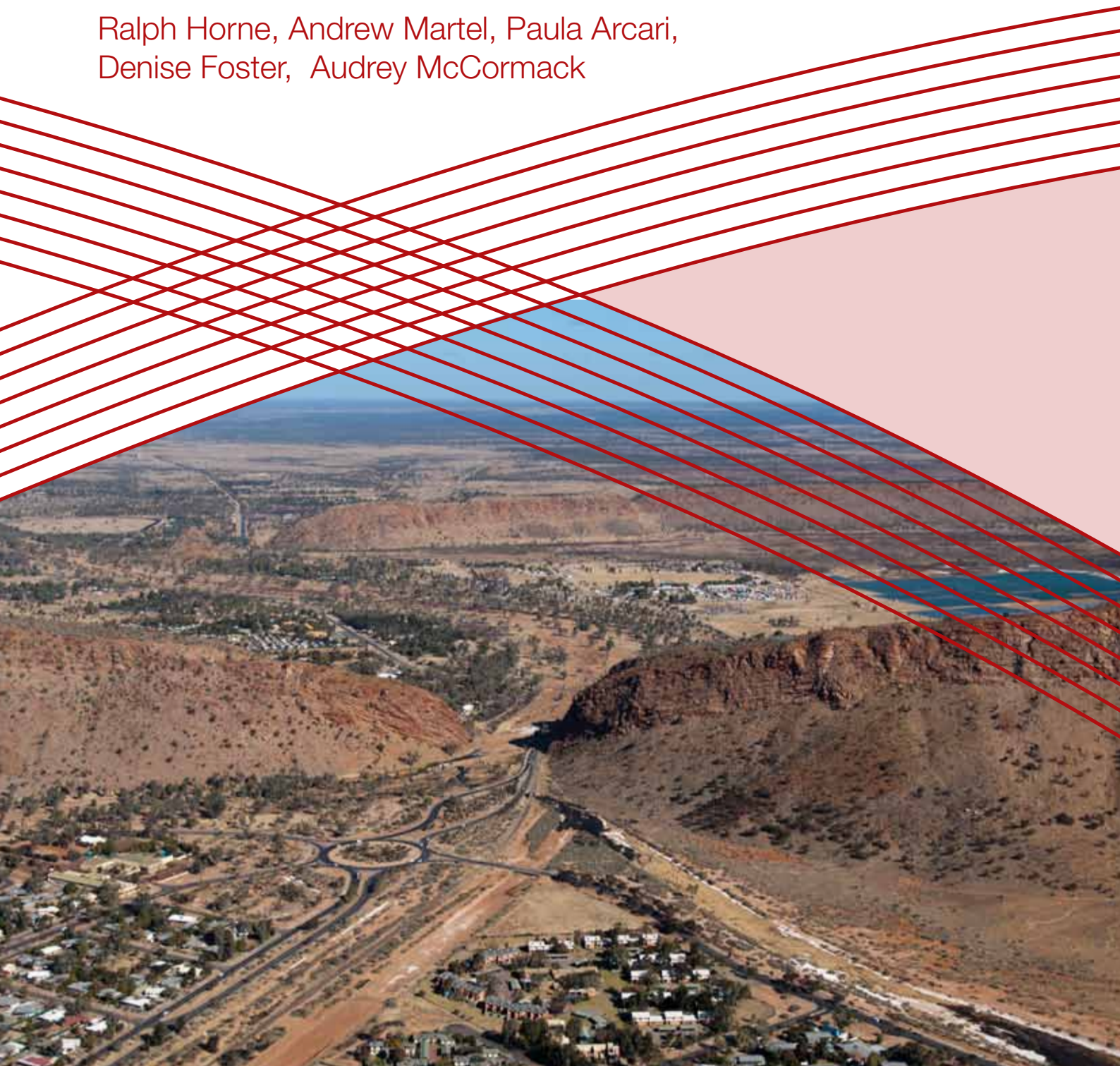


Living change: adaptive housing responses to climate change in the town camps of Alice Springs

Final Report

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Disclaimer

The views expressed herein are not necessarily the views of the Commonwealth or NCCARF, and neither the Commonwealth nor NCCARF accept responsibility for information or advice contained herein.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	3
2. BACKGROUND.....	4
2.1 Housing in Aboriginal communities	4
2.1.1 <i>The case of Alice Springs' town camps</i>	5
2.2 Housing and climate change in central Australia.....	7
2.3 Previous studies of the town camps of Alice Springs	9
2.3.1 <i>Energy audits</i>	9
2.3.2 <i>Tenancy management</i>	12
2.3.3 <i>Post Occupancy Evaluations</i>	12
2.3.4 <i>Some comments regarding the previous studies</i>	14
3. A SOCIAL PRACTICE APPROACH AND METHOD	15
4. PROJECT OUTLINE	17
4.1 Preparing and conducting the interviews.....	17
4.2 Interview breakdown by category.....	20
5. RESULTS	22
5.1 The practice of dealing with the heat.....	22
5.1.1 <i>Existing (stable or maintained) practice variants</i>	22
5.1.2 <i>Materials</i>	23
5.1.3 <i>Practical knowledge</i>	24
5.1.4 <i>Common understandings</i>	25
5.1.5 <i>Rules</i>	26
5.1.6 <i>Bundled practices</i>	29
5.2 The practice of dealing with the cold	30
5.2.1 <i>Existing practice variants</i>	30
5.2.2 <i>Materials</i>	31
5.2.3 <i>Practical knowledge</i>	32
5.2.4 <i>Common understandings</i>	33
5.2.5 <i>Rules</i>	33
5.2.6 <i>Bundling of practices</i>	35
5.3 Extreme weather events and their consequences.....	36
6. DISCUSSION	38
6.1 Adaptive capacity of the town camp residents.....	38
6.2 Tenancy management, housing design and climate change adaptation.....	41

6.3 A note on conducting interviews in the town camps	44
7. CONCLUSION AND RECOMMENDATIONS	46
REFERENCES	48
APPENDIX A: QUESTIONNAIRES	50
Town camp resident survey questionnaire	50
Town camp resident survey questionnaire (visitors)	51
Tenancy Management questionnaire	52
APPENDIX B: RESEARCH INFORMATION FLYER.....	54

List of tables

<i>Table 1: Alice Spring's predicted temperature and humidity change (Wang 2010:1667)</i>	<i>8</i>
<i>Table 2: Alice Spring's Town camp new and refurbished house numbers (Tangentyere Council). SIHIP - Strategic Indigenous Housing and Infrastructure Program; TC - Tangentyere Council.....</i>	<i>19</i>
<i>Table 3: Town Camp interview breakdown (Stage 1).....</i>	<i>20</i>
<i>Table 4: Language Groups of town camp interviewees</i>	<i>20</i>
<i>Table 5: Age Groups of town camp interviewees</i>	<i>21</i>
<i>Table 6: House Types of town camp interviewees. SIHIP - Strategic Indigenous Housing and Infrastructure Program</i>	<i>21</i>
<i>Table 7: Location of follow-up (stage 2) interviews.....</i>	<i>21</i>

List of figures

<i>Figure 1: Alice Springs prescribed areas (town camps).....</i>	<i>5</i>
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EXECUTIVE SUMMARY

This project focussed upon adaptive housing responses to climate change in the town camps of Alice Springs. It particularly examined household practices of staying cool and keeping warm in the context of increasing extremes of temperatures and climate.

In a departure from several other studies that concentrated on actively changing the behaviour of household residents or assessing occupant satisfaction with how houses performed, in this project the concern was on identifying the various elements of social practices. These elements include housing hardware (the physical house and appliances), management regimes, skills and knowledge, rules and common understandings.

Instead of starting with human behaviour as the driver of responses to hot and cold conditions, the project takes a starting point where the practices of keeping cool and warm are the central focus. Thus, instead of asking the question “How can we change the cooling behaviour of householders”, we ask “What shapes the practices of keeping cool?” Of course, people will have a variety of things that they do when it is hot (in this report these are referred to as ‘practice variants’ of the practice of ‘keeping cool’), and the practices change over time. Changes to any of the four elements mentioned above may modify how a practice is performed, and hence changed. Moreover practices are often connected to others (or ‘bundled’), so changes in a particular practice may cascade into multiple changes across other practices. This has implications for household (and community) resilience and vulnerability to changed circumstances.

The research found that town camp residents involved in the study deal with heat and cold in a diverse variety of ways. Diversity is widely regarded as a sign of adaptive capacity. Town camp residents retain variants of previous practice and embrace new practice variants, which have emerged since refurbishment and provision of new housing over the couple of years prior to the study. Town camp residents have many experiences of dealing with extreme weather events, and are (at least) bilingual, bi-cultural, and have strong cultural identities in Indigenous practice while participating in ‘mainstream’ economic and social life in Alice Springs and throughout Australia. As such, the town campers are well placed to adapt to changing circumstances, including changing climate conditions. However, that capacity is jeopardised by poverty and both chronic and periodic overcrowding, which remains an entrenched problem and cause of community stress, so adaptive practices need to be actively monitored and nurtured. The emerging tenancy management regime is partially supporting tenant initiated sustainable living practices and there is a need for further work in this regard, as indicated in the recommendations emerging from this research.

The full list of recommendations is detailed in section 7. The research highlighted the need to extend the focus of housing providers beyond the delivery and preservation of houses, and to extend community education programs beyond a focus on behaviours around protecting houses and using appliances efficiently. Programs should recognise what shapes how people do things in and around the home. The house is only one element that informs practices and effective adaptation to changed conditions requires accounting for all elements.

The research also underlines the importance for housing providers to know and understand how town camp residents use power and water in their daily lives. Electricity is an essential,

yet scarce and costly commodity within the camps. Changes to the physical makeup of the houses and the appliances that they contain must be considered in the context of total household energy use. The same principle applies to water usage. It is important that the promotion of efficient energy and water use (using less of a scarce resource) does not compromise existing healthy practices unintentionally, or stifle new ones from emerging.

The report also recommends that specific responsibility for climate adaptation planning and resourcing should be assigned and plans and actions instituted to equip town campers with ongoing climate adaptive capacity.

1. INTRODUCTION

This project was funded under the Adaptation Research Grants Program (ARGP) in the Indigenous Communities Research stream, and was a partnership between researchers from RMIT University and the Tangentyere Research Hub.

The project aim was to examine the extent to which current practices related to maintaining comfort levels in households were adapting to the changing physical and climatic environmental conditions in the town camps of Alice Springs. A focus on social practices was intended to provide an alternative framework for community groups, service providers and housing management organisations to conceptualise potential town camp resilience and vulnerability to climate change. In a departure from several other studies (discussed in section 2), that focussed on changing the behaviour of household residents or assessing occupant satisfaction with housing performance, in this project the focus was on identifying the various elements of practices relating to keeping warm and cool in town camp households. These elements include housing hardware, management regimes, and the knowledge and preferences of the town camp residents.

The project had three overarching research objectives:

1. To identify current adaptive practices of residents in newly provided or refurbished houses in selected Alice Springs town camps in relation to comfort and healthy-living practices, and to examine resident vulnerabilities to climate change, including changed weather patterns and rising energy and water costs.
2. To identify tenancy management regimes that increase or reduce vulnerabilities to climate change scenarios for town camp residents and investigate the integration of tenant initiated sustainable living practices into ongoing tenancy management and future public housing design guidelines.
3. To build the existing research capacity of the Tangentyere Research Hub in energy and water use studies, and sustainable design using technical and social practice research, and to build the experience of the RMIT researchers in conducting interview based surveys of Indigenous households.

2. BACKGROUND

2.1 *Housing in Aboriginal communities*

Aboriginal housing design is a specialised field within housing studies due to the need to incorporate an understanding of cultural differences in Aboriginal domiciliary behaviour (Memmott, 1989:115). Housing for Indigenous people living in regional and remote Australia has been long characterised by an acute shortage of dwellings, poor quality construction, and a building stock ill-suited to Indigenous lifestyles and preferences. Rapid population growth, short housing stock lifetimes, and rising construction costs have meant that efforts to limit overcrowding and provide healthy living environments for Indigenous people have been difficult for governments to achieve. However, in the nearly half century since the 1967 referendum that formally recognised Aboriginal people in the census, many aspects of Indigenous housing, in particular culturally specific living practices and preferences of Aboriginal residents, have been observed and acknowledged in the design and management of Indigenous dwellings. This has included the study of traditional Indigenous dwellings, traditional socio-spatial properties of Indigenous settlements, the composition of Indigenous 'households', housing and health, and the use of inside and outside domestic space (Memmott 1988, Ross 1987, Heppell 1979, Heppell and Wigley 1981, Pholeros 1993).

Whether it is a 1970s era transitional one-room, metal skinned house or a contemporary three bedroom concrete one, Western style housing imposes conditions on Indigenous residents that hinder the performance of some traditional cultural practices, while assisting others. If the act of adjusting to living in a particular house strains traditional relationships and practices, then severe stress can result (Memmott 1988, Reser 1979, Ross 1987). As Ross noted, 'Inappropriate housing and town planning have the capacity to disrupt social organisation, the mechanisms for maintaining smooth social relations, and support networks' (Ross: 1987:6). Memmott (1988:34) lists the stress factors around housing for Indigenous people as including: lack of protection from the weather, living in squalor, overcrowding, alcoholism, domestic violence, wide-spread ill-health, insecurity from temporary tenure, and the threat of forced eviction. Many of these conditions continue to impact on Indigenous housing.

Practices that are particular to some (but not all) Indigenous cultural groups include the temporary abandonment of a house following a death, avoidance relationships between some family members, a lack of emphasis on personal possessions compared to communal ones, high mobility between dwellings, and a high number of 'visitors' that must be accommodated due to traditional kinship relationships (Hamilton 1972, quoted in Memmott 1988:36-37). In addition, it has been noted that in many early Aboriginal dwellings the provision of shelter and of facilities were separated. In terms of shelter, a dwelling must keep out elements like rain, wind, dust, heat and cold, while facilitating warmth, breezes, and visual connections. This can be accomplished either in-house (a room), near-house (a verandah), or external to the house (a tree, for example). Facilities include water, toilets, showers, electricity, gas, wood, kitchens, laundries, stoves, washing-machines, and fans (Ross 1987:104). Where provided, these have often been co-located in western-style dwellings and/or regarded as communal facilities.

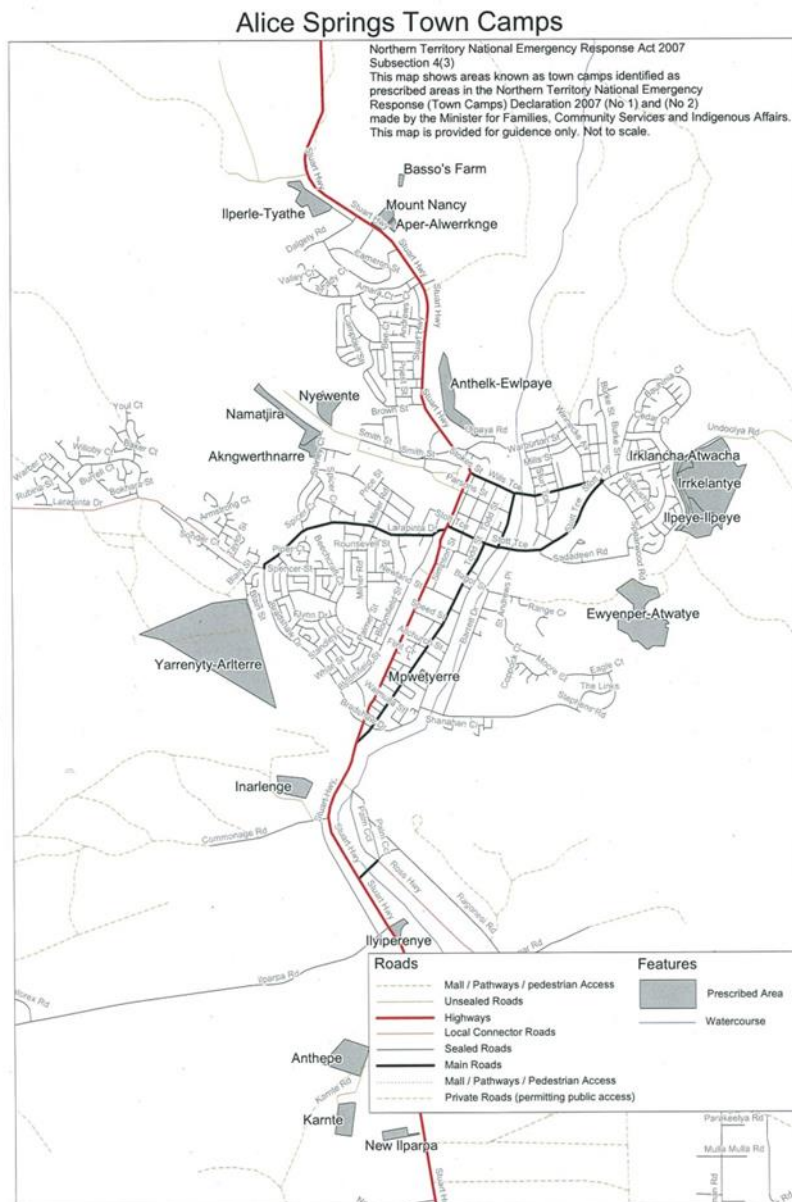


Figure 1: Alice Springs prescribed areas (town camps)

Source: www.fahcsia.gov.au. © Commonwealth of Australia 2012

2.1.1 The case of Alice Springs' town camps

The town camps of Alice Springs have existed in some form or other since the establishment of Alice Springs itself (then called Stuart) in the late 19th century (Heppell and Wigley, 1981:6). However, considerable efforts were made by the local (white) population, supported by various levels of government, to ensure that the camps were not made permanent (Rowley 1970, Heppell and Wigley 1981). This ensured that for over a century the camps were denied land tenure, water, electricity, and sanitation services. Despite this, Indigenous people continued to occupy discrete parcels of land, and although highly variable, establish a core of permanent residents around Alice Springs. Alice Springs developed as an

important centre for Aboriginal people from the outlying areas of the central desert region of Australia, with people coming to town to visit relatives, for employment, to receive medical treatment, attend to government or police business, and for shopping and recreation (Heppell and Wigley, 1981). With accommodation options within the town of Alice Springs proper severely limited and restricted, these visitors had little option but to stay with relatives and friends in the town camps. Visitor numbers can swell the permanent town camp population by up to 50% (Heppell and Wigley 1981:51, Foster 2005:33).

Greater certainty of tenure began to emerge following the 1967 referendum and a change in Commonwealth policies in the early 1970s. By the late 1970s, 12 town camps had applied for leaseholds over the land they occupied, and the 5 year period from 1977 to 1982 saw a considerable expansion of house construction and social services on the camps (Heppell and Wigley 1981, Coughlin 1991). Critical to this was the establishment in 1977 of the Indigenous run organisation, the Tangatjira Council (later renamed Tangentyere Council), set up to represent the various town camps. Tangentyere Council would become responsible for land tenure, shelter and essential services, building maintenance and management, education, training, employment and income security (Coughlin 1991: xci). By 1989, 16 town camps had been granted leaseholds, and the current (2012) number is 18 'official' town camps (with the existence of at least 2 unofficial camps).

The Aboriginal population in Alice Springs is a heterogeneous one, with significant differences between the various camps and groups of people. Each camp is a small community, substantially made up of residents connected by ties of friendship, kinship and common language. Traditional ties, customs, and laws are strong, as is the association with 'traditional' land or country. Residents of a town camp identify as members of a group with shared mutual interests and responsibilities (Heppell and Wigley, 1981:51). Camps are mostly geographically orientated towards traditional lands, with camps on the west, east, north and south of central Alice Springs reflecting the direction of the traditional lands of the residents. The original dwellings on the town camps were self-built from variously sourced materials, or consisted of small numbers of tents or caravans, and while often lacking in protection and amenity, they reflected traditional Aboriginal spatial settlement patterns (including specific areas for single people, for example), and could respond to changing weather conditions. As Wigley noted, 'One of the most important factors is that the structures are built in such a way that they can be quickly modified to suit prevailing conditions' (Heppell and Wigley, 1981:57). As the building of permanent houses and infrastructure has developed since the 1980s, the structure of the town camps has modified and become more conventionally planned. However, the role of Tangentyere Council and its architectural arm has ensured that considerable effort was put into designing house types that accommodated local Aboriginal preferences for living (see Memmott, 1989). Most recently, the town camp leases have been 'leased back' to the Commonwealth Government, through the Office of Township Leasing, in return for new houses, renovations and refurbishments to existing houses, and a shift from a community housing management program to a 'mainstreamed' public housing program (Commonwealth Ombudsman, 2012:6).

Currently, there are 284 houses in the 18 official town camps, with a population estimated to be between 2,000 and 3,000 permanent residents and visitors (Tangentyere Council *pers. comms.*, Foster 2005).

2.2 Housing and climate change in central Australia

The 2004 report, *Climate Change in the Northern Territory* (Hennessy, 2004), noted that the frequency of extremely warm days and nights has increased, while the frequency of extremely cool days and nights has decreased in the last half century. Since 1950, the Northern Territory's average annual maximum temperature has increased by 0.12 °C per decade and the minimum temperature by 0.17 °C per decade. The Northern Territory as a whole has become wetter since 1950, and annual heavy rain has also increased (that is, more heavy rain days), although this has occurred more in the Top End of the Territory. In the central regions, Alice Springs is expected to be drier in future (in both wet and dry seasons), and to see fewer frosts during winter (Hennessy, 2004).

The report noted that Alice Springs currently averages 90 days over 35 °C and 17 days over 40 °C. By 2030 that is expected to increase to between 96 and 125 days over 35 °C and to 21 to 43 days over 40 °C. By 2070, the increase is expected to be 110 to 194 days over 35 °C and to 31 to 111 days over 40 °C (Hennessy, 2004:34). Alice Springs currently has on average 23 'hot spells' (3 to 5 days over 35 °C in a row) per year. By 2030, this is expected to grow to between 25 to 33 over 35 °C hot spells, and up to 10 very hot (over 40 °C for 3 to 5 days) spells (Hennessy, 2004:35).

Two recent CSIRO reports (Wang, 2011; 2010), have examined the impact of predicted climate change effects on the performance of residential houses in Australia. The 2011 study assessed the energy reduction capacity (ERC) for residential houses in different climates throughout Australia. In heating dominated regions ERC is expected to increase (i.e. energy savings outweigh energy increases), but in cooling dominated regions, such as central Australia, ERC is expected to decline (that is, the capacity for energy reduction will decline). ERC represents the percentage of projected carbon emission reduction under changing climate conditions in a specific year relative to changes expected in a stationary climate. In terms of housing performance, recognised AccuRate star rating bands for Alice Springs are very similar to those of Melbourne (the star bands represent indicative energy use required to maintain comfort in a dwelling - the lower the energy use predicted, the higher the 'star rating' of the dwelling). The report predicts that a 3 °C increase in global temperature would see a 5 star rated house in Melbourne become a 6 star house, while a 5 star rated house in Alice Springs would become a 3 star house. In addition, a 2 °C rise in global temperature may reduce carbon emissions by 25% in Hobart and, 22% in Melbourne, but increase emissions by 68% in Darwin and 49% in Alice Springs (and 76% in Sydney) (Wang, 2011:876). As carbon emissions in central Australia relate to energy consumption for comfort control, global warming is predicted to make housing more expensive (or more uncomfortable) for residents.

The 2010 CSIRO report, examines the potential impact of climate change on heating and cooling energy requirements of residential houses in five regional climates, under three carbon emission scenarios (A1F1, A1B, and 550ppm scenarios). It found that there is likely to be a significant climate change impact on household heating/cooling energy use within the lifespan of existing housing stock (Wang, 2010:1663).

The report found that the total heating/cooling energy requirement of a new 5 star house was projected to vary significantly in the range of -26% to +101% by 2050 and -48% to 350% by 2100 given A1B, A1F1 and 550 ppm scenarios. The A1F1 scenario assumes very rapid

economic growth, global population peaking 2050, rapid introduction of new and more efficient technologies, substantial reduction in regional differences in per capita income, and intensive fossil energy consumption (high GHG emission scenario). The A1B scenario is similar to A1F1 except balanced fossil and non-fossil energy consumption is assumed (medium GHG scenario), and the 550 ppm scenario assumes that the CO₂ peak atmospheric level has already occurred (low GHG scenario). Houses in a balanced H/C zone (requiring equal amounts of heating and cooling, e.g. Sydney) were found to be most sensitive to global temperature change. The report noted that in general, more energy efficient houses may be more resilient to absolute changes in equivalent energy demand, although overall percentage change would be higher for less efficient dwellings (Wang, 2010:1670).

Regional electricity demand is closely correlated to Heating Degree Days (HDD) and Cooling Degree Days (CDD). Alice Springs is predicted to see average temperature rises, a fall in relative humidity, but no change in solar radiation levels (see Table 1 below).

Table 1: Alice Spring’s predicted temperature and humidity change

		2050	2100
Temperature °C	A1F1	2.5	5.9
	A1B	2	4
	550ppm	1.8	2.8
Humidity %	A1F1	-2%	-4%
	A1B	-1.8%	-3%
	550ppm	-1.5%	-2%

Source: Wang 2010:1667

Housing in Alice Springs invariably requires both heating and cooling although the latter dominates the overall predicted energy use. In cooling dominated areas such as Alice Springs, the increase in cooling load is much more than the decrease in heating load, resulting in a significant increase in heating/cooling requirements (of between 61% and 101% to 2050 and 112% to 350% by 2100). The CSIRO report predicts that heating reduction in Alice Springs associated with a global temperature rise of 3 °C would equal 30 MJ/m² (and for a 6 °C change, 40 MJ/m²). However, the corresponding cooling increase for global temperature rise of 3 °C would be 200 MJ/m² (and for 6 °C change, 500 MJ/m²). In Melbourne, a 6 °C global temperature increase, would see a heat decrease of 100 MJ/m² and a cooling increase 120 MJ/m² (Wang, 2010:1677). In Alice Springs it is predicted that the change in total energy requirement for a 3 °C temperature rise is 120 MJ/m², with a 6 °C equal to an extra 320 MJ/m² (Wang, 2010:1677).

Predicted changes to energy consumption are of course averages, and every individual household will demonstrate a different energy use profile that reflects occupancy levels, age profiles, types of household appliances and so on. However, the predictions clearly indicate

that maintaining indoor domestic comfort in Alice Springs is likely to become increasingly difficult or expensive in terms of energy and water consumption.

2.3 Previous studies of the town camps of Alice Springs

Previous studies have examined aspects of power and water usage, energy efficiency, and tenant satisfaction with housing performance (post occupancy evaluations, POE), in discrete Indigenous communities. In this section, six recent examples of energy audit studies, tenancy management, and POE-type studies are briefly described. The intention here is to highlight the primary aims of the studies which focus on promoting efficient use of scarce resources, education programs, and determining levels of user satisfaction with physical housing assets, and to provide a context for the social practice based approach of the Living Change project.

2.3.1 Energy audits

2.3.1.1 Tangentyere Energy Efficiency Study, 2011

This study was conducted jointly by the Tangentyere Research Hub and Bushlight (Centre for Appropriate Technology) over six months in the first half of 2010. The study combined a post-occupancy evaluation of the 2009 Thermal Efficiency Project that refurbished (or 'upgraded') 100 houses in various town camps, with a community education program (with assistance from Bushlight). The upgrades included the installation of:

- Evaporative air conditioning (known as 'swampies')
- Radiant Panel heating on the ceilings of habitable rooms
- One shot booster solar hot water switches
- Timer switches
- External shading
- Window and door renovations
- Compact fluorescent lighting

The education component included the production of an illustrated "Energy saving tips for our home" Residents guide. The study undertook 48 household surveys across 11 town camps over 5 months in 2010 (Box 1 shows an excerpt of questions from the survey). Most of the surveys (37 of 48) covered upgraded dwellings, with the rest un-refurbished. The key findings of the report were:

- Before the houses were upgraded they were generally perceived by the occupants to have poor thermal performance and were uncomfortable
- After the houses were upgraded they were perceived to have improved thermal performance and were more comfortable
- Town campers were not completely satisfied with the thermal efficiency upgrades
- Town campers found it easy to adjust to the new thermal efficiency upgrades
- Town campers will continue to use a mix of energy sources and appliances to keep warm and cool
- After the thermal efficiency upgrades, 32% of households reported spending less on electricity

Most of the criticisms of the housing upgrades were unrelated to thermal efficiency (e.g. 27% were unhappy with the kitchen cupboards and cutlery storage).

The study also noted the number and type of electrical appliances in residents' homes.

Box 1: Examples of questions from Tangentyere Energy Efficiency Study: June 2011

How do you keep warm in winter? *tick boxes for answers*

- a. bar heater, b. open fire outside, c. fan heater, d. stove/oven, e. blankets only, f. new ceiling heaters, g. other

In general, what is your house like in winter? *Comment*

How do you keep cool in summer? *Tick boxes*

- a. new air conditioner, b. ceiling fan, c. stand-up fan, d. sleep out, f. sleeping outside, g. other

In general, what's your house like in summer? *Comment*

How do you feel about the new renovations? *Comment*

What do you like? *Tick boxes*

- a. swampy air con., b. new heaters, c. door stoppers, d. stove timer, e. new windows, f. hot water boosters, g. window blinds, h. cladding on hot walls, i. kitchen cupboards

What do you not like? *Tick boxes*

- a. swampy air con., b. new heaters, c. door stoppers, d. stove timer, e. new windows, f. hot water boosters, g. window blinds, h. cladding on hot walls, i. kitchen cupboards

2.3.1.2 CoolMob (Darwin) post audit survey, 2010

DesertSmart CoolMob is a joint initiative of the Arid Lands Environment Centre (ALEC) and Power and Water Corporation (PWC) and has offices in Darwin and Alice Springs.

CoolMob's mission statement is: "To help and inspire our community to live sustainably and reduce their greenhouse gas emissions". CoolMob began in 2001 and is currently funded until 2014. In 2010 CoolMob conducted a qualitative 'Audited Household's Phone Survey' (based around Indigenous households that they had previously energy audited in the Darwin area). 70 houses were surveyed and asked (in relation to their audit):

1. Did they change anything?
2. What was most effective?
3. Were there any barriers to changing behaviour?

CoolMob also acquired pre- and post-audit energy consumption data from Power and Water Corporation. In summary, while the survey found that most houses had reduced their energy usage (by around 2 kw/h per day), it also noted that that many respondents recalled the

auditor's suggestions but did not 'do them'. Reported changes included an increased consciousness in 'turning stuff off', and having one or two members of the household committed to reducing energy use. However, households reported that they were educated by the audit process but that certain barriers existed that have prevented a full uptake of improved energy related practices. These included:

- the type of house (lightweight houses were able to reduce power more than houses with greater thermal mass)
- the type of householder (transient residents e.g. defence force personnel, had less motivation to change practices),
- the age or life phase of the occupants.

The survey found that the most significant 'change drivers' were money (income), the level of autonomy/agency (e.g. owner/renter etc.), investment in the dwelling (long or short term resident), and the residents' sensitivity to criticism from others. The most significant barriers to effective change drivers were found to be: the difficulty of changing habits, financial restrictions, locating solar hot water systems (especially for flats), the rental split-incentive, and a lack of trust in the quality of tradespeople.

2.3.1.3 WA Home Energy Efficiency Engagement Refit Program, 2011 This program was a collaboration between Horizon Energy, WA Department of Housing, and WA's Office of Energy. The project was an 'energy-efficient refit' of approximately 100 houses in five Aboriginal communities in the Kimberley region (with plans for a total of 300 refits in 11 communities). The refits included:

- Installing roof insulation
- Installing or repairing solar hot water systems
- Installing Low flow water devices
- Providing external shading to walls
- Installing energy efficient appliances
- Providing educational materials to community members

The project developed out of a 2009 audit of electricity use of 440 houses in remote and town based Indigenous communities in WA. Horizon Power compiled a report with recommendations of cost effective upgrades for each house. The Energy Efficiency Program involved training opportunities for local community residents (employed by AWC Carey Training Workforce and Development), with 'up to' 20 trainees working towards Cert III in Civil Construction, taking part in the refits. Horizon estimates that with the refits and more efficient use practices, households could save around 20% on their energy costs (with fuel savings of \$400 a year).

Note: The authors of the Living Change report were unable to view the full Horizon report due to confidentiality concerns.

2.3.2 Tenancy management

2.3.2.1 *Maintaining Houses for Better Health (MHBH), 2011A* project run in conjunction with Tangentyere Council and the Central Australian Affordable Housing Company, the MHBH had two primary aims:

1. The development of a working model of a 'systems' approach to sustainable repair and maintenance program.
2. Increased potential for capacity development of Indigenous housing service providers by improving the development of their employees.

The program aimed to develop a tenancy management database that integrates the survey/audit process (data collection), the practical day-to-day operations of housing repair and maintenance, quality assurance, and the analysis and reporting functions into one program.

The focus was on developing 'workflow' processes that are consistent and repetitive to make the software match the job (task analysis). This is essentially a development of the Building Homes for Better Health (BHBH) approach into regular (as opposed to emergency) maintenance. The program was developed and field tested simultaneously.

The developer stated that: "there is a multitude of property management software products on the market. Our contribution is the establishment of some criteria for measuring the 'function' of the services required from a house i.e. 'the healthy living practices'." That is, the concern is not with the 'asset' *per se*, but the healthy living practices of the tenants of that 'asset'.

2.3.3 Post Occupancy Evaluations

2.3.3.1 *Living Spaces: An evaluation of housing in remote Aboriginal communities, 2000*The Living Spaces report by The Architects Studio was a post-occupancy evaluation of ten remote Indigenous communities in both the NT and SA (five from the Top End and five from central Australia) that had received houses through the National Aboriginal Health Strategy (NAHS) or Indigenous Housing Authority of NT (IHANT) funding sources. The communities were: (Top End) Wadeye, Nguiu, Waruwi, Galiwin'ku, Ngukurr, and (Central Aust.): Tennant Creek, Lajamanu, Nyirripi, Papunya, and an 'un-named community'.

The study included technical evaluation by the Architect Studio members, economic evaluation (by Rawlinsons), and social evaluation (by Memmott and Associates). The houses selected had been occupied for a minimum of one and a maximum of four years. Technical problems (weather related, bureaucratic and social (funerals)), meant that only six communities of the ten were surveyed and 33 houses visited. In addition, eight community staff members were interviewed.

The survey contained five categories of questions relating to the:

1. Household size and density (including family relationships)
2. Sufficiency of designed spaces (inside and outside)
3. Comfort and climate control
4. What do you like/dislike about the houses

5. Overall satisfaction.

From the survey responses, 18 housing issues emerged:

1. The need to accommodate large households (bedrooms/bathrooms)
2. The need for bedrooms to be an adequate size for large, complex families
3. The need to locate bathrooms and toilets correctly with respect to the other house spaces
4. Living rooms need to be correctly planned/designed
5. Hallways need to be adequate for comfortable circulation
6. Toilets, bathrooms and laundries might not be wanted outside
7. The need to consider separating the kitchen from the rest of the house
8. Adequate design required for external visual surveillance
9. Appropriate building location and orientation
10. Climate protection to verandas
11. Verandas need to be of sufficient size and shape for large households
12. Privacy considerations in verandah design
13. Adequate storage facilities in appropriate locations in the house
14. Minimising damage to locks and latches on doors
15. Need for adequate wet-weather clothes drying facilities
16. Adequate planning required for outdoor cooking and socialising
17. Adequate accommodation for visitors
18. Graffiti on houses.

Box 2 below contains the section of the housing questionnaire that dealt with comfort and climate control issues.

Box 2: Comfort and climate related questions from Living Spaces, 2000

Question 9 of the survey examined Comfort and climate performance (in four parts):

1. In the dry season, is the house too hot? If so, how might this be fixed?

Typical answers: *Yes, not enough air in the house: The house gets hot inside when you cook in the kitchen: OK it is not hot in the dry time*

2. In the cold time, is the house too cold? If so, how might this be fixed?

Typical answers: *In June and July it is cold, but they just make a fire and sit outside: The bedrooms get cold in the winter: June/July make fire outside and stand around it*

3. Which direction do the winds come from? Are there any draughts?

Typical answer: *The south and east:*

4. Does the house leak when it rains? What about during heavy storms or cyclones?

Typical answers: *No leaks, but windblown rain comes under back door: Water leaks through verandah roof: Wet time, when it is windy and rainy the verandah gets wet*

2.3.3

2012

Researchers from the Centre for Appropriate Technology were engaged by Tangentyere Council to conduct a post occupancy review of the recent Strategic Indigenous Housing and Infrastructure Program (SIHIP) construction activity in the town camps. The

Stage 1 report (June 2012) was intended to provide baseline data to anchor a more in depth longitudinal study (the Stage 2 report, due June 2013).

The initial report found that the newly constructed houses were in 'reasonable condition', with the exception of some wall finishes, screen doors and external lighting, and that the residents found them functional, safe and 'easy to clean' (around 85% of the occupants 'felt good' about their houses). Residents of refurbished and rebuilt houses also reported being satisfied with the new state of their dwellings. The major area of dissatisfaction concerned the state of the yards surrounding houses and the relative lack of storage space inside dwellings (most particularly in the kitchen).

The survey did not specifically inquire about comfort levels related to climate conditions in the new or refurbished dwellings, and the subject did not 'spontaneously' come through in responses to questions about housing satisfaction ("What do you like/dislike in your new house?"). A couple of households commented that their sleep-outs (external, semi-sheltered sleeping areas) were too dusty in summer and too cold in winter, and 'not suitable for this climate', but no mention was made of the climate suitability of the houses themselves.

2.3.4 Some comments regarding the previous studies

The studies and projects briefly outlined above represent examples of research in Indigenous communities that have explicitly attempted to engage directly with Indigenous tenants in culturally appropriate ways. The studies have involved Indigenous researchers and local community members and representatives wherever possible, and there has been an emphasis on providing practical assistance in conjunction with collecting data. As such, these projects represent best practice research in Indigenous communities. They also focus attention on the physical house, rather than the practices that occur within and around the house.

Hence, the questions put to households tend to reflect this focus on physical aspects of dwellings, as indicated in the following examples (emphasis added),

- "In general what is your **house** like in summer?" from the Tangentyere Energy Efficiency study,
- "Is your **house** too hot?" from the Living Spaces study and,
- "What do you like/dislike in your new **house**?" from the latest Tangentyere/CAT POE.

In the next section of this report, the rationale behind the 'social practice' approach, where the focus is on "What do you **do** to keep cool?" is outlined.

3. A SOCIAL PRACTICE APPROACH AND METHOD

This project approaches dealing with hot and cold weather and adaptation to changing climate from the perspective of the householder experience. Specifically, in order to investigate responses to hot and cold weather, the project starts with an understanding of current social practice of keeping cool or warm. The ways in which some practices are maintained over time, some are modified, new ones emerge, and still others fade away, has implications for community and household adaptation in the face of changing environmental and climatic conditions.

What are social practices? They have been defined variously as ‘a routinized type of behaviour’ (Reckwitz, 2002), and a ‘temporally and spatially dispersed nexus of doings and sayings’ (Schatzki, 1996). In simplified terms, a practice is both an entity in itself, a specific thing that exists in a society, such as the practice of driving a car, and something that is performed by an individual (a ‘carrier’ of a practice), where a person performs the act of driving a car. A practice can exist for a time without being performed by a carrier, whether in the minds of potential carriers or stored as instructions in books or on-line, but to be active and influential, a practice must ‘capture’ carriers willing to repeatedly perform the practice. However, carriers of practices are often unreliable. That is, people will modify how practices are performed through changed circumstances, personal preference or caprice, and if enough carriers modify how a practice is performed then that practice is changed. What happens in a society is not fixed, but is continually reproduced by doing, and in that reproduction may change if circumstances change (Shove, 2012).

Social practice theorists posit at least three primary elements that shape social practice form and take-up: material settings of the practice; skills and knowledge required to ‘do’ the practice, and; rules and common understandings about how a practice should be done. Recent studies of household resource use that adopt a social practices perspective further divide the latter into two categories (see Strengers 2011, Maller 2011, and Sofoulis 2005). In order to emphasise the differences between what ‘must’ be done and what ‘should’ be done, in terms of the practices the project is concerned with in the town camps, this expanded four-element structure is used:

1. Materials; the physical things around us. In housing terms, these would include the form of the dwellings, services, appliances, furniture and so on.
2. Rules; the things that must be done (or that must not be done). These are generally imposed upon people rather than stemming internally, as with rules for driving like speed limits, and the wearing of seatbelts.
3. Practical knowledge; the technical knowhow and skill required to perform a particular practice (not everyone can text in Finnish, even if they owned a mobile phone with a Finnish language keyboard).
4. Common understandings; these are the set of understandings about cultural practices that people consider to be ‘normal’ or common to a particular social group. An often unspoken assumption about ‘what people like me, do’ in different situations.

Changes to any of these elements may modify how a practice is performed, and hence change the profile of that practice. Moreover as practices, particularly those performed within

a household, are often connected to other practices (or 'bundled'), changes in a particular practice may cascade into multiple changes across a series of practices (Shove, 2012).

Social practices also overlap and compete with each other. In terms of the scope of this project, only those practices performed within the town camp households that relate to 'comfort practices' are examined, although in the discussion section other practices that are 'bundled' with comfort practices are identified as additional elements that may influence or be part of several different practices.

Drawing extensively on the experience of the Tangentyere researchers, the primary aim of interviews with householders is to gain some insight into their current comfort-related practices, to ascertain the extent to which these have changed, and in response to what, such as changes to the components of their dwellings (materials). Also important is to explore the role of tenancy management in constituting these practices, particularly where this concerns responsibilities (rules, and common understandings), and where they lie.

Interviews were also conducted with service providers in order to establish the network of relationships between the different tenancy management providers, Territory Government, Tangentyere Council and the town camp residents, particularly in relation to where responsibility lies in comfort-related areas of tenancy management. For example, is comfort something that can be provided? Is climate change an issue for Tenancy Management? What are the feedback pathways for resident concerns? Are there strategies in place designed to promote community resilience and what form do these take?

When examining the housing management framework on the town camps, a focus for this project is on the social practices of keeping cool and warm. For example, the reporting of faults or breakdowns, along with tenancy management rules and repair and maintenance strategies all form part of household comfort practices.

In addition to utilising social practice theory to frame household responses to comfort in a changing climate, the project also sought householders' views and experiences of other extreme weather events, such as storms and floods. Since these are not regular occurrences the responses are not regarded as social practices, and so are documented separately in section 5.3.

4. PROJECT OUTLINE

The project was jointly conducted by researchers from RMIT and the Tangentyere Research Hub, over a 12 month period from January to December 2012. Primary data was collected in two interview periods, in May and September (see below). In addition, the combined research team met in Alice Springs and Melbourne on several occasions over the year. As noted in the introduction, the primary focus and scope of the project was to investigate the social practices active amongst the town camp residents that related to dealing with the heat and the cold when they were at home, and the role of tenancy management procedures in constituting those practices. This was against a backdrop where the town camps of Alice Springs had recently experienced a significant program of new housing and infrastructure construction (see Table 2), as well as the refurbishment and upgrading of existing housing stock. As a consequence, the residents were now living in either new houses, or houses that have had improvements to their general condition (including new safety screens for doors and windows, for example), and new appliances installed (such as air conditioners). In addition, the residents are now formally public housing tenants of the Northern Territory Government, and are subject to a changed set of tenancy management rules and guidelines.

4.1 *Preparing and conducting the interviews*

A series of questionnaires was developed for town camp residents, tenancy and property managers from the Central Australian Affordable Housing Company (CAAHC) and management from Territory Housing (see appendix). The questionnaire for residents concentrated on engaging people to tell their stories about what they did to achieve comfort during periods of hot or cold weather. The interviewees were encouraged to use their own words in describing the various practices performed in their households, and to reflect on the reasons behind the preference for those practices. The interviewees were also asked to reflect on the effect that past extreme weather events had had on them, and on their feelings about the current tenancy arrangements (including options for reporting faults) and the state of their house. The questionnaires for the town camp residents were developed initially by the RMIT research team and then workshopped with the Tangentyere researchers, with a focus on question clarity and appropriate word choice. An additional focus was on encouraging participants to reflect on why they did things, not simply recording what they did.

From the point of view of the Tangentyere researchers (who were also themselves Indigenous and town camp residents), the development of the questionnaire seemed at first weird because it raised topics that were not normally talked about at home. But as the concepts 'sank in' or were considered, it was recognised that they were important because it affected them, their families, and their surroundings. It was therefore a considerable task to modify the questions to make them simpler for the researchers to read, understand and explain to other residents. The time allocated for the RMIT and Tangentyere researchers to workshop these questions together was an essential and valuable part of the project in this regard.

The interviews with tenancy and property management and Territory Housing concentrated on issues of responsibility for providing comfortable and healthy living conditions in town camp housing, the role of housing managers as 'change managers' responding to altering

environmental conditions (including the role of educational programs), and the ability of current practices to adapt to future circumstances.

As town camp residents are regularly confronted with many Government surveys on personal issues, including health, education, and alcohol policy, some residents were at first wary of the survey and its purpose. The Tangentyere researchers felt awkward discussing climate change with residents, as many of the residents thought it was a funny/strange question to ask, and would laugh about it. Interviewing residents on a very hot day was a further challenge, especially when several interviews at different camps were involved over the course of the day. There was some existing understanding about climate change, so residents were generally forthcoming with answers. Some interviews involving residents with low literacy were more time consuming as the Tangentyere researchers made sure that they understood the questions.

Interviews on the town camps were conducted in two stages, in May and September 2012. The first set of interviews was aimed at recruiting a broad cross-section of participants from different town camps, house types, language groups, age ranges and genders (Maxwell, 2005:88-89; Weiss, 1994:24). Tables 3 to 6 describe the breakdown of interviews according to these categories. The second set of interviews targeted a smaller group of a) full time working 'house-bosses' and b) visitors (although the actual interviews were conducted with 'house-bosses' on the visitors' behalf).

The composition of the second interview cohort was an attempt to recognise a weakness in the methodology of selecting interviewees in the first stage (Maxwell, 2005:89). The first suite of interviews represented town camp house bosses from a variety of different camps and circumstances; however the methodology of selecting interviewees meant that all participants were contacted at their homes between 10 am and 2 pm on week days. In an effort to stretch the interviewee profile, the second round of interviews targeted full time working house bosses on the one hand (taken as a proxy for residents confident in dealing with government), and visitors (non-residents) to houses on the other (taken as a proxy for a population with no direct control over their housing situation). Practicality and cultural sensitivities dictated that the 'visitor' interviews were in fact conducted with 'resident' house bosses, but with a modified questionnaire that focussed on the practices of non-residents within and around the household (see appendix, and some additional discussion in section 6.3). Table 7 indicates the number of stage 2 worker and visitor interviews conducted, and their associated town camp.

Flyers were delivered to town camps in the week prior to a visit by researchers, and interviewees selected based on their availability and willingness to take part. During the interview periods, most typically two RMIT researchers and two or three Tangentyere researchers would travel together by vehicle to the camps. Individual interviews were conducted by one RMIT researcher and one Tangentyere researcher, with the Tangentyere researcher asking questions and taking notes while the RMIT researcher observed and asked occasional follow-up questions. Around 20% of the town camp interviews were voice recorded. All interviews were initiated with a discussion regarding consent to be interviewed, the purpose of the survey, how data was to be kept, and how questions or complaints about the survey process could be made, in accordance with the ethics approval criteria for the project (RMIT Ethics/HREC/A03/12).

The interviews of personnel from the CAAHC and Territory Housing were conducted by the researchers from RMIT. These included interviews of manager, tenancy management officers, property management officers, and environmental health officers from the CAAHC, and a representative of senior management responsible for the Alice Springs town camps from Territory Housing.

Table 2: Alice Spring's Town camp new and refurbished house numbers (Tangentyere Council). SIHIP - Strategic Indigenous Housing and Infrastructure Program; TC - Tangentyere Council

No.	Name	Other Name	Houses prior to SIHIP work	New SIHIP houses	Housing upgrades SIHIP		Housing upgrades TC
					Rebuild	Refurb.	
1	Ilperle Tyathe	Warpiri	7	2	4	-	3
2	Aper-Alwerrkngge	Palmers	6	1	4	1	1
3	Itwiyethwenge	Basso's Farm	2	-	1	-	-
4	Mount Nancy		11	-	6	2	3
5	Anthelk-Ewlpaye	Charles Creek	21	-	9	7	4
6	Nyewente	Trucking Yards	19	7	8	6	5
7	Akngwertnarre	Morris Soak	10	5	5	2	5
8	Ewyenper-Atwatye	Hidden Valley	23	24	16	2	5
9	Yarrenyty-Arltere	Larapinta Valley	22	12	14	3	5
10	Anthepe	Drive In	8	7	2	3	3
11	Inarlenge	Little Sisters	13	9	6	2	5
12	Ilyperenye	Old Timers	8	1	2	1	4
13	Ilparpa		11	2	8	-	3
14	Mpwetyerre	Abbotts	6	-	3	-	3
15	Ilplye-Ilplye	Golder's	9	6	4	3	2
16	Karnte		12	7	6	-	6
17	Lhenpe Artnwe	Hoppy's	11	2	4	1	6
		Total	199	85	102	33	61

4.2 Interview breakdown by category

Table 3: Town Camp interview breakdown (Stage 1)

Town Camp	No. Interviewees	Male/Female
Nyewente (Trucking Yards)	4	1/3
Akngwertnarre (Morris Soak)	3	2/1
Karnte	3	0/3
Inarlenge (Little Sisters)	2	0/2
Lhenpe Artnwe (Hoppy's)	2	0/2
Anthelk-Ewlpaye (Charles Creek + Kunoth Block)	2	1/1
Ilparpa	2	1/1
Ilyperenye (Old Timers)	1	1/0
Yarrenyty-Arltere (Larapinta Valley)	2	1/1
Mount Nancy	2	0/2
White Gate	1	1/0
Ewyenper-Atwatye (Hidden Valley)	4	3/1
Total	28	11/17

Table 4: Language Groups of town camp interviewees

Language Group	No. Interviewees	Town Camps
Arrernte (Aranda)	14	Trucking Yards, White Gate, Hoppy's, Ilparpa, Morris Soak, Larapinta, Old Timers, Hidden Valley
Kaitish	2	Mount Nancy, Morris Soak
Walpiri	2	Kunoth Block (Charles Creek), Hidden Valley
Luritja	2	Karnte, Little Sisters
Pitjantjara	3	Karnte, Hidden Valley
Amatjira	1	Hoppy's
Yangkutjatar	1	Mount Nancy
Warramangu	1	Hidden Valley
Murindja	1	Little Sisters
Not recorded	1	Charles Creek

Table 5: Age Groups of town camp interviewees

Age Group	No. Interviewees	Town Camps
18-29	2	Trucking Yards
30-39	3	Hoppy's, Mount Nancy, Little Sisters
40-49	10	Trucking Yards, Hoppy's, Charles Creek, Morris Soak, Karnte, Larapinta, Hidden Valley
50-59	10	White Gate, Ilparpa, Old Timers, Karnte, Little Sisters, Larapinta, Mount Nancy, Hidden Valley
60+	3	Trucking Yards, Morris Soak

Table 6: House Types of town camp interviewees. SIHIP - Strategic Indigenous Housing and Infrastructure Program

House Type	No. Interviewees	Town Camps
New SIHIP	7	Ilparpa, Larapinta, Morris Soak, Little Sisters, Hidden Valley
SIHIP rebuild	9	Trucking Yards, Old Timers, Ilparpa, Karnte, Mount Nancy, Morris Soak, Larapinta, Hidden Valley
SIHIP refurbishment	1	Charles Creek
Tangentyere refurbishment	10	Trucking Yards, Hoppy's, Charles Creek, Karnte, Mount Nancy, Hidden Valley
Existing	1	White Gate

Table 7: Location of follow-up (stage 2) interviews

Interviewee Type	No. Interviewees	Town Camps
Visitor	4	Little Sisters, Old Timers, Hoppy's, Trucking Yards
Worker	3	Old Timers, Trucking Yards, Larapinta

5. RESULTS

The project investigated how town campers deal with hot and cold weather, through – practices that involved keeping cool and those that involved keeping warm. Within each, existing and emerging practices were noted, and discussions held on different aspects of household life that affected any of the four elements that influence practice emergence, modification and reproduction: material provision and maintenance, rules, practical knowledge and common understandings regarding keeping warm or cool. In addition, the project elicited accounts of dealing with other extreme weather events, responses, and their consequences (see section 5.3).

5.1 The practice of dealing with the heat

The practice of keeping cool in the town camps is evolving. A variety of ways of keeping cool (referred to as ‘practice variants’), were used by residents of the town camps, some of which appear to be stable (section 5.1.1) and others emerging/new. Themes from the interview materials are grouped under the most relevant of the four practice elements: materials; practical knowledge; common understandings and; rules (section 5.1.2 to 5.1.5).

The appearance of new or emerging practices impacts on other practices performed within a household as different practice variants can compete or complement one another; this linking of practices is referred to as ‘bundling’ and is examined in section 5.1.6.

5.1.1 Existing (stable or maintained) practice variants

A variety of practice variations related to keeping cool were used by the residents of the town camps. These included a mixture of active (that is, requiring the use of metered power), and passive practices, with passive cooling practices persisting alongside developing active practices.

‘So I still know how to keep cool without air conditioners or fans’ TC3

‘It didn’t worry us because we grew up without air conditioners and heaters’ TC4

The most commonly expressed continuing practice variant related to keeping cool was sitting outside and using shade from either trees or the house, in a position to catch any breezes. 30 of 31 respondents commented that they use this practice. Sitting outside in the shade was often conducted in small groups, indicating that the practice variant is related to the maintenance of social connections as well as comfort control. In particular, older town camp respondents emphasised the preference for keeping cool outside of a dwelling.

‘Outside is best, fresh air and the environment, swampies (air conditioner) not so effective with more people inside house’ TC10

‘We’d all sit out the back. Most town campers sit outside, you know in the backyard.’ TC37

‘Prefer being outside because you can feel the breeze, more comfortable. Also the air conditioner has a smell (not healthy)’ TC19

‘We use the air conditioner for very hot days but it can make you feel too cold.’

It's better to be outside' TC23

A common practice variant (noted by 20 of 31 respondents) that was linked or connected to using shade to stay cool was the hosing of the verandah and yard area with water. This helps reduce dust (a ubiquitous feature of town camp yards) and possibly adds some moisture (humidity) to the air around the areas where people sit. This practice variant links water use to passive, outdoor cooling techniques.

'We find a nice place to sit and hose (ground) around a shaded tree' TC3

'Wet the ground, no air conditioners

'No power only solar power at the ablution area' NB Whitegate – unofficial camp TC4

'Air conditioner broke so we just used the fan and hosed the ground down outside' TC9

Other techniques for keeping cool mentioned by the town camp respondents included sleeping outside (10 of 31), playing with water (5 of 31), taking cold showers (6 of 31), and visiting other locations, relative's houses that were cooler (3 of 31), public facilities such as the Alice Spring's swimming pool or local parks in the town centre (5 of 31).

'Sleep outside at night, sleep outside' TC12

'Go to families house sit down in the cool during the day and come home' TC3

'Swimming pool (small portable) for little kids' TC28

'We go up to town to the park and sit around until it gets cool and come home or take the kids to the pool' TC25

5.1.2 Materials

Emerging practices

Developing or emerging cooling practice variants overwhelmingly involved new housing hardware and active energy use, with the widespread uptake of the newly installed evaporative air conditioners (the swampies). Even where air conditioners use was not enthusiastically embraced (see above), it was noted as a counter-point to other 'better' and more 'traditional' practices.

'We use the air conditioner and use it all night' TC5

'Stay in the house with the air conditioner and fans' TC7

'Now use swampie (evaporative air conditioner), used to use portable air cooler' TC10

However, despite its widespread uptake (29 of 31 respondents said that they used the swampies at least sometimes), the narrative around air conditioner use was often conditional. The benefit of an effective indoor cooling mode for children was noted by the respondents, while at the same time being 'not for them' (6 of 31). For older respondents, air conditioner use raised the idea of a 'luxury' option for cooling (2 of 31). Perhaps related to this, cost concerns were also noted by 13 of 31 respondents (see section 5.1.6).

'Air conditioner more comfortable for daughter (2 years old), she gets uncomfortable if outside in the heat' TC15

'Before used to sit at another house as the last house did not have effective air conditioning Before (my) daughter, just used to hang around with cousins, didn't care much about the weather, more aware now with little daughter' TC15

'But air conditioner is good for the grandchildren (if they are only) on hot days' TC19

'Oh that humidity thing yes. That was a bit harsh for the kids in a way. For us it's all right, we can just sit back, but the kids they grubby and hot and want to have the air conditioner' TC9

'Used to all sit outside out back. Big space and verandah with trees. All fruit trees planted by herself. Now – prefer the luxury of the air conditioner.' TC17

'Nice and cool. Only if we've got family we'll sit outside with them. But when you get old you don't worry about sitting outside. Old people like sitting outside, but you know I want retired luxury in the air conditioning.' TC37

Interviewer: 'So which would you do first, like go to the trees or use the air conditioner? Resident: No, I'm old, I'm go stay inside.' TC37

'When it gets hot we sit down inside with the air con on. Sometimes the air con gets a bit stuffy. We go outside. That's why I got this from that, a bad cold.' TC8

5.1.3 Practical knowledge

Cost

The most significant cost implication for keeping cool practice variants was connected to the power use of the newly installed air conditioners. Town camp households are already adept at managing household energy use, and air conditioner usage was generally viewed through the prism of overall energy use. Power costs in summer were considered less than those for winter (as the power cost of heaters was higher), and many respondents when asked about cooling practices if power was unavailable, noted that they would simply use the various passive practice variants that were performed before the arrival of the air conditioner units. Of the participants that cited costs during the interviews (13 of 31), the majority had children living in the home (9 of 13). However the type of dwelling did not appear to be a factor, with the distribution, 5 Tangentyere refurbishments, 6 SIHIP rebuilds and 2 new SIHIP dwellings, mirroring the overall housing type distribution of the participants.

'You have to be a millionaire to keep it running. It chews a lot of power yeah.' TC8

'Well we've got air conditioning, so we've got ducted air conditioning here but I've found these have really good insulation, summertime. Yeah so that helps me save power you know, running the air con, otherwise we've also got fans, internal fans as well' TC20

'Turn all of the power off (at the fuse box) to save power for the air conditioner' TC7

5.1.4 Common understandings

Visitors

Information about visitors' was filtered through resident house bosses; however a fairly clear picture emerged whereby visitors tended to use the household equipment and services (except for bringing their own swags and sleeping gear) of the house they were staying at. It was acknowledged that visitors would often contribute power cards or cash to compensate for power consumption. Visitors' ability to gain permission to independently use house hardware like the swampies varied (most likely with the degree of closeness of family relations); however, reflecting the theme above around air conditioners and small children, there was considerable flexibility within these relationships, particularly for the very young and the very old.

Air conditioner access

'Visitors can turn it on – mainly for the kids to keep cool. But she (the mother) comes outside. She finds the air con too cold.' TC35

'They need to ask me permission to use it, but they can turn it on. If they want to then I let them' TC32

'They can operate the air conditioner themselves – she lets them know how to use it.' TC33

'It depends on if my wife has put it on, they don't put it on if she is not here' TC34

'I don't let them touch the switches, I don't have the air conditioner on during the day, so they go outside and sit down. That's why I don't let them, they might break it' TC36

Using 'house' or 'visitor's' equipment

'They bring their own blankets. No heaters. (Her) firewood is for personal use at the weekends, not visitors, to keep warm and for cooking.' TC35

'Visitors use items from the house, they don't bring their own things to stay cool' TC32

'They use the stuff in the house. If there is no heater available then they make fire if there is wood' TC32

'They use items from the house, don't bring their own' TC34

'If there is room in the house then they come inside and use the (house's) heater. If it is crowded then they stay outside. They bring their own swag to sleep in' TC34

'They don't use my things in the house, they just come with their swags' TC36

Visitors staying inside or outside

'Always outside, in winter too. Grandkids stay inside, adults outside' TC35

'When it's cold they stay inside the house. When it's hot they stay outside.' TC33

'They stay both inside and outside. They need to ask permission to stay inside, but if they want to I usually say yes' TC32

'Good visitors can stay inside the house. If drunk then they have to stay outside' TC34

'Mostly outside because I got a grand-daughter (at home). Don't like to make her leave her room, trying to teach her to have her own space and belongings' TC36

Power cards

'Sometimes they just give money and sometimes they get a card themselves and slot it into the power box. Heating is for the kids inside at night.' TC35

'Yes, visitors bring their own power cards and they will also contribute money for power cards' TC32

'They would normally buy a power card and put it in the box themselves.' TC33

'Sometimes they will buy their own powercard. I don't mind if they do this' TC34

'Yes they do and sometimes they give us money to help out with the food as a gift' TC36

Generational differences

Generational differences in practice variants of keeping cool tended to be noted at either end of the age spectrum, with some of the older respondents viewing air conditioner use as a luxury or bonus (see 5.1.2), while the younger (house boss) respondents saw air conditioners as a modern or contemporary way of staying cool. It was the middle generation that tended to have reserves about air conditioner use as being either ineffective (too cold) or unhealthy. Of the 10 respondents that noted sleeping outside as a passive method for staying cool, 8 were aged between 40 and 59.

'Nice and cool. Only if we've got family we'll sit outside with them. But when you get old you don't worry about sitting outside. Old people like sitting outside, but you know I want retired luxury in the air conditioning.' TC37

'Prefer being outside because you can feel the breeze, more comfortable. Also the air conditioner has a smell (not healthy)' TC19

'When it gets hot we sit down inside with the air con on. Sometimes the air con gets a bit stuffy. We go outside. That's why I got this from that, a bad cold.' TC8

5.1.5 Rules

Reporting

All of the residents interviewed were clear in their understanding of where they would report faults and how they would go about it. When the issue concerned cooling (and particularly air conditioners), the vast majority of interviewees were clear that they would contact tenancy management swiftly. Many of the respondents still referred to the Central Australian Affordable Housing Company (CAAHC) as Tangentyere Housing, reflecting their past

association with Tangentyere Council. Stories of long delays in service delivery were common, but examples of prompt repairs were also noted.

*'Report it to Tangentyere Housing and Territory Housing
When Tangentyere workers around we tell them about it'* TC5

*'Would tell Tangentyere housing
Would go into town and see Tangentyere (not call)'* TC10

*'Tangentyere Housing (would ring them), plus a woman from Territory Housing comes
around every so often, so would tell her if anything wrong'* TC15

'Contact Tang. Who then puts an order in with Territory Housing in Darwin.' TC17

*'Yeah. We've got to talk to them (CAAHC) first and then they will put an order in to Territory
Housing.'* TC17

*'Just work around it. Call Territory Housing or Tang, sometimes both. Territory Housing too
slow to react.'* TC20

*'Yes, I did. For six, seven months we had it. The pipe sticking out from there, coming right
across this way, about a 100m pipe sticking out. My kids were having a stinking hot shower
on a forty-degree morning, because it took an hour to get the water cool. Complained to
housing about ten times and got nowhere. We went higher then, to (name), got in touch with
him, and he told us to get in touch with someone in Darwin. That person from Darwin, he
had the hat, he might be as thick as your finger nail, and I named all the people that were
supposed to be doing it, but they never did it.'* TC9

*'Go to Tang or territory housing. Usually call but sometimes go into Tang or catch them
driving around.'* TC24

*'Yeah with Territory Housing if there's a leaking tap, they've got to send someone to actually
see that that tap's leaking'* TC37

*'Yeah, sometimes a bit of both because I've found Territory Housing repairs have been a lot
slower than Tangentyere (CAAHC) , sometimes we'll be able to push Tangentyere to push
Territory Housing, especially in the beginning eh there was a lot of confusion about who's
got what role. But even now because I actually I've got to get on their back again, when we
had the AGM I said we want a meeting with Tangentyere and Territory Housing to, because
they've both got split roles and split camps, so Territory Housing they're looking after the
responsibility and repairs of some number of camps'* TC20

After the last tendering round towards the end of 2012, the reporting methodology described above by the residents is likely to change, with the Tenancy and Property Management tasks now divided between two organisations: CAAHC (Tenancy management) and Ingkerreke (Property Management). This is likely to involve more formalised and less flexible reporting pathways. This in turn is likely to affect residents' keeping cool practices more than

their keeping warm practices due to the recognised responsibility of tenancy management to maintain air conditioners in good working order.

'Territory Housing has a sub-lease and say, CAAHC do tenancy and someone else did property, they would be expected to take on far more of a governance role on what happens within that area because it's under a full contract' (Territory Housing)

5.1.5.1 Responsibility, resilience and change management

Regarding the performance of housing stock in terms of resident comfort, Territory Housing has a 'conditional' responsibility for the housing hardware in the town camp residents. This extends to evaporative coolers (the swampies) but not reverse cycle air conditioners (or heaters). Where these are present, the policy is to not remove them if residents accept responsibility for their maintenance and upkeep. This policy is similarly applied to the approximately 860 public housing units in Alice Springs.

'It's about doing the best we can with what we have got' (Territory Housing, referring to the older houses)

'Our responsibility is to, in terms of air conditioning, is to support evaporative air conditioning in this region. We haven't got the funding to support refrigerated or split systems' (Territory Housing)

With reference to the Alice Spring's town public houses with existing A/C: *'we would say to those folks when they moved in, we want to do an alteration report on this property so that you accept responsibility for that unit. It's there and working, we don't want to take it out, providing your happy to accept responsibility for it, and then if it breaks down you would need to repair it'* (Territory Housing)

Territory Housing appear to have a less generous opinion of the technical skills of the town camp residents than the CAAHC. This could reflect the difference in the extent of day-to-day interactions with residents by Territory Housing compared to the CAAHC.

'I've got no doubt that people do not understand the existing technologies that are in there' (Territory Housing)

'Yes, I think pretty much for themselves. Like, we can help and do so much but really it's what they can do for themselves most of the time.' (CAAHC)

'I think they would all just know how to turn it on and off at the switch, that's probably basically it' (CAAHC)

'Well realistically from our core priority we want to put something there that gives the people the service that they need and they probably have as little interaction with it as they possibly can' (Territory Housing)

Management efforts at capacity building among residents are concentrated in 'learning programs' run by outside organisations, such as the Tenancy Sustainability Program.

'(Tenancy Sustainability program) Tang have been delivering for a number of years. Now an extended program, original tranche of 50 households. Now second round of 150 households. Service providers are Tang, Mission Australia and Anglicare. Works around

modules of health, hygiene, and managing money. (It's an) in house program.' (Territory Housing)

'Not just working hardware but education 'huge amount, huge amount'' (CAAHC)

'The house is really, I think where a lot of the primary health care either exists or fails' (Territory Housing)

This reflects a largely 'behaviour change' approach, orchestrated from above and 'delivered' to communities either directly through Territory Housing or via other housing or charitable organisations, coupled with a concern to minimise resource use (either power and water use, or the frequency of required maintenance).

'Absolutely...if you look at Territory Housing as an entity... and you look at the tenants, the only link between them and TH is the tenancy officers. So realistically I think we have,...,a really strong obligation to work with those folks, and help them live the best life that they can through housing.' (Territory Housing)

'Should we educate and provide information on energy and water use, yes' (Territory Housing)

'The new houses...a full focus on...the most common or the best energy efficiency that they could gain throughout that (SIHIP) program' (Territory Housing)

'But my vision if you like was to improve the lives of aboriginal people through improved housing.' (Territory Housing)

5.1.6 Bundled practices

As noted in section 5.1.1 with sitting in the shade and hosing the front yard, different practice variants may be linked or bundled together to form a more complex practice. In the case of air conditioner use in the town camps, the practice is automatically linked with the practice of staying inside on hot days, for example. The enabling of this practice to emerge may act to displace the practice of sitting outside, particularly if combined with the removal of shade options in the immediate vicinity of the dwellings. In addition, due to the fact that the air conditioner uses power and water, this explicitly bundles the practice with other, sometime competing household practices that similarly use power and water, such as cooking, washing, using lights, and recreation activities like watching television. As town camp households use a power card system for their electricity, the additional power requirements associated with air conditioner use must be factored in to overall decisions around the allocation of household power consumption.

'Turn all of the power off (at the fuse box) to save power for the air conditioner' TC7

'But we always, the thing is with the power use, you're always managing your power usage, they [tenancy management] really help you to manage your power usage so you know you don't have everything turned on all at once or you pop the air con on, cool it down, turn it off or turn it down on low.' TC20

'Put air conditioner on and in the evening we put the fan on all night' TC28

*'Air flow in the house is good, but prefers to use the air con.
Need to keep cool – has rheumatic heart and asthmatic lung, so heat affects her badly.'*
TC24

5.2 The practice of dealing with the cold

As with 5.1 themes from the interview materials are grouped under the most relevant of the four practice elements: materials; practical knowledge; common understandings and; rules (section 5.22 to 5.25).

5.2.1 Existing practice variants

As with the practice of dealing with the heat, practice variants were also spread over a variety of passive and active methods. The preference for sitting outside wrapped in blankets and by a fire (either next to the house or elsewhere in the yard) was noted by 28 of 31 respondents. Some confusion over the status of lighting fires in the tenancy contract existed, with many believing that it was not allowed (but that they continued to do it anyway). In fact, no rule bans the lighting of fires but Territory Housing tenancy officers, suggested to many residents when handing over the new tenancy agreements that fires should not be lit for safety reasons.

Inside dwellings, personal heaters (brought from stores) remain the most popular method of internal heating, although most residents noted their relative expense (in power use), (28 of 31). The Tangentyere installed ceiling heaters were appreciated although their method of ambient heat delivery was considered ineffective (if doors left open etc.), and the eight hour timer switches were thought by some to use too much power.

'When family walk in and out the house doesn't stay warm (especially kids leaving doors open) prefer to have a fire outside' TC12

'So I can cook outside and same time I make myself warm and its more relaxing'. Don't have heater (Note: this house had radiant heater panels in each room). Fire best way to have more people sit around. Fire comfortable, warmer than a heater, can't share a bar heater.'
TC1

'House changes temperature (when wind blows from one side of house) but heating is still the same as before, follow sun to sit in it' TC2

*'We made wind break to keep the cold wind out and mostly slept near the fire.
And day time sat in where the sun was'* TC4

'Sit outside in sun with fire is the best way, get warm quicker than with heater' TC10

'Just blankets and keep all my windows and doors closed and wrap up in blankets' TC3

*'So what do you do if your heater breaks down?
Make fire outside if heater is broken'* TC6

'Bar heaters only, I don't have that new heater (radiant panels)' TC3

'Use bar heaters or fire outside.

At night time put heaters on for a few hours before bed' TC6

'Chuck it away. Go and buy a new one. Or we'll have to get someone to replace it. Get the heater early, and the price is right down, once it gets real cold the price goes up. So you've got to get in early, get two or three. In winter, the price skyrockets.' TC9

*'So when you cook with the stove that tends to warm the house up anyway?
Yep. When you put the heat on it goes around in the house, no worries, deadly.'* TC8

'We make fire when no power. But we use heaters inside. Only in the morning to heat up the house, and only in the lounge and kitchen.' TC16

'We talk to our housing mob. Like my hot water system, I've got a problem with my hot water system. I don't know why they expect us to press that button for. Who want to press that button?' TC37

5.2.2 Materials

5.2.2.1 Emerging practice variants

Most of the emerging practice variants among residents concerning heating reflected losing pre-existing options rather than gaining new ones. Existing pot-bellied stoves were removed from residences that were refurbished under the SIHIP program in the camps. This reflects the situation that Territory Housing does not support 'fixed' heating in town camp houses or public housing in Alice Springs proper, and has lukewarm support for the Tangentyere installed heaters. The suspension of subsidized fire-wood delivery by Tangentyere Council was also noted by residents.

'Well according to the residents it has. Because they had a bit more freedom (before) to light their fires, to keep themselves warm, to have as much bedding as they wanted outside.... So they seem to have a lot more freedom then, whereas now not so much' (CAAHC)

'Don't have fire buckets, that how we used to keep warm but now I have to go by housing rules.

But still I want that fire bucket because it's good' TC3

*'Pot belly stove was removed during renovation
Would use pot belly at night to keep warm'* TC10

'Heater on the ceiling (radiant panel), automatic goes off (after 8 hours) gets cold when turned off

Used to use pot belly stove inside and fire bucket outside' TC12

'In the morning, in the lounge room where the kids get ready for school. We turn it (fan heater) on at six and warm the lounge room, when the lounge is warm it shuts off itself automatically and then comes back on when someone opens the door.' TC9

'Yes, and sometimes when it gets cold it (fan heater) comes back on itself. It's good. About half an hour to warm up and it will shut down then. Then when it gets cold then it comes back up again. Better than a bar heater – a bar heater costs too much power.' TC9

'No well that's, we've just got to plan around it, make sure we've got extra power. But the heater we've got we've got three adjustable settings, so it's a three bar one of auto with a fan so you can you know read about how much output its, power it's going to be using, so once it's warm you can say turn it right down to one or turn it off.' TC20

'Good to have to keep the house clean for inspections. She doesn't make fire, don't put up pictures. Put curtains up though – got permission for that. She would light a fire if they had a fire bucket. So obeys some rules, but not others.' TC18

5.2.3 Practical knowledge

5.2.3.1 Cost

Active heating practice variants like using heaters require residents to evaluate the costs associated with different keeping warm practices. This includes the cost of purchase and maintenance of portable bar or fan heaters, as well as their operating costs. Although residents retained many practice variants that did not require energy use (like using blankets, cited by 23 of 31 respondents), heater use was widespread (28 of 31 respondents), and the costs associated are widely acknowledged and understood (costs for both heating and cooling were mentioned by 13 of 31 respondents).

Interviewer: 'So you're not worried about the cost of the heater to keep warm?'

Respondents: 'No well that's, we've just got to plan around it, make sure we've got extra power in the meter. But the heater we've got we've got three adjustable settings, so it's a three bar one of auto with a fan so you can you know read about how much output its, power it's going to be using, so once it's warm you can say turn it right down to one or turn it off.' TC20

'Can't turn on (bar) heater as wastes too much power. Used the ceiling radiant panels before buying the bar heater from the shop' TC15

'Because my heater on the roof take a while to heat up and by the time it heats up my credit runs out.' TC3

'Gets too hot with clothes on as well as heater. He plans around the cost of the heater. It has three settings – 3 bar heater with fan.' TC20

'It's (fan heater) good. About half an hour to warm up and it will shut down then. Then when it gets cold then it comes back up again. Better than a bar heater – a bar heater costs too much power.' TC9

'Blankets. No heater – no heating from alliance refit. No money for a heater – save power and bills.' TC18

5.2.4 Common understandings

5.2.4.1 Visitors

Similarly with keeping cool, visitors to town camp houses usually use the existing house infrastructure and housing hardware to keep warm, although it was noted that they sometimes buy their own heaters. Again, it was noted that visitors would supply (or donate) power cards, showing respect for the common understandings (house rules) about resource use and distribution.

They bring their own blankets. No heaters. Her firewood is for her personal use at the weekends, not visitors, to keep warm and for cooking. TC33

'Sometimes they come inside to use the heaters or they sit outside near a fire. The older visitors prefer to be by the fire while the younger ones like the heaters.' TC32

'When it's cold they stay inside the house. When it's hot they stay outside.' TC33

'If there is room in the house then they come inside and use the (house's) heater. If it is crowded then they stay outside. They bring their own swag to sleep in.' TC34

5.2.4.2 Generational differences

The most noticeable generational difference regarding keeping warm practices was the attitude towards using fire. While almost universally regarded as the 'best' way to keep warm by the middle and older generations, the practice variant of sitting around a fire was primarily viewed as being an (occasional) social practice by the younger house bosses. The most common reason given for preferring heaters to fires concerned the smell of smoke on clothes.

*'Used to sit around the fire but not allowed to make fire now
But anyway prefer to use the heater because of the smell of smoke on clothes'* TC15

'We cook outside because it makes us feel good, the outside fire makes me feel warm. Us older ones like that, that's how we grew up. These days young kids are too used to heaters' TC26

'I feel sorry for the younger kids they are a bit funny about making fire and smelling that smoke on their clothes' TC26

5.2.5 Rules

5.2.5.1 Reporting

The most significant difference in reporting problems or faults relating to heating comfort compared to keeping cool is the lack of reporting by tenants to management. With the exception of issues surrounding hot water systems (which may be considered as linked to keeping warm practices but are also closely associated with practices around hygiene, cleanliness and health), very few inquiries are made regarding heating. As noted above, Territory Housing makes clear that it does not consider itself responsible for heating hardware in the town camp dwellings (even existing heaters), which may explain the lack of engagement from tenants with management. If so, it reveals that tenants have a clear

conception of where responsibility for provision, maintenance and upkeep of specific housing hardware lies and of the different rules and regulations surrounding heaters.

'When I first got here the phones hardly ever rang. Like now at least they ring. But when I first got here they just didn't ring at all. And I sort of queried it and it was just that lack of expectation, "why ring? It probably won't happen".' (CAAHC)

A/C's *'in the summer they'll let us know about that'* (CAAHC)

'Hot weather...that's the trigger. Hot weather will trigger a complaint rather than the cold weather. I think that's mainly because people assume that well they can't do anything about it. There's no heaters to repair (except in some Tang refurb's)' (CAAHC)

5.2.5.2 Responsibility, resilience and change management

The CAAHC strongly believe that any item of housing hardware that is part of a residence when a tenant moves in should be covered by the tenancy agreement and maintained by the relevant tenancy/property management organisation. This includes heating panels installed in Tangentyere upgrades that were not part of SIHIPnew builds and upgrades. Personal responsibility for maintaining comfort lies with the tenants themselves, but this can only be effective (due to overcrowding, low incomes, etc.), if the housing hardware is maintained in a timely fashion and the rules and regulations around this are clearly understood. As with issues around keeping cool, the primary response from housing management at all levels is to ensure housing hardware is functional and to supplement tenant knowledge about housing hardware with education programs.

'Not input in design but certainly into education and information processes with the tenants...with educational processes for women in technology and workshops and things like that. So explaining to people...what the buttons for time switches are for, booster switches for the hot water, those sorts of things.' (CAAHC)

'Make sure everything is running and working properly' (CAAHC)

Tangentyere refurbished houses heating panels 'if we've signed a tenancy lease and those items are there, then we are bound to maintain that item. However, what we will be moving to... that should it break down in the future, you're (tenant) going to have to pay for that' (CAAHC)

'Well a lot comes into the fact that if there is no heating supplied then they have to provide their own heaters. They would have to provide their own sausage things to stop the draft coming in. They would have to close the blinds and utilise the sort of window coverings to assist in any sort of thermal approach. So it would be personal responsibility around how well do you actually keep it cool or how you keep it hot. It's those additional things that aren't currently in the house. So anything in the property is Territory Housing's responsibility to maintain and repair. But anything that actually would assist in thermal quality would be the tenant's responsibility.' (CAAHC)

'Yes it's pretty much for themselves. Like, we can help and do so much but really it's what they can do for themselves most of the time.' (CAAHC)

'So it's up to us (tenancy management) to try and educate them on these things, because they've just been placed in the house and they're expected to know what to do with a lot of the technical stuff in there.' (CAAHC)

The CAAHC believe that their role certainly extends beyond simply enforcing tenancy and property rules, and that part of their mandate is to encourage, inform and assist residents in adapting to changing circumstances, including climate change effects and new housing hardware.

'They (Tenancy Management Officers and Property Management Officers) play the biggest role. Because they play the role of communicating with the tenants and sometimes trying to balance between what is, I mean the government isn't addressing the maintenance issues and the tenants are continuously screaming out, they see these guys on the camps all the time...so it's a very challenging position for them.' (CAAHC)

'You will always have to have advocacy separate. Territory doesn't have a tenants union and I don't think the legislation has much rights for tenants either.' (CAAHC)

'They (Government) could support us to do it. Or they could support the community better to do it. And let the community providers do what they are fundamentally good at. Because ideally that how you want it.' (CAAHC)

'There are other agencies but I think because of the Tang connection people feel reasonably comfortable to tell us and tell us that we're not doing the right thing if that's the case. That's good. Because I think we need to raise the bar about that. Expectation should be that it should be fixed.' (CAAHC)

'And a lack of interest in and actually understanding what it is that's happening in those communities. They (TH) think that well that's the policy.' (CAAHC)

'But it's very rare that you see people out on camp who actually listen as to what an issue is, why is it happening, and what can we do about it? It's more around "Well we've got this policy and we haven't got any money, so therefore it can't happen."' (CAAHC)

'Look I think it's a pre-determined role that we take on. We certainly take the advocacy role but also in trying to get people to live more comfortably and to live within an appropriate setting and to have an appropriate house.' (CAAHC)

'Yeah. Because they (tenants) are referred to agencies, tenancy support programs, but it's a voluntary program so they don't have to take it if they don't want to. But then when they don't then we just step in and try and help them. So we do a lot of support work as well. Even though our main thing is just rent collection, allocations, leases, but it's just the human thing.' (CAAHC)

5.2.6 Bundling of practices

Similarly to keeping cool practices, keeping warm practices have links to many other practices performed in the town camp households. The preferred practice of sitting outside by a fire, while providing warmth, also has strong connections to practices around family bonding, information exchange, child rearing (via surveillance), and to culturally important

cooking and eating activities, notably the preparation of kangaroo tail (11 of 31). In the interviews, the citing of 'cooking kangaroo' cut across sex, age, and language groups.

'Still doing cooking outside and keeping warm (cook kangaroo tail)' TC7

'It's not really good, we can't do the things that we did before

Like making fire outside, we can't cook kangaroo tail outside but we still do it' TC11

'And make fire outside to cook roo tails and it's what we being doing for a long time' TC28

The use of heaters, like the use of air conditioners, uses power and so is bundled with a collection of sometimes competing practices that require power in their performance, including cooking, washing, cleaning and so on. As such, cost concerns and rationing of limited resources influence decisions around the allocation of power, and therefore the timing and extent of use of heaters in households (see cost section 5.2.6).

'If it's too cold, it affects her asthma. No heater in lounge as use bedrooms more – they have the televisions in them.' TC17

5.3 Extreme weather events and their consequences

Practices around extreme weather events were not a focus of this project. This section highlights the reported impact of these events on residents and the implications of future (increased) events for housing, and resident health and safety in Alice Springs town camps.

While most interviewees could remember particular extreme weather events, few admitted that it had caused any particular hardship, and fewer still commented on the likelihood of future events causing undue harm. Flooding was considered the most potentially disruptive, but recent infrastructure upgrades (including new drainage systems), seem to have reduced worries about being inconvenienced. Extended periods of hot weather were considered the most dangerous to health. Other health worries concerning weather events stemmed from having long grass near houses and the associated potential danger of fire and snakes.

5.3.1.1 Flooding

'We couldn't get into town to do any shopping because all of the creeks were overflowing' TC28

'When it's raining can't do anything. Kids get mad, locked up inside the house all day.

When it's hot tried to stay inside the house but get all stuffy, need that open space' TC26

'When we had big rain it floods the road and it gets real slippery and muddy' TC28

'Water lays around everywhere and wets the verandah

Sometimes the creek is full and it's hard to get to the shop' TC5

'(recent floods) Kids can't go to school, we can't buy food, just blocked off from the other side of town for a couple of days' TC6

'It's sometimes hard for ambulance to get through (flooded creek) lots of sick people because of the cold' TC7

'Can flood in front of house.

Problem for car.

But can used verandah with fire bucket when flooded' TC10

'When it rains there is water full up in my yard

Hard for me because I'm in a wheelchair' TC11

'Heavy rain produces long grass and lots of snakes. Fire hazard too. She killed about 4 snakes in the last big rains. Flooding came over the garden.' TC17

Heat/Fires

'When we had bushfire close to the camp, we didn't have nowhere to keep ourselves cool Because we only had water in our water tank' TC4

'Karnte camp is quite exposed so wind and dust can be a problem

When the wind comes from the west, sit inside and not let the children play outside as it is not healthy' TC23

'And bush fire yeah. I had a bush fire thing, they had to come and do a bush fire report here and they found that this was at risk here on the hill coming back to my place. So they had to do a, cutting grass' TC37

6. DISCUSSION

As indicated in section 1, the project had three overarching research objectives:

1. To identify current adaptive practices of residents in newly provided or refurbished houses in selected Alice Springs town camps in relation to comfort and healthy-living practices, and to examine resident vulnerabilities to climate change, including changed weather patterns and rising energy and water costs
2. To identify tenancy management regimes that increase or reduce vulnerabilities to climate change scenarios for town camp residents and investigate the integration of tenant initiated sustainable living practices into ongoing tenancy management and future public housing design guidelines.
3. To build the existing research capacity of the Tangentyere Research Hub in energy and water use studies, and sustainable design using technical and social practice research, and to build the experience of the RMIT researchers in conducting interview based surveys of Indigenous households.

This section is structured accordingly with discussion below following these three project objectives.

6.1 Adaptive capacity of the town camp residents

Many practices found in the town camp communities reflect distinctive Indigenous cultural preferences in household activities, in particular regarding social expectations and commitments, but also in terms of personal privacy and child rearing, amongst others. As Wigley (1994:38) notes: *'While the kinship system provides social and some economic support it also is a source of stress for household management'*. Notwithstanding some stress, Elvin (2010:43) found that *'householders are actively and effectively organising and reorganising their household arrangements to accommodate family business or in response to other environmental factors'*.

The practices of dealing with cold weather and hot weather amongst residents of the town camps indicate a wide diversity of variation, including both active (reliant upon electricity) and passive approaches. This diversity indicates a good basis for adaptation to climate change locally. While new practice variants are developing (such as the use of air conditioning), some established practice variants are being maintained and continue to play an important role, particularly with regard to keeping warm practices, where the residents are largely independent of tenancy management. This is due in part to Territory Housing not acknowledging responsibility for heating, a point of some contention with regard to the inbuilt ceiling heating panels installed during the Tangentyere refurbishments and responsibilities under the Residential Tenancy Act. However, heating and cooling practices are changing, reflecting changes in material aspects (facilities such as power, water, and selected appliances); skills and knowledge; common understandings including the continuing integration in Indigenous households of westernised dwelling services, and; rules around tenancy management and housing services.

While the heating and cooling practices engaged in by residents differ between households, there remains a significant correlation of practices amongst the town campers suggesting that, at least in the town camps included in this project, there is a degree of social and cultural cohesion around common understandings of appropriate comfort practices, facilitated and shaped by a common range of available materials and standard rules and regulations set by authorities based outside of the town camps. Current 'hands-on' tenancy management practices by the CAAHC also encourage transmission of knowledge to residents about climate related practices. The CAAHC tenancy and property personnel believe that the residents have a high level of resilience, and that they are technically proficient in using the majority of housing hardware items in their homes.

'A lot of them they go outside and they hose themselves down, the kids play in the water. So they do know how to keep cool.' (CAAHC)

'I mean people in the camps they're quite willing to learn. It's only when you come in and sort of I suppose talk down to them and make them feel like they don't know how to use this or that, then it's when they start getting a bit hostile' (CAAHC)

Reflecting fluctuating and regularly large household sizes and visitor numbers, town camp dwellings (new or refurbished) continue to be subject to high and constant use by occupants inside and out. As noted by Wigley (1994), this is not a new phenomenon, and is likely to continue.

'Contrary to the generally held view the interiors of houses are in constant use throughout the day' (Wigley, 1994:38)

However, Ross (1987), noted in her work in WA that for Indigenous people crowding (in a house) is more of a state of mind linked to 'who' people are (how closely related) not persons per square meter. So a full house of close family does not feel crowded, but one with an 'unwelcome' visitor may (Ross, 1987:114). Nevertheless, whether a large number of people using a dwelling causes 'stress' for the house-boss or not, their presence impacts on household practices. As a consequence, the main threats to the adaptability and resilience of the town campers emanate from the low income levels of many households, which limits the ability of those households to use 'power-based' appliances for both heating and cooling purposes, given the substantial other power commitments within the home, and continued high numbers of visitors that put a strain on the material resources of households, even though many visitors will supply their own power cards.

Given predictions that climate change will bring pressure for increased cooling capacity in households (with a reduction in heating requirements), a key finding of this research is that continued changes in associated practices is likely and, moreover, changes in any elements of practices for dealing with hot or cold weather are likely to prompt shifts in the balance of practice variants across different households. There is therefore a need to track changing practices as they relate to climate change stressors in order to monitor adaptive capacity and detect any potential declines in this critical resource in the face of increasing climate change.

The move towards air conditioner use has been enthusiastically embraced (in the main), although the bulk of town campers retain practice variants for keeping cool wherever they can that pre-date installation of the 'swampies' in their homes.

'Didn't have air conditioner before, used to sit down outside to keep cool' TC21

'Used to all sit outside out back. Big space and verandah with trees. All fruit trees planted by herself. Now – prefer the luxury of the air conditioner.' TC17

The uptake in air conditioner use has changed the balance of cooling practices, shifting them towards both indoor and power-based practices. This has brought cooling practices into potential competition for resources with other power-based activities practiced in the home, such as cooking, showering and watching TV, further complicating power management.

'Turn all of the power off (at the fuse box for the lights) to save power for the air conditioner' TC7

'You have to be a millionaire to keep it running. It chews a lot of power yeah.' TC8

'But we always, the thing is with the power use, you're always managing your power usage, they [tenancy management] really help you to manage your power usage so you know you don't have everything turned on all at once or you pop the air con on, cool it down, turn it off or turn it down on low.' TC20

Meanings associated with using air conditioners for cooling vary, with the idea of 'luxury' being noted in several interviews, however, an expressed notion that air conditioning is healthy for young children, has been a recurrent theme in the interviews.

'Before used to sit at another house as the last house did not have effective air conditioning Before (my) daughter, just used to hang around with cousins, didn't care much about the weather, more aware now with little daughter' TC15

'But air conditioner is good for the grandchildren (if they are only) on hot days' TC19

This raises the possibility that air conditioner use has become embedded into practices of 'raising healthy kids' as well as practices of dealing with heat. This should be further investigated as strategies aimed at providing passive 'hot weather friendly' community infrastructure (including shading and water features) for pre-school children may act to lower the power use of households (with young children) over the hot summer months. The combination of air conditioner use being 'inside' the dwelling and 'good for kids' also opens up potential ground for renegotiation of the relationship between residents and visitors, particularly around night-time sleeping arrangements.

'Always outside, in winter too. Grandkids stay inside, adults outside' TC35

In summary, current constraints in adaptive capacity are 'capacity' based, rather than being 'education or knowledge-gap' related, so the current tenancy and property management focus on practical, technical, education platforms regarding housing hardware may not be addressing the most pressing adaptation threats. This highlights one of this reports recommendations (see section 7) that tenancy management move beyond an 'education' and 'appliance efficiency' focus in their efforts to ease cost-of-living pressures on town camp

residents. Key adaptive capacity threats include the possible loss of passive cooling options as yards and outdoor shade shelter is neglected in favour of capital outlays inside dwellings. If these are no longer available, residents are prevented access to the material options for seeking passive cooling alternatives to mechanical cooling options. The research also revealed 'bundling' of practices that require further attention. Suffice to say, where cooling practices are shifting to mechanical, indoor options and away from passive shading, outdoor options, there are also impacts on associated practices around maintaining social connections, which decisions around appliance provision and house envelope may not overtly consider at present. These in turn may have knock-on effects for future climate adaptive capacity.

6.2 Tenancy management, housing design and climate change adaptation

"There has been some recognition by governments that the provision of hardware alone will not guarantee improvements in the living conditions on Aboriginal communities" (Wigley, 1994:vii)

"Effective housing management is directly related to the availability of informed and trained person power in the community" (Wigley, 1994:vii)

Current housing management practice in the town camps involves Territory Housing subcontracting the day-to-day tenancy and property management duties to the Central Australian Affordable Housing Company (CAAHC). Territory Housing also employs tenancy management personnel to visit the town camps, and Government Business Managers (GBM's) associated with the town camps report observations back to CAAHC for action. Territory Housing retains control of approval for funding all property or tenancy based actions, and assesses requests based on selected criteria (mainly health and safety based). Relative urgency of approved works triggers a timeframe for job completion. If nobody is at home, then the contractor rings back CAAHC and the clock for job completion is reset.

'We would send out a property management officer who would go and check first of all whether or not the air cooler was working and whether it was on...doing things that would be suitable for air flow...or they would get up and check whether or not the waters coming through, whether the pads full of calcimine. And if that's the case they would come back and put in a request to be fixed through the air conditioning mob (contractors). So once we have got that request we would then inform the contractor that it was turning on the heat, if it was a really hot day. We'd put an immediate notice through which is to do it within four hours. If it was a day of 25 or 30 (degrees) and it wasn't stinking hot we'd probably say it's an urgent so two days to actually get that fixed.' (CAAHC)

The CAAHC are broadly in favour of the current flexible system where there are a number of pathways by which residents can inform tenancy and property management of problems/faults etc. In addition to calling Territory Housing or the CAAHC, or speaking to CAAHC employees who are on the camps, residents can inform any Tangentyere Council employee working on the camps about faults, and the Tangentyere workers are compelled to inform CAAHC. (Note; in the course of conducting interviews on the town camps for this project, the Tangentyere researchers were asked to report several faults, as well as to contact other Tangentyere services). The system has its merits, but also drawbacks in that

faults may be simultaneously reported through several avenues leading to confusion and possible double reporting to Territory Housing, or that residents may inform tradespeople working on the camps of faults, but the tradespeople fail to report (they may be contract workers with no connection to Tangentyere Council, CAAHC or Territory Housing). Residents may then 'sit back and wait' not following up the initial report because they are used to long lead times for jobs.

'The majority of the requests don't come from our tenants. The requests that come from our tenants actually come from when our guys are out in the camps. The requests that we get are filtered through here, there's probably only 5 or 10% that are actually phoned in by the tenants' (CAAHC)

'You can turn up to a house for a leaking tap and be there for up to an hour taking down other problems that they're reporting at the time, which is a good thing because they are letting us know about it.' (CAAHC)

Feedback about how town camp residents are adapting to their new or refurbished housing, as well as other changes occurring due to new infrastructure work, is usually gathered using a similar multi-channel system.

'Our tradies. It's a combination, from tenant's complaints, us inspecting them, the property maintenance officer's feedback and then also our tradespeople who go out to fix those jobs. That, whether it's a standard, we've had a lot of issues with ovens and things like that, and there's been some big issues that need to be dealt with. But yes, that normally comes through our PMOs' (CAAHC)

'If there's an elderly person in a wheelchair or somewhere the air conditioner has broken down again, usually they would let us know, but when it gets sent through to housing (Territory Housing) I'm not sure whether they've got anything from that side. We can get it from our side, they let us know but it's up to us to put it on the request form when we send it through, to let them know, or in the email, that there's babies there, or elderlies, that need cool air for their health.' (CAAHC)

From a tenancy and property management perspective, the largest change since the beginning of the SIHIP project and negotiation of the new leasing agreements has been the loss of direct control by Tangentyere Council, and where responsibility has shifted to the Territory Government (via Territory Housing), albeit with the tenancy and property field duties sub-contracted back to CAAHC. This has led to some ambiguity about where practical responsibility for housing management resides, and exactly how tenancy management should be carried out in Aboriginal communities. This is further complicated as procedures are generated outside of the town camp environments and then imported in, a situation that has a long history as noted by Wigley (1994) and restated in various ways in this research. As noted in section 5.2.1, there was widespread confusion in the camps over the status of lighting small fires in yards for warmth and cooking (although the practice continued almost universally).

'Well it's very hard to work out where our responsibility lies because we have very little control over it (maintaining comfort)' (CAAHC)

'It's sort of half and half with them (Territory Housing). We can only do so much and the rest goes to them. They sort of get the final say for whether it gets done or not' (CAAHC)

What is clear is that the responsibilities placed on tenants have changed in the move to public housing that accompanied the new housing and upgrades. Although again, there appears to be a degree of uncertainty (from management) about what these changed responsibilities really mean.

'It has changed. But it hasn't been clear or coherent in how it's changed.' (CAAHC)

'...move to urban housing policy rather than remote camps policy. So going from one extreme to another without that education process. And so there's that middle part that's been missed, there's a lot of, there has been a lot of reliance and still is, whether it's for rubbish or things like that. But tenants will just expect to be given rubbish bags and, you know, light globes will be changed, rather than, this is your responsibility, you'll have to do that. Which is fine, it's a gradual thing.' (CAAHC)

Notwithstanding some additional delays in service delivery due to the new three tier management system, beyond basic service provision (fixing faults, collecting rents *etc.*), additional services to town camp residents aimed at 'quality of life' issues are an important part of the role of housing management in the town camps. However, these are almost exclusively delivered as 'educational campaigns'. This characterises the town camper population as 'lacking' necessary information and skills, and in addition, fosters a teacher-student (or manager-client) relationship which limits the possibility of information exchange going both ways, or the development of, in Elvin's (2010) terms, a 'recognition space' of meaningful engagement between housing management and residents. Current practice continues to reflect the findings of previous studies outlined in section 2 of this report.

As the results in section 5 show, both energy and water are important resources in the town camps. They are essential to many practice variants of dealing with heat such as hosing down yards, showering, as well as evaporative air conditioner use. Proposals to charge town camp residents for water use have implications for the way this resource is utilised. Health related benefits of activities such as hosing the surrounds of the house include dust control and improved humidity, for example. Similarly, the use of cold showers and children playing in water has potential health benefits around personal hygiene and the prevention of infections. There is a need to document and analyse the practices and wider benefits as well as the costs of water and energy use in the context of regulating the scarcity of their use through charging mechanisms.

The results in section 5 also have profound implications for housing design. Since social practices essential to climate adaptation are conducted outside dwellings as well as within them, so there are implications for climate adaptive housing design both internally and externally to dwellings. Across these two domains, the current research indicates that there has been relative neglect of design considerations and needs outside dwellings, leading to loss of tree cover, outside shading, veranda's, open fires areas and related material infrastructure.

The current management strategy imposes a hierarchy on the four elements that influence practice uptake. Material provisions are selective, with, for example, air conditioners being

provided, while mechanical natural or passive shading options denied. Moreover, along with these selective material infrastructures, rules and practical knowledge are privileged (in the name of asset protection), while common understandings – the internalised value system of the town campers ('what do normal people like me do?') – are often excluded:

- **Materials:** the housing asset is the primary focus of housing management strategies, this should be expanded to include broader design considerations including the environment immediately surrounding the dwelling
- **Rules:** are in place primarily to protect and preserve the housing asset
- **Practical Knowledge:** is disseminated in education programs to support 'proper' house use
- **Common understandings:** are often ignored, or when considered are viewed as stemming from poor practical knowledge and so can be 'fixed' by targeted education programs.

This finding leads to several key recommendations (section 7). Tenancy and property management strategies are needed that allow consideration of adaptive responses to dealing with climate change, including practices of heating and cooling that involve energy and water use, and how these practices are constituted and bundled with other practices around health, social connectedness, finances and so on. As a result, that education programs and capital expenditure programs will be better equipped to avoid unintended and possibly perverse consequences for households. Furthermore, future public housing design guidelines should take due account of the importance of broader design considerations including the curtilage of the property in promoting and enabling adaptive climate practices.

6.3 A note on conducting interviews in the town camps

In 2012 there were four separate research projects centred in the town camps of Alice Springs involving the Tangentyere Council Research Hub; a high number given that there are only around 280 households in the town camps. As a consequence, the Tangentyere researchers' have a considerable presence and profile in the camps among the residents. The researchers' are also residents of a town camp and maintain active social, community and administrative roles outside of their work conducting surveys and interviews.

This level of familiarity with resident households, with the residents themselves but also with what they do and why, entails a very specific, and unusual, connection between interviewer and interviewee that, on the one hand raises challenges in data collection and analysis but, on the other, represents important opportunities and lends an action research component to studies.

In terms of the RMIT researchers, all had experience in conducting interviews with households discussing social practices, including interviewing householders of varying ethnicities; however, none had conducted interviews with Indigenous residents in Aboriginal communities before (although the Project Leader and Research Fellow had previously worked on projects involving remote Indigenous housing procurement and construction). In this situation, the methodology of the interview process (how they were conducted), was led by the experienced Tangentyere researchers. To a certain extent, this methodology was also informed by the presence of the other concurrent research efforts underway in the town

camps in 2012. One project in particular, which involved researchers entering people's homes and photographing certain features as part of a post occupancy evaluation of the new and refurbished houses in the town camps, initiated a change in method for this project that involved only talking to residents outside of their homes (i.e. on their verandas). These instances were part of the ongoing learning on behalf of the RMIT researchers regarding cross-cultural interviewing practices.

In this project, a total of five Tangentyere Council Research Hub staff were involved in data collection, and two spent time at RMIT in Melbourne familiarising with Nvivo software for qualitative analysis, and analysing the data with the RMIT researchers. Despite the involvement of these researchers in a wide variety of research projects over the years it is apparently extremely rare for Tangentyere Council Research Hub staff to be actively involved in on-the-job research training at Universities, with their role usually restricted to data collection in the two camps.

There is a growing need for housing workers and researchers to be informed about climate change and the implications for adaptation, adaptive practices and housing services. This need is set to grow further as climate change is increasingly experienced in locations across Australia, including in Alice Springs. The project led to exposure of housing service providers and householders alike to the interrelations of housing and climate change, and it is expected that the insights and experiences gained by research participants and interviewees will assist in addressing this growing need.

7. CONCLUSION AND RECOMMENDATIONS

The research found that town camp residents involved in the study deal with heat and cold in a diverse variety of ways, and we conclude from this that diversity is a sign of adaptive capacity. Town camp residents retain variants of previous practice and embrace new practice variants, which have emerged since the refurbishments and provision of new housing over the couple of years prior to the study. Moreover, town camp residents have a clear understanding and many experiences of dealing with extreme weather events, and are (at least) bilingual, bi-cultural, and have strong cultural identities in Indigenous practice while participating in 'mainstream' economic and social life in Alice Springs and throughout Australia. As such, the town campers are well placed to adapt to changing circumstances, including changing climate conditions. However, there exists a capacity imbalance arising from poverty and both chronic and periodic overcrowding, which remains an entrenched problem and cause of community stress, so adaptive practices need to be actively monitored and nurtured. The emerging tenancy management regime is partially supporting tenant initiated sustainable living practices and there is a need for further work in this regard, as indicated in the following recommendations emerging from this research.

Recommendation 1: Extend focus on housing material provision to include consideration of climate-adaptive practices.

The existing focus of housing providers on the material aspects and governance of the housing stock should be broadened to consider the other elements that constitute practices. Material additions to houses, particularly those that require power and/or water affect not just cooling and heating practices associated with comfort control but many other practices that occur within a household that also require power and water. While additional material components may bring greater choice in engaging in practice variants, if unconsidered they may promote practice variants that compete with and eliminate alternative variants reducing overall household (and community) resilience.

Recommendation 2: Redesign community education programs to account for social practices and relations between them.

While education programs, such as those around the introduction of air conditioning, are important in building community capacity through expanding practical knowledge, such programs in the future should move explicitly 'beyond behaviour change' and take appropriate account of (a) practice elements (material, rules, common understandings and practical knowledge) and (b) dynamic relations between practices. Education programs should focus on housing providers as well as householders, and explore how changes such as the introduction of the evaporative air conditioners alter household material configurations and impact on practices beyond cooling and comfort. Implicit in this recommendation is the need for meaningful engagement between housing management and residents so that future programs are able to respond to, and complement, resident initiated adaptations.

Recommendation 3: Assess the household practices associated with water and energy use in order to inform tenancy and property management strategies that promote integration of (a) climate adaptive capacity and (b) healthy living practices.

Energy is a scarce resource in the town camps, where household incomes are low, and this scarcity is set to rise with increased climatic variation as energy is increasingly called upon to assist with adaptation. Water remains a key component in town camper cooling strategies and so any action that significantly changes how town campers' access water should be based on considerations larger than resource management (using less water). In particular, the health impacts of restricting water usage, for example, through water charging, should be fully investigated. Although this research was restricted to consideration of water use in adaptive practices, there is also a need to investigate water-using practices more widely in this context.

Recommendation 4: Revise tenancy and property management strategies to allow consideration of adaptive responses to dealing with climate change.

Tenancy management regimes have been changing and are not yet 'bedded down' into an established system of responsibility, compliance and process. A systematic study is needed of the implications for climate vulnerability arising from these changes. Specific responsibility for climate adaptation planning and resourcing should be assigned and plans and actions instituted to equip town campers with ongoing climate adaptive capacity.

Recommendation 5: Revise future social housing design guidelines to enable and promote adaptive climate practices.

Future social housing design guidelines should take due account of the importance of broader design considerations including the curtilage of the property in promoting and enabling adaptive climate practices in town camps. For example, the elimination of landscaping or garden provision in housing provision should be reconsidered in light of the lost opportunity for residents to regulate their environment without resorting to power use.

Further research: Significant and growing climate adaptive capacity constraints are faced by Indigenous communities across Australia. In addition to the recommendations above, it is recommended that a program of research and roll-out of climate adaptive practice is instituted across indigenous communities beyond the town camps of Alice Springs.

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APPENDIX A: QUESTIONNAIRES

Town camp resident survey questionnaire

Interview A:

HOT WEATHER STORIES

1. How do you keep cool on a hot day?
2. What things do you do to keep cool?
3. Why do you do that?
4. What do you do if that (e.g. the air conditioner) is broken?
5. Is this different to how you kept cool before?

COLD WEATHER STORIES

1. How do you keep warm on a cold day?
2. What do you do to keep warm?
3. Why do you do that?
4. What do you do if that is broken?
5. Is this different to how you kept warm before?

EXTREME WEATHER STORIES

1. What is the worst weather that you have been in?
2. How did it affect you?
3. What about heavy rain or flooding
4. What about when it is very hot for many days?
5. What did you do?

COMFORT (FEELINGS)

1. Apart from being warm or cool, can you tell us your feelings about your home since you moved back in?
2. How do you feel about the new house rules?

SUPPORT AND HELP

1. Who do you talk to when your house is too hot or too cold?

Living change: Adaptive housing responses to climate change in the town camps of Alice Springs

2. When was the last time?
3. How long did it take to get fixed/

Town camp resident survey questionnaire (visitors)

Interview A:

HOT WEATHER STORIES

6. What would a visitor normally do to keep cool on a hot day?
7. Do they use items (fans, air conditioners) from your house or bring their own?
8. Do you tell visitors what they can or can't do to keep cool?
9. Can a visitor turn on the air conditioner by themselves?
10. How would visitors keep cool in their community?

COLD WEATHER STORIES

6. What would a visitor normally do to keep warm on a cold day?
7. Do they use items (blankets, heaters) from your house or bring their own?
8. Do you tell visitors what they can or can't do to keep warm?
9. How would visitors keep warm in their community?

VISITORS IN THE HOUSE

6. Do visitors stay inside or outside the house?
7. Do visitors bring their own power cards?
8. Who would your visitors talk to when the house is too hot or too cold?
9. Does having too many visitors make it difficult to keep your house feeling right?

Tenancy Management questionnaire

- 1. What is your position within the organisation?**
 - How long have you worked in this position?
 - What were you doing before?
- 2. What is CAAHC's responsibility regarding the thermal performance and comfort levels of the new and refurbished houses?**
 - Has this responsibility changed since the current new building and refurbishment programs (SIHIP + TC) have begun?
 - Does Territory Housing have any responsibility here?
 - Who in your opinion bears ultimate responsibility for the houses? For the houses form, performance, and R+M?
- 3. What is the tenants responsibility regarding the comfort levels of the new and refurbished houses?**
 - How has this responsibility changed under the new public housing model of tenancy management through SIHIP/National Partnership Agreement?
- 4. What happens when a tenant complains that their house is too hot?**
 - How often does this happen? Is it recorded in the Tenancy Management database?
- 5. What happens when a tenant complains that their house is too cold?**
 - What kind of feedback do you get from residents regarding the comfort levels of their new or refurbished houses?
 - Is there a mechanism for this feedback to be incorporated into current tenancy management practices? Does the new database system assist in this?
- 6. Which tenants are particularly vulnerable to extremes of hot or cold weather?**
 - Are there 'good' and 'bad' houses that you manage?
 - How does that affect the most vulnerable?
 - Whose responsibility would it be?
- 7. Do you advise residents on ways to maintain comfort levels in their homes on extreme weather days? Is this active or re-active (i.e. in response to a request) advice?**
 - Does CAAHC record or monitor extreme weather conditions in Alice Springs?

8. Do you think that will be the balance between new technologies and new ways of using existing technologies in maintaining comfort levels as climate change impacts Alice Spring’s weather?

Why is that? What do you see as the main barriers to new technological uptake or new practices developing?

9. In what ways do Tenancy Managers play a role as ‘intermediaries’ or ‘change managers’ in climate change adaptation by town camp residents?

- How will your job change?
- Do you see a role here for other community members or organisations?
- Do you see a role here for other government organisations?

10. Does Tenancy Management have any responsibility for the power and water consumption of individual houses?

- What effect do think the change to ‘user-pays’ for water will have?

11. How would you describe the relationship between CAAHC and Territory Housing?

- How does that affect the ability of town camp residents to adapt to changed weather or climate conditions?

Demographic Information:

- Do you live in Alice Springs?
- How long have you lived in Alice Springs?
- Age group:

18-29 30-39 40-49 50-59 60+

Climate Change Adaptation and Indigenous Communities

Mon 21st – Thurs 31st

May 2012

Tangentyere Researchers
will be visiting your
camp.



To talk to you about your stories about staying cool when it is hot and staying warm when it is cold, your stories of what you do when it floods or when it

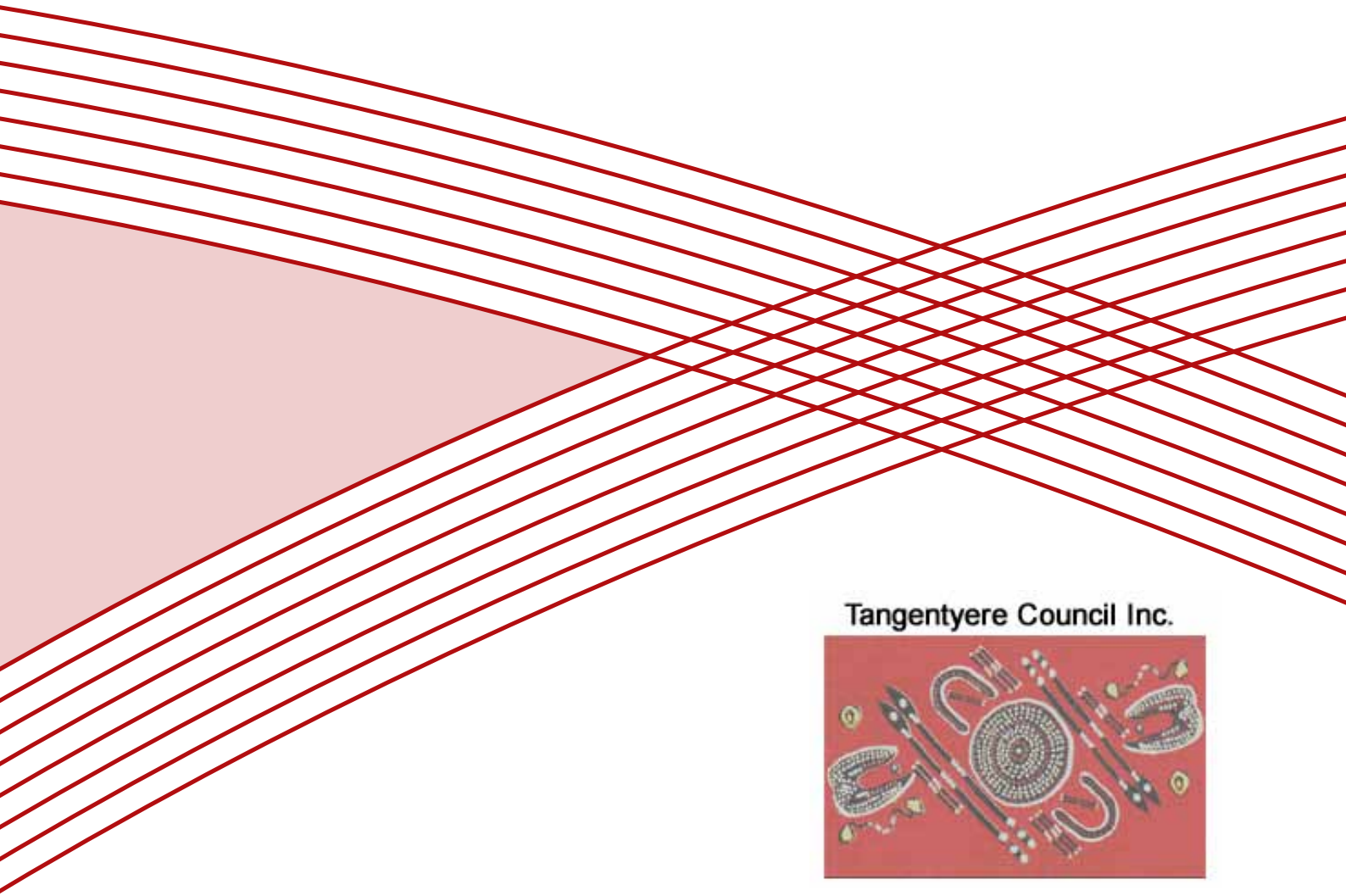


has been dry for a long time.

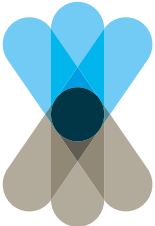
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