ABSTRACT

This paper reports on the development of a design framework for improving housing conditions in remote Indigenous communities in Australia. The first section of the paper outlines the nature of the housing crisis in these communities and briefly reviews recent policy changes that have the potential to facilitate major improvements in the number and quality of houses to be built in the communities in coming years. The second section defines the concept of ‘design framework’ used in this paper and the process of research that was undertaken in three case study communities to elicit stakeholder views of an appropriate design framework for remote Indigenous housing in Australia. The final section of the paper provides an overview of the design framework that was developed with a particular emphasis upon how a ‘Triple Bottom Line’ view of sustainability was used to guide the development of an integrated and balanced set of guiding principles for the planning, design, construction and maintenance of remote Indigenous housing.

Key words: Housing, Australia, Indigenous, Design.
Introduction

The number of indigenous Australians is just over half-a million people or 2.5% of the total population (ABS 2007). Of these, almost a third live in remote and very remote parts of the country (GISCA n.d.) where they experience health, life-expectancy, education and living conditions far below those of the majority of other Australians (SCRGSP 2007) and where crowded and poorly maintained housing is both an ongoing cause and a symptom of social disadvantage (AIHW 2005, 2007a,b). As Pholeros (2007) argues, “If people live in Third world conditions in overcrowded, poorly built and maintained houses, then it is not surprising that they suffer the same health and social problems as people in developing countries”.

The search for solutions to the housing crisis in remote Indigenous communities in Australia has been led by anthropologists and architects (e.g. Memmott and Chambers 2003) and public health specialists (e.g. McPeake and Pholeros 2005). Although very significant and a source of many practical improvements in housing conditions, this research has not been sufficient to redress the scale of the problem, however. The key challenge was described by a senior officer in a government housing department who said in a research workshop:

We need to know how to get a house on the ground at a price we can afford but with a standard of design and specification that people can live there happily and with a cost R&M schedule that can keep the house at the highest possible standard of livability to ensure both housing and non-housing outcomes for families. (20 Sept., 2007)

Achieving this goal requires an understanding of how the residents of remote Indigenous communities define sustainable housing and how their aspirations intersect with policy frameworks and training programs. It also requires research into alternative forms of procurement, construction and management as well as life-cycle and best-value assessments which can incorporate the ‘social savings’ from improved education, health and family stability that result from improved housing. This whole-of-system view of housing helps to identify the neglected areas where further research is needed if the housing sector, as the largest source of public sector investment in remote Indigenous communities, is to contribute to opportunities for employment and community well-being on an on-going basis.

This paper reports on the development of a design framework that has sought to integrate perspectives from the sustainability assessment, construction and project management disciplines with those of anthropologists, architects and public health specialists. The first section of the paper elaborates on the nature of the housing crisis in remote Indigenous communities in Australia and briefly reviews recent policy changes that have the potential to facilitate major improvements in the number and quality of houses to be built in the communities in coming years. The second section
defines the concept of ‘design framework’ used in this paper and the process of research that was undertaken in three case study communities to elicit stakeholder views of an appropriate design framework for remote Indigenous housing in Australia. The final section of the paper provides an overview of the design framework that was developed with a particular emphasis upon how a ‘Triple Bottom Line’ view of sustainability was used to guide the development of an integrated and balanced set of guiding principles for the planning, design, construction and maintenance of remote Indigenous housing.

The Indigenous Housing Crisis

Although increased levels of funding has been allocated to building houses in remote Indigenous communities in recent years, many Indigenous Australians continue to live in substandard and over-crowded accommodation at a rate five to six times that of non-Indigenous households (AIHW 2005, 2007a; FaCSIA 2006). For example, The SCRGSP (2007) reports that 60% of people in remote Indigenous communities are living in overcrowded households, with NT and WA worst affected. Yet, Indigenous housing stock increased by only 3 per cent between 2001 and 2006 while the proportion of houses needing major repairs increased from 19 to 23 per cent (ABS 2007b). Together with relatively young age of the Indigenous population (AIHW/ABS 2006), the chronic undersupply of houses, and deteriorating condition and short life-span of much existing housing (AIHW 2007b), means that remote Indigenous housing in Australia is at crisis point. As a Minister for Housing stated,

The mathematics are defeating us now – and will continue to do so unless radical changes are enacted... [I]n 33 years time at current construction rates we would still be lagging unmet demand by 16 years. (McAdam 2006)

Twenty years ago, Memmott (1988) noted that such concerns were decades old even then; yet his descriptions of the problem the remains valid today:

Many groups of Aborigines suffer high levels of physical and mental stress which appear to be causally linked (either directly or indirectly) to their domiciliary environment. Stress-related factors include lack of protection from the weather, living in squalor, crowding, alcoholism, domestic violence, widespread ill-health, insecurity arising from the temporariness of living circumstances.... Occupants may find it very difficult to escape from such circumstances even if motivated to do so, due to lack of finance and credibility which in turn arises from a lack of employment and education. (p34)

Numerous government reports indicate that the housing situation is so severe that the health, safety and well-being of residents, especially the elderly and children, are at
risk (e.g. see AIHW 2005; SCRGPS 2007, Ch. 10). Indeed, a 2007 report, entitled *Little Children Are Sacred*, found that ‘the shortage of Indigenous housing in remote, regional and urban parts of the Territory is nothing short of disastrous and desperate’ (Wild and Anderson 2007, p195). It further reported that the Northern Territory (a ‘province’ of Australia) needs 4,000 additional dwellings (at a cost of $1.2 billion) to meet current needs of remote Indigenous families and another 400 houses each year, for 20 years, to meet projected demand. The situation is similar in the state of Western Australia, where many Indigenous families live in remote communities that lack sufficient and suitable housing. For example, a 2004 report by the Equal Opportunities Commission of WA (2004) called for urgent support for people in ‘overcrowded extended family situations ... [which] often increase the risk of sexual abuse of children.’

The 2007 Federal Budget was a turning point in levels of government interest in this area as it provided substantially increased funding and instituted new housing management arrangements for remote Indigenous housing (Brough 2007). These initiatives encourage the adoption of approaches to procurement and project management that offer opportunities for economies of scale. State/Territory Governments are currently negotiating new bilateral housing agreements with the Commonwealth, which will come into effect on 1 July 2008. The Australian Remote Indigenous Accommodation (ARIA) program has been established to replace previous funding mechanisms in which individual communities were responsible for building and managing houses. Instead, housing will be the responsibility of State and Territory Government who, it is argued, have greater capacity for innovation, efficiency and administration than local housing organizations (FaCSIA 2007). They also have the capacity to initiate large-scale procurement strategies across communities and, thus, establish the economies of scale that can come from constructing large numbers of houses in a region and from the use of pre-fabrication and modularized construction. However, if not managed appropriately, such centralized processes risk reducing the degree of consultation possible and the cultural responsiveness of the resultant house designs and management systems in local communities.

**The Research**

The goal of this research was to develop a Design Framework that is appropriate to the changing policy context for remote Indigenous communities as well as to the people and landscapes in the communities where the housing is to be provided. Meeting this need calls for a Design Framework that integrates the multidisciplinary mix of political, geographical, cultural, anthropological, historical, psychological, sociological, health, architectural, engineering, economic, landscaping and legal aspects of Indigenous housing into a trans-disciplinary response to a family or group’s needs for shelter, security, health and well-being. Thus, the process of designing a house – or any structure – is not limited to the act of drawing plans to shape and guide
construction. Issues of form and function are important in design, as are responsiveness to the physical environment and local cultural experiences and expectations. As such, design is a complex process that begins with initial discussions about aspirations and the feasibility of them for a building project and extends through the various and multiple stages of consultation with clients, drawing and revising concept and detailed plans, responding to quantity surveyors’ reports and cost estimates, specifying materials and fittings, project planning, construction management, developing a maintenance schedule and post-occupancy evaluation.

Thus, the concept of design was defined in this study as encompassing the following aspects of a design system:

- Consultation and site analysis to achieve a clear understanding of the problem(s) to be solved;
- Research investigating similar design solutions in the field or related topics;
- Design brief stating mutually agreed design goals;
- Engagement, coordination and integration of expertise particular to the problem(s) to be solved;
- Production of architectural design options sufficient for client evaluation and selection of a design strategy;
- Development of the agreed architectural design strategy providing sufficient detailed design options for client evaluation of a final design solution;
- Documentation of the final detailed design to guide the building construction process;
- Supervision of the construction process in accordance with the documentation; and
- Development and implementation of a post-occupancy management and maintenance plan, including provision for ongoing post-occupancy evaluation (POE).

The research was conducted in two phases. The first involved a review of the relevant policy and academic literature and interviews with State/Territory agencies for Indigenous affairs and housing, with three Community Councils where the fieldwork would take place, and with design practitioners experienced in Australian Indigenous housing. This information was synthesized into a range of interrelated ‘best practice’ principles – or ‘draft’ Design Framework – for the delivery of remote Indigenous housing.

The ‘draft’ Design Framework was then ‘tested’ through further research in three case study communities in Queensland (Palm Island), South Australia (Mimili) and the Northern Territory (Maningrida). All three are culturally, historically and environmentally distinct, and home to three very different communities. However, despite these differences, the communities were found to share many similar housing problems, due to their common experiences of remoteness; the legacy of chronic
under-funding for housing, infrastructure and services, and the lack of local education, training and employment opportunities. The ‘draft’ Design Framework was tested by identifying a list of the housing patterns and issues across the three communities and using them to guide observations and interviews in a second round of field visits and with interviews with staff in State/Territory Indigenous housing agencies. Written comments on the draft Design Framework were also elicited from some of the experienced designers interviewed previously as a form of validation.

The Design Framework

The case study communities of Mimili, Maningrida and Palm Island are culturally and environmentally distinct, and home to three very different communities. Coming from such diverse landscapes in such widely distant parts of Australia, the people of Mimili, Maningrida and Palm Island represent diverse language groups, cultural beliefs and practices, ‘contact histories’, and patterns of response to changing social, political and economic conditions. The historical origins of the three settlements are quite different also – a pastoral workers’ settlement (Mimili), a missionary and trading post consolidated into a township to progress assimilation (Maningrida) and a penal settlement for exile and punishment (Palm Island). Each of these histories plays a significant role in shaping the patterns of similarity and diversity of language groups in each settlement, of attachments to ‘country’, of levels of cultural continuity, and of the changing social mores that influence responses to housing needs and aspirations.

However, despite these differences, the communities of Mimili, Maningrida and Palm Island share many similar housing problems, due to their common experiences of remoteness; lack of local education, training and employment opportunities; and a legacy of chronic under-funding for infrastructure and services. Most significantly, the settlement planning and house plans in the three communities mostly fail to meet the most basic of responses to Australian Indigenous culture or environmental conditions. The resultant cultural dislocation, together with severe overcrowding and irregular maintenance, means that the condition and appropriateness of housing stocks are not conducive to the health, social well-being and other non-shelter outcomes possible from better housing.

The Design Framework was developed from an analysis of the solutions to these problems suggested in the extensive interviews and workshops we conducted with residents, Councilors and housing officers in the three case study communities, with relevant staff in State/Territory housing agencies, and with design and construction professionals experienced in building houses in remote Indigenous communities. The Design Framework is intended as a practical reference guide for policy makers and built environment professionals responsible for the design, procurement, construction and management of remote Indigenous housing. It is not to be read as a prescriptive set or guidelines or ‘one-size fits-all’ approach to the complex cultural, economic,
environmental and technical challenges in building and maintaining houses across the many diverse remote Indigenous communities in Australia.

The major outcome of this analysis an increasing understanding that the key to improving every phase in the design and delivery of remote Indigenous housing was the integrated and balanced consideration of community and resident consultation, cultural responsiveness, settlement layout, eco-efficiency, job creation, employment and training, resident and environmental health, and the economics of construction and asset management. All of these considerations could be defined within the broad conceptual umbrella of ‘sustainability’. This reflects the call by Ross (2002) for the ‘economic aspects of Aboriginal housing … [to be] integrated with environmental and social aspects… Sustainable Aboriginal housing requires the integration of social, economic and environmental analysis and design’. (p140) This broaden conception of ‘sustainability’ reflects a key finding from the case studies, namely that the economic, social, cultural and environmental imperatives of design are interdependent and mutually reinforcing. For example, the choice of whether to use concrete block, mud brick or steel-frame construction not only impacts upon initial construction costs but also upon opportunities to employ community labor and locally available materials, thereby promoting employment and the circulation of money in the local economy, the durability of the building in response to climatic factors, and the level of repair and maintenance required. Similarly, design decisions in response to the systemic, long-term overcrowding in houses in remote communities, such as decisions about the size and location of bedrooms and verandas and the number and location of toilets and showers, impact upon the livability of a house in terms of both cultural appropriateness and the likely rate of wear-and-tear on the structure, fixtures and fittings. In the same way, decisions about the size and location of kitchens, the provision for both internal and external cooking spaces, and the size and security of storage for food and cooking equipment all impact significantly on the appropriateness of the house to the number of residents and their preferred domiciliary practices and the overall functionality of the house.

Six sustainability values or principles were identified when this integrated view of sustainability as a central goal of Indigenous housing policy was applied to the findings of the three case studies and the revision of the draft Design Framework. These are: Cultural appropriateness; Environmental sustainability; Healthy living practices; Employment opportunities and economic development; Life-cycle costing; and Innovation in procurement, ownership and construction systems. These six principles provide for the physical, social and economic well-being of people living in remote communities as well as the infrastructure needed to support the improvements greatly needed in the health, education and employment of Indigenous individuals and families in remote locations.
Cultural Appropriateness

The design of Indigenous housing must respond to core cultural imperatives associated with customary beliefs, preferred domiciliary practices, and the diverse range of household types, sizes and aspirations found in remote Indigenous communities. Culture is dynamic and changing and responds to new opportunities for education and livelihoods. In turn, culture of a community affects how these new opportunities will be interpreted and received. This aspect of culture, together with the great diversity of cultural patterns in different parts of Australia means that it is unwise to try to specify the aspects of cultural that should be integrated into the design of a house. This means that a key foundation of the Design Framework is the need for cross-cultural between design and other housing professionals, the community where a house is to be located, and family for whom it will be home. Areas in which such consultation is vital include: the location of the house in relation to family and kinship groupings, the site design and orientation of the house in relation to ‘country’ and adjacent homes of relatives, the functions and design of internal and external spaces, customary practices in relation to sight-lines and avoidance relationships, and the impacts of these on the location of toilets and bathrooms, etc.

Environmental Sustainability

There are two aspects to the environmental credential of a house. The first relates to ensuring that the form and design of the house is responsive to the local environment, especially the climate. This is imperative for ensuring the comfort of residents and reducing the energy (and financial) costs of installing artificial heating and cooling systems, and involves passive solar design influences on the choice of building styles, site design and orientation.

The second aspect relates to the selection of building materials that are climatically-responsive, construction systems that maximize the use of local materials and labor and water (thereby, reducing the energy (and financial) costs of transport), and the integration of energy and waste management systems that support the social, economic and environmental health of the community.

Healthy Living Practices

Personal and family well-being through attention to health and safety is the focus of The National Indigenous Housing Guide. The Guide contains guidelines for ensuring that appropriate ‘health hardware’ is provided in a house to support the nine Healthy Living Practices identified by Health Habitat:

- Washing people
- Washing clothes and bedding
Remote Indigenous Housing

- Removing waste water safely
- Improving nutrition: the ability to store, prepare and cook food
- Reducing the impacts of over-crowding
- Reducing the negative effects of animals, insects and vermin
- Reducing the health impacts of dust
- Controlling the temperature of the living environment
- Reducing hazards that cause trauma

Household safety is an important additional aspect of health hardware. Thus, the *National Indigenous Housing Guide* also contains guidelines for meeting minimum standards for

- Electrical safety
- Gas safety
- Fire safety
- Structural safety

Attention to these aspects of health hardware contributes not only to the health and safety of householders but can also help to address the links between health and overcrowding, the spread of infectious diseases and poor nutrition, and the wider issues of domestic violence and school truancy.

**Employment Opportunities and Economic Development**

The economic sustainability of remote Indigenous communities is one of their greatest weaknesses and, to date, too little attention has been paid to maximizing the significance of housing construction as the major area of infrastructure investment in almost every remote Indigenous settlement in Australia. Yet, the design, construction and maintenance of houses have the potential to be a major creator of local employment and the retention and circulation of money in local economies. However, few possess appropriate skills for employment in the construction industry at the present time. Thus, the economic development of remote indigenous communities is heavily dependent upon the rapid expansion of education and training schemes to provide the skills needed for employment in various aspects of the housing system,

**Life-cycle Costing**

The severe shortage of housing in most remote Indigenous communities makes it imperative that all available funds are well-spent. To date, the emphasis has been on building the maximum number of houses for the least cost. However, this approach only deals with the direct costs of housing. Indirect costs also need to be considered in order to maximize the value and return on housing expenditures. The cost savings from minimizing direct costs, e.g. by making rooms too small, not providing adequate external spaces and wet areas, and a low specification standard for fixtures and fittings, can in high and on-going recurrent costs for repairs and maintenance and greatly reduce the longevity of the house. Indirect costs that also have to be
considered include the financial, not to mention human, costs of problems such as ill-
health, family instability and reduced productivity that result from living in
inappropriate, over-crowded and/or poorly maintained housing. The design of
Indigenous housing is reflects the principle of ‘best value’ rather than ‘best price’ and
the subsequent use of whole-of-life costing for housing that integrates the cost of
materials and construction with the planned and budgeted lifespan of a house, the
associated repair and maintenance schedules, and the housing-related costs of health,
family stability and education.

Innovation in Procurement, Ownership and Construction Systems

‘Value for money’ can also be sought through the development of the range of
innovative procurement, ownership and construction systems that are likely to result
from changes in the financing and management of remote Indigenous housing. As
outlined in previous chapters, the 2007 Commonwealth Budget has provided
significant additional housing funds, as have recent initiatives of State and Territory
Governments. The allocation of responsibility for managing community-title rental
housing to State/Territory housing departments provides for a pooling of these funds
and the resultant opportunity to ensure ‘value for money’ through:

- economies of scale in housing procurement, construction and management,
- innovative procurement systems (such as regional alliances),
- the appropriate use of modular construction technologies (such as the off-
  and on-site fabrication of building components and on-site assembly
  supported by certification systems), and
- a characteristic of property management and rental management.

The possible injection of housing funds from mortgages as people take advantages of
new opportunities for home ownership may also add to the pool of funds available.
Also important here is the development of alternative financing schemes such as
lease-purchase arrangements and ‘sweat equity’.

Summary

These six aspects of sustainability provide a lens through which to analyze and
channel all decisions in the design, procurement, construction and post-occupancy
management of housing in remote Indigenous communities. However, it should be
noted that decisions about sustainability must be locally relevant and culturally
appropriate, i.e what is ‘sustainable’ in none context may not be relevant or
appropriate within another. This is particularly so within the vast range of
geographical environments and Indigenous cultural patterns in remote regions of
Australia. Thus, the principles outlined in the following sections are not a ‘one-size
fits-all’ set of prescriptions. Rather, each one needs to be considered in the light of
local contexts and endorsed, modified or rejected.
The Design Framework applies these six aspects of sustainability at each of the key decision points in the housing system:

- Consultation (throughout the process)
- Settlement design
- Design of the house, including internal and external spaces
- Integration of education and training plan into construction schedule
- Design development, construction and project management
- Post-occupancy management

This is illustrated in Figure 1.

**Figure 1:** The design framework

Guided by the six principles of sustainability, a set of best practice principles for policy makers and built-environment professionals were developed for each of these decision points or phases. There is not space in this paper to outline all the principles for each of these phases. However, the listing below provides an example of the nature of these principles. It relates to Phase 4: The Design of the House, and includes principles for responding to the household composition, external design and internal design. Together, the principles for all six phases provide a guide for achieving the goal of a sustainable housing system in remote Indigenous communities in Australia.

**Household composition**

→ A careful study is made of the composition of the householders who will be using a house over what period of time and according to what season
Particular attention is paid to extended family, age, gender and disability issues amongst possible residents, so that:

- there are flexible facilities for sleeping, feeding and ablutions for up to four times the number of regular residents
- internal circulation and functional relationships between spaces and space needs are accommodated, e.g. through appropriate size, location and number of wet areas, bedrooms, kitchen spaces, storage requirements, veranda areas, etc.
- access to external services and emergency escapes are facilitated.

Flexible accommodation is provided for visitors through, for example, larger living room spaces, semi-enclosed, wide verandas, etc. Additional external toilets and showers are available to avoid overuse of toilets, showers, septic systems, etc.

**External Design**

- Decisions about the form and structure of the dwelling are decided as result of a balanced consideration of: design responses to environmental and climatic conditions, patterns of construction and maintenance costs, locally available materials and skills, opportunities for local employment and skills development, possibilities for modularization, extensions, etc., and household composition. These considerations will determine, for example, whether houses are high or low set; built on a concrete slab or a raised timber floor; are built from cement block, mud brick or with steel or timber light-frame construction and cladding.
- Houses are sited and oriented appropriately with respect to: the direction of ‘country’, family and kinship groupings and possible clustering, sightlines, views, breezes and solar aspect, and in relation to local services and resources.
- The number of doorways are appropriate to the number of people living in a house, with doors and windows positioned to allow natural ventilation and breezes, as appropriate to local climatic conditions.
- The location of verandas, external cooking space/s yard spaces, perimeter fences, etc. takes account of health and safety requirements and social protocols.
- Sturdy construction of wide roof overhangs to verandas helps manage roof storm-water overflows and avoid rain penetration and harvest water.
- External site planning facilitates the use of outside cooking/hearth areas, with well-drained and shaded structures for outside entertaining.
- An extra toilet/hand basin is provided in the yard for emergency and visitor use.
- Secure gates (through appropriate specification of hinge selection and fixings) ensure privacy and security of verandas and yard spaces.
- Fencing is provided around houses to provide definition of boundaries to domiciliary spaces and to limit entry of unwanted dogs, cars and people to private yard spaces.
- Provision is made in external areas for the storage of additional bedding, tools, machinery and vehicles, as appropriate.
- Landscaping provides a mix of shades areas, gardens and open space for gatherings or for children to play.

**Internal Planning**

- Bedrooms are large enough to accommodate the household sub-units who may occupy them, together with secure storage and shelving for all of their possessions.
- Bedrooms have two-way access to ensure safety and security of individuals.
- Living rooms are planned to allow for a range of storage, living and sleeping activities, including accommodating mattresses and people sitting on the ground facing one another.
Corridors are of sufficient width to provide additional sleeping and storage spaces and allow people in avoidance relationships to pass without embarrassment.

The number of toilets and bathrooms are appropriate to the likely number of residents and are located correctly according to local avoidance behaviors, with regard to other areas of the house and to ensure privacy and security.

Kitchen, bathroom and laundry design, fittings and fixtures incorporate the health and safety recommendations for healthy living practices in the National Indigenous Design Guide.

Sufficient lockable storage is provided in kitchens to enable different family sub-units to store their food and to accommodate large-size cooking equipment such as pans, pots, etc.

Window openings in living and kitchen spaces allow for exterior visual surveillance in terms of their size, location and positioning.

Windows in kitchen spaces allow utensils and food from the internal kitchen to be passed to an outdoor bench. Adequate acoustic insulation in floor, wall and roofing construction in bedroom, bathroom and living spaces allows for minimal noise disturbance from within the house.

Conclusion

The aim of this study was to develop a design framework rather than design guidelines. The diversity of cultural patterns and geographical environments around Australia, together with the need for in-depth consultation with community leaders and future residents of a house, meant that we were not seeking to develop a prescriptive set or guidelines or ‘one-size fits-all’ approach to the complex cultural, economic, environmental and technical challenges in building and maintaining houses across the many diverse remote Indigenous communities in Australia. Nevertheless, our framework allows for both developing and evaluating plans for the design, construction and management of remote Indigenous housing provided each of the best practice principles is reviewed in the light of the physical and cultural environment where the houses are to be built and, where appropriate, modified or replaced.

References

5. Australian Institute for Health and Welfare (AIHW) & Australian Bureau of


