THE ADAPTABLE DWELLING A RESPONSE TO CULTURAL DIVERSITY

### THE ADAPTABLE DWELLING

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A 120 point thesis submitted to the School of Architecture, Victoria University of Wellington, in partial fulfilment of the requirements for the degree of Masters of Architecture (Prof.)

Victoria University of Wellington

2012

## ABSTRACT

Traditionally, dwellings have evolved in response to social and cultural needs, and changed simultaneously with the development of society. The dwelling is associated primarily with the concept of culture and identity of its occupants. This is challenged through migration to a new and unfamiliar context.

In 2010, immigrants granted residency in New Zealand came from increasingly diverse cultural backgrounds (Department of Labour, 2009). These varied cultural backgrounds present greater challenges and complex settlement barriers. A house that is able to cater to diverse cultural needs in terms of function, privacy, and adaptability is crucial for today's growing multicultural society. Immigrants are often placed in council housing that was designed for New Zealand's Pakeha culture which does not provide for the requirements of non-Pakeha cultures. Immigrants are often required to make significant cultural changes through the immigration process and many attributes of their cultures are lost because dwellings are inappropriate.

This thesis argues that architecture has a vital role to play in the mediation and integration of immigrants. The dwelling is an important medium through which immigrants can maintain a sense of cultural identity and can develop positive interactions with the wider community. It proposes a generic solution to public housing that is not spatially restrictive nor culturally inhibitive. The research navigates multi-disciplinary boundaries, through both an individual and community lens. It enables a holistic view of culture, immigrants and the importance of the dwelling. The research looks at recent immigration to New Zealand, the ethnic and cultural backgrounds of immigrants and the general challenges immigrants face. Furthermore, it explores historic and contemporary architectural theories on flexibility and adaptability.

The design phase brings together research findings of cultural research on immigrants' cultures in the design of a dwelling. It focuses on flexibility as an architectural solution. The design responds to the differing spatial needs of immigrant groups moving to New Zealand. It enables reflection of their identity in their transition to the new culture of New Zealand. The design phase is split into three sections: first, the creation of a generic solution that remains site-less, second, the generic solution is tested against the requirements of an Islamic family, and third, the outcomes of part one are tested in a higher density situation.

This thesis concludes by reviewing how the proposal has taken into account the diverse needs of particular cultures and specific living requirements of the immigrant groups studied. Through the concept of flexible design, the changing cultural needs of occupants are addressed. Immigrants moving to New Zealand will have a housing typology that can be adapted to their lifestyles and accommodate diverse cultural requirements.

# A C K N O W L E D G E M E N T S

This thesis draws together five years of studies, that would not of been possible without the support of the following people:

Firstly, I would like to thank my parents for their continuous support, in particular Angela Cook for her time, assistance and perseverance, throughout the year.

Secondly, I would like to thank Shenuka De Sylva, who as well as supervising this project, provided invaluable assistance and input.

Lastly, to my fellow students and friends for their ongoing support and guidance and for making this, and the four previous years so enjoyable.

January 2012

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# INTRODUCTION TO RESEARCH

Architecture can play an important role in accommodating cultural needs of immigrants while simultaneously allowing for transformation and integration of immigrant cultures into a new context. Architecture as a cultural medium can also help influence local perceptions towards immigrant groups. The premise for the thesis is for adaptive architectural design to create spaces that better meet the housing needs of immigrant groups, easing immigrant transition and integration to the wider community. The thesis presents an argument for housing that is adaptive to diverse cultural need and a design solution that could be adopted by Wellington City Council to better respond to the needs of its immigrant tenants.

Immigration is defined as an act of people passing or coming into a country for purpose of permanent residency. The last 15 years have seen considerable increases in immigration to New Zealand. In 2010, 45,719 immigrants were granted residency in New Zealand (Immigration New Zealand, 2010)<sup>1</sup>. As well as increasing numbers, there is a greater diversity of ethnic and cultural backgrounds now coming to New Zealand. Lifestyles, cultures, environments and dwellings in New Zealand often differ greatly from that of immigrants' original context.

Successful settlement is about completing the transition from one cultural context to another. It is also about engaging in and adapting to all that the new context offers while attempting to retain much of the immigrants' own cultural identity. Good dwellings and connections to the community are imperative for building a successful life for newcomers.

<sup>1</sup> These immigrants have contributed to the growth of the local economy with Immigration Minister Dr. Jonathan Coleman stating that immigrants added \$1.9 billion to the New Zealand economy in 2010 (Stock, 2011).

The dwelling is a potential architecture site that can influence the re-settlement process of immigrants. Suitable housing can help in the role of identity formation, cultural continuation and transformation, as well as integration into a new culture. The dwelling can be an important medium through which immigrants sustain cultural traditions and practices, and thereby maintain their sense of cultural identity. The house can also be important in the development of positive relationships between immigrants and the wider community.

Many immigrants are placed within council housing, which in Wellington is provided by Wellington City Council. This accommodation does not recognise culture of immigrants in terms of spatial layout, room sizing, privacy or function. Often housing is designed for the predominant New Zealand culture or based on post-World War II notions of the nuclear family.

#### A i m s

The aim of this thesis is to develop a fuller understanding of the role that architecture can play in the social and cultural needs of immigrants. It applies adaptive design techniques to address the issues faced by Wellington City Council. The thesis examines the concepts of culture and identity and their possible influence on the dwelling design, then develops an understanding of the settlement issues immigrants face. The research explores adaptive and flexible theories and practice and their relevance to cross-cultural design possibilities. More specifically, the thesis **aims** to understand the key housing requirements (spatial and cultural) of the dominant immigrant groups entering New Zealand and being settled in council housing. Overcrowding and illegal alterations and additions that compromise the health and safety of occupants is often the outcome of housing that is inappropriate to cultural needs (Wellington City Housing Trust, 2011).

Research findings have informed a design reflective of immigrants' needs, which draws heavily on flexible design elements. Overall the thesis aims to illustrate the role architecture can play in transitioning and adapting immigrants into a foreign cultural context.

#### Scope

The scope of the research is primarily a qualitative review of literature, which covers: the concept of culture and identity; research on migrant homes; a multidisciplinary background study of the issues surrounding culture, immigration and the relationship to architecture; theories of flexibility in architecture; and the cultural appropriateness of existing council housing conditions in Wellington.

Immigrants come from diverse cultural and language backgrounds and vary depending on their pre-migration circumstances. In general terms these newcomers fall into two main groups; those who are from Western origins, and non-Western migrants who are from backgrounds and environments that are vastly different to each other. It is the second group that is the focus of this thesis. Their cultural background present greater challenges and more complex settlement barriers than those from Western countries. These difficulties can include political oppression, lack of jobs, education or English skill as well as unrecognised qualifications. These immigrants usually fit into the low income category (Housing New Zealand, 2004). The main source countries of these migrants are Africa, China, India, and the Philippines (Department of Labour, 2009). It is this group that requires considerable support in a range of areas, including housing, to successfully adjust to a new context. Many of these migrants require council housing on entering New Zealand<sup>2</sup>.



Figure 1 The number of overseas born by area of birth, (highlighting the large increases from Pacific Island, Asia and other)

NUMBER OF OVERSEAS BORN BY AREAS OF BIRTH

<sup>2</sup> May include elderly people as well as families. Many elderly immigrants come from the Pacific nations to join family already migrated and have high rates on the benefit. Asian immigrants also have a low employment rate and this is reflected in their income (Winklemann, 2008).

This thesis concentrates on the provision of social housing; in this case council-owned housing that comes under Wellington City Council. Of all Wellington City Council stock, immigrant tenants make up 33% of occupants (Wellington City Council, 2011). New Zealand housing policy is also relevant to the research and provides guidelines to assess government provided housing.

The thesis excludes issues such as location of housing, outdatedness of designs, age and quality (standard/maintenance) of housing stock. It focuses purely on cultural appropriateness and inadequacies of housing for today's needs.

#### Methodology

The thesis structure is divided into two main parts: the first is an analysis of the background and cross-disciplinary research literature on cultures and theories of flexibility. The second part consists of design which explores how the concepts outlined in the first part can be translated into an architectural response. The research is informed by literature reviews and analysis of reports and data<sup>3</sup>.

Part one comprises the first four chapters; chapter one explores culture and identity and its influence on the built environment. Anthropology has been employed in this chapter as it is a perspective often seen as complementary to architecture; "anthropology, like architecture, deals with the relationship between human artefacts and mental constructs" (Robinson, 1991: p.157). The chapter includes multidisciplinary studies of physiology and anthropology and discovers the implication of cross-cultural adaptation and identity. The way culture has influenced dwellings, and therefore identity, is highlighted.

Chapter two examines traditional Japanese architecture theories and how these theories underpin the development of contemporary ideas of flexibility. It leads to discussions on modernist thinking on flexible and adaptable design, including key principles, systems and spatial layouts, and is primarily researched through historical and contemporary case studies.

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This excludes interviews, empirical methods, interactions, surveys etc.

Chapter three examines the housing needs of the diverse cultures of immigrant groups in order to establish principles on which to base the design component of the thesis. This is achieved by assessing the spatial and cultural needs of five different cultural groups of Pacific, Asian, African, and Arabic origins, analysing similarities and differences to create a range of requirements for an appropriate design solution.

Chapter four investigates the existing immigrant housing situation in Wellington. This chapter covers existing policies such as the Regional Settlement Strategy and its appropriateness in the current situation. A case study analyses the spatial planning of bedsit and townhouses in the Wellington City Council's Arlington Apartments Complex, confirming the gap between the cultural needs highlighted in Chapter three and current provision.

Part two informs key design principles from the literature in Part one. The design experiments with layout and the use of spatial separators to react to different family sizes and cultural needs in order to create a brief for design. The advantages and disadvantages of layout and division techniques in meeting cultural needs are assessed. The final design created is based on a modular system. This allows adaptability within the dwellings as well as between different sites and contexts. To test this design, a case study looks at how one particular cultural group, an Islamic family with culture-specific spatial requirements, would use the dwelling. This part concludes by testing the design and modular elements at higher densities to examine its application in those settings.

To conclude, an evaluation of the success of the design and the design process is undertaken. The final chapter summarises the key findings of the body of work by bringing together research and case studies and assessing how they have influenced the overall design outcomes. The chapter discusses shortcomings and areas requiring further investigation or testing.

# PART ONE:

LITERATURE AND PRECEDENT REVIEW

### CHAPTER ONE Culture and Identity

This chapter looks into existing theories of culture and identity, immigration and the challenges it creates, and the role housing plays in immigrant settlement into a new cultural environment. The chapter uses multidisciplinary studies to gain a holistic view on culture and identity. It covers anthropological definitions of identity and culture, and highlights the significance of the built environment and the dwelling for the migrant.

#### Culture and the built environment

As people move between cultures, interaction takes place both at the intersection and boundaries of cultures. Culture is a concept in a state of flux. Karamjit Gill (2007), a professor specialising in human and ethnic study, comments that this results in a diversity of interrelations, cultural combinations and cultural resources. The specific focus of this thesis is the varying cultural expectations that affect housing and the associated environment.

Schusky and Culbert (1973) in *Introducing Culture* define culture as the complex whole which includes knowledge, belief, art, morals, law, custom, behaviours, symbols and habits acquired by man as a member of a particular society and shared by a large group. This description contains most of the features that anthropological critics agree are crucial for the concept of culture.

According to Schusky and Culbert (1973), culture can be divided into four sub categories; first, culture is learnt from parents, family and environment; second, it is shared by a group of people; third, knowledge is stored and passed on from one generation to another, including learnt knowledge; finally, culture is diverse. They comment that culture is the way that man adapts to his environment in a world made up of many separate cultures.

Culture can therefore be seen as inseparable from the natural and built environment it cumulates. It improves and evolves over time and space rather than remaining static, and is influenced by global factors. In reference to immigration, Rebecca Chiu (2006), a specialist in housing studies, describes the world as a continuous spectrum of interacting forms, which combines and synthesises various local cultures and so breaks down cultural plurality. A migrant is someone whose culture often needs to adapt to the new environment while retaining customs and ideologies acquired from previous environments. Julia Robinson (1991) states that culture is important in understanding how ordinary people use and understand architectural artefacts, and what cultural behaviours and attitudes are supported by the forms of the built environment. Additionally Amos Rapoport (1969), a well-published author on culture, human behaviour, and how environments affect house form, notes the influence of culture on physical expressions within global architecture. Within the context of the migrant, the host culture impacts the migrant culture, and the migrant influences their immediate environment.

#### Identity

Contemporary questions of culture are today transferred into questions of identity. Cultural studies and social theories investigate cultural identity. According to Chiu (2006), culture gives identity to individuals as well as to groups and places over different time periods. Individual identity, as Rapoport (1981) describes it, is subject to a collection of various cultural identifiers: family life, school experiences, social categories and groupings, religious and ethnic training, sex and age, as well as the built environment; spaces and places encountered. In relation to this thesis, the influence of spaces, places, setting and, most importantly, the dwelling, are crucial factors impacting on identity and thereby culture.

Immigrants face rapid cultural change within a short space of time. Rapoport (1981), states that new cultural codes of identity are learnt through 'enculturation' in which the built environment is an agent and transmitter of culture. Further, if identity is questioned or not known in a new context, then place identity (which usually communicates social identity) becomes important to integration.

#### Cross-cultural

As this thesis looks at multiple cultures and their associations and differences, the term cross-cultural has been adopted for means of comparison. The term covers the study of the role of cultural factors in shaping human behaviour. Shiraev and Levy (2004) describe 'cross-cultural' under a psychological lens, as the critical and comparative study of cultural effects on human psychology. Cross-cultural

analysis examines psychology studies from a comparative view of the links between cultural norms and behaviour and the ways in which particular human activities are influenced by social and cultural forces. 'Cross cultural interactions' is a term used by W. Barnett Pearce and Kyung-Wha Kang (1988), that refers to the complex process through which an individual acquires an increasing level of "fitness" or "compatibility" in the new cultural environment.



Figure 1.1 The individual psychological development of migration

#### Cultural adaptation

Ultimately, all forms of identity, whether ethnic, religious or individual, depend on establishing a contrast to describe those who are different. Differences both separate and distinguish social units, leading to varied interactions or communication. Migrants relocating to a new country find conflict in retaining a proportion of their culture while simultaneously adapting to the culture of their new country.

#### Context

The current global migration situation is described by Dawson (1998) as the culmination of four hundred years of massive global migration, and traffic of cultural items and information has become continuous. The result of this migration is socially and culturally diverse societies.

Historically, immigrants into New Zealand have predominately come from Great Britain and Ireland. World Wars I and II saw increases in refugee migrants, a migration that has continued due to conflicts in immigrants' home nations. In the 1950s and 1960s more people were helped to migrate, including larger numbers of English, Dutch and Scots. At this time immigrants also began to come from the Pacific Islands, attracted by work opportunities. Through the 1990s the number of British immigrants fell (Phillips, 2009).

In 1975 and again in 1987, New Zealand changed its immigration policies to admit people on the basis of their qualifications and not origins or family (Phillips, 2009). The points system of entry led to increased and diverse immigration. Since then there has been a large flow of immigrants from Asia and Africa (Phillips, 2009). Immigrants come from increasingly diverse origins and New Zealand is today more multicultural than ever before.

#### Retaining culture and identity

There are two main arguments for retaining one's cultural values and identity: first, for the individual and family so they can navigate a new context and culture, and second, for the new society, wanting to have immigrants successfully integrate and so assist settlement. Retaining ethnic identity contributes significantly to migrants' wellbeing and is vital for their successful adaptation into a new society. Allowing for cultural continuation enables migrants to cope with the many adversities they may have to face within a new context. The Department of Labour (2009) routinely stresses the importance of host environment members understanding the different cultural aspects, particularly relating to families, marriage, gender and gender roles, so as to inform settlement processes.

Rapoport (1981) comments on the major role the new environment plays in communicating identity and culture. Adaptation becomes less stressful for immigrants when a dwelling or living environment is culturally familiar or reflects some sensitivity to cultural practices.

Opposing cultural retention, Shiraev and Levy (2004), comment that social and environmental conditions influence conformity. Conformity is a form of social influence in which individuals change their attitudes and/or behaviour to adhere to a group or social norms. Immigrants are placed within an existing building fabric which sometimes leads to immigrants losing contact with their culture for purposes of conformity and acceptance.

#### Settlement issues

Some of the main settlement issues encountered by immigrants to Wellington include the lack of appropriate dwellings, with immigrants often filling voids left in the housing stock. Poor living conditions, lack of privacy, and concerns about safety and security have often been associated with immigrant accommodation.

Immigrants may also face problems of discrimination and exclusion in a foreign context. Pearce and Kang (1988), state that immigrants are strangers in a foreign land who face new demands from standing out in a new setting. They must cope with a high level of uncertainty and unfamiliarity.

Furthermore, settlement problems may include harassment and abuse<sup>1</sup>. In Wellington, many immigrants are placed in council housing (public housing provided by Wellington City Council) where expression of identity is often blocked. According to Rapoport (1981), public housing environments are often already characterised by a negative identity. This also contributes to stigmatisation of immigrants.

Shared experiences, cultures and the situations of immigrants can lead to them settling in clusters; the introduction of specialist shops, cafes and other institutions result in a further disassociation and segregation from the wider community.

<sup>1</sup> This may be more extreme in neighbourhoods with little previous history of accommodating diversity and difference.

#### Architect's role in public housing

Currently the role of architects in the housing of immigrants is established through design services, usually commissioned by government or council agencies, rather than by the people for whom the dwellings are designed. John Zeisel (1974), an architect who designs for the non-paying client, comments that there is a complete disassociation between the architect and the inhabitant; the architect is paid by one client, the design is for another. In order to overcome this disconnect, designers should incorporate adaptability and participation involvement in order to increase user control (Zeisel, 1974). Housing should be designed so that residents can live the way they want to.

#### Housing and integration

To overcome the issues highlighted above, mediating architecture becomes important in settling immigrants and translating their culture into a new context. Solutions are important for both the immigrant group as well as the local population.

Firstly, according to Rapoport (1981), identity can be communicated in different ways and at many levels by buildings, spaces, locations, gardens, plants and furnishings; both fixed and semi-fixed elements. He goes on to comment that stand alone dwellings are more desirable to reflect culture, as apartments can be criticised for limiting personalisation and inhibiting self-identity (Rapoport, 1981).

Secondly, as a response to accommodating differing needs of identity and culture, Rapoport (1981) suggests a complex of easily adaptable, semi-fixed elements. They can be highly distinctive and, therefore, communicate a particular message and expression of identity of each occupant. If elements can be extended the possibility of reflecting identity is increased.

Lastly, in terms of the contemporary notion of individual identity as a function of control and competence, Rapoport (1981) argues there is evidence of some striking effects when introducing gardens into public housing, which appear to enhance feelings of individual identity and hence self-esteem.

#### Concept of 'culture of the artificial'

Gill (2007) has noted that cross-cultural interactions should occur in culturally neutral space, space that enables individuals from two different cultural groups to meet and share their common experiences. This space provides a stage for crosscultural learning or recognition, and for acceptance of cultural differences<sup>2</sup>. Simply put, Gill (2007) is stating the inadequacy of a space dominated by one particular culture in facilitating interaction between two or more diverse cultures. The reason being expressed symbolism dominates interaction and does not enable a fair representation of other cultures. In neutral spaces interactions are not bound by social or cultural factors. Therefore, within the context of immigrant housing, a cross-cultural space which is not bound by a culture provides a space for diverse cultures to interact.

Gill (2007) also notes that if we extend this cross-cultural interaction to more than two cultures, we begin to visualise interactions taking place at various levels and layers of cultural architectures, at times overlapping and intersecting each other.

#### The built environment

When dealing with theories of culture, housing should be defined in a culturally neutral way. Dawson and Rapport (1998) states homes and the allocation of resources can be understood as the organisation of space over time. Traditional domestic forms evolve in response to social and cultural needs of a time, and change according to how the culture develops (Anthony, 2001).

In anthropology, the built environment is understood to be a medium for the communication and propagation of cultural ideas which can either perpetuate cultural norms or enable change (Robinson, 1991). Julia W. Robinson (1991), an architect focuses on social and cultural factors in architect, argues that architecture is essentially cultural. Using the concept of architecture as a medium for culture,

<sup>2</sup> Gill calls this process 'valorising' of cultures, which says that we make best use of our common cultural experiences while recognising our different cultural identities.

architecture is a material substance that communicates and perpetuates cultural attitudes and behaviour. The 'home' participates in culture, reveals it, and potentially comments on it. Therefore 'home' can serve to encapsulate, but also to link and transcend, traditional classifications of culture. Similarly, as a concept, 'home' can and must encompass cultural norms and individual fantasies, representations of and by the group and the individual (Rapport&Dawson, 1998).

#### The importance of the 'house'

In a new context, successful integration is dependent upon appropriate housing and environments. Rapoport (1981) states that it is quickly realised that in the case of most traditional cultures, individual identity expressed through dwellings is important. According to Mark Poddubuik (1999), housing is the clearest reflection of our everyday life; of what we value, of how we live and to what we aspire. The study of dwellings is reflective of the aspirations and capabilities of a population. The homes represent values, culture, identity, and economic conditions of a time.

As well as representing culture and identity for most groups in their own culture, the dwelling is very central within the routine of our daily lives; the highest proportion of our time is spent there, and it is one's most valuable possession (Rapoport, 1981). Crucial to this thesis is how dwellings can communicate identity through examining a broad range of factors across diverse cultures.

#### The migrant house

The house both encloses space (the physical building) and excludes space (everything outside it). The house therefore nicely reflects how a person sees themselves. Claire Cooper (1974), comments that most of us have had the experience of moving from one house to another, and of finding the new dwelling initially strange, un-welcoming, and perhaps even hostile. There becomes a greater disconnection for immigrants when the context they are moving into does not reflect their culture and spatial needs in relation to privacy and size.

The immigrant is part of an increasingly globalised world. As a consequence this has changed the traditional notion of 'home', usually associated with the fixed and stable. Rapport and Dawson (1998) define the traditional idea of 'home' as being a safe and still place to leave and return to, and a principal focus of immigrants. However Akiko Busch (1999), a published author on design, culture, and the natural world, is of the opinion that, "any definition of home today must consider how new attitudes and values come up against the familiar; how our needs are served by what we know, as well as by what we remember" (p.20).

#### The exterior

The exterior of a dwelling can help to mediate the process of integration between two or more different cultures. The "exterior form of the house becomes a symbol that interacts between both the migrant and the host community" (Lozanovska, 1997: p.110). This is reiterated by Lozanovska (1997) who, in reference to an example of an immigrant home in Australia where lion figures are placed at the gate, states, "For the migrant these figures are images of power and force, images of territory, of a frontier in and of space" (p.110). However, she also highlights the differences in perceptions between cultures which can lead to misunderstanding, resulting in negative consequences for the immigrant and their settlement. She states: "in their transfer into the suburban environment, they become targets for the common gesture of finger pointing – a gesture of military intent in the cultural battlefield" (p. 110). While this example highlights the importance and meaning of cultural symbolism to the immigrant, it also demonstrates possible conflicts that can arise. It is important that the exterior of the dwelling limits prospects of negative perception from the existing community. The exterior becomes important as it is where the wider perceptions of the inhabitant are negotiated and should be designed with careful consideration of the surrounding context.

However, it has also been noted that limiting symbolism creates barriers to integration within the community, as focus is placed on the interior with little interaction with the external. Rapoport (1981) comments that identifying elements immigrants may add to their new homes are thus concentrated to the dwelling's interior in the form of an 'aesthetic complex'<sup>3</sup>.

#### The interior

3

It is the interior that should allow for cultural continuation. The interior is where the immigrant is able to express cultural symbolism, memory and ritual without judgement. Dawson (1998) comments that the interior becomes an environment that allows for immigrants to maintain traditional practices and routines that make them feel most at home. The interior should be thought of as the space which provokes cultural meaning and symbolism, linking the immigrant to their cultural background<sup>4</sup>.

The physical fabric is individualised by the occupants, the furniture we install, the way we arrange it- all are expressions of our image of ourselves (Cooper, 1974). The product of interior space is not linear in the sense that the phrase 'cultural produces' suggests; architectural space is never simply the production of abstract symbolic space, "it is space produced out of an entangled network of cultural negotiations surrounding ideas of home, identity, community, propriety, property ownership, gender, aesthetics, and a multitude of other issues" (Ingraham, 2003:p.63).

This is also often the case when immigrants are placed in higher density units.

<sup>4</sup> It should be noted that this could create an inward focus and therefore encourage isolation of immigrants from the wider community, therefore a balance needs to be created.

#### Discussion

Culture, identity and the dwelling are all concepts that are intertwined. Changes in immigration policy have seen increasingly diverse migration. As a result, dwellings need to be appropriate to immigrants to aid in settlement and cultural retention.

It is noted by Lozanovska (1997) that exterior symbolism needs to be considered, with respect to the new culture, and a understanding between cultures needs to be established to avoid negative connotations. However, cultural symbolism is not always viewed negatively. Symbolism may not necessarily come in the form of a lion but it may be an architectural style or a colour applied to the house. The migrant cultural intervention may improve and inform local thinking.

Concentration and outward symbolism can have a positive effect and create vibrant communities such as Chinatown, Little Italy, etc... (with positive effects on both the culture and new context mainly). Plischke, a migrant architect,<sup>5</sup> designed several migrant houses in New Zealand in addition to those he designed for the Ministry of Housing and Wellington City Council, including the Dixon Street Flats. His architecture informed, influenced and improved local architectural thinking and practice. This highlights a conflict of what is acceptable within council regulations and cannot be predicted by expressions of immigrants. However, to respond to these issues becomes beyond the scope of this thesis, which has a focus on spatial planning of dwellings in relation to immigration.

<sup>5</sup> Ernst Plischke and his family struggled to integrate into New Zealand society, due to prejudices against their nationality at the time.

It is desirable to find a balance, of enough symbolism to be meaningful for the occupant but pegged back to avoid any negative connotations. The home is where an immigrant spends most of their time and this reinforces the need for a dwelling to respond to their needs. There needs to be a compromise between fitting into a context and not wanting to draw unwanted attention, but allowing for the exterior of the dwelling to speak of the occupant.

Research indicates that the internal space is most important for cultural symbolism, it is where the ideas of cultural traditions can be illustrated without outside negative perceptions. However, for a dwelling to do this, it must consider systems of beliefs imbedded in different cultures. These cultural requirements are be explored in Chapter three.

It is through identification of the function of a space that cultural differences between groups can be taken into account in designed physical environments. This is one of the central contributions from research on architectural design. The use of living room, dining room, entrance and kitchen can clearly point to the value of analysing behavioural and perception data in terms of latent function.

## CHAPTER TWO Flexibility in architecture

This chapter contains an historic and contemporary study of flexible architecture including ideas of adaptable and modular design. Origins of flexibility are traced back to traditional Japanese dwellings and the adoption and development of flexible architecture in Western architecture is discussed. A number of case studies have been used to show the use and development of flexible architecture. The concept of flexibility has been selected as central in developing a design for immigrant housings. Throughout the twentieth century there has been a fascination with the search for the 'ideal' home. Most existing houses allow minimum freedom to adapt as individual needs and 'ideals' change. As a response many designs have focused on flexibility and adaptability as a key innovative element.

Houses tend to be built for the particular wants and needs of the occupant at the time of construction and are therefore tailored to the occupants' current situation. Over time the layout and walls are generally not able to be adjusted as lifestyles change, resulting in a need for renovation. Robert Kronenburg (2007), an architect enthusiastic about responsive and adaptive architecture, states: "unless flexible elements are incorporated into the design, architects have to try to predict likely future needs while responding to current needs" (p.40). Stewart Brand (1997), a well published American author, has voiced a cynical view about architects' abilities to predict these future needs, stating "all buildings are predictions, all predictions are wrong" (p.178).

#### Defining flexible architecture

Dutch architect Helga Fassbinder (1990) confirms the conflict between the static character of a house or dwelling, the dynamic character of inhabitants and their ever changing needs. Flexibility in architecture is based on the principle that a building can absorb, or adapt, to reflect changes in use throughout their lifetimes (Kronenburg, 2007). As Jonathan Hill (2003) notes, the flexible approach attempts to deal with the contradiction between the expected and actual human use and the fact that the architect is no longer involved once the building is built. A flexible dwelling is a means of responding to the inconsistency of habitation.

Tatjana Schneider and Jeremy Till (2005), who have done extensive research on flexible housing, acknowledge that flexibility is the concept that gives the user choices about how they want to arrange and use space instead of the dwelling "predetermining the way they use the dwelling" (p.158). A building designed for responsive living could be moved from one place to another or changed in shape or structure; the walls might fold; floor shift, staircase extend; lighting, colours and surface textures metamorphose (Kronenburg, 2007). Flexibility can also be through the design layout and accommodate future occupation needs. As Kronenburg (2007) states this is architecture that "adapts, rather than stagnates, transforms rather than restricts, is motive rather than static; interacts with its users, rather than inhibits".

#### Advantages of flexible design

According to Schneider and Till (2007), the arguments for flexible housing are compelling. Socially, it empowers the user to take control of their own dwelling over the lifetime of the home. Demographically, it enables housing providers to adjust to new living patterns and configurations of users. Economically, it avoids obsolescence and costs involved in reconfiguration or refurbishment. Technically, it should allow for the incorporation of new technologies and the upgrading of old ones, in particular servicing.

Flexibility requires architecture having a loose fit and is sometimes called 'open building'. This concept means that buildings are not complete until people inhabit and use the space. The inhabitation can continue to change while the architecture remains the same. Fluid architecture and the loose fit of the spaces means changes of functions are easy. Kronenburg (2007) also states the benefits include being in use for longer, fitting buildings' multiple purposes, accommodating users' interventions, and having "greater potential to remain relevant to cultural and social trends" (p. 6). According to Hill (2003) this also increases its exchange value because of the possibilities.



Figure 2.1 Layers of a building (breaking down the size of the structural elements increases flexibility)

Flexibility can offer greater individualisation. Herman Hertzberger (2005) notes that flexibility can contribute to creating an environment which offers far more opportunities for people to make their personal markings and identifications, in such a way that it can be appropriated and annexed by all as a place that truly "belongs" to them (Schneider&Till, 2005).

Fassbinder (1990) discusses how flexibility can create a dual use of space. Fixed aspects such as the toilet and bathroom, with sliding walls and moveable cupboards to create the remaining spaces, so that a living area can be created in the daytime and a sleeping area at night. Le Corbusier states that "the occupants have a usable living space of not less than 71 square meters while only paying for 46" (Fassbinder, 1990:p. 21).

#### Modular design and prefabrication

Included in ideas of flexibility, modular design is a principle that subdivides a building into smaller parts known as modules. Modular elements are able to be changed, removed or replaced as occupants see fit. This creates flexibility through a number of possibilities (Smith, 2011). These systems work within a fixed structure, with flexible elements such as doors, walls, storage and furniture that fit into a modulated system determined by the overall structure. These modules can be created separately and used in different systems, but together the modules make up an overall dwelling.



Figure 2.2 Modular Furniture (bed) system

Advantages of modular design, as noted by Ryan Smith (2011), are reduced cost (due to lesser customisation and less learning time), and flexibility in design. Modular buildings are very affordable because they are factory constructed and modular units are typically constructed in an enclosed facility; therefore weather is not a factor in the construction time line. Modular homes are easy to alter and extend. A building can have sections, or even entire floors, simply added.
# History of flexible architecture

Flexible architecture is not a new phenomenon, but a form of building that has evolved alongside human beings developing creative skills (Kronenburg, 2007). The traditional design of Japanese dwellings has had the most influence on current concepts of flexibility and adaptability in Western architecture.

## Traditional Japanese architecture

The underlying idea of the traditional Japanese concept of flexibility is guided by Zen Buddhists. Botand Bognar (1989), an American architect extensively published on Japanese architecture, comments that traditional Japanese architecture is "in the continuous process of transformation and change, nothing is permanent, or, conversely, every momentary stage of development is equally viable and complete". He states: "In this world everything is in a perpetually temporary state of in-between" (Bognar, 1989: p.200). In other words this constant state of change demands an architecture that is able to be to changed and adapted. This is where theories of flexible architectures have originated from.

Traditional Japanese architecture has no clear limits, and has smooth transitions and zones which are non-specific as to use. The traditional Japanese dwelling is characterised by a large open floor plan. The spatial continuum of the wooden frame, which can be laid out in various ways, means any desired space configuration is freely available to occupants through sliding walls (Fassbinder, 1990).

The openness of the plan as well as the frame construction system used in traditional Japanese architecture allows functional and social changes to be dealt with easily. This change can be on a daily as well as a periodic or even long term basis. Schneider and Till (2007) emphasise the flexible connections in Japanese architecture, walls can be opened or closed through



Figure 2.2 Photographs of traditional Japanese dwelling, highlighting the lightweight sliding partitions

sliding screens, changing the size or function of the space instantly. Two individual rooms can be joined by simply opening up large screens to make one room that can be used for a specific festivity or gatherings (Schneider&Till, 2007). Traditionally, while the use of spaces within a Japanese house was mostly left un-designated, the entrance, kitchen and bathroom were specified.

Walter Gropius, noted that "the traditional Japanese house is so strikingly modern because it contains perfect solutions, already centuries old, for problems which the contemporary Western architect are still wrestling with today" (Kishimoto, 1986). He is referring to the flexibility of this architecture; moveable exterior and interior walls, changeability, multi-use of spaces, prefabrication and modular coordination of all the building parts. Further, Yuji Kishimoto (1986), a Japanese architect working in America, comments that the indoor-outdoor relation between the house and garden, which has only been recently discovered in the West had been a matter of great concern in Japan centuries ago (Kishimoto, 1986).

#### Movable partitions

The origin of movable interior partitions can be traced to the Japanese *fusuma*<sup>1</sup>. The *fusuma* allowed flexibility and change to suit the changing needs of days or seasons. The interior walls were created from movable *shoji* screens<sup>2</sup>, allowing residents to modify the interior of the house to accommodate different functions. Their dynamic nature was sharply contrasted by the static condition of the heavy timber posts and beams which brought order to the whole dwelling<sup>3</sup>. Wen Jie (2010) in *Building Traditional Japanese Houses*, comments the featureless, diffuse light that comes through a *shoji* screen creates a calm interior atmosphere, manipulating light and air. The screens' most effective role is in dividing and connecting spaces. They can be moved either horizontally or vertically, a little or for their entire distance, and part of a *shoji* panel can be lifted for visibility and ventilation.

<sup>1</sup> A *fusuma* is a wooden-framed sliding door, both sides covered with opaque paper usually painted in Japanese style. These sliding panels are strengthened by cross battens to which several layers of paper are glued which allow light through but hide what is behind them.

<sup>2</sup> *Shoji* screens act as room dividers and are made of translucent paper over a frame of wood, which holds together a lattice of wood. They are often designed to slide open, and thus conserve space that would be required by a swinging door.

<sup>3</sup> The timber post and beam structure that traditional Japanese homes allow for large open spaces, meaning that internal walls are not required to carry load and therefore *fusumas* were able to be used.

## Modular

Traditional Japanese architecture follows well-elaborated modular systems derived from the coordinated structural span between square posts. Proportion and hierarchy are very important in the traditional Japanese house design. To design a house, the first thing that needs to be established is the total number of *tatami* mats (type of mat used as a flooring panels) required for the purpose of the home. The size of the rooms, and therefore the dwelling, is based on the standard measure of *tatami* mats, with rooms made up of sets of these mats(i.e. 6 or 8) (Schneider&Till, 2007).

In a traditional Japanese house, as explained by Jie (2010), there is also a hierarchy of form. Rooms designed for important functions, like entertaining, are usually larger than rooms for other possible purposes. To accommodate the possibility for changes in function in future use, spaces are usually designed larger than the basic requirements.

#### Flexibility in Western architecture

More recently, flexibility in Western architecture was a reaction to functionalism, a principle that in the early twentieth century proposed that buildings should be designed purely for their purpose. Louis Sullivan who coined the phrase "form follows function" believed that a building's size, mass, spatial grammar and other characteristics should be driven solely by the function. Tight-fit functionalism followed, with "the idea that rooms can only be used in one predetermined way because of the size and shape of rooms" (Schneider&Till, 2005: p. 164). This meant that buildings and dwellings were strictly responsive of needs at a particular point in time, thus creating inflexibility. Schneider and Till (2005) comment that once the users' needs change, as inevitably they do, the occupants have no choice but to move.

Many architects including, Walter Gropius and Frank Lloyd Wright, have employed ideas from Japanese architecture with the use of sliding doors and screens. Wright introduced the open-floor plan into modern European architecture at the beginning of the 20th century. In 1910 Wright commented: "Each domestic function was properly

box to box, I could see little sense in this inhabitation, this cellular sequestration, so I declared the whole lower floor as one room. Then I screened various partitions of the big room for certain domestic purposes. The house became free as space and more live able too" (Fassbinder, 1990, p. 13).

#### Post-functionalism

In the West, ideas of flexibility began to surface in the early-to-mid twentieth century as a reaction to functionalism. Hill (2003) comments that at this time, the movement considered that not all uses could be foreseen at the moment of design and 'flexibility' was therefore a desirable property. 'Flexibility' could redeem functionalism by introducing time, future and the unknown. Supporters saw adaptable and flexible design as well-placed, not only to solve a wide range of architectural problems, but to design dwellings better than more conventional responses of the time (Kronenburg, 2007). Buildings should therefore be designed for uses beyond their primary purpose.

# Modernism

The primary legacy of the movement towards flexibility in house design is the merging of space, usually described as the free-plans. Kronenburg (2007)notes as almost as important as flexible floor plans is the phenomenon of the disappearing wall. Many of the more emphatic examples of intentionally flexible houses have a formal clarity, distinguishing between those elements that are fixed and those that are open to change and variation, allowing the upgrading of individual items with little disruption to the entirety of the building (Schneider&Till, 2005).

Advances in technology meant that ideas of flexibility were able to be explored more easily. Additionally, advances in cast-iron and steel loading meant traditional load-bearing walls could be reduced to columns, allowing for space dividing with no structural significance. This is an important component of flexible design as the walls no longer needed to be fixed and strong; instead lightweight movable walls were able to be used to divide large space<sup>4</sup> (Kishimoto, 1986).

Flexible design has three types:

- 'mobility' allows for rapid change of spaces on a virtually instantaneous basis, allowing for day to day reconfiguration.
- 'evolution' provides built-in capacity for long-term modification to the basic layout over a period of years.
- 'elasticity' concerns the expansion or contraction of the habitable space.

## Early Twentieth century examples of flexible design

The development of flexibility is best illustrated through case studies highlighting how flexibility has been employed. An important figure in flexible architecture in the twentieth century was Le Corbusier, who in 1926, formulated 'Five points of architecture'. These points included:

1. The *pilotis* (supports such as columns, pillars) elevating the mass off the ground.

2. The free plan, achieved through the separation of the load-bearing columns from the walls subdividing the space.

- 3. The free façade, the corollary of the free-plan in the vertical plane.
- 4. The long horizontal sliding window.

5. The roof garden, restoring, supposedly, the area of ground covered by the house (Moos, 1979).



Figure 2.4 Indeterminate space (non-loading walls easily added or removed)

These points were best illustrated in Le Corbusier's domestic architecture. In addition, the ideas of flexibility can be seen in the 'double house', a project designed in the mid 1920s. The transformable 'double house' employs a variant program, plan and structure in accordance with the character of its imagined inhabitants. Inspiration for Le Corbusier came from a train carriage as a modern traffic machine, and is reflected in the hallway which is dimensioned accordingly.

The house combines two double rooms, symmetrical and unified by a row of piles and ribbed windows the size of the building. The idea was of an expandable house to which more bays could be added like cars on a train, hence the placement of the stairs perpendicular to the body. By day, the space is delineated but not divided by the columns, concrete built-in cabinets and desks. By night, sliding partitions at the columns divide the continuous room into a series of sleeping cells. The service areas, kitchen and bathroom are placed together. The architect and the inhabitants are able to shift arrangements of the interior according to what they want to do (Gans, 2006).

## E - 1 0 2 7

During the modernist period in the 1920s a liveable and flexible modern building was designed and built by Eileen Gray. Gray created a villa with an open and flexible design, which allows the user to experience the space as an organic whole, comprising the self, the house, and the outside environment. Divisions between the living rooms and balcony are movable and varied, and the living space and balcony are the same height and made of the same materials, making the living room part of the outside.

Though the house is clearly within the modernist canon, it expresses a different sensibility to how the inhabitant would interact with the environment. E-1027 incorporated many special design elements that blur the line between what is building and what is furniture. Kronenburg (2007) describes this as a loose-fit and able to be changed by the occupant.



Figure 2.5 E-1027 Plan of the first floor( not to scale)

The main flexible aspect of the house is the multi-purpose space that includes living room, wardrobe, dining area, bar, and a guest room complete with bed and shower. The bedroom was proposed to be a multi-functional space for all aspects of life, pleasure, rest, studies, business meetings and parties (Bonnevier, 2005). The other rooms are smaller but also have interlinking functions, each internal space connected to a private exterior for views and also to extend the room's space. This is the modernist's architecture that focuses on human experience as a primary generator in creating form (Kronenburg, 2007).

Screens are transformed into walls and combined with floors. Spaces are folded into entire interiors, to a complete building, where divisions between interior decoration and building are impossible (Bonnevier, 2005). Walls and screens can slide aside and windows flip and disappear, the bar can be folded into the wall, and table can be linked, folded and extended depending on individuals' desire.







Figure 2.7 E-1027 Exterior view of the house

Katarina Bonnevier (2005) comments that through the in-built flexible elements the norm for how houses usually work is broken. The occupant can set the house in motion, the "architecture prescribes a behaviour where the body is engaged with the building elements" (Bonnevier, 2005:p. 167). The space is designed to be adaptable, while elements of the design can be uniquely tailored to the functions of the occupants. In addition to a flexible floor space, each room has multiple entrances to accommodate a variety of access ways.

## Rietveld Schroder house

Described as perhaps the most flexible house of this period, the Rietveld Schroder house of 1924 was designed by De Stijl architect Gerrit Rietveld in collaboration with his client, Mrs. Truus Scroder-Schrader, and her three children. She commissioned the house to be designed preferable without any walls.

Mrs. Schroder provided criteria for the design of the rooms:

- 1. a bed should be able to fit in the room in at least two different positions.
- 2. each room should have direct water supply, drainage and access to the outside.

Wilma Kwan (2003) notes that Gerrit Rietveld was able to meet all the criteria and created a masterpiece by paying a lot of attention to details. Inside the house there is no static accumulation of rooms, but a dynamic, changeable open zone. The ground floor can still be termed traditional; ranged around a central staircase are the kitchen and three bedrooms. The living area upstairs, stated as being an attic to satisfy the fire regulations of the planning authorities, in fact forms a large open zone as a living space that could be usable in either form, open or subdivided. This was achieved with a system of sliding and revolving panels. Rietveld used his training as a cabinet maker to create a system of surfaces that combined to divide the bathroom and bedrooms from the other spaces (Kronenburg, 2007).



Figure 2.8 & 2.9 Rietveld Schroder House living level: use of sliding and removable panels to define the space

As in a traditional Japanese house, the flexibility relies on the participation of the user, who is constantly employed to create enclosure and then dissolve it again. When entirely partitioned in, the living level comprises three bedrooms, bathroom and living room. In-between this and the open state is a wide variety of possible permutations, each providing its own spatial experience. This flexible floor plan is based on the idea that generally speaking, the various functions need not be required simultaneously (Fassbinder, 1990).

During the day the hinged internal walls are pushed towards the outer walls of the building and either kept in storage cupboards or gathered behind short fin walls. When closed again the screen in the centre doubles up as a door so that each room can be accessed separately from the hall; two rooms for sleeping and one living room.

Principles implemented in this dwelling, were according to the De Stijl manifesto, the new architecture has to be open, connecting the interior and exterior, while the layout must be moveable the party walls can also be replaced by screens or panels.



Figure 2. 10 Rietveld Schroder house, exploded Axonometric of structure



Figure 2. 11 Rietveld Schroder house: sliding panels

There is little distinction between interior and exterior space. The rectilinear lines and planes flow from outside to inside, with the same colour palette and surfaces. Even the windows are hinged so they can only open ninety degrees to the wall, preserving strict design standards about intersecting planes, and further blurring the delineation of inside and out. In the 1920s, the flexible house was a design challenge to which modern architects devoted a great deal of attention and sought possible variations, including:

- non-specific rooms for flexible applications
- load-bearing frames allowing for completely free layout
- principles of alterable layout as indicated in Japanese houses
- the extent of variation of spacing of structural bays create possibilities for different combinations.

# Flexibility in high density housing

As well as individual dwellings, the ideas of flexibility have been employed in high density social housing developments in Europe since the 1920s, with floor plans of houses developed independently from the structural framework.

In 1929 Rietveld Schroder developed the 'core' house, a solution that recurs later in the work of many other architects. Fassbinder (1990) comments this solution creates a production of a clock in which all the services such as the sink, the plumbing, stairs and chimney are concentrated, and depending on the dwelling, living areas and bedrooms could be grouped in a particular manner. This idea is particularly important to higher density developments. In high density development flexibility must be established prior to occupation as a way of allowing different variations within the same architectural form.



Figure 2.12 'Core' unit within a house or higher density complex

# Contemporary thinking on flexibility

The increased use of large spans, the minimization of structural order, and technological advances meant flexibility could be more easily developed in contemporary society. Convertible technical fittings or moveable objects play a vital role in that open and fluid virtual space, the same role as traditional dividing panels, but with greater versatility (Gausa, 1998,). Flexibility today can create a more fluid and transformable space which encourages the evolution of partitioning systems based on mass-produced or industrialised elements such as sliding, folding, collapsible panels, technical fittings, swivelling units, dismountable ceilings, partitions.

The degree of flexibility is determined in two ways. First, the in-built opportunity for adaptability, defined as 'capable of different social uses', and second, the opportunity of flexibility, defined as 'capable of different physical arrangements' (Schneider&Till, 2005:p. 157). Furthermore, Hill (2003) highlights three main types of flexibility in contemporary architecture: technical means, spatial redundancy and as a political strategy. These types of flexibility, and the concept of polyvalence, which addresses criticism of flexibility, are discussed below<sup>5</sup>:

#### Flexibility by technical means

Technical flexibility includes elements in a fixed location that have a limited range of configurations (as seen in the Rietveld Schroder house). Folding walls allow the first floor to be either a single space or a series of smaller spaces. This type of flexibility allows the occupant to select from a range of configurations defined by the architect. Hill comments "The flexibility of the house lies in its accommodation of changing relationships between events, context and the use of space." (Hill, 2003: p. 31). The user is able to make significant physical changes but the architect still largely defines the character of the building<sup>6</sup>.

<sup>5</sup> Beyond this, theories of 'character flexibility' exist, which include the different and changing demands of the finish, style adaptation of façade layout, and personalised exterior appearance.

<sup>6</sup> Developments meant that services were able to be accommodated in the roof space, offering freedom in layout and arrangements (Hill, 2003). Mark Poddubuik has noted this type of flexibility has also been called, 'Spatial flexibility', the adaptation of the spatial structure of the dwelling through interchangeable components within a field or carefully planned, limited fixed structural and service elements (Poddubuik, 1999).

#### Flexibility by spatial redundancy

Spatial redundancy refers to a space that is so large it can accommodate different uses, and where rooms are not dedicated to specific uses. Flexibility is not the exhaustive anticipation of all possible changes. Poddubuik (1999) notes spatial redundancy is also known as 'functional flexibility', the idea of multi-functional and purpose-neutral rooms. Further, Hill (2003) explains spatial flexibility as the creation of a margin; excess capacity that enables different, and even opposite, interpretations and uses. The extent of spatial flexibility can be achieved by identifying potential modifications to suit individual needs (Poddubuik, 1999).

#### Flexibility by open plan

Flexibility by open plan suggests a loose fit between space and use. Hill (2003) states the open-plan is similar to flexibility by spatial reduction, however the change of use is less dependent upon a physical transformation of the building than a change in the perception of the user. Flexibility of use is not created by the physical flexibility of a building alone.

## Polyvalence

Polyvalence is a response to criticism of flexibility by Aldo van Eyck and Herman Hertzberger in the 1960s. They state that "although a flexible set-up admittedly adapts itself to each change, it can never be the best and most suitable solution to a problem. It can at any given moment provide any solution but the most appropriate one" (Hill, 2003:p.31). The criticism of flexible space is directed at neutral space.

## Movement

Michael Schumacher (2010) in '*Move, Architecture in Motion*' comments on the connection of movement, flexibility and architecture. He states that movement has been, and will continue to be, integrated into architecture, intricately with flexible architecture. According to Schumacher(2010), the use of movement can create adaptive space. Movement is created through spaces and elements that as movement occurs, spaces change and adapt (see Appendix 1). The most common use of movement in architecture is in the form of individual moving elements; opening doors, windows, gates.

Examples of adaptation and movement in architecture include the movement of an entire building which turns to adapt to the position of the sun, or individual rooms that can be made moveable within the confines of the external envelope or extending outwardly. In other cases individual surfaces or elements that enclose a room are made to move (Schumacher, 2010).

Schumacher (2010) also comments on the expression "opening the building envelope", which refers to building volumes whose external skin can be opened in one form or another, either in its entirety or partially. In most cases larger or smaller sections of the external building envelope can be opened, usually part of the side of the building. Open-able elements also have other benefits such as protection against wind and rain, insulation against noise and heat loss, safety and security, protecting inhabitants and property (Schumacher, 2010). The quality of the opening elements can extend or change the way in which interior space can be used.



Figure 2.13 Variations of sliding walls

## Contemporary examples of flexible architecture

Shingeru Ban is a contemporary Japanese architect, who has integrated adaptability and flexibility into recently built residential projects, three of which are discussed below:

## a. 'Furniture house' in Yamanakako

This house was born through Ban's exploration of the use of furniture in place of structure. Ban concluded that shelves able to account for the load of books would also be able to support the weight of the roof and the furniture house was conceived. Furniture becomes an indispensable element of this dwelling. In this project, floor to ceiling shelves function not only as an element of space composition but also as the main structural element of the house. Built in 1995, the house uses two types of units; one is 240 centimeters high, 90 wide and 45 deep, the other is 240 centimeters high, 90 wide and 70 deep (Burkhart, 2002).

Kronenburg (2007) states that 'in this project materials are used by the architect in unexpected ways'. The furniture house is supported by modular panels and floor to ceiling storage units, creating a clear span roof, rather than relying on traditional beams. Within the perimeter walls, also made of storage units, the internal spaces can be arranged in many different ways to accommodate functional needs depending on mood or season. These panels are neither walls, screens nor doors, but an extremely flexible system of enclosure that can reconfigure space in many different ways (Kronenburg, 2007).



Figure 2.14-2.16 -Furniture house (Yamanakako): external walls create both storage and structure

# b. 'nine-square grid house' Kanagawa

This furniture house lead Ban to another concept for flexible house design, the nine-square grid<sup>7</sup>. The plan of this house is divided into nine, smaller square areas. The roof is supported along two sides by structural furniture, incorporating steel studs, which release the other boundaries and the internal space from any further structural support. Horizontal stiffness is secured by a plywood board member mounted on the girder. This method is characterised by its simple construction, preciseness and lower cost.



Figure 2.17-2.19 Nine-square grid house (Kanagawa): the openness of spaces through structure and simple geometries

## b. 'The Naked House'

Ban designed another home in 2000, called 'the naked house', with a client wanting an open-communal atmosphere. The house, as Ban describes, "provides little privacy so that the family members are not secluded from one another, a house that gives everyone the freedom to have individual activities in a shared atmosphere, in the middle of a unified family" (Ban, 2000).

The house consists of a rectangular shed-like space made with a timber frame. The internal space is bordered on one side by service rooms for storage, cooking and bathing, and on the other by a translucent and opaque wall. The house consists of

<sup>7</sup> Nine-square grid is an old concept explored at the different periods of time with different intentions. Ban explores it yet again with a different intention.

one unique large space, two-stories high, in which there are four personal rooms on casters which can be moved freely. To reduce weight and optimise mobility, these rooms are not very large and hold a minimum of belongings and fittings. The character of the home's space can be dramatically reconfigured. The rooms can be moved according to the needs of their users. They can be grouped together or stay separate. Together they create a larger room, where the family can sit inside, or on top of. The design enables spaces to become more productive, to be used for different purposes by different groups at the same time, and enables a unique connection of the internal space with the external environment.

The house creates an environment that is not static, but it brings kinetic life to what is normally static. Though movable features are determined and incorporated into the design by the architect, their objective is to shift the buildings finite form out of their control. The design creates an indeterminate architecture, that although within limits, is responsive and has characteristics associated with events and performances that the user controls.



Figure 2.20-2.22 Naked house, (Saitama) flexible modules within the greater structure create space

#### Fukuoka housing project

An example of a current high density flexible development can be seen in project by Steven Holl. From 1983, Holl began to experiment with 'hinged space' in housing, based on the principle that space is generated by moving walls that 'participate' with their inhabitants in the creation of interactive environments. By pushing, pulling and physically manipulating these separators and surfaces, people can reorder their homes to their liking.

In order to make residential spaces multifunctional and adjustable to suit the need of the day, Holl's 'hinged space' takes the process of customization and connects it to the poetics of space, opening and closing the apartments in relation to their surroundings. Steven Holl's concept of 'hinged space' gives modern interpretation to the versatility of the traditional Japanese *fusuma* partitions. Light, colourful wooden walls turn on pivotal hinges, making it possible to combine or isolate spaces according to needs. The arrangement approaches change on an entirely inwardfacing level, allowing the occupant to open or close the space as he or she sees fit. Opening a window becomes opening a room, a personal act informing the design of an entire unit.



Figure 2.23 Fukuoka Housing, Japan, Steven Holl

Holl's idea was extensively explored in 1989 with the Fukuoka housing project in Japan. Initially designed with half 'hinged' space and half conventional fixed walls, the client insisted using only the 'hinged space' concept. The project consists of five buildings containing twenty-eight apartments in total, each of which is different and incorporates alternative moveable walls, corners, and surfaces that fold and rotate depending on the needs of the occupant. Holl (2000) states that 'diurnal' hinging allows expansion of the living area during the day, and its conversion to bedrooms at night. Furthermore, 'episodic' hinging allows rooms to be added or subtracted, accommodating changing needs of a family over time.

Kronenburg (2007) believes that the apartments of the Fukuoka Housing project are "indeterminate and incomplete rather than autonomous and fixed" (p.52). The occupants can manipulate the space on a daily basis, responding to the



Figure 2.24 Fukuoka housing plan view of 'hinged' spaced units

individual needs of sleeping, eating, work and leisure as well as seasonal needs, creating feelings of enclosure in winter and letting light flood the entire space on a spring day in an action as simple as opening a window (Kronenburg, 2007).





Figure 2.25 -2.26 'Hinged Space' closed versus open, Fukuoka housing, Japan



Figure 2.27 & 2.28 'Hinged Space' closed versus open, Fukuoka housing Japan,

# Discussion

Flexibility has existed in architecture for a long time. Traditional Japanese housing design has influenced how flexibility has progressed in Western architecture. Through ideas of movement, spatial redundancy and open plan a home is more able to respond and adapt to different occupants' needs in terms of spatial planning and room functionality. The ideas of flexibility embody movement to allow for changes in the dwelling. Flexibility today can create a more fluid and transformable space, more responsive to dynamic and kinetic movement of humans. The degree of flexibility is determined in two ways, capability to have different uses, and capability of different arrangements, meaning space should be designed to be a loose fit and considered for multiple functions.

Flexibility can be embodied in the design in many different ways, through initial planning, in the structure, or through the use of flexible elements and partitions in predetermined space. Adaptation can be to maximise climate factors, occupants or daily activities. The main concept of embodying flexibility is through the layout; design for possibility of changes and designing rooms for more than one functional possibility. The reason flexibility has not been readily adopted into architecture is because flexibility provides a solution to many possibilities, most of which are a solution but not necessarily the best fit alternative.

The main design informers from the chapter include employment of notions of flexibility at the initial design stage and throughout the design process. There are three important enablers that allow flexibility to be used to its full potential. First, through the use of technical elements, specifically the provision of fixed elements which allow flexible elements, to create different configurations; second, through size of space, large enough to accommodate different uses; thirdly, a loose fit between space and use, or open plan. Further a house can open to include the exterior and let space expand outward. The contemporary cases studied highlights how open space and removal of internal structure and inclusion of large spans allow the internal functions to be more easily adapted.

# CHAPTER THREE Cultural diversity

This chapter looks at literature concerning five diverse immigrant communities. These cultures were initially selected based on the statistical profile of immigrants in Wellington. This chapter assesses, through general research and then case studies, predominant design characteristics of the five cultures. The findings create a basis from which to design a dwelling that is reflective of these communities' characteristics and needs. Immigrants to New Zealand come from a range of different ethnic and cultural backgrounds, with the diversity of these backgrounds is ever increasing. While cultural values are not held consistently among all individuals, this research attempts to draw out the general and common characteristics of selected places relating to housing. This research is subsequently used as a basis to design a dwelling reflective of these communities' characteristics and needs.

Paul Oliver (1997), a respected source on vernacular dwellings worldwide, comments that every culture has particular expectations of a dwelling, and each arranges domestic space in ways that reflect social structure, traditions and the organisations of daily lives of its members. It is evident too, that kinship patterns, environmental conditions and economic systems inform spatial organisations of dwellings. There is such cultural diversity across human groups, each with individual demands that there is a great variety in the built environment (Rapoport, 1998). Anthropologists have noted that through culture, people can adapt to their environment in non-genetic ways, so people of the same cultural group living in different environments will often have a variety of the culture (Marcus, 1995).

For the purpose of this thesis, generalised ideas of spatial planning and privacy requirements of different cultures are considered. This study involves the organised comparison of human societies, which includes a particular emphasis on the reason people living in different parts of the world often share beliefs and practices.









0-2.5 2.5-5 5-7.5 7.5-10 10-12.5 12.5-15 17.5-20 20-22.5 22.5-25 n/a

MIDDLE EASTERN CITIZENS

ASIAN CITIZENS

NS

NZ EUROPEAN CITIZENS

PACIFIC ISLAND CITIZENS

For the purpose of this study cultural groups have been chosen by region, ethnicity and religion. In addition consideration is given to the current ethnic make-up of Wellington City Council housing. The current make up of council housing is varied, although the housing is designed for the dominant *Pakeha* culture, council tenancy is only made up of 40 percent *Pakeha*/European<sup>1</sup>. This means that 60% of tenants come from different, often diverse cultural backgrounds. The makeup of ethnicities' is shown below in figure 3.2 below. Although diverse, combined these diverse groups make up over half the occupants of council housing.

	All Tenants		Female Tenants		Male Tenants	
Ethnicity	Number	%	Number	%	Number	%
African (Other)	25	1%	3	0%	22	2%
Asian (Other)	103	6%	56	7%	47	4%
Chinese	148	8%	76	10%	72	7%
Ethiopian	61	3%	31	4%	30	3%
Indian	58	3%	20	3%	38	3%
Maori	273	15%	127	17%	146	13%
Middle Eastern	98	5%	31	4%	67	6%
Pakeha/European	760	41%	227	30%	533	49%
Pacific Island	207	11%	118	15%	89	8%
Russian	36	2%	22	3%	14	1%
Somali	90	5%	56	7%	34	3%
Total	1859	100%	767	100%	1092	100%

**Tenant Ethnicity** 

Figure 3.2 Current tenant ethnicity of Wellington City Council units

In New Zealand there is an increase in people affiliated with non-Christian religions. This is attributed to migration, particularly from Asia. The New Zealand census (Statistics New Zealand, 2006) notes 78.8 percent affiliated with the Hindu religion and born overseas. A similar proportion of people affiliated with Islam, 77 percent were born overseas. Also a large number of immigrants from Asia were affiliated with Buddhism (37,590 people). Of these people born overseas affiliating with Hindu, Buddhism and Muslim religions, almost half had arrived in New Zealand less than five years ago (Statistics New Zealand, 2006). Between 2001 and 2006, the number of people affiliated with either Hinduism or Islam increased by more than 50 percent (Statistics New Zealand, 2006).

<sup>1</sup> Contemporary New Zealand housing requirements have been examined in order to provide the base for considering how design can be better tailored to meet the needs of other cultures.

The three main groups represented in council housing are European who the units are designed for, and Maori and Pacific Island occupants. Housing New Zealand has already begun research into the requirements of the two latter cultures. Therefore this research is primarily looking beyond these groups to understand the requirements of other tenants that occupy Wellington City Council houses, although Pacific housing is also included <sup>2</sup>. (*Figure 3.3 illustrates the cultural and ethnic composition of working aged immigrants' coming into Wellington by region of origin and the breakdown of the cultures selected.*)

The chosen groups come from Asian, Middle Eastern, Pacific and African, within these regions, the chosen groups are as follows:

- Traditional **Japanese** dwellings have been researched where flexibility has been seen to have originated. Further Japan was selected for its association with Buddhism.
- Pacific peoples' dwellings have been included as New Zealand houses are not designed to cope with the pressures and demands of the Pacific lifestyle. Eleven percent of council houses are occupied by Pacific people, making the study relevant. The number of immigrants from this region are also steadily increasing (see Appendix 3). This research focuses on the outcomes of a Housing New Zealand study of housing Pacific people.
- The **Islamic** culture has been selected to cover Middle Eastern immigrant group<sup>3</sup>, increasingly represented in New Zealand. The spatial needs are based around the requirements for gender segregation principles. Islamic communities can today be found globally, thus highlighting the relevance.
- There has also been an increase of migrants from African decent, with large

<sup>2</sup> The average number of tenants per unit greatly differs between ethnicities. Europeans average 1.1 persons per unit and thus the way the units have been designed accommodates this. The remaining cultures tenant size varies from 1.7 to 4.3, often resulting in overcrowding. Council also note the length of tenancy of immigrant of diverse cultures is shorter (2.2- 4.6 years) than that of European (7.7 years). This highlights the need for adaptive solutions to accommodate small ethnic groups to help Wellington City Council house these tenants.

<sup>3</sup> Although religious ideas can be consistent, the environment presents a different requirement for dwelling. Religion is not restricted to region.

number of immigrants ending up in Council dwellings. This making a study from this region relevant.

- Under the Asian group, **Hindu** communities are also studied. Hindu culture, a religion that originated in Asia, is today found globally. Therefore the Indian community has been included in this study as the 2006 census highlighted the number of people born in India who were living in New Zealand, more than doubled since 2001 (see Appendix 4). Their planning of space is uniquely different from the other cultures selected, as it is based on physiological reasoning and orientation.
- Contemporary New Zealand dwellings will be studied to offer a point of difference for the selected cultures.



Figure 3.3 Number of working-age newcomers to the Wellington region by global area of origin and the breakdown of selected cultures

The following sections describe the cultural needs of each of these selected cultures. Firstly, there is a general commentary on the housing requirements associated with the broad cultural group, and then a specific case study. Each section concludes with a summary of the dwelling requirements for the cultural group. Through examining the different housing arrangements of these cultural groups, it has been possible to draw out the main features which can act as the basis for the design approach.

# Japan

Dr. Ritsuko Ozaki (2002) has undertaken a sociological study on housing in England and Japan, which looks into national trends and their influence on housing. The study highlights the different requirements of housing for multiple cultures. According to Ozaki (2002), a house is laid out in reference to how it is used; the main determinant of the physical arrangement of the house is the cultural matrix. Ozaki emphasises that sociological and historical studies have noted the layout of the house expresses underlying cultural values and norms, which limit the possible choices for spatial arrangement.



Figure 3.4 Japanese screens (light and shadow)

A key factor in English housing is the demarcation of private-use space from publicuse space, with the desire of privacy gradually becoming a status symbol resulting in the introduction of corridors and increased use of small rooms separated by doorways. Ozaki (2002) states "the more a society values individual privacy, the more the organisation of space within a house will enable individual household members to exclude others from their dedicated private space" (p. 214). In English society people are home-centred with a sense of personal privacy; whereas in Japan, people are more family-centred with a strong sense of family privacy (Ozaki, 2002). The notion of privacy in Japan is different, a person's self tends to be identified with the family or secondary group values, and therefore the dwelling is open internally with multi-purpose, adaptable spaces, creating a realm of privacy for the whole family from the external environment. Parents and children are likely to sleep together in the same room, considered to be more pleasant, intimate and safe, rather than being isolated in separate rooms (Ozaki, 2002).

In general there is greater capacity for personal space in English dwellings than in Japanese dwellings, although both cultures prefer detached forms for more privacy and seclusion. Traditional Japanese houses belonging to the middle classes are always enclosed, with walls and fences surrounding the house, preventing passers-by from viewing the interior. This creates a feeling of security and seclusion. The dwellings' structural form is reflective of social-cultural factors. Other factors, including climate, construction techniques and cost, influencing the different aesthetics of the dwellings.



Figure 3.5 Undefined rooms mean that multiple functions can occur in Japanese rooms

Japanese dwellings have been described in Chapter two, where the flexibility of functional layout and the dynamic nature of connections have been highlighted (Figure 3.5). This section presents a case study of a traditional Japanese dwelling in Kyoto, in order to draw out common and key characteristics.

## Case study: townhouse (Kyoto, 1914)

This dwelling is laid out in the traditional style of sizing through straw *tatami* mats (3 by 6 feet). There are no specified bedrooms as any of the space can be transformed into a bedroom by putting *futon* mats onto the floor. The walls are made of sliding shutters so that it is possible to make doors anywhere, and the wooden veranda is also enclosed by shutters.



Figure 3.6 Traditional Kyoto townhouse floor plan

The rectangle is the logical geometry of the floor area as it allows for adding further rooms. The dwelling consists of three main areas: living areas, kitchen and multipurpose space. Entry is into the main living space, with a multi-purpose bedroom space/tea room/spiritual refuge to the left. The space is surrounded by a veranda, and an in-between space to mediate the dwelling with the surrounding landscape. To the left is the kitchen, which is connected to the exterior and separated from the living space by a storage area. The toilet is located at the rear of the dwelling, separate from the bathroom. As noted above, versatility of space is possible because of the structure of the dwelling, as well as the use of storage spaces where belongings and furniture are kept. Additional case studies are contained in Appendix 5.

# Characteristics

The main features that can be used as a basis for the design approach from this case study are:

Entry:

• a wide entry into the house is important

#### Circulation:

- often through rooms and spaces
- never straightforward, staggered hallways

Living areas:

- core of the building
- strong connection to the exterior
- can accommodate a number of functions

#### Kitchen:

- connection to an external space and dining area
- includes a utility room

## Bedrooms:

- living room may be transformed at night for sleeping
- families often sleep within the same room
- proportional around *tatami* system

#### Bathrooms and toilets:

- separation between bathroom and toilet
- located away from formal space

## Additional

- tea room spiritual refuge
- veranda around the exterior of the living space to allow an in-between space with the landscape

#### Overall:

- store rooms make the all-purpose space possible, allowing the interior rooms to be kept empty and therefore without a specific function
- emphasis on protecting the family/families from the exterior
- outside gradually progresses room by room into a centre courtyard.

## **Key Characteristics**

- undefined rooms for most of the dwelling (rooms are finished and function fixed when furnishings are brought in)
- flexibility and transparency in rooms without defined functions
- a constant connection with nature and the landscape
- Cross-generational emphasis, multi-generational occupants usually living under the same roof
- an internal focus.



Figure 3.7 Diagram of connections required between Japanese spaces

# Pacific Islands

In 2006, 266,000 people in New Zealand (Statistics New Zealand, 2006) were identified as belonging to a Pacific ethnic group, which represented 6.9 percent of the total population. Statistics New Zealand estimated that in 2006, 27 percent of households with people of Pacific ethnicity experienced overcrowding because of their larger family size. Hall (2008) noted that often the number of people living in a dwelling can be up to fifteen. It has been noted that state housing design does not take into account the size of Pacific families, their cultural values and practical needs (Housing New Zealand Corporation, 2004).

Pacific people predominantly keep strong ties to their culture, with frequent large gatherings and hosting of guests for both short and extended periods, which has had implications for their housing needs. Pacific people often live with large numbers of extended family because of their desire to provide mutual support for each other and to manage the integration of new family migrants. Accommodating large numbers of people is a very 'natural' aspect of their family life, but, most houses in New Zealand are not designed to be able to host such large gatherings (Hall, 2008).

In this case, guidelines and examples have already been developed by Housing New Zealand and these have been drawn upon for this section. The case study in this instance is an assessment of the guidelines.

## Case study: Housing New Zealand guidelines for Pacific families

The typical Pacific dwelling is made up of a large formal space that is bordered by external decking to allow for expansion. Entry is directly into the main formal space where social gatherings occur. The bedrooms are placed at the rear of the space with the possibility of combining multiple rooms to create a larger sleeping area. The kitchen is generally connected to the informal space and sits towards the centre of the dwelling. There may also be a garage that can be used as a multi-functional space and offers possibilities to accommodate or house functions or gatherings. The dwelling is positioned with the living areas facing the north to maximise solar gains. The size of the dwelling is large to be able to cope with the size of Pacific Island families. Additional case studies are contained in Appendix 6.



Figure 3.8 Pacific Island floor plan according to Housing New Zealand Guidelines

## Characteristics

Guidelines by Housing New Zealand have been reviewed according to spatial needs of Pacific Islanders:

Entry:

- a wide entry into the house, directly into the lounge
- secondary entrance preserving the sanctuary of the main entry

#### Circulation:

• should be open-plan and be connected to the formal space

Living areas(formal space):

- lounge the heart of the house
- main room, the formal space where guests are entertained
- · ability to temporarily separate formal and informal
- needs to be large and adaptable to accommodate events
- a physical and visual connection to the outdoor area to monitor children
- located separately from cooking spaces

#### Exterior space:

- vegetable gardens important
- external underground oven to be able to cook in the conventional way
- sunny and sheltered outdoor space
- direct access to living areas

#### Kitchen and dining:

- large enough to cater for large numbers and for two or three people to be working at the same time
- adequate storage space
- possibility to be separated from formal areas
- visual connection with outdoors

#### Bedrooms:

- partitioned or opened up to create larger rooms for visitors
- five/six sleeping areas sometimes necessary
- elderly to be accommodated downstairs
- separate sleeping quarters for single females and single males

Bathrooms and toilets:

- separate bathroom and toilet
- located away from formal space

Additional:

- multi-purpose space with utility room
- veranda of a traditional Pacific house totally removable walls or blinds
- ease of inside/outside movement
- position of house to maximise exposure to the sun to ensure solar gain
- plan should allow for future extensions.

## **Key Characteristics**

The key characteristics can be grouped into two main concerns: pressures of larger families and spaces, and importance of interior and exterior connections:



- large spaces with emphasis on the need to accommodate large formal occasions
- large sleeping spaces to accommodate extended family
- easy connections to the exterior
- open space available to allow formal occasions to overflow
- maximise sun and solar gains.

Figure 3.9 Diagram of connections required between Pacific Island spaces

# Middle East (Islam)

"In prophet time homes consisted of a large courtyard with long galleries and a row of simple rooms. No matter how modest the accommodation, the sanctity of privacy is most important. The harim or sanctuary contains women, children and the family head. Male guests are excluded and are received in the majlis near the entrance. Separation of genders is as old as the Middle East and was practised well before Islam" (Ragette, 2003).

As this quote highlights spatial planning of traditional Islamic homes is centred on traditional principles of gender separation and privacy for females and the family, (particularly segregation and seclusion of the female from male guests). The design of the traditional Islamic house is based on the concepts associated with the veil and privacy. Islamic notions of privacy emphasise the requirement of permission for guests to disrupt the family privacy.

Islam also emphasises the transition zone between the public and private. The entrance is a transition from the secular to sacred within the dwelling and therefore has a large religious significance (Vahiji&Hadjiyanni, 2009). An Islamic home must also provide for various religious rituals, including daily prayers and occasions such as weddings and funerals. Islamic homes often feature a private backyard or an open court (*hayat*). This is where the woman can take off her veil and enjoy the feeling of sunlight and wind in the privacy of her own home (Vahiji&Hadjiyanni, 2009).

Traditionally *mashrabiya*, an important architectural element, are placed over windows and openings to control views into the house. The screens are often seen as a permanent architectural representation of the Islamic women's veil (Guindi, 1999). However, in a western context they can be interpreted as a symbol of segregation and sanction leading to discrimination.



Figure 3.10 Photographs showing the detailing of mashrabiya screening devices

## Case study: Islamic dwelling (Egypt, 1908)

This case study looks into a traditional dwelling designed on Islamic principles. This dwelling is used to highlight the separated gender areas. The entry of the dwelling leads to the inner courtyard, where guests are entertained and functions take place. Next to this is the guest area and an open hall gallery, usually facing towards the centre of the building. The entrance becomes a secondary boundary zone between the public and private. In order for men and women to socialize separately, the private spaces of both traditional and modern Islamic homes are often divided into two segments: the male quarter (*majlis*) and the domain of the women (*harim*).



Figure 3.11 Floor plan of traditional dwelling designed by principles of Islam (Egypt, 1908)

The courtyard is enclosed by two large walls on the perimeter, with the guest area and gallery on the other side. Entry further into the house is narrowed to a smaller hallway which winds around the stairway. Further into the dwelling is the open courtyard which can be used for multiple uses. Towards the front of the house the women's quarters are located with no direct route to the main entrance and inner courtyard. This area contains the kitchen and *harem*. The *harem* spaces include the living room, bedrooms, bathrooms, kitchen and storage areas; all areas prohibited for men.
There is a secondary entrance to this area. Exterior windows have been covered by extruded window boxes covered in screens. A female can inhabit the space without being seen by male guests.

Privacy is also continued through the *mashrabiya*, which allows the woman to view the outside world without being seen. These are located on balconies at the perimeters of the house, and may also be built opening from the *harem* onto the reception. Additional case studies are contained in Appendix 7.

## Characteristics

The particular spatial requirements of individual rooms are summarised below:

Circulation:

• two entrances; one to the female areas, unseen by any male visitors

Living spaces:

- a formal space large enough for rituals/large gatherings
- female living space, private and hidden from views from the male living space and outdoors

Kitchen:

- separated from the formal space
- secluded to ensure that women can cook without wearing the veil

#### Bedrooms:

- large sleeping areas to allow for extended family
- located away from entrances and external views
- hidden from view from the male spaces and the street
- private to allow the women to take off their veils without being seen

#### Bathroom and toilets:

- located at a distance from the kitchen area, as this space is regarded as unclean
- toilet located in a separate room to the bathroom

#### Additional:

- private interior courtyard
- prayer space located in the living areas of the house, orientated towards Mecca.

## **Key Characteristics**

- double entry points
- gender segregation
- outdoor private areas
- exterior views into dwellings to be controlled by occupant
- female privacy so that male gatherings and festivities can be observed but women cannot be viewed.



Figure 3.12 Diagram of connections required between Islamic spaces

## Africa

Diverse cultures within continental Africa have developed according to changing needs and availability, and are further modified as they have passed through the screens of Eastern and Western cultures.

""Africans are communal people and most of the homes would be huddled together in a homestead as an extension of each other and for protection against outside" (Oliver, 1971).

The main determinant of African dwellings has traditionally been associated with ideas of territory and protection from predators. The external boundary was a permanent element, restricting access. The internal spaces were centred on an open core and open space. *Cases,* or huts, were created for individuals, but only used for sleeping and housing valuable possessions.

The *cour*, the courtyard at the centre and the heart of the house, is surrounded by the cases/ huts (rooms). As Folkers (2010) states the *cour* becomes the centre of the house as the living room is in European houses. The cases become individual structures within a constantly changing complex. *Cours* have been described by as a growing and contracting organism; "with every new member to a family a new case is formed" (Folkers, 2010: p.235).

#### Case study: Ashanti architecture

Ghana, in particular dwellings in the Ashanti region has been chosen to assess the spatial requirements of functions of space and the cultural impact of these spaces. The Ashanti dwellings are courtyard-based buildings, constructed of walls with striking reliefs in mud and plaster, brightly painted, "Social life takes place outside, only at night do we go in to sleep" (Folkers, 2010: p. 234).

This African home in Ghana is centred on a courtyard, with an inward focus in which other rooms radiate. There are four rectangular rooms, constructed from wattle and daub<sup>4</sup>, around a courtyard. Bright animal designs mark the walls, and palm leaves cut into a tiered shape provide the roof. The individual house has a 25 degree pitched roof supported on a light timber frame, with recessed balconies. Precast concrete balustrades fill in the spaces between columns, incorporating a variety of geometric designs. Windows have hard wood joinery, with closely spaced louvers providing permanent ventilation. Walls are plastered with hard, smooth cement and sand rendering, decorated externally with a dark colour for the bottom three feet. Internally, the courtyard has a veranda separated from the large area of concrete-surfaced floor by dwarf walls and one or two steps; kitchens are built against the outer walls. Courtyards are working areas, holding barrels of water, firewood, stools, baskets, and items of washing (Oliver, 1971). Additional case studies are contained in Appendix 8.



Figure 3.13 Floorplan of traditional African dwelling (Ghana)

<sup>4</sup> A woven lattice of wooden strips ,called wattle is daubed with a sticky material usually made of some combination of wet soil, clay, sand, animal dung and straw.

## Characteristics

Living space (exterior):

- one main open formal space
- centre of the complex with all spaces connected
- activities able to spread, as they occur outdoors

#### Courtyard:

• internal courtyard often connecting all other spaces

#### Kitchen:

- connections to the exterior for outdoor cooking
- cooking, cleaning, eating, working, resting, playing and washing conducted in the open air

#### Bedrooms:

- individual *cases*/huts within the complex for each person
- possibility to add, remove cases/huts as family requires
- space only required for sleeping

#### Bathroom and toilets:

• usually at the corners of the complex

#### Additional:

- shrine room has religious significance
- importance of entry threshold to protect compound from intrusion
- open living with an external boundary
- majority of activities happen externally.

## **Key Characteristics**

- territorial, external boundaries of the dwelling are important for notions of protecting the family
- internally everything but own bed is shared
- sleeping units are centred around a core or 'heart'
- strong connection to nature.



Figure 3.14 Diagram of connections required between African spaces

## India (Hindu)

As Dasa (2007) states, Hinduism is more than just a religion; it is a way of life. Houses are based on a traditional Hindu system of directional alignments, *Vastu Shastra*, based on a concept of flow of energy. Not only is the home and family important, but so is the actual building where the family lives, as the dwelling is itself a shrine.

A home is called manushyalaya, meaning human temple (Dasa, 2007). The concept behind house design is the same as for temple design; sacred and spiritual are the two spaces. Consequently, how a physical building is designed and constructed is valued highly, especially its directional alignment. The wrong orientation of a structure and other architectural failures are believed to cause unhappiness, disease and troubles for the inhabitants (Dasa, 2007). The morning sun is considered especially beneficial and purifying, so the east is a treasured direction. The body is considered a magnet, with the head, the heaviest and most important part, being considered the North Pole, and the feet the South Pole. Sleeping with one's head directed north is believed to cause a repulsive force with the Earth's magnetic north and is thus considered harmful.

Typically dwellings are created around a grid. Within the dwelling, the centre space is an open courtyard. It creates a spiritual ambiance called the *brahmasthanam*, meaning the VEST nuclear energy field which is open to the sky .This central courtyard is likened to the lungs of the human body.



Figure 3.15 The Vastu Purusha Mandala is an indispensable part of *vastu shastra* and constitutes the mathematical and diagrammatic basis for generating design

The east is the source of light; the north-east is the most important due to the maximization of light. Opposing this, the southwestern corner, is not considered a positive place, and cannot house the kitchen. *Agni*, god of fire, sits in the southeastern corner so this is an ideal position for a kitchen. *Kuvera*, the god of wealth, sits in the west; this area is best for financial matters. Finally, the meditation area should ideally be placed in the northeast corner (Dasa, 2007).

#### Case study: Indian Hindu dwelling in Rajasthan

This courtyard house utilises thick walls, often 0.6 meters thick, constructed of stone clad over brick and lime masonry, generating a time lag of heat. The courtyard is a semi-private open space that is used extensively for a number of activities.



Figure 3.16 Floor plan and section of a traditional Indian dwelling in Rajasthan

The dwelling consists of a front yard, a central court and a backyard. The house is inward-looking, and has three rectangle rooms that have common walls arranged in an L-shape on the western and southern sides of the central court. This house has a mud wall 1.2 meters high separating the front yard from the central court, which consists of the circular kitchen, a bathing space, a firewood store, a water store, a grain store and two stepped accesses to the terraces of the rectangular rooms. These rooms do not have exterior windows. A platform is located behind the kitchen for outdoor cooking. The kitchen is circular in plan and separate from living/sleeping spaces. The rooms cover about 45 percent of the total house, leaving 55 percent as open space. The yard provides access to a separate guest rooms (Oliver, 1997). Additional case studies are contained in Appendix 9.

### Characteristics

The layout of a dwelling is strongly based on directional alignments;

Entry:

• main doors should never face or open to the south

Living space:

- formal space
- facing north direction

#### Kitchen:

- located in the south(or east or north), but never in the southwestern direction
- cooking area should allow people to face east while cooking

#### Bathrooms and toilets:

• facing southwest

#### Bedrooms:

• beds place so the so that the head never points towards the north

#### Courtyard:

- lawns and gardens with small plants on the northeast and eastern sides
- large trees planted on the southern and western sides

#### Additional

- meditation area ideally in northeast corner
- financial part of home, study, west or southwest corner
- site should be square or rectangular
- site should be higher in the west than east
- · odd shapes should be avoided as symmetry is basis of Hindu aesthetics

## Key characteristics

Central to any design is the directional alignment, as follows:

- east direction to maximise light
- avoid southeast corner to avoid negative energy
- never in southwest direction for kitchen
- north is for financial areas.



NEGATIVE ENERGY



Figure 3.17 Diagram of connections required between Hindu spaces

#### New Zealand contemporary houses

As well as analysing five diverse cultures of immigrant communities, it is useful to assess the contemporary demands and examples of homes in New Zealand. Alison Drummond, author of *At Home in New Zealand*, remarks that New Zealanders have a distinct idea of a home as a detached house, surrounded by garden- flowers at the front, vegetables out back. The outside is often weatherboard with a painted corrugated iron roof (Drummond, 1984).

## Case study: New Zealand design built home

A number of Lockwood and design-build homes have been assessed to understand the current stock of New Zealand housing, particularly typical three to four bedroom dwellings.



Figure 3.18 Floorplan of a typical Lockwood house available in New Zealand

The entry is located around the centre of the dwelling, merging into a large open plan living area containing the kitchen, dining and living areas. This space connects to an exterior courtyard/decking area, linking the interior and exterior. Moving further into the house to the private areas, one passes through a family space that can be opened as additional space to the living area. Through this space there is a corridor that contains four bedrooms, a bathroom, laundry and storage. One end of the corridor is connected to a large double garage. The dwelling is a single level and the spaces are generous in size.

## Characteristics

Characteristics have been derived from the above case study and the Wellington City Council Design Guide. The characteristics include:

Entry:

- one main entry visible from the street
- reception space inside, and separate from living spaces

#### Living spaces:

- visual or physical connection to the exterior
- shield noise-sensitive living areas
- reception space separate from main living area

Kitchen:

- easy connection to the living and dining area
- often acts as a hub to the living area

Bathroom and toilets:

- away from main entry and kitchen
- limited views from exterior

Circulation:

- circulation simple and direct
- door swings minimise obstructions within rooms

#### Bedrooms:

- large enough to contain a double bed
- access is easy through circulation
- away from living areas views and noise

Courtyard:

• windows providing daylight and ventilation to circulation also provide a glimpse view of the outside

#### Overall:

- rooms large enough for their specific function
- windows positioned to restrict direct outlook so that the short-range view from one dwelling is not directly into the main internal living areas of any neighbouring dwellings.

## Key characteristics

- open plan living areas
- · outdoor living and connections to the exterior
- usually split into two main zones (living and sleeping) off a central entrance way
- rooms of sufficient size for functions.



Figure 3.19 Diagram of connections between spaces in New Zealand houses

## Discussion

This chapter has highlighted the variety of spatial planning across the selected cultural groups. These findings are to be tested through the design process to translate key findings to a different environment, exploring what can be accommodated and adapted.

The dwelling characteristics of African and Japanese cultures tend to have some similarities; they tend to have an internal focus and keep within the external confines of the dwelling. This contrasts with Pacific lifestyles that tend to open out to the exterior and accommodate large numbers of extended family and friends. African activities often occur in an external environment with the interior used primarily for sleep. Islamic and Hindu dwellings are created around strict principles. Islamic dwellings are determined by gender segregation and the importance of privacy for the female occupants. Hindu dwellings are determined by directional orientation, prescribing the locations and direction of rooms.

Oliver (1997) states that numerous dwellings have porches, verandas and upper storey balconies, which make spatial connections to the outside world, while preserving their functional purposes as extensions of living space and providers of privacy. How society regards the relationship of internal to external space is often a measure of the importance they place on privacy. It has been discovered that many spatial requirements of cultures do align and are compatible across multiple cultures. The common characteristics include: housing of larger families and extended families, desire for connections with landscape and nature, privacy and separation of formal and informal spaces. The placement of the bathroom away from the formal area is constant, as are requirements for maximising solar gains to be able to heat the dwelling efficiently<sup>5</sup>. However, there do remain varied requirements, with some features exclusively desired by a particular culture which should be addressed within the design.

Immigrants come from a range of different environments that often allow for activities such as cooking and socialising to occur outdoors. Wellington's climate does not accommodate these cultural activities for the majority of the year. Therefore, provisions are required to allow these activities to occur internally but remain reflective of an exterior environment.

<sup>5</sup> This may not always be the case in hot and tropical climates where solar gains are avoided through orientation of openings. This is more appropriate for colder climates and the New Zealand context to ensure warmer homes therefore maximising solar for purposes of heating.

## CHAPTER FOUR Wellington context

This chapter evaluates the current placement of immigrants in Wellington. It contains current national and local council settlement policy. It includes direct qualitative information to gain a holistic view of current housing issues within this community. The chapter identifies the changing needs of Wellington City Council housing, and the gap in current provisions for diverse cultures. Finally, a council development, Arlington Apartments, is analysed in order to identify key issues for immigrant occupants.

The country's population is becoming increasingly ethnically and culturally diverse, through natural increase as well as immigration. Leilani Hall (2008) states that the current housing stock is not always appropriate. Housing has primarily focused on spatial layouts that neglected the specific needs of different cultures and religions. The Wellington Housing Trust (2006) highlights the size of houses as problematic for many families, who are living in overcrowded conditions.

## Settlement

When discussing immigrants in a new context, 'settlement' and 'integration' are often used interchangeably. These terms, defined by Anne Henderson (2004), an immigration researcher, tend to have different foci; settlement focuses on short term goals and the individual immigrant, while integration refers to a longer-term and more reciprocal adaptation process, involving both immigrants and structures within the host society.

In terms of 'settlement', housing becomes an issue for many immigrants and key into their successful settlement. As Henderson (2004) notes, housing options for immigrants are restricted by their economic circumstances and, for some, by prejudice from landlords.

Beyond settlement, successful integration of immigrants requires a number of different components. Wellington City Council (2010) notes that resilient and cohesive communities are important for immigrants. They create places that provide safety and security, which occupants contribute to, and thus benefit from a rich and varied life.

#### Settlement influences

Government and local councils have realised the possibilities immigrants bring, as well as the implications, and have worked to create guidelines and policies accordingly<sup>1</sup>. The Department of Labour has noted that immigrants' early settlement experiences contribute significantly to their subsequent economic and social outcomes. New Zealand Housing research (2008) has highlighted that immigrants' housing behaviour changes as they spend more time here, so catering to the immigrants' needs when they first arrive in Wellington becomes crucial.



#### Settlement problems

Figure 4.1 Components of successful settlement

Current Government research, conducted by the Department of Labour, has uncovered key information about the problems immigrants face in New Zealand. Accessing suitable housing is a challenge. Newcomers experience problems with the suitability, size and affordability of housing (Wellington City Council, 2008).

The main difficulty in finding suitable housing for immigrants is the high cost of rent<sup>2</sup>. Immigrants have an immediate need for housing. The location also impacts on settlement (Francis, 2011). Vilkama (2007) states that it is presumed that immigrants have a tendency to isolate themselves from the rest of the community, which is a negative phenomenon. Therefore integration of immigrants needs to be considered.

The successful settlement of the whole migrant family is integral to New Zealand's ability to attract 1 and retain the immigrants needed to contribute to the country's growth and diversity (Department of Labour, 2008).

In a recent survey (2006) of the settlement of immigrants, 59 percent of respondents gave this 2 reason (Henderson, 2006).

It has been found by Immigration New Zealand that immigrant respondents commented on social and cultural aspects, including safety and security, and the importance of relationships with people of the same ethnic group. Immigration New Zealand (2008) identifies that a high concentration of migrant families from diverse cultural backgrounds within a suburban area struggle to integrate into the wider community. Therefore, to prevent social and residential segregation, national policies suggest that immigrant groups are dispersed in different neighbourhoods and residential blocks. Proximity to occupants from the same ethnic group needs to be considered.

A concentration of cultures can have positive effects and create vibrant communities, such as commercial centres providing diversity for the pleasure of all cultures in the case of Chinatown and Little Italy. However, this can generally only successfully occurs in larger populated centres with higher concentrations of immigrants, so is not realistic in Wellington. Although housing needs to consider the location (the concentration or isolation) of immigrants, these considerations are beyond the scope of this thesis.

## Wellington City Council

Generally, recent migrants are not eligible for Housing New Zealand Corporation houses (HNZC). Therefore, it comes down to the Wellington City Council portfolio to accommodate immigrants. The council targets its services to where housing needs are not met by other providers, as the case with recent immigrants. The Wellington Housing Trust (2006) notes that council housing is available under the social allocation model for vulnerable people and households, those newly arrived, and those who cannot afford a mortgage (see Appendix 10). People that fall into the above criteria are constantly altering; therefore the tenants occupying council housing are also changing. The average length of tenancy in council units ranges from two to eight years. These units are critical in the immediate settlement of immigrants.

#### Current situation of council housing

Council housing in Wellington City began in the mid-1920s, and the majority of properties are designed for 1950s housing requirements. The Council's housing stock is predominantly (71.3 percent) comprised of bedsits and one-bedroom units (Wellington City Council, 2011). However, Phiri (2006) from the Wellington Civic Trust comments that social housing is at a crossroads, as present needs are not met by the mix of housing units available. The needs in today's society for housing able to accommodate larger families and differing cultures have increased.

As Housing New Zealand Corporation provides mostly two and three bedroom accommodation (for which immigrants are not eligible) and council units were originally developed for singles and childless couples as a response particular need when they were built<sup>3</sup>. Consequently only about 30 percent of the council's stock currently houses children. The original purpose of the bedsits and their spatial arrangement rarely conforms to current needs (Busch, 1999).

Council housing has been critiqued as illsuited to today's society. There is a need in Wellington City Council housing for more family-appropriate and larger dwellings.



As a response, Wellington City Council has begun an upgrade of ten of its larger complexes to make homes safer, warmer and improve standards. However, consideration of diverse cultural needs is very limited. Wellington City Council (2011) discuss merging existing bedsits into one or more bedroom apartments to provide more space for families. The move away from bedsits reflects changes in modern living standards.

<sup>3</sup> Originally built for working people, rather than people who were mostly at home and feedback indicates they are too small for visitors (Council, 2011) This meaning there is currently a shortage of 2-3 bedroom and family housing

## Case study: Arlington Apartments

This ten storey tower is part of a development providing medium and high-density housing, and is the largest of Wellington City Council's housing properties. It was designed by Ian Athfield in 1970 and was his first high-rise project.

This case study uses the requirements for cultures established in Chapter three to assess how well the units address cultural needs. The focus is on Islamic communities' requirements as this culture creates the most specific needs of the communities researched.

The floor plans of the main tower, which consists of bedsits and one bedroom units, comprise:

## Bedsit

The bedsit is made up of one large room for functions such as living and sleeping, located off the dining room. The dining room and bathroom are located off the single entry point. Access to the kitchen is through the dining room. The units contain two party walls shared by neighbouring units, with access through a shared corridor. Views and connections to the exterior are limited, with only one window in the living space.



Figure 4.3 Arlington Apartments bedsits

Size is the main concern with bedsits, but there is also limited connections to the exterior environment. A combined living and bedroom also creates issues. The shared party walls create issues for privacy and sound proofing. There are also no external spaces.

The overall limited size and the open spatial layout do not support traditional Islamic living practices. As discussed in Chapter three, a separate space is required for women so they achieve ultimate privacy (Hadjiyanni, 2009). Also, the connected kitchen and dining prevent the segregation requirements. Furthermore, the singular living/bedroom space and the single entry affects the privacy of women from being in the home when males guest visit.

#### 0 n e - b e d r o o m

The one-bedroom units are comprised of open-plan living and dining, with separate bedroom, kitchen and bathroom. There is one entry point, where the dining room, bedroom and bathroom are accessed. Access to the kitchen is through the dining area. The unit contains two shared walls with neighbouring units and access is through a shared corridor. Windows and connections to the exterior are limited and are only through the living area.

The main issues are those of private space and lack of connections with the exterior. Segregation is prevented through the singular entry; however, the kitchen is segregated, so it can be completely private and females could remove their veils. No provision for a female living area means they must remain within the bedroom when there are male guests. There is a limited connection to the exterior, with only one external wall and one window; there is no outside space, let alone a private courtyard for females.



Figure 4.4 Arlington Apartments one-bedroom units

From the case study above, some generalisations can be made about apartment complexes in regards to immigrants.

Advantages:

- privacy of rooms as set back from the street
- views from street level diminished the higher the level of the unit
- while apartment units are smaller than standalone dwellings, a complex may be able to house extended families and friends in different units within the same building
- limited social isolation and ethnic segregation as an apartment complex can accommodate mixed ethnicities.

Disadvantages:

• often apartment entries are through a public circulation space to one main entry, which does not support gender segregation and does not allow private entries

• there is unlikely to be any private external space for the units, nor private space in which a female can remove her veil

- shared walls and close proximity of units and occupants decreases privacy
- potential for discrimination and abuse, due to proximity of neighbouring units
- the identical nature of the units limits expression of cultural identity.

## Townhouses

Fifteen townhouse blocks surround the main tower of the Arlington complex. The townhouses within the complex consist of four storey blocks, containing three to four units. This section focuses on Block G.



The first two floors both contain a one-----bedroom units, on the northern end (bottom of the page), which includes a small courtyard and a bedsit at the southern end.

There is one party wall, dividing the units. Compared to the tower units, these units allow for windows and connections to the exterior on three sides though the physical connection remains very limited, particularly for the bedsit unit.



On the third floor there are the entries to two identical two-bedroom, two-storied units. The lower level contains the kitchen, open-plan living, and external living space in the form of concrete decks, with an additional timber deck from the kitchen of the northern unit. A stairwell to the fourth level provides access to two bedrooms and a bathroom. Wellington Housing Trust (2006) have noted that these dwellings have at times housed families of up to 6 people.





Figure 4.8 Arlington Apartment block G (fourth floor)

BATH

ROOM

BATH

ROOM

in.

(WZ)

2.400

49200.

BEDROOM

BEDROOMW7

(wi)

BEDROOM

BEDROOM

3 400

2.200

2.200

The size and layout provides more opportunities for gender segregation and privacy. The external connections in the bedrooms are limited and maintain a sense of privacy. The proximity of the stairwell and main entry reduces privacy in accessing the upper floor. The singular main living space does not allow for the traditional separation of women and men during visits, however, its scale would support a small gathering. The sizing of spaces has been noted to be smaller than those required, particularly by Pacific communities, and does not allow for changes in function or future requirements. The shared external stairwell for the three or four units does not support gender segregation. From the exterior, the openings located on the lower floors easily allow views into the house; this is acceptable for the spaces that are relatively public spaces, however the bedrooms/bedsits on the lower levels lack privacy.

The kitchen area and bathroom are located at the front of the house, adjacent to the shared entry, which permits public view into these spaces. The size and placement of the windows in the bathroom, however, limit views into this room.

## Discussion

This chapter has highlighted that although there are systems in place to help immigrants integrate into a new city, there is little attention to tailoring housing to meet cultural need. The main issues include: dwellings not supporting privacy requirements, small spaces, and limited connections to the exterior.

A key issue in terms of immigrants housing is discrimination, creating a disadvantaged position in the housing market compared to the local population. Council housing needs to be more responsive and adaptive to tenants' requirements, and more solutions are needed to accommodate the temporary nature of occupants in council units.

Council dwellings are a response to those in need that cannot afford homes of their own, this means remaining within a small budget is crucial. Council housing falls into the category of public housing. Often public and low cost housing can result in high density developments able to accommodate large numbers of tenants within one site. Therefore it is appropriate to also consider higher density developments as well as stand alone dwellings, which its has been highlighted immigrants prefer.

# PART TWO:

## A DESIGN SOLUTION

## CHAPTER FIVE The adaptable dwelling

This part of the thesis applies architectural concepts of flexibility to design an adaptable dwelling that successfully meets the diverse needs of immigrant groups. The spatial requirements of the selected cultural groups have been examined and key design features have been determined. This chapter is divided into three sections: Section one presents a generic solution that is a client-less, site-less response, and the adaptable aspects are discussed. Section two tests the generic solution by introducing a site and a client, an Islamic family. Section three further tests the ideas in higher-density living.

## Section one: a generic solution

This part of the thesis consolidates the spatial design requirements identified for the studied immigrant cultures. It applies key flexible architectural concepts, and develops a design for an adaptable dwelling that can respond to the requirements of the various cultures over time. The design has the objective of being adopted by Wellington City Council (WCC) as a response to housing immigrants. While the design is for a dwelling, and has been especially adapted for Islamic immigrants, consideration is also given to its applicability in higher-density complexes for multiple cultures. The design seeks to provide a feasible solution that improves the housing conditions for immigrants.

The literature reviewed in Chapter three highlighted the design requirements of the five diverse cultural groups selected. The next step has been to analyse the requirements and highlight, firstly, similarities of spatial arrangement, which have been used to develop a suitable spatial layout, and, secondly, the differences which need further development by employing flexible design concepts. The architecture is intended to support cultural identity and transformation through its responsiveness to the highlighted cultural spatial requirements.

#### Key findings from research:

The adaptable dwelling design draws on key research findings from Part one. These are summarised below:

Chapter one [Culture and identity]:

- the important role dwellings play in cultural continuation
- external perceptions of immigrants impact on integration
- the importance of integrating the dwelling into surrounding context
- the need for cultural continuation within the interior of the dwelling, through appropriate spatial layout
- the desirability of maintaining traditional practices and routines in a new context

Chapter two [flexibility and adaptability]:

- flexibility is created through the continuous process of transformation and change
- multi-use, undefined and flexible spaces allow flexibility through the ability to be changed depending on activities and requirements
- the openness of the plan, as well as the frame construction, allows functional and social changes to be dealt with easily
- removable interior partitions allow for changes in sizing and space function
- proportion and hierarchy are important in flexible architecture
- flexibility is enhanced through modular systems that are derived from a coordinated structural span
- flexible and modular elements can allow for individualisation
- the use of flexible boundaries can create different levels of privacy and size

Chapter three [Culture Study]:

- the need for large spaces to accommodate bigger families than the average New Zealand family
- the possibility of extension of spaces and subdividing/reducing larger spaces
- the need for two separate entries
- the need to consider privacy (different levels of privacy required between cultures)
- the need for an external space, that is also enclosed and private
- the shape of the external wall to convey a sense of protection and security
- the consideration of materials as crucial in achieving a sense of comfort
- a core space within the dwelling in which circulation and activities can be centred
- connection to the landscape throughout the dwelling

Chapter four [Wellington City Council]:

- there is a lack of culturally appropriate accommodation in New Zealand
- WCC housing stock is not responsive to diverse cultural requirements
- council housing occupants are often temporary residents of council units
- most immigrants want to be accepted into the New Zealand lifestyle and local communities
- dwellings need to encourage integration and interaction beyond immigrant cultures into the surrounding community
- the need to remain within a low-level budget for council housing
- adaptive architectural elements in dwellings can easily accommodate changes in tenants
- consider effects of high-density developments on different cultures.

#### Brief

The dwelling design is a response to the differing needs of immigrants, including differing privacy needs, connections to the exterior and facilities to hold larger gatherings. Spatially, the house is organised around aligning requirements of five diverse cultures. The spatial planning of the dwelling is summarised in the following characteristics below and shown in the floorplans and sections of the dwelling on the following pages:

- need for multiple entries
- formal space accessible from the main entry
- formal space which is extendable to the exterior, with direct access from outside if required
- informal area private from external views and formal spaces, with the possibility of completely private female quarters, including a female living area
- cooking space facing a private internal courtyard, with the option of it being open or closed
- a multipurpose room which could act as a religious/spiritual room (e.g. meditation room, prayer room, shrine room or a tea room)
- sleeping areas with provisions for elders on the ground level
- provisions to allow males to sleep in/near the formal area while accommodating females in a separated and private space
- bathrooms separate from the living areas and kitchen; direct views from formal spaces to be avoided
- provisions for segregated bathrooms
- connections between areas that allow full privacy, yet maintaining openness of spaces.



Figure 5.2 General ground floor plan, site-less and clientless (not to scale)



Figure 5.3 Longitudinal section AA highlighting the use of the courtyard to create a private outdoor space


Figure 5.4 Short section BB through dwelling, highlighting level changes and zones of the house

These requirements have essentially split the dwellings into two zones. The first zone can be completely private and may be used as the informal female area. The informal area uses materiality and partitions to completely separate the space. The zone includes two service cores, with the kitchen and bathroom making up the solid components. The bathroom core, which is extended up to the second floor, determines the bathroom placement on the next level. This zone connects to an internal courtyard, allowing for an private outdoor area and visual connections to the outdoors separated from the formal area. Although it is possible to completely separate this space, it is also possible to completely open it up, visually connecting the entire dwelling for an open-planned living alternative.

The second zone is a more formal zone. The formal zone is designed to be open and light, with connections to the surrounding environment. This sense is reinforced through the predominant use of timber. The zone is more open to the exterior and public realm and is more adaptable in its possible ways of defining space, including extensions or divisions, than the informal zone. The two zones can act together, allowing open-planned living, but are also able to be separated by the use of adaptable elements to create private rooms.

In order to translate the brief into design, the relationship of flexible design theories and elements, as well as cultural requirements in the design, are considered.



Figure 5.5 Zoning of the dwelling

## Flexibility in design

Initially, labels for rooms are removed so each space becomes an independent entity, which can be used according to the changing needs of the inhabitants. Space can be redeployed; the standard size of the living room is slightly reduced, whilst the size of the bedrooms and kitchen is increased. This means that the latter can take on other uses. An advantage of the neutral approach to functionality is that the same housing unit can be occupied by a variety of different user groups. Also, the corridor size is increased so functions can expand out to corridors as required. The flexibility in the design is through both planning and boundaries which allow the spaces to be altered between cultures.

## Modular

Standardized sizing plays a large role in the design of the dwelling, which allows for replication, ease and low construction costs. This design can be broken down into three key components that combined create a big enough dwelling for large families. The three components include: a living core, including the kitchen, bathroom and multi-use spaces, a flexible formal unit, which contains the main living space, and a sleeping unit which can be place on top of the living core and contains multi-use spaces. The orientation of the elements can be easily altered to ensure each dwelling is receiving adequate sunlight, shown in figure 5.8.



Figure 5.6 Main modular parts of the dwelling



Figure 5.7 Adaptation of element three



The size of a room in traditional Japanese architecture is determined by the number of *tatami* floor mats, and usually ranges from four and a half to twelve mats. Herman Hertzberger (2005) notes that flexibility and modulation can contribute to creating an environment which offers far more opportunities for people to make their personal markings and identifications, in such a way that it can be appropriated and annexed by all as a place that truly "belongs" to them.

This design adopts these ideas of modulation through basing the floor plan and design elements in a 90 centimeter system. Dwellings can become distinct by using the possibility of many modular solutions and modular plug-in systems. The initial design is one example of the possibilities of a dwelling.



Figure 5.9 Grid determining floorplan (90 centimeters) (displaced according to direction of the sun)

## Modular flooring system

Raised floor construction methods are used within the formal space. As noted, the construction needs to be lightweight, simple, fast, and uses cost, energy and structurally efficient building methods.

The design project uses plywood stressed-skin panel system (SSP) in most parts of the house to provide space for light fittings or services to the floor below, which allows walls be altered easily. The use of single skin panels allows for temporary and flexible internal spaces and allows for flexibility beyond that of contemporary concrete floors. Lightweight, simple and rapid to assemble, there is more potential for subsequent changes in flooring layout.

Along with the rest of the dwelling, the panels follow the modular of 90 centimeter sizing and offer choices in arrangement. Other electrical services, which would normally be housed in the walls, are incorporated into the floor panels, enabling the necessary movement. Difference in the level of flooring panels can also help to define spaces and act as boundaries, increasing privacy and intimacy.





Figure 5.10 Typical stressed-skin flooring panel

Figure 5.11 Formal space boundary

#### Flexible boundaries/walls

The main elements of the dwelling that change the use and feeling of rooms are those that are required to be adaptable. Keeping rooms of similar sizing means the potential use of space is unlimited and adaptive to the needs of the occupants. Through the use of flexible design elements, spaces can be configured through the easy movements of these elements to create separate rooms or open plan space depending upon cultural needs.

Walls can be slid or folded away to provide partially, completely open or completely enclosed space when required. An example is the division between the kitchen and dining. Even small sections of folding or sliding partitions can greatly increase the functional options of the spaces.

The design approach has been to ensure the basic layout of the house is applicable without the inclusion of sliding walls. The level of flexibility is largely determined by the frequency of change, for example easier systems for occupants to use allow for frequent changes of layout.

#### The five flexible wall partitions options are as follows:

#### Internal partitions:

Modular wall components are used to split up space. These partitions are used to define the remaining spaces in the female quarters and the upper levels. They enclose the living area and subdivide spaces. Removable screens are attached by sliding grooves which can be overlapped partially or completely, and can be completely removed to create an open area. Placed on the first floor, screens are clicked into place and slide along so a space can be entirely or partially closed off.







Figure 5.13 Detail for internal partitions

#### Kitchen connection:

The connection between the kitchen and the formal space is a significant boundary, potentially creating a separation between male and female quarters. The boundary is also important in that the kitchen and the living areas can be more connected to create open plan living. The boundary is defined by a vertical folding wall that means it is possible to open or close the space for future occupants.





Figure 5.14 Location of kitchen connection



Figure 5.15 & 5.16 Detailing of kitchen connection

## Sliding:

Internal walls are retractable into the walling systems. These are located between formal and informal spaces, as well as within the formal space to allow further subdivision. These boundaries are internal and are critical in dividing the house for gender segregation. However, by being retractable, they allow for the creation of open plan living and transparency. They create flexibility of dividing space, but are a more permanent feature.



Figure 5.18 Detail of Sliding wall



Figure 5.19 Location of privacy screens

Privacy screens:

In order to meet the privacy needs of Islamic female occupants, screens have been incorporated to interrupt views into the connection spaces downstairs and the upstairs sleeping and circulation space. The south wall houses the female quarters and therefore, along this wall, complete privacy needs to be achieved. Furthermore, the connection of this area with the exterior is possible, when gender segregation and privacy are not required, by sliding the screen apart. Design considerations include allowing natural light and sun into the space, through screens and the careful placement of windows.



Figure 5.20 Detail of privacy screens



Figure 5.21 Location of semitransparent screens



Figure 5.22 Detail of semi-transparent screens

#### Semi transparent screens:

These screens are located on the edge of the veranda off the formal space. The veranda space works to extend the formal space where necessary, so the screen is required to restrict views into this space. These screens are made of timber slats working along a sliding system, allowing multiple screens to be overlapped to create more private spaces and semi-block views from particular angles. Spread out, these screens create diffused views and ventilation into the space. The screens help create a private internal/external environment to allow children to play or formal activities to extend out. They allow some privacy while also allowing natural light into the space.

#### Extension

As Till notes, the potential for additions should be tested at the design stage, so the initial plan should anticipate future extensions. The possibility to extend this house is through the screened wall, where additional rooms can be added and mirrored on the upper level. The formal space can be extended by enclosing the surrounding veranda space. Furthermore, screens and layout are adaptable and flexible, making rearrangements easy when a change in occupancy occurs.



Figure 5.23 North elevation (not to scale)

## Construction

The timber frame construction is separated from the partitions, services and fittings. It provides a skeleton, or permanent feature, which contains in-fill elements that have shorter life spans and can be adapted over time. The structure spans across the width of an individual unit, resulting in non-load bearing internal partitions.



Figure 5.24 First floor structure

Figure 5.25 Second floor structure

#### Core elements: permanence of the dwelling

The dwelling has an emphasis on flexibility. However, not all spaces can be undefined and flexible, so design of the fixed service areas of the building becomes important. There are two fixed service areas of the house, comprising of the bathroom and the kitchen. This service core, often the most permanent element in the plan, is less likely to be moved over the lifetime of a house (T. S. J. Till, 2007). The placement of these spaces therefore needs to be carefully planned.

There a four fixed components in this design and are described below:

- The kitchen is accessible from the formal space, but is be able to be closed off and completely private from the formal area. For this design it needs to face the east and have a connection to the exterior. The transitions of the kitchen and the formal space are flexible, as the kitchen needs to remain fixed.
- The bathroom services are placed on a wall that extends to the second floor; an important consideration in determining the placement. The bathrooms must be placed away from the kitchen, and formal areas.
- 3. The staircase is also a permanent element that lies between levels. It needs to accommodate the privacy requirements for some cultures and allow females to move around the house.
- 4. Storage facilities are placed throughout the dwelling to allow flexibility. In the main spaces there are alcoves, window seating and shelves and the hallway contains a storage wall made up of shelves and cupboards. Upstairs, a storage wall is used to hold belongings so the rest of the space is able to be altered.

#### **Cultural Requirements**

The dwellings' two zones, are also reflected through the use of materials. First, in the more intimate and private areas heat is produced through thermal mass, with concrete elements, to keep a constant temperature and retain heat during warm days to release at night. Concrete or similar material has also been used to symbolise an earth-like material, reflective of cultures that use exterior areas for many activities. This approach allows occupants to carry out similar activities indoors in an environment that is temperature-wise more akin to their homeland.

Second, in the more public space, the use of timber creates the visual feeling of warmth. This is in line with traditional Japanese construction, which has been predominantly timber-based. It also creates a strong contrast with the concrete. This formal space is more public for guests to socialise. The overall effect of warmth is created, not only through the use of timber elements, but also through the introduction of a skylight to bring light into the space.

## Privacy

A balance of privacy and interaction between family members, guests and immediate neighbours is achieved through layout and the use of adaptable transitions, internal courtyards, flexible flooring and screened walls. Elevated spaces and informal upstairs space reduce the visual intrusion from the street. The flexible space upstairs can then be designed as a semi-private space including some private external spaces. Flexibility through elements, such as walls that can fold and floors that shift, allow changes in function, size and privacy.

In order to provide more privacy for the family, particularly the women, the internal courtyard is placed between the formal and informal spaces. Flexible connections to the formal area mean the outdoor space can be separated and thus female family members can socialize outdoors without wearing veils. Separation from the informal area is available in a secondary entrance.

## **Connections to exterior**

There are three points of possible entry to the dwelling. The main entry is at the front of the dwelling and is framed by timber members; the second is at the back of the dwelling, entering into the rear of the formal area; the third is on the south side and is protected by privacy screens. The main entry point is important as a threshold to maintain a sense of entry and monument, making it clear to visitors.

Casual connections to the exterior are positioned along the northern edge. Along the north edge, there is an in-between space, the 'veranda'. a layer of space midway between the interior and exterior which is sheltered by eaves and framed by posts. It is timber-floored and functions as an exterior corridor. It is raised off the ground and forms the immediate edge of a garden which can be enclosed by semi transparent screens. The south façade has a number of privacy screens, that when opened, allow multiple connections to the exterior.







Figure 5.27 Veranda space closed off to increase privacy of the formal space







## Section two: Islamic case study

The literature research from Part one highlighted that Islamic communities demand the most specific and most challenging needs of an immigrant group for a dwelling. Therefore to test the generic solution in this section this immigrant group has been chosen. This section demonstrates how the dwelling can be adapted to the specific needs of an Islamic family, as the client and within the context of Wellington

The biggest difficulty Islamic families face with current housing is lack of privacy in open plan living. Women are forced to wear their *hijabs* (veils) inside when there are male guests present. Open plan creates difficulties which contradicted the idea of home as a place where woman can do anything they want, prohibiting female activities and movement when guests are present.

This case study considers how an Islamic family would use the house in a way that is reflective of their cultural requirements. This includes private external walls, spaces private from guests and a designated female entry. Having two separate spaces to



Figure 5.28 Dwelling on site, viewed from above

accommodate gender groups is ideal for a pleasant gathering. The dwelling's elements can be spatially manoeuvred by women to meet their privacy needs, allowing them to move around and perform their tasks. The entrance separates the public from private space, with reception for male visitors at the main entry.

Site: (34 Queens Drive, Kilbirnie)

The site chosen is located close to the Wellington Islamic mosque in Kilbirnie; an already diverse community, home to a number of ethnic groups. The site analysis initially involved investigating the greater Wellington region in order to determine the current concentrations of immigrant citizens, and therefore the most suitable placement of the dwelling.

The design seeks to blend the new dwelling in with those existing in an already developed residential area. Merging the exterior of the dwelling with others in the local community can help the immigrant integrate into the surrounding context.



Figure 5.29 Site photos



Within this context of suburban housing, there is emphasis on having a house that is different from the others on the street, for the inhabitants who identify with to maintain some sense of personal uniqueness in an increasingly conformist world. However, too much difference would result in negative repercussions.

The direction of Mecca determined the directional requirements of the prayer room as well as the how the rooms are prescribed and the overall aesthetic of the dwelling. The consideration of the direction of Mecca has created the diagonal wall at the space of the dwelling. This wall points to Mecca and is where the prayer room in located.



Figure 5.31 Back view of the dwelling



Figure 5.32 Direction of Mecca

Figure 5.33 Surrounding context in Kilbirnie



FIRSTFLOOR

Figure 5.34 Floor plan for Islamic family

## Entry/Circulation

Entry is the transition from the secular to the sacred and has a large religious significance. The main entry is used to welcome visitors, and the hallway/gallery leads into the formal space. Entry to the female quarters is off this hallway, but to achieve gender segregation this entry can be completely closed off. The main entry is directing the visitors into the formal space and is for male visitors.

Circulation around the rest of the dwelling is hidden from guests' view, and the placement of the staircase enables a female to go to the second floor without being seen. The staircase is located away from the front entry of the house, within the female quarters. Circulation in the female quarters is on the perimeter of the dwelling, creating an in-between space with the exterior.



Figure 5.35 Main entry to dwelling



Figure 5.36 The adaptable dwelling



Figure 5.38 Main entry space, surrounding rooms have been separated for female privacy



Figure 5.37 Main entry space, surrounding rooms are opened to create open-plan living

#### Formal space

The formal space is an area to socialise with guests, and acts as the male quarters of the house. The space is able to be completely segregated from the female quarters. Entry to the formal space has two possibilities; through the main entrance, or through the back of the living space. The space opens out to a veranda, which allows for activities to expand into a controlled external area. Light into the space is diffused by the placement of timber screens on the outer edge of the veranda. A skylight along the length of the formal space creates a connection to the sky and further emphasises the feeling of an exterior environment. The space is split into two areas; the largest and main formal space, and an extension of this space, stepped down half a level. This latter area is able to be partitioned off from the main space and has the ability to act as a sleeping space for male guests.



Figure 5.39 Formal space, with connections to exterior and the possible connection between the kitchen living space



Figure 5.40 Formal space



## Female quarters

The dwelling is designed so it can be divided to accommodate the privacy needs of female occupants. This space includes a living room, kitchen, courtyard, bathrooms, bedrooms and the circulation between these spaces including the staircase. There is also a secondary female entry for this area. The prayer space at the back of the dwellings is accessible from the formal space as well as the female quarters. Excluded from this area is the formal reception and the formal living spaces where male guests are entertained and where visual and physical connections are directed towards the exterior.



Figure 5.43 Threshold between female spaces, closed off for an Islamic occupants

Figure 5.42 Threshold between formal and private space, and second entry

## Kitchen

The kitchen can be completely separated from the formal space through the use of vertical folding walls. Entry to the kitchen can be through the second living space instead of the main corridor, preventing view into the kitchen on entry to the dwelling. Female can remove her veil and cook in privacy. The kitchen is also connected to the internal courtyard so the space can be ventilated and natural light can enter. The connection to the exterior allows access space for a possible vegetable garden. There is also the option to open the wall to the formal space if required.

## Courtyard

Although the courtyard has the possibility of opening up on all four sides to the surrounding rooms, the courtyard is usually closed off and separate from the formal guests' space. This arrangement allows light into the house and female quarters and creates privacy from exterior views.



Figure 5.44 Courtyard space viewed from the elder's bedroom, looking through the kitchen and female living space

## Bedrooms

Bedrooms for the family are located on the second level and are adaptable according to the number of family members and rooms required. On the upper level there is a multi-use, undefined space that can be divided into a maximum of four bedrooms according to a modular wall system that fits into the main storage wall of the upper level. A skylight is included on the upper level, helping allow natural light into the space without allowing views into the space.

There is provisions within the ground floor multi-use space to accommodate elderly generations at the rear of the house. If required the formal space can be divided to sleep male guests.

Enclosing the upstairs terrace also provides a further option for sleeping spaces. The light and privacy of the space is controlled by screens over the openings, while light still enters the space through the walls facing the internal courtyard and a skylight.



Figure 5.45 Approach to second floor



Figure 5.46 Breaking up bedroom spaces

#### Storage

There are two main storage areas which are fixed to allow flexibility of space. These are located in the entrance space to the left, as well as on the upper level, which contains cupboards, shelves, modular systems wall components (discussed on p.116), fold-down beds and furniture. Storage is also available around the staircase and within the formal space. These areas remain constant and static.

The wall on the north edge of the upper level works as a wardrobe and storage unit, accommodating foldout furniture such as beds, desks, and shelves. Additional modular components can also be stored here to allow for alterations to be made. The wall also contains wall modules that slide out to act as room dividers.



Figure 5.47 Breaking up bedroom spaces



Figure 5.48 - Modular wall and its possible components

## Modular Wall Design

The wall splits up the multi-purpose space on the first floor which can be broken up into up to four rooms (labelled above). The wall acts as a storage unit that includes furniture and fittings into the 90 centimetres module. This means it is easy to change and plug new systems/modules into as required. The wall allows for changes in function with options of cupboards, shelves, windows and walls that then fold out to break up the space. The 90 centimetres module allows for the possibility of different compositions within the wall that reflect individual needs.

## Bathrooms

The bathroom area remains the core because of the flexibility required in the rest of the spaces within the dwelling, . This is a solid and constant element, located at the front corner of the house. The position of the bathroom is continued to the upper level. The ground floor bathroom contains toilet, shower and basin and has a separated laundry area. There are two entries to the downstairs bathroom, one through the female quarters and one through the reception area. When the female quarters are closed off for privacy purposes, the bathroom is then accessible to males through the reception room<sup>1</sup>. This means the entry from the female quarters should be permanently locked from the inside and the female bathroom is located upstairs.

#### **Roof terrace**

The roof terrace on the upper level increases the flexibility of the dwelling and allows the possibility of a vegetable garden, or a possible extension to the overall interior sleeping space. By simply moving the exterior screen bordering the courtyard to the perimeter an additional external space can be created. Further, closing the louvres of the screen, creates a private external space able to be used by females.



Figure 5.49 Second floor exterior porch

<sup>1</sup> When segregation is not required the screen that opens up the female quarters closes off this entry, as shown in the plan.



SOUTHERN WALL WITHOUT SCREENING DEVICES



DECORATE SCREEN limiting views into interior



SINGLE SLATTED TIMBER SCREEN- Limited privacy



WOODEN SLATTED LOUVRED PANELS, open vertically



DOUBLE LAYERED TIMBER PANELLED SLIDING DOOR



Figure 5.50 Screening options

#### Screens

In Middle Eastern Islamic countries, ornamental screens are used to diminish views into the more private female domains of the house, as well as to provide decoration. The exterior façades in this design allow for movement and adaptation, enabling the inhabitants to control the level of privacy. A common technique of controlling views into the house is via *mashrabiya* woodwork screens, which protect a woman's' right to privacy, 'to see' but not to 'be seen' (Hadjiyanni, 2009). Residential spaces are much like the veil; dynamic, flexible, and adaptable forms that can be creatively manipulated and moulded to meet Islamic societal expectations.

In this design, the main use of the sliding screen is along the south wall on both levels, where the female quarters lie. These screens, controlled by the occupant, are easily removed or replaced and can create different levels of privacy. A screen study of the southern wall is shown, looking at the visual effects of different screening systems and layouts from the perspective of the overall aesthetics as well as effects on privacy. The options of the wall create a range of diverse possibilities, each changing the look of the dwelling. The layering of multiple screens to increase privacy is also an option.



Figure 5.51 Visibility study of screening patterns

## Section three: high-density

While the design has been a single adaptable dwelling suitable for immigrants from diverse cultures, the design can also be adopted within a complex containing multiple dwellings, meeting broader housing requirements.

To test the ideas of the mediation and adaptability of the dwelling, two further densities have been considered to assess the impact of privacy on the inhabitants. The first typology looks at low-rise apartment complex that would be occupied by mixed ethnicities and the second explores a medium-density townhouse complex. The relationship between the individual dwellings and the overall complex and wider connections becomes important.

The cultural dwelling can be appropriate in the two higher densities through repetition and small adaptations of the initial dwelling design. This section provides an instance of a solution within each density, however there are downfalls of each.

This section has been employed to discover the applicability at different densities that may be required in more populous regions. Further detailing would be required in the circulation spaces of complexes, noise and privacy issues, and views from surrounding buildings and the street.





This section tests the design in a high-density situation of ten or more units. High-density is created by stacking the module components discussed on p.93. It looks at how multiple units can interact while remaining private and create individualisation of units.







An urban site within the Wellington CBD has been chosen to test the design at high density, taking into account neighbouring buildings, accessibility and privacy of the site. With higher density, requirements of entrance ways and privacy become challenging, due to the shared exterior space and the greater potential for abuse from neighbours. Entry ways have been highlighted as cultural important and privacy can be enhanced by misaligning the doorways of neighbouring houses. The entries are staggered and no more than two entries occur on one level as shown in figure 5.5.

External areas have been established as important and not often present in high density complexes. In this instance an exterior communal space where interactions can occur in a cultural neutral space between occupants of the high-density complex has been incorporated into the plan. The placement of windows aligning the street is important and a private entry for females remains a priority.

The possibility of extension in high density units can be through the use of a 'shared room'. This room is non-specific and can be connected to either a neighbouring unit to extend the dwelling or act as a communal room shared between units. In this study the room is narrow and lies between the two units allowing one unit to take over the space, both units to connect through the space or use the room as a secondary and private entry for female tenants.



Figure 5.52 -53 'shared room' Allowing a private entry or possibility for units to temporarily extend







Figure 5.58-60 Modular stacking of units to make a high density development



Figure 5.54 Section-showing the make-up of units between levels (numbers correspond to the modular units described on p.93)



Figure 5.55 Circulation and entries of units



Figure 5.56 Views from street level



Figure 5.57 Maximising solar gains



#### Townhouse complex

The design is further tested in a medium-density study that includes four-six units. It looks at how multiple units can interact while remaining private and retaining a sense on individualisation.

For a medium-density development a site in Newtown has been chosen. Newtown is a suburb that already has an ethnically diverse population, and is home to a number of Wellington City Council flats. While Newtown was originally a European working-class suburb. It is an area that in more recent times has attracted a large number of students, young professionals and immigrants, resulting in an ethnically diverse population and it also contains multiple medium density developments.

As discussed in Chapter one, architecture should enable individuals from two different cultural spaces to create a third artificial cultural space in which to meet and share. Therefore, to help integration in a medium density complex, it is important that a community is created by the occupants of the complex and interaction occur between tenants.

Visual and physical connections to the community become important in a complex. The site has four possible entry points and, following the Japanese ideas of an indirect path, these take turns through the complex to encourage individuals to associate themselves with the surrounding communal environment. Encouraging pedestrian access through the site further fosters a interaction with the community.

NEWTOWN

Figure 5.61 Surrounding context of the Newtown site

The individual houses are designed in a way to create public and private parts of the dwelling. The private area becomes internally focused, while the public area remains open to the surrounding context. This allows the possibility of catering for a large gathering that can extend beyond the dwelling, and connections between dwellings can be created to accommodate relatives and guests. This is where the mediation to the surrounding context can take place and interactions between multiple cultures and the community can occur.

The houses need to consider a clear visual association with the identity of the mediumdensity complex and how the complex connects, with and is perceived by, the buildings immediately surrounding the complex and the wider community. Physical connections through and around the site, and the effects on these on the individual units within the complex needs to be considered.



Figure 5.62 Relationship between two dwellings



Figure 5.63 Relationship of dwellings on a sloped site



Figure 5.64 Possible layout of dwellings within the site

# CHAPTER SIX Conclusions and discussion

This thesis has demonstrated the potential role architecture can play in assisting the integration of immigrants into new environments. With a focus on dwellings in Wellington, it highlights the importance of suitable temporary housing for new immigrants in unfamiliar surroundings. It has applied the concepts of flexibility and adaptability as architectural solutions to support migrant settlement and facilitates integration. This is demonstrated through a responsive architecture that responds to adjustments between a range of temporary cultural tenants with ease.

The initial research concentrated on culture, identity and its connection to the built environment. Chapter one shows how these concepts are intertwined and constantly changing. Focus was placed to specific immigrant cultures and their positions within a Western context. Chapter three identifies key spatial requirements of five diverse cultures and creates common characteristics that have been used in the design brief. These are general, holistic and relevant when designing for specific communities. The design aspect of this thesis can be seen to act as a case study that tests the guidelines established to address the current issues in housing provision.

Wellington City Council housing has been analysed, with a discussion relating to the unresponsive nature of current accommodation. It becomes evident in the research that accommodation is generally designed for the housing requirements of the 1950s and is therefore out of date. It also does not consider the unique socio-cultural requirements of immigrant groups.

This thesis has employed theories of flexibility to respond to differing housing needs of specific immigrant cultures, with the ability to adapt from one immigrant culture to another for temporary tenants. Flexibility can create a more fluid and transformable space that is responsive to humans' dynamic movement. Adaptable housing concepts are explored through the spatial configuration, with the use of flexible elements to define and divide space for the intended variety of occupants. For city councils, this research provides not only a more responsive approach to immigrant housing, but also a relatively low cost option. The ability for flexible architecture to be adapted and modified offers a cost-effective solution, especially when analysed over its lifetime. However, an estimated costing of this project was beyond the scope of this thesis, as the focus was on cultural issues associated with housing for immigrants.

The developed design is a response to the specific problem that has been identified; the lack of culturally appropriate dwellings for immigrants in Wellington. The core of the design is its ability to meet the housing needs of diverse cultural groups. This has been achieved by adopting the common characteristics and guidelines created from the literature and case study research in Chapter three. The generic design solution in Section one responds to the design brief which highlighted the need to accommodate large events and to create an internal outdoor space which allows sunlight into the surrounding rooms. This design involves flexible and adaptable responses incorporating standardised sizing, undefined rooms, modular flooring panels, flexible boundaries, large structural spaces and the possibility for extension. The generic solution presents options for open plan living as well as limiting views from the exterior through flexible aspects. These elements highlight how the brief and research has been effectively embodied in the general design.

The Islamic case study in Section two employs a representation of an Islamic family as a client. The aim of this is to illustrate how the basic design can be tailored to the needs of a particular culture and to confirm the applicability of the design approach. While the design's suitability for other cultures has not been assessed, its adaptability suggests it could easily meet a wide variety of needs. This assumption is based on flexible design theories and has not been evaluated.

From Chapter three, the key design characteristics for an Islamic family are grouped into three main categories: privacy requirements, gender segregation, space for larger families and family events. This design has focused on responding to these three categories through multiple entries, strong division between the formal/male
area and the informal/female area, restricting accessibility and viewing to reinforce gender segregation. The main requirement for this part of the design is successfully segregating spaces for females and males.

In section three, the generic solution has also been tested in a higher density situation. This section tests the use of the modular design components and adaptive site techniques of the general solution, in a higher density apartment block, containing ten-plus units, and a medium density townhouse complex, containing six dwellings. The exploration of the design's applicability in higher density settings is not comprehensive, but the findings suggest that fuller development could be worthwhile.

Research has confirmed the connection between architecture, culture and identity. By employing research from a anthropological perspective, the design presents how architecture can act as a cultural medium. The thesis highlights the role anthropological research can have on architecture, providing a closer relationship to the effects of architecture on its context.

This thesis provides a practical design that could be used by Wellington City Council or large private development companies. It negotiates between architecture and culture, and creates a successful design that acts as a medium to influence and reflect change. Both the design and research guidelines may have a more general application for other local council bodies and private sector owners.

The concepts can be applied in adapting accommodation that responds to changing demands. The adaptable house fulfils the cultural requirements of potential immigrant occupants, within a responsive dwelling that is able to be adapted to a variety of needs, and sites.

By developing a fuller understanding of the housing needs of different immigrant groups and developing a appropriate design solution, this thesis contributes to the body of knowledge about the important role that architecture can play in meeting the social and cultural needs of immigrants.

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# APPENDICES

### Appendix 1: Flexible partitions



# Appendix 2: Ethnicity and Religious Affiliations (census 2006: Wellington region)

E

hnicity					
thnicity	thnicity	Wellington City		New 3	Cealand
	Number	96 of Respondents	Number	46 of Respondents	
ropean	121,293	70.1%	2,609,589	67.6%	
Bori	13,335	7.7%	565,329	14.6%	
wife	8.931	5.2%	265.974	6.9%	
iland					
sian	22,854	13.2%	354,649	9.2%	
ELAA*	3,615	2.1%	34,746	0.9%	
ther	10,304	10.6%	430,878	11.2%	
stal	172,971		3,860,163		

### Appendix 3: Number of overseas born living in New Zealand by areas of birth

Make-up of the Asian Ethnic groups in New Zealand

Seven Largest Asian Ethnic Groups 2001–2006 Censuses					
Ethnic group	2001 count	2006 count	Percentage change 2001–2006		
Chinese	105,057	147,570	40.5		
Indian	62,190	104,583	68.2		
Korean	19,026	30,792	61.8		
Filipino	11,091	16,938	52.7		
Japanese	10,023	11,910	18.8		
Sri Lankan	7,011	8,310	18.5		
Cambodian	5,268	6,918	31.3		

## Appendix 4: Male-up of the Asian Ethnic groups on New Zealand





#### Appendix 5: Traditional Japanese dwellings:

Figure Takayama common houses

The house was home to successful merchants and built by an expert carpenter of the time. The structural system has undoubtedly also contributed to making the 'casualness' of room character possible. The roof load is transferred by heavy cross beams to strong longitudinal members whose maximum span is 18 foot, a distance greater than would ordinarily be required. Additional supporting beams can be used without disadvantageous visual consequences because of the suspended ceiling. Thus the placement of the columns is done freely and follows room organisation rather than construction necessity.



#### Appendix 6: Traditional Pacific Island dwellings:

Figure Vanuatu traditional dwelling

Buildings generally have rectangular plans and are covered by two-sided roofs that touch the ground. They are constructed directly on the ground. Houses are low and use flaxlike partitions to divide the limited interior space so as to provide separate quarters for men and women. The dwelling is built from materials derived from plants that are found in the natural environment (Oliver, 2007).

Functions are split between separate structures making up a complex. There is a central open space surrounded by a centre malae. The size and distinction of buildings diminish as you travel from the centre. The principal lineage property possesses a guest-house, prestigious structures, multiple residences and outbuildings. The cooking house is usually located at the rear perimeter. The dwellings are thatched in coconut or sugar cane with coconut leaf wall screens that can be lowered as blinds for weather protection and privacy (Oliver, 2007).

Figure Fiji dwelling, Waitabu

The typical Fijian house is divided in ways that are common throughout much of the world, distinguishing the area occupied by the men from that occupied by the women, and giving a space of importance to the household head. When spaces need to be differentiated within the dwelling there are alternative ways to define them. Sleeping arrangements are an important cultural issue with pacific families (Oliver, 2007).



### Appendix 7: Traditional Islamic dwellings:

Figure Deie el-Qamar house, Lebanon

Three iwans (a rectangular hall or space) create the main living space that encircles the gallery, open to the exterior, Coupled windows adorn the wings towards the view. An elaborate lower floor portal was supposed to lead to an enlarged space. The entry space behind has been used as a shop (Ragette, 2003).

#### Figure Hileh house, Iraq

This house reflects the more agricultural setting of the Hileh, but has an uncommon axial orientation due to the deep and narrow plot. The entrance is formal and symmetrical. The end wing accommodates store rooms and the stables. On the next level there is a reception and guest quarters. The family wing is on the far side of the court (Ragette, 2003).

Figure Marrakesh House, Morocco

The dwellings is shaped in a U-shaped arrangement, consisting of two floors.

Townhouses are found in cities of the littoral and the lowlands of the mountains. They mainly include an introverted courtyard scheme with a simple gallery or complete peristyle (columned porch) and often elaborate courtyards (Ragette, 2003).

### Appendix 8: Traditional African dwellings:



Figure Tswana dwelling, Bostwana

The dwellings contain three or The dwellings facade that faces the four circular-plan huts of mud built street is un-ornamented with a single within a yard. The parents were accommodated in the main hut, children in other huts. Absentee sons may also build a hut which more frequently favoured modern design of rectangular plan and hipped roof covered in corrugated sheeting. The kitchen was located in the yard (Oliver, 2007).

Figure Zinder, Niger republic

entrance. This means that from the street it is hard to tell if it is a house or simply a high wall. The house is made up of a compound which includes a number of huts for various occupants. The old gentleman and his wife live in the finest house, which can only be accessed by passing through another reception. Kitchens are contained in the round huts that are covered. There are huts for storage and the toilet is located in the upper left corner. The entire complex is bounded on three sides by others(Gardi, 1973).

Figure Maasi dwelling, Kenya

The dwelling consists of a ring of rooms protected by a thorn fence with several openings. The walls, interior partitions and flat roof are a lattice of sapling and interwoven brushwood plastered with several layers of clay, cow dung and ash. The entrance is low and narrow and is offset to the wall to prevent wind blowing in. The main room has a three stone fireplace. Women and young children sleep together in one compartment; the other is for the husband and visitors (Gardi, 1973).



#### Appendix 8: Traditional Hindu dwellings:

Figure Bohra dwelling, Gujarat

Figure Bishnoi dwelling, Rajasthan

Dwellings/townhouse are clustered together in a linear arrangement. The house is connected to the street either by a platform or a porch. The dwellings are deep between two long, shared parallel walls with a courtyard in the centre. From entry to the innermost rooms there is a hierarchy and an increasing sense of privacy. The ground floor contains the kitchen, storeroom, and living/ dining spaces, while the bedrooms with attached bathrooms are on the upper floors (Oliver, 2007). This example has both rectangular and circular rooms made of mud covering about 25 percent cent of the entire house. The dwelling consists around a central court which includes seating platforms for men. The main rooms consisting of a circular kitchen, a sleeping room which is used for working in the day and a circular grain store, open to the centre court. The court also consists of a semi-open cooking area. The detached living room and rectangular sleeping rooms have a roof overhang or veranda that provides shelter and space for outdoor activities (Oliver, 2007).

Figure Kerala dwelling

Typically a Kerala home is a detached, independent house. Layout is a central open courtyard with rooms arranged around it. The middle of the courtyard, in Hindu families, usually has a flower bed with the '*Thulasi*' plants (religious associations).

The house is perceived as square and broadly consists of three concentric zones around the central space. The temple architecture of Kerala has significantly influenced this style of home design (Chakrabarti, 1998).

### Appendix 10: Median income of immigrants by region



#### Median income of immigrants by region