LEARNING TO LIVE WITH A NEW MINIMUM

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2020

LEARNING TO LIVE WITH A NEW MINIMUM

A 120 point thesis
submitted to the Victoria University of
Wellington in partial fulfilment of the
requirements for the degree of Master of
Architecture (Professional).

Victoria University of Wellington
School of Architecture

2020

Acknowledgements

To Mark Southcombe, thank you for your guidance, support and patience over this past year, I am incredibly grateful.

To Mum and Dad, without your love and support this would not have been possible.

And to my friends, who have been there through the highs and lows, thank you for an unforgettable experience.

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Figure 1.00. 3D The Desirable Subdivision.

Abstract

Many of the issues that plague society are a consequence of the way we live and build. Preferences for large sections and spacious homes have led to a series of complications at both individual and communal levels, which can be resolved by adopting housing typologies that are responsive to modern issues and lifestyles. Wide spread low-density housing has formed sprawling suburbs, consuming most buildable land resources and increasing its value, culminating significant affordability issues. This style of living constructs highly private individual residences, creating isolated communities by discouraging pedestrian activity and limiting opportunity for social interaction.

Internationally, smaller living environments have been successfully implemented for many decades to reduce the effect of urban sprawl and its ramifications, however this is yet to be realised in New Zealand at an impactful scale. Accommodating our living preferences in medium-high density environments presents a challenge that this research will explore. Although apartment typologies are a solution to density issues, they require residents to adapt to unfamiliar living circumstances, and have struggled to grow in popularity. Smaller homes on compact sites have the potential to facilitate community and ease resource and affordability issues, whilst providing a strong connection to the external environment, an aspect that many New Zealander's seek.

The research is tested on a site in Featherston, a small satellite town less than hour's train ride from Wellington. Intensification of satellite towns and city fringes is key to sustainably easing housing demands and generating supportive communities. The design tests the research at varying scales; how private buildings are designed, how the space between them is designed, and how the wider urban environment is designed to collectively achieve a desirable housing alternative that is responsive to New Zealand's housing issues and preferences.

An understanding of accommodating functional and psychological needs of housing and the role of common facilities is at the forefront of this research, as it ensures the homes have the ability to be occupied long-term. This was investigated through precedents, design testing and background theory research over four design phases, which examine private spaces, public spaces, and the areas in between.

This research demonstrates that dense, small home communities can offer a more desirable housing alternative than traditional forms, and incidentally provide inherent solutions for New Zealand housing.

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Chapter One

Introduction

1.1 Introduction
1.2 Aims
1.3 Methodology
1.4 Scope

“

How can small homes be a desirable long-term multiple housing solution?

1.1 Introduction

When visiting one of New Zealand's many suburbs, one would likely experience an array of large, sparsely placed homes with vast front yards and wide streets which are absent of activity aside from passing road traffic or a few pedestrians. While there may seemingly be no immediate issue with such settings, the extent of such environments has led to a series of inextricably linked problems that are not easily resolved.

The contradiction with our housing is that we are continuing to build large homes with more bedrooms on single sections which are costly to build, run and maintain while family structures are downsizing and the way we live and connect is changing.

The continuation of these types of developments and strict regulations have made it difficult for alternative housing models to gain momentum. Implications of this have meant that most New Zealand cities have exhausted buildable land resources within their boundaries, and been forced to sprawl outwards into fertile land areas to house the population influx. This in itself has many consequences. It requires more public infrastructure such as roads, services and buildings, and creates longer commutes for residents. Despite these new builds, we are yet to see a significant change in the way we structure and orientate these developments. While these homes may adequately house us, they amount to societies that leave much to be desired, their designs further fragmenting communities by discouraging pedestrian activity and forming sharp public/private thresholds.

On the contrary, there have been many examples where developers have taken advantage of housing demands by producing poor quality tiny apartments which do more harm than good for their occupants. Small homes cannot simply be built. They must entail thoughtful planning and adhere to a series of design guidelines that make them superior to regular sized homes, so that by satisfying both physical and psychological needs they are desirable to inhabit for the long-term.

1.2 Aims

With little research having been done in the field of small homes locally, this research investigates the question, "How can small homes be a desirable long-term multiple housing solution?". The principal aims of this design-led research are to investigate and test approaches for implementing a small home subdivision that provides high quality, efficient individual homes and facilitates a desirable level of community and social cohesion through its external and common spaces. The quality of external environments becomes ever more important when living in small spaces. As suggested by Goodchild (1997) in his book 'Housing and the Urban Environment', "most discussion of quality in housing design concentrated on its socio-cultural aspects. They focus on how people experience the environment around them; how they interact with that environment; and how they judge its suitability in relation to their daily routines and their expectations for the future" (p. 32).

1.3 Scope

The scope of this research is limited to select sites in Wellington and Featherston, however findings are applicable to any site in a New Zealand context. Construction methods and materiality have not been addressed and are recommended for further research. Affordability is assumed through the collective ownership of land and reduced building costs as a result of fewer material resources, shorter labour time and shared amenities. This research works with the presumption that for such a housing model to exist, new regulations would be introduced to relax suburban requirements and thus allow such developments.

1.4 Methodology

This research adopts a design-led research methodology; a combination of research through design, and research for design, which ran simultaneously, each informing the course for the other. An investigation of contemporary New Zealand small home precedents aided in developing an understanding of design principals required for desirable small spaces. Studying the relationship between these buildings, how they contributed to the wider environment and the role of common facilities was key. Research into successful developments that behold dense, singular forms of accommodation was also key to achieve a desirable balance between public and private realms at a large scale. This also required investigation into co-housing precedents and consideration of ownership amongst the occupants.

Downton's approach to iterative testing and extracting is a strong method used throughout; "constant judgments are made about the degree of success of each proposition of whatever scope or scale and can only utilize the designers existing knowing or knowledge" (Downton, 2003, p. 36).

The research has been divided into four design phases. The first phase, "Investigating Small Homes", the second phase, "Small Homes on a Site", the third phase. "Inhabiting the Subdivision", and the final phase, The Desirable Subdivision. Each project is built on the findings of the last, and research for design was introduced through different resources for each design phase. The design through research was achieved via a continuous discourse between written reflections and digital 3D modelling.

Introduction

Analysis of New Zealand Housing problems and risks of poorly-designed small homes;

How can small homes be a desirable long-term multiple housing solution?

Design Phase One

Investigating Small Homes

Research for design; precedent study:

1 - Contemporary Small Homes

Research for design; background literature research:

1 - New Zealand Housing
2 - Urban Sprawl
3 - Minimum Apartment Sizes and the Effect of Standards
4 - Small Spaces and Well-being

Critical Reflection

Design Phase Two

Small Homes on a Site *Scale Shift*

Research for design; precedent study:

2 - Mobile Homes
3 - Stair Study

Critical Reflection

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Figure 1.01. Methodology diagram.

Design Phase Three

Inhabiting the Subdivision _____ *Scale Shift*

Research for design; precedent study:

4 - Campgrounds

5 - American Trailer Parks

Critical Reflection 

Design Phase Four

The Desirable Subdivision

Research for design; precedent study:

6 - Tiny Home Villages

7 - Co-Housing

Research for design; background literature research:

5 - Social Spaces Research

6 - Infill Opportunities Report

Critical Reflection 

Conclusions

A desirable small home subdivision typology

Chapter Two

The problem

2.1 New Zealand Housing
2.2 Urban Sprawl
2.3 Minimum Apartment Sizes and the Effect of Standards
2.4 Small Spaces and Well-being

2.1 New Zealand Housing

Background Research One

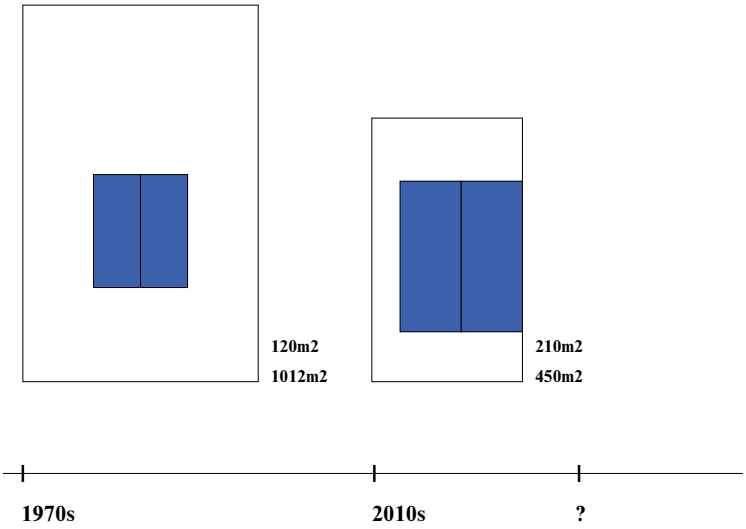
Established during the early years of European settlement, the quarter-acre section was heavily adopted by New Zealand residents, and became synonymous with their easy-going attitudes and cultural preferences for wide open spaces and strong relationships with the outdoors. The result was many sprawling low-density suburbs, with population growths absorbed by the influx of greenfield developments. Lack of environmental awareness and an emphasis on private motorised transport allowed vast continuations of this style of development, while strong preferences for standalone homes also played a significant role (New Zealand Productivity Commission, 2016). Despite this, quarter-acre sections have gradually become a thing of the past. Driven by a mix of contributing factors, the last two decades have seen a shift towards developing more compact urban environments amongst our most populous regions.

During the twentieth century, it was commonly expected that families would own their own home, as the average house size of 120sq m on a 1012sq m (quarter-acre) section typically cost 2.1 times the average salary (Marriage, 2010). The cultural preferences that were established with this style of settlement are still very much ingrained within many New Zealanders. However, despite these lasting preferences, housing sizes, sections and prices have fluctuated significantly. A house now typically costs around 9 times the average salary, while housing sizes average 210sq m on sites that have shrunk to around 450sq m (Marriage). Comparatively, this equates to an increase of site coverage from 11.85% to 46% (Marriage).

Reduction of section sizes can be largely attributed to increased land costs and limited availability of larger plots. While these smaller section sizes remain perfectly adequate to accommodate many outdoor activities, the problem lies with the increasing floor areas of homes, despite occupancy rates recording historic lows. According to Statistics New Zealand, one-person households are predicted to be the quickest growing household type, increasing by an average of 1.6% a year, to account for 27% of all household types in 2038, up from 24% in 2013 (Statistics New Zealand, 2013). This adds unprecedented pressure to housing demands which are already seemingly out of reach for many people. New Zealand is projected to have over 2.2 million households in 2038, 500,000 more than today (Statistics New Zealand, 2017a). Assuming section sizes of 450sq m, a land area similar in size to Hamilton would be required to meet this demand. Rising land prices, subdivision rules, and incentives created by quoting building prices per square metre, are all factors that encourage large floor areas in new builds.

Large homes cost more time and money to build, heat and maintain, and need to be filled with additional possessions and furnishings that many residents neither need nor can afford, adding to the cycle of resource and affordability issues. Increases in housing sizes are also related to the growing popularity of low maintenance lifestyles, most commonly preferred amongst younger generations, who are progressively becoming time poor. This is attributed to most households now having two wage earners, rather than one, and as such time for regular chores and routines is stretched thin. Instigated by necessity to cover mortgage costs and women becoming equally career orientated, there is less appeal in giving attention to outdoor areas and general upkeep of larger sections in spare time, occupants instead choosing to spend valuable weekends and free time pursing hobbies and social activities.

While the obvious solutions to the housing demand issue suggest an adoption of high-density strategies observed in international case studies, it is much more complex than that.



Housing research in New Zealand has concluded strong preferences for detached housing, with approximately 80% of people preferring standalone houses and 60-70% commenting that apartments would be their least preferred option (Preval et al., 2010; Randal & Hamer-Adams, 2015). Common concerns include a loss of privacy, lack of natural light, increased traffic, parking pressures, and safety (Auckland Council, 2016). Residents of standalone dwellings also tend to inhabit their homes for longer periods, a pattern which is likely reflective of the general preference for detached homes (Kim et al., 2005). The strong desire to inhabit detached housing by the general population creates challenges in meeting housing demand that apartments may have otherwise solved, but despite their success internationally, there are aspects of standalone housing that cannot feasibly be recreated in an apartment setting. Reducing footprints of detached homes on a significant scale is potentially a more favourable compromise if we are to continue widespread implementation of standalone housing typologies.

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Figure 2.01. House and section size comparison.

2.2 Urban Sprawl

Background Research Two

As a result of decades with minimal urban planning, a fondness for large sections and population growth exceeding 5 million, most urban New Zealand centres are experiencing the consequences of urban sprawl. Auckland, infamous for its congested roads and unaffordable housing, is set to experience a 60% population growth over the next 30 years, an increase from 1.4 million to 2.3 million (Statistics New Zealand, 2017b), through a combination of natural growth and internal and external migration. To meet this growth a significant amount of new housing will be required, escalating pressure on local authorities to administer innovative housing solutions and fund new infrastructure to support the influx.

The irony in urban sprawl is its attractiveness at an individual level, but its destructiveness communally. While many desire spacious sections and large private dwellings, they detest lengthy and congested travel commutes and increased taxes to fund additional infrastructure. Although reducing section sizes and homes would appear to be a partial solution, it is a more complex problem than this. There is a conflict between the individual economic effects of sprawl, and those on society as a whole. Cost is one of the primary factors which drives the continuation of urban sprawls. As summarised by Deal and Schunk (2004), developers and individual purchasers are more inclined to opt towards low-density housing as they are generally cheaper to construct and create higher returns, albeit at the expense of the community and society as a whole. Infrastructure costs such as sewerage and water are particular aspects of urban sprawl which can be exceptionally expensive for local governments. It is also highly inefficient, wasteful and unsustainable to build new roads, schools, sewers, and waterlines at the urban fringe while leaving old ones in the inner city to deteriorate (Kelly-Schwartz et al., 2004).

In addition to the economic effects of urban sprawl, Calthorpe (1993) argues that as a result of changing household structures, family types and heightened environmental awareness, traditional suburban lifestyles are no longer compatible with our modern culture. He writes that, in spite of these changes, "we continue to build post-World War II suburbs as if families were large and had only one breadwinner, as if the jobs were all downtown, as if land and energy were endless, and as if another lane on the freeway would end traffic

congestion" (Calthorpe, 1993, p. 15). According to Calthorpe (1993), unaffordable housing and widespread traffic congestion are two main contributing factors which demonstrate how incompatible urban sprawl has become with modern society. He also levels criticism against the continuation of privatized urban space and neglect of public space that defined the great post-war period of suburban growth, and proposed an alternative form of growth, based upon modifying design guidelines of 'post-war' towns to fit modern lifestyles, by providing a more balanced transportation system, denser development and mixed zoning, and the revival of public spaces which are comfortable and useable. Implementation of these strategies and similar would create a society that is much more compatible with modern culture, and form "integrated walkable communities with a strong local identity and most of all a focus on the pedestrian rather than automobile" (Calthorpe, 1993, p. 16).

Solutions for many of the issues related to urban sprawl can arise by adopting compact city policies. There is no exact definition for what a compact city is "but in general [it] is taken to mean a relatively high-density, mixed-use city, based on an efficient public transport system and dimensions that encourage walking and cycling" (Burton, 2000, p. 43) and provide green spaces to maintain liveability. These policies are designed primarily to increase foot traffic, minimise private car usage and reduce the loss of open fertile landscapes. It is widely accepted that compact, connected cities are more economically productive, socially inclusive, resilient, healthier, and energy efficient than poorly-managed, sprawling cities (New Climate Economy, 2014).

A shift towards higher density developments can also provide benefits in the form of social sustainability. Although there is difficulty in measuring the societal effects of urban sprawl accurately, they are possibly the most telling evidence of its unsustainability. Loss of, or fragmented communities, inability to adapt to changing lifestyles and household structures, a negative health impact and segregation, are just a few of the ways in which urban sprawl is said to affect social sustainability (Kelly-Schwartz et al., 2004). "Higher density settlements are argued to be more socially sustainable because local facilities and services can be maintained, due to high population densities, and therefore accessibility to goods and services is more equitably distributed" (Williams, 1999, p. 168).

In light of these issues, compact urban growth and its associated benefits have the potential to enhance the long-term productivity of cities and encourage higher population densities by increasing both liveability and desirability through various environmental, social and economic benefits.

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Figure 2.02. Early example of urban sprawl beginning in Glen Innes, Auckland, 1962.

2.3 Minimum Apartment Sizes and the Effect of Standards

Background Research Three

In contrast to its sprawling suburbs, the early 2000s saw Auckland's CBD experience an influx of 'shoebox' apartments that were as small as 12sq m (Orsman, 2005), of which many were poorly designed and charged comparatively high premiums for their small footprints. Lack of regulations allowed the establishment of these apartments which prompted the council to implement minimum standards for apartment sizes, ranging from studios to three bedrooms. They were; 35sq m for a studio, including an 11smq living area, 9sq m bedroom area, 5sq m for a kitchen, 5sq m balcony and the rest for a bathroom, laundry and entry area, as well as 70sq m for two-bedroom and 90sq m for three-bedroom residences (Auckland City Council, 2011).

However, it was evident that implementation of purely size based standards did not guarantee quality in design, as they had no influence on internal organisation and "permitted designs that could feature awkwardly shaped rooms and space wasted through inefficient circulation" (Levitt, 2010, p. 89). In response to such criticisms as these, the United Kingdom's National Housing Federation published Standards and Quality in Housing Association Development, which considered the activities that new homes needed to accommodate in combination with minimum size standards. Although the document was designed to be used as a guide only, it did for the first time "set out guidance on how to accommodate essential activities in all the principal rooms of a house or flat, expressing minimum space requirements for those activities and the furniture needed in each room" (Levitt, 2010, p. 89). Whether they are recommended

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Figure 2.03. A hallway separating closed coffin bunks in Hong Kong.

standards or enforced regulations, standards that provide minimum sizes for activity requirements or design guidelines are invaluable tools as they are formed by collaborated knowledge, and provide a base upon which higher-quality housing can be built.

Implementation of housing standards also prevent influxes of extreme micro spaces that lack the ability to accommodate the most fundamental activities and rights. Many of these developments have arisen in dense urban areas such as Hong Kong, infamous for its coffin apartments. Coffin apartments are illegally subdivided and house over 200,000 residents across the city (Stevenson & Wu, 2019). Most of these average 50sq m and house up to 30 people in plywood bunkbeds each with its own sliding door. The existence of such developments is a consequence of Hong Kong's unaffordable housing market, known to be one of the most expensive in the world. Average house prices there cost around 20 times the median annual salary (Stevenson & Wu), pricing even middle-class families out of the housing market. The cramped nature of these apartments means that hygiene is virtually impossible to maintain, allowing illnesses, bedbugs and other infestations the ability to spread uncontrollably. Lack of privacy is another serious issue, with residents lying only centimetres away from one another separated by paper thin walls. Any noise or conversation can be overheard, denying residents the opportunity for solitude, interrupting both sleep and reflective thoughts. Access to natural daylight is sorely limited and provided through only a few external windows located in common circulation spaces. Individual coffin spaces are fully enclosed by sliding doors, placing residents in either complete darkness or artificially lit environments.

Coffin apartments fail to fulfil the most basic rights of housing, and can be fostering grounds for mental and physical health issues. Environments such as these prompt questions of how small is too small, and what activities and design qualities must be provided in order to make long-term occupation of small spaces desirable.

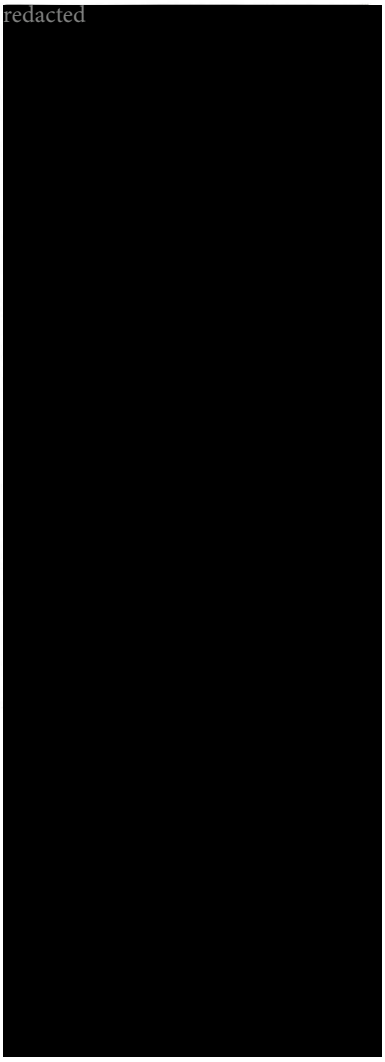

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Figure 2.04. Typical coffin apartment layout in Hong Kong.

2.4 Small Spaces and Well-being

Background Research Four

> *"We benefit from the conveniences of proximity, but these conveniences can come with the price of overstimulation and crowding. We will not solve the conundrum of sustainable city living unless we understand these contradictory forces and resolve the tension between them."*
>
> ——— Charles Montgomery

There is a correlation between housing size and well-being. Although many cities enforce minimum size requirements, no design requirements exist. The nature of design requirements allows a home to become significantly more desirable, as they focus on the occupants' experience, as opposed to providing essential minimums, as size requirements do.

The absence of design requirements is what has led to the occurrence of many undesirable living spaces such as the Auckland Shoebox and Hong Kong Coffin apartments. It is concerningly easy for developers to either build or subdivide existing dwellings to form a greater quantity of inefficient and poor-quality small homes that fail to meet common needs of all individuals. The combination of small and poor design can lead to psychological issues, health issues and other difficulties, as in many cases, comfort is sacrificed, creating a breeding ground for crowding and stress related issues to arise.

In urban centres such as New York there has been a sharp increase in the development of micro-apartments, which are considered to be the solution to housing shortage issues. They allow occupants to live in areas which are convenient for work, reducing time spent on commutes and aiding traffic congestion, which allows more time for personal activities. These tiny living spaces can provide residents with more control, as they are easier to clean and maintain, and often include managed common amenities, making them an attractive option for older generations and younger residents who entertain busy lifestyles.

However, critics question the sustainability of living for prolonged periods in small spaces, and argue that the consequences of doing so may lead to detrimental psychological effects. There are multiple well-known space-saving techniques such as moveable partition walls and collapsible furniture to help with space efficiency, but how are the needs of living met from a psychological perspective?

Humans are driven by fundamental needs. Schwartz (1968) divides these needs into three groups; biological needs, social interaction requirements, and social institutional demands. In the context of housing, biological needs and social requirements are the most essential. Max-Neef (1992) defines these needs into both axiological and existential categories. Needs of Protection, Affection and Subsistence are assigned to the first category, while Interacting, Having, Being and Doing are assigned to the latter. We seek to fulfil these needs, which are subjectively transformed into values, by the function of satisfiers. Max-Neef explains "from the classification proposed it follows that, for instance, food and shelter must not be seen as needs, but as satisfiers of the fundamental need for Subsistence" (1992, p. 199). The purpose of these needs has remained consistent throughout time, albeit developing in the ways they are met. The axiological category is most relevant to a dwelling's function. Not only does it provide physical Protection of its inhabitants from the external environment, but also psychological Protection in the form of a refuge for withdrawal and isolation. Subsistence is satisfied through the form of shelter, while Affection is met through the formation of a social environment by living together.

Providing the ability to withdraw is a highly important function of a dwelling, not

only from external environments, but also from co-inhabitants. This is achieved through having one's own personal space, which is an intangible buffer zone of comfort formed by providing privacy, in which physical barriers play a major role. If personal space is not made available for each inhabitant, one may begin to feel a sense of crowding or claustrophobia. Altman (1975) suggests that a dominant psychological issue for people is the ability to regulate social connections. While we have a need for contact from some people fairly regularly, it is preferable to be able to control the extent and frequency of this contact. A dwelling provides a physical separation from the public environment, while individual rooms allow for privacy and personal intimacy from co-habitants. "The door closes out, the wall encloses. The walls and the doors provide different functions. As the wall is a set perimeter for appraisal or enclosure, the door provides the user with an option of close people out or invite them in" (Schwartz, 1968, p. 147). In the context of small living spaces, acquiring privacy through separate rooms is harder to achieve, as providing additional walls has an undesirable effect on inhabitants by creating a heightened sense of enclosure, and as people who live with others have a higher demand for personal space than people living alone, the ability to withdraw when the social event reaches a point of saturation reduces.

Territoriality is an important psychological factor in regards to one's home; it is a means of altering a surrounding physical environment to make it distinctly one's own, procuring a sense of ownership and self-identity. Public placement of possessions and physical boundaries within the home communicate a sense of ownership. They are used to express ourselves and suggest personal values, as people tend to personalise their homes to suit their own personal needs.

"A house may be large or small; as long as the neighbouring houses are likewise small, it satisfies all social requirement for a residence. But let there arise next to the little house a palace, and the little house shrinks to a hut."

—— Karl Marx

Space demands for different needs may contrast one another, yet to provide a psychologically harmonic space, a balance must be found. This may present a challenge for small designs. Territoriality requires an extension of space to express personalisation, while separate spaces are needed for withdrawal when accommodating more than one individual through additional walls and doors. Spaces which can be reconfigured to adapt to different activities may be used to meet multiple needs. However, Daniel Kopec explains that although daily life is a sequence of events, most tend to avoid adding extra steps to everyday tasks (Kopec, 2006). When occupants are required to reconfigure spaces for different functions often, what may seem like easy novelty tasks in the beginning such as folding away a bed or workspace can quickly become a tiresome inconvenience, and consequently occupants may stop using the space flexibly, making it become further constrained. Should there be a need for adaptable spaces, it must be procured through simple and convenient routines, such as lightly maneuvered wall fold-outs and multi-use seating.

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Figure 2.05. A house of seemingly less status and wealth amongst a street of higher wealth.

A recent study by Reading University PhD candidate Chris Foye, analysed the relationship between the size of living spaces and subjective well-being. He proposed that there are two significant 'pathways' through which space can affect well-being, these being the capability of the home to accommodate its occupants' values and activities, and secondly, the perceived social status of the home through its signified wealth when compared to neighbouring homes (Foye, 2016). The study found that people tended to move to

larger homes based on how they compared with others in surrounding contexts. As Foye puts it, “individuals are deriving subjective well-being from having more space than other people, as opposed to having more space in itself” (Foye, 2016, p. 8), therefore, provided all necessary activities are accommodated, increases of minimum living space standards are unlikely to have much effect on societal well-being (Foye).

Furthermore, the study establishes that changes in living spaces have initial positive effects on subjective well-being, but this initial sense of improved satisfaction is not sustained over time, as occupants adapt to new the standard of living. This implies that “space is a less important metric of societal well-being, as it has only a temporary effect on well-being” (Foye, 2016, p. 8).

While the answer to what is considered a sufficient amount of space for a dwelling is user dependent, it can be assumed that a space is too small if it prevents occupants from accomplishing activities they want or need to perform. Outside of explicitly size based requirements, accommodating axiological needs may be achieved through spatial design guidelines that work in collaboration with small spaces.

It can be concluded that so long as the space can accommodate all necessary activities comfortably, additional happiness and satisfaction within homes are determined by the surrounding context, a small home owner in a small home development is much more likely to be satisfied than a small home owner in a regular sized street. In the aim of achieving desirability, is it therefore important that the designs explored with this research do not compromise any necessary activities for the sake of smaller footprints, and give specific attention to design guidelines that satisfy the psychological needs of its inhabitants.

Chapter Three

Investigating Small Homes

Design Phase One

3.1 Contemporary Small Homes - New Zealand
3.2 Precedent Analysis - Guidelines for Design
3.3 Design Phase One - Investigating Small Homes
3.4 Critical Reflection

3.1 Contemporary Small Homes - New Zealand

Precedent Study One

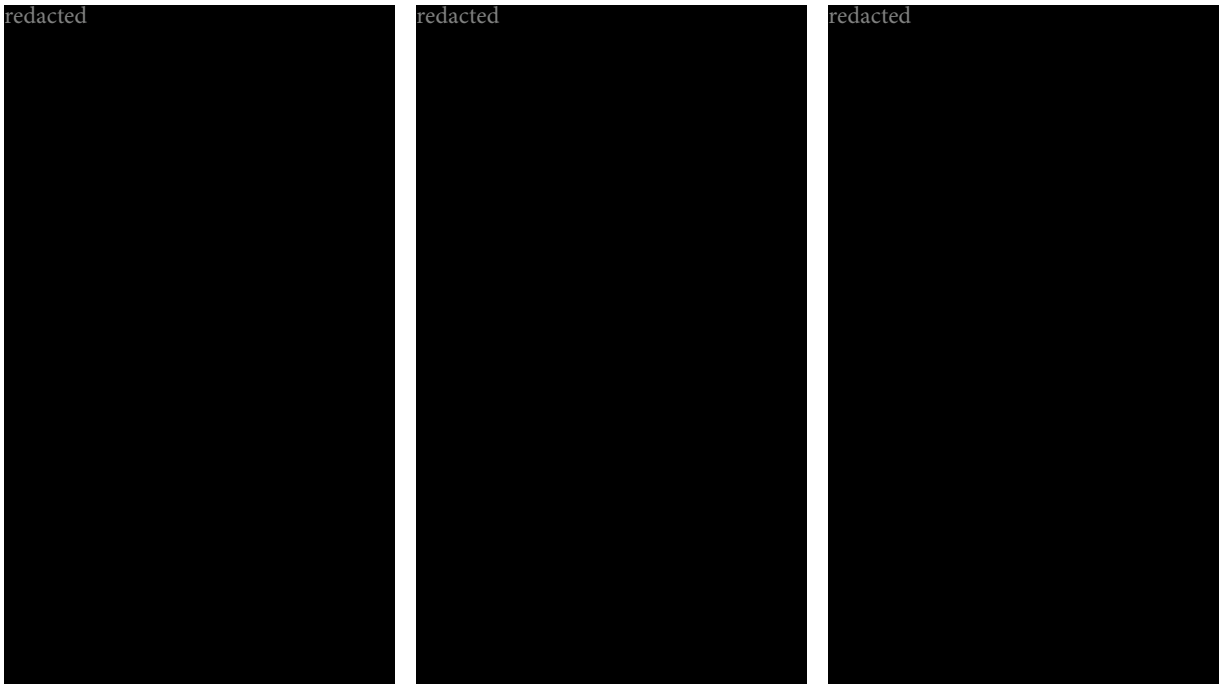
The first series of precedents investigated were several small homes located throughout New Zealand, which were used to establish preliminary design guidelines for successful small spaces. They demonstrate New Zealand's approach to small houses, and suggest that our definition of 'small' ranges from 30sq m – 60sq m for a one to two-bedroom home. This is important to acknowledge when considering desirability, as the designs must be somewhat reflective of our current understandings and expectations.

While international examples such as highly efficient Japanese micro homes may be well resolved, they are designed to accommodate foreign values and lifestyles, and thus would not result in a desirable design outcome. A key concept for all precedents was budget, so despite the sophistication and detail given to such designs, affordability is entirely achievable.

Hut On Sleds

Crosson Architects - Coromandel

40m2



With a footprint of 28sq m and total floor area of 40sq m, and comfortably sleeping up to two adults and 3 children, the Hut on Sleds is remarkably compact. The design contains seven different zones of habitation which are marked by thresholds and material changes, each home to a different mood/atmosphere. The bathroom comes across as rustic and strong, while the children's sleeping space is cool and dim.

The largest of these 'zones' is the living area, which makes use of the double height space to accentuate its small size, this is furthered by its strong external outlook through two fully glazed double height hinged doors. The sleeping mezzanine overlooks the living area, expanding what would have otherwise been a small confined space. Floor to ceiling storage lines the unglazed wall sections, allowing the central living space to remain entirely open. The interior walls are clad in hoop pine plywood which creates a soft and warm atmosphere, also adding a sense of continuity to the design despite its distinct separation of living and sleeping spaces.

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Figure 3.01 - 3.03. Hut on Sleds.

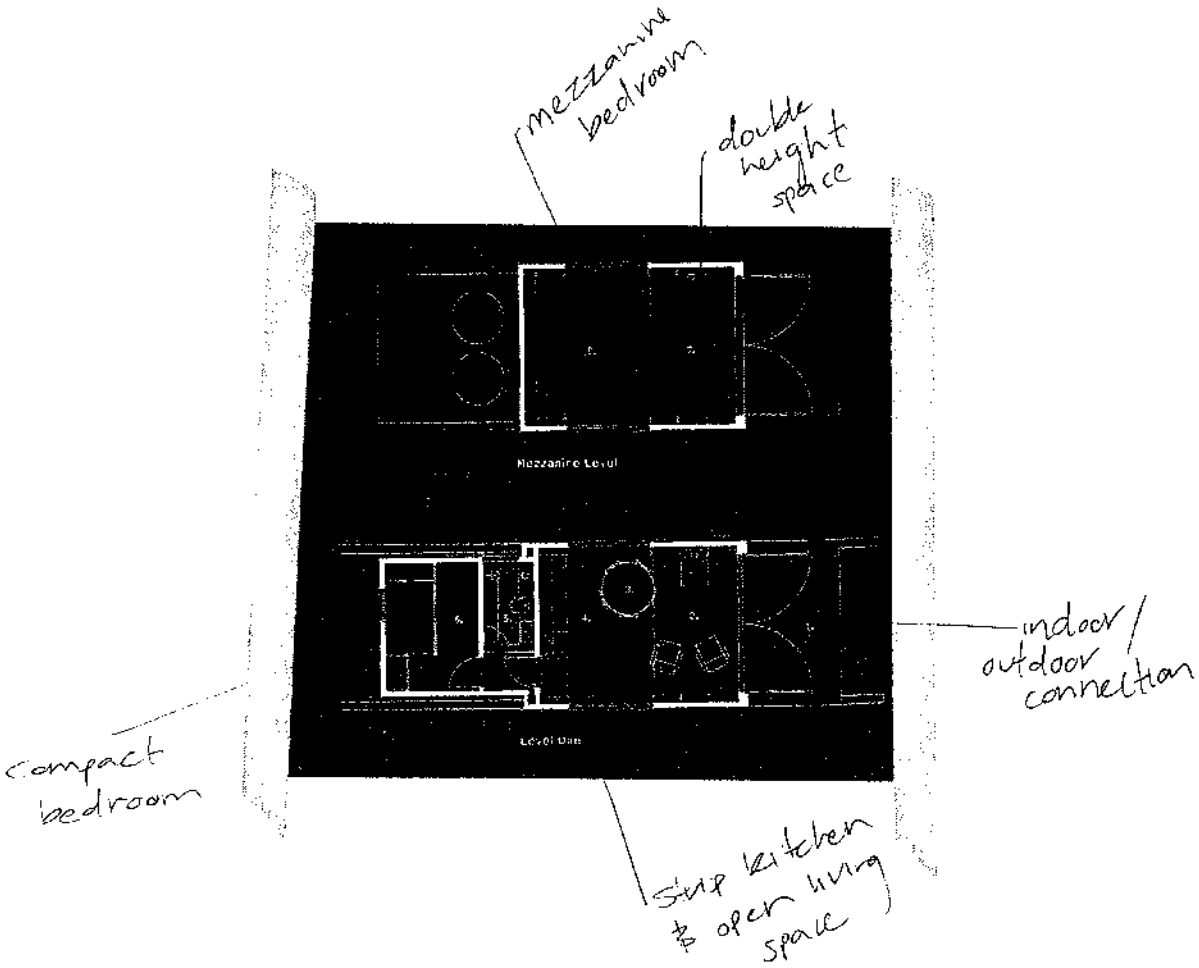

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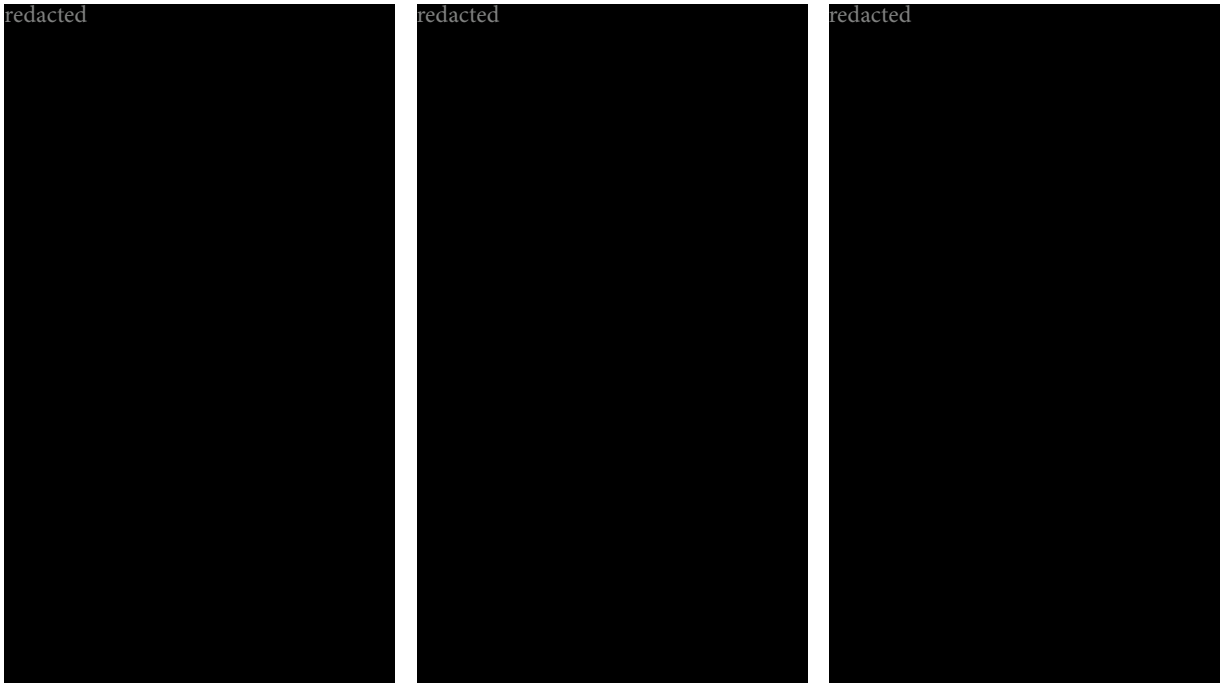
Figure 3.04. Hut on Sleds analysis.

Nine Tsubo House

Wiredog Architects - Wellington

50m2



The design of the Nine Tsubo House was influenced by the original Japanese Tsubo prototypes, which were developed in response to post-war housing issues. A single 'tsubo' is a square made up of two tatami mats; nine of them together form a floor area of 50 square metres. Used to apply constraints and discipline, the home utilises every inch of available 'dead' space for storage through clever techniques, such as under the stairs and shelves above eye level.

Aside from the bathroom and laundry, the home acts as one open space. The absence of internal walls and the high use of glazing gives the illusion that the space is much larger than it appears. This perception is furthered by entering through a small space that leads into a wider environment. The double-height glazed doors, in combination with the restricted natural colour palette, create a light and airy atmosphere, while contrast and depth are echoed through the space by the deeper tones of the ash floors and ceilings.

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Figure 3.05 - 3.07. Nine Tsubo House.

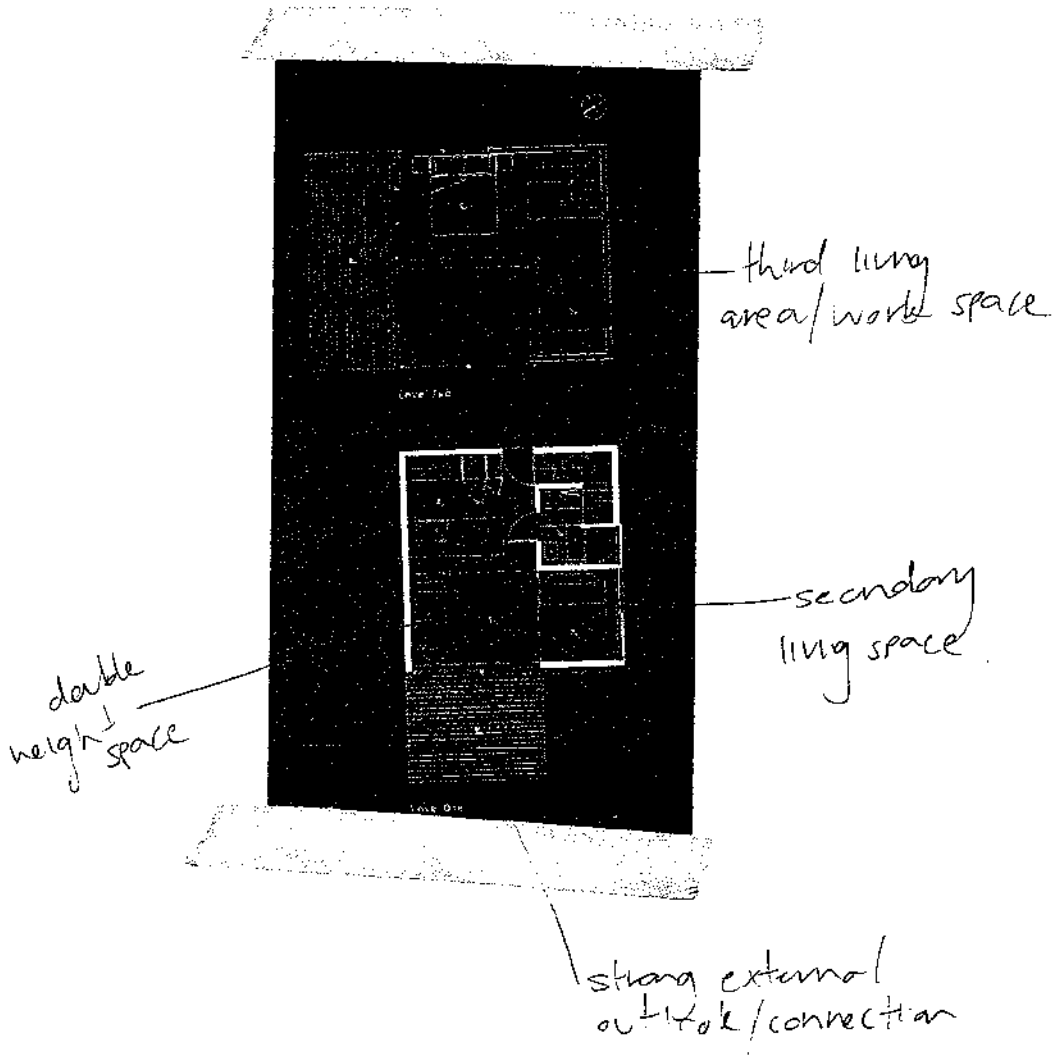

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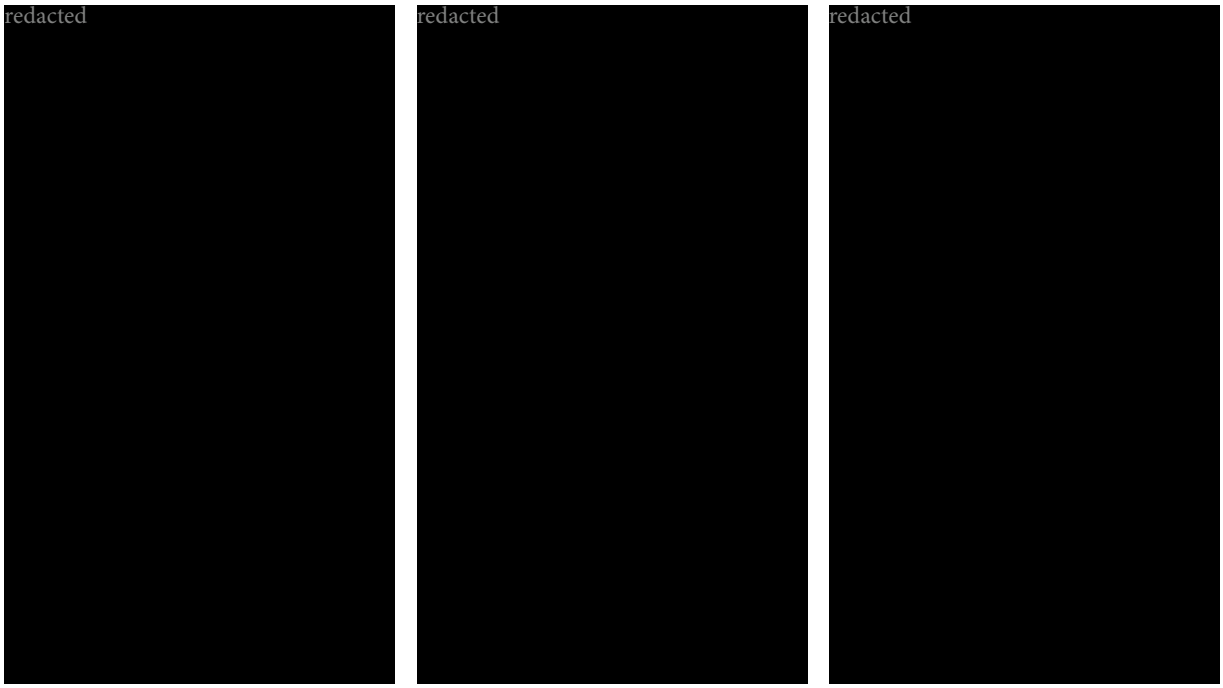
Figure 3.08. Nine Tsubo House analysis.

Te Modular

Herbst Architects - Great Barrier

87 m2



Te Modular consists of three freestanding modules totalling 87sq m. The key design guideline to be drawn from Te Modular is the ability to adapt. The main unit is approximately 60sq m, however only half of this can be fully enclosed. The weather tight section contains a strip kitchen, dining and living area, which with adjustable furniture can be transitioned into a sleeping space.

Warmth is given to the space by lining the walls with oiled macrocarpa, which are left mostly bare, creating a minimalist aesthetic, while storage is concealed within the purpose-built furniture. Adjacent to the internal section of the main pod lies the covered deck, which compared to the solidarity of the central core, is only lightly enclosed by a pair of sliding shutters. This allows the space to be used flexibly and adapt to suit weather conditions; it can be treated as one living space, or divided up to accommodate multiple activities.

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Figure 3.09. - 3.11. Te Modular.

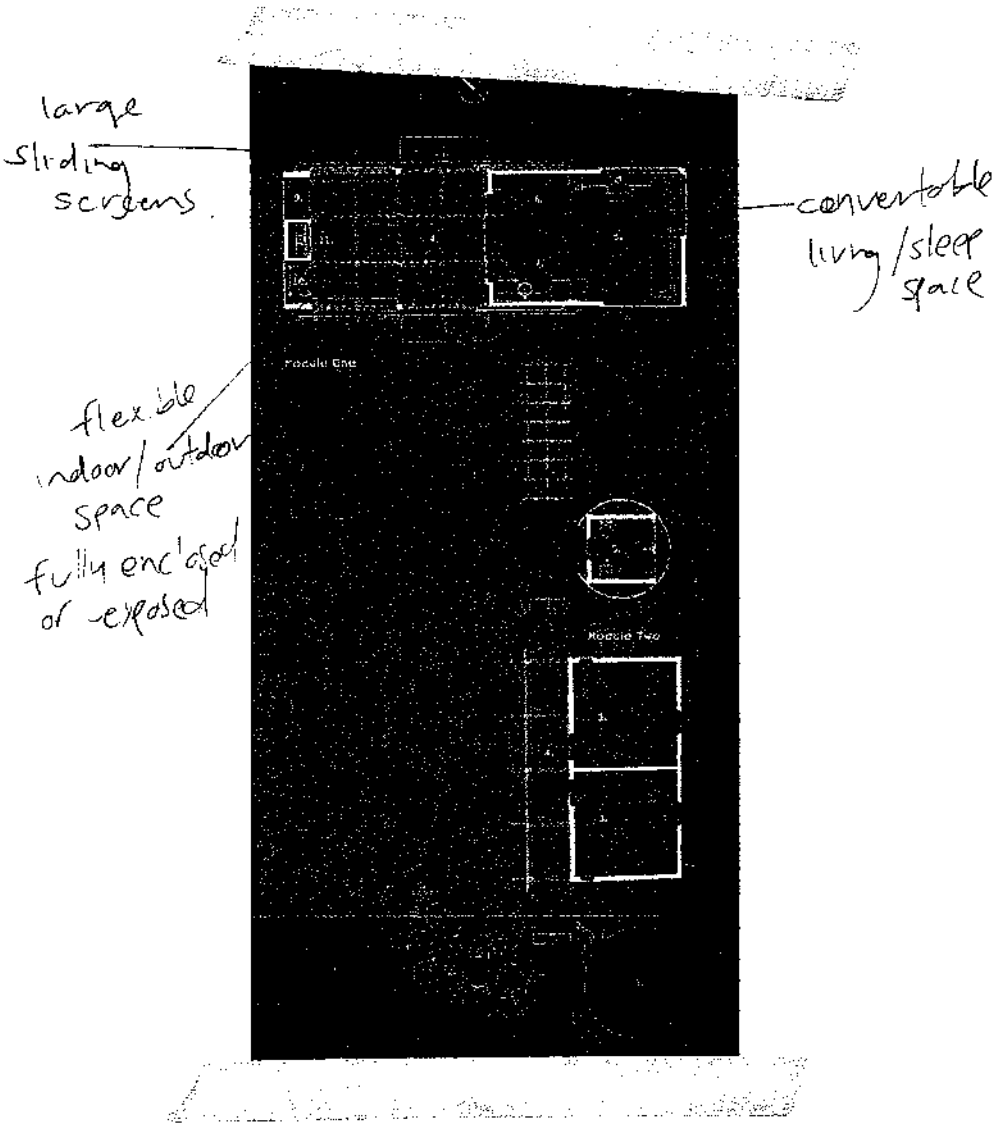

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Figure 3.12. Te Modular analysis.

3.2 Precedent Analysis - Guidelines for Design

+ Storage

Use furniture as a source of storage. Make use of under used space such as stair treads or space beneath, wall space above eye level and unconventional methods such as hooks and peg boards on bare walls.

+ Double Height Space

Double height space can make limitations between rooms dissapear. It creates an illusion of extra space and opens up a potentially enclosed room. Mezzanines and high ceilings also work in this instance.

+ Exterior Outlook and Flow

Connections to exterior views will expand small spaces and create a sense of ease for the inhabitant. If this is not possible use mirrors to bounce light in through small windows and skylights.

+ Floor to Ceiling Ratio

Extra height creates a perception of more space, leaving a room feeling less enclosed. If a room is narrower, a higher ceiling is important, if it is wider, a lower ceiling may be appropriate.

+ Interior Lighting

Exaggerating small spaces can be achieved by using light and shadow, lower ceiling heights can make spaces appear smaller so avoid down lights in these cases.

+ Circulation

Corridors and hallways in small dwellings waste valuable space and add to building costs, reduce circulation with open plan designs and create multifunctional spaces.

+ Materials

Minimal colour palettes and surfaces which are or mimic natural materials enhance the illusion of space. Textured materials and contrasting palettes also create a sense of depth.

+ Minimalism

Designing spaces which are minimalist and clutter free help to keep small homes organised and functional, it can also help with mental clarity, ‘a cluttered house is a cluttered mind’.

+ Multi-Functional Space

Adaptable spaces can be created through partition walls and concealed cavity doors, this adds to a homes longevity by creating multi-use spaces, where some may not be required as regularly as others.

+ Built-in Furniture

Built-in and adaptable furniture that can appear and disappear when required can maximise space and reduce clutter, streamlining the room to make it seem larger and more inviting.

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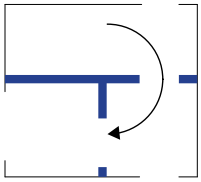
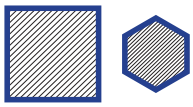
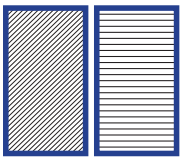
Figure 3.13. Diagrammatic small home design guidelines.



circulation

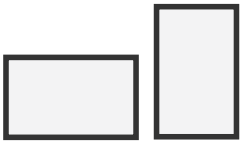


minimalism

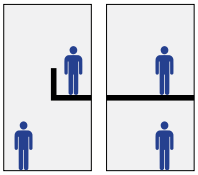


materials

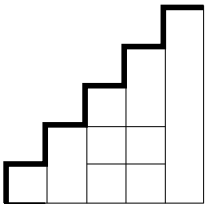
built-in furniture



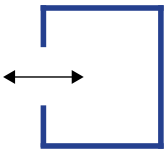
floor to ceiling ratio



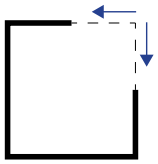
double height space



storage



indoor-outdoor flow



multi-function and adaptable space

interior lighting

The Importance of Spatial Distinction

A significant commonality observed amongst the New Zealand small home precedents is the attention given to creating different zones within single open plan spaces. Poorly designed confined spaces can lead to stressed and hospitable environments, as they provide little privacy or additional places of refuge for psychological relief. The ability to use additional rooms and walls to accommodate changes in mood is often omitted from small homes, as this can induce claustrophobic tendencies. Most commonly, residents are forced to inhabit singular spaces, which can feel stale and strained without the use of spatial distinctions.

These precedents achieve intangible distinctions within their small footprints through changes in materiality, light, level and composition, creating thresholds for different activities and changes in mood whilst retaining an overall fluidity. The distinction between spaces also helps to form order, hierarchy and prevent clutter. It provides placement for objects and allows a space to feel organised and serve a specific purpose, essential for small homes where occupants can feel quickly overwhelmed.

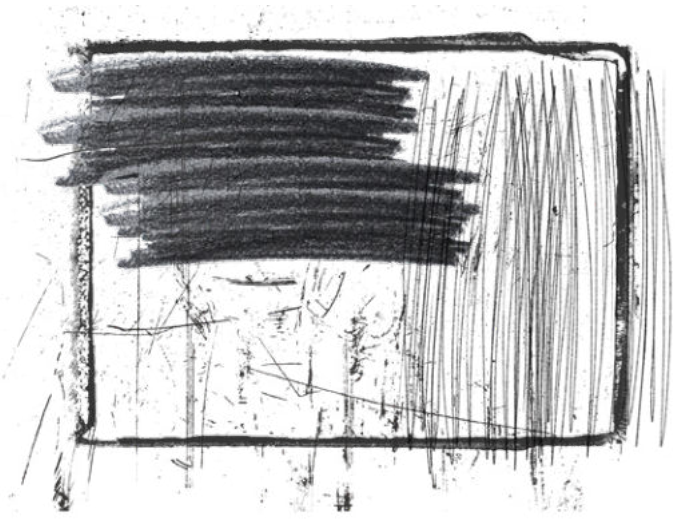


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Figure 3.14. Diagrammatic example of a singular space divided by light, shadow or materiality.

3.4 Investigating Small Homes

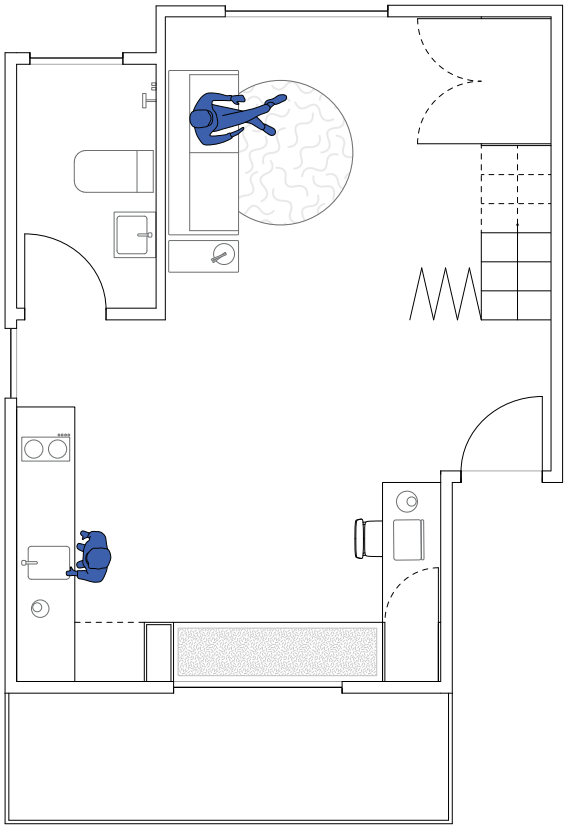
Design Phase One

To begin the design process, three spatial experiments were informed by the design guidelines. They investigated how utilising these guidelines allowed a space to compactly accommodate activities whilst achieving a desirable level of comfort.

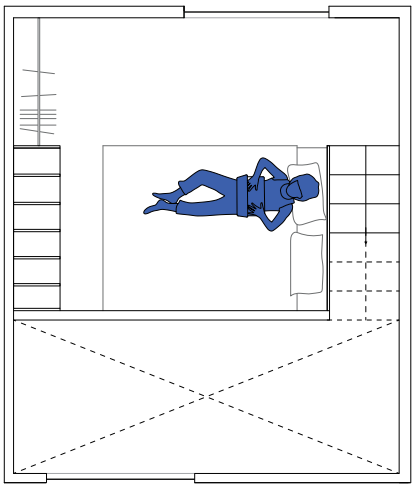
Each design contains all necessary amenities, and have either one or two bedrooms. The designs were not tested against any site constraints and are considered to be spatial experiments, with a focus on understanding efficient internal planning and avoiding ‘dead’ space.

0 0 1

Adaptable Single



G



M

27m2

——— Analysis

+ The Adaptable Single makes use of a double height space to accentuate its small size, which increases comfort by creating an appropriate floor to ceiling ratio.

+ The mezzanine bedroom overlooks the main living space, providing additional light and outlook, reducing the small spaces sense of confinement.

+ Alternating tread stairs are used for access to the mezzanine which minimise the space required for vertical circulation and provide a concealed storage solution.

+ Internal walls are used only to enclose the bathroom which permits the space to remain open plan. However, a folding partition wall is supplied to allow the extended living area to become separate from the main living space, to form either a study or second bedroom.

+ Storage is provided in purpose-built furniture and high placed cabinetry, so that the space remains flexible and uncluttered.
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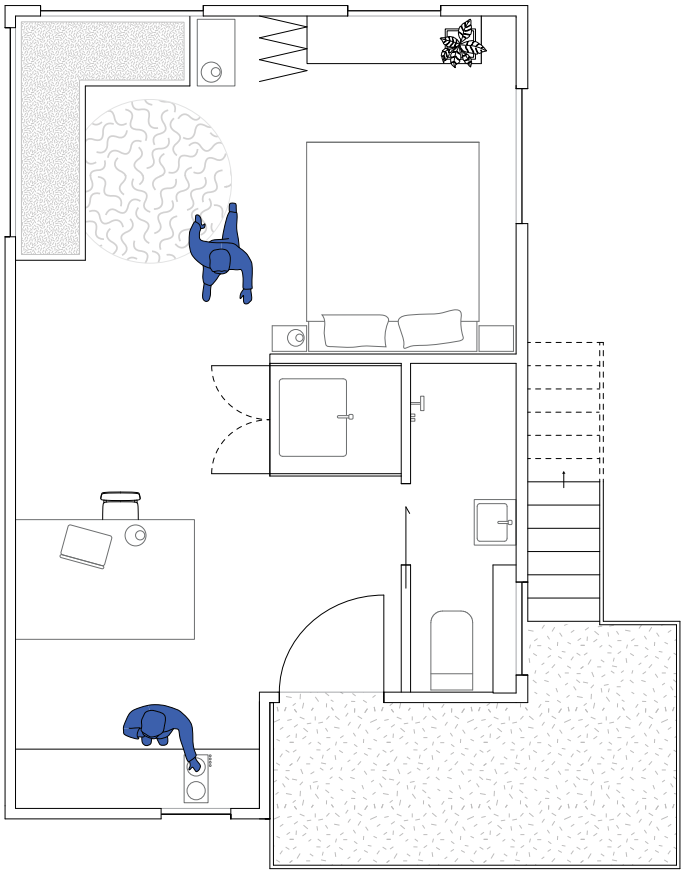
Figure 3.15. Adaptable Single floor plan at 1:50.

0 0 2

Flexible Studio



L1

34m2

——— Analysis

+ The Flexible Studio is a one-bedroom studio that uses a privacy screen to divide the bedroom and living spaces which sit adjacent to one another when necessary.

+ Like the Nine Tsubo House, the dwelling is entered through a confined space which then leads into a well-glazed wider environment.

+ The central living space is open plan and unfixed, as locations of seating, cooking and dining facilities can be adapted to suit the user's needs.

+ The ability to provide flexibility adds an impressionable sense of scale to the design, as it is a commonly desired aspect of larger dwellings, and rarely associated with small spaces.

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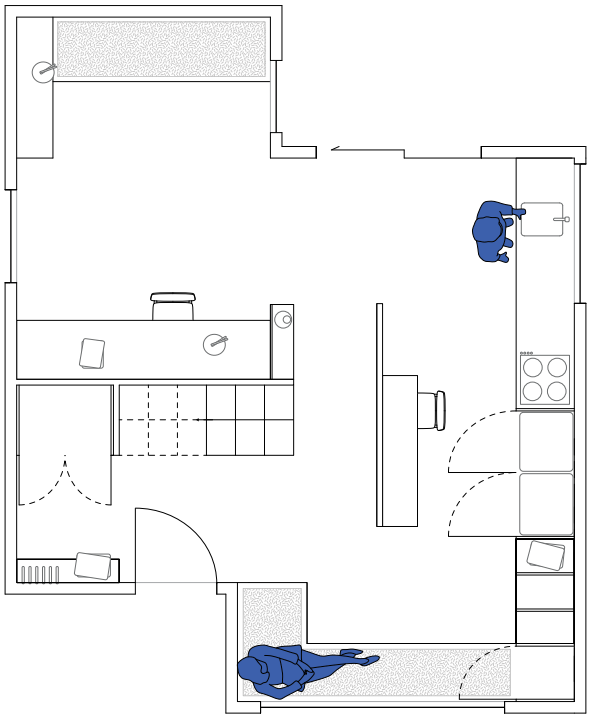
Figure 3.16. Flexible Studio floor plan at 1:50.

0 0 3

Compact Double



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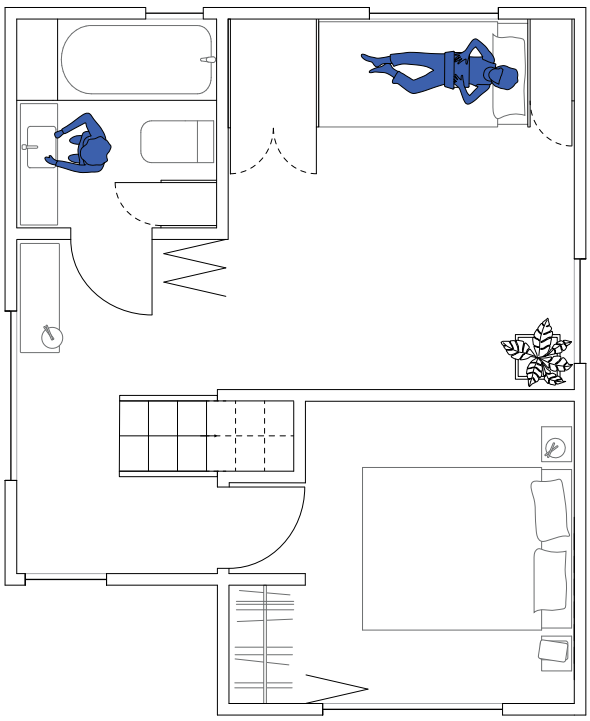

L1

55m2

——— Analysis

+ In a small home with multiple occupants, the ability to withdraw becomes paramount. The Compact Double is a two-bedroom family home that used two smaller living spaces to give privacy and separation.

+ The children's bedroom is extended to incorporate the first-floor landing for a larger play area, allowing the ground floor living spaces to become a private environment for the adults.

+ Alternating stair treads reduce vertical circulation and create a more significant barrier between the two levels.

+ Most available wall space has been used for storage solutions, and concealed within purpose-built furniture to streamline what may otherwise become a busy space.

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Figure 3.17. Compact Double floor plan at 1:50.

3.5 Critical Reflection

This first stage of design sought to establish small home design guidelines to inform the design of three different typologies, and determine what is most necessary to increase a home's desirability by satisfying physical and psychological needs. The spatial experiments tested these guidelines and concluded several most key to achieving this. These were; open plan and unobstructed central spaces, ample concealed storage solutions to reduce clutter, provision of privacy through adjustable or visually/audibly separate spaces, and appropriate proportions to manipulate perceptions of scale. Implementation of the design guidelines produced desirable spaces by creating homes which address both forms of needs in a compact nature. However, this initial design-based research also highlighted issues that have not yet been addressed, including the challenges of a site in an urban setting, the necessity for outdoor space, and the value of common amenities in small developments.

Although these spatial experiments tested many of the precedent drawn guidelines, they are theoretical and designed without constraints. The next phase of design will explore the implementation of site and its limitations. It will also begin to consider what activities are compromised in small homes that need to be supplemented by introducing common amenities and spaces, such as outdoor areas. As indicated by the similarity in scale of the small home precedents, the reflective scale of the spatial experiments is within existing comfort zones of New Zealander's, and could be pushed further, to create spaces which truly require us to 'learn' to live with new minimums.

The next stage of research will explore designs of a smaller scale, investigating how we can increase efficiency and density, and what the implications of this may have on the designs and their desirability.

Chapter Four

Small Homes on a Site

Design Phase Two

4.1 Small Home Demographic
4.2 Mobile Homes - New Zealand
4.3 Stair Study
4.4 Designing for a Compact Site
4.5 Design Phase Two - Small Homes on a Site
4.6 Critical Reflection

4.1 Small Home Demographic

For generations of New Zealanders, home ownership has almost always been a certainty, rather than a possibility. Home ownership is more likely to result in long-term residencies, which is a key contributor to a community's social sustainability, as occupants are more likely to have stronger community ties and care for its prosperity. At present, a house in New Zealand costs almost 9 times the annual salary, and as such, home ownership has become one of our biggest issues (Marriage, 2010). "The stresses felt by generation rent are many and various: a feeling of disenfranchisement and desperation at being unable to realise the Kiwi dream of home ownership; not being able to save enough for retirement or a rainy day; and being forced to rent, which remains significantly inferior to ownership in terms of stability and comfort" (Eaqub & Eaqub, 2015). The economic benefits of small homes make them a promising opportunity for first home buyers to own their own property.

As discussed by Tremblay and Bamford in Small House Designs (1997), small homes are likely to attract particular types of occupants due to their specific benefits, namely young couples/ singles and small, young families (1997). They are generally more affordable, require less cleaning, routine maintenance, materials and furnishing, and are more energy efficient than average sized homes. Subsequently, occupants have more time and money to pursue personal and recreational activities (Tremblay & Bamford). Younger demographics also adapt to different living situations more smoothly than older ones, and should a family outgrow the home they can easily move on. However, small homes are not limited to just those looking to step onto the property ladder, and may well suit older 'empty nesters' who are looking to downsize into more maintainable properties. This can lead to the formation of rich, sustainable, multi-generational communities.

4.2 Mobile Homes - New Zealand

Precedent Study Two

A series of New Zealand based mobile home precedents were analysed for their efficiency and ability to adapt to accommodate multiple activities in a singular space. Although mobile homes are not the end focus of this design project, they are an exemplar of absolute minimums that are capable of being inhabited for long periods. At present, tiny homes are a fast-growing trend in New Zealand, primarily in response to unaffordable land prices and growing awareness of the environmental impacts of urban sprawl.

Mobile Home 001

This mobile home is designed and built by Living Big in a Tiny House host Bryce Langston. Having developed a sound understanding for the design of small spaces from reviewing many tiny homes, the design features numerous simple yet ingenious design elements which make living comfortably in a small space entirely achievable. Within its footprint are all of the aspects of a regular home, albeit in a downsized version including a kitchen, bathroom, bedroom, lounge, office and plenty of storage space.

The kitchen is small but utilitarian, and despite it containing two large sinks and a third smaller one, most of the 2.2 x .6 bench space can still be used, as the large sinks are covered by fitted chopping blocks. The intricately angled stairwell is designed and built to comfortably access the sleeping loft whilst being shaped to not close off the living space in any way. It includes a vast amount of storage and provides wardrobe space for hanging clothes. A pleasant external outlook is created through the use of large opposing windows in the design's living and work area, and in combination with the white and timber colour palette, a relaxing yet vibrant environment has evolved.

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Figure 4.01. Main living space.

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Figure 4.02. Case study 001 plan.

Mobile Home 002

Both designed and occupied by an architect, this exemplary mobile home demonstrates that there is no need to compromise on quality and functionality when building small.

In addition to its sleek appearance, the design is incredibly flexible. The living space adapts between a dining, work and lounge space, by simply reconfiguring storage cubes and panels that are slotted into a magazine wall, a highly efficient feature which allows shelves to be placed along it at any point. The sleeping loft is positioned above the kitchen and is accessed by an unfixed, purpose-built ladder that has wide

treads to provide easy access to the loft and storage area, and provides an alternative seating option. Long vertical adjacent windows fill the space with light which forms an invitingly cosy yet open atmosphere.

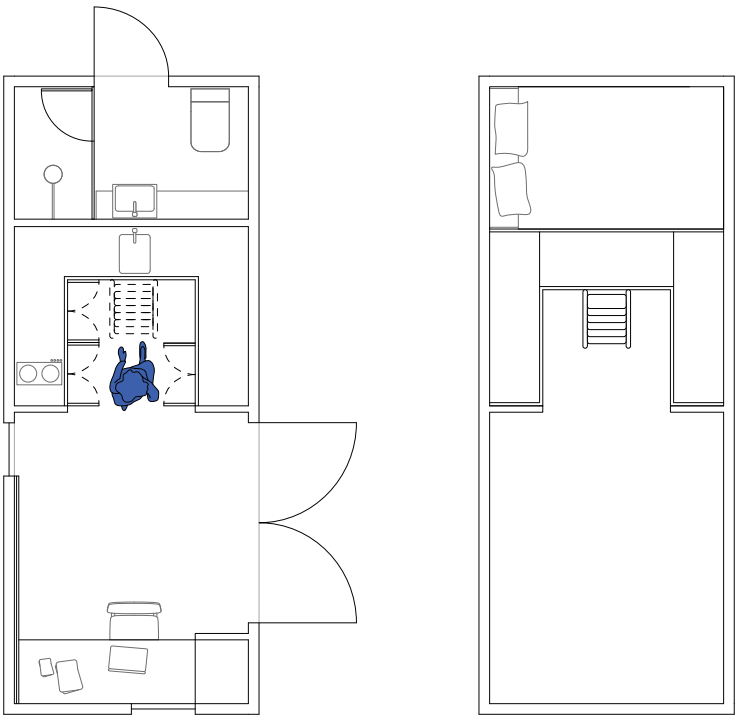

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Figure 4.03. Kitchen and loft space.

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Figure 4.04. Case study 002 plan.

Mobile Home 003

A first for architecture firm First Light Studios, this tiny home is a perfect balance between form and function. All furniture doubles as storage, which in combination with the restricted colour palette, keeps the space refreshingly minimal and clean. A long kitchen bench is used which can extend beyond full height French doors as extra prep space or a table that allows a connection between indoor and outdoor dining and entertainment areas, the latter of which is formed by a modular deck that doubles the potential size of the living space. Sliding windows opposite the French doors provide light and views from either direction.

Externally, the home is clad completely in ebony coloured corrugate, while the interior finish is a contrastingly light poplar plywood. This helps to give the home a spacious and Zen-like quality. “With comfortable, ergonomic and entirely fit-for-purpose spaces, the client has not compromised on quality in the pursuit of space conservation” (First Light Studio, 2020, para. 4).

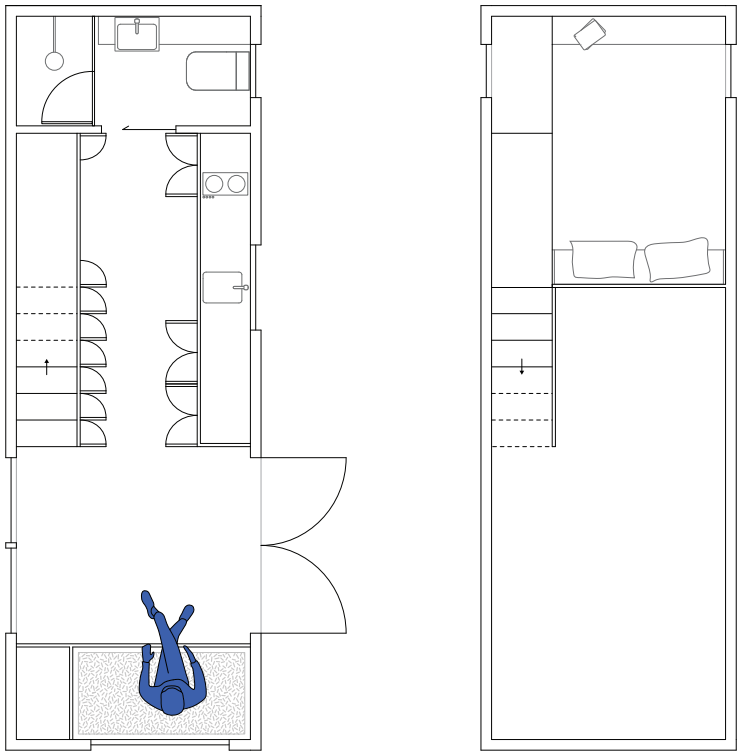

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Figure 4.05. Kitchen.

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Figure 4.06. Case study 003 plan.

Summary

Each of these mobile homes procure a balance of beauty and efficiency within their design, and despite their individuality, use similar strategies to form their spaces. These are;

+ The ability for additional surface space to appear and disappear when required

+ Joinery which can be reconfigured for other purposes by folding and slotting and stacking

+ Light and restricted colour palettes to visually enhance a space's size

+ Appropriate storage so interiors can be streamlined and free of clutter

+ Skylights to allow wall space to be utilised whilst still providing natural daylight

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The next phase of design will seek to apply these design strategies in combination with the established design guidelines from the previous design phase, to develop designs of an increasingly compact scale, allowing for a greater density on the chosen site.

4.3 Stair Study

Precedent Study Three

Each mobile home case study addressed the issue of vertical circulation through either accessible ladders or steep and narrow stairs. While both of these options are highly efficient, it is useful to analyse alternatives that are more accessible, so that small homes can accommodate a wider range of occupants, as for many, regular use of such compact vertical circulation may pose a health risk.

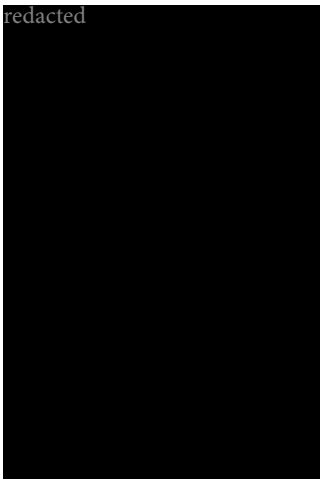

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Figure 4.07. U Shaped precedent.

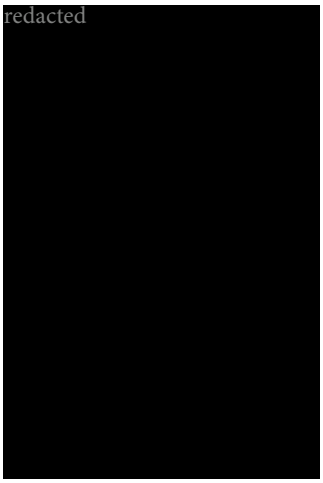

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Figure 4.08. L Shaped precedent.

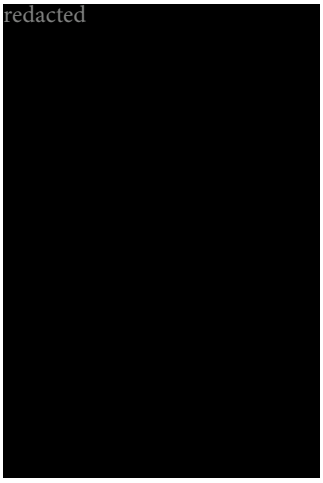

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Figure 4.09. Single flight precedent.

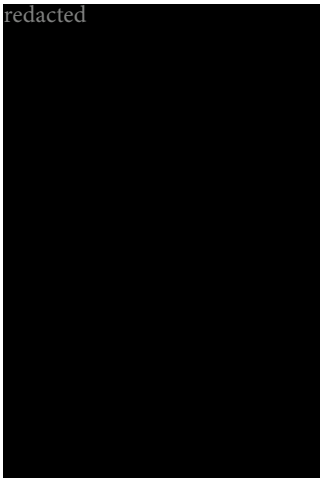

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Figure 4.10. Alternating Tread precedent.

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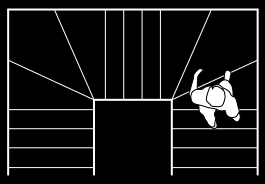
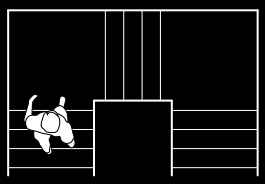
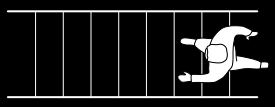
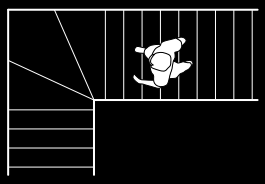
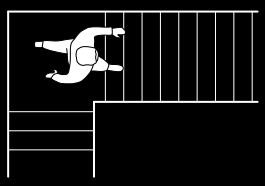
Figure 4.11. Stair precedent - plan.

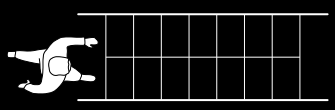












U Shaped

+ Can be easier to fit within buildings

+ Landing(s) can offer a resting point

+ Create visual interest

Single Flight

+ Efficient as don't require additional room for landings

+ Space beneath can be utilised for seating or storage

+ Straight-line construction

L Shaped

+ Provide a visual barrier between floors to add privacy

+ Reduce the sound from one level to another since they are built up within the walls

+ Landing(s) can offer a resting point – ideal for older users

+ A safer option as the central landing reduces the number of treads one could fall

+ Can be located in a room's corner for better use of space

Alternate Tread

+ Most compact way to transition between levels and minimise vertical circulation

+ Create visual interest due to their unusual appearance

+ Easier to transport large household items due to their straight-line construction

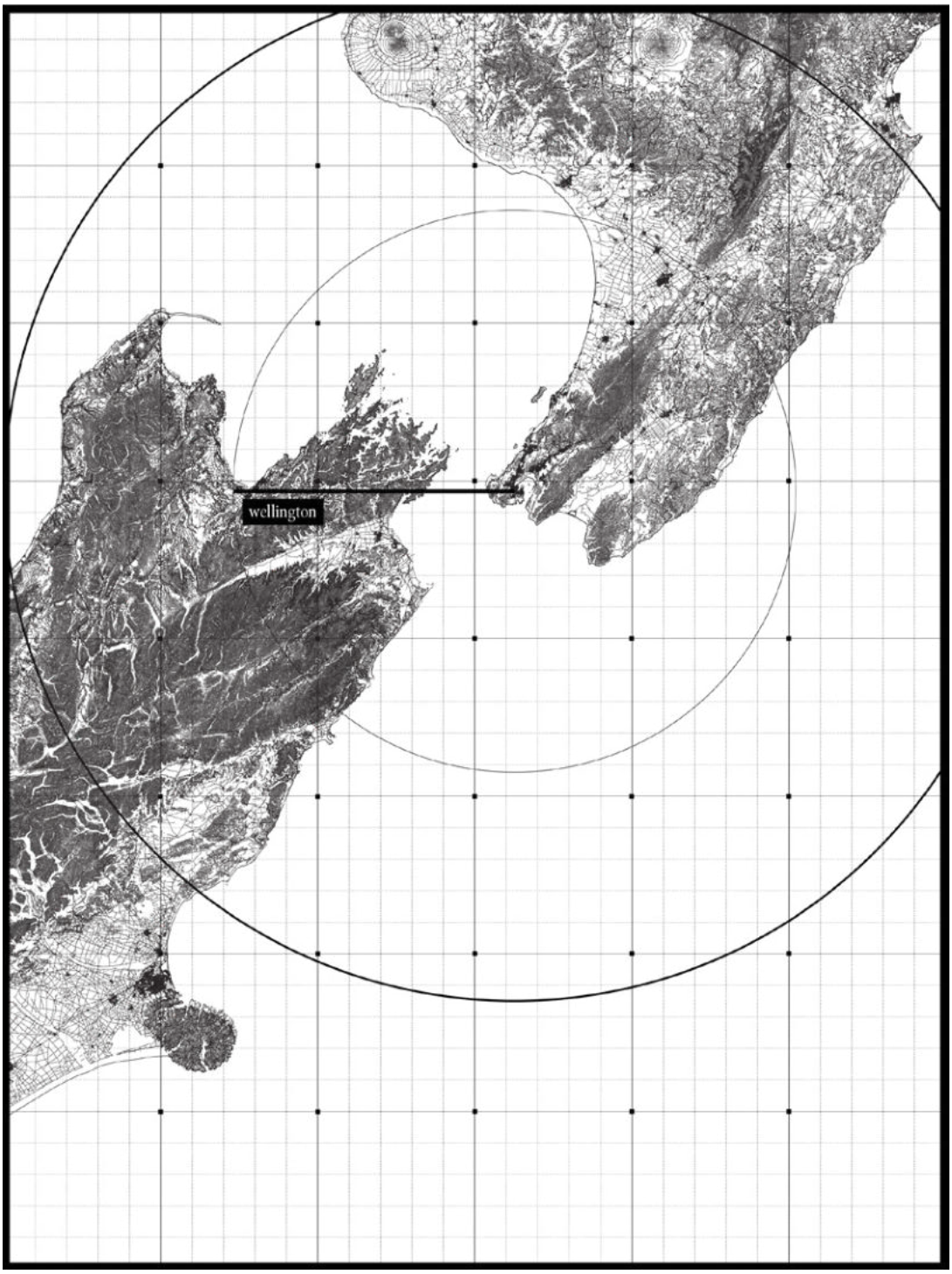


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Figure 4.12. Wellington location.

4.4 Designing for a Compact Site

Karo Drive

Expected increases in Wellington's population and dwindling land resources have made it essential for alternative housing typologies to become readily available to accommodate new growth. It is expected that the population will increase by 16% from 2020 to 2043 (Wellington City Council, 2019a), while average number of persons per household is predicted to fall from 2.62 in 2018 to 2.57 by 2028 and number of dwellings to increase by 7916 (Wellington City Council, 2019b), meaning that there will be increased demand for one to two-bedroom homes. Small infill homes can address both of these issues, as their small size allows them to be built in greater quantities.

A site in Wellingtons CBD was chosen for an infill small home housing development. Its proximity to public services and amenities meant it was an optimal location for infill development. The flat site is approximately 200sq m and oriented north. Although located next to a busy highway, a wide pedestrian footpath forms a barrier between the two. Peak traffic hours generate a significant amount of vehicle noise. However, this can be resolved by using materials with high acoustic values and double glazing, and a perimeter wall to create a sound and visual barrier. The highway sits to the north of the site, allowing unobstructed sunlight exposure. Low rise residential and mixed-use developments surround the remainder of the site, most of which are terraced, semi-detached or apartment dwellings. There are no green spaces in the immediate surrounding context, so inclusion of this is necessary.

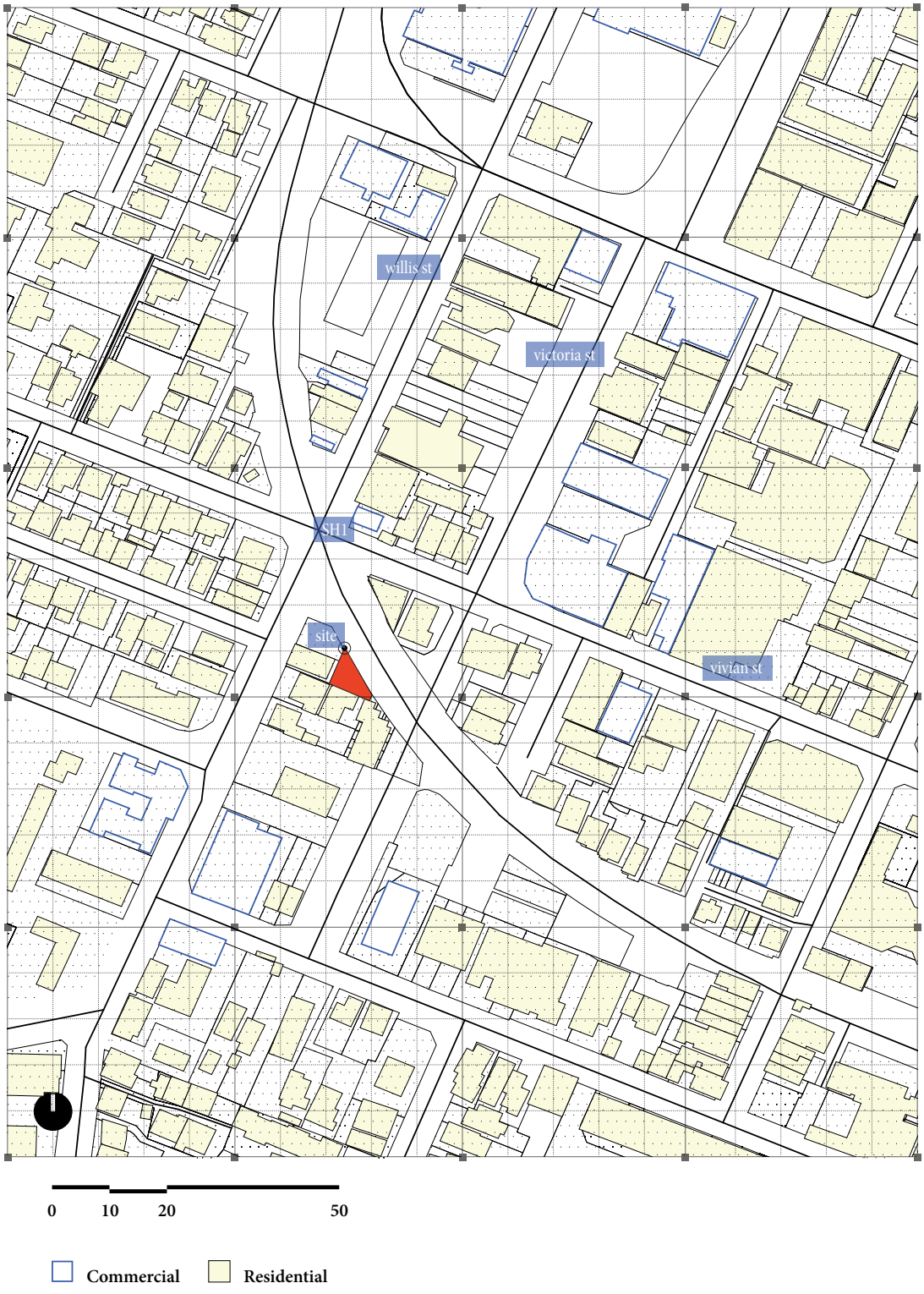

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Figure 4.13. Karo Drive site analysis.

Site Massing

A decision was made to develop three individual homes for the site. This was deemed an appropriate number to explore relationships between dwellings and warrant common facilities, beginning a co-housing dialogue. Due to the site's compact nature, placement of multiple detached dwellings required micro footprints, so therefore to accommodate homes, green space, and common facilities, multiple levels were incorporated into the designs.

The site's triangular shape presented a challenge for how to most efficiently use the space. Due to the site's orientation, green space was best positioned to the north of the site, allowing good access to sunlight and adding a degree of separation between the dwellings and the busy highway. This left the south and west sections of the site for dwellings. Three modules were placed on the site and arranged to maximise each footprint's potential. The detached typology reduced the potential solidity of the site, constituting a human scale, and formed a dynamic relationship between the dwellings. As the site is closely located to public transport and amenities, vehicle access and parking was not supplied, despite the district plan requiring a minimum of 1 parking space per household (Wellington City Council, 2017). It is instead presumed that the growing use of public transport will result in less demand for private transport and consequently such requirements will be relaxed.

Site Issues

Once the general position of the dwellings had been determined, it became apparent that privacy amongst the individual dwellings was a significant issue. With only a few metres between each home, it was inappropriate to use high amounts of glazing. The shallow depth of the site also meant that the dwellings were closely positioned to the public path and highway, allowing passers-by to potentially see in to private areas. This was resolved by using narrow and lengthy windows and skylights to supply additional daylight, and elevating the main inhabited spaces to the first floor.

The compact site had the potential to form abrupt transitions between public and private realms. To soften this, it was necessary that the designs facilitated semi-private entrances by placing them either on the sides of each dwelling or using some form of partial screening.

Common Facilities

To compensate for small homes' inability to accommodate less frequently occurring activities, it was necessary to provide some common facilities within the site. It was established that, in addition to common green space, additional amenities would include a space for storage of outdoor items and pottering/ garden possessions, and a larger dining/living facility, that residents could utilise for hosting guests for various occasions, or as an additional living space to withdraw to.

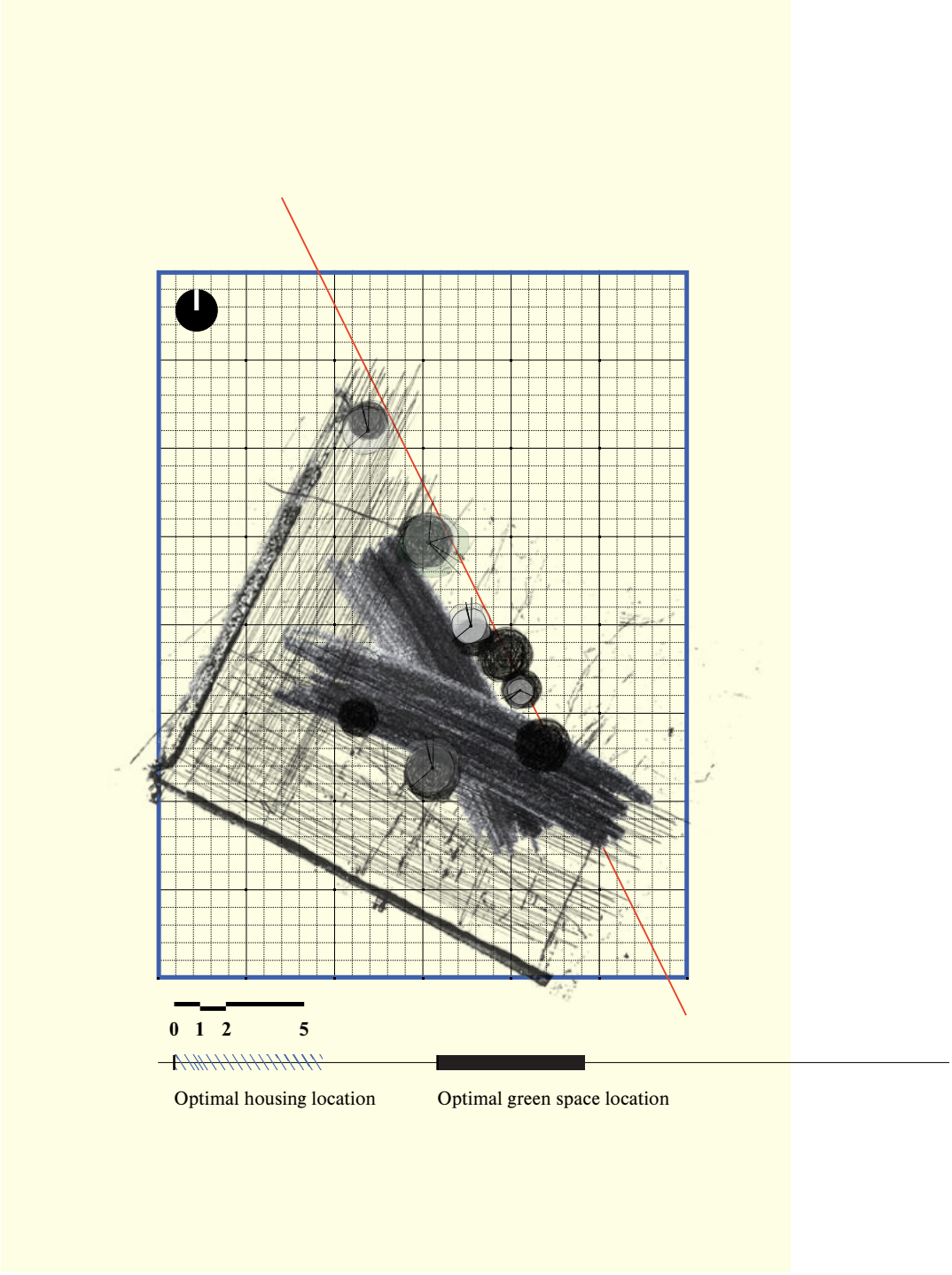

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Figure 4.14. Diagrammatic site massing.

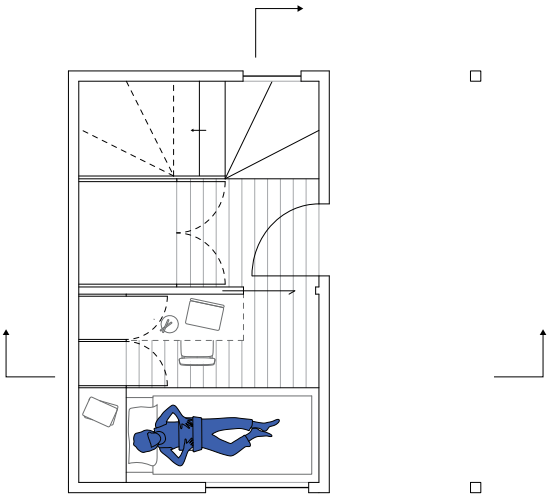
4.5 Small Homes on a Site

Design Phase Two

The next phase of design seeks to refine the design guidelines under site specific conditions at a further compact scale by utilising the space efficiency techniques identified in the mobile home precedents. This allows the small spaces an ability to adapt for specific needs and purposes, while less frequent needs are met through the provision of common amenities.

0 0 1

Stacked House



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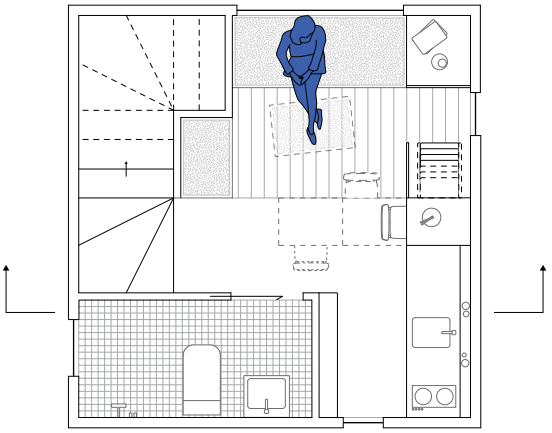

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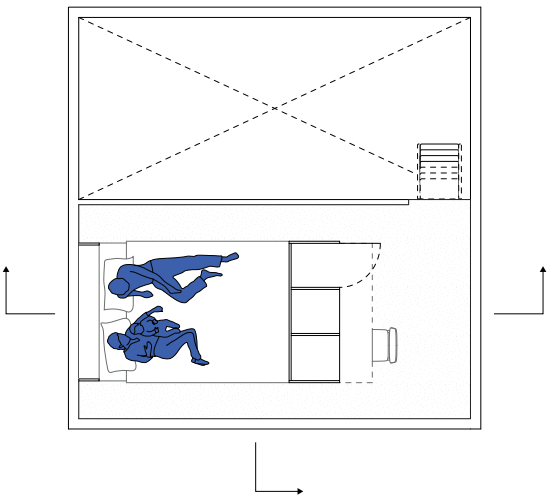

L2

34m2

——— Analysis

+ The L shaped staircase is compactly positioned in the north-west corner and provides significant storage space, minimising the effect of clutter in the small living space.

+ A deep platform ladder is used to access the sleeping loft, and can be repositioned as additional seating in the living area.

+ A small study nook/single dining space is located beside the kitchen bench, which can fold out as a dining table when necessary. As this activity is not likely to be used multiple times each day, the table's ability to appear and disappear means there is no compromise for the open plan living space.

+ An unfixed cushioned seat provided in the living space can be maneuvered to provide a leg rest, while the space it currently occupies is an optimum position for additional shelves should the occupants need further storage.

+ The ground floor children's bedroom can be used as an office or work space depending on the occupant's needs. This provides a separate area for potentially accommodating clients or forming a sound and visual barrier between occupants.

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Figure 4.15. Stacked House floor plan at 1:50.

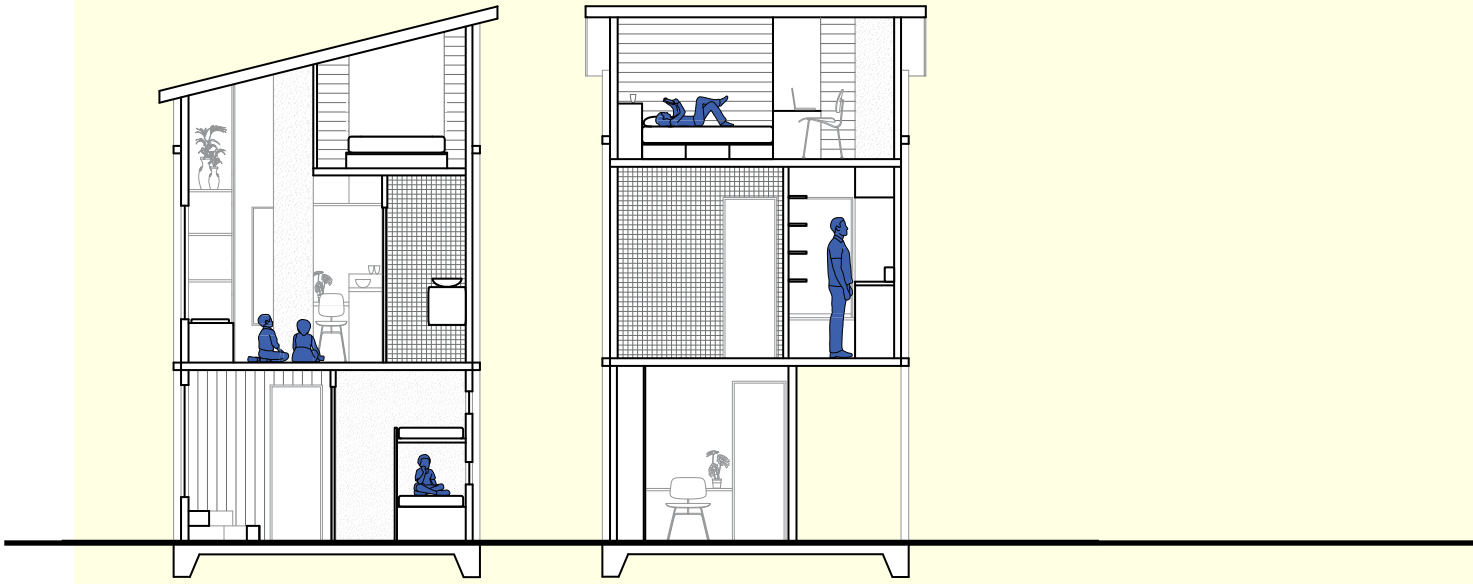

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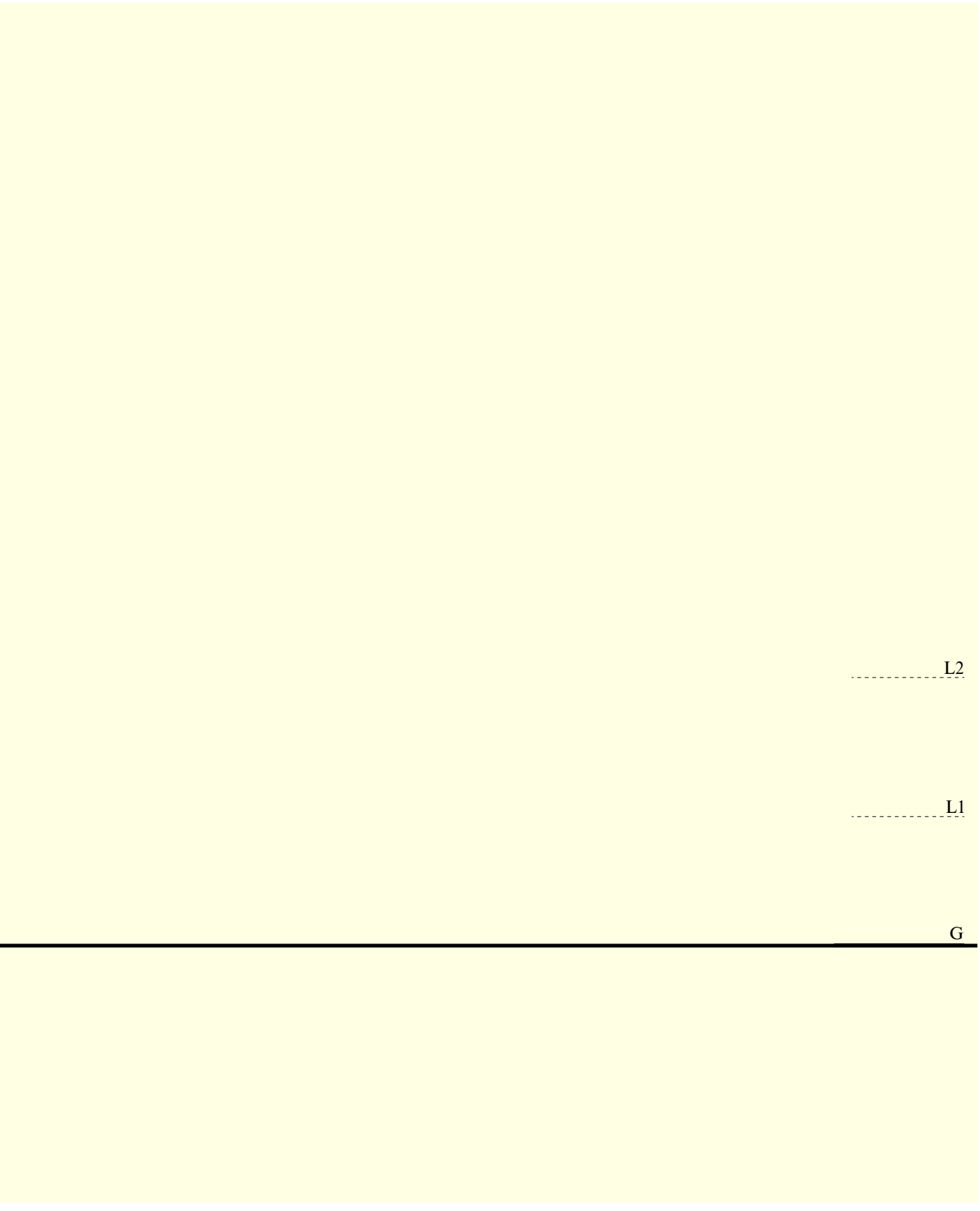
Figure 4.16. Stacked House section, not to scale.


L2
L1
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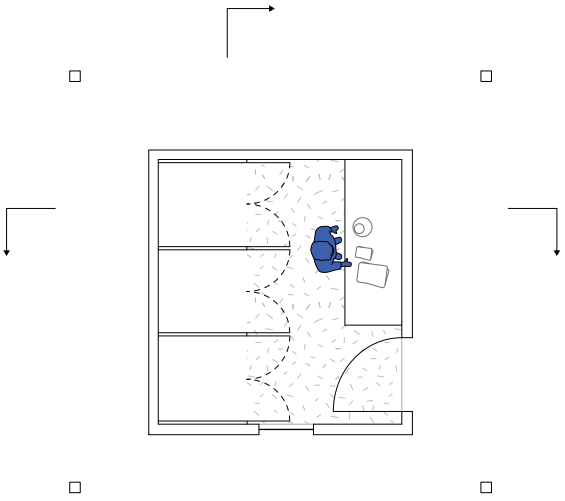
0 0 2

Central House



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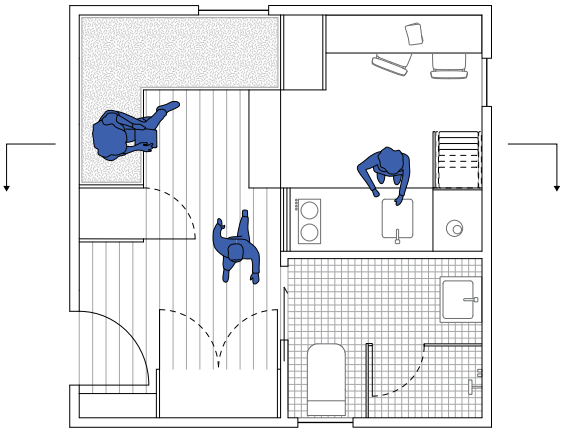
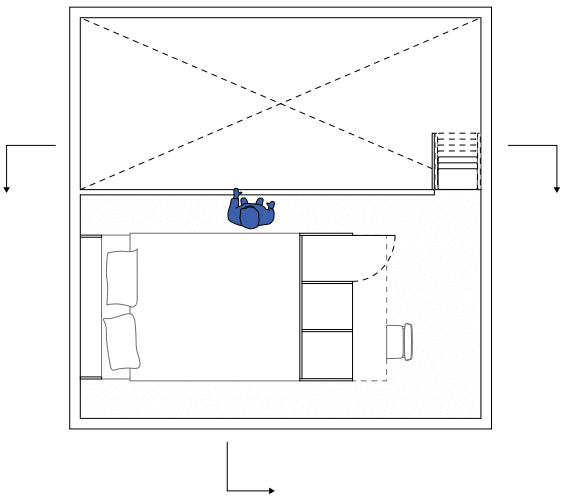


L1



L2

24m2

——— Analysis

+ To minimise vertical circulation space a deep platform ladder has again been used to access the sleeping loft.

+ The change in level between kitchen and living areas creates distinct zones without the need for walls. If required, a partition wall is provided which slides from the kitchen bench to completely separate the spaces for visual or audible purposes.

+ The mezzanine bedroom overlooks the kitchen and living areas, forming a double height space to reduce the sense of enclosure.

+ The dining area can also be used as a study space, providing a multifunctional element to the design.

+ The ground floor of the Central House is the 8sq m dedicated storage and workshop room, comprising three large cupboards, which can be divided into one per household or used as a collective.

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Figure 4.17. Central House floor plan at 1:50.

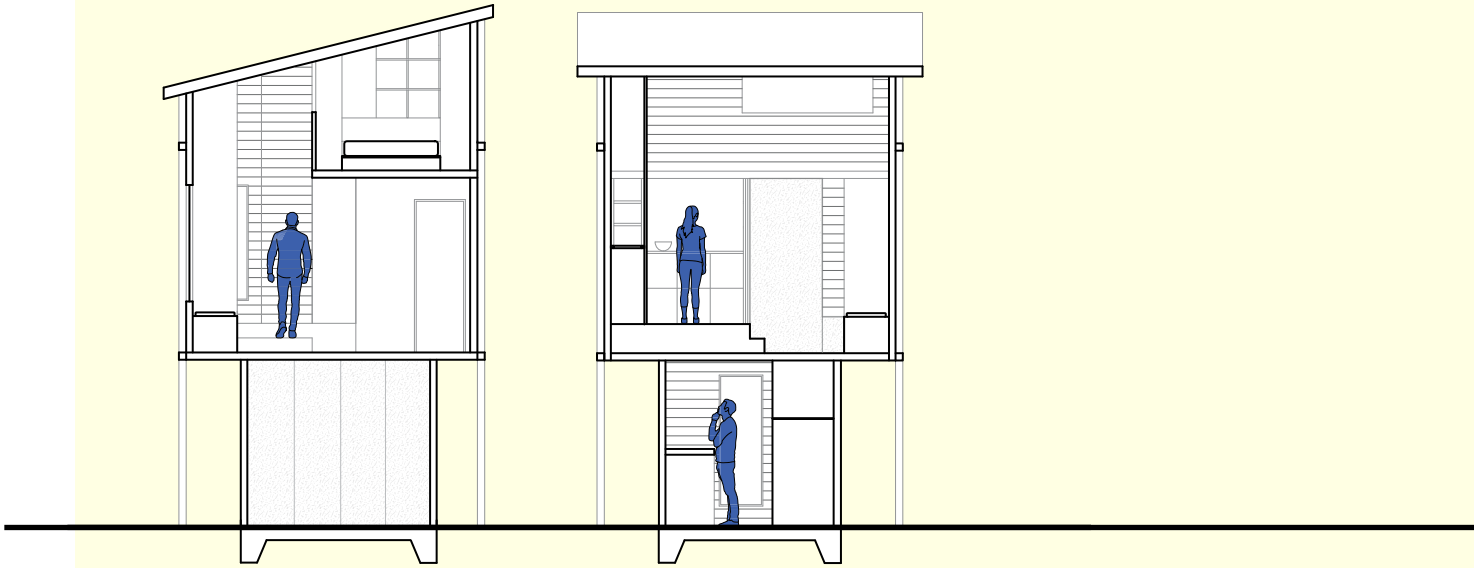

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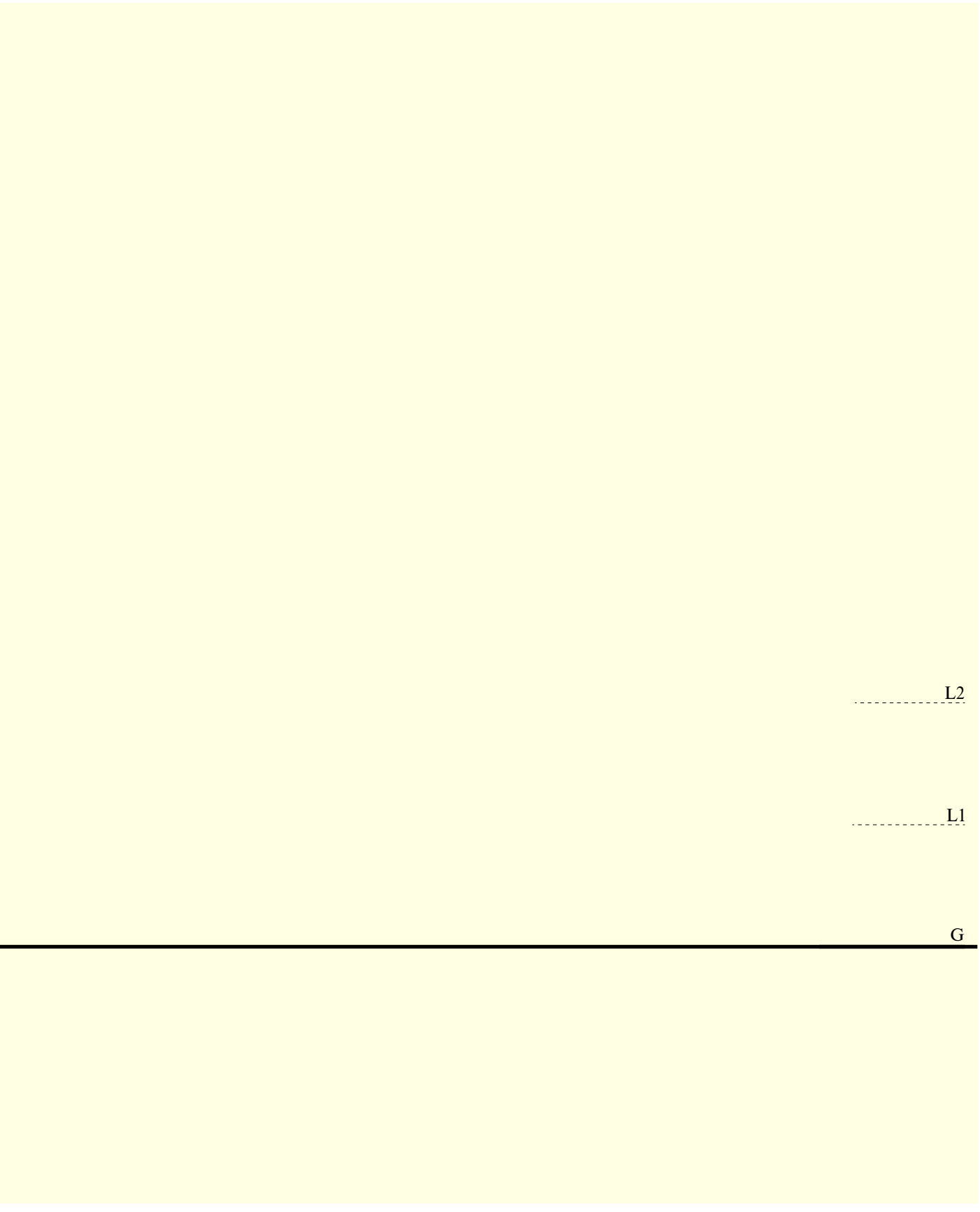
Figure 4.18. Central House section, not to scale.


L2
L1
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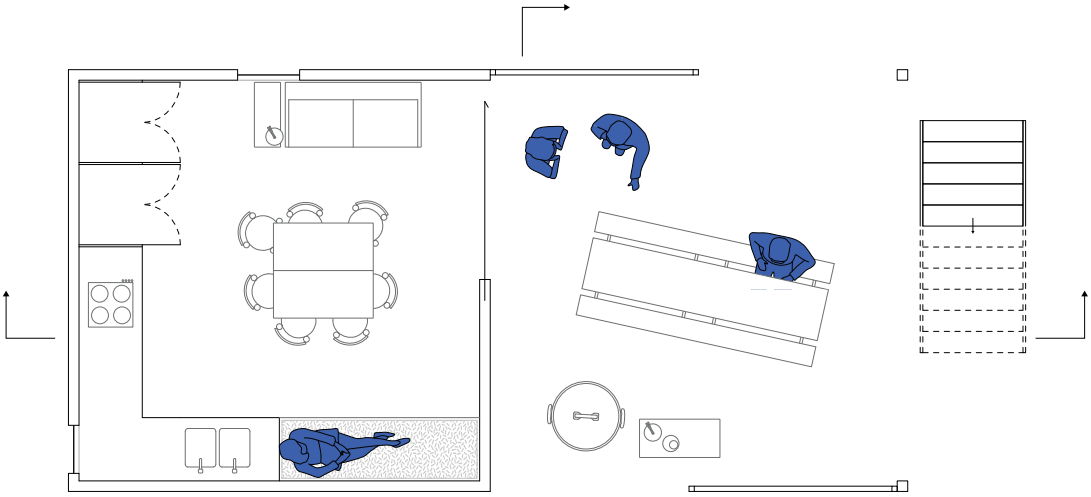
0 0 3

Level House



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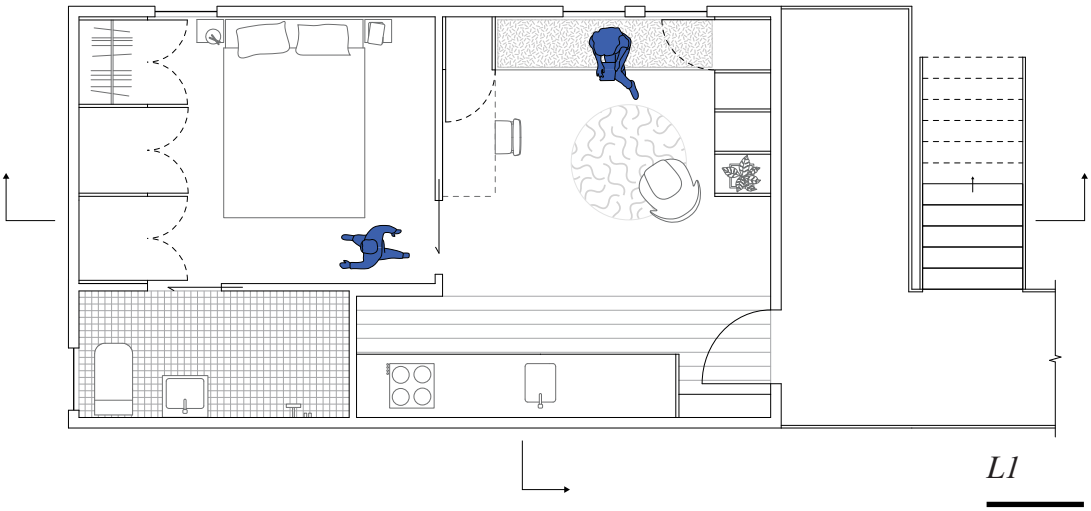

L1

27m2

——— Analysis

+ The straight-line kitchen is practical for small builds as it creates an efficient use of space, minimising potential dead space.

+ A collapsible desk provides flexibility for the living space to accommodate additional seating or guests.

+ The level floor plan is a more accessible option which could be reused in a ground floor design to accommodate a wider demographic.

+ A fold out dining table concealed in thick wall.

+ Large amounts of storage are provided by occupying wall space with shelves and cupboards, providing a minimalist effect.

+ The ground floor of the Level House holds the common dining and living space. The indoor and partially sheltered flexible outdoor spaces are 16sq m each, which can be adapted by large sliding doors. It provides large cooking facilities and seating for group activities or as a separate place of withdrawal.

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Figure 4.19. Level House floor plan at 1:50.

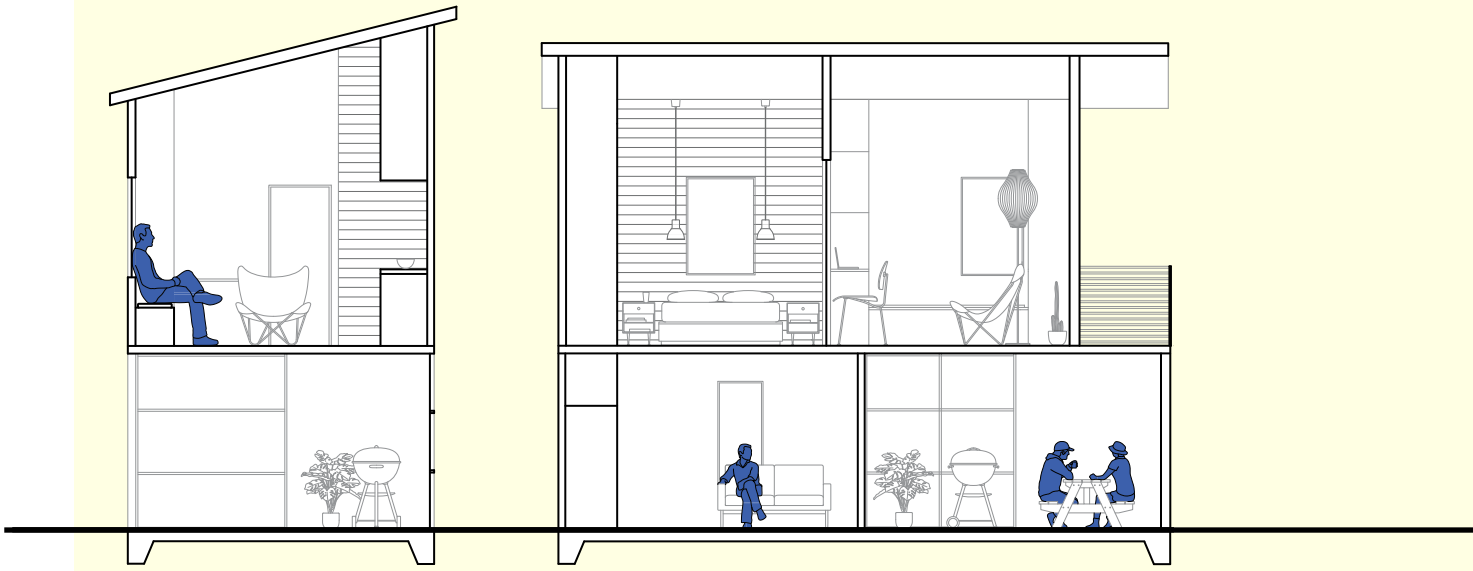

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Figure 4.20 Level House section, not to scale.


L1
G

Site Plan

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Figure 4.21. Design Phase Two site plan at 1:100.

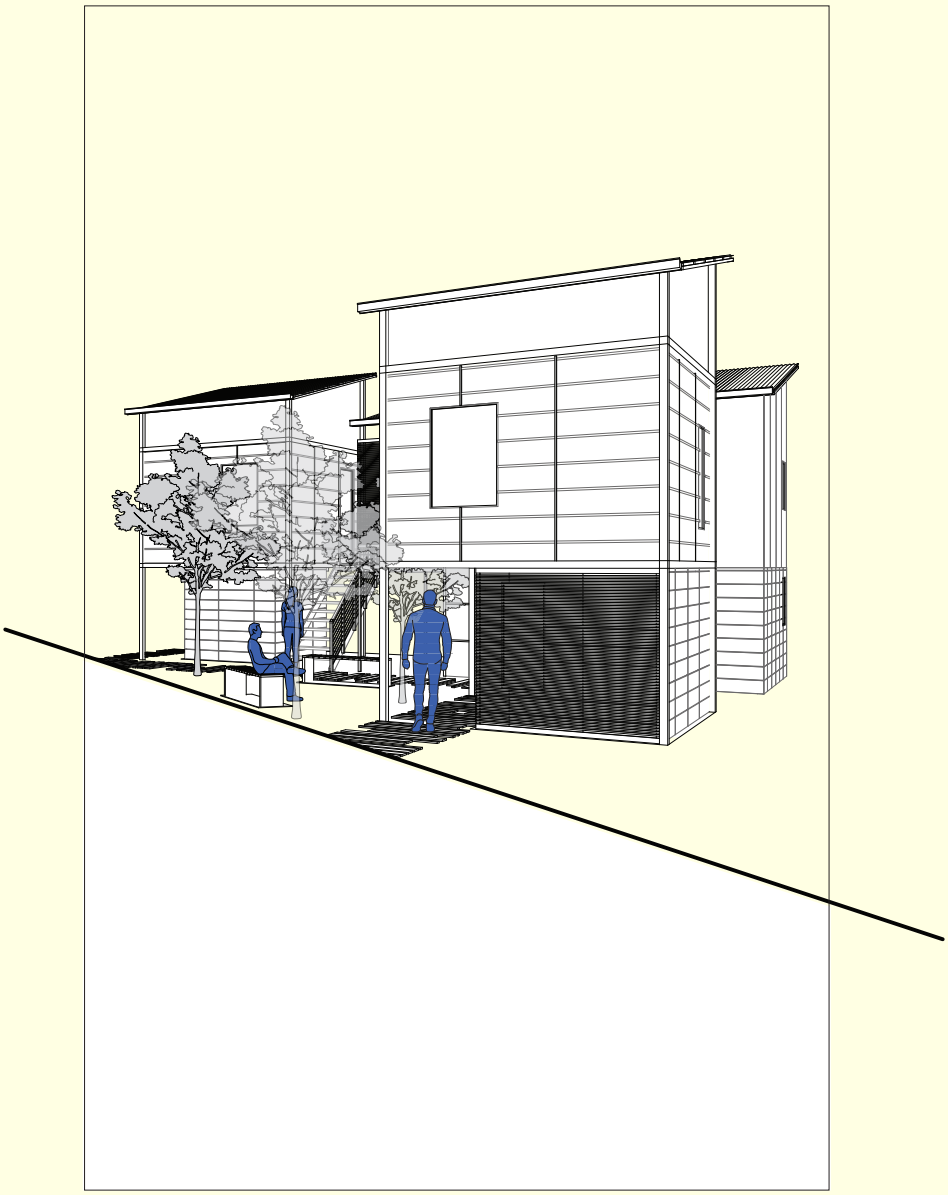

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Figure 4.22. Design Phase Two 3D.

4.6 Critical Reflection

Design Phase Two developed three new housing typologies on a compact site in central Wellington and began to consider the potential for and implications of common spaces. The designs found that by using multiple levels, each footprint could become more compact and therefore achieve a greater density onsite. The individual homes implemented findings from the mobile home precedent study, and sought to further refine the design guidelines of Design Phase One.

They key findings that emerged from the analysis of mobile home precedents were the use of dual-purpose and adaptable spaces. Dual-purpose spaces create a more affordable dwelling as they require fewer building materials and floor area, yet accommodate multiple activities within a singular space. Spatial distinctions were imposed through changes in material and level, allowing each zone to appear separate yet fluid. Great importance was placed on designing open plan spaces; each home's kitchen, dining and living were located adjacent to one another, using spatial distinctions to define each zone. Skylights and double height spaces in the Stacked House and Central House were used to achieved a greater sense of openness.

The series of shared amenities and common spaces developed within the site began to test the balance between public and private. Providing shared amenities meant that the individual residential footprints could be reduced, the shared spaces compensating for the absence of space for additional activities, such as entertaining guests and secondary living areas, which residents could use as desired. Providing sufficient outdoor green space was made a priority over expanding floor areas, as it provided a separate additional space of inhabitation, which is particularly valuable for couples with children. The site's proximity to a busy highway presented a challenge in fully resolving an indoor-outdoor connection for private dwellings, and will be addressed in more depth in the following design phase.

The site achieved a density of 120 dwellings per hectare, which is an exceptionally

high density in a New Zealand context. The next phase of design will support a significant increase in housing numbers, and as such will reduce the density achieved in this phase. The individual homes were developed to an extremely compact design, so to encourage a diverse demographic within the small home subdivision. The next design phase will generate a third series of small homes that are more accessible, and together create a small home community. The third small home design series should establish strong connections to the external environment, and include sheltered private outdoor space. It is important to include private outdoor space in large developments as it provides residents with the option of immersing themselves in social situations, or withdrawing to their own personal space. Consideration must be given to access and layout within the subdivision, as this will significantly impact its desirability. The research will investigate precedents that provide insight for designing low-rise, highly dense housing environments, such as trailer parks and campgrounds.

Chapter Five

Inhabiting the Subdivision

5.1 Featherston Site
5.2 New Zealand Campgrounds
5.3 American Trailer Parks
5.4 Outdoor Connections
5.5 The Resolved Small Home
5.6 Density
5.7 Access
5.8 Initial Siting Test
5.9 Parking
5.10 The Side Yard
5.11 Design Phase Three - Inhabiting the Subdivision
5.12 Critical Reflection

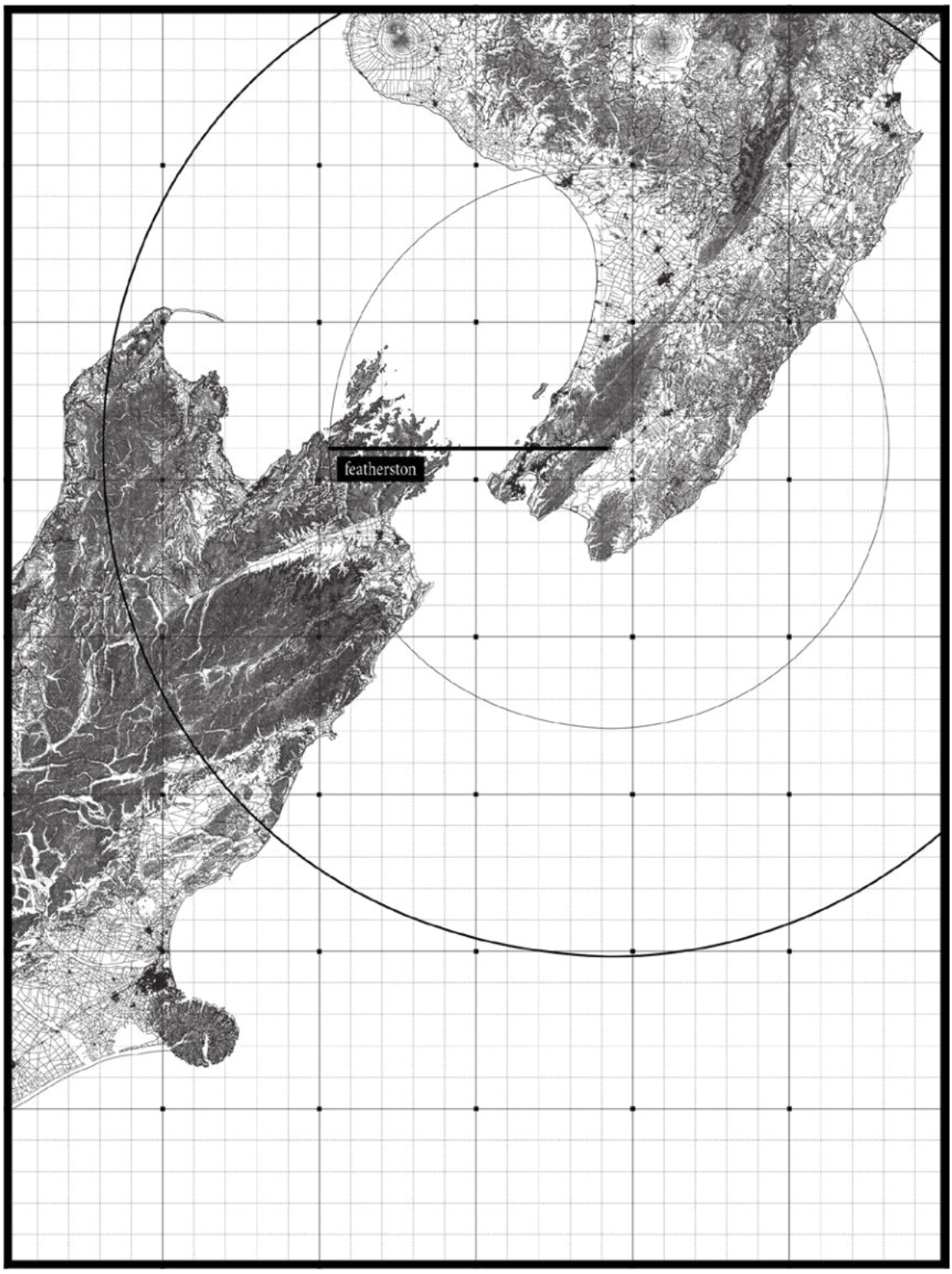

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Figure 5.01. Featherston location.

5.1 Featherston Site

Development of small home subdivisions in satellite towns such as Featherston have potential to ease pressure on the country's housing demands and urban land shortages. Affordable house prices and a close proximity to Wellington and has made Featherston an attractive choice for many who work in the Captial. At the 2006 census, 36% of employed Featherston residents worked in the Wellington metro area (Census, 2006). With a small population of almost 2,500 (Census, 2018), there is significant room for expansion through smaller homes. Implementing small homes at a larger scale introduces a new set of issues to address, as it places large numbers of residents in close proximity to one another. To maintain desirability, considerations of layout, access, parking, privacy and outdoor spaces must be investigated.

The chosen site is located to the east of the town and is within reasonable walking distance of schools, public transport services, various amenities and the town centre. It is orientated north-east and has a gentle gradient of 0.7% towards the south boundary. State Highway 2 boarders the southern end of the site and there are two industrial properties to the east, both of these however are well screened by vegetation. The site is already earmarked for a proposed small home development, which includes an array of housing options to suit different demographics and public and communal facilities. The density of the existing proposal is far less than the intended density of this research. Currently, the development looks to facilitate 30 houses per hectare, which are larger in scale and range from one to three bedrooms, placing it under a medium density category. This research aims to design a high-density development of somewhere between 60 – 75 single detached dwellings.

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Figure 5.02. Featherston site analysis.

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Figure 5.03. Proposed site.

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Figure 5.04. Proposed site.

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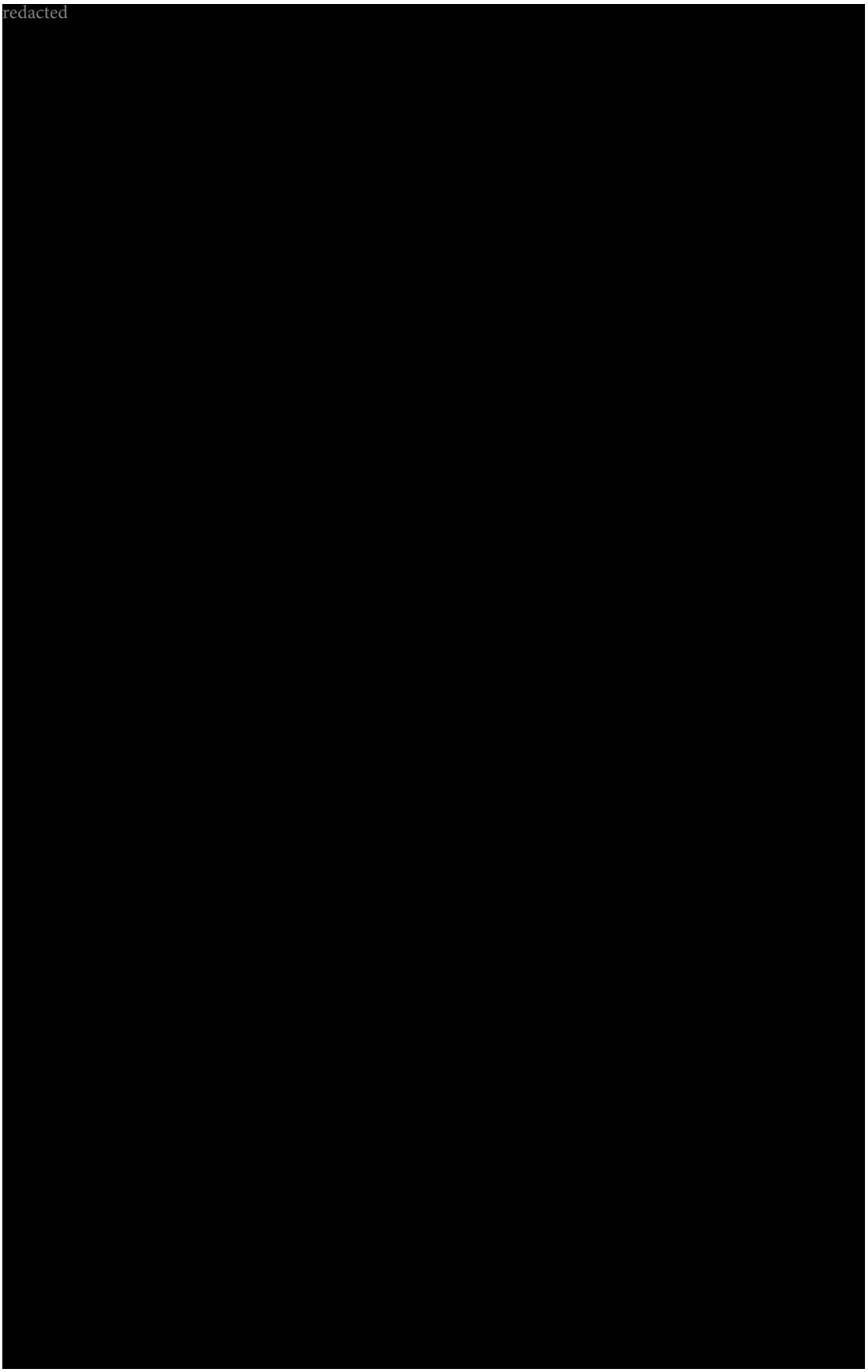
Figure 5.05. Section of proposed site to be developed.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5.2 New Zealand Campgrounds

Precedent Study Four

Campgrounds and holiday parks are modest forms of accommodation that have become a highly popular part of New Zealand's culture. Among their many enjoyable aspects is a unique sense of community and sociability that has developed as a result of their intimate nature and pedestrian orientation. In our sprawling suburbs it is not uncommon to go a week or more without seeing neighbours, with vehicular prioritised streets and vast, empty front yards that provide no opportunity for interaction, our suburbs have become lonely and isolated places.

Contrastingly, campgrounds are dense and informal spaces that provide many opportunities for social encounters. Sites are usually orthogonal pieces of land which are then divided into plots that are based around a central vehicle access way that runs through the centre of the site, while man-made paths for pedestrian access meander between individual plots. The plots are typically organised into rows or arcs which hug the boundaries of the site and form small groups of clusters, which often accommodate centralised common amenities. There is little to obstruct visibility on sites; trees and vegetation may provide some screening but fences, gates and other such barriers are generally absent.

In Collins and Kearns' article; Pulling up the Tent Pegs? The Significance and Changing Status of Coastal Campgrounds in New Zealand, they discuss the fundamental sense of community that campgrounds create. They write; "the camping experience puts tents and other types of temporary and moveable accommodation in (very) close proximity to one another, and provides a transitory sense of community" (Collins & Kearns, 2010, p. 62). These physical aspects of individual sites primarily help build relationships, but it is also a result of up to 70% of campers who prefer to return to the same campgrounds each year and renew acquaintanceships (Collins & Kearns, 2010). As residents of small home subdivisions are permanent occupants, implementing design strategies used in campgrounds- further increases the potential for establishing social connections.

In response to the closing of Hawke's Bay's Blue Bay Campground, one camper spoke of the community that is fostered through its informal co-living approach, "There's no fences, there's no hedges, no one's out mowing their little patch of lawn or whatever. You've all got to go over there [points] to go to the toilet [facilities] together and people all mix and mingle over at the cookhouse. You all just muck in together here. People from all walks of life" (Collins & Kearns, 2010 p. 67).

The pedestrian orientation and dense, intimate nature of campgrounds plays a large role in their social and communal success. The barriers that are often seen in modern suburbs which prevent social encounters are removed, allowing users to freely interact with one another in a controlled setting. Access within these campgrounds can be used to inform the layout of the subdivision and apply an appropriate hierarchy for vehicles and pedestrians, along with specific design attributes that encourage interaction and connections amongst residents such as omission of visual barriers including fences and walls.

The following figure documents an observation of many New Zealand campgrounds, analysing vehicle access routes and general patterns of site layout and individual campsite positioning.

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Figure 5.06. A classic New Zealand campground setting.

Campground Vehicle Access Comparative Study

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Figure 5.7-5.18. Analysis of vehicular access within New Zealand campgrounds.

5.3 American Trailer Parks

Precedent Study Five

Mobile homes and trailer parks are a similar style of living to campgrounds, albeit with more permanence. They are an example of seeking to balance the ability to "mind your business" with "getting to know" other residents. While mobile home parks are often associated with the words "trailer trash", many of their urban design principals are applicable in a small home subdivision.

During the 50s and 60s American trailer parks grew in popularity for their affordability and strikingly suburban qualities. Around 10% of new non-farm single-family homes were made up by trailer homes (Bair, 1961). They were designed and built as a permanent and relatively fixed form of housing, and were depicted as a smaller version of the American Dream. Many residents chose them over conventional homes as they found them efficient, economical and comfortable (Bair). They were particularly popular with retirees and young families who were buying their first home (Bair).

The parks also held a social aspect that most suburban subdivisions lacked. From their earliest days, the notion was that the trailer was going to be a forever home. Lots were slightly larger to provide more space to have a white picket fence, a garden and pets (Hix, 2017). Their arrangements of clusters, cul-de-sacs, loops, courts, and blocks provided space for neighbours and children to meet and play, and encouraged a more secure and social environment. The parks were also a sovereign entity of sorts, meaning that the residents within were automatically part of a community. Almost every park had some form of community centre where residents could hold meetings or events and have coffees and dinners together (Hix). In this respect, mobile-home living has been far more successful at community-building than life in a high-rise, where it is more common than not to know little of your neighbours.

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Figure 5.19. An American trailer park in the 1960's.

This style of living is beginning to make a comeback. In the USA there are now many upscale mobile-home communities, rebranded as 'tiny houses', which are sold as a more social, sustainable and affordable way of living. Trailer parks can solve urban sprawl and density issues without the use of high-rise living environments. As New York City Planner Nolan Gray writes, "Trailer Parks are often subject to uniquely liberal land-use regulations, with minimal setbacks, fewer parking requirements, and tiny minimum lot sizes. As a result, many trailer parks have relatively high population densities" (Gray, 2016, para. 5).

Well-designed parks give specific importance to how each unit was placed amongst others, and "having appropriate aspects of both privacy and neighbourliness" (Bair, 1961, p. 8). Lots have both private and open areas, which relate appropriately to the internal configuration of the home. Many parks arrange their blocks or clusters so that lots internally 'front' pedestrian areas, with the rear backing on to the street. This creates more desirable views and allows supervision of children from one's home. It also places car storage and roads conveniently out of the way of other functions, whereas conventional street fronting provides views of parked cars and traffic, and wastes considerable amounts of space in relatively unused front yards and paved areas for garage access. Pedestrian access is typically provided through internal networks that

run through each block instead of accompanying vehicle accessways.

Trailers are most commonly placed in rows which are either parallel to one another or diagonally in a herringbone fashion. In some cases, however, the dwellings are also offset from one another, creating a staggered effect. This provides softer semi-private thresholds which increase privacy. Certain features inherent in each individual site are controlling factors in the design and usually prevent attempts to use a 'one arrangement suits all' approach, such as topography and local zoning restrictions. As a result, many parks use various combinations in an orderly scheme. Curving the streets gently help parks to look less monotonous, with many lots becoming clustered around cul-de-sacs when it became apparent that units were no longer likely to be moved. Acoustic privacy is a common issue for trailer parks, as their close proximity and minimal screening provide no aid to subdue external or heightened internal noise.

The trailers are accessed through a side entrance, creating a softer transition between public and private environments. These entrances typically include patios, which provided an appropriate outdoor living area to supplement the limited interior space. The positioning of these patios form semi-private side yards, as they prevent residents from viewing directly into neighbouring yards, and as such, large fences for privacy are unnecessary. Well-designed parks strategically incorporated landscaping to frame areas and create privacy screens, and provide a buffer between the parks and external roads. This provides varying degrees of separation without formally segregating any regions of the parks. The use of landscaping also has a significant effect on the character and desirability of parks, as "good design for houses and lots and clusters and road patterns may produce a good subdivision, but it

Summary

The key design strategies drawn from the analysis of trailer parks will be used to influence the first design stage of the small home subdivision. They include;

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Figure 5.20. Comparison of a trailer park density to a typical suburb.

+ Narrow lots

+ Internal 'fronting'

+ Pedestrian network

+ Common areas

+ Patios and side yards

+ Semi-private entrances

+ Landscaping

+ Vegetation as privacy screens

redacted

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Figure 5.21. Bradenton, Florida, home to 1,200 mobile homes in the 1960's.

Trailer Park Layout and Access Comparative Study

A comparative study of multiple American trailer parks found that the placement of lots in relation to other lots appeared to be influenced by existing site conditions. Parallel placement allows for the highest density and is used where there are little restrictions on site such as significantly established vegetation. Parks in rural areas tended to have a less formal, random layout which followed existing site conditions, while those with parallel or diagonal placements tended to be located in urban areas.

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Figure 5.22. - 5.33 Comparative Study of layout and access within American trailer parks.

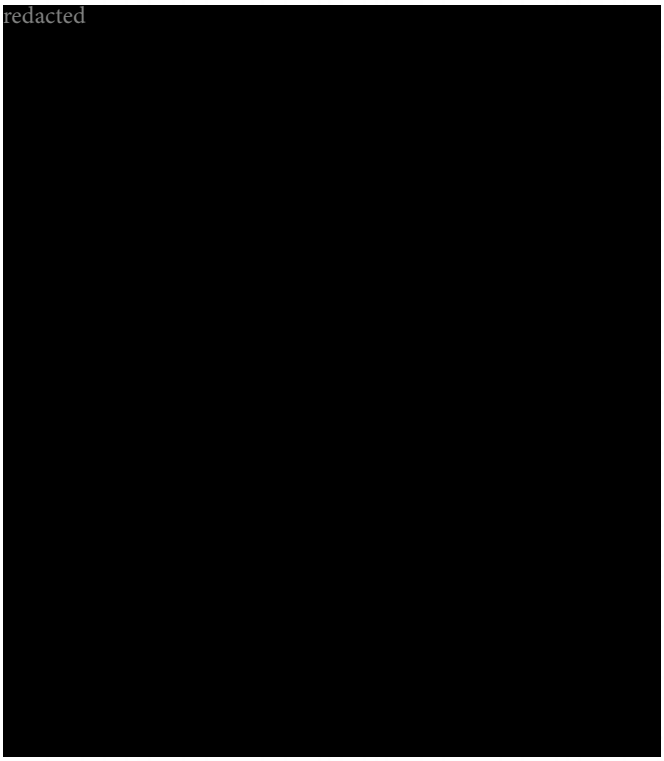

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Figure 5.34. A typical individual mobile home site layout.

5.4 Outdoor Connections

Door Study

One of the key ways an indoor-outdoor connection is established is through doors. There are multiple different types to use to achieve this. However, some are more relevant for small homes.

+ Bifold – External

Bifold doors allow for a maximum opening. To open externally they require a significant amount of space which limits the placement and amount of outdoor furniture, particularly in shallow spaces.

+ Sliding – 1 Panel; Side

Sliding doors are a more effective option for creating a corner for furniture placement. While there is increased room for usability, only one third of the wall is openable and therefore limits the connection to the outdoors.

+ Bifold – Internal

An alternative to this is to open the doors inwards. They often face into living areas where existing room for circulation is already provided. Using this circulation space allows the spaces to be used efficiently and make no compromise on outdoor usability. These maximum openings however lack occupiable corners, which are often desirable spaces for outdoor furniture.

+ Sliding – Stacked

The most effective and flexible option is a sliding stacking door. This allows the user to set the opening size without compromising any occupiable outdoor space and maintain a strong indoor-outdoor connection.

+ Sliding 1 Panel; Central

A central panel increases usability again by forming two corner zones. Like the side panel however, only a single pane can be opened resulting in a weaker connection with the outdoors.

^

Figure 5.35. Door study - plan.

5.5 The Resolved Small Home

Small Home Third Design Series

Design Phase Three begins with a third generation of small homes which seek to establish a fluid connection to a private outdoor area. New Zealanders have a long-felt relationship with the outdoors and cherish quality outdoor spaces that are connected to their homes. The previous design phase used a compact urban infill site that made indoor-outdoor connections impractical. A larger area such as the selected subdivision site provides a greater opportunity to develop indoor outdoor spaces without restrictions.

0 0 1

Private Double

38m2

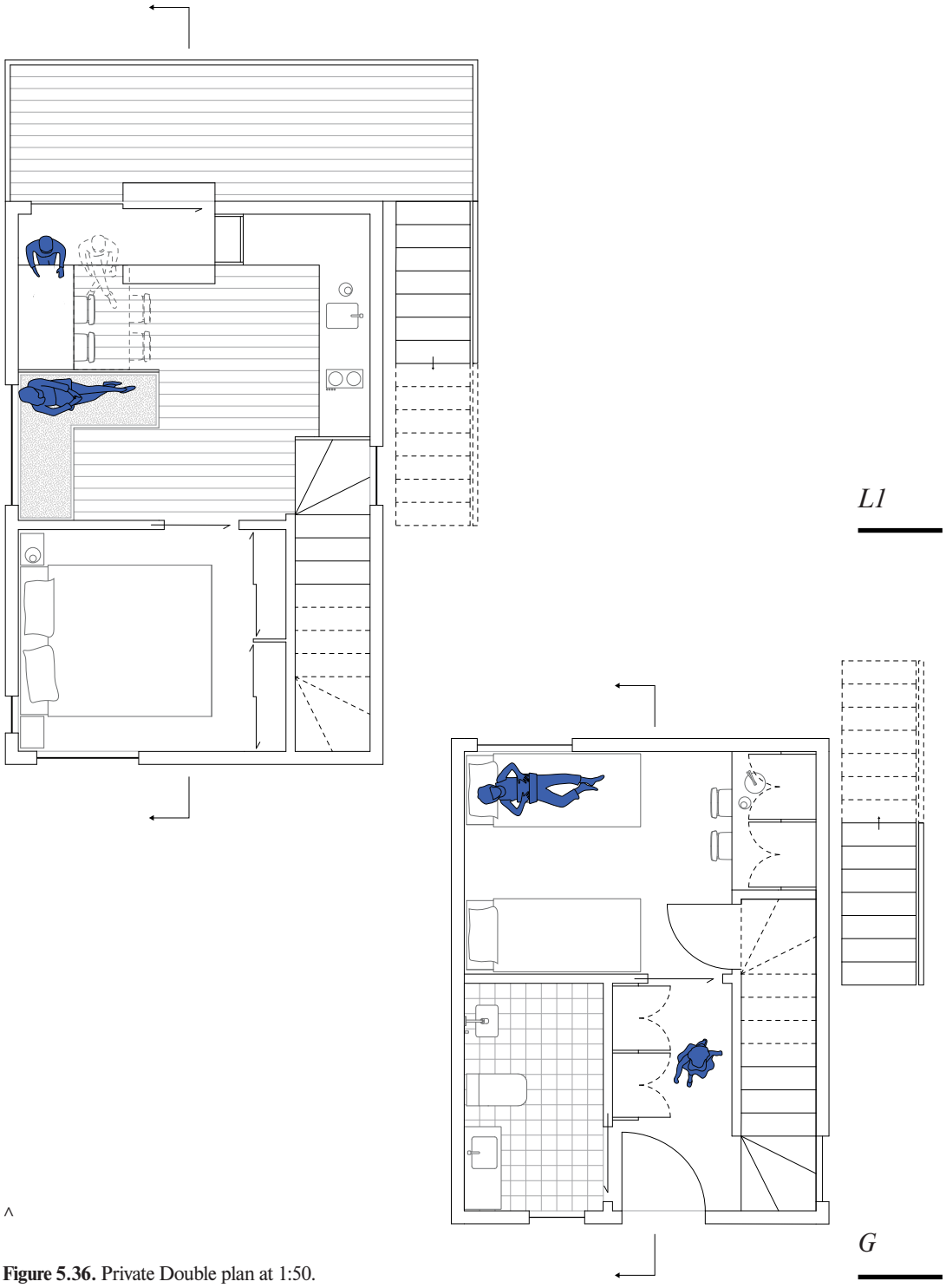

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Figure 5.36. Private Double plan at 1:50.

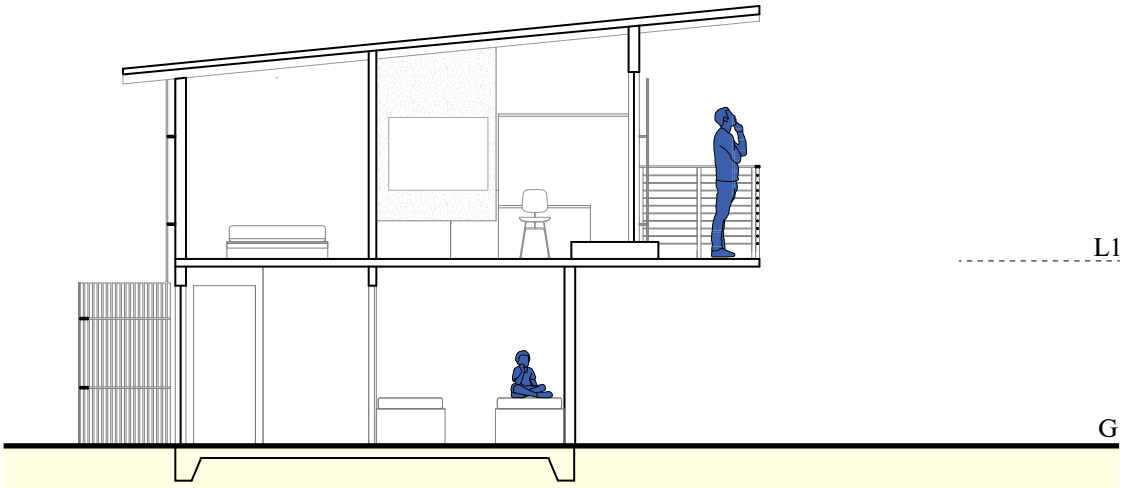

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Figure 5.37. Private Double section 1:100.

0 0 2

Verndah Single

34m2

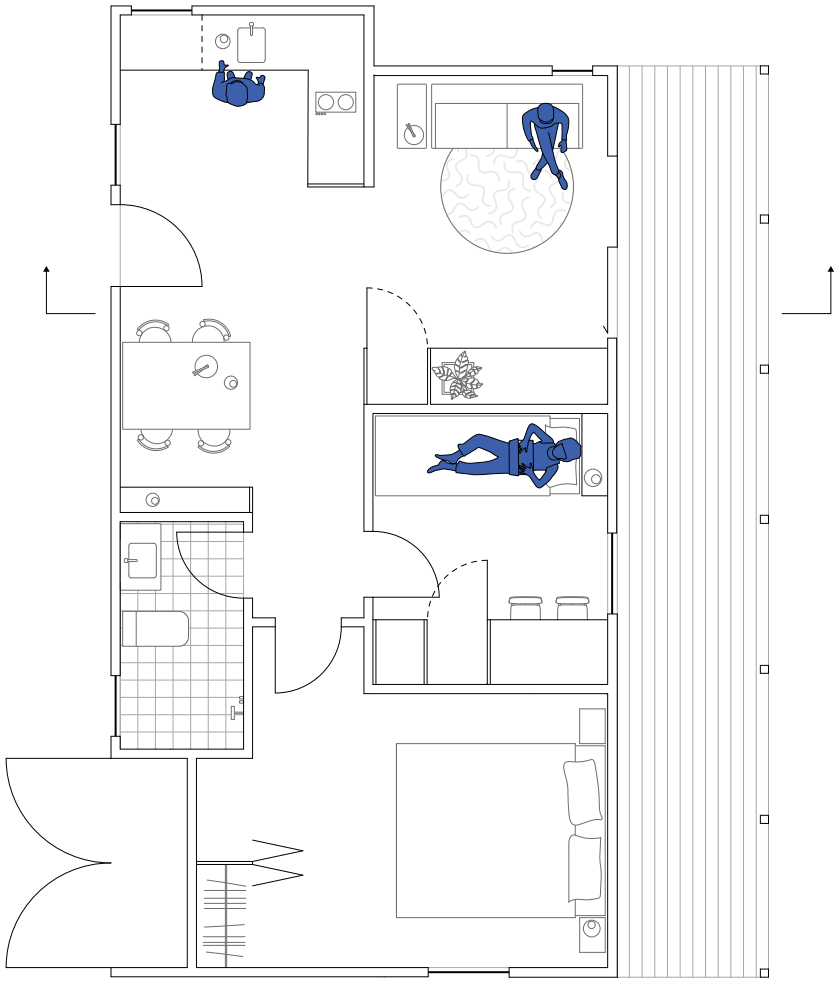

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Figure 5.38. Verandah Single plan at 1:50.

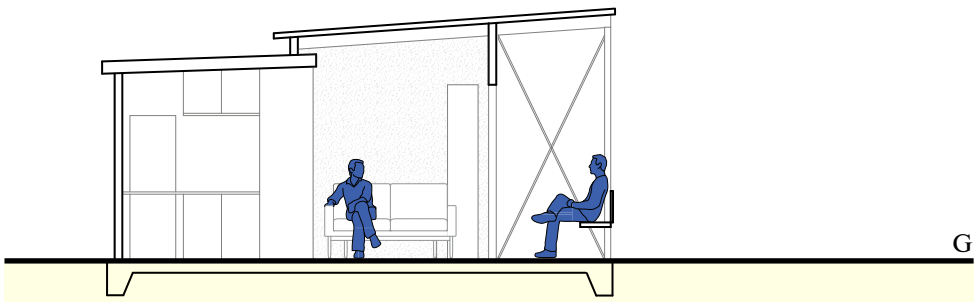

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Figure 5.39. Verandah Single section 1:100.

0 0 3

Connected Single

34m2

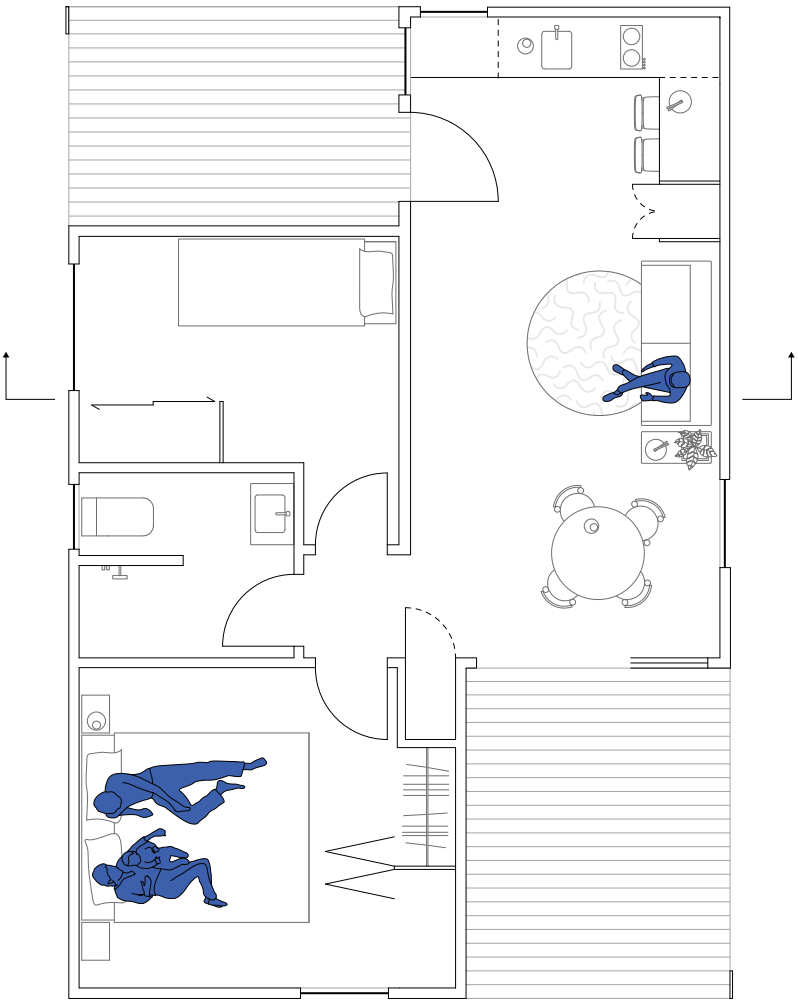

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Figure 5.40. Connected Single plan at 1:50.

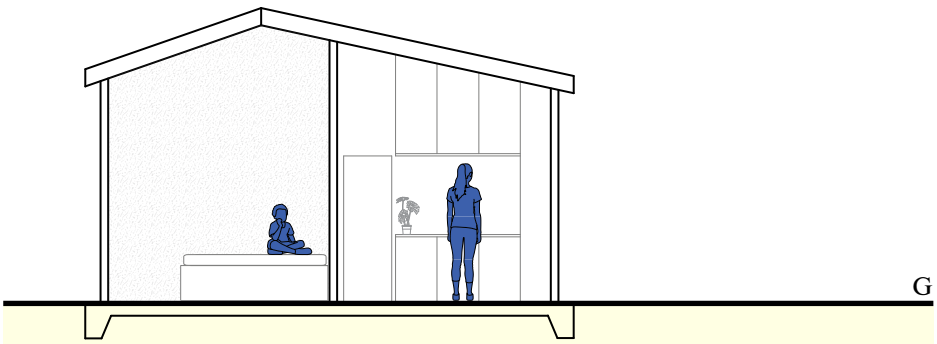

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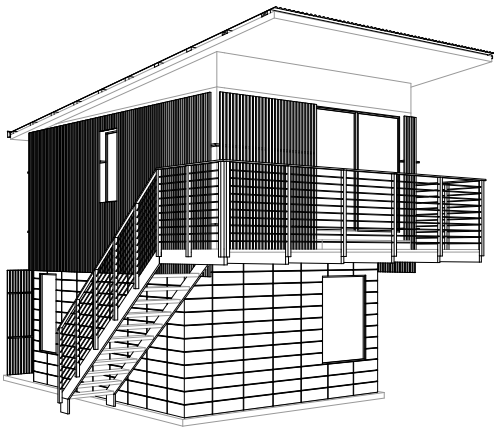
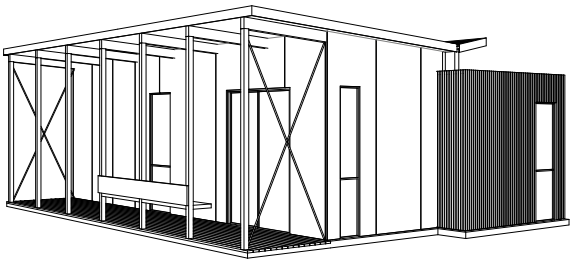
Figure 5.41. Connected Single section 1:100.

0 0 1



0 0 2



0 0 3

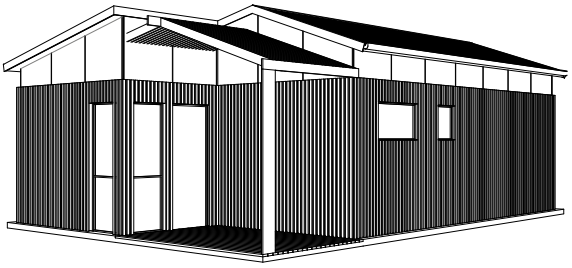


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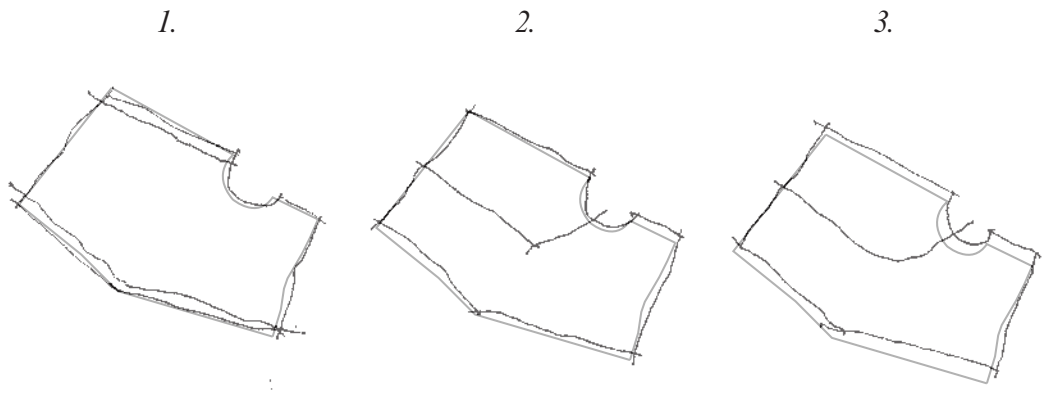
Figure 5.42. The Resolved Home 3D's.

5.6 Density

Small homes are in part a response to density issues in urban environments. Urban sprawl has become a major issue within New Zealand's cities and smaller homes are one option to remedy this. The subdivision aims to accommodate enough dwellings to achieve a medium-high density. Density is measured in multiple ways. However, for city calculations, persons per hectare is most accurate. At present, Featherston has a density of 7 persons per hectare (South Wairarapa District Council, 2018), while inner city suburbs of Wellington range from 27.09 in Thorndon, to 53.4 in the CBD (Wellington City Council, 2018). Although this is a significant increase, it pales in comparison to the density of international cities such as New York, which has a density upwards of 104 persons per hectare (City of New York, 2020). Increasing density in small developing towns such as Featherston is critical, as while most cities are left with only a few infill sites to realise this alternative, small towns have an opportunity to avoid repeating these mistakes.

5.7 Access

The design of the subdivision began by testing the options for vehicle access, as this would help inform dwelling placement. Having established that a single vehicle access route was most desirable, a centrally placed one-way lane was deemed to be the most efficient and convenient, as it would provide equal access to the site. The lane was required to connect to the roundabout proposed by the Brookside Village development, which had divided the site into four adjoining sections. To run through the site's centre and meet the proposed roundabout, the lane would need to encounter a 90-degree angle. The safest way to achieve this was to introduce a slow bend that would allow traffic a visual connection beyond the corner, yet be sharp enough to encourage a slower speed. An additional smaller lane was later added to access a parking bay. Once this access had been determined, initial dwelling placement could begin.



1. Perimeter Access
2. Central Access - Sharp bend
3. Central Access - Slow bend

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Figure 5.43. Vehicle access iterations.

5.8 Initial Siting Test

Using several design strategies drawn from the campground and trailer park analysis, an initial siting test was carried out to establish a preliminary layout and gentle maximum density. This allowed for private dwellings, common green space along pedestrian access routes, and a 3.5 metre distance between each dwelling to be used as a semi private side yard. It used a parallel placement to achieve an efficient density. Using these parameters, 68 dwellings were placed on the site. The site is 1 hectare, meaning that the current density is 68 dwellings per hectare. It is expected that the addition of communal facilities and parking will have an impact on this number. The arrangement of dwellings in the fourth design phase will also test alternative placements which will impact the current density.

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Figure 5.44. Initial siting test.

5.9 Parking

The Wairarapa Combined District Plan onsite parking requirements are a minimum of 1 space per household (Masterton District Council, 2011). Within a development of this size, complying with these requirements would result in a substantial amount of site area being lost to vehicular access and parking.

Due to the site's central location, the town centre and public amenities are all within short walking distances, while the train station which runs frequent services to Wellington is also located nearby. With this in mind, it is assumed that for many residents, daily use of a car may not be necessary. Coupled with an anticipated drop in vehicular ownership due to rising fuel prices and more sustainable transport options being encouraged, it was decided that space for one park for every two dwellings would be provided. This will provide more room for quality outdoor space, which is critical for conceiving desirable medium-high density developments, and encourage carshare amongst residents. If it is found over time that this ratio creates a surplus number of parks, then existing parks can be adapted for other uses.

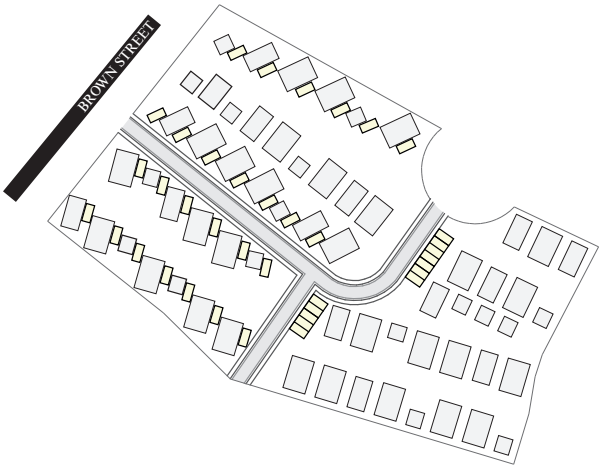
The following set of iterations explore different parking options which seek to minimise space reserved for this sole purpose, to maximise the number of dwellings and available outdoor space. 35 parks were allocated per design.

>

Figure 5.45. Parking tests.

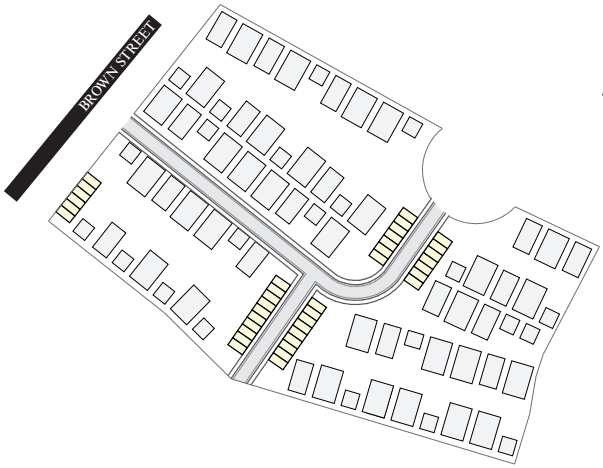
Onsite

Providing a car park adjacent to the dwelling is the most convenient option for individual users. However, this takes up over half the space allocated for the side yard for each household and requires a drivable lane between the rows which would otherwise be used as common green space. It also visually impairs the site as paved roads and parked cars become a focal feature, and increases privatisation as residents are not required to enter a public domain.



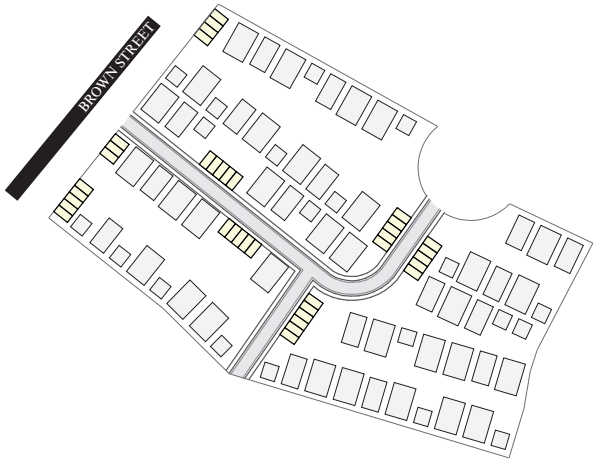
Central

A central car park reduces traffic hazards as cars are reversing and exiting from a central point. However, this requires some residents to walk much further to their vehicles than others. It also impairs visual desirability by creating a large paved area, which is difficult to adapt for future uses.



Dispersed

Placing multiple small groups of lots throughout the site ensures that residents have equally convenient access to their vehicles. Unlike the central car park, smaller lots are more visually appealing as they require a smaller paved area and can be partially screened by vegetation. The shallow depth of these lots allows the space behind them to be developed for communal facilities such as vegetable gardens and outdoor seating, creating a central hub of sorts. By using permeable ground surface treatments, their small scale allows them to be easily repurposed. The dispersed parking layout was the selected option for the subdivision design.



5.10 The Side Yard

Trailer park research found that individual outdoor space was provided in the form of semi-private patios, that were fixed to the entrance side of the trailer. These patios allowed residents to have both privacy and observation of their surroundings, and could be screened with planting if further privacy was preferred. From this, the concept of the side yard was developed. An extension of trailer patios, the intent of the side yard is to replace vast front and back yards, instead concentrating all activities into one highly functional compact space. It is necessary to provide quality outdoor space in small homes as it mitigates the effects of living in small spaces and improves the overall desirability of a home by providing a separate, secondary place to withdraw to. In conventional homes, side yards are typically dead space that are purely used for pedestrian and sunlight access. Though backyards are well-used spaces, their enclosed, private nature prohibits residents from developing connections with the surrounding environment.

Consideration of dwelling placement found that by positioning them to the side of the plot boundary, outdoor space could be maximised on the opposing side, by combing both areas which are typically too narrow to have a purposeful function. Extending the width of the side yards also allows windows that run along the length of the dwelling to have greater access to natural light and ventilation than they typically would.

To maintain density and encourage the use of common green areas, side yards are either 2.5m or 3.5m wide. Each is designed to accommodate activities that allow residents to spend prolonged periods of time outdoors, and as such increase potential for passive interaction. Permeable surfaces have been used so that the space can be altered over time if necessary. For convenience, pavers have been provided for access to all amenities.

The side yards are individually designed to act as an extension of sheltered outdoor space for the two single level dwellings. The side yards of the single level dwellings provide a green strip, a valuable tool if children live within the home as it provides a space for them to play and exercise. The elevated outdoor living area of the double level dwelling is visually disconnected from the side yard, and thus has been designed as a functional area, as opposed to an extension of the outdoor living space. The secondary bedroom

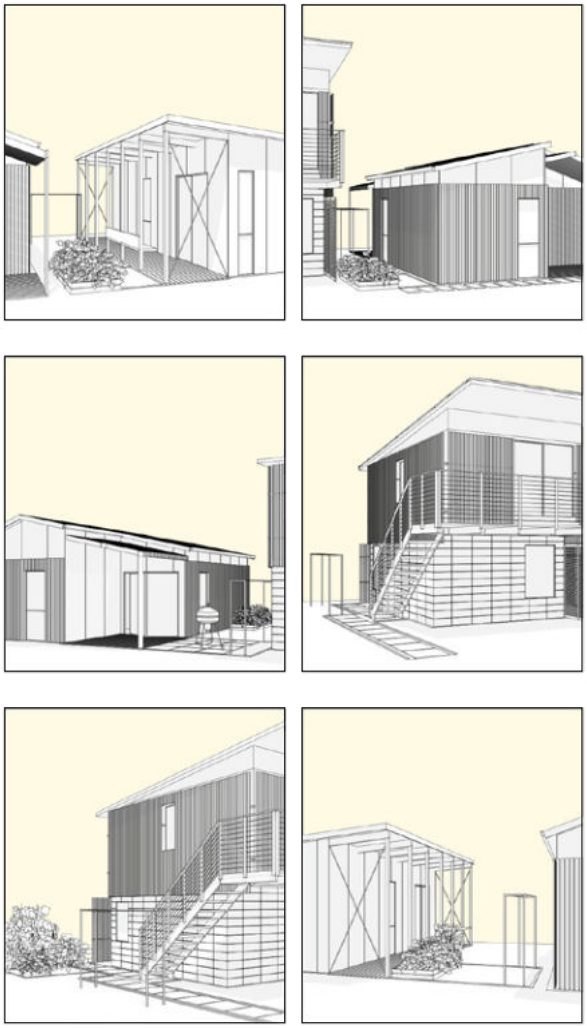


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Figure 5.46. Side Yard 3D's.

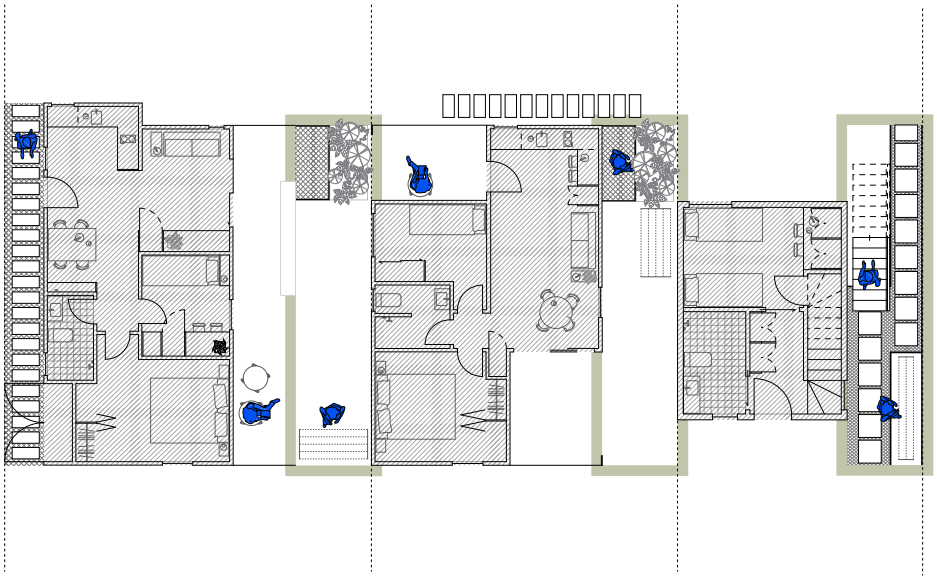

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Figure 5.47. Side Yard 2.5m plans.

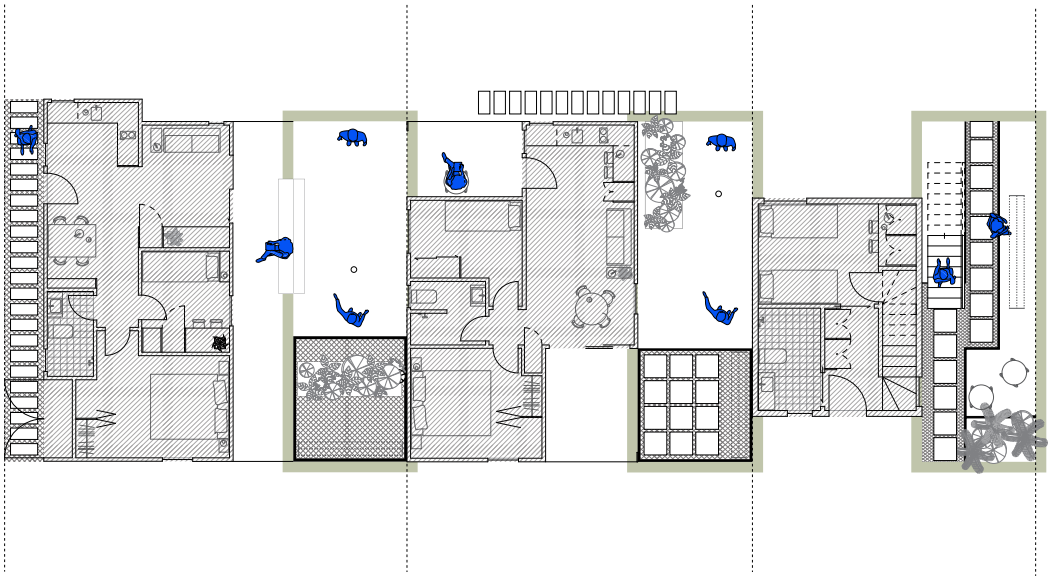

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Figure 5.48. Side Yard 3.5m plans.

5.11 Inhabiting the Subdivision

Design Phase Three

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Figure 5.49. 3D of the vehicle access route and housing.

Figure 5.50. Design Phase Three masterplan at 1:200.

Figure 5.50. 3D of vehicle access route and pedestrian pathway.

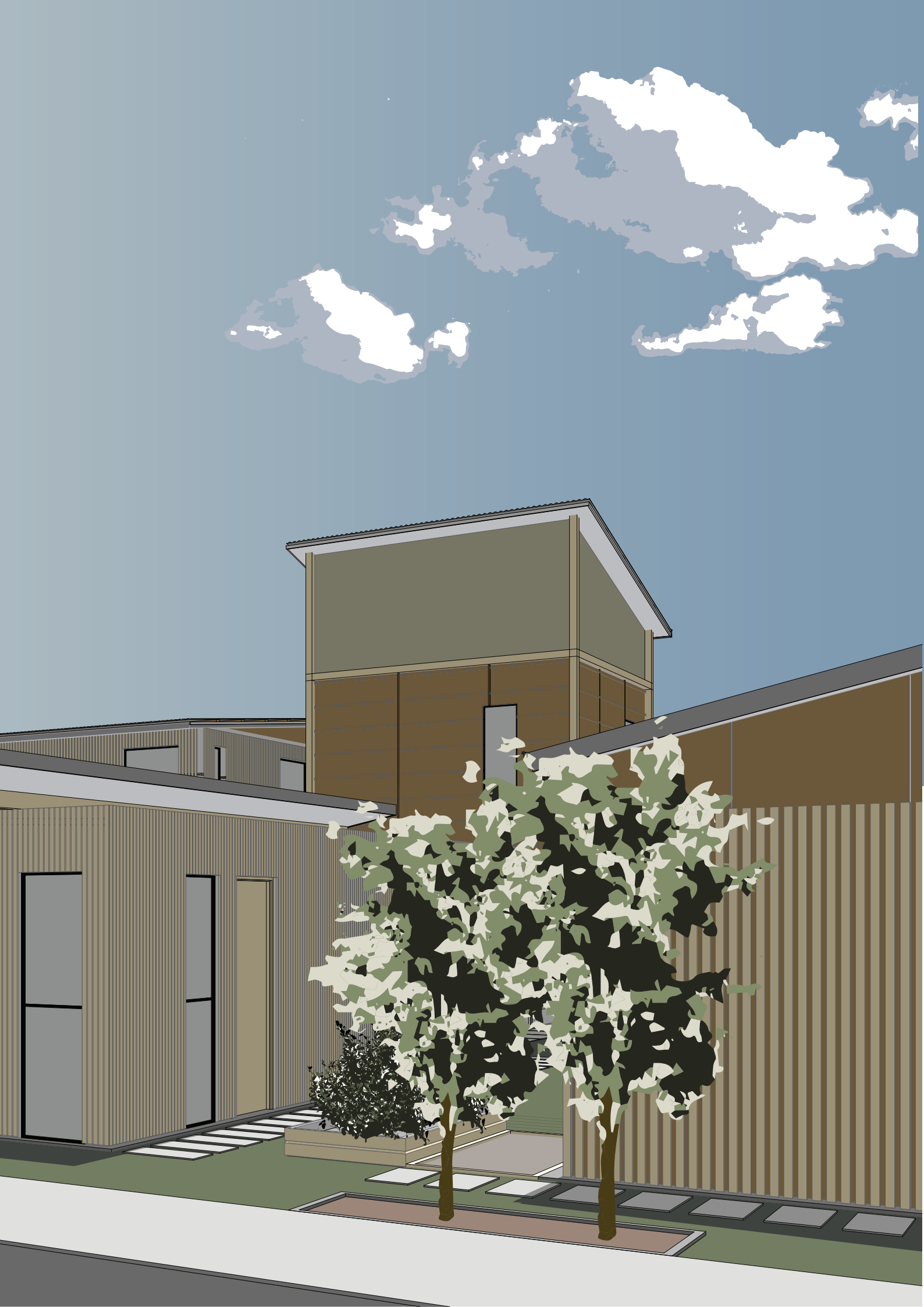

Figure 5.51. 3D of common outdoor space

5.12 Critical Reflection

Project three was the first of a two-stage design process for the small home subdivision. It explored a third series of small homes which sought to establish a strong indoor-outdoor connection, which was furthered by the design of side yards. The sheltered outdoor space supplements the limited internal space, acting as an extension of the living area. By placing these outdoor areas adjacent to living areas and utilising glazed sliding or bi-folding doors, a fluid connection was achieved. The outdoor space were positions to create semi-private regions, which could be further enclosed by vegetation screening if desired. As two of the three designs were designed to a singular level, window size and placement were specific to ensure that passing residents did not invade the occupant's privacy. Long and narrow panes were primarily used to allow natural light to reach deeper into the home but limit viewing opportunities of those walking past. Entranceways faced a similar issue, and were placed on either side walls, back walls, or elevated, so that other residents were unable to look directly into an occupant's home. This allowed each home to be private internally, and semi-private externally, while green space in front of each home would be public common space. Each new design included a secondary bedroom, which could be used for alternative purposes.

A first stage masterplan was developed which addressed density, parking and layout concerns. The masterplan was largely influenced by the research findings of Campgrounds and American Trailer Parks. It found that a primary vehicle access way through the sites centre best provided convenient and equal access for each section and required the least amount of paved area. Small groups of parking lots were distributed along this access way which allowed the remainder of the site to be used for pedestrian activity. As the site was relatively bare and no existing parameters to influence dwelling placement, homes were placed in rows or arcs parallel to one another which allowed for the most compact density. Lining the site and vehicle access way boundaries and working inwards, homes were positioned to 'front' common green strips, providing each home with an external outlook of vegetation and neighbouring homes as opposed to traditional outlook which commonly feature paved roads and parked cars. This helps to form an open, peaceful and easy-going environment, a desirable and often forgone trait of high-density areas. Side yards provided for each of the third design series formed private to semi-private outdoor space for individual dwellings, while larger green spaces were provided in common areas. Structured outdoor spaces with pooled minor amenities to accommodate larger gatherings were provided at double the ratio specified in The Monash University Report, which provided collective benefits for residents by supplementing the amenities not provided in individual homes. As identified in the report, permeable ground surface treatments were used, allowing the structured outdoor space and parking lots to be flexible for future needs.

In total 65 homes were placed on the site, creating a density of 65 homes per hectare.

Several questions arose from stage one which were used to frame stage two's development. Firstly, how can architecture and urban planning be used to encourage sociability amongst residents, and what is the significance of privacy gradients. To what extent will common spaces be provided, what amenities are most essential to include and what benefits will they have for residents will also be considered. Common outdoor space currently provided is relatively unstructured, and from a density perspective, could be better utilised. Alternative clustered building arrangements will be explored to use space more efficiently.

Chapter Six

The Desirable Subdivision

6.1 Tiny Home Villages
6.2 Social Spaces Research - Life Between Buildings
6.3 Co-Housing
6.4 Common Facility Design
6.5 Infill Opportunities Report
6.6 Design Phase Four - The Desirable Subdivision
6.7 Critical Reflection

6.1a Tiny Home Villages - Muriwai, New Zealand

Precedent Study Six

In the pursuit of evidence that small scale residential co-housing is a desirable and viable option for the New Zealand housing market, a first of its kind tiny house development is scheduled to open in Muriwai in spring of 2020. Situated on the site of Muriwai Campgrounds and Lodge, it uses a model that developer Kyron Gosse calls Freedom Village, in which the development will be collectively owned by its residents (Smith). “It is structured so that each of them buys into the actual holding company, with a license to occupy,” he says. “Each [house owner] owns a share of the land, and will also earn a percentage of the profits of the café to meet their expenses” (Smith, 2020, para. 4).

The model will act as a form of tiny co-housing, the distinction being that each owner will build their house around supplied infrastructure. All houses will be individual designs but will integrate well with the style of Muriwai’s community. The 8477sq m site will hold 18 tiny houses along with a co-working space and whole food plant-based café, which will be adapted from the Muriwai Lodge Store. The vision is to create a community that collaborates and makes use of shared social spaces. Gosse says “This is a place for visitors to Muriwai as well as tiny house owners, a place to meet and socialise, to collaborate and grow” (Smith, 2020, para. 8).

Responding to global trends of housing affordability issues, lots are expected to sell for around $200,000 (Smith). The village also demonstrates the growing demand for connected communities, whose residents are willing to sacrifice excess space for a higher quality of living.

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Figure 6.01. - 6.02. Muriwai Tiny House Village proposal.

6.1b Tiny Home Villages - Constellation, Austin, USA

Precedent Study Six

Constellation ATX is a similar proposal for a tiny home development in Austin, USA. Its primary concept is community integration. As developer James Stinson commented, “people are moving to Austin from all over the world. A lot of them don’t know people. This is a housing development that is focused around that socialisation aspect as well as the small house aspect” (Kimble, 2020, para. 7). The design is comparable to a modernised trailer park, with an emphasis on communal amenities. The tiny, semi-permanent homes are lain parallel to one another and accessed through side patios, which are collectively linked by pedestrian networks that access common facilities.

Residents of tiny homes are more likely to make use of communal facilities, as they often supplement the lack of space for additional activities. Through this, residents become familiar with one another and begin to establish connections. The similarity of proposed common facilities within these case studies suggests the importance of the inclusion of several key amenities, these being; communal kitchens, storage, work spaces and designated outdoor areas. Other noteworthy amenities provided are; on-site car sharing services; communal laundries; and additional on-site tiny homes available for overnight guest rentals.

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Figure 6.03. - 6.04. Constellation ATX proposal.

6.2 Social Spaces Research - Life Between Buildings

Background Research Five

> *"Life between buildings offers an opportunity to be with others in a relaxed and undemanding way. One can take occasional walks, perhaps make a detour along a main street on the way home or pause at an inviting bench near a front door to be among people for a short while. Even looking out of a window every now and then, if one is fortunate enough to have something to look at, can be rewarding. Being among others, seeing and hearing others, and receiving impulses from others, imply positive experiences, alternatives to being alone. One is not necessarily with a specific person, but one is, nevertheless, with others." -*
>
> ——— Jan Gehl

The pivotal argument made by Jan Gehl in his book Life Between Buildings is the significance of our need for contact. As much of our social interaction now takes place behind screens, active presence, participation, and experiences are often replaced with virtual substitutes, constituting a 'connected' modern society that is more isolated than ever. Physical environments in 'modernised' cities also have a tendency to isolate people. Low density suburbs with wide residential streets, extensive lawns and front yards with no space for pottering or sitting have turned neighbourhoods into social deserts, discouraging residents from pursuing activities in a public environment. However, if public spaces are sympathetic to human scale and scope of senses, the quality of the outdoor space becomes significantly more inviting, encouraging people to shift activities that once occurred from the privacy of their homes into the public realm, allowing residents an opportunity to interact with one another in an undemanding way (Gehl, 2011).

One might assume that satisfying this need for contact would be achieved through lengthy interactions and physical touch. However, much essential contact is satisfied through low intensity, passive contact, which occurs through visual and audible observations of others from a distance, or fleeting interactions than can occur when coming into contact with others in public places, or a short exchange of words. The built environment plays a major role facilitating this. If there is opportunity for one to engage in activities that allow them to linger in the public realm, the potential for passive contact and interactions increases (Gehl). Gehl identifies these mild forms of contact as a prerequisite from which other forms of more complex contact can stem. This research investigates achieving desirability within small home subdivisions, in which facilitated and controlled social interaction plays a key role.

Gehl's book entails hundreds of black and white images accompanied by texts which illustrate how men, women and children actively use public space in a pedestrian environment. The book makes three propositions in regards to the different forms of outdoor activities. First, many activities beyond the home and workplace are "more or less compulsory", such as "going to school or to work, or shopping and running

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Figure 6.05. An anti-pedestrian suburb.

errands", these activities are independent of the surrounding environment and will take place regardless of its quality (Gehl, 2011, p. 9). However, the speed in which people carry out these activities may be influenced by the built environment; if the surroundings are enjoyable then people may linger and allow more time for various tasks. Secondly, "optional activities", which unlike necessary activities, are entirely dependent on the quality of the environment, may include "taking a walk", "standing around enjoying life" or "sitting and sunbathing" (Gehl, 2011, p. 11). However, if the conditions are not favourable, these activities are unlikely to take place. Lastly, and possibly the most compelling, are social activities. Sitting and observing from places of comfort such as a park bench or café are widely attractive activities for human beings. Our inquisitive nature means that people working, playing and chatting are attractions of interest and can encourage interaction amongst even strangers. Therefore, physical environments that are designed to encourage "optional activities" will attract people, encourage sociability, and provide increased enjoyment (Gehl, 2011, p. 117).

Through his observational studies, Gehl found that successful public spaces had favourable conditions for facilitating social interaction, accommodating many stationary and pedestrian activities. Amongst the conclusions he drew from the studies were a series of recommended physical design strategies to help simulate these conditions. They were;

1. Semi-private front yards:

As an alternative to expansive front lawns that hold little interest, introducing soft edges in front or side yards develops a comfortable transitional zone between the dwelling and the street (Gehl). Semi-private transitions encourage residents to occupy these intimate spaces and they feel less exposed, allowing social interaction to occur on their own terms. Gehl used an example of traditional Australian housing forms which incorporated a backyard, small front yard and porch. This provided a valuable freedom of choice for residents to switch between private and semi-private and created an opportunity for them to linger outdoors in a semi-private fashion. "Front yards with a resting space and a small garden also have another important quality, in that there are always a number of meaningful chores to do if one wishes to stay for a while. For example, watering flowers, sweeping the porch or cutting the grass, are excuses for being outdoors for an extended period of time" (Gehl, 2011, p. 188). These semi-private zones developed "an unusually vivid and multi-faceted street life" (Gehl, 2011, p. 188), by allowing interactions between residents and passers-by, or conversations between neighbours. Gehl observed that for these spaces to be successful, houses should be placed far enough back to ascertain a certain amount of privacy, whilst being near enough to the street to allow contact with events occurring within it (Gehl).

2. Aesthetic Quality:

"The experiencing of attractions in a given space is also a question of the design of the space, of the quality of the experiences offered by the physical environment – whether or not it is a beautiful place" (Gehl, 2011, p. 181). Significant consideration should be given to the materiality of the built environment when planned at a large scale. Artificial materials such as concrete can be uninviting for pedestrians when used in large quantities in residential areas, while the inclusion of natural materials such as timber and well-designed landscaping create a softer and favourable environment for the pedestrian experience (Gehl).

3. Smooth Public and Private Transitions:

The layout of private dwellings should be arranged to construct seamless transitions between areas of similar privacy gradients. This means a strong connection between indoor and outdoor spaces should be established, so that activities can flow freely, which may be achieved through doors that connect the kitchen, dining and living areas to the outdoors on the public side of the house (Gehl). Level changes, additional doors and walls should be avoided (Gehl).

4. Pedestrian streets:

Many cities discourage pedestrian activity by prioritising vehicles and making little use of pedestrian streets, which are known to increase the liveliness and sociability of urban areas. Evidence of this can be seen in cities such as Copenhagen where pedestrian streets have been used since the early 60's, which resulted in a quadrupling of social and recreational activities in downtown areas between 1975 and 1995 (Gehl). Where it is necessary to provide vehicle access, one-way streets can make for a friendlier pedestrian environment. Short walks to parking areas also help create interest and street life, as opposed to providing car parks directly outside residences which leads to privatised neighbourhoods.

5. Fluid Privacy Gradients:

Modern households often have sharp and exposing public/private thresholds. Residents typically exit from a place of complete privacy into a highly exposed, expansive public realm of driveways and bare lawns, creating an experience that is both physically and psychologically difficult (Gehl). "Whether the public environment invites or repels is, among other things, a question of how the public environment is placed in relation to the private, and how the border zone between the two areas is designed" (Gehl, 2011, p. 113). "Flexible boundaries" can be used to form an inviting public environment. These are transitional zones that use semi-public and semi-private areas that help ease the user from the private to public realm (Gehl). Residential areas which have been designed with outdoor spaces that use a gradient of semipublic and intimate areas allow occupants to get to know people in the area better, resulting "in a greater degree of surveillance and collective responsibility for this public space and its residences" (Gehl, p. 59). Diagram p. 59. public space and its residences" (Gehl, p. 59).

Territorality Thresholds

Within his book Life Between Buildings, Gehl defined several territorial thresholds which can be used to either help facilitate or limit interaction (Gehl, 2011). The following diagram indicates distances for three territorial thresholds in order of; the social sense of hearing, the social field of vision, intensity of social contact. These distances can be implemented within the subdivision design to encourage social connections in desired areas.

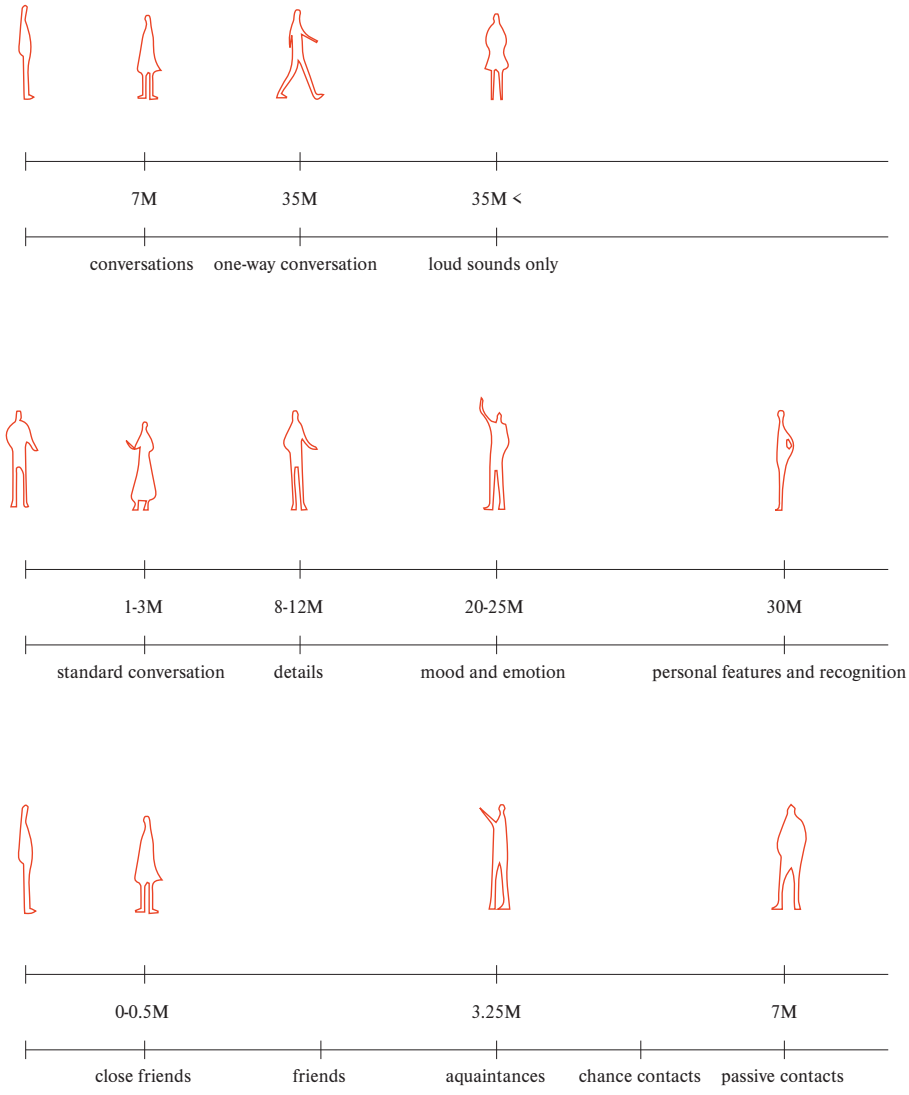

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Figure 6.06. Territorality thresholds.

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Figure 6.07. 3D of common outdoor space.

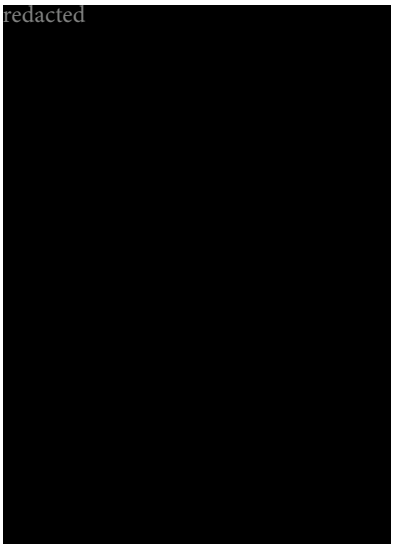
6.3 Co-Housing

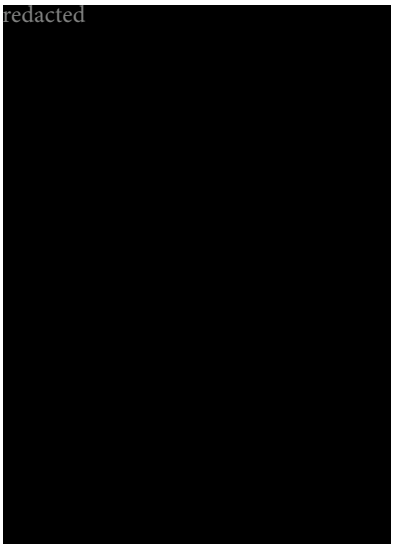
Precedent Study Seven

Far from a new phenomenon, communal living has long been a part of human history. Prior to individual home and land ownership, civilisations lived together in settlements not dissimilar to co-housing. The origins of our social structures are reflected in co-housing, where multiple families lived together and different generations were well involved with one another, fostering rich, intergenerational communities. Examples of co-housing range broadly, from urban apartments to low-rise suburban and rural developments. However, it is typically identified by a participatory design process, extensive common facilities, separate income sources and a non-hierarchical resident management structure (McCamant, Durret, 1994). Co-housing provides a modern housing typology that offers a more social, economic and practical lifestyle. It is not for the exclusion of external environments, but rather of a group of people collectively living together for a higher quality of life. Co-housing reflects the changing needs of society and the way we are willing to live.

Residents typically have their own private home but share amenities such as larger kitchens, laundries, storage and outdoor living spaces. Co-housing will be introduced within the subdivision in the form of a common house, amenities and green spaces. With such a high number of dwellings and potential occupants, multiple, small scale shared facilities will be implemented across the site. It was believed that providing a main facility for all had the potential to become unmanageable and could discourage some residents from utilising the space due to do its expectedly high activity. The scope of this research primarily explores the implementation of common facilities, however future research would consider additional aspects to co-housing in more depth, such as management and participatory processes.

Saettedammen





Saettedammen is recognised as one of the world's first co-housing developments. Situated in Denmark, it features 28 homes clustered around a common recreational outdoor space with shared walkways, parking, gardens and a common house. Saettedammen's prominence is in its social structure and management. It has a well-established support network for its residents of all ages. The intergenerational nature creates a solution for social isolation issues; it provides greatly needed connections to the younger generation for the elderly, and childcare solutions for working parents. Families also have the option of joining communal dinners multiple times a week that are prepared by residents. The private dwellings are individual property, however the common spaces and buildings are owned and managed collectively.

Spatially, the development is designed as two rows of autonomous private dwellings which are clustered to form an enclosed common green space. The design is highly family orientated. Multiple playgrounds have been established and with car access restricted to the entrance, children are able to explore the site without compromising their safety. There is an abrupt relationship between the private residences and common space, which is a result of incomplete landscaping that was initially proposed to create a transitional threshold between the two spaces. Without fences, the site has minimal barriers, using only vegetation and trees to screen private areas. This gives the site a collective openness, enhanced by the absence of fixed boundaries which allow it to appear fluid and social. The design is built to a human scale, its buildings are low rise and the site is pedestrian orientated. This creates a slow, enjoyable, multisensory experience for residents and visitors.

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Figure 6.08. - 6.09. Saettaedammen.

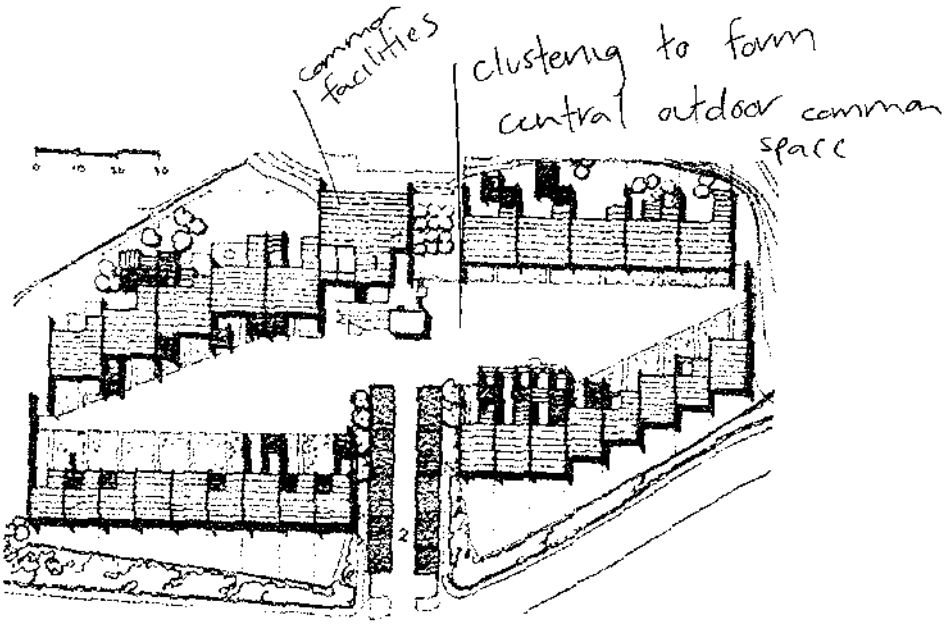

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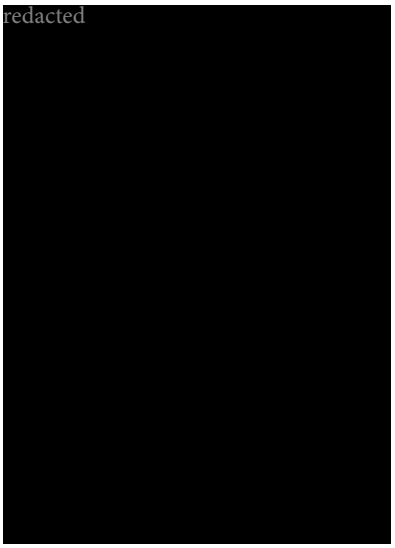
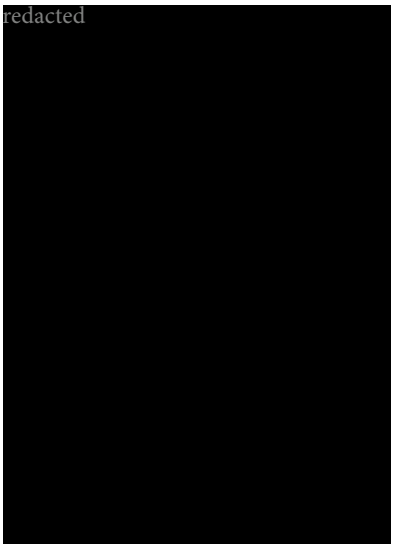
Figure 6.10. Saettaedammen plan and analysis.

Quaker Settlement





The Whanganui Quaker Settlement was built over twenty-five years and currently consists of 17 alike yet individual homes which are clustered amongst common amenities (Southcombe, 2017). The settlement has a community life that is similar to Saettedammen, which was a strong influence for the development. There is no individual ownership of land so tenure is collective.

Minimal internal site barriers allowed all buildings to face north to achieve maximum solar gain. Like Saettedammen, the absence of fences and physical boundaries remove any segregated effects which encourages sociability amongst residents. The design is attentive to moments where social interaction is likely to occur, ranging from key moves such as its compact shape and centralised form common areas, to smaller components such as shared carports and letter boxes, where residents frequently meet and socialise (Southcombe). The remarkable sociability of the site is furthered through co-operatively allocated tasks, job lists, and weekly gatherings for meetings and meals (Southcombe).

The site's notably relaxed environment is achieved partly by restricting car ports to the site's entrance, which reduces paved areas, and the lack of formal pathways connecting the private and common areas. The compact dwelling placement leaves a significant part of the site to be utilised for growing trees for timber, a food forest, gardens, orchards, to graze sheep and chickens and for regenerating bush (Quakers in the World, 2020).

The design was deliberately compact to facilitate social connections and minimise infrastructure costs (Southcombe, 2017). The common facilities enclose a north facing courtyard, forming a central hub of activity. An aesthetic unity is formed across the site through use of a common colour palette and dwelling form, which is "balanced by a highly individual private realm where every house and building is tailored to meet each individual's needs" (Southcombe, 2017, p. 303).

Figure 6.11. - 6.12. Quaker Settlement.

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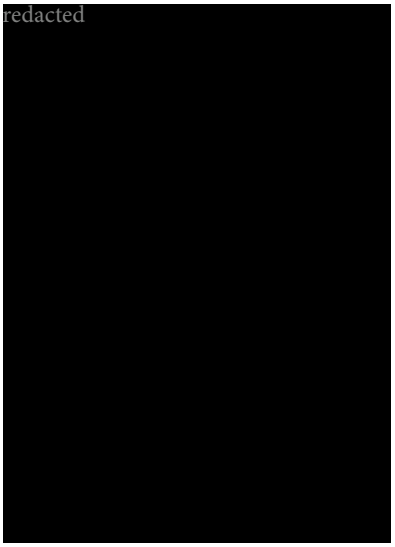
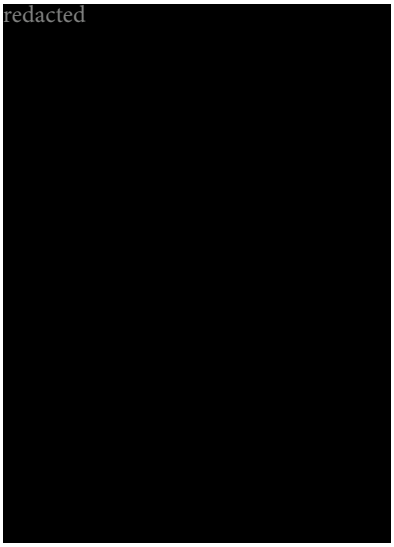
Figure 6.13. Quaker Settlement plan and analysis.

Nightingale 1





The Nightingale 1 Co-Housing project was built on the concept of affordability, sustainability and sociability. The thoughtfully designed medium density building creates and encourages community through the use of shared utilities and well curated common spaces which act as an extension of residents' homes. Although Nightingale 1 is an apartment typology and largely considers vertical circulation, valuable design techniques can be drawn from its common spaces.

The common roof top is divided into two spaces with distinct functions. The northern section is dedicated to utility purposes including a communal laundry and clothes line, storage, and planter boxes for growing fruits and vegetables. Communal gardens are settings where social interaction often arises as users may remain there for extended periods of time and engage in conversation with others, exchanging small talk or knowledge and advice. If residents frequently visit these spaces, relationships can form and be maintained.

To the south of the roof deck is a common dining and outdoor area which is partly shaded by photovoltaic arrays. The dining space can be fully enclosed or entirely open through sliding doors, making it a suitable space throughout the year. Outdoor seating is angled so that users face towards one another, so that even if no conversation occurs, passive contact is had, enabling residents to familiarise themselves with one another. A grassed area is provided where children mix and play whilst adults can mingle on the adjacent seating. A level change near the railing allows those who are seated to be at eye level with those who are standing, the steps' wide ledges being utilised for extra seating. The exposed outdoor space is positioned to receive the last of the evening sun, making it a desirable place to inhabit for as long as possible. Carefully considered planting is used to divide the space and create areas of intimacy, whilst allowing the space to remain whole. The floors materiality is used to form a threshold between formal and informal areas; the timber floor indicates a more orderly setting while the grassed area is casual and relaxed.

Figure 6.14. - 6.15. Nightingale 1.

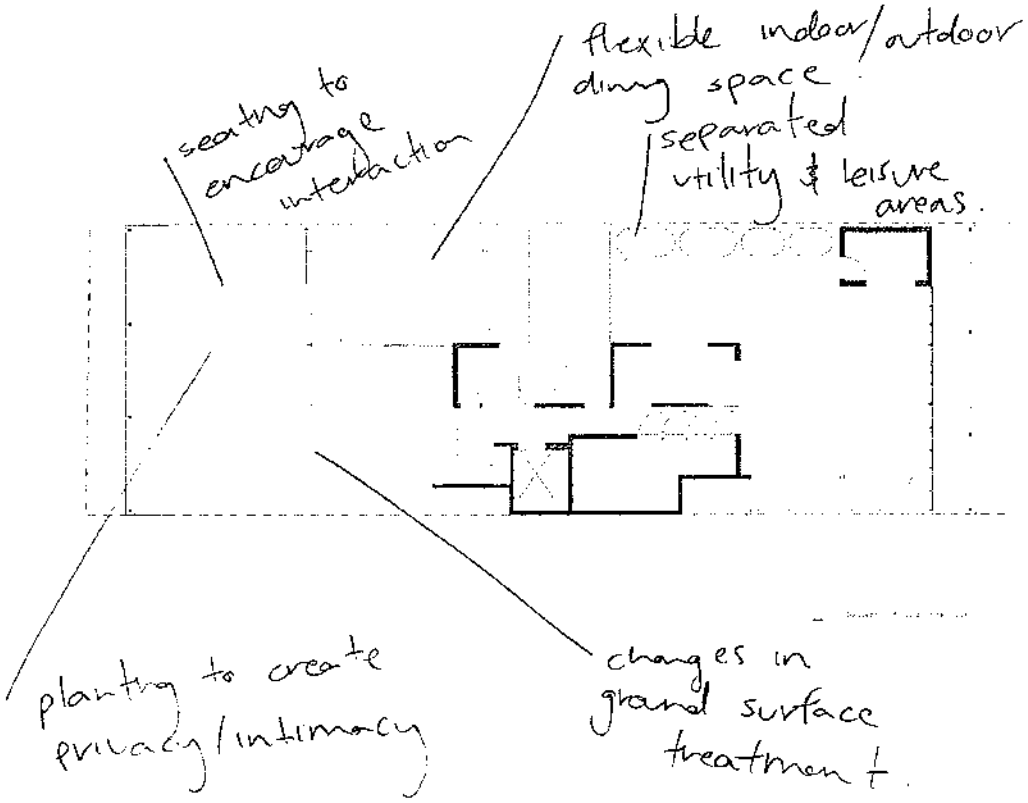


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Figure 6.16. Nightingale 1 roof plan and analysis.

Summary

Many common characteristics have arisen between the co-housing precedents. It is evident that providing a central communal hub is essential to establishing social connections, and within this specific design, attributes are practiced to enhance desirability. This 'common house' should provide residents with a comfortable place to mingle, relax and hold meetings or gatherings, and be designed in conjunction with common outdoor spaces to establish a strong relationship and centralised activity hub. Common houses are valuable as they allow residents the opportunity to socially interact with one another in an undemanding way or withdraw to the privacy of their homes as they choose.

Courtyards

An emerging design principle of the co-housing precedent study was the use of courtyards. As discussed by Gehl, accommodating varying degrees of privacy within residential areas is essential for creating lively, social communities. Many single-family suburban houses feature abrupt thresholds between public and private environments, which makes the transition both functionally and psychologically challenging (Gehl, 2011).

To better this transition, tangible structures which give way to a corresponding social structure can be established. This involves implementing small communal spaces that allow various privacy gradients across the site, so that residents can interact with smaller groups or gradually larger ones as they choose. This has psychological benefits for residents as they experience a greater sense of belonging in public places and security by incidentally establishing a collective responsibility and surveillance of the area (Gehl).

Courtyards are used by both Saettedammen and the Quaker Settlement to administer gradual privacy gradients by clustering homes around a central common area. Stage Two of the small home subdivision will revisit the positioning of dwellings by introducing a clustered typology to form communal courtyards with a corresponding common house.

The following figures summarise the co-housing precedent study findings at a detailed and wider urban scale.

Precedent Analysis - Common Space Design Guidelines

+ Level Changes

Changes in level can be use to facilitate passive contact through increased visual connections by aligning eye levels of seated and standing individuals.

+ Green Spaces

Green spaces are necessary to provide in any common design. They are particularly valuable for developments with children, allowing supervising parents to get to know one another.

+ Materiality Changes

Changes in materiality, particularly in ground surface treatments, can be used to signify changes in zones and functions, without physically dividing a space.

+ Sheltered Outdoor Dining

Sheltered outdoor dining and living areas allow spaces to be used year round, as opposed to when weather conditions are favourable.

+ Seating

Seating options can be utilised to encourage passive interactions, such as mirrored seating, allowing residents to familiarise themselves with one another without needing direct contact.

+ Adaptable Space

Adaptable spaces provide more functions in a single space, increasing desirability by accommodating aditional activities.

+ Separate Utility and Leisure

Separating areas of leisure and utility creates appropriate privacy gradients dependant on the areas function.

+ North Orientation

A north orientation provides the greatest access to natural daylight, allowing outdoor areas to be occupied for longer periods.

+ Landscaping for Privacy

Landscaping can be utilised to create semi-private intimate areas whilst maintaining an open feel across the design.

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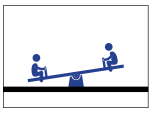
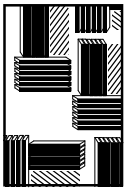
Figure 6.17. Diagrammatic common space design guidelines.

level changes to facilitate passive contact or +

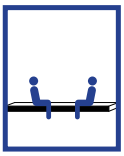


green spaces appropriate for children to play

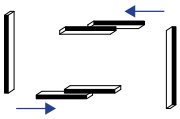


different zones through materiality changes

sheltered outdoor dining



seating to facilitate passive contact or +



adaptable space

separate utility and leisure

orientate outdoor areas to be north facing

landscaping to divide space and create intimacy

Precedent Analysis - Wider Organisation Common Design Guidelines

+ Communal Hub

A central hub of activity attracts other residents and is be achieved by pooling amenities into a central common space.

+ Informal Pathways

Remove a sense of hierachy across the site and improve privacy gradients, encouraging residents to linger outdoor and take more time with activities.

+ Communal Gathering Points

Incorporating design elements such as community notice boards and letterboxes provide places for residents to meet and interact.

+ Cluster Formations

Clustering buildings creates courtyards which can be used for developing desirable common spaces.

+ Collective Ownership

Collective ownership of land and facilities introduces a sense of community without the use of specific design strategies, as residents are already part of a collective.

+ Moments of Social Interation

Attention should be given to moments of social interaction, such as thresholds and lingering spaces.

+ Pedestrian Priority

Pedestrian activities are encouraged by orientating the site to accommodate pedestrians, rather than vehicles, which promotes more opportunities for social interaction.

+ No barriers

Limited use of fences and boundary walls reduce percieved barriers between neighbours and encourage interaction.

+ Compact Design

Compact designs create bustling central areas of activity, and leave more space for common facilities.

+ Human Scale

Dwellings design to a smaller, human scale create pedestrian friendly environments and encourages indoor activities to take place outdoors.

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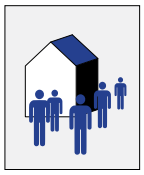
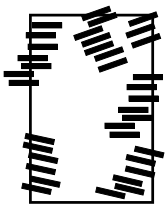
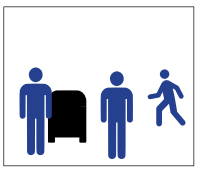
Figure 6.18. Diagrammatic wider organisation common design guidelines.



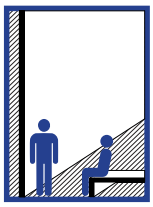
communal hub



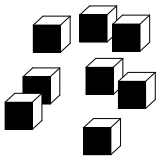
informal pathways



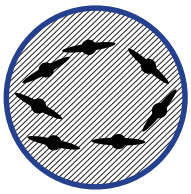
communal gathering points; carports/letterboxes



attention to potential moments of social interaction

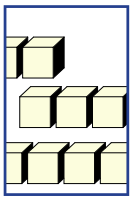


cluster formations



stewardship

pedestrian priority

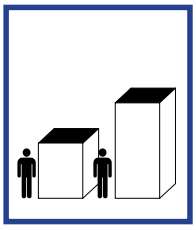


compact design

no fencing

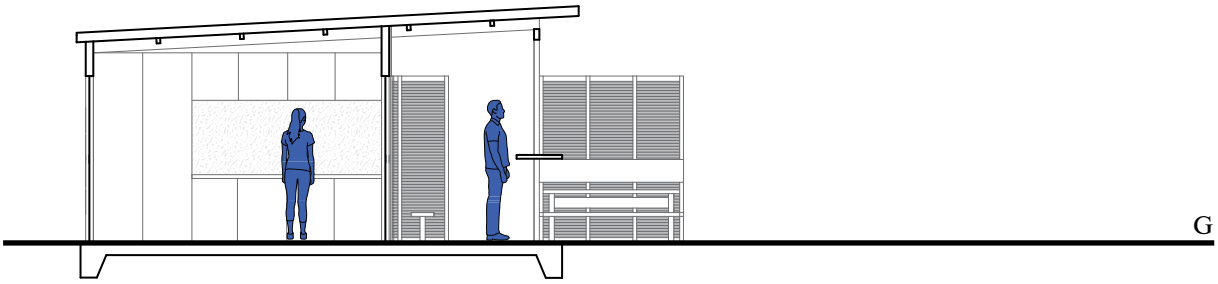
north orientation

vegetation as privacy screens



human scale

6.4 Common Facility Design



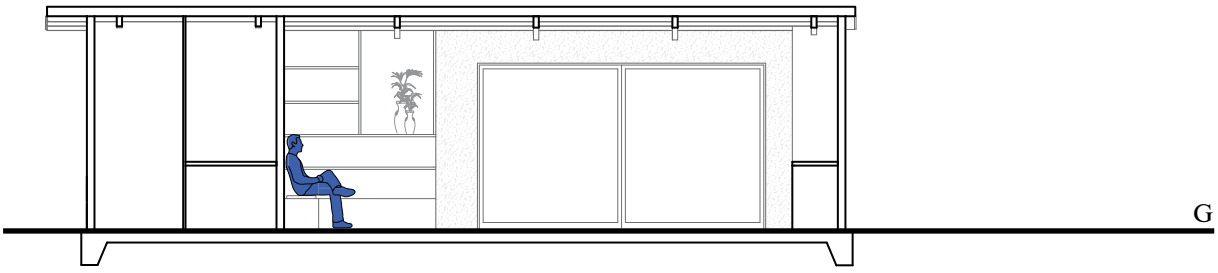


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Figure 6.19. - 6.20 Common facility sections.

0 0 1

Floor Plan - Dining Example

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Figure 6.21. Common Facility plan at 1:50.

0 0 1

Floor Plan - Movie Example

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Figure 6.22. Common Facility plan at 1:50.

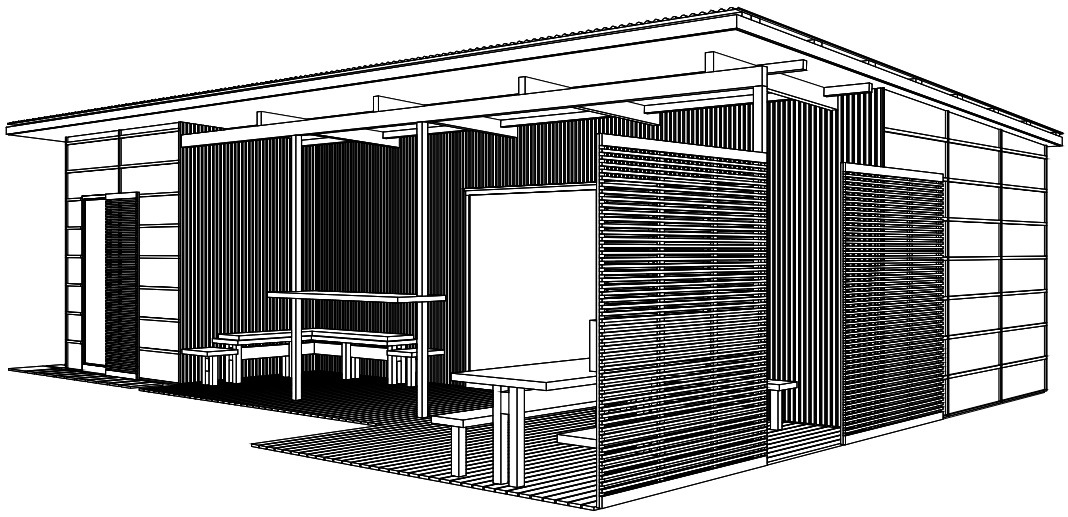

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Figure 6.23. Common Facility 3D.

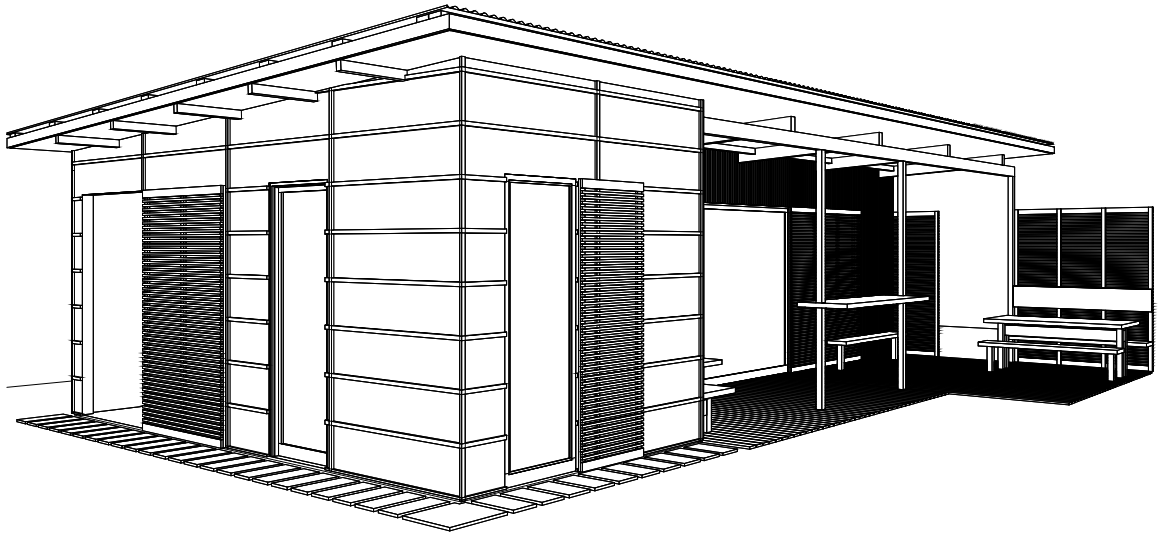

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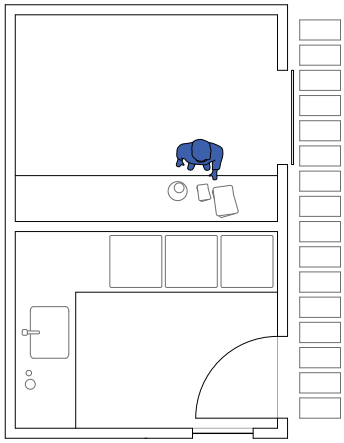
Figure 6.24. Common Facility 3D.

Communal Laundries



Communal laundries play a significant part in the role of privacy gradients. A more private communal amenity than common houses and outdoor space, they allow residents to interact briefly. While residents may not linger for lengthy conversations in such spaces, people are creatures of habit and typically do their washing at similar times each week, and as such, residents frequently meet and become familiar with one another. Communal laundries are also highly personal spaces. Our clothes are personal markers of who we are, and by allowing others to see them in such close proximity, often in less than desirable conditions, creates a unique vulnerability between residents. Functionally, communal laundries are necessary for small homes as they prevent claustrophobic and damp conditions from eventuating by removing wet laundry from modest living areas. Attached to the laundry design is a garden shed where residents can store personal or collective tools for their gardens.

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Figure 6.25. Communal laundry plan at 1:50.

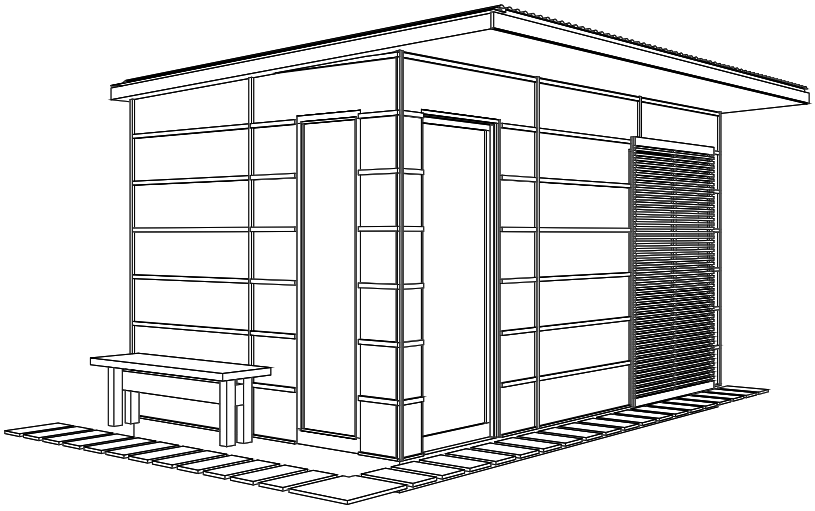

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Figure 6.26. Communal laundry 3D.

6.5 Infill Opportunities Report

Background Research Seven

The Infill Opportunities report inspects a range of design guidelines which can be implemented to enhance small scale infill redevelopment within established Melbourne. Collectively, the guidelines develop strategies which improve quality and performance of infill housing.

A primary part of the investigation looked at maximising shared amenities and collective benefits. These benefits can be achieved by 'pooling' amenities in shared facilities which increases affordability for residents and encourages social interaction (Monash University, 2011). High quality common spaces are necessary to support higher density dwelling environments, so to achieve this they proposed a '3-for-1' dwelling replacement at a ratio of 1:4, which ensured the allocated site was of sufficient size. The shared space can be positioned at any point on the site in response to existing conditions such as vegetation, solar accessibility and site orientation.

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Figure 6.27. Infill Opportunities Report plan.

The project is designed with consideration given to both current and future needs, where in the short term it is used as a collective parking area, however as alternative transport option grow in popularity and vehicle decreases, the space can be repurposed as an open common area with shared amenities such as outdoor dining spaces, vegetable gardens and utility sheds. Permeable ground surfaces and additional plantings allow the area to become overgrown and adapted into green space.

Due to a fluctuation of building sizes, not all sites will be mirrored in size, a rough ratio of 1 common space for every 6 dwellings will be allocated, which doubles the density of the Melbourne Scheme. This is due to most dwellings having outdoor space incorporated within the design, so the use of a larger collective space may be required less often.

6.6 The Desirable Subdivision

Design Phase Four

Figure 6.28. Design Phase Four masterplan at 1:200.

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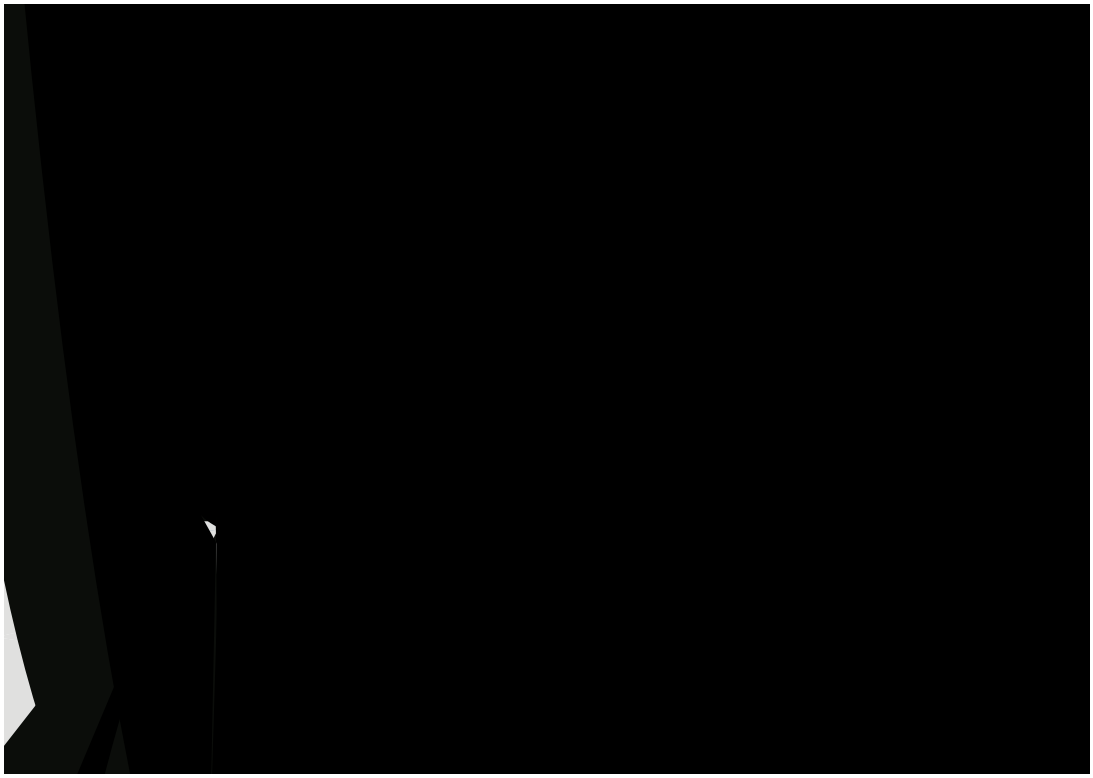
Figure 6.29. 3D of common space.



3 D o f c o m m o n f

F i g u r e 6 . 3 0 .

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Figure 6.31. 3D of pedestrian pathways.

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Figure 6.32. 3D of common facility.

Figure 6.33. 3D of pedestrian pathways.

Figure 8. 34. 3D of vehicle access route pedestrian pathways.

6.7 Critical Reflection

Design Phase Four is the final developed design within this research portfolio, in which findings from all design phases have been included. Key developments for this design phase were the implementation of communal buildings, refined understanding of urban design guidelines to encourage social interaction and provide varying degrees of privacy, and reconfiguring the masterplan using cluster formations to create central common courtyards.

Analysis of proposed tiny home developments in both New Zealand and America gave insight to which amenities are most necessary to include in these types of developments. It was concluded that accommodating areas for cooking and dining, relaxing, working and laundry were most essential to supplement the small floor areas of homes and provide opportunity for interaction between residents. The ability to perform some of these activities outside the home allows individual residences to become spaces dedicated to unwinding and withdrawing.

Jan Gehl's Life Between Buildings discussed and justified the need to provide designs which facilitate social interaction and varying privacy gradients, and outlined urban design guidelines to encourage "optional activities". The significance of these activities is that in order for social activities to occur, optional activities must take place. With this in mind, several co-housing case studies which are widely recognised for their social success were analysed for the design of their common spaces which inherently encourage optional activities.

The Common House was designed to incorporate multiple different areas of habitation to encourage many different users at one time. Multiple detailed design features drawn from Nightingale 1 were used to develop this social space, most specifically including flexibility and seating to facilitate interaction. As indicated in the plans, the interior is relatively unfixed. Shelves and desks line one end of the building while a strip kitchen is located at the other. This means that the design can accommodate both dinners, movie nights, or events that require a larger indoor space by rearranging existing furniture.

It is not expected that residents would initiate communal gatherings to the extent observed in Saettedammen or the Quaker Settlement, but rather adopt a social level similar to Nightingale 1, where residents can come and go, interacting as they please.

In contrast to the long and narrow design of the private homes, the Common House was designed to be wide and shallow. This set back begins to structure a courtyard in itself, which is then furthered by the clustering placement of homes. The outdoor space has several different areas to inhabit, which provides residents comfort in using the space if it is already occupied, as it does not directly invade the space of other residents, but rather allows them to interact in a desirable and undemanding way.

A small 'rentable' office is provided which residents can hire for meetings or other related activities. Bike storage was considered an important utility to include, as limited parking will likely eventuate in the use of alternative transport options.

Other accommodated amenities such as communal laundries and gardens were placed in close proximity to Common Houses. In doing so, a central hub of activity could be developed, in which residents who may not be using the same facilities could still come into passive contact with one another. By creating vibrant and active hubs, the desirability of the subdivision can be enhanced. As Jan Gehl proclaims, great satisfaction is achieved through simple observation of others in their everyday activities and routines, and through establishing social connections.

Clustering homes enables pedestrian pathways to become less structured, creating semi-private and informal areas across the site which encourage residents to linger and take more time with tasks than they would in accessways which are more exposed and public.

Chapter Seven

Conclusions

7.1 Further Research
7.2 Final Conclusions

7.1 Further Research

The nature of this research has generated the potential for further research regarding several aspects which could be investigated if more time was permitted.

Mixed Use

Further research could consider mixed use. Due to the size of the subdivision and Featherston's small population it was not included within the scope of this research, however a site in a more populous region could take advantage of the benefits of mixed-use developments. Mixed-use is beneficial as it not only provides living, working and recreation activities within a singular environment, but also allows building purposes to be adapted over time. By reducing distances between public facilities and residential areas, it also encourages a pedestrian-led environment.

Further Implementation of the Wider Site

The design strategies identified throughout this research could be used to develop the remaining parts of the site (or any alternative site) which are designated for a proposed small home community by Brookside Villages. This would test the success of the research, and how site specific these particular principles have been. This would generate new questions regarding the provision of common amenities, and whether they may need to be developed further to accommodate a larger scale of implementation.

Tenure

The research has assumed a collectively owned tenure. However further research could consider the implementation of mixed tenure, including privately owned sections and rental sections, as well as managed short-term accommodation facilities. Mixed tenure provides a multitude of choices and opportunities for residents to obtain their housing ambitions within the same communities, creating social stability as residents can remain in the same neighbourhoods for prolonged periods and therefore maintain connections.

7.2 Final Conclusions

Through this research, and the continuous dialogue between research for design, and research through design, the research question has been answered. Splitting the overall research into four key design phases created an opportunity to develop design strategies that could be tested at different scales. The final phase of the subdivision is a culmination of the research findings from all three previous design phases, and is the most appropriate design outcome to answer the research question.

Design Phase One; Investigating Tiny Through Small Homes, began to explore desirability at an internal scale by adopting design guidelines that sought to create efficient and psychologically desirable spaces. The guidelines, drawn from the first precedent study, established that simple, open plan spaces with appropriate proportions and storage were critical to achieving desirable homes. It was key that these open spaces provided multiple zones of habitation within their open plan, or could be adapted to do so. This provided internal privacy and an opportunity for occupants to withdraw from exhausted environments. As the designs focused on internal planning, addressing external constraints such as site and relationships between dwellings became the primary challenge for the second design phase.

In Design Phase Two; Small Homes on a Site, a small infill site in central Wellington was chosen for the development of three small homes, which addressed the implications of density, and introduced common facilities as a strategy to reduce floor plan sizes. This enhanced desirability by providing spaces to accommodate activities that are often challenging in smaller homes, including a larger entertainment and cooking area, additional living zone, a 'pottering' shed and generous outdoor space. Dual-use spaces and adaptable furnishings allowed individual footprints to be further reduced, providing extra space for the outdoor area and common amenities. While the extent of the site's density and compact floor plans were appropriate for the single infill site, it was decided that desirability at a wider level of implementation would be achieved through reducing overall site density and increasing floor plan sizes to reflect the scale adopted in Design Phase One, with one to two bedroom homes ranging between 30sq m – 40sq m. The absence of private outdoor spaces for individual units was made possible by the small number that shared the common spaces. However, in a larger subdivision design, providing these spaces would be an essential design requirement.

Design Phase Three; Inhabiting the Subdivision, was the first phase of design for the small home subdivision, which focused on resolving initial site issues, including accessibility, parking, outdoor space and dwelling placement and orientation. Dwelling density was scaled back to achieve a medium-high density and a third series of private dwellings were designed. Two of these homes were designed to a single level, allowing the subdivision to appeal to a broader demographic as they were more accessible. Desirability was increased here by providing semi-private sheltered outdoor areas, which flowed into side yards for the single level designs. Providing these semi-private/private zones gives occupants the ability to choose the level of social interaction they wish to engage in. Desirability of the wider site was achieved by the design favouring a pedestrian orientation. Small dispersed parking lots were confined to a singular one-way vehicle access route. This allowed the remainder of the site to be utilised for pedestrian activity, and had a tranquil, safer and social flow on effect. The single vehicle access route meant that homes could front green areas which enhanced visual desirability and supervision of common areas. This strengthens residents' sense of place by providing them a greater connection to their surrounding environment.

The fourth and final design phase of the research, Design Phase Four; The Desirable Subdivision, embodies the findings from each of the previous design phases and further achieves

desirability through the inclusion of refined common facilities and the opportunity for social connections. Here, the design cultivates functional and inviting common areas, whilst developing semi-private transitional zones. The common facilities create an opportunity for residents to engage in activities outside their private homes and accommodate all functions that exist in regular sized homes, while establishing improved support networks and relationships with neighbouring inhabitants. This means that small homes do not compromise on any qualities that are expected in desirable living environments, and in fact procure living standards that are well beyond those currently provided by traditional suburban developments. The transitional zones were formed by clustering dwellings which established many intimate and informal pedestrian networks. This provides an enjoyable external experience for residents and encourages optional activities, which eventuates to more social activities, creating lively, active and social communities which have been regarded as highly desirable environments.

The combination of these three scales, explored within four design phases, have collectively led to the key learnings within this research.

> **How can small homes be a desirable long-term multiple housing solution?**

KEY LEARNINGS FROM EACH DESIGN PHASE;

Design Phase One

+ Simple form

+ Places to withdraw; change in mood,

+ Open plan dwellings with defined zones of occupation

+ High ceiling heights or double height spaces

+ Ample storage which is discretely concealed

+ Appropriate scales and proportions

Design Phase Two

+ Adaptable and multi-purpose spaces

+ Common amenities to supplement small floor plans

+ Compact footprints for additional outdoor space

+ Skylights to provide additional daylight

Design Phase Three

+ Dedicated semi-private/private outdoor living areas

+ Connected indoor-outdoor areas through access and visibility

+ Considered placement and design of windows and entranceways to provide privacy

+ Secondary bedrooms which can have alternative uses

+ Primary vehicle accessway – preferably one way

+ Dispersed parking lots which can be adapted – facilitate meeting points

+ Side yards which are connected to sheltered outdoor areas

+ Front homes towards common outdoor and pedestrian areas for desirable outlooks

+ Parallel dwelling placement to achieve a higher density

+ Common outdoor spaces

+ Use of landscaping to create intimacy

Design Phase Four

+ *Cluster formations*

+ *North orientation*

+ *Limited physical barriers/fences*

+ *Internal/informal pedestrian networks*

+ *Privacy gradients from private to public*

+ *Centralised common facilities*

+ *Design elements to facilitate social interaction*

+ *Collective ownership of common facilities*

Concluding Statement

This research proposes design strategies that together cultivate a housing typology that is responsive to housing issues in New Zealand at present. Utilising these strategies through thoughtful planning allows small home communities to be a progressively more desirable housing solution than traditional housing forms, that have the ability to be inhabited through all stages of life.

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