Urban design for sustainable cities

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September 2007
The design of urban environments represents our collective identity – who we are and what we value.

As urban designers, planners and architects we are familiar with the role of imagining the future, and our knowledge and skills are important community assets to guide the future world we design today.

Our professions are at the intersection of conflicting cultural, financial and political objectives with passionate debate occurring both in private – as defined by client requirements – and in public – via approval processes defined by planning law that is, in turn, the result of our democratic political system.

In the debate, our work is often condensed to relatively dry instruments that control the outcome of whole cities. These instruments represent layers of interpretative material defining a collective societal identity – who we are as a society and what we value.

When future generations look back at what we have built, they will see what sort of society we were, and know what we valued through our work today.

We as a group need to work together more effectively and conceive a new planning and legal paradigm to contribute to a sustainable future for the built environment.
• **Today we face unprecedented environmental change threatening the physical sustainability of the world, as we know it.**

As citizens, our communal responsibility for the environment we live in today, and as urbanists, our role within the process of environmental change, cannot be underestimated. After all, next to nothing has happened without a design, a plan or a decision within or even outside of some law we created. Everything we occupy, all the places we know in the world and even our most sensitive environments are in some way affected by human endeavour. As people trained to design and manage urban environments we must be key players in the process of creating sustainable cities.
The urban environments we design today – our cities, towns and places will significantly affect global sustainability in the future.

The ‘sustainable city’ is one of the most important concepts for the survival of the world as we know it – a city of the future with neutral effect (at least) on the environment through design.

Australia is a leader in many specialised fields of environmental design and well positioned to transform urban infrastructure into a sustainable model. Unlike many other places within developed nations much of our built urban fabric is of a relatively low level of cultural significance. We have extraordinary opportunity, as there is a substantial amount of built infrastructure to renew to a higher, more durable and environmentally appropriate standard.

We are a nation with enormous environmental issues requiring intense focus on developing better ways of practicing planning, urban design and architecture as improving the environmental footprint of cities is critical to sustaining every aspect of the environment.
The contribution to environmental sustainability by Urban Design through practice and process cannot be understated.

In most Australian urban environments today, the production of architecture is managed through a variety of societal mechanisms – including the economy – and micro-managed through planning controls. Planning controls provide a useful focus for discussion of a framework for the sustainable city as planning laws control the design of the city itself. They substantially define the scope of work for architects for example, and built architecture in turn influences new planning law.

Urban Design practice and process is not overtly present in planning controls or required in the design process for architecture. Increasing community and political awareness of the value of urban design practice and process is vital to improving the design of the public domain of cities, particularly from a sustainability point of view.

Today within most planning frameworks the general built form and density is controlled through mechanisms such as FSR, height and setback. Each of these and other similar controls is conceived with an objective to achieve a preconceived, often scenographic idea about the deemed appropriate scale, height, physical form and character of a place within an urban or suburban environment. Such a framework is unsuitable for the design of sustainable cities.

Most sustainable concepts in planning controls today in Australia are ‘bolt ons’ – added to pre-existing, often unsustainable, scenographically derived building form controls.

We need to rewrite the planning framework for architecture to place the sustainable city concept as the critical if not sole criterion for determining the architecture we create.
• Planning law and process requires reform to ensure appropriate emphasise on environmental sustainability, particularly as administered through local government in Australia.

A sustainable planning and architectural framework will conceive the best quality and sustainable public environment first – the streets, blocks, parks, water management technology and system, sewer system, urban air movement patterns, solar access requirements, energy supply infrastructure, transportation network and community facilities.

Building form and use controls would then be conceived in relation to protecting the amenity and sustainability of the public environment as well as ensuring reasonable levels of interior amenity through more detailed building controls. The aim in urban environments must be to maximise density within the established planning and building design principles.
• *Planning controls in Australia today are commonly underpinned by ‘scenographic’ concepts of what make an attractive place based on successful urban models with relatively low density levels.*

Under this new planning framework scenographic issues are irrelevant, allowing the architect to design freely within a genuine and serious community objective – the sustainable city. The architect, then, is vital to adding an important interpretive and expressive layer to the ‘sustainable city’.

The argument is developed from the premise that new strategic planning and urban design frameworks be focused and limited to the design of the public domain based on sound environmental principles.

In effect, new development controls are proposed that minimize, if not eliminate, building design controls in planning legislation not relevant to these issues. Architects and their clients are then guided by less prescriptive development controls for building design in parallel with more specific public domain controls framed from environmental requirements.

The objective is to more effectively acknowledge and integrate the valuable work of architects in site specific design processes. Implicit in this proposition is the concept that planning legislation is not as effective as architectural processes on a site specific basis for solutions to building infrastructure.
• *Architecture in a new environmentally based planning framework may have greater expressive opportunity and more objectively defined responsibility to deliver environmentally sustainable built infrastructure.*

The proposal in this planning framework is for the responsibility for architecture to be understood by all to be with architects and their clients.

Review processes for architecture by the community and rights to object to development proposals are retained, but with fewer and more significant environmentally based considerations defined by planning legislation to form the basis of any determination by an approving authority. This aims to accordingly focus public debate about new building infrastructure on the design of the public domain from an environmental and amenity perspective, with fewer avenues to argue the merits of a particular architectural approach based on scenographic or aesthetic considerations.
• Architecture is seen as one aspect of the process and more culturally orientated with more community focus on the design of the public domain from environmental analysis and public amenity viewpoints.
A relatively straightforward but perhaps difficult to implement aspect of the reform process is the application of a consistent vocabulary, including definitions, to the legal frameworks and processes controlling urban development across all political jurisdictions in Australia.

One starting point is to eliminate planning jargon such as ‘urban village’ or ‘villa home’ or ‘high rise’ from legal instruments and use instead a ‘plain English’ approach to vocabulary to communicate concepts related to environmental sustainability.

FSR, height, setback and other development controls remain as clearly defined tools for implementing simply expressed environmental concepts.

Vocabulary and terminology within development controls must be aimed at defining actual environmental effects in plain English and not scenographic or building form concepts as pre-conceived solutions to development propositions.
An aim of any planning code in the future is to not limit the range of solutions, tools or concepts that are available to use to provide architecture and other built infrastructure but to define objectives that have to be met for a sustainable future that the community understands as reasonable and necessary to implement.

One of the questions to consider in this debate about planning reform comes from the widely accepted observation that most architects have a “unique voice” or way of formulating architecture.

The argument may go something like this. Allowing greater freedom for architects to express this “voice” is not in the public interest as the community will experience more architecturally inappropriate applications for approval and a generally lower standard of built infrastructure as an outcome. .

This line of thinking intimates that places and neighbourhoods will be less successful as architects and their clients tend to not to see their work in relation to the work of others, thus compromising cohesive built form outcomes. In such a scenario it is acknowledged that there is an increase in architectural “empowerment” or “flexibility” and potential reduction in the ability to control architecture in the public domain through legislation.

In reality, cohesive built form outcomes can still be easily be achieved, perhaps even more comprehensively, where they are required. For example, a relatively straightforward requirement defining solar access will produce building forms that are cohesive relative to solar access. If solar access is the only prescriptive control, then other elements of architecture are less likely to be cohesive, and does this really matter?

It is worth noting that in urban environments, under controls related to the environmental performance of building services, energy and water management technology, land use, solar access, urban connectivity at the ground plane, heritage, view corridors and vehicular management, architecture will still remain substantially regulated. The main difference is that the proposed new ways of regulating the built environment are based on sound environmental design principles. Within the proposed regulation framework, how architects develop a site-specific response to a particular brief need not be the subject of specific regulation.

In suburban and non-urban areas, environmentally-based controls may focus more on the management of water systems, natural habitats for fauna, landscape structures and planting regimes, soil management, and scenic protection (or natural heritage) and less on built form and other architectural controls. Architectural considerations in non-urban environments as a consequence are likely to be significantly less regulated, and again, does this really matter?
• Architecture in this environmentally based planning and urban design framework is given a clear role and responsibility. Recognizing and supporting the full range of collaborative skills required to design, deliver and manage the built environment is ultimately a planning and legal responsibility and integral to achieving sustainable cities valued for amenity and cultural significance.
Case Study:
The redevelopment Carlton & United Brewery Site in the City of Sydney
An example of this approach is reflected in the Council of the City of Sydney’s planning reform agenda summarised in the slogan: ‘A City of Villages’.

‘Scenographic’ controls are not usually derived from principles engaged with environmental sustainability.

The Council of the City of Sydney is not alone in providing evidence to support this observation.

The key environmental benefit that results from increasing density where extremely high levels of public infrastructure exist or can be implemented is not a prominent feature of many contemporary planning regimes controlling development in Australia.

Increasing density whilst maintaining an excellent urban environment with vital, cohesive neighbourhoods is not easy and places new challenges on the design of the public domain and internal amenity of buildings.
The (former) CUB site on Broadway near the Central Railway Station, University of Technology and Sydney University Campuses within the mixed use urban neighbourhood of Chippendale is a useful case study to demonstrate some of the appropriate urban design tools and controls to establish well designed public domain outcomes and interior amenity at levels of density that required the intervention of the Minister for Planning in NSW in the approval process to be implemented.
Sustainable Transport

Mode of travel for different locations (for the journey to work):

<table>
<thead>
<tr>
<th>Location</th>
<th>Train</th>
<th>Bus</th>
<th>Car</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultimo / Chippendale</td>
<td>15%</td>
<td>25%</td>
<td>25%</td>
<td>33%</td>
</tr>
<tr>
<td>Rouse Hill</td>
<td>10%</td>
<td>2%</td>
<td>82%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Average Travel distances by car (for the journey to work):

- Ultimo / Chippendale: 6.7 km
- Rouse Hill: 14.1 km

Residents located at a greenfield site are likely to generate 10 times the vehicle kilometres of residents at the CUB site.
Sustainable Density

Comparison of residential dwellings at the CUB site with a new release suburban area:

The minimum density of development per hectare advocated by the NSW State Government in new release areas is 15 dwellings per hectare, excluding streets and parks.

Applied to the CUB site at the proposed FSR and residential yield gives the following equation:

\[
\frac{1690}{15} = 112 \text{ hectares}
\]

residential units divided by dwellings / hectare = developable land

The CUB site is 6 hectares.

To locate the proposed residential population of the CUB site in a new release suburban site would require an additional 106 hectares of greenfield land, plus new streets and parks than if located at the CUB site.
LOCATE PARK AWAY FROM INTRUSIVE ROADS AND AIRBORNE POLLUTION
LOCATE PARK ALONG FORMER WATERCOURSE
LOCATE PARK ADJACENT TO MAJOR HERITAGE GROUP
LOCATE PARK ADJACENT TO RESIDENTIAL AREAS OF CHIPPENDALE
1. Existing streets and heritage items
2. Extend existing streets
3. New laneway - Chippen Lane
4. Creation of Tooth Avenue - links heritage items
6. Layout with overlay of Park Location diagram

CARLTON & UNITED BREWERY SITE
COX/ATA

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HIERARCHY OF PUBLIC SPACE

IMPROVE EXISTING STREETS BOUNDING SITE: ABERCROMBIE / WELLINGTON STREETS
CHIPPENDALE STREET HIERARCHY -
1. Lanes and walkways 3m - 6m wide
CHIPPENDALE STREET HIERARCHY -
2. minor streets 9-15m wide
CHIPPENDALE STREET HIERARCHY -
3. streets 15m - 20m wide
4. streets greater than 25m wide
CHIPPENDALE STREET HIERARCHY - overlay of all street types
1. Sun Access Plane to Central Park - noon, 2pm, Winter Solstice
2. Sun Access Plane to O'Connor Street - noon, Winter Solstice
3. Sun Access Plane to Wellington Street - noon, Winter Solstice
CUB Site Height Map 2

NOTE
This diagram provides an indication of the maximum height achievable by use of the sun access plane formula. To calculate the actual height the formula in Schedule 3, Clause 13 must be used.

LEGEND
- LAND TO WHICH THIS MAP RELATES
- BOUNDARY OF DEVELOPMENT BLOCK
- SUN ACCESS PLANE HEIGHT CONTOURS SHOWING MAXIMUM BUILDING HEIGHT ABOVE GROUND IN m
- P1 SUN ACCESS PLANE (CLAUSES 13(2) AND 13(3))
Projected sun aspect at 07:30, 21 June
Scheme z-all-54d
Projected sun aspect at 08:30, 21 June
Scheme z-all-54d
Projected sun aspect at 09:30, 21 June
Scheme z-all-54d
Projected sun aspect at 10:30, 21 June
Scheme z-all-54d
Projected sun aspect at 11:30, 21 June
Scheme z-all-54d

LEGEND
RESIDENTIAL
BALCONY / ARTICULATION ZONE TO RESIDENTIAL
COMMERCIAL
RETAIL
PLANT ZONE
HERITAGE
AWNING
BASEMENT
EXISTING RESIDENTIAL
EXISTING CONTEXT