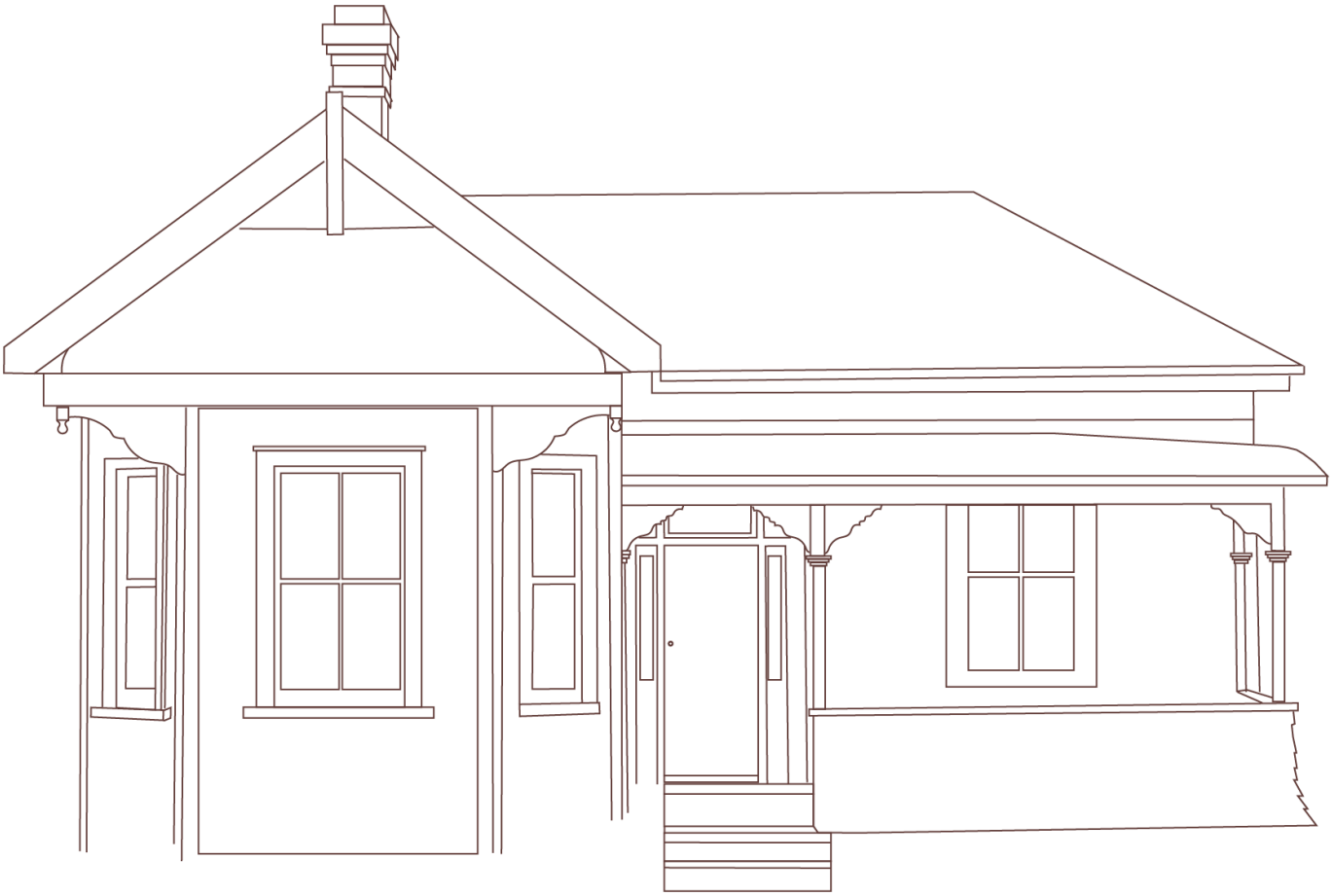
Sensitive Developments

The Role of Bluefield Reuse and Infill Development in Auckland Residential Suburbs



Abby Geddes

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The Role of Bluefield Reuse and Infill Development in Auckland Residential Suburbs

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A thesis submitted to Te Wānanga Aronui O Tāmaki Makau Rau Auckland University of Technology in partial fulfilment of the requirements for the degree of Master of Architecture (Professional)

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School of Future Environments

Figure 1 - Overview of Auckland City sourced and adapted from Google Earth

Abstract

The classic Kiwi lifestyle has followed the concept of a single-family home on a quarter-acre section for generations after colonisation . However, with increasing housing needs, cost-of-living crises and environmental crises, we must question how we live and our actions as humans and design our homes to meet changing needs.

Within the architecture and design industry, there is a tension between new construction and conservation. Some argue that new builds are the solution as they are designed and constructed using the latest technologies to meet the current housing densification needs. However, others argue that conserving the existing built environment and cultural heritage is more sustainable, using methods such as adaption and retrofit to bring buildings up to current standards.

Conserving historic buildings through sustainable solutions is a way to avoid erasing quintessential New Zealand architecture styles from the rapidly evolving built environment. The traditional New Zealand villa is an example of existing housing stock that fills the central suburbs of New Zealand's cities, which are now prime candidates for development to meet housing and densification needs. For buildings in existing suburbs with cultural and historical significance, a careful balance is needed between infill densification, building conservation and appropriate interventions. This poses the research question: How can interventions to existing residential buildings assist in contemporary infill development while maintaining existing neighbourhood character?

This research proposes the use of Bluefield development solutions and architectural concepts such as adaptive reuse, retrofitting, relocation and infill development to create an architectural response that challenges the objectives behind building policy, reimagining the existing family home and how we can co-exist between heritage and modern living.

The work aims to explore sensitive building solutions within Auckland, New Zealand, focusing on infill development and adaptive reuse. It examines adaptation, relocation, cooperative living and existing government policies and practices. By analysing how design research and practices exist under current local and government housing policies, this thesis aims to challenge the current understanding of these policies, exploring the physical and non-physical aspects of urban housing to understand new ways of living within current and future environments . This is explored by creating a design guide that assists in the site's analysis and design process. The design guide is tested through a design project to reveal how Bluefield's design and methodology can be used as a tool to create sensitive densification. The final design demonstrates a method to increase density eight times without demolishing structures or removing the existing nature. If implemented across other sites in the neighbourhood, it could substantially boost the number of homes while minimizing environmental and heritage impacts.

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor used artificial intelligence tools or generative artificial intelligence tools (unless it is clearly stated, and referenced, along with the purpose of use), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed Abby Geddes

Acknowledgements

I would like to thank my supervisors, Dr. Priscila Besen and Dr. Stacy Vallis , for their guidance and support. Thanks also to the Liveable Neighbourhoods lab, Riana, Jyllian, James, Kyle, Devarsh, Dr Andrew Burgess, and Dr Stefan Marks.

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Introduction

As New Zealand faces growing housing needs, a cost-of-living crisis and an environmental crisis, it is critical to question and rethink how we live and design our homes to adapt to changing needs. The architecture industry has evident tensions between new construction and conservation as solutions to these crises. Some advocate for new builds, as they are designed and constructed using the latest technologies to meet current needs. However, others believe that conserving and reusing the existing built environment, culture, character and heritage through adaption and retrofit techniques enable buildings to meet current standards. This raises the question of how interventions to existing residential buildings can assist in contemporary infill development while maintaining existing neighbourhood character.

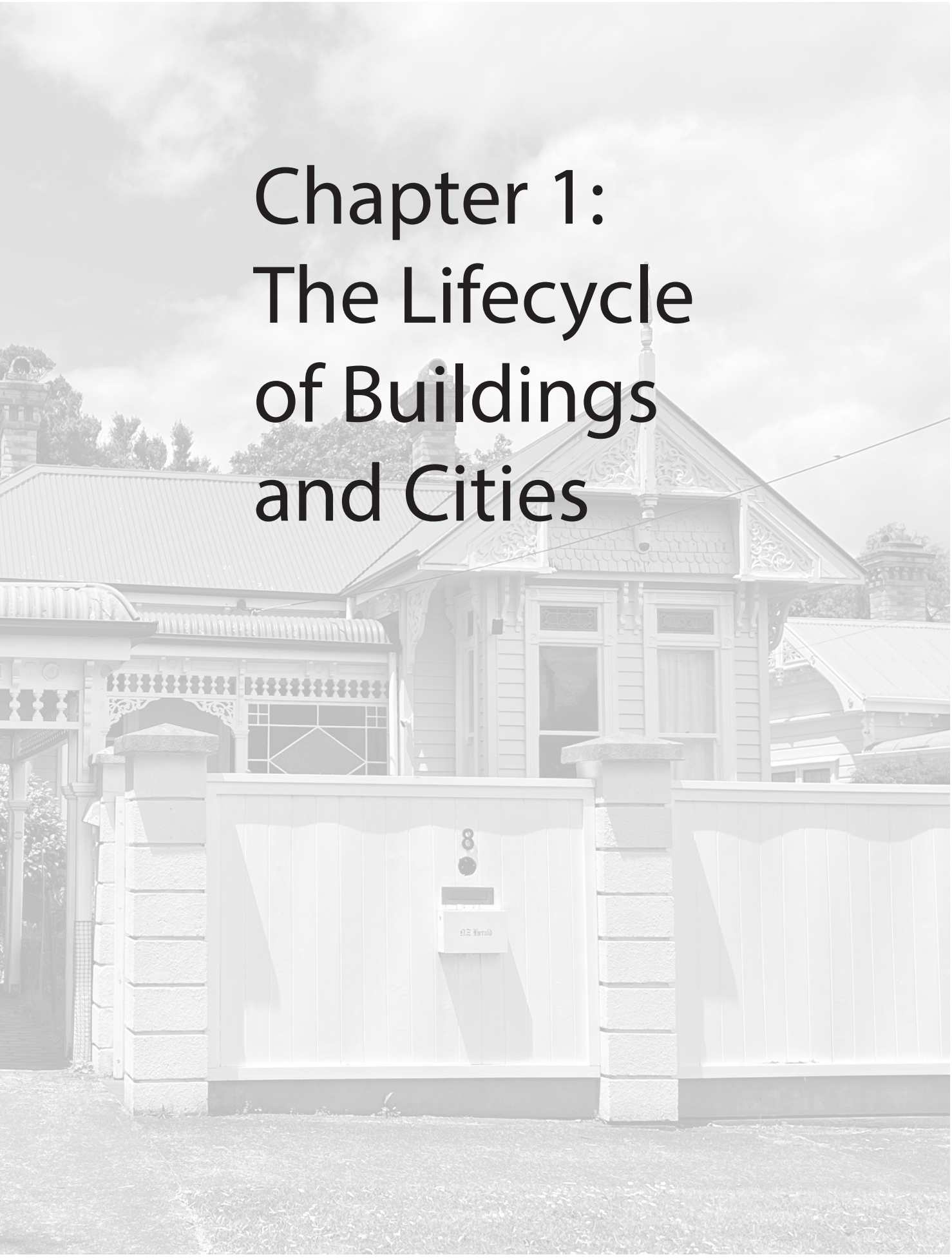
This thesis explores the space between new build and reuse, focusing on infill development strategies such as adaptive reuse and Bluefield housing to bring up the residential development standards in the central suburbs of Auckland, New Zealand. It explores architectural research that advocates for the conservation of place due to age, character and history, promoting the reuse of existing structures to tackle densification. Contextual studies investigate how a design-driven approach can enhance the adaption and reuse of existing buildings, addressing the current trend in Auckland, where older homes are being demolished to make way for terraces or apartments as part of densification efforts.

The context for this research is a 1900s villa in the central suburb of Mt Eden, Auckland. Context includes the significant natural landmark of Maungawhau (Mt Eden), the history of the development of the Mount Eden suburb, and the history of the Villa. The context also introduces the aspect of research surrounding the adaptive reuse strategies and Bluefield housing that may best serve to conserve existing buildings undergoing infill development.

The design proposition results in a design guide, which is then tested through a design project. The design guide considers existing research and practices of current local and government housing policies. This thesis aims to challenge the current understanding of these policies, introduce Bluefield housing and its principles, and explore physical and non-physical aspects of urban housing to understand new ways of living within current and future environments. The design guide is then applied to the chosen Mt Eden site, exploring design through physical and digital models. The proposition of sensitive infill densification through reuse, adaptation, and a new addition reflects the theories and case studies from within the research of this thesis while leveraging the existing context and character set by existing densification strategies. The design proposition aims to offer a practical intervention that ensures that existing buildings on development sites have a continued lifespan into the future.

Figure 2 - Chapter 1 Cover Image of a Villa

Chapter 1: The Lifecycle of Buildings and Cities



1.1 The Transformation of Cities

It is impossible to define modern civilisation without cities. Cities are a place of rapid change and host to most of the world's population. Over the past few decades, there has been a shift in how people live, with populations migrating from rural living into cities and surrounding urban areas. With 4.4 Billion people living in urban areas worldwide — a statistic growing every year, as seen in Figure 3 — it has become a critical focus to ensure the distribution of resources and services meets appropriate needs. (Ritchie et al., 2024).

The increase in population over the last hundred years has resulted in the merging of towns into cities and cities into global cities, metropolises, and super cities. The growth of these cities to meet rising urbanisation rates has a wider impact, including deciding to allocate services and resources to sectors such as housing, transport, healthcare, education, and employment. Auckland, New Zealand, is an example of a rapidly growing city, being the largest city in New Zealand, and continues to have the largest growing rates of urban land cover due to the rapid increase of urban growth over the past decade, as seen in Figure 6 (Stats NZ, 2021).

Auckland is the largest city in New Zealand, with the largest growing rates of urban land cover due to the rapid increase of urban growth over the past decade, as seen in Figure 4 (Stats NZ, 2021). The urban growth of cities commonly happens in two ways: urban sprawl and the densification of existing areas. Sprawl or greenfield development is the development of new land, often areas surrounding the city, turning farmland into new suburbs (Auckland Council, n.d.-d). These new low-density suburbs are usually promoted as a refreshing suburban lifestyle with affordable housing and clean-air environments that support economic growth (Greaves & Stopher, 2006). This increase in urban sprawl results in merging cities into larger cities or even large cities into supercities, as was the case with Auckland in 2010 when previous councils merged to create one Auckland Council (Auckland Council, n.d.-e). In stark contrast to sprawl is densification. Densification can be achieved in different ways, such as through the knockdown and rebuild (KDR), which leads to the loss of local character and the waste of materials, or through infill development, which increases density through subdivision, additions/extensions or larger scale new builds which can lower costs, meet demand for inner city housing and reduce greenhouse gas emissions (Greaves & Stopher, 2006). Both densification strategies change an area's housing demographic from low to medium density or medium to high density. The rapid turnover of KDR densification sees older buildings replaced with new ones. This can be due to the often-economic decision that the new building

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Figure 3 - Number of people living in urban and rural areas worldwide (Our World in Data, n.d.)

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Figure 4 - New Zealand Urban Rural Indication 1996-2023

promises a higher return than the old building retrofitted. The rebuilding of the city allows for the increase within one of its central commodities: space.

Space as a commodity is a crucial factor during a housing crisis and the post-global pandemic way of living. In Auckland, to meet the needs of this housing crisis, developers are demolishing existing homes, sometimes over two or three neighbouring sections, to replace them with higher-density developments such as townhouses or apartment blocks. While this is positive in its ability to increase housing numbers quickly, these new builds max out the available footprint of the site, removing existing nature, gardens, permeable areas, outdoor spaces, and even sometimes parking, pushing them out on the street and wider neighbourhood. New developments removing all existing buildings can create neighbourhoods that lack diversity in their building stock, with buildings of similar age and design repeated along streetscapes, making neighbourhoods within cities indistinguishable from one another. As Jane Jacobs once noted, "Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them." (Jane Jacobs, The Death and Life of Great American Cities, 1961)

Figure 5 – Auckland Region Population Estimation 1991-2048 (Stats NZ, 2021)

Figure 6 - New Zealand Urban land cover net change by region(Stats NZ, 2021)

1.2 Building Life-Cycles

Cities are built upon their own waste and the waste of humans. Land reclaimed, buildings demolished, new buildings constructed, roads redone year after year (Dobraszczyk, 2019). The urban surface contains a history through its own debris. From the moment of its inception, a building has a life cycle.

Architects often think of a building through its form and design as a singular concept that makes up a whole. In contrast, contractors think of a building as a system constructed layer by layer (Brand, 1994). A building is designed and constructed with several layers of components and differently paced systems. This systematic thinking is evocative of Frank Duffy (a leading theorist of the change rate of buildings) and his concept surrounding building system layers. Duffy distinguished four layers in his theory of change rate in buildings; Shell, Services, Scenery and Set. However, Stewart Brand expands upon these four layers revising them into six comprehensive layers that consider everything from the ground up. Brand's layers are site, structure, skin, services, space plan, and stuff and their frequency of change (Figure 8 - Building system layers (Brand, 1994)).

> *"A building properly conceived is several layers of longevity of built components." (Brand, 1994)*

The different layers of Brand's diagram correspond to the longevity of the built components within a building. Site is the geographical location with defined boundaries that is long-lasting with minimal change. Structure – the foundations and load-bearing elements that are critical and costly to change. Skin – the exterior surfaces that, while durable and long-lasting, may be changed to keep up with fashion or technology. Services – the working components of the building, including wiring, plumbing, HVAC and any other moving parts which may wear out or become outdated within a decade. Space Plan – the interior design and layout of a building, which may change alongside the needs of its users. Stuff – the furniture and all moveable items that change positions frequently, daily to monthly.

The concept of architecture strives to be long-lasting, permanent. However, even in the case of historical buildings there is always the practice of building and rebuilding. Nothing lasts forever and requires the maintenance and, in some cases, change to remain a functioning building after centuries of use.

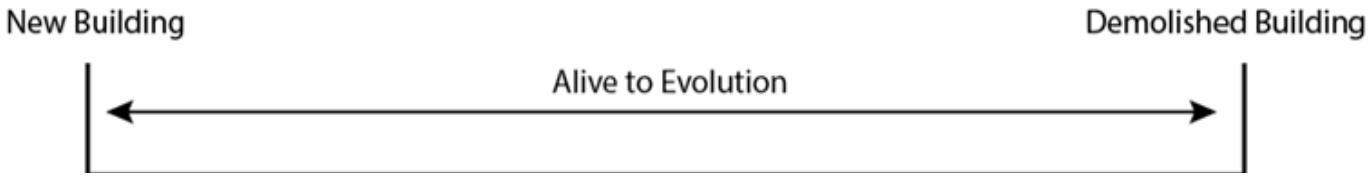

Figure 7 - Building Life Cycle

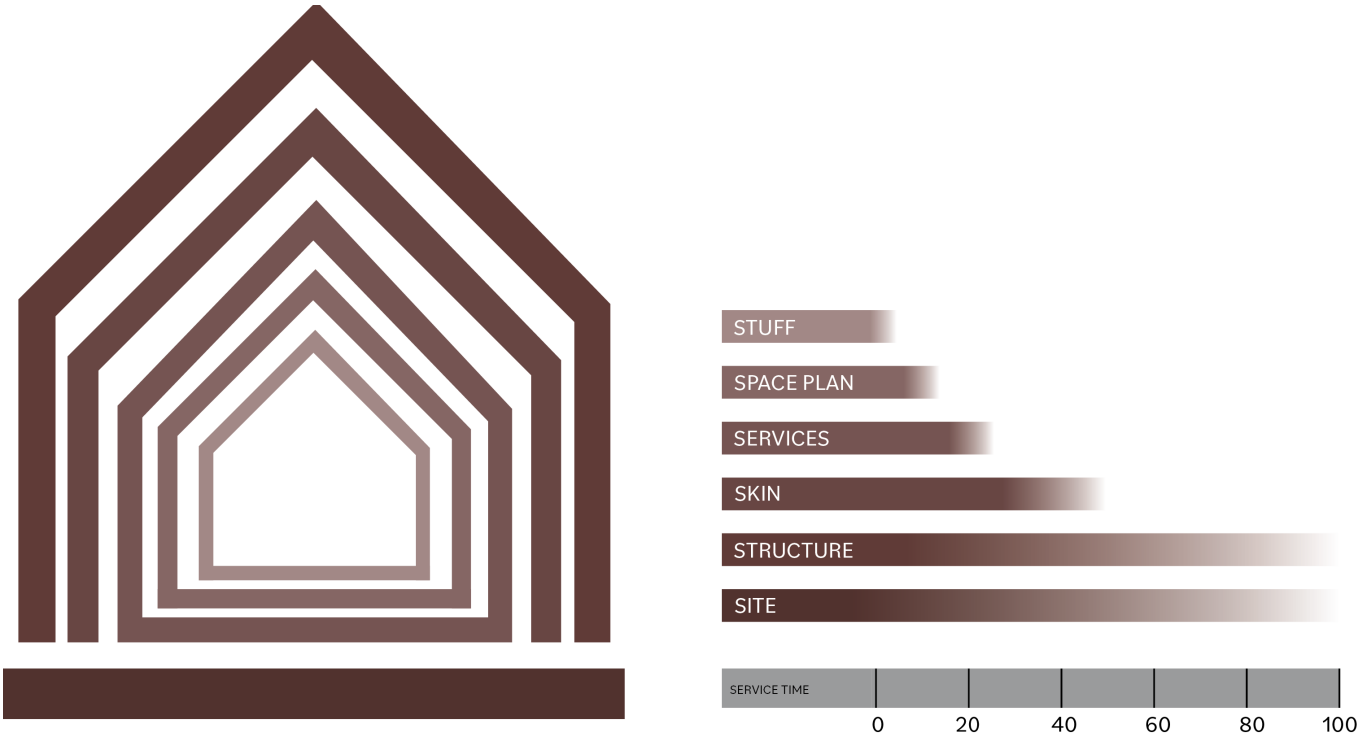

Figure 8 - Building system layers (Adapted from (Brand, 1994))

1.2.1 Life Cycle Assessment

Buildings and their components play a critical role in the consumption of energy, resources and the emissions released. The demand for energy in a building's life cycle is direct and indirect. Direct energy includes everything from the construction, through to operation and the eventual demolition of the building. Indirect energy includes the energy used in the production of materials and the technical installation process(Cabeza et al., 2014). Both direct and indirect energy is calculated into a building's Life Cycle Assessment.

Life Cycle Assessment (LCA) is a tool for the calculation of potential environmental impact of a building(s). By incorporating LCA early into the iterative design process the environmental impact of design decisions can be widely tested and changed or refined as needed (BRANZ, 2017). LCA methods are also a widely used tool in the comprehensive environmental evaluation of products and materials. Considering and incorporating LCA methods early into the design and construction decision-making promotes environmentally friendly products and the optimisation of construction processes minimising the environmental impact of buildings (Cabeza et al., 2014).

The use of LCA can be easy to achieve within new developments as components and construction decisions can be considered early into the design process making them easily changed and sourced. The challenge lies in how we can include LCA methods into existing and heritage buildings, allowing them to be adapted to continue their lifespan rather than knocked down and rebuilt (KDR).

The LCA is not currently mandatory within the New Zealand construction industry, and there are no regulatory frameworks that encourage its use. By including LCA within regulatory frameworks, it increases the potential for positive impacts, such as, the minimisation of embodied carbon through the retention of existing buildings. This can then prevent the premature demolition and replacement of buildings that do not meet current needs allowing them to be adapted and reused instead (Kolovos, 2023).

Researchers are using LCA to demonstrate the environmental benefits of reusing existing buildings, such as Preservation Green Lab and National Trust for Historic Preservation, who have studied and concluded that "building reuse almost always offers environmental savings over demolition and new construction. Moreover, it can take between 10 and 80 years for a new, energy-efficient building to overcome, through more efficient operations, the negative climate change impacts that were created during the construction process."(Frey et al., n.d.)

Figure 9 - Whole of life embodied carbon assessment (Ministry of Business Innovation and Employment & New Zealand Government, 2020)

1.2.2 Environmental Benefits of Building Reuse

Modern society and life impact our environment with the built environment creating a considerable part of environmental damage. The focus on climate change over the past few decades has brought the conservation of resources to the forefront of the architecture industry. The UNEP states that "buildings and construction sector is by far the largest emitter of greenhouse gases, accounting for a staggering 37% of global emissions." There is now a universal concerted effort to reduce these impacts for future generations. In 2015, the United Nations created a 2030 agenda with 17 Sustainable Development Goals (SDGs) at its core, aiming for "peace and prosperity for people and the planet, now and into the future" (United Nations, n.d.). Goal 9 and goal 11 focus on the sustainability of the construction industry and the sustainable development of cities

In New Zealand construction and demolition waste makes up 40% - 50% of total landfill waste (LEVEL, 2024). Kāinga Ora, New Zealand's urban development and social housing entity, has put targets in place to divert 80% of uncontaminated waste in the Auckland and Northland Regions and 60% across the country. This successfully diverted 33,000 tonnes of uncontaminated building waste from going to landfill within a year (Kāinga Ora, 2023).

History has often shown that reuse was necessitated by resource scarcity. Today, as urbanisation and climate change pose new challenges, there has been a shift in thinking towards the reuse of existing buildings emerging as a powerful tool to mitigate the impact of the built environment on our planet." The 'greenest' building is one that is already built" - Carl Elefante, 2007
By improving systems such as urban planning, building system maintenance, renovation, transportation, and waste management, building reuse can significantly reduce our environmental footprint, enabling us to build a more sustainable future.

"Never demolish, eliminate or replace, always add, transform and reuse. Most of what exists has a lifespan which can be extended and prolonged. Transformation uses the existing qualities of a site as the driving force of a new project. Transformation is as ambitious as building new." Anne Lacaton – 2022 (Nguyen, 2022)

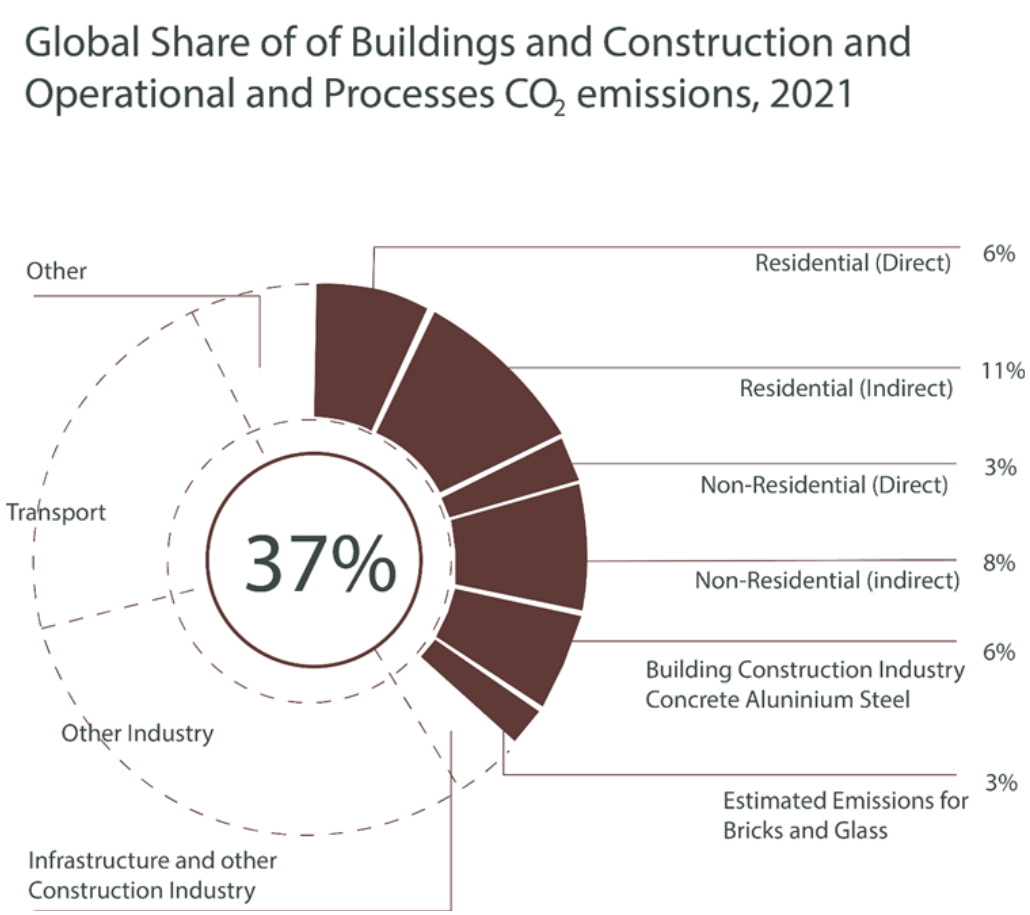

Figure 10 - Global Share of buildings and construction operational and process CO_2 emissions, 2021, adapted from (UNEP,2023)

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Figure 11 -Percentage Graph of Construction Waste by Weight in New Zealand Landfills. Using statistics from (BRANZ, 2024)

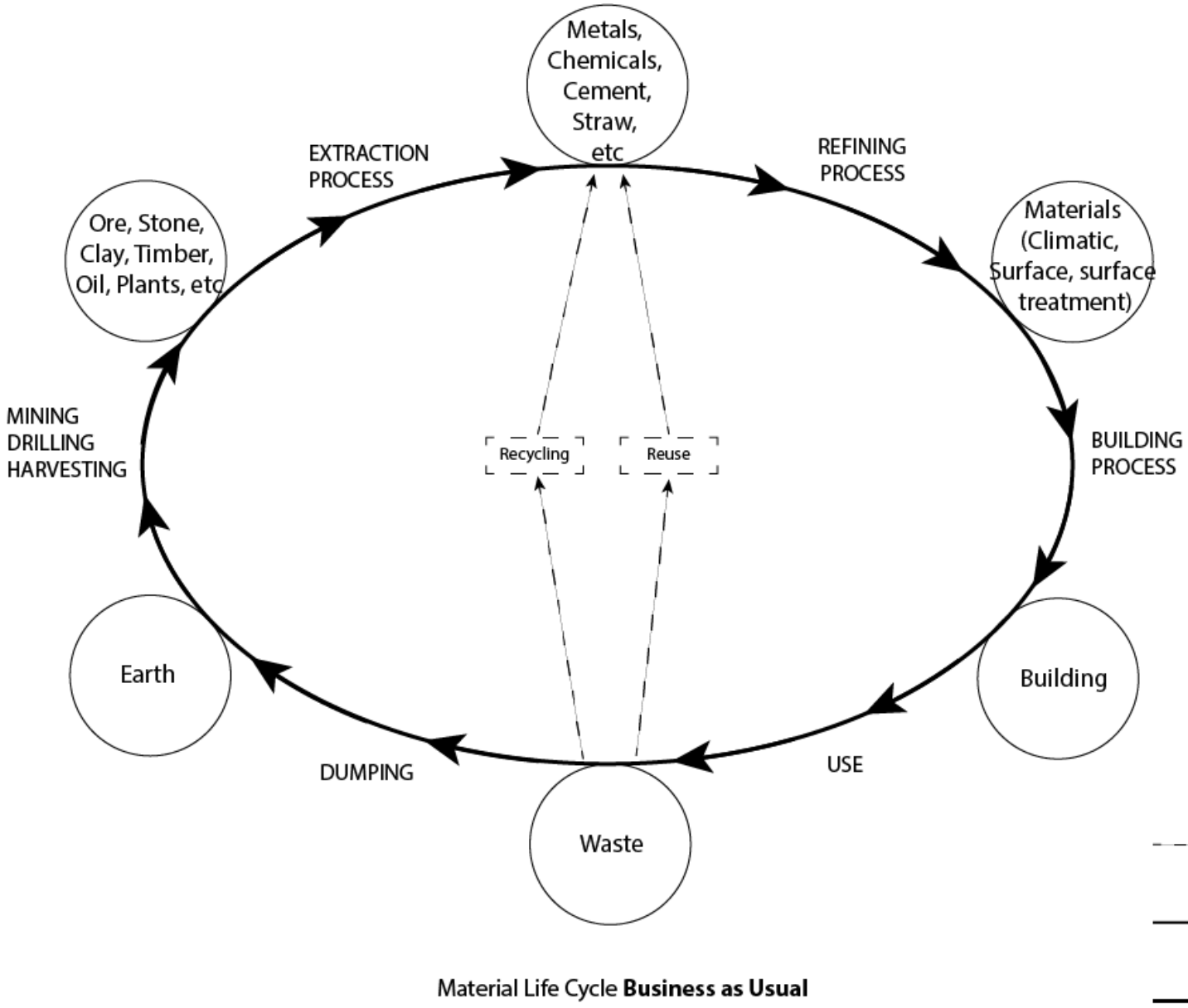
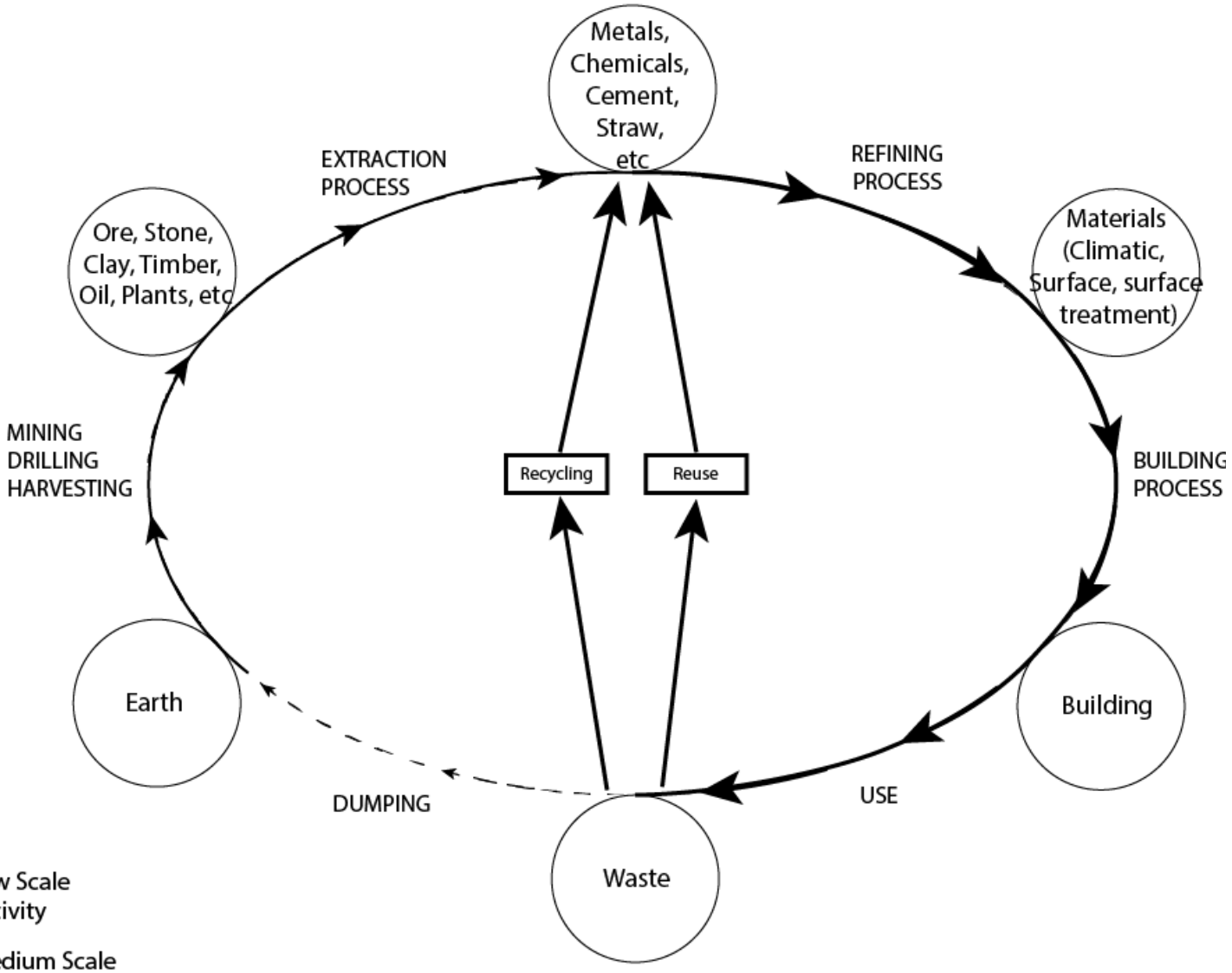


Figure 12 - Comparative Material Life Cycles of Business as Usual and Closed Loop Circularity (Adapted from (Rios et al., 2015)).



Material Life Cycle **Closed Loop Circularity**

1.3 Infill Development

The need for appropriate housing to meet New Zealand's growth needs is an ongoing challenge with the demand for approximately 200,000 additional dwellings within Auckland over the next 30 years (ME Consulting, n.d.). The development industry is at the forefront of trying to meet these needs, delivering housing in return for a profit (Auckland (N.Z.). Council, n.d.). Developers have financial backing and the ability to amass multiple assessments of sites, with in-depth considerations such as the current market demand and supply, development costs, local policies, and land costs.

In a time of rapid densification, urban sprawl can be the go to solution to meet the increasing housing demand due to the ability to start with a clean slate and design to meet all the needs of a dense community. Densification and the infill development of compact buildings aim to counteract the negative effects of urban sprawl, including ineffective land use and related environmental problems (Haaland & van den Bosch, 2015). Infill development is the further development of land within an existing urban and built-up area (Land Information New Zealand, 2019). By carefully planning infill development in existing well-serviced areas of the city, it can offer opportunities and benefits such as increased housing numbers and walkable neighbourhoods, Development sites are often chosen due to their location, where economic calculations often find that new developments promise a higher return than renovating the existing building for use. In New Zealand, this typically involves subdividing (creating a new section behind or in front of an existing house) or demolishing or removing an existing house to build apartments or terraces. Infill development is a developer's tool in the increasing density or creating higher density new builds near existing resources and service infrastructure.

Over the past decade, there has been an increase in infill developments densifying central city suburbs. These suburbs are often filled with old buildings and homes which face the risk of replacement in favour of new builds due to factors such as, climate change issues, and the financial cost of bringing buildings up to new standards. For many developers it would generate more profit by replacing old buildings with new ones that have multiple units. As Jane Jacobs startes "Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them." (1961). Despite this many communities often prefer and rely on the character of existing buildings for wayfinding and to draw people into the area. It the use of conservation solutions, such as adaptive reuse that many older buildings are given an extended or new life (Jacobs, 1961).

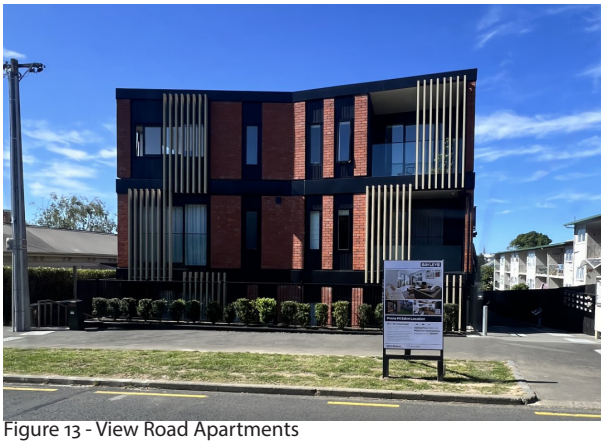


Figure 13 - View Road Apartments


Figure 14 - Delta Ave Terraces


Figure 15 - Valonia St Houses


Figure 16 - New North Road Apartments


Figure 17 - New North Road Apartments


Figure 18 - Valonia Houses


Figure 19 - Kingsway Ave Apartments


Figure 20 - View Road Homes

1.4 Bluefield Housing

A new development within urban design is the creation of "Bluefield Housing", a concept coined by Damian Madigan in 2022 in his PHD thesis on alternative infill development within the suburbs of Australia. Madigan's Bluefield Housing refers to the existing low-rise suburban neighborhoods with lackluster densification strategies and policies with minor infill and housing additions. Bluefield Housing aims to increase housing density and diversity within existing suburbs while retaining neighbourhood character(Madigan, n.d.).

Madigan's research into infill development strategies discovered a gap in Australian housing between the low-density detached single-family home and the medium-density duplexes, terraced housing, and mixed-use. This gap is also prominent within the Auckland housing stock. Bluefield Housing aims to bridge this gap through "an additional suburban infill housing model that can add to the existing low-rise mix". (Madigan, n.d.)

Unlike the commonly used knock-down-rebuild (KDR) model, Bluefield focuses on reusing the existing fabric of a site and neighbourhood to create sustainable and resilient housing for the people living there.

Seven key principles underpin Madigan's Bluefield housing model:

- Facilitate sharing,
- Ignore lot size and yield and co-locate to avoid land division,
- Retain and adapt the lot's original housing,
- Leverage the prevailing pattern of alterations and additions,
- Creating housing in a flat hierarchy,
- Arrange housing around shared landscape in a unified design,
- And Design for social, financial and environmental sustainability.

At the centre of Bluefield housing is community-centric design, which prioritises residents' needs by creating moments for interaction and connection. This can be achieved through co-locating independent housing on the same lot with the ability to modulate degrees of sharing and interaction depending on the resident's needs. The co-housing strategy requires a flat hierarchy across the site, treating all housing equally with no one dwelling more significant than others.

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Figure 21 - Housing Typologies Across Densities (Madigan, 2023)

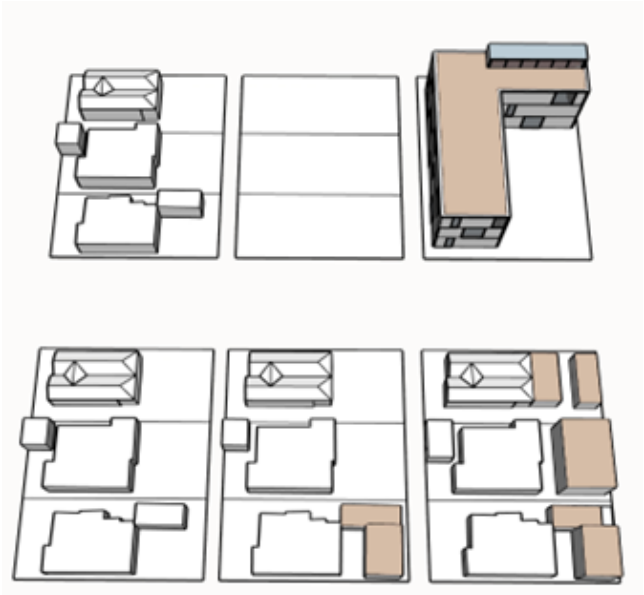

Figure 22 - KDR Densification vs Bluefield Housing

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Figure 23 - BAU Battleaxe Subdivision vs Bluefield Housing (Madigan, 2023)

The retention and adaptation of the lot's existing housing recognise and incorporate the global desire to renovate and tailor homes to meet personal preferences. This allows projects to be staggered over time according to needs, funds and the ability to live on-site while work is completed, as explored within the Acaccia Cottage case study in Chapter 3.

People are often attracted to older homes due to their aesthetic character, including garden and neighbourhood amenities. Retaining and adapting older housing maintains the existing scale and streetscape, which has developed gradually over time and is something KDR often cannot replicate. Instead of replication, by looking at the local development pattern and context, mimicking or taking inspiration from surrounding structures can be a useful tool to allow new housing to relate to the existing neighbourhood.

> *"if the adaption of houses is a staple of older neighbourhoods, so too is that the spaces around them are filled with housing additions and extras." (Madigan, n.d.)*

A successful Bluefield development retains the existing building on site, re-configuring it to create small-footprint living, and co-locating one or more new dwellings, including:

- A division of the existing house into separate dwellings under one roof,
- An extension to the existing dwelling, or
- As a detached backyard home.

While Bluefield Housing contains these infill strategies for within established neighbourhoods, it does require tailoring to the conditions of individual neighbourhoods. These strategies can be used individually or combined within a project to "intensify, densify, transform the city from the inside . . . without losing quality." Anne Lacaton

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Figure 24 -Common Internal Modifications(Madigan, 2023)

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Figure 25 - Prime for Development Site and a Site with Common Developments(Madigan, 2023)

1.5 Adaptive Reuse

Buildings are the record of our history, containing our lives and a memory of past generations. Few buildings are designed to change yet they change anyway (Brand, 1994). From the initial drawings through to its end of life, buildings are altered and changed. Changed by usage, changed by property value, and changed by evolving cultural and social-political environments.

Adaptive Reuse refers to the process of adapting a building for a purpose other than the one it was designed for (The Getty Research Institute., 2017). This is consistent with many other definitions revolving around the concept of change such as the process of converting a building to a new use, one different from the initial construction (Arfa et al., 2022). The adaptive reuse practice focuses on the reuse of the existing structure but can also involve materials, defining interventions and the preservation of any cultural heritage surrounding the building. All buildings are constructed with a finite lifespan in mind. The practice of adaptive reuse of a building can extend the lifespan, delaying the deconstruction process, practising a form of immortality and preservation of memory.

People are drawn to places with distinct characters and a rich history. These qualities are often found in communities with aging buildings, whose unique character has evolved over time becoming a defining centre to their community. For these buildings, adaptive reuse is not just a practical solution, but a form of historic preservation. It allows us to maintain and restore the building's components while respecting its cultural heritage, instilling a sense of responsibility and pride in our shared history (Auckland Council, n.d.-a).

Adaptive reuse practices can accurately preserve while also radically change a building and its function. In the book Adaptive Reuse: Extending the Lives of Buildings (2017), author Liliane Wong considers all existing buildings and structures as hosts and us as their inhibitors or guests. Through this concept, we can identify the different host structure types, as suggested by Wong in the figure below and apply them. These different structure types become a guide to understanding the existing attributes of a host building to determine the level of intervention required to support the building's continuing personality and existence (Wong, 2017).

While interventions may appear aesthetically different, the use of contemporary components within projects demonstrates a fusion of old and new, promoting respect and incorporation into the history of architecture. This fusion can become the foundation to a successful intervention to a building, instead

investigating the best means for alterations and interventions can be made to support the building as a host, creating a change to the existing order that is respectfully incorporated into the surrounding community (Wong, 2017).

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Figure 26 - Host Structure Types (Wong, 2017)

1.5.1 Adaptive Homes

Domestic buildings – people's homes – are the most constant building type to change. They respond directly to the needs of its residents, through changing decorations such furniture and paint, or at an extreme level the construction and removal of walls to change the feel of a space, allowing home and user to meld to each other (Brand, 1994). Homes, more than any other type of building, collect a record of intimate history, through the scuffs on the floor, picture hooks in the walls, and the marks of growth charts on doorframes. Buildings as homes, can survive and be passed through many generations, shifting people's fantasies to meet rapidly changing needs. It is the home that responds the most through the frequent changing of its components within the building layers of services, space plan and stuff (Brand, 1994).

On the surface, the modern preference of embedding systems may appear efficient, but over time as components age and need replacing it can become difficult and destructive. Old buildings such as the New Zealand Villa are designed and constructed to make them more adaptable than the modern designs of embedded concrete and steel. The villa's timber construction separates the building system layers of structure, skin, and services. Each layer gets space to itself, enabling easy maintenance and renovation while the standard timber stud construction surrounds and connects them.

> *"An adaptive building has to allow slippage between the differently paced systems of site, structure, skin, services, space plan, and stuff." (Brand, 1994)*

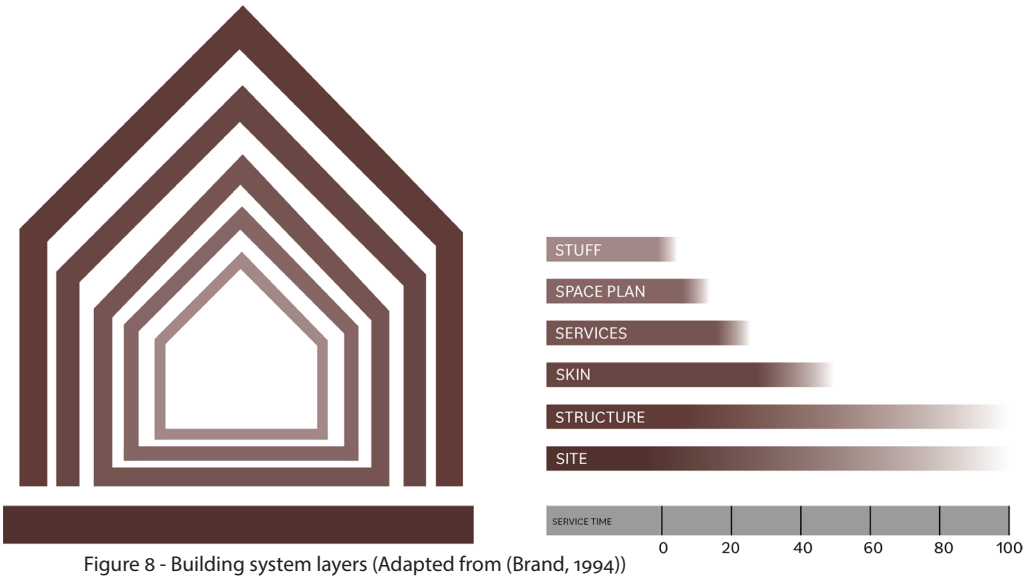


Figure 8 - Building system layers (Adapted from (Brand, 1994))

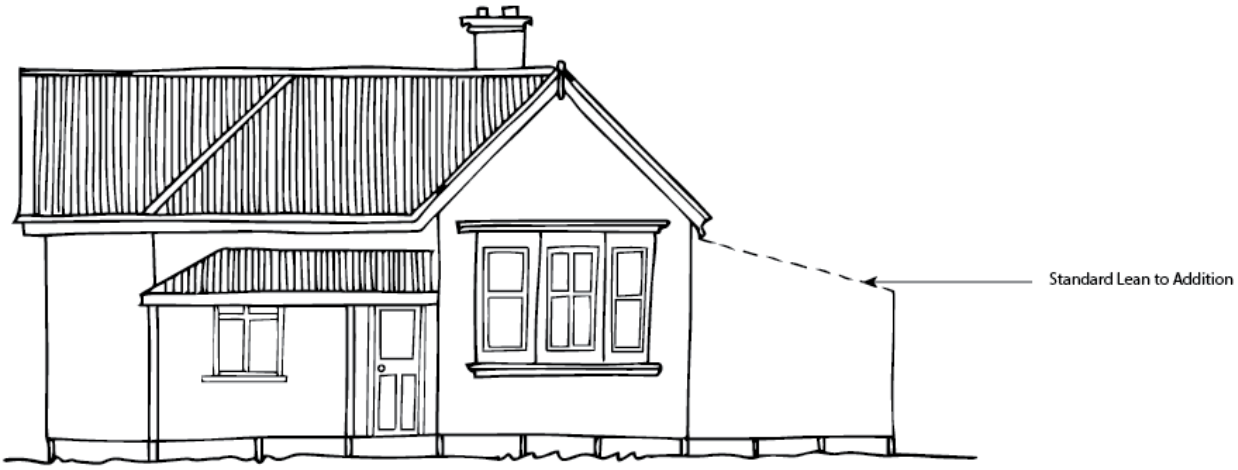


Figure 27 - Example of a Lean-to Addition to an Existing Building

1.6 Heritage Conservation Principles

Buildings contain the ability to tell stories of their history through their form and details(Glendinning, 2013). It is by showcasing their past through heritage and cultural components that we get to understand these stories specific to each community, individual building, their inhabitants and of society impact upon them.

Architectural styles can be tracked through time, creating a visual timescale that allows us to age and understand buildings, which aligns with the continuity of human experience (Giedion, 2009). These different styles indicate changing society values, rise and fall of economies, the influence of cultures, and a memorial of war (Salmond, 1986). The architectural and design styles corresponding to each period are part of history and while they are not all successful or last long-term, they represent the learning and the creativity of humankind.

Globally, people have an interest in things that show their age and a process of evolution, collecting and preserving creative endeavours such as art, costume and even architecture. Since the 1970s New Zealand finally understood this, beginning to celebrate how old homes, not just significant buildings, should be supported and celebrated (Salmond, 1986).

As a relatively new country, New Zealand's history began with the Māori who used nature and the land around them to create homes and communities, Papakainga (which hold similarities to some bluefield housing ideas, with lots of shared spaces). Shelters were one or two rooms constructed from local materials such as Nikau, Raupo, tōtara and harakeke (flax)(Schrader, 2016)). It was the early European settlers that took much inspiration from other countries' architectural design styles importing prefabricated houses from England or Sydney (Stewart, 1992). These imported designs evolved over time into more spacious and detailed homes, such as the villa and the bungalow, a nostalgic part of post-colonisation New Zealand architectural history. In a time of rapid urban development, these old homes and buildings require heritage protection to ensure their continual survival.

Each architectural and building style is its own entity, with its own specific characteristics. Using heritage conservation principles and standards, the transformation of these buildings can demonstrate respect for the continuing identity of the host building. It is with the assistance of organisations such as ICOMOS (International Council on Monuments and Sites) that we can employ and apply principles and guidelines to enable the conservation of places and sites of cultural and historical value.

The New Zealand ICOMOS Charter for the Conservation of Places of Cultural Heritage Value outlines the purpose, practices, principles and processes of conservation, offering clear definitions of key terms to enable understanding and ease of application. Where this charter differs from other ICOMOS Charters is in specificity of principles towards the conservation of places of cultural heritage value in New Zealand (ICOMOS, 2010).

The 2010 ICOMOS New Zealand Charter contains several degrees or process of intervention possible for conserving buildings with cultural heritage value. These interventions range in severity from meticulous and limited preservation (ensuring long-term survival) to adaptation, which allows for maintenance or change in its use. Not all of these listed interventions below may be appropriate for every project, requiring careful analysis of a site's cultural heritage values to determine intervention application.

ICOMOS New Zealand's degrees of intervention for conservation purposes:

i) Preservation (Interventions of stabilisation, maintenance or repair.)

ii) Restoration (Reassembly, reinstatement or removal.)

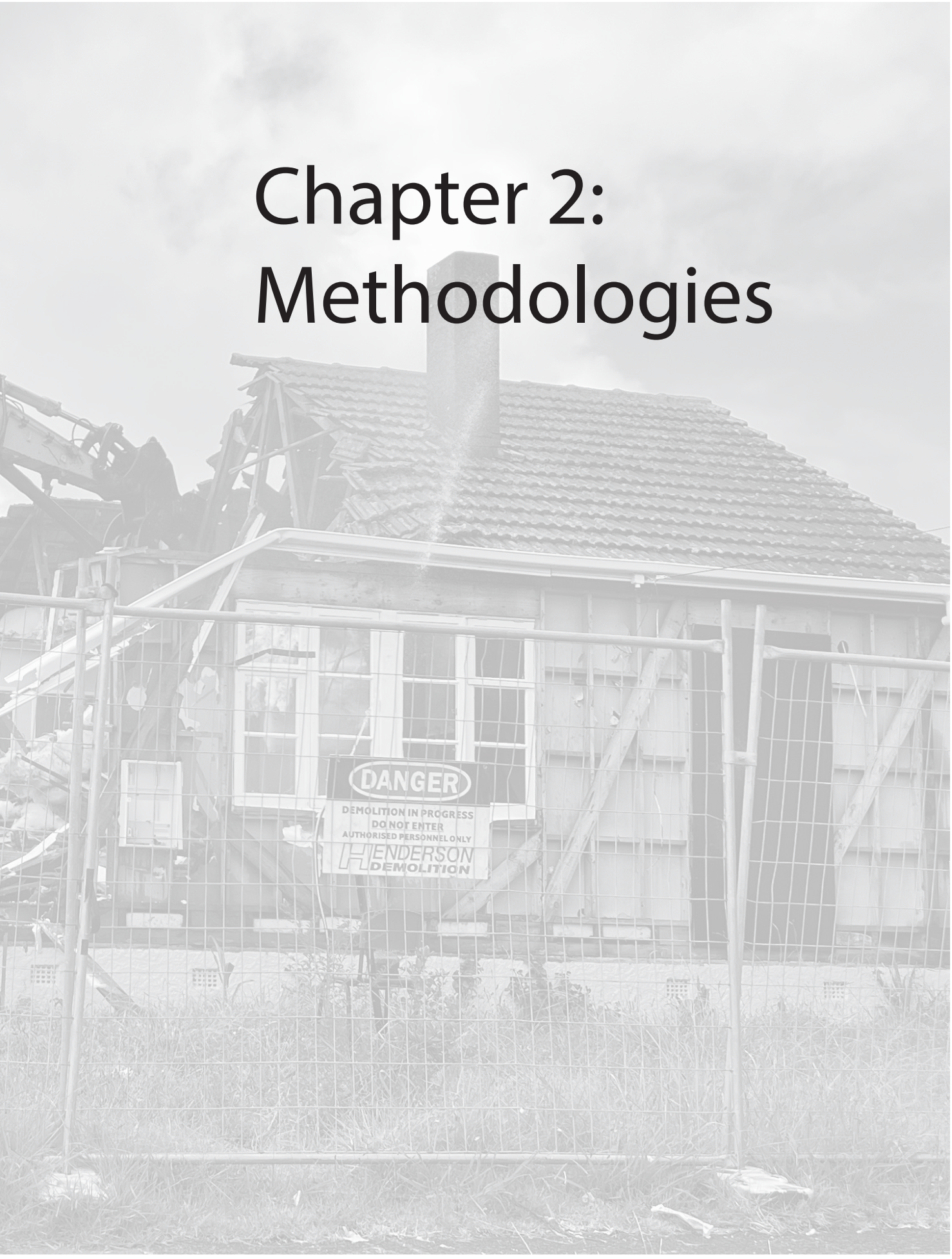
iii) Reconstruction (Introduction of new material to replace existing)

iv) Adaptation (Alterations or additions to maintain or change use)

ICOMOS defines adaptive reuse as "The conversion of outmoded or unused structures, such as buildings and objects of historic value, to new uses or applications in new contexts"(ICOMOS, 2021). In this thesis context of reuse of existing residential buildings in infill development, one or a combination of the above degrees of intervention may be used to create sensitive developments.

Figure 28 - Chapter 3 Cover Image of O'Donnell Ave Home

Chapter 2: Methodologies



Throughout history architectural research has been present, through practical trial and error, experimentation, critical observation and the passing of knowledge through application (Groat & Wang, 2002). These are still the same processes we still use within architectural research, however, our tool for expanding knowledge is much more systematic and analytical with the rise of digital technologies such as CAD software, and Life Cycle Analysis tools. This research has been undertaken using mixed methods of research of qualitative and quantitative research through a literature review, mapping, surveys, and site analysis.

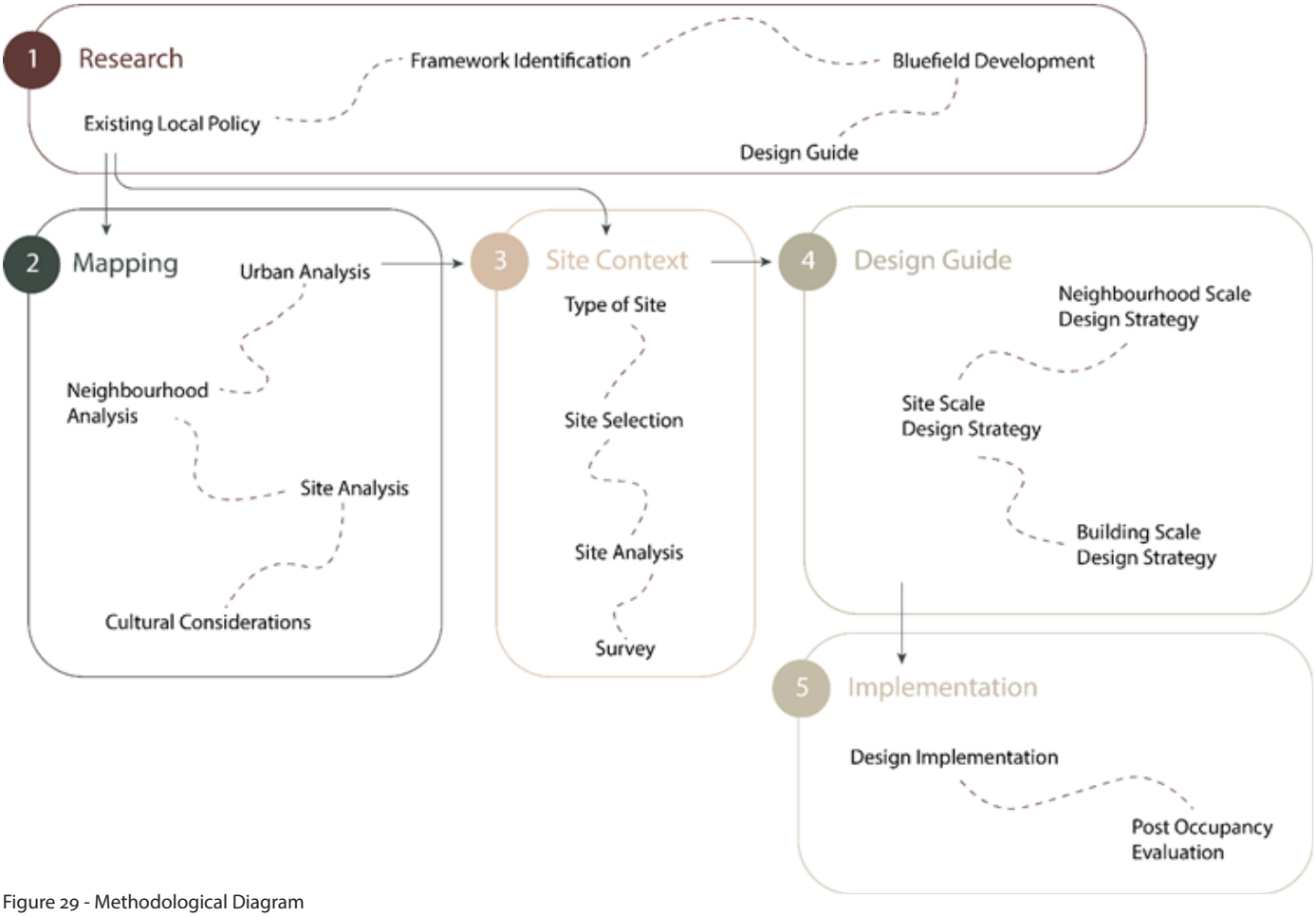


Figure 29 - Methodological Diagram

2.1 Design Led Research

Design-led research uses design practices and processes to explore possibilities during the early stages of a project. The use of drawing and model making as a design approach allows for visual testing and analysis of information of physical design outcomes and how to achieve them. Design has placed itself as a form of research that is a strategic approach for architects and their businesses as it is a creative process that that can be adapted for multiple applications (Wrigley, 2017). Following the initial research stage of Survey and Literature Review, the design-led research methodology was applied to the thesis for the reuse and development of the Walters Road Site. The combination of research and visualisation through design interventions of drawing and model making and 3D modelling.

2.2 Case Studies

Case Studies are a common research methodology used within a wide range of fields including psychology, political science, social work, business, nursing and planning. Groat and Wang describe a case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (2013)." This places the need for a case study in wanting to understand a complex social phenomenon or answer the question "What are the characteristics of this particular entity, phenomenon, person, or setting?" (Yin, 2009). Within architecture, it is looking at a case in relation to the complex dynamics, such as the setting (site context and usage) with which it intersects and is inseparable (L. Groat & Wang, 2013).

There are six case studies that are analysed within this thesis, which explore alternative infill and densification options, such as expansion, adaptation, and small additions that are sensitive to existing buildings on site and their urban contexts. These infill and densification case studies provide the analysis of whether they could be applied as a solution to this thesis project.

2.3 Survey With Residents

To understand the perspectives of residents in the area, an online survey assisted the development of this study. The survey was an anonymous online questionnaire created and delivered to selected neighborhoods by AUT Master of Architecture (Prof) students with assistance from faculty supervisors as part of initial stage thesis research. Distributed in following selected Tamaki Makaurau neighborhoods; Henderson, Massey, Mount Eden, New Lynn, Northcote, Takanini, Piha and St Heliers, the survey included quantitative and qualitative questions surrounding livability, the quality of public amenities and available infrastructure of the participants neighborhood.

The survey was distributed from April to May 2024 in selected neighborhoods via invitations in letterboxes and posters with a QR code in public spaces and on social media platforms. There were a total of 2321 letterbox invitations delivered, four displayed posters in public spaces and nine social media posts involving location-based Instagram advertisements and community Facebook groups.

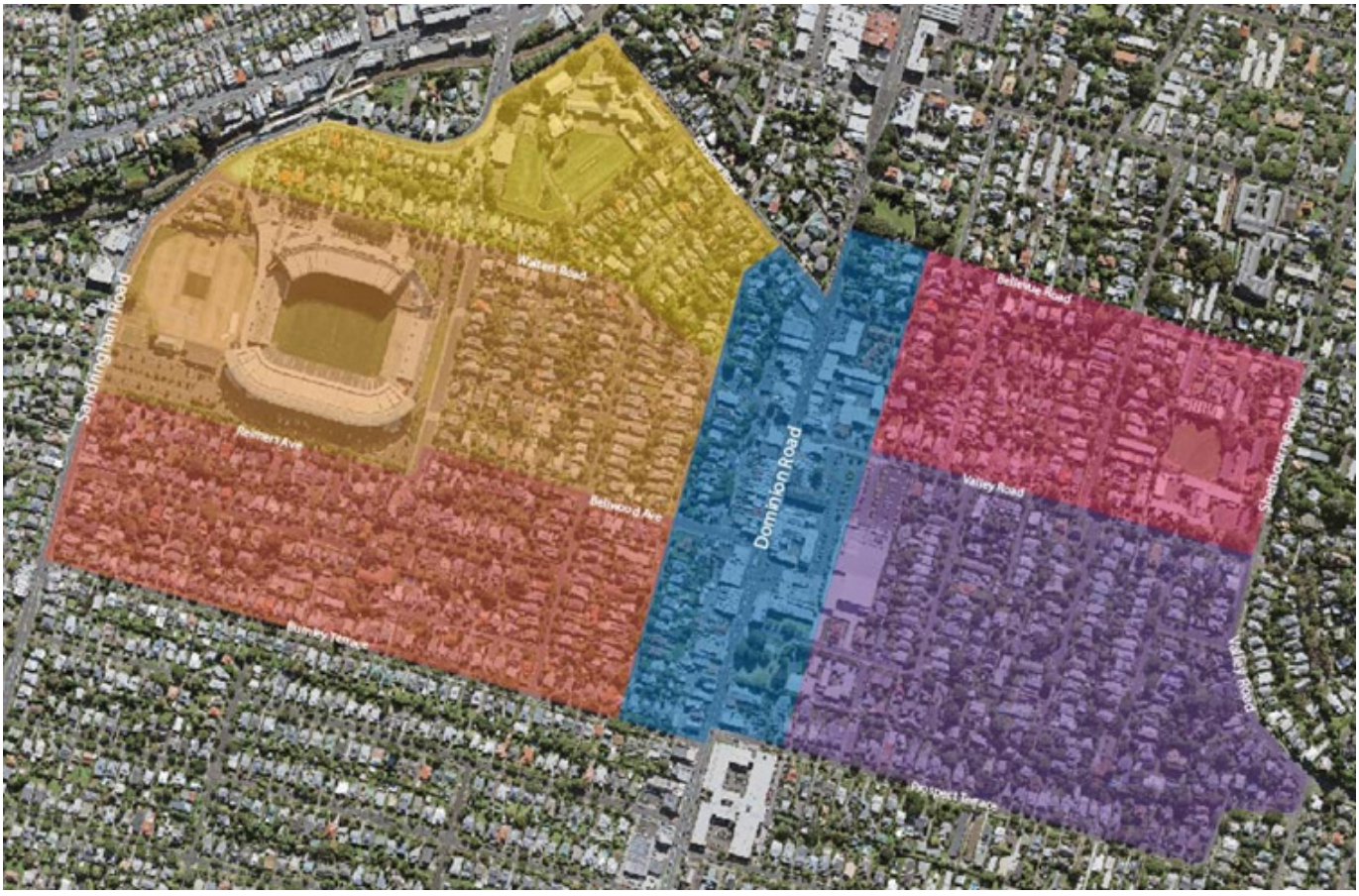
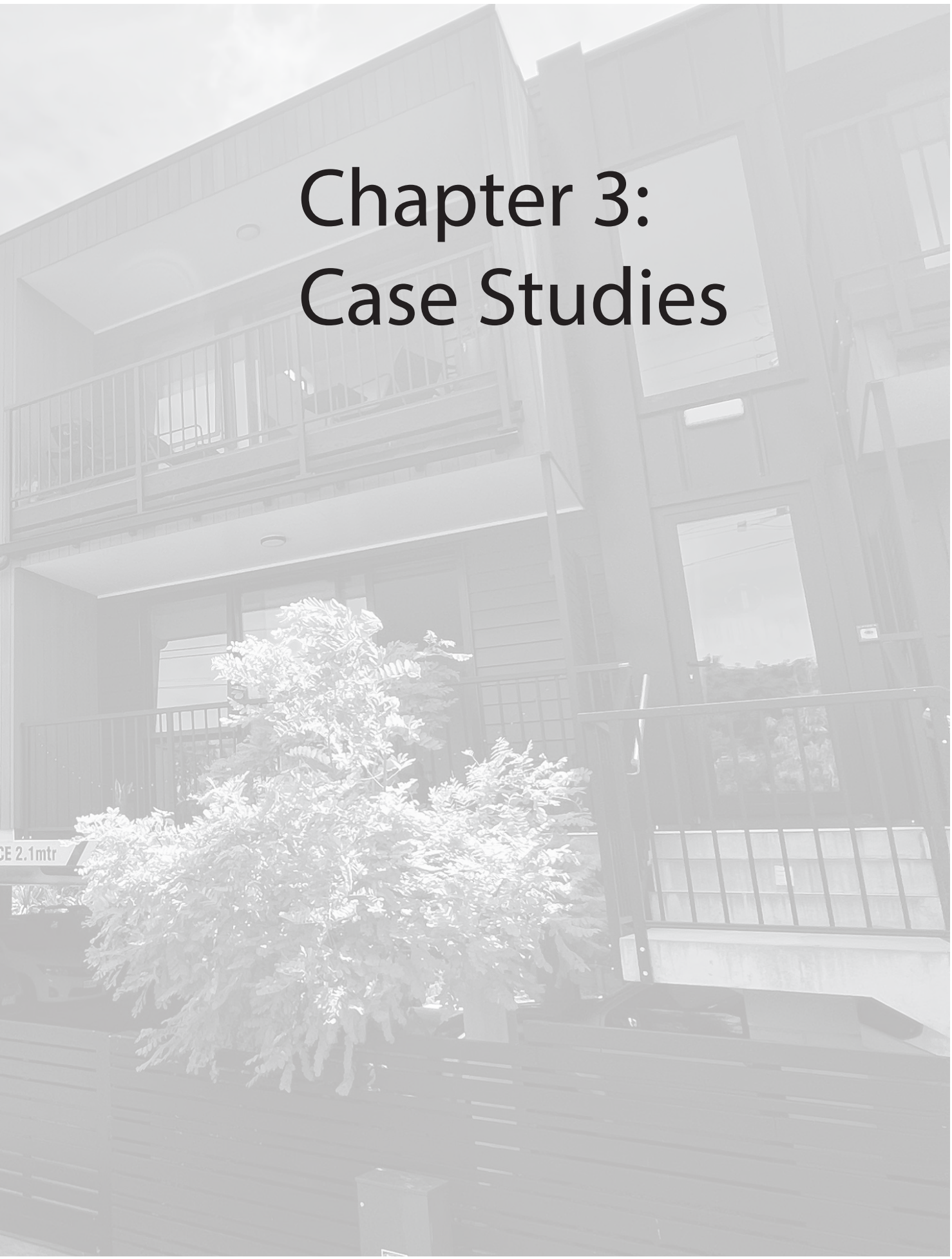


Figure 30 - Resident Survey Map of Site Neighbourhood

Figure 31 - Chapter 2 Cover Image of Sandringham Road Apartments

Chapter 3:
Case Studies



As New Zealand's population continues to grow, the need for more housing within urban areas has increased, making densification one of the primary focuses within the housing and construction sector. While urban densification is commonly considered the removal of multiple homes to be replaced by terraces or an apartment block, when dealing with heritage homes and cultural heritage areas demolition densification is not a viable solution. Instead, we must look to precedents that maintain respect for existing sites and structures, providing opportunities for a longer lifespan, the oldest example of which is Acacia Cottage.

3.1 Acacia Cottage

Acacia Cottage, circa 1859, is one of the earliest surviving timber dwellings in New Zealand. While the preserved colonial-era home is now protected by its Category 1 Historic Place listing, Acacia Cottage has been adapted multiple times throughout its lifetime, expanding to meet the changing needs of its occupants. Acacia Cottage alike many existing inner city suburban homes was threatened by redevelopment prompting its relocation to Cornwall Park (Figure 32) before undergoing successive restoration to return it to its original structure (Heritage New Zealand, n.d.). As an example of pioneer vernacular architecture, the building's adaptability through maintenance and conservation techniques of the historically significant home heralds it as architectural preservation that allows it to survive through the centuries.

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Figure 32 - Acacia Cottage being relocated to Cornwall Park (Auckland Weekly News, 1921a)

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Figure 33 - Plan of Acacia Cottage, built 1841 [drawn by] T.C.M. Patterson (Patterson, 1859)

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Figure 34 - Acacia Cottage on its current Cornwall Park Site (Heritage New Zealand, n.d.)

3.2 Albert Park Addition

A differing example of architectural preservation is the use of alteration and extension which is showcased in Albert Park Addition by MUSK Studio. The addition project follows the careful reuse, renovation and addition to a heritage building enabling it to meet the needs of modern living. Located in Melbourne Australia, the original red brick Edwardian era home boasts a new contemporary aluminium clad extension to the rear of the property (MUSK Studio, 2018). The contrasting distinction of the two cladding materialities helps separate the character of the original and the new parts of the building, making visible to the public how the home has adapted to meet needs.

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Figure 35 - Albert Park Addition Street Perspective (MUSK Studio, 2018)

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Figure 36 - Albert Park Addition Courtyard (MUSK Studio, 2018)

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Figure 37 - Albert Park Addition Internal Courtyard(MUSK Studio, 2018)

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Figure 38 – Interior corridor of Albert Park Addition (MUSK Studio, 2018)

3.3 Dally Terrace

Dally Terrace transformed a 19040's statehouse into a multi-generational home through a second-floor extension. The reuse of existing structures and the reuse of components such as native timbers from the original home into the new extension provided a character link between the two homes mirroring the character that transcends the generations of its occupants (Construkt Architects, n.d.). While densification of urban areas can start to take place through these lower density addition/extensions another up and coming method is the popularisation of the Tiny Home movement.

Figure 39 - Birds Eye of Dally Terrace(Construkt Architects, 2017)

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Figure 40 - Dally Terrace Garden Exterior(Construkt Architects, 2017)

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Figure 41 - Dally Terrace Stairwell(Construkt Architects, 2017)

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Figure 42 - Dally Terrace Hallway Skylight(Construkt Architects, 2017)

3.4 FLiP Homes

Tiny homes are the concept of living compactly a concept that is reminiscent of apartment living. Promoted as a complementary dwelling for the front or backyard they can help provide extra living space and example of which is Flip Homes and Te Whare-iti. Flip Homes have a range of layouts and sizes to choose from to meet each site and owners needs (FLiP Homes, n.d.).

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Figure 43 - FLiP mini one bed(FLiP Homes, n.d.)

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Figure 44 - FLiP high two bed (FLiP Homes, n.d.)

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Figure 45 - FLiP Low 1 in Hastings, Hawkes Bay (FLiP Homes, n.d.)

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Figure 46 - FLiP Mini in Mirimar, Wellington(FLiP Homes, n.d.)

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Figure 47 - FLiP Punch 90 in Mirimar, Wellington (FLiP Homes, n.d.)

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Figure 48 - FLiP Stack in Mt Roskill Auckland (FLiP Homes, n.d.)

3.5 Te Whare-iti

Te Whare-iti uses a more adaptive module system that can be mixed and matched to create a unique dwelling for its desired purpose. The modular system breaks down space into five zones, services, bedroom, multi-use, sunspace and porch, that can be placed in any formation on site(Te Whare-iti, 2024). The main limitation of this module system is the lack of a stair module while would allow to increase project space vertically, a critical factor for most urban development projects as it is their goal to maximise developable area on the site. This is something that Torontos Laneway Houses Initiative took into consideration.

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Figure 49 - Te Whare-Iti modules (Te Whare-iti, 2024)

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Figure 50 - Te Whare-iti Brooklyn Project(Te Whare-iti, 2024)

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Figure 51 - Te Whare-Iti Brooklyn Project Plan (Te Whare-iti, 2024)

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Figure 52 - Te Whare-Iti Brooklyn Project (Te Whare-iti, 2024)

3.6 Torontos Laneway Homes Initiative

With the goal to meet urban development and affordable housing demands due to rapid growth. Toronto's Laneway Houses Initiative encouraged eligible property owners to develop part of their property with a secondary dwelling unit: a laneway suite. Laneway suites are constructed behind street-facing homes on lots that abut a public laneway (City of Toronto, 2015). Alike the aims of this research, the laneway suites aim to enhance the quality of Toronto's affordable housing market by densifying existing neighbourhoods and utilising existing infrastructure and underused urban space.

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Figure 53 - Laneway Suites (Lanescape Architecture and Construction, n.d.-a)

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Figure 54 - East End Laneway Houses Proposal (Craig Race Architecture, 2019)

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Figure 55 - East End Laneway Houses (Craig Race Architecture, 2019)

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Figure 56 - Norwood Park Laneway Suites Plan (Lanescape Architecture and Construction, n.d.-b)

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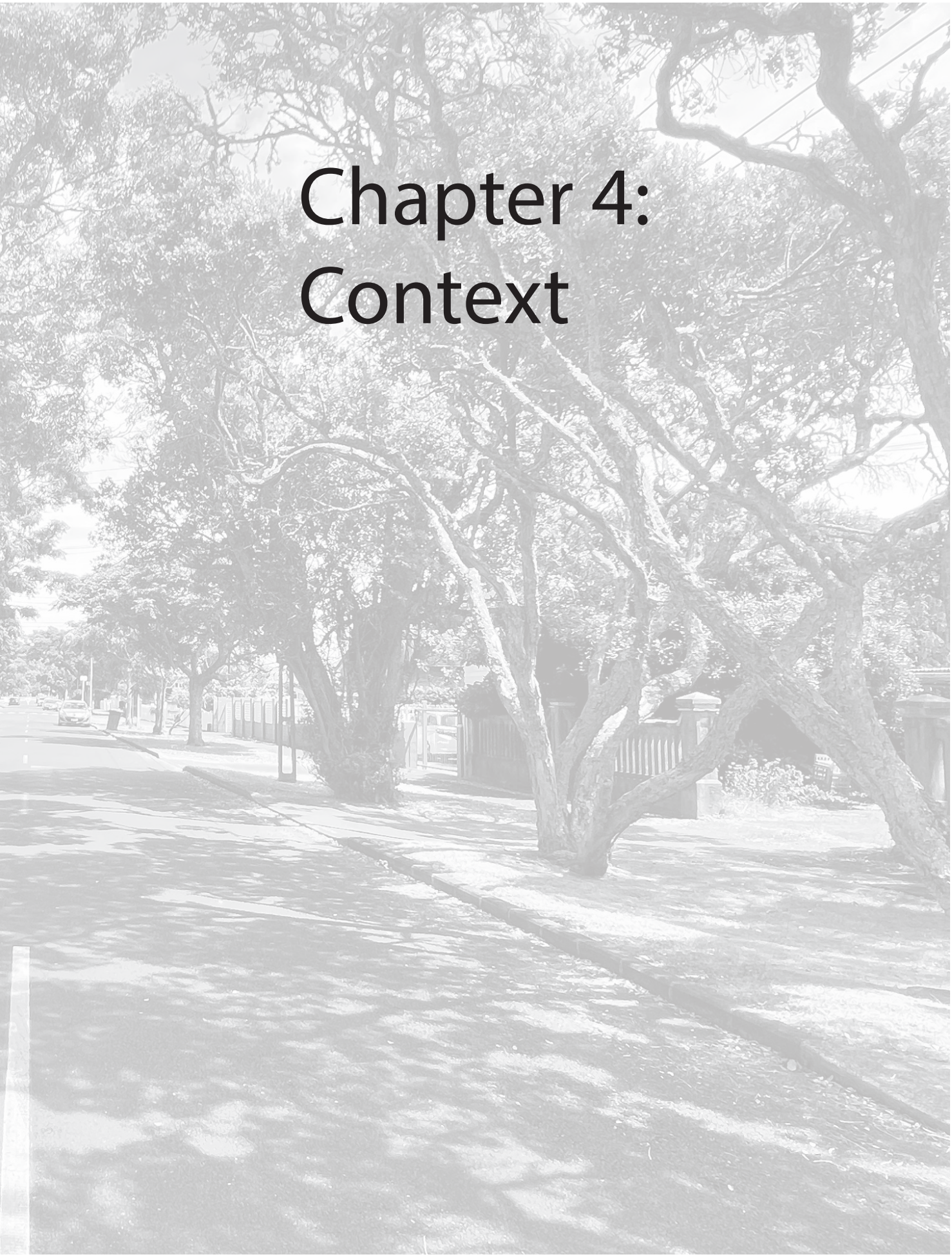
Figure 57- Norwood Park Laneway Suites (Lanescape Architecture and Construction, n.d.-b)

Case Studies Conclusion

The case studies explored within this chapter have covered multiple alternative infill and densification tools from renovation to new construction. Concepts within these case studies can be explored through this thesis' design project such as Acacia Cottages relocation and preservation of the heritage home to enable its continued lifespan. Albert Park and Dally Terrace are examples of how renovation and extentions can retain and improve the livability of existing buildings by adapting to meet modern living needs, such as larger families requiring more room or the ability to co-locate and share amenities. Te Whare-Iti and FLiP are examples of how new additions to sites can be compact and flexible for a range of sites and accommodation sizes yet encompass all needed amenities. Laneway houses Initiative are a tested example of careful infill densification by individuals and while it was not deemed a successful program the concepts about infill densification in order to increase housing and lower housing costs align with the aims of Bluefield housing and this thesis.

Figure 58 - Chapter 4 Cover Image of Paice Ave



Chapter 4: Context

4.1 History of Mt Eden

The suburb of Mount Eden sits below the volcanic cone of Maungawhau (Mount Eden). After erupting about 15,000 years ago, Maungawhau is a196-meter volcano, the tallest volcano in Auckland and part of Auckland's iconic skyline (Berthier & Tātaki Auckland Unlimited, n.d.). Maungawhau is the location of a significant fortified pā and was part of a network of pā which included Te Whau (Blockhouse Bay), Maungakiekie (One Tree Hill and Maungarei (Mt Wellington) (Auckland Council, n.d.). The Maungawhau pā was large enough to be the home of several hundred people (Smith et al., 2006) and has genelogical connections to 13 Iwi (tribes); Ngāi Tai, Ngāti Tamaoho, Te Ahiwaru - Waiohua, Ngāti Pāoa, Te Ākitai Waiohua, Te Rūnanga o Ngāti Whātua, Te Kawerau a Maki, Ngāti Whātua o Kaipara, Ngāti Whātua Ōrākei, Ngāti Tamaterā, Ngāti Te Ata, Ngāti Maru, Waikato – Tainui (Auckland Council, n.d.-b).

Land subdivision and sales in the area began in 1841 developing small farms over the next decade. In 1896 the suburb of Mount Eden was considered as an outlying village and rural suburb to central Auckland (Auckland Council, n.d.). Rural living within these outer suburbs was the foundation of the quintessential style of New Zealand living where each family lives in their own home on their own quarter acre plot of land. By the start of the twentieth century the farms within Mt Eden, Balmoral and Sandrigham had given way to housing, schools and businesses (Auckland Council, n.d.). With Auckland's suburban growth relying on land availability and transportation the introduction of the tramways provided unprecedented access to the public to travel into areas outside of the urban centers. Suburbs such as Mount Eden developed around these tramway routes which made daily commute to and from central Auckland easier, increasing the desire for separating work and living a concept that remains today. Despite the growing urbanisation of Auckland, single family detached houses on their own section have remained the suburban ideal, an ideal where an individual works in the city and lives in the suburbs (Stewart, 1992).

Figure 59 - The Corner of Dominion and Vally Road

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Figure 60 - 1917 Street Map of Auckland City and Suburbs (Wilsons & Horton, 1917)

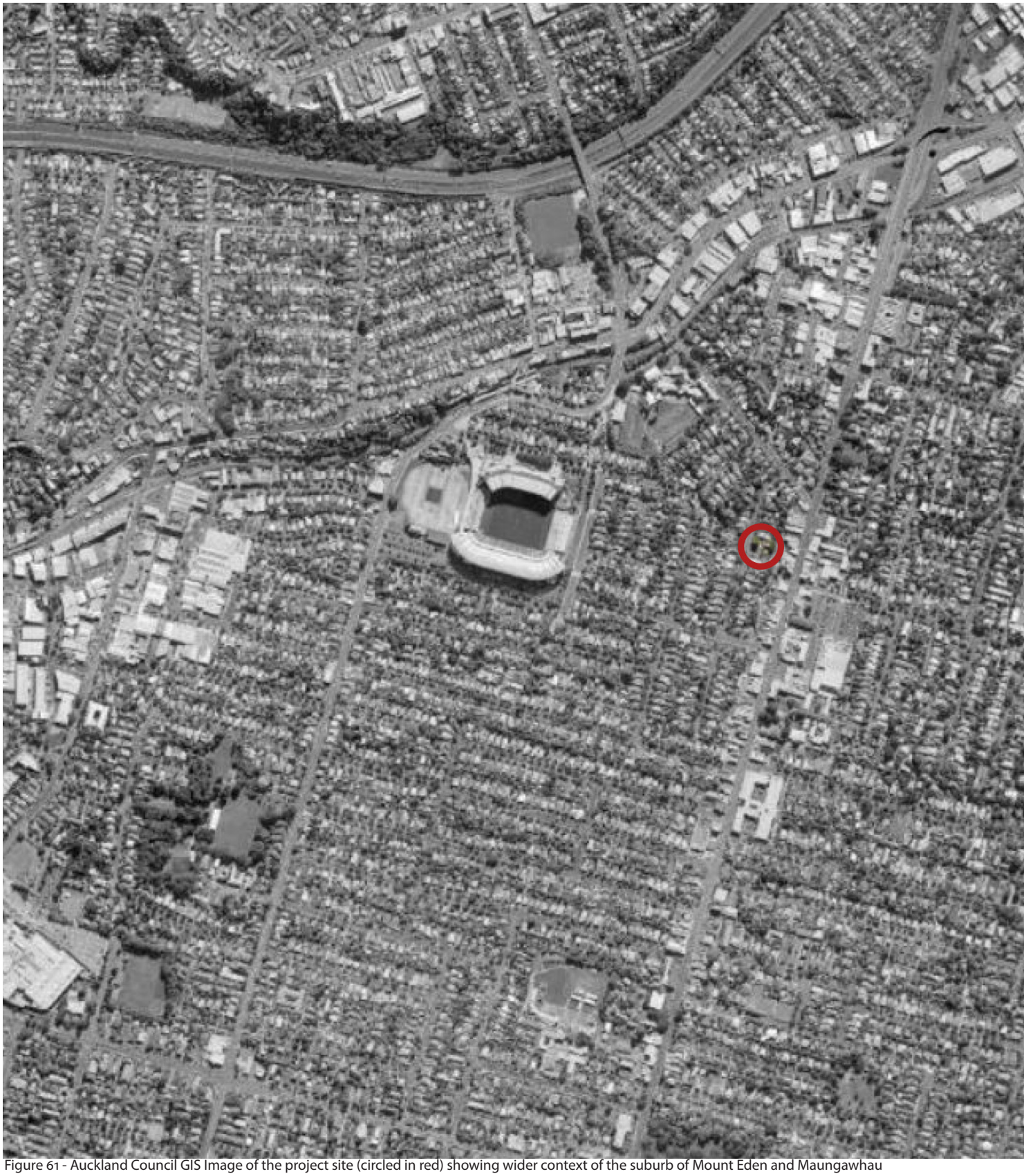


Figure 61 - Auckland Council GIS Image of the project site (circled in red) showing wider context of the suburb of Mount Eden and Maungawhau

4.2 Site Context

The chosen project Site is located at 3 Walters Road which sits just off Dominion Road and Eden Park within the central Auckland suburb of Maungawhau (Mount Eden). In 1896 the suburb of Mount Eden was considered as an outlying village and rural suburb to central Auckland. Rural living within these outer suburbs was the foundation of the quintessential style of New Zealand living where each family lives in their own home on their own quarter acre plot of land. The introduction of the tramways provided unprecedented access to the general public to travel into areas outside of the urban centers. Suburbs such as Mount Eden developed around these tramway routes which made daily commute to and from central Auckland easier, increasing desire for separating work and living a concept that remains today. Despite the growing urbanisation of Auckland, single family detached houses on their own section have remained the suburban ideal, an ideal where an individual works in the city and lives in the suburbs (Stewart, 1992).

The project site is a corner site prime for development into a higher-density residential development. Located on the cusp of Dominion Road, a high traffic route between the center city and the suburbs, once proposed for tram line connection. The site is on the same street as Auckland's largest stadium, Eden Park, putting it on the edge of the no traffic zone for events. Close to public transport, the site is around the corner from Dominion Road bus stops and the Kingsland Train Station being a 10-minute walk away at the other end of Walters Road. Mt Eden's development as a suburb began in the 1900's, shown through the style of architecture within the area ranging from Victorian Villas through to the Bungalow further towards Sandringham. Mt Eden is a well-developed suburb with supermarkets, multiple schools, churches, St Lukes mall, community hall used by multiple groups, gyms, charity shops and halfway homes. The site sits under the shadow of Maungawhau (Mt Eden), a 196-meter volcano, the tallest volcano in Auckland and part of Auckland's iconic skyline.

The project site sits within Residential - single house zoning which borders onto a property of Business - Local Center zoning. Residential – single house zoning requires that any development maintains and enhances the amenity values of an established residential neighborhood. These amenity values can include historical special character, sites with prominent trees, coastal location or other factors such as established neighborhood character (Auckland Council, n.d.-a).

Figure 62 - Walters Road Site Zoning Map

Figure 63 - Mount Eden Neighbourhood Mapping 1:8000


Tram
Train Station
Bus Station
Bus Stop
400M Walking Area
Green Space
Amenity
Arterial Road
Secondary Arterial
Design Site

Figure 64 - Villa Extention

Figure 65 - View Road Villa

Figure 66 - Prospect Terrace Home

Figure 67 - Walters Road Apartments

Figure 68 - Dominion Road


Figure 69 - Footpath Marlborough Street


Figure 70 - Paice Ave Villa


Figure 71 - Bellwood to Walters Service Lane

Figure 72 - Taupata Street Stained Glass Window

Figure 73 - Auckland Meat Building Dominion Road

Figure 76 - Transect Mapping of Walters Road to Valley Road

Figure 74 - Construction Site Valley Road


Figure 75 - Taupata Street Villa

4.3 Survey Analysis

From April to May 2024, an anonymous survey was undertaken by the Liveable Neighbourhoods lab, garnering responses from the residents of eight selected neighbourhoods around Auckland, Henderson, Mount Eden, Piha, New Lynn, Massey, Northcote, Takanini and St Heliers. The survey covered livability, public amenities and infrastructure topics, allowing for assessment and comparison of each neighbourhood and their differences. Throughout this survey period, a total of 2321 letterbox invitations were delivered, four posters were displayed in public spaces and nine social media posts involving location-based Instagram advertisements and community Facebook groups. While anonymous, this survey collected information about the age range, gender, occupation, and area of residence (based on a map provided).
A total of 200 responses were collected from the survey, with 18 only partially answered, resulting in 182 complete responses. Only considering completed responses the response rate was 7.7%.

Within this thesis' chosen research neighbourhood of the Mount Eden community, 745 letterbox invitations were delivered, and one poster was displayed in a public space within the highlighted area in Figure 30 below. The survey garnered 60 responses from the Mount Eden community.

The survey included quantitative and qualitative questions about livability, local public amenities, and the available infrastructure of the highlighted Mount Eden neighbourhood.

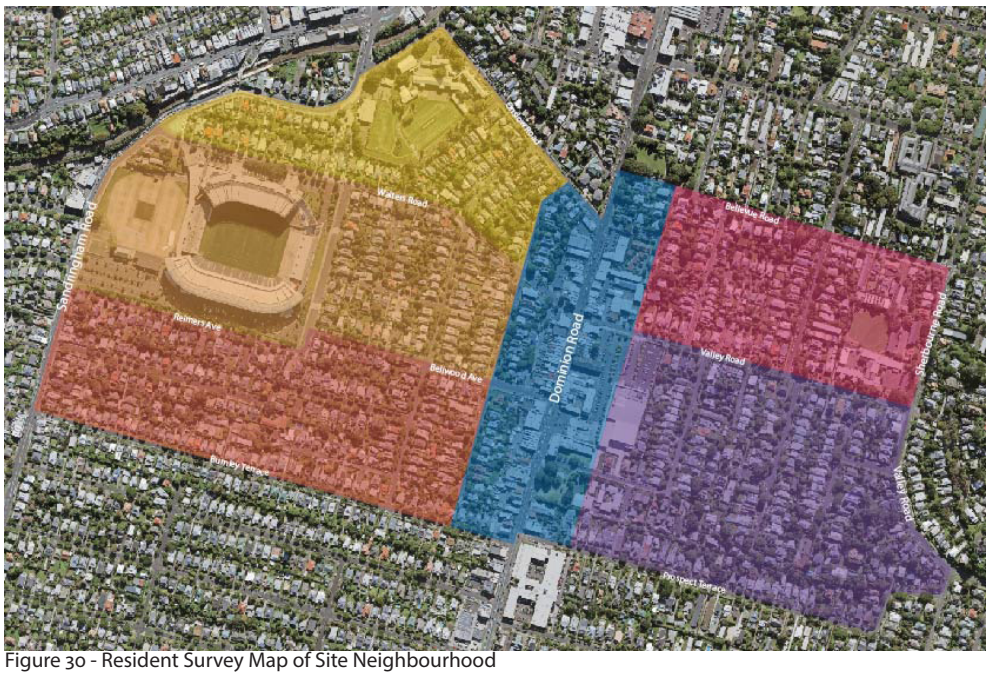
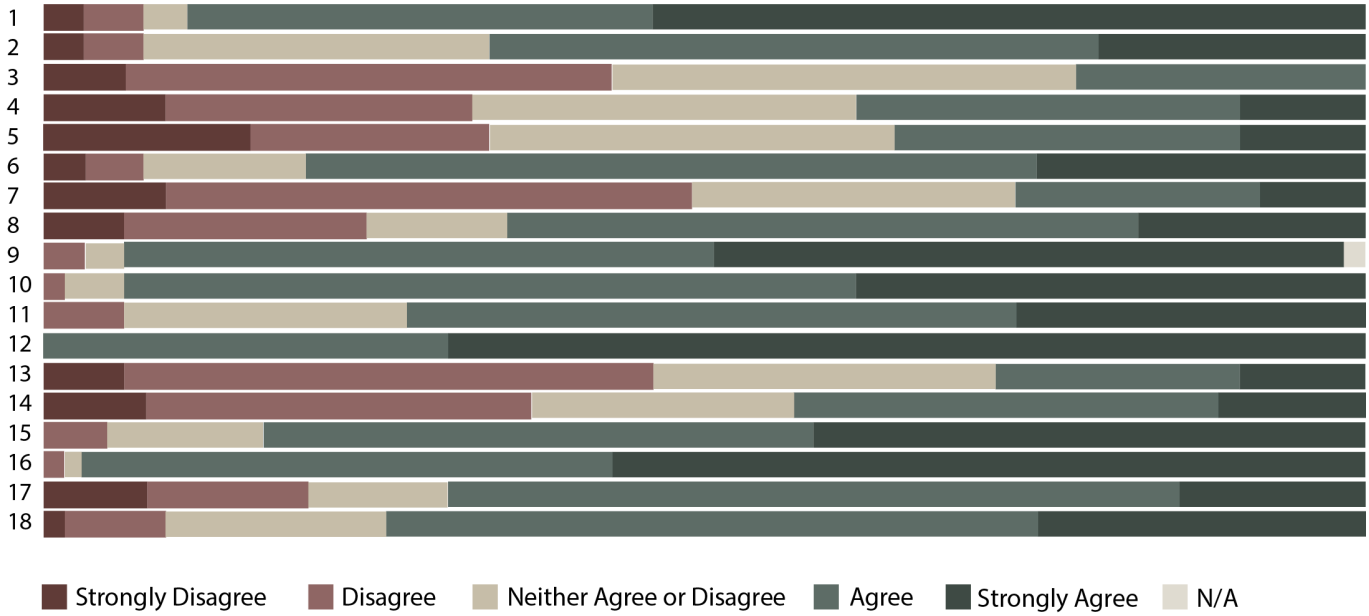


Figure 30 - Resident Survey Map of Site Neighbourhood

Perceptions on Liveability and Community in Tamaki Makauru, Auckland



Legend: Questions

1. I am able to easily satisfy most of my daily needs within a 15 minute walk from home
2. I feel like I belong in this community
3. My neighbourhood is well prepared for the impacts of climate change (e.g. storms, floods)
4. There is good infrusturcture for cycling within my neighbourhood
5. The increase of residential developments and densification within my neighbourhood is positive
6. There are well-maintained streets, parks and community facilities
7. I often have friends from the neighbourhood over to see me
8. The design and condition of footpaths and pedestrian road crossings is good
9. There is a good amount of greenery within my neighbourhood
10. I believe my neighbours would help me in an emergency
11. There is a distinct neighbourhood identity
12. There is public transport within a 10 minute walk from my home
13. There is housing for a range of income levels within the neighbourhood
14. I can recognise most of the people who live on my street
15. I plan to stay a resident of this community for a while to come
16. I feel safe walking alone in my neighbourhood during the day
17. I feel safe walking alone in my neighbourhood after dark
18. When walking, I feel safe from fast-moving vehicles

Figure 77 - Results from questions on agreement/disagreement with statements about neighbourhood perceptions

From the survey, question 18 asked respondents, "What kind of home do you live in?" Unsurprisingly, 85% of respondents said they lived in a detached dwelling/ house. This corresponds with villas being the primary form of housing in the area. Interestingly, 12% of respondents reported living in apartments, which is an uncommon housing typology for the neighbourhood, seeing more terraces and duplexes while delivering letters. This questions whether apartments are being constructed on back lots, hidden from view to maintain neighbourhood character or if detached homes are being adapted into multiple units.

In question 36, respondents were asked, "How many people live in your household?" 40% of respondents responded that two people were living in their household, and 26.7% had four people living in their household. This is unsurprising compared to the results from the respondents' ages, where the highest responding age ranges were 35-44, 45-54 and 65-74. These age ranges are likely to be couples or families with children. 13% of respondents reported living by themselves. When comparing the housing typology results, this means there are people living by themselves in a detached dwelling/ house. This poses the question of if there is enough housing stock in the area for people who choose to live alone or may want to downsize.

"What kind of home do you live in?"

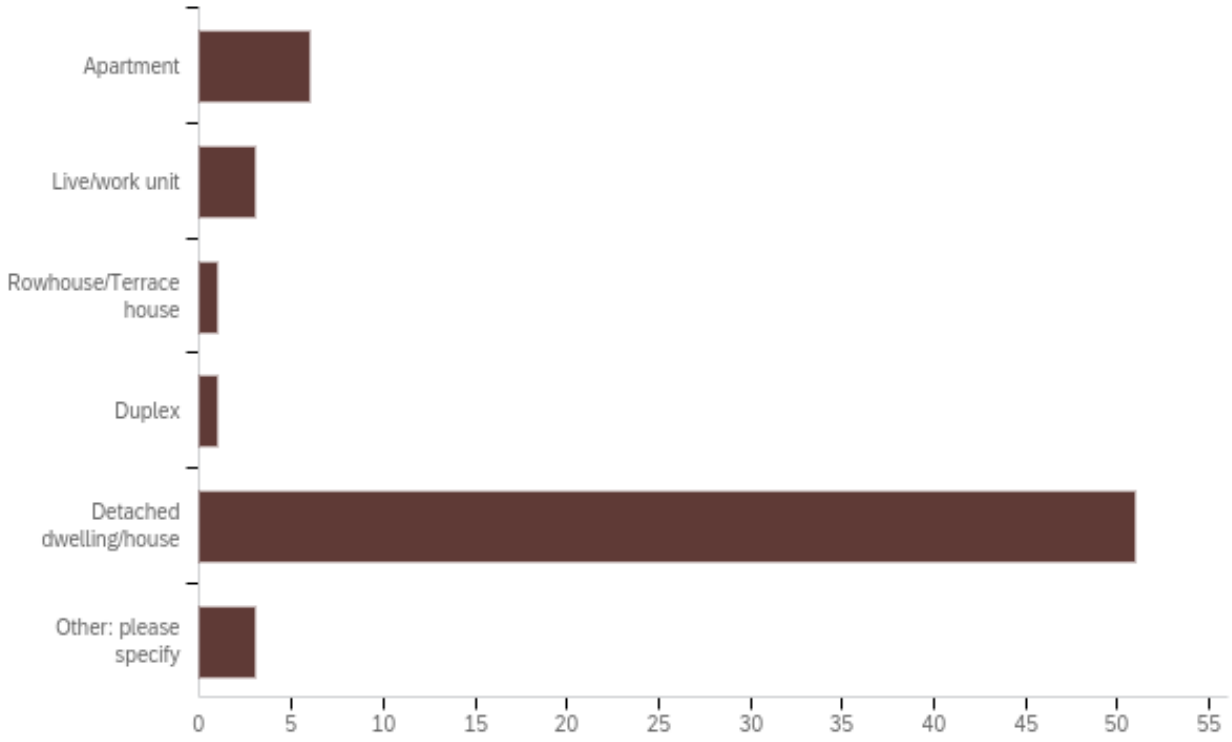


Figure 79 - Question 18: What kind of home do you live in?

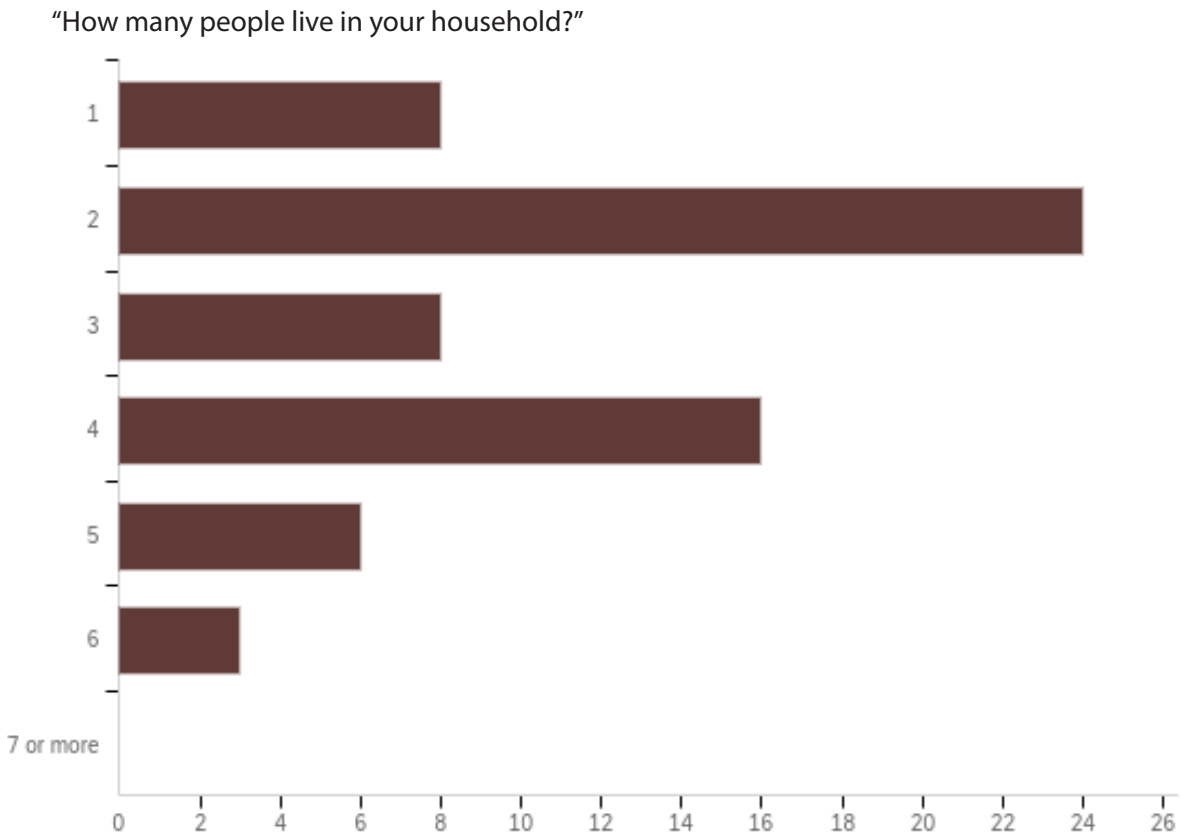


Figure 80 – Question 36: How many people live in your household?

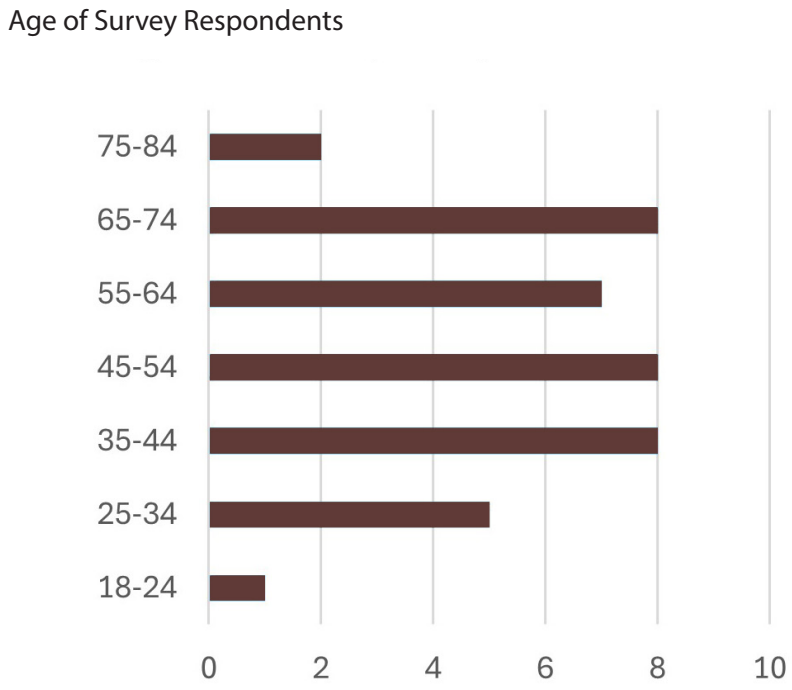


Figure 81 - Age ranges of Mount Eden Survey Respondents

In the survey statement above (Figure 77), "There is public transport within a 10-minute walk from my home" Mount Eden, with multiple bus and train network options, obtained the best results out of all eight neighbourhoods, with 30.7% agreeing to the statement and 69.3% strongly agreeing. While it is clear that these public transport options exist question 26, "What are your main modes of transportation?" allows us to compare to see what transportation modes people actually use. From the results of question 26 (figure ?), private car is the most frequently used mode of transportation, followed by walking. While walking might seem surprising, the selected survey neighbour is located close to Maungawhau (Mt Eden), an ideal place for walking as a form of exercise. People may also use a combination of walking and public transportation, which is the third most used form of transport. From this response, for homes constructed in the area with limited or no parking options, walking and public transport are feasible everyday transport options depending on lifestyle. This is promoted by results from Figure 83 which asked respondents, "What kind of street do you live on?" 40.6% reported they lived on a low-speed, narrow residential street ideal for walking, cycling and scooters due to less vehicular traffic than larger, busier roads, such as Dominion Road.

Q26: What are your main modes of transportation?

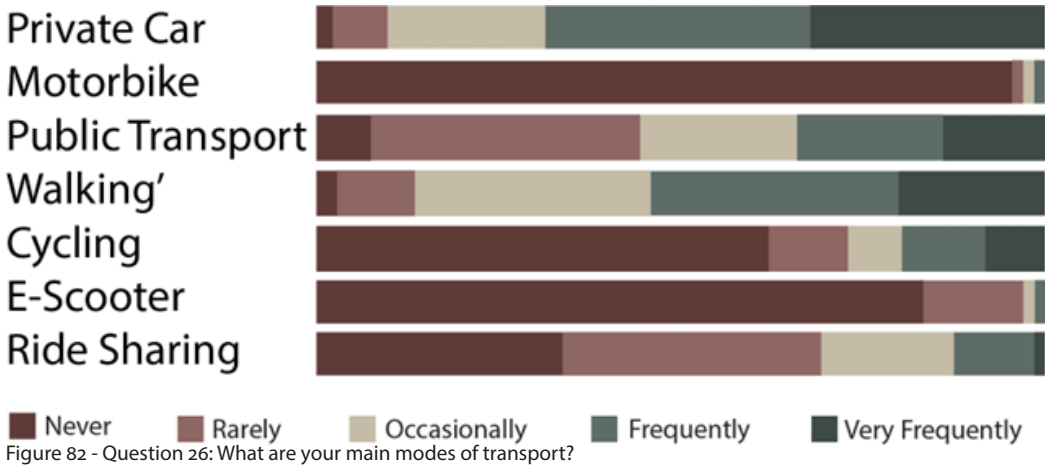


Figure 82 - Question 26: What are your main modes of transport?

Q19: What kind of street do you live on?

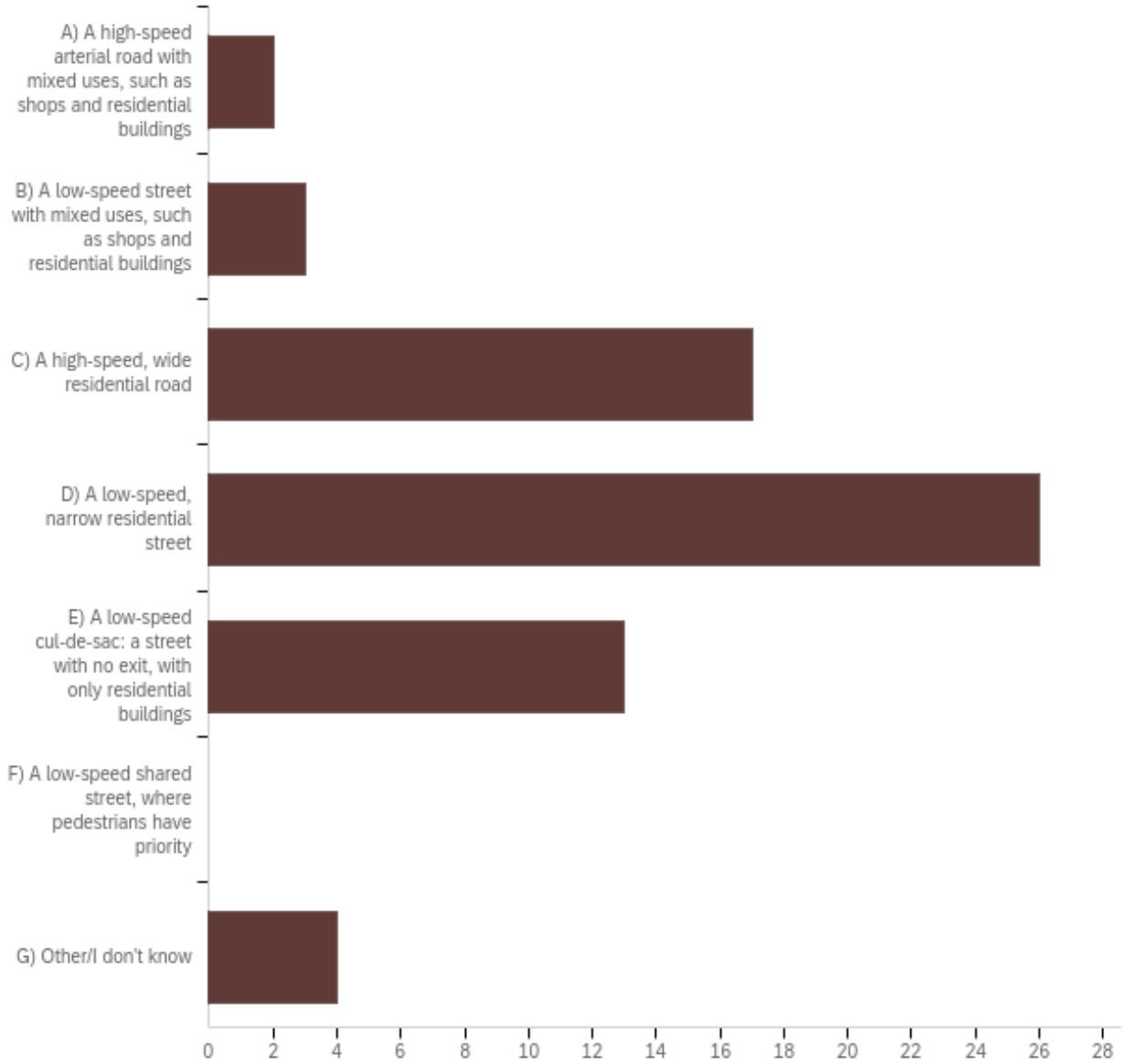


Figure 83 - Question 19: What kind of street do you live on?

In choosing the Mount Eden neighbourhood for this survey and thesis research area, question 41, "Which of these amenities exist within walking distance from your home?" was useful in getting an accurate local perspective on the neighbourhood context. From the results, generally shared amenities such as public transport, cafes, and parks ranked higher. Spaces with a more specific clientele, such as artist spaces and libraries, ranked lower. This is just due to the older demographic of the area and their focus on everyday functionality rather than "hobby amenities", which are more used on occasion.

Question 45 of the survey asked respondents to pick the top three things they would like improved in the neighbourhood. Surprisingly, maintaining heritage/historic buildings in the area gained the most votes out of the selection. This is positive as it proves that people appreciate and want to protect the neighbourhood due to its heritage and character. Also, surprisingly, there were several votes for an increase in apartments. This may be due to the lack of housing typologies within the neighbourhood, but people want to move or downsize an option not currently accessible.

Q41: Which of these amenities exist within walking distance from your home?

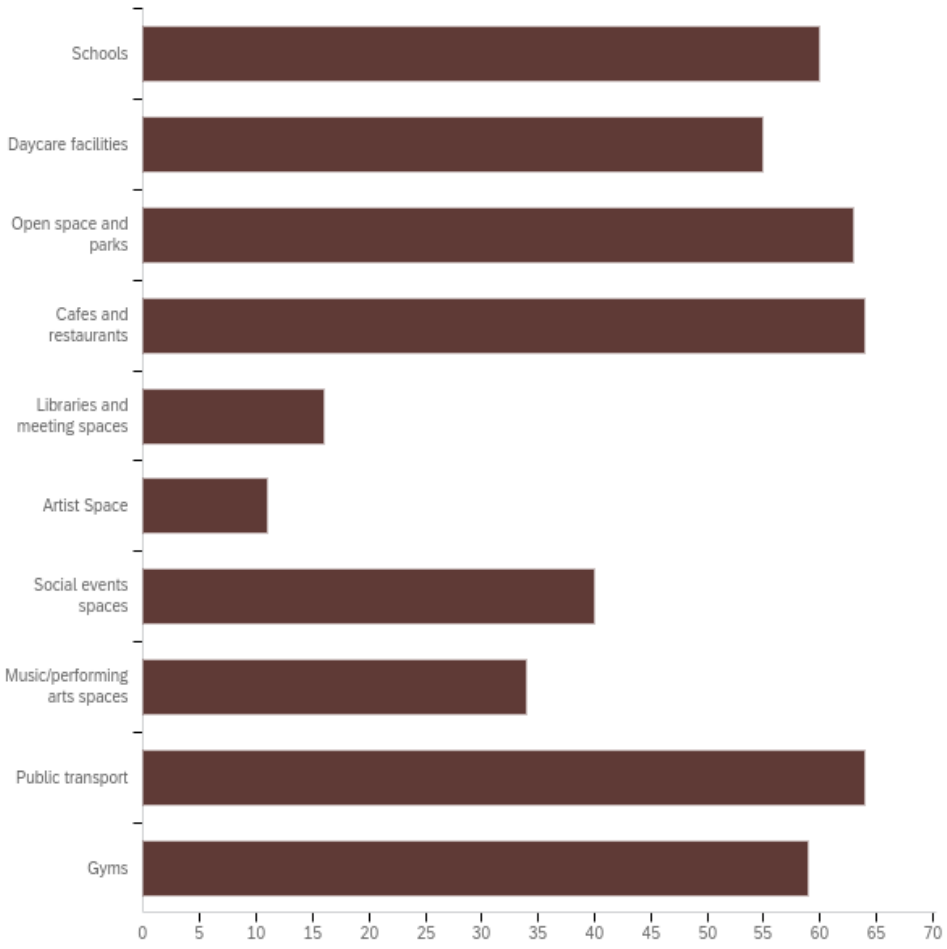


Figure 84 - Question 41: Which of these amenities exist within walking distance of your home?

Q45: Top three things they would like improved in the neighbourhood.

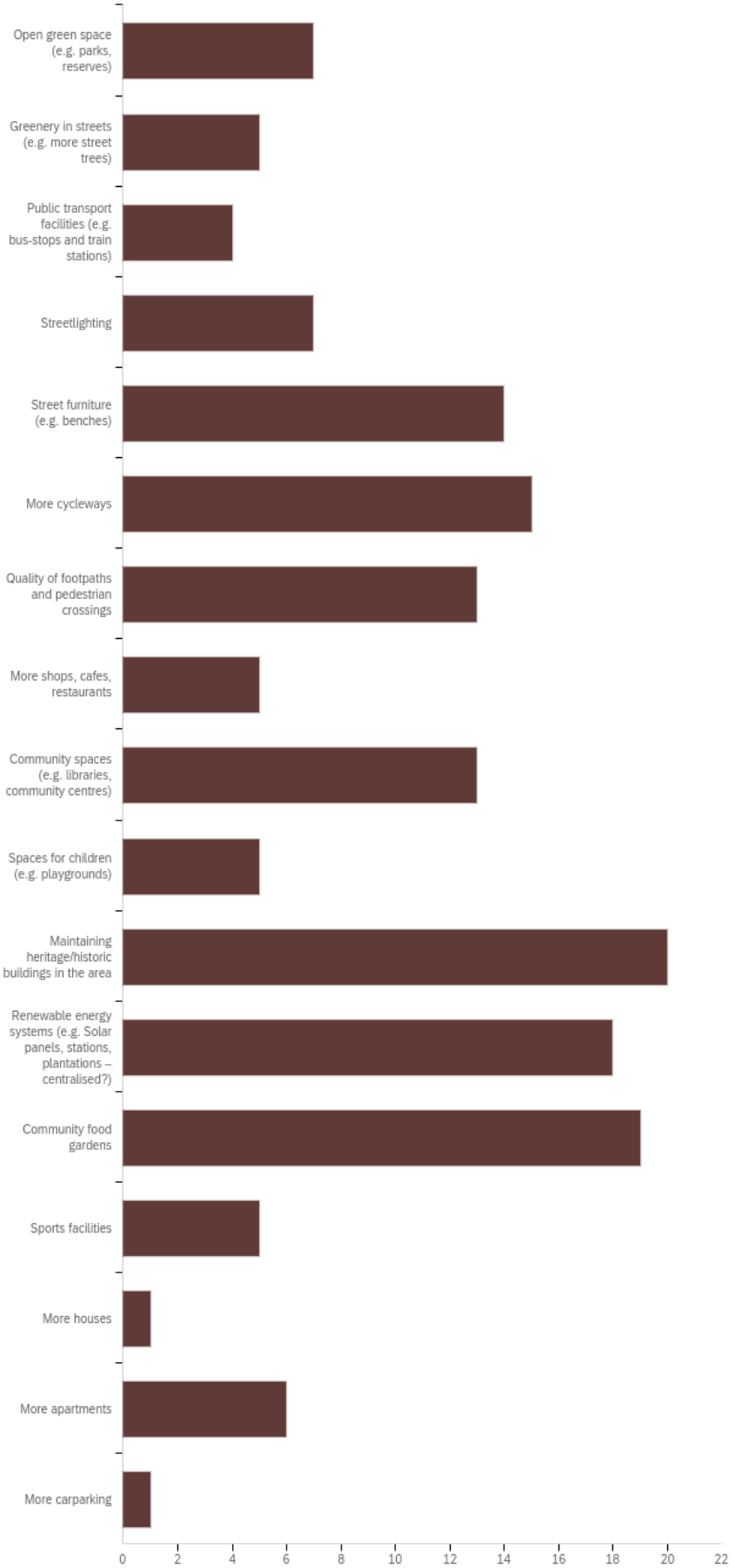


Figure 85 - Question 45: Neighbouhood Improvements

For question 47 of the survey respondents were asked: "Do you have any other recommendations or ideas for your neighbourhood that you would like to share?" This was an open question for respondents to write whatever they wanted. There were a total of 24 responses to question 47, however a number of these responses were outside the scope of this thesis project and have therefore not been included within my findings. Below are some quoted responses from question 47 from Mount Eden residents.

> "Greater consideration of preserving some of Mt Eden's heritage when approving new density housing. Too many sites can now be developed with really ugly townhouses that look out of place against Mt Eden's traditional villa/bungalow houses. It would be nice to see some design requirements considered when approving such developments so the urban development is not ugly."

> "Maintain the current heritage and architecture of this community"

> "More affordable housing"

> "References to historical aspects of the area"

> "Any development within the precinct needs to protect the historical residential style"

From the responses, many people within the community felt that the cultural heritage values of the area were vital and needed protection from harsh developments. This was balanced with the desire for more affordable and smaller housing, such as apartments. The findings from this survey have influenced the design portion of this thesis to focus on sensitive infill residential development that references the heritage residential style of the area while increasing the current number of units on the site.

4.4 History of the Villa

The Bay Villa became the forefront of New Zealand architecture after the war when there was demand for change from the single and two-room cottages of the pioneer settlement. The villa was a favored design in the creation of suburbs as urban populations increased dramatically. In its most distinctive form, the villa was constructed almost entirely of timber with a metal roof. The floor plan and its accessories could be chosen out of a catalogue and then assembled from prefabricated elements by the local tradesperson. This meant that limited documentation would have been required as construction plans riveled those of Ikea flatpack furniture and allowed for alterations to respond to local conditions. For example, in his book Old New Zealand Houses 1800-1940, Jeremy Salmond noted that villas in Auckland were more likely to have expansive verandas (Salmond, 1986). It is because of the building's adaptability that the villa construction technique of light timber framing, studs with nails clad in weatherboard or shingles, remains our standard for house construction in New Zealand (Toomath, n.d.).

The villa's building form was restricted by its formality. The verandah for the parlour, formal rooms, and the master bedroom, were to the front, facing the street, no matter the site's positioning as shown in Figure 86 (Toomath, n.d.). This feature is associated with the Victorian middle class' love of displayed opulence. The public spaces of the home were highly embellished at both its exterior and interior to emphasis the perceived wealth of the family. It is these embellishments that continue to make the villa popular today.

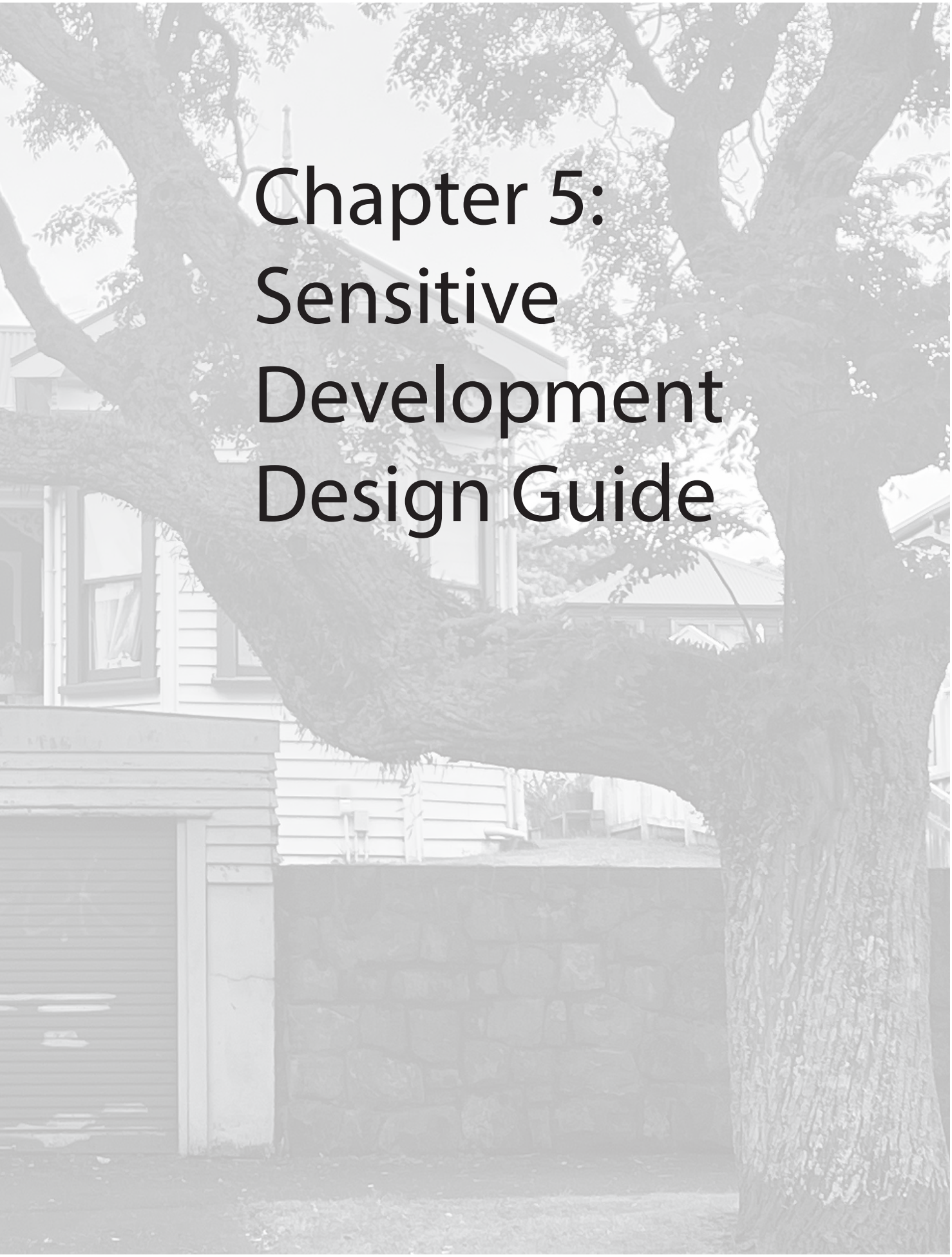
Figure 86 - Traditional Villa Plan (Salmond, 1986)

Villas have seen a resurgence in popularity with the renovation of such houses becoming a significant portion of the residential building industry. Many have been renovated to high standards, particularly in 'high-end' suburbs such as Ponsonby and Freemans Bay. The level of renovations can range from minimal maintenance to extensive full modernization leaving only the exterior façade with historic character. Villas yet to be upgraded are typically cold and draughty with a poor spatial relationship to the sun yet can provide the most development potential. The Villa is an architectural design style that has accrued meaning and cultural heritage over time, requiring that we safeguard its cultural heritage for future generations.

Figure 87 - Traditional Villa Character Elements

Figure 88 - Prospect Terrace Villa

Figure 89 - Chapter 5 Cover Image of Reimers Ave Villa



Chapter 5: Sensitive Development Design Guide

This thesis has so far explored the tensions between new construction and the conservation of the existing built environment and its cultural heritage. This then considers the traditional New Zealand villa as an example of the central suburbs of New Zealand's cities and are often candidates for development to meet housing and densification needs. From the inital research question: How can interventions to existing and heritage residential buildings assist in contemporary infill development while maintaining existing neighbourhood character? Bluefield has proposed the amendment of existing zoning regulations, creating flexibility, to sensitively densify.

This chapter analyses the existing Unitary Plan which is a guide to the terms and standards for a residential project. Residential standards vary depending on the scale of urban development so considering all standards is critical. Standards analyzed includes Residential – Single House Zoning, Residential – Terraced and Apartment Zoning, and Mixed Housing Urban Zoning regulations along with the Historic Heritage Overlay and the ICOMOS New Zealand Charter. There is currently a lack of integrated strategy for sites that currently have a single house, but have the potential to become more like a terrace housing zone while respecting the heritage overlay principles. Comparative analysis of these regulations aim to create a framework of how bespoke infill development can create sensitive infill densification of existing properties to aid in New Zealand's housing crisis.

Figure 90 is a policy matrix that compares the different policies from the chosen regulations. The three housing related regulations had considerable overlap in the details and calculations. In contrast, the ICOMOS Charter and the Heritage Overlay policies are more conceptual and idealistic as emphasized in overlap on only a few policies including conservation plan implementation, retained or compatible building use, avoiding relocation, understanding of cultural heritage values and enabling maintenance and repair of utilities.

Policy Matrix

POLICIES	Single House Zone	Terrace and Apartment Zone	Mixed Housing Urban Zone	ICOMOS Charter	Heritage Overlay
Maximum number of storeys	1-2 storeys	7 storeys	3 storeys	N/A	N/A
Transition in height from the business centre to lower-scale residential zones					
Zone also provides for a range of non-residential activities					
Quality on-site residential amenity for residents and the street					
Compatible form, fabric, scale and intensity of development					
Variety of housing types					
Provision of setbacks and landscaped areas					
Passive surveillance					
Minimising visual dominance of garage doors					
Supports public transport and social infrastructure					
Maintain daylight access					
Maintain reasonable level of privacy					
Useable and accessible outdoor living space	N/A	20m2, 5m2, 8m2	20m2, 5m2, 8m2		
Avoid or mitigate adverse affects					
Maximum impervious area	60%	70%	60%		
Enable people to work from home					
Conversions into a maximum of two dwellings					
Maximum building height	8m + 1m roof form	16m + 1m roof form	11m + 1m roof form		
Height to boundary	2.5m, 45-degree	3m, 45-degree	2.5m, 45-degree		
Design flexibility at the upper floors of a building					
Building setback must be a stepped profile					
Maximum building coverage 50% net site area	35%	50%	45%		
Minimum landscaped net site area, and front yard	40%, 50%	30%, N/A	35%, 50%		
Visual privacy between habitable rooms of different buildings					
Outlook spaces required					
Maximum Fence height front yard	1.4m, 1.8m permeable	1.4m, 1.8m permeable	1.4m, 1.8m permeable		
Minimum net internal floor area 30m^2 studio, 45m^2 one+ bedroom					
Minimum yard depth (front, side, rear)	3m, 1m, 1m	1.5m, 1m, 1m	2.5m, 1m, 1m		
Don't detract from surrounding business zone					
1 minor dwelling 65m2 on site					
Promoting walkable neighbourhoods					
Flexability for differeing roof forms					
Inclusion of indeginous cultural heritage					
Conservation plan and principles					
Minimal removal of heritage elements					
Minimum intervention					
Physical investigation					
Systematic recording					
Retained use or compatible use					
Conserved setting					
No relocation					
Archival documentation					
Understanding tangible and intangible cultural heritage values					
Category Places, A, B and C					
Reduced consent application costs					
Access to funding and grants					
Development and adaption					
Long-term viability					
Minimise loss of fabric					
No compromise interpretation of place					
Retain and integrate heritage					
recover and reveal heritage					
Removal of non-heritage features or additions					
No demolition or deconstruction					
Enable operation, maintaince, repair and the upgrading of utilities					

Figure 90 - Policy and Regulation Matrix

From analysing the policy matrix and the chosen regulations, these policies all focus on the following unitary plan objectives:

POLICIES:

1. Provides and maintains appropriate amenities and amenity values of the existing neighbourhood.

2. In keeping with existing and planned neighbourhood built character.

3. Non-residential activities provide community, social, economic, and cultural well-being in keeping with scale and intensity of the neighbourhood.

4. Protection, maintenance, restoration and conservation of historic places.

5. Historic and heritage places protected from inappropriate subdivision, use and development, including inappropriate modification, relocation, demolition or destruction.

6. Land near business zones, high-density residential areas, and close to public transport is efficiently used to provide urban living that increases housing capacity, choice, and access to public transport.

These six objectives can then be simplified into four key objectives,

1. Achieve the planned urban built character of the zone,

2. Achieve attractive safe streets and public open spaces,

3. Manage the effects of development on adjoining sites, and
4. Achieve high-quality living environments.

Following the key objectives found within this thesis research, the project aims to adaptively reuse the site's existing bastardised villa while creating a complementary residential infill development project.

The following design guide was created using the precedents of the Buckley Hobsonville Architecture and Landscape Design Guide (Hobsonville Land Company, n.d.), Kāinga Ora's TĀONE ORA URBAN DESIGN GUIDELINES (Kāinga Ora, n.d.) and Bluefield Housing design principles (Madigan, n.d.).

Use of the Design Guide

Every site offers unique development potential with its opportunities and constraints. This guide considers the current regulations, charters, heritage overlays, and development concepts and covers the missing elements from them to ensure quality architectural development while encouraging variety and interest through built forms and landscapes.

The following guidelines outline the minimum level of design quality expected from a New Zealand Bluefield development at all scales.

This includes:
- Reuse of existing buildings upon site
- Interface between site and street
- Amenities for residents and neighbourhood
- Connection to wider neighbourhood character, context and culture
-Sustainable Building practices

These guidelines are designed to promote better design outcomes for development projects and serve as a benchmark for project evaluation and provide a foundation for innovative design solutions.

These design guidelines cross three different scales: Neighbourhood, Site and Building (Figure 91). All three sections are critical to ensuring the creation of high-quality developments that maintain and enhance the existing conditions. This guide should be used in conjunction with existing guides and frameworks, including zoning regulations, unitary plans, and the Resource Management Act.

Figure 91 - Design Guide Scales

Design Guide Values

The following design values this design guides aims to achieve through the incorporation of bluefield concepts to the existing New Zealand buildings guides and frameworks.

Sustainable Communities

Careful development design contributes to building vibrant communities by providing effective design solutions that create built environments that promote community well-being, improve streets and public spaces, and honour local culture, character and amenity values.

Residential Experience

The quality of residents' experiences is a key indicator of successful residential developments. A place's atmosphere and perception of and amongst its community are strongly shaped by the quality and character of its surroundings and the external amenities it provides. Creating attractive, functional buildings helps residents take pride in their homes and environment.

Protecting Environments

Developments should prioritize the preservation, protection, and restoration of natural landscapes, contributing to the enhancement of healthy environments for all living things. Development designs must consider multiple scales, acknowledging the broader landscape and understanding the interaction between natural and built systems. This includes recognizing significant landscape features and their relationship to the unique site context.

Collective Living

As Aotearoa moves towards ways of collective living, it is essential to explore opportunities for multi-generational living and cohousing. What we design and build can foster environmental, social, and cultural benefits by creating interconnected, inclusive, and accessible spaces. This includes offering a range of housing types, facilities, and infrastructure that support and sustain families and communities.

Safer Living

The design of the built environment can greatly influence personal safety, security, crime rates, and social behaviour within a neighbourhood. Good development design is crucial in creating safer, more welcoming communities that encourage positive social interactions and a sense of security.

Figure 92 - Bellevue Road Villa

Neighbourhood

The sites and the buildings that occupy them are critical to the broader neighbourhood and landscape. The design and function of buildings, their connection to private and public spaces, and the flow of pedestrians, cyclists, and vehicles all play a crucial role in fostering sustainable, inclusive, and vibrant communities. The objective is to provide people with the opportunity to live in healthy, well-designed, and efficient urban environments, with easy access to employment, public transport, and essential social services.

Neighbourhood Context
Consider the existing and planned scale of development within the neighbourhood. Respond to existing scale when considering building typologies, density, car parking ratios, and communal space to enable a cohesive broader neighbourhood context.

Consider the street within the design. The location of the site and its specific street frontages determine the size and scale of the development and how it connects to the street.

Consider the walkability and amenities of the neighbourhood. Is there easy access to shops, open spaces, and public transport? Sites near existing amenities provide greater potential for increased density, accessible housing, and less on-site parking.

Consider the local environment. Are there opportunities to increase nature on the site, contributing to local ecologies of the wider landscape? Existing trees and nature on and surrounding the site should be retained where possible.

Respond to the existing land conditions on-site. Earthworks should be minimised to maintain natural features and view shafts.

Consider Building Typologies and Density of Surrounding Area

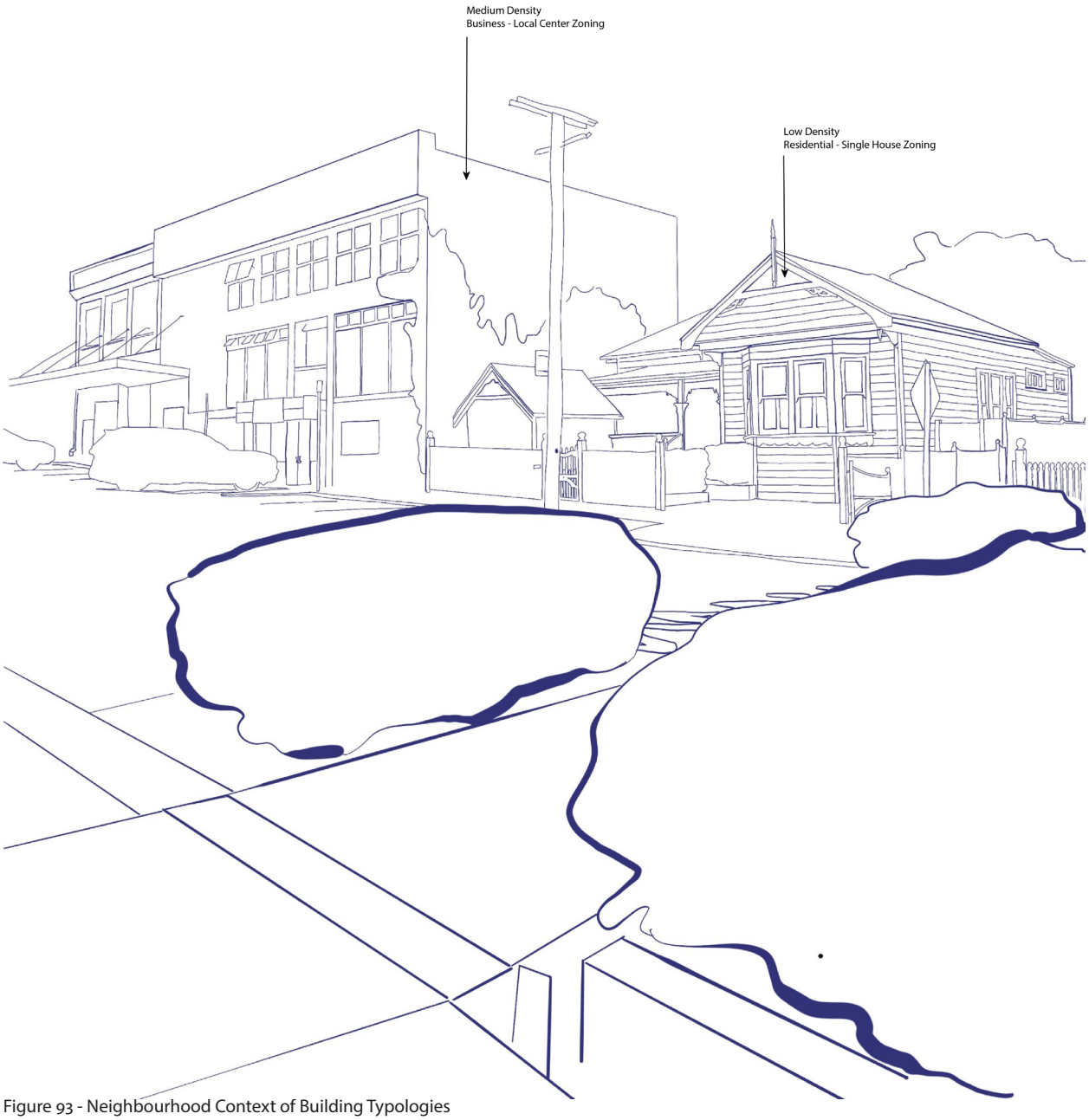


Figure 93 - Neighbourhood Context of Building Typologies

Site

This section outlines guidelines to assist in the design and development of individual sites. Site design considers the existing conditions, character, opportunities and challenges. Outcomes should positively respond to the site's features and context while allowing for sustainable and efficient housing densification.

Built Form
The built form of the site needs to respond to the existing conditions found within the site and neighbourhood to ensure appropriate site design that actively contributes to enhancing context and character of the wider neighbourhood.

Retain and Adapt
Within suburbs of low-density detached single-family homes, medium-density duplexes, terraced housing, and mixed-use, retaining and adapting existing housing maintains the existing scale and streetscape. Looking at the local development pattern and using that context, can be used to allow new housing to relate to the existing neighbourhood.

Retention, adaptation and development can be achieved through

- A division of the existing house into separate dwellings under one roof,
- An extension to the existing dwelling, or
- As a detached backyard home.

Site Frontages
The layout of new and existing residential buildings should align with that of the existing neighbourhood and create a clear distinction between public and private spaces, aligning buildings with public streets or open spaces to define an active edge.

Entrances and communal rooms should face the primary street to promote activation and passive surveillance, enhancing safety.

Building orientation, outlook and privacy
Buildings should be oriented and arranged to ensure access to daylight and privacy while preventing overshadowing and dominance between structures. Prioritize daylight and sunlight for

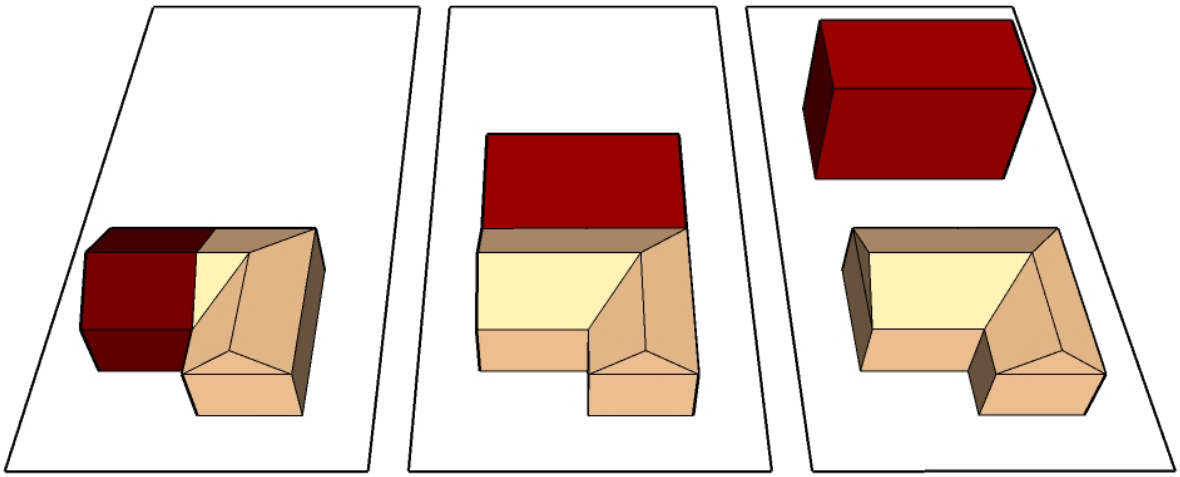


Figure 94 - Retention and Adaption Options

Figure 95 - Public to Private Spaces

living rooms and private outdoor spaces.

Avoid placing private outdoor spaces directly facing the street where possible. Position them above street level or design them to accommodate landscaping and screening for privacy.

Site layouts should maximise the exposure of homes to communal spaces, creating a flat hierarchy.

Storage
In buildings provide secure, weather-protected storage for bicycles, mobility scooters, and prams. Communal storage should be conveniently located within the building, near the lobby or stairs.

Pedestrian Accessibility
Ensure pedestrian routes connect street interfaces, dwellings, parking, and communal spaces while eliminating barriers like steps and steep footpaths that hinder mobility.

Pedestrian routes should be well-lit to enhance safety, and through-site access should be considered to improve connectivity and permeability, particularly when amenities and services are nearby.

Vehicle Movement and Parking
Parking provisions should consider proximity to public transport and local amenities, with reduced or no parking in walkable areas. Mandated parking spaces should be limited to disability only and uncoupled from specific dwellings.

Parking spaces should be designed to accommodate alternative uses.

Planting
Mature trees and existing planting should be preserved whenever possible. Large trees enhance developments by balancing built form, providing scale, creating focal points, offering shade, and contributing to the neighbourhood's character.

Site layouts should allow enough space for tree planting, considering the mature size of the trees.

Privacy, and frontages
Planting designs should ensure private outdoor spaces receive ample daylight while minimizing overlooking from other dwellings.

Street-facing private spaces are best located above street level and designed with enough space for landscaping and screening to ensure privacy. Planting should also highlight thresholds and entranceways, define boundaries, and provide privacy to ground-floor units and communal spaces.

Fencing and screening proposals should clearly define private and public edges, ensuring privacy for outdoor living areas and

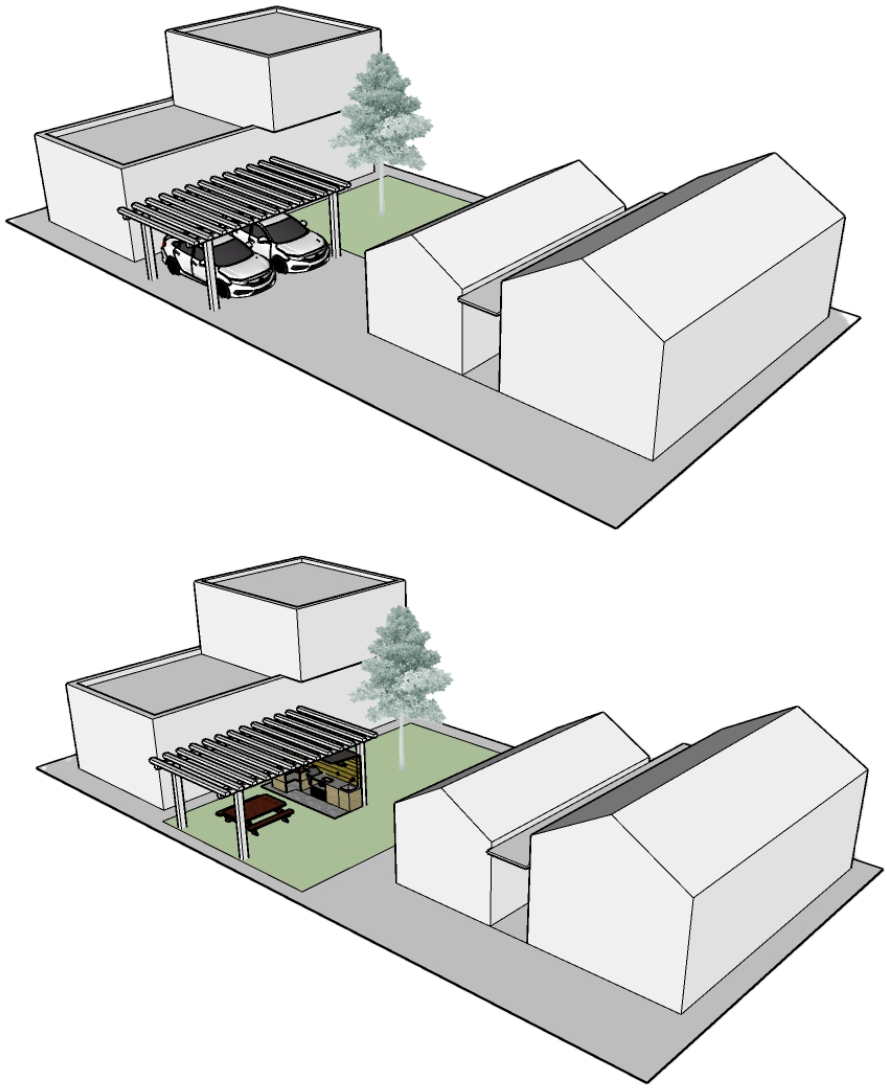


Figure 96 - Parking Space Flexibility Diagram

for elements like rubbish bins, clotheslines, and bike storage.

Services
Waste management should include individual and collective waste storage areas, ensuring accessibility and convenience.

New builds must provide sustainable service solutions to minimise the impact on existing site services and the grid. They may include solar panels and storage, and water recycling systems.

Communal Spaces
The size and design of communal areas should match the development's scale, consider the mix of residents, and account for nearby amenities.

Key design considerations include central, sunny locations, accessible gradients, direct sightlines from dwellings or public spaces, wind protection, and adequate shade.

Play areas should be placed away from vehicle circulation routes and consider noise impacts on neighbours.

Safety
Design communal spaces to encourage passive recreation and maintain surveillance, with homes providing informal surveillance over streetscapes or other public areas.

Public and private boundaries should be clearly defined to establish a sense of ownership and safety.

The landscape should promote active use of spaces while limiting access to sensitive areas and avoiding blind alleys or hidden spots. Adequate lighting should be provided in all areas.

Figure 97 - Public Private Boundaries Clearly Defined

Building

The building is a crucial design scale, as it not only shapes the immediate context but also significantly impacts the people who live in it and the overall quality of the public realm. The design of residential buildings plays a key role in enhancing the lives of their occupants, particularly the whānau, while also contributing to the development of well-functioning neighbourhoods. Thoughtfully designed buildings create meaningful, functional spaces that promote safety, comfort, and a sense of belonging. At this scale, architectural elements such as form, materiality, and orientation combine to create a cohesive structure that responds to its environment, supporting both the inhabitants and the broader community. Through integration with its surroundings, a well-designed building can positively influence the urban or rural fabric, fostering a strong sense of place and contributing to the area's identity.

Building Entrances

Building entrances should be clearly visible, located close to and facing street frontages. They should be well-lit to ensure good visibility and reduce concealment opportunities.

Entrances should be easily identifiable with a clear address, distinguishable from the building façade and provide weather protection.

Entranceways should be designed to allow occupants to see visitors before opening the door, and ranch sliders or similar are not suitable as front doors.

Access

Entrance paths should be separate from driveways and lead directly from the street to the front door.

Accessibility should be prioritized by designing step-free, shallow-graded paths to eliminate movement barriers.

Pedestrian connections between entrances, parking areas, communal spaces, and the street network should be step-free and

Figure 98 – Visible Building Entrance Close to the Street

easy to navigate.

Visitor cycle parking for apartment buildings should be provided near the building entrance.

Facades and Materiality
Facades should enhance the overall street character and offer opportunities for storytelling and placemaking.

Facades should contribute to an engaging and dynamic public realm by incorporating elements like frequent doors and windows, minimal blank walls, and three-dimensional features such as sun shading, bay windows, balconies, and porches.

The arrangement and mix of façade treatments should be carefully considered, with coherence achieved either through the repetition of a single treatment along a block or by allowing individual façades to vary.

Colour should balance individuality with cohesion, avoiding overuse of different colours and materials that could create inconsistency and ensuring no distinction between building tenures.

Materials should express their true nature rather than imitate other materials and be durable, selected with aesthetics and low maintenance in mind.

Balconies
Balconies should be easily accessible from indoor living spaces through sliding glazing, allowing for a seamless connection between indoor and outdoor areas. They may also have secondary access from bedrooms.

Balconies should be appropriately sized in relation to the unit, with enough space to accommodate a table and chairs.

Corner Lots
Buildings on corner lots should engage with both frontages, ensuring they overlook and visually connect with streets or public spaces.

High-quality, three-dimensional architectural features should be incorporated to emphasize the corner and enhance the building's visual prominence.

Privacy
Buildings and sites should be designed to ensure privacy for residents while protecting the privacy and amenity of neighbours. As development density increases, careful consideration must be given to the design of both indoor and outdoor living spaces to maintain privacy for all.

In apartment or multiunit buildings, privacy for adjacent private outdoor areas, including balconies, should be protected through appropriate separation, landscaping, and screening.

Private outdoor spaces should be shielded from the street, entrances, neighbouring dwellings, and any overlooking dwellings.

Semi-permeable balustrades or screening are preferred, as glass balustrades often fail to offer privacy, particularly at night.

Adaptability
Ensure generous floor-to-floor heights for future flexibility of use.

Hard infrastructure should be grouped and stacked.

Door height windows provide for future use flexibility.

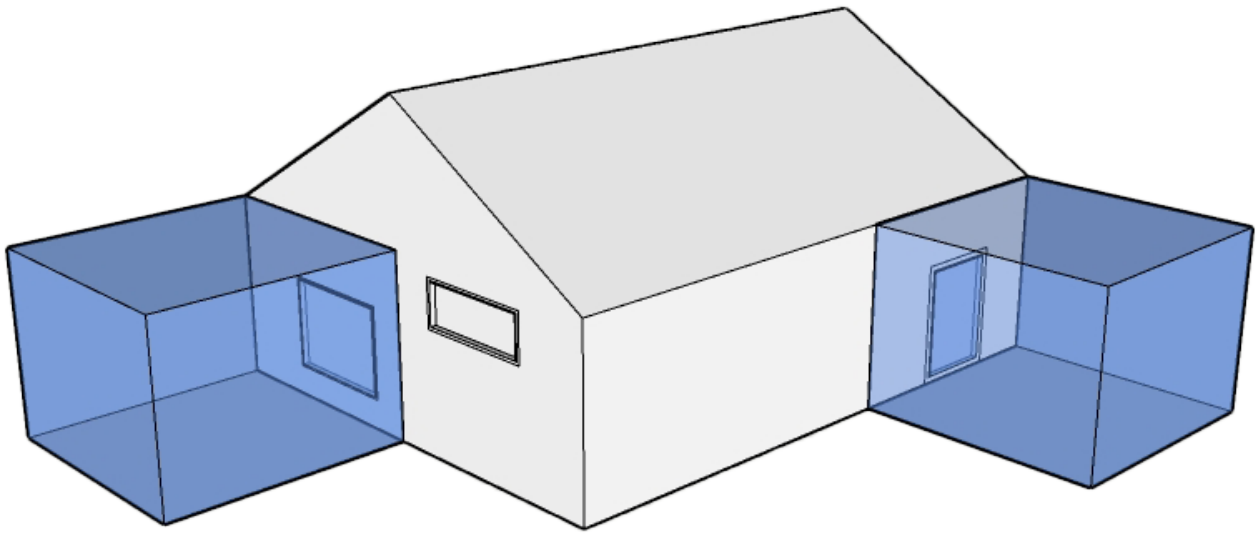
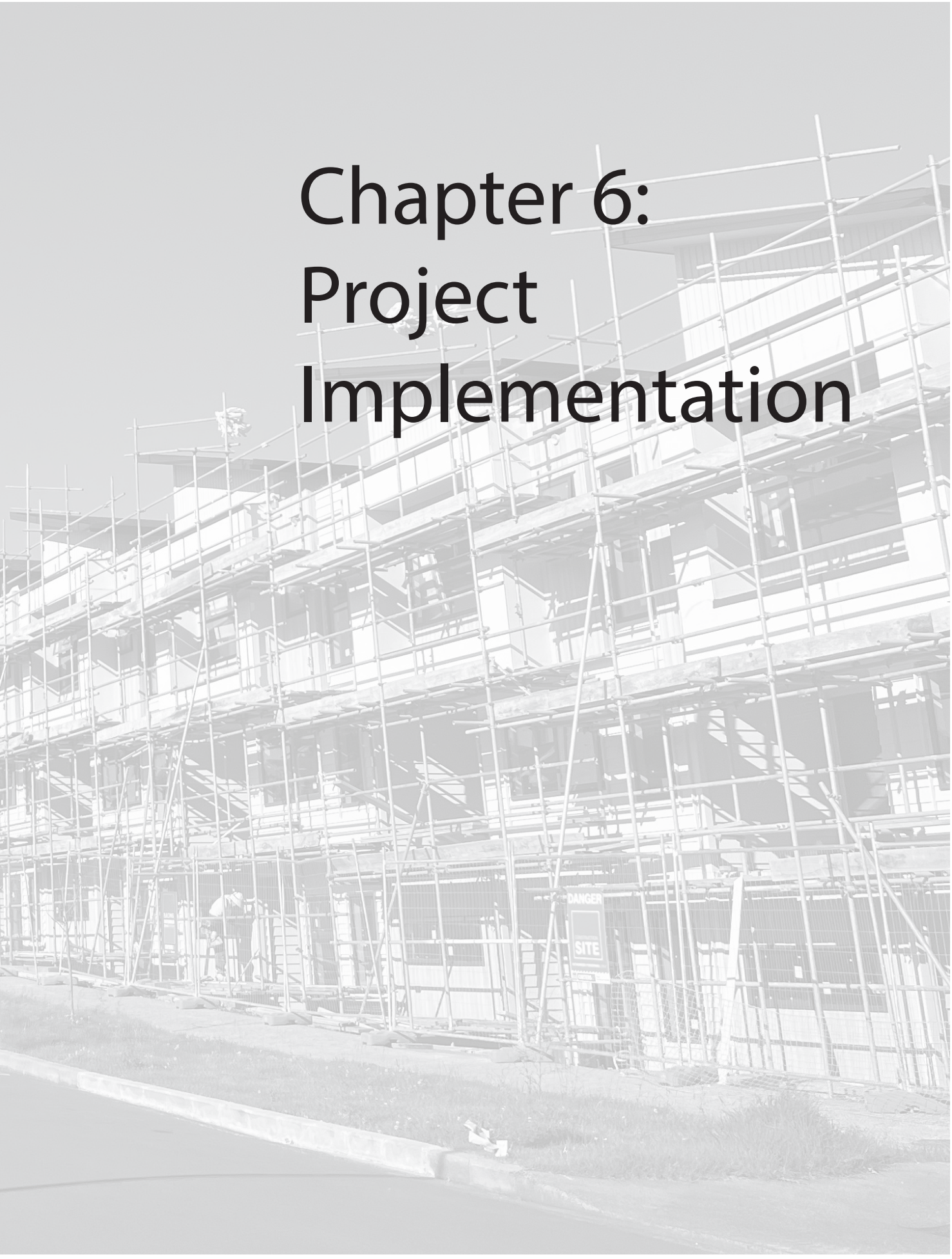


Figure 99 - Door Window Heights Provide Flexibility

Figure 100 - Chapter 6 Cover Image of Haverstock Road Terraces

Chapter 6: Project Implementation



The design guidelines outlined in Chapter 5 will be applied to the Walters Road site, creating a checklist to compare the test project against.
Site analysis before design provides important information and consideration of the site's existing opportunities and constraints. The outcomes of the site analysis should enable design decisions that positively respond to and improve the site's unique features and context while creating a sustainable housing development.

Understanding the Site

The chosen site sits at 3 Walters Road within the heritage residential suburb of Mt Eden, Auckland. The project site is a corner site prime for development into a higher-density residential development. Located on the cusp of Dominion Road, a high-traffic route between the centre city and the suburbs, once proposed for a tram line connection. The site is on the same street as Auckland's largest stadium, Eden Park, putting it on the edge of the no-traffic zone for events. Close to public transport, the site is around the corner from Dominion Road bus stops, and the Kingsland Train Station is a 10-minute walk away at the other end of Walters Road. Mt Eden's development as a suburb began in the 1900s, as shown by the style of architecture within the area, ranging from Victorian Villas to Bungalows and further towards Sandringham. Mt Eden is a well-developed suburb with supermarkets, multiple schools, churches, St Luke's Mall, a community hall used by multiple groups, gyms, charity shops and halfway homes. The site sits under the shadow of Maungawhau (Mt Eden), a 196-meter volcano, the tallest volcano in Auckland and part of Auckland's iconic skyline.

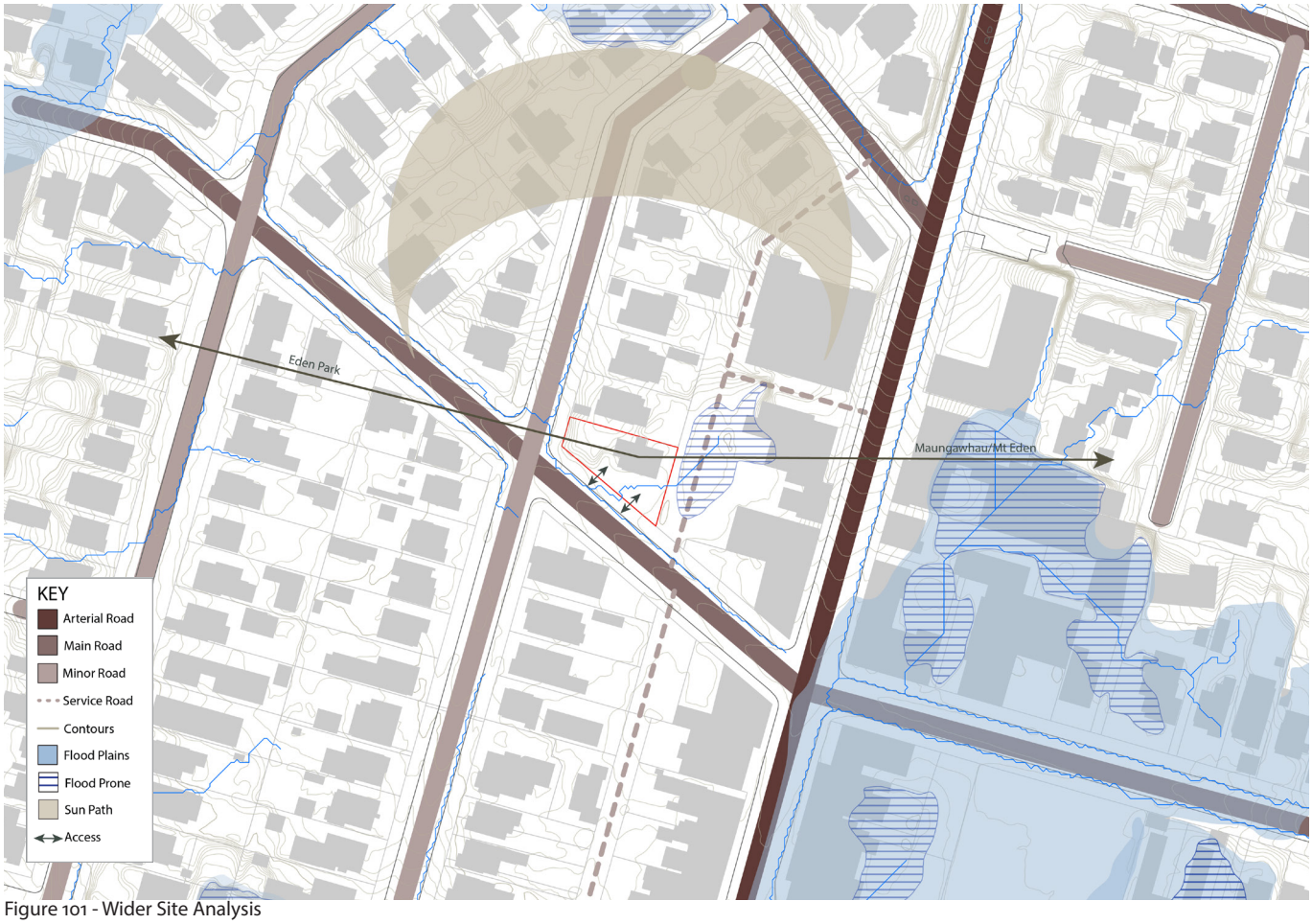


Figure 101 - Wider Site Analysis

Figure 102 - Walters Road Site (Google Earth, n.d.)

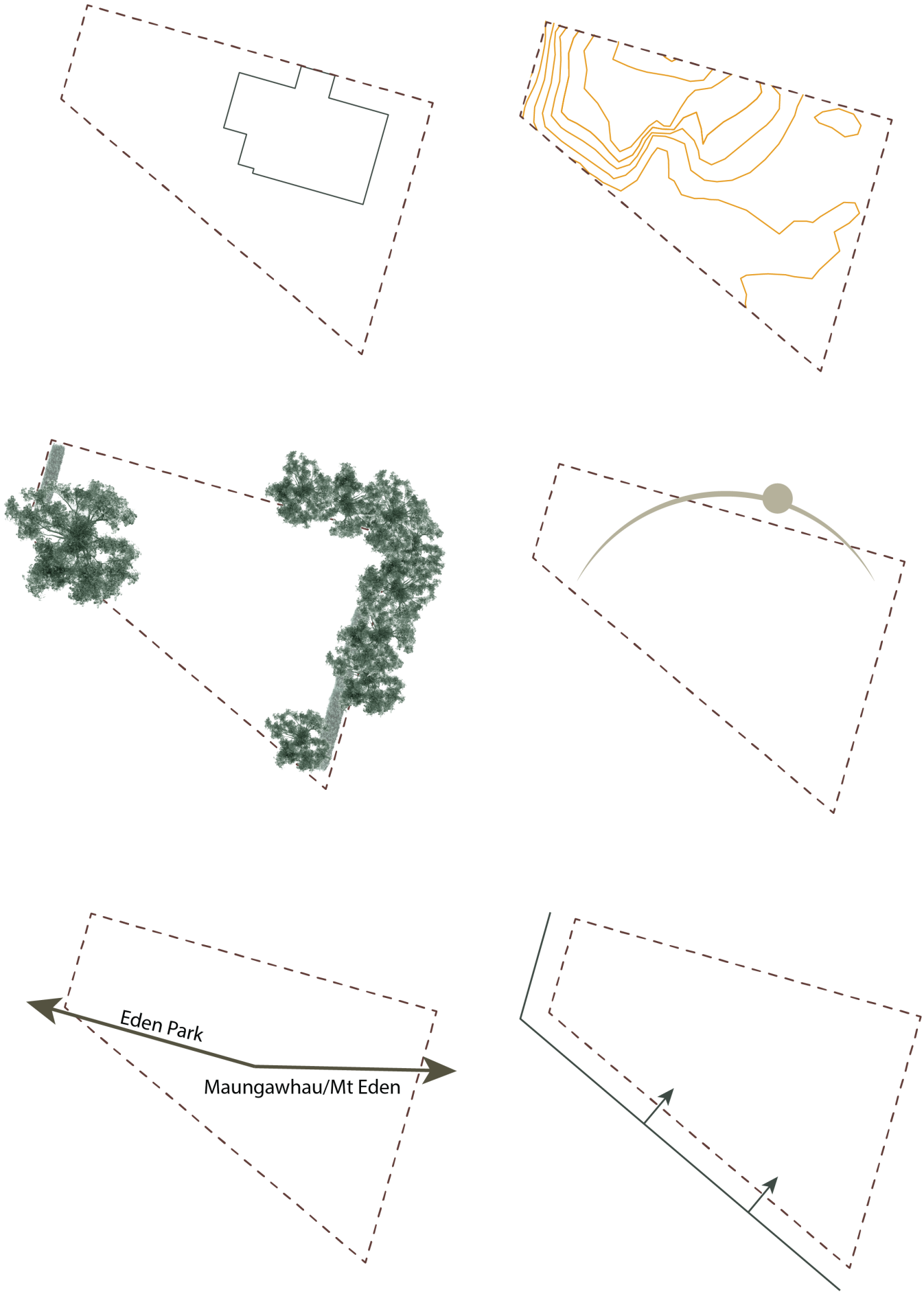


Figure 103 - Site Analysis

Built Form

The project site sits within Residential - single house zoning which borders onto a property of Business - Local Center zoning. Residential – single-house zoning requires that any development maintains and enhances the amenity values of an established residential neighbourhood. These amenity values can include a historical special character, sites with prominent trees, coastal location or other factors such as established neighbourhood character (Auckland Council, n.d.-a).

A 1900s villa was relocated to the Walters Road site after the original building was demolished in the 1970s. The building's orientation, not being street-facing, shows its non-originality to the site (as shown in Figure 105). The site also has a 15m tree on the southwest corner. While this tree is not a native species, its size, age, and location on the site recommend that any development work protects it.

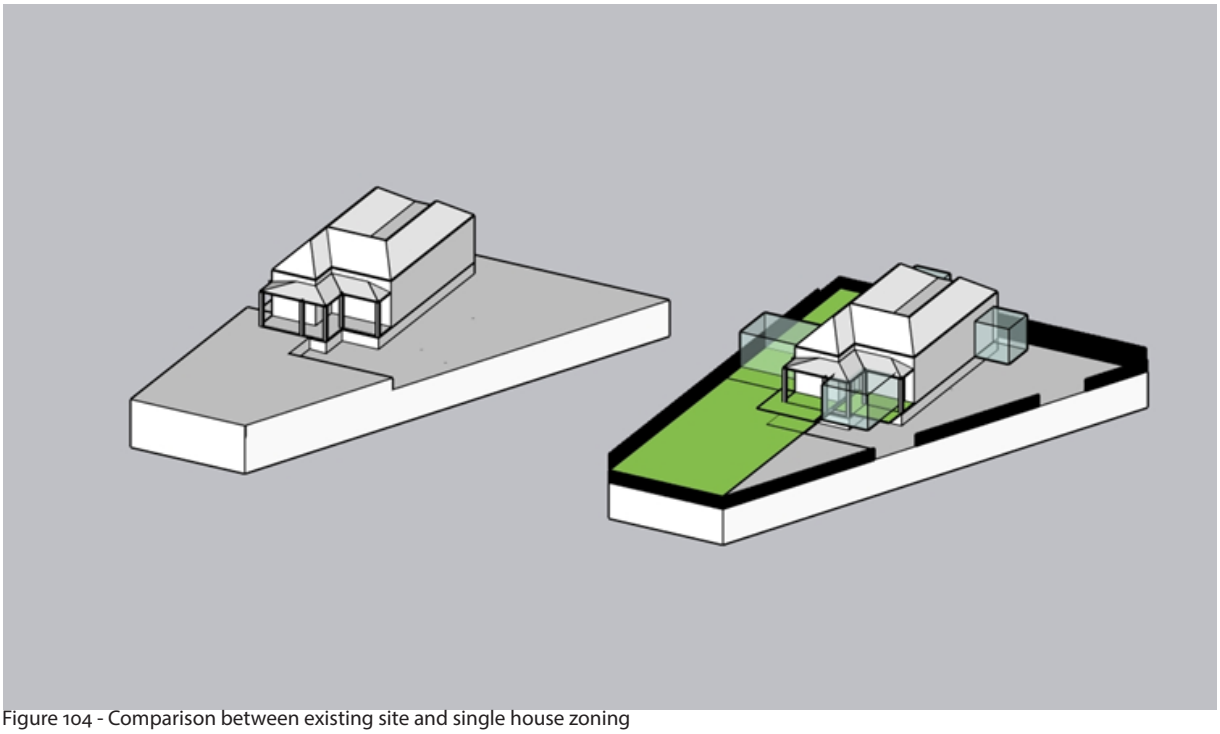


Figure 104 - Comparison between existing site and single house zoning

Figure 105 - Walters Road Site from the South East Corner

Figure 106 - Existing tree on the Walters Road Site

Figure 107 - Exterior of the Existing Building

Figure 108 - Garden on the Site

Figure 109 - Back Deck of the Villa

Figure 110 - Villa Entry

Figure 111 – Living Room

Figure 114 - Hallway and Laundry

Figure 115 - Bathroom

Figure 112 - Kitchen

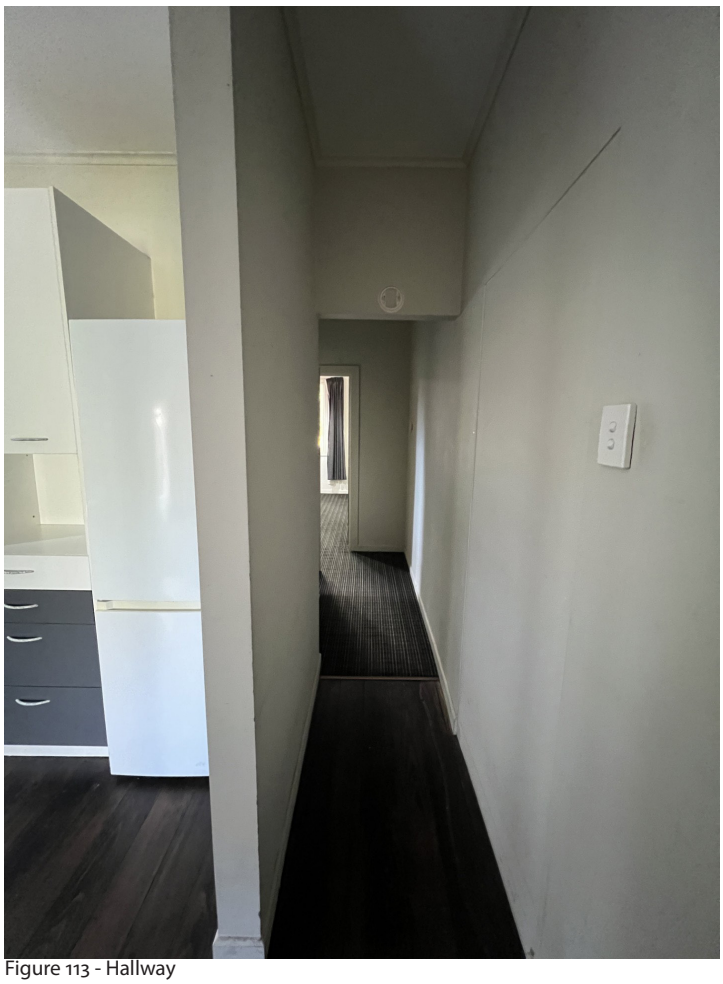


Figure 113 - Hallway

Figure 116 - Bedroom

Figure 117 - Waiting Room of the Optometrists

Figure 118 - Roof Gutter Support

Figure 119 - Roof Joint

Figure 120 - Roof to Wall Joint

Figure 121 - Roof Cavity

Originally a single-family home (Figure 86), the existing villa has undergone multiple renovations to adapt to the users' needs. When the current owners purchased the property in 2006, the building was separated into two flats. This layout was then renovated again, turning the streetside flat into an optometry practice and keeping the other as a one-bedroom flat (Figure 118).

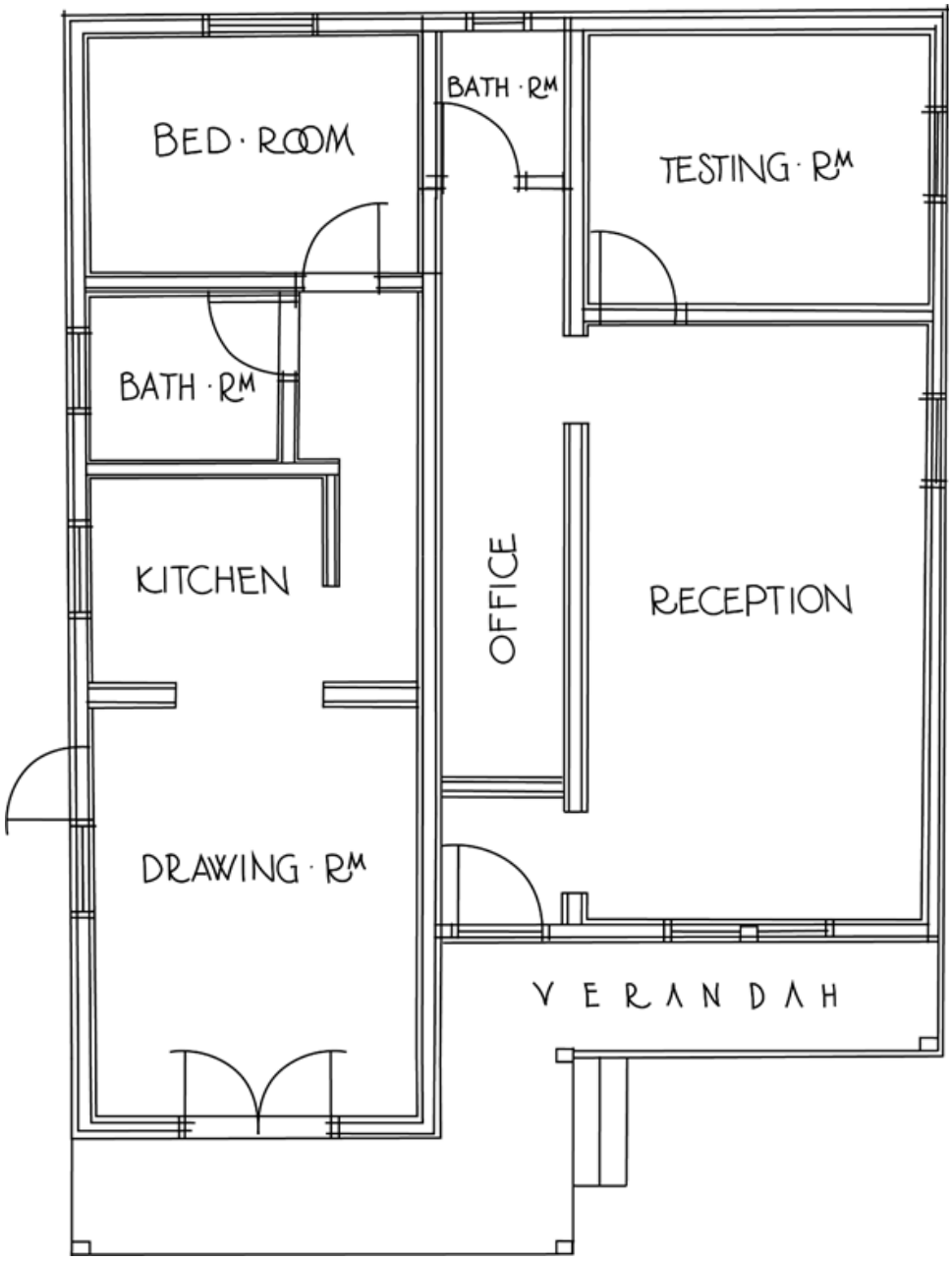


Figure 122 - Current Floor Plan of Existing Building

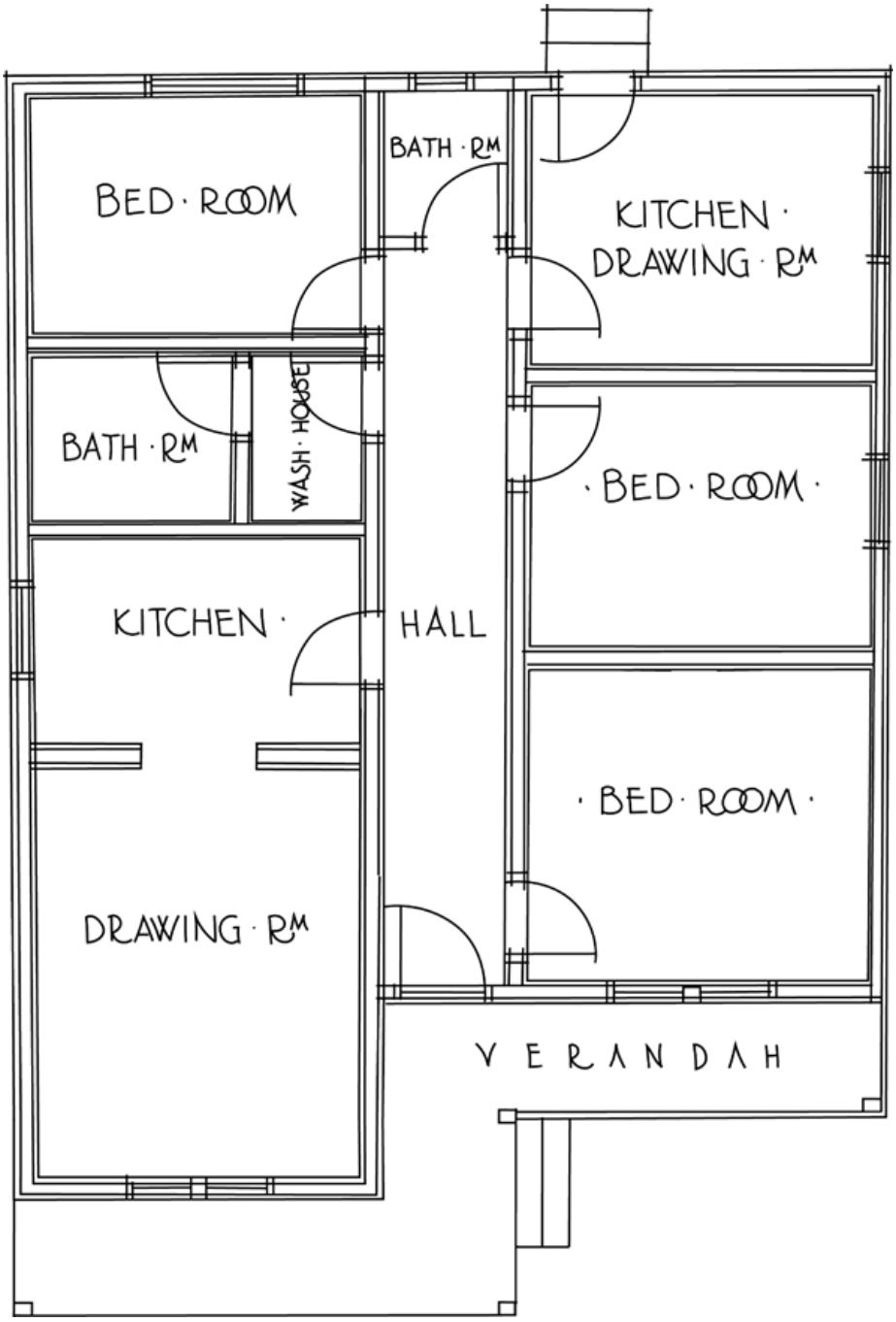


Figure 123 - Floor Plan of the house when bought in 2006

The history of the existing villa on site was explored through physical iterative models to help understand the changes in layout due to the renovations over its life span. The three building models explore the villa in what would likely have been its original layout at construction as based upon the traditional villa plan in Old Houses New Zealand 1800-1940 by Jeremy Salmond, the villa layout upon its purchase in 2006 and the current villa layout.

Figure 124 - Villa Models

Figure 125 - Model Front Elevation

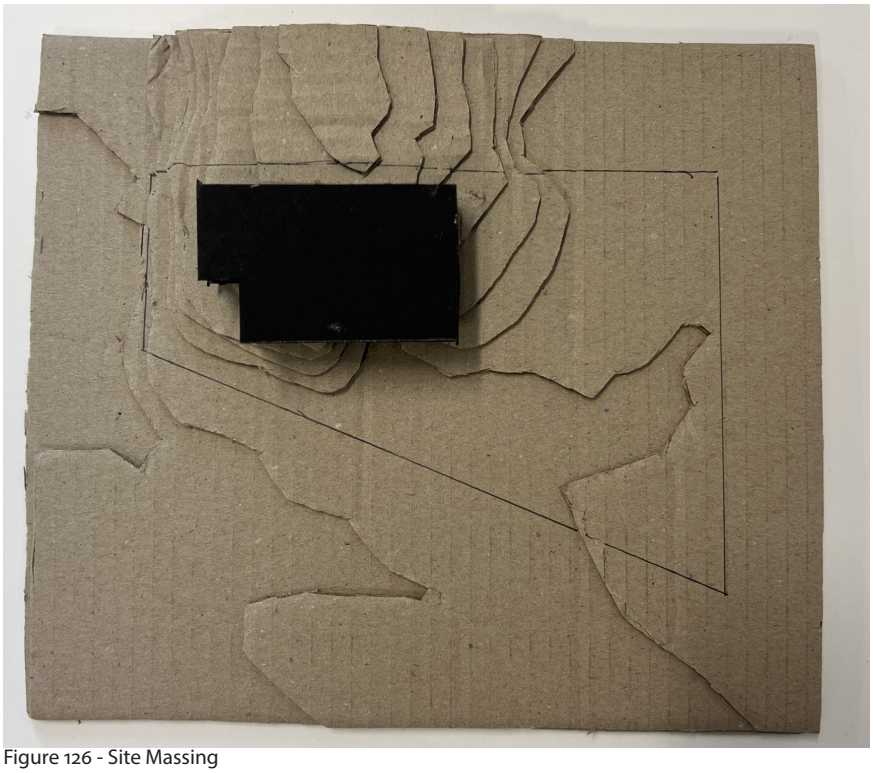


Figure 126 - Site Massing

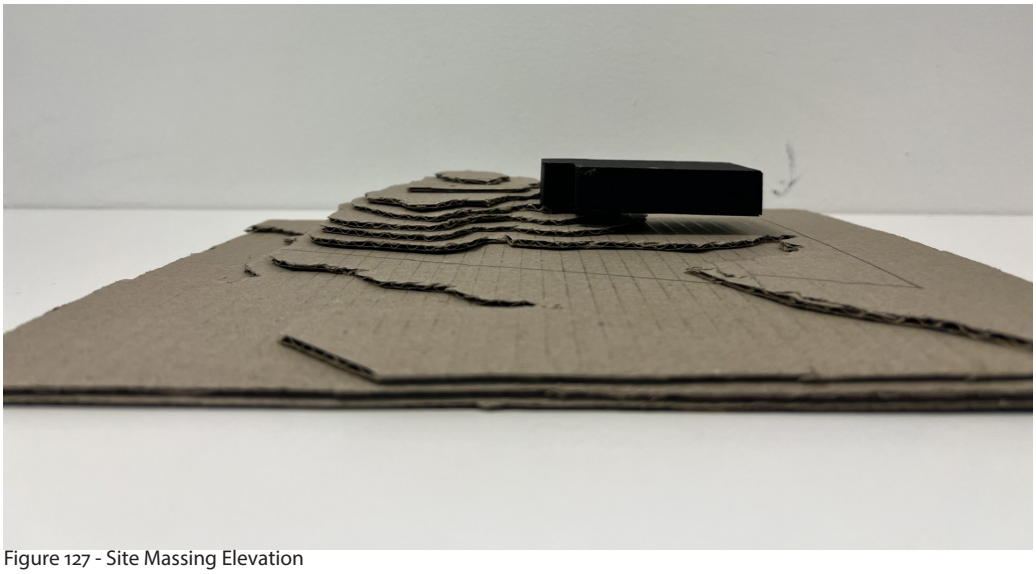
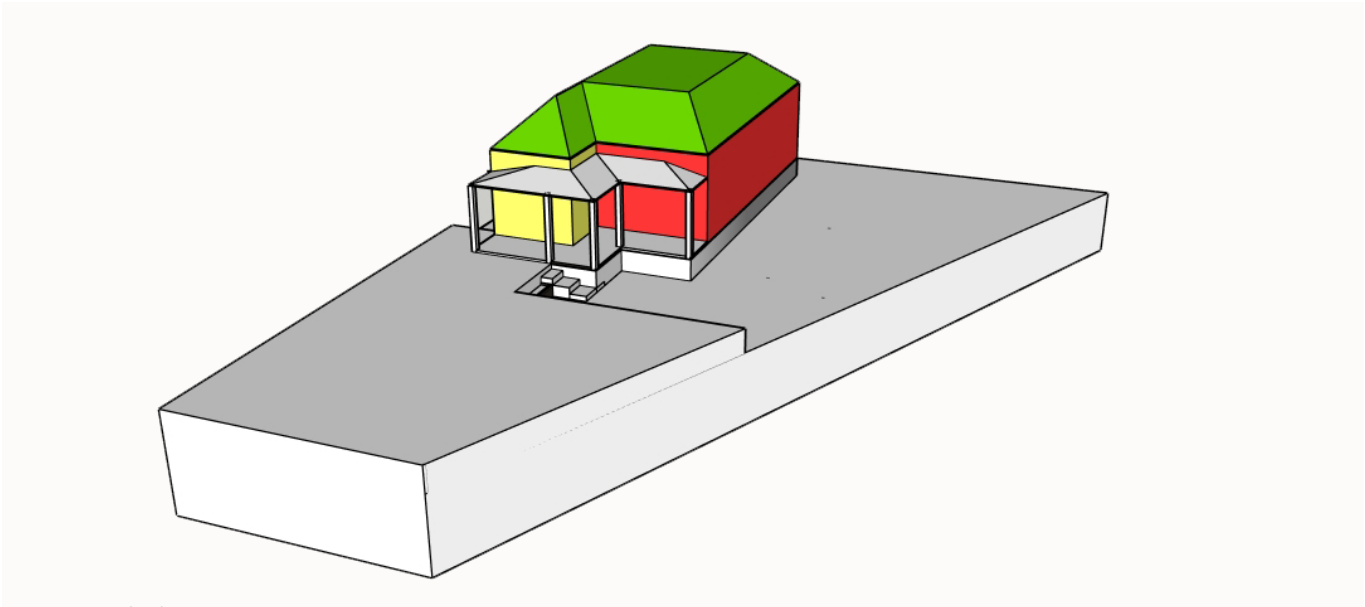
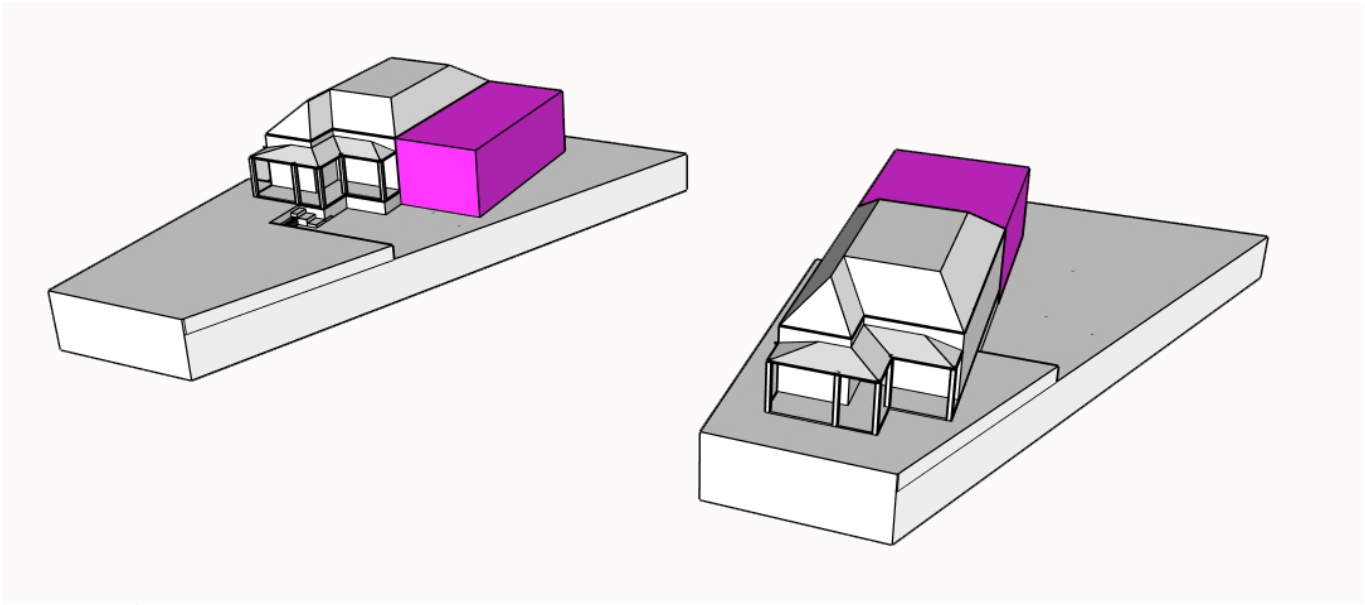


Figure 127 - Site Massing Elevation

The Walters Road site has immense residential development potential, being a corner site in a central location. Using the infill and densification strategies from Bluefield Housing and the case studies analysed in Chapter 3, the development options of the site were tested.

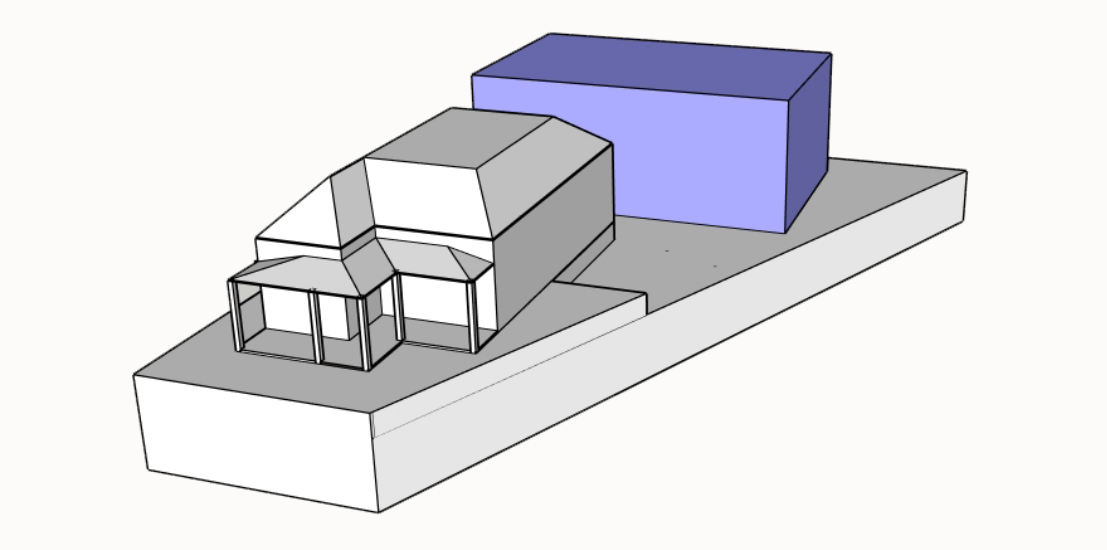


Division of of Existing House

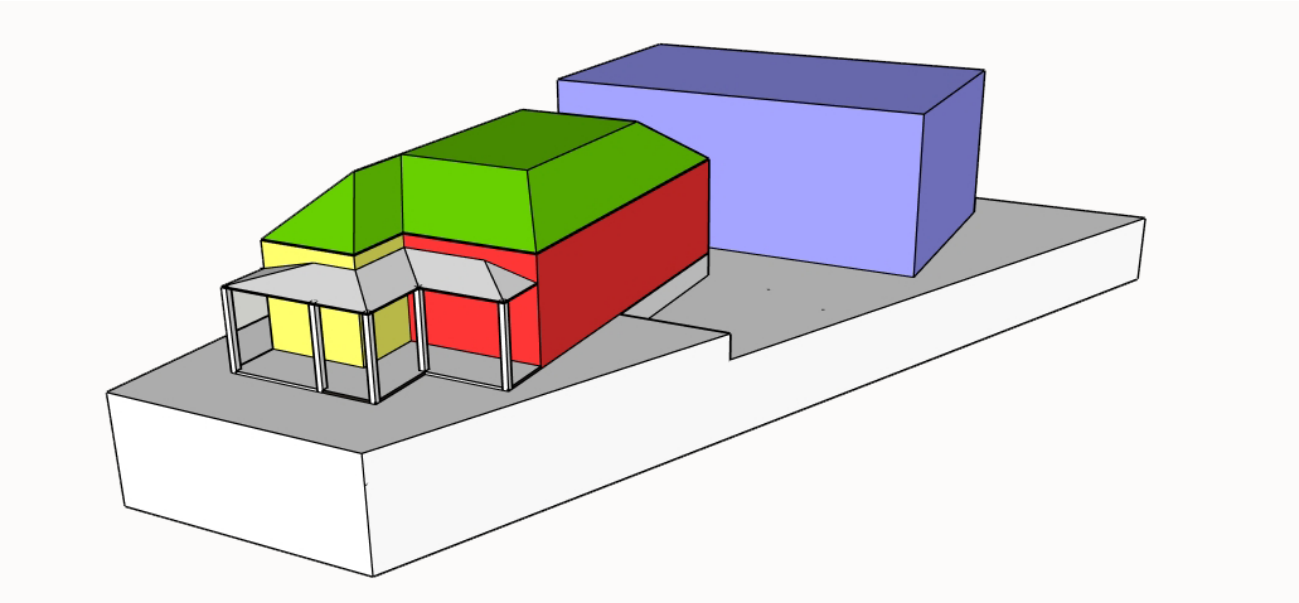


Extention Options to Existing House

Figure 128 - Testing of Densification Options on Project Site



Detached Backyard Home



Combination of Bluefield Development Options

From the testing of the densification options shown in Figure 124 it concluded that in order to reuse the existing villa on-site and maximise the site's developable area, relocating the villa to the west of the site was the preferred design decision. Not only does it maximise the developable area of the rest of the site it returns the villa to a traditional siting, with the verandaed front of the house, facing Cromwell Street.

The development of the rest of the site went through multiple design phases testing the different infill and densification strategies of division, new addition and relocation as shown in Figure 125.

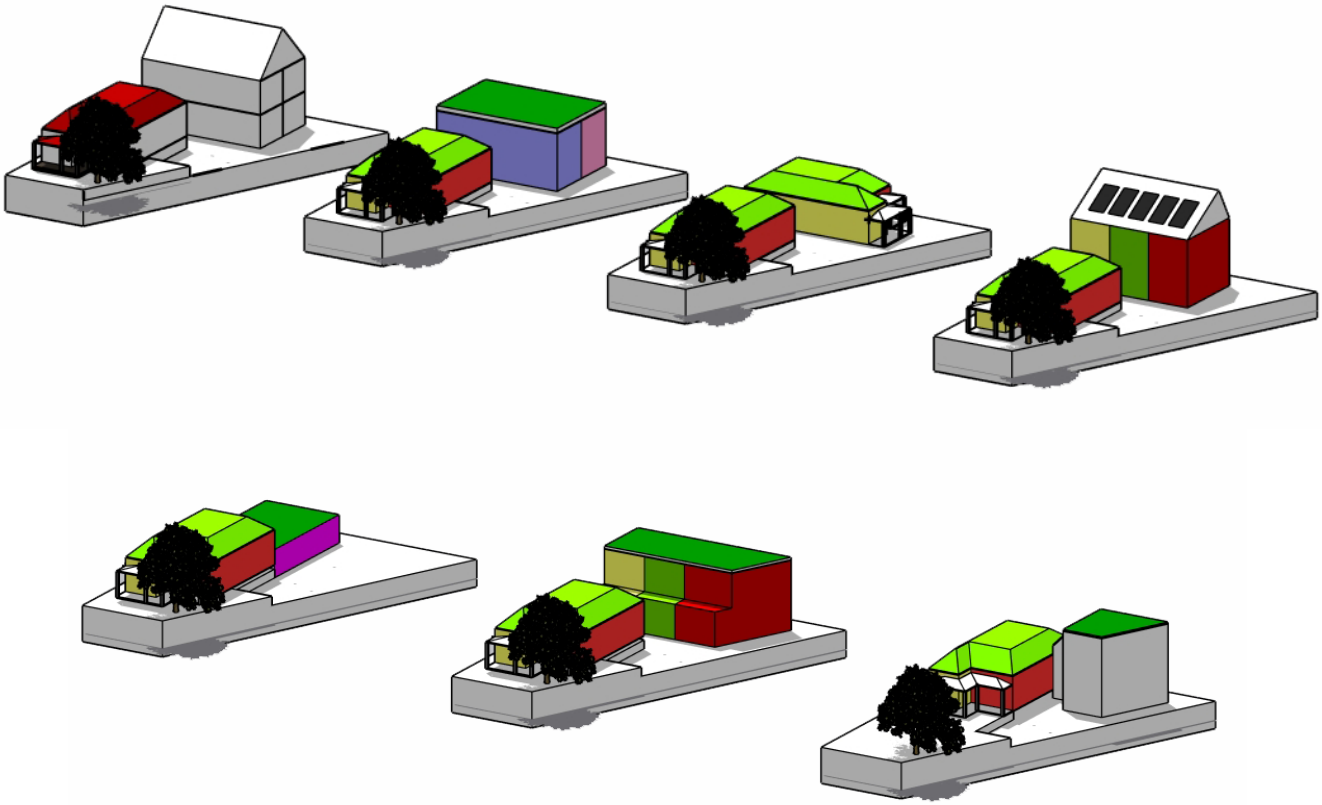


Figure 129 - Site Development Options

To compare the options for the site's development, a table was created to measure the various aspects and implications of each scheme. The aim of this assessment was to find the options that provided the higher number of housing units while providing amenities and retaining character for the area.

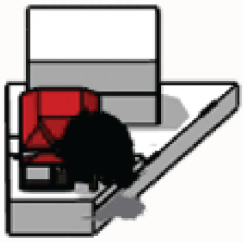
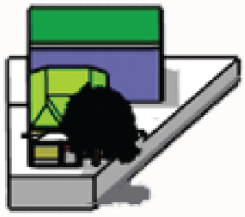
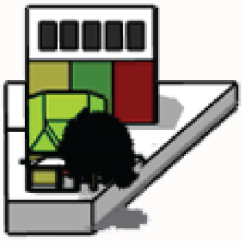
	Concept One	Concept Two	Concept Thr
	Reuse and New Development	Reuse and New Development	Reuse and Relo
			
Number of Units			
Impermeable Areas			
Embodied Carbon Emissions			
Passive Surveillance			
Heritage Conservation			
Solar Exposure			
Vegetation			
Deconstruction Systems			

Figure 130 - Design Concept Comparison Table

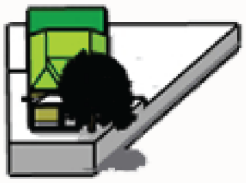
After exploring different design concepts and assessing them against the table below, the concepts that provided the highest number of units with the least impact on existing amenities were Concept One and Concept Four. These designs both divide the existing villa into three units and propose a new building on the rest of the section with five units and a communal space in them. This balances the need for increased housing with the protection and reuse of the existing building and greenery. These two design concepts were then combined to create the final concept design.

ee
cation

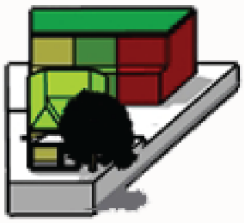
Concept Four
Reuse and New Development



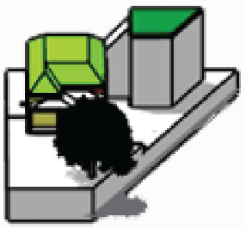
Concept Five
Reuse and Addition



Concept Six
Reuse and New Development



Concept Seven
Reuse and Addition



The residential development potential of the existing villa exists within two steps. The first step is to restore the optometry practice into a one-bedroom flat, and the second step is to transform the unutilised roof cavity into a third one-bedroom flat accessed via stairs from the existing front door of the optometrist. While roof cavity flats are not common in New Zealand, they are a useful densification tool used in high-density cities around the world.

The existing centre gutter roof of the villa creates an internal pitch of 2.4m in its cavity space. Reroofing the centre gutter of the villa to create a flat roof (Figure 127) creates the floor space for the third one-bedroom flat.

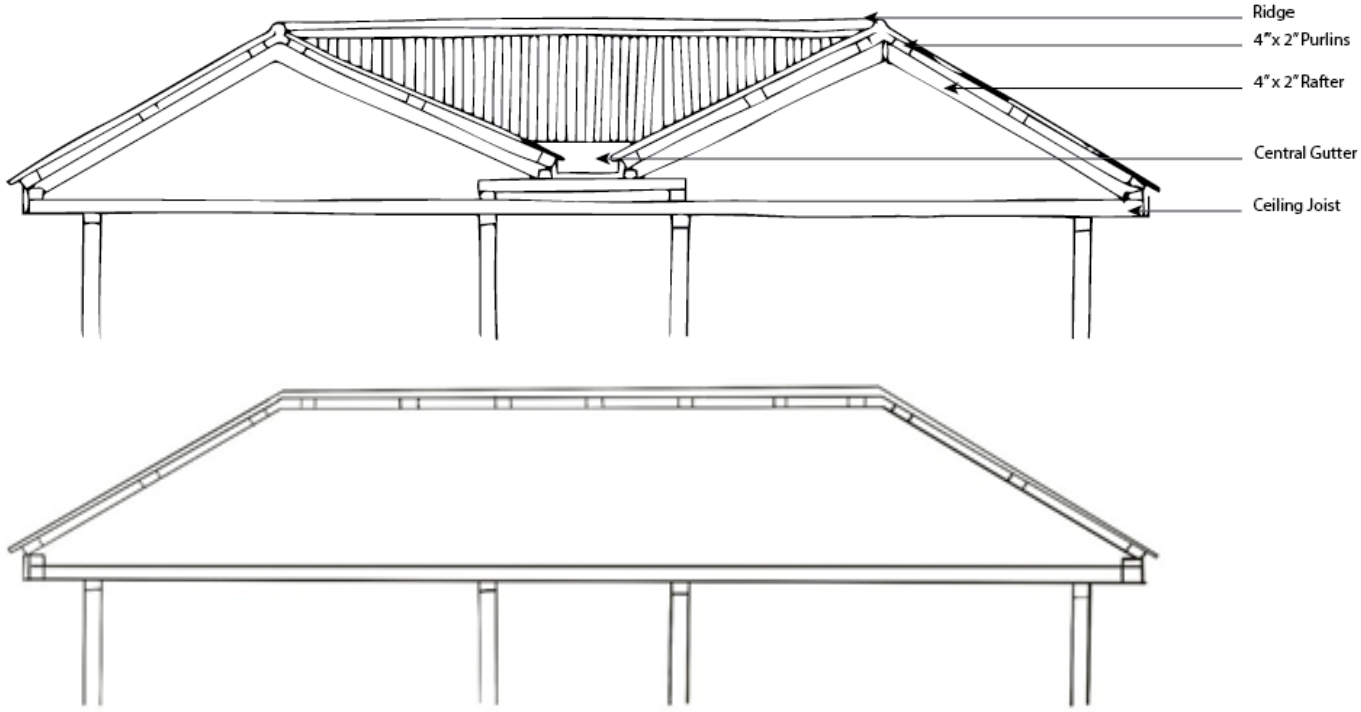


Figure 131 - Roof Alterations

Figure 132 - Ground Floor Plan of Development


1 Lobby
2 Living Spaces
3 Kitchen
4 Bathroom
5 Bedroom
6 Private Deck
7 Shared Garden
8 Site Entry and Car Park

Figure 133 - First Floor Plan of Development

Figure 134 - Second Floor Plan of Development

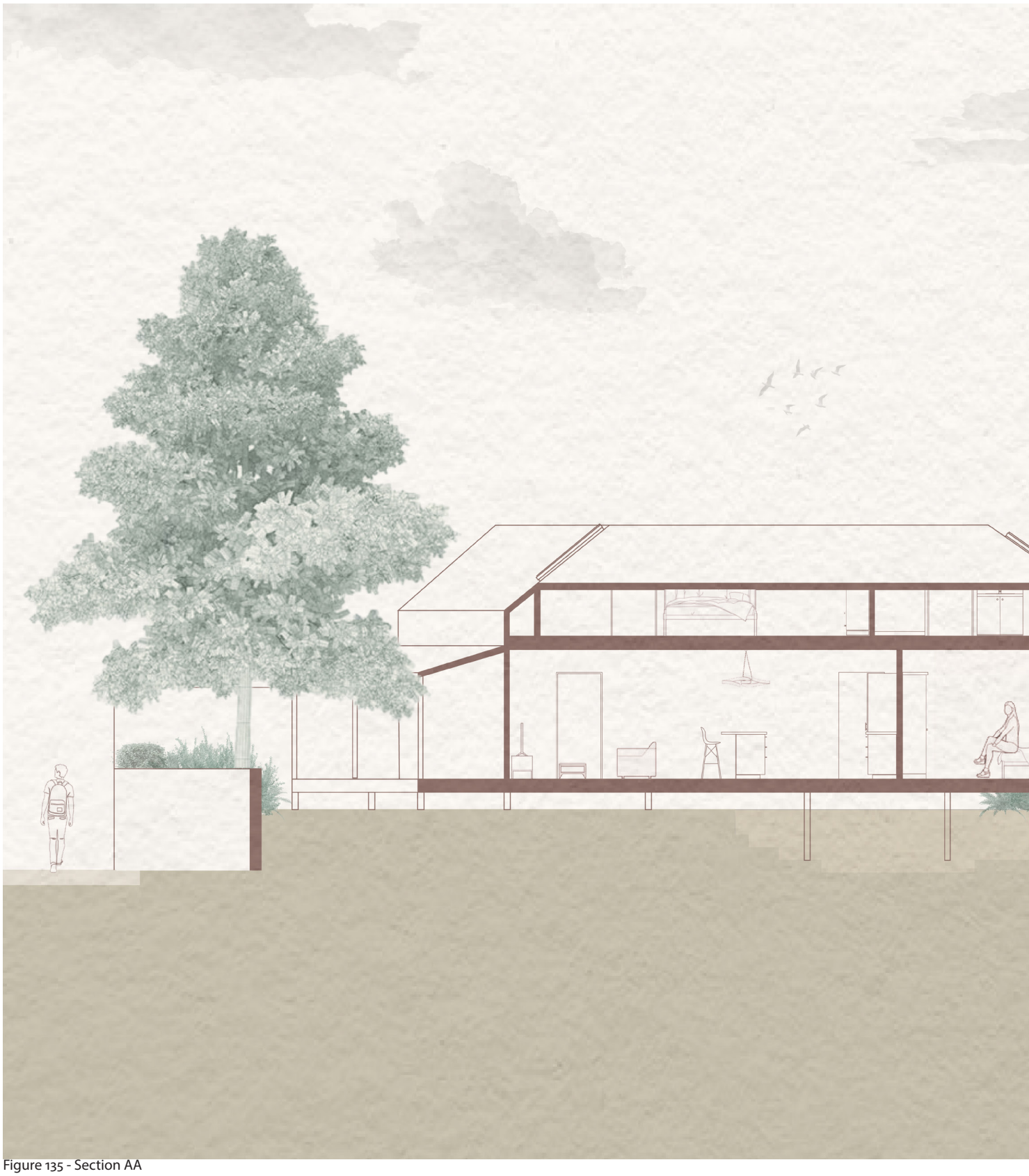


Figure 135 - Section AA

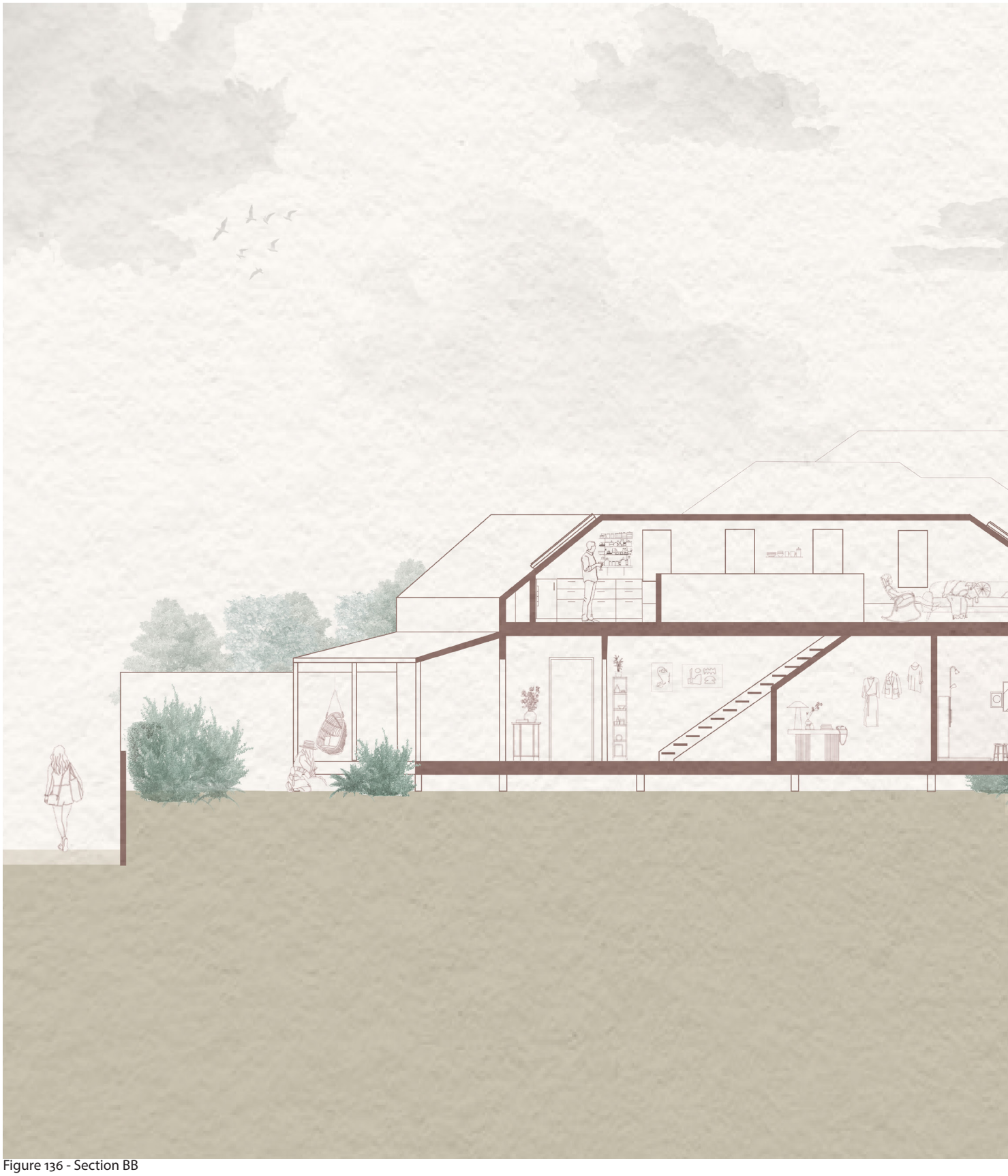


Figure 136 - Section BB

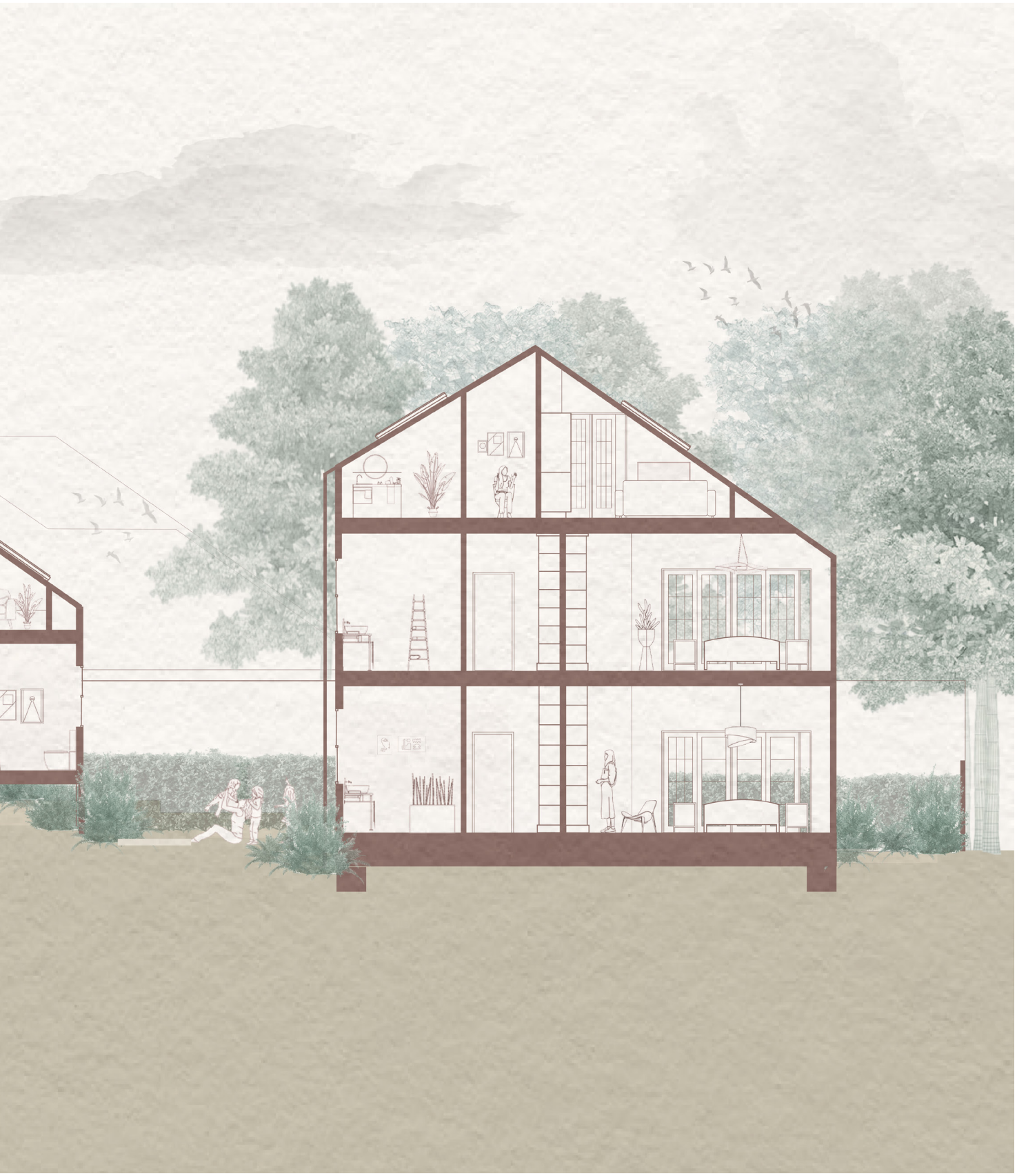


Figure 137 - Walters Road Site Perspective


Wendy's
DRIVE THRU

Figure 138 - Street Frontage of the New Building

Figure 139 - Walters Road Perspective of Site Entryways


Wendy's

Figure 140 - Site from Cromwell Street


VE THRU

Figure 141 - Shared Garden Space

Figure 142 - Villa Frontage

Figure 143 - Living Space of New Building Flats

Figure 144 - New Building Communal Space

Figure 145 - Villa First Floor Unit

This thesis proposition transformed the Walters Road site from a one-unit into an 8-unit development sensitive to existing vegetation and heritage. While the existing villa on the Walters Road project is not native to the site, it is in keeping with the style and age of the surrounding neighbourhood, making it contextually accurate. This makes it a good project test site for the sensible development design guide created by Bluefield Housing and existing regulations.

The existing villa was adapted using Bluefield Housing Solutions from a one-unit and commercial building into a three-unit building. Renovating the commercial half of the building and expanding the living space into the roof cavity created two more one-bedroom units, tripling the existing unit capacity. These units share one entryway as a threshold for interaction and incidental conversation.

The new addition contains five one-bedroom units and a communal laundry, dining and kitchen space for entertaining. The new apartment follows a similar layout to the villa's ground floor units, with a linear public-to-private flow and a shared entry and stairwell to the street fronting the southeast of the building. The ground-floor apartments of the new building are wheelchair accessible and have the space for laundry equipment to be fitted if required. A lift was not feasible in the design due to the angular roof cutting through the first and second floors.

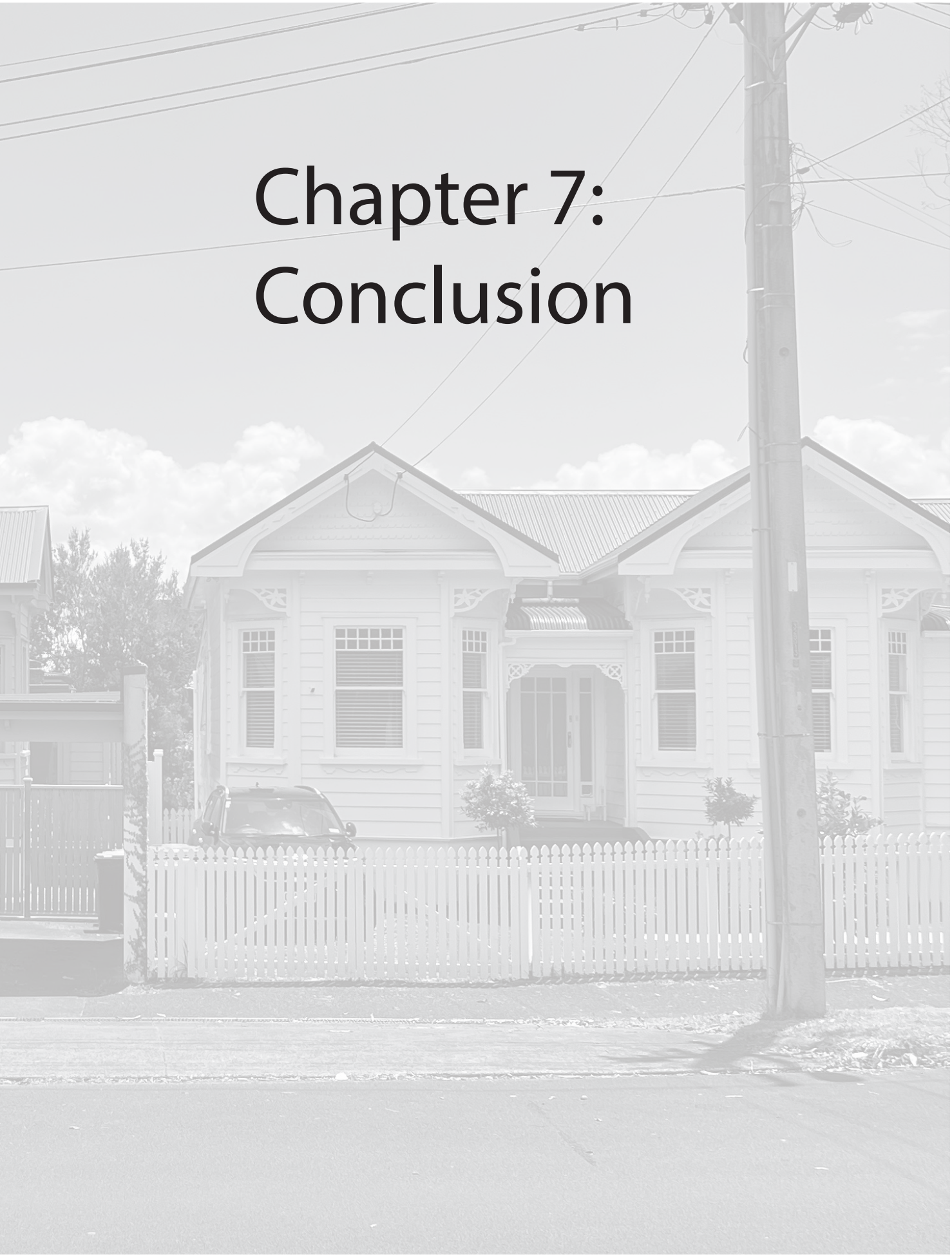
Parking on the site is heavily limited to two spots, one outside each building. Due to the context and locality of the site to public transport, the parking spaces are limited to a disability only and designed for flexibility of use if the space is not needed for a car. The outdoor and garden space is also shared as a space for interaction.

The angular form of the new building takes inspiration from the pitched roof of the traditional villa but is dramatically scaled to contrast the original design and to match the scale of the neighbouring commercial buildings. Timber is used as a structural and cladding material to be reminiscent of the built context of the neighbourhood.

Reusing the existing building and taking inspiration from it to apply to the new building shows how to extend its life and promotes new development on the site to be sensitive to the neighbourhood's existing character. If housing densification solutions like this were applied to multiple sites across Mount Eden and other areas of Auckland, there would be an opportunity for significant sensitive densification, meeting New Zealand's housing needs, without the loss of amenities typical KDR densification brings.

Figure 146 - Chapter 7 Cover Image of Marlborough St Villas

Chapter 7: Conclusion



7.1 Summary

This design-led thesis explored the research question: How can interventions to existing residential buildings assist in contemporary infill development while maintaining existing neighbourhood character? Alternative infill and densification methods have been researched and explored to create a way to mitigate tensions between new construction and the conservation of existing residential buildings. There has been a lot of controversy surrounding the correct approach to infill development and its impact on the environment and neighbourhood. Through the research into the adaptive reuse of residential suburbs, Damian Madigan's concept of Bluefield Housing as a method of sensitive densification was discovered.

Bluefield housing was created as a potential solution for the infill development of existing neighbourhoods. Although existing densification strategies exist, they often fall to each end of the scale, with intensive KDR at one end and renovation/ conservation at the other. This leaves a gap in the middle, which Bluefield Housing fills by combining existing strategies by reusing the existing structures and developing empty parts of the site through extensions or additions.

This thesis has then applied its research findings to the traditional New Zealand villa as an example of architecture found within the central suburbs of New Zealand's cities. These central suburbs contain unprotected heritage homes in prime locations for redevelopment to meet New Zealand's housing and densification needs. The final design has shown a way to increase density eight times without demolishing anything or removing the existing tree. If this was applied to other sites in the neighbourhood, it could significantly increase the number of homes without creating a significant environmental and heritage impact.

While the final design proposition of this thesis would likely not be allowed on this site due to the current regulations, the zones within the area show a big "jump" from the business zone of Dominion Road to the residential – single housing zone of the Walters Road site. While the current zoning aims to maintain the neighbourhood's existing character, it raises the question of whether there should be some flexibility to the housing on the edges, creating a more gradual increase in density instead of the current sharp change.

7.2 Limitations

This thesis has been heavily influenced by Bluefield Housing and its strategies toward the infill development of existing suburbs. Limitations to the Bluefield framework are that as a new concept, a concerted effort on behalf of both the client and the designer is required to reuse existing buildings to create sensitive infill densification. Bringing existing buildings up to New Zealand housing standards and then designing an extension or new construction may be a more significant cost in terms of both money and time than a typical KDR project, which is often a daunting task for an individual owner and not profitable enough for a more prominent developer.

This thesis has also applied its research on an existing heritage suburb. Heritage buildings tend to have stricter standards and regulations that need to be followed, potentially limiting the ability and impact that sensitive infill densification strategies such as Bluefield housing may have.

7.3 Contributions to the Field

The research on Bluefield Housing used within this thesis has been created and studied by Madigan in the Australian context. This thesis has then applied this research to the context of New Zealand, focusing on Auckland City and its existing residential central suburbs. This thesis has done an in-depth analysis of Auckland's local zoning and heritage policies of residential suburbs, which directly affect the ability to translate Bluefield Housing strategies into the New Zealand context. The sensitive development design guide was then created as part of this thesis design proposition, filling in the gaps in existing regulations and incorporating Bluefield Housing strategies toward infill densification.

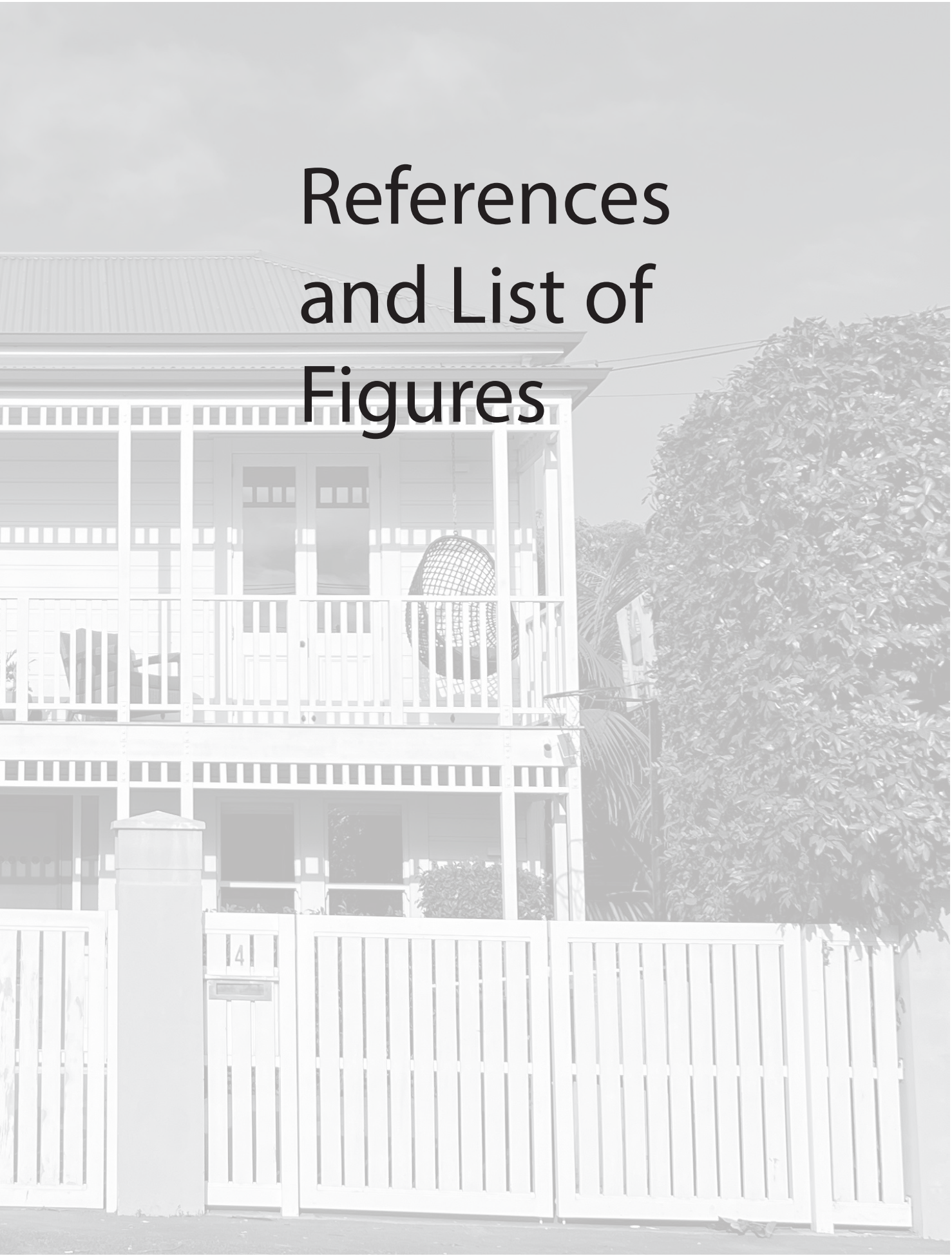
7.4 Speculations on the Future

This thesis focuses on interventions to existing residential buildings to assist in sensitive infill development while maintaining the heritage and character of neighbourhoods.
While the central suburbs, full of character and heritage-age buildings, grapple with the balance of reuse vs KDR, there is the potential for future research on this topic to be expanded to other densities or cities. This could include venturing across Auckland into more expansive suburbs, such as Henderson, Mount Roskill and Manurewa or other fast-growing cities in New Zealand, such as Christchurch and Dunedin.
The practicality of similar infill developments should be considered when in locations where public transport does not exist or is easily accessible.

Future research also has the potential to look at infill densification using bluefield housing strategies on a smaller scale, focusing on more specific sustainability goals, such as carbon calculations and build and operational costs of Bluefield and infill developments when compared to traditional developments.

Figure 147 - Cover Image of References and List of Figures of Taupata St Cottage

References and List of Figures



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List of Figures

All non-referenced images are by the author.

Glossary

Adaptation

Modifying a place for compatible use while conserving cultural heritage is the process (es) of modifying it for compatible use. This may be done through careful alterations and additions when essential to use, and all modifications must be compatible with the original design while remaining distinct. (ICOMOS, 2010)

Any work to a building more than maintenance to change its capacity, function, or performance.
(Douglas, 2006)

Adaptive Reuse

The conversion of outmoded or unused things, often things having historical value, to new uses or applications in new contexts.(The Getty Research Institute., 2017)

Alteration

Modifications to the appearance, structure, or function of a building.
It often forms part of many adaptation schemes rather than being done on its own. (Douglas, 2006)

Bluefield Housing

"Low-rise suburban neighbourhoods that are excluded from strategic densification policies or targets or where increased housing numbers can only be achieved through minor infill via subordinate housing add ons." (Madigan, 2023)

Brownfield development

"Development of land that has already been developed and therefore has existing infrastructure." (Auckland Council, n.d.-c)

Compatible Use

A use consistent with a place's cultural heritage value and has little or no adverse impact on its authenticity and integrity. (ICOMOS, 2010)

Conservation

Conservation is the process of understanding and caring for a place to safeguard its cultural heritage value. It is based on respect for the existing fabric, associations, meanings, and use of the place. It requires a cautious approach of doing as much work as necessary but as little as possible and retaining authenticity and integrity to ensure that the place and its values are passed on to future generations. (ICOMOS, 2010)

To retain and reveal cultural heritage values to support ongoing meanings and functions of a building.

The practice of caring for places with cultural heritage value, their structures, materials, and cultural meaning.

Conversion

Changing a building's function through structural and interior layout interventions.

Cultural Heritage

The natural and physical resources, including historic sites, structures, places, and areas; archaeological sites; and sites of significance to Māori, contribute to understanding and appreciating New Zealand's history and cultures.

Cultural Heritage Value/s

Possessing aesthetic, archaeological, architectural, commemorative, functional, historical, landscape, monumental, scientific, social, spiritual, symbolic, technological, traditional, or other tangible or intangible values associated with human activity. (ICOMOS, 2010)

Documentation

Collecting, recording, keeping, and managing information about a place and its cultural heritage value, including information about its history, fabric, and meaning; information about decisions made; and information about physical changes and interventions made to the place. (ICOMOS, 2010)

Extension

New structure that increases a building's capacity and volume through connection to the existing building.

Greenfield Development

"Land that has not been previously developed, usually further from the CBD (central business district)" (Auckland Council, n.d.-c)

Historic Heritage

The natural and physical resources contribute to an understanding and appreciation of New Zealand's history and culture. (New Zealand Parliamentary Counsel Office, n.d.)

Infill

"the more intensive use of land for residential development in urban areas. Such development can be in the form of medium to high density residential flats, town houses (row housing) and villa units."(Greaves & Stopher, 2006)

Intervention

Any activity that disturbs or alters a place or its fabric is considered an intervention. Interventions include archaeological excavation, invasive investigation of built structures, and any intervention for

conservation purposes. (ICOMOS, 2010)

Maintenance
The regular and ongoing protective care of a place to prevent deterioration and to retain its cultural heritage value. (ICOMOS, 2010)

Continually necessary routine actions to keep components up to standards and working order.

Preservation
Maintaining buildings or components with as little change as possible, keeping them in their original physical condition. (ICOMOS, 2010)

Reconstruction
To build again as closely as possible to a documented earlier form, using new materials. (ICOMOS, 2010)

Refurbishment
The adaptation and modernisation of non-structural elements of a building to meet current standards.

Rehabilitation
Modifying and altering building components to meet current and changing uses and standards while retaining historic character.

Relocation
Moving a building to a different location as a whole or in parts through dismantling and reassembly.

Renovation
The upgrading and repairing of building components through maintenance.

Repair
Use identical, closely similar, or otherwise appropriate material to make good decayed or damaged fabric. (ICOMOS, 2010)

Restoration
The reassembly and reinstatement of elements based on respect for existing materials and logical interpretation of evidence of building elements so that a building remains consistent with its form and meaning. (ICOMOS, 2010)

Retrofitting

The redesign of existing building systems to meet new standards using components unavailable during construction.

Structure

Any building, standing remains, equipment, device, or other facility made by people and fixed to the land. (ICOMOS, 2010)

Sprawl

"low-density, leapfrog development that is characterized by unlimited outward extension. In other words, sprawl is significant residential or non-residential development in a relatively pristine setting. In nearly every instance, this development is low density, it has leapt over other development to become established in an outlying area, and its very location indicates that it is unbounded." (Burchell et al., 2002)

Use

The functions of a place, and the activities and practices that may occur at the place. The functions, activities, and practices may in themselves be of cultural heritage value. (ICOMOS, 2010)

Appendix

Predentation Model