhoods, back yards and balconies.

The heavy reliance on oil for cultivation, for pesticides and weedicides, and on gas for fertiliser is likewise vulnerable. There are significant moves toward more organic techniques of farming and toward adoption of permaculture principles and practices. These practices are more labour-intensive, but less reliant on oil-derived energy and consumables. They are also more amenable to mixed farm arrangements, involving crop rotation techniques which can be productively applied at the small scale and more local level. The more organically and locally we source our foodstuffs, the less vulnerable we are to oil depletion.

And so it goes with other enterprises, from manufacturing to service provision. The more we make use of renewable local raw materials (fibres, starches and resins from plants rather than from petroleum, for instance), the more opportunity we have for local enterprise and the less reliant we are on oil and its derivatives. The more we source our goods and services locally, the less transport is required from provider to customer, and the more opportunities for local skills development and employment. This, in turn, increases opportunities for local enterprise while reducing the demand to travel great distances for education and employment, further reducing reliance on motorised transport and oil.

There is increasing policy support for managing vulnerability to peak oil. The South East Queensland Regional plan includes a Principle and associated policies and programs designed to respond to oil supply vulnerability, including “*Design Development Areas to encourage walking, cycling and public transport use to get to local shopping facilities and employment locations, and early provision of public transport services*”, and “*Reduce the length of trips and dependence on oil by localising access to goods, services and employment opportunities.*” (Dept of infrastructure and Planning 2009) The Queensland Government released an oil vulnerability assessment report and is in the process of undertaking an oil vulnerability strategy. Sunshine Coast Regional Council has adopted an oil vulnerability report and is formulating an energy transition strategy. Gold Coast City Council has undertaken a desk-top study of oil vulnerability. Other local authorities are expected to follow suit.

### **Urban Place-making**

The same key characteristics of necessary responses to oil depletion also address other contemporary urban place-making challenges: reducing energy requirements, reducing travel time, encouraging physical activity, providing more equitable access to goods and services, and optimising opportunities for human contact and exchange.

Vibrant, intensive, permeable, walkable and accessible mixed use centres at all levels of the network from the local and district centres to the sub-regional and central business districts are recognised as being critical to both liveability and robust economic function of our communities. The accessible and activated multi-function streets, squares, plazas and promenades in which the wide range of economic, social, and cultural exchanges are transacted and where spontaneous exchanges are facilitated are the essential urban places of our cities towns and neighbourhoods. The movement economy of such active streets and places is derived from the functions of movement and exchange coming together.

The degree to which that movement is spontaneous and compatible with pedestrian amenity will determine the degree to which it will contribute to, rather than detract from, the quality and enjoyment of urban exchange. Rather than the movement corridors being designed to facilitate the greatest speed and capacity of vehicle passage, they should be designed to entice people from their vehicles and to facilitate a variety of exchanges without having to resort to private cars.

The capacity of “market” accessible to such centres and their “urban places” within walking distance, within cycling reach, or within convenient public transport, will fuel and support the intensity, depth and quality of exchange. Here, population density within the centre and non-motorised accessibility from the immediate catchment is as important to the effective functioning of the centre as it is to supporting the use of public and active transport as an alternative to car dependence.

### **Initiatives**

Rather than focussing primarily on fuel efficiency and oil substitutes for energy to drive increased transport, we should also focus on reducing our dependence on oil by focussing on maximising local exchange and minimising travel.

Transit-oriented development is one part of the equation. This entails increasing the intensity of residential capacity and other urban activities in proximity of public transit nodes and interchanges. This concept promotes the sort of walkable, accessible centres which are measurably less dependent on private car travel than other forms of development. Transit-oriented developments are not just “buildings over railway stations”, but are a dynamic set of land use and movement relationships.

Development-oriented transit is another, but poorly recognised, part of the equation. This entails re-orienting public transit routes and services to more directly and conveniently focus on centres at all levels of the hierarchies from their natural catchments. We already have nominal centres at each level, but, apart from the central business district, they are typically dominated by car-oriented retail functions. They are generally unattractive for provision of other services or for facilitating and supporting other types of enterprises and exchanges because they are not the focus of public transit, and are inhospitable to approach by foot or cycle.

These centres are potentially transformable by making them the focus of safe and amenable walking and cycling from their catchments and making them the focus of frequent local transit from their catchments, with transit linkages to complementary centres at other levels in the network. If infrequent local buses were re-routed to provide short loops to local centres rather than each running parallel to the central business district, would enable the

frequency to be trebled with the same driver hours, bus kilometres and energy requirements. If the frequency were trebled, they would be perceived as being orders-of-magnitude more convenient and attractive, with consequent increase in ridership.

The degree to which access to all centres is facilitated, without reliance on private cars, will determine the scope of opportunity for a wider range of exchange, including spontaneous exchange to be fostered and supported. This, in turn, will attract new enterprise, a wider range of functional uses and more diverse and intense activity, attracting new forms of development, new residents and creation of appropriate and vibrant urban spaces.

## Conclusion

Instead of dreading peak oil, or pretending technology will fix its impacts, we need to recognize the silver lining. We can use the opportunity of responding to peak oil to realise many other place-making objectives, achieving better urban outcomes for our communities.

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## Figure 1

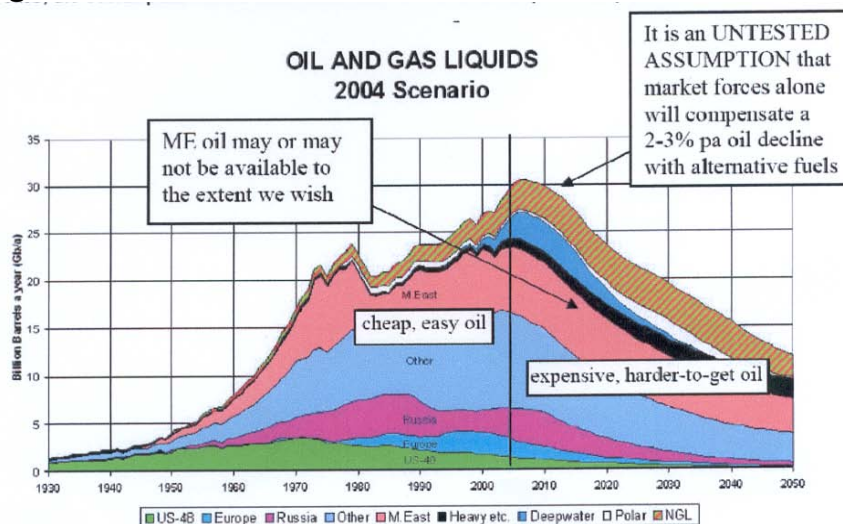


Figure 4 The production profile for oil and gas for current oil sources (ASPO 2004)

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# Green Travel Plans

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## **ABSTRACT:**

*Green Travel Plans that have been adopted by public and private authorities are becoming increasingly important in the promotion of sustainable transport planning for the creation of healthy city living. By targeting travel behaviour change through Green Travel Plans in the workplace, education, residential and visitor centres alternative sustainable transport options such as rail, bus, cycling and walking are more likely to be considered and used by the community through increasing awareness, the application of various incentives and infrastructure provisions.*

*Without such an approach car dependency, traffic congestion and parking demand will continue to grow and the ability to create healthy cities without serious impacts on health, environment, social and economic well being will be seriously compromised.*

**Keywords:** Transportation, City Design, Green Healthy Cities

## **GREEN TRAVEL PLANS**

### **Introduction**

Green Travel Plans are an important transport management tool designed to encourage smarter working practices across organisations to improve the sustainability of employees, education students, residents, visitors and tourist' travel to/from and during work. Green Travel Plans are used in many countries around the world. They can act as a bridge to better integrate transport and land use planning.

There principal aims are to:

- Change travel practices, investigate opportunities for smarter working and reduce travel to/from and during work;
- Deliver tailored measures, facilities and services to enable and encourage more sustainable and active travel;
- Implement measures to improve sustainability of servicing and deliveries at buildings; and enable and encourage more sustainable travel by visitors.

This paper gives a brief overview about how to deliver travel planning within organisations. Firstly, by explaining the background of travel plans through the context of the four main travel plan types namely:

- 1. Workplaces including Government offices and major employers and businesses**
- 2. Schools and Universities**
- 3. Residential developments**
- 4. Visitor and Leisure plus others**

Secondly I have drawn on previous experience working on Travel Plans these I have presented as case studies to highlight what Travel Plan frameworks aim to achieve and the means to go about doing this.

## **1. Workplace Travel Plans**

I was involved in preparing Workplace Travel Plans both for Transport for London and for Local Councils in the Thames Gateway area. A workplace travel plan is typically a package of measures designed to increase awareness of the travel plan options available to employees – and provide the opportunities and encouragement to make more sustainable travel choices to/ from and at work.

To begin with travel plans were viewed as strategies to improve the sustainability of employees' travel (typically by reducing single-occupancy car journeys and encouraging the use of more sustainable modes) and to minimise the impact organisations have on the environment. Increasingly, however, businesses are developing plans for wider, more varied reasons.

The main benefits organisations may derive from travel plans include:

- Attract and/or retain a more diverse and inclusive employee group
- Improve employee health, wellbeing and work/life balance
- Enhance their sustainable credentials and their standing as an employer of choice
- Reduce road or other network congestion in and around sites
- Optimise overall productivity (as a result of any of the above)
- Save costs
- Minimise their environmental impact

Some of London's top organisations including GlaxoSmithKline (GSK) and the BBC are already making a difference through developing workplace travel plans. For GSK, providing excellent facilities and incentives for a cyclist costs the company up to 80 per cent less than a car driver requiring a parking space.

One of the successes of the BBC travel plan has been the savings made with the introduction of shuttle buses between its main sites. Over four years, this has saved the organisation approximately £750,000 per year. Travel plans contain a range of measures and services designed to enable people to make cleaner, greener and more efficient travel choices.

**Incentives** include:

- Bonuses (e.g. payment for not using parking space at work)
- Reduced fares (e.g. employer subsidies)
- Free trials (e.g. one month free bus travel)
- Recognition or reward schemes (e.g. VIP tickets for employees who cycle)

**Tools and info**

- Physical infrastructure (e.g. broadband access at home, telephone /video conferencing, cycle parking)
- Information (e.g. Journey Planner, local bus maps, live information on delays)

**Disincentives**

- Mainly financial (e.g. parking charges, claims, tax regimes)

**Changing capacity**

- Mainly physical (e.g. removal of parking spaces, priority for car sharers, new communal space)

## **Results**

The result of applying the Transport for London Workplace Travel plan has led to a 13.5% reduction in car use at worksites and offices where Travel Plans have been implemented and a 5% rise in active travel (walking and cycling) and public transport use since 2000 which has reduced congestion and CO2 levels across London.

## **2. School Travel Plans**

School Travel Plans have been developed in response to increasing car use and the impact of the 'school run' which is a problem everywhere and travel to nurseries, schools and colleges generates a significant number of car journeys contributing to peak time traffic congestion. There are also increasing concerns around road safety at schools and poor health in young people, both in terms of inactive lifestyles and the effect on air quality and climate change.

I wish to use Thurrock Council in the London area which I am familiar with as a case study to demonstrate the benefits of developing a Sustainable Modes of Travel Strategy that sets out how the authority will assess the travel and transport needs of its pupils and promote sustainable travel to school, bringing educational issues and travel and transport into one place.

The Strategy document aims to improve educational choice by providing details of the safe and sustainable modes of travel available to parents and pupils. A summary of the Strategy is included below

### **Walking**

Walking initiatives help to promote and facilitate healthy lifestyles for young people as well as reducing the reliance on the private car for the school run. Thurrock Council has a number of schemes in place to promote walking in schools including:

- School crossing patrols
- Walking Buses
- Park and Stride schemes
- Walking incentive schemes ( Walk on Wednesdays )
- Pedestrian training

### **Cycling**

Cycling helps improve the health of young people as well as being a sustainable mode of transport. Thurrock Council have a number of schemes in place to promote and facilitate cycling in schools, and to make cycling safer by training young people. Some of the initiatives around the Borough include:

- Sustrans Bike It Initiative
- National Standard Cycle Training
- Cycle parking improvements

### **Promotional Initiatives**

As well as co-ordinating sustainable travel initiatives we also promote new schemes, share success stories and offer best practice advice through publicity and activity that includes:

- Annual newsletters – Travel Education News
- Walk to School Week
- School Travel Plans

### **3. Residential Travel Plans**

A residential travel plan is a package of measures designed to promote sustainable travel at and around a residential development by:

- reducing the number of single occupancy car trips from a development (for example by promoting car sharing and car clubs);
- providing more travel options to promote the use of public transport, cycling and walking (for example by upgrading local bus services and providing safe pedestrian and cycle lanes)
- reducing the need to travel out of the development (for example by promoting home delivered

#### **Benefits of Residential Travel Plans**

Residents and Housing developers may benefit from travel plans in several ways.

Benefits to residents can include:

- Improved health (i.e. increased fitness and reduced stress and obesity)
- A reduction in travel costs
- A cleaner local environment
- Improved accessibility to local services
- Increased road safety
- Reduced travel times
- Improved travel choice
- Reduced congestion and demand for parking spaces
- A reduction in the need to travel

Benefits to Housing developers:

- An increase in the amount of space available for development (i.e. if the number of parking spaces is reduced, there will be more land available to build houses)
- A decrease in car park construction and maintenance costs
- An increase in the speed at which planning permission is decided
- An increase in the likelihood of gaining planning permission
- Improved marketability
- Creating good relations with the local community
- Leading the field in sustainable design

#### **When is a Residential Travel Plan Required?**

A residential travel plan is needed for all residential developments that are likely to have a significant transport implication and for all major developments. If you are not sure whether a residential travel plan should be submitted alongside a planning application, please contact your relevant city or district council.

### **4. Leisure and Visitor Travel Plans**

Tourism and Leisure sites aim to attract, consequently they can become major generators of traffic within an area. A Visitor Travel Plan has a different emphasis than one designed for employees. Although staff will be included in the Travel Plan, the main aim will be to actively encourage visitors to travel to your site by the more sustainable modes of public transport, cycling, walking and car share. An effective plan will help to reduce the amount of car travel



generated by visits to your site. In turn, this will decrease congestion and pollution, as well as improving accessibility and help towards addressing social exclusion.

Priority areas for the Local Leisure and Visitor Transport Plan in Merseyside are to support ongoing area regeneration and the continuing development of tourism. This assists with the national objectives to improve access to countryside leisure and exercise opportunities, and to increase participation in culture and sport.

### **Benefits of a Travel Plan for Visitors and Leisure Facility users**

- Achieves a more attractive environment - reduced need for car parking frees up land for other uses
- Creates good PR and improves relationships with your neighbours
- Improves accessibility for all
- Taps into a new visitor market - 1 in 5 households that do not have access to a car
- Car park charges can provide an additional income as well as being a disincentive to drive
- Promotes your organisation as environmentally and socially responsible
- Promotional strategies can easily be used to publicise sustainable travel for little or no extra cost

In addition to measures discourage visitors away from car use could include:

- Information on public transport, walking and cycle routes can be included with membership information, leaflets and website
- Include your site in other visitor information.
- “How to get there” information should begin with walking and end with driving, rather than highlighting the nearest motorway junction

### **Updating Travel Plans**

Travel Plans need to be seen as “living documents”. To stay relevant, and remain effective, they need to be regularly updated to ensure they meet desired targets. There are three main stages for Travel Plans including:

#### **Stage 1 Set up Travel Plans**

- Secure effective dialogue with key parties
- Establish benchmark data and monitoring
- Design marketing information (brochures, timetables route maps)
- Set up on-going management arrangements for post construction
- Implement the measures

#### **Stage 2 Operational Phase**

- Establish Management arrangements
- Appoint Travel Plan Co-ordinator and train and inform other staff
- Maintain effective dialogue for all interested parties
- Set up training courses for Employers, Students, Residents about benefits of Travel Plans
- Review benchmark information by undertaking surveys and update databases

#### **Stage 3 Post Full Operations**

- Monitor effectiveness, assess and review
- Maintain and evolve effective dialogue with all interested parties

## **Benefits of Travel Plans**

A Travel plan provides an opportunity to make smarter travel choices, to take healthier forms of travel and enjoy a better work/life balance. By implementing and continually developing a Travel Plan it will create efficiencies and savings, improve the benefits to workers, residents, visitors and students alike to the wide-ranging benefits that can be achieved through effective travel planning.

A summary of Travel Plan benefits include:-

- Decongestion;
- Vehicle operating costs savings;
- Parking cost savings;
- Travel time savings;
- Journey ambience;
- Health benefits in the form of reduced mortality and absenteeism savings;
- Accident costs;
- Reduced air pollution
- Reduced noise pollution;
- Greenhouse gas reduction;
- Reduced water pollution;
- Reduced urban separation; and
- Reduced pressure on government infrastructure and services.

Through combining Travel Plans with integrated land use and transport planning significant reductions in car use can be achieved together with increased use of public transport, walking and cycling. The increased use of active transport modes will help to create healthier citizens and healthy cities.

## **An improved approach to community segmentation as the foundation for environmental behavioural change communications**

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*Community segmentations based on environmental attitudes have traditionally adopted a continuum approach, for example 'Deep Green' to 'Deep Brown'. Using this approach as the basis to develop targeted messaging for behavioural change programs assumes a positive relationship between environmental attitudes and behaviours and that motivation for undertaking pro-environmental behaviours is consistent across the population. In fact, research has consistently shown the link between pro-environmental attitudes and behaviours is weaker than expected and these behaviours are not necessarily the result of environmental motivations. Further compromising the accuracy and usefulness of the traditional approach to environmental attitudinal segmentations is the evidence that self-reported pro-environmental attitudes have become socially desirable attitudes. Ipsos-Eureka has developed an alternative approach to environmental segmentations using two validated quantitative scales, the New Ecological Paradigm (NEP) and the Crowne Marlow Social Desirability scale, in combination with a series of intervening factors when it comes to assessing environmental attitudes and behaviours. This paper outlines a comparison of this new approach with the traditional approach, in terms of the strength of the outcomes and the potential of each to form the basis of effective behavioural change campaigns.*

**Keywords:** Community engagement, planning

With environmental issues occupying a prominent place in the policy agenda globally, significant effort has been invested in understanding and measuring levels of environmental concern to develop effective behavioural change communications. Environmental issues are often deeply polarising, due to current environmental problems being less directly observable than the most prominent ones in the past, complex in origin and global in scope. This results in a broad range of attitudes present in a single community. Accurately understanding this range of attitudes is crucial in developing effective targeted behavioural change campaigns.

### **Traditional approach and its inherent problems**

Audience segmentations are an accepted approach to identify quantitatively groups with like attitudes or behaviours within a community. A detailed understanding of the various segment groups allows for the development of specifically targeted communications strategies to achieve a desired objective, rather than a generalist approach that may only resonate with a portion of the population.

When attempting to segment a community based on environmental attitudes, segmentations have traditionally adopted a continuum approach. For example, the development of three segments: Brown, Pale Green and Deep Green or Disengaged, Hesitant and Enthusiastic.

There are a number of problems associated with this approach.

Firstly, employing a continuum based attitudinal segmentation as the basis for developing behavioural change campaigns presumes the existence of a positive link between attitudes and behaviours. There is a significant body of research that illustrates a lack of attitudinal – behavioural consistency when it comes to the environment.<sup>i</sup> This attitude – behaviour gap presents challenges for decision-makers and social researchers. The essence of the problem is this: how useful is a community survey of attitudes, if attitudes have little ability to

predict behaviour? Not only is this issue important for the implementation of programs (it may lead to an overestimation of people's willingness to comply), it also has an important implication for policy development (the introduction of policies based on broad attitudes may not be met with resounding community appreciation).

Another issue with the attitudinal continuum approach is the multitude of drivers for seemingly pro-environmental behaviours. Conducting a survey of community attitudes which segments the audience into 'Brown', 'Pale Green' and 'Deep Green' presumes each individual is driven by environmental motivators. Pro-environmental behaviours have become so many and varied that they are not necessarily driven by pro-environmental attitudes. Consider the following set of seemingly pro-environmental behaviours: cycling instead of driving; planting a vegetable garden instead of shopping at Coles for vegetables; and using organic shampoo and conditioner instead of chemical based products. In the context of a community survey it would be easy to presume these attitudes indicate a pro-environmental mindset however they could alternately be driven by reasons of speed, convenience, health, recreation or cost.

Finally, the attitude – behaviour gap may also suggest that social desirability plays a role in self-reported environmental attitudes. There are obviously strong opponents of the pro-environmental mindset, as evidenced in the recent shifts in the strength of climate change belief and apparent success of the deniers claim climate change is not human induced. Even so, openly admitting to disinterest or anti-environmental attitudes may be challenging for less engaged sections of the population. This potential degree of overstatement of pro-environmental attitudes needs to be considered in interpreting research results.

Behavioural segmentations attempt to avoid these pitfalls and also tend to adopt a continuum approach that can be summarised as either ranging from 'Many behaviours' to 'Few behaviours' or 'No behaviours' or segment based on frequency, such as 'All the time' to 'Never'. While this approach does circumvent many of the issues associated with environmental attitudinal segmentations, concentrating purely on behaviour does miss much of the detail captured by examining attitudes and may not adequately understand motivations for behaviour, making developing targeted communications difficult.

### **The revised approach and its advantages**

Ipsos-Eureka set out to develop an approach to environmental segmentation that overcame as many of the issues described as possible.

To address the attitude – behaviour gap we introduced the New Ecological Paradigm (NEP) scale as the attitudinal basis of our segmentation. The NEP was initially published by Dunlap and Van Liere in 1978 and has since been revised in 2000.<sup>ii</sup> This scale was chosen for its apparent extension beyond a measure of environmental concern to a measure of ecological consciousness (or an investigation of views about nature and humans' relationship to it). A growing acknowledgement that humans are altering ecosystems upon which we are all dependent suggests an evaluation of ecological consciousness is more appropriate than merely environmental concern.

The scale attempts to score audiences across five dimensions of ecological consciousness: belief in the fragility of nature, anti-anthropocentrism, rejection of human exceptionalism, the existence of limits to growth for human societies and the possibility of an eco-crisis. A series of studies have been conducted that validate the predictive abilities of NEP to predict environmental belief systems.<sup>iii</sup> In short, a tendency to provide high scores on the NEP scale should lead to a set of pro-environmental beliefs and values. Furthermore, these beliefs may influence behaviour, and there is evidence of relationships between the NEP Scale and various types of self-reported and observed behaviours. However, real or perceived constraints in relation to carrying out pro-environmental behaviours do question the strength

of the causal link between a strong NEP-behaviour relationship.<sup>iv</sup> Segments based on the NEP do not necessarily ladder to behavioural assumptions, making a close examination of specific reported behaviours and their drivers critical.

Ambiguity in relation to drivers of pro-environmental attitudes and behaviours has traditionally been a problem in terms of fully understanding segmentations. The Ipsos-Eureka approach acknowledges drivers are likely to vary for individual behaviours. However, too much attitudinal specificity prevents drawing conclusions at an overall level. An approach investigating the drivers for behaviours at a sub-category level (transport, food and shopping, energy and water usage, waste and recycling) was developed which supported the analysis of behavioural drivers in far more detail. For example, the transport behaviour investigated included using public transport instead of driving, walking or cycling instead of driving, driving in a fuel efficient manner and purchasing a hybrid or more fuel efficient vehicle. Rather than investigating the individual drivers and barriers to each of these behaviours, the study investigated drivers and barriers for the transport behaviours collectively.

In an attempt to account for any levels of social desirability influencing outcomes an additional validated scale, the Crown Marlow social desirability scale, was included.<sup>v</sup> This measure is designed to identify members of the audience who are likely to provide socially desirable responses to any line of investigation, environmental or other. If a strong correlation between the segments and social desirability was identified, these participants could be either excluded or analysed within that context.

Finally, the approach included a series of other intervening variables with potential to understand further the segments. The degree of control or perceived ability to undertake a behaviour is often considered a key barrier, breaking the relationship between attitude and behaviour (particularly for mid to high level cost of entry behaviours). For example, a strongly ecologically conscious individual who rents a small apartment and is as a result unable to change light bulbs, install solar hot water heating or grow vegetables may feel unable to act on their beliefs. Degree of perceived ability was captured at the same behavioural sub-category level (transport, food and shopping, energy and water usage, waste and recycling) in order to gather a greater level of behavioural and motivational specificity. Reported levels of willingness across these sub-categories were also investigated to examine the relationship between perceived ability and willingness – potentially a key influencer in designing intervention programs.

The final set of intervening factors included critical environmental experiences or life transitions based on the hypothesis that these experiences and transitions may have some bearing on changed environmental behaviours.<sup>vi</sup> These measures included: having a child in past 12 months; becoming a grandparent in past 12 months; personally or a member of the immediate family experiencing serious illness past 12 months; and having to alter lifestyle due to water restrictions in the past 12 months.

### **The study**

The survey was conducted online between 1 and 8 May 2010 with a nationally representative sample of the Australian population aged over 18. Sample A and B comprised n=525 and n=528 participants respectively.

To test the strength and applicability of the traditional segmentation approach versus Ipsos-Eureka's experimental design we designed an online survey comprising the two alternate attitude batteries. Details of the questionnaire structure can be found overleaf:

SAMPLE A n=525		SAMPLE B n=528	
NEP attitudinal battery (basis of sample A segmentation)		Traditional attitudinal battery to measure environmental concern (basis of sample B segmentation)	
Transport behavioural investigation: <ul style="list-style-type: none"> <li>• Current behaviours &amp; future intentions</li> <li>• Drivers &amp; barriers</li> <li>• Overall effort, perceived ability &amp; willingness</li> </ul>		Transport behavioural investigation: <ul style="list-style-type: none"> <li>• Current behaviours &amp; future intentions</li> <li>• Overall effort, perceived ability &amp; willingness</li> </ul>	
Food and shopping behavioural investigation: <ul style="list-style-type: none"> <li>• Current behaviours &amp; future intentions</li> <li>• Drivers &amp; barriers</li> <li>• Overall effort, perceived ability &amp; willingness</li> </ul>		Food and shopping behavioural investigation: <ul style="list-style-type: none"> <li>• Current behaviours &amp; future intentions</li> <li>• Overall effort, perceived ability &amp; willingness</li> </ul>	
Energy and water usage behavioural investigation: <ul style="list-style-type: none"> <li>• Current behaviours &amp; future intentions</li> <li>• Drivers &amp; barriers</li> <li>• Overall effort, perceived ability &amp; willingness</li> </ul>		Energy and water usage behavioural investigation: <ul style="list-style-type: none"> <li>• Current behaviours &amp; future intentions</li> <li>• Overall effort, perceived ability &amp; willingness</li> </ul>	
Waste and recycling behavioural investigation: <ul style="list-style-type: none"> <li>• Current behaviours &amp; future intentions</li> <li>• Drivers &amp; barriers</li> <li>• Overall effort, perceived ability &amp; willingness</li> </ul>		Waste and recycling behavioural investigation: <ul style="list-style-type: none"> <li>• Current behaviours &amp; future intentions</li> <li>• Overall effort, perceived ability &amp; willingness</li> </ul>	
Additional attitudinal measures: <ul style="list-style-type: none"> <li>• Belief in human induced climate change</li> <li>• Ability to make a difference to the environment</li> <li>• Interest to learn more about reducing environmental impact</li> <li>• Willingness to pay a premium for environmentally friendly products</li> <li>• Advocacy among family and friends</li> <li>• Sense of shared responsibility for environmental problems</li> <li>• Overall degree of environmental concern</li> </ul>			
Social desirability measures			
Critical environmental experiences or life transitions			
Demographics			

## The results

Cluster Analysis was employed to develop a four cluster solution for both samples. Discriminant Analysis was then used to examine the extent to which the models successfully classified respondents when all statements were included. The results of this analysis revealed that when each respondent was classified using the results of all other respondents (i.e. leave-one-out classification), 89.1% of respondents in Sample A were correctly classified and 91.3% of respondents in Sample B were successfully classified. This, of course, is not a measure of the utility of the model; it simply shows that the statements can be used to predict segment membership.

The segmentation based on the traditional environmental concern statements can be described as follows:

SAMPLE B SEGMENTATION (DERIVED FROM TRADITIONAL ENVIRONMENTAL CONCERN STATEMENTS)		
<b>Deeply Engaged &amp; Willing to Pay For It</b> <b>n=166</b> <b>31%</b>	A fully engaged and knowledgeable segment (self-reported). This group are very likely to believe they personally contribute to the problem of climate change and that they will be affected within 5 years. They demonstrate a high level of desire for industry and government to do more to address environmental issues and are highly likely to be currently actively reducing their impact on their environment, although see room to do more.	↓ Less likely to be unsure or a non-believer in human induced climate change ↑ More likely to strongly agree they can personally make difference to the environment ↑ More likely to strong agree they are interested to know more about how they can reduce their environmental impact ↑ More likely to strongly agree they are prepared to pay more for environmentally friendly products ↑ More likely to strongly agree they often talk to family and friends about how they can help the environment

SAMPLE B SEGMENTATION (DERIVED FROM TRADITIONAL ENVIRONMENTAL CONCERN STATEMENTS)		
<p><b>Deeply Engaged but Price Sensitive</b> n=138 26%</p>	<p>An equally engaged segment, who identify themselves as lacking in knowledge but are interested to know more. This segment is also very likely to believe they personally contribute to the problem of climate change and that they will be affected within 5 years. Like <i>Deeply Engaged &amp; Willing to Pay For It</i> they demonstrate a high level of desire for industry and government to do more to address environmental issues and also likely to be actively reducing their impact on the environment. They differentiating characteristic of this segment is they are very price sensitive.</p>	<p>↑ More likely to strong agree they are interested to know more about how they can reduce their environmental impact ↓ Less likely to strongly agree they are willing to pay more for environmentally friendly products</p>
<p><b>Unsure</b> n=142 27%</p>	<p>This segment is sitting on the fence in terms of many of their attitudes. They are less likely to believe they will be affected by climate change within 5 years and demonstrate a weak belief in their personal contribution to the problem. They are more likely to have low levels of reported knowledge regarding how to improve the natural environment. Interestingly, this group are the most likely to believe they are doing all they can to reduce their impact on the environment, reflecting their low levels of willingness to uptake environmental behaviours.</p>	<p>↑ More likely to be unsure about the existence of human induced climate change ↑ More likely to be unsure about their potential to personally make a difference to the environment</p>
<p><b>Disengaged</b> n=82 16%</p>	<p>Environmental concerns are not on the radar for this segment. They are least likely to believe they will personally be affected by climate change within 5 years, they demonstrate low levels of belief they personally contribute to the problem of climate change and have the lowest desire for industry and government to do more to address environmental issues.</p>	<p>↑ More likely to disbelieve in the existence of human induced climate change ↑ More likely to strongly disagree they can personally make a difference to the environment ↑ More likely to strongly disagree they are interested to know more about reducing their environmental impact ↑ More likely to strongly disagree they are willing to pay more for environmentally friendly products ↑ More likely to strongly disagree they often talk to family and friends about how they can improve the environment</p>

While this continuum approach to segmentation does convey the range of attitudinal perspectives among the audience, critical to the analysis is there is no correlation between attitudes and reported effort across the behavioural categories of transport, food and shopping, energy and water usage, waste and recycling. In addition, no significant differences emerged by segment according to reported levels of ability or willingness. These findings suggest there is a low level of attitudinal – behavioural consistency associated with this segmentation. This finding, combined with no indication of drivers and barriers to the uptake of pro-environmental behaviours, makes developing effective behavioural change communications based on this segmentation very difficult.

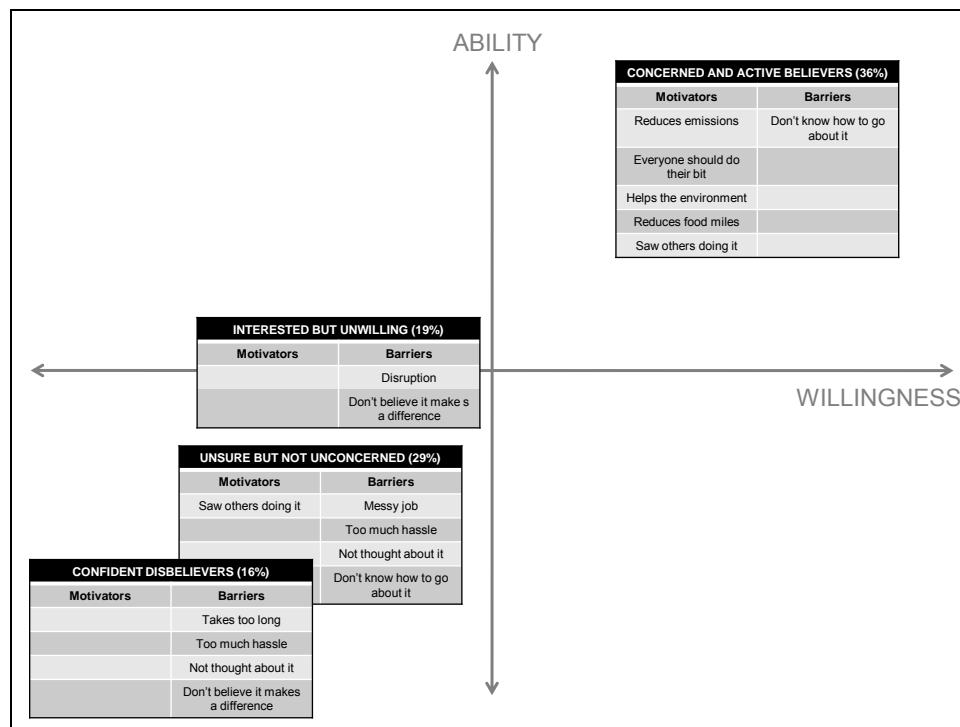
The segmentation based on the NEP Scale, to assess an ecological consciousness is described below:

<b>SAMPLE A SEGMENTATION (DERIVED FROM NEP ATTITUDINAL STATEMENTS)</b>		
<p><b>Concerned and active believers</b> n=189 36%</p>	<p>This segment demonstrate strong concern about an impending eco-crisis, they show strong belief in the fragility of nature's balance and have a strong sense of the limits to human population growth. This group strongly reject the idea that humanity has a right to prevail over other species and doubt the human capacity to prevail over the power of nature.</p>	<p>↑ More likely to believe in the existence of human induced climate change            ↑ More likely to strongly agree they are interested to know more about reducing their environmental impact            ↑ More likely to strongly agree they are willing to pay more for environmentally friendly products            ↑ More likely to strongly agree they often talk to family and friends about how they can improve the environment            ↑ More likely to strongly agree they feel jointly responsible for the current set of environmental problems            ↑ More willing to adopt pro-environmental behaviours in all categories            ↑ More likely to expend more effort in relation to pro-environmental behaviours in all categories except transport            ↑ More likely to have had a child in the past 12 months            ↑ More likely to have had to adjust their lifestyle due o water restrictions</p>
<p><b>Interested but unwilling</b> n=100 19%</p>	<p>This segment demonstrates a concerned ecological worldview, although they appear to believe it is not the result of humans. They have a reasonably strong belief in the fragility of nature's balance and in an impending eco-crisis, but they have a very strong sense of humanity's capacity to overcome ecological issues. Interestingly they are more likely to reflect low levels of willingness to adopt pro-environmental behaviours.</p>	<p>↑ More likely to disbelieve in the existence of human induced climate change            ↓ Less willing to adopt pro-environmental behaviours in all categories</p>
<p><b>Unsure but not unconcerned</b> n=154 29%</p>	<p>This segment is more likely to be unsure about the possibility of an eco-crisis, as well as several other attitudes. They report relatively low levels of belief in the fragility of nature's balance and the idea there are limits to human population growth. They have the strongest sense of humanity's right to prevail over other species.</p>	<p>↑ More likely unsure regarding their willingness to pay more for environmentally friendly products            ↑ More likely to be unsure whether they feel jointly responsible for the current set of environmental problems            ↓ Less willing to adopt pro-environmental behaviours in all categories</p>
<p><b>Confident disbelievers</b> n=86 16%</p>	<p>This group are more likely to disbelieve we are experiencing or expecting an eco-crisis. They display low levels of belief in nature's fragility and in the idea there are limits to human population growth. They are more likely to believe humanity should and could prevail should we face a crisis.</p>	<p>↑ More likely to be aged 18-29            ↑ More likely to disbelieve in the existence of human induced climate change            ↑ More likely to strongly disagree they are interested to know more about reducing their environmental impact            ↑ More likely to strongly disagree they are willing to pay more for environmentally friendly products            ↓ Less willing to adopt pro-environmental behaviours in all categories</p>



The literature suggests the NEP Scale potentially taps primal beliefs about the nature of the earth and humanity's relationship with it and this segmentation supports that finding. The higher level of correlation with a series of intervening attitudinal factors, critical environmental experiences or life transitions, and overall willingness and effort in relation to pro-environmental behaviours suggests those primal beliefs also inform these factors.

This segmentation can be further explained by examining levels of willingness compared with ability and the reported motivators and barriers to uptake of pro-environmental behaviours.



Intriguingly, the *Interested but Unwilling* segment demonstrates a high level of engagement with environmental concerns although their tendency to disbelieve in man-made climate change could explain their simultaneously low levels of willingness to adopt pro-environmental behaviours. While *Confident Disbelievers* and *Unsure but Not Unconcerned* report low levels of perceived ability to carry out pro-environmental behaviours, their reported barriers suggest perceived ability is influenced by their ecological worldview, rather than their financial or practical context.

Comparing the two segmentations, the multi-dimensionality of the NEP Scale provides a deeper picture of the segments versus the traditional environmental concern statements. In addition, when you compare the use of the intervening factors a richer picture emerges and provides insight into the drivers and barriers to various behaviours. No trend in levels of social desirability was present in either segmentation.

### Applications of the revised approach

If decision makers are to be effective in developing environmental policy, they must accurately perceive where the community stands with regard to environmental issues. The revised segmentation approach provides a fuller understanding of each segment's drivers, barriers, and willingness to adopt pro-environmental behaviours and suggests a stronger attitudinal – behavioural link, thereby providing insight into considerations that may alter supportive or oppositional orientations to a given set of environmental policies. This approach is important in order to gain an understanding of environmental issues and then to

solve environmental problems. This is just as true in the field of environment and conservation as it is in the fields of public health or road safety where the need for good stakeholder understanding is beyond question and research and evaluation are seen as necessary components of any policy initiative.

The segments derived using the revised segmentation approach, *Concerned and Active Believers*, *Interested but Unwilling*, *Unsure but not Unconcerned* and *Confident Disbelievers* differentiate based on attitudes, willingness and reported behaviours and therefore four distinct campaign strategies and/or policy instruments may be required to achieve the desired behavioural changes across the population. For example, *Confident Disbelievers* would be unlikely to respond to any environmental focused messaging. For this attitudinal mindset, changing behaviour would not necessarily require a prior change in knowledge or attitudes. A coercive policy instrument such as statutory or regulatory prescription may be required to cast the desired behavioural change as a social norm, that is, repositioning the behaviour as something people simply do, rather than an overtly 'environmental' behaviour. Alternatively, signalling and incentive strategies may be appropriate to encourage behavioural change.<sup>vii</sup> While these policy instruments are not unsuitable for *Concerned and Active Believers*, it may be argued that given this segment would likely respond to messaging regarding the collective wellbeing of their community, the addition of an organisational policy strategy such as community coordination or participatory approaches may further enhance behavioural outcomes.

## Conclusion

The comparison of the two approaches to environmental attitudinal segmentation has delivered some interesting findings regarding attitudinal and behavioural consistency and understanding attitudinal sets within the context of perceived ability and control. This increasingly dimensionalised understanding of the segments certainly may provide a stronger basis for developing environmental behavioural change communication strategies and policies. While the NEP Scale attempted to broaden understanding from environmental concern to an ecological worldview, an even broader view of attitudes, taking in concepts of sustainability and institutional trust may be next step in fully understanding attitudinal orientation, considering environmental attitudes a subset.

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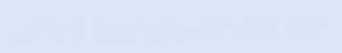
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