Good design- A case for adopting a user centred approach to medium density housing.

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Abstract

Contemporary urban design theory has, for the past quarter century, favoured medium density compact forms of residential development (medium density) over low density urban typologies as being more sustainable. Similarly, governments have imposed building standards specifically aimed at improving the environmental efficiency, or 'green design', of residential dwellings. However, the migration towards more compact, sustainable urban developments has been slow despite regulatory pressure. In Australia, the average house size has doubled over nearly fifty years while occupant numbers have almost halved in this period (per capita averages (ABS 2010)).

This research traces the emergence of the compact housing agenda in Australian cities with a particular reference to the early experiments in Canberra during the early 1960s and 1970s. The case is then established to argue that the combination of changing attitudes to housing, and the increased knowledge in the Architectural community set the scene for new design typologies to emerge during that period. While 'green' house design was understood as beneficial to the user experience, a gap remains between findings on user satisfaction and the design outcomes of more compact housing typologies.

Introduction- The emergence of the compact housing agenda in Australian Cities

The merits of medium density housing and corresponding critiques of urban sprawl go back at least half a century in Australia for example (Boyd, 1963; Greig, 1995; Stretton, 1970; Troy, 1996). While housing policy was central to post war reconstruction in Australia, it was the reform agenda of the Whitlam administration (1972-75) that introduced broader concerns about containing low density suburban sprawl through medium density housing. (Troy & Lloyd, 1981). At the time, emerging environmental, political movements in part also created a demand for a more compact city. Similarly increased local environmental activism, pursued through demanding increased accountability of local authorities, was designed to ensure environmental justice was being pursued in land development (Gleeson & Lowe, 2000). Similarly, as the state retreated from direct funding of housing and development, in the face of critiques by free market advocates, the housing and construction industry argued for a

reduction in centralised planning control. This shift occurred in the political criticism of top down post-war planning reflecting the broader rejection of the State in the affairs of individuals. The most ardent criticism of planning lay in the failure of bureaucracy to stem corruption, ineptitude and duplicity (Pennington, 1999). Most common; a failure to "liberate the plethora of community values and interests that had been either ignored or actively suppressed by the rational instrumental [logic] of planning" (Gleeson & Lowe, 2000). From this time, urban consolidation emerged as the most desirable means of achieving the environmental and housing goals compatible with the objectives of both the emerging green movement and the housing industry (Smith, 1997; Troy, 1996). As a result, development codes for house setback, verge widths and provision of private open space were pared back under political pressure to achieve often dubious sustainability objectives and efficiency targets.

More recently, under the Development Assessment Forum (DAF) established in 1998, the rewriting of development codes in planning regulation cemented this shift in market power to the private sector. Under the DAF reforms to streamline the development process in Australia, the approval application procedures have been progressively standardised to reflect a universal approach to design that focuses on reducing red tape and expediting development. Standardising of development codes has had the effect of diminishing local planning authorities' to regulatory rather than a strategic planning function (Gleeson, 2006). However, the overall cost and size of housing has not reduced commensurately (ABS, 2008). In effect the goal of achieving a more suitable medium density urban form has been lost in the pursuit of fewer regulatory costs to development.

These regulatory changes, intended to open up opportunities for urban renewal and densification of existing urban areas, have not fundamentally shifted Australia's housing market that remains dominated by land release of greenfield sites on the urban edge. The resulting new greenfield suburbs have narrow streets and verges, smaller blocks and reduced sets backs with little open space. Indeed, the back yard has been replaced by residual ribbons of green verge circumscribing a perimeter fence (Hall, 2010; A. MacKenzie, 2009). Many of the changes to urban development since the 1970s have seen a higher density of housing per hectare but failed to address the impacts of smaller lots and reduced setbacks on housing design. Although house sizes have doubled since the late 1970s, both block size and household occupant numbers have shrunk (per capita averages (ABS)). Despite the advances in environmentally sustainable development theory and subsequent legislating the use of green materials and building practices, energy consumption environmental improvements in greenfield development have not occurred (Horne, Wood, & Berry, 2009).

Canberra's medium density experiments

Canberra's history of medium density development substantially influenced much of the thinking behind the broader regulatory move toward compact housing across Australia from the mid-1970s onwards (R. Freestone, 2007; Robert Freestone, 2010). However discrete experiments in medium density housing in Canberra were developed during this period. The National Capital Development Commission (NCDC) played a key role both as bureaucrats and developers of early experiments in house design. Led by architects and planners, the NCDC was the federal agency responsible for the planning and development of Canberra from 1958-1988 (Reid, 2002). Recognising the need to curtail suburban sprawl and minimise wasteful use of land resources, the NCDC pursued medium-density housing from the 1960s through to the early 1980s experimenting with alternate suburban forms in Canberra (Freestone 2010). It was a time of policy, research, design and development of medium density housing on a scale not seen in the city's history and only recently partially revived by the current ACT government. Advocates acknowledged the benefits of well-designed, compact urban form, with many projects involving notable Australian architects of that era (Judd & Dean, 1983; Judd & Gamble, 1993; Marcus & Sarkissian, 1986; Paterson, Yencken, & Gunn, 1967).

At a precinct level, the principles of private and public or communal space were explored in these projects. Governed by the principles of Radburn planning, these projects tested the efficacy of independent vehicular and pedestrian routes, along with public shared open space between buildings. Key design considerations included working with site features, achieving privacy, and seeking individual expression of attached terrace and courtyard houses within a precinct. As a result, these developments achieved housing densities between 20 to 40 dwellings per hectare (dw/ha) compared with their single storey typical suburban equivalents at around five dw/ha.

Notable demonstration projects from 1970-1980 have included Swinger Hill by Ian McKay Architects, Fisher Housing by Cameron Chisholm Nichol, and Jerilderie Court Housing, Reid by Cox Architects. The Campbell and Garran Housing Groups are further examples of medium density cluster housing designed for the Australian National University by Harry Seidler and Associates - the latter housing now demolished (ACT Heritage NI 2011 – 489). Michael Dysart Architects designed the Urambi Village Housing Cooperative, for a group of bureaucrats within Whitlam's Department of Urban and Regional Development (DURD), and later Wybalena Grove (RSTCA, 2012).

Such precincts, demonstrating suburban alternatives, have and continue to play a role in shaping societal expectations of good housing design in the Nation's capital. Similarly,

recurring patterns of compact house experimentation last century included a prolific period of project builder and architect collaboration in the mass housing market from the 1950s to 1980s. Direct links between architectural design and Australian suburban "style" manifest in new home display villages, display fairs, print media, lifestyle magazines and design competitions (OCallaghan & Pickett, 2012).

The politics of planning has played a major part in the current state of new urban development in Australia. However the role of architecture in influencing the size and typology of housing is not as well understood except for a few examples. Paralleling the broader political, urban planning debates, architects were equally vigorous. Australian architect and social critic Robyn Boyd's book, The Australian Ugliness (Boyd 1963) provides an enduring thesis on the Australian cultural identity in the 1960s. It set the tone for future commentaries that ranged from denigration to celebration of the ordinary, the average and the underwhelming. Boyd described the suburb as the frontier of Australia's "second period of pioneering" (p. 94).

At a century old in 2013, Canberra is in the early stages of urban renewal with various forms of attached compact housing increasing in number (SOAC, 2013). However, as this process accelerates, the replacement of single lot detached houses, to make way for increased medium density, risks a deepening of community resistance to this housing form (Sarkissian, 2004). The design of medium density precincts of smaller houses requires the careful consideration of urban design principles (Marcus and Sarkissian 1986) and in what is now a mature medium density housing market in Canberra, a belief that all the lessons have been learned remains a risk for the housing design industry.

Despite the aspirations by Architects of developing and demonstrating design precedents in Canberra, their influence on policy making has been minimal, in part due to an inability to capture the imagination of the housing market. Innovations rarely survive past the original demonstration project, and consequently the goal of integration architectural design solutions into project housing are rarely realised (Hal, 2000).

Housing design is a complex topic, which includes socio-cultural and environmental factors, location and landscape context (Judd & Gamble, 1993; Marcus & Sarkissian, 1986; Paterson et al., 1967). Themes such as personalisation, territory, way-finding, flexibility, comfort, and delight need to be sensitively addressed through the design in medium density housing (Sarkissian, 2013; Zeisel, 2006). The trend in Australia towards larger houses colloquially known as McMansions has not been restricted to project builders (Andrew MacKenzie, 2013). Despite regulatory pressure and concerted efforts by governments, house growth and suburban sprawl has continued in the 21st century (Blair, 2003). Similarly, the development

of environmental standards, such as the mandatory energy efficiency rating system (EER) in the ACT, do not capture the effect of overall house size in the calculation. Many new homes remain expensive to heat and cool due to their size. Regardless of disconnect between energy efficiency and house size, households feel that the rating system is valuable both in terms of energy saving and their own environmental credentials (A. MacKenzie, 2012). The somewhat perverse and unintended consequences of the EER system in the ACT is that compact housing is even more difficult to sell to the market on environmental grounds and such factors impede success of the medium density housing market.

However the gap between medium density compact house design, user satisfaction, and market demand continues to exist in the conversation between design professionals, the community and the end-user on housing. This in-turn has social and environmental impacts. A lack of input from residents, who must live with their designs, leaves architects to rely on their own experience and intuition to interpret user needs (Sarkissian, 2004). Reasons for this are complex and include a lack of access by the architect to the end user or to existing post occupancy evaluation findings on compact housing (Marcus & Sarkissian, 1986; Steen, 2011). Expediency, driven by project holding costs and other economic drivers, can also compromise the design and delivery phases of medium density projects (Barrett, 2007; Vischer, 2008). For architects to offer medium density alternatives to the single lot detached housing, additional challenges emerge around tenure mix, construction delivery and the perceived strata management challenges associated with medium density communities.

It is timely, therefore, to consider the role of Architecture in medium density development in the current development market. This paper concludes by advocating for a more conscious use of post occupancy evaluation in proposing medium density development by Architects. This approach forms part of broader research project into the role of Architecture in medium density housing.

Alternative approaches to designing compact housing in new developments

This paper has established that the combination of changing approaches to urban planning and development and historical architectural experiments in medium density housing have done little to insert architecture at the centre of the medium housing debate in Australia. Similarly, broader societal attitudes and reactions to commentaries, such as those historically proffered by Boyd in the 1960s, are among factors contributing to a long standing cultural suspicion of architects in Australia.

Regardless, the case for more compact housing is compelling from a sustainability perspective. Demand for housing diversity for a changing household demographic and

"aging in place" solutions favour medium density housing (Elton_Consulting, 2011; Sarkissian, 2004). Similarly, empirical research provides evidence of significant reductions in the use of space and energy for heating and cooling and reduced car ownership and consumables, through increased sharing within medium density clusters (Metzler, 2005). For example, a study of ten compact housing villages, households achieved on average 31% space savings; 57% electricity savings and 8% goods savings (Metzler, 2005; Williams, 2005). Well-designed medium density compact houses potentially serve the needs of many sectors of the community better than alternative low and high density housing solutions (Marcus & Sarkissian, 1986).

Well-designed medium density compact houses can serve the needs of many segments of the population better than some low and high density housing solutions (Marcus & Sarkissian, 1986). However a lack of available research or a failure by the designer to draw upon existing research in areas such as post occupancy evaluation and user centred design can result in common and recurring design errors. Functional design criteria from research on predictive behaviours can be variously case study specific, or flexible for a range of scenarios. From a research perspective, designed spaces provide ideal settings for examining user behaviour through observation (Vischer, 2008). Anderson (2002) puts this succinctly, asserting that the design artefact may be a "communicator" or "receiver" of use and the designer should anticipate a variety of intended and unintended uses over the life of a dwelling. For example, the useability of a particular design might range from; ease of adaption to the environment; to a mismatch; or to occupant stress resulting from inappropriate design or design error (Jansen, 2014).

Post occupancy research on medium density user satisfaction has been diminishing in popularity in recent decades (Sarkissian, 2004). Reasons for the declining interest in post occupancy research include the inaccessibility of data generated, challenges with incorporating and disseminating key findings, the relevance of findings and comprehending how to make meaningful use of unwanted findings (Vischer, 2008). Similarly, ethical and practical challenges of studying participants in private settings combined with a gradual withdrawal of research funding into housing in Australia have also contributed to the decline. Sarkissian (2013) summarises the impact of this decline in research activity by suggesting that theories and literature on residential environmental psychology and behaviour studies relating to house design has diminished in recent decades. Her challenge to architects is to remedy this by recovering their understanding of post occupancy evaluation and its application in the design of housing from a user centred perspective.

The case for recovering a greater empirical foundation to a user centred approach by consciously incorporating post occupancy evaluation into the design process appears self-evident. To be clear an improved understanding of usability at the pre-occupancy stage can feed into the briefing and design stages of a project while post-occupancy supports corrective action and feeds into future projects (Vischer, 2008). Occupants can offer perspectives on their compact house and living experiences, and when combined with observation, post occupancy evaluation allows the researcher to better understand the meaningfulness of everyday activities. Notwithstanding the subjective elements of design; one of the architect's tasks never-the-less is to support positive interactions and limit unwanted interactions through careful design (Cox, 1983). The architect can engage in critical reflection on their user-centred design methods, their role and on the design artefact; the home. Balancing the ideas and knowledge of the designer and the ideas and knowledge of others, the designer will have to decide to what extent to be user-centred through their own reflexive process. Pressure, expediency, power plays between design process participants, may see the architect privileging their own ideas at times to the disadvantage of the design and the end-user. But at its best, the architectural design process skilfully uses design, and indeed elegant design solutions, to navigate the challenges of the user brief and to derive opportunities from it. User-centred design may mean more rigorous user brief development, accompanied by a more in-depth review of the actual usability of the implemented design.

More focus on post occupancy research can reveal insights for the architect about the types and desirability of interactions between households, along with some of the pragmatic and esoteric insights that comprise the functional design brief and contribute to more useable and adaptable compact housing forms consistent with medium density developments.

Conclusion

The role of the architect and their interrelationship with the end user requires careful consideration supported by empirically sound studies of occupation and use. Architectural design usually involves a series of decisions to prioritise competing benefits and constraints with, interaction, discussion, and collaboration occurring variously between the designer , their colleagues, clients, authorities, builders, technical specialists, the community of interest, and the end user, or client. Each of these groups has their own knowledge and ideas, with gaps and tensions occurring between them. A tension between developing and sustaining, and between what is, and what could be, exists for the designer. Conceptually the architect should to research the present in order to design for the future. The architect should include research methods not traditionally associated with design practice, and requires a more

critical approach to evaluating the success or otherwise of design for communities living in medium density developments.

Medium density compact housing offers the benefits of reduced energy, resource and land use. Market delivered medium density, however, continues to offer widely varying design outcomes. An improved design outcomes derived from user-centred techniques based on post occupancy evaluation can offer a more sustainable, liveable and socially responsible form of compact housing.

References

ABS. (2008). A twenty year history of the cost of building a new house. Canberra: ABS.

Barrett, P. (2007). *Revaluing Construction*. Oxford: Blackwell Science.

Blair, J. e. a. (2003). Affordability and Sustainability Outcomes: A triple bottom line Assessment of Traditional Development and Master Planned Communites Australian Housing and Urban Research Institute.

Boyd, R. (1963). *The Australian Ugliness*. Melbourne: Hawthorn Press.

Cox, P. (1983). Collapse of a Suburban Dream. In J. a. Dean (Ed.), *Medium Density Housing in Australia* (pp. 8-16). Canberra: RAIA Education Division.

Elton_Consulting. (2011). Time to Talk - Community Consultation. from http://timetotalk.act.gov.au/about-time-to-talk/

Freestone, R. (2007). *Designing Australia's Cities: Culture, Commerce and the City Beautiful, 1900-1930* Sydney: UNSW Press.

Freestone, R. (2010). *Urban Nation*: CSIRO.

Gleeson, B. (2006). *Australian Heartlands making spaces for hope in the suburbs*. Sydney: Allen and Unwin.

Gleeson, B., & Lowe, N. (2000). Revaluing planning Rolling back neo-liberalism in Australia. *Progress in planning, 53*, 83-164.

Greig, A. (1995). *The Stuff Dreams are Made of: Housing porvision in Australia 1945-1960*. Melbourne: University of Melbourne Press.

Hal, A. (2000). *Beyond the Demonstration Project: The Diffusion of Environmental Innovations in Housing*. Culemborg: Twin Design

Hall, A. (2010). *The life and death of the Australian backyard*. Brisbane: CSIRO.

Horne, R., Wood, G., & Berry, M. (2009). Global Cities Annual Review: 2.4 Urban Infrastructure. *RMIT Global Cities Institute Annual Review, 2009*, 48-55.

Jansen, S. J. T. (2014). The impact of the have-want discrepancy on residential satisfaction. *Journal of Environmental Psychology*. doi: 10.1016/j.jenvp.2014.04.006

Judd, B., & Dean, J. (1983). *Medium density housing in Australia* Canberra: RAIA Education Division.

Judd, B., & Gamble, J. (1993). *Designed for urban living : recent medium-density group housing in Australia* Royal Australian Institute of Architects and the Department of Health, Housing and Community Services.

MacKenzie, A. (2009). *Recovering suburbia: An analysis of suburban form - post fire redevelopment.*Paper presented at the 4th State of Australian Cities conference, Perth.

MacKenzie, A. (2012). *A city in a fragile landscape.* Paper presented at the Urban Transformations, Perth.

MacKenzie, A. (2013). *Suburb under pressure: An investigation into the redevelopment of a Canberra suburb after the 2003 bushfires.* Paper. The Fenner School of Environment and Society Australian National University. Canberra.

Marcus, C. C., & Sarkissian, W. (1986). *Housing as If People Mattered: Illustrated Site Planning Guidelines for Medium-Density Family Housing.*: Berkeley: University of California Press

Metzler, G. (2005). *Sustainable Community: Learning from the Cohousing Model*: Trafford Press.

OCallaghan, J., & Pickett, C. (2012). *Designer Suburbs: Architects and Affordable Homes in Australia*: Powerhouse Publishing.

Paterson, J., Yencken, D., & Gunn, G. (1967). A Mansion or no House, Report for the U.D.I.A. on the consequences of planning standards and their impact on land and housing. Melbourne

Pennington, M. (1999). Free market environmentalism and the limits of land use planning. . *Journal of Environmental Policy and Planning, 1*(1), 43-59.

Reid, P. (2002). *Canberra following Griffin*. Canberra: National Archives of Australia.

RSTCA. (2012). ACT Register of Significant Twentieth Century Architecture. R041, R043, R047, R050, R107, R124. Retrieved 12/04/2012, from http://raia.com.au/i-cms?page=5878

Sarkissian, W. (2004). Social Issues and Trends Associated with Medium- to High Density Urban Living - Final Report for the Land Management Corporation

Sarkissian, W. (2013). *Not in my backyard: Community responses to higher density living - is it all in the mind?* Paper presented at the The Bob Hawke Prime Ministerial Centre, University of South Australia.
http://w3.unisa.edu.au/hawkecentre/events/2013events/Wendy_Sarkissian.asp

Smith, S. (1997). *Urban Consoliation: Current Developments*. NSW Parliamentary Library.

SOAC. (2013). State of Australian Cities (Canberra / Queanbeyan)Australian Government

Steen, M. (2011). Tensions in Human-centred Design. *CoDesign, 7*(1).

Stretton, H. (1970). *Ideas for Australian Cities*. Melbourne: Georgian House.

Troy, P. (1996). *The perils of urban consolidation : a discussion of Australian housing and urban development policies* Sydney: Federation Press.

Troy, P., & Lloyd, C. (1981). *Innovation and Reaction*. Sydney: Allen and Unwin.

Vischer, J. C. (2008). Towards a user-centred theory of the built environment. *Building researcha nd information, 36*(3), 231-240.

Williams, J. (2005). Sun, surf and sustainable housing—cohousing, the Californian experience. *International Planning Studies, 10*(2), 145-177. doi: 10.1080/13563470500258824

Zeisel, J. (2006). *Inquiry by Design*. New York and London: W W Norton and Company.