Centre for Building Performance Research

Designing for the Elderly in Social Elderly Care Facilities.

An occupant informed analysis that considers design interventions for senior housing facilities.

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Edition information

The Document Register is provided at the rear.

Preface

In New Zealand, 190,000 older people are part of the core demand for social housing, with this number expected to rise as the population ages. To combat this issue, a market driven response through the supply of social housing for elderly is necessary. Current research indicates that there is little information nationally or internationally about specific requirements for social elderly care facilities, particularly in the NZ context.

Working with a medium scale, research based architectural practice, the objective of this paper is to survey and test a specific case study to understand conceptual design techniques for upcoming practice based social elderly housing development. The ultimate aim of this research is to inform design project work and outputs, current operations and possible design interventions in the future that address designing for the elderly, testing occupant preference of globally researched interventions.

This paper first identifies the key findings of a systematic review of literature that investigates the most appropriate design intervention for elderly care facilities. Then, using a qualitative case study approach, it examines the living experience of 10 elderly people who live in local-authority rental housing in New Zealand and two custodians of these occupants. The survey consisted of conversation based interviews with the residents in their dwellings. The study finds that consideration needs to be given to elements of specific interior spaces, spatial configuration, accessibility, outdoor, light, privacy and safety and social aspects.

Acknowledgments

Notes

This report is intended to aid designers in understanding occupant perceptions of elderly care facilities. Confirming if there are elements to user informed feedback that have not been considered in existing design strategies for implementing social elderly care facilities.

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Background research Phase 1

The research project is an occupant informed analysis that considers design interventions for senior housing facilities. There is little information, nationally or internationally about specific requirements for social elderly care facilities. This phase of the research project tests the specific findings of the systematic review of literature conducted in phase one. The preceding research project funded by Willis Bond and Victoria University of Wellington (VUW) in 2018 was an objective, critical summary of published research relevant to architectural interventions for elderly care facilities, globally. The literature review primarily focused on social development buildings and examples of private elderly facilities.

The research question for Phase one asked, 'Is there evidence of design guidelines and interventions implemented in senior housing facilities that affect occupant satisfaction and/or outcomes?' The search terms and keywords included defining the type of environment looking at "senior housing facility," "rest home," "care home" or "assisted living facility," and it was specifically looking at the built environment. The research focused on studies that provided measurable outcomes and studies that had direct input from seniors, not solely opinions of staff. It excluded dementia or hospital/nursing homes and children. The results were collated in a comprehensive database that outlined a number of studies conducted internationally and nationally and the kinds of design measures that have been established (with measurable evidence) as design guidelines. The research identified existing studies that speak to design attributes for elderly care facilities about what works well and what the drivers are behind these. It specifically focused on what literature says about design guidelines at multiple scales including the masterplan level, site layout, spatial layouts and also the configuration of buildings. The outcomes of the first phase of this research are summarized below.

Phase 1: Specific Interior Spaces

This includes commenting on the themes kitchen, bathroom, floor, furniture & personal items and ventilation. Limited commenting was found from literature on these themes, only talking about flooring and bathrooms. Kuboshima, McIntosh & Marques (2018) stated floor materials should be considered in respect to traversibility and maintenance. Elderly are more inclined to dirty a floor, yet have a lower ability to clean it. Non slip tiles are preferred for cleaning, yet carpet is preferred for warmth. However, McIntyre & Harrison (2017) suggested types of flooring are not the issue, but it is the changes in flooring which provide concern when stepping over the threshold. Coverage of flooring for people with mobility aids is important to avoid spillages and tripping (Zhipeng et al., 2011).

Burton & Sheehan (2010) and Kuboshima et al., (2018) noted the accessibility and practicality of the bathroom is an important consideration. Wet surface showers are favoured over showers with a step to enter to avoid tripping. Enclosed showers are not ideal for those who need assistance with showering as they are not big enough. Bathtubs are also not preferable as they can heighten risk of residents falling (Kuboshima et al., 2018). Use of sliding doors in bathrooms was identified as valuable for increasing the usability of the space, and are easier to use for those with wheelchairs or walkers (Hoof, 2018).

Phase 1: Spatial Configuration

This includes commenting on the themes traversibility, layout, storage and seating. The literature revealed that spatial features are something that need attentive consideration in designs for elderly care facilities.

Spatial traversibility was identified by McIntyre & Harrison (2017) as an important effect of the built environment design on opportunities for wellbeing in care homes. This focuses on how easy a building

is to move through. The design of the built environment should consider appropriate hand rails and seating, door usability, circulation layout and width of circulation spaces. They noted that when handrails were not provided, other furniture was used for support. The functionality of corridors is also very important (Zhipeng et al., 2011). The width of corridors or passageways needs to be considered with enough space to pass someone in a wheelchair.

Spatial organisation surrounding the sitting area was another important design feature identified by Kuboshima et al., (2018). While there are different preferences to where residents like to spend their time, most tend to enjoy sitting in the sitting spaces in their lounge. When designing for people with limited mobility, there should be careful consideration in the micro environment surrounding the sitting area. The spatial organisation of sitting spaces should allow for an armchair and immediately adjacent tables and shelves to keep things within reach. These shelving surfaces within their reach are essential to accommodate various things such as glasses, phones, remote controls, medicine, cups of tea, pens, and papers. The design should facilitate residents various activities including watching television or knitting. Thus the area should be designed to maximise access and control (Kuboshima et al., 2018).

It was identified that the quantity of space was not a big issue in elderly care facilities, the issues were more focused on the layout and the openness (Burton & Sheehan, 2010). Open plan is appealing as it provides interest and increases social engagement. However the noise and lack of privacy of open plan living must be considered (McIntyre & Harrison, 2017).

Providing a diverse range of spaces was noted as an important element of designs. Barnes (2006) illustrated that spaces of various size and variation between public and private to allow more retreat options and space for various additives. This could be achieved through flexibility of furniture, a choice of rooms and a variety of conditions (McIntyre & Harrison, 2017).

The literature discussed how residents in elderly care facilities desire maintaining an optimal level of independence (Kohen et al., 2016). This can be achieved through designing aspects of the external and internal environment to optimise residents' ability to use certain features. Having the ability to allow guests to stay overnight was something that encouraged this. For example private space to host guests or a spare sleeping arrangement, such as a pull out couch (Kohen et al., 2016). Kuboshima et al., (2018) also commented on the importance of having space for guests.

Layout should be designed to maximise access and control. Residents having the ability to see their guests before they arrived was identified as increasing their sense of control. Literature identified it as desirable for the spatial layout to allow a clear line of site from the residents preferred sitting space to the door, as well as sufficient proximity to hear guests upon arrival is an important spatial consideration (Kuboshima et al., 2018).

These results highlight that spatial configuration should be a vital consideration in designs for elderly care facilities.

Phase 1: Privacy

Privacy was another theme identified as very important to residents in elderly care facilities. An element of safety was recognised when staff members would check up on residents regularly. However this was also noted as an intrusion of privacy for some. This illustrated that in elderly care there is a necessary trade-off between enhanced security and decreased control (Kohen et al., 2016).

Phase 1: Safety

Kuboshima et al., (2018) illustrated that privacy and safety concerns are particularly important in small dwellings where members of the public can pass by in close proximity. It was an issue for resident's safety and security when public would traverse through the site, particularly during the night, even despite a sign stating "no public access". Furthermore, if residents could see the public pathway from their unit, they would shut the curtain as they felt a loss of privacy (Kuboshima, McIntosh & Thomas, 2018). Having safety from public was a reoccurring theme mentioned in the literature and it was noted that the security increases resident's wellbeing (Burton & Sheehan, 2010). In order to ensure maximum safety, door security systems were put in place in some residencies, such as buzzer entry phone systems, code pads, release buttons, key locks.

However, the usability of these caused problems (McIntyre & Harrison, 2017). Sidewalk and crosswalk safety around the residency should also be considered. There should be flat surfaces, safe for walking on and even handrails. If one does not feel safe to go outside, or threatened of their safety, one will no longer exercise the ability to do so. This limits their sense of control (Kohen et al., 2016).

These two key pieces of literature suggest that safety was talked about more through the literature than privacy, however there was some overlap where Kuboshima et al., (2018) and Kohen et al., (2016) spoke about both privacy and safety.

Phase 1: Accessibility

The accessibility between indoor and outdoor was a prominent theme mentioned in the literature. The study by Potter &… (2018) identified that the outdoor space must be accessible without restrictions. This includes locked doors, uneven foot paths, steep steps or needing permission or assistance to go outside. This helps to avoid residents feeling trapped. Burton & Sheehan (2010) also spoke about how outdoor space must be accessible without restrictions.

The functionality of doors should be considered particularly in reference to how heavy they are (McIntyre & Harrison, 2017). Some people experienced difficulty with swing doors while using their walker frames, whereas sliding doors, which do not require much strength to open were more suitable. Further, accessible under cover storage is desired for those who have mobility aids or vehicles (Kuboshima et al., 2018).

Kuboshima et al., (2018) stated in their study that it is important to recognise the accessibility usability of storage, not only how to optimise potentially limited space. It was recognised that higher shelves were rarely used when occupants were less able, as they could only reach the front of the cupboard. Considering height and depth of shelving and storage is important.

In terms of accessibility for all, the case study of Hoof (2018) showed that all units are designed to facilitate the provision of any kind of health care. Thus apartments can be used as residential or nursing care units to ensure full inclusivity. This is perhaps an important consideration for sustainable design.

Phase 1: Outdoor

One of the most significant findings of phase one identified the importance of outdoor spaces in elderly care facilities. Contact with outdoor natural environments is found to have significant therapeutic potential for older adults (Rodiek & Fried, 2004) and links to lower levels of depressive symptoms (Potter et al., 2018). Increased physical activity, appreciation of nature elements, enhanced sense of autonomy, and the hormonal effects of bright outdoor light levels are all factors contributing to this therapy.

The study of Rodiek & Fried (2004) examined aspects that elderly would prefer in outdoor spaces. Transitioning from indoor to outdoor was identified as important, with "benches to rest" near the access to outdoors. Comfort was also recognised, with a need to ensure shading and seating outside and multiple paths that looped or linked with each other. Residents had a preference for non-internal courtyards, with 'soft' green landscape, as opposed to 'hard' concreted landscape (Burton & Sheehan, 2010). Fencing was also preferred to an enclosed courtyard, or a window to look out to avoid feeling trapped. Also windows to see outdoors from inside, at wheel chair height (Rodiek & Fried, 2004).

Views were identified as a prominent design feature that affected older residents, particularly onto green spaces (Burton & Sheehan, 2010). McIntyre & Harrison (2017) explained views are important as they provide a focus for attention and sometimes even motivation for physical activity as residents are drawn to the window to look out.

Layout of units was identified as important in terms of optimising sunshine. Sunshine is important for brightness and warmth. Design and placement of windows should consider particular requirements for privacy and controlled access to sunlight to limit glare on TV/computer screens. The position of trees should also be considered to maximise residents' sunlight (Kuboshima et al., 2018). However, Kuboshima et al., (2018) also commented that access and desire for sunlight varies depending on residents' health impairments, thus this also should be considered.

The multi-use of outdoor spaces, like porches was also highlighted, where they could be used not only as a leisure space, but also to accommodate other things such as mobility aids. However it was identified that under cover storage is preferred. Further, communal outdoor spaces have great potential to encourage social interaction (Kuboshima et al., 2018).

Spending time outdoors has been found to be therapeutic and highly valued by older adults. However outdoor areas at residential care facilities are commonly reported as being underutilised. Rodiek & Fried (2004) conducted a photographic comparison survey to explore what features were perceived by elderly residents as attracting or deterring outdoor usage. The findings illustrated that deterrence of outdoor usage was influenced by accessibility issues such as, safety concerns like problems with an uneven sidewalk, pathway length (too long), problems with doors being too heavy. Aesthetic concerns were also a factor such as a lack of interesting features to admire.

Phase 1: Social

The need for socialising spaces was a prominent theme throughout the literature. Kohen, Mahmood & Stott- Eveneshen (2016) conducted a study in an ethnically diverse elderly care home. They found it was beneficial to create spaces with a purpose to encourage social interactions with other tenants. For example the dining room, an activity room or the space around the mail box. Chance encounters can also be created through converging paths/routes which increase interest and social connection. However this can also cause congestion (McIntyre & Harrison, 2017). It is important to install these areas to encourage social interaction as some studies have found that without the encouragement, residents do not socialise with each other and then have greater difficulty feeling a sense of 'belonging' (Kuboshima, McIntosh & Marques, 2016). Burton & Sheehan, (2010) discovered that open plan communal areas with grouped seating are among the design characteristics identified for well-being. These findings were consistent with the findings from Kuboshima, McIntosh & Thomas (2018) who stated that communal spaces are necessary and that the design should accommodate for residents preferred approach to socialising. Flexible space and appropriate facilities should be provided to facilitate various preferred uses, for example private common spaces as well as open organised activities. This can be achieved through flexibility of furniture, a choice of rooms and a variety of conditions (McIntyre & Harrison, 2017).

Although much of the literature states that social spaces are necessary, a few studies highlight the reality of their use. Andersson's (2014) study explored the function and use of common spaces in assisted living for older persons. The research noted that while common spaces are intended for social interaction, it is counteracted by the declining capabilities of the users which results in a lower degree of use. It was found that the use of common spaces also differed between somatic and dementia patients. There was a higher presence of dementia patients in social spaces as opposed to somatic whom tended to spend more time in their own units.

These findings are consistent with Rockwell's (2017) study which explored the narratives of moving into an Assisted Living facility, and spoke largely about the experiences with socialising spaces. The observations identified that while there is a large, aesthetically pleasing lounge space, it is barely ever used. It was recognised that this could be because residents do not associate the physical space with 'belonging' to them.

It is commonly stated that recreational activity (RA) positively relates to happiness, quality of life and life satisfaction. However, in quantitative studies small to moderate effects were identified and RA was rarely a significant indicator of psychological wellbeing after controlling for health and psychological variables. It was recognised that RA facilitates interaction, yet does little to promote intimate relationships. A number of variables were found to affect the desire to participate in RA, such as gender, socio economic status, age, previous profession and sensory ability (Plys, 2017). This was also highlighted across other studies. In one study, nearly all residents interviewed stated that the complex did not act like a family, as they did not have a close relationship with each other, they treated each other more like hotel guests (Andersson, 2014).

Rockwell (2017) stated that having the opportunity to socialise does not always mean it will be successful. Fostering spontaneous, positive, lasting connections requires more than simply seating people together at meals or directed group activities.

An issue is that independent people already go out and socialise. There needs to be a way to uphold the independence of all residents who are capable of socialising, while facilitating an in house connection to create a sense of community. Residents need a way to come together and get to know each other, but in a self-directed way. A buddy system was suggested for new residents to help with settling in. Or enabling residents to run their own workshop/classes (Rockwell, 2017). This is a strong notion to consider in new elderly care facilities.

Introduction to "Phase 2"

This research project assesses the specific findings identified in phase one by surveying and testing a specific case study to understand conceptual design techniques proposed for an upcoming practice based social elderly housing development. It will test the theoretical ideas identifying occupant preferences when they are introduced to the theoretical approaches established. It will also collect and identify, 1. Key occupant perception of usability and functionality of space, 2. A range of methods that can meet a range of user needs and 3. Identify specific strategies (construction and layout) from phase 1 that meet the limitations of elderly facilities and the project parameters.

The term social housing has become a more relevant phrase in this era where there is more social equity. While at the moment there is a lot of research on elderly housing, understanding the quality and lived experience of social elderly care facilities is limited. Thus the second phase of this research project aims to inform SPA's existing design project work and its outputs, current operations and a pipeline of possible SPA design interventions in the future that address designing for the elderly, testing occupant preference of globally researched interventions. Its purpose is to create familiarity

with current thinking and research concerning design methods, and may justify future research into a previously overlooked or understudied area.

It also aims to precisely describe the key findings of this analysis, presenting the findings succinctly, both orally and in the form of a written report and a series of studio based presentations. The project aims to meet the following research objectives:

1. Research material collection
2. Occupant survey
3. Literature review comparison with recorded data
4. Initial write-up

This paper focuses on elderly who live in local authority rental housing specifically built for the elderly in the Wellington Region of New Zealand. The research project intends to obtain knowledge and comprehension of a range of user occupant preferences to provide evidence and direction for the effective design of social housing for a sustainable society with a growing population.

Research Questions

The focus of this study can be summarized by the following research questions:

1. How can Studio Pacific learn from the lived experiences of elderly people in social housing in order to design more effective social housing?
2. How can SPA and social housing partners improve designs and collaborate based on this information?
3. How closely do the findings from occupant preferences of globally researched interventions correlate with the local occupant survey?

Background

There are four points identified in the background research for this project. These focus on the "Changing Demographics and suitable housing; the housing crisis; income sources for the elderly; and social housing". These are discussed in greater detail here.

Changing Demographics and suitable housing - The New Zealand population is ageing dramatically. As the baby boomer generation age, the elderly are becoming an increasing share of the total population. During the next 30 years, the proportion of people aged 60 or over will increase from 15.4% in 1996 to 25.3% in 2030 (Chapman, Signal & Crane, 1999). The process of ageing tends to be associated with some decline in functional ability and the propensity for disability increases, thus this elderly group require more help to perform everyday tasks (Chapman, Signal & Crane, 1999). As they are more vulnerable they require certain types of housing to accommodate for their specific ailments (Taylor, 2016). These factors encourage those elderly to seek a more suitable space to live, typically happening when they are in their 70s. Some elderly want to move closer to their children however most would ideally like to move away, to avoid imposing on their families. In order to accommodate for this projected rapid growth of elderly people, there is an increasing need for appropriate residential housing that supports those who are able to live independently and also those that require low levels of dependent care.

The housing crisis - Over the past ten years house prices have increased dramatically contributing to an inequality gap between those who can afford to own a home and those who cannot. There has been a rise in renters as well as an increased reliance on social welfare. According to the 2013 census, 33% of people lived in rented dwellings. 3% lived in a rent-free dwelling. As of 30 September 2017, Stats NZ estimates of households and dwellings display that the number of dwellings either rented or

provided rent-free to tenants grew approximately 23% between 2007 and 2017. While the total number of dwellings grew just 11%. This indicates that around 70% of the additional dwellings were occupied by tenants. Further, this displays that the proportion of dwellings occupied by tenants rose from 34% in late 2007 to 37% in late 2017. Until the results from the 2018 census are made available, these estimates display that the trend of renters is likely to continue as the cost of housing continues to price many out of the market; particularly in urban areas.

The Government has responded to this housing crisis by building density housing. This tends to be terraced housing developed to take advantage of the density and zoning rules. However this is not suitable for the requirements of older people due to their mobility and accessibility issues where multi story designs are not suitable. It appears that much of the new designs are targeted towards demographics who will realise greater value uplift (Taylor, 2016). Fewer people are entering retirement with a mortgage free home ownership, thus they seek somewhere suitable to live, yet many of the rental facilities are not suitable for the elderly needs.

Income sources for the elderly - There has been an increase in retirement care to accommodate for the ageing population who have financial assets. While this market is well catered for, there is another growing demographic of elderly, who cannot afford these retirement villages. It is apparent there is an increasing need to cater for this growing demographic of less well-off elderly, through the provision of social housing for elderly (Taylor, 2016).

The amount of people who are not wholly financially independent, or are dependent on government assistance to support them once they leave employment, particularly superannuation, is ever increasing (Taylor, 2016). Much of income of this the older generation in New Zealand is largely based on investment income or superannuation, as opposed to wages or salaries.

The most recent collated statistics from census data was in 2013. At census night in 2013 there were 628,636 people aged 65 years or older in New Zealand. Eighty-two percent of these people received a superannuation payment or veterans pension (Statistics New Zealand, 2013). Current policy set by the Ministry of Social Development outlines that of April 2018, before tax superannuation was set at $701.52 per week for a couple where both spouses qualify for superannuation. For singles living alone it is $463.04 per week and for singles living with others $425.55 (Work and Income, 2018). One person superannuation allowances are among the lowest incomes across all of New Zealand (Chapman, Signal & Crane, 1999). Further, Statistics from Statistics New Zealand state that 70% of people aged 65 and over are earning less than $30,000 per year, with 20.6% earning less than $15,000. This makes it very difficult to fund a life, particularly with housing prices continue to increase. Thus, people aged 65 and over with limited and fixed incomes and limited housing choice will make up a growing market segment for future social housing (Johnson, 2017).

Social housing - Social housing is housing assigned to people who are most in need of housing (Johnson, 2017). That is in the same way social welfare is defined as welfare for those most in need. Some definitions state that social housing must be owned by the government but this is not always the case. There is a need for multiple sources to provide subsidies for new built social housing to meet expenses. For example companies like Willis Bond. The need for social housing is becoming more prevalent in our society, but social housing for whom has not really been determined. Statistics from the Social Policy and Parliamentary Unit at the Salvation Army states that in New Zealand 190,000 older people are part of the core demand for social housing, and this number may grow to 270,000 by 2030 (Johnson, 2017). To illustrate how large this growing problem is, to provide social housing to just 25% of all elderly tenants will require an additional 30,000 units over the next 15 years (Johnson, 2017).

The Government is attempting to respond to this situation by encouraging the increase of the community housing sector, for example the Salvation Army and the Home of Compassion. The main funding mechanism taken by the Ministry of Social Development (MSD) to increase the supply of social housing is through an income-related rent subsidy (IRSS). The IRSS is a subsidy paid by the MSD to cover the gap between what a social housing tenant is able to pay toward rent, and the market rental for the property. This enables tenants to pay no more than 25 of their net household income on rent (Ministry of Social Development, 2018). This encourages more development of social housing, as developers are not losing money.

Even with this aid, the number of existing units available is limited, particularly in comparison to the growing demographic. Thus, a market driven response through supplying elderly social housing is necessary (Taylor, 2016). What this could look like is an adequate level of amenities derived from access to community, services and facilities which enable the individual to live in comfort and to remain as self-sufficient as they choose to be. This will result in different outcomes for each individual however it is worthwhile to observe and create a guideline for how we can achieve this.

Methodology

Qualitative approach

Throughout this research, insights into the lived experiences of the elderly were wanting to be gained. Thus a qualitative methodology approach was chosen.

I was looking to gain insights into the lived experiences of the elderly. Qualitative methodology focuses on the 'human experience' (Stewart-Withers, Banks, McGregor & Meosewabu, 2014, p. 59) exploring social realities and the social world enhanced with detail and difference. It deviates away from precise measurements and focuses on a holistic understanding of complex realities (Mayoux, 2006, p.118). Taking a qualitative perspective also enables the studying of communities in their natural environments and also the 'why' behind certain perceptions (Stewart-Withers et al., 2014). This was an important consideration as occupant perceptions of day to day living were wanting to be analysed. Perceptions of occupants were aimed to be recorded, yet not minimized. O'Leary (2014, p.130); explains this succinctly; "qualitative methodology… accepts multiple perspectives and realities… argues the value of depth over quantity… delves into social complexities in order to explore the interactions, processes, lived experiences and belief systems that are part of individual… cultural groups and the everyday."

Conversation and insights were encouraged in this research. Quantitative methods focus on measurement, precision and statistical analysis and involves little direct contact between researcher and participant. This was not an attractive method for this study as the in-depth understanding of occupant experience in their natural setting was central to the research. A quantitative approach can also often discourage participants from conversing at length on the topic. It was essential that participants felt a sense of power in the conversations, allowing them to share their insights and stories freely and openly. It was necessary to ensure meaningful engagement in my research in order to develop dimensions of trust to extract the most valuable information. Thus, qualitative research was the most attractive approach for this research.

The two qualitative frameworks that are relevant to the specific research design are outlined below. These include ethnography and a case study approach.

Ethnographic Case Study

An ethnographic case study framework guided my approach to my research. Ethnography is an inductive analysis that builds upon the perspectives of the people studied. The central aim of ethnography is to provide rich insights into people's views and actions, as well as the environment, through observations and interviews (Reeves, Kuper & Hodges, 2008). It allows exploring a social phenomenon, as opposed to testing a hypotheses, which was important as conversations with occupants needed to be approached open minded.

Ethnography has renowned potential in post-occupancy studies and many uses in the built environment and architecture. The method here dictated by definitions of action research. Action research focuses on the idea that research should do more than understand the world, it should help change it (Tolich & Davidson, 2003, p. 131). The case study was focused on occupants residing in community housing owned and managed by Compassion Housing, a social housing provider. Residents in Compassion Housing units must meet the specific requirements to enter social housing. Thus it can be reasoned that those interviewed have limited financial resources and assets. The service manager at Compassion Housing selected the specific residents that would be interviewed. These people were chosen on their willingness to coordinate and potential to offer unbiased, useful opinions in relation to the topic. A range of occupants were selected including singles and couples, men and women and an approximate 30 year range in age to ensure diversity in my results. For the focus of this study those selected for analysis were 10 households (of which eight were sole occupants, and two were couples.) elderly people who live in local authority senior rental housing complexes in the Wellington Region of New Zealand. Of these ten, eight were sole occupants, and two were couples. Three custodians of the occupants were also interviewed.

Semi- structured interviews

A research assistant, and an architect conducted the interviews together, to ensure as much information was manually recorded as possible, as ethics did not allow recording. It was important for the research assistant to be present, as well as someone from an architectural background to diversify the observations and allow architectural insights, as well as observations from a non-design perspective. This was also beneficial because the conversation was not entirely design focused, allowing occupants to feel more comfortable.

Semi structured interviews allow for flexibility within structured parameters (Bailey, 2007, p. 100). I was guided by an interview framework with specific questions broadly relating to research questions. However, as I was more interested in flow and discussion, I was flexible in terms of the order of questions. I wanted to encourage dialogue and engagement rather than just simple answers to my questions. Semi structured interviews also allow the pursuit of interesting tangents that may arise (O'Leary, 2014). I scheduled the interviews in advance and gave my participants an indication of how long they would take.

Conducting face to face interviews in a context with a broad range in age also highlighted potential power issues which needed to be addressed. Opportunity for participant's empowerment was optimized ensure they could see the benefit of the research. A shared sense of power aimed to be established, to ensure occupants understood their input was valuable. The words used in the interview were adapted from architectural terminology to ensure they were familiar and understandable from an outsider's perspective. Thus it was further important the research assistant was there with no prior architectural background. The interviews were also conducted in their place of residency to ensure the participants felt comfortable.

A written introduction of the project was handed to the selected participants prior to the arrival of the researchers. This informed participants of the project and its purpose. The introduction also emphasized the security and anonymity of all information recorded, and the importance of following Victoria University's Human Ethics policy. This was emphasized in hope that participants would feel comfortable enough to willingly coordinate and openly share their opinions. This introduction was further discussed at the beginning of each session with the occupant. While informing selected participants of the purpose of the project, it was important to avoid stating anything that suggested redevelopment and changes or upgrading of their unit. The discussion points were amended to avoid any reference to this line of questioning. It was specifically stated to them that the information from the survey was to potentially provide pertinent information for any new future elderly care developments in New Zealand.

Data Analysis

Analysing the data was a critical part of the research project. In terms of the interviews, the collected transcripts were analysed through a series of steps including preparation, organisation and categorisation, before arriving at presentation of findings. Observation notes and interviews were transcribed thoroughly, and emerging themes were coded on a spread sheet in relation to themes that had also emerged from the literature. This coding and classifying helped determine the relevance of all data in relation to the research questions. This was a critical time in developing the findings. It was a process of integrating the data, examining how it paralleled with the literature while being open to insights.

A narrative approach was chosen to convey findings. Results were grouped into design themes. In quoting occupants directly, they were spoken as occupant 1, 2, 3... and custodian 1 and 2, in order to disguise their identity as well as could be achieved with a small sample size

Key design attributes investigated

Design attributes investigated were drawn from themes identified in the literature. These included:

- Specific interior spaces - kitchen, bathroom, floor, ventilation and furniture & personal items.
- Spatial Configurations - storage, seating, layout, traversibility
- Accessibility
- Light
- Outdoor
- Views
- Sound
- Privacy
- Safety
- Vehicles
- Social

Diagrams 1, 2, 3, 4 and 5 (see Figure 1) display the Compassion Housing complexes observed in this research. Compassion housing manages 93 pensioners in Upper Hutt and 115 pensioners in Levin, Foxton and Shannon, at many different sites. Of these, five were spoken to in Levin at Cambridge Park and Cambridge Place, and five occupants in Upper Hutt, at Bonnie Glen Crescent, Clouston Park Road and Liverpool Street. Compassion housing has a range of different types of units, with different orientations as the images display. The research only saw a segment of the units, and did not look at

all Compassion Housing sites. However as illustrated by the aerial photographs, a number of various units were looked at as shown below.

Figure 1: Aerial photographs of the various units examined in this research..

Key:

Diagrams 1, 2, 3 and 4 display the layouts of the different units observed. As illustrated, units have different spatial arrangements and internal layouts, as well as different degrees of open space and shared and individual gardens. While units were different, much of the discussion and comments from occupants were the same across all types of units

1 = Front door	8 = Back door
2 = Living/Dining	9 = Porch/patio
3 = Kitchen	10 = Toilet
4 = Bedroom	11 = Washing line/backyard
5 = Cupboard/storage	12 = Shed
6 = Laundry	13 = Car parking
7 = Bathroom	

Figure 2: Diagrams 1 to 4 showing floor layouts of the five case study sites.

Specific Interior Spaces

Kitchen

Six occupants enjoyed cooking and did all their own cooking, with some even baking. Four occupants did not like cooking so much or were incapable because of impairments.

Ovens were a point of controversy in discussions with occupants. Sixty percent of occupants interviewed did not use the big ovens provided in the units. Four occupants had bought smaller convection ovens, one occupant used an air fryer and one used the microwave as they ate heat and eat meals. There were a variety of reasons for not using the free standing ovens. Occupant 1 claimed they used too much power. While they did use the big oven when there were more than two people eating, this was not very often. Occupant 3 stated the big oven was too large for his needs, even though they used to be a chef. Occupant 5 stated the oven was old and cheap and did not have fan bake, which lead them to buy a smaller, convection oven, however they did use the stove top. This was also the case for occupant 4 who loves cooking yet because of the poor state of the ovens provided, they bought themselves a new free standing oven. One occupant simply stated they would have used the free standing oven if they had been taught how, yet they do use the stove top. Occupant 2 was in a wheelchair friendly unit by chance, and because of this had an upmarket stove and wall fitted oven. The occupants were pleased with this, however, a big issue occupants identified was that there was no air extract. This meant grease got stuck in many places and the smell and steam would always linger. This was also an issue for Occupant 5 who put a fan above the stove to avoid the smell, however because it was only small it was not very effective. One person gave away their microwave because it was too quick and another commented they did not have a microwave but did not need one. None of the units had dishwashers and one occupant commented they are unnecessary because there are never too many dishes. Microwaves are not a necessity however the consideration of the usability of ovens is important.

Bathroom

Five occupants had wet surface showers and five occupants had step in showers with a 150mm step. Those who had wet surface showers loved them. They enjoyed the shower being one big space and the fact that there was a slight slope to avoid flooding. Occupant 4 stated they used to have a step in shower but much prefer the wet surface. In saying this occupant 2 noted that the shower space was quite big and it could be smaller. Five occupants had step in showers, and offered mixed reviews. Of those with step in showers, sixty percent stated the step was fine for them and not difficult, however one of those occupants had to carefully manoeuvre their walker to assist getting over the step. One commented that at the moment it was fine but as they get older they may prefer a wet floor shower. Occupant 9 stated they thought step in showers were 'stupid' for older people and they also had to carefully use a walker to assist getting over the step. They thought a wet floor shower would be 'absolutely marvellous'. Only one occupant stated they would like a bathtub, while another occupant noted they would not want a shower over a bath because of the danger of slipping. Wet surface showers tend to be a more preferable design when accommodating for everyone's needs.

Most bathrooms were fitted with handrails next to the toilet and in the shower. Forty percent of occupants spoke about using these handrails. Occupant 7 also had a seat as well as a handle in the shower. Occupant 2 noted that the hand basins were plastic and may be difficult to clean for less able elderly, suggesting that porcelain would be better. They also suggested that a wall fitted toilet may be easier for those less able to clean.

Occupant 4 stated that the size of the bathroom was 'just perfect' and they enjoyed how it was big enough to fit a clothes horse if it was raining outside. However, two occupants stated there was not

enough storage in the bathroom. There was only a small set of drawers which proved to be particularly difficult if there were two people in the unit. Occupant five had to add an extra set of shelves for shampoo and other items.

Occupant 3 avoided this issue by using the cupboard across the hall for their toilets, commenting it was 'close enough'.

Occupant 1 had two bathrooms while every other occupant had one. Occupant 1 said they enjoyed having 2 bathrooms because when their grandchildren come to visit one there is no waiting. It is convenient however they noted one of the spaces could be used for something else, however they were not sure what.

The bathrooms were adjacent to the kitchen/living space, not ensuites. Occupants 1-5 had a separate bathroom from laundry space, refer to diagrams 1 and 2. Occupants 2, 3, 4 and 5 had a laundry cupboard with a sliding door, as displayed by diagram 2. Occupants 6-10 had a laundry room and the bathroom was adjacent to this, refer to diagrams 3 and 4. There was a door in between the bathroom and laundry which occupant 6 noted they liked as it created more privacy. Occupant 7 noted they liked the location of the bathroom and did not want it adjacent to the bedroom because it encouraged them to walk which is important. Occupant 8 thought an extra door connecting the bathroom to the bedroom would be helpful, however as they are so used to the current layout they were not too worried. It can be recommended that one bathroom is enough in each unit, yet bathroom storage is important as well as safety fittings, such as handrails or shower seats.

Flooring

All units had carpet in everywhere besides the kitchen and bathroom which was a timber look vinyl. All occupants liked the mix of flooring, with one occupant commenting on how they liked that it gave a visual separation of kitchen and living space. Majority of occupants noted they would not like the whole unit to be carpet because of concerns about cleanliness. No one had difficulty getting over the threshold of the change in flooring. One occupant noted they would like darker flooring. A few occupants also had rugs in the living spaces.

Ventilation

Seven occupants said they enjoy keeping one or both of their doors open to get ventilation, and a 'cross breeze'. Only three of those occupants had fly screens, and when they had their doors open they always had the fly screens shut. Two occupants said they did this for ventilation, safety and flies but one occupant said they did not do this for safety reasons because they felt safe enough. Occupant 10 had netting as a fly screen but would have preferred a screen door, not for safety but for ventilation and flies. Whereas occupant 9 enjoyed keeping her doors open for fresh air and avoiding mould, they did not have a screen door but would like one for safety reasons. Occupant one also noted they liked having their windows open all the time, preferring their unit to be cold. As occupants tend to enjoy air flow through their units, a front and a back door is recommended and fly screens are preferred.

Furniture & personal items

Accommodating a standard amount of furniture and personal items is required. Occupants tended to have two arm chairs, a 2-seater couch, Television unit and some sort of table. As well as photos and personal possessions on the wall. Occupants all referred to their units as their homes which indicates a sense of belonging.

Spatial Configurations

Seating

Only one occupant commented that they like to be able to see the door from their preferred seat in the living room. It did not bother the other occupants. Seven occupants have a dining table and one had one but got rid of it as they did not use it. However, only four occupants used their dining tables to eat their meals at.

Occupant 3 just enjoyed having a dining table and had enough space for one, choosing to instead eat their meals on a trolley table at the couch. Occupant 7 also did this. Occupant 4 chose to eat at a pull-out table which they put away after eating to create more space. Their dining table was used to store/hold things.

Occupant 10 uses the dining table for writing or puzzles, or when visitors come. Otherwise, they eat at a small desk with a computer on it. Occupant six also does this, noting they like sitting at a table but are in a bedsit and aware of the limited space, thus do not want a big dining table. One occupant eats at their breakfast bar, using their walker as a seat. Occupant 5, who did not have a breakfast bar said they would like one, so they could eat at it and they thought it would separate the kitchen from the living space and hide the oven, while also creating another space for storage. Space for some form of table is needed, for eating as well as activities.

Storage

Eighty percent of the occupants were happy with the amount of storage in the units. In the units of occupants 2, 3, 4 and 5 there were several cupboards in the kitchen, a linen cupboard opposite the bathroom and a wardrobe, as seen in diagram 2. Occupant 3 commented there was plenty of storage for just one person.

Occupant 4 said they had adequate storage. They downsized from a 5 bedroom house yet thought it was a 'brilliant space and amount of room.' Although they spent a lot of time in the kitchen and thus added 2 extra 400x200mm shelves on each side of the bench. Occupant 6, noted how storage is very important, but they make use of the spaces available, such as using the water cupboard to store linen and towels. Occupant 9 also commented there was enough, although was slightly hesitant.

Occupants 2 and 8 thought more storage was needed in the units, particularly when downsizing from family homes. Occupant 2 stated that the hot water cupboard (HWC) is a waste of space and alternatively it could be an instant hot water system which would be cheaper in the long run and free up more space. Occupant 9 also commented on the use of the HWC saying while they used it as a space to store their vacuum and linen, they thought it could be on its own in a different space so you had extra space for storage. Occupant 2 further commented that the roofs are most likely fake and thus could be utilised as storage space. While they thought their unit lacked storage, they used their initiative to create storage in new ways. They are in a wheelchair friendly unit, despite not being in a wheelchair, so have had to adapt to the space. Because of this they had no cupboards underneath the kitchen bench, so put baskets underneath on rollers. They thought this was very smart as it enabled them to reach everything. They did not feel the need to store much linen/towels, which occupant 3 and 6 also noted about themselves. Occupant 2 converted the linen cupboard into storage for arts and crafts supplies. They also had a 2x2m shed out the front of their house. They converted this into a space for their hobbies, building a work bench and shelves to store possessions. Also noting that a neighbour uses the shed as a music room.

Occupants 3, 4 and 5 also had 2 x 2m sheds which they used for various purposes. Occupant 4 used the shed and built shelves inside and uses it for storage, they stated they liked it because it was lockable and had a light inside. Occupant 5 said they liked their shed because it was quite spacious. They noted they kept a freezer in there. Occupant 10 who did not have a shed thought it would be useful to have one. Occupant 6 also commented that for those with mobility scooters a shed would be useful because currently they only use a tarpaulin or barbecue cover to cover them, so they get wet anyway. Occupant 8 did not have a shed but commented they did think they needed one.

Six occupants thought the storage in their units, particularly in the kitchen, was not easily accessible. It was noted that built in shelves should be at an appropriate height, preferably arm height to ensure ease of access. Cupboards that are too high or too low result in difficulty. In saying this, occupant 8 said that while they would prefer cupboards below the kitchen bench to be higher, it would result in less storage space. Occupant 9 and 10 commented that even though cupboards up high are difficult to use, they still use them, getting stuff with a wooden spoon or a stool. This displays they make do with the situation. Four occupants thought drawers would be beneficial as opposed to deep cupboards, to ensure everything was accessible. Occupant 2 had already done this idea, putting baskets on rollers to store kitchen items because of their wheelchair friendly unit. Occupant 1 also thought a 'lazy Susan' type cupboard would be helpful. Adjustable height benches were also mentioned.

Consideration in the design for storage spaces with regard to the common amount of objects and furniture is necessary. Storage cupboards must be functional as well as accessible. Adequate storage is required, although occupants tend to make use with the amount they have. Thought into innovative space for the HWC use and sheds are necessary if possible.

Traversibility

Three out of ten occupants in the survey required a walker all the time. One occupant had to use a walking stick and a further two occupants had walkers in their unit in case they needed them. This indicated that majority of the occupants were fairly able and did not tend to lean on things when they walked around the house.

Those that had walkers used handrails in the shower and next to the toilet for assistance, yet noted they did not need other handrails for assistance as they always used their walkers. Occupant 10 who had a walker said even though they had a handrail by the toilet they did not think they needed it anymore because they use their walker. Occupants 5 and 2 who did not have mobility aids said they used a handle in the shower or by the toilet. Occupant 2 also mentioned they tend to lean on things when they woke up in the middle of the night. However this is when it is dark. Occupant 1 who was very mobile said they installed a handrail on the side of her front door which had a step, for guests who found it difficult.

Only two occupants commented that they find it difficult lifting their walker over the door threshold. Occupant 10 said because of this they tended to use the back door more which does not have such a level difference. However they also noted that the walker fits well through all doorways. Occupant 9 noted they would prefer there to be a ramp or it to be level. Occupant 7 said they did not find it difficult, however a ramp was being installed to avoid the level difference at the front door, and also a hand rail fitted outside the door. This suggests they did indeed find some difficulty in traversing through the door. Occupant 3 who occasionally used a walker because of a leg injury, said that even though there is 2 steps to their front door they do not find it difficult. Occupants who used a walker said there were no difficulties in moving it through the unit.

Difficulties in traversing through the space varied depending on the occupant's level of impairment. Consideration of traversibility should be designed for the lowest ability.

Layout

Occupants 1, 2 and 5 were not happy with the layout of their unit. The privacy of bedrooms was highlighted as an important issue, as well as ensuring bedrooms are big enough to accommodate a range of furniture, especially when two people live in the unit. However, one occupant commented that the size of the living room should be prioritised over the bedroom, as there is no point in having a big bedroom. Occupant 5 thought their unit was too big for one person, and that it could be half the size so more units could be built in the complex. Occupant 6 who was in a bedsit (diagram 3) stated they enjoyed the bedsit because it meant less work, less furniture and less clutter.

Six occupants made comments about open plan layout. Of these occupants, five out of six stated they liked the kitchen being separated from the living space, which was done so through a breakfast bar. These five occupants lived in units illustrated by diagrams 3 and 4. It was commonly stated they did not want their spaces to be open plan, or any more open plan. Occupant 5 who did not have a breakfast bar said they would like one to separate the kitchen from the living space and hide the oven. They also thought they could eat at it, and have storage underneath it. This suggests open plan living space was not favourable among the occupants.

Light

Occupant 5 was the only occupant who commented that their unit was not well positioned for getting natural light. All other occupants were happy or satisfied with the amount of natural light in their units. Some occupants got sun all day through different windows, while others tended to get just afternoon sun.

Occupants tended to prefer afternoon sun. Occupant 5's unit was north facing and only got morning sun in the kitchen. There were also trees in front of the unit which blocked the sun and the occupant wanted these to be cut down. In order to increase the natural light, occupant 5 removed her net curtains, however she complained that this was bad for her eyes. Consideration of the layout to maximise natural light is important.

Most occupants commented that if they got a glare on the TV, they would shut the curtains and it did not annoy them. However occupant 4 and 5 said that this bothered them. Occupant 4 suggested having a connection for the TV on both sides of the wall to avoid the glare on the TV.

Occupant 7 and occupant 5 commented the artificial light in the living space was not bright enough. As a result, Occupant 7 installed an extra light. Occupant 5 stated they did not want to get stronger bulbs because they were too expensive and not good for their eyes. Occupant 2 also commented they would like another light over the dining table.

Outdoor

All occupants surveyed had some access to a raised garden, however 50% of the occupants had larger patio spaces than the other half, equipped with a 1.5m patio cover. Occupants were fond of this as it allowed them to shade from sunlight however still get enough natural light. All those with the larger patio spaces liked them and used them. One occupant commented that the back garden also needs some type of shelter to protect from wind and rain and to stop the draught.

The rule in place was that you could have a garden if you maintained it, however if not it would be dug up and replaced with grass. Occupants 1, 2, 3, 4, 5, 9, and 10 enjoyed gardening and had some sort of garden. Only one of these occupants had help with maintaining their garden, everyone else did

the upkeep themselves. Occupant 8 used to enjoy gardening but does not do it anymore because of frailties. While most occupants had a garden, only 2 would sit outside for meals. Occupant 5 and 8 commented they like to look onto the garden, however do not like to be in the sun because of difficulties with eyes and skin cancer.

Occupant 1 used to have a unit with a larger patio, and more space for flowers. They would sit outside in their lovely garden all day and watch the day pass. However they moved units and now do not have a patio, only a small raised garden box. Yet they commented on this positively saying not being able to sit outside all day encourages them to do more activities and be more social which they like. In saying this, they do note it would be nice to have an outdoor space, to look after and to look at while sitting in the living area. This highlights the positivity and gratefulness of occupants.

Two occupants commented they had lovely views and enjoy being able to look onto hills and greenery, and one other occupant commented they would like to have more greenery to look at. However 30% of occupants commented that they did not mind not having a view.

One occupant stated they like their patio being at the front of the house as they are able to say hello to people as they pass, and it feels friendlier. Whereas two other occupants stated they like the patio space to feel more private.

The occupants that had large patio spaces had a sliding door to go outside. Two of the occupants who did not have a sliding door said they would not like one, particularly if there was no real view to look at. Another occupant said while they are not outside enough for a sliding door to affect them, perhaps it would actually be nice to have one.

The use of gardens largely depends on occupant's ability and independence. Raised gardens are recommended, as well as patio covers of a reasonable extension. Views are not essential, but sliding doors are liked when people have them.

Safety

Occupants offered differing perspectives about the safety of the dwellings. In some complexes the public would pass through, particularly one complex which was used as shortcut between main roads.

Fifty percent of the occupants spoken to said they were not affected by the public walking through or around the dwellings. Occupant 4 even stated they 'loved it' when the public passed by their unit, saying they liked to see people were 'alive and kicking'. Occupant 7 was located next to a stream where the public would jump over to cut through the dwelling, and they did not mind this although commented they might mind if they were coming and knocking on the unit.

The complexes were always lit up by street lights at night. Occupant 2 and 8 stated this made them feel especially safe. However occupant 2 suggested the brightness was slightly excessive.

Occupants 1, 8 and 9 stated they felt safe and were not affected by the public walking through their complex, however did things to ensure safety. Occupant 1 said only at their old complex did the public walk through, and while it did not affect them because they were not in the thoroughfare, they had to store items such as outdoor furniture in their shed as the public were 'so mischievous' and would steal things. Occupant 8 stated they feel safe however always keep both doors locked for reassurance. Occupant 9 also said they felt safe but would like security screens for safety reasons.

Occupants 3 and 5 stated they were affected by the public passing through their complex. Both these occupants were in a complex where the public passed through in close proximity. Occupant 3's unit was located right by the front entrance. They noted that sometimes intoxicated people stumble

through and smash bottles. Because of this they thought a fence should be installed to increase security and stop public access. Occupant 5 had been broken into before, so now has a security system on all windows and doors and feels much safer now. However they still had concerns with the ability for people to break through their cat door. In terms of increasing safety, Occupant 2 suggested CCTV cameras could be installed.

As fifty percent of occupants had some concerns about safety, it is definitely an important feature to consider when designing, particularly when the public can pass by in close proximity.

Privacy

All occupants identified that they enjoy having privacy and 90% felt like their units were private enough. Comments were made about how people are respectful and do not invade other people's privacy. Occupant 8 noted that while they look onto other units, they do not worry about it because everyone is used to living in a communal space. Two comments were made that if you did not feel you had enough privacy in the living space, you would adjust were you sat. This indicates they make do with what they have. One occupant had issues with privacy and installed beaded curtains across the doorway to limit public observance.

Vehicles

Half of the occupants we spoke to had cars, four of them parked the cars outside their unit and one had to park it on the road but this was not an issue. One occupant also had a campervan parked at the front of their unit. Occupant 4 suggested they would like an extended cover between the patio/front door and the car so you do not get wet when going to your car.

Sound

Nine occupants commented positively on the sound quality of units, exclaiming even when walls were adjoining between units they could not hear their neighbours. One occupant however was concerned about this issue, particularly about their neighbour hearing the TV when they were in their bedroom. All occupants who were near the motorway or main roads said they could not hear the noise of the cars or if they could, it did not bother them and was actually comforting. Ensuring connecting walls between occupants are sound proof is important.

Social

The occupants spoken to had no organised activity nor any communal space in the complexes where they lived. Occupants 1, 2 and 4 were fond of socialising and maintaining relationships. They actively engaged in various kinds of social activity such as personal hobby groups. Occupant 2 commented they would like a communal facility in their own complex as they were new residents and would like the opportunity to meet more of their neighbours and a place to feel a sense of community. They suggested the common space could facilitate different activities such as a place to teach others a skill, like quilting. They also suggested a type of hot house, a space where people can drop things such as jams, baking of vegetables for neighbours to take.

Occupant 1 said a communal facility would be beneficial for those who cannot get out by themselves, so they do not have to seek companionship or activities. However they did not want this for themselves as they preferred to keep in touch with friends more personally, and like their home to be a place of privacy.

Occupant 6 did not socialise very often however thought a communal facility would be a good place to meet people.

Seven occupants did not like the idea of a communal space. Five of these occupants also did not participate in any social activity. Occupants 3, 4, 5 and 9 stated a communal space would not be used and community events in the past were not successful. However occupant 4 also said they would like more council run social gatherings with other housing complexes. Only 2 occupants thought a communal garden was a good idea, with one occupant commenting there used to be a communal garden however people stopped taking care of it.

It was also noted that people who are able already go out and socialise, thus do not feel the need to attend social gatherings in the community. Those who did not socialise tended to have family visit or take them out on excursions such as going to the shops or a cafe. However only 4 occupants had family stay over and used a pull out couch or blow up bed to accommodate them, and occupant 9 noted that you could always make room. Occupant 2 thought it was unnecessary to have a spare room for guests as it becomes wasted space and raises the rent price. Differences in the manner or desire for socialising with others can be affected by levels of impairment as well as personal preference.

Custodian User Perceptions and Preferences

Bathroom
Custodian 1 identified that occupants can handle step in showers at their current height. However, wet surface showers are preferred. They also noted that tenants like a shower seat. Baths are not wanted.

Kitchen
It was stated that ovens do not tend to be used by tenants. However by law they have to be installed. Custodian 1 commented on the fact that even though tenants do not tend to use the ovens, when they first come to look at the unit before moving in, it is the first thing they inspect. Custodian 1 also suggested installing more wall fitted ovens.

Traversibility
Custodian 1 said it is most suitable to design for the worst off people, such as mobility aid or wheelchair uses. Particularly as custodian 1 estimated, around 10% of tenants use mobility scooters. A level door, with no steps or a ramp is preferred. People often ask for handrails outside the door, and custodian 2 suggested the height of these should be increased from the current height. Custodian 1 said that occupants do not tend to complain because they are content with what they have, especially considering the price they pay compared to other options of elderly housing.

Storage
Both custodians stated that powered sheds are ideal as they allow for more storage space. However if people do not have sheds, custodians commented that they make do with what they have. Custodian 1 noted that while majority of occupants were mobile and did not require a mobility scooter, in any new developments an enclosed scooter storage with power adjacent to either the front or rear doors should be integrated into the overall design of the unit. Proximity is a particularly important consideration to assist with occupant's safety and mobility.

Layout
The external layout of units was commented on by both custodians. Preventing units from facing each other is an important consideration to optimise occupant's privacy. This positioning of units should also optimise views and sun.

Accessibility

Higher cupboards are not ideal as they may encourage occupants to climb to get things which increases risk of an accident. It was noted cupboards should not be higher than 1.6-1.7m.

Custodian 1 noted that while 1-2 bedroom units are preferable, some people really enjoy bedsits as everything is handy. Further, TV outlets in living area and bedrooms is important.

Outdoors

Raised gardens are preferable and custodians thought they encourage more people to use the garden. The occupants in the complex with porch areas and pretty, grass filled landscape loved it. Also noted that residents enjoy being able to look out at things such as cherry trees or roses.

Strategically placed those who have issues hearing near motorways or busy roads. However noted that no one tends to complain about the noise because 'it is what it is'.

Safety

At complexes where there was a public walkway through the site, residents requested more security such as a lockable gate at the entrance or fly screens for safety. It was noted that four people had been burgled.

Privacy

Privacy was a concern, and some occupants has requested screening on the window to stop people seeing in.

Social

The level of social participation depends on the person's ability and preference. There is a nurse who circulates each complex once or twice a week, custodian 1 thought this service should be increased as it is a very valuable asset. Also noted that while sometimes there is tension in the complexes, there is also quite a lot of camaraderie and tenants looking out for each other.

Key outcomes of discussions

A number of differences were observed between what the literature identified as important to consider for designs of elderly care facilities, and what occupants identified as important. Albeit in saying this, from the beginning of this research it was apparent that the literature largely focused on private sector retirement villages/homes, and rarely identified the New Zealand context. Whereas the focus of this study was specific to social rental housing for elderly. Thus, to an extent researches were aware that results would diverge.

Some distinctive differences identified in the results of occupants, custodians and literature included that of outdoor preferences, traversability and layout. For example the literature noting that the threshold of change in floor material is an issue as it can cause spilling or tripping (Zhipeng et al., 2011). Whereas 100% of occupants spoken to did not experienced this difficulty. Another example is the contrasting opinions of open plan living. Literature suggested open plan living is appealing as it provides interest and engagement, albeit with downsides of lack of privacy and noise. Occupants had an opposite opinion, liking separation of kitchen and living space, whether that was through a dining table or breakfast bar. The general consensus among occupants was that open plan living was not favourable. The majority of differences identified between the subjects of the research most likely stems from the differences in the type of home.

Most of the literature available for analysis (as established by the systematic review protocol established in phase 1) tended to focus on privately owned care homes and Assisted living facilities, which accommodate adults with a higher dependency. Whereas occupants observed were relatively independent and lived in social rental housing.

While there were differences between the literature and interviews of this research, the majority of similarities identified were from that of Kuboshima et al., (2018) study. This study also focused on social rental housing in New Zealand. Themes that corresponded very closely between the current case study and work by Kuboshima et al. (2018) study include accessibility, light and bathrooms. This shows that private versus social housing is a distinct difference and results in differing user perceptions and preferences, thus future design recommendations also differ.

Another implication was that occupants expressed an almost surprising element of contentment. Occupants tended to not complain, or avoid saying something was an issue. Often occupants would comment that things were 'fine for me' or 'just perfect', indicating what was interpreted as gratefulness. One occupant even commented on privacy exclaiming if you did not feel private enough, you would just adjust where you sat in the lounge. And those occupants located near main roads said they did not mind the sound of the cars, and one occupant said they found comfort in the noise. It was understood that because of the occupant's situation, having little money, they were very grateful of being able to live in these units, and thus did not want to come across as complaining or unappreciative.

Further examples of this include, comments on traversibility. Eighty percent of occupants stated they had no difficulty stepping over door thresholds, or down steps, yet forty percent had mobility issues. To an outsider it would seem difficult to traverse over steps or uneven surfaces with a mobility aid, and much simpler if the surface was flat, with a ramp or a level surface. Thus it seemed interesting that when asked if they would like a level surface and to avoid steps, it was not a unanimous yes. Furthermore, one occupant commented that even though they used to have a lovely patio outside their old unit, and do not anymore, they do not mind this as they now do different things with their days. This was a very clear insight that the occupant was thankful they had the opportunity to have a unit.

Reluctance to come across as unappreciative was also highlighted when observations of occupants actions, contradicted their statement. This was raised in conversation about safety. Thirty percent of occupants said they felt safe and were not threatened by the public coming through their complex, yet they all had precautionary measures in place that contradicted this statement. For example, ensuring outdoor items were always stored in a shed, or always keeping the doors locked.

Occupants	Positive	Negative	Precaution
1	+		x
2	+		
3		x	x
4	+		
5		x	x
6	+		
7	+		
8	+		x
9	+		x
10	+		

Table 1: Table showing contradictory comments in relation to safety.

Table 1 illustrates this pattern. Those that answered positively to feeling safe have a '+', as they feel safe, they should not also have an 'x' under precaution. The table shows all those that commented they felt safe or unsafe in their complex, yet distinguishes those that had precautionary measures in place.

Conversation about shower preferences also highlighted this tendency. Occupants and custodians both commented that step in showers tend to be fine for those that have them. However, while those that had mobility issues said they did not find using a step in shower difficult, they explained going through a complex procedure to traverse into the shower with the help of a walker. Once again this shows hesitancy to come across as asking for more than what they already have, even if they potentially might prefer it. This was a major insight gained from the research.

Occupants interviewed had to meet the specific requirements to be eligible for living in the social housing. Therefore it is assumed that as they are from a low socio economic demographic, they feel grateful for the opportunity to live in such an environment.

A further insight gained from this research was in relation to social aspects of elderly care facilities. While it was common for the literature to speak about the importance of integrating social spaces, some literature mentioned that social spaces are rarely used, and for a variety of reasons. For example the declining capabilities of users and issues with 'belonging'. It was also identified that creating social spaces does not necessarily promote the benefits commonly believed as they do not tend to establish lasting connections. What is needed is more than just seating people together at a dining table, or directed group activities. These findings corresponded with that of the occupants spoken to, where 70% did not warm to the idea of introducing a communal space in their complex. They believed it would not get used. We can rationale that occupants spoken to grew up in 1950's style housing, with large fences and largely private from neighbours. They may also have an aversion to social community spaces as they would not have experienced flatting or any joint living. Thus the generation tend to be unaccustomed to living in density housing, such as apartments which is what is common now. It can be reasoned that this may have influenced their preference for no social spaces in the complex. However, as elderly care facilities designed in the future will most likely accommodate younger

generations, these preferences may change. Younger generations tend to be more familiar with living in close proximity, and integrated communities, and thus may enjoy social spaces.

It was also identified that occupants who are capable of socialising already find their own ways to socialise and do not feel a need to also socialise in their own community. This same notion was commented on in Rockwell's (2017) study. She noted that there needs to be a way of establishing some sort of in house connection between those that are capable of socialising. One occupant stated that they think a community facility would be good for those who cannot already socialise themselves, however not for themselves because they already did enough socialising outside of the community/complex. This is the exact trend the literature identified as important to avoid and a solution needs to be found. Recommendations included a buddy system for new arrivals, or a workshop run by residents. This idea would need serious thought in terms of how to design for new elderly care facilities, to ensure building on recommendations from the literature, but also the sincere desires of occupants.

A further insight was that people only now what they know, and can really only speak to their specific environment that they are used to.

Conclusions

This study aimed to obtain knowledge and comprehension of a range of user occupant preferences to provide evidence and direction for the effective design of social housing for a sustainable society with a growing population. The study interviewed 10 occupants and two custodians of the occupants. The study has contributed some further insights to the body of knowledge concerning design for elderly social housing in New Zealand. Among these recommended design consideration there was a mixture of spatial and physical requirements as well as aspects of the exterior environment such as privacy, safety and social preferences.

While the findings identified some key design considerations, much of the insights gained did not provide answers that were expected. Residents were less than forth coming with constructive criticism than might have been anticipated. As a result, more qualitative research would be desirable to get more nuanced design recommendations for future facilities.

It should be noted that this study is not without its limitations. Firstly, in order to identify occupant preferences of usability and functionality of space, this study only analysed three occupants who relied on mobility aids and thus majority of occupants were mobile and relatively independent.

This was a limitation as dependent occupants and those with mobility issues would potentially have more specific preferences in terms of the design and usability of their unit. This is a particularly important limitation as elderly care facilities should be designed for the least able. Such a small sample size of dependent occupants means their preferences cannot be generalised to other populations. However because there was consensus among majority of the conversations, this suggests a reasonable sample size.

Second, interviews with occupants only consisted of a series of conversation style questions, no physical alternatives were presented. This proved a limitation as occupants could only speak about what they know and the unit that they are used to, thus found it easy to say that what they had was just fine. This meant not a lot of insight was shed onto what might work better in the future.

This lack of alternative options, such as diagrams or pictures, proved to be a further limitation. As occupants seemed to be very grateful to live in Compassion Housing, they did not tend to offer much

criticism or suggestions for the future. This raised an important question, how do you bring about comments for future improvement from occupants who are happy with what they currently have?

Further, in order to test occupant preferences and perceptions, only occupants in five different housing typologies were observed. While this was a substantial selection, not looking at all housing typologies of the community housing inherently means that the results presented are restricted to only these housing typology. Another limitation is that the research only spoke to a single generation, with life experience and expectations that potentially are matching the era that they have lived through. As a result, there is a potential for currently a younger generation to have a fundamentally different outlook. Other generations may require elderly care facilities with very different, possibly even contradictory specifications of appropriate design. Yet these generations will have different expectations and social norms and this will likely lead to different preferences of spatial arrangement and requirements.

These four limitations are the basis for the logical next steps in this research which will need to be focused on:

- Presenting occupants with alternative design and layout options of units, to encourage insight into recommendations for the future
- Larger focus on higher dependency of occupants
- Examining preferences for younger/other generations that will move into elderly care facilities in the future.

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APPENDIX 1 – Summaries of Key Literature

PRIORITY READING

Burton, E. & B, Sheehan. (2010) Care home environments and well-being: identifying the design features that most affect older residents. Journal of Architectural and Planning Research. [Online] 27 (3), 237-256. Available from: https://www.jstor.org/stable/43030908 [Accessed 5 December 2018].

> The overall aim of this research was to identify the aspects of care home design that appear to have the greatest influence on the well-being of older residents. There has been a resurgence in the 21st century about the impact of the built environment on human health and well-being. Housing type and quality, neighbourhood quality, noise, crowding, indoor air quality and light have all been linked to personal mental health. The built environment may also have indirect influences on mental health, particularly through the ability to support social interaction. This research is an explorative study of residents perceptions based on qualitative, semi structured personal interviews with 81 residents across 20 different care homes in the UK. It seeks the views of residents themselves in identifying the aspects of design that appear to most affect their well-being. Findings identified that design characteristics for well-being include ease and access around the home and into outdoor space, practicality and accessibility, open plan communal areas, wide, light corridors, plenty of views out preferably onto green spaces, soft landscape. Space was not identified as being a large issue, but the layout and openness is important.

Johnson, A. (2017). The Demand for Social Housing in New Zealand. [Online] The Salvation Army Social Policy & Parliamentary Unit. Available from: https://www.otago.ac.nz/library/pdf/Harvard_referencing.pdf [Accessed 2nd December 2018]

> This paper explores the large problem of social housing in New Zealand. It defines social housing and explains the scope of the problem, with 150,000 working age people needing social housing and 190,000 older people, with this number forecasted to grow to 270,000 by 2030. The paper outlines the significant shortage of social housing stock region by region. They provide an analysis suggesting the need for between 1500 and 3500 additional social housing units each year, for at least the next decade.

Koehn, S. D., Mahmood, A. N. & Stott Eveneshen, S. (2016) Quality of Life for Diverse Older Adults in Assisted Living: The Centrality of Control, Journal of Gerontological Social Work. [Online] 59 (7-8), 512-536, Available from: DOI: 10.1080/01634372.2016.1254699 [Accessed 5 December 2018]

> This paper focused on how ethnically diverse older adult residents of assisted living (AL) facilities in Canada experience quality of life. It also looked at the role of organisational and physical environments in terms of influencing quality of life. The qualitative study was conducted across three AL sites.
>
> Environmental audits were conducted, capturing data on policies, fees, rules, staffing, meals and activities, and the built environment of the AL building and neighbourhood. Quality of life of older adults was defined as being contingent upon 5 attributes; attachment, role, enjoyment, security and control. The paper found that all dimensions of the environment, especially organisational, influence tenants' capability to attain the attributes of quality of life, most importantly control. While many tenants accept there must be a trade-off between increased safety and diminished control when moving into AL, more could be done to minimise the loss.

Kuboshima, Y., McIntosh, J., & Marques, B. (2016). Improving the sense of wellbeing for dependent older people living in supported housing. In R. Cole, S. Costa, & S. Watson (Eds.), Well-Being 2016: The third international conference exploring the multi-dimensions of well-being Vol. 3 (pp. 103-106). Birmingham: Birmingham City University, Birmingham, UK.

This study aims to identify the problems of current supported housing for older people focusing on psychological well-being. The objectives are to clarify and evaluate the reasons why supported housing is deemed detrimental to older people's psychological well-being and their quality of life. As people age, they spend more time in their homes, thus the features of the space is more detrimental to ones Quality of life. This paper reviews literature exploring the quality of life of residents in long term care settings. They found four essential needs for the quality of life of frail older people living in institutions consisting of sense of self, the care environment, relationships and activities. The institutional characteristics are the biggest concern in reducing resident's quality of life. The problems raised specifically were, personal care affecting the sense of independence, ambiguity or loss of privacy in private spaces, personal identity and activities and relationships. The study found that improving the design and maximising the space can help improve these issues. Main issues of supported living related to 'institutional characteristics', consisting of needing independence with respect to personal care, privacy, needing personal and private space and more opportunities to socialise and do activities.

Kuboshima, K., McIntosh, J. & Thomas, G. (2018) The Design of Local-Authority Rental Housing for the Elderly That Improves Their Quality of Life. Buildings. [Online] 8 (71) 1-13. Available from: doi:10.3390/buildings8050071 [Accessed 1st December 2018].

This paper examines what is needed for quality of life for elderly living in rental housing with high care needs. It uses a qualitative, ethnographic case study approach, examining six elderly people living under this requirement/condition. Themes of quality of life were identified form literature and summarised into 6 key categories, activities and independence, sense of control, privacy, relationships, quality of care and comfort. The analysis found that focusing and acting on these features has the ability to significantly enhance the quality of life of elderly people living in these environments. Specifically, consideration for micro-spatial organisation in the lounge and outside space will help allow for different privacy and safety needs swell as promoting a wider range of activities. Thus the layout of the space needs to be flexible to accommodate for different needs. Bathrooms and the individual units should accommodate for the caregiver or those close to the individual by making the space slightly larger. However the study only explored six individuals so further research would help confirm and consolidate these findings.

McIntyre, J, L. & Harrison R, I. (2017) The Effects of Built Environment Design on Opportunities for Wellbeing in Care Homes. International Journal of Architectural Research. 11 (1) 138-156.

This study explores how the built environment affects the activities of care home residents. It identifies qualities of the built environment which alter its ability to enable or disable the everyday activities of residents. Ethnographic observations were conducted from five care homes in the UK. Five significant qualities of the built environment were identified; spatial legibility (provide spatial cues to assist with way finding), spatial interconnectedness (providing an interconnection between different zones within one space. Open plan has both positives and negatives, provides interest and engagement and increases social engagement. However it is often loud and lacks privacy. Further interconnectedness such as providing seating in circulation

spaces, considering doors and openings to define public and private space), spatial traversability (consider obstacles and aids to movement such as appropriate handrails and seating, door usability, circulation layout, and width of circulation spaces), spatial diversity (provide diverse spaces that allow for the choice of rooms both public and private, with flexibility of furniture, and variety of conditions within different spaces), and spatial aesthetics (type of decor and furnishings that relate to homeliness, connection to outside, and points of interest).

Rodiek, D, S. & Fried, T, J. (2005) Access to the outdoors: using photographic comparison to assess preferences of assisted living residents. Landscape and Urban Planning. 73 (2005) 184-199.

> This study aimed to better understand how the physical environment supports outdoor usage in assisted living facilities. Photographic comparison was used based on the findings of a previous verbal assessment. Images were based directly on key features that had been identified by users in the previous verbal study. Key features included, pathways, fencing and landscape. Preferences were assessed for each of the above listed environmental features, using four different photographic examples of each, depicted in real- world settings. The features tested are among those that are commonly described as desirable by architects and landscape architects, and considered to promote resident well-being. A main purpose of the current study was to extend the evidence base on these commonly held assumptions, from the perspective of residents.

Taylor, A. (2016) Building Affordable Elderly Housing: How New Zealand's planning system influences market outcomes In: NZPI. NZPI (2016) Over the Rainbow.

> This paper focuses on the ageing population in New Zealand and how this changing demographic necessitates the need for a change in housing that will be cater to the needs of this demographic. It explores the issue of the elderly needing specific types of homes and features to cater to their ailments. It explains how the changing population demographics will have significant impacts on the ability of the country to financially support the elderly in the future. As superannuation is one of the only sources of income for many elderly in New Zealand, it does not give them much to live off, thus more are in need of affordable housing. However, because of the current market conditions and the planning rules it is difficult to develop the affordable homes for elderly which are becoming more and more desperately needed. The paper considers how the Resource Management Act (RMA) has influenced the development of affordable elderly housing.

> Firstly, through the District Plan process which results in policy and zoning outcomes including the density allowed in operative plans. The second is the land supply restrictions which are the results of land use zoning and setting urban limits. This typically results in medium density development in high value areas and low density development in lower value areas. This suggests that the current planning rules are not effectively working to encourage the development of affordable housing for elderly. The text followed to state how the RMA may assist the future developments of affordable housing, through recognising its importance, reducing development costs and allowing subdivisions.

Appendix 2 – Project Interview Questions

1. Discussion points about furniture and equipment
   a. Do you own any equipment that needs to be incorporated or planned for in anyway? For example, Vacuum cleaners, cleaning supply, linen, specialised equipment. Do you need more storage?
   b. Do you own any furniture or art items that need to be incorporated or planned for in anyway? For example, Single lounge chair with side tables or side light? Pull-out bed?
   c. Do you currently have too much of one kind of space and/or not enough of another kind of space?

2. Discussion points about space qualities
   a. What is the quality of light you want to achieve? For example, Morning sun in the kitchen, dark at night in the bedroom, the ability to create different moods in the dining room
   b. What is the quality of sound you want to achieve? For example, I want it quiet in the bedroom/ meditation space; I want to be able to hear my guests in the living space, or I want to be able to hear my guests when they call out on arrival
   c. What views are important, and what kind of connection do you want to establish to the outdoors? For example, do you want an area outside to use or just to look at?
   d. Do you have friends or family members who will stay overnight or for long periods of time?
   e. What transitional spaces are part of your preferred dwelling spaces or important to you? For example, porch, deck, patio, covered walkway
   f. Do you have a preference for hard-surface floors, area rugs, or wall-to-wall carpet?
   g. Do you want any rooms or areas to convey a particular feeling, like calm or energising?

3. Discussion points about facilities and spatial configuration
   a. Do you enjoy cooking and spending a lot of time in the kitchen? Do you have a delivery service for meals? Do you have an oven, how often is that used? Would a microwave oven be just as beneficial?
   b. Where do you eat your meals?
   c. Do you prefer a full ensuite or a bathroom and toilet accessible from the living/guest space? Or would a toilet accessible through the lounge space be helpful?
   d. Do you prefer a walk in level space or a standalone step in shower?
   e. What relationships between rooms and spaces are important? For example I want my private bedroom space tucked away and private; I want the kitchen open and adjacent to the guest space/living room, I want the guest space/living room to seem private.
   f. Do you prefer to be able to see the door from where you sit in the living space?

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g.   Are there aspects of the living room space that provide greater comfort and support? Do you enjoy the sun hitting you where you sit? Or does this affect the TV?

h.   Do you tend to lean on things when walking around the house?

i.   Is there a zone you want the shelving units to sit in? Does this apply to power points?

j.   Do you need a front and back door? Is there a particular preference? For example a sliding door.

k.   Do you prefer your laundry to be in your own space or in a communal space?

4.   External Environments

a.   Would you like/use a private terrace space? Greenery/astroturf outside?

b.   Would an external space need any particular shelter? (From wind, rain or sun?)

c.   Do you use a Walker, wheelchair, mobility scooter?

d.   Any specific preferences for mobility scooter storage? For example a shared location somewhere on site or closer dedicated storage near your living space? How far away is too far?

5.   Public and private environments (Privacy needs)

a.   Do you like to be able to easily communicate or socialise with your immediate or close neighbours?

b.   Would you like to have access to communal facilities? For example flower gardens or vegetable gardens, conservatory/lounge spaces, communal clothes lines?

c.   Would you like to live in an integrated way with families and other demographic groups in neighbouring dwellings?

d.   It is important to you to have privacy from the other units?

e.   Does the public walk through this dwelling area? How does this affect you?

f.   How much time do you spend going to the shops or doing activities outside your home?