SUBURBAN TO URBAN

Wellington High Density Family Housing

SUBURBAN TO URBAN

Wellington High Density Family Housing

Emma Mary Curran

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

2017

Acknowledgements

Mum and Dad, thank you for the wonderful support and encouragement you have given through my years of study.

Thank you to my supervisor Shenuka De Sylva for your help and guidance. Additionally, I would like to thank all the other lecturers and tutors who have taught and shaped my thinking over the past five years.

Finally, thank you to everyone in studio; From the gelato trips to Sunday brunches, your friendship has made architecture school unforgettable.

Fig 1.1 *(Previous) Aerial photo of Te Aro, Wellington with site highlighted*

Abstract

‘Suburban to Urban’ explores a family-focused high-density residential model as an inner-city alternative to the suburban detached home.

The research responds to two key criteria; first how to meet the needs and desires of families in an inner city high-density environment, second the spatial qualities that encourage a sense of community in a high-density mixed demographic environment to enable the creation of a positive public realm.

Located in Te Aro, Wellington, this thesis identifies through research a criterion of qualities intrinsic to suburban living in New Zealand and defines a methodology that enables the translation of this criterion into the spatial design of a family-focused high-density development in Wellington’s inner city.

Fig 1.2 (Opposite) Aerial photo of Te Aro, Wellington with design highlighted

Thesis Structure

This thesis follows an iterative, design-oriented approach to research in the creation of a high-density family focused inner city alternative. The configuration of this thesis works sequentially, intersecting relevant literature where appropriate. While the research responds directly to Wellington, this thesis raises the broader argument of how these findings could be adapted for similar New Zealand urban centres.

The thesis begins by describing the research question and problem, followed by an overview of suburban life and analysis of comparative cities, case studies and site.

The body of the thesis follows the design development and refinement, discussing previous experiments and relevant case studies towards the final developed design.

The final section concludes how the design responds to the initial problem and what the future steps are for high-density family-focused mixed demographic housing in Wellington and New Zealand.

Fig 1.3 (Opposite) *Plimmer House Restaurant*

CONTENTS

Acknowledgements	v
Abstract	vii
Thesis Structure	ix
A CASE FOR WELLINGTON: THE PROBLEM AND THE SITUATION	2
Introduction	2
The Benefits of High-density Housing	4
High Density Low-high rise	5
02 OBSERVATIONS ON SUBURBAN LIVING	7
The New Zealand Dream	7
Key Characteristics and Qualities of the New Zealand Suburban House	9
Key Features of Suburbia	10
Transferable Qualities of the New Zealand Suburban Home	11
The Shifting Values of New Zealanders	13
Key Housing Characteristics	14
03 COMPARATIVE CITIES AND CASE STUDIES	17
Berlin	19
Amsterdam	27
Melbourne	35

Fig 1.4 (Opposite) Site location in Te Aro, Wellington

WELLINGTON MAPPING + SITE CONTEXT	43	Development Floor Plans	87
Wellington City	43	Final Floor Plan Series	92
Te Aro	43	Development of Public Space	94
Site Analysis	48	Site Arrangements	96
LIVING IN DENSITY	56	08 DESIGN DEVELOPMENT PUBLIC REALM	98
Territoriality	57	Establishing Height	98
INITIAL EXPLORATIONS	59	Public Park Spaces	100
Access and Circulation	59	Urban Connectivity	104
Massing Studies	62	Residential Intensification	107
The Minimum Apartment	65	Vehicle Organisation	108
Project Design Guidelines	66	09 FINAL DESIGN	115
Minimising Social Harms	67	Final Design	115
Introduction to Zoning	68	Floor Plan Series 1	134
Housing Units	71	Floor Plan Series 2	134
Housing Cells	72	09 CONCLUSIONS, UNANSWERED QUESTIONS AND FUTURE STEPS	151
Housing Layers	74	Conclusions	151
Outdoor Spaces	77	Research Limitations	153
Methodology Overview	80	Future Research	154
06 DESIGN DEVELOPMENT	85		
Garrett Street Building	85

Can a high density residential model for Wellington City act as a valid alternative to suburban living and encourage a mixed demographic focused on families and community?

Fig 1.5 *(Opposite) Courtyard public park*

01

Fig 1.6 (Opposite) *High-rise of Homes*

A CASE FOR WELLINGTON: THE PROBLEM AND THE SITUATION

Introduction

“The nature of our housing, no matter of what culture and what era, communicates an undistorted impression of the human condition. In that sense housing... has always shaped the quality of human life” (Ebner 7).

Inner city apartment living is a relatively new phenomenon to New Zealand. The traditional and still ubiquitous form of residential development is the standalone family home in a low-density suburban setting (Witten 79). Despite this, the suburban typology is fast becoming unsuitable. Increasingly value is placed on convenience and ease of living over high maintenance sections. As one of the highest urbanised populations, residential intensification of New Zealand's urban areas is unavoidable. Current examples of high-density living often developed for other demographics do little to encourage the migration of the families to the city centre (Witten 79). Families therefore remain perpetually just outside the city in suburbs sprawling exponentially outwards.

Fig 1.7 (Above) 86% of New Zealand's population live in urban centres (world bank data).

In recent years housing scarcity and affordability have become significant issues for New Zealand. This has been caused by increasing urban populations, diminished housing supply, reduced public investments and a policy vacuum allied to crude financing and taxation (Harding and Thasis 13). Continual use of Greenfield developments and traditional housing approaches will further strain the infrastructure of New Zealand's main cities. The re-urbanisation of work and social life has created a valid argument for inner city living. By rethinking traditional housing preferences, the apartment will become the urban signifier of societal change (Harding and Thasis 11). This thesis seeks to engage with housing and collective life as tools of social transformation to generate a family focused high-density residential model for the inner city.

What isn't being provided by existing typologies?

Within this context of decreasing housing affordability and diversity, new housing typologies must be developed (Thompson 26). Families residing in inner-city apartments in New Zealand are rare. Instead belief in the suburban detached single family home as the best place for child rearing prevails (Witten 86). Witten notes that while 'well-designed apartment complexes providing adequate environments for children in the inner city' exist, these are reserved for the few (89). Instead low cost high-rise blocks developed with targets other than families, are the primary housing option available to low-income families (Witten 89). Situated in poor locations, many of these apartments provide limited access to green spaces or other amenities essential for the social and developmental needs of resident children (89). These limited safe areas for children to play, as well as often windowless bedrooms, bathrooms and sometimes kitchens combined with a lack of privacy and storage, increase the struggle for families to live comfortably in these environments (Witten 85). Additionally, inadequate space often leads to health, education and income issues. This negatively impacts day-to-day life by inhibiting activities such as how and where people prepare and eat food (Sheppard). To convince families to move into the city family focused housing and local infrastructure must be developed (Krämer 7).

Increased no. of dwellings and people in Wellington

Change in number of dwellings

Fig 1.8 (Above left+right) Wellington population and dwelling growth

The Benefits of High-density Housing

- Central location, close to public transportation, schools and workplaces
- Views from tall buildings
- Shared community amenities
- Good protection against intruders (Schittich 29).
- Reduced distances between residential and commercial spaces
- Supporting pedestrian and bicycle friendly environments
- Limit urban sprawl
- Meet increased demand for accommodation close to services and amenities
- Increase demand and support for local businesses
- Reduce transport and commute time, distance and costs
- Increase the activity and vibrancy of the streets
- Contribute to a safer environment by combining different uses used at different times of the day (Auckland Council).

This thesis interprets low rise housing as 1-3 stories, mid-rise as 4-7 and high-rise over 7 stories.

Fig 1.9 (Above) Low, medium and high rise as interpreted for this thesis

High Density Low-rise

Articulated in America by architects such as Louis Sauer in the 1960's and 70's, the high-density low-rise model emphasises the liveable scale and community context (Chandler 69). The typology is dense enough to achieve "access to public transportation and civic and commercial amenities, while also providing a sense of individual identity for residents and accommodating an integration of open space" (Archdaily).

High Density Mid-rise

The European model follows a mid-rise urban form, traditionally dictated by the number of stairs occupants were willing to climb to reach their apartment (Chandler 95). This formed five to seven storey perimeter apartment blocks grouped around central courtyards and used collectively between residents. In recent years parking has been integrated, predominately in adjacent buildings or below ground (Chandler 97).

High Density High-Rise

High-density high-rise housing can generate a level of pedestrian activity that encourages informal meetings if located on a site where height is appropriate (Chandler 121). However, when poorly planned or when car parking and the building's relationship to the street is not sufficiently addressed, high-rise buildings can corrupt the quality of surrounding urban life and prevent the creation of community (121). Children living in these environments often lack access to safe, supervised recreational space, and face limited opportunities for social interaction (Witten 86).

02

OBSERVATIONS ON SUBURBAN LIVING

“Our house is part of the street, is part of the suburb, is part of the city. The quality of each one matters in the making of the greater composite that is the neighbourhood” (Thompson 24).

The New Zealand Dream

Since the post-war housing crisis, which resulted in the State Housing Scheme, New Zealand housing has been shaped by the governments’ support for the ‘New Zealand dream’. This model, originally a detached single-family house on a quarter acre suburban section, formed a healthy solution for the working class and spurred nationalistic sentiment. Whether these suburbs ever achieved the intended ‘pastoral paradise’ is worth considering. Residential decentralisation increased the cost of providing often-underutilised community amenities. Consequently a limited provision of such amenities, infrastructure and public space created “not the Elm Street of the American imagination but a stripped down antipodean alternative” (Falconer 154). Despite this, the inner-city suburbs often presented positive public realms where “narrower streets, low picket fences... and front verandas” provided a semi-public space for social dialogue and effective street surveillance (154).

Fig 2.1 (Above left) *The Holmes family outside their home in Naenae*

Fig 2.2 (Above right) *House and children at 13 Patrick Street, Petone*

Over time the dream has adapted, but remains a strong aspiration for much of the population. This “longstanding view that suburban family life is the desired model for community development” has meant continual support from the government (Ferguson 297). However the traditional dream has become out-dated; changes in economy, family dynamics, aspirations, lifestyle and cultural shifts have made suburban living less practical. The suburban house of the 1970’s covered 11.5% of its site (Marriage). Shortage of land, economic factors and changes in lifestyle have contributed to a reduction of plot sizes and an increase of house size where the current house covers 46% (Marriage). This thesis argues that some families would choose life in the city, for the accessibility it provides, as long as some aspects of the New Zealand dream are retained.

Fig 2.3 (Above) Comparison of average New Zealand House and plot size in 1970's and 2010's

Key Characteristics and Qualities of the New Zealand Suburban House

Assumptions on New Zealand Housing

1. New Zealand’s main housing typology is the standalone suburban home.
2. This typology holds sentiments, such as a place to call one’s own, individuality and a sense of belonging, for which it is considered the superior typology.
3. These sentiments are not dependent solely on the physical configurations of this typology.
4. These sentiments situate the typology in suburbs, hinged on ideas of self-sufficiency and the single working parent model.

Fig 2.4 (Above) Key features of the original New Zealand Dream

Key Features of Suburbia

Fig 2.5 (Above) Key features of the New Zealand suburban house

Transferable Qualities of the New Zealand Suburban Home

New Zealanders' choose housing they can afford, moderated by the location and a desire for a particular housing typology (Cox 11). An ambition to own land remains deeply embedded in the national psyche. The concept of suburbia coupled with an island mentality and nationalistic sentiment allows New Zealanders' to isolate themselves through the 'private view' and establish territoriality attached to sections and fences (Henderson 39).

The suburban New Zealand house is therefore in part the physical composition of elements but is also the associated sentiments generated by identity, culture and history. Identification of what the New Zealand home now constitutes is a piece of research that is missing. While the original dream has adapted there is no definition of the new ideal house. Designers are limited to looking at the conditions of the site and the needs of the family to develop these feelings of association and belonging.

In the development of a successful inner city alternative, apartments must be "appropriate to our living conditions, climate, cultural expectations and budgets" (Johnston). Key factors from the suburban home, beyond location must be analysed and reinterpreted for the inner city context as many of these key suburban qualities remain within the ideal inner city apartment:

The Private View

As a nation New Zealanders' value privacy (Johnston). The spatial organisation of the home ensures certain spaces overlook the backyard as a retention of the private view. Additionally, while the suburban home is designed to see out onto the street and front yard, the placement of fences and vegetation prevents others seeing in. In high-density housing environments, this sense of privacy is often eroded both in terms of sight and sound.

Multifunctional Space

The kitchen and dining spaces are the heart of the suburban house. A fully functional kitchen and dining area provide separate defined areas in the home with the ability to engage across these

spaces. This space is often poorly defined or lacking in existing apartments. The translation of this suburban quality into apartment life must be further developed to support families.

Separation of Public and Private Realms

The suburban home gives the occupier control over the levels of social interaction they desire within the house itself. In practice, this allows the user to open up living spaces or close off private areas as desired (Johnston). Features such as the passage are used to clearly separate the private and public regions of the dwelling. Due to small floor areas, or poor design, these features are often missing in current Wellington apartments.

Individual Identity

The detached dwelling generally offers greater opportunities to personalise space, with extra land to build and renovate on if desirable. By contrast, apartment sizes are fixed and often the ability to individualise is limited. It is important that family-focused apartments allow for individual flexibility (Johnston). This ability helps develop the sentimental concepts of home and attachment.

By providing an alternative high density typology that meets most of the suburban needs, it is possible to change people's preconceptions of high density living.

The Shifting Values of New Zealanders

As people begin to orient themselves according to new priorities with regard to their living environment, the ideals of the 'New Zealand dream' must be adjusted to support families in a dense urban setting. To create a viable high-density alternative, this housing model must respond directly to Central Wellington and retain preferences for community, privacy and quality outdoor space.

Factors such as transport costs, employment opportunities, smaller family sizes, increasing house prices and familiarity with inner city living are all positively affecting perceptions of high-density housing. This shift in values are convincing some to sacrifice parts of the New Zealand dream for the conveniences of inner city living. A high density housing model in this context should therefore closely reflect certain qualities of the New Zealand suburban home while also responding to the conditions of the inner city.

Fig 2.6 (Above) Diagram of changing family demographics

Key Housing Characteristics

03

Fig 2.7 (Above) Key characteristics of successful High-density housing

03 COMPARATIVE CITIES AND CASE STUDIES

“The fact that the overwhelming majority of the population dream of owning their own home in the countryside must be harmonised with the necessity for high density housing in order to halt urban sprawl and prevent further development of green spaces” (Schittich 10).

All successful cities have at some stage experienced a growth and intensification process. Wellington, as a developing city, can adapt these models to fit local conditions (Johnston). Using Berlin, Amsterdam and Melbourne as comparative cities, precedents were selected from each for their successful and transferrable spatial solutions in the development of a new housing typology. The two European cities were selected for their historically consolidated cores and high-density living models. Melbourne was chosen for its comparable cultural values and standards of living. A variety of criteria was examined for each precedent. The pictograms indicate what qualities the project has achieved particularly well in reference to housing ideals identified for this thesis.

Fig 3.1 (Above) Pictograms of qualities analysed across case studies

Berlin

“The great thing about Berlin’s self-made culture is its [architectural] diversity. Locally grown projects are tailored specifically to the people that make them, and to the neighbourhoods in which they are built” (Ring 14).

City factors

- 3.4 Million people
- 3,900 per square kilometre
- Capital city and representation of national identity
- Temperate seasonal climate

Urban form

- High-density mid rise
- Inner city largely defined by the perimeter block
- Historically consolidated core
- Approximately 60% of the city was rebuilt following World War II; Eastern Berlin in large, uniform prefabricated blocks and the West focused on urban quality (Dalziel 126).
- Approximately 10% of the population lives in single or two-family dwellings with the remainder living in multi-residential buildings (126).
- Traditionally, urban living was organised in multi-storied flats around tight courtyards. Recently, townhouses with outdoor space have proliferated from middle class families (126).
- Baugruppen (cohousing) (128).
- Retention of highly distinctive character
- Natural reserves cover almost a quarter of Berlin’s total area (Jaworsky 14).

What are Berlin’s housing aspirations?

- Common amenities/ social focus
- Affordability/ cost effectiveness
- Friendly child/ disability/senior living
- Urban vitality/ green spaces
- Flexibility
- Building ecology/ architectural quality (Ring key).

E3 Kaden. Klingbeil Architekten.

Fig 3.2 (Above Left) E3 Exterior
Fig 3.3 (Above) E3 site plan and floor plan
Fig 3.4 (Above) E3 analysis diagrams

The seven-storey infill building uses an open frame to divide the stair tower and apartments separating circulation and creating triple orientation dwellings. This effectively increases the residents' privacy and maximises light entering the dwellings. The building's success is in the large variety of floor plans created, each offering a high degree of flexibility to create an interesting mix of alternating transparencies, loggias, views and staggered entrances (Wietorrek 256). These shared, generous loggias are set back from the facade in front of the apartments and are accessible to the residents as common property (256). This encourages the development of gardens and spaces of interaction between residents.

Zelterstrasse 5. Zanderrotharchitekten.

Site Plan 1:1000

Floor Plans 1:500

Fig 3.5 (Above Left) Ze05
Fig 3.6 (Above) Zelterstrasse 5 site plan and floor plan
Fig 3.7 (Above) Zelterstrasse 5 green spaces

Targeted towards families as a dense urban alternative, this five-storey housing scheme successfully offers a combination of outdoor spaces and different housing typologies to create individual homes in a high-density environment (Zoller 217). The inner row of housing features garden houses and loft apartments. The front row holds narrow four-storey townhouses accessed from the street. The shared carpark raises the courtyard garden to the first level, creating a focal point to the project. This central garden offers a large, safe, secure environment for children to play unsupervised. Additional private outdoor spaces enhance the feeling of the individual home and allow residents to regulate their privacy. The shared rooftop terrace, summer kitchen, sauna and visitors' apartments, further aid the creation of a community (217).

- Green Spaces
Central enclosed garden
- Child Friendly
Enclosed garden, townhouse typology
- Common
Roof garden, summer kitchen, sauna
guest apartments
- Mixed-Use
Residential, commercial spaces
- Social Focus
Large amount of communal amenities

Oderbergerstrasse 56. BARarchitekten

This mixed-use infill building has a complex internal structure with a direct relationship to its urban environment (Zoller 285). Situated on a small site, commercial space occupies the ground floor. Above this are two-storey adjoining studios with residential units stacked from the third floor upwards. These fit around the central stairwell as an array of flexible and varied spaces, allowing smaller units to combine with larger if necessary (285). The result is a complex spatial structure that responds to the varied mix of utilisations. This is achieved through intertwining spaces, changing room heights, small-scale areas and combinable spaces (285).

- Mixed-Use
Residential, studios, restaurant,
commercial space
- Flexibility
Modular system with various types of
separate spaces
- Urban Interaction
commercial spaces are popular
neighbourhood venues

Fig 3.8 (Above Left) Oderberger Strasse 56
Fig 3.9 (Above) Oderberger Strasse 56 site plans and floor plans.
Fig 3.10 (Opposite) Location and isometric drawing of an apartment

Amsterdam

City factors

- Population 780,000
- 4,457 per/km²
- Capital and most populous city of the Netherlands
- The Amstel river terminates in the centre of the city and connects to a number of canals dividing the inner city into 90 'islands' (Vincent).
- The Canal district is a UNESCO world heritage site (Zeinstra 9).

Urban form

Well known for its public housing and planning models, Amsterdam's urban development and policies emphasize the high-density compact city as a means of reaching sustainable ambitions (Gelsomino 22). Recent development of old industrial areas have created a series of artificial, residential islands in the IJ estuary (I amsterdam). Amsterdam's vast quantities of affordable social housing managed by housing associations make up nearly fifty percent of the total housing stock (I amsterdam). As a mixed city, most neighborhoods are heterogeneous which makes Amsterdam an attractive mix of people and activity (I amsterdam). Recent changes in housing aspirations have shifted emphasis from social housing to more privately owned housing (I amsterdam).

What are Amsterdam's housing aspirations?

- **Emancipation:** To advance in the housing market and become easier for middle-income earners to progress to privately owned housing
- **Non-segregation:** Neighborhoods should contain a wide range of socio-economic groups
- **Affordability:** Sufficient affordable housing must remain available to low-income earners
- **Renewal:** Urban renewal of disadvantaged neighborhoods
- **Quality:** High-quality housing and associated amenities
- **Care for vulnerable:** Independent living and social inclusion for elderly and vulnerable groups where possible
- **Sustainability:** Energy-efficient housing to reduce Amsterdam's energy consumption (I Amsterdam).

Lootsbuurt Housing Complex. Ana Architecten

Fig 3.11 (Above) Overview garden facade
Fig 3.12 (Above) Lootsbuurt analysis diagrams
Fig 3.13 (Opposite) Lootsbuurt floor plans

Replacing ten buildings in the perimeter block, the building forms an inconspicuous street façade on one side and a communal courtyard on the other (Wietzorrek 59). The ground floor units are accessed directly from the footpath, each from its own front door. Behind a gate, a passageway leads residents into the courtyard from which all of the other apartments are accessed via a system of steps, terraces and galleries (59). The buildings volumes, which step back and forth, creating a mix of private and semi-public spatial situations. These variations in external space, as well as unit type and placement, allow for the individual home to be identified within the complex. This creates a sense of ownership and individuality for the inhabitant.

Borneo Sporenburg. West 8 Urban Architekten

Fig 3.14 (Above) Borneo Sporenburg. West 8 Urban Architekten

Fig 3.15 (Above) Borneo Sporenburg Site plan and floor plans, Borneo prototype

Fig 3.16 (Opposite) Borneo Sporenburg analysis diagrams

Circulation

Private/common outdoor space

The suburb's success is in the sense of individuality created for each house. Built in the Eastern docks, 2500 three-storey residential units house 100 people per hectare (Zoller 315). Created as a prototype, each house has private ground level access with an attached garage and is strongly orientated toward the private realm, by incorporating patios and roof gardens (315). The development is based on five basic building types from which floor plans are developed and articulated by separate firms (Chandler 79). By repeating these five typologies with maximum architectural variation, the street elevation is consistent but emphasises diversity and individuality to become animated (Zoller 315). The 30-50% void in each house allows for courtyards and patios (Chandler 79). This supports the needs of families in higher density environments to provide an outdoor space for children that does not require supervision.

Architectural Quality
Large variation of units and facades

Materiality
Vast use of different materials stimulating individuality

Child Friendly
Low rise buildings, internal streets, public parks

Urban Interaction
Scale of intervention, provision of neighbourhood amenities

Green Spaces
Public parks

Silodam. MVRDV

Fig 3.17 (Above) MVRDV's Silodam in Amsterdam

Fig 3.19 (Above) Silodam site plans and floor plans

Fig 3.18 (Opposite) Silodam analysis diagrams

This large residential building is set just above the water on the IJ waterway. The building's success relies on its variation of dwellings and accessways to reduce the scale of the complex for the user. In each area, similar dwelling types are organised around one access to create a stack of 'neighbourhoods' with individual atmospheres and characters. The dwellings themselves vary in size and number of rooms, as well as height and number of floors. The access alternates between galleries and corridors connect to three vertical access channels. Each stacked neighbourhood is visually apparent from the exterior, where the claddings reference stacked containers on a cargo ship (Leupen 164).

Melbourne

‘Melbourne has the essence of continental Europe with its vibrant café culture within narrow lanes and tree lined boulevards with a diverse cultural scene and innovative architecture’ (Dalziel 83).

City Factors

- 98,900 population
- 2,600 people per square kilometre
- Capital city of Victoria
- Built on the back of the gold rush, 1835
- Sits on the Yarra River (Dalziel 82).

Urban form

- Consolidated core with sprawling suburbs
- Efficient public transport in inner city
- High-rise buildings concentrated to downtown area
- Government support of high density housing and restriction of urban growth to designated growth corridors since 2000
- Majority of dwellings are single detached houses on wide suburban streets
- 1850’s Victorian terraced houses and bungalows form the inner suburb’s streetscape
- State initiatives are introducing new sustainable prefabricated homes to the city (Dalziel 83).

What are Melbourne’s housing aspirations?

Despite a highly urbanised society, the Australian self-image remains focused on suburban symbols. Butler argues that the Australian psyche epitomises the suburban life and aspiration to occupy a detached house (Butler 56). Apartments remain at odds with this typology, and are frequently considered hostile to family life (Butler 204). Only in recent years have apartments become significant, spurred by changes in the populations’ age structure, household size and family composition, as well as demand for housing close to employment centres, which have lead to gentrification of the inner city (204). Provided apartments exhibit generous outdoors space, openness, individuality, privacy and sufficient amenities, apartment living is a viable and attractive alternative (204). Despite this the suburbs remain the preferred lifestyle for the nuclear family (Butler 202).

The Commons. Breathe Architecture

Fig 3.20 (Above) *The Commons*
 Fig 3.21 (Opposite) *The Commons, site plan and floor plans*
 Fig 3.22 (Opposite) *The Commons analysis diagrams*

The twenty-four unit residential development prioritises shared facilities to generate a socially and environmentally sustainable high-density housing model (Ward 85). Shared laundries and roof garden offer casual meeting spots for residents, and replace individual car parks, second bathrooms and private laundries (85). The scale of the building remains in context with its surroundings to create an effective public interface on the ground floor with two studios and two retail spaces. The success of the design relies heavily on its proximity to public transport, green roof, material reductionism, cross ventilation and natural lighting to maximise the overall sustainability of the development (85).

Heller Street Residences. Six Degrees Architects

Fig 3.23 (Above) Heller Street Park and Residences.

Fig 3.24 (Above) Heller Street site plan and floor plans

Fig 3.25 (Above) Heller Street Park analysis diagrams

Situated in an inner suburb, this family-oriented housing scheme required for one-third of the land to be residential and the remainder decontaminated for a public park (Horrocks 61). The north-facing strip of land offered by the council lent itself to a terrace housing typology. This maximised public space to effectively create a huge shared front yard, which is maintained by residents and council (61). The selective location of greenery indicates public and private occupation of space. Each of the three storey townhouses accommodates four bedrooms, and a subterranean private garage accessed via a shared driveway to reduce interference on ground level space . Open to the public, the park is used extensively by residents and the public, generating a feeling of community, allowing for passive surveillance and incidental meetings (61).

Fig 3.26 (Above) social organisation of E3, The commons and Lootsbuurt.

WELLINGTON MAPPING + SITE CONTEXT

“Great cities are not like towns, only larger. They are not like suburbs only denser. They differ from towns and suburbs in basic ways...cities are, by definition full of strangers” (Jacobs 38).

Wellington City

The surrounding topography and harbour setting largely shape Wellington’s inner city. Geographically, it is confined on the flat by the steep hills of the town belts and water’s edge (Wellington City District Plan 4). Combined with the urban motorway, the expandability of the central city is limited. Much of the dense high-rise buildings are concentrated to the Lambton Quay area. The remaining low city spreads out to the north and south towards the surrounding residential areas and adjacent hills (4). Here “large amounts of mature or regenerating bush within walking distance to its CBD” are located (Gray 127). Rather than exacerbating congestion by focusing on transport links into the city, Wellington can rethink its residential model by intensifying the central city.

Te Aro

Te Aro, in the southern central area of Wellington, is made up of larger, less intensely developed blocks. The suburb has undergone substantial changes in land use from former industry to a strong presence of inner residential living and the formation of the Te Aro corridor traffic route (Wellington City District Plan 5). With the exception of the main street life found in Cuba Street and Courtenay Place, other areas of Te Aro are less intensely used due to the lower building heights, smaller daytime population, and ‘coarse grain’ of the area (5). Te Aro, offers significant potential for residential densification as it is relatively underdeveloped, has strong existing road connections to other inner city areas, many vacant or underutilised land plots and high existing amenities.

Fig 4.1 (Opposite) Wellington Aerial Imagery showing boundaries of inner city suburbs

THE SITE

Fig 4.2 (Above) Te Aro amenities diagram used in selection of site

Fig 4.3 (Opposite) Site location in Te Aro. Site Bounded by Vivian, Bute and Garrett Street

Fig 4.4 (Above) Initial site analysis

Site Analysis

The selected site was chosen as an example of Wellington city’s typical urban condition. Located in the central suburb of Te Aro, the site is well connected to local amenities. This supports the argument for higher density living and the reduced need for vehicle dependence. Situated behind Cuba Street, the 0.3-hectare site combines several misused plots, including a petrol station and car parks, which connect Vivian Street through to Glover Park on Garrett Street, presenting three street frontages. As a main arterial route for vehicles through the city, Vivian Street hosts two lanes of back-to-back traffic.

Housing developments in this context must engage with the specific conditions and climate to accommodate New Zealander’s love for outdoor space and need to maintain privacy in close living environments (Johnston). Overexposed or poorly located outdoor space will create undesirable conditions. Successful apartments should also maximise on orientation, natural light and natural ventilation (Johnston).

Existing Density

The existing residential density of Wellington’s inner city according to mesh-blocks. (darker orange represents higher densities)

Geographical Borders

Wellington city is confined by natural boundaries including the ocean, hilly terrain and town belts

Artificial Borders

The urban motorways confine the inner city to the central residential suburbs. The motorways act as a physical barrier which prevents the spread of the inner city outwards

Fig 4.5 (Above) Wellington City existing density, natural and artificial borders

Fig 4.6 (Opposite) Photograph of site from Vivian Street

Fig 4.7 (Above) Photos from the site, location of each photo is marked in fig 4.8

Fig 4.8 (Opposite) Site plan. Scale 1:1000

Fig 4.9 (Above) Sun Studies of site for summer and winter solstice
 Fig 4.10 (Opposite) Surrounding green and public-focused spaces in Te Aro, Wellington

05

Fig 5.1 (Above) Comparative Study of precedents showing scale and density. Scale 1:1000

LIVING IN DENSITY

“Without sufficient quality density does not work- it even becomes dangerous” (Rudy Uytenhaak).

Emily Cockayne identifies a lack of ‘neighbourliness’ as an adverse condition of higher density living. Often the act of physically living closer together, with no pre-existing ties of kinship or occupation, results in the withdrawal of neighbours to retain a sense of privacy. This thesis argues that through the provision of sufficient private, public and communal spaces the design can “ameliorate the decline of neighbourliness by creating homes that accommodate modern requirements without isolating people in hermitic boxes” (Cockayne). This allows occupants to regulate their privacy by cultivating relationships with neighbours as well as allowing retreat.

Cockayne further argues that while architecture itself cannot determine this spirit of neighbourliness, factors such as “the materials used, the spaces between dwellings and the configuration of living arrangements all affect the ways people are accessible, audible and visible to neighbours” (Cockayne). Jan Gehl, a prominent urban theorist adds that the quality of urban spaces must emphasises this. In poor quality outdoor spaces only the necessary activities will occur. Improved conditions of these spaces ensure additional optional activities occur creating greater opportunities to see hear and meet others (Gehl 13). To respond to residents’ perceived proximity of others the design must offer a sense of privacy and a sense of control over undesirable social interactions.

There is a distinct difference between physical crowding as a lack of space, and the perception of crowding as the sensation of being crowded (Spacemate 12). The goal is to achieve a high measured density while maintaining a low perceived scale (12). Singapore’s metropolitan area yields a density of 7,130 inhabitants per square kilometre whereas Paris’ metropolitan area holds 704 (International making cities liveable). However, within the City of Paris itself the density is 20,169 inhabitants per square kilometre. These two urban environments reflect different value systems and consequently respond through different urban forms. (International making cities liveable) For this thesis it is important that the design reflects the value system of New Zealanders.

Territoriality

Territoriality, defined by Oscar Newman as the ‘capacity of the physical environment to create perceived zones of territorial influence’ is closely linked to notions of privacy (Carmona 151). Often, in high density living residents’ territoriality is heightened to retain some sense of privacy, identity and security. The modern city often degrades this feeling through ambiguous spatial design (Lawson 289). While a visual and physical relationship between apartment and public space should exist, sufficient territorial borders both between apartments and public space ensure the inhabitants of the apartment maintain a sense of control over social contacts (Lawson 291).

Fig 5.2 (Above) Density comparison diagram between Singapore and Paris

06

INITIAL EXPLORATIONS

“Some of the elements of the successful mix will be purely social or economic. But some of them will be to do with physical organisation; its form, its functioning, its appearance- in a word its design” (Lewis 4).

Access and Circulation

As a collection of public and private spaces, the design must clearly articulate access from the public to the private sphere. The first threshold is the transition into the apartment complex, thereafter the apartment block and then the individual apartment. Between, there is a sequence of horizontal and vertical connections that invite residents to use this space for collective habitation in varying degrees (Leupen 171). How this zone is accessed also depends on whether it is clear where habitation begins, whether it is in front of the building, behind the front entrance or behind the apartment door (Heckmann 36). At the same time, how the collective area relates to the privacy of the individual dwelling is a vital consideration. Where circulation zones run alongside a dwelling, privacy is constrained, and a certain level of shielding is required (Leupen 172).

In practice, the design should be developed with multiple points of access to limit the amount of circulation. The result confines stairwells and lifts to a limited number of residents to create small communities, reduce anonymity and increase the feeling of an individual and personalised home (Johnston).

Fig 6.1 (Above) Forms of dwelling access.

Fig 6.2 (Above) Ground floor massing diagrams showing possible relationship of building to open space
Fig 6.3 (Opposite) Massing of buildings surrounding the site

Massing Studies

Initial massing studies looked at building coverage of the site in response to existing physical and climatic conditions. The models looked at how designing for factors such as the sun, wind, and the placement of open spaces could shape the building placement and form.

Fig 6.4 (Above) Massing experiments for site considering sun, wind and outdoor spaces

Fig 6.5 (Opposite) Massing experiments for site considering sun, wind and outdoor spaces

Fig 6.6 (Above) Massing drawings showing potential site organisations

The Minimum Apartment

Currently, what constitutes high-density living in the context of Wellington and New Zealand is undefined. The initial study sought to identify the minimum size apartment a family could reasonably reside within. From this a series of issues were raised over the living standards New Zealanders' would accept and the housing conditions they value. However, without guiding limitations this was hard to assess. Concerns such as how many rooms should receive natural light and whether the apartment should be single or dual aspect all affected the minimum size. As this study sought to identify the minimum size plausible, not possible, minimum apartment sizes as defined by the Auckland City District Plan were used as a starting point. It is expected that floor areas in this thesis design model will be larger than this, as families will reside here for an extended period of time.

Instead, a series of 'project design guidelines' were created to assess the success of design iterations and restrain the decision making process. Each guideline responds to existing New Zealand housing ideals as well as gaps in existing high-density conditions:

PROJECT DESIGN GUIDELINES

Density

- 1. Achieve density of 200 dwellings per hectare (60 dwellings for site)

Design

- 1. Apartments blocks will maintain connection with ground (maximum five to seven stories)
- 2. Individual apartments will be no more than two stories in height
- 3. Each dwelling will have direct access to private outdoor space and easy access to communal and public outdoor space
- 4. No living space will have only south facing windows
- 5. All dwellings must receive light from two or three faces
- 6. No unit will be smaller than 70m² for two bedroom, or 90 m² for three bedroom
- 7. Bedroom, kitchens and living spaces will be naturally lit and ventilated, with operable windows on an external wall
- 8. External circulation should be naturally ventilated and lit

Community

- 1. Act as a valid alternative to suburban living
- 2. Connect Vivian Street to Garrett Street through public space
- 3. Create effective ground floor interface between public and private space
- 4. Translate values of the suburban house into high density living
- 5. Create safe community spaces with good street surveillance
- 6. Provide a high level of amenity, including relevant commercial spaces
- 7. Include public and communal green space
- 8. Include spaces that support a diverse section of society

Minimising Social Harm

Giles-Corti identifies factors to minimise the negative impacts of higher density housing as:

- Location near transit, shops, services, schools and public open space
- Avoid exposure to noise and pollution
- Avoid locations that reduce social engagement
- Restrict housing heights particularly for families
- Provide safe and age appropriate recreation areas
- Design to maximise privacy and territoriality
- Provide opportunities for controlled social interactions between neighbours
- Design to minimise noise transfer
- Provide facilities to help foster neighbourliness (Giles-Corti 19).

Introduction to Zoning

In *Housing Design: A Manual*, Bernard Leupen identifies three factors that define the proportioning and spatial organisation of the apartment. These are size, orientation and total façade surface area (91). Size determines the number of separate spaces possible; orientation, dictates which sides can be exposed to natural light, determining where spaces are grouped; total façade surface area determines the maximum quantity of natural light entering the dwelling (91).

Zoning as a form of spatial organisation separates the floor plan into different functional areas, achieving an uninterrupted course of individual functions side by side (Leupen 96). This defines which activities are carried out where and how they relate to each other (Leupen 63). Graphically Leupen defines this system in its most basic form (Fig 6.7). This method provides sufficient limitations to determine the minimum zones a family could comfortably live in. For each of the zoning types it is then possible to work out a series of optimum solutions.

Fig 6.7 (Opposite) *Spatial Organisation of the dwelling. Bernard Leupen 90*

Units

Using five of Leupen's zoning types, a series of basic unit configurations were developed for each. Made up of the zones needed for a family to comfortably reside within, the diagrams remain simplistic, organising space to ensue inclusion, orientation and access to light. As such the zones are not given a definitive measurement but are instead based on the organisation of space. The units become the smallest component of the methodology.

Cells

The generation of cells combined four units with a maximum of two unit types and a height limit of two storeys. This ensured units could be combined, that the necessary rooms received light and allowed for a circulation system to be established. This format derived from both the Lootsbuurt and Silodam case studies, which use cell configurations to create wide variation across the complex, but limited variation in each cellblock.

Layers

Layers combine two cells. The selected cells were chosen based on their success in receiving natural light, privacy, orientation, stacking ability, layout, access and circulation. Here a more prominent circulation system is developed from which it is possible to place layers onto the site and shape in response to its context. Examples such as Rue de Suisse in Paris show how a complex can be broken down to contain a variety of typologies grouped into different structures.

Fig 6.8 (Opposite) Unit spatial organisation according to zoning typologies. Red Highlighted shows selected unit types and spatial organisations for further refinement

Housing Units

Housing Cells

Fig 6.9 (Above) Selected cell variations as four combined units

Fig 6.10 (Opposite) Selected cell variations as four combined units- orthographic projections

Fig 6.12 (Above) Selected housing layers -orthographic perspective

Outdoor Spaces

A high-density pilot study in Auckland found the desire to have a backyard was the major reason most participants left apartment living (Witten 85). For families, even a “generous balcony represents a modest space in comparison to the garden of a freestanding single family home” (Ebner 244). The suburban New Zealand home typically has four kinds of outdoor space:

The Back Yard: A secluded, private, utilitarian space often used for open-air clothes drying, storage and vegetable gardens.

The Veranda/Deck: A private but semi-visible, semi-supervised area often used for outdoor eating

The Front Yard: A visible, semi-secure non-utilitarian space. It is the most open of private outdoor spaces it is usually forms part of the access system to the suburban dwelling.

Suburban Park: A large open outdoors space, accessed by the wider community for a variety of activities

To sit the typology firmly within its context, the design seeks to appropriate the outdoor spaces of the suburban home to redefine them within the context of inner city living. Allowing a version of the ‘front’ and ‘backyard’ to be accessible to each unit as private space, as well as providing community focused public parks, diffuses the negative effects of high-density. By spreading greenery and outdoor spaces across the site the residents are presented with direct visual and physical access to these spaces, offering opportunities for social contact.

Fig 6.13 (Above) The ‘Outdoor spaces’ in a high-density environment

Fig 6.14 (Opposite) Analysis of 'Outdoor Spaces' in a high density environment
Fig 6.15 (Above) Spatial organisation diagram showing how the 'deck' and 'backyard' spaces are included

Methodology Overview

This methodology aimed to create a master plan of the site that met the desired number of units and unit variations. This process used the previously described zoning system to ensure the orientation and organisation of spaces to receive natural light. This method ensured the system worked logistically at each step for units to function independently, then with three other units and finally with seven other units. Concluding this methodology, it is assumed the layers would be situated, stacked and adapted on site in response to the context to create desirable, individual family orientated spaces.

This methodology was successful in the generation of potentials but did not resolve many issues identified with high-density family housing (Fig 6.16). The system combines groups of pre-organised units that work independently to the site, limiting flexibility. While the methodology works on the larger portion of the site its success is limited within narrower parts, or if placement of buildings is predetermined. Massing studies indicated that a building should act as an entry point along Garrett Street. Here, site boundaries limit the number of units to each floor, eliminating or excluding portions of many of the predefined layer systems. Furthermore, the methodology successfully achieved relationships between spaces but in practice is limited by structure and services. To achieve the desired level of variation and adaptability to site, this methodology requires further development to sequence the modular cells correctly.

Fig 6.16 (Above) Diagram showing stacking of layers and failure of methodology

Fig 7.1 (Opposite) Aerial view showing sites relationship to surrounding public focused environments

DESIGN DEVELOPMENT

“More than just the location of one’s house, a true community means opportunities for gathering, meeting and making contact with neighbours at many levels” (Chandler 9).

Garrett Street Building

The development of the Garrett Street building refined the methodology at a smaller scale. The result created ‘Floor Plan Series 1’. The floor plan series steps the building mass back and forth to create circulation and in doing so creates larger outdoor areas for the apartments.

Fig 7.2 (Opposite) Garrett Street infill site as entrance building to complex

Fig 7.3 (Above) Site showing location of Garrett Street building

Fig 7.4 (Above) Garrett Street Building using existing methodology. To allow for structure and services further refinement is needed

Development Floor Plans

In this development of the methodology, the widths of the apartments and building are defined. The building is set at a depth of 14m, the maximum depth that light can easily reach for dual orientation apartments. The width of the building is set a 20m, as it is easily divisible. These limitations ensure structure and services can be integrated. The existing apartment typologies can then be refined and adapted to fit within these boundaries.

Fig 7.5 (Above) Diagram showing a developed methodology. The staggering of units creates circulation and increase the size of outdoor spaces

Fig 7.6 (Above) Variations of 'Floor Plans Series 1' establishing interior configuration. Scale 1:300

In order to cater to the stepping, variation of unit widths and overall building width of 20m, risers were placed at 5m in from the external walls. An investigation into the placement of the risers along the 5m lines allowed for the development of a series of floor configurations (Fig 7.6). The selected series established the layout of four unit types for 'Floor Plan Series 1' (Fig 7.7).

Floor Plan Series 1

Fig 7.7 (Above) Floor plan series 1, used in Garrett street building. Scale 1:200

Fig 7.8 (Above) Garrett Street external spaces, circulation, private/ communal space

Fig 7.9 (Above) Views of Garrett Street building (development phase) testing methodology

Final Floor Plan Series

Following the creation of ‘Floor Plan Series 1’ a second series was created. Each series contains four different unit types, resulting in eight unit types across the site. Each building on the site uses one series of floor plans stacked in various ways, to ensure the structure and services line up at each level. The variation in unit types and differentiation in outdoor space maximise individuality for the resident, making their dwelling easily identifiable. The unit types were developed from the original ‘unit spatial organisations’. The result is a wide variation across the site responding to site conditions and the different needs of families.

Floor Plan Series 1

Floor Plan Series 2

Fig 7.10 (Above) Final floor plan series 1 and 2 showing the eight unit variations, Scale 1:200

Development of Public Space

Often the pressure to develop inner city sites in the most profitable way precludes the inclusion of spaces that are not utilitarian or productive (Zoller 11). As the demand for inner city housing increases, developments must not only contribute to the built environment but also society. It is important that public spaces create points for potential passive and interactive interaction between residents and the public.

Jane Jacobs emphasised the necessity for activity to provide surveillance and sufficient territorial definition between public and private spaces (Carmona 150). Jacobs argued that in a city full of strangers, a successful neighbourhood allows inhabitants to “feel personally safe and secure on the street among these strangers (Jacobs 38). For this to happen the footpaths must have regular use, and surveillance from the streets natural proprietors (street users and residents); achieved through the placement of shops, commercial ventures and public spaces along the footpaths (Jacobs 46). The extent to which the public spaces are used depends on the perceived safety. This is in part based on the design, but also who uses the space, and when (Jacobs 565). A mixture of building types and occupants surrounding these public spaces ensures varying uses and users at different times of the day (Jacobs 125). Following these principles, well-positioned commercial spaces, in line with the writing of Jane Jacobs, will help form a positive public sphere through the interconnection of public spaces.

Fig 7.11 (Opposite) Development of Public space diagram

Site Arrangement

Following the development of the Garrett Street building, the same methodology, using the two ‘Floor Plan Series’, was applied to the rest of the site (Fig 7.12). The development of site arrangements looked at the relationships of form and open space to support territoriality and privacy. The development also presents opportunities for the flexible use of internal and external spaces.

Residential spaces at ground level in urban centres require habitual transitional space (Zoller 11). The apartments located here are raised above ground level. To further emphasis the division between public and private, units at this level are set back. This creates large outdoor areas, which with planting mitigate the effects of public noise and scrutiny.

Fig 7.12 (Above) Application of developed methodology to site

DESIGN DEVELOPMENT (PUBLIC REALM)

Establishing Height

According to Legge, residential apartments are most accessible between five and seven storeys, above which, they become disengaged from the street (Cheng). Johnston concurs, noting “Four and five story buildings provide a comfortable threshold of density” where land is used more efficiently and vibrant public spaces can be created (Johnston). The design investigates building heights in response to site conditions, predominantly high winds. It also investigates New Zealand housing preferences for sun, shelter, privacy and outdoor spaces. The height of each building was determined according its placement on site. As the Bute St elevation will predominately receive northern sun, the buildings do not exceed four stories along this face. This ensures sunlight will reach the buildings and park placed behind.

Fig 8.1 (Above left) Diagram indicating number of floors of surrounding buildings

Fig 8.2 (Above right) Building heights surrounding the site

Fig 8.3 (Opposite) Establishment of building heights diagrams

Public Park Spaces

Harding and Thasis comment “Good quality mass housing must explore social and spatial organisation to provide generous access to light, air, privacy, outlook and gardens while defining public and private space”(14). The inclusion of public park spaces effectively restrains building depth for natural light, provision of views and give residents easy access to public outdoor space. This engages with the resident community and the public, to provide an improved urban environment. As a collection of outdoor spaces the design creates a green corridor through the site linking Vivian Street to Glover Park on Garrett Street. Here the location of public and commercial functions maximise the safety of the area.

Fig 8.4 (Opposite+ above) Development of park spaces diagrams

Fig 8.5 (Above) Courtyard public park, 'eyes-on-street'. Ground floor. Scale 1:200

Fig 8.6 (Above) Second public park, 'eyes-on-street'. Ground floor. Scale 1:200

Fig 8.7 (Above) Section 'eyes-on-street'. The variation in public and private functions ensure the parks are used continuously and remain safe spaces. Scale 1:200

Urban Connectivity

A series of public spaces create a passage through the site. Gehl notes the distance between people in public space is linked to the size and its programme (Gehl 69). The ease of being at close proximity to others adjusts accordingly so that time to process visual impressions can be maintained (69). The design can therefore isolate or promote contact. The articulation of the design at pedestrian level to provide certain scale giving elements is essential (Carmona 192). In these public spaces, Carmona notes a preference in cities for ‘defined openness’ of open but bounded public space (Carmona 177).

Fig 8.8 (Above) Seeing- A matter of distance. Gehl

Casba Apartments, Sydney

Casba is a prominent example of developing successful urban connections within a residential block. The success of the project rests on the creation of a public thoroughfare and the provision of a community space on private property (Hyde 91). The design places retail and restaurant spaces on the ground floor with dwellings in three to five stories buildings around a publically accessible, communal courtyard and cloister (91). Here the public functions ensure the courtyard is used continuously. The varying widths of the thoroughfare slow pedestrians down to move through the space at a regulated pace.

Fig 8.9 (Above) Ground floor Casba showing public thoroughfare

Fig 8.10 (Above Right) Casba Northern Facade

Fig 8.11 (Above Right) Casba Interior Courtyard

Fig 8.12 (Above) Pedestrian connections through site. Scale 1:1000

Fig 8.13 (Above) Pedestrian connections through the site in context. Scale 1:2000

Residential Intensification

This thesis engages with issues of community and neighbourhood to achieve urban densification. In the creation of 'place' Jane Jacobs favours a haphazard juxtaposition of buildings, uses, ethnicities and socio-economic standings to ensure a vibrant city (153). Jacobs argues inner city neighbourhoods must not be viewed as sentimental concepts in an attempt to replicate suburban life. Instead they should combine living, working and recreational spaces in favour of the pedestrian (153).

Te Aro, in its current condition has the capacity for residential intensification but it must not disregard its existing context. While gentrification can revitalise the area, bringing many desirable qualities to the inner city, it has the potential to rid the area of the people who created its culture. While the political right tend to favour words such as regeneration and revitalisation, the implications for the displaced communities remain profound (Carmona 157). Glass in 'Public Places Urban Spaces' notes that once 'gentrification starts in a district, it goes on rapidly until all or most of the original working class occupiers are displaced, and the whole character of the district is changed' (Carmona 257). Carmona suggests inoculating areas that are becoming gentrified by allowing established communities to benefit from the rising value of their neighbourhoods. This is achieved through the selective purchasing of units by the public sector, incentives to affordable housing providers and initiating equity-share schemes (Carmona 257).

In cities, privacy is indispensable. Privacy can be managed in apartments through the arrangement of spaces and modes of circulation (Thompson 24). By placing living spaces next to the street or shared gardens, the exchange between public and private takes place in the most public zones of the house. Rooms such as the bathroom however, must remain hidden from the view of the public (Thompson 26).

Vehicle Organisation

Often located at the front of the house, the garage remains deeply ingrained in New Zealand's suburban culture. As a multifunctional space it is used predominately for parking but often accommodates other functions such as storage, workshops and social spaces. To most New Zealand households, the private vehicle remains the primary means of transportation. Despite arguments for a reduction of private cars in high amenity areas, some parking requirements are likely to remain (Carmona 238). Future improvements to public transport, introduction of car sharing and increased use of electronic vehicles will likely reduce inner city vehicle dependence for most of New Zealand's large urban centres.

Wellington's compact nature means a short walk to most amenities and inner city suburbs. Combined with an effective inner city bus network and several public parking facilities, Wellington's situation is unique and supports an argument for reduced inner city apartment parking. Instead the use of basement spaces could be developed for other purposes. This housing model advocates a change to the New Zealand dream by arguing for a more sustainable inhabitation of the city where private parking is limited in favour of public transport options. As such, the design does not develop an integrated parking system. However, the design allows space for this to be developed and looks conceptually how parking may be integrated if required. In the investigation of car parking for high-density housing two case studies were examined:

Zelterstrasse 5- Car parking is located on the ground floor, raising the inner garden. Accessed along the street front, each house is provided a car park in a shared underground space. The individual townhouses can be accessed directly from the carpark through individual doors. Two stairwells ascend into the rear building for access to the other dwellings. The space provides a singular and utilitarian function (Fig 8.14).

Heller Street Residences- Here large, private garages are located beneath the houses. Accessed via a shared driveway running adjacent to the park, the subterranean garages minimise the impact of the vehicle on the housing scheme. Each unit has a private space for two cars as well as additional storage and multifunctional space with direct access into each house (Fig 8.15).

Fig 8.14 (Above) Vehicle organisation of Zelterstrasse houses

Fig 8.15 (Above) Vehicle organisation of Heller street residences

Fig 8.16 (Above) Section of vehicle organisation 1:300

In this housing model car parking takes a subordinate position. As such, the conceptual car parking model favours that similar to the Zelterstrasse precedent if required. However further research into the needs of inner city parking for Wellington apartments would be required.

Fig 8.17 (Above) Conceptual plan of subterranean vehicle organisation and storage. Scale 1:300

09

Fig 9.1 (Opposite) Bute and Vivian St corner showing main entrance way into enclosed public park

09 FINAL DESIGN

In this conclusive design iteration, the potential of the design and methodology is fully realised. The housing scheme is broken into six integrated buildings using the two 'Floor Plan Series' to meet the objectives of the housing guidelines outlined in chapter 5.

The design sets in place the tools to successfully translate family life into the high-density urban dwelling. Developed as a series of interconnected units, the apartments offer a sense of identity and community to the residents. Variation of unit types, placements, exterior spaces, materials and articulation of the exterior maximise the sense of individuality for each apartment.

In this iteration the methodology allows flexibility of site placement to be maintained with the pre-organised units. By allowing the units to be stacked in various ways the units work independently, in a series and as a complex. Resultantly, each of the units has direct access to a variety of public and private outdoors spaces.

The sixty apartments are planned around two public spaces to create a public thoroughfare and green corridor through the site. The variation in public, communal and private spaces gives residents a sense of control over their desired level of social interactions.

Building heights between three and seven stories maintain a relationship to the ground. This is of particular importance for families. Additionally, the limitation of height, density of housing and mixture of building uses means that eyes are always on the street and parks. The inclusion of commercial spaces on the ground floor, as well as the kindergarten ensures constant activity within these spaces, maximising surveillance. The result is an architecture that encourages a social environment attuned to the needs of families and focused on community.

Fig 9.2 (Opposite) Main entrance into courtyard public park

Fig 9.3 *(Opposite) Public internal park with access to commercial spaces (day)*

Fig 9.4 *(Opposite) Public internal park with access to commercial spaces (night)*

Fig 9.5 (Above) Garrett Street elevation 1:200

Fig 9.6 (Above) Garrett Street building entrance way

Fig 9.7 (Above) Unit type A interior living spaces

Fig 9.8 (Above) Unit type B interior living spaces

Fig 9.9 (Above) Garrett Street Building Roof Garden

Fig 9.10 (Above) Garrett Street Building Balcony

Fig 9.11 (Above) Shared balcony Vivian St Building

Fig 9.12 (Above) Unit type C interior living spaces

Fig 9.13 (Above) *Vivian Street Elevation in context 1:300*

Fig 9.14 (Above) *Vivian Street building entrance way*

Fig 9.15 (Opposite) View of complex along Bute Street

Fig 9.16 (Above) 'Backyard' spaces in Garrett Street Building

Floor Plan Series 1

Floor Plan Series 2

Fig 9.17 Final unit plans, Scale 1:200

Key:

1. Cafe/Restaurant
2. Commercial space
3. Bicycle storage
4. Public Park/ Playground
5. Residential- Unit B
6. Residential- Unit D
7. Residential- Unit D
8. Residential- Unit E
9. Residential- Unit G
10. Residential- Unit G
11. Commercial Space
12. Commercial Space
13. Restaurant
14. Kindergarten
15. Kindergarten- cloakroom
16. Public Park
17. Carpark Entrance
18. Commercial space
19. Commercial space
20. Commercial space

Fig 9.18 *Ground floor Plan*

Scale 1:250

- Key:
- 21. Residential- Unit C
 - 22. Residential- Unit A
 - 23. Residential- Unit B
 - 24. Residential- Unit G
 - 25. Residential- Unit G
 - 26. Residential- Unit E
 - 27. Residential- Unit E
 - 28. Residential- Unit E
 - 29. Residential- Unit G
 - 30. Residential- Unit G
 - 31. Residential- Unit E
 - 32. Kindergarten Outside
 - 33. Residential- Unit C
 - 34. Residential- Unit A

Scale 1:250

Fig 9.19 First floor Plan

Key:

- 35. Residential- Unit B
- 36. Residential- Unit B
- 37. Residential- Unit C
- 38. Residential- Unit A
- 39. Residential- Unit H
- 40. Residential- Unit H
- 41. Residential- Unit G
- 42. Residential- Unit G
- 43. Residential- Unit B
- 44. Residential- Unit B

Scale 1:250

Fig 9.20 *Second floor Plan*

Key:

- 45. Residential- Unit D
- 46. Residential- Unit D
- 47. Residential- Unit C
- 48. Residential- Unit B
- 49. Residential- Unit B
- 50. Residential- Unit F
- 51. Residential- Unit F
- 52. Residential- Unit G
- 53. Rooftop Garden
- 54. Residential- Unit G
- 55. Residential- Unit F
- 56. Residential- Unit E
- 57. Residential- Unit C
- 58. Residential- Unit D
- 59. Residential- Unit D

Scale 1:250

Fig 9.21 Third floor Plan

Key:
 60. Residential- Unit B
 61. Residential- Unit H
 62. Residential- Unit H
 63. Residential- Unit B

Scale 1:250

Fig 9.22 Fourth floor Plan

Key:

- 64. Residential- Unit C
- 65. Residential- Unit C
- 66. Residential- Unit C
- 67. Residential- Unit H
- 68. Residential- Unit H
- 69. Residential- Unit C
- 70. Residential- Unit C
- 71. Residential- Unit C

Scale 1:250

Fig 9.23 Fifth floor Plan

Key:

- 72. Rooftop Garden
- 73. Residential- Unit C
- 74. Residential- Unit C
- 75. Residential- Unit C

Scale 1:250

Fig 9.24 Sixth floor Plan

09 CONCLUSIONS, UNANSWERED QUESTIONS AND FUTURE STEPS

“The dwelling is a reflection of culture, social norms and value systems... defined by our individual frame of reference” (Leupen 15).

Conclusions

This thesis investigated whether a high-density residential model for Wellington City could act as a valid alternative to suburban living and encourage a mixed demographic focused on families and community.

Situated in Te Aro, the research responds to two key criteria. First how to meet the needs and desires of families in an inner city high-density environment. Second, the spatial qualities that encourage a sense of community in a high-density mixed demographic environment to enable the creation of a positive public realm. This approach to the research meant that the thesis was driven by design and aided through academic works and case studies. The design was reviewed and refined at each step of the methodology. The research discovered the following:

Needs and desires of the New Zealand family

The detached suburban home still largely defines the New Zealand dream. As people begin to orient themselves according to new priorities, a successful inner city alternative must respond to Wellington’s living conditions, climate, cultural expectations and budgets. Key factors from the suburban home must be reinterpreted for the inner city. The translation of these ideals intrinsic to the New Zealand dream and suburban family home, such as privacy, individuality and quality outdoor space are essential to support families in a high-density inner-city environment.

The desire to have the backyard is a primary reason New Zealand families’ disregard high-density living as a viable option. This housing model appropriates the outdoor spaces of the suburban home within the context of inner city living. This allows a version of the ‘front’ and ‘backyard’ to be accessible to each unit as private space, as well as providing community focused public parks. Features such as space for outdoor laundry drying and others integral to the New Zealand lifestyle are included. Connections to open green spaces at varying degrees of privacy cater to New

Zealanders' needs and diffuse the perceived density. The public parks and communal residents' roof gardens provide larger spaces for outdoor community gatherings and for children to play.

Encouragement of community and a positive public realm

In the creation of higher density living it is essential that density improves the existing urban environment. Increased housing density can support a greater number of amenities for the community. As a collection of outdoor spaces the design creates a green corridor linking Vivian Street to Glover Park on Garrett Street. Public and commercial functions maximise the safety of the area. They create an engagement between the pedestrians and their urban surroundings as they progress through the site. The inclusion of a kindergarten, retail spaces and restaurants ensures these spaces are used at various times by a wide range of users.

Community within the building is stimulated through residents' ability to control social interactions. Multiple points of access limit circulation to create small communities, reducing anonymity and increasing feelings of an individual personalised home. Provision of generous private and communal outdoor spaces increases opportunities for community to be developed. Units selectively purchased for social housing would ensure that a diverse section of society is achieved across the housing complex. This would also prevent certain demographics being forced out of inner city housing as gentrification of the area continues.

This design-led research offers a methodology for developing a high-density housing model that is a viable alternative to the suburban detached single family home.

Research Limitations

Research was limited to the creation of a family focused high-density residential model on a single test site in Wellington's inner city. This met the design guidelines outlined in chapter 5, and set in place an architectural methodology which can be extended to other sites in Wellington, and similar urban centres in New Zealand. The feasibility of the design relies on the realities of cost and construction time. Both factors would determine whether it is economically plausible for a family as a valid alternative to suburban living.

The research is contained to inner city Wellington, where the provision of public space on private land is minimal. While the benefits of providing access to outdoors space on inner city land are considerable, it is likely the cost of providing public amenities on private sites would be at the expense of the families.

The design did not look into the adaption of existing infrastructure for high-density family housing but instead started from an empty site. There is scope for further refinement in terms of its application to sites with existing programmes throughout the city.

Future Research

The design offers a high density-housing model for families that anticipates future needs through the translation of particular familiar qualities of suburban New Zealand living. Through this research, questions for further exploration are generated on communal integration, environmentally responsive design and adaptability of a unit based concept to other sites.

Though the design proposal is firmly situated in central Wellington, its model offers a broader lesson for urban development in New Zealand's similar cities. The adaptability of this model in terms of its materiality and proportionality to other sites is worth investigating.

Future projects have the potential to challenge communal living further. This thesis puts forward ideas of shared gardens and communal outdoor spaces. Despite this, New Zealand housing ideals have not yet transformed adequately to support a more forced level of shared amenities similar to those found in European models. This could be pushed further in applications of this methodology to certain sites, such as marae.

Further, adaptations in technology and popular belief will allow the methodology to be developed further as socially and environmentally conscious design. Further investigations into water collection, power generation and zero carbon options are the next step to creating an environmentally responsive design following this housing model.

While the design provides sufficient outdoor and recreational facilities, it is noted that on balconies supervision of children is still required. Future design could look into how to make outdoor spaces more safety conscious. In this respect the issue is offset slightly by providing two ground level parks on which the children could play.

Finally, legislation changes to improve the quality of apartment buildings, enforceable minimum amenity standards and a shift from individual vehicular transport to public transport are equally as essential to the development of high-density family focused housing.

WORKS CITED

Archdaily. “Low Rise High Density Exhibition.” 25 Apr 2013. 26 Feb 2017. <<http://www.archdaily.com/364494/low-rise-high-density-exhibition/>>.

Auckland Council. “Apartments.” 2017. Auckland Design Manual. 20 Feb 2017. <<http://www.aucklanddesignmanual.co.nz/project-type/buildings-and-sites/housing/apartments>>.

Butler-Bowdon, Caroline and Charles Pickett. Homes in the sky : apartment living in Australia. Sydney: Miegunyah Press: Published in association with Historic Houses Trust , 2007.

Carmona, Matthew. Public Places Urban Spaces: The Dimensions of Urban Design. Ed. 2nd Ed. New York: Architectural Press, 2010.

Chandler, Robert et al. Building type basics for housing. Hoboken: J. Wiley & Sons, 2004.

Cheng, Linda. “Six Degrees’ Hawke and King apartments.” 3 Mar 2016. Architectureau. 28 Jan 2017. <<http://architectureau.com/articles/six-degrees-hawke-and-king-apartments/>>.

Cox, Philip, Philip Graus and Bob Meyer. Home: Evolution of the Australian Dream. Jane Curry Publishing, 2011.

Dalziel, Robert. A house in the city : home truths in urban architecture. London: RIBA Publishing, 2012.

Ebner, Peter [et al.]. Typology+ : innovative residential architecture. Basel: Birkhäuser , 2010.

Emily, Cockayne. “Love thy Neighbour.” 19 June 2012. Architectural review. 12 February 2017. <<https://www.architectural-review.com/rethink/love-thy-neighbour/8631814.article>>.

Falconer, Garth. Living in Paradox: A history of Urban Design across Kainga, towns and cities in New Zealand. Matakana: Blue Acres Press, 2015.

Ferguson, Gael. Building the New Zealand Dream. Palmerston North: Dunmore Press with the assistance of the Historical Branch, Dept. of Internal Affairs, 1994.

Gehl, Jan. Life Between Buildings. New York: Van Nostrand Reinhold, 1987.

Gelsomino, Luisella. European Housing Concepts. Bologna: Editrice Compositori, 2009.

Giles-Corti, Billie. “Increasing Densities in cities: How do we maximise benefits and minimise harm?” Growth misconduct? : avoiding sprawl & improving urban intensification in New Zealand. Ed. Karen, Wokje Abrahamse, Keriata Stuart Witten. Auckland: Steele Roberts Aotearoa, 2011.

Gray, John, Jacqueline McIntosh. “Growth misconduct in the suburbs.” Growth misconduct? : avoiding sprawl & improving urban intensification in New Zealand. Ed. Karen, Wokje Abrahamse, Keriata Stuart Witten. Auckland: Steele Roberts Aotearoa, 2011.

Harding, Laura, and Philip Thalís. “Urban housing: Making the city.” Architecture Australia May/June 2014.

Heckmann, Oliver and Friederike Schneider. Floor Plan Manual Housing. Ed. Oliver / Schneider, Friederike Ed. by Heckmann. 4th ed. Basel: Birkhäuser, 2011.

Henderson, Kelly. “Opinion:Kelly Henderson.” Architecture New Zealand 2015 January 2015: 39-44.

Horrocks, Tobias. “Heller Street Park and Residences.” Architecture Australia July 2012: 61.

Hyde, Olivia. “Casba.” Architecture Australia Jan/Feb 2016: 89-92.

I amsterdam. City Policy: Housing in Amsterdam. 2017. 20 Feb 2017. <<http://www.iamsterdam.com/en/local/live/housing/rental-property/housing-policy>>.

Jacobs, Jane. The death and life of great American cities. Ed. Modern Library. New York: Modern Library, 1993.

Jaworsky, Anja, ed. Berlin Apartments. New York: te Neues , 2002.

Johnston, Blair. “Living at Higher Densities.” 14 April 2015. Warren and Mahoney. 26 4 2015. <<http://www.warrenandmahoney.com/en/perspectives/living-at-higher-density/>>.

Lawson, Brian. “The Social and Phychological Issues of High Density City Space.” Designing high density cities: for social and environmental sustainability. Ed. Edward Ng. London: Sterling, 2011. 285-292.

Leupen, Bernard and Harald Mooji. Housing Design: A Manual. 2nd Revision. Rotterdam: NAI Publishers, 2011.

Lewis, Sally. Front to Back : a design agenda for urban housing. Oxford: Architectural Press An imprint of Elsevier, 2005.

Marriage, Guy. “Minimum vs Maximum: Size and the New Zealand House.” 5th Australasian Housing Researchers’ Conference. Wellington: Victoria University of Wellington, 2010.

Pickett, Caroline Butler-Bowdon and Charles. Homes in the Sky: Apartment Living in Australia. Carlton: Miegunyah Press, 2007.

R Neil Gray Strategic Projects. “Residential Intensification – Wellington Housing Typologies.” Mar 2007. 20 Feb 2017. <<http://wellington.govt.nz/~media/your-council/projects/files/infill-resintens.pdf>>.

Ring, Kristien. Selfmade City : Berlin : Self-initiated urban living and architectural interventions. Berlin: Jovis, 2013.

Schittich, Christian. High-density housing : concepts, planning, construction. Ed. Christian Schittich. Munich: Birkhäuser, 2004.

Shephard, Toby and Tim Matthews. “High-Density Family Housing.” 2017. Auckland Design Manual. 20 Feb 2017. <http://www.aucklanddesignmanual.co.nz/resources/articles/high_density_family_housing>.

Thompson, Kerstin. “Single House- No Future?” Architecture Australia Jan/Feb 2016: 24-27. Vincent, Paul, Evert Werkman. “Amsterdam.” 3 Feb 2015. Encycloaedia Britannica. <<https://www.britannica.com/place/Amsterdam>>.

Ward, Maitiu. “The Commons.” Architecture Australia Jan/Feb 2015: 85-91. Wellington City District Plan. “Central Area Urban Design Guide.” 12 Sep 2012. Central Area Urban Design Guide. 20 Feb 2017. <<http://wellington.govt.nz/~media/your-council/plans-policies-and-bylaws/district-plan/volume02/files/v2central.pdf?la=en>>.

Wietzorrek, Ulrike. Housing + : On Thresholds, Transistions, and Transparencies. Basel: Birkhäuser, 2010.

Witten, Karen, Penelope Carroll. “Intensification, housing affordability and families: Learning from the Auckland CBD.” Growth misconduct? : avoiding sprawl & improving urban intensification in New Zealand. Ed. Karen, Wokje Abrahamse, Keriata Stuart Witten. Auckland: Steele Roberts Aotearoa, 2011.

Wüstenrot Stiftung (Hg.) ; mit Beiträgen von Doris Zoller [and twelve others]. Herausforderung Erdgeschoss = Ground Floor Interface. Berlin: Jovis, 2014.

FIGURES LIST

Fig 1.1 Aerial photo of Te Aro, Wellington with site highlighted. Author

Fig 1.2 Aerial photo of Te Aro, Wellington with design highlighted. Author

Fig 1.3 Plimmer House Restaurant. 1974. Alexander Turnbull Library.

Fig 1.4 Site location in Te Aro, Wellington. Author

Fig 1.5 Courtyard public park. Author

Fig 1.6 High-rise of Homes. Site Inc<<http://www.siteenviroidesign.com/content/high-rise-homes>>

Fig 1.7 New Zealand’s population live in Urban Centres. 2013. World bank data

Fig 1.8 Wellington population and dwelling growth graphs. Wellington Urban Growth Plan 20

Fig 1.9 Low, medium and high rise as interpreted for this thesis. Author

Fig 2.1 The Holmes family outside their home in NaeNae. 1945. Alexander Turnbull library.

Fig 2.2 House and children at 13 Patrick Street, Petone. Alexander Turnbull Library.

Fig 2.3 Comparison of average New Zealand House and plot size. Author

Fig 2.4 Key features of the original New Zealand Dream. Author

Fig 2.5 Key features of the New Zealand suburban house. Author

Fig 2.6 Diagram of changing family demographics. Author

Fig 2.7 Key characteristics of successful High-density housing. Author

Fig 3.1 Pictograms of qualities analysed across case studies. Adapted from Ring.

Fig 3.2 E3 Exterior. ‘Selfmade City’ Ring 98

Fig 3.3 E3 site plan and floor plan. ‘Selfmade city’ Ring 99

Fig 3.4 E3 analysis diagrams. Author

Fig 3.5 Ze05. Simon Menges. ‘Selfmade City’ Ring 102

Fig 3.6 Zelterstrasse 5 site plan and floor plan. ‘Selfmade city’ Ring 104-105

Fig 3.7 Zelterstrasse 5 green spaces. ‘Selfmade city’ Ring 103

Fig 3.8 Oderberger Strasse 56. Jan Bitter <<https://www.bundesstiftung-baukultur.de/en/examples/oderberger-strasse-56-berlin>>

Fig 3.9 Oderberger Strasse 56 site plans and floor plans. Zoller 286-289

Fig 3.10 Floor plan, location and isometric drawing of an apartment. ‘Selfmade city’ 86

Fig 3.11 Overview garden facade. Sander <<http://architizer.com/projects/lootsbuurt/media/1542159/>>

Fig 3.12 Lootsbuurt analysis diagrams. Author

Fig 3.13 Lootsbuurt floor plans. Wietzorrek 58-61

Fig 3.14 Borneo Sporenburg. West 8 Urban Architekten. <http://www.west8.nl/projects/borneo_

sporenburg/>

Fig 3.15 Borneo Sporenburg Site plan and floor plans, Borneo prototype(chandler 82)

Fig 3.16 Borneo Sporenburg analysis diagrams. Author

Fig 3.17 MVRDV's Silodam in Amsterdam. Flickr CC User pnwbot <http://images.adsttc.com/media/images/53ee/9bac/c07a/8038/8e00/0359/large_jpg/Silodam_pnwbot_from_Flickr.jpg?1408146332 >

Fig 3.19 Silodam site plans and floor plans. Wietzorrek 98-103

Fig 3.18 Silodam analysis diagrams. Author

Fig 3.20The Commons. Andrew Wuttke <<http://www.breathe.com.au/the-commons-1/>>

Fig 3.21 The Commons, site plan and floor plans. Ward 88

Fig 3.22 The Commons analysis diagrams. Author

Fig 3.23 Heller Street Park and Residences. Patrick Rodriguez

Fig 3.24 Heller Street site plan and floor plans. Horrocks 64

Fig 3.25 Heller Street Park analysis diagrams. Author

Fig 3.26 Social organisation of E3, The commons and Lootsbuurt. Adapted from Ring 87

Fig 4.1 Wellington Aerial Imagery showing boundaries of inner city suburbs. Author

Fig 4.2 Te Aro amenities diagram used in selection of site. Author

Fig 4.3 Site location in Te Aro. Site Bounded by Vivian, Bute and Garrett Street. Author

Fig 4.4 Initial site analysis. Author

Fig 4.5 Wellington City existing density, natural and artificial borders. Author

Fig 4.6 Photograph of site from Vivian Street. Author

Fig 4.7 Photos from the site. Author

Fig 4.8 Site plan. Author

Fig 4.9 Sun studies of site. Author

Fig 4.10 Surrounding green and public-focused spaces in Te Aro, Wellington. Author

Fig 5.1 Comparative Study of precedents showing scale and density relative to the site. Author

Fig 5.2 Density comparison diagram between Singapore and Paris. Author

Fig 6.1 Forms of dwelling access. Leupen 171

Fig 6.2 Ground floor massing diagrams. Author

Fig 6.3 Massing of buildings surrounding the site. Author

Fig 6.4 Massing experiments for site considering sun, wind and outdoor spaces. Author

Fig 6.5 Massing experiments for site considering sun, wind and outdoor spaces. Author

Fig 6.6 Massing drawings showing potential site organisations. Author

Fig 6.7 Spatial Organisation of the dwelling. Bernard Leupen 90

Fig 6.8 Unit spatial organisation according to zoning typologies. Author

Fig 6.9 Selected cell variations as four combined units. Author

Fig 6.10 Selected cell variations as four combined units- orthographic projections. Author

Fig 6.11 Selected layer variations as two combined cells. Author

Fig 6.12 Selected Housing Layers orthographic perspectives. Author

Fig 6.13 The 'Outdoor spaces' in a high-density environment. Author

Fig 6.14 Analysis of 'Outdoor Spaces' in a high density environment. Author

Fig 6.15 Spatial organisation diagram showing how the 'deck' and 'backyard' spaces. Author

Fig 6.16 Diagram showing stacking of layers and failure of methodology. Author

Fig 7.1 Aerial view of surrounding public focused environments. Author

Fig 7.2 Garrett Street infill site as entrance building to complex. Author

Fig 7.3 Site showing location of Garrett Street building. Author

Fig 7.4 Garrett Street Building using existing methodology. Author

Fig 7.5 Diagram showing staggering of units to create circulation and outdoor spaces. Author

Fig 7.6 Variations of 'Floor Plans Series 1'. Scale 1:300. Author

Fig 7.7 Floor plan series 1, used in Garrett street building, scale 1:200. Author

Fig 7.8 Garrett Street external spaces, circulation, private/communal space. Author

Fig 7.9 Views of Garrett Street building (development phase). Author

Fig 7.10 Final Floor Plan Series 1 and 2. Author

Fig 7.11 Development of Public space diagram. Author

Fig 7.12 Application of developed methodology to site. Author

Fig 8.1 Number of floors of surrounding buildings. Author

Fig 8.2 Building heights surrounding the site. Author

Fig 8.3 Establishment of building heights diagrams. Author

Fig 8.4 Courtyard public park, 'eyes-on-street'. Author

Fig 8.6 Second public park 'eyes-on-street'. Author

Fig 8.7 Section 'eyes-on-street'. Author

Fig 8.8 Seeing- A matter of distance. Jan Gehl

Fig 8.9 Ground floor Casba showing public thoroughfare. Author

Fig 8.10 Casba Northern Facade. Brett Boardman <<http://architectureau.com/articles/casba/>>

Fig 8.11 Casba Interior Courtyard. Brett Boardman < http://sjb.efront-flare.com.au/cms_images/42_27-09-2015_7893.jpg>

Fig 8.12 Pedestrian connections through site. Author

Fig 8.13 Pedestrian connections through site in context. Author

Fig 8.14 Vehicle organisation of Zelterstrasse houses. Zoller 218-219

Fig 8.15 Vehicle organisation of Heller street residences.

Fig 8.16 Section of vehicle organisation 1:200. Author

Fig 8.17 Partial plan of vehicle organisation 1:200. Author

Fig 9.1 Bute and Vivian St corner showing main entrance. Author

Fig 9.2 Main entrance to interior Public park. Author

Fig 9.3 Public internal park with access to commercial spaces (day). Author

Fig 9.4 Public internal park with access to commercial spaces (night). Author

Fig 9.5 Garrett Street elevation 1:200

Fig 9.6 Garrett Street building entrance way. Author

Fig 9.7 Unit type A interior living spaces. Author

Fig 9.8 Unit type B interior living spaces. Author

Fig 9.9 Garrett Street Building Roof Garden. Author

Fig 9.10 Garrett Street Building Balcony. Author

Fig 9.11 Shared balcony Vivian St Building. Author

Fig 9.12 Unit type C interior living spaces. Author

Fig 9.13 Vivian Street Elevation in context 1:300. Author

Fig 9.14 Vivian Street building entrance way. Author

Fig 9.15 View of complex along Bute Street. Author

Fig 9.16 'Backyard' spaces in Garrett Street Building. Author

Fig 9.17 Final unit plan. Author

Fig 9.18 Ground floor Plan. Author

Fig 9.19 First floor Plan. Author

Fig 9.20 Second floor Plan. Author

Fig 9.21 Third floor Plan. Author

Fig 9.22 Fourth floor Plan. Author

Fig 9.23 Fifth floor Plan. Author

Fig 9.24 Sixth floor Plan. Author